

# WooKong-M Quick Start Guide

V 1.14

November 24, 2014 Revision

For Firmware Version V5.26

& PC Assistant Software V2.04

&WM Assistant V1.4.25

Please strictly follow these steps to mount and connect the autopilot system on your multi-rotor, as well as to install the Assistant Software on your computer or Mobile Device.

Thank you for purchasing this DJI product. Please regularly visit the WooKong-M web page at [www.dji.com](http://www.dji.com). This page is updated regularly. Any technical updates and manual corrections will be available on this web page. Due to unforeseen changes or product upgrades, the information contained in this manual is subject to change without notice.

This manual is only for basic assembly and configuration; you can obtain more details and advanced instructions when using the assistant software. To assure you have the latest information, please visit our website and download the latest manual and current software version.

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# Disclaimer & Warning

**Please read this disclaimer carefully before using the product. By using this product, you hereby agree to this disclaimer and signify that you have read them fully.**

**THIS PRODUCT IS NOT SUITABLE FOR PEOPLE UNDER THE AGE OF 18.**

WooKong-M is an autopilot system designed for serious multi-rotor enthusiasts providing excellent self-leveling and altitude holding, which completely takes the stress out of flying RC multi-rotors for both professional and hobby applications. Despite the product having a built-in autopilot system and our efforts in making the operation of the controller as safe as possible when the main power battery is connected, we strongly recommend users to remove all propellers when calibrating and setting parameters. Make sure all connections are good, and keep children and animals away during firmware upgrade, system calibration and parameter setup. DJI Innovations accepts no liability for damage(s) or injuries incurred directly or indirectly from the use of this product in the following conditions:

1. Damage(s) or injuries incurred when users are drunk, taking drugs, drug anesthesia, dizziness, fatigue, nausea and any other conditions no matter physically or mentally that could impair your ability.
2. Damage(s) or injuries caused by subjective intentional operations.
3. Any mental damage compensation caused by accident.
4. Failure to follow the guidance of the manual to assemble or operate.
5. Malfunctions caused by refit or replacement with non-DJI accessories and parts.
6. Damage(s) or injuries caused by using third party products or fake DJI products.
7. Damage(s) or injuries caused by mis-operation or subjective mis-judgment.
8. Damage(s) or injuries caused by mechanical failures due to erosion, aging.
9. Damage(s) or injuries caused by continued flying after low voltage protection alarm is triggered.
10. Damage(s) or injuries caused by knowingly flying the aircraft in abnormal condition (such as water, oil, soil, sand and other unknown material ingress into the aircraft or the assembly is not completed, the main components have obvious faults, obvious defect or missing accessories).
11. Damage(s) or injuries caused by flying in the following situations such as the aircraft in magnetic interference area, radio interference area, government regulated no-fly zones or the pilot is in backlight, blocked, fuzzy sight, and poor eyesight is not suitable for operating and other conditions not suitable for operating.
12. Damage(s) or injuries caused by using in bad weather, such as a rainy day or windy (more than moderate breeze), snow, hail, lightning, tornadoes, hurricanes etc.
13. Damage(s) or injuries caused when the aircraft is in the following situations: collision, fire, explosion, floods, tsunamis, subsidence, ice trapped, avalanche, debris flow, landslide, earthquake, etc.
14. Damage(s) or injuries caused by infringement such as any data, audio or video material recorded by the use of aircraft.
15. Damage(s) or injuries caused by the misuse of the battery, protection circuit, RC model and battery chargers.
16. Other losses that are not covered by the scope of DJI Innovations liability.

## Certifications

This product is approved with quality standards such as CE, FCC and RoHS.

## Symbol Instruction



Forbidden(Important)



Cautions



Tip



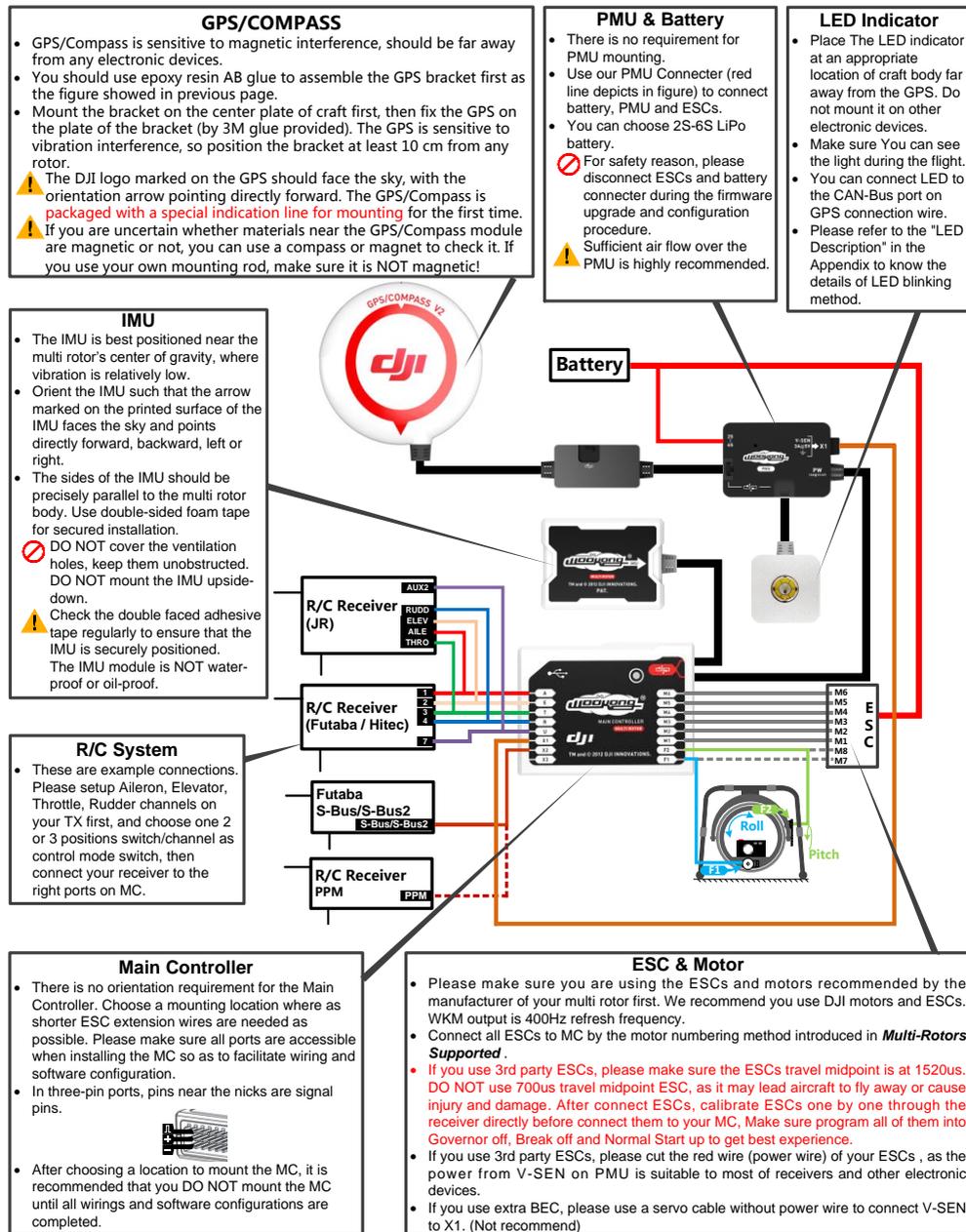
Reference

# Assembly & Configuration

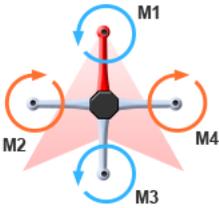
## Step 1 Assembly

Install the autopilot system and receiver to the aircraft, and connect them according to the following diagram.

