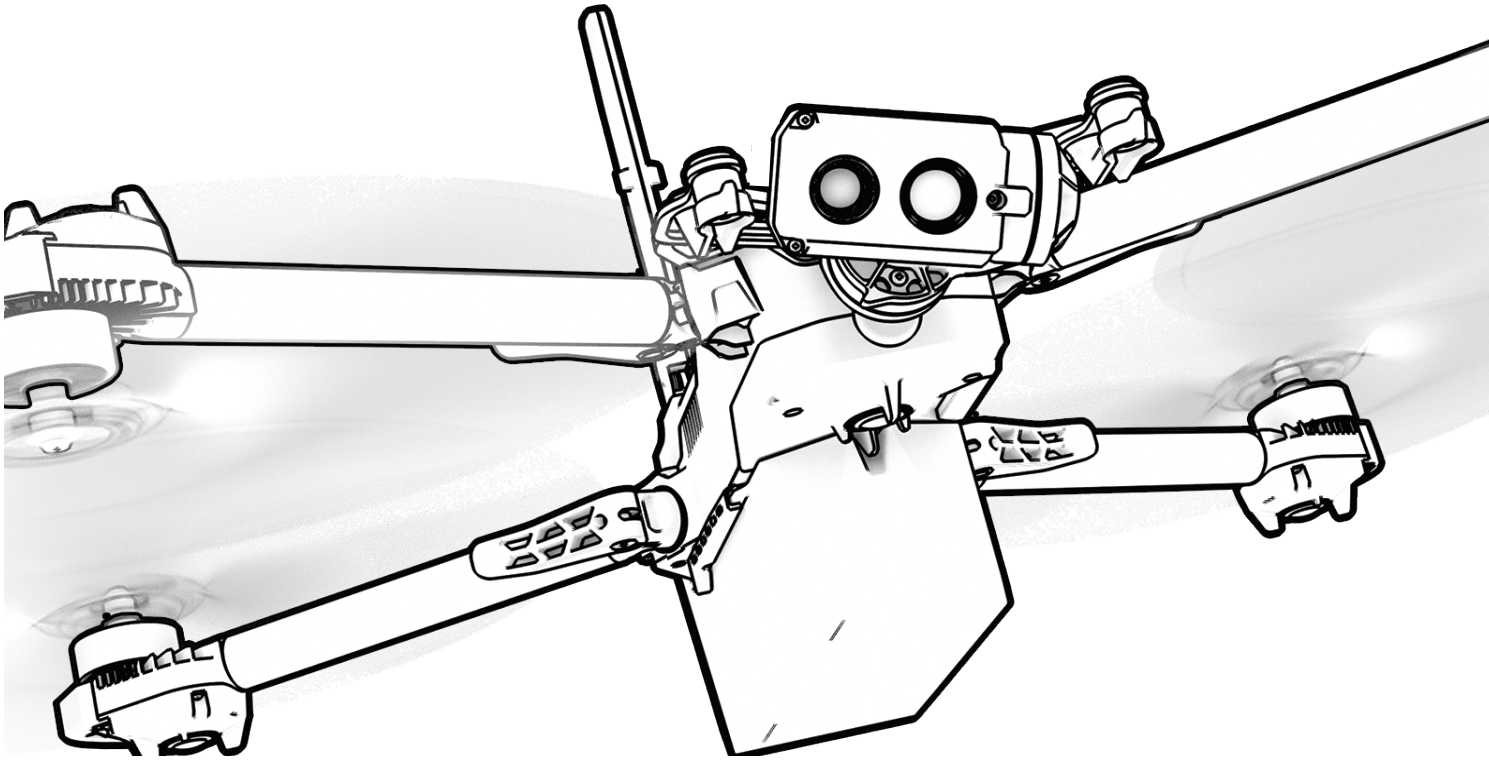
Skydio

Skydio X2D

Maintenance Manual



WARNING: *Please read all documentation provided with your Skydio X2, including but not limited to the X2 Safety Guidelines in the Safety and Operating Guide: www.skydio.com/safety. Failure to follow any instructions or recommendations in our documentation may void the Skydio Limited Warranty.*

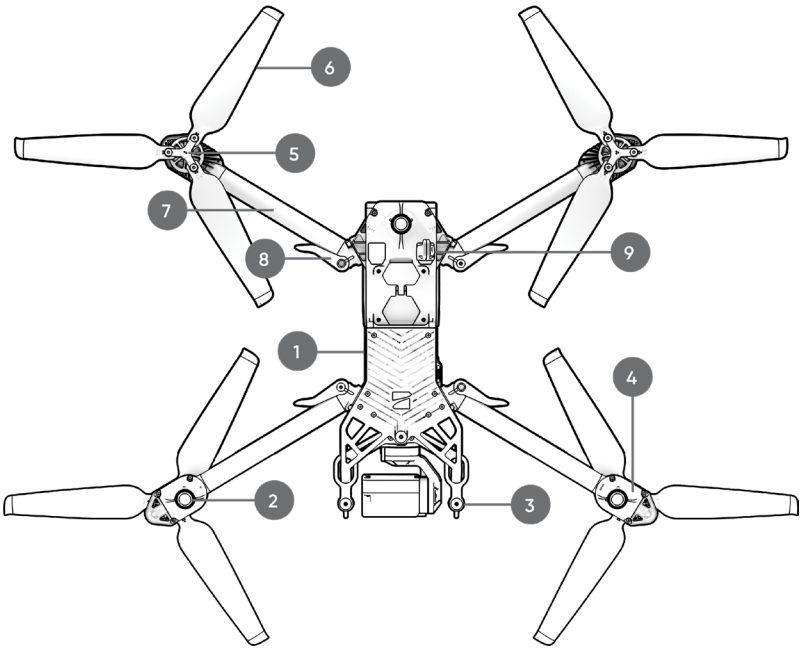
Scope

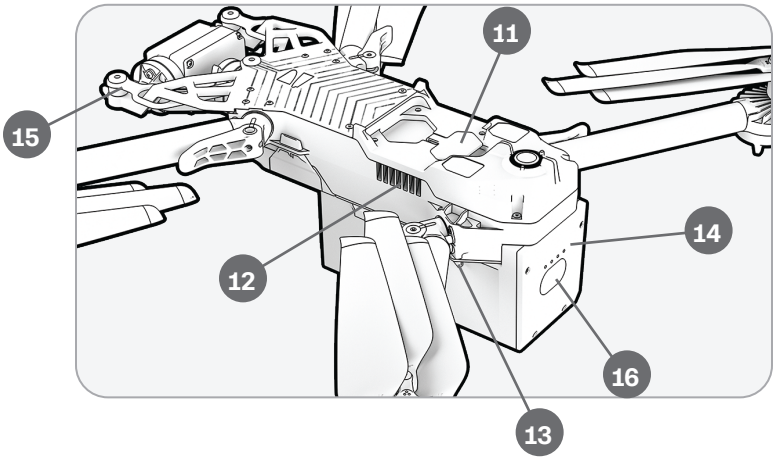
This manual is designed to provide users with maintenance procedures and schedules to ensure optimal flight behavior. A life-cycle table to record and track flight hours is included. Read the Operator Manual for detailed information about flying your Skydio X2D. Sections divide the manual into major categories of information:

