ALTA by MONNIT

Remote Monitoring for Business

ALTA Wireless Resistive Bridge Meters

General Description

The ALTA Wireless Resistive Bridge Meter is a precision analog device that supplies an excitation voltage to a resistive bridge. It measures the voltage across the leads and reports this measured voltage in millivolts per volt (mV/V).

Key Features

- Supplies up to 2.0V excitation
- Resolution: 24-bit or down to 0.00001 mV/V
- Accuracy: down to 0.0002 mV/V
- Measures both positive and negative percentages
- Programmable gain: 1X to 128X
- Optional 50 Hz and 60 Hz filters
- Cable length: 0.9 m (3')
- Cable terminations: bare-wire
- Reports additional temperature measurement

Principles of Operation

The ALTA Wireless Resistive Bridge Meter uses two wires, red(1) and black(4), to excite a resistor bridge, thus providing a reference voltage for the measurement. Two additional wires, white(2) and yellow(3), measure the differential voltage across this bridge in mV/V.

This meter contains a Programmable Gain Amplifier (PGA) and can be set to values between 1X and 128X, essentially increasing the measurement's resolution and reducing measurement error. The 50 and 60 Hz filters are also programmable.

Thresholds can be set so that when the output gets above or below a user-defined threshold, a wireless communication is immediately sent to the gateway. The gateway will immediately attempt to securely send the message to iMonnit or other approved data services.

Example Applications

- Quarter/Diagonal/Half/Full Bridge configurations
- Strain Gauge
- Force (Load cell)
- Pressure
- Displacement
- Inclinometer
- Torque
- Additional applications

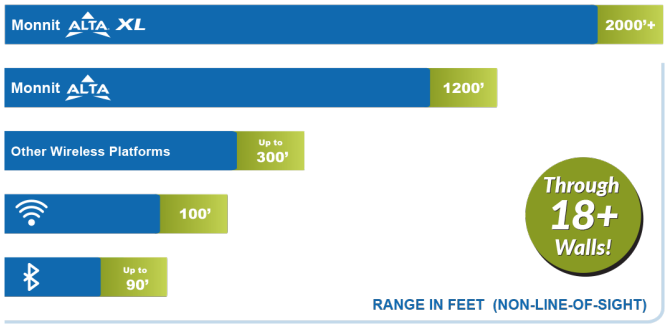
Features of Monnit ALTA Sensors

- Wireless range of 2,000+ feet through 18+ walls[1]
- Frequency-Hopping Spread Spectrum (FHSS)
- Best-in-class interference immunity
- Best-in-class power management for longer battery life[2]
- Encrypt-RF® Security (Diffie-Hellman Key Exchange + Advanced Encryption Standard (AES)-128 Cipher Block Chaining (CBC) for sensor data messages)
- Sensor logs 2000 to 4000 readings if the gateway connection is lost (non-volatile flash, persists through power cycling):
  - 10-minute Heartbeats = ~ 22 days
  - 2-hour Heartbeats = ~ 266 days
- Automatic over-the-air updates to sensor firmware (future-proof)
- Free iMonnit Basic Online Wireless Sensor Monitoring and Notification System to configure sensors, view data, and send alerts via SMS text, email, and voice call

1 Actual range may vary depending on the environment and gateway.

2 Battery life is determined by the sensor reporting frequency and other variables. Other power options are also available.

