

SITE PREPARATION GUIDE

L2140-*i* and L2130-*i* Isotopic Water Analyzer with A0211 High Precision Vaporizer and A0340 Autosampler

PICARRO



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Introduction

This document describes the environmental conditions, power supplies, and gas supplies required for the operation of the Picarro L21x0-*i* Isotopic Water Analyzers with an A0340 Autosampler and A0211 High Precision Vaporizer or optional A0214 Micro-Combustion Module (MCM). Operating the instrument in conformance with these conditions enables the instrument to achieve its optimum performance and safe use.

Responsibilities

A Picarro Field Application Scientist / Engineer or designated installer will typically be responsible for installing the system to ensure that the instrument is properly installed and operational. In some cases, a Technical Jump Start / remote installation may be preferred by the client. In either case, it is required to prepare the laboratory / site in advance to allow them to carry out the installation efficiently. A site preparation checklist is included at the end of this document for you complete in and return to Picarro after verifying the installation site is ready.

Important: The installation of the system cannot begin until the checklist is completed and returned to your sales support representative, Field Application Scientist / Engineer at Picarro or designated installer. It is required complete the site preparation checklist as accurately as possible to help minimize installation time.

Important: It is recommended that the designated users responsible for the normal use and maintenance of the instrument be present during the installation. This ensures they receive training in the basic operation of the system. If there are any anticipated times when the intended user cannot attend, please notify us in advance so we can schedule the installation for a more convenient time.

Note: If you have questions regarding the information in this document or any specific site problems, contact your local Picarro sales representative.

Storage

The following storage conditions must be met prior to installation. Picarro recommends that shipping crates and boxes be opened in the presence of a Picarro Field Application Scientist / Engineer or designated installer.

Store crates and containers away from heavy machinery, such as compressors or generators, that produce excessive floor vibrations. The storage area temperature should be between -10°C and 50°C, and the humidity must be below 80% and non-condensing.

Bench Loading

Once unpacked, the instrument weights are approximately as shown in Table 1

Warning: To avoid injury, a Picarro Field Application Scientist / Engineer or designated installer may require assistance lifting and positioning the instrument. The system requires placement on a fixed bench or sturdy table able to support the combined weight of the complete system. Avoid installing the system on a rolling or mobile cart as excess vibration may affect the performance of the Autosampler.

Item Description	Weight
L21x0- <i>i</i> Isotopic Water Analyzer	45 lbs (20.4 kg)
A0340 Autosampler	23.15 lbs (10.5 kg) (without sample trays & waste station)
A0211 High Precision Vaporizer	12 lbs (5.4 kg)
A0214 Micro-Combustion Module	1 lbs (0.5 kg)
A2000 Vacuum Pump	14.3 lbs (6.5 kg)
PC Monitor	1 lbs (0.5 kg)
A0101 Standards Delivery Module (SDM)*	11.5 lbs (5.2 kg)
A0213 Induction Module (IM)*	3.09 lbs (1.4 kg)
A0217 Continuous Water Sampler (CWS)*	22.04 lbs (10 kg)

Table 1: Uncrated instrument weights

* Optional peripherals

Space Requirements

The recommended dimensions for the workbench are as follows: a width of 6 feet (182.8 cm), a depth of 3 feet (91.4 cm), and a height clearance of 3 feet (91.4 cm). These specifications ensure adequate space for the installation of two vacuum pumps—one designated for the analyzer and the other for the vaporizer—positioned behind the instrument. Furthermore, this configuration allows for necessary clearance for the autosampler arm, which has a height of 30 inches (77.0 cm). Additionally, the layout provides sufficient space on the side of the system for a monitor, keyboard, and mouse.

Dimensions	L21x0- <i>i</i> Analyzer	A0340 Autosampler	A2000 Vacuum Pump
Width	17" (43.2 cm)	22" (55.7 cm)	6.1" (15.5 cm)
Depth	17.5" (44.6 cm)	29.5" (75 cm)	13.6" (34.5 cm)
Height	7" (17.9 cm)	30" (77.0 cm)	8.7" (22 cm)

Table 2a: Instrument dimensions

Dimensions	A0211 High Precision Vaporizer	A0214 Micro-combustion Module
Width	6.3" (16 cm)	7" (17.8 cm)
Depth	15.9" (41 cm)	2" (5 cm)
Height	4.5" (12cm)	6.5" (16.5 cm)

Table 2b: Instrument dimensions (Cont.)

If the instrument is connected to a UPS (Uninterruptible Power Supply) unit on the same workbench, please add an additional 2 feet to the width of the bench. Many users choose to place the UPS unit below the system, either on the floor or on a lower shelf of the bench if one is available.

