spraybot

SB10A

User Manual

Version 2.0

Flight Manual

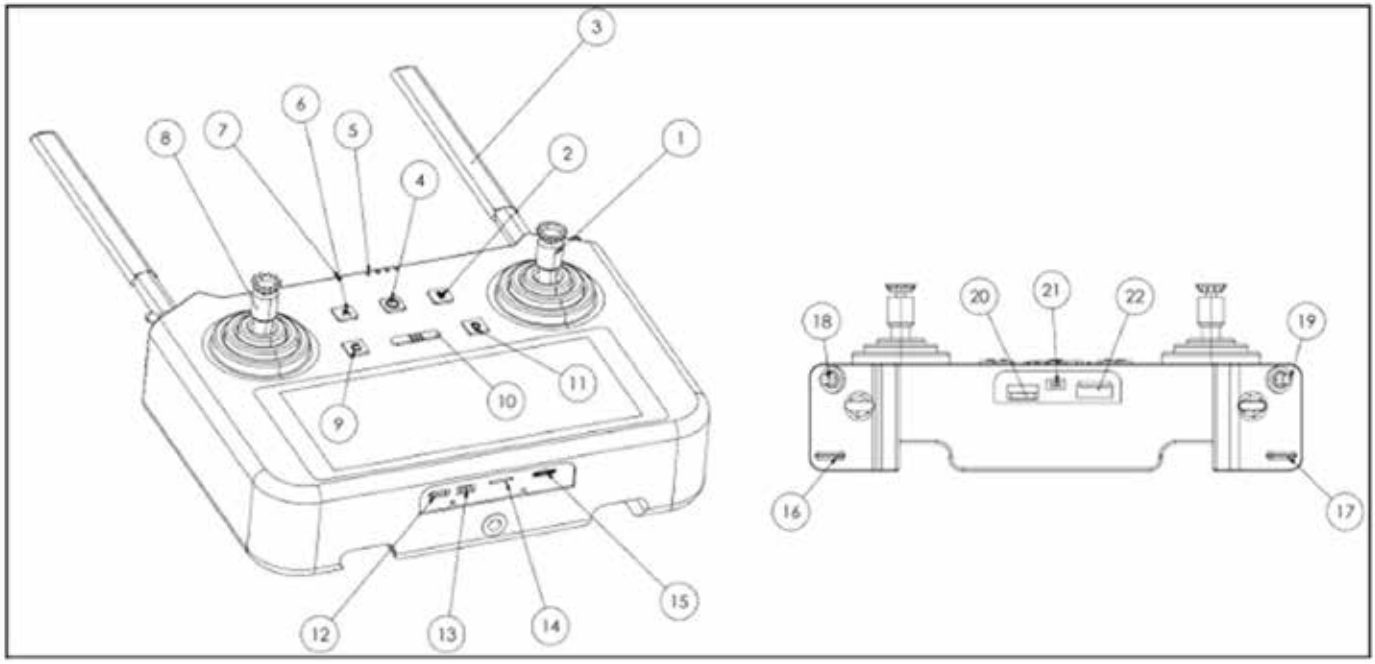
To User

Dear user, thank you for choosing Marut products. For safety purposes and better user experience, it is highly recommended that you read this manual carefully and strictly follow the instructions hereof

Office Address:

2nd Floor Veda Ventures, Survey Of India Society, Road No.4, Chanda Naik Nagar, Madhapur, Hyderabad, Telangana, 500081

TRANSMITTER OVERVIEW – MK15TX



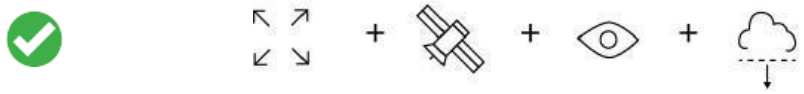
Number	Description	Number	Description
1	Right Joystick - Roll & Pitch	12	Type C / Charging Port
2	Switch B - Buddy mode switch	13	4 Pin Data
3	Antenna	14	SIM Card Slot
4	Power On/Off Switch	15	TF Card Slot
5	Battery Level Indicator	16	Right Dial
6	Switch A - Obstacle Avoidance	17	Left Dial
7	Status Indicator	18	Toggle Right Switch - Pump
8	Left Joystick - Throttle & Yaw	19	Toggle Left Switch - Mode Switch
9	Switch C - Terrain Radar	20	USB Port
10	Slider Switch - RTH	21	4 Pin Data
11	Switch D - Camera lights on/off	22	HDMI Port

SAFETY PRECAUTIONS / DISCLAIMERS

Before using the product please ensure you read this operating manual and watch the instructional videos carefully and completely. It is mandatory to strictly follow the instructions contained in this manual to setup and use this product, paying special attention to warnings and safety precautions to avoid mishappenings of any sorts involving either the product or the individual.

