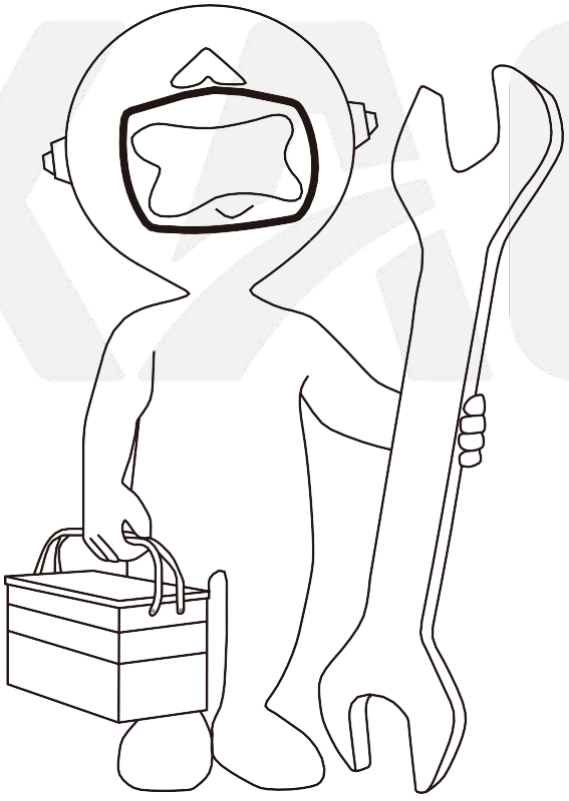
极飞农业无人飞机
XAG Agricultural Drone
维修保养手册
Maintenance Manual

V1.5



极飞科技
提升农业生产效率

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修订记录
Revision History

修订颁布 Version No.	修订日期 Date	作者 Author	修改描述 Description	备注 Remark
V1.0	2023-6-28	技术管理部 Technical Management Department	首次发布 First release	
V1.1	2023-7-03	技术管理部 Technical Management Department	增加故障类型-各系统子目录 Added malfunction type - subdirectory for each system	
V1.2	2023-7-24	技术管理部 Technical Management Department	修正了一些内容 Revised some contents	
V1.3	2023-8-31	技术管理部 Technical Management Department	修正重复内容 Deduplicated some contents	
V1.4	2023-9-05	技术管理部 Technical Management Department	修正了一些内容 Revised some contents	
V1.5	2023-11-07	技术管理部 Technical Management Department	针对海外的分销商做出相应修改 Made modifications for overseas distributors	

第一章　极飞农业无人飞机简介

Chapter I　Introduction to XAG Agricultural Drone

极飞农业无人飞机系统组成

Composition of XAG Agricultural Drone System

极飞 2023 款农业无人飞机（简称“无人机”）主要由以下几个部分组成：载机平台（包括边梁、横梁、机臂）、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 ARC3 Pro 双手遥控器和差分定位模块组成的农田测绘器、移动基站、云基站）、感知系统（SUPERX4® Pro 飞控、避障雷达、对地视觉、PSL 视觉影像）、执行系统（睿喷系统：药箱、蠕动泵、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）、运营管理监控系统。

The XAG 2023 Agricultural Drone ("Drone") mainly consists of the following parts: airframe (including spandrel beams, beams and arms), propulsion system (main ESC, main motor, propeller, etc.), power system (smart supercharge battery, intelligent supercharger, auto supercharge station), GNSS RTK high-precision positioning system (farmland RTK Rover composed of ARC3 Pro remote controller and differential positioning module, portable base station, cloud base station), sensor system (SUPERX4® Pro flight controller, 4D imaging radar, downward vision, and PSL (pilot sight livestream) camera), application system (RevoSpray system: liquid tank, peristaltic pump, liquid tubes, nozzles; RealTerra system: RealTerra module; RevoCast system: granule container, screw feeder gearbox, spreading disc motor), and operation management monitoring system.

无人飞机系统组成
Drone System Composition

GNSS RTK 系统
GNSS RTK System

电力系统
Power System

操作系统
Operation System

管理平台
Management
Platform

2023款农业无人飞机系统
XAG 2023 Agricultural Drone System

极飞农业无人飞机整机结构

Overall Structure of XAG Agricultural Drone

2023 款农业无人飞机机身采用了碳纤维覆盖的镁铝合金材料，整机（所有模块与结构）具备 IPX6K 级三防性能，可全机身水洗。另外，无人机搭载了 SUPERX4® Pro RTK 飞行控制系统，将 3 路并行 IMU 和 2 套 RTK 引擎集成在同一个飞控中。

The fuselage of XAG 2023 Agricultural Drone is made of magnesium aluminum alloy covered with carbon fiber, and the whole machine (including all modules and structures) features resistance to water (IPX6K), splash, water, and dust, which can be rinsed with water. In addition, it is equipped with SUPERX4® Pro RTK flight controller system integrating 3-parallel IMUs and 2 sets of RTK engines into the same flight controller.
P100 Pro 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 components of the P100 Pro Agricultural Drone include foldable propellers, high-performance motors, nozzles, foldable arms, hood, fuselage, 4D imaging radar, PSL camera, application system, flight controller, smart supercharge battery, etc.

P100 Pro农业无人飞机系统
P100 Pro Agricultural Drone System

V50 Pro 农业无人飞机外观可见部件有：可折叠螺旋桨、高性能电机、舵机倾转结构、离心喷头、可折叠机臂（含抱箍）、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 components of V50 Pro Agricultural Drone include foldable propellers, high-performance motors, servo tilting structure, nozzles, foldable arms (including clamps), hood, fuselage, 4D imaging radar, PSL camera, application system, flight controller, smart supercharge battery, etc.

V50 Pro 农业无人飞机系统
V50 Pro Agricultural Drone System

P100 Pro 农业无人飞机的机身采用全新的折叠四旋翼设计，折叠后减少近 62% 收纳体积，转场运输再无难事，轻松装车。
The P100 Pro Agricultural Drone uses a new foldable quad-rotor design, which makes it nearly 62% smaller when folded and easy to load for transfer.

折叠机臂
Foldable Arm

动力系统采用 55 英寸高效螺旋桨、柔性连接结构，并且优化了电机与机臂的连接设计。
The propulsion system features 55-inch propellers, flexible connection structures, and a more appropriate connection between the motor and the arm.

机臂特写
Arm

P100 Pro 及 V50 Pro 农业无人飞机的执行系统包括睿喷、睿播、睿图，集喷洒、播撒、测绘于一身。
The application systems of Agricultural Drones P100 Pro and V50 Pro include RevoSpray, RevoCast, and RealTerra, integrating the spraying, broadcasting, and mapping features.

P100 Pro 及 V50 Pro 农业无人飞机为整机 IPX6K 防护，水密隔舱设计，农田作业结束后，可直接水洗冲刷设备全身。
The Agricultural Drones P100 Pro and V50 Pro feature IPX6K protection and a watertight compartment design that allows them to be rinsed directly with water after operations.

第二章　农业无人机飞机损坏 / 故障隔离

Chapter II　Damage/Fault Isolation of Agricultural Drones

前言概述

Overview

故障损害维修手册是判断和排除设备故障的重要技术文件，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。故障维修手册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。

The Fault Isolation Manual (FIM) serves as an important technical document for diagnosing and isolating faults. It provides the necessary technical data and replacement criteria to identify and analyze faults and assist maintenance technicians in isolating the faults. The document is applicable to routine maintenance, inspection, testing, and repair. It is designed to identify breakdowns effectively and take necessary troubleshooting measures to return the device to normal service. The manual will be updated as device is upgraded. This chapter contains: damage inspection and testing guidelines and specifications, exterior and basic operation damage inspection requirements, device replacement requirements, terminology interpretation, exterior and basic operation damage inspection standards, exterior 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

适用机型及设备

Applicable Models and Device

极飞农业无人飞机
XAG Agricultural Drone
极飞睿喷系统 / 睿喷系统
XAG RevoSpray System/RevoSpray System

工程师职责定义

Technician’s Responsibilities

维修工程师对所接收的设备具有维修责任及管理责任，若需要对维修中的设备进行移交前应整理好设备异常信息，维修进度，注意事项等资料，交接时应与接收工程师共同核实。

The maintenance technician shall be responsible for the maintenance and management of the device received. In case the device under maintenance or repair is to be handed over, abnormal information, maintenance progress, precautions, and other information shall be collected and managed well in advance. The above information shall be verified with the receiving technician during the handover.

维修责任

Repair

保证维修及维护保养的时效性。
Ensure that repairs and maintenance are performed on time.
保证维修及维护保养后的完整性。
Ensure device integrity after repairs and maintenance.

维修责任

Repair

保证设备存放的合理性。
Ensure the device is stored properly.
保证设备的完整性。

Ensure device integrity.
保证交接的信息完整性。
Ensure the information handed over is complete.

所需工具要求 Tool				
内六角螺丝刀 Allen screwdriver	电动螺丝刀 Electric screwdriver	扳手 Wrench	扭力扳手 Torque wrench	老虎钳 / 尖嘴钳 Vise/pointed tongs
套筒 Sleeve	万用表 Multimeter	剪线钳 Wire cutter	电工胶带 Electrical tape	醋酸胶带 Acetate tape
扎带 Cable tie	手电筒 Flashlight	除锈剂 Rust remover		

特殊穿戴要求
Special wearing requirements
严禁穿着拖鞋进行维修工作，在日常维修过程中如遇到涉及严重污染的无人机或设备应穿戴防护手套进行清洗工作。
Do not wear slippers when performing repairs. For drones or device with heavy contamination, protective gloves should be worn during cleaning.

外观及基础运行损害检查要求

Inspection Requirements for Exterior and Basic Operation Damages

检查环境及存放要求

Requirements for Inspection Environment and Storage

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, put the drone on the repair bench in the designated area. Put small parts in storage boxes or other containers after disassembly. Put the electrical device in an appropriate place away from water. Wrap or protect sharp and vulnerable parts with foam.

名词解释

Glossary

裂纹
Crack
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 formed under the action of stress and/or environment and is one of the important performance indices of materials. The appearance and propagation of cracks significantly degrade the mechanical properties of a material.

延伸性裂纹 / 开裂
Ductile crack/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, also known as ductile fractures, form with significant plastic deformation. The fracture

surface is perpendicular or inclined to the tensile stress with fine fibrous bumps. 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”, usually leaving 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 crack/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 to more than half 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 other shapes.

刻痕
Nick
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 occurs when a workpiece is scratched or cut on the surface by a sharp object. In general, it will not cause penetrating damage but will cause oxidation or corrosion inside the workpiece, resulting in 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 caused by drilling, chiseling, or striking with a sharp object and penetrating the surface of an object. Irregular perforations can induce cracks. Perforation affects the mechanical properties of an original object and induces 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 weight polymer when deformed by an external force. Specifically, holes, fractures, or delamination appear in the material under the action of an external force. Stress-whitened materials (such as plastics and rubber) lose their mechanical properties, resulting in fracture.

线皮
Wire jacket
线皮是塑料或橡胶做成，有的橡胶外还有纤维做外套，用于包裹在电线用于绝缘及保护内部线芯之用。
A wire jacket is made of plastic or rubber, and sometimes there are fiber jackets outside the rubber. It is used to wrap around a wire to insulate and protect the inner core.

线芯
Core
线芯在电线线皮包裹之下的导线，设备中电流、信号的传导会经由线芯传递。电线中的线芯一份分为单股与多股，在无人机设备中一般采用多股线。当线芯暴露于环境中时会受到腐蚀，而在供电线缆中的正负极线芯出现短接时则会造成短路导致着火或电子设备的物理性损坏。
A core refers to a conductor that is wrapped by a wire jacket, and it is used to transmit current and signal in the device. Wire cores are typically categorized into single-strand and multi-strand types, and the latter are usually used in drones. The core corrodes when exposed to the environment. When the positive and negative cores in the power supply cable are short-circuited, fire or physical damage to the electronic

device may be caused.

触片
Contact
触片常用与长期进行维修闭合且需要通信或通电的设备上，触片一般由铜片制成，具有较高可塑性。在闭合状态时触片与触片会紧密贴合确保紧密性。
Contacts are often used on devices that are closed for long-term repair and need communication or power. It is usually made of copper sheet and has a high plasticity. In the closed state, two contacts are closely fitted to ensure tightness.

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，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 a function of local high temperature and foreign matter on the contacts due to wear or arcing from long-term use. It is physically manifested as blackening, increased thickness of foreign matter, or increased resistance on the contact surface.

外观及基础运行损害检查标准

Inspection Standards for Exterior and Basic Operational Damages

头部中部及尾框损害检查

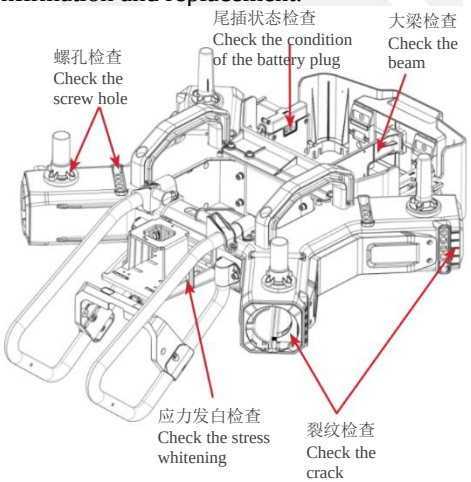
Inspection for Damage to Fuselage front compartment, Fuselage and Tail Frame

P80 头部中部及尾框损害检查

Inspection for Damage to Fuselage front compartment, Fuselage and Tail Frame of P80

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。
Confirm that there is no damage to the equipment as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 结构出现大于 10mm 应力发白现象且伴有开裂或变形。
- Stress whitening greater than 10mm, accompanied by cracks or deformation, occurs in the structure.
- 中部及尾框大梁出现变形、开裂及无法固定现象。
- The Fuselage and Tail Frame beams deform, crack, or fail to secure.
- 螺孔出现滑丝、无法固定及开裂现象。
- The screw hole is slipped, unable to secure, or cracks.
- 单片尾插触片出现烧蚀（烧蚀面积大于 30%）。
- A single connector contact is ablated (ablation area greater than 30%).
- 两片或两片以上尾插触片出现烧蚀（烧蚀面积大于 20%）。
- Two or more connector contacts ablated (ablation area greater than 20%).
- 尾插线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Plug cable with open damage greater than 10mm on the cable jacket and with a broken core.
- 尾插线缆缆线皮出现大于5mm 的缺失。



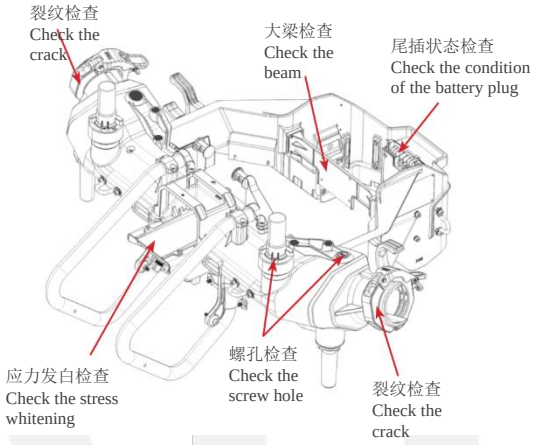
- More than 5mm of the plug cable jacket is missing.

V40 头部中部及尾框损害检查
Inspection for Damage to Fuselage front compartment, Fuselage and Tail Frame of V40 Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 结构出现大于 10mm 应力发白现象且伴有开裂或变形。
- Stress whitening greater than 10mm, accompanied by cracks or deformation, occurs in the structure.
- 中部折叠结构及锁定结构出现变形、开裂现象。
- The folding structure and locking structure in the Fuselage deform or crack.
- 螺孔出现滑丝、无法固定及开裂现象
- The screw hole is slipped, unable to secure, or cracks.
- 单片尾插触片出现烧蚀（烧蚀面积大于 30%）。
- A single connector contact is ablated (ablation area greater than 30%).
- 两片或两片以上尾插触片出现烧蚀（烧蚀面积大于 20%）。
- Two or more connector contacts ablated (ablation area greater than 20%).
- 尾插触片出现缺失、变形或松脱。
- The connector contact is missing, deforms, or loosens.
- 尾插线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Plug cable with open damage greater than 10mm on the cable jacket and with a broken core.
- 尾插线缆缆线皮出现大于5mm 的缺失。
- More than 5mm of the plug cable jacket is missing.

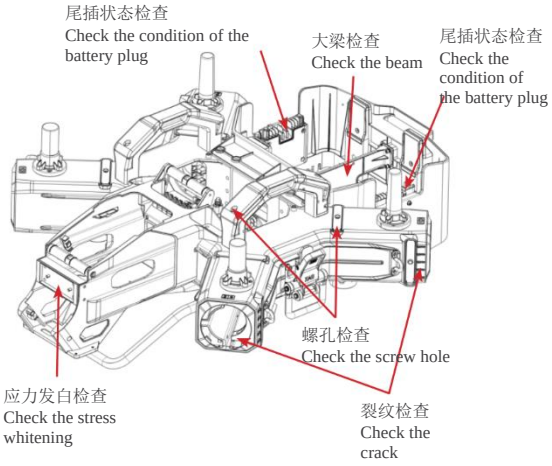


P100 头部中部及尾框损害检查
Inspection for Damage to Fuselage front compartment, Fuselage and Tail Frame of P100 Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 结构出现大于 10mm 应力发白现象且伴有开裂或变形。
- Stress whitening greater than 10mm, accompanied by cracks or deformation, occurs in the structure.
- 中部及尾框大梁出现变形、开裂及无法固定现象。
- The Fuselage and Tail Frame beams deform, crack, or fail to secure.
- 单片尾插触片出现烧蚀（烧蚀面积大于 30%）。
- A single connector contact is ablated (ablation area greater than 30%).
- 两片或两片以上尾插触片出现烧蚀（烧蚀面积大于 20%）。
- Two or more connector contacts ablated (ablation area greater than 20%).
- 尾插触片出现缺失、变形或松脱。
- The connector contact is missing, deforms, or loosens.
- 尾插线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Plug cable with open damage greater than 10mm on the cable jacket and with a broken core.
- 尾插线缆缆线皮出现大于5mm 的缺失。
- More than 5mm of the plug cable jacket is missing.



