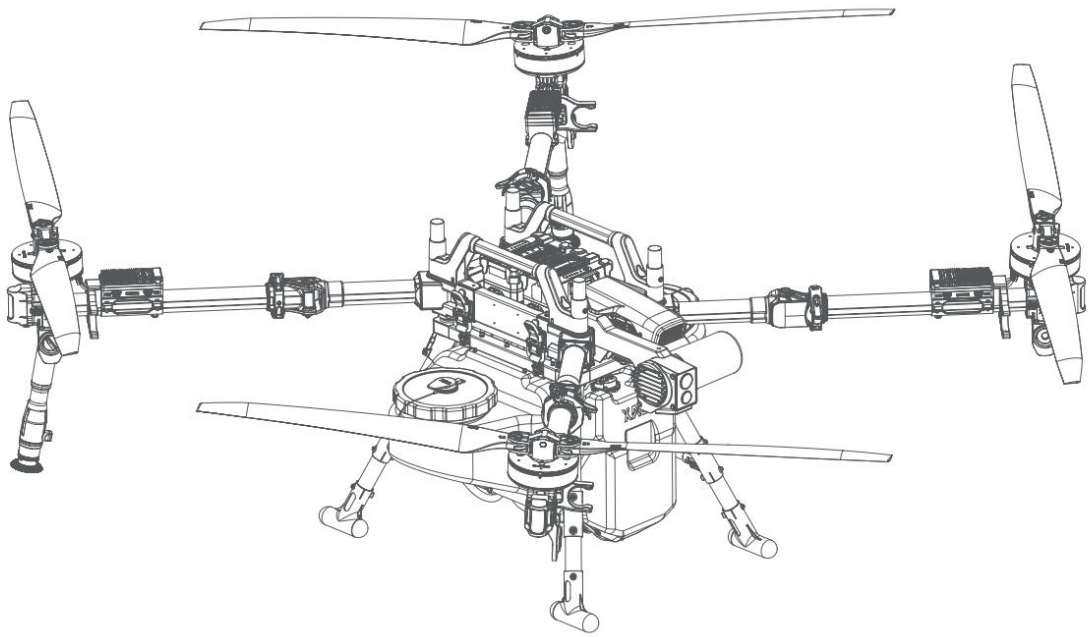
极飞科技2024款农业无人机

XAG 2024 Agricultural Drone

维修保养手册

Maintenance Manual

V1.3



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一、基础原理及系统介绍

Fundamental Principles and System Overview

前言概述
Overview

极飞 2024 款农业无人飞机（简称"无人机"）主要由以下几个部分组成：飞行器整机，操控系统，GNSS RTK 定位系统，电力系统。飞行器整机（包括飞行平台、执行系统）、动力系统（动力电调、动力电机、螺旋桨等）、电力系统（智能超充电池、充电管理器、移动超充站）、 GNSS RTK 高精度定位系统（由 SRC4 带屏遥控器、ACS4单手控及XRTK6手持测绘器、云基站）、感知系统（SUPERX5 Pro 飞控、避障雷达、PSL 视觉影像）、执行系统（睿喷系统：药箱、叶轮泵、输液管、离心喷头；睿图系统：睿图模块；睿播系统：种箱、绞龙减速组、甩盘电机；睿运系统）、运营管理监控系统。

The XAG 2024 agricultural drone (referred to as the "drone") are mainly composed of the following parts: drone assembly, control system, GNSS RTK positioning system, and power system. Drone assembly (including aircraftand application system), propulsion system (main ESC, main motor, propeller, etc.), power system (Smart SuperCharge Battery, Intelligent SuperCharger, Supercharge Station), GNSS RTK high precision positioning system (SRC4 Smart Remote Controller, ACS4 Agricultural Control Stick 4 and XRTK6 Ground Module, cloud base station), sensor system (SUPERX5 Pro flight controller, 4D Imaging Radar, PSL camera), application system (RevoSpray system: liquid tank, impeller pump, liquid tube, centrifugal nozzle; RealTerra system: RealTerra module; RevoCast system: granule container, screw feeder gearbox, spreading disc motor; RevoCargo/RevoSling system), operation management monitoring system.

无人飞机系统组成
Drone System Composition

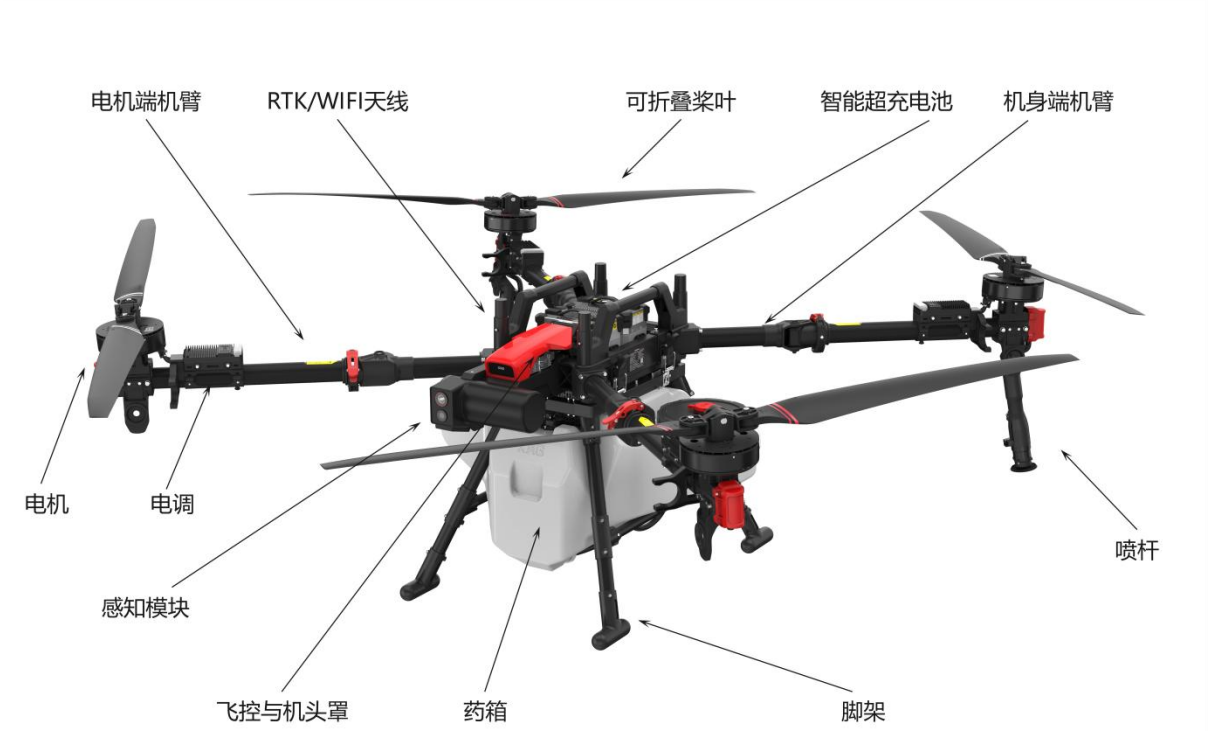
产品 Product	图片 Picture
农业无人飞机 Agricultural Drone	
操控系统 Control system	

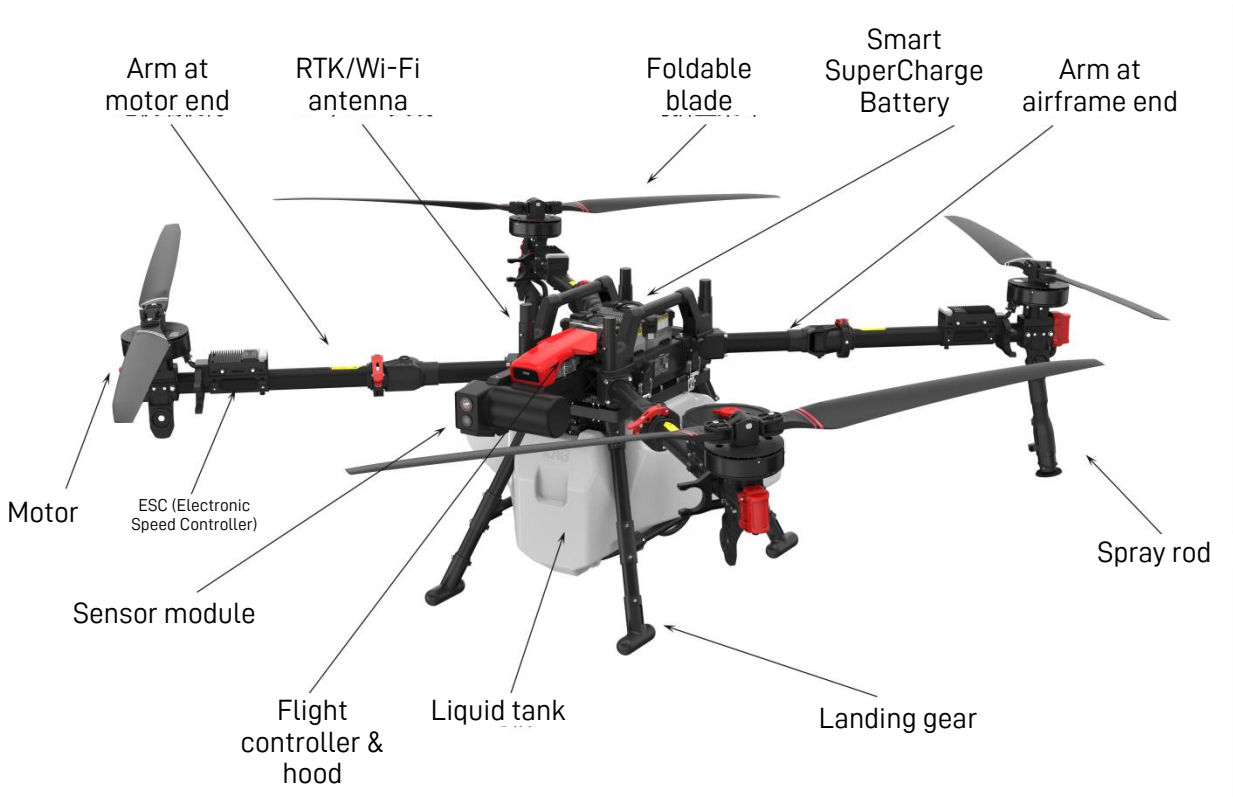
GNSS RTK高精度定位系统 GNSS RTK high precision positioning system	
电力系统 Power System	

2024款农业无人机系统组成
2024 Agricultural Drone System Components
P150及P60结构介绍
P150 and P60 Structures

P150 农业无人飞机外观可见部件有：可折叠螺旋桨、高性能电机、离心喷头、可折叠机臂、头罩 、机身、避障雷达、PSL 摄像头、执行系统、飞控、智能超充电池等。

The visible parts on the exterior of the P150 Agricultural Drone include: foldable propeller, high-performance motor, centrifugal nozzle, foldable arm, hood, airframe, obstacle avoidance radar, Pilot Sight Livestream camera, application system, flight controller, Smart SuperCharge Battery, etc.





注：图示为P150 农业无人机，P60 与P150 除电池数量存在差异外，总体结构及系统基本一致

Note: The figure shows the P150 Agricultural Drone. Except for the difference in the number of batteries, the P60 and the P150 have largely the same overall structure and system.

P150及P60执行系统
P150 and P60 Application Systems

P150 及P60 农业无人飞机的执行系统包括睿喷、睿播、睿运，集喷洒、播撒、测绘、运输于一身。

The application system of the P150 and P60 Agricultural Drones includes RevoSpray, RevoCast, RevoCargo/RevoSling, and integrates spraying, spreading, mapping and transportation features.

系统及原理介绍
System and Principle Introduction
飞控系统
Flight Controller System

飞行控制系统（以下简称飞控）之于无人机相当于无人机的"大脑"，是无人机完成起飞、空中飞行、执行任务、降落等整个飞行过程的核心系统，该系统可以保障无人机飞行稳定，降低操作员的操作难度，提高执行任务能力与飞行品质、增强飞行安全、减轻操作员负担。

The flight controller system (hereinafter referred to as the flight controller) is equivalent to the "brain" of the drone. It is the core system of the entire flight process of the drone, including takeoff, flight, performing tasks, and landing. The system can ensure the stability of the drone flight, reduce the operating difficulty of the operator, improve the ability to perform tasks and flight quality, enhance flight safety, and reduce the operator's burden.

飞控控制四旋翼农业无人机的飞行原理如下：首先，飞控中含有多个传感器，通过加速度计、陀螺仪、磁力计等多种传感器采集数据，加速度计测加速度，陀螺仪检测角速度，磁力计获取航向信息。然后，利用算法如互补滤波或卡尔曼滤波对这些数据进行融合与姿态解算，得出无人机的俯仰角、横滚角和偏航角。接着，基于设定的目标姿态和当前姿态的差值，飞控系统运用PID等控制算法计算出控制量，调整电机转速，实现对无人机姿态和位置的精确控制，确保其稳定飞行和完成各种任务。

The flight controller's principle for controlling the quad-rotor agricultural drone is as follows: First, the flight controller contains multiple sensors, such as accelerometers, gyroscopes, and magnetometers, to collect data. The accelerometer measures acceleration, the gyroscope detects angular velocity, and the magnetometer provides heading information. Then, the data is fused through algorithms such as complementary filtering or Kalman filtering, and then the attitude calculation is carried out to obtain the pitch, roll and yaw of the drone. Then, based on the difference between the set target attitude and the current attitude, the flight controller uses PID and other control algorithms to calculate the control outputs, adjust the motor speed, and achieve precise control of the drone's attitude and position, ensuring its stable flight and the completion of various tasks.

农业无人机上的避障模块，执行模块的正常运行也离不开飞控系统的控制，飞控与各模块协同运作，方使得无人机实现避障、定量喷洒、定量播种、自主飞行等功能。

The obstacle avoidance module and application module on the agricultural drone also rely on the flight controller for normal operation. The flight controller cooperates with these modules to enable functions such as obstacle avoidance, constant-rate spraying/seeding, and autonomous flight.

P150 飞控

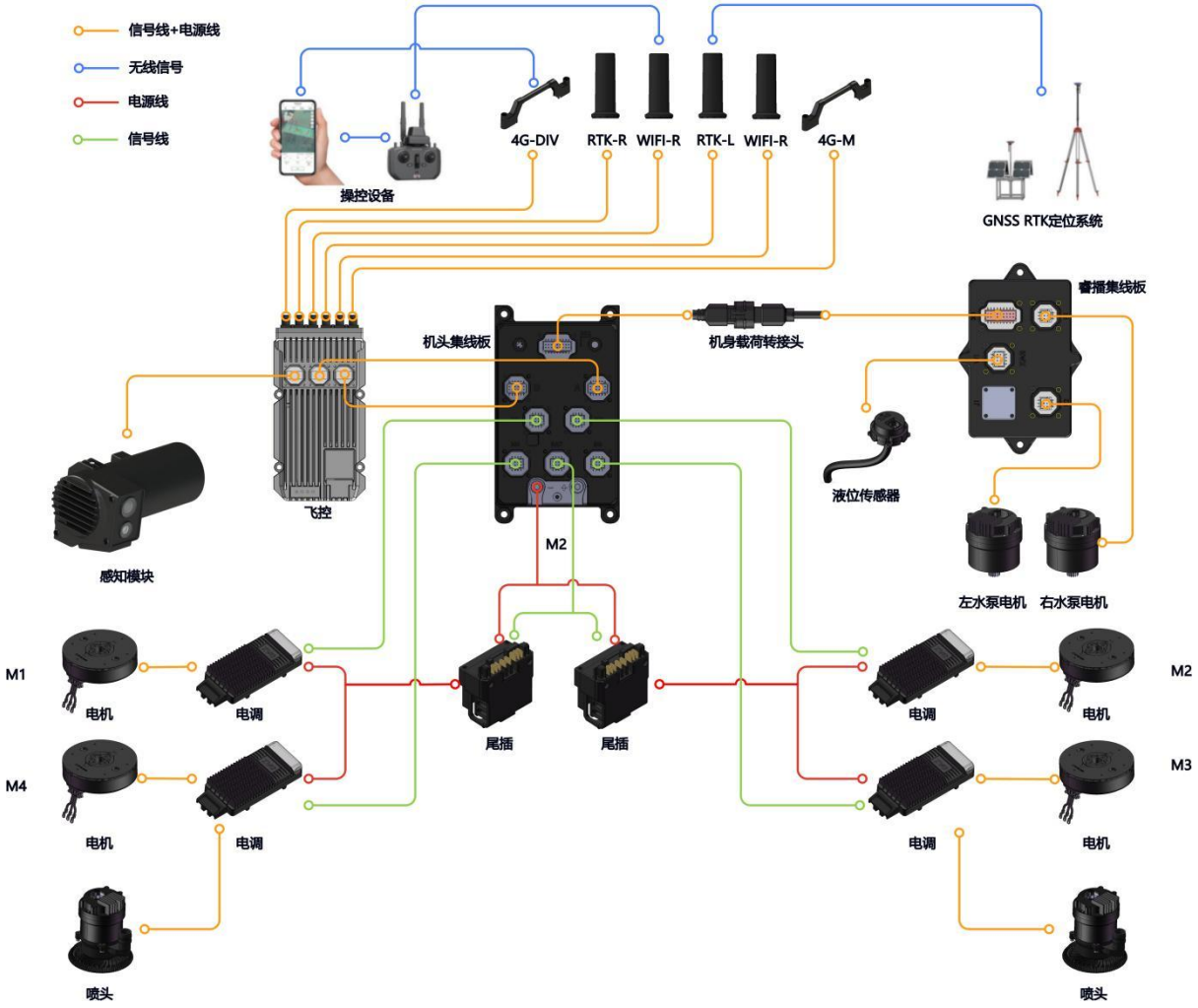
P150 Flight Controller

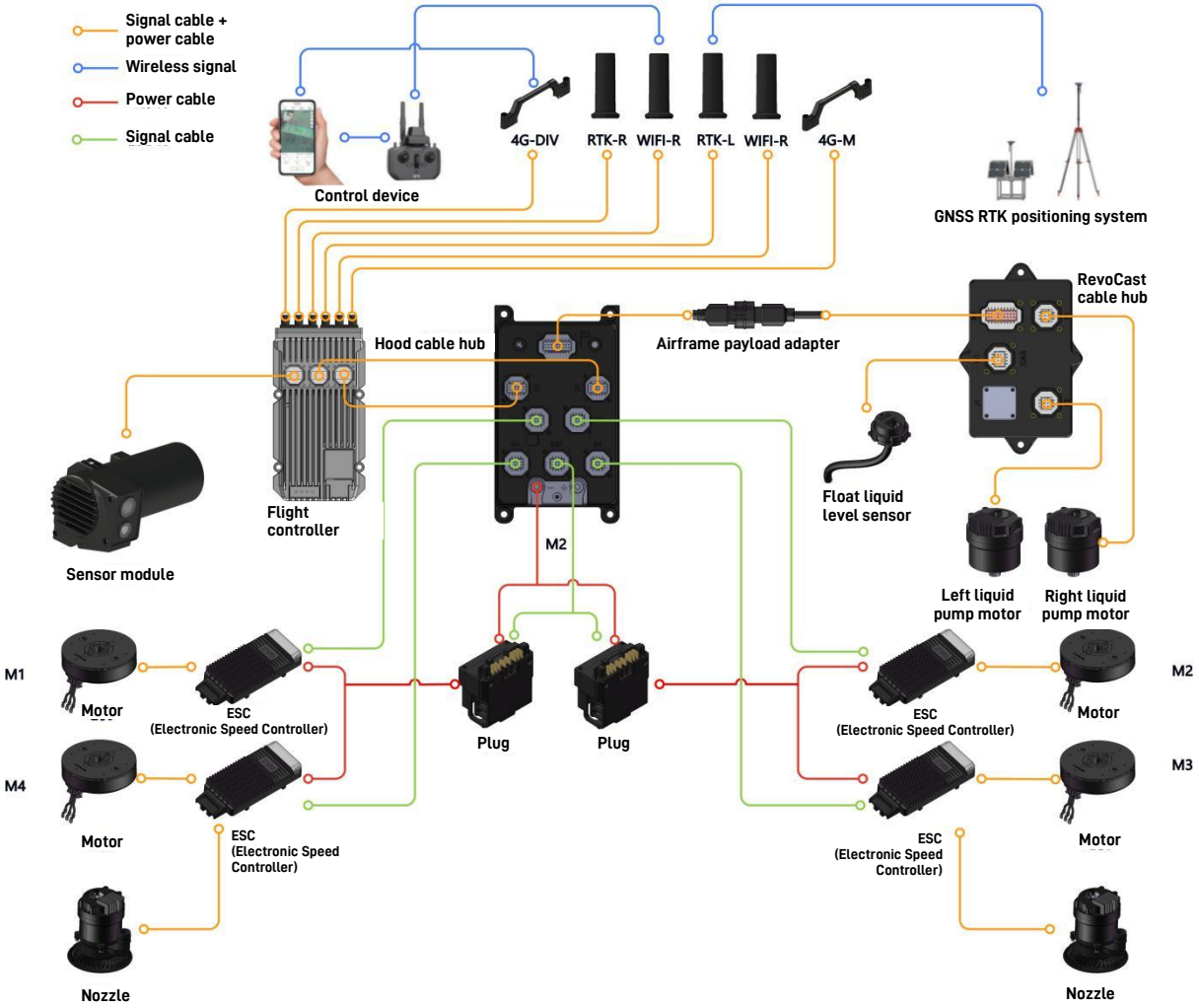
飞控与各系统模块连接

Flight Controller and Connections to Each System Module

无人机的飞行控制系统与各系统模块共同协作，集成了飞行控制、导航、传感器数据处理、通信、安全保护等多项功能，使得无人机能够在各种复杂环境下实现安全、可靠的飞行，其原理图如下所示：

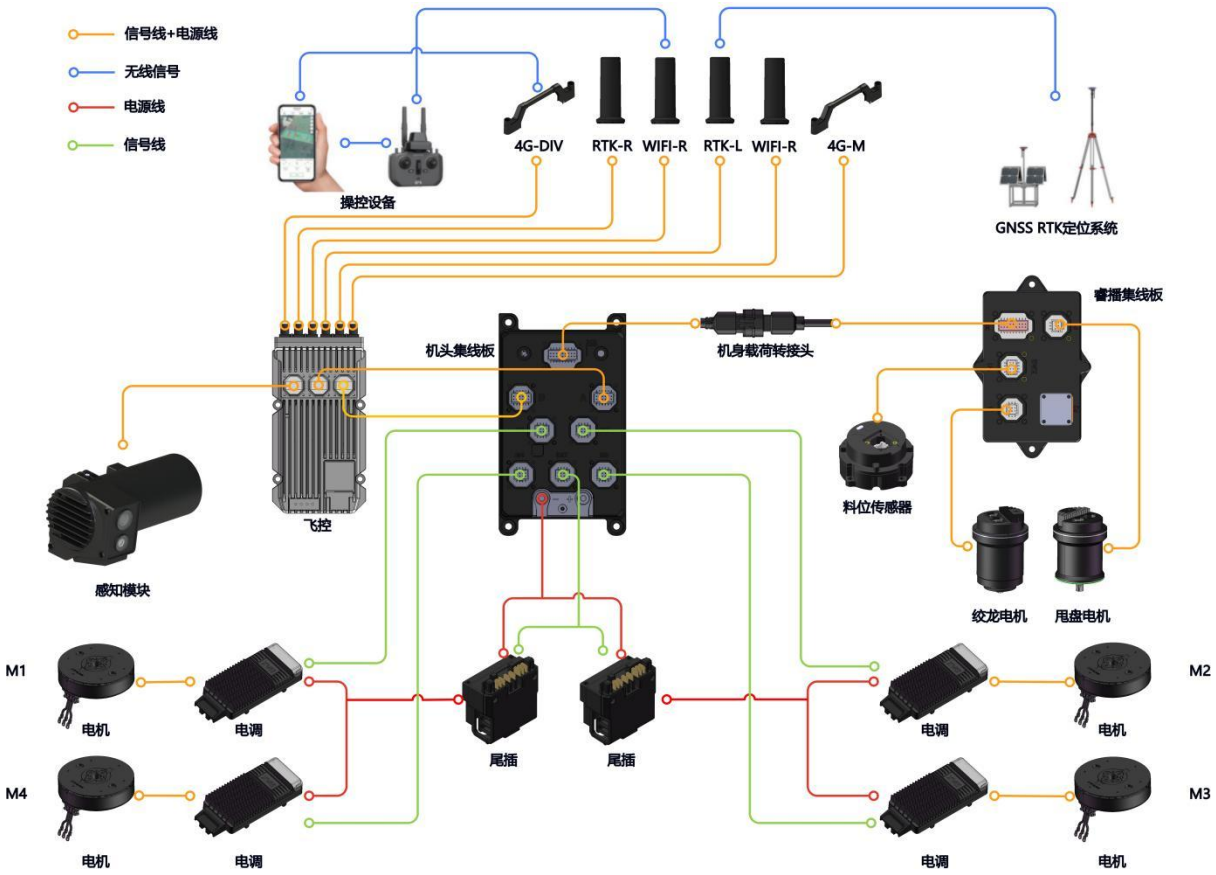
The flight controller system of the drone cooperates with various system modules, and integrates flight controller, navigation, sensor data processing, communication, safety protection and other functions, so that the drone can achieve safe and reliable flight in various complex environments. The principle diagram is as follows:





P150 /P60 睿喷各系统模块连接图

P150 /P60 RevoSpray System Module Connection Diagram


信号线+电源线
无线信号
电源线
信号线
操控设备
4G-DIV
RTK-R
WIFI-R
RTK-L
WIFI-R
4G-M
GNSS RTK定位系统
睿擂集线板
机头集线板
机身载荷转接头
飞控
料位传感器
感知模块
绞龙电机
甩盘电机
M1
M2
M3
M4
电机
电调
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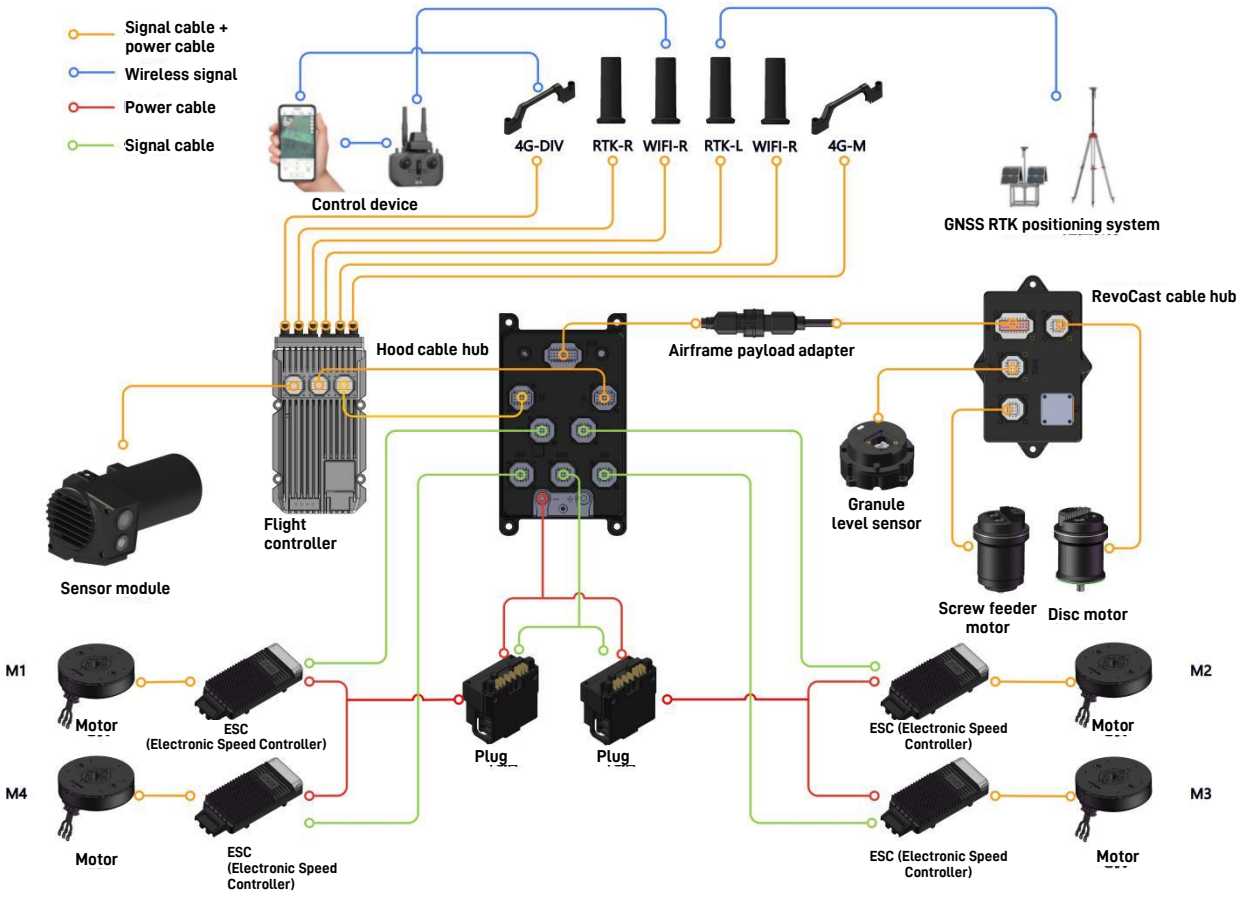


P150 /P60 睿播各系统模块连接图

P150 /P60 RevoCast System Module Connection Diagram

感知系统
Sensor System

感知系统主要功能介绍

Main Functions of the Sensor System

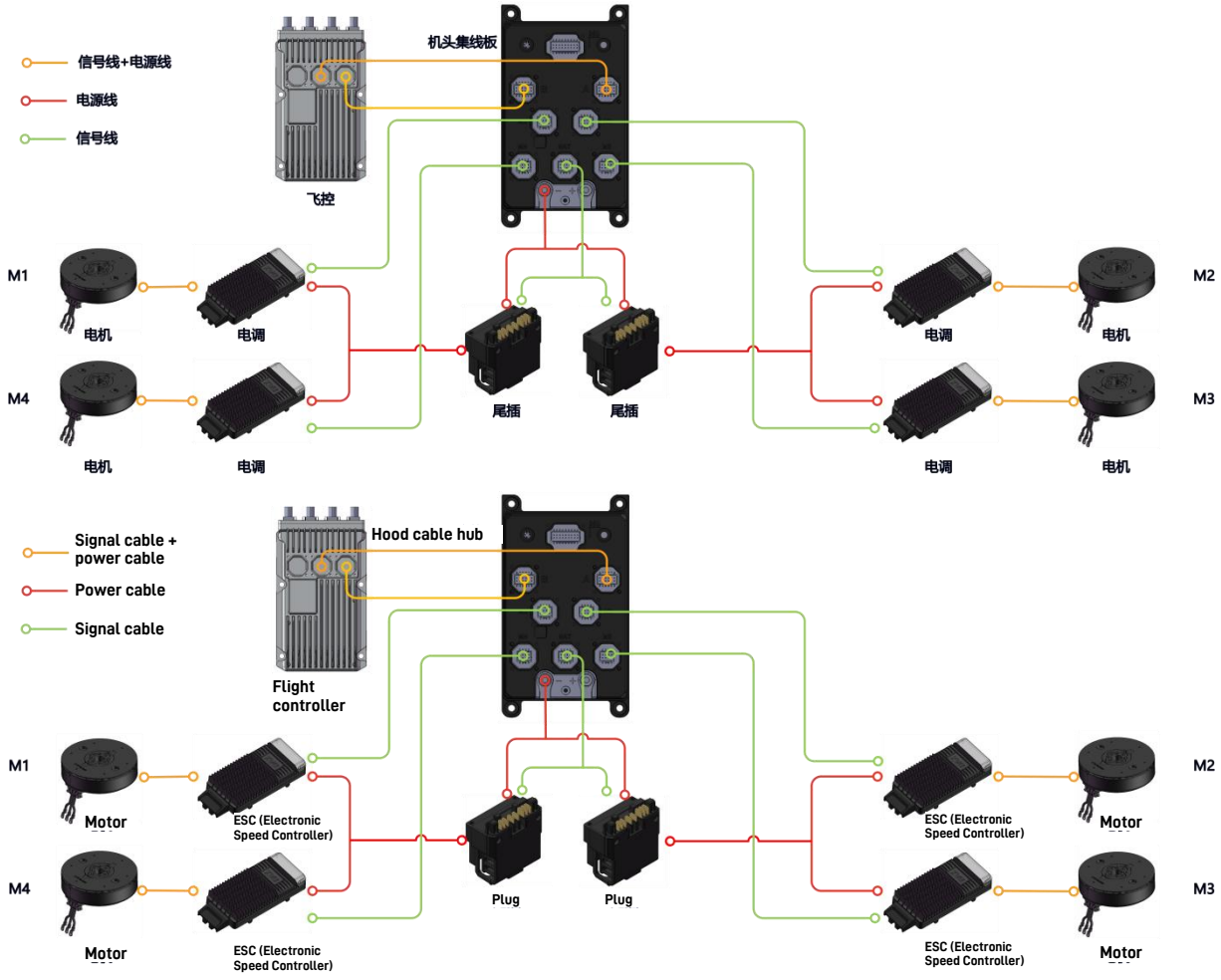
感知系统主要包括以下模块：PSL 摄像头、仿地雷达、4D成像雷达及LED灯组件。

The sensor system mainly includes the following modules: PSL camera, terrain radar, 4D imaging radar and LED light unit.

动力系统
Propulsion System

农业无人飞机的动力系统主要由中心舱集线板、动力电调、动力电机、螺旋桨构成，为整机提供动力输出。其中，中心舱集线板负责将飞控信号和电池电流分配至电调，电调负责根据飞控信号控制电机电流大小，控制电机的转速，而电机则负责驱动螺旋桨旋转，使螺旋桨产生升力，让无人机得以飞行。

The propulsion system of the agricultural drone is mainly composed of the central cable hub, main ESC, main motor and propeller and provides power output for the drone. Among them, the central cable hub is responsible for distributing the flight controller signal and battery current to the ESC; the ESC is responsible for controlling the magnitude of the motor current and the motor speed according to the flight controller signal; while the motor is responsible for driving the propeller to rotate, generating lift to enable the drone to fly.

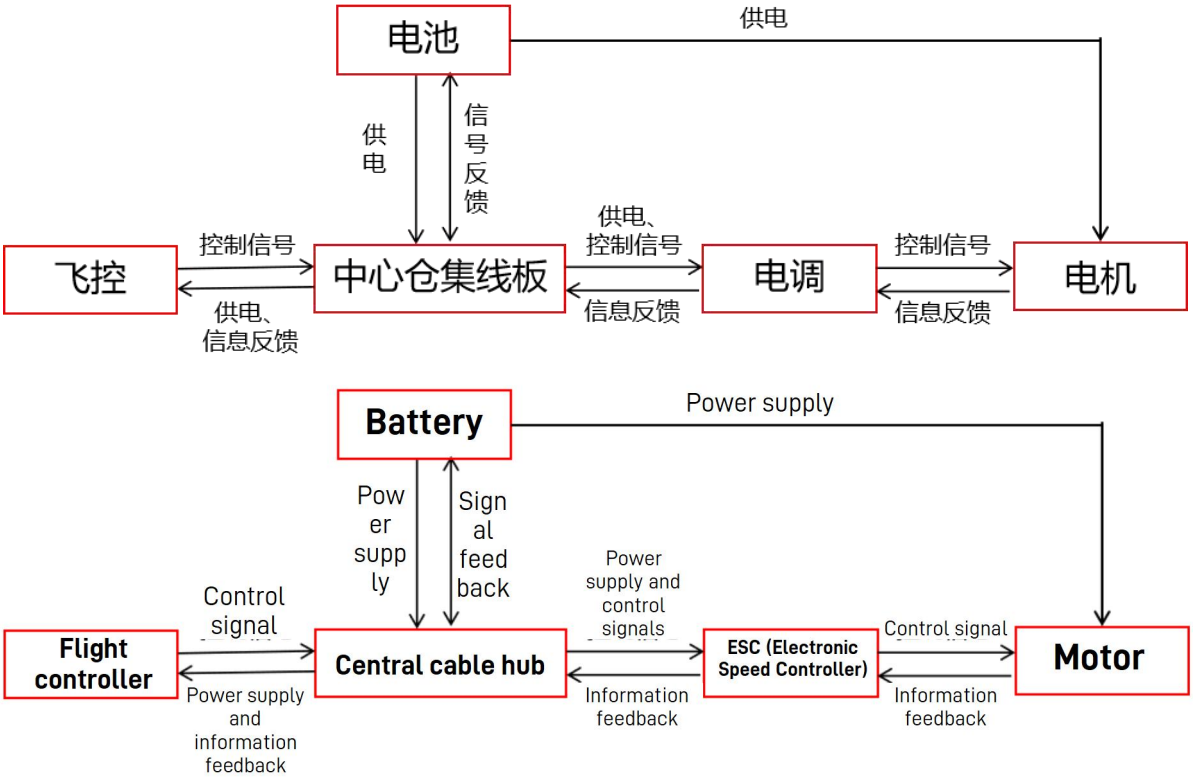


P150 /P60 农业无人飞机动力系统

P150 /P60 Agricultural Drone Propulsion System

动力系统数据流分析

Propulsion System Data Flow Analysis



P150 /P60 农业无人飞机动力系统数据流

P150 /P60 Agricultural Drone Propulsion System Data Flow

动力系统信号传输流程

Propulsion System Signal Transmission Process

- 极飞2024款农业无人飞机对动力系统的控制主要通过两条链路来实现，一条是电源输出链路，该链路分配电力给各电机，使电机驱动螺旋桨让无人机得以飞行；另一条链路为信号传输链路，该链路能让飞控获取到电调的状态信息，同时能发送控制信息给电调，电调再调整电机的转速大小，从而改变无人机飞行姿态。

The control of the propulsion system in the XAG 2024 Agricultural Drones is mainly realized through two links. One is the power output link, which distributes power to each motor, so that the motor drives the propeller to make the drone fly; the other link is the signal transmission link, which allows the flight controller to obtain the status information of the ESC and send the control information to the ESC at the same time, and the ESC adjusts the motor speed to change the drone's flight attitude.

- 电源输出链路：电池是无人机飞行的电力来源，首先电池通过电池尾插给动力集线板供电，通过Y线连接将电流分配至各电调，电调再将电流传输至电机，驱动电机转动。

Power output link: The battery serves as the power source for the flight of the drone. First, the battery supplies power to the power distribution cable hub through the battery plug, and the power distribution cable hub distributes the current to each ESC through the Y-cable connection, and then the ESC transmits the current to the motor to drive the motor to rotate.

- 信号传输链路：飞控将控制信号通过PTS插口的连接线传输至中心舱集线板，中心舱集线板再将各电调的功率信号分配至对应电调，电调通过控制电流的输出大小来控制电机的转速；飞控也是无人机的大脑，而大脑需要实时获取动力系统的相关参数。电流、电机转速、电调功率和温度等信息通过PTS插口的连接线反馈至飞控。

Signal transmission link: The flight controller transmits the control signal to the central cable hub through the connecting wire of the PTS socket, and the central cable hub distributes the power signal of each ESC to the corresponding ESC, and the ESC will control the motor speed by adjusting the output current; Flight controller acts as the flight controller of the drone and requires real-time access to parameters of the propulsion system. The current, motor speed, ESC power, temperature and other information are fed back to the flight controller through the connecting wire of the PTS socket.

动力系统模块介绍

Introduction to Propulsion System Module

中心舱集线板

Central Cable Hub

主要用于给飞控、执行系统供电，并且能够分配飞控给电调的控制信号及收集电调的反馈信息给飞控。

It is mainly used to supply power to the flight controller and application system, and can distribute the control signal of the flight controller to the ESC and collect the feedback information of the ESC for the flight controller.

中心舱集线板

Central Cable Hub

动力电调

Main ESC

电调为磁场导向控制电调，又称为矢量控制，是利用变频器控制三相交流电机的技术，通过调整变频器的输出频率、输出电压的大小及角度，来控制电机的输出功率。

The ESC based on field-oriented control (also called vector control) is a technique that uses a variable frequency drive (VFD) to control three-phase AC motors. It controls the power output of the motor by adjusting the output frequency, as well as the magnitude and angle of the output voltage of the VFD.

电调

ESC (Electronic Speed Controller)

动力电机

Main motor

极飞2024款农业无人飞机采用的是无刷直流电机，无刷直流电机是采用半导体开关器件来实现电子换向的，即用电子开关器件代替传统的接触式换向器和电刷。

The XAG 2024 Agricultural Drones adopt brushless DC motors. These motors are provided with semiconductor switching elements for electronic commutation, instead of traditional contact commutators and electric brushes.

动力电机

Main motor

螺旋桨

Propeller

2024款P150农业无人飞机无人机可折叠螺旋桨，采用63英寸高性能桨叶，P60采用60英寸高性能桨叶。

The P150 2024 Agricultural Drone features foldable propellers and utilizes 63-inch high-performance blades, while the P60 utilizes 60-inch high-performance blades.

螺旋桨

Propeller

运动控制的原理

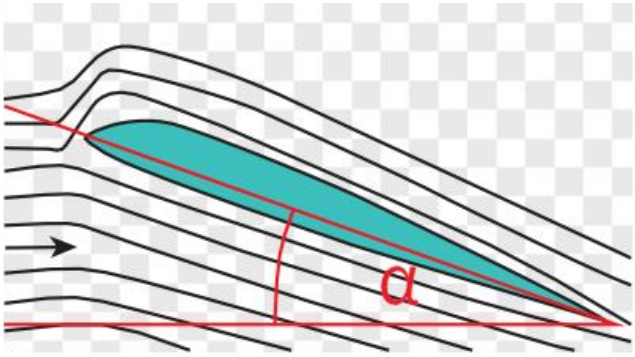
Principles of Motion Control

无人机升力原理

Principle of drone lift

升力是指物体在流体（如空气）中云运动时，由于流体对物体的压力差而产生的向上的力。对于无人机来说，升力主要是由其机翼产生的。当无人机的机翼空气接触时，空气会在机翼上下表面形成不同的流速和压力，从而产生升力。

Lift refers to the upward force generated on an object moving through a fluid (such as air) due to the pressure difference exerted by the fluid on the object. For drones, lift is mainly generated by their wings. When the air contacts the wings of the drone, it will create different flow velocities and pressures on the upper and lower surfaces of the wings, thus generating lift.



迎角α

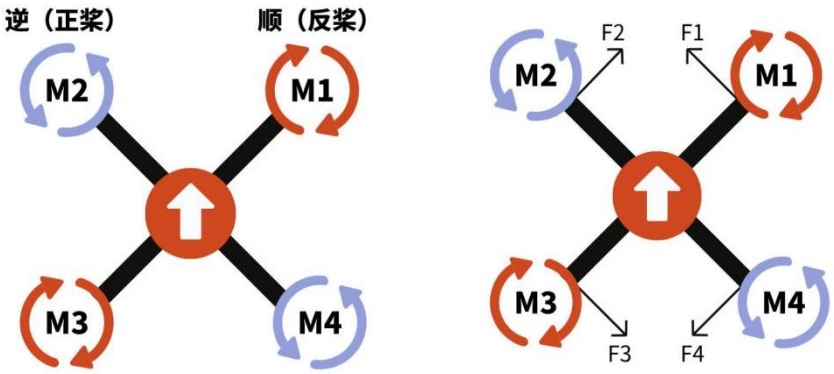
Angle of Attack α

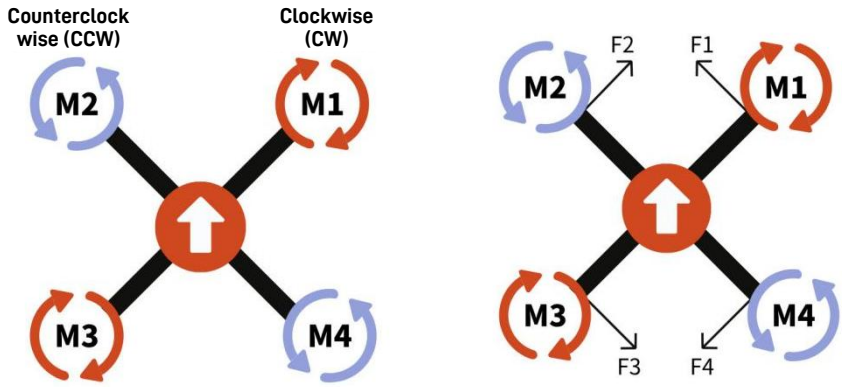
如上图所示，旋转的螺旋桨相对于空气具有迎角α（通常螺旋桨沿迎角方向转动，由此可以判断螺旋桨旋转方向），此时螺旋桨上方曲面气流流速快，气压低，而下方平面气流流速慢，气压高，形成了上下桨面间的压力差，进而产生使螺旋桨向上的空气动力，支持无人机飞行。

As shown in the figure above, the rotating propeller has an angle of attack α relative to the air (the propeller typically rotates along the direction of the angle of attack, which can be used to determine the propeller's rotation direction). At this time, the air flow velocity on the upper curved surface of the propeller is high, resulting in low pressure, while the air flow velocity on the lower flat surface is slow, resulting in high pressure. This creates a pressure difference between the upper and lower surfaces of the propeller, generating an upward aerodynamic force that supports the drone's flight.

螺旋桨排布原理

Propeller arrangement principle





P系列农业无人飞机的螺旋桨排布在对称的四个角上，逆时针旋转的螺旋桨称为正桨(CW)，顺时针旋转的螺旋桨称为反桨(CCW)。M2和M4电机带动的螺旋桨为正桨，M1和M3电机带动的螺旋桨为反桨。

In the P-series agricultural drone, the propellers are arranged symmetrically at four corners. The counterclockwise-rotating propeller is called a counterclockwise propeller (CCW), while the clockwise-rotating propeller is called a clockwise propeller (CW). The propellers driven by the M2 and M4 motors are counterclockwise propellers, while those driven by the M1 and M3 motors are clockwise propellers.

无人机正常飞行时,根据牛顿第三定律—作用力与反作用力，电机驱动螺旋桨旋转的同时，螺旋桨也会给电机带来与旋转方向相反的扭力，如图所示。由于电机固定在机臂上，因此该反向扭力会作用于机臂，当各反向扭力相互平衡时（F1、F2、F3和F4相互抵消），无人机航向稳定。

When a drone flies normally, according to Newton's third law of motion - action and reaction, the motor drives the propeller to rotate, and the propeller also brings a torque opposite to the rotation direction to the motor, as shown in the figure. Since the motors are fixed on the arms, this counter-torque acts on the arms. When the counter-torques are balanced (F1, F2, F3, and F4 cancel each other out), the drone's heading remains stable.

无人机姿态控制原理

Drone Attitude Control Principle

P系列无人机通过调节四个电机转速改变旋翼转速，实现升力变化，从而控制飞行器的姿态和位置。

The P-series drone adjusts the rotational speed of its four motors to change the rotor speed, thereby altering the lift and controlling the drone's attitude and position.

上升与下降

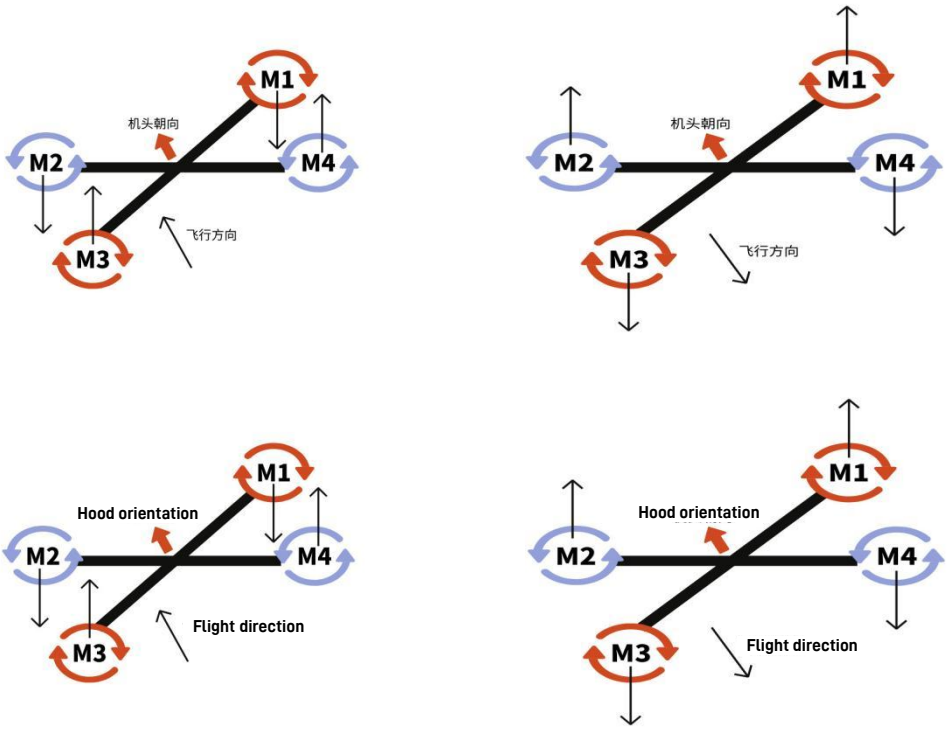
Ascending and Descending

P150 与P60 农业无人飞机当竖直向上的升力等于无人机的重力时，无人机高度保持不变；当竖直向上的升力大于无人机的重力时，无人机上升；当竖直向上的升力小于无人机的重力时，无人机下降。

For the P150 and P60 agricultural drones, when the vertically upward lift equals the drone's weight, the drone maintains a constant altitude; when the vertically upward lift exceeds the drone's weight, the drone ascends; when the vertically upward lift is less than the drone's weight, the drone descends.

俯仰运动（前后）

Pitch Control (Forward and Backward)



向前飞行向后飞行

and Backward Flight

P150 农业无人飞机当M3、M4号电机转速比M1、M2号电机转速大时，无人机前侧向下倾斜，此时垂直于螺旋桨旋转平面的升力F也随之倾斜,进而产生了竖直分力F1以及水平分力F2，竖直分力F1平衡无人机的重力，水平分力F2拉动无人机向前飞行。

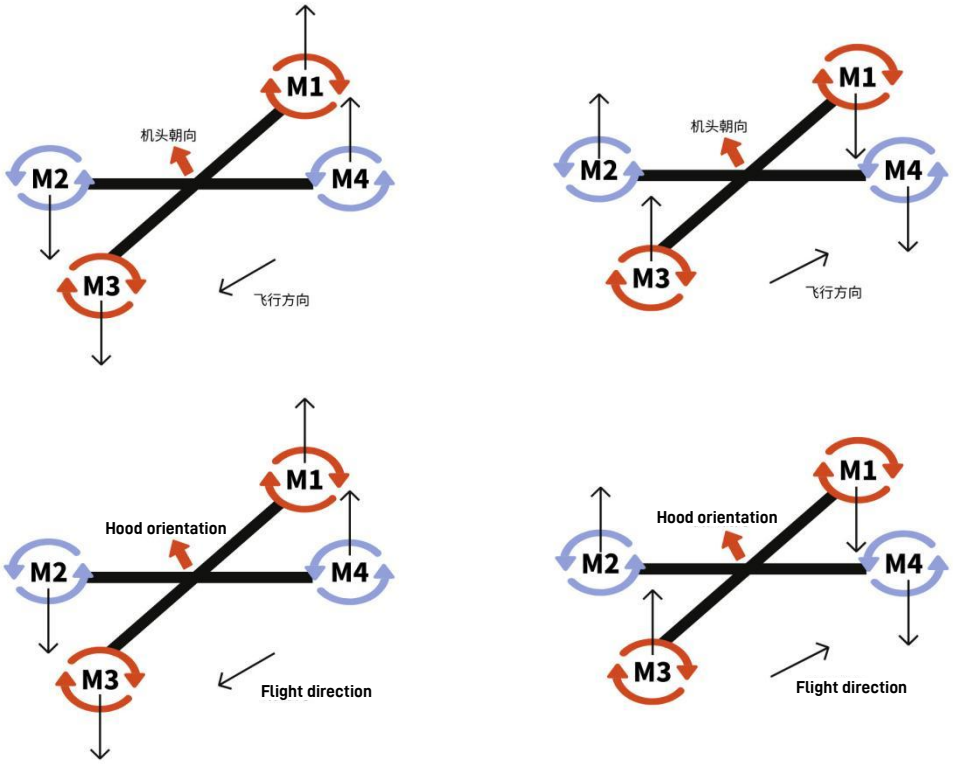
For the P150 agricultural drone, when the rotational speed of the M3 and M4 motors is greater than that of the M1 and M2 motors, the front side of the drone tilts downward. At this time, the lift F perpendicular to the propeller's rotational plane also tilts, generating a vertical component F1 and a horizontal component F2. The vertical component F1 balances the drone's weight, while the horizontal component F2 pulls the drone forward.

P150 农业无人飞机当M1、M2号电机转速比M3、M4号电机转速大时，无人机后侧向下倾斜，此时垂直于螺旋桨旋转平面的升力F也随之倾斜,进而产生了竖直分力F1以及水平分力F2，竖直分力F1平衡无人机的重力，水平分力F2拉动无人机向后飞行。

For the P150 agricultural drone, when the rotational speed of the M1 and M2 motors is greater than that of the M3 and M4 motors, the rear side of the drone tilts downward. At this time, the lift F perpendicular to the propeller's rotational plane also tilts, generating a vertical component F1 and a horizontal component F2. The vertical component F1 balances the drone's weight, while the horizontal component F2 pulls the drone backward.

横滚运动（左右）

Roll Control (Left and Right)



向左飞行向右飞行

Leftward Flight and Rightward Flight

P150 农业无人飞机当M1、M4号电机转速比M2、M3号电机转速大时，无人机左侧向下倾斜，此时垂直于螺旋桨旋转平面的升力F也随之倾斜,进而产生了竖直分力F1以及水平分力F2，竖直分力F1平衡无人机的重力，另一个水平分力F2则拉动无人机向左飞行。

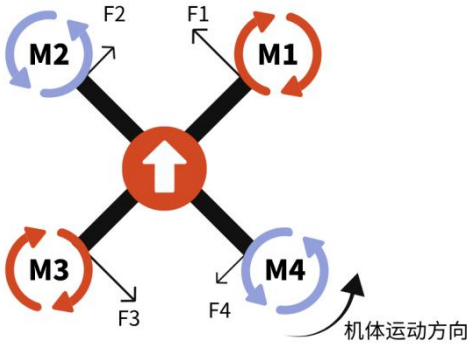
For the P150 agricultural drone, when the rotational speed of the M1 and M4 motors is greater than that of the M2 and M3 motors, the left side of the drone tilts downward. At this time, the lift F perpendicular to the propeller's rotational plane also tilts, generating a vertical component F1 and a horizontal component F2. The vertical component F1 balances the drone's weight, while the horizontal component F2 pulls the drone to the left.

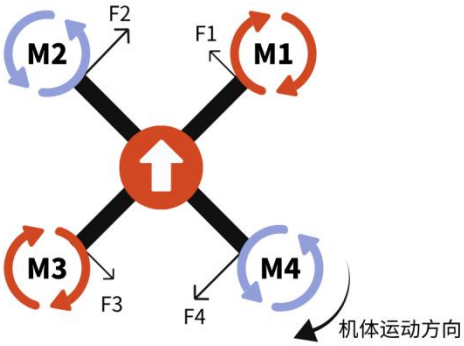
P150 农业无人飞机当M2、M3号电机转速比M1、M4号电机转速大时，无人机右侧向下倾斜，此时垂直于螺旋桨旋转平面的升力F也随之倾斜,进而产生了竖直分力F1以及水平分力F2，竖直分力F1平衡无人机的重力，另一个水平分力F2则拉动无人机向右飞行。

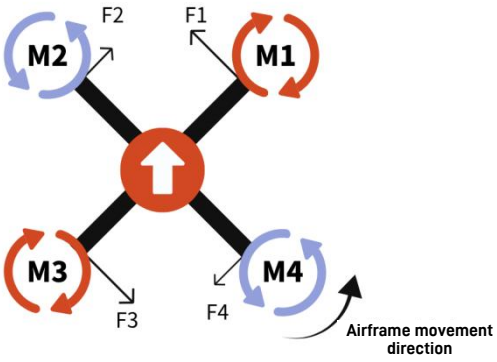
For the P150 agricultural drone, when the rotational speed of the M2 and M3 motors is greater than that of the M1 and M4 motors, the right side of the drone tilts downward. At this time, the lift F perpendicular to the propeller's rotational plane also tilts, generating a vertical component F1 and a horizontal component F2. The vertical component F1 balances the drone's weight, while the horizontal component F2 pulls the drone to the right.

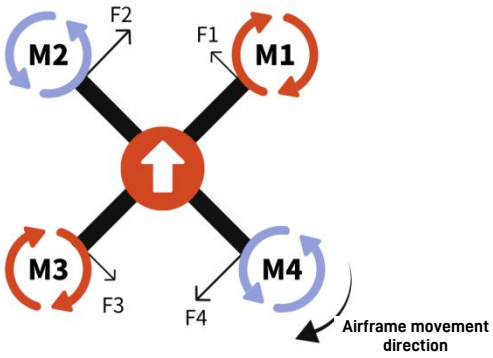
偏航运动（自旋）

Yaw Movement (Spin)









逆时针旋转顺时针旋转

Counterclockwise Rotation and Clockwise Rotation

当M1、M3号电机整体转速高于M2、M4号电机整体转速时，F1和F3的合力大于F2和F4的合力，无人机逆时针旋转.

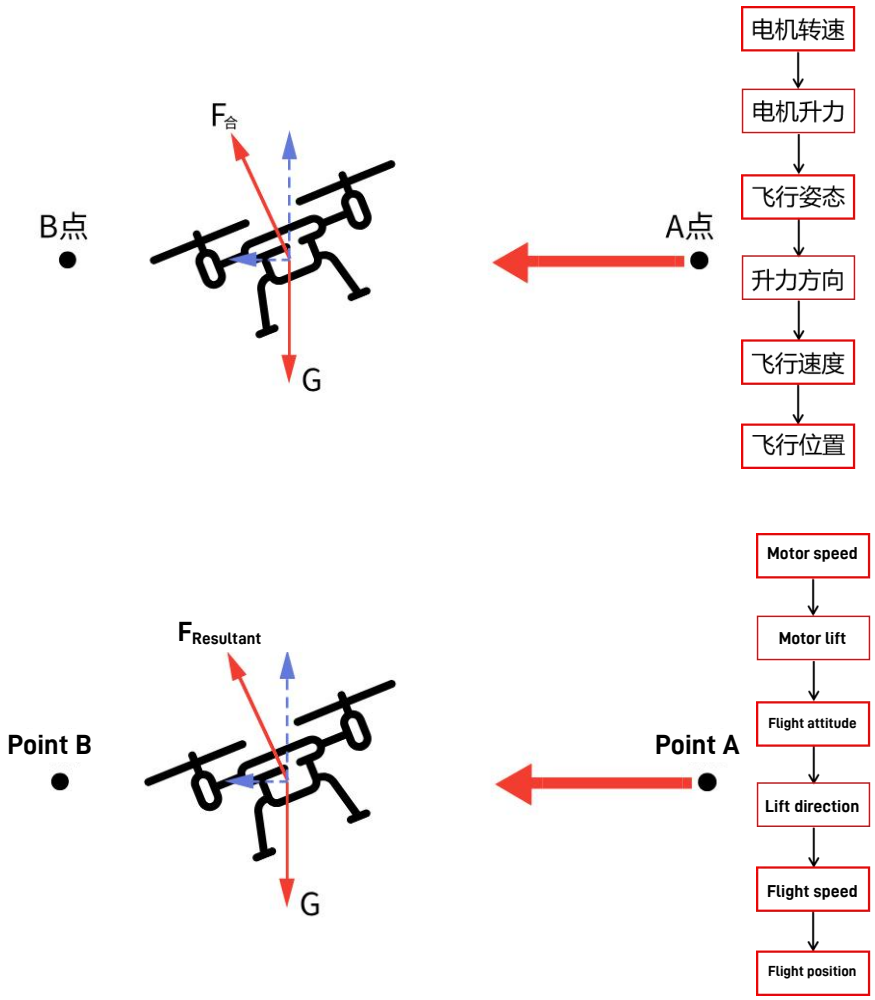
When the overall rotational speed of the M1 and M3 motors is higher than that of the M2 and M4 motors, the combined force of F1 and F3 is greater than that of F2 and F4, causing the drone to rotate counterclockwise.

当M2、M4号电机整体转速高于M1、M3号电机整体转速时，F2和F4的合力大于F1和F3的合力，无人机顺时针旋转。

When the overall rotational speed of the M2 and M4 motors is higher than that of the M1 and M3 motors, the combined force of F2 and F4 is greater than that of F1 and F3, causing the drone to rotate clockwise.

综合运动飞行控制

Integrated motion flight controller



当无人机需要从A点飞往B点时，无人机的动作过程如下：

When the drone needs to fly from point A to point B, the motion process of the drone is as follows:

调整电机转速,使近A点侧的两个电机的转速比近B点侧的两个电机快。

Adjust the motor speeds so that the two motors closer to point A rotate faster than the two motors closer to point B.

电机转速差的改变带来电机升力差的改变，无人机近A点侧升力比近B点侧的升力大。

The difference in motor speeds results in a change of motor lift difference, with the side closer to point A generating more lift than the side closer to point B.

电机升力差的改变带来飞行姿态的改变，无人机近B点侧向下倾斜。

The change of motor lift difference causes a change in the drone's attitude, which results in tilting the side closer to point B downward.

飞行姿态的改变带来整体升力方向的改变（如上面图1，升力F合的方向往B点倾斜），使无人机产生水平方向的分力，同时调整整体的电机转速，使无人机保持竖直方向分力不变（平衡无人机本身重力）。

The change in attitude alters the direction of the total lift (as shown in Figure 1, the direction of the lift $F_{Resultant}$ tilts toward point B), generating a horizontal component of force. Simultaneously, the overall motor speeds are adjusted to maintain a constant vertical component of force (balancing the drone's weight).

水平方向的分力使无人机产生水平方向的加速度，进而产生水平方向的速度，最终改变无人机的位置，实现从A点往B点移动。

The horizontal component of force creates a horizontal acceleration, which in turn generates a horizontal velocity, ultimately changing the drone's position and enabling it to move from point A to point B.

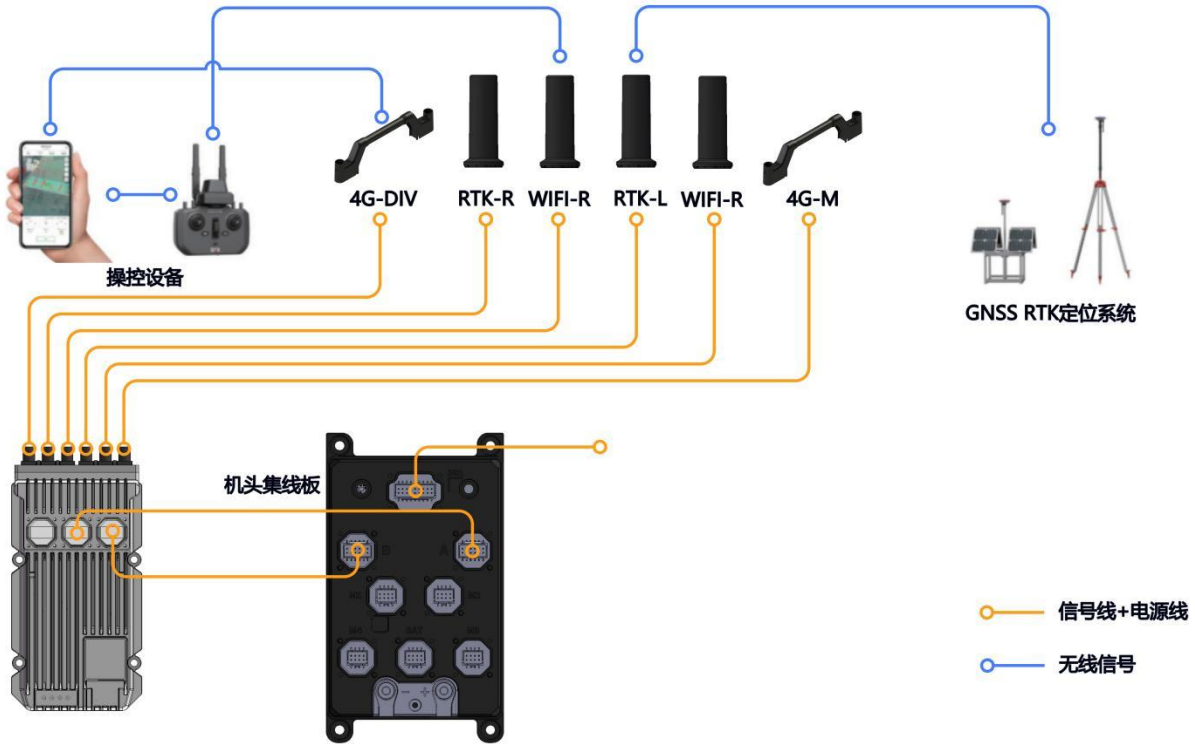
定位系统
GPS System

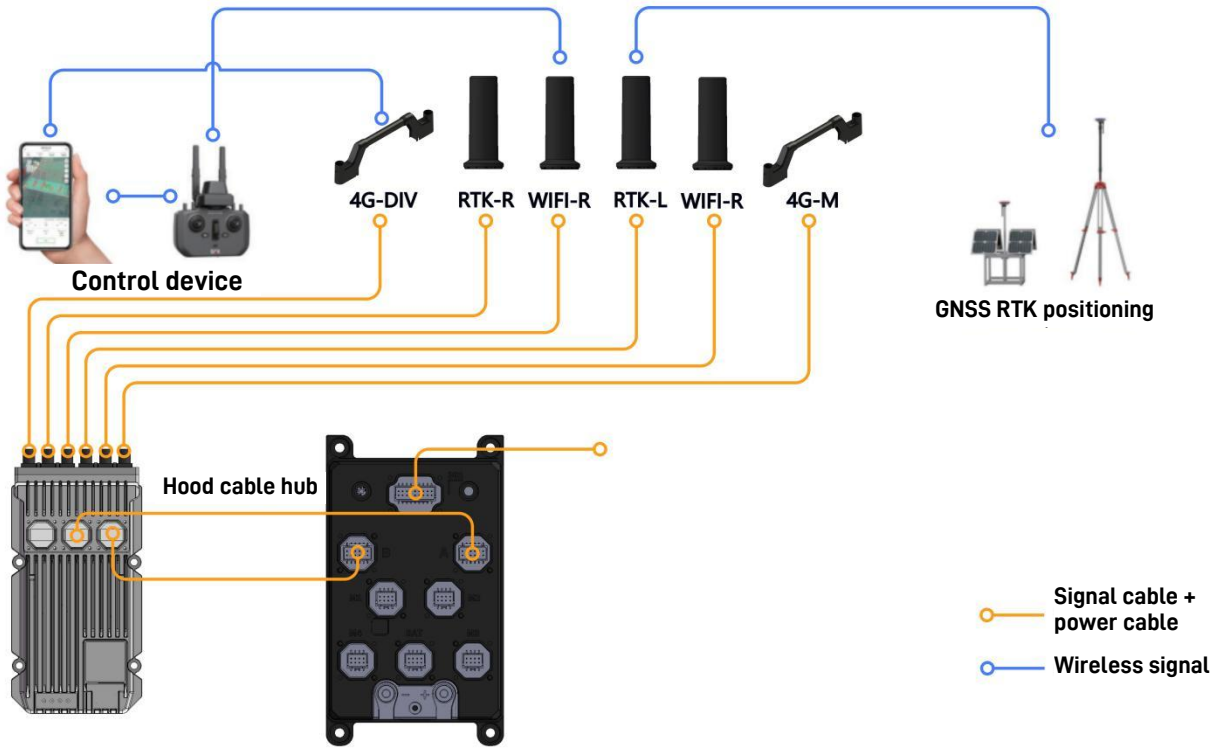
RTK工作原理

Working principle of RTK

RTK定位系统由农田测绘器（由ARC3 遥控器配合差分定位模块构成）、移动基站与固定基站组成，为农田测绘、无人机飞行提供厘米级的高精度定位。使航线规划精度达到厘米级，同时也实现厘米级高精度航线飞行。无人飞机使用双擎RTK模块，两路天线同时进行工作，高度保障飞行安全。

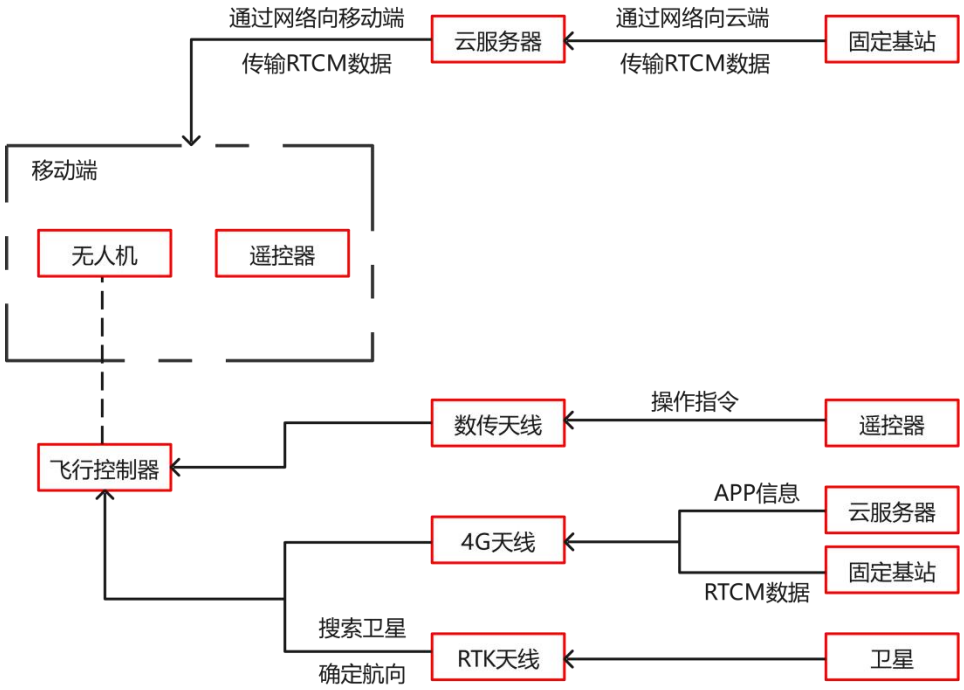
The RTK positioning system is composed of farmland rover (consisting of ARC3 remote controller and differential positioning module), portable station and fixed station, and can provide centimeter-level high-precision positioning for farmland mapping and drone flight, enabling both centimeter-level route planning accuracy and flight along centimeter-level high-precision routes. The drone is equipped with a dual-antenna RTK module, where two antennas operate simultaneously, ensuring a high level of flight safety.

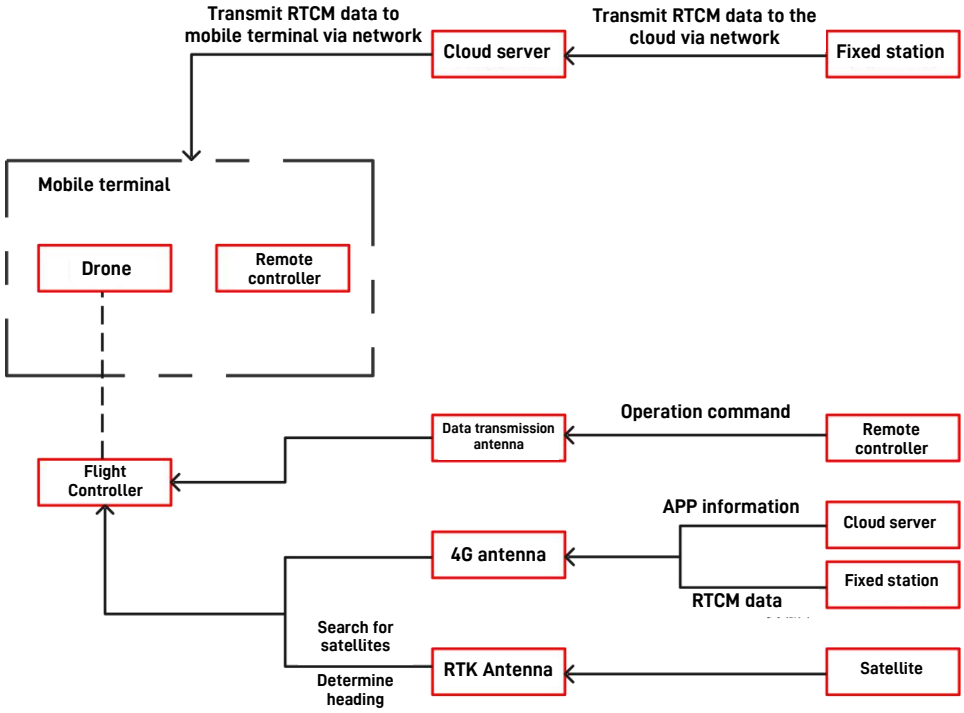




P150 农业无人飞机RTK定位系统

P150 Agricultural Drone RTK Positioning System





RTK定位系统数据流分析

RTK Positioning System Data Flow Analysis

当移动端（无人机，测绘器）的RTK主机与基站（移动基站，固定基站）的RTK主机共用卫星信号足够、稳定，且接收到的RTCM差分数据稳定、有效时，无人机进入实时的、高精度定位状态。因此，在无人机的定位系统中存在两条链路，一条是移动端的搜星链路，另一条是RTCM差分数据的通讯链路。

When the shared satellite signal between the RTK mainframe of the mobile terminal (drone or rover) and the RTK mainframe of the base station (portable station or fixed station) is stable enough, and the RTCM differential data received is stable and valid, the drone enters a real-time and high precision positioning state. Therefore, there are two links in the drone's positioning system: satellite search link of mobile terminal and communication link of RTCM differential data.

移动站的搜星链路：无人机的搜星链路主要通过无人机端的RTK天线来实现，机身上左右两根RTK天线均可负责无人机搜星定位，两根RTK天线共同负责获取无人机的航向；测绘器的搜星工作则直接由测绘器内置天线来完成。

Satellite search link of mobile terminal: The drone's satellite search link is primarily achieved through the RTK antennas mounted on the drone. Both left and right RTK antennas participate in satellite search and positioning, with their combined data determining the drone's heading. The rover utilizes its built-in antenna for satellite search.

RTCM差分数据传输链路：RTCM差分数据主要由基站端传送给移动端，基站传送给移动端的方式有多种，其中主要可通过两种途径广播数据给无人机和测绘器：

RTCM differential data transmission link: RTCM differential data is mainly transmitted from the base station to mobile terminals including the drone and rover via multiple pathways, among which there are two main ways:

1.通过2.4/5.8GHz双频天线电台直接广播数据给无人机或手持测绘器（广播距离约半径2公里);

1. Use 2.4/5.8 GHz dual-band antenna radio to broadcast data to the drone or rover (effective broadcast range: approximately 2 km in radius);

通过自身网络将RTCM差分数据发送至云服务器，再由云服务器通过网络发送至无人机或手持测绘器。

Send RTCM differential data to a cloud server via the network, and then send to the drone or rover from the cloud server via the network.

电力系统
Power System

智能电池（极飞B13970S智能超充电池）

Smart Battery (XAG B13970S Smart SuperCharge Battery)

功能介绍

Function

B13970S智能电池主要为无人机飞行提供动力，电机运转依赖其供电；支持飞控系统、图传系统、RTK天线等电子元件工作，确保各系统正常运行。

The B13970S Smart SuperCharge Battery mainly provides power for the flight of drones, with the motors relying on it for operation. It also supports the flight controller system, video transmission system, RTK antenna, and other electronic components, ensuring the normal operation of all systems.

雾冷箱

Battery cooling tower

功能介绍

Function

在农事作业中，无人机的充电效率尤为重要。水雾冷却方案，让无人机电池实现落地即充，提升作业效率。

In farm operations, the charging efficiency of drones is particularly important. The water/mist cooling solution enables the drone batteries to be charged immediately upon landing, significantly improving operational efficiency.

移动超充站（GC4000+）

Supercharge Station (GC4000+)

功能介绍

Function

极飞GC4000+移动超充站包含发电机机架、油箱、发动机总成、发动机控制器、充电控制器等几大模块。超充站可在外场无市电的情况下将汽油的化学能转换为电能，为极飞科技出品的智能超充电池高效快速充电。超充站在使用过程中，将自动识别插入的待充电电池型号，调节充电电流，自动完成充电功率自动匹配，具备过热、短路、过流、过压保护功能，并可为单组电池提供额定3400W的充电功率，超充站具备实时检测发动机机油量、统计发动机使用时间，可通过智能控制面板LCD显示屏显示设备累计运行时间和保养时间，并通过"极飞农服"App提醒用户对发动机进行保养维护，极飞GC4000+移动超充站实现了全面的外场充电作业智能化管理，保证设备在外场复杂环境下工作的可靠性和安全性。

The XAG GC4000+ Auto SuperCharge Station consists of several major modules, including a generator frame, fuel tank, engine assembly, engine controller, and charge controller. The SuperCharge Station can convert the chemical energy of gasoline into electrical energy in field conditions without access to utility power, enabling efficient and rapid charging for XAG's Smart SuperCharge Battery. The Supercharge Station can identify the model of the smart battery inserted to charge automatically, adjust charging current and automatically match the battery power, characterized by over-heat, short circuit, over-current and over-voltage protection functions. It provides a rated charging power of 3,400W for a single battery. By detecting and monitoring the engine's fuel level and recording engine service duration in real time, it displays cumulative running time and maintenance time of the device through the LCD display screen of smart control panel, and reminds users of timely maintenance of the engine through the XAG One App. The XAG GC4000+ Auto SuperCharge Station achieves comprehensive intelligent management of field charging operations, ensuring the reliability and safety of the device in complex outdoor environments.

充电器（极飞13600S充电器）

Charger (XAG 13600S Charger)

功能介绍

Function

13600S充电器采用宽电压、自冷式设计，并具有欠压保护、过压保护、过温保护、故障隔离等功能，属于中功率充电器，充电过程中能够实时监控所有智能电池的状态信息。

The 13600S charger features a wide-voltage, self-cooling design and includes functions such as under-voltage protection, over-voltage protection, over-temperature protection, and fault isolation. As a medium-power charger, it can monitor the status information of all smart batteries in real time during the charging process.

执行系统介绍

Introduction to Application Systems

2024款无人机均具备喷洒、播撒、运输三大功能，P150 额定载重75kg，P60 额定载重40kg，搭载不同执行系统，可满足作业过程中的不同需求，实现一机多用。

All 2024 drones provide spraying, spreading, and delivery functions. With a 75kg max. payload for P150 and 40kg for P60, equipped with different application systems, the drone meets various needs during operations, achieving a multi-functional design.

睿喷5系统

RevoSpray 5 System

功能介绍

Function

睿喷5具备精准的喷雾系统，能高效、均匀地喷洒农药等植保药剂。采用智能控制技术，可实现远程操作和自动化作业，提高作业效率和准确性，为农业生产中的病虫害防治等提供有力支持。

RevoSpray 5 features a precise spraying system, capable of efficiently and evenly spraying plant protection liquid such as pesticides. By means of intelligent control technology, the system enables remote and automated operation, thus improving operational efficiency and precision and vigorously supporting pest and disease control in agricultural production.

睿喷5

RevoSpray 5

柔性叶轮泵

Flexible impeller pump

柔性叶轮泵的工作原理是，通过工作叶轮带动液体高速转动，把机械能传递给液体，从而达到输送液体的目的。叶轮泵的叶轮安装在泵壳内，由叶轮泵电机带动泵轴旋转。液体通过管道进入泵内，然后通过叶轮的旋转被加速和输送，最终从泵的排出口排出。

The flexible impeller pump operates by driving the liquid to rotate at high speed through the rotating impeller, transferring mechanical energy to the liquid, thereby achieving the purpose of liquid transportation. The impeller of the pump is installed inside the pump housing and is driven by the impeller pump motor to rotate the pump shaft. The liquid enters the pump through the inlet pipe, is accelerated and transported by the rotation of the impeller, and is finally discharged from the pump outlet.

柔性叶轮泵

Flexible impeller pump

离心喷头

Centrifugal nozzle

离心喷头由离心电机和离心喷盘构成，电机提供雾化的离心力，在高速旋转下，拥有强大的扭矩；离心喷盘则将药液甩开，实现有效雾化。

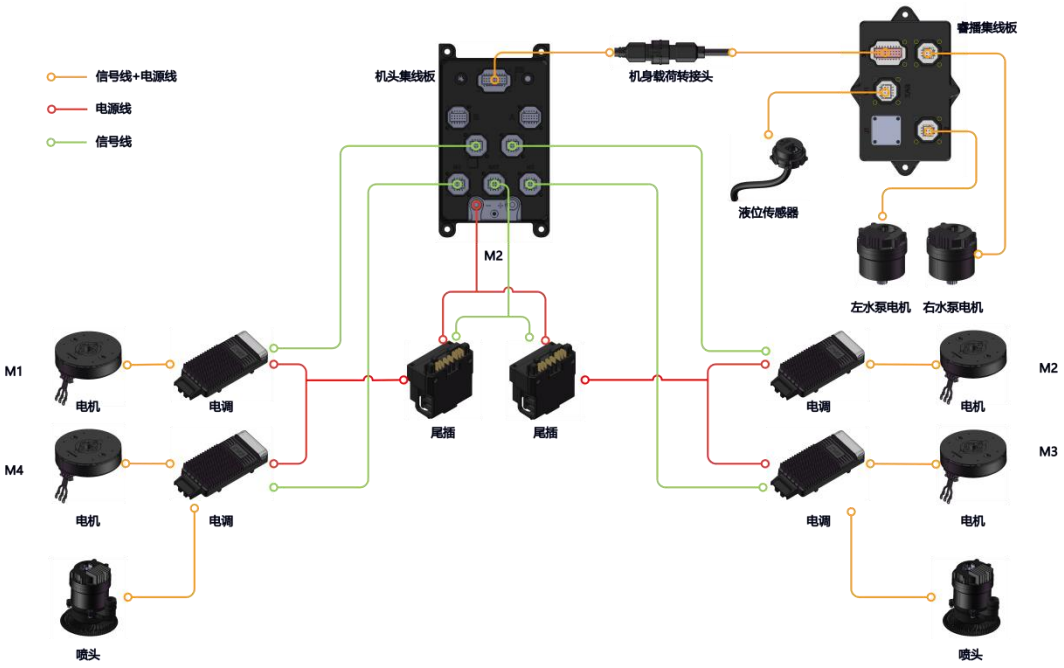
The centrifugal nozzle consists of a centrifugal motor and a centrifugal spray disc. The motor provides the centrifugal force for atomization, delivering high torque during high-speed rotation. The centrifugal spray disc disperses the liquid, achieving effective atomization.

