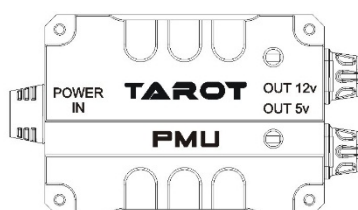
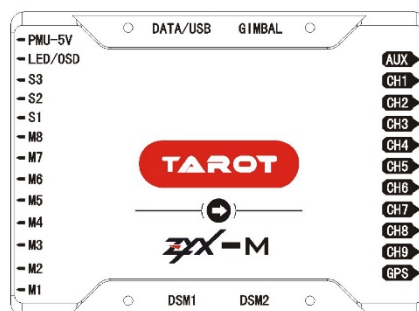


# ZYX-M Multi-Rotor Flight Control

## User Manual

V 1.5

2016.06.01 Revision



Thanks for your purchase of Tarot professional aerial photography products. To ensure your success with this product, we would like to introduce the following information and important notes. We hope it can be useful for you.





## Contents

<b>Disclaimer</b>	<b>3</b>
<b>Package Contents</b>	<b>4</b>
<b>Wiring</b>	<b>6</b>
1. Aircraft Preparations	6
2. Aircraft Mounting and Wiring	7
<b>Assistance Software</b>	<b>9</b>
1. Drive & Assistant Software Installation	9
2. Assistant Software Setup	9
3. Recommended Gains	10
<b>Flight Test</b>	<b>11</b>
1. Flight Modes	11
2. Turn On/Off Motors	11
3. Compass Calibration	13
4. Check before Flight	14
5. Flight Test	15
<b>Advanced Functions</b>	<b>16</b>
1. Failsafe	16
2. Low Voltage Protection	17
3. Intelligent Orientation Control (IOC)	17
4. Flight Limits	21
<b>LED Indicators</b>	<b>23</b>
<b>Troubleshooting</b>	<b>24</b>
1. Abnormal Motor Solutions	24
2. Flight Mode Changes When GPS DATA Are Abnormal	24
3. Parameters Cannot Be Modified in PC Assistant Software	24
4. Attentions during Flight	25
<b>ZYX-M SPECS</b>	<b>26</b>



## Disclaimer

**Please carefully read this statement before using the product. Once using the product, you agree to and accept this statement. This product is not designed for people under 18.**

ZYX-M is the flight control systems specially designed for multi-rotors enthusiasts. With attitude stabilization, altitude holding, position locking and autopilot functions, it can be widely applied to various entertainments, aerial photography and FPV activities.

**We strongly recommend you to remove all the propellers during upgrading and parameters setup, ensure all the connections are correct and keep the aircraft far away from the crowd, the vulnerable and dangerous goods.** Tarot accepts no liability directly or indirectly for the personal injuries and property loss caused by the conditions below:

1. Damages or injuries incurred when users are drunk, taking drugs, drug anesthesia, dizzy, feeble, nausea and any other mental or physical discomfort.
2. Damages or injuries caused by subjective intentional operations of users.
3. Damages or injuries caused by the failure to follow the guidance of the user manual.
4. Damages or injuries caused by refit or replacement of non-Tarot accessories or components.
5. Damages or injuries caused by products of third party or fake.
6. Damages or injuries caused by misoperations or misjudgments.
7. Damages or injuries caused by the internal abrasion, erosion or aging.
8. Damages or injuries caused by continued flying under abnormal alarm.
9. Damages or injuries caused by being aware of flying under abnormal conditions.
10. Damages or injuries caused by flying in magnetic-interference zone, radio-interference zone, no-fly zone or poor-sight zone.
11. Damages or injuries caused by bad weather.
12. Damages or injuries caused by crash, capsizing, fire, explosion, thunderstrike, storm, flood, tsunami, land subsidence, avalanche, earthquake or some other disastrous accidents.
13. Damages or injuries caused by infringement of data, audio or video materials recorded by the aircraft.
14. Damages or injuries caused by misuse of battery.
15. Damages or injuries caused by misuse of users.
16. Other conditions that are not covered by the range of liability of Tarot.



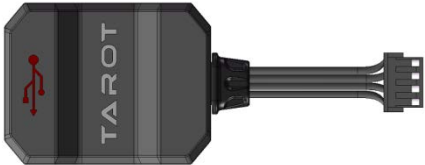




## Package Contents

Contents	Diagrams
Main Controller*1	
PMU*1	
GPS Module *1	
LED Indicator * 1	



<p><b>Assistant Cable * 1</b></p>	
<p><b>Connection Cables * 8</b></p>	
<p><b>USB Cable *1</b></p>	

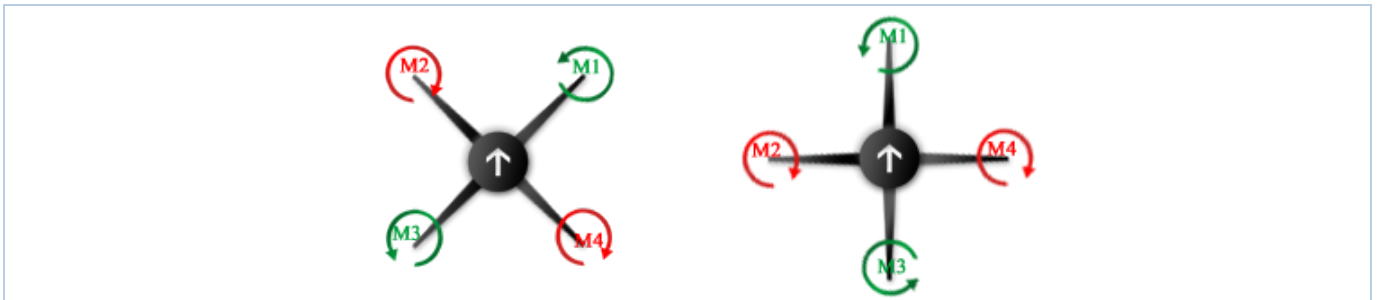


## 1. Aircraft Preparations

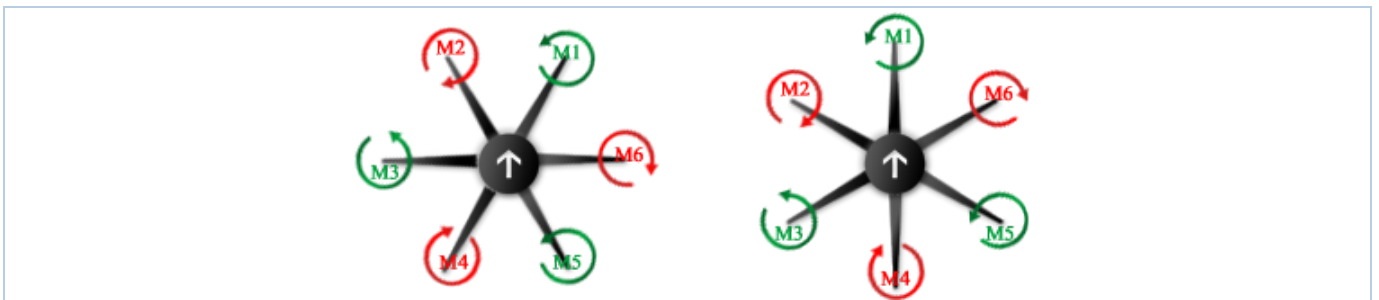
ZYX-M supports the mixer types below. The direction of the arrow corresponds to the rotation direction of motors and propellers.

