HALO HVAC

Remote Wireless Monitoring

Halo Wireless Motion+ Sensor: Motion, Temperature, and Humidity

General Description

The Halo Wireless Motion+ Sensor detects movements made by people and animals within a range and measures ambient temperature and relative humidity (RH).

Key Features

- Accurately detects occupancy and movement
- Software adjustable range (9-ft / 12-ft / 15-ft)
- Standard and wide-angle lens options (80° / 110°)
- Operating Temperatures: Limited to the operational range of the sensor body (enclosure and battery)
- High-accuracy humidity and temperature measurements

Principles of Operation

The Halo Wireless Motion+ Sensor detects motion, temperature and relative humidity, based on a user-configurable time interval or Heartbeat. Using a passive infrared (PIR) motion sensing element, the sensor detects relative changes in temperature caused by warm bodies moving through the sensing area. The Motion+ Sensor is also equipped with a high-accuracy RH/temperature sensing element. Once the sensor detects movement, or if a RH/temperature threshold is crossed, it communicates to a gateway. The gateway will immediately attempt to securely send the message to Halo, or another approved data service.

Example Applications

- Full-featured room/area monitoring
- Hospital rooms
- Senior care monitoring
- Pet care monitoring
- Animal welfare monitoring
- Data centers
- Manufacturing
- Art galleries
- Greenhouses and grow houses
- Life science labs

Features of Halo Sensors

- Wireless range of 2,000+ feet through 18+ walls*
- Frequency-Hopping Spread Spectrum (FHSS)
- Best-in-class interference immunity
- Best-in-class power management for longer battery life**
- 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 Basic Online Wireless Sensor Monitoring and Notification System to configure sensors, view data, and send alerts via SMS text, email, and voice call

**Actual range may vary depending on the environment and gateway.*
***Battery life is determined by the sensor reporting frequency and other variables. Other power options are also available.*

Technical Specification – Halo Wireless Motion Detector Sensor		
Motion Detection	Motion Sensing Technology	Quad Array Passive Infrared (PIR) Sensing Element
	Typical Response Time	1 to 3 Seconds*
	Operating /Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Lens	Viewing Angle	80°**
	Max Range	5m (15 ft)**
	Configurable Range	Software Configurable: 3 / 4 / 5 meter (or 9 / 12 / 15 feet)
Temperature	Accuracy	+/- 0.3°C***
	Range	Limited to operational range of sensor body
	Resolution	0.01°C
	Response time	100 minutes (20 minute time constant)****
	Repeatability	+/- 0.15°C
	Long-term drift	<0.03 °C/yr
Relative Humidity	Accuracy	+/- 2%***
	Range	0- 100%
	Resolution	0- 100%
	Response time	6+ hours (75 minute time constant)****
	Repeatability	+/- 0.21%
	Long-term Drift	0.5 %RH/yr*****
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	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 Halo Gateway
	Security	Encrypt-RF ® (256-bit key exchange and AES-128 CTR)
General	Battery Voltage Range	2.0 to 3.8 VDC
	Operating Altitude	-15.2 to 1,982 m (-50 to 6,500 ft) ******
	Storage Altitude	-15.2 to 3,048 m (-50 to 10,000 ft) ******
	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

**The motion response time may be enlongated by up to three seconds after a radio transmission. The sensor is most responsive when used with less frequent heartbeats. Sensor heartbeats of 10 seconds or greater is recommended.*

***The maximum range is greatest when the target is centered on the sensor. As the target moves farther from the center of the sensor in any direction, the range reduces gradually (Ex: On standard lens, 5-meter range when centered on sensor, 3-meter on edge of widest detection angle). Also, the range assumes a 5' 8", 170-lb person moving across the sensor face from left to right wearing pants and a t-shirt. If the target is fully covered with insulating material or moving toward (not across) the sensor face the actual detection range may be reduced.*

****Refer to element specific figures in this data sheet for more information on accuracy variations.*

*****Temperature and humidity response time is best case in ideal conditions and is very dependent upon temperature and humidity exchange between the sensor and environment. In a stagnant air environment, it may take longer for the air in the sensor to exchange with the environment and the temperature response will generally be slower than ideal since the sensors board and batteries act as a temperature well slowing down how quickly the sensing element responds to environmental changes.*

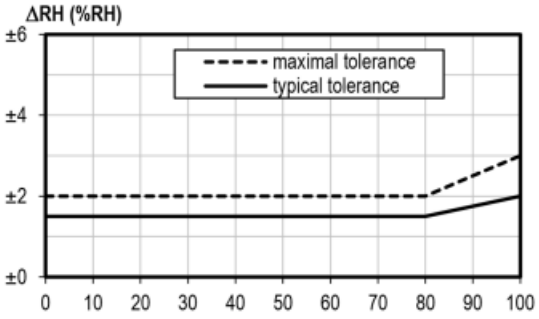
******Maximum value is < 0.5 %RH/yr. Higher drift values might occur due to contaminant environments with vaporized solvents, out-gassing tapes, adhesives, packaging materials, etc. For more details please refer to Humidity Sensor handling instructions. Do not clean with or expose sensor to alcohol-based cleaners or solutions.*