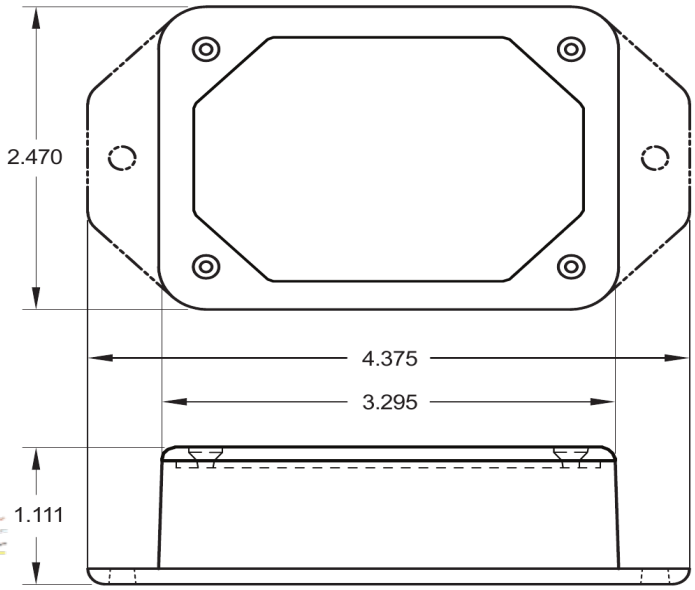
Wireless Range Comparison

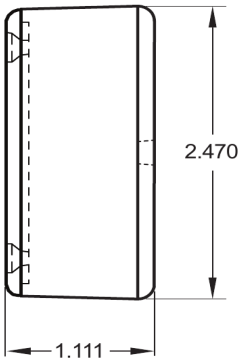


Technical Specification | ALTA® Wireless Resistive Bridge Meter

Resistive Measurement	Maximum Bridge impedance	500 kΩ[1]		
	Accuracy	0.0002 mV/V @ PGA = 128 [2]		
	Resolution	0.00001 mV/V		
	Range	-1000mV/V to 1000mV/V[3]		
	Filters	50Hz and/or 60Hz		
Temperature Measurement	Accuracy	+/- 0.5 °C (0 °C - 75 °C or 32 °F - 167F), +/- 1.0°C otherwise		
	Resolution	0.1 °C		
Lead	Cable length	0.9 m (3 ft)		
	Wiring Diagram [4, 5]	**Label**	**Wire Color**	**Function**
		1	Red	Excitation Wire
		2	White	Positive Measurement
		3	Yellow	Negative Measurement
		4	Black	Ground
	Wire gauge	26 AWG		
	Conductor material	Stranded Copper 7/34		
	Insulation	PVC, 0.29mm (0.010")		
	Shield	No		
	Jacket	PVC (black)		
	Overall Diameter	4.25 ± 0.2 mm (0.17" ± 0.007")		
	Ratings / Approvals	UL AWM STYLE 2464, cUL AWM I/II A 80°C 300V FT1 LF		
	Temperature Rating	-25°C to 80°C (-13°F to 176°F)[6]		
	Voltage Rating	300 V Max		
	Dielectric Strength	1500 V RMS		
ALTA Wireless	Data logging	Sensor logs 2000 to 4000 readings if gateway connection is lost (non-volatile flash, persists through power cycling): 10-minute Heartbeats = ~22 days - 2-hour Heartbeats = ~266		
	Wireless protocol	ALTA Proprietary Frequency-Hopping Spread Spectrum		
	Wireless transmission power (EIRP)	50 mW (900MHz), 25 mW (868 MHz), 10 mW (433 MHz)		
	Wireless range	2,000+ ft. through 18+ walls with the ALTA XL® Gateway		
	Security	Encrypt-RF® (256-bit key exchange and AES-128 CTR)		
General	Battery voltage range	2.0 to 3.8 VDC		
	Operating altitude (non-pressurized	-15.2 to 1,982 m (-50 to 6,500 ft)[7]		
	Storage altitude (non-pressurized environments)	-15.2 to 3,048 m (-50 to 10,000 ft)[7]		
	Operating humidity	5 to 85% RH (non-condensing)		
	Certifications	900 MHz sensors: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1. 868 and 433 MHz sensors tested and comply with: EN 55032: 2015/A11:2020; EN 55035:2017/A11:2020; ETSI EN 300 220 V3.2.1 (2018-06); ETSI EN 301 489-3 V2.2.0. (2021-11); and ETSI EN 303 645. All sensors tested and comply with: EN 61010-1 and EN 60950 and meet RoHS 2015/863 and REACH 224 (June 2022), according to IEC		

