HEXTRONICS

Global Advanced Drone Station

USER MANUAL

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Introduction

Hextronics mission:
Enabling aerial autonomy.

Purpose of this manual:
The purpose of this manual is to educate and inform the Hextronics Global Advanced user in proper Installation, operation, maintenance, and troubleshooting of the station, along with providing all specific and general information in order to achieve successful use of the Hextronics Global Advanced Drone Station.

Help & support

Point of contact
Please email us at **Support@hextronics.tech** for any and all technical & support related questions and inquiries.

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HEXTRONICS

Global Advanced Drone Station

TECHNICAL SPECIFICATIONS

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Station specifications

Properties
Standard weight : 100lbs || 45kg
Dimensions : 30” x 30” x 13” || 0.76m x 0.76m x 0.33m
Exterior material : insulated and anodized aluminum
Exterior temperature range : -20ºC : 50ºC || -5ºF : 120ºF
Internal regulated temperature : 10ºC : 35ºC || 50ºF : 95ºF
Radio frequencies : 2.4 GHz - 5.0 GHz
Latencies : 200ms – 300ms
API communication : Ethernet / 4G LTE
Input power : 110VAC/240VAC || 50-60 Hz

Hardware
Compatible drones : DJI Mavic 2 zoom/pro & enterprise zoom/dual/advanced
Battery storage : 6 Total simultaneously smart charging at 110 min (0-100%)
Cooling system : compressor based HVAC system
Heating system : thermoresistive 100W
Uninterrupted power supply : 100Wh

Flight Software
Supported provider : FlytNow auto+
Mission planning : scheduled and continuous
Video streaming/uploading : 720p quality, cloud storage
Precision landing range : +/- 8cm
Precision landing
Reliability: 99.99%

Performance
Max operable wind speed : 15 knots
Max unobstructed flight radius : 4.5km
Operating area : 16 sq km
Normal flight speed : 10 m/s (22 mph)
Max flight speed: 15m/s (34mph)

Sensors
Battery charging current : 5mAh resolution
Internal temperature : 1ºC resolution
Internal and external cameras : 480p streaming resolution
Wind speed [weather station add-On] : 1 mph resolution
External temperature [weather station add-On] : 0.1ºC resolution
Humidity [weather station add-on]: : 1% resolution
Rain gauge [weather station add-on] : 1 mm/s resolution
Pressure [weather station add-on] : 1 bar resolution

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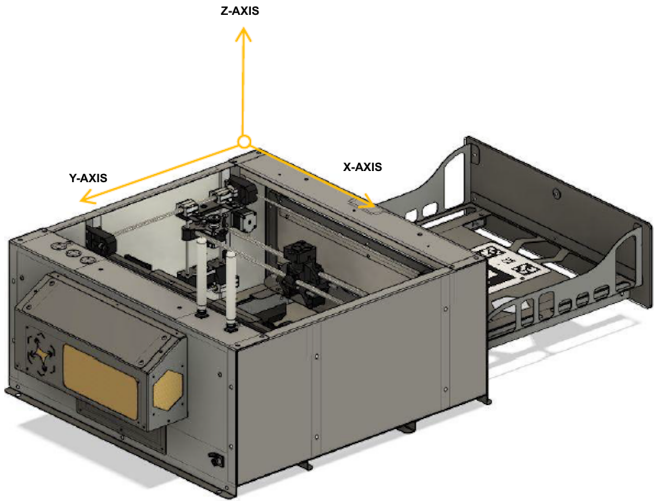
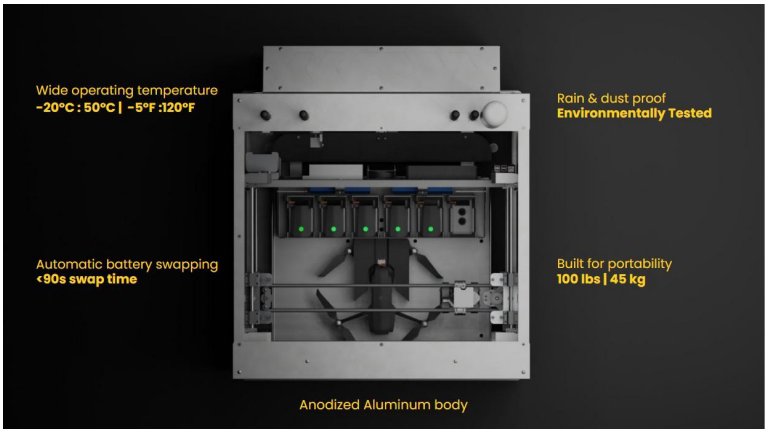
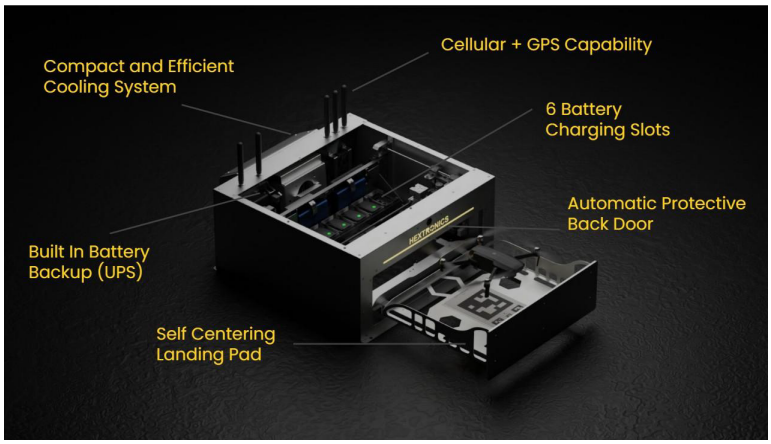
Station XYZ axis overview



Station parts & features





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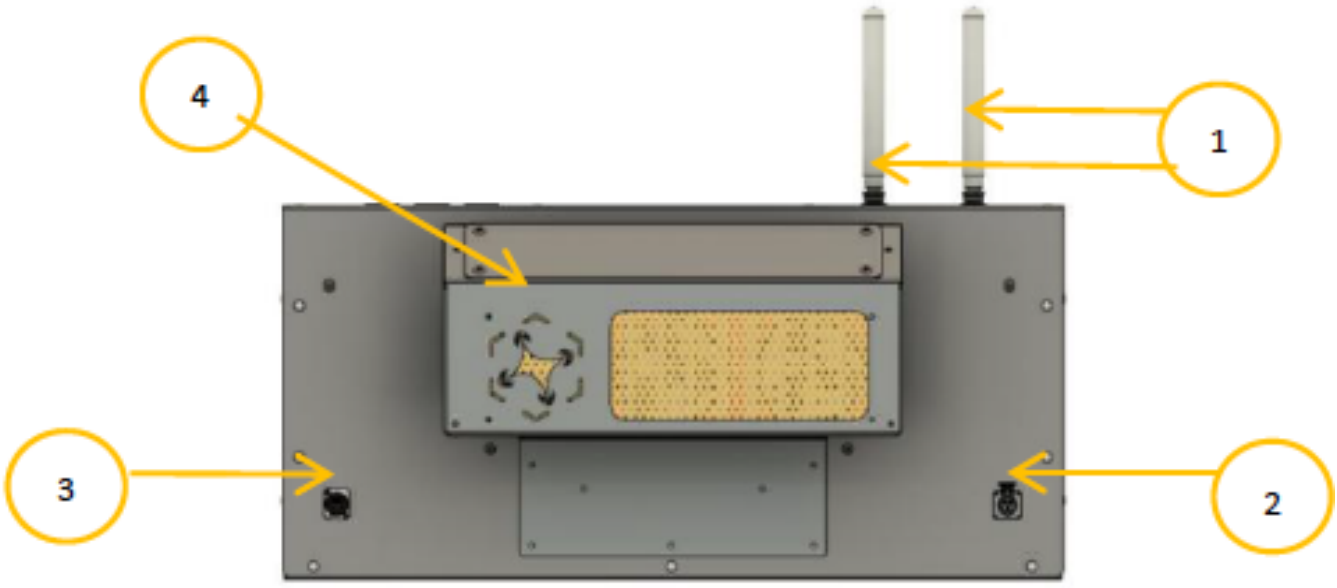
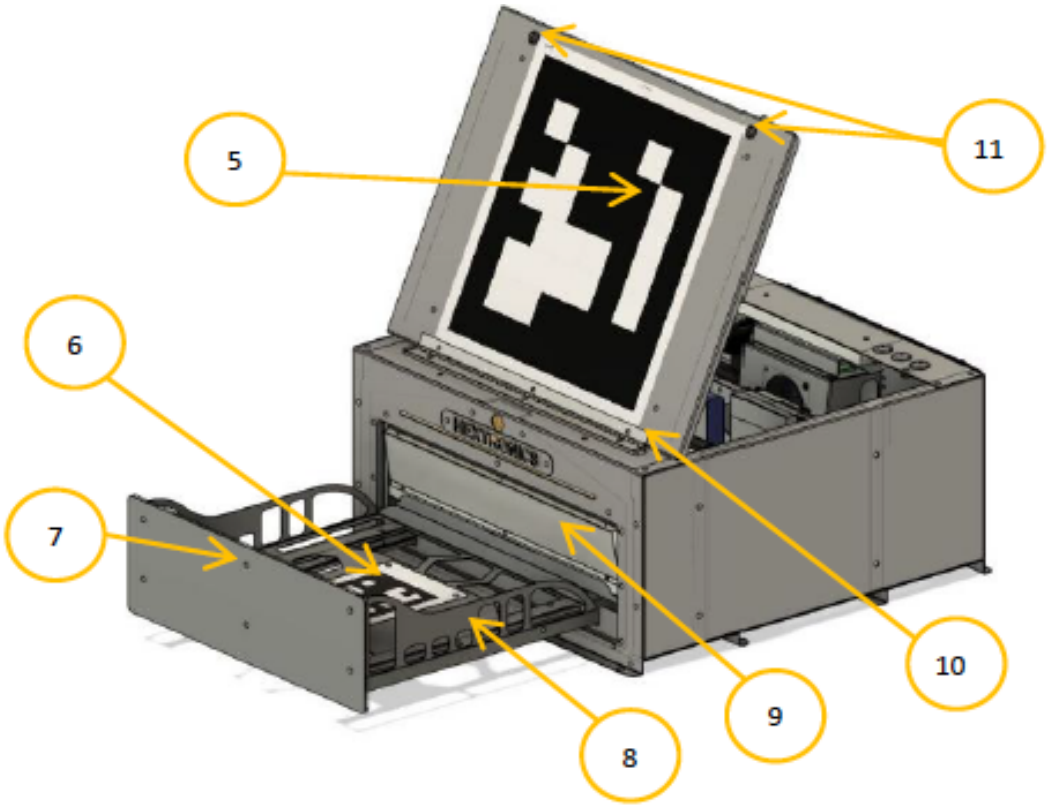
Product reference numbers

- Please see reference numbers descriptions in the following section.





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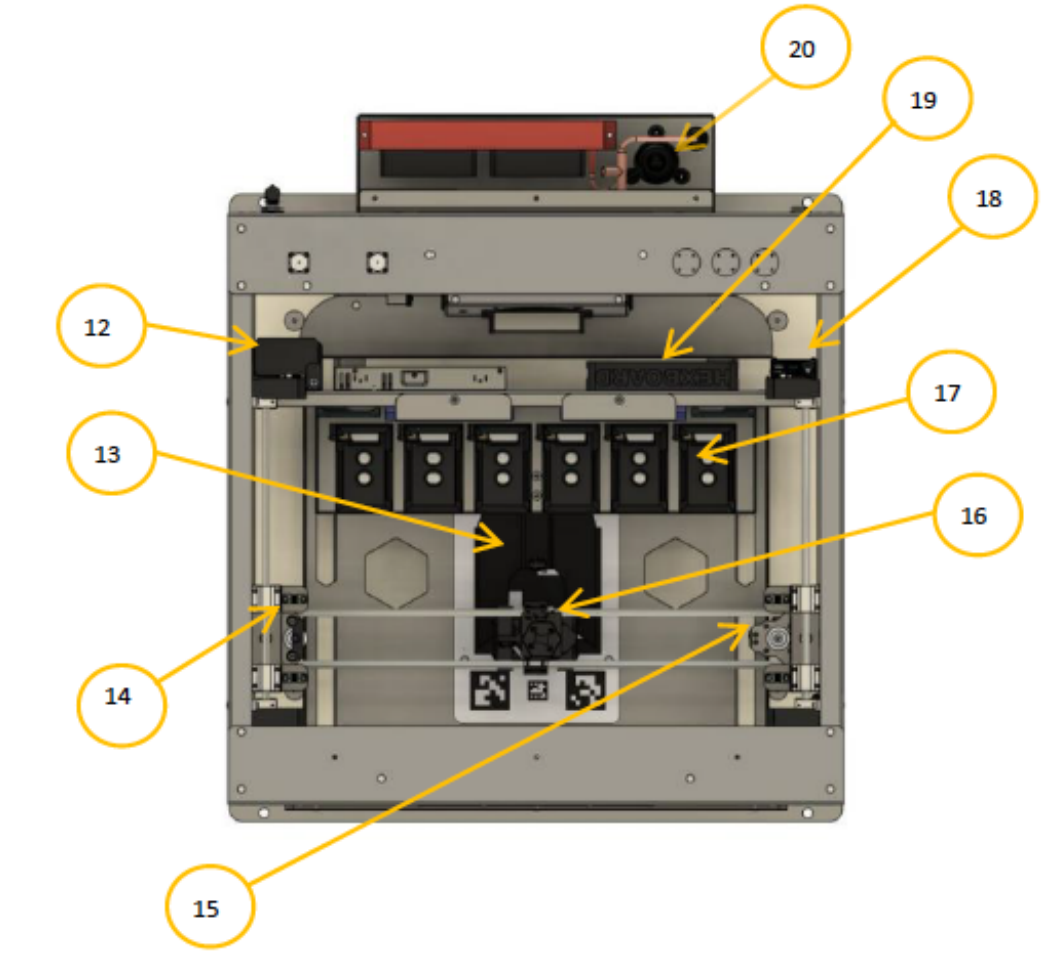

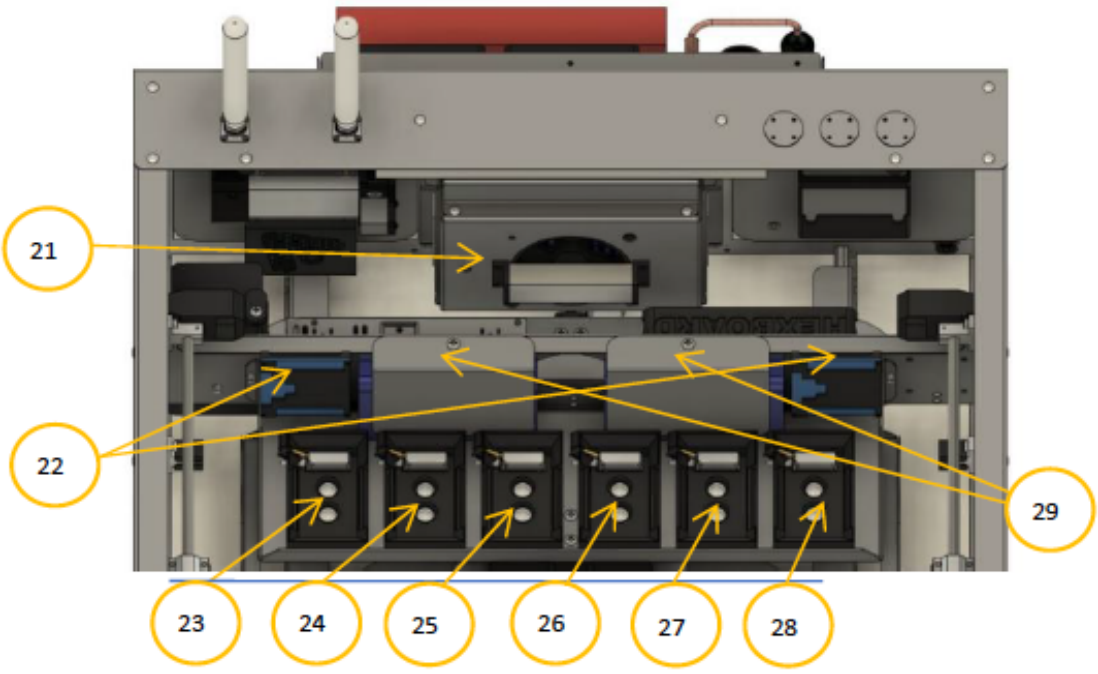

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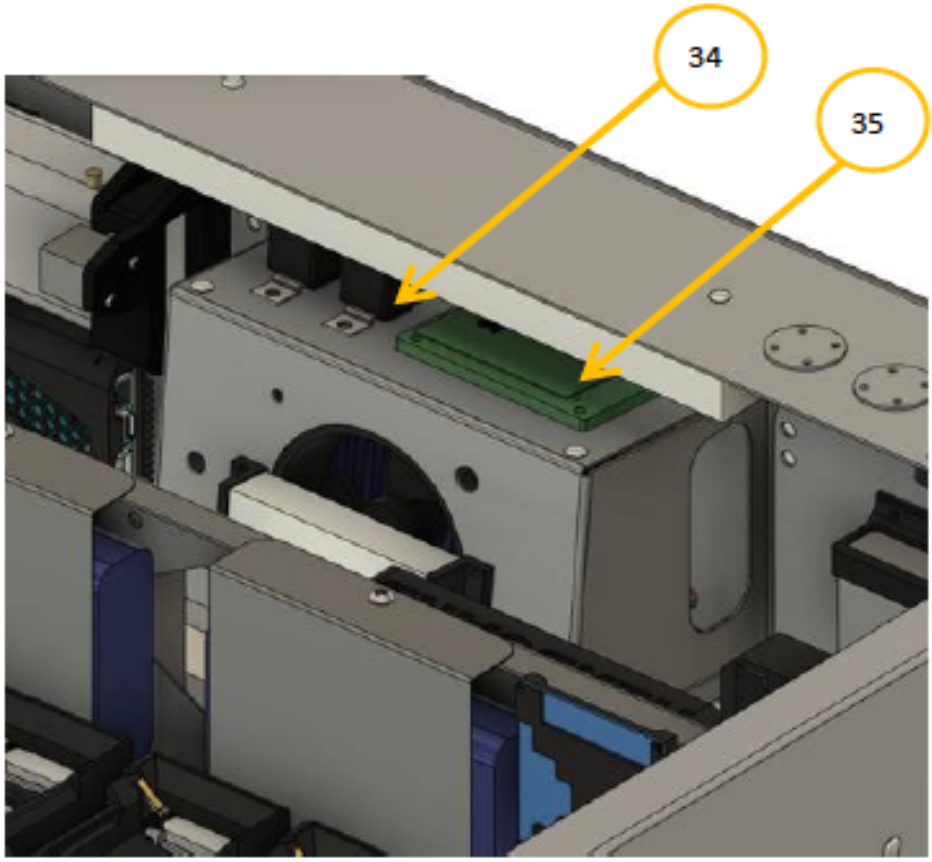

