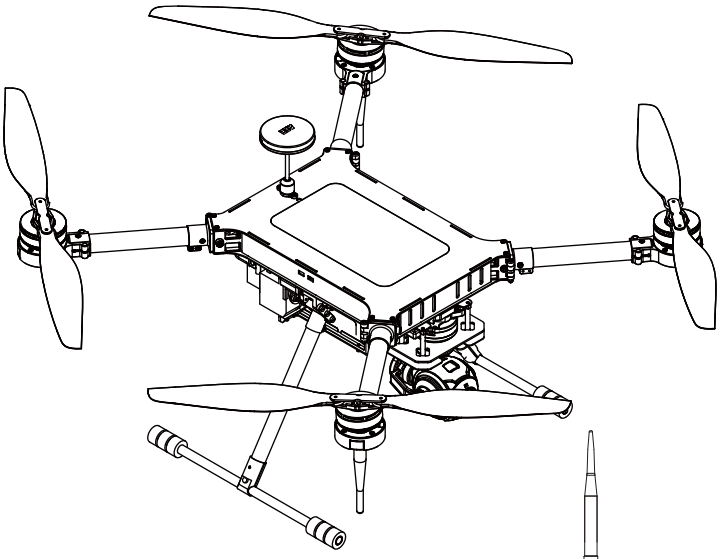
Product name: MACH4
Model name: X70

AEE UNMANNED AIRCRAFT SYSTEM

Professional • Leading



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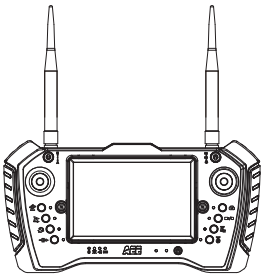


Product Name: MACH4 Y12
Model Name: Y12

USER'S MANUAL

Please read this manual carefully before use and keep it properly for reference.

CONTENTS

1. Important notes

Please read the following notes carefully before using this product. Once using the product, it will be regarded as your approval and acceptance of all the contents in the manual

This product is a high-tech electronic product integrating flight control and camera control. Under the condition of normal power supply and undamaged components,it can provide excellent flight control and camera surveillance. Although the aircraft program has a safety mechanism, which can keep the product in a safe state when powered on, it is highly recommend that propellers be removed before calibration.

Shenzhen AEE Aviation Technology Co., LTD shall not assume any liability for personal injury, property loss (including direct & indirect losses), legal disputes and compensations caused by the following reasons during your use.

1. Application of the product to any illegal activity;
2. Use of the product for flight, video recording and photo taking in the no-fly zone;
3. Failure to operate the product according to the manual;
4. Other force majeure, including earthquakes, tsunamis, lightning strikes, hail, etc.

2. Product introduction

Thank you for choosing the AEE unmanned aircraft system product. This product is a small integrated four-rotor multi-function drone that can take off and land vertically. It adopts the world′s highest standard integrated design, with professional airborne shooting and monitoring equipment, ground station control equipment, and miniaturized real-time monitoring and video recording remote control, which can satisfy various environments and tasks. Featured by simplicity, flexibility, stability and reliability in operation, this system can easily realize the editing of 3D map waypoints, the setting of flight routes, and the real-time information feedback of coordinates, flight attitude, speed, video, etc. It can meet the shooting needs of multi-dimensional detection and monitoring. It is widely used in tasks such as criminal detection, anti-terrorism and riot control, security monitoring, disaster relief, patrol and search & rescue, tracking and search, public safety, traffic supervision, exploration and survey, recording and evidence collection, and favored by sectors including military, armed police, public security, traffic police, fire, land, power, communications, mining, geography, etc.

3. Safety precautions

* Do not disassemble or modify the AEE unmanned aircraft system product without permission.
* Try to avoid controlling the product alone in the initial stage. Having experienced drone pilots to guide the flight are advised.
* Try to avoid starting two drones at close range simultaneously to prevent accidents.
* Check whether all parts of the product are in good condition. No flight is allowed in case of any aging or damaged parts.
* Ensure that both the video antenna and the radio antenna are installed correctly for the flight to avoid affecting the flight and video receiving distance or causing damage to the transmitting module inside the drone and remote controller.
* Do not shut down the remote control and ground station in violation of the regulation during use, so as to avoid unpredictable consequences.
* Keep away from the running parts, and do not touch and keep away from any rotating parts while the drone's propeller is running. Keep your head away from the propeller to avoid danger. At the same time, ensure that the drone is kept away from small metal objects, so as to prevent danger due to absorption of such objects by the drone.

