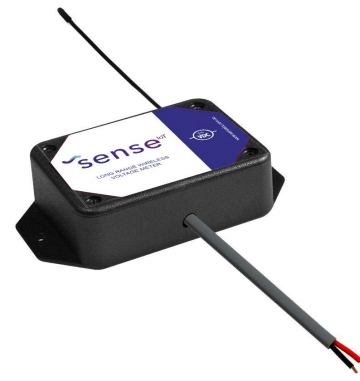


sense^{IoT}



Technology that Breathes

Wireless 0-5 VDC Voltage Meters

General Description

The Sense IoT Wireless Voltage Meter measures the voltage between two electrical points. It can be connected to the power and ground of any voltage source and measure within stated accuracy up to 5 VDC. It can be connected to any kind of variable voltage device, such as a transducer or sensor that outputs voltage. If the device to be measured is passive, the user must supply their own excitation voltage to the device.

- Accurate to $\pm 3.0\%$ full scale (FS) of voltage range
- Accurate to $\pm 0.5\%$ FS with user calibration
- Interfaces with any variable-voltage device
- 3 mV resolution

Principle of Operation

Sense IoT Wireless Voltage Meters read the voltage difference between two electrical points and reports back the measured voltage. It is programmed to sleep for a user-given time interval (heartbeat) and then wake up, convert the analog data, mathematically compute the voltage, and transmit the data to the gateway, where it is then logged into a cloud service. The user can configure defined thresholds and have the system alert on threshold breaches.

Example Applications

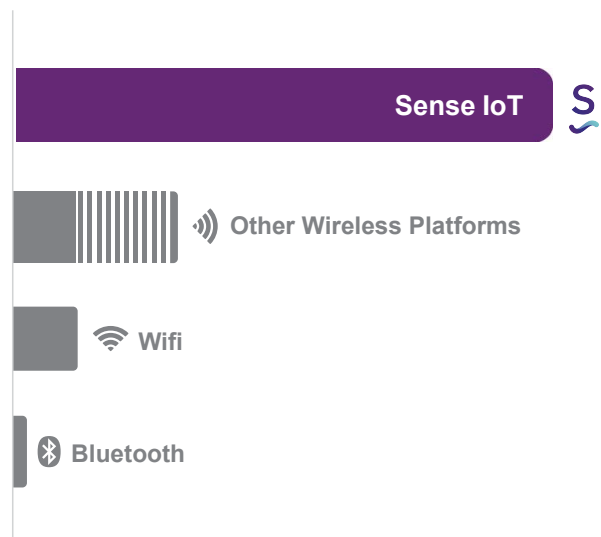
- Battery health
- Voltage measurement
- Transducer measurement
- Machinery
- Electrical motors
- Many additional applications

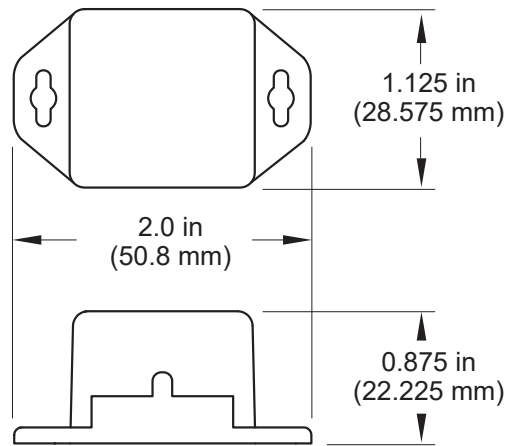
Features of Sense IoT Sensors

- Wireless range of 350 meters, through 12+ walls *
- Frequency-Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Improved power management for longer battery life ** (12+ years on AA batteries)
- Encrypt-RF® Security (Diffie-Hellman Key Exchange + AES-128 CBC for sensor data messages)
- Onboard data memory stores up to 512 readings per sensor:
 - 10-minute heartbeats = 3.5 days
 - 2-hour heartbeats = 42 days
- Over-the-air updates (future proof)
- Sense IoT online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email



- * Actual range may vary depending on environment.
- ** Battery life is determined by sensor reporting frequency and other variables. Other power options are also available.

