

HIGH PERFORMANCE WIRELESS VIBRATION SENSOR | ACCELERATION AND VELOCITY MONITORING

PRODUCT VIDEO



APPLICATION VIDEO



USER GUIDE



QUICK START



MECHANICAL DRAWING



STEP FILE



SmartSensor

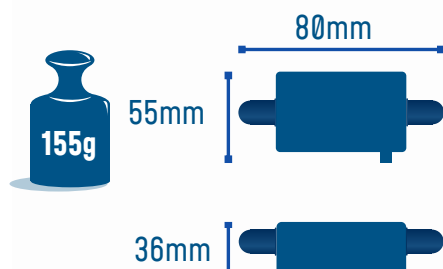


2year
Warranty

MADE IN GERMANY



001A-08148



MAIN FEATURES



- Embedded data logger : up to 1 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)



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



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



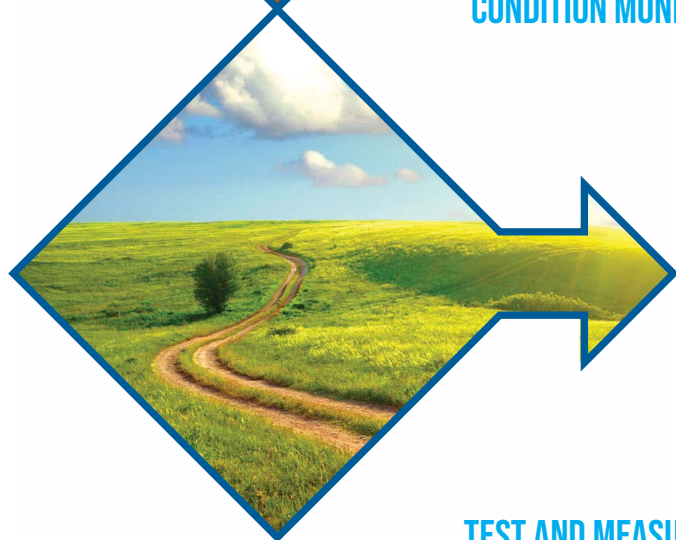
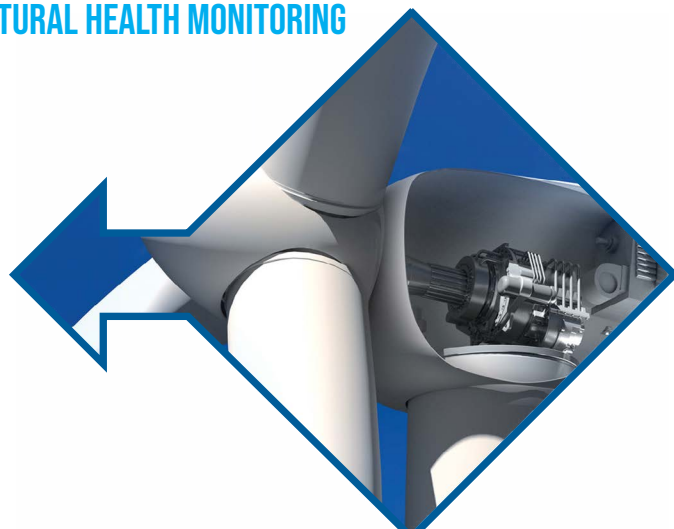
- Integrated Lithium-Ion battery charger

