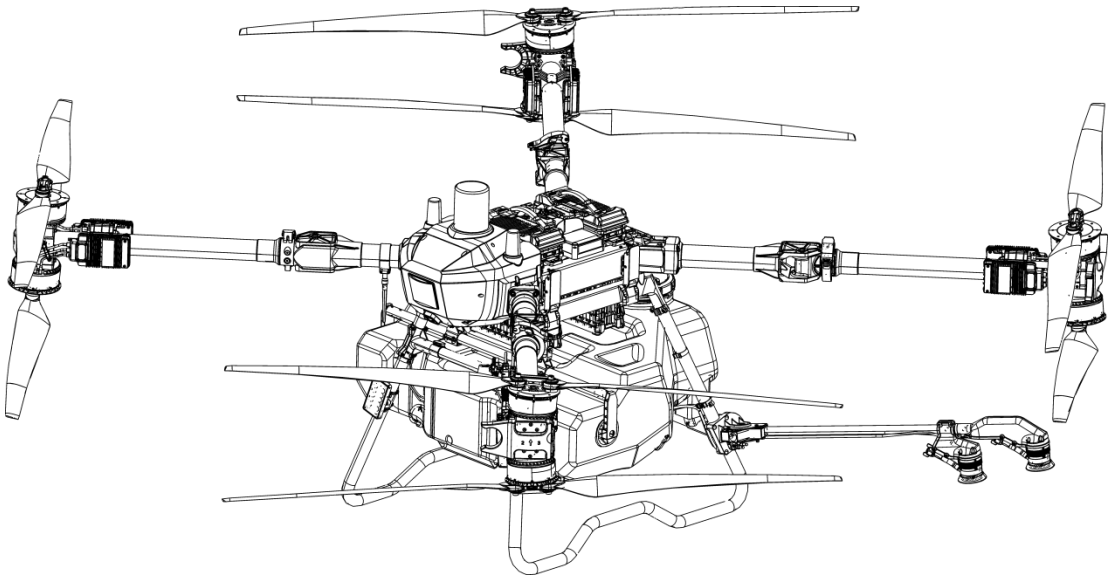
C31 Agricultural Drone

Maintenance manual

V1.1



Ceres Air LLC

January 2026

Revision record

version	Revision date	Revision department	Modify the description	Note:
V1.0	2025.12.30	Testing Services Department	First release	

Notice to Users

1. Maintenance Requirement

   The aircraft must be operated, maintained, and serviced strictly in accordance with the instructions set forth in this *Maintenance Manual*, including all routine and scheduled maintenance requirements. Failure to properly perform such maintenance may void the applicable warranty. The Company reserves the right to request and review maintenance records at any time. Warranty coverage and service eligibility may be denied if the aircraft has not been maintained in accordance with the requirements of this manual.

2. Exclusion of Indirect and Consequential Damages

   The Company shall not be liable for any indirect, incidental, consequential, or special damages, whether foreseeable or not. This includes, without limitation, downtime costs, loss of use, loss of labor, travel expenses, transportation costs, handling fees, communication expenses, loss of business, loss of profits, reputational damage, or any other related or consequential losses.

   For personal injury or property damage to third parties arising from improper operation or misuse of the aircraft, the Company shall not be responsible for any damages exceeding applicable insurance coverage.

3. Consumables and Excluded Causes

   Consumable parts and wear-and-tear items are not covered under warranty. The Company shall not provide warranty coverage or compensation for damage or subsequent failures caused by force majeure, accidents, external forces, improper operation, misuse, abuse, or operation outside of normal or intended use.

4. Use of Authorized Parts Only

   Only original or Company-authorized parts and components may be used with the aircraft. The Company shall not be liable for any damage, malfunction, or loss resulting from the use of non-original or unauthorized parts.

5. No Liability for Unauthorized Modifications

   The Company shall not be responsible or liable for any damage, failure, or

loss resulting from unauthorized modifications, alterations, retrofits, or additions to the aircraft or its components.

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1. Notice to Users

Dear Valued Customer:

Thank you for purchasing our unmanned aircraft product. This Maintenance Manual defines the establishment and termination of warranty responsibilities, as well as the rights and obligations related to after-sales service between the Company and the user.

Upon receipt of the aircraft, please be sure to carefully read this manual before operating the product.

This Maintenance Manual serves as proof for submitting quality or warranty claims to the Company and must be properly retained. The manual must be presented for warranty service.

This manual is provided with the equipment, one copy per aircraft, and shall be regarded as a permanent component of the aircraft. When the aircraft is sold or transferred, this manual shall be transferred together with the aircraft.

Due to regulatory changes, technological improvements, or performance upgrades, the Company reserves the right to modify the design and technical specifications of its aircraft models at any time without prior notice for units already sold.

If any issues occur, please contact the nearest authorized service station, authorized dealer, or call the service hotline at +1 (314) 887-4999.

When repairs are performed by an authorized dealer, please provide this manual to the service station for completion of the Maintenance Record Card.

⚠ Note: The contents and technical specifications in this manual were valid at the time of printing. The Company reserves the right of final interpretation in case of changes.

2. Maintenance agreement

2.1. Basis and purpose

Regular maintenance of agricultural unmanned aircraft is essential to maintain proper technical condition, reduce failures, ensure safe operation, and extend service life.

2.2. Maintenance grading

Maintenance is divided into daily maintenance and regular maintenance.

2.2.1. Routine maintenance

Daily maintenance refers to routine inspections and cleaning performed before and after each flight operation.。

2.2.2. Regular maintenance

1 Scheduled maintenance refers to maintenance activities centered on cleaning, tightening, inspection, and replacement of safety-related components beyond daily maintenance.

2 Maintenance interval: every three months or every 400 flight missions or 200 agricultural tons, whichever occurs first.

3 Users may choose between minor or major maintenance programs recommended by the Company to ensure optimal operating condition and extended service life.

3. Daily Maintenance

Maintenance cycle	system	Components	Daily maintenance items
Before daily operations	Propulsion system	propeller Propeller clamp	Check for damage, gaps in the propeller spacers, and loose screws
		motor	Check whether there is any **gap** between the motor base and the adapter, and whether excessive **movement** is present
		ESC	Check whether the ESC surface is damaged and whether the mounting screws are loose.
	Frame system	Frame Arm	Check whether the airframe and arm mounting screws are loose or damaged.
		Arm lock	Check whether the arm locking mechanism is intact, whether there is any offset **gap** during folding, and whether excessive **movement** is present.
	Spray System	Pump	Check the pump for abnormal noise or leakage, and verify that the wiring harness is not loose.
		Flowmeter	Check the interior of the flow meter for foreign objects or leakage, and verify that the wiring is not loose or damaged.
		Nozzle	Check the nozzles for abnormal noise or leakage, and verify that the wiring is not loose or damaged. Check whether the

