

# AGRAS MG-1

## User Manual

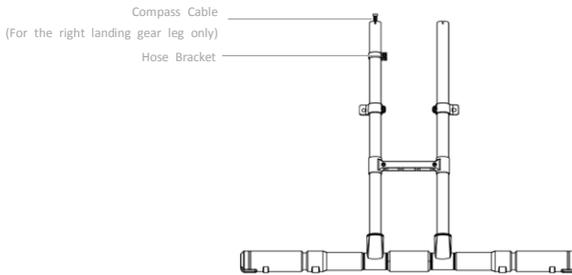
V1.0 2016.02

# Contents

Installation .....	3
Mounting the Landing Gear .....	3
Mounting the Liquid Tank.....	4
Unfolding the Frame Arms .....	5
Mounting the Sprinklers.....	5
Mounting the Radar-Assisting Altitude Stabilization System .....	7
Connecting the Batteries .....	7
Remote Controller .....	9
Profile.....	9
Prepare the Remote Controller .....	9
Remote Controller Diagram.....	10
Using the Remote Controller .....	10
Turning the Remote Controller On and Off.....	10
Remote Controller LED .....	14
Operation Status Display Panel .....	15
Aircraft .....	18
Profile.....	18
Operation Mode.....	18
Radar Assisted Altitude Stabilization System .....	22
No Liquid Warning.....	23
Return-to-Home (RTH) .....	24
Low Battery Level Warning.....	25
Flight .....	26
Starting and Stopping the Motors .....	26
Appendix.....	27
Specifications .....	27
Aircraft Status Indicator Description.....	28

# Installation

## Mounting the Landing Gear



The structures of the two landing gear legs are different. The one with a compass cable should be mounted to the right side of the aircraft (with its tail facing you).

### 1. Mounting the right landing gear leg

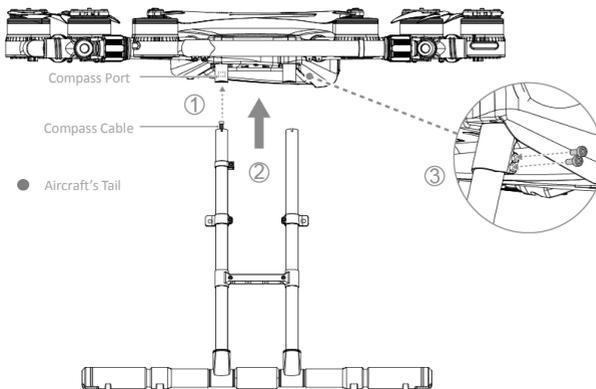
There is a compass cable in the landing gear leg. Connect the compass cable before mounting the landing gear leg.

① Connect the compass cable to the compass port in the landing gear mount on the right side of the center frame.

Use tools such as tweezers if needed.

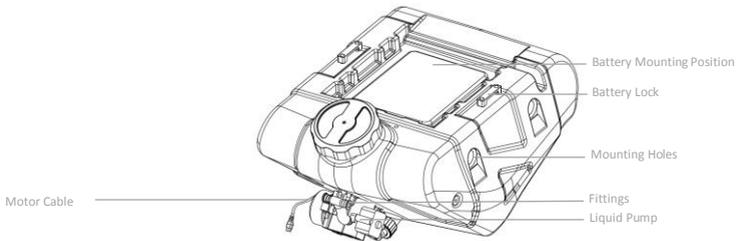
② Mount the landing gear leg to the center frame. DO NOT damage the compass cable.

③ Insert and tighten M3x10 screws.

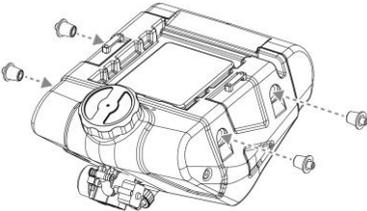


2. Follow the step 2 and 3 above to mount the left landing gear leg.

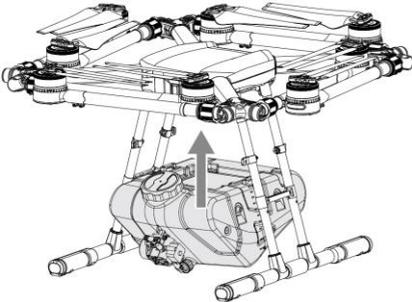
## Mounting the Liquid Tank



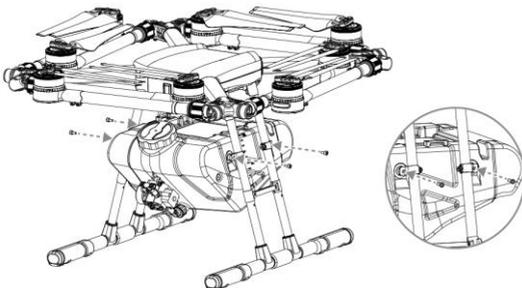
1. Insert the four liquid tank plugs into the mounting holes on the liquid tank.



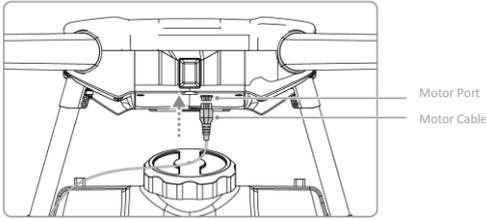
2. Hold up the liquid tank to the lower position of the center frame with the liquid pump facing the aircraft's tail.



3. Align the mounting holes on the liquid tank and landing gear. Tighten the four M5x18 screws on the two sides.

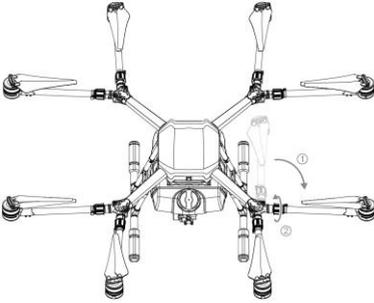


4. Align the fin on the motor cable connector and the slot on the motor port. Then plug the motor cable.

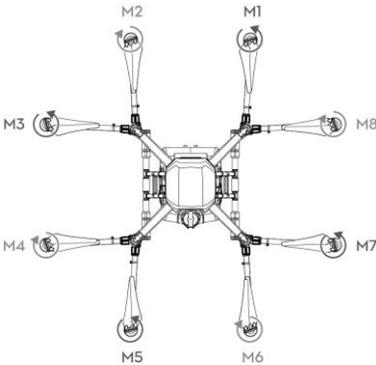


## Unfolding the Frame Arms

1. Unfold the frame arms totally ①. Tighten each sleeve at the eight junctions ②.

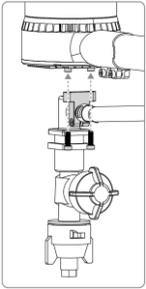


2. Double check the positions of the frame arms. Frame arms M1 and M2 form the front of the aircraft, while frame arms M5 and M6 form its rear. Seen from the top, motors on frame arms M1, M3 and M5 should rotate counter clockwise, while motors on frame arms M2, M4 and M6 should rotate clockwise.



