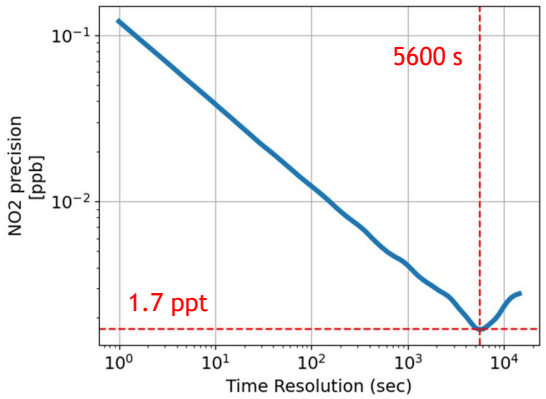
Airyx
DIFFERENT THINKING. BETTER MEASURING.
A SPIN-OFF FROM THE UNIVERSITY OF HEIDELBERG INSTITUTE OF ENVIRONMENTAL PHYSICS

ICAD NO_2-NO_x-NO Analyzer SERIES 210DL

PATENTED, FAST, ACCURATE AND DIRECT NITROGEN DIOXIDE DETECTION

ICAD-NOx-210DL series featuring 19" rack housing and OLED display.



Time scaled modified Allan deviation for NO_2 precision. Note: Detection limits are defined as twice the modified Allen deviation values.

WI-FI

LOW MAINTENANCE

LOW POWER CONSUMPTION

DIRECT NO_2 DETECTION

- ✓ Iterative Cavity DOAS (ICAD) spectroscopy
- ✓ High resolved spectroscopic NO_2 detection from 430 to 480 nm using fingerprint of NO_2 spectrum
- ✓ No observed interferences, e.g. to water, glyoxal, Ozone
- ✓ No sample drying, e.g. Nafion tubing, required

NO_x MEASUREMENTS BY INTERNAL CONVERSION

- ✓ Patented, NO_x-free ozone generator for NO conversion
- ✓ Dual measurement cells for parallel NO_2 and NO detection

LONG-TERM STABILITY AND ROBUSTNESS

- ✓ Insensitive to temperature and vibrations
- ✓ Independent from absolute light source intensity
- ✓ No zero-point drift, integrated zero measurement

EASY SET-UP AND OPERATION, LOW MAINTENANCE

- ✓ No gas calibration required, minimal maintenance effort
- ✓ Controllable via Wi-Fi devices (PC, tablet, smartphone)
- ✓ Multiple data communication protocols
- ✓ 19” rack
- ✓ Sustainable: Long life time, low power consumption

SERIE 210 NEW FEATURES

- ✓ System health user interface and on-board diagnosis
- ✓ Easy adjustment of span calibration in user interface
- ✓ Enhanced time resolution of 1 second
- ✓ Improved accuracy at high concentrations
- ✓ Improved long term stability

Patents: EP3329251; D502016003239.4; GB3329251; FR3329251; US10473583B2; ZL201680057099.6; DE102015000423 (pending); EP325928; D502016014735.3; GB3325928; FR3325928

ICAD Product webpage

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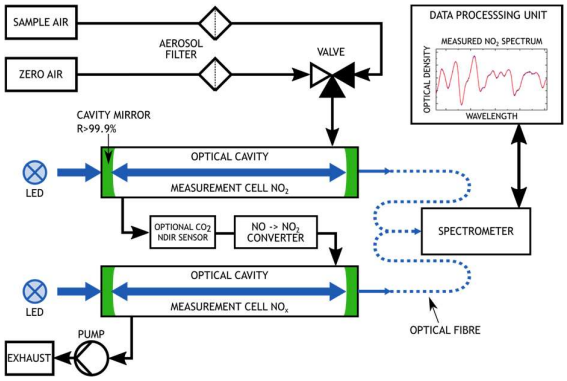
GRAPHICAL USER INTERFACE AND ON-BOARD DIAGNOSIS

The Graphical User Interface provides easy operation and quick access to advanced functions and data time series. The ICAD can be accessed and controlled by any Wi-Fi device (PC, tablet, smartphone) without additional software/apps required. A comprehensive system health table shows the health status of critical sensor data (e.g. gas flow, supply voltage, temperature) for easy and fast on-board diagnosis.

MEASUREMENT PRINCIPLE AND GAS FLOW

ICAD instruments are based on optical resonators which provide here long absorption paths of up to 4 km for precise NO_2 / NO_x detection especially at low concentrations. Gas concentrations are derived by patented Iterative Cavity DOAS (ICAD) spectroscopy between ~430 to 480nm. Below, the measurement scheme incl. additional NO to NO_2 converter for NO_x measurement and optional CO_2 sensor is shown.



INSTRUMENT SPECIFICATIONS

Measurement range[1]	0 – 2000 ppb	**Other detectable gases**	Glyoxal, CO_2 (optional NDIR sensor)
Time resolution	1 sec minimum temporal averaging	**Mechanical stability**	Insensitive to vibrations
Limit of detection[1] **(2σ)**	0.03 ppb at 60 sec	**Power consumption**	Less than 40 W at 12 V (typ.)
Precision (1σ)	0.12 ppb at 1 sec 0.02 ppb at 60 sec	**Processing unit**	Internal embedded PC, with data analysis and measurement software
Detection of NO_2	Direct ICAD spectroscopy	**Temp. range of operation**	-10 to +40°C
Detection of NO_x / NO	By conversion to NO_2	**Temperature sensitivity**	Less than 0.01 ppb/°C
Response time (10% to 90%)	<3 sec at 2 l/min (flow adjustable)	**Cross sensitivity**	No significant cross sensitivity[5]
Zero Drift	Less than 0.1 ppb/month[2]	**Weight**	Less than 12 kg (depending on config)
Sample flow	1 to 2 l/min	**Consumable gases**	No gases needed for operation
Path length characterization	Helium (every 1 to 2 years, optional) or NO_2 reference measurement or Gas free ICOM[3] method	**Dimensions W x H x D**	19" rack housing 43.8 x 13.3 (3HU) x 66.5 cm
Calibration	NO_2 calibration gas not needed[4]; NO gas for converter calibration above 1000 ppb (~every 12 months)	**Data communication**	LAN/Wi-Fi/RS232/M2M/OPCUA; Bayern-Hessen Protocol; Volt./Current Output
		Start-up time	Less than 1 min (typ.)
Model variations	ICAD-NO2-210L (NO_2 only) ICAD-NOx-210DL ($NO + NO_2$)		

[1] Custom configurations / measurement ranges available. By reducing the measurement range better precision and LOD can be achieved.

[2] Upper limit. Regularly automated zero measurement reduce measurement noise and guarantee also a negligible zero drift.

[3] ICOM (upcoming with software update): Integrated Calibration by means of optical Modulation. Patented gas free calibration method allows consumable free, automatic path length monitoring and calibration of ICAD measurement cells. Patents: EP325928; D502016014735.3; GB3325928; FR3325928

[4] Literature absorption data for NO_2 is used for gas quantification.

[5] No significant spectroscopic cross sensitivity to: Carbon oxides, Formaldehyde, Ozone, Methane, Hydrogen, Sulphide, Sulphur dioxide, Chlorine, Chlorine dioxide, Hydrogen cyanide, Hydrogen chloride, Phosphine, Hydrogen, Ammonia, Acetylene, Nitromethane, Ethylene, Ethanol, Methyl mercaptan, Ethyl mercaptan.