ZETA®Low-Power Wide Area Networks

ZETA Edge-AI Vibration Sensor

ZAIoT-VTC01

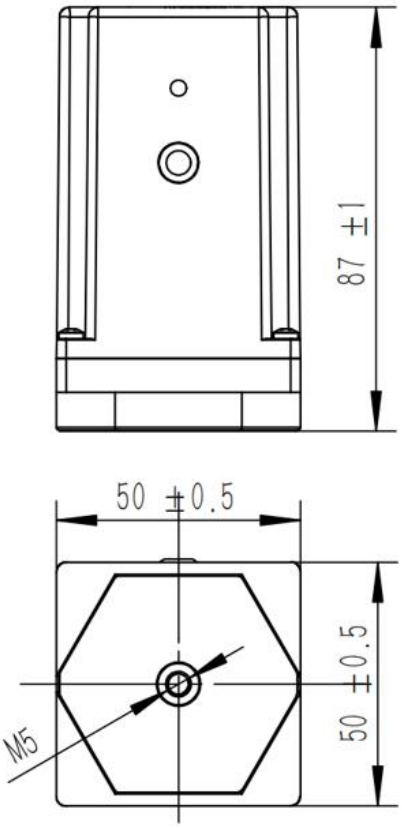
Content

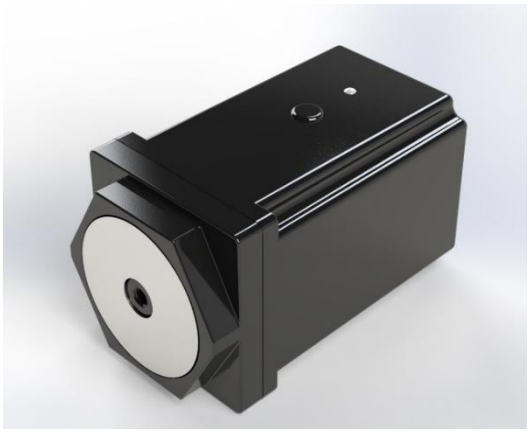
1. Product Description

ZAIoT-VTC01 is a low-power design, plug-and-play wireless vibration and temperature integrated collection terminal product, with high-precision vibration acceleration and temperature collection functions. The product has built-in 10kHz (Z-axis) and 6kHz (XY-axis) high-frequency response acceleration and temperature sensors. By carrying the ZETA high-speed protocol, the original waveform can be transmitted while ensuring wide-coverage communication performance, and the effective communication line-of-sight is greater than 800 meters. Powered by a large-capacity lithium sub-battery, it can work continuously for 3 years at a typical transmission interval (6h). At the same time, the product has built-in end-side analysis and AI alarm algorithms, and can flexibly configure various combination strategies of original waveform and feature edge calculation to meet the needs of multiple use scenarios. The product complies with IEC 60079 intrinsically safe explosion-proof standard, the explosion-proof mark is Ex ia IIC T4 Ga, and the operating environment temperature is -20℃~+60℃. Suitable for industrial and chemical scenarios.

- Suitable for general rotating equipment application scenarios: motors, bearings, pumps, fans, air compressors, gearboxes...
- Three-axis vibration + temperature monitoring, supporting 10000Hz high frequency vibration eigenvalues + waveform monitoring.
- Support for synchronous acquisition between different nodes to meet applications with synchronous monitoring requirements.
- Supports multiple installation methods, plug and play, rapid deployment
- ZETA network wireless transmission and deployment, low cost, wide coverage, stable connection, local deployable
- Low power consumption design, battery powered life of approximately 3 years (default configuration)
- Web platform and mobile client APP support, view data and track device status anytime, anywhere