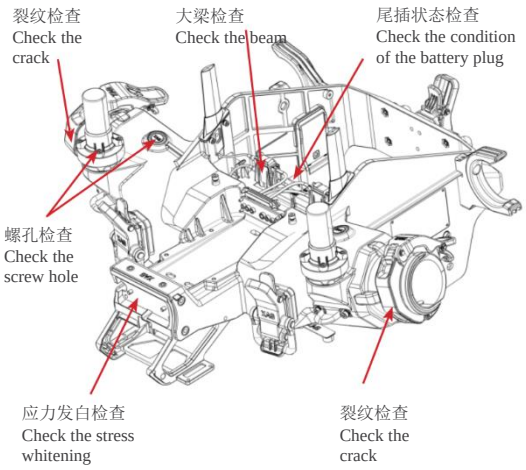
V50 头部中部及尾框损害检查

Inspection for Damage to Fuselage front compartment, Fuselage and Tail Frame of V50 Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 结构出现大于 10mm 应力发白现象且伴有开裂或变形。
- Stress whitening greater than 10mm, accompanied by cracks or deformation, occurs in the structure.
- 中部折叠结构及锁定结构出现变形、开裂现象。
- The folding structure and locking structure in the Fuselage deform or crack.
- 螺孔出现滑丝、无法固定及开裂现象。
- The screw hole is slipped, unable to secure, or cracks.
- 单片尾插触片出现烧蚀（烧蚀面积大于 30%）。
- A single connector contact is ablated (ablation area greater than 30%).
- 两片或两片以上尾插触片出现烧蚀（烧蚀面积大于 20%）。



- Two or more connector contacts ablated (ablation area greater than 20%).
- 尾插触片出现缺失、变形或松脱。
- The connector contact is missing, deforms, or loosens.
- 尾插线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Plug cable with open damage greater than 10mm on the cable jacket and with a broken core.
- 尾插线缆缆线皮出现大于5mm 的缺失。
- More than 5mm of the plug cable jacket is missing.

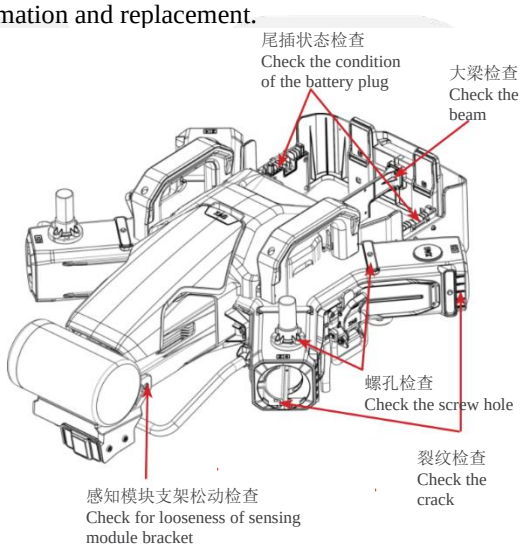
P100 Pro 头部中部及尾框损害检查

Inspection for Damage to Fuselage front compartment, Fuselage and Tail Frame of P100 Pro Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 结构出现大于 10mm 应力发白现象且伴有开裂或变形。
- Stress whitening greater than 10mm, accompanied by cracks or deformation, occurs in the structure.
- 中部及尾框大梁出现变形、开裂及无法固定现象。
- The Fuselage and Tail Frame beams deform, crack, or fail to secure.
- 单片尾插触片出现烧蚀（烧蚀面积大于 30%）。
- A single connector contact is ablated (ablation area greater than 30%).
- 两片或两片以上尾插触片出现烧蚀（烧蚀面积大于 20%）。
- Two or more connector contacts ablated (ablation area greater than 20%).
- 尾插线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Plug cable with open damage greater than 10mm on the cable jacket and with a broken core.
- 尾插线缆缆线皮出现大于5mm 的缺失。
- More than 5mm of the plug cable jacket is missing.
- 感知模块支架松脱，出现大于 10mm 裂纹或应力发白现象。
- Sensing module bracket loosens, with crack or stress whitening greater than 10mm.

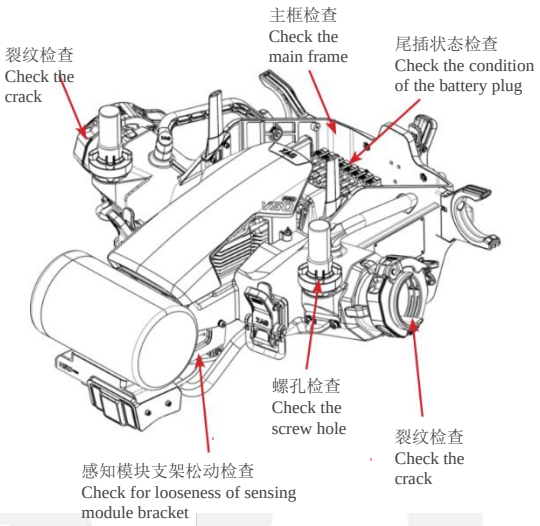


V50 Pro 头部中部及尾框损害检查
Inspection for Damage to Fuselage front compartment, Fuselage and Tail Frame of V50 Pro Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 结构出现大于 10mm 应力发白现象且伴有开裂或变形。
- Stress whitening greater than 10mm, accompanied by cracks or deformation, occurs in the structure.
- 中部折叠结构及锁定结构出现变形、开裂现象。
- The folding structure and locking structure in the Fuselage deform or crack.
- 螺孔出现滑丝、无法固定及开裂现象。
- The screw hole is slipped, unable to secure, or cracks.
- 单片尾插触片出现烧蚀（烧蚀面积大于 30%）。
- A single connector contact is ablated (ablation area greater than 30%).
- 两片或两片以上尾插触片出现烧蚀（烧蚀面积大于 20%）。
- Two or more connector contacts ablated (ablation area greater than 20%).
- 尾插线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Plug cable with open damage greater than 10mm on the cable jacket and with a broken core.
- 感知模块支架松脱，出现大于 10mm 裂纹或应力发白现象。
- Sensing module bracket loosens, with crack or stress whitening greater than 10mm.



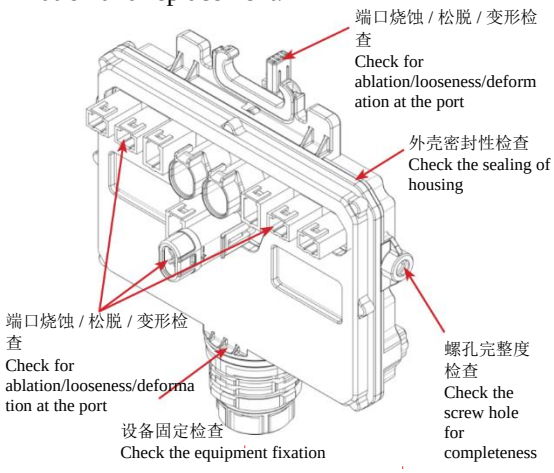
汇流板及中心舱供电线缆损害检查
Inspection for Damage to Power Supply Cables of Busbar and Central Cabin

P80 汇流板及中心舱供电线缆损害检查
Inspection for Damage to Power Supply Cables of Busbar and Central Cabin of P80 Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 防水胶出现脱落、穿孔及缺失等损坏现象。
- Detachment, perforation, missing and other damages to the dust cover.
- 汇流板端口出现烧蚀现象。
- Ablation occurs at the port of the busbar.
- 汇流板出现松脱或变形现象。
- Busbar loosens or deforms.
- 线缆线皮出发大于 10mm 开放性破损且可目视线芯。
- Open damage greater than 10mm at the cable jacket, with exposed cores.
- 线缆线芯出现开放性断裂或暗断现象。
- Open break or hidden breakage occurs on the cable core.

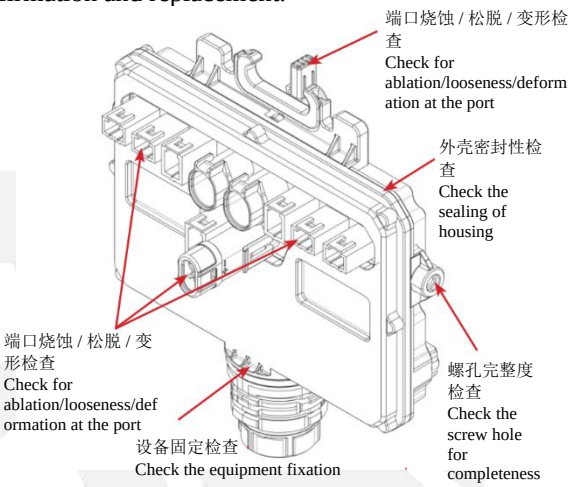


V40 汇流板及中心舱供电线缆损害检查
Inspection for Damage to Power Supply Cables of Busbar and Central Cabin of V40 Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 防水胶出现脱落、穿孔及缺失等损坏现象。
- Detachment, perforation, missing and other damages to the dust cover.
- 汇流板端口出现烧蚀现象。
- Ablation occurs at the port of the busbar.
- 汇流板出现松脱或变形现象。
- Busbar loosens or deforms.
- 线缆线皮出发大于 10mm 开放性破损且可目视线芯。
- Open damage greater than 10mm at the cable jacket, with exposed cores.
- 线缆线芯出现开放性断裂或暗断现象。
- Open break or hidden breakage occurs on the cable core.



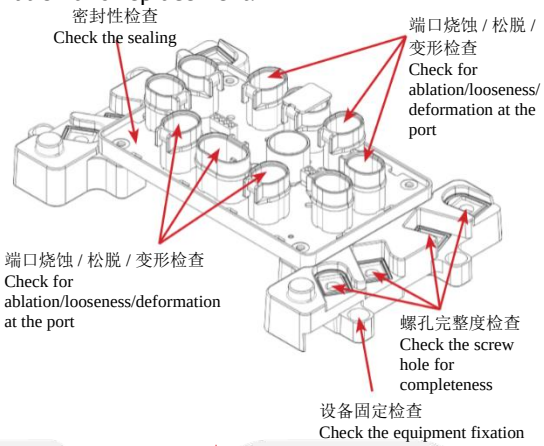
P100 汇流板及中心舱供电线缆损害（22/23 款通用）检查

Inspection for Damage to Power Supply Cables of Busbar and Central Cabin of P100 Drone (applicable for 22/23 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 防水胶出现脱落、穿孔及缺失等损坏现象。
- Detachment, perforation, missing and other damages to the dust cover.
- 汇流板螺孔出现裂纹或缺失。
- Busbar screw hole cracks or is missing.
- 汇流板端口出现烧蚀现象。
- Ablation occurs at the port of the busbar.
- 汇流板出现松脱或变形现象。
- Busbar loosens or deforms.
- 线缆线皮出发大于 10mm 开放性破损且可目视线芯。
- Open damage greater than 10mm at the cable jacket, with exposed cores.
- 线缆线芯出现开放性断裂或暗断现象。
- Open break or hidden breakage occurs on the cable core.



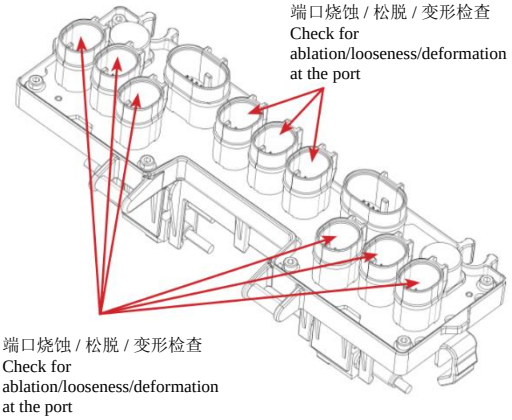
V50 汇流板及中心舱供电线缆损害（22/23 款通用）检查

Inspection for Damage to Power Supply Cables of Busbar and Central Cabin of V50 Drone (applicable for 22/23 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 防水胶出现脱落、穿孔及缺失等损坏现象。
- Detachment, perforation, missing and other damages to the dust cover.
- 汇流板螺孔出现裂纹或缺失。
- Busbar screw hole cracks or is missing.
- 汇流板端口出现烧蚀现象。
- Ablation occurs at the port of the busbar.
- 汇流板出现松脱或变形现象。
- Busbar loosens or deforms.
- 线缆线皮出发大于 10mm 开放性破损且可目视线芯。
- Open damage greater than 10mm at the cable jacket, with exposed cores.
- 线缆线芯出现开放性断裂或暗断现象。
- Open break or hidden breakage occurs on the cable core.

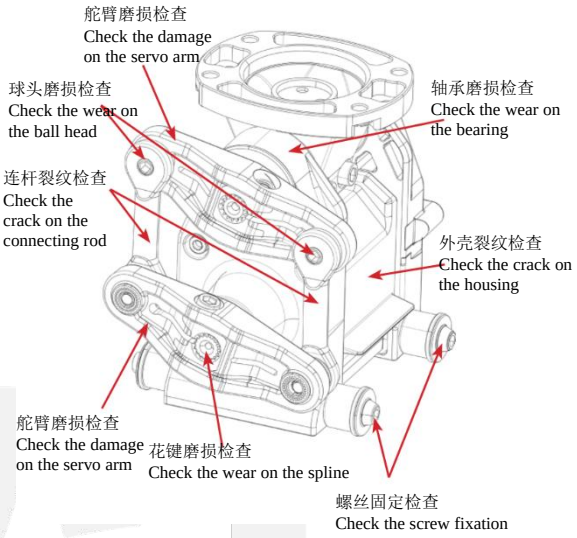


舵机损害检查
Inspection for Damage to Servo
V40 舵机损害检查
Inspection for Damage of the Servo of V40 Drone

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 舵机外壳出现大于 5mm 穿透性开裂。
- Penetrating crack greater than 5mm occurs on the servo housing.
- 舵机外壳出现大于 10mm 裂纹且伴有应力发白现象。
- Crack greater than 10mm with stress whitening on the servo housing.
- 舵机固定螺孔出现大于 2mm 穿透性开裂。
- Penetrating crack greater than 2mm occurs to the set screw hole of the servo.
- 舵机或电机座花键轴出现大于 2mm 穿透性开裂。
- Penetrating crack greater than 2mm occurs on the servo or motor base spline shaft.
- 舵机或电机座花键齿出现大于 30% 磨损（磨损深度大于 1mm）。
- More than 30% (greater than 1mm in depth) wear occurs on the servo or motor base spline teeth.
- 舵机或电机座花键与舵臂固定后仍出现松动（左右及前后摇晃明显松动）。
- Looseness persists when the servo or motor base spline is fixed to the servo arm (noticeable looseness in side-to-side and fore-and-aft rocking).
- 舵机无法正常运行。
- The servo malfunctions.

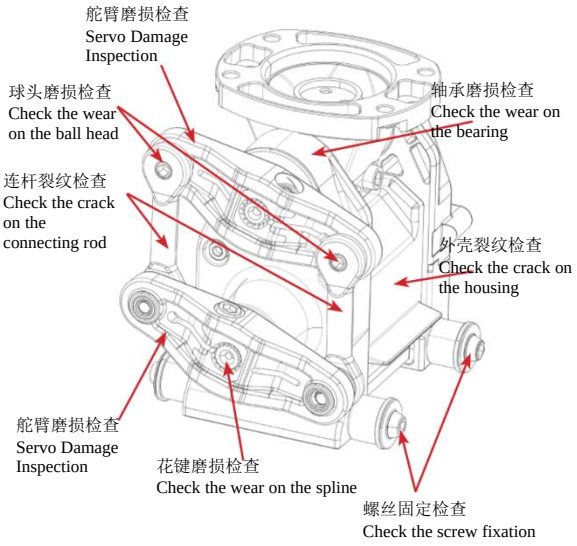


V50 舵机损害检查
V50 Servo Damage Inspection

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 舵机外壳出现大于 5mm 穿透性开裂。
- Penetrating crack greater than 5mm occurs on the servo housing.
- 舵机外壳出现大于 10mm 裂纹且伴有应力发白现象。
- Crack greater than 10mm with stress whitening on the servo housing.
- 舵机固定螺孔出现大于 2mm 穿透性开裂。
- Penetrating crack greater than 2mm occurs to the set screw hole of the servo.
- 舵机或电机座花键轴出现大于 2mm 穿透性开裂。
- Penetrating crack greater than 2mm occurs on the servo or motor base spline shaft.
- 舵机或电机座花键齿出现大于 30% 磨损（磨损深度大于 1mm）。
- More than 30% (greater than 1mm in depth) wear occurs on the servo or motor base spline teeth.
- 舵机或电机座花键与舵臂固定后仍出现松动（左右及前后摇晃明显松动）。
- Looseness persists when the servo or motor base spline is fixed to the servo arm (noticeable looseness in side-to-side and fore-and-aft rocking).
- 舵机无法正常运行。
- The servo malfunctions.

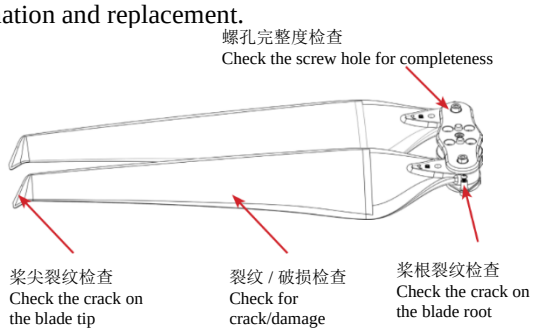


螺旋桨损害检查
Propeller Damage Inspection
螺旋桨损害（21 款 /22 款 /23 款通用）检查
Propeller Damage Inspection (applicable for 21/22/23 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 桨叶出现大于 5mm 开裂或破损。
- Crack or damage greater than 5mm occurs on the blade.
- 桨叶出现变形，桨尖偏差大于 30mm。
- Blade deforms with a deviation of more than 30mm at the tip.
- 桨根出现大于 5mm 纵向开裂。
- Longitudinal crack greater than 5mm occurs at the root.
- 桨根出现大于 5mm 横向开裂且伴有大于 2mm 纵深开裂。
- Transverse crack greater than 5mm and longitudinal crack greater than 2mm occur at the root.
- 桨根出现分层破损或钢套松脱现象。
- The root delaminates or loosens.

