



Remote Monitoring for Business

ALTA® Wireless CO₂ - Carbon Dioxide Sensors

General Description

The [ALTA Wireless Carbon Dioxide Sensor](#) uses a low-power high-performance carbon dioxide (CO₂) sensing element to measure the amount of CO₂ in ambient air and report instantaneous and time-weighted average (TWA) readings.

Key Features

- ▶ Measurement Range: 0 to 10,000 ppm CO₂
- ▶ Resolution: 1 ppm
- ▶ Accuracy: +/- 45 ppm + 3% of reading
- ▶ Data:
 - ▶ Instantaneous CO₂
 - ▶ 8-hour time-weighted average (TWA) of CO₂
- ▶ Configurable thresholds for critical condition monitoring
- ▶ Configurable auto-calibration

Principles of Operation

The ALTA Wireless Carbon Dioxide Sensor measures the CO₂ level in the air using a non-dispersive infrared (NDIR) sensing element. The sensor reports data from the most recent measurement every user-configurable Heartbeat (report interval). This measurement is then sent to the gateway, making the data available in iMonnit or other approved data services.

The sensor also produces 8-hour TWA data by accumulating eight hours of instantaneous CO₂ readings and averaging them together.

Example Applications

- ▶ Indoor air quality
- ▶ [Greenhouses](#)
- ▶ Cellar and gas stores
- ▶ Marine vessels
- ▶ Modified atmospheres
- ▶ Landfill gas
- ▶ Confined spaces
- ▶ Cryogenics
- ▶ Ventilation management
- ▶ [Additional applications](#)

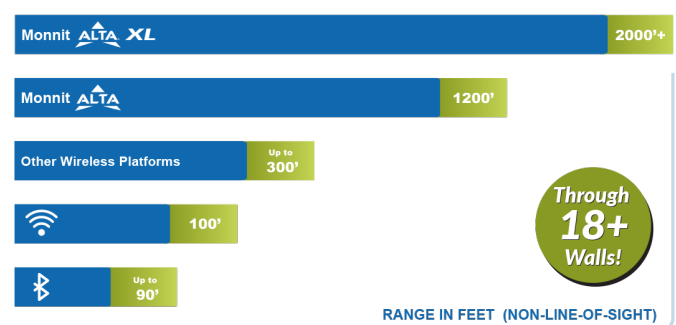
Features of Monnit ALTA Sensors

- Wireless range of 2,000+ feet through 18+ 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 2000 to 4000 readings if the gateway connection is lost (non-volatile flash, persists through power cycling):
 - 10-minute Heartbeats = ~ 22 days
 - 2-hour Heartbeats = ~ 266 days
- Automatic over-the-air updates to sensor firmware (future-proof)
- Free iMonnit Basic Online Wireless Sensor Monitoring and Notification System to configure sensors, view data, and send alerts via SMS text, email, and voice call

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.

Wireless Range Comparison



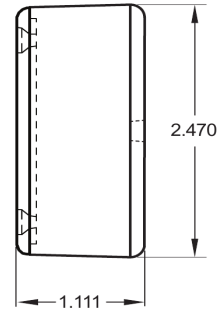
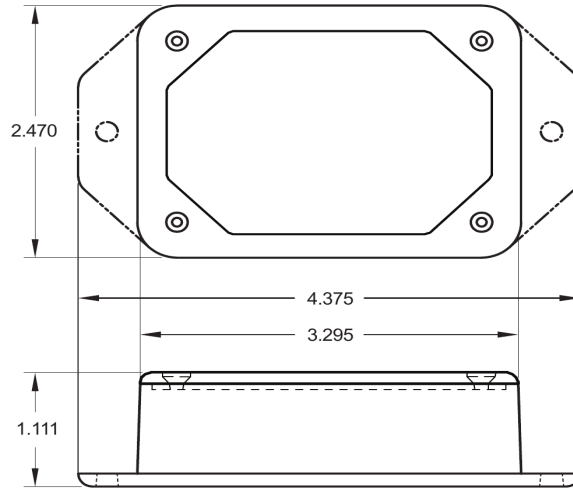
Technical Specification | ALTA® Wireless Carbon Dioxide Sensors

CO ₂ Measurement	Range (Instantaneous and TWA)	0 to 10000 ppm CO ₂
	Accuracy	+/- ((45 ppm + 3%) * (1 + .0013 * ΔP)) ¹
	Resolution	1 ppm ²
	Response time	3 minutes (63% of actual), 15 minutes (99.3% of actual)
	Repeatability	+/- ((45 ppm + 3%) * (1 + .0013 * ΔP)) ¹
	CO ₂ element operating temperature	0°C to 50°C (32°F to 122°F)
	CO ₂ element operating humidity	0 to 95% (non-condensing)
	CO ₂ element operating altitude	-1524 to 5547 m (-5000 to 18,200 ft) ²
	CO ₂ element storage temperature	-40°C to 70°C (-40°F to 158°F)
	CO ₂ element storage altitude	-5547 to 5547 m (-18200 to 18,200 ft) ²
	Pressure dependence	~0.14% of reading per mbar from sea level ²
	Calibration	Configurable auto-calibration ³
	Sample method	Diffusion
	Sensing method	Non-dispersive infrared (NDIR) absorption Gold-plated optics Solid-state source and detector
ALTA Wireless	Data logging	Sensor logs 2000 to 4000 readings if gateway connection is lost (non-volatile flash, persists through power cycling): 10-minute Heartbeats = ~22 days - 2-hour Heartbeats = ~266 days
	Wireless protocol	ALTA Proprietary Frequency-Hopping Spread Spectrum (FHSS)
	Wireless transmission power (EIRP)	50 mW (900MHz), 25 mW (868 MHz), 10 mW (433 MHz)
	Wireless range	2,000+ ft. through 18+ walls with the ALTA XL® 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) ⁴
	Storage altitude (non-pressurized environments)	-15.2 to 3,048 m (-50 to 10,000 ft) ⁴
	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. ΔP is in mbar and is the difference between atmospheric pressure at sea level (1013 mbar) and the pressure at the sensors altitude (Ex: 1013 mbar – ambient pressure in mbar).
2. The sensor has a user-configurable altitude calibration to compensate for atmospheric pressure levels other than sea level. As altitude is increased resolution increases and accuracy/repeatability decreases. As altitude is decreased the range may decrease but resolution, accuracy, and repeatability will improve.
3. For correct auto-calibration, the sensor must experience fresh air CO₂ levels (~400 ppm) for at least four hours per day. If the environment does not meet this criteria then disable the auto-calibration feature in settings.
4. Operating and storage altitude without DC power supply is -30.48 to 5547 m (-100 to 18200 ft).

The sensor reports CO₂ parts per million (ppm) and the 8-hour time-weighted average (TWA) of CO₂ in ppm.



Technical Specifications | ALTA® Enterprise

Battery	2x 1.5V AA Alkaline, 1500 mAh, (standard) 2x 1.5V AA Lithium, 3000 mAh, (optional)
Battery Life	10+ years expected
External line-power option ¹	Input voltage: 5.0-12.0 V Power jack: 2.1 x 5.5 mm barrel, center positive
Operating temperature range ²	0°C to 50°C (32°F to 122°F) - AA Alkaline Batteries 0°C to 50°C (32°F to 122°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	4.5 oz. (127 g)

1. Batteries will provide backup power in the case the external power is removed.
2. Operating below 0°C (-32°F) degrees will reduce battery life.