Refer to the Port Description for more details.



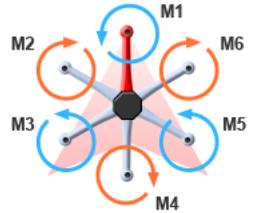
## Multi-Rotors Supported



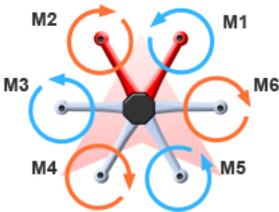
Quad-rotor I



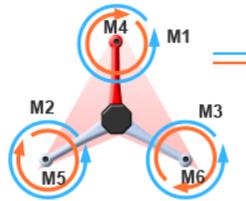
Quad-rotor X



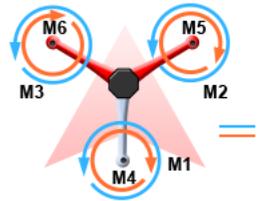
Hexa-rotor I



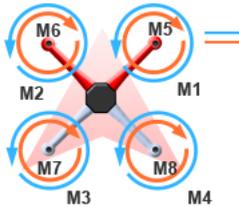
Hexa-rotor V



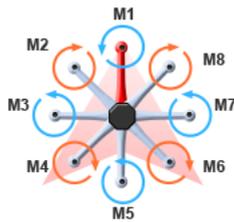
Hexa-rotor IY



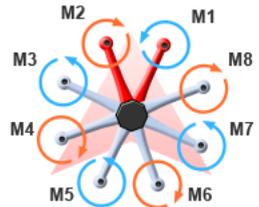
Hexa-rotor Y



Octo-rotor X



Octo-rotor I



Octo-rotor V



- To coaxial propellers: **Blue** propeller is at **Top**; **Red** propeller is at **Bottom**. Otherwise all propellers are at top.



- Please select the Mixer type in the assistant software according to your aircraft.

## Step 2 Software and Driver Installation on a PC

1. Please download the drive installer and the assistant software from DJI website.
2. Connect the autopilot system and the PC via a USB cable, and power on the autopilot system.
3. Run the driver installer, and follow the instructions strictly to finish installation.
4. Run the assistant software installer, and follow the instructions strictly to finish installation.

## Step 3 Configuration by Assistant Software on a PC

1. Power on the PC. Make sure your computer is connected to the Internet for the first time you use.
2. Switch on the transmitter first, and then power on the autopilot system. Connect the autopilot system to the PC with a Micro-USB cable. DO NOT break the connection until setup is finished.
3. Run the Assistant Software.
4. Observe the indicators   on the left bottom of the software. ( connection indicator and  communication indicator) If the connection indicator is  communication indicator is  blinking, that the software is ready, please go to next step.
5. Select the “Info” option. Check the software and the firmware version.
6. Select the “Basic” option. Please follow step-by-step for your first-time-configuration. Basic configuration is necessary, including Mixer Type, Mounting, RC, and Gain settings.
7. You can click the “Advanced” option for more parameter settings. Advanced setting is optional. There are settings of Motor, FailSafe, Intelligent Orientation Control (IOC), Gimbal, Low-Voltage Alert, and Flight Limits. Read the instruction in the assistant software to obtain more details.
8. Select the “Viewer” option and check all parameters.



- You may be required to fill register information for your first-time-usage.
- If the communication indicator is , please double check the connections.
- Basic configuration is necessary before you go to the “Basic Flying Test”.



- If the software and the firmware upgrade are available, please upgrade the assistant software and the firmware by referring to the Appendix.
- This step is required to use together with the assistant software to obtain more details.

Recommended Settings for the users with F450/F550/S800/Z15.

|          | Configuration Information |         |             |          |        | Basic |      |     |          | Attitude |      |
|----------|---------------------------|---------|-------------|----------|--------|-------|------|-----|----------|----------|------|
|          | Motor                     | ESC     | Propeller   | Battery  | Weight | Pitch | Roll | Yaw | Vertical | Pitch    | Roll |
| F450     | DJI-2212                  | DJI-30A | DJI-8 Inch  | 3S-2200  | 890 g  | 150   | 150  | 100 | 105      | 150      | 150  |
| F550     | DJI-2212                  | DJI-30A | DJI-8 Inch  | 4S-3300  | 1530 g | 170   | 170  | 150 | 140      | 170      | 170  |
| S800     | DJI-4114                  | DJI-40A | DJI-15Inch  | 6S-15000 | 4770 g | 200   | 200  | 195 | 175      | 190      | 190  |
| S800-Z15 | DJI-4114                  | DJI-40A | DJI-15Inch  | 6S-10000 | 6100 g | 240   | 240  | 200 | 200      | 220      | 220  |
| S800 EVO | DJI-4114 PRO              | DJI-40A | DJI-15 Inch | 6S-15000 | 6700 g | 130   | 130  | 150 | 150      | 180      | 180  |

\*S800 with damping kit can use the same values as S800 EVO.

## Step4 Compass Calibration

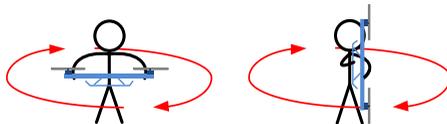
Without GPS module, please skip this step. If you use with GPS module, follow step-by-step for calibration.



- DO NOT calibrate your compass where there is strong magnetic interference, such as magnetite, car park, and steel reinforcement under the ground.
- DO NOT carry ferromagnetic materials with you during calibration, such as keys or cell phones.
- Compass module CANNOT work in the polar circle.

### Calibration Procedures

1. Quickly switch the control mode switch from **GPS Mode** to **Manual Mode** and back to **GPS Mode** for 6 to 10 times. The LED indicator will turn on solid BLUE.
2. Rotate your Multi-rotor around the horizontal axis (about 360°) until the LED changes to solid GREEN, and then go to the next step.
3. Hold your Multi-rotor vertically and rotate it (**its nose MUST be downward**) around the vertical axis (about 360°) until the LED turns off, meaning the calibration is finished.



