

LGR-ICOS™ GLA451-N2O12/N2O13

Isotopic N₂O analyzers – EP QC Benchtop



Highly sensitive, accurate and stable analyzer for reliable measurement of N₂O, $\delta^{15}\text{N}$, $\delta^{15}\text{N}_\alpha$, $\delta^{15}\text{N}_\beta$, $\delta^{18}\text{O}$ and $\delta^{17}\text{O}^*$.

Measurement made easy

LGR-ICOS™ GLA451-N2O12/N2O13
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-N2O12 and GLA451-N2O13 enhanced performance quantum cascade (EP QC) benchtop analyzers provide continuous and precise analysis of the site-specific isotopic ratios $\delta^{15}\text{N}_\alpha$, $\delta^{15}\text{N}_\beta$, $\delta^{18}\text{O}$ and $\delta^{17}\text{O}^*$ of N₂O directly and without any preconcentration or water cooling. They allow distinguish between two structural isomers containing one heavy isotope of nitrogen, namely ¹⁴N¹⁵N¹⁶O and ¹⁵N¹⁴N¹⁶O, referred to as ¹⁵N^α and ¹⁵N^β, respectively.

The intramolecular distribution of ¹⁵N in N₂O can provide useful information about the geochemical cycle of N₂O 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-N2O12 and GLA451-N2O13 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-N2O13 only

Features and benefits

- Simultaneous measurements of N₂O 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
- N₂O measurement rates selectable up to 10 Hz with fast-flow mode (optional dual use)

Specifications

Item (gases)	N ₂ O	δ ¹⁵ N, δ ¹⁵ N ^α , δ ¹⁵ N ^β	δ ¹⁸ O	δ 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 ₂ O: Up to 100 ppm	N ₂ O: Up to 100 ppm	N ₂ O: Up to 100 ppm
Operational range	Up to 100 ppm	N ₂ O: Up to 1000 ppm	N ₂ O: Up to 1000 ppm	N ₂ O: 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-N2O12	GLA451 Series – Enhanced Performance Quantum Cascade Benchtop	Nitrous oxide and its stable isotopes (N ₂ O, δ ¹⁵ N, δ ¹⁵ N ^α , δ ¹⁵ N ^β , δ ¹⁸ O)	Internal (standard)
GLA451-N2O13		Nitrous oxide and its stable isotopes, incl. δ ¹⁷ O (N ₂ O, δ ¹⁵ N, δ ¹⁵ N ^α , δ ¹⁵ N ^β , δ ¹⁸ O, δ ¹⁷ O)	

Accessories and options

Item	Description	Item	Description
MIU-16	Multiport Inlet Unit Automated control of up to 16 inlet ports	ACC-DP4H	4-head Diaphragm External Pump ~2.5x pumping speed of ACC-DP3H Fast flow option only
MIU-8	Multiport Inlet Unit Automated control of up to 8 inlet ports	ACC-DS10	Dry Scroll External Pump ~9x pumping speed of ACC-DP3H Fast flow option only
ACC-AUTOINJECT-HP	Head-space gas auto-injector Controlled by analyzer Including racks and starter supply kit	ACC-DS35	Dry Scroll External Pump ~25x pumping speed of ACC-DP3H For >5Hz response time Fast flow option only
ACC-DP3H	3-head Diaphragm External Pump	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
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		

ABB Inc.
Measurement & Analytics
3400, Rue Pierre-Ardouin
Quebec, Quebec
Canada G1P 0B2
Tel: +1 418 877-2944
Email: icos.sales@ca.abb.com
abb.com/analytical

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