

M500 Remote Sensing UAS

User Manual

Version 1.0 **EN**

To User

Dear user, thank you for choosing XAG's product.

For safety purposes and better user experience, it is highly recommended that you read this manual carefully and strictly follow the instructions hereof.

Contact Us

If you have any questions about this document, please contact our Technical Support team via email:
info@xa.com

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Safety Guidelines


- Please get acquainted with the flight location in advance, which should be far away from obstacles and crowds and free from unsafe conditions.
- NEVER operate while drowsy, drunk or in a poor mental state so as to prevent accidents.
- Keep the product away from heat to avoid damage to the electronic device or other components.
- Instead of operating alone, the beginner should seek help from a veteran beforehand.
- It is a MUST to do the pre-flight inspection and eliminate co-frequency interference before a flight.
- Stay away from the operating machine. NEVER touch the spinning propellers with your body or other components. Loose clothing is NOT allowed as it should get caught in the spinning propellers easily and cause injury.
- For safety purposes, it is NOT recommended to install the propellers until finishing the trial run of the aircraft and inspections of the remote controller, motors and other modules.
- Here are 8 rules that MUST be strictly followed during the flight.
 - (1) NEVER fly over highways, railway stations, subways or areas surrounded by tall buildings;
 - (2) NEVER fly near or over designated national security sensitive locations such as military bases, borders and airports;
 - (3) NEVER fly over national political and diplomatic sites, populous areas and other no drone zones;
 - (4) NEVER fly in controlled airspace;
 - (5) NEVER fly in poor weather conditions;
 - (6) NEVER fly a drone with safety hazard or if you are not well prepared;
 - (7) NEVER fly a drone if you are not skilled enough or in a poor mental state;
 - (8) NEVER fly a drone if you have little or no knowledge of aircraft laws and regulations.

Read/Download E-Document

Scan the QR code below to read/download this User Manual.



Note

 Contents concerning "Xpilot" App in this document will be refined and updated on a regular basis in electronic form. Please scan the QR code to read or download the latest version of "M500 Remote Sensing UAS User Manual".

Disclaimer

1. Please read this User Manual carefully before using the product, as it has much to do with both operational safety and your legitimate rights and interests. You shall be deemed to know, understand, agree and acknowledge all terms and conditions as well as contents stated herein upon activation of this product.
2. Not being a toy, plus for certain safety risks, this product is not suitable for those who are under 18 years old, or those without a UAS operator certificate accredited by XAG or existing laws, regulation-sand policies. Please keep the product out of reach of children and be particularly cautious while there are children present.
3. This product is an XAG M-series remote sensing drone. Please read this User Manual and Instruction Manual carefully to scrutinize your legitimate rights and interests, responsibilities and safety guidelines, or it may pose risks of property loss, flight accident and personal injury.
4. User commit to use this product only for a legitimate purpose and acknowledge the terms and conditions herein as well as possible formulation and amendment of policies and norms by XAG. User understand and accept that flight records and data during the operation will be automatically uploaded and saved to XAG's server. XAG assumes no responsibility for the failure to analyze the flight records and data caused by unsuccessful upload and storage due to any reason attributable to the user.
5. To the maximum extent permitted by law, under no circumstances shall XAG offer an implicit or explicit guarantee for this product, including but not limited to implicit guarantees pertaining to vendibility, fitness for a particular use, or non-infringement.
6. To the maximum extent permitted by law, XAG shall not be liable for all losses arising from user's operation not following the instruction in the User Manual/Instruction Manual. Also, XAG shall not be liable for any indirect, consequential, punitive, accidental, special or exemplary damages, including any loss incurred as a result of your purchase, use, or inability to use the product, even if user have been advised of the possibility of such loss.
7. To the maximum extent permitted by law, under any circumstances, the liability or compensation-amount from XAG to you for all damages, losses and litigation arising therefrom will not exceed your purchase amount.
8. On any account, the purchaser or user shall comply with laws and regulations of the country and the region where the product is used. XAG shall assume no liability arising from the violation of relevant laws and regulations by the purchaser or the user.
9. It is noteworthy that, as this product and the services it provides are able to access high-precision geolocation, please DO conform to the local laws and regulations concerning mapping aircraft. XAG shall not be held accountable for any violations of relevant laws and regulations.
10. As exclusion clauses may be prohibited by laws in some countries, your rights and interests in different countries may vary. However, this does not imply that the contents contained in this Disclaimer is necessarily invalid.
11. To the extent permitted by law, XAG reserves the rights for final explanation and revision of the terms and conditions hereinabove. XAG also has the right to update, modify or terminate these terms and conditions via channels including its official website, the Instruction Manual/User Manual and online App, without prior notice.

Warning

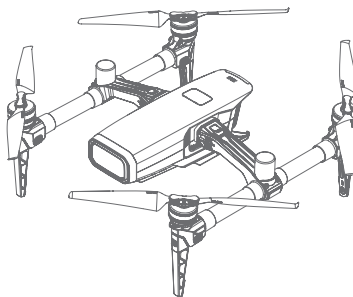
User is required to fully read the Instruction Manual and obtain a UAS operator certificate accredited by XAG or existing laws, regulations and policies. Otherwise, it may cause serious injury to yourself or others, or damage to the product and property loss. User should be strongly safety-conscious. This product is not suitable for children. Do NOT use the components that are not provided or suggested by XAG. Please install and use the product by strictly following XAG's instructions.

Introduction

With a built-in RTK+GNSS Dual Positioning System and a more intelligent and powerful "brain" - Super X4 Flight Control System, XAG® M500 Remote Sensing UAS leaps forward in both high-precision mapping owing to its centimeter-level positioning and real-time map generation. WiFi/4G dual-path ensures smooth communication at different distances and a safer flight. "Xpilot" App with a new simplified UI interaction design allows you to watch the real-time HD video during the flight. Featuring multi-mission control (the ability to control multiple remotely piloted aircraft with a single remote controller) and super-fast map generation in the cloud and local server (inside the drone), it offers you instant access to an HD map. Besides, more application scenarios and operation modes are supported as it fits a replaceable standard mounting interface, allowing for other payload sensors such as XCam 20 Pro Gimbal Camera and Multi-spectral Gimbal Camera.