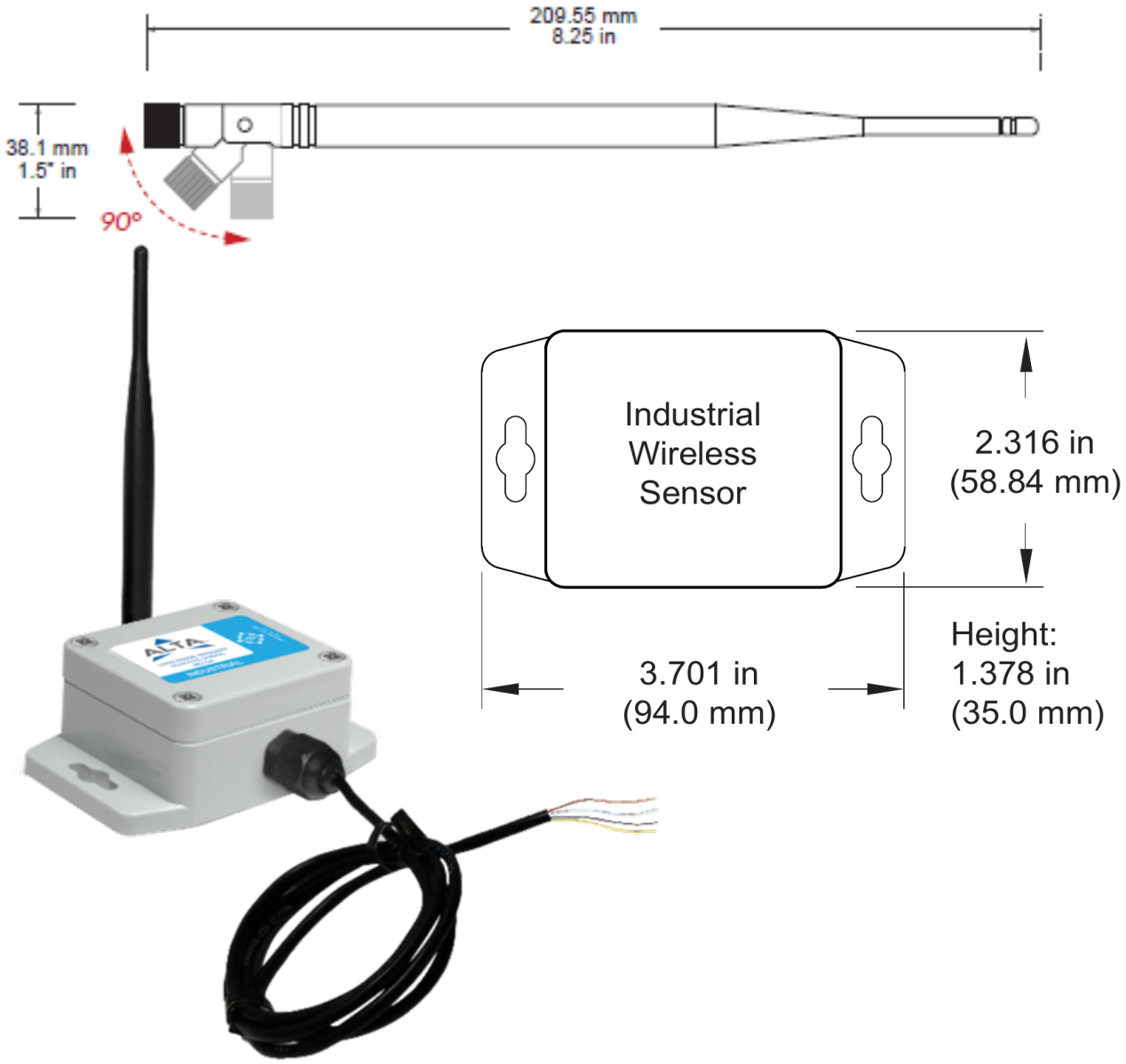
1. If the total resistance of the bridge (the resistance applied across the red wire(1) and the black wire(4)) is greater than 500 kΩ, the accuracy of the measurement cannot be guaranteed.
2. Accuracy will vary depending on the total resistance of the bridge. In general, lesser resistances will have greater accuracy. The meter will take multiple measurements using a 24-bit ADC. It waits for the readings to stabilize and then averages the stabilized measurements and calculates a percentage based on the averaged ADC value.
3. The range is -1000mV/V to 1000mV/V when the gain is set to 1x. Each time the gain is increased the range will decrease by a factor of 2. For example if the gain is set to 2x, the range will be -500mV/V to 500mV/V. If the gain is set to 3x, the range will be -250mV/V to 250mV/V.
4. The input of this meter is passive. NEVER apply any voltage to any of the leads. The meter applies its battery voltage(3V) using the excitation wire(1).
5. There must be a resistance between the measurement wires(wires 2 and 3) and the ground/excitation wires(wires 1 and 4). If these wires are shorted, accurate measurements are not possible.
6. Temperatures colder than the rating are acceptable if the cable is not moving or vibrating.
7. Operating and storage altitude without DC power supply is -30.48 to 9144 m (-100 to 30000 ft).