4. The LED indicator will show whether the calibration is successful or not.
  - If the LED keeps WHITE for 3 seconds, meaning the calibration is successful, and then calibration mode will exit automatically.
  - If the LED keeps flashing quickly RED, the calibration has failed. Switch the control mode switch one time to cancel the calibration, and then re-start from step 1.



1. You don't need to rotate your multi-rotor on a precise horizontal or vertical surface, but keep at least 45° difference between horizontal and vertical calibration.
2. If you keep having calibration failure, it might suggest that there is very strong magnetic interference around the GPS & Compass module, please avoid flying in this area.
3. When to do re-calibration.
  - The flight field is changed.
  - The multi-rotor mechanical setup has changed, including the following situations:
    - a) If the GPS & Compass module is re-positioned.
    - b) Electronic devices added, removed or re-positioned (Main Controller, servos, batteries, etc).
    - c) When the mechanical structure of the multi-rotor is changed.
  - If the flight direction appears shifting (meaning the multi-rotor doesn't "fly straight").
  - The LED indicator often indicates abnormality blinking when the multi-rotor spins. But it is normal for this to happen only occasionally.
  - LED blinks yellow and green (●●) continually, indicating that the compass data is abnormal.

# Basic Flying Test

## Step 1 About the Control Mode Switch

The autopilot system can work in Manual Mode and ATTI. Mode without a GPS module. After connecting to the GPS module, GPS Mode is available. Follow the below steps to enter the different control modes.

1. Use a 3-position switch on the transmitter as mode control switch.
2. Make sure to take off the aircraft in ATTI. Mode in every flight.
3. Hover the Aircraft. Release all joysticks and then flip the control mode switch to the GPS Mode or Manual Mode (NOT RECOMMENDED).

## Step 2 Start & Stop Motor

**Star Motor** : Pushing throttle stick before takeoff will not start motors. You have to execute any one of following four Combination Stick Commands (CSC) to start motors



**Stop Motor** :The default setting of stop motor is Immediately. For the immediately mode, in any control mode, once motors start and throttle stick is over 10%, motors will stop immediately when throttle stick is back under 10% again. In this case, if you push the throttle stick over 10% within 5s after motors stop, motors will re-start, CSC is not needed. If you don't push throttle stick after motors start within 3s, motors will stop automatically.



Please refer to the instructions of A1 and A2 in the Advanced Functions section, to learn more about the Control Mode and Stop Motor details.

## Step 3 Checking List before Flying



- Make sure you have assembled your multi-rotor correctly.
- Make sure you have done the configuration procedure correctly.
- Make sure all connections are in good condition.
- Make sure batteries are fully charged for your transmitter, autopilot system and all devices.
- Any of the following mistakes will lead to a dangerous accident, double check all these items: Rotation direction of motor is opposite / Propeller installation mistake / Main controller installation mistake / Wrong connection between the main controller and ESC.
- Always switch on the transmitter first, then power on multi-rotor! (Power off multi-rotor first, then switch off the transmitter after landing!)
- Make sure the GPS signal is good, only one Red LED blinking or without Red LED blinking. Otherwise multi-rotor will drift without stick commands.



- When system is powered on, you MUST NOT move your multi-rotor or sticks on transmitter until the system initialization is finished (about 5 second).
- Please AVOID using the autopilot system in areas of urban area with crowded buildings, tunnels and under bridges, where GPS signal will be blocked most likely.



- In ATTI Mode, throttle stick center position is for 0m/s along the vertical direction. You should keep the position of throttle stick higher than 10% from cut-throttle during the flight!
- Please do the fly test and gain tuning with ATTI. Mode in the open air without heavy wind!
- Refer to the indication in the software: Basic->Gain for more details.

## Step 4 Flying Procedures

1. If in GPS Mode, place the aircraft in an open space without buildings or trees. Take off the aircraft after 6 or more GPS satellites are found (RED LED blinks once or no blinking). If in Manual Mode or ATTI. Mode, you can skip this step.
2. Place the aircraft three meters away from you and others (especially child), to avoid accidental injury.
3. Start-up
  - ✓ Switch on the transmitter, and then power on autopilot system! You MUST NOT move your multi-rotor or sticks on transmitter until the system initialization is finished (about 5 second).
  - ✓ Push both sticks of transmitter to the left bottom or right bottom to start the motors.
  - ✓ Release the yaw, roll and pitch sticks and keep them at the neutral position, avoiding the aircraft to tilt to one side. At the same time raise the throttle stick from the bottom quickly. The motors will stop if you do not push the throttle stick from the bottom within 3s and you will need to execute the start-up procedure again. When the aircraft is on the point of leaving the ground, continue to push the throttle stick upwards to take off from the ground, pay attention not to push the stick excessively.
  - ✓ Pay attention to the aircraft movement at any time when flying, and use the sticks to adjust the aircraft 's position. Keep the yaw, roll, pitch and throttle sticks at the neutral position to hover the aircraft at the desired height.
4. Lower the aircraft slowly. Pull the throttle stick to the bottom and then push the sticks to the left bottom or right bottom to stop the motors after landing. (Also, with throttle stick under 10%, and after landing 3s the motors will stop automatically)
5. Power off the autopilot system, and then switch off the transmitter after landing.



- DO NOT fly near to any ferromagnetic substances, to avoid strong magnetic interference with the GPS. Otherwise, it may cause the aircraft to FailSafe, crack or even fly away.
- If abnormal compass data occurs during flying, LED will blink Yellow and Green alternatively (●●). If in ATTI and Manual Mode, it is free from influence. In any other control mode, the autopilot system will enter into ATTI. Mode automatically; once the compass data goes back to normal, the autopilot system will regain the original control mode.



- If the LED flashes quickly YELLOW then this indicates battery voltage is low, land ASAP.
- It is recommended to land the aircraft slowly, to prevent the aircraft from damage.
- If the transmitter indicates low-battery alarm, please land ASAP. In this condition the transmitter may cause the aircraft to go out of control or even crash.
- The LED will blink White to indicate huge cumulative yaw errors caused by spinning the craft continuously. In this case, you can stop or slow down the spinning, and continue flying after the White blinking has stopped, so as to have better flight performance.



- If Low-Voltage Alarm is set, the aircraft will act according to the configuration of the Assistant Software once Low-Voltage Alarm is triggered.
- If Fail-Safe function is set, the aircraft will act according to the configuration of the Assistant Software once Fail-Safe is triggered.



- Refer to the LED Indicator Description in the Appendix.

# Advanced Functions

## A7 Control Mode Knowledge

Please read the Control Mode Knowledge clearly before usage, to know how to control the aircraft.