2. Appearance and size





Unit: mm

ZAIoT-VTC01 Sensor Appearance

3. Product Specification

Hardware Specification	
Frequency response	Z-axis: 10kHz (1dB point) XY-axis: 6kHz (3dB point)
Sampling frequency	Z-axis: configurable by class: 25600 12800 6400 3200 XY-axis: 26667Hz
Frequency resolution	1Hz
Measuring range	±33g
Working temperature	-30~85℃
Ingress level	IP66
Mounting	Magnetic, adhesive, M5 stud
Size	50*50*87mm
Weight	~400g (With battery)
Battery capacity	9600mAh (Replaceable)
Battery life	~3 years (default setting)
Wireless Specification	
Wireless Protocol	ZETA H
Frequency band	Sub-GHz, adjustable according to local regulations
Gateway coverage	~1km
Antenna type	PCB Antenna
Functional Specification	
Data collection and return	Tri-axis vibration + temperature data acquisition and return, supporting synchronous acquisition between different nodes, to meet the application of synchronous monitoring requirements
Vibration index report	vibration velocity rms, vibration acceleration rms

4. Installation guide

Step1 - Measurement point selection

- Sensors are generally deployed on flat surfaces with high stiffness on the equipment, as close as possible to the rotating bearings, such as the drive end bearings of motors.
- Please refer to national and industry standards for the number and location of measurement points for each equipment model.

Step2 - Surface treatment

- The mounting surface should be as flat as possible, if necessary sandpapered and cleaned with acetone to remove oil and dirt.
- The bottom surface of the installation can be coated with a suitable amount of silicone oil to increase the accuracy of the vibration signal.
- Check the grounding of the equipment before installation to ensure safe use.

Step3 - Sensor installation

- The sensor supports three types of mounting: magnet, adhesive and M5 bolt, with the threaded connection mounting being preferred. If the equipment does not have the conditions for drilling, a transition plate can also be used to thread the terminal first and then weld the transition plate to the surface of the equipment.
- If magnetic adsorption is used, the terminal can be fixed by applying quick-drying adhesive on the bottom surface and silicone around the outer ring to play a sealing and long-term fixing role.
- Installation direction: vertical, horizontal and axial are all possible.

Step4 - Sensor online

- Ensure that the gateway is powered up and covered by the ZETA network and add the terminal to the platform.
- Press and hold the button on the front of the terminal for 5 seconds, the device powers up and the blue light flashes to indicate that the terminal is attempting to register the gateway (the internal battery was powered up

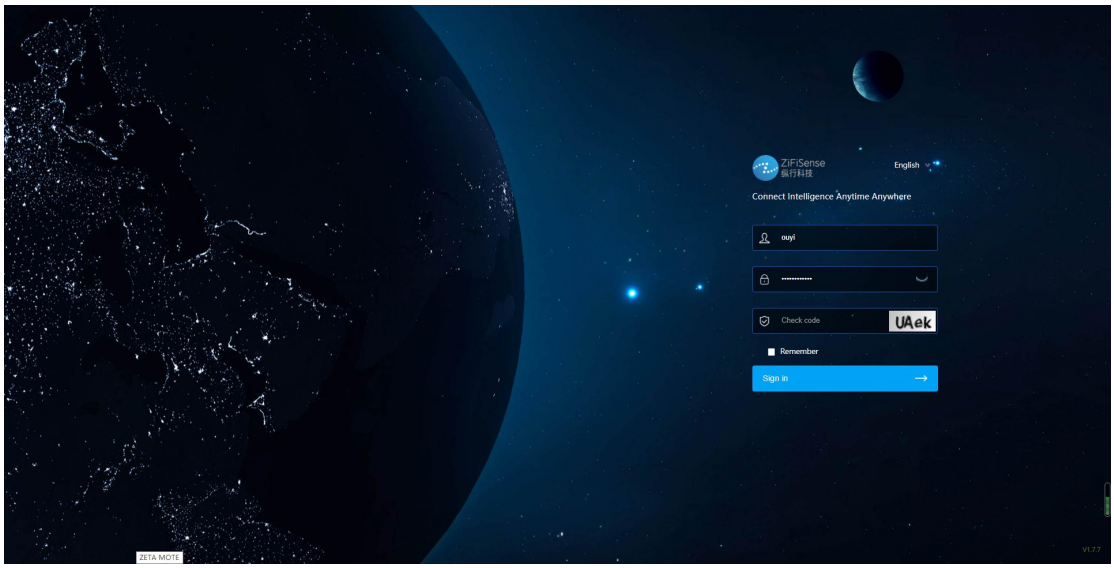
when shipped).