APPLICATIONS



STRUCTURAL HEALTH MONITORING

CONDITION MONITORING

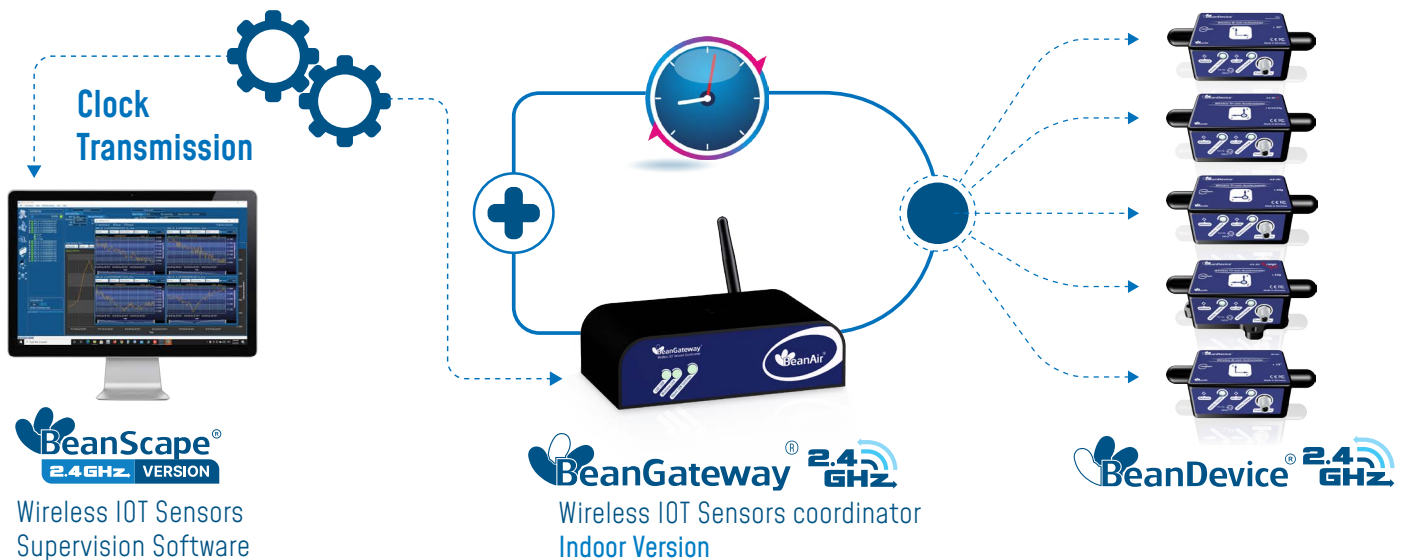


LAND SURVEYING

TEST AND MEASUREMENT



TIME-SYNCHRONIZED WIRELESS IIOT SENSORS



REMOTE CONFIGURATION & MONITORING

Configure and monitor your Wireless IIOT Sensors from an unique

BeanScape® 2.4Ghz, a powerful Wireless IIOT Sensors supervision software, allows the user to:

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

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

- **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** operates in standalone without being connected to the **BeanGateway® 2.4Ghz**
All the measurements are backed up on the onboard data logger;



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 IIOT sensors show their limits in harsh industrial environment, the **BeanDevice® 2.4Ghz AX-3D** 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

