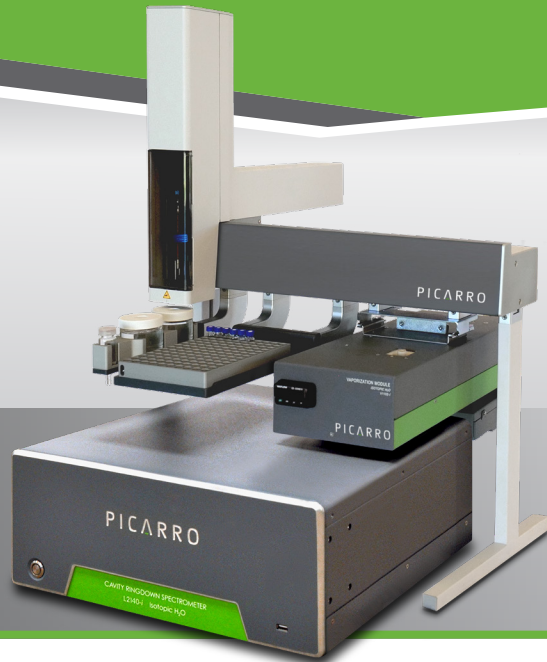


# $\delta^{18}\text{O}$ and $\delta^2\text{H}$ Isotopic Water Analyzer

# PICARRO

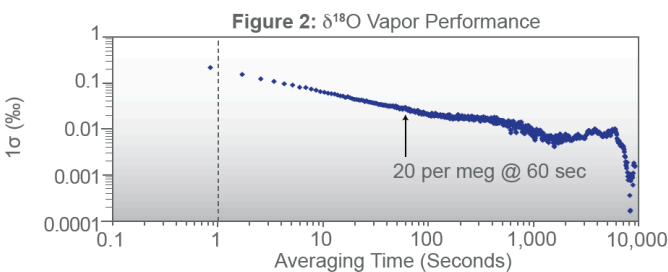
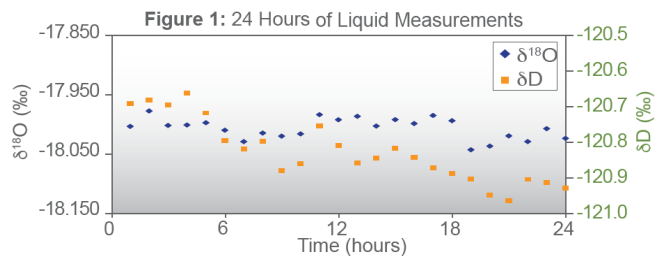


- High-precision measurements of  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$
- Minimal drift: calibrate once per day while measuring with sub permille certainty
- Flexibility to measure water samples from different sources, including liquids, vapor and solids
- Small footprint and robust design
- Intuitive user-interface and data processing
- Increased sample throughput modes available

The **Picarro L2130-*i* isotopic water analyzer** provides the high-quality measurements of water stable isotopes that are critical for demanding applications such as paleoclimatology, hydrology, and oceanography. Our patented CRDS technology uses a laser to quantify spectral features of gas phase molecules in an optical cavity. Picarro's unique design enables an effective measurement path length of up to 20 kilometers in a compact cavity, which delivers exceptional precision and sensitivity in a small footprint. As a result,  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$  are measured with the highest precision and reproducibility (see Figures 1 and 2).

The L2130-*i* has three measurement modes. The Standard mode processes 27 samples per day. The Express mode delivers faster high-precision measurements for up to 50 samples per day. The Survey mode makes super-fast approximations of isotopic values for very large sample batches—up to 900 injections per day. This enables more efficient sorting and rearranging of sample clusters to reduce memory effects, and thereby accelerates the measurement process and increases the accuracy of the results. Combining the Express and Survey modes will further increase throughput by reducing the time it takes to measure 100 samples by up to 68 hours.

The L2130-*i* comes with ChemCorrect™ post-processing software for flagging contamination and normalizing measurements. A variety of peripherals that enable analyzing water in various forms and sources is also available.



Sample	Name	Calibrated $\delta^{18}\text{O}$ Mean	Calibrated $\delta^2\text{H}$ Mean	Ch <sub>4</sub>	C <sub>2</sub> Alcohols	relative Tolerations	Uncalibrated $\delta^{18}\text{O}$ precision	Uncalibrated $\delta^2\text{H}$ precision	slope	curvature
1	WW	3.96	-31.41				0.04	0.04		
2	SD	-23.24	-253.29				0.09	1.15		
3	DW	-21.04	-172.36				0.07	0.85		
4	SWAYWG-R_1	-25.11	-189.89				0.13	0.98		
5	SWAYWG-R_2	-25.33	-189.71				0.06	0.82		
6	SWAYWG-E1Y_1	-25.26	-189.14				0.07	0.90		
7	SWAYWG-E1Y_2	-25.33	-189.35				0.07	0.96		
8	SWAYWG-R_1	-25.36	-189.53				0.05	0.81		
9	SWAYWG-R_2	-25.32	-189.43				0.07	0.82		
10	SWAYWG-E1Y_1	-25.38	-189.55				0.06	0.87		
11	SWAYWG-E1Y_2	-25.32	-189.55				0.06	0.84		
12	SD	-23.11	-184.53				0.04	0.81		
13	TRC-CD-CR-01	-24.77	-184.88				0.07	0.88		
14	TRC-CD-CR-02	-23.62	-183.22				0.13	0.90		
15	TRC-CD-CR-03	-24.50	-183.31	5.00			0.04	0.11		
16	TRC-CD-CR-04	-24.83	-183.76	5.00			0.06	0.14		
17	TRC-CD-CR-05	-23.41	-182.78	0.00			0.11	0.12		
18	TRC-CD-CR-06	-24.90	-183.90				0.29	0.88		
19	SD	-21.43	-173.87				0.08	0.89		
20	SD	-23.38	-174.37				0.43	0.83		
21	WW	3.83	-31.36				0.03	1.06		