Dry Gas Supply

The Isotopic Water Analyzer and High-Precision Vaporizer require a source dry gas. This is used to set a baseline during sample analysis as well as to dry the CRDS (Cavity Ring Down Spectroscopy) chamber prior to shutting down the analyzer. This can be achieved either using a Drierite™ Desiccant Drier Kit (C0360) or a cylinder of dry gas such as Zero Air (ZA) (mixture of O₂ and N₂) or Nitrogen (N₂) connected directly to the vaporizer.

Note: N₂ cannot be used when the Micro-combustion Module (MCM) or Induction Module (IM) are present in the system.

The Desiccant Drier Kit consist of a column (dimensions: 2.6” x 11.4” (6.7 x 29 cm)) packed with Drierite™ granules - an all-purpose drying agent capable of rapid and efficient removal moisture from ambient air. It is manufactured from the naturally occurring mineral gypsum (calcium sulfate) and is blue when fully dry and turns pink as it becomes saturated with moisture. It can be regenerated by baking in an oven for one hour at 210°C / 425°F. It’s recommended to perform regeneration of the granules no more than five times before replacing them. It’s recommended to contact Drierite™ (W.A. Hammond Drierite Co., Ltd.) directly for best practices and safety information.

Dry gas cylinders of either ZA or N₂ are free of hydrocarbons with only trace levels of moisture (typically < 5 ppm H₂O). Using dry gas can achieve a lower baseline (H₂O ppm) than with using the Desiccant Drier Kit during sample analysis.

A ZA dry-gas kit (A0923) and N2 dry-gas kit (A0921) for Isotopic Water Analyzers are available for purchase from Picarro and include the recommended 2-stage regulator, tubing, and Swagelok™ fittings. ZA kit comes with a CGA-590 regulator while N₂ kit has a CGA-580 regulator.



Figure 1 - A Drierite™ Desiccant Drier Kit (C0360)

Note: The Picarro dry-gas kits come with regulators and CGA connectors which may not be compatible with gas tanks used in your region.

Warning: A dry gas supply ranging from 10 to 60 psi (4 bar) is reduced to a pressure of 2 to 3 psi before being connected to the analyzer. It is crucial that the pressure supplied to the analyzer does not exceed 5 psi, as this could cause damage.



Figure 2a – Zero Air Dry-Gas Kit (A0923)



Figure 2b – Nitrogen Dry-Gas Kit (A0921)

Vacuum Pumps

The system is delivered with two A2000 diaphragm vacuum pumps. One is used with the Isotopic Water Analyzer and the other for the High-Precision Vaporizer. The pumps are manufactured by Vacuubrand™, model MD1. They are three-stage, ultra-low vibration pumps designed for oil-free evacuation and pumping of non-corrosive gases down to 1.5 mbar (1.1 torr) ultimate vacuum using precisely guided flat diaphragms. The flow path consists of aluminum and selected plastics (diaphragms and valves made of PTFE/FKM and FKM, respectively).



Figure 2b – A2000 Diaphragm Vacuum Pump and Vacuum Hose

Vacuum Pumps (continued)

Parameter	Specification
Dimension Length	326 mm
Dimension Width	143 mm
Dimension Height	215 mm
Weight	7.3 kg
Rated mains voltage range	100-115V or 220-230V
Mains frequency	50-60 Hz
Max. pumping speed (50 Hz)	1.2 m³/h
Ultimate vacuum	1.5 mbar / 1.1 Torr
Lower ambient temperature (operation)	10 °C
Upper ambient temperature (operation)	40 °C
Lower ambient temperature (storage)	-10 °C
Upper ambient temperature (storage)	60 °C

Table 3 – A2000 pump technical data

Power Requirements

A standard iso-water system consisting of an Isotopic Water Analyzer, High-Precision Vaporizer, and Autosampler will require six power sockets to accommodate the system, including a PC monitor. The system will require seven power sockets, including a PC monitor if the MCM is present.

Instrumentation	Power Requirements
Isotopic Water Analyzer with 1x Vacuum Pump	100–240 VAC; 47–63 Hz; < 375 W at start-up; < 270 W in steady-state operation
A0340 Autosampler	90-264 VAC, 47-63 Hz
A0211 High-Precision Vaporizer with 1x Vacuum Pump	100-240 VAC, 50/60 Hz; < 910 W at start-up; < 210 W in steady-state operation
A0214 Micro-Combustion Module (MCM)	90–240 VAC, 50/60Hz, <30 W in steady-state operation
A0101 Standards Delivery Module (SDM)*	90 - 240 VAC, 50/60 Hz, < 25 W in steady state operation
A0213 Induction Module (IM)*	100-240 VAC, 50/60 Hz, < 75W at startup; < 25W in steady-state operation
A0217 Continuous Water Sampler (CWS)*	< 50 W at start up; < 30 W in steady-state operation

Table 4 – System Power Requirements

* Optional peripherals

The total wattage load at start-up is < 1315 W and < 510 W in normal steady-state operation. Picarro recommends connecting the iso-water system to a UPS unit to keep it running in case of power loss and protect it from power surges or fluctuations.

