BeanAir
WIRELESS IIOT SENSORS

Wilow

BeanDevice® WILOW® AX-3DS

ULP (ULTRA-LOW-POWER) WIRELESS IOT SHOCK SENSOR

MADE IN GERMANY

2year Warranty

Wi Fi CERTIFIED

CE FC

R 001A-08148

PRODUCT VIDEO

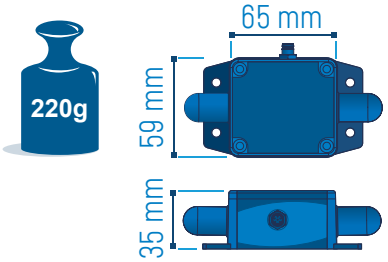
USER GUIDE

QUICK START

MECHANICAL DRAWING

STEP FILE

MQTT TOOLKIT FOR IOT SENSOR



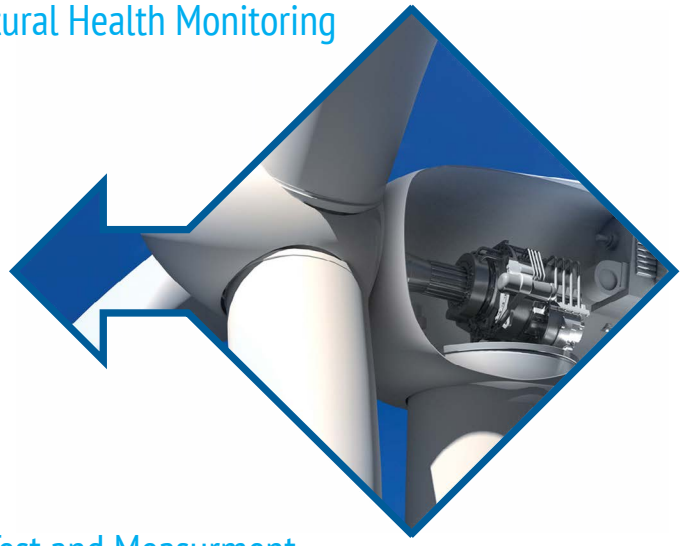
MAIN FEATURES

- ULP (Ultra Low Power) Wifi technology
- Scalable shock measurement range: ±2/4/8/16g
- 772900 data logs per sensor channel (streaming mode)
- SSD (Smart Shock Detection) allows to trigger data acquisition on a shock detection
- Waterproof (IP67|NEMA 6) and Rugged aluminum casing,
- Over the Air Firmware Upgrade via WIFI
- Virtual Inclinometer
- USB 2.0 link for device configuration (including firmware upgrade)
- Store and Forward+: lossless data transmission
- Excellent radio link relying on the radio antenna diversity designed by Beanair®
- IIOT Ready: integrates MQTT data exchange, an open-source Internet of Things (IOT) protocol
- Smart and Flexible power supply :
  - Internal Rechargeable Lithium Battery (780 mAh)
  - External 5VDC power supply compatible with both USB power and solar energy harvesting

BeanDevice® WILOW® AX-3DS

APPLICATIONS

Structural Health Monitoring



Condition Monitoring

Test and Measurment

AN OPEN-STANDARD & INDUSTRIAL WIFI TECHNOLOGY

- ULP (Ultra Low power) Wifi – IEEE 802.11 b/g/n
- Lower total cost of ownership-works with existing access points
- Large installed base and consequent broad-based familiarity with configuration, use and troubleshooting at the physical and link layers
- Easy provisioning & IT friendly : our ULP wifi sensors use IP-over-Ethernet networking environment

