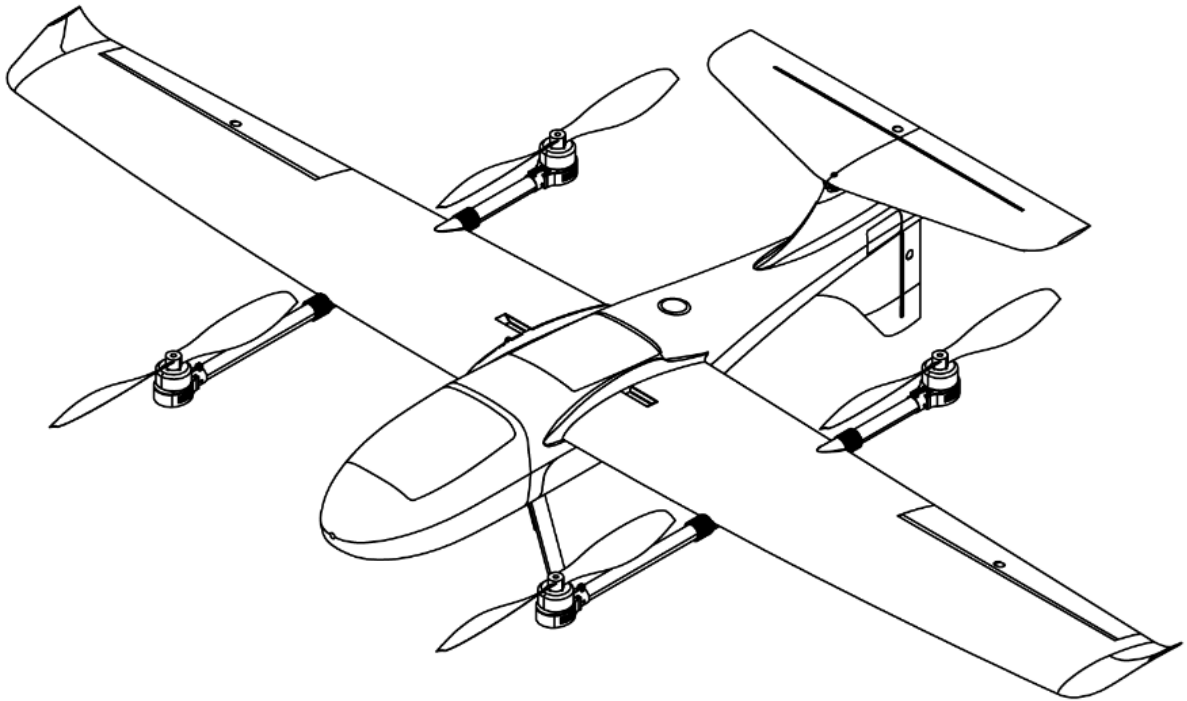


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# Raefly VT240 Pro

User manual



Raefly Ttch ltd

## Disclaimer

Strictly follow the manual installation and use of this product, and any improper use will result in damage or loss, for which our company is not responsible for any corresponding liability and compensation. As the configuration based on the version is continuously updated, Raefly Flying reserves the right to change the content of the manual according to system changes and work needs, without any guarantee of timeliness and accuracy of the document.

This product is a purely hardware product, and the software and firmware it runs are provided by third parties. We cannot control the user's usage purpose. Our company only provides after-sales service within the warranty period. Our company does not guarantee reliability for any purpose. We are not responsible for any losses, damages, penalties, or injuries resulting directly, indirectly, derivatively, or accidentally from any reason or situation. Once used, it is deemed to be an acceptance and acknowledgement of the content of this statement.