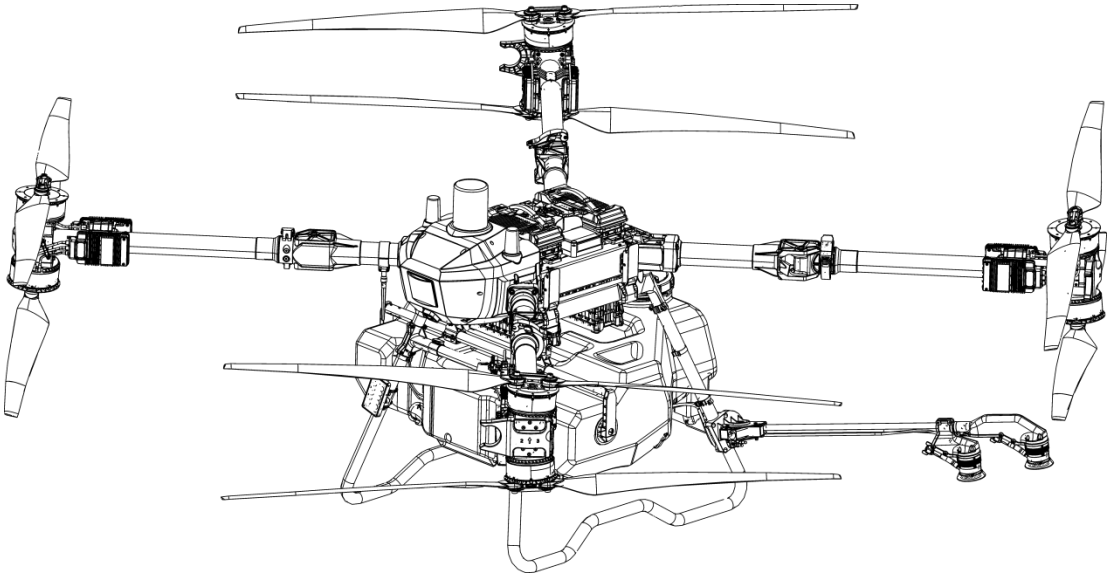
			spray disc is damaged or excessively worn
		Weigh Components	Check whether the sensor housing is intact, and whether the wiring is loose or damaged.
		Hoses and connectors	Check for any damage or excessive wear.
		Disc assembly	Check whether the spray disc is damaged and whether the locking screws are loose.
		Sling	Check whether the spray disc is damaged and whether the locking screws are loose.
	Cargo system	Hook	Check whether the hook is deformed, worn, or cracked
		Lifting Pendulum components	Check whether the sensor housing is intact, and whether the wiring is loose or damaged
	Spreading system	Auger	Check for excessive wear.
		Spreader	Check whether the spreader operates normally, whether there is any abnormal noise, and whether the wiring is loose or damaged
	Lidar system	radar module	Check whether the radar surface is contaminated with debris or foreign matter
	Battery	battery	Check whether the battery charge level is sufficient.
	Avionics system	RTK	Check whether the antenna is damaged

		Antenna	
		Image Transmission Antenna	Check whether the antenna is damaged
		Avionics module	Check whether the avionics equipment surfaces are contaminated with debris or foreign matter.
		Distribution board assembly	Check whether the power distribution board connectors are worn, and whether the locating pins and battery latches are damaged.
	Remote controller	Remote control	Check whether the remote controller battery charge level is sufficient.
	Charger	charger	Check whether all charger functions operate properly and whether the charger connectors are worn
After daily operations	Daily cleaning	Cleaning of the lifting device	After operations are completed, clean the lifting (hoisting) system
		Airframe Cleaning	After operations are completed, clean the airframe surfaces

3.1. Key operation methods for daily maintenance

3.1.1. Airframe inspection

Visual inspection: Before operating every day, carefully check the appearance of the drone。



Inspection Areas:

1 Check whether the airframe has any cracks, deformation, or damage

2 Check the connection points between the arms and the airframe

3 Check the landing gear mounting points

If any damage to the airframe is detected, operation shall be stopped immediately and the affected components shall be repaired or replaced. After the operation is completed, re-inspect the airframe to determine whether any new damage occurred during flight

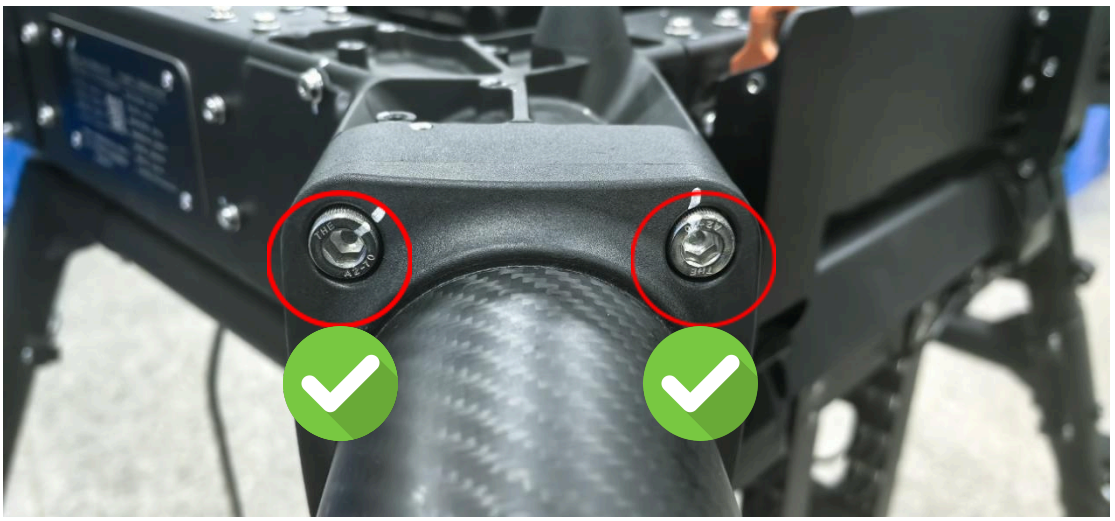
Radar Inspection:

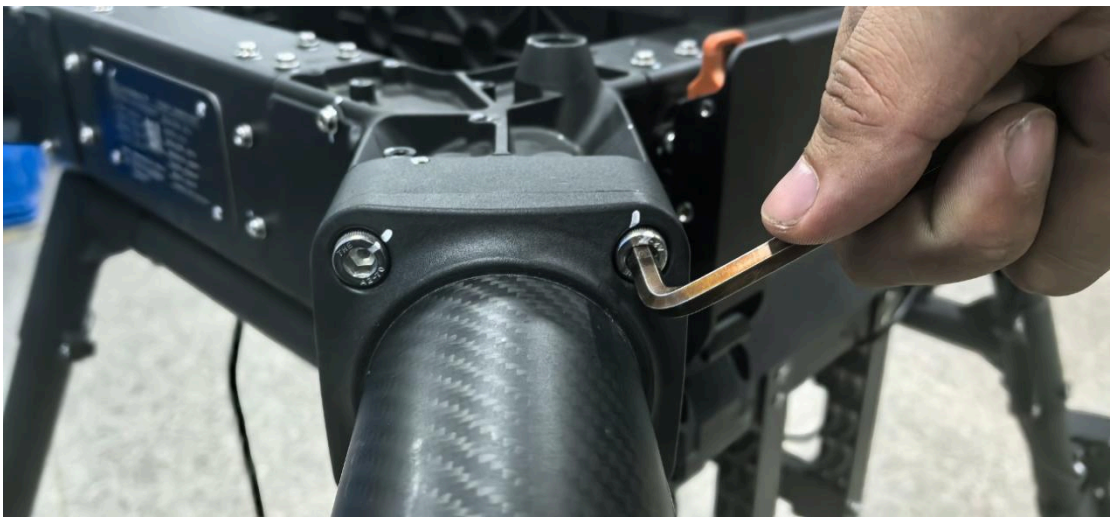
Check the radar for any external damage or contamination. No foreign objects are permitted on the radar surface, including stickers or residue.

