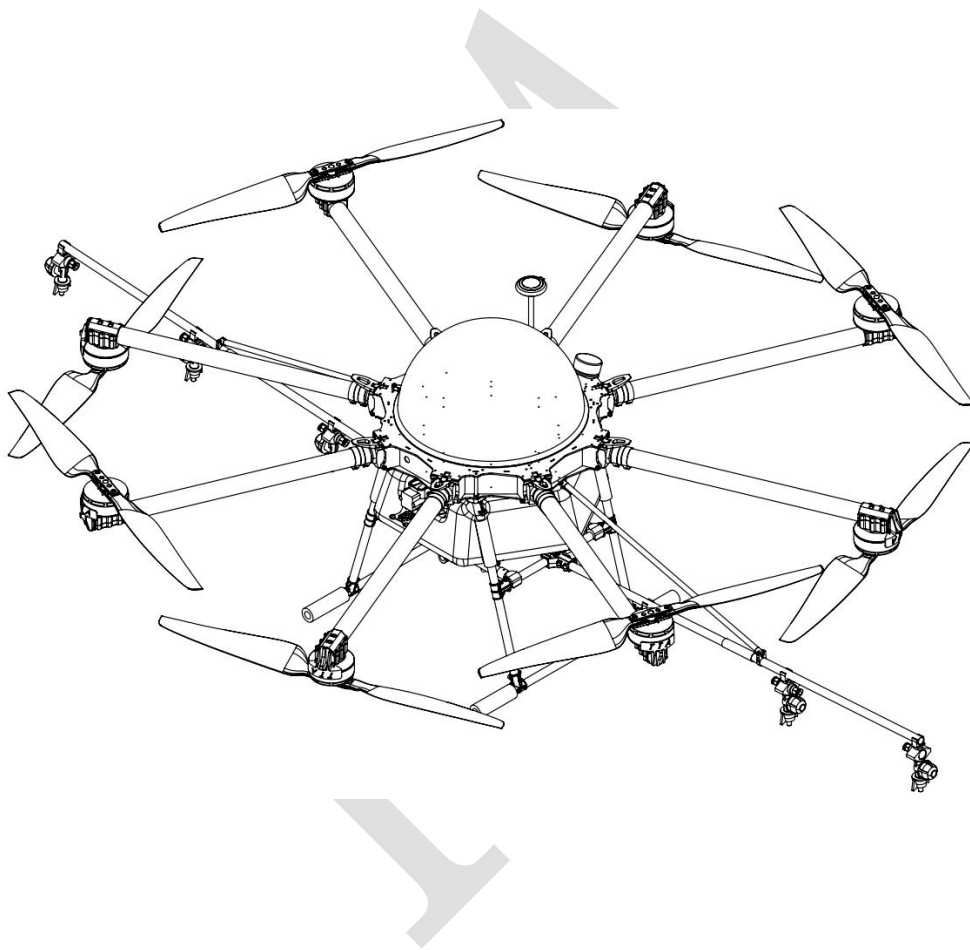




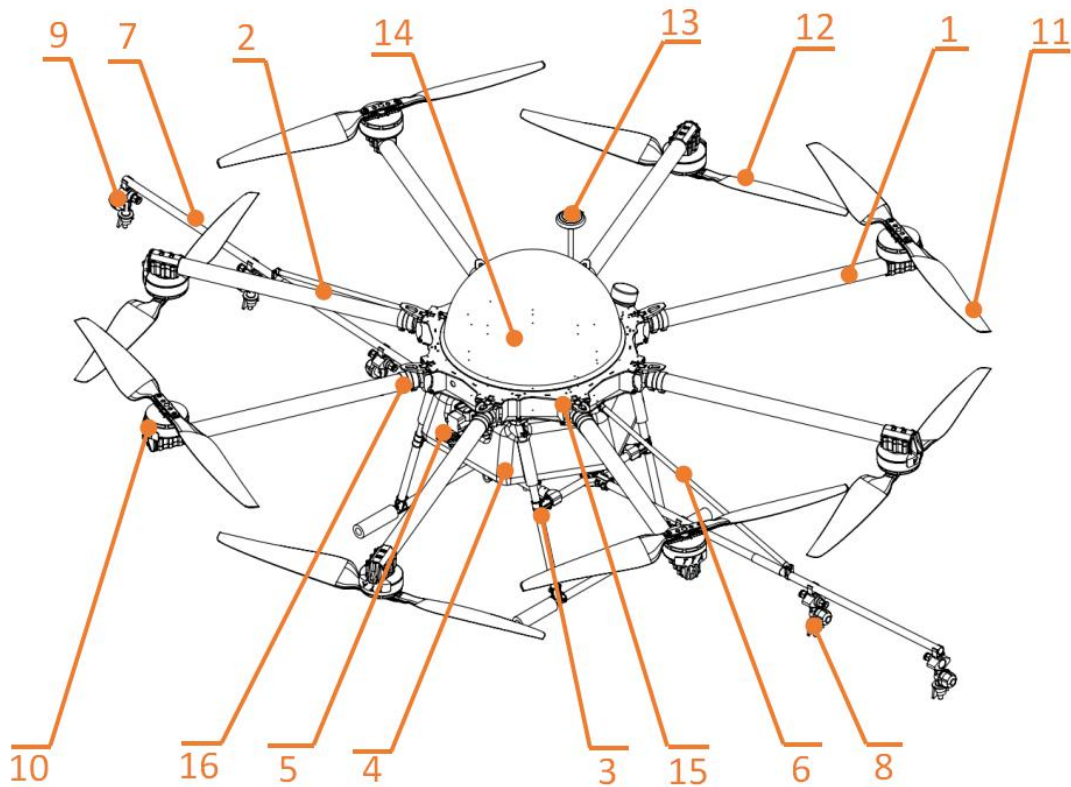
**Beijing TT Aviation Technology Co., Ltd.**

# M8A Pro Manual



**Beijing TT Aviation Technology Co., Ltd.**

Make sure the pilot is well-trained in operating UAVs before going on mission.



**M8A Pro Structure Picture**

No.	Component	No.	Component
1	CCW Arm assembly	9	Edge nozzle assembly
2	CW Arm assembly	10	Motor
3	Landing gear assembly	11	CCW Propeller
4	Water tank	12	CW Propeller
5	Pump assembly	13	GPS antenna
6	Holder assembly of spraying rod	14	Dome
7	Spraying tube	15	Up plate
8	Middle nozzle assembly	16	Arm joint jacket



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## **1.Use Instruction**

### **1.1 Safety Instruction**

- ♦ The product is not suitable for the ones who are less than eighteen or who do not have full capacity for civil conduct.
- ♦ The product have bigger fuselage size, high speed rotary and strong flight dynamics. At runtime have a certain dangerousness . Not in accordance with the requirement operation and usage will cause to potential danger and hurt.
- ♦ When using this product, please keep away from airport, railroad, high speed road, high buildings ,electric wire and other dangerous environments.
- ♦ When using this product, please keep away from mobile phone base stations, high power transmitting equipment, and other high electromagnetic interference environments.
- ♦ When using this product, please keep away from army and kinds of manned craft flight area.
- ♦ Don't use this product in rain, thunder, sandstorm, fog snow ,high wind ,and low temperature and other bad environments.
- ♦ When flying in more than three kilometers. Environmental factors can lead to flight performance degradation, please care of using it.
- ♦ When operating this product fly in low sky .Please always keep UAV and people & animals in a safe distance of ten meters
- ♦ When using this product in desert area, please keep UAV within the range of operator's eyes



- ♦ Don't hover or fly over the crowd, Don't be delight in scaring others.
- ♦ When it is close to the crowd ,please land this UAV as soon as possible and guide people to keep and avoid potential accident.
- ♦ Don't operate it in the area of children playing.
- ♦ If not in the extreme necessary condition, please do not power off when flying in the air.
- ♦ You can not fly it you are in drinking , tired, drugs, physical ,discomfort, etc. .
- ♦ Please inspect it before using very time, including but not limited to parts of fastness, organism and propeller of cracks, and abrasion ,battery ,the effectiveness of light. When error happens, please stop using immediately and replace the corresponding parts.
- ♦ Abnormal working state of the UAV maybe happen accidentally, don't open the propellers and forcibly fly with wrong.
- ♦ Do not try to prevent the moving parts while working.

## **1.2 Pesticide Usage**

- ♦ All pesticides are poisonous. Please be careful and work strictly according to the safety instructions of pesticides.
- ♦ When dispensing, please use clear water. If not, will cause jams mesh of impurities. If it is blocked, please clear it before reuse
- ♦ When dispensing , please note that liquid sparks and the pesticide residue in fuselage will be harmful to human body.
- ♦ When dispensing, please pay more attention and use protective tools, and do not let body directly touch with the pesticides; After pesticide spraying, please clear your skin,



copter and remote control.

- ♦ When using pesticide, there will be interaction between different pesticides , user should clear cartridge or keep a certain interval time。
- ♦ Spraying shall be carried out in windless sunny day, don't spray under high temperature at noon. While breezing, the operator should be standing above the wind and spraying; do not work when wind is four.
- ♦ When spaying ,if you feel uncomfortable ,headache or dizzy, please leave the site at once and rest. If once severe symptoms occur, immediately be sent to hospital.
- ♦ Pesticide effect and the solution concentration, spray rate ,copter high from crops ,wind direction, wind speed and so on are close related. When using pesticide should consider the above factors, to achieve the best effect. Please make sure that do not damage the human beings and animals and surroundings during the process of sprayings.
- ♦ When using pesticide , do not pollute river and drinking water

### **1.3 Inspection**

- ♦ Before flying, ensure the battery is enough
- ♦ Ensure all the parts are installed firmly, and all the screws are tight as required.
- ♦ Ensure all the wires are correctly linked.
- ♦ Ensure all parts goes well. If it is broken or aging, please replace timely.
- ♦ Before flying, carefully check the propellers installation direction 、 rotation direction, control and others.
- ♦ Ensure all the propellers are fine, no any scratch and tightly installed.
- ♦ Ensure the sprayer is fluent without any clogging and work normally.



## **1.4 Environment**

- ♦ While flying, please ensure the drone away from the crowds, dangerous goods, high buildings, high-voltage wires and others. Please fly the drone in a dedicated space.
- ♦ Please ensure the drone fly within the operator's eyesight.
- ♦ The drone working temperature is between 0°C-40°C.
- ♦ Ensure the drone fly within the permit of local law and regulations.
- ♦ To fly the drone safely as required, please fly it within in the height of 50 meters. If it has local flying height limit within 50meters, please make sure obey the related regulations.

## **1.5 Operation**

- ♦ Please ensure the multi-rotor drone flying height is within 8 meters, except the special requirements.
- ♦ Before remote control calibration、hardware update, parameter setup, please remove the propellers and avoid the potential moving suddenly.
- ♦ Remove the battery if it does not fly, to avoid flying it when touching the remote control once.
- ♦ Please remove the batteries once landing. Do not move the drone when it is in power.
- ♦ Do not touch the joy stick mistakenly, and prevent start the drone.
- ♦ When it is powered, please stand in the safe distance of above 10 meters.
- ♦ Ensure the propellers completely stop and power off.
- ♦ Please switch it to the manual operation mode when errors happen. When the manual operation mode does not work, please press the emergency bottom. Please keep





away from the crowd.

- ♦ When the battery is damaged, please ensure it is stored in the disposal area and avoid spontaneous combustion. In order to protect environment, please don't throw batteries randomly. And consult the maker about the proper disposal method.
- ♦ During the flight, don't fly overload and do not cause any potential dangers.
- ♦ When low battery is warning, please return as soon as possible.
- ♦ Ensure that the remote control and battery is enough, to ensure that firmware has been updated to the latest version.
- ♦ Ensure flying sites outside of the restricted areas and is proper for flight . .
- ♦ Please make sure do not fly or operate the drone when you are drunk or with medicine limitation.
- ♦ Be familiar with the remote control operation & each flight mode, and ensure you know how to operate the control condition.
- ♦ User shall know and obey all the law and regulations in flying location.

## **1.6 Compass Calibration Requirements**

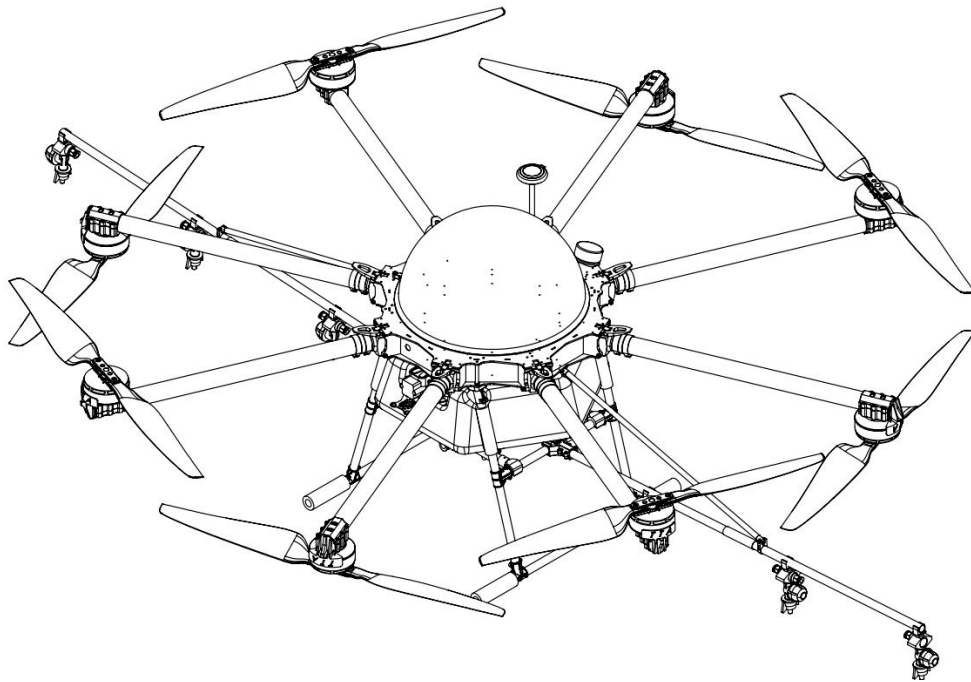
- ♦ Compass has to be calibrated before using the first time. If else, it cannot work and will affect flying safety. Calibration tips:
- ♦ Please do not calibrate it in the place close to the high-magnetic field or big metal materials, such as high-voltage, magnet, parking lot, concrete iron building, etc.
- ♦ When calibrating, please do not bring the magnetic materials, such keys and cellphone.
- ♦ If it is calibrated indoor, please do not re-calibrate it outdoor. It prevents that the two magnet differences cause the potential flying data errors.