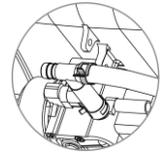
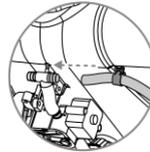
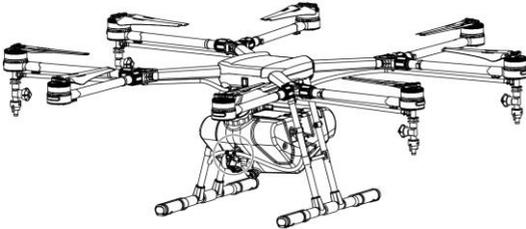
## Mounting the Sprinklers

1. There are sprinkler mounting positions on the bottom of the four motors on the aircraft's left and right side (motors on frame arms M3, M4, M7 and M8). Tighten the two M3x6 screws to mount the sprinklers.



2. Prepare hose clamps A. Tools such as pliers may be required. Follow the instructions below to connect the other end of the hose to the liquid pump.

- ① Pull the hose through the hose clamp A and then connect it to the fitting of the liquid pump.
- ② Open the hose clamp A by tools such as pliers. Move it to the fitting and release the hose clamp A to grip the hose.

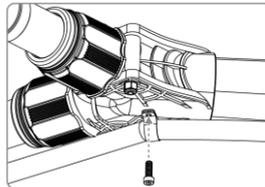
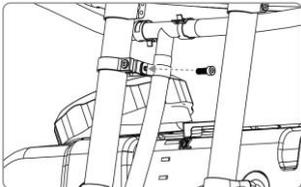


3. Prepare hose clamps B and M3x6 screws to fix the hoses to the arms and landing gear.

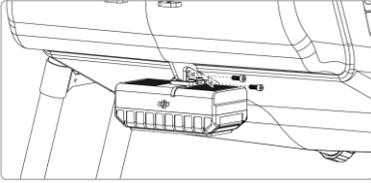
- ① Open the hose clamp B to an appropriate angle to hold the hose. DO NOT damage the clamps.



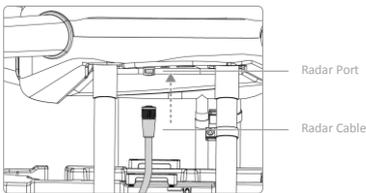
- ② Tighten one M3x6 screw to the hose bracket on the landing gear.
- ③ Tighten one M3x6 screw to the mounting hole on the bottom of the frame arm junction.



## Mounting the Radar-Assisting Altitude Stabilization System

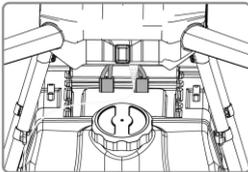


1. Arrange the side with a DJI logo outwards.
2. Align the mounting holes on the liquid tank and altitude stabilization system. Then tighten two M3x8 screws.
3. Align the slot inside the radar cable connector and fin of the radar port on the center frame. Plug the cable and then rotate the upper part of the cable to the left to insert it into the slot on the cable port.



## Connecting the Batteries

There are two XT90 ports on the aircraft. The allowable voltage is 22.2 V for every XT90 port. Connect two 6S batteries in series to get a maximum power supply of 50.4 V.



Battery Use Requirement:

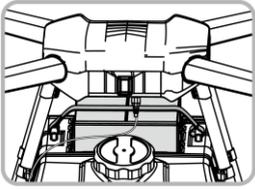
1. Be sure to use two 6S LiPo batteries of the same model. 6S LiPo batteries of 12000 mAh capacity and 10C continuous discharging rate are recommended.
2. Ensure that the voltage of the two batteries used is the same.
3. The two batteries must be used together all the time. Replace the two batteries together for safe use, if one of them is damaged.



Batteries are required but not included with the MG-1.

The batteries for the MG-1 are of high voltage and energy. Use them in accordance with their instructions and make safety your top priority. DJI assumes no liability for damage(s) or injuries incurred from using batteries.

Place your batteries to the battery position on the liquid tank. Pull the Velcro through the battery lock and bind the batteries as shown below.



## Remote Controller Profile

The aircraft remote control system operates at 2.4 GHz and the maximum transmission distance is 5 km. The remote controller features a number of spray system control functions to help complete operation mission. Users can switch between different operation modes via the remote controller.

	<p>Compliance Version: The remote controller is compliant with both CE and FCC regulations.</p> <p>Operating Mode: Control can be set to Mode 1 or Mode 2, or to a custom mode.</p> <p>Mode 1: The right stick serves as the throttle.</p> <p>Mode 2: The left stick serves as the throttle.</p>
	<p>To prevent transmission interference, do not operate more than three aircrafts in the same area.</p>

## Prepare the Remote Controller

### Mounting the Operation Status Display Panel

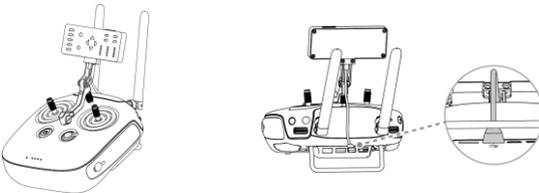
1. Unfold the Operation Status Display Panel①. Remove the screw using the slotted screwdriver coming with the MG-1②.



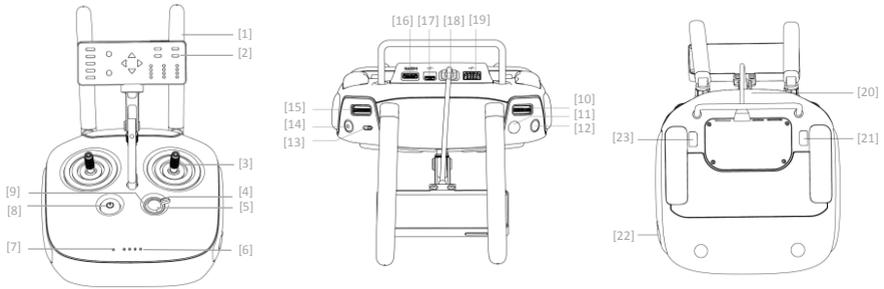
2. Plug the panel into the remote controller and tighten the screw lock.
3. Line up the hole on the panel with the metal loop on the remote controller. Insert and tighten the screw.