- Equipment
- Fleet Management
- Maintenance
- Inspection
- Schedule

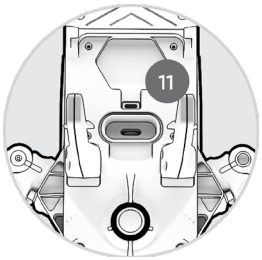
Hardware Overview

1	Chassis
2	Navigation camera (6)
3	Gimbal
4	Motor pod (4) RGB/IR/Strobe navigation lights
5	Propeller hub
6	Propeller blades clockwise (6) counter-clockwise (6)
7	Arm (4)
8	Arm clamp (4)
9	Antenna(s)





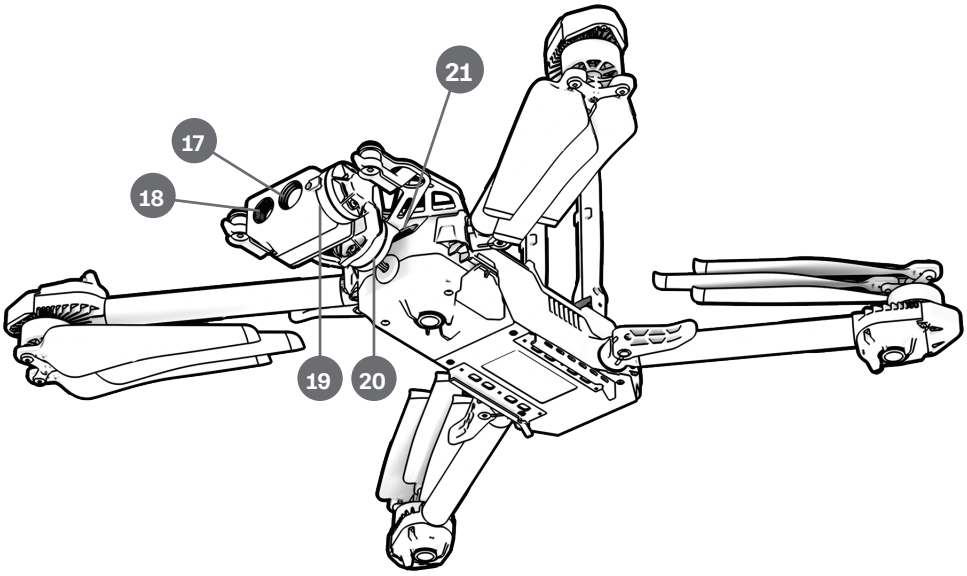
10	MicroSD card ports & seal
11	USB-C port & seal
12	Cooling outlet (2)
13	Hard stop (4)
14	Battery
15	Gimbal isolator (3)
16	Power button

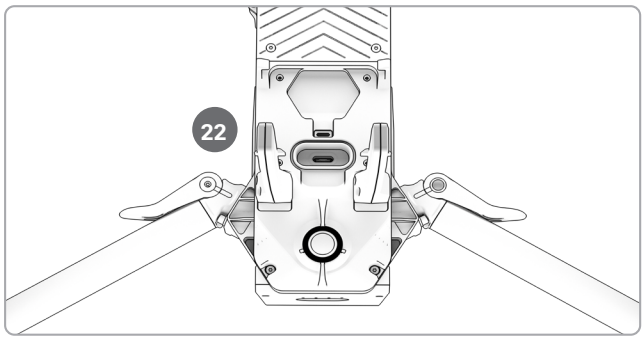


Hardware Overview

Skydio Hardware

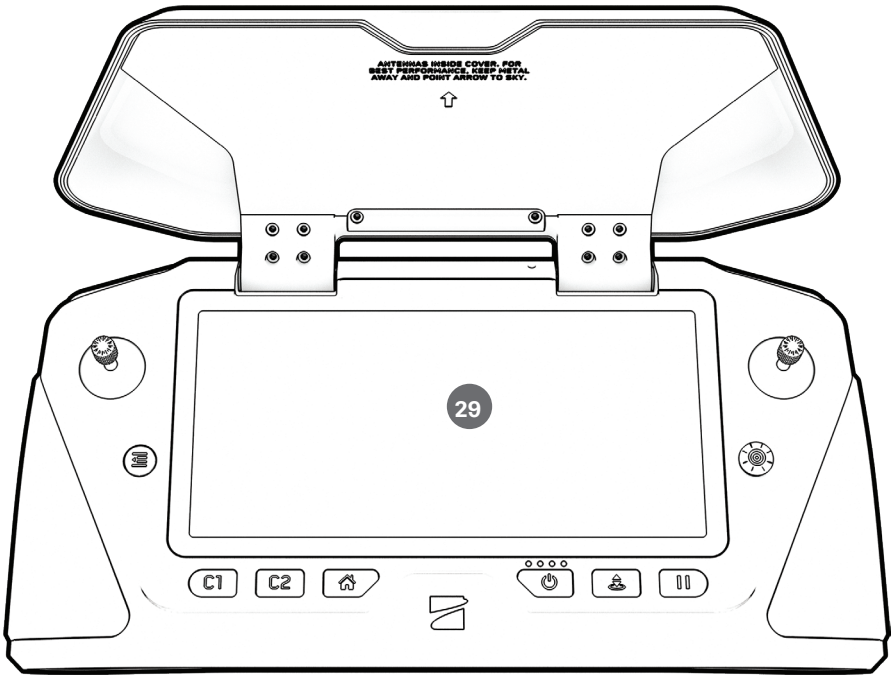
17	Color EO camera
18	Thermal IR camera
19	Gimbal pitch motor
20	Gimbal roll motor
21	Telephoto camera
22	Cooling fan outlet
22	Payload bay