**Attention: Coaxial propellers:** **Green** arrow is at **TOP**, while **Red** arrow is at **BOTTOM**. Otherwise, all the propellers are at top.

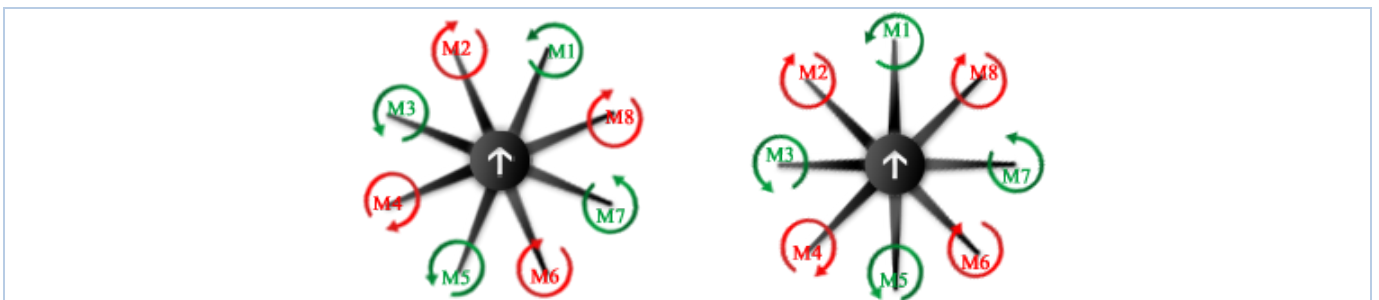
### Quad-rotor X & Quad-rotor I



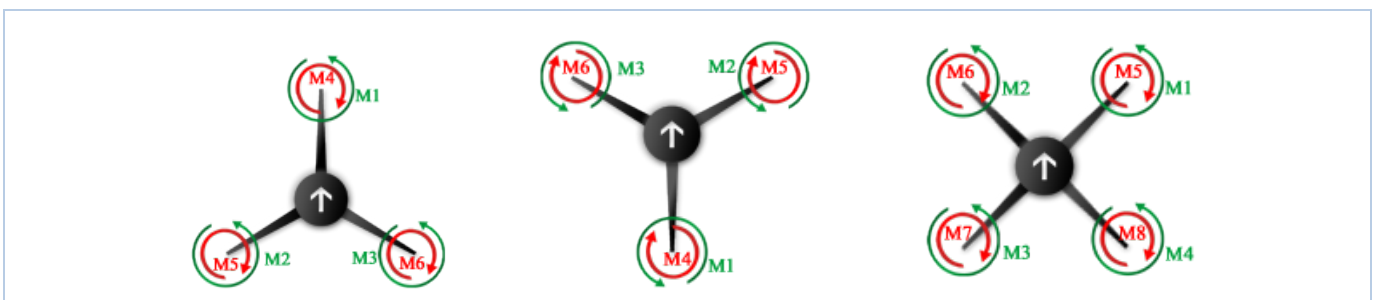
### Hexa-rotor X & Hexa-rotor I



### Octo-rotor V & Octo-rotor I



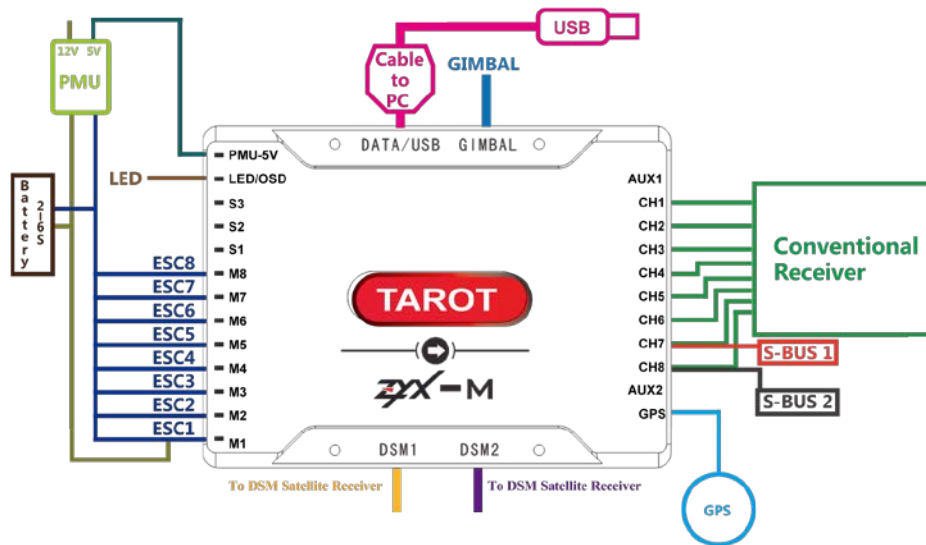
### Hexa-rotor IY & Hexa-rotor Y & Octo-rotor X





## 2. Aircraft Mounting and Wiring

Please connect cables according to the diagrams below:



**Attention: Please take care of the mounting direction of GPS module cable based on the diagram below. Otherwise, damages may occur in the GPS module.**



1. Gimbal port is an auxiliary communication interface for gimbal to improve its control accuracy. It only supports the latest Tarot 5D gimbal and other new gimbals in the future. Tarot T-2D gimbal is not available to use this port.
2. Tarot T-2D Gimbal: Connect the pitch cable to S2 port in the main controller, and map a receiver channel to Gimbal Pitch in the assistant software.
3. All series of Tarot Landing Gear: please connect the input cable of landing gear controller to the S3 port in the





main controller, and map a receiver channel to Landing Gear in the assistant software. Set a corresponding switch in the Tx. To avoid mis-operation, it is strongly suggested to enable the Intelligent Landing Gear in the assistant software or choose a knob switch to control.

