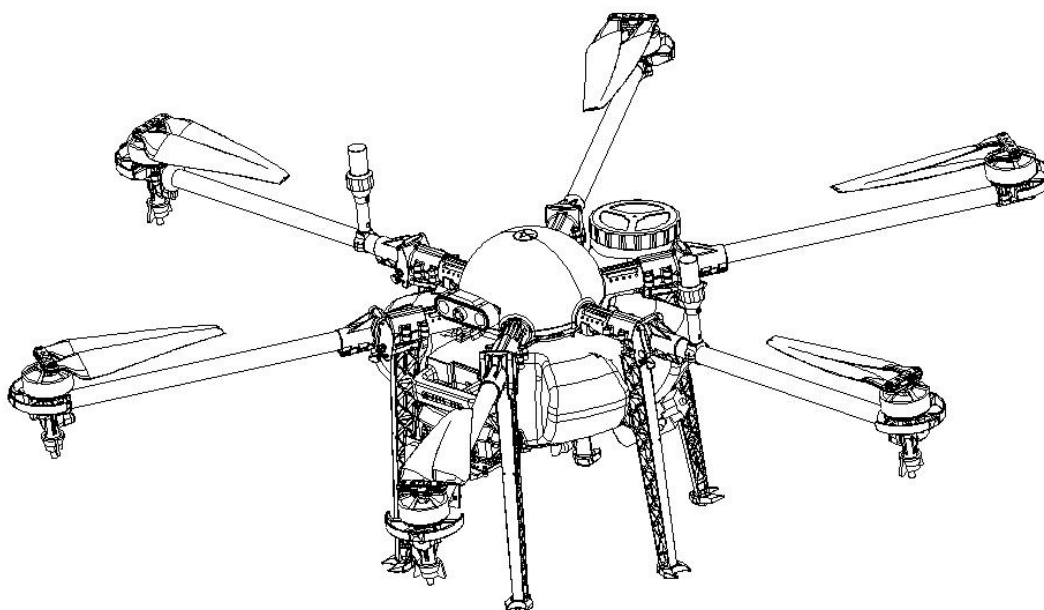


TIANNONG M6E-X2

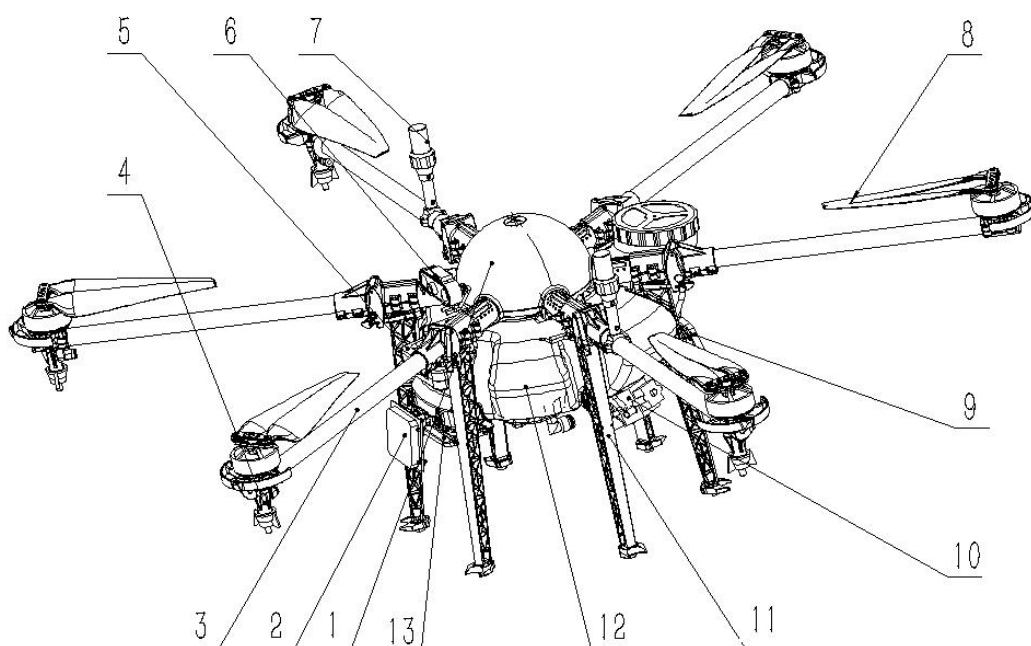
USER INSTRUCTIONS



Beijing TT Aviation Technology Co.,Ltd.

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

TIANNONG M6E-X2 Structure



Item	Component	Item	Component
1	Fuselage	8	Propeller
2	Front Collision Avoidance Radar	9	Rear Collision Avoidance Radar
3	Arm Assembly	10	Pump
4	Sprinkler Assembly	11	Landing Gear
5	Battery	12	Tank
6	FPV Camera	13	Terrain Following Radar
7	RTK Antenna		

Catalogue

1. Use Instruction.....	1
1.1 Safety Instruction.....	1
1.2 Pesticide Usage.....	2
1.3 Inspection.....	3
1.4 Environment.....	3
1.5 Operation.....	3
1.6 Compass Calibration Requirements.....	4
2. Product Introduction.....	5
2.1 TIANNONG M6E-X2 Parameter.....	5
2.2 TIANNONG M6E-X2 Agriculture UAV Specification.....	6
2.3 Preparation Before Takeoff.....	7
2.3.1 Installation of the Fuselage.....	7
2.3.2 Arm Installation.....	9
2.3.3 RTK Antenna Installation.....	15
2.3.4 Spraying Tube Installation.....	16
2.3.5 Intelligent Battery Installation.....	16
2.3.6 Obstacle Avoidance Radar Installation.....	17
3. Intelligent Battery Instruction.....	18
3.1 Key Function.....	18
3.2 Electricity Inspection.....	18
3.3 Charging.....	19
4. Charger Station Introduction.....	20
4.1 Production Parameters.....	20
4.2 Wiring diagram.....	21
4.3 Indicator Lamp Instruction.....	23
4.4 Operation Instruction.....	24
4.5 Interface Instruction.....	25
4.6 Operation Instruction.....	26
5. App Setting of Copter.....	28
Operation Flow of A New Drone.....	28
5.1 Overall Registration Procedure.....	29
5.2 Software Installation.....	29
5.3 Registration and Login.....	30
5.3.1 Registration.....	30
5.3.2 Login.....	30
5.3.3 Account Update.....	30
5.4 Flying Homepage.....	32
5.5 Connect.....	35
5.6 Device.....	36
5.6.1 Plane list.....	36
5.6.2 Plane Add.....	36
5.6.3 Nofly Apply.....	36
5.6.4 Switch Owner.....	37

5.7 Record.....	38
5.8 Route Planning.....	39
5.8.1 Mapping.....	39
5.8.2 Mission Assignment.....	43
5.8.2.1 How to share your ground to everyone nearby?.....	43
5.8.2.2 ADD a ground from “Around Ground” into my ground list.....	44
5.8.2.3 Add the ground into my “Wait-Job” list or a specific account.....	45
5.9 Start Mission.....	47
5.9.1 Route Adjust.....	47
5.9.2 Start Spraying.....	49
5.10 AB Mission Mode.....	50
6 Settings.....	52
6.1 RC Calibration.....	52
6.2 Parameters Settings.....	53
6.2.1 Sensor.....	53
6.2.2 Battery.....	54
6.2.3 Spray.....	55
6.2.4 Parameters.....	58
6.3 Extra Mode.....	58
6.3.1 Smart Battery.....	59
6.3.2 Terrain Follow Radar.....	59
6.3.2 J-RTK.....	60
6.3.3 Obstacle Avoidance Module.....	60
6.4 About.....	62
7. Remote Controller.....	63
7.1 Function Description.....	64
7.2 Bind.....	64
7.3 RC Hardware Calibration.....	64
7.4 RC Connection & Device Helper.APP Introduction.....	65
7.6 Remote Controller Antenna.....	67
7.7 Flying Control.....	67
7.7.1 Manually Arming and Take-off.....	68
7.7.2 Disarming.....	68
8. Flight Mode.....	69
Appendix I Key Parts Maintenance.....	70
Appendix II Implication of Indicator Light.....	71
Appendix III How to connect copter to Assistant 2.....	72
Appendix IV How to download log from Assistant 2.....	73
Appendix V How to upgrade the firmware.....	74
Appendix VI Important Attentions and Clauses.....	75
Disclaimer.....	77

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 if you are in drinking, tired, drugs, physical discomfort, etc. .
- ♦ Please inspect it before using every 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 spraying, 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 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.

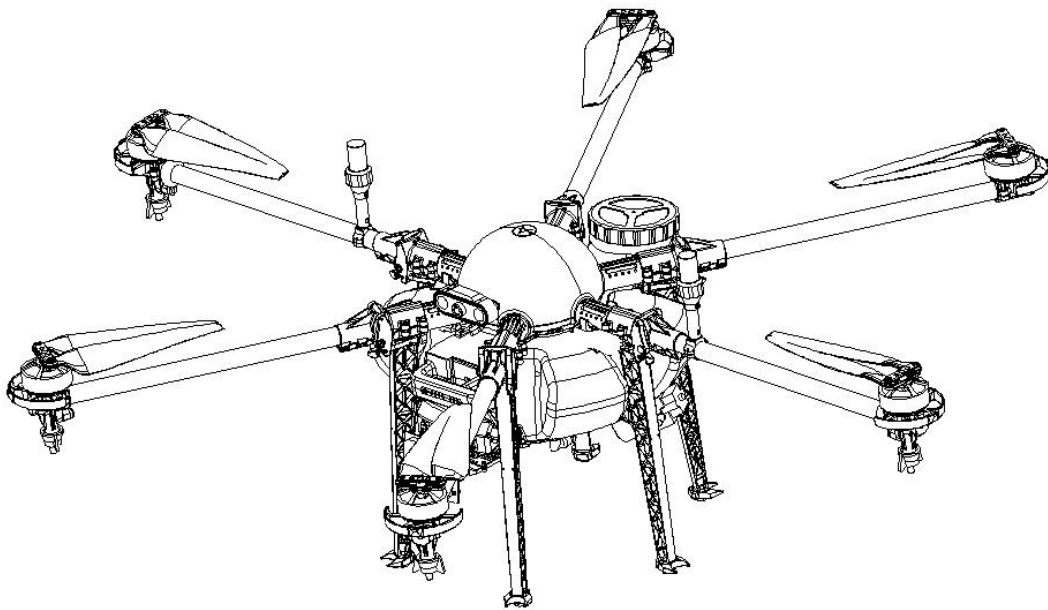
1.6 Compass Calibration Requirements

- ♦ 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

TIANNONG M6E-X2, 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. Dual Directional Antenna brings strong resistance against electromagnetic Interference. Various spraying tests proves the best performances of this UAV



2.1 TIANNONG M6E-X2 Parameter

Weight (without battery)	9.5KG	Max Pitch Angle	≤35°
Standard Takeoff Weight	24KG	Best Spraying Speed	4--6m/s
Max Takeoff Weight	25KG	Max Spaying Speed	10m/s

Max Thrust-weight Ratio	2.25(Flying weight 24Kg)	Working Time	6--12min/flight
Battery	TTA Intelligent Battery(12S)	Max Climbing Speed	5m/s
Max Theoretical Power	12000W	Max Landing speed	3m/s
Hovering Power	3200W	Max Flying Speed	10m/s
Hovering Time	Empty flight ≥22min Full flight ≥10min	Recommended Working Temperature	10-35C°
Hovering Accuracy	Horizontal ±0.5m 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-X2 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	160KV
		Max Thrust	9KG
		Max Power	2000W
		Weight	325g
	ESC	Max Continuous Working Current	50A
		Max Peek Current(3s)	100A
		Max Voltage	14S
		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	2388 (L=585mm)

		Weight	95g
	Battery	Capacity	14000MAh
Spraying System	Tank	Rated Payload	10KG prevail over 10L
	Sprayer	Model No.	Pressure Type (Sector&Cone)
		Quantity	6 pcs
		Sprayer Diameter	0.5-1.5mm
		Spraying Speed	4--6m/s
		Spraying Volume	1.6--2.2L/min
		Spraying Width	4-6m (up to height)
		Spraying Droplet Diameter	80--200 μ m (adjustable)
Remote Controller	Remote Controller	Model No.	R4
		Working Frequency	2.4Ghz
		Endurance	10h
		Effective Signal Distance	1.2KM
		Battery capacity	3.7V, 4000mAh
		Charging type	DC, 5V 2A
		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

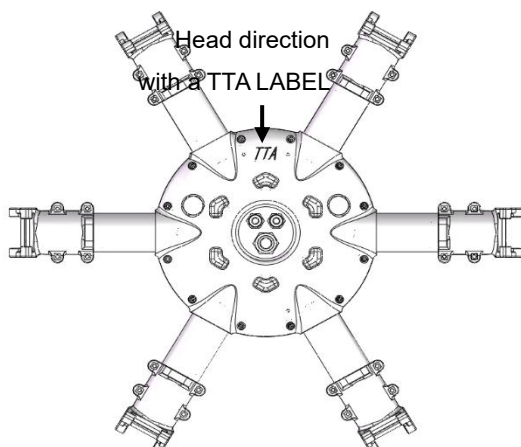


Figure 1

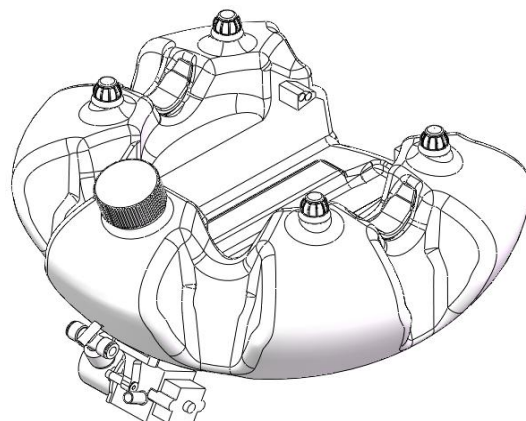


Figure 2

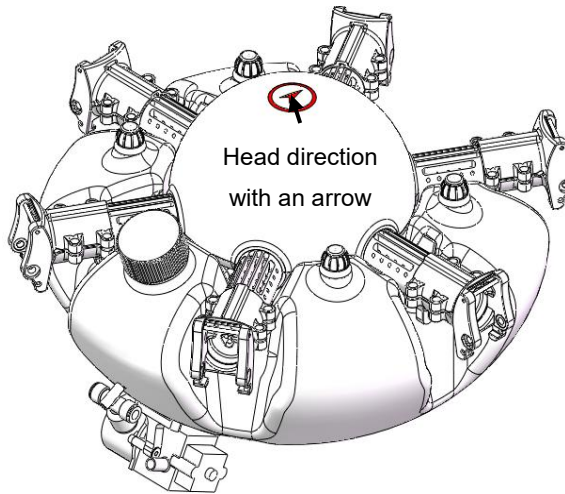


Figure 3

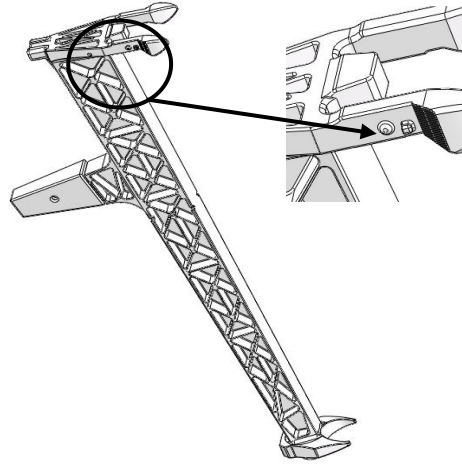


Figure 4

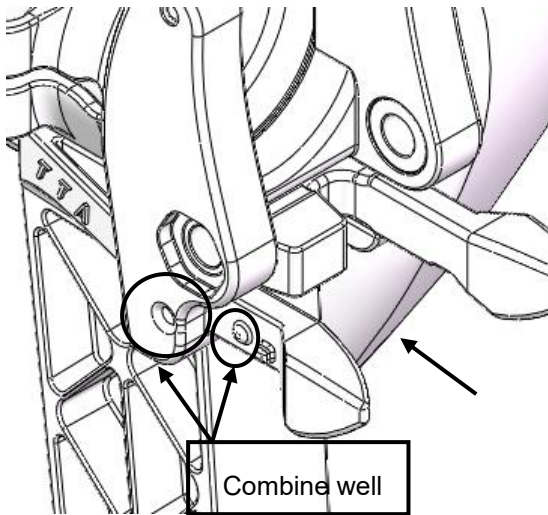


Figure 5

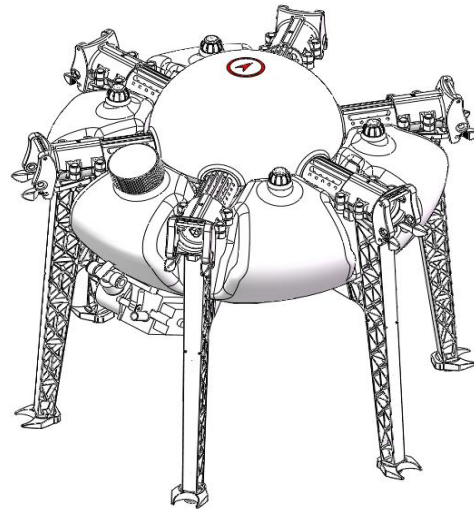


Figure 6

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)**

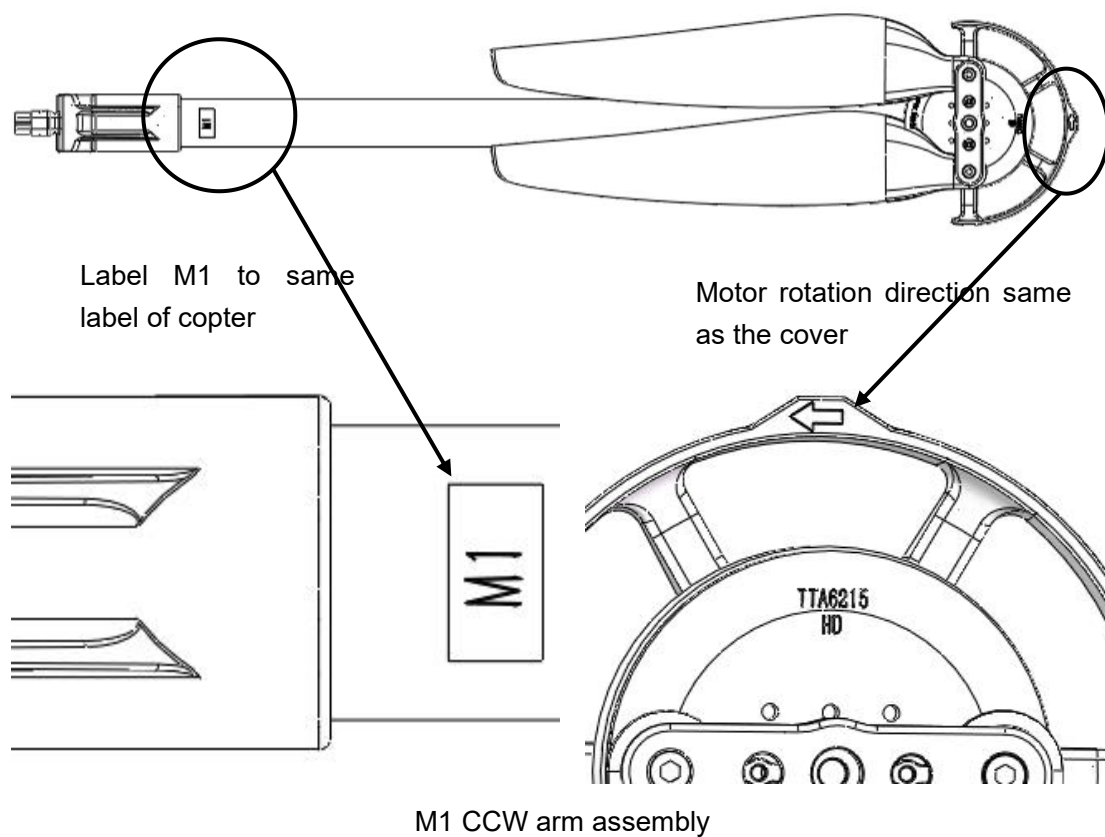
- 1) Put the fuselage bottom upward as the Figure1.
- 2) Install the fuselage and the water tank kit according to the mark ,1-3,2-4. It will be completed like Figure3.
- 3) Marking on the corresponding position of the 6 landing gears as Figure 4.
- 4) Slip the landing gear gently into the fillister mark 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

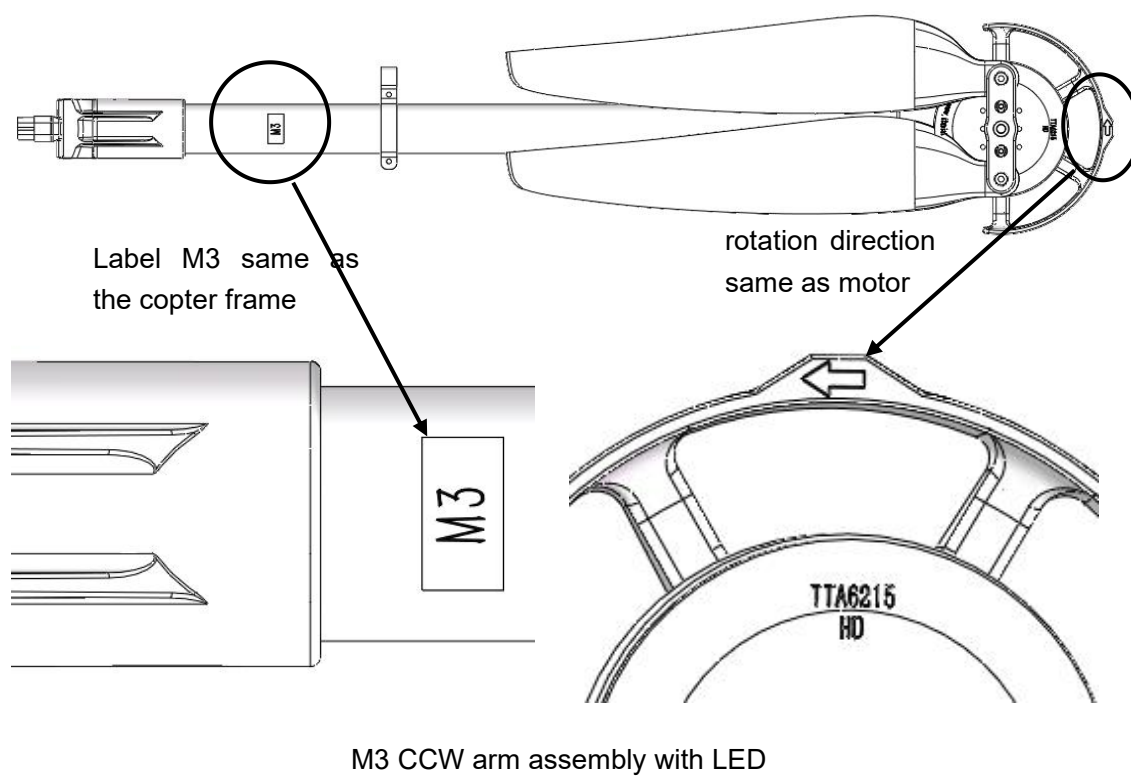
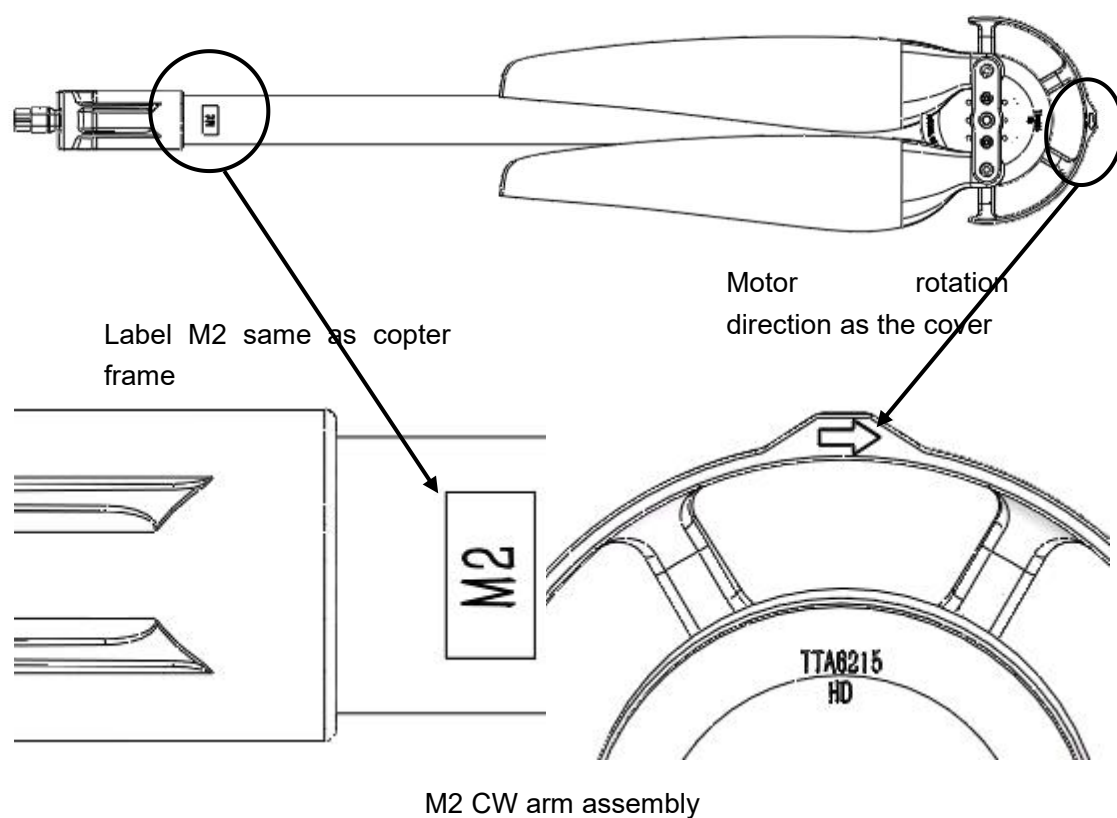
the installation.

