SATEVIS

BEANAIR® SENSORS BRAND

α·INC

WIRELESS IOT INCLINOMETER SENSORS

PRODUCTS CATALOG

WIRELESS IOT INCLINOMETER SENSORS

HEADQUARTER

Buchholzer Straße 65,
13156 Berlin, Germany

MAIN WEBSITE

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info@satevis-systems.com

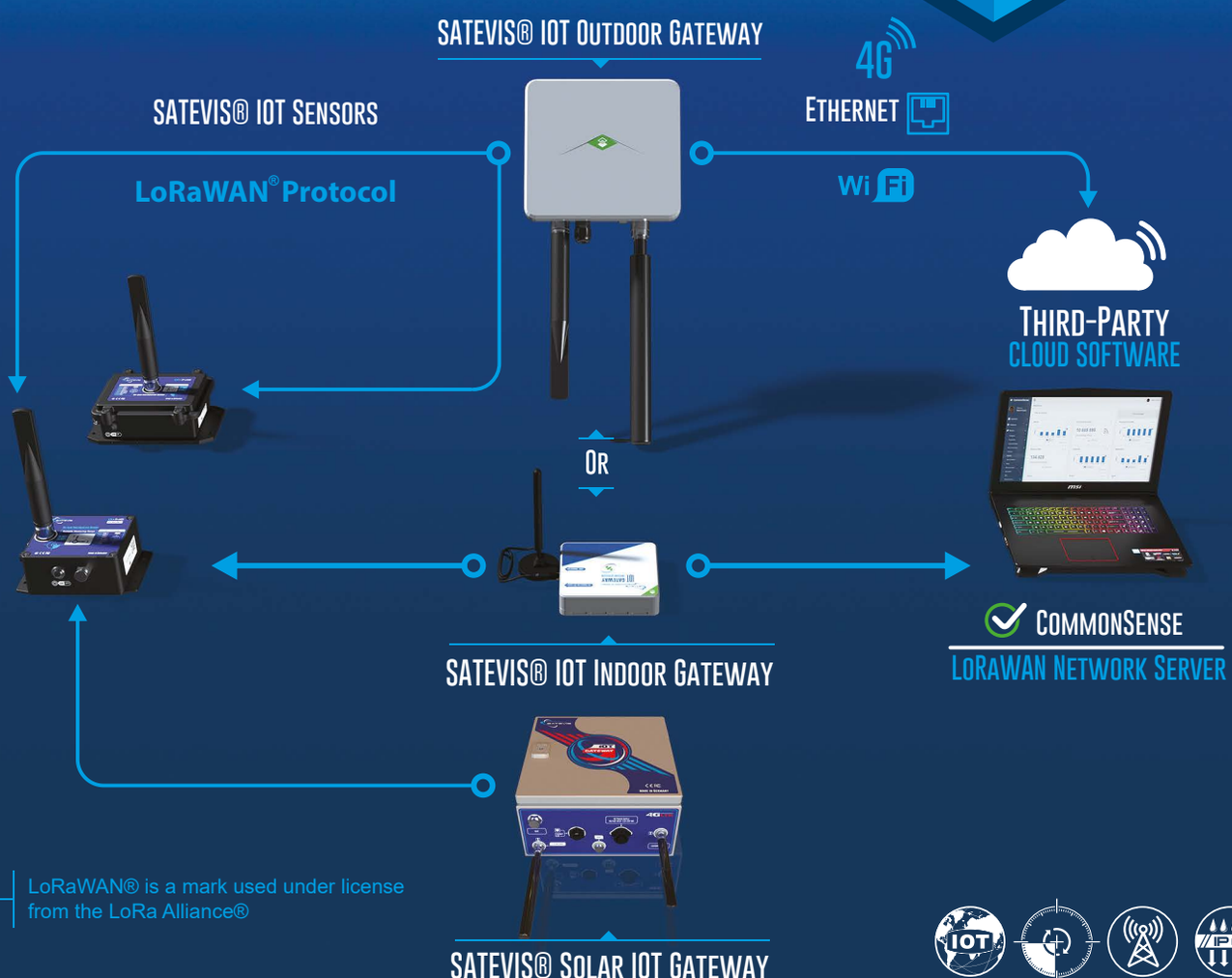
Satevis® was created to make easier the deployment of IOT sensors, our IOT sensors constitutes an outstanding technology for various applications: Structural Health Monitoring, Test and Measurement, Land Surveying, Condition Monitoring, Environmental Monitoring ...