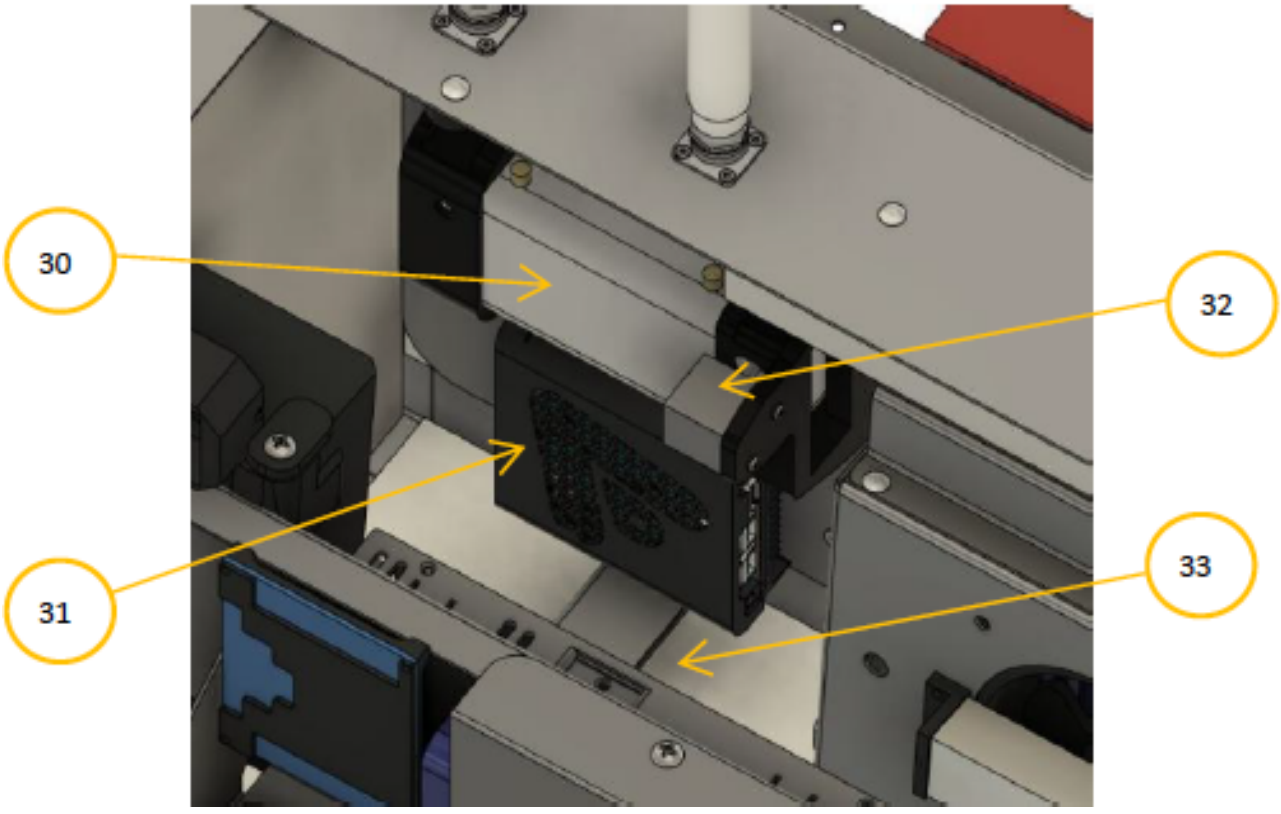

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Product reference number descriptions

1	Antenna relays aircraft control and video signal
2	Power input receives energy in the form of electric current from a sourceIP67 Plug 110/240VAC
3	Ethernet input connect wired network hardware in an Ethernet LAN IP67 Plug
4	Easy access service panel contains unit serial number and product data
5	Landing pad Provides a platform where aircraft can land and take off
6	ArUco marker point of interest tracking for centering the Drone during precision landing
7	Drawer to prevent the ingress of large debris enter the station
8	Extended landing pad grated for reduced prop wash
9	Back door Prevents ingress of large debris during takeoff/ landing
10	Hinged roof Creating Weatherproof Seal
11	Roof locks Uniquely Keyed to lock the station.
12	Backup battery and power converter uninterrupted power supply stores and converts 24V to 12V and 5V
13	Centering fork to center the drone position
14	Paired ball screw stepper motor precision
15	Main microswitch as a button to start the command for the system.
16	Gripper: gripping mechanism utilizing actuated retention force by geared DC motor
17	Battery charging slots self-latching to battery and sensed by microswitch

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18	Raspberry Pi (5v) stable architecture handles high level system operations
19	HEXBOARD (12v & 24v) ESP32 microcontroller handles motor and switch actuation
20	Refrigerant access valve removes pressure from the liquid refrigerant to allow expansion or change of state from a liquid to a vapor in the evaporator. Uses R-134a
21	PTC resistor (12v) bring efficiency and safety to EV heating systems 200W
22	Battery PCBs measures and controls current flow, also senses battery positions
23	Battery slot 1 a slot to place battery for charging
24	Battery slot 2 a slot to place battery for charging
25	Battery slot 3 a slot to place battery for charging
26	Battery slot 4 a slot to place battery for charging
27	Battery slot 5 a slot to place battery for charging
28	Battery slot 6 a slot to place battery for charging
29	Battery chargers Stores energy in a battery by running an electric current through it, @ 17.4V at 4A Max per channel
30	DJI M2 remote controller(5v) with extended antennas
31	Odroid N2+ flight CPU (12v) Running FlytOS
32	Solenoid to power RC to turn on the RC
33	Power supply 24v* convert the power from the source into the region appropriate format and voltage 14.7A meanwell (110v/220v)
34	Climate control relays automatically switch from cooling/heating/idle
35	Compressor control PCB ensure long compressor lifetime

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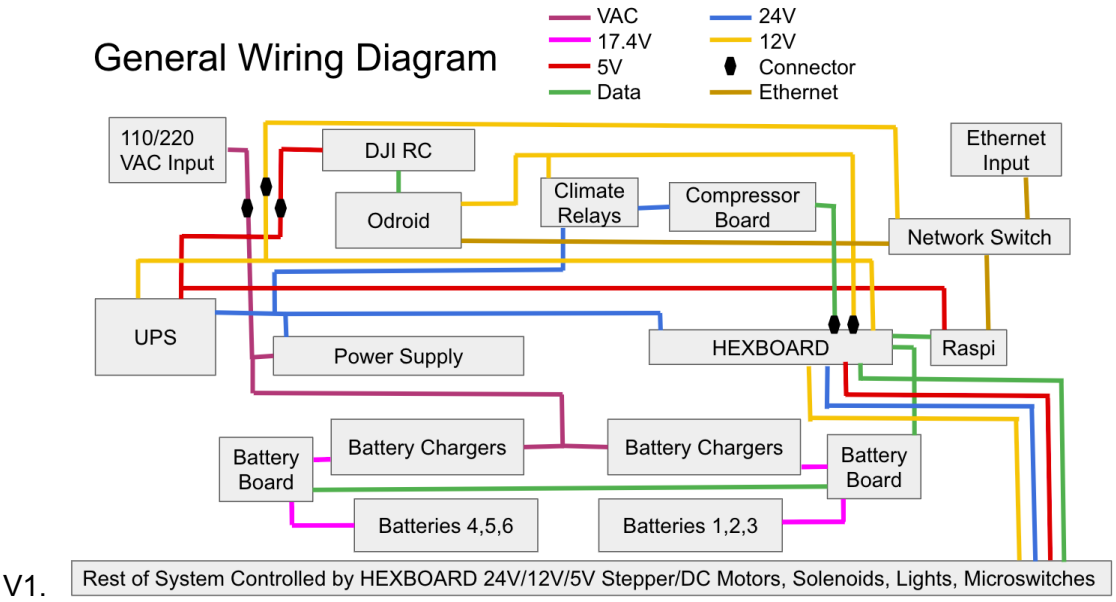
Product wiring diagram

Note: All stations manufactured up to March 2022 should reference (Version 1) wiring diagram & stations manufactured after March 2022 should reference (Version 2).

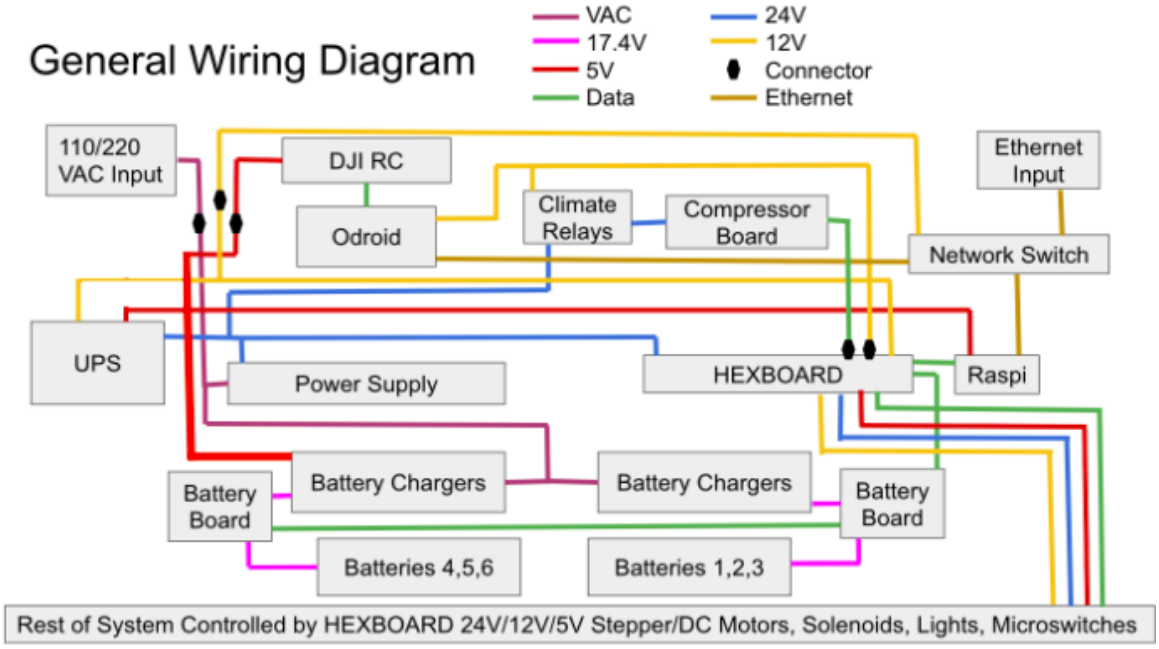
CAUTION

Please do **NOT** attempt to re-wire, repair, or handle any station wiring configuration without explicit consent and guidance from the Hextronics Support Team.

V1.



V2.



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DJI region/country frequency chart

Different Countries & Regions around the world have varying legislation and regulations regarding which frequencies electrical components can be used within the region/country. Please refer to the below chart to verify what drone type and models are within regulation and can be used within your region/country.

Specific Countries/Regions have individual compliance codes, regulations and legislation regarding what frequencies are permitted within their territories, including DJI RC/Drone components that can emit either 5.8ghz or 2.4ghz frequencies.

You can verify what Dji drone model type you have and what Ghz frequencies it uses by contacting any local DJI dealership or calling the DJI support team at **1 (818) 235-0789** and providing the series number in the battery pack or located on one of the arms or inside the battery compartment of your aircraft (See example below)

Drone	Type (See Serial #)	Region/Country
Mavic 2 Enterprise Advanced	North American China General	US/Canada/S.America/C.America China Global
Mavic 2 Enterprise Duo	No region/country limitation	Global
Mavic 2 Zoom	No region/country limitation	Global

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Global Advanced Drone Station

INSTALLATION

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FlytNow create account

Step By Step

1. Go to https://app.flytnow.com/signup to create an account.

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2. You will need your unique UDC code from your welcome email for this step.

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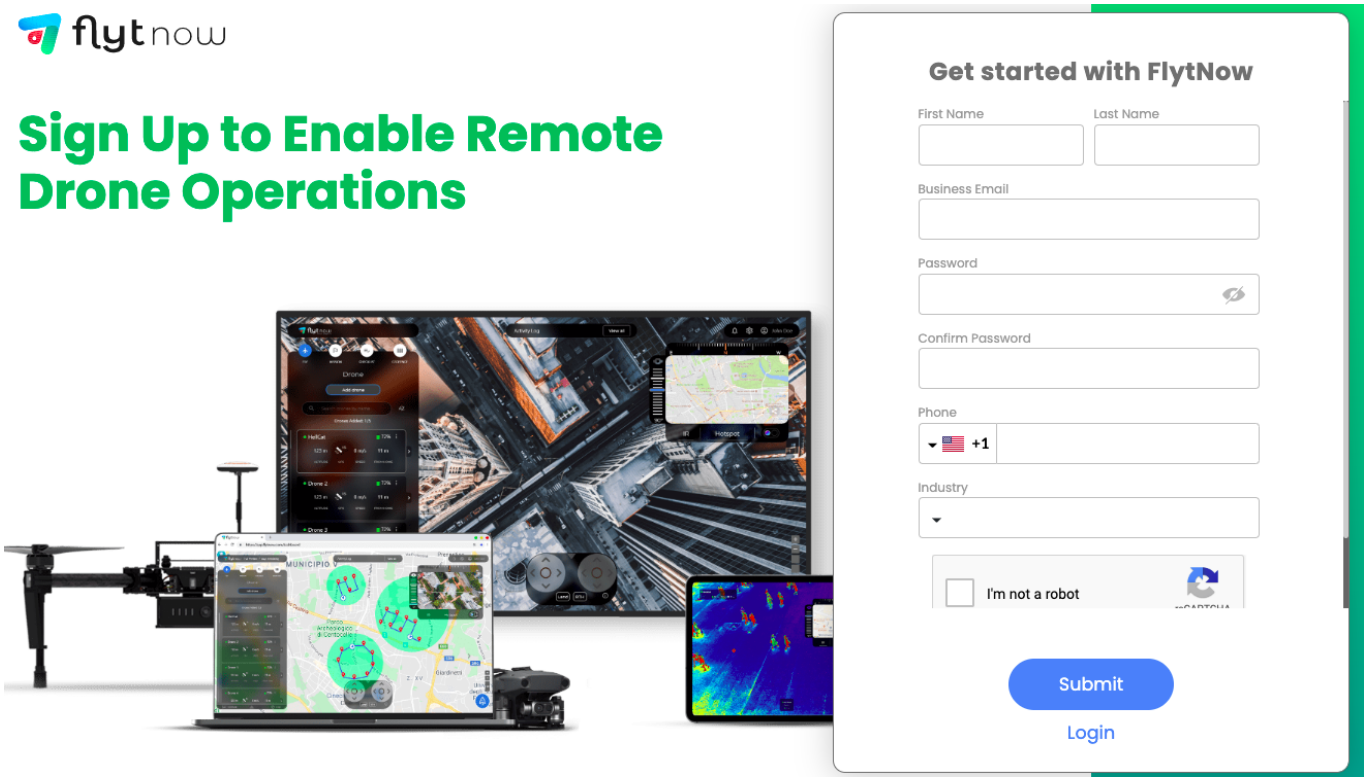
3. Once you have created an account continue the installation process on the following section of the user manual.



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Station unboxing

Step By Step

1. Open box by cutting box wrap cords

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2. Remove foam fillings inside

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3. Remove and open accessory box

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4. Open station box (cut cardboard)

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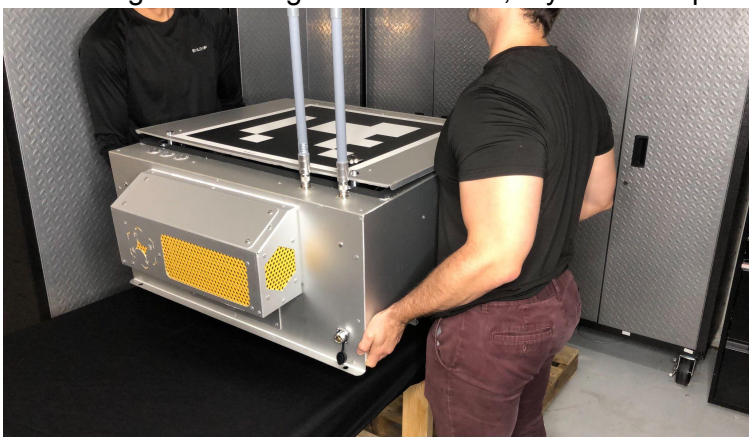
5. Place the station in a good working area that is flat, dry and near power & ethernet.



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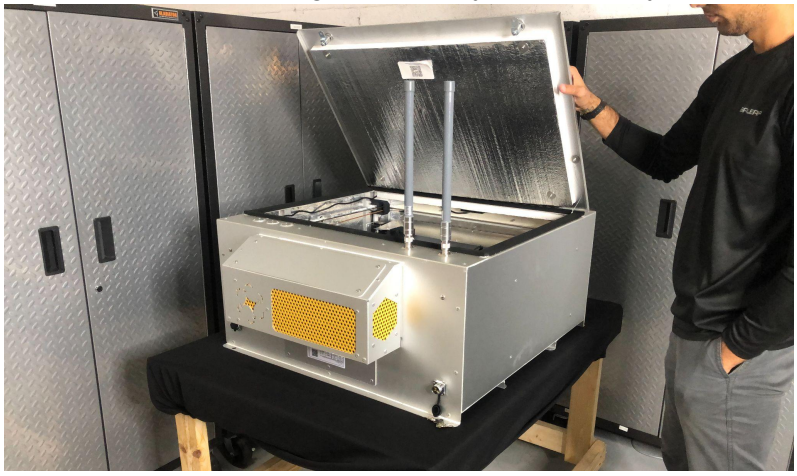
6. Open the hatch of the station using the roof keys provided by Hextronics



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7. Cut the zip ties to the gripper

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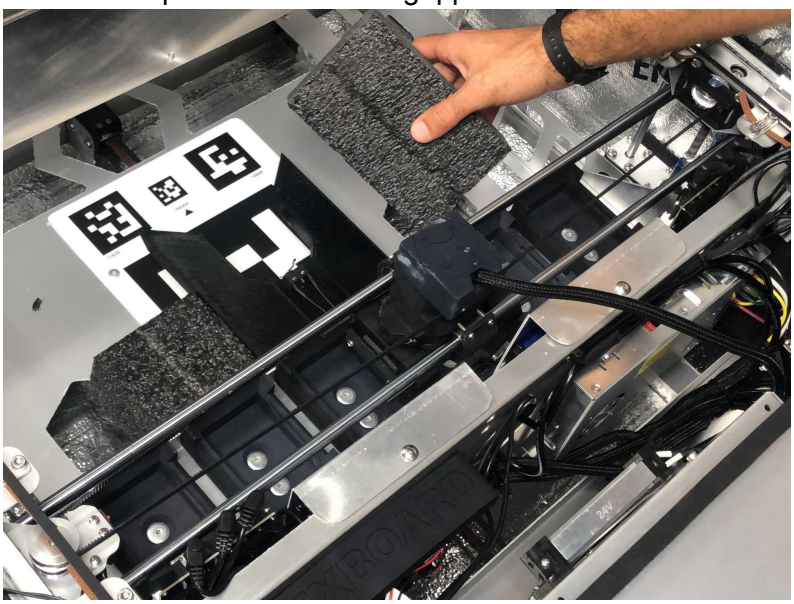
8. Remove the two foam pieces around the gripper



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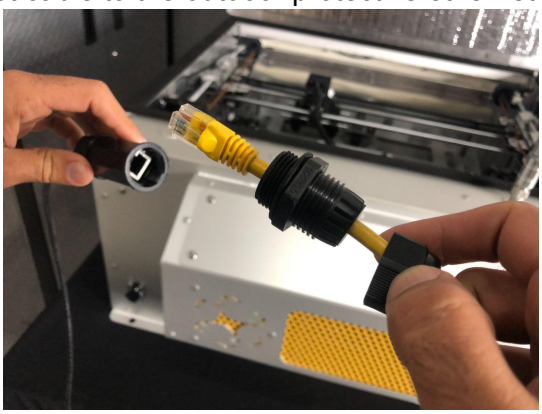
Step By Step

9. Connect the ethernet cable to the outdoor protective ethernet port



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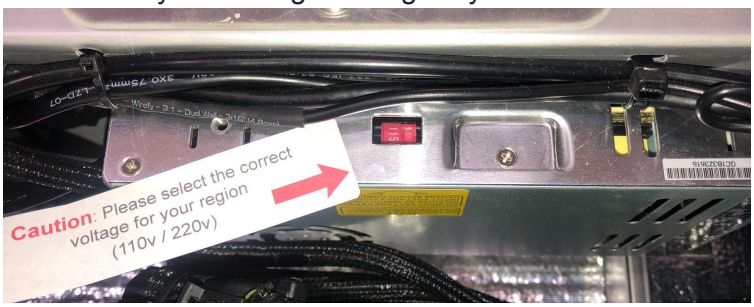
10. CRITICAL: Please verify the voltage setting for your location is selected. (110v vs. 220v)



