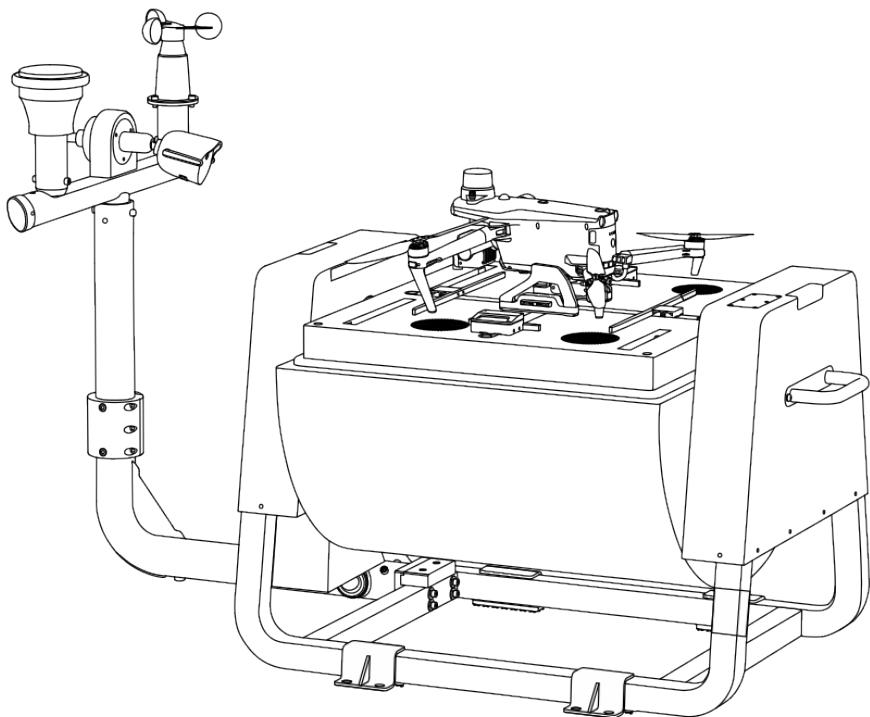


# EVO Nest Kit

## User Manual

V1.0.1 2024.11



**AUTEL**  
ROBOTICS

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## Reading Assistance

- This manual is an electronic PDF document that supports high-resolution printing. If you are using a PDF reader such as Adobe Reader to read this manual, press Ctrl+F on Windows or Command+F on Mac to search for keywords.
- View the content structure in the table of contents and click on titles to navigate to the respective pages.

## Legend

The following symbols are used in this manual to draw the user's attention to important safety and operating information. Please be sure to follow the notes or requirements under each symbol, otherwise, it may affect the safety features of the product or cause personal injury.

Symbol	Definition
	Warning: Alerts to a potentially hazardous situation.
	Important: Reminds the user to pay attention to a point.
	Remarks: Supplementary information.
	Tips: Quick tips to get the best possible experience.

Thank you for purchasing and using the EVO Nest Kit (hereinafter referred to as "Nest") from Autel Robotics. Relevant user documents for this product are provided in electronic or paper form along with the product, and download links are provided in this manual. Before using this product, please carefully read the operation steps and precautions in this manual, so that you can quickly understand the characteristics and usage methods of this product, so as to ensure safe use of the product.



- The final interpretation right of this document and all related documents of this product belongs to Autel Robotics.
- This document is subject to update without notice.

## Term and Acronym

To facilitate reading, the following table displays terms and acronyms that may be used in the manual:

- Autel Robotics: Autel Robotics Co., Ltd.
- Aircraft: EVO Max Series Multi-rotor Drone.
- Battery: ABX40 Smart Battery For Nest.
- Remote Controller (RC): Autel Smart Controller V3.
- Flight Application: Autel Enterprise (Installed on the Remote Controller before leaving the factory)
- AICS: Autel Integrated Command System
- UAS: Unmanned Aircraft System
- Autel Enterprise: Unmanned Aerial Vehicle
- C2: Command and Control
- Remote Identification System:
  - In EU, it is referred to as Direct Remote Identification
  - In other countries or regions except EU, it is referred to as Remote ID.
- DRI: Direct Remote Identification
- UGZ: UAS Geographical Zones
- IMU: Inertia Measurement Unit

## Read Before Your First Flight

To ensure safe use of the EVO Max series multi-rotor drone, Autel Robotics provides you with the following documents and relevant tutorial videos. Please scan the QR codes in this manual or use the provided links to access them.

1. "Packing List": A list of everything that should be included in the packing box.
2. "Safety Operation Guidelines": Instructions on how to operate the product safely.
3. "Site Selection Survey Report": Standard about how to choose a site for nest deployment.
4. "Construction Guidelines": Requirements on nest construction.
5. "Quick Installation Guide": Instructions on how to quickly install the nest.
6. "User Manual": A guide for you to master the operation method of the product proficiently.
7. "Maintenance Manual": Instructions on how to maintain the nest and its accessories.

It is recommended that users first read the "Site Selection Survey Report" and the "Construction Guidelines" to understand the relevant survey standards in the early stage of the nest site selection and the relevant construction specifications and requirements in the construction stage, such as the nest site selection criteria, power supply and network configuration, lightning protection grounding facilities specifications, and aircraft alternate landing points.

After the completion of the preliminary site selection and infrastructure construction, before entering the site to deploy the nest, read the "Quick Installation Guide" to understand the nest installation and deployment process, so that the nest can be quickly installed and configured on the deployment site.

Before officially using it, read the "User Manual" to understand the relevant functional characteristics and product details of the machine nest suite.

Before officially using it, read the "Safety Guidelines" to understand the important safety matters and ensure flight safety.

## Getting Tutorial videos, User Documents, and Relevant Software

You can scan the QR codes below or visit the following links to access tutorial videos and user documents or download relevant software for the EVO Max series multi-rotor drone:

To watch tutorial videos, please visit:

<https://www.autelrobotics.com/videos/nest/>.



To download resources, please visit:

<https://manuals.autelrobotics.com/?dir=/EVO%20Nest/Suite/>.



## Manual Guide

This manual contains 7 main chapters and 1 appendix. You can refer to the corresponding chapters for the desired information.

Chapter	Chapter Overview
Product Overview	This chapter introduces the main features of the Nest kit product and relevant accessories.
Flight Safety	This chapter introduces the flight safety requirements that the nest unattended operation system needs to comply with.
Nest	This chapter introduces the function and usage of each nest component.
Aircraft	This chapter introduces the functions and usage of various components of the aircraft.
Nest Configuration	This chapter introduces how to configure and debug the nest by using the nest application.
Autel Integrated Command System	This chapter introduces how to achieve automatic operation of the nest unattended operation system in the AICS.

Updates and Troubleshooting	This chapter introduces how to perform firmware updates and troubleshoot for the nest kit product.
Appendix A	This chapter provides technical specifications for the Nest kit product.

## Disclaimer

To ensure the safe and successful operation of this product, please read and fully understand all user documents listed above and strictly follow the operating instructions and steps described in this manual. Store the aircraft and its accessories out of the reach of children and pets. If you do not abide by the Safety Operation Guidelines, Autel Robotics shall not be responsible for any product damage or personal and property loss during use, and shall not provide any warranty service. Never modify the product using any incompatible component or in any way that does not conform to the official instructions of Autel Robotics. Otherwise Autel Robotics will not be responsible for any product damage or personal and property loss caused by such behaviors. Please make sure that the operations you perform do not endanger the personal or property safety of yourself or those around you. By starting to use this product, you agree that you have read, understood, and accepted all terms related to this product. You undertake to be responsible for your own actions and all consequences arising therefrom. You undertake to use this product only for legitimate purposes and agree to these terms and any relevant policies or guidelines that Autel Robotics may establish.

### Important

- When unboxing the product for the first time, carefully check the aircraft and other accessories included in the packing box according to the "Packing List".
- The content of this manual will be updated from time to time based on the function updates of the product. Please be aware that Autel Robotics will not be responsible for any product damage or personal and property loss caused by usage of outdated user documentation. Every time before product update, please ensure the user documentation is the latest version.
- Please be aware that in the absence of flight logs, Autel Robotics may not be able to analyze the causes of product damage or accidents and provide after-sales service.

### Warning

- Using the aircraft involves certain safety risks. Do not allow minors to operate the aircraft.
- Do not use this product in places that children tend to stay.
- Before using this product, please obtain corresponding flight certificate according to the laws and regulations in the corresponding countries or regions in advance.
- Only users who have mastered the usage method can be allowed to conduct operations and daily maintenance on the aircraft and its relevant accessories.

## End Use Statement

This product may be subject to export control laws in China, U.S, EU or other countries, which can only be authorized for civil (not military) use in sale, export or domestic transfer. Users

need to confirm the product will not be used in the following situations, otherwise he or she will assume all losses caused by usage in such situations and legal responsibility on their own:

1. any military end use;
2. used for nuclear weapons, biological or chemical weapons or missiles that carry those weapons;
3. export or re-export or transfer it to any entity or person sanctioned by China, U.S, EU or any other government with jurisdiction;
4. export, re-export or transfer it to Cuba, Iran, North Korea, Syria, Crimea, Sevastopol and other areas under embargo;
5. any device or equipment that supports monitoring purpose.

## **Warranty Policy**

Autel Robotics guarantees users who purchase products through its official authorized channels that:

- Under normal use, the Autel Robotics products you purchase will be free from material and workmanship defects during the warranty period.
- If you can provide a valid purchase receipt, the warranty period of this product is calculated from the midnight of the next day after you receive the product.
- If you cannot provide a valid purchase receipt, the warranty start date will be postponed by 90 days from the date of manufacture indicated by the product's serial number or as defined by Autel Robotics.



**Tip**

- For the after-sales policy of the product, please visit:  
<https://www.autelrobotics.com/service/policy/>.

## **After-Sales Support**

If you have any questions or concerns about our products, please contact Autel Robotics customer support:

Hotline: (844) MY AUTEL or (844) 692-88 35

## **Maintenance Service**

If your equipment needs to be inspected or repaired, please contact Autel Robotics through the following methods:

- Email [after-sale@autelrobotics.com](mailto:after-sale@autelrobotics.com) or [support@autelrobotics.com](mailto:support@autelrobotics.com).
- Call Autel Robotics customer support at (844) MY AUTEL or (844) 692-88 35.
- Contact dealers authorized by Autel Robotics.



**Important**

- All data stored on the product may be erased during the repair process. To avoid data loss, please back up important files in your aircraft or remote controller before the product is under warranty.

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# Chapter 1 Product Overview

## 1.1 Introduction

EVO Nest (hereinafter referred to as the “nest”) is a fully automatic unattended operation platform for EVO Max Series Aircrafts. The nest is about 70 kilograms and occupies less than 1 square meters with operation radius of 7 kilometers. The nest is integrated with surveillance camera, mechanic wind speed sensor, rainfall sensor, temperature and humidity sensor, communication antenna, UPS power and TEC air conditioner, enabling quick installation and deployment. It adopts a roller shutter door design that offers strong environmental adaptability, with an IP55 protection rating (referring to IEC 60529 standards), allowing it to operate continuously and stably even in harsh climates. The built-in TEC air conditioner provides a suitable environment for long-term storage of the aircraft and enables rapid cooling of the smart battery during operation, significantly improving continuous operation efficiency. By using Autel Integrated Command System (AICS), automatic operation of the nest can be achieved in the cloud.

The EVO Max Series multi-rotor drone (hereinafter referred to as “the aircraft”) is equipped with an industry-leading high-performance processing chip, has powerful autonomous flight and mesh network mission capabilities, is integrated with a visual obstacle avoidance sensing system and a millimeter-wave radar sensing system, and has an omnidirectional obstacle avoidance system. With an excellent power management system, the aircraft can reach a flight time of up to 32 minutes. Also, it utilizes a three-axis stabilized gimbal.

The EVO Max Series multi-rotor drone adopts a foldable arm design and can hold its propellers for easy storage and transportation. The aircraft is equipped with a PSDK interface, and can be installed with RTK module, achieving high precision GNSS positioning; it also allows you to add different industry-specific mounts on the aircraft to meet various operational needs. At its top, the aircraft is equipped with a high-intensity strobe for indicating the aircraft's position in the air, while at its bottom, it has auxiliary lights to improve visual positioning performance in weak light conditions, thus enhancing flight safety during landing.

AICS is a comprehensive aircraft management and control platform accessed through web page. The platform features user management, asset management, route planning, mission management, results management and situation sensing. Using the platform, the backend personnel can achieve remote cluster scheduling and visual management on devices in the front end; AICS can also support storing and managing flight data, which is easy for querying and calling in later stage.

### Tip

- The protection level of the nest is not permanent and may experience varying degrees of failure as components age and wear. Regular maintenance of the aircraft is required according to requirements in “Maintenance Manual”.
- The nest kit includes EVO Max 4T XE Aircraft, and users can also choose EVO Max 4N Aircraft in combination use with the nest.
- The flight time of the aircraft is measured in a laboratory environment (the aircraft is equipped with a RTK module, a charging stand and ABX40 smart battery and flies at a constant speed of 10 meters per second in a light breeze environment) and is for

reference only. The actual flight time may vary depending on factors such as environmental conditions and flight mode.

- When the aircraft is not equipped with a RTK module and a charging stand, the flight time reach 42 minutes.
- AICS adopts public network visiting form, and also provides designated network deployment solution.

## 1.2 Optional Components

Users can choose any of the following optional components to improve the nest operation experience and thereby meet requirements in different operation environment.

### Tip

- The nest kit product has already met the basic operation requirements. Users can, based on their needs and environment in the actual operation region, purchase relevant components.

### 1.2.1 Remote Controller

Users can, based on their needs, purchase Autel Smart Controller V3 (hereinafter referred to as "RC") retail kit to control the aircraft in flight. When the nest is being deployed, the RC can be used to connect the nest for relevant configuration and local debugging; in the process of automatic flight, the RC can be used to manually take over the control of the aircraft for flight.

### Tip

- It is recommended that users should prepare at least 1 RC to facilitate the nest deployment experience and ensure the automatic test safety of the aircraft.
- For details about how to use the RC, please refer to "Autel Smart Controller V3 User Manual".

### 1.2.2 4G Dongle Module

Users can, based on their needs, can contact Autel Robotics to purchase 4G Dongle module, providing the capability to access 4G wireless network for the corresponding device.

After a 4G Dongle module is installed in the nest, when there is a wired network and a 4G wireless network simultaneously, the 4G wireless network will serve as a backup for the wired network; when the wired network is disconnected, the nest can automatically switch to the 4G wireless network to ensure its normal operation. In operation sites where it is not convenient to deploy a wired network, users can also use the 4G Dongle module to achieve normal network access of the nest.

After the 4G Dongle module is installed in the EVO Max Series Aircraft, it can provide the aircraft with remote flight control capabilities and achieve enhanced image transmission and network RTK service access, easily dealing with various complex environments and making

flights safer and more stable.



### Tip

- The nest supports 4G Dongle modules with USB-A interface, and the aircraft supports 4G Dongle modules with USB-C interface.
- 4G wireless network connection services may not be available in some countries and regions. Please consult your local operator before purchasing a 4G Dongle module to obtain relevant information.
- Users should consult and handle the data traffic package service required for the 4G Dongle module with the local operator on their own. Autel Robotics does not provide related SIM card services.

## 1.3 Feature Highlight

- **Automatic Operation:** EVO Nest has strong environment adaptability. In combination use of EVO Max Series Aircraft, the nest can achieve full operation procedures, includes automatic takeoff, autonomous flight, return and precise landing, parking and automatic charging, so as to unleash manpower and achieve unattended operation.
- **Precise Flight:** EVO Nest features built-in high precision RTK module with precision accuracy of down to centimeter. In combination use of EVO Max Series Aircrafts, the nest can enable the precise flight and landing of the aircraft in the route.
- **Cloud Management:** As AICS provides device management and mission planning for the nest, users can, according to operation requirements, conduct route planning and mission sending, and aircrafts will automatically take off and operate, and the operation results will automatically be encrypted and uploaded to AICS. In operation process, users can check the nest and the aircraft live screens remotely and monitor the operation site in real time, and can also check the nest and the aircraft operation status and conduct remote debugging, so as to achieve greater efficiency management.

## 1.4 Automatic Operation Procedures

Operation procedures in AICS and nest automatic operation procedures, provided by Autel Robotics, are as follows:

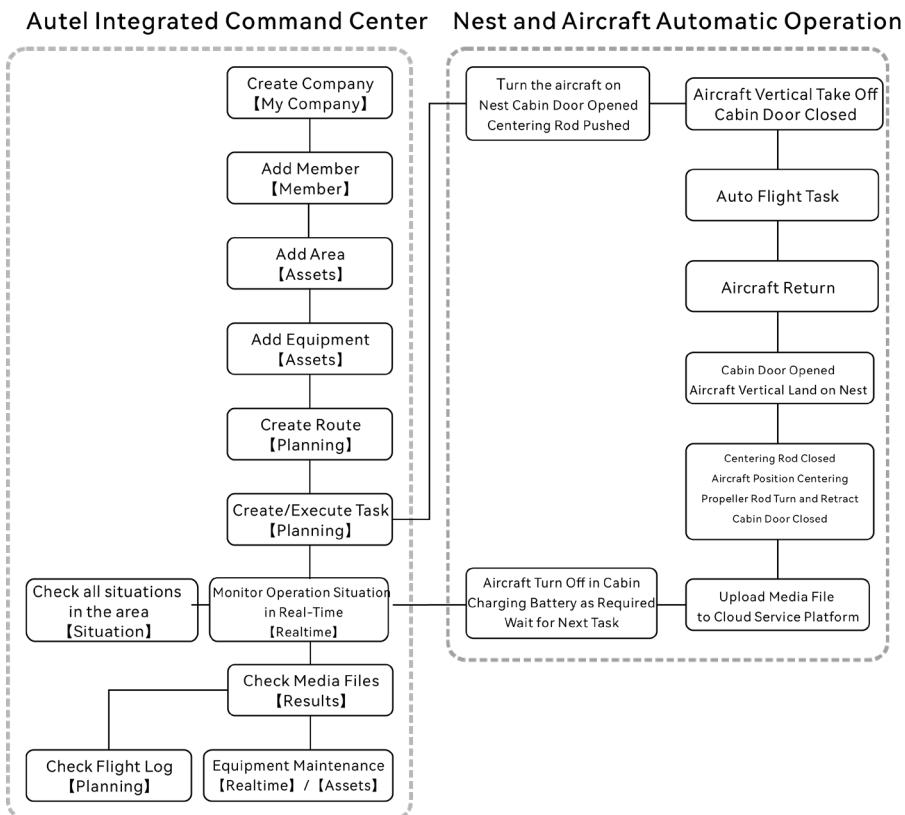


Fig 1-1 Automatic Operation Procedures Map



- For how to use AICS provided by Autel Robotics, please read "[Chapter 6 Autel Integrated Command System](#)", to learn more function details.

## 1.5 Product Acceptance Checklist

A nest kit comprises the nest main body packaging box, weather monitoring pole packaging box, aircraft packaging box, battery packaging box, and RC packaging box (optional).

After unboxing the product, please check whether the actual items match the items described in the following packing list and carefully inspect the appearance of the nest, the aircraft and all accessories. If anything missing or damage is found, please contact Autel Robotics.



- Upon receiving the product, please check and confirm that the packaging box is intact without any signs of secondary opening. Meanwhile, please keep the unpacking video for convenient compensation in case of damage during logistics transportation.

Table 1-1 Packing List

No	Item	Quantity	Unit	Package	Remark
1	Nesting main body	1	Set	Included	

2	Triangle key	1	Pc	Included	The key to nest power distribution cabinet.
3	"Packing List"	1	Pc	Included	
4	"Safety Overview"	1	Pc	Included	
5	"Quick Installation Guide"	1	Pc	Included	
6	Product Certification	1	Pc	Included	
7	Weather monitoring pole	1	Set	Included	It comes with a surveillance camera and temperature and humidity sensors, and has four built-in lead wires.
8	Mechanical wind speed sensor	1	Pc	Included	Installed on the weather monitoring pole.
9	Rainfall sensor	1	Pc	Included	Installed on the weather monitoring pole.
10	Pole connection base plate	1	Pc	Included	To fix the pole on the nest support base bracket.
11	Pole reinforcement plate	1	Pc	Included	To fix the pole on the nest support base bracket.
12	Nest Foundation Plate	4	Pc	Included	To fix the nest support base bracket.
13	Expansion Bolts	4	Pc	Included	To fix nest foundation plate. M12×120.
14	Nesting Power Cable	1	Pc	Included	A 2-meter cable, used to connect the nest with mains electricity with water-proof plug on its one side and three-pin plug for temporary debugging on the other side.
15	Repairment Tools	5	Pc	Included	Tools used for nest installation, include S1.5/S2/S3/S5 hex key and an open-end wrench.
16	Nesting Installation Screw Bag	3	Pack	Included	Screws used for nest installation, include M6×12/M6×16/M6×55 screws.

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17	Aircraft	1	Pc	Included	EVO Max 4T XE aircraft, includes Fusion 4T XE gimbal, gimbal protective cover, propeller, 64GB microSD storage card and charging stand.
18	RTK Module	1	Pc	Included	EVO Max series RTK module.
19	Spare Propeller	1	Pair	Included	One CW propeller and one CCW propeller.
20	Smart battery	1	Pc	Included	ABX40 smart battery for nest.
21	USB-A to USB-C data cable	1	Pc	Included	Used to connect RC with the nest when configuring the nest.
22	Autel Smart Controller V3	1	Pc	Optional	RC packaging product. 7.9 inch display with 2 sticks and 2 antennas.
23	Remote Controller charger	1	Pc	Optional	RC packaging product.
24	USB-C to USB-C data cable	1	Pc	Optional	RC packaging product. Used with the RC charger.
25	Spare Stick	2	Pc	Optional	RC packaging product.
26	RC lanyard	1	Pc	Optional	RC packaging product.
27	RC Cover	1	Pc	Optional	RC packaging product, used to protect the RC shell.
28	Nest 4G Dongle module	1	Pc	Optional	Used to connect the nest to 4G wireless network. Autel Robotics does not provide SIM card service.
29	Aircraft 4G Dongle module	1	Pc	Optional	Used to connect the aircraft to 4G wireless network. Autel Robotics does not provide SIM card service.

### 💡 Tip

- Users can purchase items marked as optional on their own, which are not included in the nest kit.
- Some optional items (not necessary) are not mentioned in the list above. If you need to purchase one, please contact Autel Robotics.
- The nest kit does not include battery charger. The aircraft can be only charged through

the nest. If customers have requirement, please contact Autel Robotics to purchase MDX120W battery charger.

## Chapter 2 Flight Safety

When unboxing the product for the first time, please scan the QR code provided in the "Safety Operation Guidelines" to access the latest electronic version of this manual, and then carefully read and understand the contents of this manual, so as to ensure safe and proper use of the aircraft and the nest.

Before operating any actual flight, be sure to first carry out relevant basic flight training (such as watching tutorial videos and receiving guidance from a professional) and be familiar with the functions and characteristics of the aircraft and the remote controller.

Before the flight, please understand all the local laws and regulations regarding civil unmanned aerial vehicles (Autel Enterprises) in advance, and according to the local flight requirements and restrictions, select an appropriate flight environment and set a reasonable flight altitude for legal flights. There may be legal risks when using an aircraft in an unsuitable flight environment.

Before the flight, be sure to read the "Safety Operation Guidelines" to understand all safety precautions.



- For relevant usage description about the RC, please download and read "Autel Smart Controller V3 User Manual".

### 2.1 Legal Use Notice

When unboxing the product for the first time, please comply with your local regulations in accordance with the laws and regulations of the following countries and regions to complete the real-name registration of the aircraft.

#### 2.1.1 Chinese Mainland

- According to the "Regulations on Real-name Registration of Civil Unmanned Aerial Vehicles" issued by the Civil Aviation Administration of China (CAAC), upon purchasing a civil drone, the owner must register the drone on the "Civil Autel Enterprise Comprehensive Management Platform" (<https://uom.caac.gov.cn>) in real name and paste the QR code registration mark on the drone. Those who fail to implement real-name registration and paste registration marks will be punished by the regulatory authorities in accordance with relevant regulations.
- The aircraft is a light unmanned aircraft. Youth under the age of 18 is prohibited from operating this aircraft.
- We recommend that you read the "Interim Regulations on the Management of Unmanned Aircraft Flights" before flying to learn more about the regulations.
- Before flight, users should, in advance, obtain lifting approval document of corresponding flight space from local aviation authority and report flight activities.

### **! Important**

- According to the regulations outlined in the "Civil Unmanned Aerial Vehicle System Safety Requirements" in Chinese mainland, users are required to input their real-name registration number and Remote ID in the flight application after registration. Additionally, users should enable the Civil Aviation Administration's flight dynamic data reporting function. For relevant operations, please enable the setting in the RC.

## 2.1.2 The U.S.

- Before using a drone, the owner of the drone must register the drone on the FAA website (<https://faadronezone-access.faa.gov/#/>) in real name (Registrants must be 13 years of age or older). Failure to register an unmanned aircraft that is required to be registered may result in regulatory and criminal penalties.
- The Federal Aviation Administration (FAA) may assess civil penalties up to \$27,500. Criminal penalties include fines of up to \$250,000 and/or imprisonment for up to three years.

## 2.1.3 Canada

- Drone pilots must be 14 or older and always carry a valid drone pilot certificate while operating their drone. A valid drone pilot certificate is a printed or electronic document issued by Transport Canada. No other form of certification will be accepted. For details about how to get a drone pilot certificate in Canada, refer to the following link: <https://tc.canada.ca/en/aviation/drone-safety/drone-pilot-licensing/getting-drone-pilot-certificate>
- Before flight, please register your drone through the following portal: <https://tc.canada.ca/en/aviation/drone-safety/drone-management-portal>
- The aircraft belongs to the multi-rotor aircraft type. You can only fly them in following operating environments:
  1. In controlled airspace. For details about the controlled airspace, please refer to relevant Canadian law: <https://tc.canada.ca/en/aviation/drone-safety/learn-rules-you-fly-your-drone/choosing-right-drone>
  2. Near people. For details about flying a drone near people, please refer to relevant law: <https://tc.canada.ca/en/aviation/drone-safety/learn-rules-you-fly-your-drone/choosing-right-drone>
- Violation of relevant laws and regulations may incur penalty of up to 3000 dollars (for person) or 15000 dollars (for company) or jail time.

### **⚠ Warning**

- Please do not fly over people, which may cause physical damage to people around.

## 2.1.4 The EU

- Drone operators/owners must register with the National Aviation Authority (NAA) of the Member State in which they reside. (<https://www.easa.europa.eu/drones/NAA>).
- This product is not a toy and should not be used by children under the age of 16.
- In the EU, the aircraft is a drone classified as C2. When using the aircraft, you must comply with the following operational limitations in subcategory A2 in an urban environment:
  1. Must not overfly uninvolved people.
  2. Maintain a horizontal distance of 30 meters from uninvolved people (can be reduced to 5 meters if the low-speed function is activated).
  3. Maintain flight altitude below 120 meters above ground level.
- The aircraft can also fly in subcategory A3.
- Remote pilot should obtain a 'Remote pilot certificate of competency' for A2 'open' subcategory by:
  1. Having a 'Proof of completion for online training' for A1/A3 'open' subcategory.
  2. Conducting and declare a practical self-training.
  3. Passing an additional theoretical exam at the NAA or proctored online.
- Before using this product, click the following link to learn the detailed information on safety operation limitations about EASA Class 2 drones with low speed mode. (<https://www.easa.europa.eu/document-library/general-publications/drones-information-notices>).

### ! Important

- According to the relevant laws and regulations in the EU, the aircraft is equipped with sensors (gimbal cameras) that can detect personal data. Users are required to register in compliance with the laws and regulations when using the aircraft.
- After registration, please enter Remote ID in the flight application and enable remote identification function before flight.

## 2.1.5 Other Countries and Regions

Before flight, consult local legal professionals or aviation authorities to learn about local laws, regulations, and policies regarding civil Autel Enterprises and follow relevant guidelines for legal registration.

## 2.2 Flight Operation Guidelines

Before flight, be sure to understand and adhere to the following flight operation guidelines to avoid serious consequences and legal violations:

- Aircraft pilot should hold the operation certification that is certified by the Autel Robotics or authority. Do not operate the aircraft while under the influence of alcohol, drugs, medication, dizziness, fatigue, or nausea, or in any other poor physical or mental conditions.

- Do not fly near manned aircraft, and make sure that the aircraft does not interfere with large manned aircraft in the same flight path when flying. Keep vigilant at all times and avoid other aircraft. Land immediately if necessary.
- Do not fly in areas prohibited by local regulations without authorization. The prohibited areas may include airports, borders, major cities, densely populated areas, large event sites, emergencies (e.g., forest fires), and sensitive building facilities (e.g., nuclear power plants, power stations, transformer stations, prisons, traffic arteries, government buildings, and military facilities).
- Do not use the aircraft at large event sites, including but not limited to sports arenas and concerts.
- Do not fly in airspace above the altitude limit specified in regulations.
- Do not use the aircraft to carry any illegal or hazardous goods.
- Be aware of the flight activity category (e.g., recreational, official, or commercial). Before flying, be sure to obtain the necessary permits from relevant authorities. If necessary, consult local legal professionals for a detailed explanation of flight activity categories.
- When using the aircraft for filming or photography, respect the privacy rights of others. Do not use the aircraft for unauthorized surveillance activities, including but not limited to monitoring individuals, groups, events, performances, exhibitions, or buildings.
- Note that using cameras to film or photograph individuals, groups, events, performances, exhibitions, or buildings without authorization may infringe upon copyrights, privacy rights, or other legal rights of others. Therefore, it is essential to familiarize yourself with and comply with local laws and regulations before using the aircraft.

## 2.3 Flight Environment Requirements

- Do not fly in severe weather conditions such as strong winds, snow, rain, heavy fog, dust storms, extreme cold, or extreme heat. The aircraft has a maximum wind resistance of 12 meters per second during take-off and landing.
- Please use the aircraft and the nest in the prescribed ambient temperature range. The working ambient temperature of the nest is -30°C~+50°C, and the working ambient temperature of the drone is -20°C~+50°C. When flying in low temperature environments, it is necessary to check the real-time monitoring of the nest site through the AICS to see if there is snow and ice on the surface of the cabin door, snow on the body of the aircraft, and ice on the surface of the propellers.
- Make sure that the aircraft takes off from and lands on open, unblocked, and flat ground, away from crowds, nearby buildings, trees, etc., and within a visual line of sight for flight safety, so as to ensure flight safety.
- When flying, please stay away from water surfaces, snow, glass curtain walls, and other mirrored reflective areas, otherwise it will affect the visual obstacle avoidance perception system of the drone and may cause flight safety accidents.
- Please fly the aircraft in regions at an altitude below 3100 meters.
- Due to insufficient lighting conditions, no GNSS signal, and narrow space, some functions of the aircraft may be limited. Always pay attention to the surrounding environment of the aircraft and maintain control of the aircraft at all times.
- When flying at night, turn on the strobe and make sure that the Aux Light is enabled during landing for flight safety.

- Keep the aircraft away from steel structures, iron ore mines, etc., to avoid interfering with the compass of the aircraft.
- Do not use the aircraft in environments with inflammable and explosive substances.
- Before starting a flight, make sure that a landing point has been set up within 5-50 meters of the nest. If the aircraft cannot land in the nest, it will land at the alternate landing point. When deploying the nest, follow the guidance of the built-in application to set up the alternate landing point. The alternate landing point area needs to be marked clearly, and make sure that no debris is within 1 meter of the radius of the alternate landing point.

## 2.4 Wireless Communication Requirements

- Keep the aircraft at least 200 meters away from areas with strong electromagnetic interference, such as radar stations, microwave stations, and mobile communication base stations.
- Keep the aircraft at least 2000 meters away from drone interference equipment. Otherwise, the drone interference equipment and the aircraft cannot work at the same time.
- When flying near sources of electromagnetic interference, exercise caution and continuously observe and assess the stability of image transmission signals and videos of the remote controller. Common sources of electromagnetic interference include but are not limited to high-voltage power lines, high-voltage substations, mobile communication base stations, and television broadcasting signal towers. If the aircraft encounters significant signal interference when flying near these locations, it may not be able to work normally. In this case, please return to the home point for landing as soon as possible.
- Fly in open, unblocked areas or highlands. Tall mountains, rocks, urban buildings, and forests may block the GNSS signal and image transmission signal of the aircraft.
- It is recommended to turn off unnecessary Wi-Fi and Bluetooth devices in the vicinity to avoid interference with the signals of the remote controller.

## 2.5 Declaration of Maximum Take-off Mass

During flight operations, make sure that the actual take-off mass of the aircraft does not exceed the maximum take-off mass (MTOM) declared for the aircraft. Exceeding this limit can lead to safety accidents. For detailed data, see Appendix A “[A.2 Aircraft](#)”.

The actual take-off mass of the aircraft consists of the aircraft's mass and the mount mass. Before adding any mount, make sure that the mount mass is within a reasonable range.

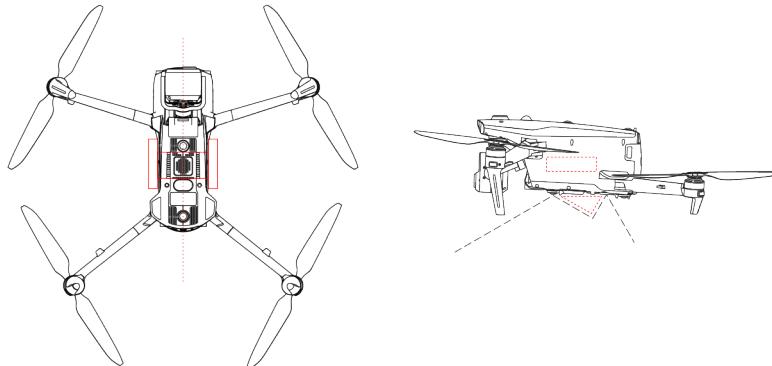


### Note

- The aircraft's mass comprises the mass of fuselage, gimbal camera, propellers, and smart battery. Different models of gimbal cameras may differ in mass. If you change the gimbal camera with one of different model, re-weigh the aircraft to determine its mass.
- Mounts consist of functional module mounts and physical mounts. When adding mounts to the aircraft, always re-weigh the actual take-off mass of the aircraft.
- The mount mass should satisfy: Maximum Mount Mass  $\leq$  MTOM – Aircraft's Mass.

### ■ Gravity Center Limitation

When users are mounting payload to the aircraft before flight, the payload should be installed in limited position in order to not affect the obstacle avoidance sensing function and flight stability of the aircraft. In other words, payload should be installed within the gravity center range, and the payload installed should not cover the lens group of visual obstacle avoidance at the bottom of the aircraft and downward millimeter-wave radar. The suggested mounted location is as follows:



**Fig 2-1 Mount gravity center and non-interference zone (circled by red line)**

#### Note

- When installing a function module to the aircraft, please choose a function module that has passed Autel Robotics safety and compatibility test as this kind of product has already passed flight safety test.
- When users are mounting payload, please ensure that the mounting point should be located at the center line of the aircraft and should not be beyond the area bracketed in the left picture in fig 2-1. Meanwhile, the size of the mounted payload, as circled in the right picture in fig 2-2, should not be too big to go beyond the non-interference zone.
- When users are mounting payload at the side of the aircraft, it is recommended that the payload mounted on the one side should weight no more than 100 g as the payload of more than 100 g (and less than 200 g) mounted may affect the braking performance of the aircraft to some degree,

## 2.6 Flight Restrictions and Unlocking Restricted Zones

#### Important

- Before flying, always carefully plan out the airspace in which you intend to fly in accordance with local laws and regulations. Do not operate the aircraft in the restricted airspace without permission.

### 2.6.1 Geofencing System

Autel Robotics has developed a geofencing system for its aircrafts to ensure safe and legal flights. This system can provide real-time updates on airspace restriction information worldwide. In different restricted zones, the flight functions of the aircraft are subject to varying degrees of restrictions. The geofencing system also supports the function of unlocking restricted zones. If you need to perform a flight mission in a specific restricted zone, you can contact Autel Robotics to lift the aircraft within valid authorization period after obtaining legal authorization for unlocking the restricted zone.

The geofencing system does not completely align with local laws and regulations. Before each flight, you should consult and understand local laws, regulations, and regulatory requirements to ensure flight safety.

The flight control system of the aircraft is pre-configured with the geofencing system. Before each flight, make sure that the remote controller can connect to the Internet to automatically update airspace restriction information and synchronously upload it to the aircraft. During the flight, relevant airspace restriction information will be synchronously displayed in the flight application to ensure the safe and legal flight of the aircraft.



#### Tip

- Due to information lag, the airspace restriction information provided by the geofencing system may not always be completely consistent with the latest local laws and regulations. All information is subject to local laws and regulations.
- For temporary airspace restrictions, Autel Robotics can obtain the relevant regulatory announcements in a timely manner and synchronously upload the relevant airspace restriction information to the geofencing system. When you take flight actions in relevant zones, be sure to synchronize and update flight airspace restriction information.



#### Warning

- Please note that when GNSS signal is lost (the aircraft is in visual positioning mode or ATTI mode), the geofencing system may not function, and relevant flight restriction functions will not take effect normally.

### 2.6.2 Restricted Zones

The geofencing system divides airspace restrictions into four categories: no-fly zones, restricted altitude zones, warning zones, and unlocked zones. The flight application will provide different prompts based on the specific zone.

