

Wireless Thermocouple Sensors

General Description

The ioX Wireless Thermocouple Sensor is available with a hardwired thermocouple or K-type connector to support various thermocouple types and ranges. The hardwired thermocouple option measures temperatures up to 400°C (752°F).

- Hardwired version measures temperatures up to 400°C (752°F)
- Pigtail version supports standard K-type thermocouples

Principle of Operation

The ioX Wireless Thermocouple is available with either a hardwired thermocouple or a K-Type connector (for supporting various thermocouple types and ranges) to measure high temperature applications. It is programmed to sleep for a user-given time interval (heartbeat) and then wakeup, send power to the thermocouple and wait for it to stabilize, and convert the analog data, mathematically compute the temperature and transmit the data to the gateway. To stay within the abilities of the processor, the temperature is computed off a data table provided by the manufacture .

Example Applications

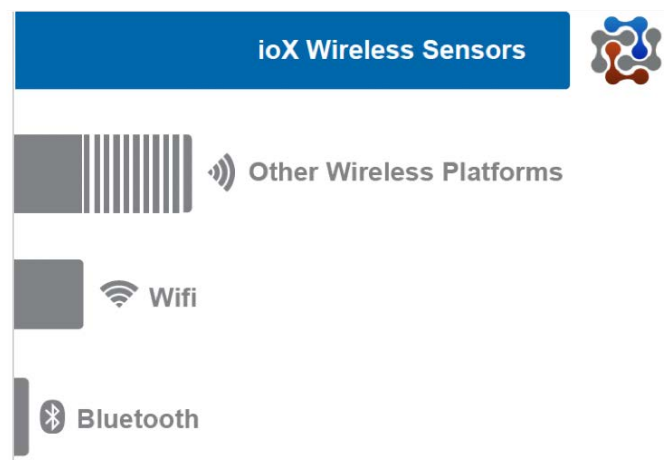
- Chimney/Flue Temperature Monitoring
- Kiln Temperature Monitoring
- High Temperature Food Monitoring
- Many additional applications

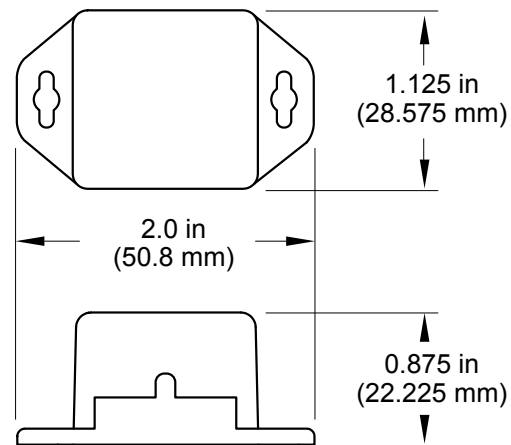
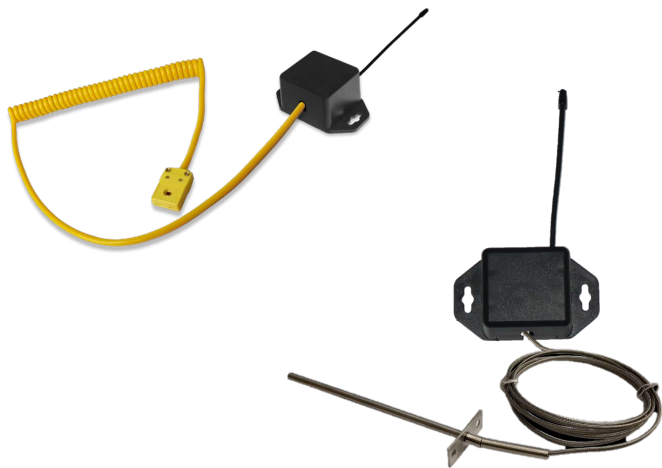
Features of ioX-Connect Sensors

- 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)
- All ioX sensors now have up to 3200 readings:
 - 10-minute heartbeats = 22 days
 - 2-hour heartbeats = 266 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





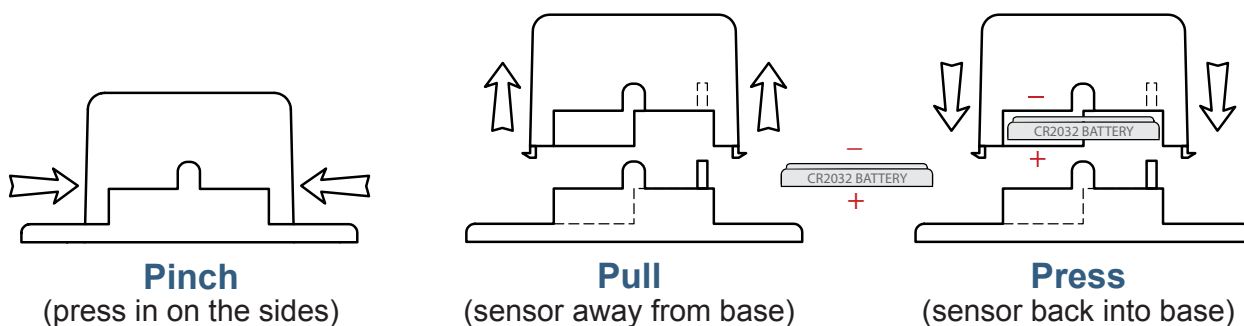
ioX Commercial Coin Cell Wireless Thermocouple Sensors | Technical Specifications

