

SITE PREPARATION GUIDE

**G2201-*i* / G2508 Analyzer with A0702
Low Leak Diaphragm Pump and A0310
Recirculation Package**

PICARRO



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Introduction

This document describes the environmental conditions, power supplies, and gas supplies required for the operation of a Picarro G2201-*i* Isotopic Analyzer for isotopic CO₂/CH₄ or a G2508 Gas Concentration Analyzer for N₂O, CH₄, CO₂, NH₃, and H₂O with an A0314 Small Sample Introduction Module 2 (SSIM2) or a A0311 16-Port Manifold System. Operating the system in accordance with these conditions will enable the instrument to achieve its optimal performance and ensure safe use.

Responsibilities

A Picarro Field Application Scientist / Engineer or designated installer is typically responsible for installing the system to ensure that the instrument is installed and operational. In some cases, clients may prefer a Technical Jump Start or remote installation. Regardless of the method chosen, it is essential to prepare the laboratory or site in advance to facilitate an efficient installation process. A site preparation checklist is provided at the end of this document for you to complete and return to Picarro once 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. You must complete the site preparation checklist as accurately as possible to help minimize installation time.

Important: We recommend that the users designated to handle the normal operation and maintenance of the instrument be present during the installation. This ensures they receive training on the basic system operations. If there are any anticipated times when the intended user cannot be available, please notify us in advance so we can schedule the installation for a more convenient time. 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:

- It is recommended that shipping crates and boxes be opened in the presence of a Picarro Field Application Scientist / Engineer or designated installer.
- Store crates and boxes away from heavy machinery, such as compressors or generators, to avoid excessive floor vibration.
- The storage area should maintain a temperature between -10°C and 50°C (14°F to 122°F), with humidity levels below 80% and non-condensation.

Bench loading

Table 1 provides the weights for the instrument and components.

Warning: To avoid injury, the Picarro Field Application Scientist / Engineer or designated installer may require assistance lifting and positioning the instrument. The bench must be able to support the combined weight of the complete system.

Item Description	Weight
G2201- <i>i</i> / G2508 Analyzer	45 lbs (20.4 kg)
A0311 16-Port Manifold*	10 lbs (4.54 kg)
A0702 Low Leak Diaphragm Vacuum Pump	9.8 lb. (4.5 kg)
PC Monitor	1 lbs (0.5 kg)

Table 1: Uncrated instrument weights

*Two A0311 16-Port Manifolds are required for recirculation

Space requirements

The ideal dimensions for the bench are 3ft (91.4 cm) in width, 3ft (91.4 cm) in depth, and a height clearance of 3ft (91.4 cm). These measurements provide sufficient space for the vacuum pump(s) to be positioned behind the instrument. Additionally, there should be enough room on the side of the system for the monitor, keyboard, and mouse. If space is limited, you can place the monitor, keyboard, and mouse directly on top of the analyzer.

Dimensions	G2201- <i>i</i> / G2508 Analyzer	A2000 Vacuum Pump	A0311 16-Port Manifold*
Width	17.0" (43.2 cm)	7.5" (19.1 cm)	19.0" (48.3 cm)
Depth	17.5" (44.6 cm)	13.5" (34.3 cm)	17.3" (43.8 cm)
Height	7.0" (17.9 cm)	5.5" (14.0 cm)	5.3" (13.3 cm)

Table 2a: Instrument dimensions

*Two A0311 16-Port Manifolds are required for recirculation

In the case that the instrument is plugged into a UPS (Uninterrupted Power Supply) unit on the same bench surface, add another 2ft of bench width. Many users opt to place the UPS unit below the system, either on the floor or lower shelf of the bench if available.

Dry Gas Supply

Picarro analyzers require a source of dry gas. If the SSIM2 is present in the system, the dry gas can be either Zero Air (ZA, a mixture of O₂ and N₂) or Nitrogen (N₂). In that case, it is used to set a baseline during discrete sample analysis because its free of hydrocarbons with only trace levels of moisture (typically < 5 ppm H₂O). It also acts as carrier gas to move the sample gas toward the analyzer.

