SAPIENS

High performance portable air monitor for personal exposure assessment and microenvironment monitoring

PEK Ultra-Compact Personal Exposure Kit for Researchers

Personal Exposure Kit (PEK) is designed for personal exposure measurement of ppb level of gas and particle pollutants, environmental factors of temperature, humidity, noise, motion and light intensity. As portable as a smartphone, it can be easily carried around anytime and anywhere. Equipped with Sapiens' patented dynamic baseline correction technology, and trusted by exposure scientists worldwide, PEK ensures accurate and reliable data for research grade applications.

General Features

- Portable design, as easy to carry as a smartphone for both mobile and fixed mode operations;
- Data transmission solutions via **4G, WiFi, and Bluetooth**;
- Real-time mapping and graphing of pollution measurements through the Sapiens Sensor App;
- Built-in rechargeable lithium battery with ultra-low power consumption and long battery life;
- PM counter and **size bin number concentration output** for multichannel particle measurements;
- Sapiens' PCT patented **Pair Differential Filter (PDF) technology** for auto-tracking the virtual baseline of gas sensor signals, ensuring superior gas data accuracy at **ppb levels;**
- Up to 5 gases simultaneous measurements of **NO, NO_2, O_3, CO, CO_2 and TVOC**;
- Internal fan for superior fast response to adapt to change of microenvironments;
- Integrated CO_2 sensor for indoor ventilation condition (PEK-PRO and PEK-Standard models);
- Environmental conditions of **light, noise and pressure** for microenvironment characterization.

Product Selection

Sapiens PEK-Lite

- ✓ User selects 3 gases among NO, NO_2, O_3 ,CO)
- ✓ ppb precision for NO_2,O_3 and NO
- ✓ Diffusion based gas sensing
- ✓ Ultra long battery life for 3 days.

Sapiens PEK-Eco

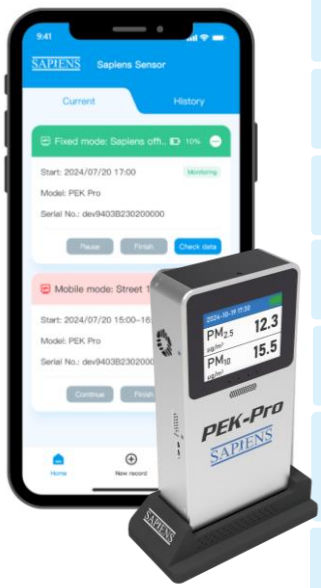
- ✓ 6 channel PM count and PM_1, $PM_{2.5}$, PM_{10} mass output
- ✓ CO2 or TVOC can be added
- ✓ Sapiens Sensor App compatible
- ✓ Bluetooth and WiFi enabled

Sapiens PEK-Pro

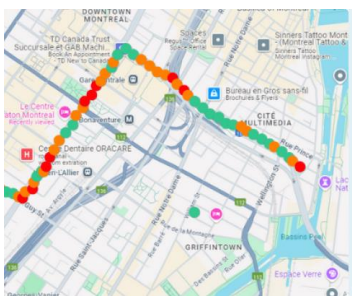
Sapiens Recommends

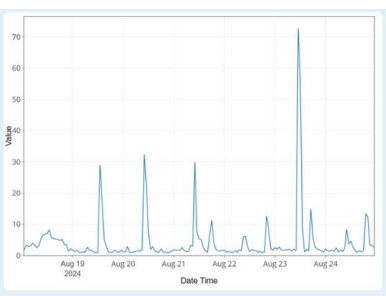
- ✓ Up to 5 gases simultaneous measurements of NO, NO2, O_3, CO, CO2 and TVOC
- ✓ ppb precision for NO_2,O_3 and NO
- ✓ 6 channel PM count and PM_1, $PM_{2.5}$, PM_{10} mass output
- ✓ Active fan for superior fast response
- ✓ Sapiens Sensor App compatible
- ✓ Bluetooth, WiFi and 4G enabled

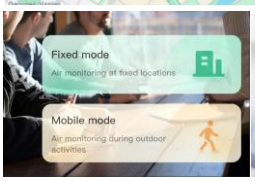
Sapiens Sensor App

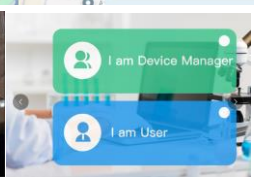


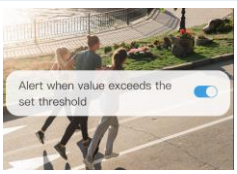
- ✓ Multi-device easy management via App for cohort study campaign
- ✓ Mobile mode for pollution mapping, hotspot identification
- ✓ Fixed mode for time series and total exposure assessment
- ✓ Smartphone connectivity via Bluetooth for GPS location logging
- ✓ WiFi and 4G connectivity for all time continuous online monitoring
- ✓ User defined 'Trips' for easy exposure assessment by Research Managers.
- ✓ Low battery alert by email to minimize data loss in your study











