ALTA Wireless IoT Sensors Kit
HVAC

"Things" are talking.

ALTA Remote Monitoring Systems enable "things" to speak. Wireless sensors, gateways and software give a voice to the IoT (Internet of Things) and allow business-es to leverage data, protect resources & save money.

For example, "things" can speak up when conditions are met that indicate an asset is at risk. The Monnit ecosystem (50+ sensor types) detects changes in variables (such as a temperature, water presence, door position, electrical current and voltages) to employ an **autonomous wireless sensing** solution that protects your bottom line.

Kit Components

Sensors

AC Current
Industrial (0-150A), Replaceable Lithium Battery

Humidity
AA Battery, Scientific-grade (± 3% accuracy)

Temperature (QTY 2)
Industrial, Replaceable Lithium Battery, 3' Leaded Probe

Temperature - Duct
AA Battery, -40° to +302°F, Accurate to ± 1.8°F

Gateway (choose from the following types)

3G Cellular (pictured in the kit above)
AT&T (USA), Rogers (Canada), w/ Battery Backup

Ethernet
100% Comprehensive - no PC or subscription req'd
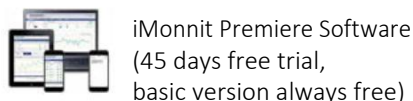
Software
iMonnit Premiere Software (45 days free trial, basic version always free)

Accessories
Quick Start Guide, Mounting Hardware, Power supplies, Antennas

FAST System Setup

15 min. or less
Build an IoT sensor network in 15 minutes or less! Monnit IoT & RF experts are standing by to help you quickly establish your monitoring system.
Email: info@monnit.com, Phone: 801-561-5555,
Web: www.monnit.com

The only 1000' / 10-yr. IoT Sensors Platform in the World

1000'+ Wireless Range / 10-yr. Battery Life

Enterprise-grade Performance

♦♦ 1,000+ ft. Wireless Range (through 12+ walls or ceilings, non line-of-sight)*

♦♦ Frequency Hopping Spread Spectrum (FHSS) / Interference Immunity

♦♦ Improved power management for longer battery life.** (10+ years on AA batteries or Industrial)

♦♦ Encrypt-RF™ Security (Diffie-Hellman Key Exchange + AES-128 CBC for sensor data messages).

♦♦ Onboard data memory - up to 512 readings / sensor
  - 10 minute heartbeats = 3.5 days
  - 2 hour heartbeats = 42 days

♦♦ Over-the-air updates (future proof)

♦♦ Free iMonnit basic online monitoring and notification software (configure sensors, view data and set alerts via SMS text, email and/or voice calls)

* Wireless range my vary according to environment.
** Battery life determined by sensor reporting & other variables

ALTA
Monitoring. Things.

ALTA
Other Wireless Platforms
Wifi
Bluetooth
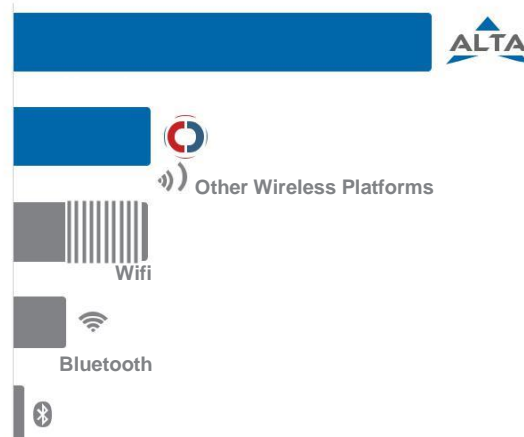
ALTA Wireless AC Current Sensor (Industrial)

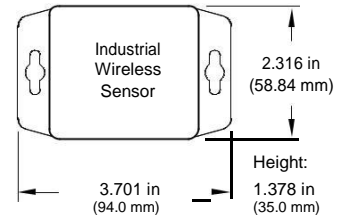The ALTA wireless AC Current Meter measures the RMS current of an alternating current (AC) system using a current transformer (CT) that wraps around the "hot" wire of a two wire (hot, common, ground (optional)) power system.

♦♦ Measures amp hours, max RMS current, min RMS current, and average RMS current.

♦♦ 20A and 150A current transducers are available.