- ♦ Magnetic field location is different, please make sure re-calibrate when it changes to the place from the previous one.

## 2. Product Introduction

M8A20A1, the multi-rotor UAV, is the most economic integrated solution for all the agriculture spraying services, the product series payload is up to 20kg. This UAV uses carbon fiber material, the saving weight could be used to payload. The big power brushless motor guarantees the sensitiveness and flexibility. The Lipo batteries guarantee the power supply and easy to repair and maintain. Various spraying tests prove the best performances of this UAV for many years.



## 2.1 Flying Parameters

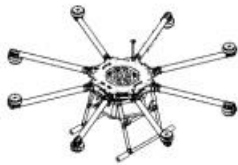

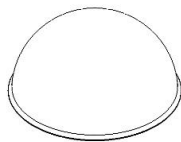

Copter weight (without battery)	18 KG	Max pitch angle	≤35°
Standard take off weight	46 KG	Best working speed	4-6m/s
Max effective take off weight	48 KG	Max working speed	10m/s
Max thrust weight ratio	2.43(take off weight 46Kg)	Working time	10-15min /sortie
Dynamic battery	16000/17000mAh *4pcs	Max ascending speed	5m/s
Max power consumption	18400W	Max descending speed	3m/s
Hovering power consumption	5400W	Max flying speed	15m/s
Hovering time	empty≥25min full≥6min	Recommended working environment temperature	10-35C°
Hovering accuracy	horizontal±1.5m vertical±0.5m	Max wind resistance	12m/s
Working height	2-4m	Max flying altitude	3500m
Max rotation angle	360°	Best reserving temperature	10-25C°

## 2.2 Copter Parameters

Frame	Frame	Diagonal Wheelbase	1630mm
		Arm Length	632mm
		Unfolded Height	600mm(top shield 200mm not included)
		Folded Height	710mm(top shield 200mm not included)
		Folded Width	570mm
		sprayer supporter length	3180mm
		Sprayer Distance	500-550mm(adjustable)
dynamic system	Motor	Motor Model	TTA8017-2
		Stator Size	75mm
		KV	120KV
		Max Thrust	14KG
		Max Power	2300W
		Weight	640g
	ESC	Max Continuous Working Current	50A

		Max Peek Current(3s)	120A
		Max Allowed Voltage	14S LiPo
		Working Voltage	12S LiPo (44-50.4v)
		Working Pulse Width	1000-2000us
		Compatible Signal Frequency	50-400Hz
		Drive PWM frequency	400Hz
	Propellers	Material	Carbon fiber
		Diameter /Screw pitch	3080(length 760mm)
		Weight	110g
	Battery	Capacity	16000mAh/17000mAh
spraying system	Water Tank	Rated Payload	20KG
	Sprayer	Model No.	pressure type(hollow cone)
		Quantity	6 pcs
		Sprayer Diameter	0.67mm
		Spraying Speed	4--6m/s
		Spraying Volume	1.8--2.2L/min
		Spraying Width	5--8m(up to height)
		Spraying Droplet Diameter	80--200μm(adjustable)
Remote controller	Remote controller	Type	R4
		Working frequency	2.4Ghz
		Signal effective distance(without interference and block)	1.2KM
		Battery capacity	3.7V,4000mAh
		Charging type	DC 5V, 2A
		Working environment temperature	0-40C°
		Reserving environment temperature	10-25C°
		Best charging environment temperature	10-25C°

## 2.3 Packing List

Name		QTY	Image
Fuselage		1pcs	
Spraying rod assembly		2 pcs	
Dome		1 pcs	
Propeller		4 pair	
R4 Remote controller		1 set	
M8A20A manual		1 pcs	
A4 adhesive sticker print paper		1 pcs	
Spare part	Tools box	1pcs	
	TTA spanner	1 pcs	
	L-type Wrench	1 pcs	
	Electric quantity indicator	1 pcs	
	spare screw	M3*8 Hexagon cap screw 5 pcs M3*8 semicircular screw 5 pcs M4*65 Screw 2 pcs M4*65 positioning Screw 2 pcs	
aviation box		optional	

16000mAH/17000mAH battery	optional	
Dual channel 6s charger	optional	
Four channel 6S	optional	

### 3.Preparation Before Take Off

#### 3.1 Device Installation

Parts and lines have been installed well before copter sending out of the factory,please do not change any position of part and line and follow the following steps is enough to work.

##### 3.1.1 GPS Antenna Installation

Step 1:erect GPS supporter,be careful that GPS supporter is vertical to the horizontal.

Step 2: tighten the nut on the bottom.

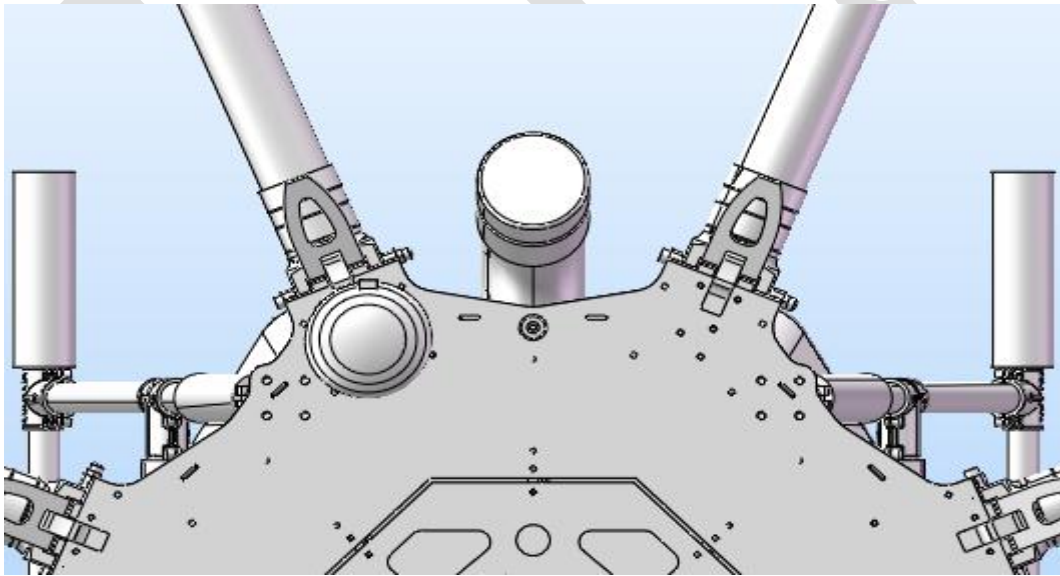


Figure 3-1 GPS installation effect picture

### 3.1.2 Arm Installation

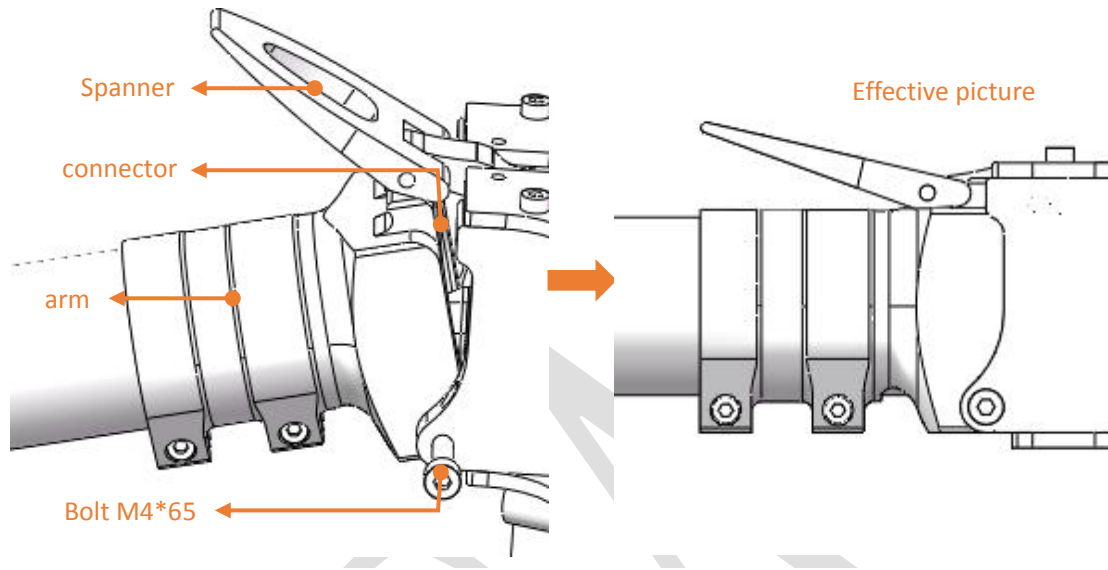


Figure 3-2 arm installation

Use a M4\*65 bolt to connect arm and frame and then tighten the bolt and operate the spanner. The other arms are same step.

### 3.1.3 Propeller Installation

Step 1: Judging the CCW and CW propellers: looking from the wing tip (both sides of the propeller) to the wing root (the middle part of the propeller), the propeller turning is from the low edge (rear edge) to the high edge (leading edge).

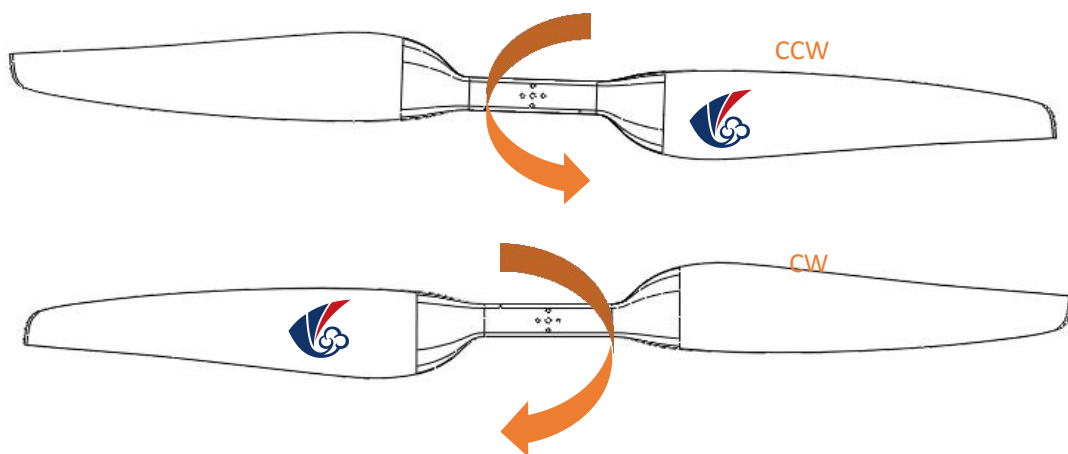


Figure 3-3 propeller type

Step 2: propeller installation. Place propeller on the motor first, then put gasket on propeller, tighten 2 pieces of M3\*14 bolt(M1,M3,M5,M7 is CCW, M2,M4,M6,M8 is CW).

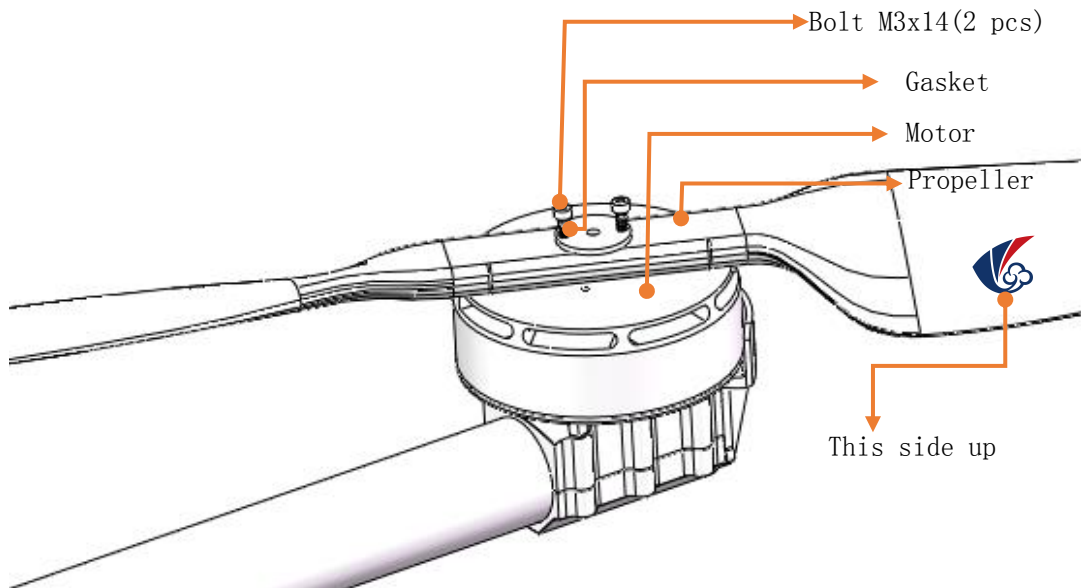


Figure 3-4 propeller installation effective figure

### 3.1.4 Sprayer Supporter Installation

Step 1: connect the sprayer and its connector,see figure3-5.

Step 2: pin the diagonal member and pin it through.

