BeanAir
WIRELESS IIOT SENSORS

2.4 GHz

BeanDevice® 2.4GHZ AX-3D-SR

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

PRODUCT VIDEO

APPLICATION VIDEO

USER GUIDE

QUICK START

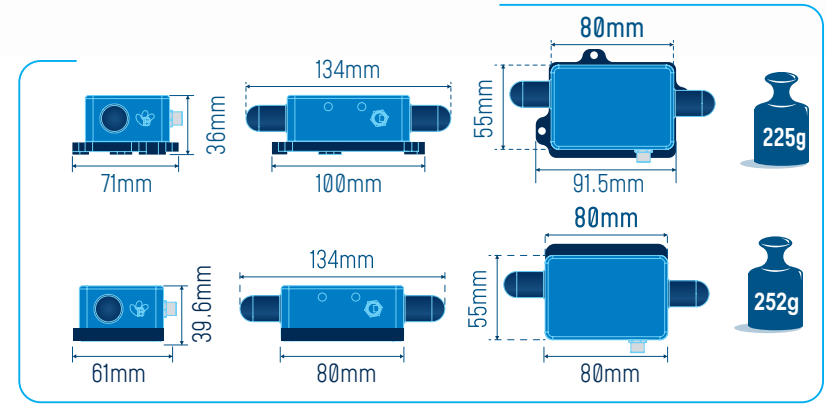
MECHANICAL DRAWING

STEP FILE

2year Warranty

MADE IN GERMANY

CE FC R 001A-08148



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 BeanScape® Premium,)
- 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

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WIRELESS IIOT SENSORS

BeanDevice® 2.4GHZ AX-3D-SR

- 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)
- Integrated Lithium-Polymer rechargeable battery with industrial battery charger (8-28VDC)
- Mounting process: screw mounting or magnetic mounting
- 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
- Waterproof (IP67 | Nema 6) aluminum casing (dimensions Lxlxh: 100x71x38 mm)
- TimSync function: Time-synchronization over the Wireless Sensor Networks with a precision of ±2.5 ms

APPLICATIONS

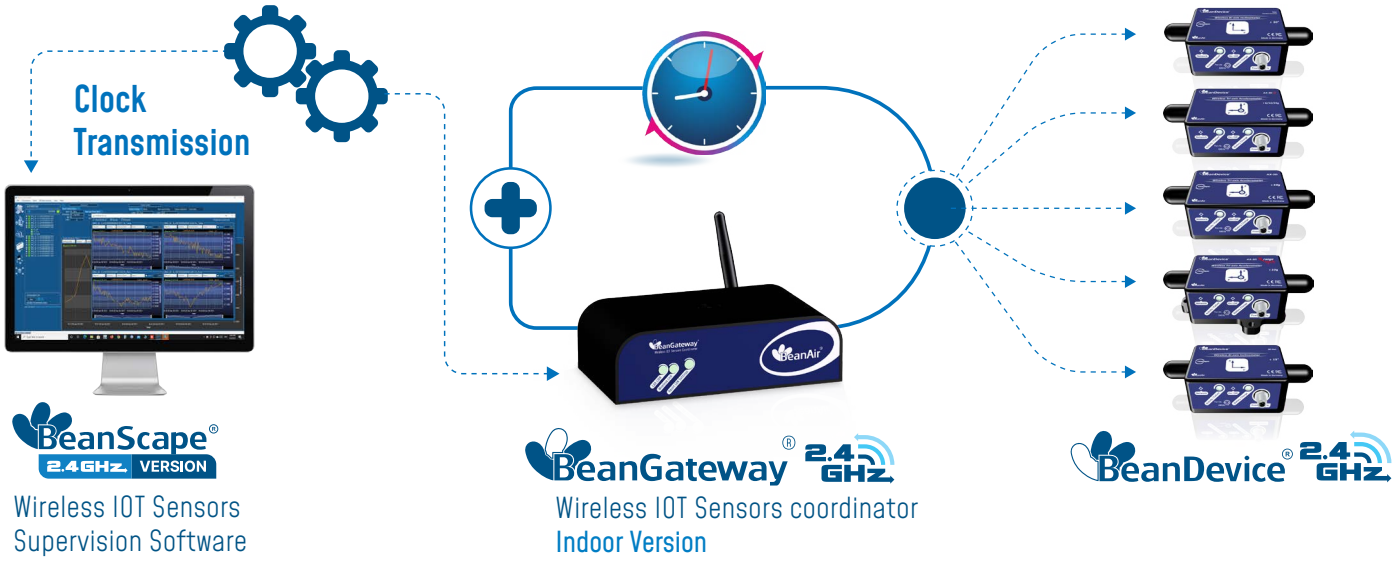
STRUCTURAL HEALTH MONITORING

TEST AND MEASURMENT

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

BeanScape®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 ksps/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