Industrial Wireless Sensor

2.316 in (58.84 mm)

3.701 in (94.0 mm)

Height: 1.378 in (35.0 mm)

Technical Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *
Current Consumption	0.2 µA (Sleep Mode) 0.7 µA (RTC Sleep) 570 µA (MCU Idle) 2.5 mA (MCU Active) 5.5 mA (Radio RX Mode) 22.6 mA (Radio TX Mode)

Included Battery	Max Temperature Range	-40° to +85°C (-40° to +185°F)
	Capacity	1800 mAh
Optional Solar Feature	Solar Panel	5VDC / 30mA (53mm x 30mm)
	Charging Temperature Range	0° to 45°C (32° to 113°F)
	Max Temperature Range	-20° to 60°C (-4° to 140°F)
	Included Rechargeable Battery	600 mAh / >2000 Charge Cycles (80% of initial capacity)

AC Current Sensor		0-20A	0-150A
	Absolute Max CT Current	50 Amps RMS (Arms)	200 Amps RMS (Arms)
	Maximum Accurate CT Current	20 Arms	150 Arms
	Frequency Range	50 – 100 Hz	50 – 100 Hz
	Accuracy	+/- 2% @ 2 to 20 Arms, +/- .07 Arms @ < 2 Arms ***	+/- 2% @ 2 to 150 Arms, +/- .4 Arms @ < 15 Arms ***
	Calibrated Accuracy with Appropriate Offset	+/- 1% @ 2 to 20 Arms, +/- .035 Arms @ < 2 Arms ***	+/- 1% @ 2 to 150 Arms, +/- .2 Arms @ < 2 Arms ***
	Offset Limits	-1.27 to + 1.27 Arms (default set to +.1 Arms) ****	-1.27 to + 1.27 Arms (default set to +.3 Arms) ****
	Measurement Resolution	~.01 Arms	~.1 Arms
	Current Transducer Dimensions	40 mm x 25 mm x 26 mm (10 mm inner diameter)	67 mm x 49 mm x 42 mm (24 mm inner diameter)

Wireless Range	1,000+ ft. (through 12+ walls or ceilings / non line-of-sight)
Security	Encrypt-RF™ (256-bit key exchange and AES-128 CTR)
Integrated Memory	Up to 512 sensor messages
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz product FCC ID: ZTL- G2SC1, IC: 9794A-G2SC1

FC Industry Canada

*   Hardware cannot withstand negative voltage. Please take care when connecting a power device.

** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

*** CTs are inherently less accurate at or below 10% of max range. For best calibration results calibrate at a current between 30% and 90% of max accurate range.

****   Offset is used to overcome a diode voltage drop inherent to the hardware. To accurately account for this drop a default offset is used. To best identify the optimal value of this offset make a series of measurements at .2 to 2 Arms and find the current (Arms) difference between your measurement standard and the Monnit sensor.

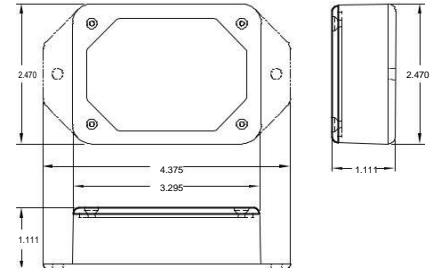Click here for complete data sheet

ALTA Wireless Humidity Sensor (AA)

The ALTA Wireless Humidity (RH) Sensor allows you to accurately monitor the relative humidity of the air within a room or enclosure.

♦♦ Measures relative humidity, temperature and dew point with high accuracy.

Up to 10-Year Battery Life

♦♦ AA Battery Powered

Technical Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *
Current Consumption	0.2 µA (Sleep Mode) 0.7 µA (RTC Sleep) 570 µA (MCU Idle) 2.5 mA (MCU Active) 5.5 mA (Radio RX Mode) 22.6 mA (Radio TX Mode)
Operating Temperature Range (Board Circuitry and Batteries)	-18°C to 55°C (0°F to 130°F) using alkaline -40°C to 85°C (-40°F to 185°F) using lithium **
Optimal Battery Temperature Range (AA)	+10°C to +50°C (+50°F to +122°F)
Power Options	1.5V AA batteries (included) Line-power w/ AA battery backup option available
Humidity Sensor — Accuracy	± 3% under normal conditions (10% - 90% RH) ***
Humidity Sensor — RH Operating Range	0 – 100% RH ***
Humidity Sensor — RH Response Time	8 sec (tau 63%) ***
Wireless Range	1,000+ ft. (through 12+ walls or ceilings / non line-of-sight)
Security	Encrypt-RF™ (256-bit key exchange and AES-128 CTR)
Integrated Memory	Up to 512 sensor messages
Weight	3.7 Ounces
Certifications	900 MHz product FCC ID: ZTL- G2SC1 IC: 9794A-G2SC1

