YO Vibration Monitor.

www.yosensi.io

Telemetry experts

LoRaWAN-based communication

BLE 5.0 support

Efficient device deployment& management

Support for multiple LoRaWAN regions

High-quality products made in EU

Release notes

Released	Version	Key changes
17.05.2024	1.0	Initial release.

Content

Application

- YO Vibration Monitor is a LoRaWAN device for monitoring vibrations in electric motors. The vibration sensor includes an accelerometer and a temperature sensor.
- Additionally, the YO Vibration Monitor has built-in temperature and humidity sensors.
- The device uses 3-axis composite measurements to detect vibrations and transmits data via LoRaWAN. Its installation is non-invasive, as it is battery-powered and does not require additional cables.
- The device is used in predictive maintenance for monitoring the condition of machines, production lines, and similar applications.
- YO Vibration Monitor replaces traditional inspections, enabling remote detection and continuous monitoring.
- Based on the data collected by the device, maintenance costs can be optimised, unnecessary repairs can be prevented, and unplanned downtime can be eliminated.

Components

- The device consists of a **microcontroller** (with Bluetooth Low Energy), communication modules (LoRa), temperature and humidity sensor and a port for connecting an external vibration sensor.
- YO Vibration Monitor includes an **ABS enclosure**, ideal for a wall or ceiling mount and smart applications.

Operation of the device

- A LoRaWAN network is required for data transmission.
- It is possible to configure or reconfigure device parameters, **at any time**, via BLE.
- **Yosensi** provides access to a convenient **Mobile Application**, enabling adaptation, device configuration, as well as firmware updates and many other options to facilitate the use of Yosensi **devices.**

- It is recommended to add the device to the **Yosensi Management Platform**, which allows detailed and easy monitoring of the data transmitted by the devices.

Device configuration

LoRaWAN settings	Network type (private or public) operating mode selection (OTAA or ABP)	
	OTAA • Device EUI • Application EUI • Application Key • Number of trails	**ABP** • Device address • Network session key • Application key
Bluetooth Low Energy (BLE) settings	Transmission power Advertising frame interval	
Device settings	Measuring interval	

Advantages

- **Production quality** - made in the **European Union** by **qualified engineers**.
- The device has a 3-axis vibration and temperature sensor.
- Several convenient mounting options for the vibration sensor, including magnet mounting.
- Easy installation without the need for additional wiring
- The device enables predictive maintenance of machines and production lines.
- YO Vibration Monitor replaces traditional inspections by enabling remote detection and monitoring of electric motors.
- The YO Vibration Monitor provides convenient operation and secure data transmission.
- Tracking condition of rotating elements based on the acceleration.
- Depending on the version, the **LoRa radio** can operate in different regions (e.g., EU868, US915, AU915, AS923) adapted to several ISM frequency bands.
- Using **Bluetooth** Low Energy (BLE) provides:

- *Configuration convenience (in a user-friendly way via a JSON data exchange format)*
- *Possibility of firmware update via OTAA*
- *Very low energy consumption*

- **Supported LoRaWAN** network type: private or public and connection over **ABP** or **OTAA**.
- Access to the **Yosensi Management Platform** and **Yosensi Mobile Application** for device configuration, firmware updates and infrastructure management.
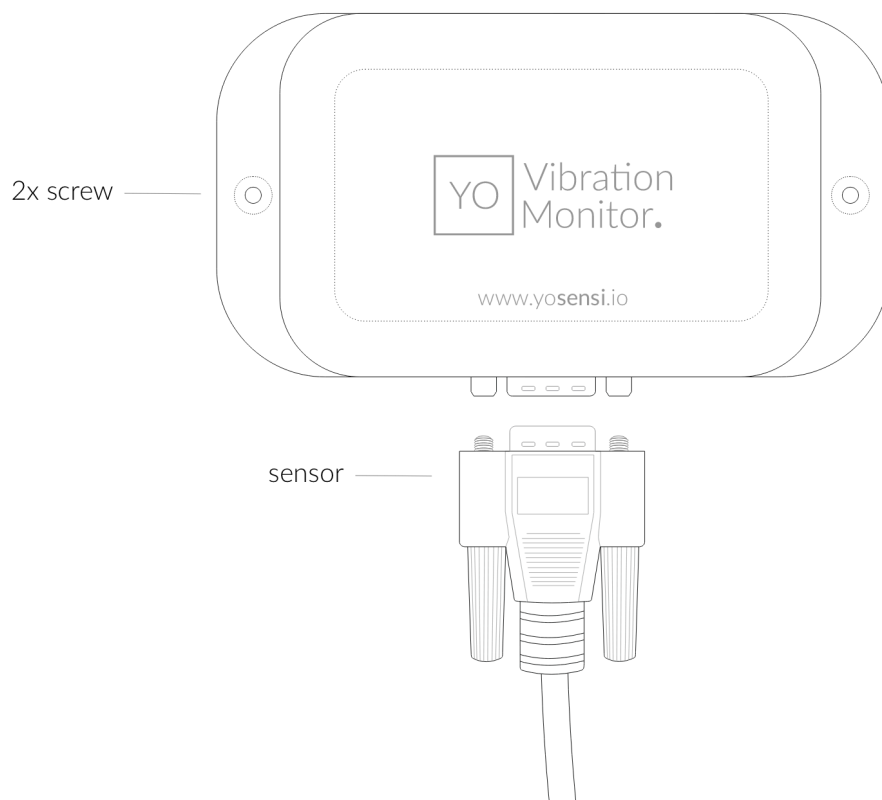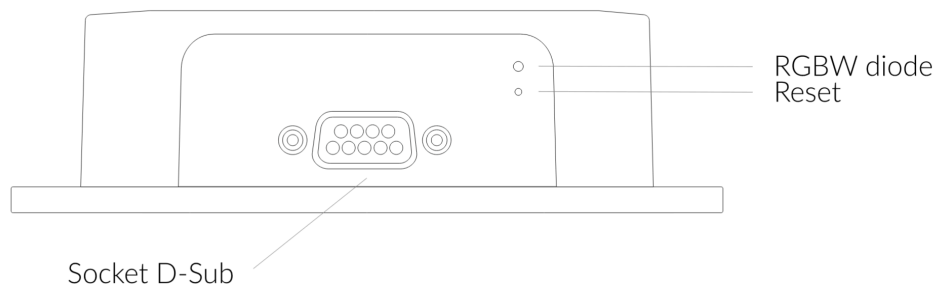
Technical details

Figure 1 Top view of the device.