- Check the status of the terminal on the platform to see if it is online.

5. Operating Instructions

5.1. Platform login

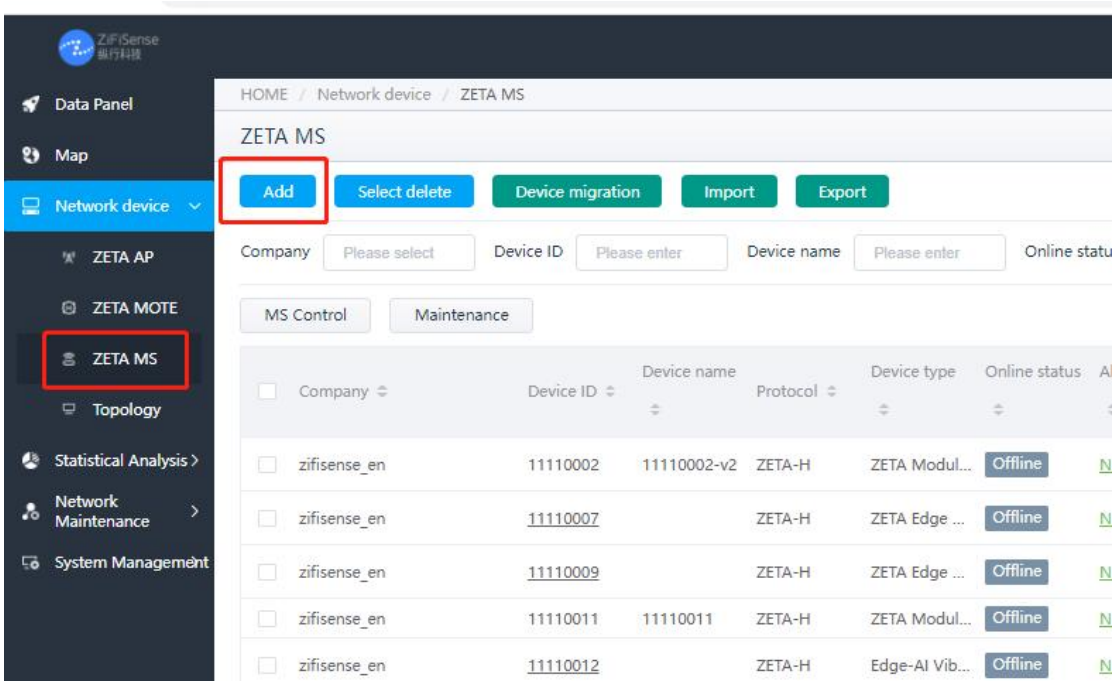
Log in to ZETA network management platform, platform address https://platforms.zifisense.com/network/#/login

