



PRODUCT DATASHEET

LoRaWAN MANHOLE SENSOR

OVERVIEW

NETOP Manhole Sensor is a long- range wireless sensor which can be used for Manhole opened/closed application that provide manhole cover's status information. It can be monitored whether something or somebody is changing the manhole state. This sensor is fully compatible with LPWAN technology by using LoRaWAN.

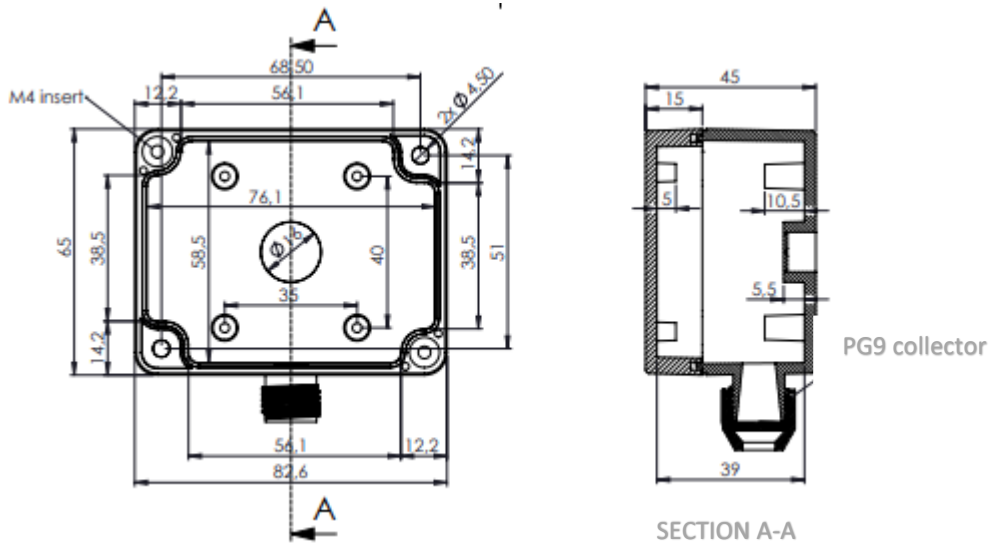




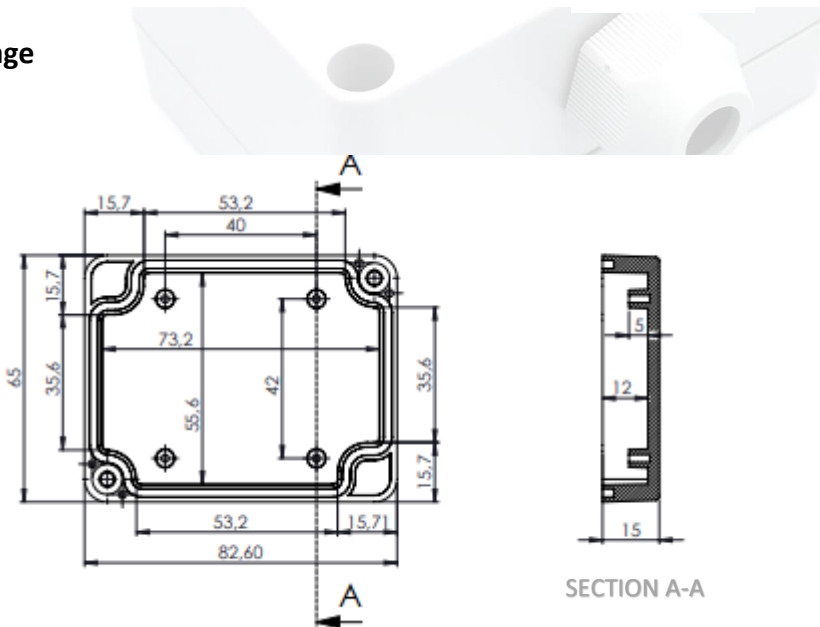
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TECHNICAL DRAWING