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### **Safety tips.**

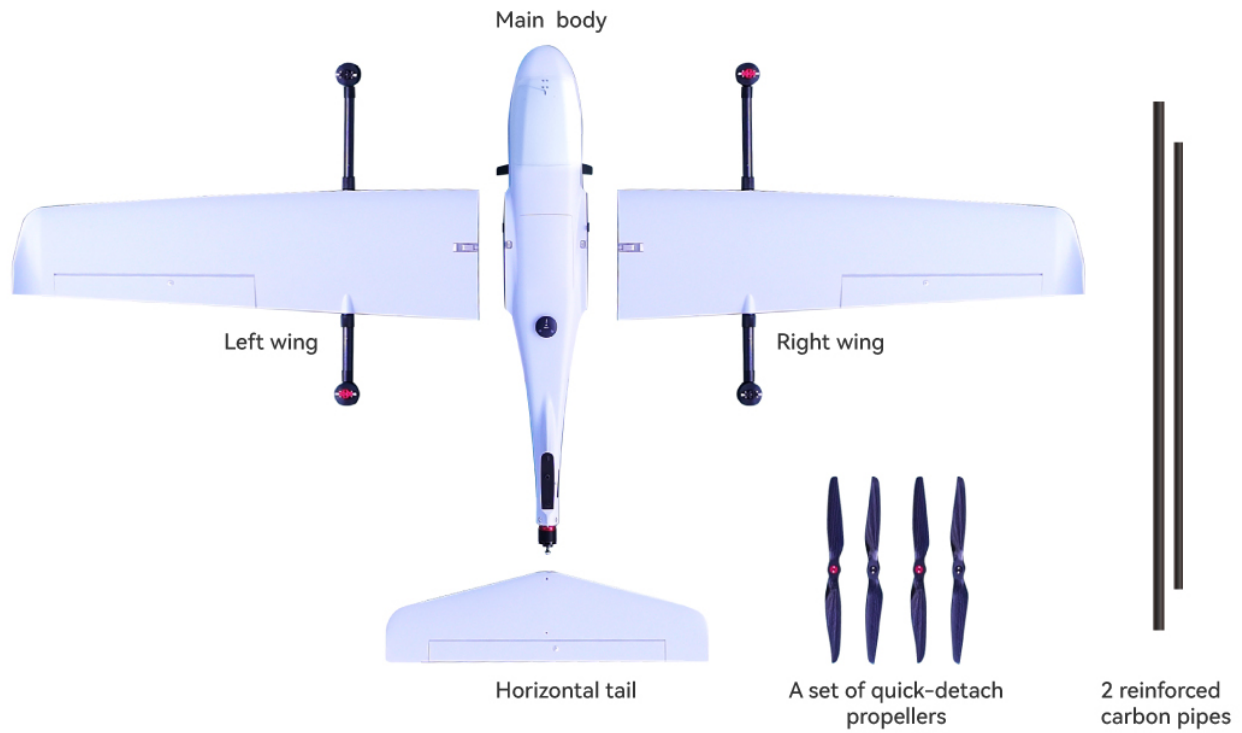
- Drone is not a toy, please conduct flight activities in accordance with local laws.
- No flying allowed in sensitive areas such as no-fly zones, airport control zones, military and administrative institutions, roads, and so on.
- Do not fly in severe weather conditions such as thunderstorms.

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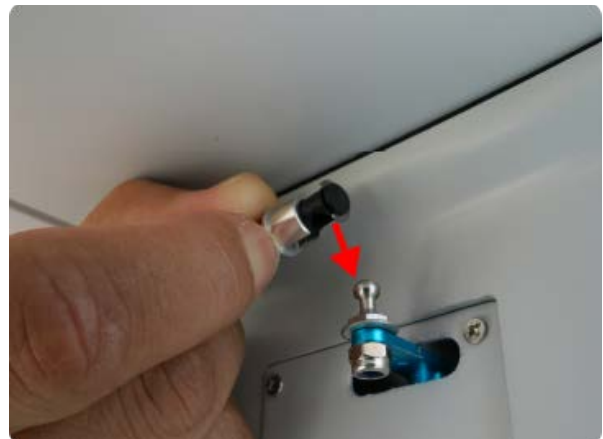
## Package list