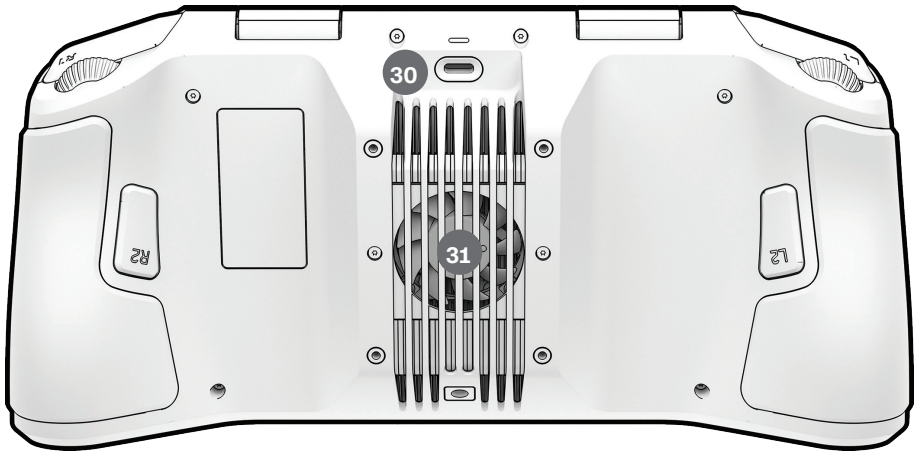




Hardware Overview

29	Touchscreen
30	USB-C charge port
31	Cooling fan





Updates

Fleet management of your Skydio drones includes updates, passwords, data storage, and deleting media as needed. Ensure that your batteries have a full charge to complete the update.

Step 1 - Access the files from Skydio Fleet Manager for Offline Drones
- a .zip file which is the update for your X2D vehicle
- a .tar file which is the update for your Skydio Enterprise Controller

Step 2 - Generate the .zip file and download the .tar file

Step 3 - Insert a memory drive into your computer

Step 4 - Copy the offline_ota folder and the .tar file into the root level of your memory drive
- So that they are not contained inside any other folders
- Safely eject the memory drive from your computer

Step 5 - Insert the memory drive into the USB-C port on the vehicle

Step 6 - Power on the vehicle
- The update will begin automatically
- The lights on your drone will pulse blue
- The camera gimbal will disengage and go slack
- The process may take several minutes
- When the update is complete, the camera gimbal will re-engage

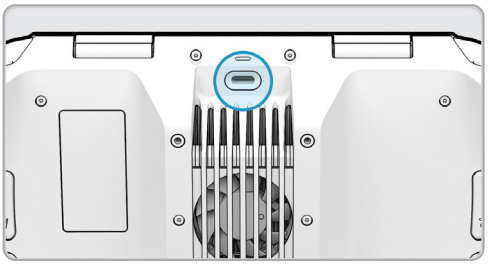
Step 7 - Remove the memory drive

Step 8 - Power on your Skydio X2D and Skydio Enterprise Controller and connect

Step 9 - Select the INFO menu

Step 10 - Select Paired Drone
- verify that the software version listed matches the software version provided by Skydio

Update Skydio Enterprise Controller



Step 1 - Power on your controller

Step 2 - Select the INFO menu

Step 3 - Select Controller Update

Step 4 - Insert the memory drive into your controller

Step 5 - Select Update

Step 6 - Navigate to the memory drive root folder

Step 7 - Select the update .tar file

Step 8 - Select Done
- The update will begin automatically
- Allow up to five minutes for the update to complete
- During this process, your controller may restart multiple times

Step 9 - Verify that the version number matches the version number provided by Skydio

Data Storage

There are two 256 GB UHS Speed Class 3 (or faster) microSD cards one for storing media and one for recording flight logs. Each card will occasionally need to be cleared of data and reformatted. Reformatting the cards will delete the stored data, ensure that any data is safely transferred.

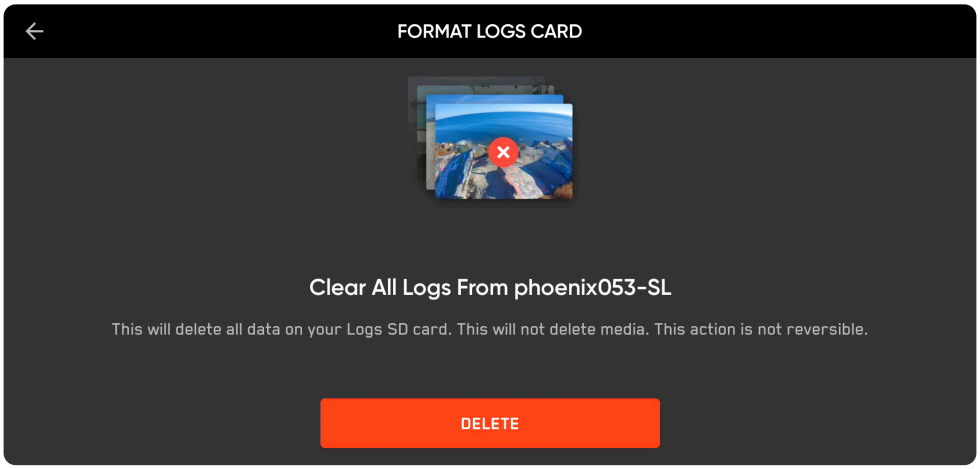
Step 1 - Select the INFO menu and drone name under Devices

Step 2 - Select Manage Data and either

- Format Media Card or
- Format Logs Card

Step 3 - Select Delete when the warning message displays

- Select OK in the confirmation message



The Media menu displays a gallery of unencrypted images and videos and allows you to manage captured images and videos. To access the media viewer:

Step 1 -Select the Review menu

- Individual thumbnails can be selected to view in full screen
- Select single or multiple to export
- Select the trashcan to delete