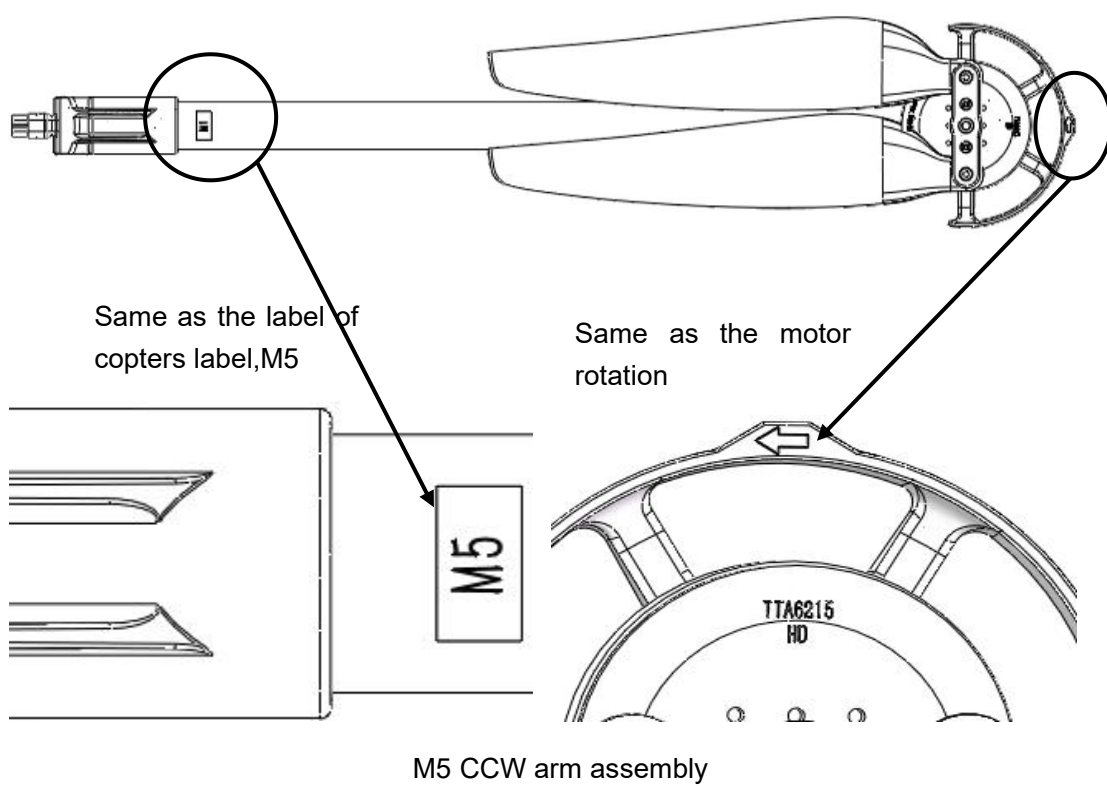
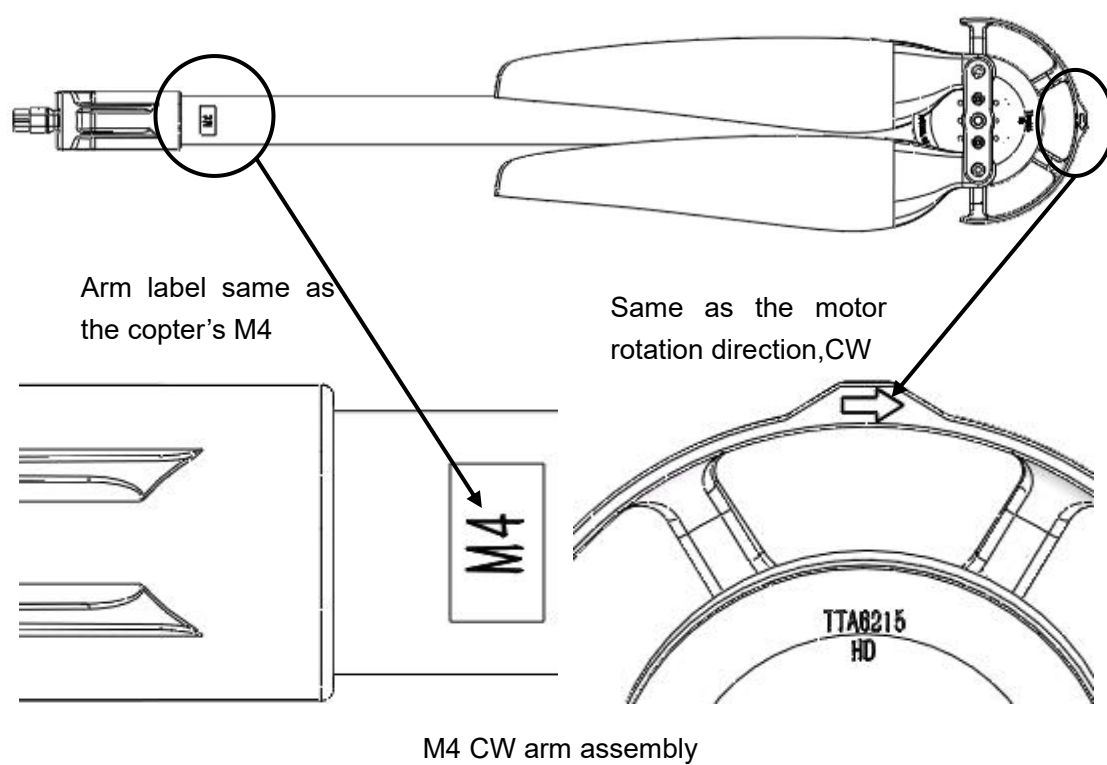
- 5) The rest 5 landing gears should be installed as above. It will be completed like Figure 6.

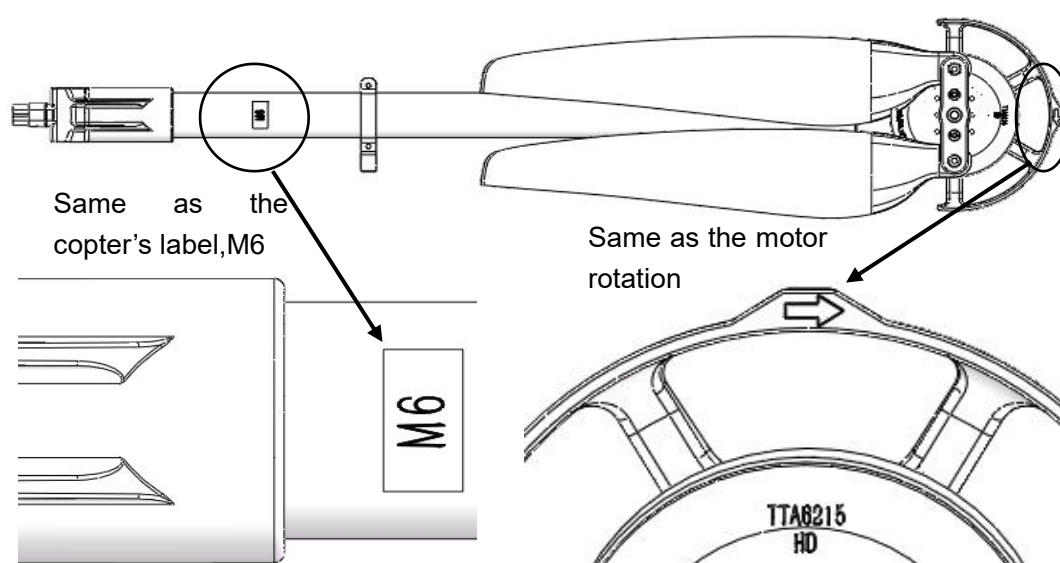
2.3.2 Arm Installation

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.

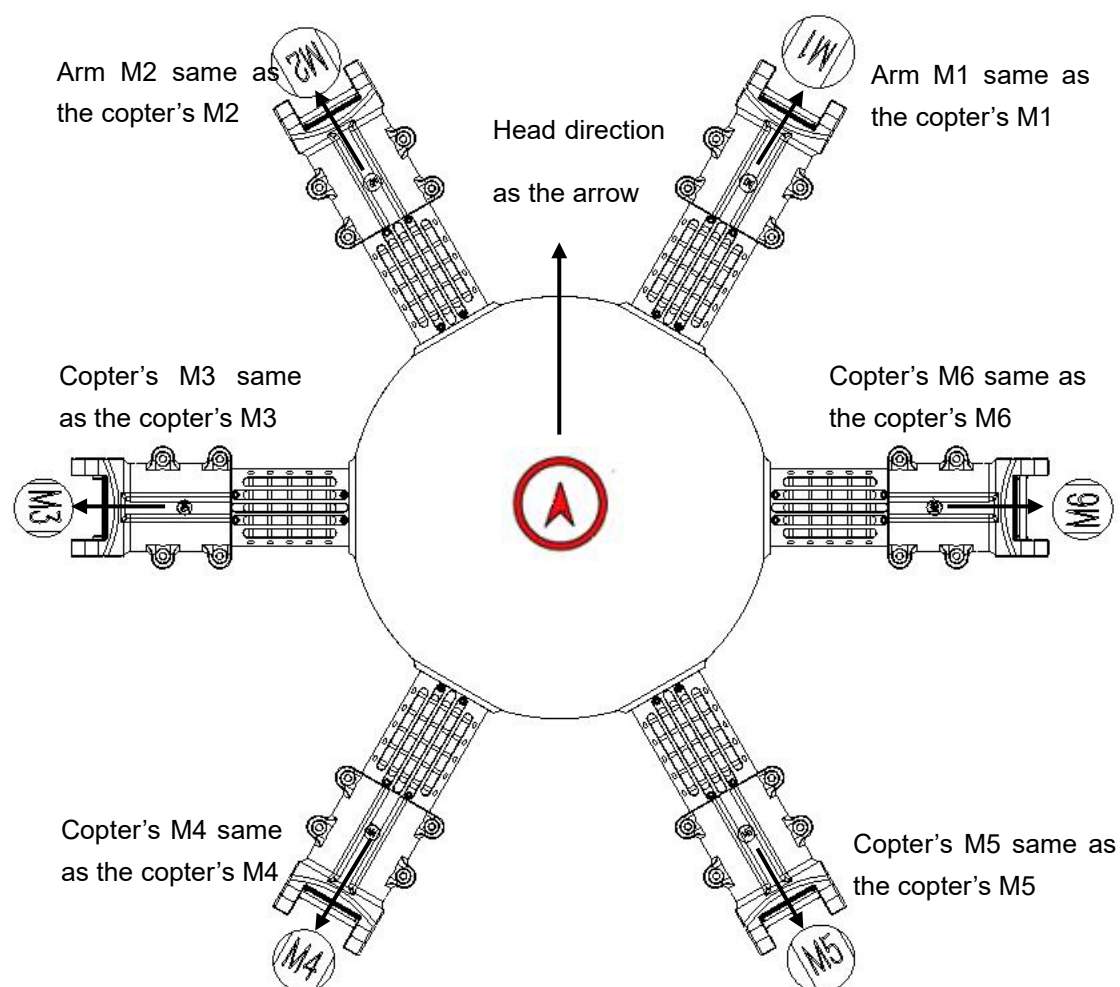








M6 CW arm assembly with LED



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.

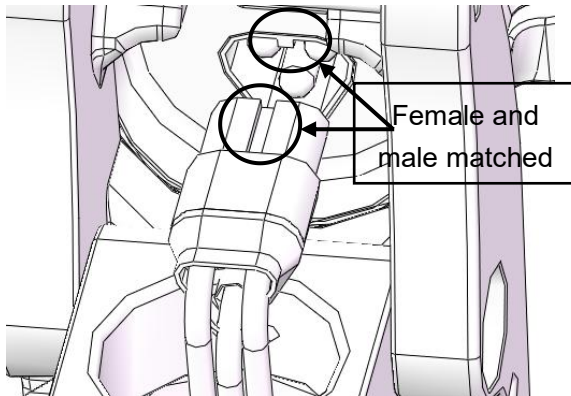


Figure 8

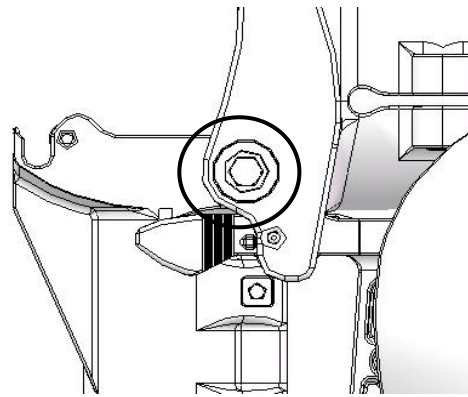


figure 9

- 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 be the same as the nut, that means lock works, as Figure 11

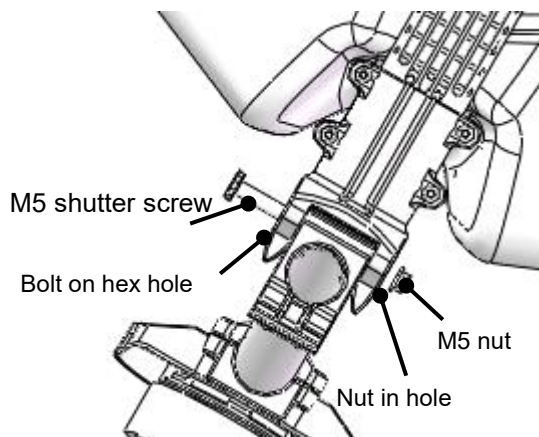


Figure 10

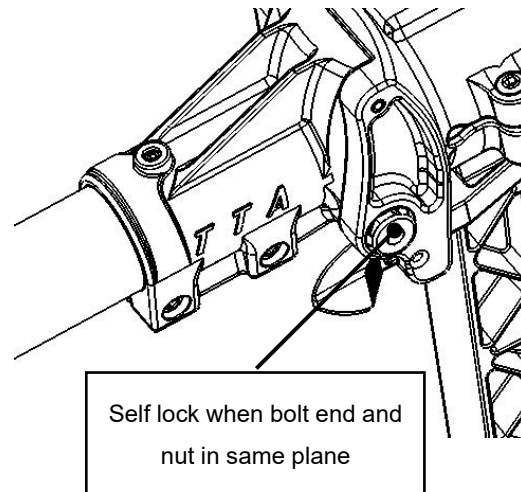


figure 11

- 5) Install the rest 5 arms as above, it will be completed like Figure 12.
- 6) Fix the camera module on the heading position as Figure 13.

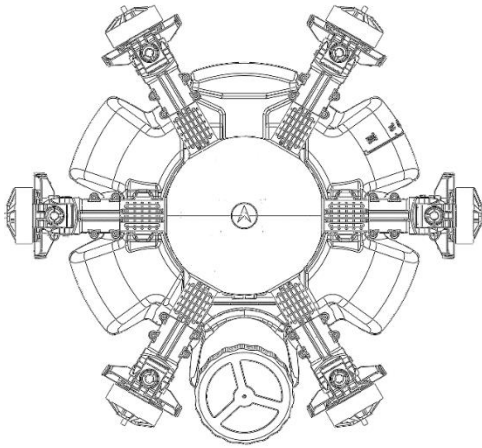


Figure 12

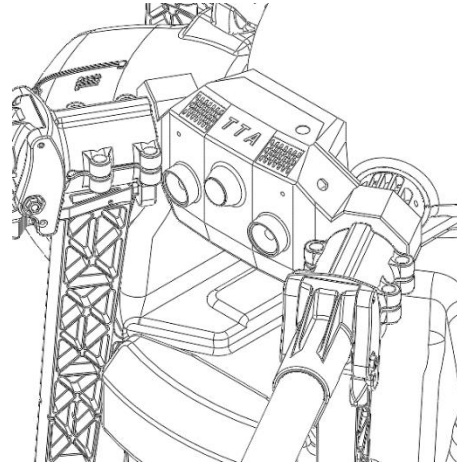


Figure 13

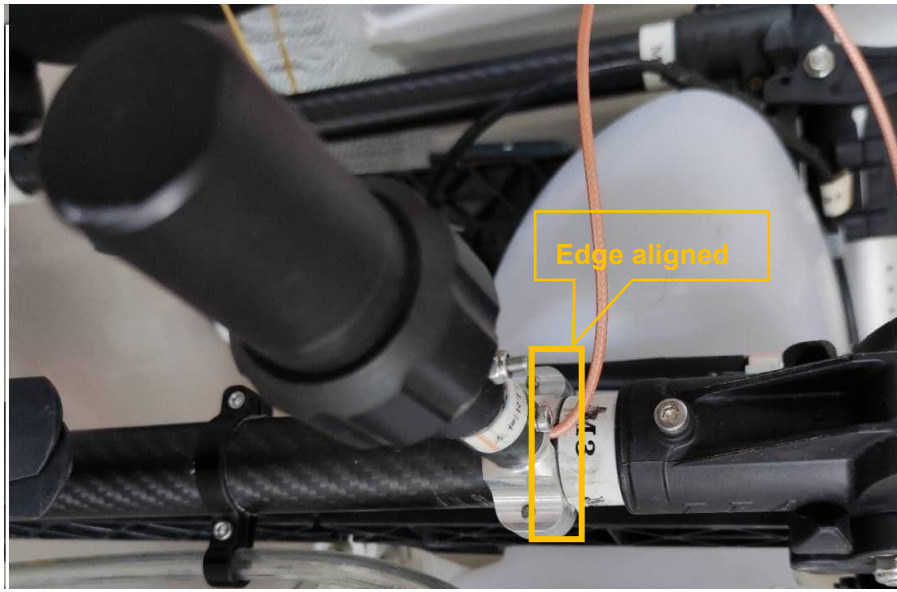
**Attention:**

- 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) There is a indicate arrow on the Dome which shows the heading direction.
- 3) 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.
- 4) Arm could only fold down instead of up during the installation, arm should be in an horizontal level with ESC

2.3.3 RTK Antenna Installation

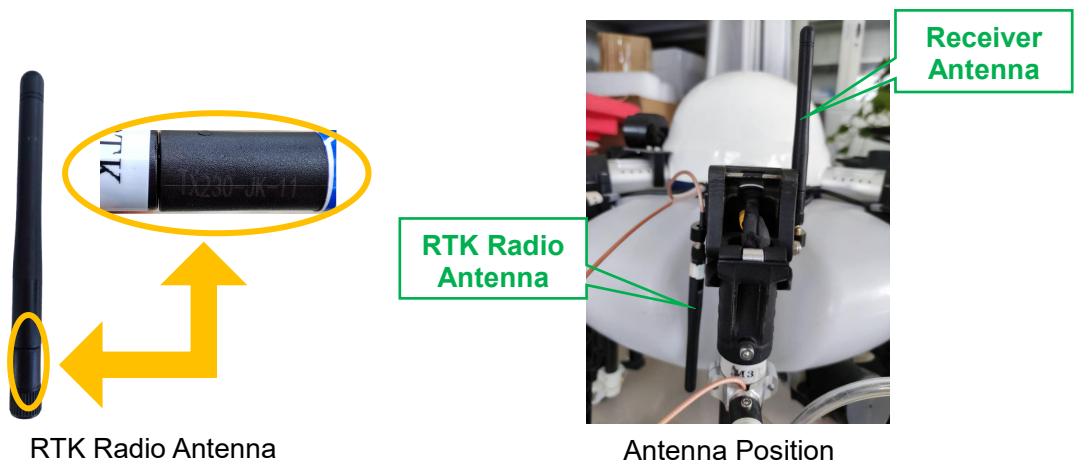
1) RTK Antenna Installation

The 2 RTK antennas should be installed on the M3 and M6 arm. The antennas should be mounted perpendicularly to the arm and upwards. The edge of antenna holder should be aligned with the out edge of arm label as picture below.



2) Data Radio Antenna Installation

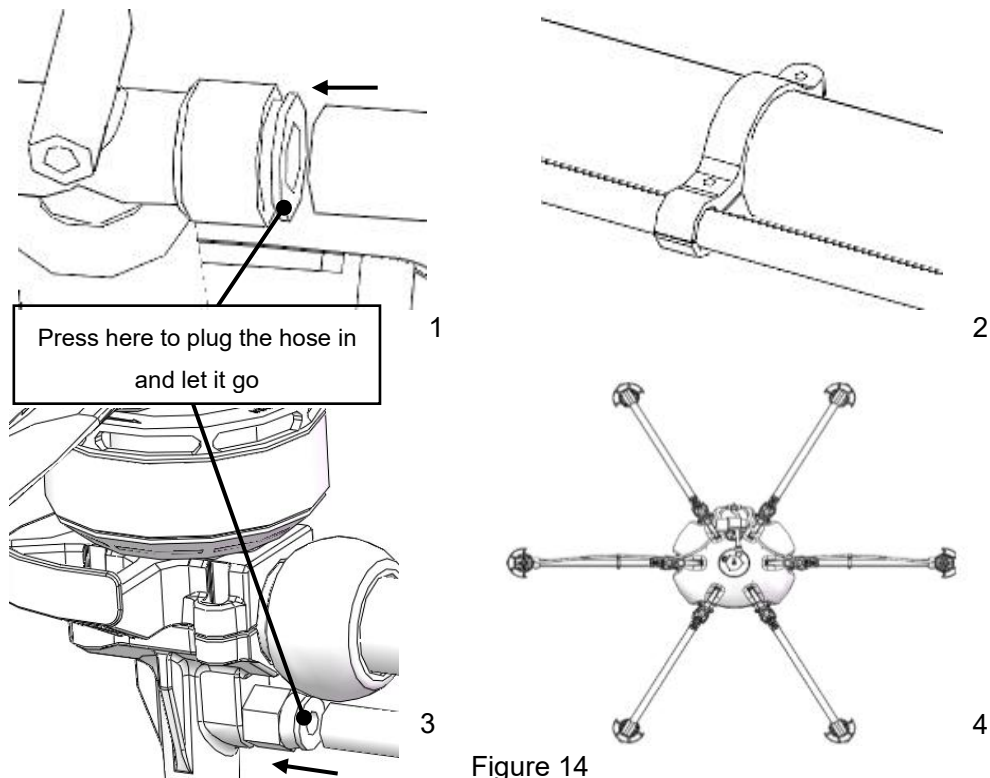
One antenna of RTK data radio need to be installed on the M3. The antenna should be mounted perpendicularly to the arm and downwards.