4. S1: backup interface.

5. In order to improve the reliability of remote signal, simultaneously using 2 S-BUS Receivers or 2 DSM Satellite Receivers are available. (Due to the differences of communication protocols, if binding of DSM2-1/ DSMX-1 is not successfully, or the remote signal shows with errors in channel mapping page when binding is successful, please choose DSM2-2/ DSMX-2 to bind.)

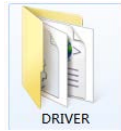
6. The OUT 5V of PMU powers up the entire flight controller and provides voltage values of battery to the flight controller. The max current output is 3A. In order to guarantee the operation of Low Voltage Protection, please connect to the PMU-5V port in the main controller. The OUT 12V of PMU can power up miniwatt devices, like camera, image transmission, and OSD, with maximum current output of 3A. Please check the input voltage range of the device and ensure the correct connections.



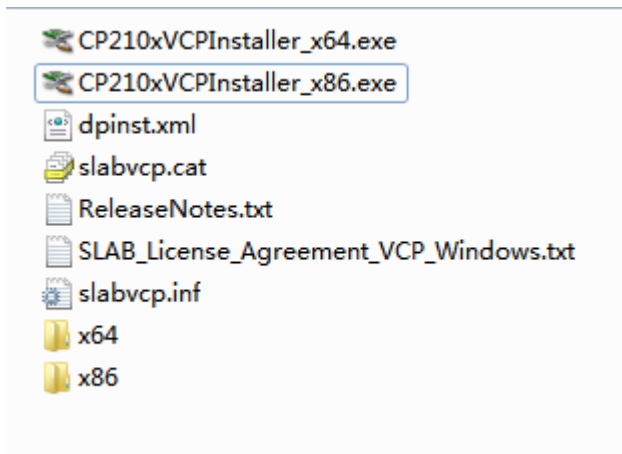
## Assistance Software

### 1. Drive & Assistant Software Installation

- (1) Please download the drive and assistant software from Tarot official website: <http://www.tarotrc.com/>
- 2) Run the drive installation program and follow the instruction to finish the procedures. Choose a corresponding drive file according to your PC system. Currently, we only support Windows System.

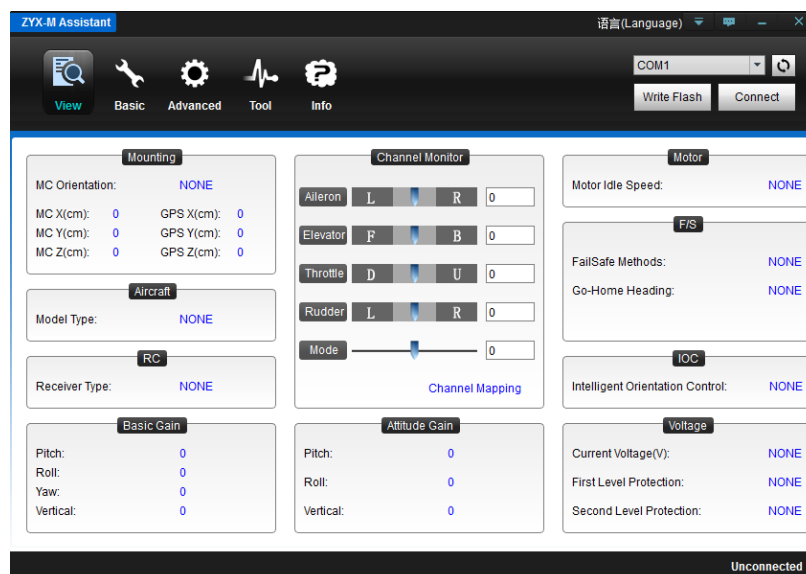


- i. Double-Click folder:



- ii. Windows x32
- iii. Windows x64

### 2. Assistant Software Setup







## Setup Procedures:

(1) Turn on the TX, and power up the flight controller. Connect the PC and flight controller with a USB cable.



Choose a Com Port and click CONNECT:

- i. When “**Connected**” shows on the bottom right corner, it indicates flight controller has successfully connected to the PC;
- ii. If it shows “**Unconnected**”, please re-check the connections, power supply, USB module drive and the antivirus program in the PC. DO NOT disconnect the connection during setup.



Basic



Advanced

(2) Click “**Basic**” to finish parameters setup, and set more functions in the “**Advanced**” page. Once a parameter has been changed, you should press the “ENTER” key to send data to flight controller. When all the parameters have

been modified, click “**Write Flash**” to save these modifications. When “**Save parameters to flash OK**” shows on the bottom left corner, setup procedure finishes. Otherwise, flight controller cannot save these parameters.

(3) Once the flight controller and assistant software have been successfully connected, motors cannot turn on. Disconnect them and power cycle the flight controller to turn on motors.

## 3. Recommended Gains

Aircraft Model	Basic Gains				Attitude Gains		
	Pitch	Roll	Pan	Vertical	Pitch	Roll	Vertical
X330	20	20	50	25	20	20	50
Tarot FY450	30	30	40	30	20	20	50
Tarot X4	40	40	80	30	15	15	50
Tarot X6	40	40	80	30	15	15	50
Tarot X8	50	50	100	30	15	15	50
Tarot T810	40	40	80	30	15	15	50
Tarot T960	40	40	80	30	15	15	50



## Flight Test

### 1. Flight Modes

**Please read this chapter carefully to achieve better flight experience.**

There are four control modes supported by ZYX-M: Manual Mode, Attitude Mode, GPS Velocity Mode, and Autopilot Mode.

You can enjoy various flight experiences with different control modes.

	Attitude Mode	GPS Velocity Mode	Manual Mode
<b>Roll and Pitch Command Sticks</b>	The midpoint of stick stands for 0° of the multi-rotor. Its endpoint corresponds to 35° of the multi-rotor.	The midpoint of stick stands for 0° of the multi-rotor. Its endpoint corresponds to 12 m/s of the multi-rotor.	Angular velocity controlled. The maximum angular velocity is 150°/s. No attitude angular limitation.
<b>Throttle Stick &amp; Altitude Locking</b>	Center Throttle Stick to enter Altitude Holding. Push the throttle stick to upper end, the ascending speed is 6 m/s. when pushing the throttle stick to lower end, the descending speed is 3 m/s.		No velocity locking in vertical direction. Throttle Stick corresponds to motor speed.
<b>Releasing Sticks</b>	Attitude stabilization only, without position locking.	With the GPS, the position is locked.	
<b>GPS Signal Lost</b>	Attitude stabilization only, without position locking.	If the GPS has lost for 3 seconds, the Attitude Mode would be automatically entered.	
<b>Yaw Stick &amp; Yaw Angular Velocity</b>	The maximum pan angular velocity is 150°/s.		

