BeanAir
WIRELESS IIOT SENSORS

2.4 GHz

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

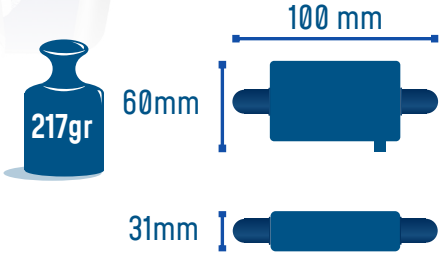
STEP FILE

SmartSensor

2year Warranty

MADE IN GERMANY

CE FC R 207-132085



MAIN FEATURES

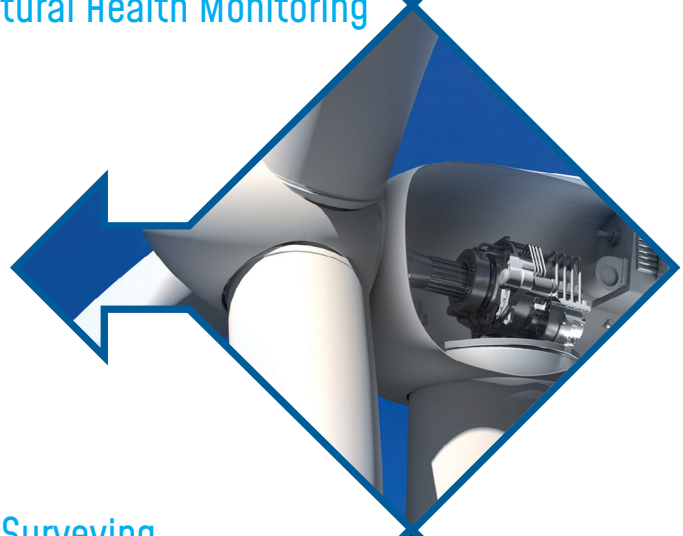
- Embedded data logger : up to 8 million data points (with events dating)
- Excellent radio link relying on the radio antenna diversity developed by Beanair®
- Wireless accelerometer (measurement range ±2g or ±10g) FFT and DIN4150-3 (Ground Vibration) modules available
- Time-synchronized wireless sensor networks (±2.5ms of accuracy)
- Waterproof IP67 casing (Nema 6)
- Integrated Lithium-Ion battery charger

APPLICATIONS

Ground Vibration Monitoring

Structural Health Monitoring

Condition Monitoring



Land Surveying

Test and Measurment

BeanDevice® 2.4GHz AX-3D XRange

TIME-SYNCHRONIZED WIRELESS IIOT SENSORS

TimeSync function brings time-synchronization over the Wireless IIOT Sensors (±2.5ms of accuracy between each Wireless IIOT Sensors) and contributes to enhance user experience about correlation of remote sensing data and modal analysis

REMOTE CONFIGURATION & MONITORING

Configure and monitor your Wireless IIOT Sensors from an unique software

The BeanScape®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

BeanDevice® 2.4GHz AX-3D XRange

BeanScape®2.4GHz Premium+ Add-on

BeanScape®2.4GHz Premium+ integrates an OPC DA server (Data Access).
OPC DA is particularly well suited for real time measurement and data sharing. Each data/measurement can be associated to a tag or its attributes and shared with one or many OPC clients.

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 IIOT 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

BeanDevice® 2.4GHz AX-3D XRange

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

MR–Measurement Range (1g = 9806.65 mm/s^2)	PS - Power Supply	MO - Mounting Option
2: ±2g measurement range 10: ±10g measurement range	RB : Built-in rechargeable Lithium-Polymer battery 2Ah	SCM - Screw Mounting Lid MM - Magnetic Mounting Lid

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
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

ACCELEROMETER SPECIFICATIONS

Accelerometer technology	Accurate and low power MEMS technology
Sensitivity	±2g Version : 61 µg/digit ±10g version: 305 µg/digit
Typical non-linearity (Full scale, @ 25°C)	±0.1%
Analog to Digital converter	16-bit, SAR architecture (Successive Approximation Register) with temperature compensation
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 : ±0.2 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 : 4mg ±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	0.02
Anti-aliasing Hardware filter	Butterworth 5th order filter – cut-off frequency : 1 Hz to 2000 Hz remotely programmable (BeanScape®)

BeanDevice® 2.4GHz AX-3D XRange

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 Protocol Stack	Ultra-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 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

