

BeanDevice[®] WILOW[®] HI-INC

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

PRODUCT VIDEO



USER GUIDE



QUICK START



MECHANICAL DRAWING



STEP FILE

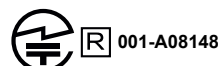


MQTT TOOLKIT FOR IOT
SENSOR

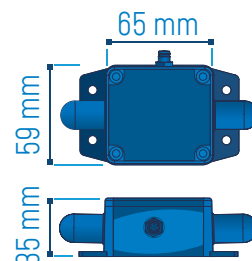


2year
Warranty

MADE IN GERMANY



220g



MAIN FEATURES

- ULP (Ultra Low Power) Wifi technology
- Store and Forward+: lossless data transmission
- Embedded data logger: up to 5 million data points (with events dating)
- Excellent radio link relying on the radio antenna diversity designed by Beanair[®]
- High precision bi-axis inclinometer $\pm 15^\circ$ or $\pm 30^\circ$ with great measurement repeatability ($\pm 0.003^\circ$ on full Scale for $\pm 15B$ version)
- IIOT Ready: integrates MQTT data exchange, an open-source Internet of Things (IOT) protocol
- Waterproof (IP67/NEMA 6) and Rugged aluminum casing,
- USB 2.0 link for device configuration (including firmware upgrade)
- Over the Air Firmware upgrade via WIFI
- 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
- SSD (Smart Shock Detection) allows to trigger data acquisition on a shock detection

APPLICATIONS



Structural Health Monitoring



Land Surveying

Test and Measurement



IIOT



MQTT Ready for Industrial Internet of Things ?

Third - party WIFI Bridge



Third - party Wifi Access Point



WIFI Access Point



Wilow HI-INC

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 HI-INC** 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-Hi-Inc -MR-APWR-MO

MR - Measurement Range:	APWR -Auxiliary External Power supply option	MO - Mounting option
15B: bi-axis ±15°	EHR - Power supply compatible with solar energy harvesting 6-24VDC	BR - 90° Mounting bracket
30B: bi-axis ±30°		M - Magnetic Mounting

Example 1: **BND-WILOW-WIFI-HI-INC-15B-BR** - ULP WIFI bi-axis inclinometer (measurement range ±15°) with 90° bracket mounting

Example 2: **BND-WILOW-WIFI-HI-INC-30B-M** - ULP WIFI bi-axis inclinometer (measurement range ±30°) with magnetic mounting

Example 3: **BND-WILOW-WIFI-HI-INC-15B-EHR** - ULP WIFI bi-axis inclinometer (measurement range ±15°) with auxiliary external Power supply compatible with Energy Harvesting 6-24VDC

REMOTE CONFIGURATION PARAMETERS

Data Acquisition mode (SPS = sample per second)	<ul style="list-style-type: none"> •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 packet mode)	Minimum: 1 SPS Maximum: 2 kSPS per axis
Alarm Threshold	High and Low Levels alarms
Power Mode	Battery Saver & Active power modes

TECHNICAL SPECIFICATIONS

SHOCK SENSOR SPECIFICATIONS (FOR SMART SHOCK DETECTION FUNCTION)

Shock Sensor technology	MEMS technology
Shock sensor range	$\pm 2g/\pm 4g/\pm 6g/\pm 8g/\pm 16g$ dynamically selectable from the BeanScope software
Sensitivity	$\pm 2g$ range: 0.06 mg/digit $\pm 4g$ range: 0.12 mg/digit $\pm 6g$ range: 0.18 mg/digit $\pm 8g$ range: 0.24 mg/digit $\pm 16g$ range: 0.48 mg/digit
Typical non-linearity	$\pm 0.15\%$ 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 $\mu g/\sqrt{Hz}$
Sensitivity change Vs temperature	$\pm 0.01\%$ /°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

INCLINOMETER SENSOR SPECIFICATIONS

Inclinometer Technology	Inclinometer based on MEMS Technology
Measurement resolution (Bandwidth 10 Hz)	0.001° or 0.00174 mm/m or 3.6 arc seconds
Measurement Repeatability (Full scale, @25°C, Static Measurement mode : LowDutyCycle or Alarm mode)	$\pm 15B$ Version: $\pm 0.003^\circ$ or ± 0.052 mm/m or ± 10.8 arc seconds $\pm 30B$ Version: $\pm 0.004^\circ$ or ± 0.070 mm/m or ± 14.4 arc seconds
Noise spectral density DC to 100 Hz	0.0004 °/√Hz
Offset temperature dependency (temperature range -25°C to +85°C)	± 0.002 °/°C
Sensitivity temperature dependency (temperature range -25°C to +85°C)	± 0.005 %/°C with temperature compensation
Long term stability (@23°C)	< 0.004 °
Analog to Digital converter	24-bit delta-sigma analog-to-digital with temperature compensation Synchronous measurement channel
Sensor frequency Response (-3dB)	DC to 28 Hz

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

EMBEDDED DATA LOGGER

Data rate	up to 5 million data points
RF Characteristics	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	<ul style="list-style-type: none"> • 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

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-SCMKIT

TECHNICAL SPECIFICATIONS

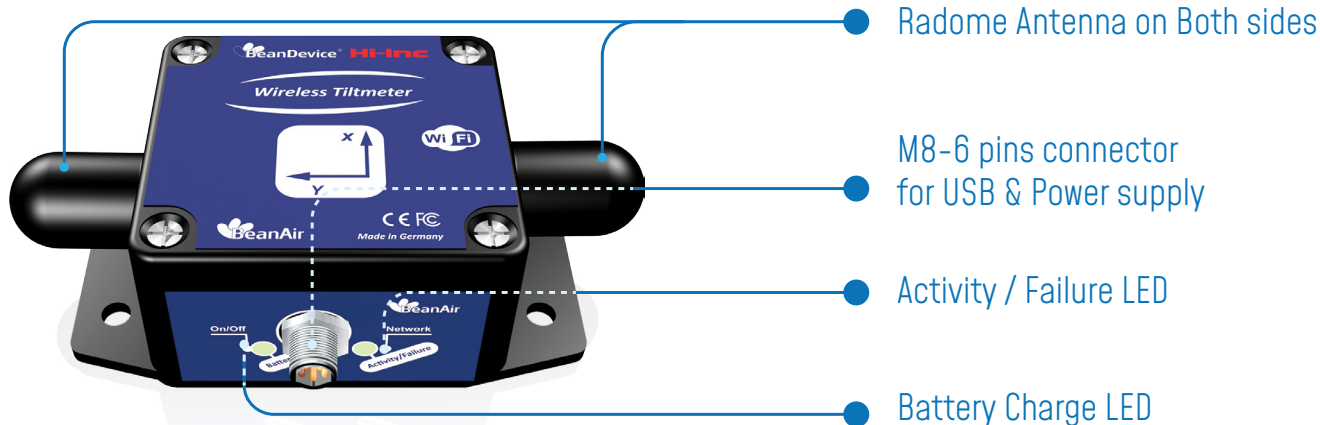
OPTIONAL ACCESSORIES AND SERVICES

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 Access Point/Bridge/Repeater Integrated N-Type RF connector + High Gain Antenna with 9 dBd 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 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

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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • USB Power supply 5V • Optional auxiliary external Power Supply: 6VDC to 24VDC compatible with solar energy harvesting

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



SCREWS MOUNTING



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