Different control modes will give you different flight performances. Please make sure you understand the features and differences of the three control modes.

|                                | <b>GPS Mode<br/>( With GPS Module )</b>  | <b>ATTI. Mode</b>   | <b>Manual Mode</b>   |
|--------------------------------|--|---|--|
| <b>Rudder Angular Velocity</b> | Maximum rudder angular velocity is 150°/s  |   |  |
| <b>Command Linearity</b>       | YES  |   |  |
| <b>Command Stick Meaning</b>   | Multi attitude control; Stick center position for 0° attitude, its endpoint is 35°.  |   | Max-angular velocity is 150°/s.<br>No attitude angle limitation and vertical velocity locking. |
| <b>Altitude Lock</b>           | Maintain the altitude best above 1 meter from ground.                                |   | NO   |
| <b>Stick Released</b>          | Lock position if GPS signal is adequate.   | Only attitude stabilizing.                                  | NOT Recommend  |
| <b>GPS Lost</b>                | When GPS signal has been lost for 3s, system enters <b>ATTI. Mode</b> automatically. | Only performing attitude stabilizing without position lock. | ---  |
| <b>Safety</b>                  | Attitude & speed mixture control ensures stability                                   |   | Depends on experience.   |
|                                | Enhanced Fail-Safe   | Auto Level Fail-Safe  |  |
| <b>Applications</b>            | AP work  | Sports flying.  | ---  |

## A2 Start & Stop Motor Knowledge



Both Immediately Mode and Intelligent Mode are available in the Assistant Software:  
Advanced->Motor->Stop Type.

If necessary, please select the Intelligent Mode in the Assistant Software.

By using the Intelligent Mode, different control mode has different way of stopping motors.

- In Manual Mode, only executing CSC can stop motors.
- In ATTL. Mode or GPS Mode, any one of following four cases will stop motors:
  - a) You don't push throttle stick after motors start within three seconds;
  - b) Executing CSC;
  - c) Throttle stick under 10%, and after landing 3 seconds.
  - d) The slope angle of multi-rotor is over 70°, and throttle stick under 10%.

### For Intelligent Mode



- In ATTL. / GPS Mode, it has landing judgment, which will stop motors.
- Start motors in ATTL. / GPS Mode, you have to execute CSC and then push throttle stick over 10% in 3 seconds, otherwise motors will stop after 3 seconds.
- During normal flight, only pull throttle stick under 10% will not stop motors in any control mode.
- For safety reason, when the slope angle of multi-rotor is over 70° during the flight in ATTL. / GPS Mode (may be caused by collision, motor and ESC error or propeller broken down), and throttle stick is under 10%, motors will stop automatically.

### For Both Intelligent Mode & Immediately Mode



- If you choose the Immediately Mode, you **SHOULD NOT** pull throttle stick under 10% during flight, because it will stop motors. If you do it accidentally, you should push the throttle stick over 10% in 5s to re-start motors
- When transmitter commands are valid under any control modes, the motors will start or stop immediately when you execute CSC. It has nothing to do with the current throttle stick position. Please **DO NOT** executes CSC during flight without a good reason.



- If you choose Intelligent, throttle stick under 10% will trigger landing judgment in any control mode. In this judgment, pitch, roll and yaw controls are denied except throttle, but multi-rotor will still auto level.
- In any control mode, **DO NOT** pull throttle stick under 10% during normal flight without any reason.



- The two cut off types will only work correctly if the transmitter calibration is correct.
- In failed-safe, CSC is denied by the main controller, motors will hold their state.

# 4.3 Intelligent Orientation Control (IOC) Flight (with GPS module)

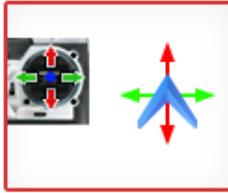
**Definition of Forward Direction:** Multi-rotor will fly along this direction when you push the elevator stick.

**Graphic Description:** → Forward direction

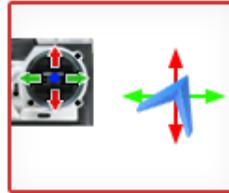
## Step 7/Before You Start

Usually, the forward direction of a flying multi-rotor is the same as the nose direction. By using IOC, wherever the nose points, the forward direction has nothing to do with nose direction. The red and blue arrows on the transmitter are corresponding to pitch and roll operations in the following diagram.

- In course lock flying, the forward direction is the same as a recorded nose direction.
- All the following requirements are met: the autopilot system is in ATTI. Mode or GPS Mode.

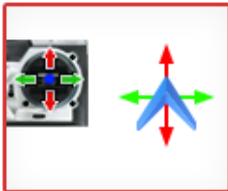


Normal flying

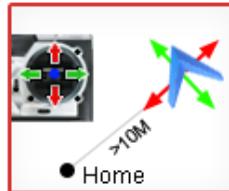


Course Lock Flying

- In home lock flying, the forward direction is the same as the direction from home point to multi-rotor.
- All the following requirements are met: 6 or more GPS satellites are found, in GPS Mode, and the aircraft is further than 10m away from the home point.



Normal flying

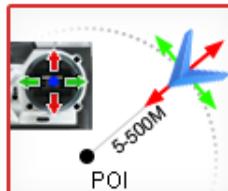


Home Lock Flying

- In POI (POI, Point Of Interest) flying, the roll channel controls the multi rotor circular flight speed around a fixed point, the pitch channel is used for controlling the diameter around the fixed point, the throttle is used to control the height around the fixed point.
- All the following requirements are met: 6 or more GPS satellites are found, in GPS Mode, and the aircraft is further than 5m (and less than 500m) away from the Point of Interest.



Normal flying



POI Flying

## Step 2 IOC Switch Setting



Refer to the assistant software; click the "Advanced" to find the "IOC".

Before using the IOC function, you have to choose a 3-position switch on your transmitter as the IOC switch, which is also used for recording the orientation, home position or point of interest in corresponding modes. There are three IOC control mode options, and you should select one in the assistant software.

| Options \ Switch | Positon-1  | Positon-2  | Positon-3  |
|------------------|---|---|---|
| Control 1        | OFF   | Course Lock   | Home Lock   |
| Control 2        | OFF   | Course Lock   | POI   |
| Control 3        | OFF   | POI   | Home Lock   |



The above table is for example. The function of the switch position may be reversed since the normal/reversed setting of the switch channel. Toggle the switch and observe the slider position of channel X2 on the assistant software screen, the corresponding area should turn blue.

## Step 3 Method of Forward Direction, Home Point & POI Recording

If you use the IOC function, **please be aware of the Forward Direction of Course Lock Flying, the home point of Home Lock Flying, and the Point of Interest of the POI Flying.** There are two ways to record the forward direction and the home point: Manually and Automatically. You may choose any one record method.