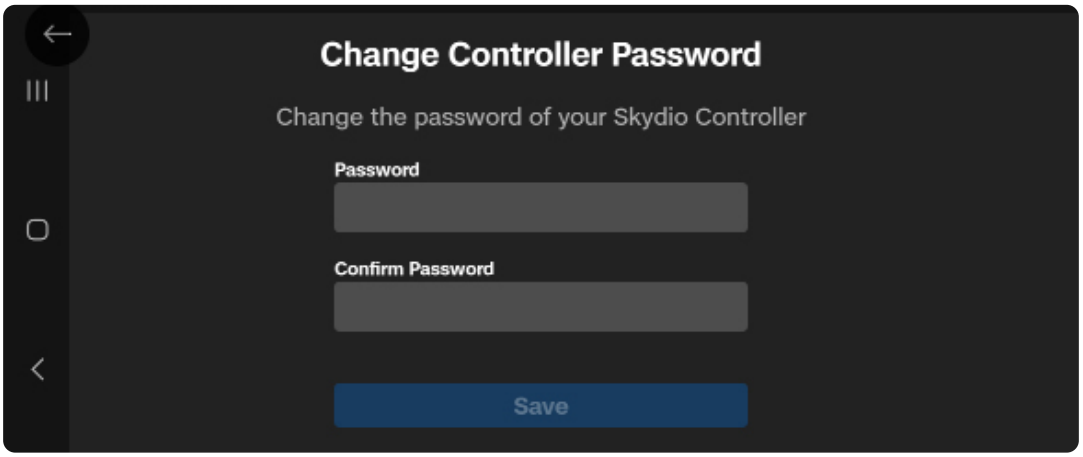
Passwords

You will be prompted to set a password for your X2D system. It is recommended that you occasionally update your password per your organizations guidelines. To change your original password:

Step 1 - Select the INFO menu

Step 2 - Select change password

> ***WARNING:*** *The password cannot be recovered or reset. Ensure that your password is entered correctly and is written down and stored in a safe location. If the password is lost, the controller will need to be replaced.*



Assist Now File

Occasionally you will be prompted to update the GPS Assist now file when using GPS Night Flight:

Step 1 - Download the Assist Now file

- Visit How to Ensure GPS Satellite Acquisition to access the file

Step 2 - Ensure that your SD card is formatted to exFAT

Step 3 - Create a top-level folder on the flash drive/SD card called offline_ota

Step 4 - Place the downloaded file (mgaoffline.ubx) on the flash drive/SD card in that folder

Step 5 - Plug in flash drive/SD card into your drone

Step 6 - Power cycle the drone

- You will not see confirmation that the Assist Now Offline file has been processed.

Cleaning

It is recommended to wipe down your drone after flights in environments with significant dust or debris.

> ***WARNING:*** *Do not submerge your drone or batteries or place them under running water. Water volumes from flight in precipitation are much lower than those from a faucet or hose. Water may get into areas where the drone is not designed to withstand and you may compromise the sensors.*

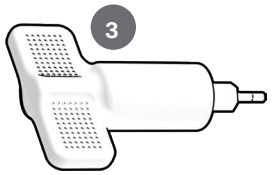
- Wipe down your drone with a dry or water-damp microfiber cleaning cloth
- Only use lens cleaner on cameras
- Do not submerge your drone or batteries
- Do not place your drone or batteries under running water
- Use a compressed air canister to remove any debris in hard to reach areas
- If needed, mild soap and water may be used to remove heavier dirt or debris. Avoid getting any soap near ingress areas on the drone
- Keep all the drain holes on the drone and battery clear. If any debris is blocking a drain hole (e.g., mud), use compressed air or gently scrape with a toothpick to remove

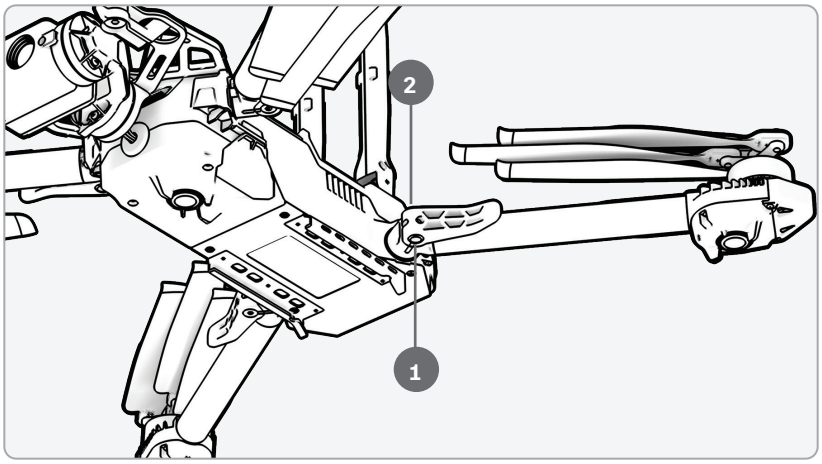
> ***WARNING:*** *Skydio X2D and the Enterprise Controller are not weatherproof. Do not operate in rain, fog, snow, or similar environments. Do not rest the controller in sand, dirt or terrain where particles can get trapped in the fan.*

Arm Clamps

If during your pre-flight inspection you observe that the arm clamps on Skydio X2D are not tight, you should inspect and tighten the tension bolts on the clamps. This process involves loosening and tightening the tension bolt set screws.

1. Tension bolt set screw
2. Tension bolt
3. Torque driver





WARNING: *Do not lubricate any of the hinges on your X2D arm, even if they squeak. Doing so may compromise the position of the arms when in flight, resulting in erratic flight and possible collision.*

Extend the motor arm:

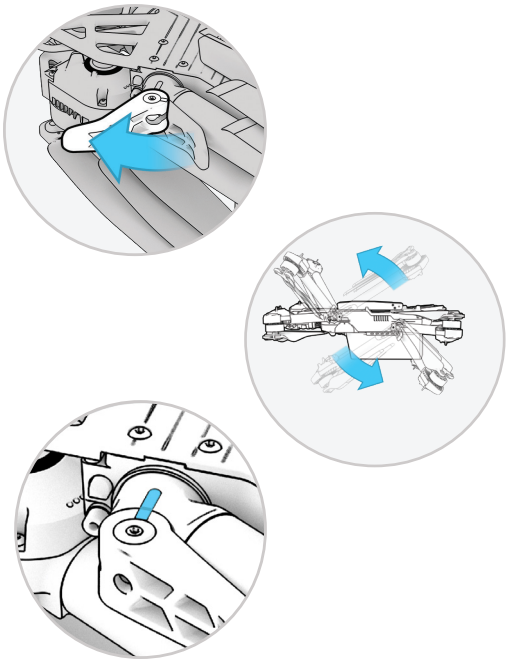
Step 1 - Open the arm clamp located at the base of the arm