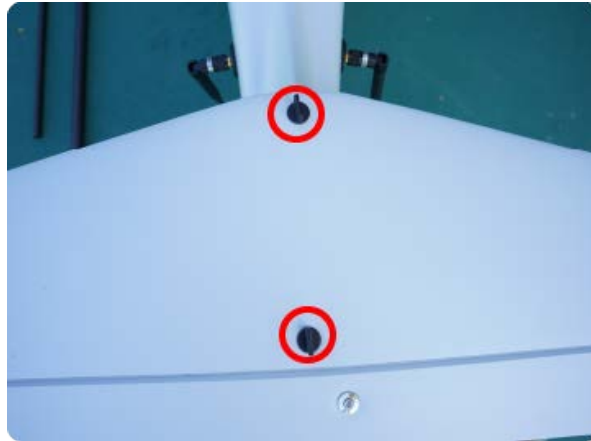


## Assembly.

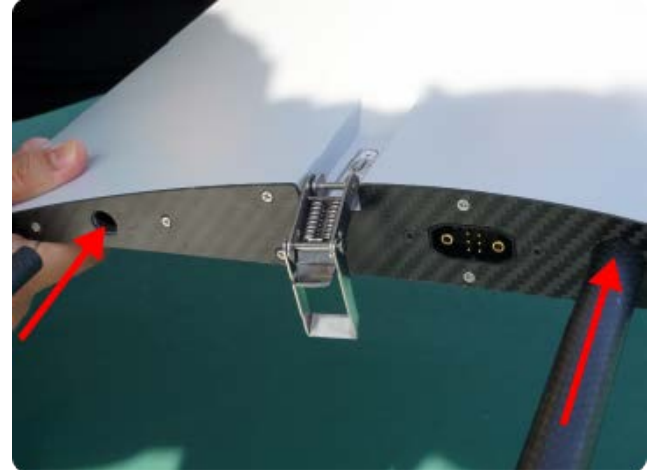
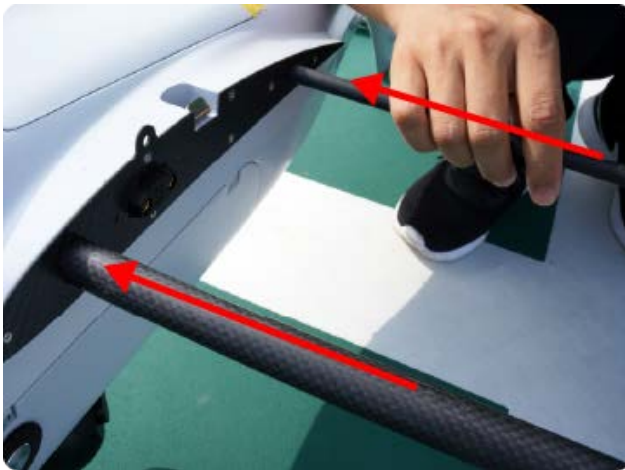
### Installing the horizontal tail wing.

Align the horizontal tail wing with the hole position on the fuselage, install the fastening nut and screws with a screwdriver, and install the tail rotor servo bracket to the tail rotor.





Installing the elevator





Installing the propeller and task box.



Tutorial Video

Welcome to search for Raefly VT240 Pro on YouTube for the full tutorial.

## Download the ground station

The ground station control software for the Raefly VT240 Pro is QGroundControl software, and the H16 remote controller comes with pre-installed QGC ground station software. You can also download it from <http://qgroundcontrol.com/>.

## Safety Overview

Before flying, please read carefully the information about safety requirements in this chapter to ensure the safe and correct use of this product.

## Safe Operation

- Do not get close to the rotating propellers and motors, please make sure the drone motors are locked before approaching.
- Before taking off, make sure that the power battery and the remote control are fully

charged, and when flying, you need to ensure that there is enough power for the return flight.