Box With Terminal Seal



Cover Page





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KEY FEATURES

Real Plug & Play

Easy to mount & install

Compatible with LoRaWAN™ specification

Maintenance free

Secure communication (AES-128)

Ultra -Low Power Consumption

Certificate: LoRaWAN™

COMMUNICATION SPECS

Compatible with LoRaWAN Specification 1.0.3

The sensor uses Low Power Wide Area Network-LPWAN technology (LoRa) for connectivity

Compliant with Low and High Frequencies (AS923, AU915, CN470, CN779, EU433, EU868, IN865, KR920, RU864, US915 MHz ISM bands)

Supports High power and Low power LoRa RF applications: - Up to +22 dBm at US915 and AU915, - Up to +14 dBm elsewhere

Ultra -low power consumption. Excellent long-term stability.

170 dB maximum link budget

Radio Performance: High RX sensitivity down to -148 dBm

Full ADR, OTAA and ABP support

Long range wireless data transmission



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MECHANICS

Housing: ABS (IP65 or higher)

Dimensions: 82.5 x 65 x 45 mm

Operating Temperature: -40°C to 85°C

POWER SUPPLY

AA Battery 3.6 V Li-SOCI2-Saft LS 14500

INDICATORS

Status LED (on board)

MANHOLE SENSOR SPECIFICATIONS

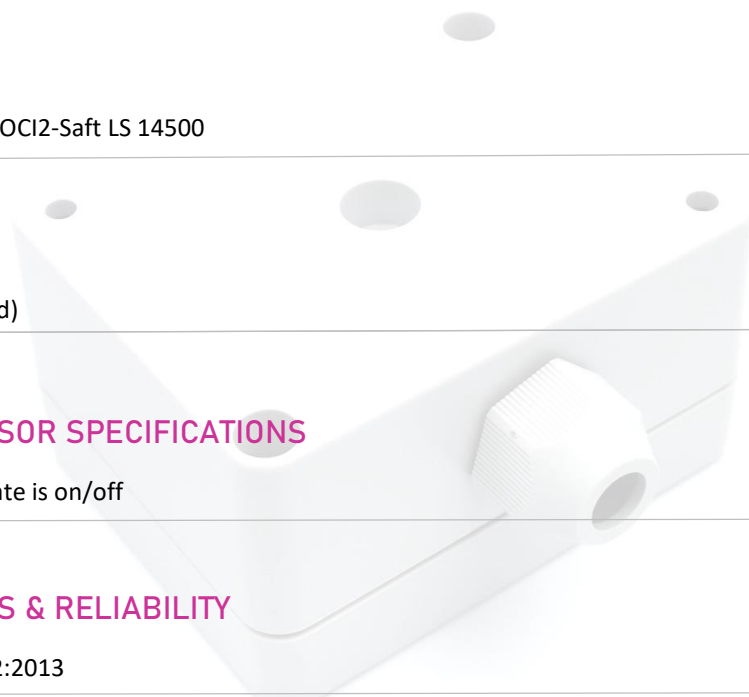
Output: Manhole state is on/off

CERTIFICATIONS & RELIABILITY

EN 60950-1;2006/A2:2013

ETSI EN 301 489-17 V3.1.1(2017-02)

