envea

Miniature solution for real-time continuous pollution monitoring

AIR QUALITY MONITORING SYSTEMS

"40 years of experience in the field of environmental monitoring to the benefit of our micro-sensors"

The Cairsens© sensor allows specific pollutant measurement comparable to reference methods. The high quality sensors are renowned worldwide by our customers looking for the newest technologies in air quality monitoring.

Most of the Cairsens© sensors use amperometric technology consisting of three electrodes: the working electrode (anode), the counter electrode (cathode) and the reference electrode. The gas to be analyzed is diffused through a permeable membrane towards the sensitive electrode. The function of the gas, oxidation takes place at the anode, or reduction at the cathode. The electrical signal generated between the two electrodes is proportional to the concentration.

Excellent measurement accuracy is achieved by limiting the effect of humidity interference by using a specific and patented inlet filter combined with dynamic sampling.

MAIN BENEFITS:

- Real-time monitoring of the most common types of pollutants: NO_2, O_3/NO_2, CO, SO_2, PM10 & PM2.5, H_2S/CH_4S, NH_3, nmVOC
- Very high sensitivity to capture low level gas concentrations (down to ppb)
- Accurate measurement data at a fraction of the cost of Reference Analyzers
- No maintenance and no need for re-calibration (1 year lifetime)
- Embedded USB and UART / ModBus communication ports
- Up to 20 days of 1-minute data storage capacity
- Ultra-small, with close to zero power consumption
- Ready to use and easy to integrate
- Measurements meet **European directive 2008/50/EC** for indicators
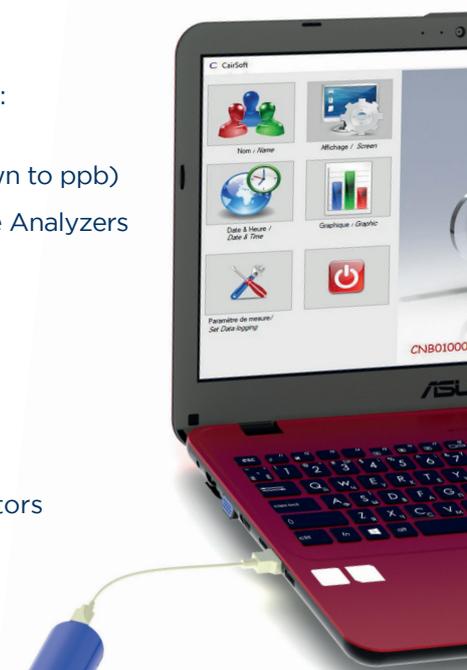
Data download via computer

RELIABILITY AND ACCURACY

Independent reviewers, including the European **JRC** (Joint Research Council), the **LCSQA** and the **US-EPA,** have determined the accuracy, linearity, limits of detection and precision of Cairsens® as very good when compared with reference methods. Further studies with **NASA** have shown **very good correlation with reference measurements.**
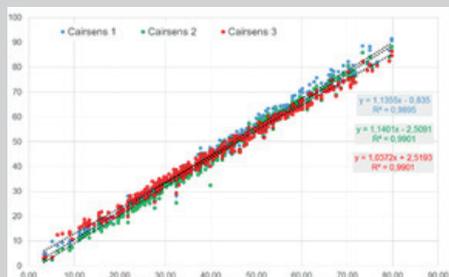
Correlation of measurements:
Reference station vs Cairsens NO_2 (ppb)
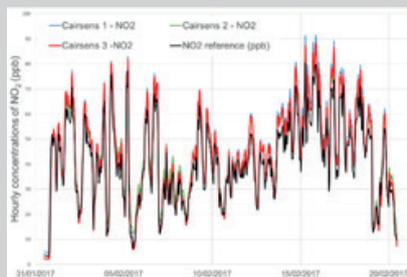
NO₂ measurement comparison:
Traffic reference-station vs 3 Cairsens
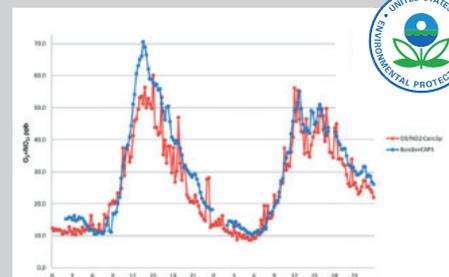
O_3 monitoring, comparative test:
Cairsens vs Reference method

" Great correlation between measurements of Cairsens and Reference Analyzer at all range, particularly at low concentration "

*Cairsens® are manufactured in France and calibrated in our metrological laboratory using Standard Reference AQMS monitors. Every sensor shipped includes a **calibration certificate.**

MAIN APPLICATIONS

- Indoor and outdoor air quality monitoring: smart cities, road-side & tunnels, schools, airports, ship terminals...