- Fly away from crowds and take safety precautions.
- Non-professional personnel are not allowed to disassemble or modify aircraft design, firmware program, or parameter settings without authorization, otherwise it may result in serious damage.

## Pre-flight inspection

Please perform the necessary flight inspections before flying.

- Propeller, motor, wing buckle, wing, steering gear, steering gear motor signal line stability inspection
- Motor steering and working status inspection
- Power battery, ground station power supply, link check
- Confirm flight mode, route and GPS status check

## Code of Practice

- After signing for the items, please confirm in time whether the items are complete, whether there are damages and stability damages caused by transportation, etc.
- The first flight should be operated by flight personnel with professional technical ability, carefully and strictly implement the pre-flight inspection procedures before the flight, and make a safe flight plan.
- **Flight crew members: operator, co-operator. The operator (pilot) is responsible for the safety of the UAV during operation, and it is necessary to ensure the flight operation specifications and adopt correct flight emergency measures to ensure flight safety. When the operator is performing remote control flight, the assistant operator will detect the UAV status through the ground station, and report the UAV status information such as flight altitude, flight speed, airspeed and fault alarm to the operator at high speed.**
- Before flying, one should be familiar with the local environment, especially the terrain, the height of buildings, and the layout of power/communication grids, etc., to prevent property damage caused by collisions during flight.

## Emergency measures

- When an alarm message appears on the ground station before the flight, it should be troubleshooted according to the prompt information. If you cannot identify the alarm, please contact our technical personnel. Do not force a flight with malfunction. During the flight, if there is

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an emergency alarm message, please immediately switch to the guidance landing route or take emergency landing measures, land the drone in a safe area for troubleshooting.

- Emergency rescue measures :
  - If there is a malfunction when in fixed-wing mode (Switch to Q\_Loiter/Q\_Hold mode and use the multicopter motor to assist with emergency landing in a safe area.
  - GPS lost or GPS spoofing occurs (Switch to Q\_Hold mode using the ground station or remote controller. If you have fixed-wing flight experience, you can switch to FBWA mode to take over the control of the drone.)

## Battery Safety Precautions:

### Warn:

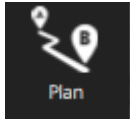
- The battery is strictly forbidden to come into contact with liquid or other objects that are likely to cause a short circuit, and it is strictly forbidden to use the battery in wet weather, otherwise it may cause spontaneous combustion or self-explosion.
- It is strictly forbidden to use overcharge, overdischarge, bulge, leakage, and package damaged batteries.
- Do not disassemble or pierce the battery with sharp objects in any way
- It is forbidden to charge when unattended. If the battery catches fire, use sand or dry powder fire extinguisher to extinguish the fire
- After using a battery, charging should be performed after the battery has returned to room temperature, otherwise it will affect the battery lifespan.

### Note:

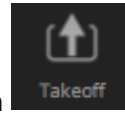
- When storing for an extended period of time, it is recommended to discharge the battery to 3.7V per cell (6S battery 22.2V, 12S battery 44.4V).
- The commonly used battery for this product is a semi-solid or all-solid battery. The empty voltage is 2.5V/cell, and it can be discharged to 3.1V/cell in general, and the lowest 3.7V for 12S batteries. Insufficient battery power will cause the drone to crash, and it is necessary to reserve enough power to return to the flight.
- This product is commonly configured with a battery with a discharge rate of 10C and a standard charge rate of 1C. Taking a 30000mAh battery as an example, the maximum charging current can be set to 30A. Using the battery beyond the specification will cause damage to the battery or even the drone.