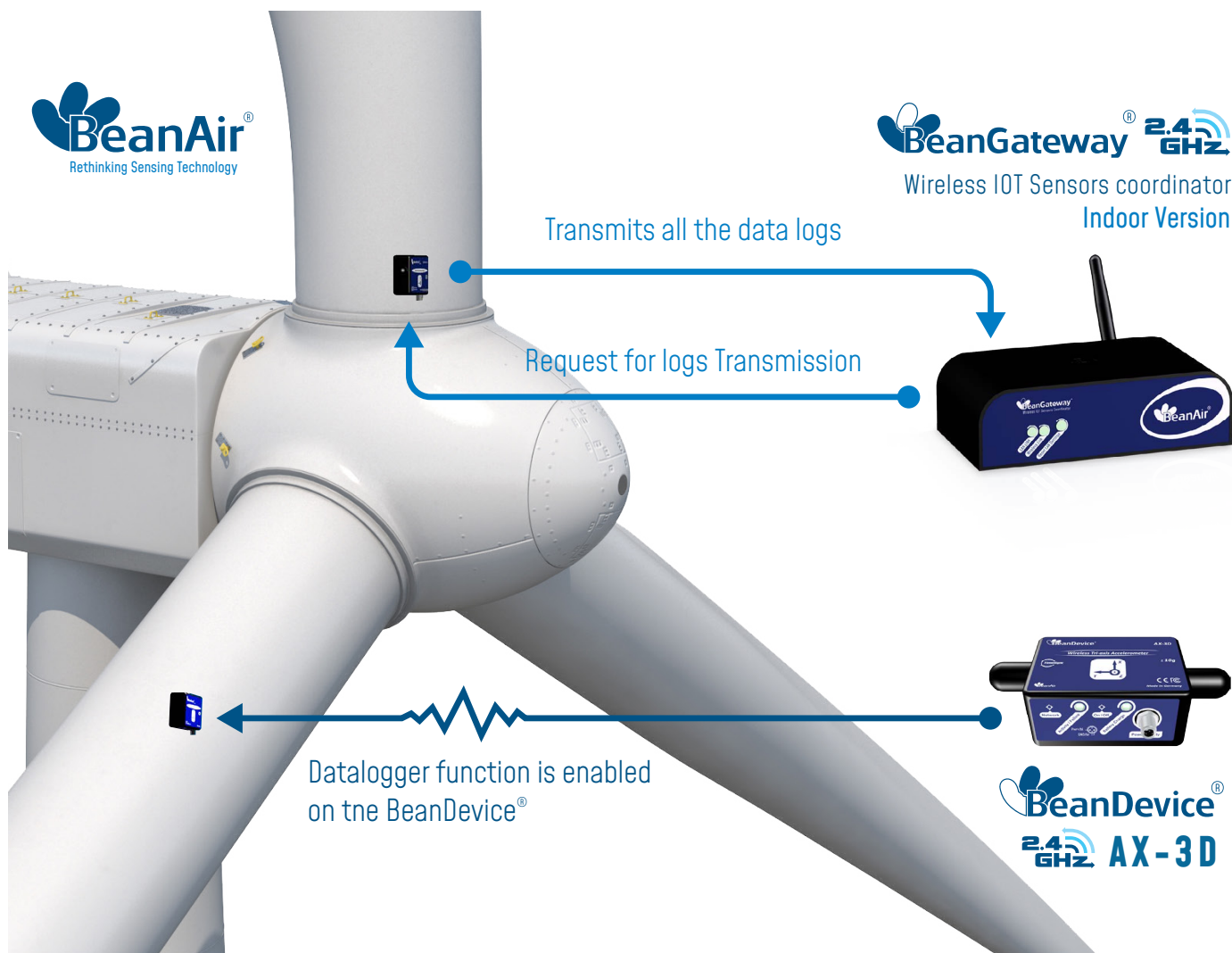
The **BeanDevice® 2.4Ghz AX-3D** integrates an embedded datalogger, which can be used to log data when a Wireless IIOT Sensors can not be easily deployed on your site. All the data acquisition are stored on the embedded flash and then transmitted to the **BeanGateway® 2.4 GHz** when a Wireless IIOT Sensors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

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

- Low Duty Cycle
- Streaming packet

EXAMPLE : CONDITION MONITORING ON WIND TURBINE

- In standalone operation, the **BeanDevice® 2.4Ghz AX-3D** 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**
- 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;



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-AX3D-MRG-RB-HG

MR – Measurement Range ($1g = 9806.65 \text{ mm/s}^2$)

2: $\pm 2g$ measurement range

10: $\pm 10g$ measurement range

Example 1: BND-2.4GHZ-AX3D-10G-RB, Wireless Accelerometer with 10g measurement range, Integrated Radome Antenna 5dBi

Example 2: BND-2.4GHZ-AX3D-10G-RB-HG, Wireless Accelerometer with 10g measurement range, External High Gain Antenna

