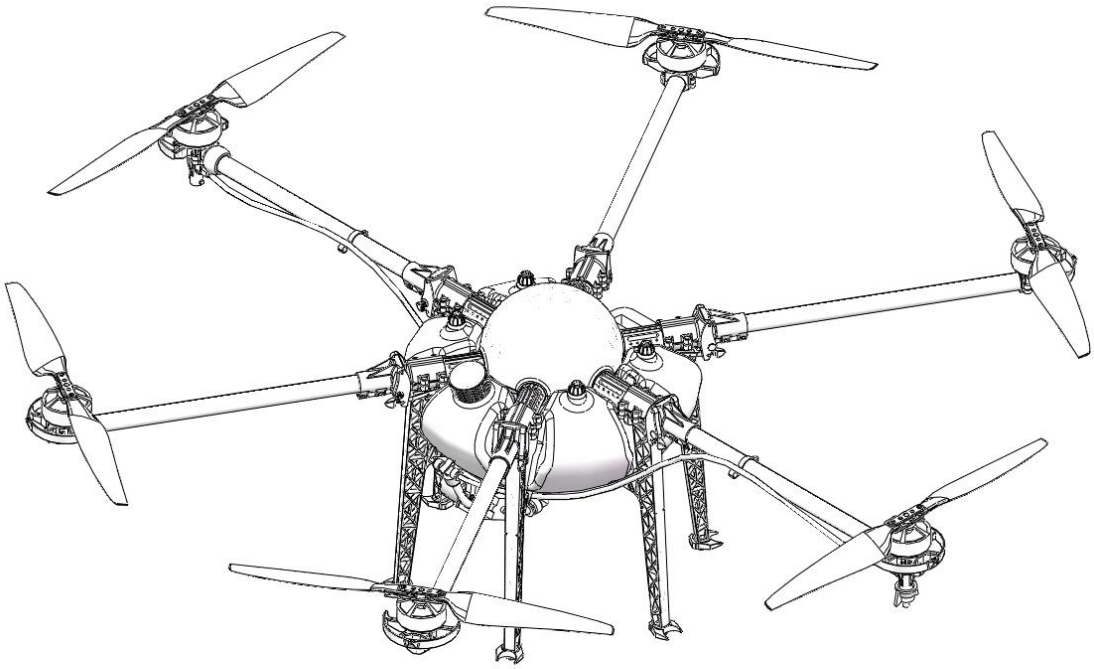
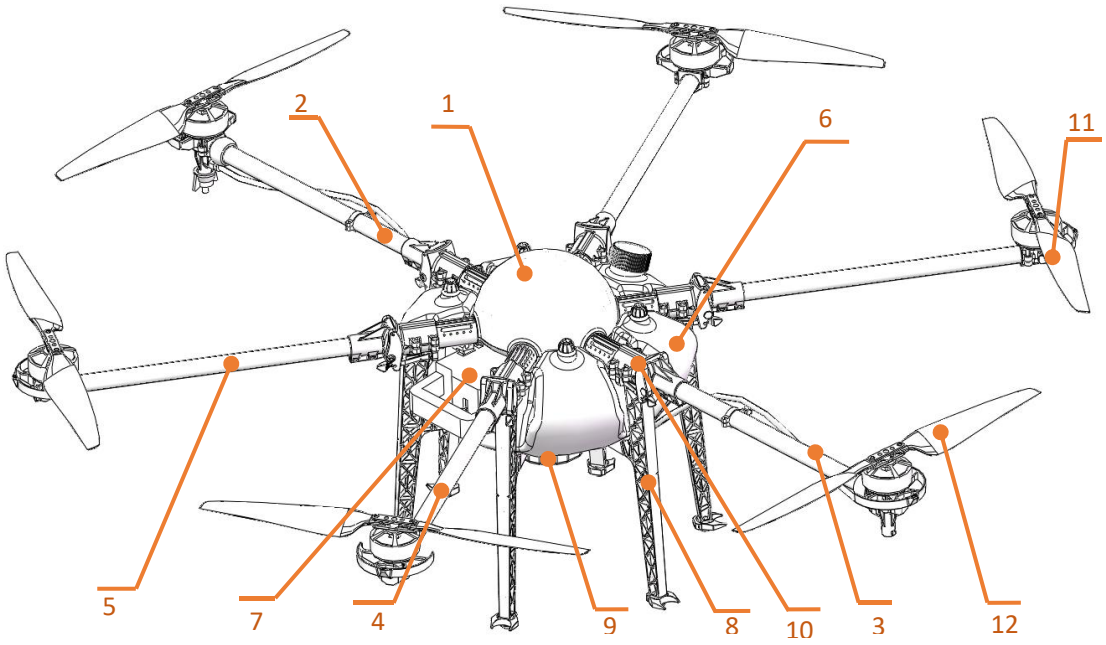
# M6E-1 Manual



Beijing TT Aviation Technology Co.,Ltd.




## TIANNONG M6E-1 Structure Picture

| Item | Component | Item | Component |
|---|---|---|---|
| 1 | Fuselage | 7 | Intelligent Battery |
| 2 | Clockwise Arm with LED | 8 | Landing Gear |
| 3 | Counter Clockwise Arm with LED | 9 | Functional Tank Lid |
| 4 | Clockwise Arm | 10 | Arm Joint(Fuselage) |
| 5 | Counter Clockwise Arm | 11 | Propeller（clockwise） |
| 6 | Water Tank | 12 | Propeller（Counter clockwise） |

# Catalogue

# 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 , tied, 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℃-40℃.
- 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 5ometers, 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.

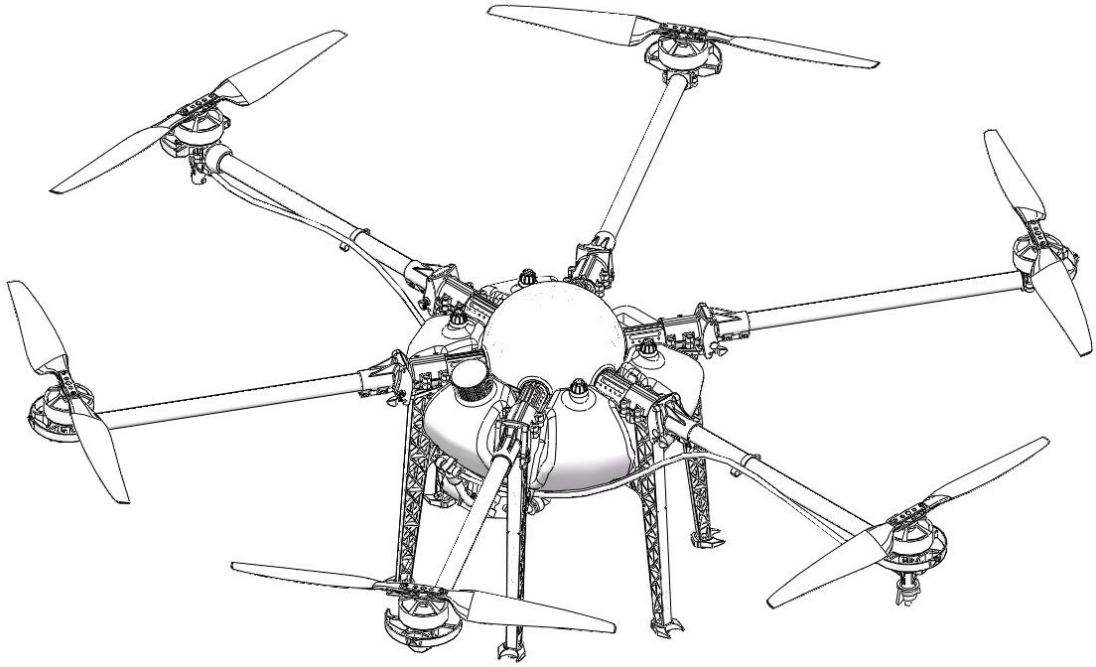
- When it is powered, please stand in the safe distance of above 10 meters.
- Ensure the propellers completely stop and power off.
- Please switch it to the manual operation mode when errors happen. When the manual operation mode does not work, please press the emergency bottom. Please keep away from 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 far away from the previous one.

# 2. Product Introduction

TIANNONG M6E-1, the multi-rotor UAV, is the most economic integrated solution for all the agriculture spraying services. This UAV is waterproof and easy to repair, long-time flight with high-strength & light fuselage material. 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 proves the best performances of this UAV.



## 2.1 TIANNONG M6E-1 Parameter

| | | | |
|---|---|---|---|
| Weight (without battery) | 9KG | Max Pitch Angle | ≤35° |
| Standard Takeoff Weight | 23KG | Best Spraying Speed | 4--6m/s |
| Max Takeoff Weight | 24KG | Max Spaying Speed | 10m/s |
| Max Thrust-weight Ratio | 2.25(Flying weight23Kg) | Working Time | 6--12min/ flight |

| | | | |
|---|---|---|---|
| Battery | TTA Intelligent Battery(12S) | Max Climbing Speed | 5m/s |
| Max Power | 12000W | Max Landing speed | 3m/s |
| Hovering Power | 3100W | Max Flying Speed | 15m/s |
| Hovering Time | Empty flight ≥25min<br>Full flight ≥7min | Recommended Working Temperature | 10-35C° |
| Hovering Accuracy | Horizontal ±1.0m<br>Vertical ±0.5m | Max Anti-wind Strength | 12m/s |
| Spraying Height | 2--4m | Max Flying Altitude | 3500m |
| Max rotation angle | 360° | Best Storage Temperature | 10-25C° |

## 2.2 TIANNONG M6E-1 Agriculture UAV Specification

| | | | |
|---|---|---|---|
| **Frame** | | Diagonal Wheelbase | 1290mm |
| | | Arm Length | 435mm |
| | | Unfolded Height | 465mm |
| | | Folded Height | 601mm |
| | | Folded Width | 400mm |
| | | Sprayer Distance | 1290mm |
| **Power System** | Motor | Motor Model | TTA6215 |
| | | Stator Size | 62mm |
| | | KV | 180KV |
| | | Max Thrust | 9KG |
| | | Max Power | 2000W |
| | | Weight | 325g |
| | ESC | Max Continuous Working Current | 50A |
| | | Max Peek Current(3s) | 100A |
| | | Max Voltage | 14S Lipo |
| | | Working Voltage | 12S(44--50.4v) |
| | | Working Pulse Width | 1000--2000us |
| | | Compatible Signal Frequency | 50--400Hz |
| | | Drive PWM frequency | 400Hz |
| | Foldable Propellers | Material | High strength engineering plastic |
| | | Diameter /Screw pitch | 2280 (L=558.8mm) |
| | | Weight | 95g |
| | Battery | Capacity | 14000MAh |

| | | | |
|---|---|---|---|
| **Spraying System** | Water | Payload | 10L |
| | Sprayer | Model No. | Pressure Type ( Sector) |
| | | Quantity | 2 pcs |
| | | Sprayer Diameter | 1.0-2.0mm |
| | | Spraying Speed | 4--6m/s |
| | | Spraying Volume | 1.8--2.2L/min |
| | | Spraying Width | 4-6m (up to height) |
| | | Spraying Droplet Diameter | 80--200μm（adjustable） |
| Remote Controller | Remote Controller | Model No. | R3 |
| | | Working Frequency | 2.4Ghz |
| | | Charging time | 10h |
| | | Effective Signal Distance | 800m |
| | | Battery capacity | 3.7V,3000mAh |
| | | Charging type | direct |
| | | Charging time | 5-10h |
| | | Working Environment Temperature | 0--40C° |
| | | Best Storage Temperature | 10--25C° |
| | | Best Charging temperature | 10--25C° |

## 2.3 Preparation Before Takeoff

2.3.1 Installation of the Fuselage,water tank and landing gear.

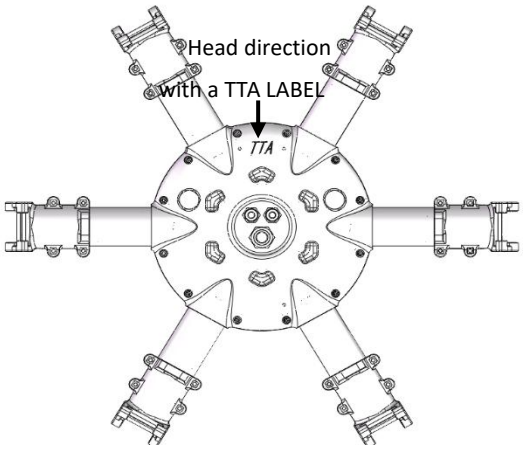



Figure 1

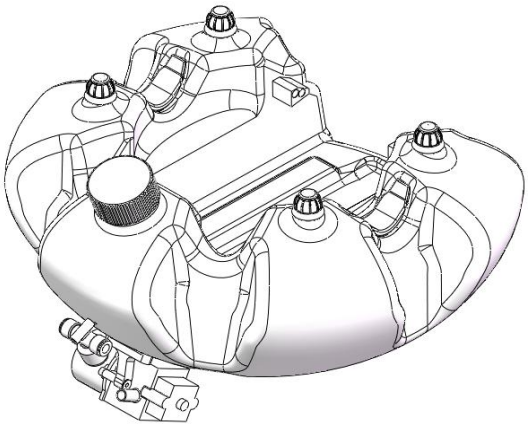


Figure 2

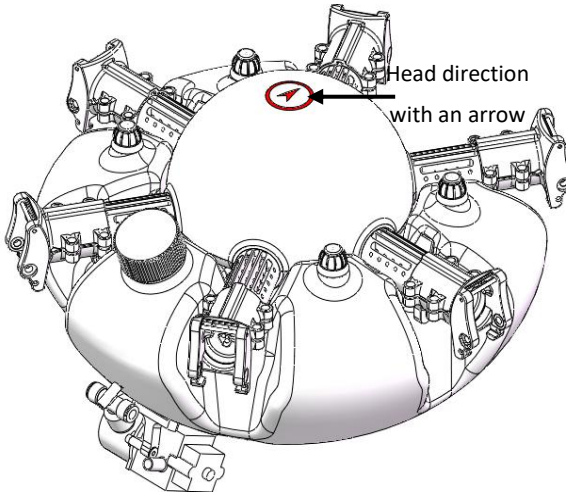



Figure 3

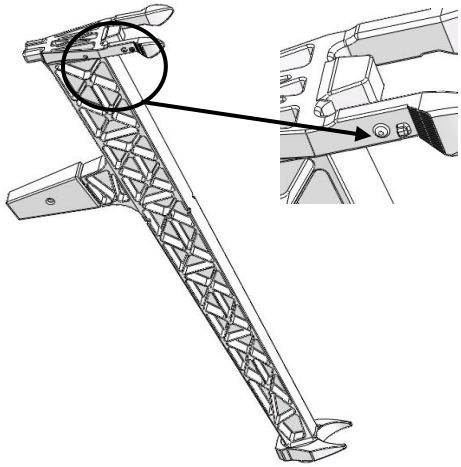


Figure 4

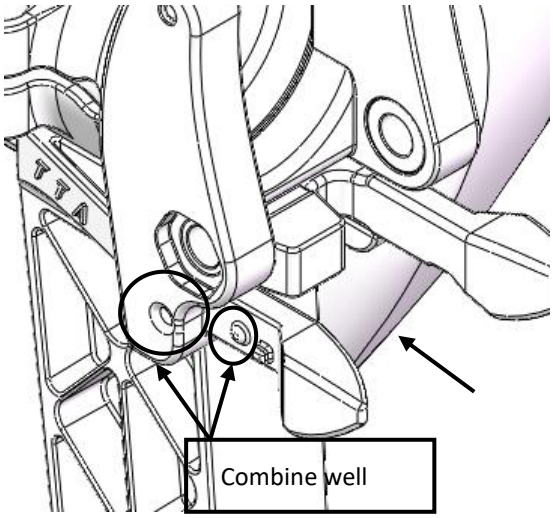



Figure 5

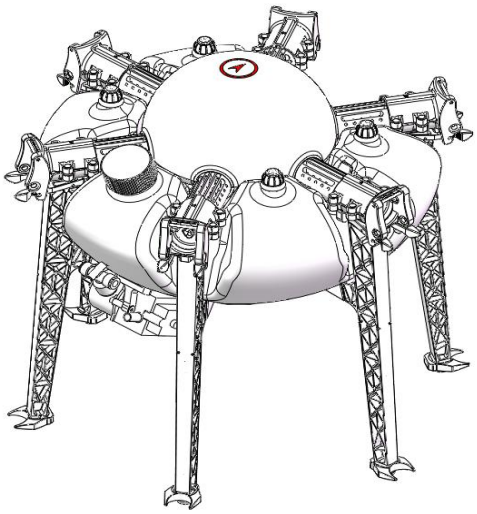


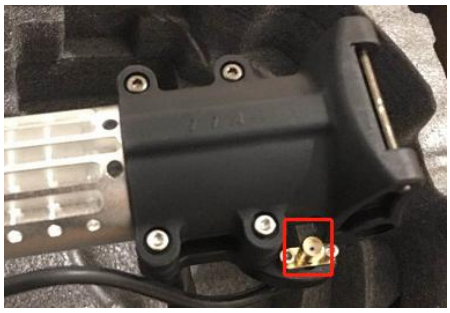
Figure 6

Marking on the corresponding position of the fuselage and water tank kit as the Figure1-2.**(TTA label is the head direction,tank lid is the tail direction)**

1) Put the fuselage bottom upward as the Figure1.
2) Install the fuselage and the water tank kit according to the mark ,1-3,2-4. It will be completed like Figure3.
3) Marking on the corresponding position of the 6 landing gears as Figure 4.
4) Slip the landing gear gently into the fillister mark 7. of fuselage as the “Mounting Direction” arrow of Figure5. Make the bulge mark 5. stuck into the fillister mark 8 and the part mark 6 get into the fillister mark 9 as the “Limit Direction” arrow to complete the installation.
5) The rest 5 landing gears should be installed as above. It will be completed like Figure 6.

