AiroCheck.

Eco Monitor 7-in-1

Measures environmental conditions, particulate matter, and pollutant gases with a single wireless sensor.

Product Overview

AiroCheck Eco Monitor is a customizable and compact wireless indoor air quality sensor designed to measure and monitor various parameters in the air to assess the quality of the air we breathe.

These sensors are valuable tools for detecting and quantifying environmental conditions, pollutants, and particulate matter, providing near real-time or periodic data on air quality conditions.

The sensor wirelessly provides near real-time and exceptionally accurate data through low-power, long-range communication and wired through Modbus protocol. Utilizing this data and dashboards facilitates the monitoring and reporting of air quality performance.

The sensors within **Eco Monitor** can also be customized and configured up to 11 parameters to measure Dust, PM1, PM2.5, PM 10, Formaldehyde (HCHO), Carbon Dioxide (CO_2), Temperature, Humidity, Atmospheric Pressure, Illumination, TVOC, Ozone (O_3), Oxygen (O_2), Hydrogen Sulfide (H_2S), Methane (CH_4), Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Hydrogen Gas (H_2), Ammonia (NH_3) and THI for swift assessment of environmental conditions that may affect microbial activity such as bacteria and fungi.

Product Features

Customizable sensor configuration based on application requirement.

Wireless data transmission Option through LoRaWAN®, and/or WIFI wireless protocol

Secure operation with top-down encryption

Easy Performance Management through MachineSens IoT Platform

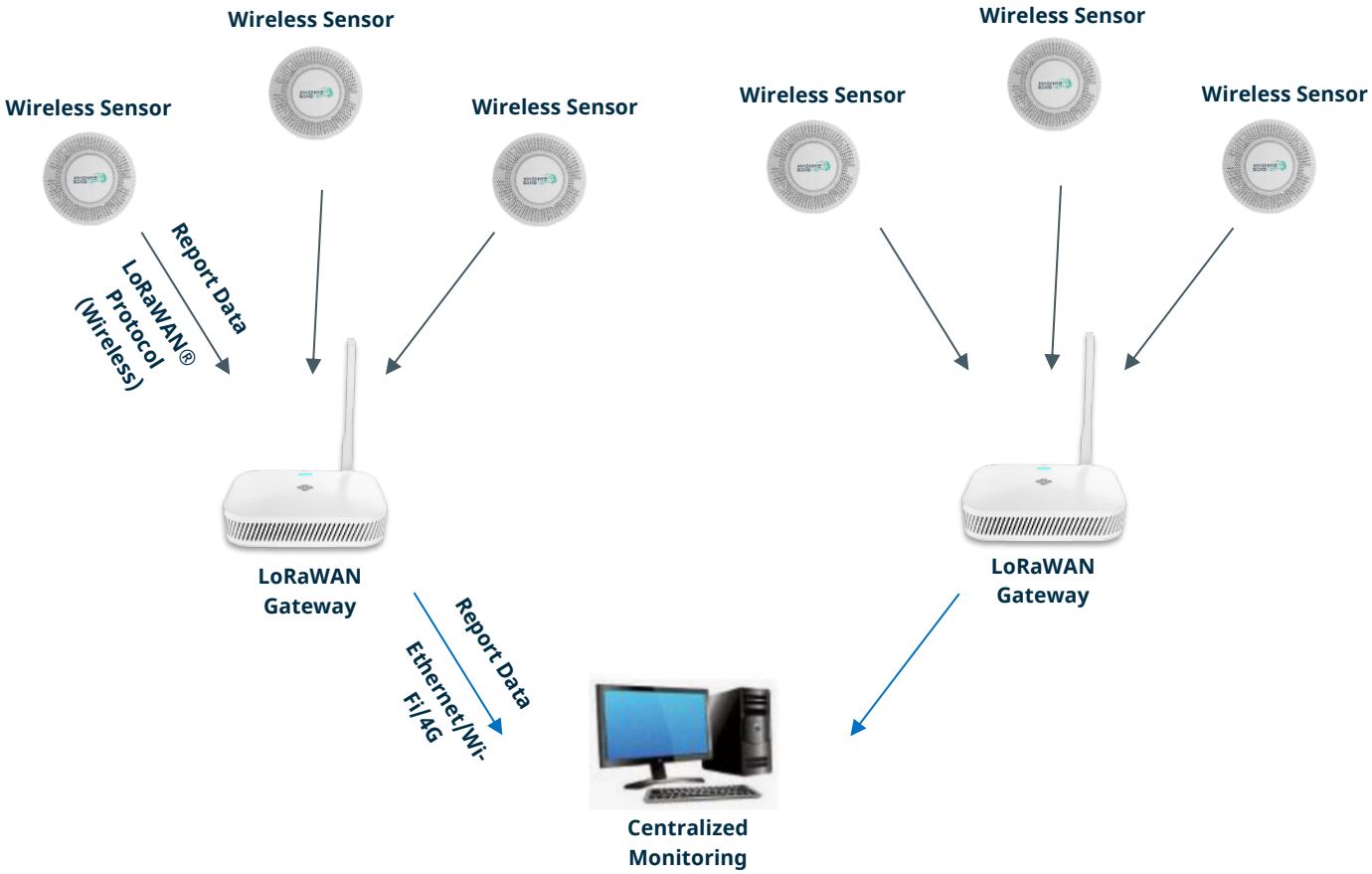
Reports room configuration every 3-60 minutes (configurable)