Fastener Tightening: Inspect all fasteners on the airframe one by one to ensure that they are properly tightened and free from looseness. Where fasteners are fitted with mechanical stops or limiters, verify carefully that each fastener is fully seated and tightened to its specified position

Inspection Area:

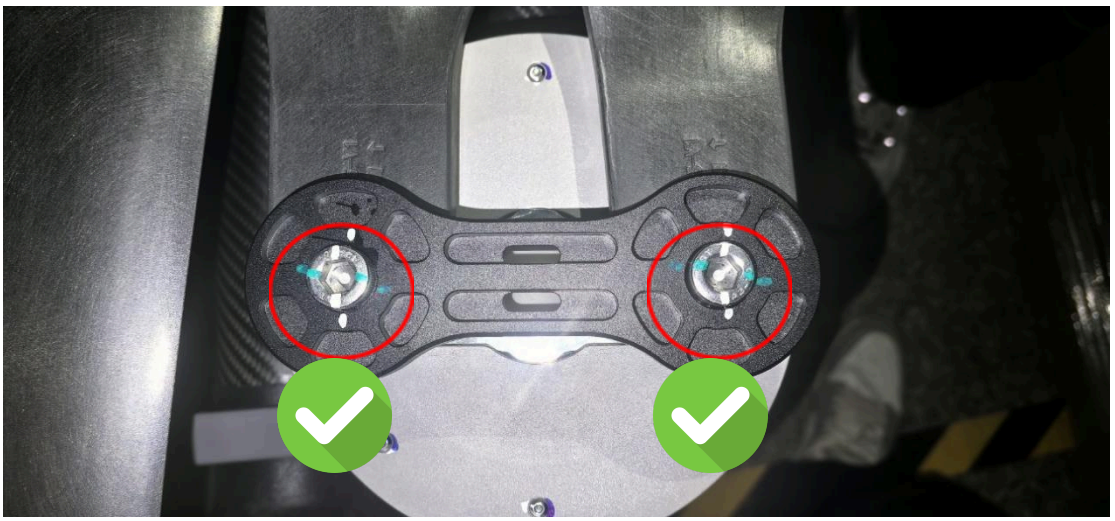
1 Arm connection components





2 Battery mounting bracket and airframe

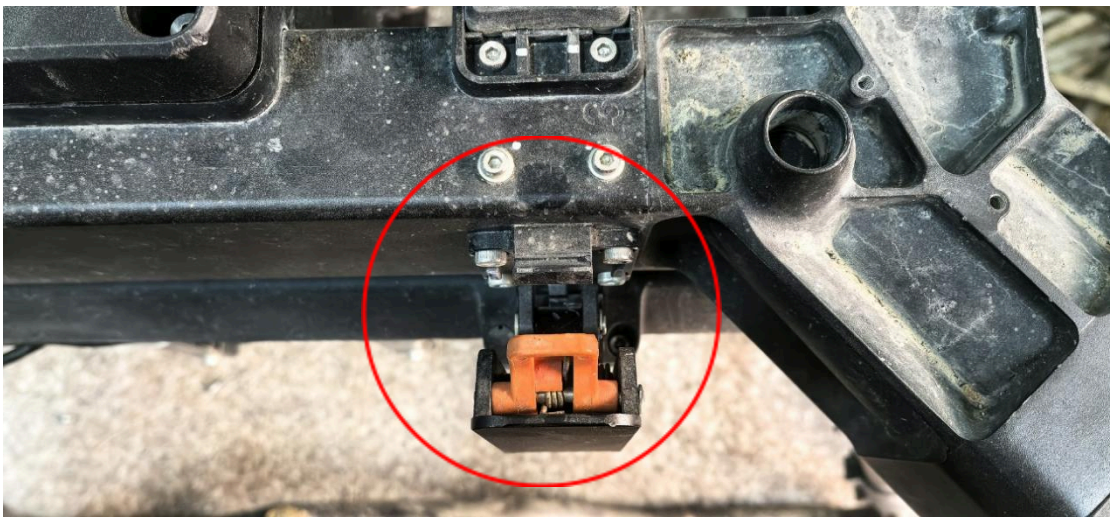
3 Propeller clamp connections

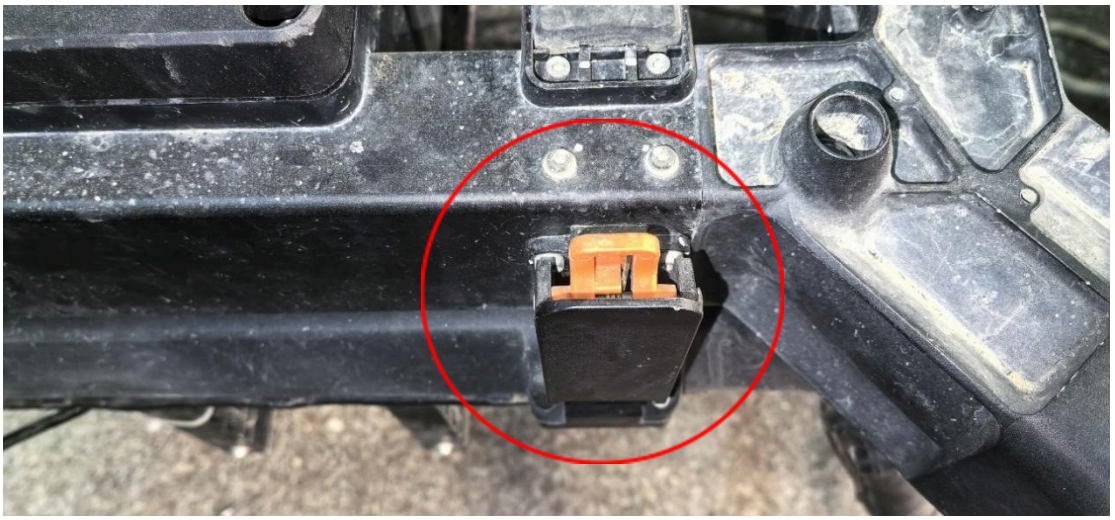


4 Locking screws


2
3


2
3



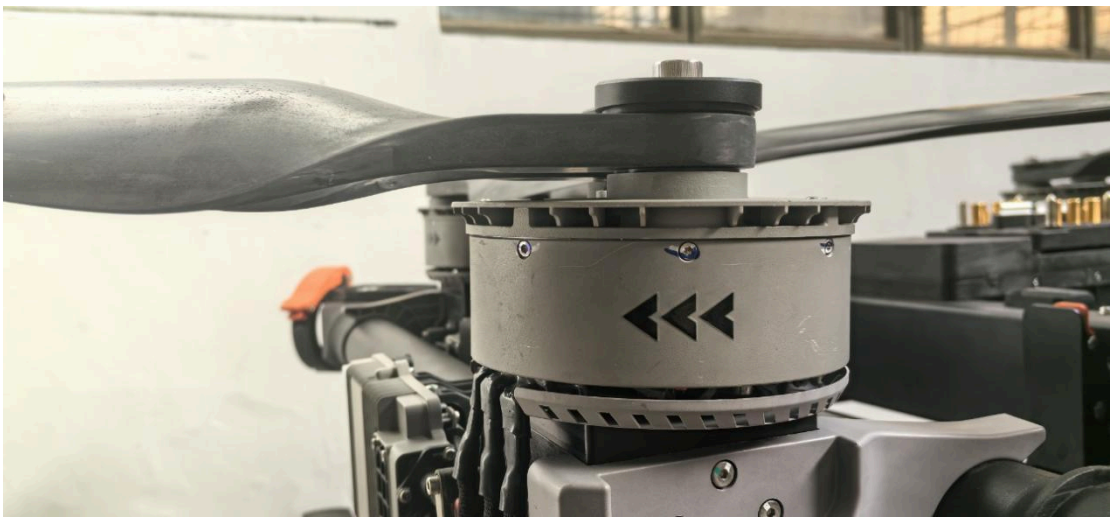


If any fastener is found to be loose, it shall be removed, thread-locking compound shall be reapplied, and the fastener shall be re-tightened. This is required to prevent component detachment caused by loose fasteners, which may result in a flight accident.

