BeanDevice® Wilow AX-3DS

ULP (Ultra-Low-Power) Wifi accelerometer sensor dedicated to shock detection with built-in data logger

Wilow **DATASHEET**

Wi Fi

www.beanair.com

Shock Sensor

BeanDevice® Willow AX-3DS

MADE IN GERMANY

Product Video

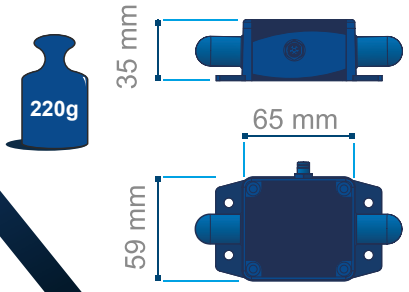
User Guide

Quick Start

Mechanical Drawing

STEP File

MQTT Toolkit for IOT Sensors



OVERVIEW

- ULP (Ultra Low Power) Wifi technology
- Embedded data logger: up to 5 million data points (with events dating)
- Scalable shock measurement range: ±2/4/8/16g
- SSD (Smart Shock Detection) allows to trigger data acquisition on a shock detection
- Rugged aluminum enclosure, Waterproof IP67 |NEMA 6
- USB 2.0 link for device configuration (including firmware upgrade)
- Store & Forward+ : lossless data transmission with hard real-time
- Excellent radio link relying on the radio antenna diversity developed by Beanair®
- IOT Ready : Integrated MQTT data exchange, lightweight and open-source Internet of Things (IOT) protocol

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APPLICATIONS

- **Structural Health Monitoring**
- **Shock measurement on vehicles & trains**
- **Transportation Monitoring**
- **Drop testing**
- **Crash and impact testing**
- **Ride quality measurement**

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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

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

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SPECIFICATIONS

Product reference	
BND-WILOW-AX-3DS -MR MO	
MR – Measurement Range:	**MO - Mounting option**
16: ±2/4/8/16g measurement range	**BR -** 90° Mounting bracket
	M - Magnetic Mounting

Example 1: **BND-WILOW-AX-3DS-16G-BR**
Wireless Shock sensor with ±16g of range with 90° Mounting bracket

Example 2: BND-WILOW-AX-3DS-16G-M
Wireless Shock sensor with ±16g of range with magnet mounting

Shock sensor specifications	
Shock Sensor technology	MEMS technology
Shock sensor range	±2g/±4g/±6g/±8g/±16g dynamically selectable from the BeanScape software
Sensitivity	±2g range: 0.06 mg/digit ±4g range: 0.12 mg/digit ±6g range: 0.06 mg/digit ±8g range: 0.12 mg/digit ±16g range: 0.12 mg/digit
Typical non-linearity	±0.15% on the FS
Analog to Digital converter	12-bits 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

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SPECIFICATIONS

Shock sensor specifications	
Typical zero-g level offset accuracy	±40 mg
Anti-aliasing filter	Butterworth 2th order filter

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	2 high levels alarms & 2 low levels alarms
Power Mode	Sleeping with Network Listening & Active

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 – 16 Channels. Antenna diversity architecture designed by Beanair®
TX Power	18 dBm @ 1 DSSS
	14.5 dBm @ 54 OFDM

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SPECIFICATIONS

RF Specifications	
Rx Sensitivity	-95.7 dBm @1 DSSS
	-74.0 dBm @54 OFDM
Maximum Radio Range	200 m (L.O.S.) , radio range can be extended by adding wifi repeater
Antenna	Antenna diversity : 2 omnidirectional antenna with a gain of 2,8 dBi

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

Embedded Data logger	
Storage capacity	up to 5 million data points
Wireless data downloading	3 minutes to download the full memory (average time)

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SPECIFICATIONS

Environmental and Mechanical	
Casing	Aluminum casing
	Dimensions in mm (LxWxH):65x59x35 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 780 mAh
Integrated battery charger	Integrated Lithium-ion battery charger with high precision battery monitoring
Current consumption @ 3,3V	During data acquisition : 20 to 30 mA
	During Radio transmission : - 1 DSSS - 278 mA - 54 OFDM - 229 mA
	During sleep power mode : < 100 µA