Attention: The difference between RTK radio antenna and receiver antenna: There are codes on RTK Radio Antenna "TX230-JK".

2.3.4 Spraying Tube Installation

First, insert the $\Phi 8$ spraying tube into the three-way connector as Figure 14-1. Second, go through the spraying tube from the tube holder as Figure 14-2. And then insert 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. It will be completed like Figure 14-3.



2.3.5 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 battery will be completely installed like Figure 15-4.

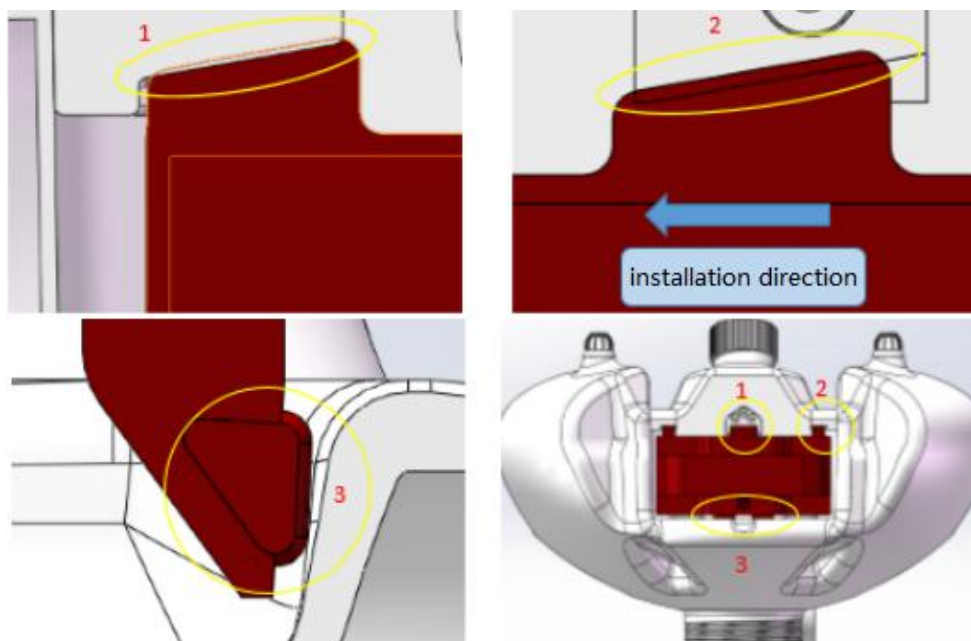


figure15

2.3.6 Obstacle Avoidance Radar Installation

Install the front obstacle radar on the front side of tank as figure 16.

Install the rear obstacle radar on the back side of tank as figure 17.

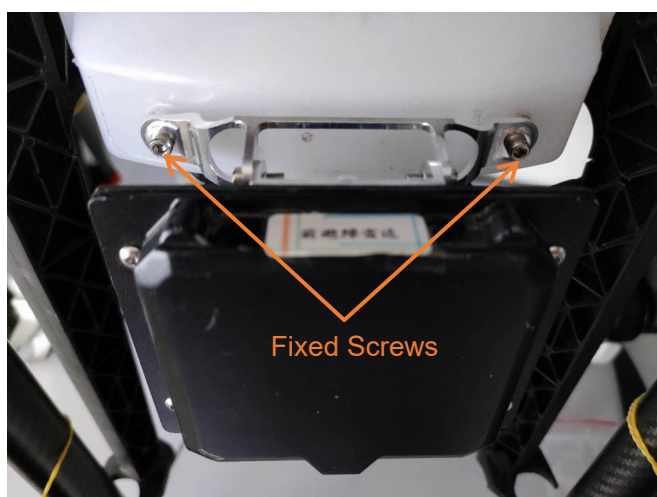


Figure 16: Front Obstacle Avoidance Radar

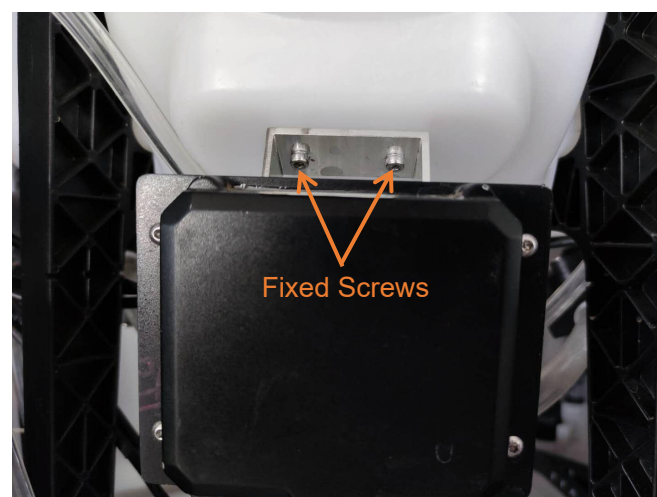


Figure 17: Rear Obstacle Avoidance Radar

Attention: The difference between front radar and rear radar is the distance between two fixed screws. The screw distance of front radar is much greater than rear radar.



3.Intelligent Battery Instruction

3.1 Key Function

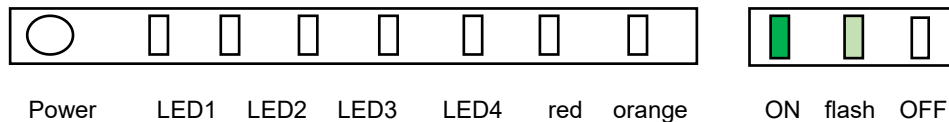
Short press 1S to check the battery real-time electricity.

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 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	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 Charging

- 1) Electric indicator will flash in cycle and displays the current electric quantity.
- 2) It means the intelligent battery has been full when electric indicator is OFF. Please take down the charger and charging has been finished.
- 3) The charging temperature of intelligent battery is 10℃ to 40℃, it's forbidden to charge above 45℃ or less than 5℃.
- 4) Please do not charge the battery without people.
- 5) 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	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



Attentions:

- Never assemble the battery by yourself;
- Inspect and Do a charge-discharge cycle to maintain battery immediately when you receive a new battery.
- Battery shall be maintained properly and regularly, or it would be damaged.
- Damages caused by improper use or improper maintenance will not be covered by warranty.
- For More use, maintenance and safe instructions, refer to <.Battery Use and Maintenance Instruction> please.

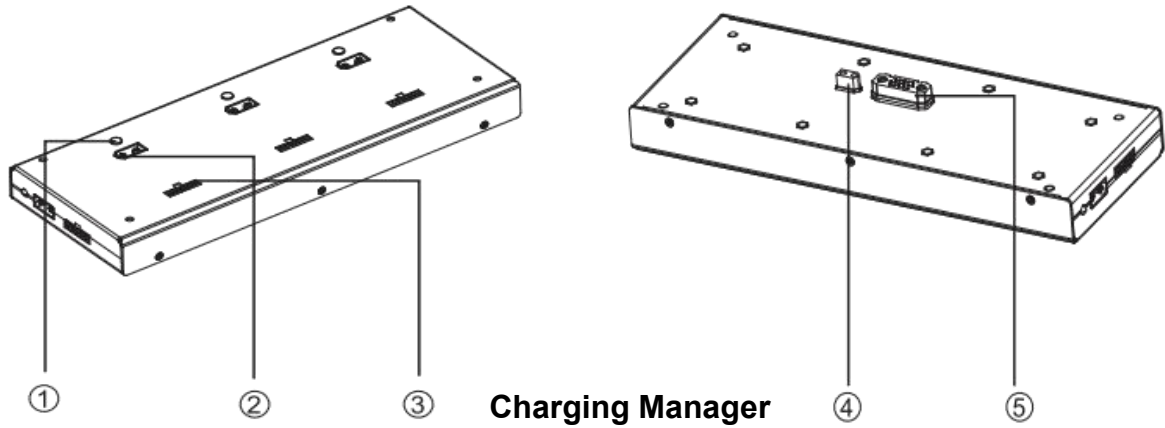


4.Charger Station Introduction

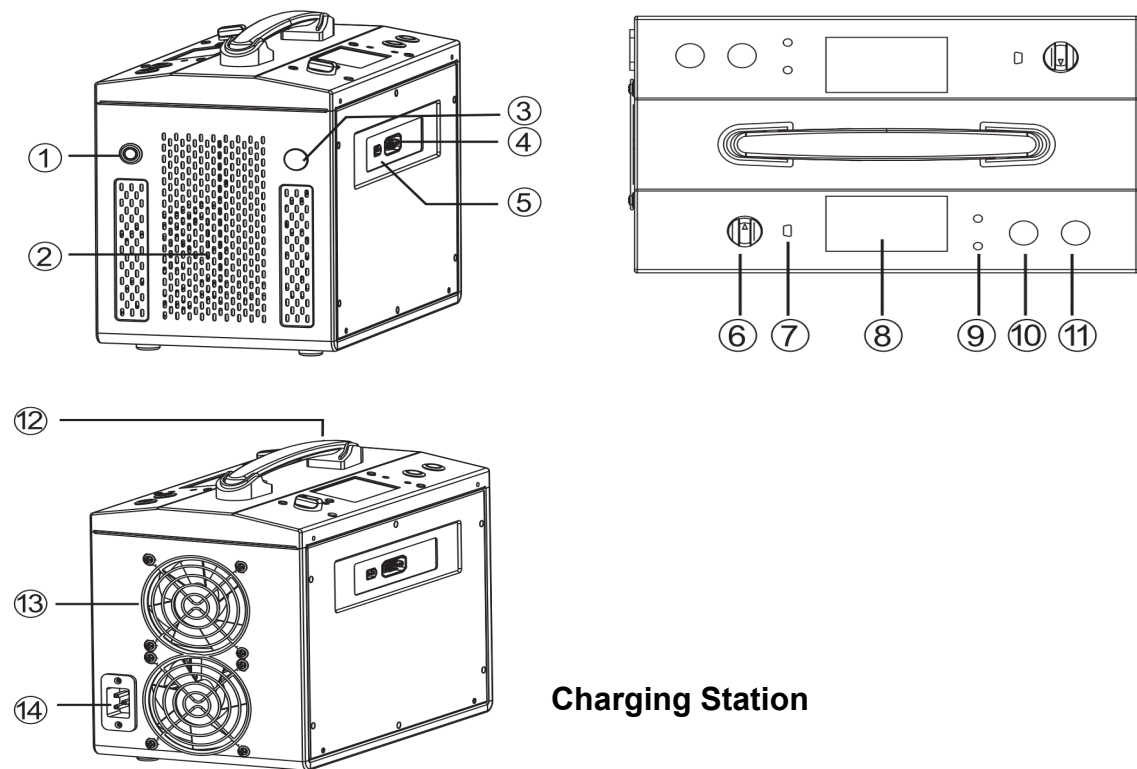
4.1 Production Parameters

Charging Manager	
Output current	Max.30.0A
Battery type	LiPo
Battery Cells	12S
Channel	5 channels/set
Input Protection	Over-current
Output Protection	Over-voltage, under-voltage, short circuit, over-temperature, open circuit, reversed polarity
Working Temperature	5-45℃
Dimension	320x121x30.4mm
Weight	1.35kg
Standard Charging Station	
Input	100-120V-18A 60Hz
	180-240V~16A 50Hz
Output	Max50.4V Max30.0A
Output Power	100-120V, Max 750Wx2CH
	180-240V, Max 1200Wx2CH
Battery	LiPo、Intelligent battery
Battery Cells	12S
Charging Channel No.	2 channels （Optional: 10-channel double-charging manager station）
Input Protection	Over-current
Output Protection	Over-voltage, under-voltage, short circuit, over-temperature, open circuit, reversed polarity
Working Temperature	5-45℃
Dimension	325x190x280.5mm
Weight	8.27kg

4.2 Wiring diagram



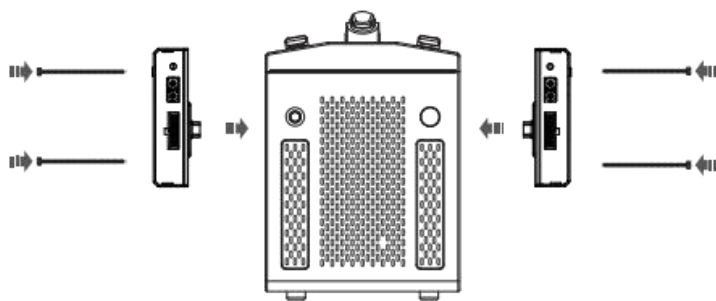
- ①Indicator lamp ②XT90 output port ③Balance port
④Power input port ⑤Master voltage port



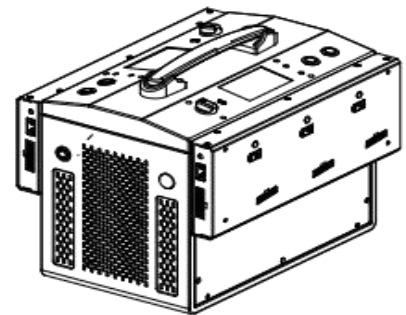
Charging Station

①	Master switch	⑥	Current switch	⑪	Storage button
②	Air intake	⑦	Micro-USB update port	⑫	Handle
③	Brand	⑧	LCD monitor	⑬	Cooling fan
④	Charge port	⑨	LED	⑭	AC input port
⑤	Master Voltage	⑩	Charging button		

1) Connect the charging station and charging manager by inserting the XT port and balance port. Fix their connection with 4 screws.

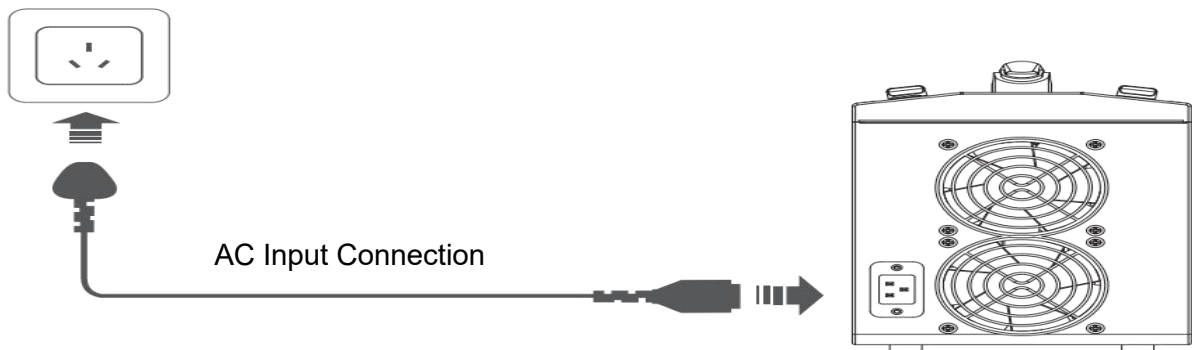


Connection



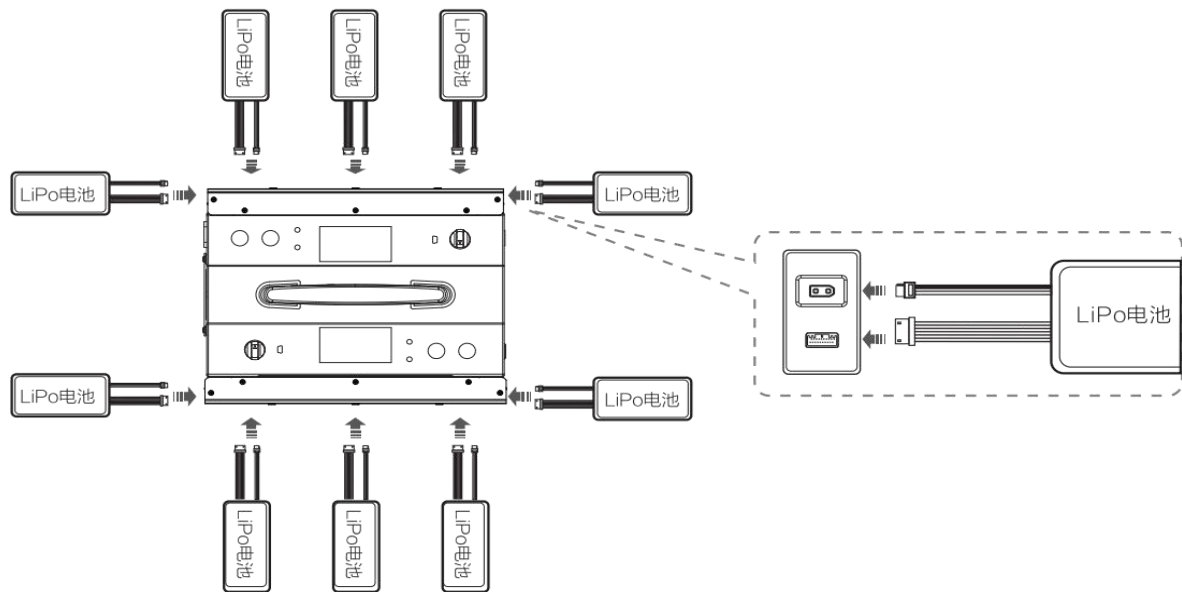
Fixed

2) Insert the port of power cable into the input port of charging station first. Then connect a AC power, 100~240V, 50/60HZ.



AC Input Connection






3) Connection of M6E-X 12S intelligent battery



Remark:

- 1) Before connecting, check the ports and cable of battery to avoid breakage and break line.
- 2) Must connect according to the negative and positive pole label, when using banana plug
- 3) To avoid short circuit, user must connect the banana plug and link box first ,then connect battery, when user want to charge it. Meanwhile, user must disconnect the battery first,then disconnect the link box and charging station,

4.3 Indicator Lamp Instruction

Indicator Lamp Status		Description
 ---	Green Flash	Standby
 ———	Red Constant	Working
 ———	Green Constant	Complete
 ---	Green & red flash alternately	Error
 ---	Orange flash	Add battery while working, total voltage detected is correct, but balance port status is unknown (standby)



4.4 Operation Instruction

1) Start and Self-inspection

Check all connections to confirm their condition first. Press the maser power switch of charger to power on. LCD monitor and LED will turn on,meanwhile the buzzer will turn on. After buzzer ring completely, it means the charger has finished the power-on and self-inspection procedure.

2) Working Mode

The charger has 2 modes, charging & storage for user to chose according to the requests. When charging manager was plugged, charger will recognized it and switch to constant working mode automatically. Charging station will work constantly assisted with charging manager, after operations once being executed.

Charging mode: Battery will be charging rapidly in this mode.

Storage mode: The battery is suggested to be maintained every 15 days when no use for long time. Battery needs to be maintained in storage mode when the endurance declines apparently or the voltage difference between each battery cell beyond 50mv. In storage mode, charger will try to balance the voltage of each battery cell to 3.84--3.86 by charging,discharging and balancing in small current.

Constant working mode: Charging station will recognize and switch to constant working mode after the charging manager is plugged.

3) Working Mode Settings

Chose the proper position of current switch to set the working mode according to battery capacity and user requirement.

4) Charging Introduction

Long press the charging button for 2 second to enter into charging mode, or it will start charging automatically after 10 seconds without any operations.

1. Red lamp on constantly: In charging status,monitor display real-time charging status dates.

2. Green lamp on constantly: Charging completely



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

3. Press any buttons: Stop charging

Cautions: Charging station will execute some actions,such as stopping, inspection, switching channels, automatically in constant working mode. Users don't need to do any actions to disturb the procedure. The charger will recharge battery if user just press Stop button once but do nothing for 30 seconds then.

5)Maintain

Long-press the Storage button to enter into Maintenance mode.

1. Red lamp on constantly: Maintaining battery, and monitor will display real-time maintaining specify status.

2. Green lamp on constantly: Maintaining completely.


3. Press any button: Stop charging

4.5 Interface Instruction

1. Charging station Interface

Channel NO. will display while

0% 20% 40% 60% 80% 100%

Display status: Charging /Storage/Standby/Error ▶ **模式:充电 NO.10** 

Real-time Charge/Maintain current ▶ **1:3.97 3.98 3.98 3.98** **5:3.98 3.98 3.99 3.97** **9:3.98 3.99 3.98 3.98** ▶ Icon interval will flash to indicate the current capacity of battery while charging or maintaining.

Real-time Charge/Maintain cvoltage ▶ **电压:29.9V 容量:999mAh** ▶ Voltage of each battery cell

▶ **电流:19.9A 时间: 25:58** ▶ Charging / Maintaining time

▶ The capacity unit will turn to Ah while capacity over 999mAh.(10000mAh will be displayed to 10Ah)

2. Error & Warning

When using the charger incorrectly or meet any problems, charger will display some errors as below:

错误 Error	错误 Error
1: 0.00 0.00 0.00 0.00	1: 0.00 0.00 0.00 0.00
5: 0.00 0.00 0.00 0.00	5: 0.00 0.00 0.00 0.00
9: 0.00 0.00 0.00 0.00	9: 0.00 0.00 0.00 0.00
Over-voltage 电池电压过高!	Over-voltage 电池电压过低!



Disconnection of output or balance cable	Charger overheat! Confirm a good ventilation!	Power failure: Short-circuit,stop charging !
Battery over-voltage !	Discharge short-circuit or overload !	Power failure: Overheat protection,stop charging!
Battery under-voltage!	Safety timer arrives at the set time !	Power failure.: AC input
Voltage differences between cells too big !	Module offline,check the connection!	Power failure: Power may shut down unexpectedly!
Cells voltage differences too big, balance failed !	Over-low Battery temperature detected!	Communication timeout!
Power failure: Fan failure detected !	Over-high temperature detected!	Communication break,battery offline!

4.6 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.



