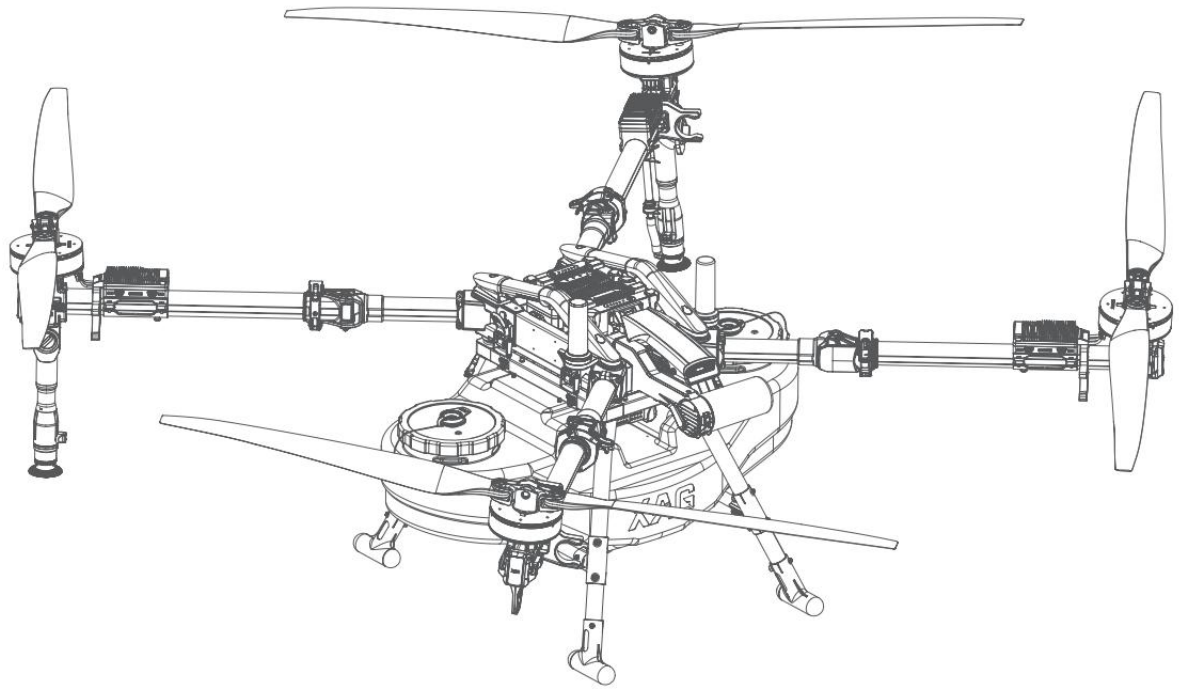
XAG

2025 P Series agricultural UAV

Maintenance and repair manual

Version1.2



XAG 2025 Agricultural UAV Maintenance and Disassembly Manual

Chapter 1: Fundamental Principles and System Overview

Introduction

The XAG 2025 Agricultural Unmanned Aerial Vehicle (UAV) consists of several key components: the integrated airframe, control systems, GNSS RTK positioning system, and power system. The integrated airframe (including the flight platform and execution modules), propulsion system (ESC, motors, propellers), power system (smart ultra-chargeable batteries, charging managers, and mobile charging stations), GNSS RTK high-precision positioning system (including the SRC5 remote controller with display, ACS4 control stick, XRTK handheld mapper, and cloud base station), sensor system (SUPERX5 Ultra flight control system, obstacle avoidance radar, PSL imaging), execution system (RevoSpray with liquid tank, Impeller Pump, pipelines, centrifugal atomizing nozzles; RealTerra with mapping modules; RevoCast with seed tank, screw reduction unit, spray disc motor; RevoCargo and RevoSling for transport), and finally, the operations management and monitoring platform.

Composition of the UAV System

product	picture
UAV	
Smart Remote Controller	
GNSS RTK high precision positioning system	
Power System	

Composition of 2025 agricultural UAV system

Structural Overview of P150 Pro and P60 Pro

The external components of the P150 Pro agricultural UAV include foldable propellers, high-performance

motors, centrifugal nozzles, foldable arms, a hood, airframe, obstacle-avoidance radar, PSL camera, payload system, flight control system, and Smart supercharged battery.

Note: The diagram depicts the P150 Pro Agricultural UAV. The P60 Pro shares the same overall structure and systems, except for differences in the number of batteries.

P150 Pro and P60 Pro Execution Systems

The execution systems of the P150 Pro and P60 Pro UAVs include the RevoSpray, RevoCast, and RevoCargo and RevoSling, integrating spraying, seeding, mapping, and transport functions into a single platform.

System and Principle Overview

Flight Control System

The Flight Control System serves as the primary control mechanism for the UAV. It assumes the role of the central hub, overseeing the entirety of the flight process, encompassing takeoff, in-flight operations, mission execution, and landing. This system is essential for maintaining flight stability, reducing pilot workload, enhancing mission capability and flight quality, improving operational safety, and easing the burden on operators.

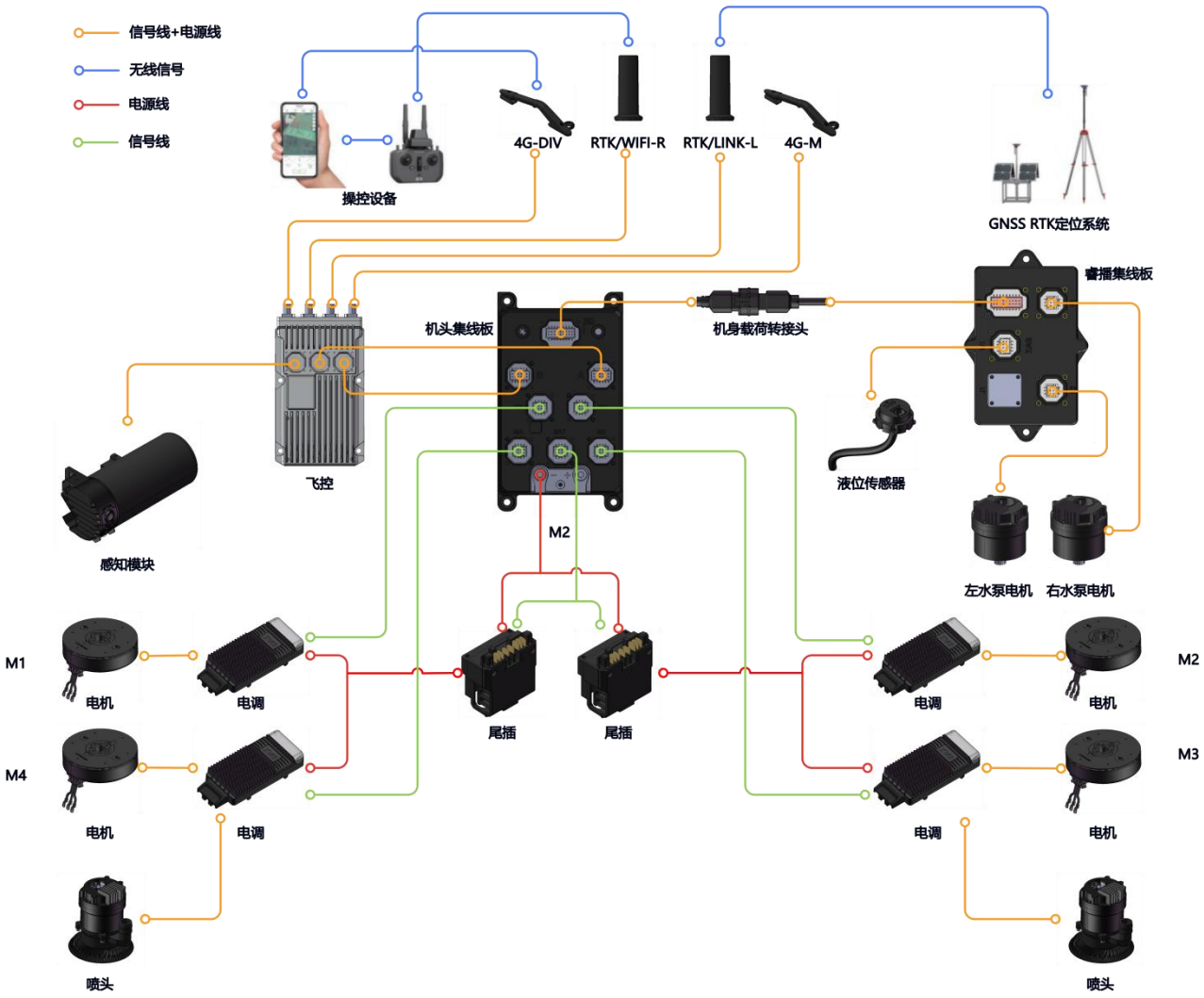
The principle of quadrotor UAV flight control is as follows: the Flight Control System incorporates multiple sensors, including accelerometers, gyroscopes, and magnetometers. The accelerometer measures linear acceleration, the gyroscope measures angular velocity, and the magnetometer provides heading information. These data are fused through sophisticated algorithms, including complementary filtering or Kalman filtering, to compute the UAV′ s pitch, roll, and yaw angles. Subsequently, based on the disparity between the desired and current attitudes, the Flight Control System employs control algorithms, such as PID control, to determine appropriate adjustments and regulate motor speeds. This comprehensive approach ensures precise control of attitude and position, thereby facilitating stable flight and reliable mission execution.

The proper operation of obstacle avoidance and execution modules on agricultural UAVs also relies on the flight control system. By coordinating with these modules, the flight control system enables obstacle avoidance, variable-rate spraying, precision seeding, and autonomous navigation.

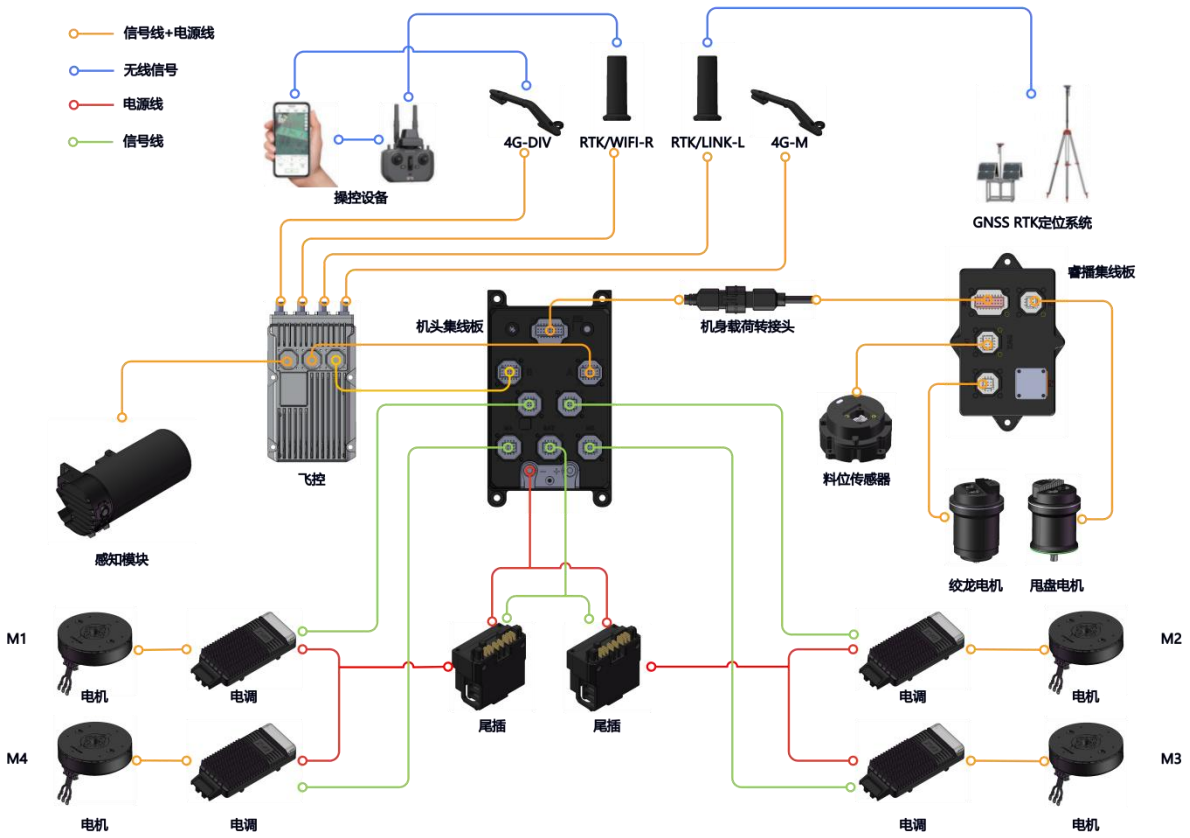
P150 Pro Flight Control System

Connection of the Flight Control System to Various System Modules

The UAV′ s flight control system operates in conjunction with all subsystems, integrating functions such as flight control, navigation, sensor data processing, communication, and safety protection. This allows the UAV to achieve safe and reliable operation in complex environments. The schematic diagram is shown below:



P150 Pro/P60 Pro Revospray System Module Connection Diagram



P150 Pro/P60 ProRevoCast System Module Connection Diagram

Sensor System

Overview of the Sensor System Functions

The sensor system primarily comprises the following modules: the PSL camera, the obstacle-avoidance radar, and the LED lighting unit.

Functional Features of Sensor System Modules

PSL Camera

The PSL camera employs a 1/2.7 CMOS-RGB sensor with a resolution of 5 megapixels. It provides a wide-angle field of view—100° horizontally and 150° vertically. The video resolution is 1280×720, encoded in H.265, with a frame rate of 30 fps. Distortion is corrected electronically, while the gimbal′ s pitch angle is adjusted, expanding the operator′ s FPV (first-person view) and thereby enhancing both flight safety and mission execution.

Parameters of the 2025 UAV Camera

Operating Voltage	24 V
Video Resolution	1280 × 720
Video Encoding Format	H.265
Frame Rate	30 fps
Focal Length	1.83 mm
Image Sensor	1/2.7-inch CMOS-RGB sensor, 5 MP effective resolution
Field of View (FOV)	100° horizontal, 150° vertical

4D imaging radar

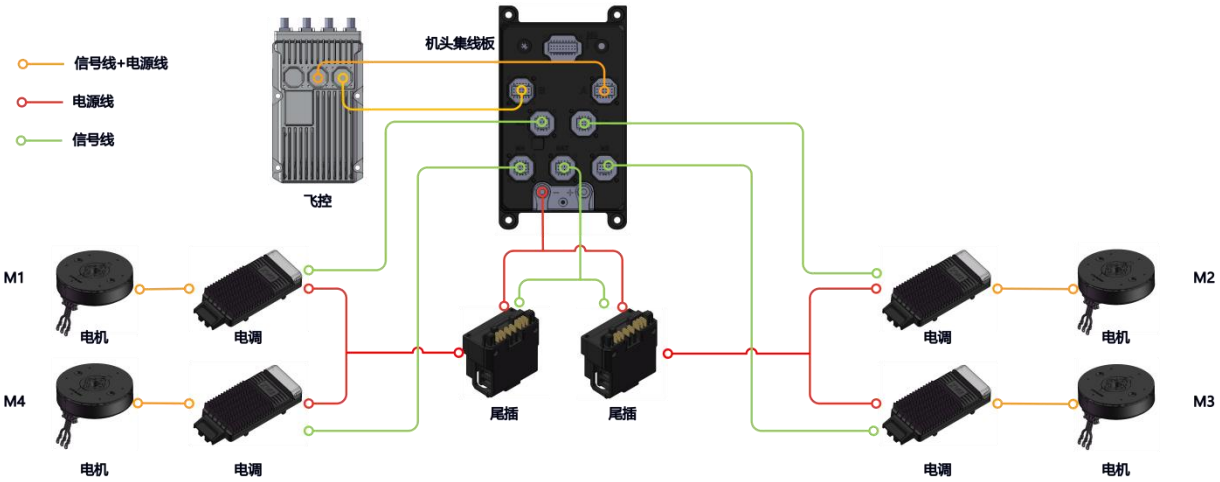
The new 4D imaging radar features a field of view of ±40° horizontally and ±115° vertically, integrating ground simulation, obstacle avoidance, and imaging functions. It operates independently of ambient light, ensuring all-weather safety.

Parameters of the 2025 4D Imaging Radar

Operating Voltage	24 V
Power Consumption	<15 W
Operating Frequency	24 GHz
Perception Method	Beamforming, 4D imaging
Perception Capabilities	Range, azimuth angle, pitch angle
Detection Range	1.5 m – 100 m
Field of View (FOV)	±40° horizontal, ±115° vertical
Minimum Safe Clearance from Ground	≥1.5 m
Safe Obstacle Avoidance Distance	2.5 m
Maximum Relative Obstacle Avoidance Speed	≤13.8 m/s
Obstacle Avoidance Modes	Horizontal bypass, vertical bypass

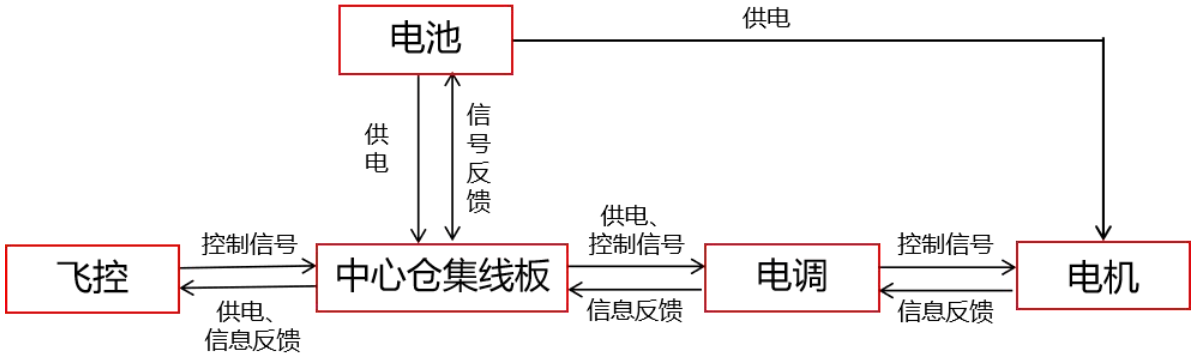
Propulsion System

The propulsion system of an agricultural UAV consists primarily of the central cable hub, electronic speed controllers (ESCs), brushless motors, and propellers, which together provide thrust for the aircraft. The central cable hub distributes flight control signals and battery current to the ESCs. The ESCs regulate the current supplied to the motors according to commands from the flight control system, thereby controlling motor speed. The motors then drive the propellers, whose rotation generates lift and enables the UAV to fly.



P150 Pro/P60 Pro Propulsion System

Propulsion System Data Flow Analysis



P150 Pro/P60 Pro Propulsion System Data Flow

Signal Transmission in the Propulsion System

- The XAG 2025 Agricultural UAV controls its propulsion system primarily through two pathways: the power output chain and the signal transmission chain. The power output chain distributes electrical energy to the motors, which drive the propellers to generate lift and enable flight. The signal transmission chain allows the flight control system to receive real-time status data from the ESCs and send control instructions back. The ESCs then adjust motor speeds accordingly, thereby altering the UAV's flight attitude.
- Power Output Chain: The battery serves as the UAV's energy source. First, power is supplied to the central cable hub through the battery's tail connector. Using Y-cables, the current is then distributed to the individual ESCs. Each ESC regulates and passes current to its respective motor, driving motor rotation.
- Signal Transmission Chain: Control signals from the flight control system are transmitted via the PTS port to the central cable hub. The hub board allocates these signals to the respective ESCs, which then adjust motor speeds by regulating current output. As the UAV's "brain," the flight control system also requires real-time feedback from the propulsion system. Parameters such as current, motor speed, ESC power, and temperature are transmitted back to the flight control system through the PTS connection.

Overview of Propulsion System Modules

Central Cable Hub

The central cable hub primarily supplies power to the flight control system and payload modules. In addition, it distributes control signals from the flight control system to the ESCs and collects feedback data from the ESCs to relay back to the flight control system.

Central cable hub

Electronic Speed Controller (ESC)

The ESC used is based on field-oriented control (FOC), also known as vector control. This technique employs an inverter to regulate a three-phase AC motor by adjusting the output frequency, voltage magnitude, and phase angle. Through these adjustments, the ESC precisely controls the motor′ s output power.

Electronic Speed Controller (ESC)

Parameters of ESC

Model	P150 Pro	P60 Pro
ESC Type	XESC-F380	XESC-F200
Maximum Output Current	380A	200A
Continuous Output Current	140A	70A

Propulsion Motor

The XAG 2025 Agricultural UAV is equipped with brushless direct current (BLDC) motors. Unlike conventional brushed motors, BLDC motors use semiconductor switching devices to achieve electronic commutation, replacing the traditional mechanical commutator and carbon brushes with electronic switches.

This results in higher efficiency, durability, and reliability..

Propulsion Motor

Parameters of Propulsion Motor

Model	**P150 Pro**	**P60 Pro**
Motor Type	A60	A35
Stator Dimensions	φ145 mm × 26 mm	φ145 mm × 16 mm
KV Rating	68 KV	58 KV
Maximum Thrust (per motor)	56 kg	30 kg
Rated Power (per motor)	4850 W	2300 W

Propellers

The 2025 P150 Pro Agricultural UAV is equipped with foldable propellers featuring 63-inch high-performance blades, while the P60 Pro uses 60-inch high-performance blades.

Propellers

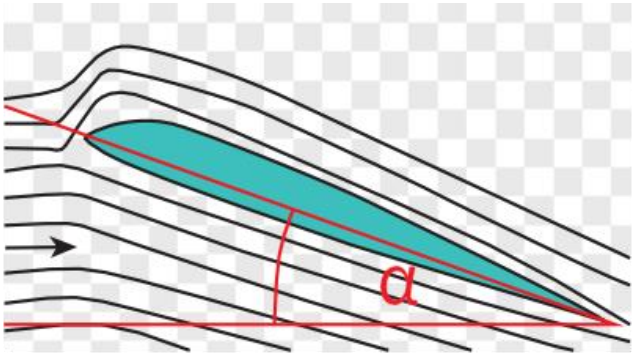
Parameters of Propeller

Model	**P150 Pro**	**P60 Pro**
Propeller Type	Agricultural 63-inch Propeller	Agricultural 56-inch Propeller
Diameter × Pitch	63 × 17	56 × 15
Single Blade Weight	360 g	305 g
Total Propeller Weight	1109 g	1000 g
Rotor Diameter	1600 mm	1422 mm
Material	Carbon-fiber composite	Carbon-fiber composite

Principle of Motion Control

Principle of Lift in UAVs

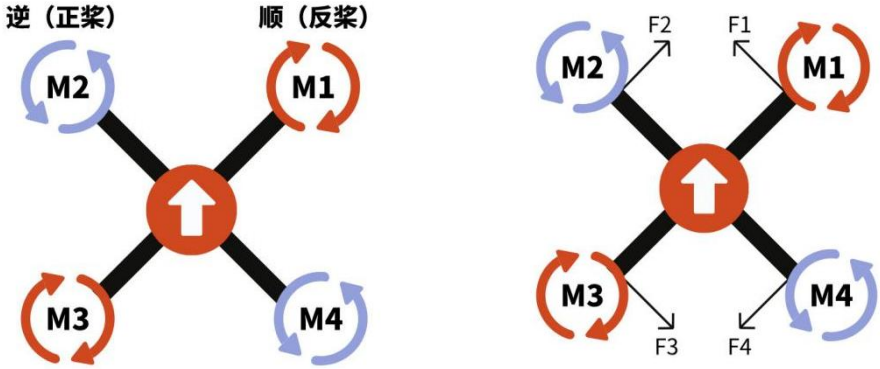
Lift refers to the upward force generated when an object moves through a fluid (such as air), caused by pressure differences exerted by the fluid on the object. For UAVs, lift is primarily generated by the propeller blades. As air flows over and under the blades, differences in airflow velocity and pressure are created, which in turn produce lift.



Angle of Attack (α)

As illustrated above, the rotating propeller forms an angle of attack (α) relative to the airflow (the propeller generally rotates in a direction corresponding to its angle of attack, which also indicates the rotation direction). In this condition, airflow over the curved upper surface of the propeller moves faster, creating lower pressure, while airflow beneath the flatter lower surface moves more slowly, resulting in higher pressure. This pressure differential between the upper and lower surfaces generates upward aerodynamic force on the propeller, enabling the UAV to sustain flight.

Principle of Propeller Arrangement



The propellers of the P-Series agricultural UAVs are arranged symmetrically at the four corners of the aircraft. Propellers rotating counterclockwise are defined as CW (clockwise) props, while those rotating clockwise are defined as CCW (counterclockwise) props. Specifically, the propellers driven by motors M2 and M4 are CW props, whereas those driven by motors M1 and M3 are CCW props.

During normal flight, according to Newton′ s Third Law of Motion—action and reaction—the motor drives the propeller to rotate, while the propeller simultaneously exerts an equal and opposite torque on the motor. Since the motors are fixed to the arms, this reverse torque is transmitted to the arms. When these opposing torques are balanced (F1, F2, F3, and F4 cancel one another), the UAV maintains a stable heading and yaw

control.

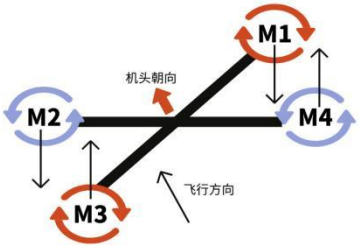
Principle of UAV Attitude Control

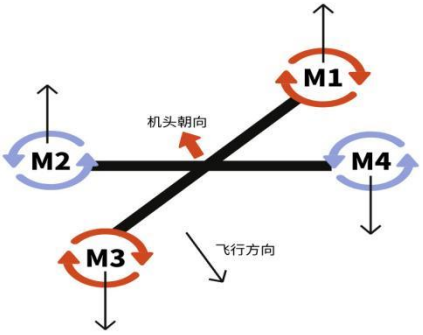
The P-Series UAVs regulate their attitude and position by adjusting the rotational speeds of the four motors, thereby altering rotor speed and lift.

Climb and Descent

For the P150 Pro and P60 Pro Agricultural UAVs, when the upward lift equals the UAV′ s weight, the altitude remains constant. When lift exceeds weight, the UAV ascends; when lift is less than weight, the UAV descends.

Pitch Motion (Forward and Backward)



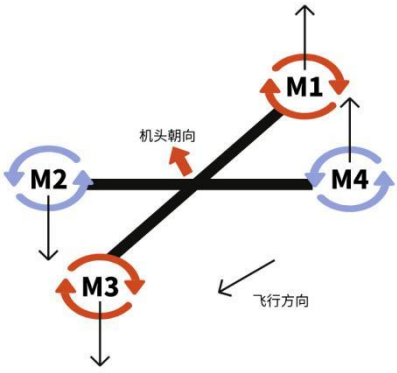


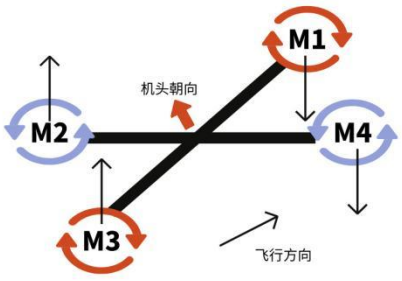
Forward Flight Backward Flight

When the rotational speeds of motors M3 and M4 exceed those of M1 and M2, the UAV tilts forward. In this state, the lift force F, which is perpendicular to the propeller′ s plane of rotation, also tilts, decomposing into a vertical component F1 and a horizontal component F2. The vertical component F1 balances the UAV′ s weight, while the horizontal component F2 propels the UAV forward.

Conversely, when the rotational speeds of motors M1 and M2 exceed those of M3 and M4, the UAV tilts backward. The lift force F again decomposes into a vertical component F1 and a horizontal component F2. Here, F1 balances the weight, while F2 drives the UAV in reverse.

Roll Motion (Left and Right)





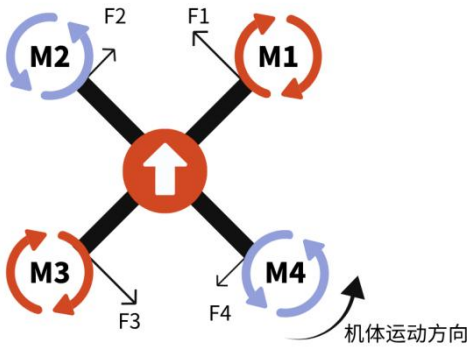
Leftward Flight Rightward Flight

When the rotational speeds of motors M1 and M4 are greater than those of M2 and M3, the UAV tilts to the left. The lift force F, perpendicular to the propeller plane, also tilts, decomposing into a vertical component F1 and a horizontal component F2. The vertical component F1 balances the UAV′ s weight, while the

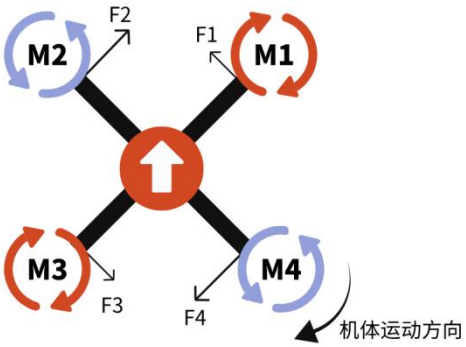
horizontal component F2 drives the UAV to the left.

Conversely, when the rotational speeds of motors M2 and M3 exceed those of M1 and M4, the UAV tilts downward on its right side. The lift force F again decomposes into F1 and F2, where F1 balances the weight, and F2 drives the UAV to the right.

Yaw Motion (Rotation about Vertical Axis)



Counterclockwise Rotation

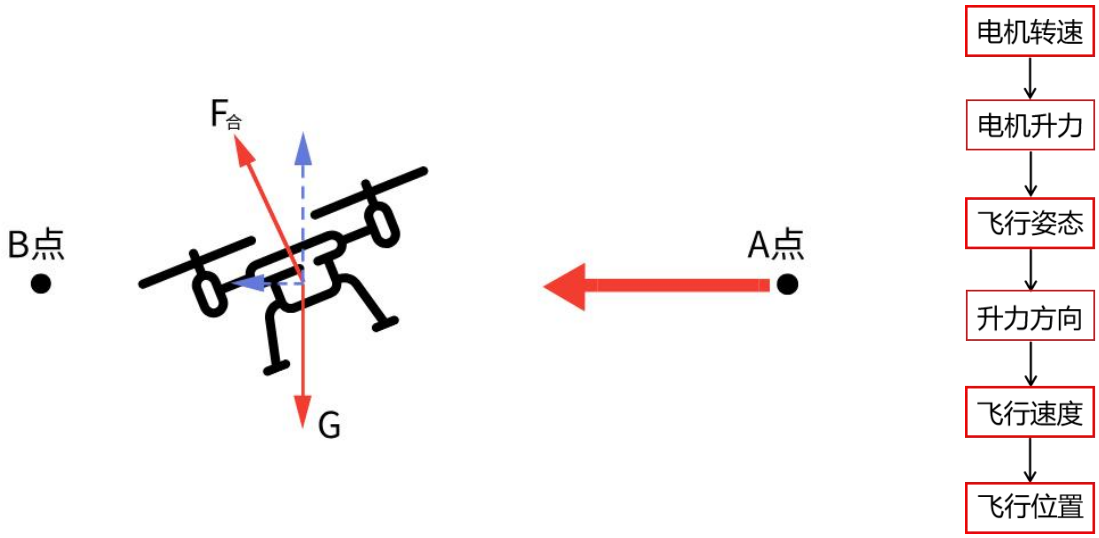


Clockwise Rotation

When the combined rotational speed of motors M1 and M3 is greater than that of M2 and M4, the resultant thrust of F1 + F3 exceeds that of F2 + F4, causing the UAV to rotate counterclockwise.

Conversely, when the combined rotational speed of motors M2 and M4 is greater than that of M1 and M3, the resultant thrust of F2 + F4 exceeds that of F1 + F3, causing the UAV to rotate clockwise.