*   Hardware cannot withstand negative voltage. Please take care when connecting a power device.
**   At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
***   View charts contained in the verbose version of the product's datasheet at Monnit.com.

Principle of Operation

HUMIDITY

The ALTA Wireless Humidity (RH) Sen-sor allows you to accurately monitor the relative humidity of the air within a room or enclosure. Measures relative humidity, tempera-ture and dew point with high accuracy.

Options & Add-ons

Power Options

♦♦ AA Battery
◊◊ Line Power (optional, w/ AA backup)
♦♦ Coin Cell Battery (smaller form factor)
♦♦ Industrial (replaceable lithium)
◊◊ Solar (optional, w/ Lithium battery backup)

Durability Grades

♦♦ Industrial (Outdoors, weather & shock proof casing)
♦♦ Commercial (Indoors, AA and Coin Cell)

Operating Frequencies

♦♦ 900 MHz

ALTA Wireless TEMPERATURE Sensors

AA Battery (x2)

Coin Cell

Industrial /
3.6V Lithium
10-year

5-year

10-year

*Sensors shown with & without
3' Leaded Prope options*

The ALTA Wireless Temperature Sensor uses a type NTC thermistor to measure temperature.

♦♦ Accurate to ± 1° C (± 1.8° F)

♦♦ Increased accuracy by user calibration to ± 0.25° C (± 0.45° F)

Data Sheet (short version)

click here for long version

Technical Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *
Current Consumption	0.2 µA (Sleep Mode) 2.5 mA (MCU Active) 0.7 µA (RTC Sleep) 5.5 mA (Radio RX Mode) 570 µA (MCU Idle) 22.6 mA (Radio TX Mode)

Temperature Sensor		
	Thermistor Temperature Range (Thermistor Only)	-40° to +125°C (-40° to +257°F) Limited to Main Unit Circuitry, -7° to +60°C unless thermistor leads being used
	Accuracy @ 25°C	+/- 1% (1° C or 1.8° F)
	User Calibrated Accuracy	+/- 0.25° C (± 0.45° F)

Wireless Range (900 MHz)	1,000'+ (through 12+ walls or ceilings / non line-of-sight)
Security	Encrypt-RF™ (256-bit key exchange and AES-128 CTR)
Integrated Memory	Up to 512 sensor messages
Certifications FC Industry Canada	900 MHz product: FCC ID: ZTL- G2SC1 IC: 9794A-G2SC1 UL Listed (Industrial): UL508-4x specifications (File E194432)

Power Options / Form Factors

	AA Batteries	Coin Cell	Industrial 3.6V Lithium (1800 mAh capacity)
Time Constant @ 25°C	15 sec max	30 seconds	
Operating Temperature Range ** (board circuitry + batteries)	0° to 130°F (-18°-55°C) alkaline, -40° to 185°F (-40° - 85°C) lithium	20° to +140°F, (-7° - 60°C) **	-40° to +185°F (-40° - 85°C)**
Optimal Operating Temperature Range (batteries) **	+10° to +50°C (+50° to +122°F)		-40° to +85°C (-40° to +185°F)
Weight	3.7 oz.	0.7 oz.	4.7 oz.
Enclosure	High impact ABS Plastic	High impact ABS Plastic (w/ PinchPower enclosure)	IP65, NEMA 4X, CE, sealed, weather & shock proof
Dimensions (click #s to view dimensional drawings)	4.375" x 2.470" x 1.120"	2.000" x 1.125" x 0.875"	3.701" x 2.316" x 1.378"

* Hardware cannot withstand negative voltage. Please take care when connecting a power device.

** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

Solar-Powered Option (available with "Industrial" version only)

Solar Panel: 5VDC / 30mA (53mm x 30mm)

Charging Temperature Range: 0° to 45°C (32° to 113°F)

Max. Temperature Range: -20° to 60°C (-4° to 140°F)

Rechargeable Battery (Included): 600 mAh / >2000 Charge Cycles (80% of initial capacity)

Principle of Operation

TEMPERATURE

Sensor outputs ambient temperatures in degrees Fahrenheit. It is programmed to sleep for a user-given time interval (heartbeat); then wakeup, send power to the NTC Thermistor, wait for it to stabilize, convert the analog data, mathematically compute the temperature and transmit the data to the gateway. To stay within the abilities of the processor, the temperature is computed off a data table provided by the manufacturer.

Get IoT Started

801-561-5555

info@monnit.com

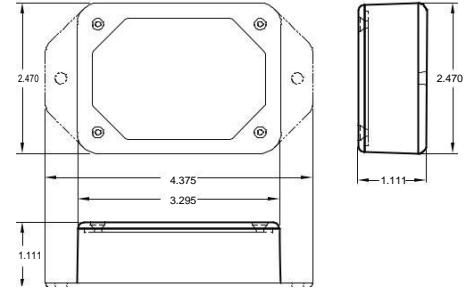www.monnit.com

ALTA Wireless Duct Temperature Sensor (AA)

The ALTA Wireless Temperature Sensor uses a type NTC thermistor to measure temperatures in duct work - while maintaining a sealed environment.

♦♦ Accurate to ± 1° C (± 1.8° F)

♦♦ Increased accuracy by user calibration to ± 0.25° C (± 0.45° F)

AA Battery Powered

♦♦ Up to 10-Year Battery Life

Technical Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *
Current Consumption	0.2 µA (Sleep Mode) 0.7 µA (RTC Sleep) 570 µA (MCU Idle) 2.5 mA (MCU Active) 5.5 mA (Radio RX Mode) 22.6 mA (Radio TX Mode)
Operating Temperature Range (Board Circuitry and Batteries)	-18°C to 55°C (0°F to 130°F) using alkaline -40°C to 85°C (-40°F to 185°F) using lithium **
Optimal Battery Temperature Range (AA)	+10°C to +50°C (+50°F to +122°F)

Duct Temperature Sensor	Thermistor Temperature Range (Thermistor Only)	-40°C to +125°C (-40°F to +257°F) - Limited to Main Unit Circuitry, -7°C to +60°C unless thermistor leads being used.
	Accuracy @ 25°C	+/- 1% (1° C or 1.8° F)
	User Calibrated Accuracy	+/- 0.25° C (± 0.45° F)
	Time Constant @ 25°C	15 sec max
	Lead Wire Length	8 ft. (96 in.)
	Cable Rating	UL listed plenum cable

Wireless Range	1,000+ ft. (through 12+ walls or ceilings / non line-of-sight)
Security	Encrypt-RF™ (256-bit key exchange and AES-128 CTR)
Integrated Memory	Up to 512 sensor messages
Weight	3.7 Ounces
Certifications	900 MHz product FCC ID: ZTL- G2SC1, IC: 9794A-G2SC1

* Hardware cannot withstand negative voltage. Please take care when connecting a power device.

** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

Principle of Operation

DUCT TEMPERATURE

Sensor outputs ambient temperatures in degrees Fahrenheit. It is programmed to sleep for a user-given time interval (heartbeat); then wakeup, send power to the NTC Thermistor, wait for it to stabilize, convert the analog data, mathematically compute the temperature and transmit the data to the gateway. To stay within the abilities of the processor, the temperature is computed off a data table provided by the manufacturer. To re-duce error, a variable resistor configuration is imple-mented over specified temperature ranges.