Wireless Range Comparison





Commercial Coin Cell Wireless 0-5 VDC Voltage Meter | Technical Specifications

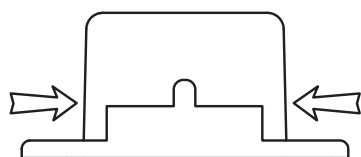
Supply voltage	2.0–3.8 VDC *
Current consumption	0.2 μ A (sleep mode), 0.7 μ A (RTC sleep), 570 μ A (MCU idle), 2.5 mA (MCU active), 5.5 mA (radio RX mode), 22.6 mA (radio TX mode)
Operating temperature range (board circuitry and coin cell)	-7°C to +60°C
Optimal battery temperature range (coin cell)	+10°C to +50°C
Voltage range	0–5 volts DC**
Resolution	~3 mV
Accuracy	+/- 3.0% FS
User-calibrated accuracy	+/- 0.5% FS ***
Open circuit voltage	~0.00 volts
Max rated input	10 volts
Lead wire length	2 Wires, 1 ft (12 in), Red (+), Black (-), 18 AWG (Custom lengths available upon request)
Integrated memory	Up to 512 sensor messages
Wireless range	350m non-line-of-sight
Security	Encrypt-RF® (256-bit key exchange and AES-128 CTR)
Weight	0.7 ounces
Certifications	<div style="display: flex; align-items: center; gap: 10px;">   Industry Canada </div> 900 MHz product; FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1. 868 and 433 MHz product tested and found to comply with: EN 300 220-2 V3.1.1 (2017-02), EN 300 220-2 V3.1.1 (2017-02) and EN 60950

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

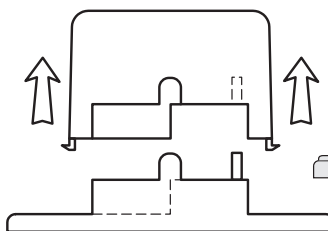
** The sensor is capable of measuring above 5 volts but may not meet the specified accuracy above this value.

*** For best results calibrate at a voltage between 50% and 90% of the voltage range.

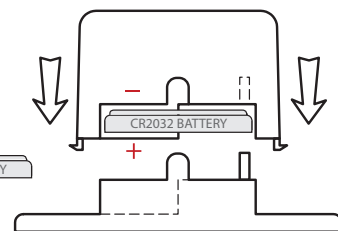
PinchPower™ Enclosures



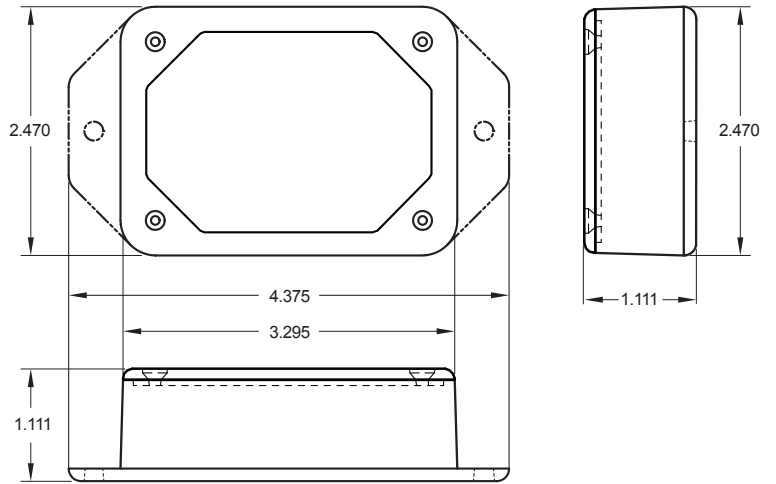
Pinch
(press in on the sides)





Pull
(sensor away from base)



Press
(sensor back into base)



Commercial AA Wireless 0-5 VDC Voltage Meter | Technical Specifications

Supply voltage	2.0–3.8 VDC (3.0–3.8 VDC using power supply) *
Current consumption	0.2 μ A (sleep mode), 0.7 μ A (RTC sleep), 570 μ A (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 using alkaline -40°C to 85°C using lithium
Optimal battery temperature range (AA)	+10°C to +50°C
Voltage range	0–5 Volts DC**
Resolution	~3 mV
Accuracy	+/- 3.0% FS
User-calibrated accuracy	+/- 0.5% FS ***
Open-circuit voltage	~0.00 Volts
Max rated input	10 Volts
Lead wire length	2 Wires, 1 ft (12 in), Red (+), Black (-), 18 AWG (Custom lengths available upon request)
Integrated memory	Up to 512 sensor messages
Wireless range	350m non-line-of-sight
Security	Encrypt-RF® (256-bit key exchange and AES-128 CTR)
Weight	3.7 ounces
Certifications	<div style="display: flex; align-items: center; gap: 10px;">   Industry Canada </div> 900 MHz product; FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1. 868 and 433 MHz product tested and found to comply with: EN 300 220-2 V3.1.1 (2017-02), EN 300 220-2 V3.1.1 (2017-02) and EN 60950

