ICARE
wireless sensor network

THREE PHASE
CURRENT METER

Industrial Wireless Three Phase Current Meters

General Description

The Industrial Wireless Three Phase Current Meter measures the RMS current of an alternating current (AC) system using 3 current transducers (CTs) that wrap around the wires of a three phase power system.

- Measures amp hours, max RMS current, min RMS current, average RMS current, and duty cycle for each phase and combined amp hours from all three phases
- 3 x current transducers
- Capable of generating watt hour or kilowatt hour readings using ICARE
- Data logging for accumulated amp hour readings
- Can notify based on amperage/power levels
- Simple and safe installation of measurement hardware, no rewiring required

Principle of Operation

To measure current, clip the CT around only a single wire of a powered 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 within one averaging interval if a threshold is crossed. The sensor reports average current, max RMS current, min RMS current, and duty cycle for each phase and amp hours for all three phases combined. These readings are based on all measurements taken between heartbeats. ICARE can also generate watt hour or kilowatt hour readings if a default RMS voltage is set in ICARE.

Example Applications

- Heavy Machinery
- Breaker Panels
- Conveyor System Motors
- Factory / Manufacturing Management

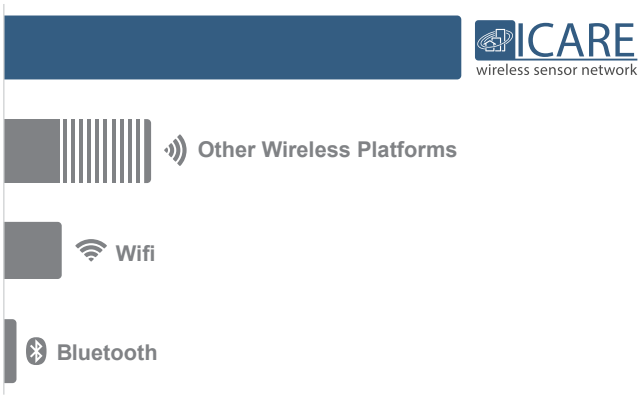
Features of ICARE Sensors

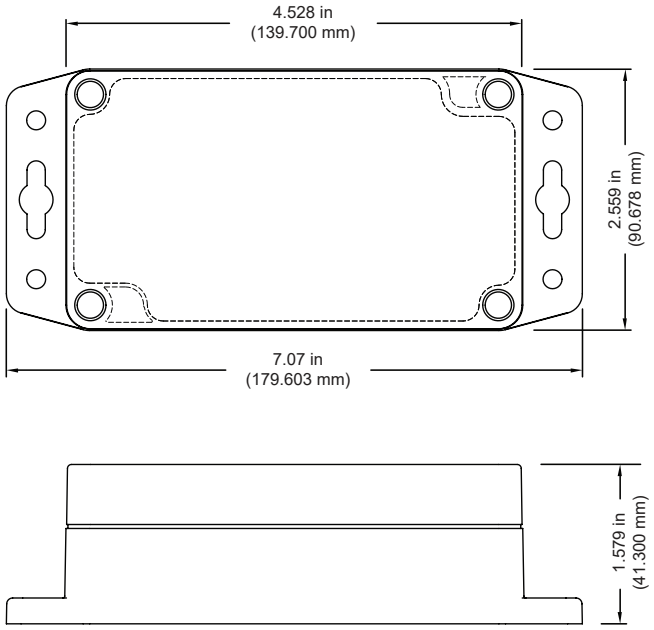
- Wireless range of 1,200+ feet through 12+ walls *
- Frequency-Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Improved power management for longer battery life ** (12+ years on AA batteries)
- Security (Diffie-Hellman Key Exchange + AES-128 CBC for sensor data messages)
- Onboard 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





Industrial Wireless Three Phase Current Meter | Technical Specifications		
Supply voltage		2.0–3.6 VDC (3.0–3.6 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 battery)		-40°C to +85°C (-40°F to +185°F) **
Included battery	Max temperature range	-40°C to +85°C (-40°F to +185°F)
	Capacity	1500 mAh
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		20 Amp Sensor: 13.20 oz. (374 g) 150 Amp Sensor: 28.90 oz. (819 g) 500 Amp Sensor: 51.60 oz. (1462 g)
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 FC Industry Canada		900 MHz wireless product; FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1.