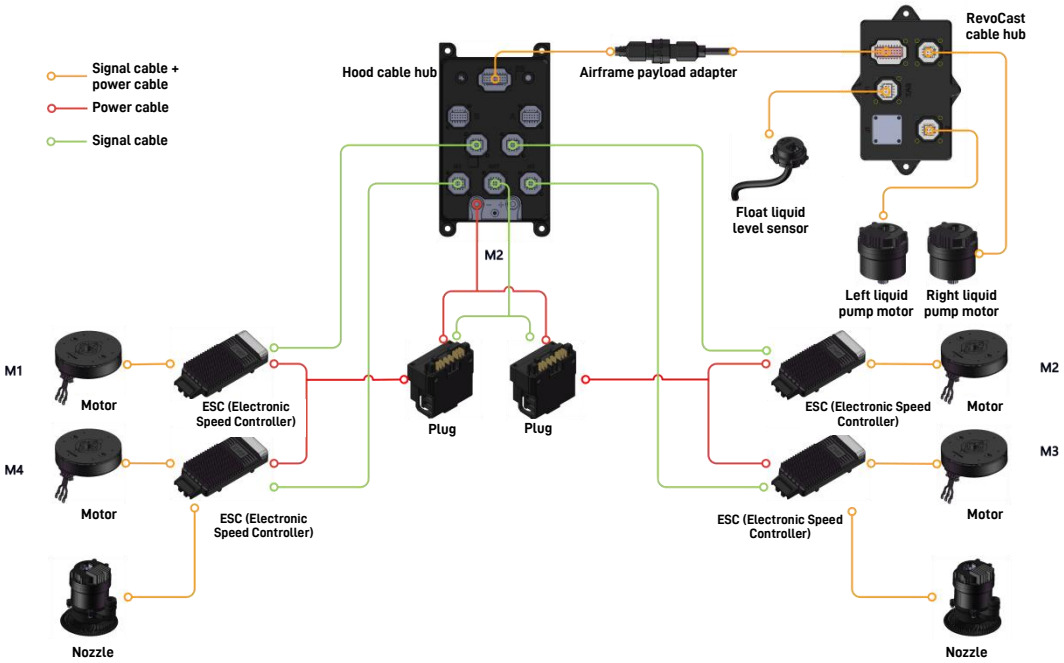
离心雾化喷头

Centrifugal atomizing nozzle

睿喷系统数据流分析（原理连线图）

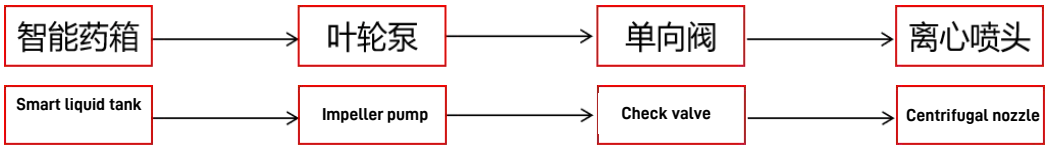
RevoSpray System Data Flow Analysis (Connection Diagram)





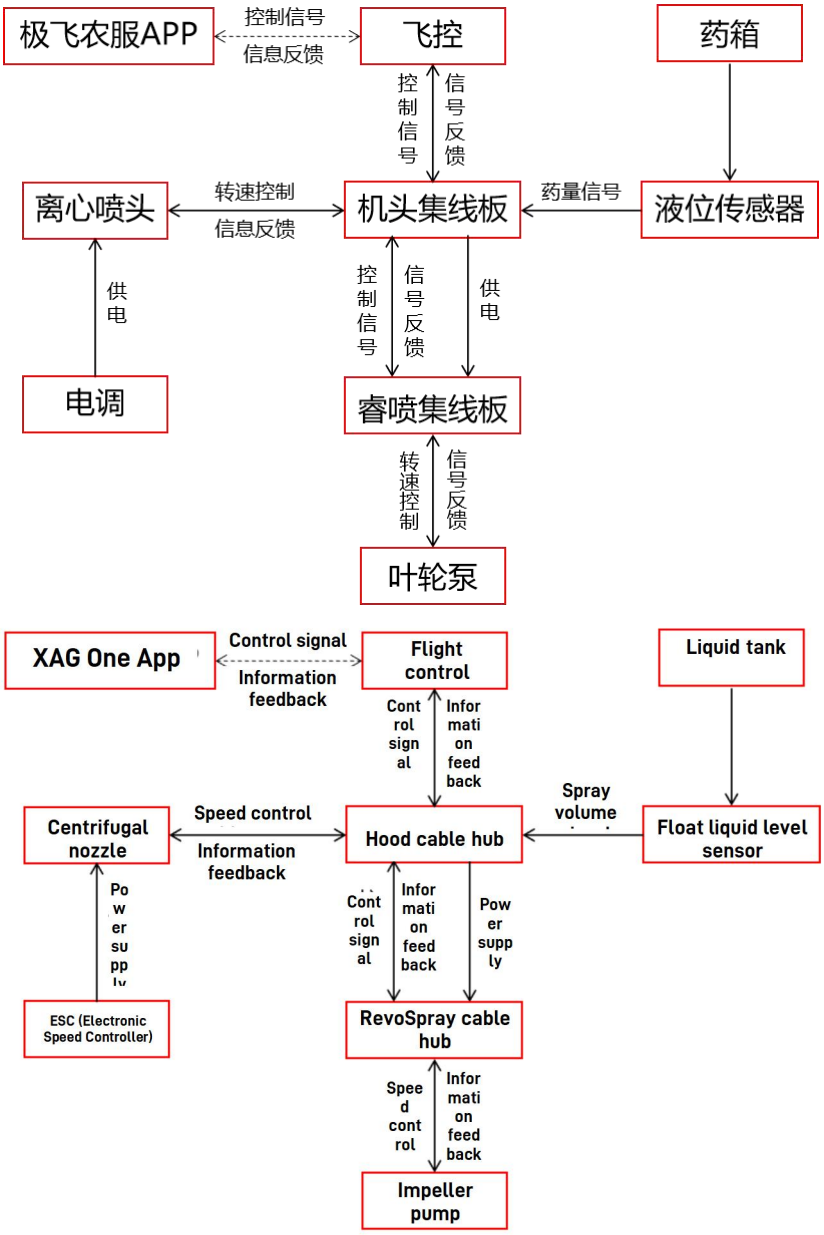
P150 /P60 睿喷系统链路图

P150 /P60 RevoSpray System Link Diagram



P150 /P60 农业无人飞机睿喷系统药液传输流程

P150 /P60 Agricultural Drone RevoSpray System Liquid Transmission Process



睿喷系统信号传输流程

RevoSpray system signal transfer process

睿喷系统主要通过两条链路来实现其功能，一条是药液流通链路，即药液从药箱流入，最后从喷头流出的链路；另一条是喷洒控制链路，即控制无人机的喷洒药量和喷洒范围的链路，使无人机能够做到精准喷洒。药液流通链路:通过压强作用，药箱里的药液，进入两个叶轮泵，药液通过叶轮泵，途径单向阀再流入喷头，将药液喷洒出来。

The RevoSpray system primarily achieves its functionality through two links. One is the liquid tank circulation link: a link through which the liquid flows from the liquid tank to the nozzle. The other is the spray control link: a link that controls the spray volume and coverage of the drone to ensure precise spraying. Liquid tank circulation link: through the pressure effect, the liquid in the liquid tank enters two impeller pumps. The liquid passes through the impeller pumps, passes through the check valve and flows into the nozzle, where it is sprayed out.

睿播5系统

RevoCast 5 System

功能介绍

Function

无人机搭载睿播系统可用于喷洒粉状或颗粒状固体。睿播5采用扫振式垂直甩盘，赋予颗粒更快的垂直向下加速度，抗风能力强，轻松实现地毯式播撒，不重播，不漏播。搭配不同型号的绞龙，满足撒肥、播种、投饲、撒粉等多种需求。

The drone equipped with the RevoCast system can spray powder or granules. Applying an oscillating vertical spread disc, RevoCast 5 allows granules to move downward faster, ensuring strong wind resistance, and enabling effortless spreading without repeating and missing. Multiple models of screw feeders are available to meet various needs, including fertilizing, sowing, feeding and powder scattering.

睿播5

RevoCast 5

螺旋变量送料器

Variable screw feeder

绞龙外型为螺旋式结构，分为超大号、大号、中号以及小号。每当绞龙旋转时，会将绞龙内部的固体颗粒推送至甩盘，通过控制绞龙的转速精准控制每次播撒所需量。

The screw feeder features a spiral structure and is available in ultra-large, large, medium, and small sizes. Whenever the screw feeder rotates, it pushes the solid granules inside the screw feeder to the spreading disc. By controlling the rotation speed of the screw feeder, the amount required for each spreading can be precisely controlled.

绞龙型号绞龙电机

Screw Feeder Model and Screw Feeder Motor

料位传感器

Granule level sensor

用于协助撒播系统判定种箱内的颗粒情况。

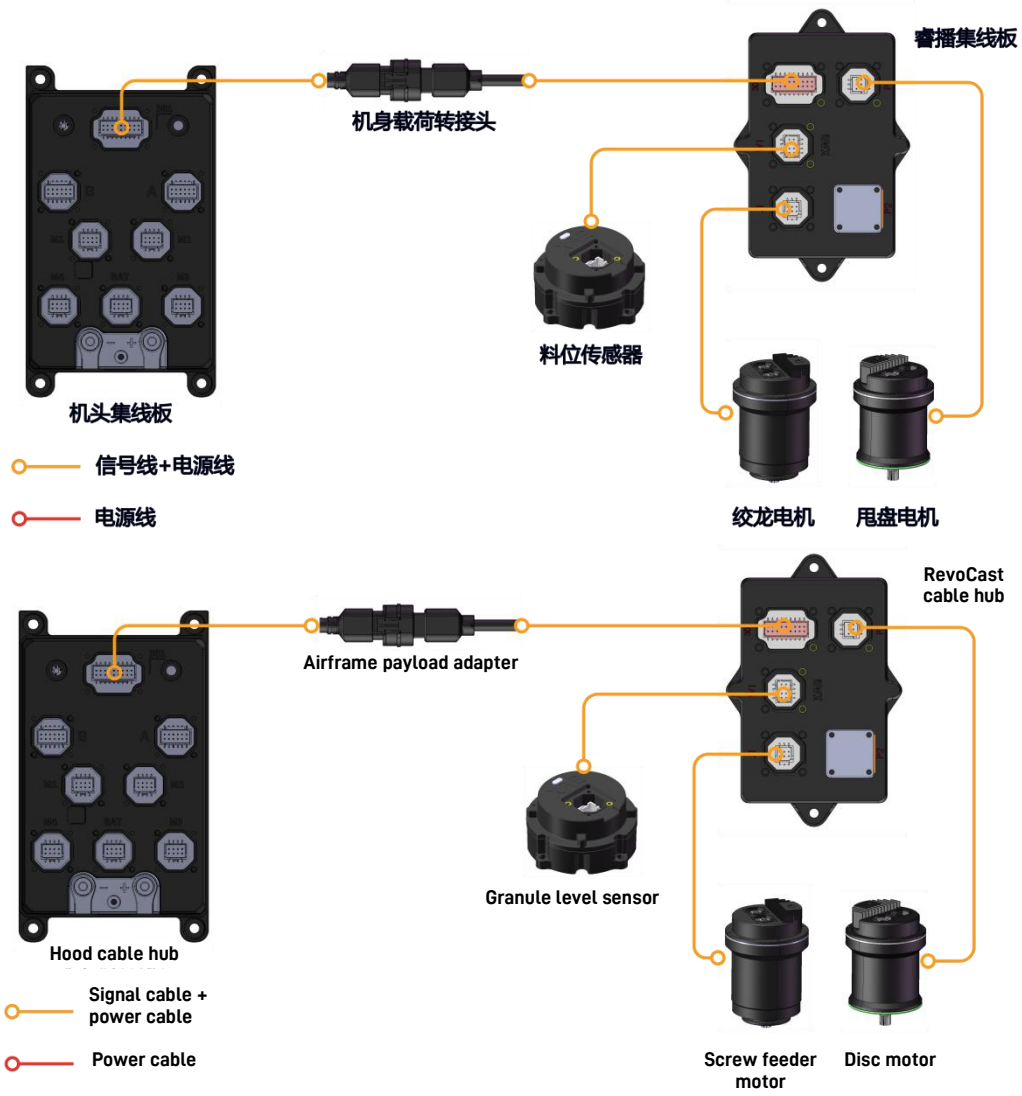
It is used to assist the seeding system in judging the granule condition in the granule container.

料位传感器

Granule level sensor

睿播5系统数据流分析

RevoCast 5 System Data Flow Analysis

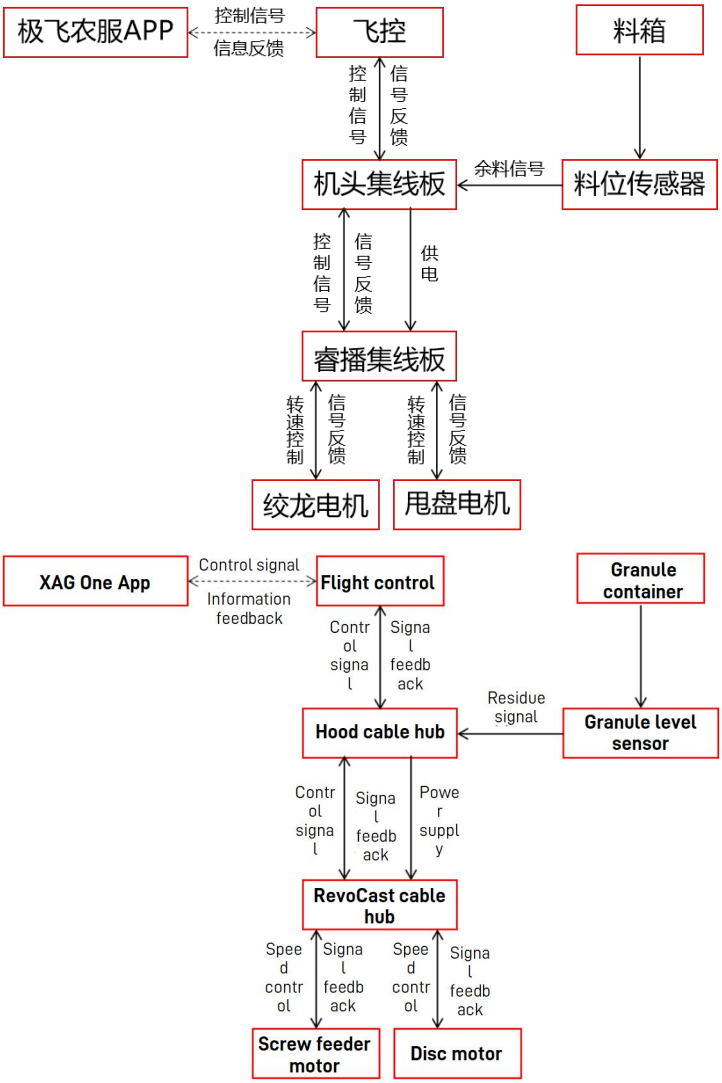


P150 /P60 睿播系统链路图

P150 /P60 RevoCast System Link Diagram

P150 /P60 农业无人飞机睿播系统物料传输流程

P150 /P60 Agricultural Drone RevoCast System Granule Transmission Process



睿播系统信号传输流程

RevoCast System Signal Transfer Process

睿播系统主要由两部分来实现其功能：一是螺旋送料装置，主要用于精准控制固体颗粒的目标输出量。二是高速甩盘，通过高速旋转甩盘，产生离心力甩开物料，保证散布范围内的分布均匀程度。

The RevoCast system realizes its function by two parts: screw feeder, which is used to precisely control the target output of solid granules, and high-speed spreading discs, which fling out granules with the centrifugal force generated by the high-speed rotation of the discs, ensuring uniform distribution of granules within the spread range.

二、一般检测工装治具介绍及使用方式

General Inspection Tooling and Fixtures and Their Use

一般检测工装治具主要用于故障损害的定位、判定以及修复后的检测。检测工作治具具备一定程度的通用性，在日常维修过程中对于损坏设备的鉴定与故障性质、故障位置进行判定时应使用检测工装治具进行实施，并结合具体运行现象作出判定。

General inspection tooling and fixtures are primarily used for fault localization, damage assessment, and post-repair verification. Designed with a certain degree of versatility, inspection tools enable damage evaluation and breakdown nature and location determination during routine maintenance, and make judgments based on specific operational conditions.

检测工装治具适用条件

Applicable Conditions for Inspection Tooling and Fixtures

极加检修APP--室内检测

XCARE TOOLXCARE TOOL APP - Indoor Inspection

若设备未发生炸机，但设备存在异常情况，可使用《极加检修APP》进行室内检测。通过室内检测可获取设备的运行状况，固件状态等信息。通过所获取的信息可判断设备是否存在故障。

When no crash damage is present but operational abnormalities are detected, indoor inspection can be conducted through XCARE TOOLXCARE TOOL APP. Indoor inspection can retrieve information such as the device's operating conditions and firmware status. Based on the obtained information, it can be determined whether the device has a breakdown.

极加检修APP--室外检测

XCARE TOOLXCARE TOOL APP - Outdoor Inspection

设备在维修完成后，或在无运行风险的情况下可使用室外检测功能实施室外检测。室外检测需要满足飞行安全条件，在检测过程中无人机将会原地进行起降、悬停、自旋及喷洒等动作，过程中将会对设备的各项运行指标进行检测。检测完成后将会生成测试报告，若若测试通过则代表满足飞行条件，若不通过，则需要重新进行检查及维修工作。

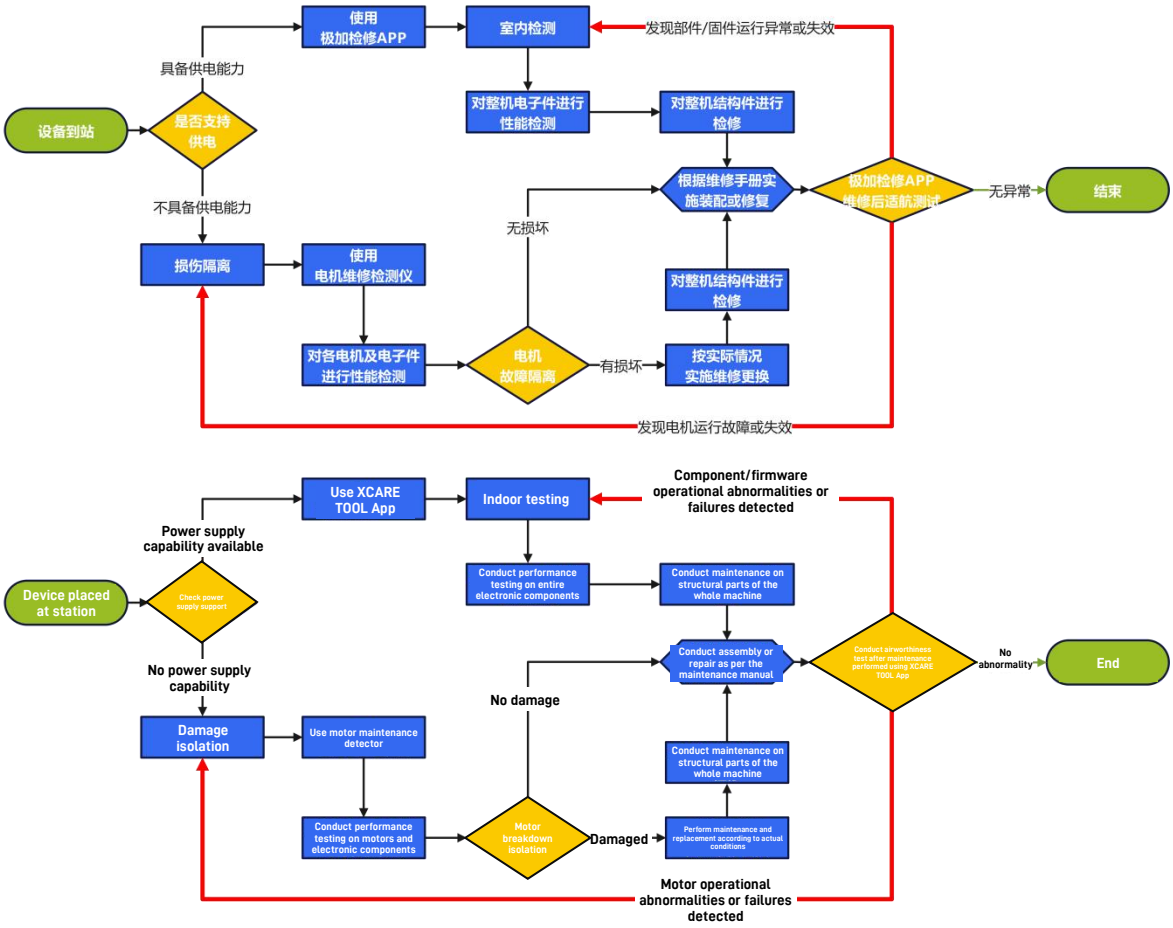
After completing repairs or under risk-free operational conditions, the outdoor inspection may be conducted. Outdoor inspection requires the compliance with flight safety regulations. During the inspection, the drone will perform in-place takeoff/landing, hovering, spinning, and spraying maneuvers while monitoring all operational indicators of the device. Upon completion of the inspection, an inspection report will be generated. If the test passes, it indicates that the flight conditions are met; if it fails, re-inspection and repairs are required.

电机维修测试仪

Motor Maintenance Detector

当设备发生炸机或不具备整体通电条件的情况下，可使用电机维修检测仪对设备关键部位的电机进行独立的运行检测。电机维修测试仪可以直接对喷洒电机、泵电机、甩盘电机、蛟龙电机进行独立测试，动力电机可通过连接集线板、动力电调后进行运转测试。测试结果将会用灯语进行反馈，工程师可根据灯语判断测试设备的状态。

If the device has a crash damage or cannot be fully powered, the motor maintenance detector may be used to independently test the operation of the motors in critical parts of the device. This detector independently tests spray motors, pump motors, spreading disc motors, and screw feeder motors. For main motors, testing is conducted by connecting them to the cable hub and main ESC. Test results are indicated via light signals, which engineers interpret to assess device status.



电机维修检测仪

Motor Maintenance Detector

电机维修检测仪功能介绍

Features

电机维修检测仪是一款适用与农业无人机上各电机运行检测的设备，通过与所需检测的电机连接（动力电机需结合动力电调、集线板进行连接），驱动所需检测的电机进行运转从而判断电机的工况。

Motor Maintenance Detector is a device designed for the operational detection of motors on agricultural drones. After being connected to the motor to be detected (the power motor should also be connected with the ESC and cable hub), the Detector drives the motor's operation to determine its working conditions.

电机维修检测仪配件主要包括：

The Motor Maintenance Detector is mainly composed of:

- 电源适配器

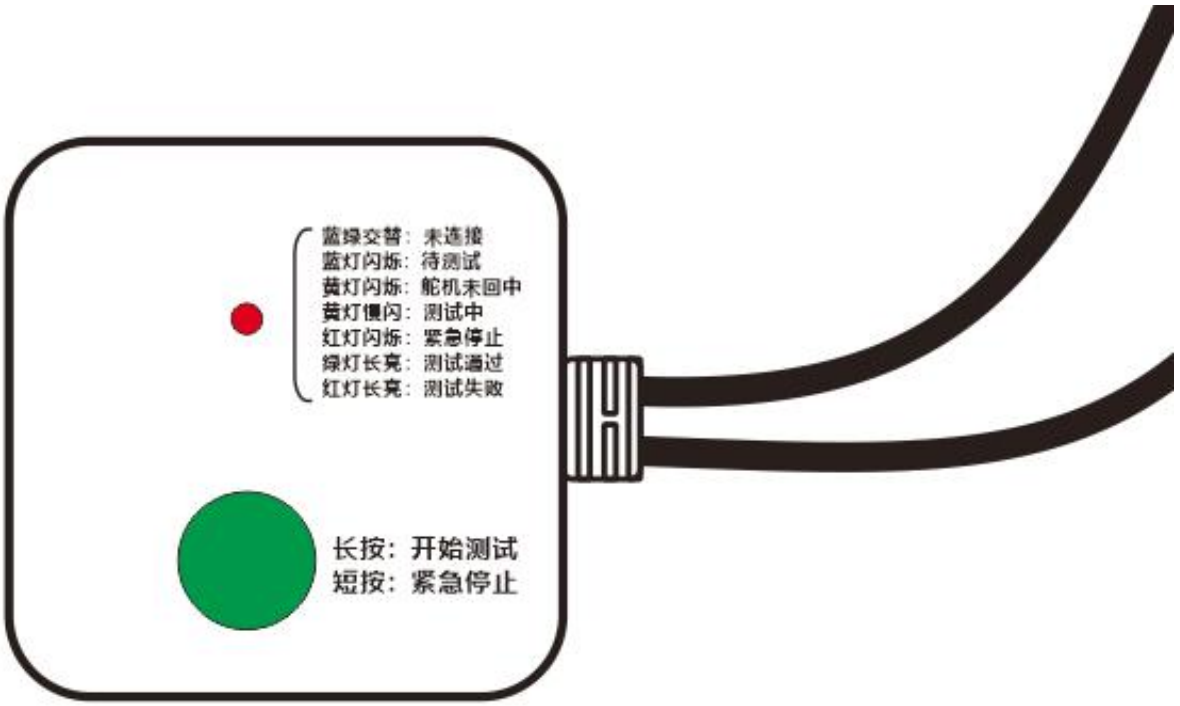
Power Adapter

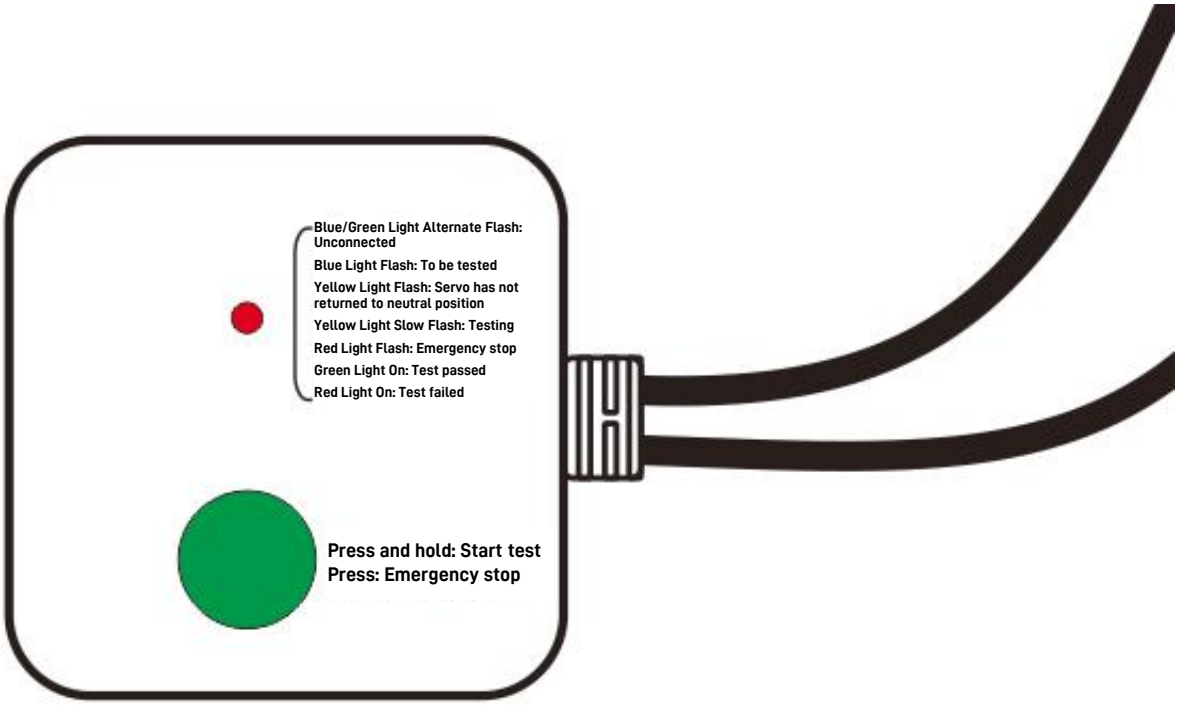
- 检测仪主体

Detector

- 检测仪转接线

Adapter cable





电机维修检测仪使用方式

Use instructions

按键说明

Button

长按--开始测试

Press and hold - Start test

短按--紧急停止

Press - Emergency stop

指示灯说明

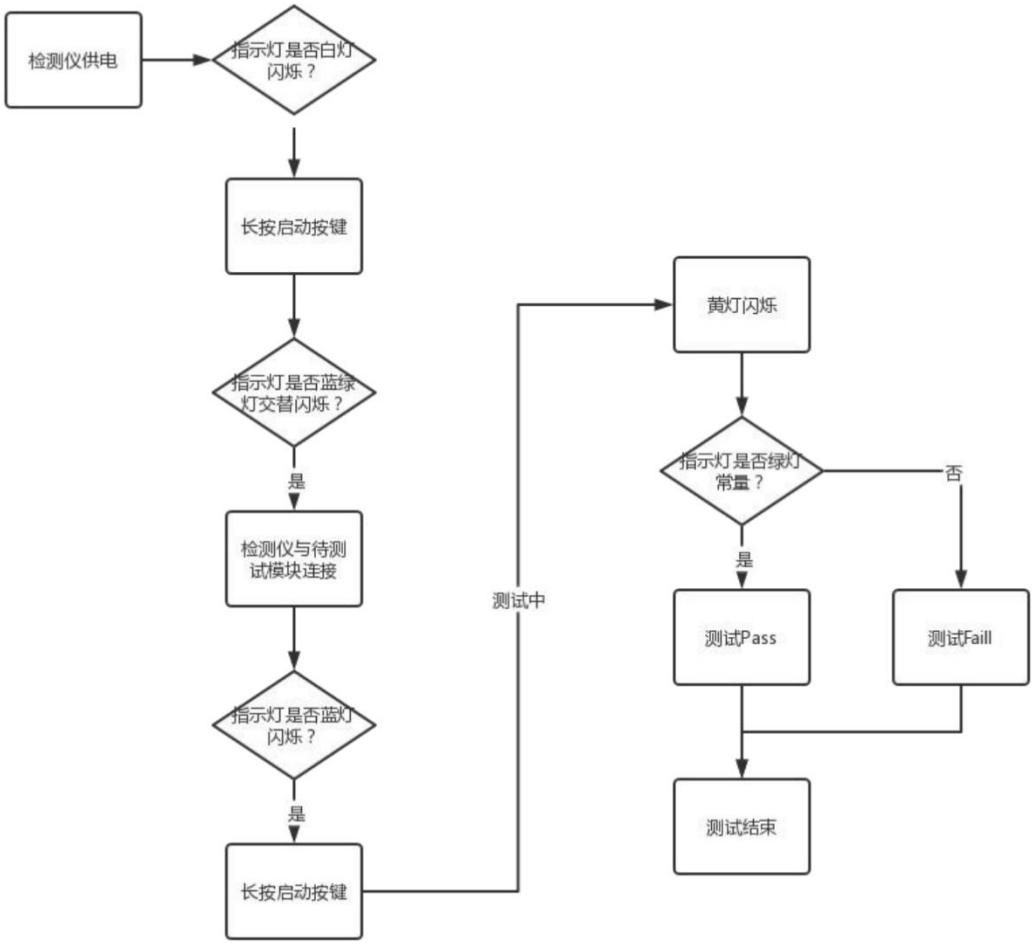
Indicators

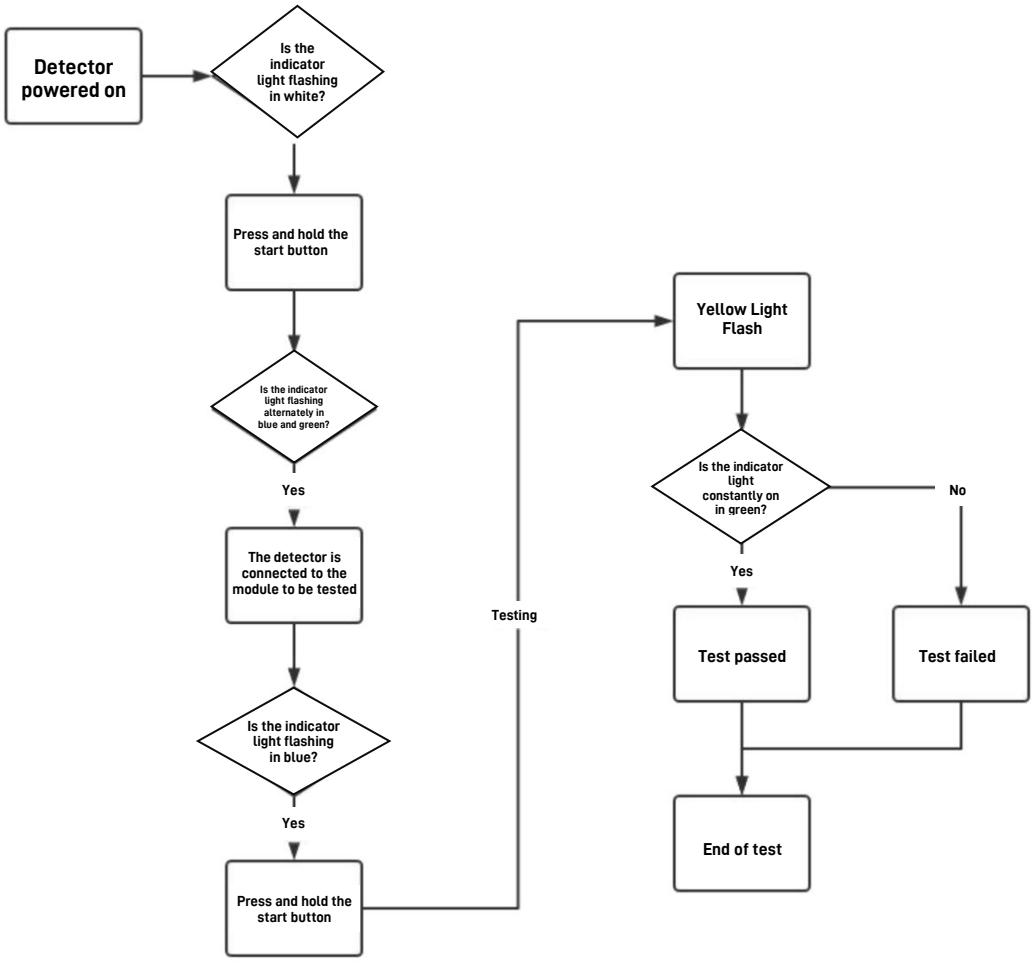
灯语说明 Indicator	状态说明 Status	备注 Remarks
白灯闪烁 White Light Flash	未复位 Not reset	白灯闪烁代表测试工具未复位，此时可长按开始进入到蓝绿灯闪烁状态 The flashing white light indicates that the detector is not reset. Press and hold the button, then the indicator flashes alternately in blue and green.
蓝绿灯交替闪 Blue/Green Light Alternate Flash	模块未连接 Module unconnected	
蓝灯闪烁 Blue Light Flash	待测试 To be tested	模块等待测试中，此时可长按开始测试 The module is waiting for the test. Press and hold the button to start the test.
黄灯快闪 Yellow Light Fast Flash	设备未回中 Servo has not returned to neutral position	黄灯闪烁代表设备未回中，手动回中后黄灯变成慢闪 The flashing yellow light indicates that servo has not returned to the neutral position, and the yellow light changes to slow flashing after manual neutral positioning.
黄灯慢闪 Yellow Light Slow Flash	测试中 Testing	
绿灯长亮 GREEN	测试通过 Test passed	

LIGHT ON		
红灯长亮 Red Light On	测试失败 Test failed	
红灯闪烁 Red Light Flash	紧急停止 Emergency stop	测试过程中短按，则红色闪烁，测试停止 Press the button during the test, then the red light flashes and the test stops.

操作步骤说明

Operating Procedures:





给检测仪供电，检测仪通电后此时指示灯的状态为白灯闪烁，长按检测仪上的按钮进行复位，待蓝绿灯交替闪烁时，进入模块待连接状态；

Power on the detector. After the detector is powered on, the indicator light flashes in white. Press and hold the button on the detector to reset. When the light flashes alternately in blue and green, it indicates that the module is waiting for connection;

将待测模块与检测仪连接，连接成功后指示灯的状态为蓝灯闪烁；

Connect the module to be tested to the detector. After successful connection, the indicator light flashes in blue;

在保证安全的前提下，长按检测仪上的按钮，待黄灯闪烁时，代表测试中；

Press and hold the button on the detector on the premise of safety, and when the indicator flashes in yellow, it means the test is in process;

测试过程中电机会转动，检测仪自动获取相关参数，测试结束后通过指示灯输出结果；

During the test, the motor runs and the detector automatically collects relevant parameters, with the result shown by the indicator light after the test;

若指示灯为绿灯长亮时，代表测试PASS；若指示灯为红灯长亮时，则代表测试Fail。

If the indicator light is in green, it means the test is passed; If the indicator light is in red, it means the test fails.

极加检修APP
XCARE TOOL APP
极加检修APP功能介绍
Functions

极加检修APP是一款针对极飞智能农业设备所开发的自动检测工作，在设备已提交维修单后，可在不拆解设备的前提下对农业无人机进行设备的室内独立测试以及室外的飞行测试。

XCARE TOOL APP is an automatic inspection tool developed for XAG intelligent agricultural drones. After a repair ticket is submitted, the app can conduct independent indoor tests and outdoor flight tests on the agricultural drones without disassembling them.

极加检修APP技术参数
Technical specifications

使用系统--Android（含：安卓、鸿蒙OS、MIUI等非IOS系统）

Operating system - Android (including Android, Harmony OS, MIUI and other non-iOS systems)

极加检修APP使用方式
Use Instructions of XCARE TOOL APP

界面介绍

Screen

Repair Ticket List Screen

Repair ticket number

Device query

Repair ticket number: Click to enter the screen of repair ticket details

Device query: Enter the repair ticket number or device serial number to query the device

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

Device Maintenance Screen

Drone Details: Tap profile picture to view the current status of the drone
One-click Indoor Detection: Tap to enter the indoor testing interface
Outdoor Testing: Tap to enter the outdoor testing interface
Replace Flight Controller: Tap to enter the flight controller configuration

ESC Configuration: Tap to enter the ESC configuration
Firmware Upgrade: Tap to view the firmware version and perform the firmware upgrade
Product Info Change: To change the product information
Return of the Right to Use: To return the right to use the drone to the user

整机测试介绍

Complete drone testing

整机测试适用于具备正常启动的无人机，可分为室内测试以及室外测试，使用前设备应正常提交"维修单"，只有在提交"维修单"且已接收了工单委派的工程师才可获得该设备的授权。使用"极加检修"App一键室内测试是面对设备处于完整状态，且具备正常开启的情况下使用。室外检测是面对设备处于维修完成后，且通过室内检测情况下使用。

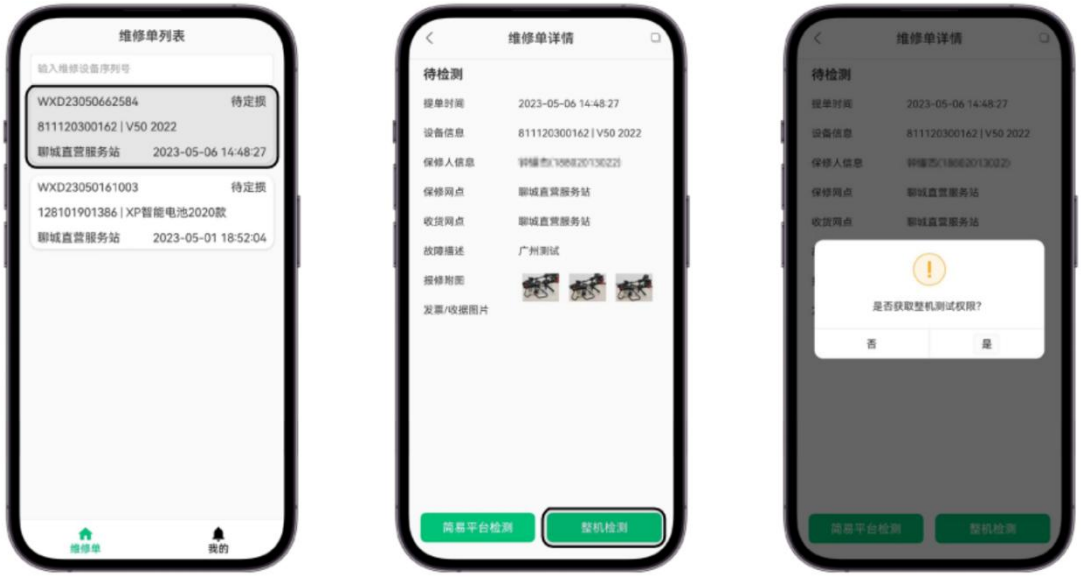
Complete drone testing, which applies to drones with normal startups, can be divided into indoor testing and outdoor testing. Before use, a "repair ticket" shall be submitted. Only after the "repair ticket" is submitted can engineers assigned to the ticket be authorized to access the device. One-click indoor testing is available in the XCARE TOOL APP when the drone is fully assembled and can be turned on properly. Outdoor testing is used when the drone has been repaired and passed indoor testing.

整机测试--室内测试

Complete drone testing - Indoor

开启无人机电源，打开"极加检修"App，点击需要测试的无人机工单，点击"整机检测"获取无人机测试权限。

Power on the drone, open the XCARE TOOL APP, tap the ticket for the drone to be tested, and then tap "Complete Drone Detection" to obtain the test permission.



选择"室内一键检测"后，可单独选择需要检测的项目或全选检测全部项目。

Choose "one-click indoor testing" to either select specific test items or enable comprehensive testing.

根据需求选择需要检测的内容后，点击"开始一键测试"，确保飞机螺旋桨已拆除以及喷洒药箱无农药，确认完毕后，向右滑动图标启动检测。

Select the test items as needed and tap "Start One-click Test"; confirm that the aircraft propellers have been removed and the spray liquid tank is free of pesticides, and then slide the icon to the right to start the test.

整机测试--室外测试

Complete drone testing - Outdoor

进入检测界面，选择"室外检测"后，可对无人机进行悬停及飞行测试。

Open the detection interface and select "Outdoor Detection" to start hover and flight testing on the drone.

注意

Note

使用睿喷进行室外测试时，药箱内应装载10至20升清水。

When RevoSpray is used for outdoor testing, the liquid tank shall be filled with 10-20 liters of clean water.

在室外悬停测试过程中应保证悬停空域的净空状态，障碍物（树木、建筑、电线杆等）与设备保持7米以上的距离。

During the outdoor hover test, maintain a clearance in the hovering airspace, with the drone kept at a distance of more than 7m from obstacles (trees, buildings, power poles, etc.).

设备在室外测试结束后会生成检测报告，若检测报告显示"测试通过"则代表设备维修后符合飞行标准，若不通过则需要根据测试报告中的异常项进行排查。

A test report is generated after the outdoor testing. If the test report shows "Test Passed," it means the drone meets flight standards after repair; otherwise, the drone should be inspected according to errors indicated in the test report.

三、损害限制及故障隔离

Damage Limitation and Fault Isolation

前言概述
Overview

损害限制及故障隔离是判断和排除设备故障的重要技术指标，提供识别和分析故障必要的技术数据和更换标准，帮助维修工程师排除故障。适用于日常维护检查及测试、日常设备维修，故障损害维修手册目的是用最有效的方式找出故障点并采取必要的措施排除故障，使得设备恢复正常状态，快速恢复运行。损害限制及隔故障隔离会并随着设备迭代而不断地更新完善。本章包括：损害检查及测试指引及规范、外观

及基础运行损害检查要求、设备更换要求、名词解释、外观及基础运行损害检查标准、外观及结构部件更换标准、损害检查测试指引及规范。

Damage limitation and fault isolation serve as an important technical indicators to diagnose and eliminate drone faults. It contains necessary technical data and replacement criteria to identify and analyze faults, helping maintenance engineers clear the faults. The document is applicable to routine equipment maintenance, inspection, testing, and repair. It aims to identify breakdowns effectively, and take necessary troubleshooting measures so that equipment resumes operation timely. Damage limitation and fault isolation will be updated along with equipment upgrade. This chapter contains: damage inspection and testing guidelines and specifications, appearance and basic operation damage inspection requirements, equipment replacement requirements, terminology interpretation, appearance and basic operation damage inspection standards, appearance and structural component replacement standards, damage inspection and testing guidelines and specifications.

损害检查及测试指引及规范
Damage Inspection and Testing Guidelines and Specifications

室内确保光线充足，维修过程应将无人机放置在指定维修区及维修台进行。拆卸后的微小零件应使用收纳盒等容器进行放置，电气设备存放应远离水源，禁止随意放置。尖锐及易损配件拆卸后应进行包裹或使用泡沫做好防护后再进行放置。

Please ensure adequate indoor lighting. For maintenance, the drone shall be placed on the maintenance platform in the designated maintenance area. Micro parts after removal should be placed in storage boxes or other containers; electrical equipment should be placed away from water sources, and should not be placed at will. Sharp and vulnerable accessories disassembled shall be wrapped or protected with foam materials before being placed.

结构部件损害检查要求
Inspection Requirements for Structural Component Damage

结构损害检查应优先采用目视检查及手动检查方式，通过目视确认开放性损坏或通过摇晃、拉拽等方式确认检查标的是否存在松动或紧固件失效情况。对于部分关键部件，需要通过角度检测工具、水平检测工具或百分表等工具确认损害情况。此外，也可通过对比法使用完好的配件与检测的标的进行对比，确认损害变形情况。

Visual inspection and manual inspection should be prioritized for structural damage assessment. Visually identify open damage or check for looseness or fastener failure by shaking or pulling. For critical components, use tools such as angle measurement and leveling gauges, or dial indicators to determine damage. Additionally, apply the comparative method by comparing the inspected parts with intact reference components to confirm deformation.

电气设备损害检查要求
Inspection Requirements for Electrical Equipment Damage

电气设备检查或运行测试应采用对应的自动化检测工具（如：电机维修检测仪、极加检修APP、电力系统软件等）进行故障定位及判定，根据不同的检测工具分别按标准测试流程实施检测工具，通过检测后的结果结合运行现象综合研判后再开始维修更换工作。检测工具适用性及使用方式可查阅本文《第二章一般检测工装治具介绍及使用方式》，故障排查可参考本文《第五章一般（常见故障）排故》。

Dedicated automated tools (motor maintenance detector, XCARE TOOL APP, power system software, etc.) shall be utilized in electrical device inspection or operational testing for fault localization and determination. Follow standardized testing procedures according to different tool specifications, and initiate maintenance and replacement work only after comprehensive analyzing the test results combined with operational phenomena. For tool applicability and usage, refer to Chapter II General Inspection Tooling and Fixtures and Their Use, and for troubleshooting guidance, consult Chapter V General Troubleshooting (Common Breakdowns).

损害现象名词解释
Damage Terminology Interpretation

- **裂纹**

Cracks

材料在应力或环境(或两者同时)作用下产生的裂隙，是材料的重要性能指标之一。裂纹的出现和扩展，使材料机械性能明显变差。

It refers to cracks generated under the action of stress and/or environment, and is one of the important performance indexes of materials. The appearance and propagation of cracks significantly degrade the mechanical properties of a material.

- **延伸性裂纹/开裂**

Ductile Cracks/Cracking

延伸性裂纹也称为（延性断裂），延性断裂是伴随明显塑性变形而形成延性断口（断裂面与拉应力垂直或倾斜，其上具有细小的凹凸，呈纤维状）的断裂。在延性断裂中，断裂之前发生广泛的塑性变形（颈缩）。延性断裂描述了承受张力的韧性材料的最终失效。材料不会破裂，而是"拉开"，通常会留下粗糙的表面。在这种情况下，在断裂之前存在缓慢的增长和大量能量的吸收。

Ductile cracks are also called ductile fractures, which are formed with significant plastic deformation. The fracture surface is perpendicular or inclined to the tensile stress, on which there are fine concave and convex features presenting a fibrous appearance. The ductile fracture follows extensive plastic deformation (necking). Ductile fracture describes the ultimate failure of a ductile material subjected to tension. The material does not break, but "pulls away", which generally leaves a rough surface. In this case, there is a slow growth and a large amount of energy absorption before fracture.

- **穿透性裂纹/开裂**

Penetrating Cracks/Cracking

穿透裂纹是贯穿构件整个厚度，常将裂纹延伸到厚度一半以上的裂纹视为穿透裂纹，作为理想尖端裂纹处理，即裂纹尖端的曲率半径趋于零。可以为直线的、曲线的和其他形状的。

A penetrating crack refers to a crack that runs through the entire thickness of a member, often extending to more than half of the thickness. It is treated as an ideal sharp crack, that is, the radius of curvature at the tip of the crack goes to zero. It can be straight, curved or in other shapes.

- **刻痕**

Nicks

刻痕的产生一般是由于工件表面受到锋利物品剐蹭或切割所造成，刻痕一般不会产生穿透性损伤，但伴随刻痕的产生可能会导致工件内部与环境接触发生氧化或腐蚀反应从而导致产生开裂现象。

A nick is generally caused when a workpiece is scratched or cut on the surface by a sharp article. In general, the nick will not cause penetrating damage, but it may lead to the contact between the inside of the workpiece and the environment, resulting oxidation or corrosion reactions, which may eventually cause cracking.

- **穿孔**

Perforation

穿孔是一种由钻、凿或受尖锐物品撞击而产生且穿透物体表面的现象，不规则的穿孔会诱发裂纹的产生。穿孔会影响原有物体的机械性能，同时会诱发物体形变。

Perforation is a phenomenon caused by drilling, chiseling, or striking by a sharp object and penetrating the surface of an object. Irregular perforations can induce cracks. Perforation will affect the mechanical properties of an original object and induce deformation of the object.

- **应力发白**

Stress whitening

应力发白现象是一种高分子聚合物因外力引发变形下的变白现象，在外力的作用下材料内部出现孔洞、断裂、分层等现象，出现应力发白现象的材料（塑料、橡胶等）会失去原有的机械性能特征，同时会引起断裂。

Stress whitening refers to the whitening of a high-molecular polymer under deformation caused by external force. Specifically, under the action of external force, there are holes, fractures or stratification inside the material. Materials (such as plastic and rubber) with stress whitening will lose their mechanical properties, causing fracture.

- **烧蚀**

Ablation

烧蚀是由于触片在长期使用中容易受磨损或电弧的产生等影响导致沾染异物和发生局部高温所产生的的，其物理表现为触片表面出现发黑、异物厚度增加、电阻增加。

Ablation is caused by a contact susceptible to wear or arc in long-term use, resulting in contamination with foreign matters and local high temperature. It is physically manifested as blackening, increased thickness of foreign matters, or increased resistance on the surface of the contact.

结构部件损害限制及症候
Structural Component Damage Limitation and Symptoms
机身损害限制
Airframe Damage Limitation

注意：若出现以下内容中出现的异常现象应立即进行更换，若出现未在本文中提及但可能存在风险的异常现象，应立即联系技术支持进行核实判定。

Note: Immediately replace components if any of the following abnormalities are detected. For unlisted abnormalities posing potential risks, contact technical support for verification immediately.

部位及检测方式 **Location and Inspection Method**	
部位 **Location**	**检查方式** **Inspection Method**
机臂连接处 Arm connection	目视/手动检查 Visual/manual check
边梁与横梁连接处 Connection of the side beam and cross beam	
全向天线固定座连接处 Connection of the omni-directional antenna mount	
电机底座 Motor base	
电调固定座 ESC mount	
抱箍紧固状态机连接处 Connection of the clamp fastening state machine	
机臂抱胶处 Arm clamp sealant	
机臂分半法兰 Arm split flange	
电源插座 Power socket	

关键损害限制信息
Key damage limitation information

- 裂纹 > 10mm、无变形差异 > 15mm，机臂5°角度（误差+-0.5°）

Cracks >10mm, no deformation deviation >15mm, arm angle of 5° (error ±0.5°)

- 螺栓孔位滑丝、锈蚀或破损

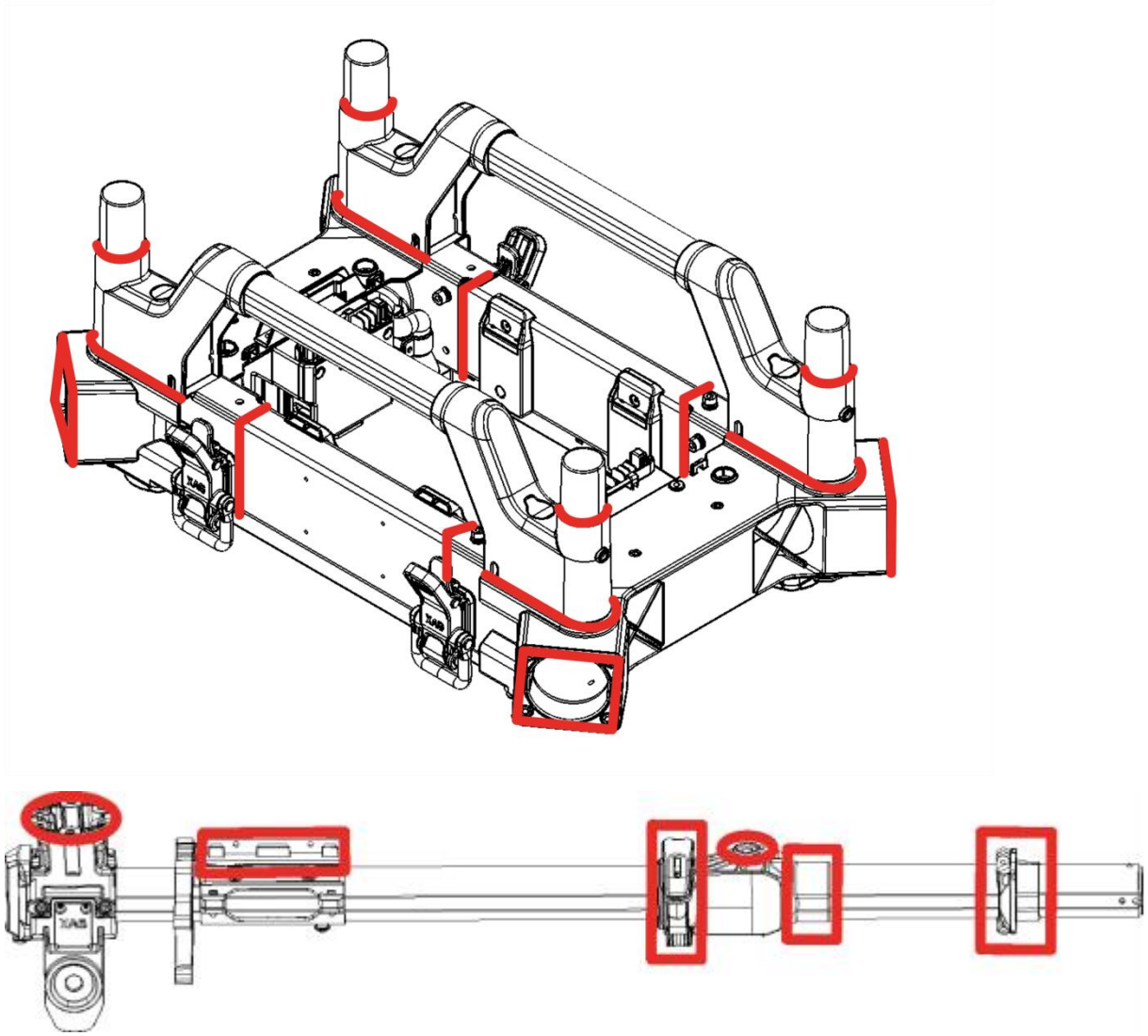
Bolt hole thread stripping, rust, or damage

- 尾插触片锈蚀（单触片 > 30%；多触片 > 2片）或变形

Connector contact corrosion (single contact area >30%; multiple contacts >2) or deformation

- 尾插整体异常松动

Abnormal looseness of connector assembly



机身损害症候
Airframe Damage Symptoms

- 机身结构出现松动--机体不平、机身震动过大导致坠毁及损害扩大化

Structural looseness of airframe - airframe imbalance or excessive vibration leading to crash and damage escalation

- 机身连接处出现应力发白--机身震动过大、结构性解体导致坠毁及损害扩大化

Stress whitening at airframe connections - excessive vibration or structural disintegration causing crash and damage escalation

- 全向天线固定座松动或存在裂纹--定位精度降低、航线偏移导致撞击事故发生

Loose or cracked omni-directional antenna mounts - reduced positioning accuracy or flight path deviation inducing collision incident

- 电源尾插锈蚀或变形--尾插温度异常、电流增大导致飞行时间缩短

Corroded or deformed power connector - abnormal connector temperature or current surge shortening flight duration

- 分半法兰松动或机臂变形--机体不平、机身震动过大导致坠毁及损害扩大化

Loose split flanges or arm deformation - airframe imbalance or excessive vibration causing crash and damage escalation

动力系统损害限制及症候
Propulsion System Damage Limitation and Symptoms
动力系统损害限制
Propulsion System Damage Limitation

注意：若出现以下内容中出现的异常现象应立即进行更换，若出现未在本文中提及但可能存在风险的异常现象，应立即联系技术支持进行核实判定。

Note: Immediately replace components if any of the following abnormalities are detected. For unlisted abnormalities posing potential risks, contact technical support for verification immediately.

部位及检测方式 **Location and Inspection Method**	
部位 **Location**	**检查方式** **Inspection Method**
动力电机 Main motor	目视/手动检查/工具测试 Visual/manual inspection/tool testing
动力电调 Main ESC	

使用极加检修APP对动力电机及动力电调进行《室内测试》，检测标的如下：

Conduct "indoor testing" on the main motor and main ESC through XCARE TOOL APP, focusing on following test items:

- 电机转速无异常报错

No abnormal motor speed errors

- 电机转动无异常卡滞堵转现象

No jamming or stalling during motor rotation

- 电流、电压及运行稳定无异常或报错

Stable current, voltage, and operation without abnormalities or errors

部位及检测方式 **Location and Inspection Method**	
部位 **Location**	**检查方式** **Inspection Method**
动力电机转子 Main motor rotor	目视/手动检查 Visual/manual check
动力电机定子	

Main motor stator	
动力电机三相线 Main motor three-phase wire	
动力电调外壳 Main ESC housing	
螺旋桨及桨夹 Propeller and propeller clamps	

关键损害限制信息
Key damage limitation information

- 转子变形量 > 15丝、间隙 < 2mm

Rotor deformation >0.15 mm, clearance <2mm

- 定子绕组烧黑 > 20%或断裂

Stator winding burnout >20% or breakage

- 定子轴承锈蚀

Stator bearing corrosion

- 三相线线皮破损（单线面积 > 5mm）

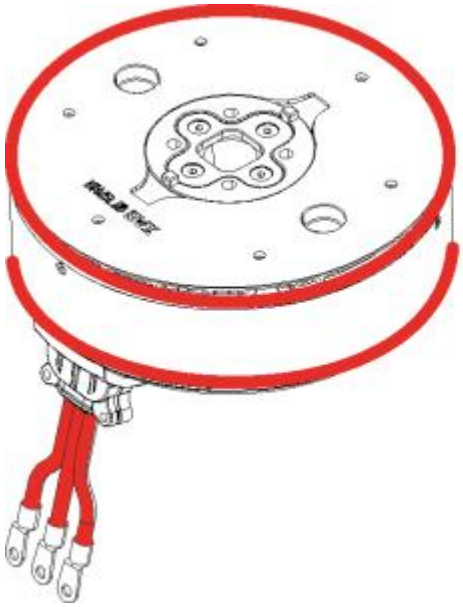
Three-phase wire insulation damage (>5 mm^2 area)

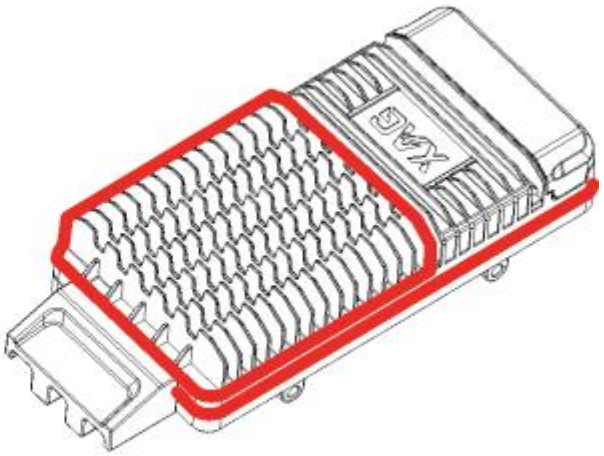
- 动力电调外壳散热鳍破损（穿孔或穿透性裂纹），外壳接合松动

Main ESC housing heat sink perforation or penetrating cracks, or loose connection with the housing

- 螺旋桨裂纹（ > 5mm）、变形差异（大于10mm）

Propeller cracks (>5 mm), deformation difference (>10 mm)





动力系统损害症候
Propulsion System Damage Symptoms

- 动力电机定子绕组损坏--动力电机缺相、堵转，偶发性缺相会导致动力电机响应异常引起致坠毁及损害扩大化

Main motor stator winding damage - main motor phase loss or stalling, or intermittent phase loss causing abnormal motor response, leading to crash and damage escalation

- 动力电机外转子变形--机身震动过大、结构性解体导致坠毁及损害扩大化

Main motor rotor deformation - excessive vibration or structural disintegration causing crash and damage escalation

- 动力电调外壳破损--动力电调水汽入侵，烧毁或运行时效导致坠毁及损害扩大化

Main ESC housing damage - moisture ingress leading to burnout or operational failure, inducing crash and damage escalation

- 电源尾插锈蚀或变形--尾插温度异常、电流增大导致飞行时间缩短

Corroded or deformed power connector - abnormal connector temperature or current surge shortening flight duration

- 螺旋桨或桨夹变形断裂--机身震动过大或、飞行过程中射桨导致坠毁及损害扩大化

Propeller or clamp deformation or fracture - excessive vibration or mid-flight propeller detachment inducing crash and damage escalation

感知系统损害限制及症候
Sensor System Damage Limitation and Symptoms
感知系统损害限制
Sensor System Damage Limitation

注意：若出现以下内容中出现的异常现象应立即进行更换，若出现未在本文中提及但可能存在风险的异常现象，应立即联系技术支持进行核实判定。

Note: Immediately replace components if any of the following abnormalities are detected. For unlisted abnormalities posing potential risks, contact technical support for verification immediately.

<table>
<tr><th colspan="2">部位及检测方式
Location and Inspection Method</th></tr>
<tr><th>部位
Location</th><th>检查方式
Inspection Method</th></tr>
<tr><td>雷达模块
Radar module</td><td rowspan="2">目视/手动检查/工具测试
Visual/manual inspection/tool testing</td></tr>
<tr><td>FPV模块
FPV module</td></tr>
</table>

使用极加检修APP对动力感知系统整体进行《室外测试》，检测标的如下：

Conduct "outdoor testing" on the sensor system through XCARE TOOL APP, focusing on following test items:

- 雷达探测距离及工况是否正常，无报错及告警

Normal radar detection range and working conditions with no errors or alarms

- 摄像头成像及图传工况是否正常，无报错及告警

Proper camera imaging and video transmission conditions with no errors or alarms

- LED模块工况是否正常，无报错及告警

Functional LED modules with no errors or alarms

<table>
<tr><th colspan="2">部位及检测方式
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Radar housing</td><td rowspan="2">目视/手动检查
Visual/manual check</td></tr>
<tr><td>雷达模块与摄像模块
Radar module and camera module</td></tr>
</table>

LED灯镜片 LED lens	
摄像头镜片 Camera lens	

关键损害限制信息
Key damage limitation information

- 无开放性裂纹及穿孔

No open cracks or perforations

- 无结构变形或内部存在异响

No structural deformation or internal abnormal noises

- 镜片无破损及穿孔

Intact lenses without cracks or perforations

- 模组接合间隙紧密无松脱

Tight module interfaces without loosening

- 各部位螺孔无锈蚀及损坏

Screw holes free of corrosion or damage

感知系统损害症候
Sensor System Damage Symptoms

- 雷达外壳穿孔及裂纹--雷达内部水汽入侵会导致雷达失效或探测失准引起航线撞击坠毁事故

Perforated or cracked radar housing - moisture ingress causing radar failure or detection inaccuracies, leading to in-flight collision or crash

- 感知系统结构变形--结构变形会引起探测失准或结构性损坏引起航线撞击坠毁事故

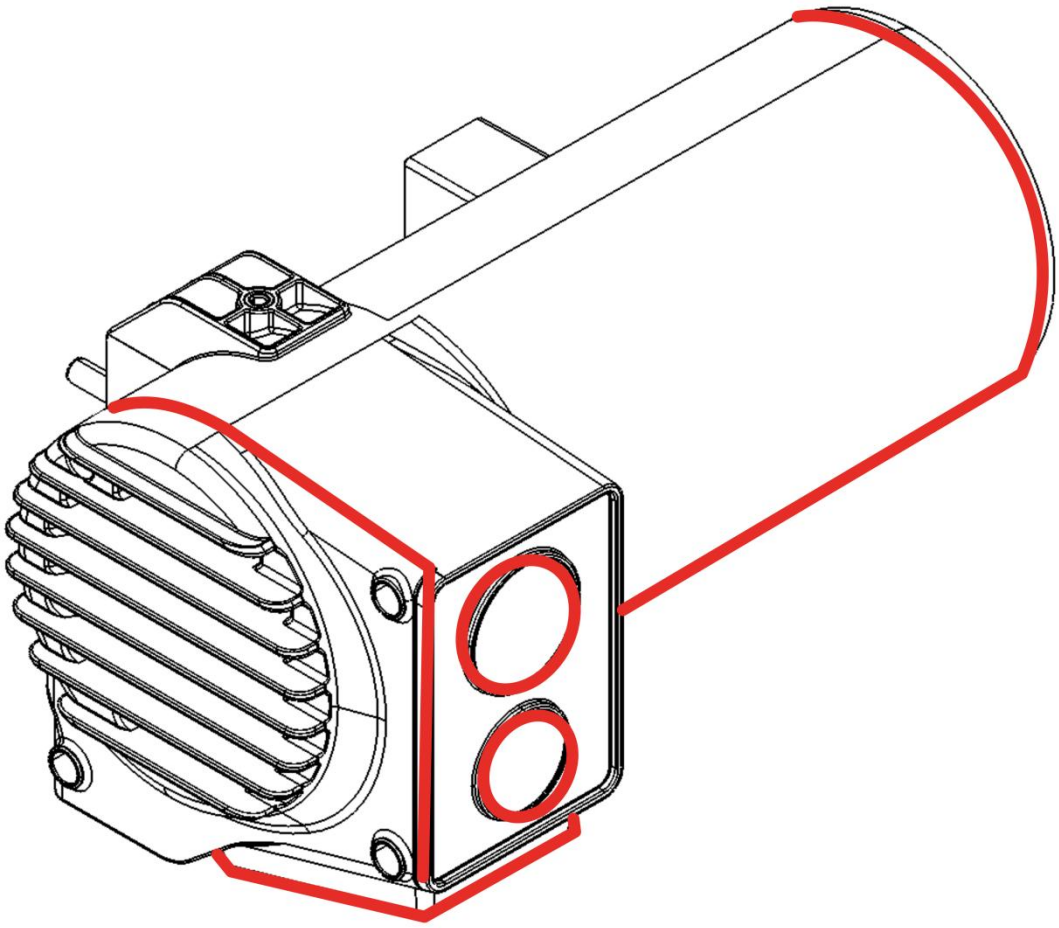
Deformed sensor system structure - structural deformation causing detection inaccuracies or structural failure, inducing in-flight collision or crash

- LED灯镜片破裂或穿孔--水汽入侵引起LED灯损坏及短路可能造成的损坏扩大化

Damaged or perforated LED lens - moisture ingress causing LED burnout or short circuits that escalate damage

- 摄像头模块镜片破裂或穿孔--水汽入侵引起摄像头损坏损坏及短路可能造成的损坏扩大化

Damaged or perforated camera lens - moisture ingress causing camera burnout or short circuits that escalate damage



四、P150农业无人飞机拆装指引

Guidelines for Removal and Installation of P150 Agricultural Drone

前言概述

Overview

本章内容主要为2024款P150农业无人飞机及其相关任务系统的关键部件拆装。在本章内容中将会以图解流程的方式结合对应序号呈现拆卸过程，安装过程大部分为拆卸过程的方向操作，但部分结构的安装顺序与拆卸顺序存在差异，请认真阅读。同时，在对结构及相关电子件进行拆卸前应确保其供电线缆、通讯线缆及管道已经实施分离，并确认无任何形式的电源供电。

This chapter mainly introduces how to fit and remove the key components of the P150 2024 Agricultural Drone and its related payload system. In this chapter, the disassembly procedures are presented by illustrating with corresponding serial numbers. For the assembly procedures, most of the steps are the reverse of the disassembly procedures. However, in some structures, the assembly sequences are different from that of the disassembly. Please read it carefully. In addition, before disassembling the structure and related electronic components, please ensure that the power supply cables, communication cables, and pipelines have been separated and confirmed that there is no power supply in any form.

拆卸条件

Fit and Remove Conditions

拆卸前应核实设备损坏情况并完成维修方案的制定，结构部件应根据附件《结构损害隔离手册》核实损坏情况，确认复合更换标准或证实损坏情况会导致设备出现安全风险后进行更换。

Prior to disassembly, verify device damage status and finalize the repair plan. Structural components must be inspected against the supporting document Structural Damage Isolation Manual to confirm compliance with replacement criteria or validate that identified damage poses safety risks before initiating component replacement.

拆装环境

Environment for Disassembly and Assembly

拆装过程必须确保室内确保光线充足，维修过程应将无人机放置在指定维修区及维修台进行。拆卸后的微小零件应使用收纳盒等容器进行放置，电气设备存放应远离水源，禁上随意放置。尖锐及易损配件拆卸后应进行包裹或使用泡沫做好防护后再进行放置。

Please ensure adequate indoor lighting for the disassembly and assembly. For maintenance, the drone shall be placed on the maintenance platform in the designated maintenance area. Micro parts after removal should be placed in storage boxes or other containers; electrical equipment should be placed away from water sources, and should not be placed at will. Sharp and vulnerable accessories disassembled shall be wrapped or protected with foam materials before being placed.

拆卸前序工作

Pre-disassembly work

当无人机或相关任务系统已完成情况核实及维修方案制定后，在拆卸前应对无人机或需要进行拆卸的相关任务系统进行表面清洁，涉及与农药或肥料接触的相关部件应在进行基础清洁，完成基础清洁并风干后方可进行拆卸工作。

After the completion of verification on the drone or relevant payload system and the formulation of maintenance plan, clean the surface of the drone or the related payload systems to be disassembled. Theparts in contact with pesticides or fertilizers shall be subject to basic cleaning and dried them by air before being disassembled.

拆装工具清单

List of Tools for Disassembly and Assembly

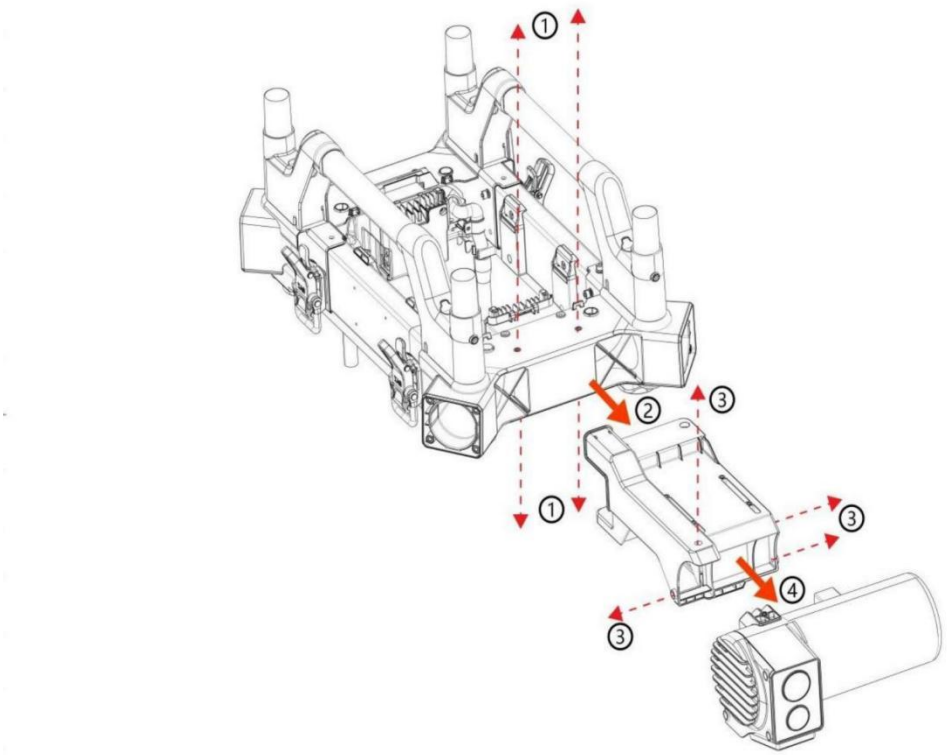
拆装工具是无人机拆装过程中的必要工具，其中包括手动工具、电动工具、校准工具、辅助工具及耗材等，工具在使用过程中具有一定的危险性，因此在使用时应严格按照《工具使用指引》进行操作避免违规操作导致人员或财产的损失。

Tools including manual tools, electric tools, calibration tools, auxiliary tools, consumables and so on are necessary for the disassembly and assembly of drones. Due to having certain risks during use, the tools shall be strictly operated in accordance with the Guidelines for Use of Tools to avoid personnel injury or property damage caused by improper operations.

工具属性 Tool attribute	工具名称 Tool description	规格 Specification	适用场景 Applications
手动工具 Manual tools	套装内六角 Hex socket set	N/A	无人机拆装 Disassembly and assembly of drones
	棘轮板 Ratchet wrench	N/A	无人机拆装 Disassembly and assembly of drones
电动工具 Electrical tools	电动螺丝刀 Electric screwdriver	12-14V可更换批头 12-14V replaceable screwdriver bits	无人机拆装 Disassembly and assembly of drones
校准工具 Calibration tools	力矩扳手 Torque wrench	电子扭力扳手 Electronic torque wrench	安装后测控点扭力校验 Torque calibration of measurement and control points after assembly
辅助工具 Auxiliary tools	拐角器 Cornering device	N/A	配合电批在狭小空间拆装螺丝 Removal and installation of screws in tight space with an electrical screwdriver.
	引线器 Lead wire	N/A	机臂及狭小位置线缆导引 Cable guidance for arms and at tight positions
耗材	马克笔 Marker	N/A	螺丝紧固后做防反松标记 Marking screws for anti-loosening after fastening
	螺丝胶 Screw adhesive	半永久螺丝胶 Semi-permanent screw adhesive	安装螺丝前涂抹，防反松现象 Applying before mounting screws to prevent them from getting loosing

Consumables	螺丝松动剂 Screw loosening agent	WD-40	锈蚀螺丝拆卸前松动 Loosening corroded screws before removal
	电工胶带 Electrical tape	N/A	小面积线缆（非电源）破损修补 Repair of cables with a small area of damage (non-power cables)
	醋酸胶带 Acetate tape	N/A	线缆及管道防磨损包裹 Abrasion-resistant wrapping for cables and pipes

P150/P60拆装程序
P150/P60 Fit and Remove Procedures
P150/P60机头拆装指引
P150/P60 Hood Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
①	M5*14	02-004-01266	29-31kgf·cm
③	M4*14*8	02-004-00835	21-22 kgf·cm

拆卸流程

Disassembly Procedures

1.拆卸机身与机头上方及下方连接处4颗M5*14大固定螺丝。

1. Remove the 4 M5*14 large set screws that connect the airframe to the top and bottom of the hood.

2.外拉分离机头结构（机头及感知模块结构可完整分离）。

2. Pull outward to separate the hood structure (the hood and the sensor module structure can be separated completely).

3.分离感知模块与机头架颗M4*14*8螺丝。

3. Remove the M4*14*8 screws that connect the sensor module and the hood.

4.前拉分离感知模块。

4. Pull forward to separate the sensor module.

安装流程

Installation Process

1.固定机头于机身安装位置，安装机头上下方螺丝。

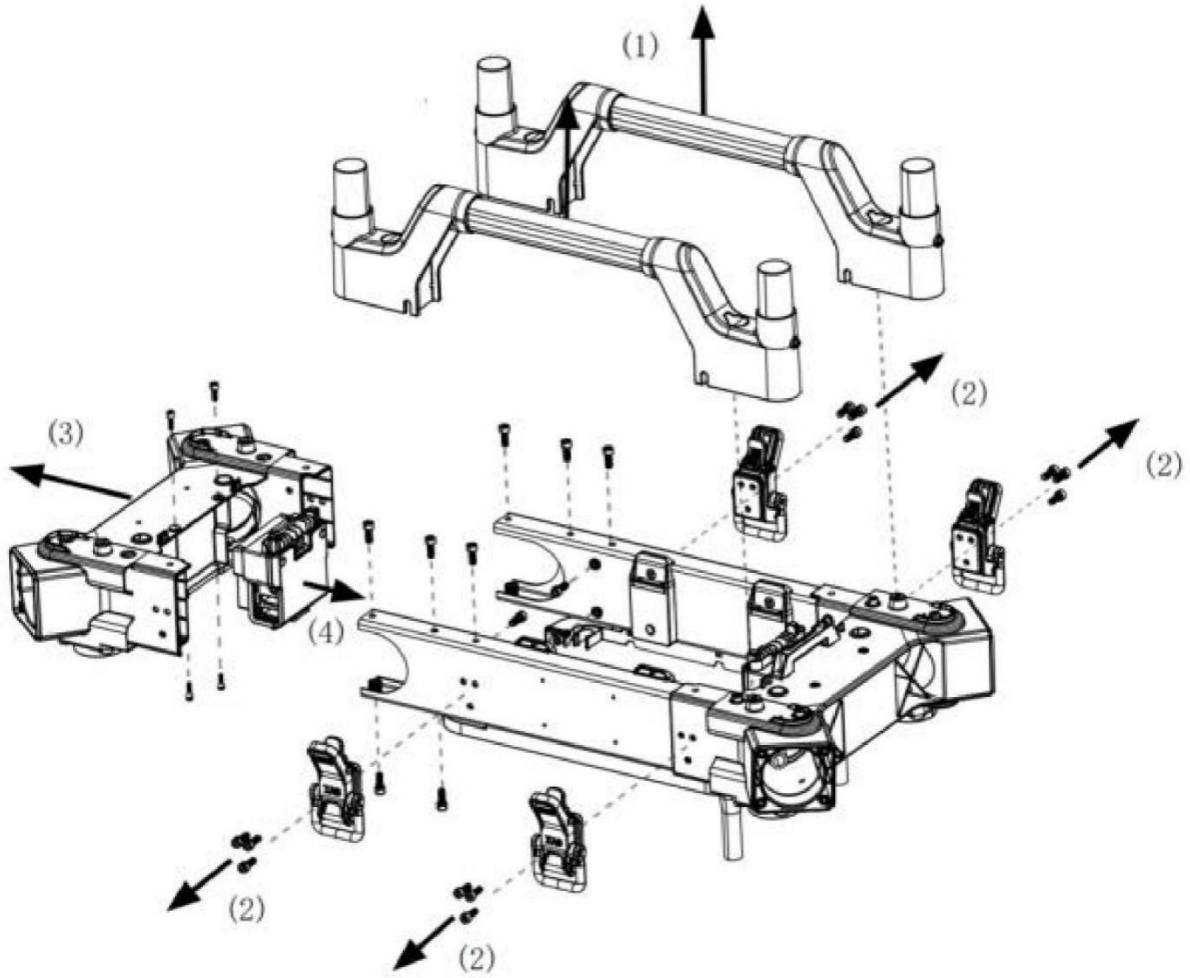
1. Fix the hood to the mounting position on the airframe, and install the upper and lower screws in the hood.

2.安装感知模块固定螺丝。

2. Install the set screws in the sensor module.

P150/P60机身拆装指引

P150/P60 Airframe Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
①	M4*10*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	12-14 kgf·cm

拆卸流程

Disassembly Procedures

1.需要掀开把手胶塞，拧出螺丝*4

1. Remove the handle rubber plug and unscrew screws *4.

2.拔下把手与飞控连接的天线*6。

2. Disconnect the antennas*6 linking the handle to the flight controller.

3.把手与机身分离。

3. Separate the handle from the airframe.

4.拆下卡扣螺丝*12。

4. Remove the snap fit screws*12.

5.卡扣与机身分离。

5. Separate the snap fit from the airframe.

6.拆下横梁与边量锁紧螺丝*14。注意边梁内侧有锁紧螺丝。

6. Remove the fastening screws*14 that connect the cross beam and the side beam. Note the fastening screws on the inner side of the side beam.

7.边梁与横梁分离。

7. Separate the side beam from the cross beam.

8.注意事项：电池尾插模块可不拆机身框架直接取出

8. Note: The battery plug module can be directly extracted without disassembling the airframe.

9.拆下上下锁紧螺丝*4。

9. Remove the upper and lower fastening screws*4.

10.电池尾插模块与横梁分离。

10. Separate the battery plug module from the cross beam.

安装流程

Installation Process

1.固定尾框结构于机身安装位置，安装尾框结构上下方螺丝。

1. Fix the rear frame structure to the mounting position on the airframe, and install the upper and lower screws in the rear frame structure.

2.固定尾插模块于尾框安装处，安装固定螺丝。

2. Fix the battery plug module to the mounting position on the rear frame, and install the set screws.

3.将电池尾插模块与机身横梁组装。螺丝*4

3. Assemble the battery plug module with the airframe cross beam. Screws *4

4.机身横梁与框架的组装，装配间隙比较小，需要压紧对准螺丝。并且此处的安装无防呆设计，需要对准上下面。框架上下侧螺丝*10，框架内侧螺丝*4

4. Assemble the airframe cross beam and frame. Since the assembly gap is narrow, press tightly and align screws properly. Given no mistake-proof design here, ensure top-bottom alignment. Screws *10 on the upper and lower sides of the frame, screws *4 on the inner side

5.卡扣的安装。螺丝*12

5. Install the snap fit. Screws *12

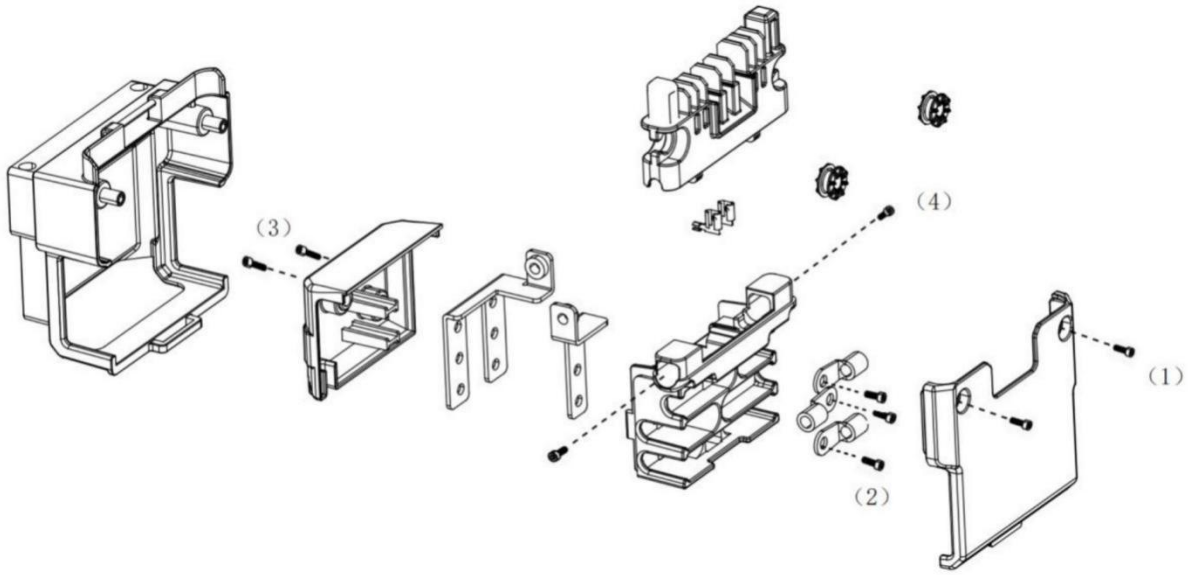
6.把手的安装，需要注意有线束的一边靠近飞控。螺丝*4

6. For the installation of the handle, ensure that the side with cables is closer to the flight controller. Screws *4

7.注意事项：机身主框为对称设计，对称相同部件的拆装方法一样。

7. Note: The main airframe structure is symmetrical, so fit and remove methods for symmetrical components are identical.

P150/P60电池尾插模块拆装指引
P150/P60 Battery Plug Module Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*10*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	24-16 kgf·cm
④	M4*10*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	24-16 kgf·cm

拆卸流程

Disassembly Procedures

1.拧出螺丝（1）*2，取出尾插模块前盖。

1. Unscrew the screws (1) * 2, and remove the front cover of the battery plug module.

2.拧出螺丝（2）*3，可将供电线取下，便可取出整个电池尾插模块。

2. Unscrew the screw (2) * 3, detach the power supply cable, and then remove the entire battery plug module.

3.拧出螺丝（3）*2，取出汇流板后盖。

3. Unscrew the screws (3)*2, and remove the rear cover of the bus bar.

4.拧出螺丝（4）*2，分离电池尾插、汇流板前壳、尾插铜排。

4. Unscrew the screws (4) * 2, and separate the battery plug, the front cover of the bus bar and the battery plug copper wire.

5.从电池尾插中拔下电池信号线。

5. Disconnect the battery signal cable from the battery plug.

安装流程

Installation Process

1.尾插铜排组合后放进汇流板前壳凹槽内，电池尾插插上电池信号线。

1. Place the assembled battery plug and copper wire into the groove of the bus bar front housing, then connect the battery signal cable to the battery plug.

