

# Enhanced Performance series delivers ultra-high stability and highest performance

Now available in ultraportable package



## LGR delivers

## N<sub>2</sub>O/CO Analyzer

### Features and Benefits

- Developed for applications requiring highest accuracy (Enhanced Performance model)
- Real-time simultaneous N<sub>2</sub>O, CO and H<sub>2</sub>O measurements
- Sub-ppb precision (N<sub>2</sub>O, CO) in less than 1 second
- Measurement rates up to 10 Hz (external pump required)
- Reports N<sub>2</sub>O and CO on a dry and wet mole fraction basis
- No cryogenics or water cooling
- Operational in minutes without training
- High-resolution absorption spectra are viewable for instrumental diagnostics
- New ultraportable package allows measurements anywhere

LGR's N<sub>2</sub>O/CO Analyzer is the first instrument capable of continuously measuring ambient levels of nitrous oxide and carbon monoxide with high precision in real time (data rates to 10 Hz with optional external pump). Users can set up the instrument in minutes. Since CO is an excellent tracer of anthropogenic emissions, simultaneous measurements of CO and N<sub>2</sub>O can allow scientists to correlate the sources of N<sub>2</sub>O emissions. The N<sub>2</sub>O/CO Analyzer now also simultaneously measures water vapor mole fraction. As a result, the instrument reports N<sub>2</sub>O and CO on a dry mol basis (accurately corrects for water vapor dilution and absorption line broadening effects) without the need for sample drying or empirical corrections. (For simultaneous high precision measurements of CO and CO<sub>2</sub>, please refer to LGR's CO/CO<sub>2</sub> Analyzer.)

The N<sub>2</sub>O/CO Analyzer is designed for many demanding applications including trace-gas (air quality) monitoring (e.g., GAW stations), eddy-correlation flux measurements, chamber flux measurements, and combustion diagnostics. The Analyzer is particularly well suited for measurements in the field and has been successfully deployed on-board aircraft for measurements in the upper troposphere / lower stratosphere. The N<sub>2</sub>O/CO Analyzer is unaffected by other atmospheric gases.

The N<sub>2</sub>O/CO Analyzer is available in different packages to serve customers' requirements. For measurements with highest precision and stability, LGR's "Enhanced Performance" packaging incorporates proprietary internal thermal control for ultra-stable measurements with unsurpassed precision, accuracy, linearity, stability and drift. For field studies or other applications requiring portability (e.g., flux chambers), the N<sub>2</sub>O/CO

Analyzer is now available in LGR's acclaimed ultraportable package.

Moreover, only LGR's analyzers provide reliable measurements (guaranteed) at concentrations more than 20 times greater than typical ambient levels and, unlike competitive instruments operating in the near-IR, without cross-sensitivity to hydrocarbons and other gases in ambient air. Furthermore, LGR's Analyzers report measurements over the widest range of ambient temperatures allowing users to easily record reliable data in the field.

The N<sub>2</sub>O/CO Analyzer uses LGR's patented Off-axis ICOS technology, the fourth-generation cavity enhanced absorption technique, which employs a high-finesse optical cavity as the measurement cell. LGR's technology has many proven advantages over conventional first-generation cavity ringdown spectroscopy (CRDS) techniques, including higher performance, inherent robustness, build simplicity and serviceability by anyone, anywhere, anytime. In addition, since LGR's technology can record reliable absorption spectra over a far wider range compared with CRDS, LGR Analyzers provide measurements over a much larger range of concentrations and without cross sensitivity.

The N<sub>2</sub>O/CO Analyzer includes an internal computer (Linux OS) that can store data practically indefinitely on its internal hard drive (for applications requiring unattended longer term operation), and send real-time data to a data logger through its analog and digital (RS232) outputs. As with all LGR analyzers, the N<sub>2</sub>O/CO Analyzer may be controlled remotely via the Internet. This capability allows the user to operate the analyzer using a web browser anywhere.

# N<sub>2</sub>O/CO Analyzer

## Performance Specifications

Precision (1 $\sigma$ , 1 second / 3 minutes):

N<sub>2</sub>O: 0.1 ppb / 0.050 ppb (Standard, EP)

CO: 0.1 ppb / 0.050 ppb (Standard, EP)

H<sub>2</sub>O: 50 ppm / 10 ppm (Standard, EP)  
(Precision 2 $\times$  worse for Ultraportable Model)

Measurement Rates:

All parameters measured simultaneously at user-selectable rates up to 10 Hz (except Ultraportable Model) (optional pump required for flow rates >1 Hz)

Maximum Drift (Enhanced Performance models)  
(15 min average, at STP, over 24 hrs):

CO: 0.1 ppb

N<sub>2</sub>O: 0.1 ppb

H<sub>2</sub>O: 50 ppm or 1% reading, whichever greater

Linear Dynamic Range:

N<sub>2</sub>O: 1 – 4000 ppb

CO: 1 – 4000 ppb

Dynamic Range:

N<sub>2</sub>O: 0 – 10 ppm

CO: 0 – 10 ppm

Temperature/Humidity:

Sample Temperature: -30 – 50 °C

Operating Temperature:

10 – 35 °C (Standard Model, Ultraportable Model)

0 – 45 °C (Enhanced Performance Model)

Ambient Humidity:

non-condensing (0–98% RH)

Fittings:

Inlet: 1/4" or 3/8"

Outlet (internal pump): 1/4"

Outlet (optional external vacuum pump): 1/2"

Outputs:

Digital (RS-232), analog, Ethernet, USB

Power Requirements:

115/230 VAC, 50/60 Hz

180 watts (Standard, Ultraportable Models; steady state)

300 watts (Enhanced Performance Model; steady state)

Dimensions:

19" W  $\times$  31.5" D  $\times$  8.75" H (Standard Model)

19" W  $\times$  31.5" D  $\times$  19.25" H (Enhanced Performance Model)

20" W  $\times$  24" D  $\times$  8" H (Ultraportable)

Weight:

36 kg (Standard Model)

68 kg (Enhanced Performance Model)

23 kg (ultraportable analyzer) + 6 kg (external power module)



## Ordering Information

Part Number 916-0015 (Standard Model)

Part Number 913-0015 (Enhanced Performance Model)

Part Number 909-0025 (Ultraportable Model)

## Accessories (optional)

908-0003-9001: Multiport Inlet Unit –  
Automated control of up to 16 inlet ports

908-0003-9002: Multiport Inlet Unit –  
Automated control of up to 8 inlet ports

908-0008-9009: N920 Pump –  
Provides flow-through response (1/e) time of 1.2 seconds

908-0001-9011: N940 Pump –  
Provides flow-through response (1/e) time of 0.5 seconds

908-0001-9001: Dry Scroll Pump –  
Provides flow through (1/e) time < 0.1 secs

907-0005-9002: Dynamic Dilution System –  
Extends upper measurement range by a factor of 100 through  
automated sample dilution

904-0002: Data Logging System – multi-channel data logging  
system records and synchronizes serial (RS-232) outputs from  
multiple LGR analyzers and other devices (GPS, anemometers)

## Option

Fast flow (provides the ability to achieve up to 10-Hz flow response with  
optional external vacuum pump)



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