RGBW diode
Reset

Socket D-Sub

Figure 2 *Side view of the device.*

Enclosure of the device

Dimensions	Height: 35 mm Width: 67,3 mm Depth: 124,3 mm
Colour	White
Installation	Horizontal Vertical (can be screwed to the wall)
Enclosure material	ABS (FR)
Level of protection	IP40
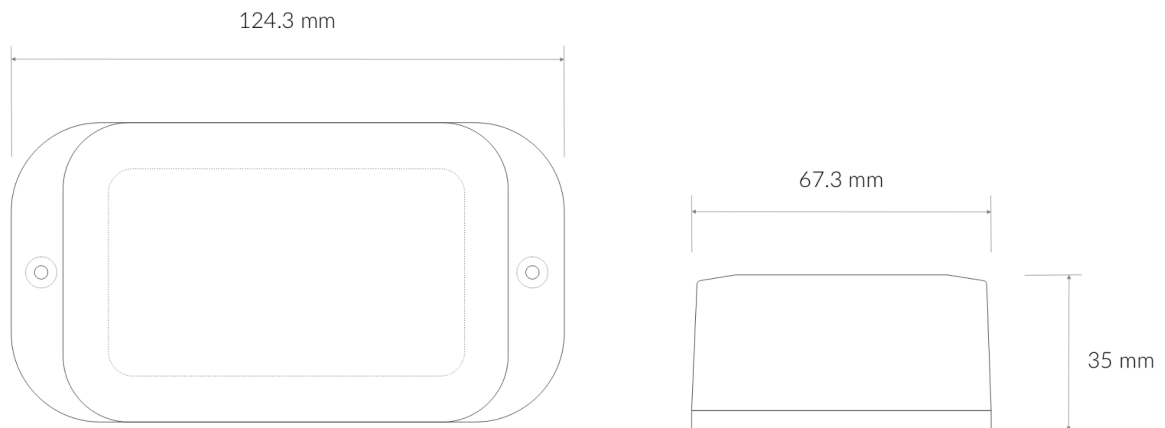
Figure 3 Dimension of the device.

Enclosure of the vibration sensor

Dimensions	Height: 35 mm Width: 35 mm Depth: 20 mm
Colour	Grey
Installation	Magnet Mounting (on request) Internal Thread Mounting External Thread Mounting Mounting Bracket
Enclosure material	ABS (FR)
Level of protection	IP67
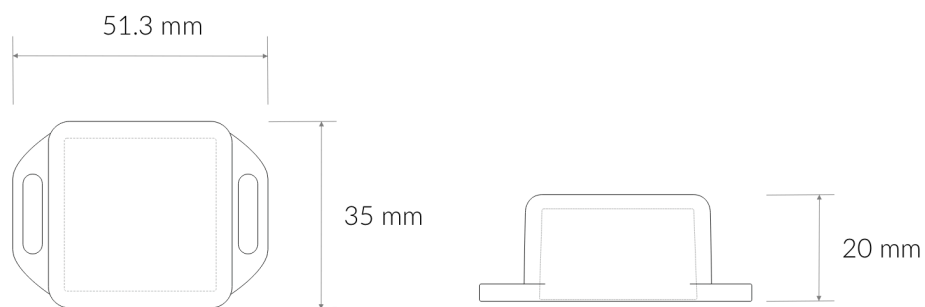
Figure 4 *Dimension of the vibration sensor.*

Parameters

Tx power	LoRa EU868: to +14 [dBm] LoRa US915, AU915, AS923: to +22 [dBm] Bluetooth Low Energy (BLE): -20 to +6 [dBm]
Power supply	3 x AA battery (3 x 1,5 V)
Power consumption	Maximum: 120mA (4,5 VDC)
Measuring range	**Temperature:** Measuring range: –40°C to 125°C (*-40°F to 257°F*) Accuracy: ±0,2°C (*at temperatures between 5°C and 60°C (41°F to 140°F)*) **Humidity:** Measuring range: 0% to 100% Accuracy: ±2% (*relative humidity from 20% to 80%*) **Acceleration X-Y-Z:** Amplitude range: ±16 g Sensitivity: 0.488 mg/LSB Noise X/Y/Z: 75/75/110 µg/√Hz Frequency range: 10 to 6300 Hz Vibration data: Acceleration RMS, peak, Velocity RMS, Displacement, Crest factor Statistical data: Standard deviation, Skewness, Kurtosis
Weight	106 g (without batteries)
Certificates	C€

