



## Wireless AC Current Meters

### General Description

The ioX 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. The sensor reports Minimum RMS current, maximum RMS current, average RMS current, and amp hours to the ioX-Connect system. The ioX-Connect system is capable of generating watt hour or kilowatt hour readings as well.

- Measures amp hours, max RMS current, min RMS current, and average RMS current.
- Two different current transducers available:
  - Low Current: 0-20 Amp
  - High Current: 0-150 Amp
- Capable of generating Watt Hour or Kilowatt Hour readings using ioX-Connect.
- Data logging for accumulated amp hour readings.
- Can notify based on current levels or changes in current levels.
- Simple and safe installation of current/power measurement hardware, no rewiring required.

### Principle of Operation

To measure current, clip the CT around only a single wire of the AC system (clipping around a hot and neutral wire at the same time will result in 0 current readings). After the sensor powers on and connects to the gateway it will begin taking measurements based on the averaging interval (5 seconds default). It will report data to ioX-Connect every heartbeat or if the current goes outside of the aware thresholds set in ioX-Connect. The sensor reports amp hours, max RMS current, min RMS current, and average RMS current. ioX-Connect can also generate watt hour or kilowatt hour readings if a default RMS voltage is set in the online system.

### Example Interfacing

- Current Monitoring
- Amperage Monitoring
- Current Usage
- Amp Hour Meter

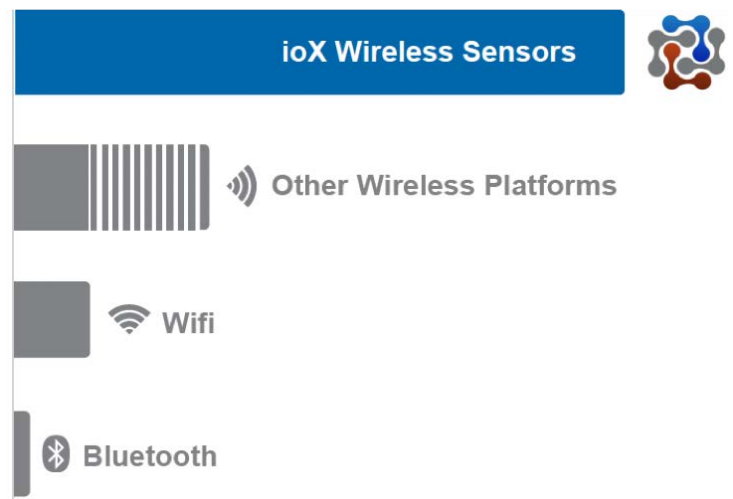
### Features of ioX Sensors

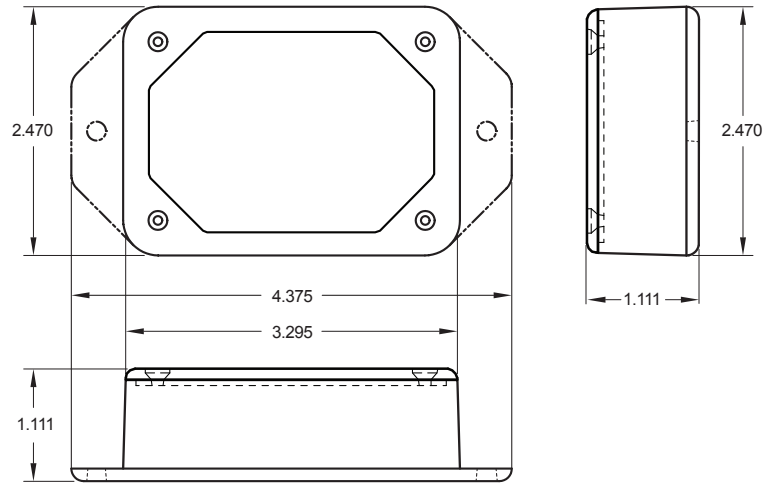
- Wireless range of 1,000+ feet through 12-14 walls.\*
- Frequency Hopping Spread Spectrum (FHSS).
- Improved interference immunity.
- Improved power management for longer battery life.\*\* (10+ years on AA batteries)
- Security (Diffie-Hellman Key Exchange + AES-128 CBC for sensor data messages).
- Onboard data memory / storage (up to 512 readings per sensor).
  - 10 min heartbeats = 3.5 days
  - 2 hour heartbeats = 42 days
- Over-the-air updates (future proof).

\* 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





### ioX Commercial AA Wireless AC Current Meter - Technical Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *
Current Consumption	0.2 $\mu$ A (Sleep Mode) 0.7 $\mu$ A (RTC Sleep) 570 $\mu$ 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 (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 )
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight
Security	256-bit key exchange and AES-128 CTR
Weight	3.7 Ounces
Certifications	   Industry Canada 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.

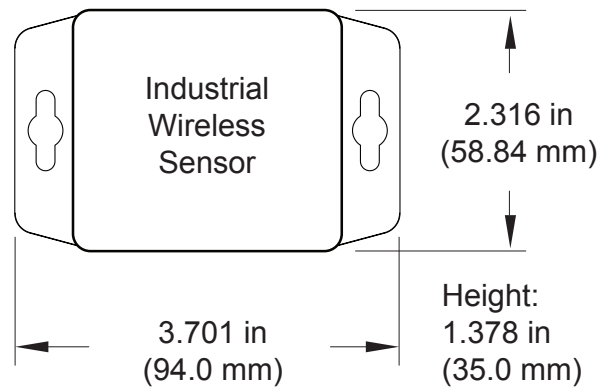
\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

### 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 un-interrupted 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.



### ioX Industrial Wireless AC Current Meter - Technical Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *	
Current Consumption	0.2 $\mu$ A (Sleep Mode) 0.7 $\mu$ A (RTC Sleep) 570 $\mu$ 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 ( -40°F to +185°F ) **	
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)
Integrated Memory	Up to 512 sensor messages	
Wireless Range	1,000+ ft. non-line-of-sight	
Security	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	   Industry Canada	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.

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

\*\*\* While the wire leads and thermistor have a water tight seal, the electronics housing (RF portion) is not sealed for wet environments or outdoor use. If needed, we recommend using ioX industrial water temperature sensors.

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

\* 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 ioX sensor.

## Commercial Grade Sensors:

ioX-Connect 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 burn-out. (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. 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 similar 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 Sensors - Type 1, 2, 4, 4X, 12 and 13 NEMA Rated Enclosure:

ioX's Industrial sensors are enclosed in reliable, weatherproof NEMA rated enclosures. The 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

For more information about our products or to place an order, please contact our sales department at [sales@iox-connect.com](mailto:sales@iox-connect.com)

Visit us on the web at [www.iox-connect.com](http://www.iox-connect.com)



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