Integration with Building Management System through protocol converters

Communication Technology

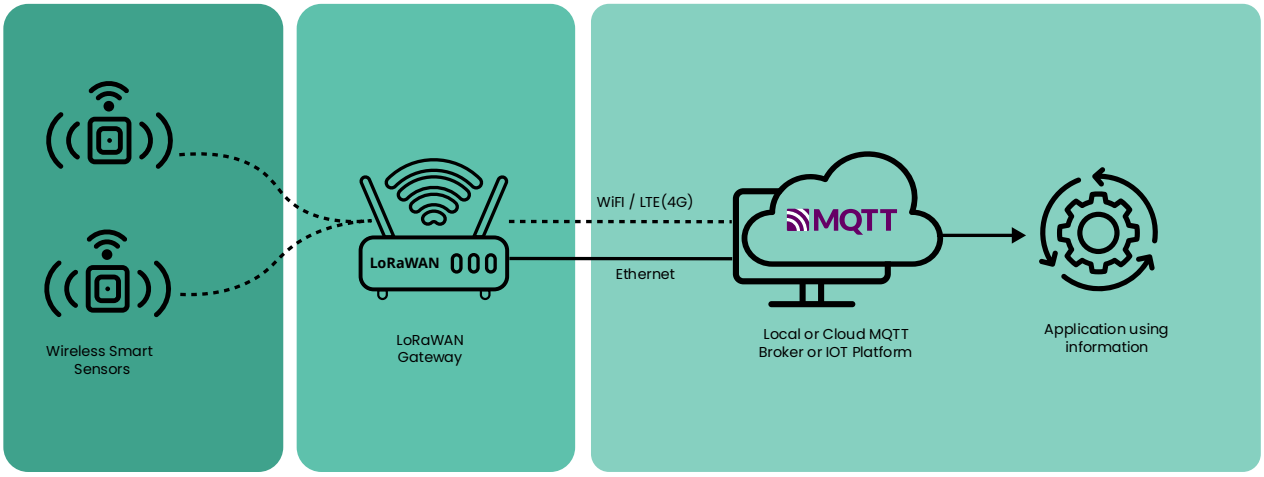
The **AiroCheck Eco Monitor** air quality sensors employs cutting-edge communication technology, LoRaWAN which provides low power consumption as well as long range signal propagation to enable real-time control and monitoring.

