![ALTA by MONNIT logo]

Remote Monitoring for Business

ALTA® Wireless Hydrogen Sulfide Sensor

General Description

The ALTA® Wireless Hydrogen Sulfide Sensor measures Hydrogen Sulfide (H_2S) before it becomes a more serious hazard.

Key Features

▸ Measures both instantaneous and time-weighted average (TWA) of H_2S gas levels, temperature compensated
▸ Measurement Range: 0 to 50 ppm
▸ Resolution: 0.1 ppm
▸ Accuracy: ± (5% of reading + 2 ppm)
▸ Response Time: 200 s (63% of actual)
▸ Configurable thresholds for critical condition monitoring

Principles of Operation

Hydrogen Sulfide (H_2S) is a dangerous, pungent gas that is often present in petroleum drilling operations or related to sewage (swamp gas). The ALTA Wireless H_2S Sensor utilizes an ultralow power, electrochemical transducer to measure H_2S. The sensor measures the H_2S level in ambient air every five seconds and reports the most recent reading, along with temperature and TWA of H_2S, on every user-configurable Heartbeat or when a threshold is breached. The temperature measurement is used to compensate for temperature effects on the H_2S element.

The sensor refreshes the TWA calculation every 15 minutes. If the sensor has been running for less than 7.5 hours, TWA will be calculated based on total time running. For temperature measurements, the sensor momentarily energizes a thermistor in series with a precision resistor. This produces a voltage proportional to the 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

▸ Crude oil production
▸ Natural gas production
▸ Waste water treatment
▸ Utility facilities
▸ Sewer / sewage monitoring (swamp gas)
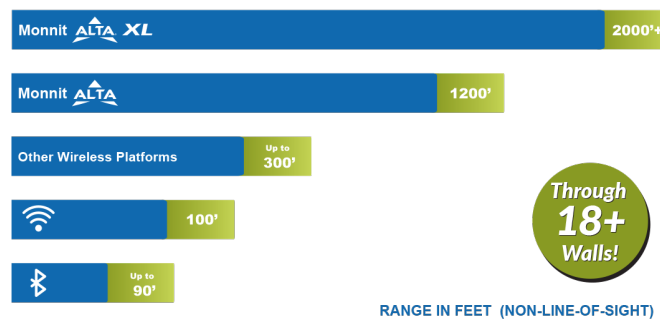▸ Additional applications

Features of Monnit ALTA Sensors

• Wireless range of 2,000+ feet through 18+ walls[1]
• Frequency-Hopping Spread Spectrum (FHSS)
• Best-in-class interference immunity
• Best-in-class power management for longer battery life[2]
• 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

Monnit ALTA XL	2000'+
Monnit ALTA	1200'
Other Wireless Platforms	Up to 300'
(WiFi)	100'
(Bluetooth)	Up to 90'

Through 18+ Walls!

RANGE IN FEET (NON-LINE-OF-SIGHT)

Technical Specification	ALTA® Wireless Hydrogen Sulfide (H₂S) Sensors	

	Range (Instantaneous and TWA)	0 to 50 ppm
H$_2$S Measurement	Resolution (Instantaneous and TWA)	0.1 ppm
	Accuracy (Instantaneous and TWA)	± (5% of reading + 2 ppm)
	Storage Temperature	5°C to 30°C[1]
	Storage Humidity	20 to 80 % RH[1,2]
	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 [2]
	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 reaction of H$_2$S
	Element expected operating life	> 5 years (10 years @ 23 ± 3 °C; 40 ± 10% RH)
	Concentration overload	> 5000 ppm
	Stabilization after power up	Up to 24 hours
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)	-15.2 to 1,982 m (-50 to 6,500 ft)[3]
	Storage altitude (non-pressurized environments)	-15.2 to 3,048 m (-50 to 10,000 ft)[3]
	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 24 hours to fully stabilize.
2. Extended periods (>60 days) in <10% RH may permanently damage the sensor.
3. Operating and storage altitude without DC power supply is -30.48 to 5547 m (-100 to 18200 ft).

This sensor reports the following three values:

- Most recent H_2S measurement in parts per million (ppm)
- 7.5-hour time-weighted average (TWA) of H_2S parts per million (ppm)
- Most recent temperature measurement in °C
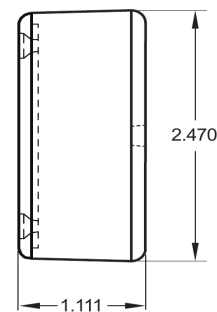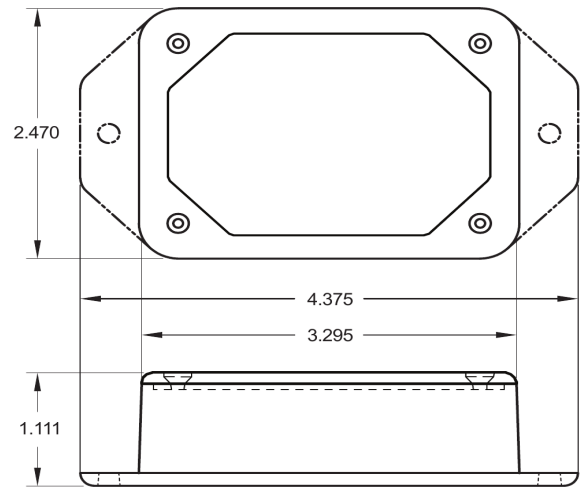
Technical Specifications | ALTA® Enterprise	
Battery[1]	2x 1.5V AA Alkaline, 1500 mAh, (standard) 2x 1.5V AA Lithium, 3000 mAh, (optional)
Battery Life	10+ years expected
External line-power option[2]	Input voltage: 5.0-12.0 V Power jack: 2.1 x 5.5 mm barrel, center positive
Operating temperature range (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	Applied Concentration (PPM)	Typical Response (PPM H2S)
Hydrogen Sulfide	25	25
Chlorine	10	-2.2
Nitrogen Dioxide	10	-2.0
Sulfur Dioxide	20	1.7
Nitric Oxide	50	1.2
Carbon Monoxide	400	1.1
Ozone	5	-0.9
Methane	500	0.1
Ammonia	100	0.1
n-Heptane	500	< 0.05

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.