If the IOC switch is set as the above table; you can do the manual recording according to the following table.

|             | Manually   |
|-------------|--|
| Course Lock | Control 1 : Toggle the switch from Positon-1 to Positon-2, and back to Positon-1 quickly 3 to 5 times.<br>Control 2 : The same as above.   |
| Home Lock   | Before takeoff and after 6 or more GPS satellites have been found.<br>Control 1 : Toggle the switch from Positon-2 to Positon-3, and back to Positon-2 quickly 3 to 5 times<br>Control 3 : The same as above.  |
| POI         | Before takeoff and after 6 or more GPS satellites have been found.<br>Control 2 : Toggle the switch from Positon-2 to Positon-3, and back to Positon-2 quickly 3 to 5 times.<br>Control 3 : Toggle the switch from Positon-1 to Positon-2, and back to Positon-1 quickly 3 to 5 times. |
|             | Automatically  |
| Course Lock | 30 seconds after you power on the autopilot system.  |
| Home Lock   | Before takeoff, the current position of the aircraft will be saved as home point when you push the throttle stick for the first time after 6 or more GPS satellites have been found.   |
| POI         | None   |

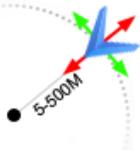
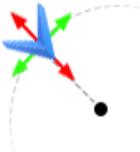


- LED will blink GREEN  quickly if Forward Direction recording is successful.
- LED will blink PURPLE  quickly if Home Point recording is successful.
- LED will blink CYAN  quickly if POI recording is successful.
- After Home Point is recorded successfully, LED will blink  continually under below conditions. None of these conditions is omitted.
  1. GPS signal is well, the satellites number MC searched is more than 6.
  2. Distance between aircraft and the recorded home point is less than 8m.
  3. Current control mode is not Manual mode.
- DO NOT toggle the switch between Positon-1 to Positon-3, since it may change the recording of the Positon-2.

## Step4 IOC Flying Test

Then you can do **Course Lock, Home Lock, and POI flying test**

Carry out an IOC flight by the following procedure. The Control Mode LED will blink GREEN to indicate the IOC mode only when the main controller is really to fly in Course Lock, Home Lock modes or POI.

| During the same flight | STEP1: Record   | STEP2: ON  | STEP3: OFF  | STEP4: ON again   |
|------------------------|---|--|---|---|
| Course Lock            |    |                     |    |    |
| Switch Setting         | Record the forward direction  | Set Control Mode switch at GPS or ATTI. position, Toggle IOC switch from OFF to Course Lock position | Toggle IOC switch to OFF position   | Toggle IOC switch from OFF to Course Lock position                                  |
| Home Lock              |   |                   |   |  |
| Switch Setting         | Record the home point   | Set Control Mode switch at GPS position, Toggle IOC switch from OFF to Home Lock position            | Toggle IOC switch to OFF position   | Toggle IOC switch from OFF to Home Lock position                                    |
| POI                    |  |                   |  |  |
| Switch Setting         | Record the POI  | Set Control Mode switch at GPS position, Toggle IOC switch from OFF                                  | Toggle IOC switch to OFF position   | Toggle IOC switch from OFF to POI position  |

|  |  |                 |  |
|--|--|-----------------|--|
|  |  | to POI position |  |
|--|--|-----------------|--|

 Aircraft moving direction when pull pitch stick       Aircraft moving direction when pull roll stick

● Home point       Aircraft ( the arrow is pointing to the direction of the aircraft nose )

### IOC FLYING NOTES !!!



When Multi-rotor is flying by home lock far away from you and the home point, please DO NOT toggle the IOC switch many times quickly so as to avoid the change of home point without your attention.



- Home lock flying requires that 6 or more GPS satellites are found and the aircraft is further than 10m away from the home point.
- In POI flying, avoid using POI in areas where the GPS signal might be lost or the transmitter /receiver signal might be lost (such as built up urban areas), to make sure 6 or more GPS satellites are found. And the multi-rotor is required to fly further than 5m (and less than 500m) away from the Point of Interest.
- Continuously spinning will cause a yaw error. In this case, you can stop or slow down the spinning, so as to have better flight performance.
- If the IOC flying requirement is not satisfied, the autopilot system will quit IOC control mode. Please be aware of the LED indicator, to know the current control mode of the autopilot system.



- Before you do the home lock flight, you have to fly the aircraft out of the 10m range around home point, and then flip the IOC switch to Home Lock position to fly in home lock when all the requirements are met. If you have already toggled the IOC switch to Home Lock position when the aircraft is still in 10m range around home point, and this is the first time you are going to fly in home lock during the current flight, then if all the requirements are met, the main controller will change into home lock automatically when Multi-rotor flies out the 10m range around home point.
- When you are flying in home lock mode, if the aircraft is back into the 10m range around home point, or you switch into ATTI. Mode, or the GPS signal becomes weak, the autopilot system will fly in course lock by the current forward direction automatically. But this forward direction is NOT the recorded forward direction. If you open the course lock now, it will fly in course lock still by the earlier recorded forward direction.
- We suggest that you should know clearly that, by which lock method you are going to fly, and the locked forward direction or home point, before you switch on IOC mode during the flight.



- Refer to the LED Description in the Appendix for more details.

# A4 FailSafe

FailSafe methods include Hover, Go-home, and Altitude Go-home. Choose one as your failsafe method, which will be triggered when the MC loses the control signal in one of the following situations:

- 1) Signal lost between transmitter and receiver, e.g. multi-rotor is out of the communication range, or transmitter has failed, etc.
- 2) One or more connections of A, E, T, R, U channels between the MC and receiver is lost. If this happens before take-off, the motors will not start if you raise the throttle stick. If this happens during the flight, the LED will flash blue to warn you, in addition to the fail-safe method. If Hovering fail-safe method is configured and U channel is disconnected, multi-rotor will auto land.

Also, you can select the Go-Home Switch item to start go-home (Go-home, and Altitude Go-home) by using a TX switch during the flight, when selected during flight the LED will flash purple instead of blue.

The multi-rotor position before takeoff, including reference longitude, reference latitude and **reference altitude**, is saved as home point by the MC automatically when you raise the throttle stick for the first time AND it has 6 or more GPS satellites acquired for more than 8 seconds (● blinks once or no blinking >8secs)  
After taking off, every time the aircraft recorded a home-point successfully the LED will blink Cyan quickly for indicating.

**THEREFORE:** to use any form of Go-home (including failsafe return home), you must make sure 6 or more GPS satellites are acquired for more than 8 seconds (● blinks once or no blinking >8secs) before take-off, this will assure correct recording of the Home position.

**Go-Home Altitude:** Determined by the **reference altitude** and the FailSafe method chosen. That is, the go-home altitude may be different due to fail-safe method chosen.

## ● Hover

The aircraft will remain hovering when the fail-safe starts.