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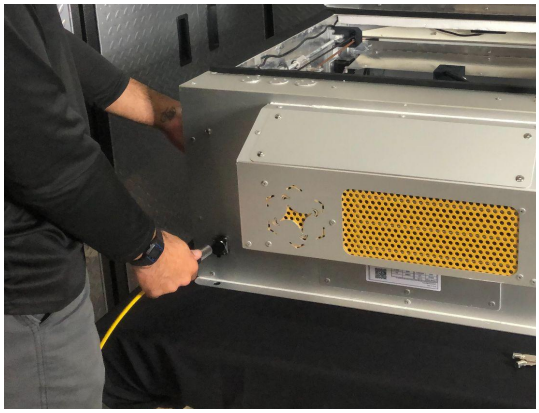
11. Connect the extended ethernet cable to the back of the station



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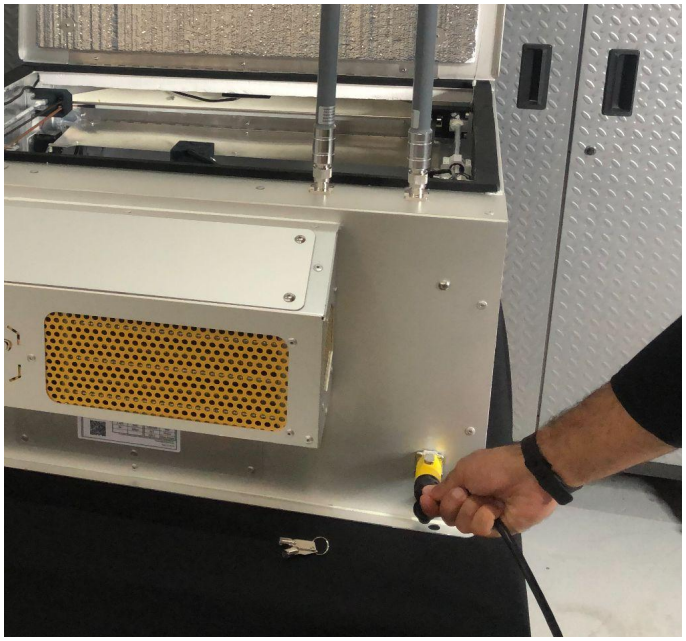
12. Connect the power cable to the station



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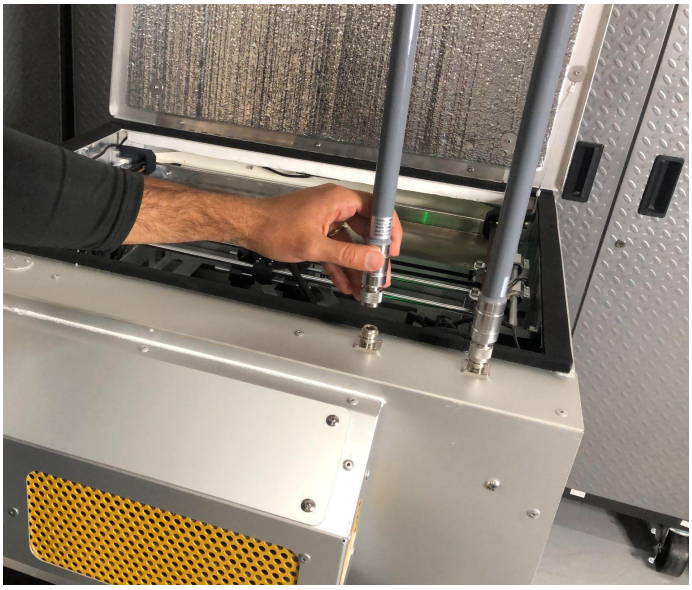
13. Attach the two station antennas



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Step By Step

14. Turn the station battery on (using the - line indicator)

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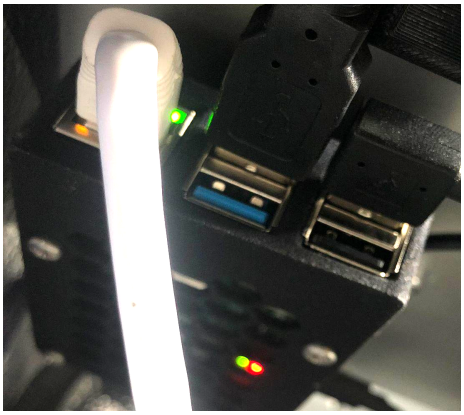
15. Confirm that the PI has a solid red light (in the center) and flashing orange/green lights (on the ethernet port)



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16. Confirm the RC has illuminated lights and receiving power

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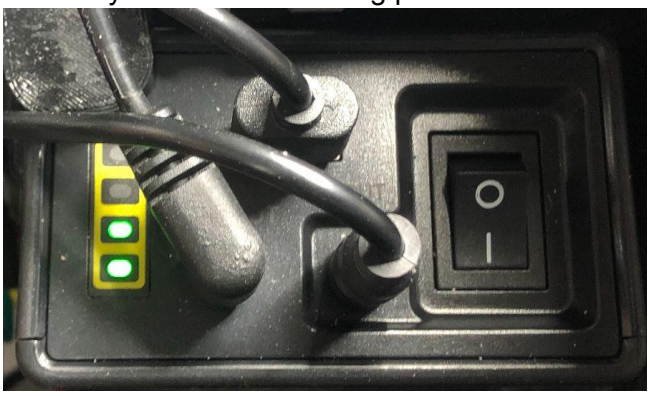
17. Confirm the black battery is ON and receiving power



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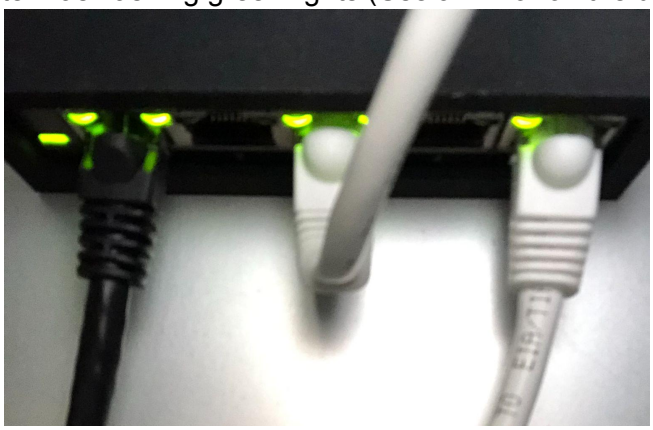
18. Confirm the router has flashing green lights (Use a mirror on the underside of the router)



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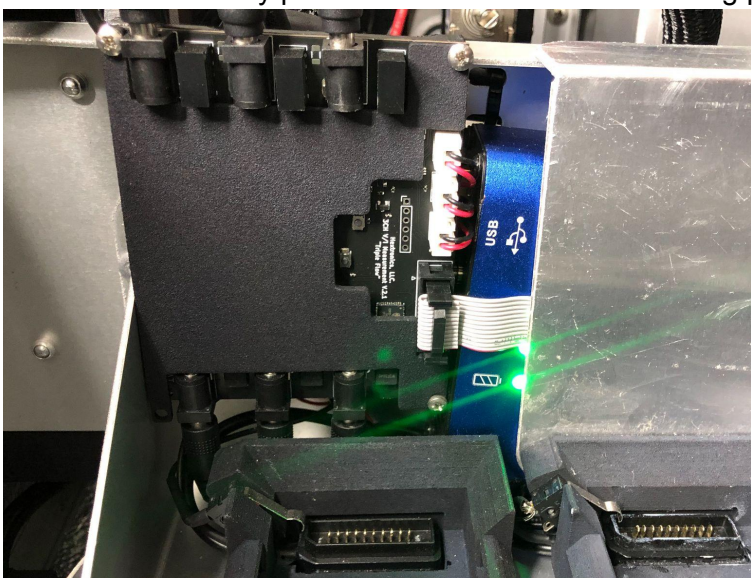
19. Confirm that the two blue battery packs are illuminated and receiving power



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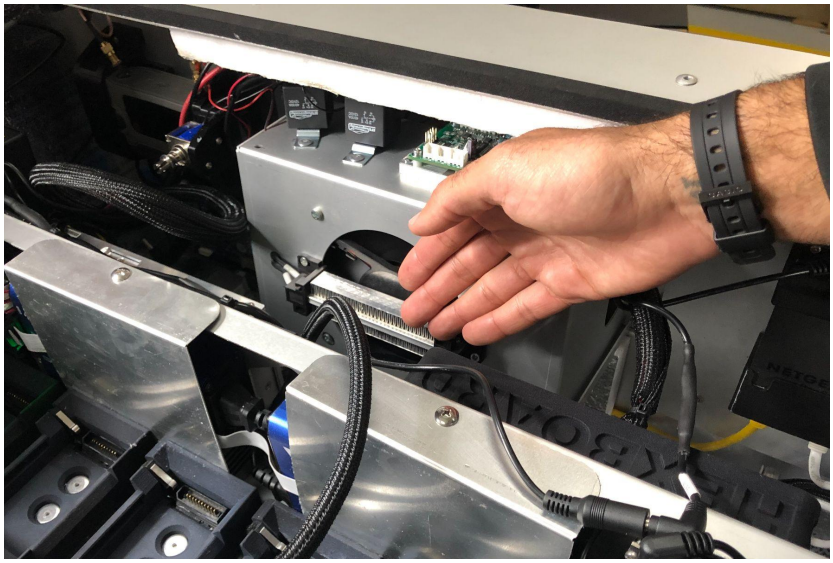
20. Confirm that the HVAC fan has powered on



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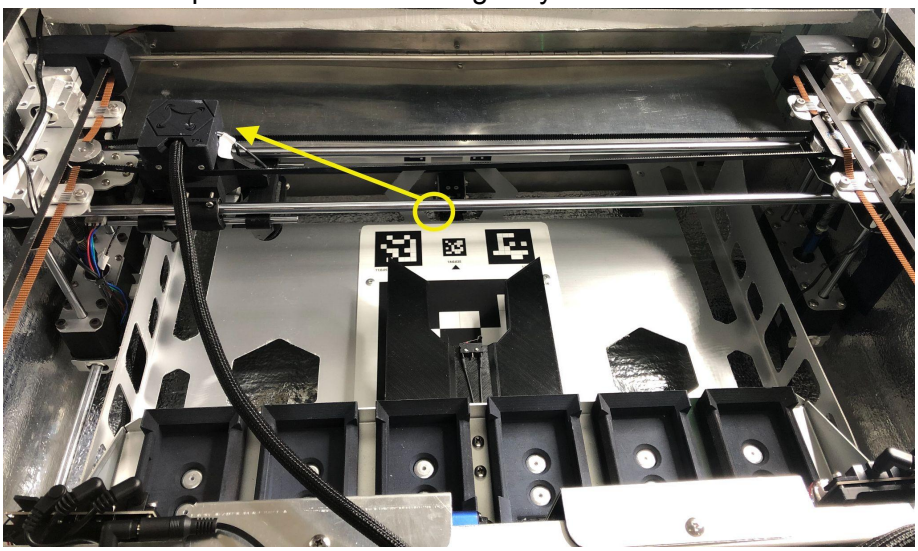
21. Upon connection to power & ethernet the gantry will ZERO to the back left corner



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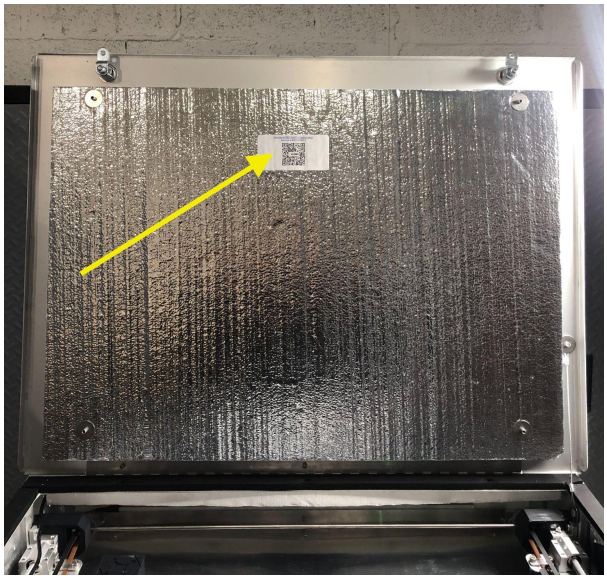
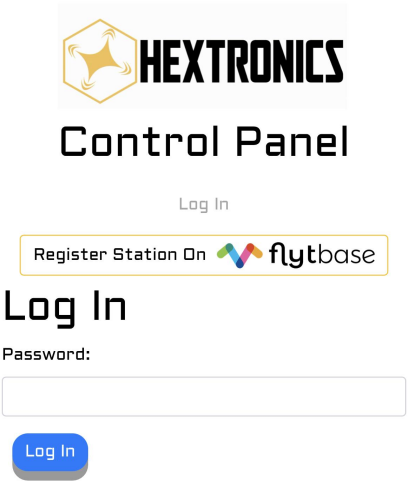
Step By Step

22. Scan the QR code under the hatch door to enter into the control panel login page





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23. Enter the Control Panel Password from your station (B**ottom line** of the QR code)

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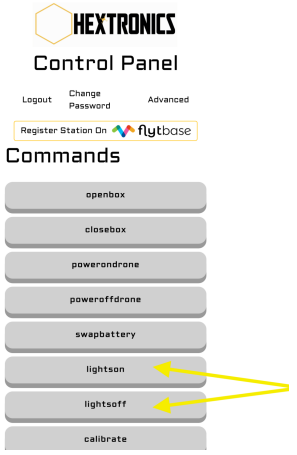
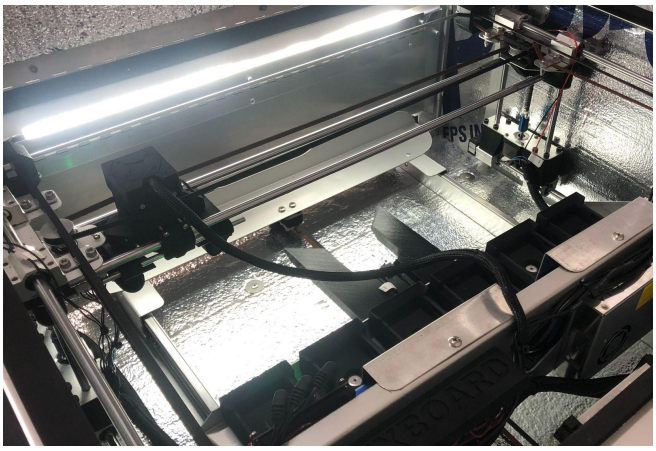
24. On the Control panel test lights ON/OFF





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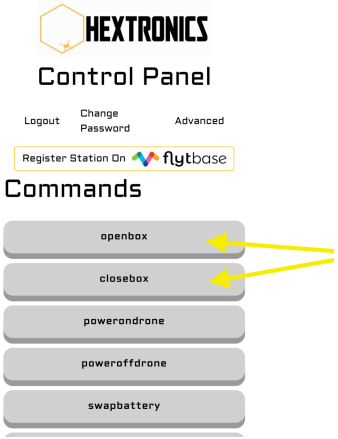
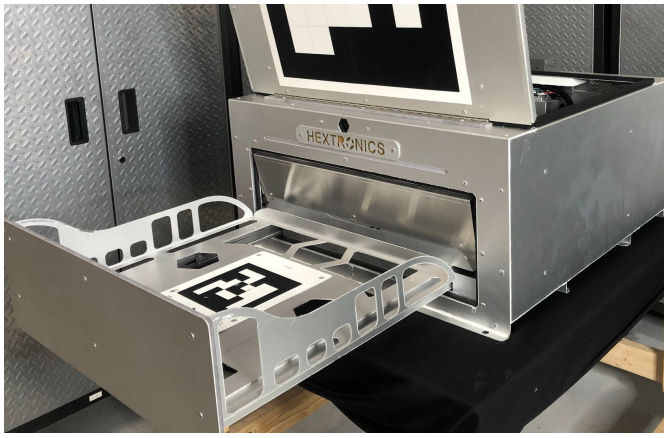
25. On the control panel test open box / close box





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26. Place the prop guards & black 3D landing guards on the drone. (They insert uniquely)

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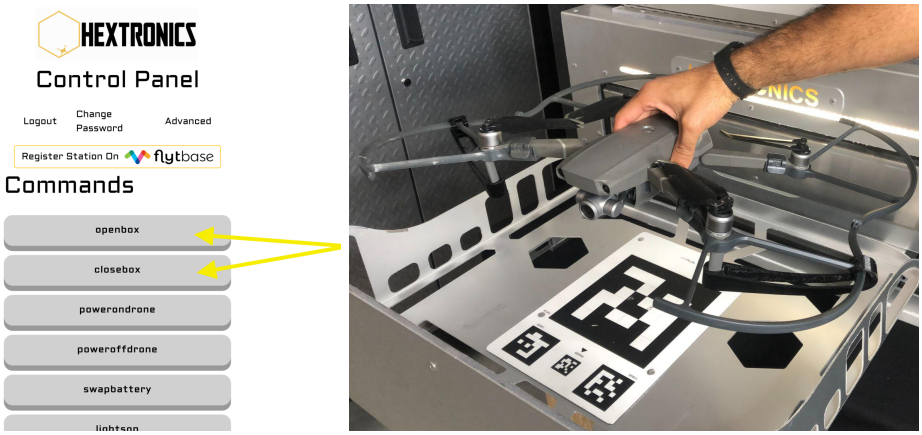
27. In the control panel open the box and insert the drone with the gimbal facing out then close the box



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28. Insert additional batteries into the station **Note**: Always leave one battery slot open

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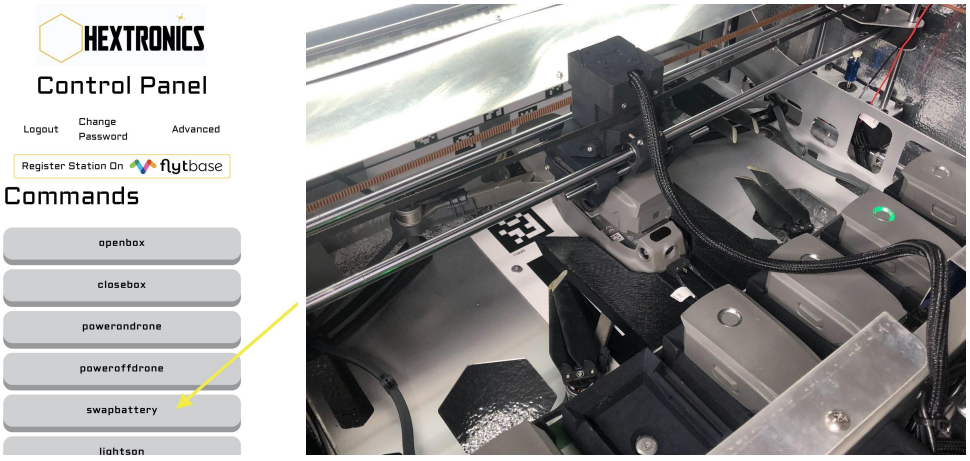
29. In control panel select “Swap Battery” to test x-y-z movements & calibration accuracy



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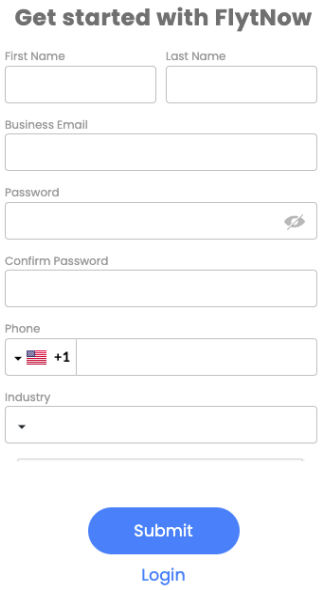
Linking drone station

Step By Step

30. If you have not already created a FlightNow account please go to FlytNow signup page and create an account. You will need the **UDC** code from the welcome packet for this.