**Table 2-1 Flight Restrictions of Restricted Zones**

Restricted Zones	Flight Restriction Description
No-Fly Zones (appear in red on the map)	<p>No-fly zones are divided into permanent no-fly zones and temporary no-fly zones.</p> <ul style="list-style-type: none"> <li>● Permanent no-fly zones: The zones are pre-configured in</li> </ul>

	<p>the geofencing system at the factory and are regularly updated.</p> <ul style="list-style-type: none"> <li>● <b>Temporary no-fly zones:</b> The zones are added by Autel Robotics in the geofencing system backend.</li> </ul> <p><b>Update method:</b> After the remote controller is connected to the Internet, it will automatically retrieve update information related to no-fly zones and push it to the aircraft.</p> <p><b>Flight restrictions:</b> Aircraft cannot take off or fly in no-fly zones. If you obtain authorization from relevant authorities to fly in a no-fly zone, contact Autel Robotics to request for unlocking the aircraft.</p>
Restricted Altitude Zones (appear in grey on the map)	<p>Autel Robotics only provides access to set altitude restrictions, allowing users to set the altitude limit accordingly.</p> <p><b>Update process:</b> Users enable height restrictions and set the altitude limit within the flight application, based on the local legal regulations of the country and region. For detailed information, see "Autel Smart Controller V3 User Manual" and "<a href="#">2.7 Altitude and Distance Limits</a>" in Chapter 2.</p> <p><b>Flight restrictions:</b> When an aircraft is flying in a restricted altitude zone, the actual flight altitude of the aircraft will not exceed the set altitude limit.</p>
Warning Zones (appear in yellow on the map)	<p>Warning zones are pre-configured in the geofencing system at the factory and are regularly updated.</p> <p><b>Update method:</b> After the remote controller is connected to the Internet, it will automatically retrieve update information related to warning zones and push it to the aircraft.</p> <p><b>Flight restrictions:</b> In a warning zone, an aircraft can fly unrestrictedly (relevant flights must comply with local regulations).</p>

Unlocked Zones  
(appear in blue on the map)

If you unlock a no-fly zone with a valid permit, you can legally fly the aircraft within the validity period in the unlocked zone.

### Tip

- In the flight application, if you tap on a restricted zone on the map, the following geofencing information will be displayed for this zone:
  1. No-fly Zone: zone name, zone level (no-fly zone), region (prefecture-level city), and no-fly time (visible only for temporary no-fly zones).
  2. Restricted altitude zone: zone name, zone level (restricted altitude zone), altitude limit (AGL), and region (prefecture-level city).
  3. Warning zone: zone name, zone level (warning zone), altitude limit (AGL), and region (prefecture-level city).
  4. Unlocked zone: zone name, zone level (unlocked zone), altitude limit (AGL), region

(prefecture-level city), and validity period.

- Currently, AICS does not support restricted zone display function, which will be provided in later version updates.

### Note

- Before any flight, users must fully understand the local regulations regarding altitude restrictions for unmanned aerial vehicles (Autel Enterprises) and set them in the flight application.
- It is important to note that it is not suggested to fly cross regions with different legal altitude restrictions. The altitude limit setting is only effective for the takeoff area, the limit may not comply with regulations in neighboring regions. Users should adjust the corresponding altitude limits when flying across different regions.

An aircraft in flight has a specific initial velocity. To prevent the aircraft from accidentally entering no-fly zones (before unlocking) and warning zones, a buffer zone with a horizontal distance of 200-meter and a vertical distance of 50-meter is set beyond the boundaries of these zones in the geofencing system.

**Table 2-2 Buffer Zone Details**

Buffer Zone Type	Buffer Zone Details
Buffer zones of no-fly zones	When an aircraft flies from the outside toward a no-fly zone: When the aircraft approaches the buffer zone boundary, the flight application will display a warning alert "The aircraft is close to the no-fly zone." and the drone will automatically start to decelerate and eventually brake and hover within the buffer zone.
Buffer zones of warning zones	When an aircraft flies from the outside toward a warning zone: The aircraft can directly fly into the warning zone without limitation. When the aircraft approaches the warning zone boundary, the flight application will display a warning alert "The aircraft is close to the warning zone." and after entering the warning zone, the App will display "Aircraft enters warning zone" to remind users to be cautious.

### Note

- When there is no GNSS signal, if an aircraft accidentally enters a no-fly zone while the aircraft is still locked from the zone, the aircraft will automatically land upon regaining the GNSS signal. During the landing process, the throttle stick will not work, but the user can control the horizontal movement of the aircraft.
- When an aircraft is hovering in the buffer zone of a no-fly zone, the user can control the aircraft to exit the buffer zone along the normal direction of the boundary.

For flights in an unlocked zone, if an aircraft is in the authorized airspace within validity period specified in the permit, the aircraft can fly normally in the zone. Once the aircraft flies beyond the authorized airspace or reaches the validity period, the aircraft will comply with the airspace restrictions of the current area.

### 2.6.3 UGZ Import

The aircraft supports for importing the UGZ (UAS Geographical Zones) file, users can get the no-fly zone data files of their own country or region, and upload the data to the aircraft's flight control system. When the aircraft approaches relevant airspace during flight, it will execute corresponding responses to ensure flight safety (including warnings and slowdown and other actions).



#### Tip

- The UGZ import supports JSON format. Users can import no-fly zone data files published by local aviation authorities.
- Operation path: Copy the JSON file into the root path of the remote controller. On the map interface of the flight application, tap "⚙️" > "Import Geo-fence" on the right side. Follow the on-screen instructions to complete the operations.

### 2.6.4 Unlocking No-Fly Zones

To apply for unlocking a specific airspace within a no-fly zone, prepare the following information in advance according to your flight plan:

1. Identity and contact information of the applicant.
  2. Unlock permit: a scanned copy or image of the valid permit for the flight application issued by local authorities (local public security bureau, aviation management department, or any other relevant organization/agency).
  3. Unlocked zone: a cylindrical area. It includes the following information:
    - Name of the unlocked zone.
    - Coordinates of the center point of the flight airspace plane (latitude and longitude, with 6 decimal places).
    - Radius of the flight airspace plane (in meters, with 2 decimal places).
    - Flight altitude (in meters, with 2 decimal places).
  4. Unlock date: Enter the unlock date according to the valid permit. The date is recommended to be accurate to day/hour/second.
  5. Aircraft S/N (Serial number): Multiple serial numbers can be applied at once.
  6. Autel account of UAS operator: Multiple accounts can be applied at once.
- Log in to the official website of Autel Robotics at [www.autelrobotics.com/service/noflight/](http://www.autelrobotics.com/service/noflight/), enter the relevant information, and complete the waiver application.
- After the unlocking application is approved, you will obtain an unlock permit. The permit contains the aircraft serial number, UAS operator account, and unlocked zone (including the validity period).

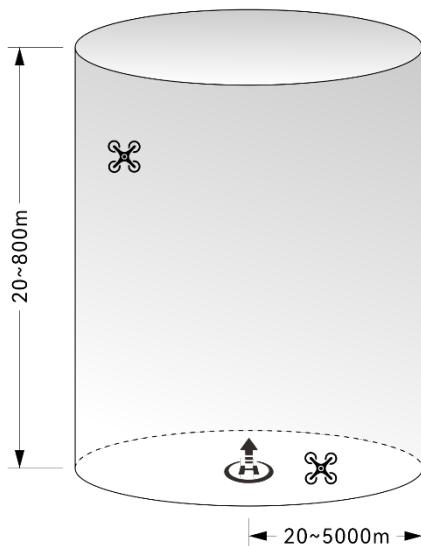
**💡 Tip**

- After the waiver application is submitted, it will be approved within 24 hours, and unlocking will be completed within 48 hours. Please make a reasonable flight plan in advance.

## 2.7 Altitude and Distance Limits

The altitude limit is the maximum flight altitude of the aircraft, while the distance limit is the maximum radius (distance from the take-off point) that the aircraft can fly.

You can set altitude and distance limits in the flight application to ensure the safe flight of the aircraft.



**Fig 2-2 Diagram of altitude and distance limits**

**💡 Tip**

- In the flight application, the altitude limit should be set between 20 meters and 800 meters, and the distance limit should be set between 20 meters and 5000 meters. During actual flights, the maximum altitude limit should be set no greater than the maximum altitude specified by local laws and regulations.
- When setting the maximum altitude limit, consider whether the RTH altitude set is reasonable or not, which should not exceed the maximum altitude limit.
- The RTH altitude should be set higher than the altitude of the tallest obstacle in the flight area.
- When creating new route in AICS, users can set altitude type and flight altitude (setting range is 0-800m, and an alert pops up when the altitude is lower 20 meters), AICS will prompt alert notification according to newly the length of newly created route (the aircraft flight mileage is within 10 kilometers so if the route is longer than 10 kilometers, an alert notification will prompt).

## 2.8 Emergency Stop Propellers During Flight

During flight, if the power motors of the aircraft experience power damage or failure (e.g., damaged or missing propellers and motor failure) that makes the aircraft out of control, users can enable the "Emergency Stop Propellers During Flight" function. At the same time, users need to manipulate the left and right sticks on the remote controller inward or outward to forcibly stop propeller rotation and allow the aircraft to descend freely for an emergency landing. This can reduce the potential damage to property and harm to ground personnel caused by aircraft malfunctions.

In the event of an aircraft malfunction, users should at first attempt to manipulate the sticks to move the aircraft away from crowds or buildings and lower the altitude and horizontal speed of the aircraft before enabling the emergency propeller stop function.

### Important

- The emergency stop propellers function can only be enabled after it is enabled in RC. For details, please refer to "Autel Smart Controller V3 User Manual".
- If you stop the propellers when the aircraft has an initial velocity, the aircraft will fall along a parabolic trajectory. If the trajectory is unpredictable, do not stop the propellers.
- After completing an emergency landing, contact Autel Robotics promptly for a power system inspection and maintenance.

## 2.9 Remote Identification

The Remote Identification system allows for uploading the registration number (Remote ID) of a UAS operator to the system. During flight, it can actively broadcast some non-sensitive data to mobile devices within its broadcast range in real time via an open, documented transmission protocol. The non-sensitive data includes the registration number of the operator, the unique serial number and timestamp of the aircraft, the aircraft's geographical location, altitude above ground level or take-off point, route measured clockwise from true north, and ground speed of the unmanned aircraft, and the geographical location of the operator (if available, otherwise the geographical location of the take-off point). This system not only effectively controls potential risks to public safety posed by unmanned aircraft during flight but also provides effective information and data tools for unmanned aircraft flight regulation.

The aircraft supports the remote identification function and uses Wi-Fi (Wi-Fi Beacon, 802.11n) for broadcasting. Users can enter the corresponding Remote ID in the flight application.

### Tip

- For how to enable RID function in the RC, please refer to "Autel Smart Controller V3 User Manual".
- At present, in some countries and regions, it is mandatory to enable the remote identification function. When users are operating aircrafts in relevant airspace, please follow local laws and regulations.
- When the aircraft is in automatic check process after being turned on or in flight, if the

remote identification function is detected as being abnormal, the flight application will prompt an alert “Remote ID anomaly, please comply with air traffic regulations during flight”, the RC will emit sound alert at the same time.

## 2.10 Remote Controller as Main Controller\*

In the nest unattended operation system, the control priority of the remote controller over the drone is higher than that of the nest. During a mission flight, if the remote controller is turned on and connected to the nest via a wire, the user can take manual control of the drone at any time by moving the joystick of the remote controller.



### Tip

- Autel Smart Controller V3 is not a product included in the nest kit. Users can contact Autel Robotics to purchase one.
- It is recommended that users should prepare 1 RC at least to improve nest deploy experience and ensure drone automatic test safety.

## 2.11 Route Flight Test Checklist

After creating or modifying a route, please conduct on-site flight test and ensure the nest and the aircraft can operate normally before executing routine operation.

### 2.11.1 Aircraft Inspection

- Make sure that the batteries of the aircraft and remote controller are fully charged, and the battery of the aircraft is installed in place, with the unlock button of the battery in a lock state.
- Make sure that the propellers of the aircraft are installed tightly without damage or deformation, the motor and propellers are clean and free of foreign objects, and the propellers and arms are fully extended.
- Make sure that the visual obstacle avoidance cameras of the aircraft, the lens of the gimbal, and the lens of the auxiliary light are free from foreign objects, dirt, or fingerprints, have their protective stickers removed, and are not blocked by loads or other accessories on the fuselage.
- Make sure that the protective cover of the gimbal has been removed and that the three-axis movement of the gimbal is in a normal state.
- Make sure that the rubber protective cover on the microSD card slot is closed firmly and the RTK module is firmly installed in the PSDK expansion interface in the fuselage. Otherwise, the protection performance of the aircraft will be affected.
- Make sure that there is no foreign object in the battery compartment and the interface of the aircraft.

- Make sure that the aircraft and the charging stand are connected firmly with screws no loosing and the charging connection cable is connected with the battery firmly.
- Make sure that after the remote controller and the aircraft are matched in frequency, the obstacle avoidance distance and warning distance, gimbal and camera parameters have been set for the aircraft, and the RTK positioning is enabled.

When the aircraft performs power-on self-test and any of the following situations occurs, the following strategies will be implemented to ensure flight safety.

**Table 2-3 Power-on self-Test flight strategy**

Flight strategy	Takeoff Denied	Takeoff Accepted
<b>Abnormal Items</b>	<ul style="list-style-type: none"> <li>● IMU Abnormal</li> <li>● Battery Verification Abnormal</li> <li>● Aircraft ESC Abnormal</li> <li>● RTK not Fixed in Mission Flight</li> <li>● Internal Communication Abnormal</li> <li>● Barometer Abnormal</li> <li>● Remote Identification Abnormal (only in US)</li> </ul>	<ul style="list-style-type: none"> <li>● Compass Abnormal</li> <li>● RTK not Fixed but not in Mission Flight</li> <li>● Aircraft in ATT Model</li> <li>● Remote Identification Abnormal (in countries or regions except US)</li> </ul>



- When the aircraft device status is abnormal, prompting calibration, please conduct the calibration procedures by referring to "Autel Smart Controller V3 User Manual".

## 2.11.2 Nest Inspection

- Ensure that the mechanical wind speed sensor of the nest can rotate normally, and the surface of the rainfall sensor, and the temperature and humidity sensor is not covered with dirt or foreign objects.
- Ensure that there is no foreign object accumulation on the surface of the nest cabin door and the bottom of the nest, otherwise it will affect life and rotation of the door.
- Ensure that the landing pad of the nest is in a horizontal state and there are no foreign objects and dirt on the surface of the landing pad.
- Ensure that the emergency stop button of the nest is in the released state.
- Ensure that the external power supply of the nest is normal and the network connection is normal.
- Ensure that the nest has completed network configuration, Cloud Service configuration, RTK base station calibration, and backup landing point setup, and local debugging is normal.

## 2.11.3 AICS Inspection

- Before conducting flight, open AICS and perform the following checks:

1. Ensure that the nest network connection is normal, the nest is online, and the aircraft stays in the nest.
  2. Ensure that wind speed, environmental temperature and humidity, and rainfall at the installation site of the nest are within the range required for safe takeoff.
  3. Ensure that the aircraft has good satellite signal and sufficient battery.
  4. Turn on the surveillance camera of the nest to ensure that there are no foreign objects or snow icing on the surface of the cabin door.
  5. Open the window of the aircraft gimbal camera to ensure there is sufficient storage capacity of the aircraft.
- In "Assets" column, ensure the firmware of the nest and the aircraft has been uploaded to the latest version.
  - In "Assets" column, ensure the RTK base station calibration, takeoff and landing height settings, alternate landing point settings, and sufficient storage capacity of the nest have been completed.
  - Ensure that the created route is within non-controlled airspace or legally authorized controlled airspace, and the takeoff point, altitude type, and flight altitude are reasonably set, and loss of connection actions, finish action are set.
  - During the flight test of the flight route, attention should be paid to the basic parameters such as flight altitude, flight speed, and battery level of the aircraft to ensure that the flight route can be completed normally.
  - If multiple aircraft are flying at the same time, please plan the airspace flight reasonably to avoid mid-air collisions and serious safety accidents.

### Warning

- In first flight, please keep the RC connected to the nest in case when there is any emergency you can manually take over the aircraft.
- Before flight, ensure the backup landing point within 5 to 50 meters around the nest. When the aircraft cannot land in the nest, it can land in the backup landing point. When deploying the nest, please follow the guidance of the nest's built-in application to set the backup landing point, which requires vivid sign set in the backup landing area, and please ensure there is no foreign matters within the nest's radius of 1 meter.

### Important

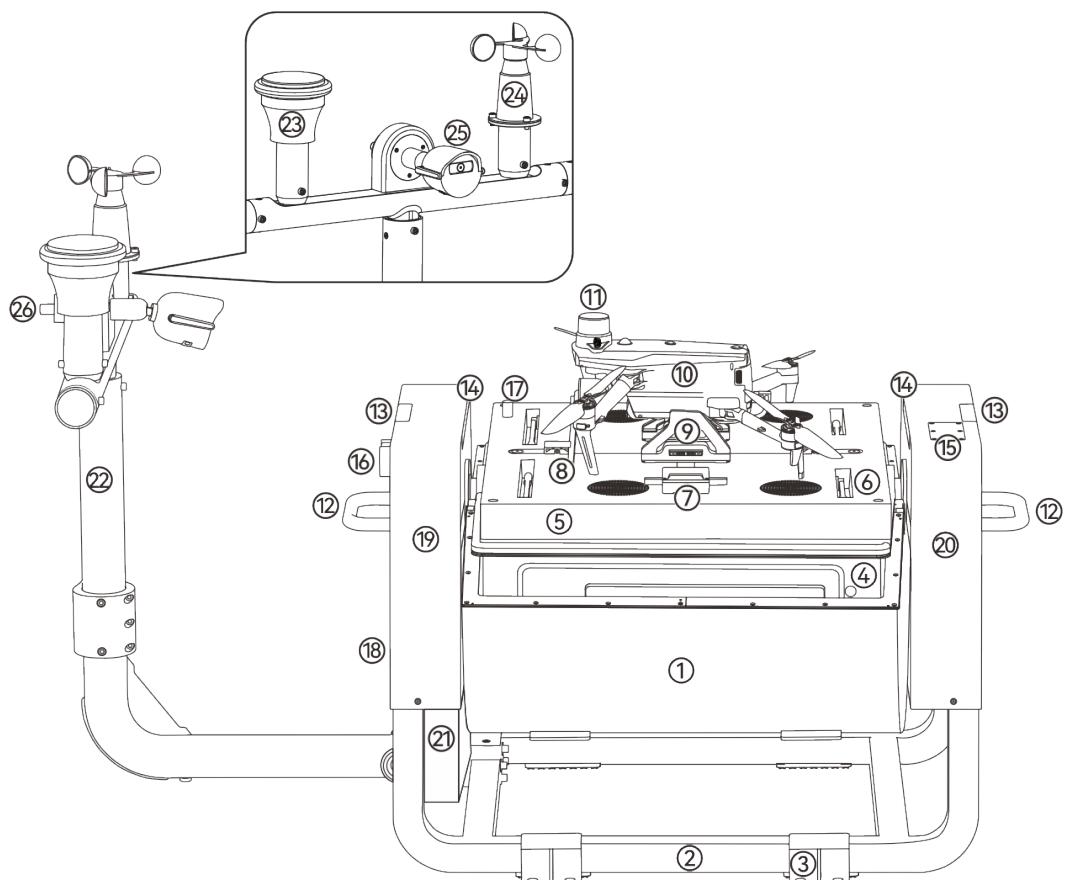
- When there is alert notification in AICS, please follow the guidance to conduct remote debugging and troubleshooting in time.
- After a KML or KMZ format file is imported to AICS to generate a route, please ensure the route meets the requirements.
- After creating a mission in AICS, users should determine whether it is suitable for flight execution according to the weather environment around the nest and device status. To ensure safe flight of the aircraft, mission execution is prohibited in following situations:
  1. Wind speed is above 12m/s.
  2. The rainfall exceeds 2.5mm/h.
  3. The environment temperature around the nest is below -20°C.
  4. The emergency stop button is pressed.
  5. The power supply is disconnected.

- 6. The smart battery level of the aircraft is below 30%.
- 7. The aircraft RTK fails to converge.
- 8. The satellite positioning signal of the aircraft is poor.

## Chapter 3 Nest

The nest provides stable recovery and storage environment, as well as charging, for the aircraft. It is mainly composed of power distribution cabinet, cabinet door, environment sensor, landing pad, RTK module, communication system, AC system and UPS module.

### 3.1 Nest Components



**Fig 3-1 Nest Components**

**Table 3-1 Nest Components Description**

No	Name	No	Name
1	Nest Cabin Door	2	Nest Support Base Bracket
3	Nest Foundation Plate	4	Manual Release Hole
5	Landing Pad	6	Propeller Rod
7	Charging Connector	8	Centering Rod

9	Aircraft Charging Stand	10	Aircraft
11	RTK Module	12	Nest Lifting Handle
13	Nest Indicator Light	14	Landing Pad Lighting Lamp
15	4G Dongle Module Installation Compartment	16	Nest Emergency Stop Button
17	Temperature and Humidity Sensor (Inside the nest)	18	Nest Power Distribution Cabinet (Side View)
19	Left Antenna Cover	20	Right Antenna Cover
21	Nest Power Distribution Cabinet Interface Waterproof Cover	22	Weather Monitoring Pole
23	Rainfall Sensor	24	Mechanical Wind Speed Sensor
25	Surveillance Camera	26	Temperature and Humidity Sensor (outside the nest)

## 3.2 Power Distribution Cabinet

The power distribution cabinet is located below the left antenna cover (at the side where the weather monitoring pole is installed) of the nest. In the cabinet, there is leakage protector, AC surge protector, DC surge protector, control signal protector, network and power surge protector, network + RS485 surge protector and nest local debugging interface, debugging button and BOOT button.

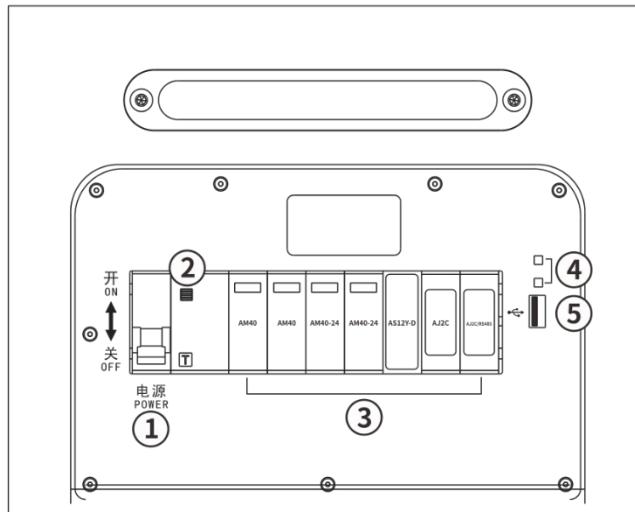
In the power distribution cabinet, users do not have to connect the cables manually, as all lead-out cables pass through the water-proof connector below the power distribution cabinet to inside the interface water-proof cover below the cabinet. Users just need to connect the cables to corresponding connector according to the marks at the external and bottom side of the cabinet, so as to connect the nest network, power supply.

Insert the triangle key, delivered in the nest main body packaging box, into the lock hole of the power distribution, and turn it clockwise by 90° and then pull it down gently to open the power distribution cabinet of the machine nest.

### ! Important

- After the nest installation and configuration is completed and the nest is powered on, if unnecessary, people except professional maintenance personnel are prohibited to open the power distribution cabinet.
- After open the power distribution cabinet to conduct relevant operations, please close the cabinet in time before exiting the site.
- Do not put objects inside the power distribution cabinet so as to ensure the cabinet is clean and tidy inside.

- After the power distribution is opened, do not press or put heavy objects on the cabinet door. Otherwise, the cabinet door will deform.



**Fig 3-2 Inside the Power Distribution Cabinet**

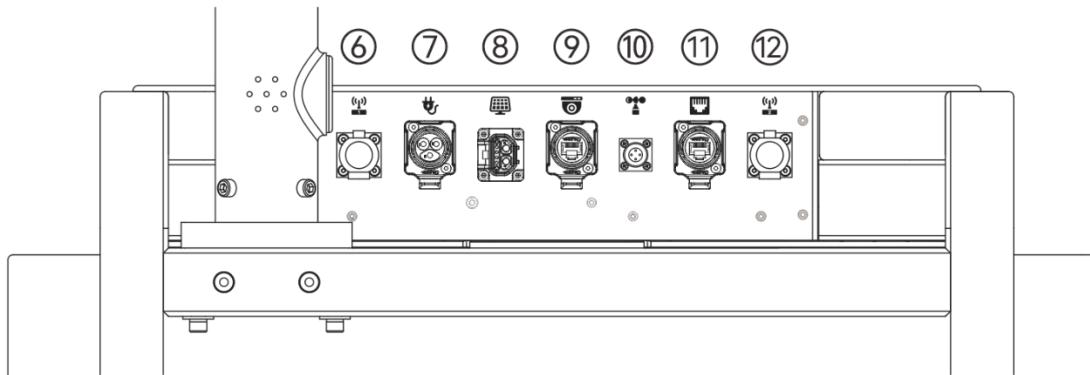
**Table 3-2 Inside the Power Distribution Cabinet Description**

No	Name	Description
1	Miniature circuit breaker	Power switch of the nest: After connecting to external power, turn the switch upward to power on the nest.
2	Leakage Protection Button	After triggering the leakage protection function or pressing the test button "T" (yellow button), make sure to press this button before closing the switch.
3	Surge Protector	Protects the electrical equipment of the nest from damage caused by overvoltage or surges during lightning strikes.
4	Debugging Button BOOT Button	For internal testing by Autel Robotics technical personnel only. Users are not allowed to operate it.
5	Local Debugging Interface	USB-A interface: After connecting it to the USB-C port of the remote control, you can configure and locally debug the nest through the remote controller.

### ⚠ Warning

- When configuring or debugging the nest on site, do not press the debugging button and BOOT button and please ensure the debugging button is released.

The lead-out interfaces of the power distribution cabinet are hidden inside the water-proof cover below the cabinet as follows:



**Fig 3-3 Power Distribution Cabinet Bottom Interfaces (Inside the Water-Proof Cover)**

**Table 3-3 Bottom Interfaces Description**

No	Name	Description
6	N-type connector	Reserved interface, not yet available.
7	AC power connector	It is used to connect to external single-phase AC power of 100-240V to power the nest.
8	Solar power supply connector	It is used to connect to solar energy storage devices to power the nest, and solar power can be used in scenarios where AC power is not available.
9	Camera network port connector	RJ45 network port, used to connect to surveillance cameras to transmit video data.
10	Meteorological sensor connector	Used to power environmental sensors on meteorological monitoring poles and perform RS485 communication.
11	External network port connector	RJ45 network port, which can be used to connect the nest to an external gigabit wired network, so that the nest can be accessed remotely through AICS.
12	N-type connector	Reserved interface, not yet available.

### 3.3 Cabin Door

The nest cabin door adopts semi-circular cylindrical structure, opened and closed by a combination of motors and reducers.

The reducer adopts the self-locking characteristic of the worm and gear wheel to serve as an electronic lock, thereby achieving anti-peeping and anti-theft functions. The tight fit between the door of the cabin and the seals ensures the seal of the door.

When users carry out equipment debugging, they can open or close the door of the nest through AICS or the built-in application of the nest to check the status of the nest landing pad and the done; they can also open or close the door of the nest manually.

### Warning

- The cabin door of the nest is a non-load-bearing structure. Please do not press the door it or place heavy objects on it to avoid damaging the door or causing injury from heavy objects slipping and falling.
- Before opening the cabin door, make sure that the emergency stop button is in the released state. If it is pressed, it needs to be pulled outwards or rotated clockwise to release the emergency stop button before performing other operations.
- When opening or closing the door of the machine nest, keep a proper distance from the moving mechanism of the nest to avoid causing personal injury; if necessary, you can press the emergency stop button to stop the moving mechanism from running.
- Before performing a mission, make sure that there are no foreign objects blocking the surface of the cabin door, as well as no snow or ice.

## ■ AICS remote control

When the nest is turned on, log in to AICS and enter the "Realtime" column. Select the target nest through search or filter, and control the opening or closing of the nest door in the nest control panel.

### ■ Control by built-in application of the nest

When the nest is turned on, connect the remote controller to the local debugging interface of the nest, and the "Nest Local Debugging" page will automatically pop up on the remote controller. In the "Control Console" of the page, you can control the opening or closing of the machine nest door.

### ■ Manual control

Remove the rubber protective cover of the manual release hole of the door, insert the S6 key directly into the hole and lock the internal moving mechanism, and then rotate the key to control the opening/closing angle of the door.

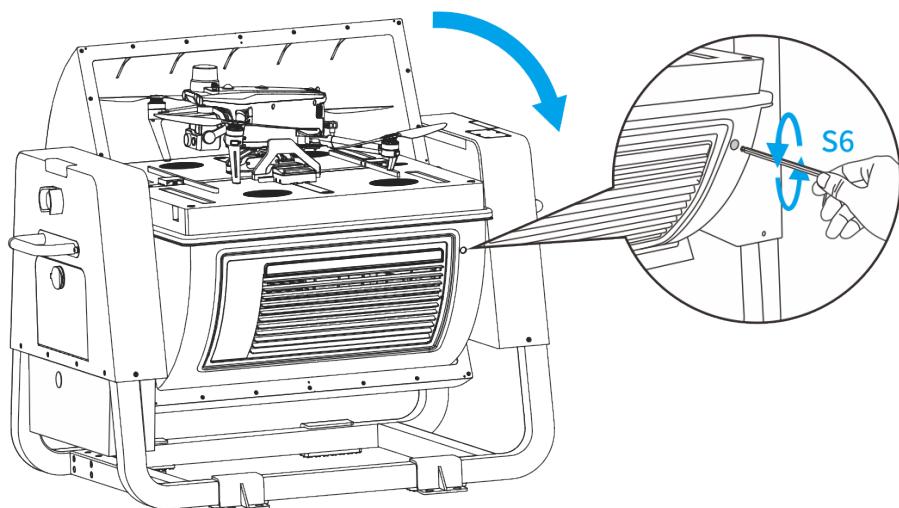


Fig 3-4 Manually Close the cabin door

### Tip

- When the cabinet door is closed, turn the key clockwise to open the door; when the cabinet door is open, turn the key anti-clockwise to close the door.

### Warning

- When opening or closing the door manually, do not insert your fingers or other objects into the gap between the door and the landing pad to avoid pinching your fingers or damaging the shell of the machine nest.
- When opening the door manually, the door is not limited, please always pay attention to the distance between the side of the door and the key to avoid pinch (the maximum manual opening and closing angle of the door is controlled within 160°).
- After manually opening or closing the door, be sure to replace the rubber protective cover in the manual release hole of the door to avoid affecting the protective performance of the nest.

## 3.4 Emergency Stop Button

The nest is equipped with an emergency stop button located at the upper part of the power distribution cabinet. During equipment commissioning and maintenance, in case of an emergency, press the emergency stop button to stop the movement of the movement mechanism of the nest and ensure personal safety.

After pressing the emergency stop button, the indicator of the nest will keep flashing red.

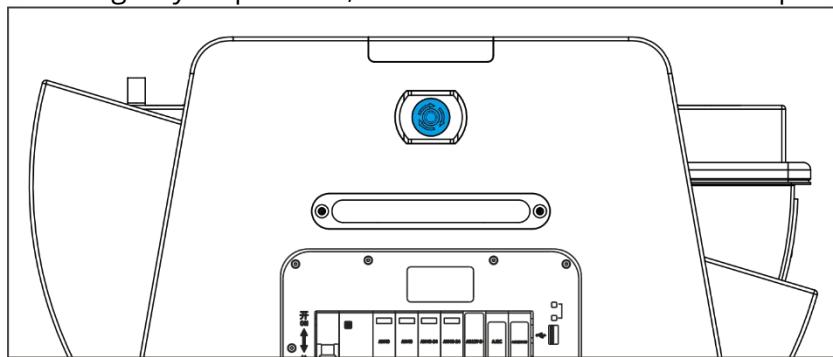


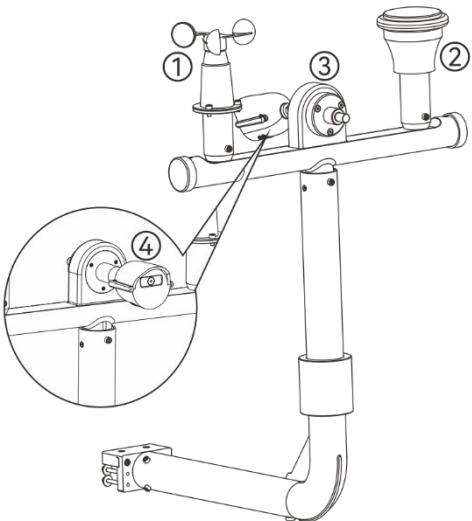
Fig 3-5 Emergency Stop Button

### Tip

- After the emergency stop button is pressed, if the power motor of the drone in the nest has not been started, the nest will not be able to perform the mission; if the drone has taken off, the drone will land at the backup landing point after the mission is completed.

## 3.5 Sensors

The nest integrates various meteorological sensors and surveillance cameras, mainly distributed in the weather monitoring pole, the landing pad and the inside of the nest, which can obtain wind speed, rainfall, environmental temperature and humidity, water immersion information and surveillance videos and other information, to ensure the safe operation of the nest.



**Fig 3-6 Sensor Distribution in the Weather Monitoring Pole**

**Table 3-4 Description of Sensors in the Weather Monitoring Pole**

No	Name	Description
1	Mechanical wind speed sensor	Monitor the wind speed around the machine nest. Users can check the real-time wind speed in the "Realtime" section of AICS.
2	Rainfall sensor	Monitor the rainfall information around the nest. Users can check the rainfall information in the "Realtime" section of AICS.
3	Temperature and humidity sensor (outside the nest)	Monitor the environmental temperature and humidity around the nest. Users can check the real-time temperature and humidity outside the nest in the "Realtime" section of AICS.
4	Surveillance camera	Monitor the condition of the nest's landing pad. After opening the door, users can check the real-time monitoring screen near the landing pad in the "Realtime" section of AICS.

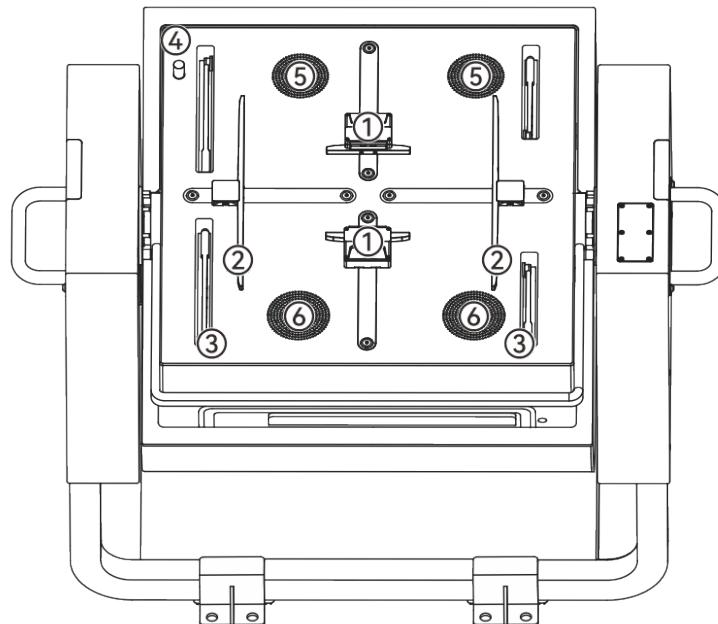
### ! Important

- The mechanical wind speed sensor can only monitor the environmental wind conditions at the installation location of the nest, which may differ from the meteorological information published by the local meteorological department. After the drone flies to high altitude, the wind speed and direction may change suddenly. Please fly carefully in windy days.
- The rainfall sensor is equipped with a pressure sensor. Do not hit or press the rainfall sensor surface hard to avoid damaging the pressure sensor.
- Please clean and maintain the sensor surface regularly. If the appearance is deformed or damaged, it should be repaired in time.
- When the outside environment temperature is lower than -20°C, in order to ensure flight safety, missions are prohibited and operations can only be carried out after the

- environmental temperature rises to a suitable temperature.
- During debugging, adjust the fixed angle of the surveillance camera to ensure that the monitoring screen covers the landing pad and the drone is located in the center of the screen.

A water immersion sensor is installed at the bottom of the housing (inside) under the landing pad of the nest, which can be used to detect whether the inside of the nest is soaked. If a water immersion alarm appears on AICS, please go to the scene in time to clean up the water in the nest and check whether the nest can work normally. If there are still problems, turn off the miniature circuit breaker of the nest in time and contact Autel Robotics.

### 3.6 Landing Pad



**Fig 3-7 Landing Pad Components**

**Table 3-5 Landing Pad Components Description**

No	Name	Description
1	Charging Connector	Used to connect the charging interface on the charging stand of the drone to charge the drone.
2	Centering Rod	A set of X rods and a set of Y rods on the landing pad. When the drone lands on the landing pad, the X rods and Y rods move horizontally through the screw drive of the motor at the bottom of the landing pad to push the drone to the center of the landing pad.
3	Propeller Rod	Four propeller rods (Z rods) on the landing pad. After the drone is centered, the four propeller rods rotate in the vertical plane

		to move the propellers of the drone into the landing pad to avoid damage to the propellers when the cabin door is closed.
4	Temperature and Humidity Sensor (inside the nest)	Monitoring the environmental temperature and humidity in the nest in real time, it is used to assist the air conditioning system in dynamically adjusting the environmental temperature and humidity in the nest.
5	AC Air Inlet	The air flow of the air conditioning system passes through the air inlet and air outlet on the landing pad to form a circulation of air in the nest, thereby adjusting the environmental temperature and humidity in the nest.
6	AC Air Outlet	

## 3.7 RTK Module

Inside the nest's left antenna cover (on the side where the weather monitoring pole is installed) a RTK module is installed, which supports mainstream GNSS signal receiving with precision accuracy of down to millimeters.

To ensure the aircraft achieves precise route flight, it is required to calibrate the RTK base station for the nest when installing and deploying the nest.

### ! Important

- RTK base station calibration can be performed on the nest using a remote controller after the nest is installed and powered on, or on AICS.
- After the RTK base station is calibrated for the nest, if the nest has not been moved again, no further calibration is required; if the nest is relocated, the nest position needs to be recalibrated.

### ■ Calibrating the RTK base station through the built-in application of the nest

After the nest is installed and powered on, connect the remote controller to the nest, and the "Nest Local Debugging" interface will pop up automatically. Click "RTK Base Station Calibration" on the interface to follow the on-screen instructions to perform the relevant operations.