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 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 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

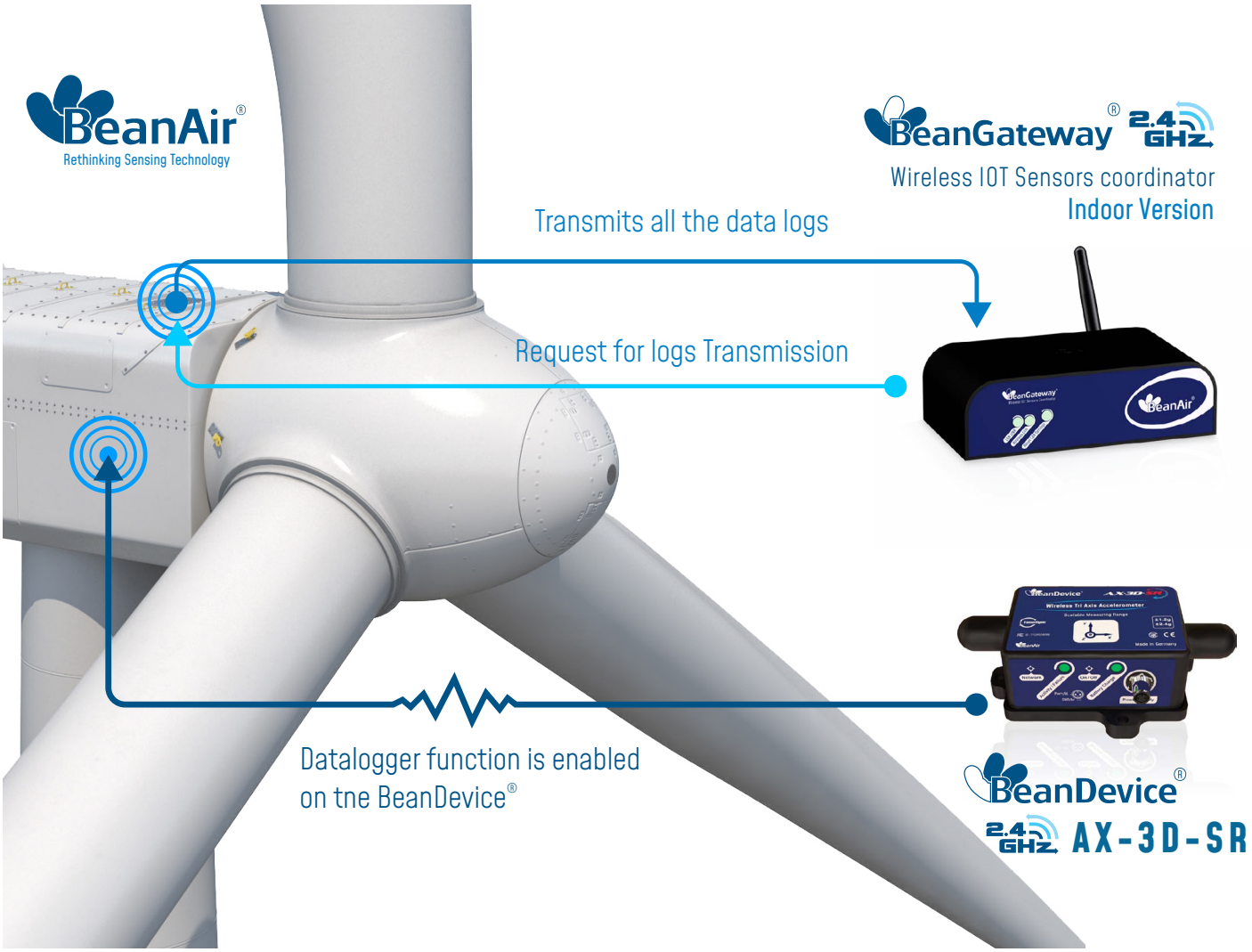
The BeanDevice®2.4Ghz AX-3D-SR integrates an embedded datalogger, which can be used to log data when a Wireless IOT Sensors can not be easily deployed on your site. All the data acquisition are stored on the embedded flash and then transmitted to the BeanGateway® 2.4 GHz when a Wireless IOT Sensors is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