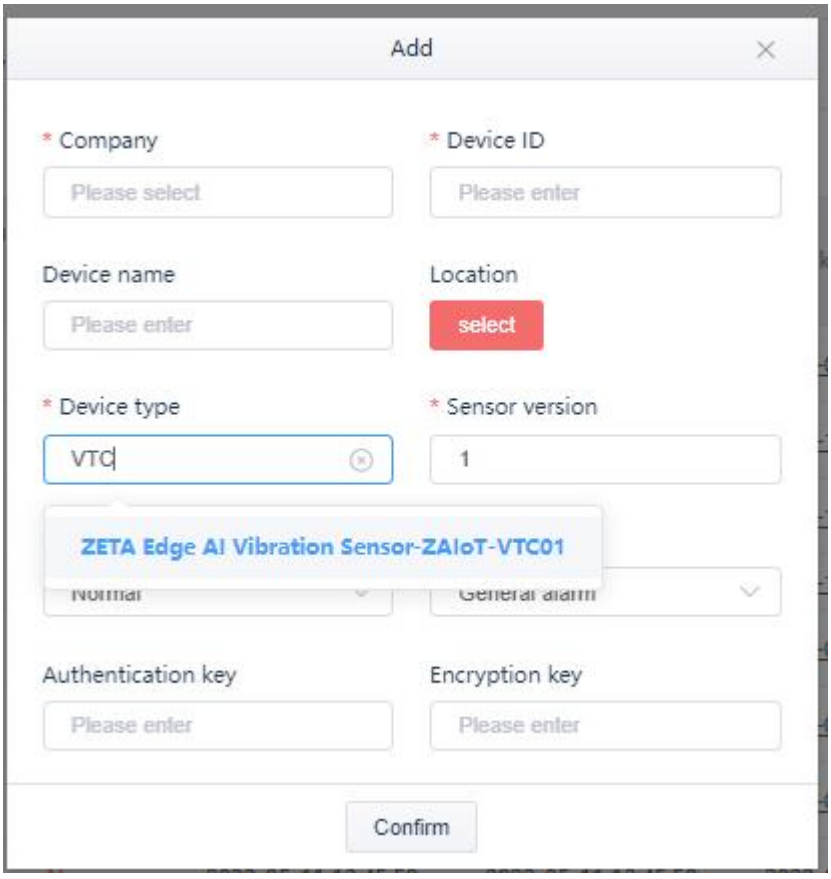


5.2. Device configuration

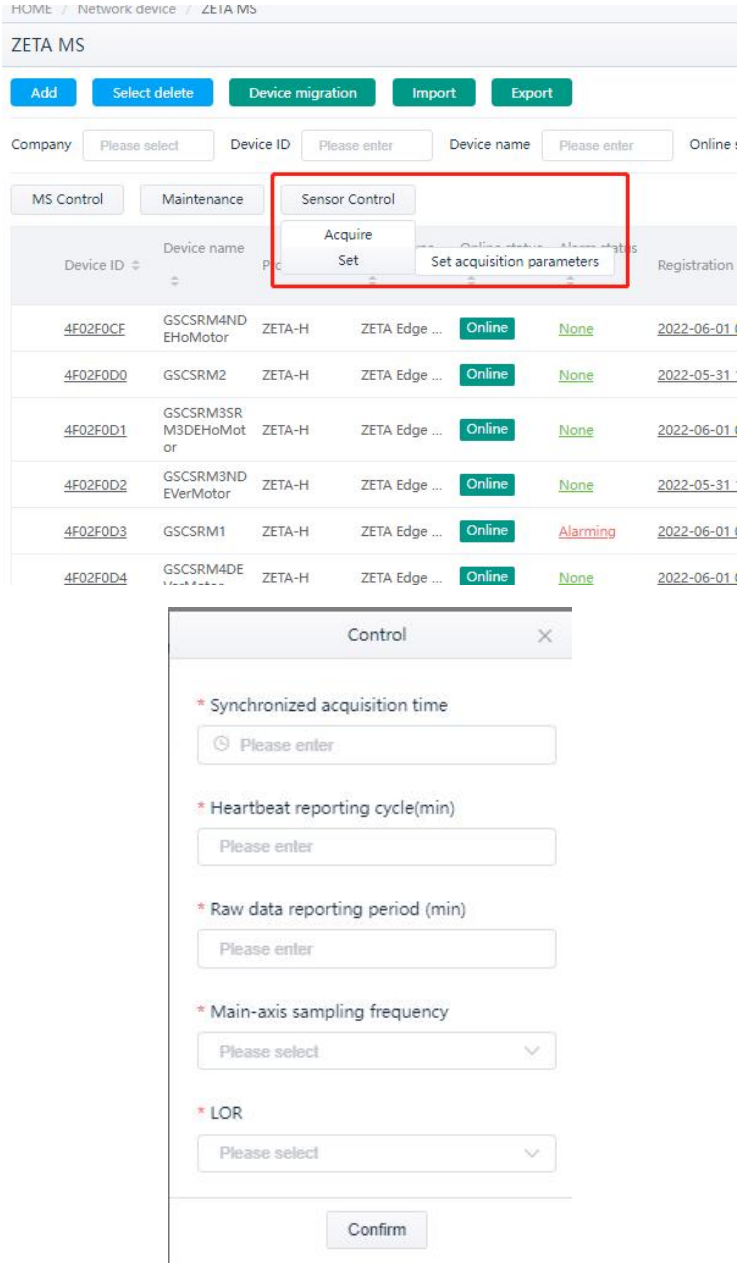
After logging in, go to the **Network Device** - **ZETA MS** page and click the Add button to add a new device.