List of Items

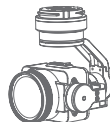
Please see that all the following items are present when unpacking the box. Should there be any item missing, please contact your seller immediately.



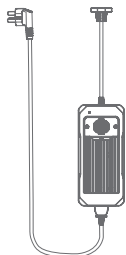
Aircraft
×1



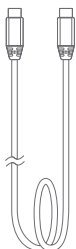
SRC1 Smart Remote Controller
×1



XCam 20 Pro Gimbal Camera
×1



CM1300 Smart Fast Charger
×1



USB-Type-C Cable
×1



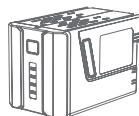
USB Wireless Modem
×1



Adapter
×1



Propeller Holder
×4

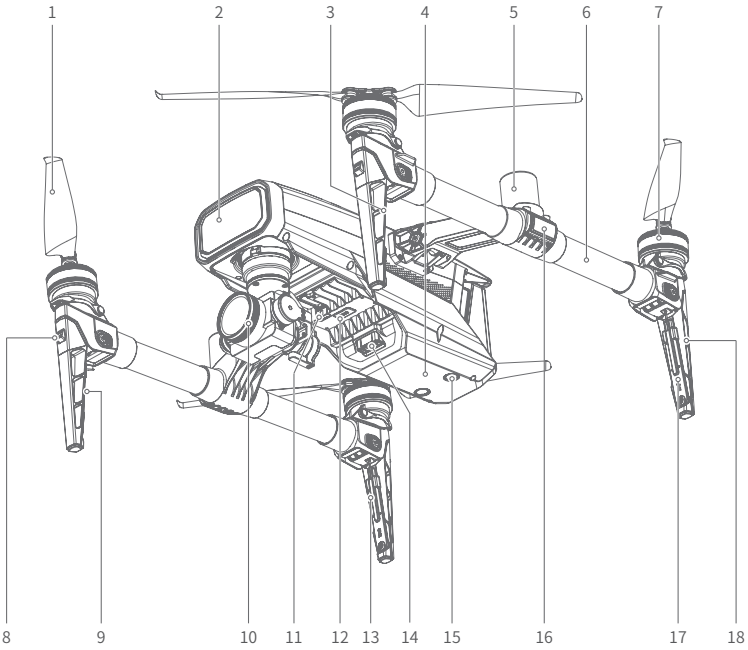


Smart Battery
×2

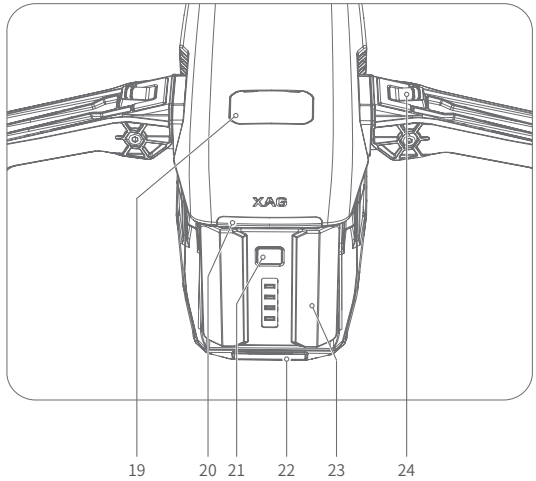
Note

△ There should be a SIM card inside the aircraft and an SD card inside the camera. Were either one missing, please contact your seller immediately.

Main Components



1. Propeller
2. Collision Avoidance Radar
3. 4G Antenna
4. Terrain-following Radar
5. RTK Antenna (one on the left, one on the right)
6. Arm
7. Motor
8. Landing Gear Fastener
9. 2.4/5.8GHz Antenna
10. Camera
11. SIM Card Slot
12. Extension Interface
13. 4G Antenna
14. Battery Snap Fit
15. Dual-camera System
16. Status Indicator
17. 2.4/5.8GHz Antenna
18. Landing Gear
19. Extension Interface
20. Flight Indicator
21. Power Button
22. Cover
23. Smart Battery
24. Arm Fastener



Systems

Super X4 Flight Control System

Boasting high-performance sensors, the latest Super X4 Flight Control System in M500 can build a high-precision model exactly the same as a real flight condition, which provides a more accurate data source and underpins its strong sensing ability. Meanwhile, the advanced self-adaptive algorithm allows it to perform real-time parameter identification of the system model, minimizing the impact on the drone's performance under different working conditions or complex environments. Furthermore, the optimized control algorithm and multi-observation measurement ensure stable flight under the precondition of guaranteed accuracy and speed of response. In addition, the powerful chip, hardware support and algorithm with optimized buffer empower the drone to process more variables at the same time.

Positioning System

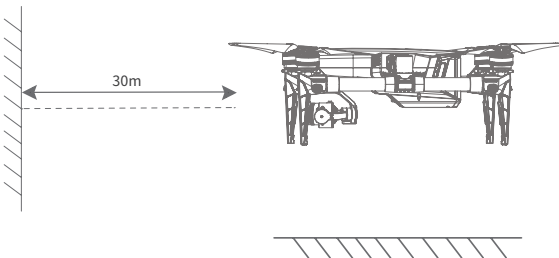
RTK + GNSS Dual Positioning System with real-time centimeter-level accuracy delivers high-precision data to support various missions. The built-in 4G module enables the drone to be covered by the XAG Cloud RTK network, ready for operation without an additional portable base station. With the handheld terminal accessing the XAG Cloud RTK network as well, high-precision positioning is guaranteed by differential data transmission via WiFi/4G dual-path. In case of failure to receive differential signals, PPK is available to support aerial mapping. For areas not covered by the XAG Cloud RTK network, you may configure via the App to get access to Qianxun network or CORS network to start the mission. Besides, if anything goes wrong with the RTK positioning system, the GNSS positioning system - essentially a backup GNSS module offering normal precision positioning - will be enabled automatically to ensure flight safety.