Composite Motion Flight Control



When the UAV needs to travel from Point A to Point B, its sequence of actions is as follows:

1. Motor Speed Adjustment – The motors located closer to Point A are commanded to spin faster than those closer to Point B.

2. Lift Differential – This difference in motor speed creates a lift differential: the side nearer Point A generates greater lift than the side nearer Point B.

3. Attitude Change – The lift imbalance causes the UAV to tilt downward on the side closer to Point B.

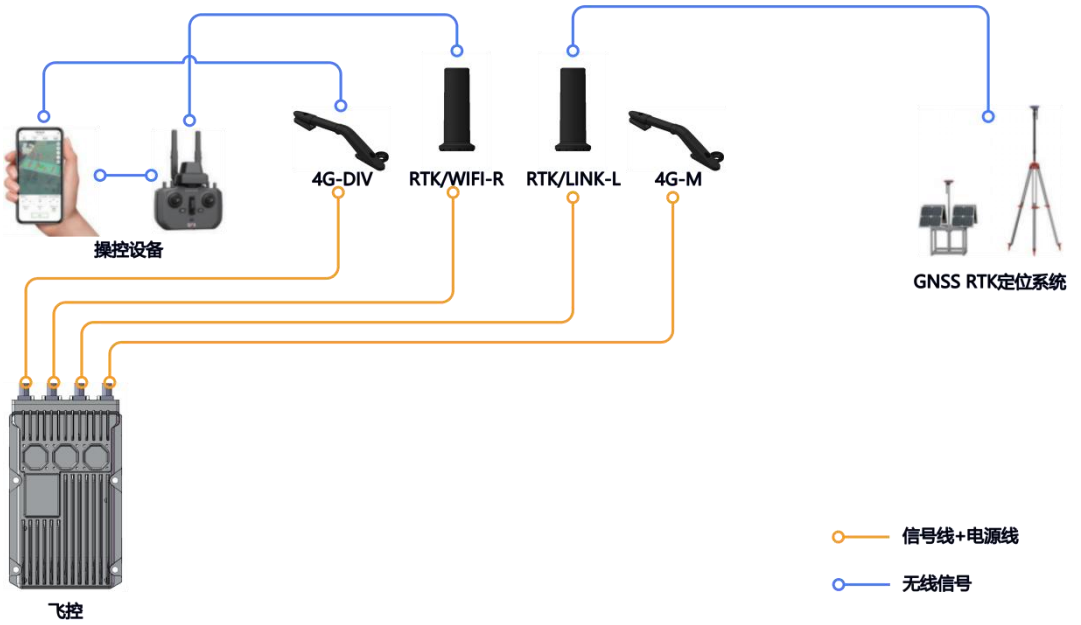
4. Resultant Lift Direction – The change in attitude shifts the overall direction of the resultant lift vector (as illustrated previously, the resultant lift force F inclines toward Point B). This generates a horizontal component of lift. At the same time, the total motor output is adjusted to ensure that the vertical component of lift remains constant, balancing the UAV′ s weight.

5. Horizontal Acceleration – The horizontal lift component produces horizontal acceleration, which then results in horizontal velocity. This shift in velocity ultimately changes the UAV′ s position, enabling it to move from Point A toward Point B.

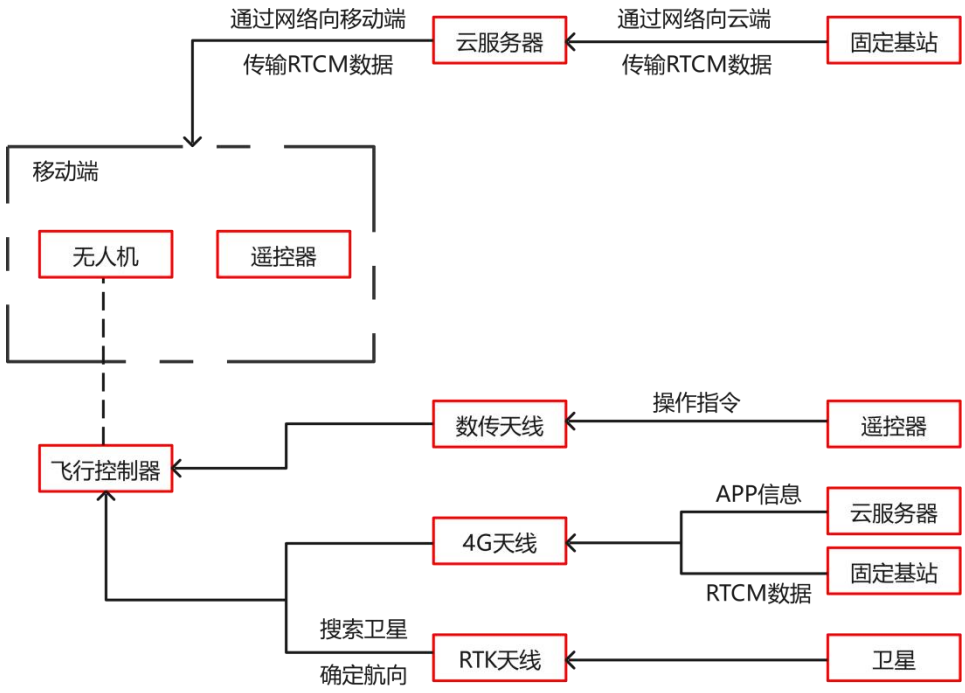
Positioning System

Principle of RTK Operation

The RTK positioning system consists of a farmland mapper (which integrates the ARC3 Pro remote controller with a differential positioning module), a mobile base station, and a fixed base station. This system provides centimeter-level positioning accuracy for farmland surveying and UAV flight. It enables centimeter-level precision in route planning as well as centimeter-level accuracy in flight path execution. The UAV employs a dual-engine RTK module, with two antennas operating simultaneously, thereby ensuring robust safety and reliability during flight.



RTK Positioning System of the P150 Pro Agricultural UAV



Data Flow Analysis of the RTK Positioning System

When the RTK host on the mobile terminal (i.e., the UAV or mapping device) and the RTK host on the base

station (whether mobile or fixed) both maintain sufficient and stable satellite signal reception, and when the received RTCM differential data is stable and valid, the UAV enters a real-time high-precision positioning state. Accordingly, the UAV′ s positioning system operates through two primary data chains: the satellite acquisition chain and the RTCM differential data communication chain.

- Satellite Acquisition Chain (Mobile Terminal):

  On the UAV, satellite acquisition is achieved through the onboard RTK antennas. The two RTK antennas mounted on the left and right sides of the fuselage jointly handle satellite reception and positioning, while also working together to determine the UAV′ s heading. For the handheld mapper, satellite acquisition is conducted directly by its built-in antenna.

- RTCM Differential Data Transmission Chain:

  RTCM correction data is transmitted from the base station to the mobile terminal. The data can be delivered through several methods, but the UAV and mapping device primarily receive it in two ways:

  1. Via 2.4/5.8 GHz dual-band radio transmission, broadcasting data directly to the UAV or handheld mapper (with an effective range of approximately 2 km radius).

  2. By uploading RTCM data through the base station′ s own network to a cloud server, which then forwards the correction data via the network to the UAV or handheld mapper.

Power System

Smart Battery (XAG B141050 Intelligent Ultra-Chargeable Battery)

Function Overview

The B141050 smart battery is the primary power source for UAV flight. It supplies the electricity required for motor operation and also supports the functioning of electronic components such as the flight control system, image transmission system, and RTK antennas, thereby ensuring stable and reliable operation of all onboard systems.

Smart Battery

Main Parameters of the B141050 Smart Battery

Dimensions	192 × 139 × 315 mm
Weight	~7.1 kg
Number of Cells	14
Rated Capacity / Energy	20,000 mAh / 1050 Wh
Rated Output	52.5 V / 140 A
Operating Temperature Range	10 – 45 ℃
Charging Temperature Range	10 – 40 ℃
Storage Temperature Range	10 – 30 ℃

Mist Cooling Box

Function Overview

In agricultural operations, charging efficiency is critical for UAV performance. The water-mist cooling system enables rapid cooling of batteries upon landing, allowing immediate recharging and significantly improving operational efficiency.

Mist Cooling Box

Parameters of the 2025 Mist Cooling Box

Tank Capacity	5 L
Input Voltage	39 – 60 V
Power Consumption	80 W
Water Consumption	500 mL / h

Supercharging Station (GC4000+)

Function Overview

The XAG GC4000+ Supercharging Station consists of several key modules, including the generator frame, fuel tank, engine assembly, engine controller, and charging controller. In field environments where grid electricity is unavailable, the station converts the chemical energy of gasoline into electrical energy, enabling efficient and rapid charging of XAG smart ultra-chargeable batteries.

During operation, the supercharging station automatically identifies the battery model being connected, adjusts the charging current, and achieves automatic power matching. It incorporates multiple layers of protection, including overheating, short-circuit, overcurrent, and overvoltage safeguards. Each unit can deliver a rated charging power of 3400 W per battery.

Additionally, the supercharging station continuously monitors engine oil levels, records total engine runtime, and, via its LCD smart control panel, displays cumulative operating hours and scheduled maintenance intervals. Integrated with the "XAG Farm" App, it also provides users with reminders for engine maintenance.

By combining intelligent monitoring, automated power regulation, and safety protections, the GC4000+ Supercharging Station achieves comprehensive intelligent management of field charging operations, ensuring both reliability and safety in complex agricultural environments.

Main Parameters of the GC4000+ Supercharging Station

Dimensions	482 × 417 × 475 mm
Weight	~31.5 kg
Engine Oil Grade	SL grade or higher, 10W-40
Fuel Type	No. 92 unleaded gasoline
Rated Charging Power	3.4 kW
Maximum Output Power	3.8 kW
Operating Temperature	/

Charger (XAG 13600S Charger)

Function Overview

The 13600S charger features a wide-voltage self-cooling design and multiple protective functions, including undervoltage, overvoltage, overtemperature protection, and fault isolation. As a mid-power charger, it is capable of real-time monitoring of all connected smart batteries throughout the charging process, ensuring safety and stability during operation.

Main Parameters of the 13600S Charger

Dimensions	346 × 109 × 73 mm
Weight	~3.9 kg
Charging Input	AC 100–120 Vac, 50/60 Hz, 15.0 A AC 220–240 Vac, 50/60 Hz, 16.0 A
Maximum Output Power	DC 59.92Vdc, 35A (Max) / 1300 W (100–120 Vac, 50/60 Hz) DC 59.92Vdc, 80A (Max) / 3400 W (220–240 Vac, 50/60 Hz)
Operating Temperature Range	–20 to 40 ℃

Overview of the Payloaad System

The 2025 UAV models are equipped with three major functional capabilities: spraying, seeding, and transport. The P150 Pro has a rated payload of 75 kg, while the P60 Pro supports up to 40 kg. By integrating different payload modules, these UAVs can flexibly meet diverse operational requirements, enabling multi-purpose use with a single platform.

RevoSpray 5 System

Function Overview

The RevoSpray 5 features a highly precise spraying system designed for efficient and uniform application of pesticides and other crop-protection agents. With intelligent control technology, it supports both remote operation and fully automated tasks, enhancing efficiency and accuracy. This provides strong support for agricultural production, particularly in plant protection and pest management.

RevoSpray 5

Basic Performance Parameters

Atomization Range: 60 – 400 μm (droplet size)

Spray Width Range: 5 – 10 m

Flexible Impeller Pump

The working principle of the flexible Impeller Pump is to drive liquid into rapid rotation through the motion of the impeller, thereby transferring mechanical energy to the liquid to achieve fluid delivery. The impeller is mounted inside the pump casing and is driven by the pump motor through the pump shaft. Liquid enters the pump through an inlet pipe, is accelerated and conveyed by the rotating impeller, and is ultimately discharged through the pump outlet.

Flexible Impeller Pump

Parameters of Flexible Impeller Pump

Voltage	50 V
Maximum System Flow Rate	32 L/min
Single Pump Flow Rate	0.5 – 15 L/min
Impeller Pump Flow Range	0.5 – 16.0 L/min

Centrifugal atomizing nozzle

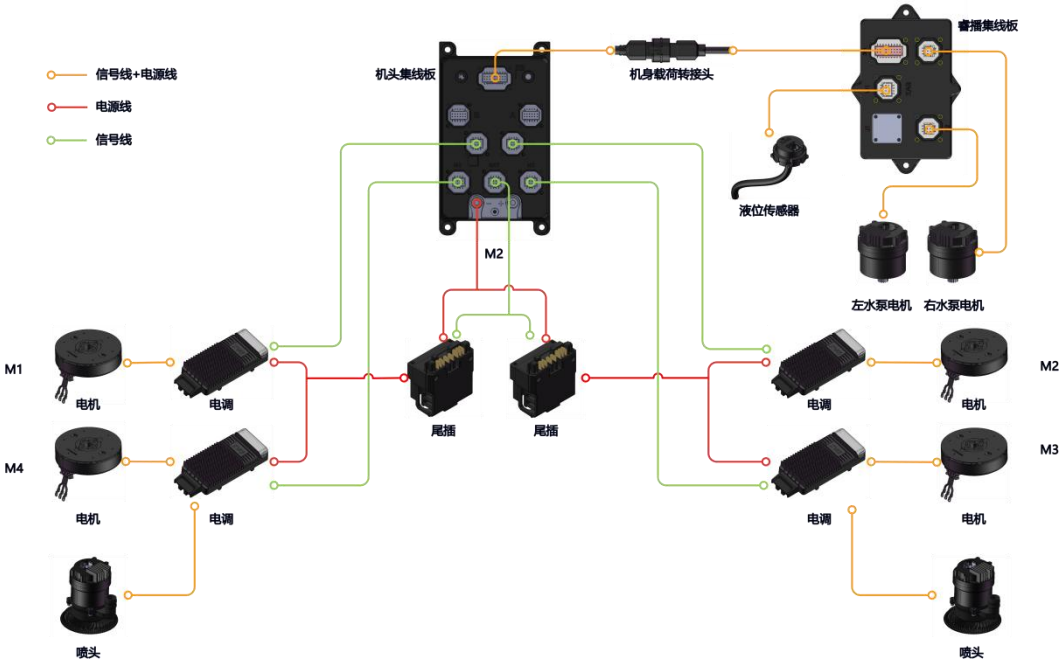
The centrifugal atomizing nozzle is consists of a centrifugal motor and a centrifugal spray disc. The motor generates the centrifugal force required for atomization, delivering strong torque during high-speed rotation. The spray disc then disperses the liquid outward under this force, achieving effective atomization.

Centrifugal atomizing nozzle

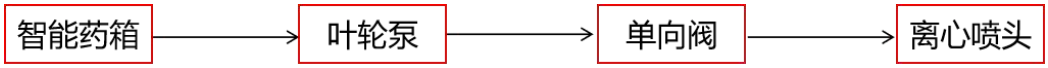
Parameters of Centrifugal atomizing nozzle

Disc Rotational Speed	1,500 – 16,000 rpm
Atomization Droplet Size	60 – 400 μm
Spray Width	5 – 10 m (depending on flight speed, altitude, application rate, and environmental conditions)

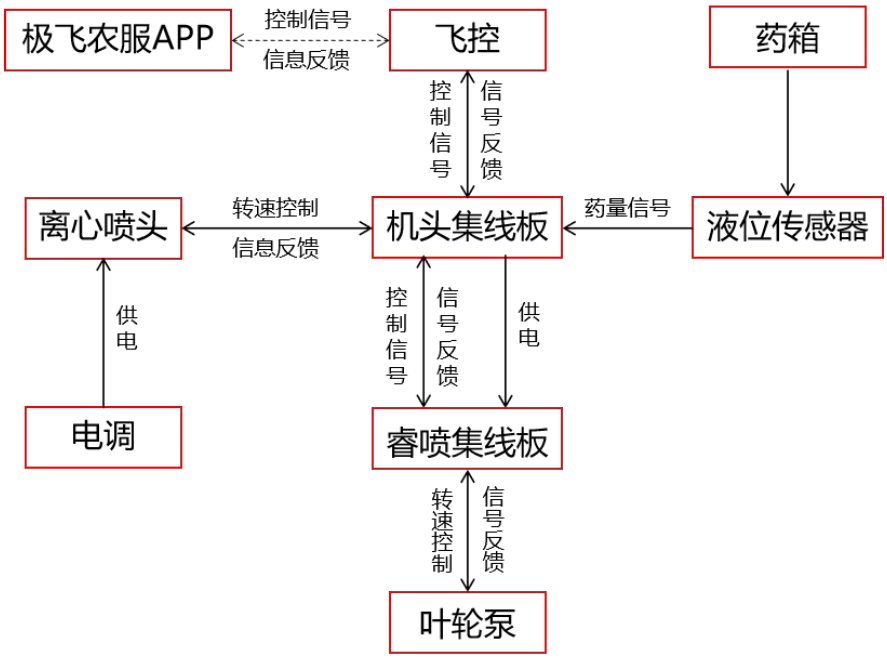
RevoSpray System Data-Flow Analysis (Schematic Interconnection Diagram)



RevoSpray System Link Diagram for P150 Pro / P60 Pro



P150 Pro / P60 Pro Agricultural UAV – RevoSpray System Liquid Transmission Process



Signal Transmission Process of the RevoSpray System

The RevoSpray system operates through two primary chains:

1. Liquid Flow Chain – This chain governs the physical movement of liquid, from entering the tank to being discharged from the nozzles. Under pressure, the liquid in the tank is directed into two Impeller Pumps. From there, it passes through one-way valves before reaching the atomizers, which disperse the liquid into fine spray.
2. Spraying Control Chain – This chain regulates both the application rate and spray coverage, ensuring precise spraying. By dynamically adjusting these parameters, the UAV can deliver accurate and efficient crop protection.

RevoCast 5 System

Function Overview

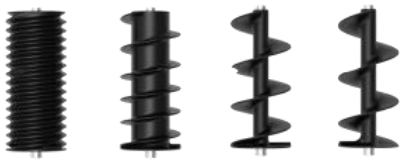
When equipped with the RevoCast system, the UAV can disperse powdered or granular solids. The RevoCast 5 adopts a sweeping vertical spread-disc design, imparting stronger downward acceleration to particles, enhancing wind resistance, and enabling uniform, carpet-like distribution without overlaps or gaps. By pairing with different Screw Feeder models, the system can accommodate a wide range of agricultural tasks, including fertilization, seeding, feeding, and powder spreading.

RevoCast 5

Basic Performance Overview

Variable Screw Feeder (Screw Feeder System)

The Screw Feeder features a helical structure and is available in four sizes: extra-large, large, medium, and small. As the Screw Feeder rotates, solid particles inside are conveyed toward the spread disc. By precisely controlling the Screw Feeder′ s rotational speed, the system accurately regulates the amount of material released during each seeding or spreading operation.



Screw Feeder Type

Screw Feeder Motor

Parameters of Variable Screw Feeder

Model	P150 Pro	P60 Pro
Number of Feeders	1	1
Maximum Rotational Speed	17,000 rpm	10,000 rpm
Maximum Discharge Rate	300 kg/min (compound fertilizer)	190 kg/min (compound fertilizer)
Particle Size Range	1 – 10 mm	1 – 10 mm
Operating Temperature	0 – 40 ℃	0 – 40 ℃
Operating Voltage	50 V	/

P150 Pro / P60 Pro Screw Feeder Feeder Parameters

Material Level Sensor

The material level sensor assists the seeding and spreading system in detecting the particle status inside the granule container.

Material Level Sensor

High-Speed Centrifugal Spread Disc

Spread Disc Motor: controls the centrifugal force generated during disc rotation by adjusting its rotational

speed.

Spread Disc: Features a unique seed-protection design that ensures both efficiency and precision while preventing damage to seeds during dispersal.

Spread Disc Motor

Spread Disc

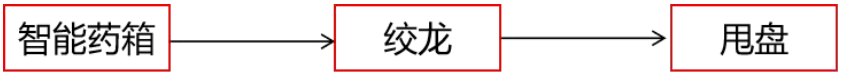
Parameters of Centrifugal Spinning Disc

Maximum Rotational Speed	15 Hz
Spreading Width	5 – 9 m
Operating Voltage	50 V
Frequency Range	Swing amplitude ±35°, swing frequency 15 Hz

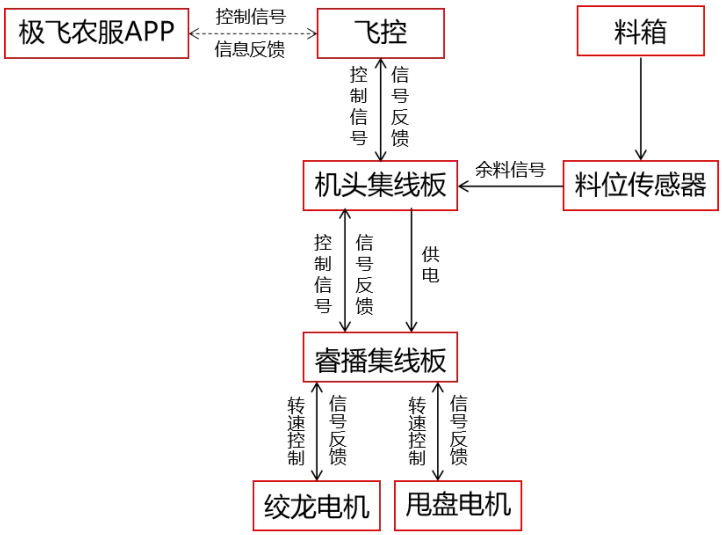
P150 Pro / P60 Pro Centrifugal Spread Disc Parameters

RevoCast 5 System Data-Flow Analysis

RevoCast System Link Diagram for P150 Pro / P60 Pro



P150 Pro / P60 Pro Agricultural UAV – RevoCast System Material Transmission Process



Signal Transmission Process of the RevoCast System

The RevoCast system achieves its functions primarily through two components:

1. Screw Feeding Device – Responsible for precisely controlling the output of solid particles.

2. High-Speed Spread Disc – By rotating at high speed, the disc generates centrifugal force to disperse the material, ensuring uniform distribution within the spreading range.

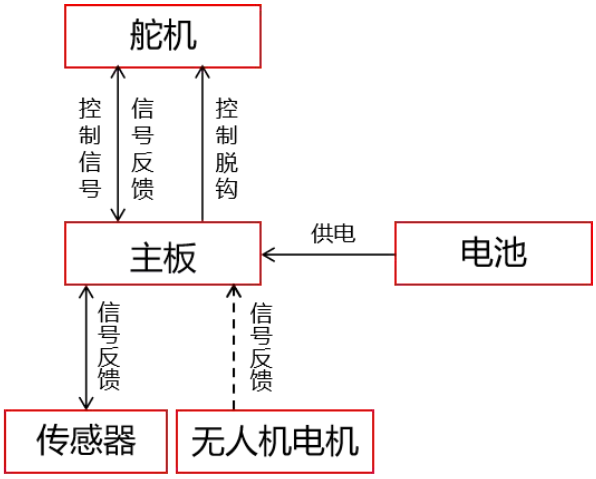
RevoSling 2 System Overview

Function Overview

The RevoSling 2, equipped with XAG′ s aerial transport system, enables rapid loading and unloading with efficient transport, helping users overcome terrain and distance limitations. It reduces manual labor and lowers transportation costs. The system is applicable in various agricultural scenarios, including the transfer of farming supplies, seedling trays, and saplings.

RevoSling 2

RevoSling 2 System Data-Flow Analysis



Signal Transmission Process of the RevoSling 2 System

The hoisting system communicates wirelessly with the UAV, while the RevoSling hook is powered independently by a built-in battery. When the system detects significant changes in sensor attitude along with a reduction in UAV motor power, the mainboard activates the servo mechanism to release the payload.

Chapter II: Introduction and Usage of General Diagnostic Tools and Fixtures

General diagnostic tools and fixtures are primarily used for locating faults or damage, determining their causes, and conducting post-repair testing. These diagnostic tools possess a certain degree of universality and should be employed during routine maintenance to identify the type and location of faults in equipment. The diagnosis should be carried out using these fixtures in combination with the observed operational symptoms.

Conditions for Using Diagnostic Tools and Fixtures

XAG Repair App – Indoor Diagnostics

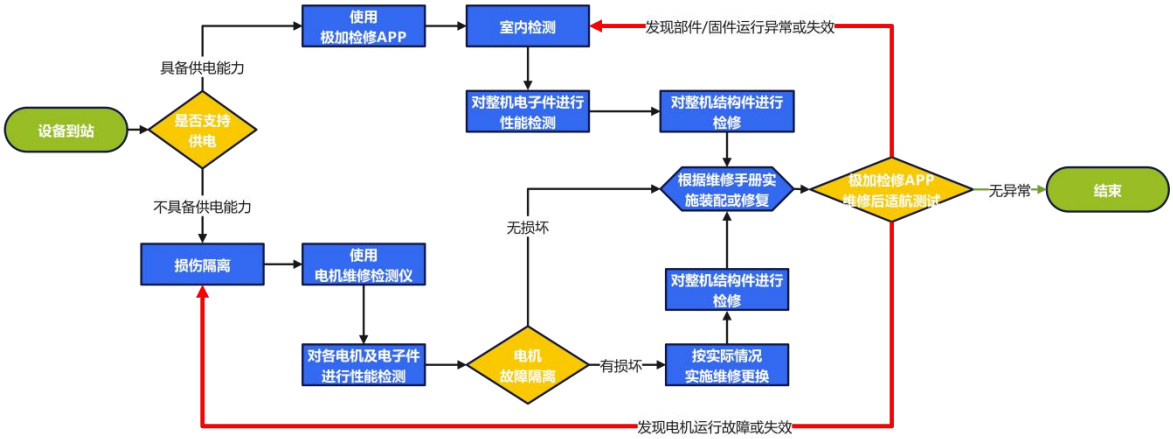
If the UAV has not suffered a crash but shows abnormal behavior, the XAG Repair App can be used for indoor diagnostics. Indoor diagnostics provide access to information about the device′ s operational status, firmware conditions, and other key parameters. Based on this data, it can be determined whether the equipment has a fault.

XAG Repair App – Outdoor Diagnostics

After completing repairs, or when there is no operational risk, the outdoor diagnostics function can be used. Outdoor diagnostics must meet flight safety conditions. During testing, the UAV will autonomously perform actions such as takeoff, landing, hovering, rotation, and spraying. Operational parameters are monitored throughout the process. After completion, a test report is generated. If the test passes, the UAV meets flight requirements; if not, further inspection and repairs are required.

Motor Maintenance Tester

When the UAV has suffered a crash or cannot be fully powered on, the motor maintenance tester can be used to independently test the performance of key motors. The tester allows for direct testing of spray motors, pump motors, Spread Disc Motors, and Screw Feeder motors. Propulsion motors can also be tested by connecting through the hub board and ESCs. Test results are communicated via indicator light signals, which engineers can interpret to assess equipment condition.

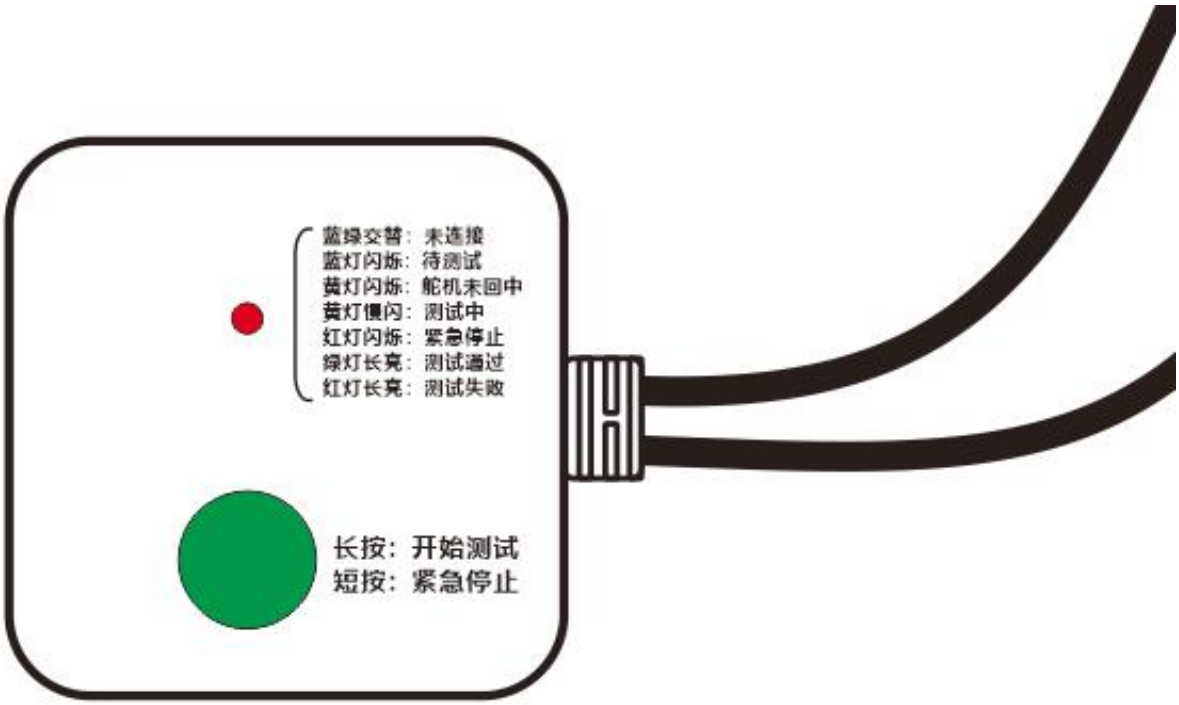


Motor Maintenance Tester
Function Overview

The motor maintenance tester is a device designed for diagnosing the operational status of motors used in agricultural UAVs. By connecting directly to the motor under inspection (for propulsion motors, connection through the ESC and hub board is required), the tester drives the motor, allowing engineers to assess its condition.

Main Accessories of the Motor Maintenance Tester:

- Power adapter
- Tester main unit
- Adapter cables for the tester



Motor Maintenance Tester – Usage Instructions

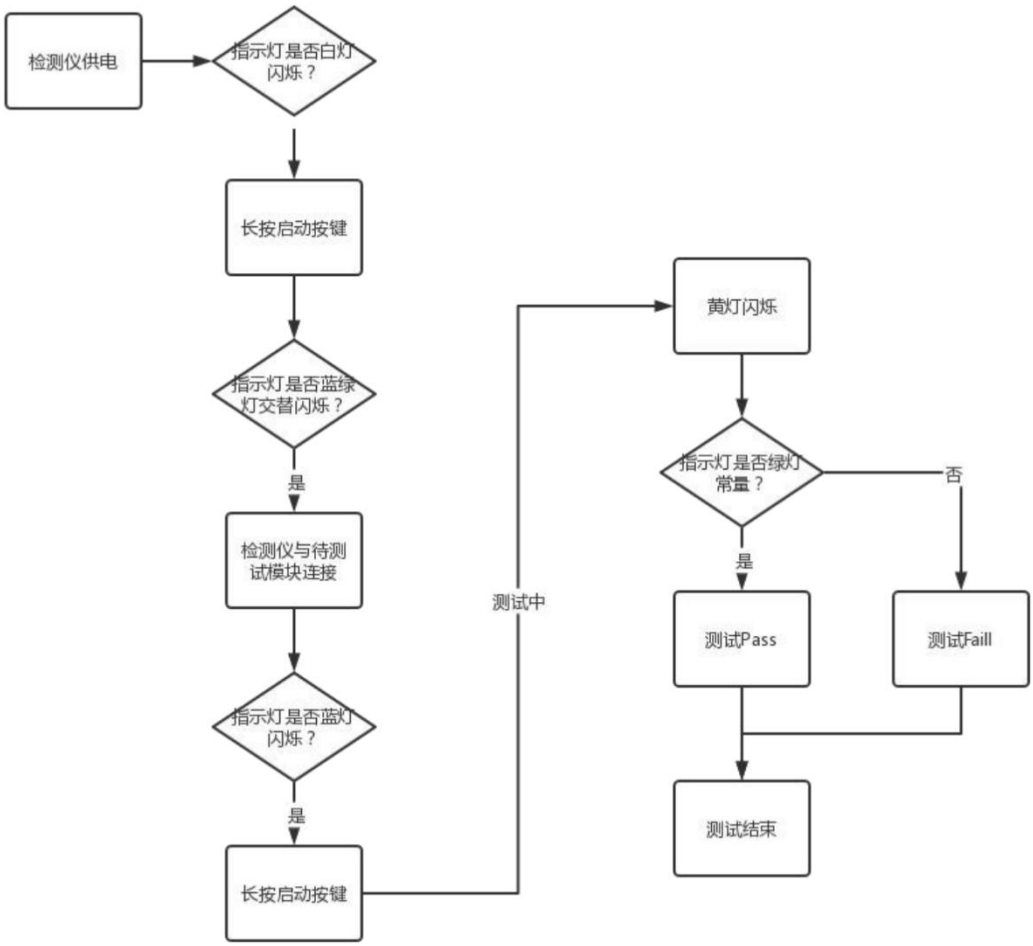
Button Functions

- Long Press – Start testing
- Short Press – Emergency stop

Indicator Light Guide

Light Signal	Status Description	Notes
White light flashing	Not reset	Indicates the tester has not been reset; long press to switch to blue-green flashing state
Blue and green lights alternately	Module not connected	
Blue light flashing	Ready for testing	Module is awaiting test; long press to begin
Yellow light fast flashing	Device not centered	Indicates the device is not centered; after manual centering, it switches to slow flashing
Yellow light slow flashing	Testing in progress	
Green light steady	Test passed	
Red light steady	Test failed	
Red light flashing	Emergency stop	Triggered when short press is used during testing; test stops immediately

Operating Instructions



1. Power on the tester. Once powered, the indicator light will flash white. Long press the button on the tester to reset it. When the blue and green lights begin flashing alternately, the tester has entered the module connection standby state.