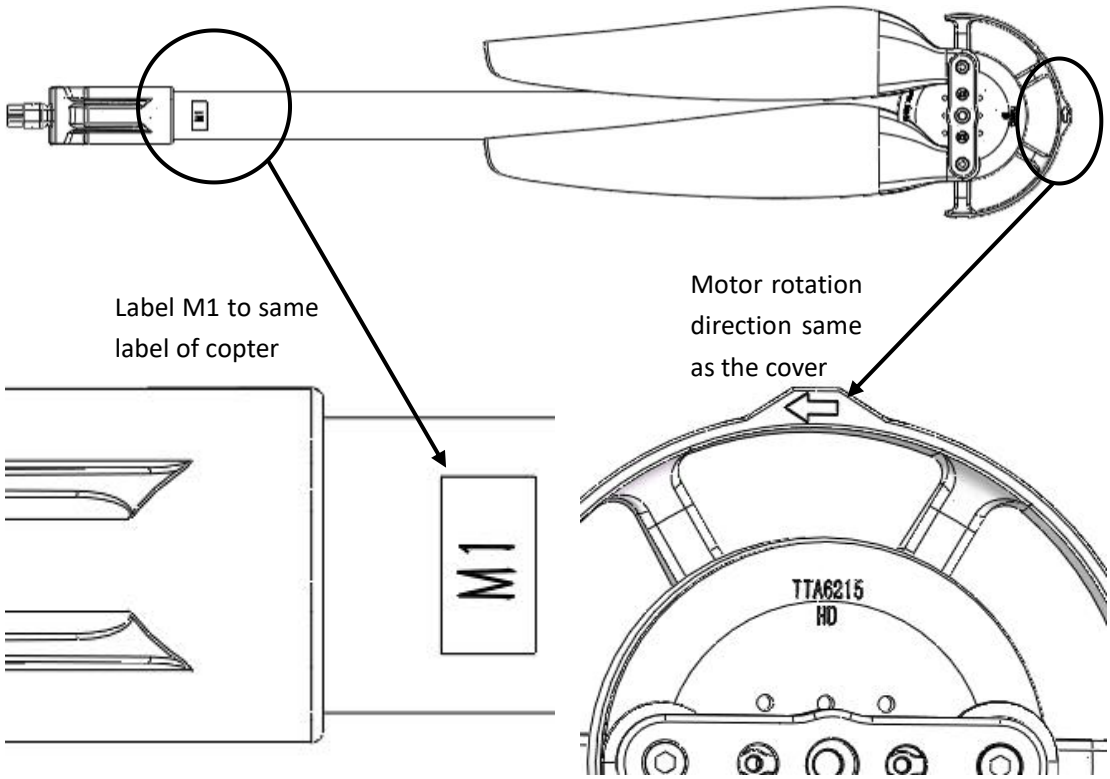
There are two black antenna on the package,one is for receiver,another is for datalink,it could be exchanged.

These antennas should be installed at the position of pictures.

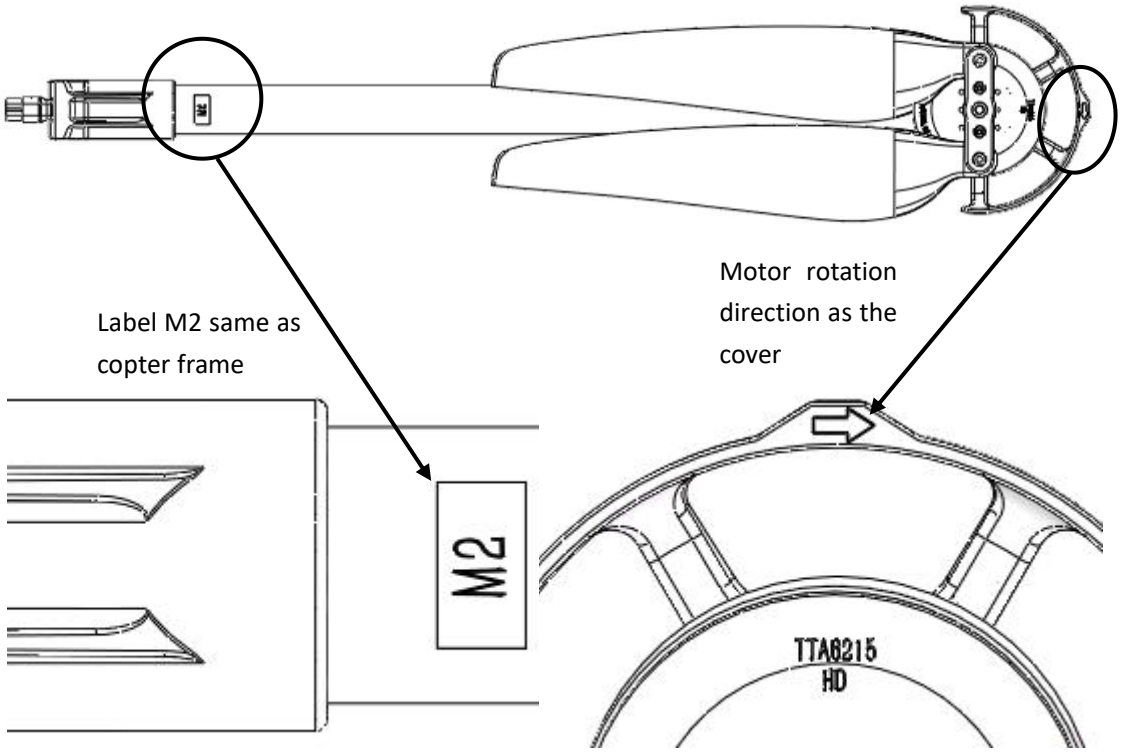


### 2.3.2 Arm Installation

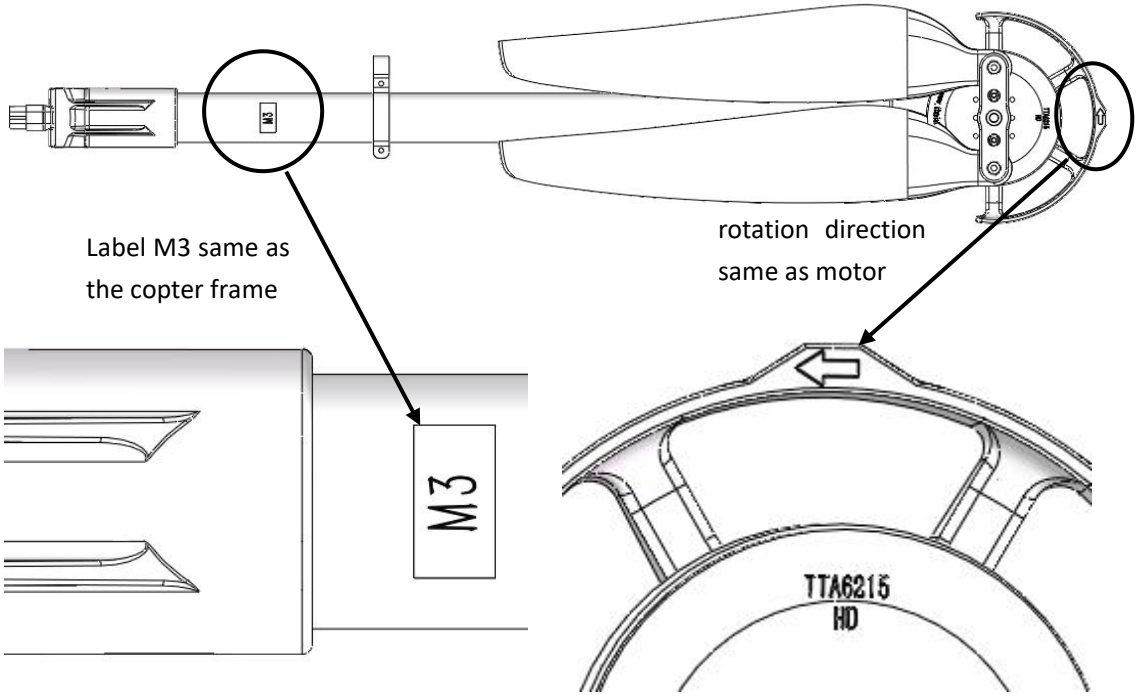
Make all the arms ready: 1 clockwise(CW) arm with LED, 1 counter clockwise(CCW) arm with LED, 2 CW arms and 2 CCW arms. Totally 6 arms.



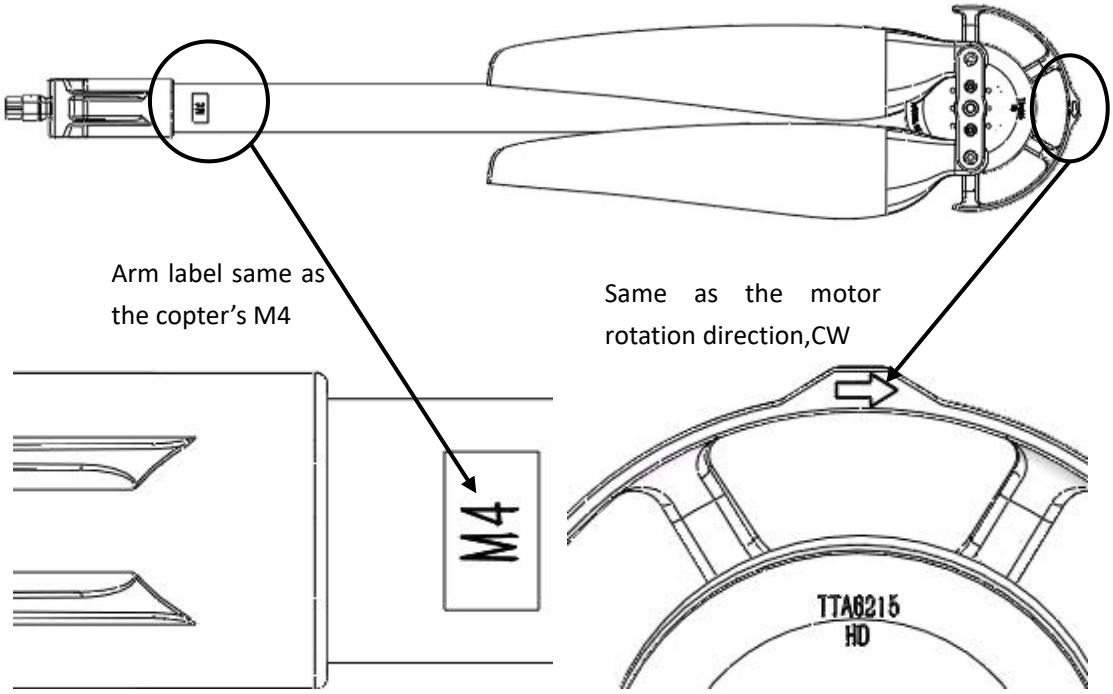

M1 CCW arm assembly



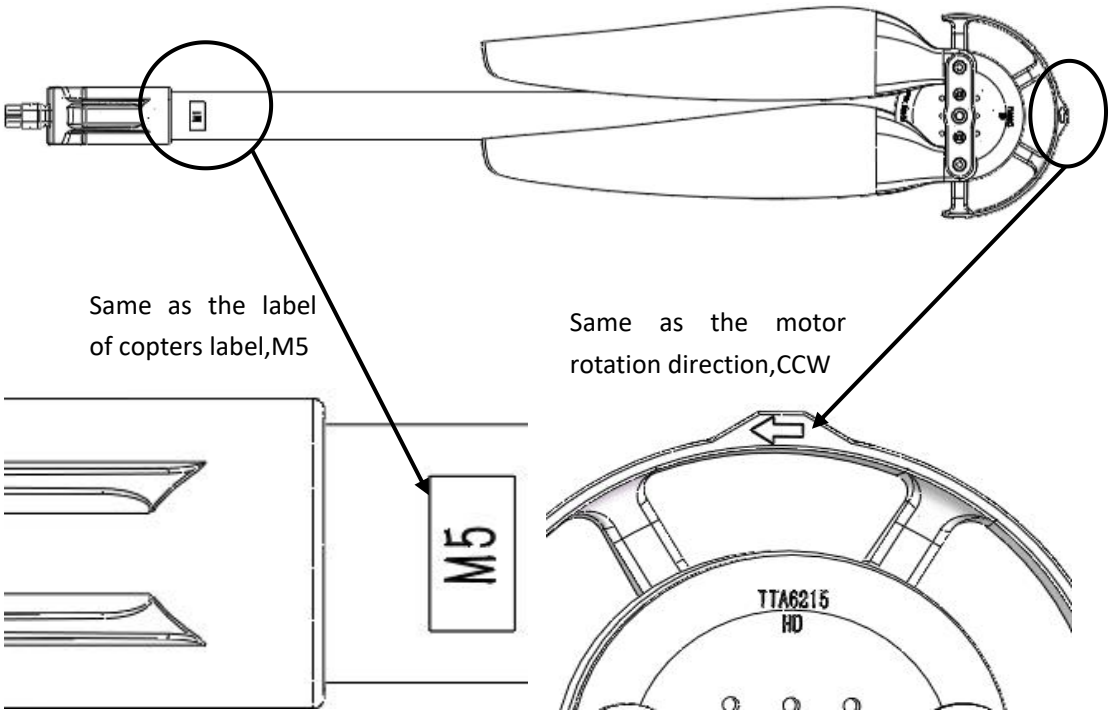

M2 CW arm assembly



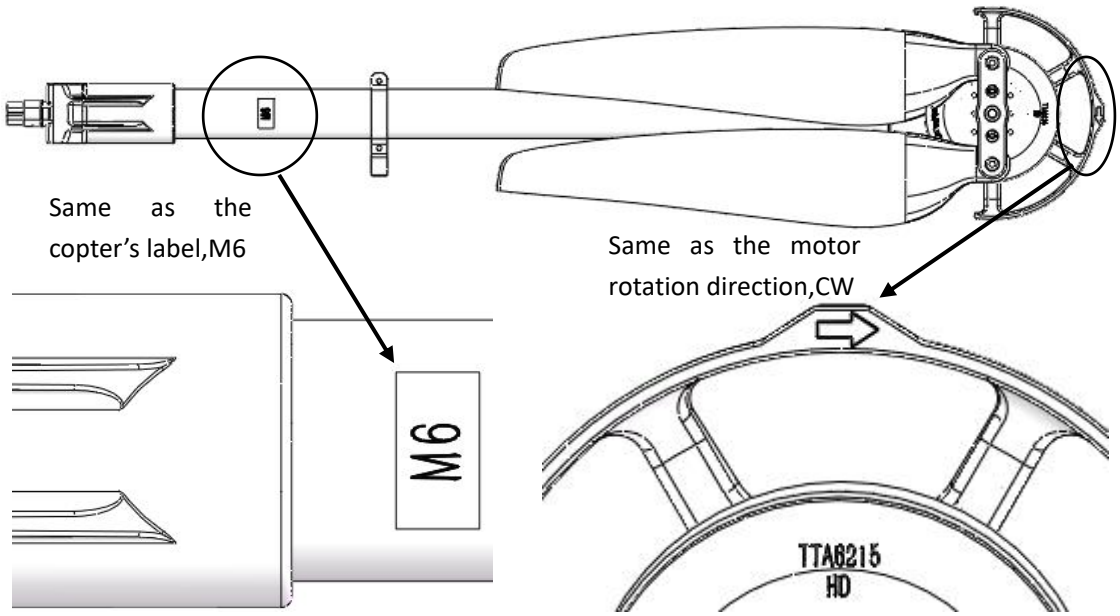

M3 CCW arm assembly with LED



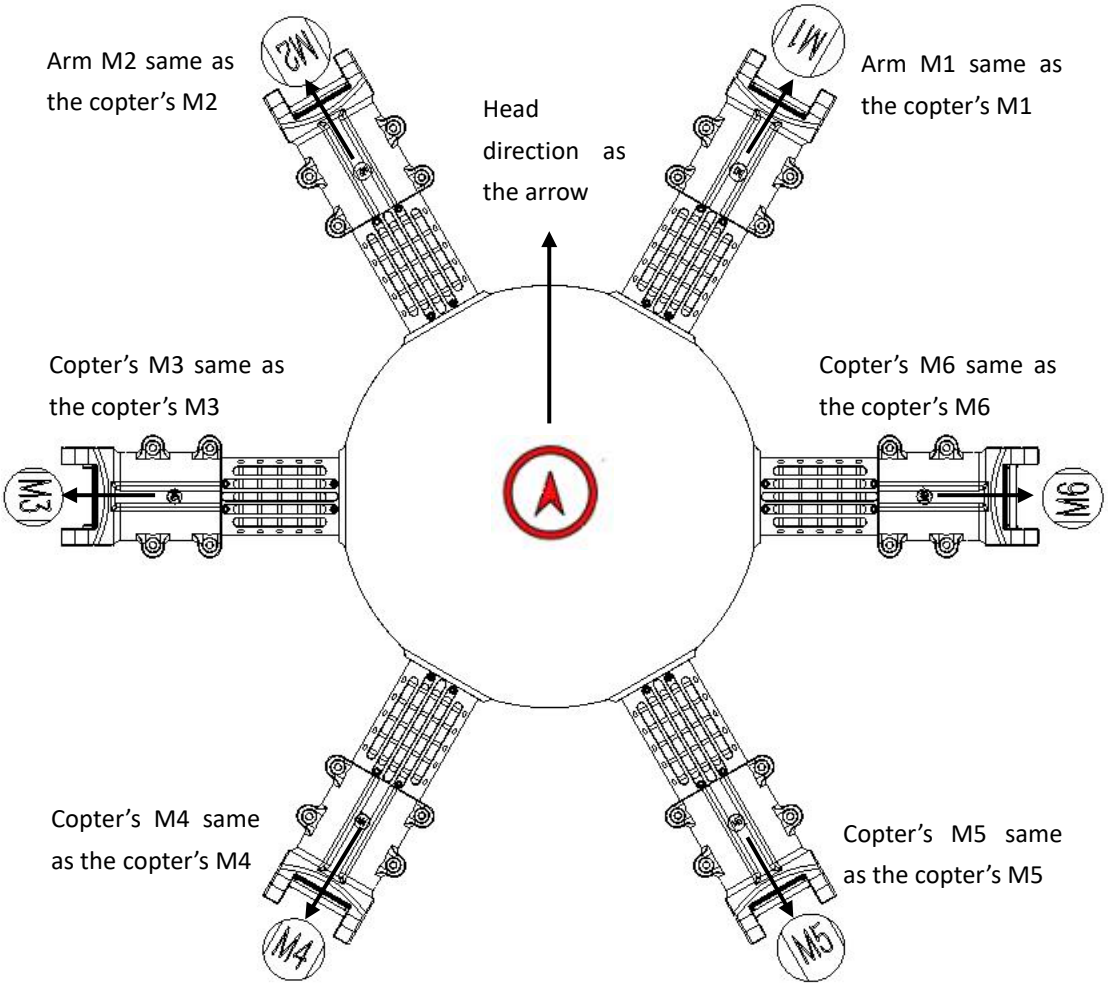

M4 CW arm assembly




M5 CCW arm assembly




M6 CW arm assembly with LED



Arm and copter installation figure

1) Arm M1-M6 should be matched with copter's.