- Odor monitoring: WWTP, recycling, pulp and paper manufacturing, sewage treatment facilities, refineries

- Leak detection and monitoring of fugitive emissions: quarries, storage facilities, mines, manufacturing plants

- Providing data for air dispersion modelling

- Health and safety: mines, industrial sites, construction

- Forecasting of industrial fence line emissions

Cairnet® is a real-time air-monitoring mini-station containing up to 6 Cairsens® micro-sensors plus cellular communication within a waterproof enclosure. Compact, easily deployable and autonomous thanks to its solar panels, Cairnet® enables you to cost-effectively monitor dust and gases, with centralized data management in the cloud, through ENVEA's Caircloud® application.
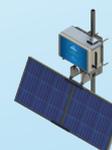
A SMART MICRO-SENSOR
WITH FULL TURNKEY CAPABILITIES

ENVEA micro-sensors are extremely versatile. They can be customized and utilized as part of a larger network for monitoring multiple pollutant measurements (Cairnet®). The micro-sensors can also be used as a standalone system, for single-spot measurements, or to be integrated by the users.

CAIRSENS
Microsensors

Cairnet
Ministations

Customized
Integration

DAS

x 6

OPTIONS

Solar Panels   Weather Station

Standalone
use

Supervision

Cairsoft
Software
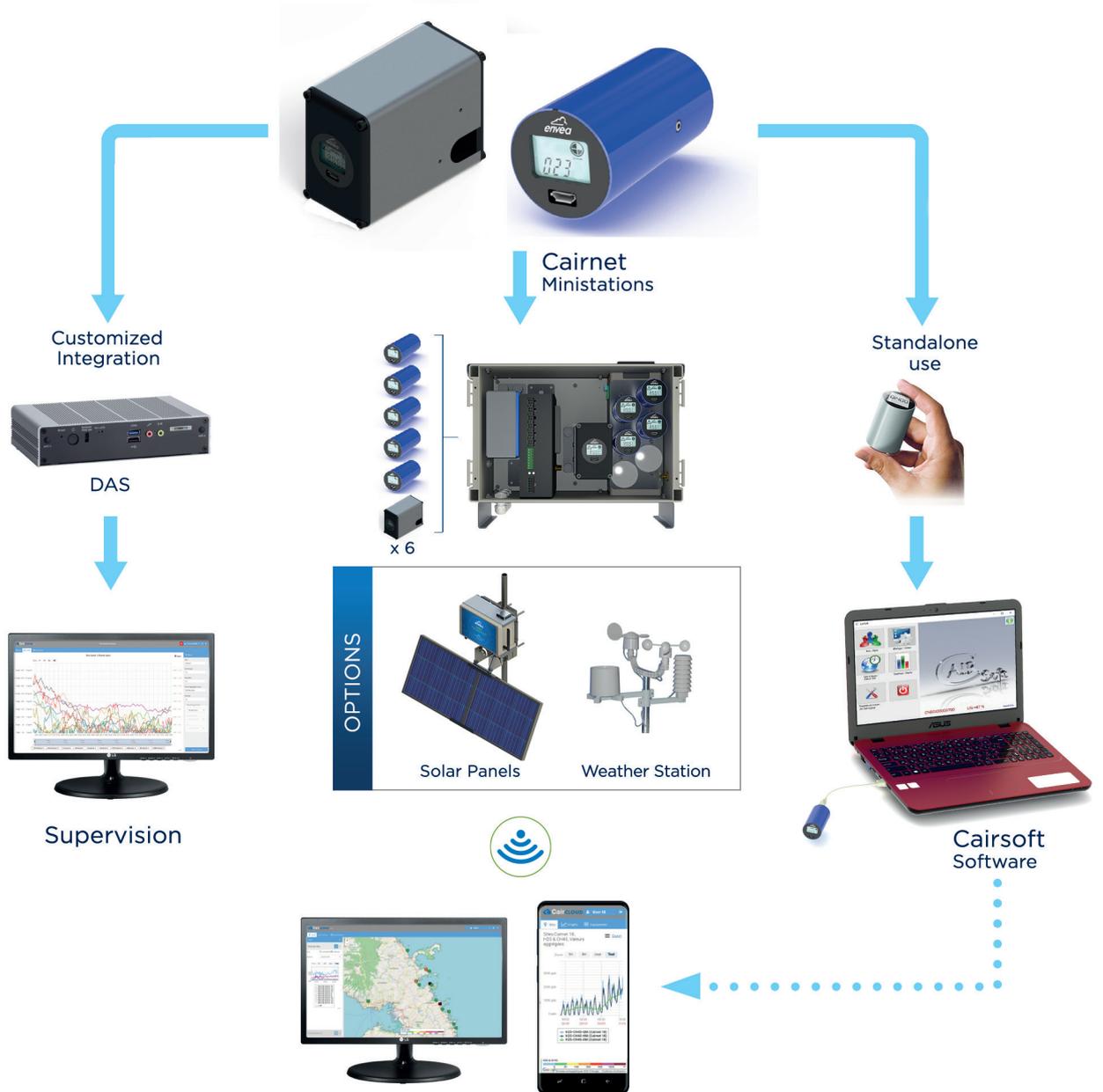
The intelligent and user-friendly Caircloud® web-based interface allows easy, continuous and real-time data acquisition, processing and the management of unlimited sensors' or Cairnet® mini-stations.