2.将电池尾插与汇流板前壳上下组合，拧紧螺丝（4）*2，在拧紧过程注意用手压紧尾插铜排，避免宁螺丝时使其错位。

2. Assemble the battery plug and bus bar front housing up and down. Tighten screws (4)*2 while pressing the assembled battery plug and copper wire firmly by hand to prevent misalignment during tightening.

3.将汇流板后可盖上前壳子，并拧紧螺丝（3）*2。

3. Attach the rear cover of the bus bar to the front housing and tighten screws (3)*2.

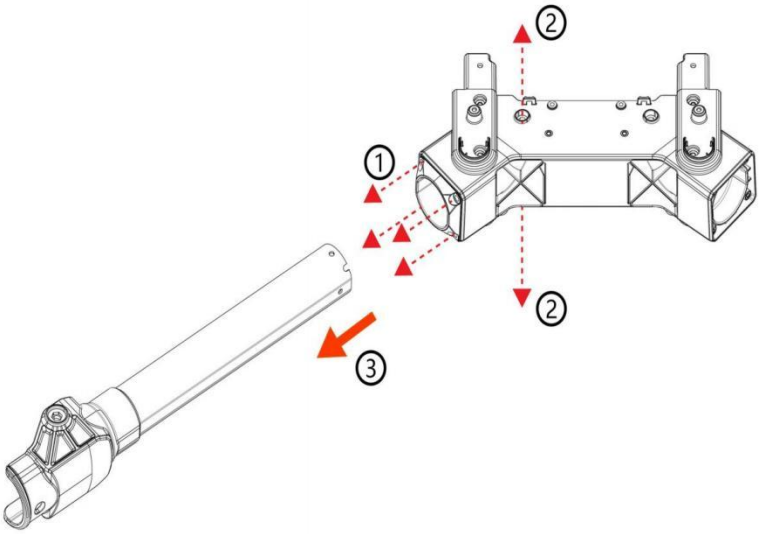
4.将供电线的螺丝（3）宁紧，需注意正负极。

4. Tighten the screws (3) of the power supply cable, ensuring correct polarity.

5.尾插模块前后盖将组装件夹住，拧上螺丝（1）*2。

5. Secure the assembled unit between the front and rear covers of the battery plug module, then fasten screws (1)*2.

P150/P60机臂拆装指引
P150/P60 Arm Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
①②	M5*14	02-004-01266	29-31kgf·cm

拆卸流程

Disassembly Procedures

1.拆卸机臂与机身接触面正前方4颗M5*14螺丝。

1. Remove the 4 M5*14 screws right in front of the contact surface between the arm and the airframe.

2.外拉分离机臂（拆卸机臂前应确保机臂的线缆与管路已分离）

2. Pull outward to separate the arm (after confirming that the arm cable and tube have been separated).

注意事项

Notes

P150及P60四根机臂拆卸方法一致。

The four arms of P150 and P60 can be removed by the same method.

安装流程

Installation Process

1.安装机臂，并插入对应的安装孔。

1. Install each arm, and insert it to the corresponding mounting hole.

2.将4颗M5*14螺丝沿对角线方向依次锁紧。

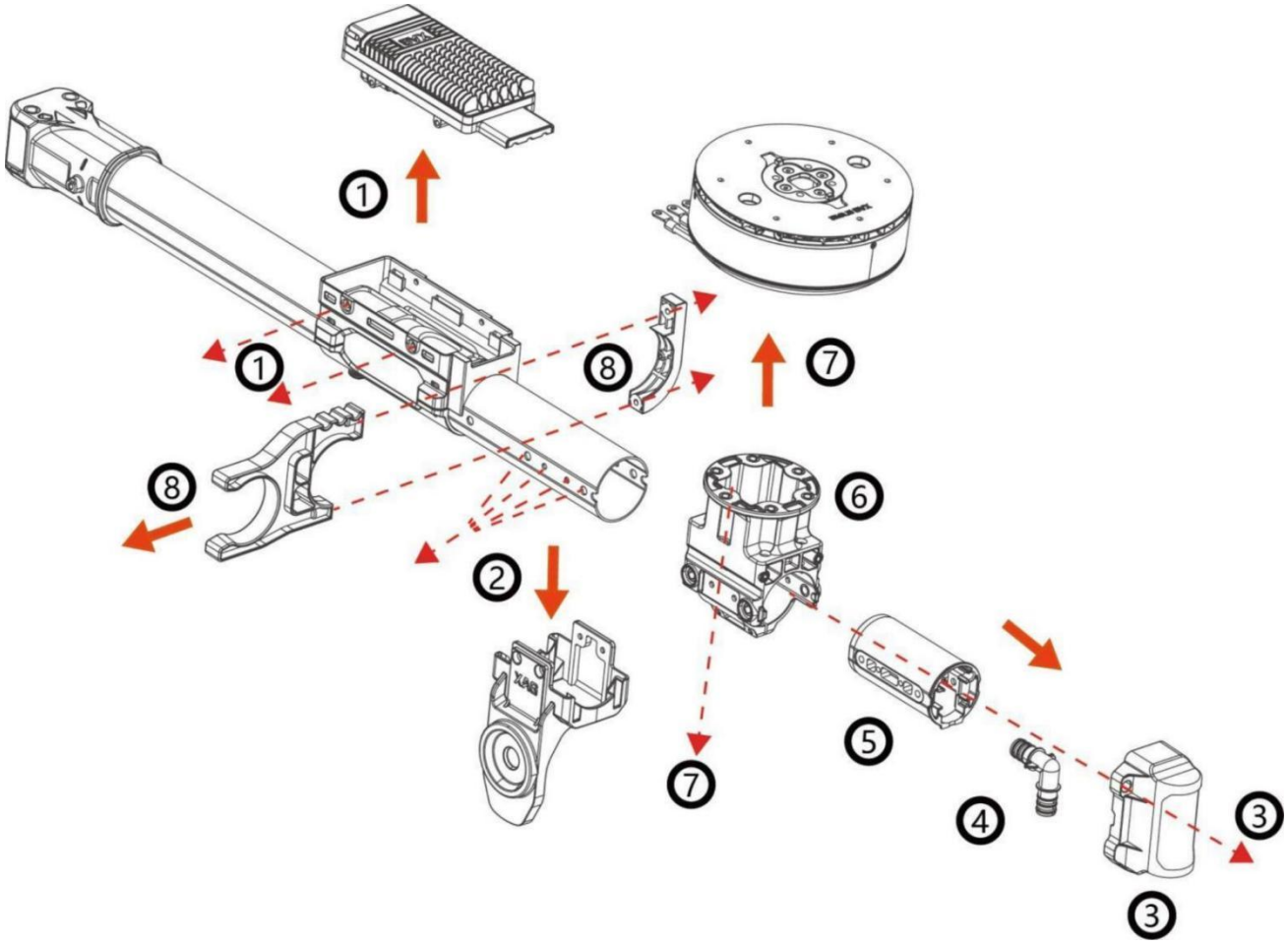
2. Tighten the 4 M5*14 screws diagonally in order.

3.在安装过程中，需要注意线缆及管路通过机臂与机身时避免剐蹭破损。在最终组装前，需捋顺线缆

3. During installation, take care to avoid scratches and breakage when routing the cables and tubes through the arms and the airframe. Straighten the cables before final assembly

P150/P60动力系统拆装指引

P150/P60 Propulsion System Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
①	M4*10*8	02-004-00833	12-14 kgf·cm
②	M4*14*8	02-004-00835	12-14 kgf·cm
②	M5*14	02-004-01266	49 kgf·cm
③	M4*12*8	02-004-00834	12-14 kgf·cm
⑦	M5*14	02-004-01266	35-41kgf·cm
⑧	M4*10*8	02-004-00833	12-14 kgf·cm

拆卸流程

Disassembly Procedures

1.拆卸动力电调固定耳上4颗M4*10*8螺丝，分离电调。

1. Remove the 4 M4*10*8 screws from the main ESC fixing lug and separate the ESC.

2.拆卸动力电机三相线端子上的3颗M4*10*8螺丝，分离动力电机三相线。

2. Remove the 3 M4*10*8 screws on the three-phase wire terminal of the main motor and separate the three-phase wire of the main motor.

3.拆卸两颗M2.5*8*4.5螺丝，拆卸电源线固定件。

3. Remove the 2 M2.5*8*4.5 screws and remove the power cable holder.

4.拆卸8颗M2.5X10X4.5信号线端子固定螺丝，分离电调信号线和喷头信号线。

4. Remove the 8 M2.5*10*4.5 set screws of the signal cable terminals and separate the ESC signal cable and the nozzle signal cable.

5.拆卸动力电调电源线端子上的两颗M4*10*8螺丝，分离动力电调电源线，分离动力电调。

5. Remove the 2 M4*10*8 screws on the power cable terminal of the main ESC, then separate the power cable of the main ESC and the main ESC itself.

6.拆卸装饰盖板上4颗M4*12*8螺丝，分离装饰盖板。

6. Remove the 4 M4*12*8 screws in the trim cover and separate the trim cover.

7.拆卸4颗M5*14螺丝，取出电机端铝管嵌件和电机座内衬螺纹件。

7. Remove the 4 M5*14 screws to extract the motor-end aluminum tube inserts and motor mount threaded liner.

8.将电机座向外拉出，取出电机座和动力电机。

8. Pull the motor mount outward and remove it along with the main motor.

9.拆卸6颗M5*14螺丝，将电机座与动力电机分离。

9. Remove the 6 M5*14 screws and separate the motor mount from the main motor.

安装流程

Installation Process

1.将动力电机与电机座对准，使用动力电机螺丝进行固定。

1. Align the main motor with the motor mount and use the main motor screws for fixation.

2.将电机座套入机臂内，向内推到安装位置。

2. Insert the motor mount into the arm and push it inward to the installation position.

3.将电机端铝管嵌件和电机座内衬螺纹件嵌入机臂内，使用电机座固定螺丝进行固定。

3. Embed the motor-end aluminum tube inserts and motor mount threaded liners into the arm, then fix them secure with motor mount screws.

4.安装装饰盖板并使用螺丝进行固定。

4. Install the trim cover and fasten it with screws.

5.安装电调电源线，并使用螺丝进行固定。

5. Install the power cable of the ESC and secure it with screws.

6.安装电调信号线和喷头信号线，并使用螺丝进行固定。

6. Install the ESC signal line and nozzle signal line, then secure them with screws.

7.安装电源线固定件，并使用螺丝进行固定。

7. Install the power cable holder and secure it with screws.

8.按颜色顺序安装电机三相线，并使用螺丝进行固定。

8. Install the motor three-phase wires in color sequence and secure them with screws.

9.整理线缆并将电调固定到位，使用螺丝固定动力电调。

9. Organize cables, position the ESC, and secure it with screws.

注意事项

Notes

在拆卸和安装动力电机和电机座时，若该机臂包含喷杆，需先取出喷杆相关的管路的线缆，拆卸喷杆固定座后再进行动力电机和电机座的拆卸和安装。

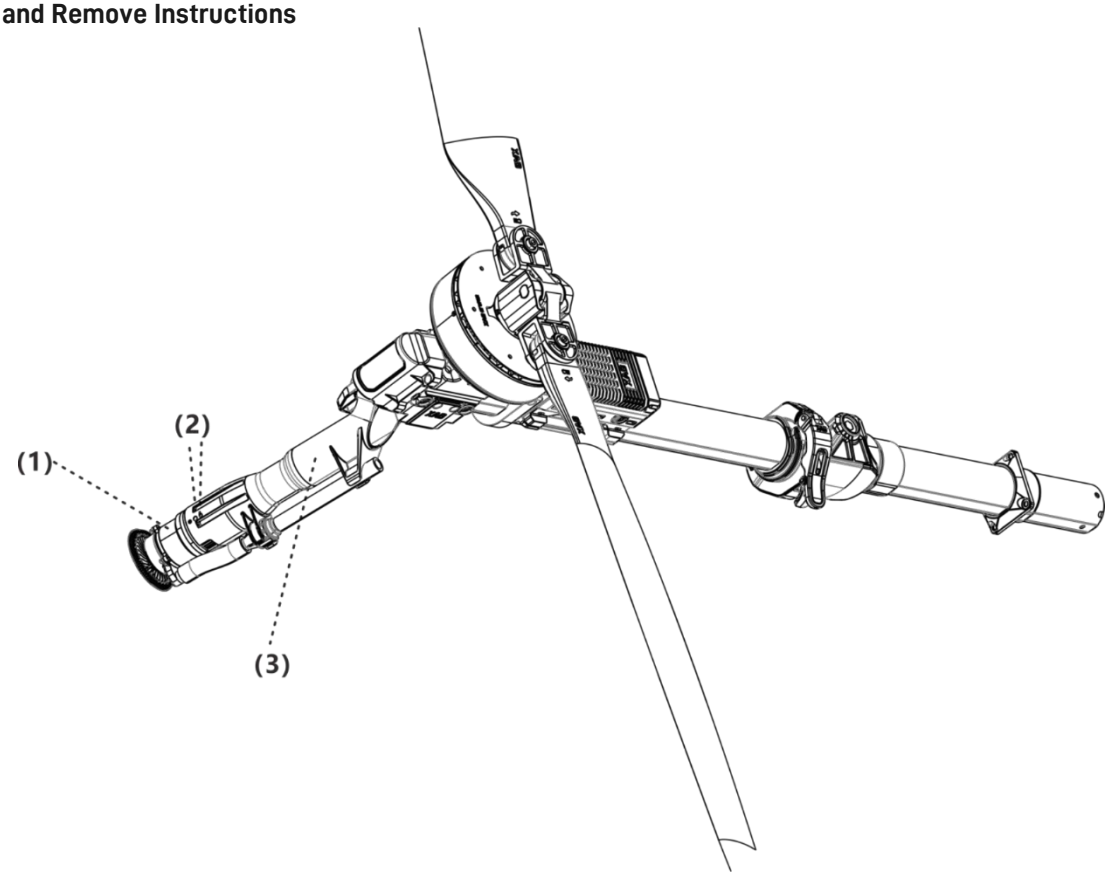
If a spray rod is included in the arm, remove the cables of the spray rod first, and then remove the spray rod mount before the disassembly and assembly of the main motor and motor mount.

150喷洒系统模块拆装程序

Removal and Installation Procedure for 150 Spraying System Module

喷头拆装指引

Nozzle Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M3*10*6	02-004-00624	6~7 kgf·cm

拆卸流程

Disassembly Procedures

1.拆卸与喷头相连的软管。

1. Remove the hose connected to the nozzle.

2.拆卸螺丝（2），并断开喷头内部线组。

2. Remove screws (2) and disconnect the internal wire harness of the nozzle.

3.将喷头（1）从喷杆上取出。

3. Remove the nozzle (1) from the spray rod.

安装流程

Installation Process

1.将喷头（1）安装到喷杆，将喷头线组插入喷头。

1. Install the nozzle (1) onto the spray rod and insert the nozzle wire harness into the nozzle.

2.将喷头固定在喷杆（3），并使用螺丝（2）拧紧（力矩：6~7kgf.cm）。

2. Secure the nozzle to the spray rod (3) and tighten it with screws (2) (torque: 6 - 7 kgf·cm).

3.将软管连接到喷头，并使用轧带系紧。

3. Connect the hose to the nozzle and fasten it tightly with a cable tie.

注意事项：测试前，应确保药箱装入不低于3L的液体。

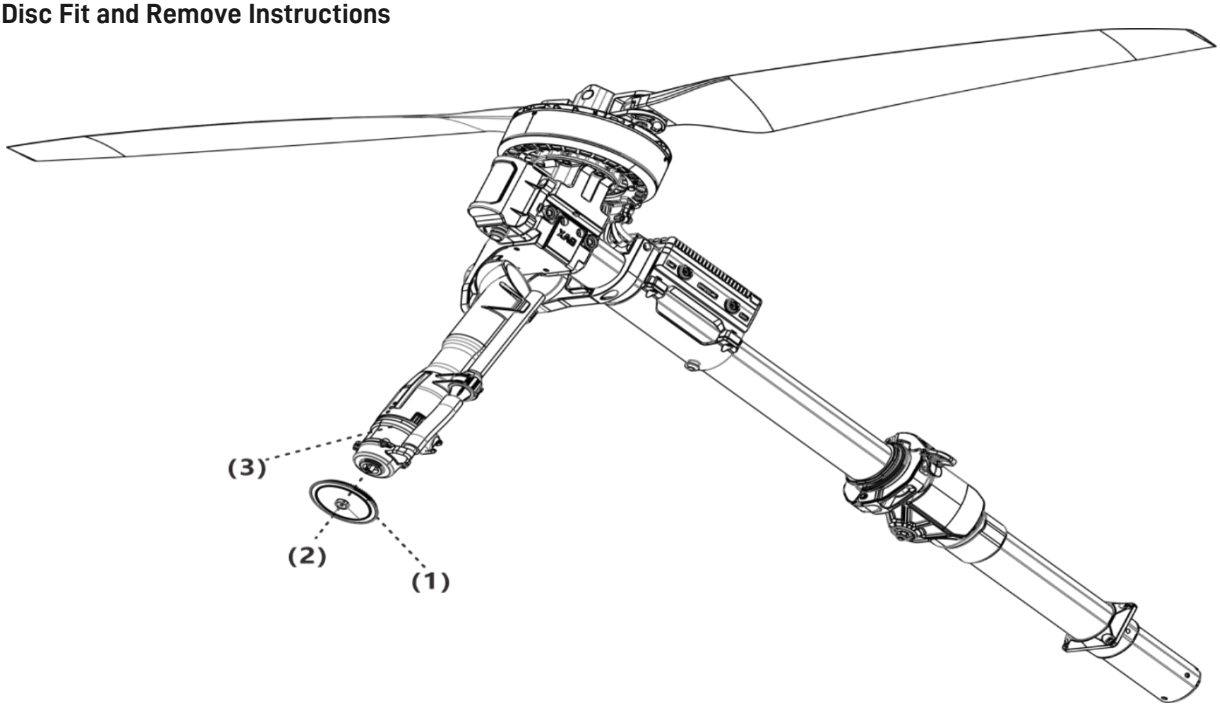
Note: Ensure the liquid tank is filled with ≥3L liquid before testing.

观察喷头及喷盘有无明显震动、松动现象。

Confirm no significant vibration or looseness in the nozzle and spray disc.

喷盘拆装指引

Spray Disc Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M3*10*6	02-004-00624	6~7 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

拆卸螺丝从喷头取下喷盘。

Remove screws to take off the spray disc from the nozzle.

安装流程

Installation Process

将新的喷盘安装到喷头并使用螺丝拧紧（力矩：6~7kgf.cm）

。

Install the new spray disc onto the nozzle and tighten it with screws (torque: 6 - 7 kgf·cm).

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

观察喷头及喷盘有无明显震动、松动现象。

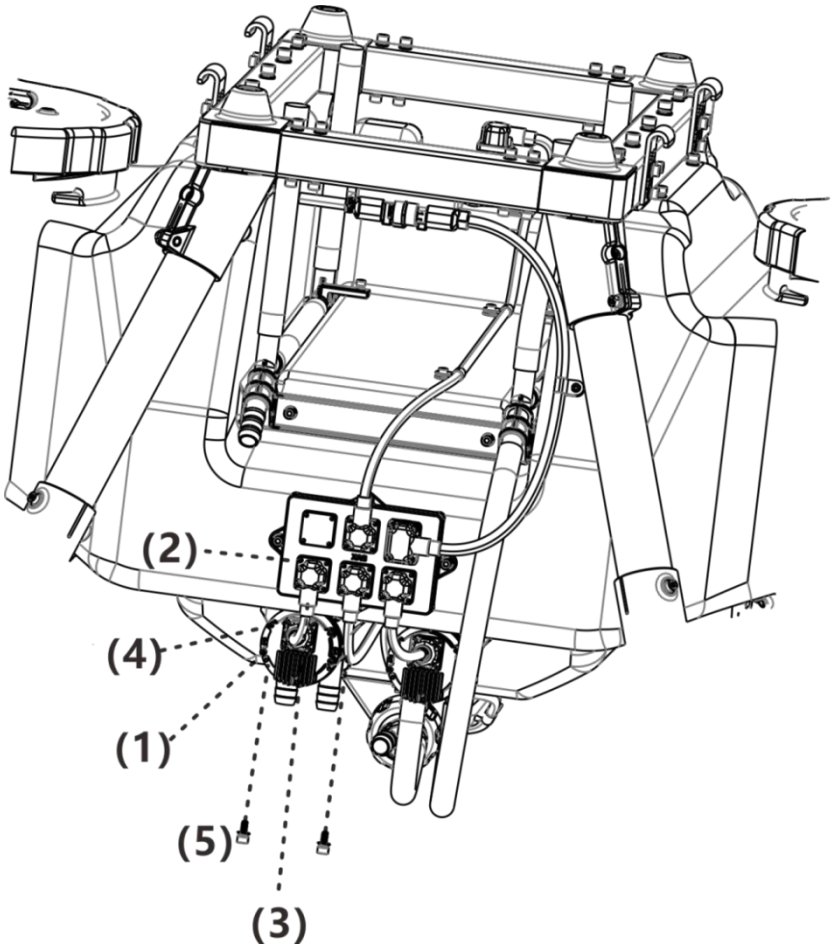
Confirm no significant vibration or looseness in the nozzle and spray disc.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

叶轮泵拆装指引

Impeller Pump Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M3*10*6	02-004-00624	5~6 kgf·cm
(4)	M3*6	02-004-00936	5~6 kgf·cm
(5)	M4*8*8	02-004-00618	11~12 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全.

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.断开连接叶轮泵的软管。

1. Disconnect the hose connected to the impeller pump.

2.拆卸集线板侧的叶轮泵线组（3）插头螺丝（2）。

2. Remove the plug screws (2) of the impeller pump wire harness (3) on the cable hub side.

3.拆卸叶轮泵侧的插头螺丝（4），并取下叶轮泵线组。

3. Remove the plug screws (4) on the impeller pump side, and remove the impeller pump wire harness.

4.拆卸叶轮泵固定螺丝（5），并取下叶轮泵（1）。

4. Remove the set screws (5) on the impeller pump, and remove the impeller pump (1).

安装流程

Installation Process

1.使用螺丝（5）（力矩：11~12kgf.cm）将叶轮泵（1）固定在药箱底部，并拧紧。

1. Use screws (5) (torque: 11 - 12 kgf·cm) to secure the impeller pump (1) onto the liquid tank bottom, and tighten them.

2.将叶轮泵线组（3）插入接线口，并使用螺丝（2）（4）拧紧（力矩：6~7kgf.cm）。

2. Insert the impeller pump wire harness (3) into the connection port, and tighten it with screws (2) (4) (torque: 6 - 7 kgf·cm).

3.注意事项：线组两端有区分，接集线板侧插座无防松扣，接叶轮泵侧插座含防松扣。

3. Note: The wire harness ends are differentiated, with no anti-loosening buckle on the socket connecting the cable hub and an anti-loosening buckle on the socket connecting the impeller pump.

4.将软管连接到叶轮泵，并使用轧带系好。

4. Connect the hose to the impeller pump, and fasten it with a cable tie.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing.

叶轮泵工作时无异响。

Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

Check the sealing of the impeller pump, and confirm no leaks.

观察喷头及喷盘有无明显震动、松动现象。

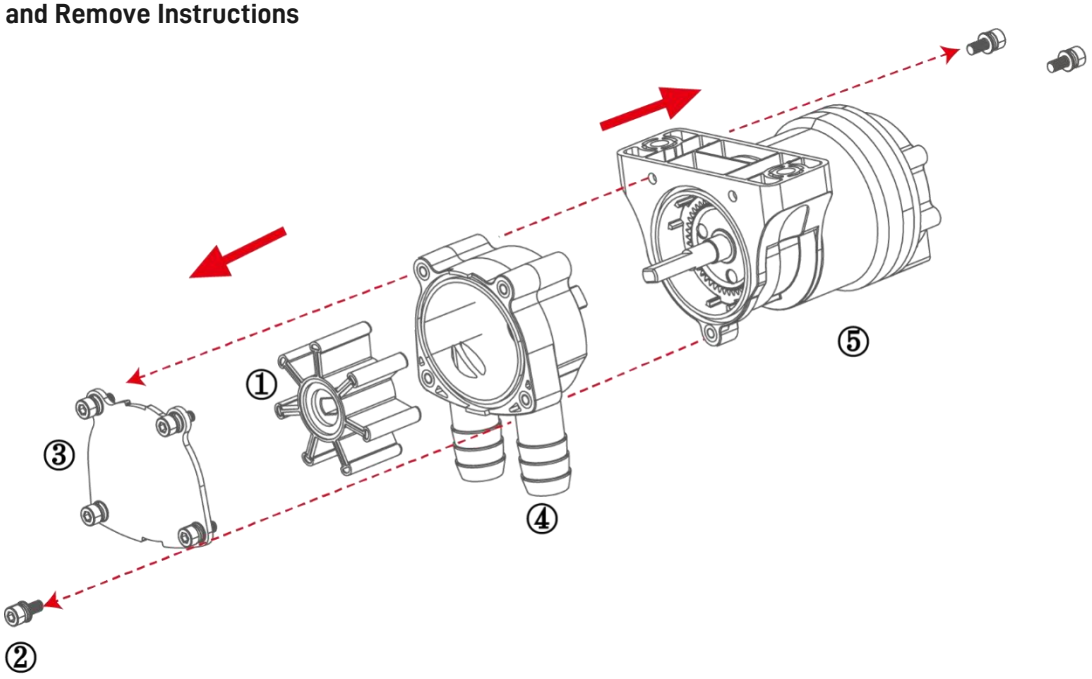
Confirm no significant vibration or looseness in the nozzle and spray disc.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

叶轮拆装指引

Impeller Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	无 No

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②,并取下钣金③。

1. Remove screws ②, and detach the sheet metal ③.

2.从泵体④中取出叶轮①。

2. Take out the impeller ① from the pump ④.

安装流程

Installation Process

将叶轮①安装到泵体④中，使用螺丝②将钣金③固定在泵体上。

Install the impeller ① into the pump ④, and secure the sheet metal ③ to the pump with screws ②.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。叶轮泵工作时无异响。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing. Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

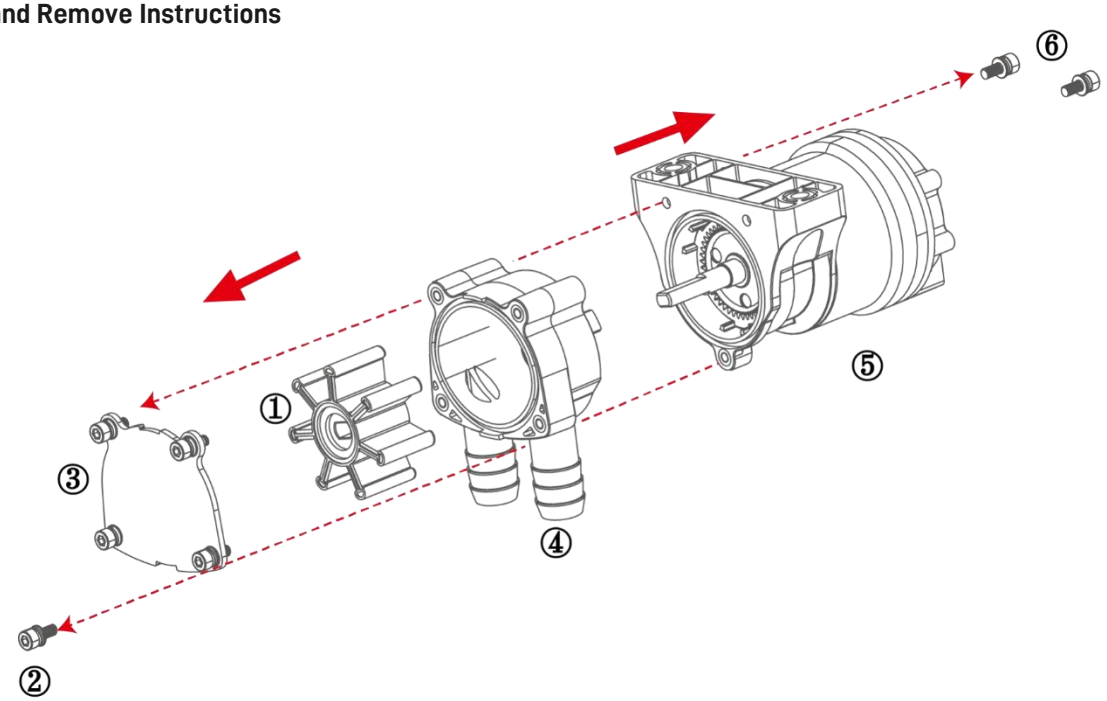
Check the sealing of the impeller pump, and confirm no leaks.

观察喷头及喷盘有无明显震动、松动现象。调节雾化等级，观察雾化程度。

Confirm no significant vibration or looseness in the nozzle and spray disc. Adjust the atomization level and observe the atomization effect.

泵体拆装指引

Pump Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	无 No
③	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	无 No
⑥	M3*16	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	6~7kgf.cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②,并取下钣金③。

1. Remove screws ②, and detach the sheet metal ③.

2.从泵体④中取出叶轮①。

2. Take out the impeller ① from the pump ④.

3.拆卸螺丝⑥,并将泵体从电机⑤中取出。

3. Remove screws ⑥ and take out the pump from the motor ⑤.

安装流程

Installation Process

1.将泵体④安装到电机⑤上，并使用螺丝⑥拧紧（力矩:6~7kgf.cm）。2.将叶轮①安装到泵体中，使用螺丝②将钣金③固定在泵体上

1. Install the pump ④ onto the motor ⑤, and fix it with the screws ⑥ (torque: 6~7kgf·cm). 2. Install the impeller ① into the pump, and secure the sheet metal ③ to the pump with screws ②.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。叶轮泵工作时无异响。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing. Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

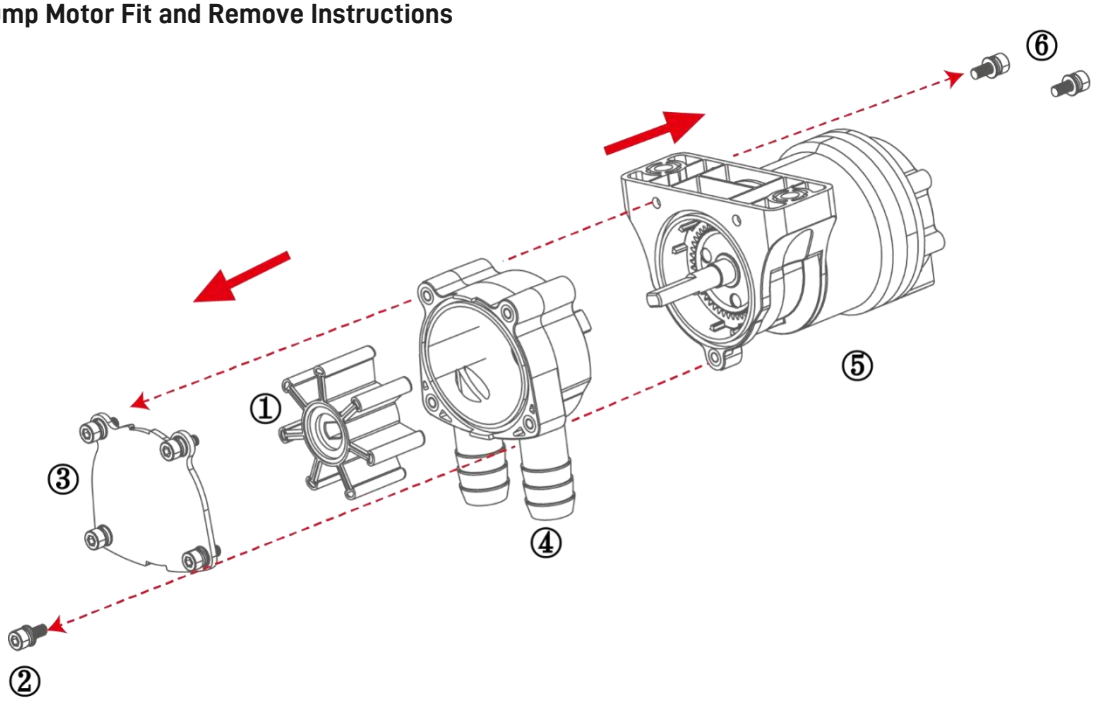
Check the sealing of the impeller pump, and confirm no leaks.

观察喷头及喷盘有无明显震动、松动现象。调节雾化等级，观察雾化程度

Confirm no significant vibration or looseness in the nozzle and spray disc. Adjust the atomization level and observe the atomization effect.

叶轮泵电机拆装指引

Impeller Pump Motor Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	无 No
⑥	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	无 No

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②、⑥,将叶轮泵电机⑤与泵体④分离。

1. Remove screws ② and ⑥, and separate the impeller pump motor ⑤ from the pump ④.

2.拆卸螺丝⑦,将叶轮泵电机盖板⑩从电机上分离。

2. Remove screws ⑦, and separate the impeller pump motor cover ⑩ from the motor.

3.拆卸螺丝⑨,将叶轮泵主板⑧与叶轮泵电机分离。

3. Remove screws ⑨, and separate the impeller pump motherboard ⑧ from the impeller pump motor.

安装流程

Installation Process

1.将叶轮泵主板⑧安装到叶轮泵电机⑤,并使用螺丝⑨拧紧（力矩:2~3kgf.cm）。

1. Install the impeller pump motherboard ⑧ to the impeller pump motor ⑤, and tighten it with screws ⑨ (torque: 2~3kgf·cm).

2.将叶轮泵电机盖板⑩安装到叶轮泵电机上，并使用螺丝⑦拧紧（力矩:2~3kgf.cm）。

2. Install the impeller pump motor cover ⑩ onto the impeller pump motor, and tighten it with screws ⑦ (torque: 2~3kgf·cm).

3.将叶轮泵电机安装到泵体④,并使用螺丝②、⑥拧紧（力矩:6~7kgf.cm）。测试：

3. Install the impeller pump motor to the pump ④, and tighten it with screws ② and ⑥ (torque: 6~7kgf·cm). Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。叶轮泵工作时无异响。

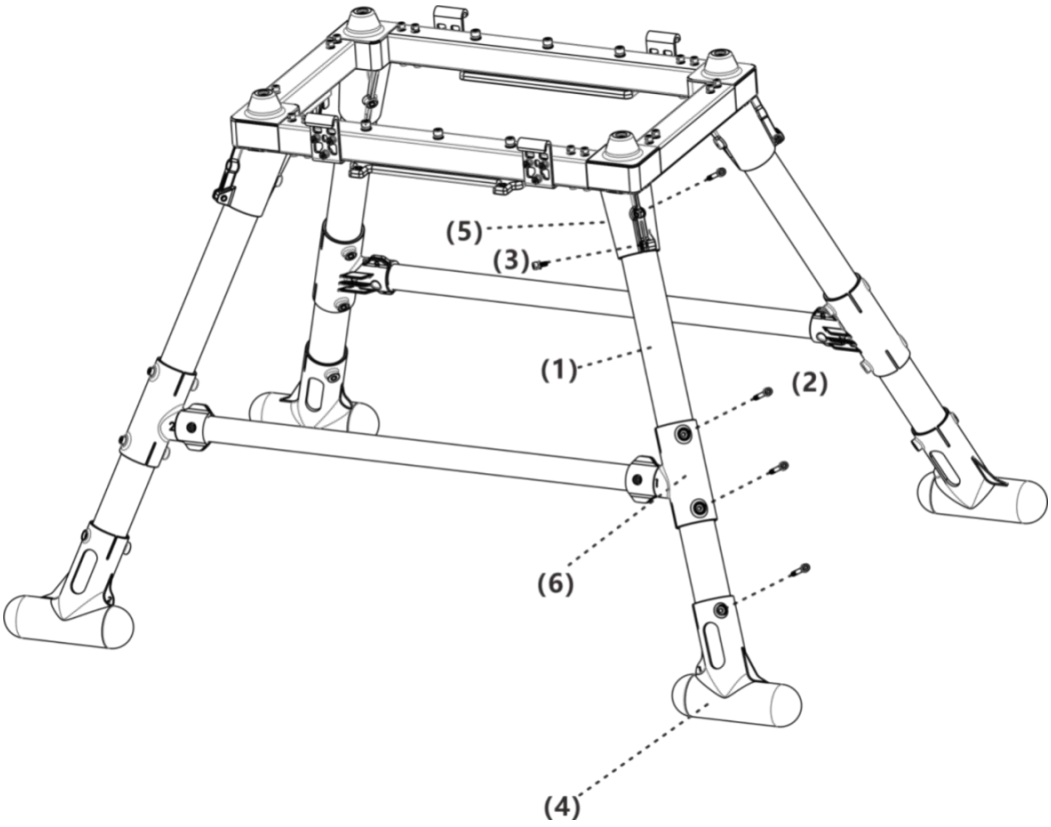
Note: Ensure the liquid tank is filled with ≥3L liquid before testing. Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

Check the sealing of the impeller pump, and confirm no leaks.

脚架管拆装指引

Landing Gear Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*45*8	02-004-01272	11~13 kgf·cm
(3)	M4*12*8	02-004-00834	11~13 kgf·cm

注意事项：脚架三通件是有方向性，务必确保脚架三通件带数字的面朝外且与负载方管（长管）朝向一致，否则无法安装。

Note: The landing gear tee fitting is directional. Ensure the numbered face of the landing gear tee fitting faces outward and aligns with the load square tube (long tube). Incorrect orientation will prevent proper installation.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect the drone with the hose and the payload system harness connected to it, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸脚架管固定螺钉（2）。

1. Remove the set screws (2) of the landing gear.

2.拆卸负载方管固定件连接件（5）的螺丝（3）。

2. Remove the screws (3) from the holder and joint piece of the load square tube (5).

3.将脚架触地件（4）从脚架管（1）上取下。

3. Remove the landing gear grounding part (4) from the landing gear (1).

4.缓慢拉扯脚架管取出。

4. Slowly pull the landing gear out.

安装流程

Installation Process

1.安装时应检查负载方管固定件连接件（5）有无变形、裂纹、破损等现象，若出现该现象应及时更换。

1. Before installation, inspect the holder and joint piece of the load square tube (5) for deformation, cracks, or damage. Replace it immediately if any defects are found.

2.将新脚架管（1）安装到负载方管固定件连接件并使用螺丝（2）（3）拧紧（力矩：12~13kgf.cm）。

2. Install the new landing gear tube (1) to the holder and joint piece of the load square tube. Secure it with screws (2) and (3) (Torque: 12 - 13 kgf·cm).

3.使用螺丝（2）紧固脚架三通件（6）。

3. Fasten the landing gear tee fittings (6) using screws (2).

4.将脚架触地件（4）安装到脚架管中并使用螺丝（2）紧固。测试：

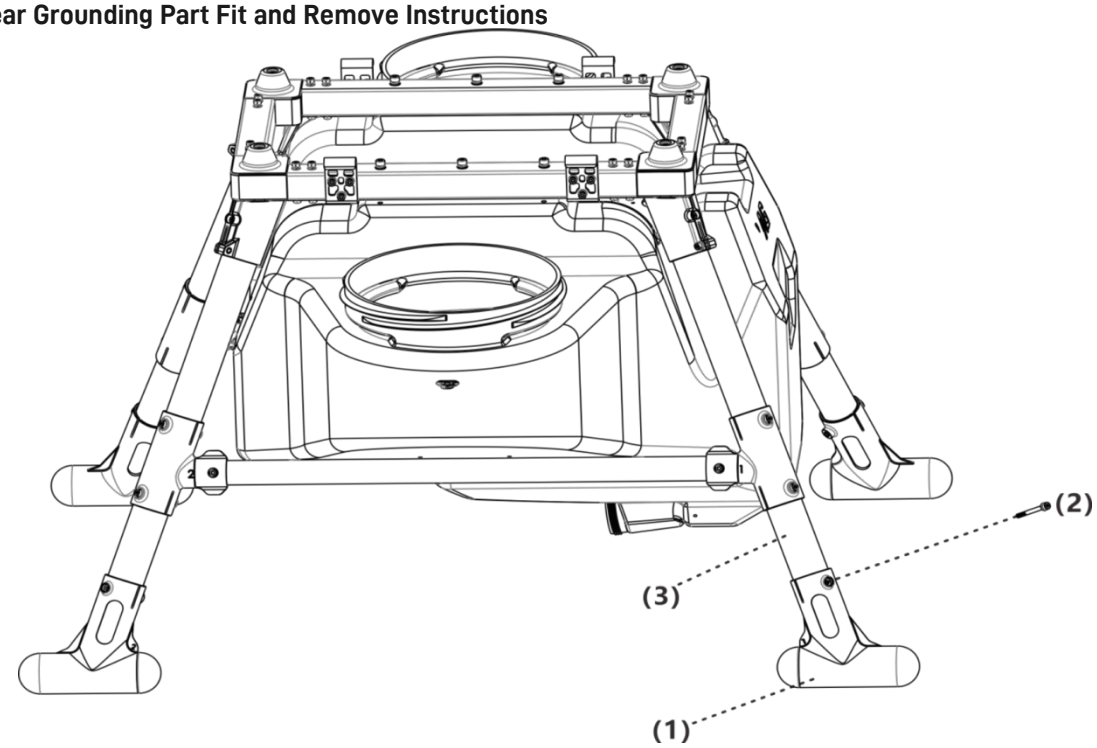
4. Install the landing gear grounding part (4) to the landing gear, and fasten it with screws (2). Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

脚架触地件拆装指引

Landing Gear Grounding Part Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*45*8	02-004-01272	11~13 kgf·cm

注意事项：脚架触地件是有方向性，务必确保脚架触地件朝向与负载方管（长管）平行并确保定位孔一致，否则无法安装。

Note: The landing gear grounding part is directional. Place the landing gear grounding part parallel to the load square tube (long tube) and align their positioning holes. Incorrect orientation will prevent proper installation.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect the drone with the hose and the payload system harness connected to it, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸脚架触地件（1）的螺丝（2）。

1. Remove screws (2) of the landing gear grounding part (1).

2.从脚架管（3）取出脚架触地件。

2. Remove the landing gear grounding part from the landing gear (3).

安装流程

Installation Process

将脚架触地件（1）安装到脚架管（3）中，并使用螺丝（2）紧固（力矩：11~13kgf.cm）

。

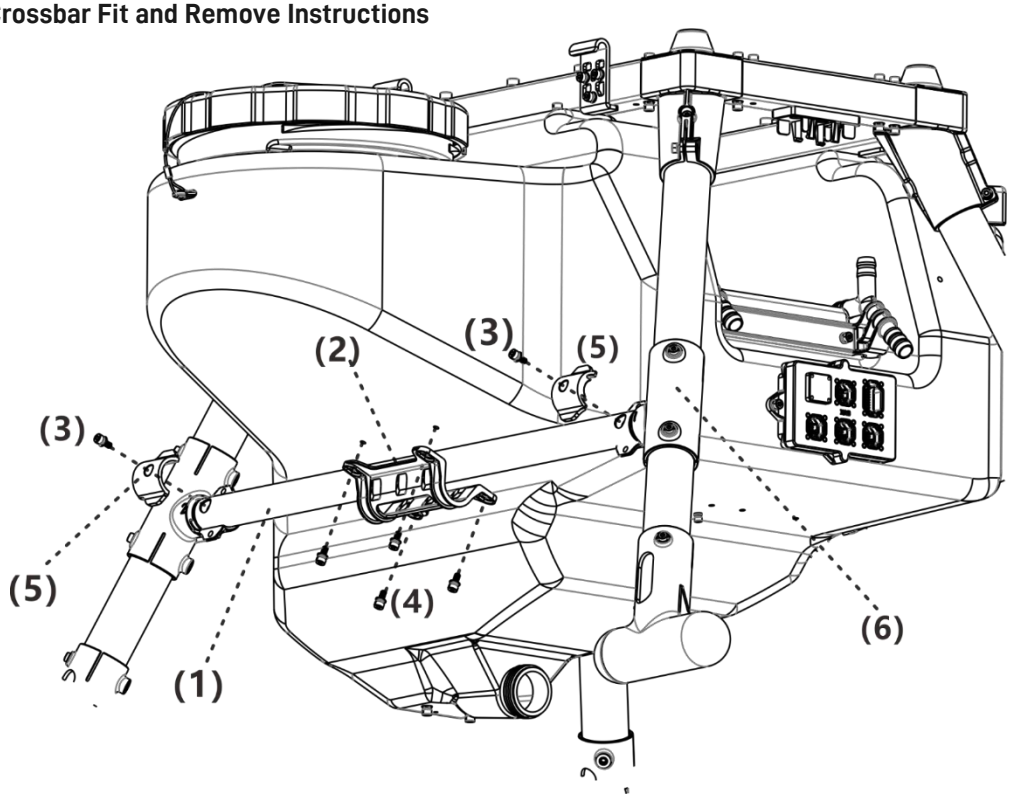
Install the landing gear grounding part (1) into the landing gear (3), and fasten it with screws (2) (torque: 11 - 13 kgf·cm).

测试：做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Test: Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

脚架横杆拆装指引

Landing Gear Crossbar Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝（4）并取下药箱底部脚架固定件（2）。

1. Remove screws (4), and remove the landing gear holder (2) at the bottom of the liquid tank.

2.拆卸螺丝（3）并取下脚架三通卡件（5）。

2. Remove screws (3), and remove the landing gear T-clamp (5).

3.从脚架三通件（6）取下脚架横杆（1）。

3. Remove the crossbar (1) from the landing gear tee fitting (6).

安装流程

Installation Process

1.将新的脚架横杆（1）安装到脚架三通件（6）中。

1. Install the new crossbar (1) to the landing gear tee fitting (6).

2.将脚架三通卡件（5）安装到脚架横杆上，并使用螺丝（3）紧固（力矩：12~13kgf.cm）。

2. Install the landing gear T-clamp (5) onto the crossbar, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

3.将药箱底部固定件（2）安装到药箱底部上，并使用螺丝（4）拧紧（力矩：12~13kgf.cm）。

3. Install the bottom holder (2) of the liquid tank to the bottom of the liquid tank, and tighten it with screws (4) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

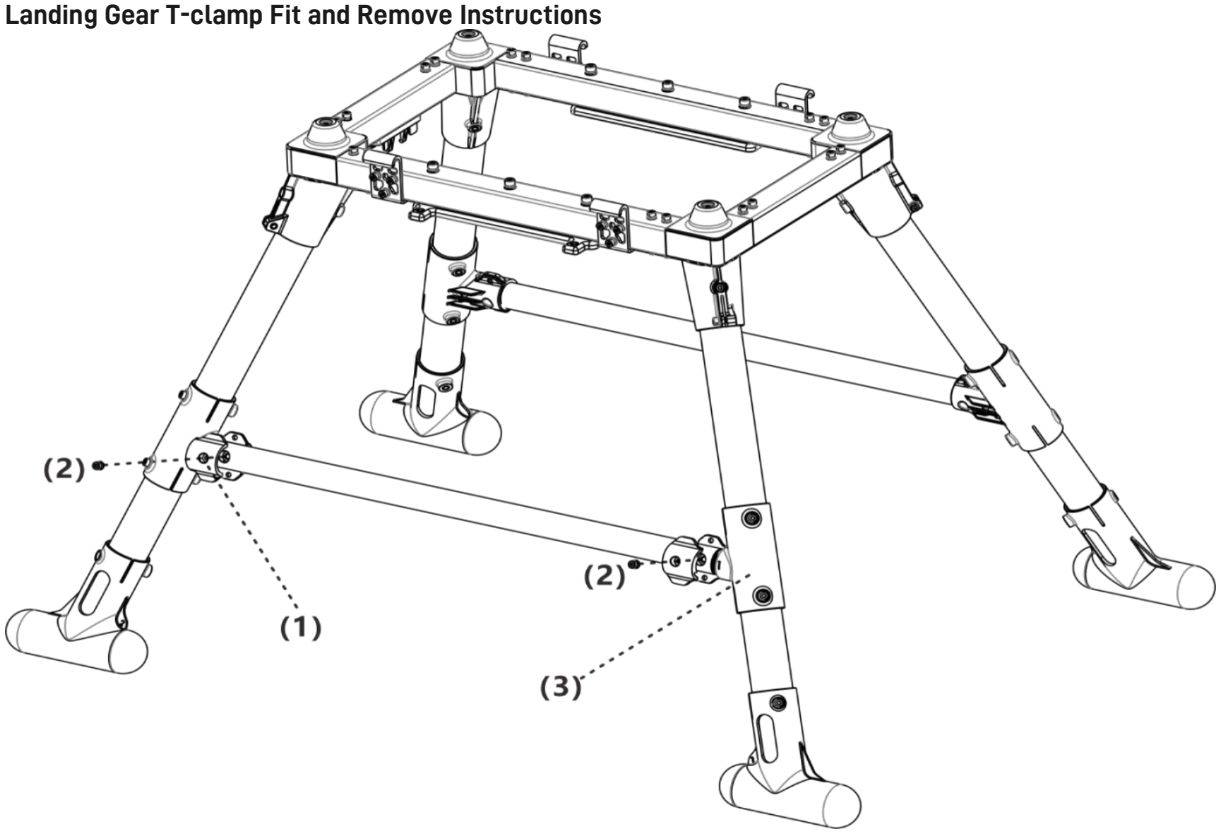
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

脚架三通件卡件拆装指引

Landing Gear T-clamp Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从脚架三通件（3）取下脚架三通件卡件（1）。

Remove screws (2), and remove the landing gear T-clamp (1) from the landing gear tee fitting (3).

安装流程

Installation Process

将新的脚架三通件卡件（1）安装到脚架三通件（3），并使用螺丝（2）拧紧（力矩：12~13kgf.cm）。

Install the new landing gear T-clamp (1) to the landing gear tee fitting (3), and tighten it with screws (2) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

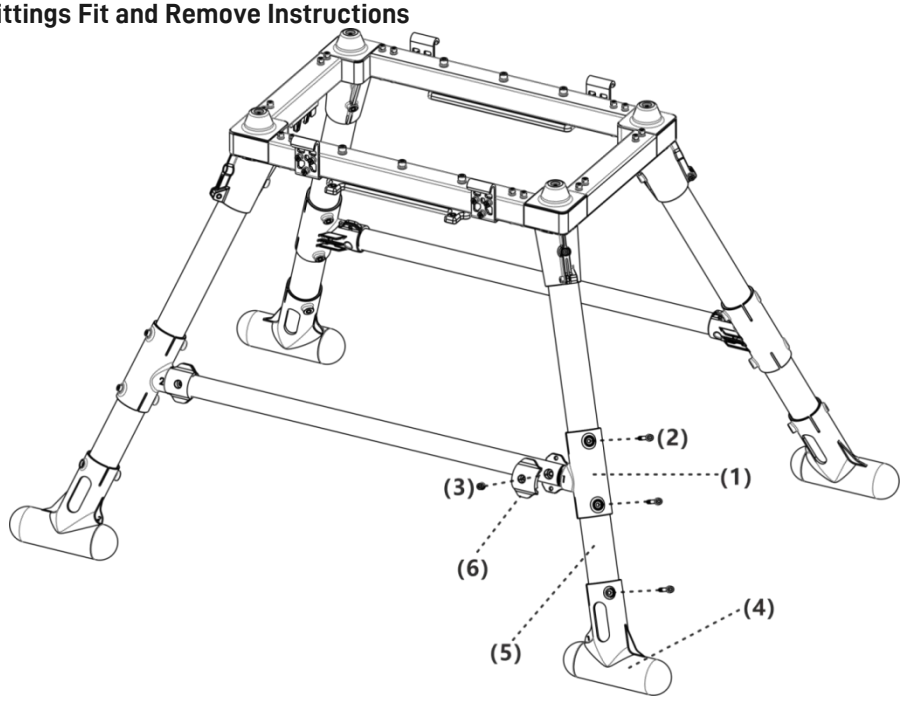
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

脚架三通件拆装指引

Landing Gear Tee Fittings Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*45*8	02-004-01272	11~13 kgf·cm
(3)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect the drone with the hose and the payload system harness connected to it, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸螺丝（3）并取下脚架三通件卡件（6）。

1. Remove screws (3), and remove the landing gear T-clamp (6).

2.拆卸螺丝（2）并取下脚架触地件（4）。

2. Remove screws (2), and remove the landing gear grounding part (4).

3.拆卸螺丝（2）并从脚架管（5）中取下脚架三通件（1）。

3. Remove screws (2), and remove the landing gear tee fitting (1) from the landing gear (5).

安装流程

Installation Process

1.将新的脚架三通件（1）安装到脚架管（5），并使用螺丝（2）紧固（力矩：11~13kgf.cm）。

1. Install the new landing gear tee fitting (1) to the landing gear (5), and fasten it with screws (2) (torque: 11 - 13 kgf·cm).

2.将脚架触地件（4）安装到脚架管，并使用螺丝（2）紧固。

2. Install the landing gear grounding part (4) to the landing gear, and fasten it with screws (2).

3.将脚架三通件卡件（6）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13kgf.cm）。

3. Install the landing gear T-clamp (6) to the landing gear tee fitting, and tighten it with screws (3) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

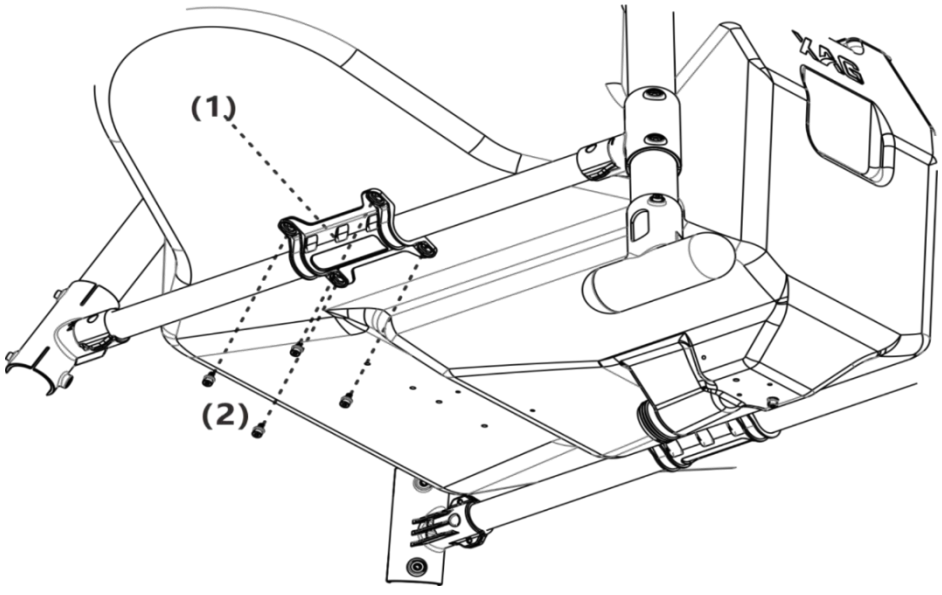
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

药箱底部固定件拆装指引

Liquid Tank Bottom Holder Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect the drone with the hose and the payload system harness connected to it, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），并取下药箱底部固定件（1）。

Remove screws (2), and remove the liquid tank bottom holder (1).

安装流程

Installation Process

将药箱底部固定件（1）安装到药箱底部上，并使用螺丝（2）紧固（力矩：12~13kgf.cm）。

Install the liquid tank bottom holder (1) to the bottom of the liquid tank, and fasten it with screws (2) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

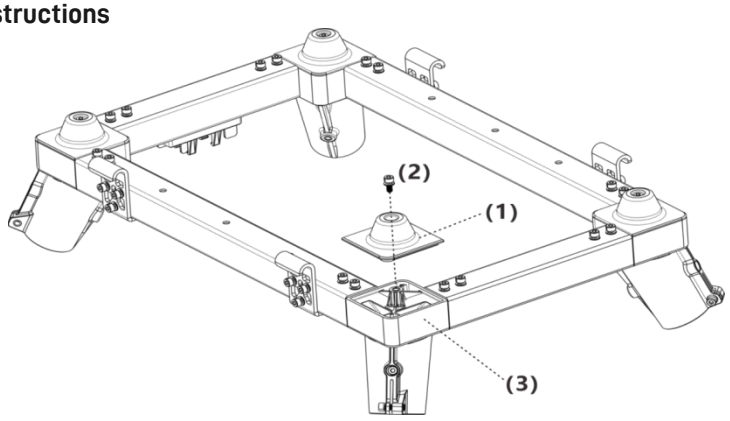
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

负载凸点件拆装指引

Load Bump Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect the drone with the hose and the payload system harness connected to it, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从负载管连接件（3）取出负载凸点件（1）。

Remove screws (2), and take out the load bump (1) from the load tube joint piece (3).

安装流程

Installation Process

将新的负载凸点件（1）安装到负载管连接件（3），并使用螺丝（2）拧紧（力矩：12~13kgf.cm）。

Install the new load bump (1) to the load tube joint piece (3), and tighten it with screws (2) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

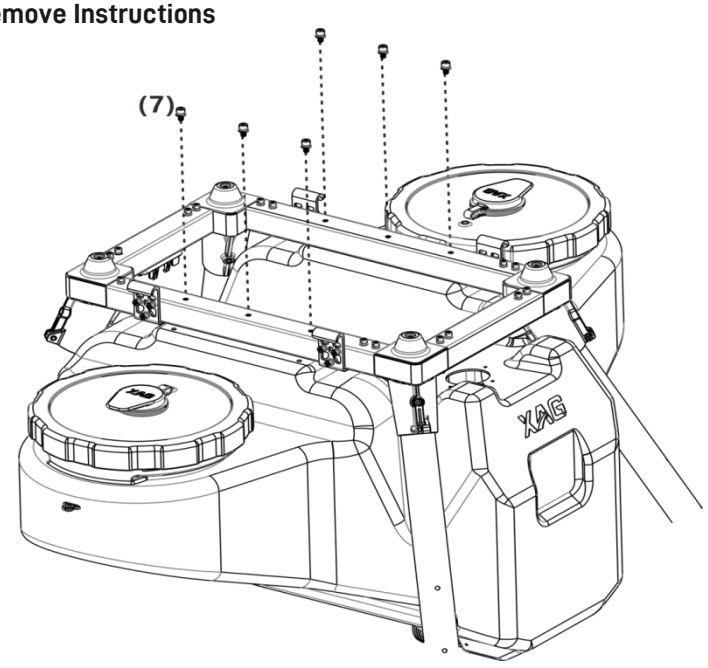
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

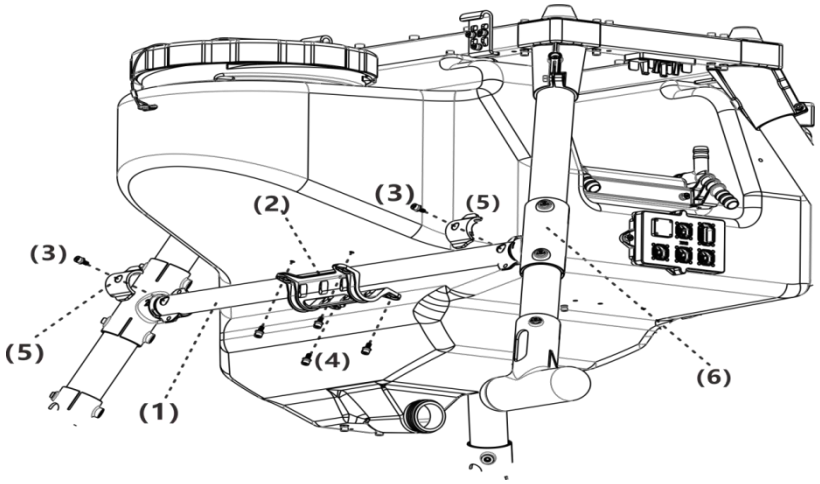
短负载管拆装指引

Short Load Tube Fit and Remove Instructions



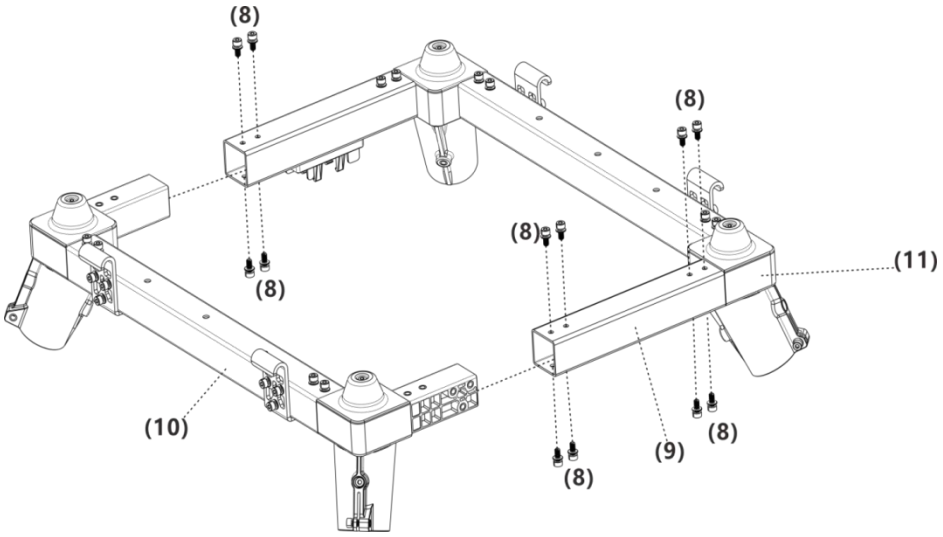
短负载管-1

Short load tube -1



短负载管-2

Short load tube -2



短负载管-3

Short load tube -3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm
(7)	M5*10*10	02-004-00747	30~31 kgf·cm
(8)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸长负载管的螺丝（7）。

1. Remove screws (7) of the long load tube.

2.将药箱翻转后，拆卸螺丝（4）并取下药箱底部固定件（2）。

2. Turn over the liquid tank, remove screws (4), and remove the liquid tank bottom holder (2).

3.拆卸螺丝（3）并取下脚架三通卡件（5）。

3. Remove screws (3), and remove the landing gear T-clamp (5).

4.从脚架三通件（6）中取下脚架横杆（1）。注意事项：必须把药箱两侧的脚架横杆都拆卸

4. Remove the crossbar (1) from the landing gear tee fitting (6). Note: The crossbars on both sides of the liquid tank must be removed.

5.拆卸螺丝（8），缓慢拉长负载管（10）使之与短负载管（9）分离。

5. Remove screws (8), and slowly stretch the long load tube (10) to separate it from the short load tube (9).

6.取下短负载管。

6. Remove the short load tube.

安装流程

Installation Process

1.将新的短负载管（9）安装到负载管连接件（11）。

1. Install the new short load tube (9) to the load tube joint piece (11).

2.将长负载管（10）安装到短负载管中，并使用螺丝（8）拧紧（力矩：12~13kgf.cm）。

2.Install the long load tube (10) to the short load tube, and tighten it with screws (8) (torque: 12 - 13 kgf·cm).

3.翻转脚架，将药箱与长负载管限位孔对准。

3. Turn over the landing gear, and align the liquid tank with the holes of the long load tube.

4.将脚架横杆（1）安装到脚架三通件（6）中。

4. Install the crossbar (1) into the landing gear tee fitting (6).

5.将脚架三通卡件（5）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13kgf.cm）。

5. Install the landing gear T-clamp (5) to the landing gear tee fitting, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

6.将药箱固定件（2）使用螺丝（4）紧固（力矩：12~13kgf.cm）。

6. Tighten the liquid tank holder (2) with screws (4) (torque: 12 - 13 kgf·cm).

7.再次翻转脚架，使用螺丝（7）紧固（力矩：30~31kgf.cm）药箱内嵌件。

7. Turn over the landing gear again, and fasten the liquid tank insert with screws (7) (torque: 30 - 31 kgf·cm).

注意事项：若螺丝（7）对不准长负载管限位孔，将药箱盖取下，用手掰动药箱内嵌件对准限位孔。

Note: If the screws (7) are not aligned with the holes of the long load tube, remove the liquid tank cover, and move the liquid tank insert by hand to align it with the holes.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

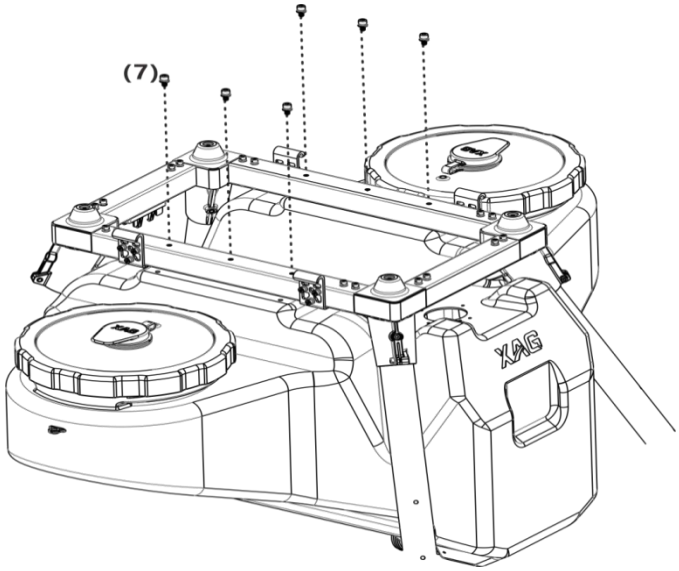
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

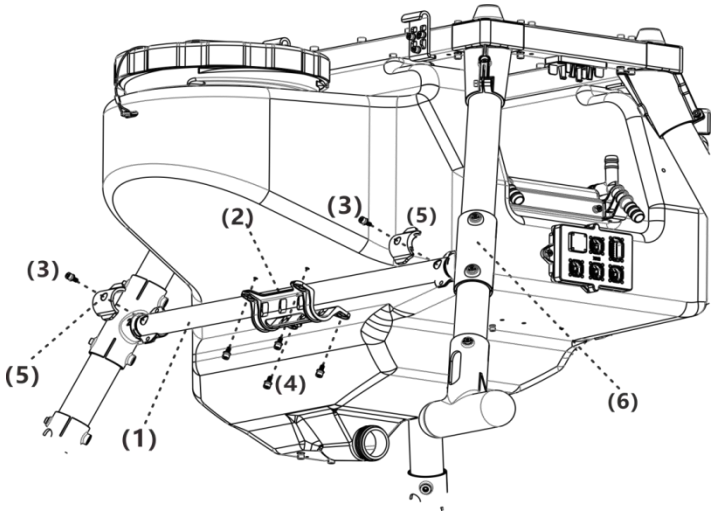
长负载管拆装指引

Long Load Tube Fit and Remove Instructions



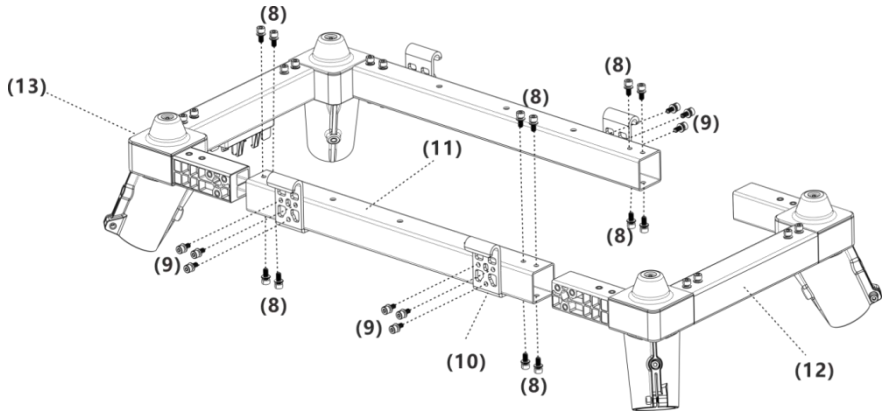
长负载管-1

Long load tube -1



长负载管-2

Long load tube -2



长负载管-3

Long load tube -3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm
(7)	M5*10*10	02-004-00747	30~31 kgf·cm
(8)	M4*12*8	02-004-00834	12~13 kgf·cm
(9)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸长负载管的螺丝（7）。

1. Remove screws (7) of the long load tube.

2.将药箱翻转后，拆卸螺丝（4）并取下药箱底部固定件（2）。

2. Turn over the liquid tank, remove screws (4), and remove the liquid tank bottom holder (2).

3.拆卸螺丝（3）并取下脚架三通卡件（5）。

3. Remove screws (3), and remove the landing gear T-clamp (5).

4.从脚架三通件（6）中取下脚架横杆（1）。

4. Remove the crossbar (1) from the landing gear tee fitting (6).

注意事项：必须把药箱两侧的脚架横杆都拆卸

Note: The crossbars on both sides of the liquid tank must be removed.

5.拆卸螺丝（8）。

5. Remove screws (8).

6.拆卸螺丝（9）并取下负载挂钩（10）。

6. Remove screws (9), and remove the load hook (10).

7.缓慢拉短负载管（12）使之与长负载管（11）分离。

7. Slowly pull the short load tube (12) to separate it from the long load tube (11).

8.从负载管连接件（13）取下长负载管。

8. Remove the long load tube from the load tube joint piece (13).

安装流程

Installation Process

1.将新的长负载管（11）安装到负载管连接件（13）。

1. Install the new long load tube (11) to the load tube joint piece (13).

2.将短负载管（12）安装到长负载管中。

2. Install the short load tube (12) to the long load tube.

3.使用螺丝（8）拧紧（力矩：11~12kgf.cm）。

3. Tighten it with screws (8) (torque: 11 - 12 kgf·cm).

4.将负载挂钩（10）安装到长负载管，并使用螺丝（9）拧紧（力矩：12~13kgf.cm）。

4. Install the load hook (10) to the long load tube, and tighten it with screws (9) (torque: 12 - 13 kgf·cm).

5.注意事项：负载挂钩螺丝务必拧紧。

Note: The load hook screws must be tightened.

6.翻转脚架，将药箱与长负载管限位孔对准。

6. Turn over the landing gear, and align the liquid tank with the holes of the long load tube.

7.将脚架横杆（1）安装到脚架三通件（6）中。

7. Install the crossbar (1) into the landing gear tee fitting (6).

8.将脚架三通卡件（5）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13kgf.cm）。

8. Install the landing gear T-clamp (5) to the landing gear tee fitting, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

9.将药箱固定件（2）使用螺丝（4）紧固（力矩：12~13kgf.cm）。

9. Tighten the liquid tank holder (2) with screws (4) (torque: 12 - 13 kgf·cm).

10.再次翻转脚架，使用螺丝（7）紧固（力矩：30~31kgf.cm）药箱内嵌件。

10. Turn the landing gear over again, and fasten the liquid tank insert with screws (7) (torque: 30 - 31 kgf·cm).

注意事项：若螺丝（7）对不准长负载管限位孔，将药箱盖取下，用手掰动药箱内嵌件对准限位孔。

Note: If the screws (7) are not aligned with the holes of the long load tube, remove the liquid tank cover, and move the liquid tank insert by hand to align it with the holes.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

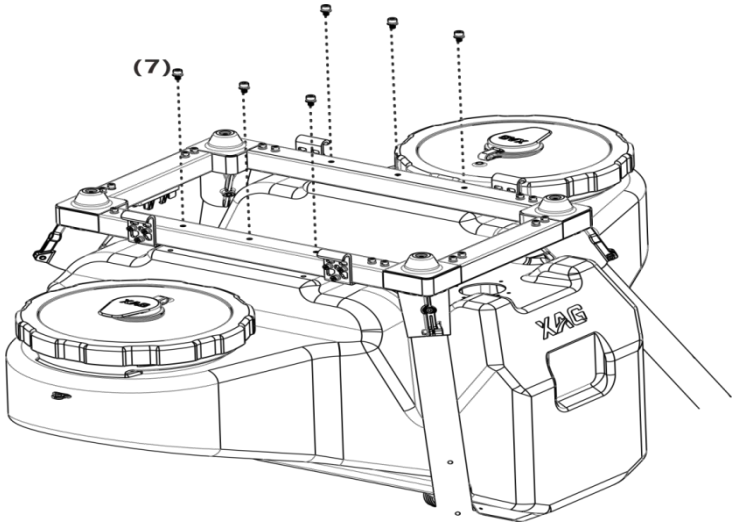
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

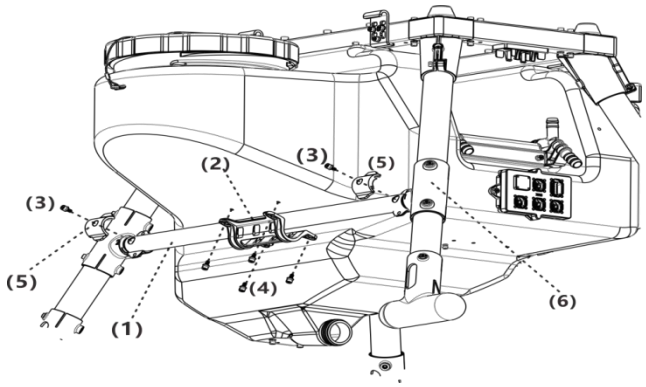
负载管连接件拆装指引

Load Tube Joint Piece Fit and Remove Instructions



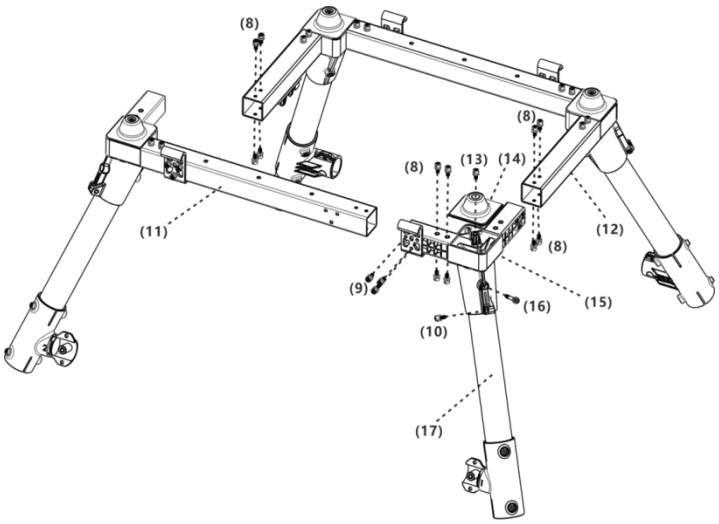
负载管连接件-1

Load tube joint piece -1



负载管连接件-2

Load tube joint piece -2



负载管连接件-3

Load tube joint piece -3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm
(7)	M5*10*10	02-004-00747	30~31 kgf·cm
(8)	M4*12*8	02-004-00834	12~13 kgf·cm
(9)	M4*12*8	02-004-00834	12~13 kgf·cm
(10)	M4*12*8	02-004-00834	12~13 kgf·cm
(13)	M4*12*8	02-004-00834	12~13 kgf·cm
(16)	M4*45*8	02-004-01272	11~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸长负载管的螺丝（7）。

1. Remove screws (7) of the long load tube.

2.将药箱翻转后，拆卸螺丝（4）并取下药箱底部固定件（2）。

2. Turn over the liquid tank, remove screws (4), and remove the liquid tank bottom holder (2).

3.拆卸螺丝（3）并取下脚架三通卡件（5）。

3. Remove screws (3), and remove the landing gear T-clamp (5).

4.从脚架三通件（6）中取下脚架横杆（1）。

4. Remove the crossbar (1) from the landing gear tee fitting (6).

注意事项：必须把药箱两侧的脚架横杆都拆卸。

Note: The crossbars on both sides of the liquid tank must be removed.

5.拆卸螺丝（8）。

5. Remove screws (8).

6.拆卸螺丝（13）并取出负载凸点件（14）。

6. Remove screws (13), and take out the alignment boss (14).

7.拆卸螺丝（9）并取下负载挂扣。

7. Remove screws (9), and remove the load hasp.

8.拆卸螺丝（10）（16）。

8. Remove screws (10) (16).

9.缓慢拉长负载管（11）使之与短负载管（12）分离。

9. Slowly stretch the long load tube (11) to separate it from the short load tube (12).

10.从脚架管（17）取下负载管连接件（15）。

10. Remove the load tube joint piece (15) from the landing gear (17).

安装流程

Installation Process

1.将新的负载管连接件（15）安装到脚架管（17）。

1. Install the new load tube joint piece (15) to the landing gear (17).

2.将负载管连接件与长负载管（11）和短负载管（12）连接，使用螺丝（8）拧紧（力矩：12~13kgf.cm）。

2. Connect the load tube joint piece with the long load tube (11) and the short load tube (12), and tighten them with screws (8) (torque: 12 - 13 kgf·cm).

3.使用螺丝（10）（16）紧固（力矩：12~13kgf.cm）负载管连接件。

3. Use screws (10) (16) to fasten the load tube joint piece (torque: 12 - 13 kgf·cm).

4.将负载对接件凸点件（14）安装到负载管连接件，并使用螺丝（13）紧固（力矩：12~13kgf.cm）。

4. Install the alignment boss (14) to the load tube joint piece, and fasten it with screws (13) (torque: 12 - 13 kgf·cm).

5.使用螺丝（9）（力矩：12~13kgf.cm）将负载挂钩安装到长负载管中并紧固。注意事项：负载挂钩螺丝务必拧紧。

5. Use and tighten screws (9) (torque: 12 - 13 kgf·cm) to install the load hook to the long load tube. Note: The load hook screws must be tightened.

6.翻转脚架，将药箱与长负载管限位孔对准。

6. Turn over the landing gear, and align the liquid tank with the holes of the long load tube.

7.将脚架横杆（1）安装到脚架三通件（6）中。

7. Install the crossbar (1) into the landing gear tee fitting (6).

8.将脚架三通卡件（5）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13kgf.cm）。

8. Install the landing gear T-clamp (5) to the landing gear tee fitting, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

9.将药箱固定件（2）使用螺丝（4）紧固（力矩：12~13kgf.cm）。

9. Tighten the liquid tank holder (2) with screws (4) (torque: 12 - 13 kgf·cm).

10.再次翻转脚架，使用螺丝（7）紧固（力矩：30~31kgf.cm）药箱内嵌件。

10. Turn the landing gear over again, and fasten the liquid tank insert with screws (7) (torque: 30 - 31 kgf·cm).

注意事项：若螺丝（7）对不准长负载管限位孔，将药箱盖取下，用手掰动药箱内嵌件对准限位孔。

Note: If the screws (7) are not aligned with the holes of the long load tube, remove the liquid tank cover, and move the liquid tank insert by hand to align it with the holes.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

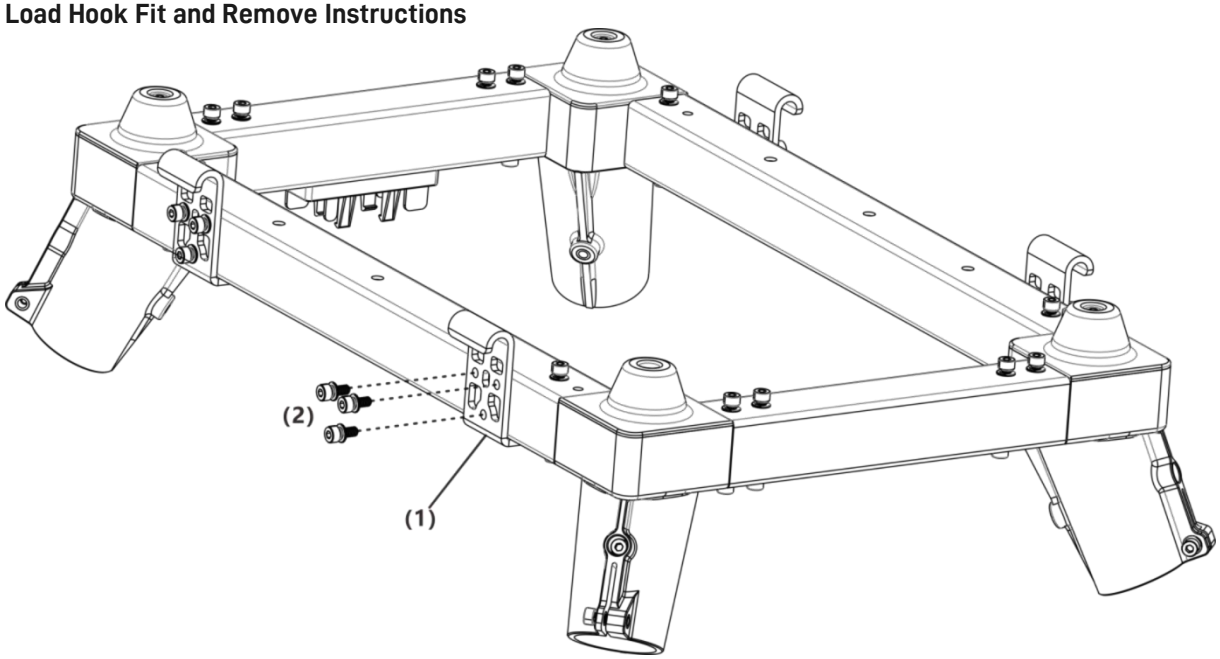
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

负载挂钩拆装指引

Load Hook Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	11~13 kgf·cm

注意事项：拆卸负载挂钩时，需将机臂完全展开，并且将搭扣解除预位。

Note: When removing the load hook, fully extend the arm and unfasten the hasp.

拆卸流程

Disassembly Procedures

拆卸螺丝（2）并将负载挂钩（1）取下。

Remove screws (2), and remove the load hook (1).

安装流程

Installation Process

将新的负载挂钩（1）安装到长负载管，并使用螺丝（2）拧紧（力矩：11~13kgf.cm）。注意事项：负载挂钩螺丝务必拧紧。

Install a new load hook (1) to the long load tube, and tighten it with screws (2) (torque: 11 - 13 kgf·cm). Note: The load hook screws must be tightened.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

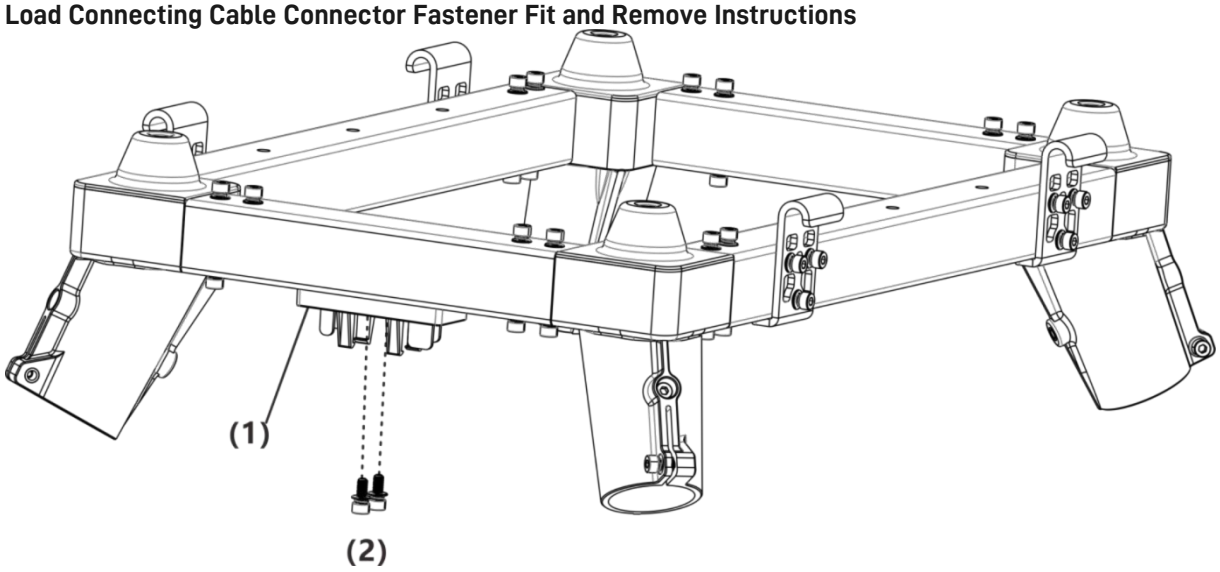
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

负载连接线接头卡件拆装指引

Load Connecting Cable Connector Fastener Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	11~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从短负载管取下负载连接线接头卡件（1）。

Remove screws (2), and remove the connector fastener of the load connecting cable (1) from the short load tube.

