



INCUE Differential Pressure Sensor

General Description

INCUE Wireless Differential Pressure Sensors measure the pressure difference between two input ports.

Key Features

- ▶ Measurement Range: -500 Pa to 500 Pa
- ▶ Accuracy: $\pm 3\%$ of reading ± 0.1 Pa
- ▶ Calibrated
- ▶ Temperature compensated
- ▶ Configurable thresholds for critical condition monitoring

Principles of Operation

The INCUE Wireless Differential Pressure Sensor measures the pressure difference between two input ports based on a user-configurable time interval or sample. When viewing the sensor from the top, the right inlet port is the positive or high-side pressure input. When the pressure on this port is greater than the pressure on the left port, the sensor produces a positive pressure reading. When the pressure is greater on the left port, the sensor produces a negative pressure reading. On each sample, the current measurement is sent to the gateway, making the data available in the INCUE platform.

Example Applications

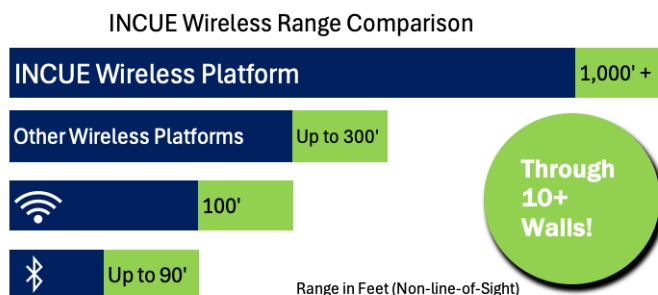
- Facility Humidity/Temperature Monitoring
- Infection Control Risk Assessment (ICRA)
- Healthcare Construction & Remediation
- Critical Area Monitoring
- Catheterization Labs
- Endoscopy Unit
- Operating Rooms
- Isolation Rooms
- Sterile Processing Department
- Supply Rooms
- Lab Monitoring
- Other Critical Area Monitoring

Features of INCUE Sensors

- Wireless range of 1,000+ feet through 10+ walls¹
- Frequency-Hopping Spread Spectrum (FHSS)
- Best-in-class interference immunity
- Best-in-class power management for longer battery life²
- Encrypt-RF® Security (Diffie-Hellman Key Exchange + Advanced Encryption Standard (AES)-128 Cipher Block Chaining (CBC) for sensor data messages)
- Sensor logs 2,000 to 4,000 readings if the gateway connection is lost (non-volatile flash, persists through power cycling):
 - 10-minute samples = ~ 22 days
 - 2-hour samples = ~ 266 days
- Automatic over-the-air updates to sensor firmware (future-proof)
- INCUE Monitoring and Notification System to configure sensors, view data, and send alerts via app, SMS text, and email.

¹ Actual range may vary depending on the environment and gateway.

² Battery life is determined by the sensor reporting frequency and other variables. Other power options are also available.