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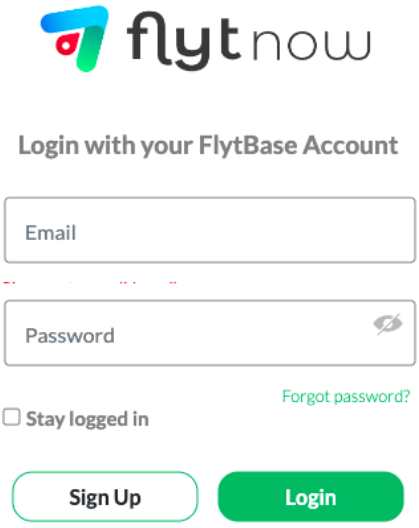
31. Login into the FlytNow dashboard at FlytNow Login with your new account information



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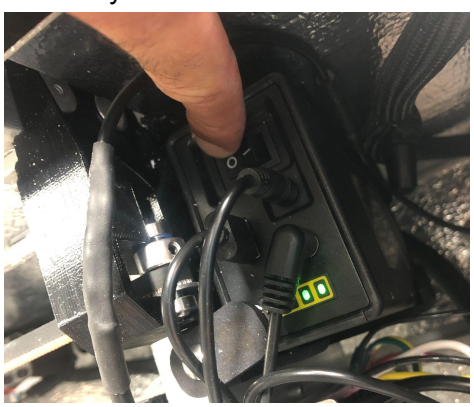
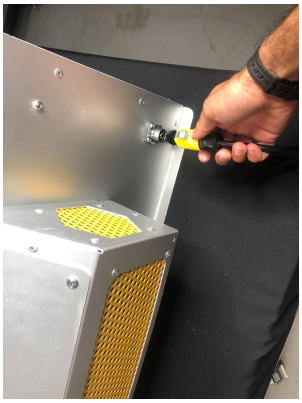
32. Perform a power cycle (Turn **OFF** the internal battery & disconnect the power cable then turn the battery back **ON** and and reconnect the power cable)





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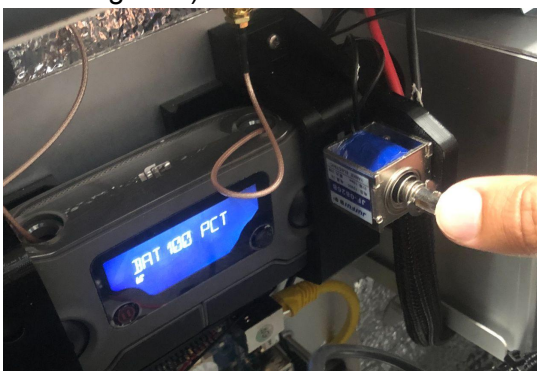
33. Turn on RC (one click & one long click)



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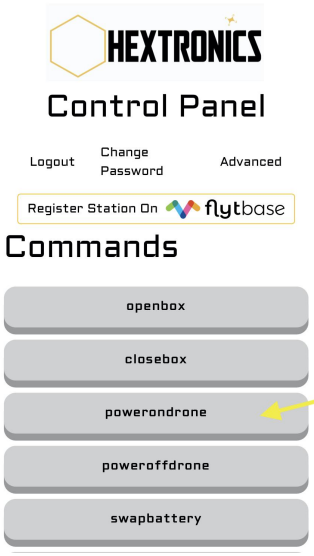
34. Turn on Drone (Manually: one click & one long click)
OR through the (Control Panel: PowerDroneOn)



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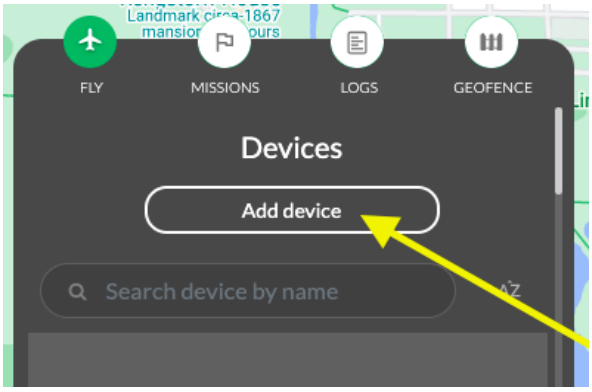
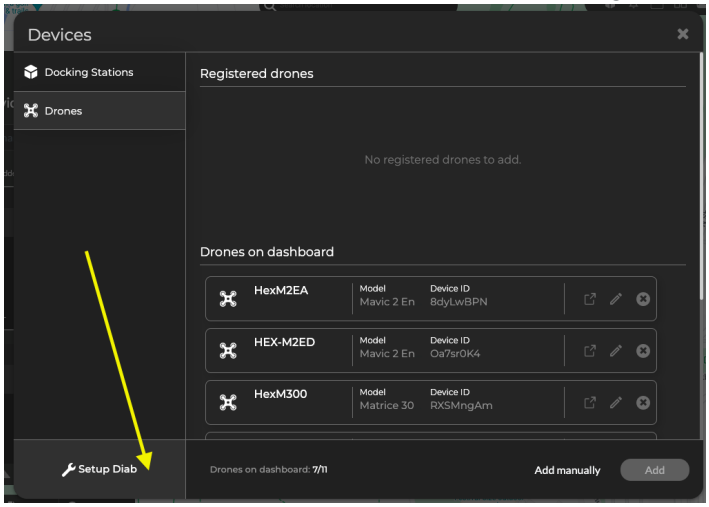
35. Enter FlytNow and Select Add device in the dashboard tab



---

36. Select “Setup DIAB” in the bottom left corner of the window and follow the prompts until completion.

You can also watch the “ Setup DIAB “ YouTube guide



---

37. Confirm that the RC is still on as you progress through the setup process

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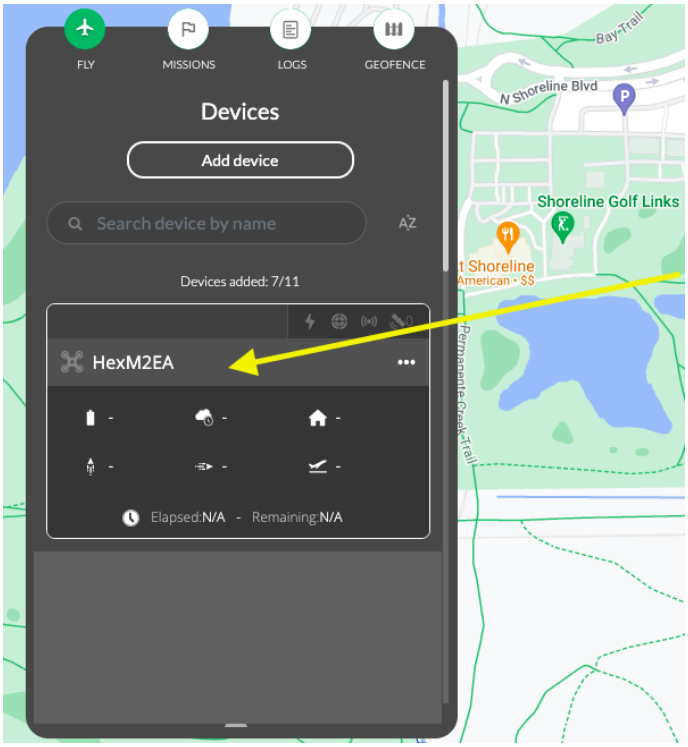
38. The steps will include naming and binding your drone. (The binding button is under the drone inside the black tab - you can open this with your finger)

---

39. Once DIAB setup is complete confirm that your station is the "**devices added**" tab on the Flytnow dashboard



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AWS photo/video bucket setup

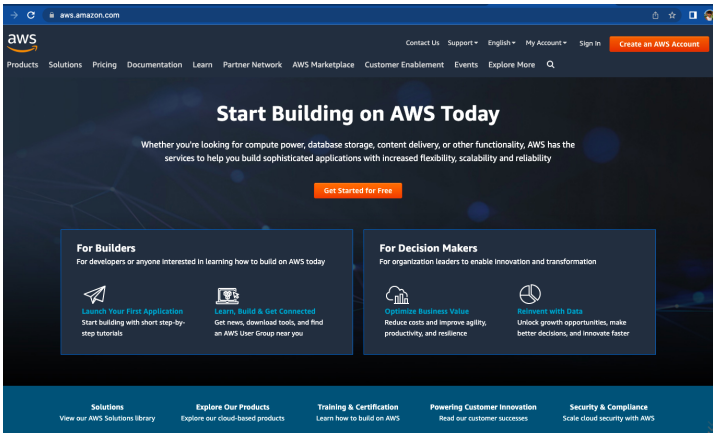
- Skip this section if you don’t intend to record photo or video

Step By Step

1. Sign in to your AWS Account at [AWS Sign In](#).

---

2. Or click on create an account if you don't already have one at [AWS Create Account](#).



---

3. Once you have logged in to AWS follow the steps on the following page.

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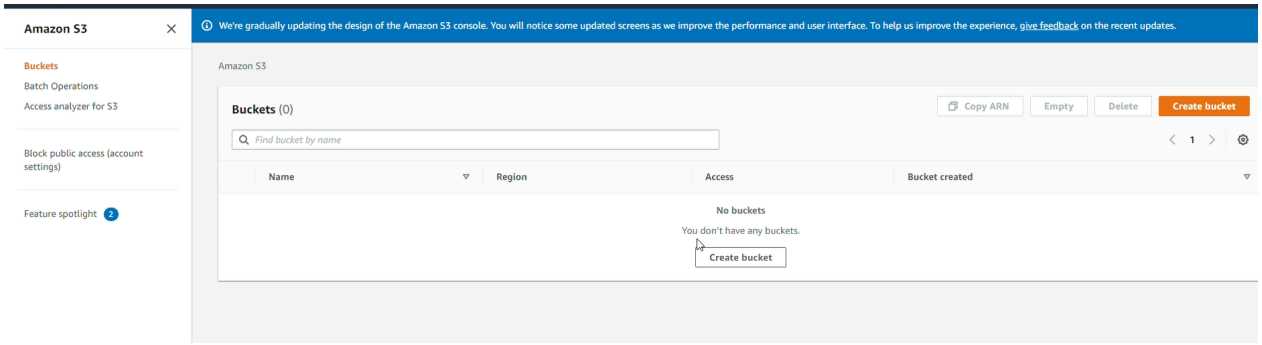
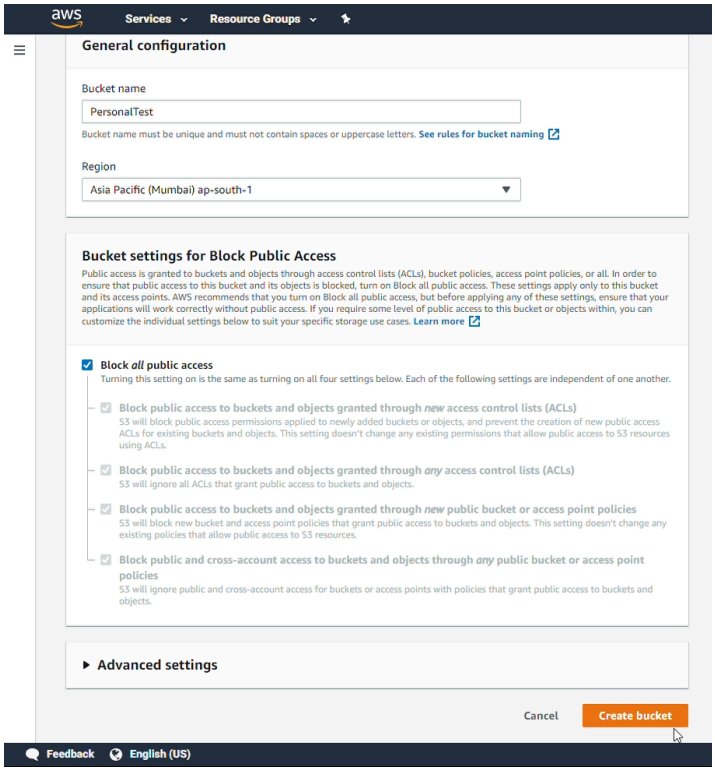
4. Go to the **Bucket** Tab (A) in the Amazon S3 console and then select **Create Bucket (B)**



5. Select your preferred region.



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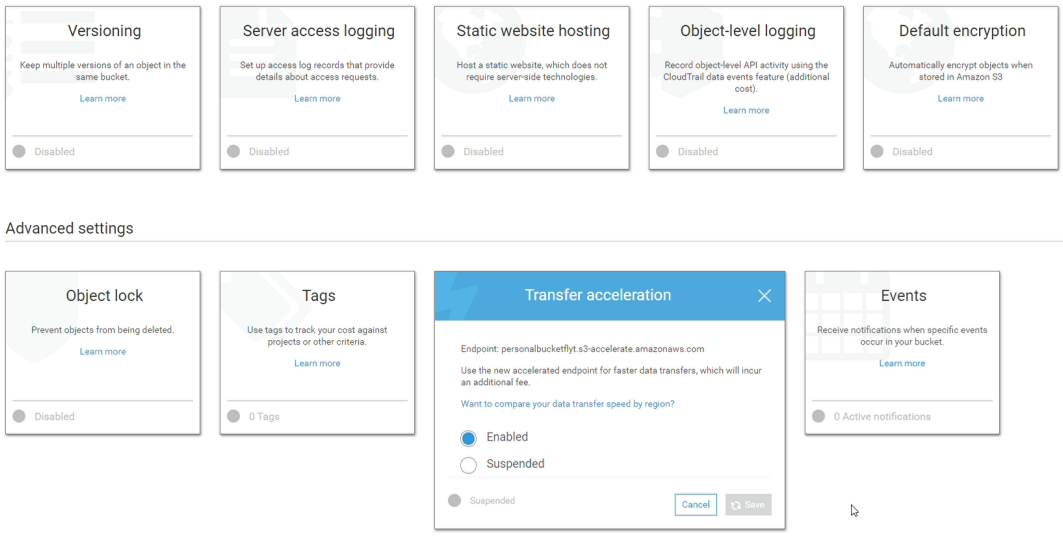
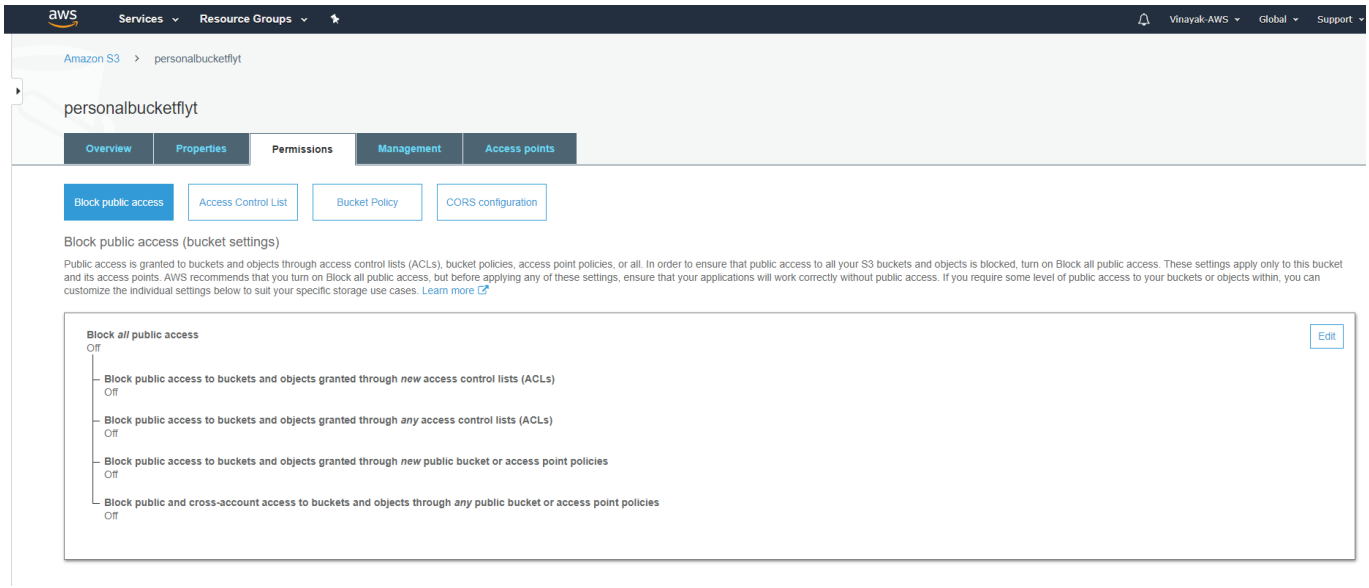
6. Once you have created a Bucket, go to Bucket Name > Properties > Transfer acceleration. Enable **Transfer Acceleration** for faster data transfer.



---

7. Next go to Bucket Name > Permissions > Block Public Access. Ensure **Block all public access** is set to **OFF**.



Note: Your bucket content will NOT become publicly accessible when you set the Block Public Access to OFF.

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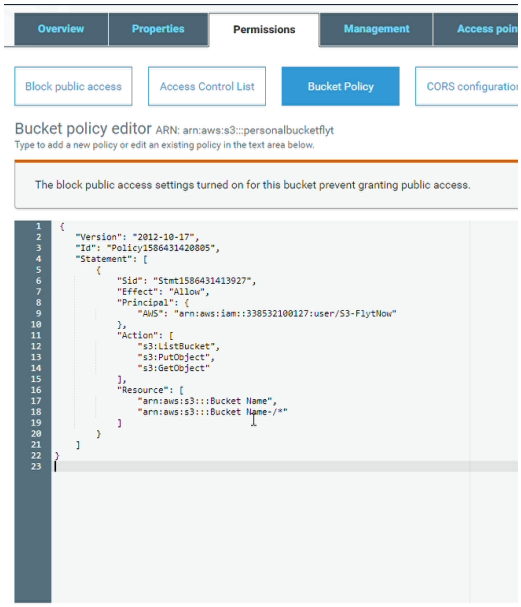
8. Go to (Bucket Name > Permissions > Bucket Policy)

---

9. Paste the following JSON and replace the **Bucket_Name** with the actual name of your bucket.



- Copy the info below

```
{
   "Version": "2012-10-17",
   "Id": "Policy1586431420805",
   "Statement": [{
      "Sid": "Stmt1586431413927",
      "Effect": "Allow",
      "Principal": {
         "AWS": "arn:aws:iam::338532100127:user/S3-FlytNow"
      },
      "Action": "*",
      "Resource": [
         "arn:aws:s3:::Bucket_Name",
         "arn:aws:s3:::Bucket_Name/*"
      ]
   }]
}
```

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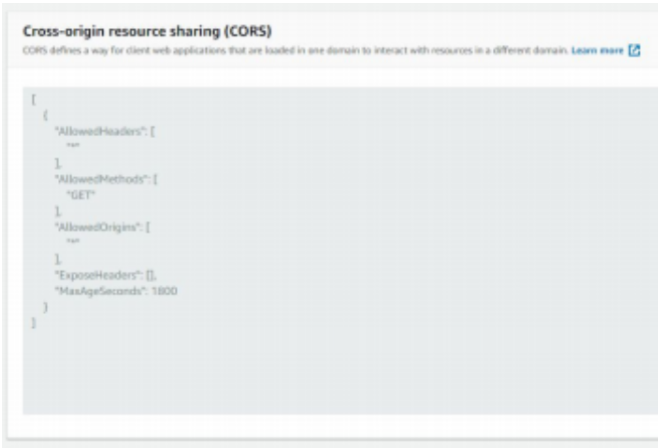
10. Then proceed to (Bucket Name > Permissions > CORS Configuration).

---

11. Paste the following array to update the CORS configuration.



- Copy the info below

```
[
    {
        "AllowedHeaders": [
            "*"
        ],
        "AllowedMethods": [
            "GET"
        ],
        "AllowedOrigins": [
            "*"
        ],
        "ExposeHeaders": [],
        "MaxAgeSeconds": 1800
    }
]
```

---

12. Once you have completed the steps above, send your S3 “Bucket Name” by email to support@flytbase.com so that your photo/video bucket can be linked to your Flightnow account.