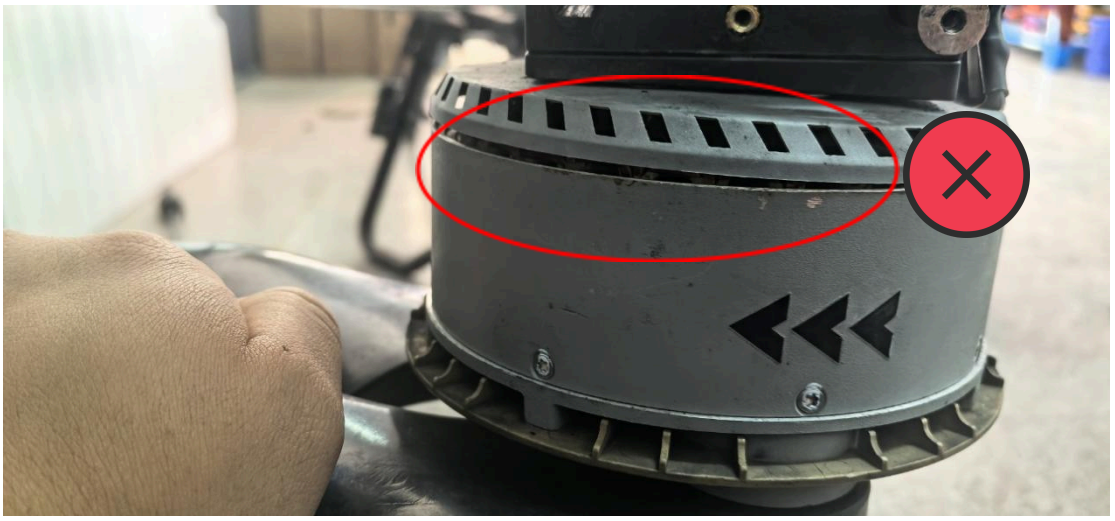
3.1.2. Propulsion System Maintenance

Motor Inspection:
Manually rotate the motor and check whether the rotation is smooth, with no binding, hesitation, or abnormal resistance. At the same time, listen to the motor while it is operating. Under normal conditions, the motor should run smoothly and quietly. If sharp noise or other abnormal sounds are present, this may indicate a motor fault and further inspection or replacement is required.

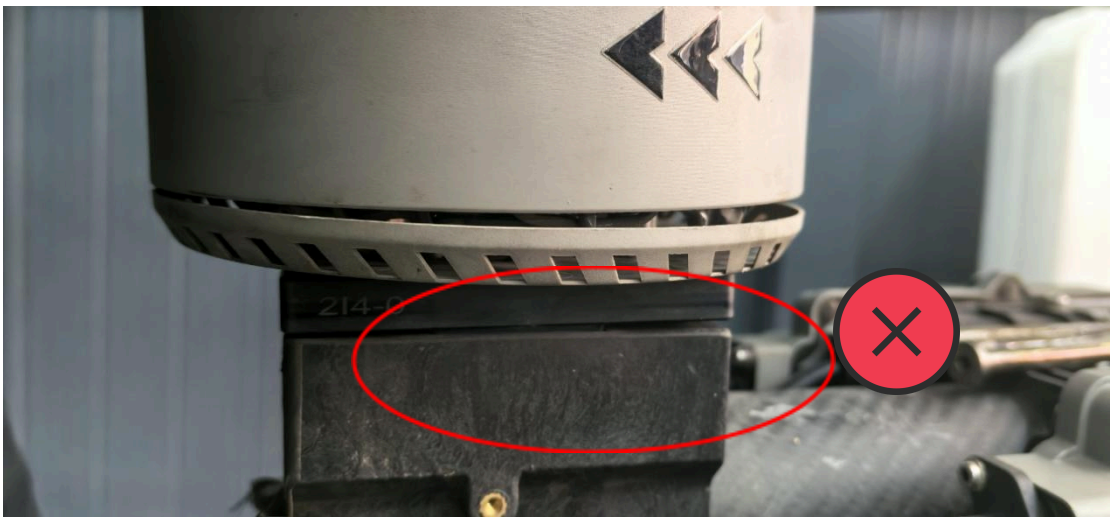
Inspect the motor surface for signs of wear or discoloration caused by overheating. If any abnormal condition is found, the root cause shall be promptly investigated, which may include excessive motor load, inadequate cooling, or other related issues.



Manually move the propeller up and down. If inconsistent **gaps** are observed between the motor and the motor base, promptly contact the nearest authorized service center；



Press the propeller clamp by hand. If any **gap** appears between the motor and the adapter, immediately contact the nearest authorized service center；



Propeller Inspection:

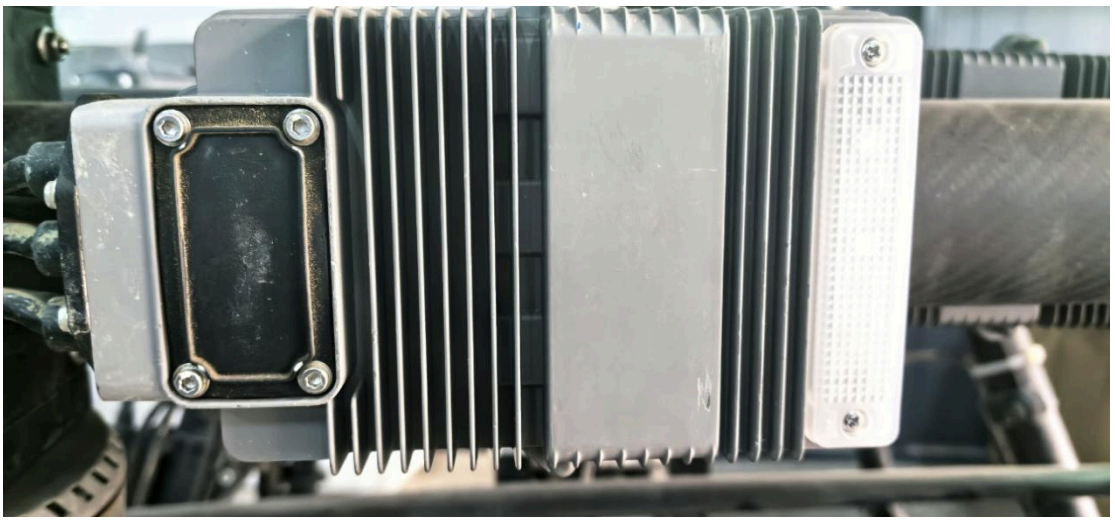
Inspect the propellers for any cracks, chips, or deformation. Even minor cracks may cause the propeller to fracture during high-speed rotation, potentially resulting in serious accidents. Check that the connection between the propeller root and the propeller clamp is secure. If any looseness is found, re-tighten as required.

