Wzzard™ Mesh Wireless Sensor
for Industrial Applications

Models BB-WSD2C31010, BB-WSD2M31010, BB-WSD2C21150

B+B SMARTWORX

Powered by **ADVANTECH**

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PRODUCT FEATURES

+ Ultra-low power 802.15.4e SmartMesh IP technology
+ Communicates with SmartSwarm-342 gateway via highly scalable and reliable wireless mesh networks
+ Connect to industry standard analog or digital sensors
+ Rugged, IP67 rated, fiber reinforced polyester PBT enclosure
+ MQTT and JSON IoT protocol to application platform
+ UL, C1/D2 approved for hazardous locations (exceptions apply)

Wireless Connectivity Where You Need It

The Wzzard™ intelligent wireless sensor platform creates a complete, quick and easy connectivity stack between your sensors and application – on your network or the Internet. The platform uses Wzzard mesh sensor edge nodes and a wireless 802.15.4e SmartMesh IP network to transmit sensor data to a SmartSwarm Gateway. The gateway can connect to the Internet via wired connections or cellular data networks and communicate with application platforms using the MQTT IoT protocol and JSON data formats.

Wzzard mesh wireless sensor nodes can accommodate virtually any industry-standard external sensors. Connections can be made via M12 connector or conduit fitting. The nodes provide a wide variety of sensor interface options, including general purpose analog input, digital input/output and thermocouple. All nodes contain an internal temperature sensor.

Secure, Reliable and Highly Scalable Wireless Networking

The 802.15.4e Wzzard platform uses mesh networking and time-synchronized channel hopping to provide up to 99.999% connectivity, even in the most demanding RF environments. New nodes may be added at any time and the SmartMesh IP network will dynamically self-configure as new nodes are added or removed.

Easy Configuration and Installation

Configuration of the Wzzard sensor platform is easy via the SmartSwarm Gateway. Nodes can be configured with scaling information, eng. units, friendly names, geo-location and other descriptive information.

The platform simplifies physical installation, too. Nodes can be attached to any surface via mounting ear flanges and screws or the embedded magnetic base. Permanent use of the magnetic mount is not approved for UL installations, but may be convenient for temporary RF link determination or other purposes. The IP67 rated, fiber reinforced polyester PBT housing makes the units deployable in any industrial or commercial environment.

Intelligence at the Network Edge

The Wzzard wireless platform places intelligence at the network edge. The Wzzard mesh wireless sensor nodes can be configured to communicate data only when specified threshold or alert levels are exceeded. When reporting, they can associate useful information like geo-location, device name and uptime. This eliminates unnecessary network traffic, eases the processing burden on upstream resources and cuts the cost of cellular data plans when the gateway is using the cellular data network. Thanks to low-power wireless technology and programmable time synchronization, the Wzzard mesh wireless sensor nodes can operate for many years on battery power.

SPECIFICATIONS

POWER	
Internal	(2) 3.6V 2400 mAH Lithium Thionyl Chloride AA Batteries
Battery Life	>5 years – based on 1 min. sensor sampling and reporting
Optional External Input Voltage	10-30 VDC @ 40mA peak
MECHANICAL	
Connection Options	Conduit (UL Type 3 outdoor approved): 12.7mm (0.5 in), - includes sensor interface cable, 8-wire, 26 gauge, 1.8m (6ft)
	M12 connector (Not UL rated for outdoor installations.)
Sensors	Analog Input (0-10 VDC, 0-20 mA, 4-20 mA)
	Digital Input (0 -48 VDC)
	Digital Input Frequency 1-1K Hz (accuracy +/- 1 Hz)
	Digital Input Counter
	Integrated Temperature
	Thermocouple (J, K, N, R, S, T, B, E)
	Digital Output, Sinking, up to 100mA @ 30VDC
External Antenna (included)	RP-SMA, Omni-directional, 3.8 dBi, 2.4 GHz
	Dimensions: 194 mm (7.64 in)
Mounting Options	(4) Mounting Ears, M5 (#10) screws (UL approved option)
	Magnetic Mounting (via internal magnet) Pull Force 2.13 kg (4.7 lb) Note: Magnetic mounting (all models) not rated for UL installations.
Enclosure	IP67 Rated – fiber reinforced polyester PBT
Weight	0.34 kg (0.75 lb)
TECHNOLOGY	
Wireless	802.15.4e, SmartMesh IP
Protocols	MQTT, JSON
LED	Network Connectivity
ENVIRONMENTAL	
Installation	Indoor/Outdoor Note: M12 models are rated for outdoor use (except in UL installations).
Operating Temperature	-40 to 80 °C (-40 to 176 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Humidity	0 to 95% Non-condensing
WIRELESS SECURITY	
Device Authentication	
128-bit, AES-based Encryption – with multiple keys	
Message Integrity Check (MIC)	
Synchronized Key Changeovers	
Customized Key Rotation	