This drone is suitable for experienced drone operators aged 18 years and older. It has a large delicate body, and should be kept out of reach of children and adults, only the owner who has been trained should use it.

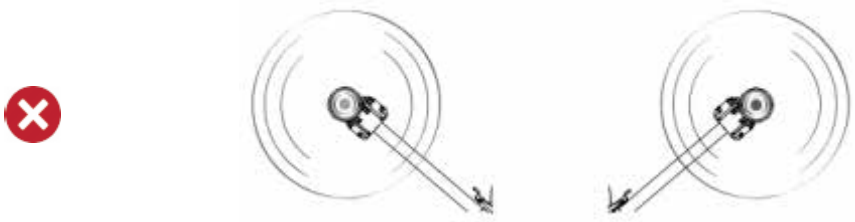
Please follow these safety procedures:



Only fly in an open space | Ensure good GPS signal | Keep within line of sight | Fly at a height below 80m

When flying, ensure that the drone is kept away from other people, trees, electric wires, buildings, airports or signal transmitting towers etc.

Ensure that the weather conditions are suitable for flying. Do not fly the drone during snow, rain, drizzle, gusts, fog, and thunder or in windy conditions.



Stay away from rotating propellers and motors

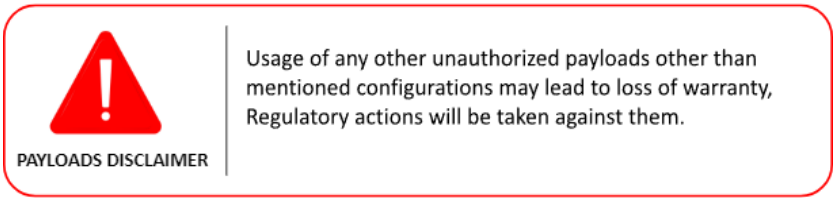
MANDATORY CONDITIONS TO FOLLOW/OBSERVE

Before using the product please ensure you read this operating manual and watch the instructional videos carefully and completely. It is mandatory to strictly follow the instructions contained in this manual to setup and use this product, paying special attention to warnings and safety precautions to avoid mishappenings of any sorts involving either the product or the individual.

- The "UAS Is not IP rated" please avoid using in Drizzle/heavy wind or dusty conditions any
- damage under this regard will void warranty.
- There is "No shock absorbing" mechanisms implemented in the UAS, Avoid Harsh/Rough
- landings
- No-fly zones must be observed. It is the user's responsibility to ensure that the drone is
- operated legally and safely.
- Changing any factory parameters is recorded on the flight controller and will void the
- warranty.
- Be careful NOT to override the drone if it is in low battery landing mode. It is not safe to fly if
- the battery is LOW
- If after calibration the craft is unsteady or toilet bowling, land the craft safely and re-do the
- calibration process. DO NOT calibrate near any metal or over reinforced concrete.
- Always wait until the props have completely stopped spinning before approaching the drone.
- Once landed remove the Quick switch and place it on the propeller and cover the drone with
- the drone cover.
- Before each flight, please check the propellers for damage – replace immediately if damaged.
- The lithium polymer batteries should be removed from the aircraft after each flight. When not
- in use, the lithium polymer batteries should be placed in a fireproof pouch or container and
- stored in a cool environment to avoid accidents. Keep out of reach of children and pets.
- Never overcharge or over discharge the LiPo battery as this will reduce the LiPo battery life or
- the LiPo may catch fire.
- The lithium polymer batteries should never be stored at full charge – the ideal level is 3.8V.
- Always remove the LiPo battery from the aircraft and place it in a fireproof pouch and store it
- in a cool environment.
- Study the LiPo voltage chart below to assist you with your battery condition checking – Use
- the BX100 battery checker
- If a LiPo battery swells or is deformed – Contact MARUT Personnel Immediately!
- Do not try to repair the aircraft by yourself, Contact MARUT personnel only.

NOTE: Due to continuous product development and improvement some images may differ from the final product.