### ■ View the RTK base station calibration status of the nest

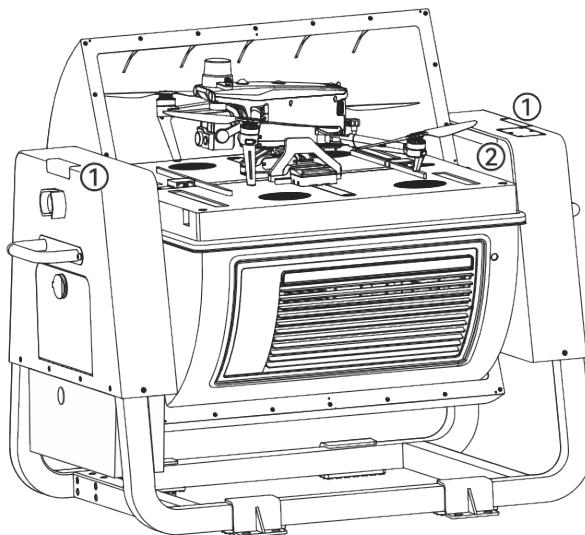
On the nest subpage of the "Assets" column on AICS, select the nest, and then click the "Calibration" icon under the "RTK Location" operation column to view the RTK base station location information of the nest or recalibrate the RTK base station.

### 💡 Tip

- The nest must be connected to the network to save or refresh the RTK base station location information.
- The calibrated RTK position is the final saved position information.
- Due to asynchronous transmission delays, please wait for a while before the calibrated

RTK position information can be refreshed and viewed.

### 3.8 Lighting Lamp and Indicators



**Fig 3-8 Lighting Lamp and Indicator**

**Table 3-6 Lighting Lamp and Indicator**

No	Name	Description
1	Nest Indicator	Located on the top of the outer side of the two antenna covers, the indicator light is used to indicate the working status of the nest through the color and flashing of the light.
2	Landing Pad Lighting Lamp	Located on the inner side of the two antenna covers, the parking lot lighting lamp is used to illuminate the parking lot. When the cabin door is opened, the white LED lighting lamp turns on, illuminating the parking lot and providing reliable illumination for the visual landing of the drone; when the hatch is closed, the LED lighting lamp turns off at the same time to prevent insects from entering the nest due to phototaxis.

**Table 3-7 Nest Indicator Status Description**

No	Status	Nest Working Status
1	Green light is always on	The nest is running normally
2	Green light flashing	The nest is being upgraded.
3	Red light flashing	Nest alarm/emergency stop button pressed.

## 3.9 Air Conditioning System

The TEC air conditioning system of the nest is located on the lower side of the landing pad and has the functions of cooling, heating and dehumidification. The air conditioning system can automatically adjust the temperature and humidity in the nest to provide a suitable storage environment for the drone and smart battery.

When the drone lands on the landing pad and the cabin door is closed after the operation is completed, the air conditioning system will perform the following work process:

- If the temperature of the smart battery or the temperature in the nest is higher than 40°C, or the humidity in the nest is greater than 80%, the air conditioning system will be forced to turn on the cooling, and it cannot be manually turned off.
- If the temperature of the smart battery or the temperature in the nest is higher than 30°C, or the humidity in the nest is greater than 75%, the air conditioning system will automatically turn on the cooling, and it can be manually turned off.
- If the temperature of the smart battery or the temperature in the nest is lower than 20°C, or the humidity in the nest is less than 65%, the air conditioning system will automatically turn off the cooling, and it can be manually turned on.
- If the temperature of the smart battery or the temperature in the nest is lower than 10°C, or the humidity in the nest is less than 60%, the air conditioning system will be forced to turn off the cooling, and it cannot be manually turned on.
- If the temperature of the smart battery or the temperature in the nest is lower than 5°C, the air conditioning system will turn on the heating; if the temperature of the smart battery or the temperature in the nest is higher than 10°C, the air conditioning system will turn off the heating.
- When the cabin door is opened, the air conditioning system will be automatically turned off.



### Tip

- When installing and configuring the nest, you can manually turn off the AC in the "Nest local debugging" interface in the RC.

## 3.10 Backup Battery

Inside the nest, a 18Ah lithium iron phosphate battery is configured as a backup battery, which can ensure the normal operation of the nest for about 60 minutes when fully charged.

In the event of an accidental power failure, the nest will switch to the backup battery to ensure continuous normal operation. The nest remains online on AICS, ensuring that the drone performing tasks can return safely.



### Note

- In different scenarios, the endurance of the backup battery may change.

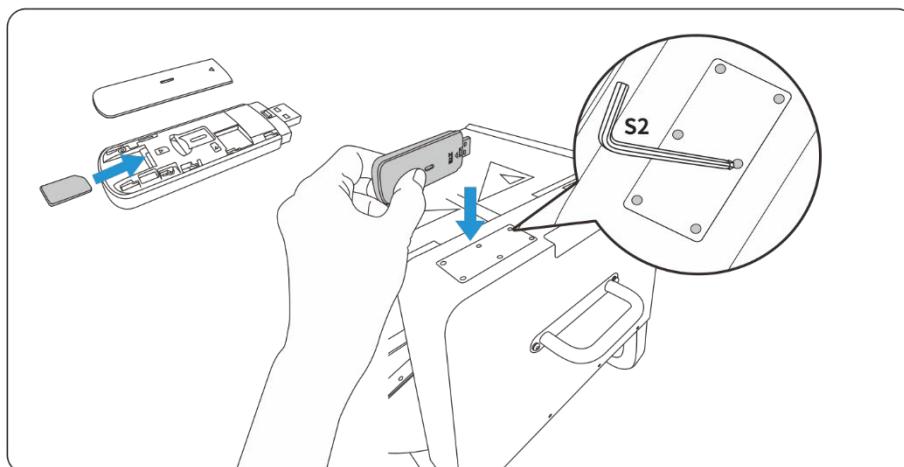
- When the nest switches to the backup battery power supply, the air conditioning system will halt.
- When the nest switches to the backup battery power supply, if it is performing a task, it is recommended to control the drone to return as soon as possible.

### 3.11 Network Connection Method

The nest supports a gigabit wired network connection via a network cable; or connects to a 4G wireless network through the nest 4G Dongle module (which needs to be purchased by the user), and the user can configure the network type according to the actual situation of the nest installation location.

A 4G Dongle module installation compartment is preset on the top of the antenna cover on the right side of the nest the user can decide whether to configure a 4G network. The detailed installation operation is as follows:

1. Remove the cover of the 4G Dongle module, and insert the SIM card in the correct direction (need to be purchased by yourself).
2. Use the S2 hex key to unscrew the 6 screws on the 4G Dongle module installation bin lid on the top of the right antenna cover of the nest, and save them properly, then remove the lid.
3. Insert the 4G Dongle module (with the Logo marked side facing out) into the USB-A interface in the antenna cover along the slot to ensure a stable connection.
4. Close the cover and tighten the 6 screws.



**Fig 3-9 Install 4G Dongle Module for the nest**

When the nest is connected to both a wired network and a 4G wireless network at the same time, it prefers to use the wired network; when the wired network is disconnected, the nest automatically switches to the 4G wireless network.

#### 💡 Tip

- Users need to consult the local operator to apply for a 4G network package, and this function may not be supported in some regions or countries.

## 3.12 Protection Level

The nest has been tested in a controlled laboratory environment and can achieve an IP55 protection class according to IEC 60529 standard. The protection class is not permanent and may decrease due to long-term use and wear, please perform regular maintenance. Under the following conditions, the nest will not have an IP55 protection class:

- The power distribution cabinet door is not closed or tightly closed.
- The rubber protective cover at the manual release hole of the cabin door is not installed in place.
- The cabin door is not closed or tightly closed.
- When the cabin door is manually closed, the side of the door is not pressed tightly against the seal on the edge of the landing pad.
- The body structure is damaged, such as cracked housing or failed seals.



### Tip

- In outdoor environments, the appearance color of the nest may change due to long-term exposure to sunlight or rain, but this phenomenon does not affect the protective performance of the nest.

## 3.13 Transportation and Temporary Storage



### Warning

- The nest contains precision structural parts, and the net weight of the nest body exceeds 63kg, so it must be handled by professionally trained personnel.

### 3.13.1 Nest Moving

Before the nest is removed from its packaging box, it is recommended to use a forklift for handling. When handling, make sure that the gravity center of the nest main body packaging box is distributed in the middle of the forklift arm.

After opening the box, if you need to move the nest, be sure to move it carefully to avoid scratching the surface of the nest; avoid any impacts or drops to avoid damage to the equipment.

#### ■ Manual handling

When handling the nest manually, two people should each hold the handles on the sides of the nest for movement. Do not apply force to the cabin door, the nest support bracket, or other locations to avoid damaging the nest or causing personal injury.



### Warning

- Do not attempt to move the nest alone, be sure to have two people to move it.
- When handling, be prepared for load-bearing stress to avoid sprains or being crushed by

heavy objects; wear protective gloves to prevent slipping hands from falling and getting hurt.

- Manual handling is only limited to short-distance movement of the nest, for long distances, please choose other handling methods.

### ■ Forklift handling

When moving the nest with a forklift, the nest support brackets should be placed smoothly on the two forklift arms, and the gravity center of the nest should be distributed in the center of the forklift to prevent it from overturning. During movement, it requires a dedicated person to watch over it.

#### **! Important**

- When using a forklift for transportation, make sure that the road surface is smooth so that the nest will not tip over due to bumps.
- When placing the nest on the forklift, make sure that the antenna covers on both sides of the nest are facing out, that is, the nest support brackets are placed in a cross shape with the forklift arms.

### ■ Hoisting the Nest

If you need to hoist the nest (such as rooftop installation), it is recommended to use the basket installation first (it requires the lifting company to prepare in advance); if the basket cannot be used, you can use sheer lifting, and when using the sheer lifting , be sure to choose the appropriate lifting point position (the stress points of the nest are on the handle and the support brackets), and wear the rigging reasonably. A trial lift should be carried out before the official hoisting.

#### **⚠ Warning**

- Personnel engaged in hoisting work must be trained professionally and qualified before taking up their positions.
- Hoisting tools must be inspected to ensure compliance with standard specifications and service life, and can be used only if they are complete.
- During hoisting, it is strictly prohibited to walk or stay under the boom or hoisting objects; it is strictly prohibited to stand within the range of falling, rolling, and swinging directions of hoisting objects

### 3.13.2 Temporary Storage

If the nest cannot be put into use immediately, the following requirements must be met during temporary storage:

- Store in a dry, rainproof, fireproof, and non-corrosive environment.
- Avoid water immersion and animal damage during nest storage.
- Nest packaging boxes should be in good condition and checked regularly.
- The built-in spare battery of the nest needs to be charged for at least 9 hours every 3

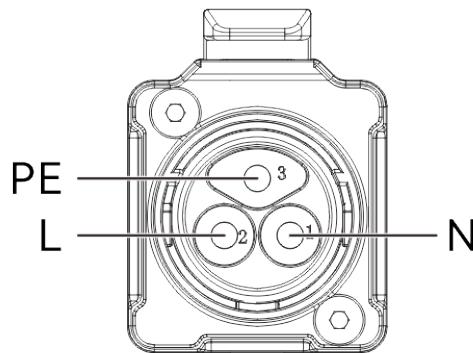
months.

- Do not tilt or invert the packaging box for storage, and do not place items on the packaging box.
- If the nest packaging is removed and not put into use, it needs to be stored for a second time. Please put the nest into the original packaging box for storage, and take moisture-proof measures.

### ■ Charging the spare battery

If you need to charge the spare battery, you can follow the steps below:

1. Remove the outer box of the nest body packaging to expose the nest; remove the nest power cord from the weather monitoring pole packaging.
2. Insert one end of the power cord with the BD-24-3-core metal circular aviation plug into the corresponding connector under the nest distribution box "④", making sure it is firmly locked.
3. Connect the three-prong plug end of the power cord to the mains supply.
4. Use the triangular key included in the nest body packaging box to open the distribution box, close the air switch, and then power on the nest to charge the spare battery.



**Fig 3-10 Nest AC Access Sequence (In official Use)**

#### 💡 Tip

- The charging temperature of the lithium iron phosphate battery is 0°C to +55°C, beyond which it cannot be charged.
- The three-prong plug of the power cord is only used for power supply during testing. When officially deployed, please remove the three-prong plug and connect the waterproof docking plug to the power cable.

#### ⚠️ Warning

- This operation must be carried out by personnel with a low-voltage electrician operation certificate.
- When operating, be sure to pay attention to electrical safety and be careful of electric shock. When connecting the power cable, make sure the upper-level power switch of the cable is turned off.
- Be sure to ensure that the phase sequence of the live line, neutral line, and ground line is correctly connected, and the neutral line and live line cannot be reversed.

# Chapter 4 Aircraft

## 4.1 Aircraft Activation

When unboxing the product for the first time, you need to activate the EVO Max series aircraft before using it. After matching the aircraft and the aircraft in frequency, please follow the guidance in the flight application on RC to activate the aircraft.

Users can also activate the aircraft after matching the nest and the aircraft in frequency in the nest deployment and configuration phase.

### Important

- Users need to purchase the Autel Smart Controller V3 based on their needs.
- Make sure that the remote controller is connected to the Internet before starting the activation process. Otherwise, activation may fail.
- If activation fails, please contact Autel Robotics for assistance.
- For how to match the aircraft with the remote controller in frequency, refer to “Autel Smart Controller V3 User Manual”.
- For how to match the aircraft and the nest in frequency, refer to “Quick Installation Guide”.

### Note

- The EVO Max 4T XE aircraft with Fusion 4T XE gimbal is included in the nest kit, and users can also choose the EVO Max 4N aircraft (equipped with Fusion 4N gimbal and night vision camera) to use with the nest.
- This chapter will introduce the EVO Max 4T XE aircraft, and the EVO Max 4N aircraft only differs in the layout of the gimbal camera.

## 4.2 Aircraft Components

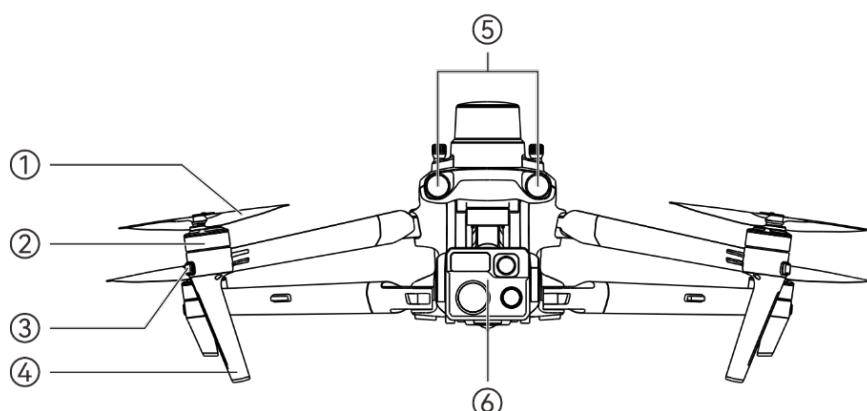
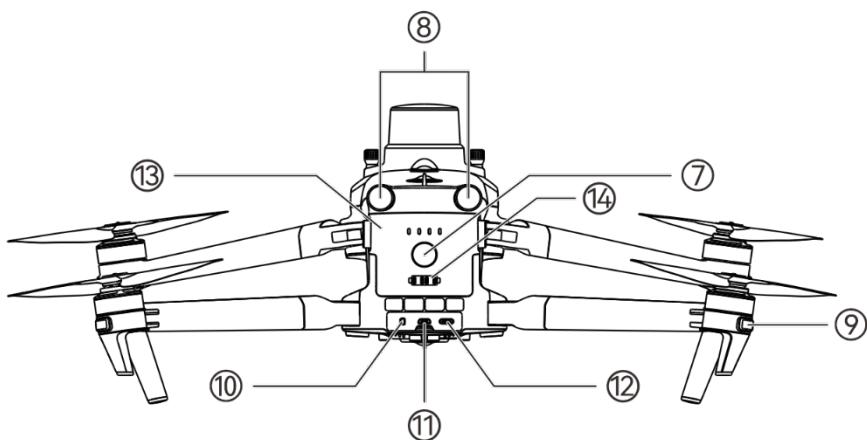


Fig 4-1 Aircraft Front View

**Table 4-1 Aircraft Front View Details**

No.	Name	Description
1	Propeller	Rotates in the air to generate thrust to propel the aircraft forward.
2	Motor	Used to drive the propeller to rotate.
3	Front Arm Light	Used to identify the nose direction of the aircraft.
4	Landing Gear	Used to support the aircraft to avoid damage to the bottom of the fuselage.
5	Forward Visual Obstacle Avoidance Sensing Lens Group	Used to sense the obstacles ahead and avoid the aircraft from colliding with them.
6	Gimbal Camera	Integrates multiple sensors for stable shooting or measurements during flight.

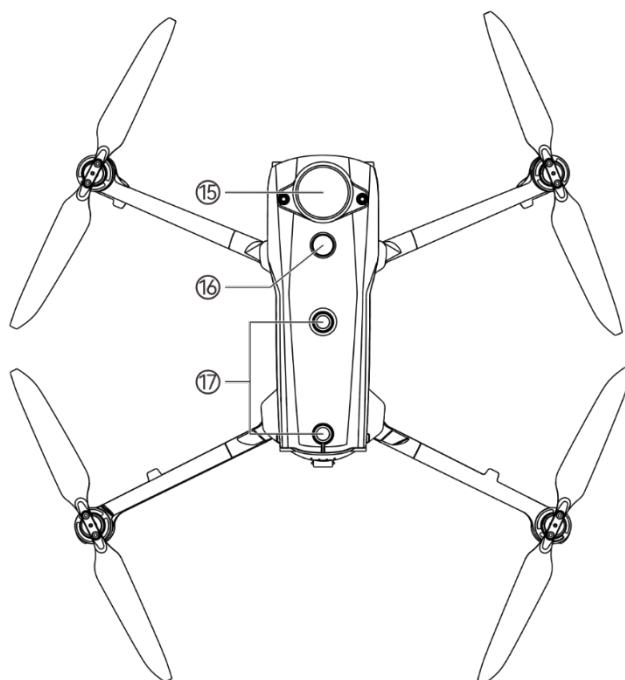
**Fig 4-2 Aircraft Rear View****Table 4-2 Aircraft Rear View Details**

No.	Name	Description
7	Power Button	Press and hold the power button for 3 seconds to start the aircraft. After the aircraft is powered on, quickly press the power button twice to enter matching mode.
8	Rear Visual Obstacle Avoidance Lens Group	Used to sense the obstacles in the rear and avoid the aircraft from colliding with them.

9	Rear Arm Light	Used to display the current flight status of the aircraft.
10	microSD Card Slot	For inserting a microSD card.
11	External SSD Interface	For connecting an external SSD.
12	USB-C Interface	Used to connect to a computer for firmware updates or debugging.
13	Smart Battery	Used to provide energy for aircraft operation.
14	Charging Stand Connect Port	Used to connect the connection cable with the charging stand. After the port is connected, the aircraft can be charged through the nest.

**⚠ Warning**

- The USB-C interface of the aircraft cannot be used for charging. Do not connect the included remote controller charger.

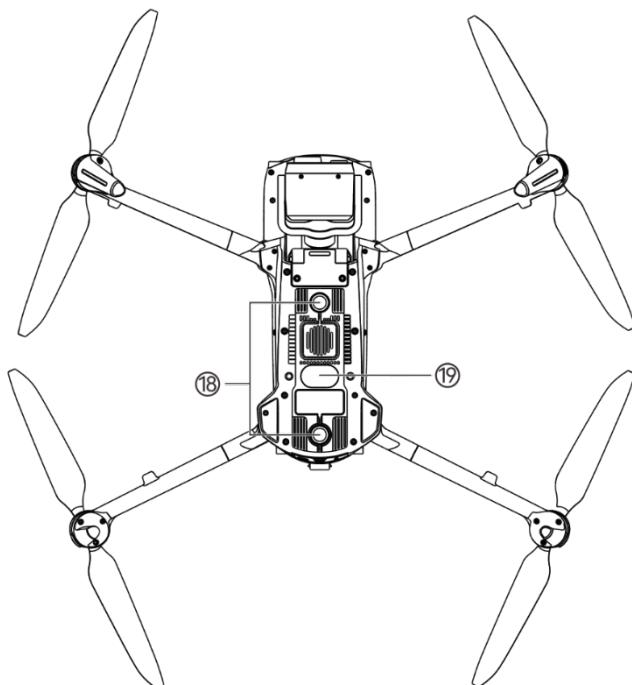


**Fig 4-3 Aircraft Top-Down View**

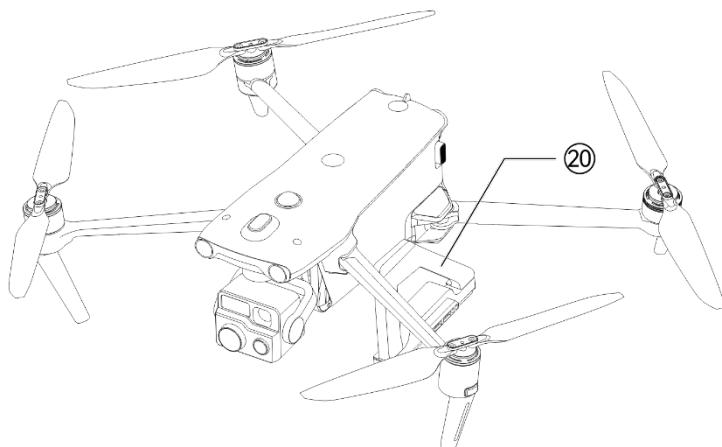
**Table 4-3 Aircraft Top-Down View Details**

No.	name	Description
15	RTK Module (Mount Extension)	Additional mounts can be added to the aircraft fuselage through the extension interface (PSDK), such as speaker,

	Interface)	spotlight, and RTK module.
16	Strobe	Emits high-intensity strobe light to indicate the position of the aircraft at weak light conditions to avoid air traffic accidents.
17	Upward Visual Obstacle Avoidance Lens Group	Used to sense obstacles above, and to the left and right of the aircraft and avoid collisions.

**Fig 4-4 Aircraft Bottom-Up View****Table 4-4 Aircraft Bottom-Up View Details**

No.	Name	Description
18	Downward Visual Obstacle Avoidance Lens Group	Used to sense obstacles below, and to the left and right of the aircraft and avoid collisions.
19	Auxiliary Light	An LED auxiliary light. In weak light conditions, it is used to enhance the ambient brightness of the landing area during the landing process, improve downward visual sensing performance, and ensure the safe landing of the aircraft.



**Fig 4-5 Aircraft Charging Stand**

**Table 4-5 Aircraft Charging Stand Description**

No.	Name	Description
20	Charging Stand	Used to charge the aircraft from the nest. It is installed on the aircraft by default before leaving the factory.

**💡 Tip**

- The charging stand is a removable component that does not affect the safe flight of the drone after removal.
- After removing the charging stand, the drone will not be able to charge through the nest. If the drone or the charging stand is not faulty, do not remove it.
- After the charging stand of the drone is removed, the maximum allowed flight altitude of the drone will be adjusted from 3100 meters to 4000 meters.

**⚠️ Warning**

- There is a rubber protective cover in the interface area on the rear side of the fuselage to protect the microSD card slot, external SSD interface, and USB-C interface. Please make sure that the protective cover is closed firmly during the flight.
- Do not disassemble the components that have been installed at the factory (except for the components explicitly permitted in the description in this manual), otherwise, the product warranty will be invalid.
- Please prevent the 6 millimeter-wave radars inside the fuselage from being blocked by foreign objects. The six millimeter-wave radars are located in the middle of the forward visual obstacle avoidance lens group, the rear visual obstacle avoidance lens group, the top shell of the fuselage, the middle part on both sides and near the fisheye lens at the bottom shell of the fuselage, respectively.

## 4.3 Propeller

Propellers are consumable parts that require regular maintenance and replacement to ensure the safe flight of the aircraft. The aircraft uses a quick-release propeller design, making it easy for you to replace them.



- Keep body parts away from the rotating propellers to avoid injury.

### 4.3.1 Replacing Propellers

The propellers are installed in the aircraft by default at the factory, and users are not required to install them usually. If the propellers are damaged (e.g., broken or damaged blades), please replace them with new ones before flight.



- Aircraft propellers are consumable parts. If needed, please purchase them from Autel Robotics.
- The propeller model is marked on the blade. You can check the model of a propeller at the edge of the blade near the propeller center shaft.
- Propellers cannot be installed on the wrong propeller mounts. Please carefully distinguish between propellers and mounts.
- Autel Robotics provides two spare propellers for each aircraft (with models 1158CW and 1158CCW). Please refer to the "Packing List" and packaging for details.

#### ■ Detaching the Propellers

1. Press and hold the smart battery power button for 3 seconds to power off the aircraft.
2. First hold the rotor of the motor on the arm below the propeller to prevent it from rotating, press down on the propeller center shaft firmly, and then turn it in the unlocking direction marked on the propeller center shaft to detach the propeller.

#### ■ Installing the Propellers

When installing the propellers, strictly follow the following instructions:

1. Make sure that the aircraft is powered off before installing the propellers.
2. The aircraft needs to be installed with two models of propellers, that is, CW and CCW, with two of each model. The CCW propellers have a white circle mark at the center shaft, while the CW propellers do not have this mark at the center shaft.
3. There are two types of propeller mounts on the power motors of the aircraft. The mounts with a white circle mark at the center shaft are for CCW propellers, while the mounts without this mark are for CW propellers.
4. Place a propeller on the corresponding propeller mount. Make sure that the buckle at the center shaft of the propeller aligns with the slot on the mount. Hold the rotor of the motor below the propeller to prevent it from rotating, press down on the propeller center shaft firmly, and then turn it in the locking direction marked on the center shaft to secure the propeller in place.

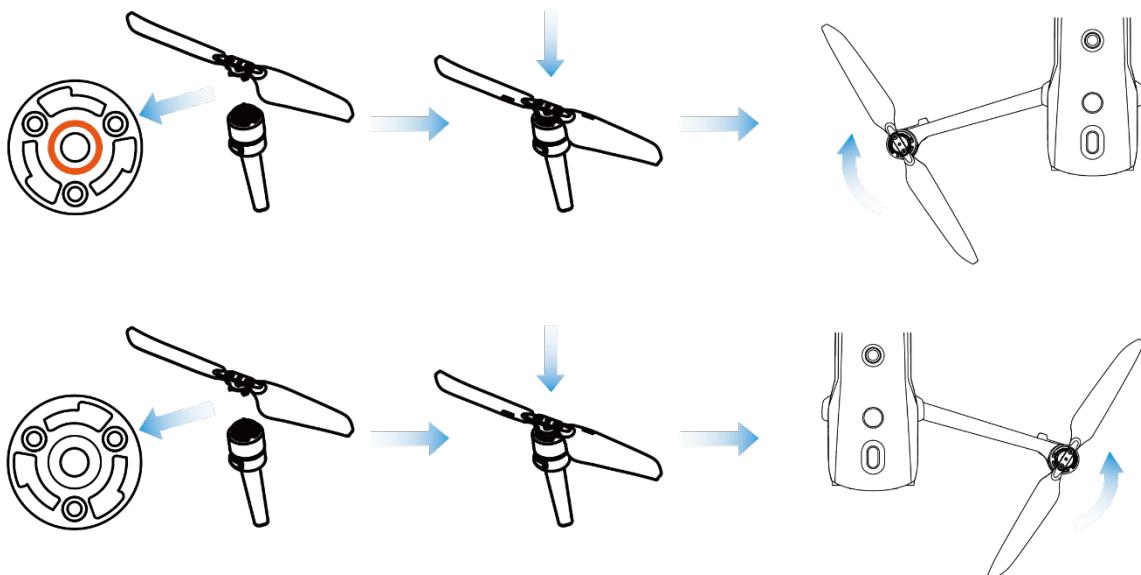


Fig 4-6 Install the Propellers

Table 4-6 Propeller Installation Details

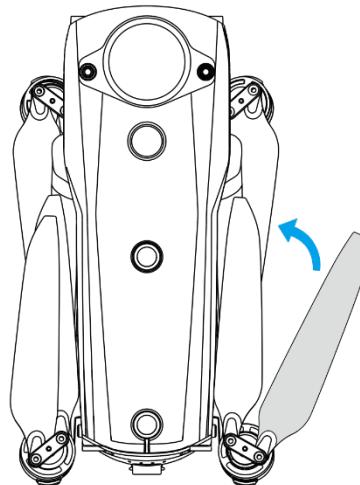
Propeller Model	CCW (White circle on the center shaft)	CW (No white circle on the center shaft)
Installation Area	Mounts with a white circle mark	Mounts without white circle mark
Lock/Unlock	Lock orientation: Turn the propeller this way:  to tighten it into the mount. Unlock orientation: Turn the propeller this way:  to remove it from the mount.	

### Warning

- The propellers can rotate at a maximum speed of 7500 RPM. Please operate with caution.
- Before each flight, make sure that all propellers are in good condition. If there are aged, damaged, or deformed propellers, please replace them before the flight.
- Before each flight, make sure that all propellers are mounted correctly and securely.
- Please use the propellers provided by Autel Robotics. Do not mix propellers of different models.
- Before replacing propellers, make sure that the aircraft is powered off.
- Propeller edges are sharp. When replacing propellers, it is recommended to wear protective gloves.
- Stay away from rotating propellers or motors to avoid injuries.
- Before testing the aircraft on the ground, make sure that the propellers are removed.

### 4.3.2 Storing Propellers

After using the aircraft, fold the arms as shown below and store the propellers in the rugged case.

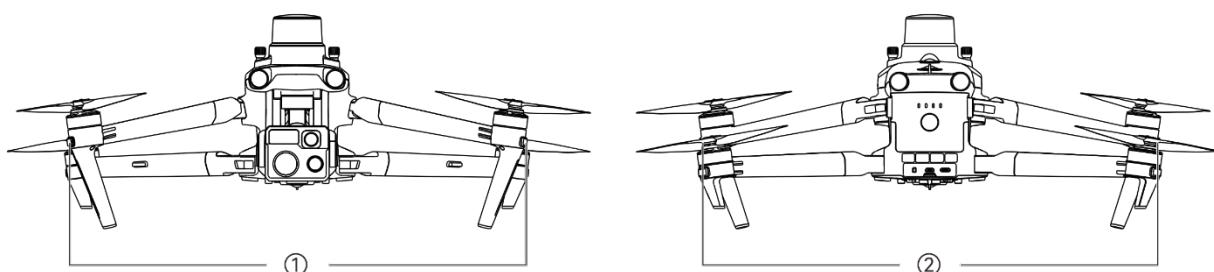


**Fig 4-7 Store the Propellers**

### 4.4 Arm Light

There is an LED indicator at the end of each arm of the aircraft. The front arm light is the heading light, and the rear arm light is the status light. After the aircraft takes off, the front arm lights will blink periodically, which can help you identify the direction of the aircraft nose; the rear arm lights will display the current flight status of the aircraft.

The front arm light is green when it lights up, and the rear arm light can display green, yellow, and red depending on the scene.



**Fig 4-8 Arm Light**

**Table 4-7 Arm Light Status Details**

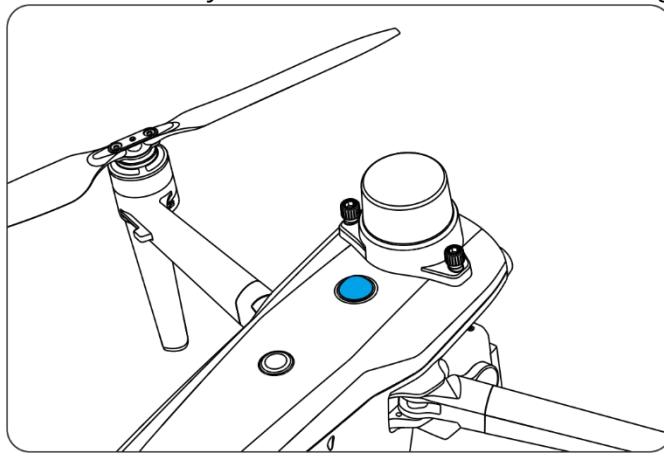
Scence	①: Front Arm Light (Periodic state)	②: Rear Arm Light (Periodic state)
Remote Controller Not Connected to Aircraft	Green: 1s on/1s off	Yellow: 0.25s on/0.25s off
Start Compass Calibration	Green: 1s on/1s off	Yellow: 0.25s on/0.25s off

Current Step Calibration Successful	Green: 1s on/1s off	Green: 0.25s on/0.25s off
Compass Calibration Successful	Green: 1s on/1s off	Green: always on
Compass Calibration Failed	Green: 1s on/1s off	Red: always on
IMU Calibration	Green: always on	Red: 0.5s on/0.5s off
Low Battery Warning	Green: 1s on/1s off	Red: 0.5s on/1.5s off
Critical Low Battery Warning	Green: 1s on/1s off	Red: 0.25s on/0.25s off
IMU Abnormal	Green: 1s on/1s off	Red: always on
Illegal Battery	Green: 1s on/1s off	Red: 0.5s on/1.5s off
Magnetometer Abnormal	Green: 1s on/1s off	Red: 0.5s on/1.5s off → Yellow: 0.5s on/1.5s off
GNSS Mode	Green: 1s on/1s off	Green: 1s on → Red: 1s on* * When the front arm light turn off, the rear arm light turns red.
Attitude Mode	Green: 1s on/1s off	Green: 1s on → Red: 1s on* * When the front arm light turn off, the rear arm light turns red.
Take Off	Green: always on	Green: 0.5s on/1.5s off
Take off with Caution	Green: 1s on/1s off	Yellow: 0.25s on/0.25s off
Single Link	Green: 0.05s on/0.05s off	Green: 0.05s on/0.05s off
A-Mesh Link	Green: 0.05s on/0.05s off	Yellow: 0.05s on/0.05s off
Link Successful	Green: 0.05s on/0.05s off	Green: always on
Link Failed	Green: 0.05s on/0.05s off	Red: always on
Firmware Updating	Green: 0.1s on/0.1s off	Green: 0.1s on/0.1s off
Firmware Update Successful	Green: always on	Green: always on
Firmware Update Failed	Green: always on	Red: 0.5s on/0.5s off
Getting Logs	Green: always on	Green: 0.25s on/0.25s off → Yellow:

		0.25s on/0.25s off
Aircraft Search	Green: 1s on/1s off Red: 0.5s on/1.5s off	
Initializing Flight Mission	Green: always on	Red: 0.2s on → Yellow: 0.2s on → Green: 0.2s on → All: 0.4s off

## 4.5 Strobe

The aircraft is equipped with a strobe at the top of the fuselage to help identify the aircraft when flying at night. You can manually turn the strobe on or off in the flight application.



**Fig 4-9 Strobe**

### 💡 Tip

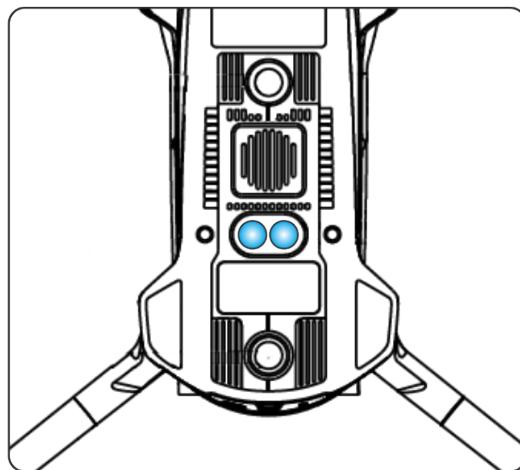
- For how to turn the strobe on or off, refer to "Autel Smart Controller V3 User Manual".

### ⚠️ Warning

- Do not look directly at the strobe while they are on to avoid vision damage caused by strong light.

## 4.6 Auxiliary Bottom Light

The aircraft is equipped with auxiliary bottom lights (LED auxiliary lights) at the bottom of the fuselage. The lights are used to assist the downward visual obstacle avoidance lens group when the aircraft is landing in weak light environments, so as to ensure better visual positioning performance and enhance the landing safety of the aircraft. You can manually turn the bottom LED auxiliary lights on or off in the flight application.



**Fig 4-10 Auxiliary Light**

**Tip**

- For how to turn the auxiliary bottom lights on or off, refer to "Autel Smart Controller V3 User Manual".

**Warning**

- When the auxiliary bottom lights are set to auto mode, they will turn on automatically at an altitude of around 5 meters above the ground when the aircraft is landing and the ambient light is insufficient, and they will turn off automatically after successful landing.

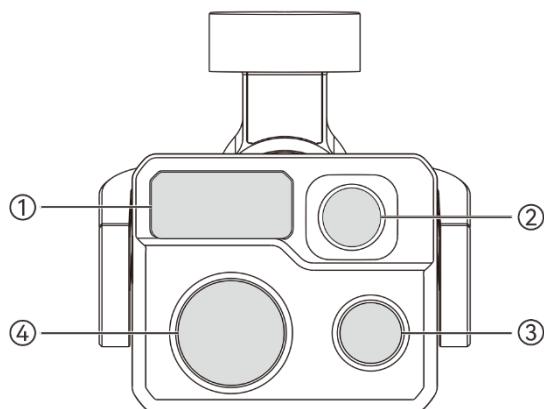
## 4.7 Gimbal Camera

The EVO Max 4T XE Aircraft included in the nest kit is equipped with Fusion 4T XE Gimbal. With a high-magnification "zoom" camera, it can clearly see vehicles and ships two kilometers away, and is also equipped with a "wide-angle" camera, a laser rangefinder, and an "infrared" camera, which can provide target thermal imaging, positioning, and ranging capabilities for flight operations, enhancing the all-weather stated work experience.

**Tip**

- If users have a nighttime operation requirement, they can also contact Autel Robotics for optional Fusion 4N gimbal. The Fusion 4N gimbal is equipped with an ultra-starlight night vision camera with excellent low-light environment photography performance.