MR – Measurement Range: 1.2T :tri-axis Low noise vibration sensor ±1.2g/±2.4g	PS - Power Supply RB : Internal rechargeable battery	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 1: BND-2.4GHZ-AX-3D-SR-1.2T-RB-SCM Low Noise wireless Vibration sensor with ±1.2G/±2.4G measurement range, internal rechargeable battery, Screw mounting , Integrated Radome Antenna.
Example 2: BND-2.4GHZ-AX-3D-SR-1.2T-RB-MM Low Noise wireless Vibration sensor with ±1.2G/±2.4G measurement range internal rechargeable battery, Magnetic Mounting , Integrated Radome Antenna.
Example 3: BND-2.4GHZ-AX-3D-SR-1.2T-RB-SCM-HG Low Noise wireless Vibration sensor with ±1.2G/±2.4G measurement range, internal rechargeable battery, Screw mounting ,External High Gain Antenna.

ACCELEROMETER SPECIFICATIONS

Accelerometer technology	Accurate and low power MEMS technology
Scalable Measuring Range	uer-seletctable range ±1.2g or ±2.4g, with automatic range adjustment depending on the application
Sensor resolution	0.167 mg range ±1.2g 0.333 mg range ±2.4g
Noise density	20 µg/√Hz for ±1.2G measurement range 32 µg/√Hz for ±2.4G measurement range
Sensor precision (full scale, @ 25°C, Static Measurement Mode every 2s)	±1.1mg for ±1.2g range ±1.8mg for ±2.4g range
Sensitivity temperature dependency (temperature range −25°C to +85°C)	±0.1 %
Offset LifeTime Drift (@25°C)	±4mg
Sensor frequency Response (-3 dB)	DC to 40 Hz for ±1.2g measurement range DC to 70 Hz for ±2.4g measurement range
Calibrations	Factory calibrated for both ranges ±1.2g and ±2.4g with calibration settings backed up on the sensor Flash memory. Calibration method used : Back-to-back calibrated with a reference sensor. Re-calibration procedures are available on our website, and sensor can be re-calibrated by the user or with an external Lab.

INTEGRATED TEMPERATURE SENSOR

Temperature Range	-40°C to +60°C
Measurement resolution	±0.06°C
Sensor Precision	±0.5°C

BeanDevice® 2.4GHZ AX-3D-SR

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 Mesurement 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 (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

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 om gateway side.
- On sensor side : Radome Antenna should point to Vertical Direction for better Coverity

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

BeanDevice® 2.4GHZ AX-3D-SR

ENVIRONMENTAL AND MECHANICAL	
Casing	Aluminum AL6061 & Waterpoof casing • 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	RB : Internal rechargeable battery -40 °C to +60 °C XT : External Power Supply -40 °C to +75 °C during battery discharge A Sunshield must be used if the sensor is exposed to direct sun radiation.
Norms & Radio Certifications	· 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	-Aluminum black anodized AL 7075 with rugged three-point-mounting -Screw Mounting Option: the device should be mounted on a flat and smooth surface with 3 screws, dimension M5. Mounting torque 5 ±1Nm -Magnetic Mounting Option: the device should be mounted on a steel surface.

POWER SUPPLY	
Integrated battery charger	Integrated Lithium-ion battery charger with high precision battery monitoring : · Overvoltage/Overcurrent/Short-Circuit/Undervoltage protection · Battery Temperature monitoring
Current consumption @3,3V	· During data acquisition : 30 to 40 mA · During Radio transmission : 55 mA @ 18 dBm · During Battery Saver Mode : < 30 µA
External power supply	8-28VDC with reverse polarity protection IEC-61000-4-2: ESD 30kV(Air), 30kV (Contact) Surge protection > 28VDC (600W during 10us max)
Rechargeable Lithium-Polymer battery	2 Ah, Lithium-Polymer battery