Communication System

M500 features dual-path communication. One is the 2.4GHz/5.8GHz dedicated path between the base station and the drone, characterized by short latency, simultaneous downstream/upstream transmission and transmission of video stream. The other is an all mode 4G path featuring long-distance communication and strong signal penetration strength, which caters for flight maneuvers and data transmission inside a 4G coverage area. Both paths are closely integrated and mutually reinforcing, making M500 a good fit for a broader range of scenarios.

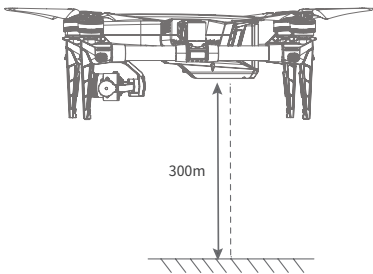
Obstacle Avoidance Radar System

There is a millimeter-wave radar at the front of the aircraft, providing a warning response during the flight. With a 30m of sensing and detection ahead, it offers obstacle avoidance in the process of high-speed flight. Obstacles detected, the drone will hover automatically. Then you may have it return to home. Otherwise, it will keep hovering in place until it depletes the battery and lands automatically.



Terrain-following Radar System

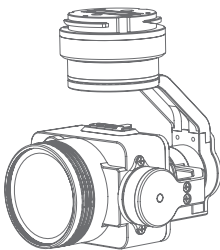
The built-in millimeter wave radar with a measurement range up to 300m in M500 allows high-precision terrain-following flight at a height less than 300m. Or, the aircraft will switch to the mode of Google DEM-based terrain-following flight. These will see images captured at the same resolution, make back-end data processing easier and ensure flight safety in mountainous areas.



Imaging System

XCam 20 Pro Gimbal Camera

XCam 20 Pro Gimbal Camera, featuring high-precision centimeter-level mapping, can generate a 1:500 HD map by combining the results in the cloud/Feitu/local server. Upon automated field boundary/crop detection via XAI Smart Agricultural System, the map can be imported to an XAG agricultural drone for autonomous plant protection. A built-in 1 inch 20MP CMOS sensor brings about high-resolution imaging while the mechanical global shutter sees that photos are free from distortion, fuzziness or rolling shutter effect. Keeping time with RTK information, it synchronizes the photo and location information in the millisecond range, essential for creating a 1:500 HD map. Preloaded lens distortion correction data and autofocus function are inextricably linked to high-resolution imaging, making post-processing and image combination much easier. With the help of 3D topographic modelling done by terrain-following radar with a measurement range up to 300m, M500 can fly along the 3D terrain-following route, ensuring unified resolution of the whole map.

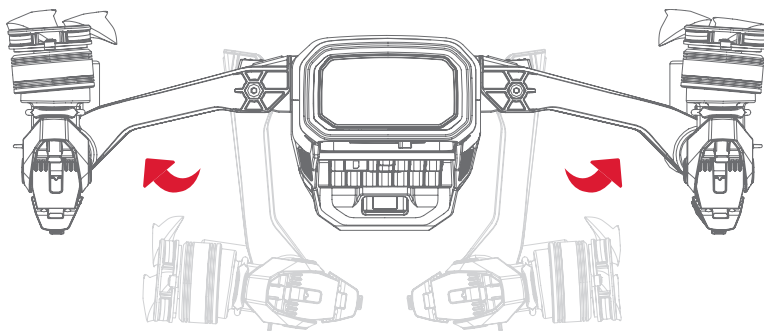


XCam 20 Pro Gimbal

Aircraft

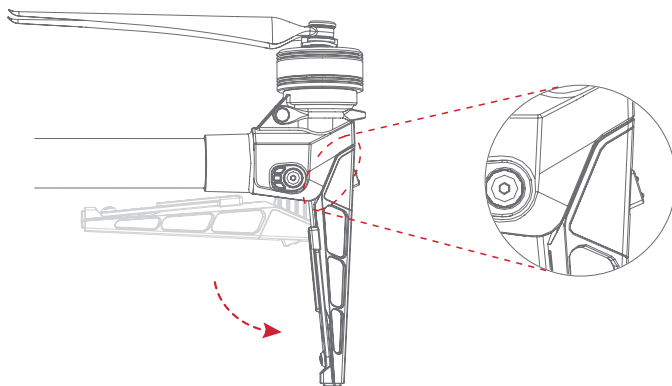
Unfold Aircraft

Spread out the arms as shown below until you hear a click.



Unfold Landing Gears

Spread out the landing gears as shown below until you hear a click.