### 4.7.1 Camera Structure



**Fig 4-11 Fusion 4T XE Gimbal Camera Layout**

**Table 4-8 Fusion 4T XE Gimbal Camera Layout Details**

No.	Name	Description
1	Laser Rangefinder	The laser ranger finder accurately determines the distance by measuring the time from the beginning of the laser emission to the time when the laser is reflected from the target. Measuring range: 5-1200 meters.
2	Infrared Thermal Imaging Camera	The infrared thermal imaging camera is used for radiometric measurement and night vision, which can monitor the temperature distribution of the measured target in real time, so as to judge the state of the target. Radiometric temperature range: -20°C ~ +150°C (high gain mode) and 0°C ~ + 550°C (low gain mode).
3	Wide Angle Camera	The wide angle camera is used to capture images with a larger field of view within a shorter shooting distance. 1/1.28" CMOS, 50 million effective pixels, and 85° field of view.
4	Zoom Camera	The zoom camera is used to shoot distant scenes, making the distant scenes clearer. 1/2" CMOS, 48 million effective pixels, 10x continuous optical zoom, and 160x hybrid zoom.

**⚠ Warning**

- Do not point the infrared thermal imaging camera at intensive energy sources such as the sun, lava, laser beams, and molten iron, to avoid damage to the infrared detector.
- The temperature of the observation target should be less than 600 °C. Observing objects with temperatures above this limit may result in damage to the infrared detector.
- The laser rangefinder is a Class 3R laser product that emits laser radiation. Avoid direct exposure to the eyes when in use.

## 4.7.2 Camera Operations

### ■ Control Camera by RC Functional Buttons

- Right dial wheel: Used to adjust the zoom factor of the selected camera. Turn left to reduce the zoom factor, and turn right to increase the zoom factor.
- Video recording button: Press the button to start video recording and press again to end video recording.
- Shooting button: Press the button to take photos.

### ■ Control Camera in the Flight Application

In the flight application, users can switch the camera lens, shoot, record and configure relevant settings on the camera.

 **Tip**

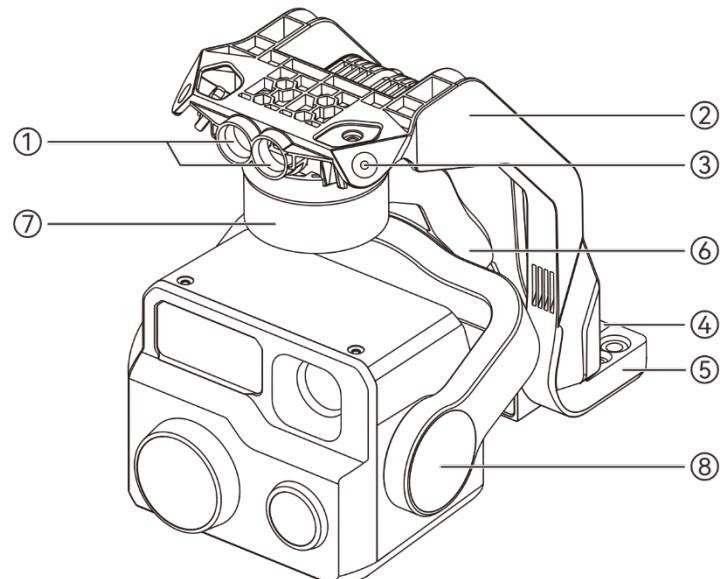
- For the details about how to control the camera in the above ways, please refer to “Autel Smart Controller V3 User Manual”.

When executing the mission flight through the nest, users can control the gimbal camera in the “Realtime” column in AICS.

In the “Live Broadcast” small window at the upper right corner of the “Realtime” interface, after the aircraft gimbal camera window is zoomed to full screen, tap the icon “

## 4.7.3 Gimbal Structure

The Fusion 4T XE gimbal is a three-axis stabilized gimbal with a high-precision motor structure, which can ensure stable camera shooting when the aircraft is flying.



**Fig 4-12 Gimbal Structure**

**💡 Tip**

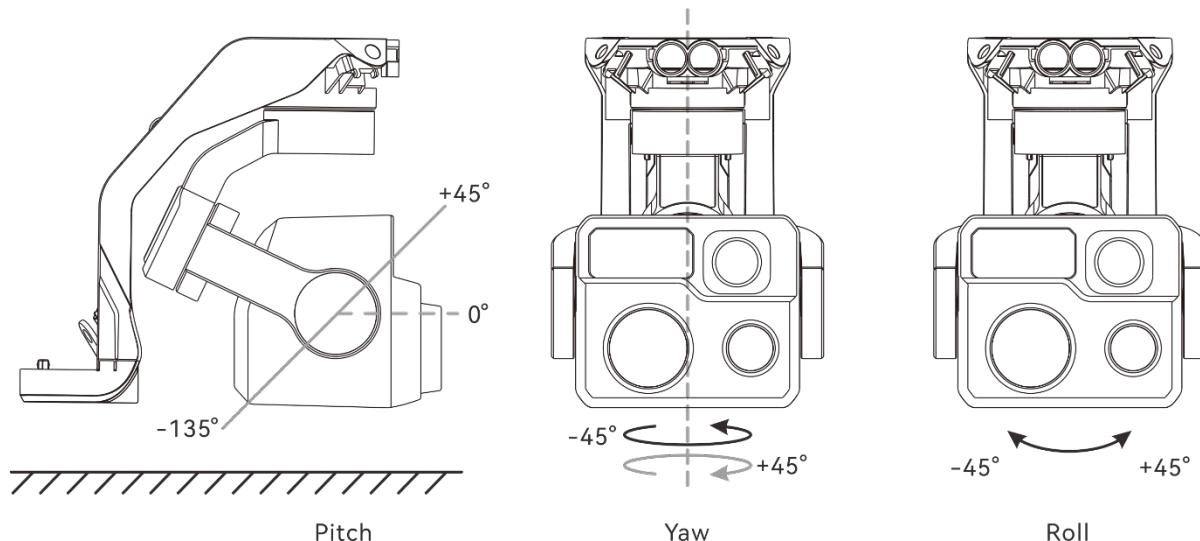
- Please be aware that, except for differences in lens layout, the structure of the Fusion 4T XE Gimbal and that of the Fusion 4N Gimbal are the same or similar.

**Table 4-9 Gimbal Structure Details**

No.	name	Description
1	Cylindrical Holes	The two cylindrical holes at the front of the gimbal dampener mount are used to fix one side of the gimbal dampener mount to the two fixed pins in the aircraft nose gimbal compartment.
2	Dampener Mount	Used to support dampeners and gimbal cameras.
3	Dampener	Used to buffer the vibration of the gimbal.
4	Connector	The connector of the gimbal is connected to the connector slot at the bottom of the aircraft fuselage.
5	Connector Cover	The protective cover above the connector is used to fix the other side of the gimbal dampener mount to the bottom of the aircraft fuselage.
6	Roll Axis Motor	Used to control the moving range of the gimbal to roll left or right (mechanical range 0: -45° ~ +45°).
7	Yaw Axis Motor	Used to control the moving range of the gimbal to rotate left or right with its own axis (mechanical range: -45° ~ +45°).
8	Pitch Axis Motor	Used to control the moving range of the gimbal to rotate up or down (mechanical range: -135° ~ +45°, controllable movement range: -90° ~ +30°).

**4.7.4 Gimbal Mechanical Rotation Range**

The mechanical rotation ranges of the pitch, yaw, and roll axes of the gimbal are shown below.



**Fig 4-13 Mechanical Rotation Range of the Fusion 4T XE Gimbal**

#### Note

- You can control the rotation range of the gimbal pitch, ranging from  $-90^\circ$  to  $30^\circ$ . For more setting details, refer to "Autel Smart Controller V3 Use Manual".

### 4.7.5 Gimbal Operations

When using the RC to control the aircraft for flight, users can control the gimbal by taking the following methods:

#### ■ Control Gimbal by RC Functional Buttons

- Left dial wheel: Used to adjust the gimbal pitch. Turn left to rotate the gimbal down, and turn right to rotate the gimbal up.
- Custom keys C1/C2: After setting the C1 or C2 key to "Gimbal Pitch Recenter/45°/Down", you can press the key to switch the gimbal angle.

#### ■ Control Gimbal in the Flight Application

In the flight application, users can configure relevant control and settings on the gimbal

#### Tip

- For the details about how to control the gimbal in the above ways, please refer to "Autel Smart Controller V3 User Manual".

When executing the mission flight through the nest, users can control the gimbal camera in the "Planning" column in AICS.

When creating a route in the "Routes" sub-interface of the "Planning" column, users can set gimbal pitch angle and yaw angle of each waypoint. For details, please refer to chapter 6 "6.2.5 Planning".

In the “Live Broadcast” small window at the upper right corner of the “Realtime” interface, after the aircraft gimbal camera window is zoomed to full screen, tap the corresponding icons to control the gimbal in corresponding way.

### Warning

- When the aircraft is not in use, especially when the aircraft is being transferred or stored, be sure to use the protective cover of the gimbal to fix the gimbal, so as to avoid damage to the gimbal camera due to accidental rotation or bumping.
- Please remove the protective cover of the gimbal before turning on the aircraft, otherwise, it may cause damage to the gimbal motor and related circuit.
- When turning on the power switch of the aircraft, the gimbal will automatically rotate to perform self-check and calibration, please make sure there is no object near the gimbal to hinder its movement.

## 4.7.6 Replacing the Gimbal

The aircraft adopts removable gimbal design, allowing users to easily replace the gimbal to meet flight requirements in various scenarios.

### Important

- Please follow the instructions below to replace the gimbal, as improper replacement may cause damage to the gimbal or poor contact with the gimbal interface.
- Do not replace the gimbal frequently. The gimbal connector is a precision element, and frequent plugging and unplugging may result in poor contact between the aircraft and the gimbal.
- Please use the gimbal model specified by Autel Robotics for replacement. Incompatible gimbals may cause damage to the aircraft.

### Warning

- Do not attempt to remove or mount the gimbal when it is powered on. Wait for 15 seconds after powering off the aircraft (the internal capacitor is fully discharged) before removing or mounting the gimbal.
- When turning the aircraft upside down to remove or mount the gimbal, please protect the visual obstacle avoidance lens and strobe at the back of the aircraft fuselage to avoid scratches.
- If there is a function mount installed on the extension interface, please remove the mount before removing or installing the gimbal, so as to prevent the mount from being damaged.

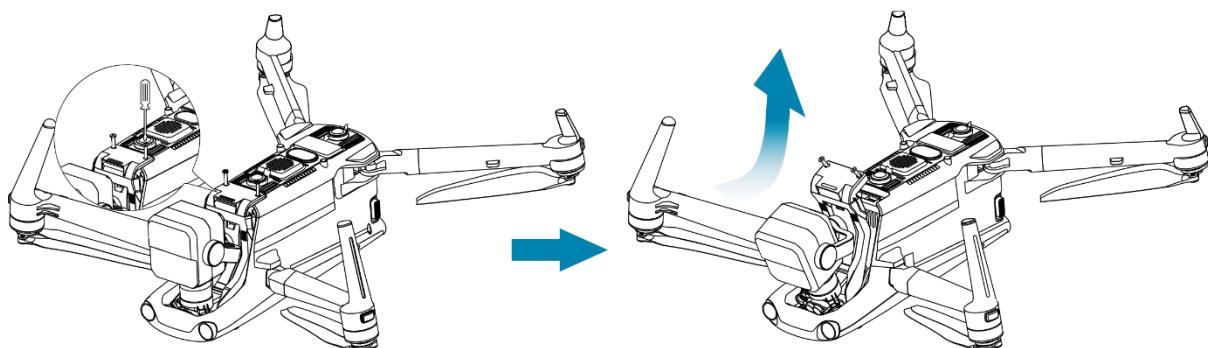
### ■ Removing the Gimbal

1. Press and hold the power button of the smart battery for 3 seconds to turn it off and remove the smart battery.

2. Place the aircraft on a level surface with the bottom of the fuselage facing up.
3. Use a Phillips PH0 screwdriver to loosen the two anti-loosening screws securing the connector cover.
4. Slightly lift the connector cover and slide it back and up to take out the gimbal.

**⚠ Warning**

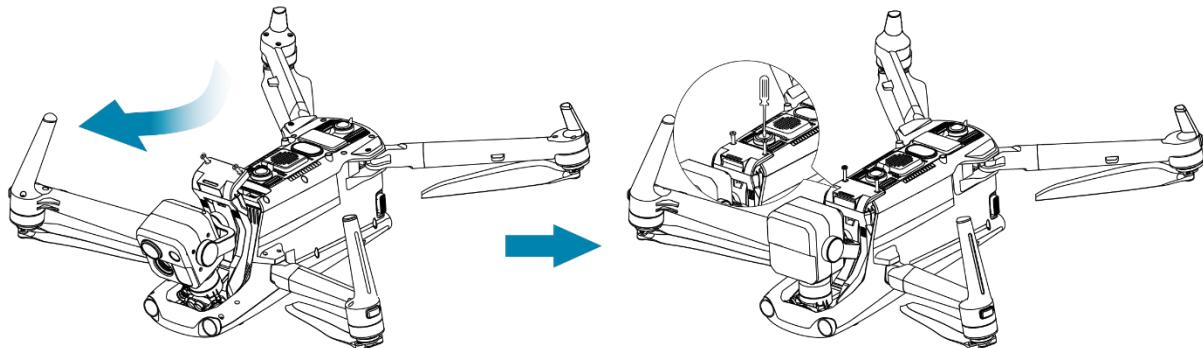
- When removing the gimbal, do not forcefully pull the gimbal out, as this may cause damage to the gimbal. You should hold the gimbal dampener mount to remove the gimbal.



**Fig 4-14 Removing the Gimbal**

### ■ Mounting the Gimbal

1. Press and hold the smart battery power button for 3 seconds to turn the aircraft off and remove the smart battery.
2. After aligning the cylindrical hole on the front end of the gimbal dampener mount with the two fixed pins in the aircraft nose gimbal compartment, push and slide the gimbal forward until the connector cover is aligned with the connector slot in the aircraft.
3. Gently push down the connector cover to the bottom, so that the connector under the connector cover is inserted into the connector slot, and the connector cover needs to be flush with the bottom of the aircraft.
4. Use a Phillips PH0 screwdriver to partially tighten the two anti-loosening screws into the two fixing holes on the connector cover. After ensuring that the connector is perfectly aligned with the connector slot, fully tighten the two anti-loosening screws to secure the connector cover.
5. Press and hold the battery power button for 3 seconds to power on the aircraft. If the connector cable of the gimbal is connected correctly, the gimbal will automatically rotate the camera to perform a self-test.

**Fig 4-15 Mounting the Gimbal**
**! Important**

- Please make sure that the connector cover of the gimbal camera is aligned with the connector slot at the bottom of the fuselage, otherwise, it will affect the connection between the gimbal and the aircraft.

**⚠ Warning**

- After mounting the gimbal to the aircraft, please make sure that all parts are fully fixed to avoid loss due to functional failures caused by loose assembly of the gimbal during flight.

## 4.8 Flight Control System

The aircraft achieves stable and convenient flight control through its built-in intelligent flight control system. The system supports a number of advanced functions, including auto-return, failsafe, and visual positioning system.

**Table 4-10 Flight Control System**

Module	Description
IMU	A three-axis gyroscope and a three-axis accelerometer measure acceleration and angular velocity.
Compass (Magnetometer)	Measures the geomagnetic field and provides reference information on the aircraft heading.
GNSS Receiver	Receives global satellite navigation signals to measure longitude, latitude, and altitude.
Barometer	Measures atmospheric pressure and is used to determine the altitude of the aircraft.
Visual Obstacle Avoidance Sensing System	Provides the aircraft with 720° obstacle avoidance sensing capability around the aircraft.

Millimeter Wave Radar	Provides the aircraft with all-day and all-weather obstacle avoidance sensing capability.
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### 4.8.1 Flight Status

Depending on the availability of GNSS signals and flight conditions, the aircraft can automatically switch between the following three modes. Users can check the flight status of the aircraft in the status notification bar in the flight application.

**Table 4-11 Flight Status**

Mode	Description
GNSS Mode	When the aircraft detects a qualified GNSS signal, it will enter the GNSS mode automatically. In GNSS mode, if the obstacle avoidance system is turned on, the system will provide auxiliary information to more accurately locate and avoid obstacles, provide stable and smooth flight control, and support auto-return, failsafe, geo-fencing and other safety functions.
Visual Positioning Mode	When the aircraft is in the visual positioning mode, and the GNSS signal detected is not strong enough to activate GNSS mode, and it meets certain environmental and altitude requirements (ensure that the surrounding environment is well-lit, the ground texture is clear, and the altitude of the aircraft must be within the observation range of the visual obstacle avoidance sensing system), the aircraft will automatically enter the visual positioning mode.
ATTI Mode (Attitude Mode)	When there is no GNSS signal and the environment and altitude cannot meet the minimum requirements of the visual obstacle avoidance sensing system, that is, when there is no GNSS signal and visual positioning failure at the same time, the ATTI mode will be activated. In this mode, the obstacle avoidance system is disabled, and the aircraft only controls the altitude through the barometer, and users are supposed to make their own decisions to ensure flight safety.

#### Warning

- If you have not fully mastered the flight control of the aircraft and the aircraft is in ATTI mode, please do not take off rashly.
- If the aircraft is in visual positioning mode or ATTI mode, the no-fly zone function of the geofencing system will be unavailable and please be cautious that do not enter restricted airspace.

## 4.8.2 Flight Modes

The aircraft has varying flight power output performance in different flight modes. You can set the flight mode of the aircraft in the flight application. For more information, see "Autel Smart Controller V3 User Manual".

**Table 4-12 Flight Modes**

Flight Modes	Description
Slow	Forward, backward, left, and right: 3 m/s; Ascend: 3 m/s; Descend: 3 m/s.
Smooth	Forward, backward, left, and right: 10 m/s; Ascend: 5 m/s; Descend: 5 m/s.
Standard	Forward and backward: 15 m/s; Left and right: 10 m/s; Ascend: 6 m/s; Descend: 6 m/s.
Ludicrous	Forward: 23 m/s; Backward: 18 m/s; Left and right: 20 m/s; Ascend: 8 m/s; Descend: 6 m/s.

 **Warning**

- If you have not fully mastered the flight control of the aircraft, it is not recommended for you to switch to Ludicrous mode.
- When flying close to the ground, it is recommended to switch to Slow mode for safety.
- When switching to Ludicrous mode, the obstacle avoidance function of the aircraft will become unavailable, and the aircraft will not automatically avoid surrounding obstacles during flight. Please always pay attention to the surrounding environment when using it, and manually control the aircraft to avoid obstacles.
- When switching to Ludicrous mode, its flight speed is greatly improved compared with Standard mode, so the braking distance in this mode will be correspondingly extended. Users should maintain a braking distance of at least 50 meters when operating the aircraft manually in this mode to ensure personal and flight safety.

## 4.8.3 Intelligent Flight Function

### ■ Accurate Landing

The accurate landing function uses the downward binocular visual obstacle avoidance lens group of the aircraft to record the information at its take-off point. When the aircraft is returning to the home point or landing, vision algorithms are used to calculate the distance between the aircraft and the take-off point in real time so as to make sure that the aircraft successfully lands at the take-off point.

### ■ Landing Protection

The landing protection function uses the downward visual obstacle avoidance lens group and downward millimeter-wave radar of the aircraft to create a depth map, then calculate the flatness and angle of the depth map to detect whether the surface is flat enough for a safe landing.

## ■ Intelligent Obstacle Avoidance

The intelligent obstacle avoidance function uses the combined observation results of the visual obstacle avoidance sensing system and the forward millimeter-wave radar sensing system of the aircraft to calculate the optimal flight path, achieving obstacle avoidance in multiple directions.

### Important

- If there is no home point set, the aircraft will record the takeoff point as the default home point. When the home point is not refreshed in flight, the precise landing will initiate.
- When the precise landing function is enabled, users should ensure the takeoff environment does not change.

## 4.8.4 Hot Swap Battery\*

The aircraft supports hot-swappable batteries, which allows you to replace smart batteries without powering off the aircraft, thus avoiding waiting for rebooting. When performing a hot swap, it is recommended to replace the battery within 8 seconds to ensure that the new battery can be properly activated when powering on the aircraft.

### Important

- Before performing a hot swap, please enable the "Hot Swap Battery" function in the flight application. For more information, see "Autel Smart Controller V3 User Manual".
- After you remove the battery during a hot swap, the aircraft will enter low power mode. In this mode, the aircraft is powered by its internal supercapacitor. Therefore, you should complete the battery replacement quickly.
- The battery replacement time may vary under different temperatures. Please replace the battery within 8 seconds. If the replacement time exceeds 8 seconds, please reboot the aircraft. Hot swap operations in temperatures below -10°C may fail.

### Tip

- The hot swap function is only applicable to scenarios where RC is used to control the aircraft to fly.

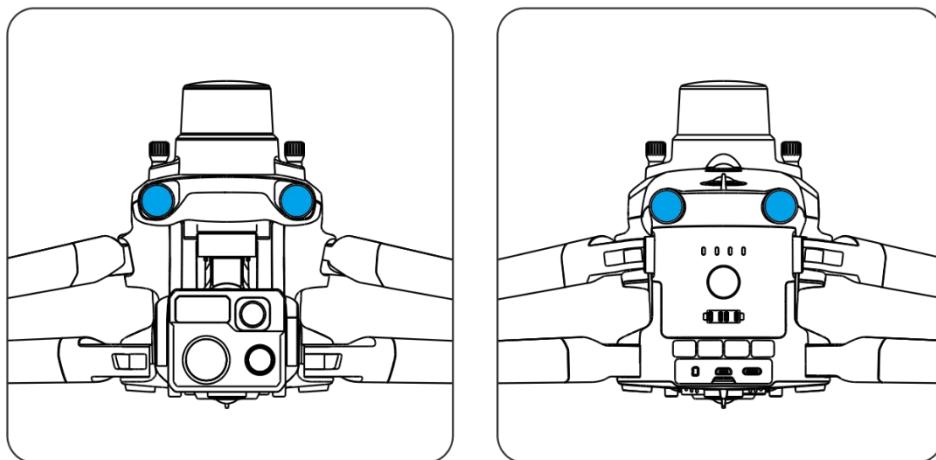
## 4.9 Obstacle Avoidance System

### 4.9.1 Introduction to Visual Obstacle Avoidance Sensing System and Millimeter-Wave Radar Sensing System

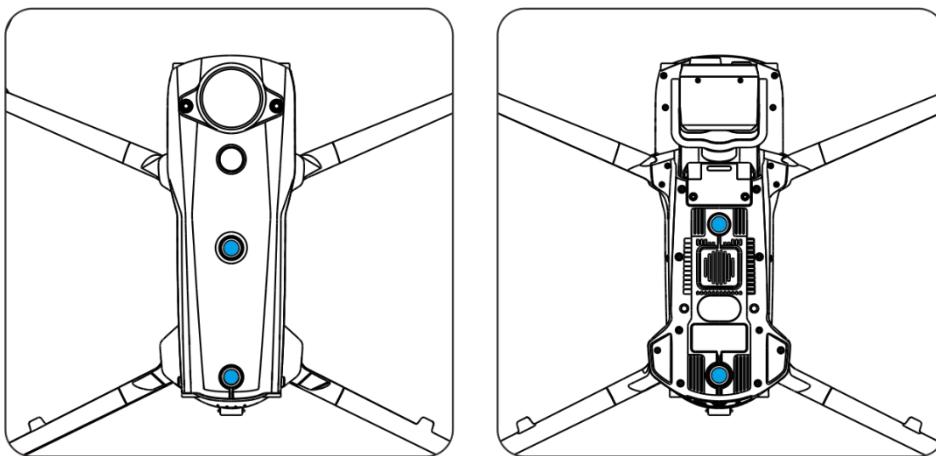
The aircraft adopts a dual-sensing system design of "Visual Obstacle Avoidance Sensing System + Millimeter-Wave Radar Sensing System". The integration of these two systems provides

excellent omnidirectional obstacle avoidance performance and ensures precise positioning and safe flight of the aircraft.

The visual obstacle avoidance sensing system is an image positioning system that uses visual image ranging to sense obstacles and obtain aircraft position information. The visual obstacle avoidance sensing system of the aircraft is located on the front, rear, top, and bottom of the fuselage. The front and rear parts use a "dual pinhole lens" structure, while the top and bottom parts use a "dual fisheye lens" structure, the combination of which enables omnidirectional visual obstacle avoidance.



**Fig 4-16 Front and rear visual obstacle avoidance lens modules of the aircraft**



**Fig 4-17 Top and bottom visual obstacle avoidance lens modules of the aircraft**

### **⚠ Warning**

- Do not block the lenses of the visual obstacle avoidance lens during flight, as it will affect the visual obstacle avoidance performance of the aircraft, potentially leading to flight accidents.

The millimeter-wave radar sensing system senses the distances and positions of obstacles by emitting electromagnetic waves. The aircraft adopts a six-direction millimeter-wave radar design, integrating millimeter-wave radars in six directions, namely, front, rear, top, bottom, left, and right on the inner side of the fuselage to improve obstacle avoidance performance.

## 4.9.2 Observation Range

### ■ Observation Range of Visual Obstacle Avoidance Sensing System

By using fisheye lenses, the visual obstacle avoidance sensing system achieves a 180° field of view (FOV) in both left and right directions, allowing for 720° all-around observation.

#### **!** Important

- The visual obstacle avoidance performance of the aircraft's visual obstacle avoidance sensing system is not 100% reliable, as the system may be affected by ambient lighting and object surface texture. When the visual obstacle avoidance system is enabled during flight, always pay attention to the image transmission screen and alarm information in the AICS or the flight application.

### ■ Observation Range of Millimeter-wave Radar Sensing System

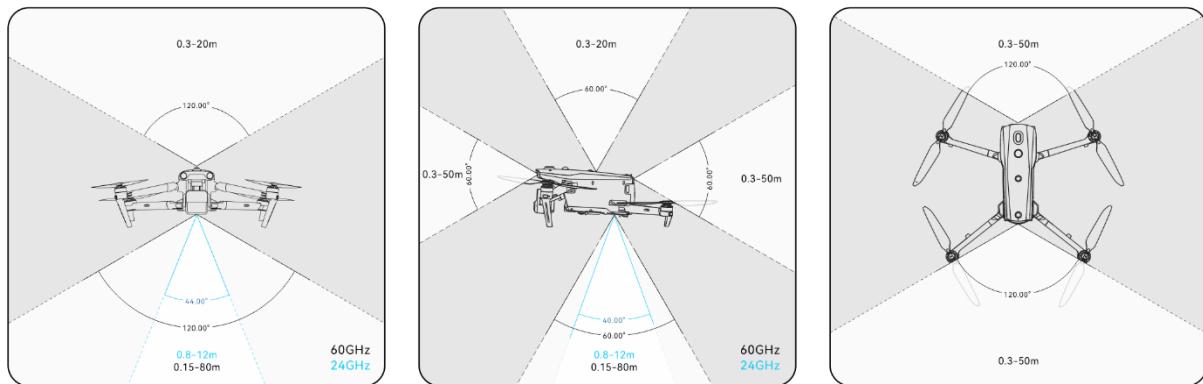


Fig 4-18 Observation Range of Millimeter-Wave Radars

#### **!** Warning

- The obstacle avoidance distance of the millimeter-wave radar sensing system varies with the obstacle's ability to reflect electromagnetic waves and its surface size.
- The gray area represents the blind spot of a millimeter-wave radar, where the radar cannot detect obstacles.

### ■ Observation Range of Radar and Visual Obstacle Avoidance Sensing Systems

With the integration of radar and visual obstacle avoidance sensing systems, the aircraft achieves 720° omnidirectional obstacle avoidance and supports nighttime obstacle avoidance.

## 4.9.3 Visual Positioning Function

The aircraft supports the visual positioning function. When the visual positioning is enabled, the aircraft will keep hovering when GNSS signal is poor, so as to ensure flight safety.

 **Warning**

- If you do not have extensive flight experience, do not fly the aircraft beyond your sight distance.
- When the aircraft is in visual positioning mode, please make sure that the aircraft flies in a well-lit environment and over object surfaces with clear texture and does not fly in mirror reflection areas such as water or snow.

 **Tip**

- When GNSS signal is strong, the aircraft will enter GNSS mode in which the visual positioning function is only used for assisting positioning and improving the aircraft's positioning accuracy.
- When there is no GNSS signal and visual positioning fails at the same time, the aircraft will enter the ATTI mode automatically.
- In the event of GNSS signal loss or weakening during flight, the remote controller will display the following warning prompts:
  1. If the takeoff point is inaccurate: The flight application will display a warning "GNSS signal is weak. The landing point may deviate." with a corresponding verbal warning.
  2. If GNSS signal is weak: The flight application will show a warning "GNSS signal is weak. Move the aircraft to an open area." with a corresponding verbal warning.
  3. If GNSS is being spoofed: The flight application will display a warning "GNSS Spoofing" with a corresponding verbal warning.

#### 4.9.4 Visual Obstacle Avoidance Function

The aircraft supports visual obstacle avoidance function. When there is sufficient light, the aircraft will detect obstacles within the flight range and brake within the set braking distance.

 **Note**

- After the obstacle avoidance behavior is set as "Emergency stop" or "Bypass" in the RC, or the OA mode in AICS is set as "Bypass", the obstacle avoidance function of the aircraft still may fail if there are obstacles that are too sparse in the flight route, such as sparse fine wire meshes or small branches at the outer edges of trees. To ensure flight safety, please choose an open and spacious airspace for flight.
- Due to inertial, to ensure the aircraft brakes within the braking distance set, the flight control system will limit the flight power performance of the aircraft and its attitude angle will be no more than 30° and its maximum flight speed will be less than 15 meter per second.
- For how to enable the obstacle avoidance function, please refer to "Autel Smart Controller V3 User Manual".

### Warning

- The obstacle avoidance function of the aircraft cannot be enabled when Ludicrous mode is set for the aircraft.

### 4.9.5 Precautions for Using Obstacle Avoidance Systems

The measurement accuracy of the visual obstacle avoidance sensing system is easily affected by factors such as light intensity and object surface texture. Exercise caution when using the visual obstacle avoidance sensing system in the following scenarios:

- Flying over pure-colored surfaces (e.g., pure white, pure black, pure red, and pure green) and low-texture surfaces.
- Flying over surfaces with strong reflections.
- Flying over moving objects (e.g., crowds, swaying reeds, bushes, and grasses).
- Flying over water surfaces or transparent object surfaces.
- Flying in environments with rapid and intense changes in lighting or direct exposure to strong light sources.
- Flying over extremely dim (with light intensity of less than 15 lux) or extremely bright object surfaces.
- Flying over small obstacles (e.g., iron wires, electric wires, and tree branches).
- Lenses contamination (e.g., water droplets and fingerprints).
- Flying in low-visibility conditions (e.g., heavy fog, heavy snow, and sandstorm).
- Flying at an altitude below 2 meters with a very fast flight speed.

The millimeter-wave radar sensing system operates as an auxiliary enhancement system for visual obstacle avoidance and can work continuously throughout the day.

### Note

- Please be noted that when flying in low-light conditions (such as at night), there is a strong possibility that the aircraft's visual obstacle avoidance sensing system may fail, leading to loss of visual obstacle avoidance function of the aircraft.
- If you need to fly in low-light conditions (such as at night), please confirm that the downward millimeter-wave radar of the aircraft is 60 GHz version. Additionally, please operate cautiously in nighttime flights, as in the nighttime obstacle avoidance is not 100% functional. It is recommended to fly in open areas.
- Please note that the aircraft does not support OA function in auto landing process. When you are setting home point, please make sure the home point and the airspace above are spacious with no obstacles; in some cases (such as critically low battery landing), when the aircraft is triggering auto landing, please take over the control of the aircraft in time to ensure the aircraft lands safely.

## 4.10 Auto-Return

The aircraft is equipped with an auto-return function. When the GNSS signal is good, once the auto-return condition is triggered, the aircraft automatically returns to the home point and lands to avoid possible accidents.

The aircraft provides three methods of activating the auto-return function: manual auto-return activation, low battery auto-return activation, and behavior-based auto-return activation.

### Note

- Home point: the landing point of the aircraft during an auto-return flight. In the flight application, you can set the home point of the aircraft as "Aircraft" or "RC". In AICS, the home point is the point where the aircraft takes off.
- If no home point is set in the flight application, the take-off point is used as the home point.
- During an auto-return, the control function of the remote controller for the aircraft is disabled. In this case, users can quickly press the pause button "" on the remote controller or press and hold it for 2 seconds to pause or exit the auto-return function, or pull the pitch stick down to exit the auto-return. After exiting the auto-return, the RC will regain control of the aircraft. For more information, please refer to "Autel Smart Controller V3 User Manual".

### Warning

- When the aircraft is in visual positioning mode or ATTI mode, the auto-return function cannot be activated.
- If the obstacle avoidance system is disabled during an auto-return flight, the aircraft will not be able to automatically avoid obstacles.
- If the home point of an auto-return flight is not suitable for the aircraft to land (such as uneven grounds and crowds), please exit the auto-return function first, and then manually assume control to land the aircraft.

### 4.10.1 Manual Auto-Return Activation

When using the RC to control the aircraft, users can press and hold the return-to-home button "" on the remote controller for 2 seconds until the RC emits a "beep" to manually activate the auto-return function. For details, please refer to "Autel Smart Controller V3 User Manual".

When using the nest to control the aircraft, users can click the one-key return button "" on the corresponding nest panel in the "Realtime" column of AICS to activate auto return. For details, please refer to Chapter 6 "[6.2.6 Realtime](#)".

### 4.10.2 Low Battery Auto-Return Activation

During the flight, to prevent unnecessary risks caused by insufficient power of the smart battery, the aircraft will automatically check, based on the aircraft's current position, whether the current battery level is sufficient for returning to home point.

If the current battery level is only enough to complete the return journey, AICS or the flight application will prompt a warning "The remaining battery is only enough for Return to Home. The aircraft will Return to Home in 10s." to prompt users to decide to execute low battery auto-return. If you choose to execute it or don't take any action within 10 seconds, the aircraft will initiate low battery auto-return after 10 seconds.

If you cancel the execution and continue flying with a low battery level, when the battery level decreases to critically low battery warning threshold, the aircraft will activate a critically low battery landing.



#### Tip

- Please note that besides the above intelligent low battery auto return, when the aircraft battery level decreases to the low battery warning threshold set in the flight application, the aircraft will also be triggered to return. The aircraft flight control system executes auto return no matter which one of those two scenarios occur.
- When critically low battery landing is triggered, in the process of landing, users can push and pull the remote controller sticks to adjust the landing location of the aircraft. After users stop using the sticks, the aircraft will continue to land.



#### Warning

- When the low battery auto-return is triggered in the aircraft, it is recommended that the auto-return process should not be canceled. Otherwise, the aircraft may be unable to return to the home point due to insufficient power.
- It is recommended that the aircraft should not enter the critically low battery landing process. Once the critically low battery landing process is initiated, if the landing point does not meet safe landing standards, the aircraft may have no sufficient battery to land in safe place, which may lead to aircraft damage.
- When AICS or the flight application displays a warning alert, it should be processed according to the corresponding references immediately.

### 4.10.3 Behavior-Based Auto-Return Activation

In scenarios where RC is used to control the aircraft:

- During a mission flight, if in the flight application "Finish Action" is set to "Auto RTH", the aircraft will activate auto-return after completing the mission; if "Signal Loss Action" is set to "Auto RTH", when the remote controller disconnects from the aircraft for 4 seconds, the aircraft will activate auto-return. For more information, please refer to "Autel Smart Controller V3 User Manual".
- During a manual flight, if "Signal Loss Action" is set to "Auto RTH", when the remote controller disconnects from the aircraft for 4 seconds, the flight application will display a

warning saying "Aircraft disconnected." and the aircraft will activate auto-return. For more information, please refer to "Autel Smart Controller V3 User Manual".

In scenarios where the nest executes the automatic flight:

- During a mission flight, if the complete action in the route addition interface is set to "Return:", the aircraft will activate automatic return after completing the mission; if the loss of link action is set to "Return", when the nest disconnects from the aircraft for 4 seconds, the aircraft will activate auto-return. For more information, please refer to Chapter 6 "[6.2.5 Planning](#)".



### Tip

- In the flight application and AICS, the signal lost action is set to "Return" by default.
- Within 4 seconds since the remote controller or the nest disconnects from the aircraft, the aircraft will continuously decelerate and attempt to reconnect the remote controller. If the reconnection is not successful within 4 seconds, the aircraft will activate the lost action auto-return.
- During the lost action auto-return process, even if the aircraft resumes connection with the remote controller or the nest, the aircraft will continue to execute auto-return.

#### 4.10.4 Auto-return Mechanism

**Table 4-13 Auto-return Mechanism**

Aircraft distance when the return mechanism is triggered	Return-to-Home Mechanism
Distance from the home point ≤ 10 meters	The aircraft returns to the home point at the current altitude.
10 meters < Distance from the home point ≤ 25 meters	If the current flight altitude is lower than 20 meters, the aircraft ascends to the altitude of 20 meters and returns to the home point. If the current flight altitude is higher than 20 meters, the aircraft returns to the home point at the current altitude.
25 meters < Distance from the home point ≤ 50 meters	If the current flight altitude is lower than 30 meters, the aircraft ascends to the altitude of 30 meters and returns to the home point. If the current flight altitude is higher than 30 meters, the aircraft returns to the home point at the current altitude.
Distance from the home point > 50 meters	If the flight altitude is lower than the set RTH altitude, the aircraft ascends to the RTH altitude. If the flight altitude is higher than the set RTH altitude, the aircraft returns to the home point at the current

altitude.

#### Note

- Aircraft distance refers to the horizontal distance from the current aircraft to the home point.