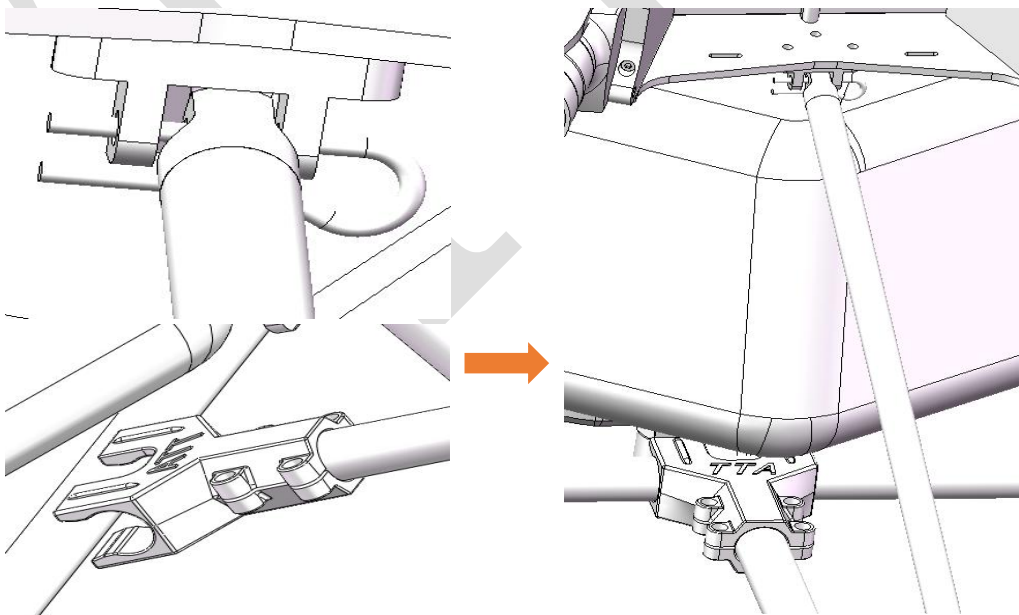


Figure 3-5 Sprayer supporter connection effect picture

Step 3: connect pipe(5mm\*8mm) between pump outlet and sprayer,and the other sprayer.



Pressing the connector when loosening the pipe.

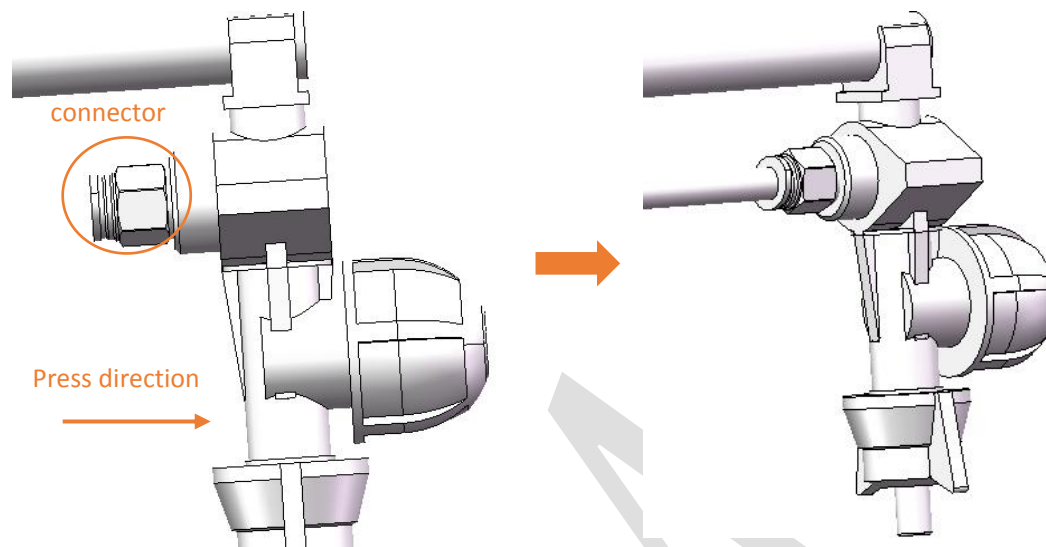


Figure 3-6 pipe connection in sprayer supporter

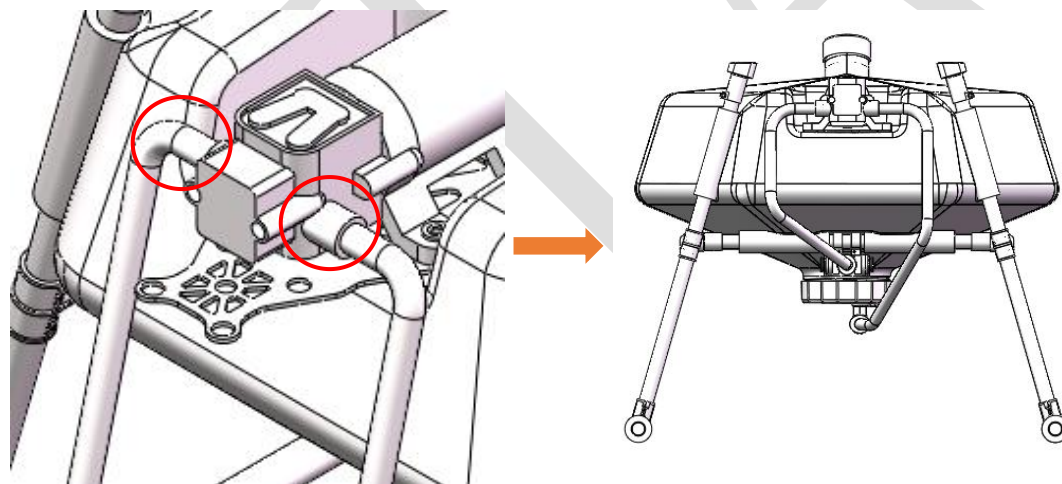


Figure 3-7 pipe connection in pump outlet

Step 4: repeat step 1 to step 3 for the other sprayer supporter.

## 4. Charger Instruction

### 4.1 Product Application

LiPo 6s balance charging

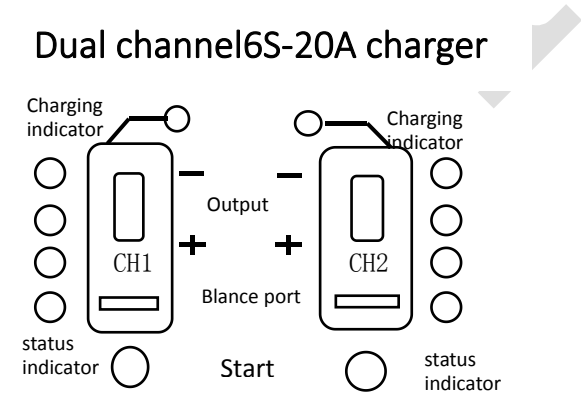
4.2 Product Features

- 1. balance charging
- 2. quick charging
- 3. input and output reverse polarity protection
- 4. Low static power

4.3 Main Technical Parameters and Application Demand

- 1. Input voltage: AC 220V
- 2. Max charging current: CH1:20.0A;CH2:20.0A
- 3.Max charging power:CH1:500W;CH2:500W
- 4. Average output voltage:CH1:25.2V;CH2:25.2V
- 5. Max output voltage:27.0V
- 6.Max balance current:400mA
- 7.Max static power:2400mW
- 8.Display mode:LED display
- 9. Support battery cell number:6S
- 10. Charger working temperature:0~40℃

4.4 Interface Indicator



Charging status	Charging indicator	status indicator	Note
-----------------	--------------------	------------------	------

	green	red	LED 1	LED 2	LED 3	LED 4	
Idle	●	○	○	○	○	○	
charging	○	●	Note 2				
full	●	○	●	●	●	●	charging status:good,balance well
			●	●	●	●	charging status:common,balance commonly
			●	●	●	●	charging status:poor,balance poor
abnormal	○	●	●	○	○	○	charging module abnormal
			○	●	○	○	balance port connection abnormal
			●	●	○	○	input voltage abnormal
			○	○	●	○	output voltage abnormal,check output connection with battery
			●	○	●	○	single cell high voltage alarm
			○	●	●	○	battery inspection fail,check balance port and output port
			●	●	●	○	no charging current,check output connection

Note1: ● → ON ○ → OFF ● → flash

Note2: ● → ○ → ● :LED1-LED4 flash in turn circularly,means charging in real time

Fast cycle speed:big electric current change

Slow cycle speed:charging near full

## 4.5 Function and Operation Instruction

1.Connect with power,leave switch at OFF position,charging channel outside is close,charging indicator is OFF.

2. Connect with power,leave switch on external power,external power supply open,charging indicator is green,charging channel is OFF.

3. Connect with power,press start button for 2s,charging channel is open,charging indicator means current status,charging status is red ON.

4.Press start button during charging process and exit charging mode;press start button when abnormal which means exit abnormal status.

5. It is suggested to charge for a while if not balanced well, which can prolong the lifetime of the battery.

## 4.6 Attention

1. Over low or high charger input voltage may lead to abnormal status or damage.
2. Please observe the instruction strictly.

## 5. App Setting of Copter

### 5.1 Software Configuration

1. Please install the GCS software.

Downloading Link:

<https://www.ttaviation.org/wp-content/uploads/2019/06/M4EM6E-1M6E-XM8A-Pro-2.45.APK.zip>

2. After GCS installation, the label will be appeared as figure 5-1.

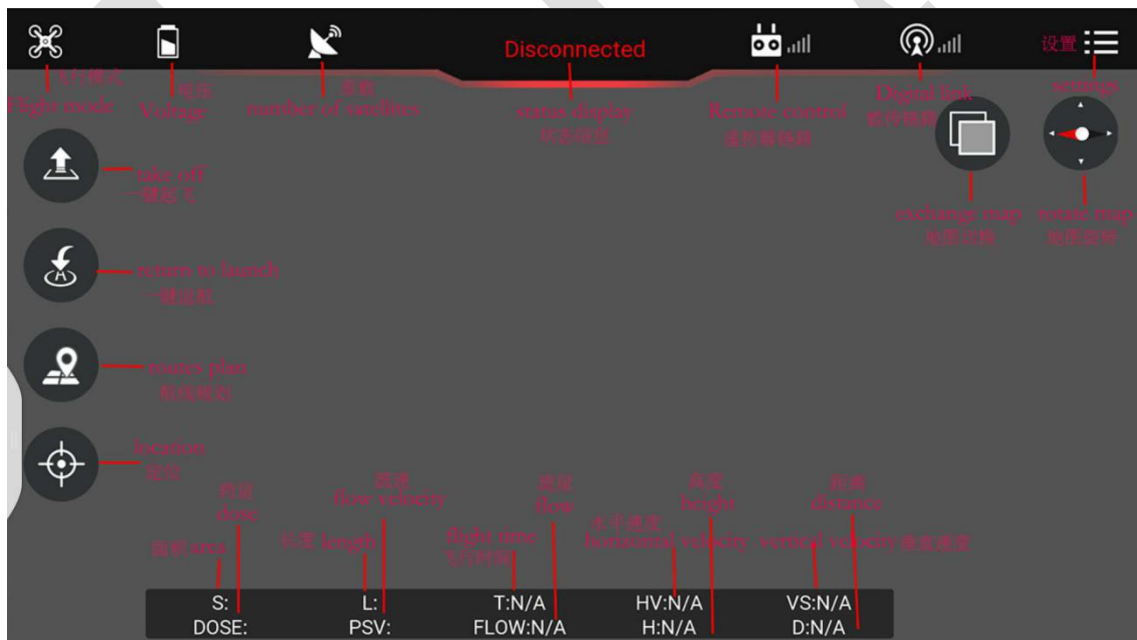


TTA-M8A pro support Android 4.0 or above



Figure 5-1

3. Open GCS, enter into the start page.
4. Enter into the main page, see figure below



### 5.2 Parameters Adjustment



- Sensitivity should not be changed by common user, the unnecessary loss should be taken by user for authorized changing.

- Remote controller could not unlock before parameters adjustment.
- Exit could only be done when all of the parameters adjustment should be done and confirmed. Copter could only fly by restarting after parameters adjustment.

Parameters could be adjusted when copter connected, the steps are as followings:

1) Open the OTG function from cellphone SETTINGS---SYSTEM---OTG (the default is Off thus it should be opened every time), see figure 5-2-1.