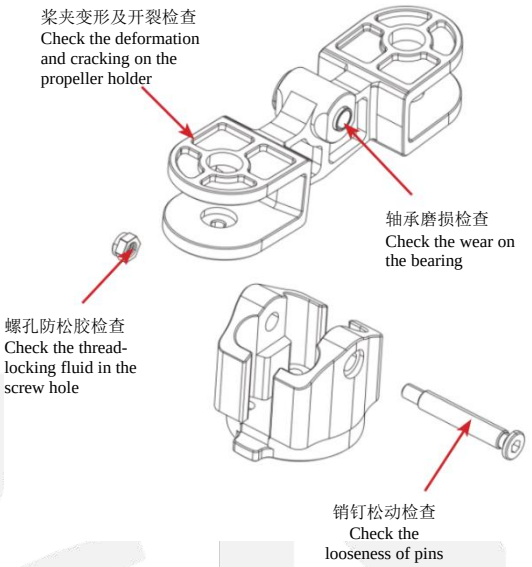


桨夹损害检查
Propeller Holder Damage Inspection
桨夹损害（23 款适用）检查
Propeller Holder Inspection (applicable for 23 model)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

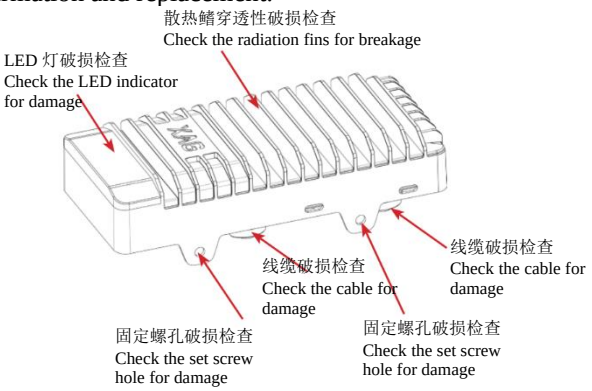
- 销钉松动脱落。
- Pins get loose and detached.
- 桨夹出现变形。
- Deformation occurs on the propeller holder.
- 桨夹出现大于 5mm 纵向开裂。
- Longitudinal crack greater than 5mm occurs on the propeller holder.
- 桨夹轴承磨损松动。
- The propeller holder bearing gets worn and loose.
- 销钉螺母防松胶失效松脱。
- Failure of thread-locking fluid causes that the pin nut gets loose.



动力电调损害检查
Main ESC Damage Inspection
动力电调损害（21 款 /22 款 /23 款通用）检查
Main ESC Damage Inspection (applicable for 21/22/23 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.



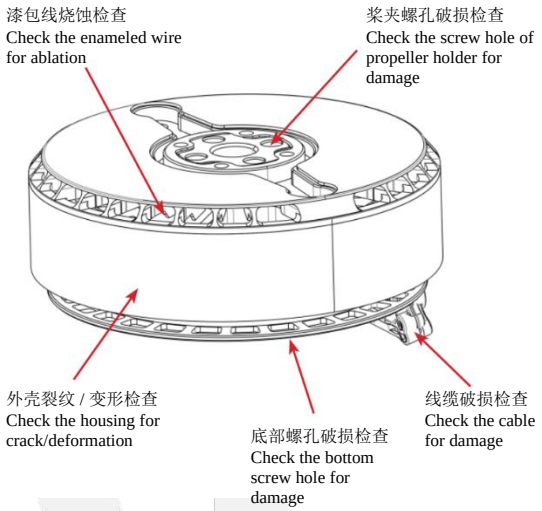
- 供电线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Open damage greater than 10mm with broken wire core occurs on the power cord.
- 供电线缆线皮出现大于 5mm 的缺失。
- More than 5mm of power cord jacket is missing.
- 三相线缆线皮出现大于 5mm 开放性破损且伴有线芯断裂。
- Open damage greater than 5mm with core broken occurs on three-phase cable jacket.
- OT 端子出现影响紧性融化、触片出现缺失。
- Melted OT terminal affecting the tightness or contact missing.
- 单个触片表面面积出现大于 20% 烧蚀、缺失或形变。
- More than 20% of the surface area of a single contact is ablated, missing, or deformed.
- 电调外壳出固定螺孔损坏。
- The set screw hole at ESC housing is damaged.
- 电调外壳出现大于 10mm 穿透性开裂
- Penetrating crack greater than 10mm occurs on the ESC housing.
- 电调外壳出现大于 5mm 穿孔。
- Perforation greater than 5mm occurs on ESC housing.
- 电调无法正常运行。
- The ESC is not functioning normally.

动力电机损害检查
Main Motor Damage Inspection
动力电机损害（21 款 /22 款 /23 款通用）检查
Main Motor Damage Inspection (applicable for 21/22/23 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 电机外壳（外转子）出现大于 3mm 穿透性开裂或变形影响转动。
- Penetrating crack or deformation greater than 3mm occurs on the motor housing (outer rotor), which affects the rotation.
- 电机外壳（外转子）出现松动且重新加固后无改善。
- The motor housing (outer rotor) gets loose and there is no improvement after being re-tightened.
- 电机铜线（定子漆包线）烧蚀发黑或伴有烧焦异味（面积大于 30%）。
- The copper wire (stator enameled wire) of the motor is blackened by ablation or has a burnt odor (the area is more than 30%).
- 电机底座螺孔出现滑丝。
- Slippage occurs on the screw hole thread of the motor base.
- 三相线缆线皮出现大于 5mm 开放性破损且伴有线芯断裂。
- Open damage greater than 5mm with core broken occurs on three-phase cable jacket.
- OT 端子出现影响紧性融化、触片出现缺失。
- Melted OT terminal affecting the tightness or contact missing.
- 单个触片表面面积出现大于 20% 烧蚀、缺失或形变。
- More than 20% of the surface area of a single contact is ablated, missing, or deformed.
- 电机无法正常运行。
- The motor is not functioning normally.

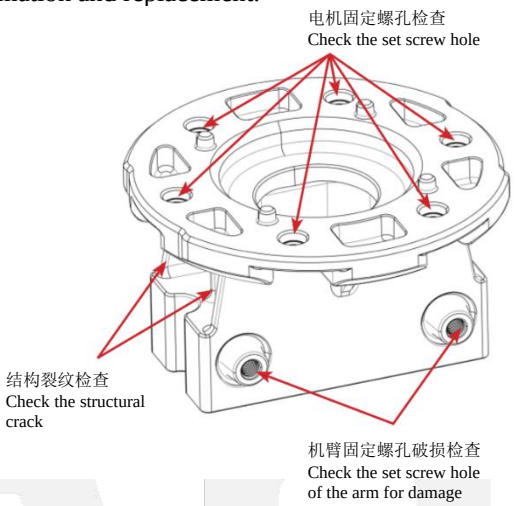


电机底座损害检查
Motor Base Damage Inspection
电机底座损害（21 款 /22 款 /23 款通用）检查
Motor Base Damage Inspection (applicable for 21/22/23 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 电机底座螺孔出现大于 3mm 穿透性开裂。
- Penetrating crack greater than 3mm occurs to the screw hole of motor base.
- 电机底座表面出现大于 3mm 穿透性开裂。
- Penetrating crack greater than 3mm occurs on the surface of motor base.
- 电机底座出现大于 5mm 裂纹且伴有应力发白现象。
- Crack greater than 5mm with stress whitening occurs on motor base.
- 电机底座出现变形且无法与电机或机臂进行装配固定。
- The motor base is deformed and cannot be assembled and fixed to the motor or arm.

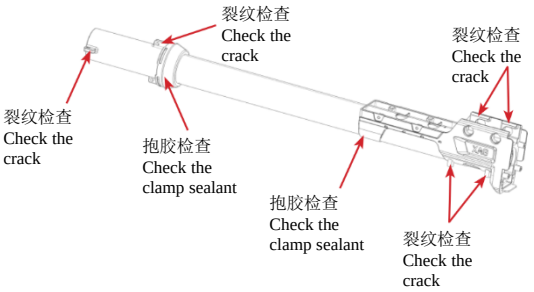


机臂损害检查
Arm Damage Inspection
机臂损害（21 款 /22 款通用）检查
Arm Damage Inspection (applicable for 21/22 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 机臂末端截面出现大于 5mm 延伸性开裂。
- Extensional crack greater than 5mm occurs to the end of the arm.
- 机臂任意位置出现大于 5mm 穿透性裂纹或穿孔。
- Penetrating crack or perforation greater than 5mm occurs at any position of the arm.
- 机臂出现明显弯曲且与完整机臂误差大于 10mm。
- The arm is significantly bent and the error of the complete arm is greater than 10mm.
- 机臂抱胶位置出现大于 5mm 裂纹或松脱。
- Crack greater than 5mm or looseness occurs at the arm clamping position.

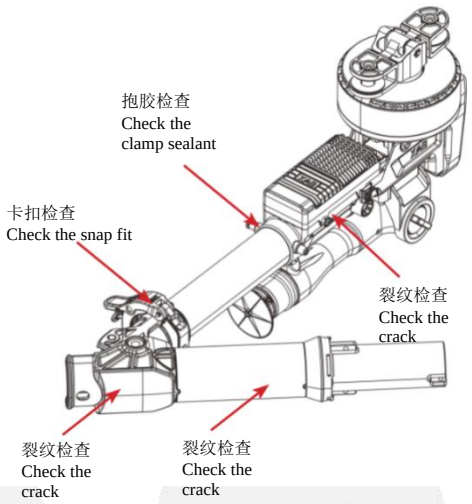


机臂损害（23 款）检查
Arm Damage Inspection (applicable for 23 model)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 机臂末端截面出现大于 5mm 延伸性开裂。
- Extensional crack greater than 5mm occurs to the end of the arm.
- 机臂任意位置出现大于 5mm 穿透性裂纹或穿孔。
- Penetrating crack or perforation greater than 5mm occurs at any position of the arm.
- 机臂出现明显弯曲且与完整机臂误差大于 10mm。
- The arm is significantly bent and the error of the complete arm is greater than 10mm.
- 机臂抱胶位置出现大于 5mm 裂纹或松脱。
- Crack greater than 5mm or looseness occurs at the arm clamping position.
- 机臂抱箍无断裂无缺失。
- The arm clamp shall not be broken or missing.
- 机臂折叠结构无大于 10mm 裂纹，无变形。
- The folding structure of the arm shall have no crack greater than 10mm and no deformation.



飞控及感知系统损害检查
Flight Controller and Sensor System Damage Inspection

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

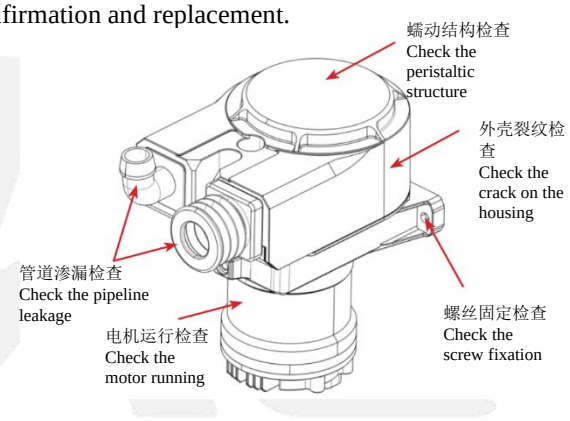
- 线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂。
- Open damage greater than 10mm with broken wire core occurs on the cable jacket.
- 线缆线皮出现大于 5mm 的缺失。
- More than 5mm of cable jacket is missing.
- 外壳出固定螺孔损坏。
- The housing set screw hole is damaged.
- 外壳出现大于 10mm 穿透性开裂。
- Penetrating crack greater than 10mm occurs on the housing.
- 外壳出现大于 5mm 穿孔。
- Perforation greater than 5mm occurs on the housing.
- 无法正常运行。
- Failure to function normally.

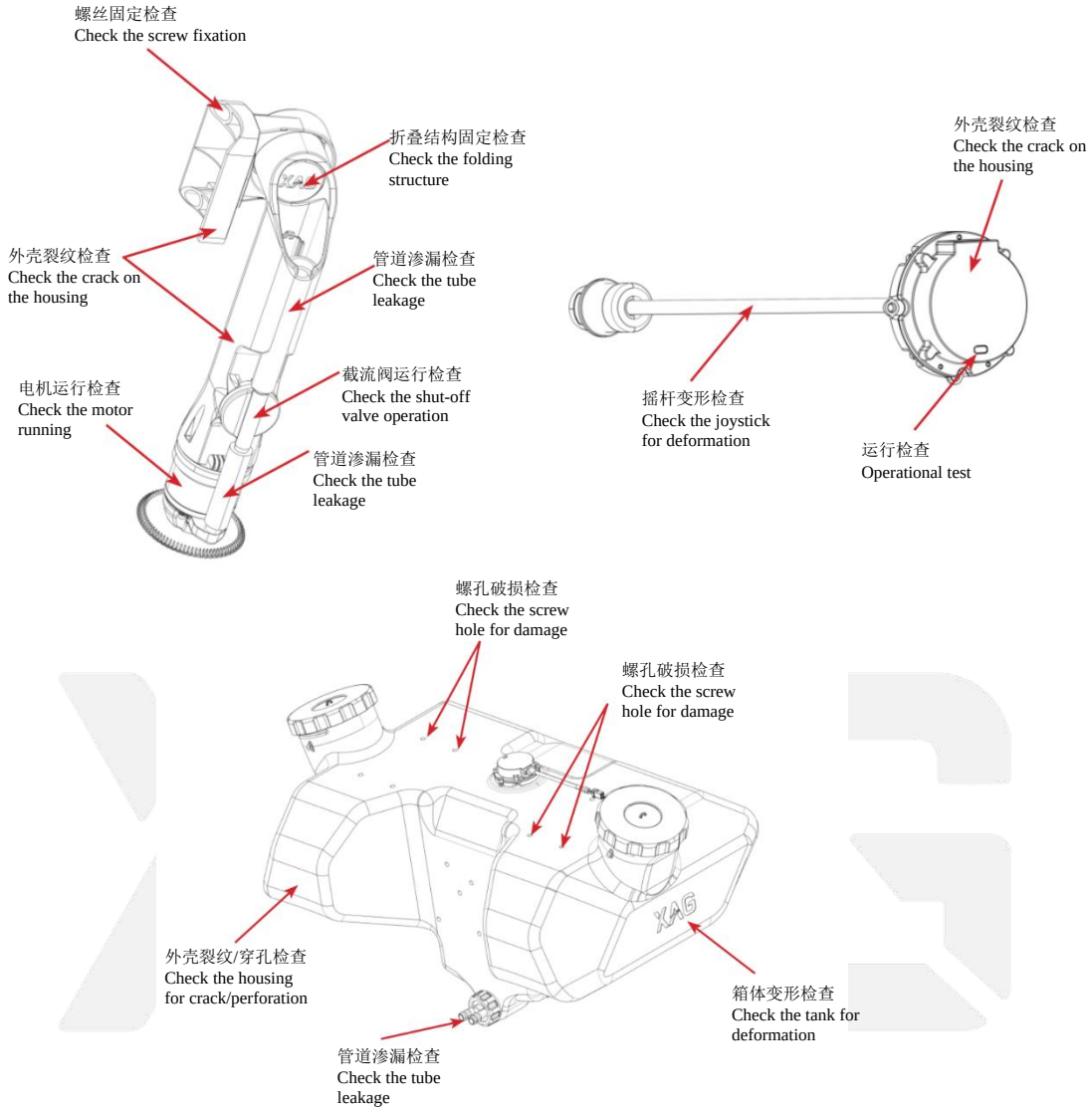
执行系统外观损害检查标准
Inspection Standard for Exterior Damages of Application System
睿喷系统关键结构外观损害检查标准
Inspection Standard for Exterior Damages of Key Structure of RevoSpray System
睿喷系统损害（21/22 款通用）检查
Inspection for Damage to RevoSpray System (applicable for 21/22 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 药箱出现药液渗漏现象，蠕动泵无法固定牢靠。
- Leakage occurs to the liquid tank, and the peristaltic pump cannot be fixed securely.
- 蠕动泵无法固定牢靠，输液管出现渗漏现象。
- The peristaltic pump cannot be fixed securely, and leakage occurs to the liquid tube.
- 蠕动泵外壳出现大于 10mm 穿透性开裂。
- Penetrating crack greater than 10mm occurs on the peristaltic pump housing.
- 蠕动泵外壳外壳出现大于 5mm 穿孔。
- Perforation greater than 5mm occurs to the peristaltic pump housing.
- 喷杆出现脱落，失效或变形。
- The spray bar has detached, failed or deformed.





注意事项
Notes

- 药箱固定螺孔内已嵌入螺母作为固定，当出现固定不牢靠现象应检查螺孔内的螺母是否处于正常卡紧状态，若出现螺母脱落可使用橡胶锤重新将螺母嵌入螺孔内并使用“环氧胶水”或“速干胶”加固后重新安装螺丝。
- The liquid tank has been secured with nuts tightened into the set screw holes. If the fixation is not stable, check whether the nuts in the screw holes are in normal locking status. Re-tighten the nuts with a rubber hammer and secure them with "epoxy glue" or "quick-drying adhesive" and tighten the screws again.
- 药箱如遇到螺母松脱，药箱变形的情况下应优先进行修复，禁止在未经修复操作的情况下直接更换药箱。
- In case of the nuts of the liquid tank get loose and the liquid tank is deformed, repair the liquid tank first. It is not allowed to directly replace the liquid tank without repairing the deformed one.

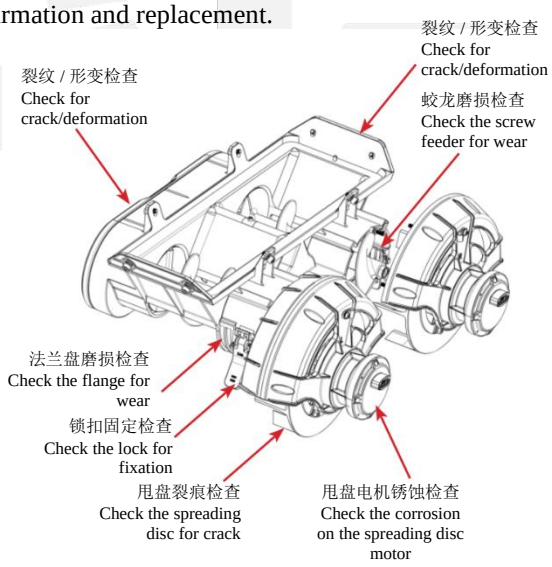
睿播系统关键结构外观损害检查标准
Inspection Standard for Exterior Damages of Key Structure of RevoCast System

睿播系统损害（22/23 款通用）检查
RevoCast System Damage Inspection (Applicable for 22/23 models)

证实设备没有出现下列损害，若出现非本列表损害且影响运行安全的损害现象上报核实后进行更换。

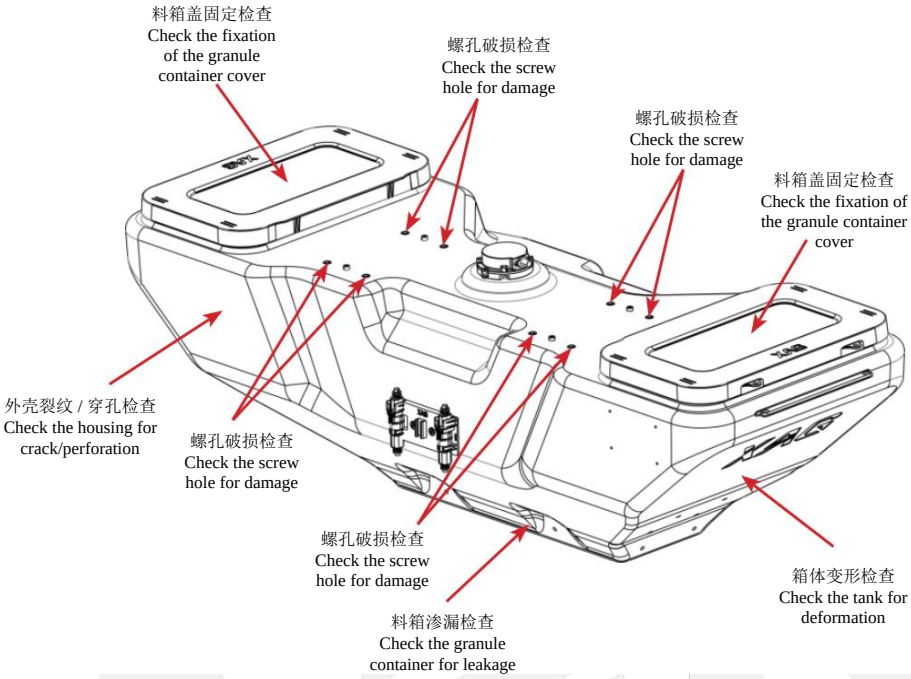
Confirm that there is no damage to the device as listed below. Any damage affecting the operation safety but not included in the list shall be reported for confirmation and replacement.