### Adjusting the Antenna and Connecting the Panel

1. Tilt the Panel to the desired position. Adjust the antenna as shown.
2. Plug the cable of the panel into the CAN port on back of the remote controller.



## Remote Controller Diagram



**[1] Antennas**

Relays the aircraft control signals.

**[2] Operation Status Display Panel**

Displays the operation status.

**[3] Control Stick**

Controls the aircraft movement.

**[4] Operation Mode Switch**

Used to switch between Smart, Assisted and Manual Operation Mode.

**[5] Return-to-Home (RTH) Button**

Press and hold this button to initiate Return-to-Home (RTH).

**[6] Battery Level LEDs**

Display the current battery level.

**[7] Status LED**

Indicates whether the remote controller is linked to the aircraft.

**[8] Power Button**

Used to power on/off the remote controller.

**[9] RTH LED**

Circular LED around the RTH button which displays the RTH status.

**[10] Flying Speed Dial**

In Smart Operation Mode, turn and press the dial to adjust the flying speed.

**[11] Button A**

Records the A Point of the operation route.

**[12] Button B**

Records the B Point of the operation route.

**[13] Flight Mode Switch**

Used to switch between G-Mode (GPS), A-Mode (Attitude) and M-Mode (Manual).

**[14] Spray Button**

In MO-Mode, press to start / stop spraying.

**[15] Spray Speed Dial**

In MO-Mode, turn the dial to adjust the spray speed.

**[16] Mini HDMI Port**

Reserved.

**[17] Micro USB Port**

Reserved.

**[18] CAN Port**

Connects to the operation status display panel.

**[19] USB Port**

To update the firmware.

**[20] GPS Module**

Used to pinpoint the location of the remote controller.

**[21] Back Left Button C1**

Press to choose left as the direction of the operation route in SO-Mode. In AO-Mode, press to fly the aircraft left by one operation width.

**[22] Power Port**

Connects to a power source to charge the remote controller's internal battery.

**[23] Back Right Button C2**

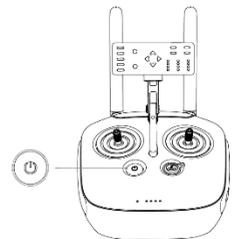
Press to choose right as the direction of the operation route in Smart Operation Mode. In AO-Mode, press to fly the aircraft right by one operation width.

## Using the Remote Controller

### Turning the Remote Controller On and Off

The remote controller is powered by a 2S rechargeable battery that has a capacity of 6000 mAh. The battery level is indicated via the Battery Level LEDs on the front panel. Follow the steps below to turn on your remote controller:

1. When the remote controller is turned off, press the Power Button once. The Battery Level LEDs will display the current battery level.
2. Press the Power Button once. Then press again and hold the Power Button to turn on the remote controller.
3. The remote controller will beep when it is turned on. The Status LED will rapidly blink green, indicating that the

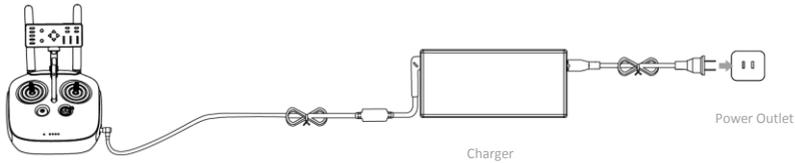


remote controller is linking to the aircraft. The Status LEDs will glow solid green when linking is complete.

4. Repeat Step 2 to turn off the remote controller.

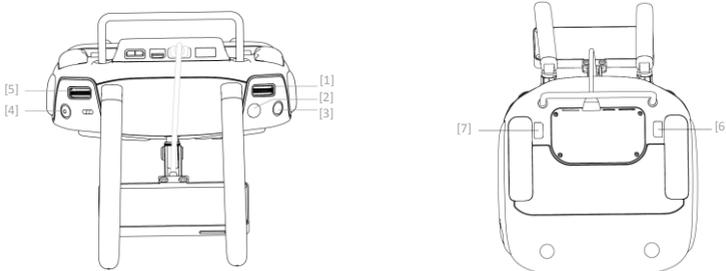
## Charging the Remote Controller

Charge the remote controller using the included charger. Refer to the figure below for more details.



## Controlling the Spray System

Adjust the flying speed, record Point A and B, start or stop spraying, adjust spray speed, choose the route direction via the Flying Speed Dial, Button A / B, Spray Button, Spray Speed Dial, Button C1 / C2.



### [1] Flying Speed Dial

In Smart Operation Mode, turn and press the dial to adjust the flying speed. You can set four speed gears in the A2-AG Assistant. The four speed gears are set to 3, 4, 5, 6 m/s by default, and the initial flying speed is the speed of the first gear. Move the dial to the left and press the dial to change to the previous speed. Move the dial to the right and press the dial to change to the next speed. The operation status display panel will indicate the current speed gear.



The final movement of the dial before you press the dial will be used to set the flying speed.

### [2] Button A

Press the button to record Point A of the Smart Operation route.

### [3] Button B

Press the button to record Point B after Point A recorded.

### [4] Spray Button

In Manual Operation Mode, press the button to start or stop spraying.

### [5] Spray Speed Dial

In Manual Operation Mode, turn the dial to adjust the spray speed. Move the dial to the left to reduce the spray speed. Move the dial to the right to increase the spray speed. The speed range is 40% - 100%\*. The Operation Status Display Panel will indicate the current spray speed. Refer to Operation Status Display Panel for detail. The spray

speed is the value for the last Manual Operation Mode when you restart the remote controller or the aircraft is in Smart Operation Mode.

\* We use a percentage for the spray speed due to the various thickness of liquid. The percentage is the ratio of the current speed to the maximum speed. For water, 100% means 1.25 L/min with four TXVK-04 nozzles and 1.7 L/min with four XR11001 nozzles.

[6] Back Left Button C1

Press the button to choose the left direction for the Smart Operation route after Point A and B recorded.

[7] Back Right Button C2

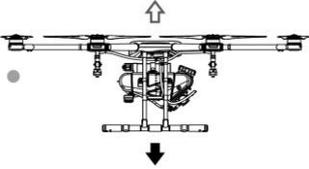
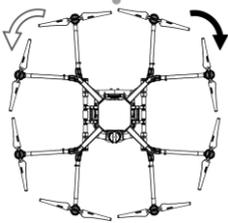
Press the button to choose the right direction for the Smart Operation route after Point A and B recorded.