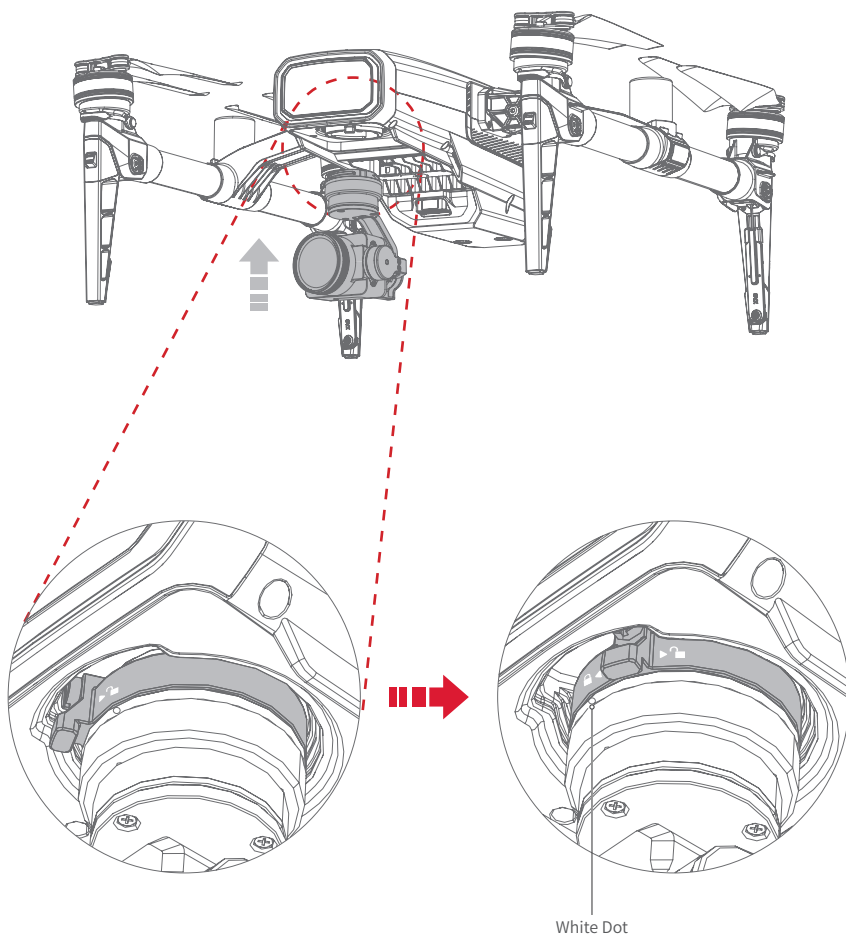


Note

 Please see that the landing gears are securely locked.

Install Camera

Align the white dot on the camera plate with the "unlock" mark on the chuck. Turn the camera plate clockwise until the white dot is aligned with the "lock" mark.

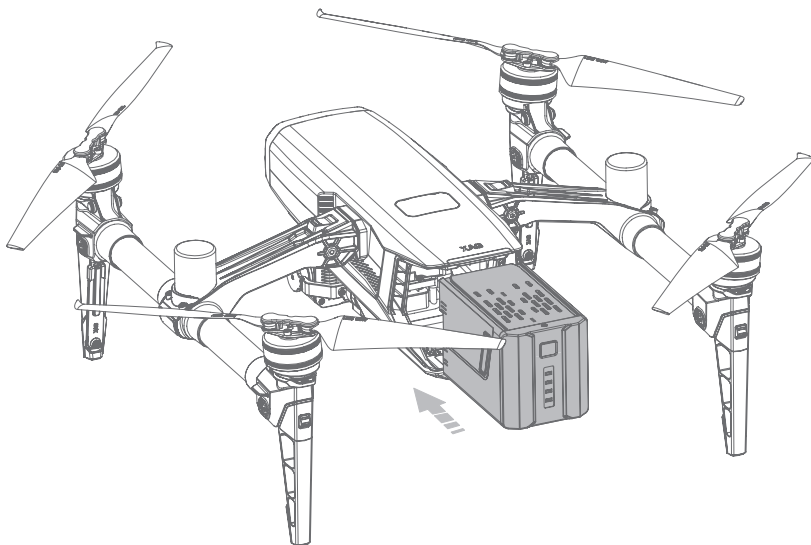


Note

- ⚠ Please switch off the aircraft before fitting/removing the camera, or it may cause damage to the components.
- ⚠ Please switch off the aircraft before inserting/removing SIM card and SD card. Otherwise, the SIM card will be locked or the SD card will be damaged.

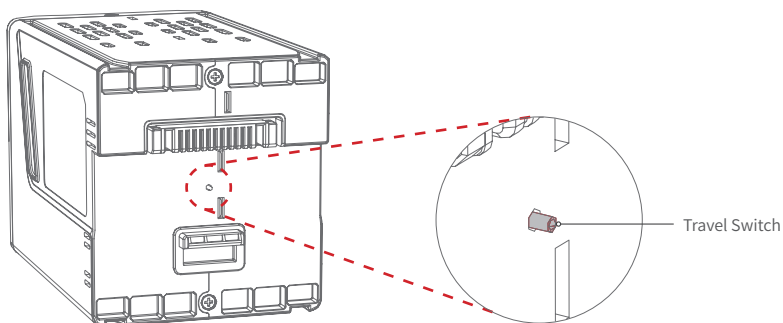
Install Battery

Insert the battery as shown below until you hear a click.



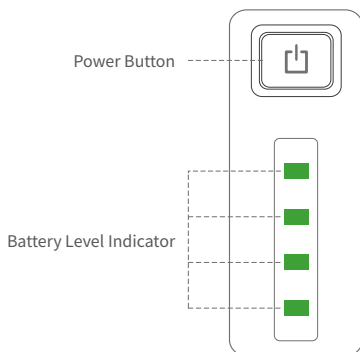
Note

- ⚠ Please make sure that the battery is firmly inserted before the flight. Otherwise, it will result in sudden power loss during the flight and cause an accident.
- ⚠ Beware of the travel switch when handling and storing the battery separately.



Smart Battery

With 6 high voltage lithium polymer power batteries and a BMS module, C500 Smart Battery, specially designated for M500, provides real-time information such as voltage, current and temperature as well as charging protection. It gives immediate feedback to the load side during use. In case of battery low or failure, it will send an emergency stop signal initiatively to ensure the electrical safety of the load side. There is one power button and four indicators shown as follows.

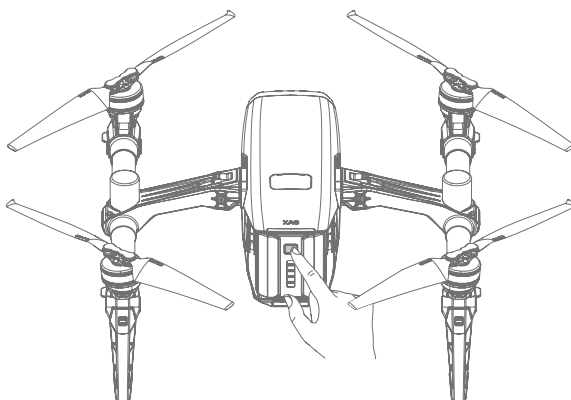


Power On/Off

Upon connection to the aircraft or the charger, long press the power button for at least 1 second until all the battery level indicators flash simultaneously, followed by the other long press for at least 1 second until the battery beeps and all the status indicators are on/off. Then the battery turns on/off.

Check the Battery Level

When the aircraft is off, short press the power button once to check the battery level. When the aircraft is on, the battery level indicators stay on.