Technical Specifications

Pollutants	Working Principle	Range	LOD	Resolution	Accuracy
PM_1, $PM_{2.5}$, PM_{10} and 6 channel PM count	Humidity and refractive index correction laser scattering sensor	0-2,000 µg/m³	1 µg/m³	1 µg/m³	± 5 µg/m³ or 15% measured concentration
Nitrogen Dioxide (NO_2)	Dynamic baseline electrochemical sensor	0- 5 ppm	1 ppb	1 ppb	± 5 ppb or 15% measured concentration
Ozone (O_3)	Dynamic baseline electrochemical sensor	0- 5 ppm	1 ppb	1 ppb	± 5 ppb or 15%measured concentration
Carbon Monoxide (CO)	Dynamic baseline electrochemical sensor	0- 10 ppm	< 0.05 ppm	0.01 ppm	± 0.05 ppm or 15% measured concentration
Nitrogen Monoxide (NO)	Dynamic baseline electrochemical sensor	0- 5 ppm	1 ppb	1 ppb	± 5 ppb or 15% measured concentration
Optional Gas Module	**Working Principle**	**Range**	**LOD**	**Resolution**	**Accuracy**
Carbon Dioxide (CO_2)	Temp compensated NDIR	400-3000ppm	400 ppm	1 ppm	±30 ppm or 15% measured concentration
Total Volatile Organic Compounds (TVOCs)	Metal Oxide Semi-conductors	0- 20 ppm	5 ppb	1 ppb	± 10 ppb or 15% measured concentration

Environment	Working Principles	Range	Resolution	Accuracy
Air Temperature	PTAT (integrated)	-15~50°C	0.1°C	±0.2°C
Air Humidity	Capacitive polymer	5- 95 %	0.1 %	± 2 % at 23 °C
Light (Optional)	LDR Light dependent resistor	1—65535 lx	1lx	±20% of measured concentration
Noise (Optional)	Silicon condenser micromachined microphone	Outward	-42dB（@1kHz, 0dB=1V/Pa）	

System Specifications

Features	PEK-Lite	PEK-Pro	PEK-Eco
Dimensions	136mm x 85mm x 30mm	170mm x 85mm x 35mm (without charging dock)	65mm x 90mm x 30mm (without charging dock)
Weight	<600g	<800g (without charging dock)	<500g (without charging dock)
Environmental Operating Range	Temperature: -5~45°C (23°F~113°F)* ; Relative Humidity: 0~99 %; Pressure: 80kPa~120kPa		
Power Input	5 V DC		
Power Consumption	≤ 2W	≤ 5.5W	≤ 2.5W
Battery Life	40~50 h	15~20 h	15~20 h
Battery Recharge Time	6h-10h		
Date Storage	Built-in Flash chip storage		
Date Communication	USB direct reading with Sapiens console software	Bluetooth, Wi-Fi and 4G data transmission	Bluetooth and Wi-Fi data transmission
Data Management	Sapiens console software	**Sapiens Sensor App** • Real-time mapping and graphing on the app • Data export, exceedance alert and activity logbook functions **SEIN Cloud Platform** • Device and project management • Data comparison and calibration	
Gas Sampling	Diffusion based sampling	Internal fan to enhance sensor response	
PM Sampling	N/A	Simultaneous output of PM_1, $PM_{2.5}$, PM_{10} with 6 size channel data count output enabled	
Sampling Rate	1 min		
Recent Research Citations	• Respiratory Effects of Traffic-Related Air Pollution: A Randomized, Crossover Analysis of Lung Function, Airway Metabolome, and Biomarkers of Airway Injury. Environ Health Perspect. 2023 May;131(5):57002. • Cardiovascular effects of traffic-related air pollution: A multi-omics analysis from a randomized, crossover trial. J Hazard Mater. 2022 Aug 5;435:129031. • Dynamic molecular choreography induced by traffic exposure: A randomized, crossover trial using multi-omics profiling. J Hazard Mater. 2022 Feb 15;424(Pt A):127359. • Reducing the Influence of Environmental Factors on Performance of a Diffusion-Based Personal Exposure Kit. Sensors (Basel). 2021 Jul 6;21(14):4637.		

*Certain specific sensors have a more limited range

PDF 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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