



## PRODUCT DATASHEET

## LoRaWAN 2 PLANE TILT SENSOR

### OVERVIEW

NetOP 2 Plane (Double Axis) Tilt sensor is a long -range wireless sensor which can be used for monitoring of angle between the device and earth (ground). The device gives 2 separate outputs of the angle of tilt as Tilt X and Tilt Y (as an example: Tilt X: +10,0 degree and Tilt Y: -15,0 degree). This sensor is compatible with LoRaWAN technology.

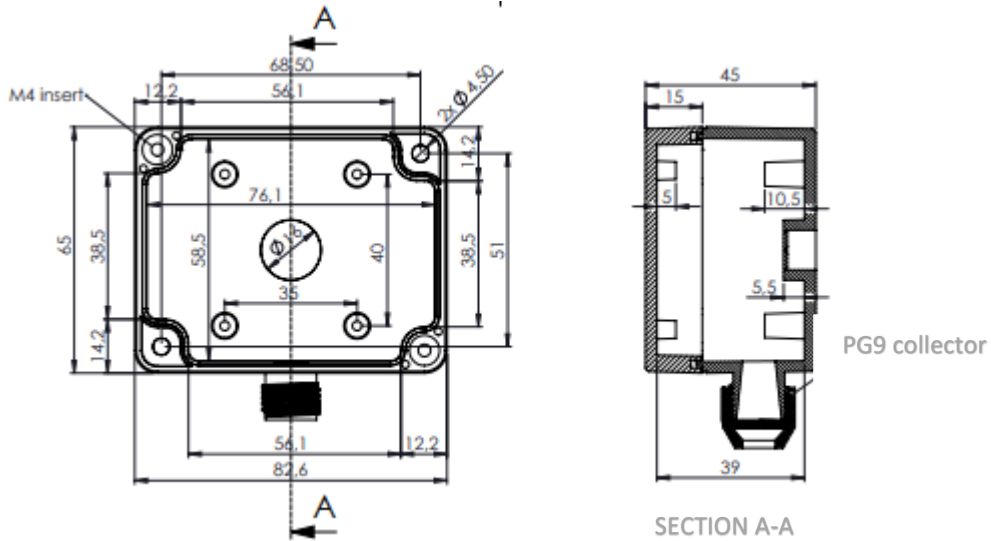




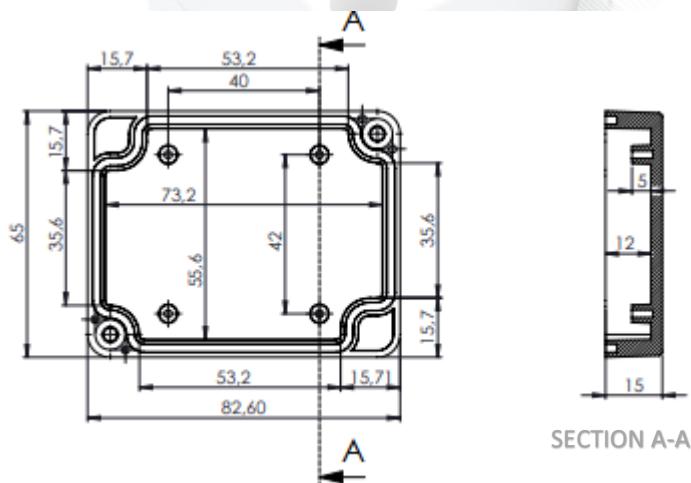
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TECHNICAL DRAWING

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)

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Dimensions: 82.5 x 65 x 45 mm

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Operating Temperature: -40°C to +85°C

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### POWER SUPPLY

USB/ LIPO Charge / Non-Chargeable Battery

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### INDICATORS

Green Red Status LED (on board)

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### 2 PLANE TILT SENSOR SPECIFICATIONS

Measurement Range:  $\pm 2.0$  g

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Accuracy: 0.061 mg

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Resolution: For X, Y axes  $m/s^2$

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### CERTIFICATIONS & RELIABILITY

EN 60950-1;2006/A2:2013

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

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EN 55032:2015

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### LoRaWAN FRAME FORMAT

Standard packet size: 24 Bytes

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

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1 byte: Connection Type(1->LoRaWAN)

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### INFORMATION

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

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## LoRaWAN 2 PLANE TILT SENSOR PROTOCOL

01-26-00-59-FF-E8-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-YY-01-2C-25-01-12-0D-EF

01: Selected Slot (1 byte)

26: 2 Plane Tilt Sensor Board ID (1 byte)

0059: 0x0059H -> 89D -> (2 bytes) -> 0.89 X Degree

FFE8: 0xFFE8H -> 65512D -> (2 bytes)

i. FFE8 – FFFF -> -0x0017H -> -23D -> -0.23 Y Degree

YY-YY: Empty Data (12 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)

ii. Main Version 1

iii. Sub Version 2

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



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### INFORMATION

01: Selected slot.

26: This slot determines the sensor type.

0059: Indicates the 0.89degree angle on the X-axis

(The value 0059H is converted to decimal. The result 89D.The resulting decimal value is divided by 1000.This value returns the result in degree for the X-Axis.)

FFE8: Indicates the 0.65degree angle on the Y-axis

The value FFE8H is converted to decimal. The result -23D.The resulting decimal value is divided by 1000.This value returns the result in degree for the Y-Axis.)

YYYY: Dummy data (12 bytes)

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).