Step 2 - Lift the arm out and away from the body of the vehicle and rotate 180°

- Listen and feel for a click when the motor arm are fully extended

Step 3 - Fold the arm clamp to the locked position on the arm

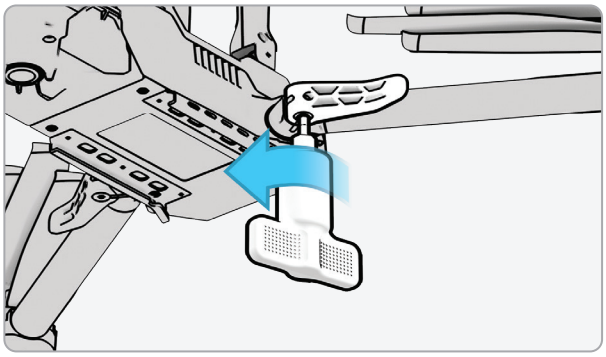
- Ensure that the blue marks align



Arm Clamps

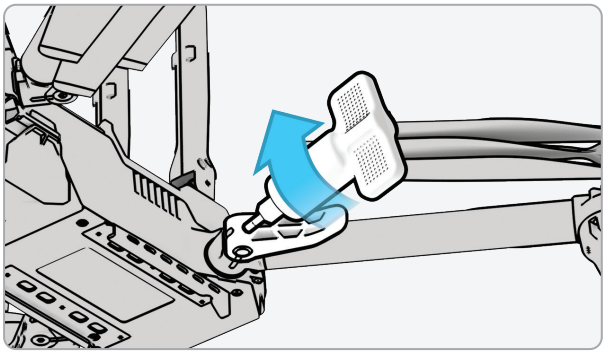
Step 4 - Loosen the tension bolt set screw

- On the arm clamp tension bolt using the torque driver



Step 5 - Tighten the tension bolt

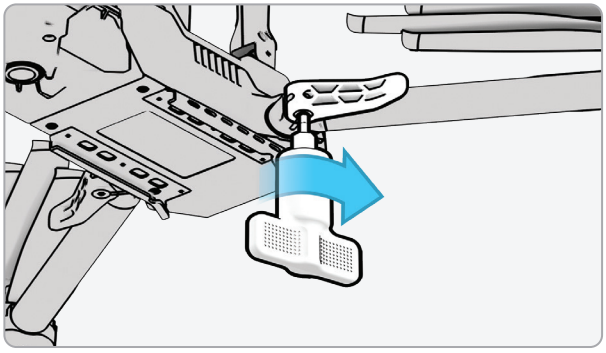
- Using the torque driver
- Turn the driver clockwise until you hear a click indicating the desired torque level has been achieved



Step 6 - Tighten the tension bolt set screw

- Turn the torque driver clockwise until you hear a click indicating the desired torque level has been achieved

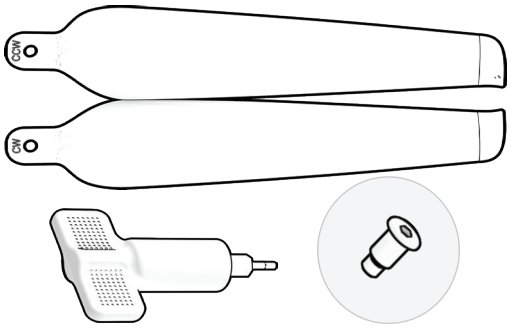
Step 7 - Repeat steps 1-6 on the remaining arms



Replace Propeller Blades

If you purchased the Skydio X2D Propeller Kit or an X2D bundle, you received the equipment necessary to replace your propellers:

- Even dot pattern props (6)
- Odd dot pattern props (6)
- Replacement propeller screws (12)
- Torque driver tool

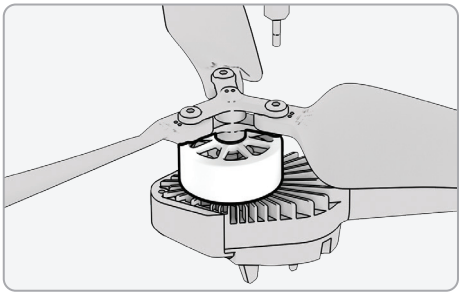


For optimal performance, Skydio recommends replacing your propellers after 100 hours of flight time or if they are damaged. Always replace all three propellers in the hub. Replacing all three propellers will reduce any potential variation between the propellers and track propeller flight time.

> ***WARNING:*** *Propellers with hairline cracks or large breaks, chops, or bends should be replaced immediately. Do NOT fly the X2D with propellers that are not in good condition as serious bodily harm or injury may occur.*

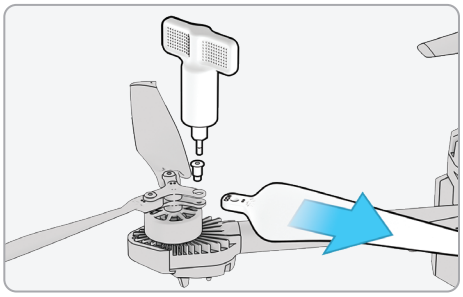
Step 1 - Identify the damaged propeller

Step 2 - Hold onto the motor or the propeller hub to stabilize the motor



Step 3 - Unscrew the propeller pin using the Torque driver

- Slide the propeller out of the propeller hub, then repeat with the remaining two propellers in the hub
- Replace all three propellers in that hub. All three replacement propellers must come from the same replacement kit
- Dispose of the removed propellers



> ***WARNING:*** *Propeller blades are sharp. Handle with care. Always ensure X2D is turned off before replacing the propellers to avoid injury. Do NOT attempt to replace the propellers while the Skydio X2D is powered on. Doing so is an extreme safety risk and may lead to serious bodily harm or injury.*