安装流程

Installation Process

将新的负载连接线接头卡件（1）安装到短负载管，并使用螺丝（2）拧紧（力矩：11~13kgf.cm）。

Install the new connector fastener of the load connecting cable (1) to the short load tube, and tighten it with screws (2) (torque: 11 - 13 kgf. cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

药箱盖拆装指引

Liquid Tank Cover Fit and Remove Instructions

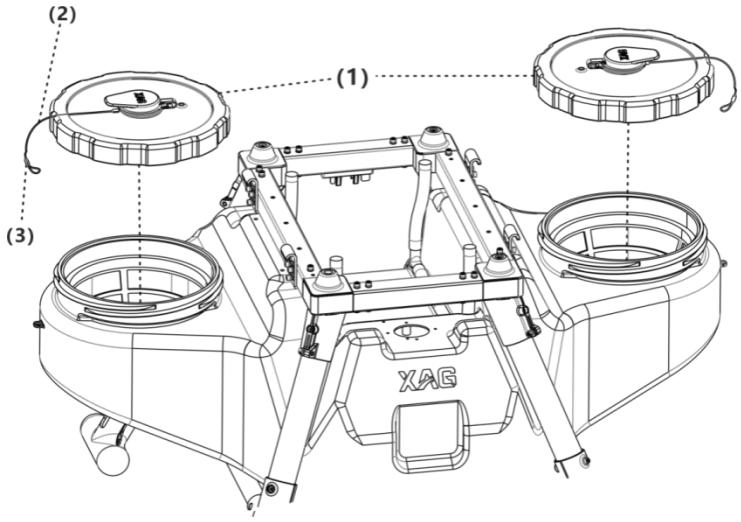


图-1

Figure 1

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全.

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.逆时针旋转药箱盖（1）从药箱中取出。

1. Remove the liquid tank cover (1) from the liquid tank by rotating it counterclockwise.

2.将尼龙绳（2）剪断。

2. Cut the nylon rope (2).

安装流程

Installation Process

1.安装药箱盖（1）时，应检查药箱口盖有无破损或裂纹，若出现异常现象应及时更换。

1. When installing the liquid tank cover (1), check the liquid tank cover for damage and cracks, and replace it promptly if any damage or cracks are observed.

2.顺时针旋转药箱盖拧紧药箱上。

2. Rotate the liquid tank cover clockwise to tighten it.

3.将尼龙绳（2）一端使用不锈钢丝绳铝套（3）固定在药箱凸耳上，另一端固定在药箱盖。警告：务必将尼龙绳使用不锈钢丝铝套夹紧，否侧吸入螺旋桨造成炸机风险。

3. Fix an end of the nylon rope (2) to the lug of the liquid tank using stainless steel wire aluminum sleeves (3), and fix the other end to the liquid tank cover. Warning: Ensure that the nylon rope is clamped securely with the stainless steel wire aluminum sleeves, otherwise the rope can be sucked into the propeller, causing the risk of drone crashing.

测试：

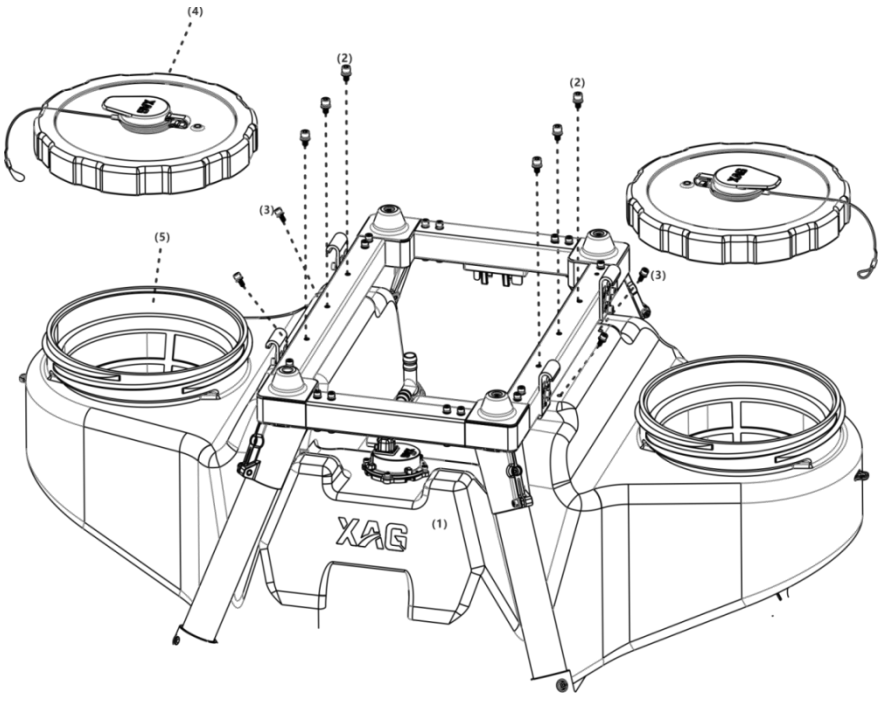
Test:

双手用力向上提起药箱盖，无松动即可。

Firmly lift the liquid tank cover upward with both hands to confirm no looseness.

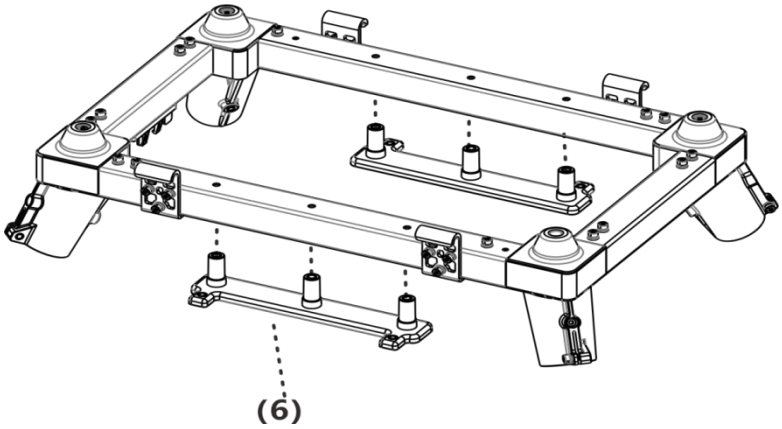
药箱内嵌件拆装指引

Liquid Tank Insert Fit and Remove Instructions



药箱内嵌件-1

Liquid tank insert -1



药箱内嵌件-2

Liquid tank insert -2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M5*10*10	02-004-00747	30~31 kgf·cm
(3)	M4*8*8	02-004-00618	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.逆时针旋转药箱盖（4），并从药箱（1）中去下。

1. Rotate the liquid tank cover (4) counterclockwise, and remove it from the liquid tank (1).

2.将药箱滤网（5）取出。

2. Take out the liquid tank filter (5).

3.移除螺丝（2） （3）。

3. Remove screws (2) (3).

4.从药药箱底部内取出药箱底部内嵌件（6）及密封圈。

4. Take out the liquid tank bottom insert (6) and sealing ring at the bottom of the liquid tank.

安装流程

Installation Process

1.将密封圈套入药箱底部内嵌件（6）中，并安装到药箱（1）内。

1. Insert the sealing ring into the liquid tank bottom insert (6), and install it into the liquid tank (1).

2.使用螺丝（2） （力矩：30~31kgf.cm），螺丝（3） （力矩：12~13kgf.cm）拧紧药箱底部固定件。

2. Use screws (2) (torque: 30 - 31 kgf·cm) and screws (3) (torque: 12 - 13 kgf·cm) to tighten the liquid tank bottom holder.

3.将药箱滤网安装到药箱进药孔处。

3. Install the liquid tank filter to the liquid tank inlet.

4.顺指针拧紧药箱盖。测试：

4. Tighten the liquid tank cover clockwise. Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

三通件拆装指引

Tee Fittings Fit and Remove Instructions

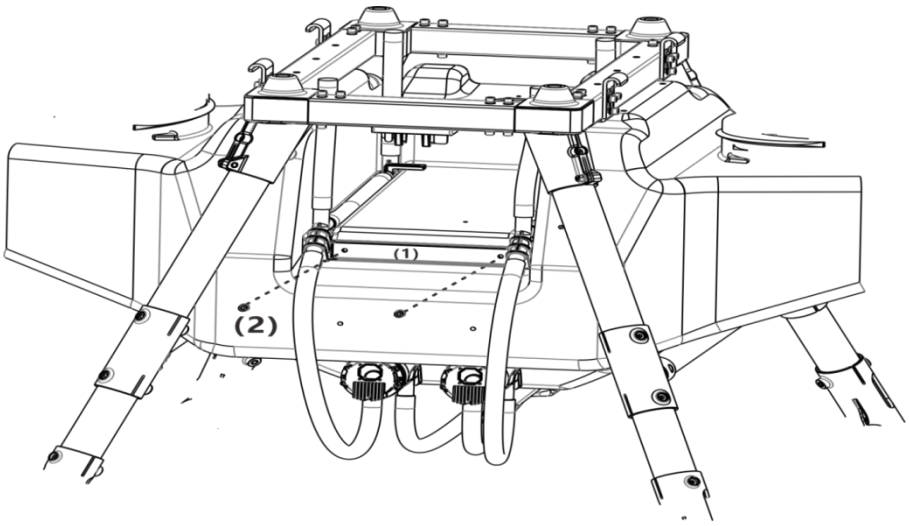


图-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*8*8	02-004-00618	11~12kgf·cm

拆卸流程

Disassembly Procedures

1.将连接三通件（1）的软管轧带剪断，并取下软管。

1. Cut the cable tie of the tube connecting the tee fitting (1), and remove the tube.

2.拆卸螺丝（2），并取下三通件。

2. Remove screws (2), and remove the tee fitting.

安装流程

Installation Process

1.将新的三通件（1）安装到药箱，并使用螺丝（2）拧紧（力矩：11~12kgf.cm）。

1. Install the new tee fitting (1) to the liquid tank, and tighten it with screws (2) (torque: 11 - 12 kgf·cm).

2.将软管安装到三通件，并使用轧带系紧。测试：

2. Install the tube to the tee fitting, and fasten it with a cable tie. Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。观察三通件无渗漏。

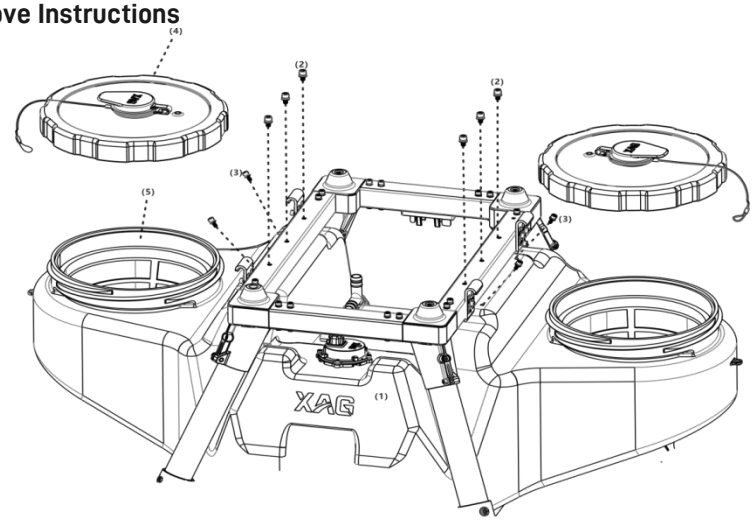
Note: Ensure the liquid tank is filled with ≥3L liquid before testing. Confirm no leaks in the tee fitting.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

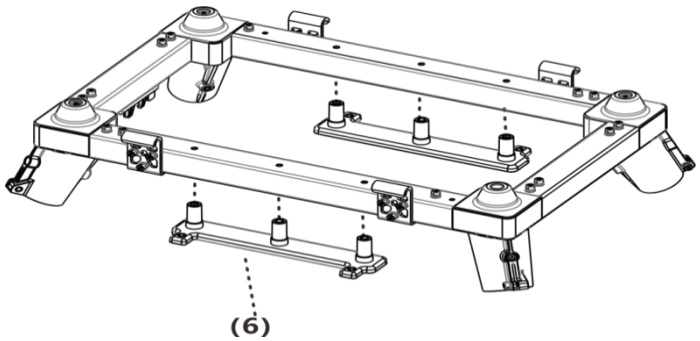
药箱拆装指引

Liquid Tank Fit and Remove Instructions



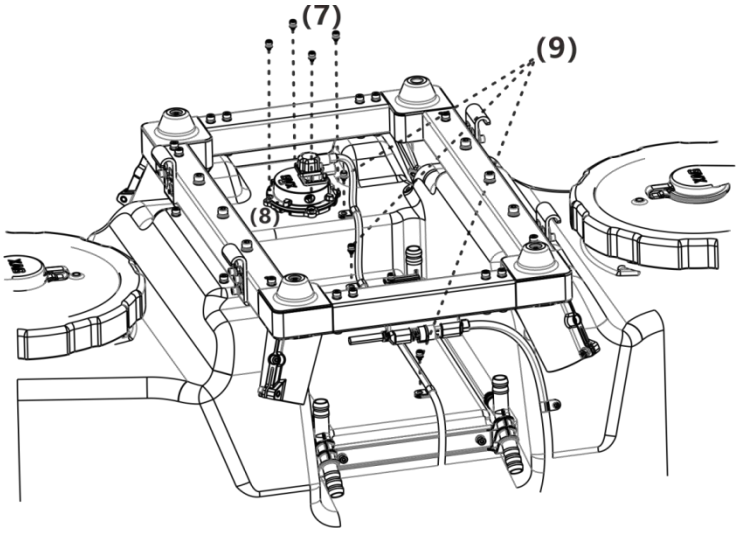
药箱-1

Liquid tank -1



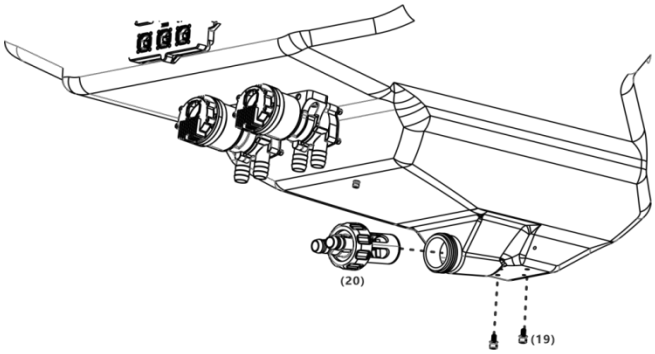
药箱-2

Liquid tank -2



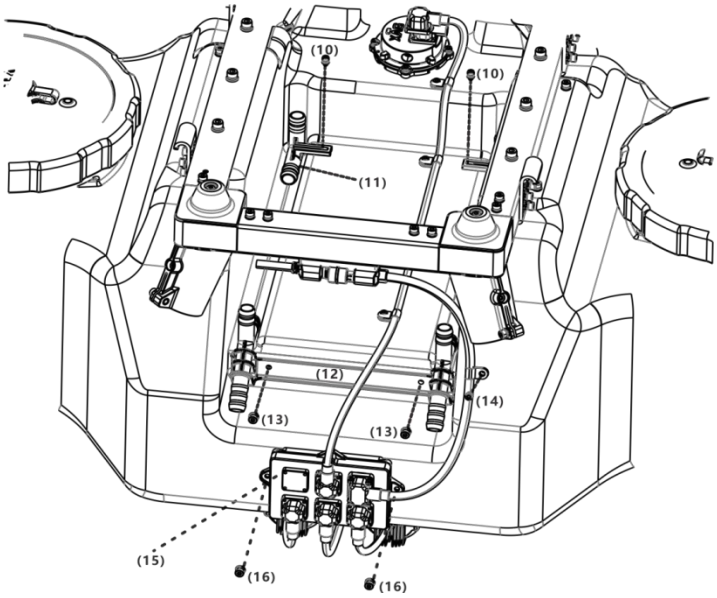
药箱-3

Liquid tank -3



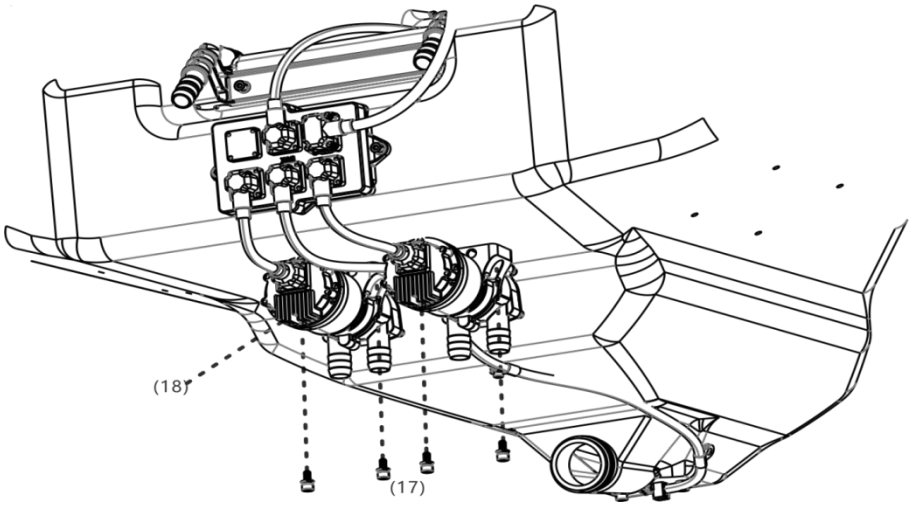
药箱-4

Liquid tank -4



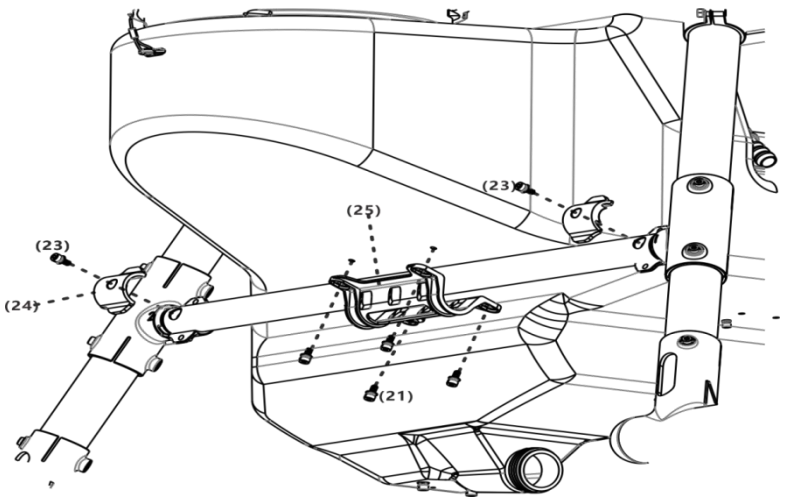
药箱-5

Liquid tank -5



药箱-6

Liquid tank -6



药箱-7

Liquid tank -7

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M5*10*10	02-004-00747	30~31 kgf·cm
(3)	M4*8*8	02-004-00618	12~13 kgf·cm
(7)	M3*10*6	02-004-00624	5~6 kgf·cm
(9)	M3*10*6	02-004-00624	5~6 kgf·cm
(10)	M3*10*6	02-004-00624	5~6 kgf·cm
(13)	M4*8*8	02-004-00618	11~12kgf·cm
(14)	M3*10*6	02-004-00624	5~6 kgf·cm
(16)	M4*8*8	02-004-00618	12~13 kgf·cm
(17)	M4*8*8	02-004-00618	11~12kgf·cm
(19)	M4*8*8	02-004-00618	11~12kgf·cm
(20)	药箱宝塔弯盖头 Liquid tank pagoda-shaped connector cover	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	手拧紧固即可，无扭力要求 Tighten it by hand, with no torque requirement
(21)	M4*12*8	02-004-00834	12~13 kgf·cm
(23)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.逆时针旋转药箱盖（4），并从药箱（1）中去下。

1. Rotate the liquid tank cover (4) counterclockwise, and remove it from the liquid tank (1).

2.将药箱滤网（5）取出。

2. Take out the liquid tank filter (5).

3.移除螺丝（2）（3）。

3. Remove screws (2) (3).

4.从药药箱底部内取出药箱底部内嵌件（6）及密封圈。

4. Take out the liquid tank bottom insert (6) and sealing ring at the bottom of the liquid tank.

5.拆卸气压计雷达（8）的螺丝（7）。

5. Remove screws (7) of the barometer radar (8).

6.拆卸药箱雷达线组的螺丝（9）

6. Remove screws (9) of the liquid tank radar cables.

7.翻转药箱，拆卸气压计底座螺丝（19），并从药箱内取出气压计底座。注意事项：必须将与之相连的软管断开。

7. Turn over the liquid tank, remove the barometer base screws (19), and take out the barometer base from the liquid tank. Note: The tube connected to it must be detached.

8.拆卸螺丝（10），并取下机身L型件（11）。

8. Remove screws (10), and remove the airframe L-shaped part (11).

9.拆卸螺丝（13），并取下三通件（12）。

9. Remove screws (13), and remove the tee fitting (12).

10.拆卸螺丝（14）（16），并取下负载集线板（15）。

10. Remove screws (14) (16), and remove the load cable hub (15).

11.拆卸螺丝（17），并取下叶轮泵（18）。

11. Remove screws (17), and remove the impeller pump (18).

12.逆时针旋转药箱宝塔弯盖头（20）并冲药箱中取出。

12. Turn the liquid tank pagoda-shaped connector cover (20) counterclockwise, and take it out of the liquid tank.

13.拆卸螺丝（21），并取下药箱底部固定件（22）。

13. Remove screws (21), and remove the liquid tank bottom holder (22).

14.拆卸螺丝（23），并取下脚架三通卡件（24）。

14. Remove screws (23), and remove the landing gear T-clamp (24).

15.从脚架三通件中取出脚架横杆（25）。

15. Remove the crossbar (25) from the landing gear tee fitting.

注意事项：必须把药箱两侧的脚架横杆都拆卸。

Note: The crossbars on both sides of the liquid tank must be removed.

安装流程

Installation Process

1.翻转脚架，将新的药箱与长负载管限位孔对准。

1. Turn over the landing gear, and align the new liquid tank with the holes of the long load tube.

2.将脚架横杆（25）安装到脚架三通件。

2. Install the crossbar (25) to the landing gear tee fitting.

3.使用螺丝（23）（力矩：11~12kgf.cm）将脚架三通卡件（24）紧固在脚架三通件。

3. Use screws (23) (torque: 11 - 12 kgf·cm) to fasten the landing gear T-clamp (24) to the landing gear tee fitting.

4.将药箱底部固定件（22）安装到药箱上，并使用螺丝（21）拧紧（力矩：11~12kgf.cm）。注意事项：必须把药箱两侧的脚架横杆都安装。

4. Install the liquid tank bottom holder (22) onto the liquid tank, and tighten it with screws (21) (torque: 11 - 12 kgf·cm). Note: The crossbars on both sides of the liquid tank must be installed.

5.将药箱宝塔弯盖头（20）安装到药箱内，并顺时针旋转拧紧。

5. Install the liquid tank pagoda-shaped connector cover (20) into the liquid tank, and tighten it clockwise.

6.注意事项：安装前，必须检查药箱宝塔弯盖内的密封圈是否良好，若出现断裂、变形应及时更换，否侧药箱气密性受影响，雷达测量不准确。

6. Note: Before installation, inspect the sealing ring inside the liquid tank pagoda-shaped connector cover. If cracks or deformations are found, replace it immediately. Failure to do so will compromise the liquid tank's airtightness, resulting in inaccurate radar measurements.

7.将叶轮泵（18）安装到药箱上，并使用螺丝（17）（力矩：11~12kgf.cm）。

7. Install the impeller pump (18) onto the liquid tank, and use screws (17) (torque: 11 - 12 kgf.cm).

8.将负载集线板（15）安装待药箱，并使用螺丝（16）拧紧（力矩：11~12kgf.cm）。

8. Install the load cable hub (15) to the liquid tank, and tighten it with screws (16) (torque: 11 - 12 kgf·cm).

9.使用螺丝（14）（力矩：5~6kgf.cm）将执行系统线组固定在药药箱底部。

9. Use screws (14) (torque: 5 - 6 kgf·cm) to secure the payload system cables to the bottom of the liquid tank.

10.将三通件（12）安装到药箱，并使用螺丝（13）拧紧（力矩：11~12kgf.cm）。

10. Install the tee fitting (12) to the liquid tank, and tighten it with screws (13) (torque: 11- 12 kgf·cm).

11.将机身L型件（11）安装到药箱，并使用螺丝（10）拧紧（力矩：5~6kgf.cm）。

11. Install the airframe L-shaped part (11) to the liquid tank, and tighten it with screws (10) (torque: 5- 6 kgf·cm).

12.将气压计底座安装到药药箱底部内，并使用螺丝（19）拧紧（力矩：11~12kgf.cm）。

12. Install the barometer base to the bottom of the liquid tank, and tighten it with screws (19) (torque: 11- 12 kgf·cm).

注意事项：安装前，必须检查密气压计底座封圈是否良好，若出现断裂、变形应及时更换，否侧药箱气密性受影响，雷达测量不准确。

Note: Before installation, inspect the sealing ring of the barometer base. If cracks or deformations are found, replace it immediately. Failure to do so will compromise the liquid tank's airtightness, resulting in inaccurate radar measurements.

13.将气压计雷达（8）安装到药箱，并使用螺丝（7）拧紧（力矩：5~6kgf.cm）。

13. Install the barometer radar (8) to the liquid tank, and tighten it with screws (7) (torque: 5 - 6 kgf·cm).

14.使用螺丝（9）（力矩：5~6kgf.cm）将气压计雷达线组固定在药箱，并将软管与气压计底座相连。

14. Use screws (9) (torque: 5 - 6 kgf·cm) to fix the barometer radar cables to the liquid tank, and connect the tube to the barometer base.

15.将药箱底部内嵌件（6）安装到药箱内，并使用螺丝（2）（力矩：24~26kgf.cm），螺丝（3）（力矩：11~12kgf.cm）拧紧。

15. Install the liquid tank bottom insert (6) into the liquid tank, and tighten it with screws (2) (torque: 24 - 26 kgf·cm) and (3) (torque: 11 - 12 kgf·cm).

注意事项：安装前，必须检查药箱底部内嵌件的密封圈是否良好，若出现断裂、变形应及时更换，否侧药箱气密性受影响，雷达测量不准确。

Note: Before installation, inspect the sealing ring of the liquid tank bottom insert. If cracks or deformations are found, replace it immediately. Failure to do so will compromise the liquid tank's airtightness, resulting in inaccurate radar measurements.

16.将药箱滤网（5）安装到药箱（1），并将药箱盖（4）顺时针拧紧。测试：

16. Install the liquid tank filter (5) to the liquid tank (1), and tighten the liquid tank cover (4) clockwise. Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。观察药箱无渗漏。

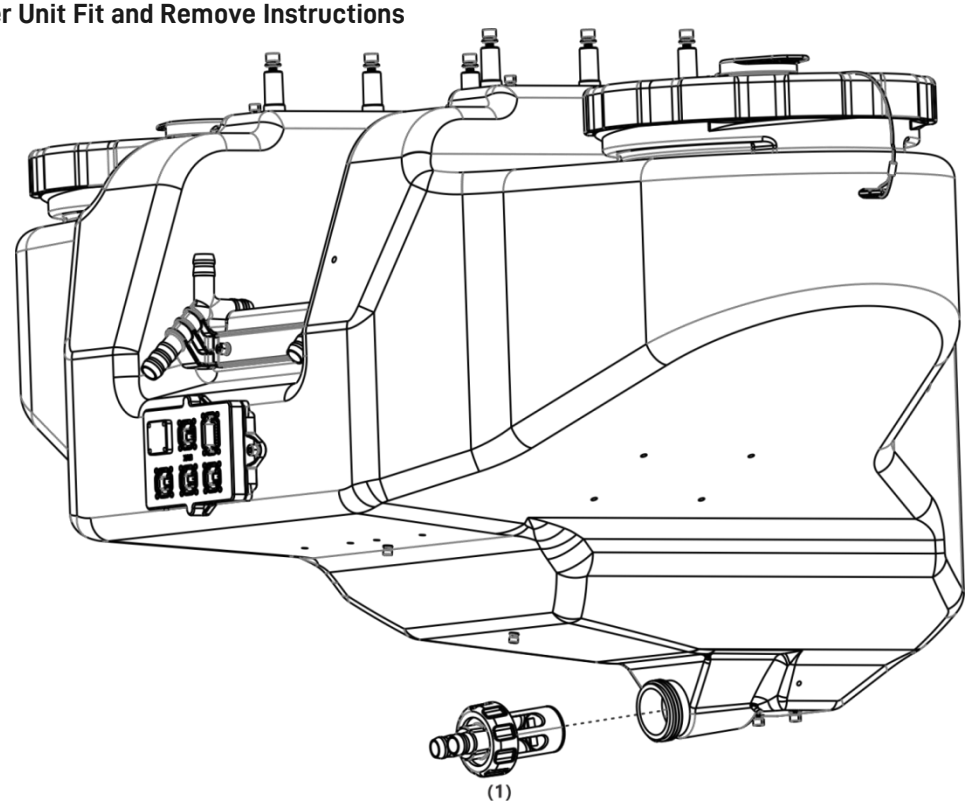
Note: Ensure the liquid tank is filled with ≥3L liquid before testing. Confirm no leaks in the liquid tank.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

药箱过滤器组件拆装指引

Liquid Tank Filter Unit Fit and Remove Instructions



警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect the drone all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.逆时针旋转药箱盖（1），并从药箱中取出。

1. Remove the liquid tank cover (1) from the liquid tank by rotating it counterclockwise.

2.注意事项：必须将与之相连的软管断开。

2. Note: The tube connected to it must be detached.

安装流程

Installation Process

将药箱过滤器组件（1）顺时针拧紧，并将软管接上使用轧带系紧。

Tighten the liquid tank filter unit (1) clockwise, connect it to the tube, and fasten it with a cable tie.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。观察药箱无渗漏。

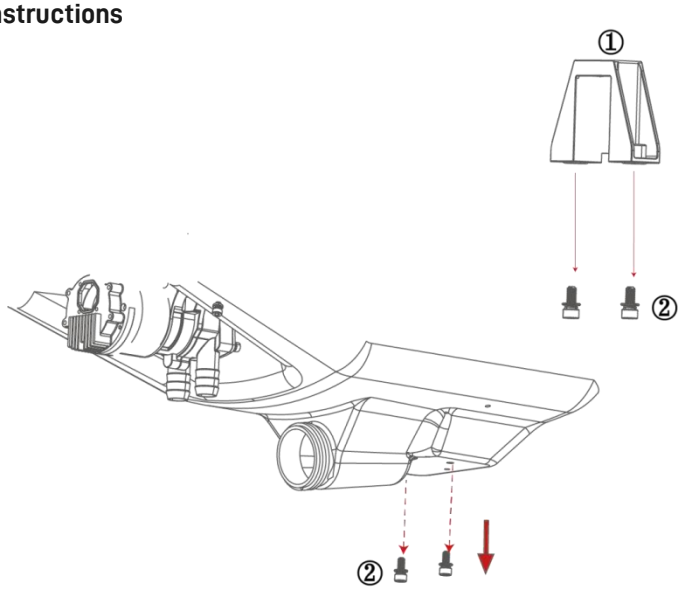
Note: Ensure the liquid tank is filled with ≥3L liquid before testing. Confirm no leaks in the liquid tank.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

浮子底座拆装指引

Float Base Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*8*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	6~7kgf.cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝②,将浮子底座①从药箱内取出。

Remove screws ②, and take out the float base ① from the liquid tank.

安装流程

Installation Process

1.将浮子底座①安装到药箱内，并使用螺丝②拧紧（力矩：6~7kgf.cm）。

1. Install the float base ① into the liquid tank, and tighten it with screws ② (torque: 6~7kgf·cm).

2.注意事项：浮子底座螺丝孔位处有密封圈。

2. Note: A sealing ring is placed at the screw holes of the float base.

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

观察药箱无渗漏。

Confirm no leaks in the liquid tank.

调节雾化等级，观察雾化程度。

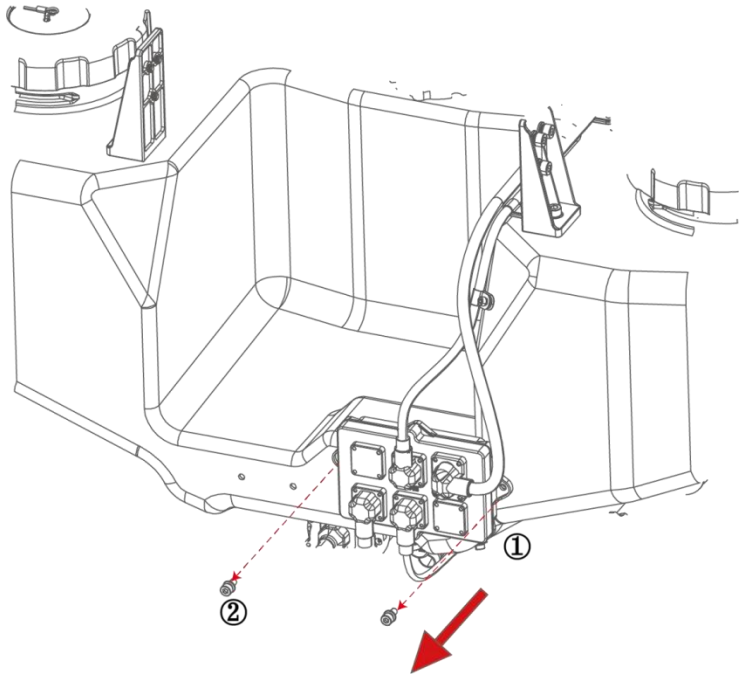
Adjust the atomization level and observe the atomization effect.

喷洒测试时，无药液返航后检查药箱实际情况，无剩余药液。

During the spraying test, after RTH without liquid, inspect the liquid tank to confirm there is no residual liquid.

负载集线板拆装指引

Load Cable Hub Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*8*8	02-004-00618	12~14 kgf·cm

警告：拆卸前务必确保电源已关闭或电池已拔出。

Warning: Before disassembly, ensure the power is turned off or the battery is disconnected and removed.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②,将负载集线板①从药箱上取下。

1. Remove screws ②, and remove the load cable hub ① from the liquid tank.

2.注意事项:务必将所有线束都拆卸。

2. Note: Be sure to remove all cables.

安装流程

Installation Process

将负载集线板①安装到药箱，并使用螺丝②拧紧（力矩：12~14kgf.cm）。

Install the load cable hub ① to the liquid tank, and tighten it with screws ② (torque: 12~14kgf·cm).

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

叶轮泵工作是否正常。

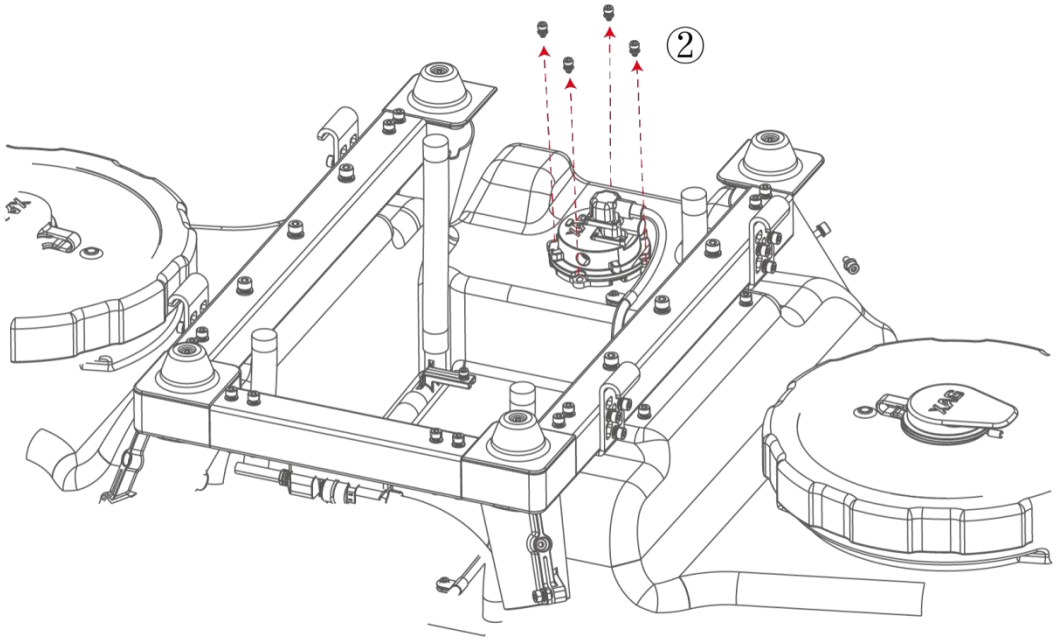
Check whether the impeller pump works normally.

观察叶轮泵密封性，无渗漏现象。APP无负载信息故障显示。

Check the sealing of the impeller pump, and confirm no leaks. No load breakdown information is displayed in the APP.

气压计拆装指引

Barometer Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*10*6	02-004-00624	5~6 kgf·cm

警告：拆卸前务必确保电源已关闭或电池已拔出。

Warning: Before disassembly, ensure the power is turned off or the battery is disconnected and removed.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②,将气压计从药箱上取下。

1. Remove screws ②, and remove the barometer from the liquid tank.

2.注意事项:务必将所有线束都拆卸。

2. Note: Be sure to remove all cables.

安装流程

Installation Process

将气压计安装到药箱，并使用螺丝②拧紧（力矩：5~6kgf.cm）。注意事项:务必将所有线束都接上。

Install the barometer to the liquid tank, and tighten it with screws ② (torque: 5~6kgf·cm). Note: Be sure to connect all cables.

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。APP无气压计信息故障显示。

Ensure the liquid tank is filled with ≥3L liquid before testing. No barometer breakdown information is displayed in the APP.

喷洒测试时，无药液返航后检查是否还存在过多的药液。

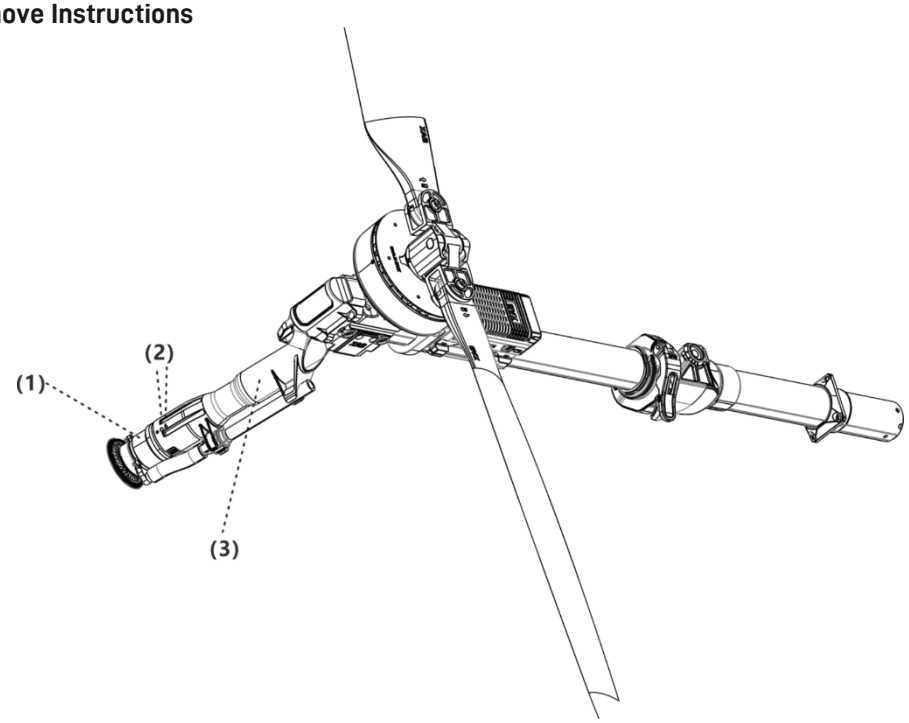
During the spraying test, after RTH without liquid, check whether there is residual liquid.

P60喷洒系统模块拆装程序

Removal and Installation Procedure for P60 Spraying System Module

喷头拆装指引

Nozzle Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M3*10*6	02-004-00624	6~7 kgf·cm

拆卸流程

Disassembly Procedures

1.拆卸与喷头相连的软管。

1. Remove the tube connected to the nozzle.

2.拆卸螺丝（2），并断开喷头内部线组。

2. Remove screws (2) and disconnect the internal cables of the nozzle.

3.将喷头（1）从喷杆上取出。

3. Remove the nozzle (1) from the spray rod.

安装流程

Installation Process

1.将喷头（1）安装到喷杆，将喷头线组插入喷头。

1. Install the nozzle (1) onto the spray rod and insert the nozzle cables into the nozzle.

2.将喷头固定在喷杆（3），并使用螺丝（2）拧紧（力矩：6~7kgf.cm）。

2. Secure the nozzle to the spray rod (3) and tighten it with screws (2) (torque: 6 - 7 kgf·cm).

3.将软管连接到喷头，并使用轧带系紧。

3. Connect the tube to the nozzle and fasten it tightly with a cable tie.

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

观察喷头及喷盘有无明显震动、松动现象。

Confirm no significant vibration or looseness in the nozzle and spray disc.

观察喷头无渗漏现象。

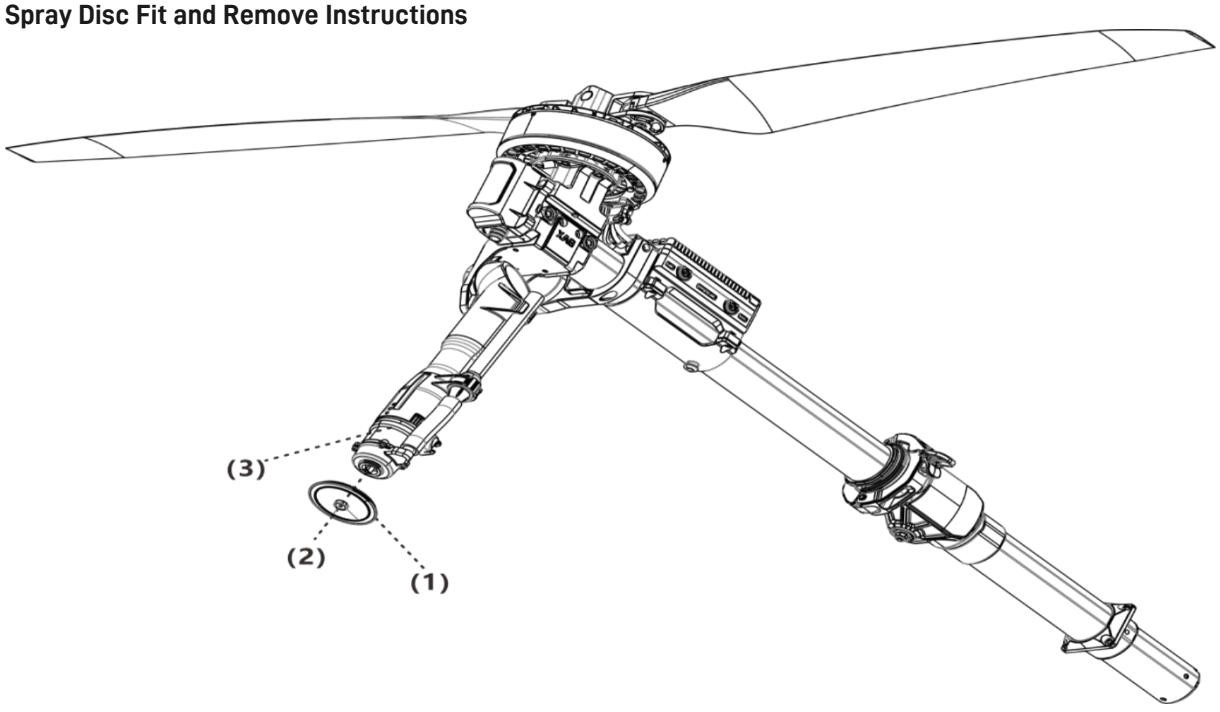
Confirm no leaks in the nozzle.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

喷盘拆装指引

Spray Disc Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M3*10*6	02-004-00624	6~7 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从喷头（3）取下喷盘（1）。

Remove screws (2), and remove the spray disc (1) from the nozzle (3).

安装流程

Installation Process

将新的喷盘（1）安装到喷头（3），并使用螺丝（2）拧紧（力矩：6~7kgf.cm）。

Install the new spray disc (1) onto the nozzle (3) and tighten it with screws (2) (torque: 6 - 7 kgf·cm).

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

观察喷头及喷盘有无明显震动、松动现象。

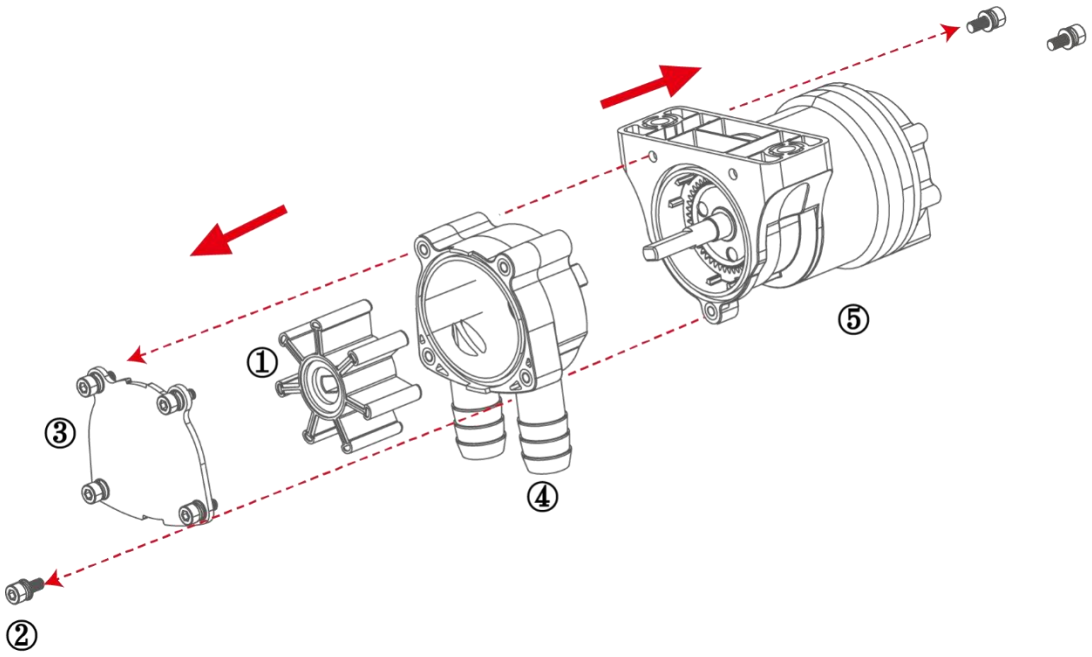
Confirm no significant vibration or looseness in the nozzle and spray disc.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

叶轮泵拆装指引

Impeller Pump Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M3*10*6	02-004-00624	5~6 kgf·cm
(4)	M3*6	02-004-00936	5~6 kgf·cm
(5)	M4*8*8	02-004-00618	11~12 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.断开连接叶轮泵的软管。

1. Disconnect the tube connected to the impeller pump.

2.拆卸集线板侧的叶轮泵线组（3）插头螺丝（2）。

2. Remove the plug screws (2) of the impeller pump cables (3) on the cable hub side.

3.拆卸叶轮泵侧的插头螺丝（4），并取下叶轮泵线组。

3. Remove the plug screws (4) on the impeller pump side, and remove the impeller pump cables.

4.拆卸叶轮泵固定螺丝（5），并取下叶轮泵（1）。

4. Remove the set screws (5) on the impeller pump, and remove the impeller pump (1).

安装流程

Installation Process

1.使用螺丝（5）（力矩：11~12kgf.cm）将叶轮泵（1）固定在药箱底部，并拧紧。

1. Use screws (5) (torque: 11 - 12 kgf·cm) to secure the impeller pump (1) onto the liquid tank bottom, and tighten them.

2.将叶轮泵线组（3）插入接线口，并使用螺丝（2）（4）拧紧（力矩：6~7kgf.cm）。注意事项：线组两端有区分，接集线板侧插座无防松扣，接叶轮泵侧插座含防松扣。

2. Insert the impeller pump cables (3) into the connection port, and tighten it with screws (2) (4) (torque: 6 - 7 kgf·cm). Note: The cable ends are differentiated, with no anti-loosening buckle on the socket connecting the cable hub and an anti-loosening buckle on the socket connecting the impeller pump.

将软管连接到叶轮泵，并使用轧带系好。

Connect the tube to the impeller pump, and fasten it with a cable tie.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing.

叶轮泵工作时无异响。

Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

Check the sealing of the impeller pump, and confirm no leaks.

观察喷头及喷盘有无明显震动、松动现象。

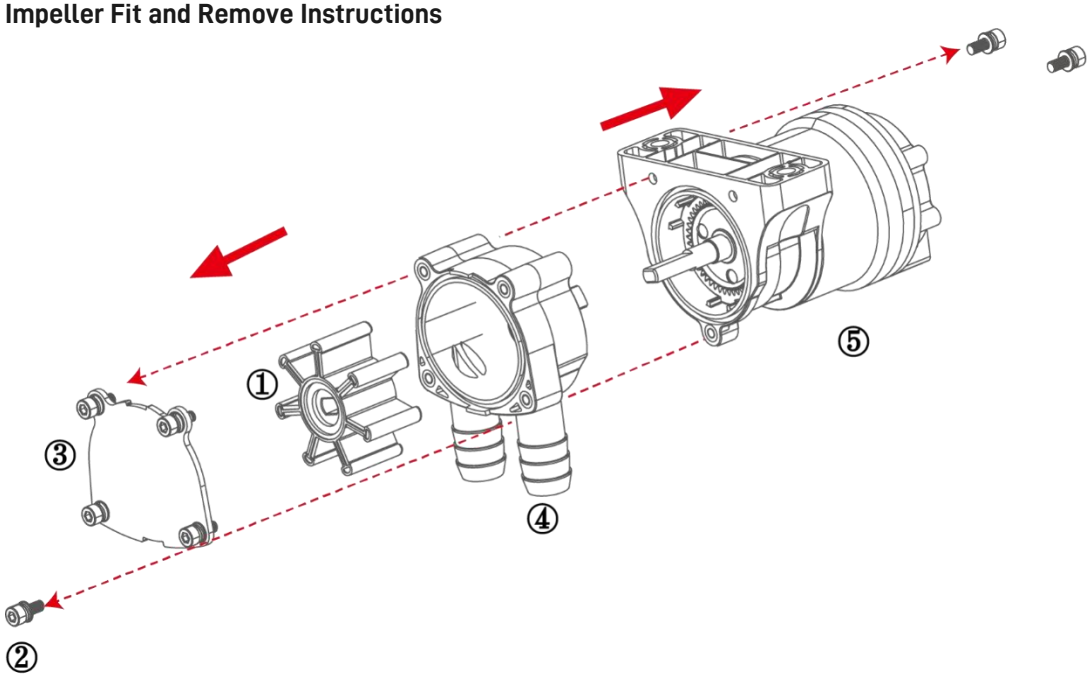
Confirm no significant vibration or looseness in the nozzle and spray disc.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

叶轮拆装指引

Impeller Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	无 No

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②,并取下钣金③。

1. Remove screws ②, and detach the sheet metal ③.

2.从泵体④中取出叶轮①。

2. Take out the impeller ① from the pump ④.

安装流程

Installation Process

将叶轮①安装到泵体④中，使用螺丝②将钣金③固定在泵体上。

Install the impeller ① into the pump ④, and secure the sheet metal ③ to the pump with screws ②.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing.

叶轮泵工作时无异响。

Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

Check the sealing of the impeller pump, and confirm no leaks.

观察喷头及喷盘有无明显震动、松动现象。

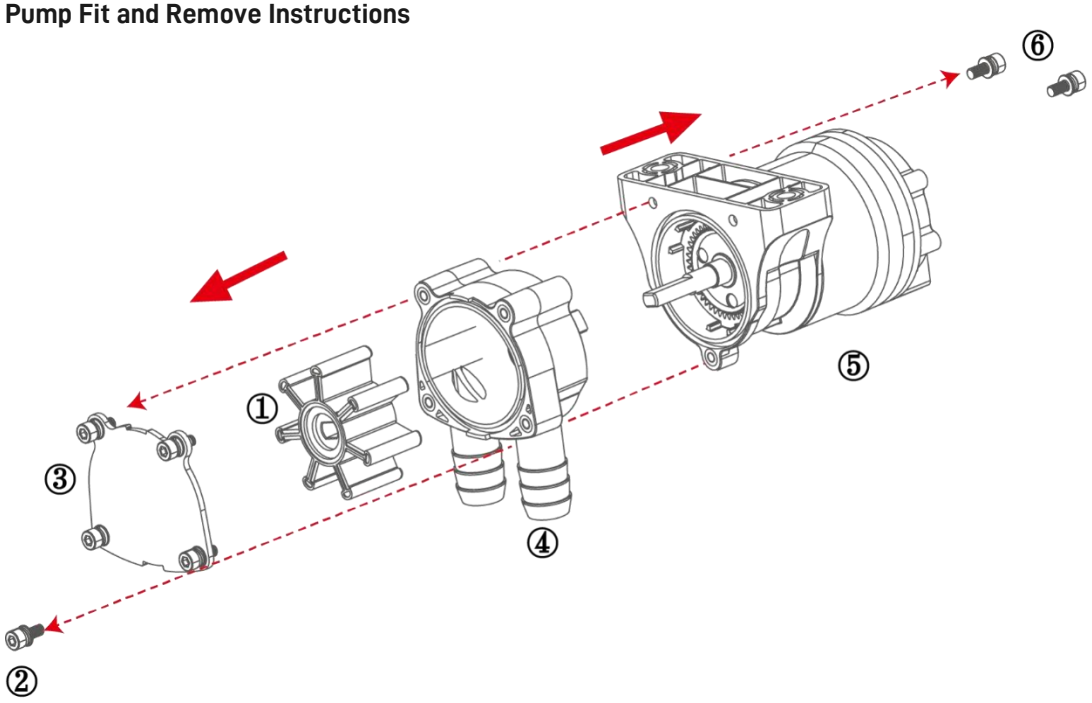
Confirm no significant vibration or looseness in the nozzle and spray disc.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

泵体拆装指引

Pump Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*8	实际编码请查阅TIS系统 For actual codes, please	无 No

		refer to the TIS system	
③	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	无 No
⑥	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	6~7kgf.cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②,并取下钣金③。

1. Remove screws ②, and detach the sheet metal ③.

2.从泵体④中取出叶轮①。

2. Take out the impeller ① from the pump ④.

3.拆卸螺丝⑥,并将泵体从电机⑤中取出。

3. Remove screws ⑥ and take out the pump from the motor ⑤.

安装流程

Installation Process

1.将泵体④安装到电机⑤上，并使用螺丝⑥拧紧（力矩:6~7kgf.cm）。2.将叶轮①安装到泵体中，使用螺丝②将钣金③固定在泵体上

1. Install the pump ④ onto the motor ⑤, and fix it with the screws ⑥ (torque: 6~7kgf·cm). 2. Install the impeller ① into the pump, and secure the sheet metal ③ to the pump with screws ②.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing.

叶轮泵工作时无异响。

Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

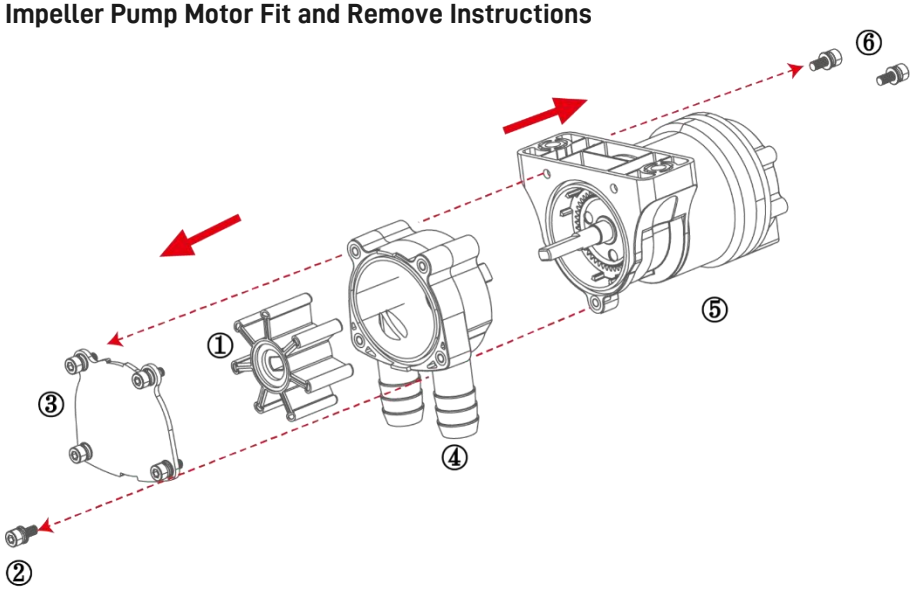
Check the sealing of the impeller pump, and confirm no leaks.

观察喷头及喷盘有无明显震动、松动现象。

Confirm no significant vibration or looseness in the nozzle and spray disc.

叶轮泵电机拆装指引

Impeller Pump Motor Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	6~7kgf.cm
⑥	M3*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	6~7kgf.cm
⑦	实际编规格查阅TIS系统 For actual specifications, please refer to the TIS system	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	2~3kgf.cm
⑨	实际规格请查阅TIS系统 For actual specifications, please refer to the TIS system.	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	2~3kgf.cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②、⑥,将叶轮泵电机⑤与泵体④分离。

1. Remove screws ② and ⑥, and separate the impeller pump motor ⑤ from the pump ④.

2.拆卸螺丝⑦,将叶轮泵电机盖板⑩从电机上分离。

2. Remove screws ⑦, and separate the impeller pump motor cover ⑩ from the motor.

3.拆卸螺丝⑨,将叶轮泵主板⑧与叶轮泵电机分离。

3. Remove screws ⑨, and separate the impeller pump motherboard ⑧ from the impeller pump motor.

安装流程

Installation Process

1.将叶轮泵主板⑧安装到叶轮泵电机⑤,并使用螺丝⑨拧紧（力矩:2~3kgf.cm）。

1. Install the impeller pump motherboard ⑧ to the impeller pump motor ⑤, and tighten it with screws ⑨ (torque:2~3 kgf·cm).

2.将叶轮泵电机盖板⑩安装到叶轮泵电机上，并使用螺丝⑦拧紧（力矩:2~3kgf.cm）。

2. Install the impeller pump motor cover ⑩ onto the impeller pump motor, and tighten it with screws ⑦ (torque: 2~3kgf·cm).

3.将叶轮泵电机安装到泵体④,并使用螺丝②、⑥拧紧（力矩:6~7kgf.cm）。

3. Install the impeller pump motor to the pump ④, and tighten it with screws ② and ⑥ (torque: 6~7kgf·cm).

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing.

叶轮泵工作时无异响。

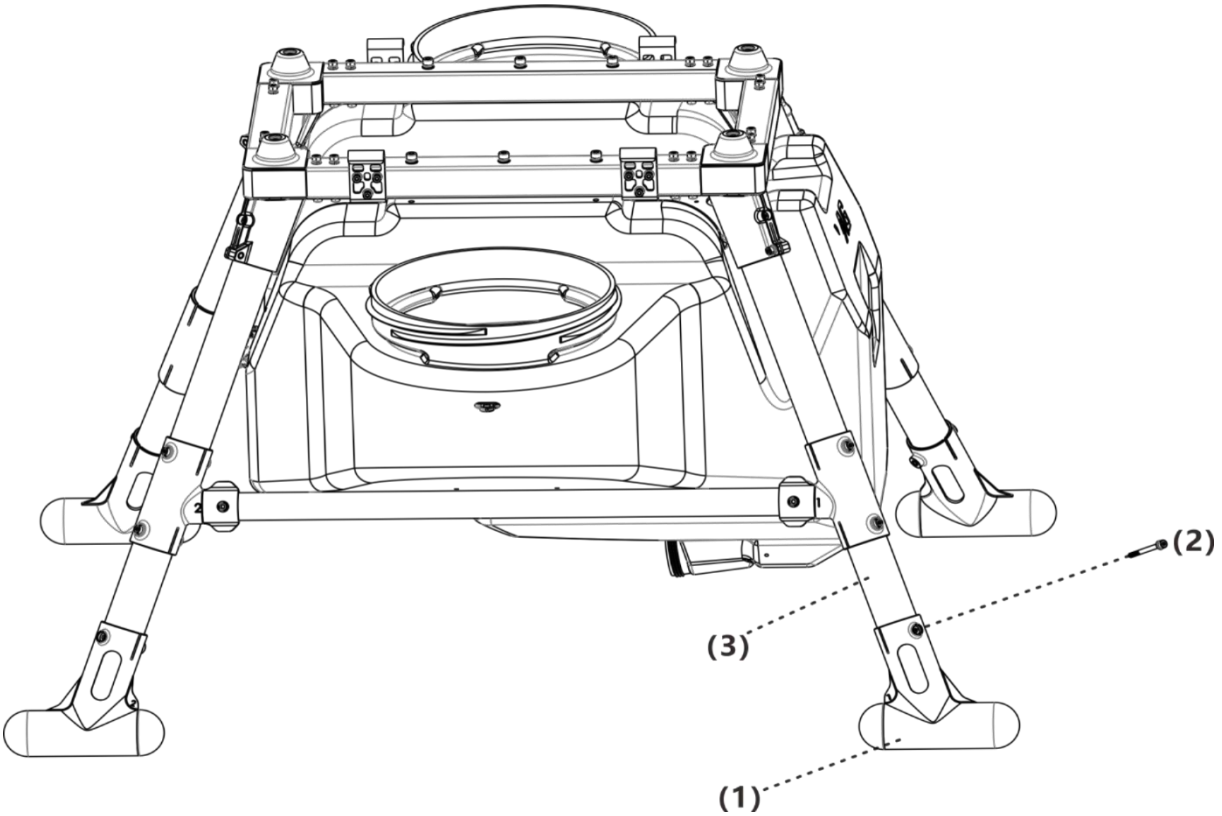
Verify that the impeller pump operates without abnormal noise.

观察叶轮泵密封性，无渗漏现象。

Check the sealing of the impeller pump, and confirm no leaks.

脚架触地件拆装指引

Landing Gear Grounding Part Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*45	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	11~12 kgf·cm

注意事项：脚架触地件是有方向性，务必确保脚架触地件朝向与负载方管（长管）平行并确保定位孔一致，否则无法安装。

Note: The landing gear grounding part is directional. Place the landing gear grounding part parallel to the load square tube (long tube) and align their positioning holes. Incorrect orientation will prevent proper installation.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸脚架触地件（1）的螺丝（2）。从脚架管（3）取出脚架触地件。

Remove screws (2) of the landing gear grounding part (1). Remove the landing gear grounding part from the landing gear (3).

安装流程

Installation Process

将脚架触地件（1）安装到脚架管（3）中，并使用螺丝（2）紧固（力矩：11~12kgf.cm）。测试：

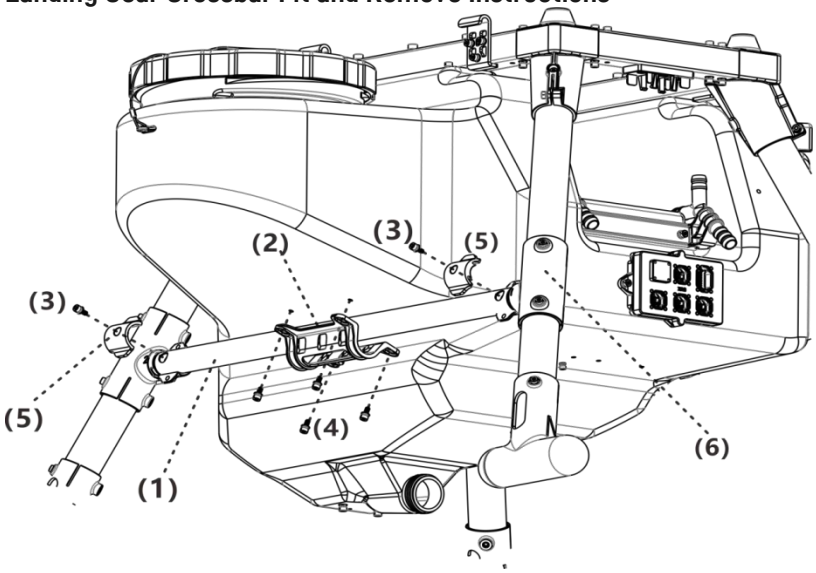
Install the landing gear grounding part (1) into the landing gear (3), and fasten it with screws (2) (torque: 11 - 12 kgf·cm). Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

脚架横杆拆装指引

Landing Gear Crossbar Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*8*8	02-004-00618	11~12 kgf·cm
(4)	M4*8*8	02-004-00618	11~12 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

拆卸螺丝（4）并取下药箱底部脚架固定件（2）。拆卸螺丝（3）并取下脚架三通卡件（5）。

Remove screws (4), and remove the landing gear holder (2) at the bottom of the liquid tank. Remove screws (3), and remove the landing gear T-clamp (5).

从脚架三通件（6）取下脚架横杆（1）。

Remove the crossbar (1) from the landing gear tee fitting (6).

安装流程

Installation Process

将新的脚架横杆（1）安装到脚架三通件（6）中。

Install the new crossbar (1) to the landing gear tee fitting (6).

将脚架三通卡件（5）安装到脚架横杆上，并使用螺丝（3）紧固（力矩：11~12kgf.cm）。

Install the landing gear T-clamp (5) onto the crossbar, and fasten it with screws (3) (torque: 11 - 12 kgf·cm).

将药箱底部固定件（2）安装到药箱底部上，并使用螺丝（4）拧紧（力矩：11~12kgf.cm）。

Install the bottom holder (2) of the liquid tank to the bottom of the liquid tank, and tighten it with screws (4) (torque: 11 - 12 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

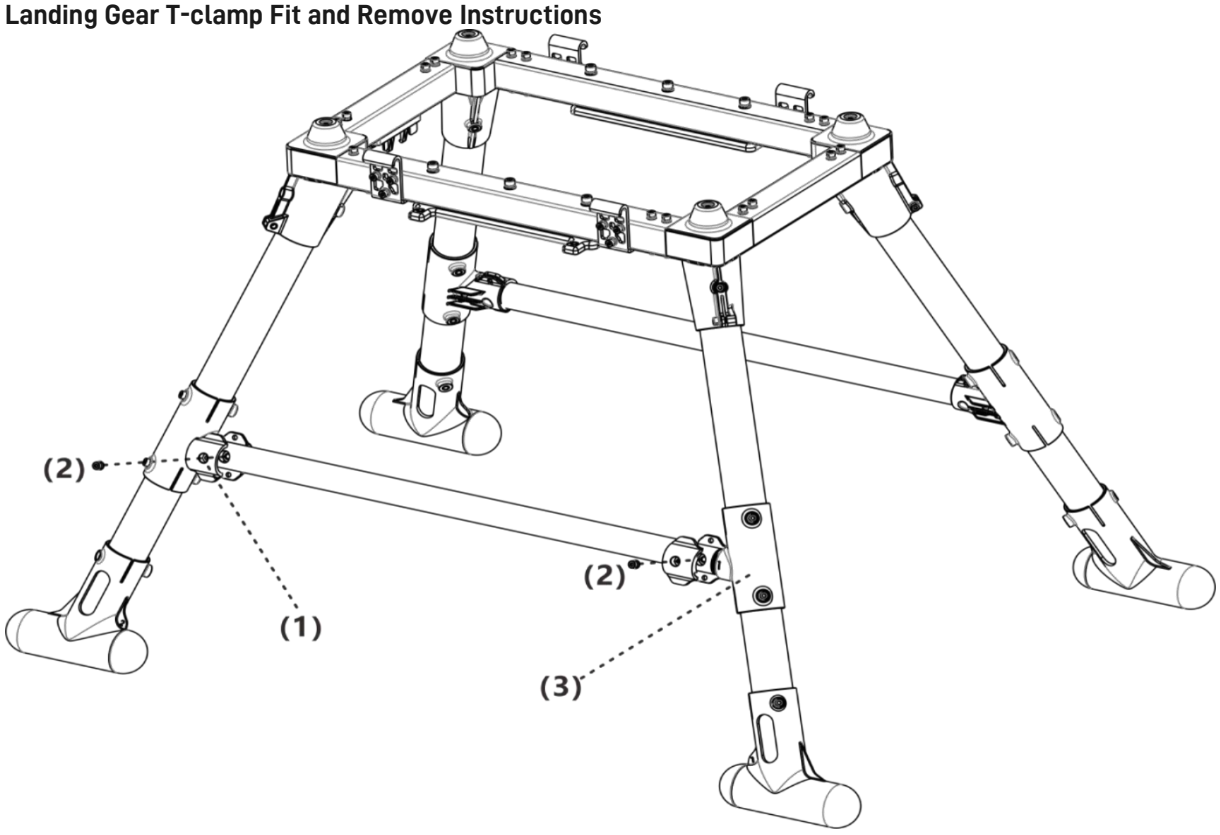
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

脚架三通件卡件拆装指引

Landing Gear T-clamp Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*8*8	02-004-00618	11~12 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从脚架三通件（3）取下脚架三通件卡件（1）。

Remove screws (2), and remove the landing gear T-clamp (1) from the landing gear tee fitting (3).

安装流程

Installation Process

将新的脚架三通件卡件（1）安装到脚架三通件（3），并使用螺丝（2）拧紧（力矩：11~12kgf.cm）。

Install the new landing gear T-clamp (1) to the landing gear tee fitting (3), and tighten it with screws (2) (torque: 11 - 12 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

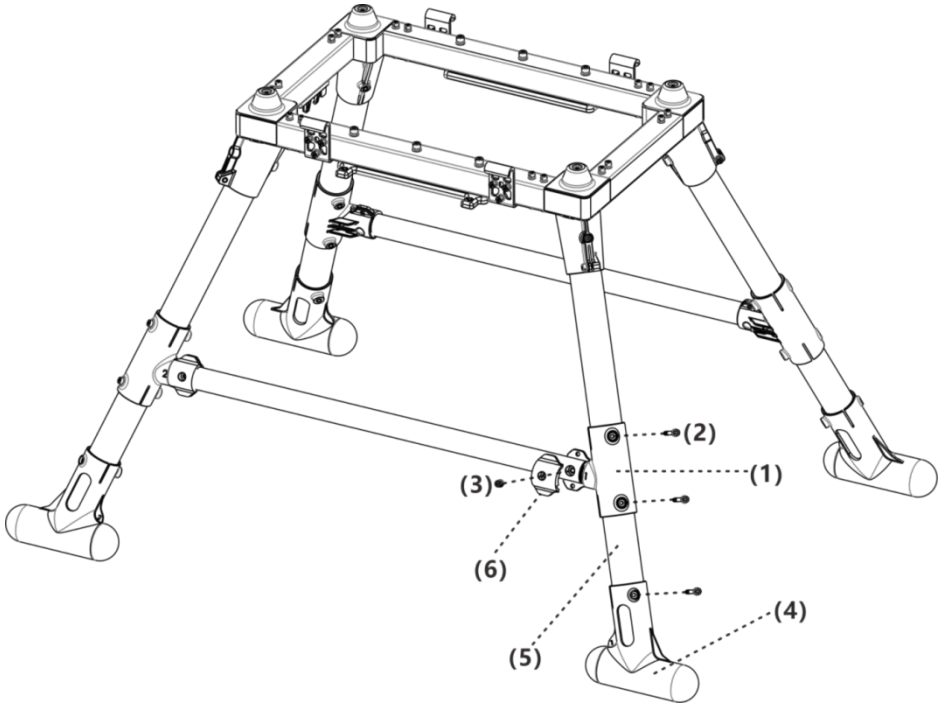
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

脚架三通件拆装指引

Landing Gear Tee Fittings Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*45	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	11~12 kgf·cm
(3)	M4*8*8	02-004-00618	11~12 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（3）并取下脚架三通件卡件（6）。拆卸螺丝（2）并取下脚架触地件（4）。

Remove screws (3), and remove the landing gear T-clamp (6). Remove screws (2), and remove the landing gear grounding part (4).

拆卸螺丝（2）并从脚架管（5）中取下脚架三通件（1）。

Remove screws (2), and remove the landing gear tee fitting (1) from the landing gear (5).

安装流程

Installation Process

将新的脚架三通件（1）安装到脚架管（5），并使用螺丝（2）紧固（力矩：11~12kgf.cm）。将脚架触地件（4）安装到脚架管，并使用螺丝（2）紧固。

Install the new landing gear tee fitting (1) to the landing gear (5), and fasten it with screws (2) (torque: 11 - 12 kgf·cm). Install the landing gear grounding part (4) to the landing gear, and fasten it with screws (2).

将脚架三通件卡件（6）安装到脚架三通件，并使用螺丝（3）紧固（力矩：11~12kgf.cm）。

Install the landing gear T-clamp (6) to the landing gear tee fitting, and tighten it with screws (3) (torque: 11 - 12 kgf·cm).

测试：

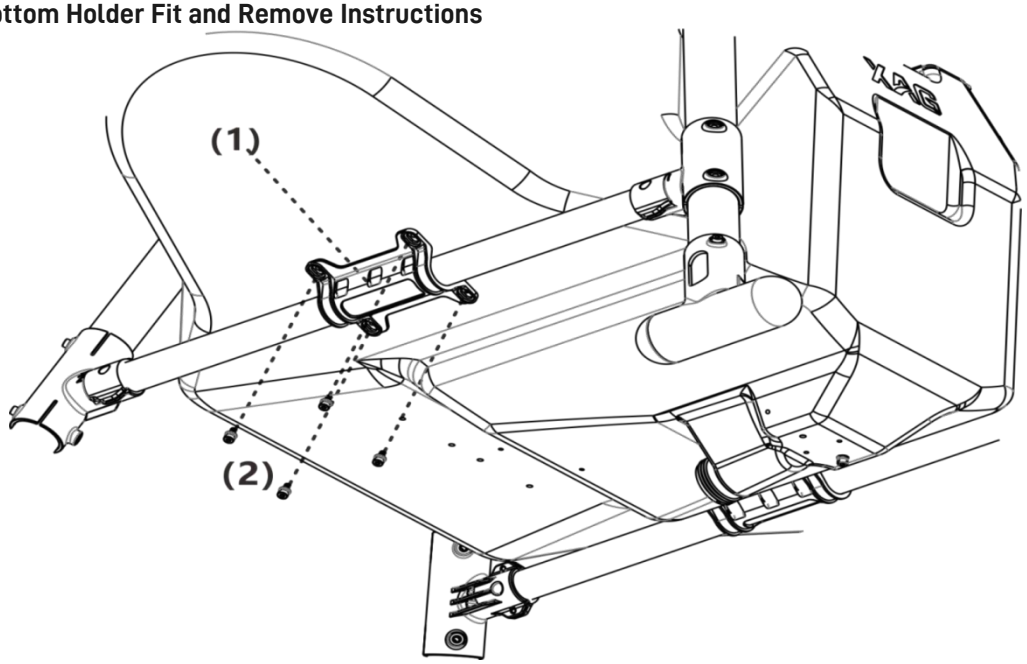
Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

药箱底部固定件拆装指引

Liquid Tank Bottom Holder Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	11~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），并取下药箱底部固定件（1）。

Remove screws (2), and remove the liquid tank bottom holder (1).

安装流程

Installation Process

将药箱底部固定件（1）安装到药箱底部上，并使用螺丝（2）紧固（力矩：11~12kgf.cm）。

Install the liquid tank bottom holder (1) to the bottom of the liquid tank, and fasten it with screws (2) (torque: 11 - 12 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜

Confirm smooth and level landing without tilting

脚架弯管拆装指引

Landing Gear Bend Pipe Fit and Remove Instructions

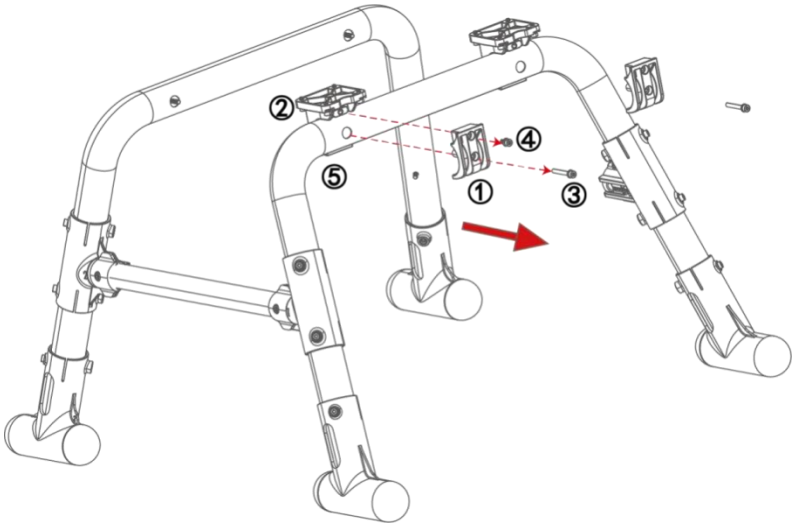


图-1

Figure 1

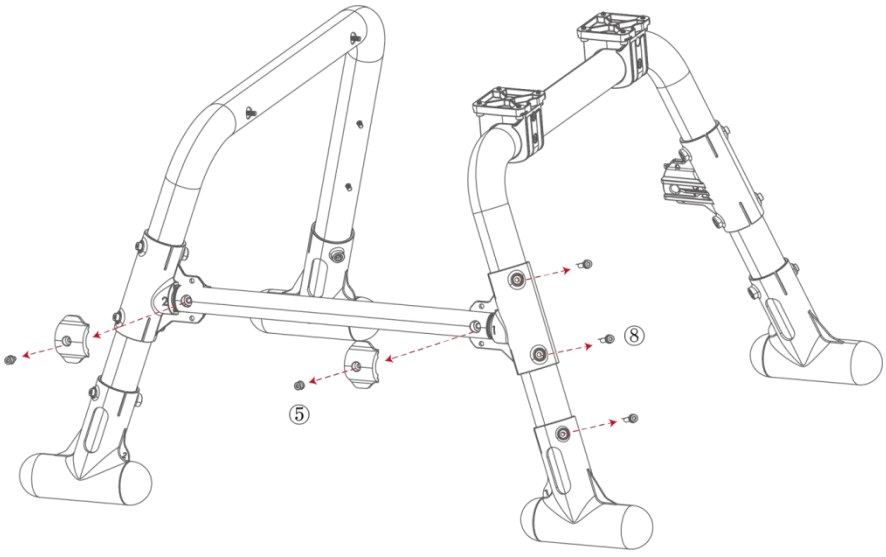


图-2

Figure 2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
③	M4*45	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	12~14kgf.cm
④	M4*8*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	12~14kgf.cm
⑤	M4*8*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	12~14kgf.cm
⑧	M4*45	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	12~14kgf.cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸螺丝③、④,并取下机身脚架固定件卡件①。

Remove screws ③ and ④, and remove the landing gear holder fastener ① of the airframe.

2.拆卸螺丝⑤,从脚架三通件⑥取下脚架三通件卡件⑦,另一端也许拆卸，并取下脚架横杆。

2. Remove screws ⑤, remove the landing gear T-clamp ⑦ from the landing gear tee fittings and also the other end, and detach the crossbar.

3.拆卸螺丝⑧,并取下脚架触地件⑨。

3. Remove screws ⑧, and remove the landing gear grounding part ⑨.

4.拆卸螺丝⑧,并从脚架管①中取下脚架三通件。

3. Remove screws ⑧, and remove the landing gear tee fitting from the landing gear ①.

安装流程

Installation Process

1.将脚架三通件⑥安装到脚架管，并使用螺丝⑩拧紧（力矩:12~14kgf.cm）。

1. Install the landing gear tee fitting ⑥ onto the landing gear, and tighten it with screws ⑩ (torque: 12~14 kgf·cm).

2.将脚架触地件⑨安装到脚架管，并使用螺丝⑧拧紧（力矩:12~14kgf.cm）。

2. Install the landing gear grounding part ⑨ to the landing gear, and tighten it with screws ⑧ (torque: 12~14 kgf·cm).

3.将脚架管①安装到机身脚架固定件②,并使用螺丝③、④拧紧（力矩:12~14kgf.cm）。

3. Install the landing gear holder ② to the landing gear ①, and tighten it with screws ③ and ④ (torque: 12~14 kgf·cm).

4.将脚架横杆安装到三通件上，使用螺丝⑤（力矩:12~14kgf.cm）将脚架三通件卡件固定在脚架三通件上。

4. Install the crossbar to the tee fitting, use screws ⑤ (torque: 12~14kgf·cm) to secure the landing gear T-clamp to the landing gear tee fitting.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

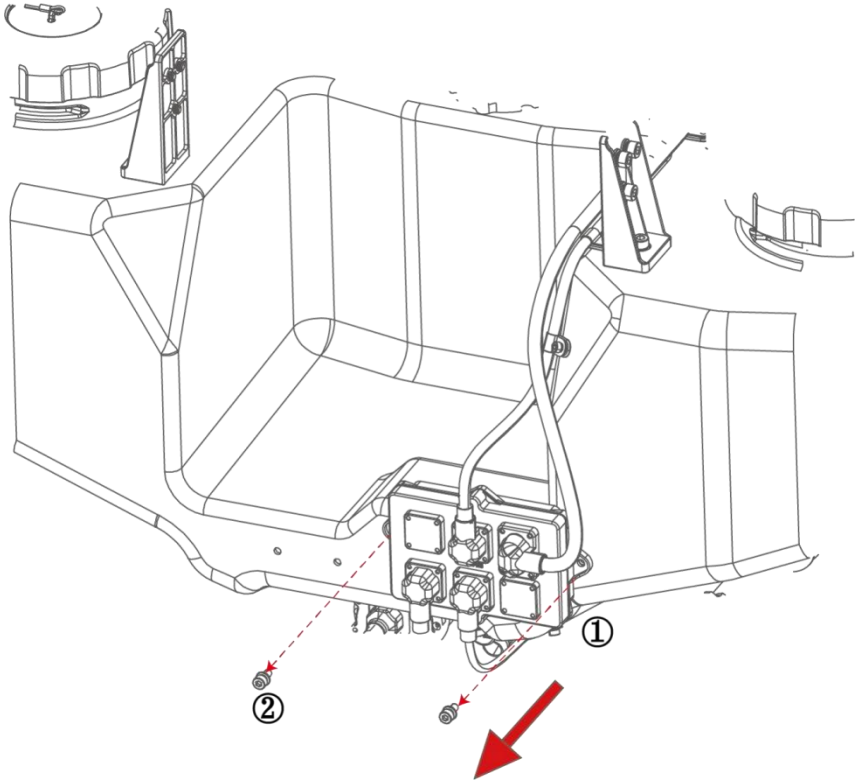
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜

Confirm smooth and level landing without tilting

负载集线板拆装指引

Load Cable Hub Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*8*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	12~14 kgf.cm

警告：拆卸前务必确保电源已关闭或电池已拔出。

Warning: Before disassembly, ensure the power is turned off or the battery is disconnected and removed.

拆卸流程

Disassembly Procedures

拆卸螺丝②,将负载集线板①从药箱上取下。注意事项:务必将所有线束都拆卸。

Remove screws ②, and remove the load cable hub ① from the liquid tank. Note: Be sure to remove all cables.

安装流程

Installation Process

将负载集线板①安装到药箱，并使用螺丝②拧紧（力矩：12~14 kgf.cm）。

Install the load cable hub ① to the liquid tank, and tighten it with screws ② (torque:12~14 kgf·cm).

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

叶轮泵工作是否正常。

Check whether the impeller pump works normally.

观察叶轮泵密封性，无渗漏现象。

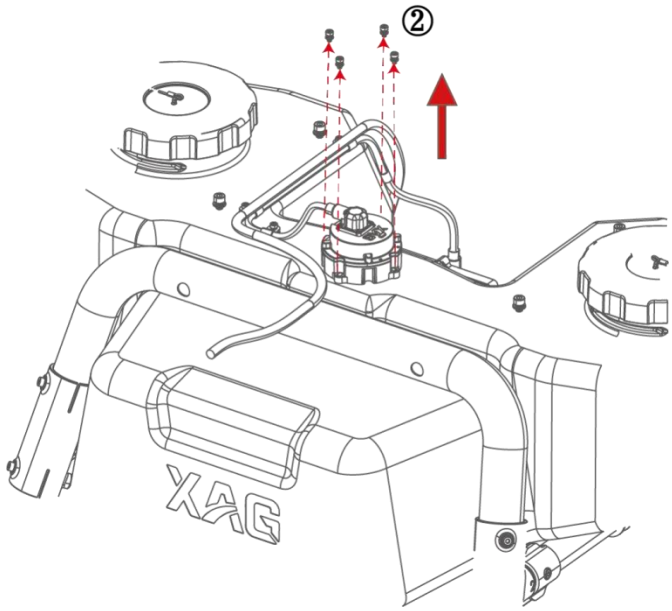
Check the sealing of the impeller pump, and confirm no leaks.