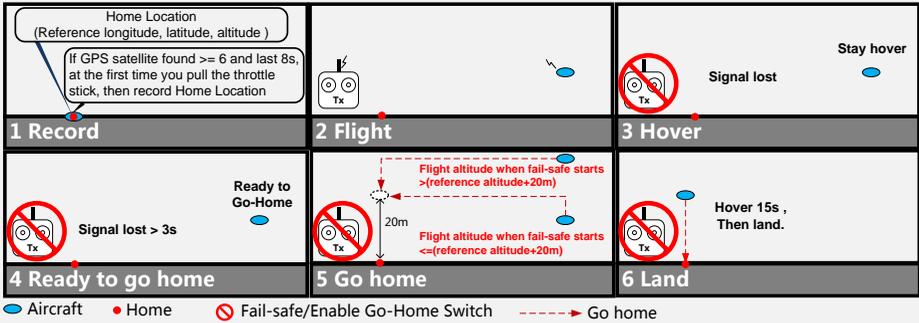


● Aircraft    ❌ Fail-safe

## ● Go-H (Go-home)

Flight altitude when fail-safe starts  $>$  (reference altitude+20m) , then go-home altitude = flight altitude when fail-safe starts

Flight altitude when fail-safe starts  $\leq$  (reference altitude+20m) ,then go-home altitude = reference altitude +20m

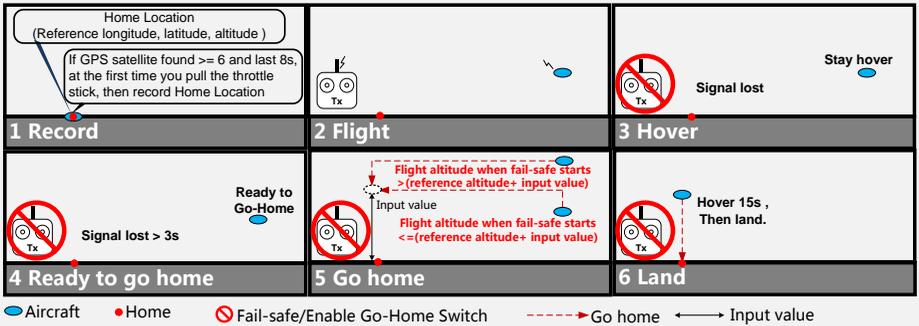


● Altitude Go-H (Altitude Go-home)

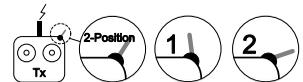
Flight altitude when fail-safe starts  $>$  (reference altitude + entered value) , then go-home altitude = flight altitude when fail-safe starts.

Flight altitude when fail-safe starts  $\leq$  (reference altitude + entered value) , then go-home altitude = reference altitude + entered value.

Entered value: 20m-300m, the default value is 20m, and has an accuracy of 1m.



Go-Home Switch : Before using this function, you have to choose a 2-position switch on your transmitter as the Go-Home switch. Then connect the correct channel of the receiver to the X3 port of the MC.



You should assign: Position-1 to Start; Position-2 to Standby; or reverse the assignment for Position-1 and Position-2. Move the Tx switch of the channel X3 and check that the corresponding area Start and Standby turns blue on the assistant software screen. If required adjust the Tx channel end points.



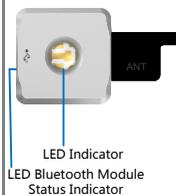
- Switching from Standby to Start will enable go-home during flight and you will no longer have flight control of the Multi rotor. If the multi-rotor is already in a failsafe condition, then the go-home switch will not work.
- If you switch to Manual Mode or Atti. Mode, (and the multi rotor is not in a fail-safe condition), then the go-home is cancelled and you regain control of the multi copter. Once GPS. Mode is re-selected you can once again use the go-home function.



- Use end-point fine tuning on your transmitter to adjust the X3 channel, to give the correct switch indication in the assistant software.
- The following example shows how to enable Go-home by the Tx Switch. Use position-1 to Start and Position-2 to Standby for example.  
Position -1 → Position -2 → Position -1, if the initial switch position is at Start (Position -1).  
Position -2 → Position -1, if the initial switch position is at Standby (Position -2).
- The home point of the ground station one key go-home is the same as the point set by user in the ground station software.
- If the home point is not set by the ground station, the home point of the ground station one key go-home function is the point recorded by the MC.
- If the Go-Home Switch cannot be selected in the assistant software, that may be due to the X3 channel been set for remote gain tuning, you should change this if required.

# WM Assistant for Mobile Device

## Step 1 Assemble the LED Bluetooth Module



The LED Bluetooth Module is necessary if you are using the WM Assistant. This module is only for the iOS Device, not for android equipment. Its Operating Temperature range is from  $-5^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ . Please refer to the Assembly & Configuration -> Step 1 Assembly to attach the module.

This module has a USB interface for configuration and firmware upgrades when connecting to PC. The “LED Indicator” tells the status of autopilot system, and the “LED Bluetooth Module Status Indicator” tells whether the LED Bluetooth Module is working or not. The built-in Bluetooth is for wireless communication between the autopilot system and mobile equipment, with a maximum communication distance of 50m.

## Step 2 WM Assistant Installation

Please search the WM Assistant from the App Store by your iOS device, download and install it.

## Step 3 Parameter Configuration Procedures

1. Prepare an iOS Device that supports Bluetooth 4.0, and turn on the Bluetooth.
2. Switch on the transmitter first, power on the autopilot system. The LED Indicator blinks (●●●.....) when self-check. After that, check the LED Bluetooth Module Status Indicator, if it is solid red on, then the LED Bluetooth Module is working normally.
3. Run the WM Assistant. The LED Indicator blinks Purple and Yellow alternately (●●) when the WM Assistant is connected to the autopilot system. Make sure your iOS device is connected to the Internet for the first time you use, to register account. And also you can login with the PC assistant account.
4. Run the WM Assistant. Set up the name and password for autopilot system according to the App start.
5. Observe the indicators ●● on the left bottom of the software. (● connection indicator and ● communication indicator) On the WM Assistant, if the communication indicator is ●, please double check the connections and driver installation; otherwise if the indicator is blinking ●, go to next step.
6. Select the “Basic” option. Please follow step-by-step for your first-time-configuration. Basic configuration is necessary. Click the icon ? to get the configuration details.
7. You can click the “Advanced” option for more parameter settings. Advanced setting is optional. There are Motor, Enhanced Fail-Safe, Intelligent Orientation Control (IOC), Gimbal, Low-voltage Alarm, Flight Limits, etc.
8. Select Viewer and check all parameters.
9. Select “More” to obtain more details. Including: (Parameter)Import-Export, Restore Factory Settings, Account, Main Controller List, Information( including Hardware ID, IMU, Loader, Firmware, SN and Functions Activation Status), Rate WM Assistant, Feedback, About(Help Document, Disclaimer)



If the LED Bluetooth Module Status Indicator does not be solid red on, then the LED Bluetooth Module works abnormally. There are following situations:

- (1) The main controller firmware version is not matched, please upgrade the main controller.
- (2) There is something wrong with the connection between the LED Bluetooth module and main controller, please check the connection.
- (3) The LED Bluetooth module is damaged, please contact your dealer.