PAYLOAD DISCLAIMER:



CONTANT

User Manual....1

SAFETY PRECAUTIONS / DISCLAIMERS....1

MANDATORY CONDITIONS TO FOLLOW/OBSERVE.... 2

CONTENTS.... 3

IN THE BOX....4

MOBILE SPECIFICATIONS....4

DRONE OVERVIEW....5

PAYLOAD OVERVIEW.... 6

TRANSMITTER OVERVIEW – T12.... 7

GUIDELINES FOR PAYLOAD CONFIGURATION.... 8

1. PAYLOAD CONFIGURATION....8

1.1 ASSEMBLY OF PAYLOAD.... 9

1.1 DISASSEMBLY OF PAYLOAD....11

TRANSMITTER BATTERY AND ITS CHARGING....13

CAUTION....13

ATTACHING MOBILE PHONE TO T12 TRANSMITTER....13

PRE FLIGHT PREPARATION....14

Plug in batteries.... 15

Step 07: Pre-flight Checklist....16

Step 08: Understanding Transmitter Controls: Basic flight controls....17

LED COLOUR INDICATION INFORMATION.... 20

Disclaimer for individual parts.... 21

Radar Modules :....21

Spraying System :....21

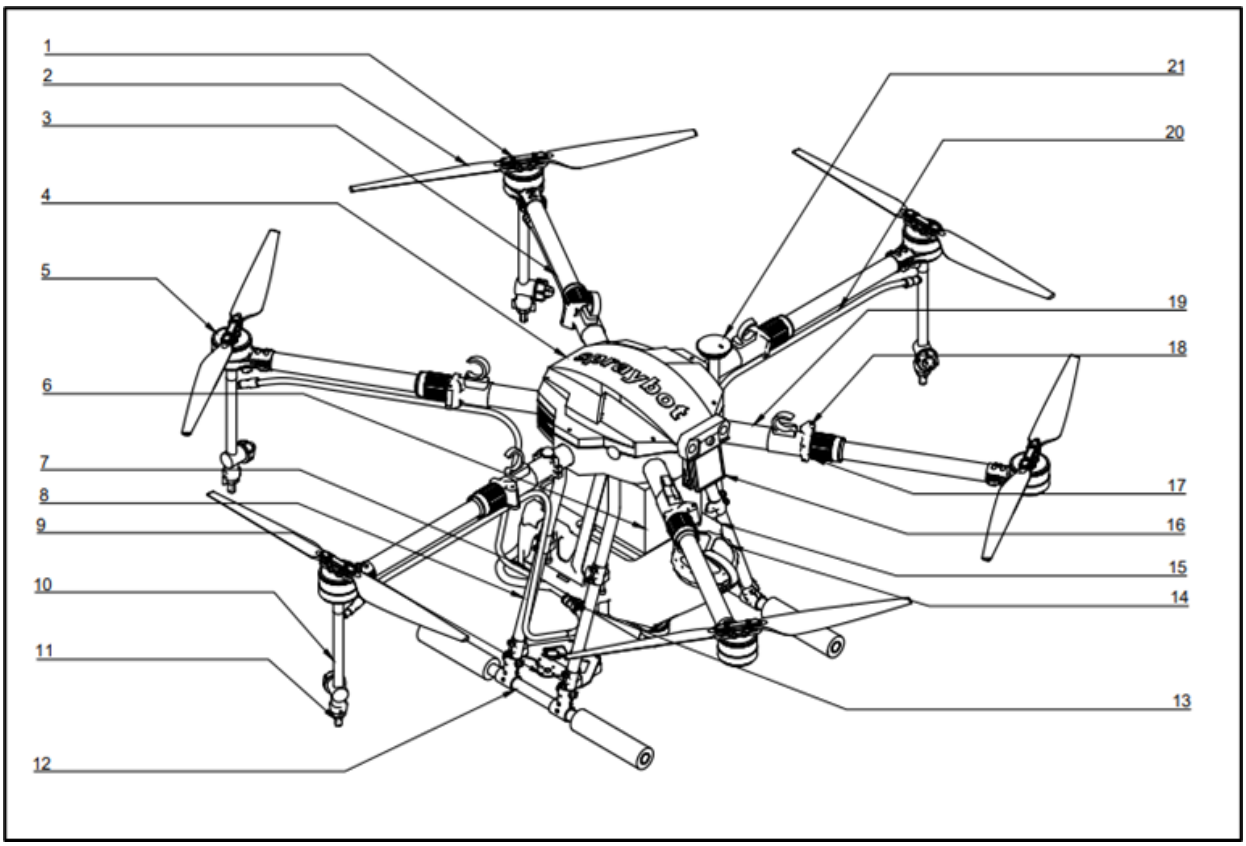
APPENDIX....22

IN THE BOX

<table>
<tr>
<td> 
DRONE- 1 No</td>
<td> 
Transmitter – 1 No.</td>
<td> 
Charger – 1 No.</td>
</tr>
<tr>
<td colspan="2">Propellers - 1 sets
Flight manual – 1 No.
Maintenance manual – 1 No.
COC- 1 No.
Operation Log book - 1 No.
Maintenance Log book - 1 No.
Battery Log book - 2 No.
Voltage Checker - 1 No</td>
<td> 
Transmitter – 1 No.</td>
</tr>
</table>