Sample charts

Figure 5 *Example chart of Velocity RMS axis X.*
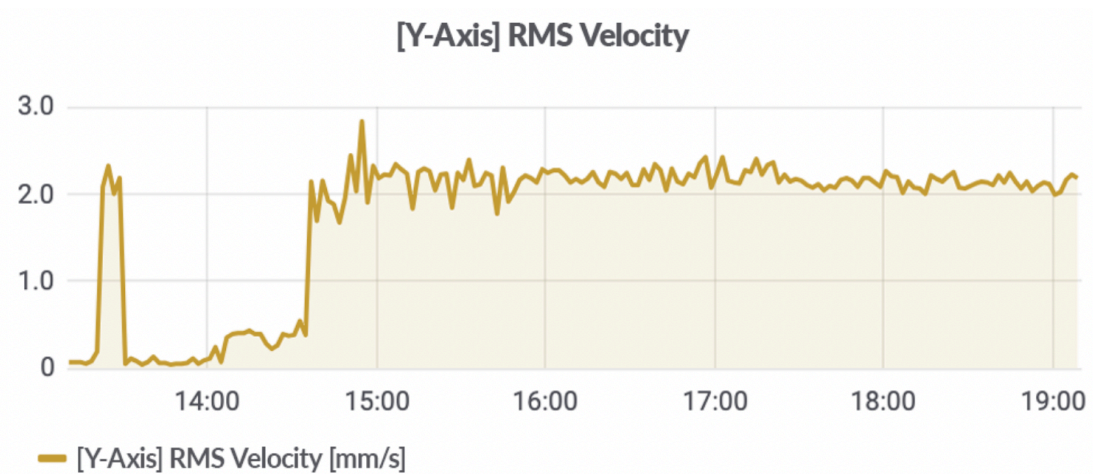
Figure 6 *Example chart of Velocity RMS axis Y.*
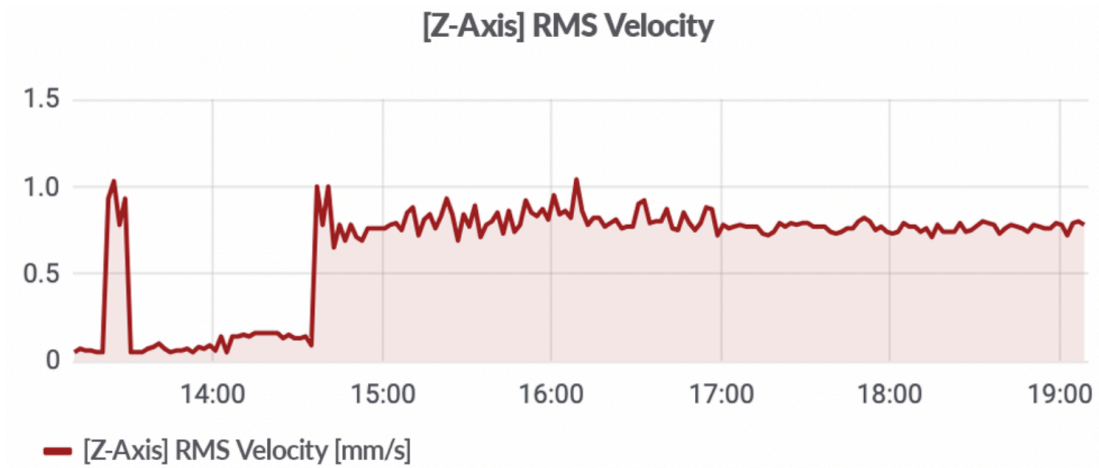
Figure 7 Example chart of Velocity RMS axis Z.
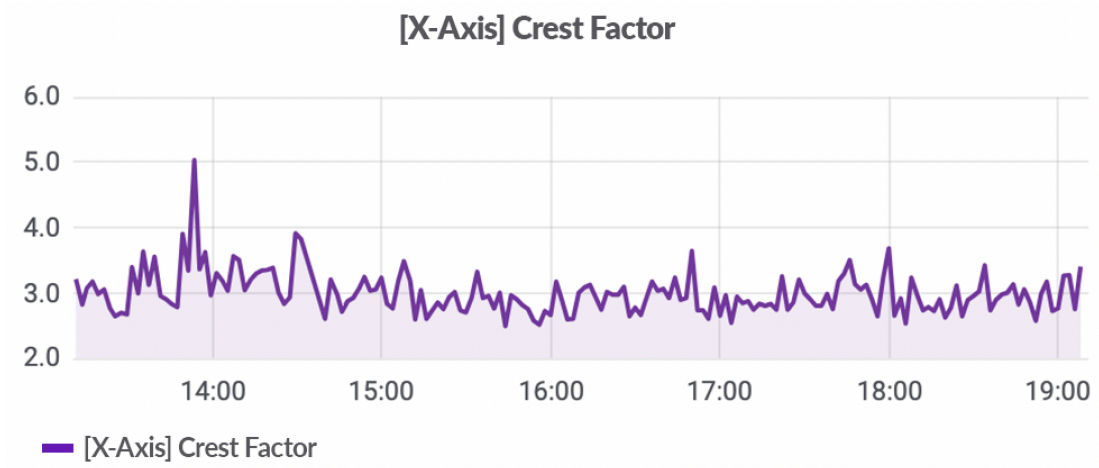
Figure 8 Example chart of Crest Factor axis X.
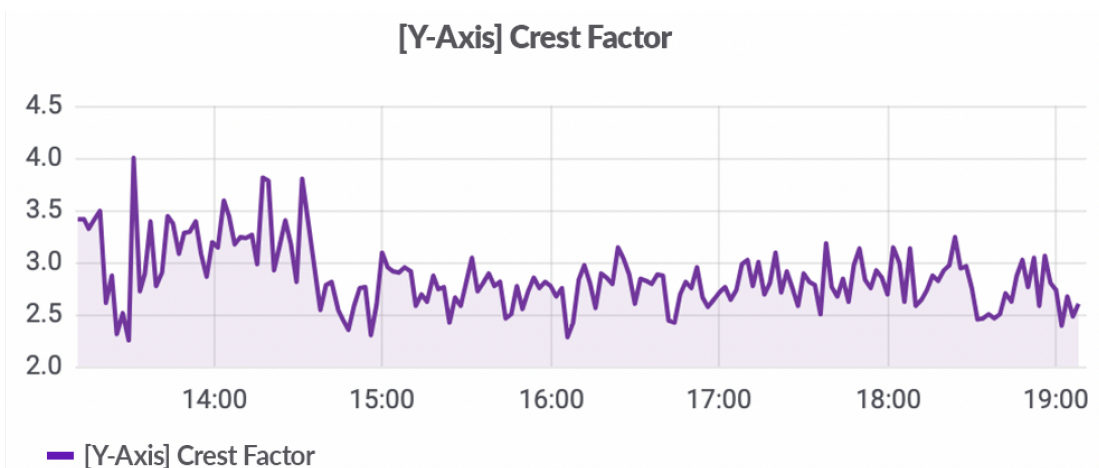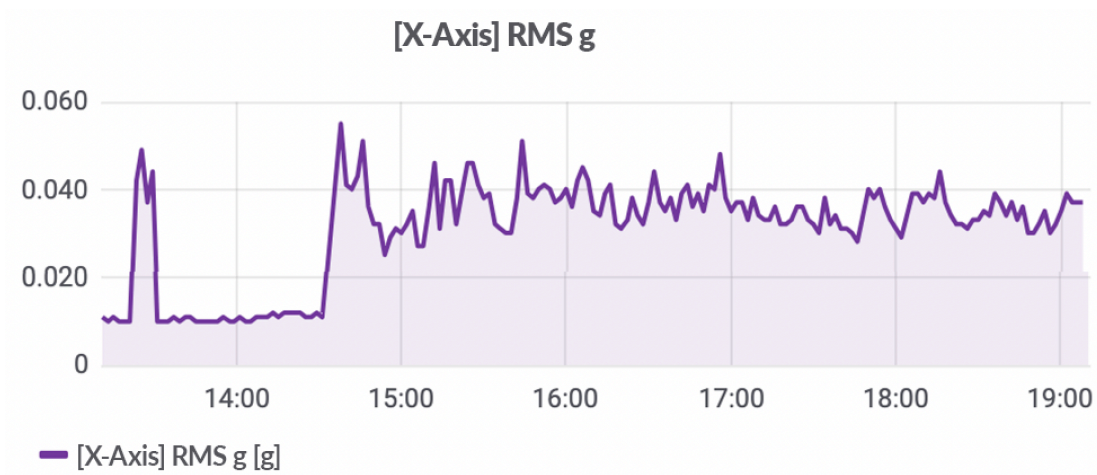

Figure 9 Example chart of Crest Factor axis Y.
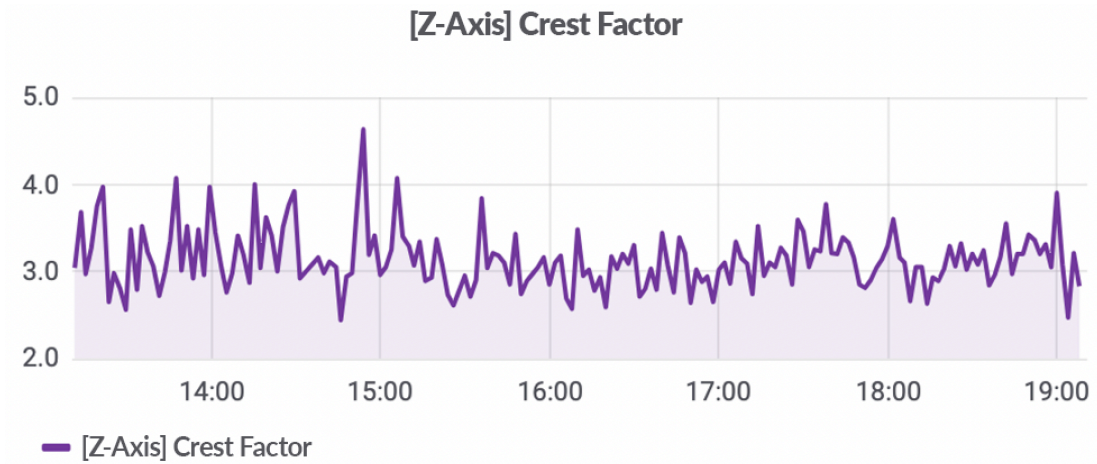
[Z-Axis] Crest Factor

Figure 10 Example chart of Crest Factor axis Z.

[X-Axis] RMS g

Figure 11 Example chart of acceleration RMS axis X.