APP无负载信息故障显示。

No load breakdown information is displayed in the app.

气压计拆装指引

Barometer Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M3*10*6	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	5~6kgf.cm

警告：拆卸前务必确保电源已关闭或电池已拔出。

Warning: Before disassembly, ensure the power is turned off or the battery is disconnected and removed.

拆卸流程

Disassembly Procedures

1.拆卸螺丝②,将气压计从药箱上取下。

1. Remove screws ②, and remove the barometer from the liquid tank.

2.注意事项:务必将所有线束都拆卸。

2. Note: Be sure to remove all cables.

安装流程

Installation Process

将气压计安装到药箱，并使用螺丝②拧紧（力矩：5~6kgf.cm）。注意事项:务必将所有线束都接上。

Install the barometer to the liquid tank, and tighten it with screws ② (torque: 5~6kgf·cm). Note: Be sure to connect all cables.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。APP无气压计信息故障显示。

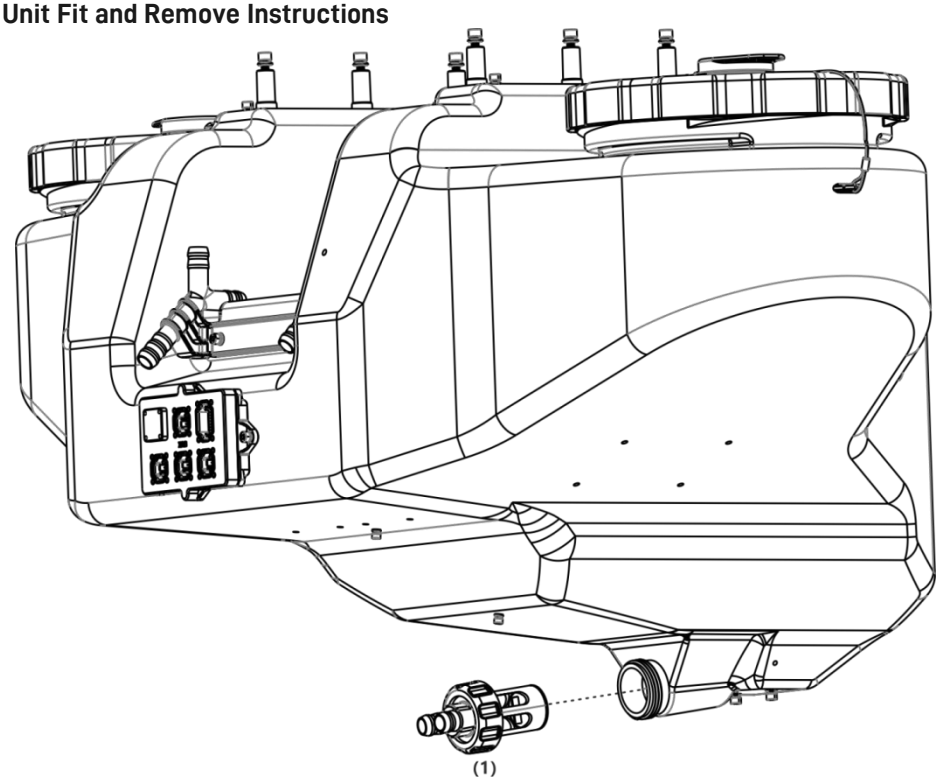
Note: Ensure the liquid tank is filled with ≥3L liquid before testing. No barometer breakdown information is displayed in the app.

喷洒测试时，无药液返航后检查是否还存在过多的药液。

During the spraying test, after RTH without liquid, check whether there is residual liquid.

药箱过滤器组件拆装指引

Liquid Tank Filter Unit Fit and Remove Instructions



警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

逆时针旋转药箱盖（1），并从药箱中取出。

Remove the liquid tank cover (1) from the liquid tank by rotating it counterclockwise.

注意事项：必须将与之相连的软管断开。

Note: The tube connected to it must be detached.

安装流程

Installation Process

将药箱过滤器组件（1）顺时针拧紧，并将软管接上使用轧带系紧。

Tighten the liquid tank filter unit (1) clockwise, connect it to the tube, and fasten it with a cable tie.

测试：

Test:

注意事项：测试前，应确保药箱装入不低于3L的液体。

Note: Ensure the liquid tank is filled with ≥3L liquid before testing.

观察药箱无渗漏。

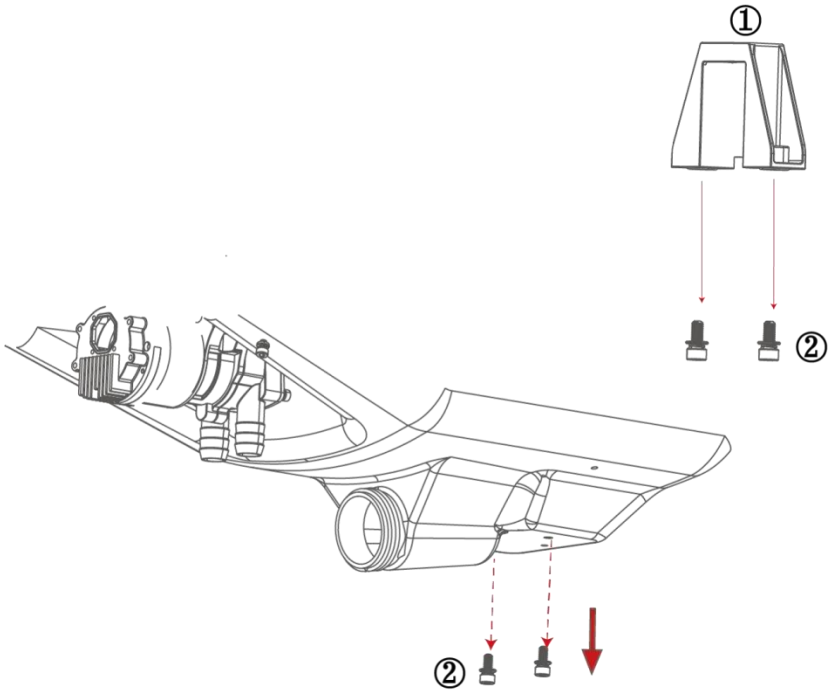
Confirm no leaks in the liquid tank.

调节雾化等级，观察雾化程度。

Adjust the atomization level and observe the atomization effect.

浮子底座拆装指引

Float Base Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*8*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	6~7kgf.cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝②,将浮子底座①从药箱内取出。

Remove screws ②, and take out the float base ① from the liquid tank.

安装流程

Installation Process

将浮子底座①安装到药箱内，并使用螺丝②拧紧（力矩：6~7kgf.cm）。注意事项：浮子底座螺丝孔位处有密封圈。

Install the float base ① into the liquid tank, and tighten it with screws ② (torque: 6~7kgf·cm). Note: A sealing ring is placed at the screw holes of the float base.

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

观察药箱无渗漏。

Confirm no leaks in the liquid tank.

调节雾化等级，观察雾化程度。

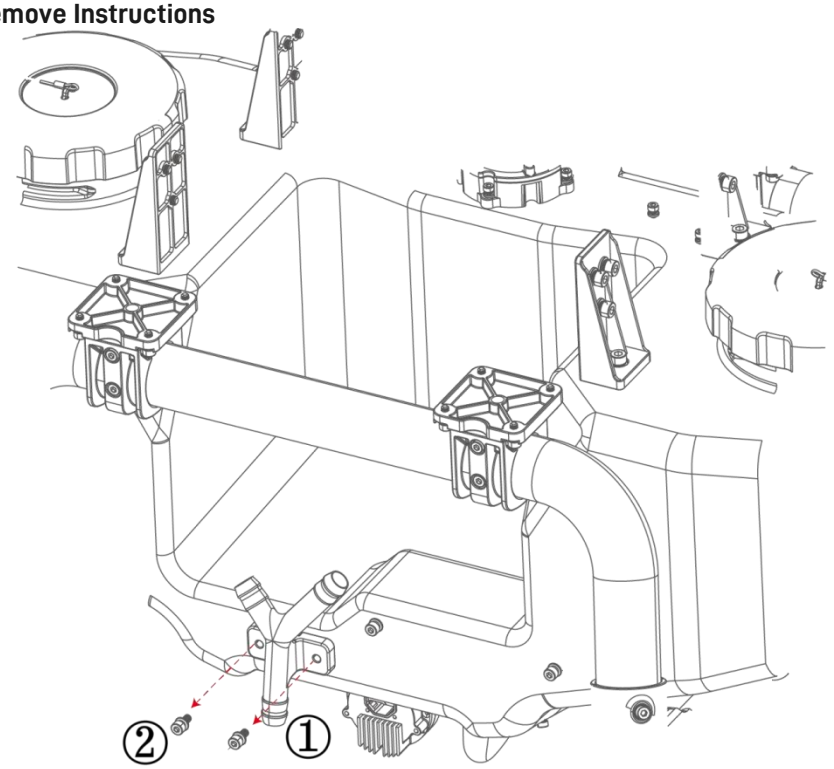
Adjust the atomization level and observe the atomization effect.

喷洒测试时，无药液返航后检查药箱实际情况，无剩余药液。

During the spraying test, after RTH without liquid, inspect the liquid tank to confirm there is no residual liquid.

三通件拆装指引

Tee Fittings Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*8*8	实际编码请查阅TIS系统 For actual codes, please refer to the TIS system	12~14kgf.cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管。

Warning: Before disassembly, disconnect the drone with the tube.

拆卸流程

Disassembly Procedures

拆卸螺丝②,将三通件①从药箱取下。

Remove screws ②, and remove the tee fitting ① from the liquid tank.

安装流程

Installation Process

将三通件①安装到药箱上，并使用螺丝②拧紧（力矩：12~14kgf.cm）。

Install the tee fitting ① to the liquid tank, and tighten it with screws ② (torque: 12~14kgf·cm).

测试：

Test:

注意事项：

Notes:

测试前，应确保药箱装入不低于3L的液体。

Ensure the liquid tank is filled with ≥3L liquid before testing.

观察三通件无渗漏。

Confirm no leaks in the tee fitting.

调节雾化等级，观察雾化程度。

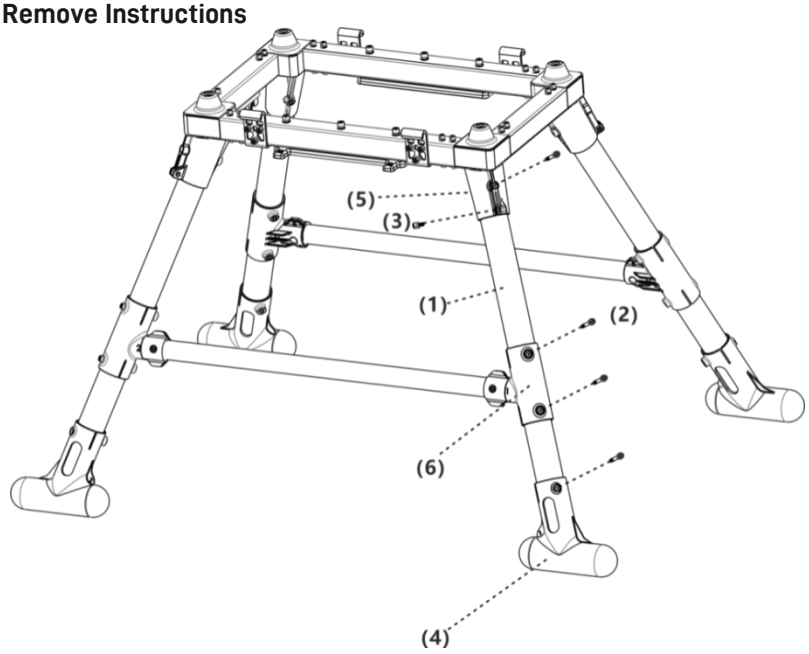
Adjust the atomization level and observe the atomization effect.

P150睿播脚架拆装程序

Removal and Installation Procedure for P150 RevoCast Landing Gear

脚架管拆装指引

Landing Gear Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement

(2)	M4*45*8	02-004-01272	11~13 kgf·cm
(3)	M4*12*8	02-004-00834	11~13 kgf·cm

注意事项：脚架三通件是有方向性，务必确保脚架三通件带数字的面朝外且与负载方管（长管）朝向一致，否则无法安装。

Note: The landing gear tee fitting is directional. Ensure the numbered face of the landing gear tee fitting faces outward and aligns with the load square tube (long tube). Incorrect orientation will prevent proper installation.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸脚架管固定螺钉（2）。

1. Remove the set screws (2) of the landing gear.

2.拆卸负载方管固定件连接件（5）的螺丝（3）。

2. Remove the screws (3) from the holder and joint piece of the load square tube (5).

3.将脚架触地件（4）从脚架管（1）上取下。

3. Remove the landing gear grounding part (4) from the landing gear (1).

4.缓慢拉扯脚架管取出。

4. Slowly pull the landing gear out.

安装流程

Installation Process

1.安装时应检查负载方管固定件连接件（5）有无变形、裂纹、破损等现象，若出现该现象应及时更换。

1. Before installation, inspect the holder and joint piece of the load square tube (5) for deformation, cracks, or damage. Replace it immediately if any defects are found.

2.将新脚架管（1）安装到负载方管固定件连接件并使用螺丝（2）（3）拧紧（力矩：11~13kgf.cm）。

2. Install the new landing gear (1) to the holder and joint piece of the load square tube. Secure it with screws (2) and (3) (torque: 11 - 13 kgf·cm).

3.使用螺丝（2）紧固脚架三通件（6）。

3. Fasten the landing gear tee fittings (6) using screws (2).

4.将脚架触地件（4）安装到脚架管中并使用螺丝（2）紧固。

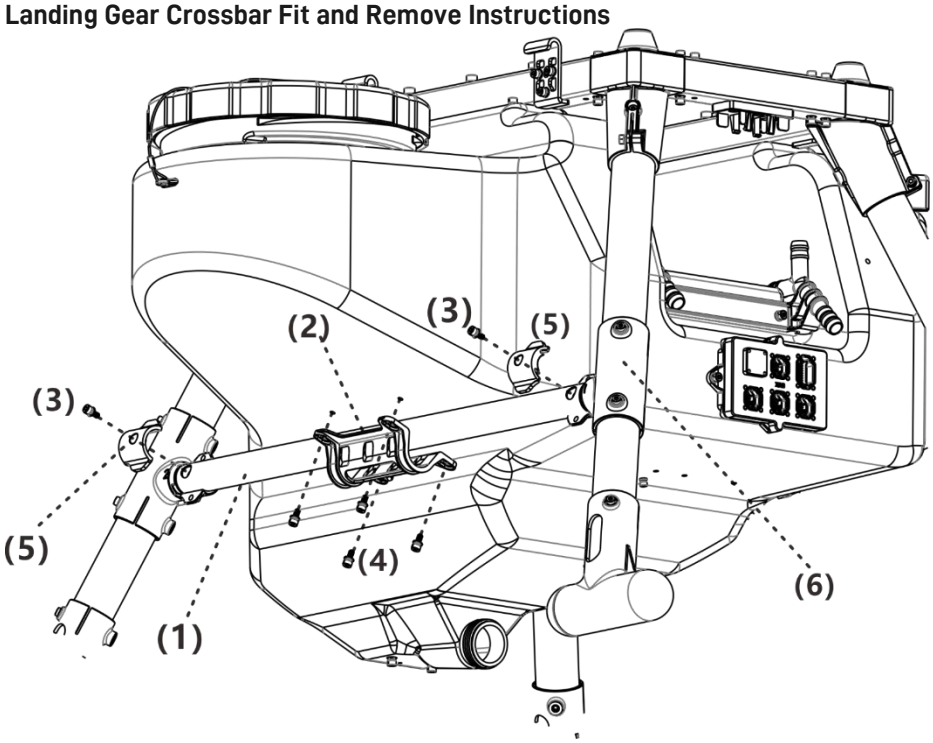
4. Install the landing gear grounding part (4) to the landing gear, and fasten it with screws (2).

测试：做悬停飞行，观察无人机飞行姿态无明显晃动。

Test: Perform a hovering flight to ensure no significant shaking of the drone.

脚架横杆拆装指引

Landing Gear Crossbar Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝（4）并取下药箱底部脚架固定件（2）。

1. Remove screws (4), and remove the landing gear holder (2) at the bottom of the liquid tank.

2.拆卸螺丝（3）并取下脚架三通卡件（5）。

2. Remove screws (3), and remove the landing gear T-clamp (5).

3.从脚架三通件（6）取下脚架横杆（1）。

3. Remove the crossbar (1) from the landing gear tee fitting (6).

安装流程

Installation Process

1.将新的脚架横杆（1）安装到脚架三通件（6）中。

1. Install the new crossbar (1) to the landing gear tee fitting (6).

2.将脚架三通卡件（5）安装到脚架横杆上，并使用螺丝（3）紧固（力矩：12~13 kgf·cm）。

2. Install the landing gear T-clamp (5) onto the crossbar, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

3.将药箱底部固定件（2）安装到药箱底部上，并使用螺丝（4）拧紧（力矩：12~13 kgf·cm）。

3. Install the bottom holder (2) of the liquid tank to the bottom of the liquid tank, and tighten it with screws (4) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

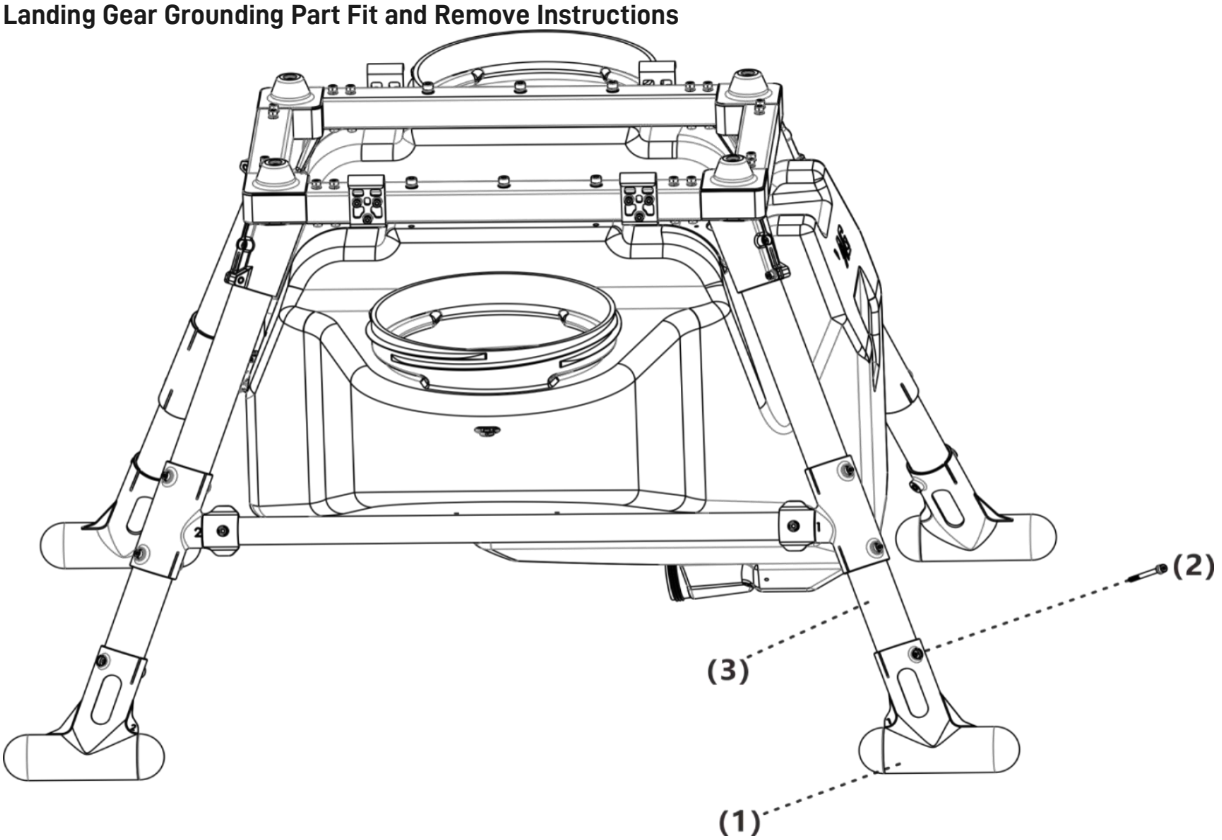
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

脚架触地件拆装指引

Landing Gear Grounding Part Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*45*8	02-004-01272	11~13 kgf·cm

注意事项：脚架触地件是有方向性，务必确保脚架触地件朝向与负载方管（长管）平行并确保定位孔一致，否则无法安装。

Note: The landing gear grounding part is directional. Place the landing gear grounding part parallel to the load square tube (long tube) and align their positioning holes. Incorrect orientation will prevent proper installation.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸脚架触地件（1）的螺丝（2）。

1. Remove screws (2) of the landing gear grounding part (1).

2.从脚架管（3）取出脚架触地件。

2. Remove the landing gear grounding part from the landing gear (3).

安装流程

Installation Process

将脚架触地件（1）安装到脚架管（3）中，并使用螺丝（2）紧固（力矩：11~13 kgf·cm）。测试：

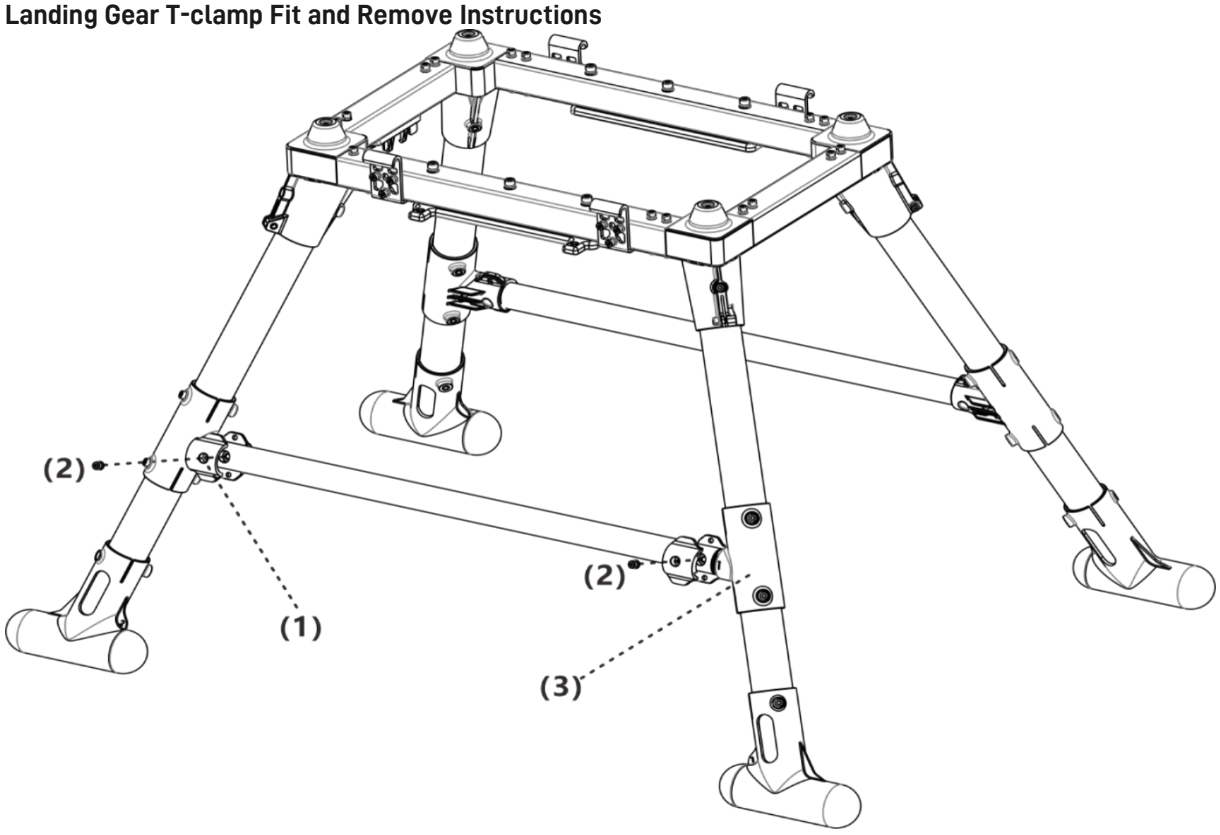
Install the landing gear grounding part (1) into the landing gear (3), and fasten it with screws (2) (torque: 11 - 13 kgf·cm). Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

脚架三通件卡件拆装指引

Landing Gear T-clamp Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从脚架三通件（3）取下脚架三通件卡件（1）。

Remove screws (2), and remove the landing gear T-clamp (1) from the landing gear tee fitting (3).

安装流程

Installation Process

将新的脚架三通件卡件（1）安装到脚架三通件（3），并使用螺丝（2）拧紧（力矩：12~13kgf.cm）。

Install the new landing gear T-clamp (1) to the landing gear tee fitting (3), and tighten it with screws (2) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

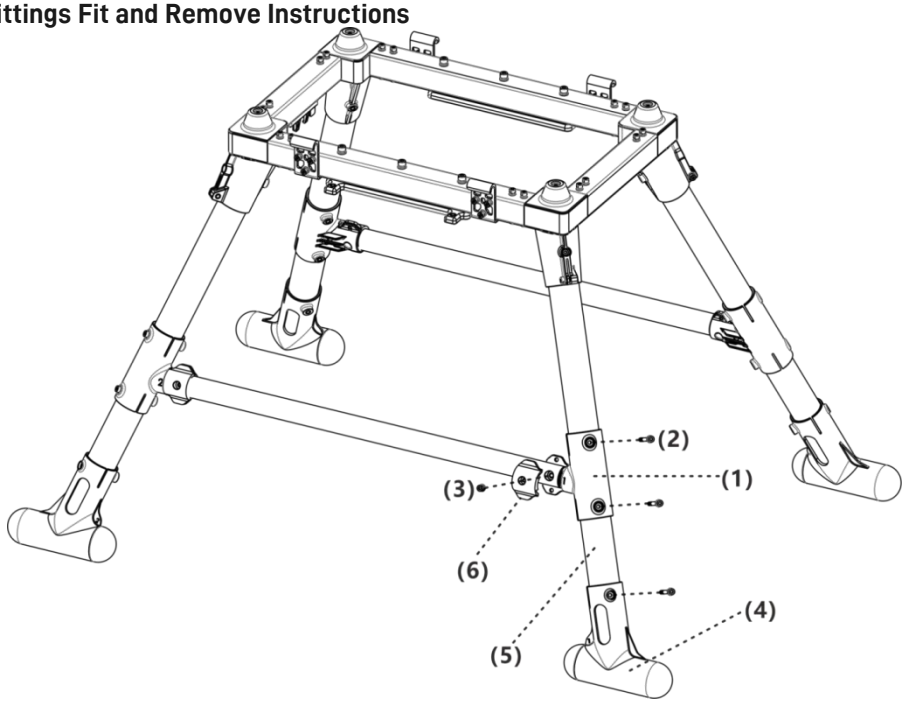
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

脚架三通件拆装指引

Landing Gear Tee Fittings Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*45*8	02-004-01272	11~13 kgf·cm
(3)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸螺丝（3）并取下脚架三通件卡件（6）。

1. Remove screws (3), and remove the landing gear T-clamp (6).

2.拆卸螺丝（2）并取下脚架触地件（4）。

2. Remove screws (2), and remove the landing gear grounding part (4).

3.拆卸螺丝（2）并从脚架管（5）中取下脚架三通件（1）。

3. Remove screws (2), and remove the landing gear tee fitting (1) from the landing gear (5).

安装流程

Installation Process

1.将新的脚架三通件（1）安装到脚架管（5），并使用螺丝（2）紧固（力矩：11~13kgf.cm）。

1. Install the new landing gear tee fitting (1) to the landing gear (5), and fasten it with screws (2) (torque: 11 - 13 kgf·cm).

2.将脚架触地件（4）安装到脚架管，并使用螺丝（2）紧固。

2. Install the landing gear grounding part (4) to the landing gear, and fasten it with screws (2).

3.将脚架三通件卡件（6）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13kgf.cm）。

3. Install the landing gear T-clamp (6) to the landing gear tee fitting, and tighten it with screws (3) (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

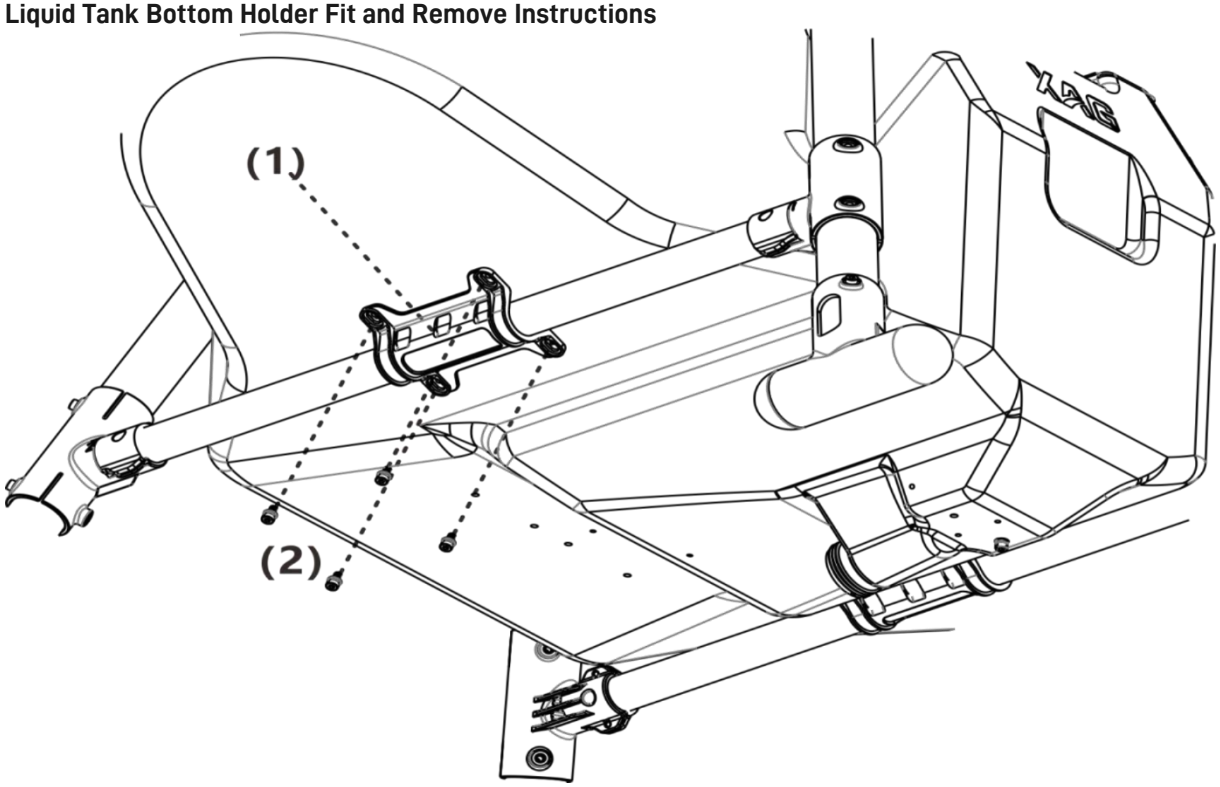
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

药箱底部固定件拆装指引

Liquid Tank Bottom Holder Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），并取下药箱底部固定件（1）。

Remove screws (2), and remove the liquid tank bottom holder (1).

安装流程

Installation Process

将药箱底部固定件（1）安装到药箱底部上，并使用螺丝（2）紧固（力矩：11~12kgf.cm）。

Install the liquid tank bottom holder (1) to the bottom of the liquid tank, and fasten it with screws (2) (torque: 11 - 12 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

料箱脚架固定内嵌件拆装指引

Granule Container Landing Gear Holder Insert Fit and Remove Instructions

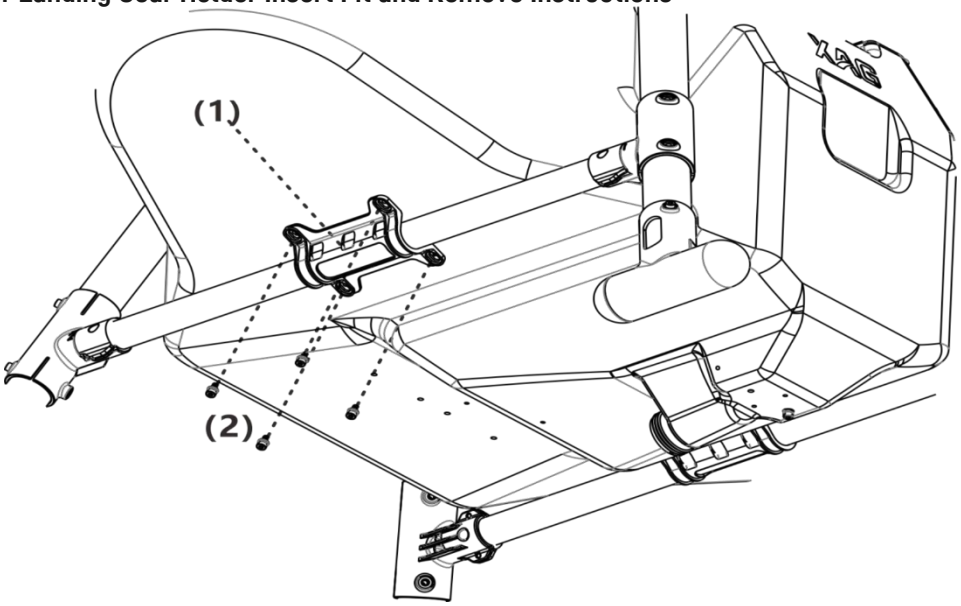


图-1

Figure 1

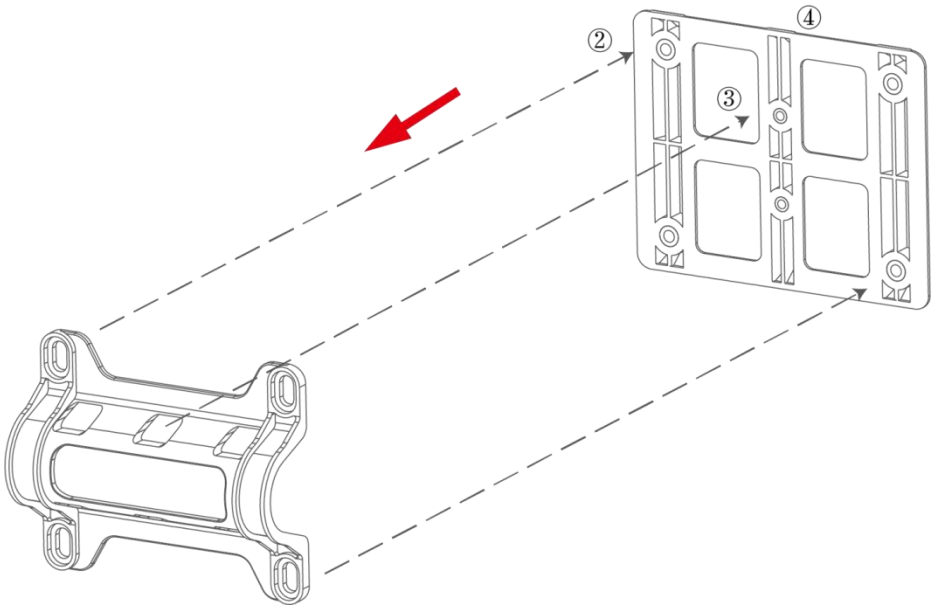


图-2

Figure 2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	12~13 kgf·cm
(3)	M3*10*6	02-004-00624	5~6 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸螺丝（2），并取下药箱底部固定件（1）。

1. Remove screws (2), and remove the liquid tank bottom holder (1).

2.拆卸螺丝（3），并从料箱内部取出料箱脚架固定内嵌件（4）。

2. Remove screws (3), and remove the granule container landing gear holder insert (4) inside the granule container.

安装流程

Installation Process

1.将料箱脚架固定内嵌件（4）安装到料箱内，并使用螺丝（3）紧固（力矩：5~6 kgf·cm）。

1. Install the granule container landing gear holder insert (4) to the granule container, and tighten it with screws (3) (torque: 5 - 6 kgf·cm).

2.将药箱底部固定件（1）安装到药箱底部上，并使用螺丝（2）紧固（力矩：12~13 kgf·cm）。

2. Install the liquid tank bottom holder (1) to the bottom of the liquid tank, and fasten it with screws (2) (torque: 12 - 13 kgf·cm).

测试：

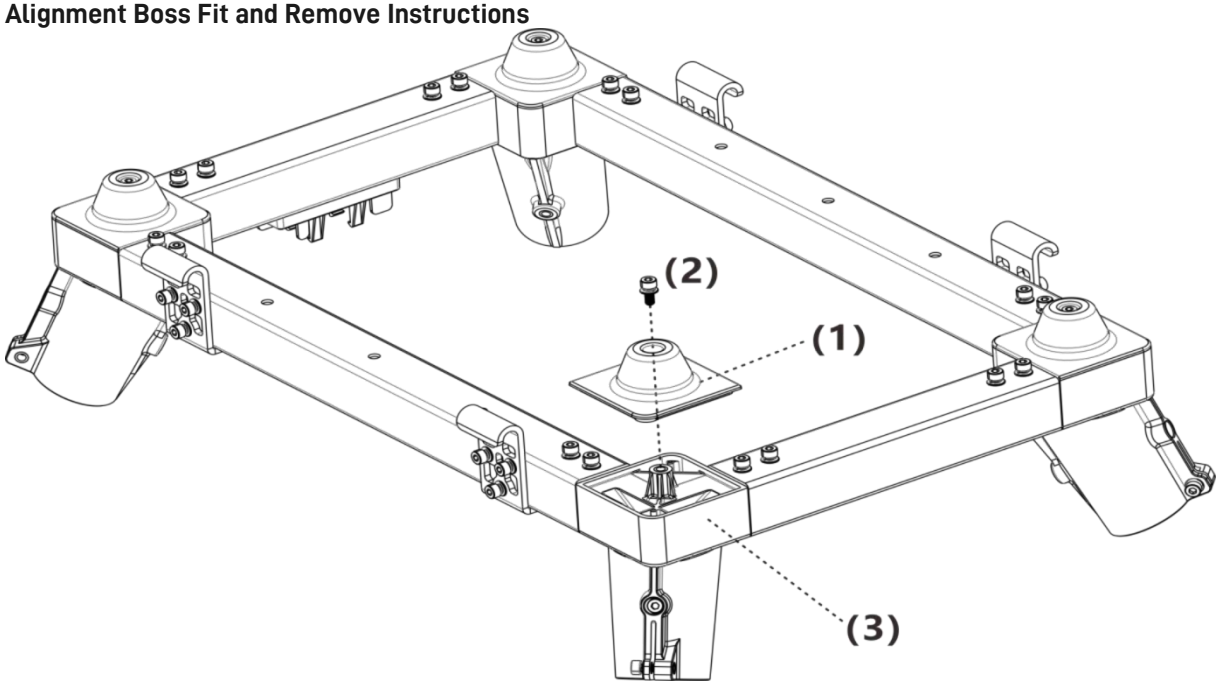
Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

负载凸点件拆装指引

Alignment Boss Fit and Remove Instructions



螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	11~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从负载管连接件（3）取出负载凸点件（1）。

Remove screws (2), and take out the alignment boss (1) from the load tube joint piece (3).

安装流程

Installation Process

将新的负载凸点件（1）安装到负载管连接件（3），并使用螺丝（2）拧紧（力矩：11~13kgf.cm）。

Install the new alignment boss (1) to the load tube joint piece (3), and tighten it with screws (2) (torque: 11 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

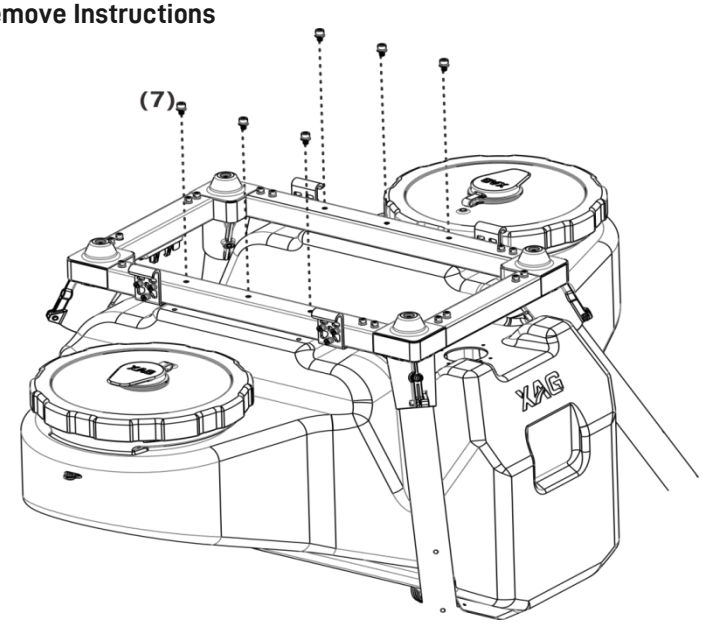
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

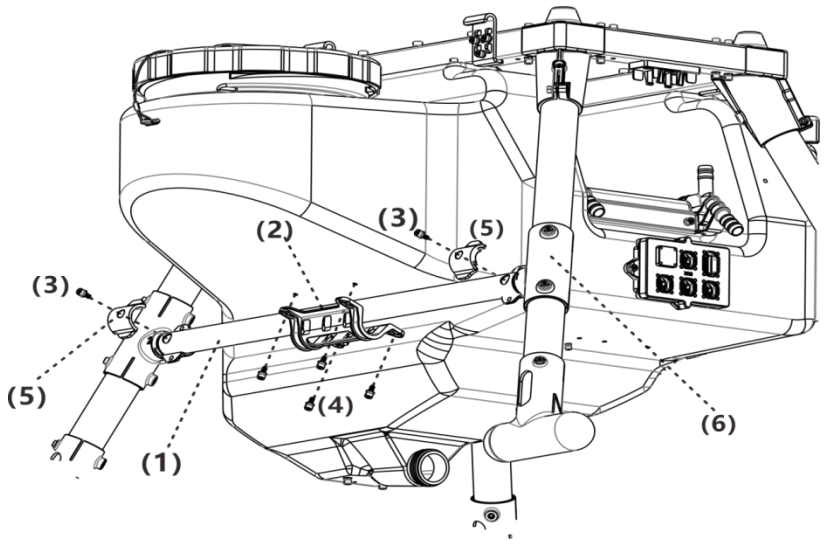
短负载管拆装指引

Short Load Tube Fit and Remove Instructions



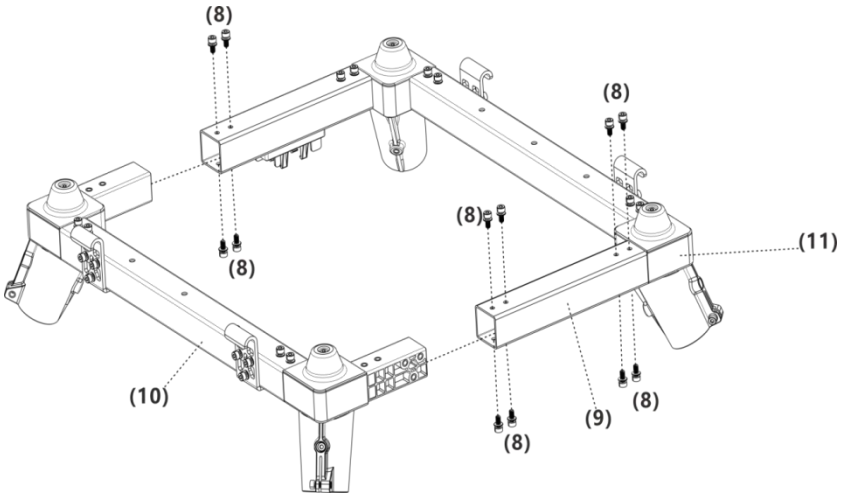
短负载管-1

Short load tube -1



短负载管-2

Short load tube -2



短负载管-3

Short load tube -3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm
(7)	M5*10*10	02-004-00747	30~31 kgf·cm
(8)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸长负载管的螺丝（7）。

1. Remove screws (7) of the long load tube.

2.将药箱翻转后，拆卸螺丝（4）并取下药箱底部固定件（2）。

2. Turn over the liquid tank, remove screws (4), and remove the liquid tank bottom holder (2).

3.拆卸螺丝（3）并取下脚架三通卡件（5）。

3. Remove screws (3), and remove the landing gear T-clamp (5).

4.从脚架三通件（6）中取下脚架横杆（1）。注意事项：必须把药箱两侧的脚架横杆都拆卸

4. Remove the crossbar (1) from the landing gear tee fitting (6). Note: The crossbars on both sides of the liquid tank must be removed.

5.拆卸螺丝（8），缓慢拉长负载管（10）使之与短负载管（9）分离。

5. Remove screws (8), and slowly stretch the long load tube (10) to separate it from the short load tube (9).

6.取下短负载管。

6. Remove the short load tube.

安装流程

Installation Process

1.将新的短负载管（9）安装到负载管连接件（11）。

1. Install the new short load tube (9) to the load tube joint piece (11).

2.将长负载管（10）安装到短负载管中，并使用螺丝（8）拧紧（力矩：12~13 kgf·cm）。

2.Install the long load tube (10) to the short load tube, and tighten it with screws (8) (torque: 12 - 13 kgf·cm).

3.翻转脚架，将药箱与长负载管限位孔对准。

3. Turn over the landing gear, and align the liquid tank with the holes of the long load tube.

4.将脚架横杆（1）安装到脚架三通件（6）中。

4. Install the crossbar (1) into the landing gear tee fitting (6).

5.将脚架三通卡件（5）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13 kgf·cm）。

5. Install the landing gear T-clamp (5) to the landing gear tee fitting, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

6.将药箱固定件（2）使用螺丝（4）紧固（力矩：12~13 kgf·cm）。

6. Tighten the liquid tank holder (2) with screws (4) (torque: 12 - 13 kgf·cm).

7.再次翻转脚架，使用螺丝（7）紧固（力矩：30~31kgf.cm）药箱内嵌件。

7. Turn over the landing gear again, and fasten the liquid tank insert with screws (7) (torque: 30 - 31 kgf·cm).

注意事项：若螺丝（7）对不准长负载管限位孔，将药箱盖取下，用手掰动药箱内嵌件对准限位孔。

Note: If the screws (7) are not aligned with the holes of the long load tube, remove the liquid tank cover, and move the liquid tank insert by hand to align it with the holes.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。

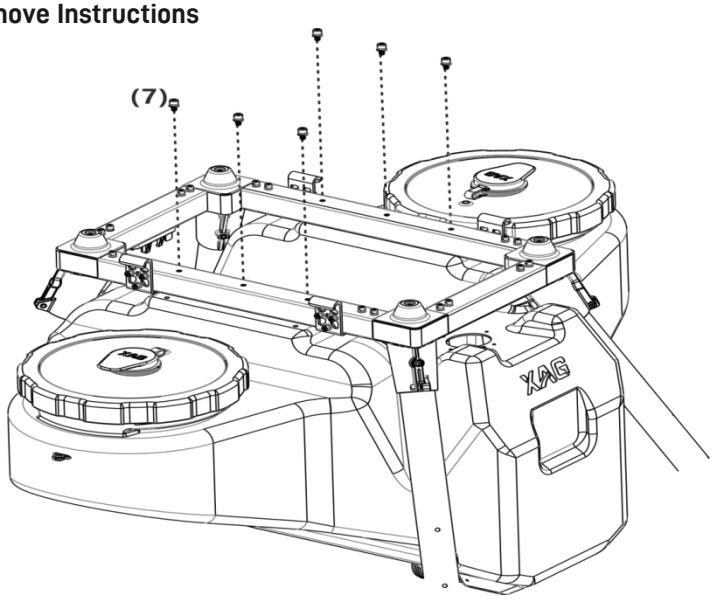
Perform a hovering flight to ensure no significant shaking of the drone.

降落平稳触底，无倾斜。

Confirm smooth and level landing without tilting.

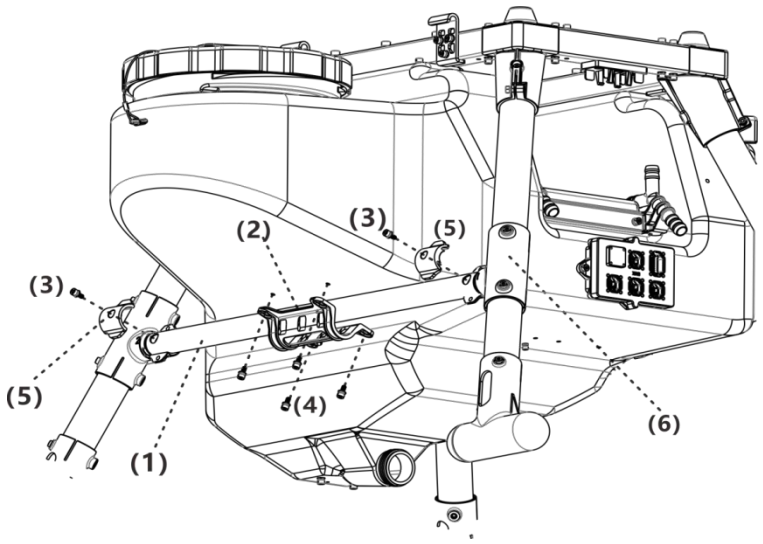
长负载管拆装指引

Long Load Tube Fit and Remove Instructions



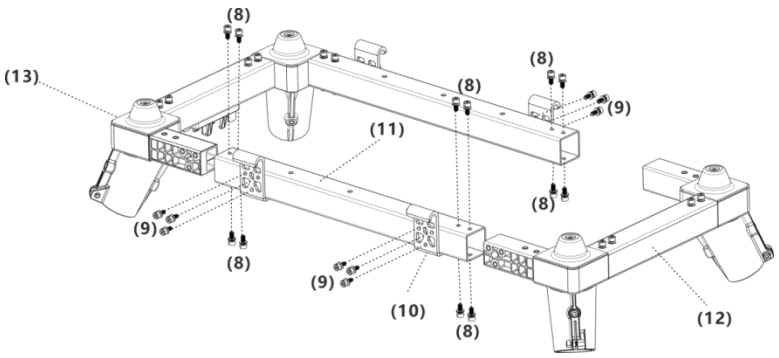
长负载管-1

Long load tube -1



长负载管-2

Long load tube -2



长负载管-3

Long load tube -3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm
(7)	M5*10*10	02-004-00747	30~31 kgf·cm
(8)	M4*12*8	02-004-00834	12~13 kgf·cm
(9)	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸长负载管的螺丝（7）。

1. Remove screws (7) of the long load tube.

2.将药箱翻转后，拆卸螺丝（4）并取下药箱底部固定件（2）。

2. Turn over the liquid tank, remove screws (4), and remove the liquid tank bottom holder (2).

3.拆卸螺丝（3）并取下脚架三通卡件（5）。

3. Remove screws (3), and remove the landing gear T-clamp (5).

4.从脚架三通件（6）中取下脚架横杆（1）。

4. Remove the crossbar (1) from the landing gear tee fitting (6).

注意事项：必须把药箱两侧的脚架横杆都拆卸

Note: The crossbars on both sides of the liquid tank must be removed.

5.拆卸螺丝（8）。

5. Remove screws (8).

6.拆卸螺丝（9）并取下负载挂钩（10）。

6. Remove screws (9), and remove the load hook (10).

7.缓慢拉短负载管（12）使之与长负载管（11）分离。

7. Slowly pull the short load tube (12) to separate it from the long load tube (11).

8.从负载管连接件（13）取下长负载管。

8. Remove the long load tube from the load tube joint piece (13).

安装流程

Installation Process

1.将新的长负载管（11）安装到负载管连接件（13）。

1. Install the new long load tube (11) to the load tube joint piece (13).

2.将短负载管（12）安装到长负载管中。

2. Install the short load tube (12) to the long load tube.

3.使用螺丝（8）拧紧（力矩：12~13 kgf·cm）。

3. Tighten it with screws (8) (torque: 12 - 13 kgf·cm).

4.将负载挂钩（10）安装到长负载管，并使用螺丝（9）拧紧（力矩：12~13 kgf·cm）。注意事项：负载挂钩螺丝务必拧紧。

4. Install the load hook (10) to the long load tube, and tighten it with screws (9) (torque: 12 - 13 kgf·cm). Note: The load hook screws must be tightened.

5.翻转脚架，将药箱与长负载管限位孔对准。

5. Turn over the landing gear, and align the liquid tank with the holes of the long load tube.

6.将脚架横杆（1）安装到脚架三通件（6）中。

6. Install the crossbar (1) into the landing gear tee fitting (6).

7.将脚架三通卡件（5）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13 kgf·cm）。

7. Install the landing gear T-clamp (5) to the landing gear tee fitting, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

8.将药箱固定件（2）使用螺丝（4）紧固（力矩：12~13 kgf·cm）。

8. Tighten the liquid tank holder (2) with screws (4) (torque: 12 - 13 kgf·cm).

9.再次翻转脚架，使用螺丝（7）紧固（力矩：30~31kgf.cm）药箱内嵌件。

9. Turn the landing gear over again, and fasten the liquid tank insert with screws (7) (torque: 30 - 31 kgf·cm).

10.注意事项：若螺丝（7）对不准长负载管限位孔，将药箱盖取下，用手掰动药箱内嵌件对准限位孔。

10. Note: If the screws (7) are not aligned with the holes of the long load tube, remove the liquid tank cover, and move the liquid tank insert by hand to align it with the holes.

测试：

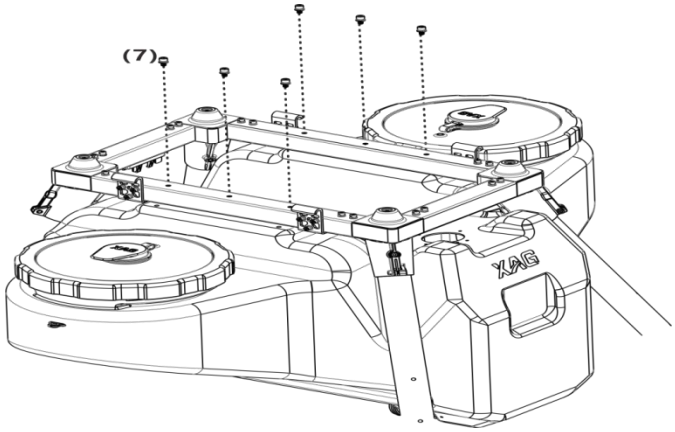
Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

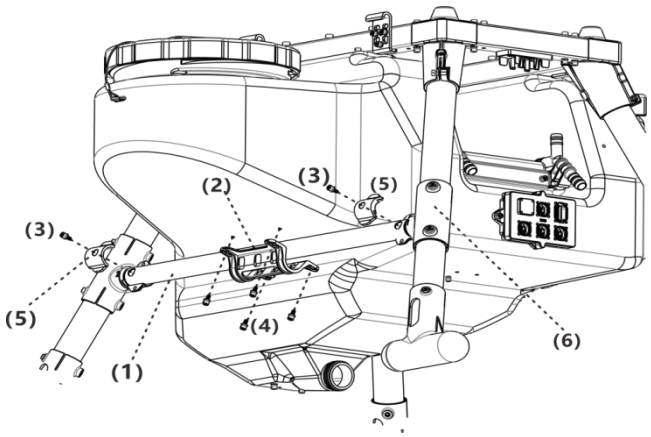
负载管连接件拆装指引

Load Tube Joint Piece Fit and Remove Instructions



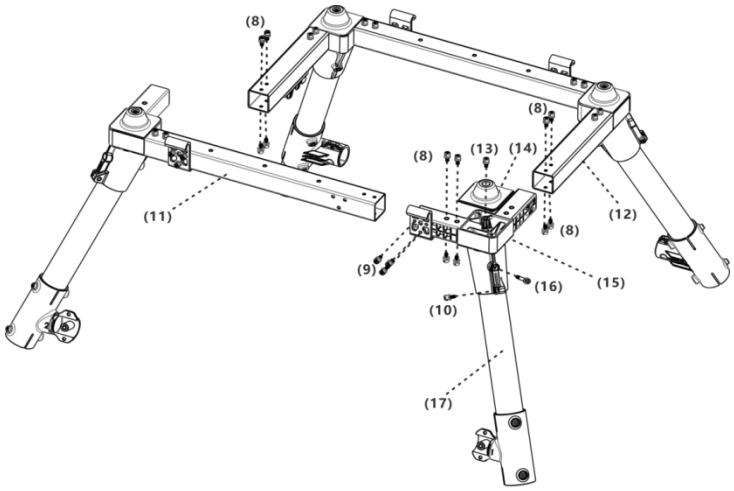
负载管连接件-1

Load tube joint piece -1



负载管连接件-2

Load tube joint piece -2



负载管连接件-3

Load tube joint piece -3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(3)	M4*12*8	02-004-00834	12~13 kgf·cm
(4)	M4*12*8	02-004-00834	12~13 kgf·cm
(7)	M5*10*10	02-004-00747	30~31 kgf·cm
(8)	M4*12*8	02-004-00834	12~13 kgf·cm
(9)	M4*12*8	02-004-00834	12~13 kgf·cm

(10)	M4*12*8	02-004-00834	11~13 kgf·cm
(13)	M4*12*8	02-004-00834	11~13 kgf·cm
(16)	M4*45*8	02-004-01272	11~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸长负载管的螺丝（7）。

1. Remove screws (7) of the long load tube.

2.将药箱翻转后，拆卸螺丝（4）并取下药箱底部固定件（2）。

2. Turn over the liquid tank, remove screws (4), and remove the liquid tank bottom holder (2).

3.拆卸螺丝（3）并取下脚架三通卡件（5）。

3. Remove screws (3), and remove the landing gear T-clamp (5).

4.从脚架三通件（6）中取下脚架横杆（1）。注意事项：必须把药箱两侧的脚架横杆都拆卸。

4. Remove the crossbar (1) from the landing gear tee fitting (6). Note: The crossbars on both sides of the liquid tank must be removed.

5.拆卸螺丝（8）。

5. Remove screws (8).

6.拆卸螺丝（13）并取出负载凸点件（14）。

6. Remove screws (13), and take out the alignment boss (14).

7.拆卸螺丝（9）并取下负载挂扣。

7. Remove screws (9), and remove the load hasp.

8.拆卸螺丝（10）（16）。

8. Remove screws (10) (16).

9.缓慢拉长负载管（11）使之与短负载管（12）分离。

9. Slowly stretch the long load tube (11) to separate it from the short load tube (12).

10.从脚架管（17）取下负载管连接件（15）。

10. Remove the load tube joint piece (15) from the landing gear (17).

安装流程

Installation Process

1.将新的负载管连接件（15）安装到脚架管（17）。

1. Install the new load tube joint piece (15) to the landing gear (17).

2.将负载管连接件与长负载管（11）和短负载管（12）连接，使用螺丝（8）拧紧（力矩：12~13 kgf·cm）。

2. Connect the load tube joint piece with the long load tube (11) and the short load tube (12), and tighten them with screws (8) (torque: 12 - 13 kgf·cm).

3.使用螺丝（10）（16）紧固（力矩：11~12kgf.cm）负载管连接件。

3. Use screws (10) (16) to fasten the load tube joint piece (torque: 11 - 12 kgf·cm).

4.将负载对接件凸点件（14）安装到负载管连接件，并使用螺丝（13）紧固（力矩：11~12kgf.cm）。

4. Install the load alignment boss (14) to the load tube joint piece, and fasten it with screws (13) (torque: 11 - 12 kgf·cm).

5.使用螺丝（9）（力矩：12~13 kgf·cm）将负载挂钩安装到长负载管中并紧固。注意事项：负载挂钩螺丝务必拧紧。

5. Use and tighten screws (9) (torque: 12 - 13 kgf·cm) to install the load hook to the long load tube. Note: The load hook screws must be tightened.

6.翻转脚架，将药箱与长负载管限位孔对准。

6. Turn over the landing gear, and align the liquid tank with the holes of the long load tube.

7.将脚架横杆（1）安装到脚架三通件（6）中。

7. Install the crossbar (1) into the landing gear tee fitting (6).

8.将脚架三通卡件（5）安装到脚架三通件，并使用螺丝（3）紧固（力矩：12~13 kgf·cm）。

8. Install the landing gear T-clamp (5) to the landing gear tee fitting, and fasten it with screws (3) (torque: 12 - 13 kgf·cm).

9.将药箱固定件（2）使用螺丝（4）紧固（力矩：12~13 kgf·cm）。

9. Tighten the liquid tank holder (2) with screws (4) (torque: 12 - 13 kgf·cm).

10.再次翻转脚架，使用螺丝（7）紧固（力矩：30~31kgf.cm）药箱内嵌件。

10. Turn the landing gear over again, and fasten the liquid tank insert with screws (7) (torque: 30 - 31 kgf·cm).

注意事项：若螺丝（7）对不准长负载管限位孔，将药箱盖取下，用手掰动药箱内嵌件对准限位孔。

Note: If the screws (7) are not aligned with the holes of the long load tube, remove the liquid tank cover, and move the liquid tank insert by hand to align it with the holes.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

负载挂钩拆装指引

Load Hook Fit and Remove Instructions

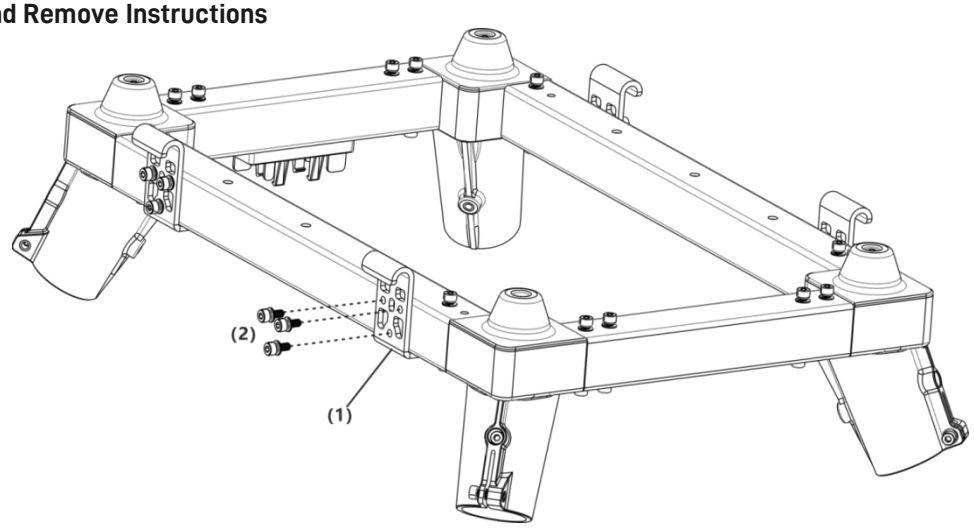


图-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	12~13 kgf·cm

注意事项：拆卸负载挂钩时，需将机臂完全展开，并且将搭扣解除预位。

Note: When removing the load hook, fully extend the arm and unfasten the hasp.

拆卸流程

Disassembly Procedures

拆卸螺丝（2）并将负载挂钩（1）取下。

Remove screws (2), and remove the load hook (1).

安装流程

Installation Process

将新的负载挂钩（1）安装到长负载管，并使用螺丝（2）拧紧（力矩：12~13kgf.cm）。注意事项：负载挂钩螺丝务必拧紧。

Install a new load hook (1) to the long load tube, and tighten it with screws (2) (torque: 12 - 13 kgf·cm). Note: The load hook screws must be tightened.

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

负载连接线接头卡件拆装指引

Load Connecting Cable Connector Fastener Fit and Remove Instructions

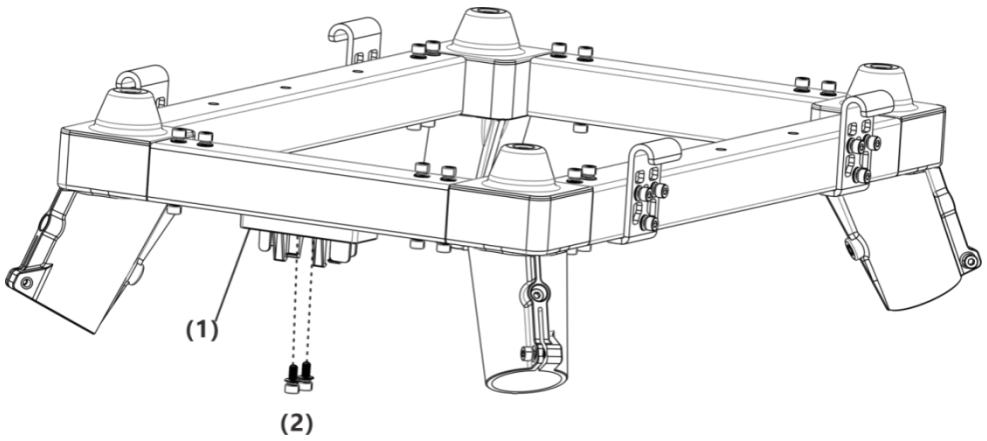


图-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M4*12*8	02-004-00834	11~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝（2），从短负载管取下负载连接线接头卡件（1）。

Remove screws (2), and remove the connector fastener of the load connecting cable (1) from the short load tube.

安装流程

Installation Process

将新的负载连接线接头卡件（1）安装到短负载管，并使用螺丝（2）拧紧（力矩：11~13kgf.cm）。

Install the new connector fastener of the load connecting cable (1) to the short load tube, and tighten it with screws (2) (torque: 11 - 13 kgf. cm).

测试：

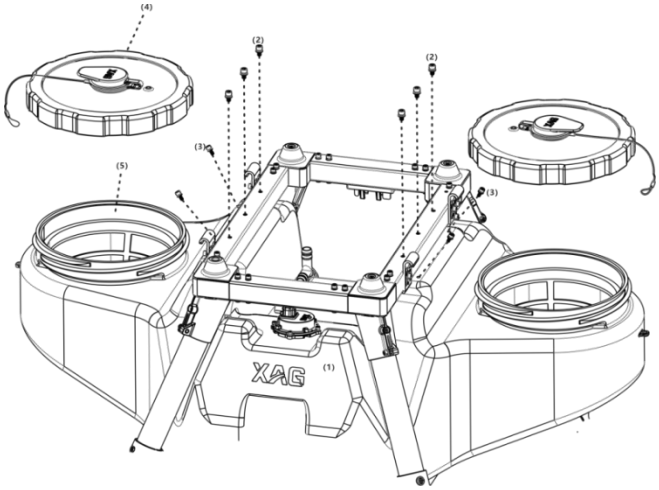
Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

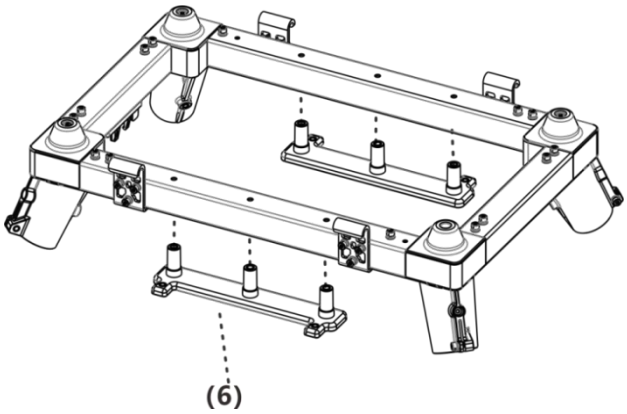
药箱内嵌件拆装指引

Liquid Tank Insert Fit and Remove Instructions



药箱内嵌件-1

Liquid tank insert -1



药箱内嵌件-2

Liquid tank insert -2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
(2)	M5*10*10	02-004-00747	30~31 kgf·cm
(3)	M4*8*8	02-004-00618	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.逆时针旋转药箱盖（4），并从药箱（1）中去下。

1. Rotate the liquid tank cover (4) counterclockwise, and remove it from the liquid tank (1).

2.将药箱滤网（5）取出。

2. Take out the liquid tank filter (5).

3.移除螺丝（2）（3）。

3. Remove screws (2) (3).

4.从药药箱底部内取出药箱底部内嵌件（6）及密封圈。

4. Take out the liquid tank bottom insert (6) and sealing ring at the bottom of the liquid tank.

安装流程

Installation Process

1.将密封圈套入药箱底部内嵌件（6）中，并安装到药箱（1）内。

1. Insert the sealing ring into the liquid tank bottom insert (6), and install it into the liquid tank (1).

2.使用螺丝（2）（力矩：30~31kgf.cm），螺丝（3）（力矩：12~13kgf.cm）拧紧药箱底部固定件。

2. Use screws (2) (torque: 30 - 31 kgf·cm) and screws (3) (torque: 12 - 13 kgf·cm) to tighten the liquid tank bottom holder.

3.将药箱滤网安装到药箱进药孔处。

3. Install the liquid tank filter to the liquid tank inlet.

4.顺指针拧紧药箱盖。测试：

4. Tighten the liquid tank cover clockwise. Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

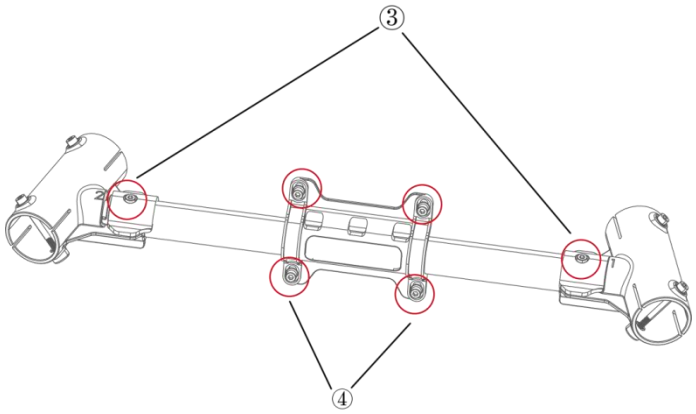
Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

P60睿播脚架拆装程序

Removal and Installation Procedure for P60 RevoCast Landing Gear

脚架横杆拆装指引

Landing Gear Crossbar Fit and Remove Instructions



图片-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
③	M4*12*8	02-004-00834	12~13 kgf·cm
④	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

1.拆卸螺丝④并取下药箱底部脚架固定件。

1. Remove screws ④, and remove the landing gear holder at the bottom of the liquid tank.

2.拆卸螺丝③并取下脚架三通卡件。

2. Remove screws ③, and remove the landing gear T-clamp.

安装流程

Installation Process

1.将新的脚架横杆安装到脚架三通件中。

1. Install the new crossbar to the landing gear tee fitting.

2.将脚架三通卡件安装到脚架横杆，并使用螺丝③紧固（力矩：12~13 kgf·cm）。

2. Install the landing gear T-clamp onto the crossbar, and fasten it with screws ③ (torque: 12 - 13 kgf·cm).

3.将药箱底部固定件安装到药箱底部上，并使用螺丝④拧紧（力矩：12~13 kgf·cm）。

3. Install the bottom holder of the liquid tank to the bottom of the liquid tank, and tighten it with screws ④ (torque: 12 - 13 kgf·cm).

测试：

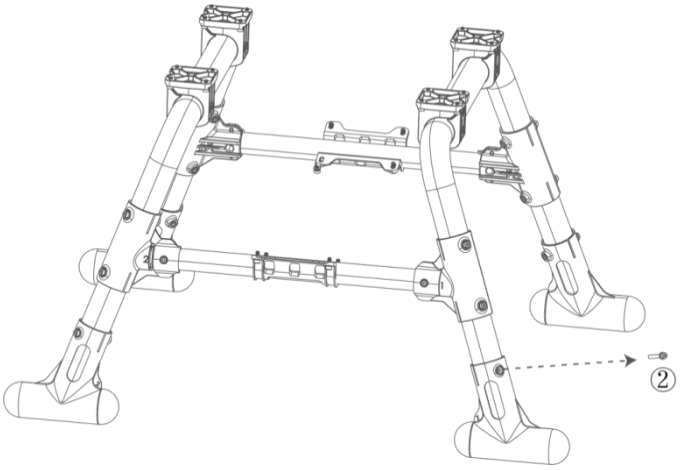
Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

脚架触地件拆装指引

Landing Gear Grounding Part Fit and Remove Instructions



图片-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*45*8	02-004-01272	11~13 kgf·cm

注意事项：脚架触地件是有方向性，务必确保脚架触地件朝向与负载方管（长管）平行并确保定位孔一致，否则无法安装。

Note: The landing gear grounding part is directional. Place the landing gear grounding part parallel to the load square tube (long tube) and align their positioning holes. Incorrect orientation will prevent proper installation.

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸脚架触地件的螺丝②。

1. Remove screws ② of the landing gear grounding part.

2.从脚架管取出脚架触地件。

2. Remove the landing gear grounding part from the landing gear.

安装流程

Installation Process

将脚架触地件安装到脚架管中，并使用螺丝②紧固（力矩：11~13 kgf·cm）。

Install the landing gear grounding part onto the landing gear, and fasten it with screws ② (torque: 11 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

脚架三通件卡件拆装指引

Landing Gear T-clamp Fit and Remove Instructions

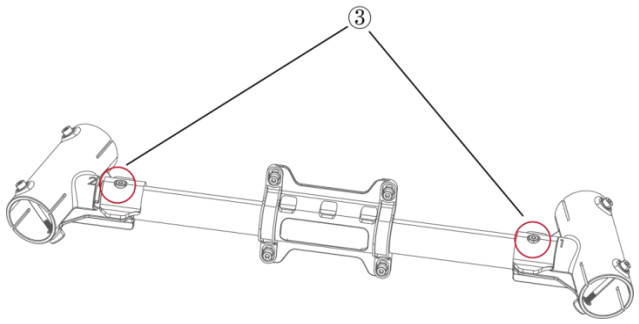


图-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
③	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸前应佩戴胶手套或线手套，由于存在残留药液具有腐蚀、有害物质危害人身健康安全。

Warning: Wear rubber gloves or cotton gloves before disassembly, as the residual liquid with corrosive and harmful substances may endanger personal health and safety.

拆卸流程

Disassembly Procedures

拆卸螺丝③,从脚架三通件取下脚架三通件卡件。

Remove screws ③, and remove the landing gear T-clamp from the landing gear tee fitting.

安装流程

Installation Process

将新的脚架三通件卡件安装到脚架三通件，并使用螺丝③拧紧（力矩：12~13kgf.cm）。

Install the new landing gear T-clamp to the landing gear tee fitting, and tighten it with screws ③ (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

脚架三通件拆装指引

Landing Gear Tee Fittings Fit and Remove Instructions

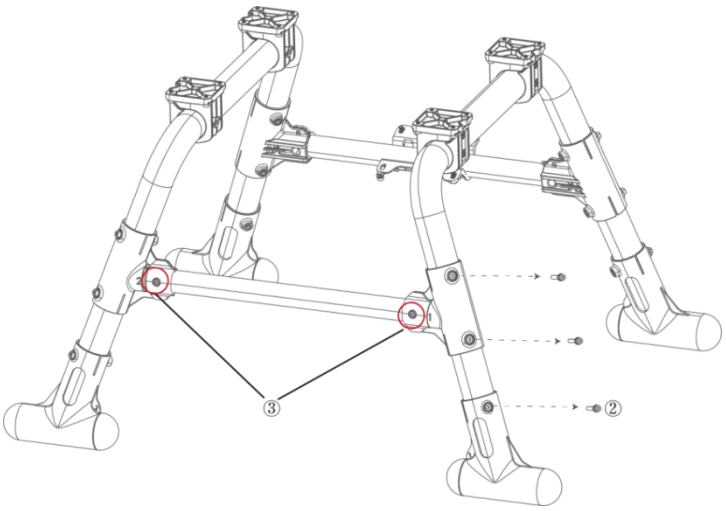


图-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*45*8	02-004-01272	12~13 kgf·cm
③	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸螺丝③并取下脚架三通件卡件。

1. Remove screws ③, and remove the landing gear T-clamp.

2.拆卸螺丝②并取下脚架触地件。

2. Remove screws ②, and remove the landing gear grounding part.

3.拆卸螺丝②并从脚架管中取下脚架三通件。

3. Remove screws ②, and remove the landing gear tee fitting from the landing gear.

安装流程

Installation Process

1.将新的脚架三通件安装到脚架管，并使用螺丝②紧固（力矩：12~13 kgf·cm）。

1. Install the new landing gear tee fitting onto the landing gear, and fasten it with screws ② (torque: 12 - 13 kgf·cm).

2.将脚架触地件安装到脚架管，并使用螺丝②紧固。

2. Install the landing gear grounding part to the landing gear, and fasten it with screws ②.

3.将脚架三通件卡件安装到脚架三通件，并使用螺丝③紧固（力矩：12~13 kgf·cm）。

3. Install the landing gear T-clamp onto the landing gear tee fitting, and fasten it with screws ③ (torque: 12 - 13 kgf·cm).

测试：

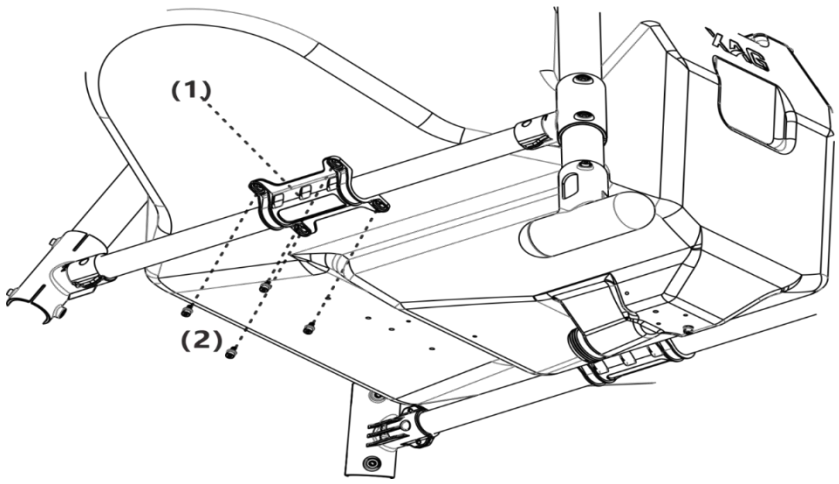
Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

料箱底部固定件拆装指引

Granule Container Bottom Holder Fit and Remove Instructions



图片-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*12*8	02-004-00834	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

拆卸螺丝②,并取下药箱底部固定件①。

Remove screws ②, and remove the liquid tank bottom holder ①.

安装流程

Installation Process

将料箱底部固定件①安装到料箱底部上，并使用螺丝②紧固（力矩：12~13 kgf·cm）。测试：

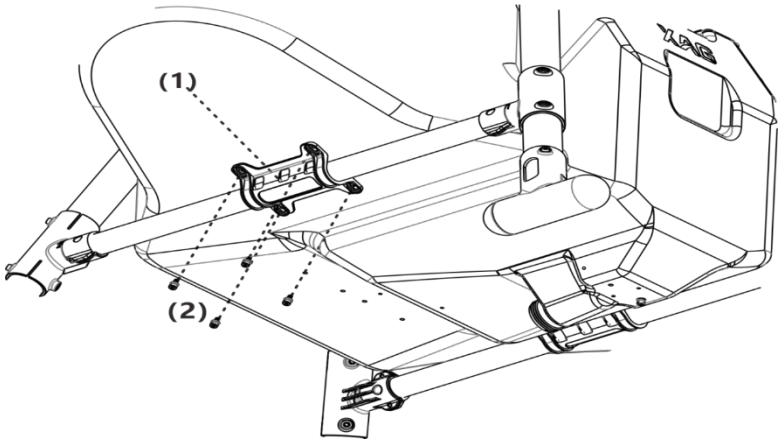
Install the bottom holder ① of the granule container to the bottom of the granule container, and tighten it with screws ② (torque: 12 - 13 kgf·cm). Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

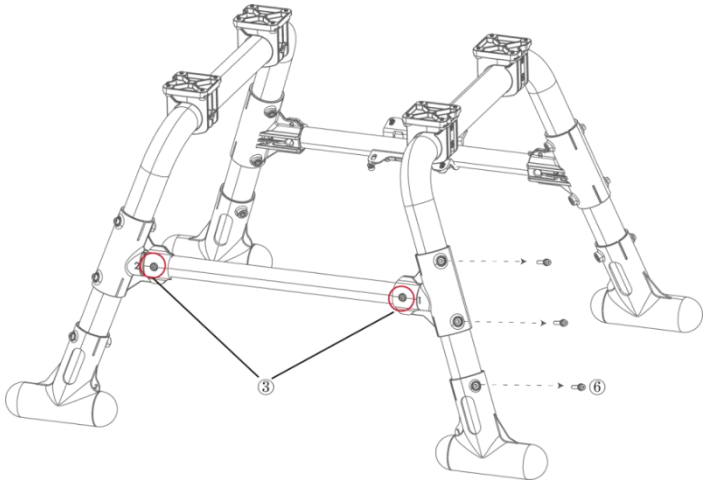
脚架弯管拆装指引

Landing Gear Bend Tube Fit and Remove Instructions



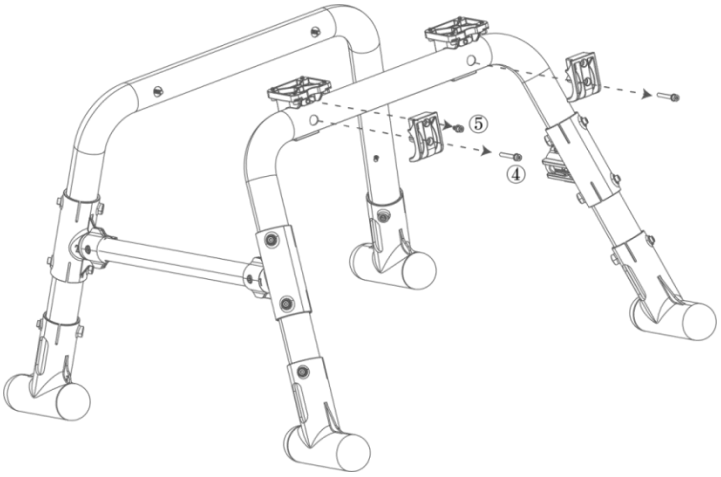
图片-1

Figure 1



图片-1

Figure 1



图片-2

Figure 2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 S/N	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*12*8	02-004-00834	12~13 kgf·cm
③	M4*12*8	02-004-00834	12~13 kgf·cm
④	M4*40*8	02-004-00982	12~14 kgf·cm
⑤	M4*8*8	02-004-00618	12~14 kgf·cm
⑥	M4*45*8	02-004-01272	12~13 kgf·cm

警告：拆卸之前，务必将飞行平台及与之相连的软管、执行系统线组断开并取下飞行平台，防止拆装过程中由于机体不稳造成意外部件损坏。

Warning: Before disassembly, disconnect all tubes and payload system cables from the drone, and then remove the drone, to prevent accidental component damage due to drone instability during fit and remove process.

拆卸流程

Disassembly Procedures

1.拆卸螺丝④⑤,将机身脚架固定件卡件取下。

1. Remove screws ④ and ⑤, and remove the landing gear holder fastener of the airframe.

2.拆卸螺丝②,并取下药箱底部固定件

2. Remove screws ②, and remove the liquid tank bottom holder.

3.拆卸螺丝③,将脚架横杆取下。

3. Remove screws ③, and remove the crossbar.

4.拆卸螺丝⑥,将三通件及触地件取下。

4. Remove screws ⑥, and remove the tee fitting and the grounding part.

安装流程

Installation Process

1.将三通件及触地件安装到脚架弯管，并使用螺丝⑥拧紧（力矩：12~13 kgf·cm）。

1. Install the tee fitting and the grounding part onto the landing gear bend pipe, and fasten it with screws ⑥ (torque: 12 - 13 kgf·cm).

2.将脚架弯管安装到脚架机身脚架固定件，并使用螺丝④（力矩：12~14 kgf·cm）,⑤（力矩：12~14 kgf·cm），将机身脚架固定件卡件紧固。

2. Install the landing gear bend pipe onto the landing gear holder on the airframe, and fasten it with screws ④ (torque: 12 - 14 kgf·cm) and ⑤ (torque: 12 - 14 kgf·cm), to secure the landing gear holder fastener on the airframe.

3.将脚架横杆安装到三通件，并使用螺丝③拧紧（力矩：12~13 kgf·cm）。

3. Install the crossbar onto the tee fitting, and fasten it with screws ③ (torque: 12 - 13 kgf·cm).

4.将药箱底部固定件安装到药箱底部上，并使用螺丝②紧固（力矩：12~13 kgf·cm）。

4. Install the bottom holder of the liquid tank to the bottom of the liquid tank, and tighten it with screws ② (torque: 12 - 13 kgf·cm).