* Ensure that the drone is the center of the circle when taking off and landing, and there are no moving people or obstacles within a radius of 10 meters. When operating this AEE unmanned aircraft system product, the drone should only be allowed to fly in a safe area away from the crowd, and it is important to pay attention to your own safety and people around.
* Do not fly in case of wind scale above 5 to avoid accidents caused by uncontrolled drone.
* Please ensure that each waypoint has a sufficient altitude (the altitude of a waypoint is that relative to the take-off position of the drone) when editing the waypoints in order to prevent the flight route from intersecting with mountains or buildings, which will result in the collision between the drone and mountains or buildings during the flight.
* Remove the protective rubber plugs when using the power battery, and put the rubber plugs back in place after using to avoid short-circuit damage to the battery.
* Be sure to remove all the accessories installed on the aircraft and put them back in place after the flight mission is completed to avoid damage to the accessories due to improper operation.
* Please charge and discharge all batteries once every 3 months to maintain the battery activity; avoid battery damage due to excessive discharge.
* Hold the fuselage when moving the drone. Do not hold the drone arm or landing gear separately, so as to avoid damage caused by improper use.
* Stay away from damp environment, lest water vapor enters the interior of the drone, causing damage to electronic components or causing unpredictable consequences.
* Stay away from heat sources to avoid the aging deformation or even melting damage of thermoplastic materials of the drone caused by high temperature.
* Please follow the user's manual and do not operate in violation of the regulations for the safety of your life and property.

Note: Please strictly observe the above safety precautions, otherwise all consequences will be borne by you.

4. Power

4.1 Remote control

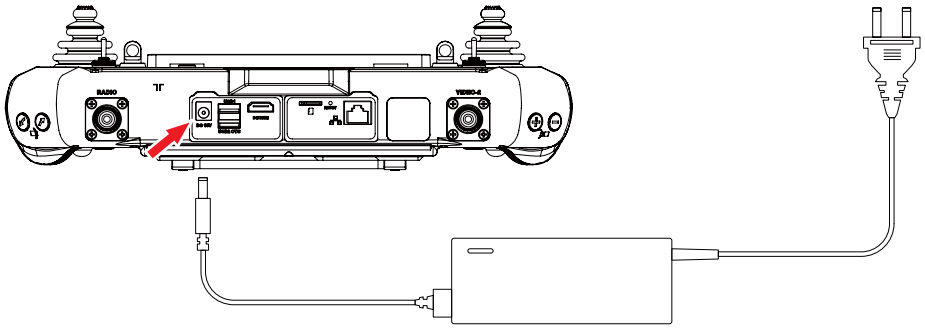
4.1.1 Lower power alarm of the remote control

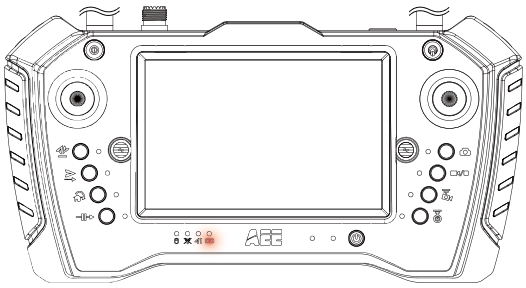
Alarm level	Buzzer of Y12 remote control	Note
Lower power alarm of X70 aircraft		
First-level low power alarm (30%)	Di...Di...Di (continuous)	(The red light of the aircraft flashes slowly)
Second-level low power alarm (15%)	Didi...Didi.. (continuous)	(The red light of the aircraft flashes quickly)
Low power alarm of Y12 remote control		
Low power alarm (30%)	Di...Di...Di (continuous)	The remote control shows a low power prompt

Note: In the state of second-level low power, the aircraft will enter the protection mode, and will slowly descend to the ground vertically at the current position. At this time, the attitude and altitude of the aircraft can still be controlled by the remote control, but two points need to be noted: ① After the aircraft is in the state of second-level low power for 5S, it will start to land automatically, regardless of the middle of the throttle. ② The aircraft can still be operated in the state of second-level low power. The mode switching button can be used to change the mode to regain the control altitude and speed. When the aircraft is not operated, its automatic landing speed is 1M/s. When the aircraft and the remote control give low power alarm, please carefully choose whether to fly or not. It is recommended to replace the battery before flight, in case of flight accident caused by insufficient power of the aircraft and remote control.

4.1.2 Charging of the remote control

The Y12 remote control has a built-in high-performance large-capacity battery (5,600 mAH), which can work continuously for three hours. Please use a special charger when charging the battery, as shown below:

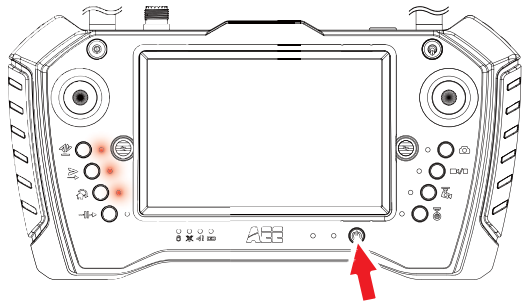




Charging indicator	Charging status
Red light	Charging...
Blue light	Charging completed