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

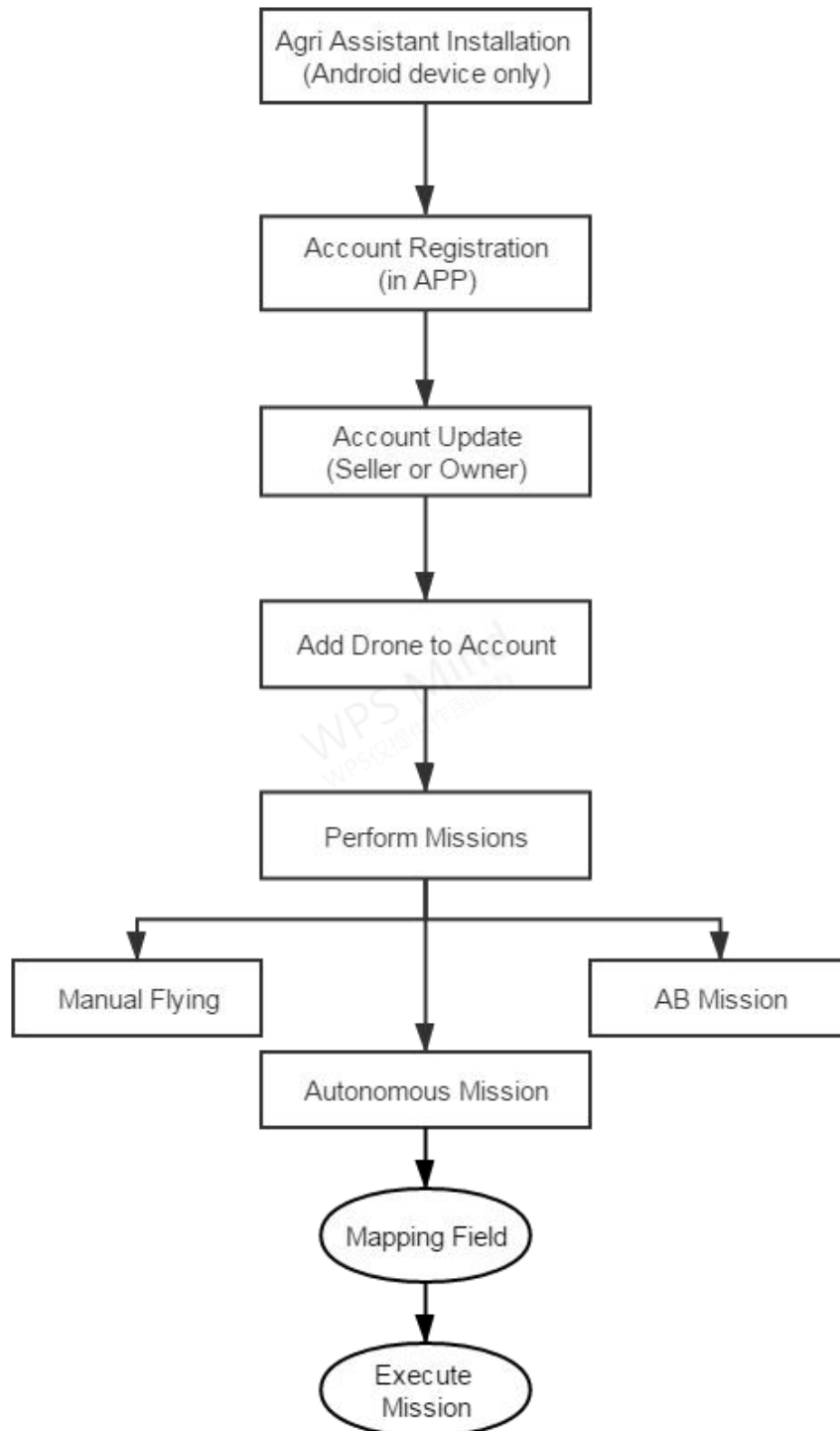
Safety Warning:

- 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 unflammable,insulated surface.
- 6) Please follow the strict instructions.

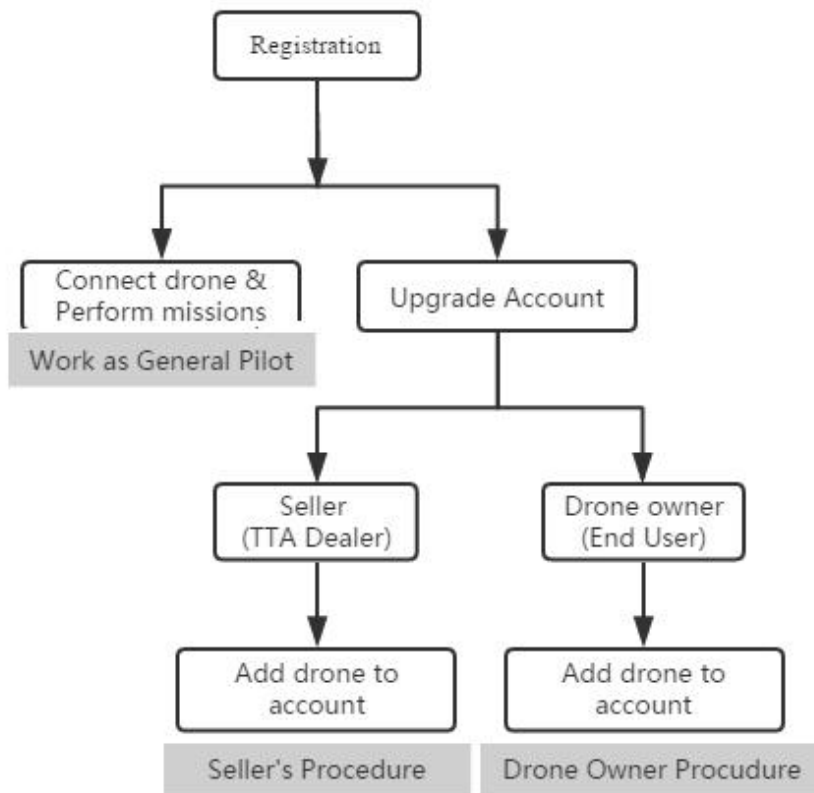


5. App Setting of Copter

Operation Flow of A New Drone



5.1 Overall Registration Procedure



Attention: Account has two selectable level, Seller and Owner. Customer can apply to the corresponding level to update. One drone can only be added to one account of one level.

5.2 Software Installation

1. Please download and the GCS software in the following link:

<https://www.ttaviation.org/downloadcat/app>

2. After GCS installation,the app will appear as figure 5-1.



Figure 5-1



TTA-M6E-X support Android 4.0 or above



5.3 Registration and Login

5.3.1 Registration



- (1) Click “Register” to start registration.
- (2) Use phone number or email to receive the verification code.

[Attention: When using email to register, please view the junk mail list as the verification mail may be recognized as junk mail.](#)

5.3.2 Login

- (1) Click “Login” to enter the login page
- (2) Input your account to log in.

5.3.3 Account Update

There are four classes of account type: Manufacturer (TTA), Seller (TTA's dealer), Owner(drone owner), Normal.

After passing real-name authorization, user shall upgrade the account's class for getting according rights. Upgrading process is as follow.

◆ “Normal” Upgrading to “Seller”

- (1) Click “Account update” to enter the upgrading page.
- (2) Select the according account class - “seller”, input “**19801108966**” as the Verifier, and



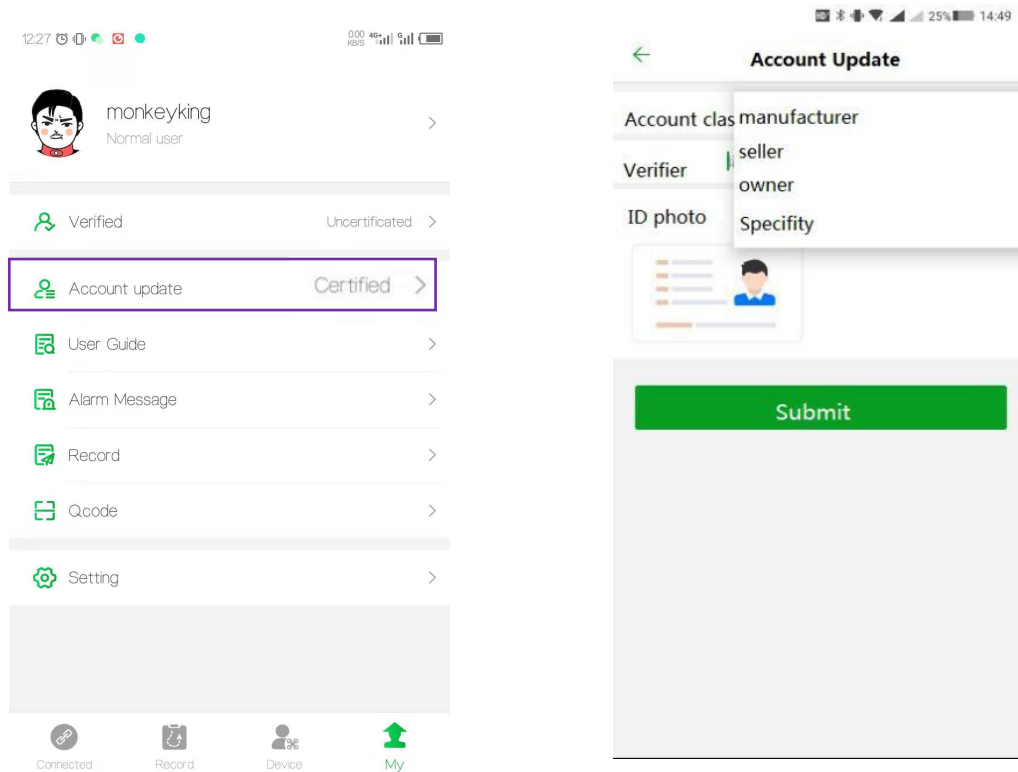
Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

upload the photo of relevant materials for applying for the account class.

(3) Click “Submit”, and then contact TTA AS engineer to notice them for further verification.



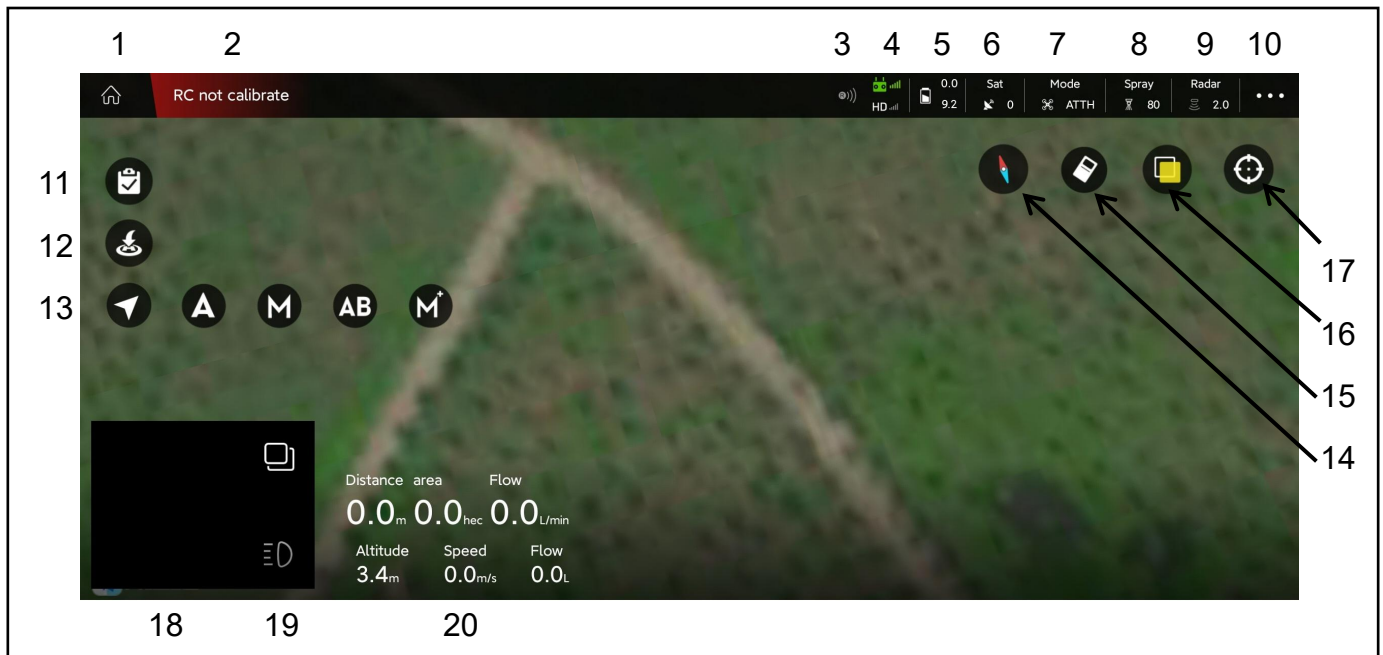
◆ “Normal” Upgrading to “Owner”

(1) Click “Account update” to enter the upgrading page.

(2) Select the according account class - “owner”, input “**19801108966**” as the Verifier, and upload the photo of relevant materials for applying for the account class.

(3) Click “Submit”, and then contact TTAAS engineer to notice them for further verification.

5.4 Flying Homepage



(1) Back to home page

(2) Connection Button

If no device is not connected, press it to select the device to be connected as Figure 5.41.

With devices connected, press it to view the drone status as Figure 5.42.

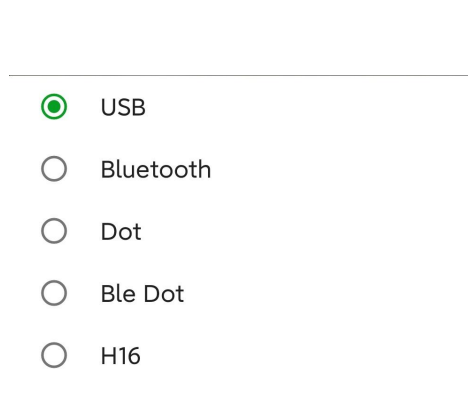


Figure 5.41

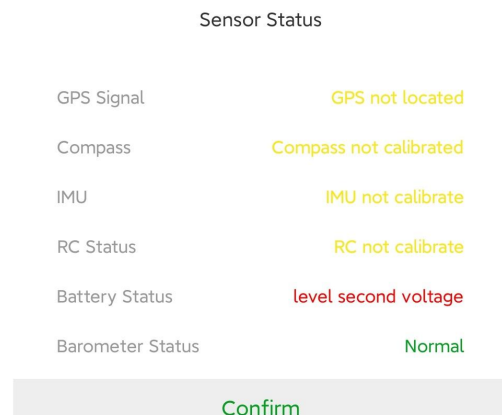


Figure 5.42

(3) RTK Icon

"Red" indicates not connected; "Green" indicates connected; "Grey" indicates not installed yet.

(4) Remote control connection status

The upper part represents the signal strength of the remote controller, and the lower part represents the image transmission signal strength.



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

“Green” means the remote control is connected; “Gray” means the remote controller is not connected

(5) Battery display

The green S icon represents a smart battery connection, and white represents an ordinary battery connection. The below part represents the ordinary battery voltage, and the upper part represents the smart battery voltage.

(6) Number of satellites

(7) Flight mode

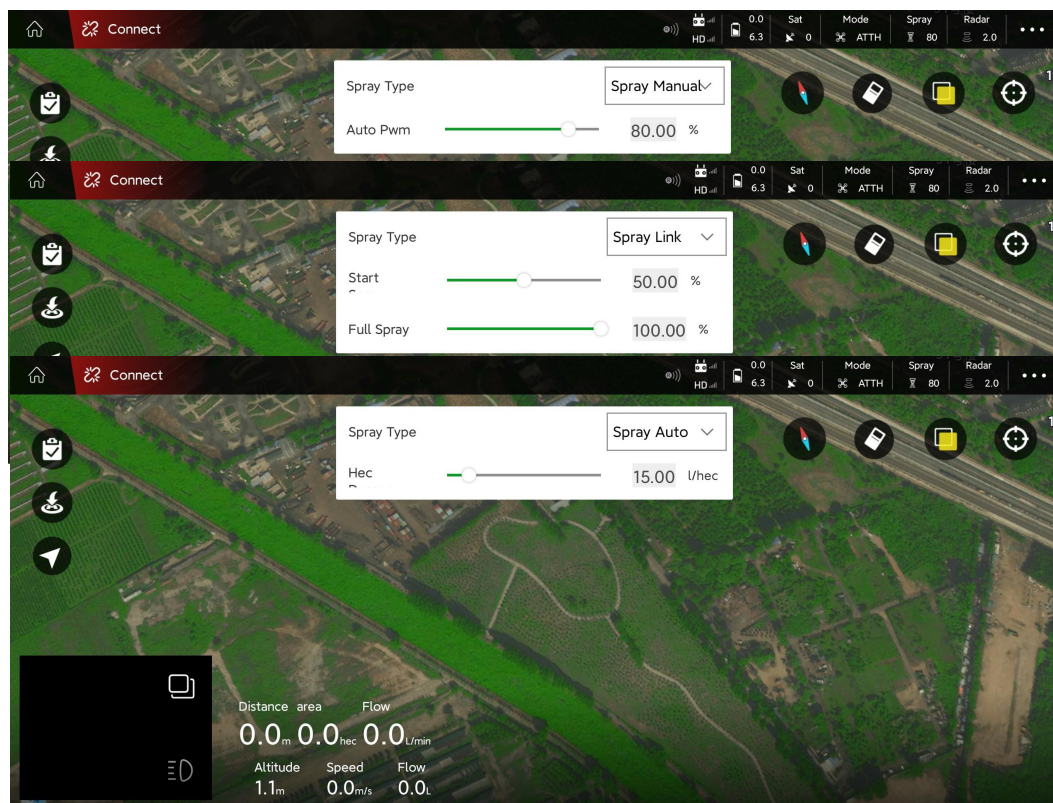
‘**A**’ indicates Attitude mode; ‘**M**’ indicates Manual work mode, equal to GPS mode; ‘**AB** mode’ indicates AB work mode; ‘**M+**’ indicates M+ work mode.

(8) Spray Mode

‘**Spray Manual**’: the flow rate is fixed once pilot set it up. But it can be adjusted at any time during flying.

‘**Spray Auto**’: It is precise spraying. Drone can spray a certain amount of liquid per hectare. The spray amount can be set in APP before each flight.

‘**Spray Link**’: The flow rate is relative to flight speed. Pilot can set the flying speed for controlling the pump. At which speed, pump will start to be turned on from the min setup flow rate; At which flying speed, pump will reach its max setup flow rate. The faster the flight speed, the bigger the flow rate. Besides, pilot can choose the min and max flow rate as a percentage of the Max pressure of pump.





Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

(9) Terrain Following Radar

Drone height to ground can be set when radar has been connected.

“Green” indicates connected, and “Gray” indicates not connected; Parameters can not be reset unless radar has been connected.

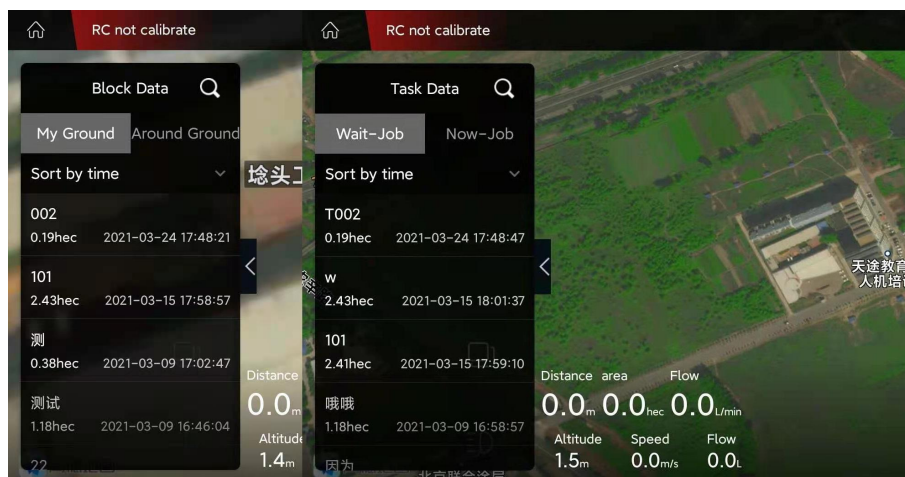
Attention: Drone will descend or ascend to the set height and maintain the height after pilot activate the terrain radar. PS. If height value set to 0, Drone will descend and land after activate the radar.

(10) APP Settings

(11) Ground List or Task list

Ground list: My Ground, Around Ground

Task List: Wait-Job, Now-Job



(12) One-key RTH

One-key return to home

(13) Flight Mode Switch

“A” is attitude mode; “M” is manual work mode(GPS mode); “AB” is AB mode;

(14) Map Compass

(15) Clear Flight Track

(16) Switch between normal map and satellite map

(17) Locate “my” location or aircraft’s location

(18) FPV image display

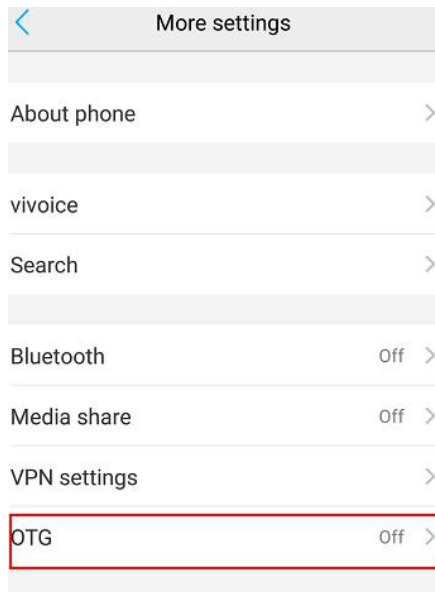
Press the small window to switch between video transmission display and map display

(19) Camera LED Switch

(20) Display "Speed", "Flow Rate", "Altitude", “area” and "Distance" information (Altitude is the drone height to ground when terrain radar is activated.)

5.5 Connect

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



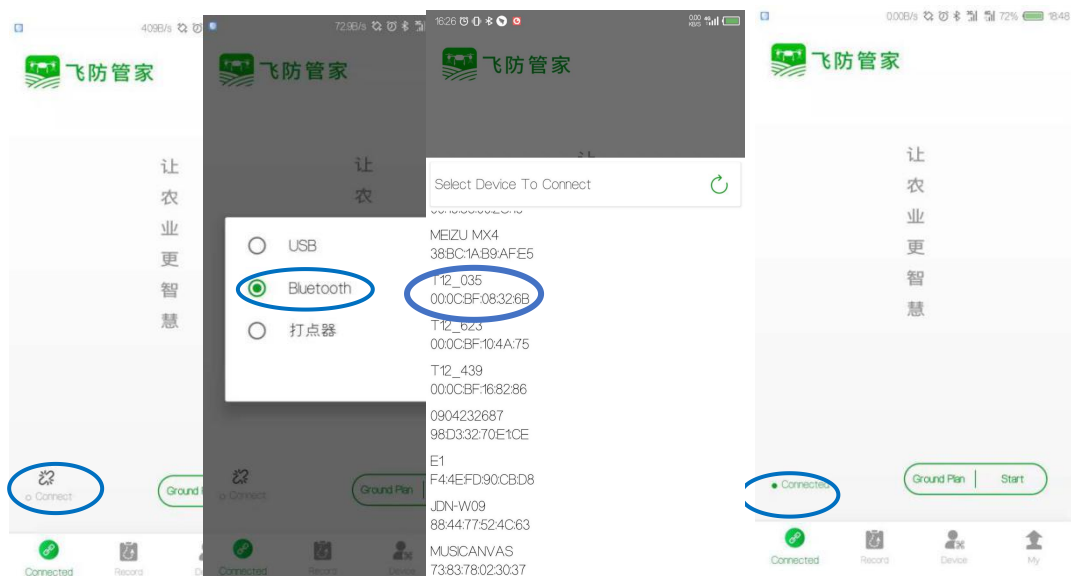
(2) Power on Remote controller.

(3) Turn on the Bluetooth of cellphone, search for the Bluetooth of remote controller and connect. **Remote controller Bluetooth name: T12_***, password:1234**

(4) Run the Agri Assistant APP.

(5) Click [Connect], select [Bluetooth], and connect the Bluetooth of remote controller.

The [connect] icon will turn to [connected] after connecting successfully.





5.6 Device

5.6.1 Plane list

After UAV is successfully added to your account as "5.6.2 Plane Add", aircraft can be viewed in the "Plane List" as the **Figure 5.6.1** .

5.6.2 Plane Add

After logging in, click "Device" in the lower right corner and click "Plane Add"; "Flight Control Serial Number" will be read automatically after connecting to the aircraft, then click the "Completed" button to finish adding as **Figure 5.6.2**.

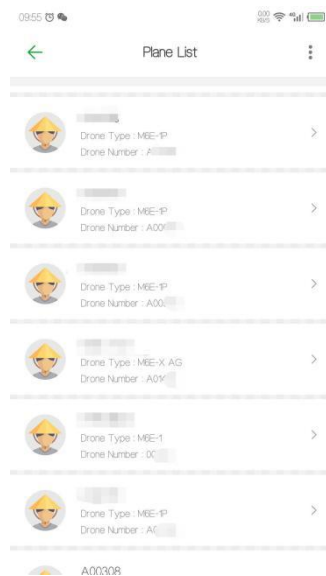


Figure5.6.1 Plane List

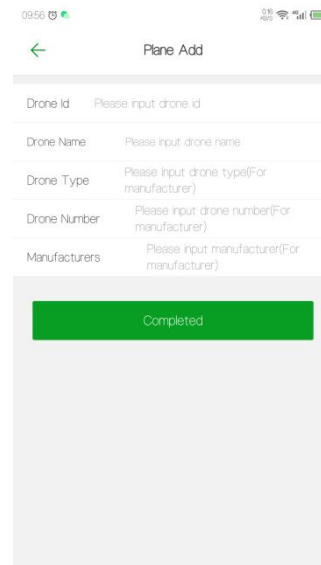


Figure5.6.2 Plane Add

5.6.3 Nofly Apply

"Nofly Apply" is used to apply to UAV manufacture for flying in No-fly zones in special situations. Drones can not take off in No-fly zones without manufacture's permission.

