



## Picarro L1102-*i* and L1115-*i*

### World's Highest Performance Isotopic Water Analyzers

#### Picarro L1102-*i* and L1115-*i* Features

- Highest sensitivity, precision & accuracy
- Largest dynamic range with high linearity
- Field and laboratory deployable
- Installed and operational in minutes

The Picarro L1102-*i* and L1115-*i* Isotopic Water Analyzers measure  $\delta^{18}\text{O}$  and  $\delta\text{D}$  and total  $\text{H}_2\text{O}$  concentration from water in both the vapor and liquid phase. These instruments operate solely on Picarro's unique Wavelength-Scanned Cavity Ring Down Spectroscopy (WS-CRDS) - a time-based measurement using a near-infrared laser to quantify spectral features of molecules in a gas contained in an optical measurement cavity. WS-CRDS offers significant performance, ease of use and cost of ownership benefits compared to absorption based technologies. An effective path length of up to 20 kilometers provides exceptional precision and sensitivity. A patented, high-precision wavelength monitor makes certain that only the spectral features of interest, in this case the lines representing the isotopologues of water, are being monitored thereby greatly reducing the analyzer's sensitivity to interfering species. Precise temperature and pressure control systems designed into the systems ensure accurate measurements over long periods of time. As a result, the analyzer maintains high linearity, precision, and accuracy with minimal calibration required.

Easily transportable from site to site, the analyzer can be set up and running within minutes. It is designed to operate both in laboratories and in remote environments. The analyzer can be configured to automatically send out measurement data at regular intervals via the Ethernet or optional modem and can output real-time data in digital format (via RS-232 interface) and via optional analog outputs. Users can connect remotely with the analyzer's internal Windows-based PC and control it through a standard Remote Desktop connection or with similar remote login software.

L1102- <i>i</i> Performance Specifications		Precision, Guaranteed*	Precision, Typical†	High Throughput Typical††	Memory, Typical – 1 <sup>st</sup> Injection	Drift, Guaranteed (peak to peak, 24 hrs)
Water Liquid Performance, Autosampler Inject	( $\delta^{18}\text{O}$ )	< 0.1 ‰	< 0.07 ‰	< 0.15 ‰	98%	< $\pm$ 0.3 ‰
	( $\delta\text{D}$ )	< 0.5 ‰	< 0.2 ‰	< 0.6 ‰	93.5%	< $\pm$ 0.9 ‰
Water Liquid Performance Manual Inject	( $\delta^{18}\text{O}$ )		< 0.1 ‰		98%	< $\pm$ 0.3 ‰
	( $\delta\text{D}$ )		< 0.5 ‰		93.5%	< $\pm$ 0.9 ‰
Water Vapor Performance	( $\delta^{18}\text{O}$ )		< 0.2 ‰			< $\pm$ 0.3 ‰
	( $\delta\text{D}$ )		< 1.0 ‰			< $\pm$ 0.9 ‰

L1115- <i>i</i> Performance Specifications		Precision, Guaranteed*	Precision, Typical†	High Throughput Typical††	Memory, Typical – 1 <sup>st</sup> Injection	Drift, Guaranteed (peak to peak, 24 hrs)
Water Liquid Performance, Autosampler Inject	( $\delta^{18}\text{O}$ )	< 0.1 ‰	< 0.07 ‰	< 0.15 ‰	98%	< $\pm$ 0.3 ‰
	( $\delta\text{D}$ )	< 0.5 ‰	< 0.2 ‰	< 0.6 ‰	93.5%	< $\pm$ 0.9 ‰
Water Liquid Performance Manual Inject	( $\delta^{18}\text{O}$ )		< 0.1 ‰		98%	< $\pm$ 0.3 ‰
	( $\delta\text{D}$ )		< 0.5 ‰		93.5%	< $\pm$ 0.9 ‰
Water Vapor Performance	( $\delta^{18}\text{O}$ )	< 0.2 ‰	< 0.1 ‰			< $\pm$ 0.3 ‰
	( $\delta\text{D}$ )	< 1.0 ‰	< 0.5 ‰			< $\pm$ 0.9 ‰

\*Guaranteed – specifications are tested and documented in the factory against a specific test criterion. Results are provided as Certificate of Compliance to the customer with the instrument

†Typical results represent data gathered from various applications and is dependent on method.

††Using High Throughput mode for liquid water samples

System Configurations	L1102- <i>i</i>	L1115- <i>i</i>
Liquid H <sub>2</sub> O measurements	Yes,	Yes
Vapor H <sub>2</sub> O measurements – with liquid calibration	Yes	Yes
Optional autosampler	Yes	Yes
Optional upgrade to full automatic vapor/liquid switching	No	Yes
LIMS for light stable isotopes compatible	Yes	Yes

System Specifications, L1102- <i>i</i> and L1115- <i>i</i>	
Measurement Technique	WS-CRDS
Vapor Measurement Range	6000 – 26000 ppmv H <sub>2</sub> O concentration, non-condensing
Vapor Measurement Interval	< 30 seconds
Vapor Measurement Sample Temp.	5 to 45 °C. (0 to 50 °C on request)
Vapor Measurement Sample Flow Rate	~30 sccm at 760 Torr, no filtration required
Vapor Measurement Sample Press.	300 to 1000 Torr (40 to 133 kPa)
Vapor Measurement Sample Humidity	< 99% R.H. non-condensing @40°C, no drying required
Operating Temperature (liquid and vapor)	10 to 35 °C (-10 to 50 °C storage)
Gas Requirement Liquid Measurements	Guaranteed specifications performed using dry nitrogen, better than 5 ppmv H <sub>2</sub> O. Zero air and Drierite® compatible
Outputs	RS-232, Ethernet, USB, optional analog, 4-20mA/-10 – 10V
Fittings	¼" Swagelok ®
Dimensions	17 x 9.75 x 23 in (43 x 25 x 59 cm), not inc autosampler 32 x 26 x 28 in (81.3 x 66 x 71.1 cm) inc. autosampler
Weight	58lbs (26.3kg), not inc autosampler < 80 lbs (36.3 kgs) inc. autosampler
Power Requirements	90-120VAC, 50/60 Hz, 220 VAC, 50Hz, < 500W