4.1.2 Battery voltage check of the remote control

Power detection before power on: Short press the power button of the remote control, and the left status light will show the current remote control power, as shown in the following table (figure):



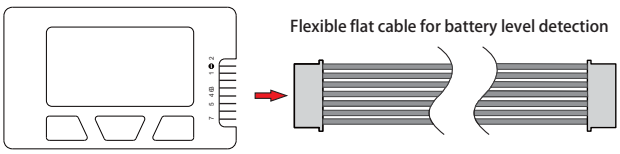
Battery level of Y12 remote control	Status light display (blue light)
Power ⩾75%	Four status lights are on
50% ⩽ Power <75%	Three status lights are on
25%⩽ Power＜50%	Two status lights are on
Power＜25%	One status light is on

Power check after power on: After turning on the power of Y12 remote control, it will automatically enter the ground station software (hereinafter referred to as GS), and the battery level of the remote control will be displayed on the remote control.

4.2 Power battery of the aircraft

4.2.1 Power battery level check of the aircraft

Insert the power indicator into the internal buckle of the flexible flat cable of the battery, and the power indicator will display the total power (6S, 25.2V) and the battery voltage of each cell, as shown below:



Note: The black wire corresponds to "7" when connected.

4.2.2 Power battery charging of the aircraft

The power battery of the aircraft is equipped with a professional intelligent balance charger, built-in high-performance microprocessor and professional operating software. Please connect the battery and charger as shown below:

Steps	Illustration	Description
Step 1		Connect the power cord of "380W power";
Step 2		Insert the power adapter cable into the "DC-24v" interface of the 380w power, and the other end into the "DCINPUT" interface corresponding to the charger;
Step 3		Insert the battery charging cable into the "OUTPUT" interface of the charger, the 6pin flexible flat cable into the "123456" interface of the charger, and the battery charging cable and 6pin flexible flat cable into the battery interface.
Step 4		Insert the power cord of "380W power" into 220V AC power to supply power to the charger, then turn on the red power switch, and the charger will start to work.
Step 5		The overall charging connection diagram is as shown on the left; Connect one end of the standard power cord to the charger power interface and the other end to 220V AC power to supply power to the charger; then turn on the red power switch, and the charger will start to work.

4.2.3 Parameter setting of the power battery charger of the aircraft

[Parameter setting and charging]

Set the charger parameters as follows after the battery and charger are connected:

1. Click the "PAUSE" button and change the battery type to "LIPO" under "BATTERY TYPE". (When the battery type keeps flashing, "UP" and "DOWN" buttons can be used to select the battery type);
2. After selecting the battery mode, click the "PAUSE" button again and set the battery cell number to "6S" under "CELLS". (When the cell number keeps flashing, "UP" and "DOWN" buttons can be used to select the cell number);
3. After selecting the cell, click the "PAUSE" button again and adjust the charging mode to "BALANCE CHARGE" under "MODE".
   (When the charging mode keeps flashing, "UP" and "DOWN" buttons can be used to select the charging mode);
4. After selecting the charging mode, click the "PAUSE" button again and adjust the charging current parameter to "7.0A" under "CURRENT". (When the current keeps flashing, "UP" and "DOWN" buttons can be used to select the current);
5. After all parameters are set, long press the "PAUSE" button for a prompt sound, which means thatcharging is successful.
6. When the battery is fully charged, click the "PAUSE" button to stop charging.

【Precautions for use of lithium battery】

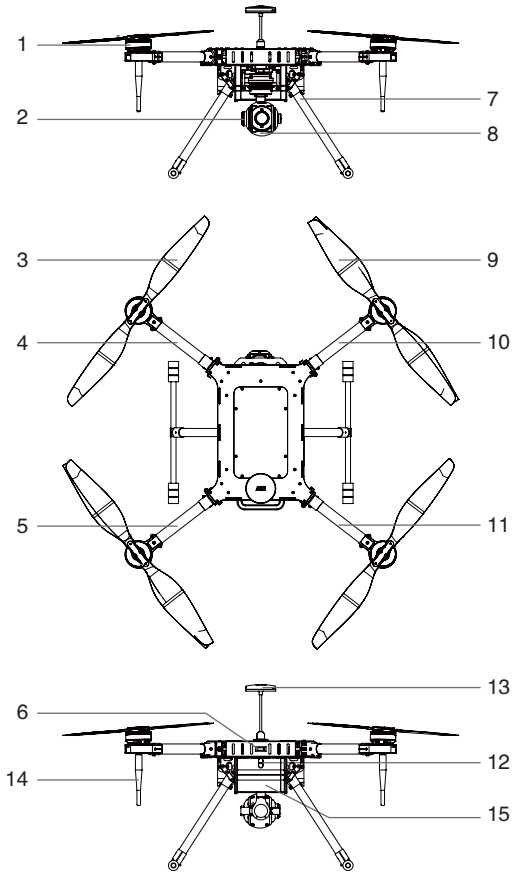
1. Do not remove or reassemble the battery
2. Do not short circuit the battery or connect it in reverse electrode
3. Do not use near heat sources
4. Do not put the battery into water or wet it
5. Do not charge near fire or under direct sunlight
6. Do not crush or throw it
7. Do not use the battery under the condition of serious damage or deformation
8. No reverse charging or over discharging (otherwise, it may cause battery bulging, leakage, cell breakdown, even explosion, etc.)
9. Waste batteries should be recycled for environmental protection
10. If the battery will be left unused for a long time, it is recommended to take out the battery and place it separately and charge it every 3 months. The batteries should be charged to 27.5V for storage, so as to maintain the battery performance and extend its service life. Press the voltage difference detection button first when using the battery. If the value is larger than 0.1V, the battery cannot be used, and needs to be maintained and detected again.