2. Connect the module to be tested with the tester. After a successful connection, the indicator light will change to blue flashing.

3. After ensuring all safety conditions are met, long press the button on the tester. When the yellow light flashes, the test is in progress.

4. During the test, the motor will rotate, and the tester will automatically collect relevant parameters. Once the test is complete, the result is displayed through the indicator lights.

5. A steady green light indicates the test has passed, while a steady red light indicates the test has failed.

XAG Repair App

Function Overview

The XAG Repair App is an automated diagnostic tool developed for XAG′ s intelligent agricultural equipment. Once a repair order has been submitted, the app enables both indoor standalone testing and outdoor flight testing of agricultural UAVs, without requiring disassembly.

Technical Parameters

Operating System: Android (including Android-based systems such as HarmonyOS, MIUI, etc.; not available for iOS)

Usage Instructions

Interface Overview

设备检修界面

设备详情：点击头像，查看设备当前状态
室内一键检修：点击进入室内测试界面
室外测试：点击进入室外测试界面
更换飞控：点击进入飞控配置

电调配置：点击进入电调配置
固件升级：点击查看固件版本及固件升级
产品信息修改：可进行产品信息修改
归还使用权限：将无人机权限归还给使用者

Full-System Testing Overview

Full-system testing applies to UAVs capable of normal startup and is divided into indoor and outdoor testing. Before use, the equipment must have a properly submitted repair order. Authorization is granted only after the order is submitted and assigned to an engineer. The one-click indoor testing feature of the XAG Repair App is used when the UAV is intact and powers on normally. Outdoor testing, on the other hand, is performed after repairs are completed and the UAV has successfully passed indoor diagnostics.

Full-System Testing – Indoor Testing

Power on the UAV, open the XAG Repair App, select the corresponding UAV work order, and tap Full-System Test to obtain testing authorization for the device.

After selecting "Indoor One-Click Test", choose individual items to test or select all to conduct a comprehensive system check.

After selecting the required test items, tap "Start One-Click Test." Ensure that the UAV's propellers have been removed and that the spraying tank is empty. Once confirmed, swipe the icon to the right to initiate the diagnostic process.

Full-System Testing – Outdoor Testing

Enter the testing interface, select "Outdoor Test," and the UAV can then perform hovering and flight diagnostics.

Note

When conducting outdoor tests with the RevoSpray, the liquid tank should be filled with 10–20 liters of clean water for testing.

During outdoor hovering tests, ensure that the airspace is clear, and maintain a minimum distance of 7 meters from obstacles such as trees, buildings, and utility poles.

After outdoor testing, the system generates a diagnostic report. If the report indicates "Test Passed," it

confirms that the UAV meets post-repair flight standards. If the test fails, troubleshooting must be carried out according to the abnormal items listed in the report.

Chapter III: Damage Limitation and Fault Isolation

Overview

Damage limitation and fault isolation are critical technical measures for identifying and eliminating equipment faults. They provide the essential technical data and replacement standards needed for fault recognition and analysis, thereby assisting maintenance engineers in troubleshooting. These procedures apply to routine maintenance inspections, testing, and daily equipment repairs. The purpose of this damage and fault repair manual is to identify fault points effectively and take the necessary corrective measures to quickly restore the equipment to normal operating condition. Damage limitation and fault isolation standards are continuously updated and refined as the equipment evolves.

This chapter covers:

- Guidelines and standards for damage inspection and testing
- Requirements for visual and basic operational damage inspection
- Equipment replacement criteria
- Terminology explanations
- Standards for visual and structural component damage inspections
- Standards for replacement of visual and structural components
- Guidelines for damage inspection, testing, and evaluation.

Guidelines and Standards for Damage Inspection and Testing

Ensure adequate indoor lighting during inspections. The UAV should be placed in a designated maintenance area and on a repair platform. Small disassembled parts must be stored in containers such as storage boxes. Electrical components should be kept away from water sources and not placed haphazardly. Sharp or fragile parts should be wrapped or protected with foam after disassembly before storage.

Structural Component Damage Inspection Requirements

Structural damage inspections should primarily rely on visual checks and manual verification. Visible damage should be identified by eye, while shaking or pulling can confirm whether a component is loose or fasteners have failed. For certain critical components, specialized tools such as angle gauges, leveling instruments, or dial indicators should be used to determine the extent of damage. In addition, comparative analysis can be performed by examining intact parts against those under inspection to verify deformation or structural compromise.

Electrical Equipment Damage Inspection Requirements

Inspections or operational tests of electrical equipment should be conducted using appropriate automated diagnostic tools (e.g., the Motor Maintenance Tester, XAG Repair App, or power system software) for fault location and assessment. Depending on the tool, follow the standard testing procedures for implementation. After obtaining results, combine them with observed operational phenomena to make a comprehensive judgment before proceeding with repairs or component replacement. The applicability and usage of diagnostic tools are detailed in Chapter 2: Introduction and Usage of General Diagnostic Tools and Fixtures, while fault troubleshooting can be referenced in Chapter 5: General (Common) Fault Troubleshooting.

Terminology of Damage Phenomena

- **Crack**

A fissure that forms in a material under stress, environmental influence, or both. Cracks are one of the key indicators of material performance. Their initiation and propagation significantly reduce the material′ s mechanical properties.

- **Ductile Crack / Fracture**

Also known as ductile rupture, this type of fracture is accompanied by pronounced plastic deformation, resulting in a fibrous fracture surface (perpendicular or inclined to the tensile stress) with fine dimples and uneven texture. Before ductile fracture occurs, extensive plastic deformation (necking) develops. This mode describes the ultimate failure of a ductile material under tensile load. Instead of breaking cleanly, the material ″pulls apart,″ typically leaving a rough surface. In such cases, there is slow crack growth and substantial energy absorption prior to rupture.

- **Penetrating Crack / Fracture**

A crack that extends through the entire thickness of a component. Cracks that penetrate more than half the thickness are often classified as penetrating cracks. They are treated as ideal sharp-tip cracks, where the tip radius approaches zero. Penetrating cracks may appear straight, curved, or irregular in shape.

- **Scratch**

Scratches are typically caused by sharp objects scraping or cutting across the surface of a component. While scratches generally do not produce penetrating damage, they can expose the material to environmental contact, leading to oxidation or corrosion, which may eventually result in cracking.

- **Perforation**

A condition in which an object is pierced or punctured by drilling, chiseling, or sharp impact. Irregular perforations can induce crack formation. Perforations compromise the original mechanical properties of the material and may lead to deformation.

- **Stress Whitening**

A phenomenon where polymers (such as plastics or rubber) exhibit whitening when subjected to external force due to deformation. This is caused by the formation of voids, microcracks, or delamination within the material. Stress whitening indicates a loss of original mechanical performance and may eventually lead to fracture.

- **Ablation**

Ablation occurs as a result of prolonged wear or the generation of electrical arcs, which cause contamination and localized high temperatures on contact surfaces. Its physical manifestation includes blackening of the contact surface, increased deposition of foreign matter, and a rise in resistance.

Structural Component Damage Limitations and Symptoms

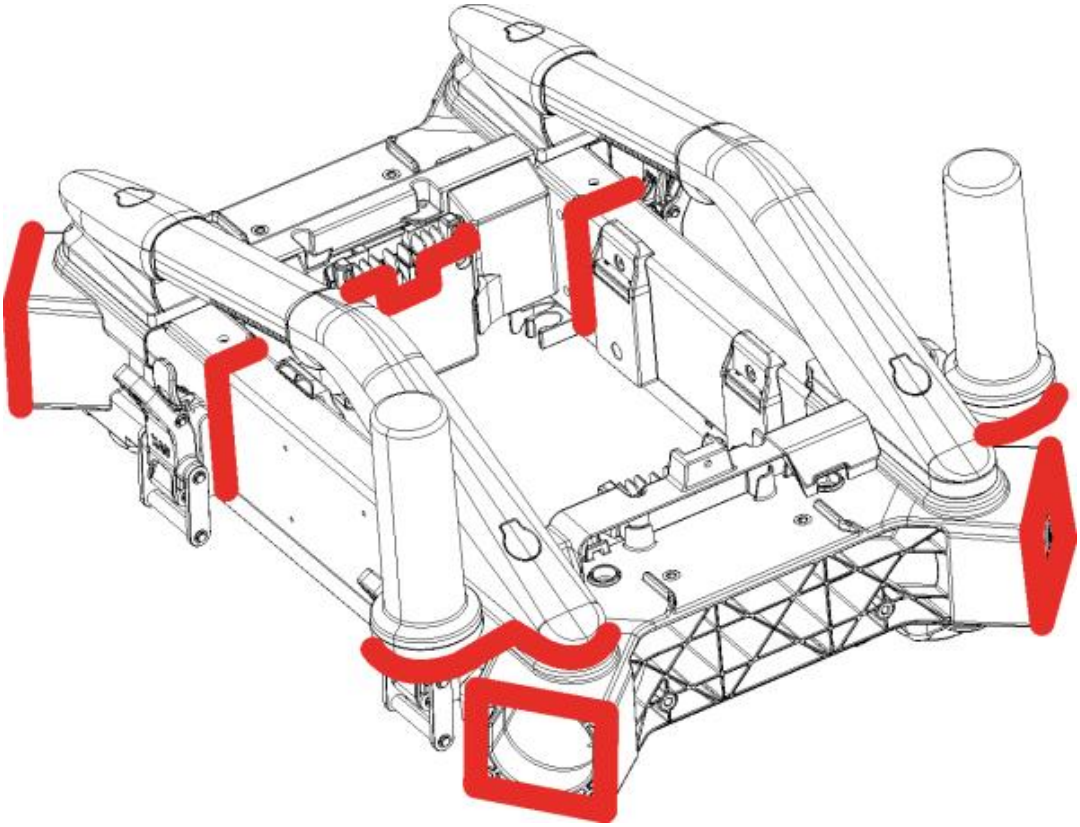
Airframe Damage Limitations

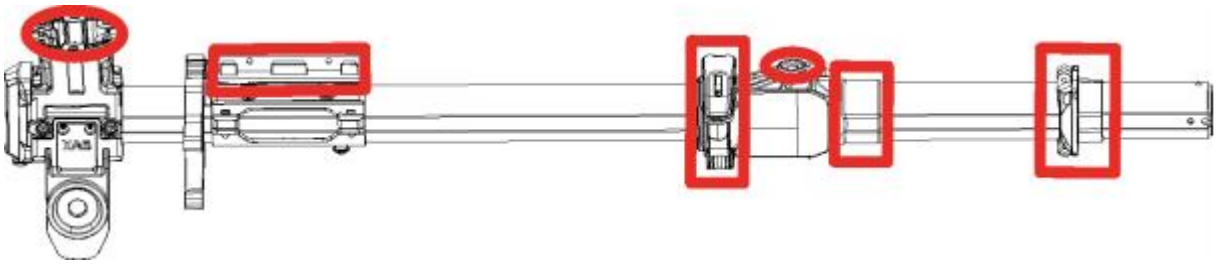
Note: If any of the abnormalities listed below are detected, the component must be replaced immediately. If other abnormalities not mentioned in this document are discovered and present potential risks, contact technical support promptly for verification and assessment.

Inspection Areas and Methods	
Area	**Inspection Method**
Arm joints	Visual / manual inspection
Beam-to-crossbeam joints	
Omnidirectional antenna mount	
Motor mount	
ESC mount	
Clamp fastener connections	
Arm rubber mounts	
Arm half-flange joints	
Power socket	

Key Damage Limitation Information

- Cracks longer than 10 mm, or deformation greater than 15 mm; arm angle deviation exceeding 5° (tolerance ±0.5°)
- Bolt holes with stripped threads, corrosion, or damage
- Tail connector contacts with corrosion (over 30% on a single contact; more than 2 contacts affected across the connector) or deformation
- Overall abnormal looseness of the tail connector





Airframe Damage Symptoms

- Looseness in the airframe structure - Leads to imbalance, excessive vibration, potential crashes, and worsening structural damage.
- Stress whitening at fuselage joints - Causes excessive vibration and possible structural disintegration, resulting in crashes and further damage.
- Loosening or cracking of the omnidirectional antenna mount - Reduces positioning accuracy
- , causing flight path deviation and potential collision accidents.
- Corrosion or deformation of the power tail connector - Results in abnormal connector temperature, increased current, and shortened flight duration.
- Looseness of half-flange joints or deformation of arms - Leads to imbalance, excessive vibration, potential crashes, and aggravated damage.

Propulsion System Damage Limitations and Symptoms

Propulsion System Damage Limitations

Note: If any of the abnormalities listed below are detected, the component must be replaced immediately. If other abnormalities not mentioned in this document are discovered and present potential risks, contact technical support promptly for verification and assessment.

Inspection Areas and Methods	
Component	**Inspection Method**
Propulsion motor	Visual / manual inspection / tool testing
Electronic speed controller (ESC)	

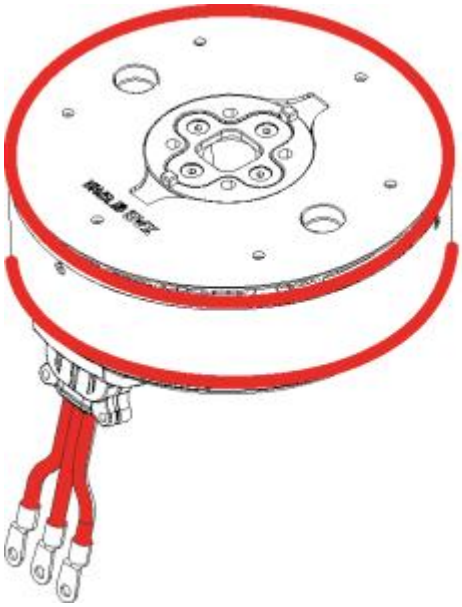
Using the XAG Repair App, conduct indoor testing of the propulsion motor and ESC. The inspection includes:

- No abnormal error reports for motor speed
- No abnormal jamming or stalling during motor operation
- Stable current, voltage, and operation without errors

Inspection Areas and Methods	
Component	**Inspection Method**
Motor rotor	Visual / manual inspection
Motor stator	
Motor Three-Phase Wires	
ESC casing	
Propeller and propeller hub	

Key Damage Limitation Information

- Rotor deformation greater than 0.15 mm; clearance less than 2 mm
- Stator windings burned or blackened by more than 20%, or fractured
- Stator bearings showing corrosion
- Insulation damage to Three-Phase Wires (damage area > 5 mm^2 on a single wire)
- ESC casing cooling fins broken (perforated or with penetrating cracks) or casing joints loose
- Propeller cracks (> 5 mm) or deformation exceeding 10 mm



Propulsion System Damage Symptoms

- Stator winding damage in the propulsion motor - Causes motor phase loss or stalling; intermittent phase loss may lead to abnormal motor response, resulting in crashes and further damage.
- Deformation of the external rotor - Leads to excessive vibration, structural disintegration, crashes, and aggravated damage.
- ESC casing damage - Allows moisture intrusion, which may burn out the ESC or reduce its operational lifespan, potentially causing crashes and expanded damage.
- Corrosion or deformation of power tail connector - Results in abnormal connector temperature, increased current, and shortened flight time.
- Propeller or hub deformation/breakage - Causes excessive vibration or propeller detachment during flight, leading to crashes and further structural damage.

Sensor System Damage Limitations and Symptoms

Sensor System Damage Limitations

Note: If any of the abnormalities listed below are detected, the component must be replaced immediately. If other abnormalities not mentioned in this document are discovered but present potential risks, contact technical support promptly for verification and assessment.

Inspection Areas and Methods	
Component	**Inspection Method**
Radar module	Visual / manual inspection / tool testing
FPV module	

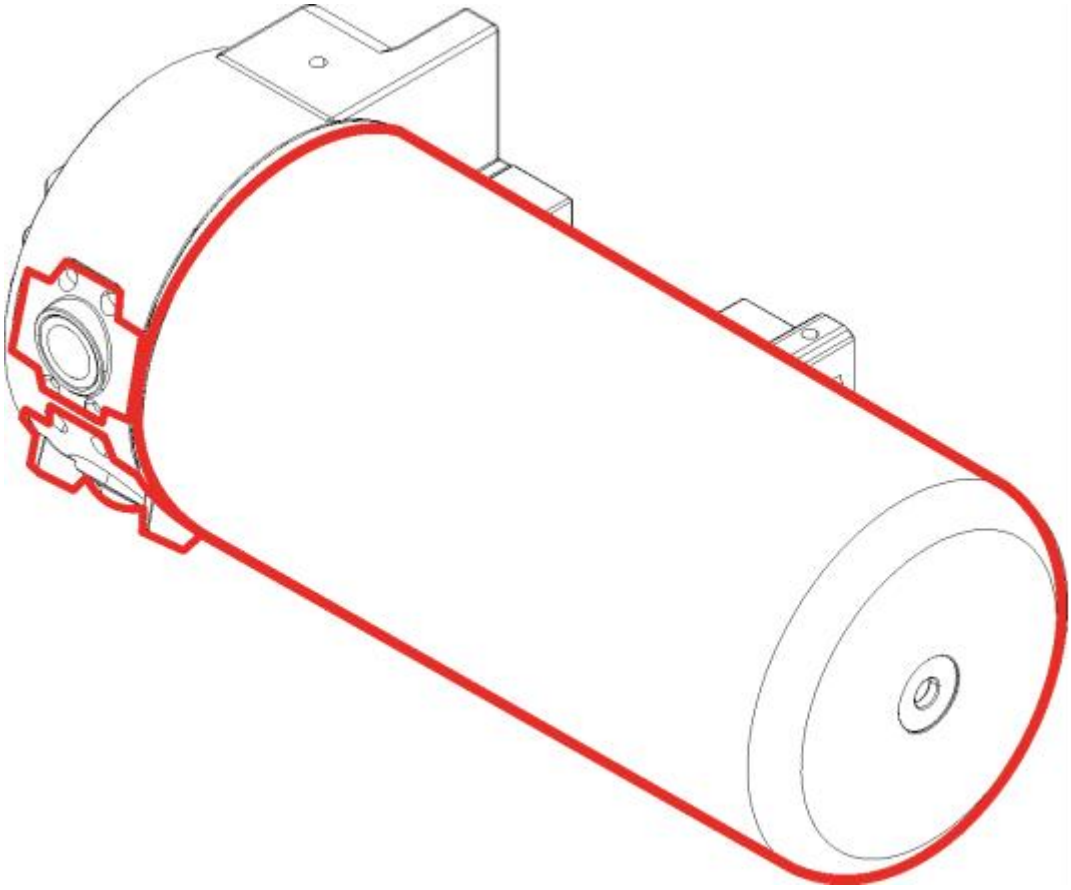
Using the XAG Repair App, conduct an outdoor test of the sensor system as a whole. The inspection includes:

- Radar detection range and operating conditions normal, with no errors or warnings
- Camera imaging and image transmission functioning normally, with no errors or warnings
- LED module operating normally, with no errors or warnings

Inspection Areas and Methods	
Component	**Component**
Radar housing	Visual/manual inspection
Radar module and camera module	
LED lamp lens	
Camera lens	

Key Damage Limitation Information

- No open cracks or perforations
- No structural deformation or abnormal internal noise
- Lenses free of damage or perforation
- Module assembly joints tight and secure, with no looseness
- No corrosion or damage at screw holes in any part



Sensor System Damage Symptoms

- Radar housing perforation or cracking - Allows moisture intrusion, leading to radar failure or inaccurate detection, which may cause flight path collisions and crashes.
- Structural deformation of the sensor system - Results in inaccurate detection or structural failure, potentially causing flight path collisions and crashes.
- LED lamp lens breakage or perforation - Moisture intrusion may damage the LED module, cause short circuits, and lead to further system failures.
- Camera module lens breakage or perforation - Moisture intrusion may damage the camera module, cause short circuits, and result in expanded damage.

Chapter IV: Introduction and Standards for Disassembly and Assembly Procedures

Overview

This chapter focuses on the disassembly and reassembly of key components of the 2025 P150 Pro and P60 Pro Agricultural UAVs, along with their associated task systems. For procedures or technical instructions not covered in this document, please refer to the XAG P150/60 Agricultural UAV Disassembly and Assembly Guide.

Within this chapter, the disassembly of critical UAV components is presented through illustrated step-by-step instructions with corresponding numbering, accompanied by detailed maintenance guidelines. In most cases, the assembly process is the reverse of disassembly; however, for certain structures, the order of installation differs from that of removal. These exceptions should be reviewed carefully.

Before removing any structural or electronic parts, ensure that all power cables, communication lines, and pipelines have been disconnected, and verify that no power source is supplying electricity to the unit.

Disassembly and Assembly Procedure Instructions

Assumed Conditions for Procedures

- Screws and components are free of dirt and can be removed smoothly.
- The structure has no severe deformation or damage.
- The fit between components remains normal.

Special Cases Handling

After a period of use, the equipment surface may accumulate dirt or chemical corrosion, making fasteners or certain parts difficult to remove. Therefore, the affected area must be cleaned before disassembly. If fasteners cannot be removed, apply a screw loosening agent to soak the part before attempting removal again.

Abnormal Situations Handling in Disassembly

If anomalies arise during disassembly or assembly, analyze and troubleshoot the affected area, using appropriate tools to assist. If dirt is adhered, moisten and clean with water before removal. For rusted screws, soak with a loosening agent before disassembly. When removing rusted screws, prioritize manual tools to avoid the excessive instantaneous torque of power tools, which could damage the screw head.

Guidelines for Assembly and Installation

Before reassembly, verify that replacement parts are undamaged. Assembly work should be performed in well-lit conditions. When fastening with screws, always use screws of the correct specification. Refer to the UAV′ s Disassembly Quality Control Points for torque requirements and tighten screws accordingly. After installation, use a torque wrench to verify compliance with specifications. Once confirmed, mark the fastened screws with a red or white marker to indicate anti-loosening status.

Engineer Maintenance Standards and Responsibility Definition

Maintenance engineers hold both repair and management responsibilities for the equipment assigned to them. If a transfer of equipment under repair is required, engineers must prepare detailed documentation, including records of equipment abnormalities, repair progress, and important notes. The outgoing and incoming engineers must verify these details together during handover.

Repair Responsibilities

- Ensure the timeliness of maintenance and servicing.
- Ensure the compliance and appropriateness of maintenance and servicing.
- Ensure the integrity of the equipment after maintenance and servicing.

Management Responsibilities

- Ensure proper storage of equipment.
- Ensure the integrity of equipment.
- Ensure the completeness of information provided during handover.

Safety and Protection Standards

It is strictly prohibited to perform repair work in slippers. During routine maintenance, if the UAV or equipment is heavily contaminated, protective gloves must be worn when cleaning.

Construction Standards

Disassembly Environment and Storage Requirements

Ensure sufficient indoor lighting. During maintenance, the UAV should be placed in a designated maintenance area and on a repair table. Small disassembled parts should be stored in containers such as storage boxes. Electrical equipment should be kept away from water sources and not placed haphazardly. Sharp or fragile parts should be wrapped or protected with foam after disassembly before being stored.

General Common Tools List

Tool Name	Tool Type	Application Scope
Hex screwdriver	Fastener tool	For disassembly and installation of fasteners on equipment
Electric screwdriver		
Flathead / Phillips screwdriver		
Fixed wrench / Ratchet wrench		
Socket wrench		
Needle-nose pliers / Pliers		
Torque wrench	Inspection and calibration tool	For checking equipment appearance, circuits, and fastening control points
Multimeter		
Flashlight		
Electrical tape	Protective fastening and wrapping tool	For wrapping, protection, and securing cables
Acetate tape		
Cable ties		
Electric soldering iron & solder	Soldering tool	For soldering propulsion motors and various equipment cables

XAG 2025 P-Series Agricultural UAV General Disassembly Procedures

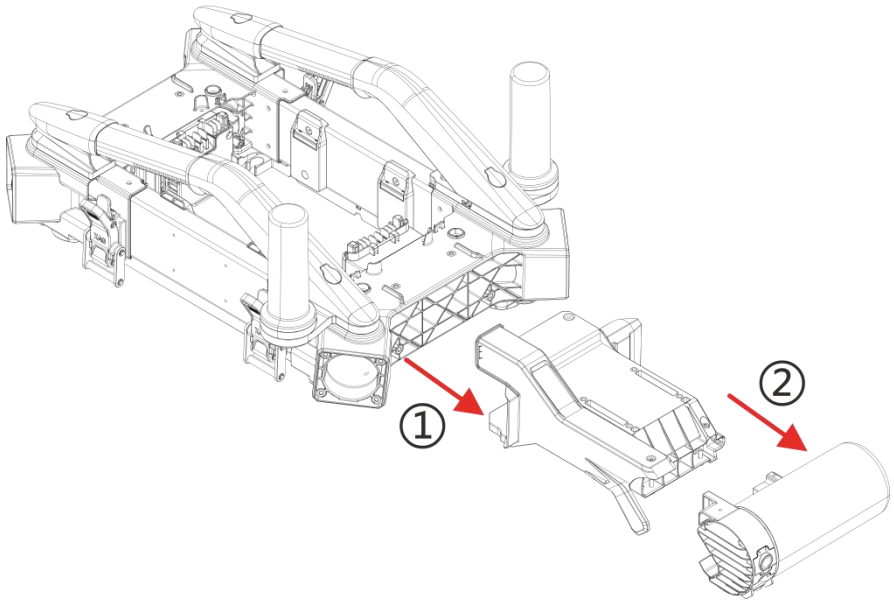
General Disassembly – Flight Platform (P150 Pro / P60 Pro)

Hood and Sensor System Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M5 × 20	02-004-00940	39–41 kgf·cm
2	M4 × 14 × 8	02-004-00835	21–22 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

None

Disassembly Sequence

1. First, remove the four M5 × 20 screws connecting the hood frame to the airframe crossbeam (note: disconnect the two-sensor system plugs from the hub board beforehand).
2. Next, remove the four M4 × 14 × 8 screws securing the sensor system to the hood.

Assembly Sequence

1. Arrange the sensor system cables neatly and secure them in the hood′ s cable slot, then install and tighten the four M4 × 14 × 8 screws.
2. Position the hood onto the crossbeam and fasten it with the four M5 × 20 screws.
3. Finally, reconnect the sensor system plugs to the hub board.

Disassembly and Assembly Notes

- When removing or installing the hood, disconnect the two sensor system plugs from the hub board beforehand.
- Screws for the flight control system and its cables must be tightened using the diagonal tightening

method.

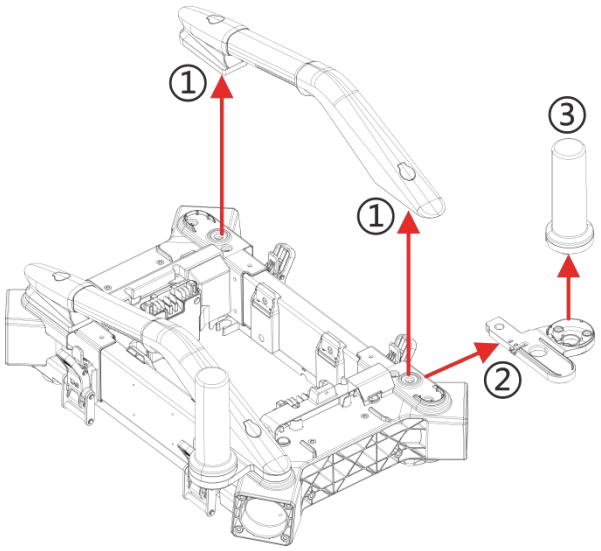
- When routing the harness from the top of the hood down to the hub box, use cable ties to bundle and secure the wires.

Handle and Antenna Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M5 × 20	02-004-00940	29–31 kgf·cm
2	M5 × 14	02-004-01266	29–31 kgf·cm
3	null	null	null

Disassembly diagram



Front Disassembly Procedure

None

Disassembly Sequence

1. Remove the rubber plugs from the handle, then unscrew the two M5 × 20 screws securing the handle to the airframe, and remove the handle.
2. Remove the one M5 × 14 screw securing the antenna mount to the airframe.
3. Unscrew the three null screws fastening the antenna to the antenna mount, then remove the antenna.

Assembly Sequence

1. Mount the antenna onto the antenna bracket and secure it with three null screws.
2. Fix the antenna bracket to the airframe using one M5 × 14 screw.
3. Secure the handle to the fuselage with two M5 × 20 screws, then insert the rubber plugs into the positioning holes.
4. After completing installation, connect the handle and antenna cables to the flight control system.

Disassembly and Assembly Notes

- Before removing the handle and antenna, ensure their connecting cables have been disconnected from the flight control system.
- When disassembling the handle, take care not to damage the rubber plugs attached to the parts.
- After reassembly, ensure the rubber plugs are properly sealed and installed over the fastening screws.

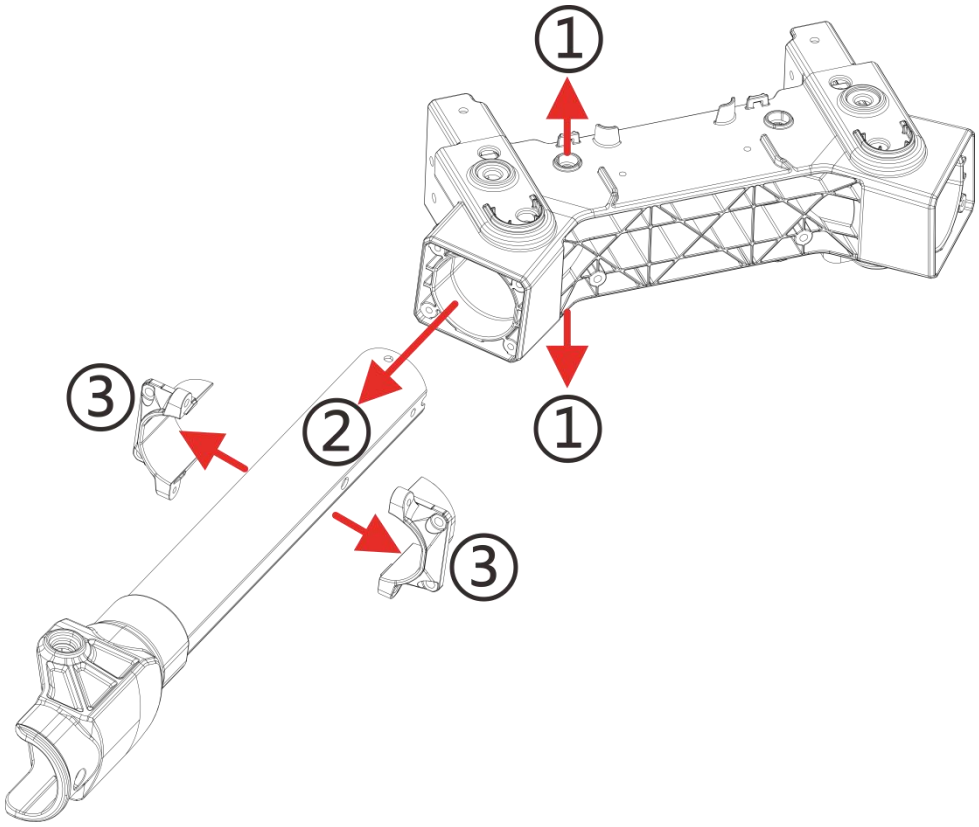
- When installing the omnidirectional antenna, make sure to align its orientation correctly.