## Mission planning



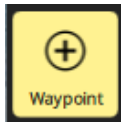
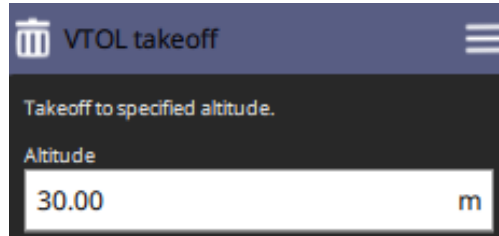


Click **Plan** icon, Enter the plan interface, click the icon



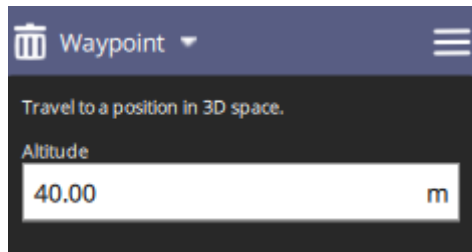
**Takeoff**

Add the takeoff command and set the altitude at which takeoff starts to convert to fixed wing.

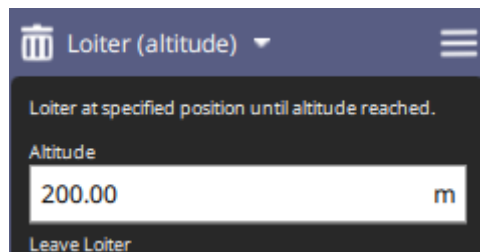


**Waypoint**

Click **Waypoint**, Place a guide conversion waypoint (upwind conversion) at a distance of more than 300 meters in front of the wind, and set the flight altitude according to actual needs (it is recommended to be slightly higher than the conversion altitude).

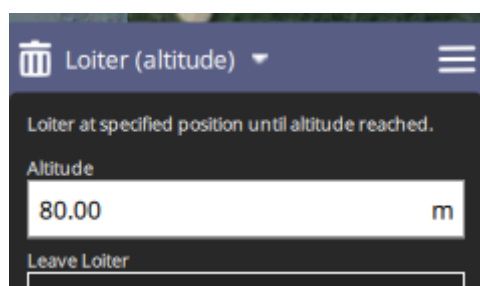


Add a hover and climb waypoint, climb to the target altitude and enter the normal mission route.

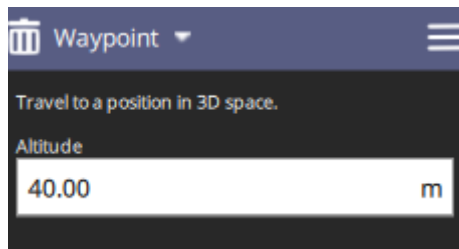


After executing the guided takeoff route, add waypoints in the target area according to mission requirements

After the mission waypoint is over, add appropriate waypoints to guide the aircraft to return to the vicinity of the landing point on a safe path. Place a hover drop point in a safe area, set the altitude to a lower value



Finally place a drone transition point in the area near the landing point with the altitude set to a low value.



When the drone reaches this point, it will automatically switch to Q\_RTL mode and land at the Home point.



Note: It is recommended to switch to headwind for takeoff and landing, to ensure that there is enough lift for safe transition during the transition.

## Introduction to common flight modes

All modes starting with Q\_ are multi-rotor modes (vertical motor rotation), and those without Q\_ are fixed-wing modes (forward motors work)

The commonly used multi-rotor modes are:

- **Q\_Loiter:** The aircraft is flying in Copter Loiter mode, and both the throttle and pitch control sticks are returned to the center, and the drone will hover in the air and maintain its position.
- **Q\_Hold:** The aircraft is flying in Copter Althold mode, Set the throttle stick to the middle

position, the drone will maintain the altitude, but not the position, you need to try to control the position through the joystick.

- **Q\_Stabilize:** The aircraft is flying in Copter Stabilize mode, The height and attitude are controlled by the control stick, which requires real-time control of the drone's attitude (but the aircraft can maintain a balanced attitude when the stick is not moved)
- **FBWA:** It is the most commonly used fixed-wing flight mode. In this flight mode, the aircraft will maintain the pitch of the roll machine specified by the joystick, but will not maintain the altitude. The increase and decrease of the aircraft's altitude depends on the airspeed. If you need to maintain the altitude, Please use FBWB mode.
- **FBWB:** Similar to FBWA mode, but the aircraft will maintain altitude, pitch and roll are controlled by the joystick, and the throttle control stick controls the target airspeed.