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HEXTRONICS

Global Advanced Drone Station

OPERATION

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Preflight inspection

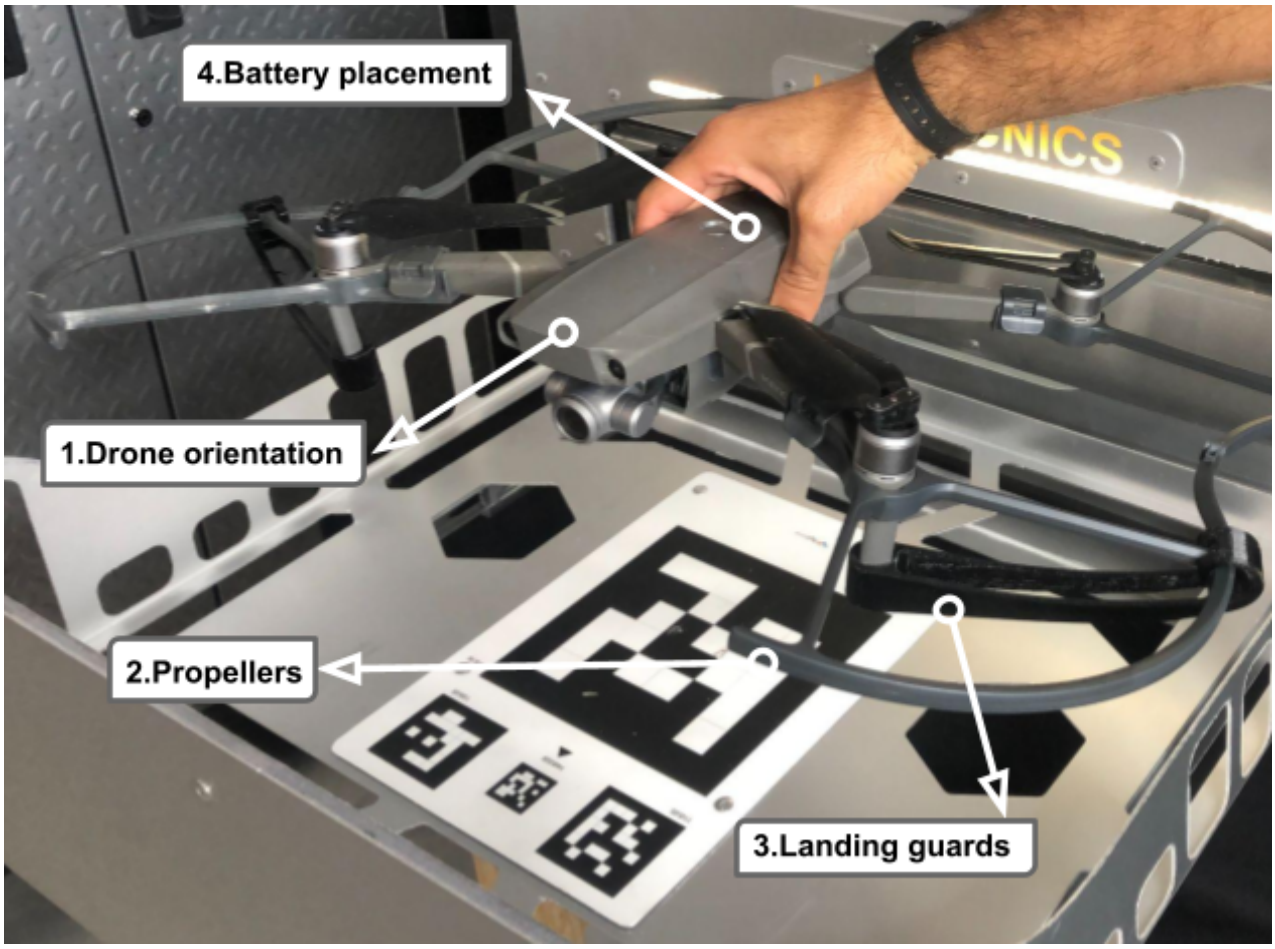
Please refer to the diagram and points below to confirm a drone inspection routine before any flight operations.

- **1. Drone orientation to station**
  Drone should be placed with the front gimbal towards the front panel of the station.

- **2. Propellers on drone**
  Propeller guards should be fixed to the drone for proper drone positioning within the station.

- **3. Landing guards on drone**
  Landing guards should be fixed to the legs of the drone to ensure safe & proper precision landing on the pad.

- **4. Battery placement on drone**
  Confirm that the battery is seated and locked within the drone properly for safe flight operations.



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How to fly

Video guide: Flight demonstration

Flight sequence: 1.Prime - 2.Allow Preflight routine to complete - 3. Lift - 4. Land - 5. Allow Post-land routine to complete.

Flight tips

1. Confirm station is powered on. It's a good idea to cycle the internal battery pack and power cable beforehand.
2. Refresh FlytNow web browser at start of operations
3. Log onto the Hex control panel to confirm station is online
4. Always **PRIME** before every flight
5. Always allow **PRE-FLIGHT ROUTINE** to complete
6. Always allow **POST-FLIGHT ROUTINE**t to complete before starting a new operation
7. Familiarize yourself with the flight area for obstacles and altitude changes before creating a mission
8. Flight waypoints should not bunch up too close to one another
9. First and last waypoints should be near the docking station home location
10. Leave station top hatch closed during flight operations for battery cooling
11. Use FlytNow utility window for station handling such as open/close + battery swap

---

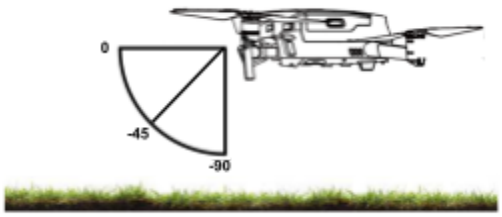
Photo/video actions:

1. **Note:** For **"**Capture image & start video" Drone will always face towards next waypoint

---

Gimbal pitch inputs:

1. 0 looks directly forward
2. -90 looks directly down
3. Adjust the value + or - for optimal pitch



Take manual control:

1. Take manual control mid-flight in drone view by clicking the Joystick icon (Middle bottom of screen)
2. Click the icons to change method of control (Keyboard,on screen,external controller)
3. Select resume/abort mission to continue (Bottom right toolbar)
4. Select return to docking station to land the drone

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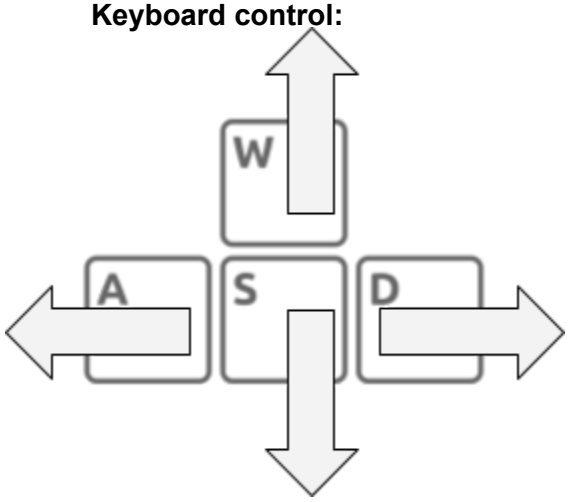
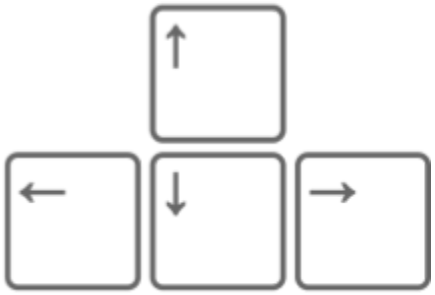
Keyboard control:





Keyboard Drone Movement

Drone Pitch Forward	**W**
Drone Pitch Backward	**S**
Drone Yaw Left	**Q**
Drone Yaw Right	**E**
Drone Roll Left	**A**
Drone Roll Right	**D**
Throttle Up	**SHIFT**
Throttle Down	**Space**
Land	**Long Press L**
Drone Return to HOME	**Long Press K**

Drone Gimbal Camera Movement

0° Gimbal Pitch Preset	**0**
90° Gimbal Pitch Preset	**9**
Camera Zoom In	**=**
Camera Zoom Out	**-**
Camera Zoom Reset	**BACKSPACE**
Gimbal Pitch Up	**ARROWUP**
Gimbal Pitch Down	**ARROWDOWN**
Gimbal Yaw Left	**ARROWLEFT**
Gimbal Yaw Right	**ARROWRIGHT**
Capture Image	**C**
Record Video	**V**
Switch Camera	**B**
Thermal ON/OFF	**N**
Keyboard Toggle Icon	**On/Off**
Controls Tutorial	**T**

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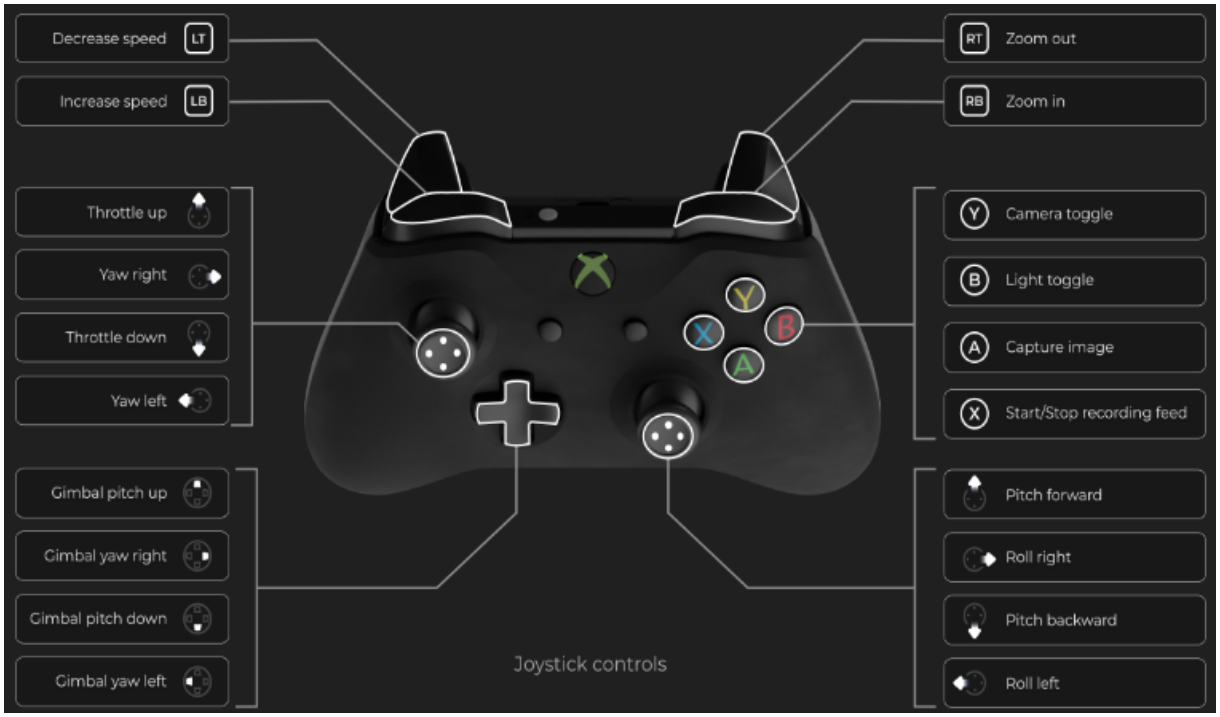
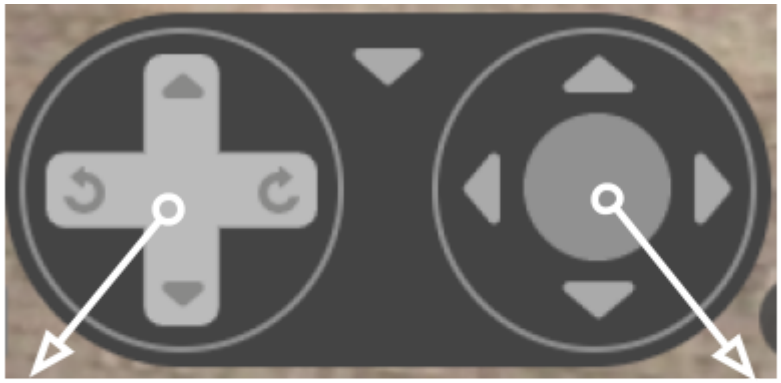
- **XBOX 360 controller - button diagram**



- **On screen dashboard control**



Drone Control

- Pitch forward
- Pitch backward
- Yaw left
- Yaw right

Gimbal Control

- Pitch up
- Pitch down
- Yaw left
- Yaw right

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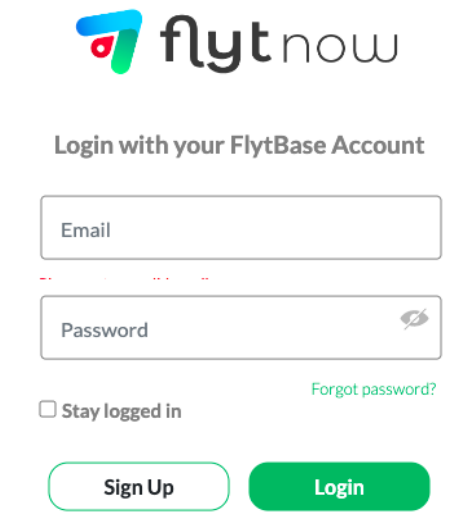
How to create missions

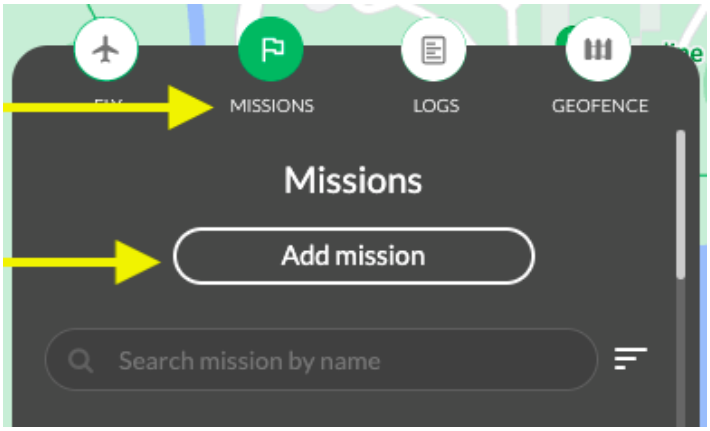
Step By Step

1. To begin flight operations login to the FlytNow Dashboard. (Using your new username/password)



---

2. On the **Mission** tab select **Add Mission**



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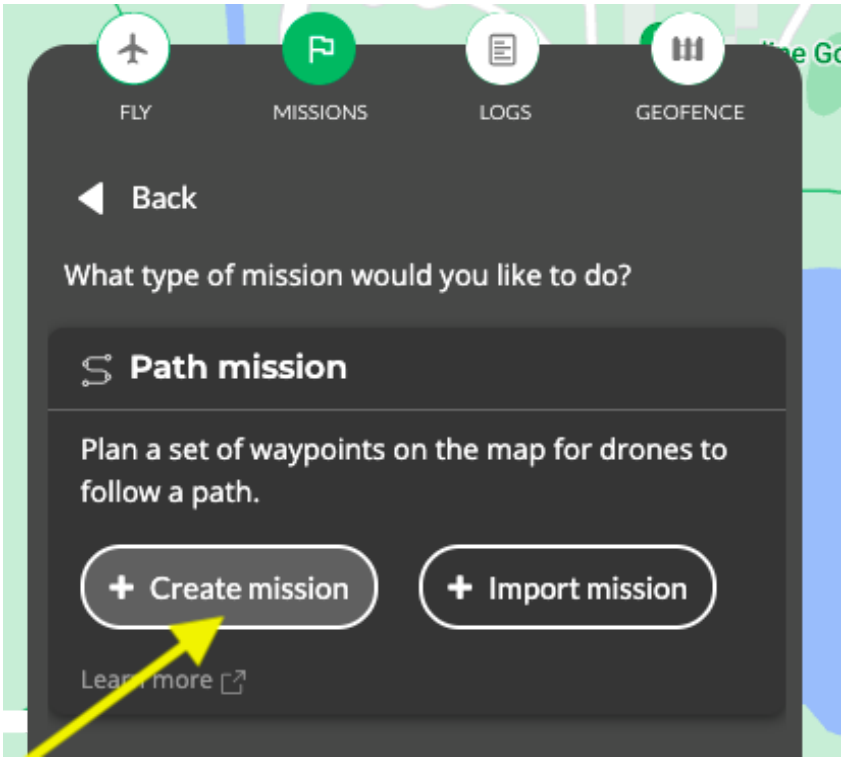
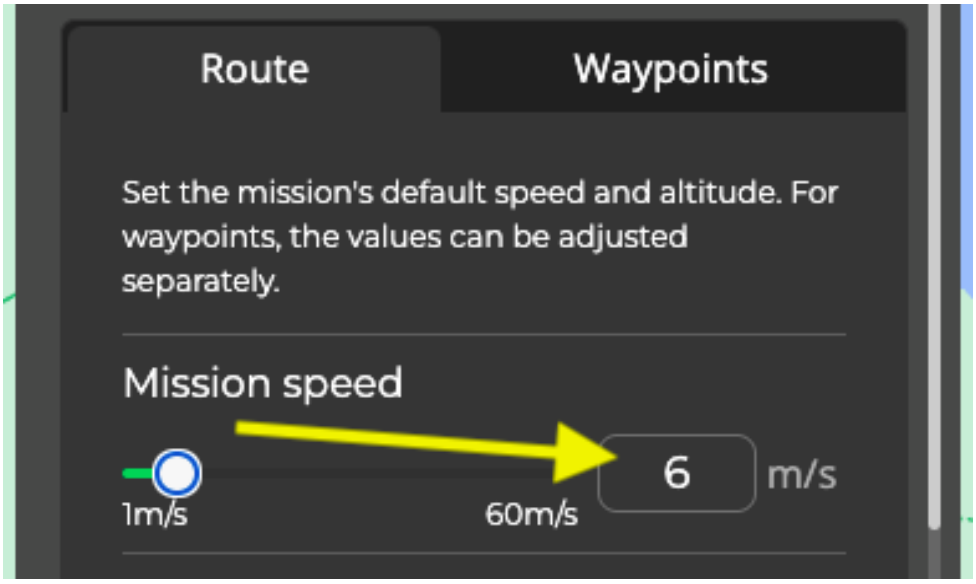
3. Select **Create S Path Mission.**



---

4. Change **mission speed** to **6m/s** (This is a safe operating speed @ 13 mph).



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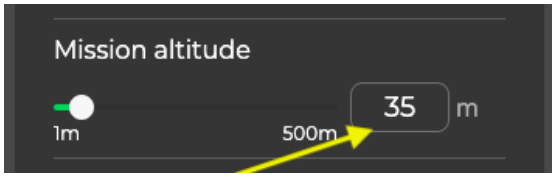
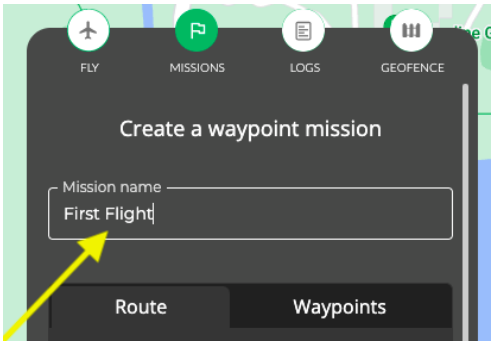
5. Change **mission altitude** to **35m** (This is a safe operating altitude above most trees)



