

# Monnit Industrial Wireless Accelerometers

## Technical Overview

### General Description

Monnit's Industrial Wireless Accelerometer is a digital, low power, low profile, capacitive sensor that is able to measure acceleration on three axes. Four different accelerometer types are available from Monnit.

### Features and Principles of Operation

**Tilt** - Accelerometer activates at a set time interval (defined by user) and converts accelerometer measurements to pitch and roll (0 to 180° -> -180° to 0°). The data is displayed in degrees with 0.1° of resolution.

*Example: Pitch: 1.6 Roll: -0.1*

**Snapshot** - Accelerometer activates at a set time interval (defined by user) and measures g-force along X, Y and Z axes. Primary use is as an inclinometer or tilt sensor. There are three operating modes,  $\pm 2$  G,  $\pm 4$  G, or  $\pm 8$  G. The data is displayed as g-force on each axis.

*Example: X: 0.001 Y: 0.031 Z: 1.01*

**Motion Over Time** - Accelerometer samples at 800 Hz over a 10 second period, and reports the measured MAXIMUM value for each axis in g-force and the AVERAGE measured g-force on each axis over the same period, for all three axes. (Only available in the AA version.) This sensor reports in every 10 seconds with this data. Other sampling periods can be configured, down to one second and up to 10 minutes\*. The data reported is useful for tracking periodic motion. Sensor data is displayed as Max and average.

*Example: Max X: 0.125 Max Y: 1.012 Max Z: 0.015  
Avg X: 0.119 Avg Y: 1.005 Avg Z: 0.007*

\* Customer cannot configure sampling period on their own. Contact Monnit to reset the period to be monitored.

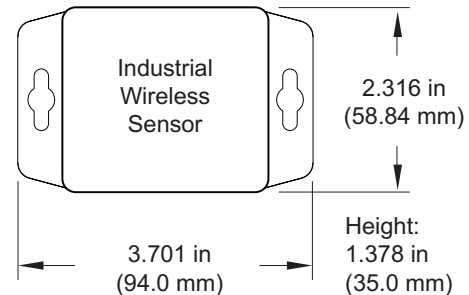
**Impact** - Accelerometer activates when g-forces are exceeded by a user defined threshold – up to 8 g-force. The user can key in the desired threshold for the g-force trigger. This sensor has two operation modes that can be also selected by the user: High Performance and Low Power. High Performance has an output data rate of 800 Hz with the High Pass Filter cutoff at 16 Hz while the Low Power has an output data rate of 12.5 Hz with the High Pass Filter cutoff at 0.25 Hz. The data is displayed as "Force Detected" or "No Force Detected".

### Monnit Industrial Sensor Electronics Specifications

- Power: replaceable 3.6V battery (included)
- Communication: RF 900, 920, 868 and 433 MHz
- Dimensions: 3.7" x 2.23" x 1.38"
- Antenna: 3dBi RP SMA antenna
- Operating Temperature: -40° to 85°C (-40° to 185°F)
- Transmission Range: 300 - 350 ft. non-line-of-sight\*
- Battery Life: at 1 hour heartbeat setting, battery will last ~ 4-5 years.\*\*

\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.



### Applications


- Inclination & Vibration Testing
- Assembly Line Monitoring
- Smart Machines, Smart Structures, & Smart Materials
- Orientation Sensing
- Impact Load Sensing

### Solar Power Option

Monnit Industrial Sensors are powered by a replaceable 3.6 V battery (included).

An optional solar powered version is also available. The solar powered sensor uses a Lithium Iron Phosphate rechargeable battery in conjunction with a solar power cell, extending the life of the battery.



Technical Specifications	
Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Optimal Battery Temperature Range (Battery)	+10°C to +60°C ( +50°F to +140°F )
Sensitivity	4096 count/g
Sensitivity Range Selections	+/-2 G, +/-4 G, +/-8 G
Measurement Accuracy	$\pm$ 2.5 %
Minimum G Force to Turn On/Wake Up	0.050 g - 0.100 g
Fastest Update Interval/Heart Rate in Any Configuration	Heartbeat: 1 Minute
Bandwidth for Data Measurement	800 Hz
Measurement Range (Profile 4 Tilt Only)	0° to 180° ► -180° to -0° (Rotating in positive direction)
Measurement Resolution (Profile 4 Tilt Only)	0.1°
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
Certifications	 900 MHz product; FCC ID: ZTL- RFSC1 and IC: 9794A-RFSC1. 920 MHz product; ARIB STD-T108 R210-103733. 868 and 433 MHz product tested and found to comply with: CISPR 22:2008-09 / EN 55022:2010 - Class B and ETSI EN 300 220-2 V2.4.1 (2012-05).

\* Hardware cannot withstand negative voltage. Please take care when connecting a power device.

\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

High Performance / Low Power Comparison		
	High Performance	Low Power
Output Data Rate	800 Hz	12.5 Hz
Noise	Normal	Normal
Oversampling Mode	Low Power	Low Power
High Pass Filter	ON	ON
Dynamic Range	$\pm$ 8 G	$\pm$ 8 G
High Pass Filter Cutoff	16 Hz	0.25 Hz
Transient Detection	X,Y, & Z axis detection	X,Y, & Z axis detection
Dynamic Transient Threshold	User Set, 0.063 G – 8.0 G	User Set, 0.063 G – 8.0 G
Dynamic Transient Debounce Count	0	0

### 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 as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).

