ROTIOT
# axial

valve position and vibration sensor with LoRaWAN® and Bluetooth LE for industrial applications

The **axial** is a valve position and vibration sensor used in demanding industrial internet of things applications.

Description

ROTIOT axial is a ruggedized valve position sensor integrating multiple independent sensors to reliably detect and track the valve position and the number of turns. The data is sent to the internet through LoRaWAN. Additional vibration and temperature sensors complete the functionality. The device is conceived to work in demanding industrial environments and is fully certified.
The battery is exchangeable.

Gas II 2G Ex ib IIC T4 Gb
Zone 1 : -40°C < Ta < +70°C

Features

- LoRaWAN® class A compliant device
- Supports EU868, US915, AU915, AS923
- Internal sensors for 3-axis acceleration, tilt, rotation, magnetic field, vibrations, temperature
- Easy to install with multiple mounting options
- Robust IP69K industrial housing
- Up to 2 years of battery lifetime (primary cell)

Applications

- Oil & Gas
- Smart Industry
- Smart city

▌ Document Information

About

File name	Document type	Date	Revision
DS ROTIOT axial	Datasheet	2023-02-24	1.0

Revision history

Date	Release	Changes
2023-02-16	0.1	Initial Draft
2023-02-22	0.4	Internal Review
2023-02-24	1.0	Initial Release

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▌Functional Description

ROTIOT axial is a LoRaWAN® Class A sensor for valve position sensing and vibration sensing.

The built in accelerometer, magnetometer and gyroscope combined with the unique algorithms by ROTIOT enable precise and reliable position sensing of any manual manipulated valve. In regular and configurable intervals, the processed data is sent through the wireless connection to the internet. The device is designed for low-power and allows for 2 years of autonomous operation.

ROTIOT axial is compatible with all network providers and can detect when there is no network coverage. If no LoRaWAN® network is available, the device will store up the history in the internal flash memory and send it to the gateway along with original timestamp information once it gets back in reach of a LoRaWAN® network.

The device can be set up and configured in three ways:
- On site with buttons and LED feedback
- On site with Android App over Bluetooth LE
- Remote over LoRaWAN with Downlinks commands.

Technical Specification

Mechanical specifications	
Weight	350 g
Dimensions	114mm × 60mm × 45mm

Operating conditions	
Temperature	-40 – 70 °C (Air Temperature)
	-40 – 90 °C (Valve Temperature)
Humidity	0 – 95 % RH

Device power supply	
Battery type	SAFT M 20 EX SV
Expected battery lifetime	Up to 2 years depending on device configuration

Radio / Wireless	868 MHz / 915 MHz
Wireless technology	LoRaWAN® 1.0.3
LoRaWAN® Device type	Class A
Supported LoRaWAN® features	OTAA, ADR, Adaptive Channel Setup
Sensitivity	-137 dB (SF12)
RF transmission power	14 dBm / 22 dBm (depending on region)

Certifications

Certifications	
CE	RED 2014/53/EU
UKCA	Radio Equipment Regulations 2017
Ex	Intrinsic safety "I", "IS" for GAS zone 1
ATEX / IECEx	II 2G Ex ib IIC T4 Gb
RoHS	Compliant

Sensor Specifications

Accelerometer

Range	±2g, ±4g, ±8g, ±16g
Resolution	12 bit, 4mG
Accuracy (typ.)	±40 mG

Magnetic sensor

Detection threshold	Max. ±4.8 mT
Magnetic response	Omnipolar
Reset activation (typ.)	After 7.5 sec

Vibration

Range	Up to 1kHz

GPS

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Receiver	Quectel L86 with patch antenna
Sensitivity	-167 dBm @ Tracking, -149 dBm @ Acquisition
GNSS	GPS & GLONASS L1 band
Horizontal Position Accuracy	2.5m CEP