CM1300 Smart Fast Charger

Specifications

Input Voltage Range: 100~240VAC
Rated Input Voltage: 220-240VAC
Output Current: 8A (MAX)

Output Voltage: 26V
Operating Temperature: -20~40°C
Efficiency: >90%@ FullLoad and 230VAC

Status Indicator

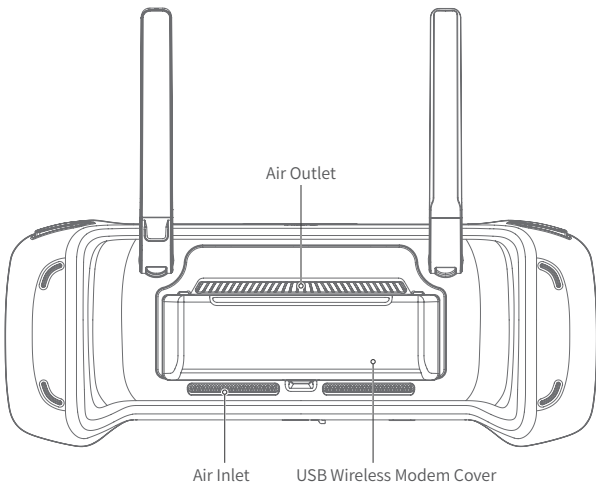
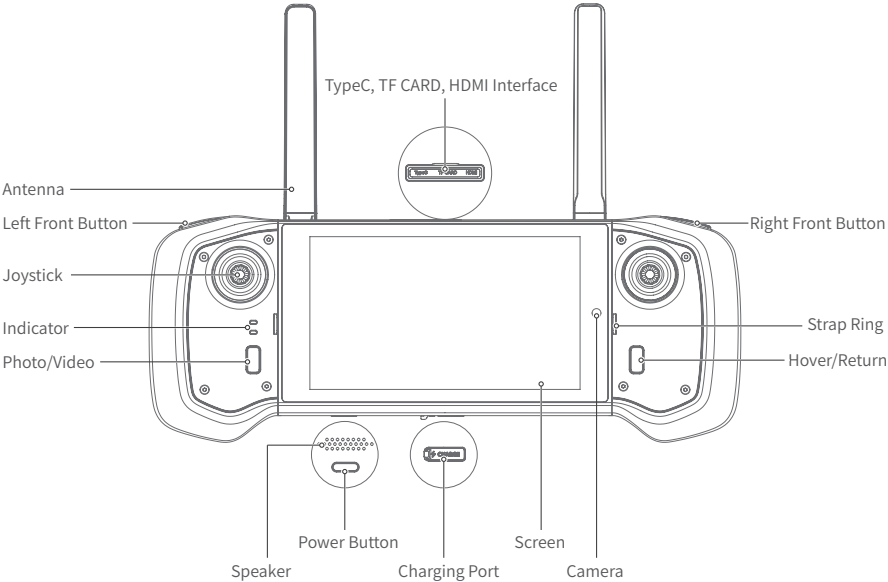
LED Behavior		Description
Solid Red		Charging
Solid Green		Idle/Full

Precautions

- Please see that the battery is firmly inserted before switching on the battery and charging. Once it is fully charged, shut down the power and take out the plug.
- To ensure timely heat dissipation, please locate the charger in a cool, well-ventilated place away from direct sunlight and heat sources while charging. In the event of excessively high temperatures, overheat protection will be triggered. It will resume charging when the temperature drops.
- NEVER disassemble or modify the charger. NEVER use the charger with a damaged power cord, or it may cause electric shock, fire or damage to the charger.
- For fear of short circuits, please prevent foreign matters from contaminating the output terminals. Not being waterproof, NEVER use a charger wet.
- Please handle the battery with care. NEVER take it apart, pierce the housing or apply pressure to it.
- Please see that the battery interface is clean and free from metal parts.
- After use, please charge the battery to 40%~60% before storage. Avoid storing the battery below -10°C or above 45°C .
- Store the unused battery in a cool, dry place. Fully discharge and recharge it every 90 days to maintain battery health.
- NEVER expose the battery to harsh sunlight or rain.
- NEVER charge the battery with an unofficial charger. Keep the battery away from inflammable and explosive substances while charging.
- To protect our environment, please properly dispose of the battery as required by the local laws and regulations.
- DO charge the battery with the XAG official charger. Otherwise, the user shall be held accountable for any consequence arising therefrom.

Remote Controller

Diagram



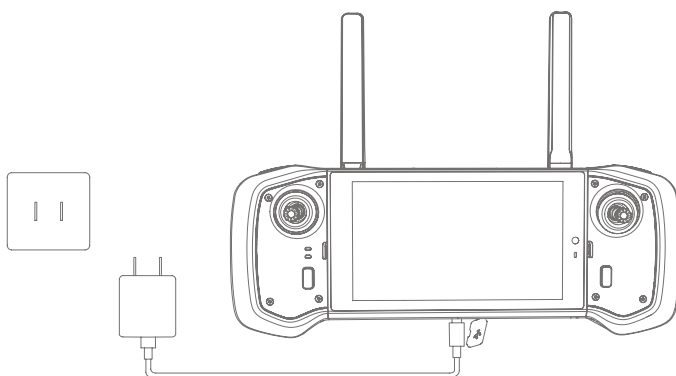
Power On/Off

When the remote controller is off, long press the power button for at least 2 seconds until all the indicators flash with green light simultaneously, followed by another long press until the speaker beeps and the second indicator goes flashing green. When it turns solid green, the remote controller turns on.

When the remote controller is on, long press the power button for at least 2 seconds until all the indicators flash with green light simultaneously, followed by another long press until the screen reads "Powering Off" and the second indicator goes flashing green. When the speaker beeps, the remote controller turns off.

Charge Remote Controller

Insert the Type-C end into the charging port of the remote controller, and the USB end into the adapter, and then connect to a power source. The first indicator is flashing green when charging begins. It turns solid green when the remote controller is fully charged.







Indicator


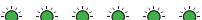
The first indicator (the upper one) indicates the battery level or charging status.

During ordinary use of the remote controller, you can check the battery level by observing the first indicator or dragging down from the top of the screen.


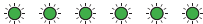

When the remote controller is off, you can check the battery level by short pressing the power button and observing the first indicator.

While charging the remote controller, you can check the battery level by observing the first indicator.