### 4.10.5 Auto-return Obstacle Avoidance Process

When the obstacle avoidance system is enabled and the light/altitude conditions meet working requirement of the visual obstacle avoidance sensing system, the aircraft will achieve obstacle avoidance during the return process. The specific situation is as follows:

- When the nest is used to control the aircraft for flight mission, During route planning, the obstacle avoidance mode is set to "Go Around". In the case of a lost action auto-return, low battery auto-return, or auto-return after mission completion, when an obstacle is detected in front of the aircraft, the aircraft will automatically brake within the set braking distance and autonomously choose a random direction from the left, right, or upward directions to bypass the obstacle.
- When the RC is used to control the aircraft for flight mission, if the obstacle avoidance mode in "OA settings" in the flight application is set to "Bypass". In the case of a lost action auto-return, low battery auto-return, or auto-return after mission completion, when an obstacle is detected in front of the aircraft, the aircraft will automatically brake within the set braking distance and autonomously choose a random direction from the left, right, or upward directions to bypass the obstacle.

#### Important

- During the obstacle avoidance process, if the aircraft's ascent altitude reaches the maximum altitude limit and obstacle avoidance is not yet achieved, the aircraft will hover in place until a critically low battery landing is triggered. In this case, please manually take control of the aircraft in advance.
- When the obstacle avoidance mode is set to "Bypass" or "Go Around", the aircraft will prioritize bypassing the obstacle from the left or right direction. If neither left direction nor right direction is feasible, it will choose to bypass the obstacle from above.
- In flight execution, if the obstacle avoidance mode is off, the aircraft will not be equipped with obstacle avoidance capability.

### 4.10.6 Landing Protection Function

When the landing protection function is enabled, the aircraft will assess whether the ground conditions are suitable for landing before landing. For more information, see "Autel Smart Controller V3 User Manual".

During the auto-return process, when the aircraft reaches above the home point and the landing protection function is enabled, the aircraft will execute the following strategies:

1. If the landing protection function detects that the ground is suitable for landing, the aircraft will land directly.
2. If the landing protection function detects that the ground is not suitable for landing (e.g., uneven ground or water below), the aircraft will keep hovering, send a prompt in the flight application, and wait for the user to take action. In this case, the aircraft will start descending only when a critically low battery landing is triggered, and the user cannot cancel this process.
3. If the landing protection function cannot detect ground conditions, the aircraft will descend to an altitude of 1.2 meter above the ground and enter the assisted landing process.

 **Note**

- Assisted landing: During the landing process, when the aircraft reaches an altitude of 1.2 meters above the ground, it will automatically descend slowly and the user does not need to pull the throttle stick.
- Before the aircraft enters the assisted landing process, make sure that the landing point is suitable for the aircraft to land.

## 4.11 Landing Protection Function

When the landing protection function is enabled, the aircraft will assess whether the ground conditions are suitable for landing before landing. For more information, see "Autel Smart Controller V3 User Manual" in Chapter 6.

During the auto-return process, when the aircraft reaches above the home point and the landing protection function is enabled, the aircraft will execute the following strategies:

1. If the landing protection function detects that the ground is suitable for landing, the aircraft will land directly.
2. If the landing protection function detects that the ground is not suitable for landing (e.g., uneven ground or water below), the aircraft will keep hovering, send a prompt in the flight application, and wait for the user to take action. In this case, the aircraft will start descending only when a critically low battery landing is triggered, and the user cannot cancel this process.
3. If the landing protection function cannot detect ground conditions, the aircraft will descend to an altitude of 1.2 meter above the ground and enter the assisted landing process.

 **Note**

- Assisted landing: During the landing process, when the aircraft reaches an altitude of 1.2 meters above the ground, it will automatically descend slowly and the user does not need to pull the throttle stick.
- Before the aircraft enters the assisted landing process, make sure that the landing point is suitable for the aircraft to land.

## 4.12 Rebuilding the C2 Link

To ensure the safety and controllability of flight behaviors, the aircraft will stay in reconnection status and constantly attempt to reestablish a connection with the ground control station (remote controller) after losing the C2 link. In practice, this process is divided into the following stages:

- Within the first 4 seconds after the link is disconnected, the aircraft will automatically decelerate and attempt to restore the C2 link. If the connection is restored within 4 seconds, the remote controller regains control of the aircraft.
- If the link is not restored within 4 seconds, the aircraft will automatically trigger the lost action. At this point, the aircraft will automatically execute relevant flight control actions according to the set lost action.
- During the execution of a lost action, the aircraft will continue its attempts to restore the C2 link. When the aircraft successfully restores the C2 link with the remote controller, the remote controller still cannot control the flight of the aircraft. To make the remote controller regain control of the aircraft, you must press and hold the pause button “” on the remote controller for 2 seconds or pull the pitch stick to exit the lost action.

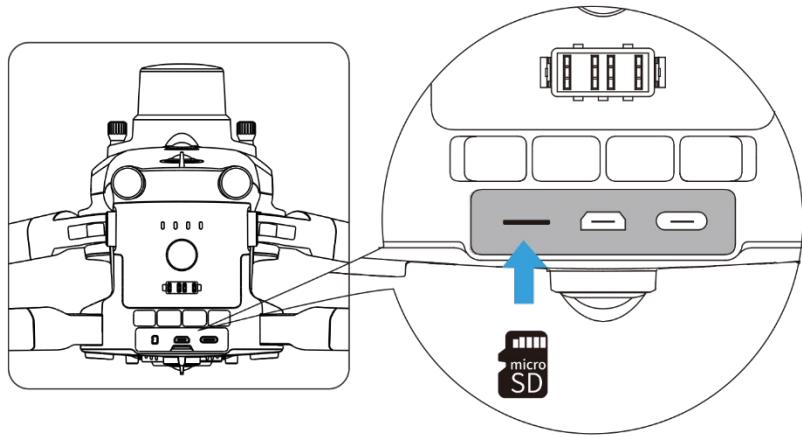


### Tip

- During the flight, as long as the aircraft and the remote controller can communicate normally, the C2 link will remain active.
- If there are decoding errors that persist for a certain duration, leading to communication failure, the C2 link will be disconnected, and the aircraft will enter the reconnection status.
- In the flight application in RC, the lost actions of the aircraft include RTH, hovering, and land. In AICS, the lost actions of the aircraft include Continue and Return.
- After the aircraft loses connection with C2 link, the flight application or the AICS will display an alert “Aircraft disconnected.” with a corresponding verbal alert.

## 4.13 Installing the microSD Card

The aircraft comes with a 64 GB microSD card (pre-installed in the microSD card slot of the aircraft at the factory). If you want to replace it with a higher-capacity microSD card, please follow the steps below.



**Fig 4-19 Installing the microSD Card**

**Tip**

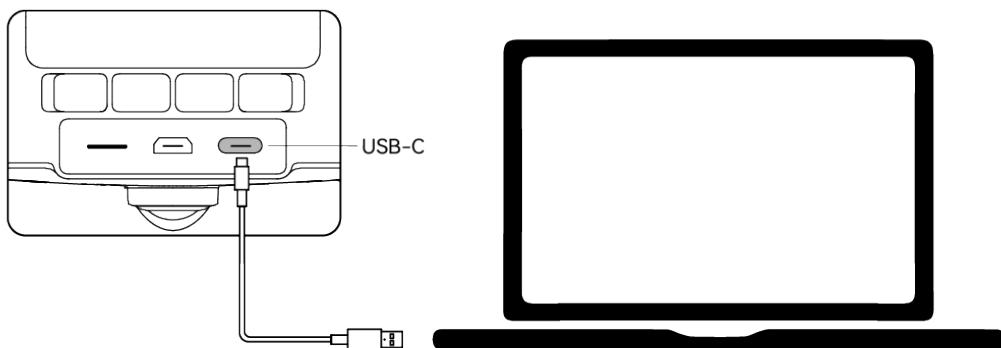
- The aircraft has built-in 128 GB storage space, with approximately 64 GB available due to system firmware and app updates.
- It is recommended that you prioritize using an external microSD card for storing the image data collected during flight to avoid running out of internal storage space, which will affect the flight safety of the aircraft.
- If you plan to shoot high-definition videos, we recommend using a Class 10, UHS-3, or higher microSD card.

**Warning**

- To prevent data loss, please turn off the aircraft before removing the microSD card.
- After installing the microSD card, close the rubber protective cover over the interface area promptly to avoid affecting the protective performance of the product.

#### 4.14 Connecting to PC/MAC

To transfer photos and videos to a PC, MAC, or other devices, please use a data cable to connect to the device through the USB-C interface of the aircraft.



**Fig 4-20 Connect to PC/MAC via Aircraft USB-C interface**

## 4.15 Extension Interface

The aircraft has a PSDK extension interface at its top, which uses the USB-C interface standard. The interface allows for additional functional mounts such as the RTK module and speaker and spotlight system.

### Note

- The nest kit includes a RTK module. When the aircraft is used with the nest, it is necessary to install a RTK module on the aircraft to improve its precise landing function.
- When users are using the RC to control the aircraft, they can choose functional mount according to their operation needs.

### Important

- Mounts for the aircraft are sold separately. If you need a mount, contact Autel Robotics.
- Do not plug a device that uses other USB-C interface standards into the PSDK extension interface, as it may damage the aircraft.
- Before flight, make sure that the mount is securely connected to the aircraft and the fixing screws on both sides are tightened.
- Pay attention to the battery level of the aircraft during flight. Functional mount consumes the battery power of the aircraft, which will reduce the flight time of the aircraft.
- After removing a mount from the aircraft, be sure to close the rubber protective cover over the interface area. Otherwise, the protective performance of the aircraft will be affected.

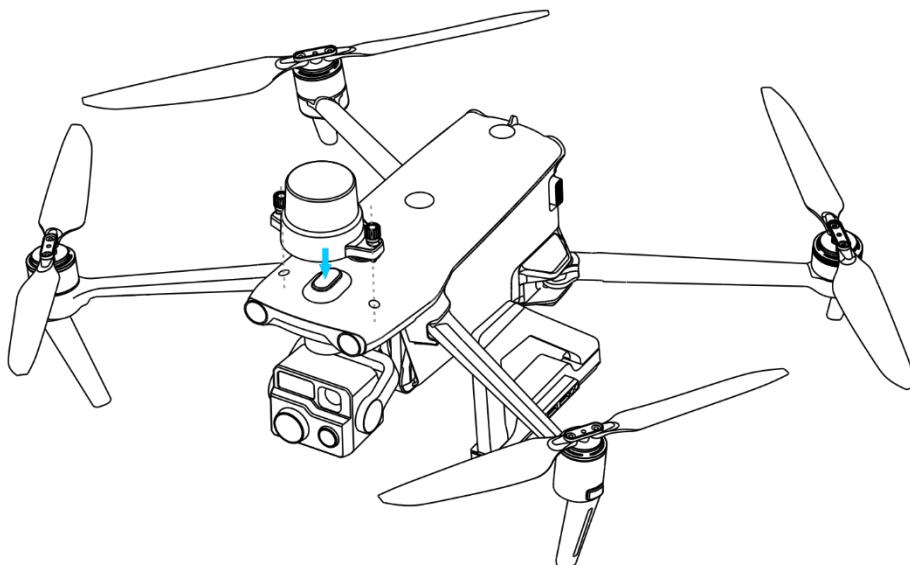
**Table 4-14 Compatible Mount List**

Mount Information	EVO Max Series RTK Module	DU4 Speaker and Spotlight System
Part Number (EAN)	6924991127222	6924991124795
Part Number (UPC)	889520207225	889520204798
Manufacturer	Autel Robotics	JZ Technology
Maximum Mount Dimension	73×49×46 mm	145×117×83 mm
Maximum Mount Weight	28 g	200 g
Functional Compatibility Requirements	Aircraft firmware version: 1.5.0.75 Remote controller version: 1.4.0.55 Flight application version: 1.2.18	Aircraft firmware version: 1.8.2.237 Remote controller version: 1.8.2.237 Flight application version:

**💡 Tip**

- Before using the above mount in the aircraft, make sure that the aircraft, the remote controller, and the flight application meet the functional compatibility requirements. If you use versions below those specified in the above requirements, the related functions cannot be enabled.
- When the aircraft is fully charged and is equipped with the RTK module, the hovering time will be extended to 37 minutes, and other aspects are not affected.

When the aircraft is used with the nest, a RTK module can achieve centimeter-level positioning accuracy after being installed on the aircraft. Please refer to the following figure to install the RTK module on the aircraft in the shutdown state. Other types of mounts are installed in a similar manner.



**Fig 4-21 Install a RTK Module on an Aircraft**

**💡 Tip**

- When the aircraft is used with the nest, you can use the RTK base station of the nest or the network RTK service. Wherein, the network RTK service requires users to prepare relevant RTK service accounts by themselves.

## 4.16 Protection Rating

Under controlled laboratory conditions, the aircraft (with smart batteries installed) can achieve an IP43 protection rating following IEC 60529 standards. The protection rating is not permanent and may degrade due to long-term wear and tear.

- It is not recommended to fly in rainy days or sandstorm days. In case of rain or sandstorm during the flight, abort the flight and return to a safe location promptly.
- Before flight, make sure that battery connector, battery compartment interface, battery surface, and battery compartment surface are dry and water-free before inserting the battery into the aircraft fuselage.
- After completing the flight, wipe off the rainwater on the aircraft fuselage before folding and storing the aircraft to prevent water from entering the aircraft and affecting its protective performance.
- Make sure that the battery connector and surface are dry and water-free before charging the battery.
- Damage caused by immersion in liquid is not covered by the warranty.

The aircraft does not have an IP43 protection rating in the following conditions:

- The aircraft is not installed with a battery or the battery is not properly installed.
- The gimbal is not installed on the aircraft.
- The rubber protective cover at the interface of the fuselage is not properly installed.
- There is other possible damage on the fuselage, such as shell cracks or waterproof adhesive failure.



#### Note

- Please strictly comply with the usage environment restrictions of the aircraft. Using the aircraft beyond specified conditions may lead to aircraft damage or safety incidents.
- The IP43 protection rating is not a universal feature of the aircraft and may require user customization.

## 4.17 Noise Description

The aircraft will generate a certain level of noise during operation. You should understand local noise pollution prevention regulations in advance and set an appropriate flight altitude or safe distance to ensure that it does not disturb other individuals, groups, or organizations.

### ■ A-weighted sound power level

The aircraft has passed sound power test conducted by relevant third-party testing organizations with qualification. The results comply with the regulations concerning unmanned aerial vehicles in the European Union.



**Fig 4-22 A-weighted sound power level of the aircraft**

### ■ A-weighted sound pressure level

Measurement results for the aircraft, in accordance with the requirements of GB 42590-2023 in Chinese mainland, are provided below:

**Table 4-15 Noise Measurements Results (normalized to 1 m from the aircraft)**

Observation Points	Hover	Fly (1 m/s)
Ground Measure Point (Below)	71.5dB	75.8dB
Side Measure Point (Horizontal Plane)	73.7dB	71.7dB

Note: The measurement environment is an outdoor cement ground.



- Before flight, please make sure to verify the noise restrictions in the flying area in advance to avoid any violation of local regulations regarding aircraft noise.

## 4.18 Aircraft Communication Frequency Band

The aircraft is equipped with excellent image transmission technology and has 4 image transmission antennas, with 2 channels of transmitting signals and 4 channels of receiving signals, so that the communication distance between the aircraft and the ground control station can reach up to 20 kilometers.

- It supports adaptive frequency hopping transmission of multiple frequency bands, selects the optimal channel according to the electromagnetic interference situation, and has strong anti-interference ability.
- The quality of real-time transmission reaches 1080p/30fps, and it has a high transmission bit rate of 64Mbps and low-latency transmission characteristics.
- The whole link data storage adopts the AES-128 encryption method to ensure that the communication data between end-to-end cannot be monitored.

 Note

- The transmission data is based on the ground control station and comes from test data, and the test environment and conditions are different, and the data may be different.
- The transmission range is for reference only. During use, please pay close attention to the quality of the image transmission signal in RC and the image transmission connection status in AICS. When the image transmission signal is weak, reduce the flight radius in a timely manner.
- Please note that the maximum communication distance of the included remote controller is 15 kilometers. To achieve a 20-kilometer communication distance with the aircraft, a ground control station device with stronger communication capabilities is required.

 Tip

- In actual use, after the aircraft and the remote controller is turned on and matched in frequency, the flight application in the remote controller will automatically determine and select the radio communication frequency band that complies with local regulations for the specific country or region based on the GNSS information received by the aircraft.
- Before flight, please ensure that the aircraft receives a strong GNSS signal after being powered on. This allows the AICS or the flight application to receive the proper communication frequency band.
- When the aircraft does not obtain GNSS positioning information after being turned on (for example, the aircraft enters visual positioning mode or ATTI mode right after being turned on), the radio communication frequency band between the RC and the aircraft adopts 2.4G frequency band by default; when the aircraft enters the visual positioning mode or ATTI mode from GNSS mode, its communication frequency band remains the same.

**■ Information of Image Transmission Frequency Bands for Aircraft**

The image transmission frequency bands of the aircraft comply with regulatory requirements worldwide. The relevant used frequency bands are listed in the table below.

 Tip

- Users can select legal image transmission frequency bands in the flight application. For details, please refer to "Autel Smart Controller V3 User Manual".

**Table 4-16 Aircraft Global Frequency Bands Used (Image Transmission)**

Operating Frequency	Details	Countries and Regions
900M	902-928MHz	<ul style="list-style-type: none"> <li>■ USA (FCC)</li> <li>■ Canada (ISED)</li> </ul>
2.4G	2400-2476MHz	<ul style="list-style-type: none"> <li>■ Chinese Mainland (SRRC)</li> </ul>
2.4G	2400-2483.5MHz	<ul style="list-style-type: none"> <li>■ USA (FCC)</li> <li>■ Canada (ISED)</li> </ul>

		<ul style="list-style-type: none"> <li>■ EU (CE)</li> <li>■ UK (UKCA)</li> </ul>
5.2G	5150-5250MHz	<ul style="list-style-type: none"> <li>■ USA (FCC)</li> <li>■ EU (Except Germany, CE)</li> <li>■ UK (UKCA)</li> </ul>
5.2G	5170-5250MHz	<ul style="list-style-type: none"> <li>■ Germany (CE)</li> </ul>
5.8G	5725-5829MHz	<ul style="list-style-type: none"> <li>■ Chinese Mainland (SRRC)</li> </ul>
5.8G	5725-5850MHz	<ul style="list-style-type: none"> <li>■ USA (FCC)</li> <li>■ Canada (ISED)</li> <li>■ EU (CE)</li> <li>■ UK (UKCA)</li> </ul>

### ■ Information of Wi-Fi Frequency Bands for Aircraft

The aircraft support the Wi-Fi Super Download feature. After the aircraft lands, it will automatically activate Wi-Fi. Other mobile devices can quickly transfer and download photos and video files captured by the aircraft by connecting to the aircraft's Wi-Fi.



- The aircraft is equipped with the hardware at the factory for the Wi-Fi Super Download feature. This feature will be available in future firmware updates. Please update accordingly when the feature is available.

The Wi-Fi frequency bands of the aircraft comply with regulatory requirements worldwide. The relevant used frequency bands are listed in the table below.

**Table 4-17 Global Frequency Bands Used (Wi-Fi)**

Operating Frequency	Details	Countries & Regions
2.4G (2400-2476MHz)	802.11b/g/n/ax	<ul style="list-style-type: none"> <li>■ Chinese Mainland (SRRC)</li> </ul>
2.4G (2400-2483.5MHz)	802.11b/g/n/ax	<ul style="list-style-type: none"> <li>■ USA (FCC)</li> <li>■ Canada (ISED)</li> <li>■ EU (CE)</li> <li>■ UK (UKCA)</li> </ul>
5.2G (5150-5250MHz)	802.11a/n/ax	<ul style="list-style-type: none"> <li>■ USA (FCC)</li> <li>■ EU (Except Germany, CE)</li> <li>■ UK (UKCA)</li> </ul>
5.2G (5170-5250MHz)	802.11a/n/ax	<ul style="list-style-type: none"> <li>■ Germany (CE)</li> </ul>

5.8G (5725–5829MHz)	802.11a/n/ax	■ Chinese Mainland (SRRC)
5.8G (5725–5850MHz)	802.11a/n/ax	■ USA (FCC) ■ Canada (ISED) ■ EU (CE) ■ UK (UKCA)

### Note

- Some countries and regions have strict restrictions on the use of radio communication frequency bands. It is crucial to use them legally, and any modification of communication modules is strictly prohibited.
- In Germany there's specific requirements for the 5.1G frequency band. Unmanned aerial systems are only allowed to use the frequency within the range of 5170MHz to 5250MHz.
- If flying in any countries not listed in the above table, please consult the local communication management authorities to ensure that the aircraft communication frequency bands comply with local regulatory requirements.
- The aircraft will automatically match the legal frequency band based on GNSS positioning, so users can use it with confidence.

## ■ RC Devices

In addition to the remote controller, the aircraft also supports matching with the nest for remote communication control over the aircraft.

**Table 4-18 Remote Control Device Support List**

Control Device Information	Autel Smart Controller V3	EVO Nest
Part Number (EAN)	6924991129011	6924991124474
Part Number (UPC)	889520209014	889520204477
Manufacturer	Autel Robotics	Autel Robotics
Control Software	Autel Enterprise Application	AICS
Software Version Requirement	V1.0.0.0 or higher	V1.0.0.23 or higher
Supplementary Information	Standard configuration	Nest Kit

### Tip

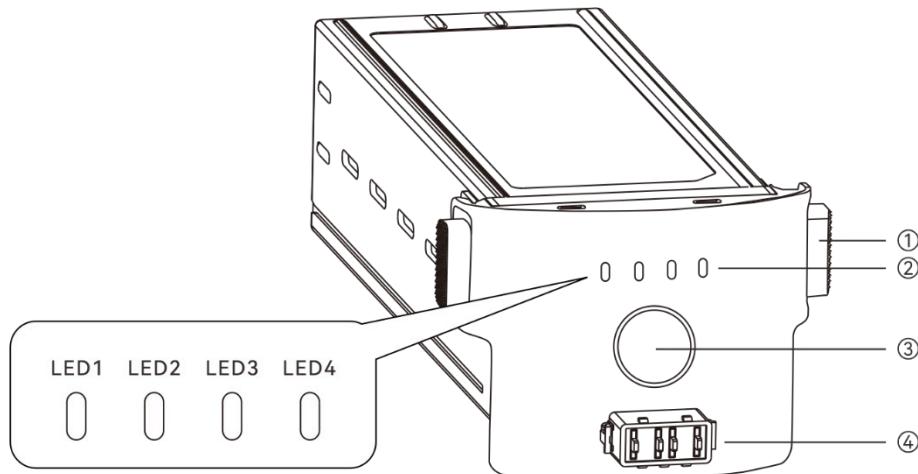
- Autel Smart Controller V3 has many retail versions. The RC that only installs Autel Enterprise flight application can be used to control EVO Max Series multi-rotor drone.

Please contact Autel Robotics to purchase according to your needs.

- When using the above devices to remotely control the aircraft, make sure that the software version meets the above requirements.

## 4.19 Smart Battery

The aircraft uses ABX40 smart battery as the power battery, which is a rechargeable lithium-ion polymer (LiPo) battery and features high energy density and capacity. Smart battery firmware is included the aircraft firmware. Please make sure the battery firmware is the latest version when using the battery.



**Fig 4-23 Battery Appearance**

**Table 4-19 Battery Appearance Details**

No.	name	Description
1	Unlock Button	To remove the battery from the aircraft, press and hold the unlock buttons on both sides and pull out the battery.
2	Battery Level Indicator	Used to display the current battery level of the smart battery in normal situations.
3	Power Button	Press and hold the power button for 3s to turn on or turn off the battery.
4	Charging Stand Connector	Used to connect the connection cable of the charging stand. After it is connected, it can be charged through the nest.

### ⚠ Warning

- Please use a smart battery within the appropriate temperature range (refer to the operating temperature of the aircraft). Using it in too high or low temperatures will affect the battery's safety and lifespan and may cause spontaneous battery combustion or

permanent damage to the battery.

- Do not use the aircraft in a strong electrostatic (such as thunderstorms) or electromagnetic environment. Otherwise, some functions of the smart battery may fail (e.g., abnormal battery output and power failure), resulting in serious aircraft malfunctions.
- Do not use a smart battery that has ever been dropped from the aircraft or subjected to external impacts.
- Do not use a water-soaked smart battery or immerse a smart battery in water or other liquids. Water contact inside the battery may cause corrosion, resulting in spontaneous battery combustion and even an explosion.
- Do not use a smart battery that emits smoke, is bulged, leaks liquids, or has a damaged appearance.
- The liquid inside the smart battery is corrosive. If it leaks, please keep away from it. If it accidentally contacts your skin or eyes, rinse immediately with clean water for at least 15 minutes and seek medical attention.
- Do not disassemble, puncture, strike, crush, or burn a smart battery in any way. Otherwise, it may lead to battery combustion or even explosion.
- Do not short-circuit the positive and negative terminals of a smart battery.
- If the battery connector of a smart battery is dirty, use a dry cloth to clean it. Otherwise, it may cause poor contact, leading to energy loss or charging failure.
- Before replacing the smart battery of the aircraft, make sure that the battery connector, battery compartment interface, battery surface, and battery compartment surface are dry and free of water, and then insert the battery into the aircraft.

#### 4.19.1 Smart Battery Functions

The smart battery has the following functions:

##### ■ **Battery Level Display**

The smart battery has a built-in battery level indicator, which shows the current battery level of the smart battery.

##### ■ **Self-heating**

This function allows the smart battery to operate normally even in low-temperature environments, ensuring flight safety. For more information, see “[4.18.5 Smart Battery Self-heating](#)” in this chapter.

##### ■ **Communication**

The aircraft can obtain real-time battery information, such as voltage, current, battery level, and battery temperature, through the communication interface on the smart battery.

##### ■ **Power Saving Mode**

The smart battery will automatically shut down after 30 minutes of inactivity to reduce power consumption.

##### ■ **Dust and Water Resistance**

When correctly installed in the aircraft, the battery has an IP43 protection rating.

##### ■ **Ultra-low Power Mode**

When the smart battery is idle for 12 hours and the battery level is less than 8%, the battery BMS will enter the ultra-low power mode to reduce self-consumption. When entering ultra-low power mode, it needs to be activated by a charger before it can continue to use normally.

## ■ Self-discharge Protection

If the smart battery is stored in a high-temperature environment or not used for 6 days with a high battery level, the self-discharge protection will be activated. The smart battery will automatically discharge to a battery level of about 60% (by default) and the discharge process takes 2-3 days.



### Tip

- Although the battery has no indication of a self-discharge cycle, you may notice that the battery is slightly warm, which is normal.

## ■ Sleep Mode Protection

If the smart battery has a low battery level, it will automatically enter sleep mode to prevent over-discharge. In this mode, the smart battery does not respond when the power button is pressed. To wake up the battery, you can connect it to a battery charger.

## ■ Charge Temperature Protection

The smart battery will stop charging when its temperature is lower than 5°C or higher than 45°C during charging, as charging the battery under such temperatures will damage the battery.

## ■ Overcurrent Protection

The smart battery will stop charging when the charging current is too high, as charging the battery with a high current can severely damage the battery.

## ■ Overcharge Protection

Charging will stop automatically when the smart battery is fully charged, as overcharging can severely damage the battery.

## ■ Balance Protection

The voltage of each battery cell in the smart battery is automatically kept balanced to protect the battery and maximize the performance of the battery.

## ■ Short Circuit Protection

Once a short circuit is detected, the power supply of the smart battery will be cut off to protect the battery.

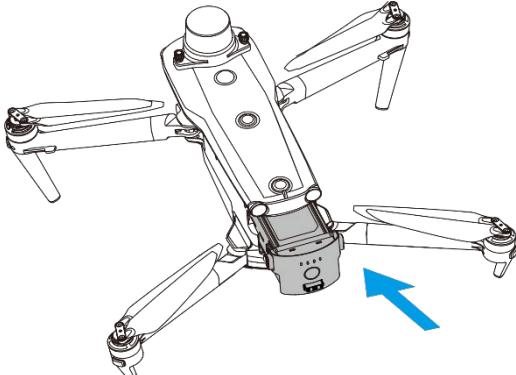


### Warning

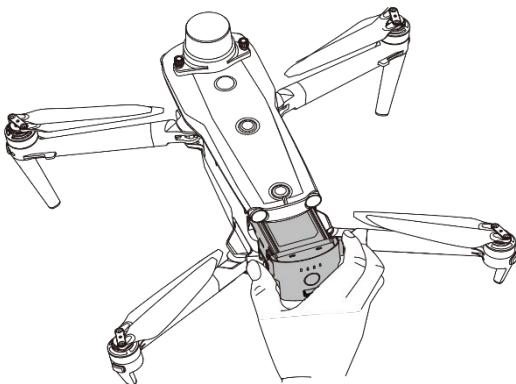
- Before using the smart battery, please carefully read and strictly follow the requirements in this Manual, "Battery Safety Operation Guidelines", and "Disclaimer", and those on the battery's surface sticker. The user shall undertake all consequences if he/she fails to follow the usage requirements.

## 4.19.2 Installing/Removing the Smart Battery

**Table 4-20 Install the Smart Battery**

Step	Operation	Diagram
1	Turn off the smart battery before installing the battery.	
2	Slowly insert the smart battery into the battery compartment on the aircraft fuselage, and you will hear a clicking sound when the battery is in place.	

**Table 4-21 Remove the Smart Battery**

Step	Operation	Diagram
1	Turn off the smart battery before removing the battery.	
2	Press and hold the unlock buttons on both sides of the smart battery and slowly pull out the battery.	

### ⚠ Warning

- If the smart battery is not installed properly, it may cause the battery to fall off during the flight, damage the aircraft, or even cause personal injury.
- Before installing the smart battery on the aircraft, make sure that the battery is turned off.
- The unlock buttons of the smart battery are wearable parts. Please do not press them hard to avoid any possible damage to the internal structure of the battery.
- In scenarios where the nest is used, before removing the old smart battery, please disconnect the charging stand and the battery; after replacing with new battery, please re-connect the charging stand and the battery.

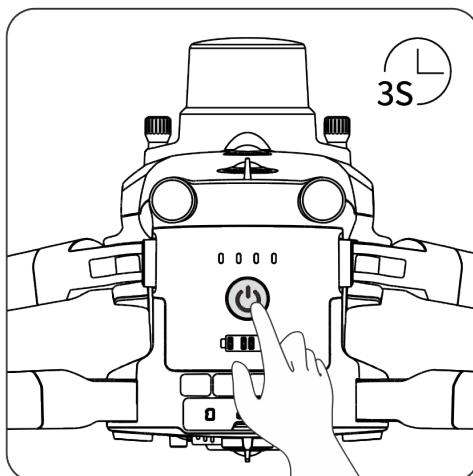
### 4.19.3 Turning On/Off the Smart Battery

#### ■ Turning On the Smart Battery

When the smart battery is turned off, press and hold the power button for 3 seconds to turn on the battery.

#### ■ Turning Off the Smart Battery

When the smart battery is turned on, press and hold the power button for 3 seconds to turn off the battery.



**Fig 4-24 Turn On or Off the Smart Battery manually**

#### ❗ Important

- If the smart battery is not installed in the aircraft, it is not recommended to turn on/off the battery, and attention should be paid to insulation protection at the battery connector.
- Before removing the smart battery from the aircraft, turn off the battery. The LED1 and LED4 battery level indicators on the smart battery will blink 5 times to indicate that the aircraft is shutting down. Remove the smart battery from the aircraft after all battery level indicators are off.

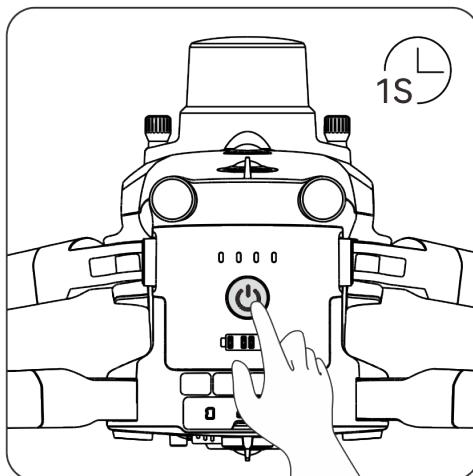
#### 💡 Tip

- When the aircraft is used with the nest, users can turn on or off the aircraft by using the nest.

### 4.19.4 Checking Battery Level

When the smart battery is off, short press the battery power button for 1 second to check the current battery level through the battery level indicator status.

After the aircraft is powered on, users can also check the indicator status for current battery level.



**Fig 4-25 Checking Battery Level When the Smart Battery is Off**

**Table 4-22 Battery Level Indicator Status (While Not Charging)**

0%~12%	13%~25%	26%~37%	38%~50%
51%~62%	63%~75%	76%~87%	88%~100%
<span style="font-size: small;">■: Green light is always on ①: Green light blinking ②: Off</span>			

### 💡 Tip

- After the aircraft is connected to the remote controller, you can check the current smart battery level of the aircraft in the top status notification bar or on the "Battery Information" interface of the flight application. For more information, see "Autel Smart Controller V3 User Manual".
- When the aircraft is used with the nest, users can check the real-time battery level of the aircraft smart battery in the device list of the "Realtime" column in AICS.

### 4.19.5 Smart Battery Self-heating

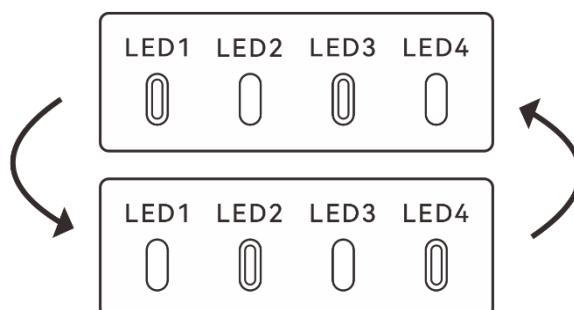
The smart battery has a self-heating function, which can increase the battery temperature in low-temperature environments, helping maintain good output performance.

- When the smart battery is installed in the aircraft and the battery power is turned on, if the battery temperature is lower than 15°C, the battery self-heating function will be activated. After the aircraft takes off, the battery self-heating function will be automatically turned off.
- If the smart battery is not installed in the aircraft, short press the power button for 1 second and then press and hold the power button for 3 seconds to activate the battery self-heating function to keep the battery temperature between 15°C and 20°C for 10 minutes. At this point, if you want to exit the battery self-heating function, short press the power button for 1 second, and then press and hold the power button for 3 seconds.
- When the smart battery is connected to the MDX120W battery charger and the battery power is turned on, if the battery temperature is lower than 5°C, the charger will supply power to the smart battery for self-heating. Once the battery temperature reaches 15°C, the self-heating function will be turned off.

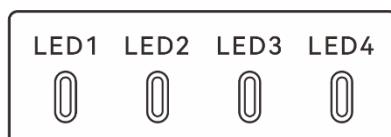
**! Important**

- When the self-heating function of the smart battery is manually activated, the battery should have at least around 10% of remaining power for self-heating.

When the smart battery is in the states of self-heating and heat preservation, the statuses of the battery level indicators are shown in the following table.



**Fig 4-26 Self-heating State**



**Fig 4-27 Heat Preservation State**

**Table 4-23 Battery Level Indicator Status**

No.	Description
1	LED1, LED3 and LED2, LED4 blink alternately in groups, indicating that it is heating.
2	The 4 LEDs blink at the same time, indicating that it has entered the heat preservation state.

0: Green light blinking 0: Off

### Warning

- When the temperature of the smart battery is lower than -10°C or higher than 70°C, the aircraft will not be allowed to take off. It is recommended to wait until the self-heating is over or the battery naturally cools down to an appropriate temperature before operating.
- When the temperature of the smart battery is lower than 5°C, the internal resistance of the battery will increase and the voltage will drop suddenly due to the low temperature, which will reduce the usable capacity of the battery and reduce the operating time of the aircraft. In low-temperature environments, make sure that the battery is fully charged before taking off.
- If the battery level of the smart battery is lower than 50%, it is not recommended to take off. When the battery level is low, it is difficult to activate the battery, which will reduce flight safety.
- During the flight, when the flight application prompts a low battery alarm, it is recommended to immediately return to the home point or land.
- In some low-temperature environments, even if the self-heating function is activated, the battery temperature may still not reach the usable temperature. In such cases, please add insulation measures during the heating process.
- In order to get the best performance from the smart battery, it is recommended to keep the battery temperature between 15°C to 35°C before flying.
- In a low-temperature environment, the self-heating time of the battery may be longer. It is recommended that you keep the battery warm in advance to shorten the self-heating time.

### Note

- When the aircraft is used with the nest, the air conditioning system inside the nest will keep the battery stay in the suitable working temperature, ensuring it can work normally in cold environment. For details, please refer to Chapter 3 "[3.9 Air Conditioning System](#)".

## 4.19.6 Charging the Smart Battery

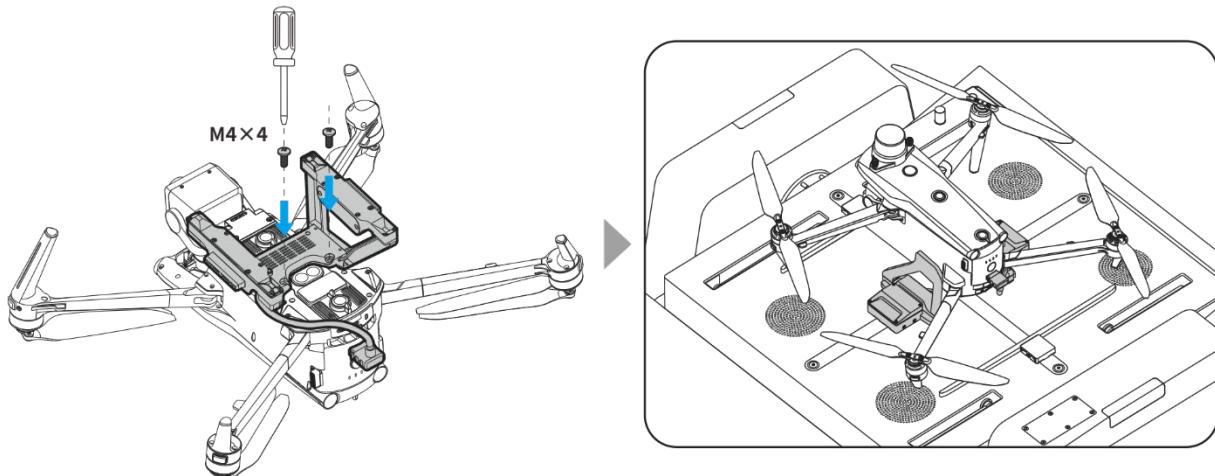
In scenarios where the aircraft is used with the nest, the aircraft can be charged through the nest, which requires the aircraft to be equipped with a charging stand. During charging, the air conditioning system of the nest will cool the battery to keep the battery temperature at a suitable charging temperature.