Furthermore, the high level of versatility, performance, and reliability of its wireless IOT sensors, in addition to a worldwide presence thanks to effective system integrators partners, Beanair has acquired an international outreach and continues to maintain a strong reputation with major customers in numerous sectors.

SATEVIS

LoRaWAN®
Long-Range & Sensor Fusion

www.Satevis-Systems.com

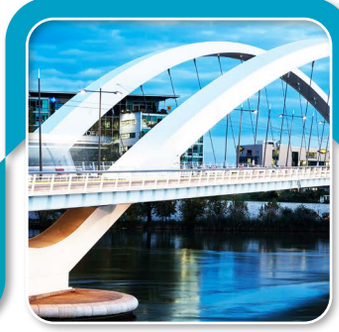


IOT IP 67

WIRELESS IOT INCLINOMETER SENSORS

1 APPLICATIONS

BRIDGE



RAILWAY SLEEPERS

CRANE

TUNNEL

CONDITION MONITORING

LAND SURVEYING

STRUCTURAL HEALTH MONITORING

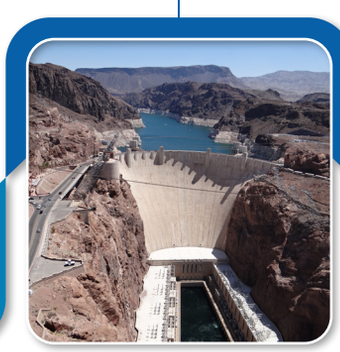
TEST AND MEASUREMENT

CARGO SHIP

DAM

ANTENNA BASE STATION

CONSTRUCTION SITE



Wireless IoT Tri-Axis Inclinometer Sensors

Features	Satevis® Alpha-Inc	Satevis® Alpha-Inc Kompakt
Scalable Measuriing range	±10° and ±85°	±10° and ±85°
Tx Radio Power	Low Power Radio +14dBm or High Power Radio +22dBm	Low Power Radio +14dBm
Mounting Base	Screw and Magnetic	Screw and Magnetic (Optional)
Battery	3 x C Size Cell 6.5Ah in Series	1 x D Size Cell 19Ah
Casing size (without antenna)	151 x 130 x 55mm	115 x 90 x 55mm
EMI Gasket	Yes	No
Weight	950g	700g

Wireless IoT Bi-Axis Inclinometer Sensors

Features	Satevis® Alpha-Inc	Satevis® Alpha-Inc Kompakt
Scalable Measuriing range	±30° and ±55°	±30° and ±55°
Tx Radio Power	Low Power Radio +14dBm or High Power Radio +22dBm	Low Power Radio +14dBm
Mounting Base	Screw and Magnetic	Screw and Magnetic (Optional)
Battery	3 x C Size Cell 6.5Ah in Series	1 x D Size Cell 19Ah
Casing size (without antenna)	151 x 130 x 55mm	115 x 90 x 55mm
EMI Gasket	Yes	No
Weight	950g	700g

WIRELESS IoT INCLINOMETER SENSORS

ACCESSORIES AND MOUNTING OPTIONS

SATEVIS® ALPHA-INC KOMPAKT

INCLUDED

BUTTON SHIELD

OPTIONAL

SCREWS AND MAGNETIC MOUNTING BASE

INCLUDED

BATTERY TYPE D

SATEVIS® ALPHA-INC

INCLUDED

BUTTON SHIELD

INCLUDED

BATTERY PACK TYPE C

INCLUDED

SCREWS AND MAGNETIC MOUNTING BASE

COMMON ACCESSORIES

INCLUDED

SELF-AMALGAMATING TAPE

OPTIONAL

90° BRACKET WITH BULLSEYE

INCLUDED

LOW PROFILE ANTENNA +2DBI

OR

INCLUDED

HIGH GAIN ANTENNA +5DBI

INCLUDED

2 M8 CAP

INCLUDED

M8 TO USB CABLE

A BATTERY LIFE SIMULATION TOOL IS AVAILABLE ON OUR WEBSITE: WWW.SATEVIS-SYSTEMS.COM

A DEVICE OPENED TO DATA FUSION AND PREDICTIVE A.I.

EXAMPLE:

- **EXTERNAL TEMPERATURE/HUMIDITY SENSORS :** IMPACT OF ENVIRONMENT ON STRUCTURE/EQUIPMENT MOVEMENT
- **EXTERNAL IR TEMPERATURE SENSOR :** IMPACT OF SURFACE TEMPERATURE ON STRUCTURE /EQUIPMENT MOVEMENT
- **EXTERNAL WATER-FLOW SENSOR:** PREDICT BRIDGE SCOUR DUE TO FAST WATER-FLOW

MULTI-SENSORS DEVICE

Our hardware is designed to seamlessly integrate with external sensors,empowering users to connect their sensor networks with their own A.I.models.This integration enables them to accurately predict potential damage, malfunctions, or failures in their structures and equipment.

Currently we have Temperature and Humidity sensors. IR temperature, Pressure and Water flow sensor are planned for Q1-2025

Looking for other external sensors to Integrate ? Please contact us.

SEAMLESS INTEGRATION WITH A THIRD-PARTY CLOUD SOFTWARE

Already using your own cloud software ? No problem, uplink/downlink specifications and JavaScript are available for free on our website.

BUILD YOUR OWN ALARMS RULES

1. INDEPENDENT ALARMS THRESHOLDS FOR EACH MEASUREMENT CHANNEL
2. THREE LEVEL OF ALARMS CAN BE SPECIFIED : CRITICAL (HIGHEST) / SEVERE / MINOR , HELPING USERS TO CREATE AN EVENT (EMAIL/SMS TRANSMISSION/ ACTIVATE RELAY) BASED ON THE CRITICALITY OF ALARM NOTIFICATION .

WIRELESS IoT
TRI-AXIS INCLINOMETER SENSORS

SATEVIS® ALPHA-INC
WIRELESS IoT TRI-AXIS INCLINOMETER
SCALABLE MEASURING RANGE
(±10° AND ±85°)

SATEVIS® ALPHA-INC KOMPAKT
WIRELESS IoT TRI-AXIS INCLINOMETER
SCALABLE MEASURING RANGE
(±10° AND ±85°)

2 SATEVIS ALPHA-INC

PRODUCT REFERENCE

SATEVIS-LORA-ALPHA-INC-MR-PS-RP-AG

MR– Measurement Range: 10T : tri-axis ±10°/±85°	PS - Power supply : BP3S : Battery Pack with 3 Primary Cell in series (3 x 6.5Ah , 3S1P configuration) - Non Rechargeable battery pack
RP- Radio Power HP - High Power Transmission +22dBm LP - Low Power Transmission +14dBm	AG - Antenna Gain AG-2dBi-868: 2dBi Antenna for EU/IND Regions (Europe /India) AG-5dBi-868: 5dBi Antenna for EU/IND Regions (Europe /India) AG-2dBi-915: 2dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA) AG-5dBi-915: 5dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA)

Example 1: SATEVIS-LORA-ALPHA-INC-10T-BP3S-LP-AG-2dBi-868
Wireless Tri-axis Inclinometer ±10°/±85° with LoraWan connectivity, Powered from Battery Pack 3S, Low Power Radio +14dBm, 2dBi Antenna 868Mhz

Example 2: SATEVIS-LORA-ALPHA-INC-10T-BP3S-HP-AG-5dBi-915
Wireless Tri-axis Inclinometer ±10°/±85° with LoraWan connectivity, Powered from Battery Pack 3S, High Power Radio +22dBm, 5dBi Antenna 915MHz

3 SATEVIS ALPHA-INC-KOMPAKT

PRODUCT REFERENCE

SATEVIS-LORA-ALPHA-INC-KOMP-MR-PS-RP-AG

MR– Measurement Range: 10T : tri-axis ±10°/±85°	PS - Power supply : 1CELL: 1 x primary cell Lithium-Thionyl Chloride 3.6VDC - D Size cell 19Ah (Non rechargeable battery)
RP- Radio Power LP - Low Power Radio +14dBm	AG - Antenna Gain AG-2dBi-868: 2dBi Antenna for EU/IND Regions (Europe /India) AG-5dBi-868: 5dBi Antenna for EU/IND Regions (Europe /India) AG-2dBi-915: 2dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA) AG-5dBi-915: 5dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA)

Example 1: SATEVIS-LORA-ALPHA-INC-KOMP-10T-1CELL-LP-AG-2dBi-868
Tri-axis Wireless Inclinometer ±10°/±85° with LoraWan connectivity, Powered from 1 x primary cell, Low Power Radio, 2dBi Antenna 868Mhz

Example 2: SATEVIS-LORA-ALPHA-INC-KOMP-10T-1CELL-LP-AG-5dBi-915
Tri-axis Wireless Inclinometer ±10°/±85° with LoraWan connectivity, Powered from 1 x primary cell, Low Power Radio,5dBi Antenna 915MHz

4 COMMON SPECIFICATIONS

SATEVIS LINK SOFTWARE (FROM USB)

Configuration	Frequency Plan, AppEUI, AppKey
Firmware Upgrade	Firmware upgrade through the USB
Sensor calibration	Calibrations Points setup and Quick calibration

INCLINOMETER SENSOR

Inclinometer Technology	MEMS Technology
Scalable Measuring Range	user-seletctable range ±10° or ±85°, with automatic range adjustment depending on the application
Sensor resolution	0.0055° on full scale
Noise density	for ±10° range : 0.0007 °/√Hz on Y Axis, 0.008 °/√Hz on X, Z Axis for ±85° range : 0.0012 °/√Hz on all axis
Sensor precision (full scale, @ 25°C)	±0.01° for ±10° measurement range ±0.02° for ±85° measurement range
Sensor Accuracy (full scale, @ 25°C)	±0.015° for ±10° range ±0.02° for ±45° range ±0.04° outside ±45° range
Offset temperature dependency (temperature range –25°C to +85°C)	±0.006°/°C
Offset LifeTime Drift (@25°C)	±0.08 °
Sensor frequency Response (-3 dB)	DC to 10 Hz for ±10° measurement range DC to 40 Hz for ±85° measurement range
Calibration	Factory calibrated on 9 references point : 0° absolute, ±5° ,±10°, ±30° and ±45° with calibration settings backed up on the sensor Flash memory. Calibration method used : Back-to-back calibration with an accurate reference sensor.
Sensor Zeroing function	Sensor zeroing can be done after Satevis Sensor installation. User need to hold a magnet on the label " sensor zeroing" for approx. 10s, zero-offset is the performed on all sensor axis X/Y/Z

Wireless IoT
Bi-Axis Inclinometer Sensors

SATEVIS® ALPHA-INC
Wireless IoT Bi-Axis Inclinometer
Scalable Measuring Range
(±30° and ±55°)

SATEVIS® ALPHA-INC KOMPAKT
Wireless IoT Bi-Axis Inclinometer
Scalable Measuring Range
(±30° and ±55°)

BI-AXIS-INCLINOMETER SENSORS

5 SATEVIS ALPHA-INC

PRODUCT REFERENCE

SATEVIS-LORA-ALPHA-INC-MR-PS-RP-AG

MR– Measurement Range: 30B : Bi-axis ±30°/±55°	PS - Power supply : BP3S : Battery Pack with 3 Primary Cell in series (3 x 6.5Ah , 3S1P configuration) - Non Rechargeable battery pack
RP- Radio Power HP - High Power Transmission +22dBm LP - Low Power Transmission +14dBm	AG - Antenna Gain AG-2dBi-868: 2dBi Antenna for EU/IND Regions (Europe /India) AG-5dBi-868: 5dBi Antenna for EU/IND Regions (Europe /India) AG-2dBi-915: 2dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA) AG-5dBi-915: 5dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA)

Example 1: SATEVIS-LORA-ALPHA-INC-30B-BP3S-LP-AG-2dBi-868
Wireless Inclinometer with LoraWan connectivity, Bi-axis inclinometer with ±30°/±55° measurement range, Powered from Battery Pack 3S, Low Power Radio +14dBm, 2dBi Antenna for EU/IND regions

Example 2: SATEVIS-LORA-ALPHA-INC-30B-BP3S-HP-AG-5dBi-915
Wireless Inclinometer with LoraWan connectivity, Bi-axis inclinometer with ±30°/±55° measurement range, Powered from Battery Pack 3S, High Power Radio +22dBm, 5dBi Antenna for US regions

6 SATEVIS ALPHA-INC-KOMPAKT

PRODUCT REFERENCE

SATEVIS-LORA-ALPHA-INC-KOMP-MR-PS-RP-AG

MR– Measurement Range: 30B : Bi-axis ±30°/±55°	PS - Power supply : 1CELL: 1 x primary cell Lithium-Thionyl Chloride 3.6VDC - D Size cell 19Ah (Non rechargeable battery)
RP- Radio Power LP - Low Power Radio +14dBm	AG - Antenna Gain AG-2dBi-868: 2dBi Antenna for EU/IND Regions (Europe /India) AG-5dBi-868: 5dBi Antenna for EU/IND Regions (Europe /India) AG-2dBi-915: 2dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA) AG-5dBi-915: 5dBi Antenna for US/KR/AS/AU Regions (USA/KOREA/ASIA/AUSTRALIA)

Example 1: SATEVIS-LORA-ALPHA-INC-KOMP-30B-1CELL-LP-AG-2dBi-868
Bi-axis Wireless Inclinometer ±30°/±55° with LoraWan connectivity, Powered from 1 x primary cell, Low Power Radio, 2dBi Antenna 868Mhz

Example 2: SATEVIS-LORA-ALPHA-INC-KOMP-30B-1CELL-LP-AG-5dBi-915
Bi-axis Wireless Inclinometer ±30°/±55° with LoraWan connectivity, Powered from 1 x primary cell, Low Power Radio,5dBi Antenna 915MHz

7 COMMON SPECIFICATIONS

SATEVIS LINK SOFTWARE (FROM USB)

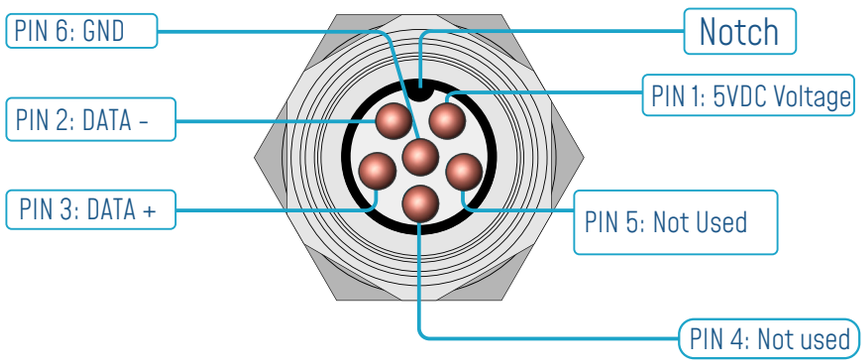
Configuration	Frequency Plan, AppEUI, AppKey
Firmware Upgrade	Firmware upgrade through the USB
Sensor calibration	Calibrations Points setup and Quick calibration

INCLINOMETER SENSOR

Inclinometer Technology	MEMS Technology
Scalable Measuring Range	user-seletctable range ±30° or ±55°, with automatic range adjustment depending on the application
Sensor resolution	0.00183° for ±30° range 0.00366° for ±55° range
Noise density	0.0009 °/√Hz
Sensor Precision/Repeatability (full scale, 25°C)	±0.00183° for ±30° range ±0.00366° for ±55° range
Sensor Accuracy (full scale, @ 25°C)	±0.005° for ±10° range ±0.01° for ±45° range ±0.02° outside ±45° range
Offset temperature dependency (temperature range –25°C to +85°C)	±0.002°/°C
Offset LifeTime Drift (@25°C)	±0.05 °
Sensor frequency Response (-3 dB)	DC to 10 Hz for ±30° measurement range DC to 40 Hz for ±55° measurement range
Calibration	Factory calibrated on 9 references point : 0° absolute, ±5° ,±10°, ±30° and ±45° with calibration settings backed up on the sensor Flash memory. Calibration method used : Back-to-back calibration with an accurate reference sensor.
Sensor Zeroing function	Sensor zeroing can be done after Satevis Sensor installation. User need to hold a magnet on the label " sensor zeroing" for approx. 10s, zero-offset is the performed on all sensor axis X/Y

