

Isotopic liquid water AND water vapor in one instrument

NEW



LGR, simply the best

Isotopic Water Analyzer - Enhanced Performance

Features and Benefits

- Comprehensive system provides unparalleled performance for both isotopic liquid water and water vapor measurements
- 1080 injections (150 unknowns) per day for liquid water
- High Throughput and High Performance modes in single (liquid) system
- Switch between liquid and vapor measurements in seconds
- Highest precision water vapor measurements
- Isotopic water vapor reported at high and low mole fractions
- Fast time response allows isotopic water vapor flux studies
- *Enhanced Performance* series provides unsurpassed stability and lowest drift
- Low power: 180 W (steady state)

LGR's Isotopic Water Analyzer (model IWA-35EP) is the world's most advanced instrument for isotopic water measurements (liquid water and water vapor). The IWA combines the features of LGR's Liquid Water Isotope Analyzer and Water Vapor Isotope Analyzer (Enhanced Performance model) in a single instrument. Specifically, for liquid water samples, the IWA-35EP reports measurements at a rate of 1080 injections per day. With the typical operating procedure (6 injections per sample), this measurement rate yields 150 unknowns and 30 reference samples per day. For measurements of water vapor, the IWA-35EP reports $\delta^{18}\text{O}$ and $\delta^2\text{H}$ and water vapor at up to 2 Hz over a range of mole fractions greater than 60000 ppm H_2O in air. Changing between operational modes could not be simpler. With only a software command, the user can switch from measuring liquid water to measuring water vapor, or vice versa.

LGR's new "Enhanced Performance series" incorporates proprietary internal thermal control for ultra-stable measurements with essentially no drift, unsurpassed precision and highest accuracy. The IWA-35EP uses LGR's patented Off-axis ICOS technology, a fourth-generation cavity ringdown spectroscopy (CRDS) technique, which employs an optical cavity to greatly enhance spectral absorption and enable the fastest and highest precision measurements of any laser absorption technique. LGR's patented technology has many proven advantages over conventional first-generation CRDS techniques. As a result, LGR analyzers are simple to build, inherently robust and easy to operate. As with all LGR analyzers, the IWA-35EP provides users with the absorption spectra for comprehensive

performance validation and diagnostics in real time. Similarly, the IWA-35EP has an internal computer (Linux OS) that can store data practically indefinitely on an internal hard disk drive and send real time data to a data logger via the digital (RS232) or Ethernet outputs. The Analyzer includes advanced post-processor software which provides many features that increase user productivity, decrease data processing time, and provide data and system diagnostics. The LGR software offers a seamless interface with LIMS for Light Stable Isotopes (water.usgs.gov/software/LIMS/) for one-stop reference normalization, sample data storage, and client management.

LGR's Post Analysis Software automatically performs many analysis procedures on liquid measurements that were previously done by researchers after the data was collected. Among the capabilities of LGR's software package are to automatically apply calibration standard measurements made during the sample run, to graphically display all results, and to diagnose instrument operation. Moreover, the Post Analysis Software includes LGR's proprietary Spectral Contamination Identifier (SCI) technology, which detects and quantifies the presence of organic contaminants in water samples based on a detailed analysis of the measured high-resolution absorption spectra.

LGR analyzers may be controlled remotely via the Internet. This capability allows users to operate the Analyzer using a web browser anywhere internet access is available. Furthermore, remote access provides the opportunity to obtain and share data and to diagnose the instrument operation without being on site.

Isotopic Water Analyzer (IWA-35EP)

Liquid Water Specifications:

Precision (1 σ):

Guaranteed: High Performance Mode

0.1‰ for $\delta^{18}\text{O}$

0.3‰ for $\delta^2\text{H}$

Typical: High Performance Mode

0.07‰ for $\delta^{18}\text{O}$

0.2‰ for $\delta^2\text{H}$

Guaranteed: High Throughput Mode

0.2‰ for $\delta^{18}\text{O}$

0.6‰ for $\delta^2\text{H}$

Typical: High Throughput Mode:

0.1‰ for $\delta^{18}\text{O}$

0.3‰ for $\delta^2\text{H}$

Throughput:

1080 injections per day

(optional autoinjector required)

Sample Volume:

1 μL per injection

Salinity:

<4%

Temperatures:

Sample Temperature: 5 – 50 °C

Operating Temperature: 0 – 45 °C

Outputs:

Digital (RS232), Ethernet, USB

Power Requirements:

115/230 VAC, 50/60 Hz

180 watts (total, steady state)

Dimensions (analyzer):

11" H x 38" W x 22" D

Weight (analyzer):

50 kg

Water Vapor Specifications:

Precision (1 σ , 10 sec / 100 sec):

$\delta^{18}\text{O}$: 0.5‰ / 0.15‰

$\delta^2\text{H}$: 2.0‰ / 0.7‰

[H₂O]: 0.2% / 0.07%

Measurement Rates:

Up to 2 Hz (external vacuum pump required for flow time < 6 seconds)

Maximum Drift:

(15 min ave at STP over 24 hrs)

$\delta^{18}\text{O}$: 0.2‰

$\delta^2\text{H}$: 0.8‰

[H₂O]: 0.1%

Measurement Range (meets specs):

4000 to 60000 ppm (non-condensing)

(lower range upon request)

Operating Range:

0 to 70000 ppm

Sampling Conditions:

Sample Temperature:

-20 – 50 °C

Operating Temperature:

0 – 40 °C

Ambient Humidity:

0-100% RH (non-condensing)

Ordering Information

Part Number 912-0026

Options

Low humidity option – extends lower range of water vapor mixing ratio to 500 ppm in air

Accessories

908-0008-9001: Autoinjector – Provides automated injection of liquid samples

908-0004-9001: Water Vapor Isotope Standard Source – Provides controllable flow of water vapor with known humidity and isotope ratios for absolute calibration of isotopic water vapor measurements

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

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