[Y-Axis] RMS g
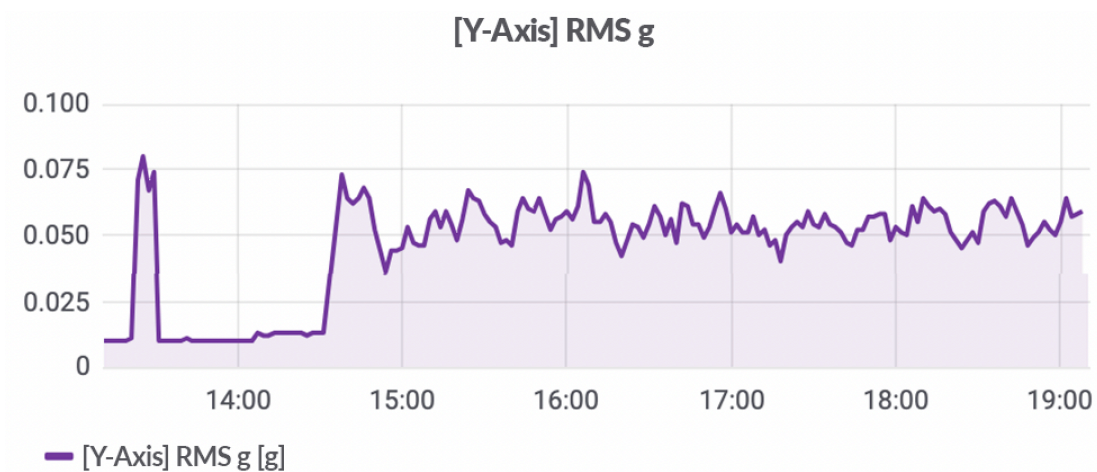
Figure 12 Example chart of acceleration RMS axis Y.

[Z-Axis] RMS g

— [Z-Axis] RMS g [g]
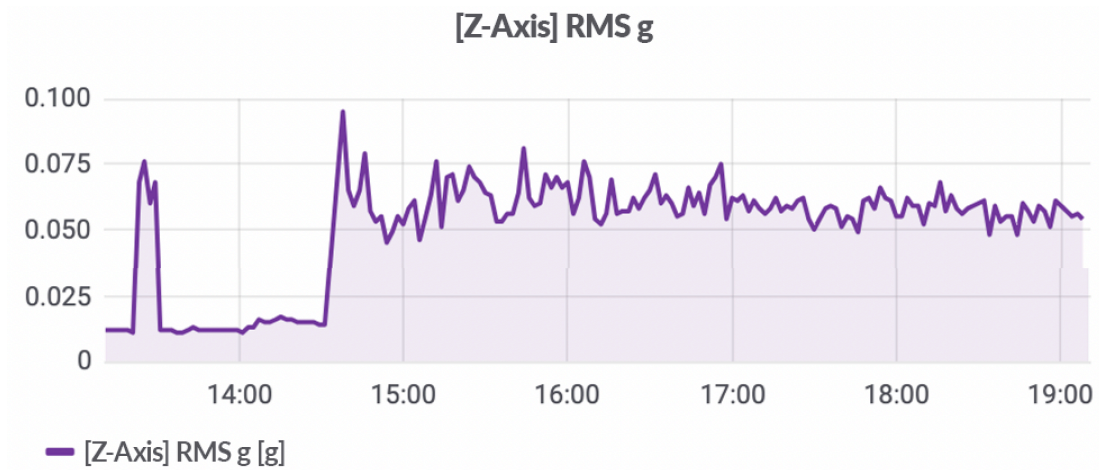
Figure 13 Example chart of acceleration RMS axis Z.

[X-Axis] Peak g

— [X-Axis] Peak g [g]
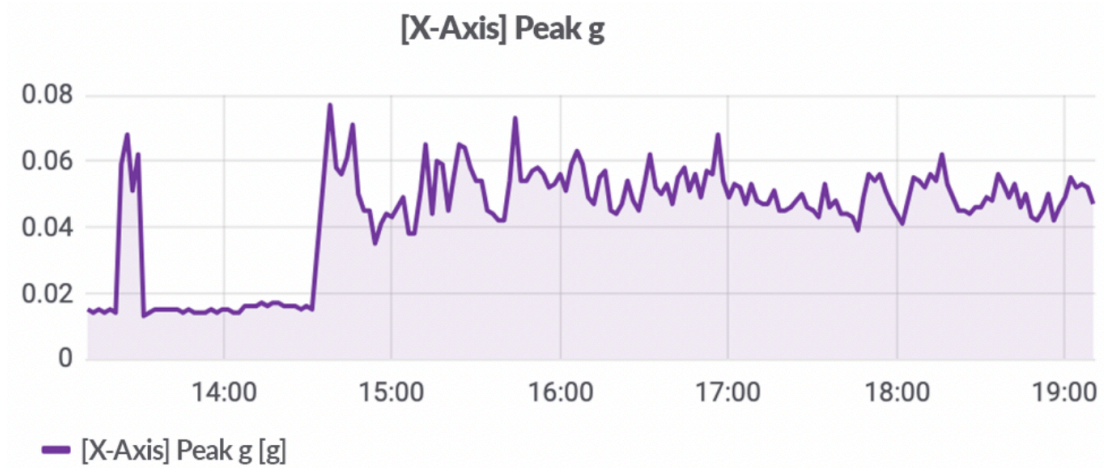
Figure 14 Example chart of acceleration Peak axis X.

[Y-Axis] Peak g

— [Y-Axis] Peak g [g]
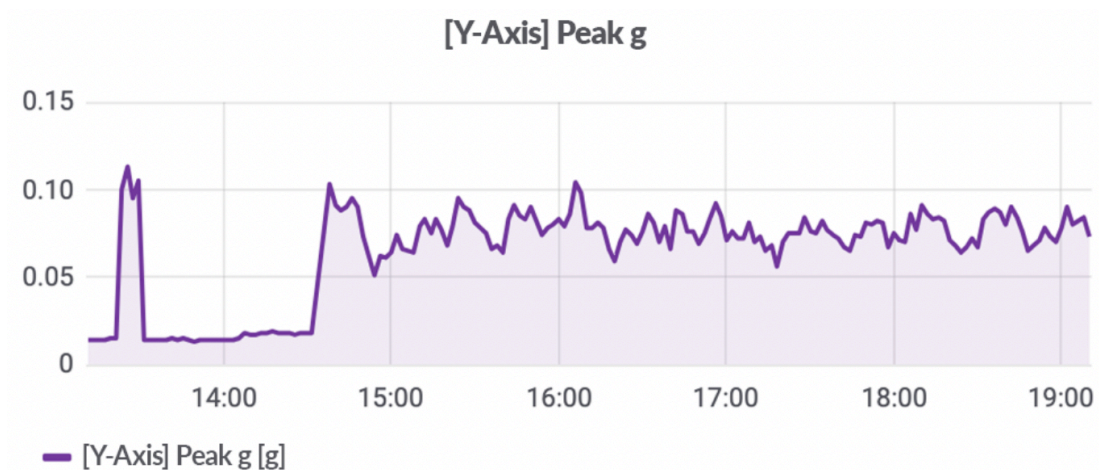
Figure 15 Example chart of acceleration Peak axis Y.

