

V40 Agricultural UAS

User Manual

Version 1.2 **EN**

To User

Dear user, thank you for choosing XAG products.

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

Contact Us

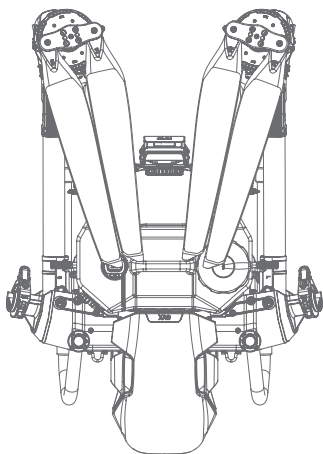
If you have any questions about this document, please contact our Technical Support team via email:
info@xa.com

Safety Guidelines

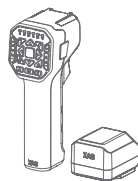
- Please make sure that the drone operator has passed the drone operation training programme and obtained a drone pilot certificate prescribed by laws and regulations where the product is used in advance. Never operate the drone without permission unless otherwise provided.
- Observe the surroundings, ensure a safe distance from the obstacles and the crowd as well as eliminate unsafe conditions including environmental factors like bad weather and extreme temperatures before operation.
- NEVER operate while drowsy, drunk or in a poor mental state so as to prevent accidents.
- Keep the product away from heat to avoid damage to the electronic device and other components.
- Instead of operating alone, the beginner should seek help from a veteran beforehand and operate the drone accompanied by the veteran.
- Please operate within maximum takeoff weight to avoid dangers caused by overload.
- It is a MUST to do the pre-flight inspection and eliminate co-frequency interference prior to operation.
- Stay away from the operating machine. Do NOT touch the spinning propellers with your body or other components. Loose clothing is NEVER allowed as it should get caught in the spinning propellers easily and cause injury.
- For safety purposes, it is NOT recommended to install the propellers until finishing the trial run of the drone and inspections of the remote control devices, motors and other modules.
- NEVER install/remove any module or insert/extract circuit while the power is on.
- NEVER take the human body or animal, whether still or moving, as an obstacle for the obstacle avoidance experiment.
- NEVER impede, intervene or impact the drone with the human body, animal or any other object.
- Should there be adverse weather conditions like a strong wind, rain, snow and hail, hover the drone and return to home as soon as possible. Weather not permitting, hover the drone and fly towards a nearby safe place.
- Drone operator shall strictly comply with relevant laws and regulations where the product is used, including but not limited to the flight height, flight area and visual line of sight.

List of Items

Please check that the following items are all present when unpacking the box. Should there be any item missed, please contact your dealer.



Airframe (including Liquid Tank)
×1



ACS2(B) ControlStick^[1] (X4 RTK Ver.)
×1



RealTerra (optional)
×1



Tool Kit
×1

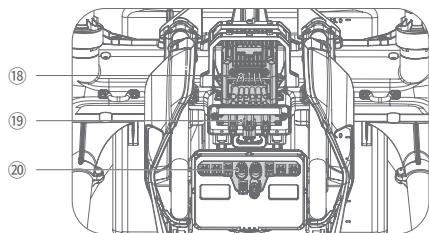
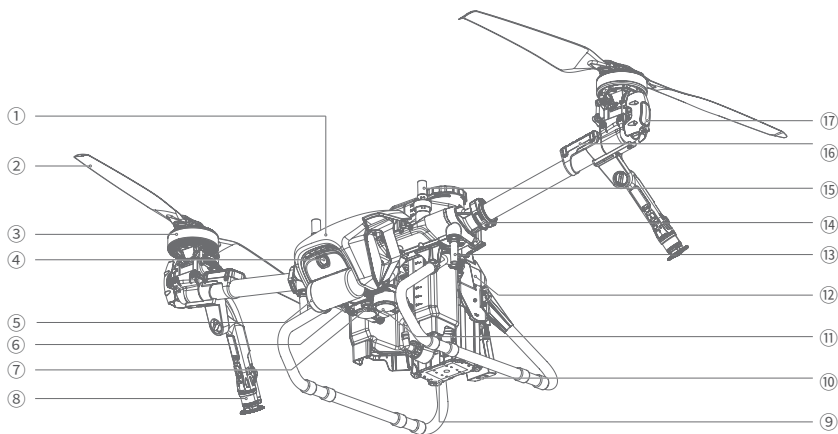


USB-Type-C Cable
×1

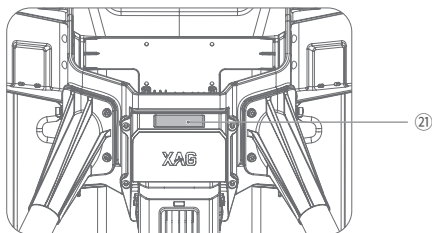
[1]: ACS2(B) ControlStick namely ACS2(B) Remote Control

Structure

The main components of V40 Agricultural UAV are as follows:



Inside of the drone



Rear view

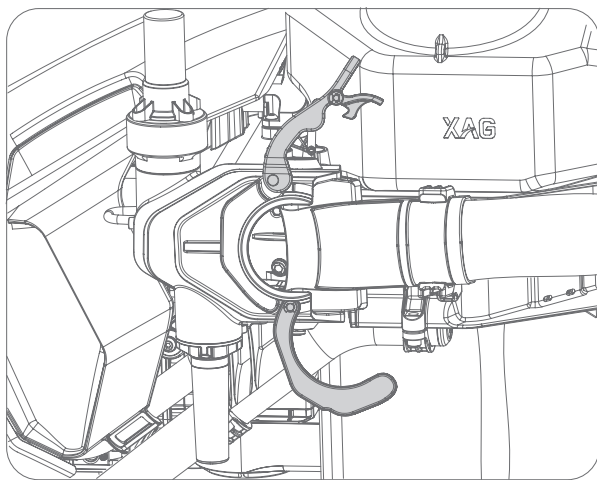
- | | | |
|------------------|-------------------------------------|--------------------------------------|
| ① Head Cover | ⑨ Smart Battery | ⑰ Spraying Status Indicator |
| ② Propeller | ⑩ RealTerra | ⑱ SuperX4 Intelligent Control System |
| ③ Arm | ⑪ Peristaltic Pump | ⑲ ESC Hub |
| ④ PSL Camera | ⑫ Airframe Nameplate | ⑳ Spraying Hub |
| ⑤ Dynamic Radar | ⑬ 2.4GHz Antenna | ㉑ Flight Status Indicator |
| ⑥ Terrain Sensor | ⑭ Arm Fastener | |
| ⑦ Searchlight | ⑮ RTK Antenna | |
| ⑧ Nozzle | ⑯ ESC (Electronic Speed Controller) | |

Pre-flight Preparation

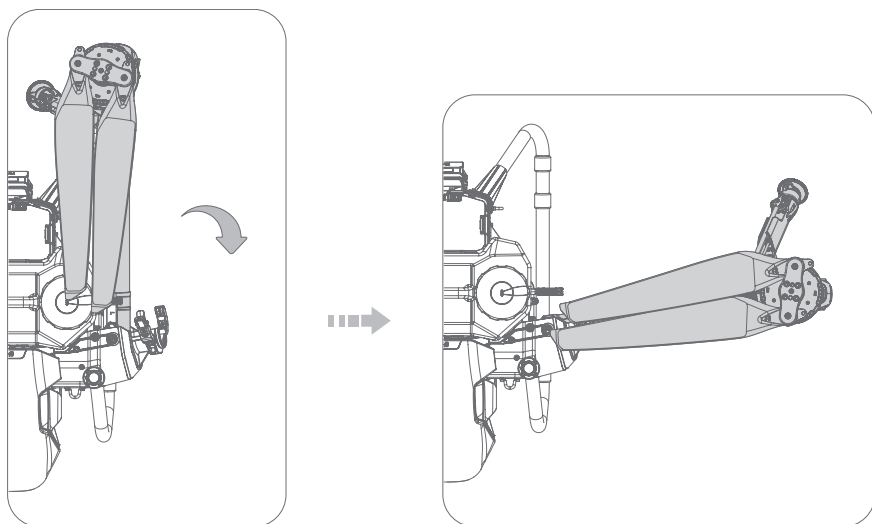
Unfold Arms

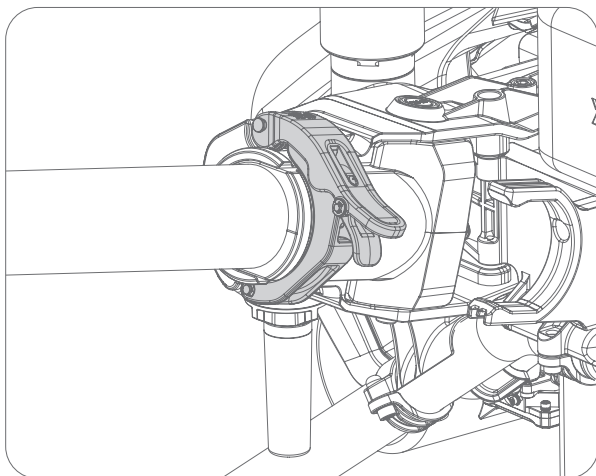
Spread out the arms from the folded position before operation.

Unlock the arm fasteners and pull them up. Then put them down and leave them at the lowest limit positions.



Spread out the left and right arms frontward (take the left arm as an example) and securely lock the fasteners.



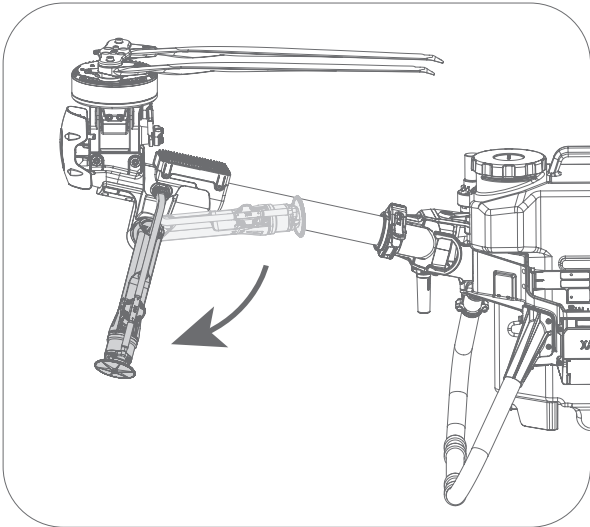
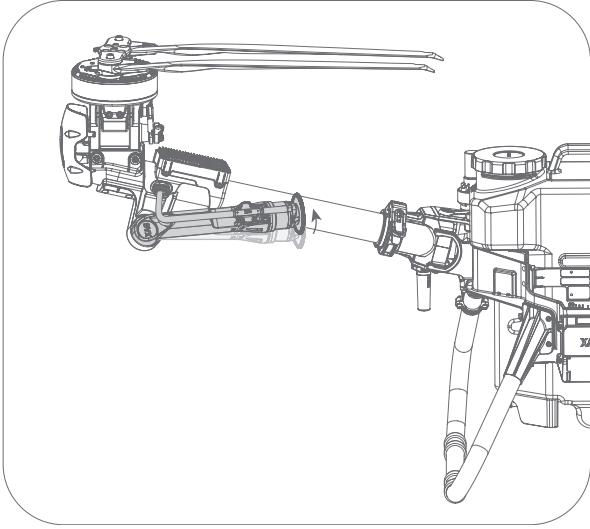


 **Warning**

 Please see that the fasteners are securely tightened and locked while fastening the arms.