2) Match the arm's MT60 female connector with copter's MT60 male connector,see figure 8.

3) Match 6mm inner hole of arm clamp with copter's main part 6mm inner hole,see figure 9.

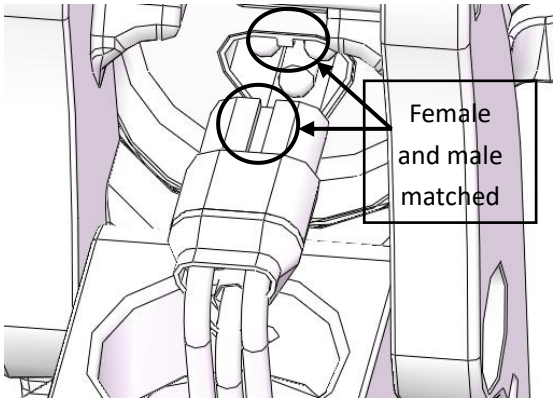



Figure 8

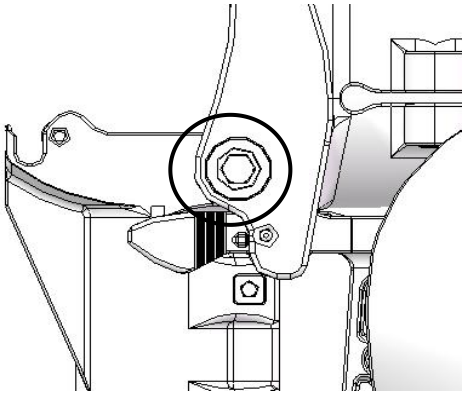


figure 9

4) Install the M5*49 plug screw from the hexagon side of the 6mm hole on fuselage arm joint,see figure 10 .

5） Lock the plug screw with a M5 nut from the other side,the bolt end should same as the the nut,that means lock works, as Figure 11

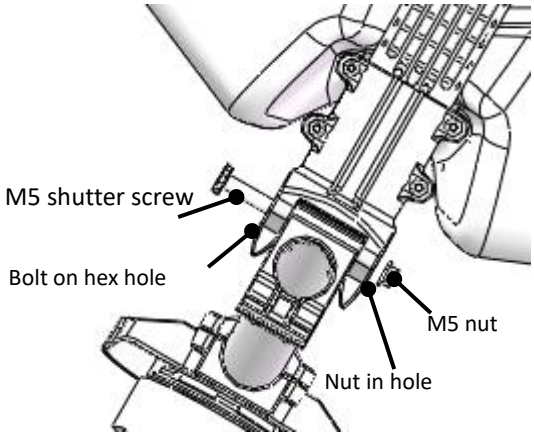



Figure 10

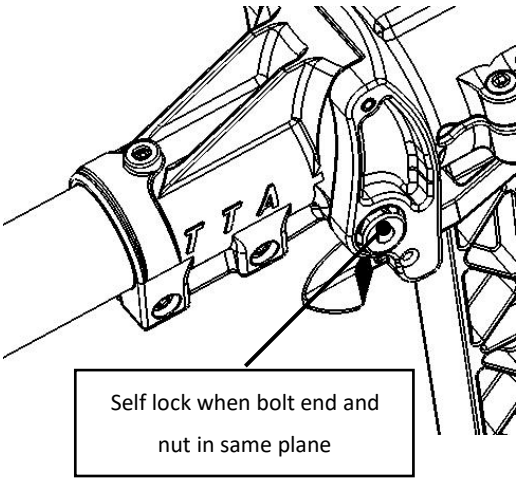



figure 11

6)Install the rest 5 arms as above , it will be completed like Figure 12.

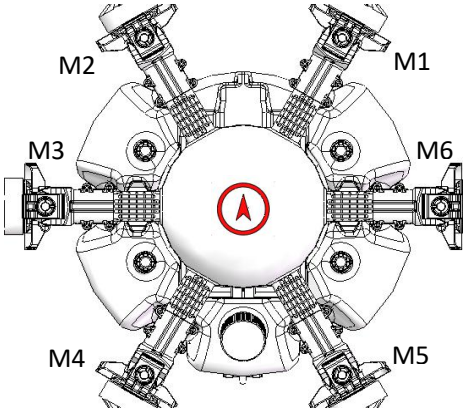



Figure 12

**Attention:**

1) The difference between CCW arm and CW arm is different rotation direction of the propellers which produce lift force. There is a mark arrow on every motor holder to help differentiate. CCW arrow means CCW arm, you need to install the CCW propeller,otherwise it will be CW arm which you need to install the CW propeller.
2) The difference between Arm with LED and normal Arm is that there are LED ring and spraying system on the Arm with LED and the other doesn't have.
3) There is a indicate arrow on the Dome which show the nose.
4) According to the Figure 7, install CCW arm on M1 and M5, install CW arms on M2 and M4, install CCW Arm with LED on M3, install CW Arm with LED on M6.
5) Arm could only fold down instead of up during the installation,arm should be in an horizontal level with ESC

### 2.3.3 Spraying Tube Installation

1) First, insert the Φ8 spraying tube into the three-way connector as Figure 14-1. Second, through the spraying tube from the tube holder as Figure 14-2. And then inset the other side of the spraying tube into the one-way connector at the nozzle place as Figure 14-4. Install the other spraying tube the same way.
2) It will be completed like Figure 14-3.

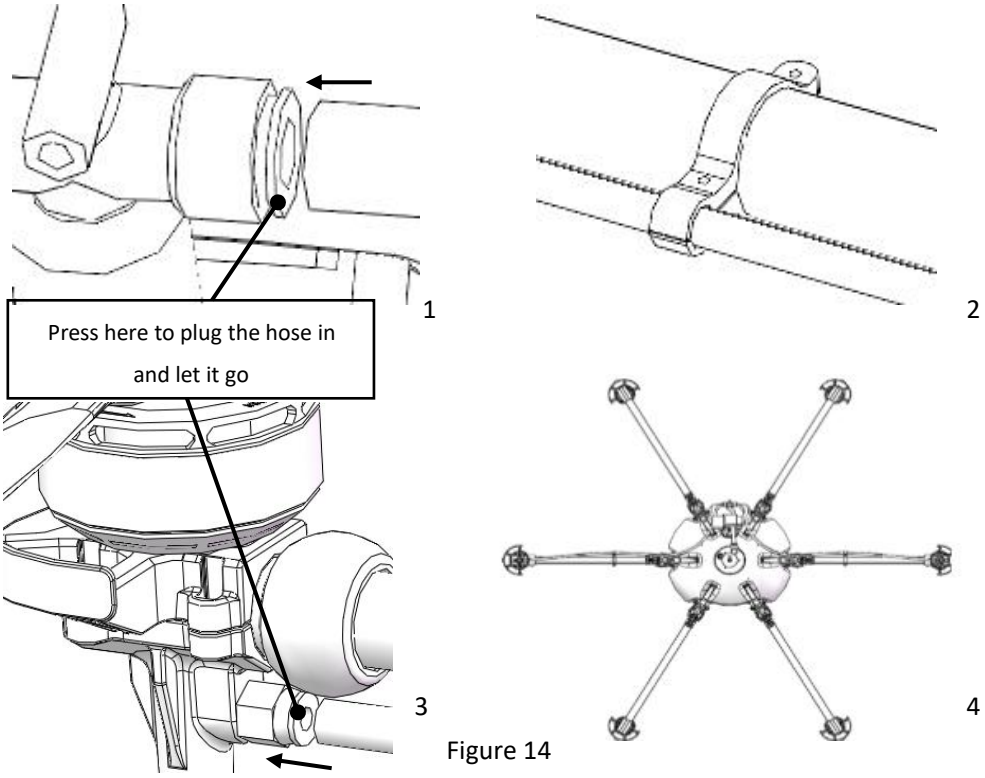



Figure 14

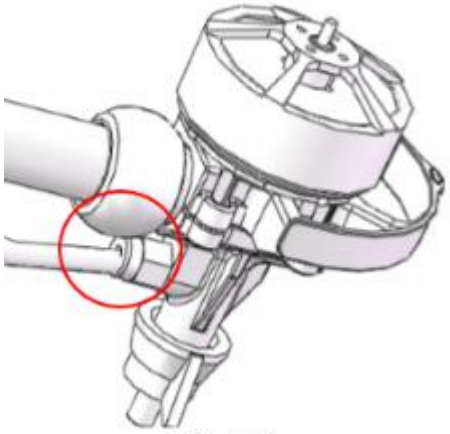


Fig.12

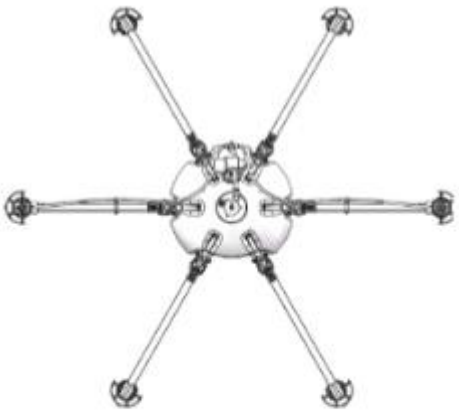


Fig.13

## 2.3.4 Intelligent Battery Installation

1) Push the Intelligent battery into the water tank as Figure 15-1, due to interference fit , it will be installed well when the battery wear pad stuck into the position Mark 3 in the Figure 15-2. It will be completed like Figure 15-3.
2) The whole copter will be completely installed like Figure 15-4.

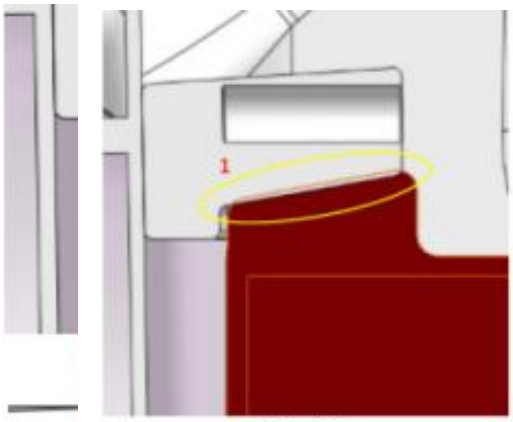



Fig.14

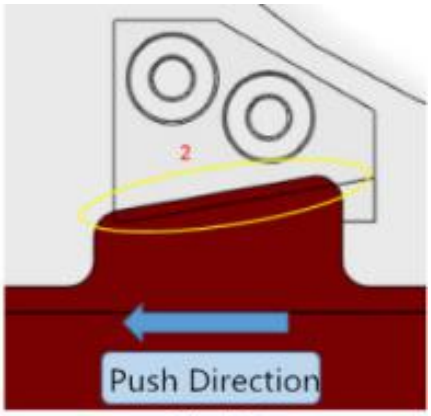



Fig.15

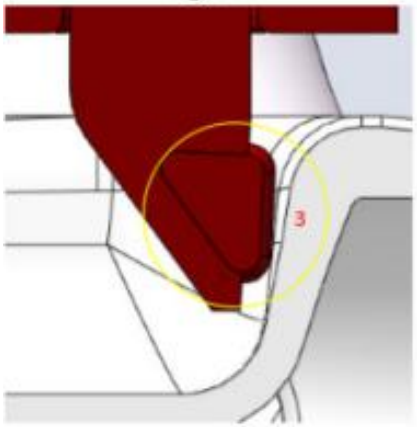



Fig.16

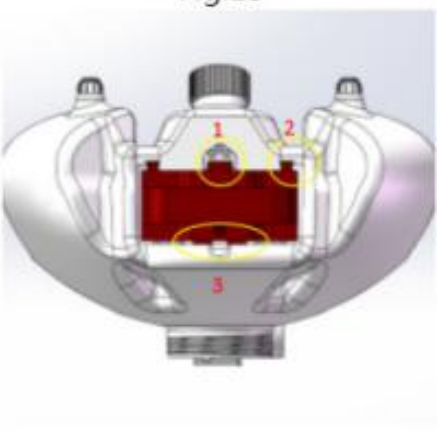



Fig.17

# 3.Intelligent Battery Instruction

## 3.1 Keypad Function

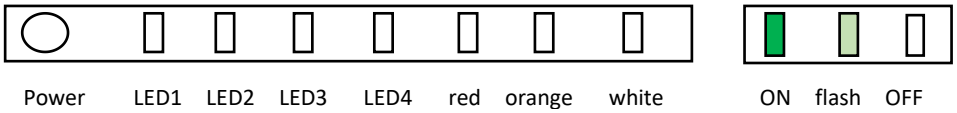
1) Short press 1S to check the battery real-time electricity.
2) Long press 5S to check the battery residual life.
3) Short press 1S + Long press 2S to turn on the battery and charge.
4) Short press 1S + Long press 2S to turn off the battery.

**Attention:**

The battery need to be power on when charge and discharge, the charge port will be opened when the battery power on and be closed when the battery power off.

## 3.2 Electricity Inspection

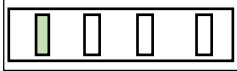
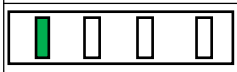
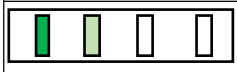
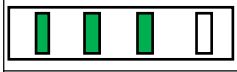
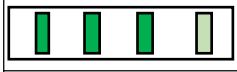
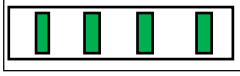
When the battery is power off,you can check the real-time electricity with a short press.




**Attention:**

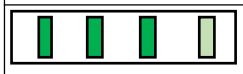
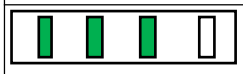
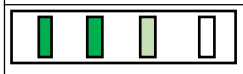
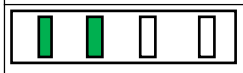
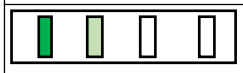
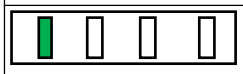
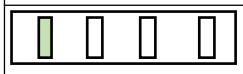
Electricity indicate light represents both the quantity of electricity when charge and discharge and also the life of the battery.

**Battery Indicate Light**

| Indicator LED1-LED4 | Battery Electricity | Green LED1 | Green | Green LED3 | Green LED4 |
|---|---|---|---|---|---|
|  | 0%~12% | Flash | OFF | OFF | OFF |
|  | 13%~24% | ON | OFF | OFF | OFF |
|  | 25%~37% | ON | Flash | OFF | OFF |
|  | 38%~49% | ON | ON | OFF | OFF |
|  | 50%~62% | ON | ON | Flash | OFF |
|  | 63%~74% | ON | ON | ON | OFF |
|  | 75%~87% | ON | ON | ON | Flash |
|  | 88%~100% | ON | ON | ON | ON |

### 3.3 Lifetime Inspection

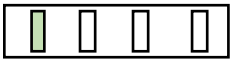
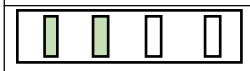
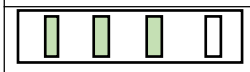
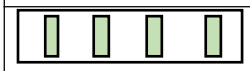
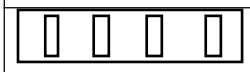
Battery lifetime means rest service time,electric quantity indicator means battery lifetime by keeping pressing power button for 5 seconds in the status of no electricity.All of indicator will be off if let go the button for 3 seconds.

| Indicator LED1-LED4 | Green LED1 | Green LED2 | Green | Green | Green |
|---|---|---|---|---|---|
|  | ON | ON | ON | ON | ON |
|  | ON | ON | ON | Flash | ON |
|  | ON | ON | ON | OFF | ON |
|  | ON | ON | Flash | OFF | ON |
|  | ON | ON | OFF | OFF | ON |
|  | ON | Flash | OFF | OFF | ON |
|  | ON | OFF | OFF | OFF | ON |
|  | Flash | OFF | OFF | OFF | Flash |

### 3.4 Charging

1) Setting, connecting intelligent battery and charger. Step1: Turn on the battery by a short press and a long press according to the instruction. Step2: Connect balance connector and then XT 60,then XT90S or AS150 anti spark connector. Step3: Start regular charging automatically.
2) Electric indicator will flash in cycle and displays the current electric quantity.
3) It means the intelligent battery has been fulled when electric indicator is OFF.Please take down the charger and charging has been finished.
4) The charging temperature of intelligent battery is 10℃ to 40℃,it's forbidden to charge above 45℃ or less than 5℃.
5) Please do not charge the battery without people.
6) Forbid to charge with the output connector and forbid to use the battery power when charging.