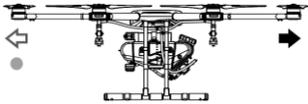
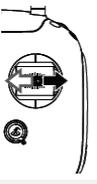
In Smart Operation Mode, when the aircraft is hovering at the key point, press Button C1 and C2 together and then the aircraft will fly to the next key point and hover. Press and hold Button C1 and C2 together for more than 2 seconds until there is a beep emitted from the remote controller, and the aircraft will enter or quit from Continuous Smart Operation Status. Refer to Smart Operation Mode for more details.

### Controlling the Aircraft

The Remote Control is set to Mode 2 by default.

	<p>Stick Neutral/Mid-Point: Control sticks are placed at the central position.</p> <p>Moving the Control Stick: The control stick is pushed away from the center position.</p>
---	--

Remote Controller (Mode 2)	Aircraft (● Indicates Nose Direction)	Remarks
		<p>Vertical movement of the left stick controls the aircraft's elevation. Push up to ascend and press down to descend. Use the left stick to take off when the motors are spinning at idle speed. The aircraft will hover in place if the stick is in the central position.</p> <p>The more the stick is pushed away from the central position, the faster the aircraft will change elevation.</p>
		<p>Horizontal movement of the left stick controls the aircraft's heading. Move left to rotate the aircraft anticlockwise and move right to rotate the aircraft clockwise. The aircraft will hover in place if the stick is in the central position.</p> <p>The more the stick is pushed away from the central position, the faster the aircraft will rotate.</p>

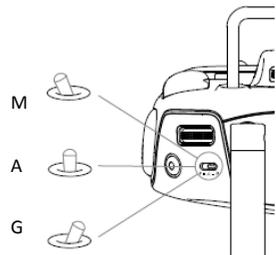
		<p>Vertical movement of the right stick controls the aircraft's pitch. Push up to fly forwards and press down to fly backwards. The aircraft will hover in place if the stick is in the central position.</p> <p>Move the stick further for a larger pitch angle and faster flight.</p>
		<p>Horizontal movement of the right stick controls the aircraft's roll. Move the stick left to fly left and right to fly right.</p> <p>The aircraft will hover in place if the stick is in the central position.</p> <p>Move the stick further for a larger roll angle and faster flight.</p>

The description above is only for the G-Mode and A-Mode.

### Flight Modes

Toggle the Flight Mode Switch on the remote controller to one of the three modes.

Figure	Flight Mode
G 	G-Mode (GPS)
A 	A-Mode (Attitude)
M 	M-Mode (Manual)



**G-Mode (GPS):** The aircraft uses GPS for positioning. Only in G-Mode and when the GPS signal is strong, users can start the motors.

**A-Mode (Attitude):** GPS is not used for positioning, and the aircraft only uses its barometer to maintain altitude. If a GPS signal is present, the aircraft will still return to the last recorded Home Point if the remote controller signal is lost.

**M-Mode (Manual):** Set as Manual or Attitude in the A2-AG Assistant. It is set to Attitude by default. Beginners do NOT set it to Manual. In Manual Mode, GPS and the attitude stabilization are not used. Control the aircraft by yourself totally.

### Operation Mode Switch

Toggle the Operation Mode Switch on the remote controller to one of the three modes.



Smart Operation Mode



Manual Operation Mode



Assisted Operation Mode

1. Smart Operation Mode: When the aircraft is in G-Mode and the GPS signal is strong, toggle the switch to this mode and the aircraft will fly and spray liquid in a certain route after Point A and B recorded.
2. Manual Operation Mode: In Manual Operation Mode, users can control the whole movement of the aircraft and spray liquid via the Spray Button.
3. Assisted Operation Mode: In Assisted Operation Mode, the flying speed is restricted and the aircraft's heading is locked. Users can control the movement of the aircraft except the heading. Press Button C1 or C2 and the aircraft will fly one operation width to the left or right. It sprays liquid when flying forwards and backwards. It doesn't sprays liquid when flying left and right.

### RTH Button

Press and hold the RTH Button to bring the aircraft back to the last recorded Home Point. The LED around the RTH Button will blink white during the RTH procedure. Users can control the aircraft during the procedure. Regain control manually to cancel the RTH procedure. Refer to How to Regain Control for details.



### Optimal Transmission Range

The signal transmission between the aircraft and the remote controller performs best when the aircraft is within the optimal transmission range. Open up the antennas on the remote controller to optimize transmission range. Ideally, the flat surface of the antenna should be facing the aircraft. If the signal is weak, fly the aircraft closer to you.

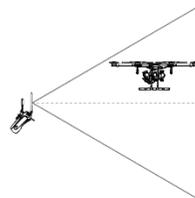


Strong



Weak

Optimal Transmission Range



### Remote Controller LED

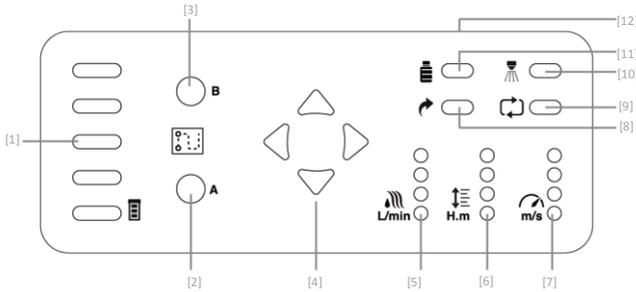


The Status LED indicates the connection status between the remote controller and the aircraft. The RTH LED indicates the Return-to-Home status of the aircraft. See the table below for details on these indicators.

Status LED	Sound	Remote Controller Status
 — Solid Red		The remote controller is not connected to the aircraft.
 — Solid Green		The remote controller is connected to the aircraft.
 ..... Blinks Red	D-D-D.....	Remote controller error.

RTH LED	Sound	Aircraft Status
— Solid White	chime	Return-to-Home procedure is initiated.
..... Blinks White	D . . .	Sending Return-to-Home command to the aircraft.
..... Blinks White	DD . . . .	The aircraft is returning to the Home Point.

### Operation Status Display Panel



**[1] Battery Level**

Displays the current battery level.

**[2] Point A LED**

The LED is on after Point A recorded.

**[3] Point B LED**

The LED is on after Point B recorded.

**[4] Orientation LED**

In Smart Operation Mode, indicates the current flying orientation.

**[5] Spray Speed**

Displays the current spray speed. The range is 40% - 100%. See the table below for details. (The bottom is LED1 and the top is LED4.)