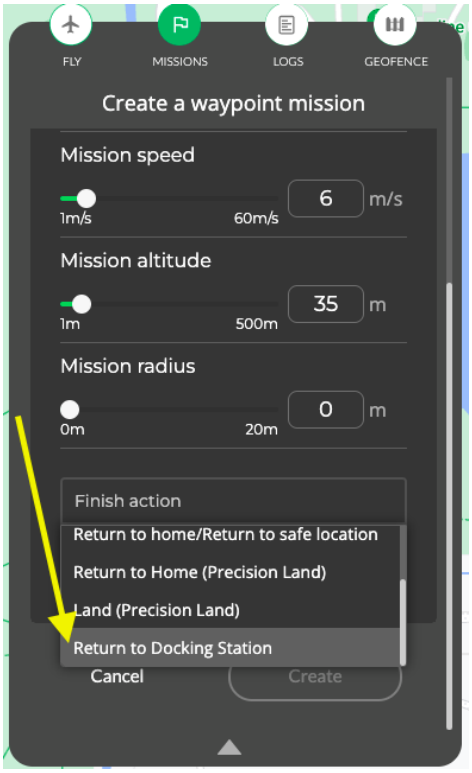
---

6. Name your mission.



---

7. Scroll down and select finish action **Return to Docking Station.**



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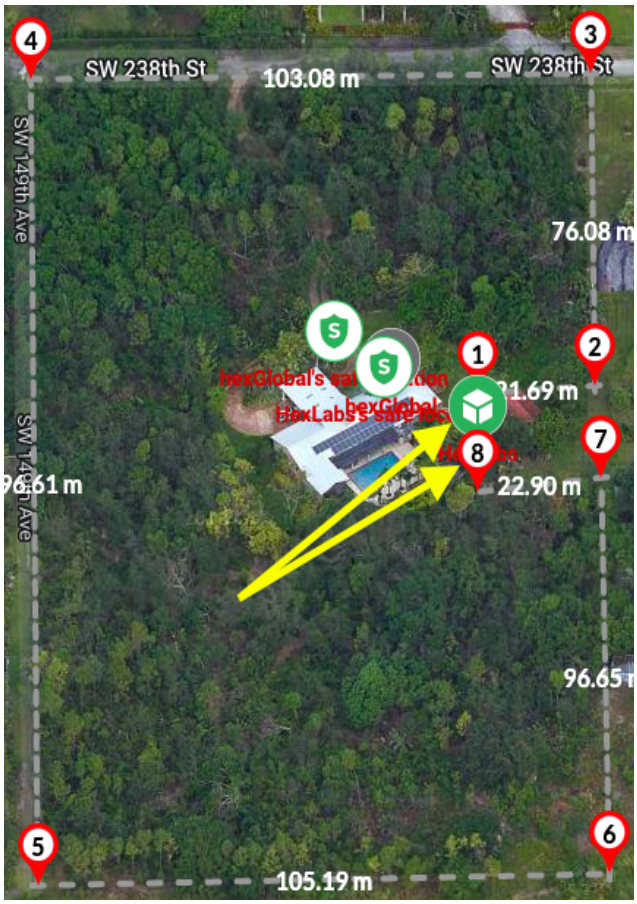
8. Make the first waypoint close to the docking station

Note: Click the map to add waypoints

---

9. Create your flight path using multiple waypoints

Note: Make the last waypoint near the docking station



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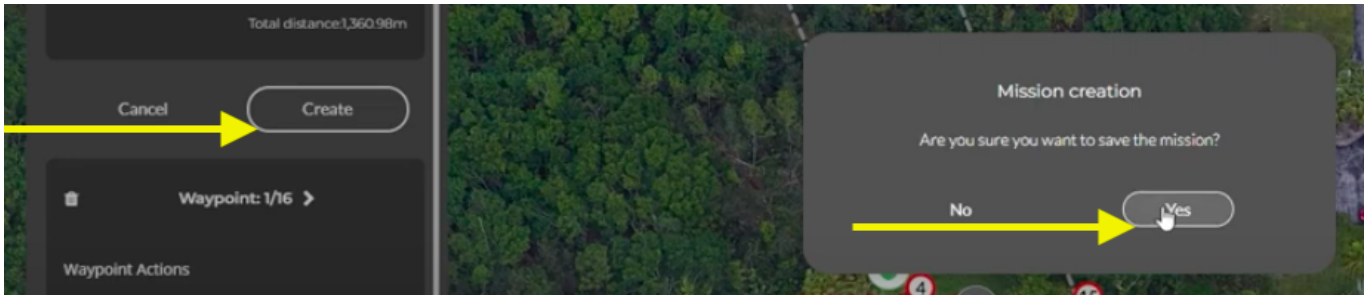
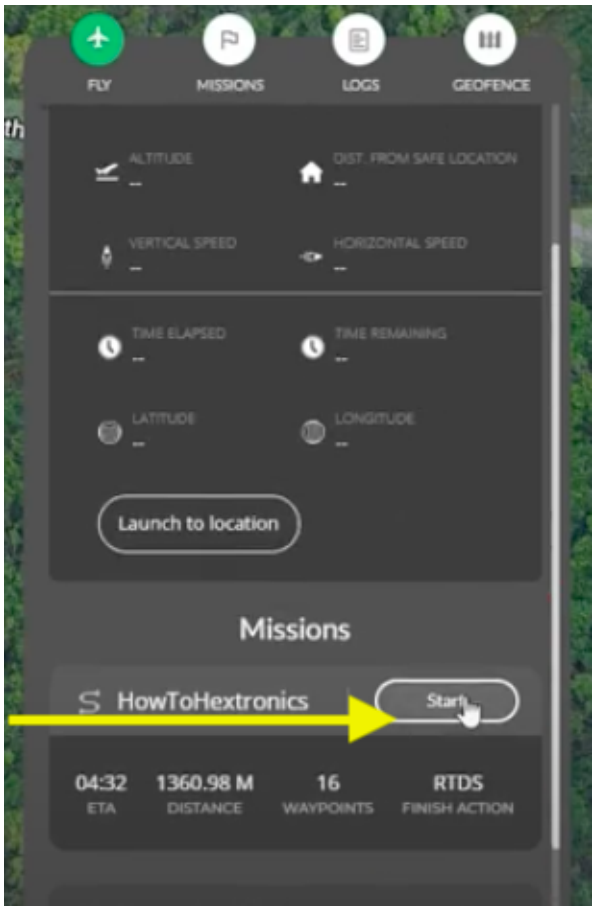
10. When ready select **Create** & **Save** mission



---

11. Once you have finished creating your new mission and are ready to fly,

- You can start a mission by selecting the **BLUE PRIME** button on the bottom right of the screen and then selecting the **GREEN LAUNCH** button when the prime routine has completed.



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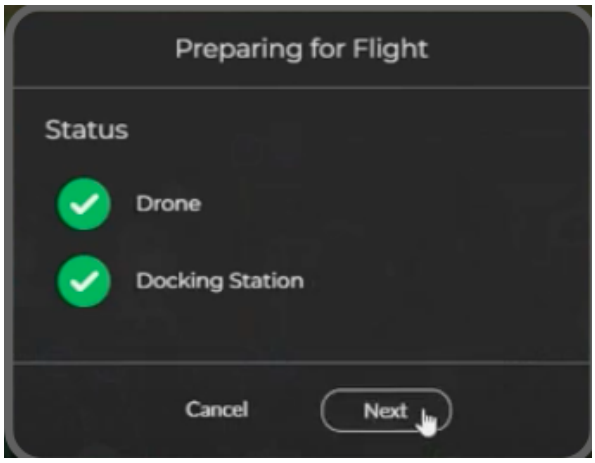
12. Click **Next** when the Pre-take off routine has completed.

Note: takes about 2 mins - this prompt can timeout if no input is made



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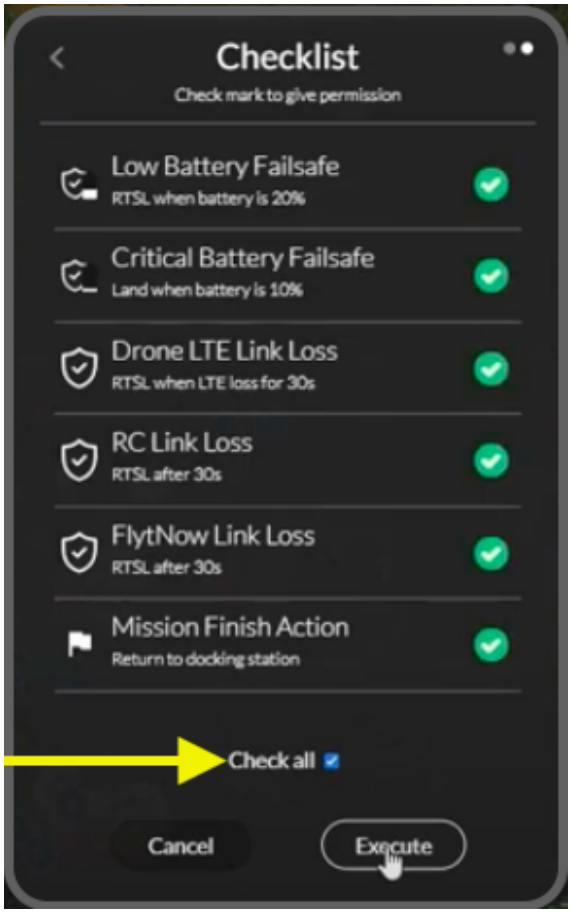
13. Check all of the pre-flight checklist items to execute the mission.



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14. Standby as the mission proceeds

Note: Click the map/video to change mission viewpoint

---

15. Mission will execute & the drone will return to the docking station upon completion
    - Please standby

COMPLETE: Once the drone has landed please allow at least 2-3 minutes for post-land routine to complete before performing your next flight mission.

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HEXTRONICS

Global Advanced Drone Station

MAINTENANCE

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Table of contents

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Introduction

Hextronics Global Advanced Station and DJI drone, as deployed as part of a larger fleet are subject to the wear and tear from normal use. This maintenance/inspection manual is designed to extend and conserve the lifespan of the products in use. This maintenance/inspection manual does not promise or guarantee the products to be free from defects, damages, and errors.

This checklist is designed to suit the needs of routine maintenance check-ups and can be applied as frequently as necessary, but it is most efficient to perform maintenance on a per-flight basis, rather than a set time frame.

Proper operation, scheduling and maintenance of the drone & the station will result in increasing the lifespan longevity of both the station and the drone. Regularly perform the inspections to ensure all systems are in working order and that any repairs or replacements can be addressed before the next flight.

Check that you have the following equipment are on hand before maintaining the drone and the station:

- Anti-static cloth
- Small cleaning brush (for tight crevices)
- Compressed air canister (air duster)
- Anti-static wristband
- Electrical Contact Cleaner

Always use protective equipment when handling, maintaining, inspecting or in contact with any Hextronics or DJI components. Drone stations and DJI drones are composed of various electrical and mechanical moving parts and may cause harm if not handled properly, confirm that all components and devices are disconnected from power and not in operation when handling, operating, maintaining, inspecting or servicing any Hextronics or DJI devices. Protective equipment may consist of but is not limited to closed to rubber shoes (for electrical grounding in order to prevent electric shock) Protective gloves also including electrical insulated gloves to avoid risk of injury to the hands including cuts, scraps, shocks, etc, also it is highly advised to to use eye protective equipment such as impact resistance goggles or impact resistance glasses in order to protect the users eyes from injury at anytime of operation, handling, maintaining, servicing, repair or inspection. Consult with the Hextronics support team or the DJI support team before initiating any inspection, maintenance, servicing, operation, handling etc if you have any questions, concerns or doubts at the below mentioned email.

Support@Hextronics.Tech

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Drone structural maintenance

Clean drone chassis of general debris

Before performing any kind of handling or inspection make sure all battery packs are disconnected and the drone is fully powered OFF.
Over time, your drone will gather layers of debris from the rigors of flight, transport, and storage. You should clean the whole unit regularly. Using an air duster in combination with a microfiber cloth and a moist (NOT WET) cloth to remove most of the dirt and build-up. Tougher debris stains may require more extensive cleaning solutions, please use caution when dealing with sensitive electronic components.

Inspect chassis of cracks

Carefully inspect the chassis for damage. You should perform these checks on a regular basis and ensure all parts are serviced accordingly. Even the smallest damage can cause critical problems if left unresolved or unnoticed. During routine maintenance check each component carefully and make a note of the damage you find in the maintenance & inspection record.

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Check for loose screws

Confirm that all components and fasteners are secured tightly in place during maintenance or repairs. It is likely that over time some components will need to be replaced or maintained in some form. Be sure to double check the fastenings, screws and bolts of the drone over time. Don't over-tighten any fasteners, screws or bolts, this can cause excess strain on joints and do even more damage to the drone. The joints should be tight and secure, but not fastened with an excess of force.

Check propellers for damage

The propellers are some of the more delicate parts in your system. You will need to inspect them very closely for damage and to confirm that they are not loose or damaged. Even if your last flight performed well you should be extremely thorough with your examination and regularly inspect the propellers. Propeller damage can go unnoticed until it proves critical. Do not perform flights with damaged propellers, be sure to replace any broken propellers immediately and proceed to test the motors as well for damage. Records maintenance activities on a Maintenance Inspection Record.

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Check propellers are free spinning

Confirm that the battery pack is disconnected before performing this inspection. Rotate each propeller to assess whether there are additional obstructions that inhibit the full range of motion or the propellers or motors. Ideally, the propeller will spin smoothly and without resistance. Should there be any difficulty in spinning the propellers freely, consult your unit's manual on propeller disassembly and perform a thorough cleaning or repair of each component in the motor-propeller module. For more serious motor repairs please contact the Hextronics support team or the DJI support team.


Check motors for debris and obstructions

The motor chamber can become obstructed with debris such as dust, rocks, dirt, and even organic matter caught in the openings around the top of the armature. Wipe down the casing, be sure that there is nothing lodged in the negative space between the propeller and motor. You should remove the propellers for direct access to the motor chamber and clean out all foreign matter. It may be necessary to further disassemble the drone to remove difficult debris; if this is the case, be sure to consult your model-specific instruction manual for proper disassembly and reassembly procedure. If you require assistance please contact the Hextronics support team or the DJI support team on how to properly repair or maintain any motor components.

Confirm that:

o Motors are free from debris

o Motors are in good condition and spinning smoothly


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Check state of wiring and solder joints

If your unit has any exposed wiring, you should address that first, because it will be subject to the highest risk of damage. Look for visibly worn or frayed points and make sure no wiring is loose. If you can visibly detect faulty wiring please refer to the Hextronics support team or the DJI support team for guidance. Do **NOT** attempt to solder or re-wire any DJI drone or RC components as well as any drone station soldering points or wiring. Please see the introduction page “Caution” section above.

Check drone camera is clean

Wipe the lens of the camera with a microfiber cloth for best results, remove dirt and debris on the body and frame of the gimbal frame if need be. Insect debris and other environmental factors can cause a large buildup of matter on the lens so it should be properly cleaned as part of a routine check. Confirm that the gimbal axis’s move freely and smoothly.

Check Landing Gear Condition

Make sure the landing gear of the unit are not bent or cracked, and that all rubber shock absorbers are intact. Faulty landing equipment will cause the drone to not be able to perform a safe landing. If any parts are damaged or missing, they will need to be ordered from your manufacturer and re-fitted.

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Inspect antenna

The antennas are responsible for maintaining wireless signal between the ground remote station and the mobile drone unit. Damaged or improperly fitted antennas can reduce signal strength and disrupt the unit connectivity and lead to fatal loss of control. Be sure that each antenna is in good shape and is screwed properly and without damage into the unit and record your findings in the Maintenance Inspection Record as per criteria below.

Confirm that:

o Antenna are in good condition

o Antenna are properly screwed into the unit

Inspect battery packs for bulges or leakage

Examine each battery pack carefully. Bulges or deformities are signs of leakage and affected packs must be replaced immediately and not be used. Battery pack maintenance should not be overlooked, and proper care should be taken to preserve and extend their lifespan. Active packs along with spares should be checked and replaced accordingly as necessary.

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Drone & battery resistance to moisture

The drone and drone battery are NOT resistant to moisture and water, and should not be flown in wet conditions. If for any reason the drone or the drone battery should become wet the user should promptly dry the entirety of the drone as well as remove the battery pack and dry the internal battery compartment and the battery, including the charging pins and housing of both. Do not attempt to fly after recently experiencing moisture for at least 24 hours.

Removing moisture from the battery port of the drone

The drone should never be operated in wet conditions such as rain or snow, and must be maintained dry at all times in order for good flight practice. If for any reason the drone should become wet the user should promptly dry the entirety of the drone as well as remove the battery pack and dry the internal battery compartments including the charging pins and housing. In order to thoroughly remove moisture. Do not attempt to fly after recently experiencing moisture for at least 24 hours.

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Station structural maintenance

Exterior visual inspection

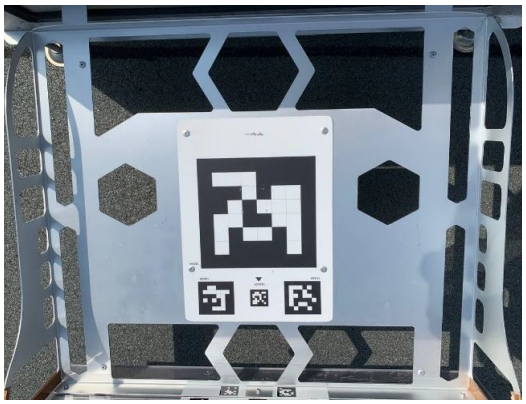
Visually inspect the physical condition of the station from the exterior. The station should be in a good form with no damage, bent or cracked panels from the outside as it would affect the mechanical movement components inside the station. The roof should be securely closed to avoid from foreign objects or water passing through into the station. Printed landing marker (AR Tag) on top of the roof needs to be visibly clean and intact for the drone auto-land procedure. Clean the exterior surface of the station if necessary with a microfibre cloth or any clean towel. Any cosmetic modification on the exterior surface should get further advice from Hextronics support team.

Interior visual inspection

Visually inspect the physical condition of the station from the interior. Monitor any abnormalities inside the station such as unknown damages, stain or debris as well as watermarks or any deformation of the silver coated insulation inside the station. Carefully clean the station interior section if necessary. Be sure to use caution when dealing with sensitive electronic components and do **NOT** use water inside the station. The cooling fan also should be clean frequently to maintain proper temperature and ventilation.

Landing pad

The landing pad should be cleaned periodically. The precision landing code along with the AR tag should be in good form to allow the Precision Landing process to run smoothly.



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Check power supply connection

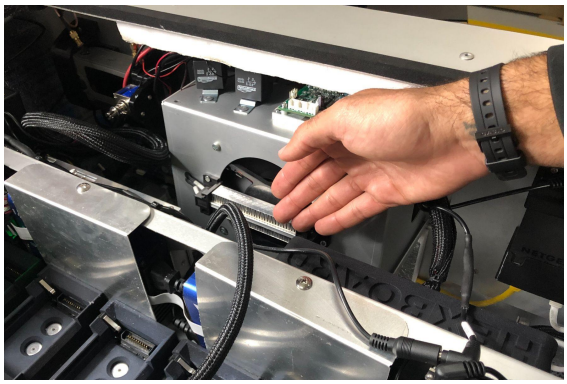
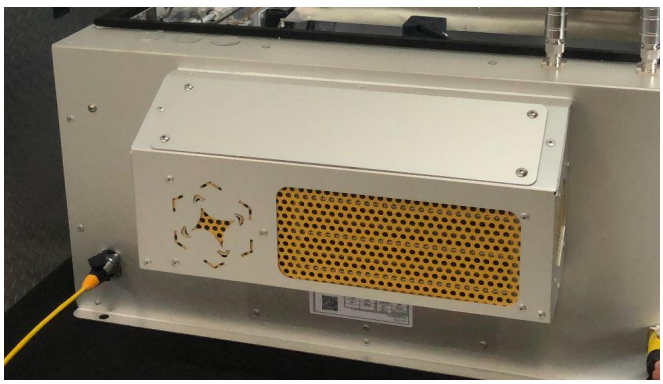
Make sure the power cable connection and socket at both ends (station-power source) are intact and perfectly secured to avoid short circuits due to weather exposure during operation. Clean the male and female conductor point with contact cleaner if necessary and confirm that the prongs are in good condition without damage or debris.


Check ethernet connectivity

Ethernet LAN connection is one of the most important things for this Hextronics stationed Drone operation. Making sure the functionality of this connection is mandatory to allow data transfer processes to run smoothly. Inspect male and female connection points frequently.

Inspect cooler compartment and ventilation.

Make sure there is no obstruction in the HVAC compartment. Clean the ventilator section thoroughly using a cleaning brush or anti-static cloth. Verify that the fan is blowing cold air. Open the service panel to access the Micro AC component inside the case and use compressed air to remove any debris.

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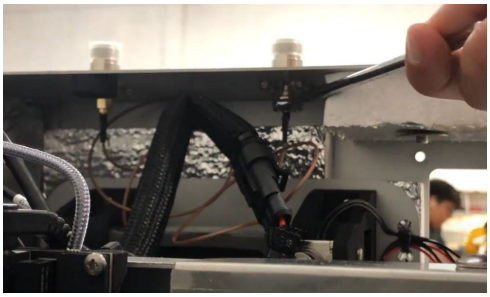
Check state of wiring and components

Reference the wiring orientation according to the wiring diagram. Look for visibly damaged points and make sure no cable is loose or hanging. Please contact the Hextronics Support team if you detect any defective wiring. The below listed components should be securely fixed and connected within the station. Please see the component diagram to reference individual parts.