TECHNICAL SPECIFICATIONS

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

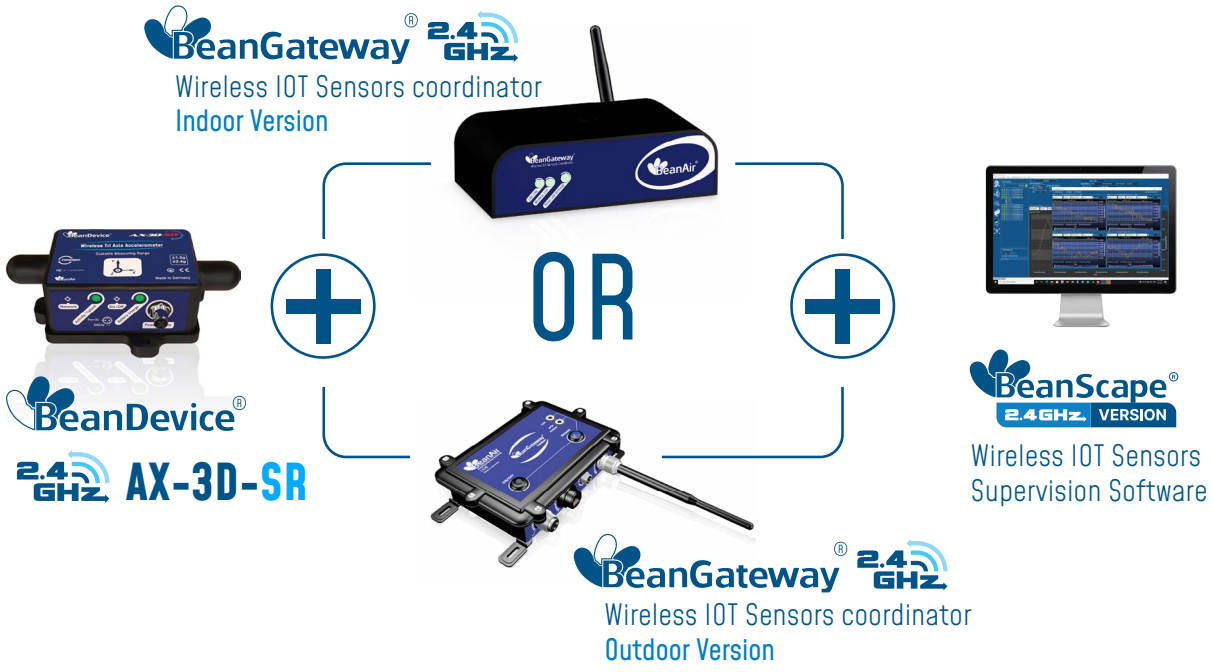
BATTERY LIFE WITH FOR DIFFERENT MEASUREMENT CYCLE	
Battery Saver mode Enabled, Measurement Cycle every minute	8 months
Battery Saver mode Enabled, Measurement Cycle every 5 minutes	13 months
Battery Saver mode Enabled, Measurement Cycle every hour	6 months
Battery Saver mode disabled, Streaming mode 20 Samples / second	72 hours

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 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
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

BeanDevice® 2.4GHz AX-3D-SR

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 BeanScape® 2.4Ghz for starting a Wireless IOT Sensors.



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

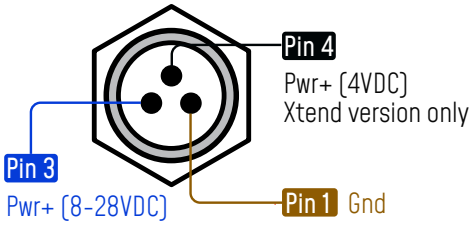
BEANDEVICE® 2.4GHZ AX-3D-SR FRONT VIEW

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

BeanDevice® 2.4GHZ AX-3D-SR

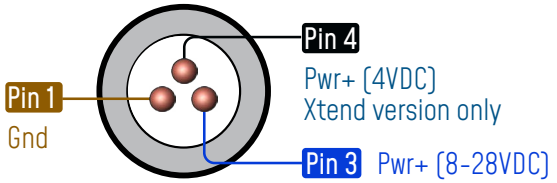
EXTERNAL POWER SUPPLY WIRING CODE

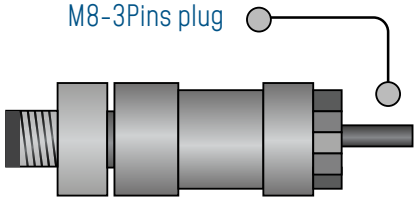
M8 Socket (A-Coding) - Pin Assignation



Interface Name	M8 Pin assignation	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

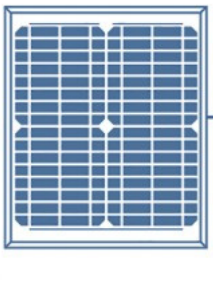
M8 Plug (A –Coding) - Pin Assignation





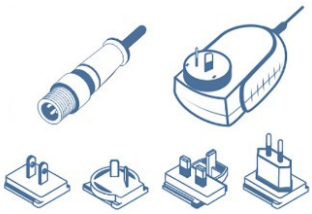
Do not power PIN4 and PIN3 at the same time, you will damage your Beandevice

