

# DJI O3 AIR UNIT

## Installation Guidelines

### Scenario 1: Video Image Shakes After Enabling RockSteady

#### Issue

Mechanical vibration at certain frequencies may result in abnormal EIS (electronic image stabilization) performance of the DJI™ O3 Air Unit.

#### Cause

##### IMU Resonance

The usual ESC (electronic speed control) PWM (pulse-width modulation) control frequency is 24 kHz by default, and the camera IMU frequency is around 24 to 30 kHz. If there is no effective vibration absorbing measure, the motor vibration may be transmitted to the camera IMU, causing resonance because the frequencies coincide. The resonance will affect the IMU data accuracy and EIS performance of the video stabilization application.<sup>[1]</sup> As a result, the processed video image shakes, but the liveview image is not affected.

Usually, aircraft frames with TPU or vibration absorbing rubber are not prone to the IMU resonance issue.

[1] Video stabilization application: refers to either the DJI O3 Air Unit EIS function or a third-party video stabilization software.

#### Rolling Shutter Effect

If the rolling shutter effect appears in both the liveview and the video image, it is usually because the propeller vibration (frequency is around a few hundred Hz) is transmitted to the camera through the aircraft frame.

### Troubleshooting and Tuning Guide

Follow the steps below to troubleshoot and fix the image stabilization issue:

#### Step 1: rule out the IMU resonance issue

1. Remove the propellers from the aircraft. Make sure that the camera is securely mounted and the aircraft is placed stationary on the ground. Then enable RockSteady and start recording.
2. Start the motors and slowly push the throttle to the full position. Observe the liveview in the goggles. If the liveview is not shaking, stop the motors and end the recording. Otherwise, check the camera and make sure it is securely mounted.
3. Check the recorded video. If the video image shakes, the issue is most likely caused by the resonance between the frame and the camera IMU. In this case, refer to the following solutions:

#### Solutions

- a. Change the ESC PWM control frequency to 48 kHz or 96 kHz and test again.

- b. If the video image shakes after the solution (a) is adopted, apply a softer vibration absorbing structure between the camera and the aircraft frame. Repeat the above testing procedures until the video image does not shake.

## Step 2: rule out the rolling shutter effect issue

After ruling out the IMU resonance issue, check if the video image has the rolling shutter effect.

1. Install the propellers on the aircraft and make sure that the propellers are not damaged.
2. Fly the aircraft and start recording with RockSteady enabled. Check the video image after the flight. If the video image has a rolling shutter effect, try the following solutions:
  - a. Adjust the vibration absorbing structure between the camera and the aircraft frame again.
  - b. Adjust the tightness of the screws that fasten the camera to the aircraft frame.

If the issue still exists after all the above methods are completed, contact DJI for support.

## Scenario 2: DJI O3 Air Unit Installation Method and Cooling Effect

### Background

DJI O3 Air Unit is integrated with both the image transmission module and the camera module. Compared with the last generation DJI Digital FPV System, the size of DJI O3 Air Unit is reduced by 40%, while the power consumption is increased by 40%. Restricted by its cooling condition, extra ventilation and heat dissipation measures are necessary when installing the air unit.

Standby Time (from cold start):

- Environment temperature 25° C (77° F): 8 mins
- Environment temperature 35° C (95° F): 5 mins

When installing the DJI O3 Air Unit, make sure that the RX and TX pins are correctly connected to the flight control board. The air unit can apply different temperature control strategies for the standby and flight states.<sup>[2]</sup>

[2] DJI O3 Air Unit has two sets of temperature control strategies for the standby state and the flight state:

- In the standby state, the protection system will be activated to automatically shut down the air unit after overheating.
- In the flight state, there will be a prompt alert after overheating and the video recording will end. At this time, the video transmission will remain connected and the aircraft must return and land within 30 seconds. If the temperature of the internal IC board continues to rise, the protection system will be activated to shut down the air unit automatically.

### Installation Guidelines

Recommended installation practices that are effective for ventilation and heat dissipation:

- It is recommended to mount the air unit in a position close to the propellers (distance between the air unit module and the propellers within 10 mm) so that the downwash can be effectively utilized.
- Use a heat conductive material to connect the aircraft frame and the air unit module. This will dissipate heat to the carbon plate and other metal components of the frame. Conducting the heat will extend the operating time.

- DO NOT install the air unit in an enclosed area.

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 The metal casing of the DJI O3 Air Unit will become hot after being powered on. The air unit should not be installed in a position that is easily accessible.

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