Technical Specifications | ALTA® Enterprise Resistive Bridge Meter	
Battery[1]	2x 1.5V AA Alkaline, 1500 mAh, (standard) 2x 1.5V AA Lithium, 3000 mAh, (optional)
Battery Life	10+ years expected
External line-power option[2]	Input voltage: 5.0-12.0 V Power jack: 2.1 x 5.5 mm barrel, center positive
Operating temperature range (non-leaded measurement range)[3]	-18°C to 55°C (0°F to 130°F) - AA Alkaline Batteries -25°C to 60°C (-13°F to 140°F) - AA Lithium L91 Batteries 0°C to 40°C (32°F to 104°F) - US 5V Power Supply 10°C to 40°C (50°F to 104°F) - International 5V Power Supply
Wireless antenna type	1/4-wave, 20 gauge wire whip, 3.5" (900/868MHz), 7" (433MHz)
Weight	3.2 oz. (91 g) with 0.3 m (1.0') lead 3.7 oz. (105 g) with 0.9 m (1.0') lead

1. Hardware cannot withstand negative voltage. Please take care when inserting and removing batteries.
2. Batteries will provide backup power in the case the external power is removed.
3. Operating below 0°C (-32°F) degrees will reduce battery life.



Technical Specifications | ALTA® Industrial Resistive Bridge Meter	
Battery	1x 3.6V AA Lithium Thionyl Chloride, 1500mAh, pre-installed
Battery Life	10+ years expected
Operating temperature range (non-leaded measurement range)[1]	-40°C to 85°C (-40°F to 185°F)
Wireless antenna type	1/2-wave waterproof dipole with RP-SMA connector and swivel neck; dBi of 3.0 (900/868MHz) or 2.5 (433 MHz); length of 8.27" (210mm) (900/868MHz) or 7.68" (195mm) (433 MHz); diameter at thickest point of 0.55" (14mm)
Weight	4.7 oz. (133 g)
Enclosure rating	IP-65 (dust-proof and waterproof but not submersible) NEMA 1, 2, 4, 4x, 12, and 13 rated, sealed, and weatherproof UL Listed to UL508-4x specifications (File E194432)

1. Operating below 0°C (-32°F) degrees will reduce battery life.

Commercial-Grade Sensors

Monnit commercial-grade sensors 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 and cause failures and burnout.

- Corrosive gas or deoxidizing gas: chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxide gas, etc.
- Volatile or flammable gas
- Dusty conditions
- Low-pressure or high-pressure environments
- Wet or excessively humid locations
- Places with salt water, oils, chemical liquids, or organic solvents
- Where there are excessively strong vibrations
- Other places where similar hazardous conditions exist

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

Industrial-Grade Sensors | Type 1, 2, 4, 4X, 12, and 13 NEMA-Rated Enclosure

Monnit's 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 and the damaging effects of 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

MONNIT

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