Battery Level LED Behavior		Description
Solid Green		30%~100%
Solid Yellow		10%~29%
Solid Red		5%~9%
Slow Flashing Red		0%~4%

Charging LED Behavior		Description
Fast Flashing Green		Fast Charging
Slow Flashing Green		Slow Charging

The second indicator (the lower one) shows the current status. The table below describes its behavior.

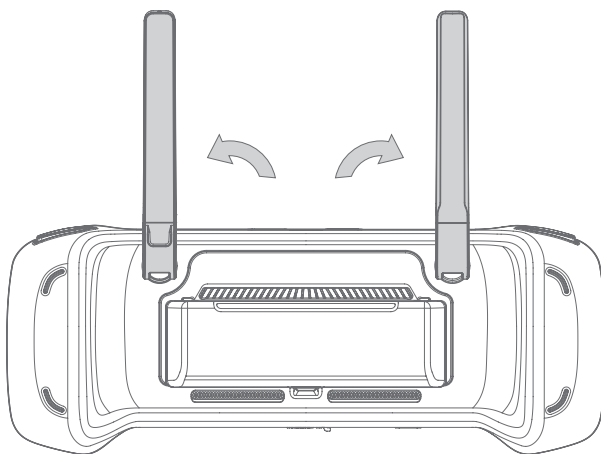
Status LED Behavior		Description
Solid Green		Normal
Flashing Green		Powering on/off
Solid Red		Abnormal

When the remote control is updating, both indicators are on, which is described as follows.

Update LED Behavior		Description
Solid Red		Updating

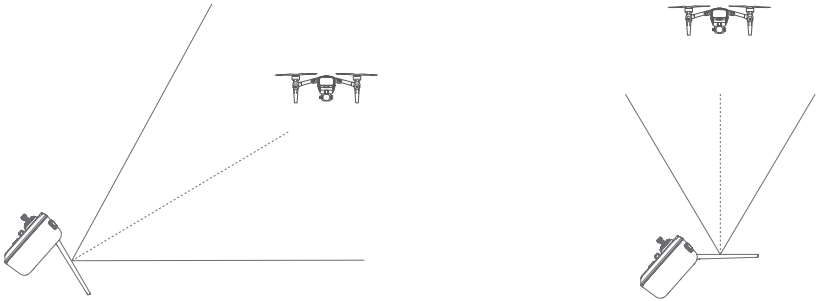
Unfold Antennas

Spread out the antennas as shown below for better signal reception.



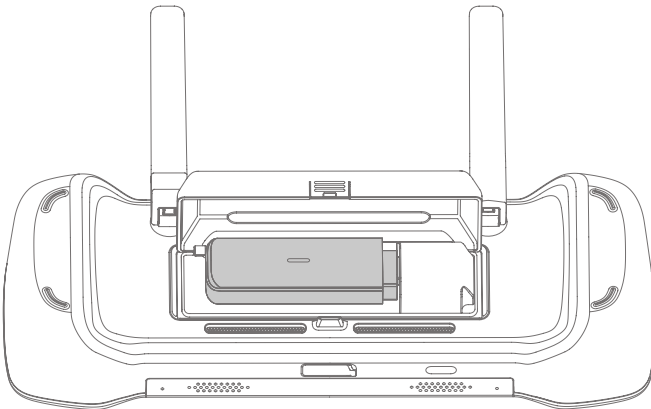
Note

△ It is recommended to adjust the antenna side-on to the aircraft as the side of the antennas sends out the strongest signal. The optimum signal coverage is shown as below.



Install USB Wireless Modem

Insert the SIM card into the USB wireless modem. Open the USB wireless modem cover, insert the modem, and close the cover firmly.



Note

△ Please switch off the aircraft before inserting/removing SIM card and SD card. Otherwise, the SIM card will be locked or the modem will be damaged.

Flight Controls

Camera

Press "Left Front Button", "Right Front Button" and "Photo/Video Button" to control the gimbal camera in real-time.

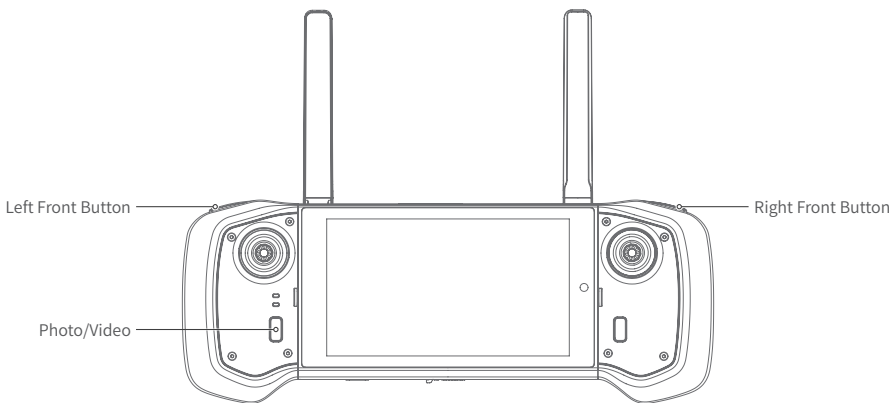
- Pitch up & down

Short press the "Left Front Button" to rotate the camera downward slowly while long press quickly.

Short press the "Right Front Button" to rotate the camera upward slowly while long press quickly.

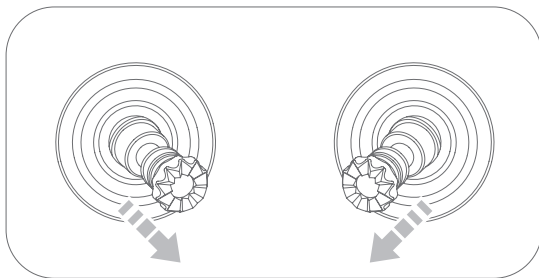
- Photo/Video

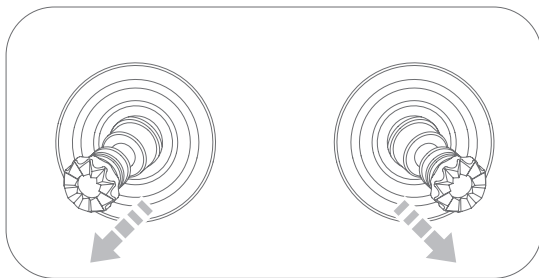
Short press the "Photo/Video Button" to take a photo while long press a video.



