



ALTA® Wireless Accelerometer - Tilt Detection Sensor

General Description

[ALTA® Wireless Accelerometer - Tilt Detection Sensor](#) is a micro-electromechanical systems (MEMS) sensor that continuously measures changes in tilt on a single axis of rotation.

Key Features

- ▶ Two modes of operation
 - ▶ Up/Down detection mode: Up, down, stuck
 - ▶ Delta detection mode: Report on change
- ▶ Axis of rotation is user-selectable
- ▶ Measurement:
 - ▶ Range: -179.9° to +180.0°
 - ▶ Resolution: 0.01°
 - ▶ Accuracy: +/- 0.5°
- ▶ Configurable thresholds for critical condition monitoring

Principles of Operation

The ALTA Wireless Accelerometer - Tilt Detect Sensor continuously monitors a single axis of rotation specified by the user. The sensor has two modes of operation. In Up/Down mode the sensor is triggered when its pitch changes between user configurable angles defined as Up, Down, and Stuck. In Delta mode the sensor is triggered when the absolute difference between the current sensor angle and the last reported angle exceeds a user-defined Delta Value. On a user-configurable time interval or Heartbeat, or when the sensor is triggered, the current measurement is then sent to the gateway, making the data available in iMonnit or another approved data service.

Example Applications

- ▶ Inclination monitoring
- ▶ Bay doors
- ▶ Loading gates
- ▶ Overhead doors
- ▶ [Additional applications](#)

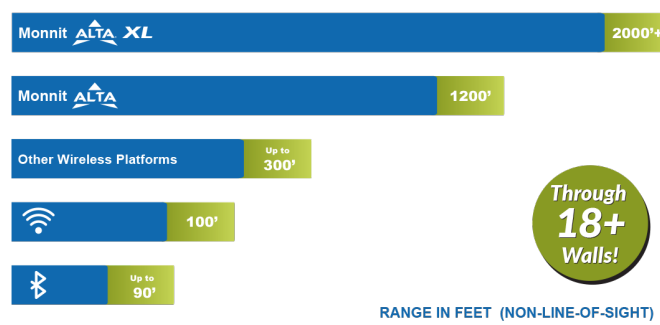
Features of Monnit ALTA Sensors

- 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.

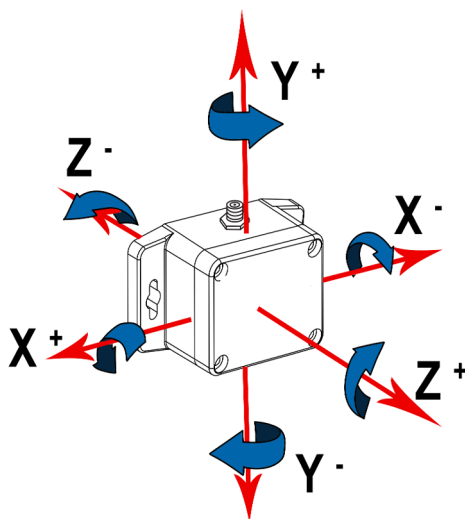
Wireless Range Comparison



Technical Specification | ALTA® Wireless Tilt Detection Sensors

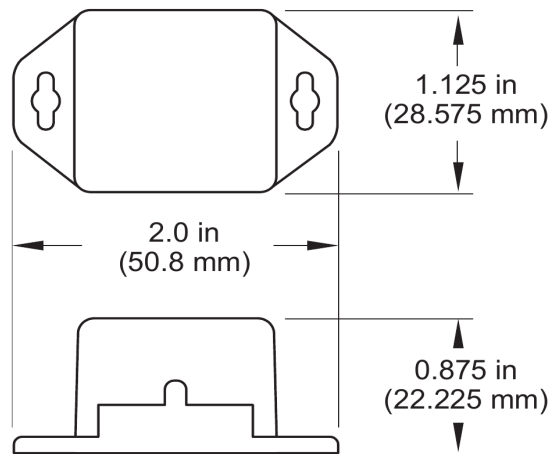
Tilt Sensor	Tilt Measurement Range	0.00° to 180.00° ► -179.99° to -0.01° (Rotating in positive direction)
	Tilt Measurement Accuracy	+/- 0.5°
	Tilt Measurement Resolution	0.01°
	Rise/Fall Time Range ¹	0 to 65535 ms
	Rise/Fall Time Accuracy ¹	+80 ms + Measurement Stability Configuration (80 ms)
	Rise/Fall Time Resolution ¹	~80 ms
	Data States	Up/Down Mode: Up, Down, Stuck
	Response Time	Up and Down: Determined by Measurement Stability setting Stuck: Determined by Stuck Time Out setting Delta Exceeded: 80 ms + Rearm Time after Previous Delta
	Axis of Rotation	User Configurable: See diagram. Blue arrows indicate direction of increasing tilt angle (0° to 180° ► -179.9° to -0.01°).
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) ²
	Storage altitude (non-pressurized environments)	-15.2 to 3,048 m (-50 to 10,000 ft) ²
	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. Only applicable in Up/Down mode, this value doesn't mean anything in Delta mode.
2. Operating and storage altitude without DC power supply is -30.48 to 9144 m (-100 to 30000 ft).