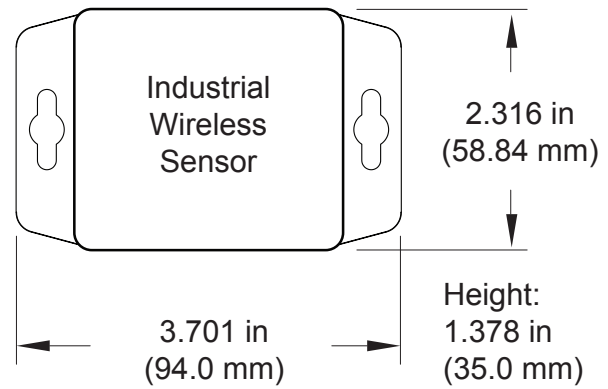
* Hardware cannot withstand negative voltage. Please take care when connecting a power device.

** The sensor is capable of measuring above 5 volts but may not meet the specified accuracy above this value.



*** For best results calibrate at a voltage between 50% and 90% of the voltage range.

Power Options

The standard version of this sensor is powered by two replaceable 1.5 V AA sized batteries (included with purchase). This sensor is also available with a line power option. The line powered version of this sensor has a barrel power connector allowing it to be powered by a standard 3.0–3.6 V power supply. The line powered version also uses two standard 1.5 V AA batteries as backup for uninterrupted operation in the event of line power outage. Power options must be selected at time of purchase, as the internal hardware of the sensor must be changed to support the selected power requirements.



Industrial Wireless 0-5 VDC Voltage Meter | Technical Specifications

Supply voltage	2.0–3.8 VDC (3.0–3.8 VDC using power supply) *	
Current consumption	0.2 μ A (sleep mode), 0.7 μ A (RTC sleep), 570 μ A (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 battery)	-40°C to +85°C	
Included battery	Max temperature range	-40° to +85°C
	Capacity	1500 mAh
Optional solar feature	Solar panel	5VDC/30mA (53mm x 30mm)
	Charging temperature range	0° to 45°C
	Max temperature range	-20° to 60°C
	Included rechargeable battery	600 mAh/>2000 charge cycles (80% of initial capacity)
	Solar efficiency	Optimized for high and low-light operation **
	Charging efficiency	40% *****
	Luminous sustainability	Minimum of 250 LUX *****
Voltage range	0–5 Volts DC***	
Resolution	~3 mV	
Accuracy	+/- 3.0% FS	
User-calibrated accuracy	+/- 0.5% FS ****	
Open circuit voltage	~0.00 Volts	
Max rated input	10 Volts	
Lead wire length	2 Wires, 1 ft (12 in), Red (+), Black (-), 18 AWG (Custom lengths available upon request)	
Integrated memory	Up to 512 sensor messages	
Wireless range	350m non-line-of-sight	
Security	Encrypt-RF® (256-bit key exchange and AES-128 CTR)	
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 and IC: 9794A-G2SC1. 868 and 433 MHz product tested and found to comply with: EN 300 220-2 V3.1.1 (2017-02), EN 300 220-2 V3.1.1 (2017-02) and EN 60950

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

** Light present 25% of day yields 125% of operating power to support 10-minute heartbeats.

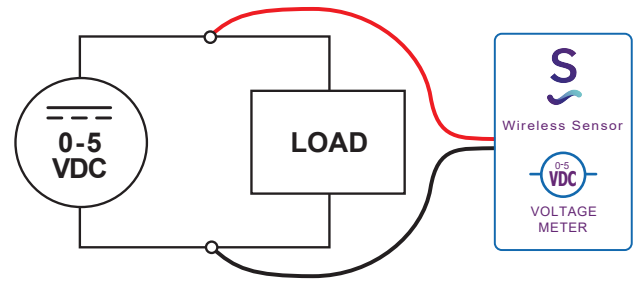
*** The sensor is capable of measuring above 5 volts but may not meet the specified accuracy above this value.

**** For best results calibrate at a voltage between 50% and 90% of the voltage range.

***** Solar feature's energy harvesting circuitry works indoors with low light.

Proper Installation

If the sensor is not connected to the power source properly, it will appear that the sensor is broken. Please follow this wiring diagram to ensure proper performance and detection.



Commercial Grade Sensors

Sense IoT 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 oxides 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 temperature may cause deterioration of the characteristics or the material quality.

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

Sense IoT 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

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For more information about our products or to place an order, please contact our sales department at 03 8640 0123.

Visit us on the web at www.senseiot.com.au.

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