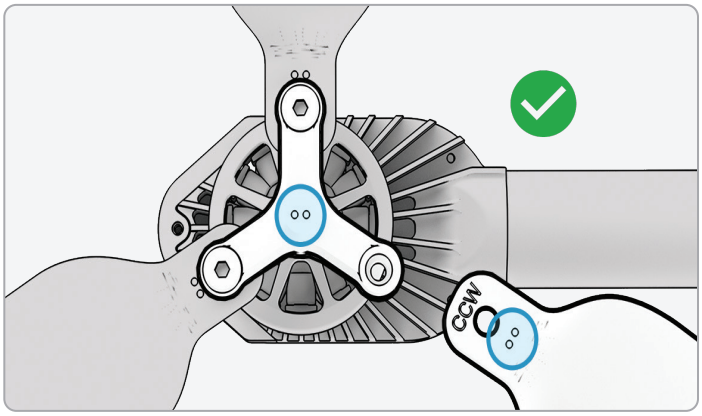
Replace Propeller Blades

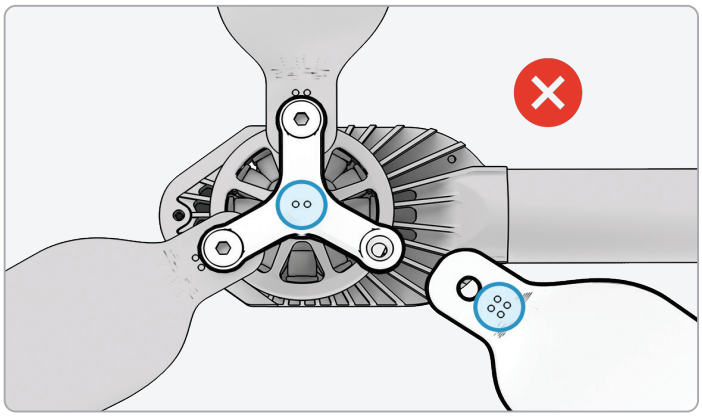
Step 4 - Identify the propeller blade markings that match the propeller hub

Step 5 - Install the propeller with matching marks facing upward

Step 6 - Ensure that the propellers are oriented in the correct direction clockwise or counter-clockwise

- Located on both sides of the propeller blades are distinct markings
- Find the markings that match the propeller hub and install with the markings facing upward, to ensures that the propeller are in the correct direction (clockwise or counter-clockwise) and orientation.





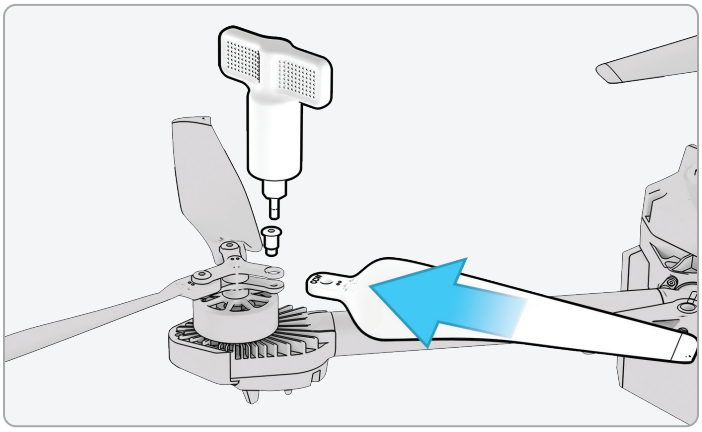
Step 7 - Slide the new propeller into the hub

Step 8 - Insert a new screw from your replacement kit

- Wiggle the screw as you insert the screw to ensure that it seats properly into the hub
- Hold the motor hub to stabilize

Step 9 - Fasten the screw using the torque driver

- Turn clockwise until you hear a click indicating the desired torque level has been achieved

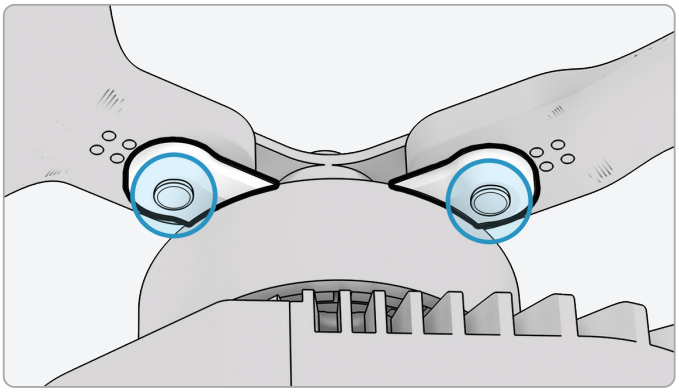


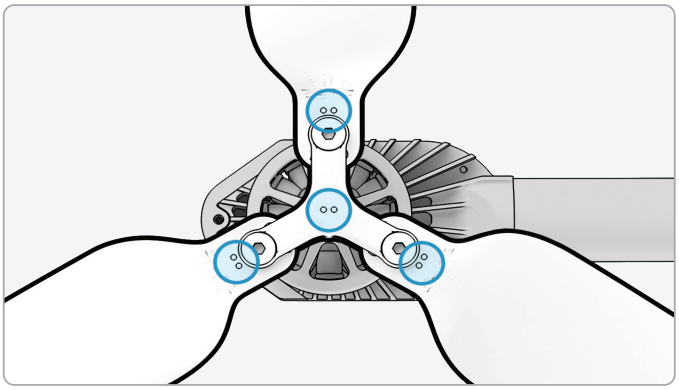
CAUTION: *Do not reuse screws even if they look to be in good condition. Whenever you replace your X2D propellers, use the new screws provided in your replacement kit.*

Replace Propeller Blades

Step 10 - Inspect to ensure successful installation:

- Propeller screw threads should extend slightly beyond the bottom of the propeller hub
- Dot patterns match between propeller blades and hub
- Propellers can rotate through full range of motion with minimal friction around the propeller screws and do not bind with the hub spokes

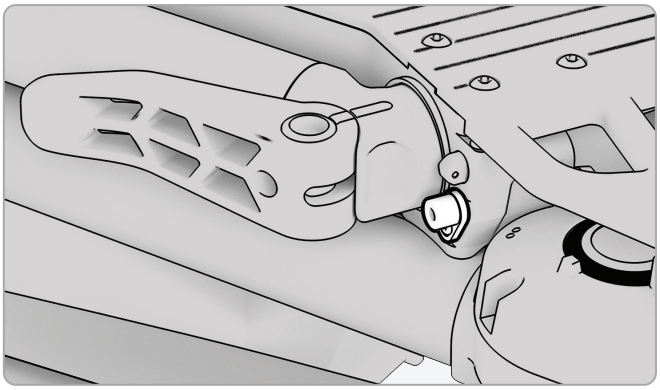




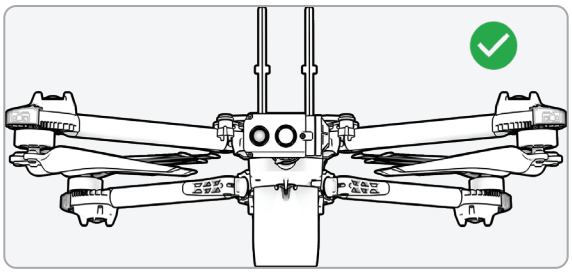
WARNING: *Incorrect propeller installation (i.e. failure to match the markings on the propeller to those on the hub) is a safety hazard and may result in potential serious damage to the aircraft and bodily harm or injury to you and bystanders.*