- If the Remote Pilot requires another payload (such as a spraying with centrifugal nozzle), another payload separately will be provided along with accessories such as screws and nuts.
- For Training - One extra transmitter will come apart from standard items for training purposes. Other accessories will be same as configuration-1

DRONE OVERVIEW



S. No.	Component Name	S. No.	Component Name
1	Propeller adaptor	12	Horizontal Landing Gear
2	Propeller	13	Pipe Connectors
3	CF Arm	14	Tank Cap
4	Canopy	15	Pesticide Tank
5	Motor	16	Obstacle Avoidance Radar
6	Battery	17	Arm Joint Clamp
7	Pump motor	18	Arm Holder
8	Vertical Landing Gear	19	Aluminum Arm
9	Terrain Following Radar	20	Pipe House
10	Nozzle bars	21	GPS
11	Nozzle tip		

PAYLOAD OVERVIEW

SPRAYING TANK

Depicts spraybot without any payload

PAYLOAD DISCLAIMER:

PAYLOADS DISCLAIMER

Usage of any other unauthorized payloads other than mentioned configurations may lead to loss of warranty, Regulatory actions will be taken against them.

GUIDELINES FOR PAYLOAD CONFIGURATION

spraybot is built to swap payloads easily from different configurations, in order to swap Payloads please follow below instructions.

PAYLOAD CONFIGURATION

Purpose of Usage -

This payload consists of Liquid tank with 10 ltr capacity and high-pressure pump along with a specific nozzle which are used to spray relevant chemical mixtures on crops (to increase the yield and to protect crop), on water bodies (for mosquito eradication) and on dump yards (for degradation of waste and to reduce pollution).

Parts of Payload -

1. Pump Motor

A. Hobby wing 3.5L pump motor
B. IP67 rated
C. Maximum Power : 150W
D. Working pressure: 0.35Mpa
E. Pump motor dimensions : 123x76x52mm

2. Nozzles

A. 110015 VP Nozzles with Nozzle bar

3. Tank

A. Capacity : 10L

Weight - 1.65 kg

Specifications -

Tank Capacity: 10 liters (max) No. of Nozzles: 4
Pump Motor Discharge Rate: 3.5 liters/minute

1.1 ASSEMBLY OF PAYLOAD

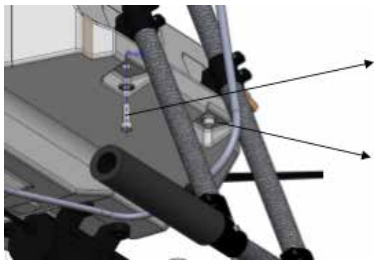
- The below picture depicts the drone without any payload configuration attached to it.

Fig1: Depicts Spraybot Without any configuration

- The following components are provided for configuration 1 in a assembled format

Fig 2: Payload Components

- To identify the forward direction, take a look at the arrow direction on the GPS module on the frame. The direction of the arrow on the GPS depicts the forward direction of the drone
- In order to fix Configuration 1, attach the payload in the forward direction to payload mounts and tighten the M5 screws along with dampers as shown in the picture below using



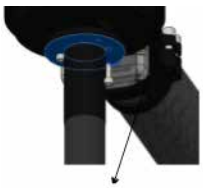
M5 Allen head screw with carbon washer

After tightening the screw

Fig 3: Shows the highlighted screws to be attached

- Ensure to screw the nozzle bars screws under the motors using M2.5 Allen key and start attaching the link pipes.

- Ensure to screw the nozzle bars screws under the motors using M2.5 Allen key and start attaching the link pipes.



M2.5 screws for nozzles

- Nozzle bars should be attached under M1, M2, M3, and M5 labelled motors.
- Make sure to attach the electrical connection of the pump motor by screwing the thread.

Fig 4: Electrical interface connection

NOTE: Make sure to use the bubble level to check the payload horizon, if not in level condition slide the payload mounts accordingly and tighten the payload mounts and ensure the payload horizon.

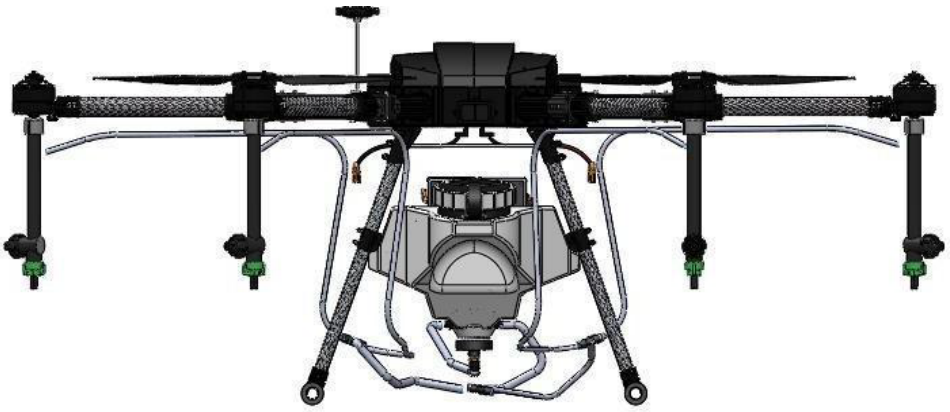
- The below picture describes the look of the configuration 1 after the payload is mounted/fixed