**Attention:** Please disconnect the discharging cable before charging.

| Indicator LED1-LED4 | Battery | Green | Green | Green LED3 | Green |
|---|---|---|---|---|---|
|  | 0%~25% | Flash | OFF | OFF | OFF |
|  | 26%~50% | Flash | Flash | OFF | OFF |
|  | 51%~75% | Flash | Flash | Flash | OFF |
|  | 76%~99% | Flash | Flash | Flash | Flash |
|  | 100% | OFF | OFF | OFF | OFF |

### 3.4.1 Charging Protection Function

1) The best charging current for intelligent battery is 0.5C,20A is maximum supported,large charging current will not benefit to prolong battery lifetime,it's forbidden to charge higher than charging current.
2) If there is abnormal(short circuit of charging end) during charging status,charging will be interrupted automatically in order to ensure to not damage to battery cell.
3) It will benefit to battery lifetime to set highest protection voltage of each cell according to different charging current.

**Attention:**

Restart should be done after any protection to ensure the abnormal has been eliminated and protection has been effective.

## 3.5 Reminding Functions

### 3.5.1 Maintenance Reminder

The red indicator will be kept on to remind to maintain before using if there is too high voltage difference of batteries or over discharging.

### 3.5.2 Low Voltage Alarm

System will take it as low voltage if 2.5V~3.65V per cell checked,charging will be reminded and orange LED will be on.

### 3.5.3 Storage Reminder

Over high voltage for long time will lead to battery cell expansion,thus system will remind user storage status and decrease the voltage to reasonable range in long time

storage or over high temperature,LED will keep white at the same time.

**Error Indicator**

| Red LED5 | Orange LED6 | White LED7 | Instructions |
|---|---|---|---|
| ON | | | It reminds battery maintenance |
| | ON | | Battery voltage is too low |
| | | ON | Battery is in storage status |

### 3.6 Self Balance and Self Storage in Storage

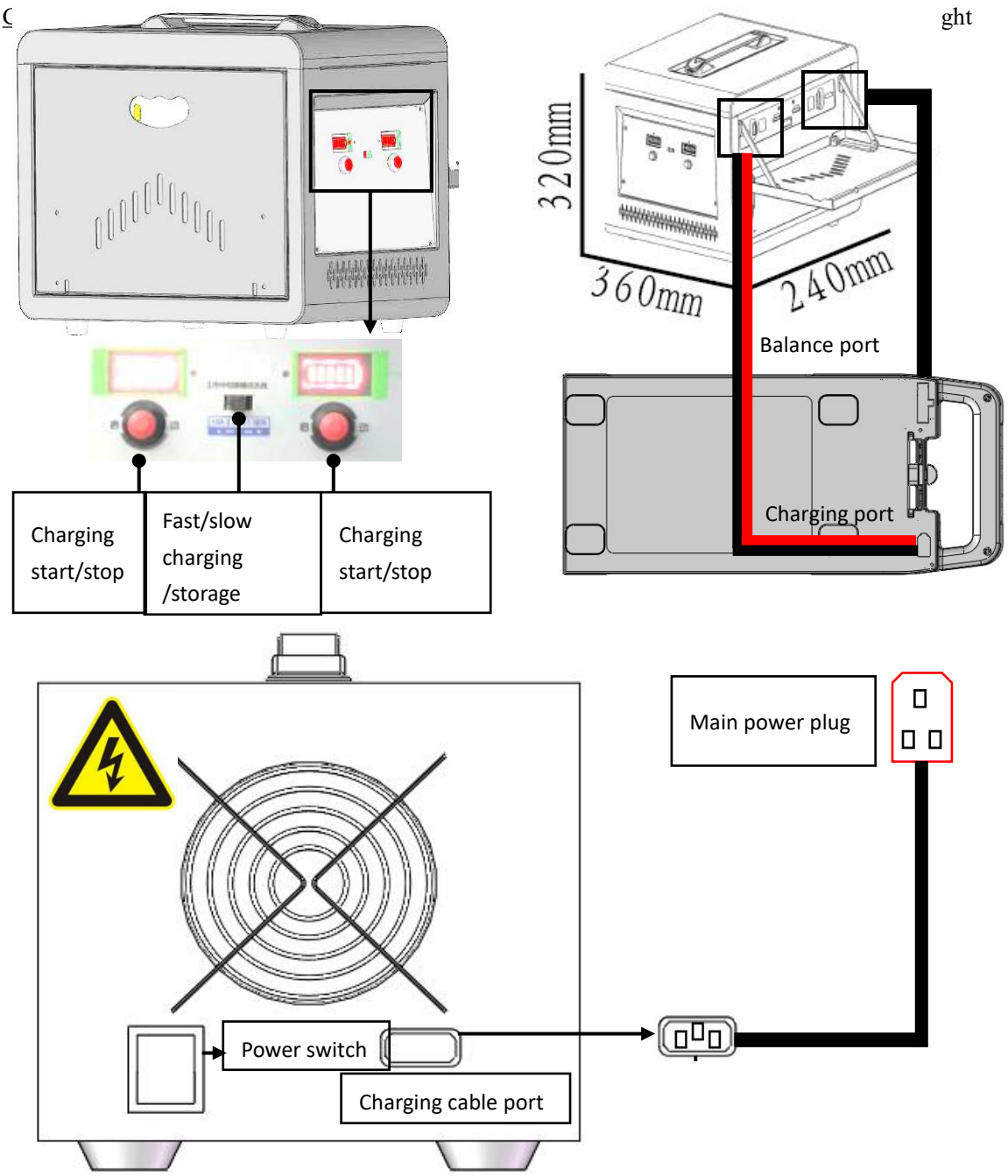
1) Intelligent balance:inside battery balance will adjust little to prolong charging and discharging time.
2) Intelligent storage:battery will adjust to the most suitable storage capacity automatically for long term storage.

## 4.Charger Station Introduction

### 4.1 Production Parameters

1) Input voltage: 190V～ 220V AC
2) Max. charging current: CH1:20.0A CH2:20.0A
3) Max. charging power:CH1:1000W CH2:1000W
4) Output voltage:CH1:50.4V CH2:50.4V
5) Max. balance current:400mA
6) Max. static power consumption:320mA
7) Display mode：LED
8) Supported battery cells:12S
9) Charging working temperature:5-45℃
10) Weight:16KG
11) Production size:360*340*320

### 4.2 Wiring diagram




## 4.3 Indicator Instruction

| Indicator Status | LED0 | LED1 | LED2 | Instruction |
|---|---|---|---|---|
|  | Flash | | | Battery communication abnormal |
| | | Constant | | Please check battery connection line or battery voltage status |
|  | Flash | | | Charging electric circuit abnormal |
| | | | Constant | Please contact after sales of factory |

**Advice:**

1) Please do not disconnect battery with charger after charging so that battery could be balanced well and its life could be extended.

2) The minimum single battery cell voltage will be adjusted to less than 3.85V or the group voltage will be less than 46.2V during storage status. Storage status will end if total voltage is more than 46.2V or battery is not balanced any more, it cost longer for bigger battery unbalance.

## 4.4 Product Function Feature

1) Balance charging
2) Rapid charging
3) Input and output reverse connection protection
4) Low static power consumption
5) Folding charging planet

## 4.5 Operation Instruction

1) When power on 220V,leave power switch in the position OFF means input power is shut off, charger does not work.
2) When power on 220V, leave power switch in the position POWER,input power has been open, battery figure L0 on the screen is lightened, inner fan begin to rotate and charging channel close at the same time.
3) **How to charge: Turn on the battery by a short press and a long press according to the instruction 3.1 first,then connect XT 60 input connector and balance connector separately, progress bar of battery type signal flash,electric quantity indicator displays red, inner fan and outside fan run together, it means the state of charging.**
4) During charging, charging or abnormal status will be stopped if start button has been pressed.
5) If charging status is displayed not good after charging, please do not disconnect battery without urgent use, thus battery life will be prolonged.
6) Battery will discharged by charger for full charge storage, discharging will be stopped when single cell voltage lower than 3.85V or total voltage lower than 46.2V,but balance current will not be stopped until battery balanced or disconnected. Please do not disconnect battery to avoid total voltage less than 46.2V but storage status has been reminded if battery is not balanced,and it will costs long time.

**Safety Warning：**

1) Charger will not work normally or be damaged for too high or too low input voltage.
2) 12S(50.4V) LiPo battery is suitable to this product, correct battery should be chosen.
3) Please take care of charging status when charger connecting, stop operation for any

abnormal phenomenon.

4) Be sure charger is far away dust,moisture,rain,heat source,direct sunlight,vibration and some other unsuitable environment.

5) Battery and charger must be placed on uninflammable,insulated surface.

6) Please follow the strict instructions.

## 5. App Setting of Copter

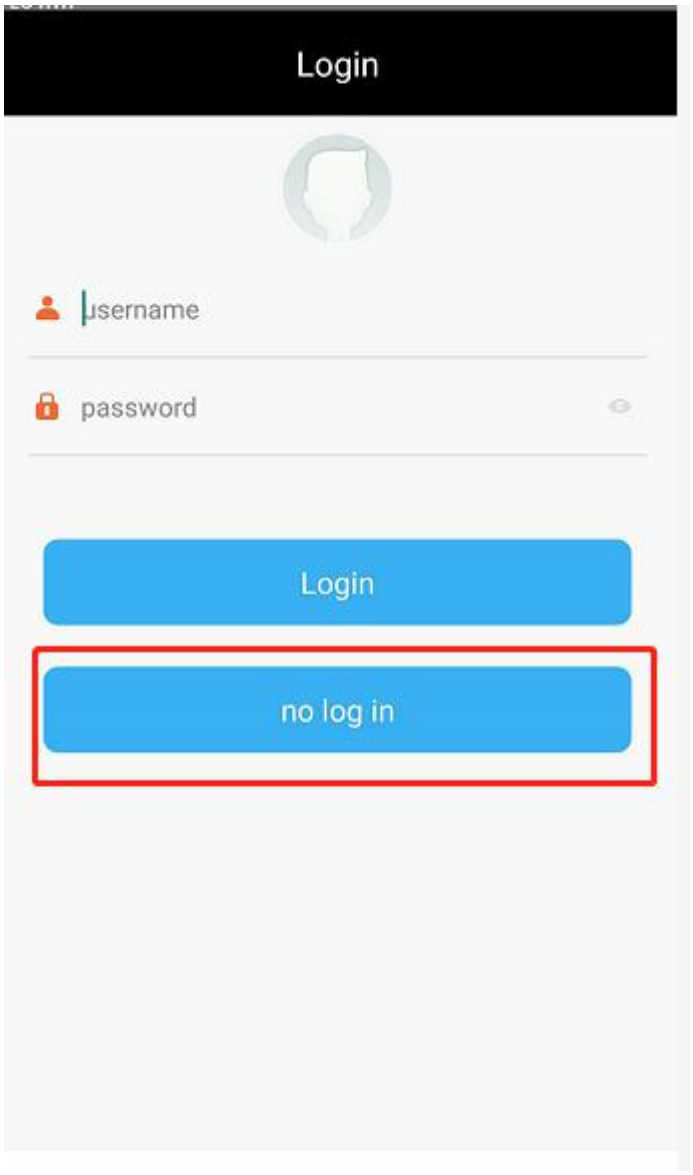



Figure 5-1

**Please choose no log in.**

### 5.1 Software Configuration

1. Please install the GCS software.

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

TTA-M6E-1 support Android 4.0 or above

3. Open GCS,enter into the start page.

4. Enter into the main page ,see figure 5-2.

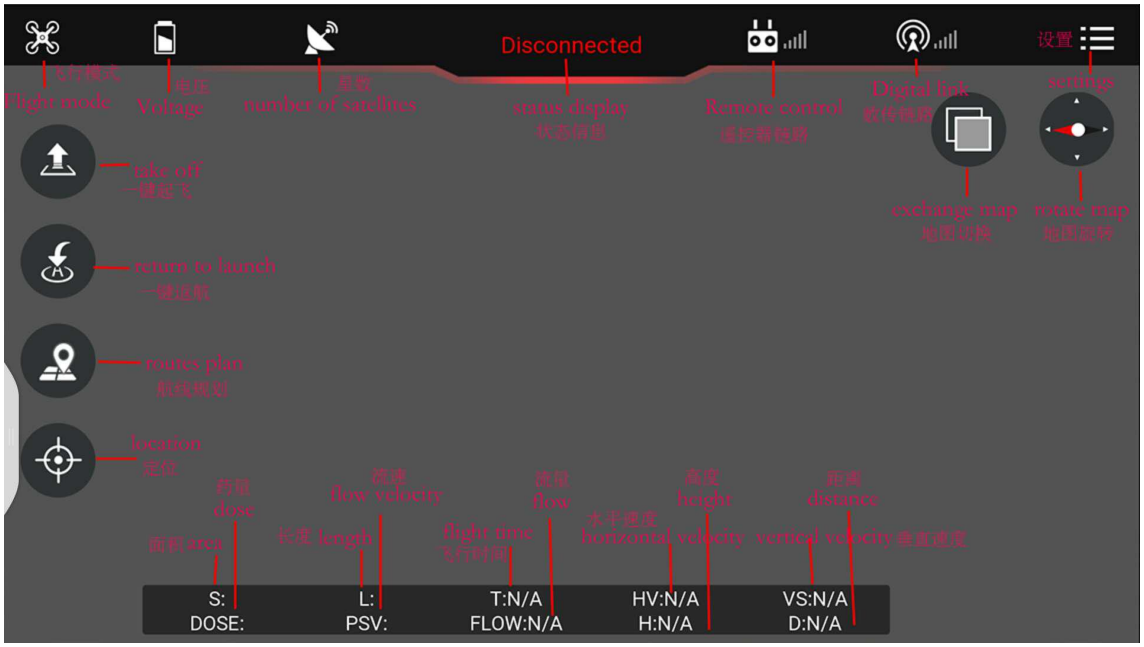



Figure 5-2

## 5.2 Parameters adjustment

### Type 1: Connection by OTG cable

- 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.

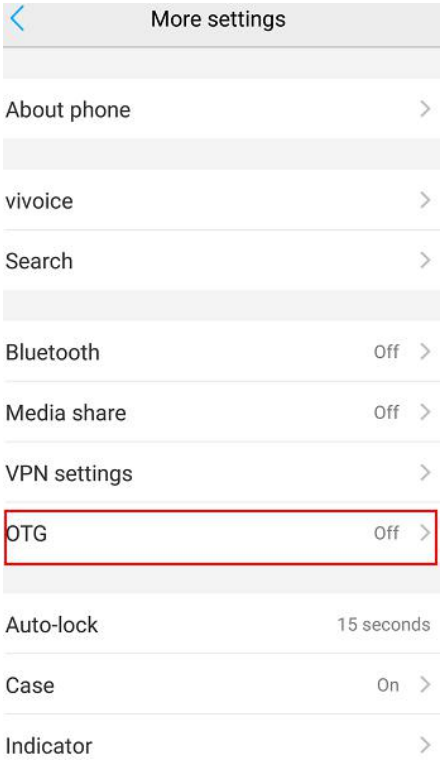
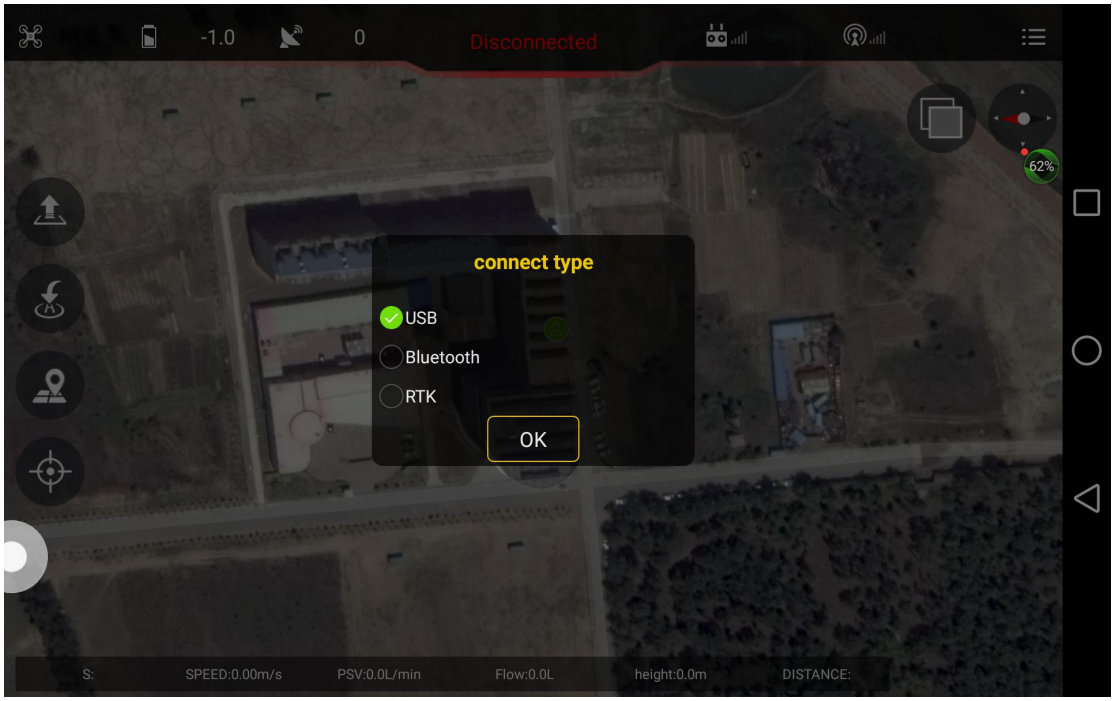