测试：

Test:

做悬停飞行，观察无人机飞行姿态无明显晃动。降落平稳触底，无倾斜。

Perform a hovering flight to ensure no significant shaking of the drone. Confirm smooth and level landing without tilting.

P150/P60播撒器模块拆装程序

Assembly and Disassembly Procedure for P150/P60 Spreader Module

睿播主框组拆装指引

RevoCast Main Frame Removal/Installation Instructions

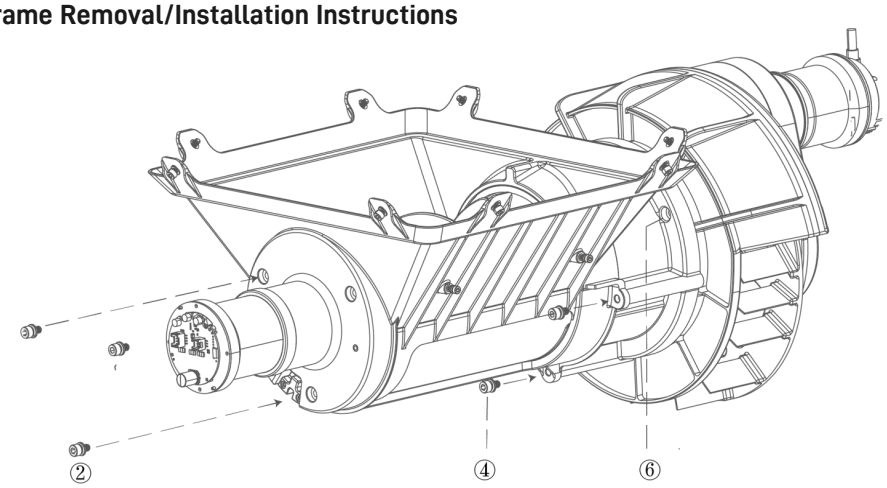


图-1

Figure 1

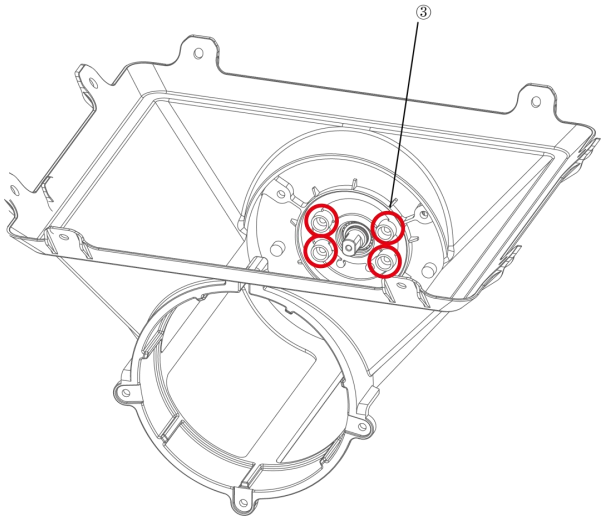


图-2

Figure 2

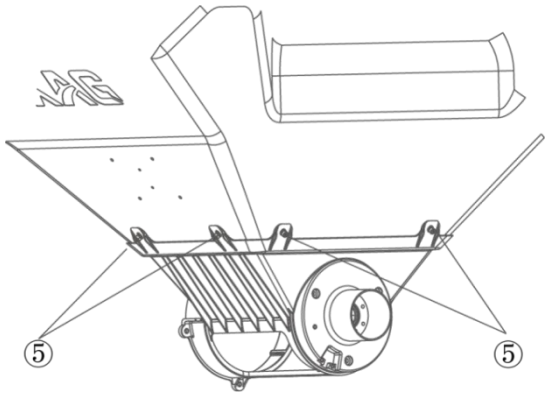


图-3

Figure 3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M5*12	02-004-00670	18~19 kgf·cm
③	M4*12*8	02-004-00834	14~15 kgf·cm
④	M5*10*10	02-004-00747	18~19 kgf·cm
⑤	M5*12	02-004-00670	14~16 kgf·cm
⑥	M5*12	02-004-00670	18~19 kgf·cm

拆卸流程

Removal Procedures

1.拆卸绞龙电机侧的螺丝②,再拆卸螺丝④⑥,将甩盘电机从上料筒中取出。

1. Remove screws ② on the screw feeder motor side, then remove screws ④ ⑥, and take out the spread disc motor from the feeder shell.

2.注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

2. Note: Before disassembly, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

3.拆卸螺丝③,并将绞龙电机从睿播主框上取出。

3. Remove screws ③, and take the screw feeder motor out of the RevoCast main frame.

4.注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

4. Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

5.拆卸睿播主框螺丝⑤,将睿播主框从料箱取下

5. Remove the RevoCast main frame screws ⑤, and remove the RevoCast main frame from the granule container.

安装流程

Installation Process

1.将睿播主框安装到料箱上，并使用螺丝⑤拧紧（力矩：14~16 kgf·cm）。

1. Install the RevoCast main frame to the granule container, and tighten it with screws ⑤ (torque: 14 - 16 kgf·cm).

2.将绞龙电机安装到睿播主框，并使用螺丝③拧紧（力矩：14~15 kgf·cm）。

2. Install the screw feeder motor to the RevoCast main frame, and tighten it with screws ③ (torque: 14 - 15 kgf·cm).

3.将甩盘电机安装到睿播主框，并使用螺丝②（力矩：18~19 kgf·cm），螺丝④（力矩：18~19 kgf·cm），螺丝⑥（力矩：18~19 kgf·cm）拧紧。

3. Install the spread disc motor to the RevoCast main frame, and tighten it with screws ② (torque: 18 - 19 kgf·cm), ④ (torque: 18 - 19 kgf·cm) and ⑥ (torque: 18 - 19 kgf·cm).

注意：安装完电机后，应检查所有线束已全部接回原位。

Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

绞龙电机拆装指引

Screw Feeder Motor Removal/Installation Instructions

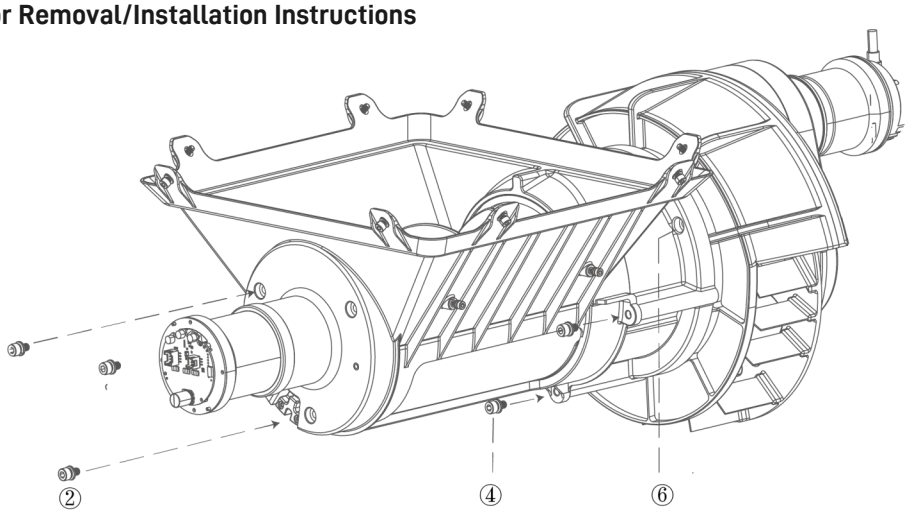


图-1

Figure 1

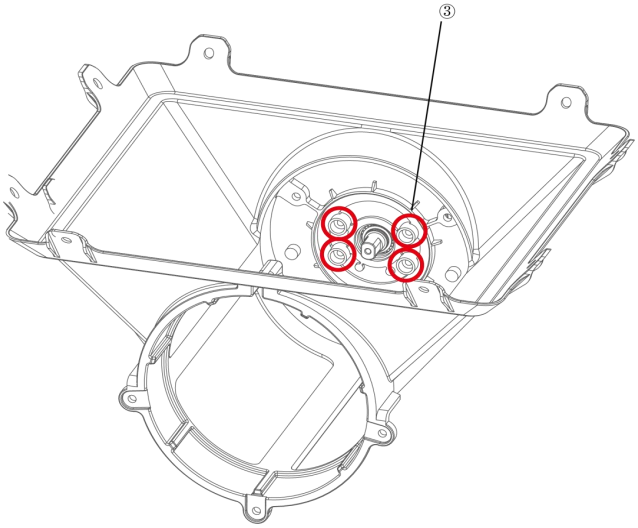


图-2

Figure 2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M5*12	02-004-00670	18~19 kgf·cm

③	M4*12*8	02-004-00834	14~15 kgf·cm
④	M5*10*10	02-004-00747	18~19 kgf·cm
⑥	M5*12	02-004-00670	18~19 kgf·cm

拆卸流程

Removal Procedures

1.拆卸绞龙电机侧的螺丝②,再拆卸螺丝④⑥,将甩盘电机从上料筒中取出。

1. Remove screws ② on the screw feeder motor side, then remove screws ④ ⑥, and take out the spread disc motor from the feeder shell.

注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

2.拆卸螺丝③,并将绞龙电机从睿播主框上取出。

2. Remove screws ③, and take the screw feeder motor out of the RevoCast main frame.

3.注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

3. Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

安装流程

Installation Process

1.将绞龙电机安装到睿播主框，并使用螺丝③拧紧（力矩：14~15 kgf·cm）。

1. Install the screw feeder motor to the RevoCast main frame, and tighten it with screws ③ (torque: 14 - 15 kgf·cm).

2.将甩盘电机安装到睿播主框，并使用螺丝②（力矩：18~19 kgf·cm），螺丝④（力矩：18~19 kgf·cm），螺丝⑥（力矩：18~19 kgf·cm）拧紧。

2. Install the spread disc motor to the RevoCast main frame, and tighten it with screws ② (torque: 18 - 19 kgf·cm), ④ (torque: 18 - 19 kgf·cm) and ⑥ (torque: 18 - 19 kgf·cm).

注意：安装完电机后，应检查所有线束已全部接回原位。测试：

Note: After motor installation, verify that all cables have been connected back to their original positions. Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

上料筒拆装指引

Feeder Shell Removal/Installation Instructions

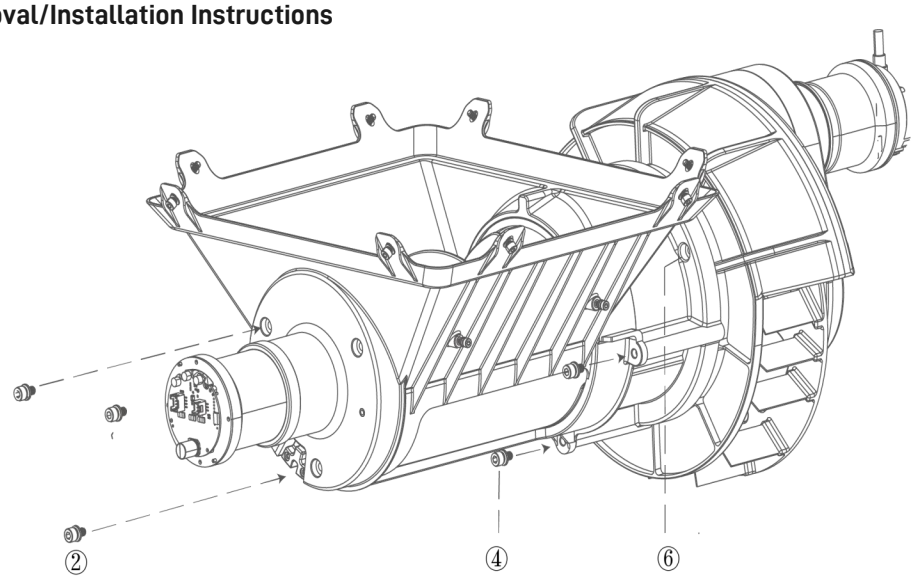


图-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M5*12	02-004-00670	18~19 kgf·cm
④	M5*10*10	02-004-00747	18~19 kgf·cm
⑥	M5*12	02-004-00670	18~19 kgf·cm

拆卸流程

Removal Procedures

1.拆卸绞龙电机侧的螺丝②④,将甩盘电机从上料筒中取出。

1. Remove screws ② and ④ on the screw feeder motor side, and take out the spread disc motor from the feeder shell.

注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

2.拆卸螺丝⑥,并将上料筒从绞龙端出料固定盖取下。

2. Remove screws ⑥, and remove the feeder shell from the discharge cover at the screw feeder end.

安装流程

Installation Process

1.将上料筒安装到绞龙端出料固定盖，并使用螺丝④⑥拧紧（力矩:18~19 kgf·cm）。

1. Install the feeder shell to the discharge cover at the screw feeder end, and tighten it with screws ④ and ⑥ (torque: 18 - 19 kgf·cm).

2.将甩盘电机安装到睿播主框，并使用螺丝②拧紧（力矩：18~19 kgf·cm）。注意：安装完电机后，应检查所有线束已全部接回原位。

2. Install the spread disc motor to the RevoCast main frame, and tighten it with screws ② (torque: 18 - 19 kgf·cm). Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

绞龙拆装指引

Screw Feeder Removal/Installation Instructions

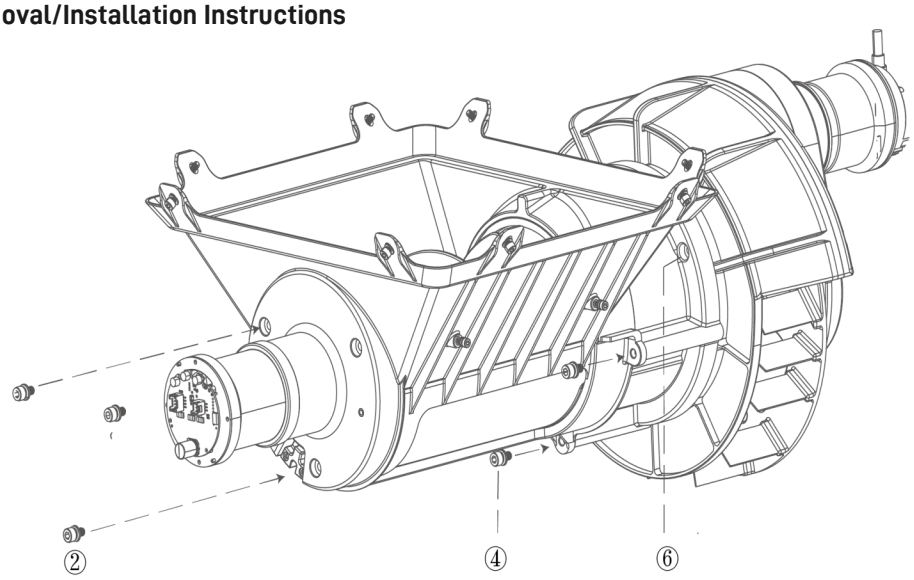


图-1

Figure 1

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement

②	M5*12	02-004-00670	18~19 kgf·cm
④	M5*10*10	02-004-00747	18~19 kgf·cm
⑥	M5*12	02-004-00670	18~19 kgf·cm

拆卸流程

Removal Procedures

1.拆卸绞龙电机侧的螺丝②④,将甩盘电机从上料筒中取出。

1. Remove screws ② and ④ on the screw feeder motor side, and take out the spread disc motor from the feeder shell.

注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

2.拆卸螺丝⑥,并将上料筒和绞龙从绞龙端出料固定盖取下。

2. Remove screws ⑥, and remove the feeder shell and screw feeder from the discharge cover at the screw feeder end.

安装流程

Installation Process

1.将绞龙和上料筒安装到绞龙端出料固定盖，并使用螺丝⑥拧紧（力矩:18~19 kgf·cm）。

1. Install the screw feeder and feeder shell to the discharge cover on the screw feeder end, and tighten it with screws ⑥ (torque: 18 - 19 kgf·cm).

2.将甩盘电机安装到睿播主框，并使用螺丝②④拧紧（力矩：18~19 kgf·cm）。注意：安装完电机后，应检查所有线束已全部接回原位。

2. Install the spread disc motor to the RevoCast main frame, and tighten it with screws ② and ④ (torque: 18 - 19 kgf·cm). Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

绞龙端出料固定盖拆装指引

Screw Feeder-End Discharge Cover Removal/Installation Instructions

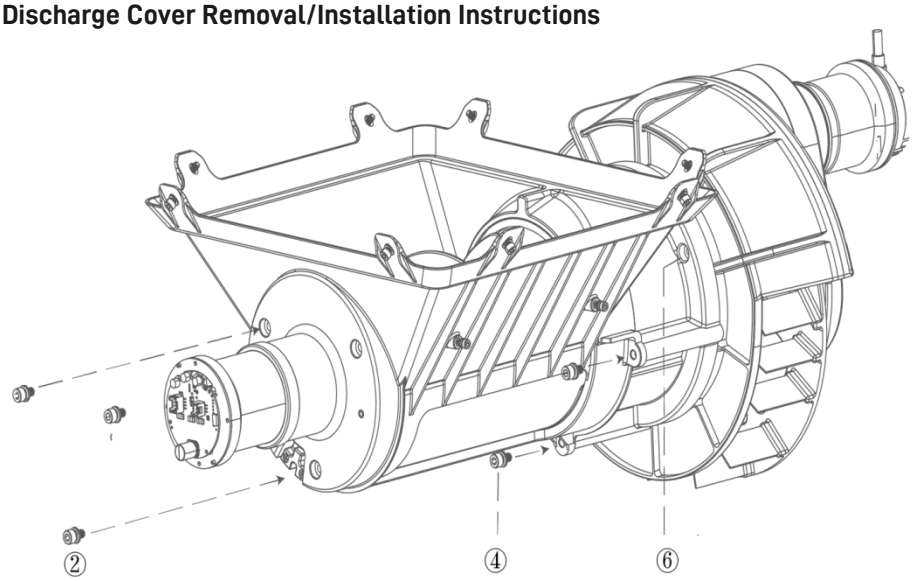


图-1

Figure 1

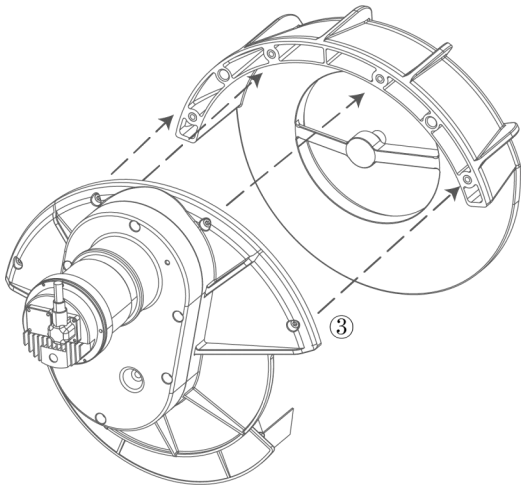


图-2

Figure 2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M5*12	02-004-00670	18~19 kgf·cm
③	M4*12*8	02-004-00834	14~15 kgf·cm

④	M5*12	02-004-00670	18~19 kgf·cm
⑥	M5*12	02-004-00670	18~19 kgf·cm

拆卸流程

Removal Procedures

1.拆卸绞龙电机侧的螺丝②④,将甩盘电机从上料筒中取出。

1. Remove screws ② and ④ on the screw feeder motor side, and take out the spread disc motor from the feeder shell.

注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

2.拆卸螺丝⑥,并将上料筒和绞龙从绞龙端出料固定盖取下。

2. Remove screws ⑥, and remove the feeder shell and screw feeder from the discharge cover at the screw feeder end.

3.拆卸螺丝③,并将绞龙端出料固定盖从电机端出料固定盖取下。

3. Remove screws ③, and remove the discharge cover at the screw feeder end from the discharge cover at the motor end.

安装流程

Installation Process

1.将绞龙端出料固定盖安装到电机端出料固定盖，并使用螺丝③拧紧（力矩:14~15 kgf·cm）。

1. Install the discharge cover on the screw feeder end to the discharge cover on the motor end, and tighten it with screws ③ (torque: 14 - 15 kgf·cm).

2.将绞龙和上料筒安装到绞龙端出料固定盖，并使用螺丝⑥拧紧（力矩:18~19 kgf·cm）。

2. Install the screw feeder and feeder shell to the discharge cover on the screw feeder end, and tighten it with screws ⑥ (torque: 18 - 19 kgf·cm).

3.将甩盘电机安装到睿播主框，并使用螺丝②④拧紧（力矩：18~19 kgf·cm）。注意：安装完电机后，应检查所有线束已全部接回原位。

3. Install the spread disc motor to the RevoCast main frame, and tighten it with screws ② and ④ (torque: 18 - 19 kgf·cm). Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

甩盘拆装指引

Guidance for Removal and Installation of Spread Disc

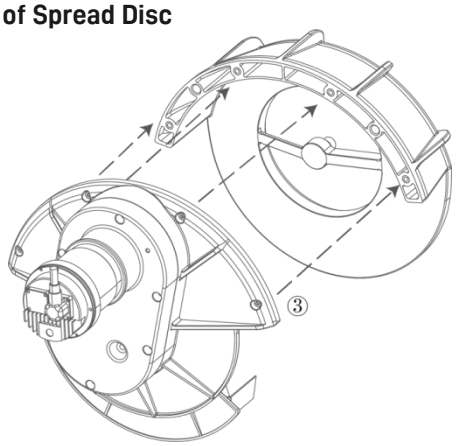


图-1

Figure 1

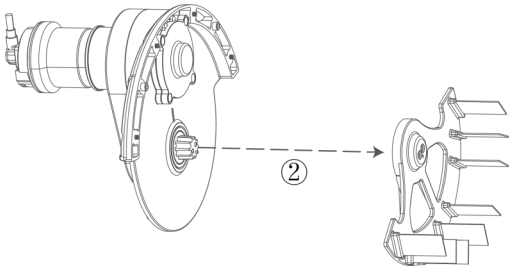


图-2

Figure 2

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*12*8	02-004-00834	14~15 kgf·cm
③	M4*12*8	02-004-00834	14~15 kgf·cm

拆卸流程

Removal Procedures

1.拆卸螺丝③,并将绞龙端出料固定盖从电机端出料固定盖取下。

1. Remove screws ③, and remove the discharge cover on the screw feeder end from the discharge cover on the motor end.

2.拆卸螺丝②,并将甩盘从电机端出料固定盖取下。

2. Remove screws ②, and remove the spread disc from the discharge cover on the motor end.

注意：拆卸之前务必将甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

Note: Before removal, be sure to disconnect the spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

安装流程

Installation Process

1.将将甩盘安装到电机端出料固定盖，并使用螺丝②拧紧（力矩:14~15 kgf·cm）。

1. Install the spread disc to the discharge cover on the motor end, and tighten it with screws ② (torque: 14 - 15 kgf·cm).

2.将绞龙端出料固定盖安装到电机端出料固定盖，并使用螺丝③拧紧（力矩:14~15 kgf·cm）。注意：安装完电机后，应检查所有线束已全部接回原位。

2. Install the discharge cover on the screw feeder end to the discharge cover on the motor end, and tighten it with screws ③ (torque: 14 - 15 kgf·cm). Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

电机端出料固定盖拆装指引

Motor-End Discharge Cover Removal/Installation Instructions

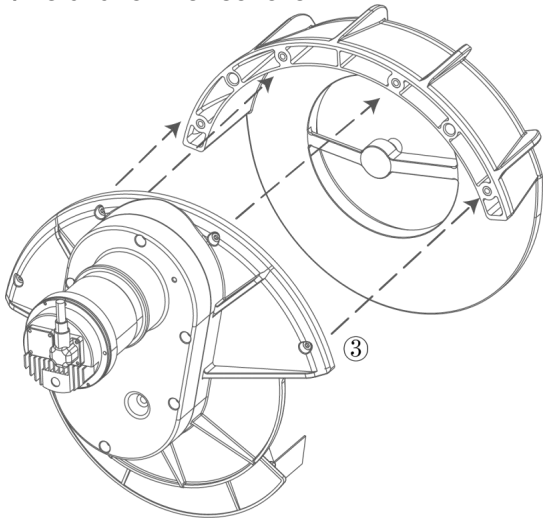


图-1

Figure 1

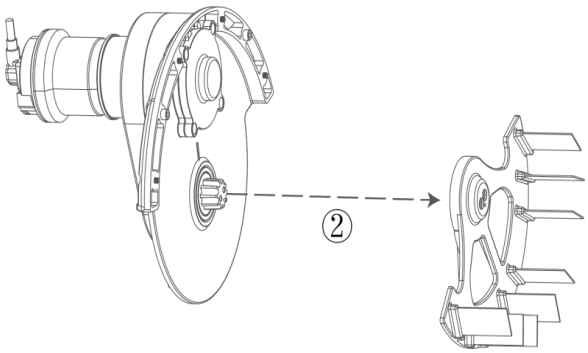


图-2

Figure 2

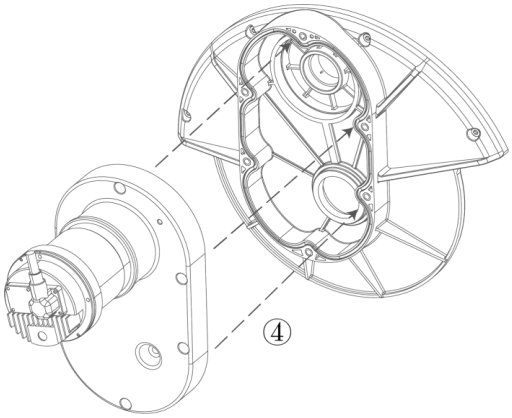


图-3

Figure 3

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*12*8	02-004-00834	14~15 kgf·cm
③	M4*12*8	02-004-00834	14~15 kgf·cm
④	M4*12*8	02-004-00834	15~16 kgf·cm

拆卸流程

Removal Procedures

注意：拆卸之前务必将甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

Note: Before removal, be sure to disconnect the spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it.

1.拆卸螺丝③,并将绞龙端出料固定盖从电机端出料固定盖取下。

1. Remove screws ③, and remove the discharge cover on the screw feeder end from the discharge cover on the motor end.

2.拆卸螺丝②,并将甩盘从电机端出料固定盖取下。

2. Remove screws ②, and remove the spread disc from the discharge cover on the motor end.

3.拆卸螺丝④,并将电机端出料固定盖取下。

3. Remove screws ④, and remove the discharge cover on the motor end.

安装流程

Installation Process

1.将电机端出料固定盖安装甩盘电机端连杆箱固定盖，并使用螺丝④拧紧（力矩:15~16 kgf·cm）。

1. Install the discharge cover on the motor end to the link box cover on the spread disc motor end, and tighten it with screws ④ (torque: 15 - 16 kgf·cm).

2.将甩盘安装到电机端出料固定盖，并使用螺丝②拧紧（力矩:14~15 kgf·cm）

2. Install the spread disc to the discharge cover on the motor end, and tighten it with screws ② (torque: 14 - 15 kgf·cm).

3.将绞龙端出料固定盖安装到电机端出料固定盖，并使用螺丝③拧紧（力矩:14~15 kgf·cm）。

3. Install the discharge cover on the screw feeder end to the discharge cover on the motor end, and tighten it with screws ③ (torque: 14 - 15 kgf·cm).

注意：安装完电机后，应检查所有线束已全部接回原位。

Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

甩盘电机端连杆箱固定件组件拆装指引

Removal/Installation Instructions for Link Box Holder on the Spread Disc Motor End

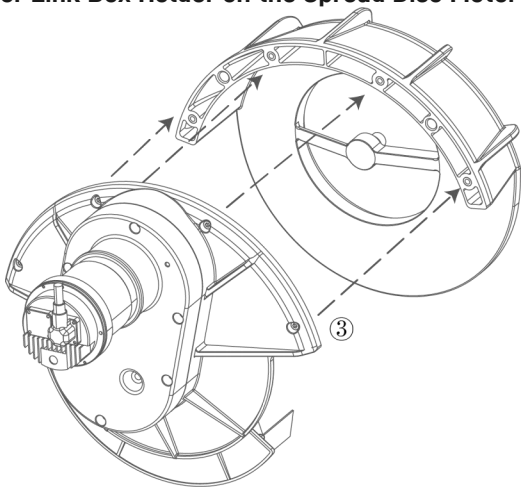


图-1

Figure 1

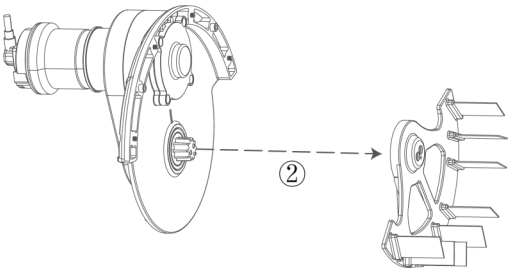


图-2

Figure 2

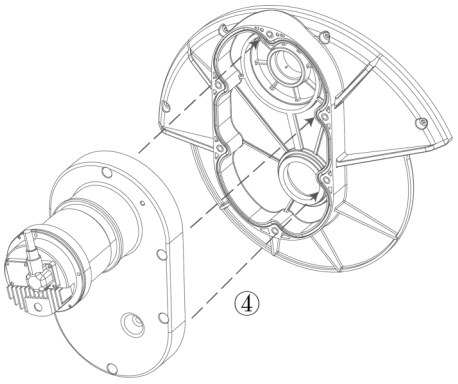


图-3

Figure 3

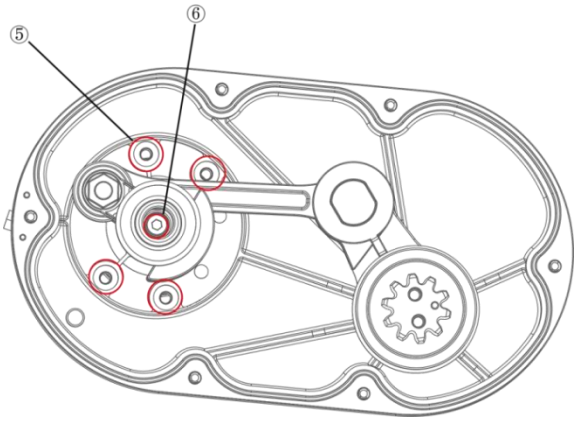


图-4

Figure 4

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*12*8	02-004-00834	14~15 kgf·cm
③	M4*12*8	02-004-00834	14~15 kgf·cm
④	M4*12*8	02-004-00834	15~16 kgf·cm
⑤	M4*12*8	02-004-00834	14~15 kgf·cm

拆卸流程

Removal Procedures

注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。

1.拆卸螺丝③,并将绞龙端出料固定盖从电机端出料固定盖取下。

Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it. 1. Remove screws ③, and remove the discharge cover on the screw feeder end from the discharge cover on the motor end.

2.拆卸螺丝②,并将甩盘从电机端出料固定盖取下。

2. Remove screws ②, and remove the spread disc from the discharge cover on the motor end.

3.拆卸螺丝④,并将电机端出料固定盖取下。

3. Remove screws ④, and remove the discharge cover on the motor end.

4.拆卸螺丝⑤⑥,并将甩盘电机取下。

4. Remove screws ⑤ and ⑥, and remove the spread disc motor.

5.用力拉扯中间连杆，将其从电机端连杆箱固定盖分离。

5. Pull the middle connecting rod firmly to separate it from the link box cover on the motor end.

注意：若用力拉扯不动，可翻转盘电机端连杆箱固定盖，使用胶锤轻敲使之脱离。

Note: If it cannot be moved by pulling with force, flip over the link box cover on the spread disc motor end, and gently tap it with a rubber hammer to make it detach.

安装流程

Installation Process

1.将中间连杆整个组件安装电机端连杆箱固定盖，并使用螺丝⑤（力矩:14~15kfg.cm），⑥（力矩:14~15kfg.cm）固定甩盘电机。

1. Install the entire unit of the middle connecting rod to the link box cover on the motor end, and use screws ⑤ (torque:14~15 kfg.cm) and ⑥ (torque: 14~15kfg.cm) to secure the spread disc motor.

2.将电机端出料固定盖安装甩盘电机端连杆箱固定盖，并使用螺丝④拧紧（力矩15~16:kfg.cm）。

2. Install the discharge cover on the motor end to the link box cover on the spread disc motor end, and tighten it with screws ④ (torque:15~16 kfg.cm).

3.将甩盘安装到电机端出料固定盖，并使用螺丝②拧紧（力矩:14~15kfg.cm）

3. Install the spread disc to the discharge cover on the motor end, and tighten it with screws ② (torque: 14~15 kgf·cm).

4.将绞龙端出料固定盖安装到电机端出料固定盖，并使用螺丝③拧紧（力矩:14~15 kfg.cm）。

4. Install the discharge cover on the screw feeder end to the discharge cover on the motor end, and tighten it with screws ③ (torque: 14~15 kgf·cm).

注意：安装完电机后，应检查所有线束已全部接回原位。

Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

中间连杆/摇臂/对侧件偏心连杆拆装指引

Removal/Installation Instructions for Middle Connecting Rod, Rocker Arm and Eccentric Connecting Rod on the Opposite

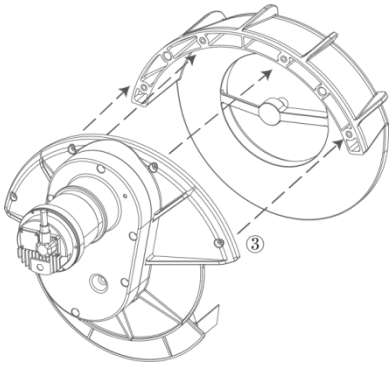


图-1

Figure 1

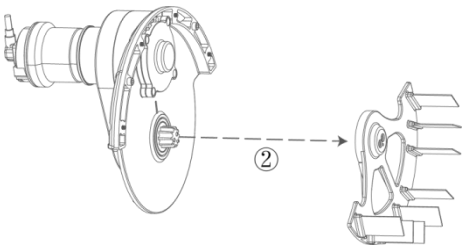


图-2

Figure 2

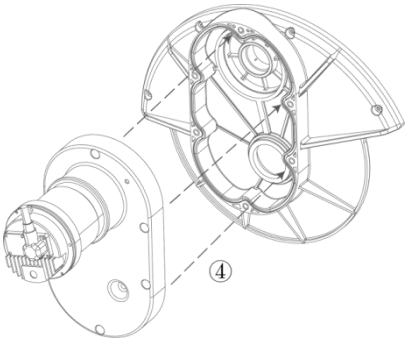


图-3

Figure 3

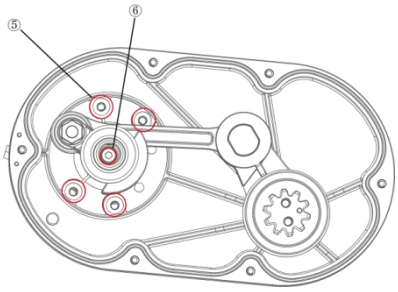


图-4

Figure 4

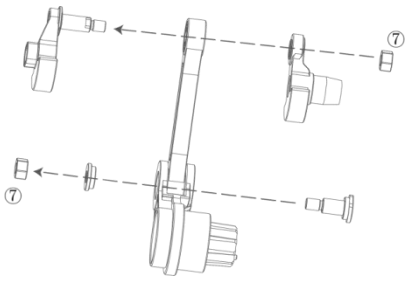


图-5

Figure 5

螺丝规格及安装要求

Screw Specifications and Mounting Requirements

序号 No.	螺丝规格 Screw spec.	螺丝物料号 Material No.	扭力要求 Torque requirement
②	M4*12*8	02-004-00834	14~15 kgf·cm
③	M4*12*8	02-004-00834	14~15 kgf·cm
④	M4*12*8	02-004-00834	15~16 kgf·cm
⑤	M4*12*8	02-004-00834	14~15 kgf·cm

拆卸流程

Removal Procedures

注意：拆卸之前务必将绞龙电机和甩盘电机线束与睿播主框、集线板断开连接，否侧拉扯过程中线束损坏。1.拆卸螺丝③,并将绞龙端出料固定盖从电机端出料固定盖取下。

Note: Before removal, be sure to disconnect the screw feeder motor and spread disc motor cables from the RevoCast main frame and the cable hub. Otherwise, pulling the cables during the removal may damage it. 1. Remove screws ③, and remove the discharge cover on the screw feeder end from the discharge cover on the motor end.

2.拆卸螺丝②,并将甩盘从电机端出料固定盖取下。

2. Remove screws ②, and remove the spread disc from the discharge cover on the motor end.

3.拆卸螺丝④,并将电机端出料固定盖取下。

3. Remove screws ④, and remove the discharge cover on the motor end.

4.拆卸螺丝⑤⑥,并将甩盘电机取下。

4. Remove screws ⑤ and ⑥, and remove the spread disc motor.

5.用力拉扯中间连杆，将其从电机端连杆箱固定盖分离。

5. Pull the middle connecting rod firmly to separate it from the link box cover on the motor end.

注意：若用力拉扯不动，可翻转盘电机端连杆箱固定盖，使用胶锤轻敲使之脱离。6.拆卸螺丝⑦,并将偏心连杆取下。

Note: If it cannot be moved by pulling with force, flip over the link box cover on the spread disc motor end, and gently tap it with a rubber hammer to make it detach. 6. Remove screws ⑦, and remove the eccentric connecting rod.

安装流程

Installation Process

1.将偏心连杆安装到对侧偏心连杆件上，并使用螺丝⑦拧紧（力矩:9~9.5kfg.cm）。

1. Install the eccentric connecting rod to the opposite eccentric connecting rod, and tighten it with screws ⑦ (torque: 9.~9.5kfg.cm).

2.将中间连杆整个组件安装电机端连杆箱固定盖，并使用螺丝⑤（力矩:14~15kfg.cm），⑥（力矩:14~15 kfg.cm）固定甩盘电机。

2. Install the entire unit of the middle connecting rod to the link box cover on the motor end, and use screws ⑤ (torque: 14~15kfg.cm) and ⑥ (torque:14~15 kfg.cm) to secure the spread disc motor.

3.将电机端出料固定盖安装甩盘电机端连杆箱固定盖，并使用螺丝④拧紧（力矩:15~16kfg.cm）。

3. Install the discharge cover on the motor end to the link box cover on the spread disc motor end, and tighten it with screws ④ (torque: 15~16kfg.cm).

4.将甩盘安装到电机端出料固定盖，并使用螺丝②拧紧（力矩:14~15kfg.cm）

4. Install the spread disc to the discharge cover on the motor end, and tighten it with screws ② (torque: 14~15 kgf·cm).

5.将绞龙端出料固定盖安装到电机端出料固定盖，并使用螺丝③拧紧（力矩:14~15kfg.cm）。

5. Install the discharge cover on the screw feeder end to the discharge cover on the motor end, and tighten it with screws ③ (torque: 14~15kgf·cm).

注意：安装完电机后，应检查所有线束已全部接回原位。

Note: After motor installation, verify that all cables have been connected back to their original positions.

测试：

Test:

上电，做播撒测试，观察绞龙转动无卡住现象。观察甩盘转动无卡住现象。

Power on, perform a spreading test, and observe the rotation of the screw feeder to ensure there is no jamming. Observe the rotation of the spread disc to ensure there is no jamming.

APP无显示任何播撒故障信息。

No spreading breakdown information is displayed in the app.

五、一般（运行失效）排故

General Troubleshooting (Operational Failure)

前言概述
Overview

本章内容主要为24/25 款农业无人飞机及其相关任务系统的常见问题故障排查。在本章中，将通过故障现象、故障原因、排查步骤和处理方法来指导排故，排故流程图将用于辅助排故方式。

This chapter mainly introduces the common problem troubleshooting of 2024/2025 Agricultural Drone and its related payload system. In this chapter, troubleshooting will be guided by breakdown phenomenon, breakdown cause, troubleshooting steps and handling methods. The troubleshooting flow chart will be used to assist troubleshooting methods.

在设备维修过程中，排故是一个关键的环节，需要综合运用治具、拆装维修工艺和测试验收等各项技术手段。准确分析故障、迅速定位问题所在，对于提高维修效率和降低成本具有重要意义。

In the process of device maintenance, troubleshooting is a key link, which requires the comprehensive use of various technical means such as fixtures, fit and remove process and maintenance process, and test acceptance. Accurate analysis of the breakdown and rapid location of the problem are of great significance to improve maintenance efficiency and reduce costs.

常见故障排查方式

Common Troubleshooting Method

动力系统
Propulsion System
电调无信号
No signal of ESC

现象描述：飞控与集线板连接，通过集线板把控制信号发送至电调，电调收到后控制电机响应。

Phenomenon description: With connection to the cable hub, the flight control system sends control signal to the ESC via the cable hub. Upon receiving control signal, the ESC controls the motor to respond.

原因分析

Causes

- 飞控到集线板之间的线路及插头故障。

Breakdown of cable between the flight control system and the cable hub, or cable plug breakdown.

- 电调信号线、电调或集线板电路故障。

Breakdown of ESC signal cable, ESC, or cable hub circuit.

- 如果多个电调无信号考虑是集线板故障。

Cable hub breakdown if more than one ESC has no signal.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查飞控到集线板的线路和插头。

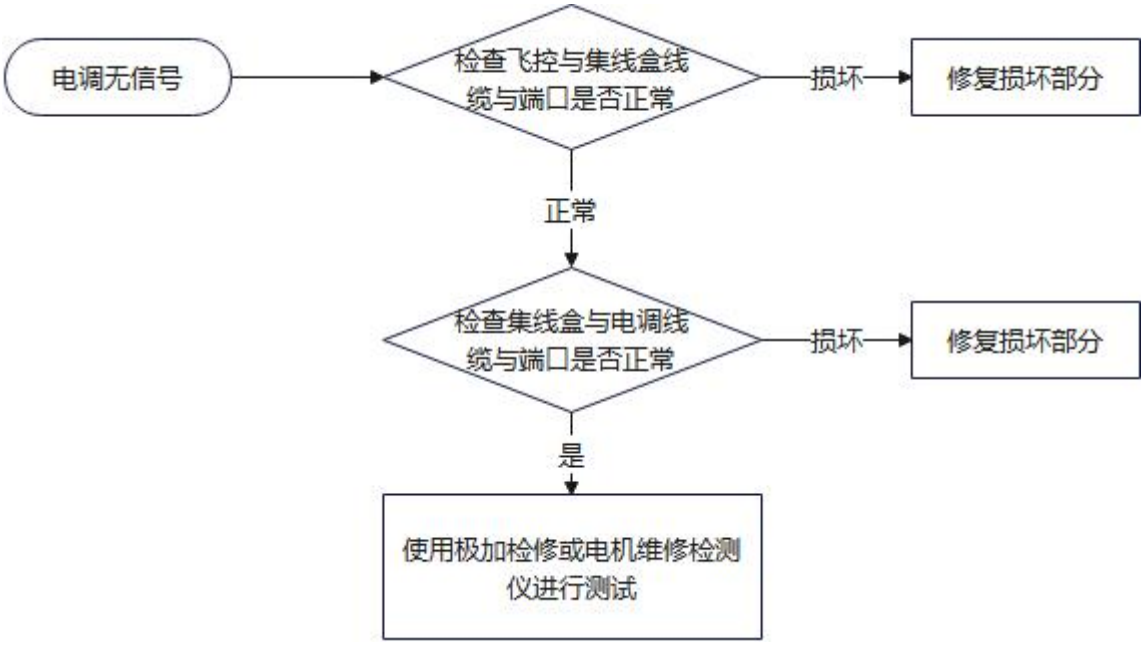
Check the cable between the flight control system and the cable hub, and the cable plug.

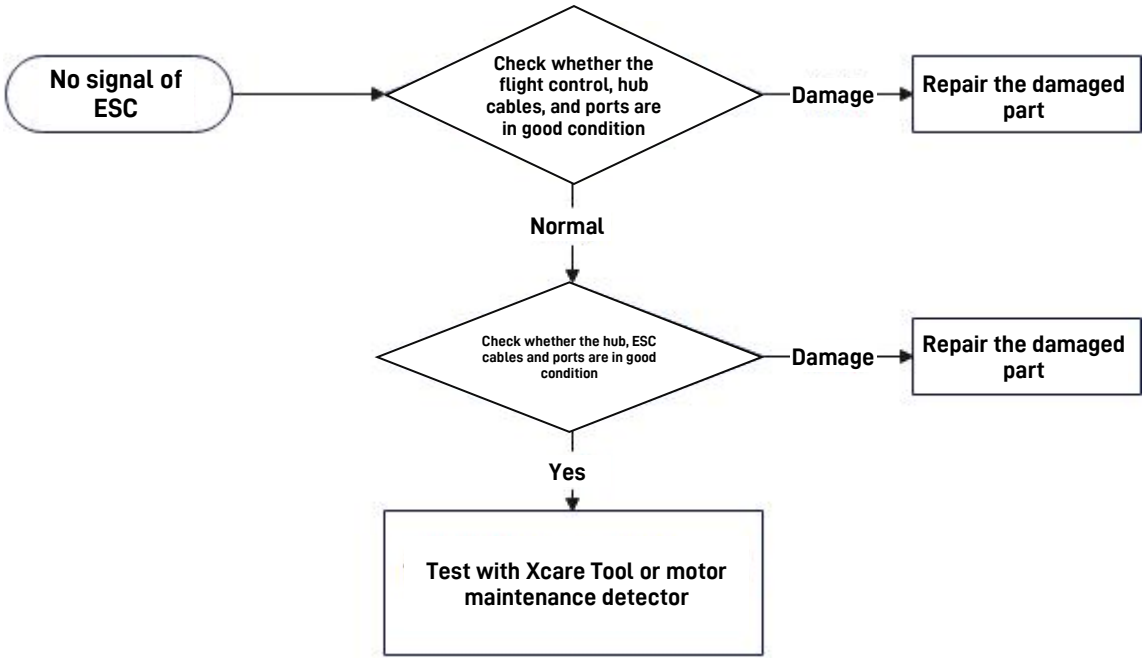
- 检查集线板和电调有无短路、进药或电路故障。

Check the cable hub and ESC for short circuit, liquid ingress or circuit breakdown.

- 可以换件进行测试。

Replace the part for testing.




No signal of ESC
Check whether the flight control, hub cables, and ports are in good condition
Damage
Repair the damaged part
Normal
Check whether the hub, ESC cables and ports are in good condition
Damage
Repair the damaged part
Yes
Test with Xcare Tool or motor maintenance detector

电调离线
ESC off-line

现象描述："极飞农服"App 报错电调离线或当前固件列表没有电调固件。

Phenomenon description: "XAG One" app reports that the ESC is off-line or there is no ESC firmware in the current firmware list.

原因分析

Causes

- 电调信号线插头没插紧或插头损坏。

The ESC signal cable plug is not connected firmly, or the plug is damaged.

- 电调电源线断路。

Open circuit of ESC power cable.

- 如果电调灯亮着但电机无法启动考虑主板问题。

The motherboard may have breakdown if the ESC indicators are ON but the motor still fails to start.

排查步骤及处理办法

Troubleshooting steps and solutions

- 如果单个电调灯没亮，查看电调与中心舱集线板的电源端子是否出现松脱，如果四个电调灯都不亮，应是中心舱集线板出现问题，可更换中心舱集线板再试一下，或者查看电池尾插供电端是否松脱。

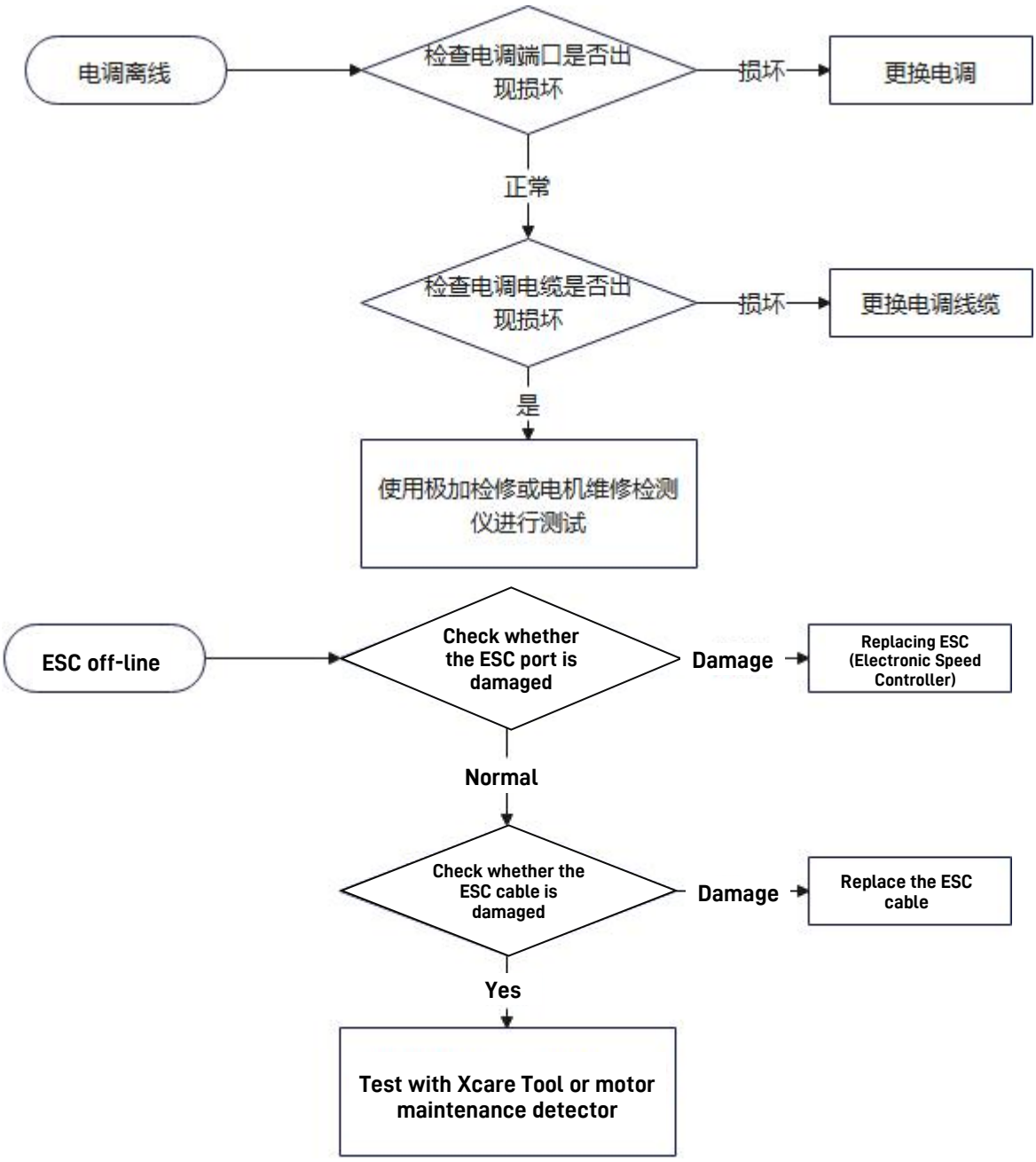
If only one ESC indicator is OFF, please check whether the power supply terminal between the ESC and the central cable hub gets loose. If four ESC indicators are all OFF, it is considered the central cable hub has a breakdown. Replace the central cable hub, or check whether the power supply terminal of the battery plug gets loose.

- 单个电调亮蓝色灯、并发出为 dou -dou-dou 的响声，查看电调信号线插头是否插紧，端子针头或变形，如果四个电调都出现这种情况，查看飞控与中心舱集线板的 PLD 插头是否有以上问题。

If only one ESC indicator is in blue, and makes dou-dou-dou sound, please check whether the ESC signal cable plug is connected firmly, and whether terminal pins are deformed. If four ESC indicators are all in blue, please check whether the PLD plug between the flight control system and the central cable hub has the said problems.

- 如电调灯正常但电机无法启动，使用简易平台分别测试更换异常的电调或中心舱集线板。

If ESC indicators show normal condition, but the motor still fails to start, use the simple workbench to test and replace the abnormal ESC or central cable hub respectively.


电调离线
检查电调端口是否出现损坏
损坏
更换电调
正常
检查电调电缆是否出现损坏
损坏
更换电调线缆
是
使用极加检修或电机维修检测仪进行测试
ESC off-line
Check whether the ESC port is damaged
Damage
Replacing ESC (Electronic Speed Controller)
Normal
Check whether the ESC cable is damaged
Damage
Replace the ESC cable
Yes
Test with Xcare Tool or motor maintenance detector

电机响应异常

Abnormal response of motor

现象描述：电调收到飞控的控制信号，根据控制信号把从集线板过来的直流电转换为三相交流电驱动电机转动从而带动螺旋桨，电机转动后电调会把电机转速信号通过集线板反馈给飞控。正常情况下电机转速和电调收到的控制信号成一定的比例关系，电机响应异常是指这个比例关系被破坏，电机无法达到应有的转速。

Phenomenon description: After receiving control signal from the flight control system, the ESC converts direct current from the cable hub into three-phase alternating current according to the control signal to rotate the motor, driving propellers to work. After the motor is rotating, the ESC feeds motor speed signal to the flight control system via the cable hub. Normally, motor speed and control signal received by the ESC are in proportion. Abnormal response of the motor refers that the proportional relationship said is broken. Consequently, the motor fails to reach proper speed.

原因分析

Causes

- 螺旋桨破损、断裂，桨夹松动。

Propellers have damage or fracture. Propeller clamps get loose.

- 电机底座与电机固定出现松动。

The connection between the motor and its base gets loose.

- 减震胶套磨损严重导致震动增大。

The damping rubber sleeve is seriously worn, causing excessive vibration.

- 电机漆包线有断裂，烧毁。

The motor enameled wire has fracture or burnout.

- 电机内部有异物导致卡转。

The motor has foreign matters inside, causing it to get stuck.

- 磁钢脱落。

Alnico magnet fall-off.

- 电机与电调三项线连接处有松动、打火烧灼。

3-phase cable connection between the motor and the ESC gets loose, or has spark or burn traces.

- 电调主板进药或其他故障。

Liquid flowing into the ESC motherboard or other breakdowns.

排查步骤及处理办法

Troubleshooting steps and solutions

- 若农业无人飞机可正常通电，先进行怠速测试查看有无问题。

Conduct the idle test first if the agricultural drone is energized normally.

- 检查螺旋桨有无裂纹破损，桨夹有无松动。

Check whether propellers have crack or damage, and whether propeller clamps get loose.

- 查看电机底座是否固定良好没有松动，钢套有无断裂。

Check whether the motor base is fixed securely, and whether steel sleeve has fracture.

- 查看减震胶套的磨损情况，更换新的减震胶套。

Check whether the damping rubber sleeve is worn, and if yes, replace it.

- 用手轻轻转动电机查看电机是否存在卡转。

Rotate the motor gently by hand to check whether it gets stuck.

- 查看电机漆包线是否烧坏变黑，三相线与电机的根部有无断裂。

Check whether the motor enameled wire is burned out, and whether the three-phase cable and the root of the motor have fractures.

- 检查电机电调三相线端子螺丝有无松动。

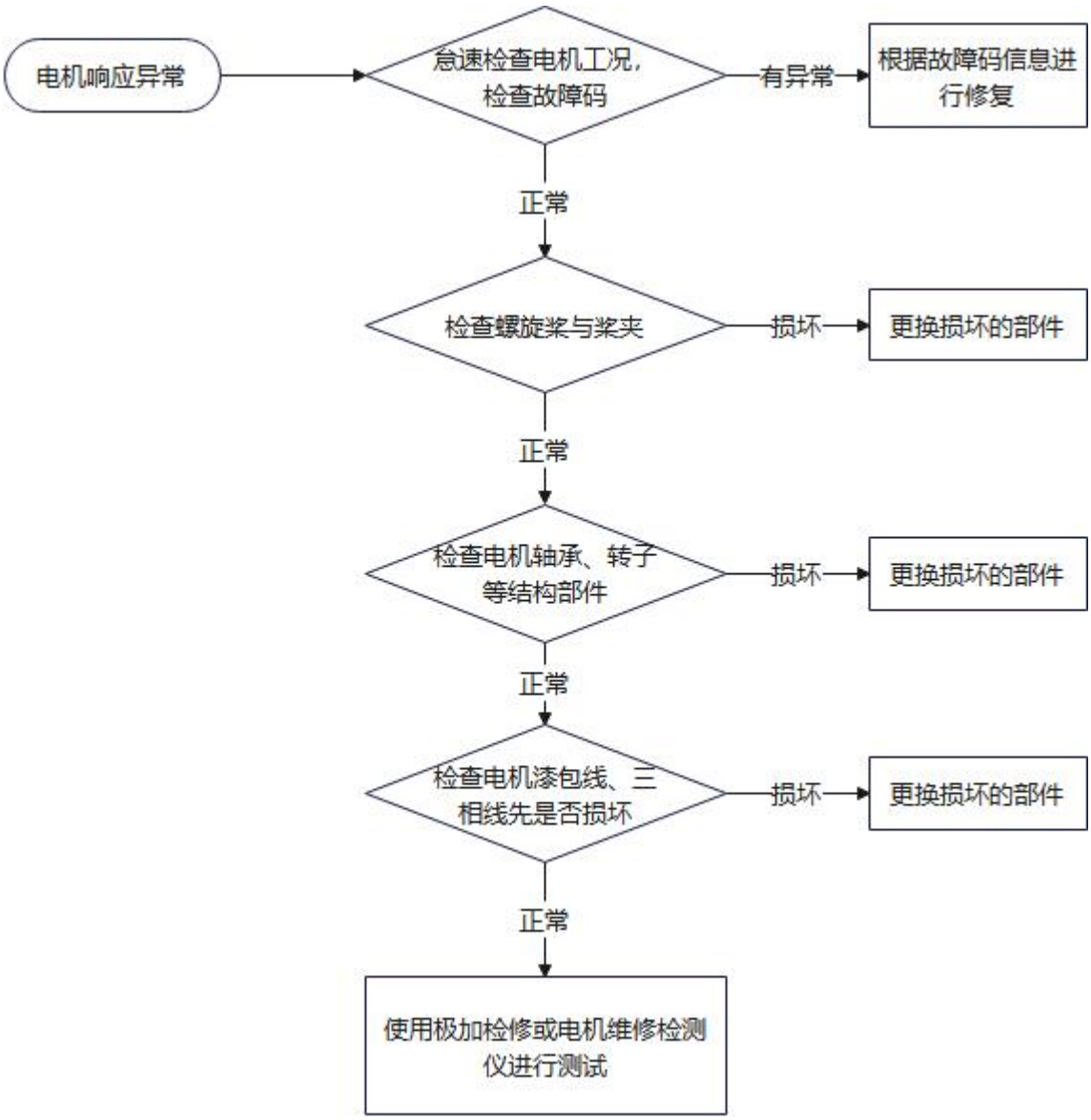
Check whether the screws fixing the three-phase cable terminals in the motor and the ESC get loose.

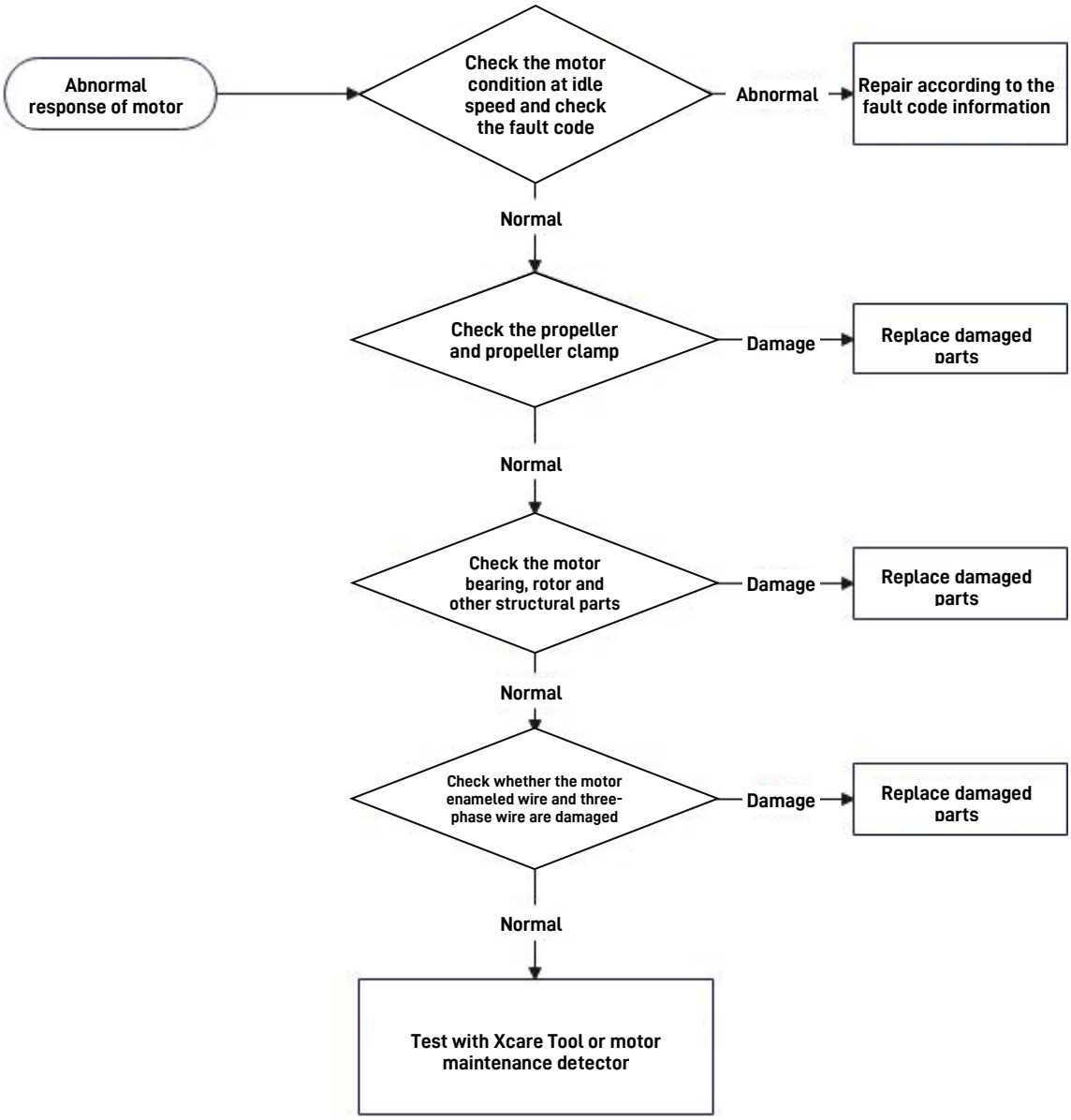
- 三相线端子接触面有无打火烧灼导致接触不良。

Check whether there is loose connection due to burnout of the contact surface of the three-phase cable terminal.

- 检查电调是否进药导致主板受损。

Check whether the ESC motherboard is damaged as liquid flows into the motherboard.


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


Abnormal response of motor
Check the motor condition at idle speed and check the fault code
Abnormal
Repair according to the fault code information
Normal
Check the propeller and propeller clamp
Damage
Replace damaged parts
Normal
Check the motor bearing, rotor and other structural parts
Damage
Replace damaged parts
Normal
Check whether the motor enameled wire and three-phase wire are damaged
Damage
Replace damaged parts
Normal
Test with Xcare Tool or motor maintenance detector

单电机动力不足

Power insufficiency of single motor

现象描述：飞控发送给单个电调输出控制信号满功率运行，电机正常响应至相应的转速， 但此时螺旋桨产生的升力仍无法满足农业无人飞机所需的动力，导致无法保持正常的飞行状态，出现掉高甚至触地炸机情况。

Phenomenon description: The flight control system sends full power output control signals to a single ESC, and as a response, the motor runs at corresponding speed. However, the lift force generated by propellers is still not enough to meet the power requirement for the agricultural drone. Consequently, the agricultural drone fails to remain normal flight, and occurs an uncontrolled descent and even a touchdown and crash.

原因分析

Causes

- 螺旋桨、桨夹出现破损、变形。

Propellers and clamps are damaged or deformed.

- 电机底座与电机固定出现松动。

The connection between the motor and its base gets loose.

- 机臂存在变形或的安装角度有偏差。

The arm is deformed or the mounting angle is deviated.

- 动力链路存在接触不良或破损等情况。

The power link has loose connection or is damaged.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查螺旋桨、桨夹是否有破损、变形。

Check whether propellers and clamps are damaged or deformed.

- 检查电机底座与电机固定是否存在松动。

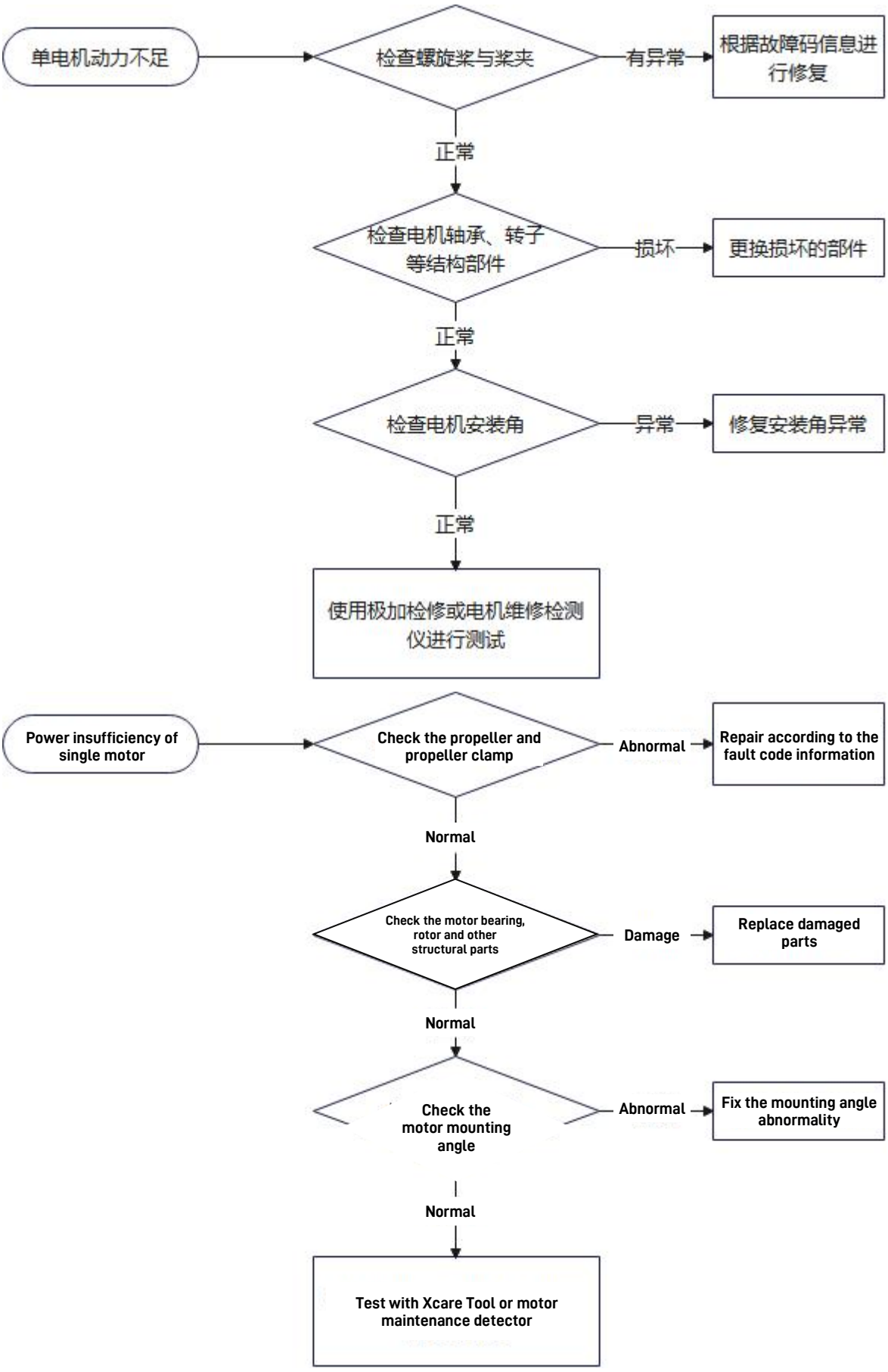
Check whether the connection between the motor and motor base gets loose.

- 检查机臂的安装角度是否符合出厂标准。

Check whether the arm mounting angle meets the factory requirements.

- 检查动力链路的连接线和插头。

Check the connecting wire and plugs of the power link.


单电机动力不足
检查螺旋桨与桨夹
有异常
根据故障码信息进行修复
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
检查电机安装角
异常
修复安装角异常
正常
使用极加检修或电机维修检测仪进行测试
Power insufficiency of single motor
Check the propeller and propeller clamp
Abnormal
Repair according to the fault code information
Normal
Check the motor bearing, rotor and other structural parts
Damage
Replace damaged parts
Normal
Check the motor mounting angle
Abnormal
Fix the mounting angle abnormality
Normal
Test with Xcare Tool or motor maintenance detector

多电机动力不足

Power insufficiency of multiple motors

现象描述：多个电调输出控制信号满功率运行且电机正常响应，此时农业无人飞机无法保持飞行状态出现掉高，甚至出现触地炸机情况。

Phenomenon description: Multiple ESCs send full power output control signals and the motor responds normally. At this time, the agricultural drone fails to maintain a flight state, and occurs an uncontrolled descent and even a touchdown and crash.

原因分析

Causes

- 电池电压过低，导致无法提供正常功率。

The battery voltage is too low to provide normal power.

- 起飞重量严重超过农业无人飞机额定最大起飞重量。

The takeoff weight seriously exceeds the rated maximum takeoff weight of the agricultural drone.

- 农业无人飞机处于高海拔地区飞行。

Agricultural drone is operating at high altitude.

- 农业无人飞机机体结构发生形变。

The agricultural drone airframe structure is deformed.

- 螺旋桨出现问题。

Propeller breakdown.

- 机臂安装错误，导致电机的安装角出现偏差。

The arm is installed incorrectly, resulting in a deviation in the mounting angle of the motor.

排查步骤及处理办法

Troubleshooting steps and solutions

- 初步查看 App 是否有电池报警，后续查看飞行日志，看电池电压是否正常（不应低于42V），电池电芯有无鼓包或其他故障。

First, check whether the app prompts a battery alarm, and then check the flight log to see whether the battery voltage is normal (not lower than 42V), and whether the battery cell has swelling or other breakdown.

- 检查农业无人飞机载荷重量，看是否超重。

Check the payload of the agricultural drone to see if it is overweight.

- 查看飞行日志确认是否处于高海拔地区作业，如果是考虑在原有基础上减重飞行。

Check the flight log to confirm whether it is operating at high altitude, and if so, consider flying with reduced weight on the original basis.

- 检查机臂是否安装错误，电机的倾转角是否符合原厂标准。

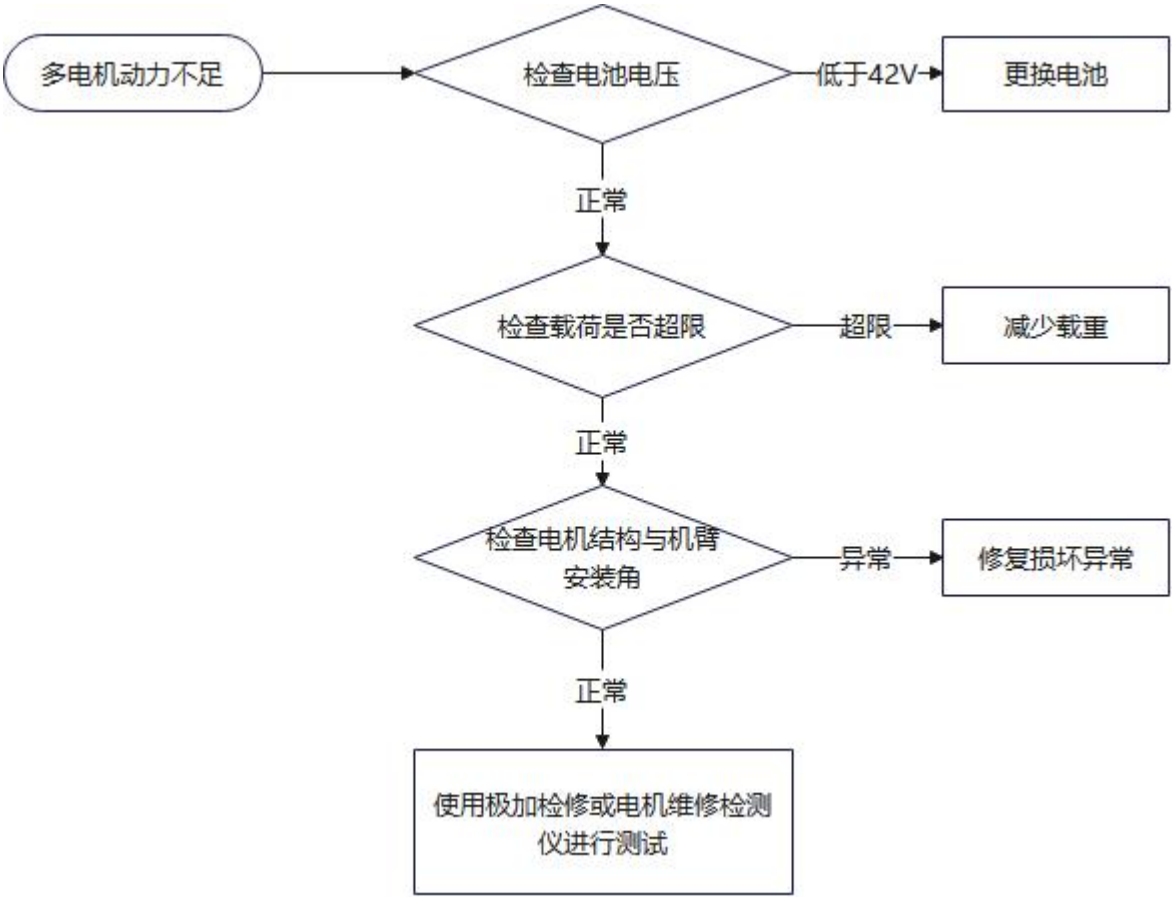
Check whether the arm is installed incorrectly and whether the tilt angle of the motor meets the factory requirements.

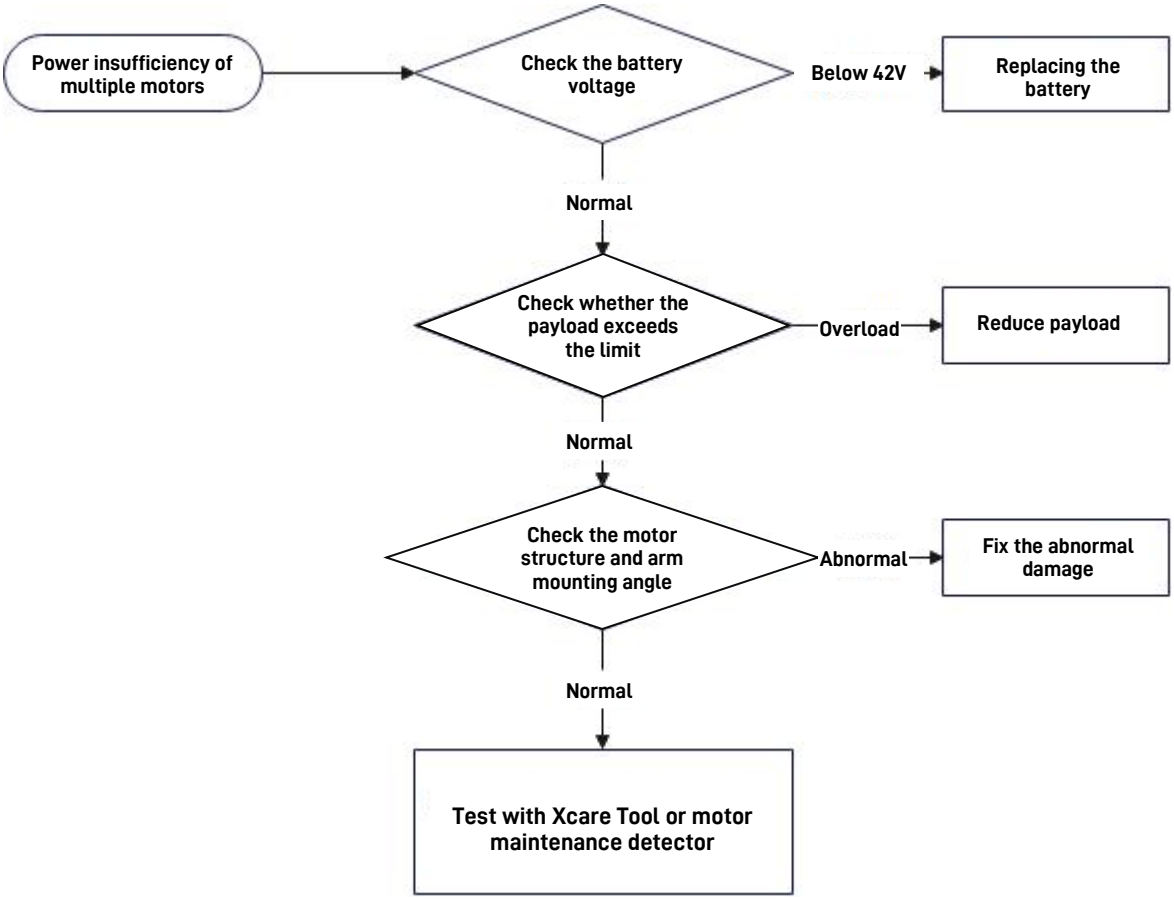
- 检查机体结构有无变形，主框尾框有无断裂破损。

Check whether the airframe structure is deformed, and whether the rear frame of the main frame is broken.

- 检查螺旋桨是否为原厂型号，桨叶是否偏软、变形、是否有过多附着物。

Check whether the propeller is of the original model, and whether the blade is too weak or deformed, and whether there are too many attachments.




Power insufficiency of multiple motors
Check the battery voltage
Below 42V
Replacing the battery
Normal
Check whether the payload exceeds the limit
Overload
Reduce payload
Normal
Check the motor structure and arm mounting angle
Abnormal
Fix the abnormal damage
Normal
Test with Xcare Tool or motor maintenance detector

电机报警

Motor alarm

现象描述：当动力系统出现某些故障会导致电机蜂鸣器报警，同时航灯蓝灯闪烁。

Phenomenon description: When some breakdown occurs in the propulsion system, the motor buzzer will alarm, and the navigation light will flash blue.

原因分析

Causes

- 电池电压过低，导致无法提供正常功率。

The battery voltage is too low to provide normal power.

- 起飞重量严重超过农业无人飞机额定最大起飞重量。

The takeoff weight seriously exceeds the rated maximum takeoff weight of the agricultural drone.

- 农业无人飞机处于高海拔地区飞行。

Agricultural drone is operating at high altitude.

- 农业无人飞机机体结构发生形变。

The agricultural drone airframe structure is deformed.

- 螺旋桨出现问题。

Propeller breakdown.

- 机臂安装错误，导致电机的安装角出现偏差。

The arm is installed incorrectly, resulting in a deviation in the mounting angle of the motor.

排查步骤及处理办法

Troubleshooting steps and solutions

可依据蜂鸣器的响声具体判断和排查故障：

The breakdown can be judged and troubleshooted according to the sound of the buzzer:

报警声为 dou-dou-dou 单声调，间隔 1.5s，这种是通信链路发生故障，可能是：

The alarm sound is "dou-dou-dou" single tone with an interval of 1.5s. This is the communication link breakdown, which may be:

a.未接受到飞控的 PPM 信号，没接油门信号或信号处理电路出现问题，重新插拔电调信号线。

a. If the PPM signal of the flight controller is not received, the throttle signal is not received or the signal processing circuit is faulty, pull out and then re-insert the ESC signal cable.

b.输出信号小于 40Hz 或者大于 450Hz 进行报警。

b. Alarm when the output signal is less than 40Hz or more than 450Hz.

报警声为 xi xi xi 单声调间隔 0.4s，这种情况是：

The alarm sound is "xi xi xi" single tone with an interval of 0.4s. In this case:

a.电调启动 2S 内油门大于启动信号。

a. The throttle is greater than the start signal within 2s after the ESC is started.

b.电调的输入输出端短路或接触不良。

b. The input and output ends of the ESC are short-circuited or have a loose connection.

报警声为 rai-mi-rai-mi，两声调间隔 1.2s，原因是：

The alarm sound is "rai-mi-rai-mi" double tone with an interval of 1.2s. The reason is:

a.启动螺旋桨之后报警：电压采样或电流采样异常，需更换电调。

a. Alarm after starting the propeller: Voltage sampling or current sampling is abnormal, and ESC needs to be replaced.

b.上电之后报警：产品类型错误，需使用"极加检修"App 对电调进行配置。

b. Alarm after power-on: The product type is wrong, and the ESC needs to be configured using the "Xcare Tool" app.

报警声为 mi-fa-sao-la-mi-fa-sao-la 四声调间隔 1.6s，原因是电机堵转报警，螺旋桨碰撞导致电机停转，电调进行保护。

The alarm sound is "mi-fa-sao-la-mi-fa-sao-la" quad tone with an interval of 1.6s. The reason is that the motor is blocked and alarms. The propeller collides with an object, causing the motor to stop, and the ESC performs protection.

报警声为fa-sao-la-fa-sao-la 三声调间隔1.6s，原因是电机序列号冲突，检查中心舱集线板是否进药或故障。

The alarm sound is "fa-sao-la-fa-sao-la" triple tone with an interval of 1.6s. The reason is that the motor serial number conflicts. Check whether liquid flows into the central cable hub or whether it has a breakdown.

机体不平
Airframe imbalance

现象描述：农业无人飞机的四个电机旋转带动螺旋桨产生升力，同时螺旋桨转动会给空气以作用力矩（或称扭矩），根据牛顿第三定理这时会产生一个跟螺旋桨转向相反的的反作用力（反扭距）。所以农业无人飞机四个电机要采取正反转的安装顺序来使反扭距相互抵消，保证农业无人飞机飞行稳定，如果机体不平则会导致升力和扭矩作用力的大小和方向发生变化，从而打破整个飞行系统力的平衡，影响农业无人飞机的飞行状态甚至炸机。

Phenomenon description: The four motors of the agricultural drone rotate to drive the propeller to generate lift, and at the same time, the rotation of the propeller will exerts a moment of force (torque) on the air. According to Newton's third law, a reaction force (counter-torque) opposite to the propeller's steering direction will be generated at this time. Therefore, the four motors of the agricultural drone shall adopt the forward and reverse installation sequence to offset the counter-torque, to ensure the flight stability of the agricultural drone. Airframe imbalance will cause the magnitude and direction of the lift and torque force to change, thus breaking the balance of the force of the entire flight system, affecting the flight status of the agricultural drone and even causing the drone to crash.

原因分析

Causes

- 机臂管夹螺丝松动或者结构变形，钢套胶套断裂。

The arm pipe clamp screws are loose or the structure is deformed, and the steel sleeve and the rubber sleeve are broken.

- 电机底座安装偏移，导致电机不在同一水平面。

The motor base is installed with offset, resulting in that the motor is not on the same horizontal plane.

- 机臂电机安装面不在同一平面。

The mounting surfaces of the arm motors are not on the same plane.

- 机体主框或者前后横梁发生形变。

The main frame of the airframe or the front and rear cross beams are deformed.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查机体与机臂连接处管夹的螺丝有无松动，钢套、胶套有无断裂、损坏。

Check whether the screws of the pipe clamp at the connection between the airframe and the arm are loose, and whether the steel sleeve and rubber sleeve are broken or damaged.