LED is on. LED is blinking. LED is off.

LED1	LED2	LED3	LED4	Spray Speed
x1 .....				40% ~ 45%
x2 .....				45% ~ 50%
				50% ~ 55%
	x1 .....			55% ~ 60%
	x2 .....			60% ~ 65%
				65% ~ 70%

		 x1 .....		70% ~ 75%
		 x2 .....		75% ~ 80%
				80% ~ 85%
			 x1 .....	85% ~ 90%
			 x2 .....	90% ~ 95%
				95% ~ 100%

[6] Relative Altitude

Display the relative altitude between the aircraft and the crops (or the surface under the aircraft). See the table below for details. (The bottom is LED1 and the top is LED4.)

 LED is on.  LED is blinking.  LED is off.

LED1	LED2	LED3	LED4	Relative Altitude
				< 2 m
				2 m
				2.5 m
				3 m
				3.5 m
				4 m
				> 4 m

[7] Flying Speed

In Smart Operation Mode, displays the current speed gear. You can set four speed gears in the A2-AG Assistant. Select the speed gear via the Flying Speed Dial on the remote controller. The number (1 to 4) of the LED(s) that is (are) on indicates the current speed gear (the first to the fourth gear).

[8] Return LED

In Smart Operation Mode, if the task resumption function is initiated, the flight controller will record a breaking point. After breaking, the aircraft will return to the point and the Return LED will be on during the procedure.

[9] Continuous Smart Operation LED

In Smart Operation Mode, when the aircraft is hovering at the key point, press and hold Button C1 and C2 together for more than 2 seconds until there is a beep emitted from the remote controller, and the aircraft will enter Continuous Smart Operation Status. This LED will be on. Refer to Smart Operation Mode for more details.

[10] Spray LED

The LED is on when the aircraft is spraying liquid.

[11] Liquid Level

The LED is solid green when there is liquid in the liquid tank. The LED is blinking red when there is no liquid in the liquid tank.

**[12] Brightness Setting Button**

Press to adjust the LED brightness of the panel. The left part is to reduce the brightness and the right part is to increase the brightness.

# Aircraft

## Profile

The MG-1 has Smart Operation Mode, Manual Operation Mode and Assisted Operation Mode. Switch to one of the three modes via the Operation Mode Switch on the remote controller. In Smart Operation Mode, the aircraft will fly in a certain route and spray liquid automatically. In the Assisted Operation Mode, the flying speed and the aircraft's heading will be restricted. The aircraft will spray liquid automatically and users can control the aircraft to fly a certain width in the left or right direction via the buttons on the remote controller. In Manual Operation Mode, users can control the aircraft and spray liquid via the button on the remote controller.

	<p>The effect of the pesticides is related to the pesticide density, spray speed, flying speed, altitude above the crops, wind direction and wind speed. Consider all the factors for optimal effect when using the pesticides.</p> <p>Fly the aircraft above the crops at a proper height to avoid damage to the crops.</p>
---	--

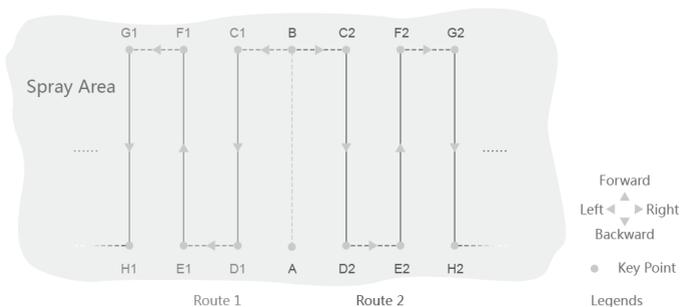
## Operation Mode

### Smart Operation Mode

In Smart Operation Mode, the aircraft will fly in a certain route and spray liquid automatically. Flight task resumption, data protection, and altitude stabilization system are available in this mode. It is recommended to fly in Smart Operation Mode when the spray area is large and approximately rectangular.

### Operation Route

The aircraft will fly in snakelike operation route 1 or 2 as shown below and spray liquid for the whole area after Point A and B recorded. The description in this manual is based on the directions in the illustrator. Points like C and D are called key point. Distances like AB and CD are called operation length. Distances like BC and DE are called operation width. All the corners in the illustrator are right angles.



### Operation Procedure

	<p>Maintain line of sight of the aircraft at all times.</p> <p>Ensure that the Flight Mode Switch is toggled to GPS Flight Mode and the GPS signal is strong (the number of GPS <math>\geq</math> 6). Otherwise, Smart Operation may be difficult.</p>
	<p>It's recommended to plan the operation route for efficient operation.</p>

**Instructions**

Ensure that the Operation Mode Switch is toggled to Manual Operation Mode, and then follow the instructions below:

1. Recording Point A and B

Switch to the Smart Operation Mode only after Point A and B recorded.

Recording Point A First:

Fly the aircraft to the planning Point A and hover. Press Button A on the remote controller. The Point A LED on the Operation Status Display Panel glows solid green and the Aircraft Status Indicator flashes red for eight times indicate that Point A is recorded successfully.

Recording Point B Secondly:

Fly the aircraft to the planning Point B and hover. Press Button B on the remote controller. The Point B LED on the Operation Status Display Panel glows solid green and the Aircraft Status Indicator flashes green for eight times indicate that Point A is recorded successfully.

	<p>If you want to update Point B after Point A and B recorded, fly the aircraft to the new Point B and record it.</p> <p>If you want to update Point A after Point A and B recorded, record the new Point A and then record Point B again.</p> <p>It's recommended to keep the direction of Point A to B parallel to the long side of the rectangular spray area for optimal effect.</p>
---	--

2. Selecting the Orientation of Point C

Press Back Left Button C1 or Back Right Button C2 on the remote controller to select the orientation of Point C, C1 for left and C2 for right. The corresponding Orientation LED on the Operation Status Display Panel will be blinking after selection. The orientation of Point C will be right if you didn't press any of the C1 and C2 buttons.

3. Enabling Smart Operation Mode

Ensure that the Flight Mode Switch is toggled to GPS Flight Mode and the GPS signal is strong (the number of GPS  $\geq 6$ ). Then toggle the Operation Mode Switch to Smart Operation Mode. The aircraft enters Smart Operation Mode and hovers at Point B. The aircraft's nose direction points to the direction of Point A to B automatically. The left and right Orientation LED on the Operation Status Display Panel blinks.

