



Wireless AC Current Meters

General Description

The 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 ICARE system. The ICARE 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
 - Medium Current: 0-150 amp
 - High Current: 0-500 amp
- Capable of generating watt hour or kilowatt hour readings using ICARE
- 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 ICARE every heartbeat or if the current goes outside of the aware thresholds set in ICARE. The sensor reports amp hours, max RMS current, min RMS current, and average RMS current. ICARE can also generate watt hour or kilowatt hour readings if a default RMS voltage is set in ICARE.

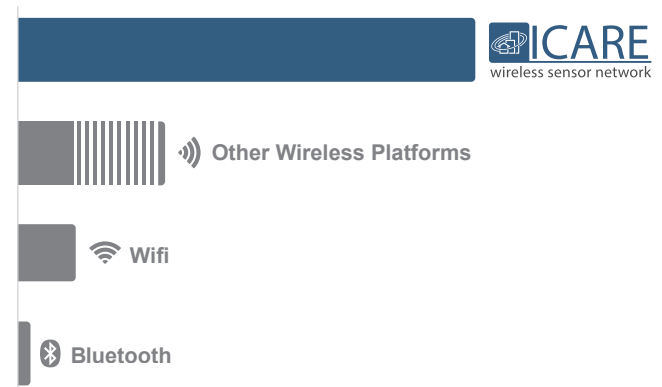
Example Interfacing

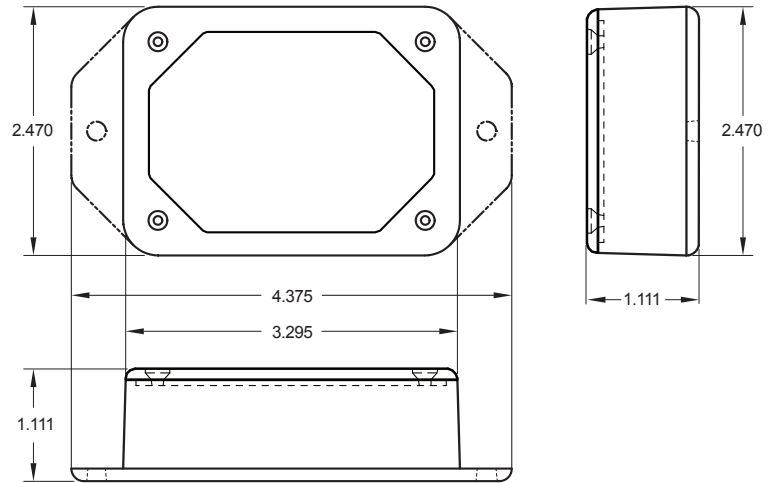
- Current monitoring
- Amperage monitoring
- Current usage
- Amp hour meter

Features of ICARE Sensors




- Wireless range of 1,200+ feet through 12+ walls *
 - Frequency-Hopping Spread Spectrum (FHSS)
 - Improved interference immunity
 - Improved power management for longer battery life ** (12+ years on AA batteries)
 - Security (Diffie-Hellman Key Exchange + AES-128 CBC for sensor data messages)
 - Onboard data memory stores up to 3200 readings per sensor:
 - 10-minute heartbeats = 22 days
 - 2-hour heartbeats = 266 days
 - Over-the-air updates (future proof)
 - 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 AA Wireless AC Current Meter | Technical Specifications

Supply voltage	2.0–3.6 VDC (3.0–3.6 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 (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)
Available Current Ratings	20-Amp, 150-Amp, 500-Amp (Specifications on page 4)
Integrated memory	Up to 3200 sensor messages
Wireless range	1,200+ ft non-line-of-sight
Security	256-bit key exchange and AES-128 CTR
Weight	3.7 ounces
Certifications	<div style="display: flex; align-items: center; gap: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> 900 MHz wireless product; FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1.

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

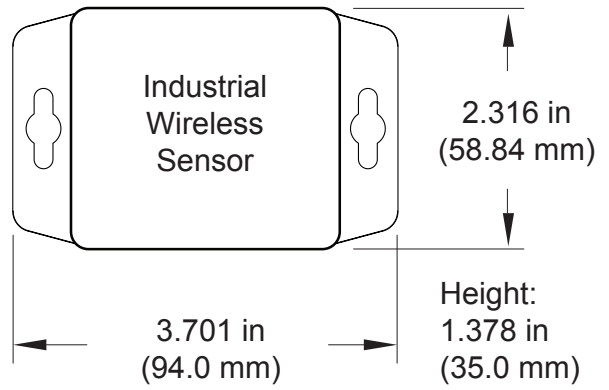
** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

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 AC Current Meter | Technical Specifications

Supply voltage	2.0–3.6 VDC (3.0–3.6 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 (-40°F to +185°F) **	
Included battery	Max temperature range	-40° to +85°C (-40° to +185°F)
	Capacity	1500 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)
	Solar efficiency	Optimized for high and low-light operation ***
	Charging efficiency	40% ***
	Luminous sustainability	Minimum of 250 LUX ***
Available Current Ratings	20-Amp, 150-Amp, 500-Amp (Specifications on page 4)	
Wireless range	1,200+ 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 wireless product; FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1.

* Circuits cannot withstand negative voltage. Please take care when installing batteries.

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

*** Solar feature's energy harvesting circuitry works indoors with low light. Light present 25% of day yields 125% of operating power to support 10-minute heartbeats.

0-20 Amp CT Specifications

Absolute max CT current	50 Amps RMS (Arms)
Maximum accurate CT current	20 A rms
Frequency range	50–100 Hz
Accuracy	+/- (2% +.07 A rms)*
Calibrated accuracy with appropriate offset	+/- (1% + .035 A rms)*
Offset limits	-1.27 to + 1.27 A rms (default set to +0.1 A rms) **
Measurement resolution	~.01 Arms
Typical Deadband	~0.1 A rms **
Current transducer dimensions	40 mm x 25 mm x 26 mm (10 mm inner diameter)
Weight	2.10 ounces (CT only)
Lead Length	3 feet

0-150 Amp CT Specifications

Absolute max CT current	200 Amps RMS (Arms)
Maximum accurate CT current	150 A rms
Frequency range	50–100 Hz
Accuracy	+/- (2% + .4 A rms) *
Calibrated accuracy with appropriate offset	+/- (1% + .2 A rms) *
Offset limits	-1.27 to + 1.27 A rms (default set to + 0.3 A rms) **
Measurement resolution	~0.1 A rms
Typical Deadband	~0.3 A rms **
Current transducer dimensions	67 mm x 49 mm x 42 mm (24 mm inner diameter)
Weight	7.27 ounces (CT only)
Lead Length	3 feet

0-500 Amp CT Specifications

Absolute max CT current	600 Amps RMS (Arms)
Maximum accurate CT current	500 A rms
Frequency range	50–100 Hz
Accuracy	+/- (2% + 1.4 A rms) *
Calibrated accuracy with appropriate offset	+/- (1% + .7 A rms) *
Offset limits	-327.68 to + 327.68 A rms (default set to + 1.45 A rms) **
Measurement resolution	~0.3 A rms
Typical Deadband	~1.45 A rms **
Current transducer dimensions	93 mm x 68 mm x 52 mm (36 mm inner diameter)
Weight	14.55 ounces (CT only)
Lead Length	3 feet

* 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.

** Because of a diode inherent to the hardware, the sensor is incapable of reading between 0 and the deadband value. This diode also creates an offset. To account for this, the firmware uses offset compensation

Commercial Grade Sensors

ICARE 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

ICARE'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 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 586-899-1150.

Visit us on the web at www.icaremonitoring.com.

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