In the nest kit, the aircraft is equipped with a charging stand by default before leaving the factory. If the charging stand is damaged, users can refer to the following process to install a new charging stand:

1. Power off the aircraft, disconnect the old charging stand from the smart battery, and use a Phillips screwdriver to unscrew the two M4x4 Phillips screws that fix the charging stand to the aircraft's fuselage and keep them safe.
2. Install the new charging stand on the bottom of the aircraft, make sure that the U-shaped structure of the charging stand's connection plate faces the rear of the aircraft and that the limiting posts of the charging stand are inserted into the screw holes corresponding to the bottom of the aircraft. The limiting posts at the bottom of the aircraft are inserted into the

fixed limiting holes of the charging stand; use a Phillips screwdriver to insert the two saved M4x4 Phillips screws through the charging stand's fixed limiting holes and lock them into the screw holes of the aircraft's limiting posts to complete the fixation of the charging stand.

3. Insert the charging cable of the charging stand into the corresponding interface of the aircraft battery to ensure a stable connection.



**Fig 4-28 Install a charging stand on the aircraft**

### 💡 Tip

- The smart battery can also be charged through MDX120W battery charger or EVO Max series battery multi-charger. If necessary, you can contact Autel Robotics to purchase one of those chargers.

## 4.19.7 Storing, Transporting, Maintaining and Handling the Smart Battery

### ■ Storing the smart battery

When storing the smart battery, keep the battery away from water or heat sources and store it in a dry, well-ventilated environment at room temperature. Ideal storage conditions: The battery level is at around 60%, the ambient temperature is between 22°C to 28°C, and the ambient humidity is 65%±20% RH.

### ■ Transporting the smart battery

The energy of the ABX40 smart battery is 120 Wh. Please refer to local lithium battery transportation policies for battery shipping or carrying.

### ⚠️ Warning

- Before storing or transporting the smart battery, please turn off the battery.
- Store the smart battery out of the reach of children and pets.
- Store the smart battery away from direct sunlight, water, or reactive chemicals.
- Do not expose the smart battery to open flame, explosives, or other hazards.

- Do not store the smart battery in extreme temperatures. Otherwise, the lifespan of the battery may be shortened and the battery may even become damaged or ineffective. If the battery is not used for more than 1 day, it should be stored at temperature -10°C~+30°C.
- Do not place the smart battery in a microwave or pressure cooker.
- Do not place the smart battery directly on conductive surfaces (such as metal shells or panels).
- Do not place heavy objects on the smart battery. When subject to an external force, the battery may be damaged or even catch fire or explode.
- Do not store or transport the smart battery with sharp objects, watches, metal necklaces, earrings, or other metal items.
- Do not transport batteries that have a damaged appearance or a battery level of more than 30%.
- If the smart battery is left idle for a long time, please charge it every three months to avoid a shortened battery lifespan resulting from long-term low battery levels.

## ■ Maintaining the Smart Battery

In order to maintain the activity of the smart battery of the aircraft, it is recommended to perform battery maintenance if any of the following conditions are met:

- It is recommended to perform battery maintenance for the smart battery every 50 times of battery cycle.
- The idle time of the smart battery reaches 3 months.
- Occasionally, there are situations that affect the lifespan of the smart battery. In this case, you can try maintenance and repair.
- AICS or the flight application reminds you when the smart battery needs maintenance.

The following battery maintenance check items are available for the smart battery:

1. Perform a standard charge and discharge operation on the smart battery.
2. Insert the smart battery into the aircraft and turn on the power. Check the battery information through the flight application, whether the voltage difference between the battery cells is less than 0.1 V, and whether the battery firmware is up to date.
3. Check whether the smart battery is bulged, leaked, or damaged.
4. Check the battery connector for dirt, damage, or rust.

### Note

- Use the maintenance charging mode of the original charger, and proceed as follows:
  1. Use the battery charger MDX120W included in the standard aircraft kit to charge the smart battery to 100% and let the battery sit for 1 hour.
  2. Insert the smart battery into the aircraft to fly, control the aircraft to land when the remaining battery level is less than 20%, and then take out the battery.
  3. Let the smart battery sit for 8 hours.
  4. After the above operations are completed, a standard battery charging and discharging operation is completed.

## ■ Replacing and recycling the smart battery

When the battery meets the following conditions, please replace it with a new one and stop

using the old one to avoid flight safety accidents.

- There are obvious bulges, leakage, and damage on the smart battery surface.
- Damage to or irreparable rust on the metal contacts at the power supply interface of the smart battery.
- After the number of cycles of the smart battery reaches 200, it is recommended to replace the battery with a new one.
- After 2 consecutive standard charge and discharge operations, if the abnormal battery still cannot be repaired, it is recommended to replace it with a new one.
- If the smart battery is discarded due to damage, leakage, or other issues that compromise the integrity of the battery shell, it is recommended to completely immerse the battery in an insulated bucket filled with 5% salt water for more than 48 hours until the battery is completely discharged.
- If the smart battery is normally retired, confirm that it is completely discharged, and then properly recycle it according to local lithium battery waste disposal policies to avoid environmental pollution.

<b>!</b> <b>Important</b>
<ul style="list-style-type: none"><li>● When the smart battery catches fire, please use solid fire extinguishers such as sand or dry powder extinguishers.</li></ul>

- When the smart battery catches fire, please use solid fire extinguishers such as sand or dry powder extinguishers.

# Chapter 5 Nest Configuration

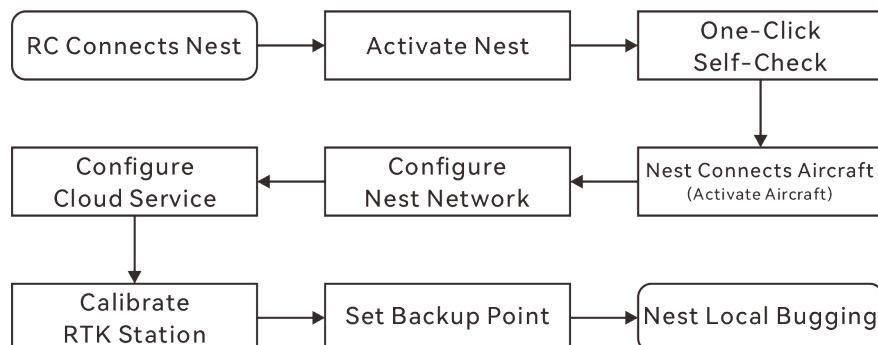
The built-in application of the nest is mainly used for the control and configuration of the nest to ensure its normal operation. Among them, the configuration entry is provided by the Autel Enterprise flight application on the remote controller. After the nest is installed and connected, it is necessary to perform related configurations (such as charging dock network configuration, cloud service configuration, RTK base station calibration, and backup landing point setting) and local debugging through the remote controller at the installation site.

## Note

- Please note that the built-in application of the nest does not provide a user interface. To configure the nest, you need to connect the remote controller to the nest via a wired connection and perform related operations on the "Nest local debugging" interface that prompts within the flight application.
- After the nest is initially installed or moved to a new location for the second time, relevant parameter configurations need to be performed. It is recommended that users prepare an EF9-3 smart remote controller to enhance the configuration experience.

## 5.1 Configuration Process

For the nest in first deployment and usage, please refer to following procedures to conduct relevant configurations:



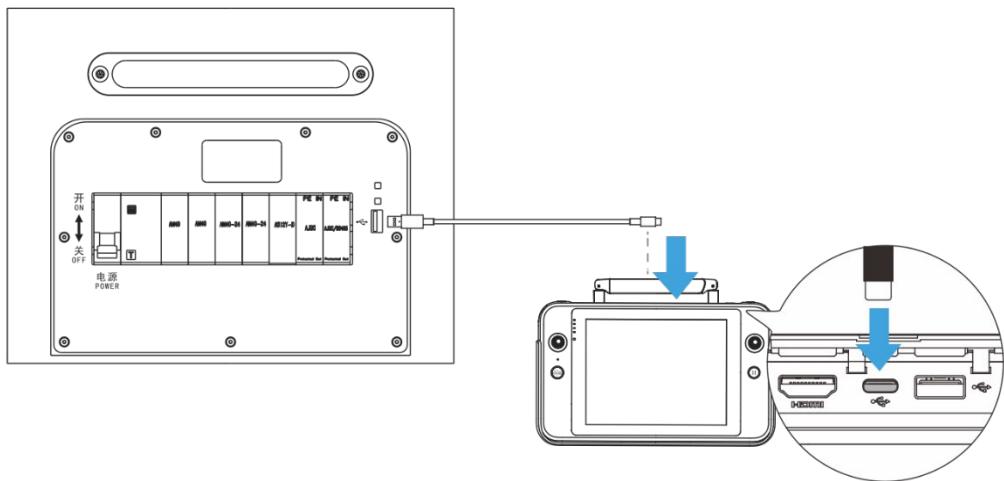
**Fig 5-1 First-Time Configuration Standard Procedures**

## 5.2 Configuration Preparation

After the nest is installed and pre-powered on check is performed, follow these steps to access the charging dock configuration interface:

1. Open the nest's power distribution cabinet and turn the miniature circuit breaker to the ON position to power on the charging dock.
2. Use the USB-A to USB-C data cable included in the aircraft packaging box to connect the USB-C interface of the remote controller to the USB-A interface inside the nest power

- distribution cabinet.
- Turn on the remote controller, make sure the RC can access the Internet, open the flight application, follow the on-screen prompts to activate the nest and perform the deployment process.



**Fig 5-2 Connect the RC to the Nest**

### ! Important

- New nest and aircraft need to be activated and matched in frequency for the first use, and relevant configurations need to be made. Please ensure that the remote controller can be connected to the Internet at the deployment site.
- Before connecting the remote controller to the nest, please ensure that the DEBUG button and the BOOT button in the power distribution cabinet of the nest are both in the released state.
- During local debugging, please ensure that you maintain a safe distance from the cabin door to avoid personal injury when testing the opening/closing of the cabin door.
- After local debugging is completed, please remove the connection between the remote controller and the nest and close the power distribution cabinet door.

## 5.3 Nest One-Click Self-Check

After completing the nest activation, enter the "One-click Self-check" page, and follow the on-screen prompts to check that the nest is correctly installed and connected, and that the nest equipment is in normal condition.

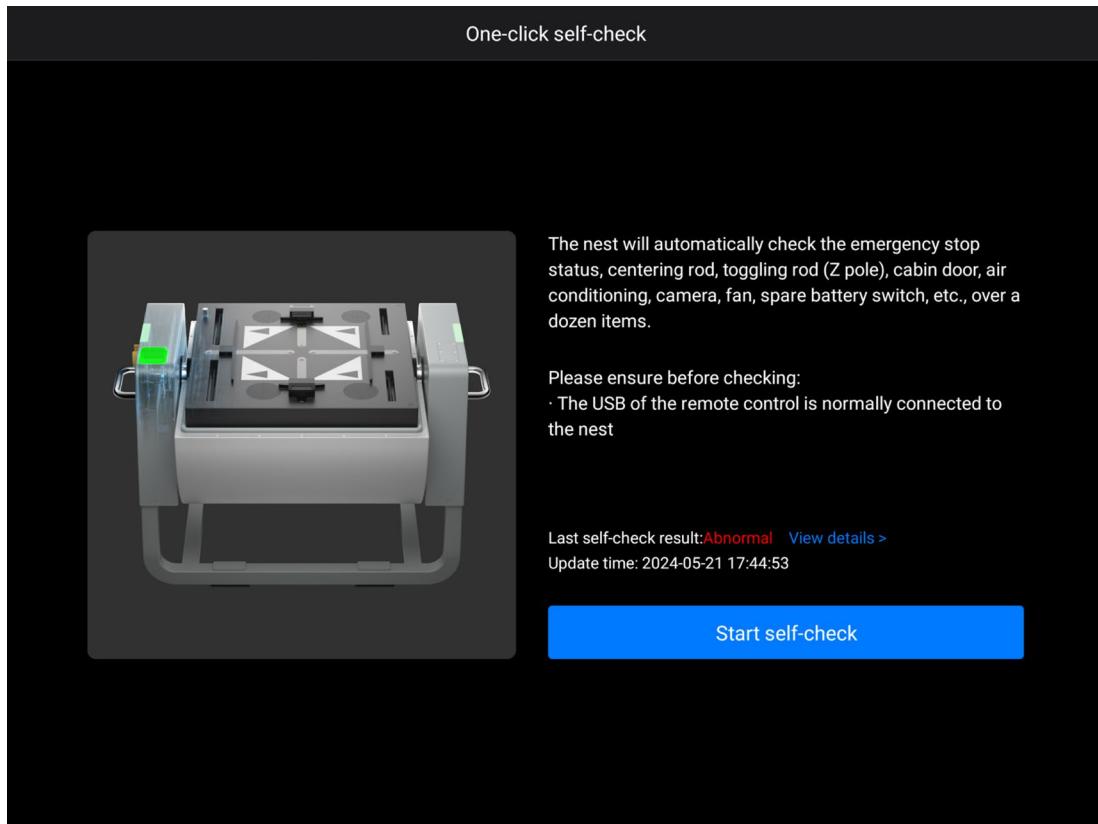


Fig 5-3 One-click Self-check Interface

## 5.4 Connecting Aircraft to Nest

After completing the one-click self-check process, click the "Next" button at the upper right corner of the "One-click Self-check" interface to enter the "Connect Aircraft to Nest" interface, and follow the on-screen prompts to frequency-match and connect the aircraft to the nest, and activate the aircraft.

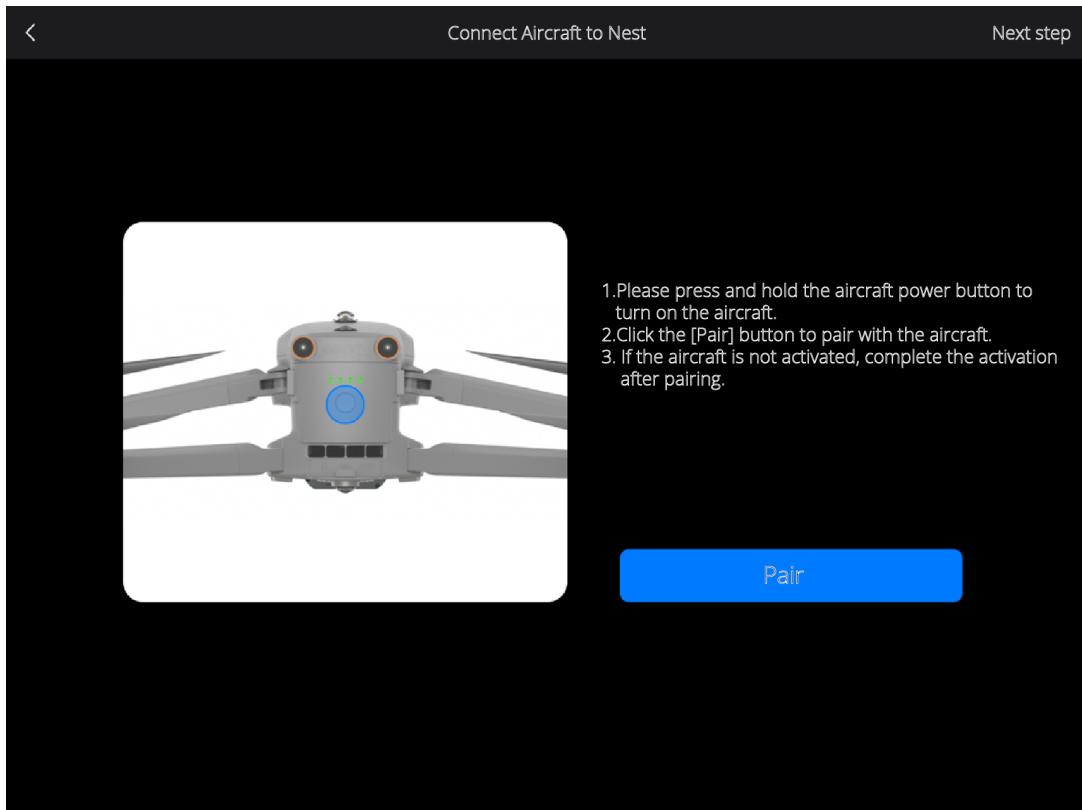


Fig 5-4 “Connect Aircraft to Nest” Interface

 **Tip**

- If the aircraft has not been activated, the activation interface will automatically pop up after the frequency matching connection between the aircraft and the nest.

 **Important**

- If the aircraft cannot be turned on due to low battery, you can place the aircraft (with charging stand) correctly on the landing pad in the direction of the nose and tail as indicated, and in the "Control console" column of the "Nest local debugging" interface, click the "Retract" button under the "Centering rod" to align the charging connector with the charging interface of the charging stand of the aircraft. Then, click the "Start charging" button under "Aircraft charging" to charge the aircraft through the nest.

## 5.5 Nest Network Setting

After completing the frequency pairing between the aircraft and the nest, click the "Next" button at the upper right corner of the "Connect Aircraft to Nest" interface to enter the "Nest Network Configuration" interface, and then click the "IP Address" and "DNS address" on the interface to set the network according to the actual network connection of the nest.

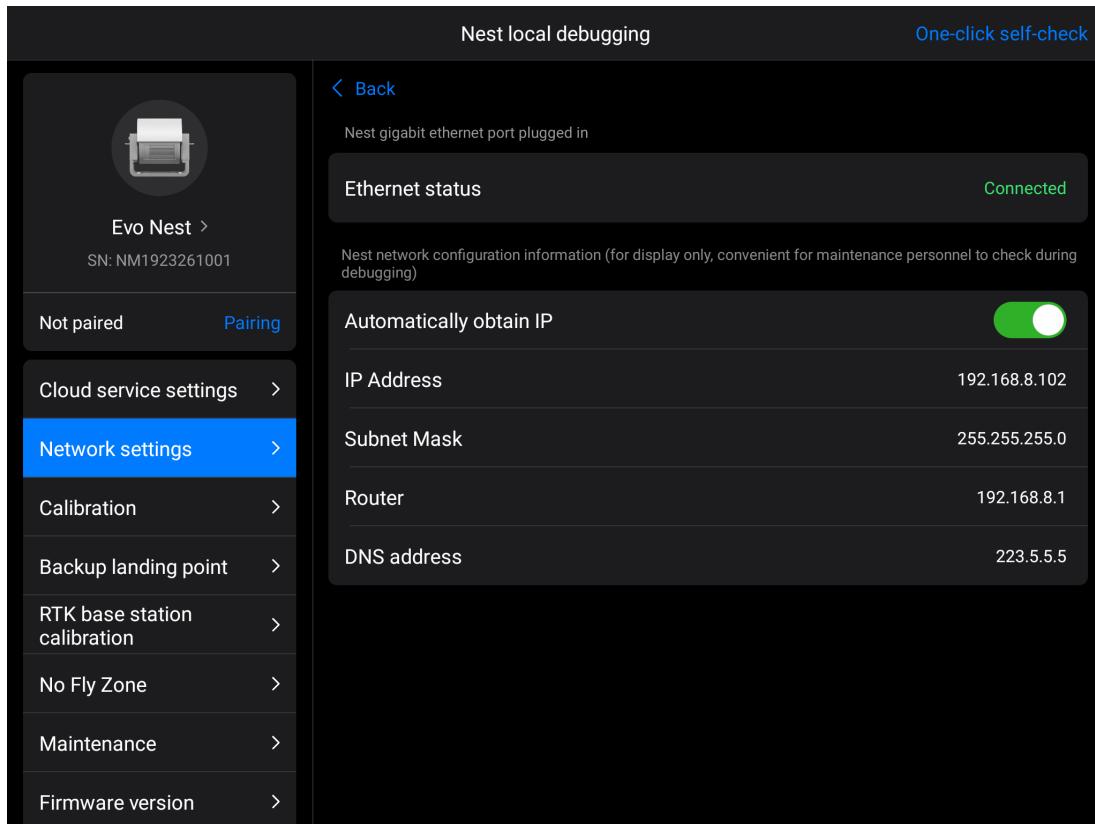


Fig 5-5 “Nest Network Configuration” Interface

### 💡 Tip

- Before configuring the nest network, please ensure the nest is connected to the network cable properly and network service is working well.
- Users can also choose to enable “Automatically obtain IP” to configure network.

## 5.6 Nest Cloud Service Configuration

After completing network configuration for the nest, click the "Next" button at the upper right corner of the "Nest Network Configuration" page to enter the "Cloud Service Configuration" page, and then fill in the relevant information according to the actual cloud service configuration method.

The nest needs to be configured with a cloud service platform before it can achieve remote device management and task planning.

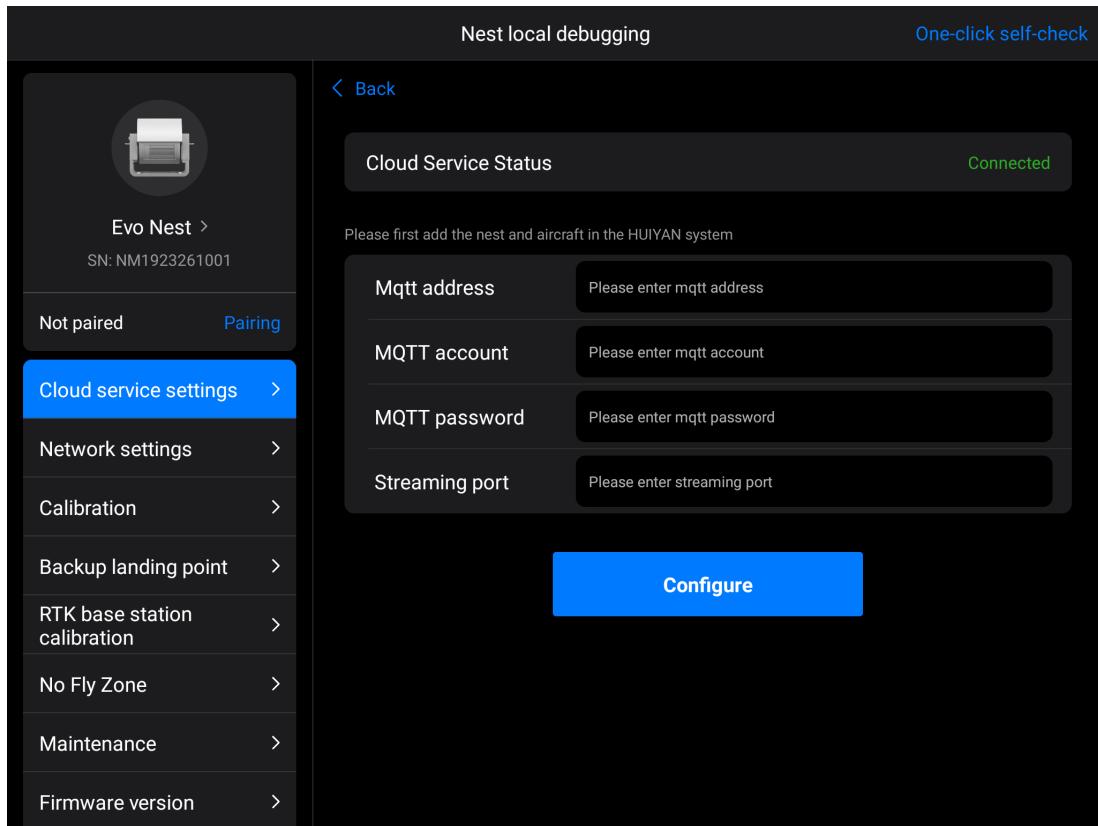


Fig 5-6 "Cloud Service Configuration" Interface

### **!** Important

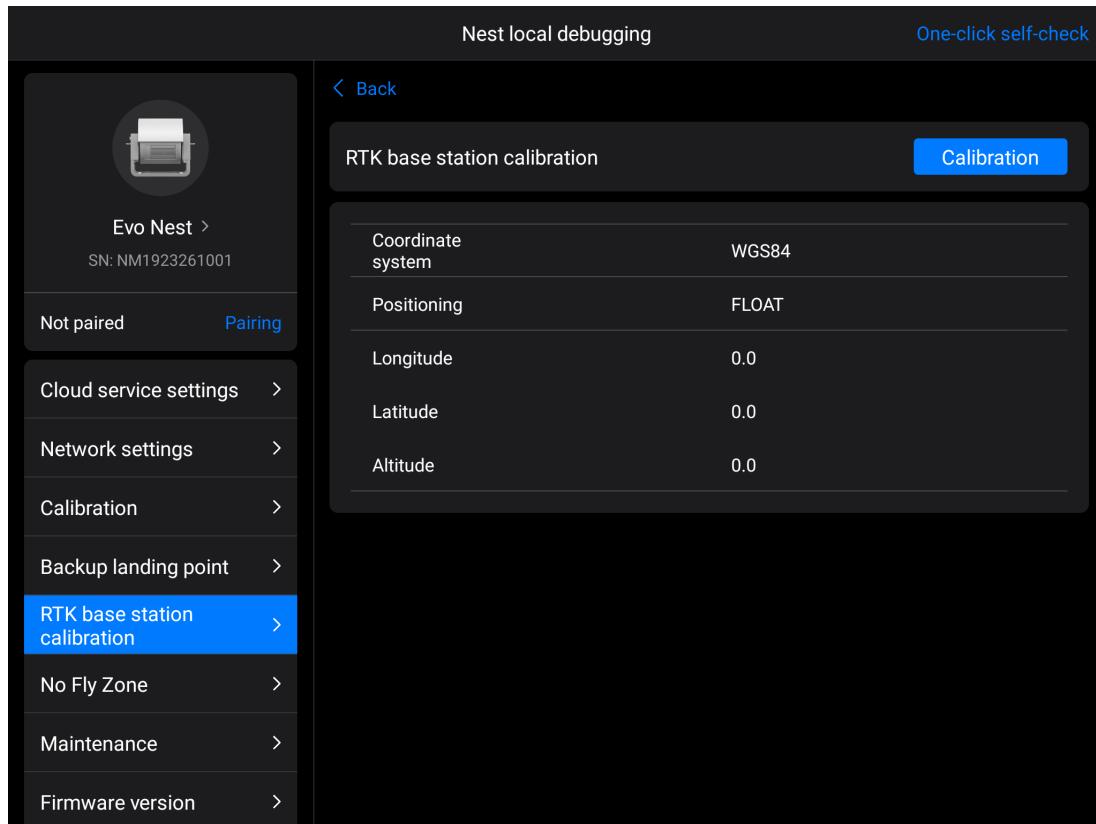
- The nest can be configured with a third-party cloud service platform or the cloud service platform provided by Autel Robotics. Different platforms may have different settings to fill in.
- When configuring the nest cloud service, users need to add relevant information about the nest and the aircraft to AICS in advance.
- When choosing the cloud service platform provided by Autel Robotics, please contact the organizational administrator to provide login addresses, accounts, and passwords for configuration and login.
- When choosing a third-party cloud service platform, please contact the backend administrator of the platform to provide the MQTT address, account, and password.
- The RTMP address is an optional item, please fill in as needed.

## 5.7 Nest RTK Station Calibration

To ensure that the aircraft can obtain accurate geographical coordinates to achieve accurate route flight when choosing the nest RTK base station service to perform tasks, it is necessary to calibrate the geographical location of the nest RTK base station to obtain high-precision absolute positions.

After completing the configuration of the nest cloud service, click the "Next" button at the upper right corner of the "Cloud Service Configuration" interface to enter the "RTK Base Station Calibration" interface, and then click the "Calibration" button to calibrate the nest RTK base

station.



**Fig 5-7 “RTK Base Station Calibration” Interface**

### ! Important

- Before performing RTK calibration, please ensure the device is running normally with nothing broken and normal network connection.

### 💡 Tip

- Nest RTK base station calibration supports two methods: manual calibration and network RTK calibration. Manual calibration requires a high-precision positioning instrument to be prepared in advance, while network RTK calibration requires an account and password provided by an RTK service provider.
- The location calibration data of the nest RTK base station is valid for a long time, and there is no need to recalibrate after the hive is powered off and restarted; however, if the nest's location changes, it needs to be recalibrated.

## 5.8 Backup Landing Point Setting

When the nest or the aircraft fails or is affected by external bad weather, the aircraft cannot land on the nest, it can land on the backup landing point.

After completing nest RTK station calibration, click “Next” button at the upper right corner of “RTK Base Station Calibration” Interface to enter the “Backup landing point setting” interface,

and click “Setting” button to set the backup landing point. Keep the aircraft turned on and place it within a range of 5 to 50 meters from the nest. Ensure that the position is safe for landing. Click the "Set backup landing point" button on the interface and save it to complete the backup landing point settings.

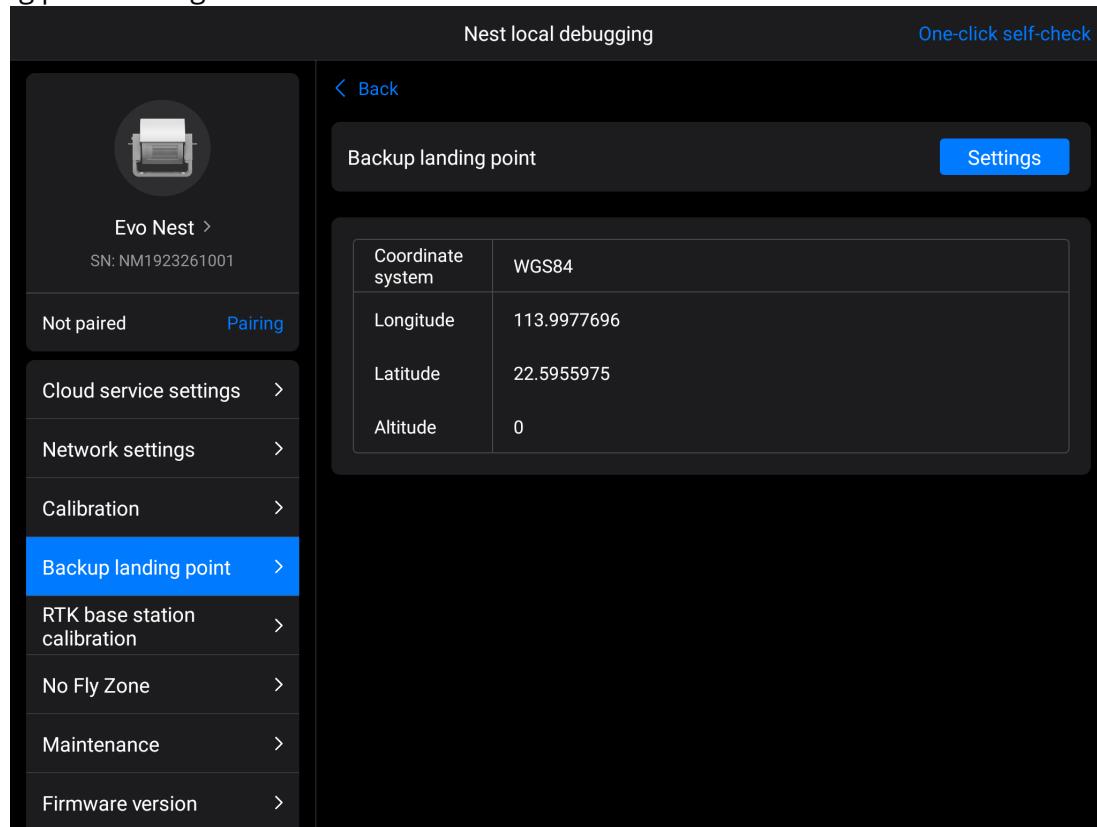


Fig 5-8 “Backup Landing Point Setting” Interface

### **! Important**

- When setting the backup landing point, a minimum safety landing distance of at least 5 meters from the nest must be reserved for the aircraft.
- The backup landing point must be marked clearly and ensure that there are no obstacles within a radius of 1 meter around the backup landing point.
- The backup landing point should be chosen in an open area as much as possible to avoid the aircraft encountering obstacles during landing and triggering obstacle avoidance, which may affect the safety of the aircraft.

## 5.9 Nest Local Debugging

After completing the settings of the backup landing point, click the "Finish" button at the upper right corner of the "Backup Landing Point Settings" interface to complete the deployment configuration of the nest, and it will automatically enter the "Nest local debugging" interface. On the "Nest local debugging" interface, the device information, related settings, nest status, and aircraft status will be displayed. Users can also test the related functions of the nest in the "Control console" column on this interface.

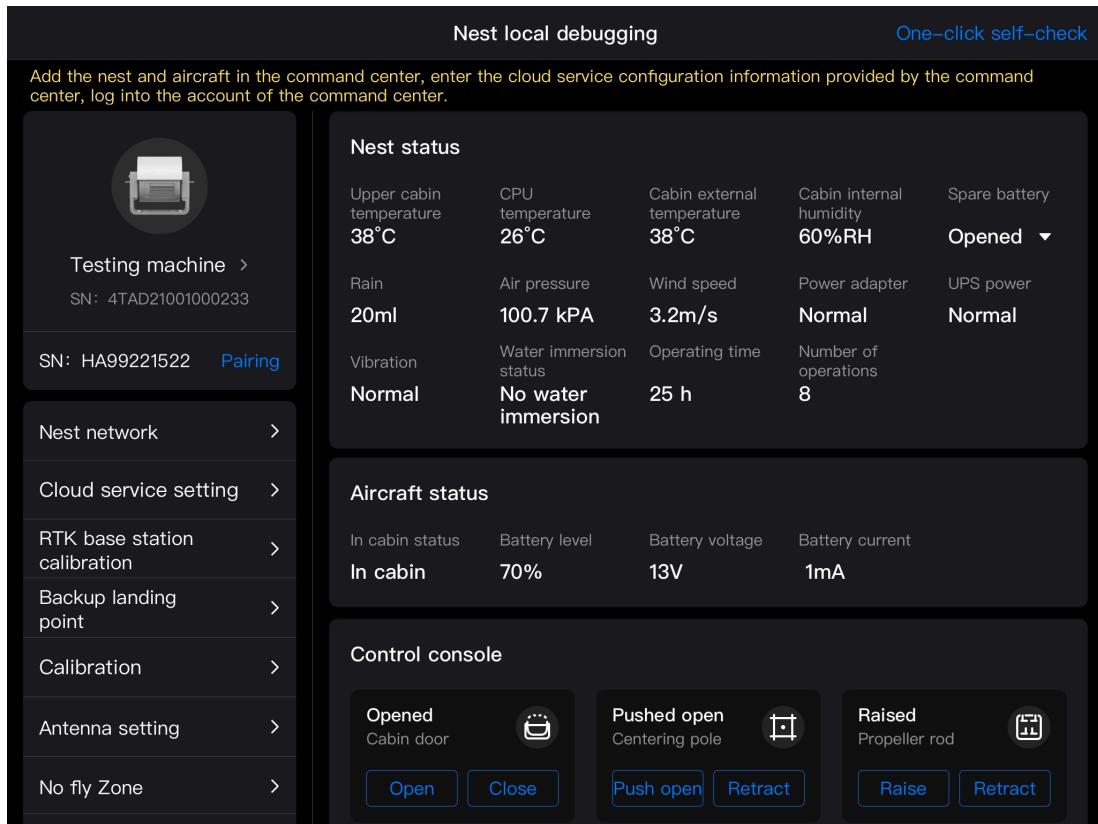


Fig 5-9 “Nest local debugging” Interface



- On “Nest local debugging” interface users can also click a setting item in the setting column at the lower left corner to configure corresponding setting.

## 5.10 Nest Calibration\*

When calibrating the nest using the remote control, if there is a movement deviation in the centering rod, propeller rod, or cabin door of the nest, you can perform the calibration procedure.

On the "Nest local debugging" interface, click the "Calibration" button in the settings column to enter the nest calibration interface. Select the component you want to calibrate from the drop-down menu on the interface and click the "Start calibration" button. Follow the on-screen prompts to perform the calibration operation and click the "End calibration" button to complete the calibration.

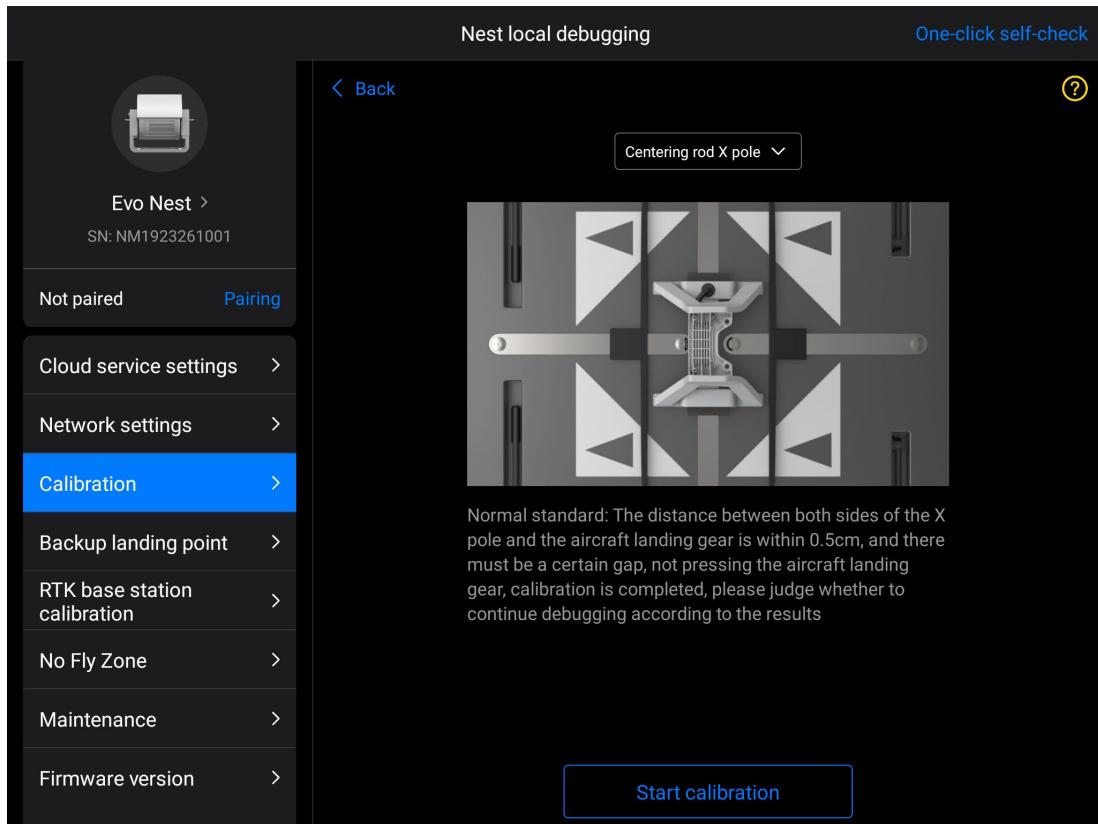


Fig 5-10 Calibration Instructions

**💡 Tip**

- Calibration program supports calibration of centering rods X and Y, propeller rods and cabinet door movement structure.
- When calibrating the centering rod, it is recommended to place the aircraft (with charging stand) on the landing pad, so as to check the gap between the centering rod and the charging stand.