XR Recorded data is fully compatible with the XR© Air Quality Data Acquisition and Handling solution from ENVEA.

METROLOGICAL PERFORMANCES

Measured Parameter	Criteria pollutants (Air Quality)				Odorous Compounds					
	NO_2	O_3 / NO_2	SO_2	CO	H_2S / CH_4S			NH_3	nmVOC	
Measuring Range (ppm)	0 - 0.25	0 - 0.25	0 - 1	0 - 20	0 – 1	0 - 20	0 - 200	0 - 25	0 - 2	0 - 16
Certified* Detection Limit (ppm)	0.02	0.02	0.05	0.05	0.01	0.03	0.2	0.5	0.2	0.5
Resolution (ppm)	0.001				0.001					
Operating Temperature (°C)	-20 to +40	-20 to +40	-20 to +50	-20 to +50	-20 to +40	-20 to +40	-20 to +40	-20 to +40	-20 to +50	-20 to +50
Operating Relative Humidity (% HR)	10 to 90 (non-condensing)				10 to 90 (non-condensing)					
Sensor Type	Electrochemical								PID	

STORAGE CONDITIONS

Temperature (°C)	+5 to +20
Relative Humidity (% HR)	> 15 (non-condensing)
Duration of Storage (Max)	3 months

COMPLIANCE TO ENVIRONMENTAL REGULATIONS

Electrical safety	NF EN 61010-1: 2010
Electromagnetic Compatibility	NF EN 61326-1: 2013
Protection Index	IP 42 (according to IEC 60529)
European directive	2008/50/EC

Ø 32,2

62,7
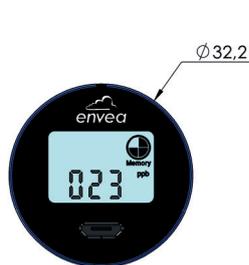
TOP

SIDE

BOTTOM

SYSTEM SPECIFICATIONS

Power supply	5VDC / 500mA, USB port of a PC or Power bank (not provided)
Gas sampling method	Air sampling with a controlled micro-fan
I/O login & communications	USB, UART, Modbus
LCD Display	Concentration in ppb or ppm, life time of the sensor, operating status, memory available, …
Control & data treatment board	Internal microprocessor for data acquisition and treatment, embedded timer
Data Storage	20 days for 1 min data, 303 days for 15 min data or 1212 days for 60 min data
Download data mode	Cairsoft (free download on our website), eSAM data acquisition