HG: High Gain External Antenna 5dBi

If this field is left blank, Integrated Radome Antenna will be provided

ACCELEROMETER SPECIFICATIONS

Accelerometer technology	Accurate and low power MEMS technology
Sensitivity	$\pm 2g$ Version : 0.1mg $\pm 10g$ version: 0.3mg
Typical non-linearity (Full scale, @ 25°C)	$\pm 0.1\%$
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	$\pm 2g$ Version : 45 $\mu g/\sqrt{\text{Hz}}$ $\pm 10g$ version: 100 $\mu g/\sqrt{\text{Hz}}$
Zero-g Offset Variation from RT over Temp	$\pm 2g$ Version : $\pm 0.1 \text{ mg}/^\circ\text{C}$ $\pm 10g$ version: $\pm 0.1 \text{ mg}/^\circ\text{C}$
Sensitivity Variation from RT over Temp	$\pm 2g$ Version : $\pm 0.01 \text{ } \%/^\circ\text{C}$ (XY), $\pm 0.02 \text{ } \%/^\circ\text{C}$ (Z) $\pm 10g$ version: $\pm 0.01 \text{ } \%/^\circ\text{C}$
Offset Ratiometric Error	$\pm 2g$ Version : 2mg $\pm 10g$ version: $\pm 0.2\%$ (XY), $\pm 0.1\%$ (Z)
Sensitivity Ratiometric Error	$\pm 2g$ Version : $\pm 1.25 \%$ (X-Y), $\pm 0.2 \%$ (Z) $\pm 10g$ Version : $\pm 1.6 \%$ (X-Y), $\pm 0.2 \%$ (Z)
Cross Axis Sensitivity	1%
Anti-aliasing Hardware filter	Butterworth 5th order filter – cut-off frequency : 1 Hz to 2000 Hz remotely programmable (BeanScape®)

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)
Programmable cut-off frequency (Anti-aliasing filter)	1– 2000 Hz
Power Mode	Battery saver mode & Active power mode

TECHNICAL SPECIFICATIONS

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

EMBEDDED DATA LOGGER

Storage capacity	up to 1 millions data points
Wireless data downloading	3 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	Aluminum AL6061 & Waterproof casing Dimensions in mm (LxWxH) without Antenna: 800x55x36mm Weight : 200g with Integrated Radome Antenna 400g with HG Antenna (antenna included)
IP NEMA Rating	IP67 Nema 6
Shock resistance	100g during 50 ms
Operating Temperature	-40 °C to +60 °C , 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

TECHNICAL SPECIFICATIONS

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 : 20 to 30 mA · During Radio transmission : 70 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

INCLUDED ACCESSORIES

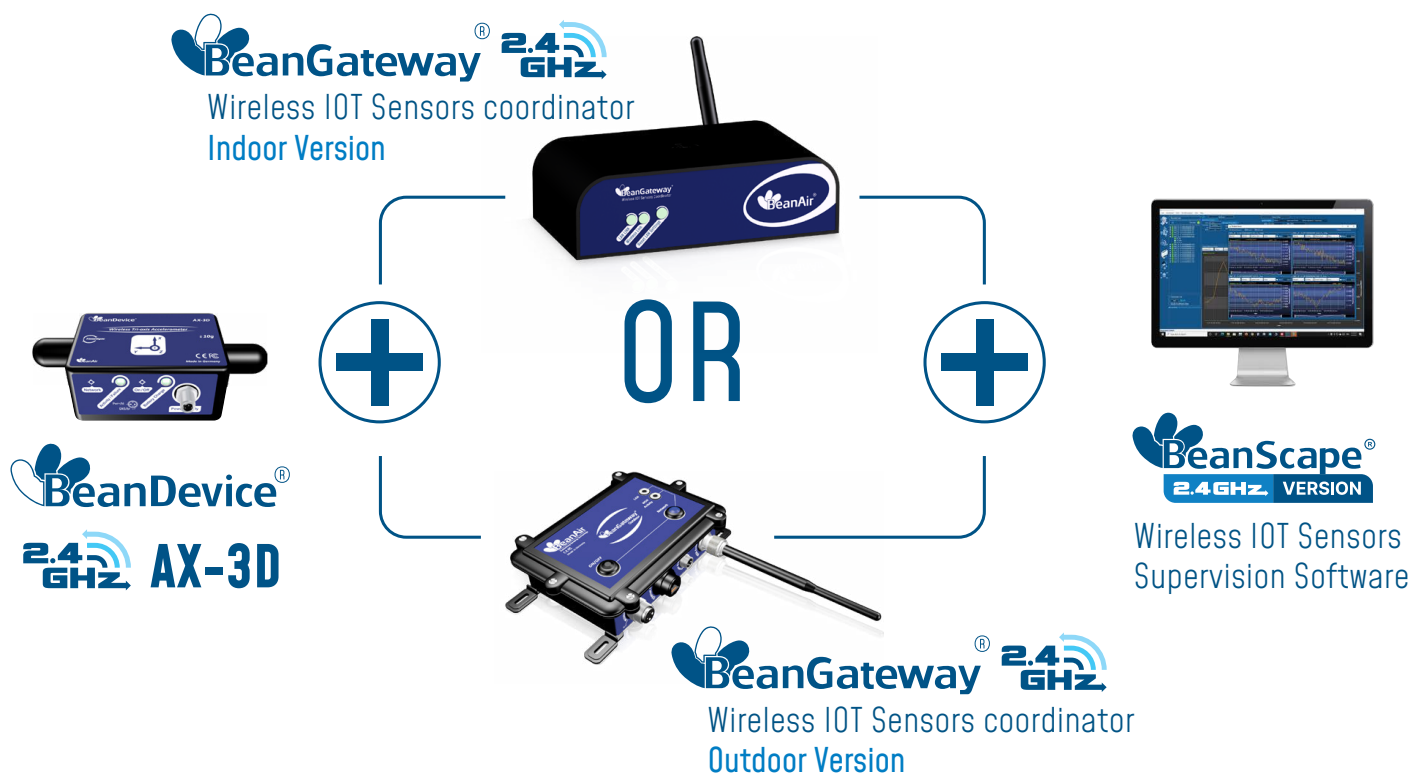
- 1x Magnet to Power ON/Power OFF the device
- 1x M8 Cap for Power Supply