### 2. Turn On/Off Motors

#### How to turn on motors ?

Before taking off, push throttle stick cannot turn on motors. You should follow any one of the two diagrams below to turn on motors.







## How to turn off motors ?

There are two methods to stop motors, including Immediate Cut Off and Intelligent Cut Off. You can change the stop method in Cut-off Type section in Receiver section in Basic Page in the assistant software. The default stop method is Intelligent Cut Off.

### Attentions for Immediate Cut Off and Intelligent Cut Off

1. If you choose Immediate Cut Off in the assistant software, please do not push throttle stick less than 10 percent during flight. Otherwise, the motor will stop. If you indeliberately push the throttle stick to less than 10 percent, please push throttle stick to over 10 percent within 5 seconds.
2. DO NOT execute CSC during flight, because it will lead to the immediate stop of motor.
3. If you choose Immediate Cut Off in the assistant software, in Attitude Mode/GPS Velocity Mode, once the throttle stick is less than 10 percent, the system will stop and pitch roll & yaw sticks lose control, with control only in throttle stick. Moreover, the aircraft will keep balance and decline vertically in 3m/s until landing or the throttle stick is over 10 percent again.
4. During flight, no matter in any control mode, we do not suggest you to push throttle stick to less than 10 percent.
5. If you want these two cut off types work properly, please correctly calibrate the Tx.
6. Executing CSC will be blocked by the main controller during Failsafe, and the motor will maintain the status before.

### (1) Immediate Cut Off

In any flight control mode, if the motor is on and the throttle stick is over 10 percent, once the throttle stick is less than 10 percent, the motor will be automatically stopped. In this case, if you push the throttle stick over 10 percent within 5 seconds, the motor will turn on again automatically. Moreover, when motor turns on, if you do not push throttle stick over 10 percent within 3 seconds, motor will stop automatically.

### (2) Intelligent Cut Off

Motor Cut Off Type differentiates according to different control modes.

- A. In Manual Mode, only executing CSC will stop the motor.
- B. In Attitude Mode/GPS Velocity Mode, any one of the following four conditions will stop the motor:
  - a. if you do not push throttle stick over 10 percent within 2 seconds, motor will stop automatically.
  - b. executing CSC.
  - c. the throttle stick is less than 10 percent, and landing successfully after 2 seconds.
  - d. tilt angle of aircraft is over 70 degree and the throttle stick is less than 10 percent.
- C. In Autopilot Mode, any one of the following three conditions will stop the motor:
  - a. executing CSC.
  - b. the aircraft lands automatically after 2 seconds.
  - c. tilt angle of aircraft is over 70 degree and the throttle stick is less than 10 percent.

### Attentions for Intelligent Mode



- (1) In Attitude Mode/GPS Velocity Mode/Autopilot Mode, when the aircraft lands, the motor will stop automatically.
- (2) In Attitude Mode/GPS Velocity Mode, if you do not push the throttle stick over 10 percent after executing CSC to turn on the motor, flight controller will enter landing procedures, and the motor will stop after 2 seconds.
- (3) During normal flight, only push throttle stick to less than 10 percent will not stop the motor.
- (4) In Attitude Mode/GPS Velocity Mode/Autopilot Mode, for safety, when tilt angle of aircraft is over 70 degree and the throttle stick is less than 10 percent, the motor will stop automatically.

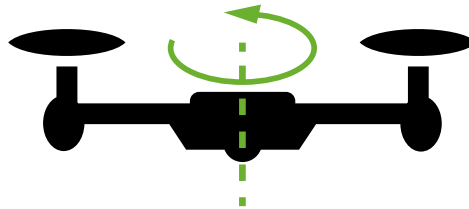
## 3. Compass Calibration

**After mounting the GPS Module, please calibrate the compass.**

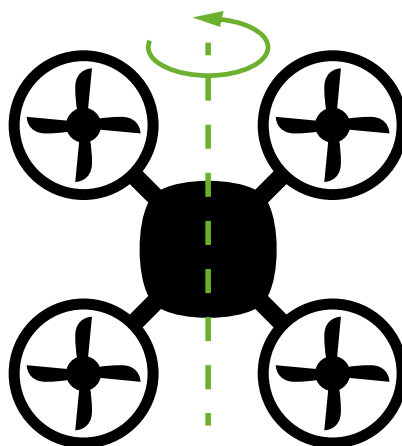
- (1) Please DO NOT calibrate the compass in magnetic interference zone.
- (2) Please DO NOT carry ferromagnetic materials during calibration, such as keys and phones.
- (3) This module cannot work in the polar cycle.
- (4) The compass calibration is very important, please DO NOT ignore.

### Calibration Procedures:

- (1) Turn on the Remote Controller and power up the flight controller.
- (2) Switch from any two of the flight modes over six times until the Yellow light is on. Calibration procedures enable.
- (3) When Yellow LED is on, hold and rotate the drone horizontally until Green LED is on.



- (4) When Green LED is on, hold the drone vertically with its nose pointing upwards. Rotate the drone around the center axis. Before calibration, LED is blinking to show the flight mode. If LED blinks to show the flight mode again, calibration is successful. For instance, before calibration, it is Attitude Mode and Yellow LED blinks once. When calibration finishes, Yellow LED blinks once again.



- (5) If Red LED is blinking twice slowly, calibration fails and please do the calibration again.

### Attentions

- (1) When compass data is abnormal, RED light of LED Indicator blinks twice slowly and GPS turns off. Attitude Mode enables.





- (2) The aircraft do not need to be rotated for 360° horizontally or vertically with precision.
- (3) If calibration procedures fail several times, please check the magnetic interference around.
- (4) You should calibrate the compass in the following circumstances:
  - 1) Flight location changes;
  - 2) Mechanical structure of aircraft changes;  
Mounting position of GPS module changes;  
Electronic devices add/remove/reposition, such as main controller, servo and battery;
  - 3) Drifts happen and the aircraft cannot fly in a straight line.

