IOTSENS
Gimeno IoT division

air quality monitor

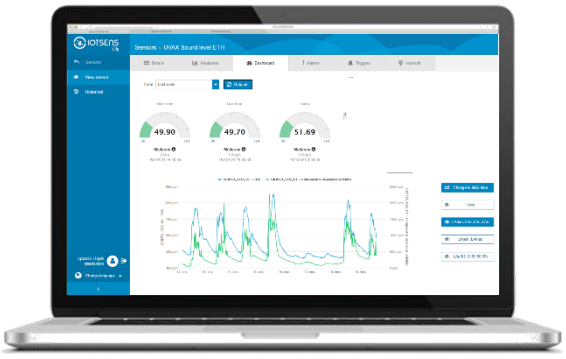
DESCRIPTION

The IoTsens Air Quality monitor consists of a set of environmental sensors capable of collecting different variables to evaluate the conditions of the air that surrounds it. This device measures the concentration of CO, SO2, NO2, O3, NO, H2S, CO2, the particles suspended in the air (PM2.5 and PM10) and TVOC. In addition, it also records environmental conditions such as temperature and humidity.

The use of this device is recommended for the evaluation of air conditions, being able to monitor the levels of contamination to make the appropriate decisions.

The device has been developed based on the guidelines set forth in the framework Directive 96/62/EC of the council and all its Daughter Directives. The purpose of this decree is to regulate air quality to avoid, prevent and reduce the harmful effects of the substances mentioned in the regulation on human health, the environment as a whole and other goods of any nature.

IOTSENS PLATFORM



Through the integration of this sensor in the IoTsens Cloud platform, the software offers the hourly and daily data of these variables, as well as their corresponding calculations to know if the levels comply with the regulation.

BENEFITS

- Reporting air pollution levels.
- Improvement of the health and well-being of citizens.
- System for the evaluation and continuous improvement of air quality.
- Different applications to accomplish with regulation rates, for example, control of traffic pollution levels.
- Applications to keep pollution levels low: monitoring of green areas.

SENSOR OPTIONS

	NO2+O3	CO+SO2	NO+H2S	CO2	Particles	TVOC	Humidity and temperature
Indoor Option	-	-	-	●	✓	✓	✓
Outdoor Basic	✓	-	-	●	✓	✓	✓
Outdoor Standard	✓	✓	-	●	✓	✓	✓
Outdoor Advanced	✓	✓	✓	●	✓	✓	✓

✓ included

● optional

VARIABLES INFORMATION

The dominant issues that determine air quality in the short term are nitrogen dioxide, particulate matter, and ozone. All three pollutants are strongly related to the use of fossil fuels. In urban environments, traffic is the dominant source of nitrogen oxides and particulate matter emissions. Power generation and occasionally an industrial site are also important sources. In the following figure the main characteristics of each variable measured are explained:

Chemical	Name	Description
NO_2	Nitrogen dioxide	Range: 0 a 20ppm Accuracy: up to 80ppm Operational life: 24 months up to 50% deviation from measurement It is formed in high temperature combustion processes (motor vehicles, power plants). It is a frequent pollutant in urban areas. It is a toxic gas, irritant and a precursor to the formation of nitrate particles that lead to the production of acid and high levels of PM2.5.