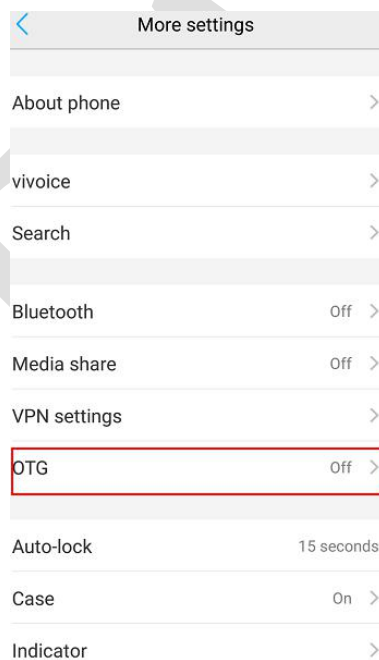
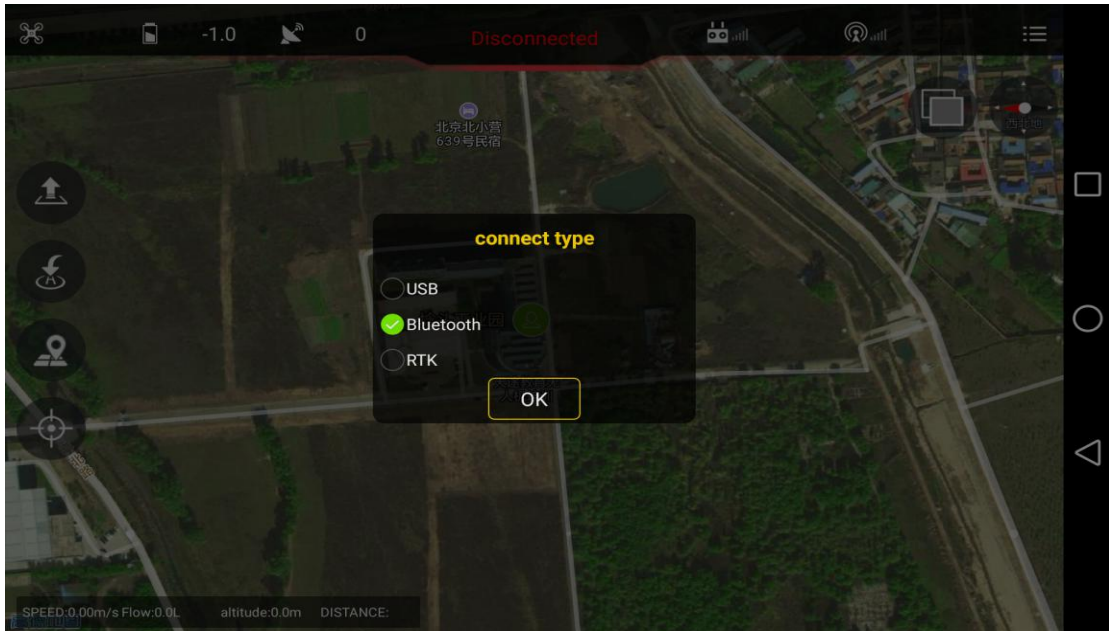


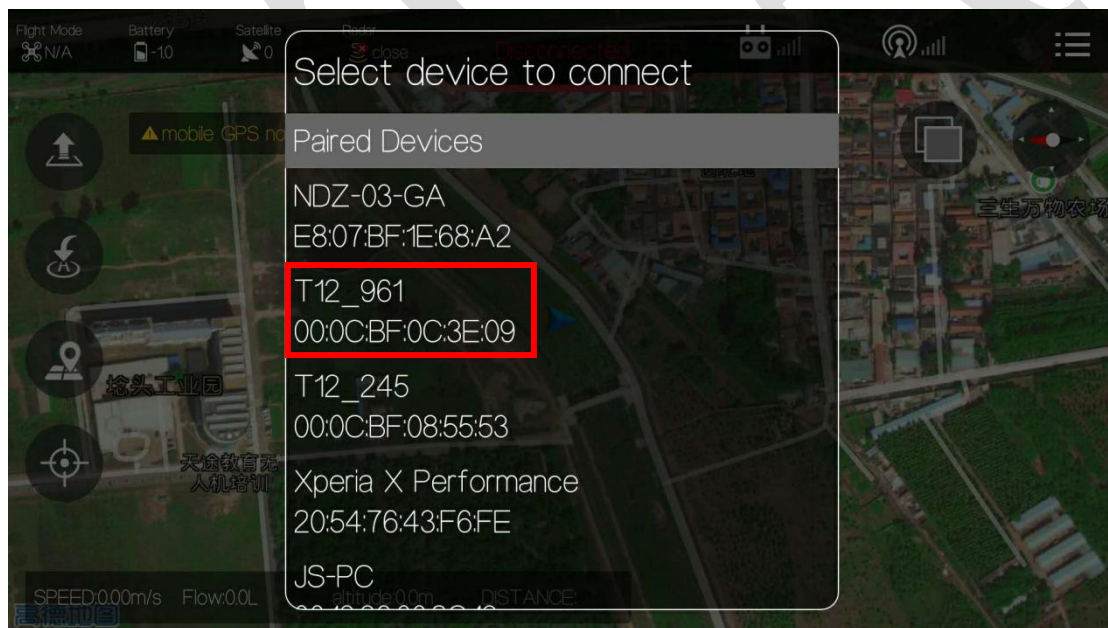
Figure 5-2-1

## 2) Bluetooth connection

Open the bluetooth function in cellphone, Open the bluetooth function in cellphone. Set the connect type of APP on Bluetooth mode.

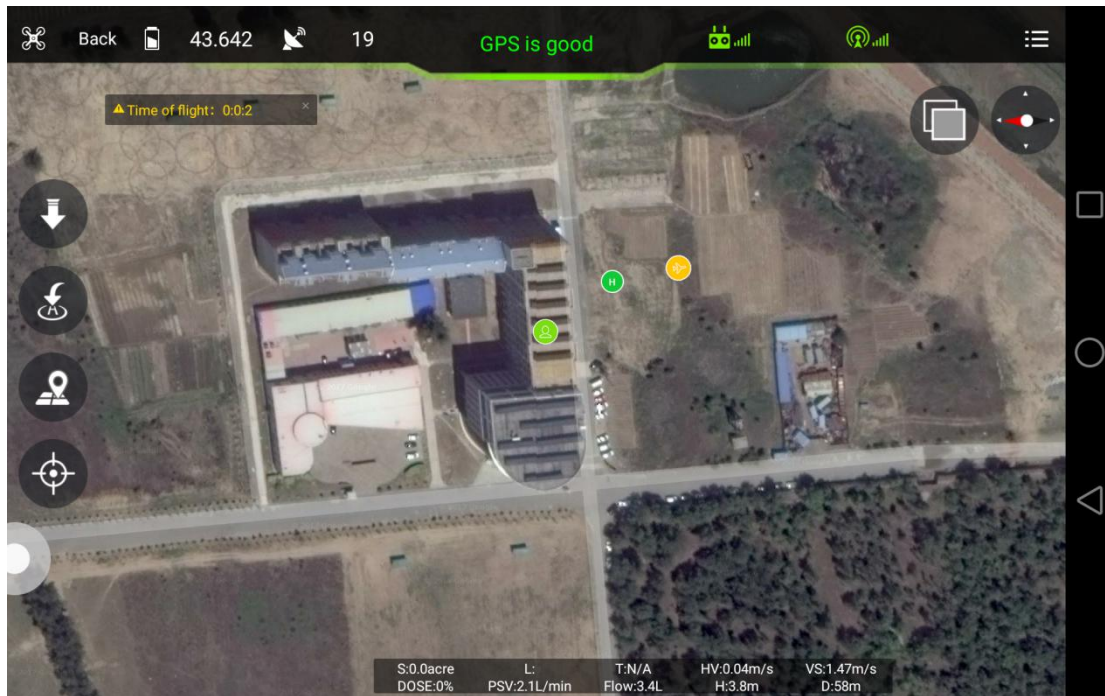


Connect the bluetooth of remote controller. **Remote controller Bluetooth name: T12\_\*\*\*, password:1234**



3) After connection,app will be as followings





5-4

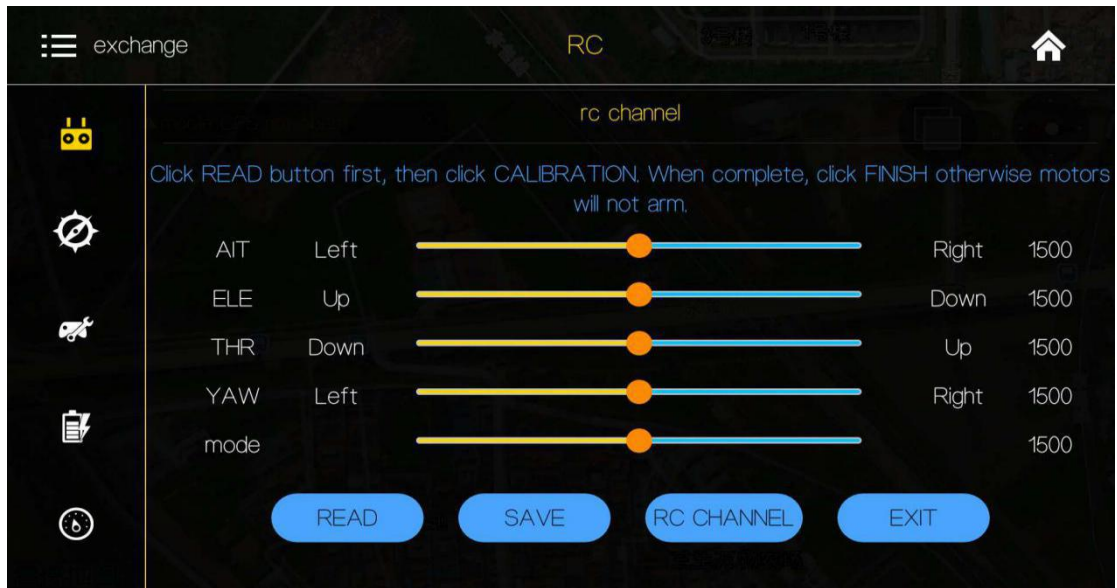
- 4) Click label  at up right corner to enter into parameters adjustment.

### 5.2.1 Remote Controller Calibration

Two kinds of calibration ways:

- ① Calibration In GCS. To keep synchronization with the Info of flight controller
- ② RC Hardware Calibration. To calibrate the channels of RC itself. (more details at chapter 6.3)

Remote controller calibration: click the button *READ* to get the data, see the following figure

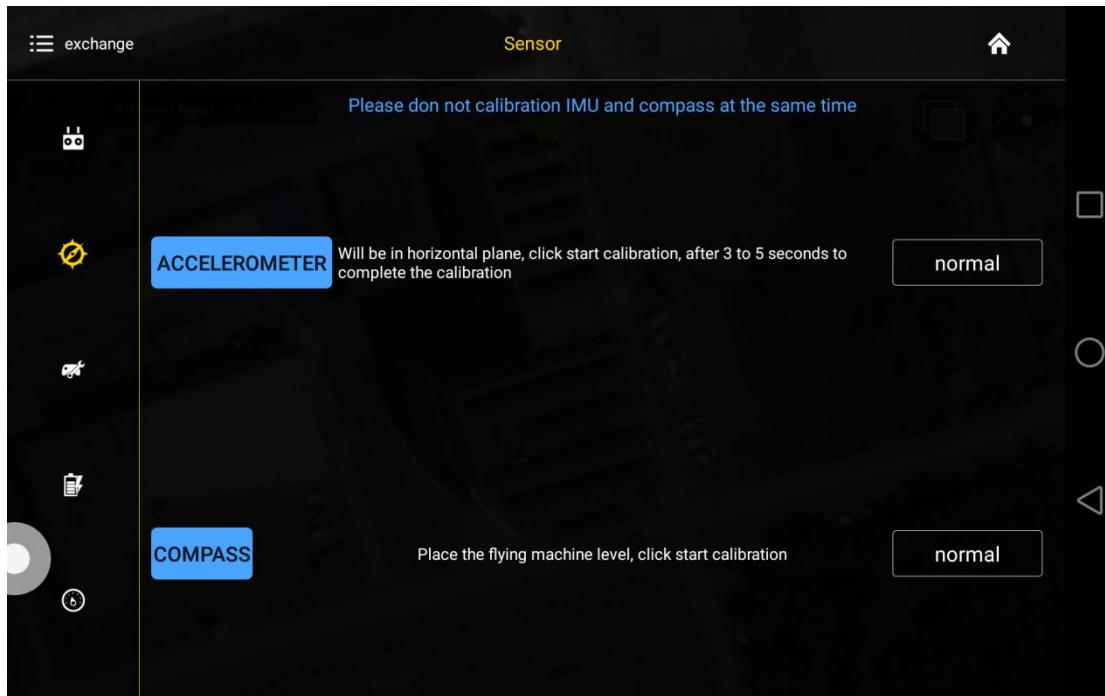


- 1) Start to calibrate: connect copter with GCS, click *RC CHANNEL*, move the stick to maximum and minimum position 4 to 5 times.
- 2) Stop calibration: click **Finish** after calibration. Then channel status could be checked.
- 3) Normal or reverse setting of remote controller is set to check whether it's right or wrong.

### 5.2.2 IMU Calibration

Leave the copter in a horizontal position, click the button *ACCELEROMETER*, LED will flash in red, green, yellow alternately, LED green means successful calibration, data will be stored by restart.





### 5.2.3 Compass Calibration In GCS

#### ▼ Situations when need calibration

- 1) Everytime you transport the drone to another place, the compass have to be calibrated .
- 2) If you fly in the mountain , every time you move from one hill to the other one , do the compass calibration .
- 3) Everytime you get new drone or a repaired drone , do the compass calibration .
- 4) Once you find that the drone cannot stay when it's hover in GPS (it might be moving like a cycle ), do the calibration .

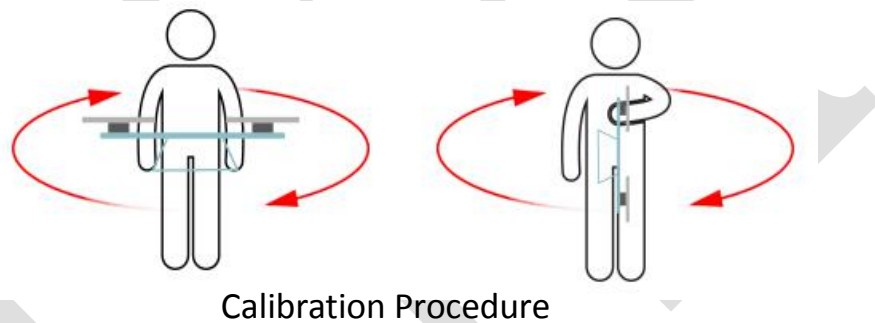
#### ▼ Calibration order

Two kinds of method of compass calibration:

- 1) Click the button *COMPASS* to enter into calibration status.
- 2) Switch switch E back and forth more than 4 times to enter into calibration status.