- Drone RC
- Raspberry Pi
- Odroid N2 Flight CPU
- Backup Battery Power Converter
- Battery chargers
- Battery PCBs
- Cooling Fan
- Ethernet LAN switch Box
- 24V Power Supply Box
- Hexboard
- PTC Resistive Heater
- Climate Control Relays
- Compressor Control PCB
- Evaporator AC Coil

Inspect antenna

Check the physical condition of the omni-directional antenna. Make sure both antennas are in good condition and the underside connections are securely tightened. Clean the connection point if necessary using the contact cleaner and remove the antenna during any relocating process.



Check battery charger docks

Examine each battery charging dock carefully. The docks are self-latching to the battery and sensed by Micro-switch that communicate with the station. There should be no debris or obstruction inside the charging docks as it has been shaped precisely according to the drone battery dimension. Perform visual inspection of the charging slots and clean the area if necessary, using a vacuum, contact cleaner or anti-static cloth.

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Check station is positioned on flat, leveled and elevated surface

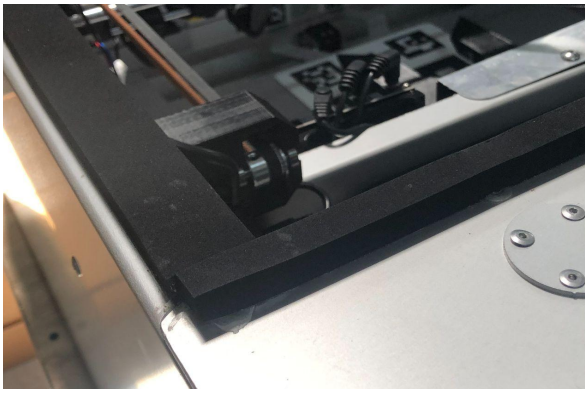
Confirm that the entirety of the station is placed on a flat, level and dry outdoor working area off the ground for best internal operational movements and precision landing of the drone. An Industrial leveler can be used as a tool to verify the positioning.

Inspect mechanical parts to operate with no obstruction

The mechanical moving parts such as the X, Y and Z axis rods must be individually inspected to confirm there are no obstructions and that the axis's move smoothly. Clean and grease the area if necessary by referencing the maintenance module timeline to prevent metal-on-metal wear & damage of the X,Y and Z axis rods.

Weather resistance seals

The weather seals are responsible for maintaining a dry interior of the station, any moisture or humidity within the station is likely to result in electrical & hardware malfunctions. Please confirm that the weather seals are in good condition and cover the entirety of the designated area.



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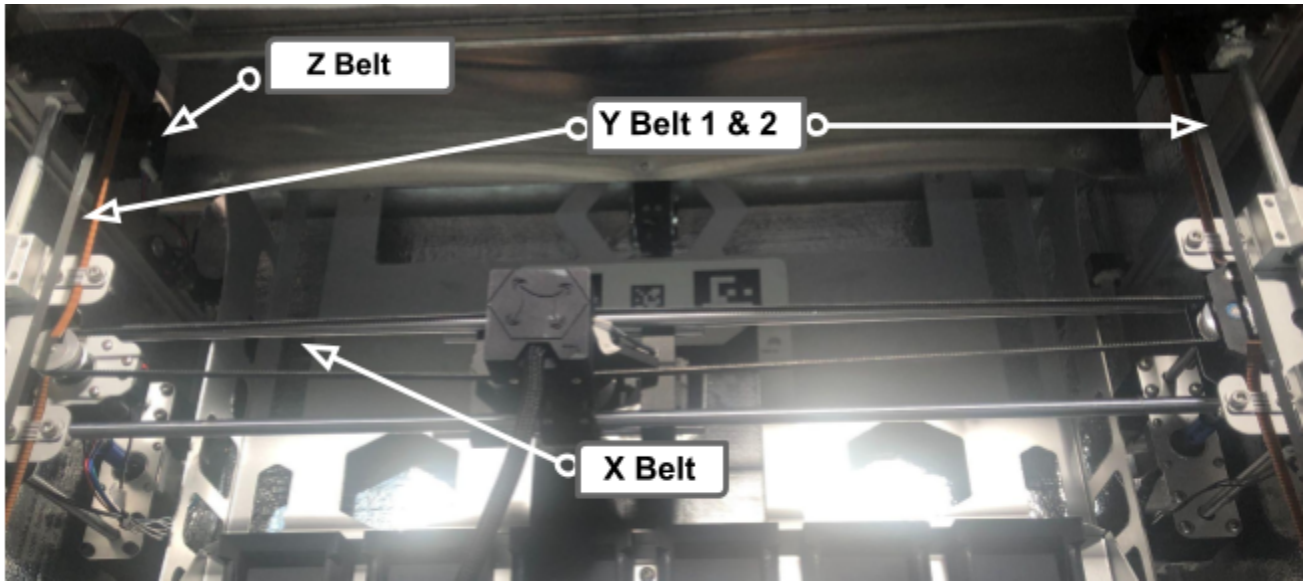
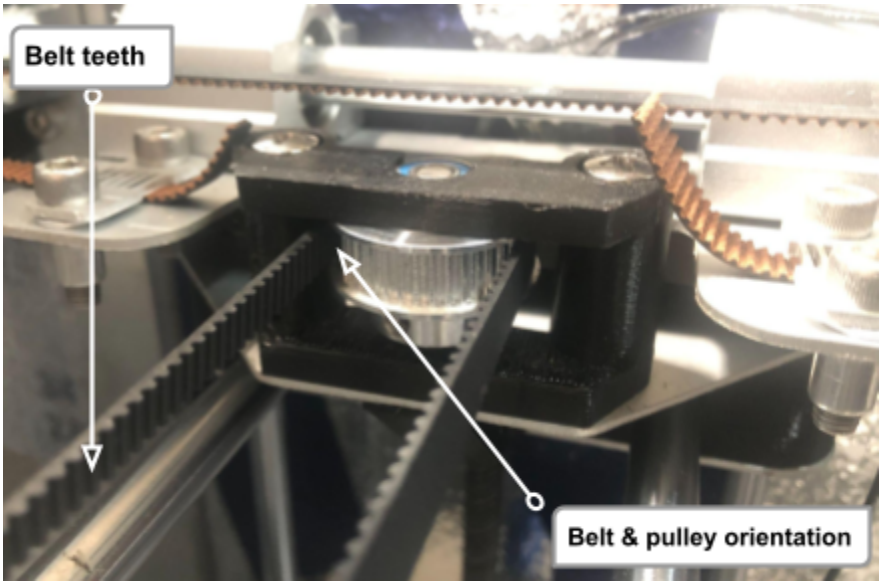
Belt condition & tension on X Y & Z

Proper belt tension is required for hardware operation movements to be successful. Manually inspect and squeeze each belt loop for any damages or missing teeth. The belts should be rigid and tight, loose belts should be addressed as soon as possible for proper station operations to continue.



Pulley orientation & teeth integrity

Confirm that the belt teeth are orientated in towards the pulleys and on track, also inspect the integrity of the teeth to confirm there are no bald spots or missing teeth.



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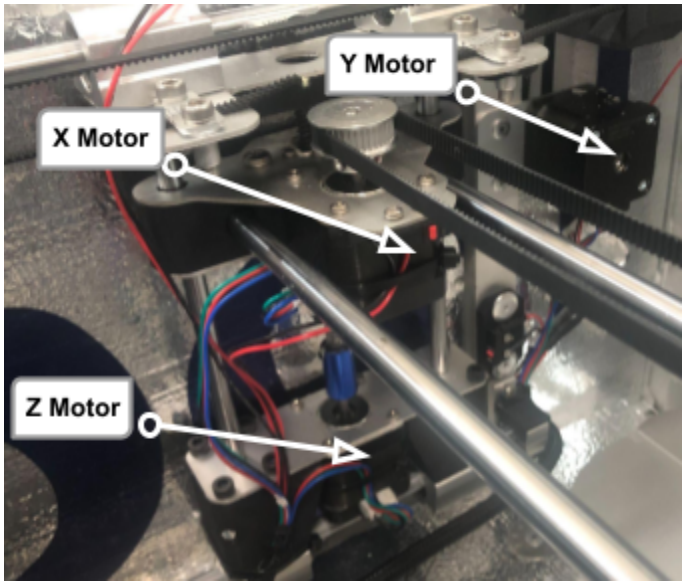
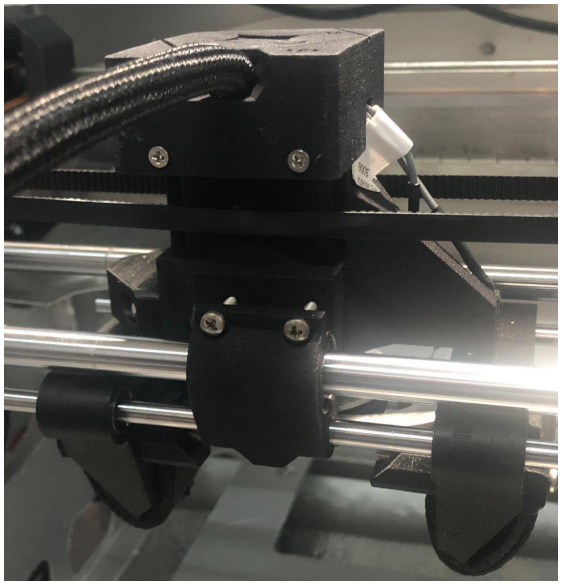
Motors on X Y & Z

Confirm that the X Y & Z axis motors are in good condition and without rust, and that the motor is powering on and operating normally when prompted.



Gripper

Confirm that the gripper opens & closes normally at the command prompt, and that the gripper is picking up and placing batteries correctly.



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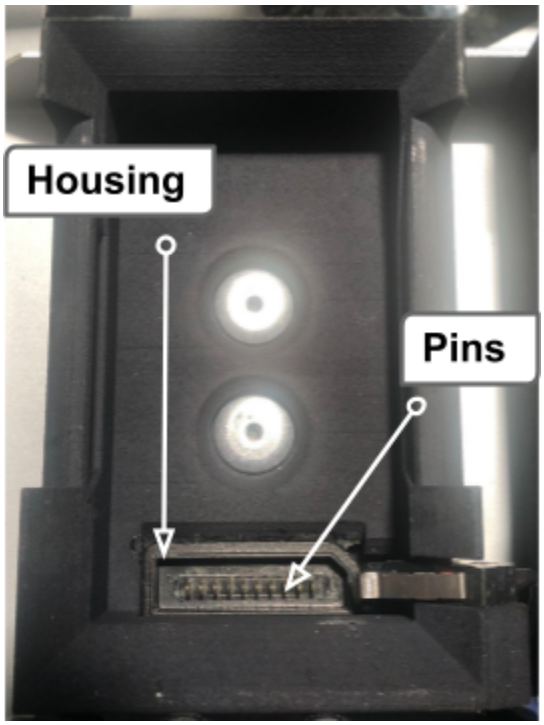
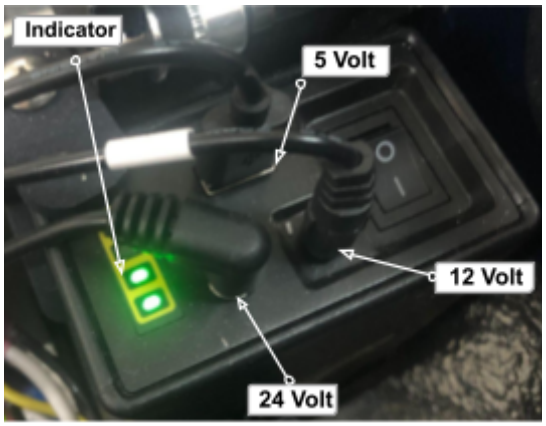
Battery slots

Individually confirm that each battery slot tray is in good condition with no damage, and that the internal charging connector is straight and not missing any pins and that the pin housing is not bent or deformed in any way. Also confirm that batteries are inserted smoothly into the slots during battery swap operations.



Internal black battery pack

The battery pack consists of a 5V, a 12V and a 24V outlet. Inspect that all connections on the internal battery pack are secure and not melted or deformed in any way. Confirm that the battery indicator is illuminated and showing green bars, the internal battery pack will hover at an intentional mid range charge of about 2 bars for optimal life span. Charging can be manually tested by connecting an outside device to the USB slot to confirm output. Use a digital voltmeter to test the output of the outlets to confirm individual voltage outputs of each port.



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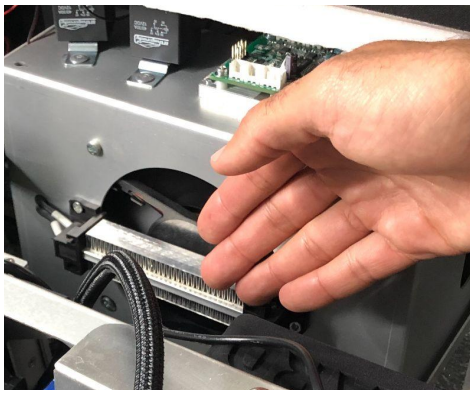
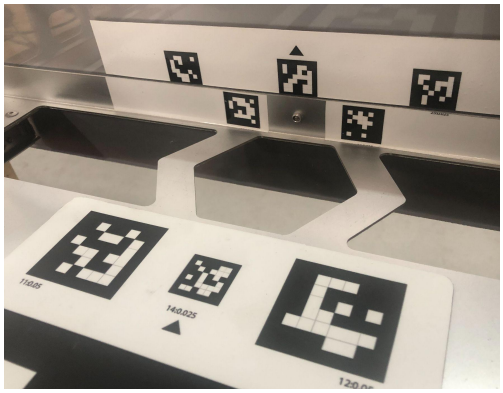
HVAC Fan

Carefully place your hand over the internal fan and confirm that the fan is blowing air, and cold air when the cooler is enabled. Confirm that the fan is spinning and producing sufficient air flow when powered on. The fan works independently from the compressor so you can also verify that the air being blown from the fan is cold to verify the compressor system.



Aruco marker

Confirm that the internal pad Aruco marker is in good condition without any damage to the design of the tag. Clean with a moist towel but do not leave any wet puddles on the pad.



Top panel QR code

Confirm that the top panel QR landing code is clean and that the design is clearly visible and without distortion. The QR code sheet is consistently exposed to the elements so a periodic treatment of RainX, anti mold chemicals may be used to resist any mildew or mold buildup.

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Station maintenance timeline

1	X axis movement rod	Add a very light layer of all-purpose grease to the X-axis horizontal rods.	Every 3 months
2	Y axis movement rod	Add a very light layer of all-purpose grease to the Y-axis horizontal rods.	Every 3 months
3	Z Axis	Add a very light layer of all-purpose grease to the Z-axis vertical rods.	Every 3 months
4	Batter Plate Screws	Confirm that both battery plate screws are securely tightened.	Every 3 months
5	Housing Outer Screws	Confirm that (four) rear screws are securely tightened to avoid humidity intrusion.	Every 3 months
6	Landing Platform	Confirm that both internal platform rails are clean of debris and that the rails slide smoothly when the drawer opens/ closes.	Every 3 months
7	Power Cable	Confirm that the power cable is free of rust, debris and damage at both ends.	Every 3 months
8	Power & Ethernet port	Confirm that the power and ethernet ports are free of rust, debris and damage to both ports (ethernet & power) and the ends are also in good condition.	Every 3 months
9	HVAC coils	1. Unscrew HVAC panel screw 2. Remove panel 3. Use compressed air to blow out debris and clean HVAC coils	Every 3 months
10	Antenna mounts	Confirm that all four screw on each antenna mount is firm and secure (Do not strip screws)	Every 3 months
11	Antennas	Confirm that both of the antennas are hand tight and secure	Every 3 months
12	Remote controls Joints	Confirm that both underside antenna connection joints are firm and secure. (size 5/16 wrench)	Every 3 months

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13	X axis belt	Confirm that the belt is not loose, that the belt is in the correct orientation with the teeths facing inward towards the pulleys, and that there are no missing teeth or ribs.	Every 3 months
14	Y axis belt	Confirm that the belt is not loose, that the belt is in the correct orientation with the teeths facing inward towards the pulleys, and that there are no missing teeth or ribs.	Every 3 months
15	Z axis belt	Confirm that the belt is not loose, that the belt is in the correct orientation with the teeths facing inward towards the pulleys, and that there are no missing teeth or ribs.	Every 3 months
16	Gripper	Confirm that the gripper is opening and closing correctly when prompted to.	Every 3 months
17	Battery slots	Confirm that the battery slots trays are in good condition with no damage, and that the internal charging connector is straight and not missing any prongs and that the connector housing is not bent.	Every 3 months
18	HVAC fan	Carefully place your hand over the internal fan and confirm that the fan is blowing air, and cold air when the cooler is enabled.	Every 3 months
19	Internal battery pack	Inspect that all connections on the internal battery pack are secure and not melted or deformed in any way. Confirm that the battery indicator is illuminated and showing green bars. Charging can be manually tested by connecting an outside device to the USB slot to confirm.	Every 3 months
20	X axis motor	Confirm that the X axis motor is in good condition and without rust, and that the motor is powering on when prompted.	Every 3 months
21	Y axis motor	Confirm that the Y axis motor is in good condition and without rust, and that the motor is powering on when prompted.	Every 3 months
22	Z axis motor	Confirm that the Z axis motor is in good condition and without rust, and that the motor is powering on when prompted.	Every 3 months
23	Aruco marker	Confirm that the Aruco marker is in good condition without any damage to the design of the tag.	Every 3 months
24	Weather station seal	Please confirm that the weather seals are in good condition and cover the entirety of the designated top hatch area.	Every 3 months

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Interchangeable components

Below is an index list of components within the station that are interchangeable in the result of an error, fault, damaged component, etc.

CAUTION

Do not attempt to repair, replace, or handle any station components without the **explicit** consent and instructions of the Hextronics support team.

- X: Motor + cable + limit switch + belt + bearings
- Y: Motor + cable + limit switch + belt + bearings
- Z: Motor + cable + limit switch + belt + bearings
- Pi + power cable cable
- Odroid + power cable + USB
- Control board
- Router
- RC + power cable
- Internal Black Battery Pack
- Gripper + cables
- Power supply unit
- Pad motor + belt
- Battery boards 1 & 2
- Ribbon cable
- Solenoid pusher
- Antenna mounts + cables
- HVAC
- Battery chargers + boards

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Station axis movement inputs

Reference the chart below & the station axis diagram on page 62 to incrementally adjust axis movements for calibration and fine tuning purposes.

To access the axis threshold limit menu in the Hextronics **Control Panel** by scanning the QR code under the station hatch and selecting the “Advanced Settings” tab.