- 料箱出现漏料现象，播撒模块无法固定。
- Leakage occurs to the granule container, and the spreading module cannot be secured.
- 睿播齿轮组损坏（齿轮出现破损失效）。
- The RevoCast gear set is damaged (gears are damaged and failed).
- 蛟龙电机出现锈蚀失效（锈蚀面积大于 30% 且电机无法运行）。
- Corrosion occurs to the screw feeder motor, causing the motor failure (the corroded area is greater than 30%, leading to the motor failure).
- 蛟龙主体出现大于 5mm 磨损并伴有漏料现象。
- Wear greater than 5mm accompanied by leakage occurs to the main body of the screw feeder.
- 法兰盘出现面积大于 30% 锈蚀且影响固定及运行稳定。
- Corrosion greater than 30% area occurs to the flange, affecting the fixation and stable operation.
- 甩盘出现大于 10mm 穿透性开裂或结构性损坏。
- Penetrating crack greater than 10mm or structural damage occurs to the spreading disc.
- 甩盘电机出现面积大于 30% 锈蚀且影响电机运行。
- Corrosion greater than 30% occurs onto the



spreading disc motor, affecting the running of the motor.

- 线缆线皮出现大于 10mm 开放性破损且伴有线芯断裂或 5mm 的线皮缺失。
- Open damage greater than 10mm occurs on the wire jacket, with core breakage or missing of 5mm wire jacket.



注意事项
Notes

- 料箱固定螺孔内已嵌入螺母作为固定，当出现固定不牢靠现象应检查螺孔内的螺母是否处于正常卡紧状态，若出现螺母脱落可使用橡胶锤重新将螺母嵌入螺孔内并使用“环氧胶水”或“速干胶”加固后重新安装螺丝。
- The granule container has been secured with nuts tightened into the set screw holes. When the fixation is not stable, check whether the nuts in the screw holes are in normal locking status. Re-tighten the nuts with a rubber hammer and secure them with "epoxy glue" or "quick-drying adhesive" and tighten the screws again.
- 料箱如遇到螺母松脱，料箱变形的情况下应优先进行修复，禁止在未经修复操作的情况下直接更换料箱。
- In case of the nuts on the granule container get loose and the liquid tank deformed, repair the granule container first. It is not allowed to directly replace the granule container without repairing the deformed one.

第三章　极飞农业无人飞机拆装

Chapter III Disassembly and Assembly of XAG Agricultural Drone

前言概述

Overview

本章内容主要为 2023 款 P100Pro 农业无人飞机、V50Pro 农业无人飞机及其相关任务系统的关键部件拆装，部分内容适用于 2022 款 P100 农业无人飞机、V50 农业无人飞机及其相关任务系统。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 includes disassembly and assembly of the key components of 2023 P100 Pro Agricultural Drone, V50 Pro Agricultural Drone and their payload systems. Some contents are applicable to 2022 P100 Agricultural Drone, V50 Agricultural Drone and their payload systems. 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 cords, communication cables, and tubes have been separated and confirmed that there is no power supply in any form.

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 the disassembly and assembly. For maintenance, the drone shall be placed on the repair bench in the designated maintenance area. Micro parts after removal should be placed in storage boxes or other containers; electrical equipment device 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. The parts in contact with pesticides or fertilizers shall be subject to basic cleaning and air-dried them 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	内六角螺丝刀 Allen Screwdriver	1.5/ 2.0 /2.5/ 3.0/ 5.0	无人机拆装 Disassembly and assembly of drones
	棘轮扳手 Ratchet Wrench	-	无人机拆装 Disassembly and assembly of drones
电动工具 Electrical Tools	电动螺丝刀 Electric Screwdriver	12v~24v 可更换批头 12v~24v Replaceable Screwdriver Bits	无人机拆装 Disassembly and assembly of drones
校准工具 Calibration Tools	扭力扳手 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	-	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.
辅助工具 Auxiliary Tools	引线器 Lead Wire	-	机臂及狭小位置线缆导引 Wiring guide for arms and at tight positions
耗材 Consumables	醋酸胶带 Acetate Tape	-	线缆及管道防磨损包裹 Abrasion-resistant wrapping for cables and tubes
	电工胶带 Electrical Tape	-	小面积线缆（非电源）破损修补 Repair of cables with a small area of damage (non-power cables)
	螺丝松动剂 Screw Loosening Agent	Wd-40	锈蚀螺丝拆卸前松动 Loosening corroded screws before removal
	螺丝胶 Screw Adhesive	半永久螺丝胶 Semi-permanent Screw Adhesive	安装螺丝前涂抹，放反松现象 Applied before mounting screws to prevent them from getting loosing
	马克笔 Marker	红色及白色 Red and White	螺丝紧固后作防反松标记 Marking screws for anti-loosening after fastening
	凡士林 Vaseline	-	蠕动泵同步盘润滑 Lubrication of peristaltic pump synchronous disc

关键测控点要求

Requirements for Key Measurement and Control Points

P 系列农业无人飞机拆装质量测控点

Quality Measurement and Control Points in Disassembly and Assembly of P Series Agricultural Drones

部件 Assembly Unit	安装件 Parts Installed	力矩控制点 Torque Control Point	安装要求 Installation Requirement
机头部件 Fuselage front compartment	机头与主体连接 Connection between the Fuselage front compartment and the fuselage	29-31 kgf.cm	-
	摇摆雷达 4D imaging radar	21-22 kgf.cm	-
机臂部件 Arm	螺旋桨 Propeller	48-52 kgf.cm	桨叶已配对，需同时更换使用 Blades must be replaced together
	电调 ESC	12-14 kgf.cm	-
	机臂与主体 Arm and fuselage	29-31 kgf.cm	-
	电机底座与电机 Motor and its base	预紧：35-4 1kgf.cm Pre-tightening: 35-4 1kgf.cm	对角顺序安装 Installed in a diagonal manner
		拧紧：49 kgf.cm Tightening: 49 kgf.cm	红色油性笔标识 Mark with a red oil-based pen
	机臂与电机底座 Arm and motor base	预紧：35-35 kgf.cm Pre-tightening: 35-35 kgf.cm	钢套方向有螺纹一端朝外 Threaded end facing outward along the steel sleeve
		拧紧：49 kgf.cm Tightening: 49 kgf.cm	红色油性笔标识 Mark with a red oil-based pen
	电机电调端子 Motor ESC terminal	25-26 kgf.cm	三相线颜色对应装配 Assemble the three-phase wires corresponding to their colors
			端子面使用酒精擦拭 Wipe up the terminal face with alcohol
主体框架 Fuselage Frame	汇流板 Busbar	12-14 kgf.cm	8pin 接口朝机头方向 8-pin interface facing the Fuselage front compartment
			线缆不可缠绕装配，3/4 机臂出线需在传输管上方 Do not wind cables during assembly, and leave the 3/4 arm outgoing line above the tube
			确认端子包胶是否有开裂 Verify whether the terminal rubber coating is cracked
	电调输入线 ESC incoming line	25-26 kgf.cm	-

部件 Assembly Unit	安装件 Parts Installed	力矩控制点 Torque Control Point	安装要求 Installation Requirement
	载荷对接件 Load butt joint	12-14 kgf.cm	尾插电源线与信号线布置方式：正极线在内侧，负极在外侧，线缆不可缠绕 Cabling of battery plug and signal cables: Positive cable at the inside, negative cable at the outside, no tangling.
尾框部件 Tail Frame	尾框与主体 Tail Frame and fuselage	29-31 kgf.cm	-
	尾插线缆 Connector cable	25-26 kgf.cm	-
睿喷睿播 RevoSpray/RevoCast	药箱与脚架 Liquid tank and landing gear	13-14 kgf.cm	-
	负载框与药箱 Load frame and liquid tank	21-22 kgf.cm	-

P 系列农业无人飞机拆装质量测控点

Quality Measurement and Control Points in Disassembly and Assembly of P Series Agricultural Drones

部件 Assembly Unit	安装件 Parts Installed	力矩控制点 Torque Control Point	安装要求 Installation Requirement
一体机身主框 Integrated Fuselage Frame	摇摆雷达 4D imaging radar	11-12 kgf.cm	-
	集线板 Cable hub	11-12 kgf.cm	-
	抱箍 Clamp	11-12 kgf.cm	-
	感应支撑架 Sensor holder	11-12 kgf.cm	-
	快拆半成品 Semi-finished piece for easy disassembly	20-21 kgf.cm	-
	尾框与尾插 Tail Frame and connector	预紧：11-12 kgf.cm Pre-tightening: 11-12 kgf.cm	接线前先使用酒精擦拭线材和尾插金属接触面 Wipe the metal contact surface between cables and connector with alcohol before wiring
机臂部件 Arm	机臂与主体 Arm and fuselage	80-90 kgf.cm	法兰防松螺母将螺栓锁紧固定，注意螺母下应放置主臂钢轴垫片 Tighten bolts with flange jam nuts, and use washers together with nuts for the steel shaft of the main arm
	螺旋桨	48-52 kgf.cm	-

部件 Assembly Unit	安装件 Parts Installed	力矩控制点 Torque Control Point	安装要求 Installation Requirement
	Propeller		
	电机底座与舵机 Motor base and servo	预紧：25-27 kgf.cm Pre-tightening: 25-27 kgf.cm	-
		拧紧：60 kgf.cm Tightening: 60 kgf.cm	
	电机与电机底座 Motor and its base	预紧：25-27 kgf.cm Pre-tightening: 25-27 kgf.cm	-
		拧紧：60 kgf.cm Tightening: 60 kgf.cm	
	锁电机电调端子 Motor ESC terminal	24-26 kgf.cm	三相线颜色对应装配 Assemble the three-phase wires corresponding to their colors
			端子面使用酒精擦拭 Wipe up the terminal face with alcohol
	舵机与机臂连接 Connection between the servo and the arm	预紧：25-27 kgf.cm Pre-tightening: 25-27 kgf.cm	-
	舵机舵臂连杆（摇臂） Servo arm connecting rod (rudder arm)	拧紧：60 kgf.cm Tightening: 60 kgf.cm	-
		预紧：25-27 kgf.cm Pre-tightening: 25-27 kgf.cm	-
	舵机舵臂连杆（连杆） Servo arm connecting rod (connecting rod)	拧紧：60 kgf.cm Tightening: 60 kgf.cm	-
		预紧：25-27 kgf.cm Pre-tightening: 25-27 kgf.cm	-
睿喷 / 睿播系统 RevoSpray/RevoCast System	药箱与脚架 Liquid tank and landing gear	13-14 kgf.cm	-
	负载框与药箱 Load frame and liquid tank	21-22 kgf.cm	-

拆装程序说明

Notes to Disassembly and Assembly Procedures

一般拆装程序假定条件说明

Notes to Assumption Conditions for General Disassembly and Assembly Procedures

- 螺丝可顺利拆卸。
- The screws shall be able to be removed smoothly.
- 结构无严重变形及损坏。
- The structure shall be free from serious deformation and damage.
- 各部件之间咬合正常。

- Components shall be engaged with each other properly.
- 各部件之间无污垢沾粘。
- There shall be no dirt sticking between parts.

拆卸异常情况处理说明
Notes to Handling Abnormalities in Disassembly

如在拆装过程中存在异常情况，应对异常位置进行分析排查并适当使用工具进行拆装帮助。在拆卸过程中如遇到污垢沾粘应使用清水对污垢处进行浸润清除，螺丝锈蚀应使用螺丝松动剂进行浸润后再进行拆卸，对锈蚀螺丝拆卸时应优先使用手动工具，避免电动工具瞬间扭力过大损坏螺丝杯头。

For any abnormal situation in the process of disassembly and assembly, troubleshoot and analyze the abnormality, and use appropriate tools as the assistance for disassembly and assembly. For any dirt sticking in the process of disassembly, moisten the dirt with water and remove it. For rusty screws, moisten them with loosening agent before dismantling. When disassembling rusty screws, use manual tools to avoid damaging the screw cup head due to excessive torque caused by electric tools.

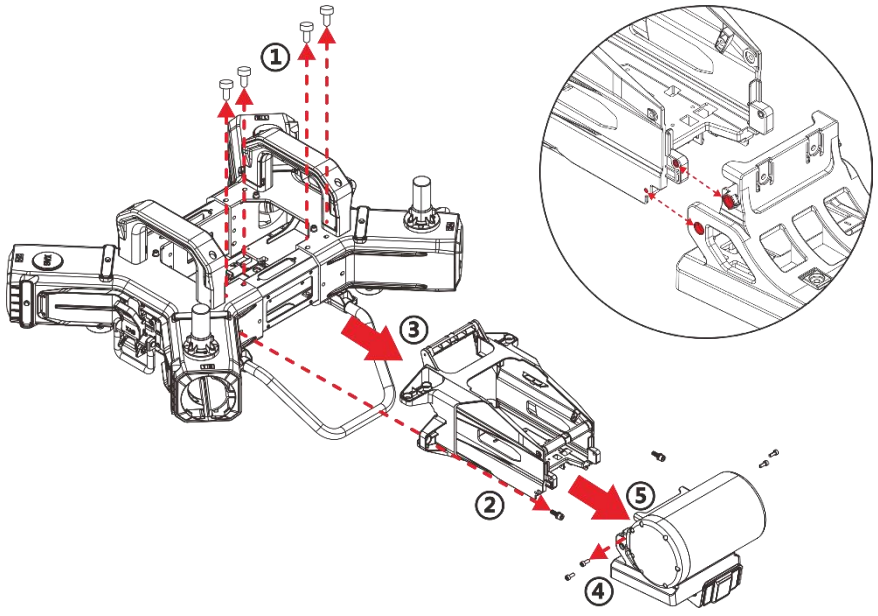
组合与安装规则明
Instruction to Assembly and Mounting

在组合安装前应核实所更换的配件无损坏，组合与安装作业应在光线充足的环境中进行。在安装过程中如需使用螺丝进行紧固时，应采用对应配件规格的螺丝，安装前应对了解对应机型的《拆装质量测控点》要求并按规定对螺丝进行指定扭力进行紧固，安装完成后使用扭力扳手进行校验，证实已达到规定扭力要求后使用红色或白色马克笔进行防反松标识。

Before the assembly and mounting, it shall be verified that the accessories for replacement are undamaged, and assembly and installation operations shall be carried out in the environment with adequate lighting. When tightening with screws in the process of mounting, the screws shall be corresponding to the specifications of the accessories. Before the mounting operation, understand the requirements of the *Quality Control Points of Disassembly and Assembly*, and tighten the screws with the specified torque according to the instructions. After completing the assembly, use a torque wrench to verify that the specified torque requirements are met and mark the anti-loosening screws with a red or white marker.

P 系列拆装程序
Disassembly and Assembly Procedures for P Series

P 系列机头拆装指引
Guidelines for Disassembly and Assembly of Fuselage front compartment of P Series



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*16	02-004-00939	29.0-31.0 kgf.cm
④	M4*12*8	02-004-00834	21-22 kgf.cm

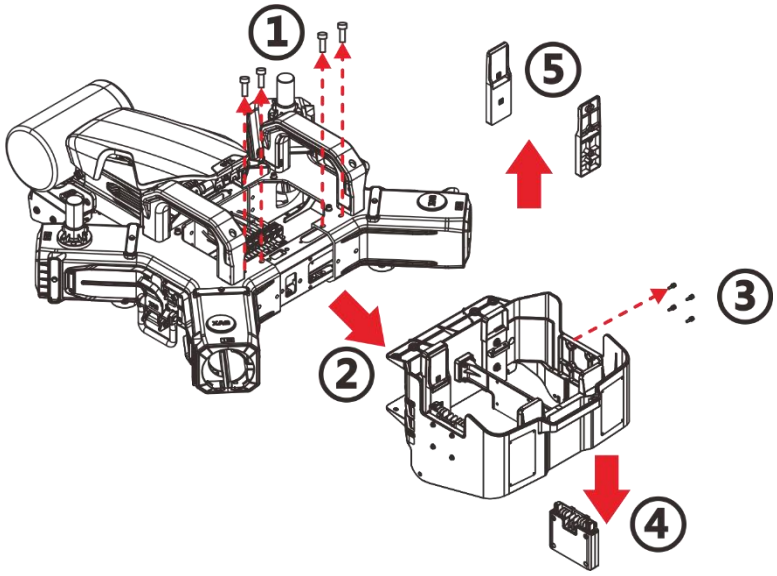
拆卸流程
Disassembly Procedures

1. 拆卸机身与机头上方及下方连接处 8 颗 M5*16 固定螺丝。
1. Remove 8 M5*16 set screws that connect the fuselage to the top and bottom of the Fuselage front compartment.
2. 拆卸机身与机头前方两侧连接处螺丝。
2. Remove the screws at the connections between the fuselage and the two sides in the front of the Fuselage front compartment.
3. 外拉分离机头结构（机头及感知模块结构可完整分离）。
3. Pull outward to separate the Fuselage front compartment structure (the Fuselage front compartment and the sensor module structure can be separated completely).
4. 分离感知模块架与机头连接处 4 颗 M4*12*8 螺丝。
4. Remove the 4 M4*12*8 screws at the connection between the sensor module and the Fuselage front compartment.
5. 前拉分离感知模块。
5. 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，安装机头上下方及正前方螺丝。
1. Fix the Fuselage front compartment to the mounting position on the fuselage, and install the upper, lower and front screws in the Fuselage front compartment.
2. 固定感知模块支架与机头正前方，安装感知模块固定螺丝。
2. Fix the sensor module bracket to the front of the Fuselage front compartment, and install the sensor module set screws.