### ▼ Calibration Steps

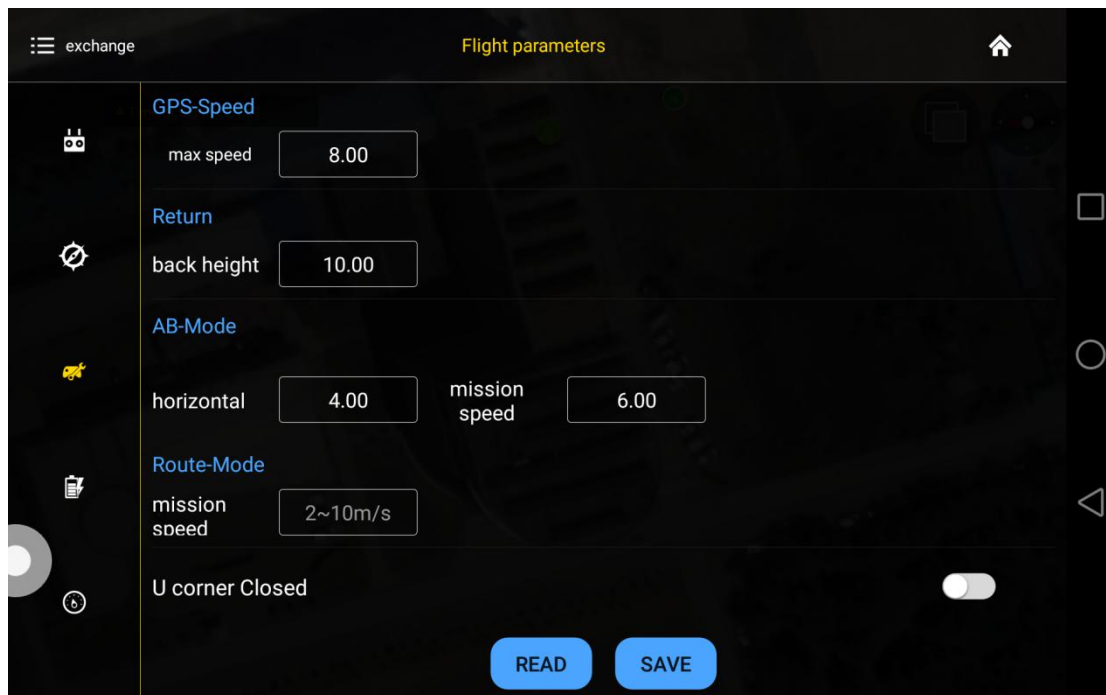
- 1) Drone shall be outside, in open field.
- 2) After clicking calibration, yellow LED of drone will on. Hold and keep copter rotating clockwise and slowly until green led is on; Hold and keep copter head to the ground, and rotate copter clockwise and slowly till LED flash in red,green and yellow alternately.
- 3) After step 2, calibration mode will exit automatically and LED will flash normally if successful. If fails, LED will keep red for 3 seconds. Then user need to calibrate again.
- 4) Please reboot after calibration.



### Attention:

- 1) Compass should be done after changing flying area.
- 2) Calibration should be done in outdoor,wild and far away from high tension line tower which is easy influenced by magnetic interference.
- 3) Keep horizontal and vertical during the slow calibration.
- 4) Clockwise is the only direction.

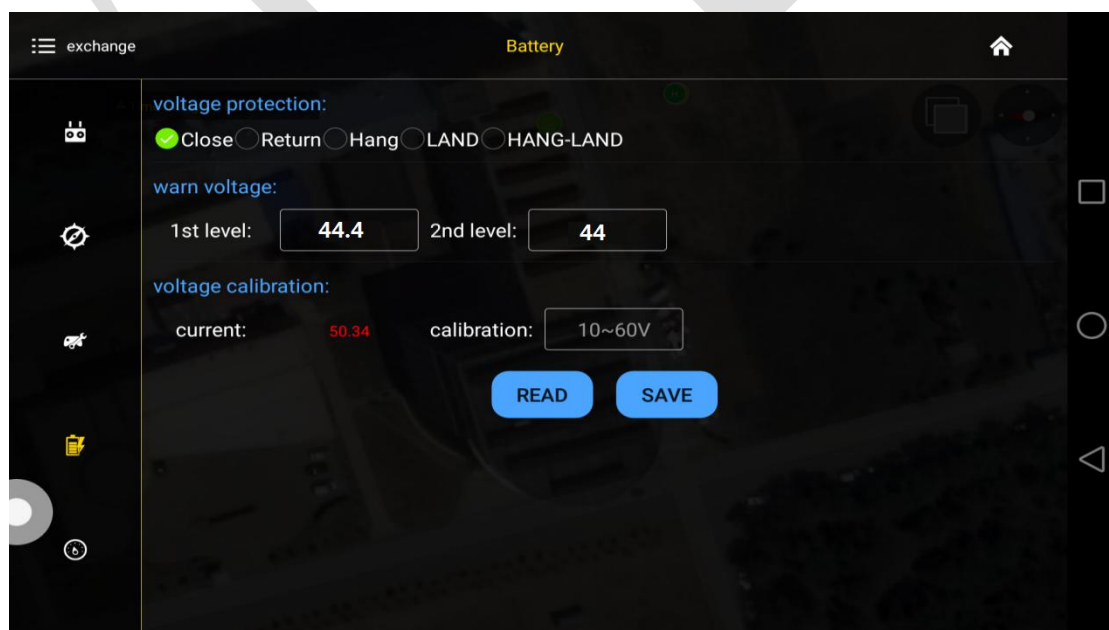
## 5.2.4 Flying Parameters Adjustment



Click the button *READ* to obtain the current flying parameters, click button *SAVE* to save the parameters.

The default number of back landing height is 20 meters, AB swath is 4 meters, route speed is 5m/s.

## 5.2.5 Low Voltage Protection



### 5.2.5.1 Low Voltage Protection Settings

Five voltage protection has been provided:close,return to home point,hovering,auto landing,hovering and then landing. User could choose the one suitable.**The default is auto landing.**

### 5.2.5.2 Alarm Voltage Settings

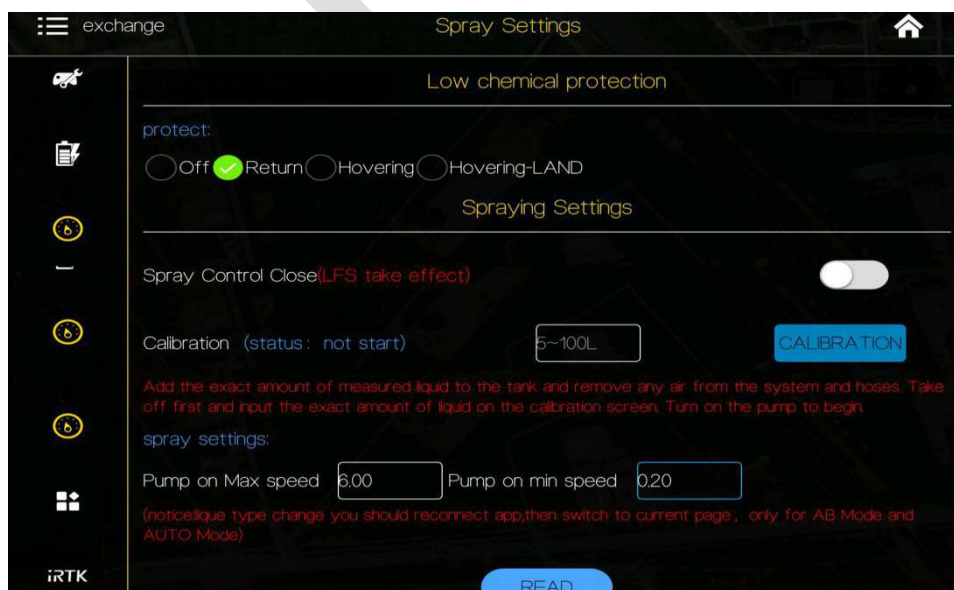
**Settings of first alarm and second alarm.It's recommended to 44.4V for the first alarm and 44V for second alarm.**

LED will flash yellow triple when get to the first alarm level;LED will flash rapidly when get to the second alarm level,copter will react as the low voltage settings,such as return to home or landing.

### 5.2.5.3 Voltage Calibration Settings

Flight controller voltage sensor need to be calibrated if flight controller voltage sensor result is different from real voltage.Real battery voltage should be filled in measured voltage,flight controller voltage will be calibrated by clicking save. **It's unnecessary to set by user as calibration has been done before delivery.**

### 5.2.5.4 Low Liquid Protection



When liquid is nearly out, the following reaction could be set: Off(Close the protection), Return(auto home landing), Hovering, Hovering & landing. The default is Off, which means only LED flash as alarm. **We suggest you to set it on Return option.**

### 5.2.5.5 Spraying Mode

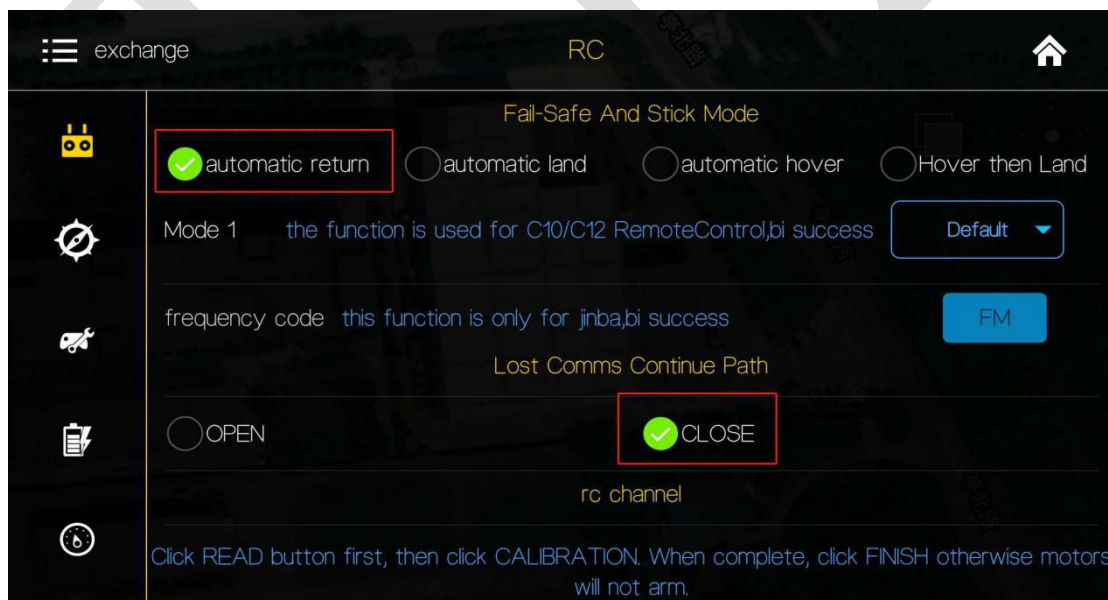
The drone has 2 spraying modes : Combination & Manual mode.

Combination mode: Spraying rate will follow flying speed. Faster speed, bigger flow rate.

Manual mode: Spraying always work under the biggest flow rate when in this mode.

Combination control of the pump,max flow rate match to max flying speed. The maximum default combination number is 6m/s,minimum default combination number is 0.2m/s.

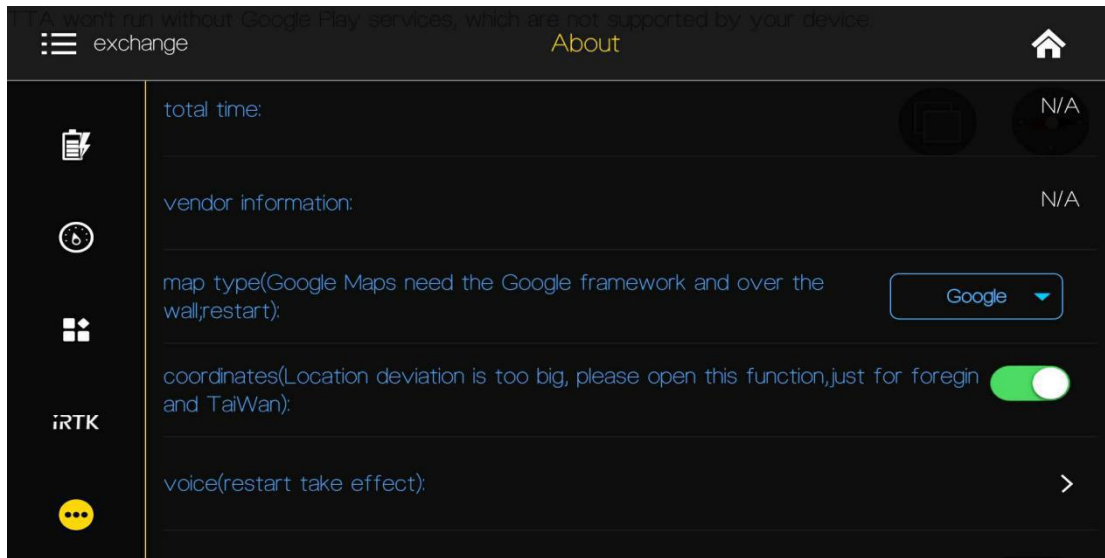
### 5.2.6 Fail-Safe



When lost RC signals, aircraft will enter into Fail-Safe status and execute the set Fail-Safe action. The default set is "*Automatic return*" which means Return To Home automatically. Besides,"*Lost Comms Continue Path*" is used to set whether drone will continue the mission after lost-control during a mission flight. If opened, drone won't execute Fail-Safe

action until its mission has been completed. The default is **Close**.

### 5.2.7 Map & Coordinates Offset



Open **About** interface,choose map type,choose **Google** map.Voice alarm could be openedto prompt the real-time information, such as voltage, GPS, operation etc...**It is suggested to open “coordinates” function if position deviation is obvious.**

## 5.3 Route Establish

Four Automatic Operation modes: **Map Point**, **Dot Equipment**, **Drone Point**, **Phone Dot**.