Fig 5: Fully assembled AG 365S Configuration 1

- The spaybot is now ready and is good to go for flights, make sure to follow flight plans

1.1 DISASSEMBLY OF PAYLOAD

- A fully assembled spraybot Config 1 looks as shown in the figure below

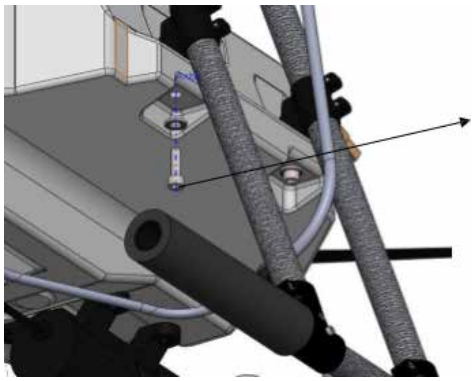


Fully assembled spraybot Configuration 1

- The first step is to remove the electrical interface connection between the payload and the spraybot

Electrical interface removal

- After removing the electrical interface, the connection should look as shown in the above figure.
- In order to disassemble the configuration 1, place the AG 365S as shown in the figure and start to unscrew the highlighted M5 hex screws with M5 Allen key as shown in the fig below.



Using M5 Allen key loosen and remove the screws

Shows the screws under the tank that are to be removed

NOTE: This above step should be repeated on either sides of the payload

- After disassembly of configuration 1 payload make sure you secure each and every bolt, hex screw and everything
- Also don't forget to remove the screws under the nozzle and secure them.
- The no payload spraybot should look as shown in the figure below

No payload Configuration of spaybot

PAYLOADS DISCLAIMER

Usage of any other unauthorized payloads other than mentioned configurations may lead to loss of warranty, Regulatory actions will be taken against them.

TRANSMITTER BATTERY AND ITS CHARGING

1. Transmitter uses LI-ion batteries
2. Use 1.5-2.5amp chargers and charge via USB to micro USB3 **(do not charge your Transmitter with Fast chargers)**

CAUTION

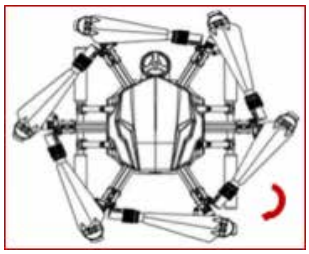
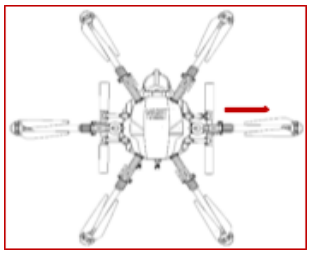
- Never charge the transmitter with less than 1.5 amp and above 3 Amp rating charger.
- Never charge them overnight, use recommended hours or min, this will save your Transmitter life.
- Try not to use your Transmitter on direct sunlight for more than an hour.
- Always keep it in a box and use joystick protectors while not in use.
- Avoid working under dusty environments, dust may damage the performance of your joysticks.
- Pilots should always wear a neck strap and attach Transmitter to it, never hand over or grab the transmitter to other persons including the co-pilot.
- Before flying, always check whether sticks and switches are in a normal position.

TRANSMITTER MK15TX

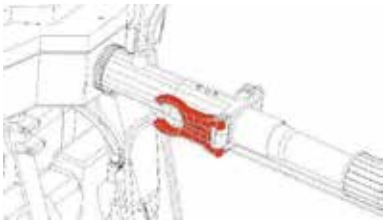
- Press the self-locking switch on the top left side of the phone clip and push the holder to a fully open position.
- Place the phone horizontally facing front, pull the phone clip down, and press tightly as possible to secure the phone and transmitter, Make sure the phone buttons are not pressed in.
- Insert the lens hood into the slot and make sure the lower edge of the lens hood is as close to the phone as possible

PRE FLIGHT PREPARATION

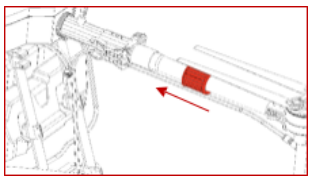
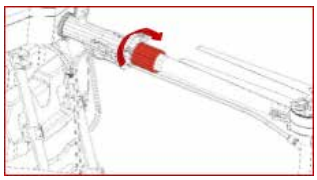
- Place the drone on level surface and unfold the arms and clamp the folding joint firmly
- Remove prop guards and unfold the prop leaves straight and ensure minimum play between the prop mount and prop leaves (it must not be too tight or too loose).
- **Unfold Arms**
  - Spread out the arms from the folded position from the arm clamp before operation

  - Push back the arm clamp parallel to the arm.