It is strictly forbidden to remove the charging cable from the charger before turning off the power switch in order to avoid short circuit caused by accidental contact between the positive and negative charging connectors, resulting in battery damage or other safety accidents.

5. Aircraft

The AEE unmanned aircraft system integrates flight control software, digital radio, HD image transmission, control joystick, and task control buttons to facilitate easy viewing of flight data and real-time images during flight, and the remote control physical button, switch, joystick or GS software enable the drone to perform various real-time route monitoring and mission control such as fixed-point hovering, route flight, and automatic return.

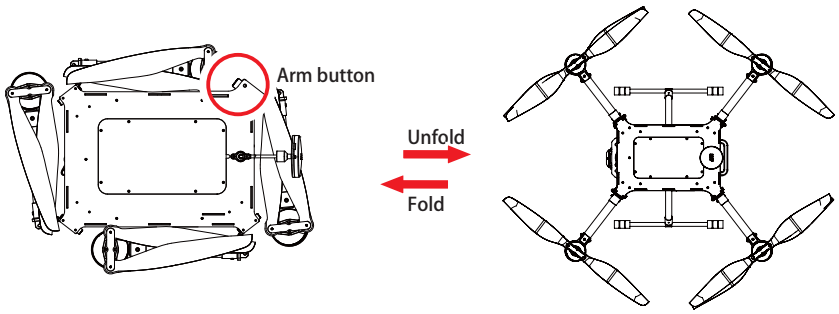
5.1 Illustration of the drone parts



【1】 Motor
【2】Gimbal
【3】Positive propeller
【4】Foldable arm L
【5】Foldable arm R
【6】Power switch
【7】Landing gear
【8】Airborne camera
【9】Counter propeller
【10】Foldable arm R
【11】Foldable arm L
【12】Battery pluggable switch
【13】GPS
【14】Antenna
【15】Battery

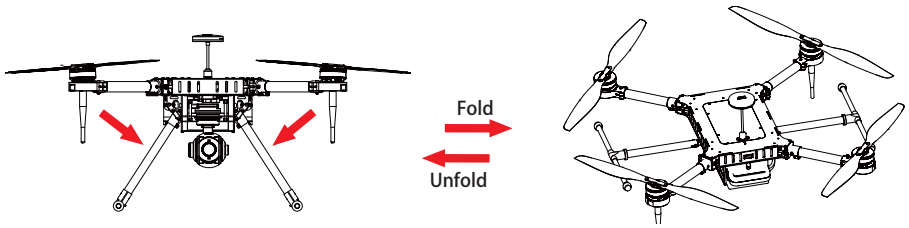
5.2 Folding & unfolding of the drone arm

Press and hold the arm button to unfold the foldable arm, then release the button when the foldable arm matches the fixed arm. Push the foldable arm left and right to make sure that the arm is locked. Conversely, press and hold the arm button to fold up the foldable arm. (It is recommended to manually unfold the blades and fix them before power on.)



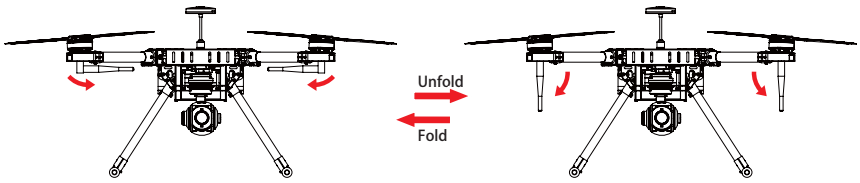
5.3 Folding & unfolding of the landing gear

The folding & unfolding of the landing gear can be controlled by the remote control customized button.



5.4 Folding & unfolding of the aircraft antenna

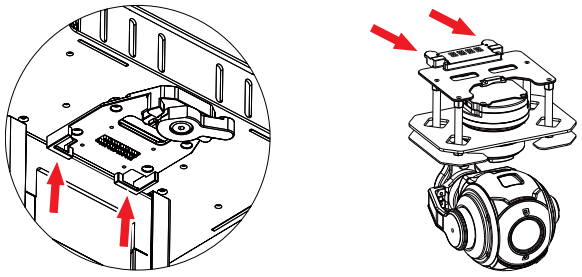
The antenna can be folded or unfolded manually.



