

Remote Monitoring for Business

ALTA® Wireless Carbon Monoxide Sensors

General Description

The [ALTA® Wireless Carbon Monoxide Sensor](#) measures the amount of Carbon Monoxide (CO) in the air.

Key Features

- ▶ Measurement Range: 0 to 1000 ppm
- ▶ Resolution: 1 ppm
- ▶ Accuracy: $\pm$ (5% of reading + 10 ppm)
- ▶ Response Time: 200 s (63% of actual)
- ▶ Configurable thresholds for critical condition monitoring

Principles of Operation

Carbon monoxide (CO) is a dangerous odorless gas that is produced when petroleum based fuels are burned. The ALTA Wireless Carbon Monoxide Sensor uses an ultra-low power electrochemical transducer to measure CO. The sensor measures the CO level in ambient air every five seconds and reports the most recent reading, along with temperature and the time-weighted average (TWA) of CO, on every user-configurable Heartbeat or when a threshold is breached.

The temperature measurement is used to compensate for temperature effects on the CO element. The sensor refreshes the TWA calculation every 15 minutes and if the sensor has been running for less than 7.5 hours, TWA will be calculated based on the total time running. For temperature measurements, the sensor momentarily energizes a thermistor in series with a precision resistor. This produces a voltage proportional to temperature that the sensor converts into a digital temperature value. This measurement is then sent to the gateway, making the data available in iMonnit or another approved data service.

Example Applications

- ▶ Air quality monitoring
- ▶ Monitoring for safety requirements
- ▶ Gas appliances
- ▶ Furnaces / boilers
- ▶ Space heaters
- ▶ Vehicles
- ▶ Water heaters
- ▶ [Additional applications](#)

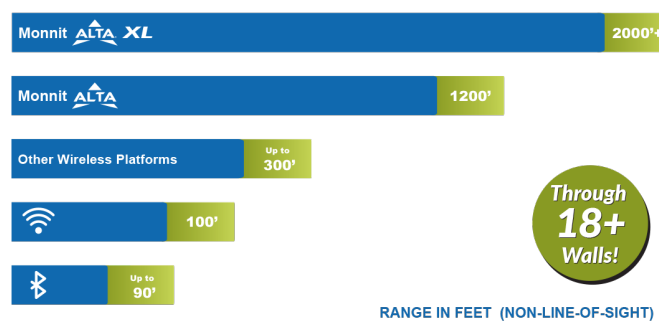
Features of Monnit ALTA Sensors

- 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 Monoxide (CO) Sensors

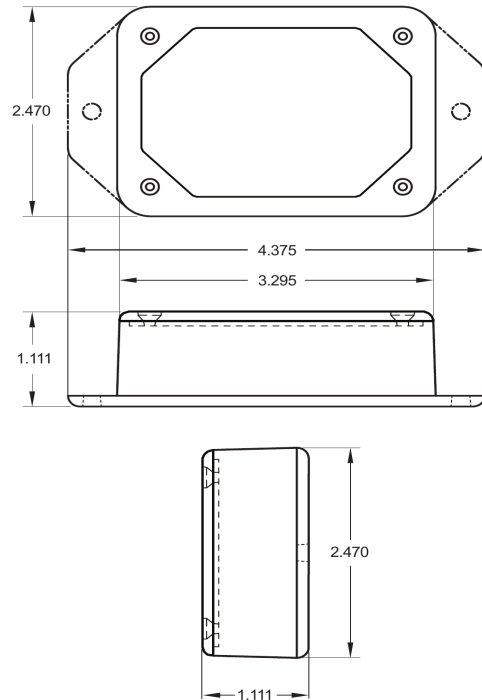
CO Measurement	Range (Instantaneous and TWA)	0 to 1000 ppm
	Resolution (Instantaneous and TWA)	1 ppm
	Accuracy (Instantaneous and TWA)	± (5% of reading + 10 ppm)
	Storage Temperature	5°C to 30°C ¹
	Storage Humidity	20 to 80% RH ^{1,3}
	Storage Pressure	0.8 to 1.2 atm. ¹
	Storage Time	< 12 months recommended ¹
	Operating Temperature (< 10 hours)	-40°C to 50°C (-40°F to 122°F)
	Operating Humidity (< 10 hours)	0 to 100% RH ³
	Operating Temperature (continuous)	-20°C to 40°C (-40°F to 122°F)
	Operating Humidity (continuous)	15 to 95% RH (non-condensing)
	Operating Pressure Range	0.8 to 1.2 Atm.
	Response time	~200 seconds (63% of actual), ~750 seconds (93.3% of actual)
	Measuring Principle	Electrochemical Oxidation of CO
	Element expected operating life	> 5 years (10 years @ 23 ± 3 °C; 40 ± 10% RH)
	Concentration overload	> 5000 ppm
	Stabilization after power up	Up to 48 hours
	Long Term Drift – Zero	Zero Signal ≤ ± 2 ppm / year
	Long Term Drift – Span	Output Signal ≤ ± 2% / year
Temperature Measurement	Range	** Limited to operational range of sensor body
	Accuracy	± 1°C (±1.8°F)
	Resolution	0.1°C (0.18°F)
	Response time	17 minutes (63% of Actual), 127 minutes (99.3% of Actual)
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)	-1524 to 1524 m (-5000 to 5000 ft) ²
	Storage altitude (non-pressurized environments)	-1524 to 1524 m (-5000 to 5000 ft) ²
	Operating humidity	15 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. Recommended storage conditions to reduce aging and drift. After storage the sensor may take up to 48 hours to fully stabilize.
2. Operating and storage altitude without DC power supply is -1524 to 1524 m (-5000 to 5000 ft).
3. Extended periods (>60 days) in <10% RH may permanently damage the sensor.

This sensor reports the following three values:

- Most recent CO measurement in parts per million (ppm)
- 7.5-hour time-weighted average (TWA) of CO parts per million (ppm)
- Most recent temperature measurement in °C



Technical Specifications | ALTA® Enterprise

Battery ¹	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 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 50°C (0°F to 122°F) - AA Alkaline Batteries -25°C to 50°C (-13°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) MHz))
Weight	4.0 oz. (113 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.

CROSS SENSITIVITY

Most chemical sensors exhibit some cross-sensitivity to other gases. The following table lists the relative response of common potential interfering gases, and the concentration at which the data was gathered.

Gas/Vapor	Concentration	Typical Response PPM CO
Carbon Dioxide	5,000 ppm	< 1
Hydrogen	100 ppm	17
Methane	3,000 ppm	< 1
Ammonia	100 ppm	< 1
Nitrogen Dioxide	10 ppm	< 1
Hydrogen Sulfide	25 ppm	< 1
Carbon Monoxide	400 ppm	400
Ozone	5 ppm	< 1
Sulfur Dioxide	20 ppm	< 1
Chlorine	10 ppm	< 1
n-Heptane	500 ppm	< 1
Toluene	200 ppm	< 1
Isopropyl Alcohol	200 ppm	1.3
Acetone	200 ppm	< 1

Commercial-Grade Sensors

Monnit 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.