[Z-Axis] Peak g
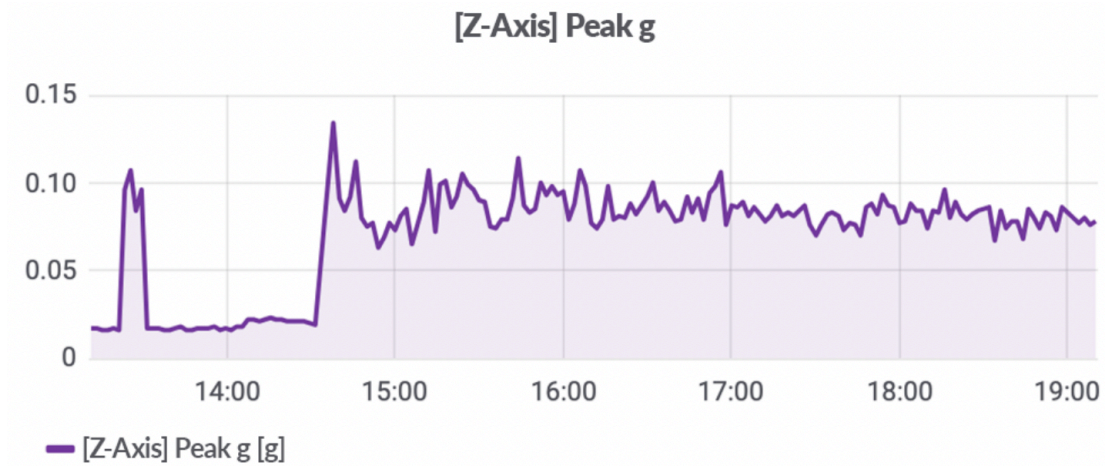
Figure 16 *Example chart of acceleration Peak axis Z.*

[X-Axis] Peak-to-Peak Displacement
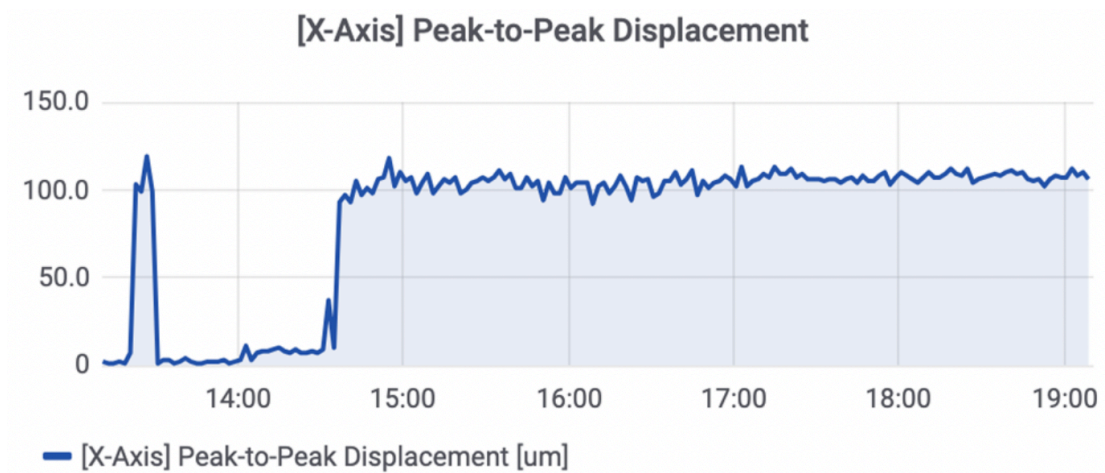
Figure 17 *Example chart of acceleration Peak-to-Peak Displacement axis X.*

[Y-Axis] Peak-to-Peak Displacement
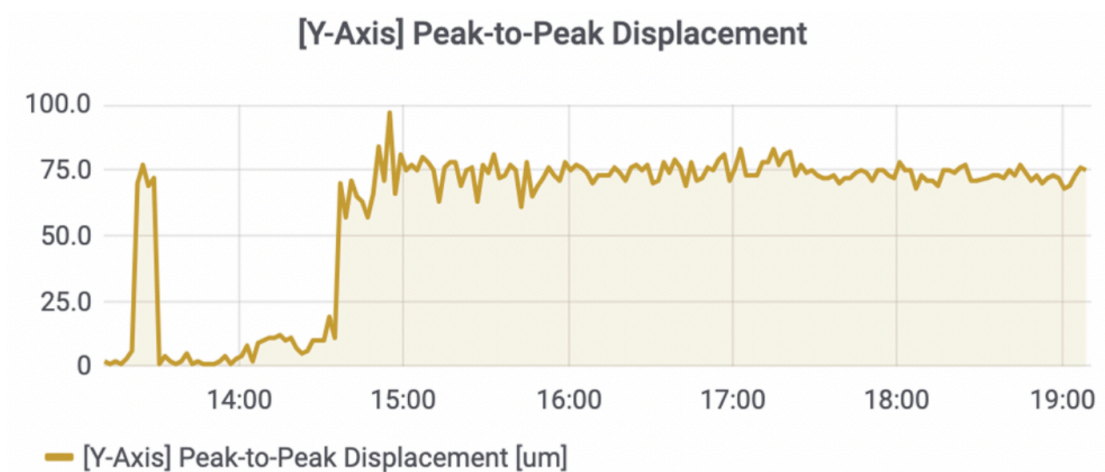
Figure 18 *Example chart of acceleration Peak-to-Peak Displacement axis Y.*

[Z-Axis] Peak-to-Peak Displacement

— [Z-Axis] Peak-to-Peak Displacement [um]
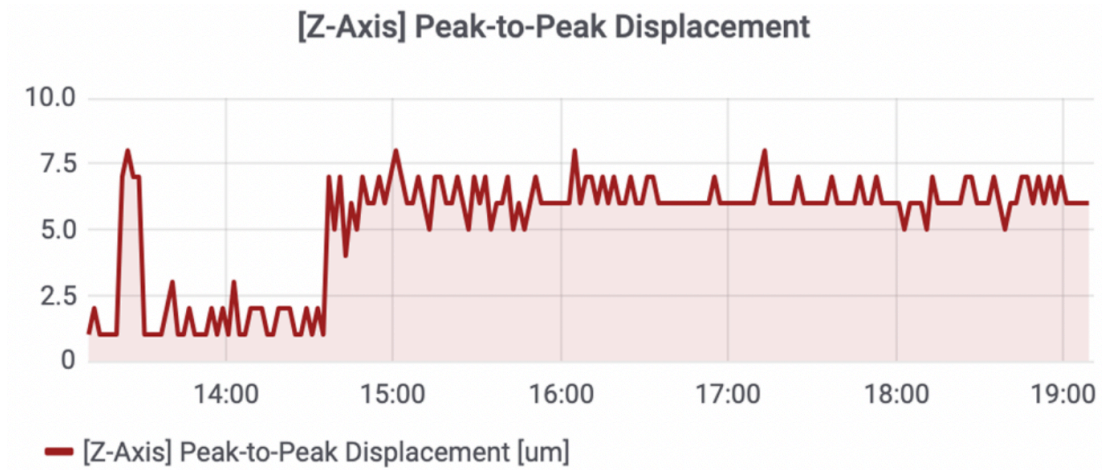
Figure 19 Example chart of acceleration Peak-to-Peak Displacement axis Z.