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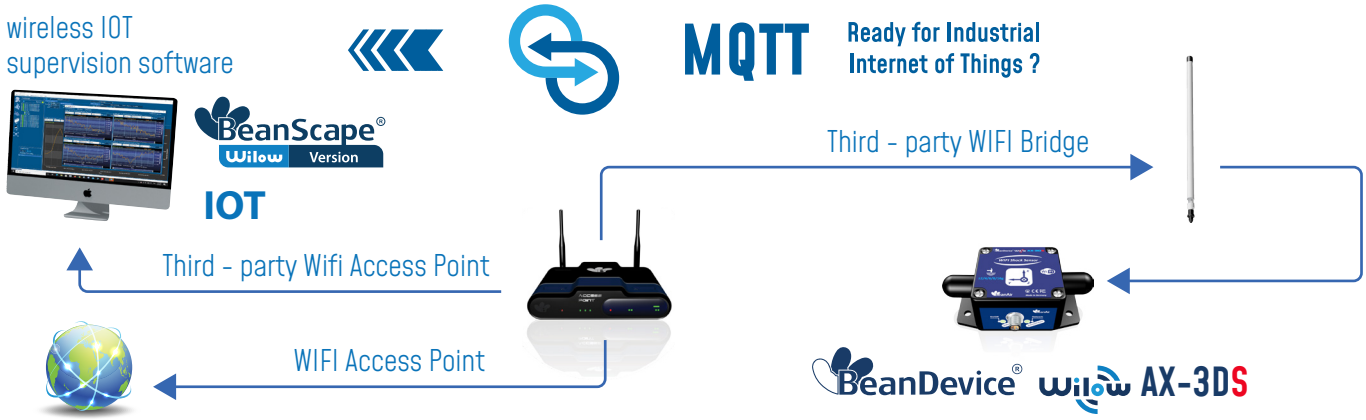
MQTT | OPEN-STANDARD INTERNET OF THINGS PROTOCOL.



EHR-AUXILIARY POWER SUPPLY COMPATIBLE WITH SOLAR ENERGY HARVESTING 8-24VDC

A RELIABLE WIFI TECHNOLOGY THANKS TO OUR " STORE AND FORWARD+ " FUNCTION

STORE & FORWARD+

The store and forward technique works by storing the message transmitted by the BeanDevice® Wilow (wireless DAQ/sensor) to a Wifi access point/ Wifi receiver. If the message is not received due to a network disruption, it will be retransmitted on the next transmission cycle. This technique allows to bring a lossless data transmission.

User can also enable the Hard real-time option; i.e. the message must be received by the Wifi Access Point/Wifi Receiver within the confines of a stringent deadline. It is automatically deleted if it failed to reach its destination within the allotted time span

BeanDevice® WILOW® AX-3DS

TECHNICAL SPECIFICATIONS

PRODUCT REFERENCE

BND-WILOW-WIFI-AX3DS-MR-MO-EXPWR-HG

MR - Measurement Range:	MO - Mounting option	EXPWR -Auxiliary External Power supply	-HG - High Gain External Antenna 5dBi
16: ±2/4/8/16g measurement range	BR - 90° Mounting bracket	EHR - Power supply compatible with solar energy harvesting 8-24VDC	If this field is left blank, Integrated Radome Antenna will be provided
	M - Magnetic Mounting		

Example 1: BND-WILOW-AX3DS-BR
Wireless Shock sensor with 90° Mounting bracket
Example 2: BND-WILOW-AX3D-M
Wireless Shock sensor with magnet mounting
Example 3: BND-WILOW-AX3D-EHR-HG
Wireless Shock sensor , with auxiliary external Power supply compatible with Energy Harvesting 8-24VDC, High Gain Antenna

SHOCK SENSOR SPECIFICATIONS

Shock Sensor technology	MEMS technology
Shock sensor range	±2g/±4g/±6g/±8g/±16g dynamically selectable from the BeanScape® Wilow® software
Sensitivity	±2g range: 0.06 mg/digit ±4g range: 0.12 mg/digit ±6g range: 0.18 mg/digit ±8g range: 0.24 mg/digit ±16g range: 0.48 mg/digit
Typical non-linearity	±0.15% on the FS
Analog to Digital converter	16-bit with temperature compensation
Sensor frequency response (-3 dB)	DC to 800 Hz
Maximum sampling rate	1.6 kSPS per axis
Noise spectral density	150 µg/√Hz
Sensitivity change Vs temperature	±0,01% /°C
Zero-g level change vs temperature (max delta from 25°C)	±0.5 mg/°C
Typical zero-g level offset accuracy	±40 mg
Anti-aliasing Hardware filter	Butterworth 2th order filter