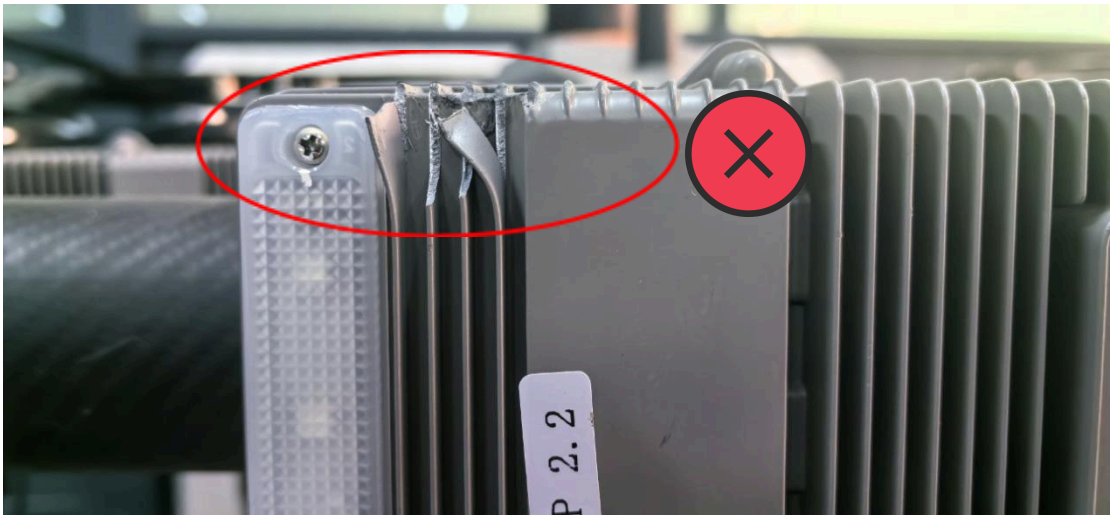
Additionally, ensure that the propeller surfaces are clean and free of foreign material. If dust, dirt, or debris is present, gently remove it using a soft-bristle brush.

ESC Inspection:

Inspect the ESC surface for contamination, signs of water ingress, or evidence of overheating or burn marks. Check whether the ESC mounting bracket has any cracks. The ESC is a critical component responsible for controlling motor speed; any malfunction may affect the flight stability of the aircraft.

If any abnormal condition is found on the ESC, do not attempt to disassemble it. Contact qualified service personnel or an authorized service center for inspection and repair.





3.1.3. Lifting System Maintenance

Hook and Connection Component Inspection:

Inspect the hook for any deformation, wear, or cracks, with particular attention to load-bearing areas. Inspect the ropes, chains, and other components connecting the hook to the aircraft for any breakage, disengagement, or excessive wear.

Lifting Load Cell (Weighing Sensor):

Inspect the sensor housing to ensure it is intact, and check whether the wiring connections are loose or damaged. Verify the accuracy of the lifting load measurement through no-load and loaded tests. Abnormal sensor data may result in overload conditions during lifting operations, posing a serious flight safety risk. If any abnormality is detected, the sensor shall be calibrated or replaced in a timely manner.

Tare Calibration:

Place the aircraft on a flat and level surface, ensuring that no lifting load is attached, and perform tare (zero) calibration.

Weight Calibration:

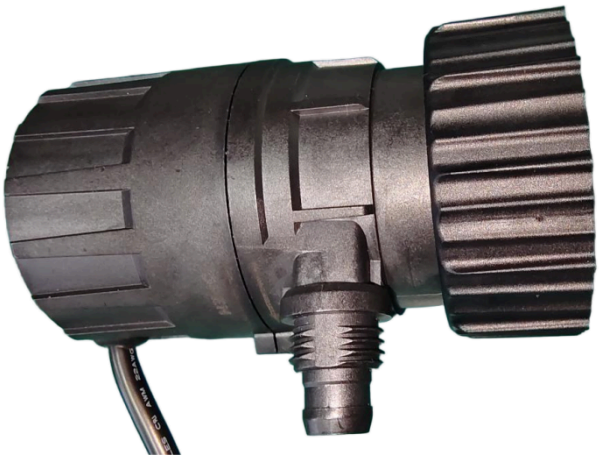
Lift the aircraft onto a stable stand capable of supporting its weight, ensuring the aircraft remains level. Suspend a 110lb(50 kg) calibration weight (weights in the range of 44lb-176lb(20–80 kg) may be used). Enter the actual suspended weight into the remote controller accordingly.

3.1.4. Spray System Maintenance

Pump:

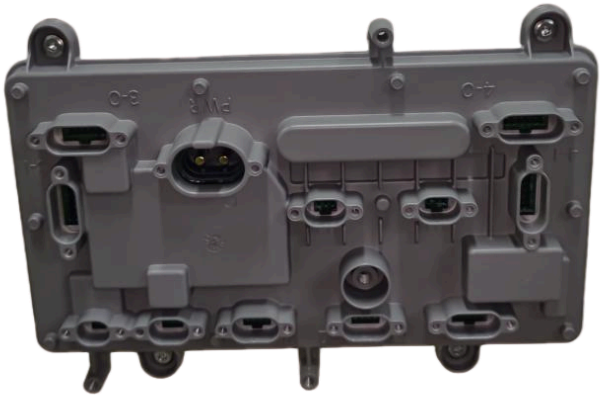
Check the pump for abnormal noise or excessive vibration. Inspect for water leakage or blockage. Check the pump check-valve assembly for any leakage

or damage.



Filter:
Check the filter for blockage or damage, and clean or replace it in a timely manner.

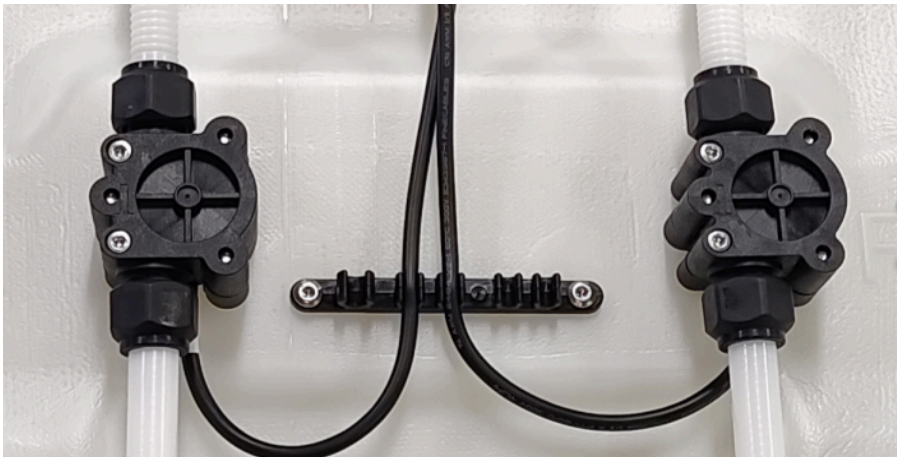
Centrifugal Nozzle:
Check whether the spray disc is damaged. Clean the nozzle and inspect it for any signs of corrosion.
Control Box Assembly:
Check whether the unit powers on normally and whether all functions operate correctly. Clean the assembly and inspect it for any signs of corrosion.



Load Cell (Weighing Sensor):
Inspect the sensor housing to ensure it is intact, and check whether the wiring connections are loose or damaged. Verify that the sensor can accurately measure weight through no-load and loaded tests.

Flow Meter:

Clean the flow meter and inspect it for any signs of corrosion. Check whether it powers on normally and whether all functions operate correctly.



Important Note:

After each operation, the spray system shall be thoroughly cleaned using clean water circulation and a neutral cleaning agent to prevent corrosion of components caused by pesticide residue.

3.1.5. Battery Maintenance

Proper maintenance and care of lithium batteries ensure reliable performance and extend battery service life.

Lithium Battery Care:

Wipe the exterior of the lithium battery with a clean towel. Clean the battery terminals using a cotton swab and alcohol. If discoloration, blackening, or corrosion is observed on the battery terminals, the battery shall not be reused and after-sales service personnel shall be contacted. When handling lithium batteries, ensure that hands and fingers are clean and dry to prevent sweat or moisture from entering the battery.

Clean the power distribution board terminals using alcohol. If any blackening or corrosion is observed, the component shall not be reused and after-sales service personnel shall be contacted.

Lithium Battery Storage Requirements:

Lithium batteries shall be stored at a state of charge of 50%–65%, or at a battery voltage of 64.8 V–70.2 V. Do not store batteries for long periods after they have been fully discharged, as this may cause over-discharge and result in cell damage.