[X-Axis] Deviation
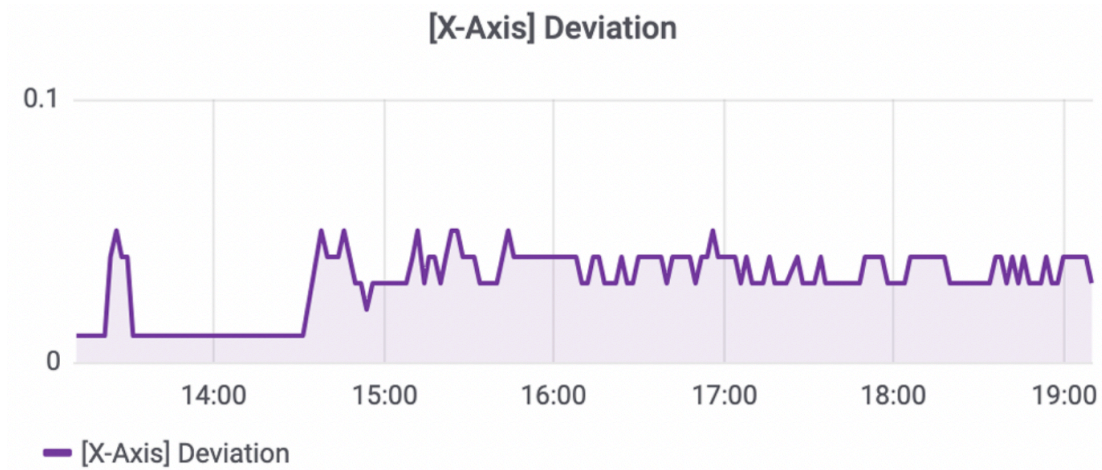
— [X-Axis] Deviation

Figure 20 Example chart of acceleration Deviation axis X.

[Y-Axis] Deviation
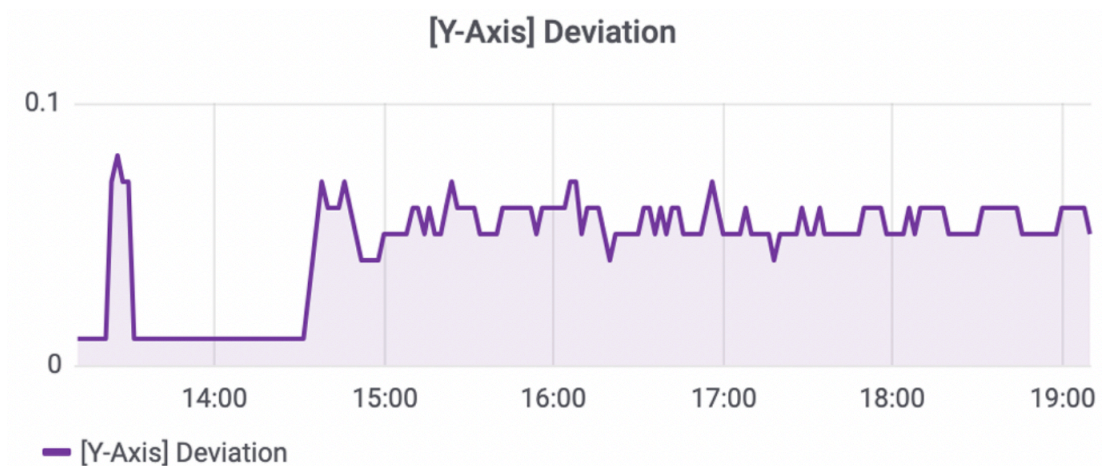
— [Y-Axis] Deviation

Figure 21 Example chart of acceleration Deviation axis Y.
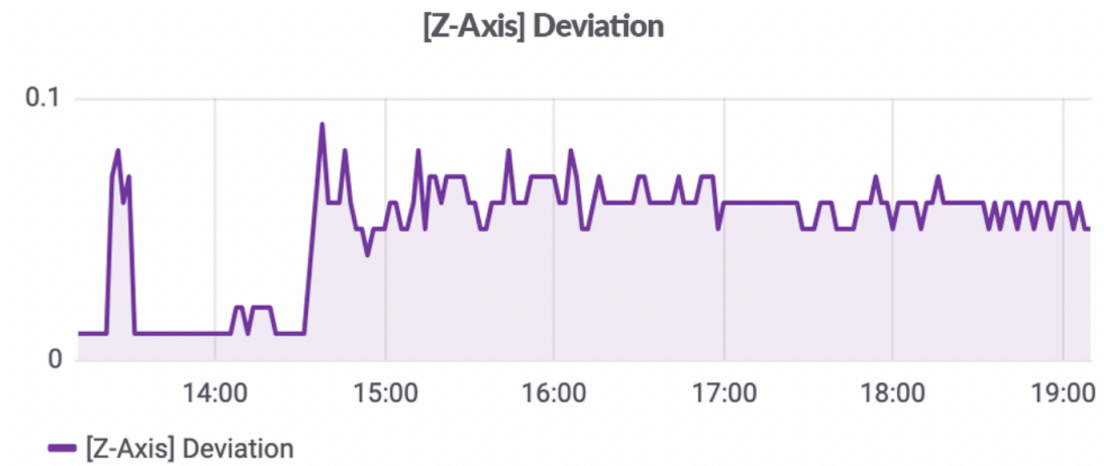
Figure 22 Example chart of acceleration Deviation axis Z.
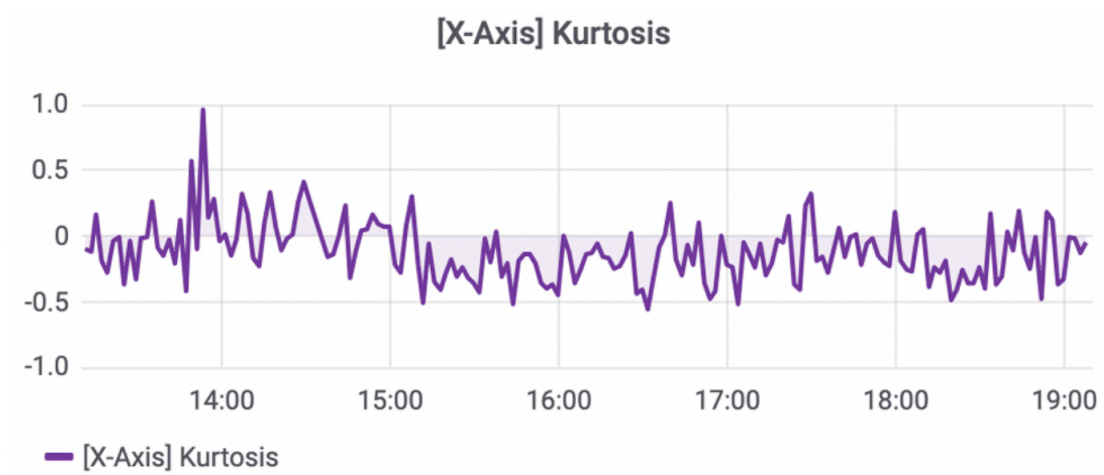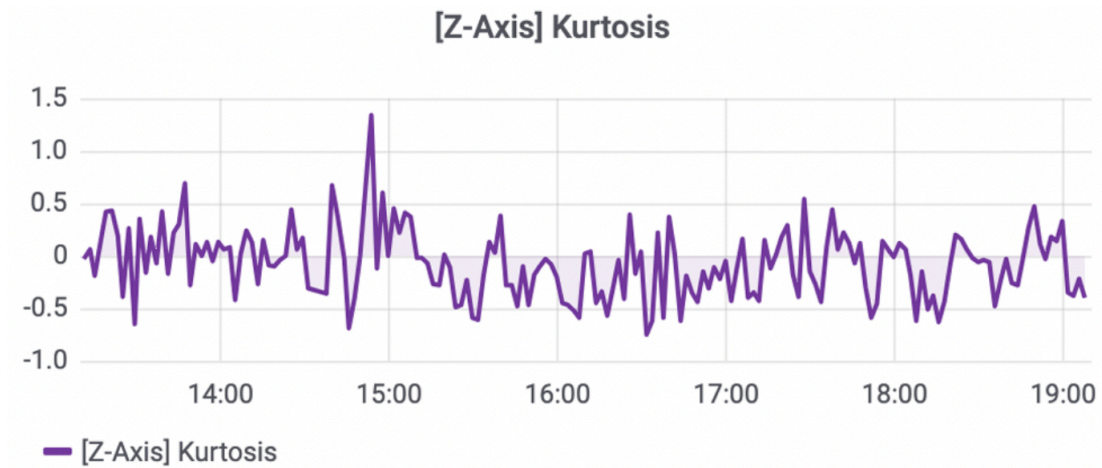