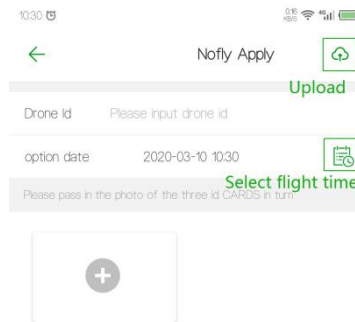
Click "Device", click "Nofly Apply"; select the expected time of performing mission, upload the relevant certificate (the flight control serial number is automatically recognized when the mobile phone is connected to the aircraft), after completing, click the "Upload" button in the upper right corner to upload the data



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org



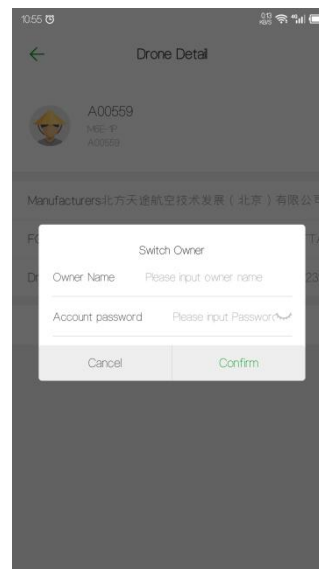
5.6.3 Nofly Apply

- 1) Waiting for permissions from UAV manufacturer.
- 2) After getting the permission, the time displayed on the “Device” interface will be the time you submitted in “Nofly Apply” when the APP connects to the aircraft. It indicates that the no-fly zone is successfully lifted temporarily during the apply time.

5.6.4 Switch Owner

“Switch Owner” can only be performed in “Owners” for transferring the ownership of UAV.

- 1) Click “Device” - “Plane List”;
- 2) Select the UAV and click “Switch Owner”;
- 3) Input the info. and click “Confirm”;



5.6.4 Switch Owner



5.7 Record

- (1) Log in to your account, add the UAV to the “Device manager”.
- (2) Connect to the app and perform missions.
- (3) After the flight is over, enter the “Record” page of APP or go to the "ai.fei-fang.com" website to view the mission records.

Process of viewing records on website

- 1) Enter "ai.fei-fang.com" and use your account to log in.
- 2) Click “UAV manage” to view the drone list and select the drone you want to check
- 3) Chose the “data sources” of the records - “APP”, “KBOX”, “IOT”. APP is the default
“APP” - Mission data is uploaded to sever via APP.
“KBOX” - Mission data is uploaded to sever via KBOX (build-in 4G device)
“IOT” - Mission data is uploaded to sever via IOT module (temporary offline data storage device)
- 4) Click “Search” to find the data.

Block list > Sorties data > Job details > UAV list > UAV detail

UAV jobs

data sources : KBOX Show Type : All Sorties

2019-03-15 C APP 2020-03-09 18:13:29 Times : last month Query Type : selection cond

Please select IOT KBOX

Longitudinal

Cost of selection Clear map trace

	worktime	area(hm ²)	worktype
<input type="checkbox"/>	2020-03-09 15:09:19	0.59	Other
<input type="checkbox"/>	2020-03-09 14:41:00	0.50	Other
<input type="checkbox"/>	2020-03-09 14:02:41	0.71	Other
<input type="checkbox"/>	2020-03-09 13:47:14	0.36	Other
<input type="checkbox"/>	2020-03-08 17:19:34	0.23	Other

2018 © Powered by FeiFangGuanJia Current version number:0.8.4

Note:

If APP cannot connect to the internet while performing missions, the mission data will be stored in the devices which is used to run the APP. When internet becomes available, the local mission data will be read and appear in this “Record” page, and the data will be uploaded to the cloud platform automatically.

5.8 Route Planning

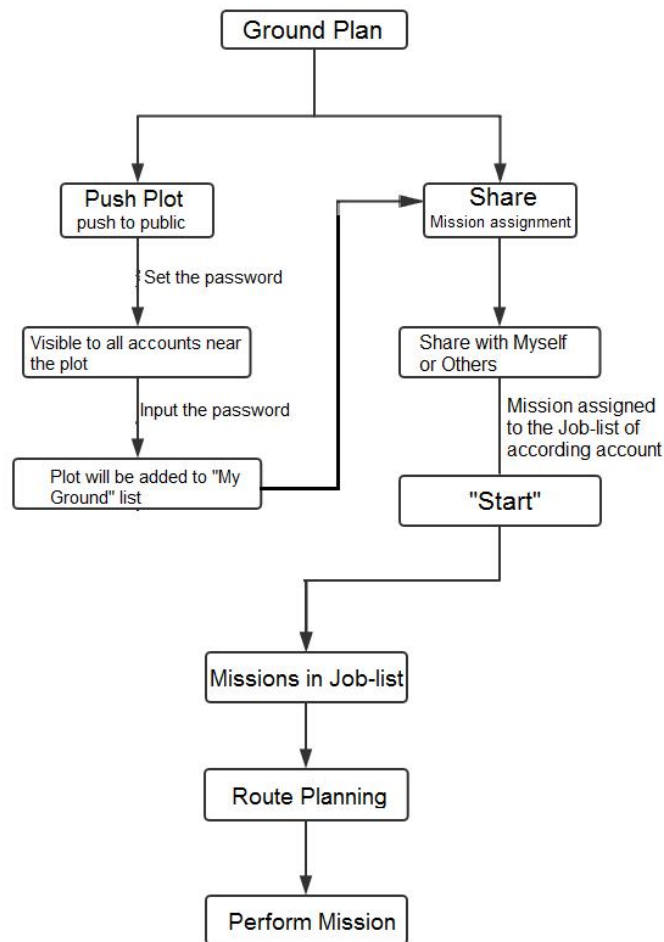



Figure 5.8 Mission Planning Procedure

5.8.1 Mapping

Click [Ground Plan]  to enter the Plot Mapping page

1) Press [Block management]  to view the marked blocks and online blocks nearby.

[My Ground]: User have rights to operate ground in this list, such as performing, sharing, editing, etc. This ground list includes the ground created by you and the ground added from the [Around ground].

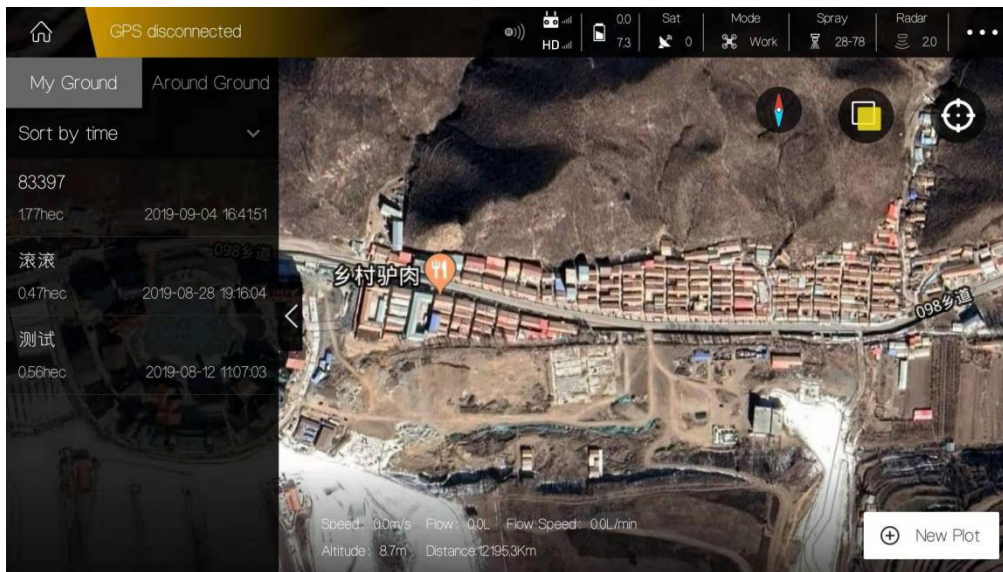
[Around Ground]: Ground will be displayed here when its position is nearby and it has been posted to the public by others or yourself.



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org



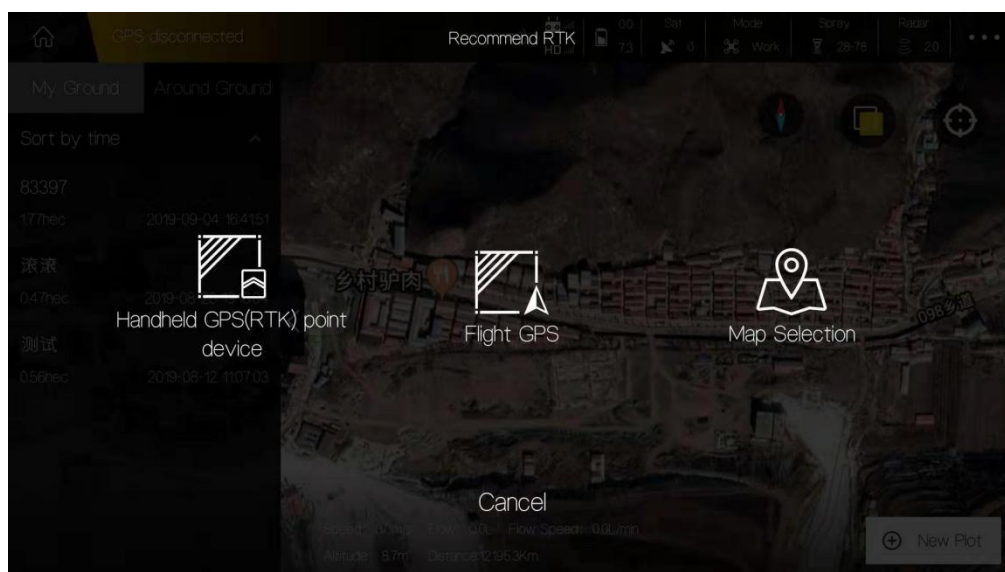
2) Press [New Plot] to start mark blocks and select mark method.

[Handheld GPS(RTK) point device]: use portable marked device to mark out boundary point.

[Flight GPS]: use drone as mark device and fly drone to the boundary point location and mark it out.

[Map Selection]: mark out boundary points manually on map.

Here will use [Map Selection] as an example.



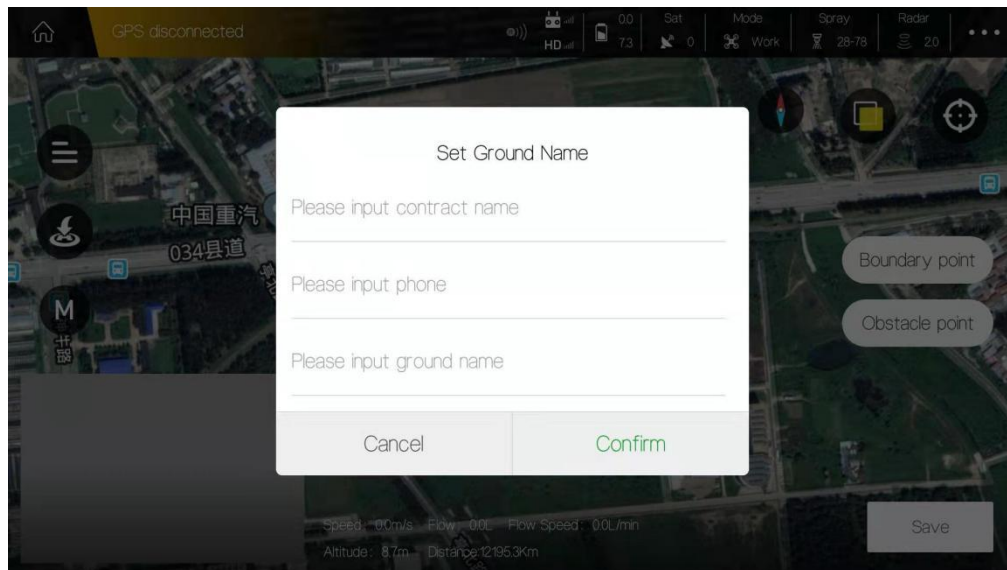


Beijing TT Aviation Technology Co., Ltd.

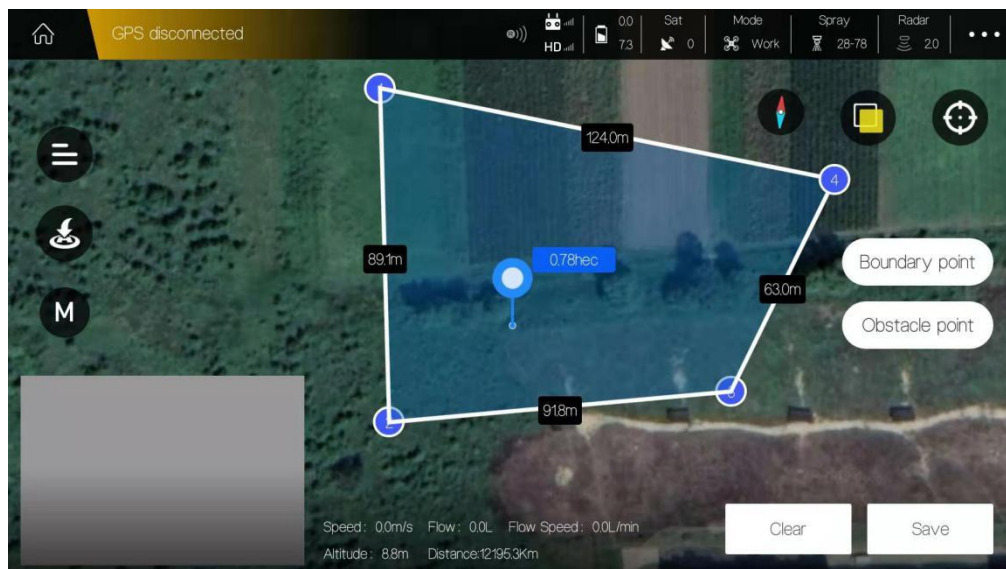
Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

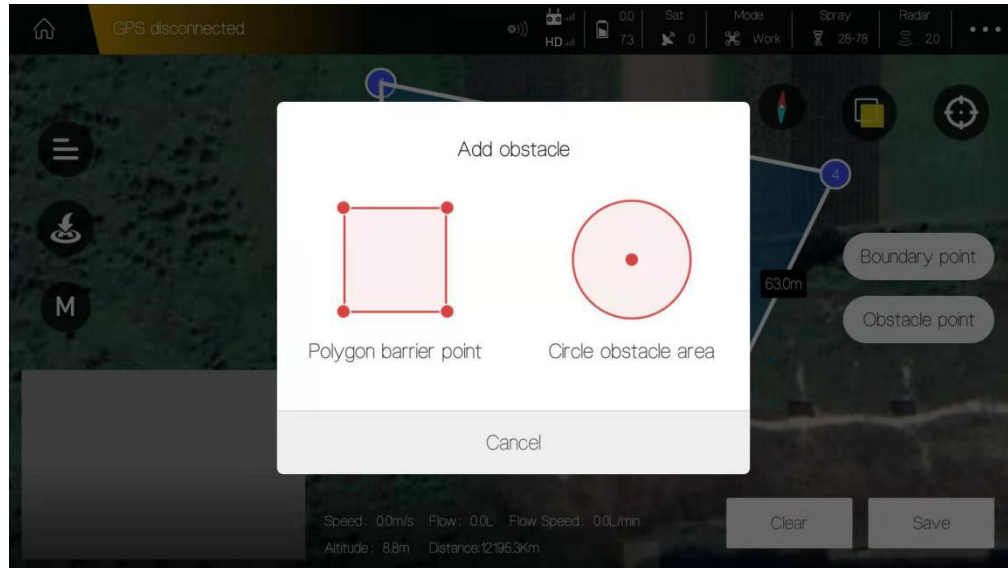
3) Input contract name, cellphone number, block name to name the blocks.



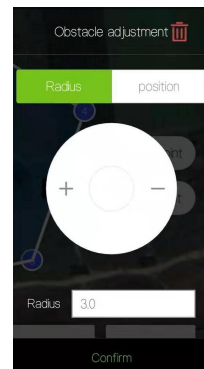
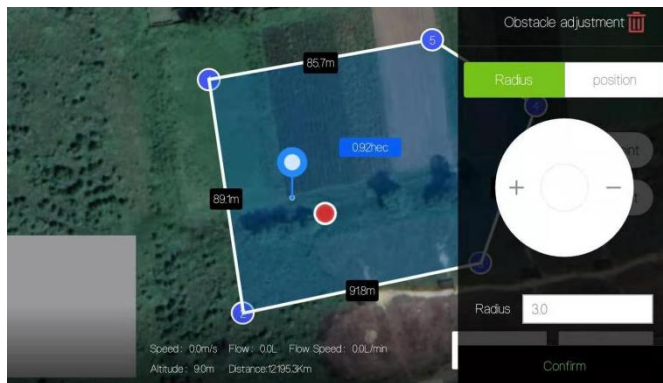
4) Mark area. Slide the map to place the Mark icon on the proper point, press [Boundary pint] to mark one boundary point.



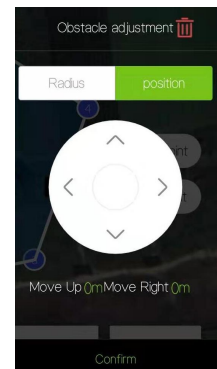
5) Add obstacles. Press [Obstacle point] to select the shape of obstacle: Polygon or Circle.



Take a circle obstacle as an example. Slide the map to place the Mark icon on the proper point, and press [RBI] to mark one red obstacle point. Then press the obstacle point to edit it.

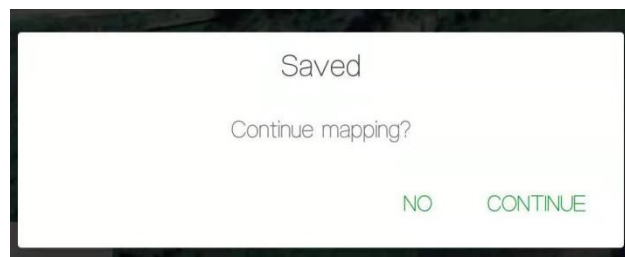


Adjust Radius



Adjust Position

(4) Save blocks. Chose to continue mapping or exit mapping.



5.8.2 Mission Assignment

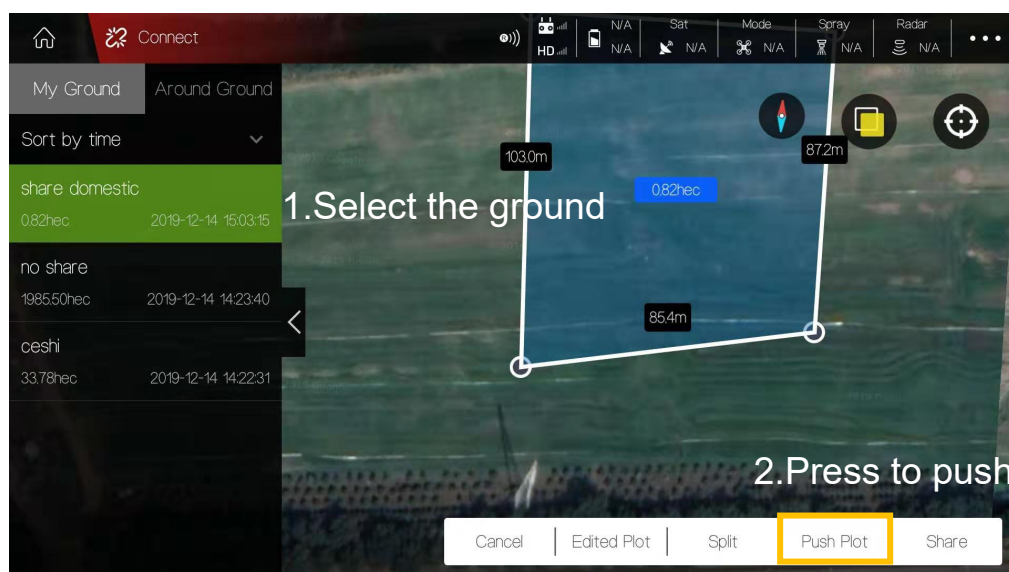
- (1) After mapping, click “My Ground” to view the plot list.
- (2) Select the plot you want to share with others.
- (3) Click [Share] on the right corner of the interface, input task name (e.g. “sky start”), the account name which you want to share with. Crop type, Rout type.

Attention: The account name do not need to fill if the blocks is shared with yourself.



5.8.2.1 How to share your ground to everyone nearby?

- Select the ground in “My Ground” you want to share and Press ”Push Plot”.





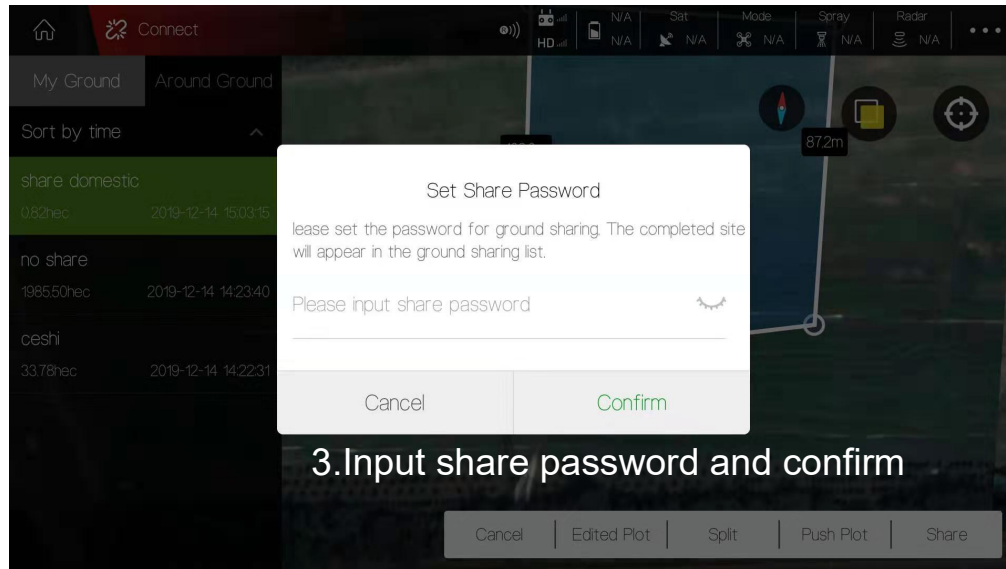
Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

- Input the password of this ground and “Confirm”.

Everybody nearby can view the shared ground in “Around Ground”.



