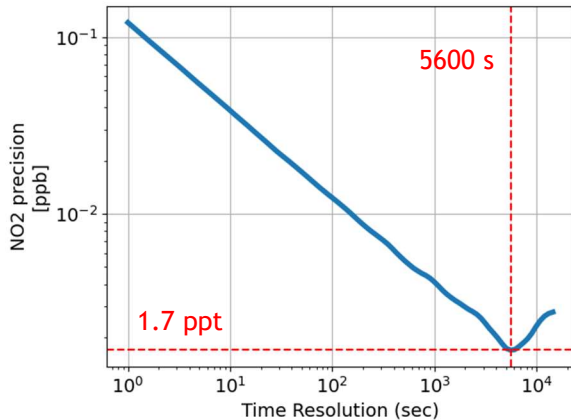


ICAD NO₂-NO_x-NO Analyzer SERIES 210DL

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 NO₂ precision. Note: Detection limits are defined as twice the modified Allen deviation values.



DIRECT NO₂ DETECTION

- ✓ Iterative Cavity DOAS (ICAD) spectroscopy
- ✓ High resolved spectroscopic NO₂ detection from 430 to 480 nm using fingerprint of NO₂ 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 NO₂ 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



Contact Airyx

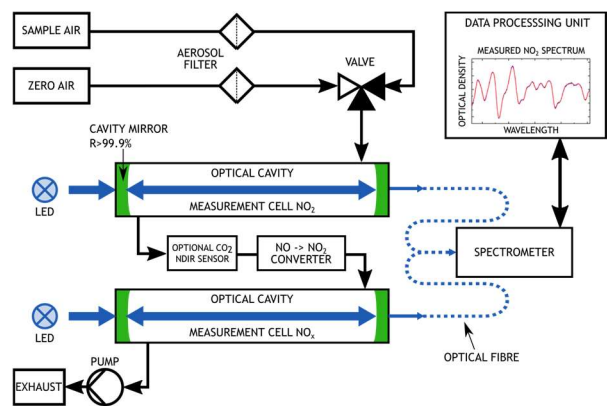
GRAPHICAL USER INTERFACE AND ON-BOARD DIAGNOSIS

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 NO₂ / 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 NO₂ converter for NO_x measurement and optional CO₂ sensor is shown.



INSTRUMENT SPECIFICATIONS

| | | | |
|--|--|---------------------------------|---|
| Measurement range¹ | 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 detection¹ (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 NO₂ | 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%) | 1 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 |
| Model variations | ICAD-NO2-210L (NO ₂ only) ICAD-NOx-210DL (NO + NO ₂) | Start-up time | Less than 1 min (typ.) |

[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 NO₂ 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.