Options & Add-ons

Power Options

♦♦ AA Battery

◊ Line Power (optional, w/ AA backup)

♦♦ Coin Cell Battery (smaller form factor)

♦♦ Industrial (replaceable lithium)

◊ Solar (optional, w/ Lithium battery backup)

Durability Grades

♦♦ Industrial (Outdoors, weather & shock proof casing)
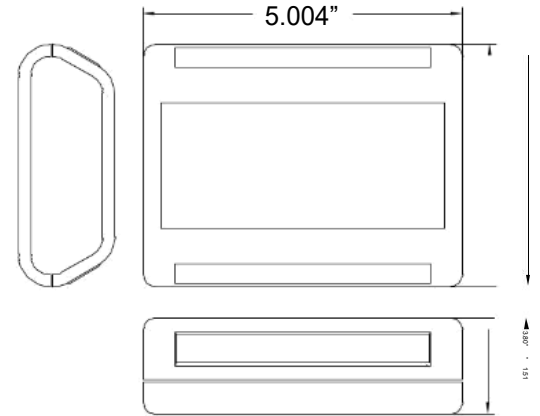
♦♦ Commercial (Indoors, AA and Coin Cell)

Operating Frequencies

♦♦ 900 MHz

ALTA 3G Cellular Gateway

True plug & play, no hassles for Internet configuration setup

No PC required for operation

Low-cost cellular service packages

Local status LEDs with transmission and online status indicators

5.004"

Technical Specifications

Cellular

Carriers Support	AT&T (USA), Rogers (Canada)
Cellular Technology	UMTS Frequency Range: 850 / 1700 / 1900 MHz
Antenna	Connector: SMA Gain (dBi): 1.5
SIM Card Compatibility	Mini-SIM (2FF) 25 mm x 15 mm x 0.76 mm

Power

Input Power	5.5 VDC @ 2.5 A
Optional Battery Backup	Battery Type: Rechargeable Lithium Polymer
	Battery Duration: Up to 24 hours
	Battery Cycle Life: 500 times

Mechanical

LEDs	Cellular Status LED, Online Status LED, Sensor Network Status LED
Device Memory:	50,000 sensor messages (Sensor messages will be stored in the event of Internet outage and transferred when connection is restored)
Enclosure	ABS
Dimensions	5.004 x 3.8 x 1.51 in.
Weight	7 ounces

Environmental

Operating Temperature	-10 to +70 °C (14 to 158 °F)
Storage Temperature	-20 to +85 °C (-4 to 185 °F)

Wireless

Wireless Range	1,000+ ft. (through 12+ walls or ceilings / non-line-of-sight)
Security	Encrypt-RF™ (256-bit key exchange and AES-128 CTR)
Certifications FC Industry Canada	FCC: ZTL- G2SC1, FCC: RI7HE910 IC: 9794A-G2SC1 and IC: 5131A-HE910

Principle of Operation

The ALTA Cellular Gateways are based on the latest Dual-band CDMA and 3G wireless protocols and come integrated with Monnit's wireless access point network (WAN) for use with all Monnit wireless sensors.

The ALTA Cellular Gateway is an advanced all wireless M2M gateway that enables fast time-to-market solutions for a wide range of M2M and partner applications as well.

Options & Add-ons

Carriers
- CDMA
  - ◊ Sprint
 - ◊ US Cellular
- 3G
  - ◊ AT&T (USA)
  - ◊ Rogers (Canada)

Protocol
- Cellular
  - ◊ CDMA
  - ◊ 3G
- Ethernet
- USB

Operating Frequency
- 900 MHz

ALTA Ethernet Gateway

The ALTA Ethernet gateway allows your ALTA Wireless Sensors to communicate with the iMonnit™ Online Wireless Sensor Monitoring and Notification System without requiring a PC. Simply plug this device into any open network port with internet connection and it will automatically connect with online servers. With the graphical iMonnit software, you can easily configure your network, view collected sensor data and set alarms through SMS or e-mail.

5.505"
(139.827 mm)

(101.00 mm)
5.4"