Electrical Plug Options

The instrument is shipped with the plugs specified at the time of order. The user must provide suitable sockets for the corresponding type of plug used. The cord sets must adhere to local regulations.












Region	Plug Type	Region	Plug Type
Plug configuration type	 IEC 60320 C13 (10-A rating)	Japan	 5-15P, 15 A
Australia	 10 A	Korea	 CEE 7/VII "Schuko", 16 A
Brazil	 16 A	Switzerland	 Type 12, 10 A
China	 10 A	Taiwan	 5-15P, 15 A
Denmark	 DK 2-5a "Data", 10 A	UK	 13 A
EU	 CEE 7/VII "Schuko", 16 A	USA	 NEMA 5-15P
India	 16 A		

Table 4 – Electrical power options

Internet Connection

While having an active internet connection is not mandatory for system installation, Picarro recommends it for supporting remote access by their support team, should troubleshooting be necessary. The analyzer is equipped with a PC that runs on Windows™ and includes TeamViewer™ as a standard feature for remote access. You can connect to the system using an Ethernet cable plugged into the Ethernet port located at the back of the analyzer. Alternatively, if Wi-Fi is available, you can use a USB Wi-Fi dongle, which can be inserted into any USB port on the analyzer.

Temperature

The ambient temperature range required for system operation using liquid samples is 10 to 35°C (50 to 95°F); for vapor samples, -10 to 45°C (14 to 113°F), and for system storage, -10 to 50°C (14 to 122°F).

Vibration

Warning: Do not place the instrument close to heavy machinery such as compressors or generators, which may generate excessive floor vibration.

Isotopic Standards and Samples

To analyze data using Picarro’s ChemCorrect™ software, as well as any other offline calibration tools, it is essential to ensure that the system is functioning correctly. This requires three standards with known isotopic values.

Picarro offers a Secondary Water Isotopes Standard Kit (C0356) designed for use with the Picarro iso-water system. This kit includes three water standards (USGS46, USGS47, and USGS48), each provided in quantities of ten 4 mL or 5 mL flame-sealed ampoules.

Users also have the option to provide their own standards and samples for testing. If your application involves samples with isotopic compositions significantly different from those of meteoric water or natural samples, it is advisable to consult with a Picarro Application Scientist. They can assist you in procuring the necessary enriched or depleted standards.



Figure 4 – The Picarro Secondary Water Isotopes Standard Kit (C0356)

Picarro Iso-Water System Site Preparation Checklist

Please complete this checklist and return it to Picarro promptly after confirming that all items and requirements are in place. If any items are on order, please note this on the checklist and include the estimated arrival date.

Note: It is the customer's responsibility to ensure that all the correct laboratory / site supplies are present. If you need any additional information or have difficulties acquiring parts or samples, contact your local Picarro Sales representative.

Storage Requirements (page 1)		
Does the storage conditions meet the specified requirements?	Yes	No
<hr/>		
Space Requirements (page 2)		
Is the available bench space adequate for the system?	Yes	No
<hr/>		
Dry Gas Supply (page 3)		
Has an appropriate source of dry gas been acquired, including the correct fittings, regulator, and other required components?	Yes	No
<hr/>		
Power Requirements (page 5)		
Are an appropriate number of sockets available, and do they meet the stipulated power requirements?	Yes	No
<hr/>		
Internet Connection (page 7)		
Is an internet connection in place (either Ethernet or WiFi (with adequate signal))?	Yes	No
<hr/>		
Temperature (page 7)		
Does the operating environment meet the temperature range specified in this document?	Yes	No
<hr/>		
Vibration (page 7)		
Is the site free from known vibrations?	Yes	No
<hr/>		
Isotopic Standards and Samples (page 7)		
Are at least three isotopic standards are available plus test samples?	Yes	No
<hr/>		

Name: _____

Signed: _____

Important: Should a Picarro Application Scientist or Engineer be unable to complete the installation due to insufficient site facilities (e.g., lifting equipment, power, water supply, test samples, or laboratory preparedness), all associated costs will be billed to the customer.

Applications Survey

At Picarro, we are always interested in hearing from our clients about their applications and research directions. As part of our commitment to provide greater customer service, we have found it necessary to obtain a little more information concerning our user base.

We would be grateful if you could take the time to complete the following questions to provide us with some information about how you will use the instrument.

This information will enable us to inform you of relevant current application notes and seminars and allow us to identify common interest groups so that we can promote the cross-transfer of information between customers.

What is your scientific field?
(e.g. pharmaceutical, environmental, general)

Which classes of compounds will be analyzed?
(e.g., greenhouse gases, isotopes)

What is your application area?
(e.g. quantitation, purity analysis, structural determination)

Our sales team often requires reference sites for specific applications.
Would you be willing to be used as a contact reference site for prospective customers?

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