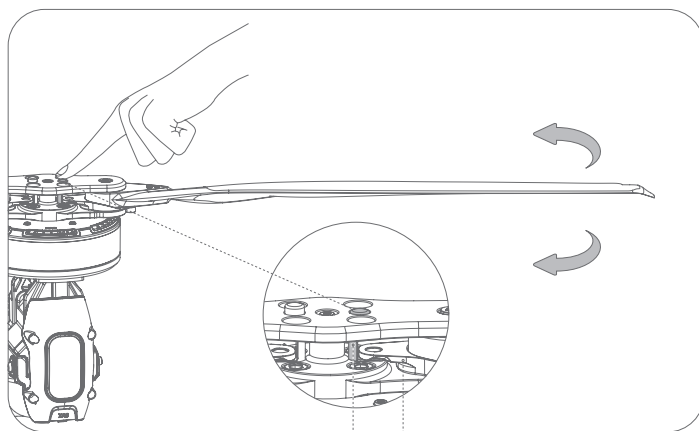
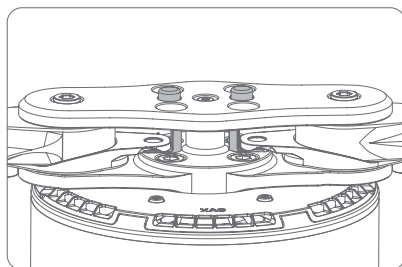
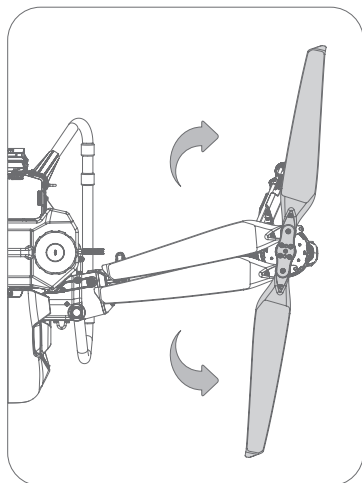
Unfold Nozzles

To spread out the nozzle (take the left nozzle for example), slightly lift it inward and then rotate it outward.



Unfold Propellers

Spread out the left and right propellers (take the left propeller as an example). It is fully unfolded when you hear a clicking sound.

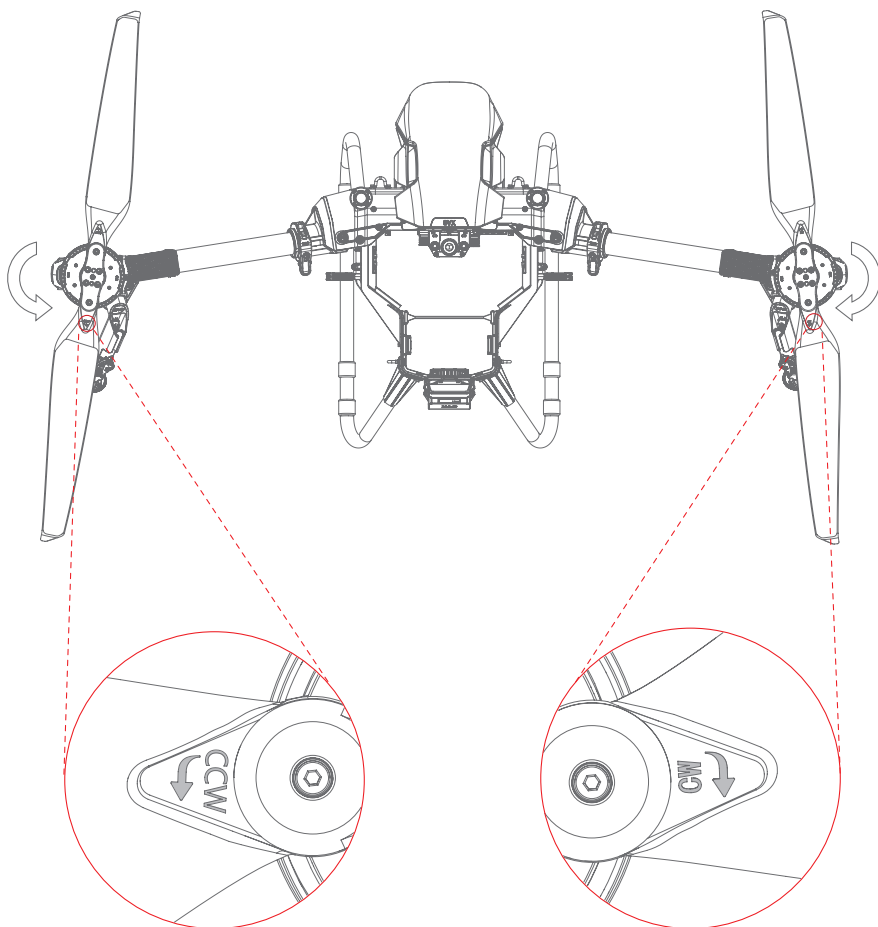


Base
Spring Plunger

Warning

- ⚠ Please see that the spring plunger of the propeller has securely snapped into the base of the clamp after spreading out the propeller.
- ⚠ Fold up the propeller by pushing down the base and rotating the propeller.

After spreading out the propeller, see that the model of the propeller, which can be found between the blade and the clamp, matches the corresponding arm. Specifically, CCW propeller corresponds to the left arm while CW propeller corresponds to the right arm.