Regardless of whether or not an SSIM2 is present in the system, a source of dry gas is required dry the Cavity Ring Down Spectroscopy (CRDS) chamber before shutting down the analyzer. This can be achieved using either a Drierite™ Desiccant Drier Kit (C0360) or a cylinder of dry gas such as ZA or N₂ connected directly to the inlet port on the back of the analyzer.

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.

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: Drierite™ Desiccant Drier Kit (C0360)



Figure 2a: Zero Air Dry-gas Kit (A0925)

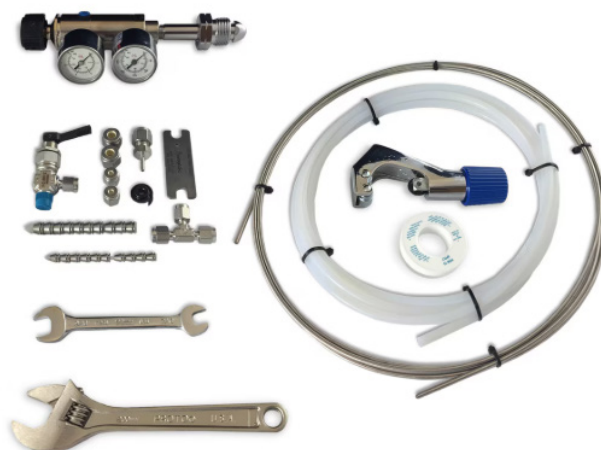


Figure 2b: Nitrogen Dry-gas Kit (A0921)

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 (0.68 to 4.14 bar) is reduced to a pressure of 2 to 3 psi (0.14 to 0.2 bar) before being connected to the analyzer. It is crucial that the pressure supplied to the analyzer does not exceed 5 psi (0.34 bar), as this could cause damage.

Vacuum Pumps

When the G2201-i or G2508 Analyzer is purchased with the A0310 Recirculation Package it is delivered with the A0702 Low Leak Diaphragm Pump. This pump is specifically designed for recirculation with minimal leakage. Stainless steel tubing and fittings are included so that a closed-loop measurement system is optimized to provide a total volume of up to 100 mL for the analyzer, pump, and tubing.



Figure 3: A0207 low leak diaphragm vacuum pump and vacuum tubing

Note: Delivered with the following items:

- 24" flexible stainless-steel bellows tubing VCR, 1/4" OD (Qty 2)
- 12" flexible stainless-steel bellows tubing VCR, 1/4" OD (Qty 1)
- NPT 1/8" Male to 1/4" VCR Male Adapter, (Qty 2)

Parameter	Specification
Weight	9.8 lb. (4.5 kg)
Width	7.5" (19.1 cm)
Depth	13.5" (34.29 cm)
Height	5.5" (14 cm)
Temperature Range	Storage: 0 °C to 70°C,
Operation: 0 °C to 45 °C	
Ambient Humidity Range	<85% R.H. non-condensing
Leak Rate	<0.05 sccm over 12 hours
Maximum Altitude	10,000 ft (operation)
Side Clearance for Ventilation	2" (5.1 cm)
Power Requirements	100 to 240 VAC, 50 to 60 Hz (auto-sensing); 60 W (at start-up); 60 W (during operation)
Power Supply Voltage Fluctuation	10% of nominal voltage
Liquid Ingress Protection	None
Fuse Rating	1.5 A at 250 VAC, 5 mm x 20 mm, slow blow

Table 3: A0702 low leak diaphragm vacuum pump technical data

Power Requirements

A system consisting of a G2201-*i* or G2508 Analyzer with two A0311 16-port Manifolds, A0702 Low Leak Diaphragm Pump and PC monitor requires 5 power sockets.