All X Values:	Positive value will move **away** from Zero position
All Y Values:	Positive value will move **away** from Zero position
All Z Values:	Positive value will move **closer** to Zero position
ButtonX:	X position above button
ButtonY:	Y position above button
ButtonZ:	Z position before pressing button
ButtonZdown:	Z position pressing the button
ButtonZup:	Z position between button pressing
ZZTop:	Should always equal Zero (used in the case of endstop failure)
DroneX:	X position of battery when removing/inserting it
DroneY:	Y position of battery when removing/inserting it
DroneYback:	Y position of battery before moving to insert it
DroneYfront:	Y position of battery before inserting it
DroneZ:	Z position of battery when removing/inserting it
DroneZup:	Z position of battery when moving above drone
DroneZdown:	Z position of battery when pushing in battery
DroneZdrop:	Z position of battery when dropping battery
DroneZMed:	Z position of battery when lowering to it
BattY:	Y position of all batteries in charging slots
BattYClose:	Y position in front of all batteries in charging slots
BattYSense:	Y position to tap all batteries in charging slots (used in older version of the station)
BattYby:	Y position to push against all batteries in charging slots (used in older version of the station)
BattZ:	Z position to grab battery from a charging slot
BattZdown:	Z position to push battery into a charging slot
BattX 1	X position of Battery 1
BattX 2	X position of Battery 2
BattX 3	X position of Battery 3
BattX 4	X position of Battery 4
BattX 5	X position of Battery 5
BattX 6	X position of Battery 6

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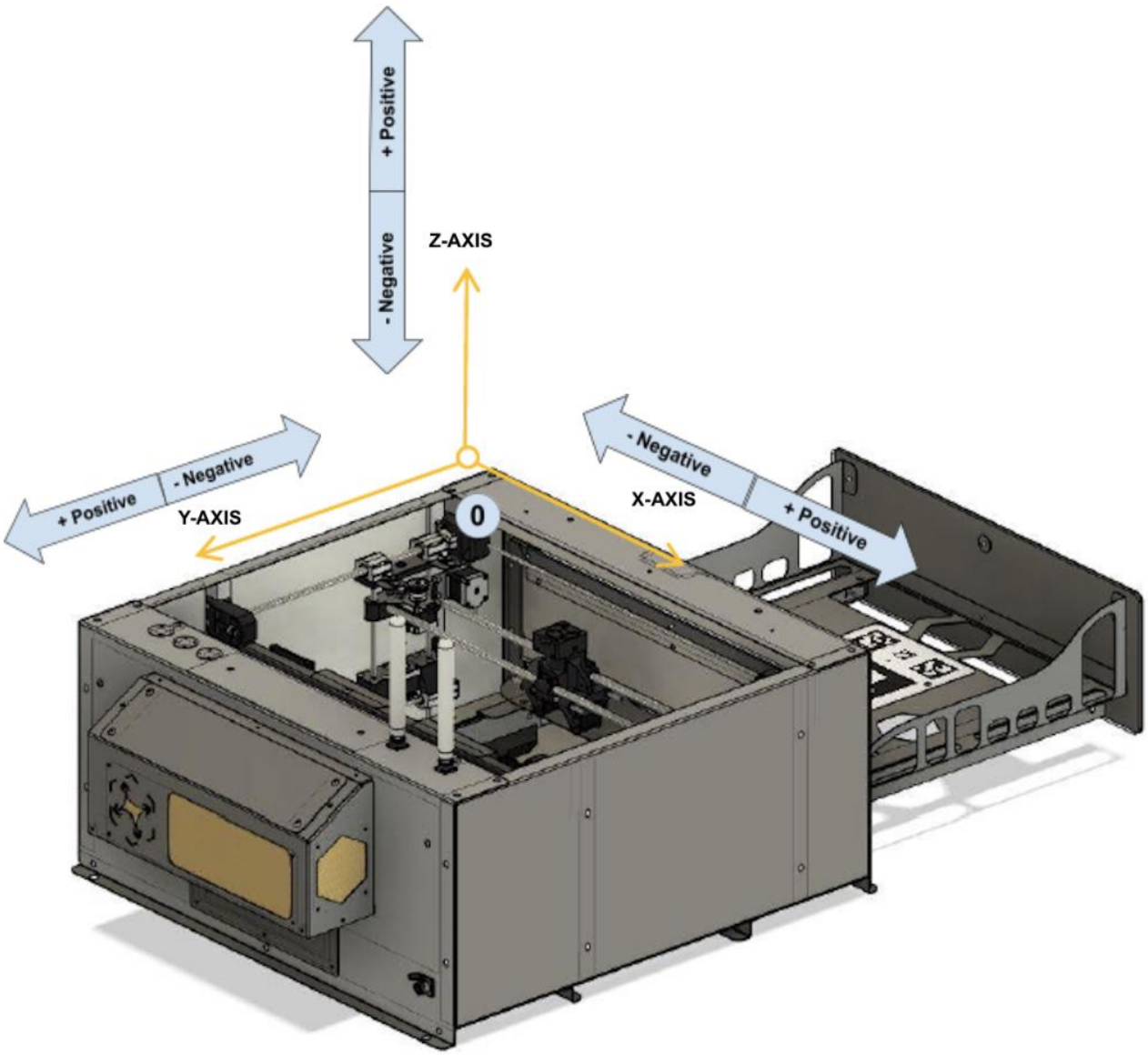

All X Values:	Positive value will move **AWAY** from Zero position
All Y Values:	Positive value will move **AWAY** from Zero position
All Z Values:	Positive value will move **CLOSER** to Zero position

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DJI mavic LED indicator chart

- Please reference the chart below to verify and address any LED indicator lights on your DJI drone.

Normal States		
R G Y	Blinks red, green, and yellow continuously	Powering on and performing self-diagnostic tests
Y G	Blinks yellow and green alternately	Warming up
G	Blinks green slowly	P-mode with GPS
G ×2	Blinks yellow twice continuously	P-mode with Forward and Downward Vision Systems
Y	Blinks yellow slowly	No GPS, Forward Vision System, or Downward Vision System
G	Blinks green quickly	Braking
G B	Blinks green and blue alternately	RTK enabled and RTK data is being used
Warning States		
Y	Blinks yellow quickly	Remote controller signal lost
R	Blinks red slowly	Low battery
R	Blinks red quickly	Critically low battery
R	Blinks red	IMU error
R ___	Solid red	Critical error
R Y	Blinks red and yellow alternately	Compass calibration required
R G	Blinks red and green alternately	RTK enabled but RTK data unavailable

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DJI Mavic compass calibration

Why should the Mavic compass be calibrated?

1. A good compass calibration is important to ensure a safe, controlled flight.
2. Rotating the three-axis magnetometers allows the aircraft flight controller to separate the surrounding magnetic field from the magnetic field of the aircraft itself

---

Warning signs

1. The Mavic can only detect when the compass is providing extremely poor *(implausible)* data. This typically occurs if you place it near a strong magnetic field. It will flash red and yellow lights and the Mavic will indicate a compass error in the app.

Compass interference

1. You can view the current compass interference in the "Main Controller Settings" --> "Advanced Settings" --> "Sensors" section of DJI GO. The colored bars should be in the green *(Excellent)* range when the Mavic is in a location that is away from magnetic influences. If the bars are in the red *(Poor)* range or close to it, move the Mavic to a different location and check again. If the compass interference is still in the red *(Poor)* range or close to it, the compass could need to be calibrated or it could be magnetized/damaged.

Note: A good compass inference value does NOT necessarily mean that your compass is working and calibrated properly.

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When should the Mavic compass be calibrated?

1. You do not need to calibrate before every flight and in some cases you definitely should not calibrate.

> ⚠ Calibrating your drone's compass on a regular basis can cause more harm than good to its operation. Only perform the calibration if:
>
> - You're flying at a location farther than six miles away from the last flight location.
> - The drone hasn't been flown for more than one month.
> - The DJI GO 4 app persistently shows compass interference warnings after changing location.

DO calibrate the Mavic compass if:

- Compass interference values are sub-par or DJI GO is displaying a compass error *(check area for magnetic metal objects before calibrating)*
- The Mavic is circling in flight while hovering in place *(also check for other possible causes)*
- New metallic equipment has been attached or removed from the Mavic *(e.g. GPS tracker)*
- If you just degaussed your compass *(don't degauss the compass unless instructed)*

DO NOT calibrate the Mavic compass if:

- The Mavic is near concrete, buildings, and/or hidden or overhead power lines/pipes/etc.
- You're indoors, on a paved surface, on a stone surface, on the beach, on a boat, on a balcony, near a car, near speakers, etc.
- There are magnetic metallic objects near the Mavic or you're not certain there are no such objects nearby.

Note: The ideal place to calibrate is a wide open location free of anything metallic within a 20ft radius.

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How to calibrate the DJI Mavic series compass

1. Remove all metal from your person that could potentially be held near the Mavic while you're calibrating *(e.g. watch or rings)*.

2. Find a location on grass or dirt and not on concrete or asphalt *(unless you know the concrete or asphalt does not contain rebar)*.

3. Power up your Mavic with all 3rd party accessories attached *(e.g. GPS tracker)*.

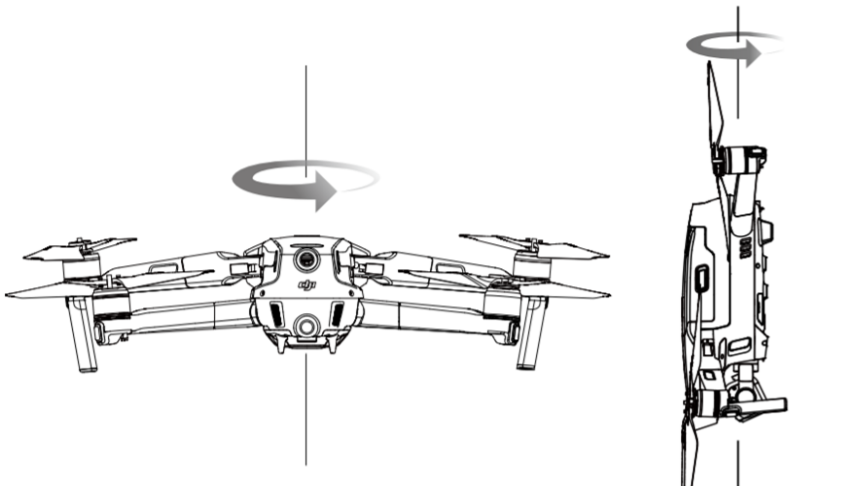
4. Wait until your Mavic is ready to fly.

5. Open the DJI GO app and tap the “Calibrate” button in the "Aircraft Status". If the "Calibrate" button does not appear there, then you can calibrate the compass from the “Advanced Settings” section of DJI GO.

6. Confirm the light on the rear of Mavic is solid yellow.

7. Pick up the Mavic and turn it smoothly and steadily a full 360 degrees *(or a little bit more)* until the rear Mavic arm lights turn solid green.
   Note: While it's okay to turn the Mavic in your hands, it's easier to hold the Mavic steady and turn your body in a circle. Point the front of the Mavic straight down and turn it smoothly and steadily a full 360 degrees *(or a little bit more)* until the rear Mavic arms start flashing green.

   Note: Don't be concerned if the Mavic gimbal reacts poorly to being face down. Continue to smoothly and steadily turn the Mavic. If for any reason you do not complete any of the above steps smoothly and evenly, restart the process.



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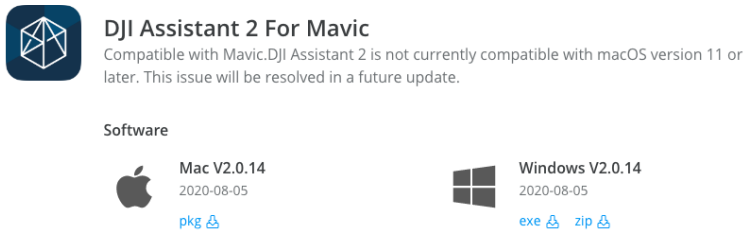
DJI Mavic vision sensor calibration

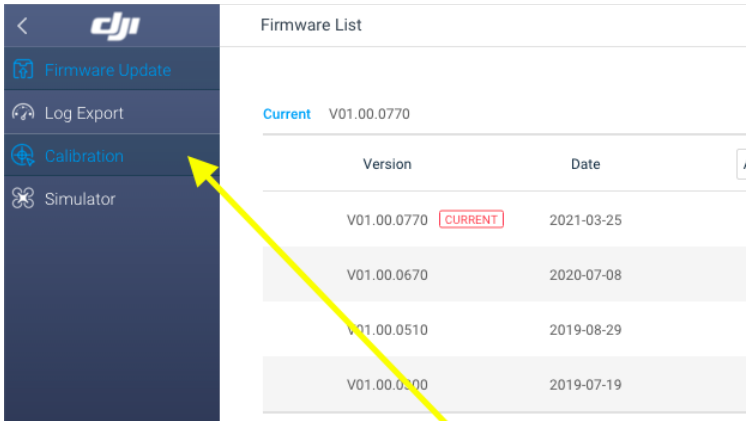
Install DJI assistant

1. First, go to the DJI Assistant download page. Log in and select your specific drone model you are currently using.
2. Click “Download” to directly install. After you installed it and saved, launch the Assistant.



Connect the drone

1. Turn on the drone (It’s a good idea to remove propellers and make sure you have the battery fully charged) Connect your drone to a mac or PC with your USB>USBC cable. **Note**: You will need a data transfer type cable for this to work.
2. After turning on the drone and connecting it to the Mac or PC with a USB>USB C cable the DJI Assistant interface will prompt your drone icon to appear on the screen.
3. Click your drone, and you will be taken to another window with options that are available for your drone.
4. To the left, choose “Calibration”. A few tutorial animations will appear on the screen showing you the technique you need to adopt for calibrating the drone. Watch them carefully.



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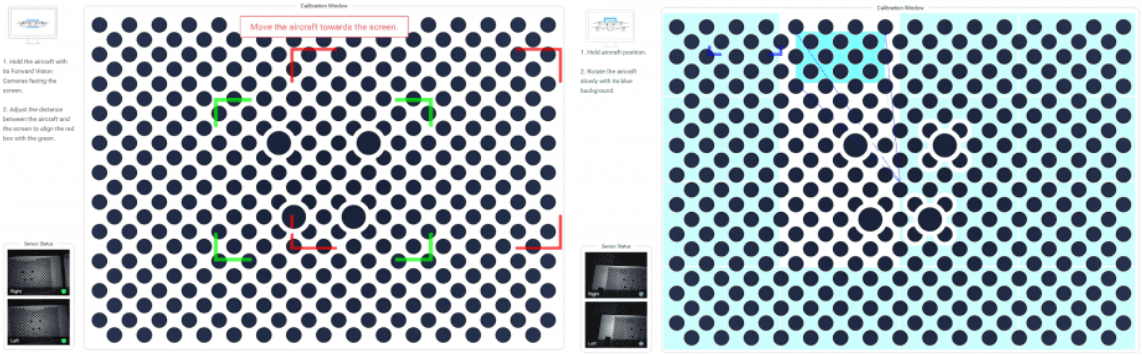
Calibrate your drone

1. Click “Calibrate Now.”
2. You will have to align the drone with the screen, and then follow the pattern instructions on the screen.

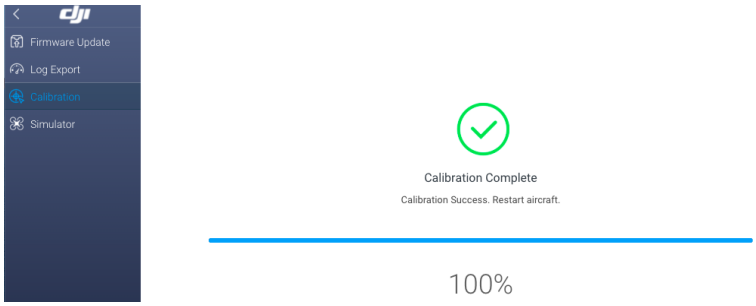
Note 1: Make sure to keep the correct distance between the drone and the screen as you go through the prompts.

Note2: Make sure to keep the drone in the same space throughout the prompts and only pivot your hands to point at the objectives on the screen. (Do not physically move the entire drone up/down).



Finishing the calibration process

1. If you completed each task you were asked to do, then you will see that window from the beginning, and it will say “Calculating…”. This means it collected all the necessary data and it’s now adjusting your sensors.
2. This step will last just a few seconds. After this, you will get a “Calibration Success!” message.
3. Now your calibration is complete, restart your aircraft.



Vision system calibration complete

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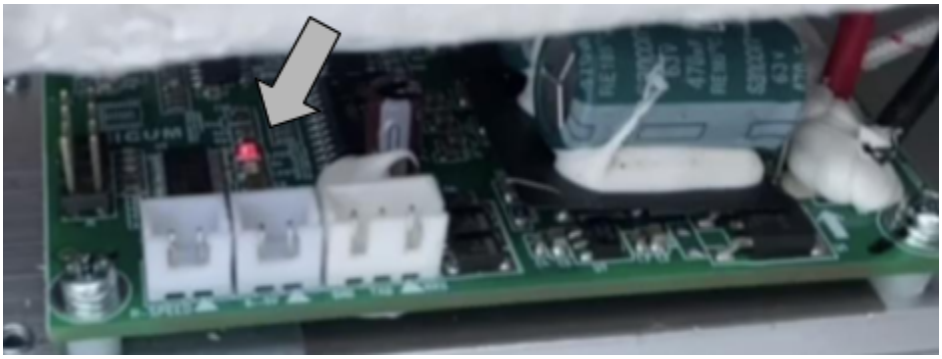
HVAC LED code troubleshooting chart

- In the case of HVAC technical issues please reference the flashing LED light on the interior HVAC board, and reference the flashing LED code to the chart below.



LED code	Failure	Description
1	Short or output over-current	The driver will alarm over current failure when the peak value of output current is larger than 30A, and stop the output. The driver will restart in 3 minutes. The driver will lock if there are more than 7 times the current within 1 hour. The alarm will clear after a power cycle.
2	Motor stall	The motor will stop the output and alarm if the motor stalls. The driver will attempt to run after 3 minutes.
3	Temperature sensor failure	The driver will shut off if the temp sensor is not detected.
4	MOSFET over temperature	Stop the output if the MOSFET temp reaches 105°c Will restart when the temp of PIM reduces to 85°c If over temp is detected the driver will stop and re-attempt after 3 minutes.
5	V_BUS low voltage	The driver will alarm - and stop the output if detected under 19v and will restore when output is over 20v for over 3 minutes.
6	V_BUS over voltage	The driver will alarm and stop the output when V_bus is higher than 33v and will restore when V_BUS is lower than 32v and last more than 3 minutes.
7	Lack phase	The driver will alarm and stop the output if disconnecting between the driver and the compressor. The drive will re-attempt after 3 minutes.

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HEXTRONICS

Global Advanced Drone Station

WARRANTY

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Manufacturer's warranty

This Limited Warranty applies only to physical goods, and only for physical goods, purchased from Hextronics LLC.

STANDARD ONE YEAR MANUFACTURER WARRANTY:

The manufacturer warrants this product to be free from defects in workmanship and materials, under normal use and maintenance, for a period of one (1) year from date of purchase. Shipping and handling fees are to be paid by the customer.
The manufacturer agrees, as its option during the warranty period:

- To repair and replace any defective components without charge (except for a fee for shipping, handling, packing, return postage, and insurance which will be incurred by the customer).
- Such repair or replacement is subject to verification of the defect or malfunction and proof of purchase as confirmed by showing the Record of Purchase form with corresponding Model and Serial Number.

Warranty limitations

This warranty does not include:

- Any condition resulting from other than ordinary residential wear or any use for which the product was not intended, such as use in rental or contract trade or commercial use
- Any condition resulting from incorrect or inadequate maintenance or care
- Damage resulting from misuse, abuse, negligence, accidents or shipping damage
- Dissatisfaction due to buyer’s remorse
- Normal wear and tear
- Damages incurred during transportation
- Damages incurred during assembly or maintenance
- Any used, previously displayed items

The Company makes no express warranty or condition whether written or oral and the company expressly disclaims all warranties and conditions not stated in this limited warranty. To the extent allowed by the local law of jurisdictions outside the United States, the Company disclaims all implied warranties or conditions, including any implied warranties of merchantability and fitness for a particular purpose. For all transactions occurring in the United States, any implied warranty of condition of merchantability, satisfactory quality, or fitness for a particular purpose is limited to the duration of the express warranty set forth above. Some states or countries do not allow a limitation on how long an implied warranty lasts or the exclusion of limitation of incidental or consequential damages for consumer products. In such states or countries, some exclusions or limitations of this warranty may not apply to the Purchaser. For consumer transactions, the

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warranty terms contained in this statement, except to the extent lawfully permitted, do not exclude, restrict, or modify but are in addition to the mandatory statutory rights applicable to the sale of this Product to the Purchaser.

All warranty claims must be filed by the consumer directly to the manufacturer. Please retain Record of Purchase for warranty purposes.

CLAIM PROCEDURES:

● Claims for defective merchandise must be made within ONE year from the date of purchase. Claims for missing parts must be made within 60 calendar days after the merchandise is received
● Any claim for defective merchandise returns must be packaged in original packaging
● We reserve the right to specify that items be returned to the original warehouse for inspection or be inspected by our representative in the field
● Pictures are required to claim defective merchandise, along with a Record of Purchase form.
● If the claim is justified, the item(s) or part(s) will be repaired or replaced.It is our policy to replace parts whenever possible.

This warranty gives you specific legal rights. You may have other rights, which vary from state to state.

Conclusion

Thank you for using the **Hextronics Global Advanced Drone Station.**

Please reach out to **Support@Hextronics.Tech** for help & support.

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