ABB MEASUREMENT & ANALYTICS | DATA SHEET

LGR-ICOS™ GLA451-N2OI2/N2OI3

Isotopic N_2O analyzers – EP QC Benchtop

Highly sensitive, accurate and stable analyzer for reliable measurement of N_2O, $\delta^{15}N$, $\delta^{15}N_\alpha$, $\delta^{15}N_\beta$, $\delta^{18}O$ and $\delta^{17}O$*.

Measurement made easy

LGR-ICOS™ GLA451-N2OI2/N2OI3 Enhanced performance quantum cascade benchtop analyzer

Overview

The ABB LGR-ICOS gas analyzers build on the heritage and extensive track record of Los Gatos Research analyzers, using patented Off-Axis Integrated Cavity Output Spectroscopy (OA-ICOS) technology, the latest evolution in tunable diode laser absorption spectroscopy.

The GLA451-N2OI2 and GLA451-N2OI3 enhanced performance quantum cascade (EP QC) benchtop analyzers provide continuous and precise analysis of the site-specific isotopic ratios $\delta^{15}N^{\alpha}$, $\delta^{15}N^{\beta}$, $\delta^{18}O$ and $\delta^{17}O$* of N_2O directly and without any preconcentration or water cooling. They allow distinguish between two structural isomers containing one heavy isotope of nitrogen, namely $^{14}N^{15}N^{16}O$ and $^{15}N^{14}N^{16}O$, referred to as $^{15}N^{\alpha}$ and $^{15}N^{\beta}$, respectively.

The intramolecular distribution of ^{15}N in N_2O can provide useful information about the geochemical cycle of N_2O because many biological and chemical processes have distinct isotopic signatures. It is used for instance to elucidate processes associated to nitrogen cycle in soils, or analysis of nitrates in water, as well as in ambient air for nitrogen source allocation.

ABB's enhanced performance (EP) OA-ICOS analyzers incorporate proprietary internal thermal control for ultra-stable measurements with unsurpassed precision, accuracy and drift. Moreover, ABB's analyzers provide reliable guaranteed measurements at mole fractions more than 20 times ambient levels without extra calibration.

ABB's patented OA-ICOS technology, a fourth-generation cavity enhanced absorption technique, has many advantages over older conventional and delicate cavity ringdown spectroscopy and direct absorption techniques. OA-ICOS analyzers are simpler, easier to operate and more rugged. They exhibit negligible zero and span drift and a significantly reduced need for regular calibration with expensive reference gases. As a result, ABB analyzers provide higher performance and reliability with minimal operational cost.

The GLA451-N2OI2 and GLA451-N2OI3 have an internal computer that can store data practically indefinitely (for applications requiring unattended longer term operation), and send real-time recordings to a data logger through its analog and digital (RS232) outputs. The analyzers include control and analysis software.

*GLA451-N2OI3 only

Features and benefits

- Simultaneous measurements of N_2O and its stable isotopes
- Highest accuracy, precision and low drift
- Installed and operational in minutes
- Batch operation option via gas autoinjector or manually from a syringe
- Robust to cross-interferences
- Extremely high dynamic range
- Unsurpassed reliability
- Real-time diagnostics
- N_2O measurement rates selectable up to 10 Hz with fast-flow mode (optional dual use)

Specifications

Item (gases)	N_2O	$\delta^{15}N$, $\delta^{15}N^{\alpha}$, $\delta^{15}N^{\beta}$	$\delta^{18}O$	$\delta^{17}O$
Precision (1σ, 300 sec)	0.05 ppb	1 ‰	< 2 ‰	< 40 ‰
Maximum drift (15 min. average, at STP,over 24 hrs, reference check every 3 hrs)	< 1 ppb	< 1 ‰	< 1 ‰	< 1 ‰
Linear measurement range	Up to 10 ppm	N_2O: Up to 100 ppm	N_2O: Up to 100 ppm	N_2O: Up to 100 ppm
Operational range	Up to 100 ppm	N_2O: Up to 1000 ppm	N_2O: Up to 1000 ppm	N_2O: Up to 1000 ppm
Data rate (user selectable)	Standard: 1, 10, 20, 100 seconds • • With fast-flow option: 10 Hz, 5 Hz, 2 Hz			
Ambient temperature	0 to 45 °C (32 to 122 °F)			
Ambient humidity	<99% non-condensing			
Output signal	Ethernet, USB, Serial (RS-232), WiFi (optional)			
Power	115/230 VAC, 50/60Hz 400 W (steady state) • • Max 520 W with ACC-DP3H external pump • • Max 650 W with ACC-DP4H external pump			
Dimensions (H x W x D)	243 x 36 x 114 cm (17 x 14 x 45 in.)			
Weight	72 kg (158 lbs)			
Measuring principle	Off-axis Integrated Cavity Output Spectroscopy (OA-ICOS)			

Ordering information

Analyzer model	Analyzer series	Gas measured	Vacuum pump
GLA451-N2OI2	GLA451 Series – Enhanced Performance Quantum Cascade Benchtop	Nitrous oxide and its stable isotopes (N_2O, $\delta^{15}N$, $\delta^{15}N^{\alpha}$, $\delta^{15}N^{\beta}$, $\delta^{18}O$)	Internal (standard)
GLA451-N2OI3		Nitrous oxide and its stable isotopes, incl. $\delta^{17}O$ (N_2O, $\delta^{15}N$, $\delta^{15}N^{\alpha}$, $\delta^{15}N^{\beta}$, $\delta^{18}O$, $\delta^{17}O$)	

Accessories and options

Item	Description
MIU-16	**Multiport Inlet Unit** Automated control of up to 16 inlet ports
MIU-8	**Multiport Inlet Unit** Automated control of up to 8 inlet ports
ACC-AUTOINJECT-HP	**Head-space gas auto-injector** Controlled by analyzer Including racks and starter supply kit
ACC-DP3H	**3-head Diaphragm External Pump**
OPT-DATALOG	**Digital Data Logging Capability** Multi-channel data logging option records and synchronizes serial (RS-232) outputs from multiple ABB analyzers and other devices

Item	Description
ACC-DP4H	**4-head Diaphragm External Pump** ~2.5x pumping speed of ACC-DP3H Fast flow option only
ACC-DS10	**Dry Scroll External Pump** ~9x pumping speed of ACC-DP3H Fast flow option only
ACC-DS35	**Dry Scroll External Pump** ~25x pumping speed of ACC-DP3H For >5Hz response time Fast flow option only
OPT-FAST-FLOW	**Fast-flow plumbing option (dual-use)** For faster response time; for use with external 4-head diaphragm pumps and dry-scroll pumps

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