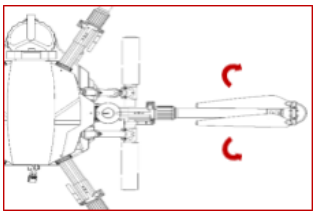


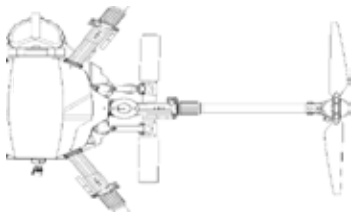
  - Then slide the arm clamp towards the threading and fasten it securely

Unfold Propellers

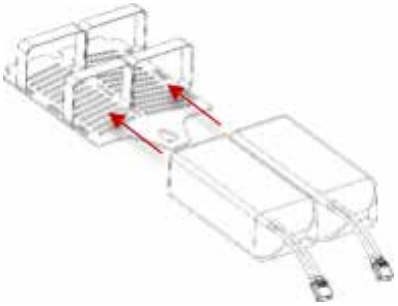
Spread out the left and right propellers as shown in the image

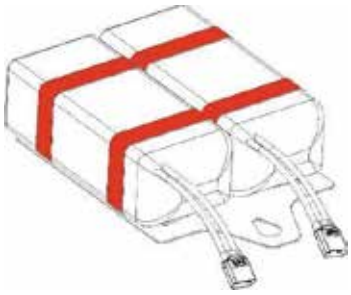




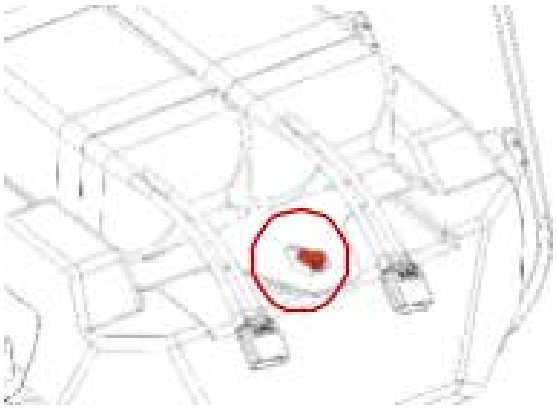
Plug in batteries

Insert the batteries into the plate as shown in the image, make sure that the connector of the battery is in proximity to the connector of the drone. Then tight both the batteries with the Velcro straps as shown in the image





Insert the plate along with batteries from the front of the drone as shown in the image
Use the lock pin and rotate to secure the plate along with the batteries



FOR THE STEPS EXPLAINING THE CONNECTION OF THE GCS AND FLIGHT OPERATIONS PLEASE REFER TO THE SOFTWARE MANUAL PROVIDED.

Step 07: Pre-flight Checklist

Mission plan area should be under green zone, check in DGCA Interactive air space map before take-off and starting the mission. Make sure to check all the following

- Visually inspect to check all motors, GPS and propellers are in right condition.
- Check all propellers are in good condition and free of any breaks or cracks.
- Propeller and frame arms are unfolded and arm locks are firmly tightened.
- Ensure that the batteries are fully charged and are firmly tightened in place
- Ensure that there is nothing obstructing the motors and propellers
- Check Ground Control Station & RC controller is fully charged.
- Check GPS is mounted properly. Check if there is no damage.
- Check the Terrain Sensor is fixed properly.
- Turn on TX & GCS. (Check flight mode in Tx and turn on loiter mode in Tx)
- Check the battery Voltage. (Full charge voltage: 25.0V/batt.)
- Connect Ground Control Station to the drone.
- Check all parameters in GCS. (Battery Voltage, HDOP, Sat count etc.)
- Plan your mission carefully & write the mission to the drone.
- Check payload is fixed and the tank cap is closed and locked.
- Check for the spraying system is free of locks and is working properly.
- Make sure there are no potential safety hazards or people within 5m radius of the drone.
- Check Ambient temperature need to be less than 50 degrees

Operating conditions

- Wind speed - Less than 5m/s
- Ambient temperature - Not more than 55 degrees
- Max Allowable Altitude- 100mtrs
- Max Range - 2km
- Max Speed - 15m/s
- Minimum sat count -14sats

Safe landing limits

- Safe landing height before Drop - 1 Feet
- Max Descent speed - 0.5 meters/second

Step 08: Understanding Transmitter Controls: Basic flight controls

HOVER UP AND DOWN

Push the THROTTLE STICK up to fly the drone up, and pull the THROTTLE STICK down to descend nd the drone down

FLY FORWARD OR BACKWARD

Push the PITCH CONTROL STICK up to fly the drone forward, and pull the PITCH CONTROL STICK down to fly the drone backward

FLY LEFT OR RIGHT

Move the ROLL DIRECTION CONTROL STICK to the left to fly the drone to the left, and move the ROLL DIRECTION CONTROL STICK to the right to fly the drone to the right.