## Take off

- 1) Turn on the remote control of the drone and place the antenna of the remote control correctly.



- 2) After installing the battery and confirming that the center of gravity is balanced,

connect the battery.

**Center of gravity:**

The ear hanging holes shown below are the reference points for measuring the center of gravity.



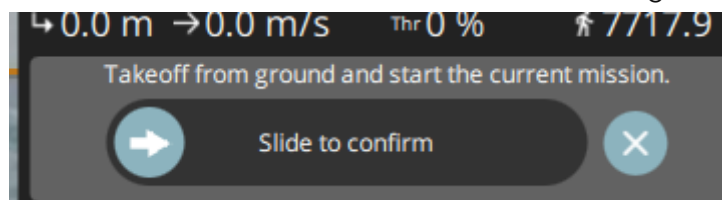
Use the rope to balance the aircraft and measure the center of gravity. The center can be adjusted forward and backward by adjusting the position of the battery. When pulling up from the measuring point of the center of gravity, if the balance is kept front and rear or the nose is slightly lifted, the adjustment is successful.



Note: The position of the center of gravity will affect the flight stability and flight efficiency. Before flying, it is necessary to confirm the balance of the center of gravity.

- 3) Turn the drone mode lever, and after confirming that the flight mode is correct, switch the mode to Q\_Lotiter mode; pull the throttle stick to the lowest position, pull the direction stick to the rightmost position, and wait for the drone to arm.
- 4) Keep the throttle stick above the neutral position, the aircraft will take off vertically, keep the throttle stick in the neutral position, the drone will maintain the altitude, and at the same time keep the pitch and roll joystick in the neutral position, the drone will hover in the air to maintain the position.
- 5) If you need the aircraft to perform route tasks (you need to write route tasks before flying), you can switch the flight mode to AOTU mode, and the aircraft will automatically climb to the converted altitude and then automatically switch to fixed-wing mode., No human intervention is required.
- 6) Fully automatic route operation