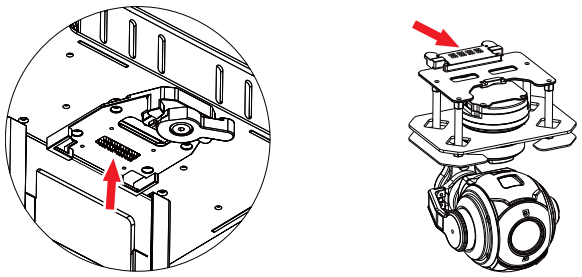
Note: The landing gear and radio antenna need to be folded and placed in the packing box before the aircraft is placed in the packing box.

5.5 Installation of airborne camera

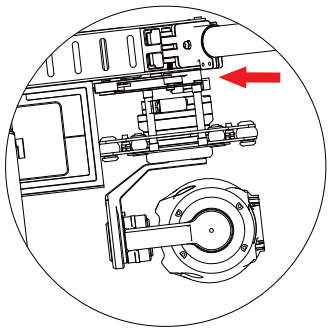
1. Align the two pins (shown in red) of the gimbal with the clamping holder (shown in red) of the gimbal and insert them into it, as shown below:



2. Align the PCB contact of the gimbal with the signal pin of the quick release clamp, push the hanging plate upwards, and the gimbal will be locked when a "click" sound is heard. As shown below:

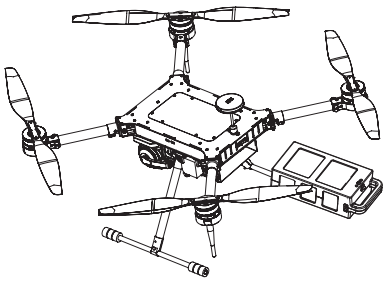


3. Check if the hanging plate of the gimbal to the drone is firm before powering on. As shown below, the gimbal is fixed.

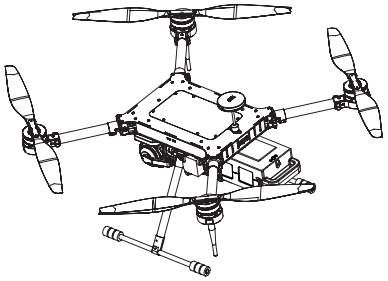


5.6 Installation of the drone power battery

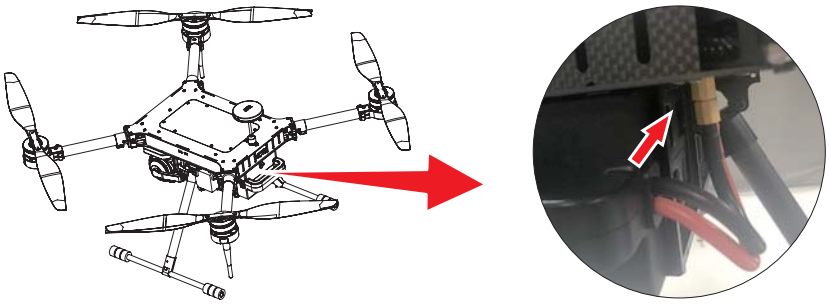
1. Let the battery interface face toward the battery holder:



2. Insert one end of the battery into the battery holder, and press the other end upward. When a "click" sound is heard, gently pull the battery outward to confirm if the battery is loose:



3. Insert the power cord connector under the fuselage into the battery:



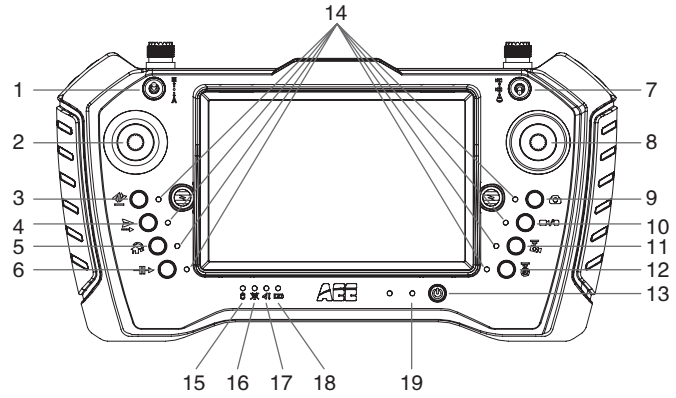
Note: Make sure the drone power switch is in a off (OFF) state when installing the battery.

