

Sapiens Sensor Tube

Sapiens Air Monitoring Sensor Tube is a highly compact outdoor air quality sensor system designed to monitor air pollutants in real-time. Additional environmental factors of Temp, Relative humidity are also included.

Product Description

The Sensor Tube DF-4/DF-5 is designed for air monitoring applications in locations without a power supply, allowing for extended monitoring periods without interruption. It supports up to four gas modules, which can be configured at the time of purchase, including ozone (O₃), nitrogen dioxide (NO₂), nitrogen monoxide (NO), carbon monoxide (CO), carbon dioxide (CO₂), sulfur dioxide (SO₂), and hydrogen sulphide (H₂S). The PM module, available only for the DF-5, enables simultaneous measurements across multiple PM size channels for accurate PM (PM₁, PM_{2.5} and PM₁₀) monitoring.

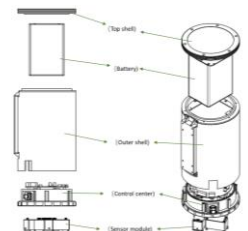
Sapiens Sensor Tube is equipped with the Pair Differential Filter (PDF) sensing technology using paired filter for continuous tracking of virtual baseline for the gas sensors signals. With effective reduction of the impact of environmental temperature and humidity, the air pollution measurement data quality has been greatly improved by this technology.

Data transmission to designated Sapiens cloud server or user designated server through API and direct TCP links are optional. The intended applications are complementary air quality monitoring with high data performance target needs and near reference data quality requirement for the government agency, communities, research projects needs.



Product Features

- At least two gas modules capable of measuring nitrogen monoxide (NO), nitrogen dioxide (NO₂), ozone (O₃), and carbon monoxide (CO) etc, all together simultaneously using respective electrochemical sensors equipped.
- Pair Differential Filter (PDF) sensing technology is enabled for gas sensors for dynamic tracking of the virtual baseline of sensor signals;
- The gas module converts sensor signals to gas concentration via an algorithm stored in the system firmware and is configured to log both sensor electrodes raw voltage outputs and converted gas concentrations in ppb (for O₃, NO₂ and NO) or ppm (for CO). Measurements are logged and reported in real-time.
- The NO₂ sensor is equipped with ozone filter membrane to remove interference from O₃.
- Internal battery to support ≥ 7 days continuous operation.
- Solar panel to support long term continuous operation.
- Algorithm on Chip (AoC) is enabled for gas concentration direct output with auto quality control.



Application Cases

- Smart city sensor network
- Urban air pollution monitoring
- Roadside air quality monitoring
- Emergency air quality monitoring



Pair Differential Filter.
PCT patent

Sapiens is an ISO 9001:2015 and GB/T24001-2016/ISO14001:2015 certified company for MAS/NAS/Sirius/PEK series products.



EN 61010:2010+A1:2019
EN 61326-1: 2013
EN 61000-3-2: 2019
EN 61000-3-3: 2013+A1: 2019



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Technical Specifications

Gas Module	Working Principles	Range	Detection Limit	Resolution	Accuracy
Nitrogen Dioxide (NO ₂)	Dynamic Baseline Tracking enabled Electrochemical sensor	0- 5 ppm	<5 ppb	1 ppb	± 5 ppb or 20% of measured concentration
Nitrogen Monoxide (NO)	Dynamic Baseline Tracking enabled Electrochemical sensor	0- 5 ppm	<5 ppb	1 ppb	± 5 ppb or 20% of measured concentration
Ozone (O ₃)	Dynamic Baseline Tracking enabled Electrochemical sensor	0- 5 ppm	<5 ppb	1 ppb	± 5 ppb or 20% of measured concentration
Carbon Monoxide (CO)	Dynamic Baseline Tracking enabled Electrochemical sensor	0- 10 ppm	0.05 ppm	0.01 ppm	± 0.05 ppm or 20% of measured concentration
Sulfur Dioxide (SO ₂)	Dynamic Baseline Tracking enabled Electrochemical sensor	0- 5 ppm	<5 ppb	1 ppb	± 10 ppb or 25% of measured concentration
Hydrogen Sulfide (H ₂ S)	Dynamic Baseline Tracking enabled Electrochemical sensor	0- 10 ppm	<10 ppb	1 ppb	± 10 ppb or 25% of measured concentration

PM Module	Description	Range	Detection Limit	Resolution	Accuracy
PM Counter	Simultaneous output of PM ₁ , PM _{2.5} and PM ₁₀	PM _{2.5} : 0~5,000 µg/ m ³ PM ₁₀ : 0~10,000 µg/ m ³	1 µg/ m ³	1 µg/ m ³	± 15% of measured concentration or ± 5 µg/ m ³

Environment	Working Principles	Range	Resolution	Accuracy
Air Temperature	PTAT (integrated)	-15~45°C	-	± 0.2°C
Air Humidity	Capacitive polymer	0- 99 %	-	± 2 %

System Specifications

Features	Descriptions
Dimension	250 mm (H) *155 mm (D) in cylindric shape.
Weight	<5 kg
Environmental Operating Range	Temperature: -10-45°C; Humidity: 0-99 %; Pressure: 80kPa~120kPa
Power Input	Internal Battery for minimum of 7 days continuous operation with extended battery capacity. Optional: External solar panel for continuous operation or mains power supply for continuous operation.
Power Consumption	Normal @ 0.2 W, Max @ 0.6 W
Data Management	Sapiens Environment IoT Network (SEIN) network for remote data browsing, downloading, system condition checking and control, and data management
Data Communication	Standard: 4G Standard: RS485 communication port for Sapiens Console software with data streaming and system configuration
Data Storage	Standard 16G on-board flash for data storage
Sampling Method	Gas: Diffusion based sampling PM: Fan based sampling
Sampling Rate	1 minute
Quality Control System	Pair Differential Filter technology for temperature and humidity impact correction on gas sensor signals;
Installation options	Tripod/ Wall mount/ Cross arm