TECHNICAL SPECIFICATIONS

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) : 225g (screw mounting) 252g (magnetic mounting)
IP | NEMA Rating	IP67 | Nema 6
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
Shock resistance	150g during 50 ms
Operating Temperature	-40 °C to +60 °C
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

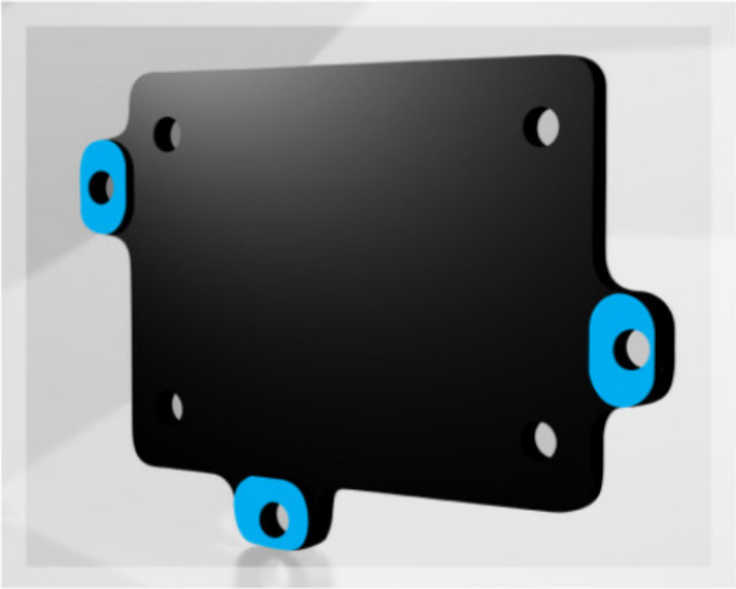
POWER SUPPLY	
Integrated battery charger	Integrated Lithium-ion battery charger with high precision battery monitoring : • Overvoltage Protection, Overcurrent/Short-Circuit Protection, Undervoltage Protection • Battery Temperature monitoring
Current consumption @3.3V	• During data acquisition : 20 to 30 mA • During Radio transmission : 40 mA @ 0dBm , 80 mA @ 18 dBm • During Battery Saver Mode : < 30 µA
External power supply	8-28VDC with reverse polarity protection
Rechargeable battery	High density Lithium-Ion rechargeable battery with a capacity of 2.2Ah with polyswitch protection

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

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 Beandevice autonomy in Streaming and Streaming Packet Mode

BeanDevice® 2.4GHz AX-3D XRange

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

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

OPTIONS AND ACCESSORIES

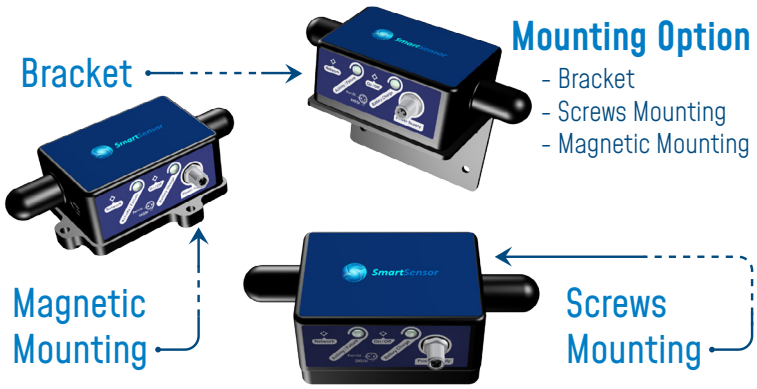
AC/DC Power supply with M8 Plug

Ref:M8-PWR-12V

- Wall plug-in power supply,
  Output: 12VDC, M8-3Pins plug
- AC Power plug: Europe/UK
  Northamerica /China/Australia
- Waterproof - IP67

Mounting Option

- Bracket
- Screws Mounting
- Magnetic Mounting



Molded Cable with M8 plug

Ref:CBL-M8-2M
(cable length : 2 meters)

- CBL-M8-5M
  (cable length : 5 meters)
- CBL-M8-10M
  (cable length : 10 meters)

X-SOLAR

(SOLAR Charging Controller)

High efficiency Solar Panel
with Solar Charging Controller
and Lead-acid battery

CONTACT US

Headquarter:

BeanAir GmbH
Wolfener Straße 32 - 34
12681 Berlin

Email:

info@beanair.com

Phone number:

+49 30 98366680

www.industrial-wsn.com

www.facebook.com/BeanAir

www.beanair.com

www.youtube.com/user/BeanairSensors

www.twitter.com/beanair