

Airthings for Business

A single ecosystem,
customizable to any building



www.airthings.com/business

Airthings for Business allows businesses to monitor, measure and analyze their indoor air quality. Improving the health and wellbeing of a building directly impacts productivity and energy efficiency, be it an office building, residential block, medical facility or educational institution.

CALIBRATION OVERVIEW

All Airthings products are designed for long-time stability, and to minimize the need for on-site calibration. We intentionally avoid using sensors known for high drift, such as electrochemical cells. Our sensors are built to minimize drift over time, with most making use of smart algorithms that continuously correct for the effects of aging and mechanical stress. In addition, Airthings runs proprietary self-check algorithms on the sensor data in our cloud servers, to identify anomalies and faulty sensors.

This document describes the methods used, and provides guidance for best performance and longevity.



CO₂



PM₁



PM_{2.5}



HUMIDITY



TEMP



VIRUS RISK



MOLD RISK



VOC



PRESSURE



RADON



LIGHT



NOISE

CO₂ Sensor



Sensor Specific Information

OPERATING PRINCIPLE AND CALIBRATION

The CO₂ sensor emits a beam of infrared light at a wavelength that is absorbed by CO₂ molecules. By measuring the amount of light that is absorbed, the sensor can accurately detect the levels of CO₂ in the air.

The CO₂ sensors make use of Automatic Baseline Compensation (ABC) to correct for the effects of sensor aging and mechanical stress. The algorithm keeps track of the lowest reading over time, and adjusts so that it matches the typical background concentration of 400 ppm.

A user calibration can be performed by exposing the sensor to outdoor levels of CO₂, which will typically happen in a sufficiently ventilated building when it is unoccupied, such as at night time.

PART NUMBER(S) AND MANUFACTURER(S)

Senseair Sunrise by Senseair AB (Wave Plus)

CM1106SL-NS by Cubic Sensor and Instrument Co (View Plus)

TECHNOLOGY

Single-beam NDIR (Non-Dispersive InfraRed)



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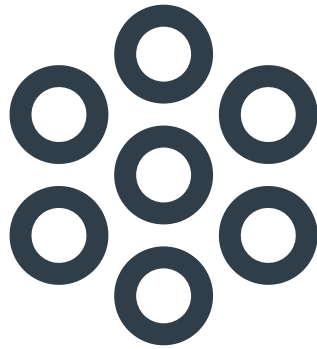


LIGHT



NOISE

Particle Sensor



Sensor Specific Information

OPERATING PRINCIPLE AND CALIBRATION

The particle sensor emits a laser beam into a flow of air that has a velocity which is precisely controlled by a variable-speed fan. When the laser hits a particle, its scattered light is detected by a sensor which estimates the size of the particle based on the magnitude of light. By knowing the rate of air flow and the size of the particles detected, the sensor can calculate the particle concentration.

As the sensor ages, the speed of the fan will usually drop. This will cause an error in the measurement that builds up over time. Our sensors measure the fan speed, and calibrate the sensor output accordingly.

Another common issue is built-up of dust. Airthings sensors run the fan for only short periods of time during each measurement, minimizing the amount of dust sucked into the sensor. In addition, the sensor is oriented in a way that any dust is unlikely to build up on the sensitive parts of the detector.

Nevertheless, it is recommended that the product is cleaned periodically with a dry cloth, and that it is not used in particularly dusty environments.

PART NUMBER(S) AND MANUFACTURER(S)

PM2105L by Cubic Sensor and Instrument Co

TECHNOLOGY

Laser-based light scattering particle counter



CO₂



PM₁



PM_{2.5}



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RADON



LIGHT



NOISE

VOC Sensor



Sensor Specific Information

OPERATING PRINCIPLE AND CALIBRATION

The sensor detects the concentration of Volatile Organic Compounds (VOCs) by measuring the change in resistance across a detector element that is exposed to the air. The target gases react with the surface oxygen on the detector element, reducing its concentration and causing a drop in the measurable resistance. This enables the sensor to react to a wide range of gases from paints, lacquers, paint strippers, cleaning supplies, office equipment, glues, adhesives and more.

Like the CO₂ sensor, the VOC sensor makes use of an Automatic Baseline Compensation (ABC) algorithm to compensate for the effects of aging and ambient non-target gases that can affect the sensor. This ABC algorithm slowly adjusts the sensor output so that the lowest level corresponds to the cleanest air it has observed the last four to five days.

A user calibration can be performed by exposing the sensor to clean air, which will typically happen in a well ventilated building during the course of a week.

PART NUMBER(S) AND MANUFACTURER(S)

BME680 by Bosch Sensortec

TECHNOLOGY

Metal-oxide gas sensor



CO₂



PM₁



PM_{2.5}



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LIGHT



NOISE

Radon Sensor



Sensor Specific Information

OPERATING PRINCIPLE AND CALIBRATION

The Airthings radon detector works by sensing alpha particles. Alpha particles are emitted by the radioactive gas radon, and are detected by a photodiode that reads the energy of each particle. There are many different particles that could "trigger" the sensor, so it must be specially designed to only register relevant particles. To rule out irrelevant particle impressions, the Airthings team developed a proprietary algorithm that allows the device to be sensitive to radon but not other particle "noise."

The sensor makes use of several different, but correlated, sources of alpha particles to measure radon levels. Smart, patented algorithms enable the sensor to correct for drift and aging by combining these different sources. This makes the sensor more accurate over time, not less, as long as the sensor stays within its recommended operating conditions. High levels of humidity can damage the sensor.

Airthings products periodically transmit diagnostic data for the radon sensor to the cloud backend, including humidity, enabling the detection of sensor anomalies and potentially damaging operating conditions.

MANUFACTURER(S)

Airthings

TECHNOLOGY

Solid-state alpha spectroscopy



CO₂



PM₁



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