ADVANCED VIBRATION ANALYSIS TOOL (AVAILABLE ON BEANSCAPE® WILOW® PREMIUM AND RA)

Software Filters	• Low-Pass Infinite Impulse Response Filter (IIR)
Fast Fourrier Transform (FFT)	• Online and Offline FFT • FFT Window Type (offline FFT only): Recangular/Hamming/Hann/Blackman/Blackman Harris/ Gaussian/Kaiser/Taylor/Triangular/Flattop/Bartlett Hann • Automatic FFT Report (Email Transmission) • Configurable Number of FFT points , 128 to 32768 points

TECHNICAL SPECIFICATIONS

REMOTE CONFIGURATION PARAMETERS	
Data Acquisition mode (SPS = sample per second)	• Low Duty Cycle Data Acquisition (LDCDA) Mode: 1s to 24 hour • Alarm -Low duty cycle: 1s to 24 hour • Streaming mode : 100 SPS by default • Streaming with event-trigger (SET) Mode : 100 SPS by default
Sampling Rate (in streaming mode)	Minimum: 1 SPS Maximum: 1.6 kSPS per axis
Alarm Threshold	High and Low Levels alarms
Power Mode	Battery Saver & Active power modes

RF SPECIFICATIONS	
Wireless Protocol Stack	IEEE 802.11 b/g/n
WSN Topology	Point-to-Point / Star / Cluster-Tree
Crypto Engine	WPA2, WPS2
Data rate	UDP: 16 Mbps TCP: 13 Mbps
RF Characteristics	ISM 2.4GHz. Antenna diversity designed by Beanair®
TX Power	18 dBm @ 1 DSSS 14.5 dBm @ 54 OFDM
Rx Sensitivity	-95.7 dBm @1 DSSS -74.0 dBm @54 OFDM
Maximum Radio Range	With High Gain Antenna : 100-200m (L.O.S), 40-80m (N.L.O.S.) With Integarted Radome Antenna : 50-100m (L.O.S), 20-50m (N.L.O.S.) In both case Radio Range can be extended by adding Wifi Bridge/Repeater"
Antenna	Antenna diversity : High Gain Antenna : 2 x N-Type Antenna 5dBi Radome Antenna : 2 x Antenna 2,2 dBi
OTA	Over the air firmware upgrade via WIFI

USB SPECIFICATIONS	
USB standard	USB 2.0
Data Rate	Full speed operation(12MB/s)
Related functions	• Firmware update • Measurement logs donwload • Wifi & Data Acquisition mode configuration

TECHNICAL SPECIFICATIONS

EMBEDDED DATA LOGGER	
Storage Capacity	772900 data logs per sensor channel (streaming mode)
Wireless data downloading	3 minutes to download the full memory (average time)

ENVIRONMENTAL AND MECHANICAL	
Casing	Aluminum casing Dimensions in mm (LxWxH) : 35x59x65 mm without antenna & eyelet, Weight (with internal battery, w/o mounting option) : 220g
IP | NEMA Rating	IP67 | Nema 6
Shock resistance	100g during 50 ms
Operating Temperature	-40 °C to +65 °C
Norms & Radio Certifications	• CE Labelling Directive R&TTE (Radio) ETSI EN 300 328(Europe) • FCC (North America) • ARIB STD-T66 Ver. 3.6 (Japan) • ROHS - Directive 2002/95/EC

POWER SUPPLY	
Rechargeable battery	High density Lithium-Ion rechargeable battery with a capacity of 900 mAh
Integrated battery charger	Integrated Lithium-ion battery charger with high precision battery monitoring
Battery Life	see Battery life table herefater and battery life simulation toolkit available on our website
External power supply	• USB Power supply 5V • Optional auxiliary external Power Supply: 8VDC to 24VDC compatible with solar energy harvesting

