

BeanDevice® 2.4GHZ AX-3D-SR

WIRELESS AND ULTRA-LOW NOISE VIBRATION SENSOR - SCALABLE MEASURING RANGE

PRODUCT VIDEO



APPLICATION VIDEO



USER GUIDE



QUICK START



MECHANICAL DRAWING



STEP FILE



SmartSensor

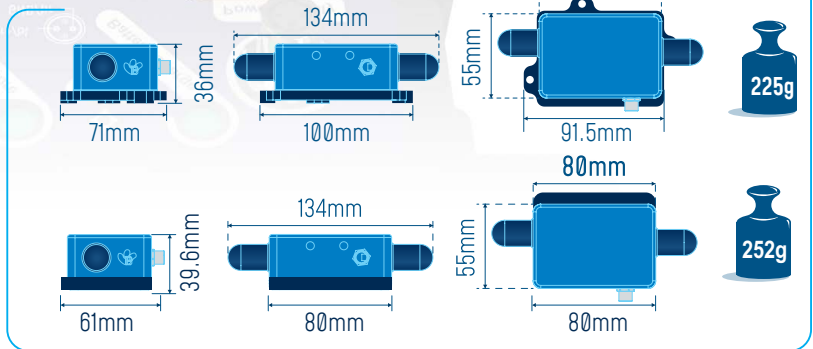


2year
Warranty

MADE IN GERMANY



Screw Mounting Base



Magnetic mounting Base

MAIN FEATURES

- High performance wireless tri-axial vibration sensor based on MEMS Technology
- Automatic report meeting the DIN4150-3 standard (Excel, PDF and Word) with FFT, PPV and Velocity values (available on BeanScope® Premium,)
- Advanced measurement modes available: continuous monitoring or event-trigger mode
- Ultra-Low-Power and license-free 2.4Ghz radio technology (IEEE 802.15.4E)
- Embedded Data Logger: up to 8 million data points (with events dating)
- Maximum Radio Range: 500 m (L.O.S), 30-100m (Non-Line of Sight)
- Excellent radio link budget thanks to our antenna diversity innovative design
- Scalable Range: ±1.2G or ±2.4G with automatic range adjustment
- Very Low Noise Density: 20 µg/√Hz (± 1.2Grange), 32 µg/√Hz (± 2.4Grange)
- Maximum sampling rate: 320 sample per seconds per channel
- Current consumption in sleep mode: <40 uA @3.3V

BeanDevice® 2.4GHZ AX-3D-SR



• Integrated Lithium-Polymer rechargeable battery with industrial battery charger (8-28VDC)



• Waterproof (IP67 | Nema 6) aluminum casing (dimensions Lxlxh: 100x71x38 mm)



• Mounting process: screw mounting or magnetic mounting



• TimSync function: Time-synchronization over the Wireless Sensor Networks with a precision of ± 2.5 ms

APPLICATIONS



STRUCTURAL HEALTH MONITORING



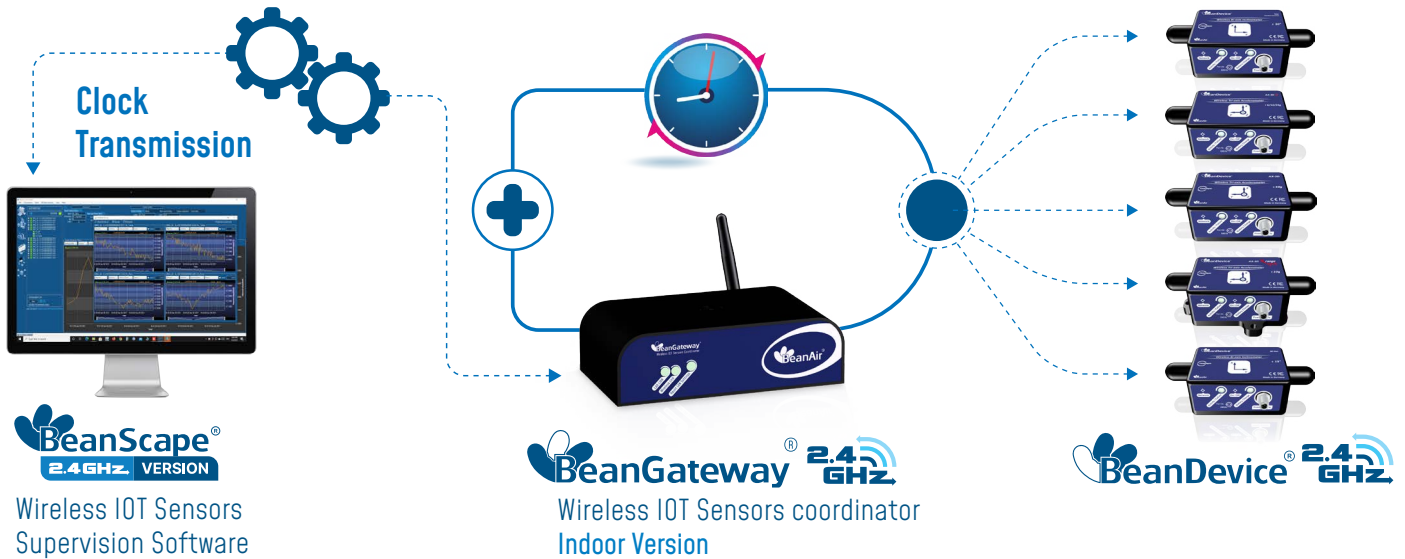
TEST AND MEASUREMENT



LAND SURVEYING

BeanDevice® 2.4GHZ AX-3D-SR

TIME-SYNCHRONIZED WIRELESS IOT SENSORS



REMOTE CONFIGURATION & MONITORING

Configure and monitor your Wireless IOT Sensors from an unique

BeanScope®2.4Ghz , a powerful Wireless IOT Sensors supervision software, allows the user to:

- visualize in real-time sensing data
- remotely configure the BeanDevice®2.4Ghz AX-3D-SR

Several data acquisition are available on the BeanDevice®2.4Ghz AX-3D-SR

- **Low Duty Cycle Data Acquisition mode (LDCDA)** : the data acquisition is immediately transmitted by radio. Transmission frequency can be configured from 1s to 24h ;
- **Streaming packet Mode** : All measured values are transmitted by packet within a continuous flow at 3 kbps/s maximum
- **Standalone**: The BeanDevice®2.4Ghz AX-3D-SR operates in standalone without being connected to the BeanGateway®2.4Ghz



BeanDevice® 2.4GHZ AX-3D-SR

i For further information about the different data acquisition modes:
TN-RF-008 – “Data acquisition modes available on the BeanDevice®2.4Ghz”

VIBRATION ANALYSIS REPORT AT A GLANCE

The **BeanScope®2.4Ghz** comes with advanced tools for user working on building and ground vibration:

- Vibration Analysis tools: FFT, PPV (Peak Particle Velocity), Velocity
- Automatic report meeting the DIN4150-3 standard (Excel, PDF and Word)



ANTENNA DIVERSITY

While the vast majority of wireless IOT sensors show their limits in harsh industrial environment, the **BeanDevice®2.4Ghz AX-3D-SR** integrates an innovative antenna diversity design, boosting the radio link quality in environments subject to random and diverse disturbances. Antenna Diversity improves both the quality and reliability of a wireless link by 30%.



EMBEDDED DATA LOGGER UP TO 1 MILLION DATA POINTS

The **BeanDevice®2.4Ghz AX-3D-SR** integrates an embedded datalogger, which can be used to log data when a Wireless IOT Sensors can not be easily deployed on your site. All the data acquisition are stored on the embedded flash and then transmitted to the **BeanGateway® 2.4 GHz** when a Wireless IOT Sensors is established.

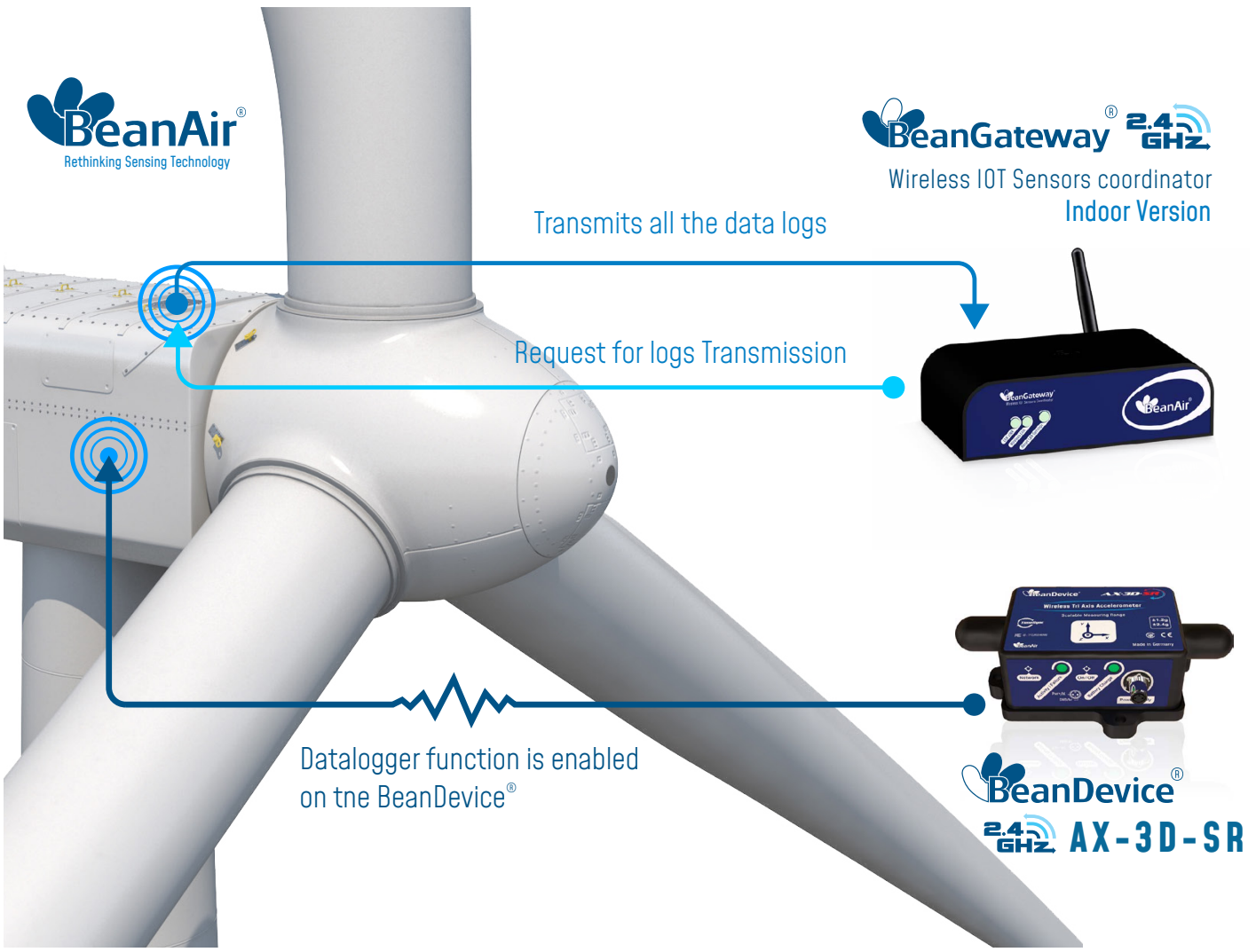
The data logger function is compatible with all the data acquisition mode available on the **BeanDevice®2.4Ghz AX-3D-SR** :

- Low Duty Cycle
- Streaming packet

EXAMPLE : CONDITION MONITORING ON WIND TURBINE

- In standalone operation, the **BeanDevice®2.4Ghz AX-3D-SR** stores all the measurements on its embedded datalogger. Thus, a direct connection with the **BeanGateway®2.4GHz** is not needed.
- Datalogging will start after powering on the **BeanDevice®2.4Ghz AX-3D-SR**
- Data logs can be transmitted to the **BeanGateway®2.4GHz** on request. Once a successful logs download is done, user can choose to erase automatically the logs from the datalogger memory;

BeanDevice® 2.4GHZ AX-3D-SR



For further information about data logger, please read the following technical note :
TN-RF-007 – “BeanDevice® DataLogger User Guide ”

TECHNICAL SPECIFICATIONS

PRODUCT REFERENCE

BND-2.4GHZ-AX-3D-SR-MR-PS-MO

MR – Measurement Range:

1.2T :tri-axis Low noise vibration sensor $\pm 1.2g/\pm 2.4g$

PS - Power Supply

RB : Internal rechargeable battery

MO - Mounting Option

SCM - Screw Mounting Lid

MM - Magnetic Mounting Lid

Example 1: BND-2.4GHZ-AX-3D-SR-1.2T-RB-SCM, Low Noise wireless Vibration sensor with $\pm 1.2G/\pm 2.4G$ measurement range, internal rechargeable battery, Screw mounting

Example 2: BND-2.4GHZ-AX-3D-SR-1.2T-RB-MM, Low Noise wireless Vibration sensor with $\pm 1.2G/\pm 2.4G$ measurement range, external power supply, Magnetic Mounting

ACCELEROMETER SPECIFICATIONS

Accelerometer technology	Accurate and low power MEMS technology
Scalable Measuring Range	User-selectable range $\pm 1.2g$ or $\pm 2.4g$, with automatic range adjustment depending on the application
Sensor resolution	0.167 mg range $\pm 1.2g$ 0.333 mg range $\pm 2.4g$
Noise density	20 $\mu g/\sqrt{Hz}$ for $\pm 1.2G$ measurement range 32 $\mu g/\sqrt{Hz}$ for $\pm 2.4G$ measurement range
Sensor precision (full scale, @ 25°C, Static Measurement Mode every 2s)	$\pm 1.1mg$ for $\pm 1.2g$ range $\pm 1.8mg$ for $\pm 2.4g$ range
Sensitivity temperature dependency (temperature range $-25^{\circ}C$ to $+85^{\circ}C$)	$\pm 0.1\%$
Offset LifeTime Drift (@25°C)	$\pm 4mg$
Sensor frequency Response (-3 dB)	DC to 40 Hz for $\pm 1.2g$ measurement range DC to 70 Hz for $\pm 2.4g$ measurement range
Calibrations	Factory calibrated for both ranges $\pm 1.2g$ and $\pm 2.4g$ with calibration settings backed up on the sensor Flash memory. Calibration method used : Back-to-back calibrated with a reference sensor. Sensors can be re-calibrated by the user.

INTEGRATED TEMPERATURE SENSOR

Temperature Range	$-40^{\circ}C$ to $+75^{\circ}C$
Measurement resolution	$\pm 0.06^{\circ}C$
Sensor Precision	$\pm 1^{\circ}C$

TECHNICAL SPECIFICATIONS

CONFIGURABLE SETTINGS FROM THE BEANSCAPE® 2.4GHZ SOFTWARE

Data Acquisition mode (SPS = sample per second)	Static Data Acquisition : Low Duty Cycle Data Acquisition (LDCDA) Mode Measurement heartbeat 1s to 24 hour Dynamic data acquisition : Streaming and S.E.T. (Streaming with Event Trigger) mode
Sampling Rate (in streaming and S.E.T mode)	Minimum: 1 SPS Maximum : 400SPS on each axis , for ±1.2g measurement range (Static and Auto Range) , for ±2.4g measurement range (Auto Range) , Maximum : 800 SPS on each axis , for ±2.4g measurement range (Static Range)
Alarm Threshold	Three-level alarms : Alert < Action < Alarm
Scalable Measurement Range	±1.2g , ±2.4g and automatic ±1.2g/±2.4g
Power Mode	Battery saver mode & Active power mode (Active Power Mode is not available on -XT version)

RF SPECIFICATIONS

Wireless Technology	Ultra-Low-Power and license-free 2.4Ghz radio technology (IEEE 802.15.4E)
WSN Topology	Point-to-Point / Star
Data rate	250 Kbits/s
RF Characteristics	ISM 2.4GHz – 16 Channels. Antenna diversity designed by Beanair®
TX Power	+18 dBm
Receiver Sensitivity	-104dBm
Maximum Radio Range	500 m in Line-Of-Sight 30-100 m in Non-Line-of-Sight
Antenna	Omnidirectional radome antenna with antenna diversity Gain : 3 dBi Waterproof IP67

EMBEDDED DATA LOGGER

Storage capacity	up to 8 millions data points
Wireless data downloading	20 minutes to download the full memory (average time)

TIMESYNC FUNCTION : CLOCK SYNCHRONIZATION OVER THE WIRELESS IOT SENSOR

Clock synchronization accuracy	±2.5 ms (at 25°C)
Crystal specifications	Tolerance ±10ppm, stability ±10ppm

ENVIRONMENTAL AND MECHANICAL

Casing	<ul style="list-style-type: none"> Aluminum AL6061 & Waterproof casing Dimensions in mm (LxWxH): 100 x 71 x 38 (without Radome antennas, with mounting eyelet) Weight (with internal battery) : 225g (screw mounting) 252g (magnetic mounting)
IP NEMA Rating	IP67 Nema 6
Shock resistance	150g during 50 ms
Operating Temperature	-40 °C to +60 °C
Norms & Radio Certifications	<ul style="list-style-type: none"> CE Labelling Directive R&TTE (Radio) ETSI EN 300 328 FCC (North America) ARIB STD-T66 Ver 3.6 ROHS - Directive 2002/95/EC

POWER SUPPLY

Integrated battery charger	<p>Integrated Lithium-ion battery charger with high precision battery monitoring :</p> <ul style="list-style-type: none"> Overvoltage/Overcurrent/Short-Circuit/Undervoltage protection Battery Temperature monitoring
Current consumption @3,3V	<ul style="list-style-type: none"> During data acquisition : 30 to 40 mA During Radio transmission : 55 mA @ 18 dBm During Battery Saver Mode : < 30 µA
External power supply	<p>8-28VDC with reverse polarity protection IEC-61000-4-2: ESD 30kV(Air), 30kV (Contact) Surge protection > 28VDC (600W during 10us max)</p>
Rechargeable Lithium-Polymer battery	2 Ah, Lithium-Polymer battery

INCLUDED ACCESSORIES

	1x Magnet to Power ON/Power OFF the device
	1x M8 Cap for Power Supply

BATTERY LIFE WITH FOR DIFFERENT MEASUREMENT CYCLE

Battery Saver mode Enabled, Measurement Cycle every minute	8 months
Battery Saver mode Enabled, Measurement Cycle every 5 minutes	13 months
Battery Saver mode Enabled, Measurement Cycle every hour	6 months
Battery Saver mode disabled, Streaming mode 20 Samples / second	72 hours

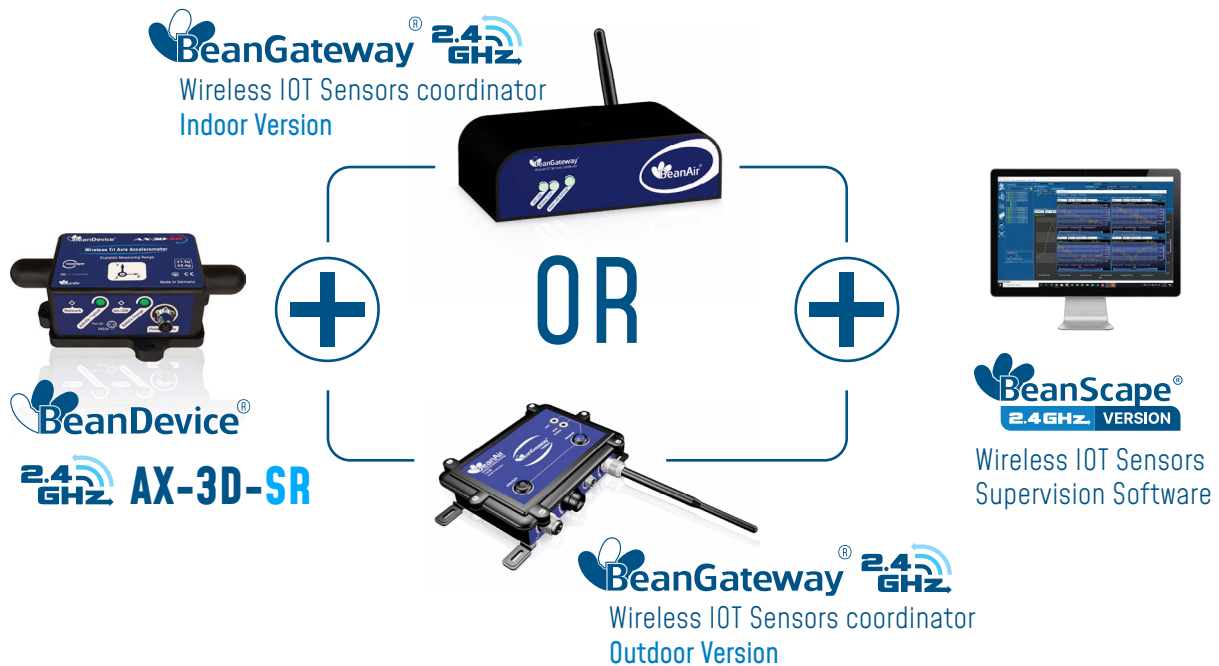
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OPTIONAL ACCESSORIES AND SERVICES

External Power Supply	Wall plug-in, Switchmode power Supply 12V @ 1,25A with sealed M8 Plug (IP67/Nema 6) Ref : M8-PWR-12V
Standalone Solar System	High efficiency solar panel with Solar charging controller and Lead-acid battery Ref.: X-SOL-7AH-20W-4V-5M for XT version Ref.: X-SOL-7AH-20W-12V-5M for RB version Ref: X-SOL-14AH-20W-4CH-4V-5M for XT version Ref: X-SOL-14AH-20W-4CH-12V-5M for RB version Ref: X-SOL-14AH-80W-4CH-4V-5M for XT version Ref: X-SOL-14AH-80W-4CH-12V-5M for RB version More options and references are available on X-SOLAR datasheet
Bracket Mounting	90° Bracket for BeanDevice (Xrange smartsensor) with 4 x M5 screws + Locknut Ref: SMART-BRACK-MNT
Calibration certificate	Calibration certificate provided by Beanair GmbH A static calibration method is used on a granite surface plate DIN876 Ref: CERT-CAL-SMART

GETTING STARTED WITH A WIRELESS IOT SENSORS

The [BeanDevice® 2.4Ghz AX-3D-SR](#) operates only on our Wireless IOT Sensors, you will need the [BeanGateway® 2.4Ghz](#) and the [BeanScope® 2.4Ghz](#) for starting a Wireless IOT Sensors.



BeanDevice® 2.4GHZ AX-3D-SR



For further information about BeanDevice® battery life :
TN-RF-002 Current consumption in active & sleeping mode
TN-RF-012 Beandevic autonomy in Streaming and Streaming Packet Mode

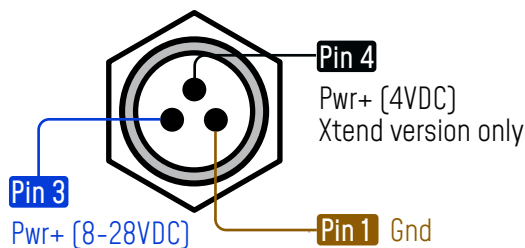
BEANDEVICE® 2.4GHZ AX-3D-SR FRONT VIEW



Product specifications are subject to change without notice. Contact Beanair for latest specifications.

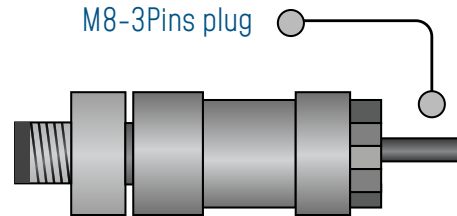
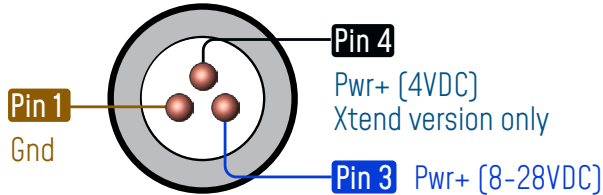
EXTERNAL POWER SUPPLY WIRING CODE

M8 Socket [A-Coding] - Pin Assignment



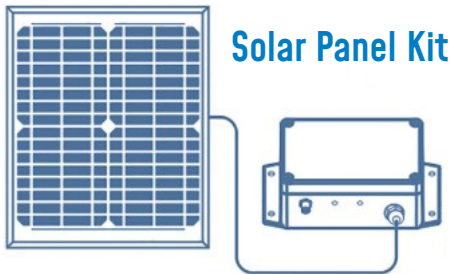
Interface Name	M8 Pin assignment	Wire Color [A-coding]
Power Supply 8-28VDC	PIN 3	Blue
Power Supply 4VDC [available on Xtend version only]	PIN 4	Black
Ground	PIN 1	Brown

M8 Plug (A -Coding) - Pin Assigantion

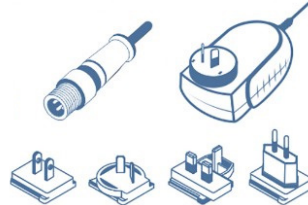


Do not power PIN4 and PIN3 at the same time, you will damage your Beandevicce

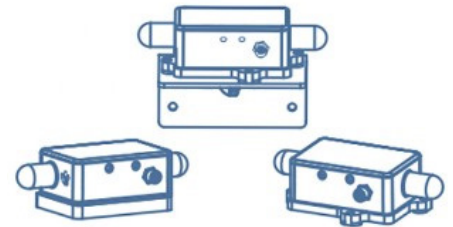
OPTIONS AND ACCESSORIES



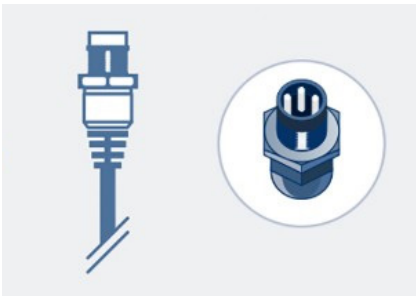
High efficiency solar panel with solar charging controller and Lead-acid battery
Ref: X-SOL-SLP-VOUT-CL



Wall plug-in, Switchmode power Supply 12V @ 1,25A with sealed M8 Plug [IP67/Nema 6]
Ref: M8-PWR-12V

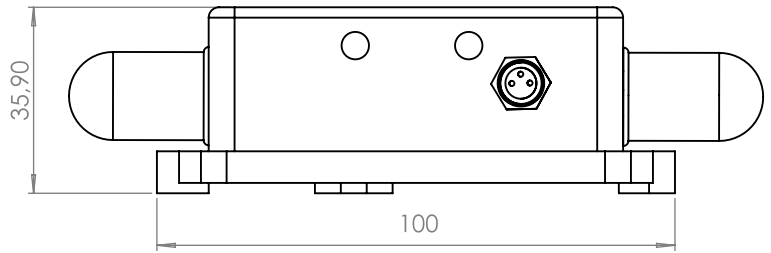
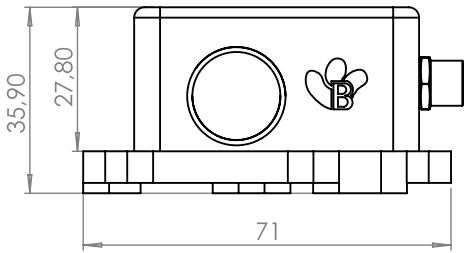
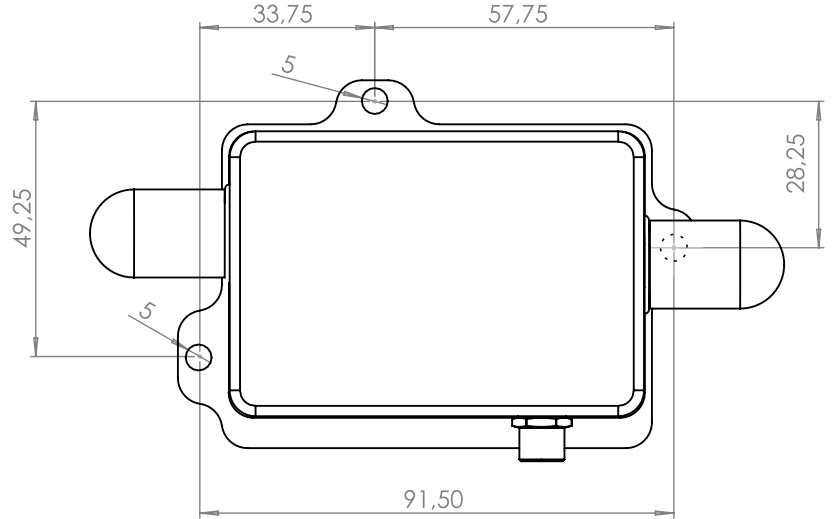


- 90° Bracket for BeanDevice [Xrange smartsensor] with 4 x M5 screws + Locknut
Ref: SMART-BRACK-MNT
- Magnetic Mounting Lid



Molded cable with M8-3pins male plug
Material: PVC with shield protection
IP Rating : IP67 | Nema 6
Cable length: 2 meters , Ref: CBL-M8-2M
Cable length : 5 meters, Ref: CBL-M8-5M
Cable length: 10 meters, Ref: CBL-M8-10M

DRAWING



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