Our smart gateway receives near real-time data from all the wireless sensors within range, converts the raw data into an easy-to-use JSON format, and then publishes it using MQTT protocol. Data can be sent to any local or cloud MQTT broker via Ethernet, LTE (4G), or WIFI.



Our smart gateway receives near real-time data from all the valves within range, converts the raw data into an easy-to-use JSON format, and then publishes it using MQTT protocol. Data can be sent to any local or cloud MQTT broker via Ethernet, LTE (4G), or WIFI.

System Architecture



Specifications

General	
Power Input	5V DC
Material	ABS Flame Redundant Shell
Operating temperature	-10 °C to +55 °C
Storage temperature	-20 °C to +70 °C
Relative Humidity	10% to 90% (non-condensing)
Environment	Indoor
IP Class	IP20
Mounting Options	Ceiling/Wall Mount
Mounting Height	1.6m to 2m (Recommended)
Configuration	Via PC software
Battery Type*	Micro USB Rechargeable Lithium Polymer (LiPo)
Battery Life*	1 to 2.5 Years (Every 15min/30 reading)
Wireless Communication	
Technology	LoRaWAN®
Frequency	EU868 (868 Mhz) license free
Transmit Range	2KM in urban environment 22+ floors in a building
Security	128 AES Encryption
Antenna	Internal
Data Format	JSON

Device Class	Class C
Activation Method	OTTA (Over-The-Air-Activation)

Sensors

Parameters	Resolution	Range	Accuracy	Operating Principle
Carbon Dioxide (CO_2)	1 ppm	400 ppm ~ 5000 ppm	≤±10% Reading	Digital NDIR
Carbon Monoxide (CO)	1 ppm	0 ppm ~ 1000 ppm	≤±3% Reading	Electrochemical
TVOC	1 µg/m3	0 µg/m3 ~ 5000 µg/m3	≤±10%Reading	MEMS
Ozone (O_3)	0.001 ppm	0 ppm ~ 10 ppm	≤±2% Reading	Electrochemical
Formaldehyde (HCHO)	0.001 mg/m3	0 ~ 1.5 mg/m3	≤±10% Reading	Electrochemical
PM2.5	1 µg/m3	0 µg/m3 ~ 999 µg/m3	≤±10% Reading	Laser Scattering
PM10	1 µg/m3	0 µg/m3 ~ 1000 µg/m3	≤±10% Reading	Laser Scattering
Temperature	0.01°C	-40 ~ 100 °C	<±0.3°C	MEMS
Humidity	0.04%	0 ~ 100%	±3% RH	MEMS

Life Expectancy of Each sensor

TVOC, CO_2	10 Years
Temperature, Humidity	10 Years
HCHO, O_3	2 Years
PM 2.5, PM 10	≥ 40,000 hours
CO	3 Years

Certifications

Regulatory	CE
Environmental	RoHS

**Battery operated versions available only in selected configurations with different enclosure design. Battery life depends on Rx/Tx frequency. Battery life is tested under laboratory conditions and for guideline purposes only.*

Microbial Activity

It is important to recognize that bacteria and fungi are biological particles, and conventional air quality sensors designed for particulate matter (PM) measurement are generally not suitable for **directly** assessing the concentrations of microorganisms in the air.

Our Wireless Air Quality sensing solution includes special sensors with algorithms to calculate a parameter called **Temperature Humidity Index (THI).** Temperature and humidity are pivotal factors influencing the favorable conditions for the growth and dispersion of **bacteria** and **fungi**. THI serves as a swift assessment tool for environmental conditions impacting microbial activity, calculated based on the temperature-to-humidity ratio. A higher THI value often indicates a more conducive environment for bacteria and fungi. THI is calculated based on the ratio of temperature to humidity. A higher THI value usually means a more favorable environment for bacteria and fungi.

However, this temperature - and humidity-based simulation can only provide rough estimates, not accurate bacterial and fungal concentrations. It can be used as a rapid assessment method, but in cases where accurate data is required, actual bioaerosol sampling and analysis is still required.

Dimensions