SPECIFICATIONS

Power supply	
External power supply	Two power supplies available: - USB Power supply 5V -5VDC to 17VDC compatible with solar energy harvesting

	Options (not included)
Power-supply	Wall plug-in, Switchmode power Supply 12V @ 1,25A with USB plug
M8 Cable	M8-5Pins Cable , cable length : - 2 meters. Ref: WL-CBL-M8-2M - 5 meters.Ref: WL-CBL-M8-5M
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 linked to national and internatiional standards (DRAKKS) (Ref: WL-CERT-CAL)

Shock Sensor

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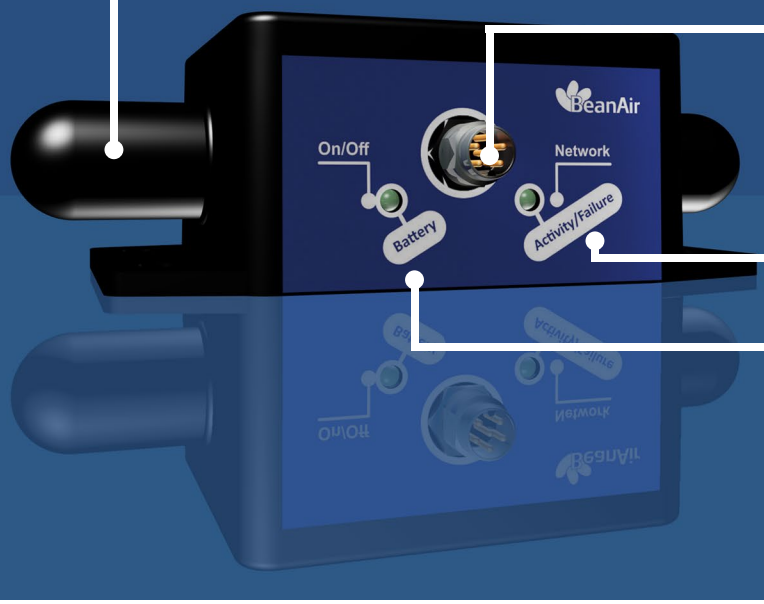
SPECIFICATIONS

Included accessories	
M8 plastic cap	1pcs, Ref: WL-PC
M8 to USB cable	1pcs M8-5pins to USB Cable, 2 meters length. Ref:WL-CBL-M8-USB-2M
Magnet for power on/power off	1pcs Magnet. Ref: WL-MGN
Wall mounting kit	4 pcs M5 screws+ Locknut. Ref:WL-SCMKIT

BeanDevice Front View



- Radome Antenna
- M8-5 pins connector for USB & Power supply
- Activity / Failure LED
- Battery LED

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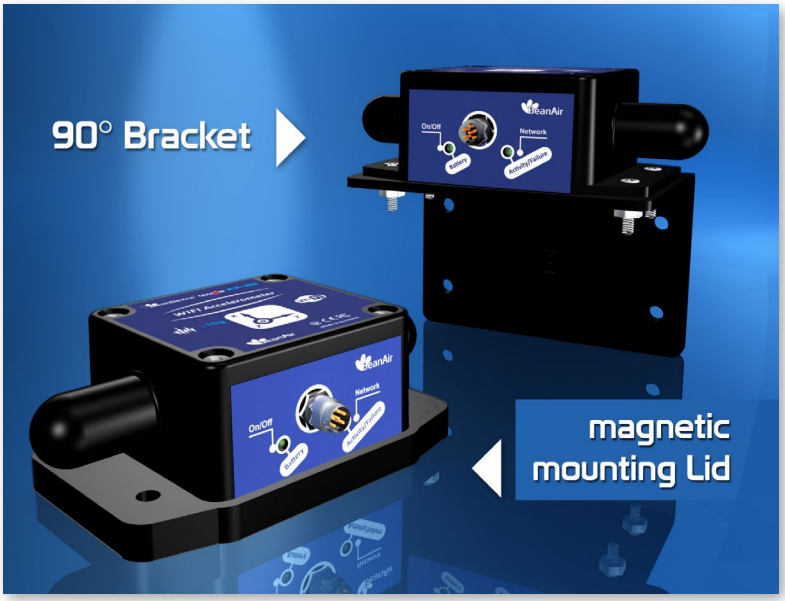
Mechanical Mounting Options

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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