- 检查电机座有无变形或安装不到位。

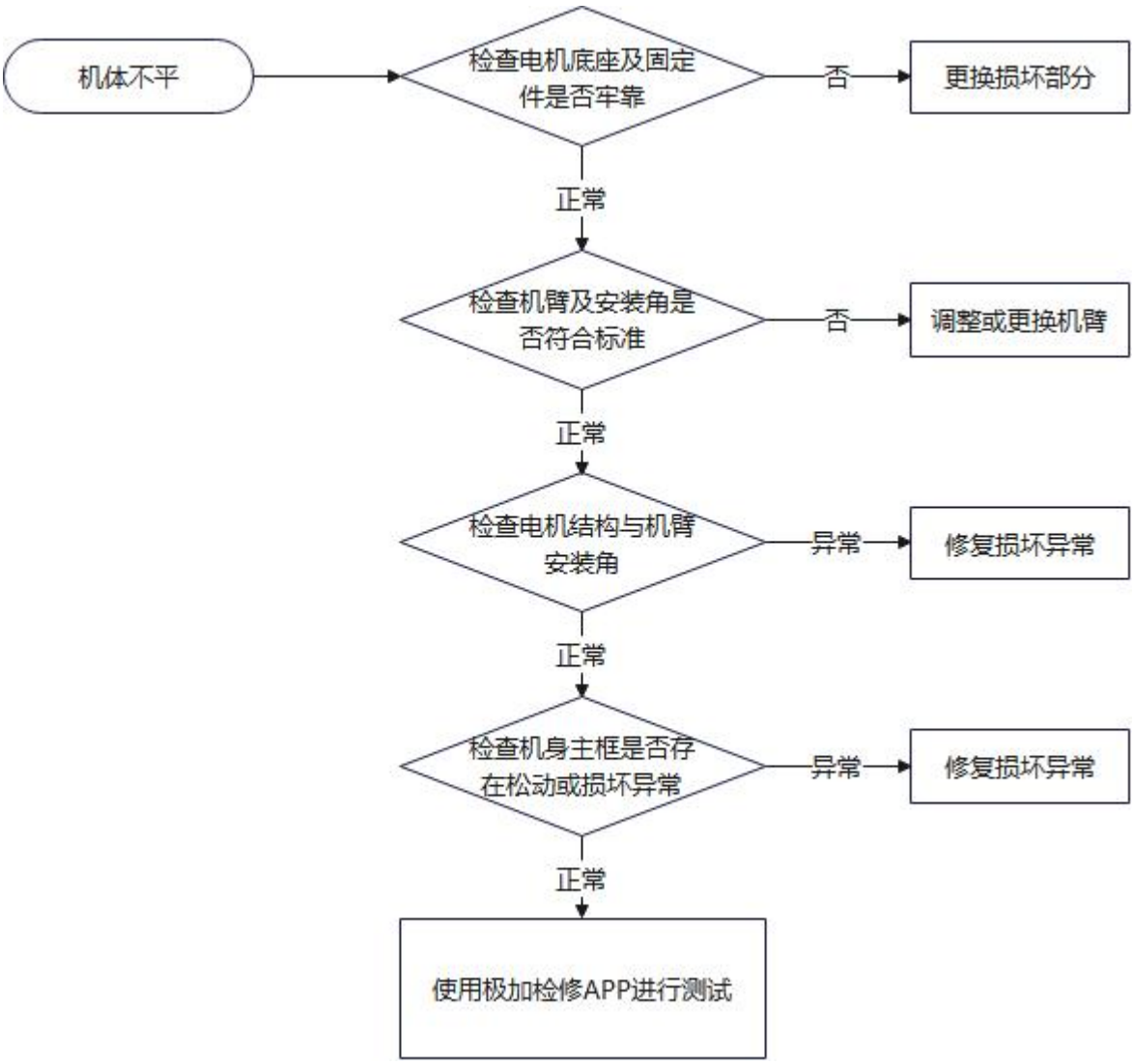
Check whether the motor base is deformed or installed improperly.

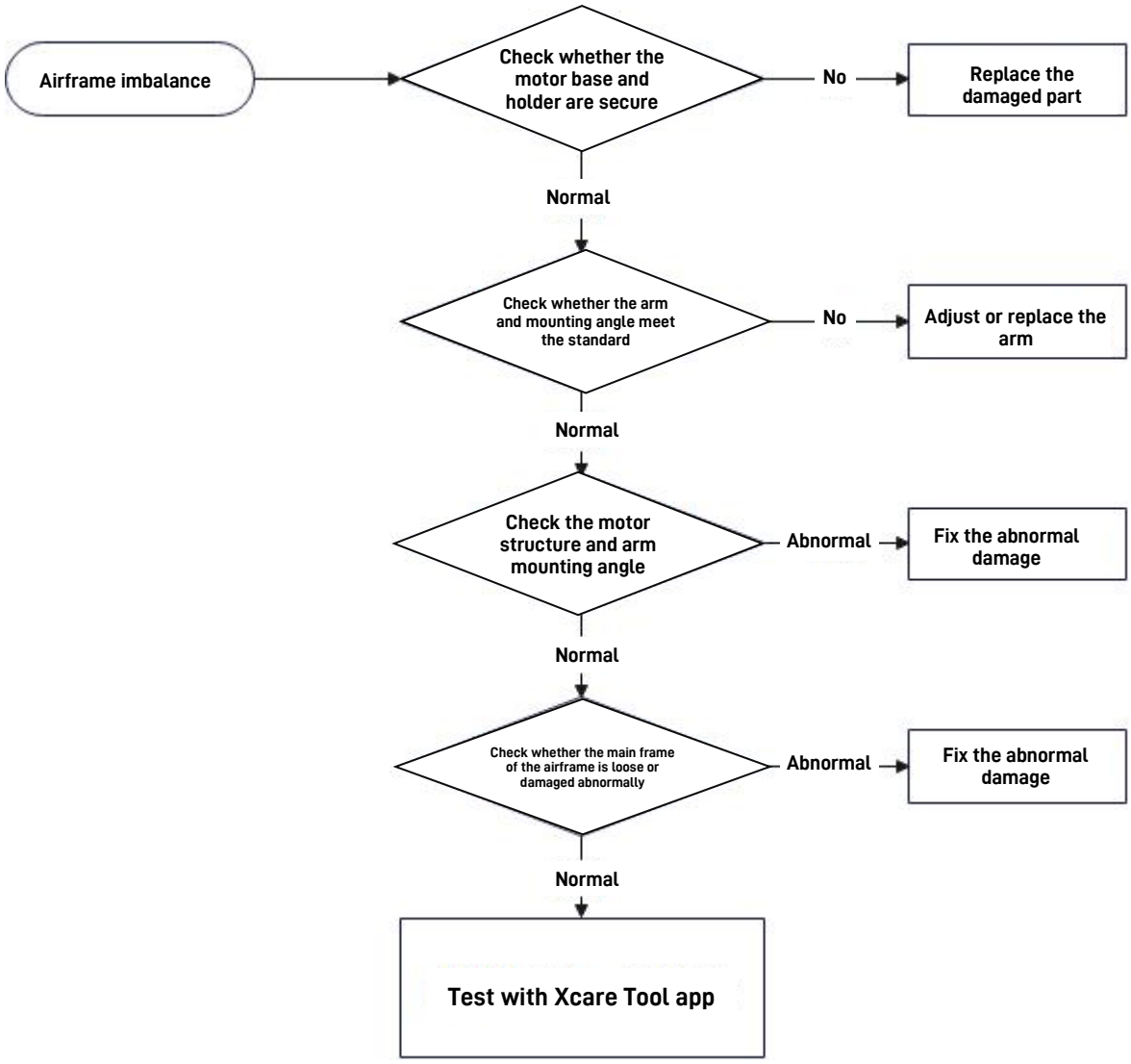
- 检查机臂有无变形或裂痕。

Check the arm for deformation or cracks.

- 检查机体主框，前后的两个横梁有无变形。

Check whether the main frame of the airframe or the front and rear cross beams are deformed.


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


Airframe imbalance
Check whether the motor base and holder are secure
No
Replace the damaged part
Normal
Check whether the arm and mounting angle meet the standard
No
Adjust or replace the arm
Normal
Check the motor structure and arm mounting angle
Abnormal
Fix the abnormal damage
Normal
Check whether the main frame of the airframe is loose or damaged abnormally
Abnormal
Fix the abnormal damage
Normal
Test with Xcare Tool app

机体震动过大

Excessive airframe vibration

现象描述：农业无人飞机飞行过程中观察到机体明显存在抖动或查看飞行日志发现震动一直偏大。

Phenomenon description: During the flight of the agricultural drone, it is observed that the airframe shows obvious jitter or it is found that the vibration is always large by checking the flight log.

原因分析

Causes

- 螺旋桨松动或异常。

The propeller is loose or abnormal.

- 电机与及其固定松动或异常。

The motor and its mounting are loose or abnormal.

- 机臂松动或异常。

The arm is loose or abnormal.

- 负载框安装松动或异常。

The load frame is loose or abnormal.

- 飞控松动或异常。

The flight controller is loose or abnormal.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查螺旋桨是否破损、变形或松动，桨叶与桨夹是否存在虚位。

Check whether the propeller is damaged, deformed or loose, and whether there is a backlash between the blade and the clamp.

- 检查电机是否松动、电机外转子与定子是否存在虚位、减震胶套是否磨损严重。

Check whether the motor is loose, whether there is a backlash between the motor outer rotor and the stator, and whether the rubber sleeve is seriously worn.

- 检查机臂折叠处是否存在松动或虚位、机臂尾部固定是否松动、机臂塑料安装件是否脱胶、开裂。

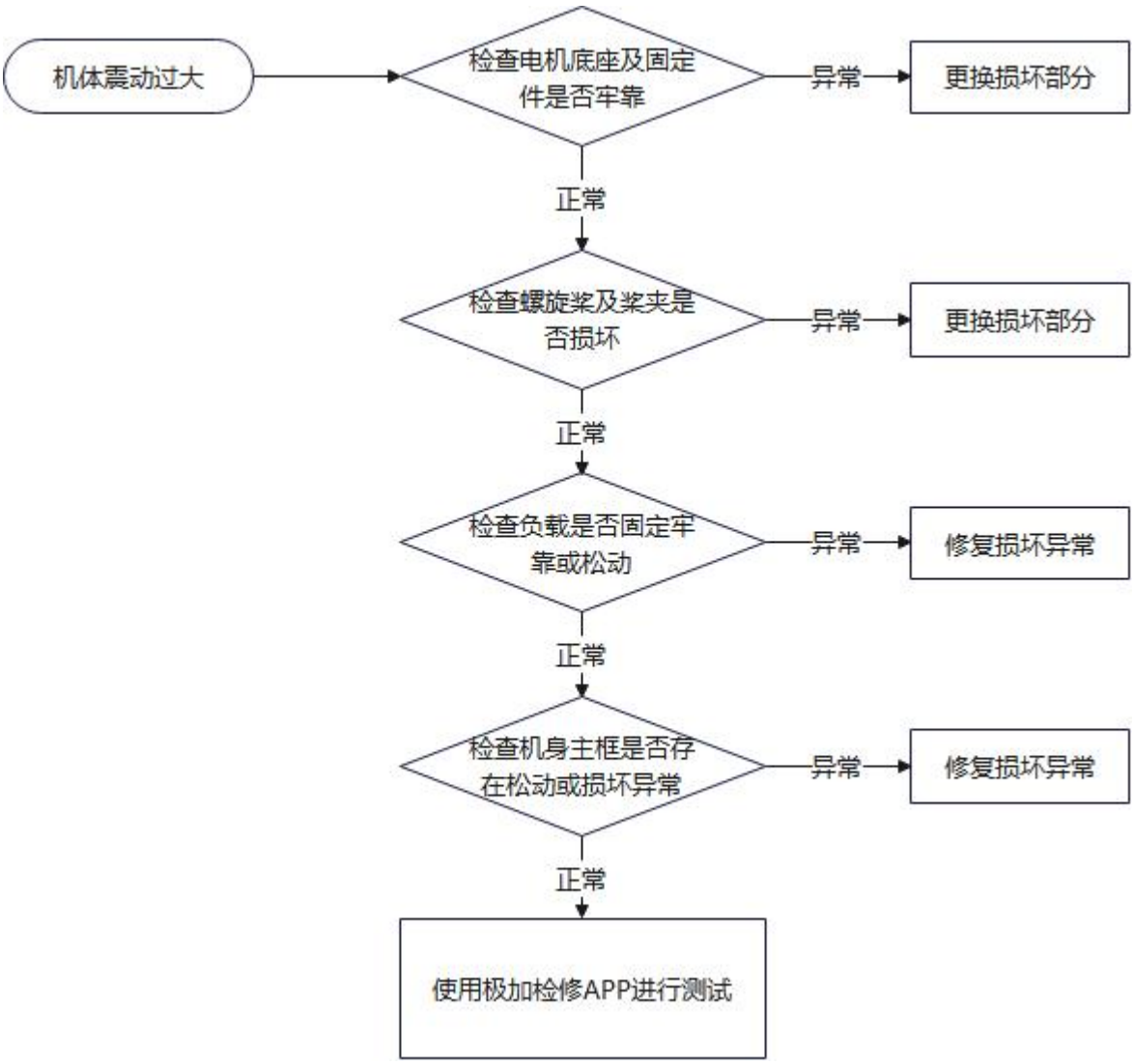
Check whether there is looseness or backlash at the folding part of the arm, whether the fixation of the arm tail is loose, and whether the plastic mounting parts of the arm are degummed or cracked.

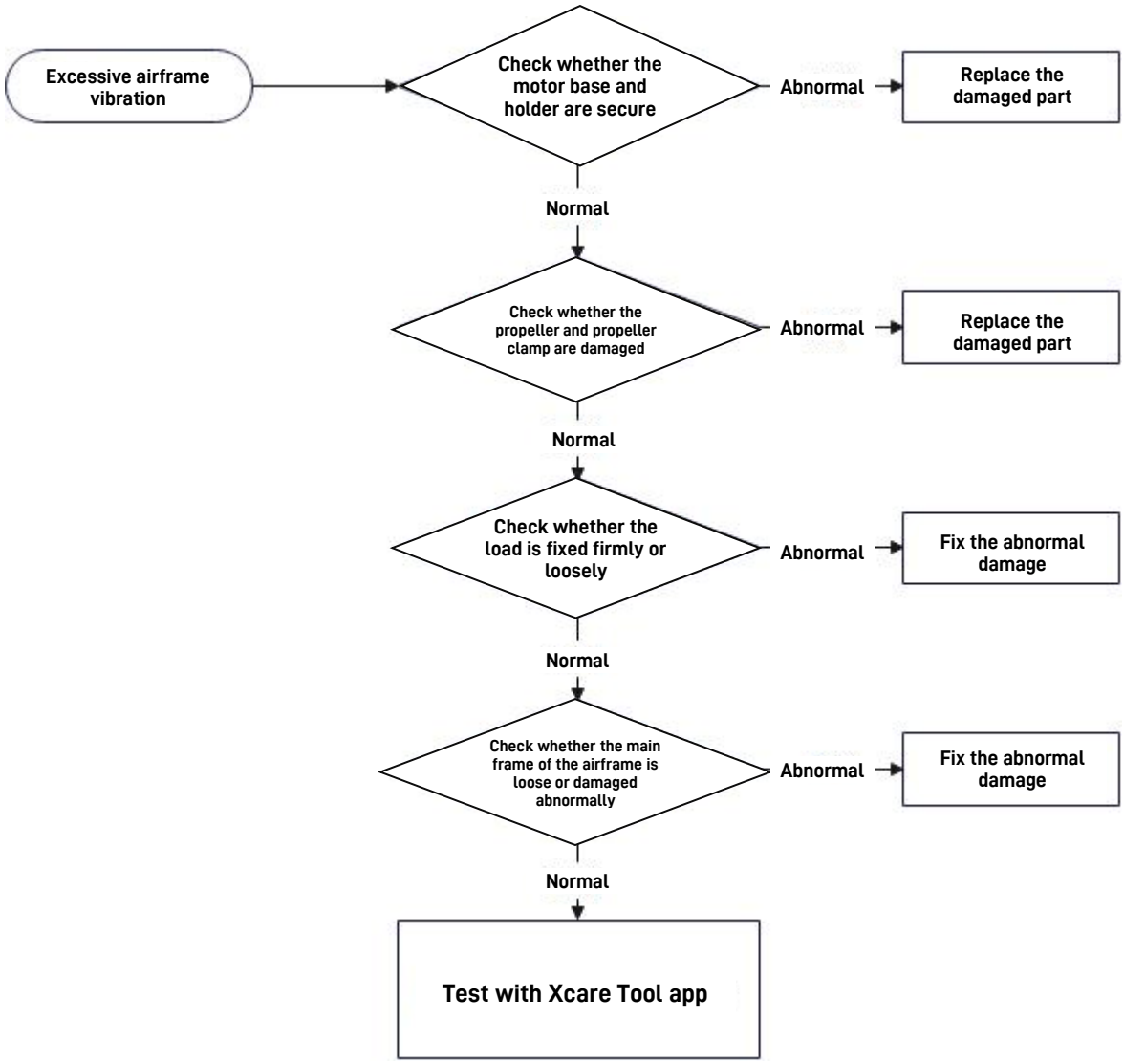
- 检查负载框快拆搭扣是否松动、负载框减震胶垫是否磨损严重。

Check whether the easy-removal hasp of the load frame is loose and whether the rubber shock pad of the load frame is seriously worn.

- (5) 检查飞控固定是否松动、头罩框架是否开裂。

(5) Check whether the flight controller mounting is loose and whether the head cover frame 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


Excessive airframe vibration
Check whether the motor base and holder are secure
Abnormal
Replace the damaged part
Normal
Check whether the propeller and propeller clamp are damaged
Abnormal
Replace the damaged part
Normal
Check whether the load is fixed firmly or loosely
Abnormal
Fix the abnormal damage
Normal
Check whether the main frame of the airframe is loose or damaged abnormally
Abnormal
Fix the abnormal damage
Normal
Test with Xcare Tool app

飞行控制及感知系统

Flight Control and Sensor System

高度波动

Altitude fluctuation

现象描述：农业无人飞机在航线飞行任务中，出现高于或低于设置航线高度的高度波动。

Phenomenon description: During the agricultural drone's route flight mission, there is a fluctuation in altitude that is higher or lower than the set route altitude.

原因分析

Causes

- 仿地飞行，地势起伏较大。

Terrain following flight, with large undulations.

- 地形模块测高错误。

Altitude measuring errors of terrain module.

- 动力执行部件出现异常。

Abnormal operation of the propulsion system.

- 载重过大、环境风大导致动力不足。

The payload is too large and the ambient wind is too strong, resulting in insufficient power.

- 融合垂直速度出错。

Fused vertical velocity error.

排查步骤及处理办法

Troubleshooting steps and solutions

- 通过飞行日志分析定位问题范围，再进一步检查实物或环境。

Analyze the flight logs to narrow down the problem, then proceed with a physical or environmental inspection.

- 如确定地势起伏过大导致，仿地飞行建议适当降低飞行速度，或者考虑使用三维仿地作业。

If it is determined that the terrain undulation is too large, it is recommended to reduce the flight speed appropriately for the terrain following flight, or consider using 3D terrain following operation.

- 如确定地形模块测高故障，建议更换地形模块。

If the terrain module altitude measurement breakdown is determined, it is recommended to replace the terrain module.

- 如确定动力执行部件异常，请检查螺旋桨、电机、机臂安装等是否存在异常，并按需更换。

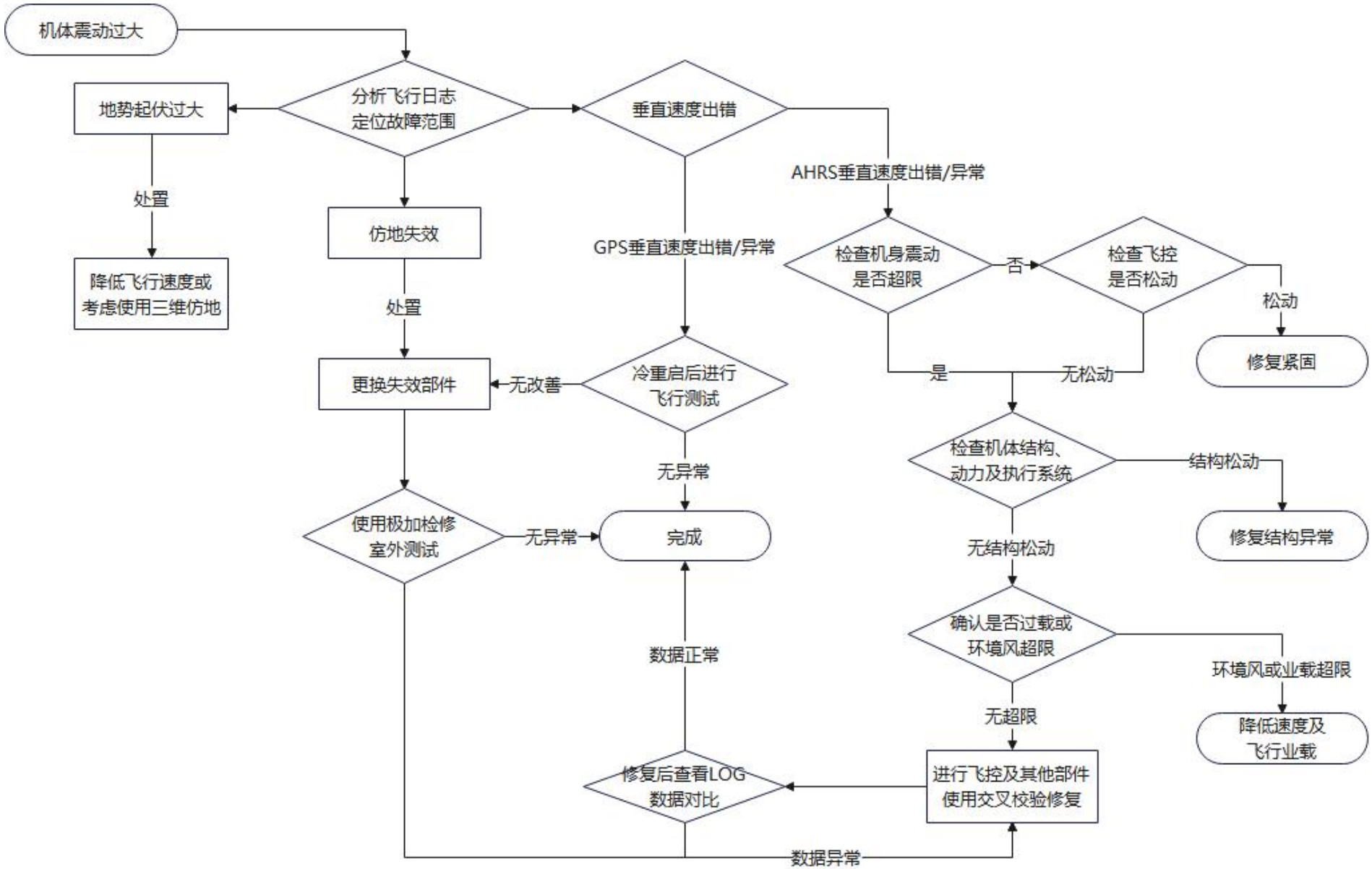
If it is determined that the propulsion system is abnormal, please check the propeller, motor, arm installation, etc. for abnormalities, and replace them as needed.

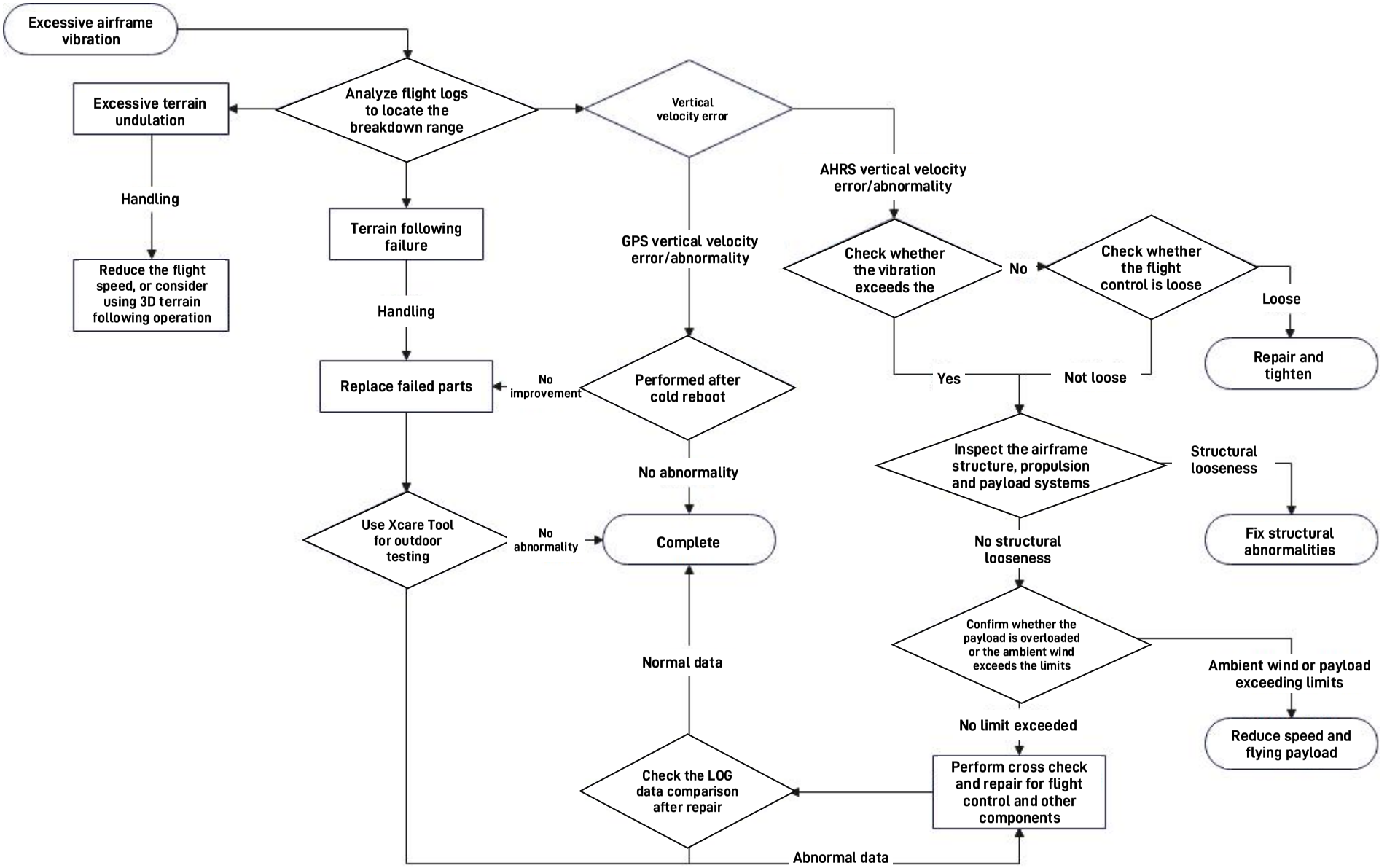
- 如确定载重或环境风问题，建议适当降低载重或适当调低速度。

If payload or ambient wind problems are identified, it is recommended to reduce the payload or reduce the speed appropriately.

- 如判断融合垂直速度出错。为振动过大导致，建议检查机体；为 IMU 或者GPS 垂直速度出错建议更换飞控。

If it is determined that there is an error in the Fused vertical velocity, and if caused by excessive vibration, it is recommended to check the airframe; if caused by the IMU or GPS vertical velocity error, it is recommended to replace the flight controller.


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


Excessive airframe vibration
Analyze flight logs to locate the breakdown range
Excessive terrain undulation
Handling
Reduce the flight speed, or consider using 3D terrain following operation
Terrain following failure
Handling
Replace failed parts
No improvement
Use Xcare Tool for outdoor testing
No abnormality
Vertical velocity error
GPS vertical velocity error/abnormality
Performed after cold reboot
No abnormality
Complete
Normal data
Check the LOG data comparison after repair
Abnormal data
AHRS vertical velocity error/abnormality
Check whether the vibration exceeds the
No
Check whether the flight control is loose
Loose
Repair and tighten
Yes
Not loose
Inspect the airframe structure, propulsion and payload systems
Structural looseness
Fix structural abnormalities
No structural looseness
Confirm whether the payload is overloaded or the ambient wind exceeds the limits
Ambient wind or payload exceeding limits
Reduce speed and flying payload
No limit exceeded
Perform cross check and repair for flight control and other components

雷达离线

Radar off-line

现象描述：“极飞农服”App 报错 4D 成像雷达离线。

Phenomenon description: The "XAG One" app reports an error that the 4D imaging radar is off-line.

原因分析

Causes

- 固件问题。

Firmware breakdown.

- 与飞控连接线缆问题。

A problem with the cable connected to the flight controller.

- 4D 成像雷达内部损坏。

Internal damage of 4D imaging radar.

排查步骤及处理办法

Troubleshooting steps and solutions

- 查看有无最新固件，更新最新固件。

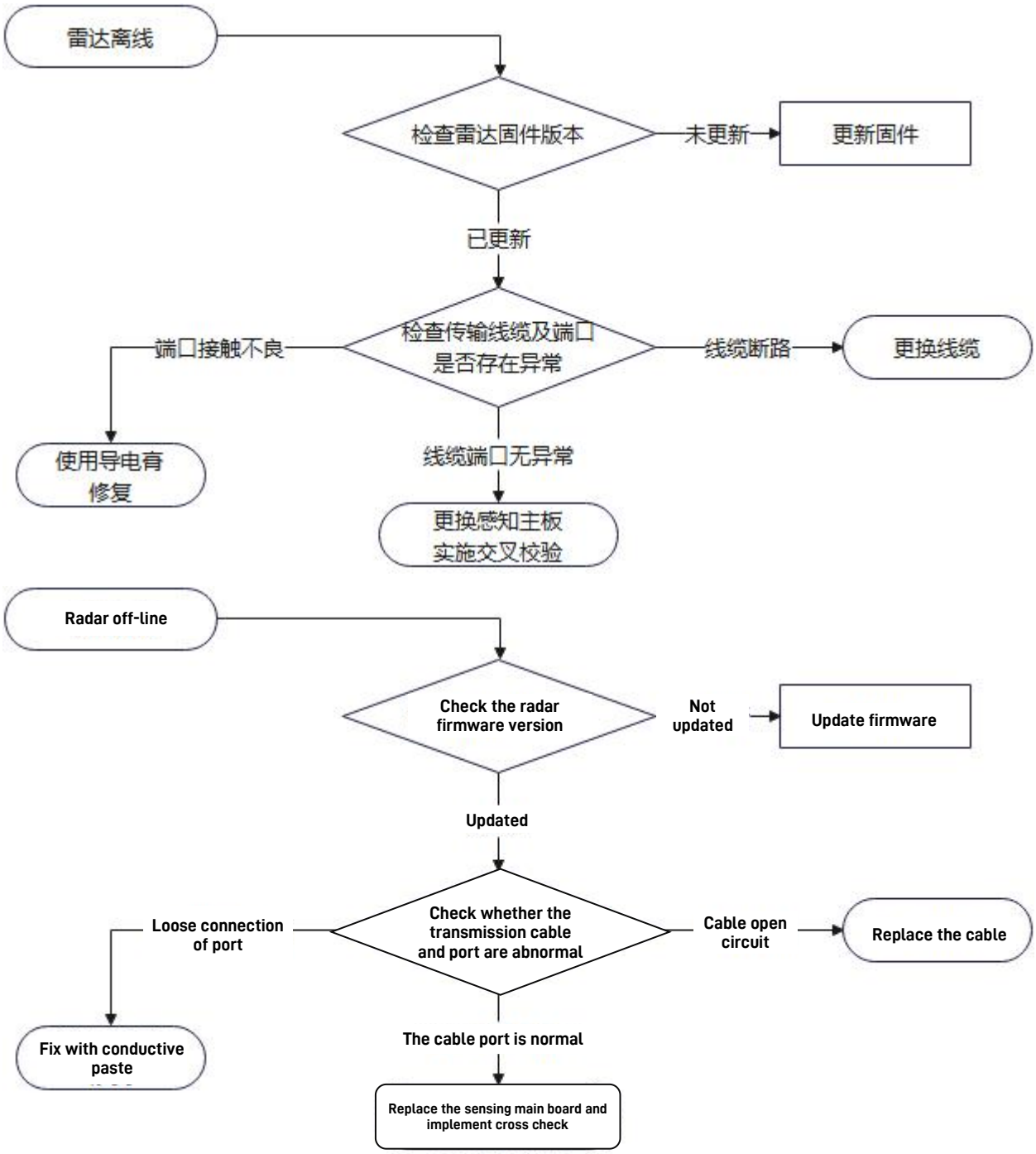
Check whether there is latest firmware, and update it to the latest version.

- 检查雷达与飞控连接的插头、线缆有无损坏，若无损坏在接头涂抹润滑脂进行测试。

Check whether the plugs and cables connecting the radar and the flight controller are damaged. If they are not damaged, apply grease to the connectors for testing.

- 上述都正常可以换件检测雷达是否损坏。

If the above conditions are normal, replace the parts to check whether the radar is damaged.


雷达离线
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
使用导电膏
修复
线缆端口无异常
更换感知主板
实施交叉校验
Radar off-line
Check the radar
firmware version
Not
updated
Update firmware
Updated
Check whether the
transmission cable
and port are abnormal
Loose connection
of port
Cable open
circuit
Replace the cable
Fix with conductive
paste
The cable port is normal
Replace the sensing main board and
implement cross check

雷达误测

Radar misdetection

现象描述："极飞农服"App 提示正在避障状态，农业无人飞机会出现飘移（一直避障但前方并无障碍物）。

Phenomenon description: The "XAG One" app prompts that it is in the obstacle avoidance state, and the agricultural drone drifts (it keeps avoiding obstacles but there is no obstacle ahead).

原因分析

Causes

- 固件问题。

Firmware breakdown.

- 雷达安装角度异常。

The radar mounting angle is abnormal.

- 飞行高度太低。

Flight altitude is too low.

- 环境问题（例如在山地、丘陵或果树地区飞行作业）。

Environment-related problems (such as mountains, hills, or fruit tree areas).

- 内部硬件损坏。

Internal hardware damage.

排查步骤及处理办法

Troubleshooting steps and solutions

- 查看有无最新固件，更新最新固件。

Check whether there is latest firmware, and update it to the latest version.

- 检查雷达固定件无变形，正常情况下可使雷达侧面二维码与地面平行。

Check that the radar holder is not deformed, and the QR code on the side of the radar can be parallel to the ground under normal circumstances.

- 避障最低飞行高度是 2 米，2.5 米以上最佳。

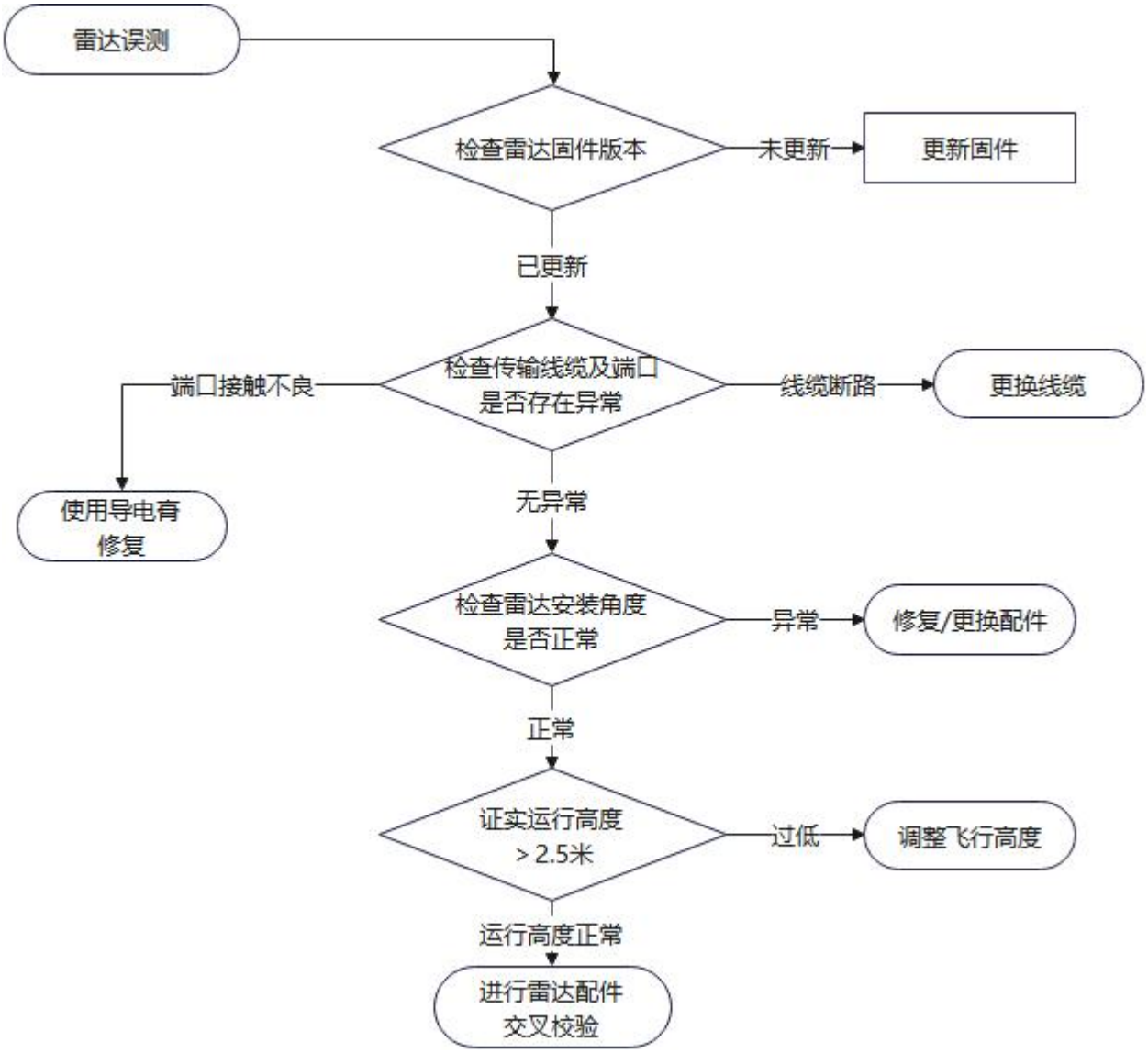
The minimum flight altitude for obstacle avoidance is 2m, and it is best to be above 2.5m.

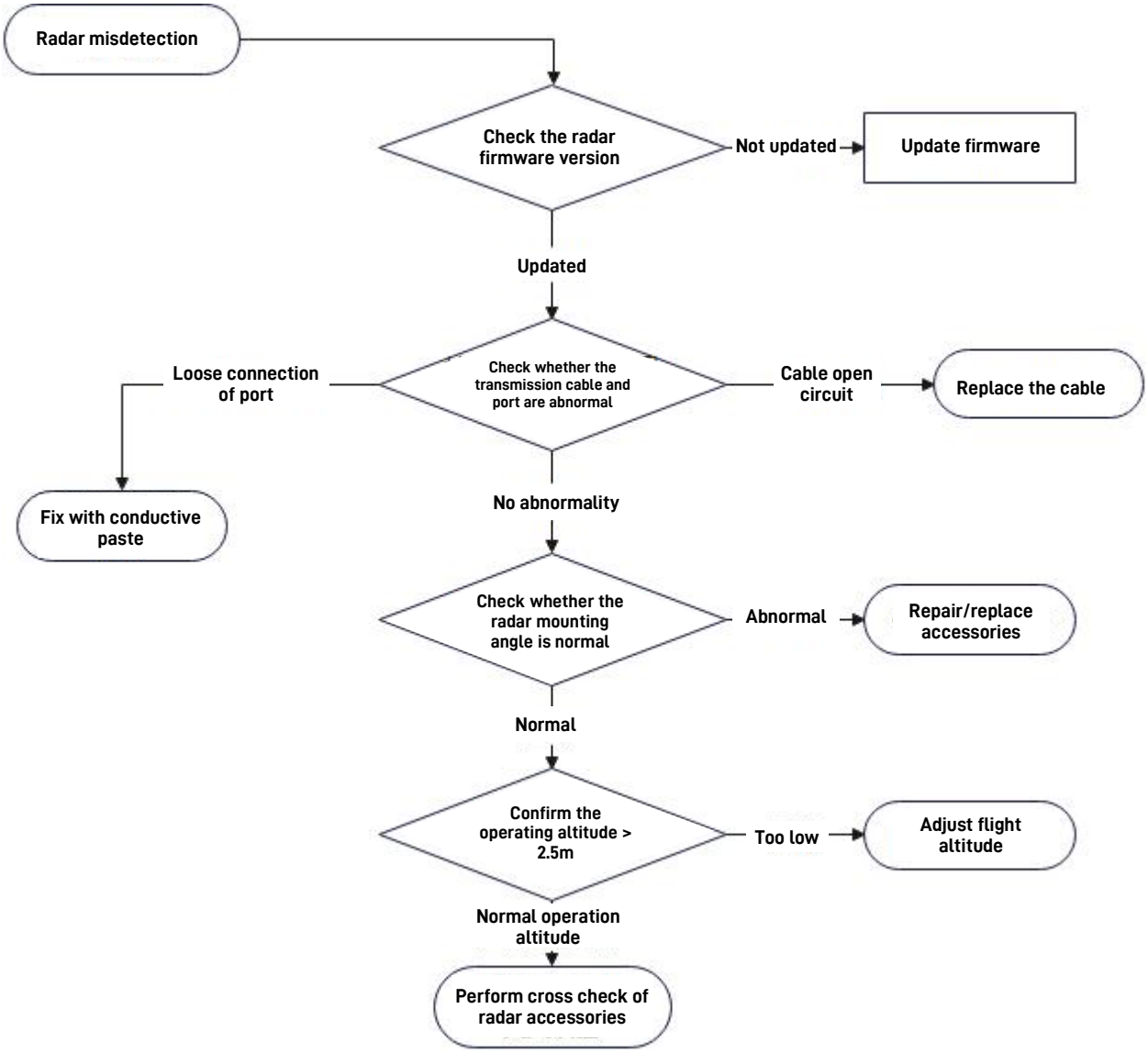
- 目前的避障只能适用于平原地区，山地、丘陵、果树等环境因素会导致雷达误测。

Obstacle avoidance only available in plains, possible radar mis-detection in mountains, hills, and fruit tree areas.

- 更换雷达进行测试。

Replace the radar for testing.


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
使用导电膏
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


Radar misdetection
Check the radar firmware version
Not updated
Update firmware
Updated
Check whether the transmission cable and port are abnormal
Loose connection of port
Fix with conductive paste
Cable open circuit
Replace the cable
No abnormality
Check whether the radar mounting angle is normal
Abnormal
Repair/replace accessories
Normal
Confirm the operating altitude > 2.5m
Too low
Adjust flight altitude
Normal operation altitude
Perform cross check of radar accessories

PSL 飞行员视角影像不显示
Pilot Sight Livestream is not displayed

现象描述：极飞农服作业界面，无法显示飞行员视角影像。

Phenomenon description: XAG One operation screen cannot display the Pilot Sight Livestream.

原因分析

Causes

- 固件问题。

Firmware breakdown.

- 相机离线。

Camera off-line.

排查步骤及处理办法

Troubleshooting steps and solutions

- 升级固件至最新版本。

Upgrade the firmware to the latest version.

- 检查相机连接线和插头有无破损、连接不良。

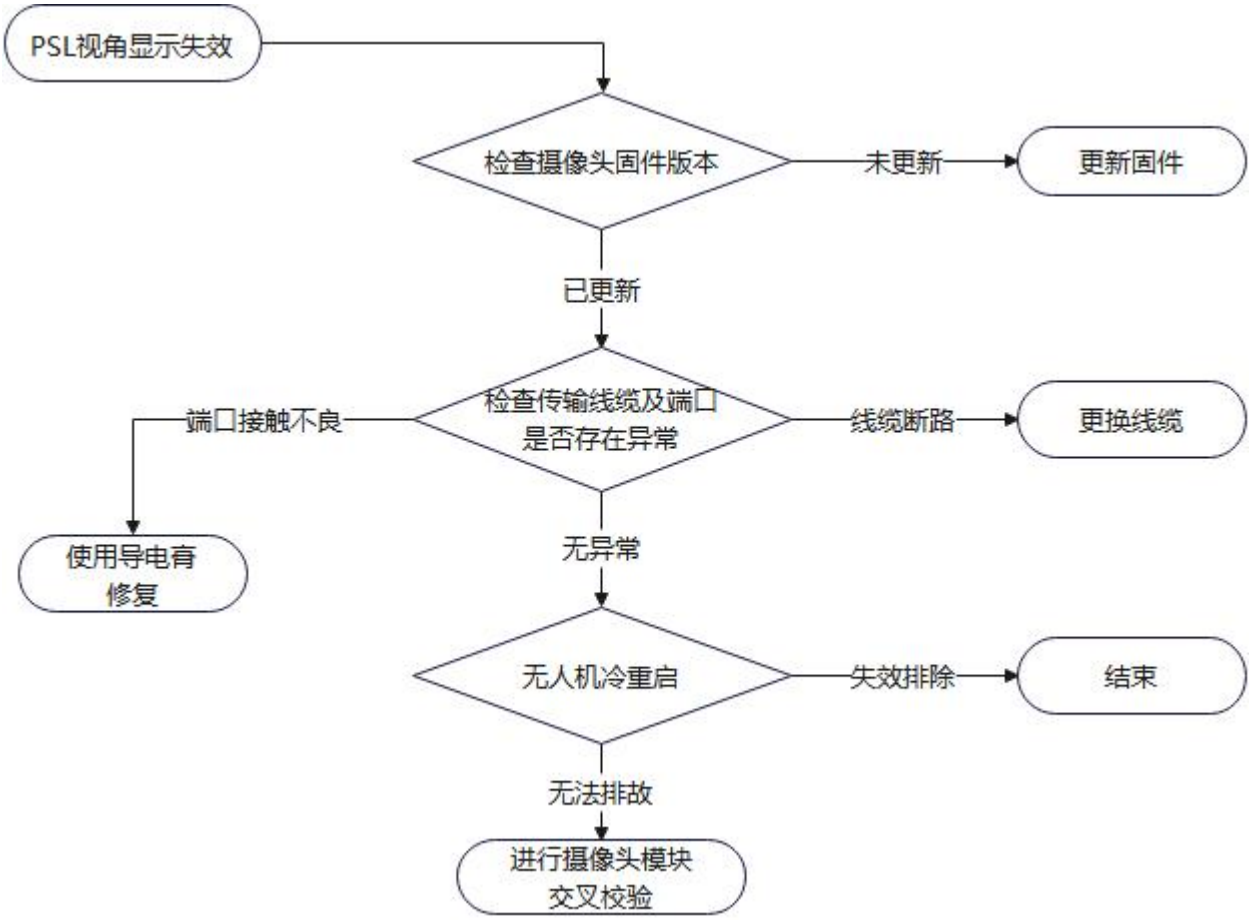
Check whether the connecting wire and the plug of the camera are damaged, or in poor contact.

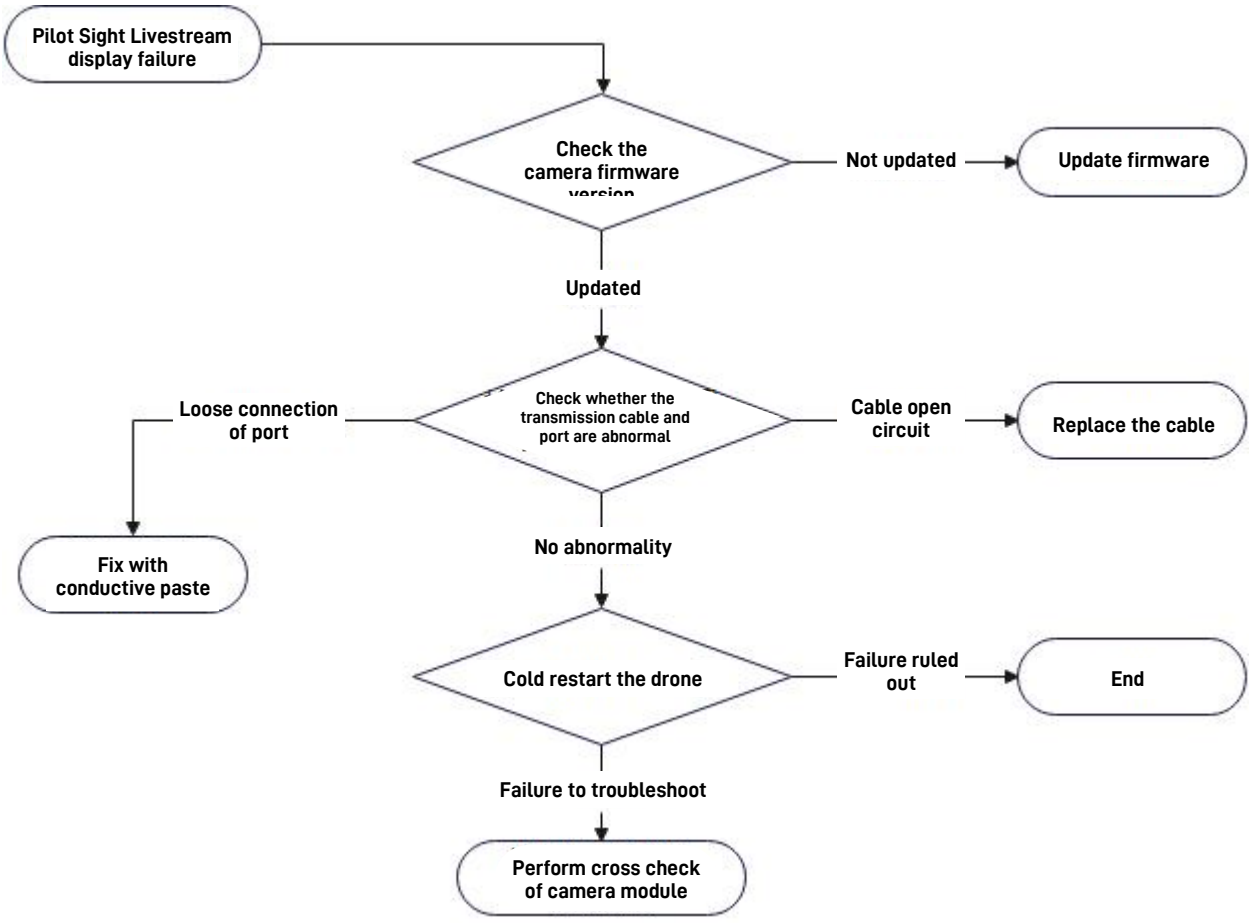
- 重新插拔插头、重启农业无人飞机。

Pull out and then re-insert the plug, and re-start the agricultural drone.

- 更换新 PSL 摄像头。

Replace with a new PSL camera.


PSL视角显示失效
检查摄像头固件版本
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
使用导电膏修复
无异常
无人机冷重启
失效排除
结束
无法排故
进行摄像头模块交叉校验


Pilot Sight Livestream display failure
Check the camera firmware version
Not updated
Update firmware
Updated
Check whether the transmission cable and port are abnormal
Loose connection of port
Cable open circuit
Replace the cable
Fix with conductive paste
No abnormality
Cold restart the drone
Failure ruled out
End
Failure to troubleshoot
Perform cross check of camera module

RTK 定位系统
RTK Positioning System

卫星信号不良
Weak satellite signal

现象描述：“极飞农服"App 提示“农业无人飞机未进入 RTK 状态，卫星数少"；或查看飞行日志显示农业无人飞机退出 RTK 且卫星数较少。

Phenomenon description: the "XAG One" app prompts "The agricultural drone is not in RTK mode, and the number of satellites is small"; Or the flight log shows that the agricultural drone exits RTK mode and the number of satellites is small.

原因分析

Causes

- 设备所在环境存在干扰或遮挡。

There is interference or obstruction in the environment where the device is located.

- RTK 天线或馈线存在松动、破损、接触不良。

The RTK antenna or feeder is loose, damaged or has loose connection.

- 飞控硬件故障。

Flight controller hardware breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确保设备在室外，环境空旷、无较大遮挡物（如高大建筑、防风林等）。检查 RTK 填写是否连接错误，是否存在松动、破损或接触不良。

Make sure the device is outdoors, in an open environment with no large obstructions (such as tall buildings, windbreaks, etc.). Check whether the RTK antenna is connected incorrectly, and whether it is loose, damaged or has loose connection.

- 依次将左右两根RTK 天线头拆下，检查馈线与天线头连接处有无破损、松动或异常，如有异常请进行更换。

Remove the left and right RTK antenna heads in turn, and check whether the connection between the feeder and the antenna heads is damaged, loose or abnormal. If there is any abnormality, please replace it.

- 若天线及其馈线无明显外观异常，请依次单独安装左右天线进行地面测试，观察卫星数及其定位精度是否正常（卫星数大于 25 左右，定位精度小于 0.1），确定某根 RTK 天线是否存在异常，如有异常进行更换。

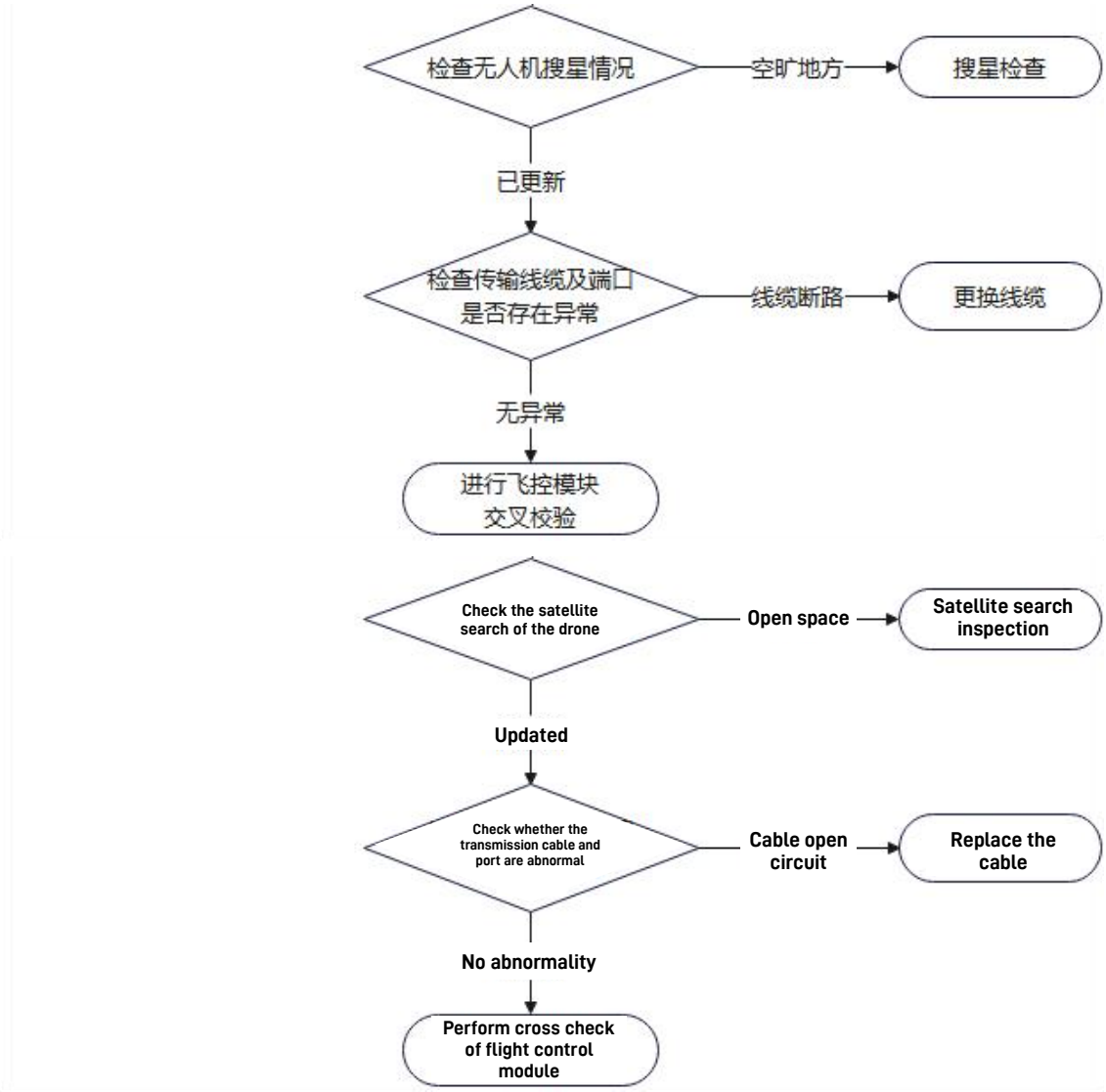
If there is no obvious exterior abnormality in the antenna and its feeder, install the left and right antennas separately in turn for ground test, observe whether the number of satellites and its positioning accuracy are normal (the number of satellites is greater than 25 or so, and the positioning accuracy is less than 0.1), determine whether there is an abnormality in a certain RTK antenna, and replace it if there is an abnormality.

- 如都正常，请进行悬停测试与飞行测试，并观察卫星数、定位精度、航向精度是否正常（卫星数大于 25 左右，定位精度小于 0.1，航向精度小于 1）；进行测试前请务必确保地形模块功能正常且对地视觉镜头干净，地面纹理清晰。

If all is normal, please perform hover test and flight test, and observe whether the number of satellites, positioning accuracy and heading accuracy are normal (the number of satellites is greater than 25 or so, the positioning accuracy is less than 0.1, and the heading accuracy is less than 1); Before testing, please make sure that the terrain module functions normally and the downward vision lens is clean, and the ground texture is clear.

- 如悬停测试与飞行测试都正常则为环境干扰造成的卫星信号不良，如否请换件进行测试。

If the hover test and flight test are normal, it is weak satellite signal caused by environmental interference. If not, please replace the parts for testing.



RTK 延时过大
High RTK latency

原因分析

Causes

- 软件或固件未更新到最新。

The software or firmware is not updated to the latest version.

- RTK 天线或馈线存在松动、破损、接触不良。

The RTK antenna or feeder is loose, damaged or has loose connection.

- 飞控内部天线松动或飞控故障。

The internal antenna of the flight controller is loose or the flight controller has a breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确定"极飞农服"App及各模块固件版本是否最新。

Determine whether the firmware versions of the "XAG One" app and each module are the latest.

- 检查 RTK 填写是否连接错误，是否存在松动、破损或接触不良。

Check whether the RTK antenna is connected incorrectly, and whether it is loose, damaged or has loose connection.

- 确保设备在室外，环境空旷、无较大遮挡物（如高大建筑、防风林等）。

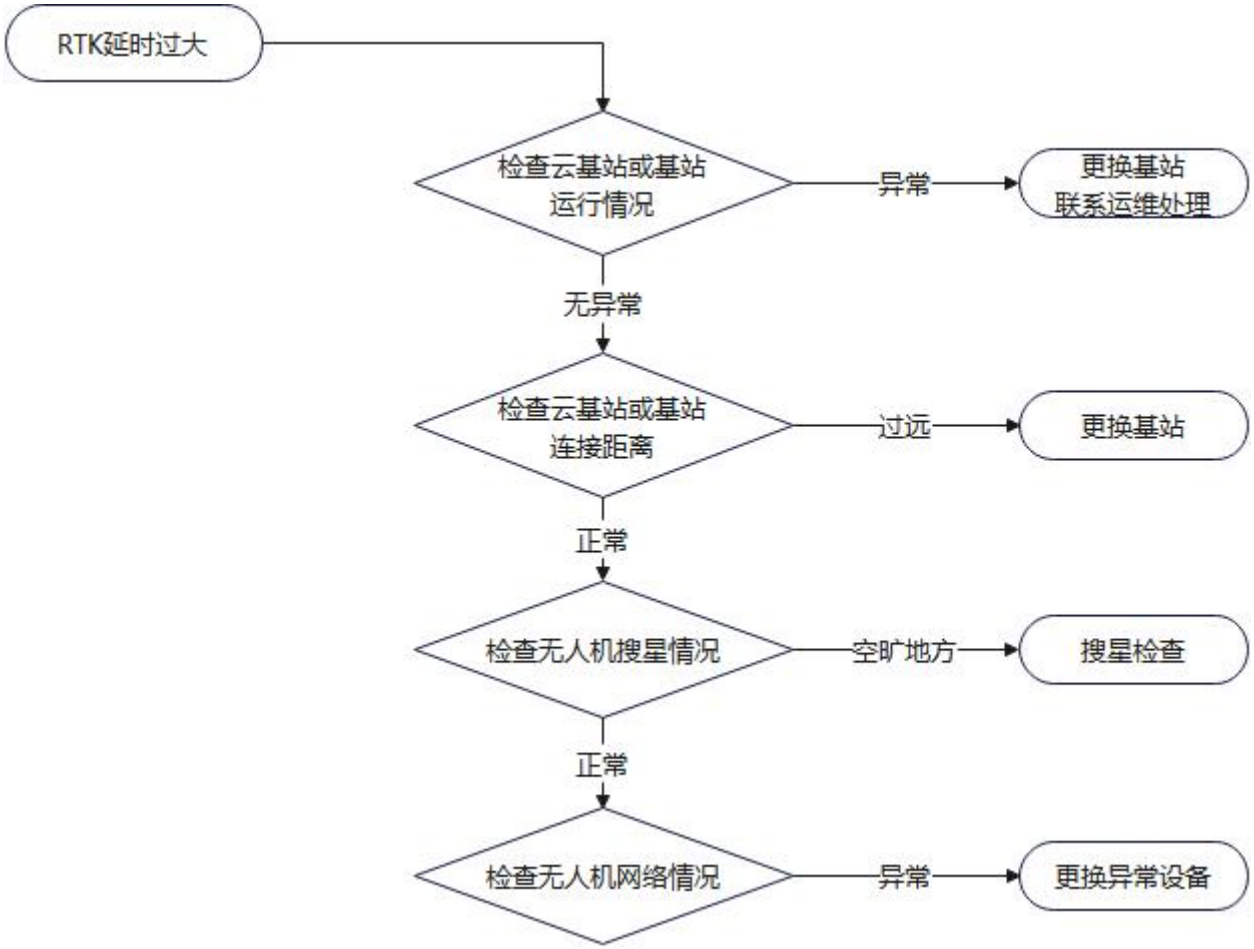
Make sure the device is outdoors, in an open environment with no large obstructions (such as tall buildings, windbreaks, etc.).

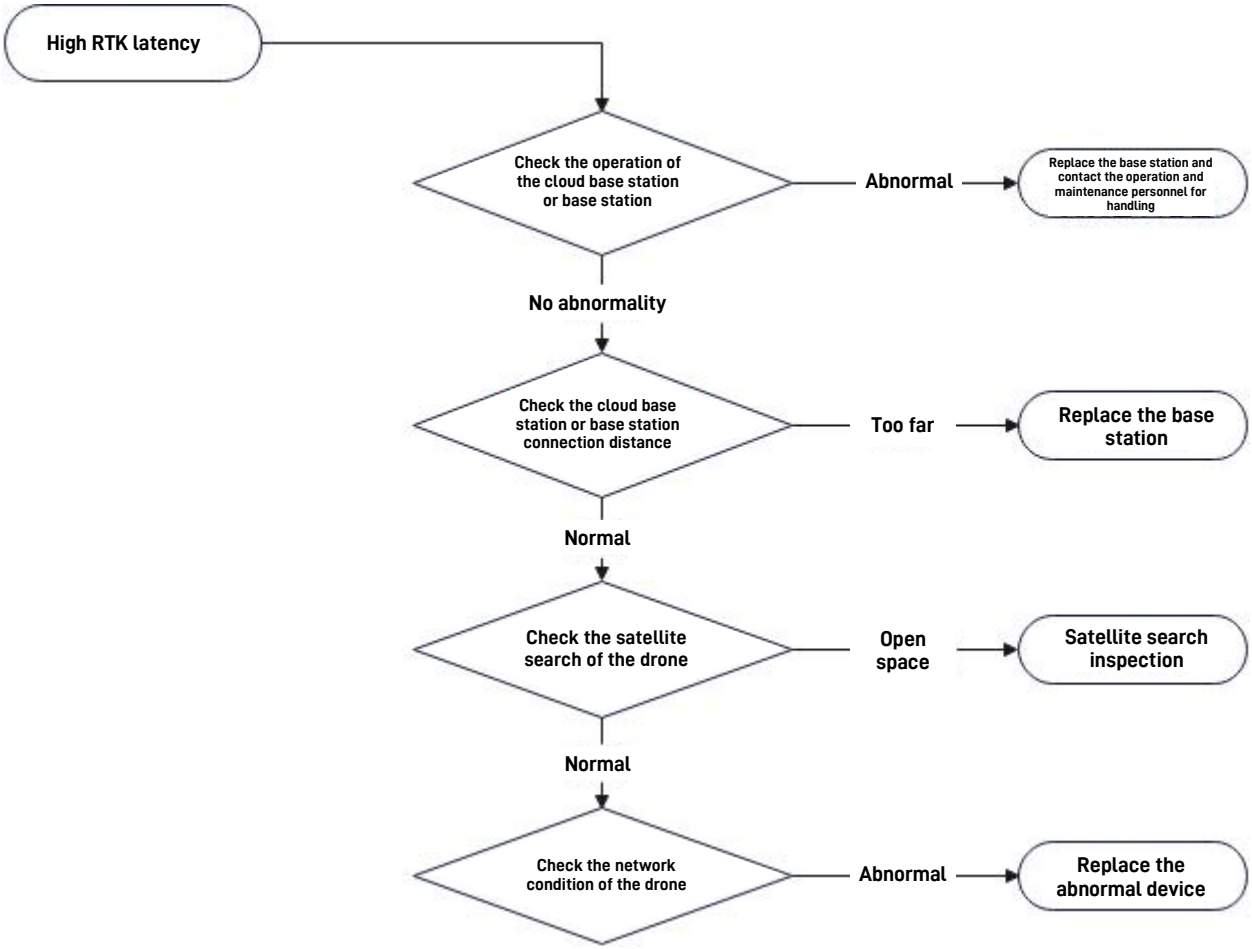
- 依次将左右两根RTK 天线头拆下，检查馈线与天线头连接处有无破损、松动或异常，如有异常请进行更换。

Remove the left and right RTK antenna heads in turn, and check whether the connection between the feeder and the antenna heads is damaged, loose or abnormal. If there is any abnormality, please replace it.

- 如天线及其馈线无明显外观异常，请依次单独安装左右天线进行地面测试，观察卫星数及其定位精度是否正常（卫星数大于 25 左右，定位精度小于 0.1），确定某根 RTK 天线是否存在异常，如有异常进行更换。如都正常，请进行悬停测试与飞行测试，并观察卫星数、定位精度、航向精度是否正常（卫星数大于 25 左右，定位精度小于 0.1，航向精度小于 1）；进行测试前请务必确保地形模块功能正常且对地视觉镜头干净，地面纹理清晰。

If there is no obvious exterior abnormality in the antenna and its feeder, install the left and right antennas separately in turn for ground test, observe whether the number of satellites and its positioning accuracy are normal (the number of satellites is greater than 25 or so, and the positioning accuracy is less than 0.1), determine whether there is an abnormality in a certain RTK antenna, and replace it if there is an abnormality. If all is normal, please perform hover test and flight test, and observe whether the number of satellites, positioning accuracy and heading accuracy are normal (the number of satellites is greater than 25 or so, the positioning accuracy is less than 0.1, and the heading accuracy is less than 1); Before testing, please make sure that the terrain module functions normally and the downward vision lens is clean, and the ground texture is clear.


RTK延时过大
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


High RTK latency
Check the operation of the cloud base station or base station
Abnormal
Replace the base station and contact the operation and maintenance personnel for handling
No abnormality
Check the cloud base station or base station connection distance
Too far
Replace the base station
Normal
Check the satellite search of the drone
Open space
Satellite search inspection
Normal
Check the network condition of the drone
Abnormal
Replace the abnormal device

农业无人飞机无法进入 RTK 或者中途退出

Agricultural drone fails to enter RTK, or exits midway

现象描述：正常启动农业无人飞机后，无法进入 RTK 状态，进入 RTK 状态后，中途退出 RTK。

Phenomenon description: After successful start-up, the agricultural drone fails to enter RTK mode or exits RTK mode midway.

原因分析

Causes

- 设备放置在室内，导致 RTK 不稳定。

The device is placed indoors, resulting in RTK working unstably.

- RTK 天线受异物遮挡，影响信号接收。

The RTK antenna is obscured by foreign matters, hindering signal receiving.

- RTK 出现故障或天线接口处接触不良。

The RTK has breakdown or its antenna interface has poor contact.

排查步骤及处理办法

Troubleshooting steps and solutions

- 若农业无人飞机处在室内，请把农业无人飞机移动至空旷、农业无人飞机上方无遮挡的地带。

If the agricultural drone is placed indoors, please move the agricultural drone to an open area with no shelter above the agricultural drone.

- 农业无人飞机在准备进入RTK 前，请勿用异物遮挡（放置）在RTK 天线上方，人员也请远离农业无人飞机一米。

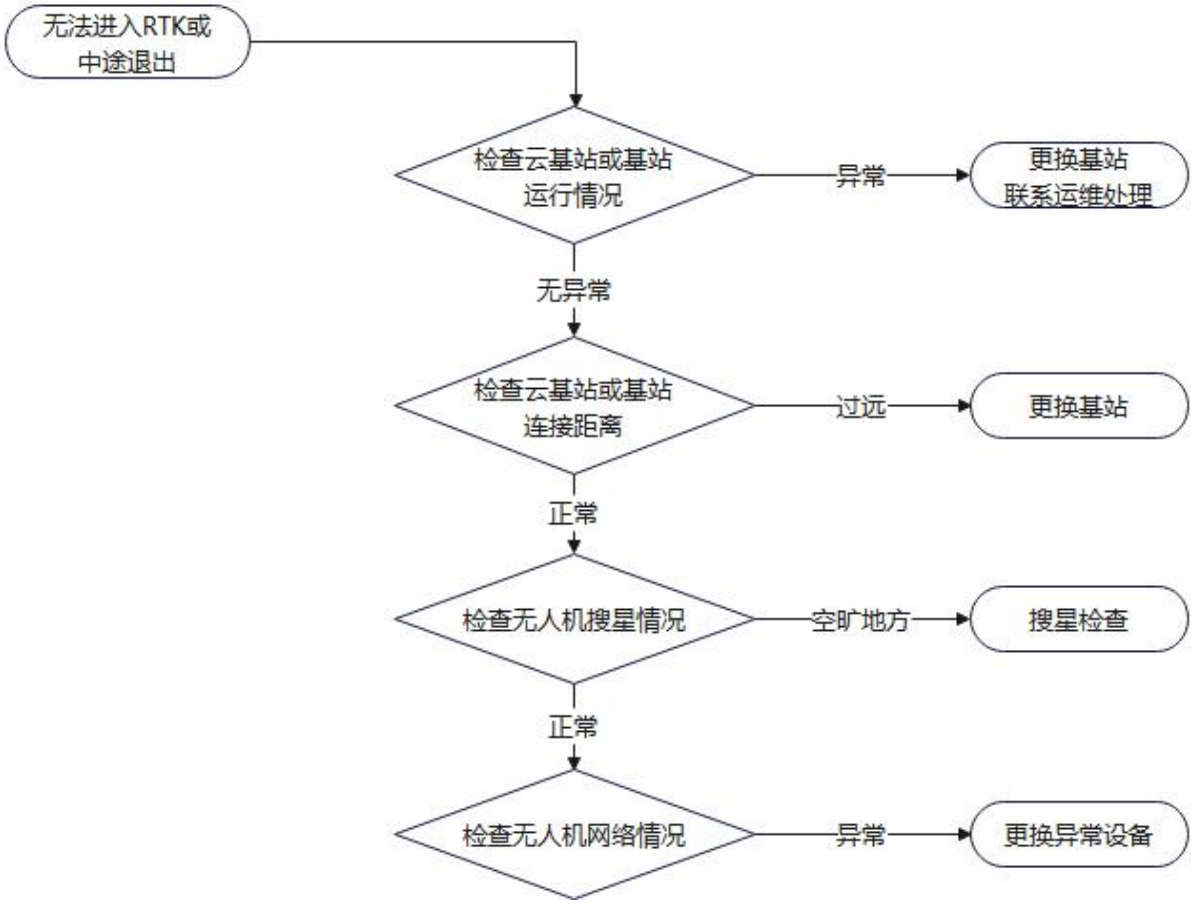
If the agricultural drone is ready to enter RTK mode, please do not put any foreign matters above the RTK antenna. Please keep personnel 1 meter away from the agricultural drone.

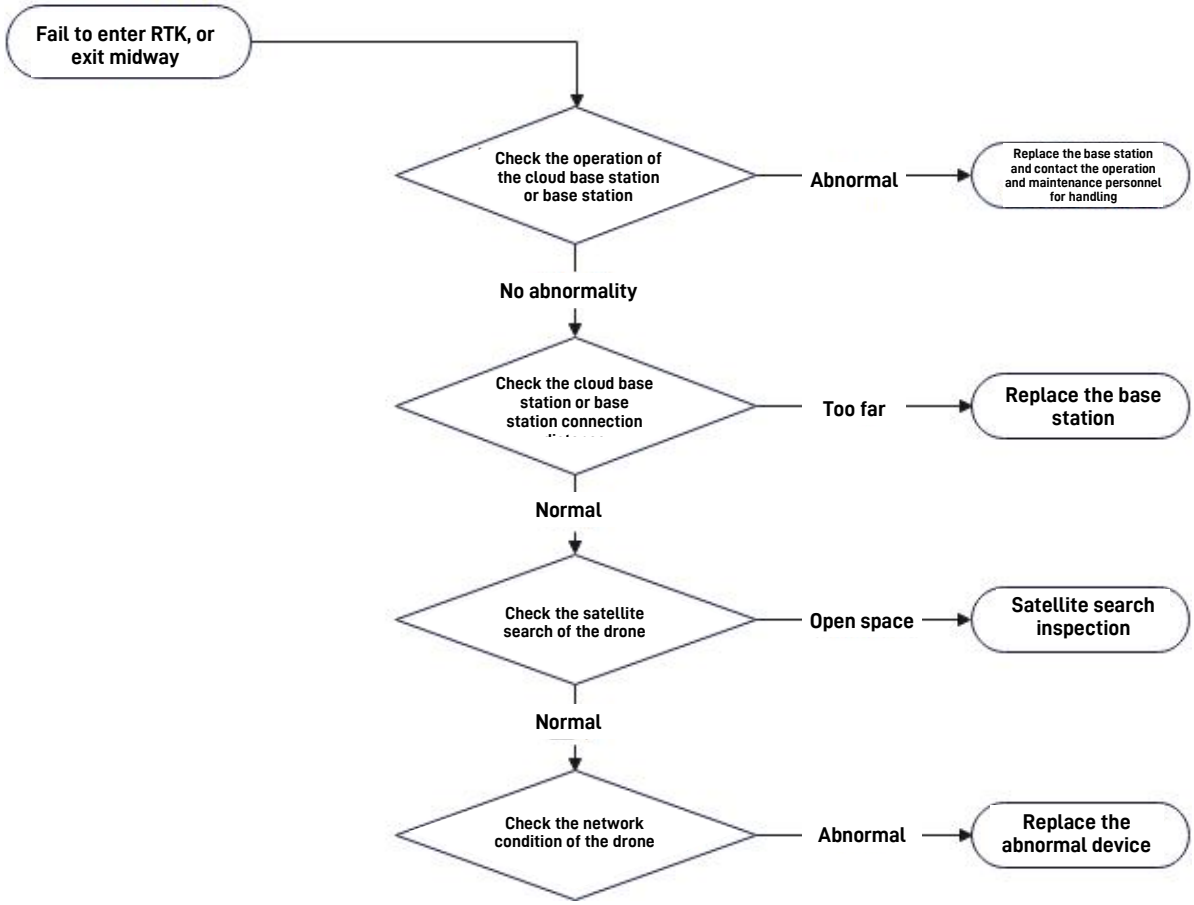
- 农业无人飞机进入 RTK 后，请勿将异物放置天线上方或遮挡 RTK 天线，检查连接处是否接触良好。

After the agricultural drone has entered RTK mode, please do not put any foreign matters above the RTK antenna. Check whether its connection is in good condition.

- 依次将左右两根 RTK 天线头拆下，检查馈线与天线头连接处有无破损、松动或异常，如有异常则更换。

Remove the left and right RTK antenna heads in turn, and check whether the connection between the feeder and the antenna heads is damaged, loose or abnormal. If there is any abnormality, please replace it.


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


Fail to enter RTK, or
exit midway
Check the operation of
the cloud base station
or base station
Abnormal
Replace the base station
and contact the operation
and maintenance personnel
for handling
No abnormality
Check the cloud base
station or base
station connection
Too far
Replace the base
station
Normal
Check the satellite
search of the drone
Open space
Satellite search
inspection
Normal
Check the network
condition of the drone
Abnormal
Replace the
abnormal device

通讯系统

Communication System

添加农业无人飞机报错“未在附近检测到设备”

When adding an agricultural drone, the software reports an error: "No device detected nearby".

现象描述：添加农业无人飞机作业设备时，软件报错，显示“未在附近检测到设备"。

Phenomenon description: When adding agricultural drone operation device, the software reports an error and displays "No device detected nearby".

原因分析

Causes

- 农业无人飞机未进行授权或绑定。

The agricultural drone is not authorized or bound.

- 农业无人飞机与手机距离超过 1 公里会有此报错。

This error will be reported when the distance between the agricultural drone and the mobile phone exceeds 1 km.

- 农业无人飞机网络通讯异常。

The network of the agricultural drone has a communication exception.

- 农业无人飞机定位系统异常。

Abnormal agricultural drone positioning system.

排查步骤及处理办法

Troubleshooting steps and solutions

- 添加设备前，请确认需要添加的农业无人飞机没有被其他用户绑定，实物飞控序列号与绑定飞控序列号一致。

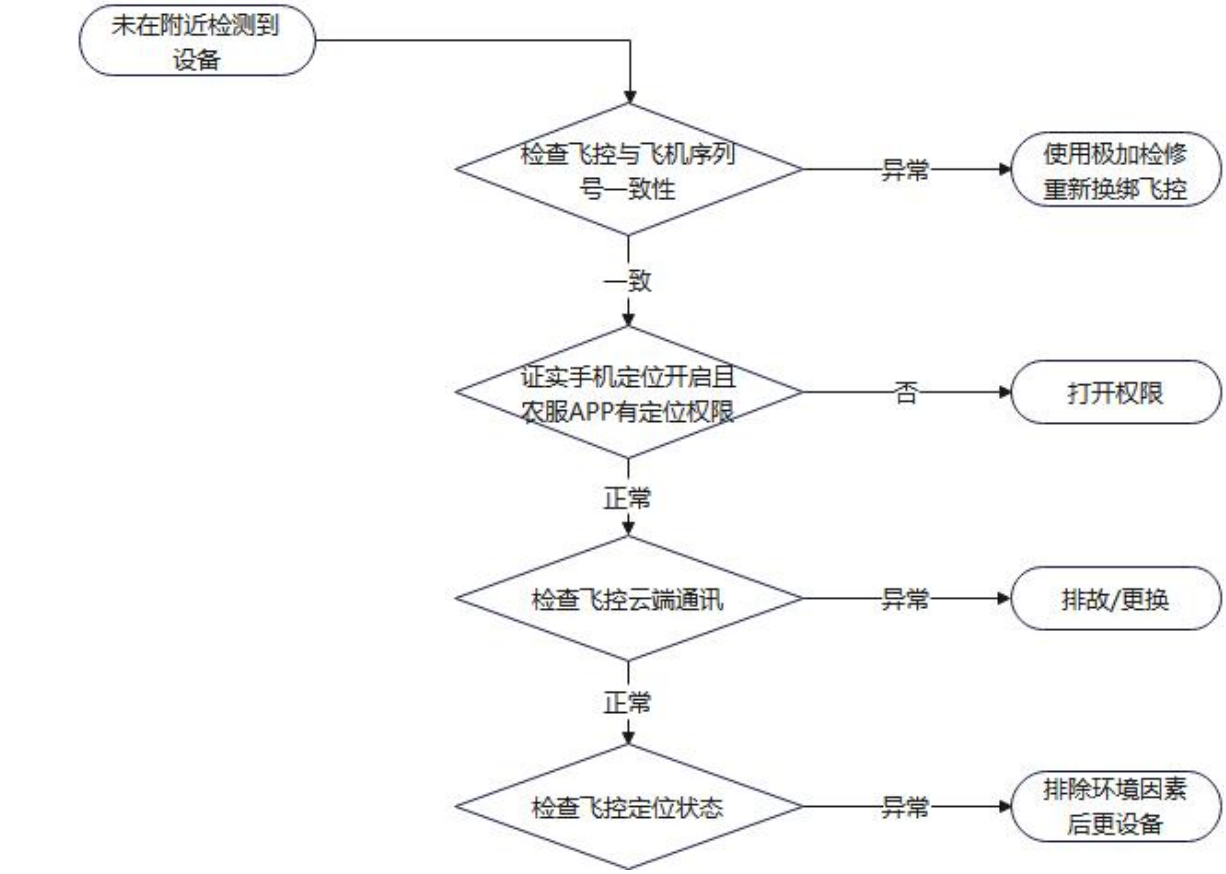
Before adding devices, please confirm that the agricultural drone to be added has not been bound by other users, and the physical flight controller serial number is consistent with the bound flight controller serial number.

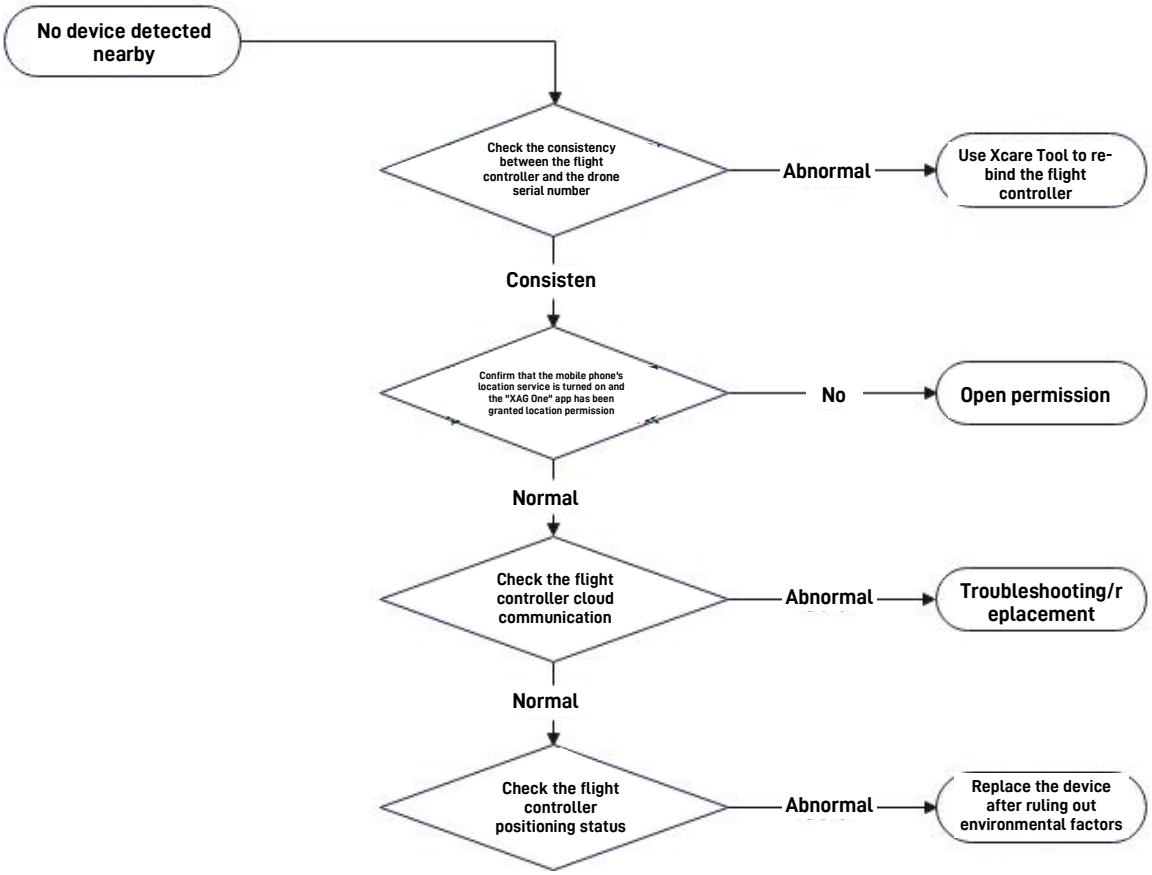
- 农业无人飞机与手机距离超过 1 公里会有此报错，请将农业无人飞机搬至空旷无遮挡的空地并开启农业无人飞机电源，确保手机定位已打开且“极飞农服”App 已获取定位权限。

This error will be reported when the distance between the agricultural drone and the mobile phone exceeds 1 km. Please move the agricultural drone to an open and unobstructed space and turn on the power of the agricultural drone to ensure that the mobile phone's location service is turned on and the "XAG One" app has been granted location permission.

- 检查飞控云端通讯指示灯，确保农业无人飞机网络通讯正常。检查飞控定位状态指示灯，确保农业无人飞机定位系统正常。

Check the flight controller cloud communication indicator light to ensure that the agricultural drone network communication is normal. Check the flight controller positioning status indicator to ensure that the agricultural drone's positioning system is normal.