Airframe Arm-to-Crossbeam Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M5 × 20	02-004-00940	19–20 kgf·cm
2	M5 × 20	02-004-00940	8–10 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

None

Disassembly Sequence

1. First, remove the two null screws on the upper and lower sides of the airframe crossbeam.
2. Remove the four M5 × 20 screws at the front where the arm connects to the airframe. Then pull the arm outward to detach it.
3. Pull the arm outward to separate it completely (ensure the motor cables and positive/negative connectors inside the arm are disconnected before removal).
4. Finally, remove the two M5 × 20 screws on the upper and lower sides of the arm′ s half-flange, then separate the half-flange.

Assembly Sequence

1. Install the arm by first fixing the half-flange to the front end of the arm and tightening it with two M5 × 20 screws, then insert the arm into the mounting hole.

2. Next, tighten the four M5 × 20 screws diagonally in sequence.

3. During installation, ensure that cables and pipelines passing through the arm and airframe are not scratched or damaged. Before final assembly, arrange the cables neatly.

Disassembly and Assembly Notes

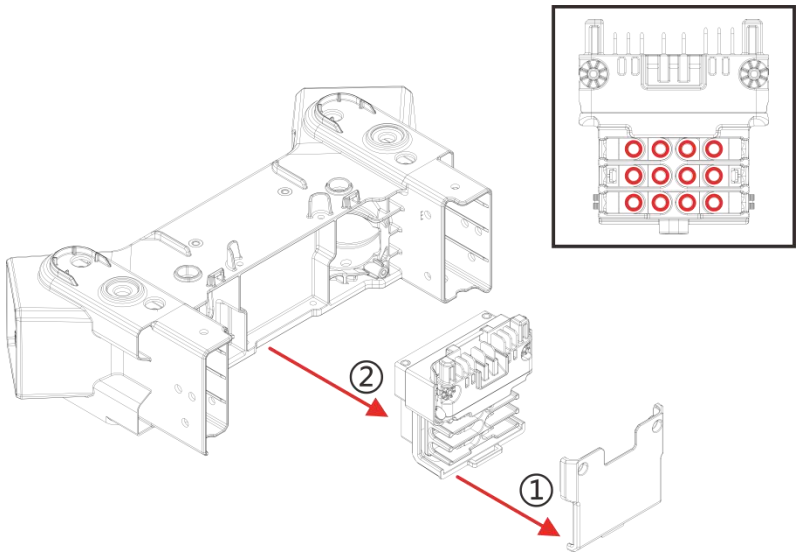
- Before disassembly, ensure the motor cable connectors, hub board connectors, and positive/negative connectors are fully disconnected.
- If separation is difficult during disassembly, clean the parts to remove dirt or corrosion; do not strike with hard objects.
- During assembly, strictly follow the diagonal fastening principle.
- After installation, check the assembly angle to ensure the arm is free of twisting, deformation, and is properly fastened

Power Socket Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M3 × 8	02-004-00937	4–4.5 kgf·cm
2			

Disassembly Diagram



Front Disassembly Procedure

None

Disassembly Sequence

1. First, remove the four null screws securing the battery tail socket rear housing to the crossbeam (note: disconnect the battery tail socket plug from the hub board beforehand).
2. Next, remove the two M3 × 8 screws from the upper part of the battery tail socket front housing.
3. Finally, disconnect the positive and negative motor connectors at the battery tail socket in sequence (be sure to note the correct positions of the positive and negative motor connectors).

Assembly Sequence

1. First, reconnect and secure the internal plugs of the battery tail socket to the rear housing.
2. Next, connect the front housing to the rear housing of the battery tail socket and fasten them with two M3 × 8 screws.
3. Then, mount the rear housing of the battery tail socket onto the crossbeam and secure it with four null screws.
4. Finally, reconnect the battery tail socket plug to the hub board socket.

Disassembly and Assembly Notes

- During disassembly and assembly, take care to protect the tail socket contact tabs to avoid damage.
- During installation, ensure that the power positive/negative bus board corresponds correctly with the ESC power supply wires; reversed polarity may cause severe equipment damage
- .

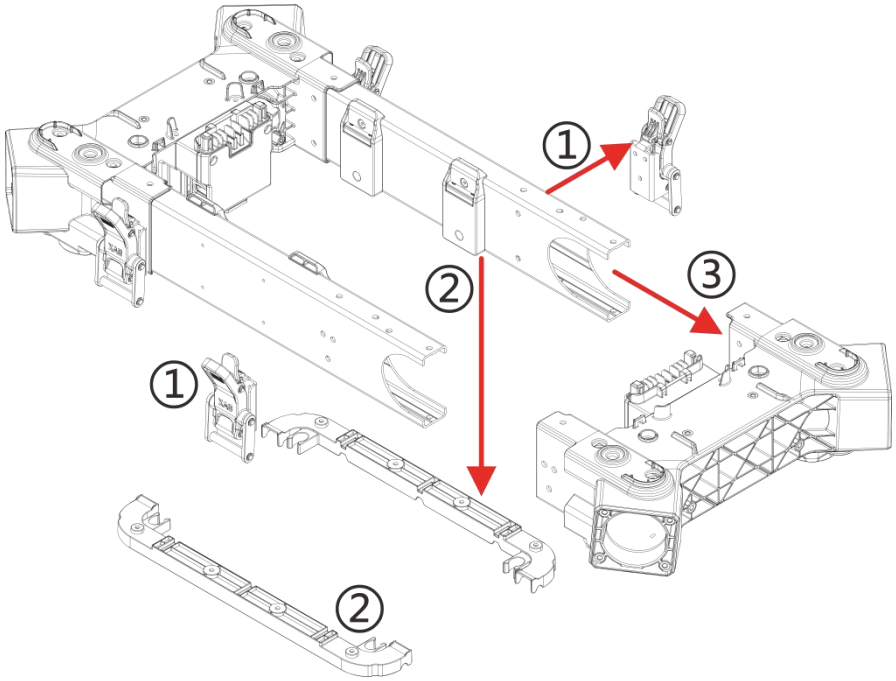
- Take care to protect the bus board tabs during disassembly and assembly, otherwise overheating or burnout may occur.

Crossbeam-to-Side Beam Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M5 × 14	02-004-01266	39–41 kgf·cm
2	M4 × 8	02-004-01031	12–14 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

"Power Socket Installation/Removal Guide"

"Handle and Antenna Installation/Removal Guide"

"Hood and Sensor System Disassembly"

"Airframe Arm-to-Crossbeam Disassembly"

Disassembly Sequence

1. First, remove the three M5 × 14 screws securing the quick-release latch to the side beam, then take off the latch (four in total, two on each side).

2. Next, remove the two M4 × 8 screws connecting the wiring duct to the underside of the side beam, then remove the duct (same procedure for both sides).

3. Then, remove the four M5 × 14 screws at the front of the crossbeam-to-side beam joint (top and bottom), along with the four M5 × 14 screws at the rear of the side beam (top, bottom, and inner side) (same procedure

for both sides).

Assembly Sequence

1. Insert the crossbeam into the side beam, and secure it with four M5 × 14 screws at the front (top and bottom), and four M5 × 14 screws at the rear (top, bottom, and inner side) (same procedure for both sides).

2. Next, reinstall the wiring duct with two M4 × 8 screws, and restore the cable routing (same procedure for both sides).

3. Finally, fasten the quick-release latch to the side beam using three M5 × 14 screws (same procedure for all four latches).

Disassembly and Assembly Notes

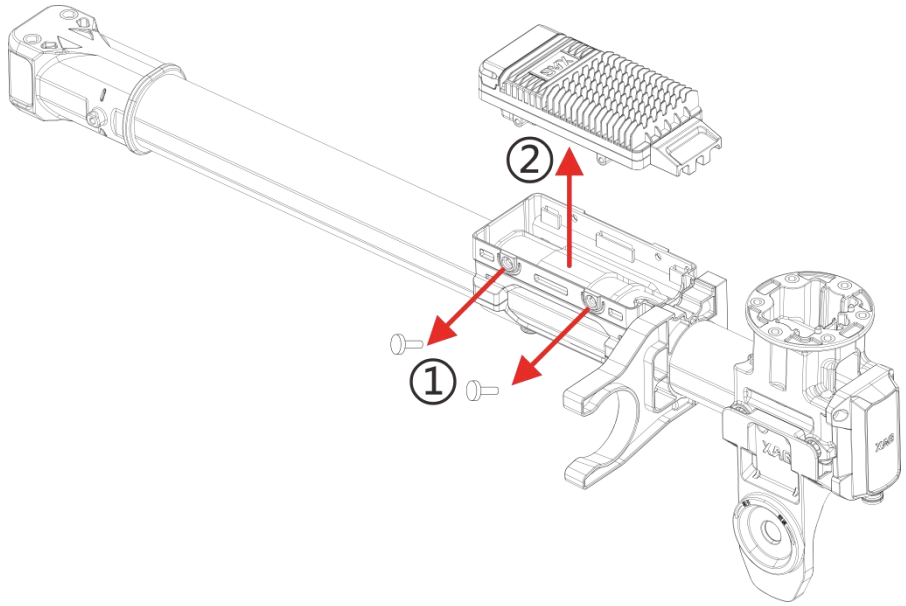
- When removing or installing the wiring duct, first remove or restore the nylon ties securing the cables, and carefully manage cable routing.
- Fasteners for the latches and airframe assembly must be tightened strictly in accordance with torque control requirements, otherwise excessive vibration or instability of the UAV may occur.

Motor-End Arm and ESC Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M4 × 10 × 8	02-004-00833	12–14 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

"Airframe Arm-to-Crossbeam Installation/Removal Guide"

Disassembly Sequence

1. Remove the four M4 × 10 × 8 screws from the front and rear of the ESC housing cover (same procedure for all four ESCs).
2. Remove the ESC and disconnect the internal cable connectors in sequence.

Assembly Sequence

1. First, reconnect and secure the internal cable connectors of the ESC to their corresponding ports (same procedure for all four ESCs).
2. Next, fasten the ESC to the housing cover with four M4 × 10 × 8 screws (front and rear).

Disassembly and Assembly Notes

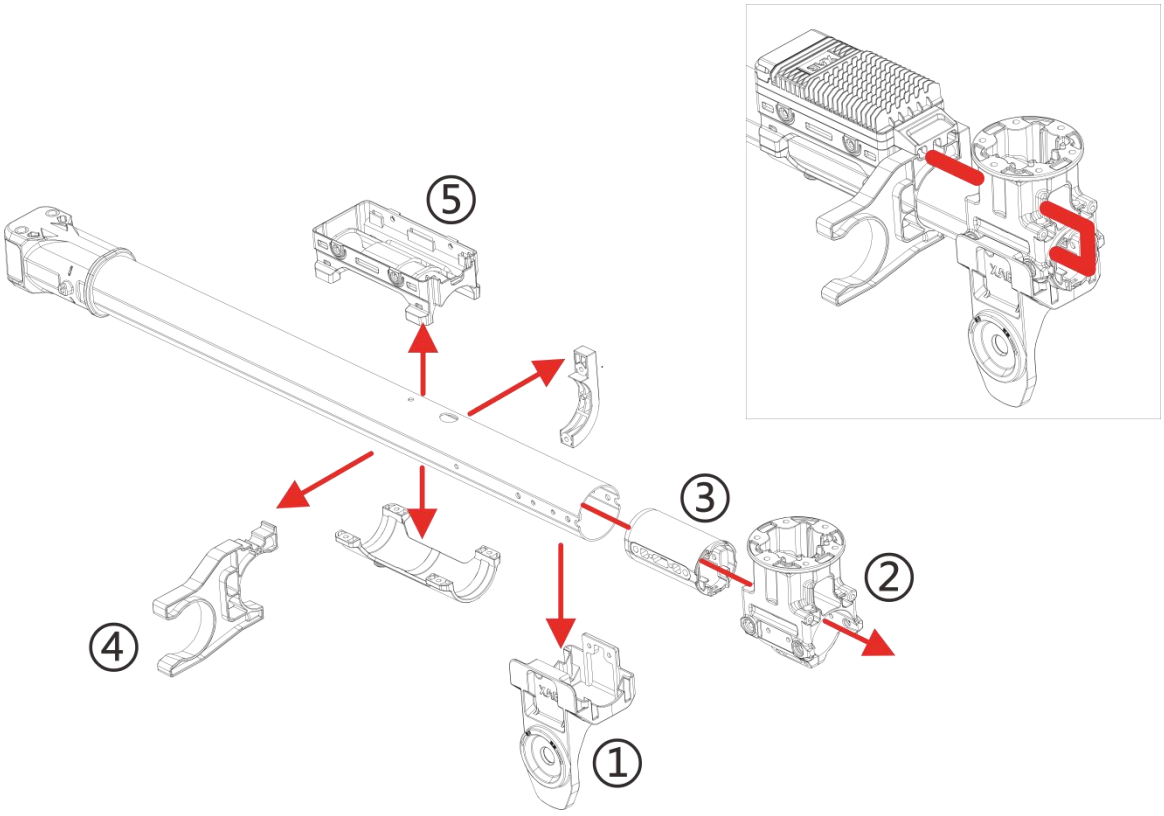
- When removing or installing ESC internal cable connectors, pay close attention to their correct positions.
- Before separating the ESC, ensure the Three-Phase Wires, signal wires, and power wires are properly disconnected to avoid damage during disassembly.
- During installation, align the ESC correctly with the mounting seat; improper alignment will result in mounting failure.

Motor-End Arm Components Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M4 × 14 × 8	02-004-00835	12–13 kgf·cm
2	M5 × 14	02-004-01266	33–35 kgf·cm
3	M4 × 10 × 8	02-004-00833	12–14 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

"Fuselage Arm-to-Crossbeam Installation/Removal Guide"

Disassembly Sequence

1. First, remove the four M4 × 14 × 8 screws securing the spray rod mount (front and rear). (Ensure the RevoSpray and motor are removed beforehand.)
2. Next, remove the motor mount by unscrewing the two M4 × 14 × 8 screws underneath, and the four M5 × 14 screws on the upper front and rear. Then pull the base outward to remove it.
3. Then, remove the two M4 × 10 × 8 screws from the arm folding mount.
4. Finally, remove the four M4 × 10 × 8 screws from the ESC base.

Assembly Sequence

1. Insert the motor mount fixing insert (3) into the arm, then install and secure the motor mount with two M4 × 14 × 8 screws underneath, and four M5 × 14 screws on the upper front and rear.

2. Next, fix the spray rod mount with four M4 × 14 × 8 screws.
3. Then, fasten the arm folding mount to the arm using two M4 × 10 × 8 screws.
4. Finally, secure the ESC base to the arm with four M4 × 10 × 8 screws.

Disassembly and Assembly Notes

- Pay attention to the routing of ESC signal wires during disassembly and assembly to prevent damage or improper installation.
- When installing the motor mount, ensure the integrity of the inner liner to avoid hidden risks.

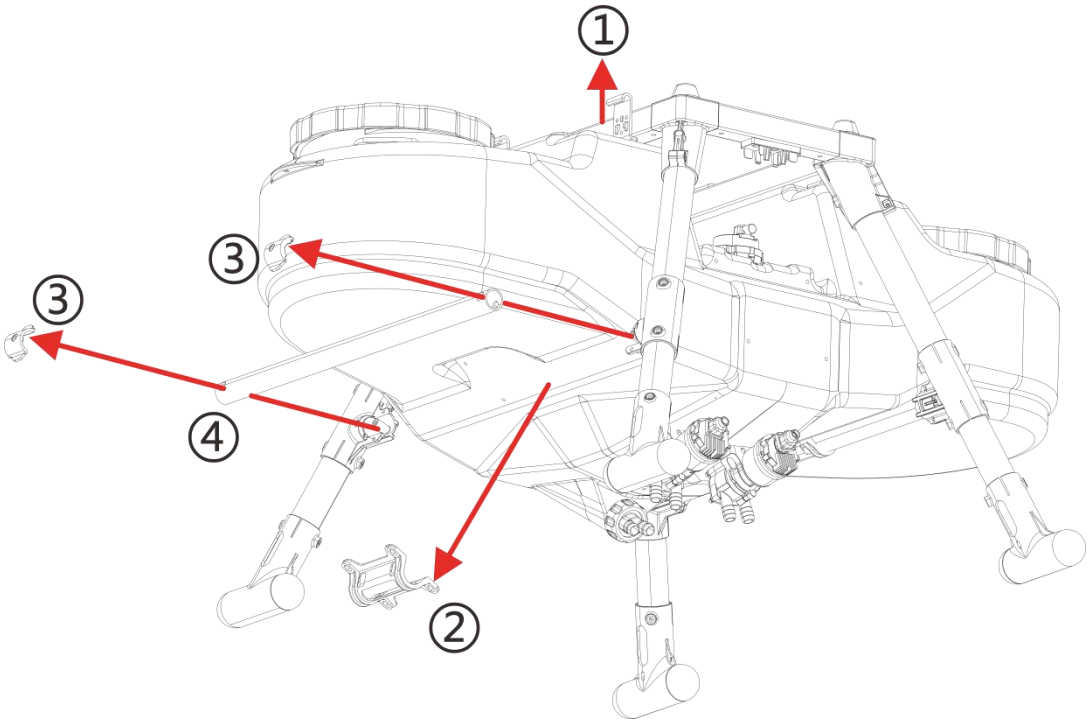
General Disassembly – Payload System (P150 Pro / P60 Pro)

RevoSpray 5 – Landing Gear Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M5 × 10 × 10	02-004-00747	29–31 kgf·cm
2	M4 × 10 × 8	02-004-00833	6–7 kgf·cm
3	M4 × 45 × 8	02-004-01272	11–13 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

Before disassembly, be sure to disconnect the flight platform along with its connected hoses and payload system wiring harness. Remove the flight platform to prevent accidental component damage caused by instability during the process.

Disassembly Sequence

1. First, unscrew the M5 × 10 × 10 screws securing the RevoSpray tank to the main frame.
2. Remove the M4 × 10 × 8 screws on the bottom mounts of the Liquid Tank, then take out the mounts (2 pieces).
3. Detach the fixed landing gear tee-joint assemblies (4 pieces), then remove the RevoSpray landing gear crossbars (2 pieces).
4. At this point, the Liquid Tank body is separated from the RevoSpray, and the tee-joints can then be disassembled to remove the tank.

Assembly Sequence

1. Align the screw holes on the top of the RevoSpray tank with the main frame, then tighten the securing screws.

2. Align the holes of the landing gear tee-joints and fasten them with screws.
3. Install the RevoSpray landing gear crossbars and tighten the M4 × 45 × 8 crossbar screws.
4. Install the four landing gear tee-joint assemblies and tighten the crossbar screws.
5. Reinstall the two bottom mounts of the Liquid Tank and secure them with their screws.

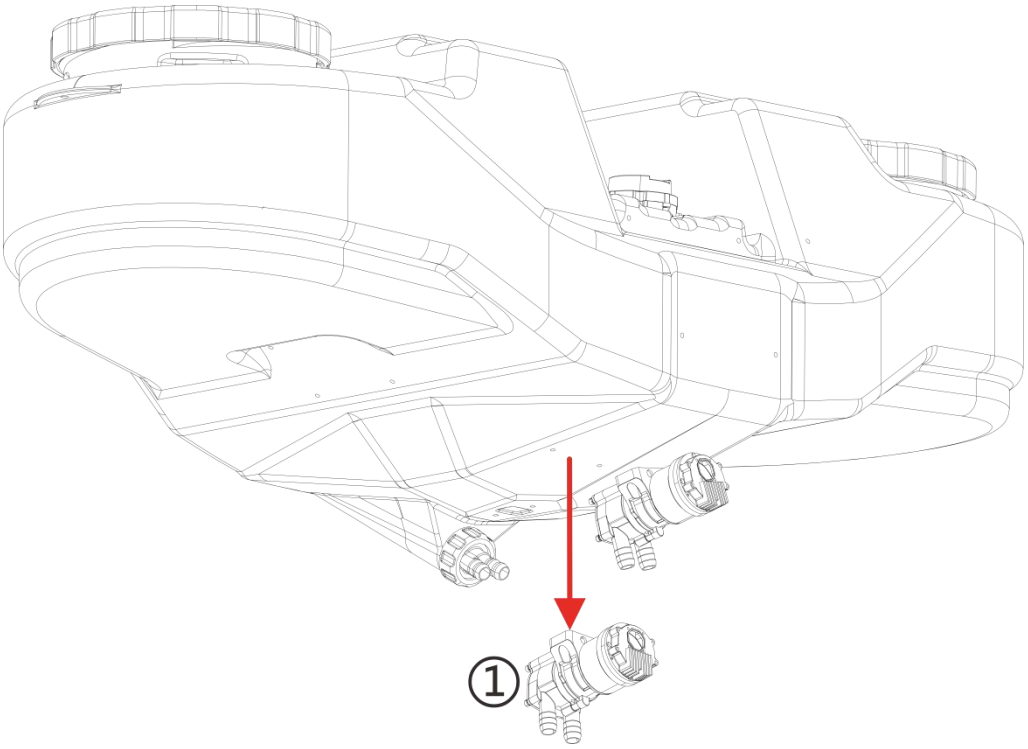
Disassembly and Assembly Notes

RevoSpray 5 – Liquid Tank and Pump Assembly Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M4 × 12 × 8	02-004-00834	12–14 kgf•cm

Disassembly Diagram



Front Disassembly Procedure

"Landing Gear Installation/Removal Guide"

Disassembly Sequence

1. Unscrew the M5 × 10 × 10 screws securing the Impeller Pump, then remove the pump.

Assembly Sequence

1. Align the Impeller Pump with the mounting holes and fasten it with the screws.

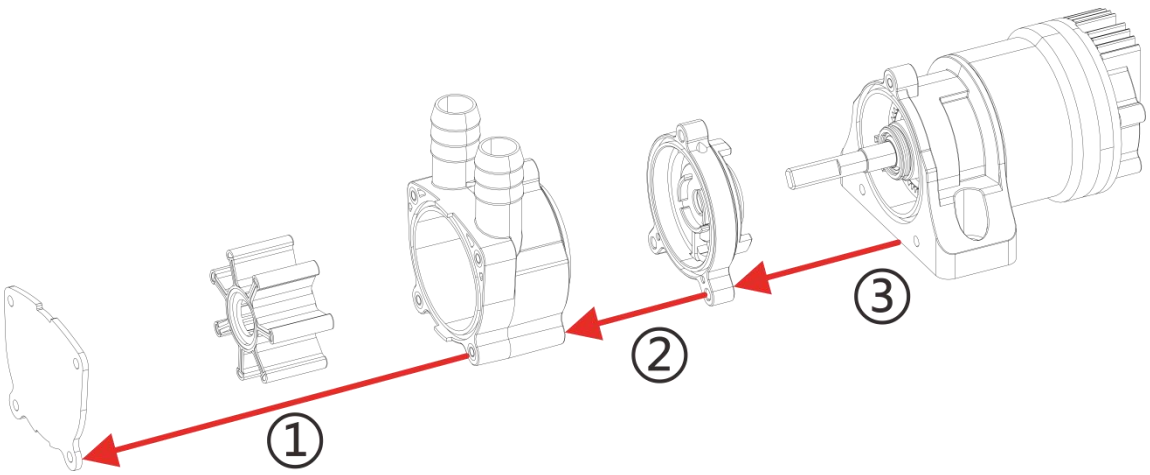
Disassembly and Assembly Notes

RevoSpray 5 – Pump Assembly Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M3 × 8	02-004-00937	6–7 kgf·cm
2	M3 × 16 × 6	02-004-01075	6–7 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

None

Disassembly Sequence

1. First, unscrew the M3 × 8 screws securing the Impeller Pump cover plate, take off the cover plate, and remove the impeller from inside the chamber.
2. Unscrew the M3 × 16 × 6 screws securing the Impeller Pump body to the pump support bracket, then separate the pump body, support bracket, and pump motor.

Assembly Sequence

1. Align the pump body, support bracket, and pump motor, then tighten with the M3 × 16 × 6 screws.
2. Place the impeller back into the pump body, align the cover plate, and fasten it with the M3 × 8 screws.

Disassembly and Assembly Notes

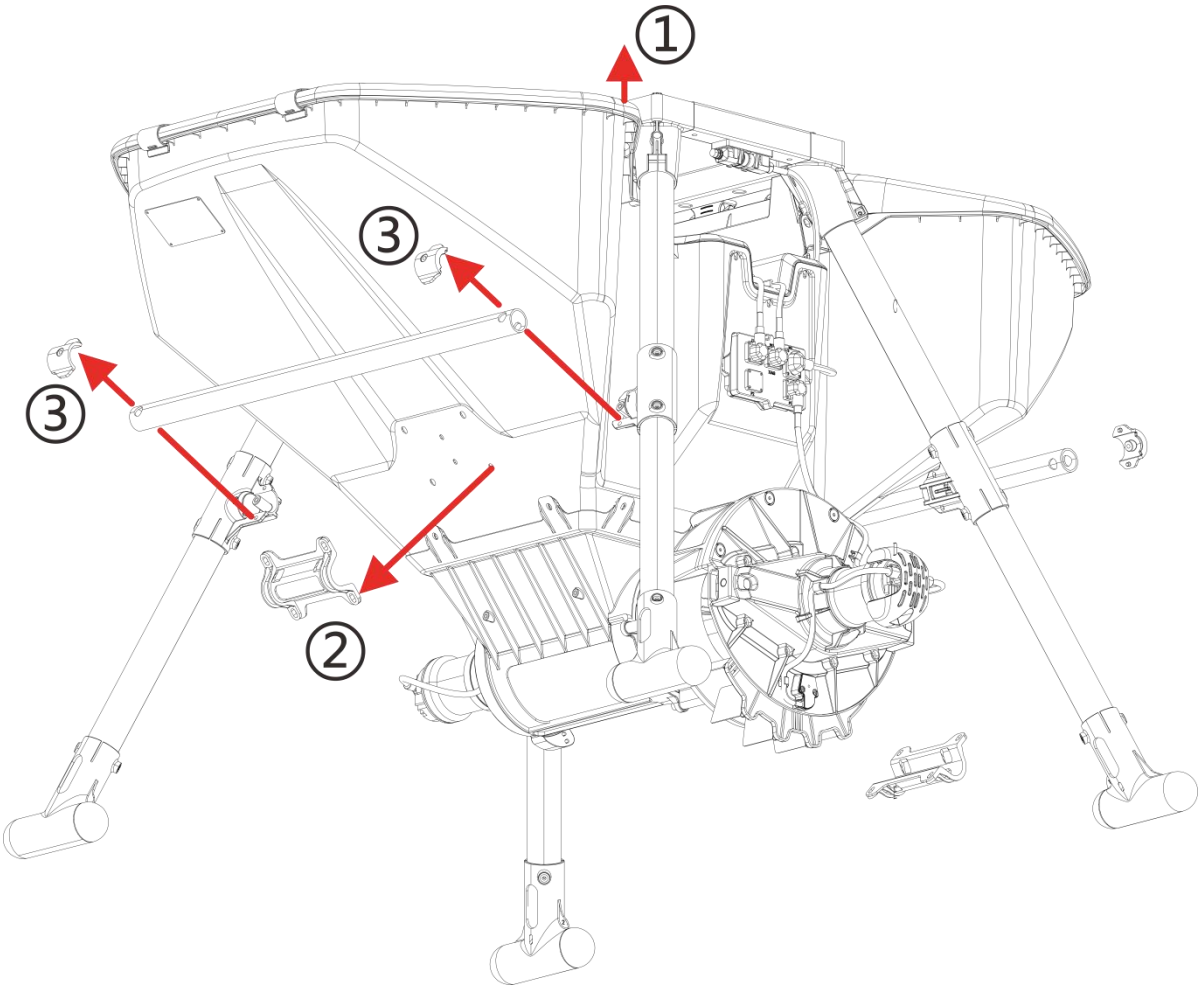
After disassembling the Impeller Pump, carefully preserve the sealing gaskets between components during disassembly. Ensure that waterproof gaskets are properly reinstalled during assembly.

RevoCast 5 – Granule Container and Landing Gear Separation Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M5 × 10 × 10	02-004-00747	29–31 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

None

Disassembly Sequence

1. First, remove the M5 × 10 × 10 screws securing the RevoCast Granule Container to the main frame.
2. Remove the Granule Container bottom mount screws (null) and then remove the two mounts.
3. Detach the four landing gear tee-joint assemblies, then remove the two RevoCast landing gear crossbars.
4. At this point, the Granule Container body is separated from the RevoCast. The tee-joints can then be removed to take out the Granule Container.

Assembly Sequence

1. Align the screw holes on the top of the RevoCast Granule Container with the main frame and fasten the screws.

2. Align the landing gear tee-joint holes and secure them with screws.
3. Install the RevoCast landing gear crossbars and secure them with null screws.
4. Reinstall the four landing gear tee-joint assemblies and tighten the null crossbar screws.
5. Reinstall the two Granule Container bottom mounts and secure them with screws.

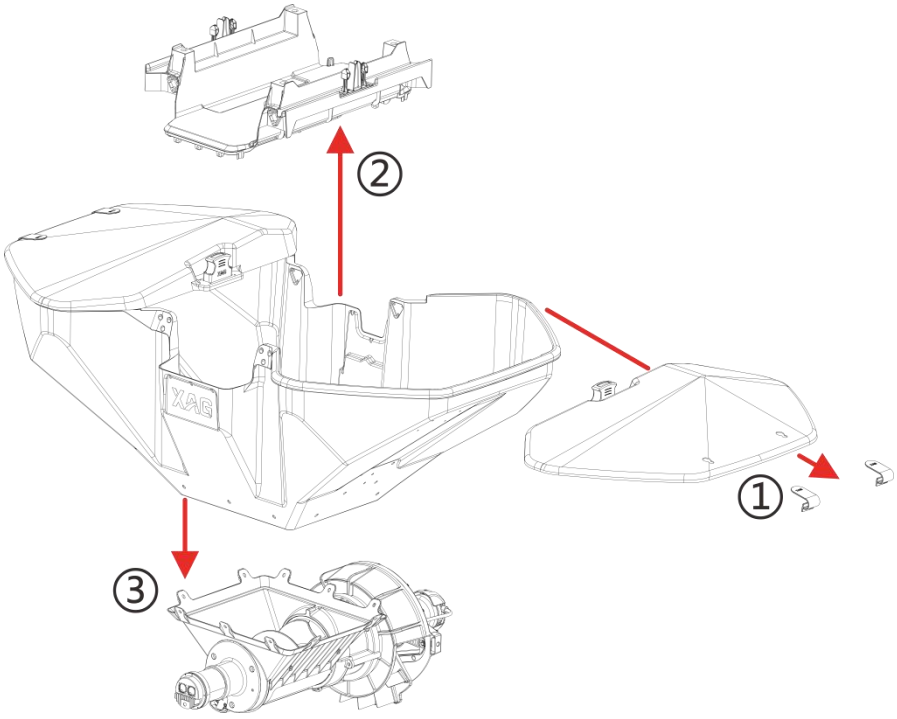
Disassembly and Assembly Notes

RevoCast 5 – Granule Container Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	N/A	N/A	N/A

Disassembly Diagram



Front Disassembly Procedure

"Granule Container and Landing Gear Separation Installation/Removal Guide"

Disassembly Sequence

1. Remove the Granule Container lid and hinges.
2. Detach the upper cover plate of the Granule Container.
3. Remove the Screw Feeder module.

