Cairsens© Micro-Sensors - Technical Specifications

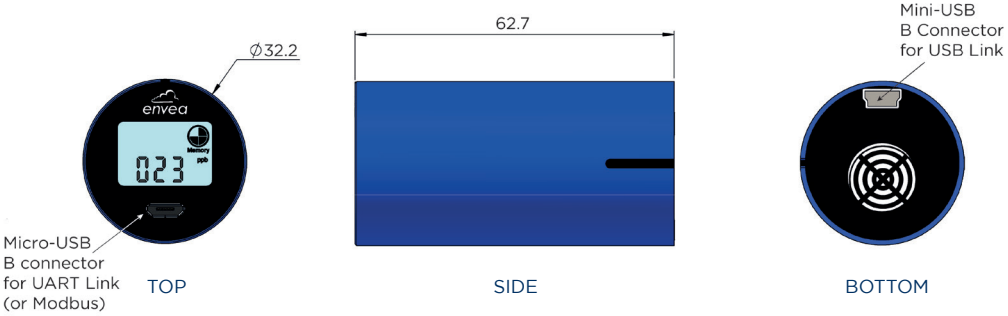
Most of the Cairsens© sensors use amperometric technology consisting of three electrodes: the working electrode (anode), the counter electrode (cathode) and the reference electrode. The gas to be analyzed is diffused through a permeable membrane towards the sensitive electrode. The function of the gas,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

* Cairsens® are manufactured in France and calibrated in our metrological laboratory using Standard Reference AQMS monitors. Every sensor shipped includes a calibration certificate. No maintenance and no need for recalibation for 1 year warranty.

STORAGE CONDITIONS	
Temperature (°C)	+5 to +20
Relative Humidity (% HR)	> 15 (non-condensing)
Maximum Storage Duration	3 months for all gas sensors, 6 months for VOC sensors

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

SYSTEM SPECIFICATIONS	
Power supply	5VDC / 500mA, USB port of a PC or Power bank (not provided)
Power Consumption	Less than 20 mA under 5VDC
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



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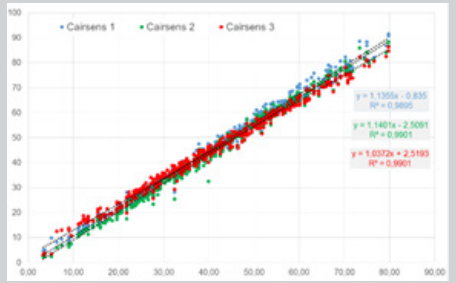
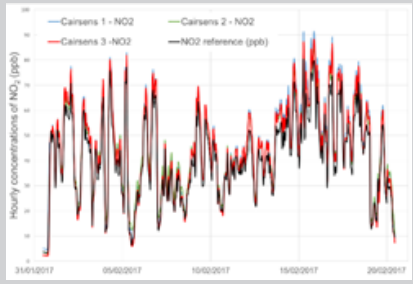
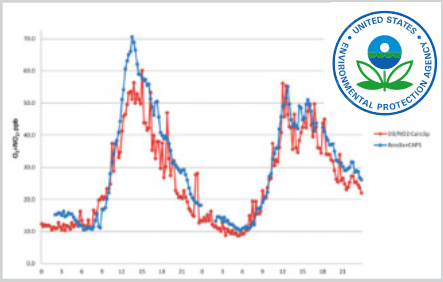
Excellent measurement accuracy is achieved by limiting the effect of humidity interference by using a specific and patented inlet filter combined with dynamic sampling.



Correlation of measurements:
Reference station vs Cairsens NO_2 (ppb)



NO_2 measurement comparison:
Traffic reference-station vs 3 Cairsens



O_3 monitoring, comparative test:
Cairsens vs Reference method

Metrological Performances[1]

	Criteria pollutants (Air Quality)				Odorous Compounds						
Measured Parameter	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						
Linearity	< ± 10 %				< ± 10 %						
Measurement Uncertainty[2]	± 25 %	± 30 %	± 25 %	± 25 %	± 30 %	± 30 %	± 30 %	± 30 %		± 30 %	± 30 %
Response Time	< 90 s	< 90 s	90 s	< 90 s	< 90 s	< 90 s	< 90 s	90 s		60 s	60 s
Calibration & Carrier gases	NO_2 + wet air	O_3 + wet air	SO_2 + wet air	CO + wet air	H_2S + wet air			NH_3 + wet air		Isobutylene (C_4H_8) + Synthetic Air	
Reference compound for the sensibility	NO_2 + wet air	O_3 + wet air	SO_2 + wet air	CO + wet air	H_2S + wet air			NH_3 + wet air		Isobutylene (C_4H_8) + Synthetic Air	
Quantification Limit (QL) (ppm)	0.04	0.04	0.1	0.1	0.02	0.06	0.4	1		0.4	1
Cross-Sensitivity	Cl_2 ~ 80%	Cl_2 ~ 80%	NO_2 & O_3 ~ -125% H_2S ~ 5% CO & H_2 <1 %	H_2 (4) < 60 %	Others VRSC[4] (SO_2, OCS, C_2H_6S, C2H6S2) < 100% Oxidant species negative interference (O_3, NO_2) ~ 30%			Interferent SO_2 H_2S NO NO_2 Cl_2	Concentration 20 ppm 20 ppm 20 ppm 20 ppm 20 ppm	Reading -7 ppm 7 ppm -1 ppm -20 ppm -55 ppm	Available list on request [6]
Exposure Limit to O_3	7.5 ppm/day[3]	N/A	N/A	N/A	N/A			N/A		N/A	N/A
Sensor Type	Electrochemical				Electrochemical					PID[5] lamp ionization potential = 10,6eV[6]	

Operating Temperature (°C)	-20 to +40	-20 to +40	-20 to +50	-20 to +50	-20 to +40	-20 to +40	-20 to +50
Operating Relative Humidity (HR%)	10 to 90 (non-condensing)				10 to 90 (non-condensing)		
Operating Pressure (mbar)	1013 ± 200				1013 ± 200		

(1) According to our operating conditions in laboratory: 20°C +/- 2°C / 50% RH +/- 10% / 1013 mbar +/- 5% (2) According to the Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.
(3) Beyond this limit, the ozone filter performance decreases. (4) VRSC = Volatile Reduced Sulfur Compounds (5) Photo-Ionization Detector (6) The Detector will respond to most common volatiles compounds that have an ionization potential less than 10.6eV.

Measurements meet European directive 2008/50/EC for indicators

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