P 系列尾框拆装指引
Guidelines for Removal and Installation of P Series Tail Frames



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*16	02-004-00939	29.0-31.0 kgf.cm
③	M3*10*6	02-004-00624	6.5-7.5 kgf.cm
⑤	M4*12	02-004-00994	12.0-13.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸机身与尾框上方及下方连接处 8 颗 M5*16 螺丝。
1. Remove the 8 M5*16 screws at the connections between the fuselage and the upper and lower parts of the Tail Frame.
2. 外拉分离尾框结构（尾框结构可完整分离）。
2. Pull outward to separate the Tail Frame structure (the Tail Frame structure can be separated completely).
3. 分离尾插模块的 4 颗 M3*10*6 螺丝。
3. Remove the 4 M3*10*6 screws in the plug module.
4. 取出尾插模块（取出先应确保电源线缆已分离）。
4. Take out the plug module (after confirming that the power cord has been separated).
5. 拆卸导轨 2 颗 M4*12 螺丝，分离电池导轨。
5. Remove the 2 M4*12 screws in the guide to separate the battery guide.

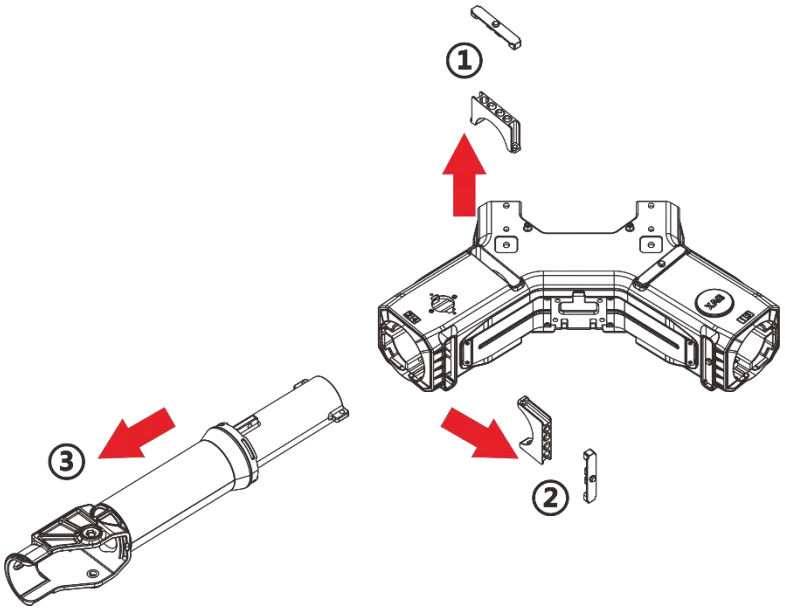
安装流程

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 Tail Frame structure to the mounting position on the fuselage, and install the upper and lower screws in the Tail Frame structure.
2. 固定尾插模块于尾框安装处，安装固定螺丝。
2. Fix the plug module to the mounting position on the Tail Frame, and install the set screws.

P 系列机臂拆装指引

Guidelines for Removal and Installation of P Series Arms



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 ②	M5*32	02-004-00780	29.0-31.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸机身上方 2 颗 M5*32 机臂管压件。
1. Remove the 2 M5*32 screws in the upper part of the fuselage that fix the arm tube shield.
2. 拆卸机身侧方 2 颗 M5*32 机臂管压件。
2. Remove the 2 M5*32 screws on the side of the fuselage that fix the arm tube shield.
3. 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）。
3. Pull outward to separate the arm (after confirming that the arm cable and tube have been separated).

注意事项

Notes

- P100 及 P100 Pro 四根机臂拆卸方法一致。
- The four arms of P100 and P100 Pro 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. 使用机臂管压件紧固机臂。
2. Use the arm tube shield to fasten the arm.
3. 扣紧防尘软胶盖。
3. Tighten the soft rubber dustproof cap.

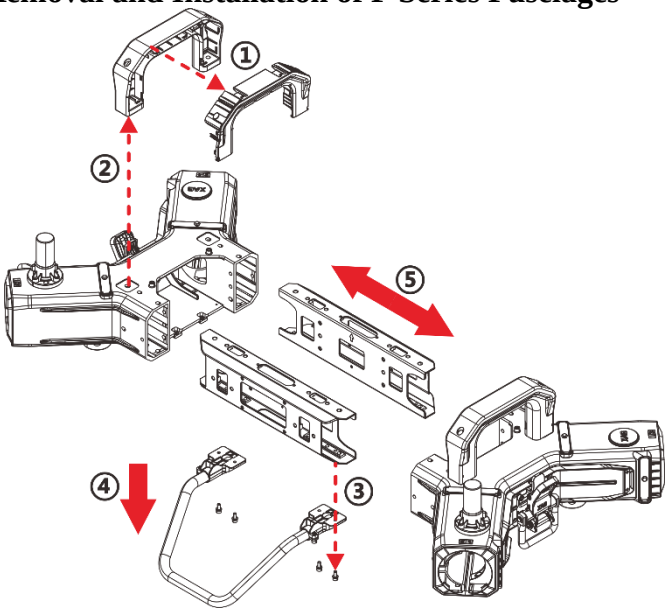
注意事项

Notes

- 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，需捋顺线缆及管道。
- During installation, take care to avoid scratch and breakage when running the cables and tubes through the arms and the fuselage. Straighten the cables and tubes before final assembly.

P 系列机身拆装指引

Guidelines for Removal and Installation of P Series Fuselages



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	M6*22*12	02-004-01053	49.0-51.0 kgf.cm
③	M4*12*8	02-004-00834	12.0-14.0 kgf.cm
⑤	M5*16	02-004-00939	38.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸机身两侧提把内 4 颗 M6*22*12 螺丝，分离提把。
1. Remove the 4 M6*22*12 screws in the handles on the two sides of the fuselage to separate the handles.
2. 分离提把及天线链路。
2. Disconnect the handles and antenna links.
3. 拆卸机身支撑杆下方 6 颗 M4*12*8 螺丝。
3. Remove the 6 M4*12*8 screws in the lower part of the fuselage support rod.
4. 分离支撑杆。
4. Separate the support rod.
5. 拆卸机身固定边梁与横梁 10 颗 M5*16 螺丝，分离横梁与边梁。
5. Remove the 10 M5*16 screws in the fuselage that fix the spandrel beam and beam, thus to separate the beam and the spandrel beam.

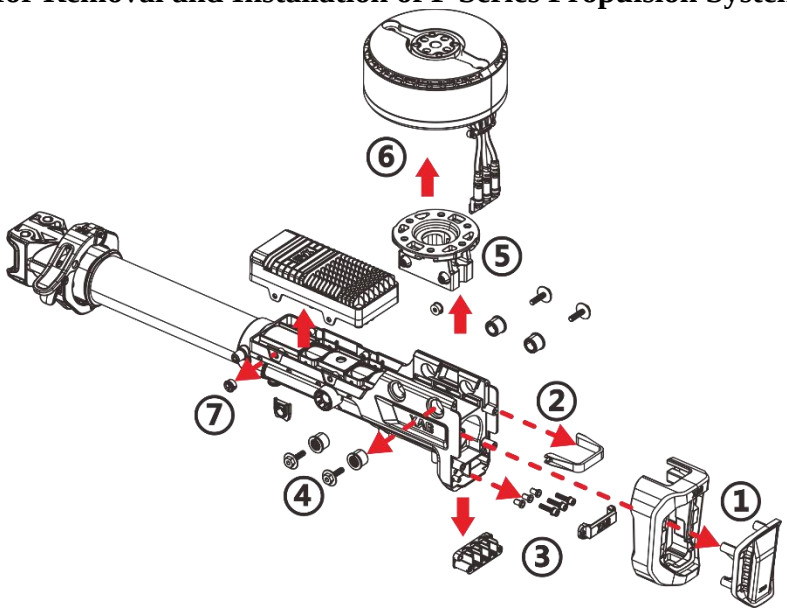
安装流程

Installation Process

1. 组合边梁与横梁并使用螺丝固定。
1. Assemble the spandrel beam and beam, and fix them with screws.
2. 安装机身支撑杆并使用螺丝固定。
2. Install the fuselage support rod, and fix it with screws.
3. 安装机身提把并使用螺丝固定。
3. Install the fuselage handles, and fix them with screws.

P 系列动力系统拆装指引

Guidelines for Removal and Installation of P Series Propulsion Systems



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	ST2.9*8PB	02-004-00942	4.5-5 kgf.cm
②	ST4.2*8PB	02-004-00918	6.5-7.5 kgf.cm
③（保护盖板） ③ (Protective Cover)	M3*10*6	02-004-00624	6.5-7.5 kgf.cm
③（电调端子） ③ (ESC Terminal)	M4*18	02-004-00978	25.0-26.0 kgf.cm
③（端子固定座） ③ (Terminal Bracket)	ST4.0*16	02-004-00775	12.0-14.0 kgf.cm
④	M5*20	02-004-01130	38.0 kgf.cm
⑥	M5*16	02-004-00939	49.0 kgf.cm
⑦	M4*12*8	02-004-00834	12.0-14.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸装饰盖板上 4 颗 ST2.9*8PB 螺丝，分离装饰盖板与防撞棉。
1. Remove the 4 ST2.9*8PB screws in the trim cover to separate the trim cover and the shock-proof foam.
2. 拆卸机臂软胶支撑上 2 颗 ST4.2*8PB 螺丝，分离机臂软胶支撑。
2. Remove the 2 ST4.2*8PB screws in the soft rubber arm support to separate the soft rubber arm support.
3. 拆卸电调端子保护盖上 2 颗 M3*10*6 螺丝，拆卸固定端子上的 3 颗 M4*18 螺丝及端子固定座上 2 颗 ST4.0*16 螺丝，分离保护盖板、端子及端子固定座。
3. Remove the 2 M3*10*6 screws in the ESC terminal protective cover, the 3 M4*18 screws in the fixed terminal and the 2 ST4.0*16 screws in the terminal bracket, to separate the protective cover, terminal, and terminal bracket.
4. 拆卸电机座上 4 颗 M5*20 螺丝，分离电机座固定螺丝、电机座减震胶套及电机座钢套。
4. Remove the 4 M5*20 screws in the motor base to separate the motor base set screws, the motor base rubber sleeve and the motor base steel sleeve.
5. 前推电机座及电机至机臂末端，上提分离电机座；拆卸电机座下方 6 颗 M5*16 螺丝，分离动力电机。
5. Push forward the motor base and motor to the end of the arm, and lift to separate the motor base; remove the 6 M5*16 screws in the lower part of the motor base to separate the main motor. （完成上述步骤可进行动力电机更换及维修）
   (The main motor can be replaced or repaired following the above steps)
6. 拆卸电调固定耳上 4 颗 M4*12*8 螺丝，上提分离动力电调。
6. Remove the 4 M4*12*8 screws in the ESC fixing lug, and lift to separate the main ESC.

安装流程

Installation Process

1. 将动力电调供电线缆引出至机臂与机身连接端。
1. Lead the main ESC power cord out to the connection terminal between the arm and the fuselage.
2. 将动力电调三相线线缆引出至机臂末端后使用电调固定螺丝进行紧固。
2. Lead the main ESC three-phase cable out to the end of the arm, and then use the ESC set screws for fixation.
3. 安装电调端子固定座，随后将动力电调三相线缆安装至电调端子固定座。
3. Install the ESC terminal bracket, and then install the main ESC three-phase cable to the ESC terminal bracket.
4. 将动力电机安装至电机座上，使用动力电机螺丝进行固定。

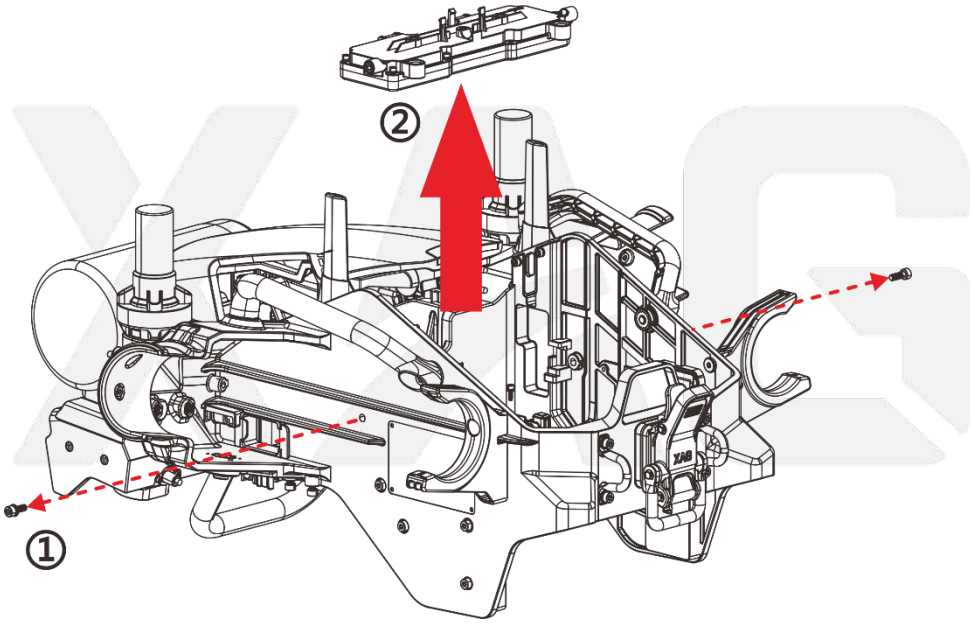
4. Install the main motor to the motor base, and use the main motor screws for fixation.
5. 将已和电机组合的电机座嵌入至机臂，并使用电机座减震胶套、电机座钢套及螺丝固定。
5. Embed the assembly of motor and motor base to the arm, and use the motor base rubber sleeve, motor base steel sleeve and screws for fixation.
6. 将动力电机三相线缆与已固定与电调端子固定座上的三相线缆端进行接合并紧固。
6. Connect the main motor three-phase cable to the three-phase cable terminal having been fixed on the ESC terminal bracket, and fasten the connection.
7. 安装电调端子保护盖及机臂软胶支撑。
7. Install the ESC terminal protective cover and the soft rubber arm support.
8. 安装防撞棉及装饰盖并使用螺丝进行固定。
8. Install the shock-proof foam and the trim cover, and fix them with screws.

V 系列拆装程序

Removal and Installation Procedure for V Series

V 系列集线板拆装指引

Guidelines for Removal and Installation of V Series Cable Hubs



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*12*8	02-004-00834	10.0-11.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸集线板两侧 2 颗 M4*12*8 螺丝。
1. Remove the 2 M4*12*8 screws on the two sides of the cable hub.
2. 后拉集线板退出预位，上提分离集线板。
2. Pull back the cable hub to exit the preset position, and lift to separate the cable hub.

安装流程

Installation Process

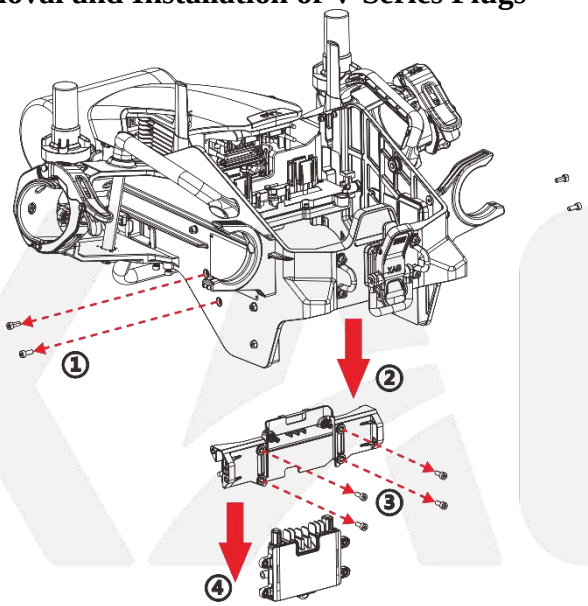
1. 将集线板从后方推入至预位。
1. Push the cable hub into the preset position from the rear.

2. 安装集线板固定螺丝。
2. Install the cable hub set screws.

注意事项
Notes

- 集线板安装应确保预位卡紧后再使用螺丝紧固。
- Ensure that the cable hub is securely installed in the preset position, and then use the screws for fixation.
- 安装确认紧固后再插入线缆。
- Confirm that the installation is secure, and then insert the cables.
- 拆卸前应分离所有连接中的线缆。
- Before removal, separate all connected cables.

V 系列尾插拆装指引
Guidelines for Removal and Installation of V Series Plugs



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	10.0-12.0 kgf.cm
③	M4*10*8	02-004-00833	10.0-12.0 kgf.cm

拆卸流程
Disassembly Procedures

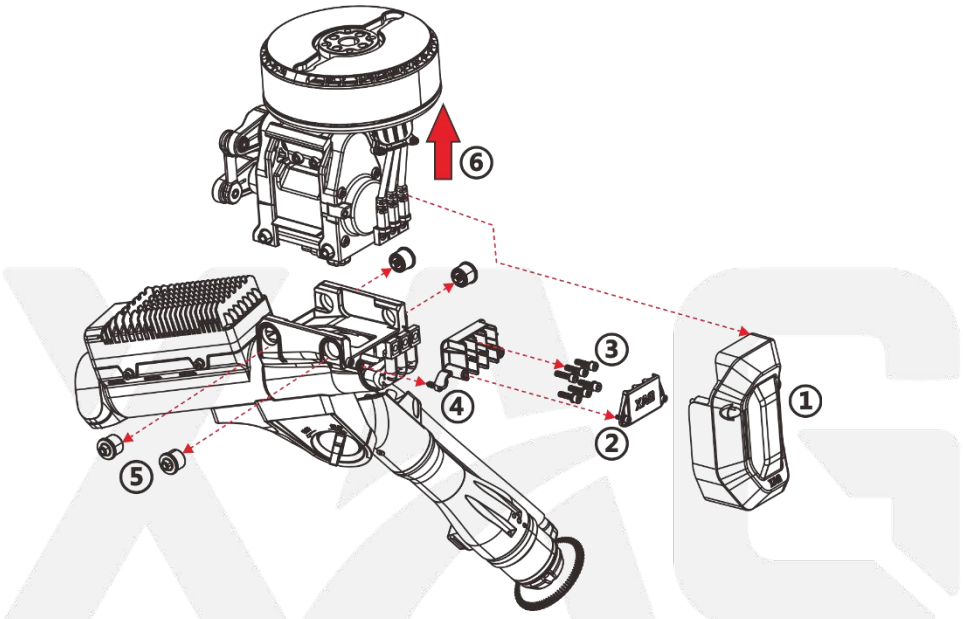
1. 拆卸主框两侧横梁固定螺丝 4 颗 M4*12*8 螺丝（左侧右侧各 2 颗）。
1. Remove the 4 M4*12*8 screws fixing the beams on the two sides of the main frame (2 on the left side and 2 on the right side).
2. 分离横梁与尾插组合。
2. Separate the beam and plug assembly.
3. 拆卸尾插固定螺丝 4 颗 M4*12*8 螺丝。
3. Remove the 4 M4*12*8 screws fixing the plug.
4. 分离尾插与横梁。
4. Separate the plug and beams.
   （如有“拐角器”进行拆卸，可直接进行第三步至第四步，无需拆卸横梁）
   (If a “corner detector” is available for removal, directly follow Step 3 and 4 without the need for

beam removal)

安装流程
Installation Process

1. 组装尾插与横梁。
1. Assemble the plug and beams.
2. 将已组合的尾插与边梁组件安装至主框。
2. Install the plug and spandrel beam assembly to the main frame.
   （如未拆卸横梁，可直接组装尾插进行固定）
   (If the beams are not removed, the plug can be directly assembled for fixation)

V 系列舵机拆装指引
Guidelines for Removal and Installation of V Series Servos



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	17.0-18.0 kgf.cm
②（保护盖板） ② (Protective Cover)	M3*8	02-004-00937	5.0-6.0 kgf.cm
③（电调端子） ③ (ESC Terminal)	M4*18	02-004-00978	25.0-26.0 kgf.cm
④（端子固定座） ④ (Terminal Bracket)	ST4.0*13	02-04-01043	9.0-10.0 kgf.cm
⑤	M5*17	02-04-01039	25.0-27.0 kgf.cm

拆卸流程
Disassembly Procedures

1. 拆卸机臂装饰盖板 2 颗 M4*10*8 螺丝，分离机臂与机臂装饰盖板。
1. Remove the two M4*10*8 screws in the arm trim cover to separate the arm trim cover from the arm.
2. 拆卸端子保护盖板上 2 颗 M3*8 螺丝，分离端子座与端子保护盖板。
2. Remove the two M3*8 screws in the terminal protective cover to separate terminal protective cover from the terminal bracket.