And add the Sensor information in the pop-up window (see the actual device nameplate information for details).





- Select from the left menu: Network Device → ZETA MS → Add
- The red asterisk is a required item, after filling in, press OK to add the device
- Check the device, apply Device Control → Settings, as shown below:

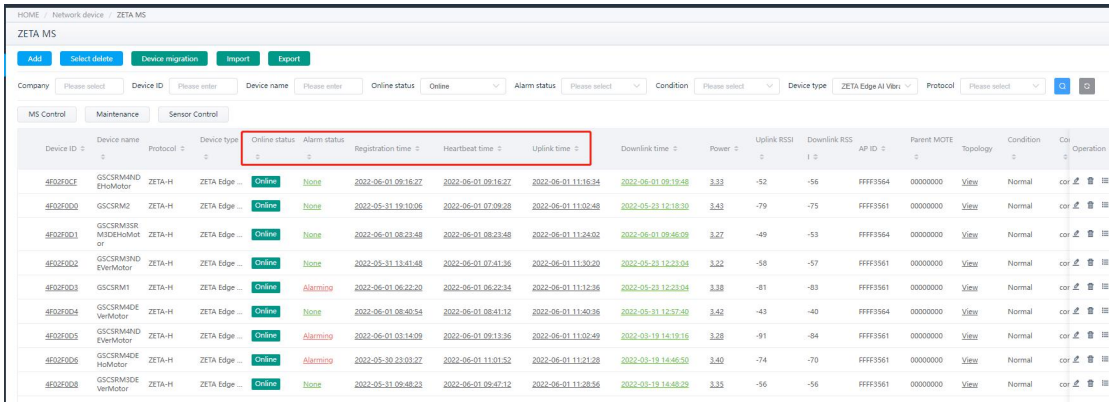


Among them, the following parameters need to be set according to the function of different rotating machinery:

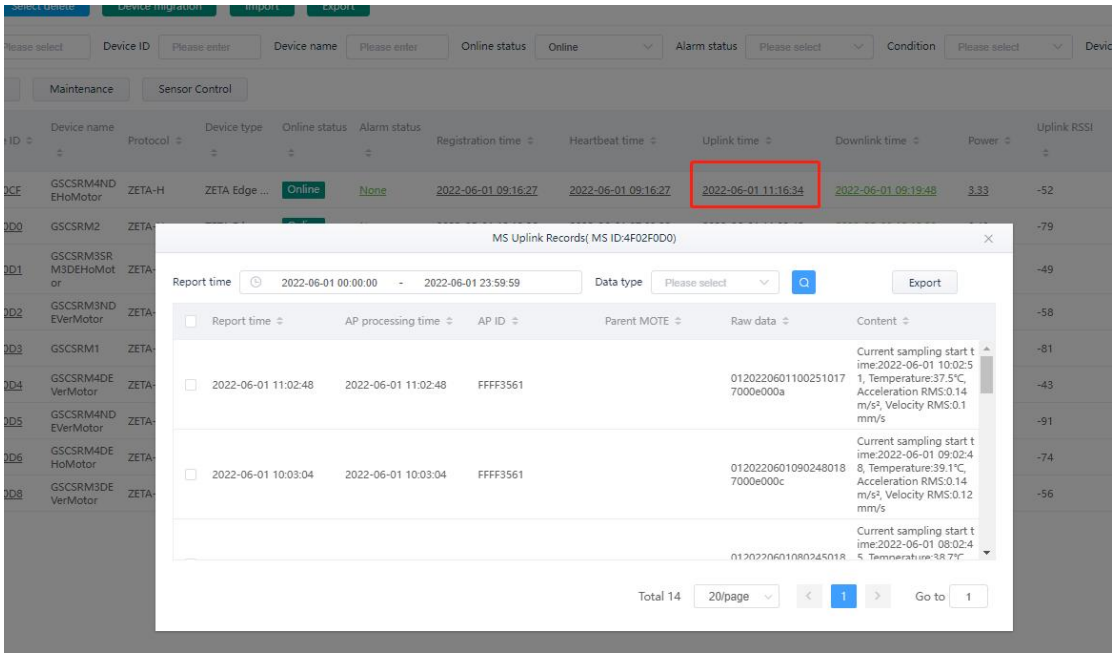
- Acquisition of raw vibration data according to the configuration period and wirelessly backhauled through ZETA-H protocol
- The sampling frequency and the number of spectral lines can be configured
- The acquisition cycle can be configured
- Support different terminals to send and set synchronous acquisition time