Figure 5-2-1

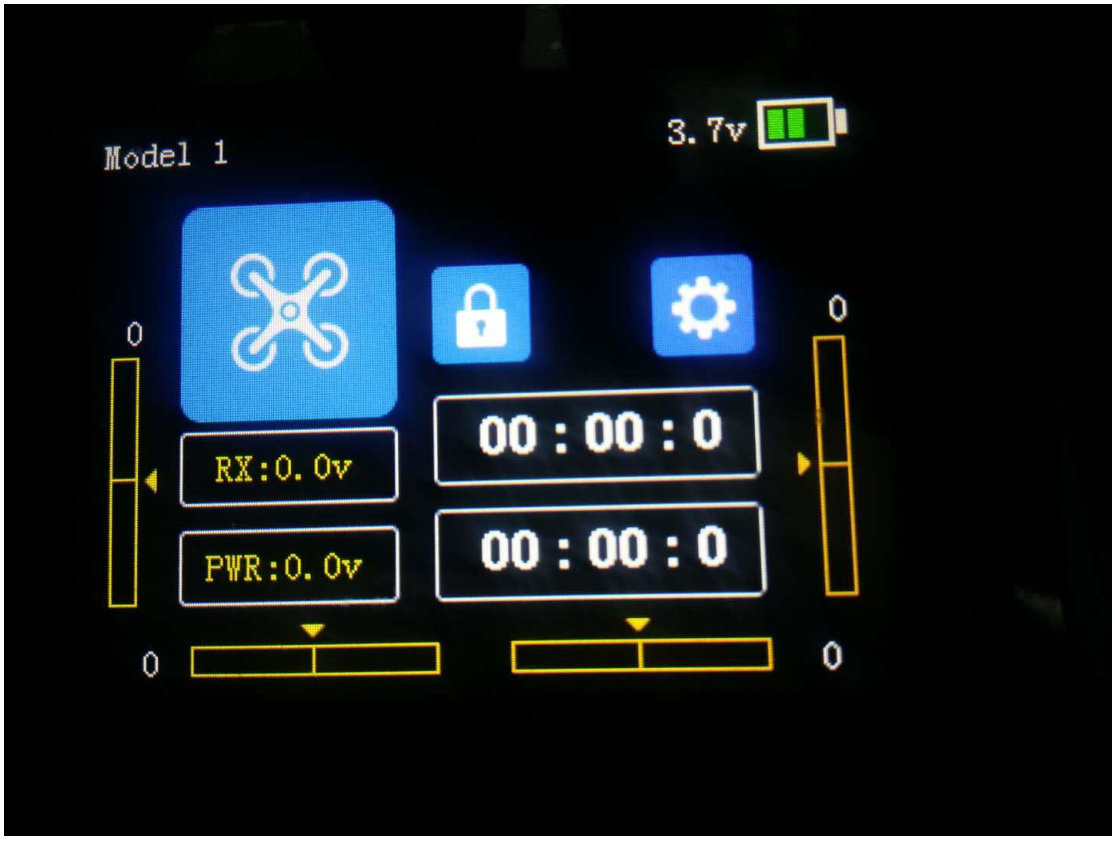
Connect cellphone with Micro USB port of remote controller.The connection method should be USB,connection label will be green after connected,see figure 5-3




Remote controller should be selected to A-USB,see the following picture:


**Type 2: Connection by Bluetooth connection:**

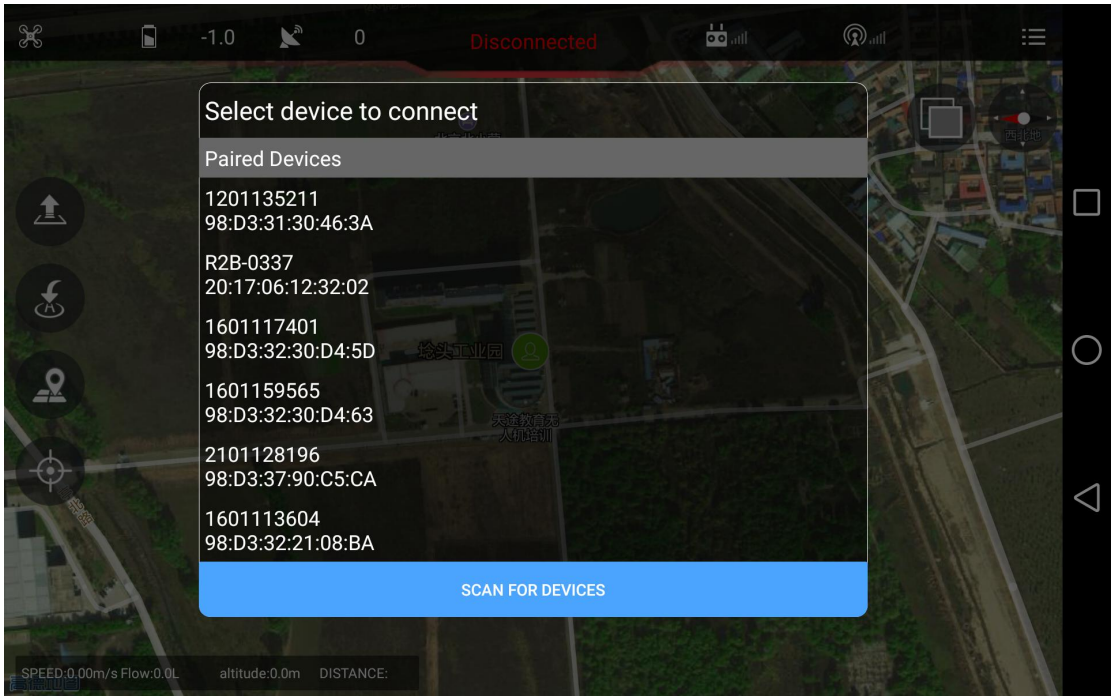
Open the bluetooth function in cellphone,


Model 1
3.7v
0
0
RX:0.0v
PWR:0.0v
00:00:0
00:00:0
0
0


Model
System
Receiver
Datalink

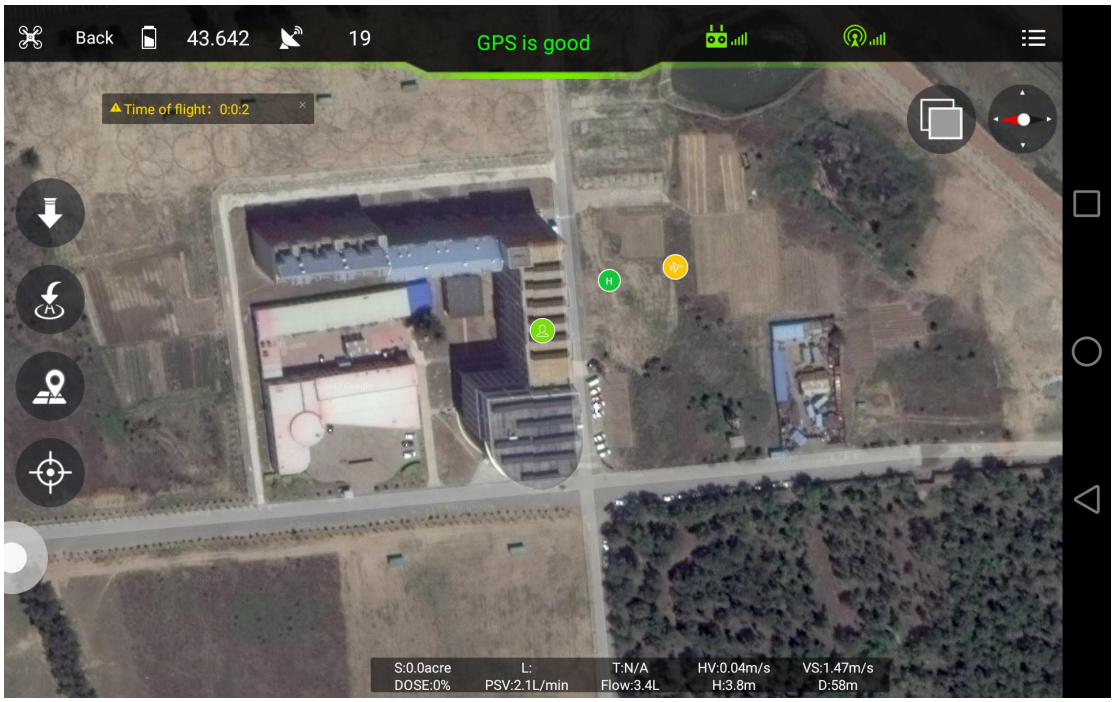

Dev 1601120984
0
Ver 0.1.4
Power ON
Bind Start
Conn BLU
FMU E6


-1.0
0
Disconnected
connect type
USB
Bluetooth
RTK
OK
SPEED:0.00m/s Flow:0.0L
altitude:0.0m
DISTANCE:




**Bluetooth password:1234**

After connection,app will be as followings,see figure 5-4




5-4

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

### 5.2.1 Remote controller calibration

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

figure

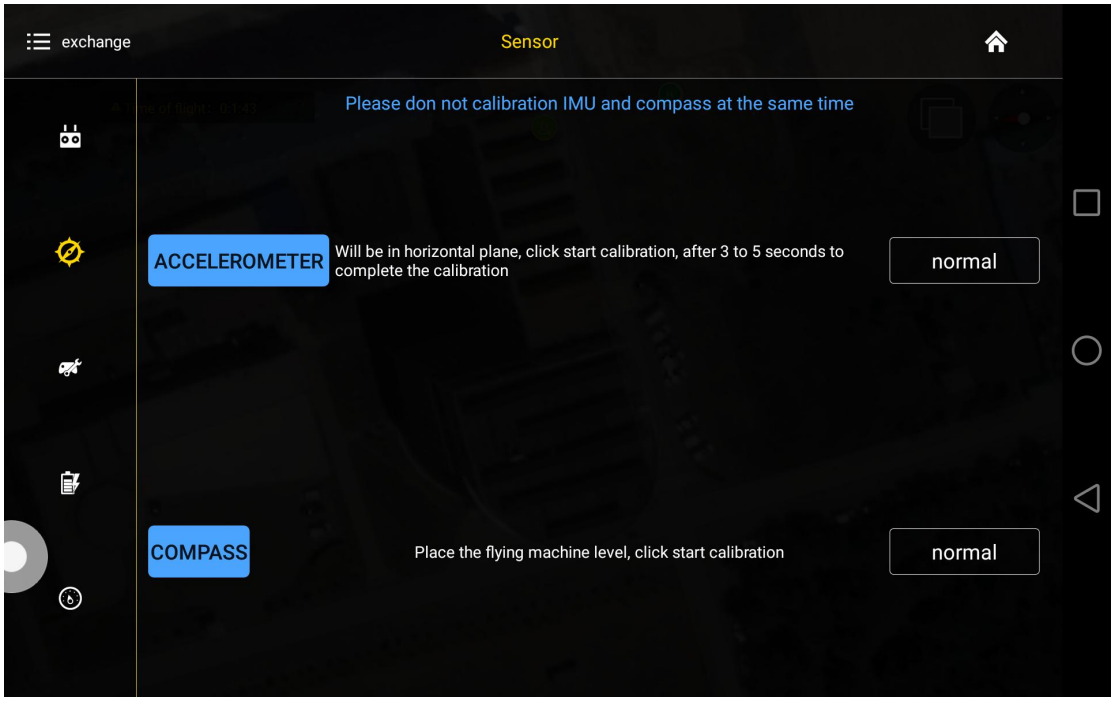

1) Start to calibrate:connect copter with GCS,click *RC CHANNEL*,move the stick to maximum and minimum position 4 to 5 times.

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

**Calibration order**

Two kinds of method of compass calibration:

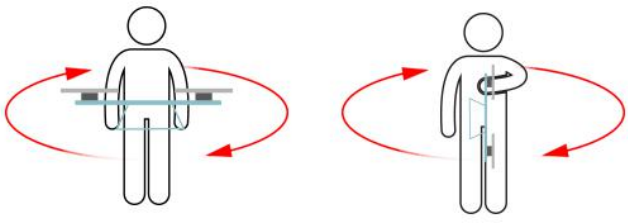
1) Click the button *COMPASS* to enter into calibration status.

2) Switch switch SA back and forth more than 4 times to enter into calibration status.

**Calibration Step**

1) Confirm GCS communication well, compass installation correct and copter outside.

2) Clicking calibration, yellow LED of copter is on, hold and keep copter rotating clockwise and slowly, leave copter head to the ground when green led is on, rotate copter clockwise and slowly till LED flash in red,green and yellow alternately.



3) After vertical calibration,calibration mode will be exited automatically and LED will flash normally if successful, LED will keep red for 3 seconds if fails and recalibration should be done.

4) Please power again after successful calibration.

**Attention：**

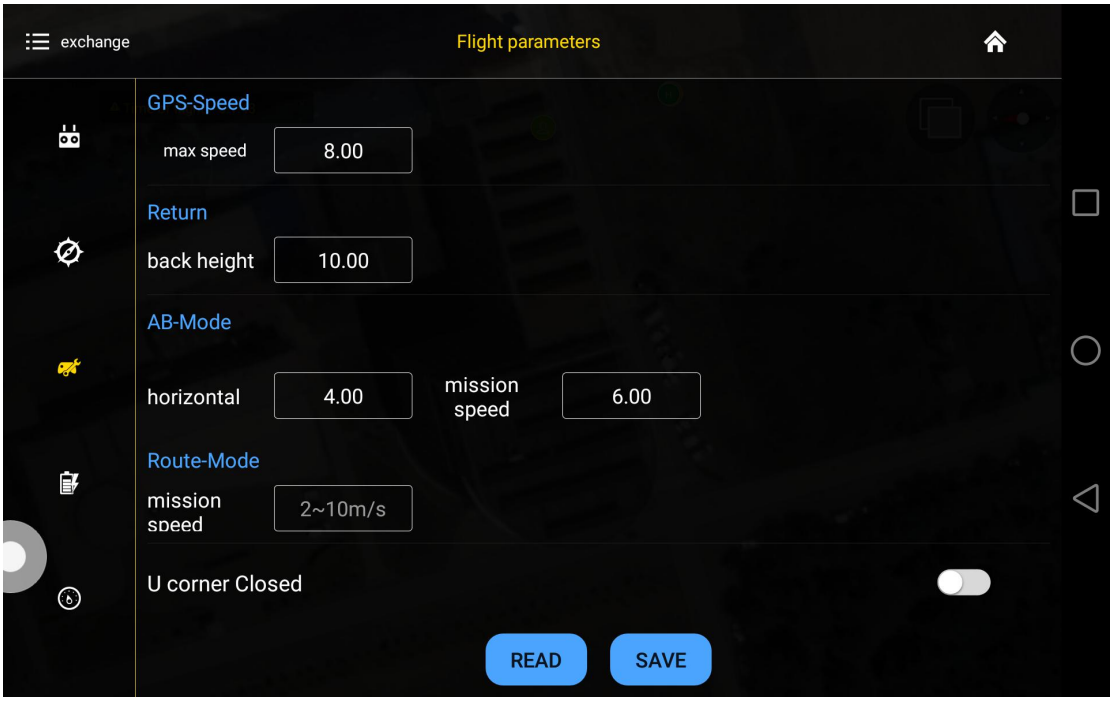
1) Compass should be done after changing flying area.

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.