Instrumentation	Power Requirements
G2201- <i>i</i> or G2508 Analyzer	100–240 VAC, 47–63 Hz (auto-sensing), < 260W start-up, 125W at steady state.
A0311 16-port Manifold*	100–240 VAC auto switched, 50-60 Hz, 10 W max.
A0702 Low Leak Diaphragm Pump	100 to 240 VAC, 50 to 60 Hz (auto-sensing); 60 W (at start-up); 60 W (during operation).

Table 4: System Power Requirements


* Two A0311 16-Port Manifolds are required for recirculation

The total Wattage load at start-up is < 340 W and < 205 W in normal steady-state operation.

Picarro recommends connecting the system to a UPS unit to keep it running in case of a power loss. It can also protect the system from power surges or fluctuations in power supply.

Electrical Plug Options

The instrument is shipped with the plugs requested at the point of order. The user must provide appropriate sockets for the relevant type of plug used. The cord sets must comply with local regulations.

Equipment end of cord	 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		

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 is 10 to 35°C (50 to 95°F). Vapor samples -10 to 45°C (14 to 113°F). 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.

Standard Gases for Performance Validation and Calibration

All Picarro Analyzers are delivered from the factory with a perfectly linear calibration line, defined by a slope of 1.0 and an intercept of 0.0. Each analyzer comes with a Certificate of Conformance that is specific to your instrument's serial number. Users can periodically verify the instrument's performance by conducting a calibration or validation.

Calibration involves recalculating the equation for the calibration line, which is then applied to all concentration calculations performed by the instrument. In contrast, a validation tests the instrument's performance without modifying the calibration line equation.

Both processes involve acquiring cylinders of certified gas standards from a reputable vendor at various concentration levels that span the analyzer's guaranteed measurement range. One of these concentration levels should be zero, typically achieved using ZA or N₂. Picarro recommends at least three additional concentration points. The selection of gas standards will vary depending on the model of the instrument.

For the G2201-*i* Isotopic Analyzer, gas standards for CO₂, CH₄, and isotopic gas standards for 13CO₂, and 13CH₄ can be used. For the G2508 Gas Concentration Analyzer, N₂O, CH₄, CO₂, and NH₃ gas standards can be used.

Warning: When using potentially hazardous gas standards in high concentrations, take appropriate safety precautions such as placing the system inside a flow hood, or wearing personal protective equipment (PPE).

In all cases, standard gases are delivered to the analyzer at a pressure of 2.5 – 3 psi for a duration of 5 minutes. An average concentration is then obtained. The user can compare the certified concentrations from the vendor-supplied gas cylinders with the CRDS measured values from the analyzer. Based on this comparison, the system will determine whether it passes or fails the validation. If re-calibration is necessary, the equation of the calibration line will be adjusted as needed.

Picarro site preparation checklist

You must complete this checklist and return it to Picarro when all the amenities are available.

Note: If any items are on order, indicate this on the checklist and include the anticipated 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 (see page 1)

Prior to installation ensure that the storage conditions are suitable

Space requirements (see page 2)

The available bench space is adequate for the system

Dry gas supply (see page 2)

An appropriate source of dry gas has acquired with correct fittings

Power requirements (see page 5)

An appropriate number of sockets are available and they meet the stipulated power requirements

Internet connection (see page 7)

An internet connection is in place (ethernet or WiFi)

Temperature (see page 7)

The operating environment meets temperature range as specified in this document

Vibration (see page 7)

The site is free from known vibration

Standard gases for performance validation and calibration (see page 7)

Appropriate certified gas standards are available

Name: _____

Signed: _____

***Important:** If an authorized Picarro Application Scientist / Engineer or designated installer arrives on site to begin installation work and cannot complete the installation because of a lack of facilities (for example, lifting equipment, power, water, test samples, laboratory readiness), costs incurred will be charged 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 the instrument will be used.

This information will enable us to inform you of relevant current application notes and seminars and allows us to identify common interest groups so that we can promote 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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