3. 拆卸动力电机及动力电调三相线缆 3 颗 M4*18 螺丝。
3. Remove the three M4*18 screws fixing the main motor and the main ESC three-phase cable.
4. 拆卸端子座 2 颗 ST4.0*13 螺丝，分离端子固定座。
4. Remove the two ST4.0*13 screws in the terminal bracket to separate the terminal bracket.
5. 拆卸舵机 4 颗 M5*17 螺丝、减震胶套及钢套，分离固定螺丝。
5. Remove the four M5*17 screws in the servo, the rubber sleeve and the steel sleeve to separate the set screws.
6. 平移舵机至机臂末端，上提舵机取出舵机。
6. Move the servo horizontally till the end of the arm, and lift the servo to take it out.

安装流程

Installation Process

1. 将动力舵机（含动力电机）组件安装至机臂。
1. Install the main servo (including main motor) assembly to the arm.
2. 安装舵机固定螺丝、减震胶套及钢套，固定螺丝。
2. Install the servo set screws, rubber sleeve and steel sleeve, and fix the screws.
3. 安装电调端子固定座，随后将动力电调三相线缆安装至电调端子固定座。
3. Install the ESC terminal bracket, and then install the main ESC three-phase cable to the ESC terminal bracket.
4. 将动力电机三相线缆与已固定与电调端子固定座上的三相线缆端进行接合并紧固。
4. Connect the main motor three-phase cable to the three-phase cable terminal having been fixed on the ESC terminal bracket, and fasten the connection.
5. 安装电调端子保护盖及机臂软胶支撑。
5. Install the ESC terminal protective cover and the soft rubber arm support.
6. 安装机臂装饰盖板。
6. Install the arm trim cover.

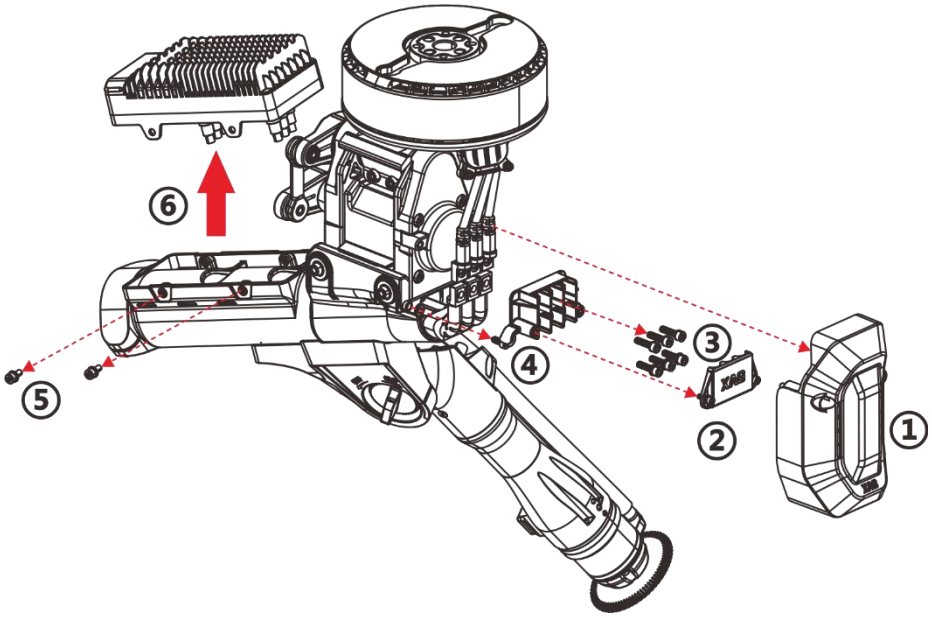
注意事项

Notes

- 动力电机拆卸前应确保设备电源已断开。
- Before removing the main motor, ensure that the device has been disconnected from power supply.
- 安装前应确保端子接触面无破损及污垢附着。
- Prior to installation, ensure that the terminal contact surface is not broken or adhered with dirt.
- 安装动力电调时，需优先将线缆从机臂引出至组合位置。
- When installing the main ESC, first lead the cable out to the assembly position.
- 线缆部分位置可能存在硬摩擦，需使用醋酸胶带进行包裹加固。
- Hard friction may exist at the cable position which shall be wrapped with acetate tape for reinforcement.

V 系列动力电调拆装指引

Guidelines for Removal and Installation of V Series Main ESCs



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	2	17.0-18.0 kgf.cm
②（保护盖板） ② (Protective cover)	M3*8	2	5.0-6.0 kgf.cm
③（电调端子） ③ (ESC terminal)	M4*18	3	25.0-26.0 kgf.cm
④（端子固定座） ④ (Terminal bracket)	ST4.0*13	2	9.0-10.0 kgf.cm
⑤	M4*10*8	4	11.0-12.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸机臂装饰盖板 2 颗 M4*10*8 螺丝，分离机臂与机臂装饰盖板。
1. Remove the two M4*10*8 screws in the arm trim cover to separate the arm trim cover from the arm.
2. 拆卸端子保护盖板 2 颗 M3*8 螺丝，分离端子座与端子保护盖板。
2. Remove the two M3*8 screws in the terminal protective cover to separate terminal protective cover from the terminal bracket.
3. 拆卸动力电机及动力电调三相线缆 3 颗 M4*18 螺丝。
3. Remove the three M4*18 screws fixing the main motor and the main ESC three-phase cable.
4. 拆卸端子座固定 2 颗 ST4.0*13 螺丝，分离端子固定座。
4. Remove the two ST4.0*13 screws in the terminal bracket to separate the terminal bracket.
5. 拆卸动力电调固定耳 4 颗 M4*10*8 螺丝，分离固定螺丝。
5. Remove the four M4*10*8 screws in the main ESC fixing lug to separate the set screws.
6. 上提取出动力电调。
6. Lift to take out the main ESC.

安装流程

Installation Process

1. 将动力动力电调安装至机臂。
1. Install the main ESC to the arm.
2. 安装舵机固定螺丝、减震胶套及钢套，固定螺丝。

2. Install the servo set screws, rubber sleeve and steel sleeve, and fix the screws.
3. 安装电调端子固定座，随后将动力电调三相线缆安装至电调端子固定座。
3. Install the ESC terminal bracket, and then install the main ESC three-phase cable to the ESC terminal bracket.
4. 将动力电机三相线缆与已固定与电调端子固定座上的三相线缆端进行接合并紧固。
4. Connect the main motor three-phase cable to the three-phase cable terminal having been fixed on the ESC terminal bracket, and fasten the connection.
5. 安装电调端子保护盖及机臂软胶支撑。
5. Install the ESC terminal protective cover and the soft rubber arm support.
6. 安装机臂装饰盖板。
6. Install the arm trim cover.

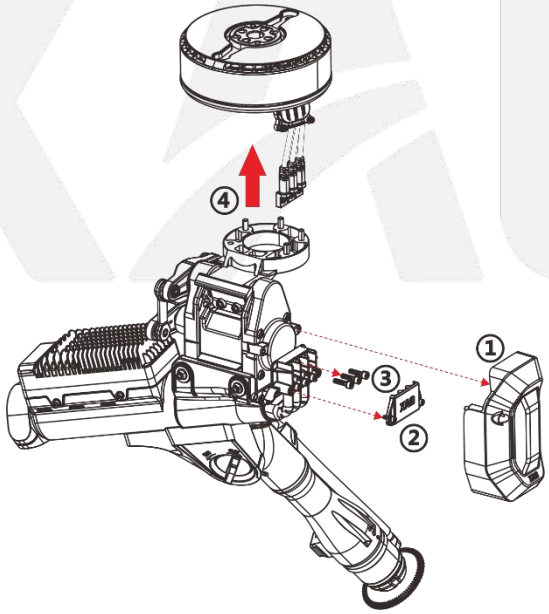
注意事项

Notes

- 安装动力电调时，需优先将线缆从机臂引出至组合位置。
- When installing the main ESC, first lead the cable out to the assembly position.
- 线缆部分位置可能存在硬摩擦，需使用醋酸胶带进行包裹加固。
- Hard friction may exist at the cable position which shall be wrapped with acetate tape for reinforcement.
- 安装前应确保端子接触面无破损及污垢附着。
- Prior to installation, ensure that the terminal contact surface is not broken or adhered with dirt.

V 系列动力电机拆装指引

Guidelines for Removal and Installation of V Series Main Motors



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	17.0-18.0 kgf.cm
②（保护盖板） ② (Protective cover)	M3*8	02-004-00937	5.0-6.0 kgf.cm
③（电调端子） ③ (ESC terminal)	M4*18	02-004-00978	25.0-26.0 kgf.cm
④	M5*16	02-004-00939	25.0-27.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸机臂装饰盖板 2 颗 M4*10*8 螺丝，分离机臂与机臂装饰盖板。
1. Remove the two M4*10*8 screws in the arm trim cover to separate the arm trim cover from the arm.
2. 拆卸端子保护盖板 2 颗 M3*8 螺丝，分离端子座与端子保护盖板。
2. Remove the two M3*8 screws in the terminal protective cover to separate terminal protective cover from the terminal bracket.
3. 拆卸动力电机及动力电调三相线缆 3 颗 M4*18 螺丝。
3. Remove the three M4*18 screws fixing the main motor and the main ESC three-phase cable.
4. 拆卸动力电机底座 5 颗 M5*16 螺丝，上提动力电机进行分离。
4. Remove the five M5*16 screws in the main motor base, and lift the main motor for separation.

安装流程

Installation Process

1. 组合动力电机与舵机并使用螺丝固定。
1. Assemble the main motor and the servo, and fix the assembly with screws.
2. 连接电调端子三相线并使用螺丝固定。
2. Connect the ESC terminal three-phase cable, and fix it with screws.
3. 组合电调端子保护盖板并使用螺丝固定。
3. Assemble the ESC terminal protective cover, and fix it with screws.
4. 组合机臂装饰盖板并使用螺丝固定。
4. Assemble the arm trim cover, and fix it with screws.

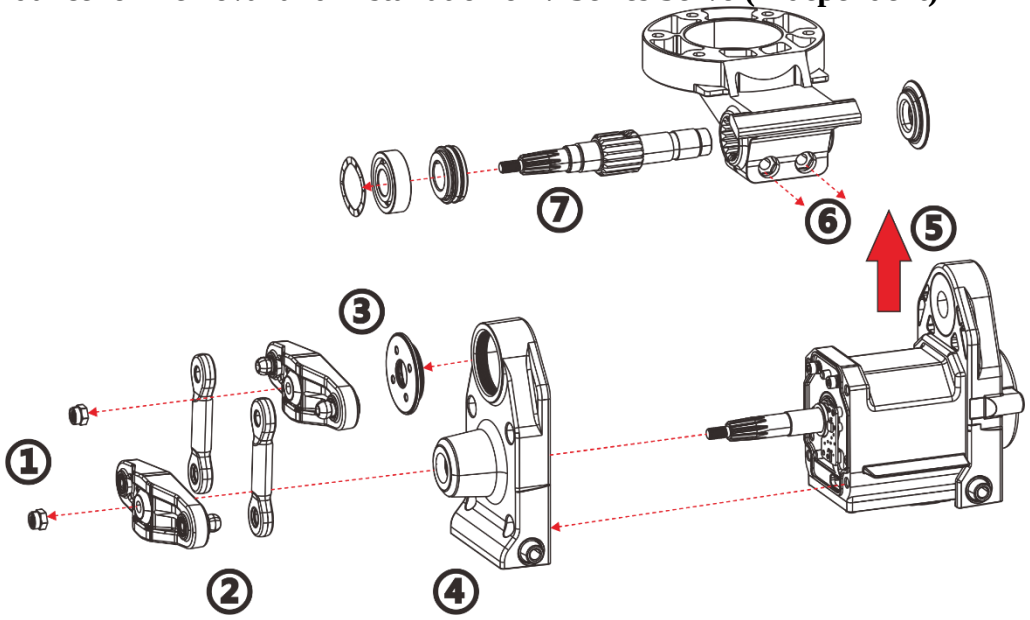
注意事项

Notes

- 线缆部分位置可能存在硬摩擦，需使用醋酸胶带进行包裹加固。
- Hard friction may exist at the cable position which shall be wrapped with acetate tape for reinforcement.
- 安装前应确保端子接触面无破损及污垢附着。
- Prior to installation, ensure that the terminal contact surface is not broken or adhered with dirt.

V 系列舵机（独立）拆装指引

Guidance for Removal and Installation of V Series Servo (Independent)



拆卸流程

Disassembly Procedures

1. 拆卸舵臂固定螺母并分离。
1. Remove the servo arm fixing nuts, and separate them.
2. 拆卸舵臂与舵机连杆（非损坏更换情况下可做整体拆卸）。
2. Remove the servo arm and servo connecting rods (integral removal is allowed for replacement without damage).
3. 逆时针旋转的舵机出轴端压盖。
3. Turn the servo output shaft cap counter-clockwise.
4. 拆卸舵机前盖板固定螺丝，分离舵机前盖板。
4. Remove the servo front baffle set screws to separate the servo front baffle.
5. 取出电机座、电机座花键、轴承及挡圈等配件。
5. Take out the motor base, motor base spline, bearing, retainer ring and other accessories.
6. 拆卸电机座中花键固定螺丝，拆卸后可取出花键动力主轴。
6. Remove the spline set screws in the motor base; after removal, the spline main shaft can be taken out.
7. 按需分离花键轴承、舵机盖软胶垫等配件。
7. The spline bearing, servo cover rubber pad and other accessories can be separated as needed.

注意事项

Notes

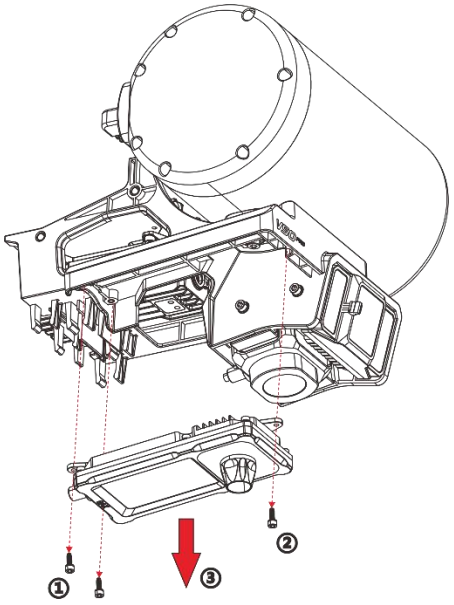
- 步骤 1 中舵臂固定螺母嵌有防脱胶，拆卸后不可复用。
- The servo arm fixing nuts mentioned in Step 1 are embedded with anti-off glue, therefore are not reusable after removal.
- 步骤 7 中舵机软盖胶垫在安装过程必须按顺序安装到位，否则将会导致舵机工作异常。
- The servo cover rubber pad mentioned in Step 7 must be installed properly in sequence; otherwise, abnormal operation of the servo will be caused.
- 舵机安装过程中应注意回中状态，安装舵臂前必须确认舵机已回中。
- When installing the servo, pay attention to its position; before installing the servo arm, confirm that the servo is centered.
- 舵机安装完成后应必须进行舵机校准。
- Servo calibration must be performed after installation of the servo.

感知系统模块拆装程序

Removal and Installation Procedure for Sensor System Module

仿地模块拆装指引

Guidance for Removal and Installation of Terrain Following Module



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	M2.5*8*4.5	02-04-00523	3.5-4 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸仿地模块后方 2 颗 M2.5*8*4.5 螺丝。
1. Remove the two M2.5*8*4.5 screws in the rear of the terrain following module.
2. 拆卸仿地模块前方 1 颗 M2.5*8*4.5 螺丝。
2. Remove the M2.5*8*4.5 screw in the front of the terrain following module.
3. 向下分离仿地模块。
3. Separate down the terrain following module.

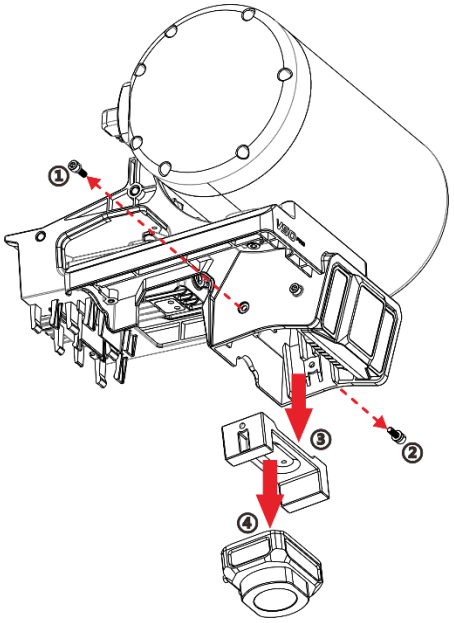
安装流程

Installation Process

1. 安装仿地模块至感知系统支架。
1. Install the terrain following module to the sensor system bracket.
2. 安装并紧固仿地模块固定螺丝。
2. Install and tighten the terrain following module set screws.
3. 向下分离仿地模块。
3. Separate down the terrain following module.