CCW Propeller - Left Arm

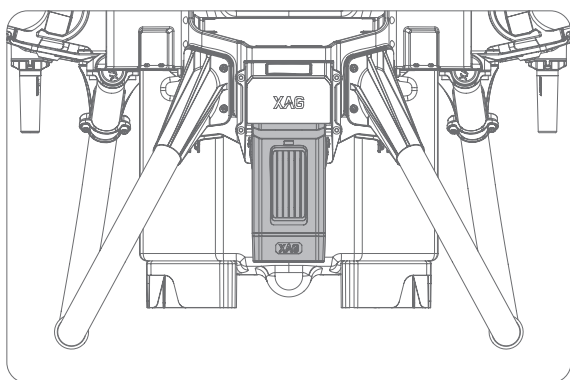
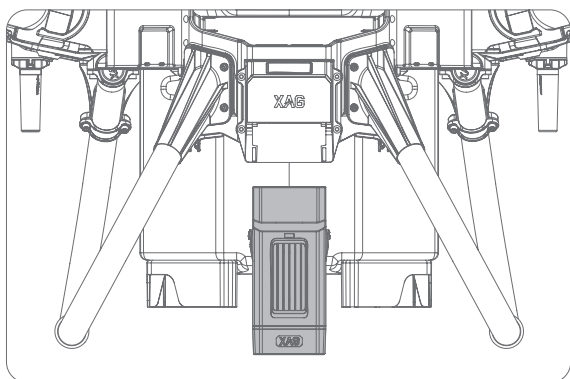
CW Propeller - Right Arm

Note

⚠ Never swap the CW and CCW propeller, as incorrect installation will cause flight accidents.

Install RealTerra

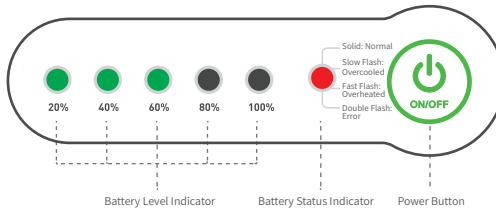
Insert RealTerra into the slot until hearing a clicking sound.



Smart Battery

Indicators / Buttons

There is 1 power button and 6 indicators on the smart battery screen.

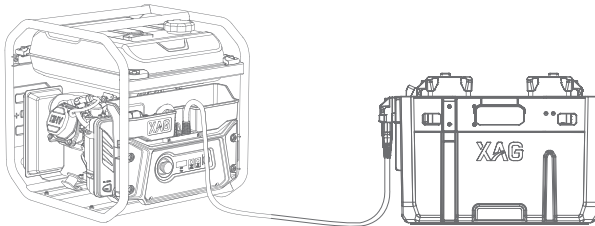


Power ON / OFF

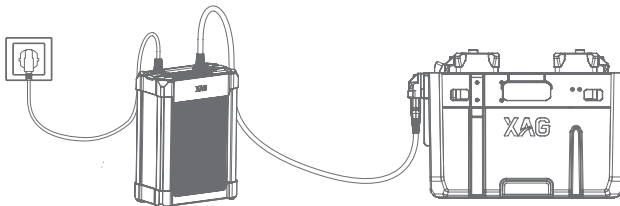
Long press twice to power ON/OFF - upon connection with the drone or the charger, long-press the power button for at least 1 second until all the battery level indicators flash simultaneously, followed by the other long-press for at least 1 second until the battery beeps and all the status indicators are on/off.

Charge Smart Battery

Charge the Smart Battery with GC4000+ Auto SuperCharge Station or Intelligent SuperCharger. Upon reaching full charge, the Auto SuperCharge Station or the Intelligent SuperCharger will stop charging and the battery will power off automatically.



Charge with Auto SuperCharge Station



Charge with Intelligent SuperCharger

Check Battery Level

When the battery is OFF, short press once to check the battery level.

When the battery is ON, the Battery Level Indicators keep solid.

LED Behaviour		Description
1 Light Flashing	●○ ○ ○ ○ ○	0%-10%
1 Light Solid	● ○ ○ ○ ○ ○	10%-30%
2 Lights Solid	● ● ○ ○ ○ ○	30%-50%
3 Lights Solid	● ● ● ○ ○ ○	50%-70%
4 Lights Solid	● ● ● ● ○ ○	70%-90%
5 Lights Solid	● ● ● ● ●	90%-100%

Check Battery Status

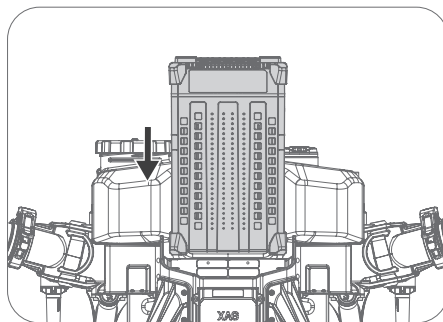
When the battery is on, check the battery status on the screen.

LED Behaviour	Status	Description	
2 Lights Double Flash	●● ●● ○ ○ ○ ○	Fault Lock	Battery locked for the low battery, please contact tech support to unlock the device.
3 Lights Double Flashing	●● ●● ●● ○ ○	Remote Lock	Battery locked remotely, please contact tech support to unlock the device.
4 Lights Double Flashing	●● ●● ●● ●● ○	Anti-dismantling Lock	Failed to verify cell identification, please contact tech support to help check.
2/3 Alternate Flashing Lights	●● ●● ○ ○ ○ ○	Over current Protection	Protection triggered by overcurrent, please contact tech support to unlock the device.
2/4 Alternate Flashing Lights	●● ●● ○ ○ ●● ○ ○	Dual-battery Power on Disabled	Dual-battery power on disable, voltages of both batteries should be roughly equal before use.