Start Motors

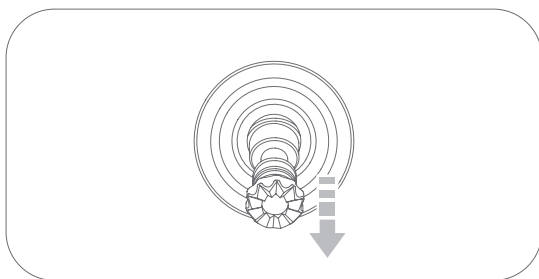
Before a flight, push both the joystick and the throttle as below to start the motor. If you fail to push the throttle within 3 seconds after releasing them, the motors will stop automatically.





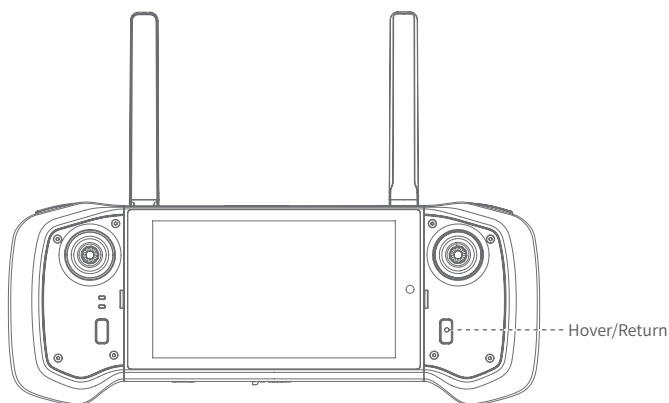
Stop Motors

After the aircraft lands, pull the throttle to the lowest position and hold it until the motors stop.



Hover & Return

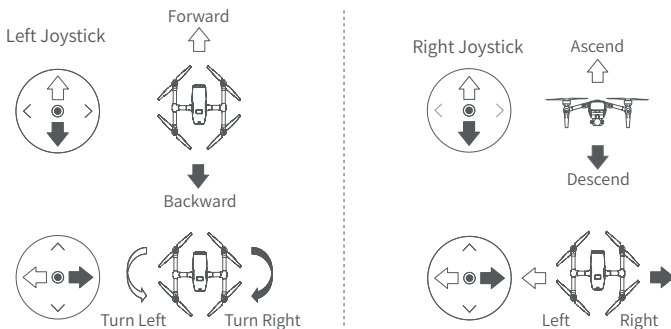
During the flight, short press the Hover/Return button to hover the aircraft while long press to have it return.



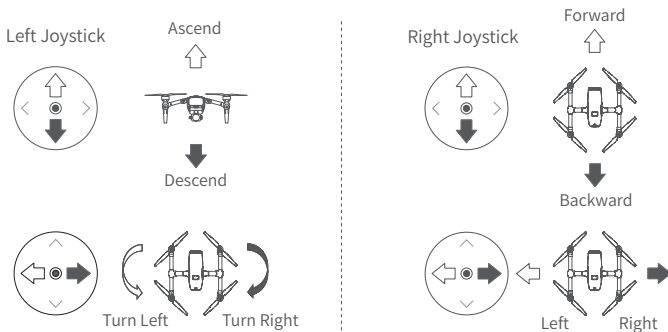
Joystick Mode

The Joystick Mode is divided into Japanese Hand, American Hand and Chinese Hand.

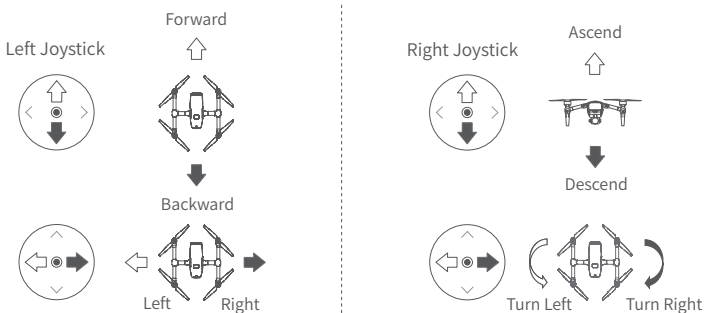
Japanese Hand (Mode 1)



American Hand (Mode 2)



Chinese Hand (Mode 3)



Note

△ The following instructions on controls are based on the Chinese Hand (Mode 3), the factory default control mode.

"Xpilot" App

App Overview

Home Screen



1. My Device

Tap to get to the device list.

2. Remote Control Status

📶: Tap to view the status of the communication system.

3. Positioning Status

📶: Tap to view positioning information.

RTK means real-time and high precision positioning (stable shared GPS signal and differential data received). Float means fluctuation (insufficient shared satellites and unstable shared GPS signal as well as differential data received). Single indicates single point signal (only GPS signal available, no differential data). None indicates no signal (no GPS signal or insufficient satellites).

4. Switch Device

⏪ / ⏩: Tap to switch to another device.

5. Flight Screen

Tap to enter the flight screen.

7. Mission Screen

📄: Tap to enter the flight mission screen.

8. Flight Results

📁: Tap to view flight results.

9. User Profile

👤: Tap to view user profile.

10. Battery Status

🔋: Aircraft's battery level. Tap to view battery status.