OPTIONS AND ACCESSORIES



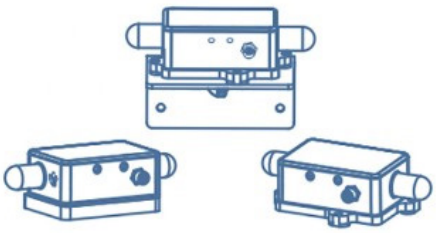
Solar Panel Kit

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



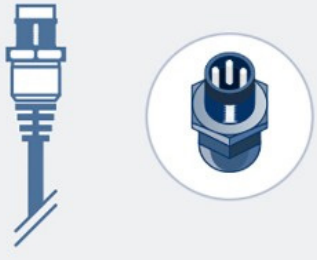
External Power-Supply

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



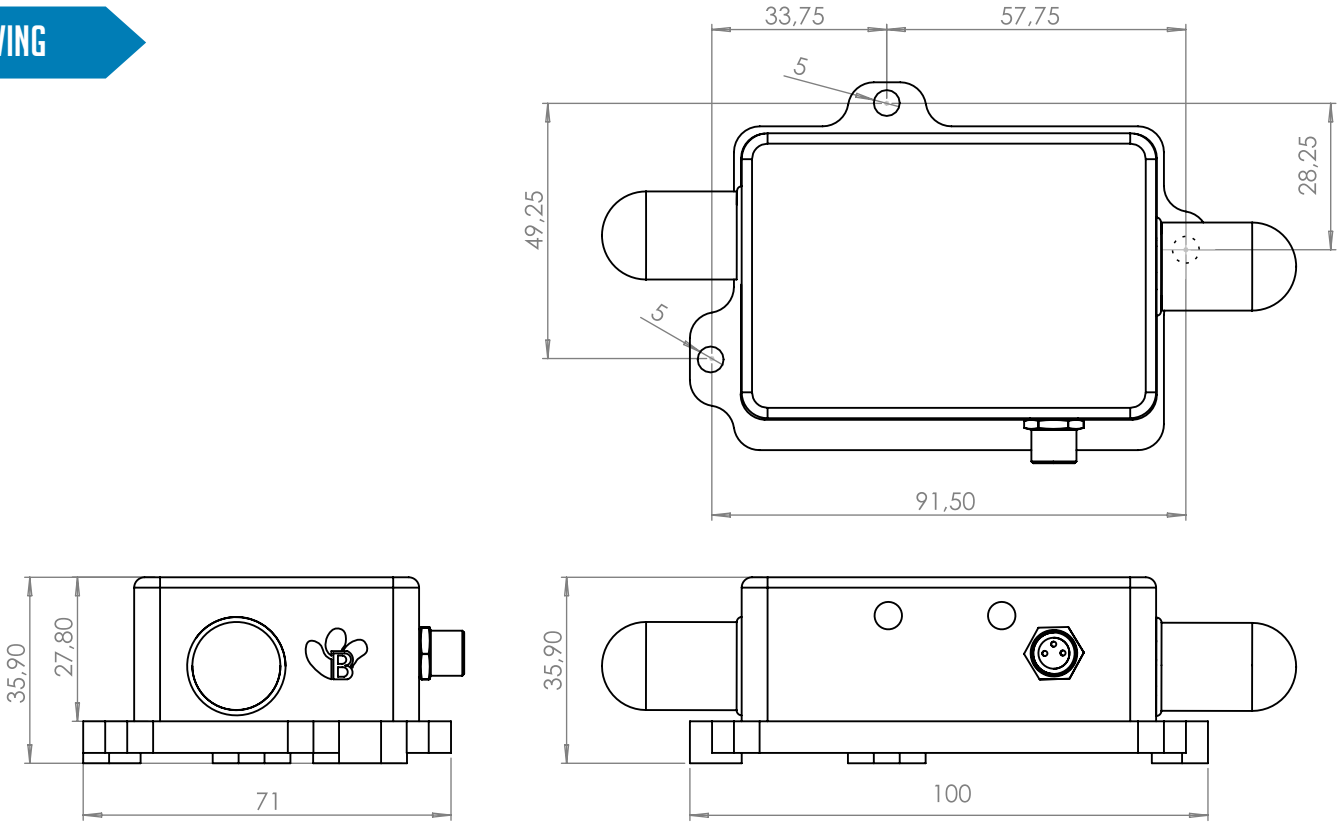
M8 extension cable for external power supply

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

BeanDevice® 2.4GHZ AX-3D-SR

2.4 GHz

DRAWING



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