## 4. Check before Flight

**Please read the following MISTAKES carefully. Any one of these mistakes may lead to serious accidents:**

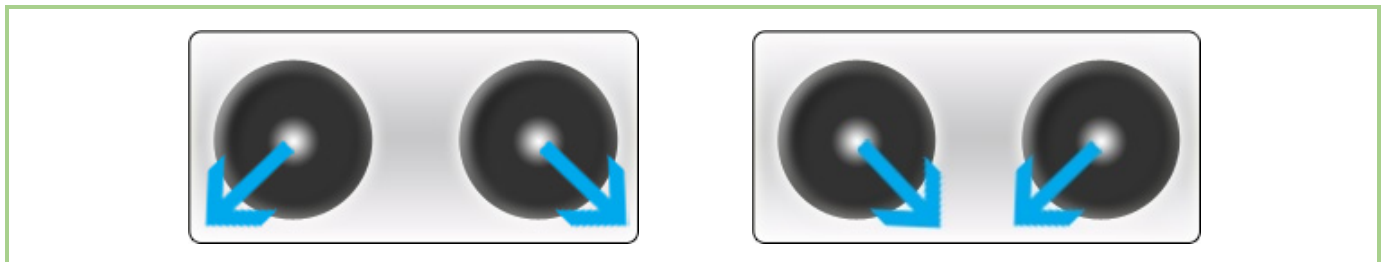
- (1) Motor rotates in the opposite direction.
- (2) Connection cables of motors and ESCs are not reliable.
- (3) The mounting direction of main controller does not match the setting direction in the software, or the mounting is not firm.
- (4) Wrong/unfirm connections between ESCs and main controller.
- (5) Wrong rotation direction of propellers.
- (6) Magnetization of the compass.

**Please ensure:**

- (1) Correctly mount the multi-rotor;
- (2) Properly set all the parameters in the assistant software;
- (3) All the wirings and connections work normally;
- (4) The power supply of Tx, main controller and other components are in great condition.

**The following procedures are based on the Intelligent Cut Off Mode. Check the status of your aircraft with procedures below. Please refer to Chapter LED Indicator Description for more information.**

- (1) Turn on the Tx, then power up the aircraft.
- (2) Keep the aircraft stationary after 5 seconds when the flight controller powers up.
- (3) When 6 or more GPS Satellites have been found for the first time, Green Light flashes for 20 times.
- (4) Toggle the switch of control mode on the Tx to Attitude Mode, and keep the aircraft stationary. Execute any one of the CSC to turn on the motor:



- (5) After turning on the motor, center the roll/pitch/yaw sticks immediately, and keep the throttle stick under midpoint. Observe the rotation direction of propellers.
- (6) Execute CSC to stop the motor and power off the aircraft.
- (7) Please ensure all the above steps are correct before entering flight test.



## 5. Flight Test

1. Choose an open space without any obstruction and the crowd. Put the aircraft on a level ground at least 3 meters far away from you.
2. In GPS Velocity Mode, please wait until enough GPS satellites have been found. With Attitude/Manual Mode, it need not wait for GPS satellites. Manual Mode is only recommended to experts.
3. Procedures:
  - (1) Turn on the Tx, then power up the aircraft. Keep the aircraft stationary and wait for the initialization and self-check.
  - (2) After the aircraft self-check, execute CSC to turn on the motor.
  - (3) After turning on the motor, center the roll/pitch/yaw sticks, and move the throttle stick from the bottom. (If the throttle stick does not move from the bottom, the motor will stop; if the motor stops, restart the procedure from step one.)
  - (4) Push the throttle stick over the midpoint, and the aircraft will take off from the ground. (DO NOT push too hard, in case of taking off too fast.)
  - (5) Observe the movement of aircraft and toggle sticks to adjust.
  - (6) When reaching the ideal altitude, you could center the throttle stick, and keep the pitch/roll/yaw stick at midpoint. The aircraft will hover.
4. Gradually decline the aircraft. Do not land it on the hard object. Move the throttle stick to the bottom and execute CSC to stop the motor.
5. Power off the aircraft, then turn off the Tx. Flight test finishes



### DO NOT

- (1) If you choose Immediate Cut Off in the assistant software, please do not push throttle stick to less than 10 percent during flight. Otherwise, the motor will stop. If you indeliberately push the throttle stick less than 10 percent, please push throttle stick to 10 percent within 5 seconds.
- (2) DO NOT execute CSC during flight. Otherwise, the motor will stop.
- (3) Please take care of the GPS Satellite LED Light during flight and ensure it on the great condition. Otherwise, the aircraft will drift during hovering.
- (4) DO NOT fly in the magnetic interference area. Ferromagnetic materials would affect inside magnetic sensor.
- (5) DO NOT choose GPS Velocity Mode in the area with weak GPS signal.
- (6) If Low Voltage Alarm occurs with RED light flashing, please land the aircraft as soon as possible.
- (7) If Low Voltage Alarm happens on the Tx, please land the aircraft as soon as possible.
- (8) With GPS Velocity Mode, please record the home-point when the GPS signal is well or great. Otherwise, the recording may not be accurate.

- (1) The midpoint of throttle stick is 0 m/s. Please keep it higher than 10 percent during flight.
- (2) Take care of the landing speed when landing. Decline gradually can avoid damages as much as possible.
- (3) Once the aircraft enters Failsafe, the aircraft would fly according to your settings in the assistant software.
- (4) Once the aircraft enters Low Battery Protection, the aircraft would fly according to your settings in the assistant software.





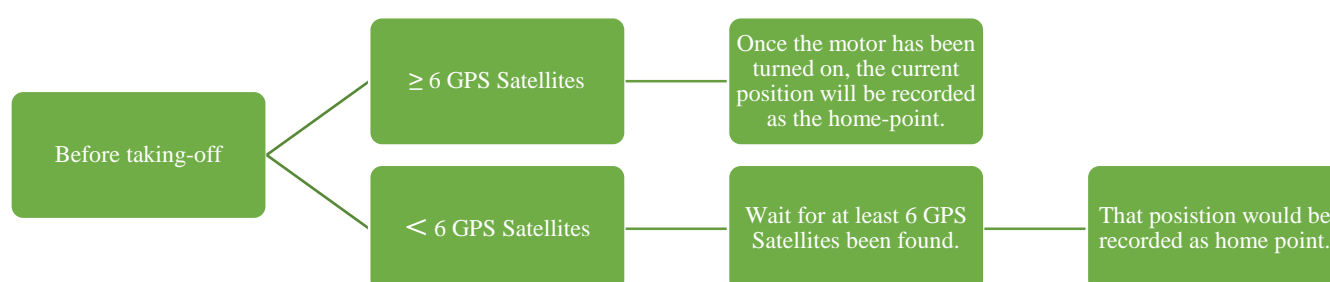
## Advanced Functions

### 1. Failsafe

If enough satellites have been found & compass work properly & Home Point has been recorded, if connection between Aircraft and Remote Controller breaks, Failsafe will be activated. Flight controller will take charge of the entire aircraft and control it back to the latest home point.