Figure 23 Example chart of acceleration Kurtosis axis X.
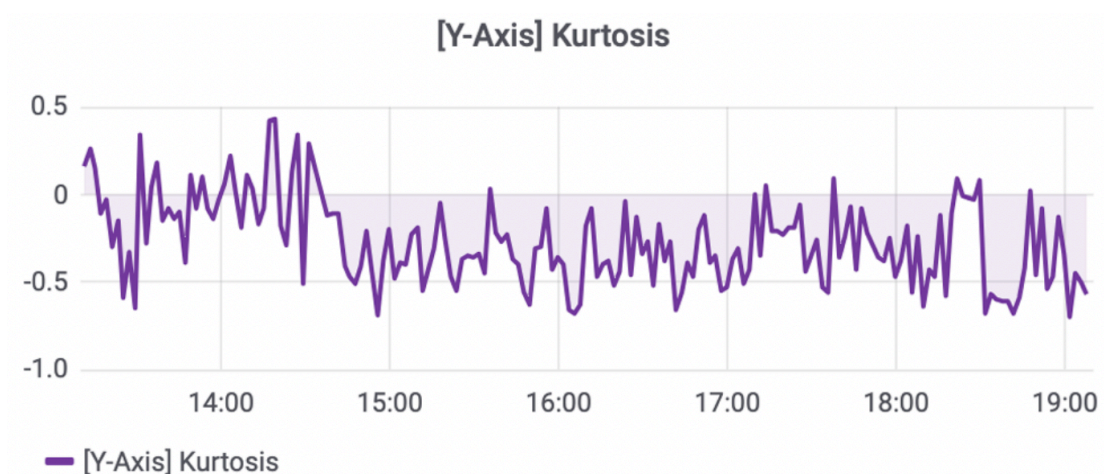
Figure 24 Example chart of acceleration Kurtosis axis Y.

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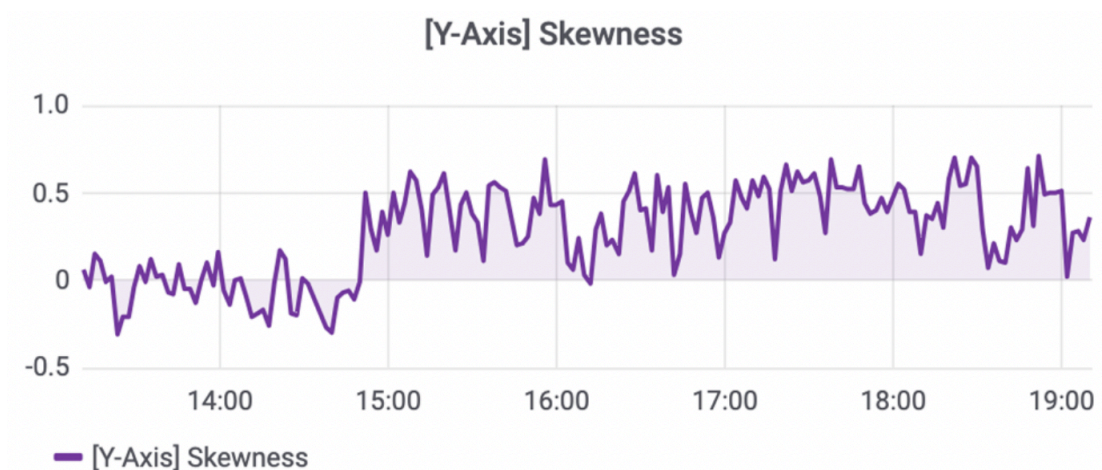*Figure 25 Example chart of acceleration Kurtosis axis Z.*
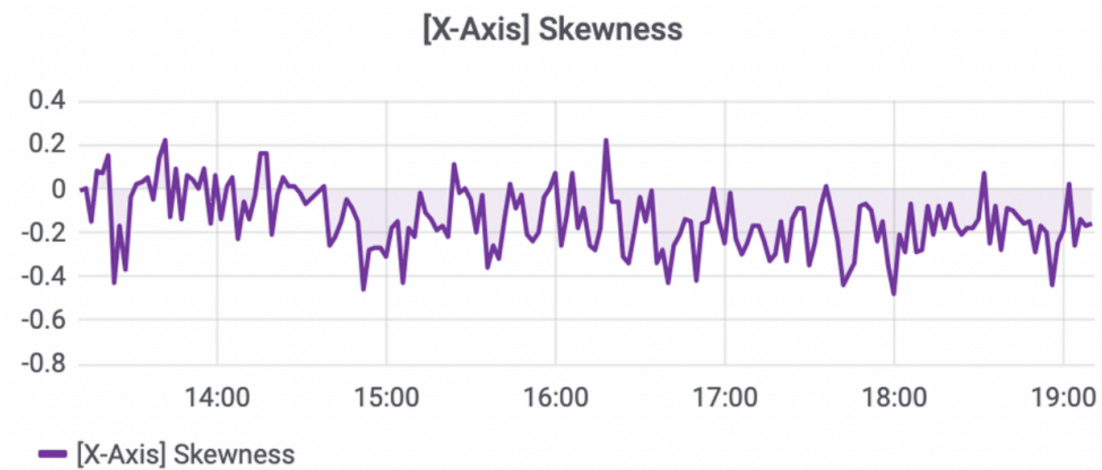
Figure 26 Example chart of acceleration Skewness axis X.