## 5.11 Check No-Fly Zone\*

On the "Nest local debugging" interface, click the "No-fly Zone" button in the settings column to enter the no-fly zone viewing interface where users can also apply for lifting.

**💡 Tip**

- On the no-fly zone viewing interface, the red transparent mask covered area is the no-fly zone, and other areas are non-controlled airspace.
- Click the "Lifting Application" button at the upper right corner of the no-fly zone viewing page, and provide the corresponding official permission documents as required by the page prompt, which can provide permission for the aircraft. After the permission is granted, the drone will be able to fly normally in the authorized airspace.
- After applying for permission, it usually takes 24 to 48 hours to approve and take effect. It

is recommended that users apply for permission in advance.

## 5.12 Nest Maintenance\*

After the nest has been in operation for a period of time and reaches the specified maintenance cycle, a nest maintenance prompt will be displayed on AICS.

Users can also connect to the nest with a remote controller at the deployment site, on the "Nest local debugging", click the "Maintenance" in the settings column to enter the maintenance page to view maintenance records and operation and maintenance status.

## 5.13 Check Firmware Information\*

On "Nest local debugging" interface, click "Firmware Information" in the setting column where you can check relevant firmware information of the nest and the aircraft.



- After logging in to AICS, for details about how to upgrade the relevant firmware of the nest and the aircraft, please refer to "[7.1 Update and Upgrade](#)".

## 5.14 Confirm after Configuration\*

After completing the nest configuration through the built-in application of the nest, make sure the centering rods of the landing pad are in the extended state; place the aircraft (with charging stand) in the middle of the landing pad according to the nose and tail direction indicated on the landing pad. Rotate the propellers of the aircraft to make the two propellers into a 90° angle and store them in the landing pad to avoid breaking the propeller when closing the cabin door.

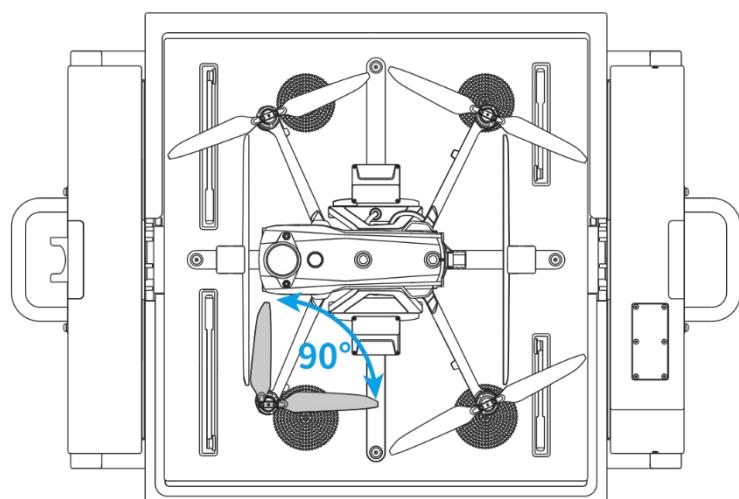


Fig 5-11 Place the aircraft on the landing pad

**! Important**

- The nose direction marked on the parking lot is the side where the weather monitoring pole is installed, and the tail direction marked is the side where the 4G Dongle module is installed.
- The configured nest must not be moved. If its position changes, relevant configurations need to be re-performed.

**💡 Tip**

- After completing all the checks and configurations of the nest, the user can view the status of the nest and the aircraft in real time on the "Nest local debugging" interface, and can also perform manual tests on the cabin door, centering rod, propeller rod, aircraft charging, aircraft power on/off, nest restart, air conditioning start, spare battery activation and emergency stop function.

# Chapter 6 Autel Integrated Command System

Autel Integrated Command System (AICS) is an aircraft comprehensive management and control platform which can be used with EVO Max series aircraft and EVO Nest to achieve unattended operation. Please read this chapter carefully to understand the operation details. AICS has core functions such as user management, asset management, route planning, task management, task result management, and situational awareness.

## Tip

- AICS supports multi-rotor drone (nest) and fixed-wing aircraft (nest). This chapter only introduces the part concerning multi-rotor drone nest.
- AICS provided by Autel Robotics supports public network access and private network deployment. If users have private network deployment requirements, please contact Autel Robotics for related support.
- Before using it for the first time, be sure to upgrade the relevant software and hardware such as the nest, the aircraft, and the smart battery to the latest version. For details, refer to "[7.1 Update and Upgrade](#)" in Chapter 7.
- This manual is written based on AICS V1.1.0.23, and the access to some functions may change with subsequent version upgrades. Please refer to the actual operation interface.

AICS public network visiting address: <https://skycc.autelrobotics.cn/>

## 6.1 Account System Description

AICS adopts a hierarchical account management mechanism, and different role accounts under the same enterprise have different platform operation permissions. The relevant description is as follows:

- The current AICS supports 4 types of user roles: owner, super administrator, regular administrator, and ordinary user.
- The permission of user roles within the same enterprise is owner>super administrator>regular administrator> ordinary user.
- The creator has the only highest permission within the enterprise, and can create three types of role accounts-super administrator, regular administrator, and ordinary user-, and can also dissolve the enterprise. After the creator role account hands over the creator role to another role account within the enterprise, it can exit the enterprise.
- Multiple super administrators can exist within the same enterprise, and super administrators can create two types of role accounts: regular administrator and ordinary user.
- Multiple regular administrators can exist within the same enterprise, and regular administrators can create ordinary user role accounts.
- High-permission role accounts within the same enterprise can manage low-permission role accounts, and accounts of the same user role cannot be managed.

 **Tip**

- The owner role account is provided by Autel Robotics or registered by the user (the account registration function will be available in the later version).
- After logging into AICS, each role account can create its own enterprise and become the enterprise creator, while having the highest operation permission within the enterprise.

## 6.2 Use AICS

### 6.2.1 Log in to AICS

Enter the access address <https://skycc.autelrobotics.cn/> of AICS in the address bar of the computer browser to enter the login page of AICS. Users can register an account on the login page and enter the account and password to log in.

 **Note**

- Under the current version, when logging in to AICS for the first time, the login account and password are created and provided by non-common users of the enterprise (owner/super administrator/regular administrator). Users can modify the password themselves after logging in.
- In the later version, the account registration function will be available, and users can register accounts and log in to AICS themselves. After logging in, users can create their own enterprise or accept invitations from other enterprises to join.
- If a private network deployment is used, please contact the relevant deployment personnel to provide the actual access address and a unique creator role account. The creator role account can create three types of role accounts: super administrator, regular administrator, and ordinary user within the enterprise.

 **Tip**

- To ensure a good access experience, it is recommended to use large-screen devices to access AICS and ensure that keyboard and mouse input devices can be accessed.
- It is recommended to use Google Chrome or the latest Chromium kernel browser for access.
- Click the drop-down menu of "Chinese" to switch the display language of AICS interface to "English".
- If a user's account is bound to multiple enterprises, when logging in, you need to select a certain enterprise to log in. After logging in, you can switch enterprises within AICS.

### 6.2.2 Functional Area

After logging in to AICS, users can refer to Chapter 1 "[1.4 Automatic Operation Procedures](#)" to become familiar with the usage process of AICS. The functional area layout of AICS is as follows:

## ■ Situation

Displays real-time space situation data panel, including "Ground Situation" panel and "Air Situation" panel:

- "Ground Situation" Panel: shows the total number of tasks, real-time weather, detection alerts, target identification statistics, and device operation status preview.
- "Air Situation" Panel: shows detection data analysis, distribution of detection targets by supplier, and device operation status preview.

## ■ Realtime

It is divided into "Event" sub-interface and "Device" sub-interface.

- "Event" sub-interface displays four categories: detection events, reconnaissance events, tag events, and whitelists.
- "Device" sub-interface displays the real-time operation status and alarm information of online devices. When the running device is a drone/hive, you can also view real-time task progress, real-time live footage, etc., and support remote control of the hive/drone.

## ■ Planning

It is divided into "Missions", "Routes", and "Execution Records" sub-interfaces.

- On the "Mission" sub-interface, you can create a new task or perform operations on existing tasks (sending tasks, viewing task flight records, viewing task details, and deleting tasks).
- On the "Routes" sub-interface, you can create a new route or perform operations on existing routes (editing routes, issuing them as tasks, copying routes, or deleting routes).
- On the "Execution Records" sub-interface, you can search, replay, add flight records to collection, or view media files corresponding to flight records.

## ■ Results

It displays media files (including photos and videos) generated by executed tasks in the area that you belong to.

## ■ Assets

It is divided into "Autel Enterprise", "Nest", "Remote Control", "Detection Device", and "Site" sub-interfaces.

- On the "Autel Enterprise" sub-interface, you can add new aircrafts or manage existing ones.
- On the "Nest" sub-interface, you can add new nests or manage existing ones.
- On the "Remote Control" sub-interface, you can add new controllers or manage existing ones.
- On the "Detection Device" sub-interface, you can add new detection and countermeasures equipment or manage existing ones.
- On the "Site" sub-interface, you can create new sub-sites under the corresponding site or manage existing ones.

## ■ Member

It displays all members in the current enterprise, in which you can add new members or manage existing ones.



### Tip

- After logging in, only the owner and super administrator have the permission to create new areas and assign users to them.
- Regular administrators and ordinary users can only view the relevant asset information in their respective areas and cannot view the asset information in areas that have not been assigned within the enterprise. Owners and super administrators can view the asset information in all areas of the enterprise.

### ■ Personal Center

Located at the lower left corner of the interface, it displays the information panel of the currently logged-in user. Users can modify their username, login password, and switch the interface display language of AICS here. They can also manage or switch the company bound to the current login user account and create a new company.

### 6.2.3 Member

Click “Member” to enter “Member” interface to manage members.

After a company is created, there is only one member account: owner. The owner can add new member or invite members from outside to complete the company member organization structure.



#### Tip

- After the owner creates a super administrator member account or a regular administrator member account:
  1. Super administrator can create regular administrator member account and ordinary user account by adding member or inviting members from outside.
  2. Regular administrator can create an ordinary user member account by adding member or inviting members from outside.

**Table 6-1 User Management Permissions of Different Account Members**

Function Menu		Owner	Super Admin	Regular Admin	Ordinary User
Member Management	View	√	√	√	√
	Add	√	√	√	×
	Import	√	√	√	×
	Delete	√	√	×	×
	Edit	√	√	√	×
	Reset Password	√	√	√	×
Role Management	View	√	√	√	×
	Add	√	√	√	×
	Edit	√	√	√	×
	Delete	√	√	×	×

### ■ Add Member

In “Member” interface, click “Add Member” button, and complete member adding in the Add Member interface.

	*Name	*Account	*Password	*Phone or Email	*Role Type	Operate
1	Please enter 0 / 30	Please enter 0 / 30	Please enter 0 / 20	Please enter 0 / 30	Please select	Delete

⊕ Add Member

Cancel Add

**Fig 6-1 “Add Member” Interface**



- When adding member, you can add multiple members at the same time. Items marked with \* are compulsory.

### ■ Invite Member

In “Member” interface, click “Invite Member” button, and enter the account number and set the role to invite the member in the prompted Invite Member interface.

	*Account	*Please select the role type	*Action
1	Please enter 0 / 30	Please enter	Delete

⊕ Invite Member

Cancel Add

**Fig 6-2 “Invite Member” Interface**



- When inviting member, you can invite multiple members at the same time. Items marked with \* are compulsory.

### ■ Manage Members

In “Member” interface, after choosing the member in the member list, you can edit it, reset its password or delete it.

- Edit: Edit name, role, phone or email and account.
- Reset Password: Modify the member login password.
- Delete: Delete the member selected from the company member organization structure.
- Batch Delete: After selecting multiple members, delete selected members from the company member organization structure.

## 6.2.4 Assets

Click "Assets" to enter "Autel Enterprise", "Nest", "Remote Control", "Detection Device", and "Site" sub-interfaces. In different sub-interfaces, you can perform different operations.

**Table 6-2 Assets Management Permissions of Different Account Members**

Function Menu		Owner	Super Admin	Regular Admin	Ordinary User
Device Management	View	√	√	√	√
	Add	√	√	√	✗
	Edit	√	√	√	✗
	Delete	√	√	✗	✗
	OTA Upgrade	√	√	√	✗
Firmware OTA Management	View	√	√	√	√
	Add	√	√	√	✗
	Edit	√	√	√	✗
	Delete	√	√	✗	✗
	Assign Permission	√	√	√	✗
Site	View	√	√	√	√
	Add	√	√	√	✗
	Edit	√	√	√	✗
	Delete	√	√	√	✗
	Assign Permission	√	√	√	✗

### ■ Add Site

After completing member addition, it is necessary to add work sites for refined management. In the "Site" sub-interface, click the "Add Site" button to add sites on the new site. When adding, place a target point on the map by mouse, which will be the center point of the area. Click the "OK" button to complete the site addition operation.



**Fig 6-3 “New Site” Interface**

### ■ Manage Sites

In the "Site" subpage, after selecting a region from the site list, you can perform the following operations:

- Details: View the basic information of the site (site ID/site name/supervisor/creation time) and the permission allocation of each role account under the enterprise user organization structure in the site.
- Edit: Edit the site again in the pop-up edit site page.
- Add sub-site: Add a sub-site under the selected site as the superior.
- Delete: Delete the selected site from the enterprise site list.
- Batch delete: After selecting multiple sites, you can delete the selected sites in batches.



#### Tip

- Items marked with \* are compulsory to add site.
- After the site area center is set, the latitude and longitude information of the placed target point will be automatically displayed, and the user can also drag the target point on the map to adjust its position.
- When adding a site area, if you do not select the superior area, the newly created area will be defaulted as a first-level area.

After adding a site, it is required to add equipment.

### ■ Add Aircraft

On the "UAV" sub interface, click the "Add Aircraft" button and complete the addition of the aircraft on the pop-up Add Aircraft interface.

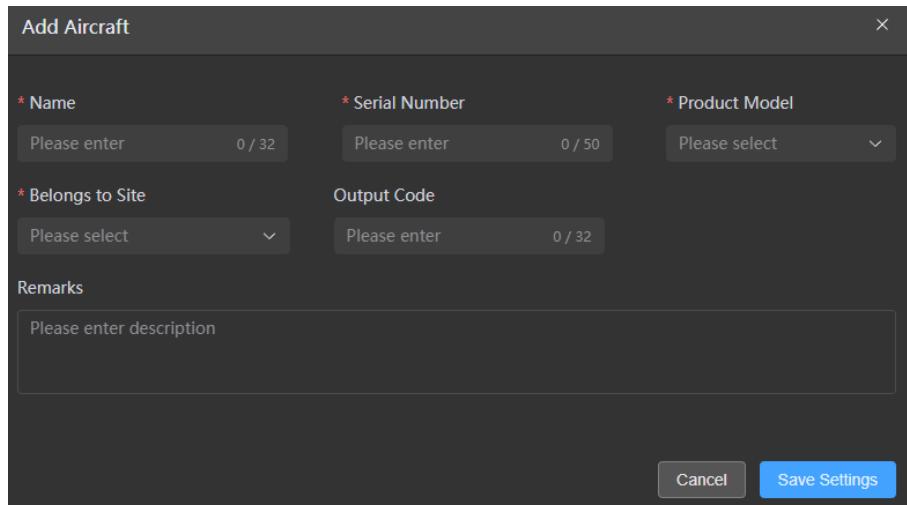


Fig 6-4 “Add Aircraft” Interface

## ■ Manage Aircraft

In “UAV” sub-interface, after choosing the aircraft in the aircraft list, you can perform following operations:

- Firmware version information: You can view the device information, firmware version, and upgrade history of the aircraft on the pop-up firmware version information page.
- View last position: You can view the relative altitude, absolute altitude, and latitude and longitude information of the aircraft’s last position on the pop-up last position page.
- Detail: You can view the device information, status, and re-edit the device information of the selected aircraft.
- Edit: You can re-edit the device information on the pop-up Edit Aircraft page.
- Delete: You can delete the selected aircraft from the company aircraft list.
- Batch Delete: After selecting multiple aircrafts, you can delete selected aircrafts in batch.



### Tip

- Items marked with \* are compulsory to add an aircraft.

## ■ Add Nest

On the "Nest" subpage, click the "Add Nest" button and complete the addition of the nest on the pop-up Add Nest interface.

On the "Nest" subpage, click the "Configuration Information" button to view relevant configuration information (MQTT Address/Account/Password) in prompted configuration information interface.

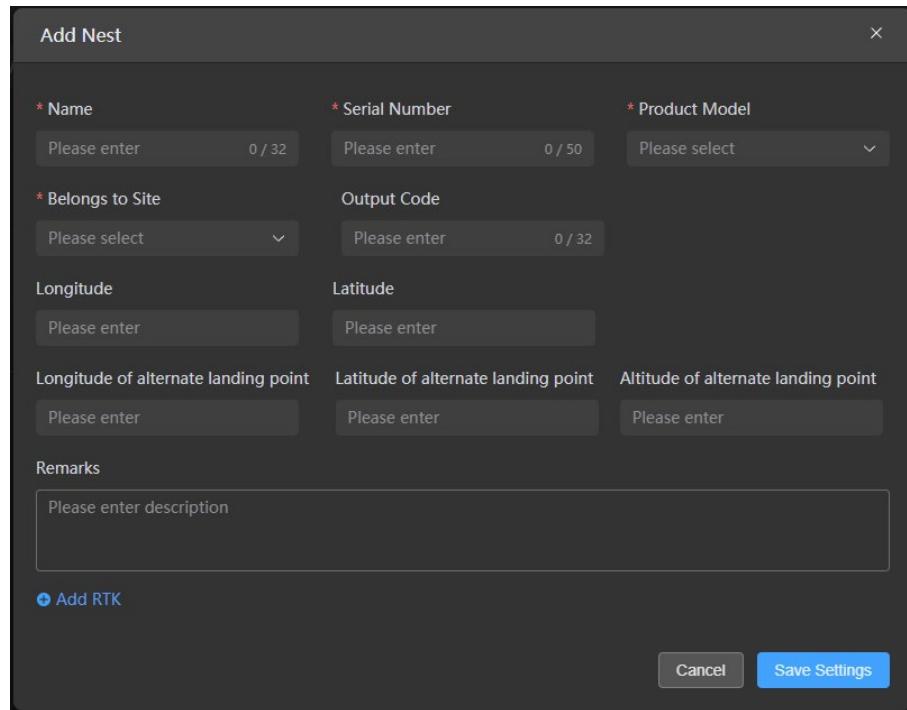


Fig 6-5 “Add Nest” Interface

### Tip

- Items marked with \* are compulsory to add a nest.
- When adding a nest, please conduct nest RTK station calibration and backup landing point setting.
- In “Add Nest” interface, users can configure one or many network RTK service accounts.

### ■ Manage Nest

In “Nest” sub-interface, after selecting the nest in the nest list, you can perform following operations:

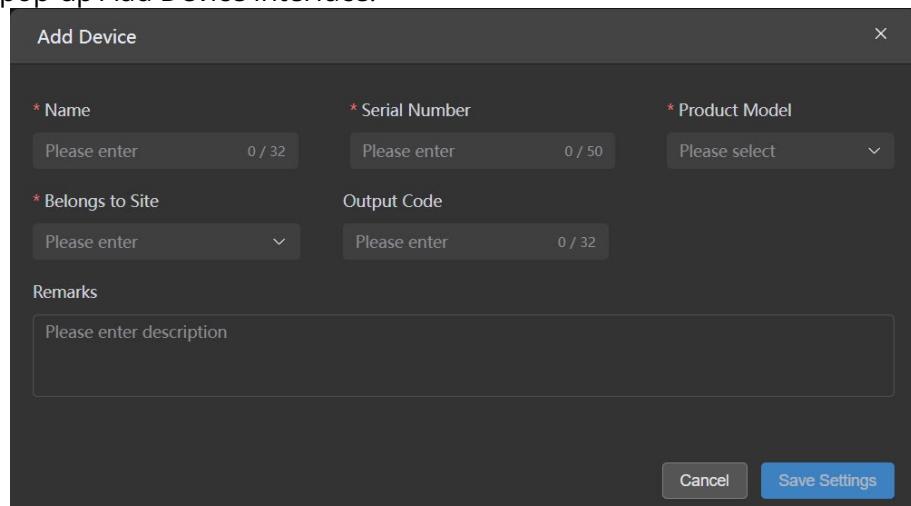
- RTK Position Calibration: You can complete the position calibration of the RTK base station of the nest on the pop-up RTK attribute page, including latitude, longitude, and height.
- Firmware version information: You can view the device information, firmware version, and upgrade history of the nest on the pop-up firmware version information page.
- View the takeoff and landing height of the nest: You can set the takeoff and landing heights of the aircraft on the pop-up page for setting the takeoff and landing height of the nest.
- View alternate landing point: You can view or edit the alternate landing point of the nest on the pop-up page for adding alternate landing points, including latitude, longitude, and altitude.
- Detail: You can view the device information, status, task execution statistics, and fault percentage statistics of the selected nest.
- Edit: You can re-edit the device information on the pop-up Edit Nest interface.
- Format: You can format the built-in storage of the selected nest.
- Logs: You can view the operation log of the selected nest or the aircraft in the nest.
- More: You can delete the selected nest from the company nest list.
- Batch Delete: After selecting multiple nests, you can delete the selected nests in batch.

**💡 Tip**

- The calibrated RTK position is the final saved position information, and the RTK position cannot be refreshed/saved when the nest is offline.
- Due to asynchronous transmission delay, it may take some time to query and display after saving the RTK position information.
- The takeoff height set by the nest is the flight height between the aircraft flying from the takeoff point to the first waypoint, and the landing height is the return height of the aircraft.

**■ Add Remote Controller**

In “Remote Control” interface, click “Add Remote Device” button to complete the addition of the nest on the pop-up Add Device interface.



**Fig 6-6 “Add Device” Interface**

**■ Manage Remote Controller**

In “Remote Control” interface, after selecting the remote controller in the device list, you can perform the following operations:

- Edit: You can re-edit the device information on the pop-up Edit Device page.
- Delete: You can delete the selected remote controller from the enterprise remote controller list.
- Batch Delete: After selecting multiple remote controllers, you can delete the remote controllers selected in batch.

**💡 Tip**

- Items marked with \* are compulsory to add a remote controller.

**■ Add Detection Device**

In “Detection Device” interface, click “Add Device” button to complete the addition of the nest on the pop-up Add New Device interface.

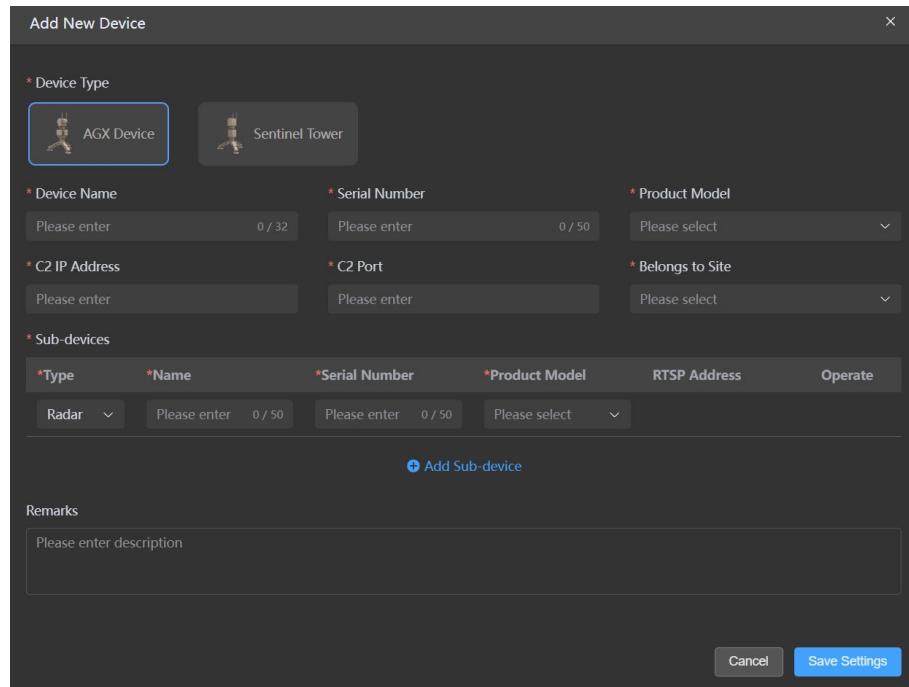


Fig 6-7 “Add New Device” Interface

### ■ Manage Detection Device

In “Detection Device” interface, after selecting the detection equipment in the device list, you can perform following operations:

- Detail: You can view the device information and status of the selected detection and countermeasure device, and re-edit the device information.
- Edit: You can re-edit the device information on the pop-up Edit Device interface.
- Delete: You can delete the selected detection and countermeasure device from the enterprise detection and countermeasure device list.
- Batch Delete: After selecting multiple detection devices, you can delete the detection devices selected in batch.



- Items marked with \* are compulsory to add a detection device.

### ■ Version Management

In “Assets”, click “Version Management” at the upper right corner of the interface. In the version management interface, users can upload upgrade package file to upgrade devices in the company in batch. Users can also check detailed information of the corresponding upgrade package and delete it.

## 6.2.5 Planning

Click “Planning” column to enter “Mission”, “Routes”, and “Execution Records” sub-interfaces. In those different interfaces, you can conduct different operations.

**Table 6-3 Planning Management Permissions of Different Account Members**

Function Menu		Owner	Super Admin	Regular Admin	Ordinary User
Site	View	√	√	√	√
	Add	√	√	√	×
	Edit	√	√	√	×
	Delete	√	√	√	×
	Assign Permission	√	√	√	×
Task Management	View	√	√	√	√
	Add	√	√	√	×
	Edit	√	√	√	×
	Delete	√	√	√	×
	Issue as Task	√	√	√	√
Route Management	View	√	√	√	√
	Add	√	√	√	√
	Edit	√	√	√	√
	Delete	√	√	√	√
Flight Record	View	√	√	√	√

**Table 6-4 Interface Icon Description**

No.	Icon	Name	Function Description
1		Map Search	Click the icon, type the address in the search box, and the location will be quickly located and centered on the map.
2		Route Centering	Click this icon, if there is a route, the route area will be centered on the map.
3		Add Marked Point	Click this icon to place marked point on map.
4		Add area	Click this icon to place polygon area.
5		Map Style	Click this icon to set the map display style from

			"Standard Map", "Satellite Map" and "Hybrid Map".
6		View Switch	Click this icon to switch map display method between 2D view and 3D view.
7		Location	Click this icon to quickly locate the position of the device currently accessed.
8		Zoom In	Click this icon to zoom in the display of map (with higher display accuracy).
9		Zoom Out	Click this icon to zoom out the display of map (with wider display area).
10		Add Waypoint	Click this icon to place waypoint for creating route in the route adding interface.
11		Clear Route	Click this icon to clear the whole route when creating route in route adding interface on map.

After adding the device, it is required to create a route and a task before executing automatic flight mission.

### ■ Create Route

In the "Routes" sub interface, you can create a new route manually by clicking the "+Route" button or importing a KML or KMZ format file.

1. After clicking the "+Route" button, you can create a new waypoint route in the "Routes-Addition-Waypoint Mission" interface by manually placing waypoints on the map. Locate the takeoff point of the drone (location of the nest) on the map, select the "" icon at the bottom of the map, and place waypoints on the map. Users can quickly adjust the altitude and latitude and longitude of waypoints by dragging the waypoint and its projection point on the ground with the mouse.
2. In the route settings interface on the left, set the relevant parameters of the route, including route name, takeoff point settings, altitude type, flight altitude, flight speed, loss of link action, complete action, yaw angle, gimbal pitch angle, and obstacle avoidance mode.

#### Tip

- The takeoff point is only used as a reference for route planning, and the aircraft will use the actual takeoff point when executing the route.
- Please adjust waypoints in the 3D map. Selecting the projection point of the waypoint on the ground allows you to adjust the position of the waypoint, and selecting the waypoint (when not following the route) allows you to adjust the altitude of the waypoint.
- The altitude type can be set to relative altitude or absolute altitude, where absolute altitude refers to the altitude of the waypoint relative to sea level or the ellipsoid, and relative altitude refers to the altitude of the waypoint relative to the takeoff point.
- The loss of link action refers to the response action after the nest loses connection with the aircraft, which can be Return or Continue Action. Return means that the aircraft flies

from the loss of link position to the takeoff point, and Continue Action means that the aircraft will continue to complete the task after losing control.

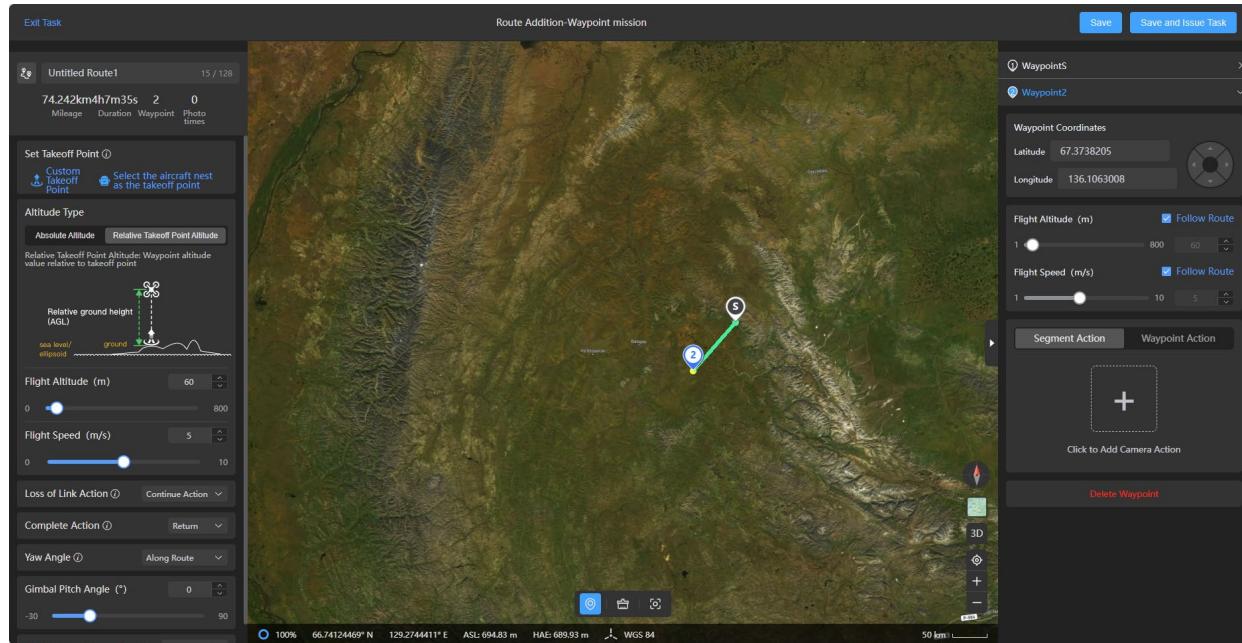
- The complete action refers to the response action of the aircraft after completing the route task, which can be Return or Hover. Return means that the aircraft immediately flies to the takeoff point after completing the route task, and Hover means that the aircraft hovers at the end point after completing the route task. If the aircraft loses connection with the nest during the execution of the completion action, it will immediately perform the loss of link action.
- The yaw angle can be set to Along Route, Manual Control, or Custom. Along Route means that the nose of the aircraft flies along the direction of the route to the next waypoint; Manual Control means that the user can manually control the direction of the nose of the drone during the flight to the next waypoint; Custom means that the nose of the drone flies along the direction of the custom-set yaw angle to the next waypoint.
- The obstacle avoidance mode can be set to Disabled or Go Around. When the obstacle avoidance is turned off, the aircraft will not avoid obstacles; when set to bypass, the aircraft will climb and bypass the obstacle from above when encountering an obstacle.
- When setting the altitude, be sure to set a reasonable altitude and not violate relevant laws and regulations in the location.

3. Set the parameters of each waypoint in the right waypoint settings interface, including waypoint coordinate settings, flight altitude/flight speed settings, coordination radius settings, segment action settings (adding camera actions), and waypoint action settings (adding camera actions).

#### Tip

- After the setting of the coordination radius at a specified waypoint is enabled, the waypoint action settings added to that waypoint will not take effect.
- The camera action in the segment action can be set to Start Recording, Stop Recording, Take Photo, Timed Photography, and Distance Interval Photography:
  1. Timed Photography: The aircraft takes pictures periodically at intervals. The interval for taking pictures can be set automatically to anything between 2 and 60 seconds with a minimum adjustment increment of 1 second.
  2. Distance Interval Photography: The aircraft takes pictures periodically at intervals. The interval for taking pictures can be set to anything between 5 and 100 meters with a minimum adjustment increment of 1 meter.
- The camera action in the waypoint action can be set to No Action, Timed Photography, Record Video, and Take Photo:
  1. No Action: The aircraft hovers at the point, and the hover duration can be set to anything between 0 and 90 seconds with a minimum adjustment increment of 1 second.
  2. Timed Photography: The aircraft takes pictures periodically at intervals at the point for a set amount of time. The duration of the recording can be set to anything between 2 and 1800 seconds, and the interval for taking pictures can be set to anything between 2 and 60 seconds with a minimum adjustment increment of 1 second.
  3. Record Video: The aircraft records a video of a set duration at the point. The duration

of the recording can be set to anything between 2 and 1800 seconds with a minimum adjustment increment of 1 second.



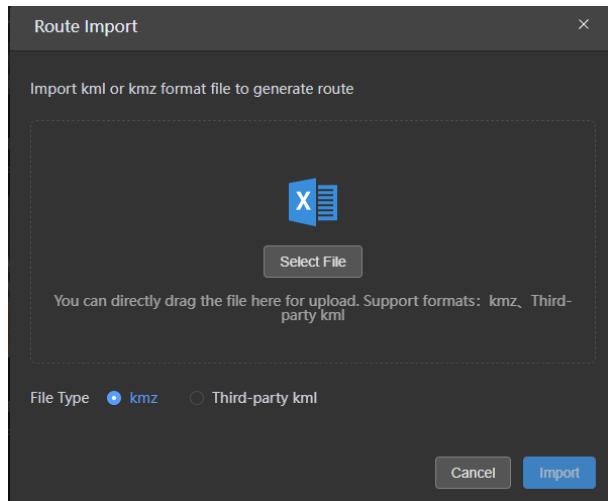
**Fig 6-8 Route Addition-Waypoint mission Interface**

### 💡 Tip

- In current version, only waypoint addition is supported. In later versions, more route types will be supported.
- After tapping “Import” button, you can import KML or KMZ format file to generate a route in the route import interface.

### 💡 Tip

- AICS supports importing files in .kml or .kmz format.



**Fig 6-9 “Route Import” Interface**

### ■ Manage Route

On the “Routes” subpage, you can perform the following operations to manage your routes:

1. Type the name of an existing route into the search box in the upper right corner of the page to search for it. This supports both fuzzy and exact searches.
2. Use the time filter box and the drop-down list of all route types at the upper right corner of the interface to filter routes by route update time and route type.
3. Click the “” icon in the card of a certain route in the route list to enter the “Route Addition-Waypoint Route” page and re-edit the selected route.
4. Click the “...” icon in the card of a certain route in the route list to perform the following operations:
  - Issue as Task: You can enter the new task page associated with this route, where you can set and issue tasks.
  - Copy Route: You can copy the selected route.
  - Delete Route: You can delete the selected route.



#### Tip

- If there are any issues (risks) with the route settings, the route editing page will provide corresponding alarm indications.

### ■ Add Task

On the “Mission” subpage, click the “+ Task” button to access the new task page, where you can perform the following operations:

- Select Route: Choose the required route from the list of existing routes. After selection, the route will be displayed on the map on the right.
- Execution Method: Nest Execution by default. You can specify a certain nest device in the area to execute the task.
- Task Strategy: Execute Immediately.
- Task accuracy: It can be set to “GNSS” or “RTK” mode. When choosing “RTK,” the route accuracy can reach centimeter-level accuracy.
- Task name: Set the task name (up to 32 characters). Please follow the naming conventions for easier future management.