LED Behaviour	Status	Description	
Red Light Solid	████████████████	Normal	Normal
Flashing Red Light (rapid)	●●●●●●●●●●●●●●	Overheated	Protection triggered. Charging/Discharging not allowed
Flashing Red Light (slow)	●● ●● ●● ●● ●●	Overcooled	Charging protection triggered for low temperature. Please keep the battery above 10°C
Red Light Double Flashing	●●●● ●●●● ●●●● ●●●●	Failure	Stop using immediately

Install Battery

Insert the battery into the battery compartment cautiously until hearing a clicking sound.



Precautions for Battery Use

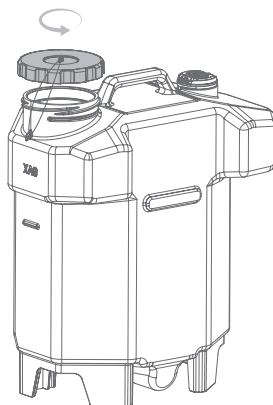
- Smart battery should be fully charged and used in strict accordance with instructions preceding operation.
- NEVER insert/remove the battery when it is ON, or it may cause damage to the interface.
- It is a MUST to check and update to the latest battery firmware and software version preceding operation. Loss caused by failing to do so shall be borne by the user.
- An optimal ambient temperature range for the battery is from 10 °C to 45 °C . Chances are that fire, even explosions will happen at a temperature over 45°C .
- NEVER connect the cathode and anode with a wire or other metals, as this will cause a short circuit.
- For heat dissipation, the battery should be immersed into pure water instead of corrosive liquids within the maximum and minimum level indicated for NO more than 60min, or else the battery will get damaged for having water leak inside.
- Please always keep the interface clean and clean the liquid or foreign matters off it promptly. Otherwise, it will cause poor contact, contributing to energy loss or failure to charge.
- Please handle the battery with care and do NOT take it apart, pierce the housing or apply pressure to it, including but not limited to behaviours such as sitting/standing on the battery, stacking heavy items on it and the like.
- Please regularly check the components like the battery interface and the plug before use. NEVER clean the charging device with alcohol or other combustible liquids. NEVER use the damaged charging device.
- Please place the battery and charging device on even ground with no combustible materials around while charging. NEVER leave the battery unattended while charging in case of an accident.
- For your safety, keep a minimum of 30cm distance between the battery and the charger, and between two batteries, lest too much heat lead to the charger or battery failure, even causing dreadful consequences like a fire.
- Please make sure the battery is fully charged prior to each operation. NEVER operate at full capacity preceding completion of charging.
- NEVER use batteries provided by manufacturers other than XAG, or to dismantle/replace the battery without permission. If necessary, please contact XAG or the authorized dealer. For the battery incidents, technical faults or other accidents caused by using a battery or accessories provided by non-XAG manufacturers, the user shall be held responsible for all the consequences arising therefrom.
- If one green light flashes at the end of the operation, please charge the battery to 40%-60% before storage. Failing to do so may damage the battery or impact battery life. Fully discharge and recharge the battery every 90 days to maintain battery health.
- Battery should be charged with the charging device specified by XAG. Otherwise, user shall assume all the economic and legal responsibilities arising therefrom.
- The Intelligent SuperCharger needs to be purchased separately. If necessary, please contact your local dealer.
- The battery should be stored at 10-30°C in a dry place instead of a wet or moist environment.
- Avoid moisture while charging the battery. Warranty does NOT cover any damage caused by problems not attributable to the product quality like damaged battery housing.
- The battery is waterproof and splashproof under controlled experiment. However, rather than being permanent effective, the protection may get weaker due to wear and tear.
- Please STOP using the batter swollen, leaking, deformed or with appearance damage instantly and contact XAG or the dealer without hesitation.

- The liquid inside the battery is highly corrosive. In case of contact with skin or eyes, flush with fresh water and seek medical attention instantly.
- To protect our environment, please properly dispose of the battery as required by the local laws and regulations.

Liquid Tank

Infusion

Twist the cap counterclockwise to open the tank. Upon infusion, turn the cap clockwise till it is tight.

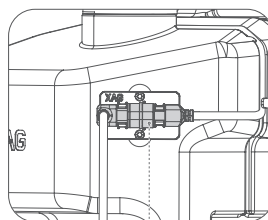
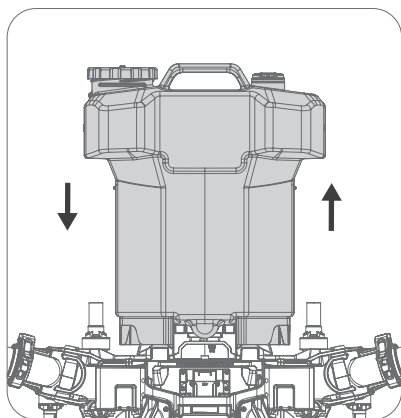


⚠ Note

- ⚠ To protect components from chemical splash damage, direct pesticide infusion is NOT allowed when the tank is installed on the drone.

Removal / Installation

After installing the Liquid Tank, wire up the Liquid Tank Signal Cable and insert it into the cable holder. Unwire the Liquid Tank Signal Cable before removing the Liquid Tank.



Liquid Tank Signal Cable

⚠ Note

- ⚠ Please DO handle the tank with pesticide inside with care.
- ⚠ It is highly recommended to empty liquid tank/granule container beforehand to enhance the efficiency of aerial mapping.
- ⚠ A drone with RealTerra installed is unable to spray or spread.