	<p>The aircraft's nose direction will point to the direction of Point A to B at all times without change by the flying direction.</p>
---	---

4. Starting Operation

	<p>The context below takes a right direction of Point C for example.</p>
---	--

1) Press the Back Left Button C1 and Back Right Button C2 on the remote controller at the same time. The Aircraft Status Indicator will flash blue for four times. The aircraft will fly from Point B to C and then hover at Point C. The

right Orientation LED on the Operation Status Display Panel will glow when flying from Point B to C. The four Orientation LEDs on the Operation Status Display Panel will blink when hovering at Point C.

- 2) Re-do Step 1) and the aircraft will fly to the next key point along the snakelike route 1 and hover.
- 3) Press the Back Left Button C1 and Back Right Button C2 and hold for more than two seconds when the aircraft is hovering at any key point. The aircraft enters Continuous Smart Operation Status. The Continuous Smart Operation Status LED will glow and the Aircraft Status Indicator will glow solid purple for one second. The aircraft will fly along the snakelike route 1 continuously.
- 4) Press the Back Left Button C1 and Back Right Button C2 and hold for more than two seconds in Continuous Smart Operation Status. The aircraft will quit from the status. The Continuous Smart Operation Status LED will be off. The aircraft will fly to the next key point and hover.

	<p>Only if the aircraft is hovering at a key point, the action of pressing button C1 and C2 in Step 1) to 3) will be available.</p> <p>If the GPS signal is weak (the number of GPS &lt; 6) in operation, the Flight Mode will switch to Attitude Flight Mode automatically, and you can spray liquid via the Spray Button on the remote controller. If the MG-1 regains GPS signal afterwards, it will fly to the next key point automatically.</p>
	<p>The distance of BC is called operation width. It is set to 5 m by default. You can customize it from 3 to 10 m in the A2-AG Assistant.</p> <p>You can control the left, right, forward, backward directions and the throttle of the aircraft to avoid obstacles when in operation, but the heading of the aircraft cannot be controlled. The aircraft will fly back to the operation route automatically and continue operation when releasing the control sticks. Release the control sticks only after avoiding the obstacles totally. Otherwise, it may cause aircraft collision on the way back to the operation route.</p> <p>The aircraft sprays liquid automatically when flying in the forward and backward direction, but it doesn't sprays liquid when flying in the left and right direction.</p> <p>The spray speed cannot be adjusted in Smart Operation Mode. It will be set to a value the same as it in Manual Operation Mode. You can enter Manual Operation Mode to adjust the desired spray speed (refer to Controlling the Spray System for details) and then return to Smart Operation Mode.</p> <p>The flying speed can be adjusted via the remote controller in Smart Operation Mode. Refer to Controlling the Spray System for details.</p>

### Flight Task Resumption

Toggle the Operation Mode Switch to quit from Smart Operation Mode or initial the Failsafe RTH or Smart RTH procedure, and then the aircraft will record the breaking point if the GPS signal is strong (the number of GPS  $\geq$  6). Return to Smart Operation Mode after other actions, the aircraft will return to the recorded breaking point

automatically and resume the task before. Flight task resumption is suitable for liquid injection and battery replacement.



The breaking point will be updated as long as the Operation Mode Switch is toggled from Smart Operation Mode to any other mode.

Ensure that the GPS signal is strong (the number of GPS  $\geq$  6) when using the flight task resumption function. Otherwise, the aircraft cannot record and return to the breaking point.

Follow the instructions below to use this function:

1. Toggle the Operation Mode Switch to quit from Smart Operation Mode or initial the Failsafe RTH or Smart RTH procedure. The current position of the aircraft will be recorded as the breaking point.
2. Fly the aircraft to a suitable altitude after other actions.
3. Ensure that the aircraft is in GPS Flight Mode and the GPS signal is strong (the number of GPS  $\geq$  6). Then toggle the Operation Mode Switch to enter Smart Operation Mode. The aircraft will return to the recorded breaking point automatically and resume the task before.

### System Data Memory

A data memory module is built in the MG-1 which can save the system data (position of Point A, B and the breaking point) during about 1 minute after the aircraft powered off. Replace the batteries and restart the aircraft within the available time. The data included Point A, B and the breaking point are still effective. Follow the instructions below to use this function:

1. Toggle the Operation Mode Switch to quit from Smart Operation Mode. The current position of the aircraft will be recorded as the breaking point.
2. Land the aircraft and stop the motors.
3. The system data memory function is activated automatically when the aircraft is powered off. The Aircraft Status Indicator will glow solid red.
4. Replace the batteries within the available time (about 1 minute).
5. Restart the aircraft and toggle the Operation Mode Switch to enter the Manual Operation Mode.
6. Ensure that the aircraft is in GPS Flight Mode and the GPS signal is strong (the number of GPS  $\geq$  6). Then start the motors and fly the aircraft to a suitable altitude.
7. Toggle the Operation Mode Switch to enter Smart Operation Mode. The aircraft will return to the recorded breaking point automatically and resume the task before.



DO NOT power off the aircraft for a long time (more than 1 minute) when using this function. Otherwise, Point A, B and the breaking point will be lost.

### Manual Operation Mode

Toggle the Operation Mode Switch to enter Manual Operation Mode. You can control all the movements of the

aircraft and spray liquid via the spray button on the remote controller. Adjust the spray speed via the dial on the remote controller. Refer to Controlling the Spray System for details. It is recommended to fly in Manual Operation Mode when the spray area is small.

### Assisted Operation Mode

Toggle the Operation Mode Switch to enter Assisted Operation Mode. The maximum flying speed is restricted to 8 m/s and the aircraft's heading is locked. You can control the movement of the aircraft except the heading. Press Button C1 or C2 and the aircraft will fly one operation width to the left or right. It sprays liquid automatically when the aircraft has a flying speed on forward and backward direction. It doesn't spray liquid when flying left and right or hovering. It is recommended to fly in Assisted Operation Mode when the spray area is irregular.



The operation width is the same as the one in Smart Operation Mode which is set in the A2-AG Assistant.

The spray speed cannot be adjusted in Assisted Operation Mode. It will be set to a value the same as it in Manual Operation Mode. You can enter Manual Operation Mode to adjust the desired spray speed (refer to Controlling the Spray System for details) and then return to Assisted Operation Mode.

## Radar Assisted Altitude Stabilization System

### Profile

The Radar Assisted Altitude Stabilization System uses microwave to realize altitude stabilization related to the crops which will ensure the spray uniformity under operating conditions. The system is active in Smart Operation Mode and Assisted Operation Mode and the aircraft will fly above the crops with a stable relative altitude. The system can measure the relative altitude above the crops or other surfaces, but the aircraft cannot fly with a stable relative altitude.