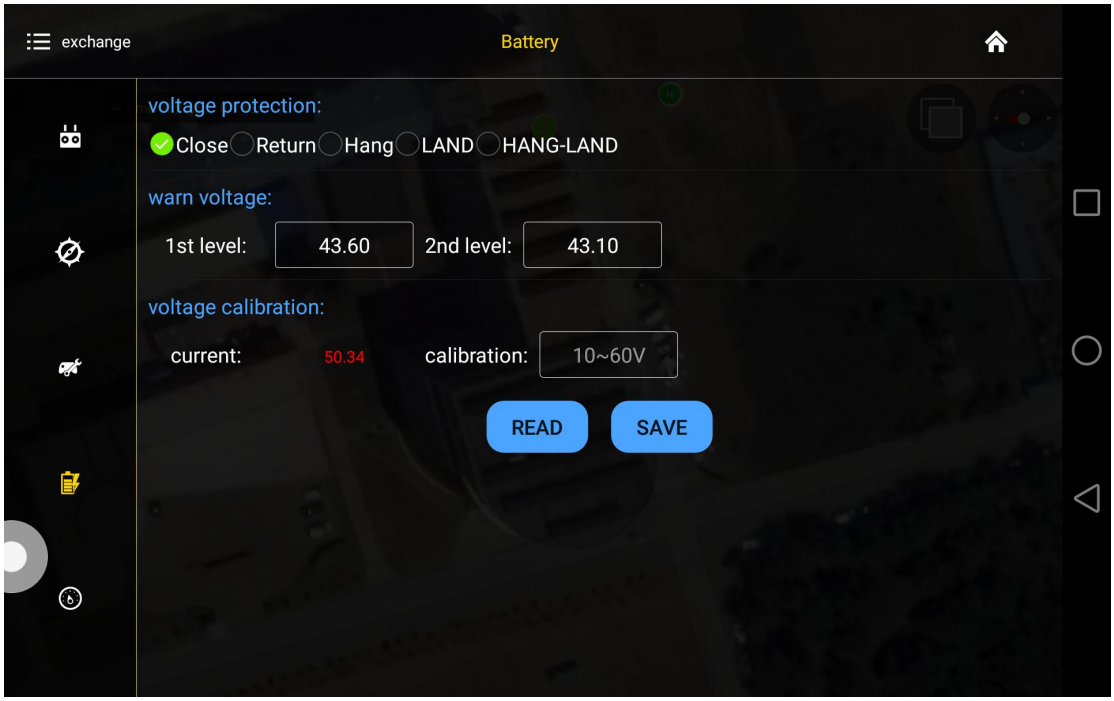
### 5.2.4 Flying parameters adjustment




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

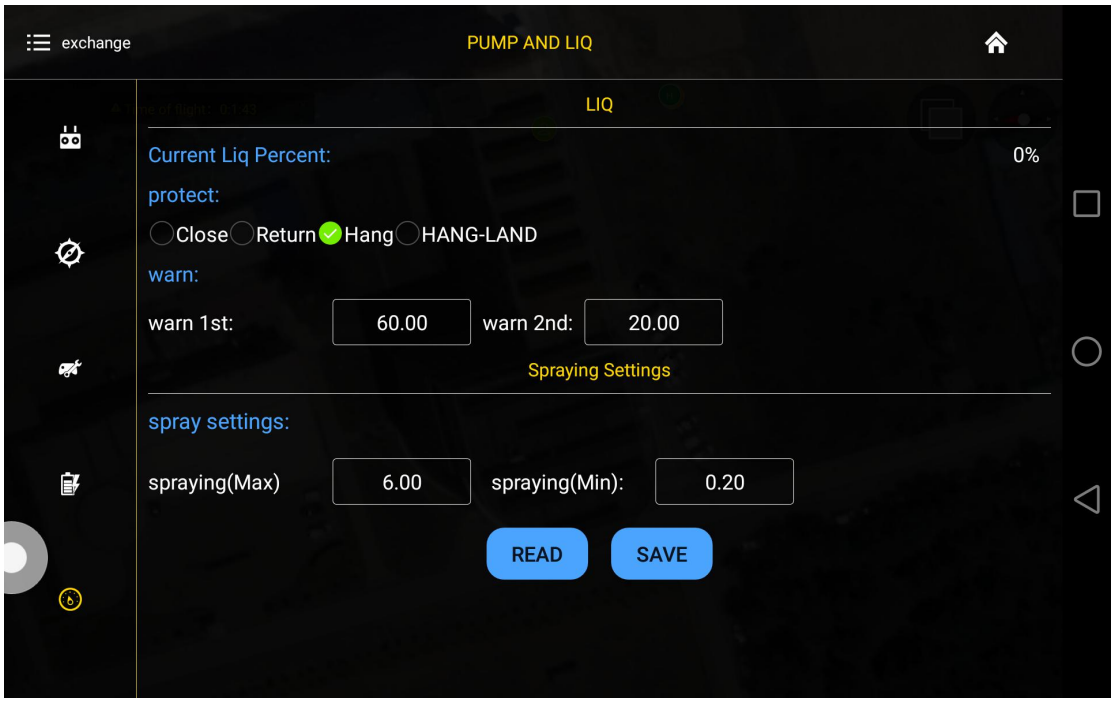
**Settings of first alarm and second alarm.It's recommended to 43.6V for the first alarm and 43.1V for second alarm.**

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 Pump and liquid level sensor settings



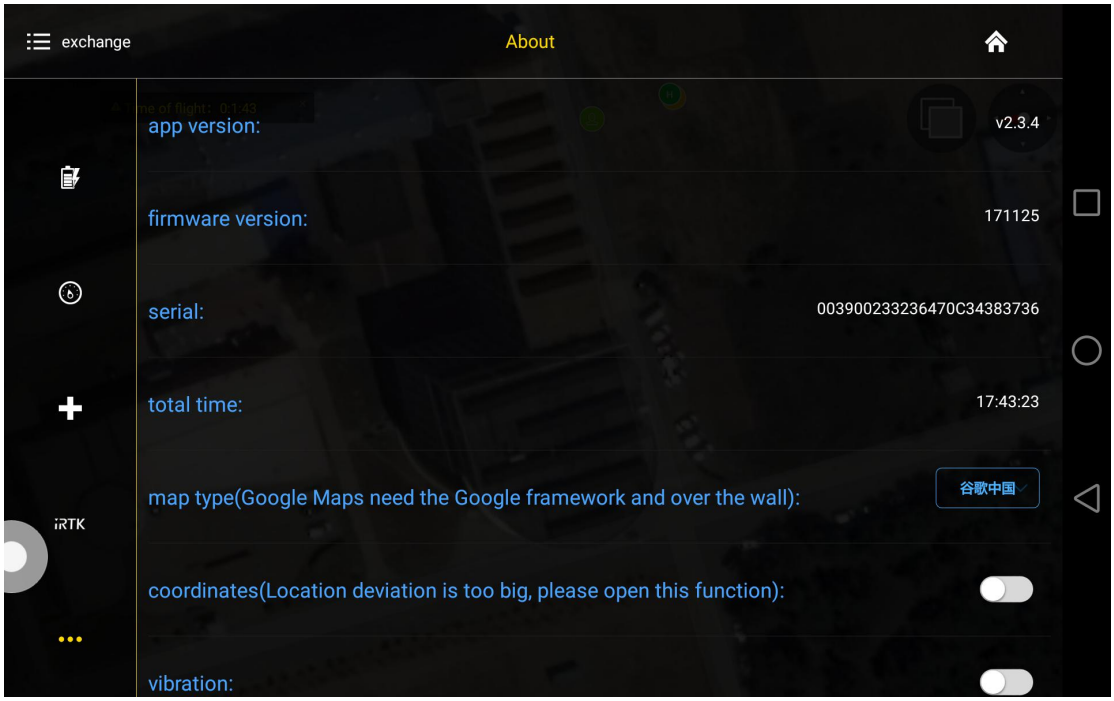

### 5.2.5.5 Tank empty reaction

The following reaction could be set:close the pump,return to home point,hovering,hovering and then landing.The default is close the pump,which means only LED flash as alarm.

**Spraying settings**

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 About interface

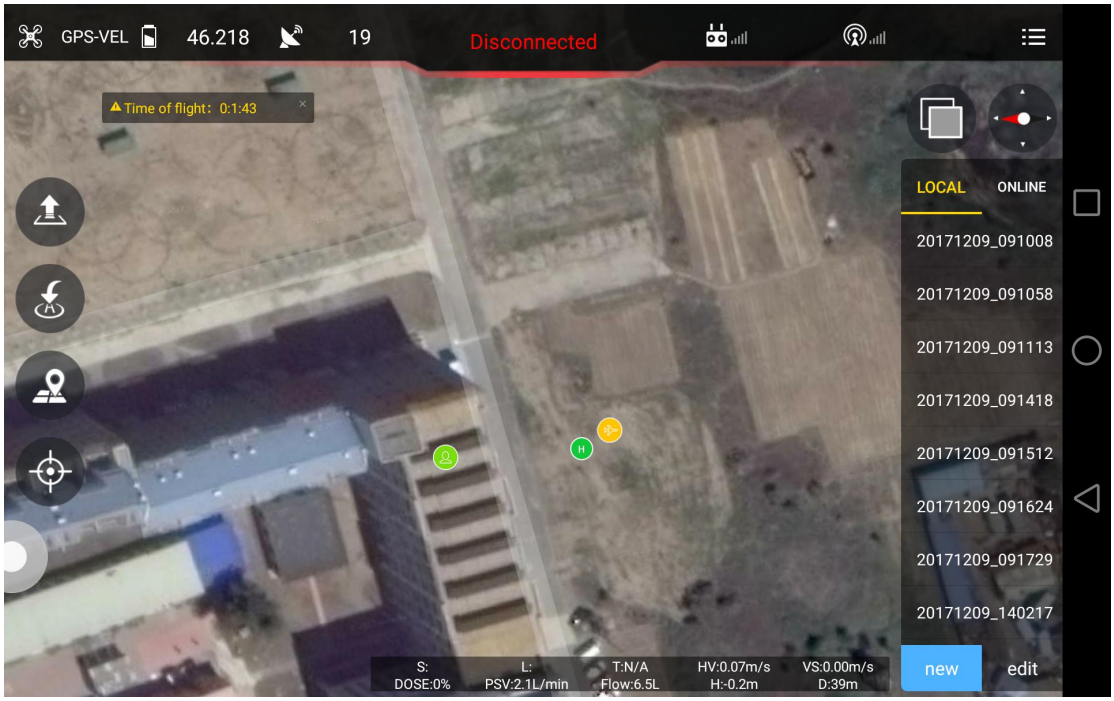



Open about interface,choose **map type**,choose **Google map**.Voice alarm could be opened.

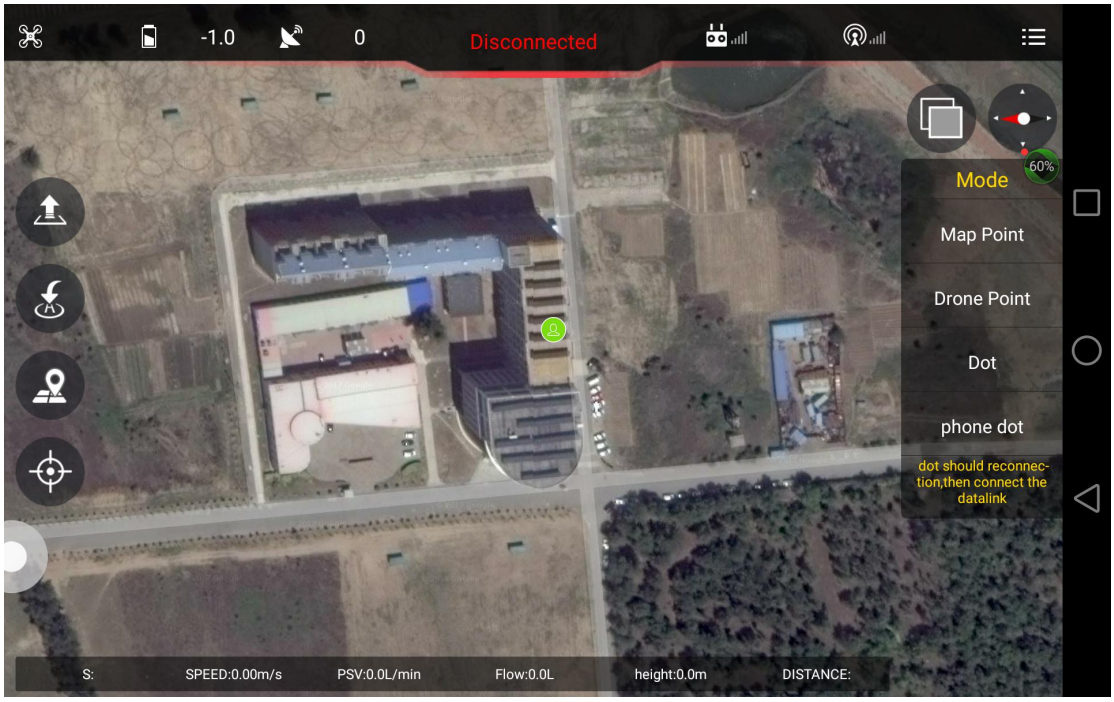
## 5.3 Route establish

Make point by map,make point by drone,make point by dot equipment,make point by phone.Working area could be done by the followings:

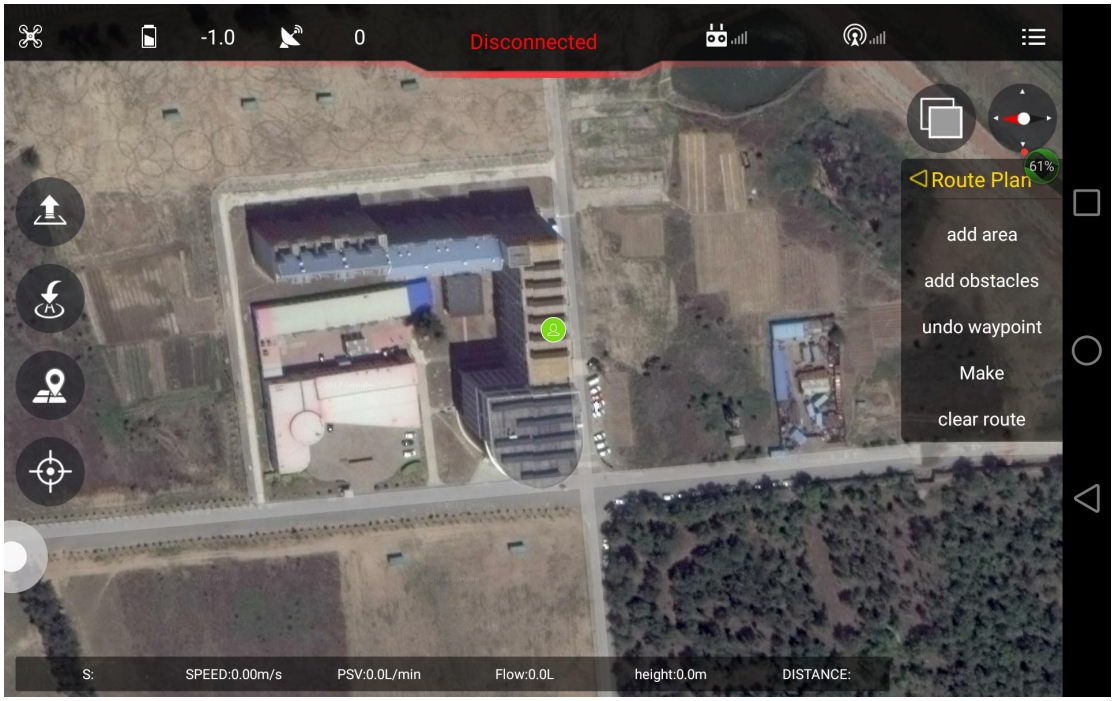
1. Click  to enter into route interface.