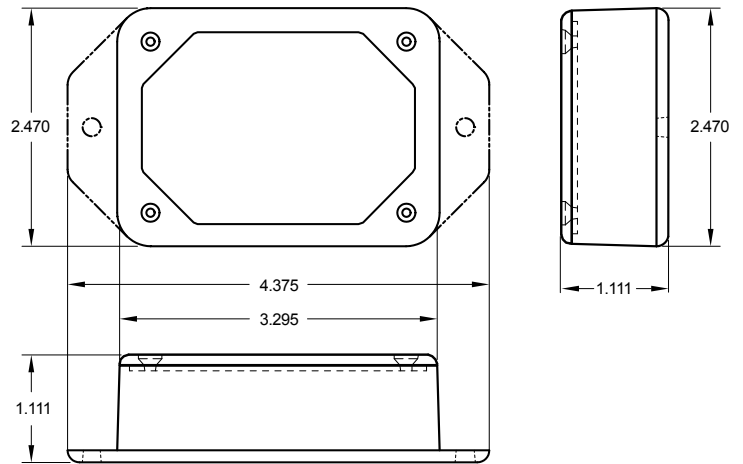
Supply voltage	2.0–3.8 VDC *
Current consumption	0.2 μ A (sleep mode), 0.7 μ A (RTC sleep), 570 μ A (MCU idle), 2.5 mA (MCU active), 5.5 mA (radio RX mode), 22.6 mA (radio TX mode)
Operating temperature range (board circuitry and coin cell)	-7°C to +60°C (20°F to +140°F) **
Optimal battery temperature range (coin cell)	+10°C to +50°C (+50°F to +122°F)
Thermocouple connection options	6 ft hardwired probe/5 ft K-type connector
Hardwired thermocouple probe: temperature range	-100°C to +400°C (-148°F to +752°F)
Hardwired thermocouple probe: accuracy above 0°C	+/- 2.2°C or 0.75% (whichever is greater)
Hardwired thermocouple probe: accuracy below 0°C	+/- 2.2°C or 2.0% (whichever is greater)
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	1.7 ounces
Certification	<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 10px;">  </div> <div style="text-align: center; margin-right: 10px;">  </div> <div style="text-align: center;"> Industry Canada </div> </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.



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

Upgraded Pinch Enclosures





ioX Commercial AA Wireless Thermocouple Sensors | 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 (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)
Thermocouple connection options	6 ft hardwired probe/5 ft K-type connector
Hardwired thermocouple probe—temperature range	-100°C to +400°C (-148°F to +752°F)
Hardwired thermocouple probe—accuracy above 0°C	+/- 2.2°C or 0.75% (whichever is greater)
Hardwired thermocouple probe—accuracy below 0°C	+/- 2.2°C or 2.0% (whichever is greater)
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	4.7 ounces
Certifications	<div>   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.

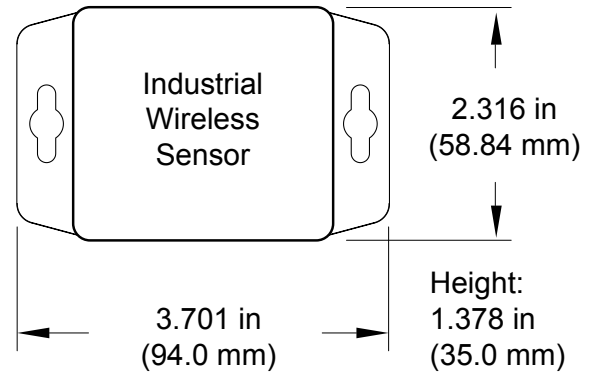
** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

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.



ioX Industrial Wireless Thermocouple Sensors | 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 (-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 efficient	Optimized for high and low-light operation ***
	Charging efficient	40% ****
	Luminous sustainability	250 LUX ****
Thermocouple connection options		6 ft hardwired probe/5 ft K-type connector
Hardwired thermocouple probe—temperature range		-100°C to +400°C (-148°F to +752°F)
Hardwired thermocouple probe—accuracy above 0°C		+/- 2.2°C or 0.75% (whichever is greater)
Hardwired thermocouple probe—accuracy below 0°C		+/- 2.2°C or 2.0% (whichever is greater)
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		5.7 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		<div>   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.

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

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

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

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 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 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-Connect'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 sales@iox-connect.com

Visit us on the web at www.iox-connect.com

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