对地视觉拆卸指引

Guidance for Removal and Installation of Downward Vision Module



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	M3*10*6	02-004-00624	7-8 kgf.cm
②	M2.5*8"4.5	02-04-00523	3.5-4 kgf.cm

前序拆卸
Pre-removal

1. 仿地模块拆卸。
1. Remove the terrain following module.

拆卸流程
Disassembly Procedures

1. 拆卸对地摄像头右侧 M3*10*6 螺丝（需优先拆卸分离仿地模块）。
1. Remove the M3*10*6 screws on the right side of the downward camera (the terrain following module should be removed and separated first).
2. 拆卸对地摄像头左侧 M3*10*6 螺丝。
2. Remove the M3*10*6 screws on the left side of the downward camera.
3. 下拉分离对地摄像头固定座及对地摄像头。
3. Pull down to separate the downward camera bracket and the downward camera.
4. 拆卸对地摄像头固定座背面 M2.5*8"4.5 螺丝，分离摄像头与固定座。
4. Remove the M2.5*8"4.5 screws on the back of the downward camera bracket to separate the camera from the bracket.

安装流程
Installation Process

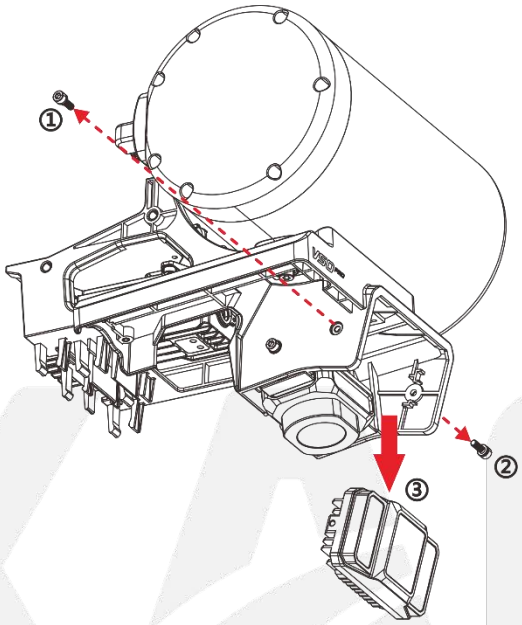
1. 拆卸对地摄像头固定座螺丝（需优先拆卸分离仿地模块）。
1. Remove the screws in the downward camera bracket (the terrain following module should be removed and separated first).
2. 拆卸对地摄像头固定座螺丝。
2. Remove the screws in the downward camera bracket.
3. 下拉分离对地摄像头固定座及对地摄像头。
3. Pull down to separate the downward camera bracket and the downward camera.
4. 拆卸对地摄像头固定座背面螺丝，分离摄像头与固定座。

4. Remove the screws on the back of the downward camera bracket to separate the camera from the bracket.

注意事项
Notes

- 安装时应确保左侧螺丝无遮挡，可顺利安装。
- For smooth installation, ensure that the screws on the left side are not covered.

前视视觉拆装指引
Guidance for Removal and Installation of Forward Vision Module



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	M3*8	02-004-00937	6-7 kgf.cm

前序拆卸
Pre-removal

1. 仿地模块拆卸。
1. Remove the terrain following module.

拆卸流程
Disassembly Procedures

1. 拆卸前置摄像头左侧 M3*8 固定螺丝（需优先拆卸分离仿地模块）。
1. Remove the M3*8 set screws on the left side of the front-facing camera (the terrain following module should be removed and separated first).
2. 拆卸前置摄像头右侧 M3*8 螺丝。
2. Remove the M3*8 screws on the right side of the front-facing camera.
3. 下拉分离前置摄像头。
3. Pull down to separate the front-facing camera.

安装流程
Installation Process

1. 前置摄像头安装预位。

Install the front-facing camera to the preset position.

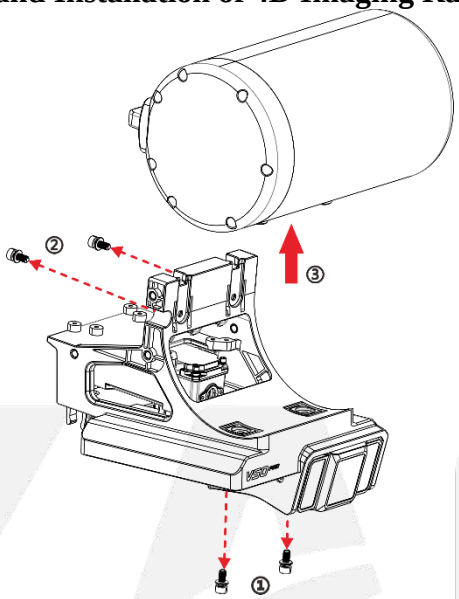
2. 使用螺丝进行固定。

Use screws for fixation.

注意事项
Notes

- 安装时应确保左侧螺丝无遮挡，可顺利安装。
- For smooth installation, ensure that the screws on the left side are not covered.

避障雷达拆装指引
Guidance for Removal and Installation of 4D Imaging Radar



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	11-12 kgf.cm

前序拆卸
Pre-removal

1. 仿地模块拆卸。
1. Remove the terrain following module.
2. 对地视觉模块拆卸。
2. Remove the downward vision module.

拆卸流程
Disassembly Procedures

1. 拆卸避障雷达下方固定螺丝（需优先拆卸仿地模块及对地摄像头）。
1. Remove the set screws in the lower part of the 4D imaging radar (the terrain following module and the downward camera should be removed first).
2. 拆卸仿地模块背面固定螺丝。
2. Remove the set screws on the back of the terrain following module.
3. 上提分离仿地模块。
3. Lift to separate the terrain following module.

注意事项
Notes

- 安装时应注意对准雷达后方卡槽。

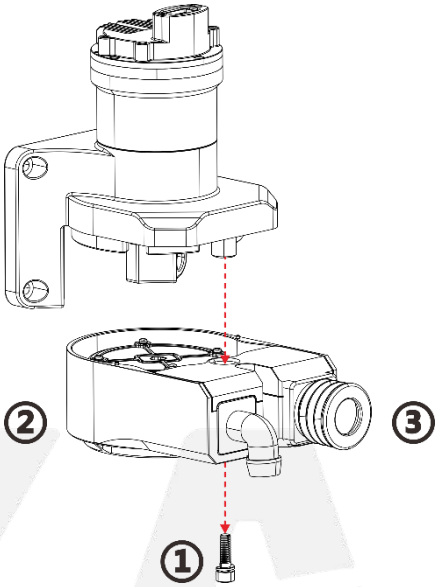
- During installation, align with the slot in the rear of the radar.

喷洒系统模块拆装程序

Removal and Installation Procedure for Spraying System Module

蠕动泵同步盘拆装指引

Guidance for Removal and Installation of Peristaltic Pump Roller



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*40*8	02-004-00982	15.0-16.0 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸同步盘 1 颗 M4*40*8 固定螺丝。
1. Remove the M4*40*8 set screw in the roller.
2. 向下分离蠕动泵同步盘组件。
2. Separate down the peristaltic pump roller assembly.
3. 按需分离同步盘组件中蠕动泵管的接头组件。
3. Separate the connector assembly of peristaltic pump tube in the peristaltic pump roller assembly as needed.

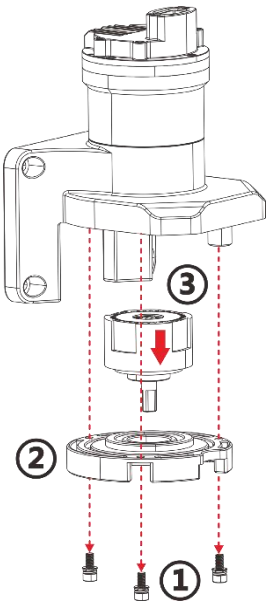
安装流程

Installation Process

1. 安装蠕动泵管接头组件。
1. Install the peristaltic pump tube connector assembly.
2. 将同步盘组件与蠕动泵减速组接合。
2. Connect the roller assembly and the peristaltic pump gearbox.
3. 安装同步盘固定螺丝。
3. Install the roller set screws.

蠕动泵行星齿拆装指引

Guidance for Removal and Installation of Peristaltic Pump Planet Gear



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	11-12 kgf.cm

拆卸流程
Disassembly Procedures

1. 拆卸减速箱下盖固定螺丝。
1. Remove the set screws in the lower cover of gearbox.
2. 向下分离减速组盖板。
2. Separate down the cover of gearbox.
3. 分离行星齿轮组。
3. Separate the planet gear unit.

注意事项
Notes

- 如需拆卸行星齿，应首先进行蠕动泵同步盘拆卸。
- To remove the planet gear, first remove the peristaltic pump roller.

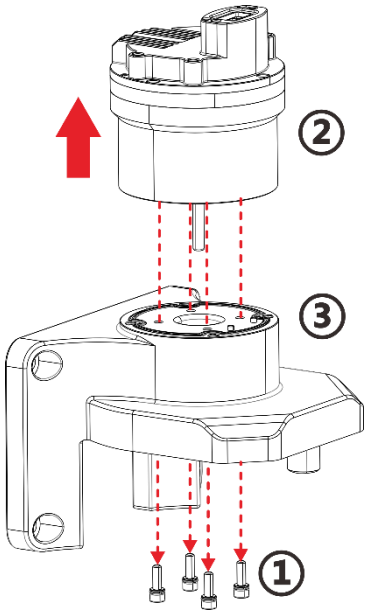
安装流程
Installation Process

1. 安装行星齿轮组（安装时需注意校准每一组齿轮的啮合）。
1. Install the planet gear unit (during installation, the engagement of each gear set should be calibrated).
2. 安装减速箱下盖板，并使用螺丝进行固定。
2. Install the lower cover of gearbox, and fix it with screws.

注意事项
Notes

- 安装前应检查行星齿轮组是否已安装到位，各齿轮之间无卡死，啮合正常。
- Prior to installation, check whether the planet gear unit is properly installed, and whether the gears are not stuck and are engaged normally.
- 安装下盖板时应确保密封圈无缺失，无破损。
- When installing the lower cover, ensure that the seal ring is not missing or broken.

蠕动泵电机组拆装指引
Guidance for Removal and Installation of Peristaltic Pump Motor Unit



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	11-12 kgf.cm

前序拆卸
Pre-removal

1. 蠕动泵同步盘模块拆卸。
1. Remove the peristaltic pump roller module.
2. 蠕动泵行星齿拆卸。
2. Remove the peristaltic pump planet gear.

拆卸流程
Disassembly Procedures

1. 拆卸电机固定螺丝。
1. Remove motor setscrews
2. 分离蠕动泵电机。
2. Separate the peristaltic pump motor.
3. 按需项：检查防水胶圈，如有损坏则需修复或更换。
3. On-demand check: Check the waterproof rubber ring; if damaged, repair or replace it.

安装流程
Installation Process

1. 装蠕动泵电机（安装时需优先安装好电机并固定，再安装行星齿）。
1. Install the peristaltic pump motor (during installation, first install and fix the motor; then install the planet gear).
2. 使用螺丝对电机进行固定。
2. Fix the motor with screws.

注意事项
Notes

- 安装前应确认电机输出轴无损坏，齿轮无损坏。

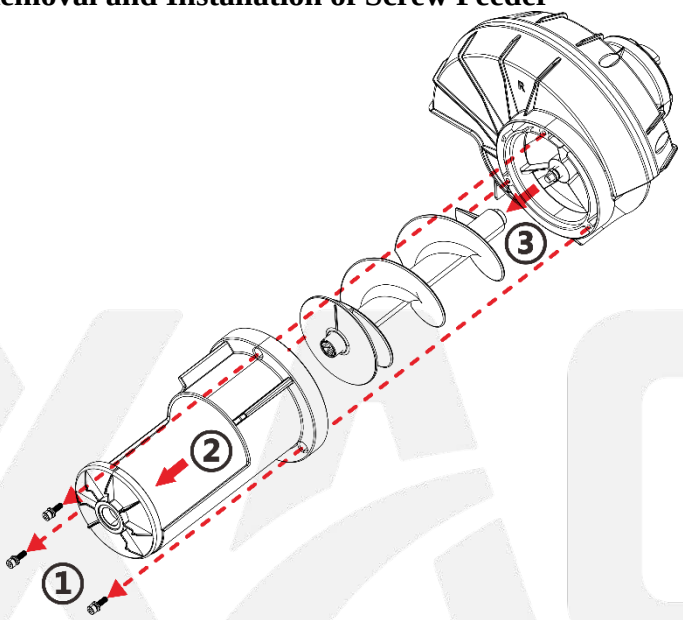
- Prior to installation, confirm that the motor output shaft is not damaged and that the gears are not damaged.
- 安装时应注意电机输出齿轮与行星齿轮之间的咬合，避免造成堵转或扫齿。
- During installation, pay attention to the engagement between the motor output gear and the planet gear to avoid jamming or scuffing during engagement.

播撒系统模块拆装程序

Removal and Installation Procedure for Spreading System Module

蛟龙组拆装指引

Guidance for Removal and Installation of Screw Feeder



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*16*8	02-004-00836	12.5-13.5 kgf.cm

拆卸流程

Disassembly Procedures

1. 拆卸蛟龙上料圆管 2 颗 M4*16*8 固定螺丝。
1. Remove the two M4*16*8 set screws in the screw feeder shell.
2. 分离蛟龙上料圆管。
2. Separate the screw feeder shell.
3. 分离蛟龙主体。
3. Separate the screw feeder body.

安装流程

Installation Process

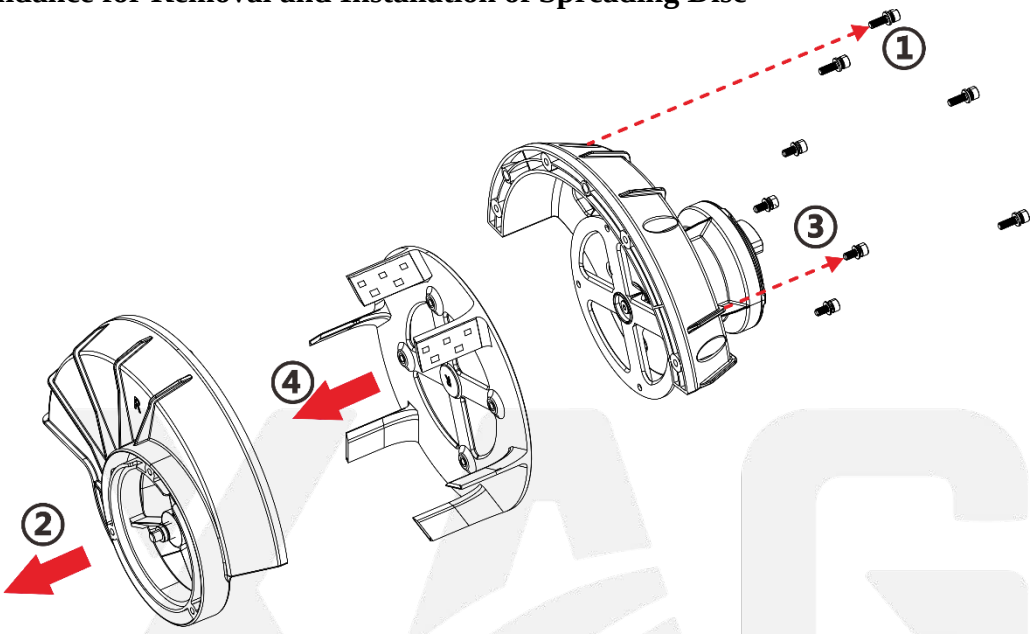
1. 组合蛟龙上料圆管及蛟龙主体。
1. Assemble the screw feeder shell and the screw feeder body.
2. 使用螺丝固定蛟龙上料圆管。
2. Fix the screw feeder shell with screws.

注意事项

Notes

- 安装前应注意检查蛟龙主体上的磁体是否完整无脱落。
- Prior to installation, check whether the magnet on the screw feeder body is complete without come-off.
- 安装时需要校准蛟龙主体上磁体的位置。
- During installation, it is needed to calibrate the magnet position on the screw feeder body.

甩盘拆装指引
Guidance for Removal and Installation of Spreading Disc



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	10.0-11.0 kgf.cm
③	M4*10*8	02-004-00833	10.0-11.0 kgf.cm

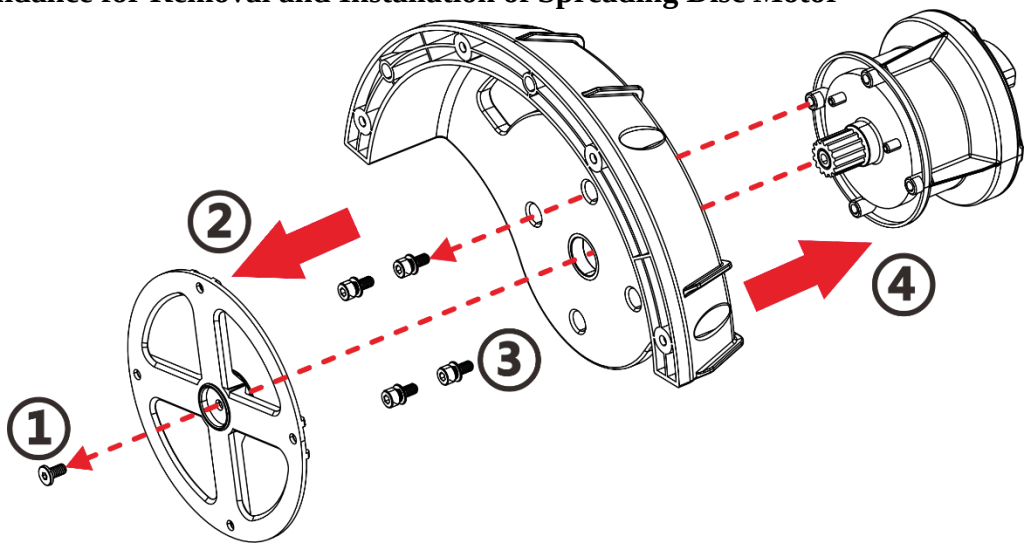
拆卸流程
Disassembly Procedures

1. 拆卸甩盘电机安装件 4 颗 M4*10*8 螺丝。
1. Remove the four M4*10*8 screws in the spreading disc motor mount.
2. 分离电机安装件与甩盘安装件。
2. Separate the motor mount and spreading disc mount.
3. 拆卸甩盘与法兰盘 4 颗 M4*10*8 螺丝。
3. Remove the four M4*10*8 screws in the spreading disc and flange.
4. 分离甩盘。
4. Separate the spreading disc.

