BeanAir
WIRELESS IIOT SENSORS

BeanDevice® WILOW® AX-3D

ULP (Ultra-Low-Power) Wifi accelerometer with built-in data logger

Wi Fi CERTIFIED

2year Warranty

MADE IN GERMANY

CE FC R 001-A08148

PRODUCT VIDEO

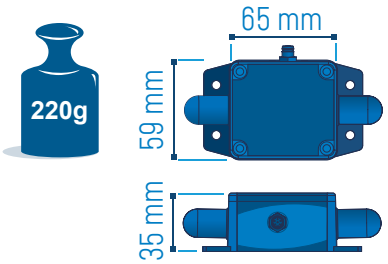
USER GUIDE

QUICK START

MECHANICAL DRAWING

STEP FILE

MQTT TOOLKET FOR IOT SENSOR



MAIN FEATURES

- ULP (Ultra Low Power) Wifi technology
- Embedded data logger: up to 5 million data points (with events dating)
- High precision accelerometer (measurement range ±2g or ±10g) with FFT, PPV (Peak-Particle Velocity) and Amplitude calculations
- 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 lithium-polymer rechargeable battery (780 mAh)
  -External 5VDC power supply compatible with both USB power and solar energy harvesting

BeanDevice® WILOW® AX-3D

APPLICATIONS

Test and Measurement

Structural Health Monitoring

Ground Vibration Monitoring

MQTT

Ready for Industrial Internet of Things ?

BeanScape

Third - party WIFI Bridge

Third - party Wifi Access Point

BeanDevice

WIFI Access Point

WILOW AX-3D

BeanDevice® WILOW® AX-3D

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

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

TECHNICAL SPECIFICATIONS

PRODUCT REFERENCE

BND-WILOW-WIFI-AX3D-MR-MO

MR - Measurement Range:	MO - Mounting option
2G: ±2g measurement range	BR - 90° Mounting bracket
10G: ±10g measurement range	M - Magnetic Mounting

Example 1: BND-WILOW-WIFI-AX3D-10G-BR
ULP WIFI Accelerometer with ±10g range with 90° Mounting bracket
Example 2: BND-WILOW-WIFI-AX3D-2G-M
ULP WIFI Accelerometer with ±2g range with magnetic mounting
Example 3: BND-WILOW-WIFI-AX3D-10G
ULP WIFI accelerometer with ±10g range

TECHNICAL SPECIFICATIONS

MAIN ACCELEROMETER SPECIFICATIONS	
Accelerometer technology	High precision accelerometer based on MEMS technology
measurement range	two versions: ±2g and ±10g
Sensitivity	±2g Version : 660 mV/g ±10g version: 200 mV/g
Typical non-linearity	±0.1% FS
Analog to Digital converter	24-bit delta-sigma with temperature compensation Synchronous measurement channel
Sensor frequency response (-3 dB)	DC to 800 Hz
Maximum sampling rate	2 kSPS per axis
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
Onboard temperature sensor	Range -40°C to +65°C , accuracy ±1°C
Anti-aliasing Hardware filter	Butterworth 2th order filter

ADVANCED VIBRATION ANALYSIS TOOL (AVAILABLE ON BEANSCAPE® WILOW® PREMIUM AND RA)	
Software Filter	• 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
Peak Particle de Velocity (PPV)	Available only on the BeanDevice Wilow AX-3D with ±2g of range: • PPV Log file (Email Transmission) • Automatic DIN4150-3 report (Email Transmission)
Displacement measurement	Available only on the BeanDevice Wilow AX-3D with ±2g of range

TECHNICAL SPECIFICATIONS

SHOCK SENSOR SPECIFICATIONS (FOR SMART SHOCK DETECTION FUNCTION)	
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: 0.18 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

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: 3 kSPS per axis
Alarm Threshold	High and Low Levels alarms
Power Mode	Sleep & Active power modes

TECHNICAL SPECIFICATIONS

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	200m (L.O.S), Radio range be extended by adding Wifi Bridge/Repeater
Antenna	Antenna diversity : 2 omnidirectional antenna with a gain of 2.8 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 • Wifi & system configuration

EMBEDDED DATA LOGGER	
Storage Capacity	up to 5 million data points
Wireless data downloading	3 minutes to download the full memory (average time)

TECHNICAL SPECIFICATIONS

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

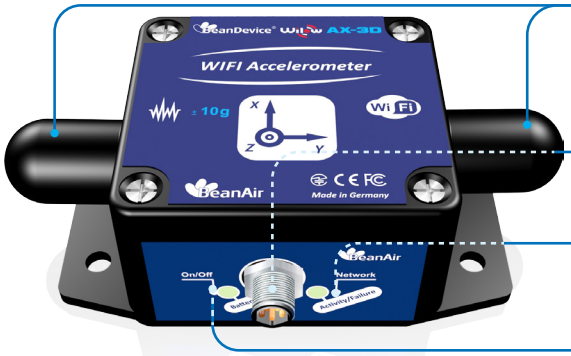
INCLUDED ACCESSORIES	
M8 plastic cap	1pcs, Ref: WL-PC
M8 to USB cable	1pcs M8-6pins to USB Cable, 2 meters length. Ref: WL-CBL-M8-6P-USB-2M
Magnet for power on/power off	1pcs Magnet. Ref: WL-MGN
Wall mounting kit	4 pcs M5 screws+ Locknut. Ref: WL-WIFI-SCMKIT

BeanDevice® WILOW® AX-3D

TECHNICAL SPECIFICATIONS

OPTIONAL ACCESSORIES AND SERVICES	
Power-supply	Wall plug-in, Switchmode power Supply 12V @ 1,25A with USB plug. Provided with power adapter: North America/Japan/China or Europe or UK or Australia
M8 Cable	M8-6Pins Cable, Waterproof (IP67) and shielded cable , cable length : • 2 meters. Ref: WL-CBL-M8-6P-2M • 5 meters. Ref: WL-CBL-M8-6P-5M
WIFI AP / Repeater / Bridge (wifi link extension)	Wireless AP/Repeater with an integrated N-Type RF connector + High Gain Antenna Wifi Acess Point/Bridge/Repeater Integrated N-Type RF connector + High Gain Antenna with 9 dBdi of Gain. Casing : Outdoor UV Stabilized Plastic, Dimensions (w/o antenna): 190 x 46 mm, Weight: 196 g Antenna Connector: N-Type Connector (male), Power over Ethernet power supply (24VDC) Max. Power Consumption: 6 Watts , Operating Temperature: -40 to 80° C Shock and Vibration: ETSI300-019-1.4 Included: 1 x AC to 24VDC POE Power supply 1 x High Gain Antenna 9dBi 1 x Power adapter (EU or UK or US) 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)

BEANDEVICE® WILOW® FRONT VIEW



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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