**Map Point mode:** Dot on a built-in map to plan route.

**Dot Equipment:** Use a Dot Equipment to make boundary points.

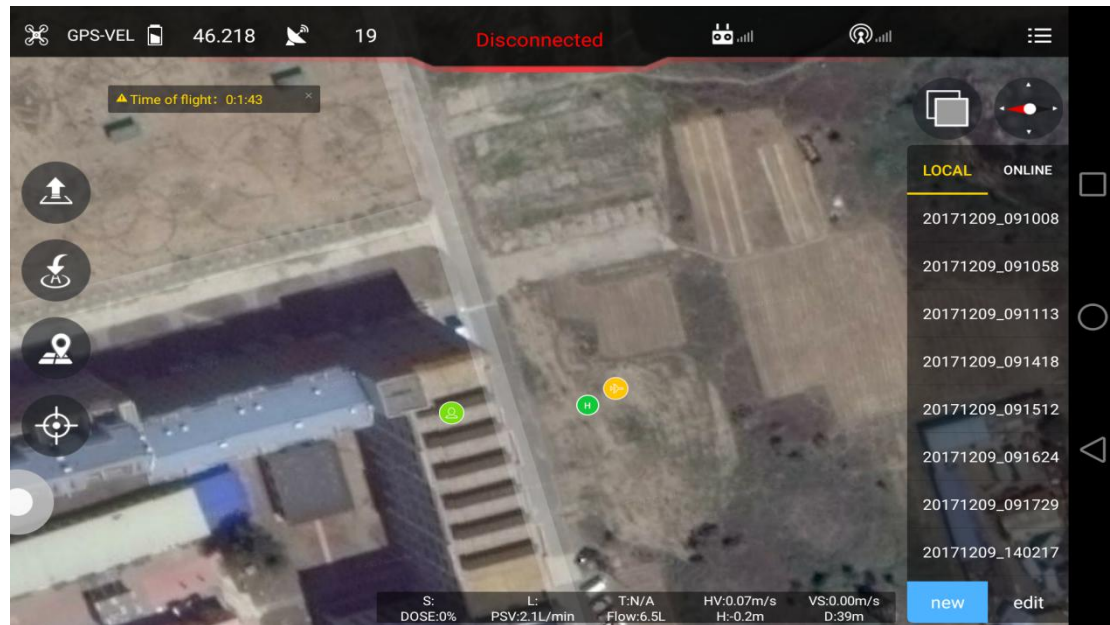
**Drone Point:** Drive drone to mark boundary points.

**Phone Dot:** Use Phone to mark boundary points.

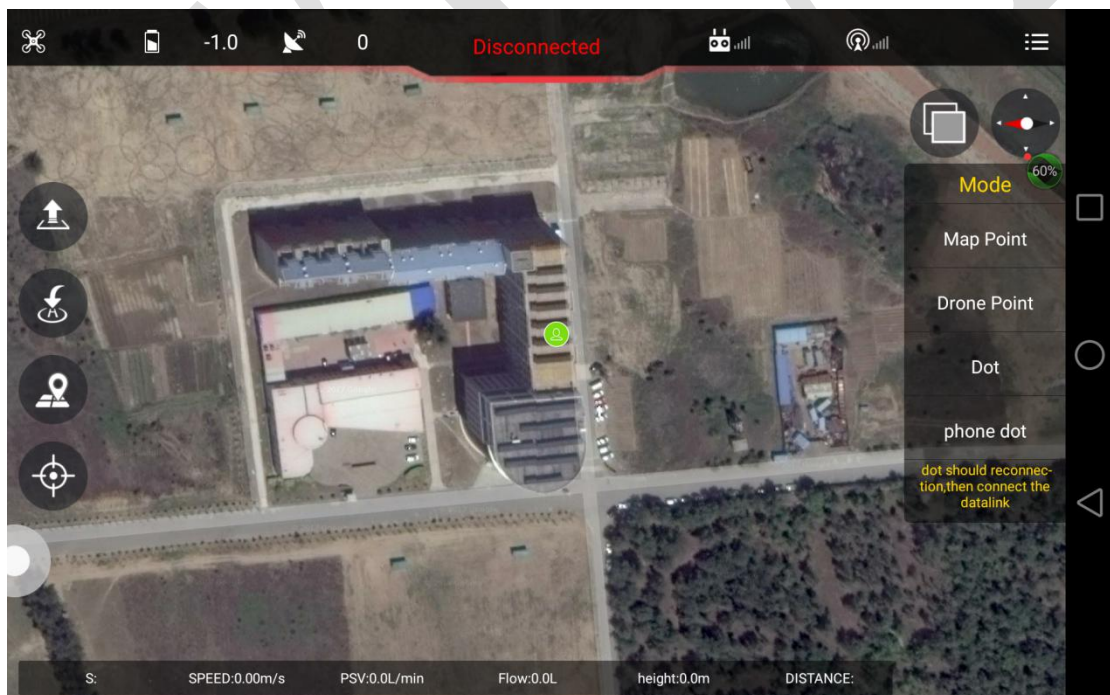
### 5.3.1 Start Route Establish

1. Click  to enter into route interface.

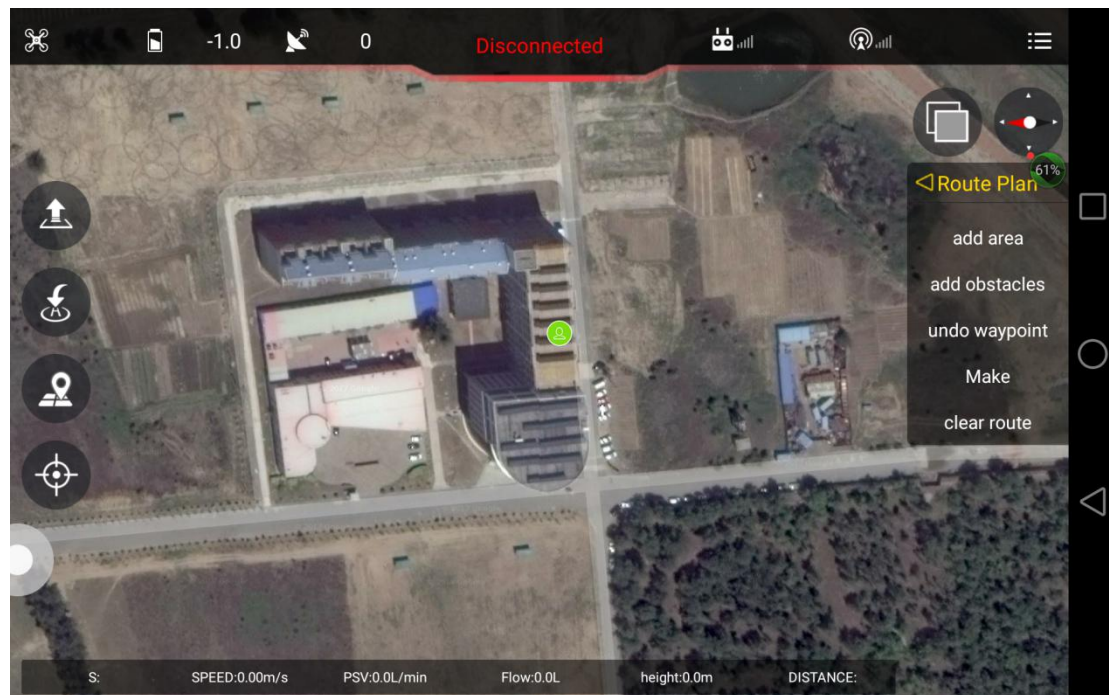




2. Click **new** to name the block and then select point making type.



### 5.3.2 Map point



1) Select **Map Point**.

2) Click **adding area** and click the boundary point on map to set the working area.

Obstacles could be added by clicking **add obstacles**.



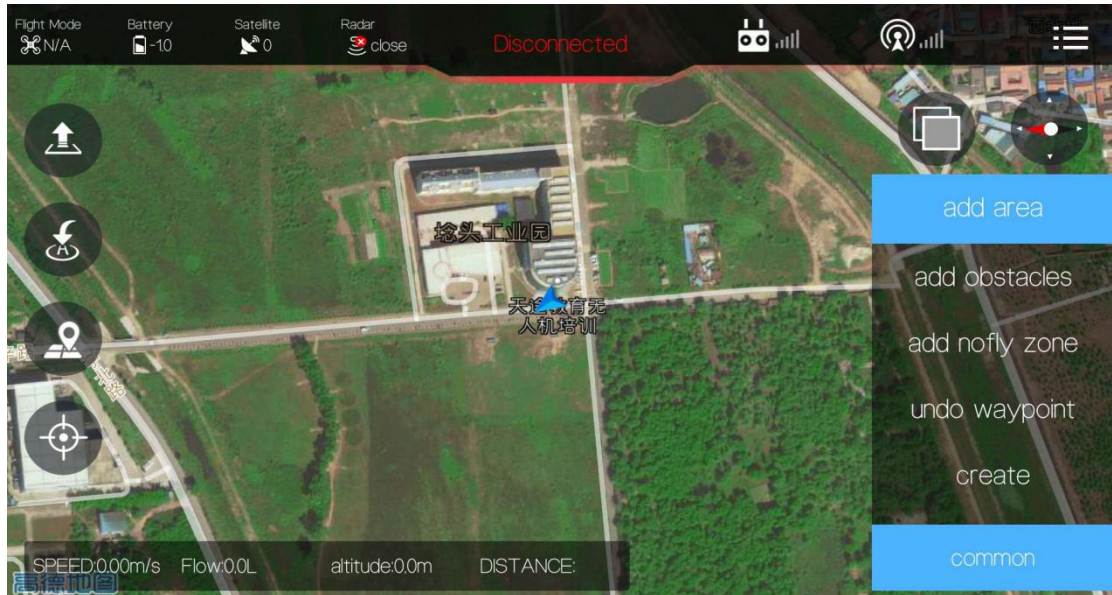
### 5.3.3 Drone Point

1) Select **Drone Point**



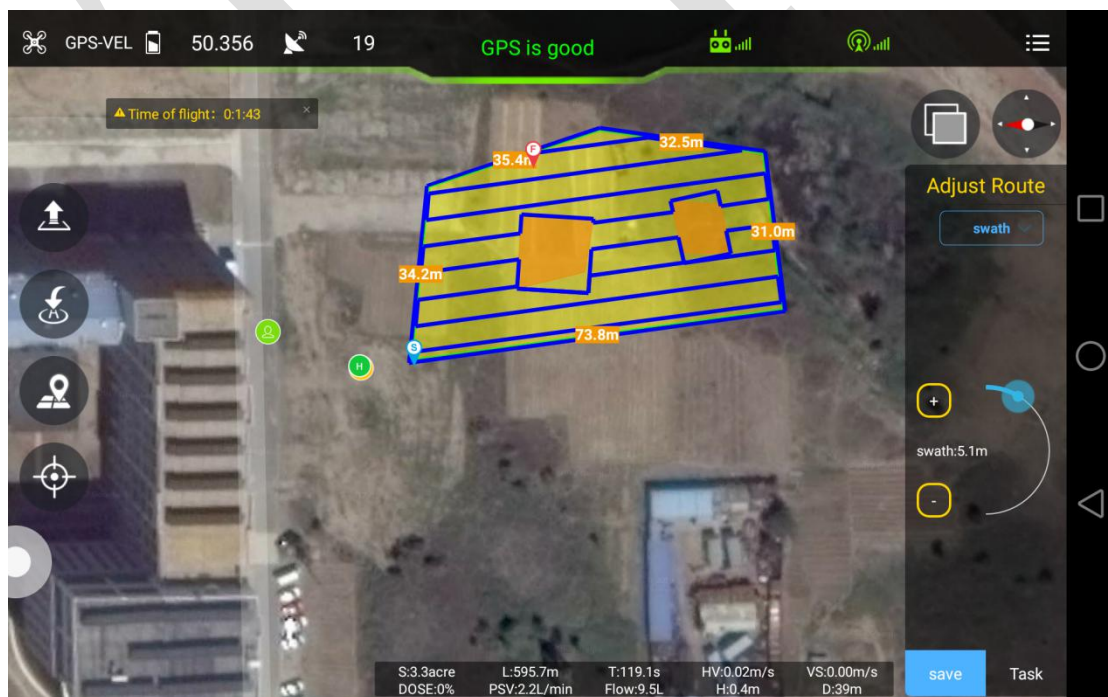
2) Click **adding area** to set working area. Obstacles could be added by clicking **add obstacles**.

3) Fly drone to the first boundary point, Click “**Common**” to make the first boundary point. Then the second, third, fourth...



### 5.3.4 Route Making

Click “**Create**” to confirm the chosen area and enter into “**Adjust Route**” interface.



**Swath**:Distance between 2 spraying routes

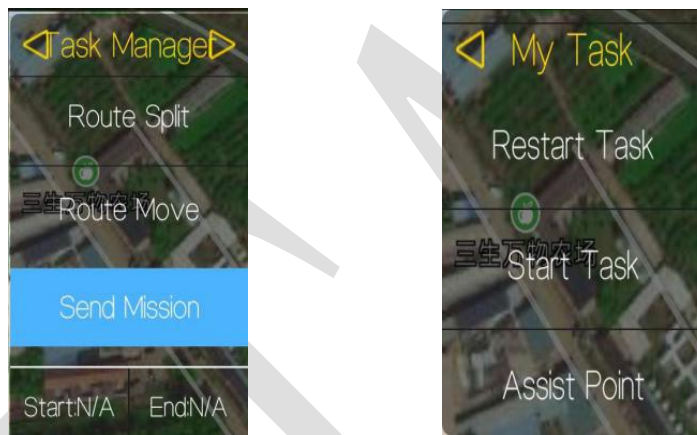
**Obstacle gap:** Distance around the obstacle

**Target gap:** Distance between working area and boundary

**Offset:** Translation of working area

**Save:** Save the task

After editing completed, click **Save** to save the task.



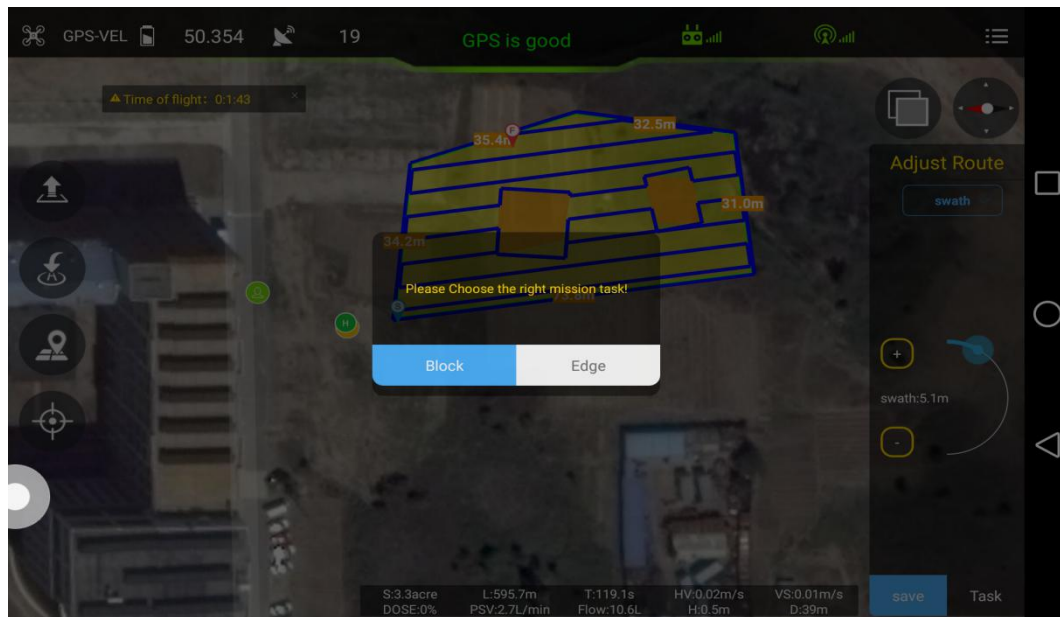
### 5.3.5 Executing Mission

1) Click **Task** to enter into **Task Management** interface. Click “**Send Mission**” to upload the task.

