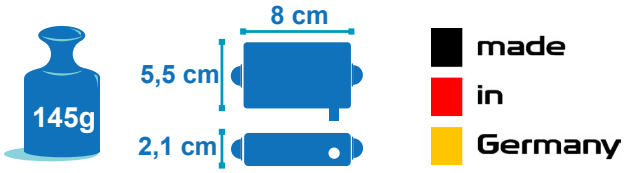
SmartSensor

WIRELESS ACCELEROMETER DEDICATED TO SHOCK MEASUREMENT WITH INTEGRATED DATA LOGGER

2year Warranty



//APPLICATIONS

FEATURED VIDEO

- BeanDevice® AX-3DS main presentation video
- BeanDevice® AX-3DS - Wireless Sensor Network dedicated to health monitoring on bridge

USER MANUAL

- BeanDevice® SmartSensor user manual

MECHANICAL DRAWING

- BeanDevice® AX-3DS drawing

SMART SHOCK DETECTION

//MAIN FEATURES

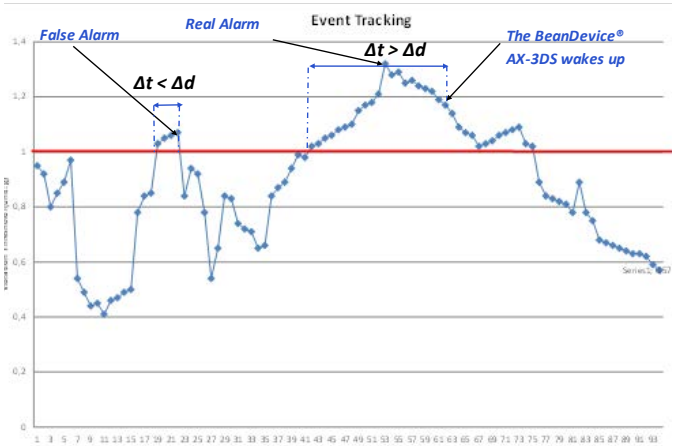
- Wireless accelerometer dedicated to shock
  Scalable measurement range :
  ±6g/±12g/±24g or ±2g/±4g/±8g
- Embedded data logger : up to 1 million data points (with events dating)
- Fully autonomous system with an integrated Lithium-Ion battery charger
- Waterproof for IP67 casing (Nema 6)
- Excellent radio link relying on the radio antenna diversity developed by Beanair®

//SMART SHOCK DETECTION TECHNOLOGY

SMART SHOCK DETECTION

The BeanDevice® AX-3DS integrates a smart shock detection technology which permits to detect & recognize a shock event during the sleeping or deep sleeping mode of the BeanDevice® AX-3DS. When the BeanDevice® AX-3DS is in sleeping mode, the accelerometer continues to track a shock event with a power consumption of 68 uA in sleeping mode and 28uA in deep sleeping mode.
A hystereris on the shock event, fully configurable through the BeanScape®, allows to avoid false alarm.

EXAMPLE : THIS CURVE SHOWS TWO SHOCK EVENTS, ONE CONSIDERED AS SIGNIFICANT (REAL ALARM) AND ANOTHER CONSIDERED AS NOT SIGNIFICANT (FALSE ALARM).



Δd : shock detection hysteresis.
Δt : Observed duration
If **Δt = Δd**, the shock event is detected and recognized, the BeanDevice® wakes up and start data sampling in “streaming mode”.

The following tables show the accelerometer sampling rate and the hysteresis time value in deep sleeping mode and sleeping mode of the BeanDevice® AX-3DS.

Accelerometer sampling rate during deep sleeping mode (in HZ)	Δd max value(s)	Resolution
0.5	128 s	2 s
1	64 s	1 s
2	32 s	500 ms
5	12,8 s	200 ms
10	6,4 s	100 ms

Accelerometer sampling rate during deep sleeping mode (in HZ)	Δd max value(s)	Resolution
50	1,28 s	20 ms
100	640 ms	10 ms
400	160 ms	2,5 ms
1000	64 ms	1 ms

//SHOCK MEASUREMENT ON PANTOGRAPH

//SHOCK TRACKING ON HIGH-VALUE ITEMS

//REMOTE CONFIGURATION & MONITORING

BeanScape® Basic

The BeanScape® application allows the user to view all the data transmitted by the BeanDevice® AX-3DS
With the OTAC (Over-the-Air configuration) feature, the user can remotely configure the BeanDevice® AX-3DS.