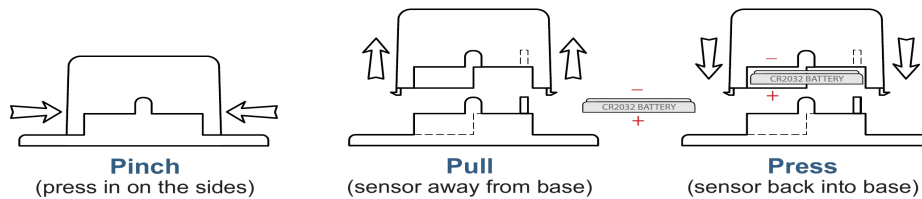


This sensor reports the following values:

Name	Description
Pitch	The angle of the sensor on the user-specified axis (X,Y, or Z)
Rise/Fall Time	The time the sensor took to Rise/Fall in milliseconds
Data State	Up/Down Mode: Reports if data is in an Up, Down, or Stuck state based on user-configurable angles Delta Mode: Reports if the sensor moved beyond the configured Delta angle

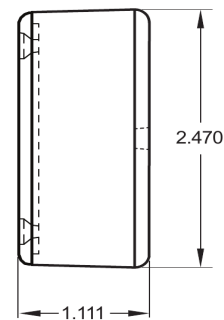
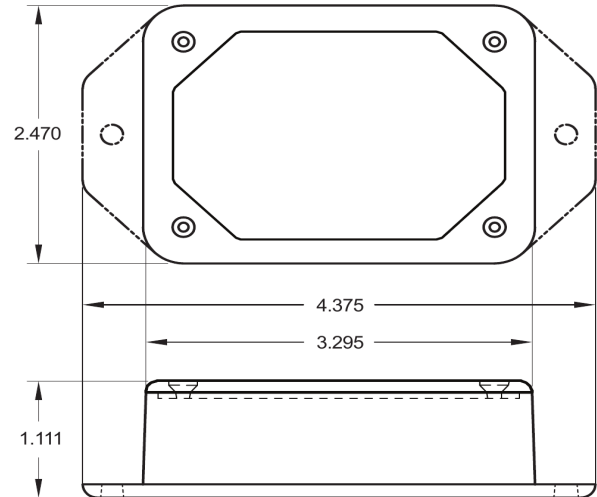


PinchPower™ Enclosures



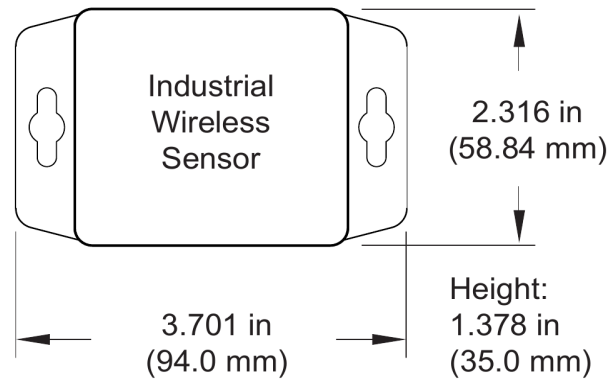
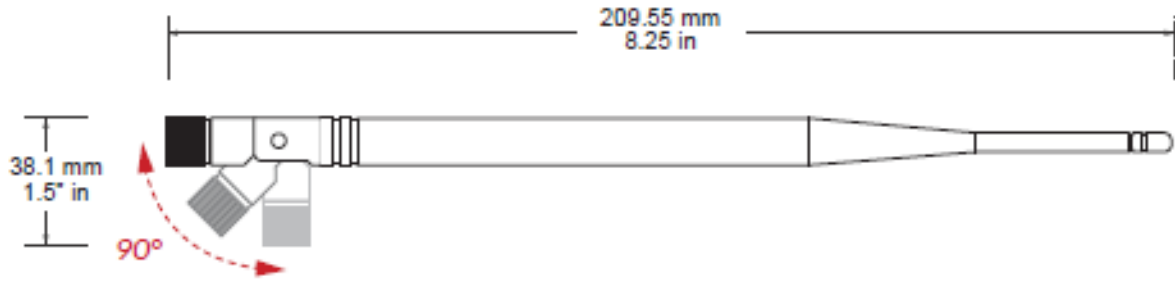
Technical Specifications ALTA® Commercial	
Battery ¹	1x 3.0V CR2032 Button Cell, 100 mAh
Battery Life	2+ years expected
Operating temperature range	10°C to 50°C (50°F to 122°F)
Wireless antenna type	1/4-wave, 20 gauge wire whip, 3.5" (900/868MHz), 7" (433MHz)
Weight	0.7 oz. (19.84 g)

1. Hardware cannot withstand negative voltage. Please take care when inserting and removing battery.



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 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) with 0.9 m (3.0') lead

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.



Technical Specifications ALTA® Industrial	
Battery	1x 3.6V AA Lithium Thionyl Chloride, 1500mAh, pre-installed
Battery Life	10+ years expected
Operating temperature range ¹	-40°C to 85°C (-40°F to 185°F)
Wireless antenna type	1/2-wave waterproof dipole with RP-SMA connector and swivel neck; dBi of 3.0 (900/868MHz) or 2.5 (433 MHz); length of 8.27" (210mm) (900/868MHz) or 7.68" (195mm) (433 MHz); diameter at thickest point of 0.55" (14mm)
Weight	4.7 oz. (133 g)
Enclosure rating	IP-65 (dust-proof and waterproof but not submersible) NEMA 1, 2, 4, 4x, 12, and 13 rated, sealed, and weatherproof UL Listed to UL508-4x specifications (File E194432)

1. Operating below 0°C (-32°F) degrees will reduce battery life.

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.

Industrial-Grade Sensors | Type 1, 2, 4, 4X, 12, and 13 NEMA-Rated Enclosure

Monnit'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 and the damaging effects of 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



Monnit Corporation

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