**Legend**  
 \* (asterisk) The detail information generating this value has exceptions.  
 (grey) Ignore this Exception Detail row.  
 (green) The required sample number.  
 (yellow) (Default sample, no contamination, GOOD)  
 (red) (Manual sample, basic verification, PRESUMELY GOOD)  
 (blue) (Manual sample, basic verification, PRESUMELY GOOD)

ChemCorrect™ post-processing software interface

## L2130-*i* Technical Specifications

L2130- <i>i</i> Liquid Specifications (with A0211 and A0340)	Specifications	Typical Performance*	
		Standard mode	Express mode
Precision (1 $\sigma$ )	<b>Guaranteed:</b> $\delta^{18}\text{O} - 0.025\text{‰}$ $\delta^2\text{H} - 0.1\text{‰}$	$\delta^{18}\text{O} - 0.010\text{‰}$ $\delta^2\text{H} - 0.05\text{‰}$	$\delta^{18}\text{O} - 0.015\text{‰}$ $\delta^2\text{H} - 0.05\text{‰}$
Zero Drift (24 hour)	<b>Guaranteed:</b> $\delta^{18}\text{O} - 0.2\text{‰}$ $\delta^2\text{H} - 0.8\text{‰}$	$\delta^{18}\text{O} - 0.059\text{‰}$ $\delta^2\text{H} - 0.30\text{‰}$	$\delta^{18}\text{O} - 0.100\text{‰}$ $\delta^2\text{H} - 0.43\text{‰}$
Throughput (6 injections for each sample; for Express mode, 10 injections per sample)	54 minutes per sample / 27 samples per day	54 minutes per sample / 27 samples per day	29 minutes per sample / 50 samples per day
Memory	<b>Guaranteed:</b> (after the 3rd injection) $\delta^{18}\text{O} - 99\%$ $\delta^2\text{H} - 98\%$	(after the 3rd injection) $\delta^{18}\text{O} - 99\%$ $\delta^2\text{H} - 98\%$	(after 15 min) $\delta^{18}\text{O} - 99\%$ $\delta^2\text{H} - 98\%$
Total Dissolved Solids	<200 g/kg	N/A	N/A

\* Typical performance is defined as the median of testing results from a number of sequentially built L2130-*i* analyzers. Results available upon request.

L2130- <i>i</i> Vapor Specifications	
Measurement Range	1,000 to 50,000 ppm
Guaranteed Precision (1 $\sigma$ ) 2,500 ppm	0.250/0.080‰ for $\delta^{18}\text{O}$ at 10/100 sec 1.600/0.500‰ for $\delta^2\text{H}$ at 10/100 sec
Guaranteed Precision (1 $\sigma$ ) 12,500 ppm	0.120/0.040‰ for $\delta^{18}\text{O}$ at 10/100 sec 0.300/0.100‰ for $\delta^2\text{H}$ at 10/100 sec
Measurement Rate	~ 1Hz
L2130- <i>i</i> Analyzer Specifications	
Measurement Technique	Cavity Ring-Down Spectroscopy
Temperature	-10 to 45 °C (vapor sample); 10 to 35 °C (liquid sample & system operation); -10 to 50 °C (storage)
Sample Pressure	300 to 1000 Torr (40 to 133 kPa)
Sample Flow Rate	~40 sccm at 760 Torr, no filtration required
Installation	Benchtop or 19" rack mount
Dimensions	<b>Analyzer:</b> 17" w x 7" h x 17.5" d (43.2 x 17.9 x 44.6 cm), not including 0.5" feet <b>External Pump:</b> 6.1" w x 8.7" h x 13.6" d (15.5 x 22 x 34.5 cm)
Weight	45 lbs (20.4 kg) for analyzer 14.3 lbs (6.5 kg) for external pump
Power	90–240 VAC, 50/60 Hz, <150 W steady state (analyzer), 80 W (external pump)
Operating System	Windows 10 Professional with onboard Picarro Software

### Included

ChemCorrect™ post-processing software for flagging contamination and normalizing measurements

### Optional Peripherals

#### For Discrete Liquid Water

A0211 – High Precision Vaporizer  
A0340 – Autosampler  
A0214 – Micro-Combustion Module (MCM)

#### For Continuous Liquid Water

A0217 – Continuous Water Sampler (CWS)

#### For Water Vapor

A0101 – Standards Delivery Module  
A0912 – Dual Mode Kit  
(requires A0211 and A0340)

#### For Solids

A0213 – Induction Module (IM)

### Optional Upgrades

S3099 – Express & Survey modes: increase the sample throughput. Compatible with required peripherals: A0340 Picarro Autosampler, A0211 Vaporizer only

### Accessories

C0354 – Salt Liner  
A0923 – Zero Air Install Kit  
A0921 – N<sub>2</sub> Install Kit  
C0211 – Vaporizer Cleaning Kit  
C0328 – Water Consumable Kit (500 Pieces)  
C0356 – Water Standards

# PICARRO

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