SEVERAL DATA ACQUISITION MODES ARE AVAILABLE ON THE BEANDEVICE® AX-3D :

- 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.
- Survey Mode: the measured value is transmitted by radio whenever an alarm threshold (fixed by the user) is detected (4 alarms threshold levels High/Low). Meanwhile, the device sends frequently a beacon frame informing its current status.
- Streaming Packet Mode : all measured values are transmitted by packet within a continuous flow at 3 ksps/s maximum

BeanScape ® Premium+

The BeanScape® 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®"

//ANTENNA DIVERSITY

While the vast majority of wireless sensors show their limits in harsh industrial environment, the BeanDevice® AX-3DS 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® AX-3DS integrates an embedded data logger, which can be used to log data when a Wireless Sensor network can not be easily deployed on your site. All the data acquisition are stored on the embedded flash and then transmitted to the BeanGateway® when a Wireless Sensor Network is established.
The data logger function is compatible with all the data acquisition mode available on your BeanDevice® AX-3DS :

- LowDutyCycle Data Acquisition
- Survey
- Shock detection
- Streaming packet

EXAMPLE : SHOCK DETECTION ON A TRAIN

- In standalone operation, the BeanDevice® AX-3DS stores all the measurements on its embedded datalogger. Thus, a direct connection with the BeanGateway® is not needed.
- When the train is moving, all the acquired measurements are stored on datalogger.
- Data logs can be transmitted to the BeanGateway® 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 the Datalogger, please read the following technical note :
TN_RF_007 – "BeanDevice® DataLogger User Guide "

Product Reference		
BND-AX3DS-*MRG*-*PS*-*SCM*		
MR - Measurement Range *24:* ±6/12/24g measurement range *8:* ±2/4/8g measurement range	PS: Power Supply **RB:** Rechargeable Battery **XT:** External Primary Cell	SCM: Screw Mounting
Example: BND-AX3DS-24G-RB = Wireless Accelerometer with ±6/12/24g measurement range, rechargeable battery		

	Sensor Specifications
Accelerometer technology	MEMS technology
Scalable measurement range	**24G Version:** ±6g / ±12g/ ±24g **8G Version:** ±2g / ±4g/ ±8g
Measurement resolution	**24G Version :** 3 mg/digit @±6g , 6 mg/digit @±12g , 12 mg/digit @±24g **8G Version :** 1mg/digit @±2g , 2 mg/digit @±4g , 3.9 mg/digit @±8g
Typical non-linearity	±0.15%
Sensitivity change Vs temperature	±0,01% /°C
Zero-g level change vs temperature (max delta from 25°C)	**24G Version :** ±0,4 mg/°C **8G Version :** ±0,1 mg/°C
Typical zero-g level offset accuracy	**24G Version :** ±70 mg **8G Version :** ±20 mg
Sensor frequency Response (-3 dB)	DC to 500 Hz
Analog to Digital converter	12-bits with temperature compensation
Noise spectral density @ BW 10Hz	**24G Version :** 650 µg/ √Hz **8G Version :** 218 µg/ √Hz
Anti-aliasing filter	Butterworth 2th order filter

	Over-the-air configuration (OTAC) parameters
Data Acquisition mode (SPS= Sample Per Second)	Low Duty Cycle Data Acquisition (LDCDA) Mode : 1s to 24 hour Survey mode : 1s to 24 hour Streaming Packet Mode Shock detection
Shock detection function	· Shock threshold in mg · Data acquisition sample rate in sleeping mode · Data acquisition sample rate after the shock detection · Shock detection hysteresis
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) 3.5 kSPS per axis (Log Only)
Alarm Treshold	2 high levels alarms & 2 low levels alarms
Programmable Cut-off frequency (Anti-aliasing filter)	1-2000 Hz
Power Mode	Sleeping with Network Listening & Active
TX Power	18 dBm

	RF Specifications
Wireless Protocol Stack	IEEE 802.15.4 (2006 version)
WSN Topology	Point-to-Point / Star
Data Rate	250 Kbits/s
RF Characteristics	ISM 2.4GHz - 16 Channels. Antenna diversity architecture designed by BeanAir®
TX Power	18 dBm
Receiver Sensitivity	-95.5 dBm to -104 dBm
Maximum Radio Range	650 m (L.O.S)
Antenna	Antenna Diversity: 2 omni-directional antenna with a gain of 3dBi

	Embedded Data Logger
Storage Capacity	up to 1 million data points
Wireless data dowloading	3 minutes to download the full memory (average time)

	Real Time Clock and Crustal
Real Time Clock	Extremely Accurate Real Time Clock for measurement time stamping in Low duty cycle mode (±10ppm)
Crystal	Extremely accurate crystal for measurement time stamping in streaming & streaming packet mode / Tolerance ±10ppm, stability ±10ppm

	Environmental and Mechanical
Enclosure	Aluminum & waterproof enclosure * Standard Version: IP67 | NEMA 6 * Screw Mounting Version: IP67 | NEMA 6 Enslosure Dimensions(W/O Antenna) L×W×H: 80×55×21 mm , Weight (battery included) 145g
Shock Resistance	100g during 50ms
Operating Temperature	-20 °C to +65 °C
Norms	CE Labelling Directive R&TTE (Radio) ETSI EN 300 328 ROHS - Directive 2002/95/EC