### iOS Device List

iPhone 4s, iPhone 5, iPod touch 5, iPad mini, iPad 3, iPad 4



Refer to the WM Assistant for more details.

The gain value displayed on Mobile Device and PC may be a little different, that is OK for use.

## Step 4 Flying Test Procedures

1. Get the aircraft ready, run the WM Assistant and make sure it is connected with the main controller. (The indicators on the WM Assistant are )
2. Start the motors.
3. The “View” page shows the relative parameters real-time when flying.
4. Go to the “Basic” and click into the “Gain” page to set the values of all gains real-time during flying.
5. Go to the “Advanced” and click into the “Gimbal” page to configure the gimbal real-time during flying.
6. Finish the flying and land your aircraft.



Only the parameter referred above can be changed during flying. Others can be configured after landing.

## Forgot Main Controller Password

When connecting to the WooKong M flight control system to the WM Assistant using a mobile device for the first time, users will be asked to set a name and password for the WooKong M main controller. If the password is forgotten, users can connect the flight control system to Assistant software on a PC and click “Reset Bluetooth Info” in the Tools page to reset username and password. Once complete, set a new username and password as before.

## How to Activate More Functions

In the Future you might be asked to fill in the new S/N in the future if you brought new function upgrades. Fill-in the S/N and then click Write button. If you filled in an invalid S/N over 30 times, your MC will be locked and you have to contact our customer support.

# Appendix

## Firmware & Assistant Software Upgrade

Please follow the procedure for software and firmware upgrade; otherwise the autopilot system might not work properly. For SAFETY REASONS, DO NOT use power battery during firmware upgrade.

1. Make sure your computer is connected to the Internet.
2. Please close all the other applications during the firmware upgrade, including anti-virus software and firewall.
3. Make sure the power supply is securely connected. DO NOT un-plug the power supply until firmware upgrade has finished.
4. Connect autopilot system to PC with USB cable, DO NOT break connection until firmware upgrade is finished.
5. Run Software and wait for connection.
6. Select Info→Software and Firmware.
7. DJI server will check your current software and firmware version, and get the latest software and firmware prepared for the unit.
8. If there is a software version more up-to-date than your current version, you will be able to click to download the new version. Please re-install the assistant software follow the prompts
9. If there is a firmware version more up-to-date than your current version, you will be able to click to update them.
10. Wait until Assistant software shows "finished".
11. Click OK and power cycle the unit after at least 5 seconds. Your unit is now up-to-date.



- After firmware upgrade, please re-configure the system using Assistant software.
- If the firmware upgrade failed, the autopilot system will enter waiting for firmware upgrade status automatically, please try again with the above procedures.

## Port Description

Please remember the function of each port, which may help you to use the autopilot system efficiently.

| Main Controller   |           |  |  |
|---|-----------|--|--|
|  | <b>A</b>  | For roll control (left/right)  |  |
|  | <b>E</b>  | For pitch control (front/back)   |  |
|  | <b>T</b>  | For throttle control   | Or to gimbal roll servo                  |
|  | <b>R</b>  | For rudder control   | Or to gimbal pitch servo                 |
|  | <b>U</b>  | For Control Mode Switch  |  |
|  | <b>X1</b> | For voltage monitor (Connect with PMU V-SEN port)  |  |
|  | <b>X2</b> | For D-Bus (S-Bus/S-Bus2 compatible)  | Or for gain tuning Or for IOC switch     |
|  | <b>X3</b> | For gimbal pitch control   | Or for gain tuning Or for switch go-home |
|  | <b>M6</b> | To #6 rotor  |  |
|  | <b>M5</b> | To #5 rotor  |  |
|  | <b>M4</b> | To #4 rotor  |  |
|  | <b>M3</b> | To #3 rotor  |  |
|  | <b>M2</b> | To #2 rotor  |  |
|  | <b>M1</b> | To #1 rotor  |  |
|  | <b>F2</b> | To gimbal pitch servo  | Or to #8 rotor                           |
|  | <b>F1</b> | To gimbal roll servo   | Or to #7 rotor                           |
|  |           | Micro-B USB port: PC connection for configuration and firmware upgrades.   |  |
|  |           | CAN-Bus port: MC uses CAN-Bus to power and communicate with other WKM modules.   |  |
| (In three-pin ports, pins near the nicks are signal pins.)                        |           |  |  |
| Power Management Unit   |           |  |  |
| <b>V-SEN</b>  |           | For monitoring battery voltage and supplying power to receiver and other electronic devices.<br>(Connect with MC X1 port)                        |  |
|   |           | <ul style="list-style-type: none"> <li>● Orange wire (signal wire) output: 0V ~ + 3.3V</li> <li>● Red wire (power wire) output: 3A@5V</li> </ul> |  |
| <b>PW</b>   |           | For supplying power to WKM system.   |  |
|   |           | <ul style="list-style-type: none"> <li>● Output: Max 2A@6V</li> </ul>  |  |



## Specifications

| General   |  |
|---|--|
| <b>Built-In Functions</b>   | <ul style="list-style-type: none"> <li>● Three Modes Autopilot</li> <li>● PPM Receiver Supported</li> <li>● 2-axle Gimbal Support</li> <li>● Enhanced Fail Safe</li> <li>● S-Bus/S-Bus2 Receiver Supported</li> <li>● Intelligent Orientation Control</li> <li>● Multi Output Frequency Supported</li> <li>● Low Voltage Protection</li> </ul> |
| Peripheral  |  |
| <b>Supported Multi-rotor</b>  | <ul style="list-style-type: none"> <li>● Quad-rotor: I4, X4;</li> <li>● Hexa-rotor: I6, V6, Y6, IY6;</li> <li>● Octo-rotor: X8, I8, V8.</li> </ul>   |
| <b>Supported ESC output</b>   | 400Hz refresh frequency.   |
| <b>Recommended Transmitter</b>  | Only PCM or 2.4GHz with minimum 7 channels and fail-safe function available on all channels.   |
| <b>Recommended Battery</b>  | 2S - 6S LiPo   |
| <b>Assistant Software System Requirement</b>                                | Windows XP SP3 / 7 / 8   |
| Electrical & Mechanical   |  |
| <b>Power Consumption</b>  | MAX 5W<br>(0.9A@5V, 0.7A@5.8V, 0.5A@7.4V, 0.4A@8V)   |
| <b>Operating Temperature</b>  | -5°C to +60°C  |
| <b>Total Weight</b>   | <= 118g (overall)  |
| <b>Dimensions</b>   | <ul style="list-style-type: none"> <li>● MC: 51.2mm x 38.0mm x 15.3mm</li> <li>● IMU: 41.4mm x 31.1mm x 27.8mm</li> <li>● GPS &amp; Compass: 50mm (diameter) x 9mm</li> <li>● LED Indicator: 25mm x 25mm x 7mm</li> <li>● PMU: 39.5mm×27.5mm×9.7mm</li> </ul>  |
| Flight Performance (can be effected by mechanical performance and payloads) |  |
| <b>Hovering Accuracy (GPS Mode)</b>   | <ul style="list-style-type: none"> <li>● Vertical: 0.5m</li> <li>● Horizontal: 2m</li> </ul>   |
| <b>Maximum Wind Resistance</b>  | <8m/s (17.9mph / 28.8km/h)   |
| <b>Max Yaw Angular Velocity</b>   | 150deg/s   |
| <b>Max Tilt Angle</b>   | 35°  |
| <b>Ascent / Descent</b>   | 6m/s   |