Lithium batteries intended for long-term storage (more than three months) shall be stored in an environment with a temperature of 15 °C ±5 °C (59 °F ±9 °F) and a relative humidity of 65% ±10% RH. During long-term storage, perform at least one maintenance charge every three months. Battery storage shall strictly comply with the above requirements.

Regularly inspect the condition of lithium batteries. If excessive heating or other abnormal conditions are observed, promptly contact after-sales service personnel for handling.

Lithium Battery Recycling:

Used batteries contain various heavy metals, including mercury, manganese, cadmium, lead, zinc, and nickel. When discarded improperly, battery casings may gradually corrode, allowing heavy metals to leach into soil and water, causing environmental pollution. If crops grown in contaminated soil or contaminated water are consumed, these toxic heavy metals may accumulate in the human body and pose serious health risks.

The Company will, in accordance with national regulations and industry policies, guide authorized dealers and users to actively carry out the recycling of used lithium batteries in compliance with local battery recycling regulations

> ⚠ If the battery charge level drops to **0%**, the battery will be locked. Please promptly contact your local authorized dealer for assistance

1.1.1. Cleaning

Airframe Cleaning:

Use a soft, dry cloth or a soft-bristle brush to gently wipe the airframe and remove dust, dirt, and debris from the surface. For stubborn stains, a small amount of clean water or a dedicated cleaning agent may be used. Take care to prevent moisture from entering internal electronic components. Pay special attention to areas where dust tends to accumulate, such as motor cooling vents, propeller roots, and airframe gaps.

Spray System Cleaning

- Basic Cleaning (After Operation)

- **Step 1: Drain Residual Liquid**
  Open the drain valve at the bottom of the chemical tank and completely drain any remaining liquid to prevent residue buildup.
- **Step 2: Clean Water Rinse**
  Fill the tank with approximately one-third of its capacity with clean water. Activate the spray system and circulate for 1–2 minutes, then drain. Repeat this process 2–3 times until the discharged water shows no pesticide color or odor.
- **Step 3: Local Wiping**
  Use a soft-bristle brush (to avoid scratching the inner surface of the tank) to clean the tank inlet at the top and the corners of the inner walls. Rinse thoroughly with clean water.
- Deep Cleaning (When Changing Chemicals / Long-Term Storage)

Step 1: Neutral Cleaning Agent Circulation
Fill the tank with approximately one-quarter of its capacity with clean water mixed with a neutral detergent diluted at a ratio of 1:50. Activate the spray system and circulate for 3–5 minutes to fully dissolve residual chemicals, then drain.
Step 2: Secondary Clean Water Rinse
Fill with clean water and circulate twice to ensure all cleaning agent residue is completely removed, then drain.
Step 3: Drying
Open the tank lid and place the tank in a well-ventilated, dry area to air-dry (avoid direct sunlight), or use clean, dry compressed air to dry the inner walls to prevent moisture retention and corrosion.
Lifting System Cleaning:
Remove dirt and debris from lifting system components such as hooks, ropes, and

chains to prevent corrosion or interference with normal operation. For connection points that use lubricants, apply an appropriate amount of lubricant after cleaning to ensure smooth movement of the components

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2. Scheduled Maintenance

After completing daily maintenance, the C31 agricultural unmanned aircraft shall undergo scheduled maintenance within fixed intervals based on **calendar time, cumulative flight hours, or operating workload/acres cover**, whichever occurs first.

Specific maintenance items and intervals are detailed in the table below.

"★" indicates inspection, tightening, cleaning, or similar maintenance actions.

"■" indicates component replacement.

Module	Maintenance		Scheduled				
		Maintenance Interval ((X 1 week)	1	4	12	26	52
		Operating Time(X 1 Hour)	20	50	100	250	500
Wear Parts	Replacement & Inspection	Propellers	★	★	★	■	■
		Propeller Clamps	★	★	★	■	■
		Spacers / Washers	★	★	■	■	■
Airframe	Frame	Inspect the **front frame** for cracks, damage, or structural looseness	★	★	★	■	■
		Inspect the **left and right frames** for cracks, damage, or structural looseness	★	★	★	■	■
		Inspect the **rear frame** for cracks, damage, or structural looseness	★	★	★	■	■
		Check whether **frame mounting screws** are loose or broken	★	★	★	■	■
	Joints	Inspect **inner and outer joints** for cracks, damage, or looseness	★	★	★	■	■
		Inspect **carbon tubes** for cracks, damage, or looseness	★	★	★	■	■
		Inspect **joint shafts** for cracks, damage, or looseness	★	★	★	■	■
		Check **fasteners for joints, carbon tubes, and shafts** for looseness or breakage	★	★	★	■	■

Air frame	**Landing Gear**	Check whether **landing gear-to-frame screws** are loose or broken	★	★	★	■	■
		Check whether **landing gear-to-body screws** are loose or broken	★	★	★	■	■
		Inspect landing gear for **deformation or excessive wobble**	★	★	★	■	■
	Frame Accessories	Inspect **battery mounting brackets** for excessive wear or deformation	★	★	★	■	■
		Inspect **propeller holder brackets** for excessive wear or deformation	★	★	★	■	■
		Inspect **frame wiring harnesses** for damage, loose connectors, or seal deformation	★	★	★	■	■
Spraying System	Water Pump	Check for **abnormal noise or leakage**, and whether wiring harness is loose	★	★	★	★	■
	Flowmeter	Check for **foreign objects or leakage**, and whether wiring is loose or damaged	★	★	★	★	■
	Nozzles	Check for **abnormal noise or leakage**, and whether wiring is loose or damaged	★	★	★	★	■
	Weighing Module	Inspect **sensor appearance**, wiring looseness, or damage	★	★	★	★	■
	Tubing & Connectors	Inspect for **damage or excessive wear**	★	★	★	★	■
	Spray Disc Assembly	Inspect for **damage**, and check whether **locking screws are loose**	★	★	★	★	■
Spreading System	Auger	Inspect for **excessive wear**	★	★	★	★	■
	Spreader	Check for **abnormal noise**, proper functionality, and wiring condition	★	★	★	★	■
Perception System	FPV Camera	Inspect and clean for **corrosion**	★	★	★	★	■

		Verify **power-on and normal functionality**	★	★	★	★	■
	Radar/LiDAR	Inspect and clean for **corrosion**	★	★	★	★	■
		Verify **power-on and normal functionality**	★	★	★	★	■
Power System	Motor	Check whether **motor top cover and shaft** are loose	★	★	★	★	■
		Check whether **mounting screws** are loose	★	★	★	★	■
		Inspect **motor terminals** for breakage	★	★	★	★	■
		Check whether motors show **axial movement or misalignment**	★	★	★	★	■
		Verify **motor tilt angle** is correct	★	★	★	★	■
	ESC	Inspect ESC surface cleanliness	★	★	★	★	■
		Check whether **ESC mounting screws** are loose or broken	★	★	★	★	■
Remote Controller	Remote Controller	Inspect and clean for **corrosion**	★	★	★	★	■
		Verify **power-on and normal functionality**	★	★	★	★	■
Charger	Charger	Inspect and clean for **corrosion**	★	★	★	★	■
		Verify **power-on and normal functionality**	★	★	★	★	■
Lithium Battery / Generator		Perform **routine maintenance and scheduled servicing** in accordance with the **maintenance cycles specified for lithium batteries and generators**.					