	Power Supply
Integrated Battery Charger	Integrated Lithium-ion battery charger with high precision battery monitoring : · Overvoltage protection · Battery Temperature monitoring
Current Consumption @3.3V	· During data acquisition : 20 to 30 mA · During Radio transmission : 40 mA @ 5dBm , 70 mA @ 18 dBm · During sleeping mode: 68uA · During deep sleeping mode : 28 uA
External Power Supply	External power supply: +8v to +28v
Rechargeable Battery	High density Lithium-ion rechargeable battery with a capacity of 1.25 Ah

	Option(s)
Power-supply bloc	Wall plug-in, Switchmode power supply 12V@ 1.25A with sealed M8 Plug (IP67 | Nema 6)
Screw Mounting	The sensor module is to be mounted on a flat and smooth surface with 3 screws; dimension M5. Mounting torque 5 ±1Nm

//SCREW MOUNTING OPTION

The BeanDevice® AX-3DS comes with screw mounting option. The sensor module is to be mounted on a flat and smooth surface with 3 screws; dimension M5. Mounting torque 5 ±1Nm

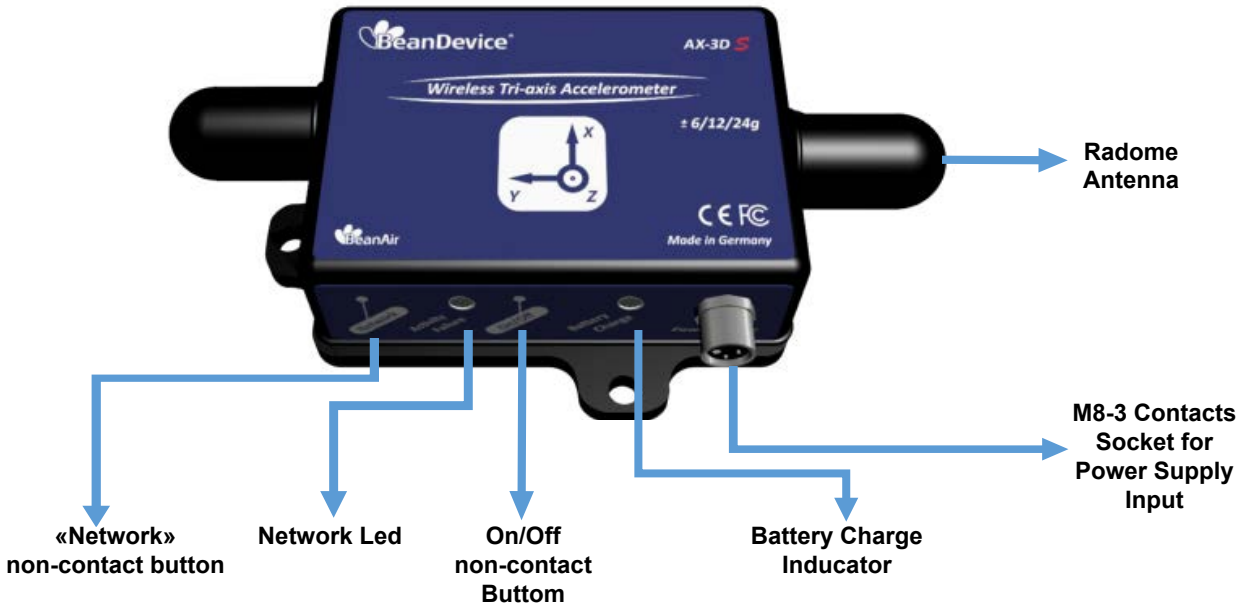
//GETTING STARTED WITH A WIRELESS SENSOR NETWORK

The BeanDevice® AX-3DS operates only on our Wireless Sensor Networks, you will need the BeanGateway® and the BeanScape® for starting a wireless sensor Network.

For further information about the BeanDevice® battery life :
TN_RF_002 Current consumption in active & sleeping mode
TN_RF_012 Beandevice autonomy in Streaming and Streaming Packet Mode

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

//PRODUCT OVERVIEW



//ACCESSORIES

External power supply | Ref: M8-PWR-12V

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

Molded Cable with M8 plug | Ref: CBL-M8-2M (cable length: 2meters)
CBL-M8-5M (cable length : 5 meters)
CBL-M8-10M (cable length : 10 meters)

. 3pole - Male, PVC with shield protection
. Waterproof - IP67

90° Bracket | Ref: SMART-BRACK-MNT

. 90° bracket for screw mounting suitable for : BeanDevice AX-3DS , AX-3D Xrange, HI-INC Xrange

//CONTACT US

FOR MORE INFORMATION:

sales@beanair.com
Visit our website : ***www.beanair.com***
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