APP Interface Introduction

"Field" Tab (Main)



Device List: Full device list

Operator: Operator's location

"Field" Tab: Main field options tab

Functions: New fields, New fields group, New HDMap, Import data, Bind devices

Map Layers: Select map type

Focus on Aircraft: Centre screen on aircraft

Focus on Operator: Centre screen on operator

Measure: Measure distance

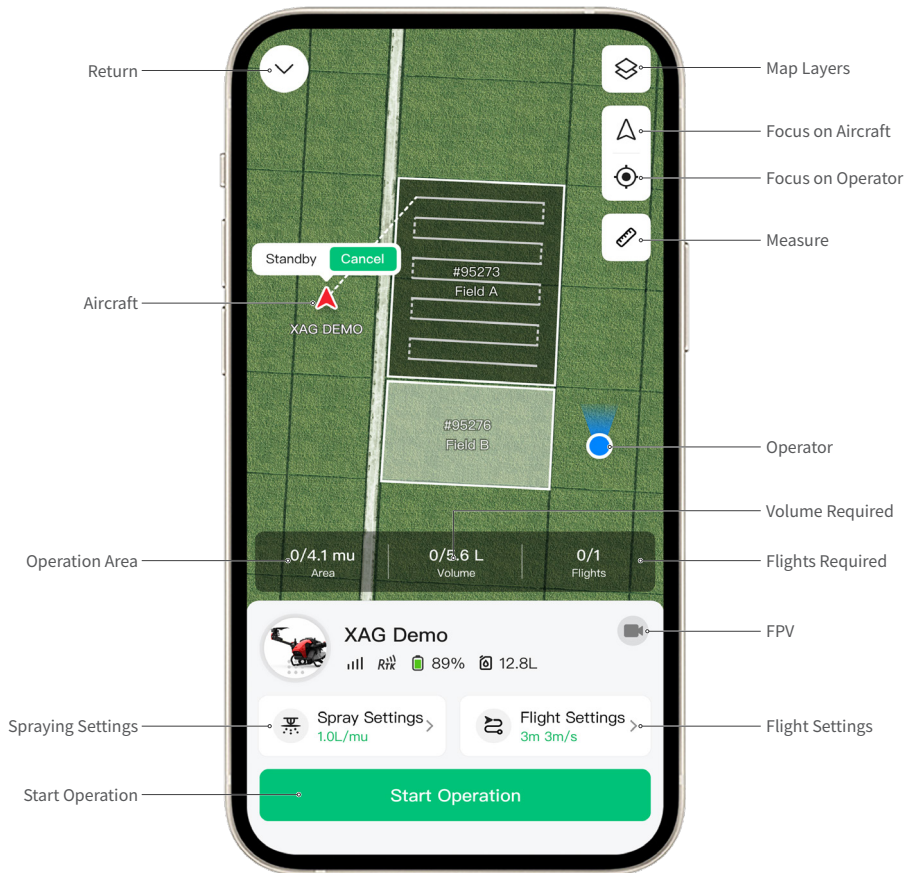
Aircraft: Aircraft's location

"Operation" Tab: Main operation options tab

"My Account" Tab: Main account options tab

"Operation" Tab

Tap on "Operation" tab to view the operation options.



Return: Return to "Field" Tab (Main)

Operation Area: Area of selected field

Spraying Settings: Spraying settings

Start Operation: Start operation

Volume Required: Estimated volume required
for current operation

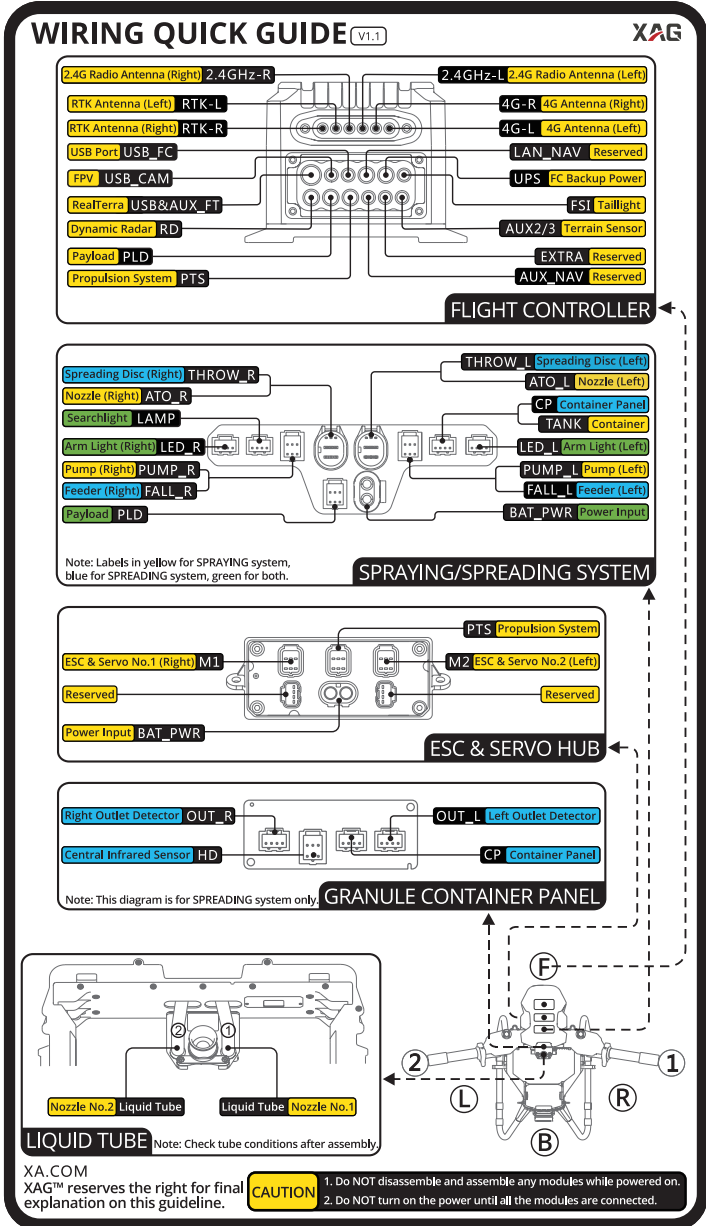
Flights Required: Estimated flights required
for current operation

FPV: First-person-view camera

Flight Settings: Flight settings

Appendix

Wiring Quick Guide



Description of Status Indicator

Super X4 Intelligent Control System Indicator



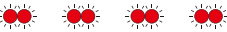









Get to know the current status of the drone by checking Super X4 Intelligent Control System Indicator.