5.8.2.2 ADD a ground from “Around Ground” into my ground list

- Select the ground in "Around Ground" list and press “Save ground plot”



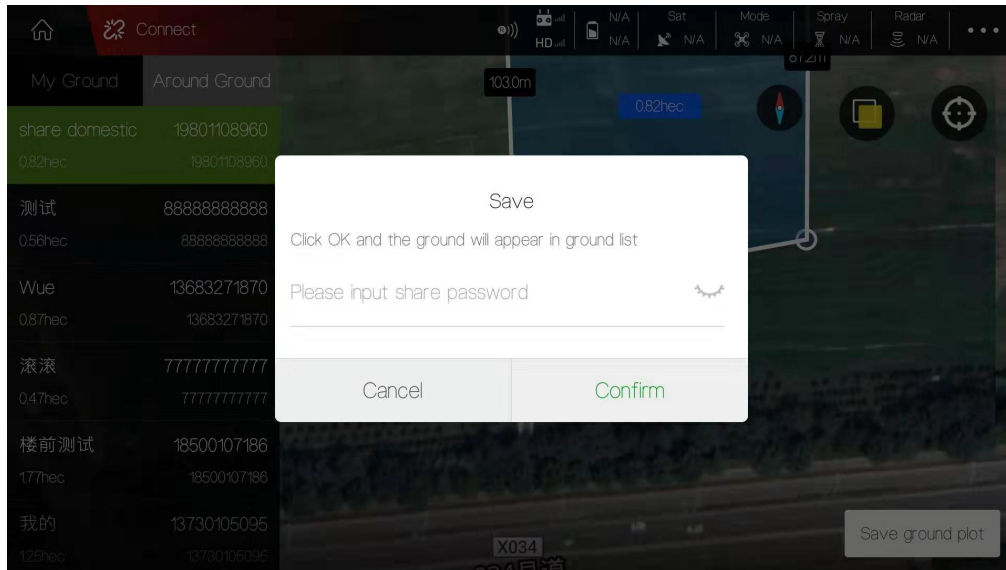


Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

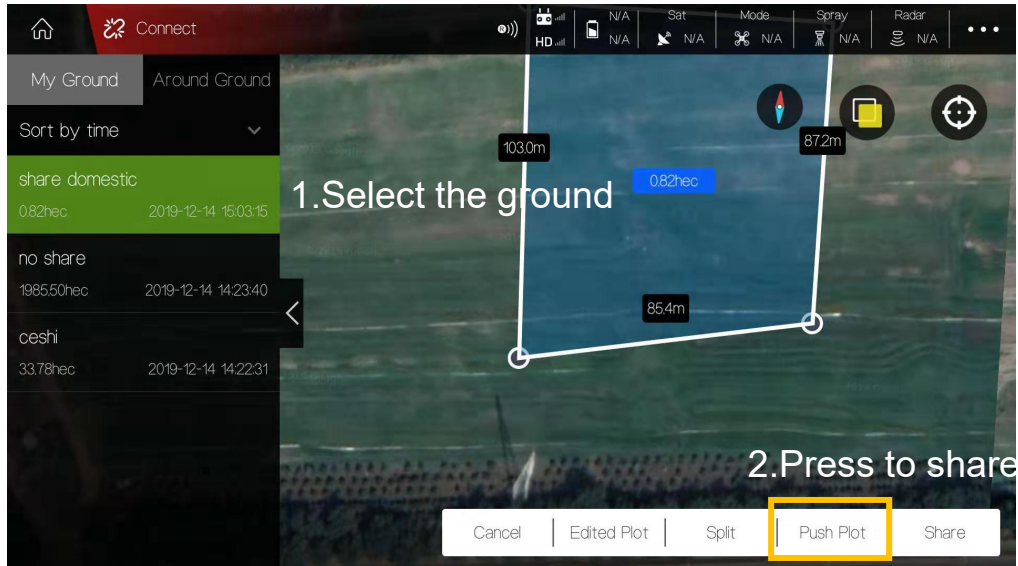
- Input share password and confirm. Then ground will be added into “My Ground” list.



5.8.2.3 Add the ground into my “Wait-Job” list or a specific account

You need to share the ground in “My Ground” list with yourself.

- Select the ground and press “Share”





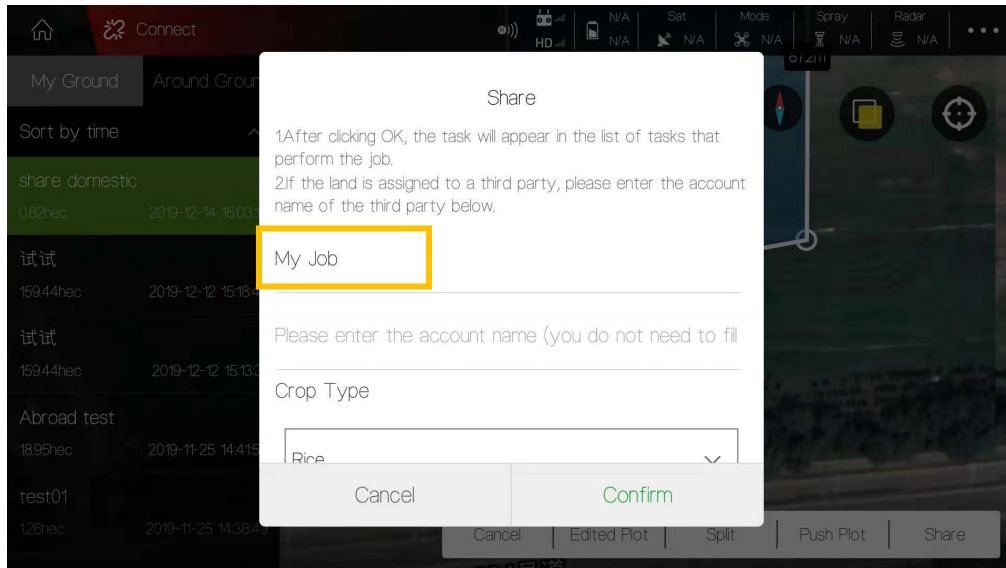
Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

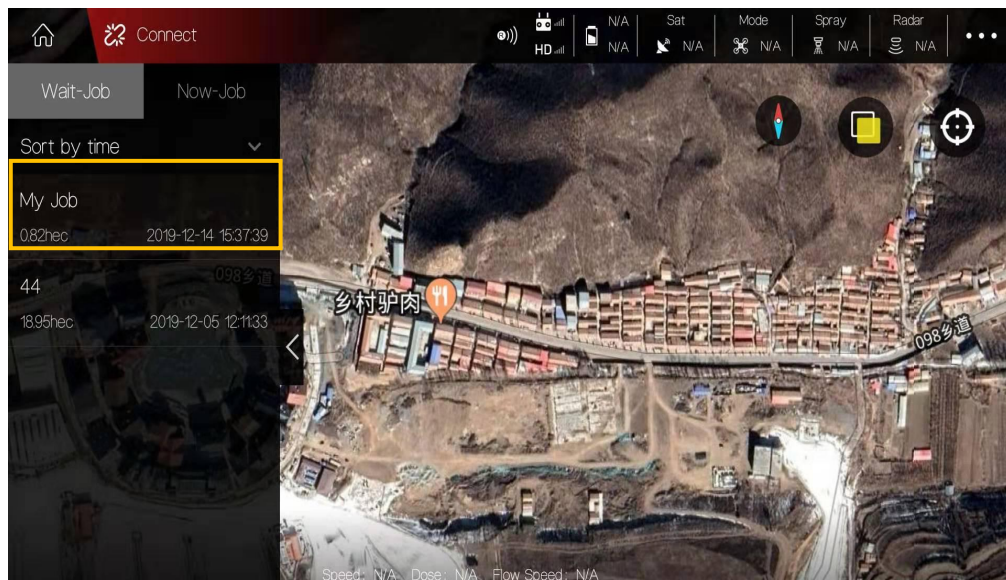
www.ttaviation.org

- Input the “Task name”and “Account name” you want to share with.

Attention: The account name do not need to fill if the blocks is shared with yourself.



- Back to home page and open “Start” section. The ground has already in your “Wait-job” list.



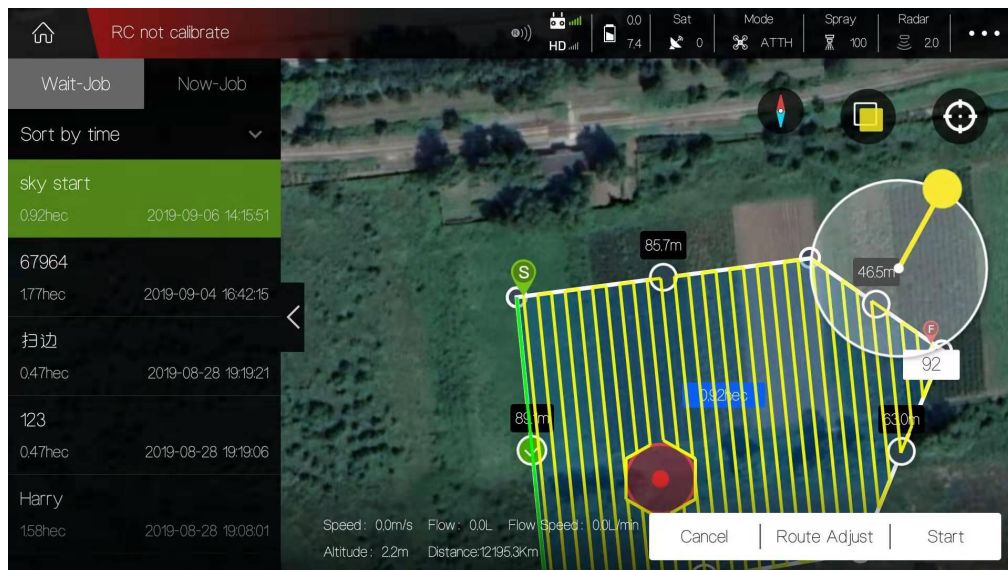


Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

5.9 Start Mission

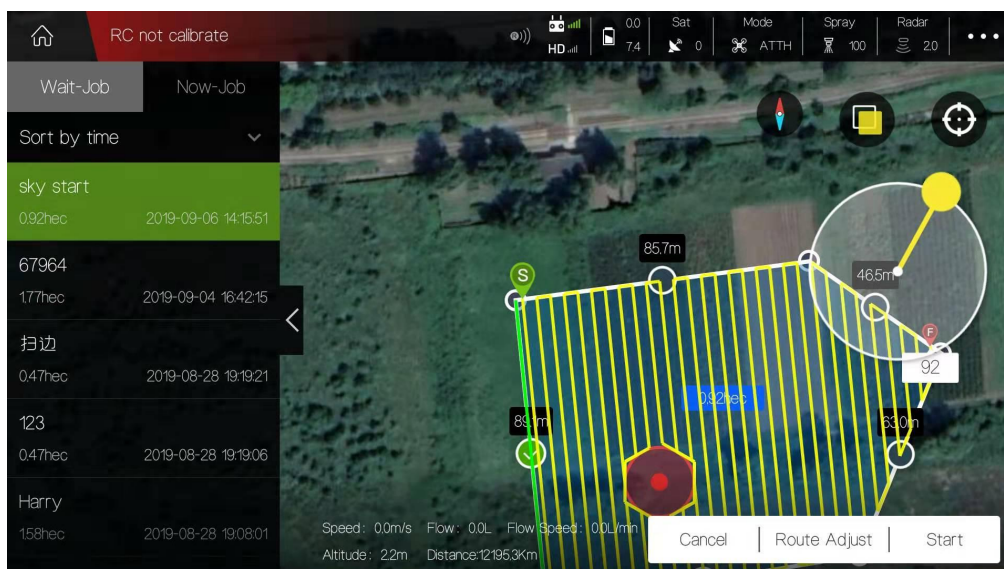


5.9.1 Route Adjust

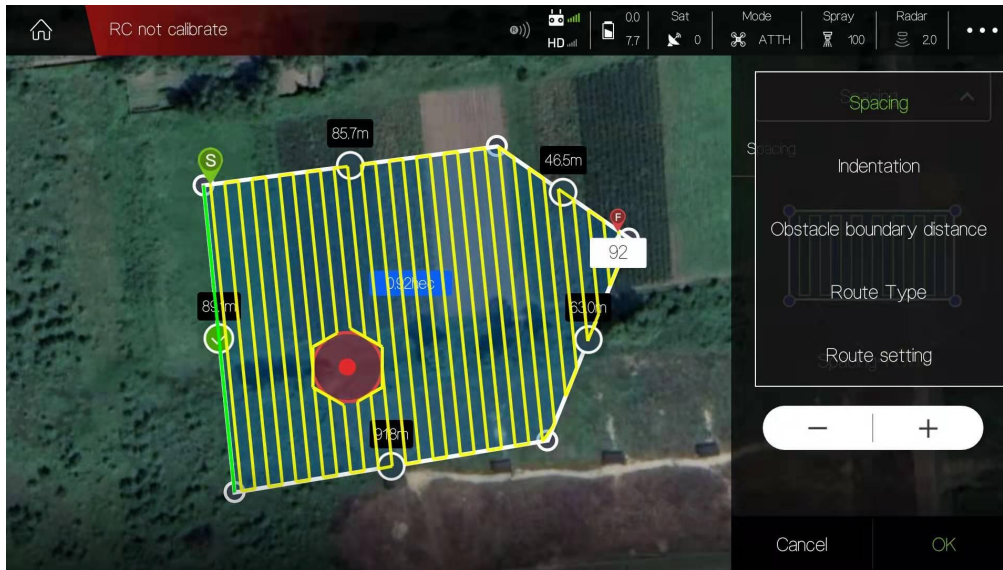
(1) Press [Task Management]  to view the tasks which is assigned.

[Wait-Job] indicates the job need to be finished after somebody released a marked field to you.

[Now-Job] indicates the job you are performing now.



(2)Select the task and press [Route Adjust] to edit the route.



Spacing: adjust lateral distance between each 2 routes

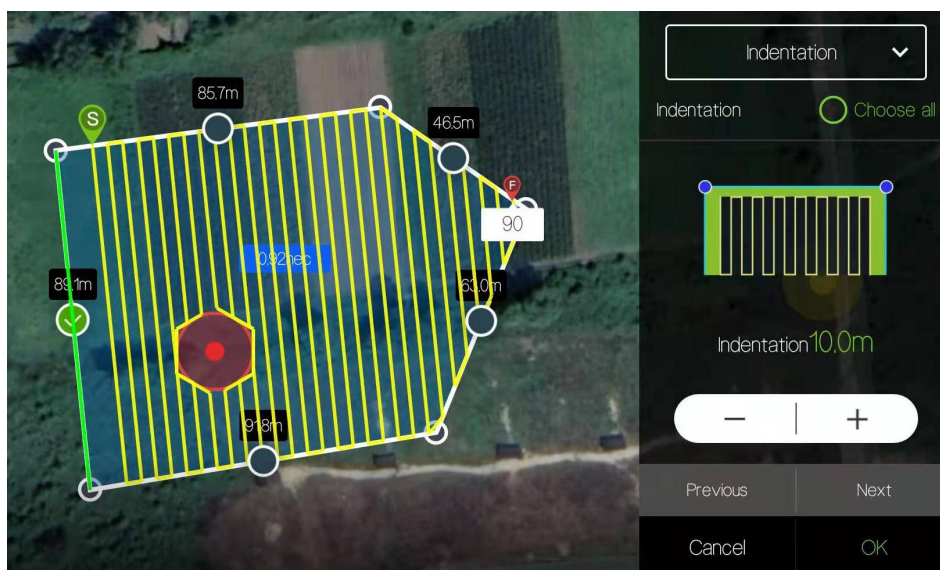
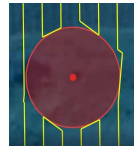
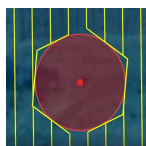
Indentation: adjust the distance between route and one selected boundary line

Obstacle boundary distance: distance between obstacle boundary of nearby route.

Route Type: Route arrangement when encountering obstacles

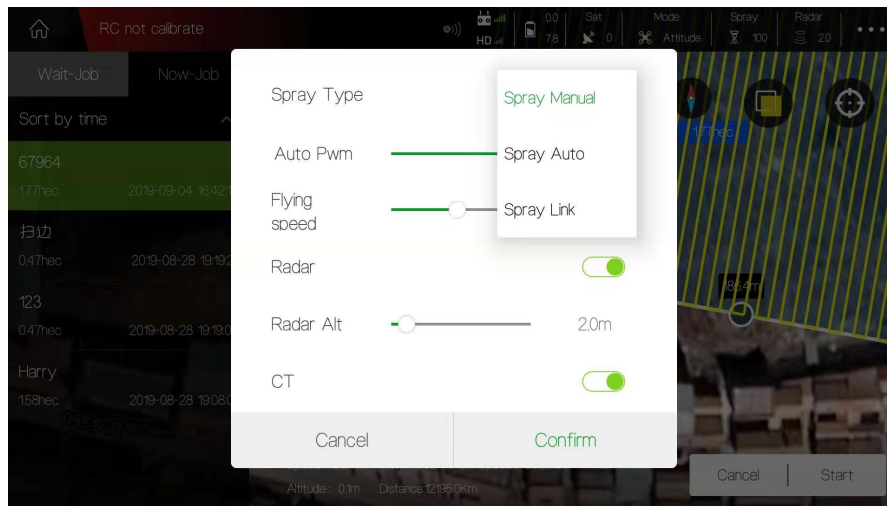
Route settings: Position adjust of the whole routes.

2 kinds of Route types: Cross Turn back



5.9.2 Start Spraying

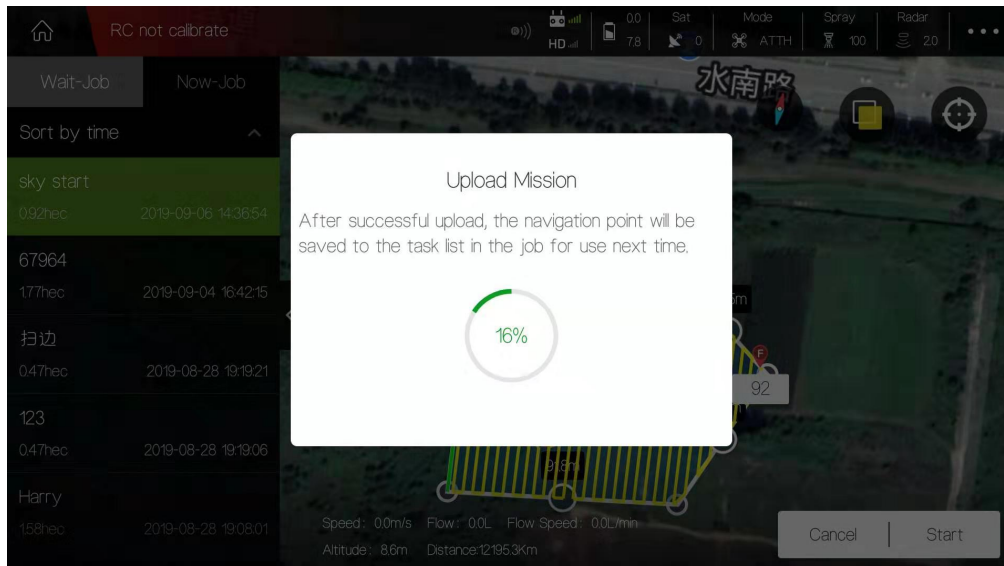
- (1) After adjusting route completely, press [Start] to enter into spraying process.
- (2) The spraying parameters can be adjusted in the spraying interface,such as spray type, flying speed, Radar etc.



Auto Pwm - spraying volume per area unit

CT - U type turn (coordinated turn)

- (3) Press [Confirm] and the route will be uploaded by itself.



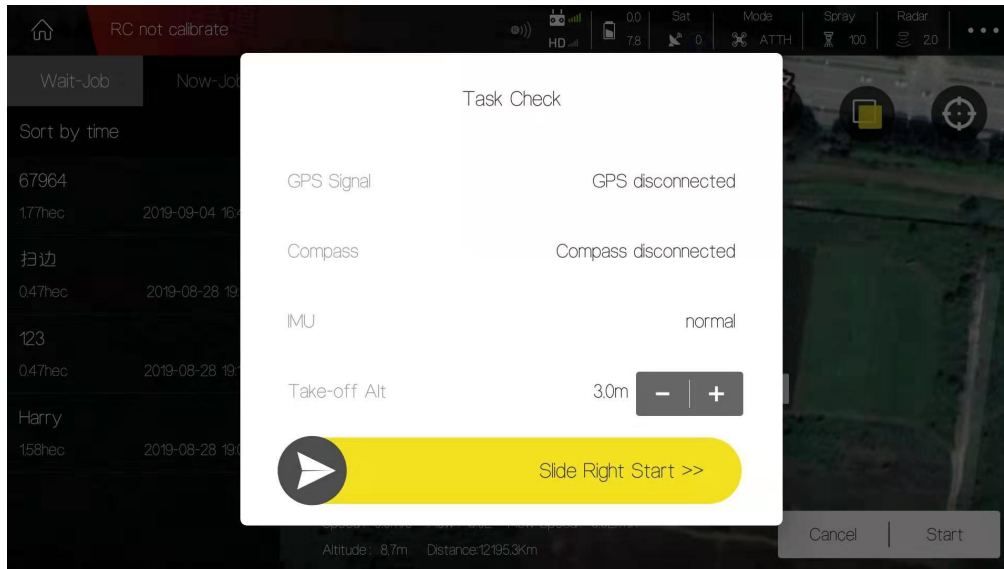


Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

(4) After uploading complete, the “Task Check” will pop up. Ensure all parameters are normal. Forbid taking off if any sensor is incorrect such as the pictures below.



(5) Slider the arrow  rightward to start the task.

(6) If needed, operator can press the [RTH] icon to make drone return to home.

5.10 AB Mission Mode

AB mission mode is a simple and easy mission mode particular suitable for regular blocks.

By setting the two boundary points A and B, a simple regional flight can be created as show below

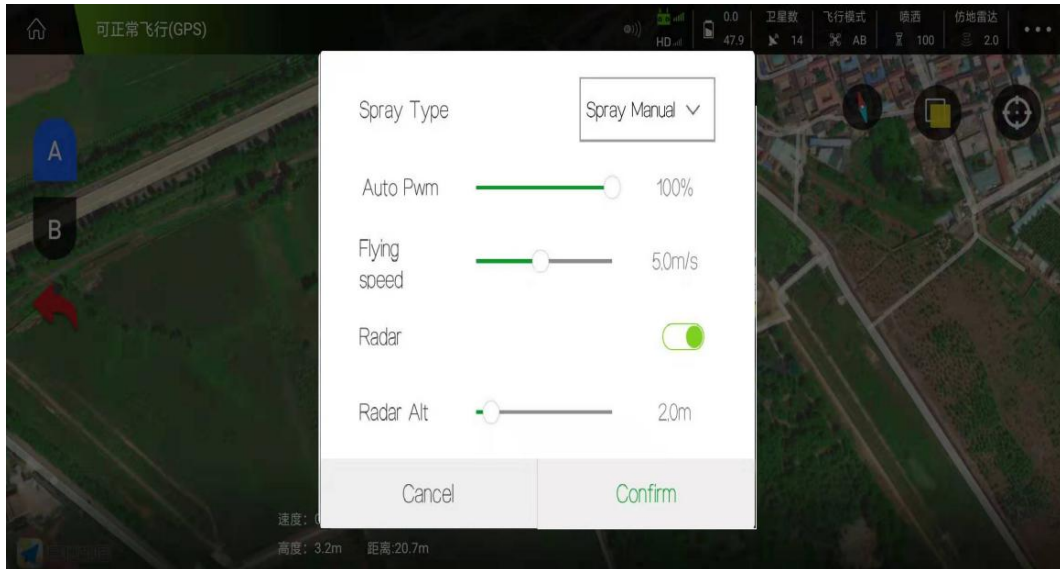
Note: Before record AB points, previous AB data must be removed by moving the F lever rapidly from top to bottom.