If connection recovers during failsafe, the process will not stop until users cancel go-home at first place.

#### Home Point:



### How to go home ?

Aircraft will go home based on its distance and altitude with home point. Please refer to the diagram for reference:

Before Go-Home, Altitude & Distance between Drone and Home Point:	How to go home?
Distance > 5m Altitude < Preset Go-Home Altitude	Drone will ascend to your preset Go-Home Altitude, and then go home.
Distance > 5m Altitude ≥ Preset Go-Home Altitude	Drone will go home directly.
Distance < 5m Altitude < 5m	Drone will ascend to 5 meters, and then go home.
Distance ≤ 5m Altitude ≥ 5m	Drone will go home directly.

### How to cancel go-home?

After 3s of losing Tx signal, flight controller enters Failsafe. If the signal recovers within 3s, flight controller will quit from Failsafe immediately.



After 3s of entering Failsafe, you should switch to Manual Mode or Attitude Mode to regain the control of aircraft.

### Attentions:

- (1) Please make sure the home-point is recorded before taking-off and be aware of location of home-point.
- (2) During going home procedures, the nose of aircraft points to the home point, or you can set the head direction in the assistant software. The aircraft will fly in a straight line between Failsafe position and home point.
- (3) During the entire Failsafe procedures, you can regain the control through the Remote Controller.
- (4) If there are huge or tall buildings around, aircraft may be blocked.
- (5) Failsafe will be not enabled when GPS is unavailable.
- (6) Land the aircraft in the appropriate location.
- (7) If you turn on motors and do not make the aircraft take-off, it is very dangerous to turn off the remote controller because it may enter failsafe mode and the aircraft may take off.

## 2. Low Voltage Protection

We design two levels of low voltage protection to avoid accidents. We strongly recommend you to turn on this function in the assistant software. When the voltage is too low, low voltage protection works to protect your aircraft from falling down. **Please calibrate the voltage in the assistant software before enabling this function.**

There are two levels of voltage protection: First-Level Protection and Second-Level Protection.

**First-Level Protection:** Red LED blinks slowly / Red LED blinks slowly with Aircraft start going home (based on your settings in the assistant software)

**Second -Level Protection:** Red LED blinks quickly / Red LED blinks slowly with Aircraft start landing (based on your settings in the assistant software)


When First-Level Protection enables, the go-home procedures will comply with the diagram in Chapter Advanced Functions → Failsafe → How to go home ?

### How to calibrate voltage?

- (1) Measure the battery voltage by the voltmeter.
- (2) Fill the voltage value in the Calibration Voltage column of Voltage Page of Advanced Page in the assistant software.
- (3) Click Calibration and check whether or not the value in the Current Voltage Box is correct.

## 3. Intelligent Orientation Control (IOC)

### Definition

Forward Direction (  ): the direction of to push pitch stick

### Step One: Preparations

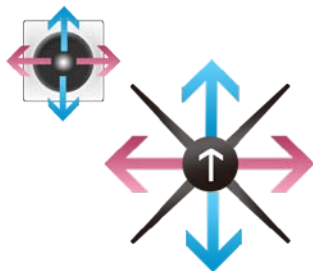
During **normal flight**, the forward direction of aircraft is as same as the nose direction. When IOC enables, the forward direction of aircraft has nothing to do with the nose direction. The red and blue arrows in the diagrams below are corresponding to the relevant sticks operations.

**Course Lock (CL):** the forward direction of aircraft is as same as the recorded nose direction.

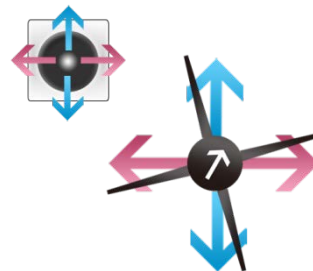




**Requirements:** GPS Velocity Mode only.



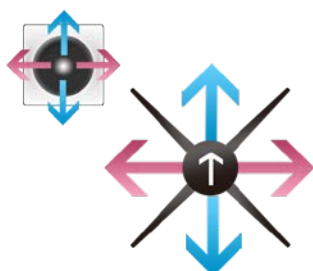
Normal Flight



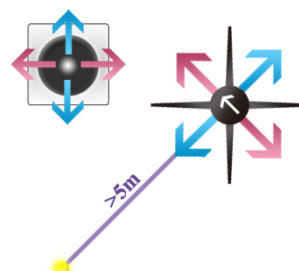
Course Lock (CL)

**Home Lock (HL):** the forward direction is as same as the direction from home point to the aircraft.

**Requirements:** GPS Velocity Mode only & the distance between aircraft and home point >5m



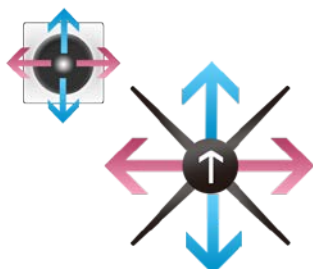
Normal Flight



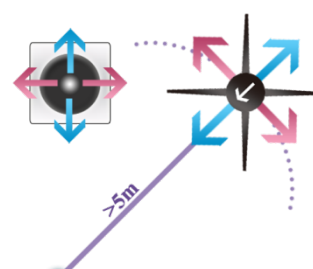
Home Lock (HL)

**Point of Interested (POI):** the forward direction is as same as the direction from interested point to the aircraft.

**Requirements:** GPS Velocity Mode only & the distance between aircraft and interested point >5m



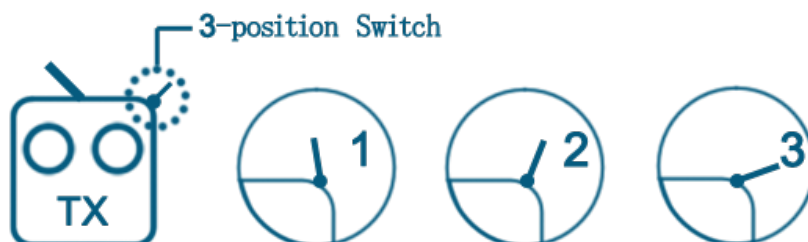
Normal Flight



Point of Interested (POI)

## Step Two: Switch Setup for IOC

Please first choose a three-position switch for IOC, which also would be applied to record course and home point manually. Please set the relevant contents in the IOC section of Advanced page in the assistant software.