Assembly Sequence

1. Install the Granule Container upper cover plate.
2. Reinstall the Granule Container lid and hinges.
3. Install the Screw Feeder module.

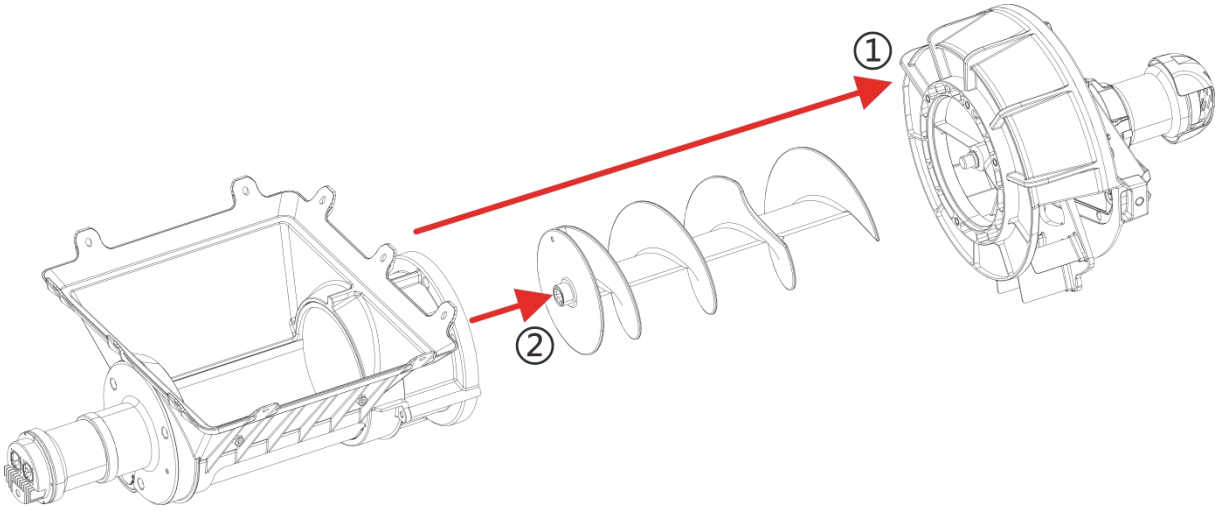
Disassembly and Assembly Notes

RevoCast 5 – Screw Feeder Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	N/A	N/A	N/A

Disassembly Diagram



Front Disassembly Procedure

"Granule Container Installation/Removal Guide"

Disassembly Sequence

1. Remove the Spread Disc Module.
2. Remove the Screw Feeder body.

Assembly Sequence

1. Install the Screw Feeder body.
2. Install the Spread Disc Module.

Disassembly and Assembly Notes

XAG 2025 P-Series Agricultural UAV – Precision Disassembly Procedures

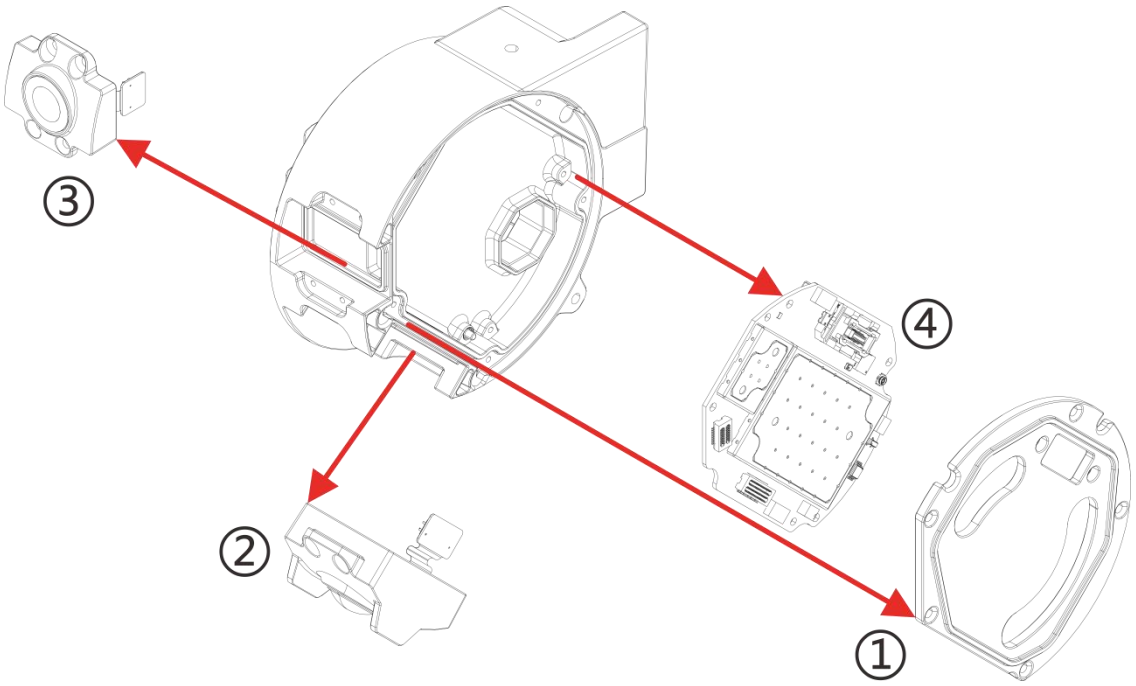
Precision Disassembly – Flight Platform (P150 Pro / P60 Pro)

Sensor System (Camera Module) Precision Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	M2 × 6	02-004-01373	2.0–2.5 kgf·cm
2	CM2 × 4	02-004-00553	1.8–2.0 kgf·cm
3	M2 × 4	02-004-01372	2.0–2.5 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

"Hood and Sensor System Installation/Removal Guide"

Disassembly Sequence

1. Using a Phillips screwdriver, remove the five M2 × 6 screws from the control board cover plate, then remove the cover plate.
2. Remove the four M2 × 4 screws securing the fisheye lens module with a Phillips screwdriver.
3. Remove the four M2 × 4 screws securing the LED light module with a Phillips screwdriver.
4. Remove the four M2 × 4 screws from the FPV motor driver board using a Phillips screwdriver, then take out the mainboard.
5. Remove the fisheye lens and LED light.

Assembly Sequence

1. Secure the LED light module onto the FPV control board bracket with four M2 × 4 screws.

2. Secure the fisheye lens module onto the FPV control board bracket with four M2 × 4 screws.
3. Install the FPV motor driver mainboard onto the FPV control board bracket and fasten it with four CM2 × 4 screws.
4. Connect the fisheye lens module and LED light module cables to the FPV motor driver mainboard.
5. Reinstall the control board cover plate and fasten it with five M2 × 6 screws.

Disassembly and Assembly Notes

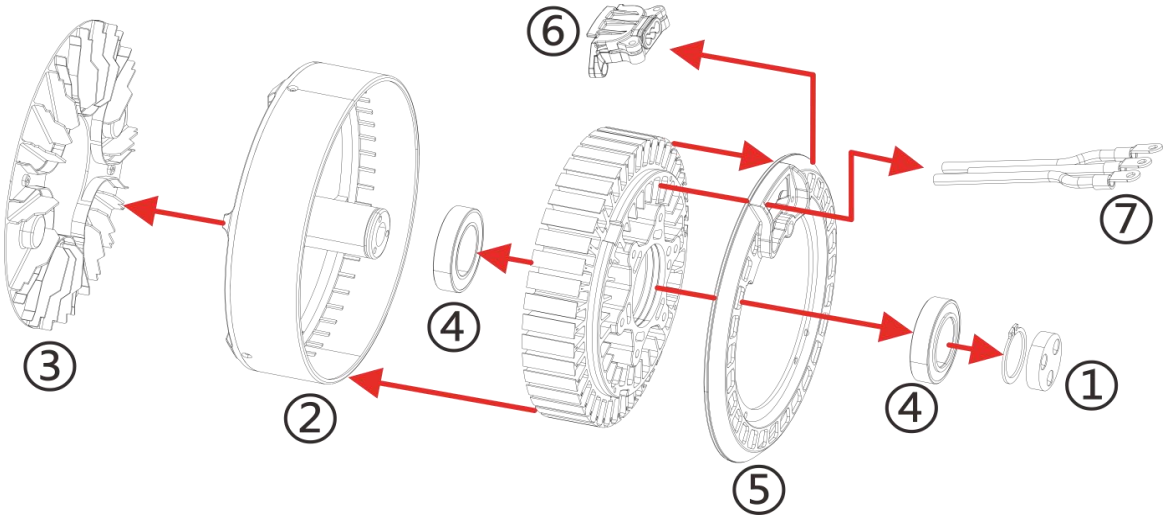
- When removing the camera module and LED module, always disconnect the mainboard first.
- Do not use sharp objects when disconnecting ports during camera and LED module removal to prevent mainboard damage.
- Before installing the camera module, LED module, and mainboard, apply thermal conductive adhesive pads.
- Ensure the mainboard is not reinstalled before attaching the camera and LED modules.

Main Motor Precision Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	N/A	N/A	N/A

Disassembly Diagram



Front Disassembly Procedure

None

Disassembly Sequence

1. Use a hex screwdriver to remove the main motor bearing cover plate, then separate the motor shaft circlip with snap ring pliers.
2. Pull out the main motor outer rotor (a three-jaw puller can be used for extraction).
3. Use a hex screwdriver to remove the main motor heat dissipation cover (if the cover is damaged, only this step is required).
4. Use a three-jaw puller to separate the main motor bearing (steps 1 and 2 must be completed beforehand).
5. Use a hex screwdriver to remove the screws securing the motor retaining ring and the three-phase wire protective cover, then detach the retaining ring.
6. Remove the screws securing the three-phase wire protective cover, then detach the cover.
7. Cut the Three-Phase Wires with wire cutters to disconnect them from the motor.

Assembly Sequence

1. Install the main motor bearings using a press or a rubber mallet.
2. Install the outer rotor, then sequentially insert the copper sleeve and circlip.
3. Use a hex screwdriver to install the bearing protective cover.
4. Use cold-press terminals to secure the Three-Phase Wires (this step may be skipped if the wires are not being replaced).
5. Use a hex screwdriver to install the retaining ring and three-phase wire protective cover.
6. Use a hex screwdriver to reinstall the motor heat dissipation cover.

Disassembly and Assembly Notes

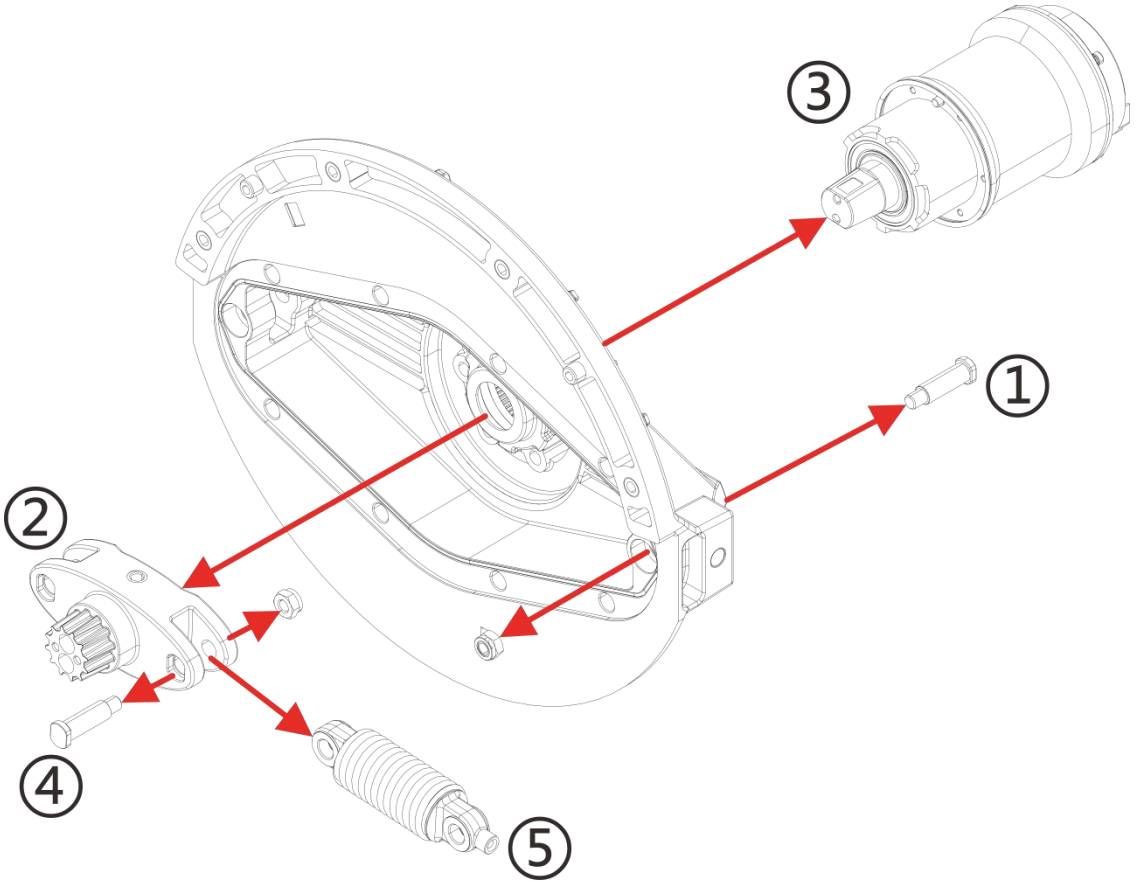
Precision Disassembly – Payload System (P150 Pro / P60 Pro)

RevoCast 5 – Spread Disc Motor and Reset Mechanism Installation/Removal Guide – P150 Pro / P60 Pro

Key Screw List

No.	Screw Specification	Material Code	Torque Requirement
1	ST4.2 × 8	02-004-01390	–
2	M4 × 16 × 8	02-004-00836	12–14 kgf·cm
3	M4 × 12 × 8	02-004-00834	13–15 kgf·cm

Disassembly Diagram



Front Disassembly Procedure

"Screw Feeder Installation/Removal Guide"

Disassembly Sequence

First, remove the ST4.2 × 8 screws securing the front sealing cover plate, then take off the transparent cover plate at the Spread Disc Motor end.

1. Remove the flat pin shaft that secures the discharge cover and spring at the Spread Disc Motor end (the pin may jam due to spring tension; insert a screw into the spring end to stretch it for easier removal).
2. Remove the M4 × 12 × 8 screws securing the Spread Disc Motor.
3. Separate the swing lever from the Spread Disc Motor.
4. Remove the flat pin shaft connecting the swing lever to the spring.

5. Detach the swing lever from the spring.

Assembly Sequence

1. Connect the swing lever to the spring and fasten with the flat pin shaft.
2. Secure the Spread Disc Motor with the mounting screws.
3. Connect the swing lever to the Spread Disc Motor.
4. Reattach the discharge cover at the motor end and fasten the flat pin shaft with the spring (use a screw to stretch the spring, align the holes, and then install the pin).
5. Install the front sealing cover plate and tighten the screws.

Disassembly and Assembly Notes

During the first disassembly, because the swing lever and Spread Disc Motor are tightly fitted, insert a long screw into the swing lever to push it apart from the motor.

Chapter V: General (Common) Troubleshooting

Preface

This chapter focuses on troubleshooting common issues with the 2024/2025 agricultural unmanned aerial vehicles (UAVs) and their associated mission systems. Troubleshooting is guided by fault symptoms, root causes, diagnostic steps, and corrective methods. Flowcharts are provided to support the troubleshooting process.

During equipment maintenance, troubleshooting is a critical stage. It requires the combined use of diagnostic tools, disassembly and repair procedures, and testing and acceptance techniques. Accurate fault analysis and rapid problem localization are vital for improving repair efficiency and reducing costs.

Common troubleshooting methods

Propulsion System

ESC No signal

Description

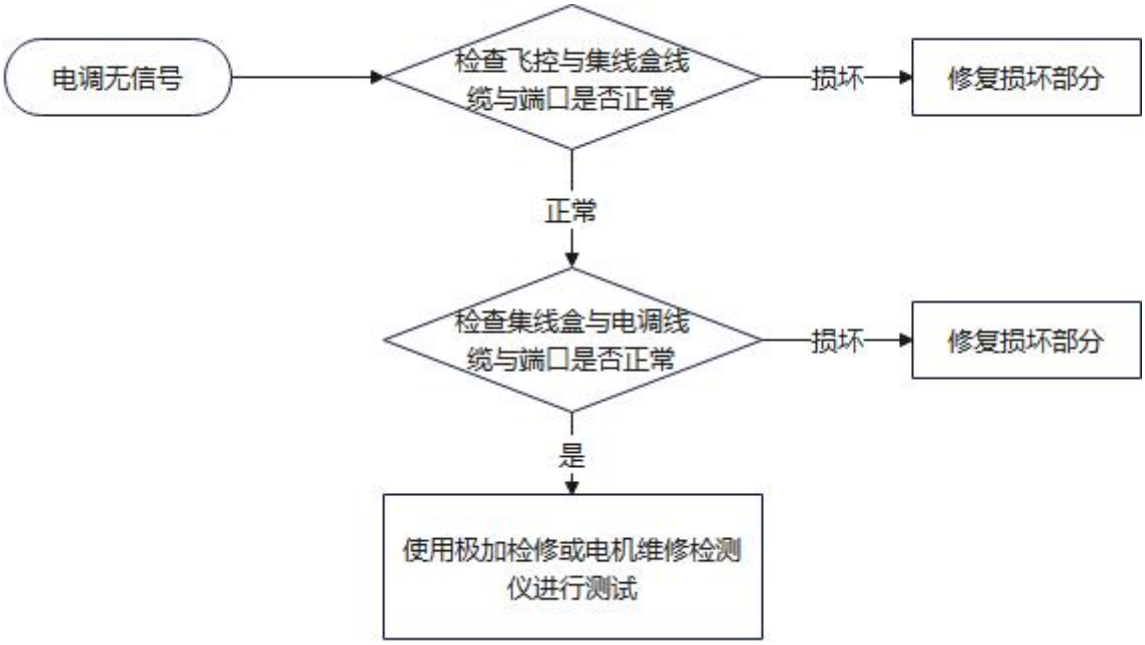
The flight control system connects to the central cable hub, sending control signals through the hub to the electronic speed controller (ESC). The ESC receives these signals and controls the motor′ s response.

Cause Analysis

- Fault in the wiring or connectors between the flight control system and the central cable hub.
- Malfunction in the ESC signal line, ESC, or hub board circuitry.
- If multiple ESCs fail to receive signals, the issue is likely with the hub board.

Troubleshooting Steps and Solutions

- Inspect the wiring and connectors between the flight control system and the hub board.
- Check the hub board and ESCs for short circuits, liquid ingress, or circuit faults.
- Perform component replacement tests where necessary.



ESC Offline

Description

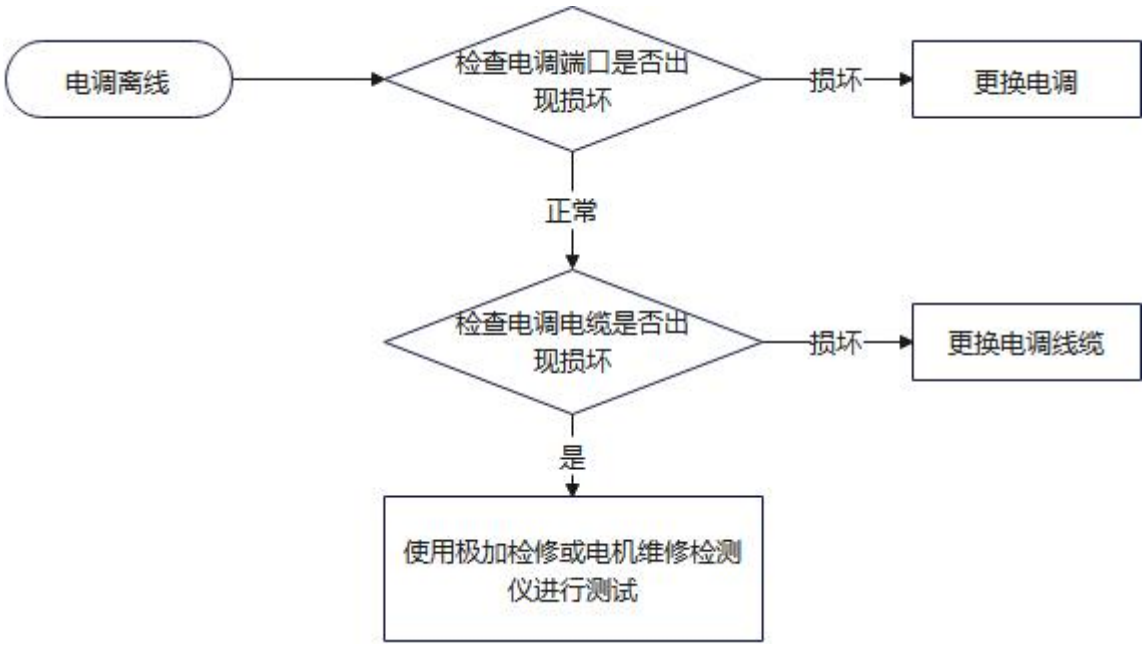
The "XAG Farm" App reports the ESC as offline, or the current firmware list does not display any ESC firmware.

Cause Analysis

- ESC signal cable connector is loose or damaged.
- ESC power cable is disconnected.
- If the ESC indicator is on but the motor cannot start, the issue may lie with the mainboard.

Troubleshooting Steps and Solutions

- If a single ESC indicator is off, check whether the power terminal between the ESC and the central cable hub has become loose. If all four ESC indicators are off, the central cable hub may be faulty. Replace the hub board and test again, or check whether the battery tail socket's power terminal is loose.
- If a single ESC shows a blue indicator light and emits a repetitive 'dou-dou-dou' sound, inspect whether the ESC signal connector is firmly inserted and whether the terminal pins are deformed. If all four ESCs show this condition, inspect the PLD connector between the flight control system and the central cable hub.
- If the ESC indicator is normal but the motor does not start, use a simple test platform to individually test and replace the faulty ESC or the central cable hub.



Abnormal Motor Response

Description

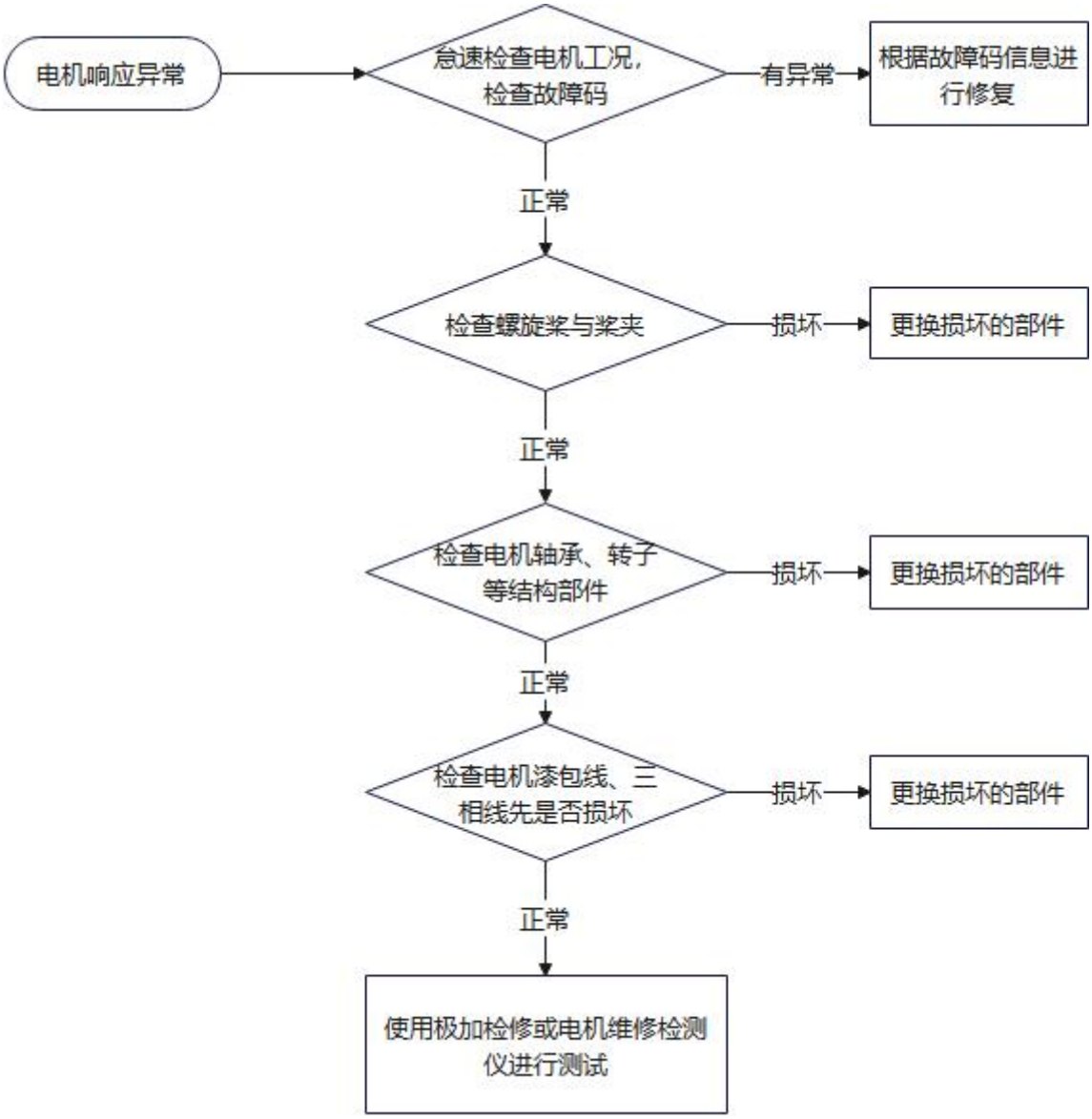
The ESC receives control signals from the flight control system, converts the DC power from the hub board into three-phase AC, and drives the motor to rotate, thereby turning the propeller. After rotation begins, the ESC feeds back motor speed data to the flight control system via the hub board. Under normal conditions, the motor speed should be proportional to the control signals received by the ESC. An abnormal motor response indicates that this proportional relationship has been disrupted, preventing the motor from reaching the expected speed.

Cause Analysis

- Damaged or broken propeller, or loose propeller clamp.
- Loose connection between the motor and the motor mount.
- Excessive wear of the damping rubber sleeve, causing increased vibration.
- Breakage or burning of motor enameled wire.
- Foreign objects inside the motor causing rotor blockage.
- Detached permanent magnets.
- Loose or burned connections between the motor and ESC Three-Phase Wires.
- ESC mainboard damage due to liquid ingress or other faults.

Troubleshooting Steps and Solutions

- If the UAV powers on normally, first conduct an idle test to check for irregularities.
- Inspect propellers for cracks or damage, and check whether the propeller clamp is secure.
- Verify that the motor mount is firmly fixed and free of looseness; check for broken steel sleeves.
- Examine the condition of the damping rubber sleeve and replace it if worn.
- Manually rotate the motor gently to detect any rotor blockage.
- Inspect motor enameled wires for burn marks or breakage, and check whether the Three-Phase Wires are intact at the motor mount.
- Ensure the terminal screws of the ESC Three-Phase Wires are tightened.
- Check whether the three-phase terminal contacts are scorched from arcing, which may cause poor connections.
- Inspect the ESC for signs of liquid ingress or mainboard damage.


电机响应异常
怠速检查电机工况，检查故障码
有异常
根据故障码信息进行修复
正常
检查螺旋桨与桨夹
损坏
更换损坏的部件
正常
检查电机轴承、转子等结构部件
损坏
更换损坏的部件
正常
检查电机漆包线、三相线先是否损坏
损坏
更换损坏的部件
正常
使用极加检修或电机维修检测仪进行测试

Insufficient Power in a Single Motor

Description

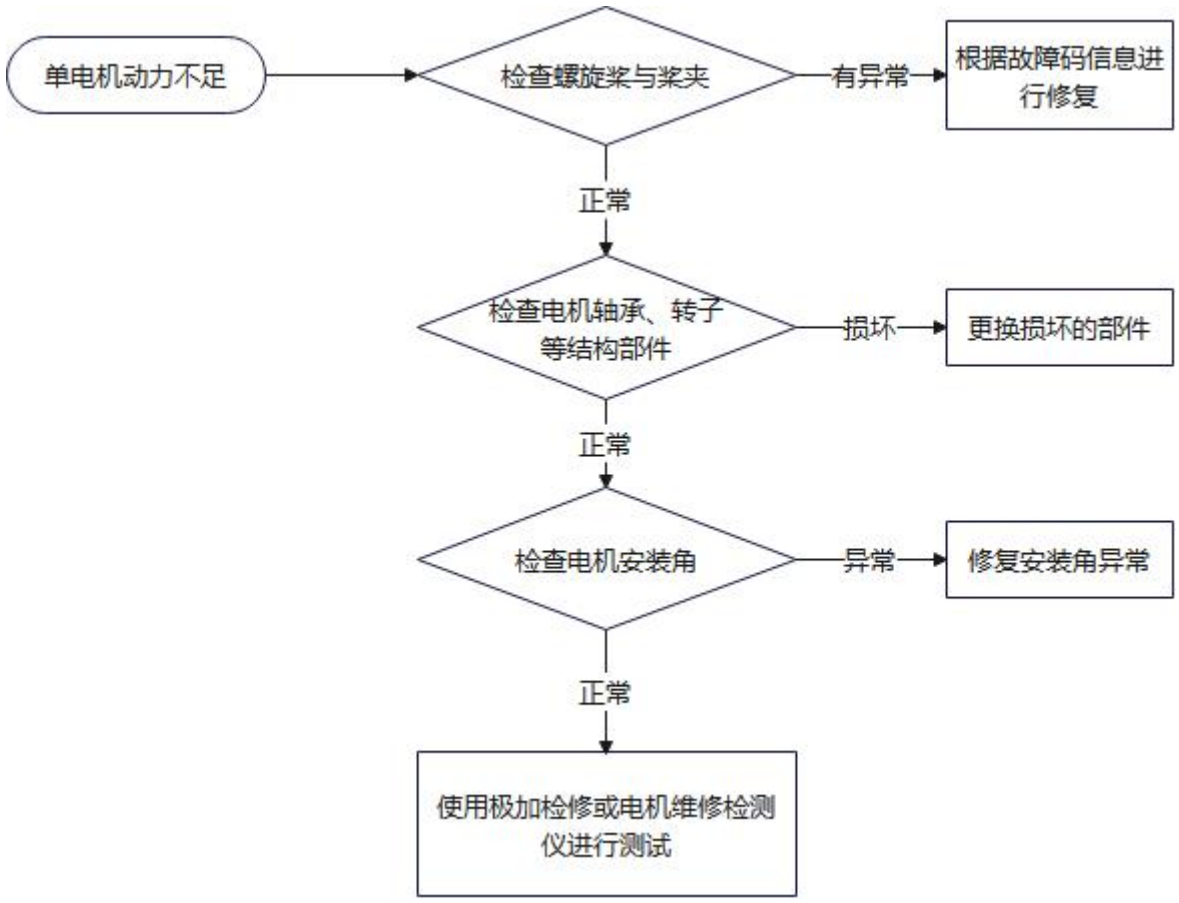
When the flight control system sends a full-power control signal to an individual ESC, the motor responds and reaches the corresponding speed as expected. However, the propeller still fails to generate sufficient lift to meet the UAV′ s power requirements. As a result, the aircraft cannot maintain stable flight, leading to altitude loss or even ground impact.