*******Operating and storage altitude without DC power supply is -30.48 to 9144 m (-100 to 30000 ft).*

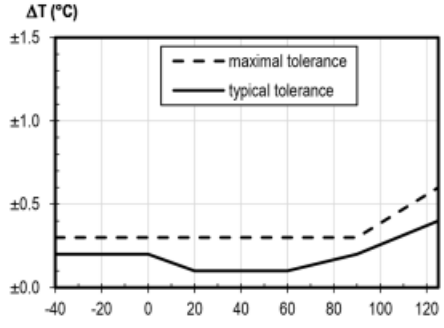
This sensor reports the following three values:

- Motion or no motion
- Temperature in °C or °F
- % Relative Humidity (RH)

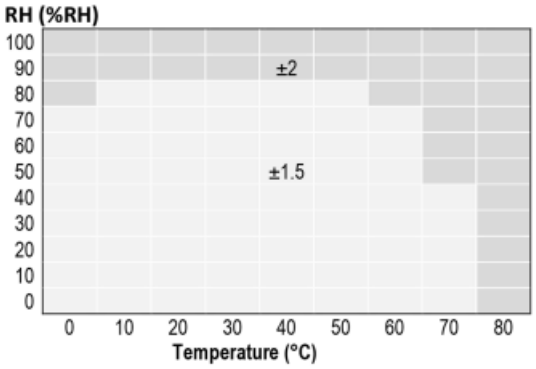
Sensor Accuracy:



Tolerance of RH at 25°C

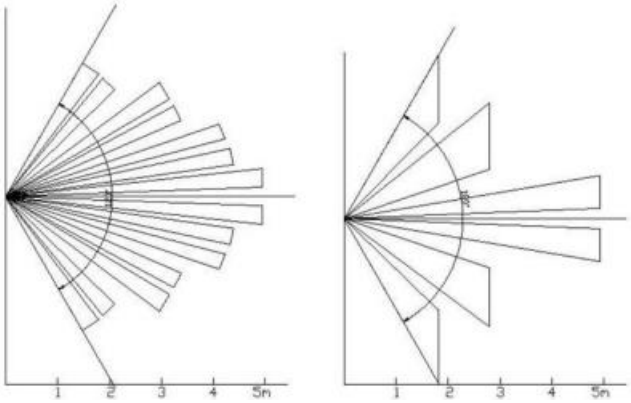


Temperature Accuracy



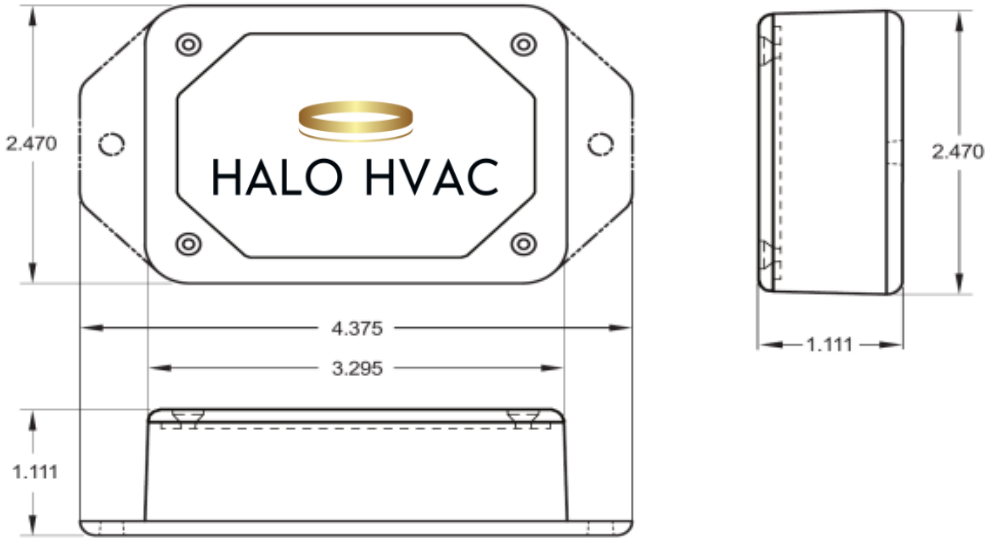
Typical tolerance of RH over T

Motion Lens Pattern:



This sensor reports the following three values:

- Motion or no motion
- Temperature in °C or °F
- % Relative Humidity (RH)



Technical Specification – Halo Enterprise Wireless Motion Detector Sensor	
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**	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)***	-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 oz. (85.05 g)

**Hardware cannot withstand negative voltage. Please take care when inserting and removing batteries.*
***Batteries will provide backup power in the case the external power is removed.*
****Operating below 0°C (-32°F) degrees will reduce battery life.*

Commercial-Grade Sensors

Halo 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.

HALO HVAC

SSIP SAFETY SCHEMES IN PROCUREMENT PAS91 Constructionline CHAS