### Use

1. Ensure that the Operation Mode Switch is toggled to the Manual Operation Mode. Fly the aircraft above the crops and adjust the relative altitude between the aircraft and the crops. The relative altitude should be in the measuring range of the system (2 – 7 m). Otherwise, the Operation Status Display Panel cannot show the relative altitude.
2. Confirm the desired relative altitude by observing the Relative Altitude LEDs on the Operation Status Display Panel. The final relative altitude should be in the altitude stabilization range of the system (2 – 3.5 m). Otherwise, the system working will be unstable in which case there will be risk.
3. Toggle the Operation Mode Switch to enter the Smart Operation Mode or Assisted Operation Mode.



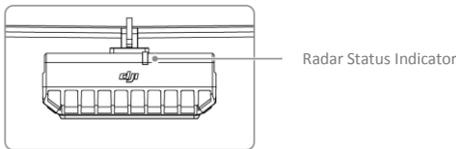
The distance between the aircraft and the surface measured should be in the operating range of the Altitude Stabilization System. Otherwise the system will fail to work.

Ensure that the pitch and roll angle of the aircraft is within 20°.

Operate the aircraft cautiously when in any of the following situations:

- a) There is a ditch or reservoir nearby;
- b) There are large height gaps between different surfaces;
- c) Flying at high speeds. When flying speed is below 5 m/s, the height gaps should not exceed 1 m; when flying speed is over 5 m/s, users should be aware of the distance between the aircraft and the surface measured to avoid accident;
- d) Flying over moving surfaces or objects;
- e) Flying over surfaces that can absorb sound waves (e.g., excessively dense vegetation of small leaves, planted turf, ferrite coating);
- f) Flying over surface with large inclination (15° at a flying speed of 1 m/s, 6° at a flying speed of 3 m/s, 3° at a flying speed of 5 m/s).

### Radar Status Indicator



The Radar Status Indicator shows the current status of the Altitude Stabilization System. See the table below:

Blinking Pattern	Description
Solid Green	Warm up.
Blinking Green	Working properly.
Off	Not working.

## No Liquid Warning

### Profile

When there is no liquid in the liquid tank, the Liquid Level LED on the Operation Status Display Panel blinks red. The aircraft movement varies in different operation modes: it will ascend for 3 meters and hover automatically in Smart Operation Mode, and it will hover in place in Assisted Operation Mode and Manual Operation Mode.

### Use

- Press the Spray Button on the remote controller to turn off the sprinklers manually when in Manual Operation Mode. Otherwise, pump motor idling will accelerate its aging and wearing and spraying after adding liquid can cause damage(s) or injuries. The aircraft will turn off the sprinklers automatically when in Smart Operation Mode or Assisted Operation Mode.
- Ensure the aircraft is in Manual Operation Mode, and then land the aircraft and stop the motors. Add liquid to the liquid tank and tighten the cover.
- Press the Spray Button on the remote controller to discharge the air in the pump until the liquid level LED on the

Operation Status Display Panel is solid green.

4. Ensure the aircraft is in Manual Operation Mode, and then take off the aircraft.
5. If Smart Operation Mode is required, fly the aircraft to a suitable altitude and then toggle the Operation Mode Switch. If other operation modes are required, just toggle the Operation Mode Switch to the required mode.

## Return-to-Home (RTH)

	<p>RTH: The Return-to-Home (RTH) function brings the aircraft back to the last recorded Home Point.</p> <p>Home Point: If a strong GPS signal (the number of GPS <math>\geq 6</math>) was acquired after powered on for 30 seconds, the Home Point is the location from which the aircraft was launched.</p>
---	--

There are two events that will trigger RTH procedure: Smart RTH and Failsafe RTH.

### Smart RTH

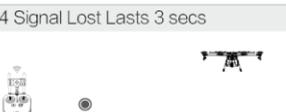
Use the RTH button on the remote controller (see RTH Button for more details) when GPS is available to enable Smart RTH. Press and hold the RTH button to start the RTH procedure. To exit Smart RTH, users should regain control manually as the way in How to Regain Control. With Smart RTH, you may control the aircraft's orientation to avoid collision when it is returning to the Home Point. The RTH procedure is the same for both Smart RTH and Failsafe RTH.

	<p>If the Flight Mode Switch is toggled to Manual Flight Mode (no matter it is set to Manual or Attitude in the A2-AG Assistant), the RTH procedure cannot be initiated by the RTH button.</p>
---	--

### Failsafe RTH

Failsafe RTH is activated automatically (if it is set to "Hovering" in the A2-AG Assistant, the aircraft will not enter RTH procedure) if the remote controller signal is lost for more than 3 seconds provided that the Home Point has been successfully recorded and the compass is working normally. The operator can interrupt the Return-to-Home procedure and regain control over the aircraft if the remote controller signal is recovered. Refer to How to Regain Control for details.

### RTH Illustration

<p>1 Record Home Point (HP)</p>  <p>Blinking Purple</p>	<p>2 Confirm Home Point</p>  <p>Blinking Purple 6 Times</p>	<p>3 Remote Controller Signal Lost</p>  <p>Blinking Blue</p>
<p>4 Signal Lost Lasts 3 secs</p>  <p>Blinking Blue</p>	<p>5 Go Home (20m can be set)</p>  <p>Blinking Blue</p>	<p>6 Landing after Hovering 15 secs</p>  <p>Blinking Blue</p>

	<p>The aircraft will not go home (only attitude stabilizing) in the condition that the number of GPS <math>&lt; 6</math> or</p>
---	---

	<p>GPS is not working, even if remote controller signal is lost or RTH button is triggered.</p> <p>It is recommended to enter RTH by pressing and holding the RTH button rather than powering off the remote controller in emergency situations.</p> <p>Make sure there are no obstacles during RTH procedure and users are familiar with the methods to regain control.</p>
--	--

### How to Regain Control

The table below shows ways to regain control in Failsafe RTH procedure. In Smart RTH procedure, the way to regain control is the same as the part under “GPS” and “Attitude” Flight Mode in the table.

Flight Mode Switch			
Flight Mode	GPS	Attitude	Manual
Regain Control	Toggle the Flight Mode Switch once to regain control if the signal recovers.		Regain control as soon as signal recovers.

### Low Battery Level Warning

There are two types of warning for low battery level:

1. The first low battery level warning is triggered when the battery level is low. The Aircraft Status Indicator blinks yellow. Fly the aircraft back and land it as soon as possible, then stop the motors and replace the batteries.
2. The second low battery level warning is triggered when the battery level is critically low. The Aircraft Status Indicator blinks red. The aircraft will begin to descend and land automatically. If it is set to indicator warning only in the A2-AG Assistant, the aircraft will not descend and land.