2. Click *new* to select point making type.

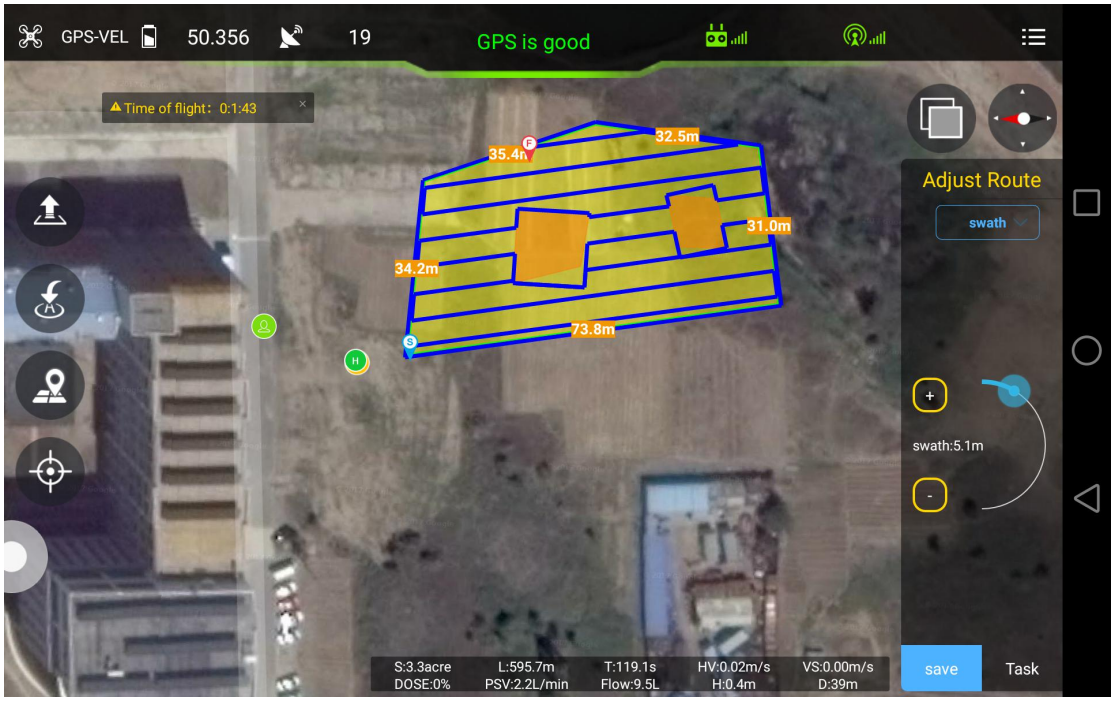



**Making point from map(map point)**

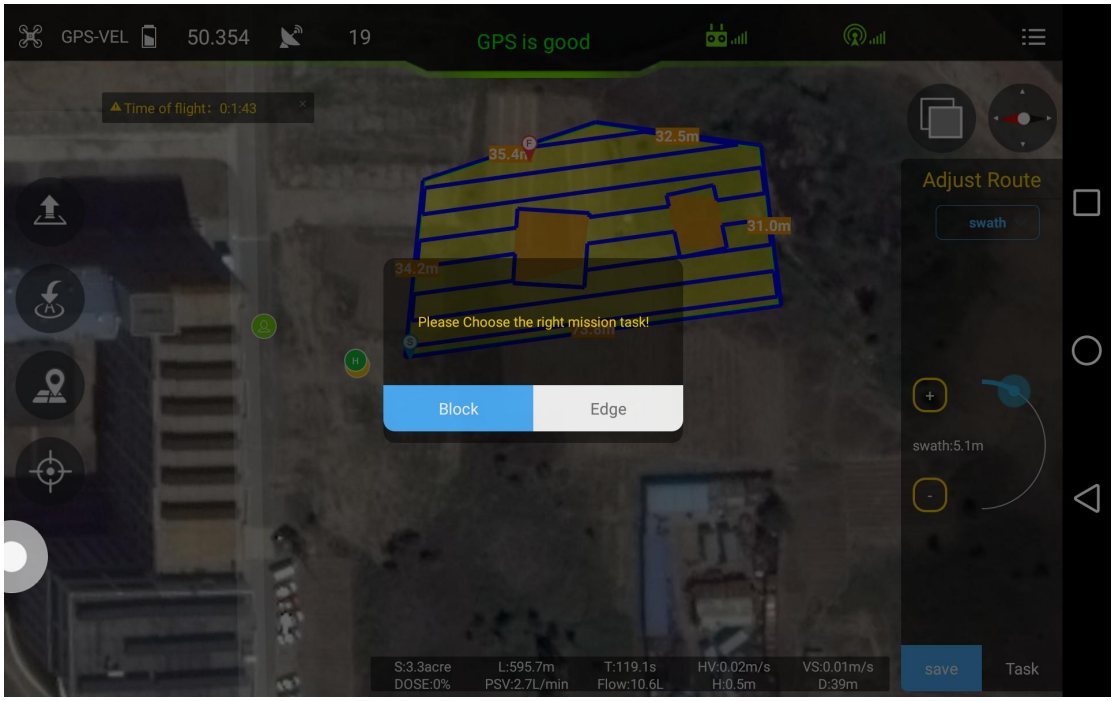


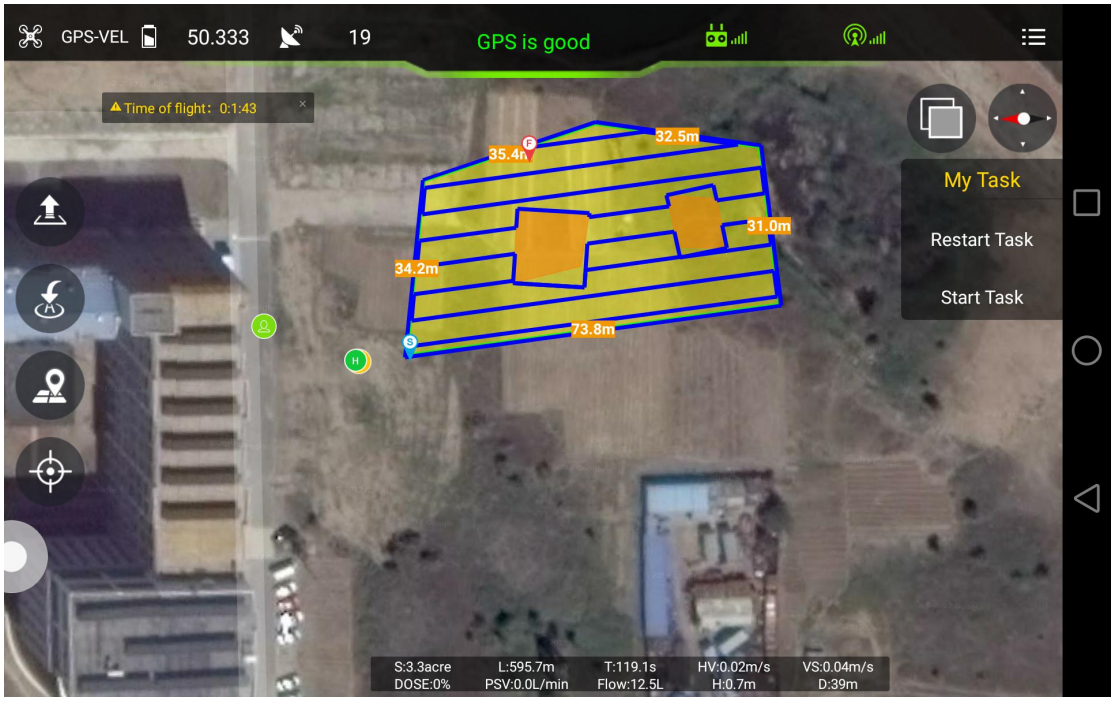

Select *adding area* to choose working area,obstacles could be added by clicking *add obstacles*.


Rout can be made after area added.

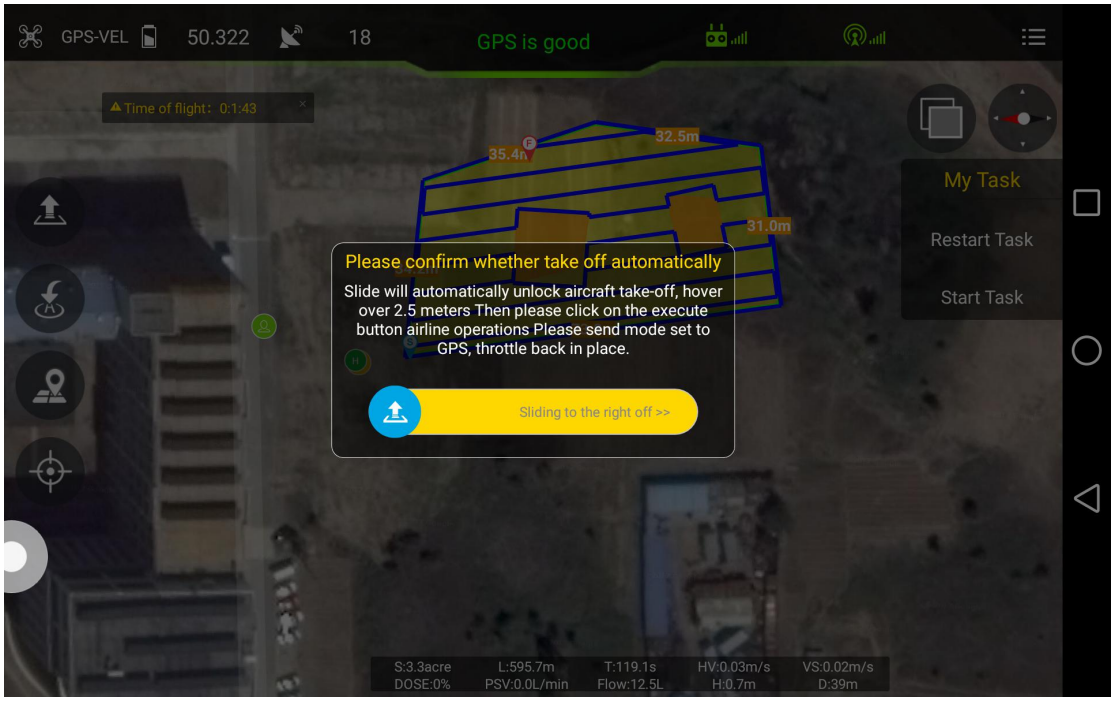



*Swath*(distance between each spraying),*angle*(angle of line),*obstacle gap*(distance around the obstacle),*target gap*(distance between working area and boundary),*offset*(offset of working area) in *Adjust Route interface.*Task could be saved according to demands,and then upload it by selecting block(working area).





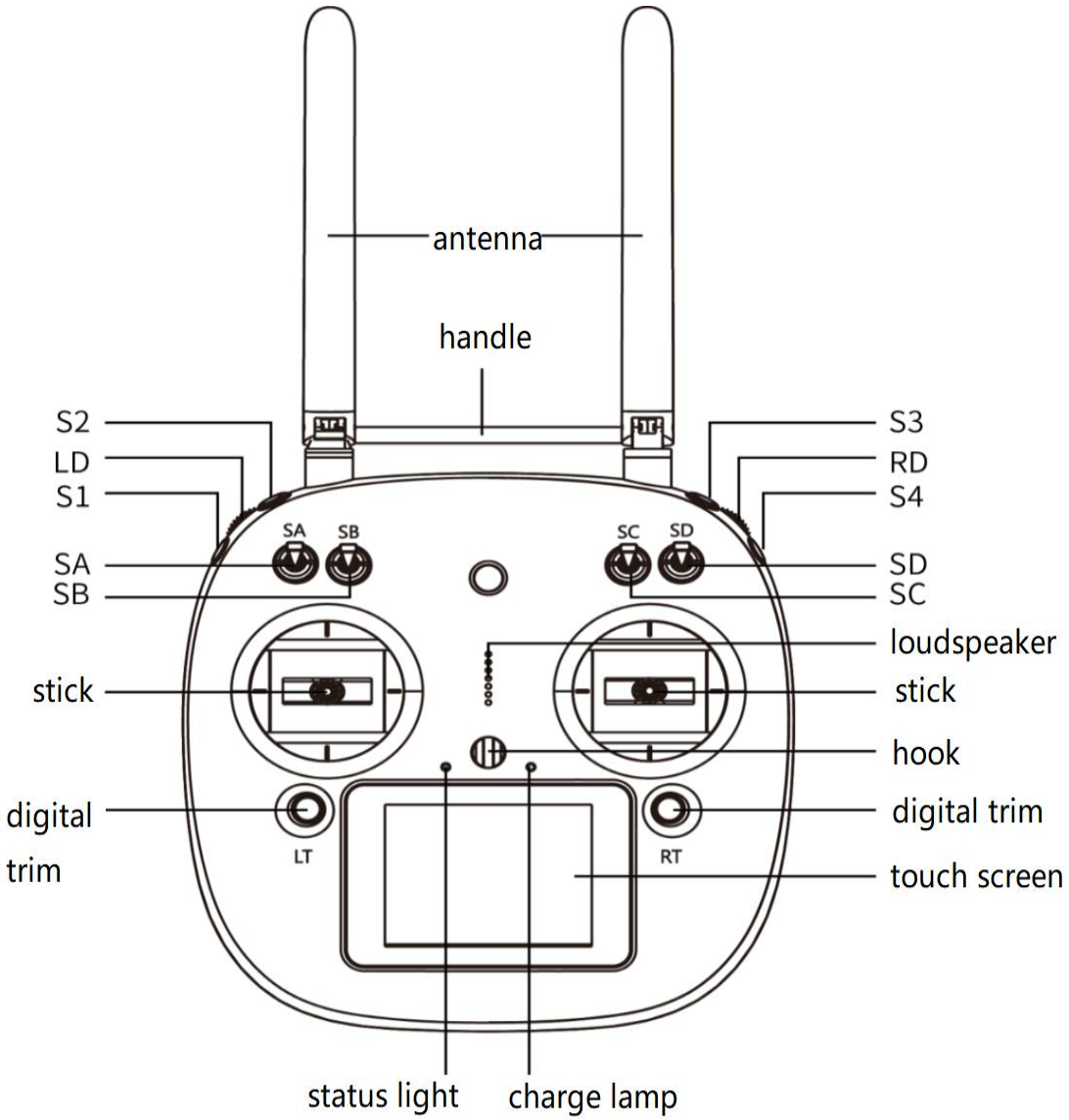

Click  to take off from GCS or remote controller,click *start task* to execute the route.

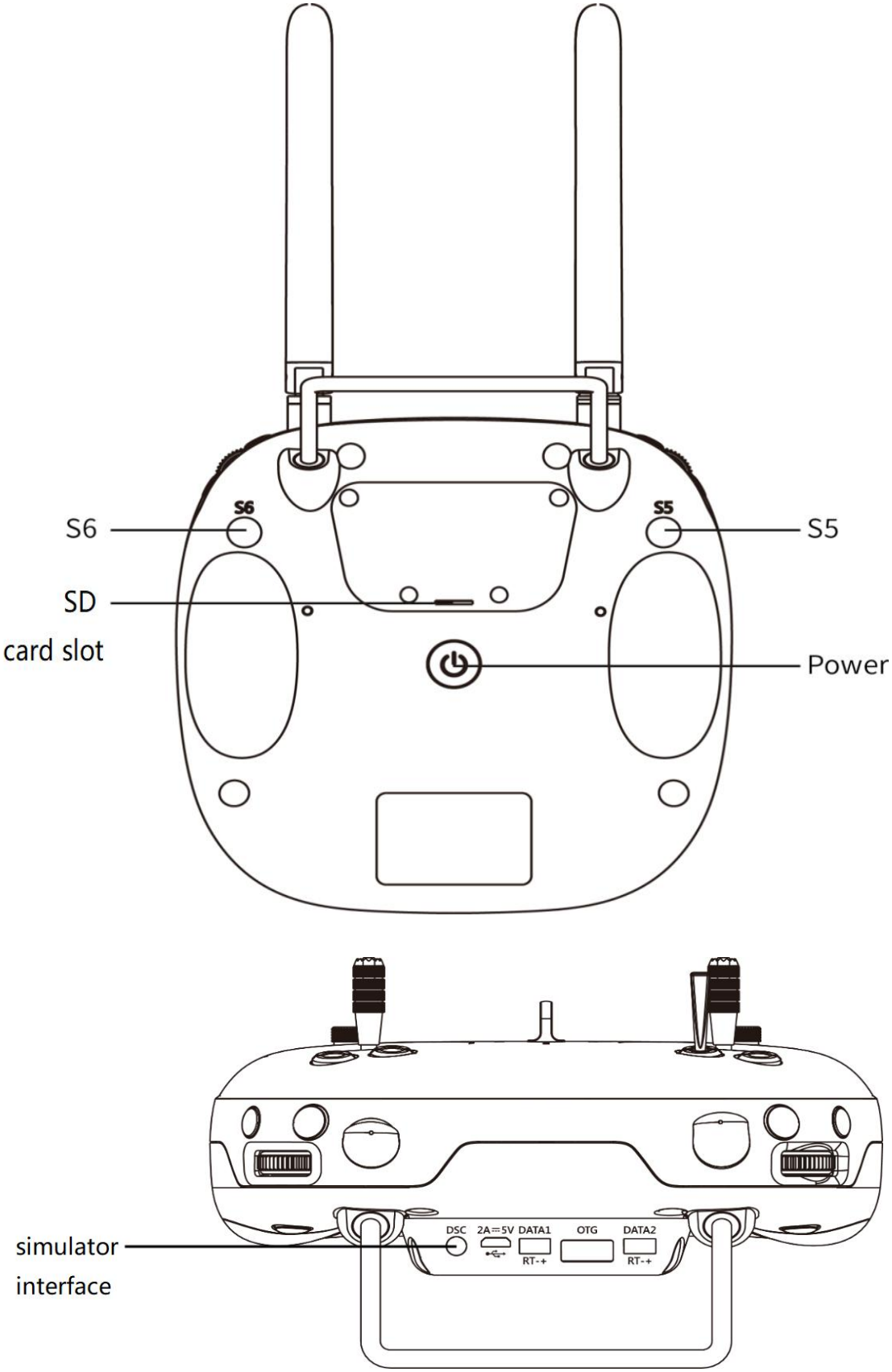



***Rudder*** **and** ***Throttle*** **could be changed during flying,obstacles could also be avoided by moving the** ***Aileron*** **stick.**

## 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 should not at temperature more than 60℃.


antenna
handle
S2
LD
S1
SA
SB
S3
RD
S4
SD
SC
loudspeaker
stick
stick
hook
digital
trim
digital trim
touch screen
SA
SB
SC
SD
LT
RT
status light
charge lamp


S6
S5
S6
SD
card slot
Power
simulator
interface
DSC
2A⎓5V
DATA1
RT-+
OTG
DATA2
RT-+

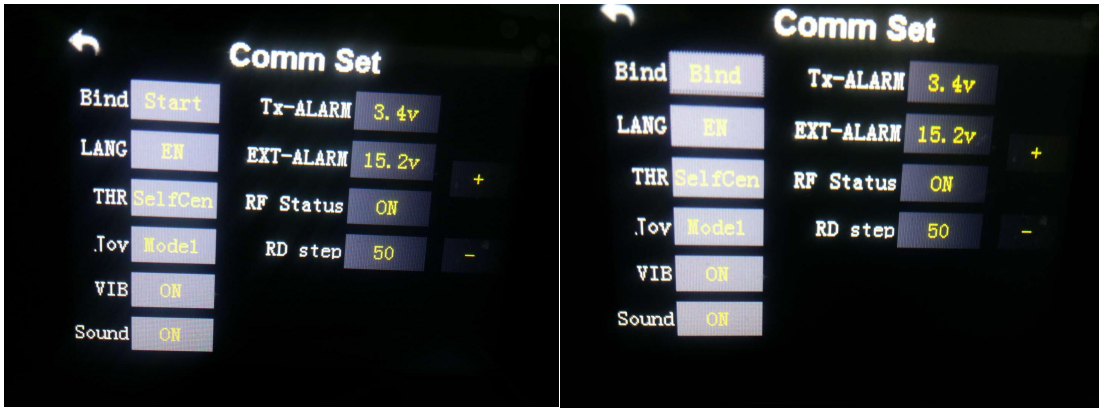
## 6.1 Function description

| Channel | top | middle | bottom |
|---|---|---|---|
| SA: flight mode | Altitude mode | GPS mode | AB mode/automatic |
| SB: pump mode | OFF | combination | manual |
| SC: terrain following | OFF | / | ON |
| SD: AB recording | / | Recording Point A | Recording Point B |
| S3: pump | OFF | / | ON |
| S2: back landing | OFF | / | ON |

## 6.2 Bind

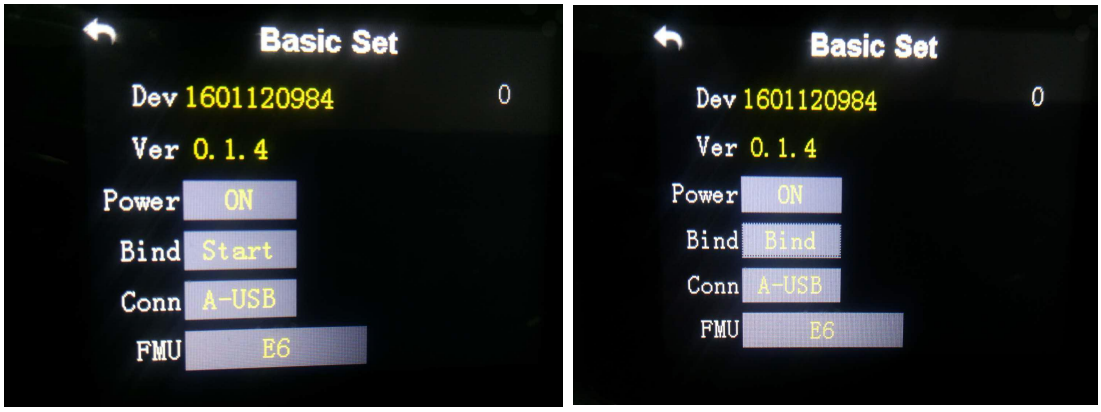
**Bind by receiver**

- Select *setting* of main menu,click *system setting--Comm Set*,click Bind *start*,then *bind* will be displayed.Power on the control system by power bank,copter will enter into bind mode automatically if the last remote controller signal could not be inspected after 5 seconds,*finish* will be displayed. Remote controller need to be calibrated after bind.