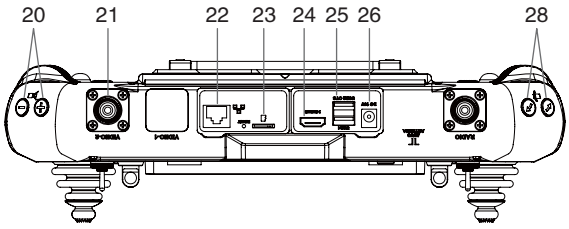
6. Remote control

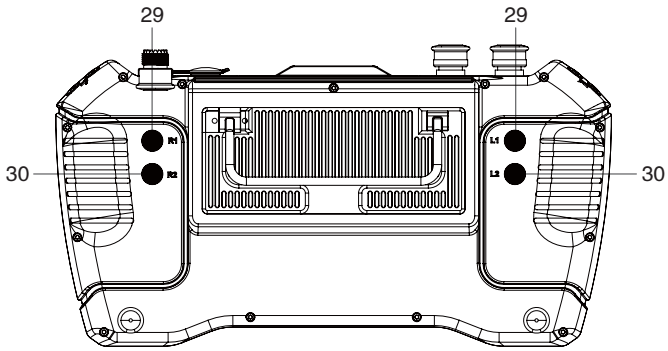
The remote control is specially developed to cooperate with the AEE unmanned aircraft system, so as to facilitate the control of drone flight. The remote control can independently control the flight of the drone and simultaneously display the flight status and the real-time image of the airborne camera.

6.1 Illustration of the remote control parts and the description of button functions

The illustration of the remote control parts and the button functions are shown below:



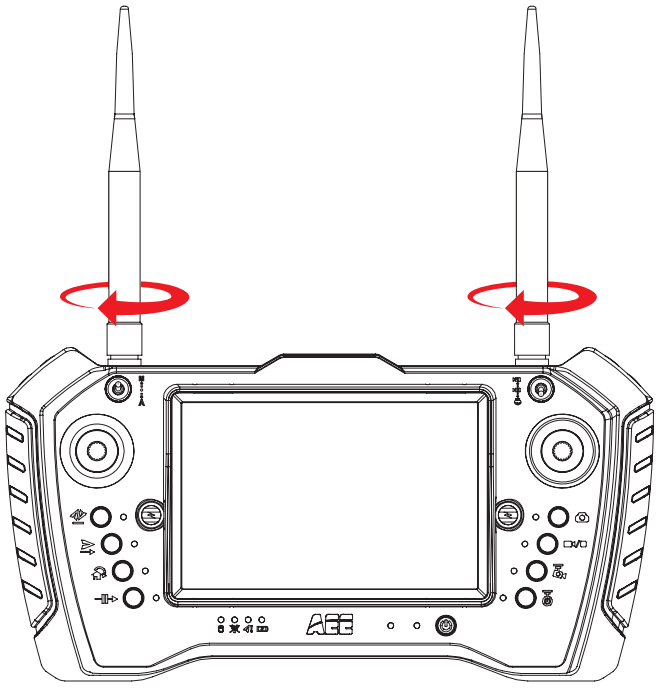




No.	Category	Type	Qty.	Brief description
1	Altitude hold/ positioning flight switching switch	Three-speed toggle type	1	High speed： head free mode Medium speed: Fixed point mode Low speed: Altitude hold mode
2	Left joystick	Universal joystick	1	Control the throttle and the heading
3	One button take-off/landing	Push-button	1	One button take-off/landing
4	One button route	Push-button	1	After setting the route, one button controls the drone to fly according to the route.
5	One button return	Push-button	1	When the drone has a normal flight, one button controls it to make autonomous return.
6	Route suspended/resumed	Push-button	1	Press the button to suspend the route, and then press it again to resume the route
7	Switch camera 1/2 / mapping	Toggle type	1	
8	Right joystick	Universal joystick	1	Control the flight forward & backward and to left & right
9	Camera button	Push-button	1	Short press to start airborne photo taking
10	Video button	Push-button	1	Short press to start/stop airborne video
11	Custom button	Push-button	1	Reserve custom button
12	Custom button	Push-button	1	Navigation light button
13	Power button	Push-button	1	Short press once, long press for 3S to turn on/off the power, and a prompt sound will be given when the power is started successfully
14	Button response indicator	LED light	8	It indicates whether the corresponding button works
15	System indicator	LED light	1	If the system works properly, the LED light will flash.
16	Communication failure light	LED light	1	If the communication between the remote control and the drone is interrupted, the light will be red.
17	Battery alarm light	LED light	1	When the battery is low, the light will be red.
18	Charging indicator	LED light	1	The light will be red during battery charging while the light will be blue when the battery is fully charged
19	Power button response indicator	LED light	1	It indicates whether the corresponding button works
20	Zoom control button	Push-button	2	Mark "+" for zooming in images, mark "-" for zooming out images
21	Digital video transmission antenna interface	/	1	Digital HD video antenna
22	Net port	/	1	Network cable interface
23	SD insertion port	/	1	SD card slot
24	HDMI	/	1	HD image transmission interface
25	USB	/	2	Software upgrade interface and external device
26	DC IN	/	1	Charger interface
27	Radio antenna interface	/	1	Radio antenna
28	Pitching control of the gimbal	Push-button	2	Control the gimbal pitching, up means nose-up and down means nose-down
29	Tripod folding & unfolding button	L1/R1	2	Up: tripod folding & unfolding function Down: reservation function
30	Reservation function button	L2/R2	2	Up: reservation function Down: reservation function