Cause Analysis

- Propeller or propeller clamp is damaged or deformed.
- Loose connection between the motor and the motor mount.
- Deformation of the arm or incorrect installation angle.
- Poor contact or damage within the power transmission chain.

Troubleshooting Steps and Solutions

- Inspect the propeller and propeller clamp for any damage or deformation.
- Verify whether the motor mount and motor mount are securely fixed.
- Check whether the installation angle of the arm conforms to factory standards.
- Inspect the power transmission cables and connectors for damage or poor contact.



Insufficient Power Across Multiple Motors

Description

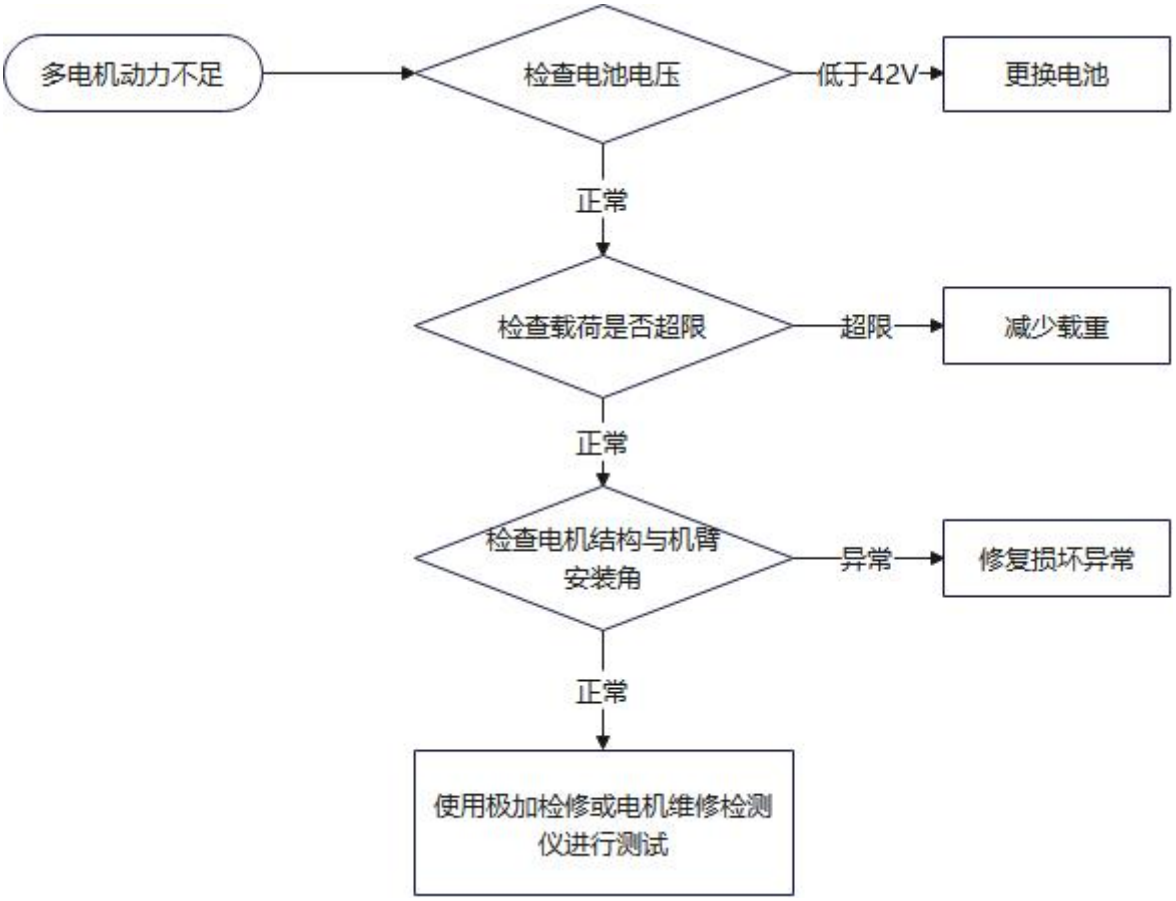
When multiple ESCs output full-power control signals and the motors respond normally, the agricultural UAV still fails to maintain stable flight, resulting in altitude loss or even ground impact.

Cause Analysis

- Battery voltage is too low to provide adequate power.
- Takeoff weight significantly exceeds the UAV's rated maximum takeoff weight.
- The UAV is operating in high-altitude environment.
- Structural deformation of the UAV's airframe.
- Issues with the propellers.
- Incorrect arm installation, causing deviations in motor mounting angles.

Troubleshooting Steps and Solutions

- First, check whether the app reports battery alarms; then review the flight log to confirm whether battery voltage is within normal range (should not fall below 42V), and inspect the battery cells for swelling or other defects.
- Check the UAV's payload weight to confirm it is within rated limits.
- Review the flight log to determine whether the UAV is operating at high altitude; if so, consider reducing payload weight for safer operation.
- Inspect the arms to confirm correct installation and verify that motor tilt angles conform to factory specifications.
- Examine the airframe for deformation, check whether the main frame or tail section shows cracks or damage.
- Verify whether the propellers are genuine factory models, ensuring they are not overly soft, deformed, or burdened with excessive debris.


多电机动力不足
检查电池电压
低于42V
更换电池
正常
检查载荷是否超限
超限
减少载重
正常
检查电机结构与机臂安装角
异常
修复损坏异常
正常
使用极加检修或电机维修检测仪进行测试

Motor Alarm

Description

When a malfunction occurs in the propulsion system, the motor buzzer will sound an alarm, accompanied by the navigation lights flashing blue.

Cause Analysis

- Battery voltage too low to provide sufficient power.
- Takeoff weight significantly exceeds the UAV's rated maximum payload.
- UAV operating in high-altitude conditions.
- Structural deformation of the UAV's airframe.
- Propeller damage or malfunction.
- Incorrect arm installation, causing deviation in motor mounting angle.

Troubleshooting Steps and Solutions

Faults can be identified by the buzzer sound pattern:

- Alarm sound: 'dou-dou-dou,' single tone, 1.5-second interval

  Indicates a communication link failure. Possible causes:

  a. No PPM signal received from the flight control system, throttle signal not connected, or signal processing circuit malfunction. Solution: Re-plug the ESC signal cable.

  b. Output signal frequency is below 40Hz or above 450Hz, triggering an alarm.

- Alarm sound: xi-xi-xi, single tone, 0.4-second interval

  Indicates:

  a. Throttle input exceeds startup threshold within 2 seconds of ESC initialization.

  b. Short circuit or poor contact at ESC input/output terminals.

- Alarm sound: rai-mi-rai-mi, two tones, 1.2-second interval

  Causes:

  a. Alarm after propeller startup: abnormal voltage or current sampling, requiring ESC replacement.

  b. Alarm after power-on: product type mismatch; configure the ESC using the "XAG Diagnostics" App.

- Alarm sound: mi-fa-sao-la-mi-fa-sao-la, four tones, 1.6-second interval

  Cause: Motor stall alarm. The propeller is obstructed, causing the motor to stop, and the ESC enters protection mode.

- Alarm sound: fa-sao-la-fa-sao-la, three tones, 1.6-second interval

  Cause: Motor serial number conflict. Inspect the central cable hub for contamination or malfunction.

Unleveled Airframe

Description

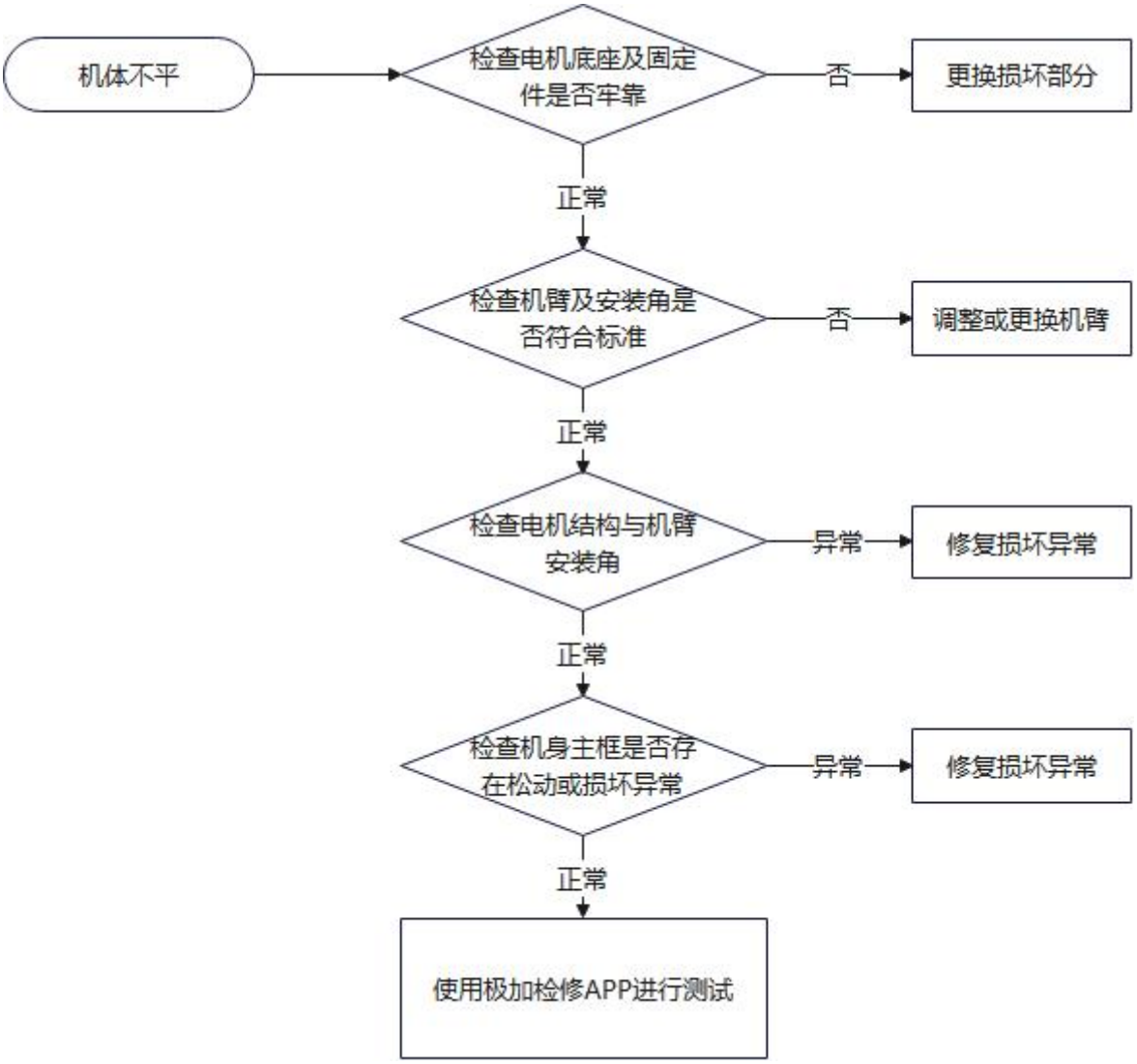
The UAV′ s four motors drive the propellers to generate lift. At the same time, the rotating propellers exert a torque on the air, which, according to Newton′ s Third Law, produces an opposite reaction torque (counter-torque). To ensure stable flight, the UAV′ s four motors must be installed in alternating clockwise and counterclockwise orientations so that these counter-torques cancel each other out. If the airframe becomes unleveled, the lift and torque forces change in magnitude or direction, disrupting the overall balance of forces in the flight system. This imbalance compromises flight stability and may ultimately cause the UAV to crash.

Cause Analysis

- Loose or deformed arm clamp screws, or fractured steel sleeves or rubber dampers.
- Misaligned installation of the motor mount, causing motors to sit on uneven planes.
- Motor mounting surfaces on the arms are not level.
- Structural deformation of the main frame or the front/rear beams.

Troubleshooting Steps and Solutions

- Inspect screws at the junction of the airframe and arm clamps for looseness, and check whether steel sleeves or rubber dampers are broken or damaged.
- Check for deformation or improper installation of motor mounts.
- Inspect arms for deformation or cracks.
- Examine the main frame and both front and rear beams for signs of structural deformation.


机体不平
检查电机底座及固定件是否牢靠
否
更换损坏部分
正常
检查机臂及安装角是否符合标准
否
调整或更换机臂
正常
检查电机结构与机臂安装角
异常
修复损坏异常
正常
检查机身主框是否存在松动或损坏异常
异常
修复损坏异常
正常
使用极加检修APP进行测试

Excessive Airframe Vibration

Description

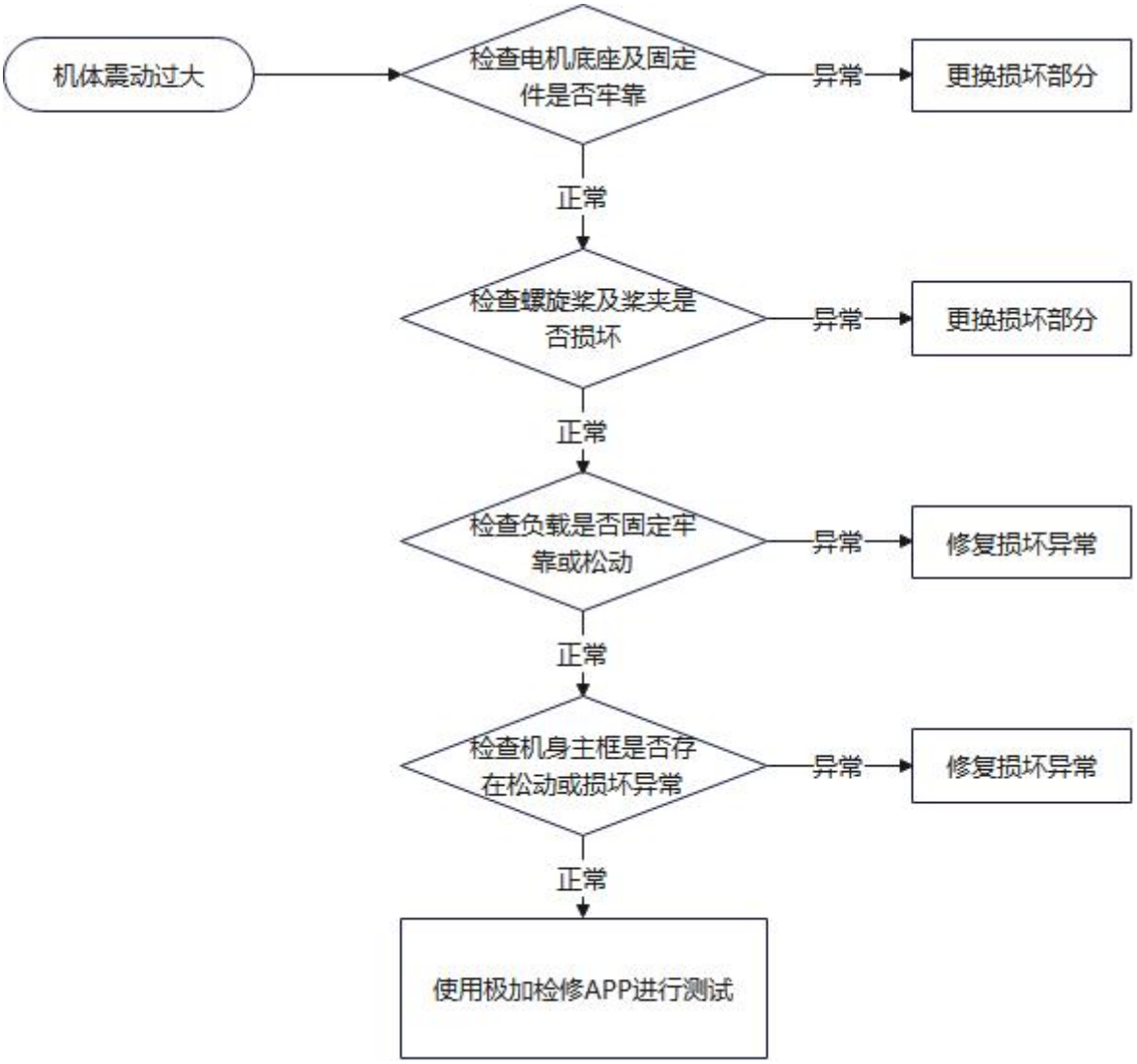
During flight, the UAV exhibits noticeable shaking, or flight logs indicate consistently high vibration levels.

Cause Analysis

- Loose or faulty propellers.
- The motor or motor mount is loose or defective.
- The arm isloose or damaged.
- The payload frame is loose or defective.
- The flight control system is loose or defective.

Troubleshooting Steps and Solutions

- Inspect propellers for damage, deformation, or looseness, and check whether propeller blades and clamps have any play.
- Check motors for looseness, verify whether the outer rotor and stator have play, and inspect damping sleeves for severe wear.
- Inspect folding joints of the arms for looseness or play, ensure tail-end arm mounts are secure, and check the plastic arm mounts for detachment or cracks.
- Check whether payload frame quick-release latches are loose and whether payload frame damping pads are excessively worn.
- Verify whether the flight control system is firmly fixed and whether the hood is cracked.


机体震动过大
检查电机底座及固定件是否牢靠
异常
更换损坏部分
正常
检查螺旋桨及桨夹是否损坏
异常
更换损坏部分
正常
检查负载是否固定牢靠或松动
异常
修复损坏异常
正常
检查机身主框是否存在松动或损坏异常
异常
修复损坏异常
正常
使用极加检修APP进行测试

Flight Control and Sensor System

Altitude Fluctuations

Description

During route flight missions, the UAV exhibits altitude deviations, flying higher or lower than the preset flight altitude.

Cause Analysis

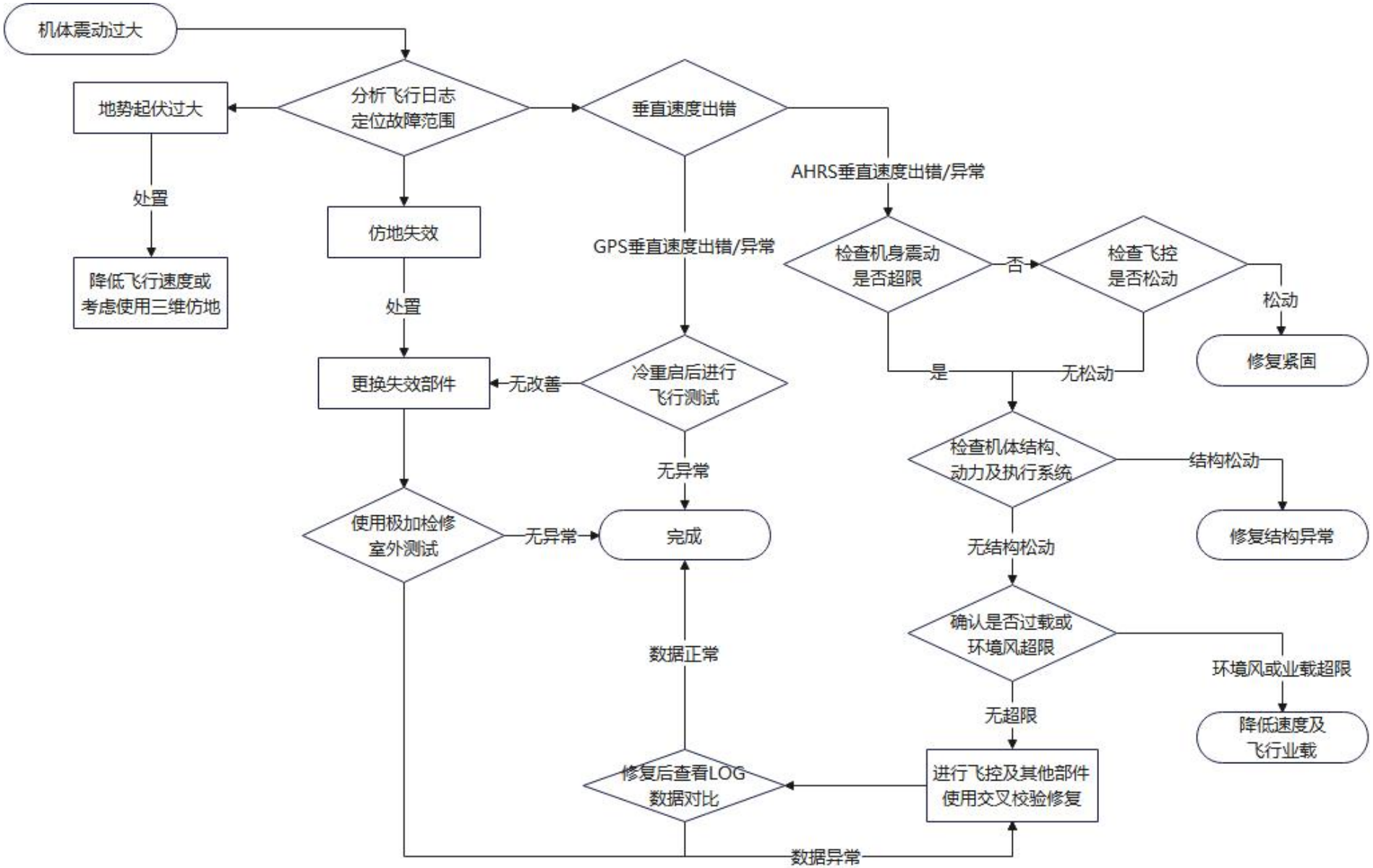
- Terrain-following flight over uneven ground.
- Altitude measurement errors from the terrain module.
- Malfunctions in power execution components.
- Excessive payload or strong winds resulting in insufficient power.
- Errors in fused vertical speed calculations.

Troubleshooting Steps and Solutions

- Analyze flight logs to narrow down the problem scope before further inspecting the hardware or environment.
- If terrain undulation is confirmed as the cause, reduce flight speed during terrain-following or switch to 3D terrain-following operations.
- If a terrain module fault is identified, replace the terrain module.
- If power execution component issues are found, inspect propellers, motors, and arm installations, and replace as needed.
- If payload or wind is the problem, reduce the payload or lower flight speed accordingly.
- If fused vertical speed errors are detected:

  When caused by excessive vibration, inspect the airframe.

  When caused by IMU or GPS vertical speed errors, replace the flight control system.


机体震动过大
分析飞行日志
定位故障范围
地势起伏过大
处置
降低飞行速度或
考虑使用三维仿地
仿地失效
处置
更换失效部件
使用极加检修
室外测试
无异常
完成
垂直速度出错
GPS垂直速度出错/异常
冷重启后进行
飞行测试
无改善
无异常
数据正常
修复后查看LOG
数据对比
数据异常
AHRS垂直速度出错/异常
检查机身震动
是否超限
否
检查飞控
是否松动
松动
修复紧固
是
无松动
检查机体结构、
动力及执行系统
结构松动
修复结构异常
无结构松动
确认是否过载或
环境风超限
环境风或业载超限
降低速度及
飞行业载
无超限
进行飞控及其他部件
使用交叉校验修复

Radar Offline

Description

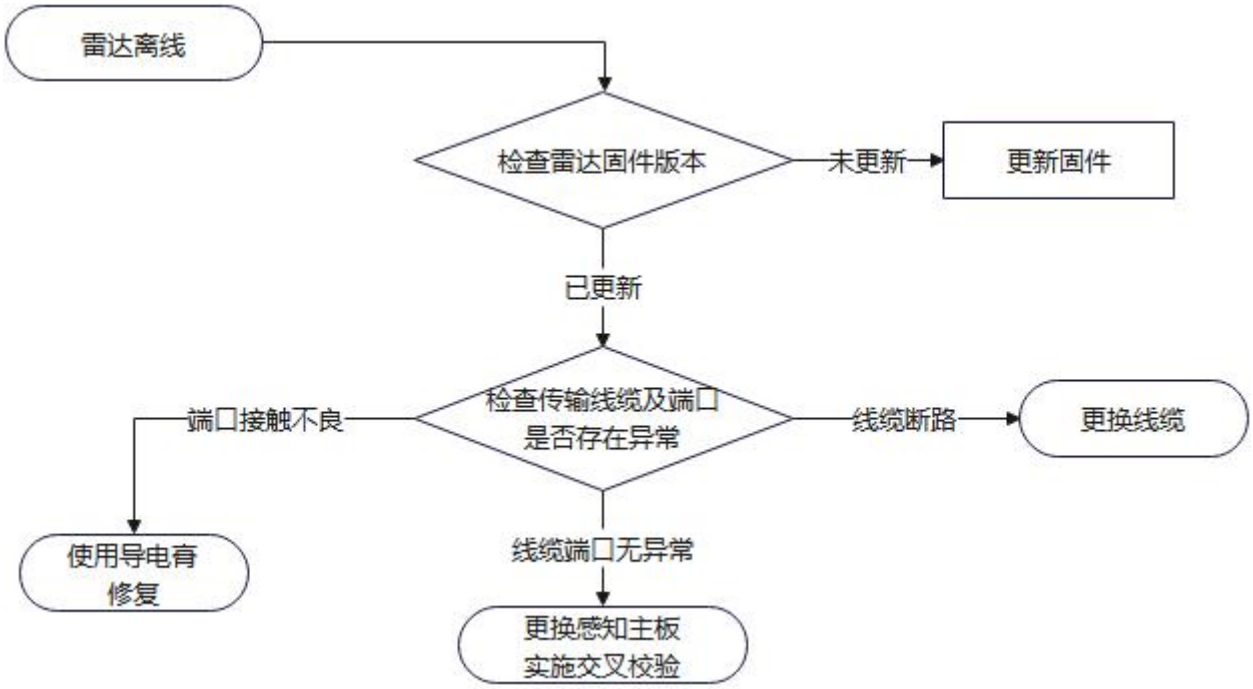
The “XAG One” App reports that the 4D imaging radar is offline.

Cause Analysis

- Firmware issues.
- Connection cable problems between radar and flight control system.
- Internal damage to the 4D imaging radar.

Troubleshooting Steps and Solutions

- Check for available firmware updates and install the latest version.
- Inspect the plugs and cables between the radar and the flight control system for damage; if no damage is found, apply lubricant to the connectors and test again.
- If all the above checks are normal, replace the radar to verify whether it is defective.



Radar Misreading

Description

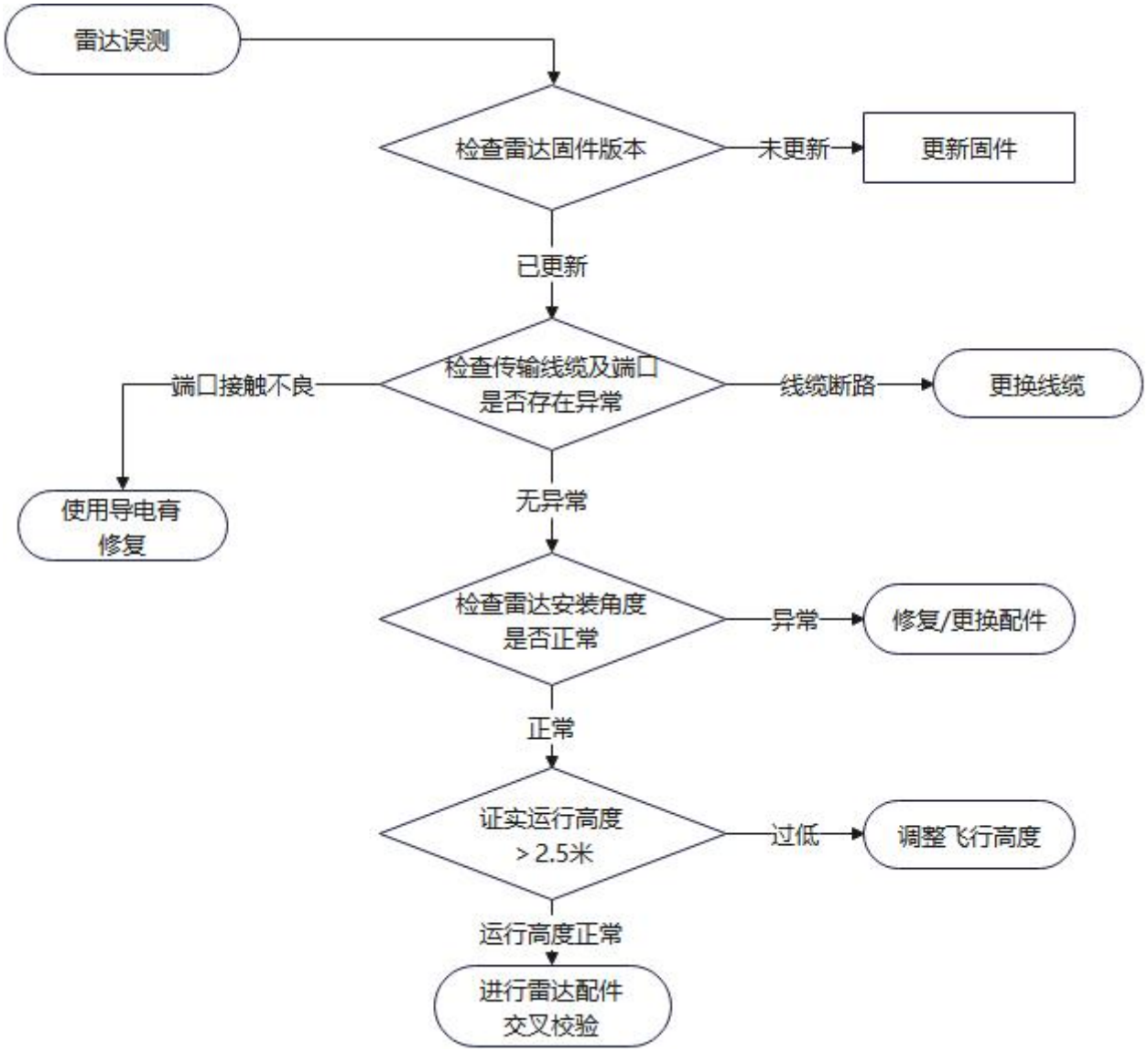
The ″XAG One″ App indicates the UAV is in obstacle-avoidance mode, causing the aircraft to drift (continuously attempting to avoid obstacles even though no obstacle is present ahead).

Cause Analysis

- Firmware issues.
- Abnormal radar installation angle.
- Flight altitude too low.
- Environmental factors (e.g., operating in mountainous, hilly, or orchard areas).
- Internal hardware damage.

Troubleshooting Steps and Solutions

- Check for and install the latest firmware update.
- Verify that the radar mount is not deformed; under normal conditions, the QR code on the side of the radar should remain parallel to the ground.
- Ensure obstacle-avoidance altitude is not below 2 meters; the recommende minimum altitude is above 2.5 meters.
- Recognize that current obstacle-avoidance functions are designed primarily for flat plains; terrain variations such as hills, mountains, or dense orchards may cause radar misreadings.
- Replace the radar to confirm whether the issue stems from hardware damage.