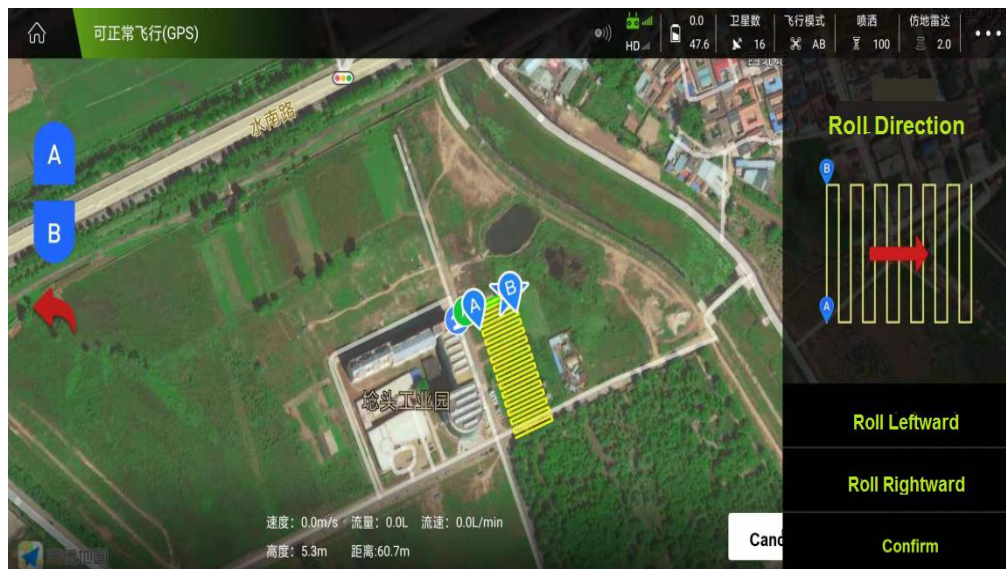
(1) AB recording.

- ◆ Switch the flight mode to AB mode.
- ◆ Fly the drone to expected A point and click “A” icon to record point A .

The below window of spraying settings will pop up for setup parameters.



- ◆ Record Point B, and select the roll direction.



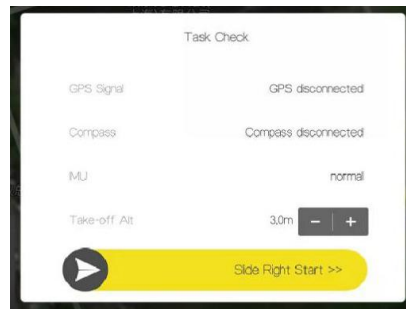
(2) Check the drone state and ensure all are normal before take off.



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org



Note: User can adjust the take off altitude, extend or shorten the course with the remote control during the flight.

6 Settings

6.1 RC Calibration

(1) “RC Calibration” is used to calibrate the maximum and minimum values of the remote control, and finally display the middle value.

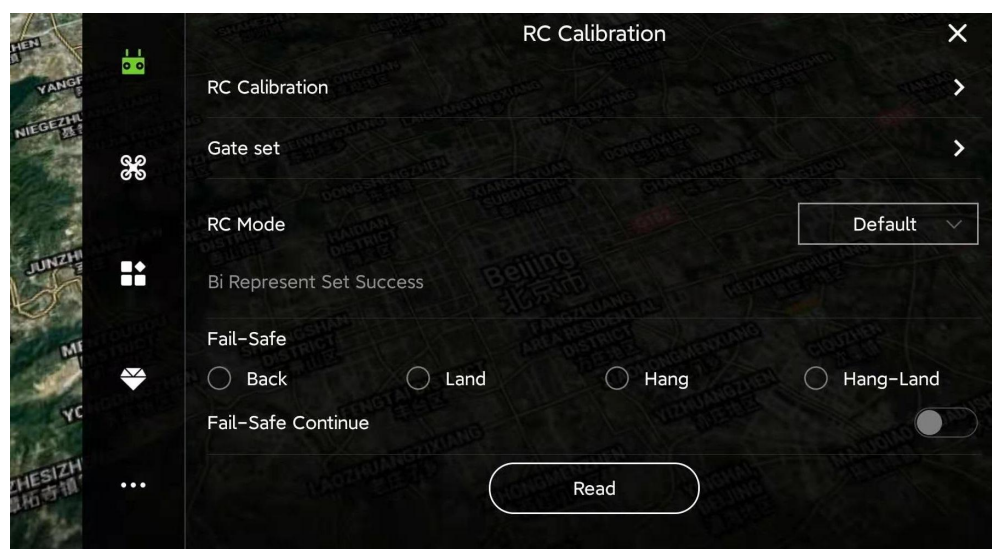
Attention: Do ‘RC Calibration’ when drone receiver or transmitter is changed.

(2) “RC Mode” is used to select the stick mode of RC.

After switching, one beep sound from the remote control indicates successful change.

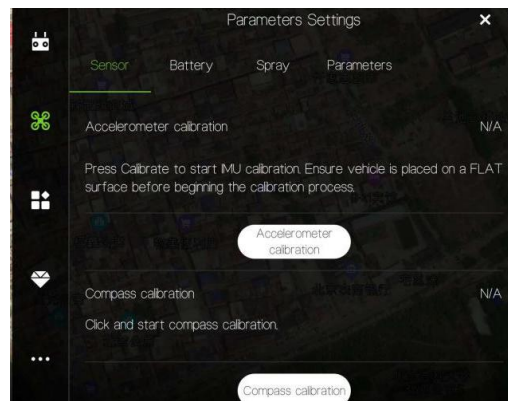
(3) “Fail-Safe” is used to set the protection action when RC is out of control.

(4) “Fail-Safe Continue”. After turn it on, drone will continue performing the missions instead of triggering Fail-Safe protection action when drone is out of control.





6.2 Parameters Settings



6.2.1 Sensor

(1) Accelerometer calibration

Place the UAV on a horizontal platform, click the button “Accelerometer calibration”, LED will flash in red,green,yellow alternately. Solid *green* LED means successful calibration,data will be stored by restart.

(2) Compass calibration

▼ 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:

Click the button “Compass calibration” to enter into calibration status.

Switch switch “E” back and forth more than 4 times to enter into calibration status.

▼ Calibration Step

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

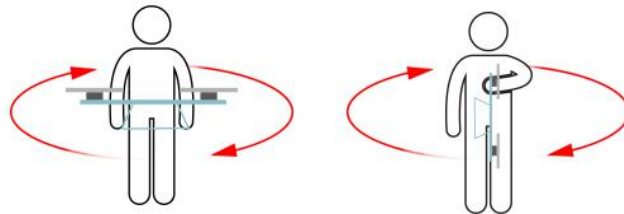


Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

Clicking calibration, yellow LED of copter will be 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.



After vertical calibration,calibration mode will be exited automatically and LED will flash normally if successful. If fails, LED will keep red for 3 seconds, then user need to calibrate again.

Please power again after successful calibration.

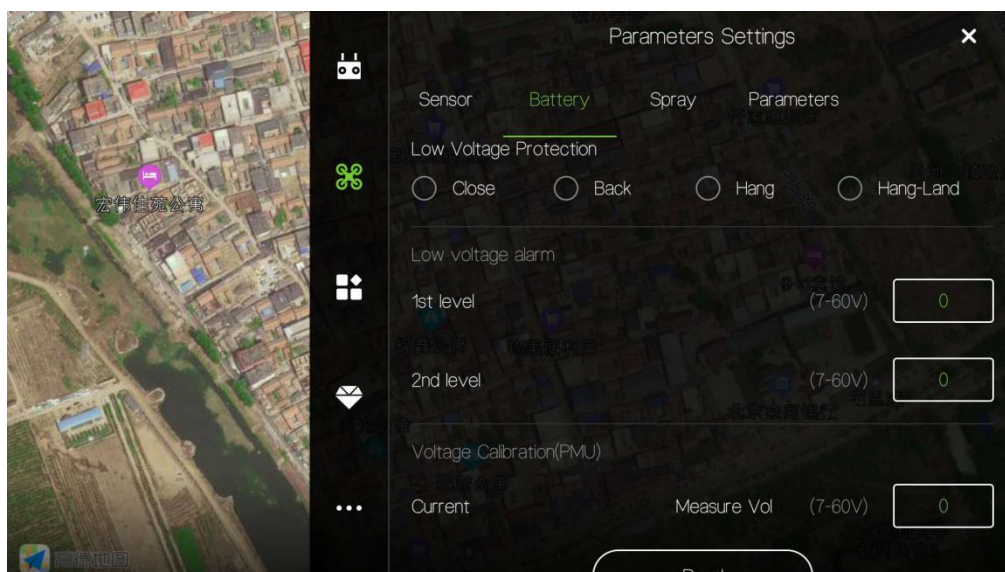
▼Attention

Calibration should be done in outdoor,wild and far away from high tension line tower which is easy influenced by magnetic interference.

Keep horizontal and vertical during the slow calibration.

Clockwise is the only direction.

6.2.2 Battery





Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

Before doing any settings, click “Read” on the bottom to read the current settings.

(1) Low Voltage Protection

When battery voltage drops to the “2nd level” of low voltage alarm, the protection will be triggered.

Five voltage protection actions for user to select: Close(close the protection), return(auto home landing), Hang(hovering), Hang-Land(hovering and then landing).The default is Return(Home landing).

(2) Low voltage alarm

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 when get to the first alarm level; LED will flash rapidly when get to the second alarm level,and low voltage protection will be triggered.

(3) Voltage Calibration

Flight controller voltage sensor need to be calibrated if the result of sensor is different from real voltage. Real battery voltage should be filled after measuring battery voltage, then voltage sensor will be calibrated by clicking save. **It’s unnecessary to set by user without encountering sensor error as calibration has been done before delivery.**

Note:The calibration is more accurate when the battery is fully charged.

6.2.3 Spray

(1) Liq protection

When liquid is out, “Liq protection” will be triggered, then drone will execute the set protection actions.

(2) Double Pump Mode

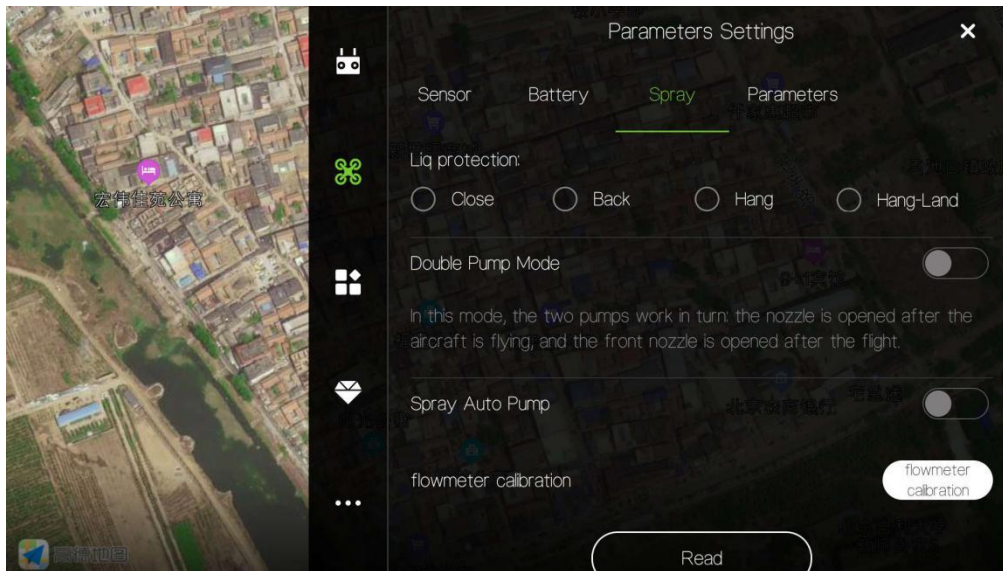
“Double Pump Mode” is specially for drones with dual pumps and the two pumps work alternatively.



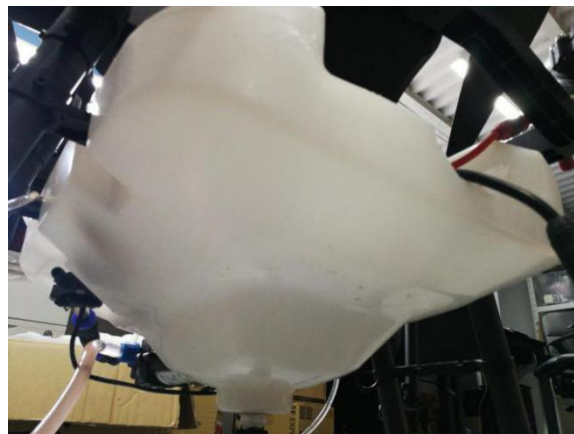
Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org



(3) flowmeter calibration



- 1) First drain all the liquid in the tank and hoses;
- 2) Pour 5-10 liters of water into the tank with measuring cup



3) Input the value of the water into the blank



4) Input the output percentage of pump



5) Click "Start", then APP will prompt the flowmeter to start calibration successfully



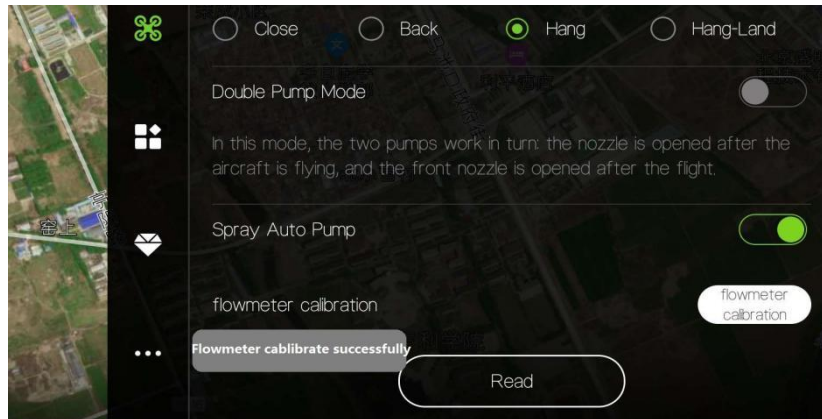
6) After the calibration is completed, the APP voice will prompt the flowmeter calibration successfully.



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org



6.2.4 Parameters

User can reset the parameters in this page. .

Click the button “Read” to get the current flying parameters. After resetting, click button “Save” to save the changes.

Note: It's not suggested to reset the Max Angel.

'Work End Action' refers to what drone will do after mission is completed.

'U Open' refers to the turn shape.

'Course Mode' refers to the drone heading direction when drone is performing missions.

'Manual' indicates drone will keep the heading direction in AB mode or autonomous route mode,unless turn it manually.

'Auto' indicates drone will keep the heading direction to flight routes, and drone won't turn.

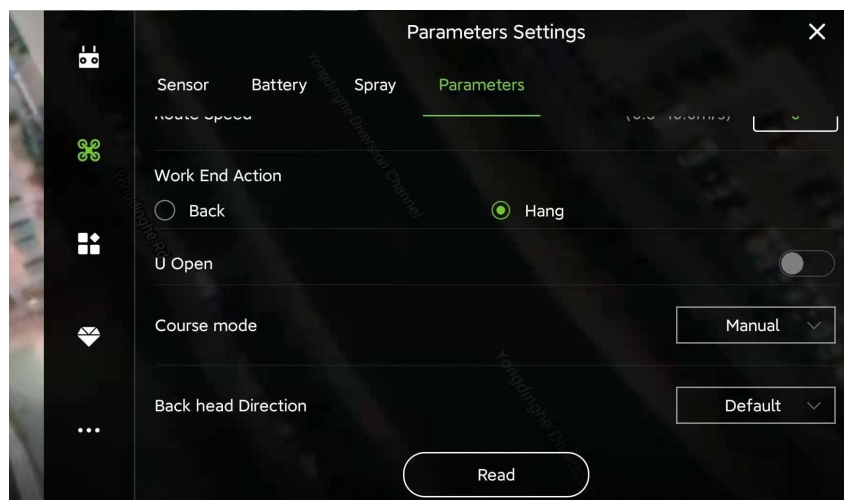
'Target' Indicates drone heading direction always point to the next target point.

'Back Head Direction' refers to the heading direction when flying to home automatically.

6.3

Mode

This



Extra

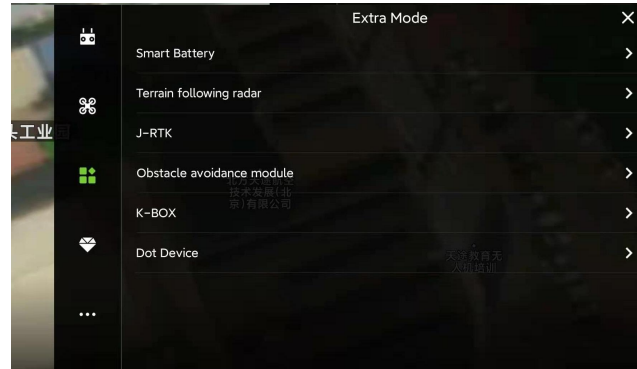


Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

section is used for setting external modules, including smart batteries, terrain following radar, etc..



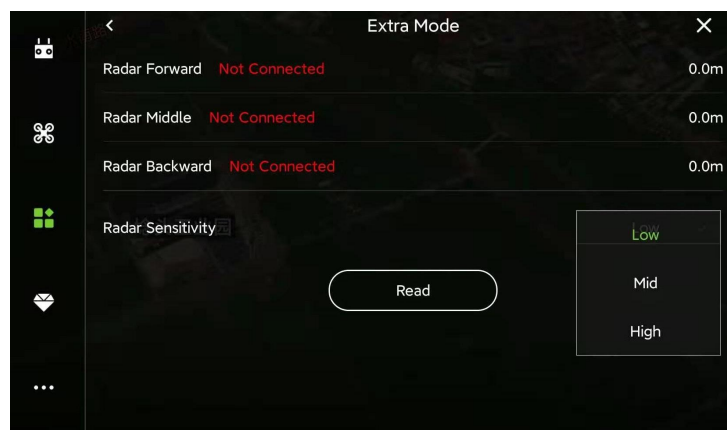
6.3.1 Smart Battery

This function is under developing.

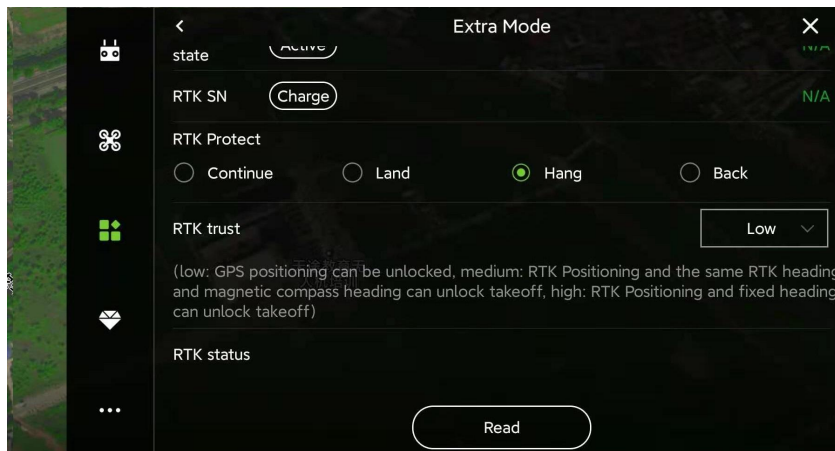
6.3.2 Terrain Follow Radar

Terrain following sensitivity: Control the drone to follow the height change of the terrain, and keep the relative distance from the ground fixed at all times.

- 1) **Low sensitivity**: suitable for high-stalk crops (such as sorghum, corn, etc.). It can prevent falling and twitching caused by high loft lodging and uneven high loft.
- 2) **Medium sensitivity**: suitable for most scenarios and non-stalk crops (such as rice, wheat, soybeans, etc.). The speed of the simulation is moderate, and the response is moderate.
- 3) **High sensitivity**: It is suitable for demonstration effects and some non-operational entertainment places. It is sensitive to imitation, rising fast and falling fast.



6.3.2 J-RTK



'**RTK Location Status**' display the yaw angle fixed status; If RTK module has been mounted on aircraft, its status should be Fix before takeoff.

'**RTK Diff_Age**' display the latency of RTK differential data. If the value changes between 1~3. it indicates the RTK signal status is good.

'**RTK Protect**' display the protection action when RTK fails.

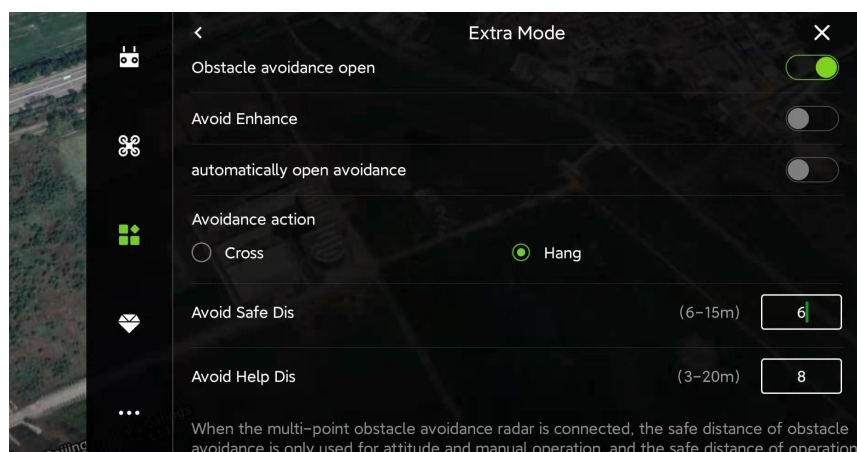
'**RTK trust**': recommended to set on Mid.

'**Hight**': Drone can't be armed, unless RTK positioning and **RTK Location Status** is fixed

'**Mid**': Drone can't be armed, unless RTK positioning is fixed, and RTK yaw angle is the same with compass yaw angle.

'**Low**': Drone can be armed when GPS positioning is fixed.

6.3.3 Obstacle Avoidance Module



‘Avoid Enhance’: Enhance the detection sensitivity of radar.

‘Automatically open avoidance’: Avoidance radar will be activated when drone is performing AB mission or Autonomous mission.

‘Avoidance action’: what drone will do when detected any obstacle.

“Cross”: Drone will plan and execute the routes to avoid obstacles automatically when detected obstacles.

‘Hang’: Drone will hover when detected obstacles.

‘Avoid Safe Dis’: After the aircraft detects the obstacle, the distance between the final hovering position of the aircraft and the obstacle (generally set 8-10 meters).

"Avoid Help Dis": When triggering the **Cross** avoidance action, the actual avoidance flying distance = swath*2 + Avoid Help Dis, referring to the **Figure 6.33**. Only valid in AB mission and autonomous mission.

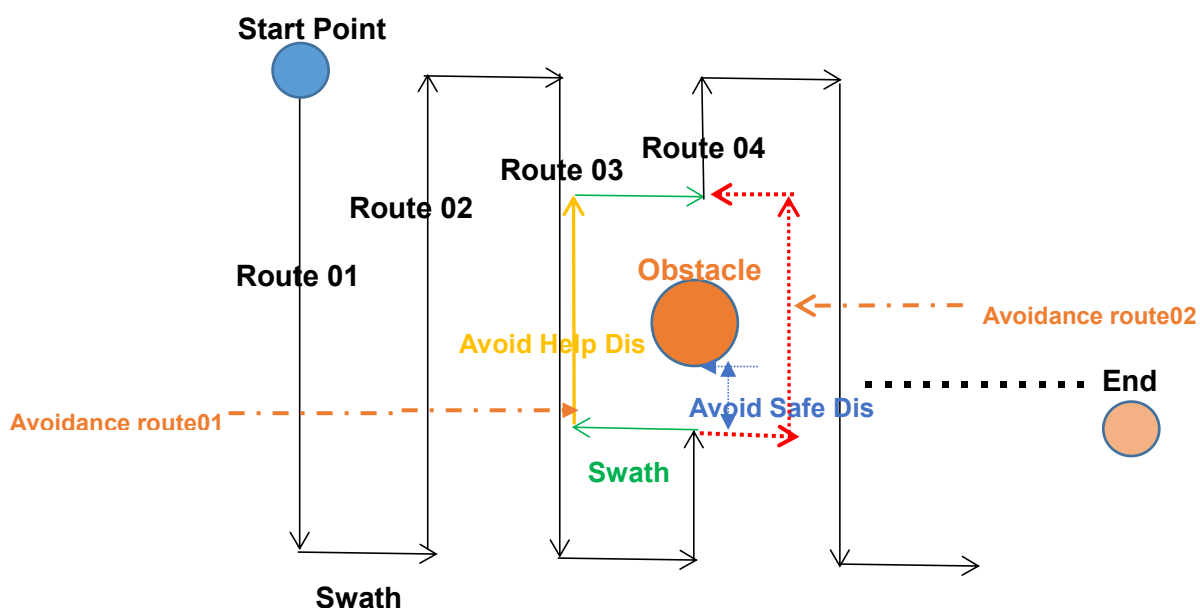


Figure 6.3.3 Auto Avoid Route

When Cross Avoidance is triggered, drone will always fly to **Flie Area** to avoid obstacles. In situation as above Figure 6.3.34, drone will perform Avoidance Route01, instead of Avoidance Route02.