O_3	Ozone	Range: 0 a 20ppm Accuracy: up to 15ppm Operational life: 24 months up to 50% deviation from measurement Ozone at ground level, unlike other pollutants, is not emitted directly into the atmosphere, but is a secondary pollutant produced by the reaction between nitrogen oxides and carbon monoxide together with other derivatives of the burning of fuel and the sunlight. Ozone levels are not as high in urban areas as in rural areas. The whole of the ozone, forms a visible mist in highly polluted areas, called photochemical smog. It is one of the gases that produce the greenhouse effect in the atmosphere. Breathing in large amounts may cause eye or throat irritation.
CO	Carbon Monoxide	Range: 0 a 1000ppm Accuracy: up to 20ppm Operational life: 36 months up to 50% deviation from measurement It is an odorless, tasteless, and colorless gas produced by the incomplete combustion of carbon-containing materials, including most transportation fuels. Even in busy urban centers, CO concentrations rarely exceed health-related standards. CO is toxic, acts by reaction with hemoglobin and reduces its oxygen transport capacity in the blood.
SO_2	Sulphur Dioxide	Range: 0 a 100ppm Accuracy: up to 15ppm Operational life: 36 months up to 50% deviation from measurement When fossil fuels, or any other material that contains sulfur, burns in the presence of oxygen, sulfur dioxide is produced. Sulfuric acid generated from atmospheric reactions is the main component of acid rain, and ammonium sulfate particles are the most abundant secondary particles found in the air.
NO	Nitrogen Oxide	Range: 0 a 20ppm Accuracy: up to 80ppm Operational life: 24 months up to 50% deviation from measurement It is produced in much greater quantities than NO2. It is a highly unstable molecule in air, and it oxidizes rapidly in the presence of oxygen to nitrogen dioxide.
H_2S	Hydrogen Sulfide	Range: 0-50ppm Accuracy: up to 5ppm Operational life: 24 months up to 50% deviation from measurement It is a toxic gas with a high danger to health. This depends on both the duration of the exposure and the concentration. It is an irritating gas for the lungs that in low concentrations irritates the eyes and the respiratory tract. The toxicity of hydrogen sulfide is high, and it can cause death in man at very low concentrations in the environment.
CO_2	Carbon dioxide	Range: 0-5000ppm Accuracy: +/- 50ppm It has no direct adverse health effects, but it is the most abundant anthropogenic greenhouse gas in the atmosphere.
VOC	Volatile organic compounds	Description: MOx gas sensor for air quality Range: 0-500 VOC Index points They are produced by incomplete combustion of hydrocarbon fuels, and by their evaporation. Because there are many hundreds of different compounds, VOCs display a wide range of properties. Some, like benzene, are carcinogenic; some are toxic and others harmless to health.

Particulate matter	PM2.5	Description: air suspended particles Measure range: de 0 a 1000 µg/m³ Accuracy: PM2.5 +-15%; PM10 +-25% Airborne particulates vary widely in their physical, chemical composition, origin, and particle size. PM10 particles (the fraction of very small sized particles in air (<10 µm)) and PM2.5 particles (<2.5 µm) are of great concern today as they are small enough to penetrate deep into the lungs and therefore potentially pose significant health risks. Meanwhile, larger particles are not easily inhaled and are removed from the air relatively efficiently by sedimentation. The main source of PM10 and PM2.5 matter in the air in cities are emissions from road traffic, especially diesel vehicles.
	PM10	

Humidity	Description: CMOS Humidity sensor Measure range: de 0 a 100% Precision: ±2%
Temperature	Description: CMOS Temperature Sensor Measure range: -40ºC a +125ºC Accuracy: +/-0.2ºC

PRODUCT INFORMATION

PRODUCT

Dimensions:	170x120x65mm
Weight	400g
Temperature range:	-40ºC to + 65ºC
Housing [1]:	- IP protection: 53 - Material: POLYCARBONATE (UV resistant)
Internal storage:	16 MB

AVAILABLE COMMUNICATIONS

Ethernet	Standard: IEEE 802.3 100Base-TX Cable: 4 pares trenzado (categoría 5 UTP) POE: Passive mode (4-5 positive, 7-8 negative) 12/24 VDC Bandwidth: 10/100 Mbps
WiFi	Standard: IEEE 802.11 b/g/ndbm Bands: 2.4Ghz Power transmission: +16dBm Sensitivity: -98 dbM (802.11b, 1Mbps)
LoRaWAN	Module RHF76-052 Region EU868 Specification Version 1.0.2 Regional Parameters 1.0.2rB
NarrowBand IOT	Module SIM7020G (3GPP Rel-14 Compliant) Bands: Global (B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B26/B28/B66/B70/B71) Bandwidth: Uplink: 150Kbps Downlink:126Kbps Power consumption: PSM / eDRX

AVAILABLE POWER SUPPLY

PoE	Passive power over Ethernet: 12/24 VDC
Direct Current	Power supply with 12/24 VDC

NETWORK CONNECTION