TECHNICAL SPECIFICATIONS

INCLUDED ACCESSORIES	
M8 plastic cap	1pcs, Ref: WL-PC
M8 to USB cable	1pcs M8-6pins to USB Cable, 2 meters length. Ref: WL-CBL-M8-6P-USB-2M
Magnet for power on/power off	1pcs Magnet. Ref: WL-MGN
Wall mounting kit	4 pcs M5 screws+ Locknut. Ref: WL-WIFI-SCMKIT

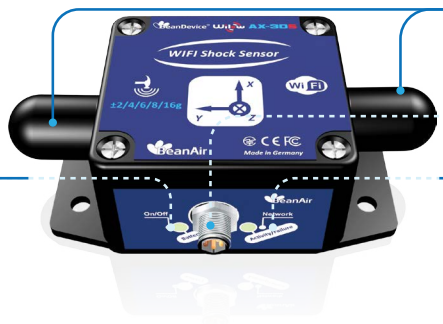
OPTIONS (NOT INCLUDED)	
Power-supply	Wall plug-in, Switchmode power Supply 12V @ 1.25A with USB plug Ref : WL-USB-5V-PWR
M8 Cable	M8-5Pins Cable , cable length : - 2 meters. Ref: WL-CBL-M8-6P-2M - 5 meters. Ref: WL-CBL-M8-6P-5M
WIFI AP/Repeater (wifi link extension)	-Wireless AP/Repeater with an integrated N-Type RF connector + High Gain Antenna -Casing : Polycarbonate Waterproof casing -Dimensions: 190 x 46 mm Weight: 196 g -Antenna Connector: N-Type Connector (male) -Power Supply: 24V, 0.5A PoE Adapter (included) -Power Method: Passive Power over Ethernet -Max. Power Consumption: 6 Watts -Operating Temperature: -40 to 80° C -Shock and Vibration: ETSI300-019-1.4 Ref: WL-AP-UBIQ-TIT-7DBI for 7dBi Antenna Ref: WL-AP-UBIQ-TIT-9DBI for 9dBi Antenna
Solar Panel	Polycrystalline Solar Panel for BeanDevice® Wilow® power supply Maximum Power : 3W Optimum operating Voltage: 12 VDC Dimension: 235 mm x 135 mm x 17mm Protection Frame: Aluminum Frame , Waterproof IP67 Length : 2 meters (Ref: WL-SLP-3W-2M) or 5 meters (Ref: WL-SLP-3W-5M) with M8 plug for a direct to connection to the BeanDevice® Wilow® Country of origin: solar panel from China, assembled and tested in Germany
Calibration certificate	Calibration certificate provided by Beanair GmbH A static calibration method is used on a granite surface plate DIN876 (Ref: WL-CERT-CAL)

TECHNICAL SPECIFICATIONS

OPTIONAL ACCESSORIES AND SERVICES	
Solar Panel	Polycrystalline Solar Panel for BeanDevice® Wilow® power supply Maximum Power : 5W , Optimum operating Voltage: 12 VDC Protection Frame: Aluminum Frame , Waterproof IP67 The 3W solar panel works only with LowDutyCycle & Survey/Alarm data acqusiition with battery saver mode enabled The 5W solar panel works only with LowDutyCycle, Survey/Alarm & streaming burst data acqusiition with battery saver mode enabled Country of origin: solar panel from China, assembled and tested in Germany REF: WL-SLP-5W-2M ,5W Solar panel with 2 meters of cable length REF: WL-SLP-5W-5M ,5W Solar panel with 5 meters of cable length
Calibration certificate	Calibration certificate provided by Beanair GmbH A static calibration method is used on a granite surface plate DIN876 Ref: WL-CERT-CAL