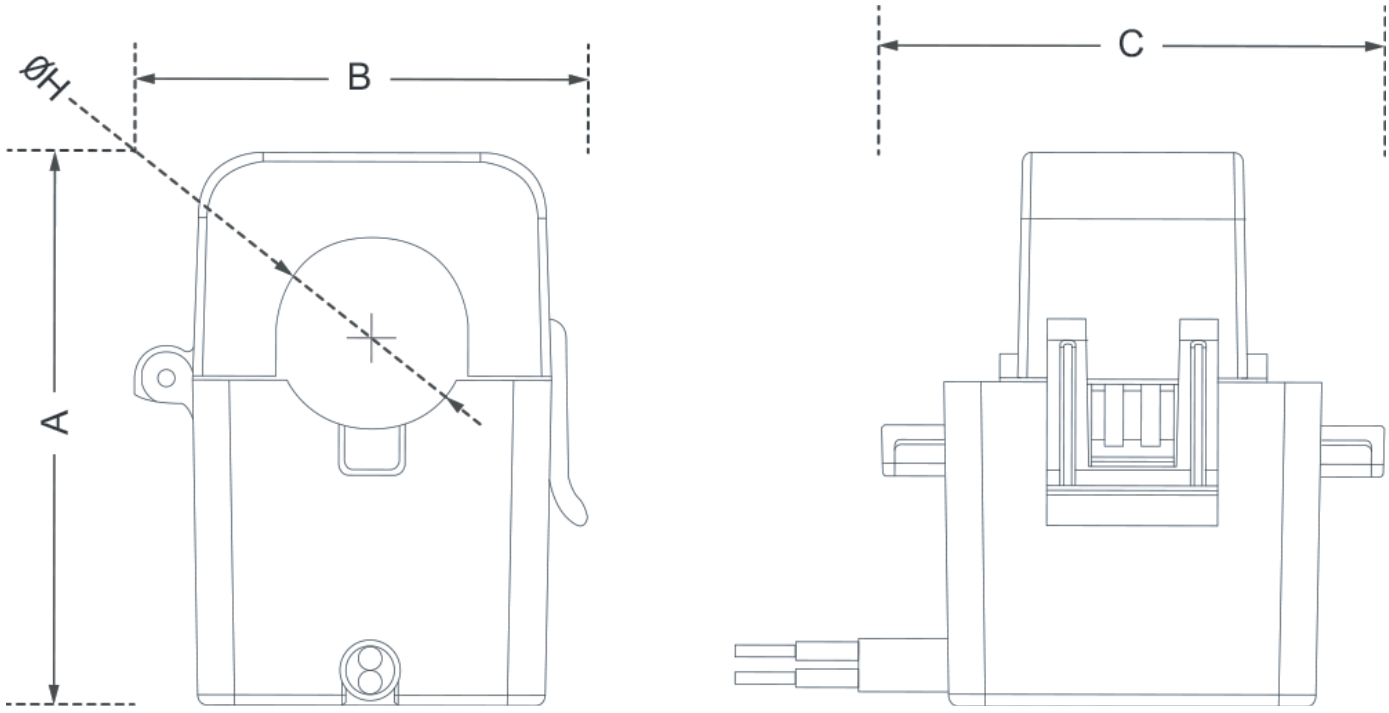
* Hardware cannot withstand negative voltage. Please take care when connecting a power device.
** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

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

Table 1. Current Transformer Specifications				
Dimensions	**A**	**B**	**C**	**ØH**
20 Amp CT	1.594” (40.5 mm)	1.059” (26.9 mm)	1.413” (35.9 mm)	0.393” (10 mm)
150 Amp CT	2.952” (75 mm)	2.169” (55.1 mm)	1.779” (45.2 mm)	0.944” (24 mm)
500 Amp CT	3.606” (91.6 mm)	2.685” (68.2 mm)	2.043” (51.9 mm)	1.417” (36 mm)



0-20 AMP Current Transformer Specifications	
Absolute max CT current	50 Amps RMS (A rms)
Maximum accurate CT current	20 A rms
Frequency range	50–100 Hz
Accuracy	+/- 2% @ 2 to 20 A rms, +/- 0.07 A rms @ < 2 A rms
Measurement resolution	~ 0.01 A rms
Response Time (90% Actual)	~ 3 Seconds
Typical Deadband	~ 0.07 A rms*
Lead Length	3 feet (91.4 cm)
Weight	2.10 oz (60 g) (CT only)
Current transducer dimensions	See Table 1

* Because of a diode inherent to the hardware, the sensor is incapable of reading between 0 and the deadband amperage for the specific CT. This diode also creates an offset, to account for this offset and deadband, the sensor adds an offset amperage to all readings above 0 Arms. So the sensor will go from0 to ~deadband amperage on the lowest end of the sensor measurement range.

0-150 AMP Current Transformer Specifications	
Absolute max CT current	200 Amps RMS (A rms)
Maximum accurate CT current	150 A rms
Frequency range	50–100 Hz
Accuracy	+/- 2% @ 2 to 150 A rms, +/- 0.4 A rms @ < 15 A rms
Measurement resolution	~ 0.1 A rms
Response Time (90% Actual)	~ 3 Seconds
Typical Deadband	~ 0.15 A rms*
Lead Length	3 feet (91.4 cm)
Weight	7.27 oz (206 g) (CT only)
Current transducer dimensions	See Table 1

0-500 AMP Current Transformer Specifications	
Absolute max CT current	600 Amps RMS (A rms)
Maximum accurate CT current	500 A rms
Frequency range	50–100 Hz
Accuracy	+/- (2% + 1.4 A rms)
Measurement resolution	~ 0.3 A rms
Response Time (90% Actual)	~ 3 Seconds
Typical Deadband	~ 0.64 A rms*
Lead Length	3 feet (91.4 cm)
Weight	14.55 oz (412 g) (CT only)
Current transducer dimensions	See Table 1

* Because of a diode inherent to the hardware, the sensor is incapable of reading between 0 and the deadband amperage for the specific CT. This diode also creates an offset, to account for this offset and deadband, the sensor adds an offset amperage to all readings above 0 Arms. So the sensor will go from0 to ~deadband amperage on the lowest end of the sensor measurement range.

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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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