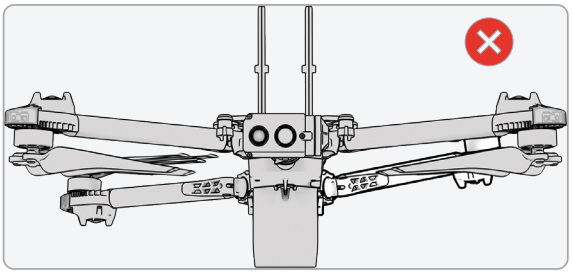
Replace Hard Stops

The hard stops prevent the motor arms from over-extending when deployed.

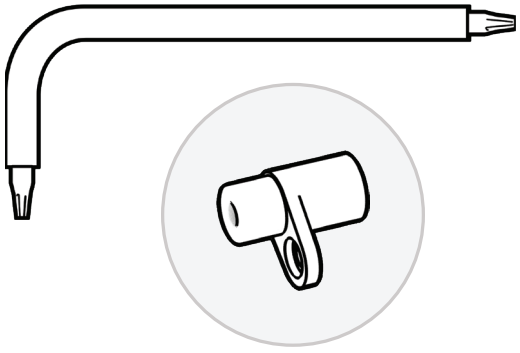


Inspect all four hard stops to ensure they are free of damage and working properly. With motor arms extended and viewing the drone head-on, X2D motor arms should be parallel to the chassis. If an arm is angled upward or downward when fully extended, this is an indication that there is a broken hard stop and it should be replaced.





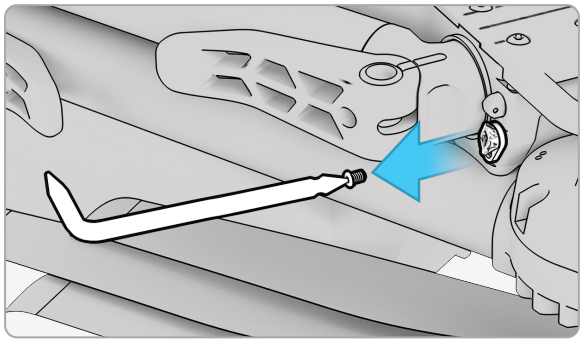
To replace your hard stops, you will need the T3 driver and replacement hard stops.



Replace Hard Stops

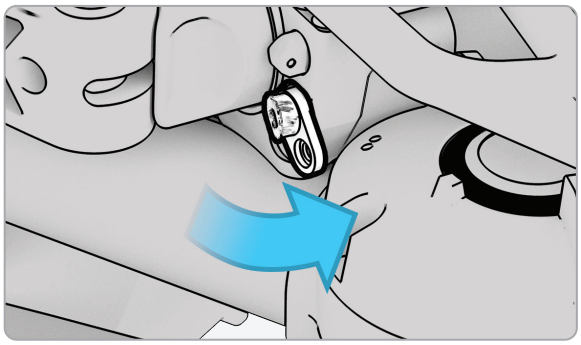
Step 1 - Extend the arm that is either above or below the arm with the damaged hard stop

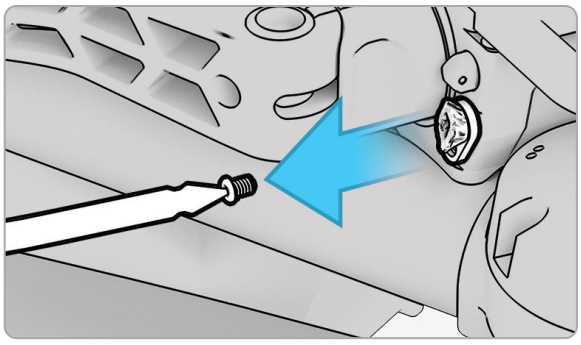
- Leave the arm with the damaged hard stop folded in
- Loosen the hard stop screw using the T3 driver
- Remove the screw
- Rotate the hard stop so the flange protrudes from the drone



Step 2 - Grab the hard stop by the flange and pull out

- Rotate the hard stop back and forth to dislodge

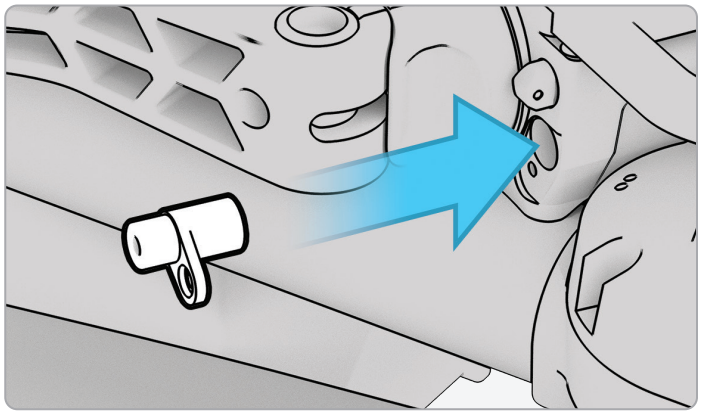




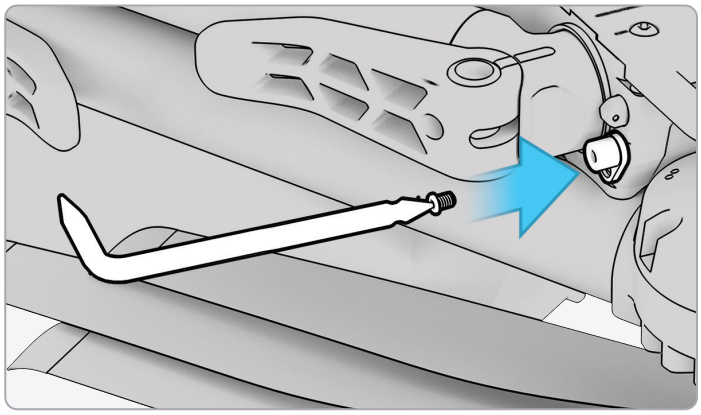
Replace Hard Stops

Step 3 - Install the new hard stop(s)

- Place the new hard stop in the socket - the larger diameter pin should be inserted into the drone, and the smaller diameter pin should face outward



- Line up the hole in the hard stop flange with the hole in the drone and insert the screw
- Tighten until the hard stop is secure



Batteries

Skydio X2D uses lightweight, rechargeable lithium polymer batteries (LiPo) that provide higher specific energy than other lithium batteries. Following the guidelines listed below will ensure long battery life and safe operation.