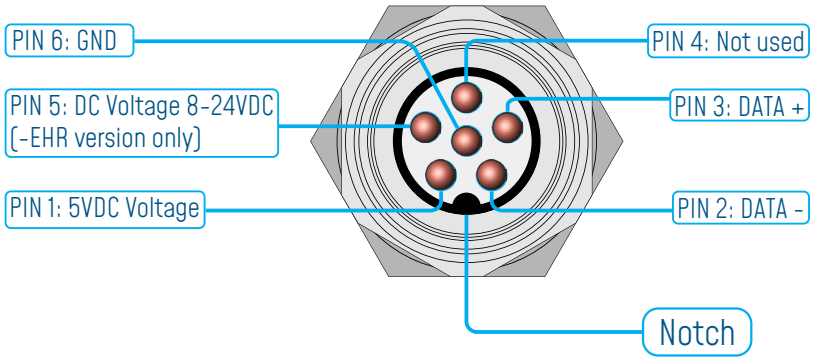
BeanDevice® WILOW® AX-3DS

BEANDEVICE® WILOW® FRONT VIEW



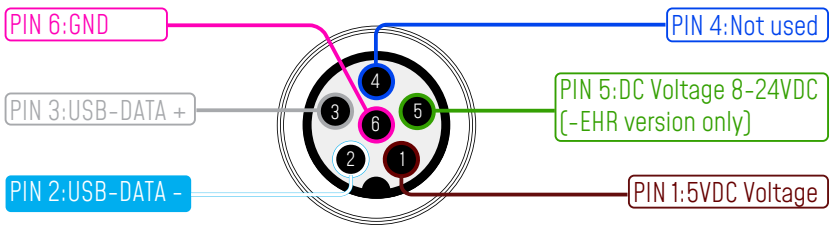
EXTERNAL POWER SUPPLY WIRING CODE

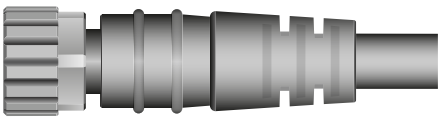
M8-6Pins socket (Male, A-Coding) - PIN ASSIGNATION



Interface Name	M8 Pin assignation
5VDC Voltage	PIN 1
DATA -	PIN 2
DATA +	PIN 3
Not used	PIN 4
DC Voltage 8-24VDC (-EHR version only)	PIN 5
GND	PIN 6

M8-6Pins Plug (Female, A-Coding) - PIN ASSIGNATION





M8-6Pins Plug

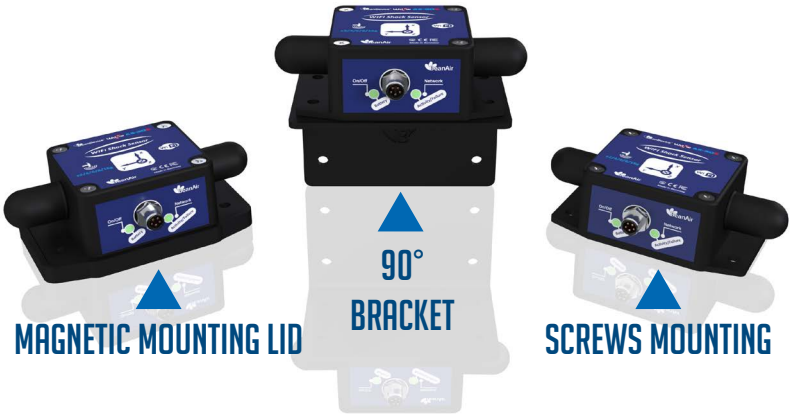
Interface Name	5VDC Voltage	USB DATA -	USB DATA +	Not used	DC Voltage 8-24VDC (-EHR version only)	GND
M8 Pin assignation	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6
Wire Color (A-coding)	BROWN	WHITE	GREY	BLUE	GREEN	PINK

BeanDevice® WILOW® AX-3DS

MECHANICAL MOUNTING OPTIONS

By default, the BeanDevice® Wilow® comes with a screw mounting lid.
Two other mounting options are available:

- Magnetic mounting , add the extension –M on your product reference
- 90° bracket, add the extension –BR on your product reference



Mechanical Mounting Options Video

VIDEO

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