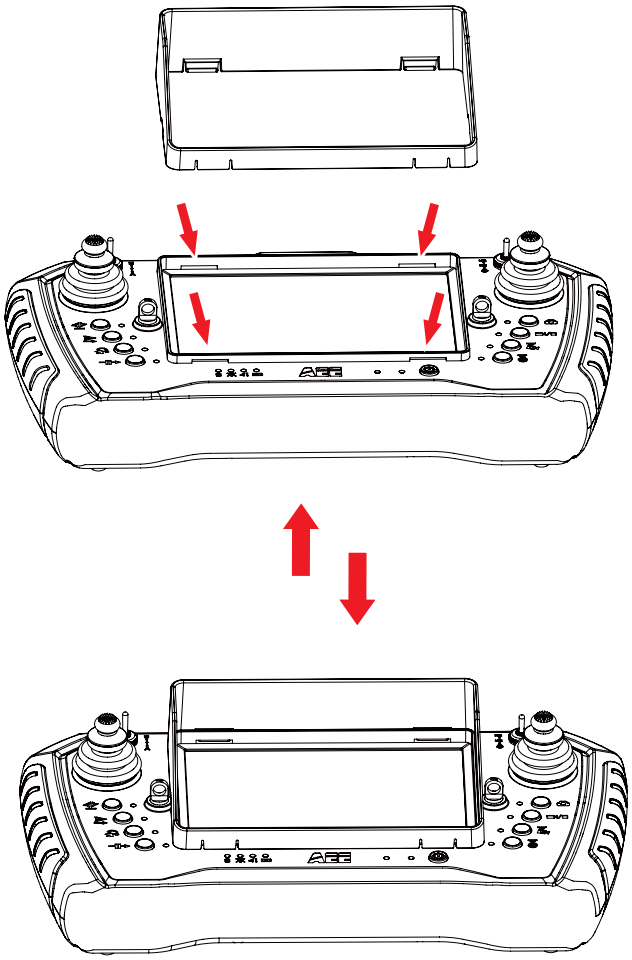
6.2 Preparation of the remote control

6.2.1 Antenna installation

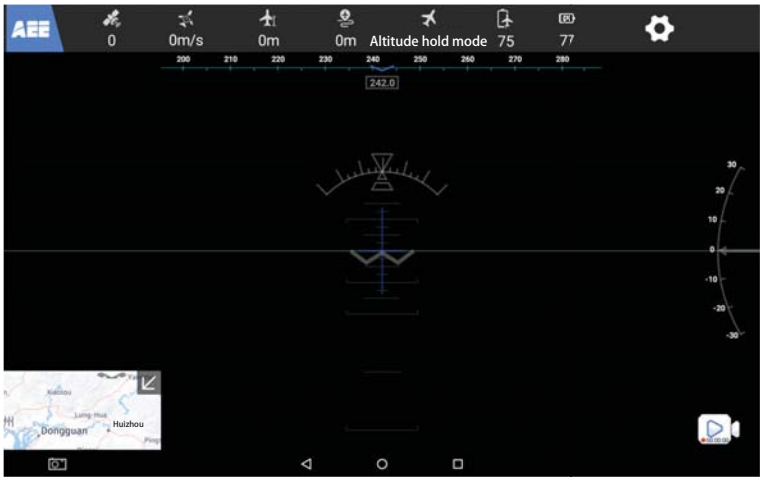


6.2.2 Installation and removal of lens hood

Align the position indicated by the red arrow and press the lens hood on the remote control.