2.1. Scheduled Maintenance Items

Minor maintenance shall be performed once per month, and major maintenance shall be performed once per quarter. All maintenance services shall be carried out at an authorized service center

Types of maintenance:	Minor maintenance	Major maintenance
Maintenance items	**Airframe exterior cleaning**	Airframe deep cleaning
	Component inspection and calibration	Component inspection and upgrade
	Free firmware update	**Free firmware update**

	Equipment repair as needed	Replacement of parts as required
Maintenance details	Airframe exterior inspection; equipment repair as needed	Airframe exterior inspection; equipment repair as needed
	Structural fastener re-tightening	replacement of necessary fasteners
	Battery and interface board maintenance	Deep cleaning of airframe and arms
	Free firmware update	Deep cleaning and maintenance of motors
	Charger plug cleaning	replacement of Charger plug
	Propulsion system ESC cleaning	Maintenance of rear interface board of battery charger
	Main controller heat sink exterior cleaning	**Main controller heat sink exterior cleaning**
	Charger cooling system cleaning	Charger exterior cleaning
		Tank deep cleaning
Maintenance cycle	Monthly maintenance is recommended	Quarterly maintenance is recommended

2.2. Scheduled Maintenance Procedures

2.2.1. Every 4 Weeks / 50 Flight Hours (Whichever Occurs First)

Comprehensive Fastener Tightening:

Re-tighten all fasteners on the airframe, arms, motors, spray system, and other components to ensure that, after repeated flight vibrations, all fasteners remain securely tightened.

2.2.2. Every 12 Weeks / 100 Flight Hours (Whichever Occurs First)

Spray System Inspection:
Check the pump for abnormal noise or leakage and verify that the wiring harness connections are secure. Inspect the interior of the flow meter for foreign objects or

leakage, and check whether wiring is loose or damaged. Inspect sensor housings to ensure they are intact and verify that wiring connections are not loose or damaged. Inspect pipelines and connectors for any damage or severe wear.

Spreader Inspection:
Check whether the spreader produces abnormal noise and whether it functions properly. Verify that wiring connections are not loose or damaged.

Lifting System Strength Inspection:
Inspect critical load-bearing components of the lifting system, such as hooks and connecting shafts, for internal cracks or other defects. If insufficient strength or any safety hazard is identified, replace the affected components promptly.

Battery Inspection:
Inspect battery connectors for damage, moisture, or foreign matter. Ensure that connectors are clean, free of corrosion, and securely connected. If foreign matter is present, perform connector maintenance by using a cotton swab dipped in an appropriate amount of anhydrous alcohol (purity ≥95%) to gently clean the metal contacts, removing oxidation and contaminants to ensure good electrical conductivity. Do not allow alcohol to enter the battery interior. After cleaning, wait until the alcohol has completely evaporated before proceeding with further operations.

Sensor Calibration:
Calibrate various sensors on the aircraft, such as the lifting load cell and paddle wheel (flow) sensors. Sensor accuracy is critical to flight attitude control and navigation. After extended use, sensors may experience drift; calibration can restore their accuracy.

2.2.3. Every 40 Weeks / 300 Flight Hours (Whichever Occurs First)

Complete Disassembly Inspection and Cleaning:
Fully disassemble the aircraft and conduct a detailed inspection of all components, including electronic components, mechanical parts, and wiring connections. Thoroughly clean internal dust, oil, and other contaminants. Replace components that are severely worn or aged.

Overall Propulsion System Evaluation and Replacement:
Conduct a comprehensive evaluation of propulsion system components, including motors, propellers, and ESCs. Based on wear level and performance condition, determine whether full replacement is required. After prolonged use, propulsion system performance may degrade; comprehensive replacement can significantly improve flight performance and safety.

Operational System Evaluation and Replacement:
Perform a comprehensive inspection of the spray system and determine whether full replacement is required based on wear and performance condition. After long-term

use, pipelines and filters may be subject to chemical corrosion. Full replacement of the fluid system can significantly improve flight performance and operational safety.

Lifting System Comprehensive Replacement (Key Components):
Replace critical and wear-prone lifting system components, such as hooks, high-strength ropes, and primary connecting components, to ensure sufficient strength and reliability after long-term use.

Software and Firmware Updates:
Check the software and firmware versions of the aircraft and related control systems and update them to the latest versions in a timely manner. Software and firmware updates typically address known issues, improve system performance, and add new functions, helping to ensure stable and safe lifting operations.

3. Post-Operation Maintenance in Special Environments

3.1. After Operation in Wet Environments

Airframe Drying:
If the aircraft has operated in a wet environment (such as during rain), immediately move it to a dry, well-ventilated area and wipe off surface moisture with a dry cloth. For components prone to water ingress, such as motors, ESCs, and battery connectors, use a hair dryer set to a low-temperature setting from a safe distance to ensure no residual moisture remains inside. Avoid charging or powering on the aircraft before it is completely dry to prevent short circuits and equipment damage.

Anti-Corrosion Treatment:
Inspect metal components of the airframe and lifting system. If rust is detected, gently remove it using sandpaper, then apply an appropriate amount of anti-rust oil or anti-corrosion coating to prevent further corrosion. For aircraft frequently operated in wet environments, perform periodic anti-corrosion treatment to improve corrosion resistance

3.2. After Operation in Dusty or Sandy Environments

Dust Removal:
Use compressed air or a high-pressure air gun to blow dust and sand out of air inlets, cooling vents, motor gaps, and other areas. Pay special attention to the interior of propellers, motors, and sensor surfaces, as dust accumulation in these areas may affect

normal operation. For dust that is difficult to remove, use a soft-bristle brush, taking care to avoid damaging component surfaces.

Component Inspection and Maintenance:
Inspect propellers for surface scratches or chips caused by abrasion. If present, assess the impact on flight performance and replace propellers if necessary. Inspect motor bearings; if rotation is impaired due to dust ingress, clean them using a dedicated motor cleaner and apply an appropriate amount of lubricant. Inspect sensor sealing to ensure dust has not entered sensor interiors and affected accuracy

3.3. After Operation in High-Temperature Environments

Cooling:
After operating in high-temperature environments, do not immediately charge the aircraft or resume flight. Place the aircraft in a shaded, well-ventilated area to cool naturally and avoid direct sunlight. Proceed with further operations only after the airframe and battery temperatures have returned to normal ranges (typically, battery temperature not exceeding 40 °C (104 °F), and the airframe not excessively hot to the touch).

Battery Inspection and Maintenance:
High temperatures can significantly affect battery health. After operation, carefully inspect batteries for swelling, deformation, or other abnormalities. When storing batteries for extended periods in high-temperature environments, maintain the battery charge level at **40%–60%** and avoid prolonged exposure to high temperatures.

4. Maintenance Records and Documentation Management

After each maintenance service performed on the aircraft lifting system, detailed records shall be kept, including maintenance content, date, personnel involved, identified issues, and corrective actions taken. Establish and maintain maintenance records for the aircraft by organizing and archiving each maintenance entry for future reference and analysis.

Analysis of maintenance records helps identify wear patterns and failure trends of aircraft components, enabling proactive maintenance and replacement planning to improve equipment reliability and availability. In the event of a failure, maintenance records also serve as an important reference for troubleshooting and fault analysis

Drone Maintenance Instructions

4. Before each flight, inspect propellers and immediately replace any deformed or damaged blades. Ensure all propellers are securely mounted.
5. Always empty and detach the liquid tank during transport or storage to prevent landing gear overloading.
6. Store aircraft in environments between -4°F (-20°C) and 104°F (40°C). Verify tanks, flow meters, pumps, and hoses are completely drained.
7. Clean aircraft promptly after spraying. Perform routine maintenance per Section 4: 'Product Maintenance' in the C31 Agricultural drone Warranty & Maintenance Manual.

Drone Maintenance & Cleaning Protocol

Folding Procedure: After operations, fold arms in this sequence: M1 and M4 arms first, M2 and M3 arms second. Ensure arms are securely locked into storage clamps on fuselage sides. Failure to properly secure them may cause arm damage.

Cleaning Preparation: Allow the drone to cool to ambient temperature before cleaning. Never clean immediately after operation. Clean drone and remote controller daily after flight operations.

Step-by-Step Cleaning Procedure:

1. Tank Flushing: Triple-rinse the liquid tank. Fill with clean water or soap solution. Spray until empty and repeat this process two additional times.
2. Remove and clean the tank filter, nozzle screens, and spray tips. After confirming there are no blockages, soak these components in clean water for 4 hours.
3. Rinse airframe with low-pressure water, scrub with soft brush or damp cloth and dry thoroughly with lint-free cloth.
4. For motors, propellers, and heat sinks. Wipe pesticide residue or dust with damp cloth. Immediately dry with absorbent cloth. Never allow liquid pooling.
5. Dampen lint-free cloth (wring until no dripping), wipe surfaces and display and Air-dry before storage.

Intelligent Battery Storage Protocol

For long-term storage, charge to 60% before storage (optimal preservation state). Check the remaining charge monthly. If the state of charge (SOC) falls below 20%, recharge to approximately 60% before storage. Prolonged low-charge storage causes permanent capacity degradation and reduces cycle life.

Storage & Transportation Safety Protocol

To prevent injury and property damage:

5. Keep all components away from children – small parts and cables pose choking hazards.

6. Always remove batteries from the aircraft before transport.
7. For long-term storage or extended transport: Detach the spray tank assembly or completely drain residual liquid. Store aircraft in climate-controlled environments.
8. For long-term storage, maintain batteries at approximately 60% state of charge .

Post-Operation Maintenance Protocol

To prevent injury and equipment damage:

- After daily operations, allow aircraft to reach ambient temperature before cleaning. Never clean immediately post-flight.
    - Fill with clean water or ≤2% detergent solution. Spray until fully emptied and repeat twice.
    - Remove and clean the following: spray tank filter assembly, nozzle screen filters, and spray tips. Verify that all parts are obstruction-free and soak disassembled components in clean water for 12 continuous hours.
    - Ensure the body structure is intact—the entire unit can be washed directly with water. It is recommended to rinse the body using a spray hose, then clean it with a soft brush or damp cloth, and finally wipe it dry with a clean, dry cloth.
    - If there is dust or chemical residue on the motor, propeller blades, or heat sink surfaces, it is recommended to clean them with a damp cloth and then wipe dry with a clean, dry cloth.
    - Keep the aircraft in a dry location.
- After each day of operation, wipe the remote controller's surface and screen with a clean, damp cloth (wring out excess water).
- After every 20 flight hours or 100 takeoff/landing cycles:
    a. Inspect the propellers for cracks. Replace any cracked propellers.
    b. Check if the propellers are loose. If looseness is found, replace the propeller and it’s washer.
    c. Examine plastic and rubber components for signs of aging/deterioration.
    d. Check the nozzle’s spray pattern. If atomization is poor, thoroughly clean the nozzle or replace it.
    e. Replace both the nozzle filter and the spray tank filter.
- After daily operations: If the equipment will be used again the next day or in the near future, perform slow charging on the batteries overnight for maintenance.
- Do not attempt unauthorized repairs on the aircraft. If damage occurs, contact an authorized Ceres Air Dealer for service.

Note:

1. Keep the radar module’s protective cover clean. Gently wipe the surface with a soft, damp cloth and allow it to air-dry.
2. Maintain FPV camera cleanliness by removing any dust, sand, or debris from the camera surface.

3. Inspect all aircraft components for signs of severe impact. If any damage is suspected, contact customer support or an authorized Ceres Air Dealer.

Do we have manual for battery, spray system, and cargo system?

Transportation, Storage, and Maintenance

Transportation and Storage

1. During transportation, ensure the battery is powered off and disconnected from the drone or any other device.
2. Store the battery out of reach of children. If any parts are accidentally swallowed, seek immediate medical attention.
3. If the battery indicates a critically low charge after flight, recharge it to approximately 25% before storage. Prolonged storage at a low charge may damage the battery.
4. Do not place the battery near heat sources, such as direct sunlight, inside a hot car, near open flames, or heating appliances.
5. Store the battery in a dry environment. Avoid exposing it to water or areas prone to leaks.
6. Do not store or transport the battery with metal objects (e.g., glasses, watches, metal necklaces, hairpins) or flammable/explosive materials.
7. Never transport damaged batteries or those with a charge exceeding 30%. Discharge the battery to around 25% before transportation.
8. When placing the battery, ensure the surface is flat to prevent sharp objects from puncturing the bottom.
9. For long-term storage (over 3 months), keep the battery in an environment with a temperature between -20°C and 40°C.
10. Avoid storing the battery in a fully discharged state for extended periods, as this may cause over-discharge, leading to irreversible cell damage.
11. If the battery is severely depleted and left idle for too long, it will enter deep sleep mode. To reactivate it, recharge the battery.
12. For long-term storage, disconnect the battery from the aircraft.

Maintenance

1. Do not clean the battery with water.
2. Never store the battery in environments where temperatures exceed 45°C (113°F) or fall below -20°C (-4°F).
3. Long-term inactivity may negatively impact the battery’s performance.

4. Recharge and discharge the battery approximately every 3 months to maintain its activity.
5. Batteries that go without maintenance (charging/discharging) for over 5 months will not be covered under warranty.

HE102 Battery Usage Guidelines

1. After connecting the battery to the aircraft, power on: Short-press, then long-press the power button.
2. Power off (after landing): Short-press, then long-press to shut down. Disconnect from the aircraft.
3. Ensure battery level exceeds 95% before each flight.
4. Low-battery alert: Land immediately and replace the battery.
5. Cold weather operation: Pre-warm batteries above 5°C (41°F); 20°C (68°F) recommended. Achieve this by hovering briefly.

⚠️ Critical Warnings:

1. Prohibited: Use near heat sources (direct sunlight, hot vehicles, flames, heaters, or generator exhaust).
2. Never expose to liquids. Water contact may cause thermal runaway, fire, or explosion. Avoid rain/humid environments.
3. Do not use swollen, leaking, or damaged batteries. Contact authorized dealers immediately.
4. Always power off before installing/removing batteries. Hot-swapping damages ports.
5. Use the battery within an ambient temperature range of 23°F to 113°F. Excessive heat (above 122°F) may cause fire or explosion. Extreme cold (below 23°F) severely reduces performance; normal function resumes at room temperature.
6. Avoid strong electrostatic or magnetic fields, which may trigger protection circuit faults.
7. Never disassemble or puncture the battery with sharp objects, as this may cause fire or explosion.
8. Electrolyte leakage, Highly corrosive! If leakage occurs, stay away. If skin or eyes are exposed, rinse immediately with clean water and seek medical help.
9. Discard batteries after impacts or drops.
10. Water immersion, send for inspection. Do not reuse.
11. Fire response, use in this order: Water/mist, Sand, Fire blanket, Dry powder, CO_2 extinguisher.

12. Never short-circuit terminals with metal objects.
13. Avoid impacts or compression. No heavy objects on batteries or chargers.
14. Clean terminals with dry cloth to prevent poor contact or charging failure.
15. Land immediately if battery falls below 15% , as this may damage the battery or cause flight accidents.
16. Reverse polarity PROHIBITED. Improper charging may cause overheating, explosion, or fire. Only use official-recommended batteries. Unauthorized batteries may lead to accidents or malfunctions, for which the user is responsible.Unauthorized batteries void warranty; user assumes all liability.
17. Place on flat surfaces to avoid puncture by sharp objects..
18. Danger: Never stack items on batteries or use as seating, as this may cause damage or danger.