	Control 1	Control 2	Control 3
Position 1	OFF	OFF	OFF
Position 2	Course Lock (CL)	Course Lock (CL)	Point of Interested (POI)
Position 3	Home Lock (HL)	Point of Interested (POI)	Home Lock (HL)

### Step Three: Forward Direction Recording & Home Point Recording

If IOC enables, you have to be aware of the definition of forward direction in **Course Lock (CL)**, home point in **Home Lock (HL)** and Interested Point in **Point of Interested (POI)**. There are two ways to record for your preferences, including Manual Recording and AUTO Recording. However, **Point of Interested (POI)** only works in Manual Recording.

**When IOC records, Green LED blinks 10 times.**

	AUTO Recording	Manual Recording
Course Lock (CL)	After 6 or more GPS satellites have been found & the nose direction records when the air-craft takes off for the first time. If aircraft takes off before GPS Module positions, nose direction will be recorded when GPS Module has positioned.	Toggle from Position 1 to Position 2 for 3-5 times. * Position 1- Position 2- Position 1 means one time.
Home Lock (HL)	After 6 or more GPS satellites have been found & the home point records when the aircraft takes off for the first time. If aircraft takes off before GPS Module positions, home point will be recorded when GPS Module has positioned.	Toggle from Position 2 to Position 3 for 3-5 times. * Position 2- Position 3- Position 2 means one time.
Point of Interested (POI)		Control 1: Toggle from Position 2 to Position 3 for 3-5 times. * Position 2- Position 3- Position 2 means one time. Control 3: Toggle from Position 1 to Position 2 for 3-5 times. * Position 1- Position 2- Position 1 means one time.

### Step Four: Flight Test

Please do **Course Lock (CL)**, **Home Lock (HL)** and **Point of Interested (POI)** tests in turns according to the following procedures.





		Forward Direction	Course	Flight Route	Auxiliary Line	Home Point	Point of Interested
Control Mode	Recording	Roll Stick Control		Pitch Stick Control			
Normal							
CL							
HL							
POI							

## IOC Warning!



### DO NOT:

**Home Lock (HL):** when the aircraft is far away from the home point, please DO NOT switch IOC Switch quickly in case that the home point would be changed indeliberately.

( 1 ) You'd better to keep the aircraft over 5 meters away from home point before entering Home Lock (HL). Ensure all the requirements are satisfied and switch to HL.

( 2 ) You should be aware of the position of home point and direction of course. Carefully choose an IOC Mode to fly.



## 4. Flight Limits

According to the airspace control regulations of ICAO and countries, drones should fly within the stipulated airspace. For safety considerations, ZYX-M enables Flight Limits functions by default to help users to fly safely and legally, including Altitude Limit, Distance Limit and Forbidden Area Limit. The aircraft will be influenced by Altitude Limit, Distance Limit and Forbidden Area Limit together.

Altitude Limit & Distance Limit: the default max flight altitude is 120m and the default max radius is 300m. Users can adjust the max altitude and radius in the assistant software.

Max Altitude Range                      0-60000m

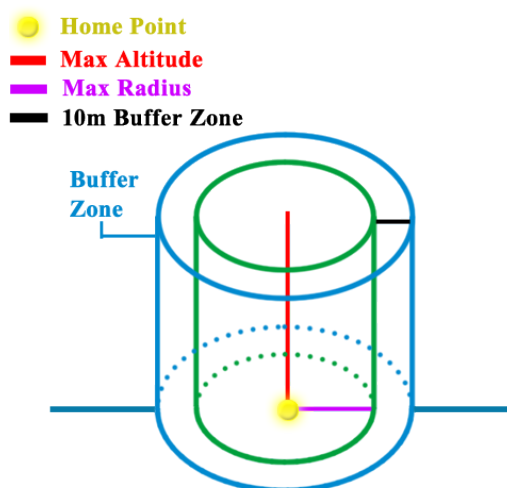
Max Radius Range                        0-60000m

After setup, the aircraft would fly within both values that have been set in the assistant software, just like in a cylinder in the diagram below.

Please use the flight controller legally and confirm to the regulations based on the local government.

### Altitude Limit & Distance Limit

The default max flight altitude is 120m and the default max distance is 300m.



(1) Altitude Limit only works in GPS Velocity Mode and Attitude Mode, while Distance Limit only enables in GPS Velocity Mode.

(2) In Attitude Mode and Manual Mode, if the aircraft flies out of the buffer zone, AUTO Go-home Mode will be entered. After it flies back to the limited radius again, you can switch to different control mode to regain control.

(3) Failsafe will not be influenced by Flight Limit.

### Forbidden Area Limit

1. There are three parts in the Forbidden Area Limit: No-Fly Zone, Altitude-Limited Zone and Warning Zone. Forbidden Area Limit I includes main civil airports around the world, while Forbidden Area Limit II contains most utility airports globally. Their values are different, but limit logic works in the same way.