ROTATE LEFT OR RIGHT

Move the RUDDER STICK to the left to rotate the drone to the left, and move the RUDDER STICK to the right to rotate the drone to the right

TROUBLESHOOTING GUIDE

#	Problem	Cause	Solution
1	The lights on the aircraft are flashing but it does not respond to the control	1. The aircraft and transmitter are not connected. 1. Insufficient battery power.	1. Repeat the connection procedure. 2. Recharge the battery.
2	The aircraft blades turn but it will not take off	1. Insufficient battery power. 2. The blades are distorted. 3. Take off button not pressed.	1. Recharge the battery. 2. Replace the blades. 3. Press the take-off button.
3	The aircraft shakes in flight	The blades are damaged/distorted Incomplete preflight check	Replace the blades. Follow Proper pre-flight checklist
4	The transmitter indicator light is off.	Low battery. Batteries are inserted improperly. Poor contact.	1. Replace the transmitter battery. 2. Reinsert the batteries. 3. Clean the battery housing/contacts.
5	Drone and transmitter fail to pair.	The indicator light is off. Signal interference. User error. Damaged components.	1. See above. 2. Restart the drone and power on the transmitter. 3. Operate the drone step by step in accordance with the user manual. 4. Buy spare parts from Marut and replace damaged parts.
6	Battery Depletes	Unmanned aerial system (UAS) incapable of continuing flight operations	UAS return to home (RTH) as soon as practical
7	Ditch Procedures	UAS incapable of continuing flight operations	Identify safe landing area; attempt a controlled landing; if able, land UAS in water (shallow preferred for ease of recovery) away from public
8	Hazardous Weather	UAS incapable of continuing flight operations	UAS RTH as soon as practical; cease data collection
9	Hostile Environment	Mission impacted by hazard (e.g. air traffic, public activity)	See and avoid; take evasive action as required with safety taking precedence; UAS RTH as soon as practical

10	Loss of Communications	Mission impacted by lack of communications hazard	Maintain visual line of sight (VLOS); take evasive action as required with safety taking precedence; UAS RTH as soon as practical
11	Loss of Control Signal	UAS not controllable	Maintain VLOS; UAS RTH and land without harm to UAS or contacting surrounding objects
12	Loss of Direct Visual	UAS could become hazard if unable to regain visual control	Regain direct visual of UAS; contact mission payload operator and/or visual observer to determine status
13	Loss of GPS Signal	Use extreme caution as the positional data for the UAS will not be accurate	Assume manual control of the UAS; Maneuver and climb UAS to reacquire GPS signal; if GPS signal cannot be acquired, determine whether safe UAS control can be maintained; if safe flight cannot be maintained, land as soon as possible
14	Loss of Situational Awareness (SA)	UAS could become hazard if unable to regain SA	Climb to safe altitude; reorient with use of sensors; RTH as required
15	UAS Failure	UAS incapable of continuing flight operations	Maintain VLOS; UAS RTH as soon as practical

LED COLOR INDICATION INFORMATION

Flight Mode Representation	Light State Indication	Priority Level
Attitude (Stability Enhancement, Altitude Setting)	Green Single Flash	Low
GPS Mode (Angle, Speed)	Green Double Flash	Low
Function Mode (Circle, Cruise, Agriculture, etc.)	Green Three Flashes	Low
Intelligent Direction On	Green Four Flashes	Low
Self Driving Mode (Ground Station Control, Return)	Green Flash Mobs	Middle
GPS Representation	**Light State Indication**	**Priority Level**
GPS not connected / GPS not receiving satellite	Red Three Flashes	Low
Poor GPS signal	Red Double Flash	Low
General GPS signal	Red Single Flash	Low
The GPS signal is very good	Red No Flash	Low
RTK Positioning	Yellow Single Flash	
Low Voltage Alarm Indication	**Light State Indication**	**Priority Level**
First level alarm	Yellow Three Flashes	Low
Secondary alarm	Yellow Flash Mobs	Height
Two Side Magnetic Calibration Indication	**Light State Indication**	**Priority Level**
Level Calibration	The yellow light is always on	Middle
Vertical Calibration	The Green light is always on	Middle
Calibration failed	The red light is always on	Middle
Calibration successful	Red Green Yellow Alternate Flashing	Middle
Accelerometer Calibration Representation	**Light State Indication**	**Priority Level**
Calibrating	Red Green Yellow Alternate Flashing	Middle
Calibration Complete	The green light is always on	Middle
Abnormal State Representation	**Light State Indication**	**Priority Level**
Remote control out of control	Red Flash Mobs	Height
Magnetic compass interference / abnormality	Yellow Green Alternate Flashing	Height
GPS satellite lost / abnormal	Red Green Alternate Flashing	Height
IMU vibration is too large / abnormal	Red Yellow Alternate Flashing	Height
Other State Representation	**Light State Indication**	**Priority Level**
Power on initialization	Red Green Yellow Alternate Flashing	Height
Unlock representation	Red Green Yellow Alternate Flashing	Height
Unlock failed	The red light is always on	Height