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SENSOR INTERFACE SPECIFICATIONS

DIGITAL INPUTS

Voltage Range	0-48 VDC
V_{IL}	0.4 V, maximum
V_{IH}	2.5 V, minimum
Pull-up Current	65 uA
Type	Sinking (NPN) Input
Isolation	None

RATE/FREQUENCY INPUTS

Frequency	Performs a 1 second measurement at each measurement/publish interval
	Digital input frequency: 1-1KHz (accuracy +/- 1 Hz)
	Uses falling edge or rising edge – based on Invert Enabled Setting

COUNTER INPUT

Counter Inputs	1
Channels	Actively counts either falling edge (Invert Enabled) or rising edge (Invert Disabled)
	Can use a multiplier to convert to a unit type or count
	Shared with digital inputs
	Rolls over at 999999.9

ANALOG INPUTS

Analog Inputs	2 or 3 (model dependent)
Input Range	0-10 VDC, 0-20 mA (software selectable)
Resolution	0.3 mV/1.3 uA
Input Load Resistance	59 K Ohms
Accuracy Variance	+/-25mV +/-0.05mA

THERMOCOUPLE INPUT

Types Supported	J, K, N, R, S, T, B, E				
Accuracy	**THERMOCOUPLE**	Temperature Range	Ambient Temperature	Worst Case RSS Error	Probe Error
	Type B	+95 to +1798 °C	B Type @ +25 °C	9.4 °C	0.5% of T, 0.25% of T
			B Type @ -40 to +85 °C	47.1 °C	0.5% of T, 0.25% of T
	Type E	-200 to +1000 °C	C Type @ +25 °C	1.4 °C	1.7 °C, 1 °C
			C Type @ -40 to +85 °C	5.2 °C	1.7 °C, 1 °C
	Type J	-210 to +1200 °C	J Type @ +25 °C	1.5 °C	2.2 °C, 1.1 °C
			J Type @ -40 to +85 °C	5.9 °C	2.2 °C, 1.1 °C
	Type K	-200 to +1372 °C	K Type @ +25 °C	1.8 °C	2.2 °C, 1.1 °C
			K Type @ -40 to +85 °C	7.3 °C	2.2 °C, 1.1 °C
	Type N	-200 to +1300 °C	N Type @ +25 °C	2.3 °C	2.2 °C, 1.1 °C
			N Type @ -40 to +85 °C	10.3 °C	2.2 °C, 1.1 °C
	Type R	-50 to +1768 °C	R Type @ +25 °C	5.4 °C	1.5 °C, 0.6 °C
			R Type @ -40 to +85 °C	26.0 °C	1.5 °C, 0.6 °C
	Type S	-50 to +1768 °C	S Type @ +25 °C	6.7 °C	1.5 °C, 0.6 °C
			S Type @ -40 to +85 °C	33.0 °C	1.5 °C, 0.6 °C
	Type T	-200 to +400 °C	T Type @ +25 °C	1.7 °C	1 °C, 0.5 °C
			T Type @ -40 to +85 °C	7.2 °C	1 °C, 0.5 °C

Resolution	0.0078 °C
Accuracy Variance	0.20% of full-scale reading (0.25%, maximum)

THERMISTOR INPUT

Type Supported	10K NTC			
Temperature Range	-40 to 85 °C			
Resolution	0.01 °C			
Accuracy	**THERMISTOR**	Typ. Error	Worst Case Error	Worst Case RSS Error	Probe Error
		853 ppm (0.1 °C)	4103 ppm	2101 ppm	n/a
Accuracy Variance	Maximum +/- 0.5 °C over -40 to +85 °C temperature range			

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SENSOR INTERFACE SPECIFICATIONS (cont'd)

DIGITAL OUTPUTS	
Voltage Range	0-30 VDC
Output Type	Open drain
Output Current	Not to be less than 100 mA
Protection	Current limit protection
Isolation	None

INTEGRATED SENSORS

TEMPERATURE	CONDITIONS	MINIMUM	TYPICAL	TYPICAL	UNITS
Offset	Temperature Offset Error @ 25 °C		+/- 0.25		°C
Slope Error	-		+/- 0.033		°C / °C

