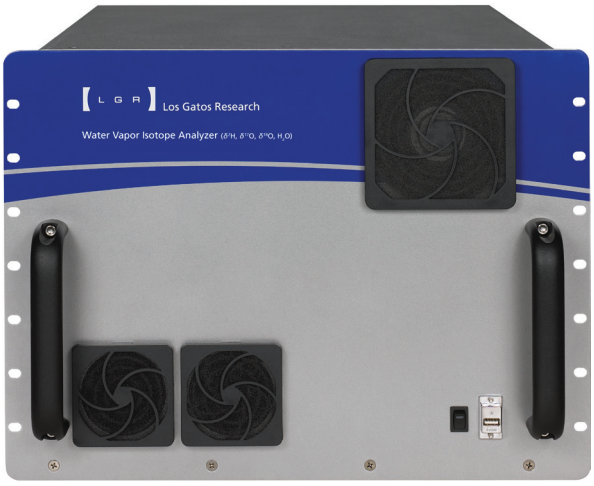
Simultaneous measurements of δ^2H, $\delta^{17}O$, $\delta^{18}O$ and H_2O in air



now, also available in ultraportable package

Water Vapor Isotope Analyzer

Features and Benefits

- Only instrument to report δ^2H, $\delta^{17}O$, $\delta^{18}O$ and H_2O simultaneously
- Automated dual-inlet operation provides unsurpassed accuracy, precision, and ease of use
- Highest precision, reliable measurements at 2 Hz
- High-resolution absorption spectra provide data validation and detailed system diagnostics
- Now available in LGR's Ultraportable package
- Accurate measurements over an extremely wide range of mixing ratios and isotopic ratios
- Proven fast flow time response allows isotopic flux studies
- Enhanced Performance models provide measurements with negligible drift
- Insensitive to other ambient air constituents like methane or carbon dioxide

Reliable in-situ measurements of δ^2H, $\delta^{17}O$, and $\delta^{18}O$ in water contained in liquids, vapor, fog and clouds are important in modeling vapor dynamics and determining potential feedbacks on future climate change. In addition, fast, high-frequency isotopic water measurements provide detailed time-resolved information on the eco-physiological performance of plants and enable improved understanding of water fluxes and evapo-transpiration at ecosystem scales. These applications require rapid measurements with high accuracy and precision over a wide range of water-vapor mole fractions.

LGR's Water Vapor Isotope Analyzer uniquely meets all of these requirements. In addition, the WVIA may be combined with LGR's Water Vapor Isotope Standard Source (WVISS), which provides a controllable reference flow of isotopic water vapor standards. The system composed of the WVIA and WVISS provides automated, dual-inlet operation and accurate, traceable δ^2H, $\delta^{17}O$, $\delta^{18}O$ and water vapor mole fraction measurements without drift.

LGR's "Enhanced Performance" models incorporate proprietary internal thermal control for ultra-stable measurements with inherently negligible drift, unsurpassed precision and highest accuracy over extremely large range of mole fractions. In addition, the availability of value-added options extends the abilities of the unit to automatically handle multiple inlets and for measurements at various locations automatically.

In response to customer demand, LGR's WVIA is now available in the acclaimed Ultraportable package (15 kg, 65 W) for ease-of-use anywhere.

The WVIA uses LGR's patented Off-axis ICOS technology, a fourth-generation cavity enhanced absorption technique. Off-axis ICOS has many advantages over conventional cavity ringdown spectroscopy (CRDS) techniques such as being simpler to build, operate and maintain, having a much shorter measurement time, and not requiring expensive and power consuming auxiliary components.

As with all LGR analyzers, the WVIA provides users with the entire absorption spectra and may be fully controlled remotely via the Internet. These capabilities allow the user to fully control and operate the analyzer practically anywhere Internet access is available without being on site.

Water Vapor Isotope Analyzer (EP and portable models)

Performance Specifications

Precision (1s, 10 sec / 100 sec):
- δ^2H: 0.5‰ / 0.2‰
- $\delta^{17}O$: 0.15‰ / 0.05‰ (models 911-0034, 912-0034)
- $\delta^{18}O$: 0.15‰ / 0.05‰
- $[H_2O]$: 0.2% / 0.07%

Maximum Drift (15 min average, at STP, over 24 hrs):
- δ^2H: 0.8‰
- $\delta^{17}O$: 0.2‰ (models 911-0034, 912-0034)
- $\delta^{18}O$: 0.2‰
- $[H_2O]$: 0.1%

Measurement Rates:
- Up to 2 Hz (up to 5 Hz, upon request)

Accuracy:
- Total measurement uncertainty <0.1% (with WVISS)

Measurement Range:
- 4000 – 60000 ppm (non-condensing)
- (measurements down to 100 ppm upon request)

Sampling Conditions:
- Sample Temperature: -30 – 50 °C
- Operating Temperature: 0 – 40 °C
- Ambient Humidity: 0-100% RH, non-condensing

Outputs:
- digital (RS232), Ethernet, USB

Power Requirements (steady state):
- 115/230 VAC, 50/60Hz, 200 watts (models 911-, 912-)
- 10-30 VDC, 115/230 VAC, 65 watts (model 909-0032)

Dimensions:
- 11″ × 38″ × 22″ (benchtop package)
- 14″ × 19″ × 24″ (rackmount package)
- 18.5′ x 14″ x 7″ (portable package)

Weight:
- 35 kg (rackmount package)
- 40 kg (benchtop package)
- 15 kg (portable package)

Ordering Information

WVIA-911 (δ^2H, $\delta^{18}O$; EP Rackmount, GLA331 Series)

WVIA-912 (δ^2H, $\delta^{18}O$; EP Benchtop, GLA431 Series)

TWVIA- 911(δ^2H, $\delta^{17}O$, $\delta^{18}O$; EP Rackmount, GLA331 Series)

TWVIA-912 (δ^2H, $\delta^{17}O$, $\delta^{18}O$; EP Benchtop, GLA431 Series)

U-WVIA-915 (δ^2H, $\delta^{18}O$; Ultraportable, GLA132 Series)

Options

Low mole fraction operation – Specify whether ranges of mole fractions will be lower than normal range

Accessories

WVISS-EXT: Water Vapor Isotope Standard Source – Provides controllable flow of water vapor at known humidity and isotope ratios for automated calibration of the WVIA

MIU-16: Multiport Inlet Unit –
Automated 16-port multiplexer

MIU-8: Multiport Inlet Unit –
Automated 8-port multiplexer

ACC-DP20: 3-head vacuum pump –
Provides fast flow-through times 1.2 sec (Ultraportable)

ACC-DP40: 4-head vacuum pump –
Provides fast flow-through times < 0.5 seconds

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

Instrument complies with 21 CFR 1040.10 and 1040.11

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