Two Mission Task Modes: **Block** and **Edge**.

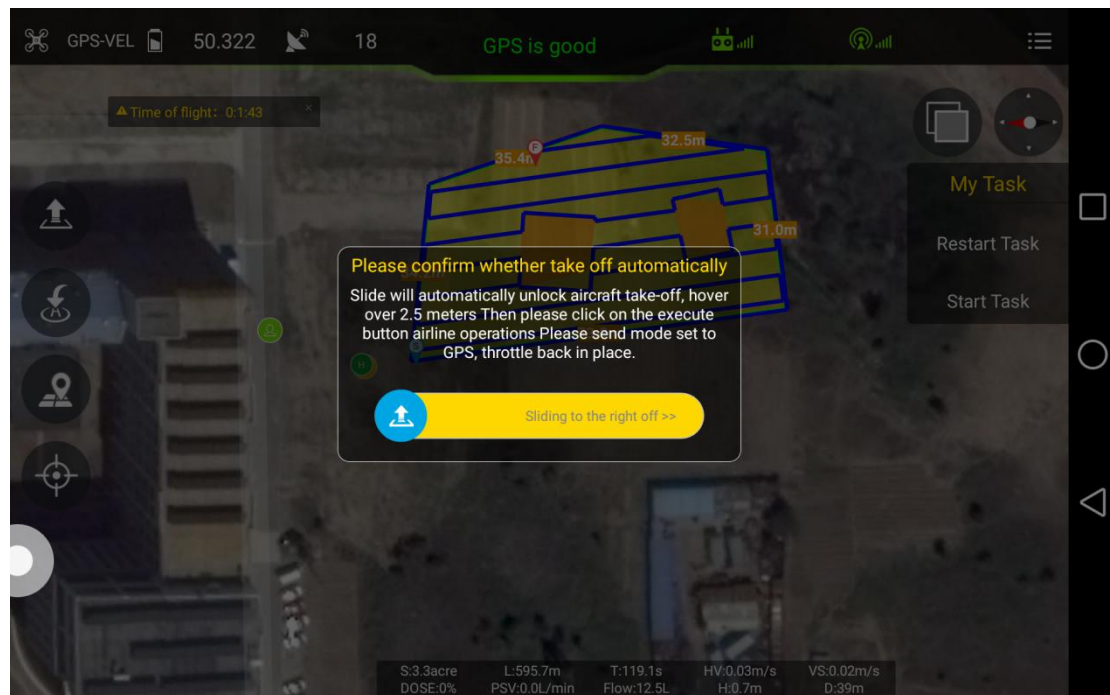
**Block** mode: Drone will only fly along the route.

**Edge** mode: Drone will automatically fly along the boundary line after finishing the route .



2) Click  to take off from GCS or remote controller, click *start task* to execute the route.

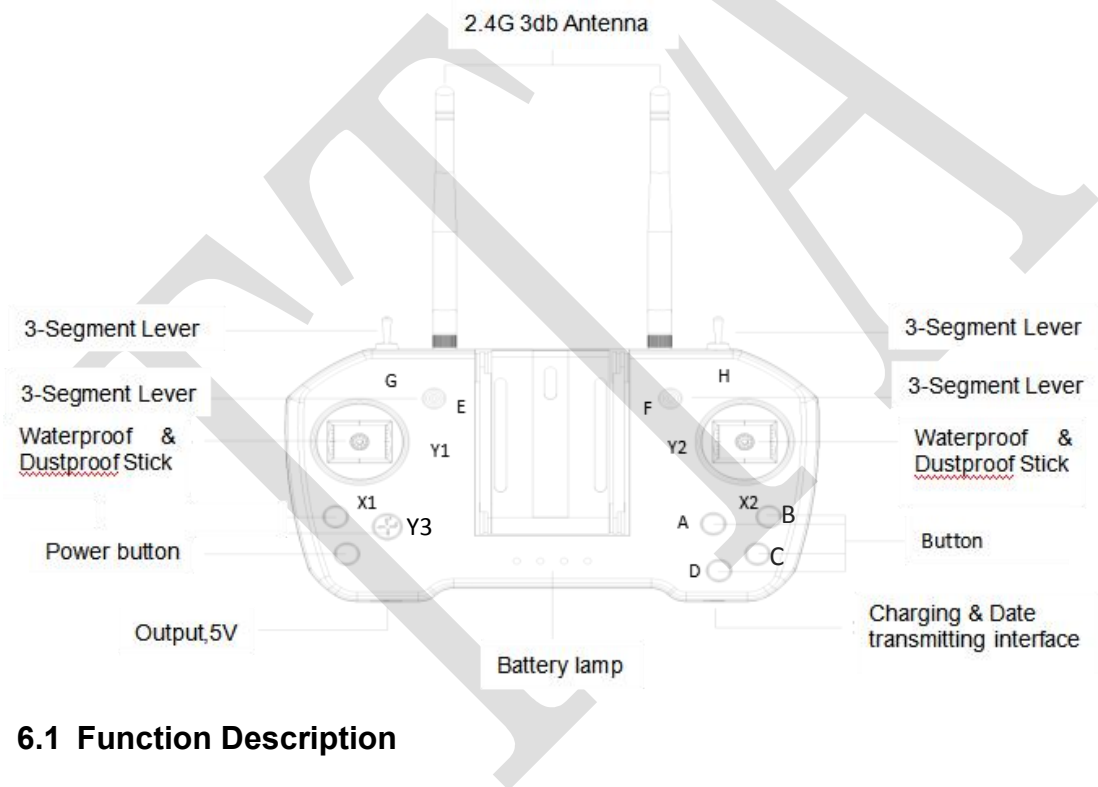




**Rudder** and **Throttle** could be operated during flying, obstacles could also be avoided by moving the **Aileron** stick.

## 6. Remote Controller

- ◆ Charger output more than 5V should not be used.
- ◆ Remote controller charging current should be not more than 2A.
- ◆ Any damaged,smoking or abnormal heating charger should not be used.
- ◆ Charging should not be continued in condition of smoking,smelly,weeping.
- ◆ Charging should not be in the area of baby playing.
- ◆ Charging temperature should not more than 60℃.



### 6.1 Function Description

Channel	Top	Middle	Bottom
E: Flying mode	Attitude mode	GPS mode	AB mode
F: AB recording	/	Recording Point A	Recording Point B
Y3: Flow rate	Higher	/	Lower
D: Home landing	OFF	/	ON
Channel	Left	Middle	Right
G: Pump mode	OFF	Combination	Manual
H: Terrain following	ON	/	OFF

## 6.2 Bind

Before binding, remove all propellers for safety.

- ◆ Power on drone for 1 second and cut off immediately, repeating this step for five times. Then power on the drone for the sixth time and keep the power connection. Drone will enter into binding mode automatically.
- ◆ Power on remote controller. Drone will bind the remote controller successfully with seven beeps from the remote controller.

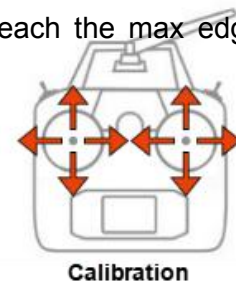
Remote controller need to be calibrated after binding.

Remark: Binding remote controller can not be operated for more than one pair at the same time. Only one-to-one pairing is allowed.

## 6.3 RC Hardware Calibration

The following method is to calibrate the channels of RC itself.

- 1) keep pressing both button C and button D until switching on the power of Remote Control successfully.
- 2) After power on, give a long press on the button D until hearing continue beeping.
- 3) Start to do joystick calibrating:
- 4) Move the joysticks around in cycle and make sure they reach the max edge / corner.
- 5) Leave the joysticks back to center.
- 6) Move the switches up and down to calibrate the them.
- 7) Give a long press on the button D to end the RC calibrating state and the continue beeping will be stopped at the same time.



## 6.4 RC connection and Device Helper.APP Introduction

- 1).Turn on remoter controller ( short-press + long-press ). Open bluetooth, search and connect bluetooth of remote controller ( T12-\*\*\* , password: 1234).
- 2).Device Helper introduction.

ADJUST PARAMETERS ----- Adjusting channels, rudder value, fail-safe value.

OTHER OPTIONS ----- Selecting SBUS or PPM output mode of receiver, and telemetry

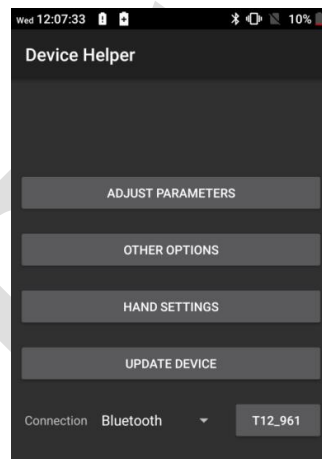
baud rate.

HAND SETTINGS ----- Select hand mode, USA, Japan ect.

UPDATE DEVICE ----- Update firmware online

Connection mode ----- Bluetooth mode, SBUS receiver mode.

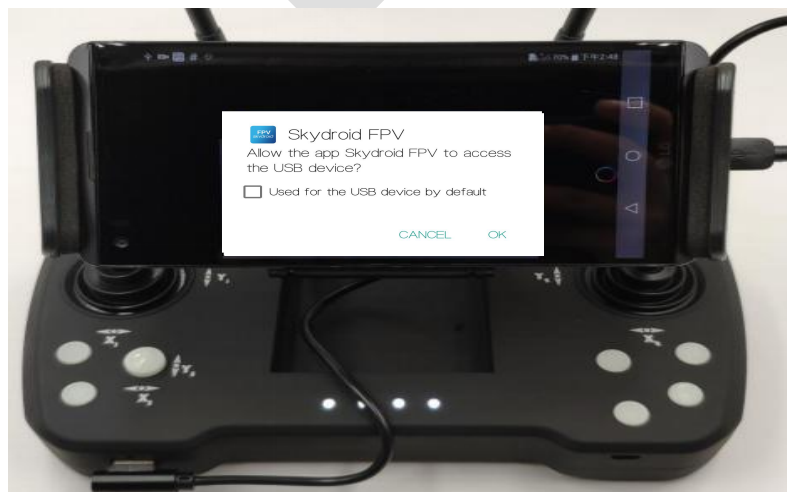
Cautions: Don't do any adjustment, unless under professional introduction. Otherwise, any consequences caused are undertaken by its users.



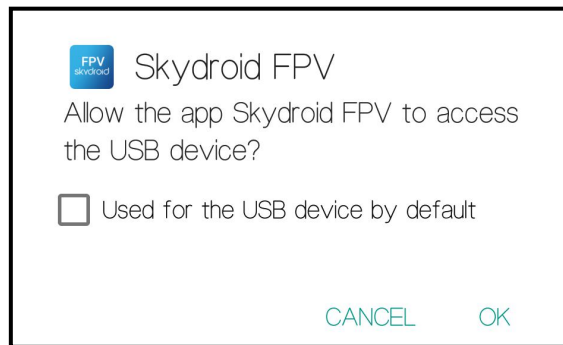
## 6.5 Video Transmitter Introduction

1) Download and install FPV.APK into user's phone. FPV.APK link:  
[https://www.ttaviation.org/wp-content/uploads/2019/09/M4EM6E-1M6E-XM8A-Pro-2.46.APK\\_.zip](https://www.ttaviation.org/wp-content/uploads/2019/09/M4EM6E-1M6E-XM8A-Pro-2.46.APK_.zip)

2) Open OTG function of cellphone to give permission of data transmission. Connect the phone and remoter controller with USB cable. Power on the drone.

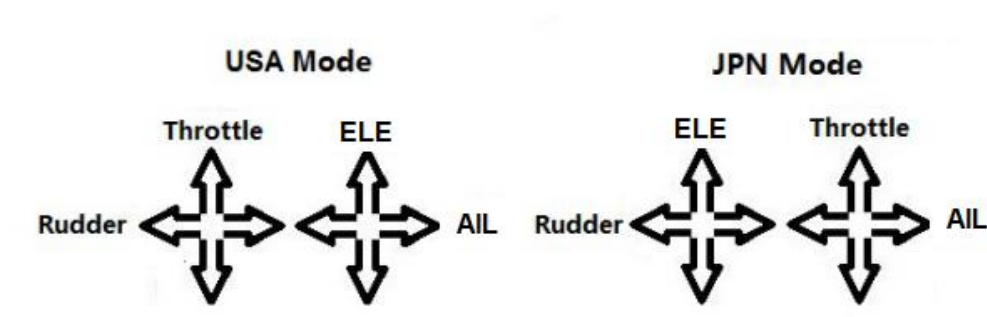
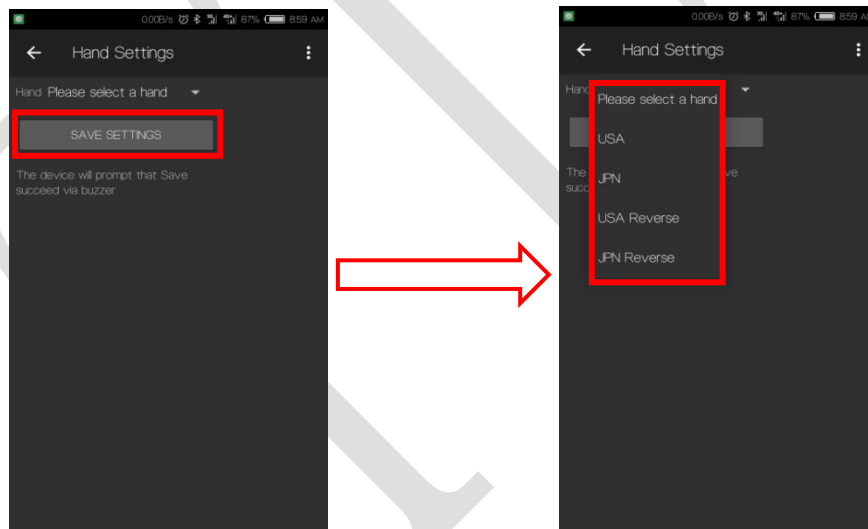


3) Video will be displayed on the phone after user click the 'OK' option.