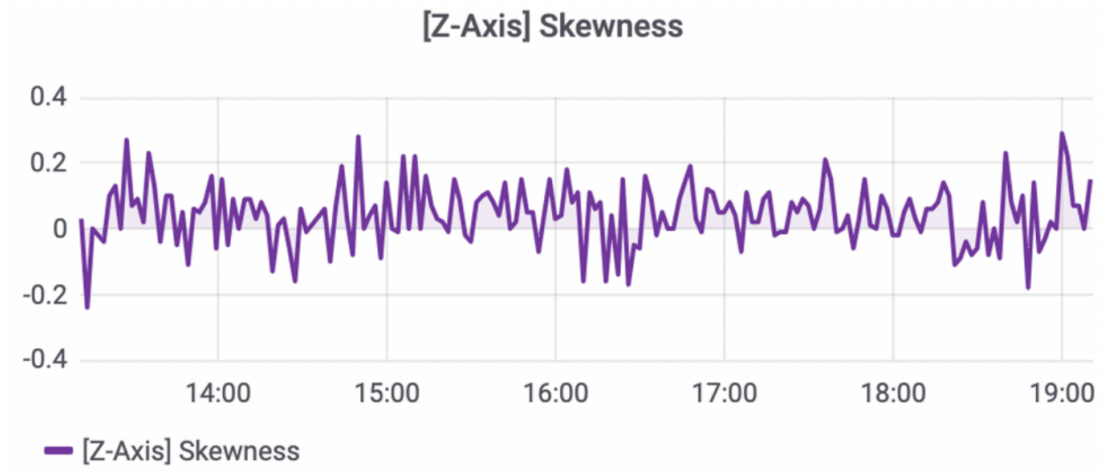*Figure 27 Example chart of acceleration Skewness axis Y.*
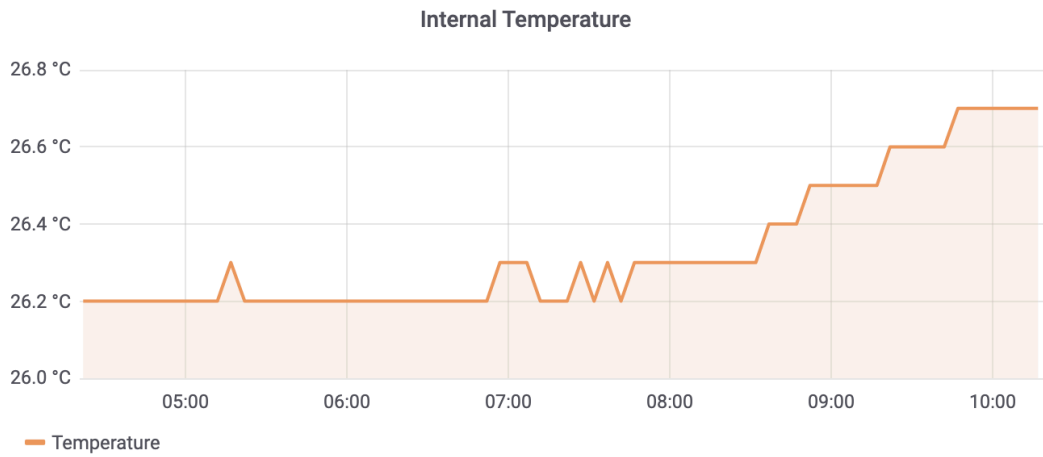
Figure 28 **Example chart of acceleration Skewness axis Z.**

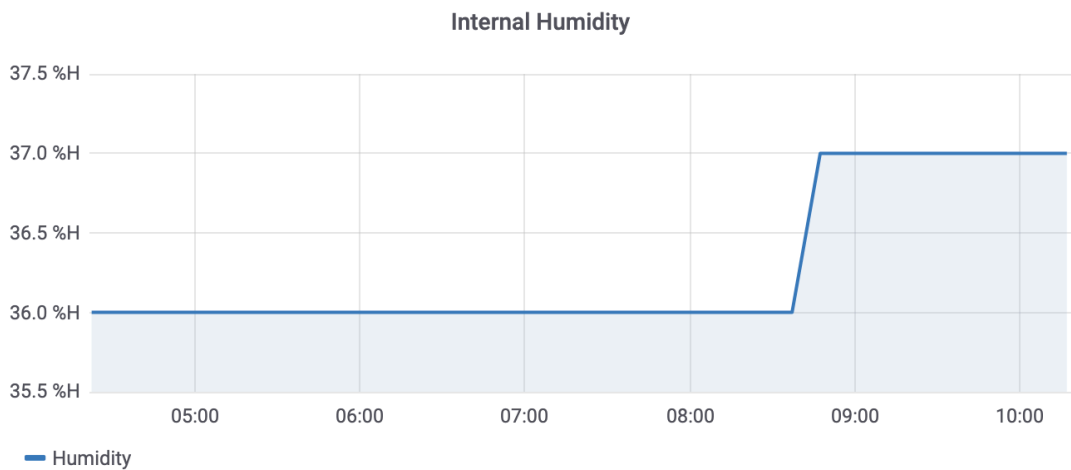
Figure 29 **Example chart of internal temperature.**

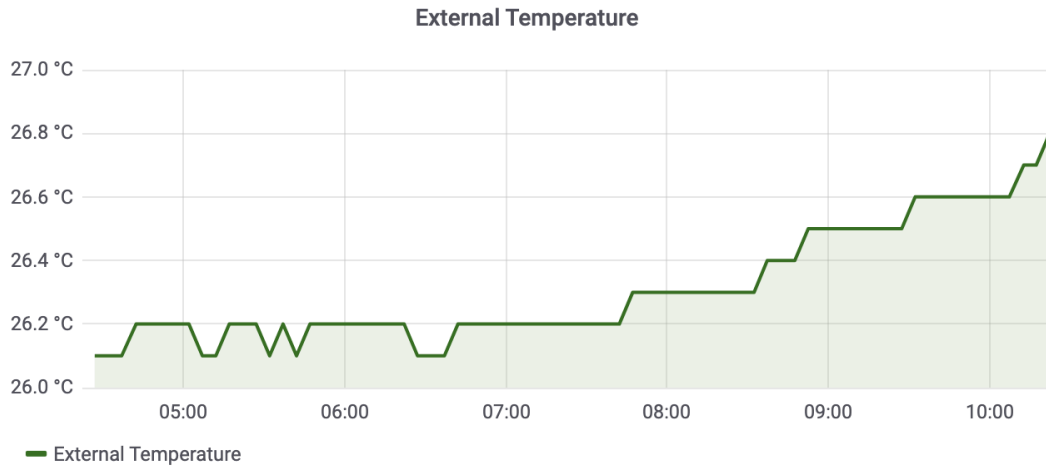*Figure 30* **Example chart of humidity.**

External Temperature

Figure 31 Example chart of external temperature.

Battery Level
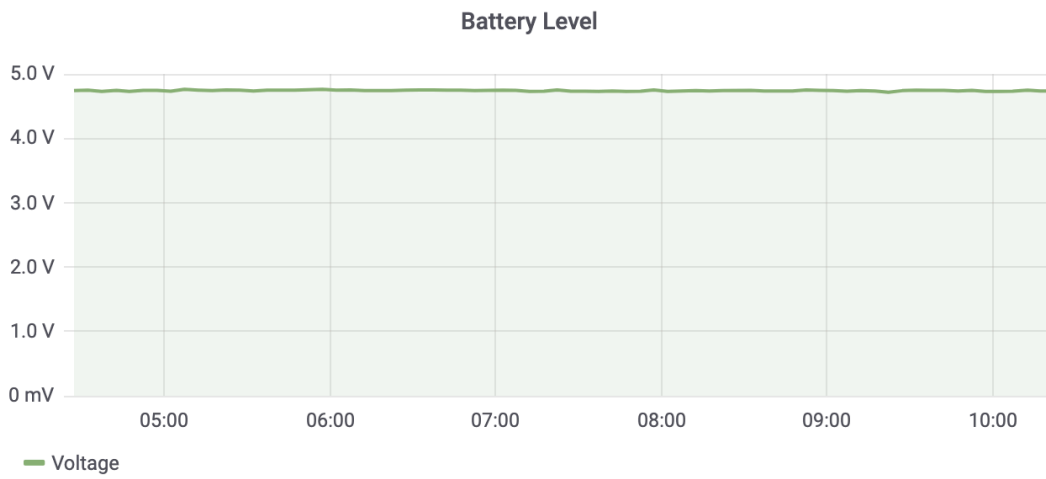
Figure 32 Example chart of voltage.

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