	The threshold of the two low battery levels can be set in the A2-AG Assistant.
---	--

## Flight

### Starting and Stopping the Motors

The Combination Stick Command (CSC) listed below is used to start/stop the motors. Ensure you perform the CSC in one continuous motion.

#### Starting the Motors

Perform the CSC command. The motors will begin to speed at an idle speed. DO NOT perform the CSC command if you will not fly the aircraft within a short time. Otherwise the aircraft may drift which can cause damage or injuries.



CSC 1



CSC 2



CSC 3



CSC 4



#### Stopping the Motors

There are two methods to stop the motors.

Method 1: When the M100 has landed, push the throttle stick down, then perform the CSC command to stop the motors. Release both sticks once the motors have stopped.



①



②



OR



OR



OR



Method 2: When the aircraft has landed, push the throttle down and hold. The motors will stop after 3 seconds.

Method 2 is not available for stopping the motors when the Flight Mode Switch is toggled to Manual Flight Mode and it is set to Manual not Attitude.



## Appendix

### Specifications

<b>Airframe</b>	
Diagonal Wheelbase	1520 mm
Frame Arm Length	625 mm
Dimensions	1471×1471×482 mm (arm unfolded, without propellers) 780×780×482 mm (arm folded)
<b>Propulsion System</b>	
<b>Motors</b>	
Stator Size	60×10 mm
KV	130 rpm/V
Max Thrust	5.1 kg/rotor
Max Power	770 W
Weight (with cooling fan)	280 g
<b>ESCs</b>	
Max Allowable Current (Continuous)	25 A
Operating Voltage	12S LiPo
Signal Frequency	30 - 450 Hz
Drive PWM Frequency	12 kHz
<b>Foldable Propeller</b>	
Material	High-performance engineered plastics
Size	21×7 inch
Weight	58 g
<b>Spray System</b>	
<b>Liquid Tank</b>	
Volume	10 L
Standard Operating Payload	10 kg
Max Battery Size	151 mm×195 mm×70 mm
<b>Sprinklers</b>	
Model	TXVK-04, XR11001
Quantity	4
Max Spray Speed	0.31 L/min (single TXVK-04 nozzle, for water) 0.43 L/min (single XR11001 nozzle, for water)
Spray Width	4 - 6 m (4 nozzles, 1.5 – 3 m above the crops)
Droplet Size*	TXVK-04 : 80 ~ 190 μm XR11001 : 130 ~ 250 μm
*Droplet size may vary according to operation environment and spraying speed.	
<b>Flight Parameters</b>	
Total Weight (without batteries)	8.8 kg
Standard Takeoff Weight	22.5 kg
Max Takeoff Weight	24 kg (@ sea level)

Max Thrust-Weight Ratio	1.81 (with 22.5 kg takeoff weight )
Power Battery	2×6S LiPo(batteries of 12000 mAh and continuous discharging rate of 10C recommended)
Max Power Consumption	6400 W
Hovering Power Consumption	3250 W (with 22.5 kg takeoff weight)
Hovering Time	24 min (@ 12000 mAh, with 12.5 kg takeoff weight) 10 min (@ 12000 mAh, with 22.5 kg takeoff weight)
Max Operating Speed	8 m/s
Max Flying Speed	22 m/s
Recommended Operating Temperature	0° to 40°C
<b>Remote Controller</b>	
Model	GL690B ( Japan Only ) , GL658C
Operating Frequency	2.400 - 2.483 GHz
Max Transmission Range (unobstructed, free of interference)	FCC: 5 km CE: 3.5 km
EIRP	100 mW @ 2.4 GHz
Built-in Battery	6000 mAh, 2S LiPo
Charging	DJI charger
Output Power	9 W
Operating Temperature Range	-10° to 40°C
Storage Temperature Range	Less than 3 months: -20° to 45°C More than 3 months: 22° to 28°C
Charge Temperature Range	0° to 40°C
<b>Remote Controller Charger</b>	
Model	A14-057N1A
Voltage	17.4 V
Rated Power	57 W

## Aircraft Status Indicator Description

Blinking Patterns	Description
Flashing Purple once	GPS Flight Mode
Flashing Purple twice at a time	GPS Flight Mode, sticks not in mid-point
Flashing Yellow once	Attitude Flight Mode
Flashing Yellow twice at a time	Attitude Flight Mode, sticks not in mid-point
No Red indicator	GPS signal Best, number of GPS > 6
Flashing Red once	GPS signal Good, number of GPS = 6

Flashing Red twice at a time	GPS signal Bad, number of GPS = 5
Flashing Red thrice at a time	GPS signal Worst, number of GPS < 5, motors cannot be started.
Flashing White thrice at a time	Attitude status bad. Hover or land the aircraft and wait for the white indicator to go off.
Flashing Green four times	IMU data lost, calibrate IMU needed
Flashing Red four times	System error
Flashing Red	Compass abnormal after powered on
Flashing Yellow and Green alternately	Abnormal compass data, compass calibration required.
Flashing Red eight times	Point A recorded
Flashing Green eight times	Point B recorded
Flashing Blue once	The aircraft flies to the next key point in Smart Mode
Flashing Purple five times	Distance from the Home Point within 8 m
Solid Purple for one second	Enters Continuous Smart Operation Status
Flashing Yellow	First low battery level
Flashing Red	Second low battery level
Flashing Blue	Failsafe RTH
Solid Blue	Flight controller SN not authorized
Solid Red	PMU abnormal or Data Protection function working

## FCC Warning Message

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## FCC Radiation Exposure Statement:

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

This AG012 should be installed and operated with minimum distance 20cm between the radiator& your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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

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

## IC RSS Warning

This device complies with Industry Canada licence-exempt RSS standard (s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference,including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et  
 (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### **IC Radiation Exposure Statement:**

This equipment complies with IC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This AG012 should be installed and operated with minimum distance 20cm between the radiator& your body.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### **KCC Warning Message**

“해당무선설비는 운용 중 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다.”

“해당 무선설비는 운용 중 전파혼신 가능성이 있음”

### **NCC Warning Message**

Administrative Regulations on Low Power Radio Waves Radiated Devices warning:

#### **Article 12**

Without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic as well as performance to an approved low power radio-frequency devices.

#### **Article 14**

The low power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, the user shall cease operating immediately until no interference is achieved.

The said legal communications means radio communications is operated in compliance with the Telecommunications Act.

The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.