雷达误测
检查雷达固件版本
未更新
更新固件
已更新
检查传输线缆及端口
是否存在异常
端口接触不良
线缆断路
更换线缆
使用导电育
修复
无异常
检查雷达安装角度
是否正常
异常
修复/更换配件
正常
证实运行高度
> 2.5米
过低
调整飞行高度
运行高度正常
进行雷达配件
交叉校验

PSL Pilot View Image Not Displayed

Description

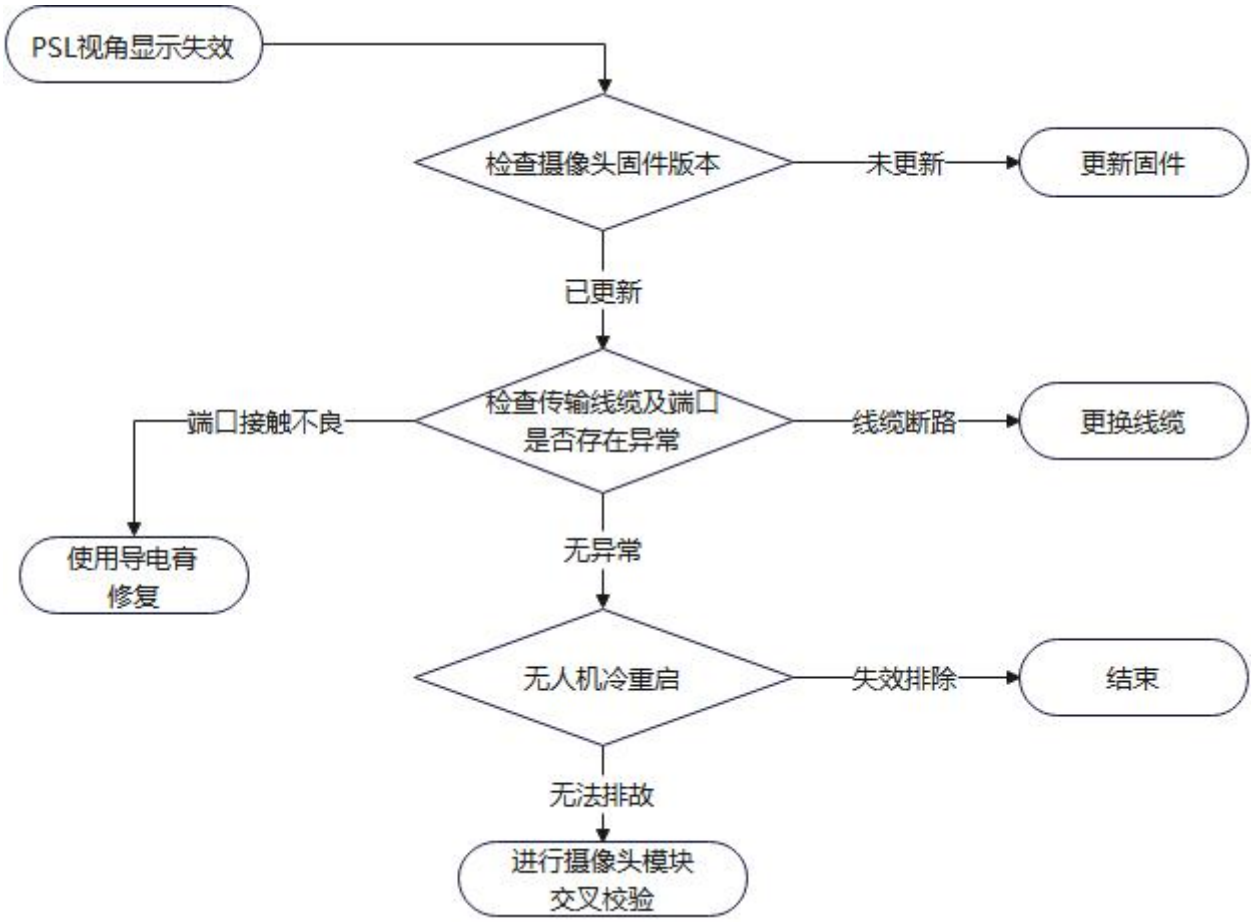
The pilot′ s view image fails to display on the “XAG One” app operation interface.

Cause Analysis

- Firmware issues.
- Camera offline.

Troubleshooting Steps and Solutions

- Upgrade firmware to the latest version.
- Inspect the camera connection cables and plugs for damage or poor contact.
- Reconnect the plugs and restart the UAV.
- Replace with a new PSL camera if necessary.



RTK Positioning System

Poor Satellite Signal

Description

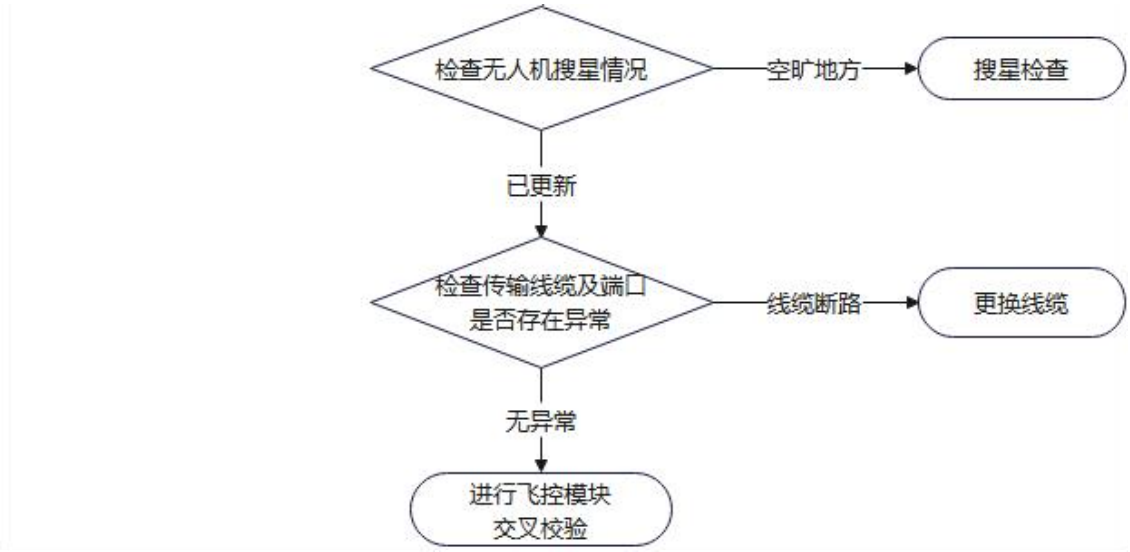
The "XAG One" App displays the message: "Agricultural UAV has not entered RTK mode, insufficient satellite count", or the flight log shows the UAV has exited RTK mode due to a low number of satellites.

Cause Analysis

- Environmental interference or obstruction.
- Loose, damaged, or poorly connected RTK antennas or feeder cables.
- Flight control system hardware fault.

Troubleshooting Steps and Solutions

- Ensure the UAV is outdoors in an open area without major obstructions (e.g., tall buildings, windbreaks). Check whether the RTK connections are correct and whether there is looseness, damage, or poor contact.
- Remove both left and right RTK antenna heads in sequence, and inspect the connection points between feeder cables and antenna heads for damage, looseness, or abnormalities. Replace if necessary.
- If the antennas and feeder cables show no visible damage, individually install and test each antenna on the ground to observe satellite count and positioning accuracy (satellite count > 25, positioning accuracy < 0.1 m). Replace any antenna found to be abnormal.
- If both antennas function normally, conduct hover and flight tests, checking satellite count, positioning accuracy, and heading accuracy (satellite count > 25, positioning accuracy < 0.1 m, heading accuracy < 1). Before testing, ensure the terrain module is working properly, the ground vision lens is clean, and the ground texture is clear.
- If hover and flight tests are normal, the poor satellite signal is due to environmental interference. If not, replace components and retest.



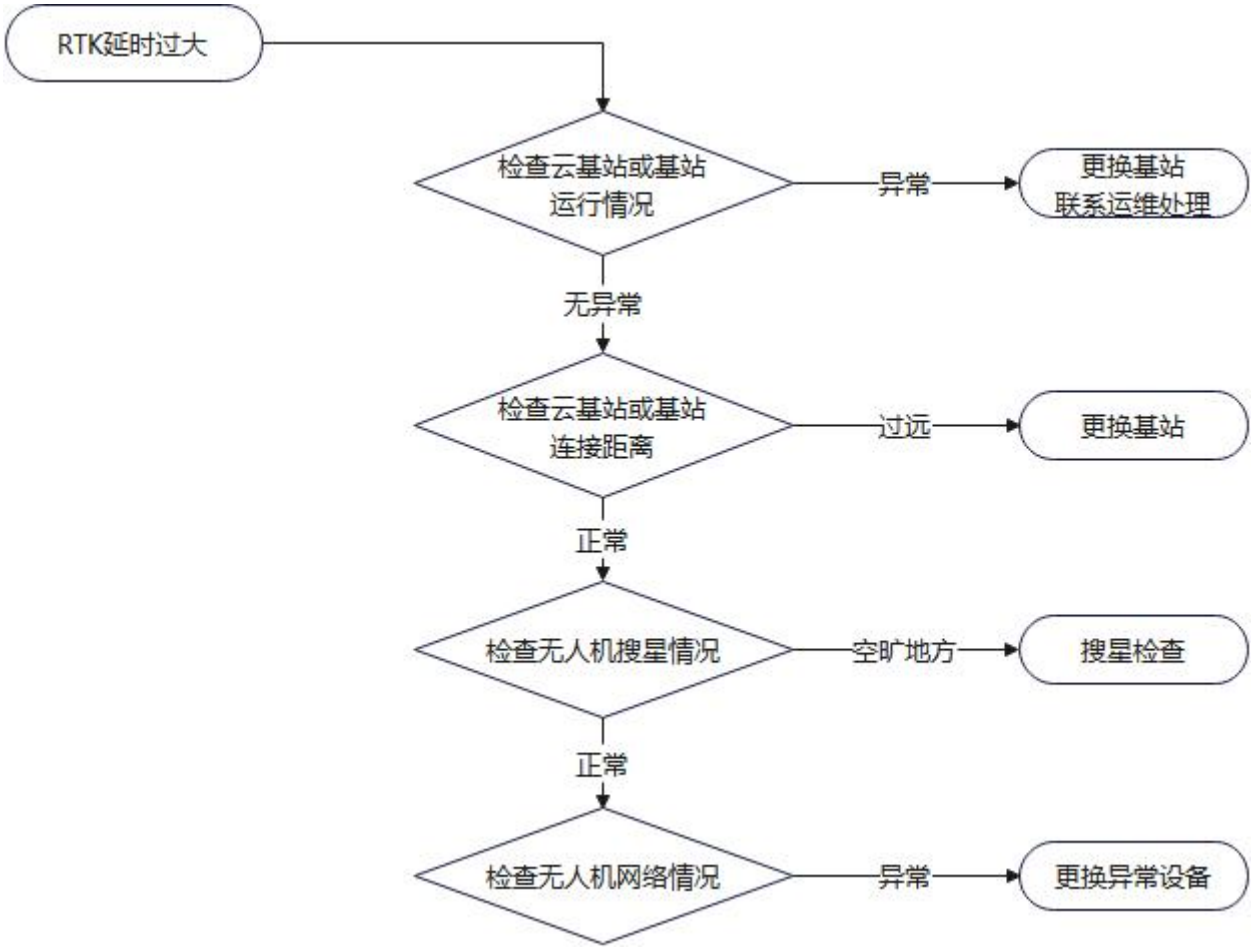
RTK Delay Too High

Cause Analysis

- The software or firmware has not been updated to the latest version.
- The RTK antenna or feeder cable is loose, damaged, or has poor contact.
- The internal antenna of the flight control system is loose, or the flight control system itself is faulty.

Troubleshooting Steps and Solutions

- Verify that the XAG One App and all module firmware versions are up to date.
- Check whether the RTK connection is correct and ensure there are no loose, damaged, or poorly connected parts.
- Ensure the equipment is outdoors, in an open area, free from large obstructions such as tall buildings or windbreaks.
- Detach the left and right RTK antenna heads one by one, and inspect the connections between the feeder cable and antenna head for any damage, looseness, or abnormalities. Replace if necessary.
- If the antennas and feeder cables show no visible issues, install each antenna individually for ground testing. Observe whether the satellite count and positioning accuracy are normal (satellite count above ~25, positioning accuracy less than 0.1 m). Identify if any RTK antenna is faulty, and replace it if needed.
- If both antennas are functioning properly, proceed with hover and flight tests. Check whether satellite count, positioning accuracy, and heading accuracy are normal (satellite count above ~25, positioning accuracy less than 0.1 m, heading accuracy less than 1). Before conducting tests, ensure that the terrain module is functioning properly, the downward vision lens is clean, and the ground texture is clear.



UAV Unable to Enter RTK or Exits Mid-Flight

Description

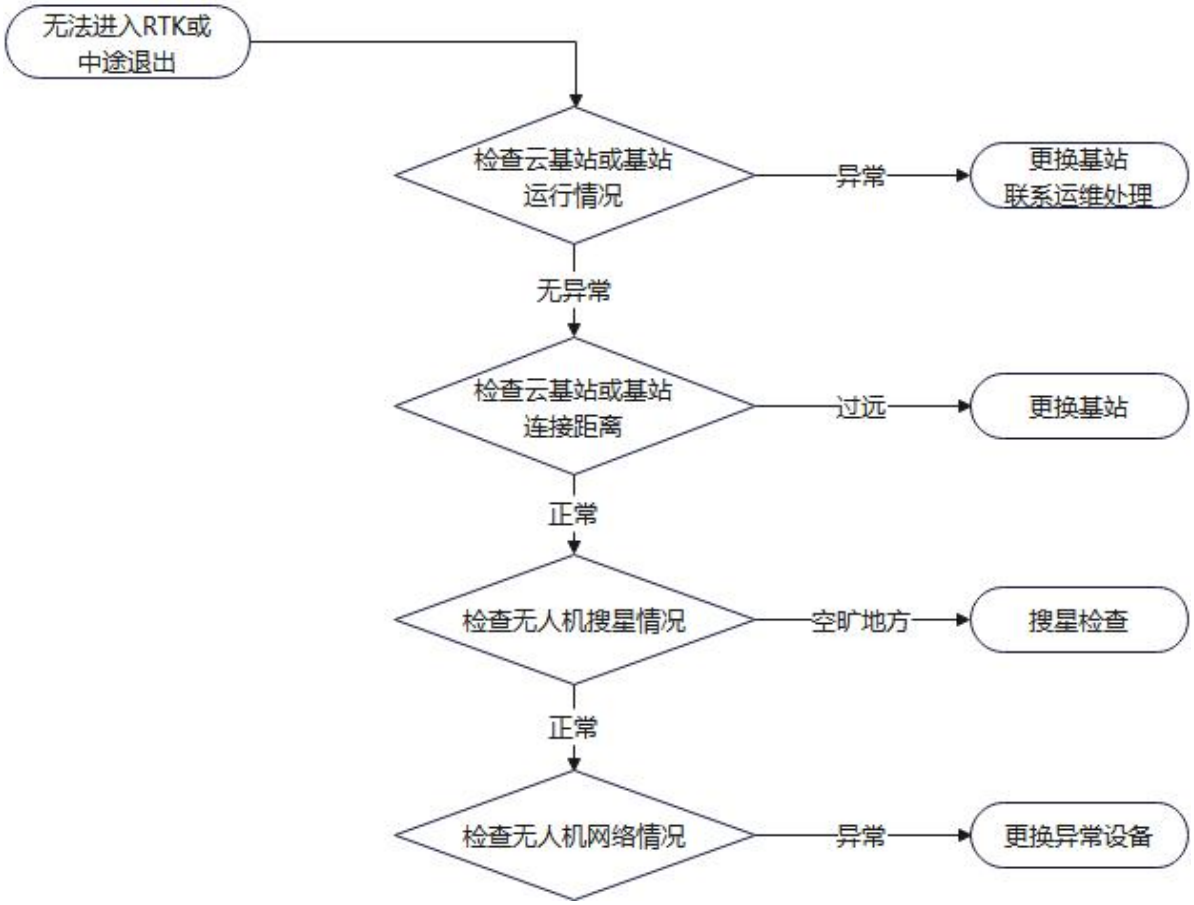
After the UAV is started normally, it cannot enter RTK mode, or after entering RTK mode, it exits RTK during operation.

Cause Analysis

- The UAV is placed indoors, resulting in unstable RTK signals.
- The RTK antenna is obstructed by foreign objects, affecting signal reception.
- RTK malfunction or poor contact at the antenna interface.

Troubleshooting Steps and Solutions

- If the agricultural UAV is indoors, move it to an open area with no obstructions above the UAV.
- Before the UAV enters RTK mode, do not place foreign objects over the RTK antenna, and keep personnel at least one meter away from the UAV.
- After the UAV has entered RTK mode, do not place any objects over or obstructing the RTK antenna. Check the antenna connections to ensure proper contact.
- Detach the left and right RTK antenna heads one by one, and inspect the connections between the feeder cable and antenna head for damage, looseness, or abnormalities. Replace if necessary.


无法进入RTK或
中途退出
检查云基站或基站
运行情况
异常
更换基站
联系运维处理
无异常
检查云基站或基站
连接距离
过远
更换基站
正常
检查无人机搜星情况
空旷地方
搜星检查
正常
检查无人机网络情况
异常
更换异常设备

Communication System

Error: “No device detected nearby” when adding agricultural UAV

Description

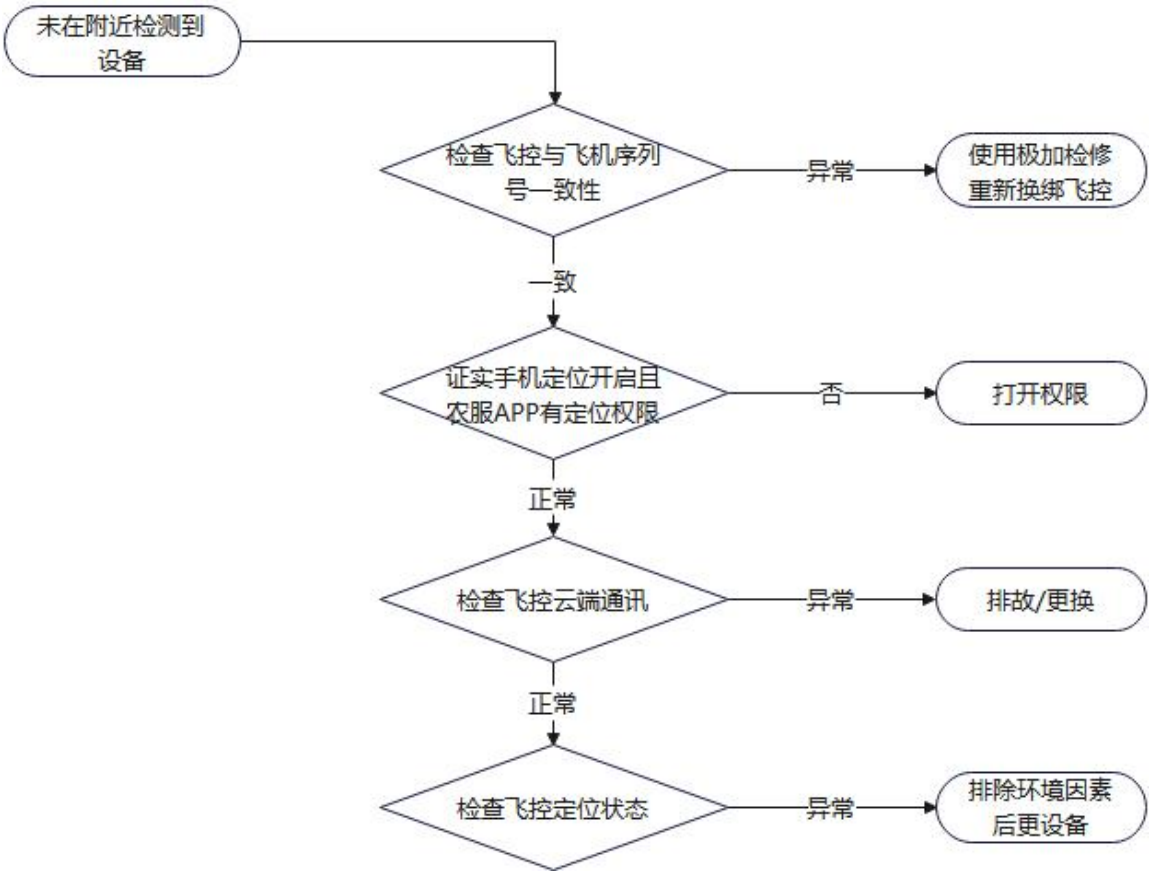
When attempting to add an agricultural UAV to the operation device list, the software reports an error stating “No device detected nearby.”

Cause Analysis

- The UAV has not been authorized or bound.
- The distance between the UAV and the mobile phone exceeds 1 km, triggering this error.
- The UAV's network communication is abnormal.
- The UAV's positioning system is abnormal.

Troubleshooting Steps and Solutions

- Before adding the device, confirm that the UAV has not been bound to another user, and ensure the physical flight control serial number matches the bound flight control serial number.
- If the UAV and the mobile phone are more than 1 km apart, this error may occur. Move the UAV to an open, unobstructed area, power it on, and ensure that the mobile phone's location services are enabled and that XAG One App has been granted location permissions.
- Check the flight control cloud communication indicator light to confirm that the UAV's network communication is normal. Check the flight control positioning status indicator to confirm that the UAV's positioning system is functioning properly.



Remote Controller Cannot Connect to the Phone.

Description

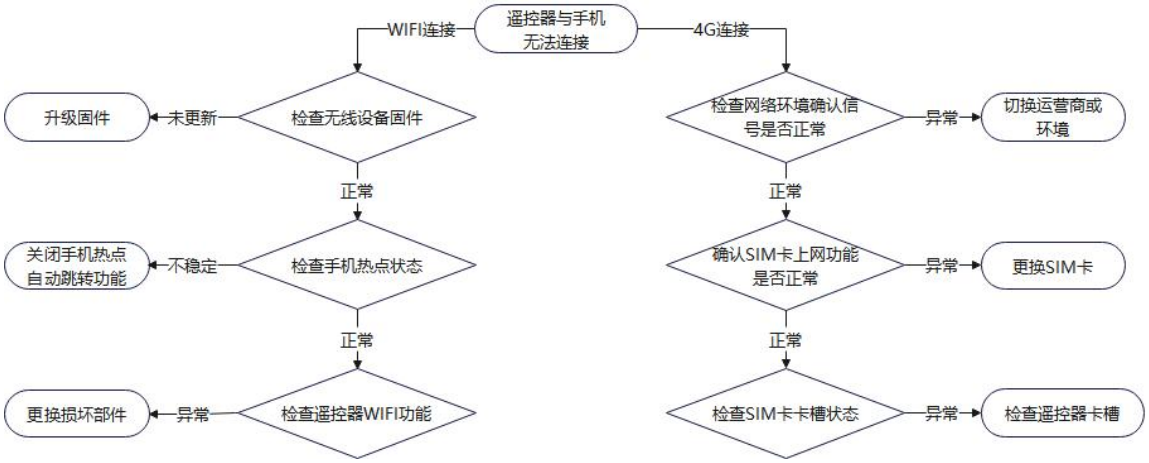
The mobile phone cannot successfully connect to it after powering on the remote controller.

Cause Analysis

- Network communication abnormality.
- Wi-Fi communication abnormality.

Troubleshooting Steps and Solutions

- When using a 4G connection, check the network environment and signal strength of both the mobile phone and the remote controller, and try switching to different carriers.
- Check whether the SIM card can access the internet (note: the built-in IoT card will be locked if removed from the device).
- Inspect whether the card slot is damaged; if so, return for factory service.
- When using Wi-Fi connection, check whether the firmware has been updated to the latest version.
- Ensure the mobile phone hotspot is correctly connected and not automatically disconnected.
- Check whether the Wi-Fi antenna or Wi-Fi module is damaged.



Remote Controller Cannot Bind to UAV

Description

The third UAV connection indicator light does not turn on, and the remote controller fails to bind with the agricultural UAV.

Cause Analysis

- Excessive 4G link latency or an outdated App version.
- Remote controller hardware failure.

Troubleshooting Steps and Solutions

- Check the network environment and signal strength of both devices, and try switching to different carriers.
- Use the networking function to connect via a local area network (LAN).
- Replace the remote controller to rule out hardware issues.

无线通信灯	状态说明
绿色常亮	与无人机通信正常
绿色单闪	遥控器通信初始化中
黄色单闪	组网模式中
熄灭	未连接无人机

Remote Controller Red Light Flashing, Unable to Switch to Green Light Flashing

Description

After normally starting the control stick, all six indicator lights continue flashing red and do not switch to flashing green.

Cause Analysis

- Misoperation of the remote controller function key, causing the controller to enter device update or frequency-matching mode.
- Abnormality in remote control data network access.

Troubleshooting Steps and Solutions

- If this occurs during the upgrade process, it is a normal phenomenon. Please wait for the flashing to complete. The controller will automatically shut down after about 1 minute.
- If the red light flashing appears every time the device is powered on, enter U-disk mode and use a computer to format the U-disk.
- If in binding mode (available in models after 2021): if it keeps flashing or extinguishes after flashing without successful binding, check the network status.
- After normal startup, check whether the third indicator light keeps flashing. If it does, follow troubleshooting steps in section 5.5.
- After normal startup, check whether the second indicator light is on. If not, it indicates a failure to connect to the network.
- Check whether the SIM card can access the network. Reinsert or replace the SIM card, and try switching to a different carrier. In general, the signal strength ranking is: China Mobile > China Telecom > China Unicom.

移动网络灯	状态说明
绿色常亮	内网通讯正常
绿色单闪	内 / 外网通讯正常
黄色常亮	LNT 模式通讯正常
红色常亮	通讯异常
熄灭	未检测到 SIM 卡

Remote Controller Third Green Light Keeps Flashing After Startup

Description

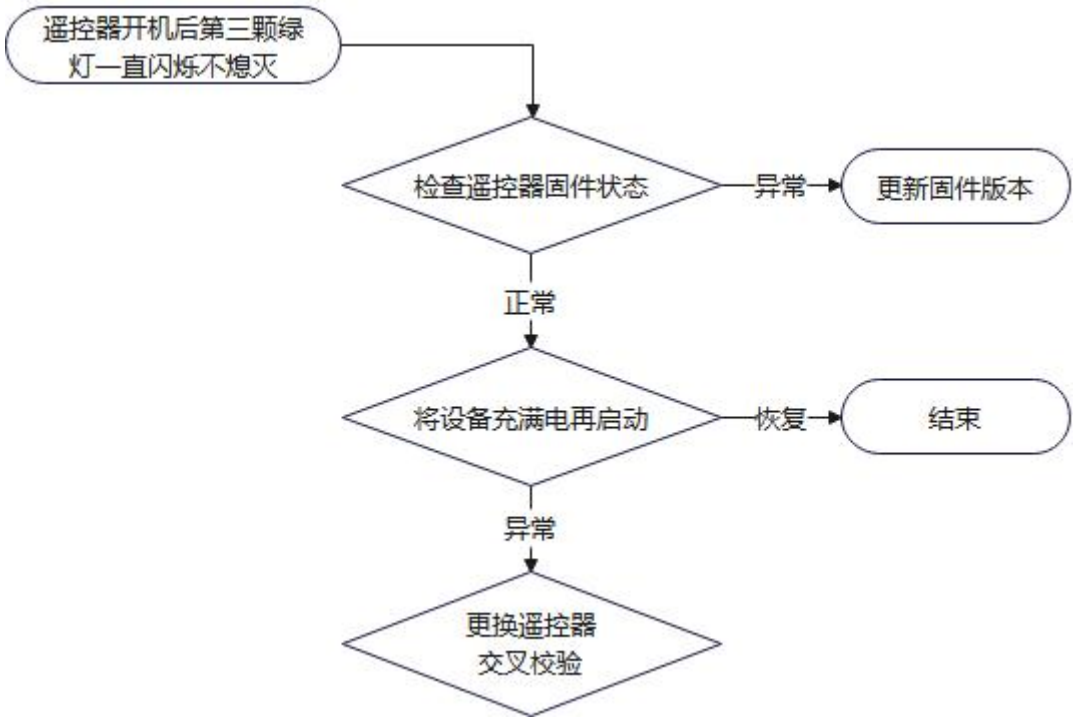
After the remote controller is powered on, the third green indicator light keeps flashing and does not go out.

Cause Analysis

- The remote controller mainboard firmware is not updated to the latest version.
- The remote controller battery is low.
- Remote controller Wi-Fi module failure or Wi-Fi firmware issue.

Troubleshooting Steps and Solutions

- Upgrade the remote controller mainboard firmware to the latest version.
- Charge the remote controller and then power it on again.
- Check whether the remote controller has been dropped; impact may damage the Wi-Fi module and cause poor contact.



Carrier Network Switching Failure

Description

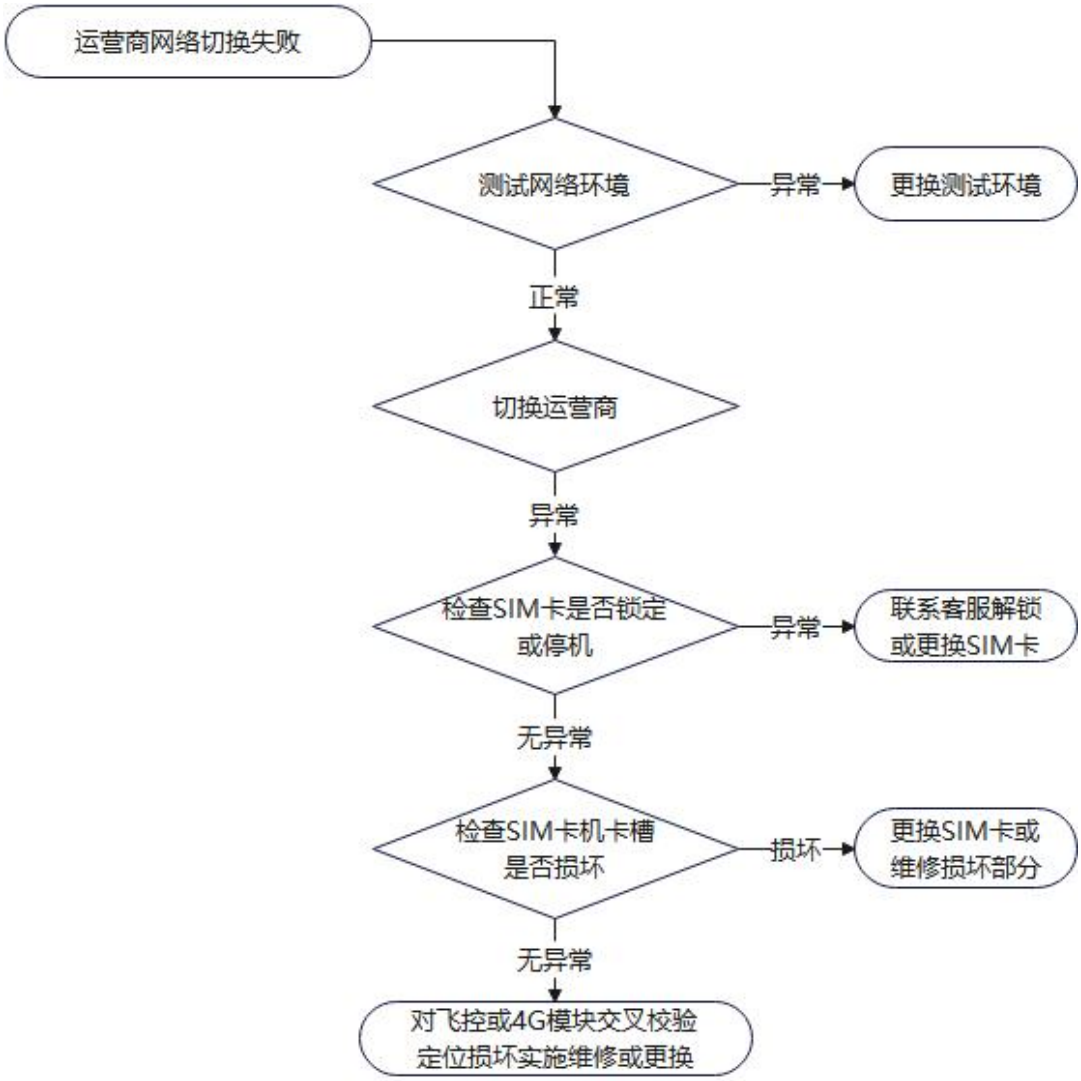
Due to operational requirements, the mobile device cannot complete the carrier network switch.

Cause Analysis

- Hardware issue: 4G module malfunction, flight control system cannot recognize the module.
- SIM card or card slot hardware fault, resulting in the SIM not being detected.
- Repeated insertion/removal of the SIM card, or carrier-side issues, may lead to card lock or service suspension.
- Poor local network signal of the corresponding carrier.
- Poor current carrier network quality, causing commands from the App to fail to reach the device.

Troubleshooting Steps and Solutions

- Confirm that the network conditions at the current location are good, and try again with a functional SIM card.
- Replace the flight control system.