1.375"
34 mm
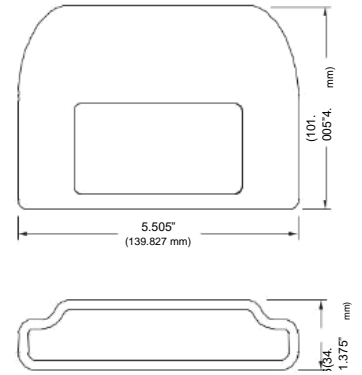
Technical Specifications

Ethernet	
Ethernet Types	Standard, POE
Antenna	Connector: SMA Gain: 5.0 dBi (900 MHz Product) 3.0 dBi (868 and 433 MHz Product)
Hardware	10/100 Ethernet Controller
IEEE Standard Compliance	802.3-2002
Operation:	Full- and Half-Duplex
Cross-Over Correction	Automatic MDI/MDI-X
Addressing	Pre-programmed MAC Address
Host Address	t1.sensorsgateway.com
Default Port	3000
Protocols Supported	UDP, DHCP, TCP, SNMP, MODBUS
Cable Connector	Cat 5
Device Memory	16,000 sensor messages (Sensor messages will be stored in the event of Internet outage and transferred when connection is restored)
Power	
Power Supply	5.5 V AC adapter or 5.5 V Power-Over-Ethernet adapter *
Mechanical	
LEDs	H/W status, iMonnit connection status, sensor data activity
Enclosure	ABS plastic
Dimensions	4.0 in x 5.5 in x 1.375 in (139.85 mm x 101.75 mm x 34.95 mm)
Weight	12.6 ounces
Environmental	
Operating Temperature	-10 to +70 °C (14 to 158 °F) **
Storage Temperature	-20 to +85 °C (-4 to 185 °F)
Wireless	
Wireless Range	1,000+ ft. (through 12+ walls or ceilings, non line-of-sight)***
Security	Encrypt-RF™ (256-bit key exchange and AES-128 CTR)
Certifications	900 MHz product - FCC ID: ZTL- G2SC1 and IC: 9794A-G2SC1.

FC   Industry Canada

*   Hardware cannot withstand negative voltage. Please take care when connecting a power device.

** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

***   Actual range may vary depending on environment.

Data Capturing Options - Data collected by the Ethernet Gateway from the sensors in the network can be accessed when these interfac-es are turned on. Multiple interfaces can be active at the same time. All interfaces require that the Ethernet gateway be set to a Static IP address. (By default, the unit uses DHCP). The following data capturing options are supported:

SNMP Poll and Trap Interface • MODBUS TCP Interface • Real Time TCP Interface

Commercial Grade

If not specified as "Industrial Grade", all ALTA sensors are commercial grade and are designed for applications in ordinary environments (normal room temperature, humidity and atmospheric pressure). Do not use these sensors under the following conditions as these factors can deteriorate the product characteristics or cause failures.

♦♦ Corrosive gas / De-oxidizing gas (chlorine, hydrogen sulfide, ammonia, sulfuric acid, nitric oxides, etc.)

♦♦ Volatile or flammable gas

♦♦ Dusty conditions

♦♦ Under low or high pressure

♦♦ Wet or excessively humid locations

♦♦ Places with salt water, oils chemical liquids or organic solvents

♦♦ Where there are excessively strong vibrations

♦♦ Other places where hazardous conditions exist

Use these product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality.

Industrial Grade

Type 1, 2, 4, 4X, 12 and 13 NEMA Rated Enclosure

ALTA Industrial sensors are enclosed in reliable, weatherproof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).

♦♦ Safe from falling dirt

♦♦ Protects against wind blown dust

♦♦ Protects against rain, sleet, snow, splashing water, and hose directed water

♦♦ Increased level of corrosion resistance

♦♦ Will remain undamaged by ice formation on the enclosure

Sensor Power Sources

AA Battery

AA battery powered sensors are commercial grade and are ideal for indoor sensor networks. AA sensors are able to achieve up to a 10-year battery life.

Line Power (w/ AA Battery Backup)

AA battery powered sensors can be upgraded to support line-powered operations.

Coin Cell Battery

Coin cell battery powered sensors offer the smallest form factor of all power options. Coin cell sensors are able to achieve up to a 5-year battery life.

Industrial Lithium Battery

Industrial sensors are powered by a replaceable lithium battery. Industrial sensors are ideal for indoor sensor networks. Industrial sensors are able to achieve up to a 10-year battery life.

Solar

Industrial Grade Sensors can be upgraded to support solar powered operations.

RF Operating Frequency

In North America, ALTA wireless products operate using the license-free 900 MHz ISM band. Contact Monnit regarding products requiring 868 MHz, 433 MHz or 920 MHz operating frequencies.

MONNIT®

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For more information about our products or to place an order, please contact our sales department at info@monnit.com or 801-561-5555.

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