未在附近检测到设备
检查飞控与飞机序列号一致性
异常
使用极加检修重新换绑飞控
一致
证实手机定位开启且农服APP有定位权限
否
打开权限
正常
检查飞控云端通讯
异常
排故/更换
正常
检查飞控定位状态
异常
排除环境因素后更设备


No device detected nearby
Check the consistency between the flight controller and the drone serial number
Abnormal
Use Xcare Tool to re-bind the flight controller
Consisten
Confirm that the mobile phone's location service is turned on and the "XAG One" app has been granted location permission
No
Open permission
Normal
Check the flight controller cloud communication
Abnormal
Troubleshooting/replacement
Normal
Check the flight controller positioning status
Abnormal
Replace the device after ruling out environmental factors

遥控器与手机无法连接

Remote controller and mobile phone cannot be connected

现象描述：启动遥控器电源后，手机无法正常连接上遥控器。

Phenomenon description: After the remote controller power is turned on, the mobile phone cannot be connected to the remote controller normally.

原因分析

Causes

- 网络通讯异常。

Network communication exception.

- Wi-Fi 通讯异常。

Wi-Fi communication exception.

排查步骤及处理办法

Troubleshooting steps and solutions

- 使用 4G 连接时，检查手机及遥控器的网络环境、信号强度，并更换不同的运营商试试。

When using 4G connection, check the network environment and signal strength of the mobile phone and remote controller, and try to switch to a different carrier.

- 检查 SIM 卡是否能上网（自带的物联卡从设备取出会锁卡）。

Check whether the SIM card can access the Internet (the built-in IoT card will be locked when it is removed from the device).

- 检查卡槽是否损坏或返厂处理。

Check whether the card slot is damaged or needs to be sent back to the factory for repair.

- 使用 Wi-Fi 连接时，检查固件是否更新至最新版本。

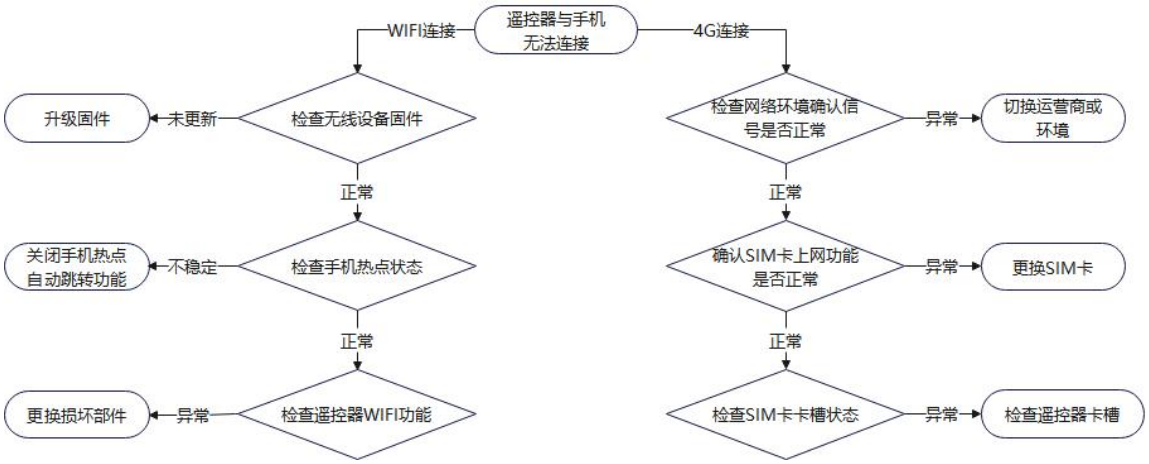
When using a Wi-Fi connection, check that the firmware is updated to the latest version.

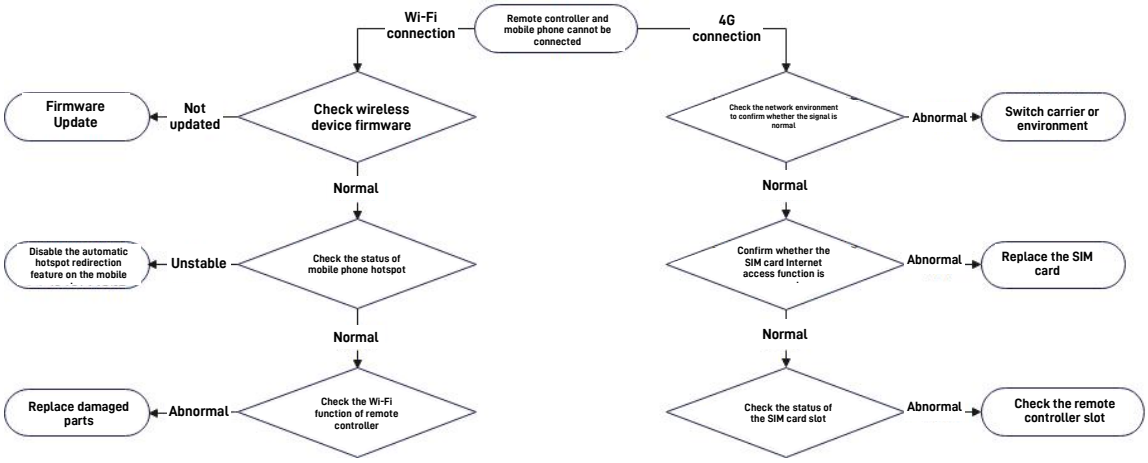
- 手机热点是否连接准确，未自动跳出热点。

Check whether the mobile phone hotspot is correctly connected and has not automatically disconnected.

- 检查 Wi-Fi 天线、Wi-Fi 模块是否损坏。

Check the Wi-Fi antenna and Wi-Fi module for damage.




Remote controller and mobile phone cannot be connected
Wi-Fi connection
4G connection
Check wireless device firmware
Not updated
Firmware Update
Normal
Check the status of mobile phone hotspot
Unstable
Disable the automatic hotspot redirection feature on the mobile
Normal
Check the Wi-Fi function of remote controller
Abnormal
Replace damaged parts
Check the network environment to confirm whether the signal is normal
Abnormal
Switch carrier or environment
Normal
Confirm whether the SIM card Internet access function is
Abnormal
Replace the SIM card
Normal
Check the status of the SIM card slot
Abnormal
Check the remote controller slot

遥控器无法绑定农业无人飞机

The remote controller cannot bind the agricultural drone

现象描述：第三颗农业无人飞机连接指示灯不亮，遥控器与农业无人飞机绑定失败。

Phenomenon description: The third agricultural drone connection indicator light does not light up, and the remote controller fails to bind the agricultural drone.

原因分析

Causes

- 4G 链路延时过大，App 的版本问题。

The 4G link has excessive latency, which may be due to an issue with the app version.

- 遥控器硬件故障。

Hardware breakdown of remote controller.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查各自的网络环境、信号强度，并更换不同的运营商试试。

Check the network environment and signal strength for each, and try to switch to a different carrier.

- 使用组网功能通过局域网进行连接。

Use the networking function to connect via LAN.

- 更换遥控器排除遥控器硬件问题。

Replace the remote controller to rule out remote controller hardware problems.

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

Wireless communication light	Status
Green Light ON	Normal communication with the drone
Single Flashing Green Light	Remote controller's communication initialization
Single Flashing Yellow Light	In the networking mode
OFF	Not connected to the drone

遥控器红灯闪烁一直无法进入绿灯闪烁

The remote controller's red light is flashing and fails to switch to green light flashing state

现象描述：正常启动单手控后，单手控 6 个灯，一直处于为红灯并闪烁，未显示绿灯闪烁。

Phenomenon description: After the ControlStick is normally started, the 6 lights of the ControlStick remain red and keep flashing, with no green light flashing displayed.

原因分析

Causes

- 误触遥控器功能键，导致遥控器处于设备更新或对频状态。

The remote controller function key is accidentally touched, causing the remote controller to be in the device update or frequency synchronization state.

- 遥控数据出现上网异常。

The remote control data is connected to the Internet abnormally.

排查步骤及处理办法

Troubleshooting steps and solutions

- 如是升级过程，该情况为正常现象，请等待闪烁并自动关机即可，时间大概 1 分钟。

If this occurs during the upgrade, it is a normal phenomenon. Please wait for the flashing and automatic shutdown, which should take about 1 minute.

- 如每次开机都出现红灯闪烁，请进入 U 盘模式用电脑对 U 盘进行格式化处理。

If the red light flashing occurs every time the device is powered on, please enter USB mode and format the USB drive using a computer.

- 若是添加模式（21 款后才有）：一直闪烁或者闪烁完后熄灭无法添加，检测网络情况。

If in adding mode (available for models after 2021): If the light keeps flashing or turns off after flashing and fails to add, check the network conditions.

- 正常开机后，查看第三个灯是否一直闪烁，一直闪烁排查步骤见 5.5。

After normal startup, check if the third light keeps flashing. If it does, refer to section 5.5 for troubleshooting steps.

- 正常开机后，查看第二个灯是否亮起，不亮代表无法上网。

After normal startup, check if the second light is on. If it is not lit, it indicates no internet connection.

- SIM 卡是否正常上网，重新拔插或者更换运营商试试，一般信号好坏：移动 > 电信 > 联通。

Check if the SIM card is connected to the internet properly. Try reinserting it or switching to a different carrier. Generally, signal strength ranks as follows: 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

Mobile network indicator	Status
Green Light ON	Intranet communication is normal
Single Flashing Green Light	Intranet/extranet communication is normal
Yellow Light ON	Normal communication in LNT mode
Red Light ON	Abnormal communication
OFF	SIM card not detected

遥控器开机后第三颗绿灯一直闪烁不熄灭

The third green light keeps flashing and does not turn off after powering on the remote controller

现象描述：遥控器开机后第三颗绿灯一直闪烁不熄灭。

Phenomenon description: The third green light keeps flashing and does not turn off after powering on the remote controller.

原因分析

Causes

- 遥控器主板固件不是最新版本。

The firmware on the remote controller's mainboard is not the latest version.

- 遥控器电量不足。

The remote controller has insufficient battery power.

- 遥控器 Wi-Fi 模块故障或 Wi-Fi 固件问题。

The Wi-Fi module of the remote controller has a breakdown, or there is an issue with the Wi-Fi firmware.

排查步骤及处理办法

Troubleshooting steps and solutions

- 将遥控器主板固件升级到最新版本。

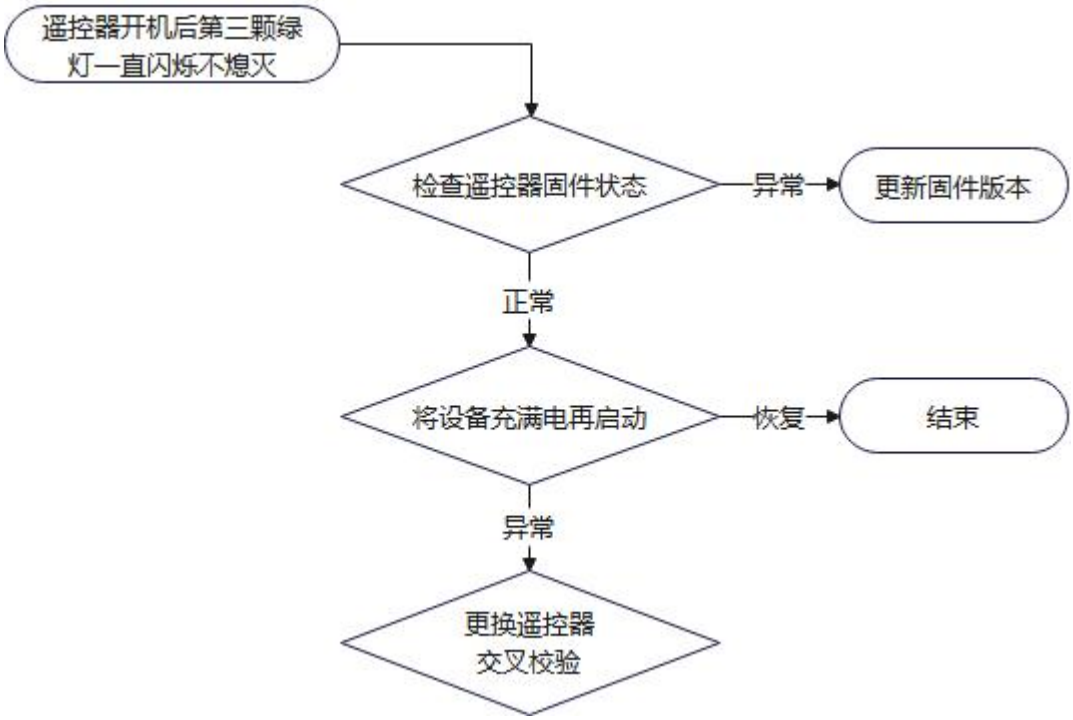
Update the mainboard firmware of the remote controller to the latest version.

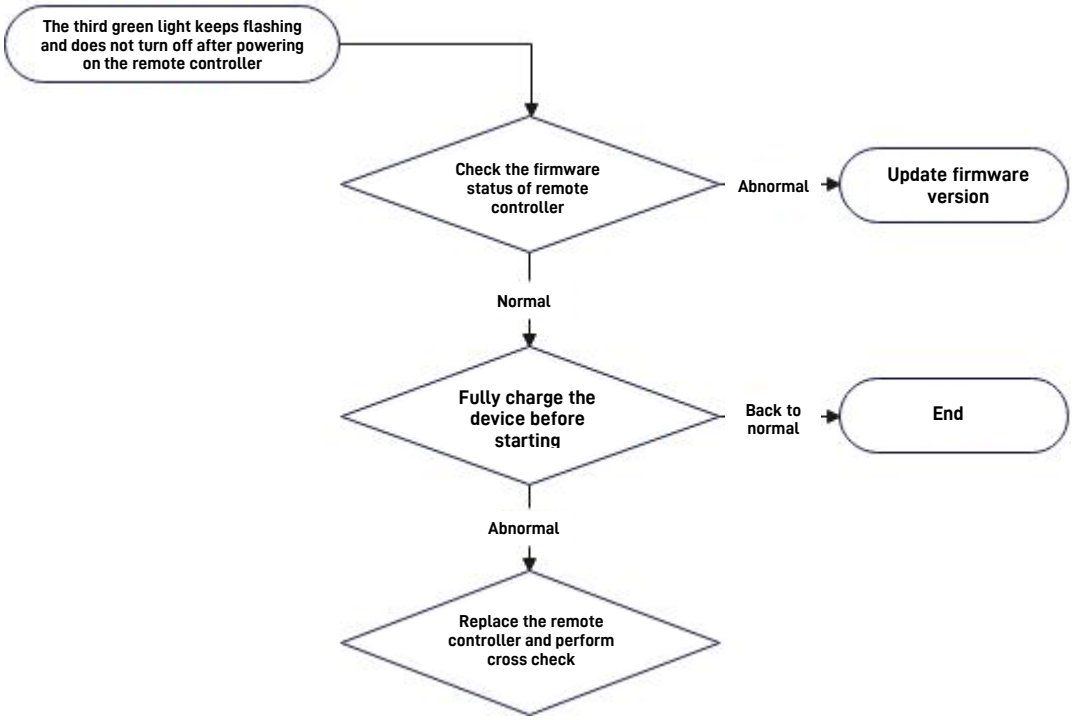
- 将遥控器充电再开机试试。

Charge the remote controller and try powering it on again.

- 确认是否摔过，可能摔坏 Wi-Fi 模块导致接触不良。

Check if the remote controller has been dropped, as this may have damaged the Wi-Fi module, causing loose connection.


遥控器开机后第三颗绿灯一直闪烁不熄灭
检查遥控器固件状态
异常
更新固件版本
正常
将设备充满电再启动
恢复
结束
异常
更换遥控器交叉校验


The third green light keeps flashing and does not turn off after powering on the remote controller
Check the firmware status of remote controller
Abnormal
Update firmware version
Normal
Fully charge the device before starting
Back to normal
End
Abnormal
Replace the remote controller and perform cross check

运营商网络切换失败

Failure to switch carrier networks

现象描述：根据作业需求，手机无法完成运营商网络切换。

Phenomenon description: The mobile phone cannot complete the carrier network switch as required for the operation.

原因分析

Causes

- 硬件原因，4G 模组异常，飞控无法识别模组。

Hardware issue: The 4G module is abnormal, and the flight control cannot recognize the module.

- 卡或卡槽硬件异常，导致无法识别到卡。

Abnormal SIM card or card slot hardware, resulting in failure to detect the card.

- 卡被拔插过、或运营商问题，导致锁卡和停机。

The SIM card has been removed and reinserted, or there is an issue with the carrier, causing the card to be locked or deactivated.

- 当地对应的运营商网络信号差。

Poor signal from the corresponding carrier network in the local area.

- 当前上网的运营商网络差，导致 App 下发的指令无法到达设备。

Poor network quality of the current carrier, causing commands from the App to fail to reach the device.

排查步骤及处理办法

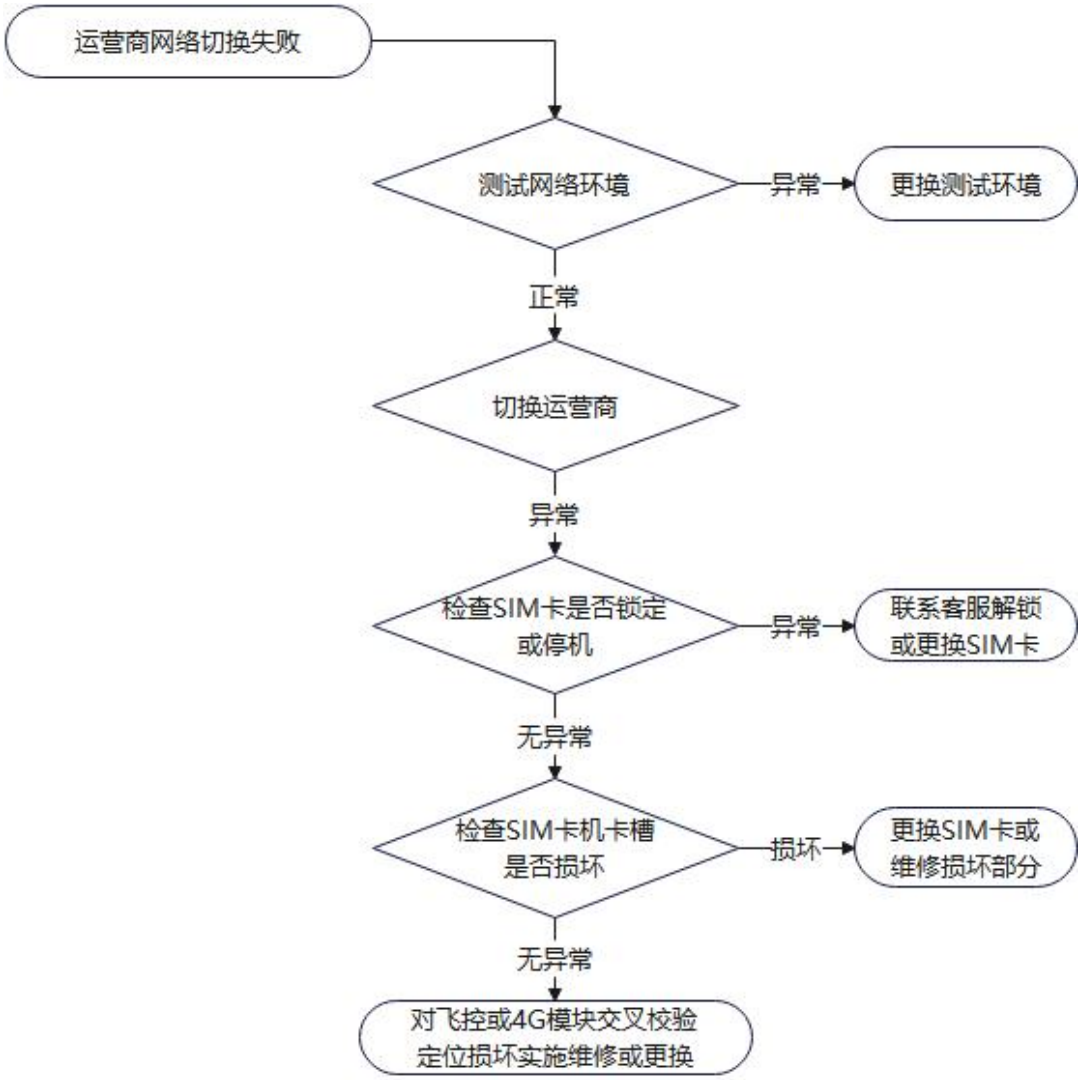
Troubleshooting steps and solutions

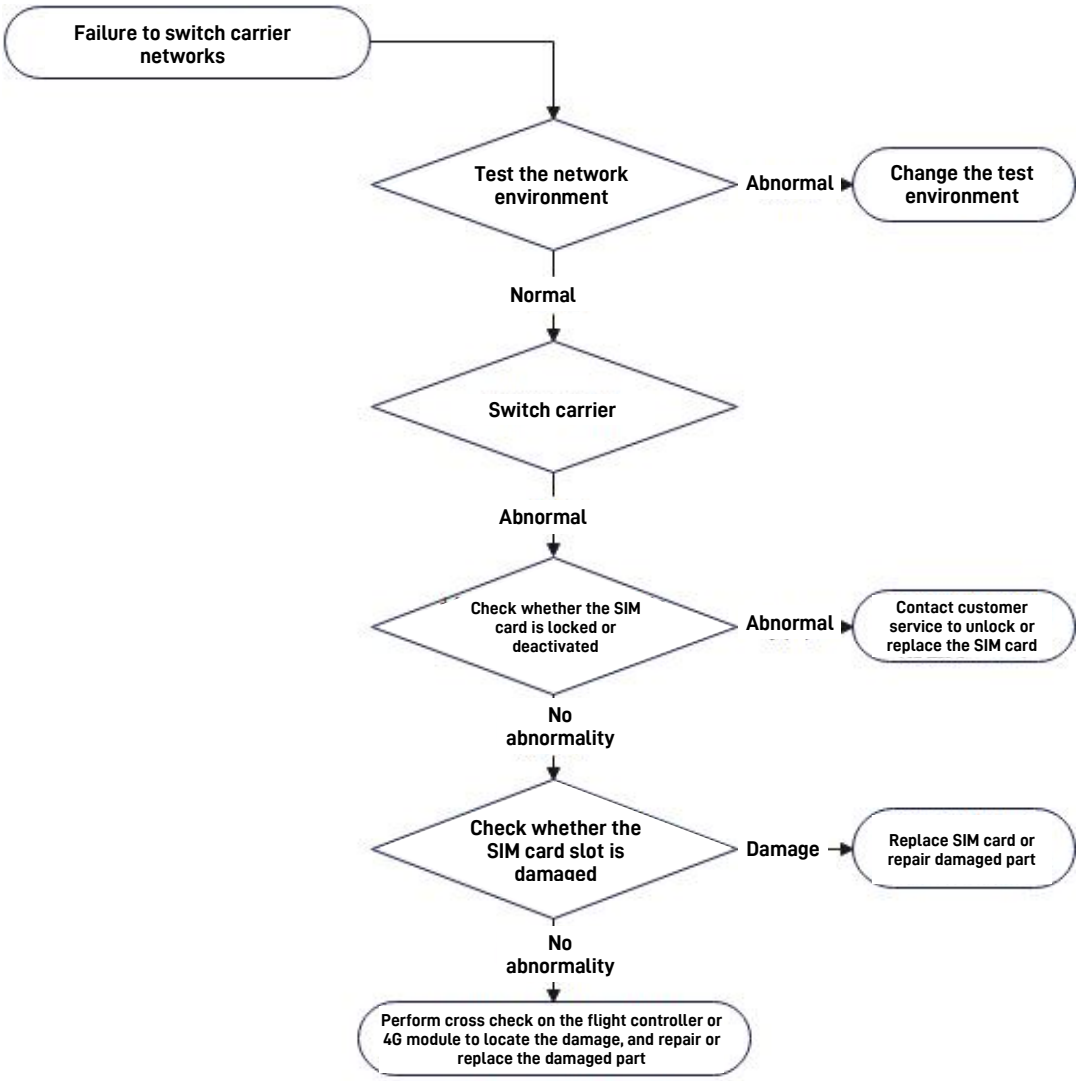
- 确认所在位置网络情况良好，更换正常 SIM 卡进行尝试。

Ensure good network conditions at the location and try replacing the SIM card with a normal one.

- 更换飞控。

Replace the flight controller.


运营商网络切换失败
测试网络环境
异常
更换测试环境
正常
切换运营商
异常
检查SIM卡是否锁定
或停机
异常
联系客服解锁
或更换SIM卡
无异常
检查SIM卡机卡槽
是否损坏
损坏
更换SIM卡或
维修损坏部分
无异常
对飞控或4G模块交叉校验
定位损坏实施维修或更换


Failure to switch carrier networks
Test the network environment
Abnormal
Change the test environment
Normal
Switch carrier
Abnormal
Check whether the SIM card is locked or deactivated
Abnormal
Contact customer service to unlock or replace the SIM card
No abnormality
Check whether the SIM card slot is damaged
Damage
Replace SIM card or repair damaged part
No abnormality
Perform cross check on the flight controller or 4G module to locate the damage, and repair or replace the damaged part

睿喷系统
RevoSpray System
喷洒系统校准失败
Calibration failure of spraying system

现象描述：在升级固件、更换喷头、水泵等管路系统之后对喷洒系统进行校准过程中，App 端提示校准失败。

Phenomenon description: During the calibration process of the spraying system after upgrading firmware, replacing nozzles, pumps, or other pipeline systems, the app prompts that calibration has failed.

原因分析

Causes

- 网络信号不良。

Poor network signal.

- 校准时药箱内水过多或过少。

Excessive water or insufficient water inside the liquid tank during calibration.

- 无人飞机未放在水平地面进行校准。

The drone was not placed on a level surface for calibration.

- 喷洒系统链路或模块存在异常。

Abnormalities in the spraying system's link or modules.

- 气压传感器损坏。

The air pressure sensor is damaged.

排查步骤及处理办法

Troubleshooting steps and solutions

- 进行网络健康诊断，确保网络通畅，网络延迟正常。

Perform a network health diagnosis to ensure the network is stable and latency is normal.

- 按照 App 提示加入适量的清水，不可过多或过少。

Add an appropriate amount of clean water as prompted by the app, neither too much nor too little.

- 将农业无人飞机放在水平地面重新进行校准。

Place the agricultural drone on a level surface and recalibrate it.

- 确保叶轮泵、喷头、截流阀工作正常。

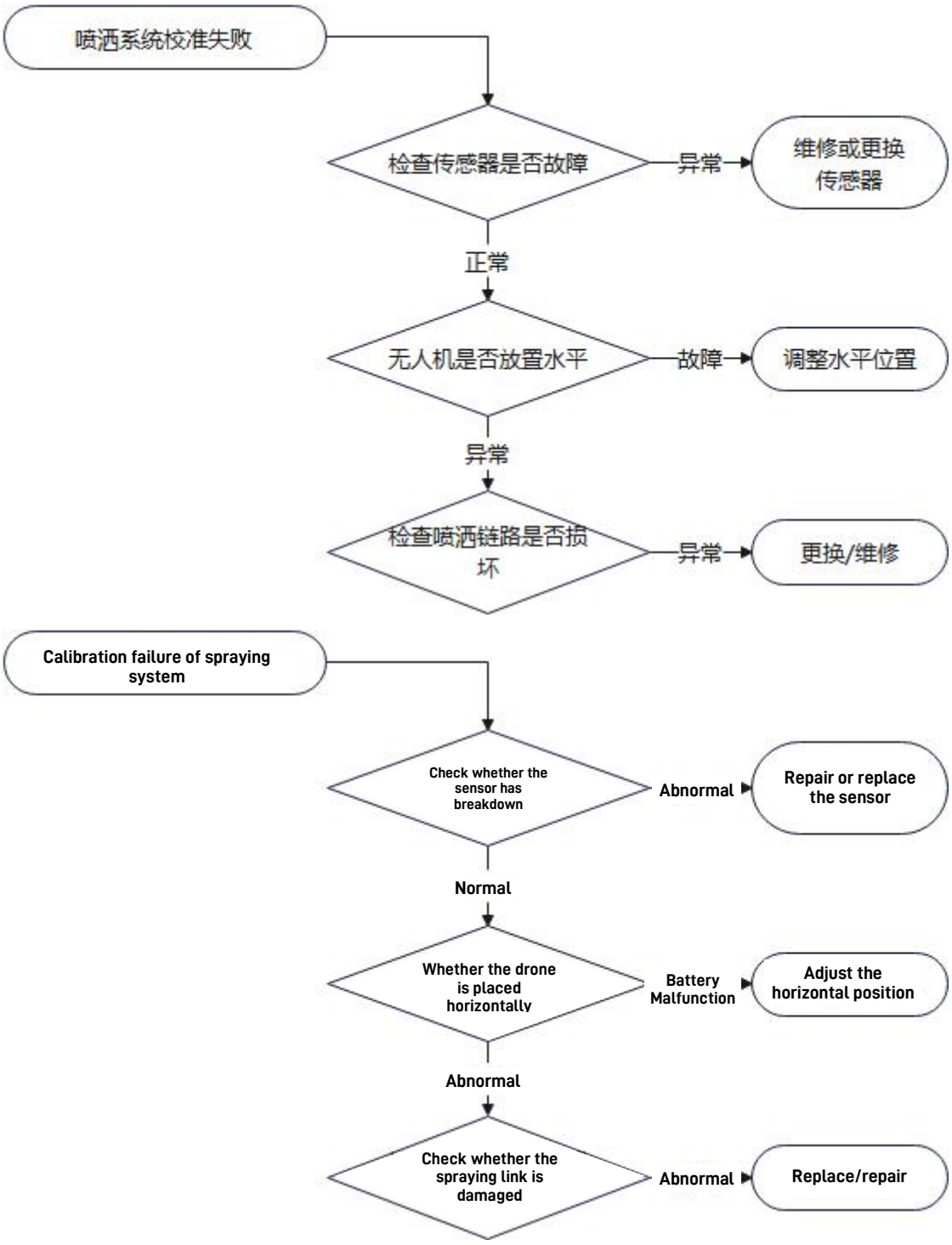
Ensure the impeller pump, nozzle, and shutoff valve are functioning properly.

- 确保管路无破损、连接处无松动，药箱嘴拧紧。

Ensure that the pipeline is not damaged, the connection is not loose, and the liquid inlet is tightened.

- 加水确认 App 的药量会不会变化，若不变化更换药箱传感器。

Add water and check if the spray volume changes in the app. If there is no change, replace the liquid tank sensor.


喷洒系统校准失败
检查传感器是否故障
异常
维修或更换传感器
正常
无人机是否放置水平
故障
调整水平位置
异常
检查喷洒链路是否损坏
异常
更换/维修
Calibration failure of spraying system
Check whether the sensor has breakdown
Abnormal
Repair or replace the sensor
Normal
Whether the drone is placed horizontally
Battery Malfunction
Adjust the horizontal position
Abnormal
Check whether the spraying link is damaged
Abnormal
Replace/repair

喷洒系统离线
Spraying system off-line

现象描述：“极飞农服"App，提示喷洒系统离线。

Phenomenon description: "XAG One" app prompts that the spraying system is off-line.

原因分析

Causes

- 固件未更新至最新版本，系统未上线。

The firmware is not updated to the latest version, and the system is not online.

- 执行系统和农业无人飞机之间的通信异常。

Communication between the payload system and the agricultural drone is abnormal.

- 集线板出现故障。

The cable hub has a breakdown.

- 飞控出现故障。

Flight controller breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确保负载线插接良好，无断路短路现象。

Ensure the payload cables are properly connected, with no open or short circuits.

- 检查集线板有无损坏。

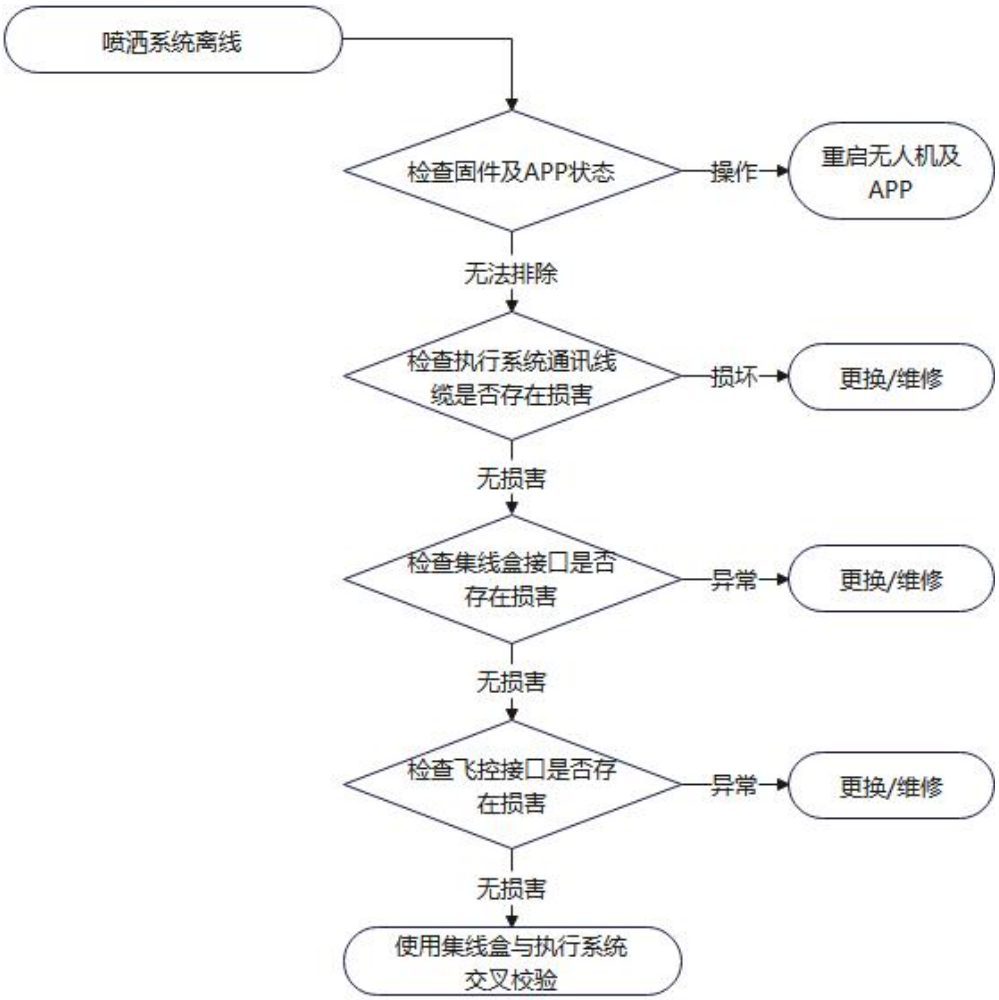
Check whether the cable hub is damaged.

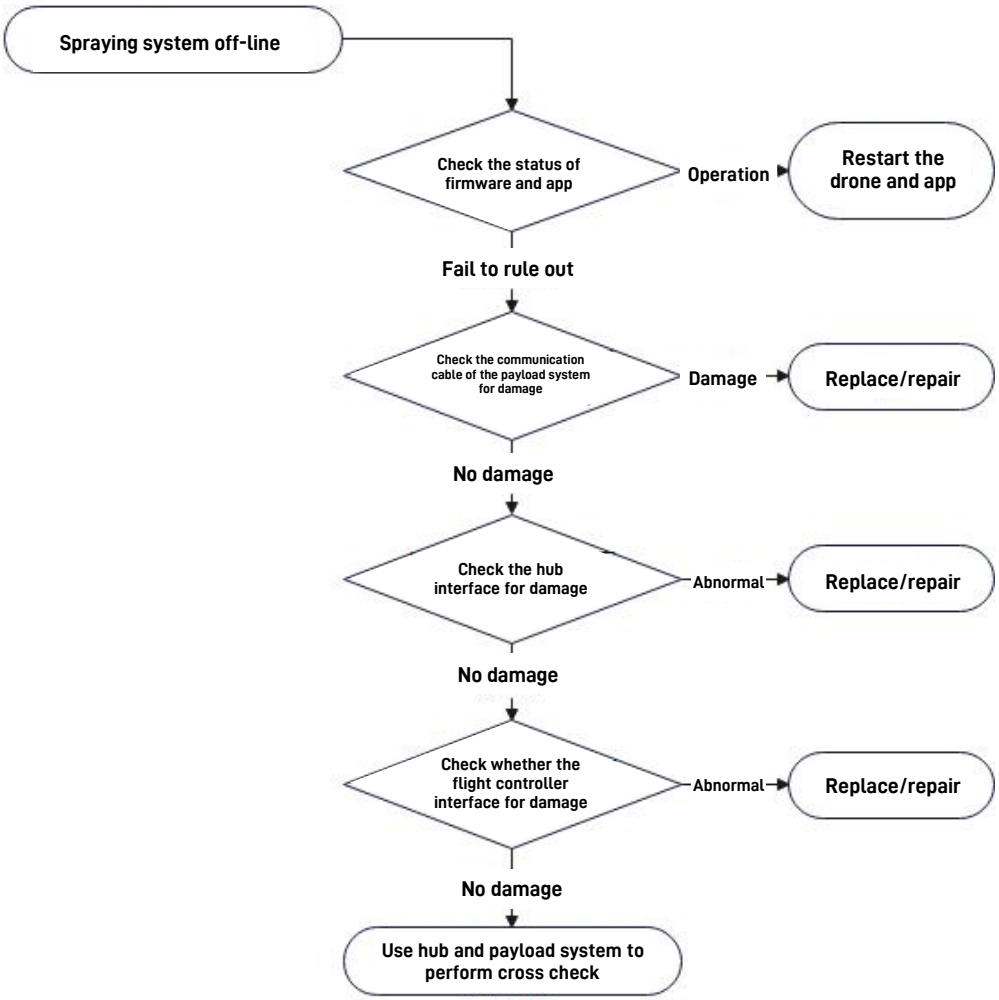
- 重启农业无人飞机和 App。

Restart the agricultural drone and the app.

- 更换飞控。

Replace the flight controller.


喷洒系统离线
检查固件及APP状态
操作
重启无人机及APP
无法排除
检查执行系统通讯线缆是否存在损害
损坏
更换/维修
无损害
检查集线盒接口是否存在损害
异常
更换/维修
无损害
检查飞控接口是否存在损害
异常
更换/维修
无损害
使用集线盒与执行系统交叉校验


Spraying system off-line
Check the status of firmware and app
Operation
Restart the drone and app
Fail to rule out
Check the communication cable of the payload system for damage
Damage
Replace/repair
No damage
Check the hub interface for damage
Abnormal
Replace/repair
No damage
Check whether the flight controller interface for damage
Abnormal
Replace/repair
No damage
Use hub and payload system to perform cross check

流量不准、误差较大
Inaccurate flow with great deviation

现象描述：实际喷洒流量与 App 设置流量严重不符，误差过大。

Description: The actual spraying flow is significantly inconsistent with the flow set in the app, showing evident deviation.

原因分析

Causes

- 农业无人飞机固件未更新至最新版本。

The agricultural drone's firmware has not been updated to the latest version.

- 管路、药箱嘴存在堵塞或漏气情况，密封性差。

The pipeline and liquid inlet are blocked or have air leak, causing poor sealing performance.

- 叶轮或油封泡大变形。

The impeller or oil seal is swollen and severely deformed.

- 气压计故障。

Barometer breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查喷洒固件是否为最新版本。

Check whether the spray firmware is upgraded to the latest version.

- 查看整个喷洒管路、药箱嘴有无开裂、漏液、磨损、堵塞现象。

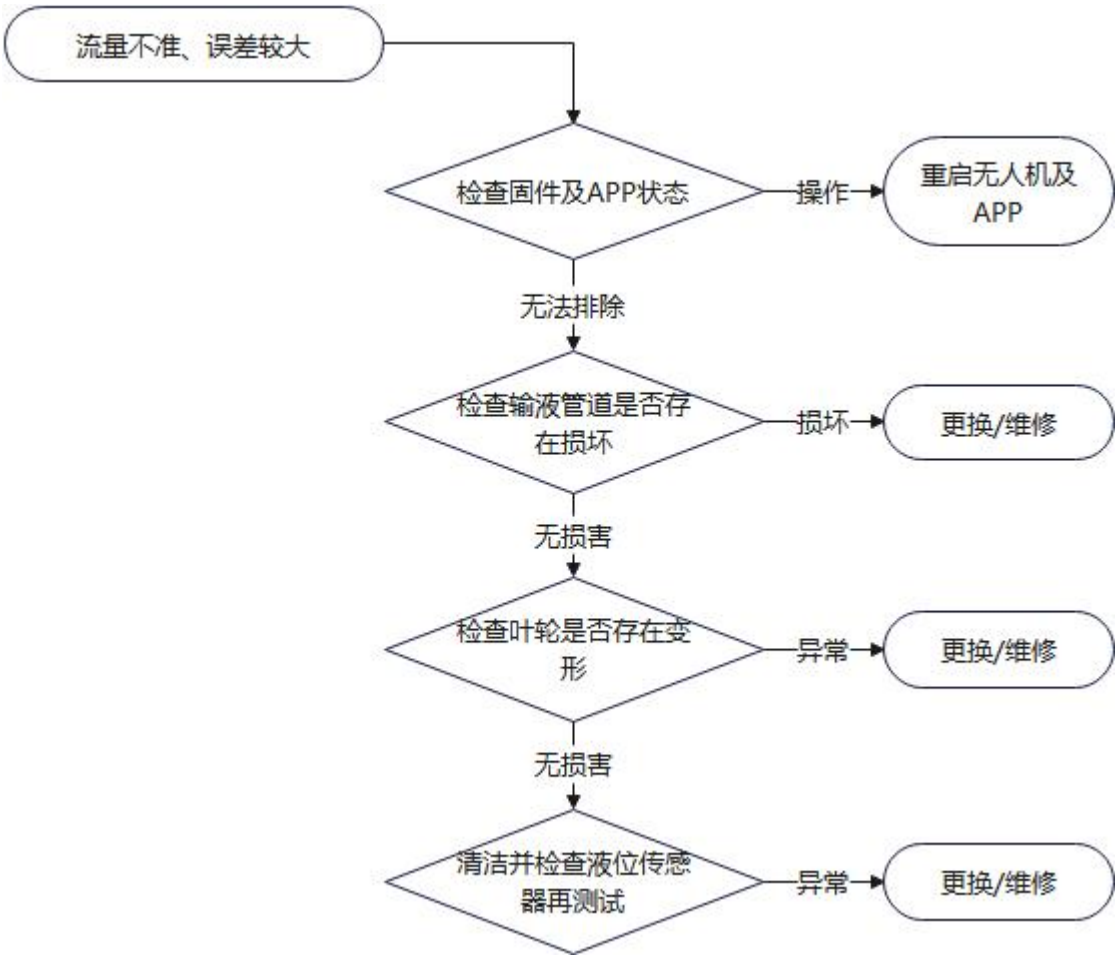
Inspect the entire spraying pipeline and liquid inlet for cracks, liquid leaks, wear, or blockages.

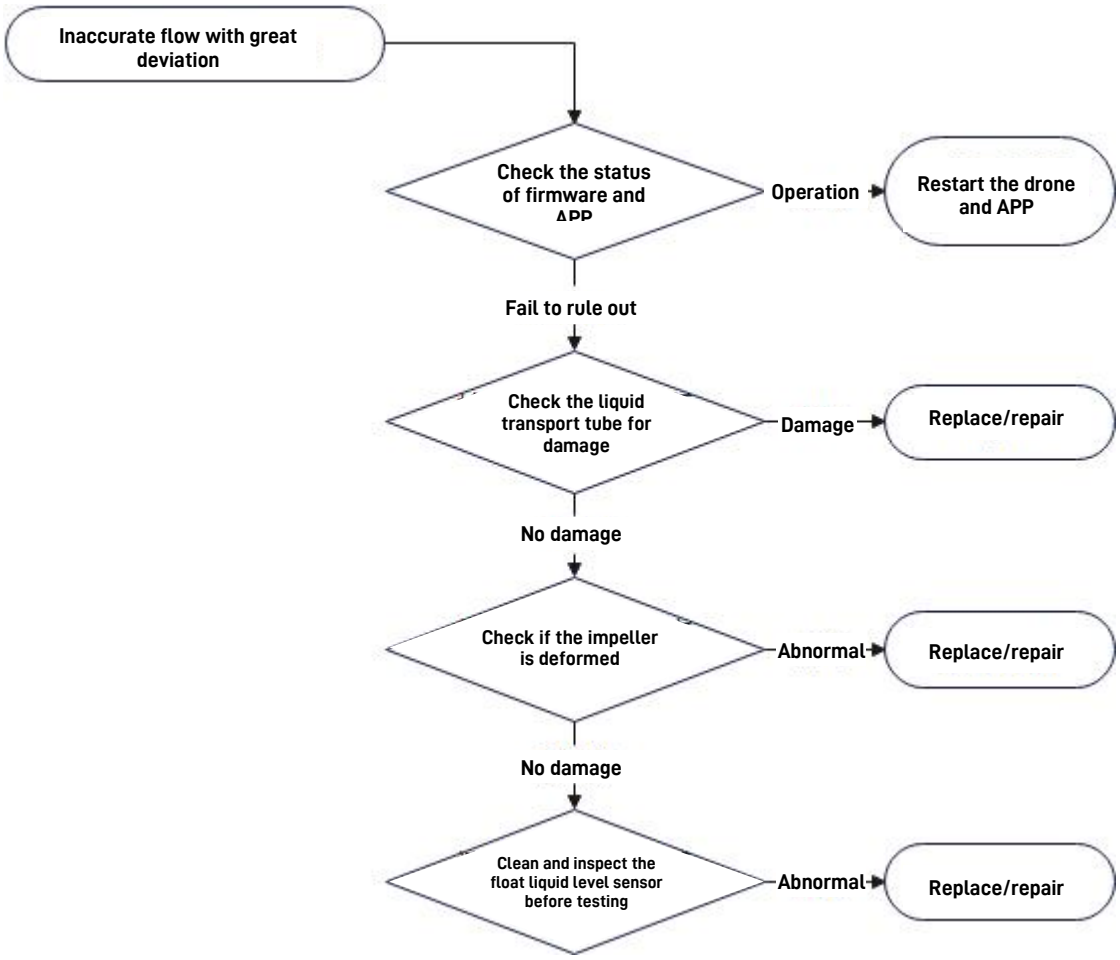
- 检查叶轮是否存在变形等情况。

Check if the impeller is deformed or damaged.

- 清洁并检查液位传感器再测试。

Clean and inspect the float liquid level sensor before testing.


流量不准、误差较大
检查固件及APP状态
操作
重启无人机及APP
无法排除
检查输液管道是否存在损坏
损坏
更换/维修
无损害
检查叶轮是否存在变形
异常
更换/维修
无损害
清洁并检查液位传感器再测试
异常
更换/维修


Inaccurate flow with great deviation
Check the status of firmware and APP
Operation
Restart the drone and APP
Fail to rule out
Check the liquid transport tube for damage
Damage
Replace/repair
No damage
Check if the impeller is deformed
Abnormal
Replace/repair
No damage
Clean and inspect the float liquid level sensor before testing
Abnormal
Replace/repair

喷头电机转速（电流）异常
Abnormal nozzle motor speed (current)

现象描述：“极飞农服"App，提示喷头电机转速（电流）异常。

Phenomenon description: "XAG One" app prompts abnormal nozzle motor speed (current).

原因分析

Causes

- 固件未更新至最新版本。

The firmware has not been updated to the latest version.

- 喷洒信号线磨损或老化或喷盘卡转。

The spray signal cable is worn or aged or the spray disc is stuck.

- 喷头内部有进药腐蚀或短路导致。

Internal corrosion or short circuits in the nozzle caused by liquid penetration.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确保喷洒相关固件均更新至最新版本。

Ensure all spraying-related firmware is updated to the latest version.

- 用手转动喷盘，看是否有卡转现象或有明显阻力。

Rotate the spray disc manually, and check whether there is rotation jam or obvious rotation resistance.

- 检查喷头信号线是否磨损或老化损坏。

Check the nozzle signal cable for wear, aging, or damage.

- 两边对调看是否正常，如果还不行尝试更换新喷头电机。

Exchange them, and check whether the motor works normally. If not, replace the nozzle motor.

泵电机转速（电流）异常

Abnormal pump motor speed (current)

现象描述：“极飞农服"App，提示水泵转速（电流）异常。

Phenomenon description: "XAG One" app prompts abnormal pump motor speed (current).

原因分析

Causes

- 固件未更新至最新版本。

The firmware has not been updated to the latest version.

- 叶轮泵与负载集线板连接线破损、通信异常。

The connecting wire between the impeller pump and the payload cable hub is damaged, causing abnormal communication.

- 叶轮泵内部叶轮或油封变形发胀。

The impeller or oil seal inside the impeller pump is deformed and swollen.

- 药箱底部滤网堵塞。

The filter screen at the bottom of the liquid tank is blocked.

- 管路存在堵塞或弯折。

The pipeline is blocked or bent.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查固件是否最新。

Check whether firmware is upgraded to the latest version.

- 检查负载集线板到水泵连接线是否完好。

Check whether the connecting wire from the payload cable hub to the pump is in good condition.

- 检查叶轮、油封是否存在变形。

Check if the impeller and oil seal are deformed or damaged.

- 检查药箱底部过滤网是否堵塞。

Check whether the filter screen at the bottom of the liquid tank is blocked.

- 检查喷洒管路，确保管路没有弯折、堵塞。

Check the spray pipeline to ensure it is not bent or blocked.

喷头电机离线
Nozzle motor off-line

现象描述：“极飞农服"App，提示喷头电机离线。

Phenomenon description: "XAG One" app prompts that the nozzle motor is off-line.

原因分析

Causes

- 喷头信号线与电调接触不良或者断开。

Loose connection or disconnection between the nozzle signal cable and the ESC.

- 喷头电机损坏。

The nozzle motor is damaged.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查喷头信号线有无连接不良或断路。

Check the nozzle signal cable for poor connection or open circuit.

- 可更换一侧电机，若仍提示电机离线，则应是连接线的问题，若正常则是电机问题。

Replace the motor on one side. If it still prompts that the motor is off-line, it shall be the problem of the connecting wire. If the problem is resolved, it shall be the problem of the motor.

水泵电机离线
Pump motor off-line

现象描述：“极飞农服"App，提示水泵电机离线。

Phenomenon description: "XAG One" app prompts that the pump motor is off-line.

原因分析

Causes

- 水泵信号线接触不良。

Loose connection of pump signal cable.

- 水泵信号线故障，

Pump signal cable breakdown.

- 水泵电机或水泵电调板故障。

Pump motor or pump ESC board breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查水泵与负载集线板之间的连接线路，看是否存在破损或接触不良等情况。

Check the connecting wire between the pump and the payload cable hub for damage or loose connections.

- 可以更换水泵信号线进行测试。

Replace the pump signal cable for testing.

- 分别换件进行测试，确认故障位置。

Replace the parts separately for testing to confirm the breakdown location.

子模块不匹配
Sub-module mismatch

现象描述：喷洒作业时，“极飞农服"App 报错子模块不匹配。

Phenomenon description: During spraying operation, the "XAG One" app reports an error that the sub-modules do not match.

原因分析

Causes

- 部分子模块（水泵、喷头、药箱传感器）异常。

Some sub-modules (pump, nozzle, liquid tank sensor) are abnormal.

- 喷洒相关固件未更新至最新版本。

Spraying-related firmware is not updated to the latest version.

- 飞控故障。

Flight controller breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查喷洒相关固件，把固件升级到最新版本。

Check the spraying-related firmware and upgrade it to the latest version.

- 进入“排查子模块异常"界面后，点击有异常状态的子模块列表，根据异常排查指引解决子模块异常问题。

After entering the "Troubleshooting Sub-module Abnormality" screen, click the list of sub-modules with abnormal status, and solve the sub-module abnormality according to the abnormal troubleshooting guidelines.

- 上述检查都无异常后，如还不能解决，可以更换飞控进行测试。

If no abnormalities are found after the above checks and the problem persists, replace the flight controller for testing.

睿播系统
RevoCast System
睿播系统校准失败
Calibration failure of RevoCast system

现象描述：睿播系统是通过PLD 信号线，实现与飞控连接，由负载集线板提供电源给到睿播系统，当我们通过"极飞农服"App 校准睿播出现校准失败提示，则表示本次睿播校准未完成。

Phenomenon description: The RevoCast system is connected to the flight controller via PLD signal cable. The payload cable hub supplies power to the RevoCast system. If the "XAG One" app warns of RevoCast calibration failure, it indicates the RevoCast calibration is not completed.

原因分析

Causes

- 固件未升级至最新版本。

The firmware has not been upgraded to the latest version.

- 料箱内校准颗粒装载不足。

Insufficient calibration granules loaded in the granule container.

- 绞龙上未完全覆盖校准颗粒。

The calibration granules do not fully cover the screw feeder.

- 出料口堵塞。

The outlet is blocked.

- 绞龙电机或甩盘电机故障。

Screw feeder motor or spread disc motor breakdown.

- 霍尔传感器、绞龙磁铁异常，负载连接线损坏。

The Hall sensor and screw feeder magnet are abnormal, and the payload connecting wire is damaged.

- 料箱传感器故障。

Granule container sensor breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查固件，打开"极飞农服"App，检查是否有最新固件，如有将设备固件升级为最新版本。

Check firmware: Open the "XAG One" app, and check whether the latest firmware is available. If any, upgrade device firmware to the latest version.

- 检查并确认农业无人飞机料箱已装满校准颗粒。

Check and confirm that the agricultural drone granule container has been filled with calibration granules.

- 检查校准过程中绞龙上是否一直有校准颗粒覆盖。

Check whether the screw feeder is covered with calibration granules at all times during calibration.

- 进行手动播撒测试，确保出料口未堵住，绞龙选择正确。

Conduct manual spreading test to ensure that the outlet is not blocked and the screw feeder is selected correctly.

- 进行手动播撒测试，检甩盘电机和绞龙电机工作是否正常。

Conduct manual spreading test to check whether the spread disc motor and screw feeder motor work normally.

- 检查绞龙磁铁是否消磁、丢失，霍尔传感器是否存在故障，负载连接线是否损坏。

Check whether the screw feeder magnet is demagnetized or missing, whether the Hall sensor has a breakdown, and whether the payload connecting wire is damaged.

- 通过极飞云查看料箱传感器探测值会不会变化，若不变化更换料箱传感器。

Check whether the detection value of the granule container sensor changes through XAG Cloud. If there is no change, replace the granule container sensor.

睿播系统离线 / 执行系统识别错误

RevoCast system off-line / payload system identification error

现象描述：睿播系统通过PLD 信号线，实现与飞控连接，由负载集线板供电给到睿播各模组，执行任务过程，飞控发送控制指令给到睿播系统，若飞控指令发送后，睿播系统未响应，表明睿播系统处于离线或未连接状态。

Phenomenon description: the RevoCast system is connected to the flight control system via PLD signal cable. The payload cable hub supplies power to the modules of the RevoCast system. In performing a task, the flight control system sends control commands to the RevoCast system. If the RevoCast system fails to respond after commands are sent, the system may be off-line, or is not connected successfully.

原因分析

Causes

- 固件未更新至最新版本。

The firmware has not been updated to the latest version.

- 执行系统和农业无人飞机之间的通信异常。

Communication between the payload system and the agricultural drone is abnormal.

- 集线板或负载集线板出现故障。

The cable hub or payload cable hub has a breakdown.

- 飞控出现故障。

Flight controller breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查固件是否未更新至最新版本，并重启农业无人飞机和 App。

Check whether the firmware is not updated to the latest version, and restart the agricultural drone and app.

- 检查负载线是否忘记插，有无断路短路。

Check whether the payload cable is unplugged and whether there is open circuit or short circuit.

- 检查中心舱集线板有无损坏。

Check the central cable hub for damage.

- 更换飞控。

Replace the flight controller.

绞龙电机转速（电流）异常

Abnormal screw feeder motor speed (current)

现象描述：正常情况下，飞控依次通过中心舱集线板、负载集线板，将控制信号发送给绞龙电调板，收到控制信号后的绞龙电调板，会输出指令控制绞龙电机进行转动，当绞龙电机电流异常时，表明绞龙电机模组出现故障。

Phenomenon description: Normally, the flight control system sends control signal to the screw feeder ESC board via the central cable hub and the payload cable hub. After receiving control signal, the screw feeder ESC board transmits the command to drive the screw feeder motor to rotate. Abnormal screw feeder motor current, if any, indicates screw feeder motor module breakdown.

原因分析

Causes

- 固件未更新至最新版本。

The firmware has not been updated to the latest version.

- 绞龙电机卡到异物。

The screw feeder motor is stuck with foreign matters.

- 霍尔传感器、绞龙磁铁异常，负载连接线损坏。

The Hall sensor and screw feeder magnet are abnormal, and the load connecting wire is damaged.

- 绞龙电机线与负载集线板接触不良。

Loose connection between the screw feeder motor connecting wire and the payload cable hub.

- 负载线或集线板故障。

Payload cable or cable hub has a breakdown.

- 绞龙电机出现故障。

The screw feeder motor has a breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确认睿播系统各模块固件已经更新至最新版本。

Check whether the firmware of the RevoCast modules has been upgraded to the latest version.

- 检查绞龙电机是否存在卡转、内部有异物等异常情况。

Check whether the screw feeder motor gets stuck, whether there are foreign matters inside the motor, and other abnormalities.

- 检查绞龙磁铁是否消磁、丢失，霍尔传感器是否存在故障，负载连接线是否损坏。

Check whether the screw feeder magnet is demagnetized or missing, whether the Hall sensor has a breakdown, and whether the payload connecting wire is damaged.

- 确认绞龙电机线与负载集线板插接良好，未出现损坏。

Confirm that the screw feeder motor cable and the payload cable hub are plugged well without damage.

- 确认负载线无破损、集线板插针良好无变形。

Confirm that the payload cable is not damaged, and the header pins of the cable hub are in good condition and not deformed.

- 若上述检查未发现异常，绞龙电机电流持续异常，更换新绞龙电机。

If no abnormalities are found after the above checks and the screw feeder motor current remains abnormal, replace the screw feeder motor with a new one.

料箱传感器离线

Granule container sensor off-line

现象描述：料箱传感器负责检测料箱剩余料量，由负载集线板进行供电，通过负载集线板实现与飞控之间的通信，料箱传感器离线则代表飞控未能读取到睿播系统料箱中的料量信息。

Phenomenon description: The granule container sensor works to detect remaining granule amount inside the container. The payload cable hub supplies power to the container, and enables communication between the container and the flight control system. An RevoCast system sensor off-line breakdown indicates that the flight controller fails to acquire the information of granule amount inside the container.

原因分析

Causes

- 固件未更新至最新版本。

The firmware has not been updated to the latest version.

- 料箱传感器线材磨损或与负载集线板接触不良。

Granule container sensor cable is worn or of loose connection with the payload cable hub.

- 料箱传感器或负载集线板出现损坏。

The granule container sensor or payload cable hub is damaged.

- 负载线或集线板故障。

Payload cable or cable hub has a breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确认睿播系统各模块固件已经更新至最新版本。

Check whether the firmware of the RevoCast modules has been upgraded to the latest version.

- 先检查料箱传感器线材是否完好，其次检查料箱传感器与负载集线板是否插接良好。

First, check whether the cable of the granule container sensor is in good condition, and secondly, check whether the granule container sensor and the payload cable hub are well connected.

- 将睿播系统固件更新至最新版本，观察料箱传感器是否有绿灯闪烁，若未闪烁说明料箱传感器供电异常，若绿灯常亮说明料箱传感器供电正常；料箱传感器内部有一个小灯，其中红灯双闪表示通信离线，黄灯双闪表示通信在线。当料箱传感器供电异常或通信离线时可更换料箱传感器。

Update the RevoCast system firmware to the latest version, and observe whether the green light of the granule container sensor flashes. If it does not flash, it indicates that the power supply of the granule container sensor is abnormal. A solid green light indicates that the power supply of the granule container sensor is normal; There is a small light inside the granule container sensor, where double flashing red light indicates communication off -line and double flashing yellow light indicates communication online. When the power supply of the granule container sensor is abnormal or the communication is off-line, replace the granule container sensor.

- 更换料箱传感器后仍存在供电异常或通信离线时，需检查或更换负载集线板、负载线、集线板。

When the abnormal power supply or communication off-line still exists after the replacement of the granule container sensor, it is necessary to check or replace the payload cable hub, payload cable and cable hub.

甩盘电机转速（电流）异常

Abnormal spread disc motor speed (current)

现象描述：飞控依次通过中心舱集线板、负载集线板，将控制信号发送至甩盘电调，收到控制信号后的甩盘电调输出指令控制甩盘电机，当甩盘电机转速 / 电流出现异常时，表明甩盘电机处于异常状态。

Phenomenon description: The flight controller sends control signal to the spread disc ESC via the central cable hub and the payload cable hub. After receiving control signal, the ESC transmits the command to drive the spread disc motor to rotate. Abnormal motor speed/current, if any, indicates the spread disc motor is in abnormal condition.

原因分析

Causes

- 甩盘电机固件未更新至最新版本。

The spread disc motor's firmware has not been updated to the latest version.

- 甩盘卡到异物，影响转速。

Spread discs get stuck by foreign matters, hindering motor speed.

- 甩盘电机线出现异常。

The spread disc motor cable is abnormal.

- 甩盘电机线跟负载集线板接触不良。

Loose connection between the spread disc motor cable and the payload cable hub.

- 负载线或集线板故障。

Payload cable or cable hub has a breakdown.

- 甩盘电机出现故障。

The spread disc motor has a breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确认睿播系统各模块固件已经更新至最新版本。

Check whether the firmware of the RevoCast modules has been upgraded to the latest version.

- 检查甩盘是否有异物卡住，清理甩盘异物。

Check whether the spread disc is stuck by foreign matters. If any, clean off foreign matters.

- 检查甩盘电机线是否良好无破损。

Check whether the spread disc motor cable is in good condition and free of damage.

- 确认甩盘电机线与负载集线板插接良好，未出现损坏。

Confirm that the spread disc motor cable and the payload cable hub are plugged well without damage.

- 确认负载线无破损、集线板插针良好无变形。

Confirm that the payload cable is not damaged, and the header pins of the cable hub are in good condition and not deformed.

- 以上步骤均无法解决甩盘电机转速（电流）异常，更换新甩盘电机。

If the spread disc motor speed (current) remains abnormal, replace the spread disc motor.

绞龙电机离线

Screw feeder motor off-line

现象描述：绞龙电机通过负载集线板，中心舱集线板实现与飞控的连接，控制绞龙电机转动时，飞控将控制信号传输给负载集线板，收到控制信号的绞龙电调板输出指令，驱动绞龙电机，并反馈信息给飞控。当启动电源后，软件显示绞龙电机离线且无反应，表示此时绞龙电机处于离线状态。

Phenomenon description: The screw feeder motor is connected to the flight controller via the payload cable hub and the central cable hub. When the screw feeder motor is rotating, the flight controller transmits control signal to the payload cable hub. After receiving control signal, the screw feeder ESC board transmits the command to drive the screw feeder motor to rotate and feeds information back to the flight controller. If the software shows that the screw feeder motor is off-line and fails to respond after the drone is energized, it indicates the screw feeder motor remains off-line.

原因分析

Causes

- 设备固件未更新至最新版本。

The device firmware has not been updated to the latest version.

- 绞龙电机线出现损坏。

The screw feeder motor cable is damaged.

- 绞龙电机线与负载集线板接触不良或损坏。

Loose connection between the screw feeder motor cable and the payload cable hub, or damage to the connection.

- 绞龙电机故障。

Screw feeder motor breakdown.

- 负载线或集线板故障。

Payload cable or cable hub has a breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确认睿播系统各模块固件已经更新至最新版本。

Check whether the firmware of the RevoCast modules has been upgraded to the latest version.

- 检查绞龙电机线是否良好无破损。

Check whether the screw feeder motor cable is in good condition and free of damage.

- 确认绞龙电机线与负载集线板插接良好，未出现损坏。

Confirm that the screw feeder motor cable and the payload cable hub are plugged well without damage.

- 使用治具检测绞龙电机各项功能、参数是否正常。

Use fixtures to check whether the functions and parameters of the screw feeder motor are normal.

- 确认负载线无破损、中心舱集线板插针良好无变形。

Confirm that the payload cable is not damaged, and the central cable hub header pins are in good condition and not deformed.

甩盘电机离线

Spread disc motor off-line breakdown

现象描述：甩盘电机通过负载集线板，中心舱集线板实现与飞控的连接，控制甩盘电机转动时，飞控将控制信号传输给负载集线板，收到控制信号的甩盘电调板输出指令，驱动甩盘电机，并反馈信息给飞控。当启动电源后，软件显示甩盘电机离线且无反应，表示此时甩盘电机处于离线状态。

Phenomenon description: The spread disc motor is connected to the flight controller via the payload cable hub and the central cable hub. When the spread disc motor is rotating, the flight controller transmits control signal to the payload cable hub. After receiving control signal, the spread disc ESC board transmits the command to drive the spread disc motor to rotate and feeds information back to the flight controller. If the software shows that the spread disc motor is off-line and fails to respond after the drone is energized, it indicates the spread disc motor remains off-line.

原因分析

Causes

- 设备固件未更新至最新版本。

The device firmware has not been updated to the latest version.

- 甩盘电机线出现损坏。

The spread disc motor cable is damaged.

- 甩盘电机线与负载集线板接触不良或损坏。

Loose connection between the spread disc motor cable and the payload cable hub, or damage to the connection.

- 甩盘电机故障。

Spread disc motor breakdown.

- 负载线或集线板故障。

Payload cable or cable hub has a breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 确认睿播系统各模块固件已经更新至最新版本。

Check whether the firmware of the RevoCast modules has been upgraded to the latest version.

- 检查甩盘电机线是否良好无破损。

Check whether the spread disc motor cable is in good condition and free of damage.

- 确认甩盘电机线与负载集线板插接良好，未出现损坏。

Confirm that the spread disc motor cable and the payload cable hub are plugged well without damage.

- 使用治具检测甩盘电机各项功能、参数是否正常。

Use fixtures to check whether the functions and parameters of the spread disc motor are normal.

- 确认负载线无破损、集线板插针良好无变形。

Confirm that the payload cable is not damaged, and the header pins of the cable hub are in good condition and not deformed.

返航剩余料量不准

Inaccurate detection of RTH remaining amount

现象描述：料箱内的剩余量是通过料箱传感器实现检测，首次使用睿播系统或更换新的播撒颗粒、不同型号的绞龙后，都必须进行播撒校准。当农业无人飞机作业完毕，通过观察料箱余料量，发现返航剩余料量与理论播撒量存在严重不符，表明料箱传感器余料检测不精准。

Phenomenon description: The remaining granule amount in the granule container is detected by the granule container sensor. After the RevoCast system is used for the first time, granule type is changed, or a different screw feeder model is used, it is required to calibrate the RevoCast system. After agricultural drone operation, observe the remaining granule amount for RTH in the granule container, and check whether it is seriously inconsistent with the theoretical spread amount. If yes, it indicates inaccurate detection of remaining granule amount.

原因分析

Causes

- “极飞农服"App 软件未更新至最新版本。

The "XAG One" app has not been updated to the latest version.

- 设备固件未更新至最新版本。

The device firmware has not been updated to the latest version.

- 首次使用睿播系统或更换新的播撒颗粒、绞龙未完成校准。

Screw feeder calibration unfinished when the RevoCast system is used for the first time, or after granule type is changed.

- 料箱传感器出现故障。

Granule container sensor has a breakdown.

排查步骤及处理办法

Troubleshooting steps and solutions

- 检查“极飞农服"App 软件，确认为最新版本。

Check the "XAG One" app to confirm that it is the latest version.

- 确认睿播系统各模块固件已经更新至最新版本。

Check whether the firmware of the RevoCast modules has been upgraded to the latest version.

- 首次使用睿播或新的播撒颗粒、绞龙，需对睿播重新进行校准。

It is necessary to recalibrate RevoCast when RevoCast is used for the first time, or new granule type and screw feeder are used.

- 以上步骤检查完毕，返航剩余料量依旧不准确，更换新的料箱传感器。

If the remaining granule amount for RTH is still measured inaccurately, replace the granule container sensor.

六、农业无人机维护保养建议

Agricultural Drone Maintenance Recommendations

前言概述
Overview

农业无人机在运行过程及存放过程中的环境较为严苛，为了确保设备运行的可靠性以及稳定性，在设备满足一定的运行时长后应进行对应的关键部位实施检测与必要的维护工作。维护保养工作是设备在整个运行生命周期内重要的一环，若缺乏维护保养或没有严格实施执行将有可能出现严重的运行安全隐患，对群众人生及财产安全造成风险。

Agricultural drones operate and are stored in harsh environments. To ensure the reliability and stability of the device, key components should be inspected and necessary maintenance should be performed after the device has reached a certain operating time. Maintenance is a critical part of the device's lifecycle. Lack of maintenance or failure to strictly implement maintenance procedures may lead to serious operational safety hazards, posing risks to public safety and property.

维护保养主要分为《一般性维护保养》以及《特殊维护保养》，一般性维护保养主要针对作业周期内满足特定运行航时后所需执行的保养程序，一般性维护保养主要针对设备运行过程中的损耗件、易损件及关键结构以及滑油等进行检测与更换。在特殊维护保养中包含年度维护保养以及适航维护，年度保养主要针对作业季结束后或需要长时期进行存放前需要实施的保养程序，其主要内容为设备的整体清洁、关键部件及滑油等检测更换。适航维护主要针对长时间存放后的设备进行的验证性保养检测程序，其目的为校验设备的可靠性，结构的完整性以及机载软件的版本。确保设备满足作业运行要求，满足飞行安全要求。

Maintenance is mainly divided into "Routine Maintenance" and "Special Maintenance." Routine maintenance primarily involves maintenance procedures required after a specific operating flight hours within the operation cycle. It focuses on inspecting and replacing consumable parts, vulnerable parts, critical structures, and lubricating oil during device running. Special maintenance includes annual maintenance and airworthiness maintenance. Annual maintenance is performed at the end of the operating season or before long-term storage, and its main tasks include overall cleaning of the device, inspection and replacement of key components and lubricating oil. Airworthiness maintenance is a verification maintenance procedure conducted after long-term storage, aiming to check the device's reliability, structural integrity, and on-board software version. This ensures that the device meets operational requirements and flight safety standards.

一般性维护保养实施周期及定义
Implementation Cycle and Definition of Routine Maintenance

一般性维护保养主要分为A/B/C三类，其中A类为用户自检，用户可根据APP操作指引进行检查。B类及C类需要前往直营或授权服务站进行检测，由检测工程师根据情况对出现损害或达到更换条件的零配件进行更换。

Routine maintenance is mainly divided into three categories: A, B, and C. Category A is user self-testing, where users can follow the app's guidelines to perform checks. Categories B and C need to go to the direct or authorized service station for inspection, and the inspection engineer shall replace the parts that are damaged or meet the replacement conditions according to the situation.

属性 Attribute	分类 Category	周期 Cycle	维护保养定义 Definition of maintenance	适用范围 Scope of application

一般性保养程序 **Routine maintenance procedures**	**A类** **Category A**	累计运行50航时 Every 50 flight hours	累计运行50航时后必须进行除APP常规检查指引外的必要检查，目的是确保设备运行的安全性及可靠性。 After accumulating 50 flight hours, necessary checks beyond the regular app check guidelines must be performed to ensure the safety and reliability of the device.	**用户自检** **User self-testing**
	B类 **Category B**	累计运行100航时 Every 100 flight hours	建立A检前提下，累计运行100航时必须进行的重要检查，该项检查中应对电机轴承、桨夹轴承、机身关键部位紧固件及负载系统损耗件等相关部件进行检查并按需更换。 On the premise of carrying out Category A inspection, after accumulating 100 flight hours, critical checks must be performed. This includes checking components such as motor bearings, propeller clamp bearings, key fasteners of critical parts of the airframe, and consumable parts of the payload system and replacing them as needed.	**服务站实施** **Service station implementation**
	C类 **Category C**	累计运行150航时 Every 150 flight hours	建立B检前提下，累计运行150航时必须对机身关键部位紧固件及负载系统损耗件等相关部件进行检查及关键部件更换，同时需要对机臂等外部框架结构件进行变形量校准。 On the premise of carrying out Category B inspection, after accumulating 150 flight hours, key fasteners of key components of the airframe and consumable parts of the payload system must be checked and replaced. Additionally, the deformation of external frame structural parts, such as the arms, must be calibrated.	**服务站实施** **Service station implementation**

完成C检后设备仍持续运行，达到200航时后应从A检开始再实施维护保养程序

The device continues to operate after the completion of the C-check. The maintenance procedure should be restarted from the A-check after reaching 200 flight hours

一般性维护保养实施方式与规则

Implementation Methods and Rules for Routine Maintenance

分类 Category	检测项目 Test items	50小时（A类） 50 hours (Category A)	100小时（B类） 100 hours (Category B)	150小时（C类） 150 hours (Category C)
		检查（V）；调整（A）；清洁（C）；更换（R）；润滑（L）；紧固（T）； Visual inspection (V); Adjustment (A); Cleaning (C); Replacement (R); Lubrication (L); Tightening (T);		
机身结构 Airframe structure	机臂与机身连接螺丝 Arm to airframe connection screws	V	V+A	V+T
	机身边梁紧固螺栓 Airframe side beam fastening bolts	V	V+A	V+T
	头部与横梁紧固螺栓 Head and cross beam fastening bolts	V	V+A	V+T
	电机座与机臂固定螺栓 Motor base to arm fastening bolts	V	V+A	V+T
	动力电调固定螺栓 Main ESC fastening bolts	V	V+A	V+T
	动力电机固定螺栓 Main motor fastening bolts	V	V+A	V+T
	感知系统固定螺栓 Sensor system fastening bolts	V	V+A	V+T
电力及动	尾插触片	V+C	V+C	V+T

力系统 Power and propulsion system	Connector contacts			
	尾插结构 Connector structure	-	V+A	V+T
	外露线缆 Exposed cables	-	V+A	V+A
	动力电机漆包线 Main motor enameled wire	-	V+C	V+C
	动力电机转子间隙 Main motor rotor clearance	-	V	V
	动力电机轴承 Main motor bearing	V	R	V
	螺旋桨桨夹轴承 Propeller clamp bearing	V	R	V
	螺旋桨叶 Propeller Blades	V+C	V+C	V+C
	螺旋桨垫片 Propeller Washers	R	R	R
执行系统 Payload system	负载集线盒 Payload cable hub	V	V	V
	负载脚架组件 Payload landing gear unit	V	V+T	V
	睿喷叶轮泵电机运行 RevoSpray impeller pump motor running	V	V	V
	睿喷叶轮泵减速组 RevoSpray	-	V+L	V

	impeller pump reducer pair			
	睿喷泵体结构 RevoSpray pump body structure	V	V	V
	睿喷防滴阀 RevoSpray anti-drip valve	V	V+C	V
	睿喷负载药液传输管 RevoSpray payload liquid tube	V	V+C	V
	睿喷叶轮 RevoSpray impeller	R	R	R
	睿播绞龙主体 RevoCast screw feeder body	V	V+C	V
	睿播绞龙电机 RevoCast screw feeder motor	-	V	V
	上料管 Feeding tube	V	V+C	V
	甩盘结构 Spread disc structure	V	V	V
	摆震结构 Oscillation damping structure	V	V+L	V
	甩盘电机 Disc motor	-	V	V

特殊维护保养实施周期及定义

Implementation Cycle and Definition of Special Maintenance

特殊维护保养主要分为年度维护保养及适航维护两类，特殊维护保养需到直营或授权服务站进行实施。

Special maintenance is mainly divided into annual maintenance and airworthiness maintenance. Special maintenance shall be carried out at a direct or authorized service station.

属性 Attribute	分类 Category	周期 Cycle	维护保养定义 Definition of maintenance	适用范围 Scope of application
特殊保养程序 Special maintenance procedures	E类 Category E	年检维保 Annual inspection and maintenance	年检维保是针对设备在作业季结束后实施的一项特殊维护保养，冬储保养无前置保养程序要求。在该项维护保养中应对设备进行全面的清洁、损耗件更换以及系统固件升级，对必要的损坏部件进行按需更换。 Annual inspection and maintenance is a special maintenance for the device after the end of the operating season. There are no prerequisite maintenance requirements for winter storage maintenance. During this maintenance, the device should undergo comprehensive cleaning, replacement of consumable parts, and system firmware upgrades. Necessary damaged components should be replaced as needed.	服务站实施 Service station implementation
	F类 Category F	作业前适航 Pre-operation airworthiness	作业前适航维护保养是一项作业季开始前对设备进行运行可靠性检查的重要维护保养措施，对于长时间处于封存状态的设备进行运行测试、固件升级以及整体的构型检查，排除安全隐患、确保设备运行的可靠性。 Pre-Operation airworthiness maintenance is a critical maintenance measure conducted before the start of the operating season to check the operational reliability of the device. For devices that have been in long-term storage, run tests, firmware upgrades, and overall configuration checks should be performed to eliminate safety hazards and ensure the operational reliability of the device.	服务站实施 Service station implementation

特殊维护保养实施方式与规则

Implementation Methods and Rules for Special Maintenance

分类 Category	检测项目 Test items	年检维保（冬季保养） Annual inspection and maintenance (winter maintenance)	适航维保（春季保养） Airworthiness maintenance (spring maintenance)
		检查（V）；调整（A）；清洁（C）；更换（R）；润滑（L）；紧固（T）； Visual inspection (V); Adjustment (A); Cleaning (C); Replacement (R); Lubrication (L); Tightening (T);	
机身结构 Airframe structure	机臂与机身连接螺丝 Arm to airframe connection screws	V+T	V+T
	机身边梁紧固螺栓 Airframe side beam fastening bolts	V+T	V+T
	头部与横梁紧固螺栓 Head and cross beam fastening bolts	V+T	V+T
	电机座与机臂固定螺栓 Motor base to arm fastening bolts	V+T	V+T
	动力电调固定螺栓 Main ESC fastening bolts	V+T	V+T
	动力电机固定螺栓 Main motor fastening bolts	V+T	V+T
	感知系统固定螺栓 Sensor system fastening bolts	V+T	V+T
电力及动力系统 Power and propulsion system	尾插触片 Connector contacts	V+T	V+R
	尾插结构 Connector structure	V+T	V+T
	外露线缆	V+A	V+A

	Exposed cables		
	动力电机漆包线 Main motor enameled wire	V+C	V+C
	动力电机转子间隙 Main motor rotor clearance	V	V
	动力电机轴承 Main motor bearing	V	V
	螺旋桨桨夹轴承 Propeller clamp bearing	V	R
	螺旋桨叶 Propeller Blades	V+C	V+C
	螺旋桨垫片 Propeller Washers	R	R
执行系统 Payload system	负载集线盒 Payload cable hub	V	V
	负载脚架组件 Payload landing gear unit	V+T	V+T
	睿喷叶轮泵电机运行 RevoSpray impeller pump motor running	V	V
	睿喷叶轮泵减速组 RevoSpray impeller pump reducer pair	V	V+L
	睿喷泵体结构 RevoSpray pump body structure	V	V
	睿喷防滴阀 RevoSpray anti-drip valve	V	R
	睿喷负载药液传输管	V	V

	RevoSpray payload liquid tube		
	睿喷叶轮 RevoSpray impeller	V	R
	睿播绞龙主体 RevoCast screw feeder body	V	R
	睿播绞龙电机 RevoCast screw feeder motor	V	V
	睿播上料管 RevoCast feeding tube	V	V
	睿播甩盘结构 RevoCast spread disc structure	V	V
	睿播摆震结构 RevoCast oscillation damping structure	V	V+L
	睿播甩盘电机 RevoCast spread disc motor	V	V

关键部件独立维护保养方式

Independent Maintenance Method for Key Components

睿播系统

RevoCast system

- 绞龙：若绞龙需要进行较长时间的存放（大于三天），应在停放前对送料管道与绞龙主体进行彻底的清洁，避免残留物粘合或固化。

Screw feeder: If the screw feeder needs to be stored for a long time (more than three days), the feeding pipe and the main body of the screw feeder should be thoroughly cleaned before the storage to avoid residue bonding or solidification.

- 播撒及绞龙电机：当发现绞龙电机或播撒电机运行过程中有异响或出现卡滞以及电流过大时，应及时检查电机减速组确认运行结构完整性，若结构完整，应及时添加齿轮滑油确保运行顺畅。

Seeding and screw feeder motor: When abnormal noise, jamming or excessive current is found during the operation of the screw feeder motor or seeding motor, check the motor speed reduction module in time to confirm the structural integrity of the operation. If the structure is complete, add gear lubricating oil in time to ensure smooth operation.

睿喷系统

RevoSpray system

- 叶轮：若设备需要进行较长时间的存放（大于三天）或更换实施药液前，应在停放前对叶轮泵及管道进行彻底的清洁，避免残留药液混合发生化学反应或腐蚀叶轮导致叶轮鼓胀。

Impeller: If the device needs to be stored for a long time (more than three days) or before replacing the sprayed liquid, the impeller pump and pipeline shall be thoroughly cleaned before the storage to avoid chemical reaction caused by the mixing of the residual liquid or corrosion of the impeller leading to impeller bulging.

- 泵电机：当发现叶轮泵电机运行过程中有异响或出现卡滞以及电流过大时，应及时检查电机减速组确认运行结构完整性。若结构完整，应及时添加齿轮滑油确保运行顺畅。

Pump motor: When abnormal noise, jamming or excessive current are found during the operation of the impeller pump motor, check the motor speed reduction module in time to confirm the integrity of the operation structure. If the structure is complete, add gear lubricating oil in time to ensure smooth operation.

动力系统

Propulsion System

- 电机轴承：当发现动力电机存在异响时，对动力电机进行分离检查。若确认转子与定子间隙无剐蹭的前提下，可更换动力电机轴承消除该现象。

Motor bearing: When abnormal noise is found in the main motor, separate the main motor for inspection. If it is confirmed that there is no scratch between the rotor and the stator, replace the main motor bearing to eliminate the phenomenon.

- 三相线路：设备长期运行后或经过长时间存放后应对动力电机连接动力电调之间的三相线进行紧固度及表面检查，确保无松动、无锈蚀现象。若发现松动情况应及时对其进行紧固处理，如出现锈蚀，应使用除锈剂进行电机端的线材除锈工作。若发现无法去除或锈蚀现场在动力电调端出现，则需要更换相应的配件。

Three-phase cable: after the device has been in long-term operation or long-term storage, the three-phase line connecting the main motor and the main ESC shall be checked for tightness and surface to ensure that there is no looseness or rust. If any looseness is found, it shall be tightened in time. If there is rust, the cable at the motor end shall be de-rusted with a rust remover. If it is found that it cannot be removed or the rust appears at the main ESC end, the corresponding accessories need to be replaced.

设计寿命限制信息
Design Life Limit

关键零部件 Key component	影响维度 Impact	寿命限制 Life limit
主框 Main frame	影响飞行能力 Flight capability affected	300小时 300h
铝梁 Aluminum beam	影响飞行能力 Flight capability affected	300小时 300h
尾插+汇流板+线材端子 Connector + busbar + cable terminal	影响飞行能力 Flight capability affected	1000次插拔 1000 times of plug and unplug
电池导轨 Battery guide rail	影响飞行能力 Flight capability affected	1000次插拔 1000 times of plug and unplug
机头架 Hood frame	影响飞行能力 Flight capability affected	300小时 300h
飞控 Flight controller	影响飞行控制 Flight control affected	500小时 500h
感知模块 Sensor module	影响飞行控制 Flight control affected	500小时 500h
集线板 Cable hub	影响飞行控制 Flight control affected	500小时 500h
短机臂-机身端 Short Arm - Airframe End	影响飞行能力 Flight capability affected	300小时 300h
长机臂-电机端 Long Arm - Motor End	影响飞行能力 Flight capability affected	300小时 300h
电调 ESC (Electronic Speed Controller)	影响飞行能力 Flight capability affected	500小时 500h
电机	影响飞行能力	300小时

Motor	Flight capability affected	300h
电机轴承 Motor Bearing	影响飞行能力 Flight capability affected	200小时 200h
电机底座 Motor base	影响飞行能力 Flight capability affected	500小时 500h
桨夹座 Propeller clamp holder	影响飞行能力 Flight capability affected	300小时 300h
桨叶 Blade	影响飞行能力 Flight capability affected	300小时 300h