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
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

GETTING STARTED WITH A WIRELESS IOT SENSORS

The **BeanDevice® 2.4Ghz AX-3D** 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.



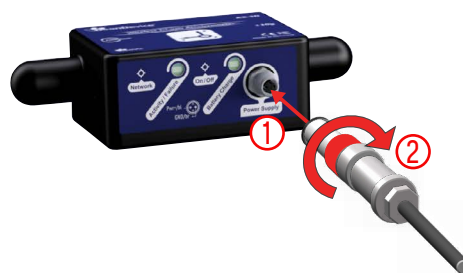
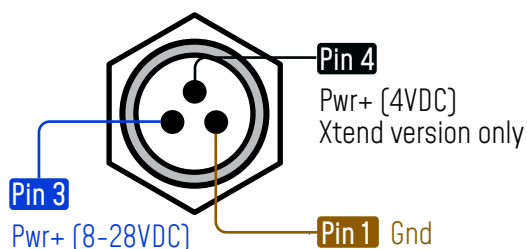
BEANDEVICE® 2.4GHz AX-3D FRONT VIEW



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

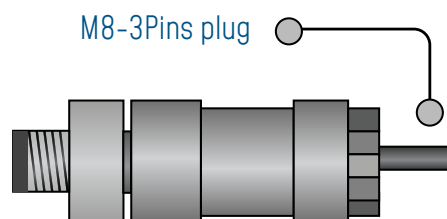
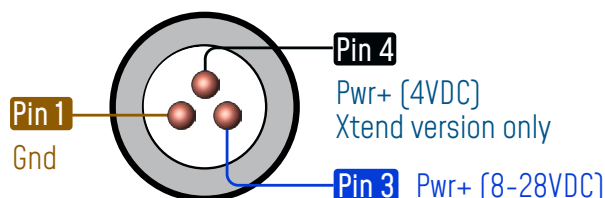
EXTERNAL POWER SUPPLY WIRING CODE

M8 Socket (A-Coding) - Pin Assignment



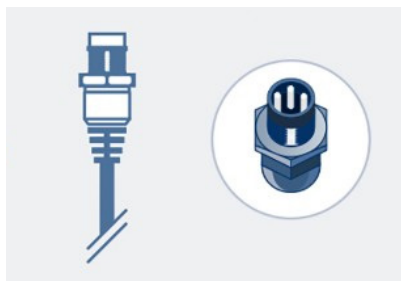
Interface Name	M8 Pin assignment	Wire Color (A-coding)
Power Supply 8-28VDC	PIN 3	Blue
Power Supply 4VDC (available on Xtend version only)	PIN 4	Black
Ground	PIN 1	Brown