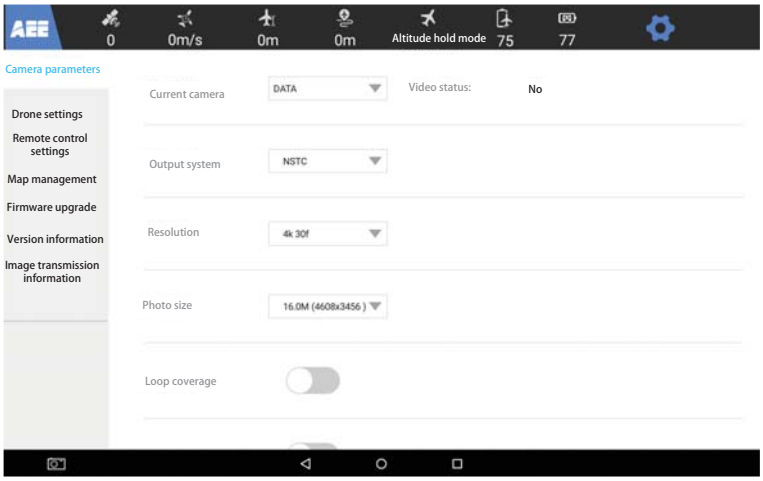


6.3 Parameter setting of the remote control



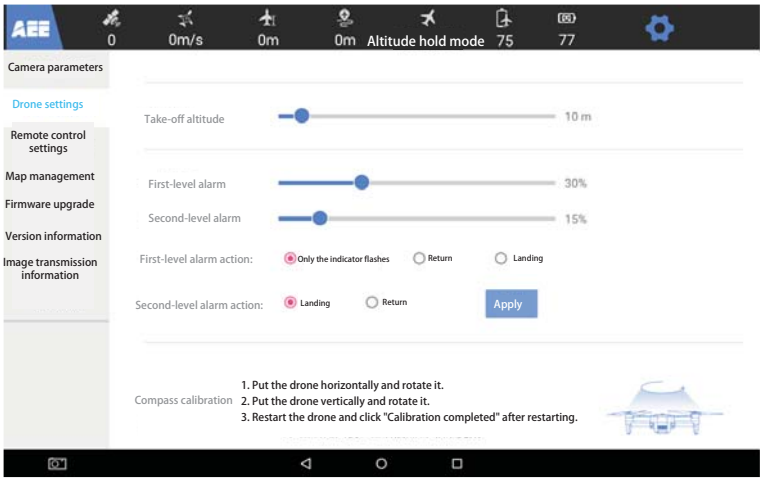
6.3.1 Camera parameters:

Under the parameter setting options, relevant parameters of the camera, such as camera resolution, loop coverage, time display, etc can be set. As shown below:



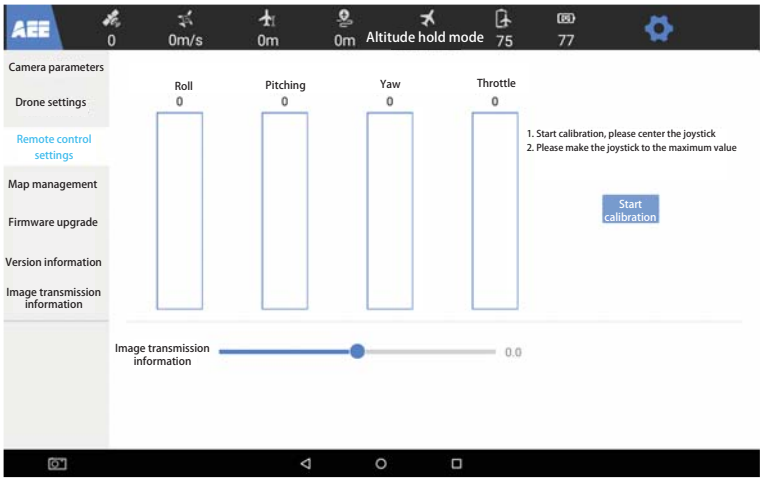
6.3.2 Drone settings

Under the functional parameter options, relevant parameters of the drone, such as: one button take-off altitude, first-level and second-level low-power alarm values can be set. As shown below:



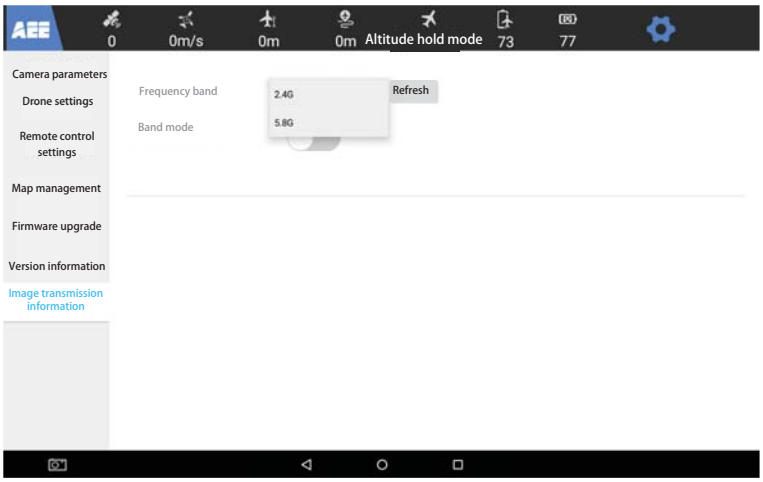
6.3.3 Remote control settings

Under the functional parameter options, the parameters of the remote control, such as joystick calibration, joystick sensitivity and viewing the joystick value can be set. As shown below:



6.3.4 Display of image transmission information

Under the functional parameter option, information of relevant image transmission, such as transmission bandwidth, transmission encryption, video resolution, module temperature and power can be viewed. As shown below:



6.3.5 Map settings

Under the functional parameter options, you can load information such as maps. As shown below: