

BeanDevice® 2.4GHz AX-3D XRange

High Performance wireless IIOT vibration sensor | acceleration and Particle Velocity monitoring

PRODUCT VIDEO



APPLICATION VIDEO



USER GUIDE



QUICK START



MECHANICAL DRAWING



STEP FILE



2year
Warranty

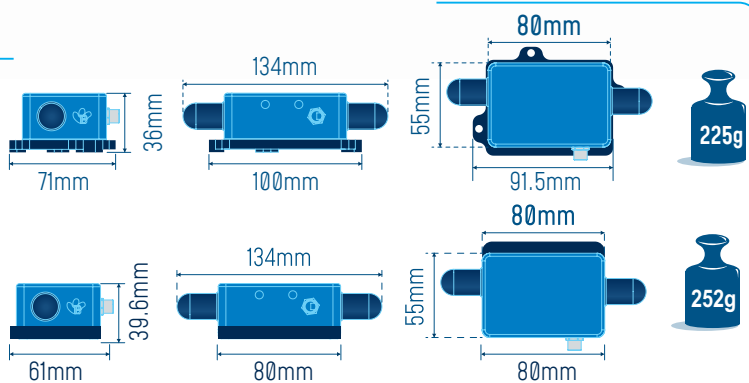
MADE
IN
GERMANY



001A-08148



Screw Mounting Base



MAIN FEATURES



• Embedded data logger : up to 8 million data points (with events dating)



• Wireless accelerometer (measurement range $\pm 2g$ or $\pm 10g$) FFT and DIN4150-3 (Ground Vibration) modules available



• Waterproof IP67 casing (Nema 6)



• Excellent radio link relying on the radio antenna diversity developed by Beanair®



• Time-synchronized wireless sensor networks ($\pm 2.5ms$ of accuracy)



• Integrated Lithium-Ion battery charger

APPLICATIONS

Ground Vibration Monitoring



Structural Health Monitoring



Condition Monitoring



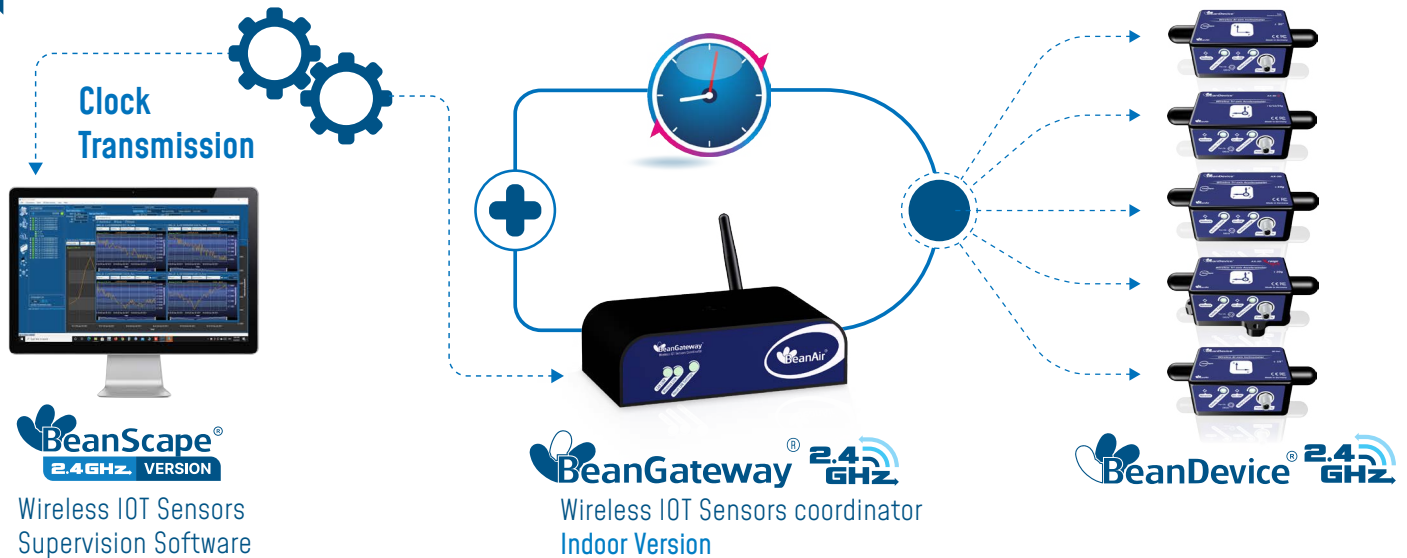
Land Surveying



Test and Measurement



TIME-SYNCHRONIZED WIRELESS IOT SENSORS



TimeSync function brings time-synchronization over the Wireless IOT Sensors ($\pm 2.5\text{ms}$ of accuracy between each Wireless IOT Sensors) and contributes to enhance user experience about correlation of remote sensing data and modal analysis

REMOTE CONFIGURATION & MONITORING

Configure and monitor your Wireless IOT Sensors from an unique software

The **BeanScope® 2.4GHz** application allows the user to view all the data transmitted by the **BeanDevice® 2.4GHz AX-3D XRange**. Thanks to the OTAC (Over-the-Air configuration) feature, the user can remotely configure the **BeanDevice® 2.4GHz AX-3D XRange**. SEVERAL DATA ACQUISITION MODES ARE AVAILABLE ON THE BEANDEVICE® AX-3D XRange :

- **Low Duty Cycle Data Acquisition mode (LDCDA)** : the data acquisition is immediately transmitted by radio. The transmission frequency can be configured from 1s to 24h.
- **Streaming Packet Mode** : all measured values are transmitted by packet within a continuous flow at 4000 samples per second maximum



 For further information about the different data acquisition modes:
[TN-RF-008 – “Data acquisition modes available on the BeanDevice®”](#)

VIBRATION ANALYSIS REPORT AT A GLANCE

The [BeanScape®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 sensors show their limits in harsh industrial environment, the [BeanDevice®2.4GHz AX-3D XRange](#) 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 8 MILLION DATA POINTS

The [BeanDevice®2.4GHZ AX-3D XRange](#) integrates an embedded datalogger, which can be used to log data when a Wireless IOT Sensor can not be easily deployed on your site.

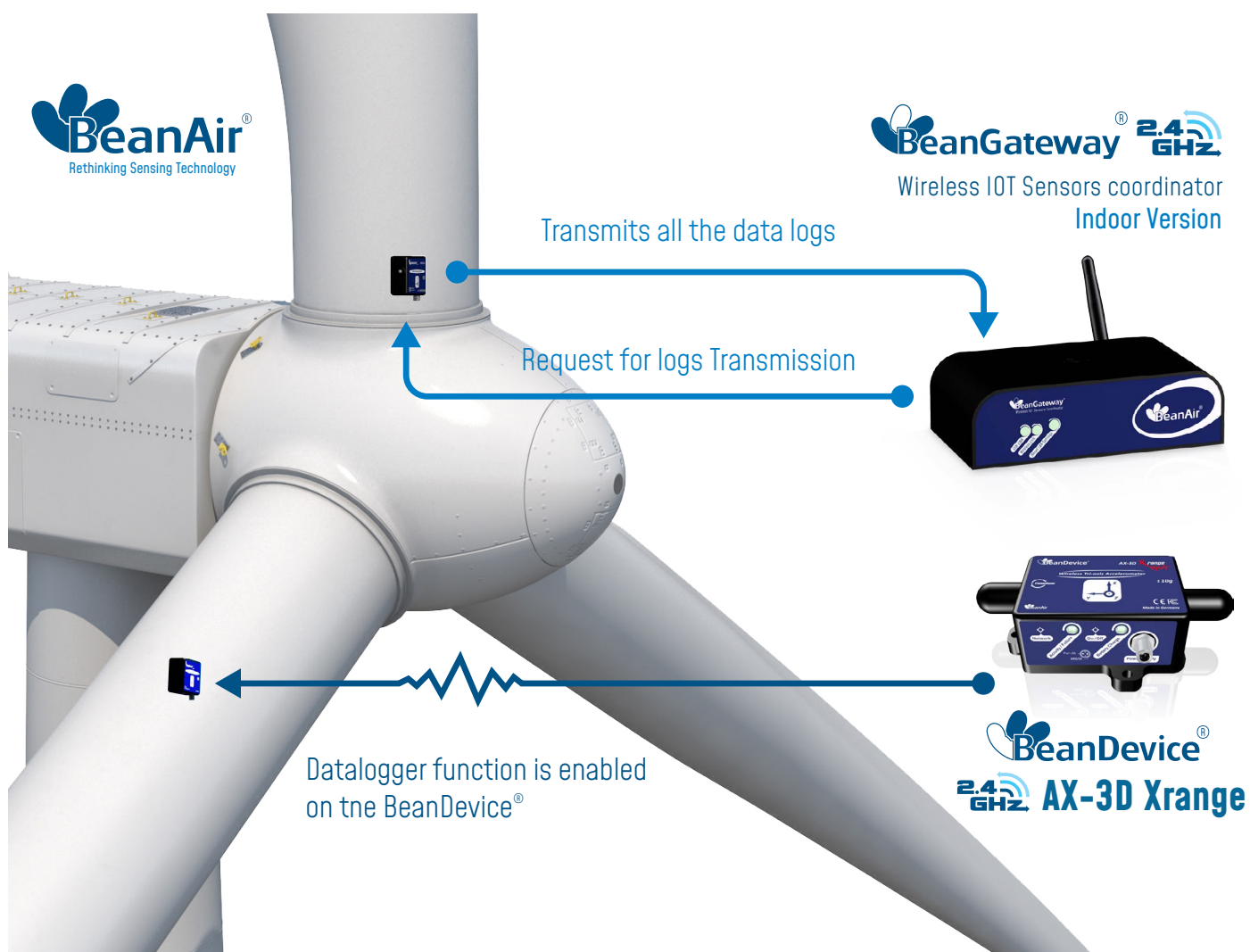
All the data acquisition are stored on the embedded flash and then transmitted to [the BeanGateway®2.4GHZ](#) when a Wireless IIOT Sensors is established.

The data logger function is compatible with all the data acquisition mode available on the [BeanDevice®2.4GHZ AX-3D XRange](#) :

- [Low Duty Cycle](#)
- [Streaming packet](#)

EXAMPLE : VIBRATION ANALYSIS ON WINDMILLS BLADES

- In standalone operation, the **BeanDevice® 2.4GHz AX-3D XRange** stores all the measurements on its embedded datalogger. Thus, a direct connection with the **BeanGateway® 2.4GHz** is not needed.
- When the blades start rotating, all the acquired measurements are stored on datalogger.
- Data logs can be transmitted to the **BeanGateway® 2.4GHz** on request. Once a successful transmission is done, the user can choose to erase automatically the logs from the datalogger memory, so new ones can be stored.



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-MR-XR-PS-MO-HG

MR - Measurement Range
(1g = 9806.65 mm/s²)
2: ±2g measurement range
10: ±10g measurement range

PS - Power Supply
RB : Built-in rechargeable
Lithium-Polymer battery 2Ah

MO - Mounting Option
SCM - Screw Mounting Lid
MM - Magnetic Mounting Lid

HG: High Gain External
Antenna 5dBi
If this field is left blank,
Integrated Radome Antenna
will be provided

Example n°1: BND-2.4GHZ-AX-3D-10G-XR-RB-SCM, High performance wireless accelerometer with 10g measurement range, built-in rechargeable battery, screw mounting, Integrated Radome Antenna

Example n°2: BND-2.4GHZ-AX-3D-2G-XR-RB-MM, High performance wireless accelerometer with 2g measurement range, built-in rechargeable battery, Magnet Mounting, Integrated Radome Antenna

Example n°3: BND-2.4GHZ-AX-3D-10G-XR-RB-SCM-HG, High performance wireless accelerometer with 10g measurement range, built-in rechargeable battery, screw mounting, High Gain Antenna

ACCELEROMETER SPECIFICATIONS

Accelerometer technology	Accurate and low power MEMS technology
Sensitivity	±2g Version : 0.1mg ±10g version: 0.3mg
Typical non-linearity (Full scale, @ 25°C)	±0.1%
Analog to Digital converter	16-bit, SAR architecture (Successive Approximation Register) with temperature compensation. Measurement values are limited to 4 digits on Beanscape software.
Sensor frequency response (-3 dB)	DC to 800 Hz
Noise spectral density	±2g Version : 45 µg/√Hz ±10g version: 100 µg/√Hz
Zero-g Offset Variation from RT over Temp	±2g Version : ±0.1 mg/°C ±10g version: ±0.1 mg/°C
Sensitivity Variation from RT over Temp	±2g Version : ±0.01 %/°C (XY), ±0.02 %/°C (Z) ±10g version: ±0.01 %/°C
Offset Ratiometric Error	±2g Version : 2mg ±10g version: ±0.2% (XY), ±0.1% (Z)
Sensitivity Ratiometric Error	±2g Version : ±1.25 % (X-Y), ±0.2 % (Z) ±10g Version : ±1.6% (X-Y), ±0.2 % (Z)
Cross Axis Sensitivity	1
Anti-aliasing Hardware filter	Butterworth 5th order filter – cut-off frequency : 1 Hz to 2000 Hz remotely programmable (BeanScape®)

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)
Sampling Rate (in streaming packet mode)	Minimum: 1 SPS Maximum: 3 kSPS per axis (one axis enabled) 1.5 kSPS per axis (2-axis enabled) 1 kSPS per axis (3-axis enabled)
Sampling Rate (in streaming mode with data logger only)	Minimum: 1 SPS Maximum: 4 kSPS maximum per axis (one or two axis enabled) 3,5 kSPS per axis (3-axis enabled)
Programmable cut-off frequency (Anti-aliasing filter)	1- 2000 Hz
Power Mode	Battery saver mode & Active power mode

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 (In Transmission Mode)	High Gain Antenna : 400-500m (L.O.S), 60-120m (N.L.O.S.) Integrated Radome Antenna : 200-300m (L.O.S), 30-60m (N.L.O.S.)
Antenna	Antenna diversity : High Gain Antenna : 2 x N-Type Antenna 5dBi , IP67 Radome Antenna : 2 x Antenna 1.9 dBi , IP67

EMBEDDED DATA LOGGER

Storage capacity	up to 8 millions data point
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	<p>Aluminum AL6061 & Waterproof casing</p> <ul style="list-style-type: none"> • Dimensions in mm (LxWxH): 100 x 71 x 38 (without Radome antennas, with mounting eyelet) • Weight (with internal battery & Radome Antenna) : 240g (screw mounting) 265g (magnetic mounting) • Weight (with internal battery & High Gain Antenna) : 440g (screw mounting) 465g (magnetic mounting)
IP NEMA Rating	IP67 Nema 6
Shock resistance	150g during 50 ms
Operating Temperature	<p>RB : Internal rechargeable battery -40 °C to +60 °C</p> <p>XT : External Power Supply -40 °C to +75 °C during battery discharge</p> <p>A Sunshield must be used if the sensor is exposed to direct sun radiation.</p>
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
Maximum Humidity	90 %RH
Base Plate	<p>-Aluminum black anodized AL 7075 with rugged three-point-mounting</p> <p>-Screw Mounting Option: the device should be mounted on a flat and smooth surface with 3 screws, dimension M5. Mounting torque 5 ±1Nm</p> <p>-Magnetic Mounting Option: the device should be mounted on a steel surface.</p>

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 : 20 to 30 mA • During Radio transmission : 40 mA @ 0 dBm, 80mA @18dBm • During Battery Saver Mode : < 30 µA
External power supply	<p>8-28VDC with reverse polarity protection</p> <p>IEC-61000-4-2: ESD 30kV(Air), 30kV (Contact)</p> <p>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

TECHNICAL SPECIFICATIONS

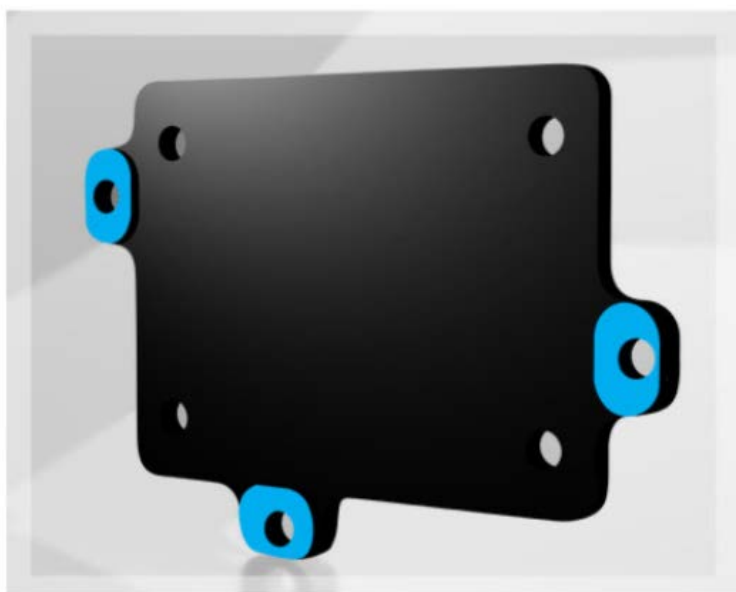
OPTIONAL ACCESSORIES AND SERVICES

External Power Supply	Wall plug-in, Switchmode power Supply 12V @ 1.25A with sealed M8 Plug (IP67/Nema 6) Ref: M8-PWR-12V
Bracket Mounting	90° Bracket for BeanDevice (Xrange smartsensor) with 4 x M5 screws + Locknut Ref: SMART-BRACK-MNT
M8 extension cable for external power supply	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
Calibration certificate	Calibration certificate provided by Beanair GmbH A static calibration method is used on a granite surface plate DIN876 Ref : CERT-CAL-SMART

*1 500m L.O.S conditions is reached:

- Beangateway is positioned in Line Of Sight toward sensor (no obstacles, no radio interferences) with High Gain Antenna, with a Height of 3 meters minimum. 26dBm High Gain Directional Antenna is used on gateway side.
- On sensor side : Radome Antenna should point to Vertical Direction for better Coverity

RUGGED BASE PLATE WITH THREE-POINT-MOUNTING



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

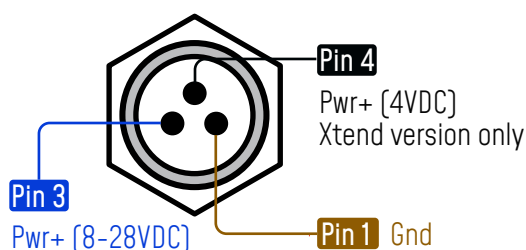
BEANDEVICE® 2.4GHz AX-3D X-RANGE FRONT VIEW



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

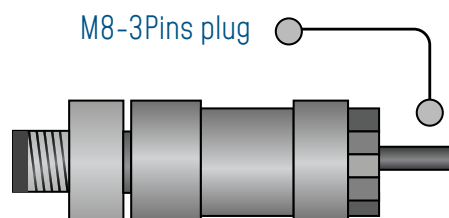
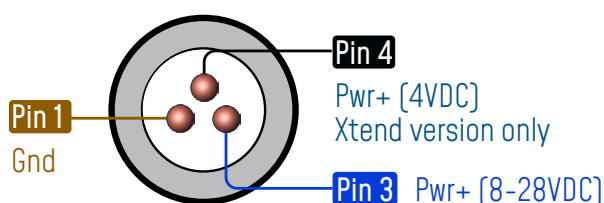
EXTERNAL POWER SUPPLY WIRING CODE

M8 Socket (A-Coding) - Pin Assignment



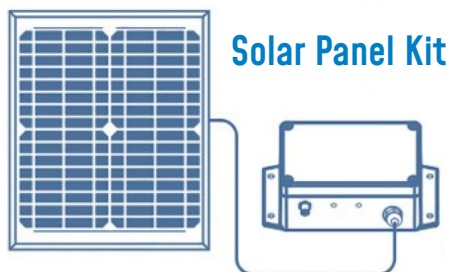
Interface Name	M8 Pin assignment	Wire Color [A-coding]
Power Supply 8-28VDC	PIN 3	Blue
Power Supply 4VDC [available on Xtend version only]	PIN 4	Black
Ground	PIN 1	Brown

M8 Plug (A -Coding) - Pin Assignment



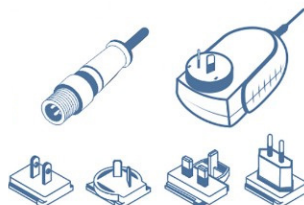
Do not power PIN4 and PIN3 at the same time, you will damage your Beandevic

OPTIONS AND ACCESSORIES



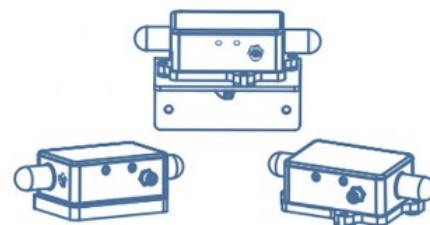
Solar Panel Kit

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



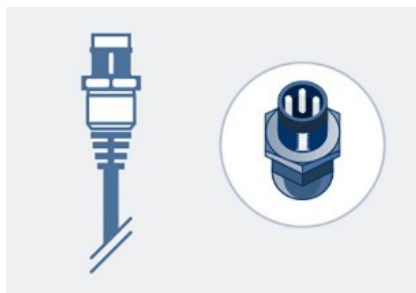
External Power-Supply

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



Mechanical Mounting Options

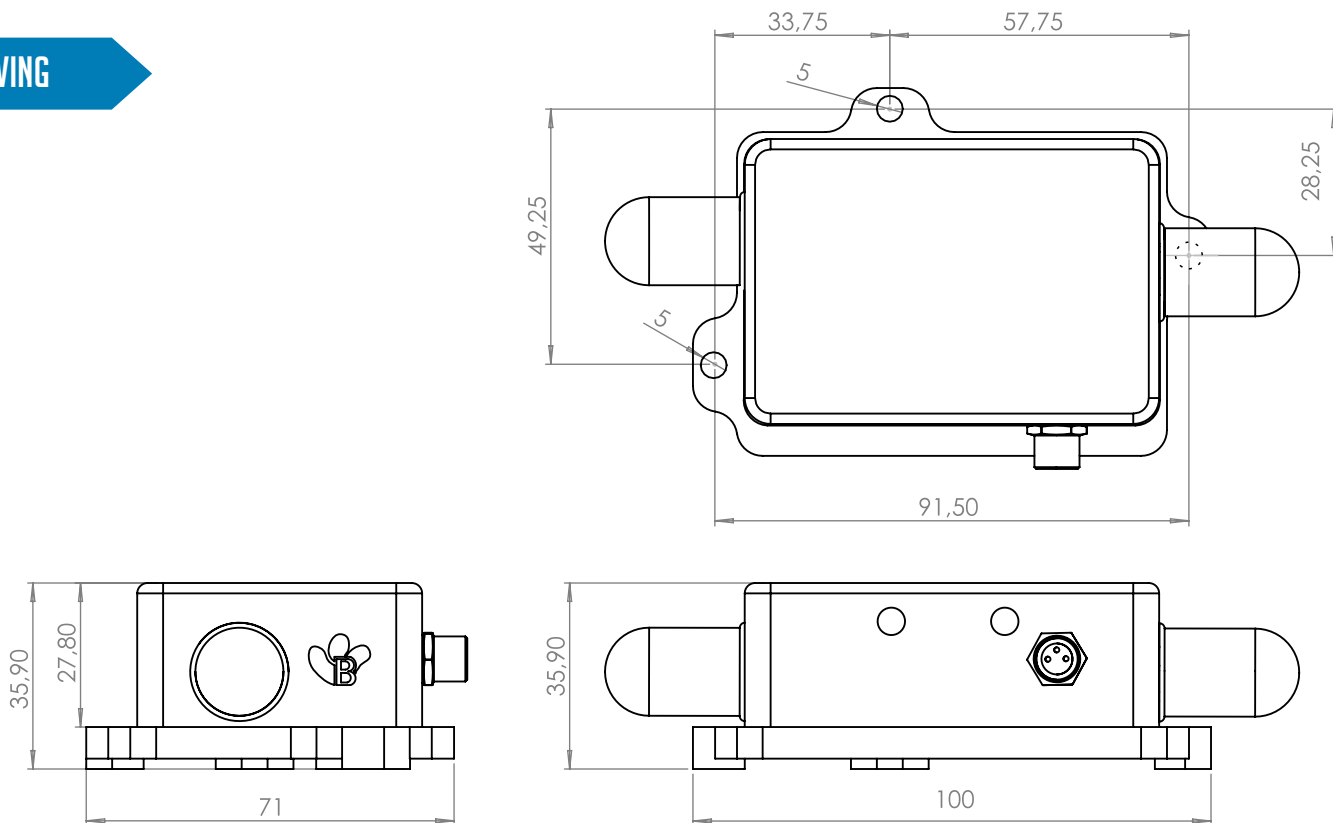
- 90° Bracket for BeanDevice [Xrange smartsensor] with 4 x M5 screws + Locknut
Ref: SMART-BRACK-MNT
- Magnetic Mounting Lid



M8 extension cable for external power supply

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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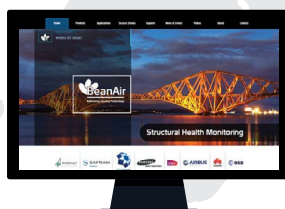
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