## 6.6 Hand Mode Settings Introduction

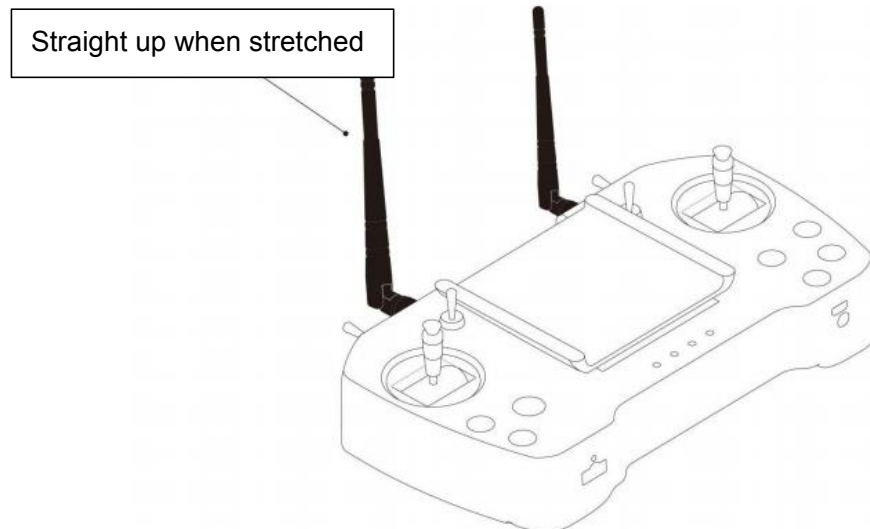
- 1) Connect user's phone, remote controller and drone
- 2) Open Device Helper.APP, click HAND SETTINGS and select hand mode: USA or JPN.



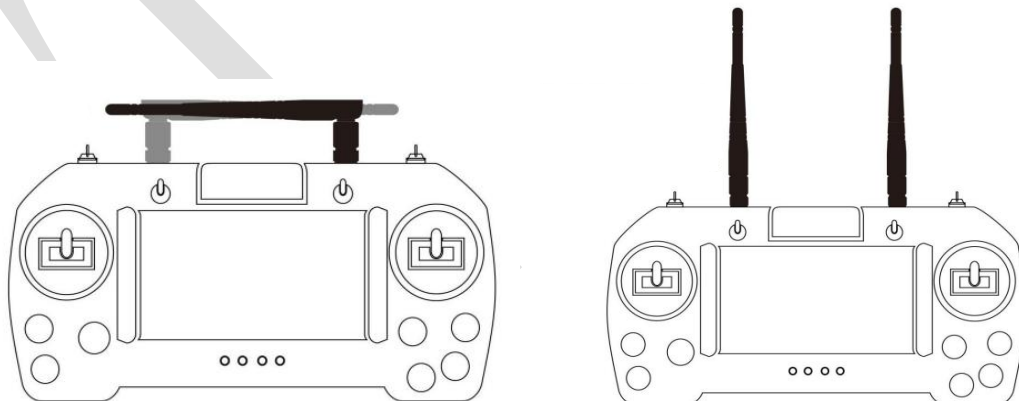


## 6.7 Remote Controller Antenna

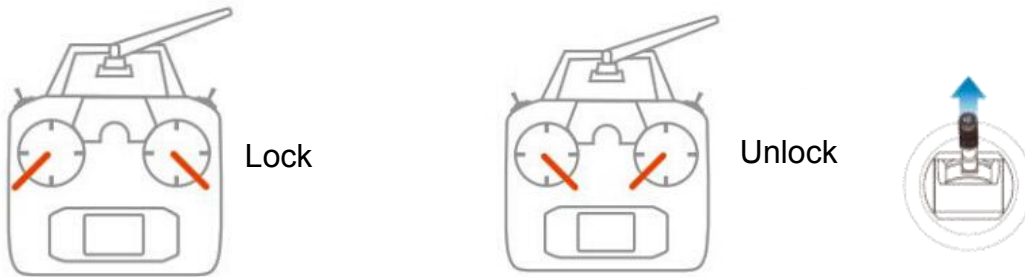
Remote controller antenna should straight up when it is stretched.



Caution: Incorrect directions as the two pictures below.



## 6.8 Flight Control



- 1) Pull control sticks to the bottom inside corners to unlock drone. **Meanwhile, Keep away from the drone to avoid any injuries.**
- 2) Pull control sticks to the bottom outside corners to lock drone(**only for emergency use**). While flying, this operation can also stop motors immediately).
- 3) After unlocked, push the throttle above the neutral position to make the aircraft take off.
- 4) After unlocked, motor will be stopped and locked automatically if user do not push the throttle above the 10% position from neutral in 3 seconds.
- 5) After landing the aircraft, push the throttle down and hold for 3 seconds. The motors will be stopped.

### Cautions:

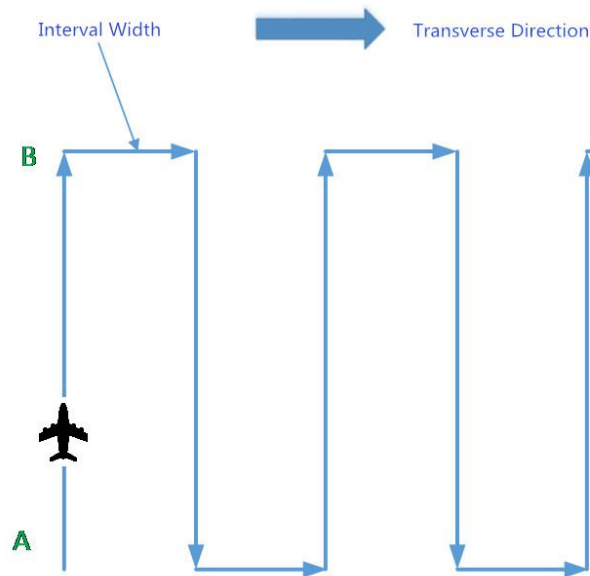
1. It is suggested to take off in **GPS mode** if satellites is more than 14, no magnetic field interference and all parts of aircraft are in good condition.
2. Before take off, please check the **stick mode** and confirm the current settings is the mode you want. If not, never reset by yourself without the introduction of TTA after-sales engineer.
3. During autonomous mode or AB mode, missions can be **interrupted** by switching the flight mode manually . After that, operator can **fully control** the aircraft.
4. When drone executes protection action such as low-voltage protection and low-liquid protection, operator can **take over control** by switching the flight mode manually if needed.

## 7. Function Control

### 7.1 Flight Mode

Flight mode	Instruction	Operate	Condition
Attitude mode	Horizontal stabilization, yaw locked, fixed altitude	By transmitter	GPS satellite enough, LED does not flash red
GPS mode	Fixed horizontal point,yaw locked,fixed altitude	Transmitter operation/ / others	GPS satellites enough,LED does not flash red
AB mode	Copter will fly and spray along with AB point	Record point A and B and switch to AB mode,choose left or right for rolling	GPS satellites enough, LED does not flash red
Return mode	Copter will fly back to home point automatically,then descend slowly, it could be controlled after arriving on the top of home point except throttle	Press button Home continuously/empty tank reaction/low voltage reaction/ reaction of losing transmitter signal	GPS satellites enough, LED does not flash red

## 7.2 AB Mode



AB mode is a more simple efficient mode with fault tolerance to operate. The working theory is above in the picture. Record the point A and B, the UAV will plan the flight line like this.

### 1. Operate Steps:

- 1) Record the point A, switch the mode to GPS mode. Until the drone self-hovering steadily, switch F to "Point A memorized". After that, the LED flash yellow for 2 seconds. The controller have voice prompt.
- 2) Record the point B, drive the drone to the position you want, **be sure it is at least 10 meters away from point A**. Until the drone self-hovering steadily, switch F to "Point B memorized". After that, the LED flash yellow for 2 seconds. The controller have voice prompt.
- 3) Select the direction, switch E (Flight mode) to AB mode, move the roll joystick to select the roll direction. Move the joystick to the left limitation, the drone rolls to the left side, move the joystick to the right limitation, the drone rolls to the right side. While the drone doing AB point flight mode, the user can stop controlling the joystick. **Make sure the water is enough, the pump is under auto-controlled or manual-controlled.**

#### 4) AB Mode Correction

- ①Altitude correction:Control the flight altitude by the throttle joystick, “up” for the drone to rise, the “down” for the drone to set ;
- ②Correct the the rudder to control the direction;
- ③Adjust point A:while the drone moving from point B to Point A,push up the pitch stick to move point A closer to point B,push down the pitch stick to move point A further away from point B.
- ④Adjust point B:while the drone moving from point A to Point B, push down the pitch stick to move the point B further away from point A,push down the pitch stick to move point B closer to point A.

#### 5) Shut Down and Quit

- ①When set the “no pesticide” action to self-hovering or return,in AB mode this function still works.
- ②When set the “low battery” action to return,in AB mode the this function still works.
- ③After the spraying work is done,AB mode can be shut down by switching into altitude mode.

- 6) To return to the breakpoint, after broke the AB mode route automatically or manually. Filling the pesticide in the tank and taking off, then switch E (flight mode)to AB mode directly ,the drone would return right to the breakpoint.

#### 2. Delete dates of Point A and B

Move stick F (AB recording) for 4-5 times rapidly,LED alternately flash red green and yellow,AB mode dates deleted.**Without deleting dates of last AB point,can not set new AB point.**

#### 3. Set the Interval Width

From the software->Flight parameters to set the spraying width and working speed

**Attention:**

- 1) Be sure to start AB mode within turning on the pump and agitation function working.
- 2) Be sure it is at least 10 meters away from point A to point be.
- 3) Every time recording point A and B, be sure to wait until the drone self-hovering steadily in GPS mode.
- 4) Without removing last AB point, can not set new AB point.

## **Appendix I      Key Parts Maintenance**

### **1.Propellers**

(1) Blades of propeller should keep intact. If there are any cracks or missing parts, the propeller should be replaced.

(2) Tightness of all the blades should be suitable and be similar. Replace the propeller gaskets/washer with new ones when blades cannot spin smoothly.

(3) Blades should be folded well and be held by the blade holder or belts after flight, and should be released and put straight before take off.

### **2.Motors**

(1) Motors should be or be suggested to be replaced:

(2) Before the rotor clearance get loose or running after 3000 hours.

(3) The rotor movement get blocked.

3.ESC should be or be suggested to be replaced:

(1) When Esc output obviously different from other ones.

(2) Damaged in crash

4.Flight Controller should be or be suggested to be replaced:

(1) When IMU is not able to be calibrated to normal.

(2) When the I/O ports is not capable to communicate with other devices on drone as normal as before.



## Appendix II Implication of Indicator

Items	Indicator light	Priority
Flying Mode		
Gyro mode(stabilization,attitude)	Green light single flash●	Low
GPS mode (angle,speed)	Green light double flash●●	Low
AB mode	Green light triple flash●●●	Low
GPS		
GPS unconnected/GPS receive no satellite	Red light triple flash●●●	Low
GPS bad signal	Red light double flash●●	Low
GPS general signal	Red light single flash●	Low
GPS Good signal	Red light off ○	Low
Low Voltage Warn(alarm)		
First alarm level	Yellow light triple flash●●●	Low
Second alarm level	Yellow light quick flash●●●●●	High
Compass Calibration		
Horizontal calibration	Yellow light constant light●——	Middle
Vertical calibration	Green light constant light●——	Middle
Calibration failed	Red light constant light●——	Middle
Calibration succeed	Red,green and yellow light alternating flash●●●	Middle
Accelerator Calibration		
Calibrating	Red,green and yellow light alternating flash●●●	Middle
Calibration succeed	Green light constant light●——	Middle
Error		
Remote controller lose control	Red light quick flash●●●●●	High
Compass interfered/error	Yellow and green light alternating flash●●●●●	High
GPS lose satellite/error	Red and green light alternating flash●●●●●	High
IMU over vibration/error	Red and yellow light alternating flash●●●●●	High
Other Situations		
Initializtion of power on	Red,green and yellow light alternating flash●●●	High
Unlock	Red,green and yellow light alternating flash●●●	High
Unlock failed	Red light constant light●——	High

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4. Once you start using this product, deemed as you have read, recognized and accepted the product specification, disclaimer and terms and conditions of all safety instructions. It's user's commitment to their own behavior and therefore is responsible for all the consequences. Users promised to use this product only for legitimate purposes, and agree to these terms and any others policies or guidelines TTA company may develop .
5. In the process of using this product, please be sure to strictly obey the safety instructions included in this document but not limited in it. For violations of the safety information we have informed and cause any personal injury, accident, property damage, legal disputes, conflicts of adverse events, and all others relevant responsibilities, the loss should be borne by the users themselves, TTA company will not bear any responsibility.
6. In the following situations, we do not provide any technical support and security commitments:
  - A) through informal agents or improper access to this product units or individuals;
  - B) the unauthorized modification, debugging, and replacement parts products.
  - C) warranty card, serial number, or flight data lost;
  - D) due to personal error caused personal injury and property damage.

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