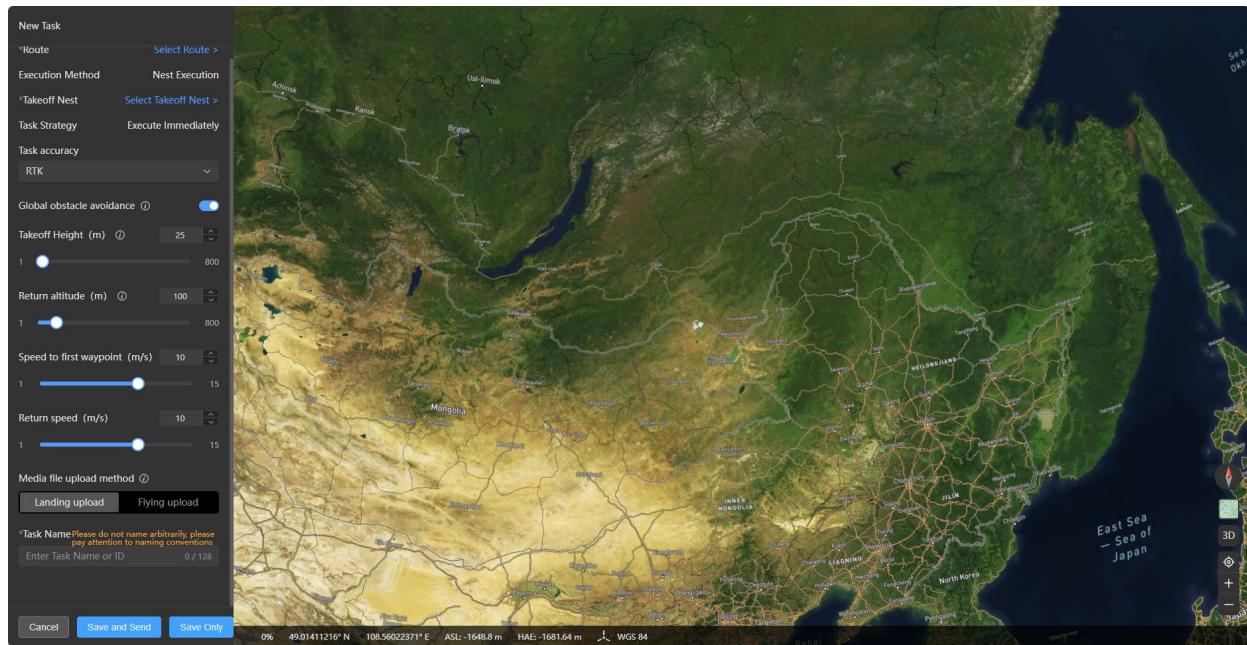


Fig 6-10 “New Task” Interface

## ■ Manage Task

On the “Mission” sub interface, you can perform the following operations to manage tasks:

- Type the task name in the task search box at the upper right corner of the interface to search for existing tasks, supporting fuzzy and exact searches.
- Use the drop-down list at the upper right corner of the interface to select the task type and filter tasks by task type.
- Batch delete: Select multiple tasks and delete them in batches.
- Send: Re-execute selected tasks.
- Flight records: View the flight records of selected tasks on the flight record page.
- Detail: View the specific information of the selected task.
- Delete: Delete the selected task.

### 💡 Tip

- When executing sending task, you will enter the New Task interface.

## ■ View Flight Record

In “Execution Records” interface, users can view the task execution record of relevant device. Users can also search accurately through filtering device name and task name.

### 6.2.6 Realtime

The “Realtime” column is the default main interface of AICS, with the “Event” sub-interface and “Device” sub-interface on the left side, where you can view four types of dynamic information such as detection events, reconnaissance events, tagged events, and whitelisted events, and monitor the real-time status of online devices and (aircrafts, nests) operation screens. Users can also remotely control the nests/aircrafts on this page.

**Table 6-5 Realtime Operation Permissions of Different Account Roles**

Function Menu		Owner	Super Admin	Regular Admin	Ordinary User
Event Management	View	√	√	√	√
	Target Command	√	√	√	√
Map Element	View	√	√	√	√
	Add	√	√	√	√
	Edit	√	√	√	√
Device	Delete	√	√	√	√
	View	√	√	√	√
	Nest Remote Control	√	√	√	√
	Flight Control	√	√	√	√
	Gimbal Control	√	√	√	√
	Return	√	√	√	√
	Shouting	√	√	√	√

### ■ View Events

In the "Event" sub-interface, click on a specific event, there will be a prompt which displays specific information about the event. Depending on the type of event, the user can perform the following operations on the specified event:

- For detection events, reconnaissance events, and whitelisted events, users can execute target commands.
- For tagged events, users can edit them.

### ■ Monitor Device in Real-Time

In the "Device" sub interface, online device is displayed in card style. Users can click any device and check the detailed status information of the equipment in the prompt.

- If the equipment is a detection and countermeasure equipment, the online status and battery information of the equipment, as well as the detection animation on the map, will be displayed.
- If the equipment is a nest or an aircraft, relevant mission function icons will be displayed and mission execution dynamic (device location, route overview and route information) will be displayed on the right side of the map.



### Tip

- When the equipment is offline, it will not be displayed under the "Device" sub-interface.
- After the task is issued, if AICS determines that the task cannot be performed based on

the device status of the nest/drone, a corresponding prompt will be given. Users can wait for the device to be in normal condition before issuing the task again.

- The icons of the tasks that cannot be operated will be displayed in gray.

When the aircraft and the nest are online, aircraft's current battery level and available function icons will be displayed on the device card. Users can click on the corresponding icon for corresponding operations:

- Click on the "📍" icon under the aircraft or the nest to center the aircraft or the nest on the right map.
- Click on the "🏡" icon under the nest to trigger the one-click return of the aircraft.
- Click on the "📝" icon under the nest to enter the new task interface.
- Click on the "💻" icon under the aircraft to expand the aircraft parameter panel, displaying the real-time status parameters of the aircraft.
- Click on the "💡" icon under the aircraft to enable AI recognition.
- Click on the "📴" icon under the aircraft to disable AI recognition.

The live streaming windows of the drone gimbal camera and the nest monitoring camera will be displayed on the right side of the "Realtime" column. Users can click on the "⤢" icon at the upper right corner of the live streaming window to full-screen view the live streaming screen.

- In the full-screen live streaming screen of the aircraft gimbal camera, users can perform operations such as zooming, taking pictures and videos, and adjusting the gimbal angle of the gimbal camera.

#### Tip

- When the aircraft and the nest are online, you can only tap the full-screen icon to enter the aircraft gimbal camera live streaming screen.

After enabling the control function on the right side of the "Realtime" column, you can remotely control the flight of the aircraft through the specified keys on the keyboard.

In the weather status panel on the right side of the "Realtime" column, the real-time weather conditions at the deployment location of the nest will be displayed, and users can judge whether to perform the task based on relevant information.

In the nest control panel on the right side of the "Realtime" column, users can perform related remote control and debugging of the nest and the aircraft.

#### Tip

- When the aircraft takes off, some operations in the nest control panel cannot be executed.

Click the task execution information panel at the upper right corner of the "Realtime" column, and the detailed task execution information will be displayed.



Fig 6-11 “Realtime” Column

### 6.2.7 Situation

In “Situation” column, users can check all equipment situation and event statistic information in the site that the company belongs to, so as to comprehensively understand the system operation status.



Fig 6-12 “Situation” Column

### 6.2.8 Results

In “Results” column, users can check media files (photos/videos) generated as the aircraft executes the task in the site area.

 **Tip**

- After the aircraft completes the task and returns to the nest, it will upload the media files generated by the task to the specified folder (automatically generated folder) of AICS.

 **Note**

- Media file upload path rule: /site/first-level folder (task name)/second-level folder (task execution date, such as 20231013) /third-level folder (time when the file upload is completed, such as 1559)/media file.

**Table 6-6 Results Operation Permission of Different Account Role**

Function Menu		Owner	Super Admin	Regular Admin	Ordinary User
Media Files	View	√	√	√	√
	Add Directory	√	√	√	✗
	Edit	√	√	√	✗
	Delete	√	√	✗	✗

In the "Results" column, you can perform the following actions on media folders and media files:

- Click the "⊕" icon or the "Move" icon (when list view) to move the corresponding folder or media file.
- Click the file name (when its icon is displayed) or the "Rename" icon (when it is displayed in list) to rename the corresponding folder or media file.
- Click the "☒" icon or the "Delete" icon to delete the corresponding folder or media file.
- Click the "⤓" icon or the "Download" icon to download the corresponding folder or media file.

 **Tip**

- Media file folders can be displayed in four ways: list, medium icons, large icons and extra large icons.
- After you check one or many folders, 'Download', "Move", "Delete", and "Create Folder" buttons are displayed at right corner of the interface.

1. Users can click 'Create Folder' button at the upper right corner of the "Results" interface to create a folder and move other media folders or media files to the new folder.
2. In the calendar at the upper right corner of the "Results" interface, users can filter media folder by task date.
3. After choosing the resource type in the All Resources drop-down menu at the upper right corner of the "Results" interface, users can filter media files with same type.
4. In the search box at the upper right corner of the "Results" interface, enter the file name to

filter media folder, which supports fuzzy search and accurate search.

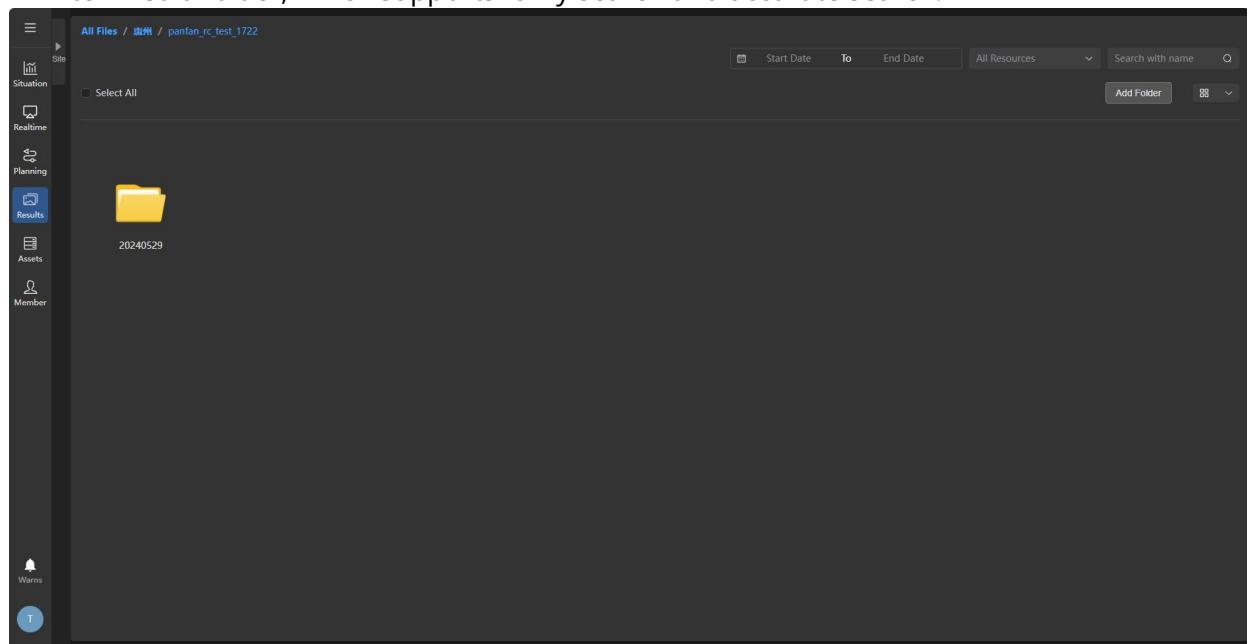


Fig 6-13 “Results” Interface (When icons are displayed)

# Chapter 7 Updates and Maintenance

## 7.1 Update and Upgrade

After logging into and connecting to AICS, users can update and upgrade the firmware and software versions of nest and aircraft in the nest through AICS.

1. In the "Assets" interface of AICS, click the "Version Management" button at the upper right corner of the interface, and then click the "Upload Upgrade Package" button on the version management interface to upload the latest upgrade package file from the local computer disk. For details, refer to Chapter 6 "[6.2.4 Assets](#)".
2. After the upload is completed, AICS will automatically perform verification and analysis, refresh the device firmware version information in the entire device list, and if there is an update (the device firmware version information prompts "▲"), click the "▲" button. In the firmware version information pop-up window, click "Download and Upgrade" to push the latest upgrade package to the nest and the aircraft, and wait for them to complete the update.



### Tip

- Please note that nest or aircraft cannot be upgraded in offline status.
- Please prepare upgrade package file in advance. AICS only supports upgrade package file in .uav format.
- Version of a new upgrade package cannot be earlier than that of upgrade package of same type.
- Upgrade package file is named in following format:
  1. Nest Upgrade Package: EvoNest-V1.4.0.15-20240402210158.Encrypt.uav.
  2. Aircraft Upgrade Package: ModelX.R6-V1.6.1.43-20240328225823.Encrypt.uav.

## 7.2 Nest Kit Product Parts Maintenance

To ensure the optimal performance of the aircraft, regular maintenance is required for the nest kit product parts. It is recommended that users maintain the product according to "Maintenance Manual".

**Table 7-1 Nest Consumable Parts List**

No.	Parts	Quantity	Recommended Replacement Cycle (Date)	Recommended Replacement Cycle (Operation Times)
1	Return to neutral pole X pole cover strip	2	1 year	8000
2	Return to neutral pole Y pole cover	2	1 year	8000

	strip			
3	Air conditioning dust screen	1	6 months	/
4	Charging connector wear-resistant block 1	4	1 year	8000
5	Charging connector wear-resistant block 2	4	1 year	8000

**Table 7-2 Aircraft Consumable Parts List**

No	Parts	Quantity	Remark
1	CW Propeller	2	Each power motor is equipped with 1 CW or CCW propeller
2	CCW Propeller	2	
3	Power Motor	4	Replace only during deep maintenance (every 900 flight hours or every 3 years)
4	Front arm bracket	2	
5	Rear arm bracket	2	
6	Arm connector cover	4	
7	Smart battery unlock button	2	
8	Air intake dust screen	1	
9	Air outlet dust screen	1	
10	RC Stick	2	
11	Aircraft charging stand	1	

**Table 7-3 User-replaceable Parts List**

No.	Parts	Quantity	Component Number	Manufacturer
1	1158CW Propeller	2	EAN: 6924991133506 UPC: 889520213509	Autel Robotics
2	1158CCW Propeller	2		

3	Fusion 4T XE Gimbal	1	EAN: 6924991124788 UPC: 889520204781	Autel Robotics
4	Fusion 4N Gimbal *	1	EAN: 6924991124238 UPC: 889520204231	Autel Robotics
5	Smart Battery	1	EAN: 6924991124412 UPC: 889520204415	Autel Robotics
6	Charging Stand	1	EAN: 6924991125136 UPC: 889520205139	Autel Robotics

 Tip

- If you need to maintain the nest kit products, please contact Autel Robotics or authorized service provider to provide related services. Damage caused by private disassembly and assembly will not be covered by the warranty.
- Do not modify the nest and related equipment without permission, and the resulting damage will not be covered by the warranty.
- For the service life of each part, see "Maintenance Manual".

### 7.3 Troubleshooting Guide

 Tip

- The following troubleshooting measures are only limited to nest failures resulting from normal usage.
- For failures resulting from abnormal usage, please contact Autel Robotics for handling.

1. The nest fails to power on:
  - Please check if the nest power supply is disconnected (including power outages, abnormal tripping, and loose power supply interface), and if the spare battery is exhausted.
  - If it is not the above situation, please check if there is a failure of the nest hardware, and contact Autel Robotics for handling.
2. The nest fails to go online on AICS:
  - Please check if the hive network is connected normally (network service disconnection, loose network cable connection, etc.).
  - Please check if the cloud service is configured correctly.
3. The nest cabin door emits abnormal noise:
  - Please check if there is a failure of the drive motor and reducer (including loose, wear, limit abnormal, and poor contact of the line). If so, please stop operating and contact Autel Robotics for handling.

- Please check if the cabin door is offset along the axis and rubs against the side of the landing pad. If so, please stop operating and contact Autel Robotics for handling.
  - Please check if the cabin door fixing mechanism is loose. If so, please stop operating and contact Autel Robotics for handling.
  - Please check if the air conditioning dust screen of the fuselage is not locked in place and rubs against the door. If so, please stop operating and contact Autel Robotics for handling.
  - If it is not any of the above problems, please test and calibrate the cabin door of the nest through the remote controller.
4. Air conditioning fails to start/abnormal temperature control:
- Please check if the temperature and humidity sensor of the landing pad is faulty. Touch the sensor with your hand. If it is normal, the temperature will change on the debugging interface.
  - Please check if the cabinet door is closed tightly. The air conditioning cannot start if the door is not closed.
  - Please check if the seal ring of the landing pad is damaged. If so, it will cause air convection between the inside and outside of the nest, resulting in low temperature control efficiency. Please contact Autel Robotics for handling.
  - If it is not the above problem, please start the air conditioning test through the local debugging of the remote controller. If it cannot start normally, there may be a hardware fault and you need to contact Autel Robotics for handling.
5. Nest centering rod/propeller rod has no response:
- Please carry out local debugging through the remote controller. If the rod group cannot move normally, there may be a hardware fault and you need to contact Autel Robotics for handling; if the rod group can move normally, it may be a network connection failure.
6. The drone cannot be charged:
- Please check if the return pole is offset and the charging connector is aligned with the charging interface of the charging stand. If not, please calibrate the return pole through the remote control.
  - Please check if the charging connection cable of the charging stand is tightly connected to the charging stand interface of the smart battery. If it is loose, please reconnect the charging connection cable.
  - Please confirm that the smart battery is not abnormal, and the battery temperature is within the specified charging temperature range, otherwise the battery over-temperature protection will be triggered.
  - If it is not the above problem, please carry out the charging test through the local debugging of the remote control. If it cannot be charged normally, there may be a hardware fault. Please contact Autel Robotics for handling.
7. The aircraft frequently experiences abnormal disconnection during mission execution:
- Please confirm if there are strong interference sources (such as signal interference devices) or other remote controllers around the nest, and the installation location of the nest needs to be changed when necessary.
8. After the power motor of the aircraft is started, the aircraft cannot take off:

- Please confirm whether the aircraft/nest is in a no-fly zone and lifting for the aircraft has been applied. If so, you need to apply for airspace authorization from the local authorities and contact Autel Robotics to lift the ban on the aircraft.
  - Please check if the power of the aircraft is sufficient and the environmental temperature is within the working temperature range of the aircraft. The aircraft is prohibited from taking off in low power and low temperature conditions.
9. Aircraft flight time is shortened:
- During flight, low environmental temperature, headwind flight, air flow disturbance and flight with payload will all reduce the normal flight endurance time to a certain extent.
  - Please ensure that the cycle of the smart battery is within 200 times. During the use cycle of the smart battery, the power will decrease normally.

## Appendix A Product Specifications

### A.1 Nest

Basic Parameters	
Nest Weight	Nest Main Body: 63 kg Nest (includes weather monitoring pole): 70 kg
Dimension	Nest Opened: 935×645×780 mm Nest Closed: 935×640×576.5 mm Nest Including Weather monitoring pole: 1363×773×853 mm
Input Voltage	AC 110V/220V
Maximum Power Supply Power	1200W-2000W (vary with voltage)
Working Temperature	-30°C~+50°C
Protective Rating	IP55
Number of Aircrafts Accommodated	1
Maximum Wind Resistance Speed	12 m/s
Maximum Allowable Working Altitude	3100 m
Working Radius	7 km
GNSS(RTK)	BDS/GPS/GLONASS/Galileo/QZSS
RTK Station Satellite Receiving Frequency	BDS: B1I, B2I, B3I, B1C, B2a GPS : L1C/A, L2P(Y), L2C, L5 GLONASS: G1, G2 Galileo: E1, E5a, E5b QZSS: L1, L2, L5
RTK Station Positioning Accuracy	Horizontal: 0.8 cm +1ppm; Vertical: 1.5 cm +1ppm
Aircraft Charging Performance	
Charging Voltage	13.2VDC

Charging Current	5A
Charging Time	In 50°C, 39 minutes (ABX40 Smart Battery tested with possibility of 10%-90%). In 25°C, 25 minutes (ABX40 Smart Battery tested with possibility of 10%-90%).
Image Transmission	
Operating Frequency	<p><b>900M:</b> 902-928MHz*</p> <p><b>2.4G:</b> 2.400-2.476GHz**, 2.400-2.4835GHz</p> <p><b>5.2G:</b> 5.15-5.25GHz***, 5.17-5.25GHz****</p> <p><b>5.8G:</b> 5.725-5.829GHz**, 5.725-5.850GHz</p> <p>*Only applies FCC and ISED regions **Only applies SRRC region ***Only applies FCC, CE (except Germany) and UKCA regions ****Only applies Germany Note: Some frequencies are available only in some regions or in indoor. For details, please refer to local laws and regulations.</p>
Antennas	4 antennas, 2T4R
Effective Isotropic Radiated Power (EIRP)	<p><b>900M:</b> ≤30dBm (FCC/ISED)</p> <p><b>2.4G:</b> ≤30dBm (FCC/ISED) ; ≤20dBm (CE/SRRC/UKCA)</p> <p><b>5.2G:</b> ≤30dBm (FCC) ; ≤23 dBm (CE/UKCA)</p> <p><b>5.8G:</b> ≤30dBm (FCC/SRRC/ISED) ; ≤14dBm (CE/UKCA)</p>
Air Conditioning System	
Air Conditioning Type	TEC Air Conditioning
Operating Voltage	28V
Built-in UPS Battery	
Battery Type	Lithium iron phosphate
Battery Capacity	18Ah
Output Voltage	22.4VDC

Charging Temperature Range	0°C-+55°C
Enduring Time	60 minutes (normal temperature with AC off)
Network Access	
Ethernet	10/100/1000Mbps Adaptive Ethernet
Wi-Fi	Wi-Fi 5.0
LTE	USB Dongle Module
Sensor	
Wind Speed Sensor	Supported
Rainfall Sensor	Supported
Temperature and Humidity Sensor	Supported
Temperature and Humidity Sensor (inside the Nest)	Supported
Water Immersion Sensor	Supported
Surveillance Camera	
Resolution	1920×1080@25FPS
Field of View	Horizontal FOV: 114.8°
Auxiliary Light	Infrared light, with a maximum range of 30 meters
Mission Flight	
Take-off Time	≤1.5 minutes
Land Time	≤1.5 minutes
Aircraft Precise Diversion	
Probability of incorrect landing	1 in 1,000
Landing accuracy (without RTK)	≤±5 cm
Landing accuracy (with RTK)	≤±2 cm

Lightning Protection	
AC Port	Nominal discharge current (8/20μs) In 20kA
Ethernet Port	Shock resistance (1.2/50μs&8/20μs) 5kV&2.5kA
Software Support	
Application	Autel Enterprise (connects to nest via EF9-3 RC for deployment and commissioning)
Cloud Service Platform	Autel Integrated Command System (AICS)
Information Security	
Image Transmission Encryption	AES256

## A.2 Aircraft

Aircraft	
EVO Max 4T XE Aircraft Weight	1825 g (ABX40 smart battery, Fusion 4T Gimbal, propellers, charging stand and RTK module included)
EVO Max 4T XE Aircraft Maximum Take-Off Mass (MTOM)	1999 g 1890 g (for C2 Certification in EU)
EVO Max 4N Aircraft* Weight	1845 g (ABX40 smart battery, Fusion 4N Gimbal, propellers, charging stand and RTK module included)
EVO Max 4N Aircraft* Maximum Take-Off Mass (MTOM)	1999 g 1890 g (for C2 Certification in EU)
Fuselage Dimensions	563×657×147 mm (unfolded, incl. propellers) 318×400×147 mm (unfolded, excl. propellers) 257×145×131 mm (folded, excl. propellers)
Diagonal Wheelbase	Diagonal: 467 mm
Maximum Propeller Rotational Speed	7500 RPM
Maximum Ascent Speed	Slow: 3 m/s

	Smooth: 5 m/s Standard: 6 m/s Ludicrous: 8 m/s
Maximum Descent Speed	Slow: 3 m/s Smooth: 5 m/s Standard: 6 m/s Ludicrous: 6 m/s
Maximum Horizontal Flight Speed (Windless Near Sea Level)	Slow: 3 m/s Smooth: 10 m/s Standard: 15 m/s (forward & backward), 10 m/s (sideways) Ludicrous: 23 m/s (forward), 18 m/s (backward), 20 m/s (sideways)
Maximum Service Ceiling Above Sea Level	4000 meters (ABX40 smart battery included, charging stand and RTK module excluded) 3100 meters (ABX40 smart battery, charging stand and RTK module included)
Maximum Flight Altitude	800 meters (Altitude limit in the Flight Application. Setting flight altitude should comply with local laws and regulations)
Maximum Flight Time (Windless)	32 minutes (only for reference)
Maximum Range	22 km
Maximum Hovering Time (Windless)	30 minutes (RTK module and charging stand included)
Maximum Wind Resistance (Take-off and Landing)	12 m/s
Maximum Tilt Angle	Slow: 10° Smooth: 30° Standard: 30° Ludicrous: 36°
Maximum Angular Velocity	Pitch axis: 300°/s Heading axis: 120°/s
Operating Temperature	-20°C to 50°C
Hot-swappable Batteries	Supported
IP Rating	IP43* (Custom service)
Internal Storage	128GB internal storage, with 64GB of available space*

(Remaining available space will vary with different firmware versions)	
MicroSD Storage Expansion	Up to 256GB
Strobe	Integrated
GNSS	GPS+Galileo+BeiDou+GLONASS
Hovering Accuracy	<p>Vertically            ±0.1 m (when visual positioning works normally)            ±0.5 m (when GNSS works normally)            ±0.1 m (when RTK Fix)</p> <p>Horizontally            ±0.3 m (when visual positioning works normally)            ±0.5 m (when high-precision positioning system works normally)            ±0.1 m (when RTK Fix)</p>
Wi-Fi Protocol	802.11a/b/g/n/ac/ax
Wi-Fi Operating Frequency	<p>2.4G: 2.400–2.476GHz*, 2.400–2.4835GHz            5.2G: 5.15–5.25GHz**, 5.17–5.25GHz***            5.8G: 5.725–5.829GHz*, 5.725–5.850GHz</p> <p>*Only applies to SRRC regions            ** Only applies to FCC, CE (Germany excluded) and UKCA regions            *** Only applies to Germany</p> <p>Note: Some frequencies are only applicable in some regions or only used in door. For details, please refer to local laws and regulations.</p>
Wi-Fi Effective Isotropic Radiated Power (EIRP)	<p>2.4G:            ≤30dBm (FCC/ISED); ≤20dBm (CE/SRRC/UKCA)</p> <p>5.2G:            ≤30dBm (FCC); ≤23dBm (CE/UKCA)</p> <p>5.8G:            ≤30dBm (FCC/ISED/SRRC); ≤14dBm (CE/UKCA)</p>
<b>Image Transmission</b>	
Operating Frequency	<p>900M: 902–928MHz*</p> <p>2.4G: 2.400–2.476GHz**, 2.400–2.4835GHz            5.2G: 5.15–5.25GHz***, 5.17–5.25GHz****            5.8G: 5.725–5.829GHz**, 5.725–5.850GHz</p> <p>* Only applicable to FCC and ISED regions.            ** Only applicable to SRRC regions.            *** Only applicable to FCC, CE (Germany excluded) and UKCA</p>

	<p>regions          **** Only applies to Germany          Note: Some frequencies are only applicable in some regions or only used in door. For details, please refer to local laws and regulations.</p>
Maximum Transmission Distance (Without Interference and Blocking)	FCC: 15km CE: 8km
Effective Isotropic Radiated Power (EIRP)	<p>900M:  <math>\leq 30\text{dBm}</math> (FCC/ISED)</p> <p>2.4G:  <math>\leq 30\text{dBm}</math> (FCC/ISED); <math>\leq 20\text{dBm}</math> (CE/SRRC/UKCA)</p> <p>5.2G:  <math>\leq 30\text{dBm}</math> (FCC); <math>\leq 23\text{ dBm}</math> (CE/UKCA)</p> <p>5.8G:  <math>\leq 30\text{dBm}</math> (FCC/ISED/SRRC) ; <math>\leq 14\text{dBm}</math> (CE/UKCA)</p>
<b>Visual Obstacle Avoidance Sensing System</b>	
Sensing Range	<p>Forward: 0.5 - 31 m          Backward: 0.5 - 25 m          Sideways: 0.5 - 26 m          Upward: 0.2 - 26 m          Downward: 0.3 - 23 m</p>
FOV	<p>Forward &amp; Backward:  <math>60^\circ</math>(H), <math>80^\circ</math>(V)          Upward:  <math>180^\circ</math> (sideways), <math>120^\circ</math> (forward &amp; backward)          Downward:  <math>180^\circ</math> (sideways), <math>120^\circ</math> (forward &amp; backward)</p>
Operating Environment	<p>Forward, backward, sideways, and upward:          The surface has rich textures, under a sufficient lighting environment (<math>&gt;15</math> lux, normal indoor fluorescent lighting environment).</p> <p>Downwards:          The surface is a diffuse material with a reflectivity <math>&gt;20\%</math> (walls, trees, humans, etc.), under a sufficient lighting environment (<math>&gt;15</math> lux, normal indoor fluorescent lighting environment).</p>
<b>Millimeter-Wave Radar Sensing System</b>	
Operating Frequency	60 - 64 GHz

Effective Isotropic Radiated Power (EIRP)	60 - 64GHz: <20dBm (CE/UKCA/FCC)
Sensing Range	60G millimeter-wave radar: Upward: 0.3 - 20 m Downward: 0.15 - 80 m Forward and Backward: 0.5~15 meters (distribution cable), 0.5~23 meters (high-voltage cable) Left and right: 0.5~15 meters (distribution cable), 0.5~23 meters (high-voltage cable)
FOV	Horizontal (6dB): ±30° Vertical (6dB): ±30°
Operating Environment	60 GHz millimeter-wave radar sensing system: Supports all-weather obstacle avoidance for glass, water, wires, buildings, and trees in 6 directions. Its obstacle avoidance distance varies with the obstacle's ability to reflect electromagnetic waves and its surface size.

### Radar and visual obstacle avoidance sensing systems

Sensing Range	Forward & Backward: 0.5~15 meters (distribution cable), 0.5~23 meters (high-voltage cable) Sideways: 0.5~15 meters (distribution cable), 0.5~23 meters (high-voltage cable) Upward: 0.2 - 26 m Downward: 0.15 - 80 m
FOV	Forward & Backward: 120°(H), 80°(V) Upward: 180° (sideways), 120° (forward & backward) Downward: 180° (sideways), 120° (forward & backward)
Operating Environment	Forward, backward, upward, and downward: Supports all-weather obstacle avoidance for various conditions, including water, forests, buildings and high voltage lines. At least one of the two conditions should be met: sufficient lighting or the obstacle has a strong reflection ability to electromagnetic waves. Sideways: The surface has rich textures, under a sufficient lighting environment (>15 lux, normal indoor fluorescent lighting environment).
ABX40 Smart Battery	
Model	ABX40

Capacity	8070mAh
Nominal Voltage	14.88V
Battery Type	Li-Po 4S
Power	120 wh
Weight	522 g
Charging Environment Temperature	+5°C~+45°C* * When the battery temperature is below 5°C, the battery stops charging and starts self-heating; when the battery temperature is above 45°C, the battery stops charging

## A.3 Gimbal Camera

### A.3.1 Fusion 4T XE

Zoom Camera	
Image Sensor	1/2" CMOS. Effective pixels: 48M
Lens	Focal length: 11.8 - 43.3 mm 35 mm equivalent focal length: 64 - 234 mm Aperture: f/2.8 - f/4.8 Focusing distance: 5 m ~ ∞
ISO Range	Auto: ISO100 – ISO6400 Manual: ISO100 - ISO6400
Shutter Speed	1/8s ~ 1/8000s
Zoom	2.7 - 10x continuous optical zoom, 160x hybrid zoom; support linked zoom
Max Photo Resolution	JPG: 4000×3000, 8192×6144 DNG: 4000×3000
Video Resolution	4000×3000 30P
Video Format	MP4
Video Encoding	H.264/H.265
Supported File Systems	exFAT/Fat32
Wide Angle Camera	

Image Sensor	1/1.28" CMOS. Effective pixels: 50M
Lens	DFOV: 85° Focal length: 4.5 mm Equivalent focal length: 23 mm Aperture: f/1.9 AF motor: 8-line SMA, PDAF focusing Focusing distance: 1 m ~ ∞
ISO Range	Auto/Manual: ISO100 - ISO6400 Night mode: ISO100 - ISO64000 (video)
Shutter Speed	1/8s ~ 1/8000s
Zoom	1-2.7 x continuous optical zoom; support linked zoom
Max Photo Resolution	JPG: 4000×3000, 8192×6144 DNG: 4096×3072
Video Resolution	4000×3000 30P
Video Format	MP4
Video Encoding	H.264/H.265
Supported File Systems	exFAT/Fat32

### Infrared Thermal Imaging Camera

Image Sensor	Uncooled VOx Microbolometer
Lens	FOV: 61° Focal length: 9.1 mm Aperture: f/1.0 Focusing distance: 2.2 m ~ ∞
Sensitivity	≤50mK@f/1.0, 25°C
Pixel Pitch	12um
Wavelength	8 - 14um
Radiometric Measurement Method	Center measurement/Pot measurement/Rectangular measurement
Radiometric Temperature Range	-20°C to 150°C (high gain mode); 0 to 550°C (low gain mode)
Radiometric Measurement Accuracy	±2°C or reading ±2% (using the larger value) @ ambient temperature ranges from -20°C to 60°C

Accurate Temperature Measurement Distance	5 m
Zoom	16x digital zoom; support linked zoom
Temperature Alert	In area temperature measurement, supports high and low temperature alarm thresholds, Reporting coordinates and temperature values
Palette	White Hot/Black Hot/Ironbow/Rainbow 1/Rainbow 2/Lava/Arctic/Ironbow/Medical/Tint
Photo Size	640×512
Photo Format	JPG (the images contain temperature information and are parsed by dedicated SDK and PC tools)
Video Resolution	640×512@25FPS
Video Format	MP4
<b>Laser Rangefinder</b>	
Wavelength	905 nm
Measurement Accuracy	$\pm (1 \text{ m} + D \times 0.15\%)$ where D is the distance to a vertical reflecting plane
Measuring Range	5 - 1200 m
<b>Gimbal</b>	
Mechanical Range	Pitch: -135° to 45° Roll: -45° to 45° Yaw: -45° to 45°
Controllable Range	Pitch: -90° to 30°
Stability System	3-axis mechanical gimbal (pitch, roll, yaw)
Max Control Speed (Pitch)	100°/s
Angular Vibration Range	<0.005°

### A.3.2 Fusion 4N\*

#### Night Vision Camera

Image Sensor	2.3M effective pixels
Lens	FOV: 52° 35 mm equivalent focal length: 41.4 mm Zoom range: 1 ~ 8x. Linked zoom is supported.
Pixel Pitch	12um
ISO Range	Auto/Manual mode: ISO100 - ISO450000 Night vision mode: Auto: ISO100 - ISO450000
Photo Size	1920×1200
Photo Format	JPG
Video Resolution	1920×1200 P30
Video Format	MP4
Video Encoding	H.264, H.265
Supported File Systems	exFAT/FAT32

### Wide Angle Camera

Image Sensor	1/1.28" CMOS. Effective pixels: 50M
Lens	DFOV: 85° Focal length: 4.5 mm Equivalent focal length: 23 mm Aperture: f/1.9 AF motor: 8-line SMA, PDAF focusing Focusing distance: 1 m ~ ∞
ISO Range	Auto/Manual: ISO100 - ISO6400 Photo: Night mode: ISO100 - ISO64000 (Video)
Shutter Speed	1/8s ~ 1/8000s
Photo Size	4000×3000, 8192×6144
Photo Format	JPG
Video Resolution	4000×3000 30P
Video Format	MP4
Video Encoding	H.264/H.265

Supported File Systems	exFAT/Fat32
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### Infrared Thermal Imaging Camera

Image Sensor	Uncooled VOx Microbolometer
Lens	FOV: 61° Focal length: 9.1 mm Aperture: f/1.0 Focusing distance: 2.2 m ~ ∞
Sensitivity	≤50mK@f/1.0, 25°C
Pixel Pitch	12um
Wavelength	8-14um
Radiometric Measurement Method	Center measurement/Pot measurement/Rectangular measurement
Radiometric Temperature Range	-20°C to 150°C (high gain mode); 0 to 550°C (low gain mode)
Radiometric Measurement Accuracy	±3°C or reading ±3% (using the larger value) @ ambient temperature ranges from -20°C to 60°C
Accurate Temperature Measurement Distance	1 ~ 25 m
Zoom	1-16x digital zoom; supports linked zoom
Temperature Alert	In area temperature measurement, supports high and low temperature alarm thresholds, Reporting coordinates and temperature values
Palette	White Hot/Black Hot/Ironbow/Rainbow 1/Rainbow 2/Lava/Arctic/Ironbow/Medical/Tint
Photo Size	640×512
Photo Format	JPG (the images contain temperature information and are parsed by dedicated SDK and PC tools)
Video Resolution	640×512 @30FPS
Video Format	MP4
<b>Laser Rangefinder</b>	
Wavelength	905 nm

Measurement Accuracy	$\pm (1 \text{ m} + D \times 0.15\%)$ where D is the distance to a vertical reflecting plane
Measuring Range	5 - 1200 m
<b>Gimbal</b>	
Mechanical Range	Pitch: -135° to 45° Roll: -50° to 50° Yaw: -45° to 45°
Controllable Range	Pitch: -90° to 30°
Stability System	3-axis mechanical gimbal (pitch, roll, yaw)
Max Control Speed (Pitch)	100°/s
Angular Vibration Range	<0.005°

## A.4 RTK Module

EVO Max Series RTK Module	
Dimension	73×49×46 mm
Operating Environment	-40°C~+85°C, 95±3%RH (no condensing)
Installation Method	Quick-release screw
Weight	29g
Port	USB-C port
Power Consumption	0.6W
Navigation Accuracy	Vertical: 1.5cm+1ppm Horizontal: 1.0cm +1ppm
Positioning Service	GPS: L1/L2/L5 Beidou: B1I/B2I/B3I/B1C/B2a/B2b Galileo: E1/E5a/E5b/E6 GLONASS: L1/L2
Protective Rating	IP43 (after installation)