11. More Information

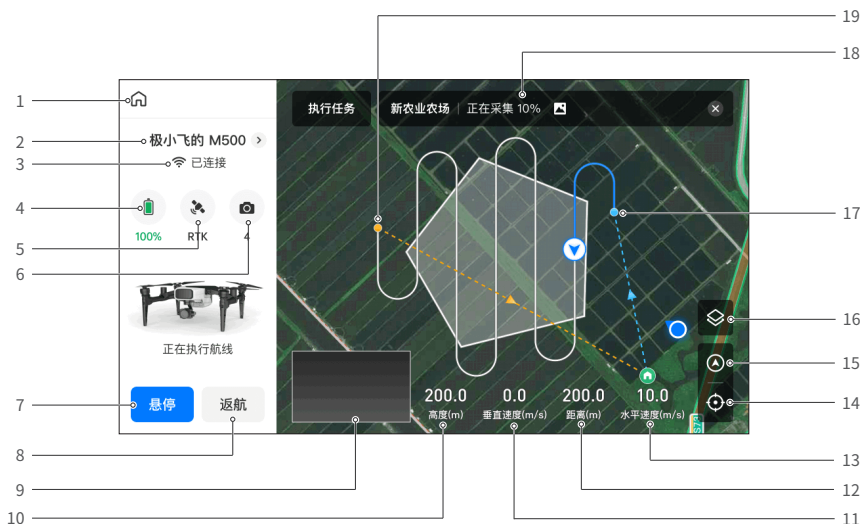
📄: Tap to view system information of the aircraft.

12. Aircraft's Name

13. Remote Controller Information

🔋: The green circle indicates the battery level of the remote controller. Tap for more information of the remote controller.

Flight Screen



1. Home Screen

: Tap to return to the home screen.

2. Aircraft's Name

Tap to view device details.

3. Connection Status

The connection status of the aircraft and the remote controller.

4. Battery Status

: Aircraft's battery level. Tap to view battery status.

5. Positioning Status

: Tap to view positioning information. RTK means real-time and high precision positioning (stable shared GPS signal and differential data received). Float means fluctuation (insufficient shared satellites and unstable shared GPS signal as well as differential data received). None indicates no signal (no GPS signal or insufficient satellites).

6. Camera Status

: Connection status of the camera and the number of photos taken.

7/8. Flight Commands

Tap to hover or return.

9. Flight View

Tap to switch video transmission images.

10/11/12/13. Flight Status

Current altitude, vertical speed, flight distance and horizontal speed of the aircraft.

14. Remote Controller's Location

: Tap to show the remote controller's location.

15. Aircraft's Location

: Tap to show the aircraft's location.

16. Map Mode

: Tap to switch to map mode.

17. Starting Waypoint

18. Mission Information

19. Ending Waypoint

Appendix

Status Indicator

Get to know the current status of the aircraft by checking the Flight Status Indicator (Tail Light). Details are as follows:

Tail Light

LED Behavior	Status	Description
Alternate Flashing Red/Green	Manual Mode	Weak GPS signal or compass interference
Double Flashing Green		
Triple Flashing Green	Auto Mode	GPS route mode
Slow Flashing Red		
Solid Red	Status Error	FC initialization or self-inspection failure when powered on
Fast Flashing Purple		Flight Control formatted or incorrect parameters
Fast Flashing Blue		Propulsion system error
Fast Flashing Red		Sensor (except IMU) error, GPS malfunction or low heading accuracy
Fast Flashing White		IMU Failure
Triple Flashing Red	Low Voltage Protection	Low battery voltage or low single cell voltage

Flight Indicator

LED Behavior	Description
Double Flashing Red	Standby mode
Left Red and Right Green	Route mode
Double Flashing Green	Return upon completion of flight
Double Flashing White	Transferring camera firmware
Fast Flashing White	Camera updating
Fast Flashing Green	Gimbal module updating

Specifications

Aircraft

Model: M500 Remote Sensing UAS
Takeoff Weight: 2.55kg
Wheelbase: 492mm
Max. Takeoff Altitude: 6000m
Max. Ascent Velocity: 4m/s
Max. Descent Velocity: 3m/s
Max. Horizontal Speed: 10km/h (Route Mode)
Max. Slope: 25°
Max. Angular Velocity: 170° /s
Duration of Flight: Max. 35 Minutes
Operating Frequency: 2.400 GHz to 2.483 GHz (Europe, Japan, South Korea) 5.725 GHz to 5.850 GHz (China, U.S.)

Equivalent Isotropic Radiated Power (EIRP)

2.4GHz
FCC: ≤ 28 dBm, CE: ≤ 19 dBm, SRRC: ≤ 19 dBm, MIC: ≤ 19 dBm
5.8GHz
FCC: ≤ 31 dBm, CE: ≤ 14 dBm, SRRC: ≤ 27 dBm

GNSS

Sensitive Single-Frequency GNSS
GPS+BeiDou+Galileo (Asia)
GPS+GLONASS+Galileo (Other Regions)
Multi-Frequency and Multi-System High Precision RTK GNSS
Frequency: GPS: L1/L2; GLONASS: L1/L2;
Frequency: BeiDou: B1/B2; Galileo: E1/E5b
Time to First Fix: < 50 s
Positioning Accuracy:
Vertical 1.5 cm + 1 ppm (RMS)
Horizontal 1 cm + 1 ppm (RMS)
1 ppm means error increases by 1mm as the aircraft moves every 1km

Data Link System

Distance of Video Transmission: 3km
Network Supported: All Mode

XCam 20 Pro Gimbal Camera

Image Sensor: 1 inch CMOS Sensor
Effective Pixels: 20 Megapixels
Lens: Focal Length $f=10.6$ mm (Equivalent 28.9mm)
ISO Range: 100 - 3200
Mechanical Shutter: 1/30-1/2000 s
Image Size: 5472*3648(3:2), 4864*3648(4:3)
Video Resolution: 4K/1080P/720P
Video Transmission Resolution: 720P
Coding Format: H.264
Video Frame Rate: 30fps
Image Format: JPEG
File System Supported: FAT32
Built-in Storage: 32G/64G/128G/512G
Memory Card Supported: TF Card
Exposure Compensation: ± 2.0
Metering mode: Average Metering

C500 Smart Battery

Model: B6130
Capacity: 6000mAh
Battery Type: Lithium Polymer Battery
Power: 130Wh
Charging Time: 30min
Overall Weight: 728.3g
Operating Temperature: 10°C ~40°C

Smart Fast Charger

Model: CM1300
Output Voltage: 26Vdc
Rated Power: 200W

Sensing System

Ranging Distance of Downward Radar: ≤ 300 m
Ranging Distance of Obstacle Avoidance Radar: ≤ 30 m
Ranging Distance of Binocular Vision: ≤ 10 m