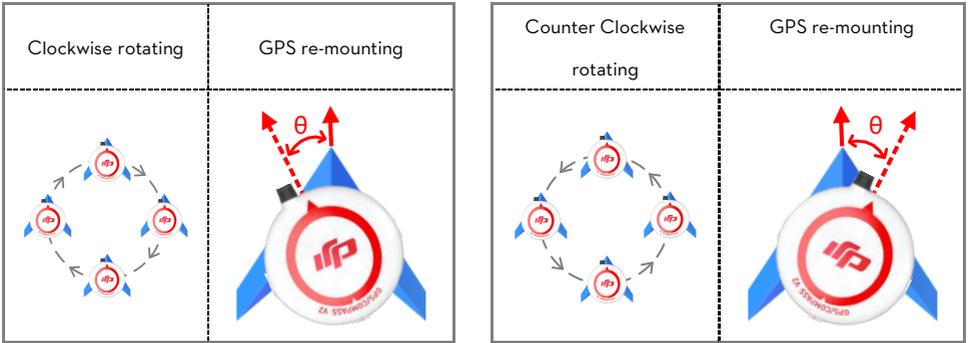
# FAQ

## Fix the TBE (Toilet Bowl Effect) Problem

When flying in GPS Mode and the compass calibration has been done correctly, should you find the aircraft rotating (Toilet bowl effect), or drifting when hovering. Please check the GPS module mounting orientation and then re-do the compass calibration. Carry out the following procedure to re-mount the GPS module.

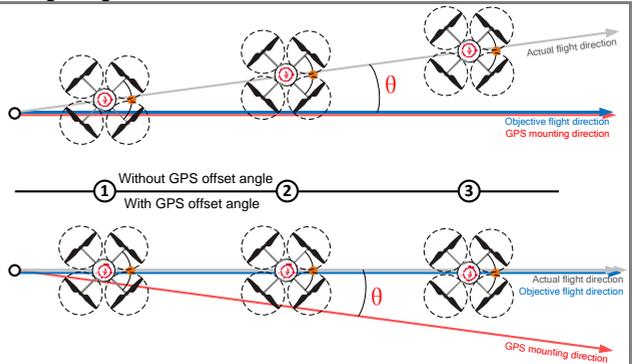
In the following diagram (view from the top), the aircraft can appear to be rotating in both clockwise and counter-clockwise direction, please re-mount the GPS module correspondingly.

 is the rotating direction of aircraft, 
  is the nose direction of aircraft, 
  is the arrow direction on the GPS module,  $\theta$  is the offset angle for GPS re-mounting (about 10-30°)



## Reinstall the GPS in an Offsetting Angle

Should you find the multi-rotor does not track straight in forward flight, you might try re-mounting GPS in an offsetting angle as showed in right figure.  $\theta$  in the figure is the offsetting angle.



## Attitude Controllable When One Motor Output is Failed

For Hexa-rotor, including Hexa-rotor I, Hexa-rotor V, Hexa-rotor IY and Hexa-rotor Y, aircraft is attitude controllable when one motor output is failed.

The WKM can still control the attitude of the Hexa-rotor for a safe landing when one motor output of the Hexa-rotor has failed, for example, one motor is stopped or one propeller is broken, etc.

The control mode of WKM should be in Atti. Mode or GPS Mode. The aircraft will rotate, due to an imbalance of torque; however, it can still be controlled by the Transmitter.

Select Course lock or home lock mode for flying the aircraft into a safe area to land when the aircraft is far away or the attitude can't be recognized. Even when the multi rotor is rotating, using Course lock or home lock mode will allow you to move the multi rotor in the corresponding Transmitter stick direction.

## Flight Restriction in Specified Area Description

Flight Functions are restricted within the radius of 15Km from Tiananmen Square in Beijing, China.

In the restricted area, with GPS/Compass Module and GPS signal is good, you cannot take off the aircraft in any Control Mode.

In the restricted area, with GPS/Compass Module and GPS signal is bad, you can take off the aircraft, once the GPS signal becomes good, you can only control the aircraft to land. Manual Mode is free form restriction.

Fly into the restricted area, you can only control the aircraft to land. Manual Mode is free form restriction.

## Abnormal Cases in Motor Test

Below are abnormal cases and solutions for Motor Test in the Assistant software

- (1) Tested motor does not rotate, there are two situations:
  - a) Connection issues: please check the connections first, such as whether MC and motors are power on, whether connection between MC and ESC is well, whether three cables of ESC are correctly connected to motor. If connections are well, then check whether motors or ESC are breakdown.
  - b) Please increase the Motor Idle Speed in the Advanced page of Assistant software.
- (2) Tested motor rotates in wrong direction: please swap over any two wire connections of the motor.
- (3) Rotating motor is not the tested motor (e.g. M2 motor rotates when click button "M1"): please ensure the cable of ESC is correct connected to the right port of MC.

## Solution for LED yellow and green blinking

LED blinks yellow and green (●●) alternatively means compass errors or interferences:

- (1) Long time ●●: in this case compass calibration is required.
- (2) Temporary ●●: e.g. LED blinks ●● several times when the aircraft flying over some district and then no ●● blinks; or take an calibrated aircraft from outside to inside of house, the ●● may appear inside. In these cases the compass is ok and has no influences to flight. Compass calibration is not required.

When compass data become abnormal (LED blinks yellow and green ●●) during flying, for safety reasons, the autopilot system will auto change the control mode. However in ATTI. and Manual Mode is free from influence. In any other control mode, the autopilot system will enter into ATTI. Mode automatically (the mode shown on status bar will be "Atti." if you connect the autopilot to the assistant software). Once the compass data go back to normal, the autopilot system will regain the original control mode.

## **Solutions for failed gain value adjustment in the Assistant software**

If you fail to adjust the gain value in the Assistant software, please check the follow items to solve the problem.

- (1) Make sure the MC has connected and communicated with the Assistant software successfully.
- (2) Make sure the Receiver has connected to the MC successfully.
- (3) Make sure you have selected the correct Receiver type in the Assistant software, and then you can try to adjust the gain value again.

# CE Statement

Due to the used enclosure material, the devices shall only be connected to a USB.

Interface of version 2.0 or higher. The connection to so called power USB is prohibited.

Hereby, SZ DJI TECHNOLOGY CO. LTD declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

# CE 0700

FCC Statement :

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**NOTE:** The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.