Details are as follows:

RTK Indicator		Description
Flashing Green Light (slow)		Normal
Flashing Green Light (rapid)		Insufficient satellites (<16), heading accuracy: <math><2^\circ</math>
Flashing Red Light (slow)		RTK timeout exceeding 10s
Flashing Red Light (rapid)		Exit RTK, no differential signal, no heading
Solid Red Light		Not searching for satellites, not positioning, no output from board
Red/Green Light Alternate Flashing(slow)		Initialization/Configuration
Red/Green Light Alternate Flashing(rapid)		Firmware Update
Wireless Communication Indicator		Description
Flashing Green Light (slow)		Communication module normal, DLS receiving and processing data
Flashing Green Light (rapid)		Communication module normal, no data received
Flashing Red Light (slow)		Initialization normal, serial port disconnected
Flashing Red Light (rapid)		Interface disconnected, initialization failed
Red/Green Light Alternate Flashing		Pairing. Indicators will become Green Light Fast Flash whether the pairing is successful or not
Cloud Communication Indicator		Description
Cloud Communication Indicator		Cloud communication connected
Cloud Communication Indicator		Cloud communication disconnected
System Status Indicator		Description
Solid Green Light		System normal
Solid Red Light		System anomalous

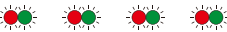
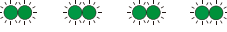








Flight Indicator

There are one Flight Indicator on the side of each motor mount, Details are as follows.

Flight Indicator		Description
Solid Green Light		Spraying
Illumination Green		Spraying paused for line changing
Double Flashing Red Light		Taking off or landing
Solid Red Light		Idling or obstacle avoidance in process
Illumination Red		Departure or RTL
Solid Cyan Light		Initializing firmware update
Flashing Cyan Light (rapid)		Downloading firmware
Flashing Purple Light (slow)		Subsystem update
Flashing Purple Light (rapid)		Transmitting subsystem firmware
Illumination Blue		No signal from flight controller
Flashing Blue Light (rapid)		Spray system offline
Solid Yellow Light		System crash

Flight Status Indicator

Get to know the current status of the drone by checking the Flight Status Indicators (Tail Lights). Details are as follows.

Tail Lights		Description
Red/Green Light Alternate Flashing(slow)		Weak GPS signal
Double Flashing Green Light		Strong GPS signal
Triple Flashing Green Light		GPS route mode
Flashing Red Light(slow)		Fly in safe mode
Solid Red Light		Powered on, Flight Control initialization incomplete or heating up
Flashing Purple Light(rapid)		Flight Control formatted or parameter anomalous
Flashing Blue Light(rapid)		Propulsion system detected as anomalous
Flashing Red Light(rapid)		Sensors (excluding IMU) anomalous, GPS malfunction or low heading accuracy
Flashing White Light(rapid)		IMU failure
Triple Flashing Red Light		Low voltage alert

Specifications

V40 Agricultural UAV Model	3WWDZ-15.2A
Flight Control System	Super X 4
Symmetrical Motor Wheelbase	1605mm
Dimensions	1790 × 810 × 745 mm
Empty Weight	28.4kg
Rated Takeoff Weight	43.8kg
Maximum Takeoff Weight	48kg
Protection Rating	IP67

Flight Parameters

Operating Frequency	2.4000GHz-2.4835GHz
Maximum Thrust-Weight Ratio:	1.8
Hovering Precision (good GNSS signal)	RTK Enabled: ±10cm (horizontal), ±10cm (vertical) RTK Disabled: ±0.6m (horizontal), ±0.3m (vertical) (radar enabled: ±0.1m)
Continuous High Precision Navigation Time without Signa	≤ 600s
Hovering Duration	13.5 min (with no-load @20,000 mAh & takeoff weight: 28.4 kg) 6.8 min (with full-load @20,000 mAh & takeoff weight: 43.8 kg) 5.2 min (with max-load @20,000 mAh & takeoff weight: 48 kg)
Maximum Flying Speed	7m/s
Maximum Flying Height	30m
Maximum Flight Distance	2000m
Wind Force Recommended	≤ 3

RevoSpray System

Smart Liquid Tank

Volume	15. 2L
Sensor	Liquid Level Sensor

Nozzle

Quantity	2
Rotational speed of spray disc	1000~16000RPM
Atomizing Size	60-400µm
Spray Width	5~10m

Peristaltic Pump

Quantity	2
Voltage	50V
Maximum System Flow Rate	10L/min
Maximum flow rate (single pump)	5L/min

XAG RealTerra

Image Sensor	1/2.3inch 12M CMOS Sensor
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Lens	FOV 112° 2.7mm/16.8mm (35mm Equivalent)
Mechanical Shutter	1/200-1/2000s
Image Format	JPG
Power	10W
Optimum Operating Temperature	10~40°C

PSL Camera

Dimensions	50 x 36.7 x 29mm
Video Resolution	720P/1080P
Video Coding Format	H.264
Frame Rate	30fps
Focal Length	2.75mm
Image Sensor	1/2.95inch 2M CMOS Sensor