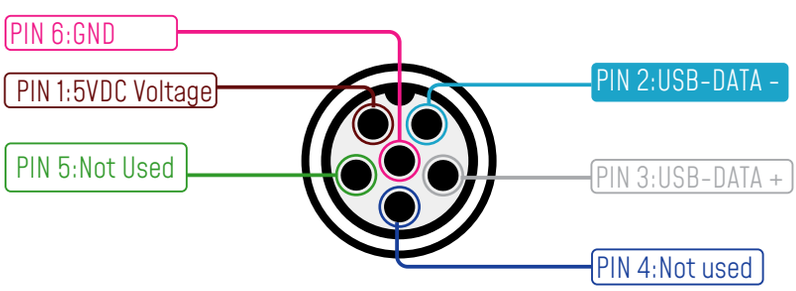
8 EXTERNAL POWER SUPPLY

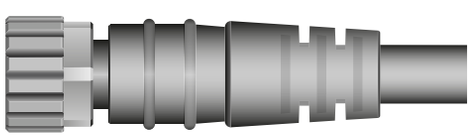
M8 6pin Socket (MALE, A-CODING)- Pin assignation



Interface Name	M8 Pin assignation
5VDC Voltage	PIN 1
DATA -	PIN 2
DATA +	PIN 3
Not used	PIN 4
Not Used	PIN 5
GND	PIN 6

M8 6pin Plug (FEMALE, A-CODING)- Pin assignation





M8-6Pins Plug

Interface Name	5VDC Voltage	USB DATA -	USB DATA +	Not used	Not Used	GND
M8 Pin assignation	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6
Wire Color (A-coding)	BROWN	WHITE	GREY	BLUE	GREEN	PINK

IoT Gateway

SATEVIS® IoT Outdoor Gateway

SATEVIS® IoT Solar Gateway

SATEVIS® IoT Indoor Gateway

9 IOT Outdoor Gateway

Main Features:

- LoRaWAN® Protocol: V1.0.3 Class A/Class B/Class C
- Long Range Sensitivity: 125dBm @125KHz/SF7 - 139dBm @125KHz/SF12
- Product Dimensions: 255*275*92mm
- Long Range TX Power: Up to 26 dBm
- Interface:
  -Ethernet RJ45 * 1
  -RP-SMA Female connector (for LoraWan Antenna)
  -SMA male connector (for 4G Antenna)
- Input Voltage : DC 12V - 2A / PoE (IEEE 802.3 af), 40V-57V DC
- Operating Temperature: -20°C to 55°C
- Relative Humidity: 0% - 85% (non-condensing)

10 IOT Indoor Gateway

Main Features:

- LoRaWAN® Protocol: V1.0.3 Class A/Class B/Class C
- Long Range Sensitivity: 125dBm @125KHz/SF7 - 139dBm @125KHz/SF12
- Product Dimensions: 143.6x135x34mm (connector not included) - 150.6x135x34mm (connector included)
- Long Range TX Power: Up to 26 dBm
- Interface:
  - -Ethernet RJ45 * 1
  - -RP-SMA Female connector (for LoraWan Antenna)
  - -SMA male connector (for 4G Antenna)
- Input Voltage : DC 12V - 2A / PoE (IEEE 802.3 af), 40V-57V DC
- Operating Temperature: -20°C to 55°C
- Relative Humidity: 0% - 85% (non-condensing)

11 IOT Solar Gateway

Main Features:

- LoRaWAN® Protocol: V1.0.3 Class A/Class B/Class C
- Long Range Sensitivity: 125dBm @125KHz/SF7 - 139dBm @125KHz/SF12
- Product Dimensions: 300x300x155mm without solar panel
- Long Range TX Power: Up to 26 dBm
- Norms and Radio certifications:

-CE Labelling Directive R&TTE (Radio) ETSI EN 300 328 (Europe)
-FCC Part 15.247 (North America)
-ARIB STD-T66 Ver. 3.6 (Japan)
-IC RS210
-ROHS - Directive 2002/95/EC

- Input Voltage : DC 12V - 2A / PoE (IEEE 802.3 af), 40V-57V DC
- Operating Temperature: -20°C to 55°C
- Relative Humidity: 0% - 85% (non-condensing)

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