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

6.4 About

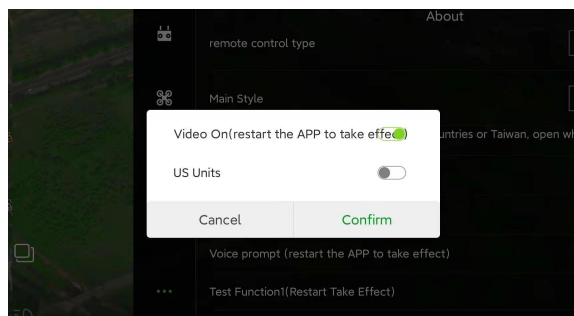


[FC] On the FC page, users can view the flight control firmware version, serial number, IOT version number, lease control status and lease management expiration date.

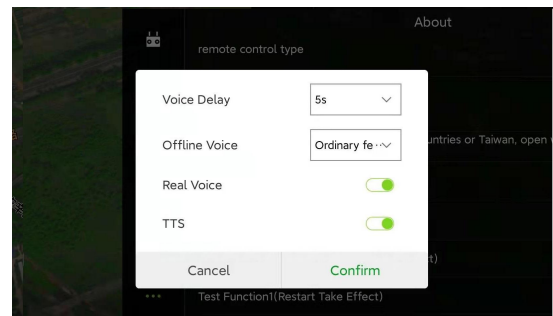
[flight time] User can view the total flight time in this page.

[Map type] User can chose proper map tape according to the working country.

[Correct coordinates] It is suggested to turn it on when the positioning deviation is large.



fpv/unit



Voice Prompt

[fpv/unit] Turn on or off FPV display; Switch to Metric Unit or US unit

[Voice Prompt] Turn on or off the voice prompt of APP.

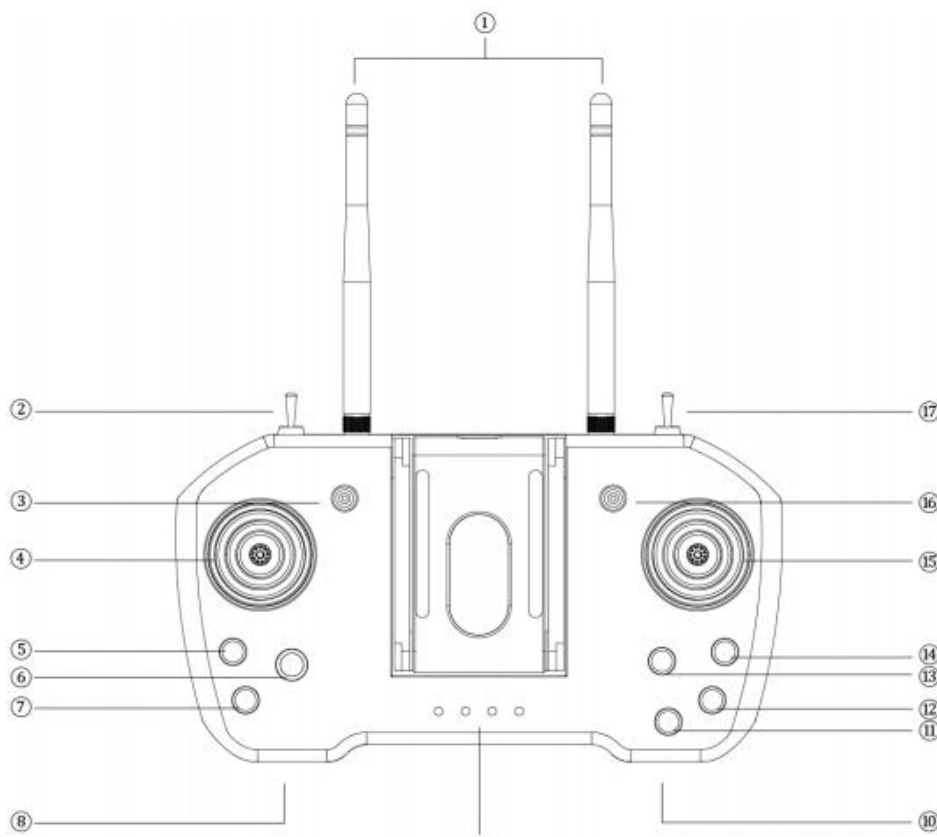
[Unlock Password] Set the password of arming drone.

[US Units] Switch statistic unit between Metric Unit and US Unit.

[SIYI] "SIYI" is used to adapt to SIYI remote controller.

7. 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℃.



No.	Specifications	No.	Specifications
1	2.4G 3DB Antenna	10	USB2/Charge/Data Transmission
2	3-Segment Lever G	11	Button D
3	3-Segment Lever E	12	Button C
4	Left Stick X1、Y1	13	Button A
5	Reserved Button	14	Button B
6	Small stick X3、Y3	15	Right Stick X2、Y2



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

7	Power Button	16	3-Segment Lever F
8	USB1/Image output	17	3-Segment Lever H
9	Battery capacity indicator		

7.1 Function Description

Switch	Channel	Top	Middle	Bottom
E	Flying mode	Attitude mode	GPS mode	AB mode
F	AB recording	/	Recording Point A	Recording Point B
D	Home landing	OFF	/	ON
Switch	Channel	Left	Middle	Right
G	Pump mode	OFF	/	ON
H	Terrain following	ON	/	OFF

7.2 Bind

Before binding, remove all propellers for safety.

- ◆ Power on drone for 1 second and cut off immediately, repeating this step for three times. Then power on the drone for the fourth 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 remote controller.

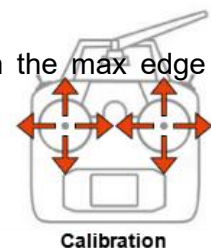
Remote controller need to be calibrated after binding.

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

7.3 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



Calibration



Beijing TT Aviation Technology Co., Ltd.

Add: No.1 TTA Building, Niantou Industrial Park ,Changping District,Beijing, China

www.ttaviation.org

beeping will be stopped at the same time.

7.4 RC Connection & 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.

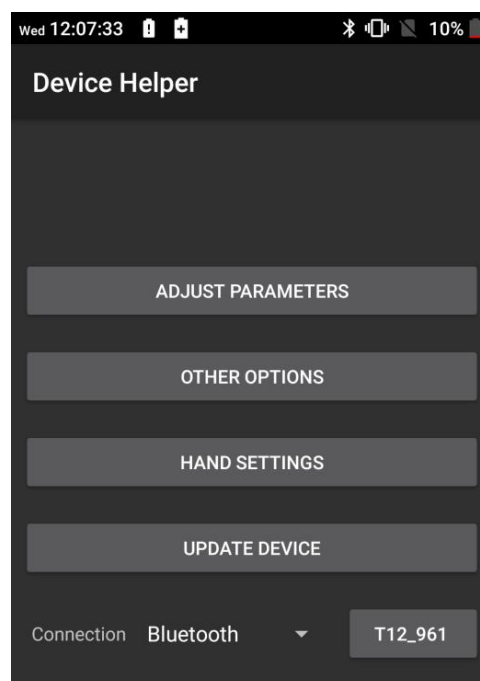
HAND SETTINGS ----- Select hand mode, USA, Japan ect.

UPDATE DEVICE ----- Update firmware online

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

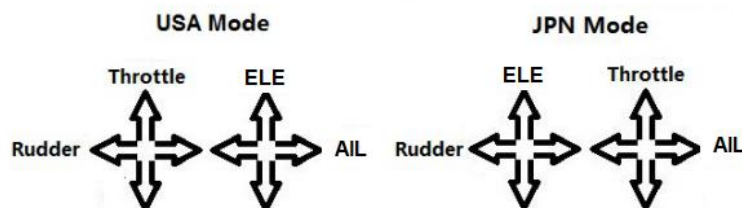
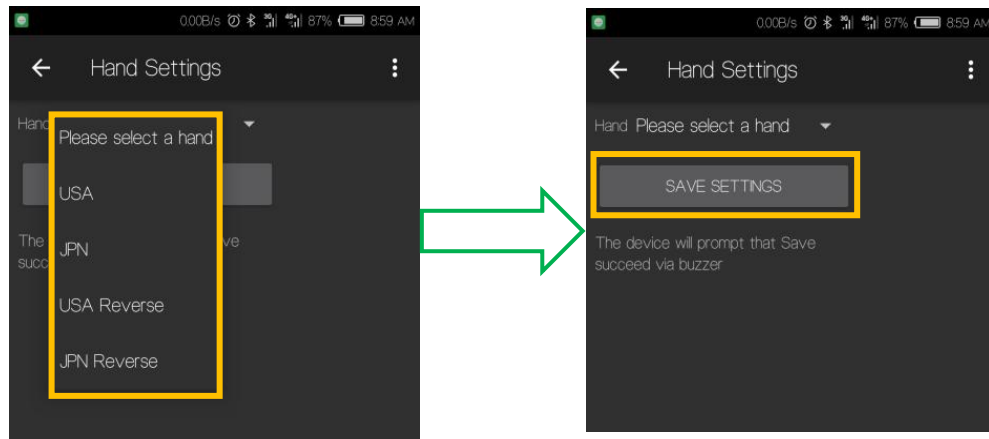
Cautions: Don't do any adjustment, unless under professional introduction.

Otherwise,any consequences caused are undertaken by its users.



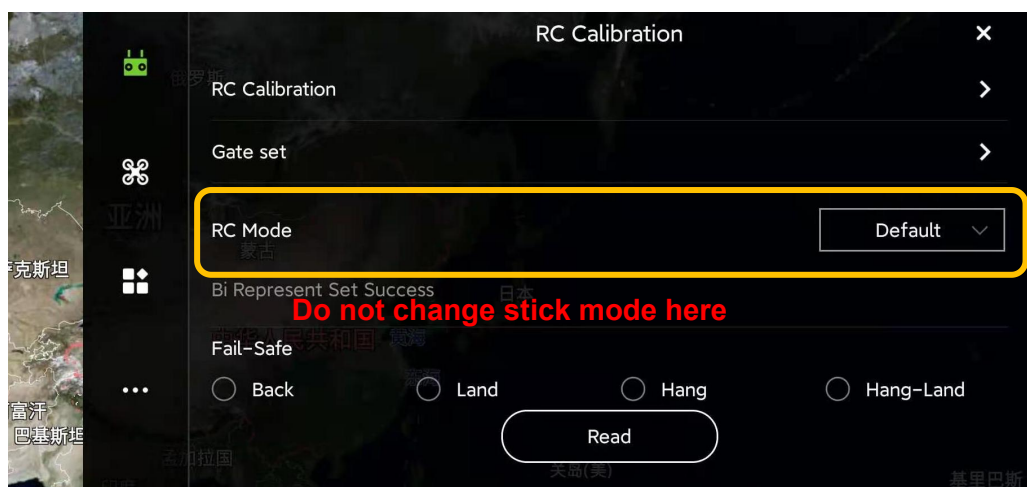
7.5 Hand Mode Settings Introduction

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



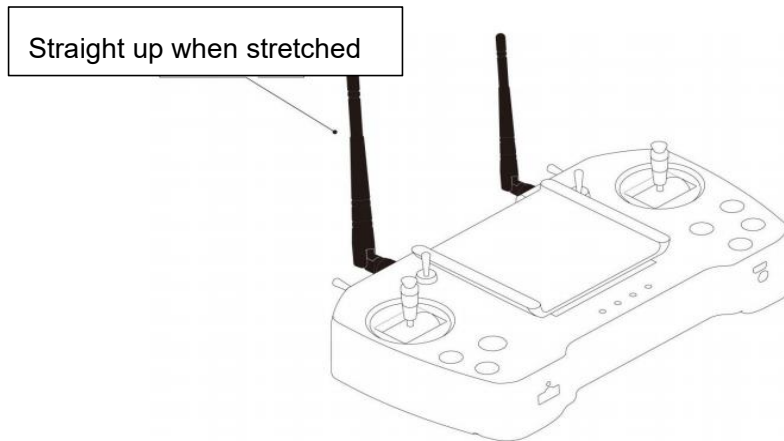
Note:

- (1)The default mode is USA mode / mode 2.
- (2)Do not change stick mode in "RC Mode" of "RC Calibration" page.

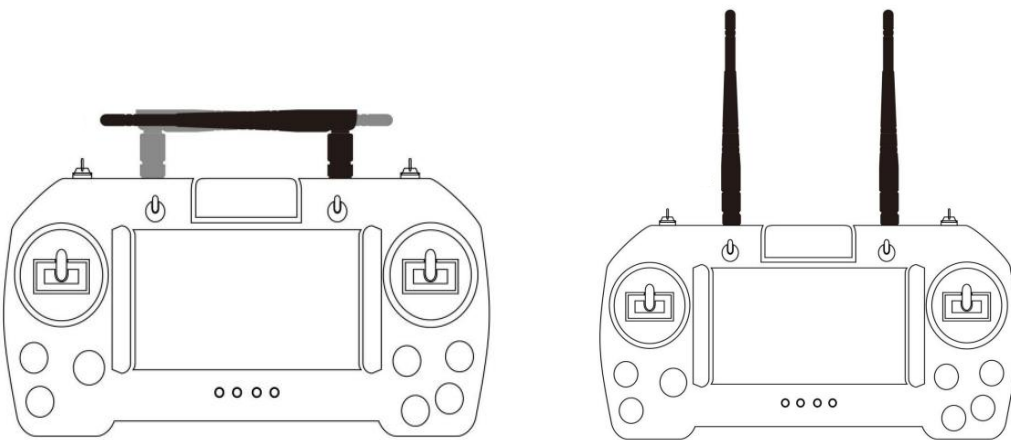


7.6 Remote Controller Antenna

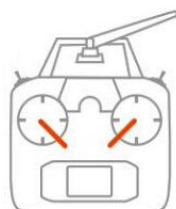
Remote controller antenna should straight up when it is stretched.



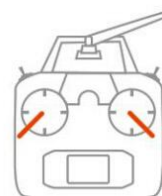
Caution: Incorrect directions as the two pictures below.



7.7 Flying Control



Arm



Emergency Disarm



7.7.1 Manually Arming and Take-off

- 1) Switch to **Attitude** mode.
- 2) Pull control sticks to the bottom inside corners to arm drone.
- 3) After armed, switch to **GPS** mode. Then push the throttle above the neutral position to 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.

Note:

- (1) Before arming, ensure no human is within 10 meters of the drone.
- (2) Drone can only be armed in Attitude mode. After arming, pilot should switch to GPS mode before take off drone.
- (3) It is suggested to take off in GPS mode, when satellites is more than 14, no magnetic field interference and all parts of aircraft are in good condition.
- (4) 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 's engineer.

7.7.2 Disarming

After landing the aircraft, push the throttle down and hold for 3 seconds. The motors will be stopped, and drone will be disarmed at the same time.

Emergency disarming: Pull control sticks to the bottom outside corners to lock drone(**only for emergency use**. This operation can control motor stop spinning immediately when flying).

Cautions:

1. During autonomous mode or AB mode, missions can be **interrupted** by switching the flight mode manually. After that, operator can **fully take over** the aircraft.
2. 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.

8. 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	Switch to AB mode, then Record point A and B, roll left or right for choosing the mission direction	GPS satellites enough, LED does not flash red
RTH	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



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.

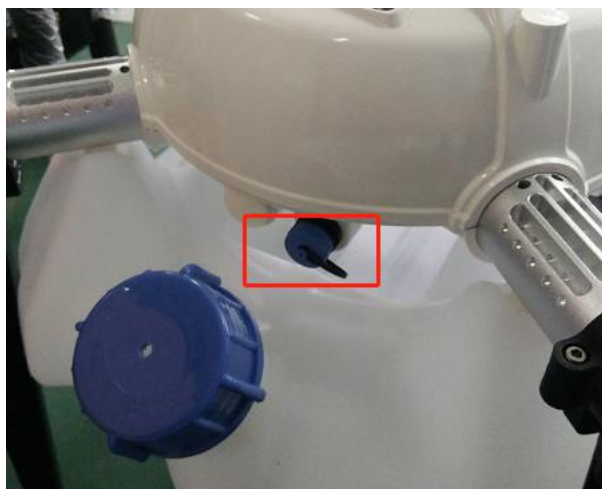


Appendix II Implication of Indicator Light

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

Appendix III How to connect copter to Assistant 2

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

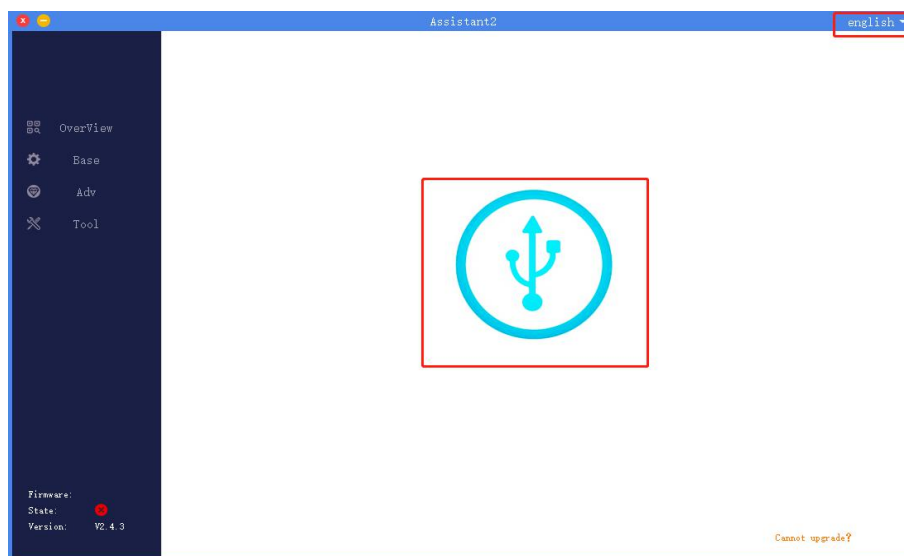


2 Find the computer connection cable from the attached bag,see figure 2:



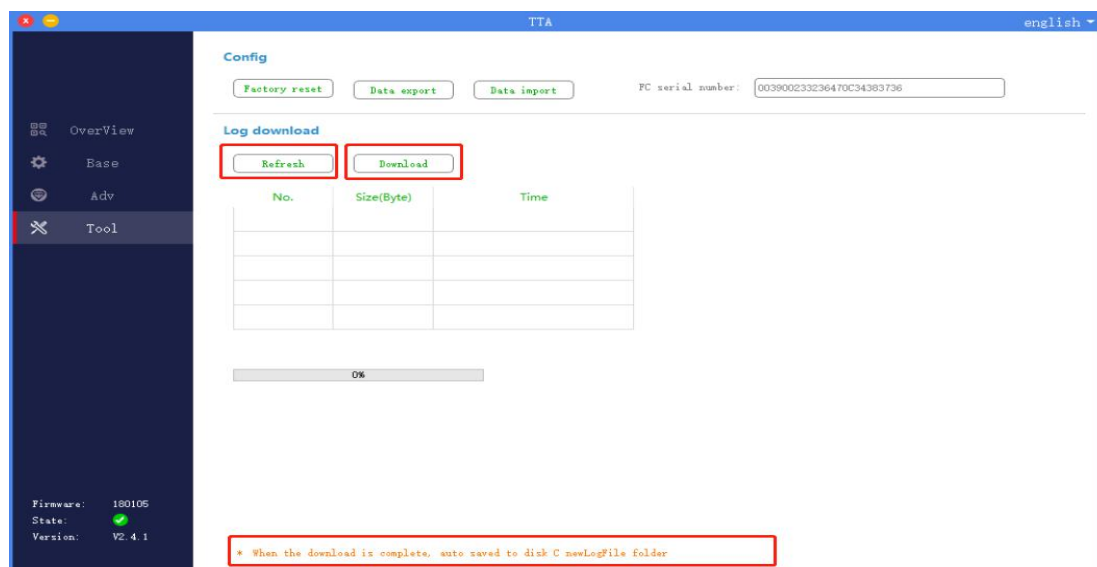
3 One connect to computer,another end connect to copter.Waiting for a moment(It takes few minutes to install the driver for the first connection with a new computer)

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



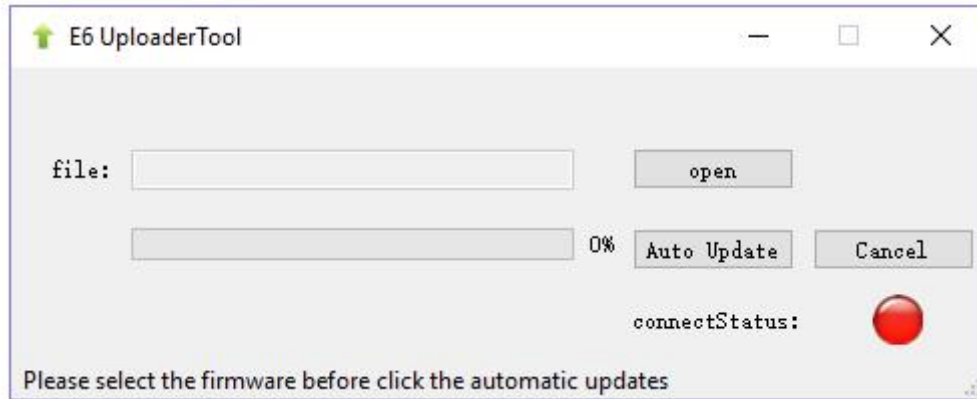
Appendix IV How to download log from Assistant 2

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 V How to upgrade the firmware

- 1 Download the upgrading tool from TTA website
- 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 be 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.

Appendix VI Important Attentions and Clauses

1. Ingress Protection Rating

Drone has a certain degree of waterproof, dustproof, when it is functioning normally. However, this protection rating is not permanent and may reduce over time after long-term use due to aging and wear. The product warranty does not cover water damage.

2. Battery Maintenance

(1) Charge batteries with balance cable connecting.

(2) Never use deformation or bulge batteries.

(3) Drone battery needs maintenance regularly.

- Generally balance battery voltage every 5 days.
- In long-term storage, charge battery in storage mode every 20 days, as battery itself is discharging all the time. Otherwise, battery may be damaged because of over self-discharge.
- In long-term storage, charge and discharge battery to activate battery every 2~3 month. Otherwise, battery performance will be largely reduced.

More details, referring to <Battery Use and Maintenance Instruction>.

Any losses caused by improper battery maintenance and storage shall be taken by users.

3. Drone Idle Time Protection

To maximize the service life of drone electronics, TTA presets a relative protection on drone idle time.

If Agricultural drone is powered on for over 30mins without flying, once every takeoff, drone have a possibility of losing control, which may crash caused by.

In case of staying over 30mins with battery connected, disconnecting and re-connecting drone battery will make drone ready for takeoff.

Hereafter any crashed by the over 30mins ground issue, any crashed losses caused shall be responsible for users.

4. Drone Payload Weight

Each time the flying altitude is increased by 1000m, the tank payload should be reduced by 2KG.

5. Radars

- The radar can only function properly in flat field, and cant work properly in sloping field with an inclination of more than 10° or field with sudden elevation changes.
- Be extra careful when flying on inclined surfaces. Recommended maximum inclination at different aircraft speeds: 10° at 0.9 m/s, 6° at 3.2 m/s, and 3° at 4.5 m/s.

Pay attention that obstacle avoidance radar will be adversely affected when aircraft pitch angle exceeds 15°

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.

This content is subject to change.

If you have any questions, please contact TTA: lan.li@ttaviation.com

Copyright©2021 TT Aviation All rights reserved.