Obstacle Sensing & Avoidance System

Dynamic Radar

Model	RD2426
Voltage	24~60V
Power	6W
Operating Frequency	24GHz
Sensing Mode	Millimeter-wave Imaging, MIMO
Sensing Parameters	Obstacle's Position, Distance, Direction of Motion, Relative Velocity
Field of View (FOV)	Horizontal $\pm 40^\circ$; Vertical $\pm 45^\circ$
Relative Height of Safe Obstacle Avoidance	$\geq 1.5\text{m}$
Relative Speed of Safe Obstacle Avoidance	2.5m (Distance between the propeller tip and obstacle after the UAV brakes and hovers stably)
Relative Speed of Safe Obstacle Avoidance	$\leq 6\text{m/s}$

Terrain Sensor

Model	TR24S100
Voltage	5.8V
Power	1.5W
Sensing Mode	Millimeter-wave
Operating Frequency	24GHz
Height Measurement Range	0.5~100m
Fixed Height Range	1m~30m
Maximum Gradient	45° (at flying speed of $\leq 2\text{m/s}$)
Protection Rating	IP67

Propulsion System

Motor	
Model	A40

Stator Size	136 x 24mm
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KV Value	75RPM/V
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Maximum Tension (Single Motor)	42kg
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Rated Power (Single Motor)	3000W
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Electronic Speed Controller

Model	VC13180
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Maximum Continuous Operating Current	180A
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Maximum Operating Voltage	56.6V
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Foldable Propeller

Model	P4718
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Diameter × Screw Pitch	47 x 18inch
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Tilt Servo

Rated Voltage	DC50V
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Operating Voltage	DC25V-55V
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Rated Torque	150Kg·cm@50V
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Rated Current	0.5A@50V
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No Load Speed	400° /second
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Communication & Control System

ACS2(B) Smart ControlStick

Compatible with	XAG® V40 Agricultural UAV, XAG® P40 Agricultural UAV, XAG® P80 Agricultural UAV
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Operating Frequency	2.4GHz
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Power Consumption	4W (without RTK module), 8-9W (with RTK module)
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Ambient Operating Temperature	-20~60°C
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Ambient Charging Temperature	5~45°C
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Power System

Smart SuperCharge Battery

Model	B13960S
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Type	13S Lithium polymer battery
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Rated Capacity	20Ah (962Wh)
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Rated Output	48.1V/120A/5500W
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Fast Charge	56.55V/50A/2800W
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SuperCharge	56.55V/80A/4500W
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Ambient Charging Temperature	10~45°C
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Note

⚠ The effectiveness of the Obstacle Sensing & Avoidance System depends on the obstacle's material, location, shape, size, etc. Please ensure the drone is always in your sight during operation. Pay close attention to the drone and use the ControlStick to avoid obstacles when necessary.

Disclaimer

01. Please read this User Manual carefully before using the product, as it has much to do with both operational safety and your legitimate rights and interests. You shall be deemed to know, understand, agree and acknowledge all terms and conditions as well as content stated herein upon activation of this product.
02. Not being a toy, plus for certain safety risks, this product is not suitable for those who are under 18 years old, or those without a UAS operator certificate accredited by XAG or existing laws, regulations and policies. Please keep the children away from this product and be particularly cautious while there are children present.
03. This product is an XAG V-series multi-rotor unmanned aerial vehicle solely designed for agricultural use. With activation in accordance with the User Manual, properly functioned battery and data indicated as normal, it will provide you with safe and satisfactory plant protection service.
04. You commit to use this product only for a legitimate purpose and acknowledge the content stated herein as well as possible formulation and amendment of policies and norms by XAG. You understand, acknowledge and accept that flight records and data during operation will be automatically uploaded and saved to XAG's server as well as licitly collected and stored by XAG. XAG assumes no responsibility for the failure to store and analyze the flight records and data caused by the unsuccessful upload due to any reason attributable to you.
05. To the maximum extent permitted by law, under no circumstances shall XAG offer an implicit or explicit guarantee for this product, including but not limited to implicit guarantees pertaining to vendibility, fitness for a particular use, or non-infringement.
06. To the maximum extent permitted by law, XAG shall not be liable for all losses caused by your improper operation. Also, XAG shall not be liable for any indirect, consequential, punitive, accidental, special or exemplary damages, including any loss incurred as a result of your purchase, use, or inability to use the product (even if you have been advised of the possibility of such loss).
07. To the maximum extent permitted by law, under any circumstances, the liability or compensation amount from XAG to you for all damages, losses, and litigation arising therefrom will not exceed the amount that you paid to XAG or XAG accredited distributor for purchasing the product.
08. On any account, the purchaser or user shall comply with laws and regulations of the country and region where the product is used. XAG assume no liability arising from the violation of relevant laws and regulations by the purchaser or user.
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10. To the extent permitted by law, XAG reserves the rights for final explanation and revision of the terms and conditions stated herein. XAG also has the right to update, modify or terminate these terms and conditions via its official website, the Instruction Manual/User Manual, online APP, etc., without prior notice.

Warning

Users are required to read the full Instruction Manual and obtain UAS operator certificate accredited by XAG (or existing laws, regulations, and policies). Otherwise, it may cause serious injury to yourself or others, or cause damage to the product and property loss. Safety awareness is of paramount importance during operation. This product is not suitable for children. Do NOT use the parts that are not provided or suggested by XAG. Please install and use the product by strictly following XAG's instructions.



Contents concerning XAG App in this document will be refined and updated on a regular basis in electronic form. Please scan the QR code to read or download the latest version of "V40 Agricultural UAS User Manual"



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