Disclaimer for individual parts

Radar Modules :

- Do not touch or let your body come in contact with the radar module when powering on the UAV.
- Maintain full control of the UAV at all times and do not rely on the RADAR module completely. Keep the UAV in VLOS at all times.
- Use your discretion to operate the aircraft manually to avoid obstacles.
- When sensing objects such as inclined utility poles or a power line against the flying direction of the aircraft, the RADAR detection performance will be affected since the RADAR solely works on electromagnetic waves and this would cause a disturbance for the same, Fly with caution.
- The effective detection range of the RADAR is 1-40 mts. Note that the aircraft cannot detect the obstacles outside the detection range.

Spraying System :

- Avoid use of water insoluble pesticides as much as possible.
- Take utmost care of the sprinklers by cleaning them after every use.
- Make sure to securely tighten the fastener near the nozzle to avoid the liquid leakage.
- The spray tank capacity must not exceed the specified max value which is 10 liters.
- After every spraying operation make sure to rinse the pump with clean water for prolonged life.

APPENDIX

• Technical Specifications

Airframe	
Diagonal Wheel base	1345 mm
Ready to Launch	1932 mm
Dimensions	1932 x 1750 x 580 mm (arms and props unfolded) 930 mm (folded dimension – circular radius)
Empty Weight	14.85 Kg's
All Up weight	24.90 Kg's
Payload Capacity	10 Litres
Flight parameters	
Max Take-off weight	24.9Kg
Max Flying speed	15 m/s
Recommended Flying speed	5-6 m/s
Max Altitude	100 m
Max range	1000 m
Max Angle	15°
Max Wind Resistance	7 m/s
Flight Modes	Loiter, Land, Position Hold, Auto
Emergency Features	RTH, GCS Failsafe, Battery Failsafe, Radio Failsafe, Liquid level failsafe.
Geo-fence	Available & adaptable
Endurance	22 min
Hovering Accuracy (With a strong GNSS signal)	Horizontal: ±2 m, Max No. of satellites 32
GNSS Operating Frequency	GPS:L1C/A GLONASS:L10F Beidou:B1I Galileo:E1B/C
Recommended Operating Temperatures	-10°C to 55°C
Payloads Supported	• Spraying payload to spray relevant chemical mixtures on crops for crop protection • Spreader payload for granules spreading with 9kg tank capacity • Remote pilot training application

Battery Specifications	
Capacity	30000mAh
Battery type	Lithium Polymer
Discharge rate	25C
Max Burst Discharge rate	50C
Net Weight	2460 gms
Maximum Voltage – Single battery	25.1V ~ 4.2 V/cell
Nominal Voltage – Single battery	22.2V ~ 3.7 /cell
Full Voltage On connection	50.1V
Recommended Landing voltage	43.0V
Recommend Charge Current	8.0 Amps or lower
Remote Controller	
Model	MK15TX
Connectivity	Bluetooth & Micro USB
Built-in Battery	4000mAh
Power Consumption	130mA
Operating temperature	-10°C to 50°C
Operating frequency	2.4GHz
Channels	12
Weight	560g
Transmitting power	100mw

Contact Support

If you have been through troubleshooting, & the unit is failing to operate,please get in touch by following email or mobile number.

Email: aftersale.spraybot@gmail.com

Mobile: **+91 9618577855**

Working Hours:

Monday - Friday 9AM to 5PM

spraybot

https://spraybot.in/ aftersale.spraybot@gmail.com

Registered Address : Spraybot AI Pvt. Ltd

22-10-13, Thatavarthi Vari Street, Bhimavaram, West Godavari, Bhimavaram (mdl), Andhra Pradesh, India, 534201

Communication Address : Spraybot AI Pvt. Ltd

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