SMARTMESH IP 802.15.4E RADIO SPECIFICATIONS

PARAMETER	CONDITIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS
Frequency Band		2.400		2.4835	GHz
Number of Channels			15		
Channel Separation			5		MHz
Channel Clear Frequency	Where k = 11 to 25, as defined by IEEE 802.4.15		$2405 + 5*(k-11)$		MHz
Modulation	IEEE 802.15.4 Direct Sequence Spread Spectrum (DSSS)				
Raw Data Rate			250		kbps
Range	25 °C, 50% RH, +2dBi Omni-Directional Antenna, Antenna 2m above ground				
	Indoor		100		m
	Outdoor		300		m
Receiver Sensitivity	Packet Data Error Rate (PER) = 1%			-93	dBm
	PER = 50%			-95	dBm
Output Power	Delivered to a 50 Ω load			8	dBm

THIONYL CHLORIDE LITHIUM BATTERIES (2 supplied with product)

CHARACTERISTICS	CONDITIONS
Temperature Range	-40 to +85 °C
Nominal Capacity	2.4 Ah
Nominal Voltage	3.6 V
Diameter	14.5mm
Height	50.5mm

*Potential Hazard: Do not recharge, crush, disassemble or heat above 100 °C (212 °F).

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION	INCLUDES:	UL
BB-WSD2C31010	Industrial Power Monitor Node - Conduit	3 Analog Inputs, 1 Digital Input, Internal Temperature	Indoor / Outdoor, w/ mounting ear installation
BB-WSD2M31010	Industrial Power Monitor Node - M12	3 Analog Inputs, 1 Digital Input, Internal Temperature	Indoor only, w/ mounting ear installation
BB-WSD2C21150	Industrial Cooler/HVAC Node - Conduit	2 Analog Inputs, 1 Digital Input, 1 Digital Output, 2 Thermocouples, 2 Thermistors, Internal Temperature	Indoor / Outdoor, w/ mounting ear installation

ACCESSORIES

ACH2-DBAT-DP002-G	External antenna, 2.4 GHz, 2 dBi, dipole, RP-SMA, hinged, 3.8 dBi
ACH2-AT-DP011-G	Magnetic mount antenna, 2.4 GHz, 3.8 dBi
BB-WCD-TM2M	Thermistor cable
WSCAC0-6	Pigtail cable, 1.8 m (6 ft.)
WSCAC12-6	M12 wiring harness cable, 8-pin, 1.8 m (6 ft.)
ZXTMT	Cable gland/conduit kit
BB-2X3.6VLTCAA	(2) Replacement batteries, AA lithium thionyl chloride battery. *Notes: Node requires two (2) batteries. UL application approved battery.*

APPROVALS, DIRECTIVES, STANDARDS

CE - DIRECTIVES	
2014/35/EU	Low Voltage Directive
2014/53/EU	Radio Equipment Directive
2011/65/EU	Reduction of Hazardous Substances Directive (RoHS)
2012/19/EU	Waste Electrical and Electronic Equipment Directive (WEEE)
CE - EMC	
ETSI EN 300 328 v2.1.1	EMC & Radio Spectrum Matters (ERM) Wideband Transmission Systems, 2.4 GHz ISM Band
ETSI EN 301 489-1 v2.1.1 ETSI EN 301 489-17 v3.2.0	Applied in accordance with the specific requirements of: EMC and Radio Spectrum Matters: Broadband Data Systems
EN 55032:2012+AC:2013, Class A	Information Technology Equipment - RF Emissions
EN 55024:2010	Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement
CE - SAFETY	
EN/IEC 61010-1 (3rd Ed.)	Safety requirements for electrical equipment for measurement, control, and laboratory use (general requirements).
EN/IEC 61010-2-201 (1st Ed.)	Particular requirements for control equipment
CE - RF EXPOSURE	
EN 62479	Assessment of the compliance of low power electronics and electrical equipment wiht the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 MHz)
ENVIRONMENTAL	
IEC 60068-2-6	Sine Vibration: 4G, 10-500 Hz, 0.06 in. displacement
IEC 60068-2-27	Mechanical Shock: 50G, 11ms, 18 pulses
FCC, IC	
FCC Part 15 Class A, FCC Part 15.247	
ICES-003:2016	ITE Emissions for Canada
UL (All models w/ mounting ear installation; M12 model indoors only.)	
UL/CSA Class 1/Division 2, Groups A, B, C, D	

MECHANICAL DIAGRAM

Units = [Millimeters] Inches