5.3. Check Status

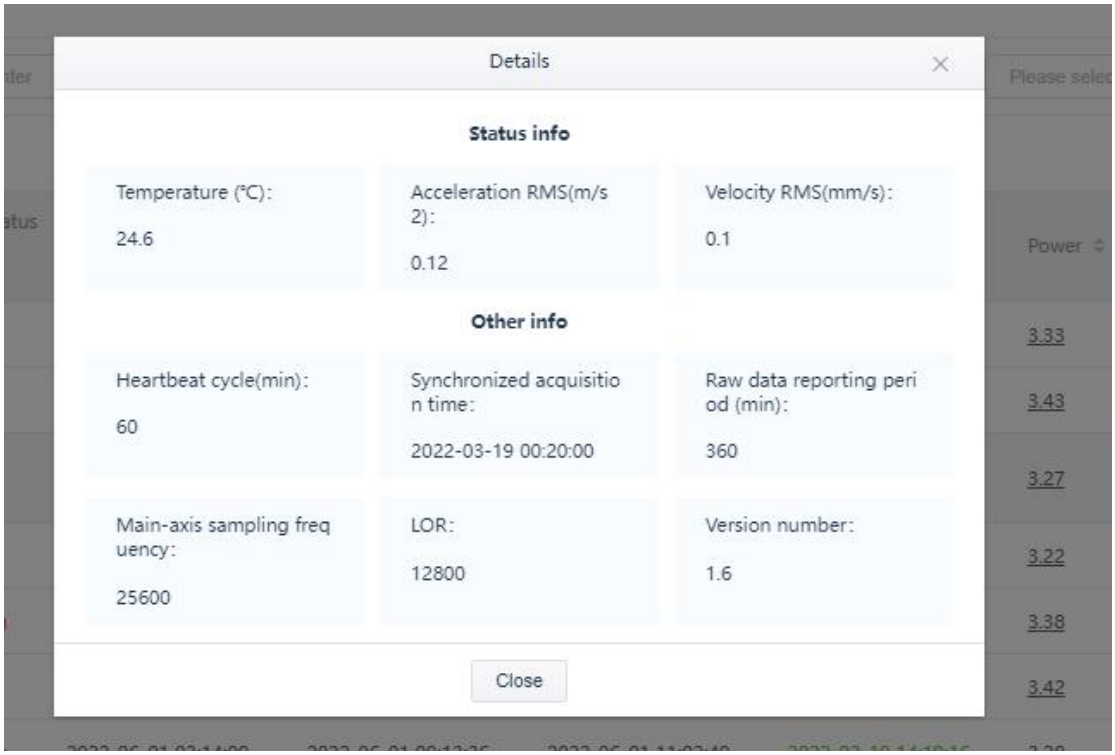
After the device is added, you can view the data of the added device in the list. When the device is powered on, the online status will change from "offline" to "online", and the startup time, registration time and heartbeat time are updated.