安装流程
Installation Process

1. 将甩盘安装至法兰盘并使用螺丝进行固定。
1. Install the spreading disc to the flange, and fix it with screws.
2. 组合甩盘安装件与电机安装件并使用螺丝进行固定。
2. Assemble the spreading disc mount and the motor mount, and fix the assembly with screws.

甩盘电机拆装指引
Guidance for Removal and Installation of Spreading Disc Motor



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*8	02-04-01031	6.0-7.0 kgf.cm
③	M4*10*8	02-004-00833	10.0-11.0 kgf.cm

拆卸流程
Disassembly Procedures

1. 甩盘拆卸。
1. Remove the spreading disc.

拆卸流程
Disassembly Procedures

1. 拆卸法兰盘 1 颗 M4*8 螺丝。
1. Remove the M4*8 screw in the flange.
2. 分离法兰盘。
2. Separate the flange.
3. 拆卸甩盘电机 4 颗 M4*10*8 螺丝。
3. Remove the four M4*10*8 screws in the spreading disc motor.
4. 分离甩盘电机。
4. Separate the spreading disc motor.

注意事项
Notes

- 安装时应注意对齐法兰盘与甩盘电机齿轮之间的啮合。
- During installation, pay attention to the engagement between gears of the flange and the spreading disc motor.

安装流程
Installation Process

1. 安装甩盘电机并使用螺丝进行固定。
1. Install the spreading disc motor, and fix it with screws.
2. 安装法兰盘并使用螺丝进行固定。
2. Install the flange, and fix it with the screw.

第四章　农业无人飞机维护保养

Chapter 4　Maintenance of Agricultural Drone

前言概述

Overview

本章内容主要为农业无人飞机的维护保养说明，在维护保养前应针对设备中对应力承受较为重要的部件进行目视检查及手动核实操作。在检查时应注意螺丝紧固件中的力矩要求，如遇到“反松”情况应重新使用半永久螺丝胶进行加固处理。在首次保养过程中应对喷洒系统中的蠕动泵药管进行检查，确认无破损及渗漏情况后对再蠕动泵管补充凡士林进行润滑并重新进行流量校准；播撒系统应对齿轮箱进行磨损检查，确认无破损或严重磨损后应对齿轮箱内部进行润滑油的补充，校准播撒量。

This chapter mainly gives instructions for maintenance of the agricultural drones. Prior to maintenance, critical stress-bearing parts of the device should be visually checked and manually verified. During check, pay attention to the torque requirement for screw fasteners. If “anti-loosening” occurs, use semi-permanent screw glue for reinforcing purpose. During initial maintenance, check the peristaltic pump liquid tube in the spraying system. After confirming that there is no breakage or leakage, replenish the peristaltic pump tube with vaseline and perform flow calibration again. As for the spreading system, the gearbox should be checked for wear; after confirming that there is no breakage or severe wear, replenish the gearbox with lubricating oil, and calibrate the spreading rate.

维护保养条件

Maintenance Conditions

维护保养前应核实设备无损坏情况，若对设备的运行情况或结构情况存在质疑，应及时与用户进行沟通核实并进行测试。

Prior to maintenance, verify that the device is not damaged. In case of any doubt about the running condition or structural condition of the device, timely communicate with the user for verification, and perform the test.

维护保养环境

Maintenance Environment

拆装过程必须确保室内确保光线充足，维保过程应将无人飞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，清洗后的污水禁止随意倾倒。

During removal and installation, ensure that the indoor light is adequate. In the maintenance process, place the drone on the repair bench 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; waste water from cleaning should not be dumped at will.

维护保养实施说明

Instructions for Implementation of Maintenance

维护保养内容

Maintenance Content

类型 Type	维保方式 Maintenance method	操作步骤 Operating procedures
载机 Drone	深度清洁 Deep cleaning	使用抛光剂结合电动工具对载机表面进行深度清洁 Use polishing agent and electric tool to deep clean the

类型 Type	维保方式 Maintenance method	操作步骤 Operating procedures
		surface of the drone
	线缆检查 Cable check	检查机身供电线缆磨损情况，适时使用醋酸胶带及电工胶带对损坏部位修复。 Check the power cable of the fuselage for wear condition; where appropriate, use acetate tape and electrical adhesive tape to repair the damaged part.
	线缆修复 Cable repair	
	结构检查 Structural check	检查载机关键结构部位的紧固情况，根据测控点要求对关键部位的螺丝进行加固并补充缺失螺丝做好紧固后标记。 Check the critical structural parts of the drone for fastening condition; reinforce the screws at key positions according to the requirements for measurement and control points; replenish the missing screws, and tighten and then mark the screws installed.
	结构加固 Structural reinforcement	
	固件升级 Firmware Update	检查载机各模块固件版本并进行更新，进行校准与测试。 Check and update the firmware version of each module of the drone, and perform calibration and test.
	校准测试 Calibration and test	
睿喷 RevoSpray	药管清洁 Liquid tube cleaning	使用洗洁精水对管道进行清洁，去除残留药物。 Use detergent solution to clean the tube and remove residual liquid.
	泵维护 Pump maintenance	添加凡士林，对减速组适时添加润滑油。 Add vaseline, and where appropriate, add lubricating oil to the gear reduction unit.
	升级校准 Upgrade calibration	检查各模块固件版本并进行更新，进行校准与测试。 Check and update the firmware version of each module, and perform calibration and test.
	结构加固 Structural reinforcement	检查睿喷关键结构部位的紧固情况，根据测控点要求对关键部位的螺丝进行加固并补充缺失螺丝做好紧固后标记。 Check the critical structural parts of RevoSpray for fastening condition; reinforce the screws at key positions according to the requirements for measurement and control points; replenish the missing screws, and tighten and then mark the screws installed.
	结构检查 Structural check	
睿播 RevoCast	蛟龙清洁 Screw feeder cleaning	使用百洁布对蛟龙、甩盘进行清洁，去除残留药物。 Use a scouring pad to clean the screw feeder and spreading disc, and remove residual liquid.
	减速箱维护 Gearbox maintenance	对减速箱进行润滑油的添加。 Add lubricating oil to the gearbox.
	升级校准 Upgrade calibration	检查各模块固件版本并进行更新，进行校准与测试。 Check and update the firmware version of each module, and perform calibration and test.
	结构加固 Structural reinforcement	检查睿播关键结构部位的紧固情况，根据测控点要求对关键部位的螺丝进行加固并补充缺失螺丝做好紧固后标记。 Check the critical structural parts of RevoCast for fastening condition; reinforce the screws at key positions according to the requirements for measurement and control points; replenish the missing screws, and tighten and then mark the screws installed.
	结构检查 Structural check	

维护保养所需辅料
Auxiliary Materials Necessary for Maintenance

电工胶带 Electrical tape	醋酸胶带 Acetate tape	尼龙扎带 Nylon cable tie	凡士林 Vaseline	润滑黄油 Lubricating grease	固定扣 Clip	洗洁精水 Detergent solution	清洁剂 Cleaning agent
载机睿喷睿播 Drone RevoSpray RevoCast	载机睿喷睿播 Drone RevoSpray RevoCast	载机睿喷睿播 Drone RevoSpray RevoCast	睿喷 RevoSpray	睿喷睿播 RevoSpray/RevoCast	睿喷睿播 RevoSpray/RevoCast	睿喷 RevoSpray	载机睿喷睿播 Drone RevoSpray RevoCast

常态化维护保养标准化作业流程（清洁与检查）
Standard Work Flow of Normalized Maintenance (Cleaning and Check)

常态化维护保养标准化作业流程（清洁与检查） Standard Work Flow of Normalized Maintenance (Cleaning and Check)				
模组 Module	部件 Assembly unit	操作 Operation	标准值 Standard value	预计用时 Estimated time
框架结构 Framework	桨叶 Blade	擦拭清洁 Cleaning by wiping	使用清洁剂与抛光棉清洁螺旋桨，清除桨面污垢及结块 Use cleaning agent and polishing cotton to clean the propellers and remove any dirt and caking on the propeller surface	6 mins
	机臂 Arm	目视检查 Visual inspection	无开裂或破损、无变形 There is no crack, breakage or deformation	
	机臂 Arm	擦拭清洁 Cleaning by wiping	使用清洁剂与抛光棉清洁机臂，清除机臂表面污垢结块 Use cleaning agent and polishing cotton to clean the arms and remove any dirt and caking on the arm surface	
		目视 / 手动检查 Visual/manual check	无开裂或磨损，无弯曲变形及松脱 There is no crack, wear, bending, deformation or looseness	
	机身结构 Airframe structure	擦拭清洁 Cleaning by wiping	使用清洁剂与抛光棉清洁机身表面，清除污垢及结块 Use cleaning agent and polishing cotton to clean the fuselage surface and remove any dirt and caking	
		目视 / 手动检查 Visual/manual check	关键结构连接处无开裂，无螺丝缺失 The critical structural connections have no crack, and no screw is missing	
动力系统 Propulsion System	电机电调 Motor ESC	擦拭清洁 Cleaning by wiping	清洁电机与电调表面，清除电机污垢及结块 Clean the motor and ESC surface, and remove any dirt and caking	3 mins
		目视 / 手动检查 Visual/manual check	OT 端子周边无融化、漆包线无破损、无开裂 There is no melting problem surrounding the OT terminal; the enameled wire has no breakage or crack	

常态化维护保养标准化作业流程（清洁与检查） Standard Work Flow of Normalized Maintenance (Cleaning and Check)				
模组 Module	部件 Assembly unit	操作 Operation	标准值 Standard value	预计用时 Estimated time
	舵机 Servo	擦拭清洁 Cleaning by wiping	清洁舵机表面，清除舵臂污垢及结块 Clean the servo surface, and remove any dirt and caking on the servo arm	
		目视 / 手动检查 Visual/manual check	无可观察的开裂、舵臂及花键无破损锈蚀、舵臂无松动 There is no observable crack; the servo arm and spline are not damaged or corroded; the servo arm is not loose	
电力系统 Power System	电池尾插 Battery plug	擦拭清洁 Cleaning by wiping	使用酒精棉签清洁铜板表面，清除污垢及结块 Use alcohol swabs to clean the copper plate surface, and remove any dirt and caking	5 mins
		目视 / 手动检查 Visual/manual check	插头无锈蚀及烧蚀、无变形及异常松脱 The plug is not corroded, eroded, deformed or abnormally loosened	
感知系统 Sensor system	避障雷达 仿地雷达 4D imaging radar Terrain radar	擦拭清洁 Cleaning by wiping	使用清洁剂与抛光棉清洁雷达表面，清除污垢及结块 Use cleaning agent and polishing cotton to clean the radar surface and remove any dirt and caking	3 mins
		目视 / 手动检查 Visual/manual check	无可观察的开裂、无松脱、仿地雷达遮光罩无缺失 There is no observable crack or looseness; the terrain radar light shield is not missing	
	FPV	擦拭清洁 Cleaning by wiping	使用清洁剂与抛光棉清洁镜头表面，清除污垢及结块 Use cleaning agent and polishing cotton to clean the lens surface and remove any dirt and caking	
	摄像头 Camera	目视 / 手动检查 Visual/manual check	无可观察的开裂、无松脱 There is no observable crack or looseness	
执行系统 Application system	蠕动泵喷杆 Peristaltic pump spray bar	内部清洁 Internal cleaning	使用洗洁精水对管道进行清洁 Use detergent solution to clean the tube	10 mins
		目视 / 手动检查 Visual/manual check	无渗漏、无松脱开裂、泵管无破损开裂现象 There is no leakage, looseness or crack; the pump tube has no breakage or crack	
	绞龙 Screw feeder	内部清洁 Internal cleaning	使用洗洁精水对泵管进行清洁 Use detergent solution to clean the pump tube	
		目视 / 手动检查 Visual/manual check	无渗漏、无松脱开裂现象（腐蚀情况） There is no leakage, looseness or crack (corrosion)	
	甩盘 甩盘电机	擦拭清洁 Cleaning	使用清洁剂与抛光棉清洁电机表面，清除污垢及结块	

常态化维护保养标准化作业流程（清洁与检查） Standard Work Flow of Normalized Maintenance (Cleaning and Check)				
模组 Module	部件 Assembly unit	操作 Operation	标准值 Standard value	预计用时 Estimated time
	Spreading disc Spreading disc motor	by wiping	Use cleaning agent and polishing cotton to clean the motor surface and remove any dirt and caking	
		目视 / 手动检查 Visual/manual check	无可观察的开裂、无松脱，线缆无破损（腐蚀情况） There is no observable crack or looseness; the cable has no breakage (corrosion)	
	药箱料箱 Liquid tank Granule container	内部清洁 Internal cleaning	使用洗洁精水对泵管及箱体内部进行清洁，随后风干 Use detergent solution to clean the inside of pump tube and tank; then air-dry them	
		目视 / 手动检查 Visual/manual check	无渗漏、无松脱开裂现象 There is no leakage, looseness or crack	
	螺丝 Screws	目视 / 手动检查 Visual/manual check	结构部件螺丝无缺失、无破损及松脱 Screws of structural parts are not missing, damaged or loosened	3 mins

常态化维护保养标准化作业流程（运行测试 / 校准检查）
Standard Work Flow of Normalized Maintenance (Test Running/Calibration Check)

常态化维护保养标准化作业流程（运行测试 / 校准检查） Standard Work Flow of Normalized Maintenance (Test Running/Calibration Check)			
设备 / 部件 Devices/components	检查项 Inspection item	标准值 Standard value	预计用时 Estimated time
固件检查与升级 Firmware check and update	飞行平台 Drone	升级至最新版本 Updated to the latest version	5 mins
	周边设备 Peripheral equipment		
动力系统测试 Propulsion system testing	动力电机 Main motor	各电机转速数值误差小于 50 The error in the value of motor speed is less than 50	2 mins
	动力电调 Main ESC	检查电流是否正常，无电流过大、电压异常及其他故障 Check whether the current is normal, without overcurrent, abnormal voltage, or other faults.	
		检各电调主板温度不得大于 90℃ Check that the temperature of each ESC mainboard is not higher than 90℃	
	舵机 Servo	检查舵机是否正常，无转动失效、回中异常及其他故障 Check whether the servo is functioning properly, without any rotation failure, abnormality in centering, or other malfunctions.	

常态化维护保养标准化作业流程（运行测试 / 校准检查） Standard Work Flow of Normalized Maintenance (Test Running/Calibration Check)			
设备 / 部件 Device/components	检查项 Inspection item	标准值 Standard value	预计用时 Estimated time
		使用“极飞农服”校准舵机回中位置 Calibrate the servo center position via “XAG One”	
喷洒系统测试及校准 Spraying system testing and calibration	运行数值 Running value	XP 系列 - 健康值：1.75（误差：±20%） 21 款与 22 款 - 健康值：1.2-1.423 款 P100 Pro 双泵管 - 健康值：2.1-2.7 XP - health index: 1.75 (error: ±20%) 2021 and 2022 models - health index: 1.2-1.4 2023 P100 Pro dual pump tube - health index: 2.1-2.7	1 min
	校准 Calibration	使用“极飞农服”校准蠕动泵流量 Calibrate the flow of peristaltic pump via “XAG One”	
动力系统测试 Propulsion system testing	蛟龙电机 Screw feeder motor	各电机转速数值误差小于 50 The error in the value of motor speed is less than 50	2 mins
	甩盘电机 Spreading disc motor	检查转速是否正常，无卡转、堵转、渗漏及其他异常 Check if the rotation speed is normal, without jamming, blocking, leakage, or any other abnormalities.	1 min
定位系统测试 Positioning system testing	RTK 测试 RTK testing	航向精度 2°以内，卫星数 16 以上，连接固定基站正常 The heading accuracy is less than 2°; the number of satellites is greater than 16; the fixed base station is connected normally	1 min
试飞测试 Flight test	飞行测试 Flight test	悬停及航线飞行测试，检查运行过程中是否出现报错 Hover and route testing, checking for errors during operation.	5 mins

清洁程序解释
Explanation of Cleaning Procedure

清洁程序分为维修前清洁与维修后清洁，维修前清洁是为了确保机身表面无污垢遮挡损坏部分、避免污垢覆盖或黏粘导致无法拆卸的情况。维修后清洁是在维修结束后进行，是交付前必须完成的标准工序之一，维修后清洁应对整机表面及执行系统进行精细清洁去除表面污垢及执行系统中的药物残留。

The cleaning procedure includes pre-maintenance cleaning and post-maintenance cleaning. Pre-maintenance cleaning is performed to ensure that the fuselage surface has no dirt that covers any damaged part, and to avoid dirt coverage or adherence that can result in removal failure. Post-maintenance cleaning is performed at the end of maintenance, which is a standard procedure that must be completed before delivery. After maintenance, the device surface and application system should be subjected to fine cleaning to remove any dirt on the surface and any residual liquid in the application system.

维修后清洁标准程序
Standard Procedure for Post-maintenance Cleaning

执行前应确保无人飞机设备已维修完毕且运行正常，设备表面无顽固污垢。

Before application, ensure that the drone has completed maintenance and runs normally, and there is no stubborn dirt on the device surface.

表面清洁（预估耗时：10 min）

Surface Cleaning (estimated time: 10min)

执行前应确保无人飞机设备已维修完毕且运行正常，设备表面无顽固污垢。

Before application, ensure that the drone has completed maintenance and runs normally, and there is no stubborn dirt on the device surface.

抛光清洁剂——喷涂至清洁部位

Cleaning agent for polishing —— Spray to the positions for cleaning

抛光手电钻——启动

Electric hand drill for polishing —— Start

- 对已喷涂清洁剂的部位进行清洁擦拭
- Clean and wipe the positions having been sprayed with cleaning agent

管道清洁（预估耗时：5 min）

Tube Cleaning (estimated time: 5min)

清水注入——喷涂至清洁部位

Adding clean water —— Spray to the positions for cleaning

洗洁精注入——按压 3 至 5 次

Adding detergent solution —— Press 3-5 times

- 使用长杆对药箱内液体进行搅拌
- Use a long rod to stir liquid in the liquid tank

启动喷洒系统（“极加检修”）

Start the Spraying System (“Xcare+ Services”)

- 仅启动蠕动泵，不启动喷洒。
- Only start the peristaltic pump without starting spraying.
- 排空洗洁精水。
- Fully discharge the detergent solution.

清水注入冲洗残留（根据药箱容量满载）

Add Clean Water to Wash Residues (full load according to the capacity of liquid tank)

- 重复进行 2 至 3 次。
- Repeat 2-3 times.
- 至排出清水无泡沫结束
- Stop washing when the water discharged is clean without bubbles

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