Lifespan

The lifespan of a Skydio X2D battery is 200 battery cycles. A battery cycle is the depletion of at least 80% of the charge. After this point, you may experience a decline in charging and performance. Battery life is highly dependent on your use case, and Skydio recommends replacing your battery when the flight time has degraded below what is acceptable for your use case.

Temperature

- Charging should be completed in an open area
- It is normal for the device to become warm to the touch
- Do not operate Skydio X2D or charge batteries at temperatures below -14°F (-10°C)
- Do not charge your batteries when the ambient temperature is above 95°F (35°C)
- If your batteries do get cold, warm them up in a room-temperature environment - DO NOT use higher heat (hairdryer, etc.) to accelerate heating.

Storage

- Fully charge and discharge vehicle and controller batteries every two months
- Store batteries at room temperature 71°F to 82°F (22°C to 28°C)
- Store batteries in a cool, dry area with less than 75% relative humidity
- Batteries in an idle state (14 days of idle time with no flights) will start to self-discharge in an effort to retain capacity. This may take several days to complete and it is normal for the battery to be slightly warm during this discharge process.

Damage

- Do not disassemble the batteries
- Avoid dropping or striking the batteries
- Do not attempt to use batteries that are damaged, dented, or ruptured after a crash or drop
- Do not immerse the batteries in water or other liquids
- Lithium polymer batteries can leak, overheat, melt, release harmful gas, burst or ignite when exposed to heat, water, and other liquids or when pierced, punctured, or ruptured
- If any substances leak from the battery pack and get into your eyes, do not rub them. Seek medical attention immediately!
- Contact your local waste facility to verify if lithium polymer batteries are permitted for disposal
- Do not insert any foreign material into the battery terminals
- Do not disassemble the battery enclosure

Preflight Inspection

	Preflight Inspection Action
☐	Inspect chassis - inspect the vehicle chassis to ensure it is free of damage
☐	Inspect motor arms - verify that they are free of damage and full extended. Viewing the drone head-on, arms should be parallel to the chassis
☐	Inspect battery - visually inspect the battery and connector pins to ensure they are free of debris and damage.
☐	Visually inspect the battery and connector pins to ensure they are free of debris and damage.
☐	Verify the battery is fully seated in the vehicle prior to launch
☐	Inspect propellers - Ensure that the quick release propellers are firmly attached and free of nicks, cracks, and damage. Do not fly with damaged propellers.
☐	Inspect motor hub - Manually spin motors to check for smooth operation
☐	Clean cameras lenses - use a clean microfiber cloth to ensure that all cameras are dust and smudge-free before every flight
☐	Inspect sensor - ensure that the camera lenses and housing are free of damage
☐	Inspect gimbal - ensure that it is free of damage and moving freely
☐	Inspect drone and controller cooling fan outlets - for debris or blockage
☐	Inspect the arm clamps for damage
☐	Inspect hard stops for damage
☐	Ensure that all USB-C port seals are secured

Schedule

Description	Performed By	Action	Frequency
Check for damage, wear, and proper alignment of the blades, propeller hub and interface to motor	Operator	Inspect	Routinely
Examine motor mounts for stability and damage	Operator	Inspect	Routinely
Inspect for external signs of wear or damage	Operator	Inspect	Routinely
Check light cover for damaged	Operator	Inspect	Routinely
Inspect fan exhausts for obstructions or damage	Operator	Inspect	Routinely
Ensure arms rotate smoothly without obstruction	Operator	Inspect	Routinely
Check for damage in the battery connection pins	Operator	Inspect	Routinely
Check for batteries for swelling	Operator	Inspect	Routinely
Examine navigation cameras for clarity and damage. Check for lens damage and recessed cameras	Operator	Inspect	Routinely
Manually spin motors to check for smooth operation	Operator	Check	10 flight hours
Check arm stops for proper functioning	Operator	Check	10 flight hours
Inspect for cracks or damage hard stop	Operator	Inspect	10 flight hours
Inspect arm clamps	Operator	Inspect	10 flight hours
Inspect 6 navigation camera protective fins are present and free of damage	Operator	Inspect	10 flight hours
Check for damage or wear in the battery bay	Operator	Inspect	10 flight hours
Check fan inlets for blockages or damage	Operator	Inspect	10 flight hours
Examine sensor cameras for lens clarity	Operator	Inspect	10 flight hours
Check gimbal motors for movement	Operator	Inspect	10 flight hours
Inspect gimbal isolators for wear or damage	Operator	Inspect	10 flight hours

Schedule

Description	Performed By	Action	Frequency
Charge stored vehicle batteries	Operator	Charge	2 months
Charge stored controller batteries	Operator	Charge	2 months
Check visible motor wires for fraying or damage	Operator	Inspect	50 flight hours
Inspect all fasteners for tightness and wear	Operator	Inspect	50 flight hours
Inspect welds on arms for cracks or weaknesses	Operator	Inspect	50 flight hours
Inspect for damage on gimbal frame, confirm that screws are secure	Operator	Inspect	50 flight hours
Check all USB-C port seals for leaks or damage	Operator	Inspect	50 flight hours
Test lights for proper operation	Operator	Inspect	50 flight hours
Check cables for damage	Operator	Inspect	On Install
Replace damaged or worn propellers	Operator	Replace	250 flight hours
Replace damaged or worn hard stops	Operator	Replace	250 flight hours
Replace batteries as needed due to health warnings, visual inspection, or damage	Operator	Replace	On fault or damage
Replace battery lifecycle	Operator	Replace	200 cycles
Replace faulty motors or arms	Skydio	Replace	On fault or damage
Factory service to replace cameras and recalibration and repeat end of line tests	Skydio	Replace	On fault or damage
Replacement or update sensor	Operator	Replace	On fault or damage

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