If the data is underlined, you can click to view the detailed data



Click the device ID to view the detailed status, as shown below:



Through the platform command, you can actively query the device status and parameter setting information as follows:

- Device status query
- Detection parameter query
- Version number query

6. Sensor functions

6.1. Equipment vibration data acquisition

- Acquisition of equipment triaxial vibration data
- Remote configuration of the reporting period
- Remote configuration of sampling frequency
- Remote configuration of linear resolution
- Support for setting the acquisition time synchronisation of different node sensors

6.2. Vibration index report

- Velocity rms (10Hz to 1kHz) in mm/s
- Acceleration rms (10Hz~10kHz) in m/s2
- Surface temperature of the measurement point in ℃

6.3. Power button and status indicator

- Power button

✧ Press and hold for 3 seconds to turn off the power

✧ Press and hold for 3 seconds to turn on the power

- Status indicator

✧ Power on: blue light flashing (10ms every 1s for 5s)

✧ Power off: red light flashing (10ms every 1s for 5s)

✧ Complete acquisition and upload: green light flashing (10ms every 1s for 3s)

6.4. Battery replacement

When the platform reports a "low battery" alarm, please replace the battery promptly. Replacement procedure

- Unscrew the four screws securing the terminal housing and open the housing by gently lifting upwards.
- Unplug the old battery from the battery supply plug on the PCB.
- Replace the battery with a new one, taking care to snap it in place and insert the battery supply plug to the PCB.
- Cover the housing gently and tighten the 4 fixing screws, taking care that the side with the buttons and indicators corresponds to the front of the PCB.
- The battery will automatically start the terminal registration when it is powered up, the blue indicator light flashes, check at the platform if the

terminal is successfully connected. If unsuccessful, operate the button to restart once.

7. Common faults and precautions

- Device cannot connect to network
  - ✓ Check that the gateway is powered up to ensure ZETA signal coverage is in place
  - ✓ Check the detection cycle, if it is offline after a proper connection, even if the gateway is properly powered up, you still need to wait for the detection cycle to arrive before you can complete the connection, at this point you can initiate the connection via a button restart, which is the fastest means
  - ✓ Check the power level reported on the last platform to see if there is a possibility of low battery
- Battery power drops badly
  - ✓ Collection cycles are too frequent, a collection frequency of 4 hours/time or more is recommended
  - ✓ Check signal quality, poor signal and frequent dropouts and uplinks will accelerate power consumption
- Periodically check the installation of the terminal for any loose or displaced measurement points
- Deploy the terminal in a suitable location with reference to the operating temperature range and protection class
- Replace the battery in case of a low battery alarm

8. Safety instructions

1. Potential electrostatic charging hazard: clean only with a damp cloth.
2. Only ER26500 lithium thionyl chloride battery produced by EVE Energy Co., Ltd. is allowed to be used as the power supply. Do not charge the battery. Do not replace battery when an explosive atmosphere is present.

9. Revision

Version	File name	Revised by	Date	Description
V1.0.0	ZETA Edge-AI Vibration Sensor User Manual	OUYI	2021.12.6	First edition
V1.0.1	ZETA Edge-AI Vibration Sensor User Manual	OUYI	2022.6.1	Add Operating Instruction part

FCC Statement:
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

Shanghai, China

Room B, 20th Floor, No. 1098
Dongdaming Road (Pujiang
International Financial Plaza),
Hongkou District, Shanghai
+86 (0) 21-61320820

Xiamen, China

Room 803, Building A-05,
Software Park Phase III, Jimei
Distric, Xiamen, P.R. China

+86 (0) 592 6070310

Cambridge, UK

3 Charles Babbage Road,
Cambridge, CB3 0GT
United Kingdom

+44(0) 1223 491 099