EN 55032:2015





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LoRaWAN FRAME FORMAT

Standard packet size: 24 Bytes

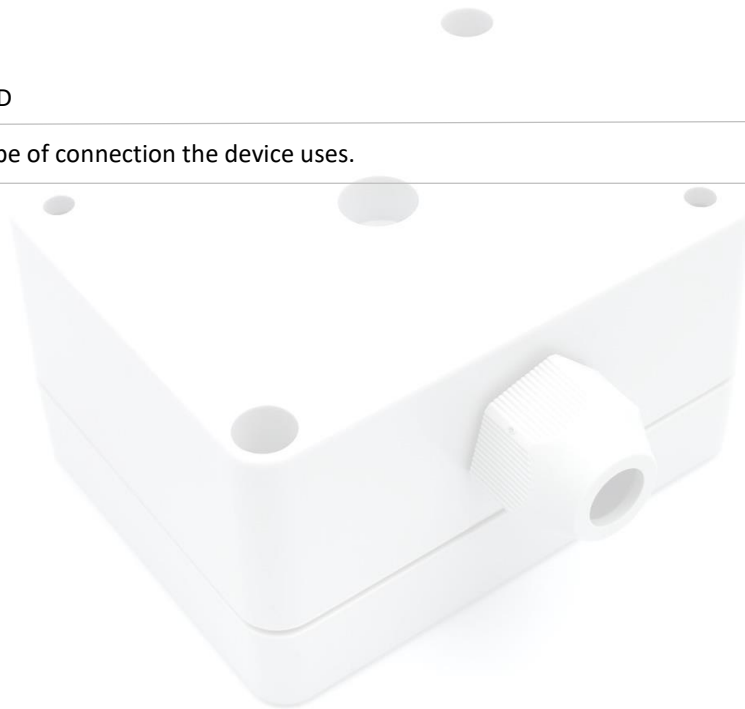
00-01-02-03-04-05-06-07-08-09-10-11-12-13-14-15-16-17-18-19-20-21-22-23

1 byte: Connection Type(1->LoRaWAN)

INFORMATION

012345678: Device ID

|1|: Indicates the type of connection the device uses.





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LoRaWAN MANHOLE SENSOR PROTOCOL

01-20-01-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-01-2C-25-01-12-0D-EF

01: Selected Slot (1 byte)

20: Manhole Sensor Board ID (1 byte)

01: Manhole State On (00->Manhole State Off)

YY-YY: Empty Data (14 bytes)

012C: Sleeping Period 0x012CH -> 300D Seconds (2 bytes)

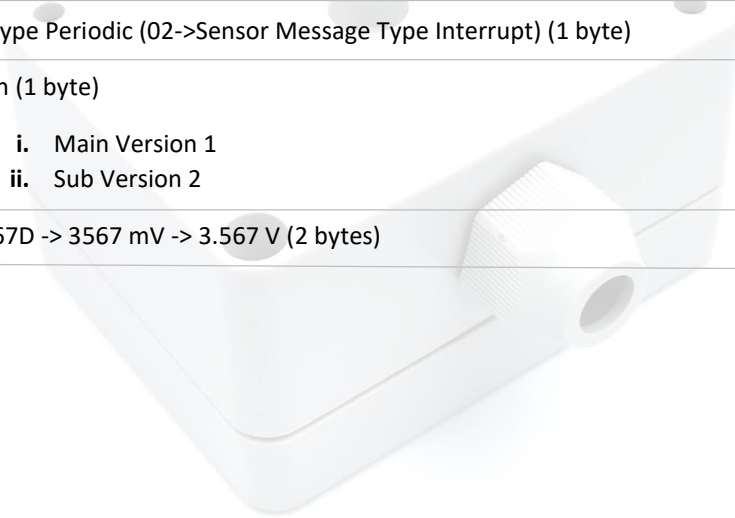
25: Payload Counter 0x25H -> 37D (1 byte)

01: Sensor Message Type Periodic (02->Sensor Message Type Interrupt) (1 byte)

12: Sensor FW Version (1 byte)

- i. Main Version 1
- ii. Sub Version 2

0DEF: 0x0DEFH -> 3567D -> 3567 mV -> 3.567 V (2 bytes)





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INFORMATION

01: Selected slot

20: This slot determines the sensor type.

01: Indicates that manhole state is on or off.

YY-YY: Dummy Data

012C: Sleep interval along 300S.

25: Data is live or not. Each measurement is incremented by degree.

01: When the sensor message 02 comes, it enters the interrupt.

12: Sensor firmware version 1.2

0DEF: Outputs the measurement in Volt (3.567V).