After uploading the route, switch to AOTU mode, and click the right icon

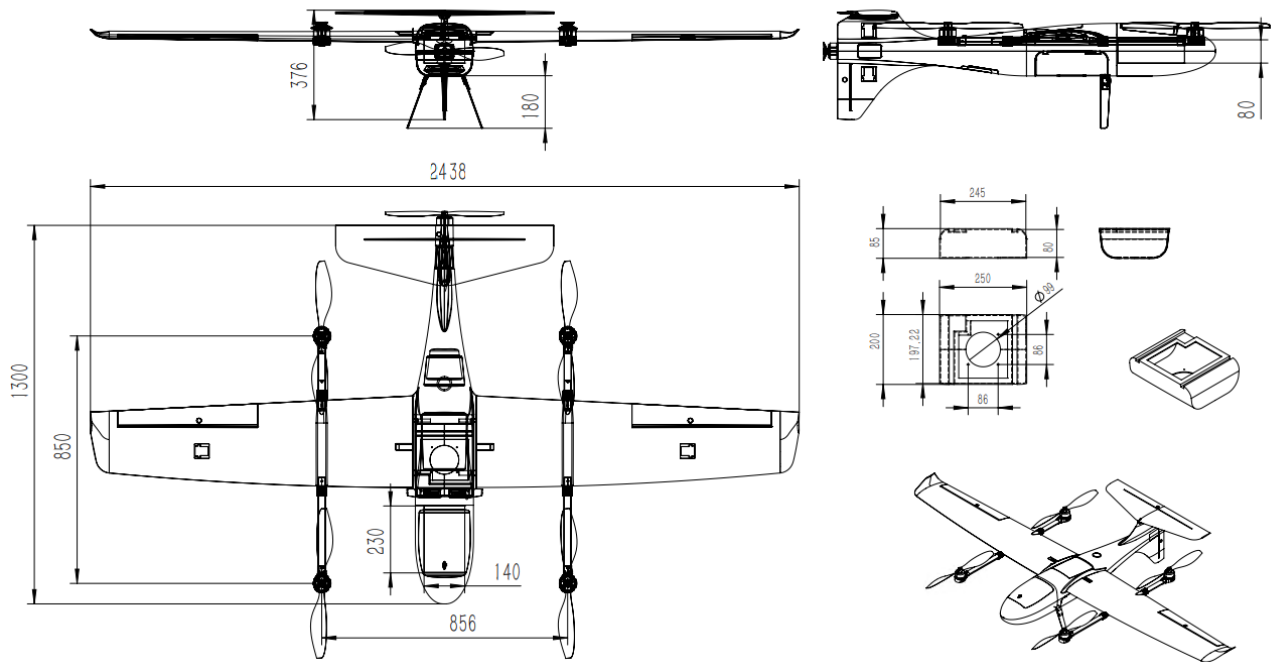


After the drone automatically unlocks and climbs to the specified altitude, the fixed-wing cruise is restored, and no manual intervention is required.

Under full-automatic flight mode, **no manual intervention for return landing.**

## Data sheet

Body material	Carbon fiber + Kevlar composite material
Aircraft size	2438*1300*376mm
Flight speed(MAX)	30m/s
Cruise speed	18m/s
Stall speed	14.5m/s@13kg
Battery life*	5h (measured near a calm sea surface, configuration, weather, and flight speed all affect battery life, the actual situation shall prevail)
Range(MAX)	310km (measured near a calm sea surface, configuration, weather, and flight speed all affect battery life, the actual situation shall prevail)
Payload(MAX)	2kg
Empty Weight** <small>((battery not included)</small>	6.5kg
Takeoff Weight*(MAX)	13.5kg
Wind resistance	Force five
Takeoff and landing	VTOL
Power energy	Battery
Positioning accuracy	GPS: 1.5m RTK:1cm+1PPM
Flight controller	Standard CUAV flight controller (optional)
Communication distance	Subject to link data
Customized/Optional	Flight control, GNSS receiver, remote control, payload,fuselagecoating, waterproof design, remote ID, etc.
GCS	QGoundcontrol/Missionplanner/LGC
Application	Aerial surveying and mapping, patrol inspection, logistics*, monitoring, security*, traffic, etc.
Wing mounting angle*	2°
Wing area*	60dm <sup>2</sup>
Wing Load*	225g/dm <sup>2</sup>



## Laws and regulations

- Everyone should be familiar with and consciously abide by local laws and regulations, and perform real-name registration, nationality registration and other procedures. Among them, the use of unmanned aircraft in mainland China should follow the requirements of the "Interim Regulations on the Flight Management of Unmanned Aircraft" for real-name registration and commercial flight. It is necessary to obtain an operating certificate and hold a drone operator license, and purchase third-party insurance. Fly in controlled airspace and apply for airspace and flight plan to the management department.

## Care and Maintenance

- When the number of flight sorties reaches 500, system maintenance is required to replace vulnerable components such as steering gear, propellers, and damaged wires.
- After use, it is necessary to remove surface debris in time to prevent the fuselage from being corroded
- Do not use it near wet or highly corrosive substances. When using it in high-salt environments such as rivers and seaside, it is necessary to clean the fuselage in time to prevent corrosion of screws, fuselage and other parts. Corroded parts should be replaced in time.
- Do not use in low temperature below  $-20^{\circ}\text{C}$  or high temperature environment above  $60^{\circ}\text{C}$
- In dusty and rainy weather, protective measures should be taken, and special checks should be made to see if the pitot tube is blocked.