M8 Plug (A -Coding) - Pin Assignment



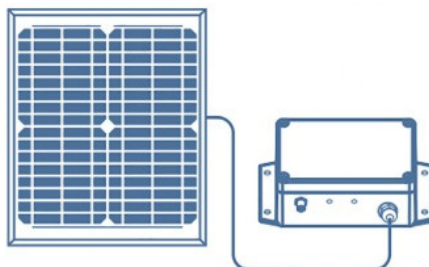
Do not power PIN4 and PIN3 at the same time, you will damage your Beandevic

OPTIONS AND ACCESSORIES



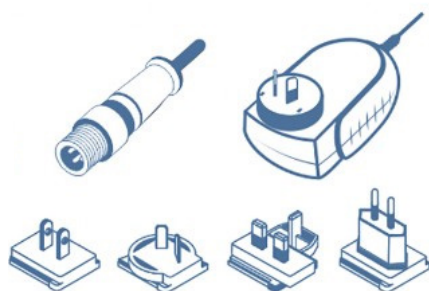
M8 extension cable for external power supply

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



Solar Panel Kit

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



External Power-Supply

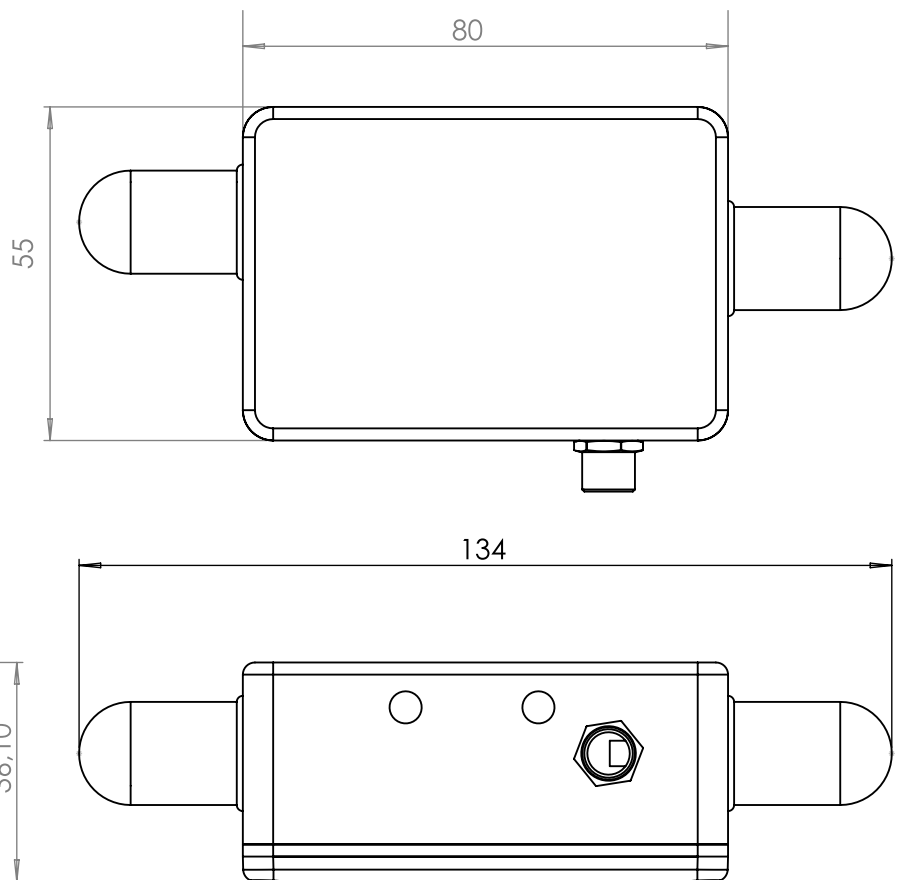
Wall plug-in, Switchmode power
Supply 12V @ 1,25A with sealed
M8 Plug [IP67/Nema 6]
Ref: M8-PWR-12V

DRAWING

“No screw mounting option, this device should be glue mounted or use a **tape/cable-tie**”

If you need screw mounting option, please choose version:

[AX-3D-XR-SCM](#)



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Above given technical data are only for information purpose.

BeanAir® Sensors has right to change product specifications without notice.