Mechanical Specification
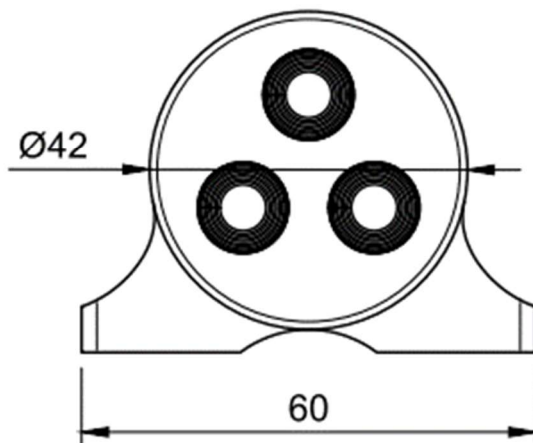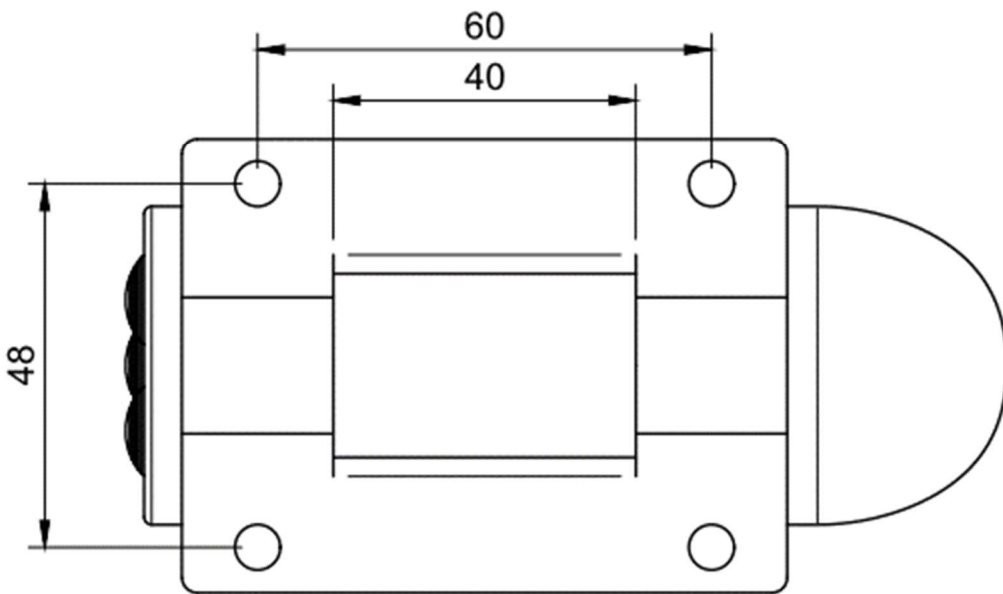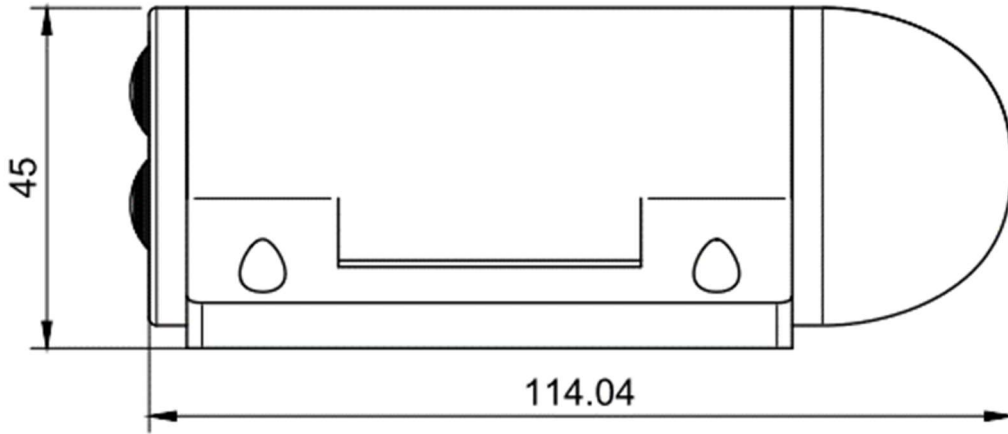
Additional Documentation

Additional Ressources

Product Information Page	rotiot.ch/axial
Technical Documentation	docs.rotiot.ch/axial

Device Options

Product ID	Options			
	EU868	US915	2.4GHz worldwide	Geolocation
AXIAL-S-*	✔	✔	✔	
AXIAL-SG-	✔	✔	✔	✔

* LoRaWAN® Region

Keep in touch

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