**Bind by datalink**

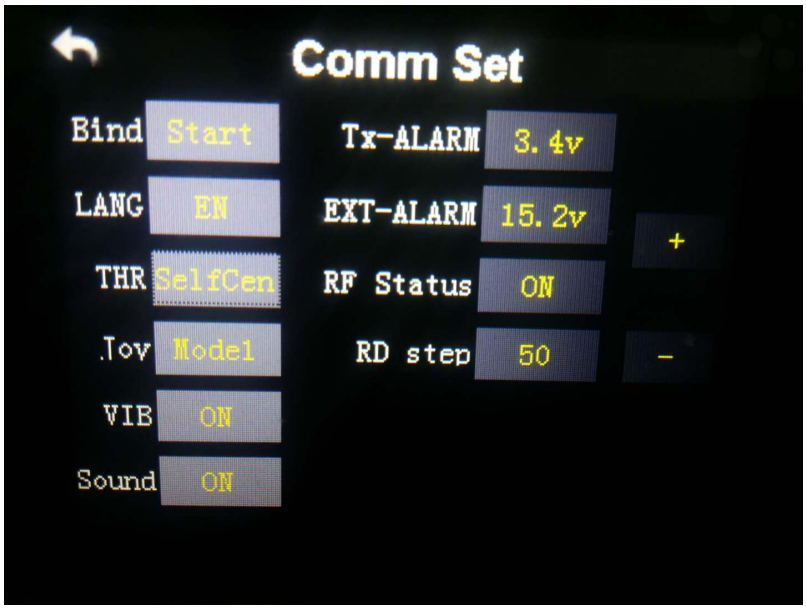
- Select *setting* of remote controller,click *datalink--Basic Set*,click Bind *Start*,power on the control system by power bank,datalink will enter into bind mode automatically if last remote controller can not be inspected after 5 seconds,*finish* will be displayed.




◆ **Remote controller joystick setting**

1. Sel back to center remote controller:close alarm function.

2. Remote controller need to be set. Setting method:main menu--*system setting*--click THR,choose SelCen.




**Language** could be set.

## 6.3 Remote controller antenna direction

Remote controller antenna should straight up when normal operation.

## 6.4 How to change between mode 1 and mode 2

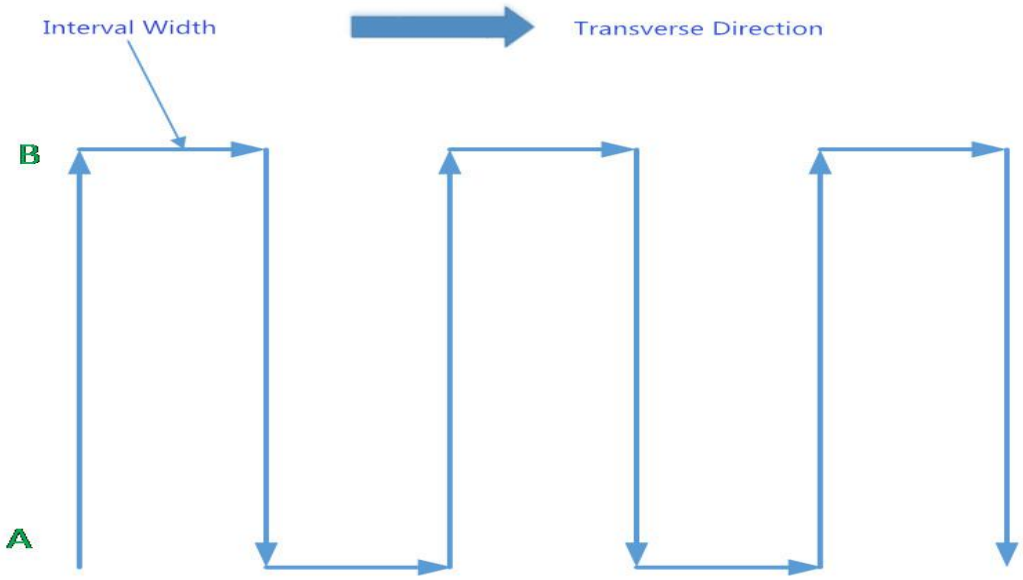
Please change in the position:System--Comm Setting--Joy

# 7. Function Control

## 7.1 Flight Mode

| Flight mode | Instruction | Operate | Condition |
|---|---|---|---|
| Altitude 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/empty tank reaction/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 roll | GPS satellites enough, LED does not flash red |
| Return mode | Copter will fly back home point automatically,flying back tail to home point and 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 SD 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,witch SD to ”Point B memorized”.After that,the LED flash yellow for 2 seconds.The controller have voice prompt.
3) Select the direction,switch SA (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 that the water 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;

③Fix point A:while the drone moving from point B to Point A,push up the pitch stick to make point A 1m closer to point B,push down the pitch stick to make point A 1m away from point B.

④Fix point B:while the drone moving from point A to Point B,push down the pitch stick to make the point B away from point A,push down the pitch stick to make point B 1m 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, shut down the AB mode auto-controlled or manual-controlled. After filling the pesticide in the tank and taking off,switch SA (flight mode)to AB mode directly ,the drone would return right to the breakpoint.

2. Remove Point A and B

Move stick SD (AB mode) for 4-5 times rapidly,LED alternately flash red green and yellow,AB mode removed.**Without removing 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.

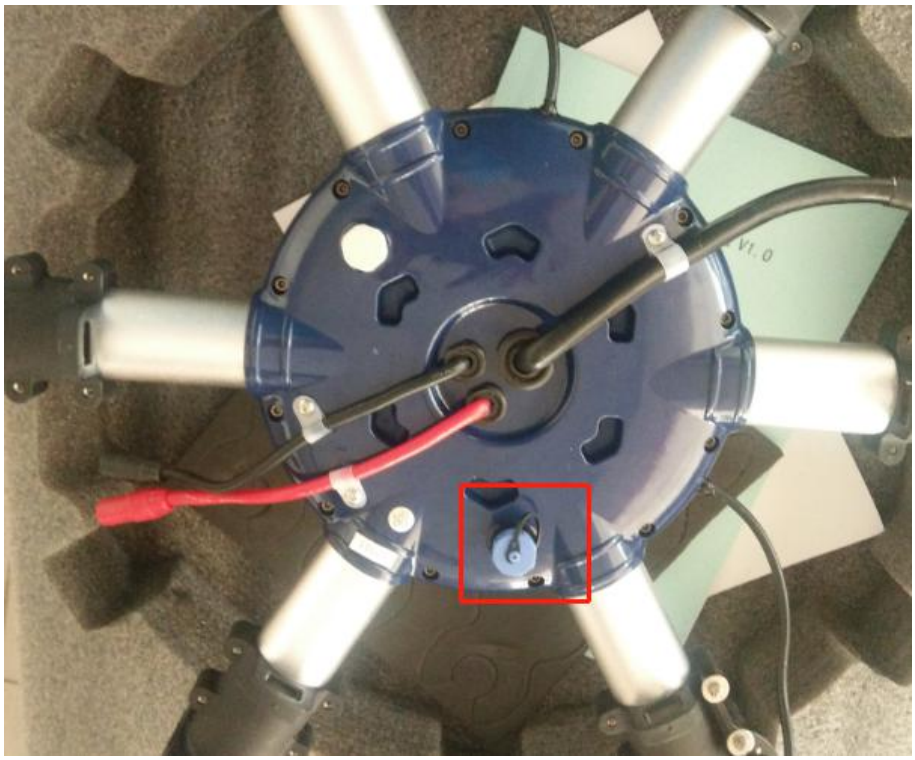
# Appendix I Implication of Indicator Light

| Items | Indicator light | Priority |
|---|---|---|
| Flying Mode | | |
| Gyro mode(stabilization,altitude) | 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 |

# Appendix II How to connect copter to PC GCS

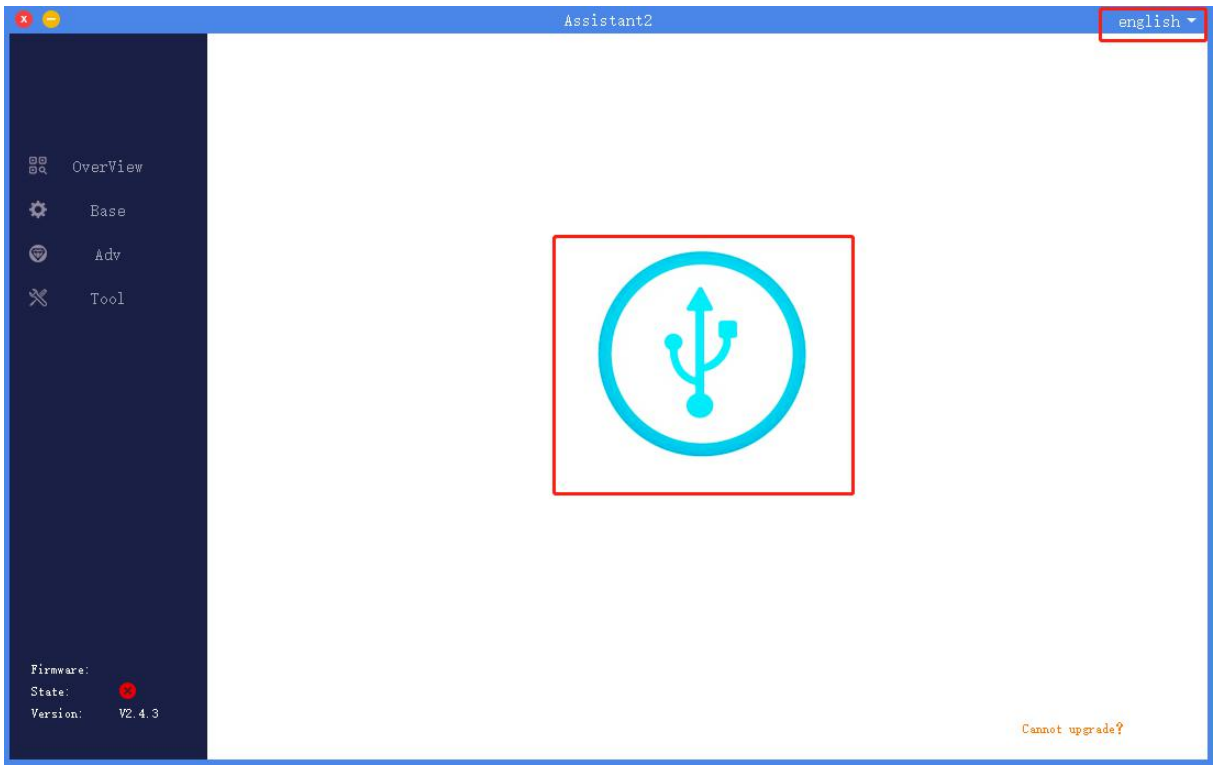
1 Find the correct port from the copter and open the protection cover,see figure 1:




2 Find the computer connection cable from the attached bag,see figure 2:

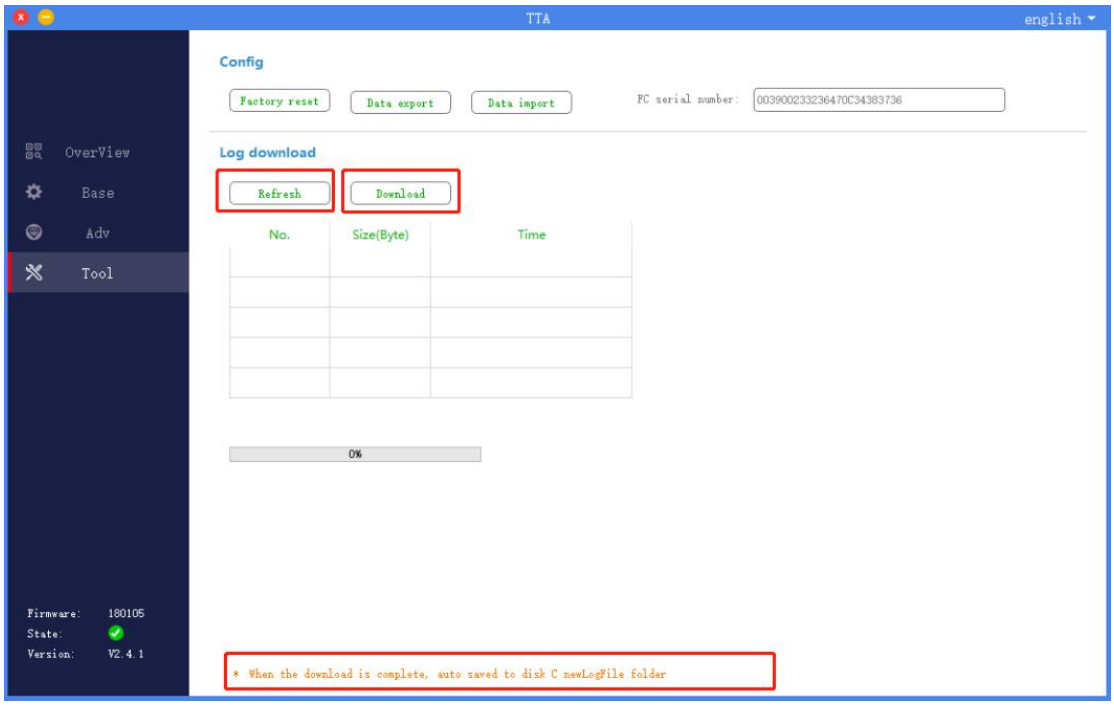
3 One connect to computer,another end connect to copter.Waiting for a moment(It takes few minutes to install the driver for the first connection with a new computer)

4 Open PC GCS,select the language you need.Click the connection button,see figure 3:



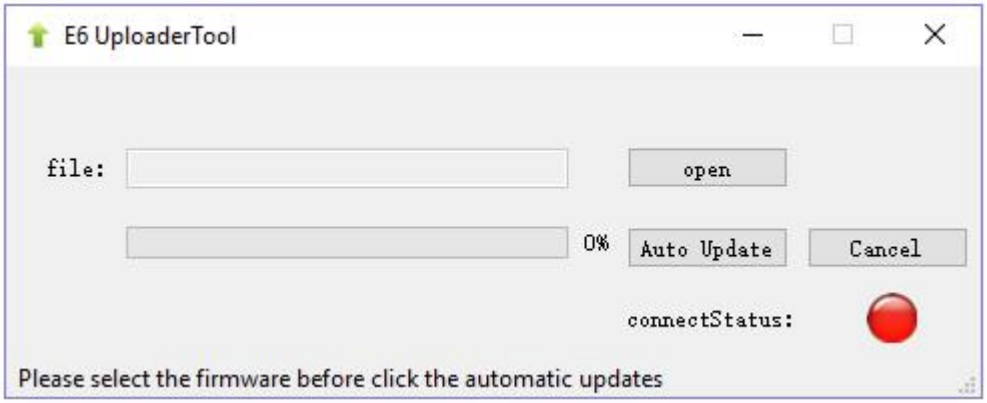
# Appendix III How to download log from PC GCS

1.Open the PC GCS, select Tool menu
2.Click Refresh button
3.Click Download button
4. Log is saved in the position as the orange word




# Appendix IV How to upgrade the firmware

1 download the upgrading tool from the following address:
https://www.dropbox.com/sh/371k17zp8guv5y9/AAB8fUGjJ7zCN8qRF0Do8x57a?dl=0
2 Open the upgrading tool,see the following picture:




3 Click the button *open*,select the correct firmware.
4 Click the button *Auto Update*,then the circular indicator will turn to be green.LED of copter usually is OFF during upgrading.
5 Waiting until the down left corner to 100%.The circular indicator will also turned to red and LED will flash red yellow green to self inspection. Waiting for a moment,the led will flash normally,then upgrading is finished.

6 Close the upgrading tool and disconnect the upgrade cable.

# Disclaimer

1. To protect the legitimate rights and interests of users, please be sure to read our instruction attached carefully before using product.Be sure to understand your legitimate rights and interests, responsibilities and safety instructions; or it may cause property damage, safety accident and hidden personal safety problem.Beijing TTA reserves the right to update this document. Please be sure to in accordance with the instructions and safety instructions operating this product.
2. The users use this product directly or indirectly, any violation of the law, TTA company will not bear any responsibility.
3. This product is not suitable for under-18-year old and other who do not have full capacity for civil conduct, please avoid these people use this product.While using this product in public occasion please pay extra attention to operate.
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.