2. When GPS Module Data are available, Flight Limits only works in Attitude Mode and GPS Velocity Mode.

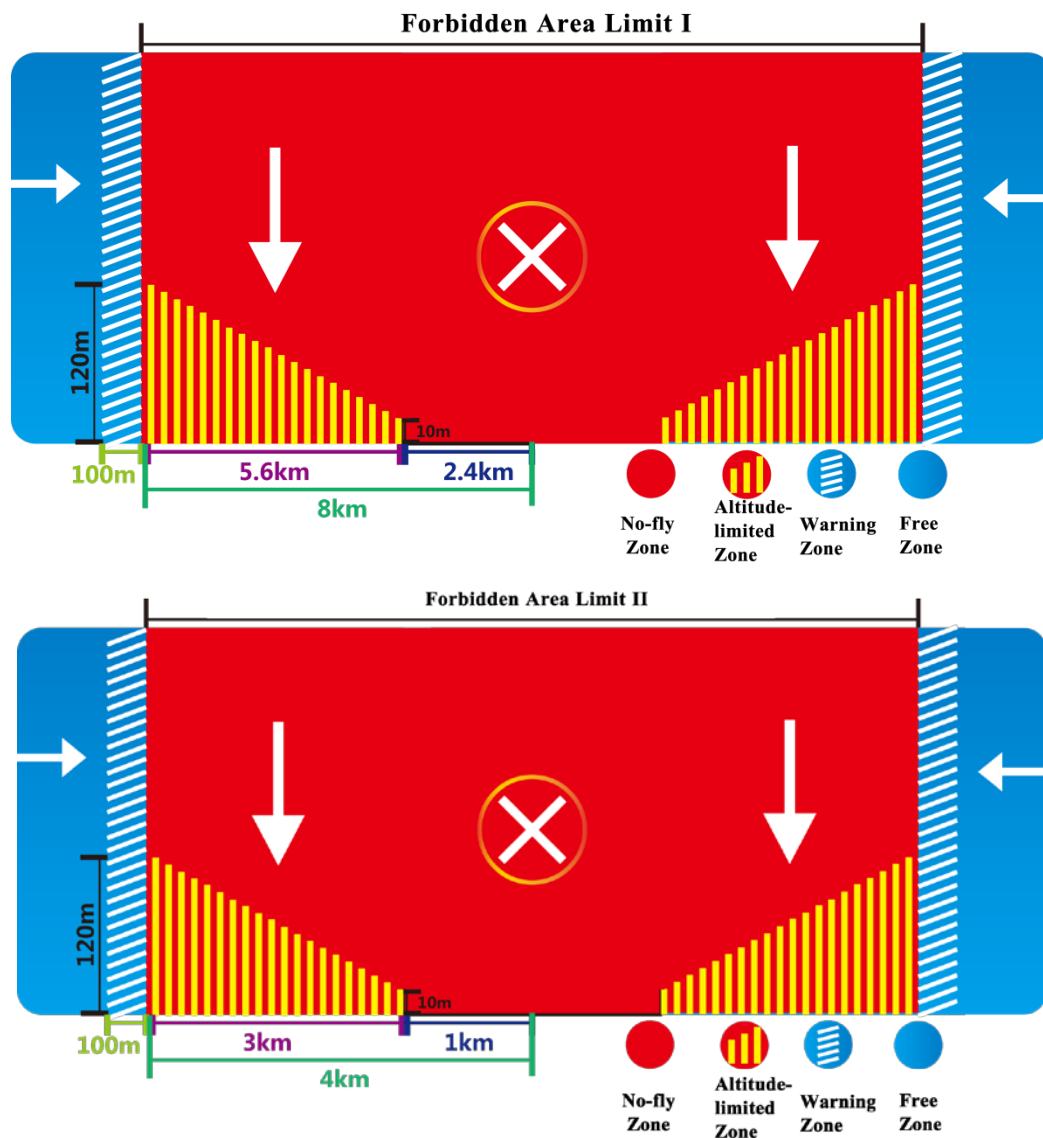




3. When entering Warning from Free Zone, Red Light in the LED Indicator flashes 10 times. If entering No-Fly Zone, you would lose control in throttle stick and the aircraft would decline in 3 m/s until landing or leaving Forbidden Area. If land within No-Fly Zone, you would lose all the control.

4. The aircraft can fly freely within Altitude-Limited Zone, but cannot enter No-Fly Zone.

5. In the range of No-Fly Zone, when GPS Module Data are available, the motor cannot turn on.





































## LED Indicators

 : Blink       : On

### 1. Normal Status

LED Status	Descriptions	Reasons
No	LED Light is not blinking or constantly on.	Manual Mode
 *1	Yellow Light blinks once per second slowly.	Attitude Mode
 *1	Green Light blinks once per second slowly.	GPS Mode
 *10	Green Light blinks 10 times quickly.	IOC Records.
 *20	Green Light blinks 20 times quickly.	GPS is OK.
	Yellow Light is on.	Compass Calibration. Please rotate the aircraft horizontally.
	Green Light is on.	Compass Calibration. Please rotate the aircraft vertically.

### 2 Abnormal Status

LED Status	Descriptions	Reasons
       	Yellow Light blinks quickly.	RC Signal Lost
 *2	Yellow Light blinks twice.	RC Initialization Error
    	Red Light blinks slowly.	First-Level Protection
       	Red Light blinks quickly.	Second-Level Protection
 *2	Red Light blinks twice.	Compass Calibration fails / Compass Error
 *3	Red Light blinks 3 times.	GSP Module Data are unavailable.
 *4	Red Light blinks 4 times.	Inertial Sensors Error
 *10	Red Light blinks 10 times.	No-Fly Zone Warning





## Troubleshooting

### 1. Abnormal Motor Solutions

Motors do not rotate	Motors rotate in a wrong direction
<p>①Wiring Problem: Please check connections between the main controller, motors with main controller, and ESCs with motors.</p> <p>②Please check whether or not the motors or ESCs are broken.</p> <p>③In the MOTOR part of ADVANCED page of PC assistant software, increase the Motor Idle Speed.</p>	<p>There are three cables connecting motors and ESCs. Please exchange any two of them.</p>

### 2. Flight Mode Changes When GPS DATA Are Abnormal

**Attention:** during flight, if there is something wrong with GPS data, the flight control system would change flight mode automatically for safety.

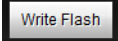
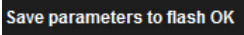
BEFORE GPS data goes wrong	AFTER GPS data goes wrong
Attitude Mode	Attitude Mode
GPS Velocity Mode	Attitude Mode
Manual Mode	Manual Mode
Autopilot Mode	Attitude Mode

### 3. Parameters Cannot Be Modified in PC Assistant Software

Please ensure:

①The main controller and PC assistant software have correctly connected;

②"ENTER" key has been clicked after modification.

③ When all the parameters have been modified, click "  " to save these modifications, and "  " shows on the bottom left corner.



## 4. Attentions during Flight

### **Please ensure that:**

1. You have correctly mounted the multi-rotor.
2. All the connections and wiring are in great conditions.
3. All the components have powered up.
4. The parameters have been correctly set in the assistant software.
5. GPS signal is great; otherwise, drift might occur during hovering.
6. Before taking off, please turn on the transmitter and then power on the multi-rotor.
7. After landing, please power off the multi-rotor, and then turn off the transmitter.
8. During flight, if Low Voltage Alarm is on, please land your multi-rotor as quickly as possible.



### **DO NOT:**

1. DO NOT fly in strong magnetic area!
2. Within the 10 seconds after the system has powered on, please DO NOT move the multi-rotor or sticks. Wait for initialization.





## ZYX-M SPECS

<b>Working Voltage</b>	Main Controller: 4.8V-5.5V
	PMU: 7.2-26V
<b>Power Consumption</b>	Max: 5W (Typical Value:0.3A-12.5V)
<b>Working Environment</b>	-10°C-50°C
<b>Weight (g)</b>	Main Controller: 46
	GPS Module: 27
	LED Indicator: 11
	PMU: 23
	USB Module: 5
<b>Dimensions (mm)</b>	Main Controller: 55*40*16
	GPS Module: 50*50*14
	LED Indicator: 27*27*9
	PMU: 40*28*9
	USB Module: 26*20*7
<b>Hover Accuracy</b>	Horizontal Direction: 1.5 m
	Vertical Direction: 0.5 m
<b>Maximum Rotation Angular Velocity</b>	150 degree/second
<b>Maximum Tilt Angular Velocity</b>	35 degree
<b>Maximum Ascend/Descend Velocity</b>	6m/s