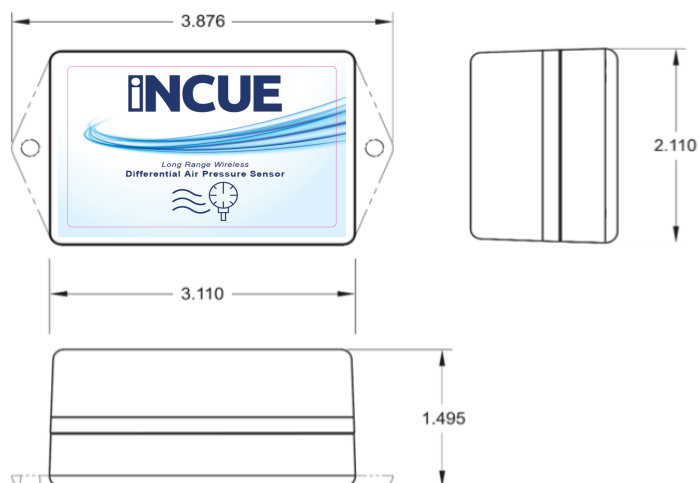


Technical Specification INCUE Wireless Differential Pressure Sensors

Differential Pressure Meter	Lead Tubing	3 ft. (91.5 cm.) 3/16" ID x 5/16" OD x 1/16" Wall Non-DEHP & phthalate-free PVC material
	Pressure range	-500 Pa to 500 Pa
	Allowable over-pressure	100 kPa
	Rated burst pressure	500 kPa
	Max humidity for long-term exposure	40° C (104° F) dew point
	Accuracy	3% of reading +/- 0.1 Pa
	Span repeatability	0.5% of reading
	Span shift due to temperature variation	< 0.5% of reading per 10° c (18° F)
	Offset stability	< 0.05 Pa/year
	Calibrated for	Air, N2
	Media compatibility	Air, N2, O2, non-condensing
	Temperature measurement range	-40° C to 85° C (-40° F to 185° F)
	Calibrated temperature measurement range	-20° C to 85° C (-4° F to 185° F)
	Temperature resolution	0.1° C (0.18° F)
	Temperature accuracy	+/- 2° C (-10° C to 60° C), +/- 3° C (40° C to 85° C) +/- 3.6° F (14° F to 140° F), +/- 5.4° F (-40° F to 185° F)
	Temperature repeatability	+/- 0.1° C (+/- 0.18° F)
INCUE Wireless	Data logging	Sensor logs 2,000 to 4,000 readings if gateway connection is lost (non-volatile flash, persists through power cycling): 10-minute samples = ~22 days - 2-hour samples = ~266 days
	Wireless protocol	Frequency-Hopping Spread Spectrum (FHSS)
	Wireless transmission power (EIRP)	50 mW (900MHz), 25 mW (868 MHz), 10 mW (433 MHz)
	Wireless range	1,000+ ft. through 10+ walls with the INCUE Gateway
	Security	Encrypt-RF® (256-bit key exchange and AES-128 CTR)
General	Battery voltage range	2.0 to 3.8 VDC
	Operating altitude (non-pressurized environments)	-15.2 to 1,982 m (-50 to 6,500 ft) ¹
	Storage altitude (non-pressurized environments)	-15.2 to 3,048 m (-50 to 10,000 ft) ¹
	Operating humidity	5 to 85% RH (non-condensing)
	Certifications	900 MHz sensors: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1 . 868 and 433 MHz sensors tested and comply with: EN 55032 : 2015/A11:2020; EN 55035 :2017/A11:2020; ETSI EN 300 220 V3.2.1 (2018-06); ETSI EN 301 489-3 V2.2.0. (2021-11); and ETSI EN 303 645 . All sensors tested and comply with: EN 61010-1 and EN 60950 and meet RoHS 2015/863 and REACH 224 (June 2022) according to IEC 63000:2016/AMD1 :2022.



1. Operating and storage altitude without DC power supply is -30.48 to 9,144 m (-100 to 30,000 ft).



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Battery ¹	2x 1.5V M Alkaline, 1500 mAh, (standard) 2x 1.5V M Lithium, 3000 mAh, (optional)
Battery Life	1+ years expected
External line-power option ²	Input voltage: 5.0-12.0 V Power jack: 2.1 x 5.5 mm barrel, center positive
Operating temperature range (non-leaded measurement range) ³	-18 °C to 55 °C (0 °F to 130 °F) - AA Alkaline Batteries -25 °C to 60 °C (-13 °F to 140 °F) - AA Lithium L91 Batteries 0 °C to 40 °C (32 °F to 104 °F) - US 5V Power Supply 10 °C to 40 °C (50 °F to 104 °F) - International 5V Power Supply
Wireless antenna type	1/4-wave, 20-gauge wire whip, 3.5" (900/868MHz), 7" (433MHz)
Weight	3.7 oz. (105 g)

1. Hardware cannot withstand negative voltage. Please take care when inserting and removing batteries.
2. Batteries will provide backup power in the case the external power is removed.
3. Operating below 0 °C (-32 °F) degrees will reduce battery life.

Commercial-Grade Sensors

INCUE 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 temperatures may cause deterioration of the characteristics or the material quality.