RevoSpray System

Spraying System Calibration Failed

Description

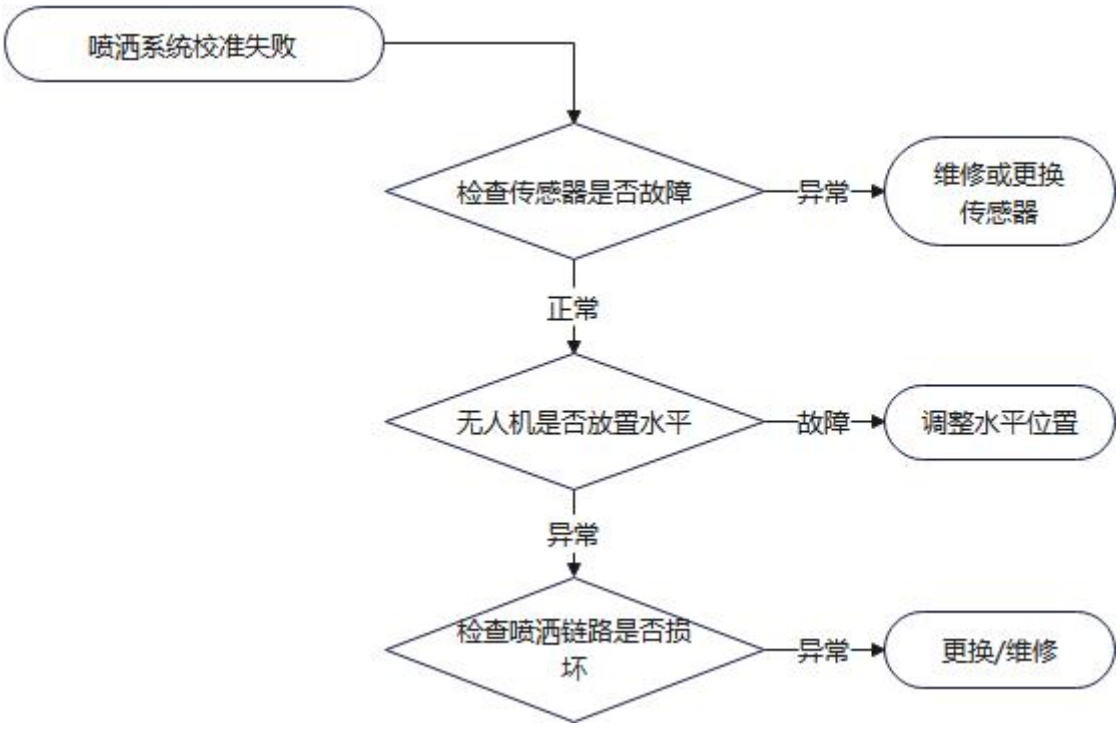
After upgrading firmware, replacing nozzles, pumps, or other pipeline components, the spraying system fails calibration, and the App displays a calibration failure message.

Cause Analysis

- Poor network signal.
- The water volume in the tank is either too high or too low during calibration.
- The UAV is not placed on a level surface for calibration.
- Anomaly in the spraying system pipeline or module.
- Pressure sensor failure.

Troubleshooting Steps and Solutions

- Run a network health check to ensure stable connection and normal latency.
- Add an appropriate amount of clean water according to App instructions; do not overfill or underfill.
- Place the UAV on a level surface and restart calibration.
- Ensure that the Impeller Pump, nozzle, and cut-off valve are functioning normally.
- Confirm the pipeline is intact with no damage, connections are secure, and the tank cap is tightened.
- After filling with water, check if the App displays changes in liquid level; if not, replace the tank sensor.



Spraying System Offline

Description

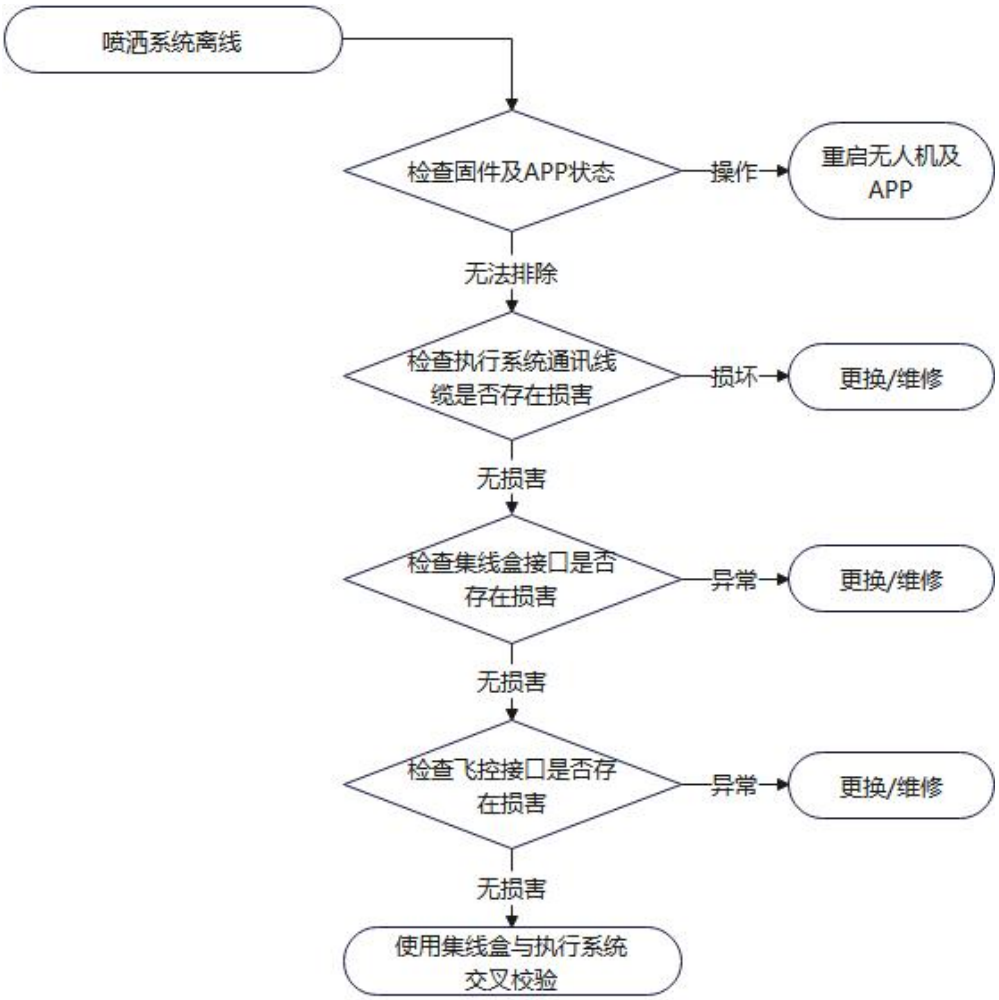
The XAG One App displays a prompt indicating that the spraying system is offline.

Cause Analysis

- Firmware not updated to the latest version, system not online.
- Communication failure between the payload system and the UAV.
- Malfunction of the distribution board.
- Flight control system malfunction.

Troubleshooting Steps and Solutions

- Ensure load cable connections are secure, with no open circuits or short circuits.
- Inspect the distribution board for damage.
- Restart the UAV and the App.
- Replace the flight control system.



Inaccurate Flow Rate, Large Error

Description

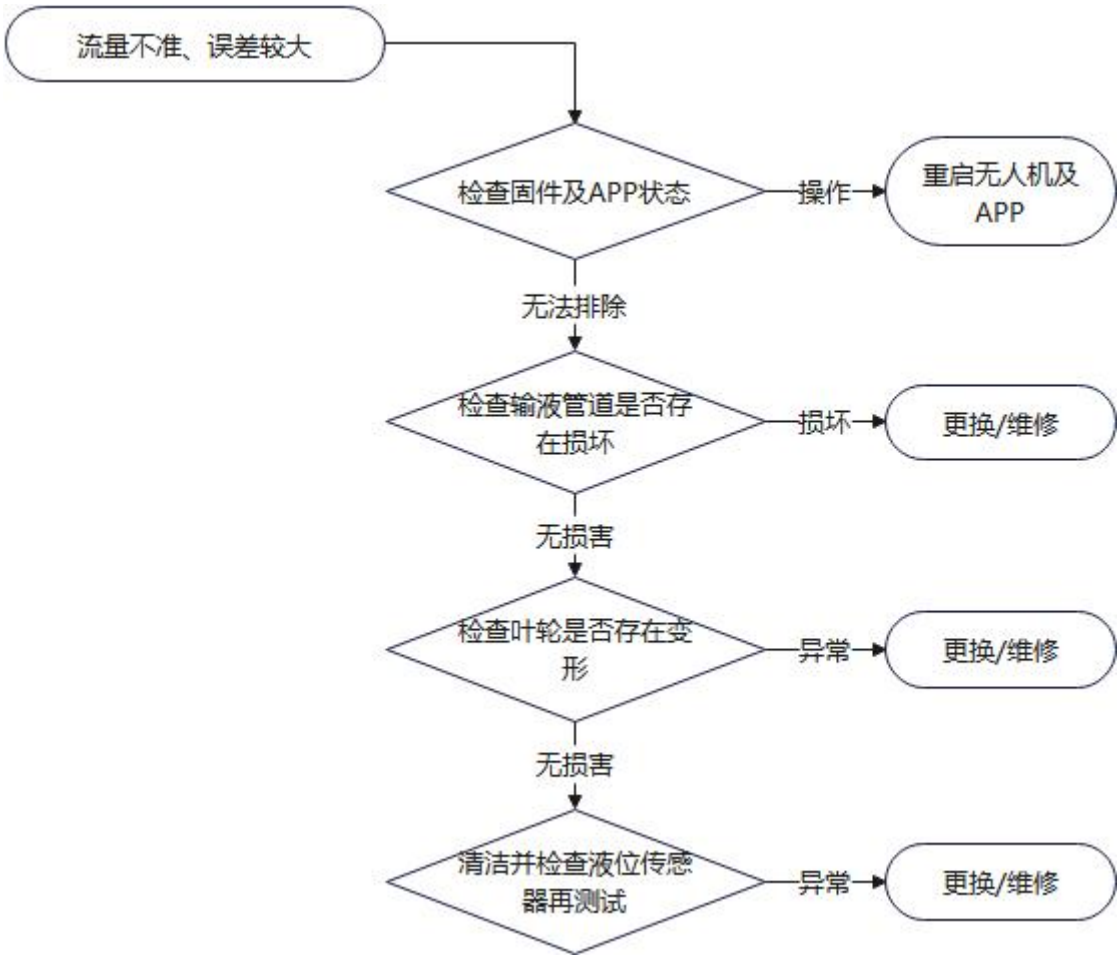
The actual spraying flow rate differs significantly from the flow rate set in the App, with a large error.

Cause Analysis

- UAV firmware not updated to the latest version.
- Blockage or air leakage in the pipeline or tank outlet, resulting in poor sealing.
- Impeller or oil seal is deformed.
- Pressure sensor malfunction.

Troubleshooting Steps and Solutions

- Check that the spraying firmware is updated to the latest version.
- Inspect the entire spraying pipeline and tank outlet for cracks, leakage, wear, or blockages.
- Check whether the impeller is deformed or otherwise abnormal.
- Clean and inspect the liquid level sensor, then retest.



Nozzle Motor Speed (Current) Abnormal

Description

The XAG One App displays an alert indicating that the nozzle motor speed (current) is abnormal.

Cause Analysis

- Firmware not updated to the latest version.
- Spraying signal cable worn, aged, or the spray disc is stuck.
- Internal nozzle corrosion or short circuit caused by liquid ingress.

Troubleshooting Steps and Solutions

- Ensure all spraying-related firmware is updated to the latest version.
- Manually rotate the spray disc to check for jamming or significant resistance.
- Inspect the nozzle signal cable for wear, aging, or damage.
- Swap nozzles between sides to test; if the issue persists, replace the nozzle motor.

Pump Motor Speed (Current) Abnormal

Description

The XAG One App displays an alert indicating that the pump motor speed (current) is abnormal.

Cause Analysis

- Firmware not updated to the latest version.
- The connection cable between the Impeller Pump and the load distribution board is damaged or communication is abnormal.
- Pump impeller or oil seal swollen or deformed.
- Filter screen at the bottom of the tank clogged.
- Spraying pipeline blocked or bent.

Troubleshooting Steps and Solutions

- Check if the firmware is updated to the latest version.
- Inspect the connection cable between the load distribution board and the pump for damage.
- Check the impeller and oil seal for deformation or swelling.
- Inspect the filter screen at the bottom of the tank for blockages.
- Examine the spraying pipeline to ensure it is free of bends or clogs.

Nozzle Motor Offline

Description

The XAG One App displays a warning indicating that the nozzle motor is offline.

Cause Analysis

- Poor contact or disconnection between the nozzle signal cable and the ESC.
- Nozzle motor damage.

Troubleshooting Steps and Solutions

- Check whether the nozzle signal cable is properly connected or if there is any disconnection.
- Replace one nozzle motor for testing. If the offline warning persists, the issue lies with the connection cable; if the problem is resolved, the motor itself is faulty.

Pump Motor Offline

Description

The XAG One App displays a warning indicating that the pump motor is offline.

Cause Analysis

- Poor contact of the pump signal cable.
- Pump signal cable failure.
- Pump motor failure or pump ESC board failure.

Troubleshooting Steps and Solutions

- Inspect the connection between the pump and the load distribution board for any damage or poor contact.
- Replace the pump signal cable for testing.
- Replace components one by one to identify the fault location.

Submodule Mismatch

Description

During spraying operations, the XAG One App reports a “Submodule Mismatch” error.

Cause Analysis

- Certain submodules (pump, nozzle, tank sensor) are malfunctioning.
- Spraying-related firmware has not been updated to the latest version.
- Flight control system malfunction.

Troubleshooting Steps and Solutions

- Check spraying-related firmware and update it to the latest version.
- Enter the 'Submodule Troubleshooting' interface, select the submodule listed as abnormal, and follow the troubleshooting guide to resolve the issue.
- If all checks show no issues but the problem persists, replace the flight control system for further testing.

RevoCast System

RevoCast System Calibration Failure

Description

The RevoCast system connects to the flight control system through the PLD signal cable, with power supplied by the load distribution board. When calibrating the RevoCast through the XAG One App, if a calibration failure message appears, it indicates that the calibration process was not completed successfully.

Cause Analysis

- Firmware not updated to the latest version.
- Insufficient calibration particles loaded in the Granule Container.
- The Screw Feeder is not fully covered with calibration particles.
- Discharge port blockage.
- Screw Feeder motor or centrifugal disc motor failure.
- Hall sensor or Screw Feeder magnet malfunction, or damaged load connection cable.
- Granule Container sensor failure.

Troubleshooting Steps and Solutions

- Check firmware by opening the XAG One App and confirm whether updates are available; if so, update device firmware to the latest version.
- Confirm that the Granule Container of the agricultural drone is fully loaded with calibration particles.
- Verify that calibration particles continuously cover the Screw Feeder during calibration.
- Perform a manual spreading test to ensure the discharge port is not blocked and the Screw Feeder type is correctly selected.
- Perform a manual spreading test to check whether the Spread Disc Motor and Screw Feeder Motor are functioning properly.
- Inspect the Screw Feeder magnet for demagnetization or damage, check the Hall sensor for faults, and verify the integrity of the load connection cable.
- Use XAG Cloud to observe whether the Granule Container sensor's detected values change; if no change is observed, replace the Granule Container sensor.

RevoCast System Offline / Execution System Recognition Error

Description

The RevoCast system connects to the flight control system through the PLD signal cable, with power supplied by the load distribution board to each RevoCast module. During task execution, the flight control system sends control commands to the RevoCast system. If the RevoCast system does not respond after the flight control system issues a command, it indicates that the RevoCast system is offline or not connected.

Cause Analysis

- Firmware not updated to the latest version.
- Communication failure between the Payload System and the agricultural UAV.
- Malfunction of the distribution board or load distribution board.
- Flight control system malfunction.

Troubleshooting Steps and Solutions

- Verify whether the firmware has been updated to the latest version, then restart the agricultural drone and the App.
- Check whether the load cable is properly inserted and ensure there is no open circuit or short circuit.
- Inspect the central distribution board for damage.
- Replace the flight control system if necessary.

RevoCast Screw Feeder Motor Speed (Current) Abnormality

Description

Under normal conditions, the flight control system sends control signals through the central distribution board and load distribution board to the Screw Feeder ESC board. Upon receiving the control signal, the Screw Feeder ESC board outputs instructions to drive the Screw Feeder motor. When the Screw Feeder motor current is abnormal, it indicates a malfunction within the Screw Feeder motor module.

Cause Analysis

- Firmware not updated to the latest version.
- Screw Feeder motor jammed by foreign objects.
- Abnormalities in the Hall sensor or Screw Feeder magnet; or damage to the load connection cable.
- Poor contact between the Screw Feeder motor cable and the load distribution board.
- Fault in the load cable or distribution board.
- Screw Feeder motor malfunction.

Troubleshooting Steps and Solutions

- Confirm that all RevoCast system module firmware is updated to the latest version.
- Inspect the Screw Feeder motor for jamming, internal foreign objects, or other abnormal conditions.
- Check whether the Screw Feeder magnet is demagnetized or missing, verify the Hall sensor status, and inspect the load connection cable for damage.
- Ensure the Screw Feeder motor cable is securely connected to the load distribution board and is undamaged.
- Verify that the load cable is intact and distribution board pins are not deformed.
- If no abnormalities are found but the Screw Feeder Motor current remains abnormal, replace the Screw Feeder Motor.

Granule Container Sensor Offline

Description

The Granule Container sensor is responsible for detecting the remaining material in the Granule Container. It is powered by the load distribution board and communicates with the flight control system via the same board. If the Granule Container sensor is offline, it means the flight control system cannot read the material level information from the RevoCast system Granule Container.

Cause Analysis

- Firmware not updated to the latest version.
- Granule Container sensor cable worn or poorly connected to the load distribution board.
- Granule Container sensor or load distribution board damaged.
- Load cable or distribution board fault.

Troubleshooting Steps and Solutions

- Confirm that all RevoCast system module firmware is updated to the latest version.
- First check whether the Granule Container sensor cable is intact, then check whether the connection between the Granule Container sensor and the load distribution board is secure.
- Update the RevoCast system firmware to the latest version. Observe the Granule Container sensor indicator:

  If no green light flashes, the Granule Container sensor power supply is abnormal.

  If the green light is steady on, the Granule Container sensor power supply is normal.
- Internal LED indicators:

  red double-flash = communication offline;

  yellow double-flash = communication normal.
- If the Granule Container sensor power supply is abnormal or communication is offline, replace the Granule Container sensor.
- If replacing the Granule Container sensor does not resolve the power or communication issue, inspect or replace the load distribution board, load cable, and distribution board.

RevoCast Spread Disc Motor Speed (Current) Abnormal

Description

The flight control system sends control signals sequentially through the central cable hub and the load distribution board to the disc motor ESC. After receiving the control signals, the disc motor ESC outputs commands to control the disc motor. When the disc motor speed/current is abnormal, it indicates that the disc motor is in an abnormal state.

Cause Analysis

- Spread Disc Motor firmware not updated to the latest version.
- Disc obstructed by foreign objects, affecting speed.
- Disc motor wiring abnormal.
- Poor contact between disc motor wiring and load distribution board.
- Load cable or distribution board fault.
- Disc motor failure.

Troubleshooting Steps and Solutions

- Confirm that all RevoCast system module firmware has been updated to the latest version.
- Check whether the disc is obstructed by foreign objects and clean if necessary.
- Check whether the disc motor wiring is intact and undamaged.
- Ensure the disc motor wiring is securely connected to the load distribution board and not damaged.
- Confirm that the load cable is intact and that the distribution board connector pins are in good condition without deformation.
- If the above steps do not resolve the abnormal Spread Disc Motor speed/current, replace the Spread Disc Motor with a new one.

RevoCast Screw Feeder Motor Offline

Description

The Screw Feeder motor connects to the flight control system through the load distribution board and the central cable hub. When controlling the Screw Seeder motor to rotate, the flight control system transmits control signals to the load distribution board, which then sends commands through the Screw Feeder ESC to drive the Screw Feeder motor and feedback information to the flight control system. If, after powering on, the software shows the Screw Feeder Motor as offline and unresponsive, it indicates that the Screw Feeder Motor has entered an offline state.

Cause Analysis

- Device firmware not updated to the latest version.
- Screw Feeder motor cable damaged.
- Poor contact or damage between the Screw Feeder motor cable and the load distribution board.
- Screw Feeder motor failure.
- Load cable or distribution board fault.

Troubleshooting Steps and Solutions

- Confirm that all RevoCast system module firmware has been updated to the latest version.
- Check that the Screw Feeder motor cable is intact and undamaged.
- Ensure the Screw Feeder motor cable is securely connected to the load distribution board and not damaged.
- Use diagnostic tools to test whether the Screw Feeder motor's functions and parameters are normal.
- Confirm that the load cable is intact and that the Central Cable Hub connector pins are in good condition without deformation.

Spread Disc Motor Offline

Description

The Spread Disc Motor is connected to the flight control system through the load distribution board and the Central Cabin Hub. When controlling the Spread Disc Motor, the flight control system transmits control signals to the load distribution board. After receiving the control signals, the spread disc ESC outputs instructions to drive the Spread Disc Motor and feeds back information to the flight control system. If, after powering on, the software shows the Spread Disc Motor as offline and unresponsive, it indicates that the motor has entered an offline state.

Cause Analysis

- Device firmware has not been updated to the latest version.
- Spread Disc Motor cable is damaged.
- Spread Disc Motor cable has poor contact with or is damaged at the load distribution board.
- Spread Disc Motor malfunction.
- Load cable or distribution board malfunction.

Troubleshooting Steps and Solutions

- Confirm that all modules of the RevoCast system have been updated to the latest firmware version.
- Check whether the Spread Disc Motor cable is intact and undamaged.
- Ensure the Spread Disc Motor cable is properly connected to the load distribution board and not damaged.
- Use test fixtures to check whether the Spread Disc Motor functions and parameters are normal.
- Confirm that the load cable is intact and the pins of the distribution board are in good condition without deformation.

Inaccurate Remaining Material Reading on Return

Description

The remaining amount in the Granule Container is detected by the Granule Container sensor. When using the RevoCast system for the first time, or after replacing with new spreading granules or a different model of Screw Feeder, a spreading calibration must be performed. If, after the agricultural UAV completes its operation, the detected remaining material in the Granule Container differs significantly from the calculated spreading amount, it indicates that the Granule Container sensor′ s residual material detection is inaccurate.

Cause Analysis

- The XAG One App has not been updated to the latest version.
- Device firmware has not been updated to the latest version.
- The RevoCast system was used for the first time or new spreading granules/Screw Feeder were replaced without completing calibration.
- Granule Container sensor malfunction.

Troubleshooting Steps and Solutions

- Check the XAG One App and confirm it is updated to the latest version.
- Confirm that all RevoCast system module firmware has been updated to the latest version.
- When using the RevoCast system for the first time, or when replacing with new spreading granules/Screw Feeder, recalibrate the RevoCast system.
- If, after the above checks, the remaining material amount on return is still inaccurate, replace the Granule Container sensor with a new one.

Chapter VI: Agricultural Drone Maintenance and Servicing Recommendations

Overview

Agricultural drones operate and are stored in harsh environments. To ensure the reliability and stability of equipment operation, inspections of key components and necessary maintenance should be performed once the equipment has reached a certain operating duration. Maintenance and servicing are critical parts of the equipment′ s entire life cycle. A lack of proper maintenance or failure to implement it strictly may result in serious operational safety hazards, posing risks to human life and property safety.

- Maintenance is mainly divided into ″General Maintenance″ and ″Special Maintenance″.

General Maintenance is primarily carried out once a specific number of flight hours has been reached within the operational cycle. It focuses on the inspection and replacement of consumables, vulnerable parts, key structural components, as well as lubricating oil, during the equipment′ s operation.

- Special Maintenance includes Annual Maintenance and Airworthiness Maintenance.
  - Annual Maintenance is performed at the end of an operational season or before long-term storage. The main tasks include thorough cleaning of the equipment, inspection and replacement of key components, and lubricating oil.
  - Airworthiness Maintenance is carried out before equipment that has been in long-term storage is returned to service. Its purpose is to verify equipment reliability, structural integrity, and onboard software versions, ensuring the equipment meets operational requirements and flight safety standards.

General Maintenance Implementation Cycle and Definition

General maintenance is mainly divided into three categories: A / B / C.

Category A is user self-inspection, which can be performed by the user following the in-App operation guide.

Category B and Category C require inspection at an official or authorized service station, where service engineers will replace damaged parts or components that have reached replacement conditions.

Attribute	Classification	Cycle	Definition of Maintenance	Attribute
General Maintenance Program	**A**	Every 50 accumulated flight hours	After 50 accumulated flight hours, in addition to the routine App inspection guide, necessary checks must be carried out to ensure the safety and reliability of equipment operation.	**User self-inspection**
	B	Every 100 accumulated flight hours	Based on Category A inspection, after 100 accumulated flight hours, a major inspection must be performed. This includes inspection and replacement as necessary of motor bearings, propeller clamp bearings, key fuselage fasteners, and load system consumables.	**Service station execution**
	C	Every 150 accumulated flight hours	Based on Category B inspection, after 150 accumulated flight hours, inspections and key component replacements must be performed on key fuselage fasteners and load system consumables. Additionally, deformation calibration of arm assemblies and external frame structures is required.	**Service station execution**

After the completion of Category C inspection, if the equipment continues to operate, once it reaches 200 accumulated flight hours, the maintenance program should restart from Category A inspection.

General Maintenance Implementation Methods and Rules

Category	Inspection Item	50 hours (A)	100 hours (B)	150 hours (C)
		Inspection (V); Adjustment (A); Cleaning (C); Replacement (R); Lubrication (L); Tightening (T);		
Airframe Structure	Arm-to-fuselage connection screws	V	V+A	V+T
	Fuselage side beam fastening bolts	V	V+A	V+T
	Nose-to-crossbeam fastening bolts	V	V+A	V+T
	Motor mount-to-arm fastening bolts	V	V+A	V+T
	ESC fastening bolts	V	V+A	V+T
	Motor fastening bolts	V	V+A	V+T
	Sensor system fastening bolts	V	V+A	V+T
Power & Electrical System	Tail connector contacts	V+C	V+C	V+T
	Tail connector structure	-	V+A	V+T
	Exposed wiring	-	V+A	V+A
	Motor winding wires	-	V+C	V+C
	Motor rotor clearance	-	V	V
	Motor bearings	V	R	V
	Propeller clamp bearings	V	R	V
	Propeller blades	V+C	V+C	V+C
	Propeller spacers	R	R	R
Execution System	Load distribution box	V	V	V
	Load landing gear assembly	V	V+T	V
	RevoSpray Impeller Pump motor operation	V	V	V
	RevoSpray Impeller Pump reduction set	-	V+L	V
	RevoSpray pump body structure	V	V	V
	RevoSpray anti-drip valve	V	V+C	V
	RevoSpray liquid transfer tubing	V	V+C	V
	RevoSpray impeller	R	R	R
	RevoCast Screw Feeder body	V	V+C	V
	RevoCast Screw Feeder motor	-	V	V
	Feeding tube	V	V+C	V
	Spread Disc structure	V	V	V
	Vibration structure	V	V+L	V
	Spread Disc Motor	-	V	V

Special Maintenance Implementation Cycle and Definition

Special maintenance is divided into two categories: annual maintenance and airworthiness maintenance. These maintenance tasks must be performed at XAG direct service centers or authorized service stations.

Attribute	Classification	Cycle	Maintenance Definition	Attribute
Special Maintenance Program	**E**	**Annual Maintenance**	Annual maintenance is a special procedure carried out after the end of the operation season. Winter storage maintenance has no prerequisite maintenance requirements. This procedure includes comprehensive cleaning of the equipment, replacement of consumables, system firmware upgrades, and replacement of damaged parts as necessary.	**Service station implementation**
	F	**Pre-Operation Airworthiness**	Pre-operation airworthiness maintenance is an important procedure carried out before the start of the operation season. For equipment stored for a long period, this includes reliability checks, operational testing, firmware upgrades, and overall structural inspection to eliminate safety hazards and ensure operational reliability.	**Service station implementation**

General Maintenance Implementation Methods and Rules

Category	Inspection Item	**50 hours (A)**	100 hours (B)
		Inspection (V); Adjustment (A); Cleaning (C); Replacement (R); Lubrication (L); Tightening (T);	
Airframe Structure	Arm-to-fuselage connection screws	V+T	V+T
	Fuselage side beam fastening bolts	V+T	V+T
	Nose-to-crossbeam fastening bolts	V+T	V+T
	Motor mount-to-arm fastening bolts	V+T	V+T
	ESC fastening bolts	V+T	V+T
	Motor fastening bolts	V+T	V+T
	Sensor system fastening bolts	V+T	V+T
Power & Electrical System	Tail connector contacts	V+T	V+R
	Tail connector structure	V+T	V+T
	Exposed wiring	V+A	V+A
	Motor winding wires	V+C	V+C
	Motor rotor clearance	V	V
	Motor bearings	V	V
	Propeller clamp bearings	V	R
	Propeller blades	V+C	V+C
	Propeller spacers	R	R
Execution System	Load distribution box	V	V
	Load landing gear assembly	V+T	V+T
	RevoSpray Impeller Pump motor operation	V	V
	RevoSpray Impeller Pump reduction set	V	V+L
	RevoSpray pump body structure	V	V
	RevoSpray anti-drip valve	V	R
	RevoSpray liquid transfer tubing	V	V
	RevoSpray impeller	V	R
	RevoCast Screw Feeder body	V	R
	RevoCast Screw Feeder motor	V	V
	Feeding tube	V	V
	Spread Disc structure	V	V
	Vibration structure	V	V+L
	Spread Disc Motor	V	V

Key Component Independent Maintenance Methods

RevoCast System

- **Screw Feeder**: If the Screw Feeder needs to be stored for an extended period (more than three days), thoroughly clean the feed pipe and Screw Feeder body before storage to prevent residual material from adhering or solidifying.
- **Spread Disc Motor and Screw Feeder Motor**: If abnormal noise, jamming, or excessive current occurs during the operation of the Screw Feeder motor or spreading motor, promptly inspect the motor reduction assembly to confirm structural integrity. If intact, promptly apply gear lubricant to ensure smooth operation.

RevoSpray System

- **Impeller**: If the equipment requires long-term storage (more than three days) or before changing the applied liquid, thoroughly clean the Impeller Pump and piping to avoid residual liquid mixing and causing chemical reactions or corrosion that could lead to impeller swelling.
- **Pump Motor**: If abnormal noise, jamming, or excessive current occurs during pump motor operation, promptly inspect the motor reduction assembly to confirm structural integrity. If intact, promptly apply gear lubricant to ensure smooth operation.

Propulsion System

- **Motor Bearings**: If abnormal noise is detected in the main motor, disassemble and inspect the motor. If confirmed that there is no rubbing between rotor and stator, replace the motor bearings to eliminate the issue.
- **Three-Phase Wiring**: After prolonged use or long-term storage, check the tightness and surface condition of the TThree-Phase Wires connecting the main motor and the main ESC to ensure there is no looseness or corrosion. If looseness is found, promptly tighten. If corrosion is present, use rust remover on the motor end wiring. If corrosion cannot be removed or is found at the ESC end, replace the corresponding components.

Appendix

Introduction to Common Support Systems

TIS Introduction

TIS refers to the Technical Information System. XAG′ s TIS is web-based and allows for fast and accurate queries of EPC (Electronic Parts Catalog) information, including maintenance parts lists for each model, part quantities, replacement compatibility, and other key implementation details.

TIS also provides functions such as technical bulletin inquiries, technical document downloads, and service work order inquiries. Within TIS, users can access key standards and implementation methods for damage assessment and maintenance processes. It serves as a digitalized repair information platform.