

PICARRO G2301

CRDS Analyzer CO₂ CH₄ H₂O Measurements in Air

The world's highest precision analyzer for the top three greenhouse gases



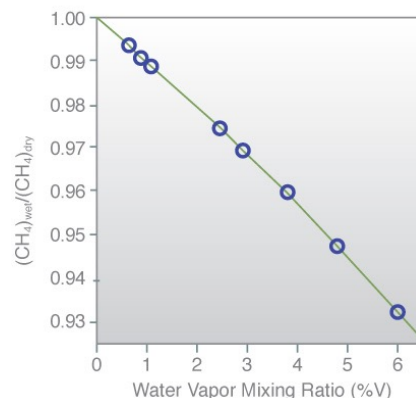
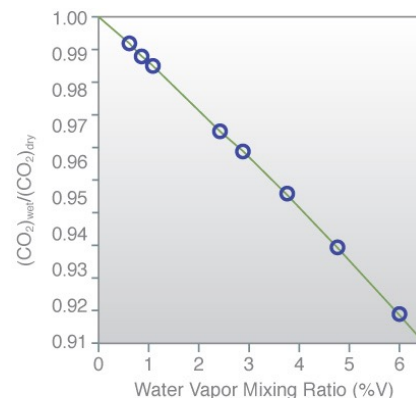
- Global #1 in precision and accuracy, and portability
- The lowest guaranteed drift of any instrument
- Unique water correction feature automatically reports dry mol fraction
- Innovative software featuring intuitive user interface & customization tools
- World class customer service and technical support

Advantage Note: Our patented Cavity Ring-Down Spectroscopy (CRDS) technology is capable of measuring the three primary greenhouse gases, CO₂, CH₄ and water, down to parts-per-billion (ppb) sensitivity with negligible long-term drift (months). In order to ensure measurement fidelity even over years of operation in the harshest environments, Picarro incorporates amazingly precise temperature and pressure control along with careful material selection and meticulous mechanical design. Scientists from the Ascension Islands to the oil spill zone in the Gulf of Mexico have reported the highest quality data, day in and day out, with fewer calibrations than other spectral absorption-based instruments.

Picarro's Patented CRDS Technology: The heart of the Picarro is a sophisticated time-based measurement that 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 results in exceptional precision and sensitivity in a small footprint. Picarro uses a patented, high-precision wavelength monitor to maintain absolute spectral position, which combats the drift inherent in all lasers and ensures accurate peak quantification.

Guaranteed Performance: In order to ensure every analyzer meets our exacting performance standards in the lab and in the field, Picarro instruments undergo thorough precision and drift testing along with a rigorous set of thermal, shock & vibration tests.

Easy Data Management & Instrument Control: The Picarro is customizable to deliver data in the format best suited to the application. Data is stored locally on the analyzer's hard drive, but can also be streamed in real time either via RS-232, or as analog output. Users can also choose to rout data via an Ethernet connection in real time or at user-defined intervals. Using standard Remote Desktop connection, users can remotely check and control the analyzer's internal, Windows-based PC.



Quadratic fit of CO₂wet/CO₂dry mixing ratios (top) and quadratic fit of CH₄wet/CH₄ dry vs. H₂O mixing ratios (bottom).

Mixing ratios for carbon dioxide and methane are only meaningful when extrapolated back to dry-gas conditions. Picarro's G2301 analyzer enables you to measure dry-gas mixing ratios for carbon dioxide and methane directly in the wet gas stream. Only Picarro includes automated water vapor corrections which have been independently validated by top labs: NOAA, MPI, LSCE.

Picarro Environmental, Shock and Vibration Testing (Performed on Every Analyzer)	
Thermal Ramp Testing (whole instrument):	> 12 hours operational temperature step testing from 5° to 40 °C with 40 minute soak at each 5 °C increment. Performance specs verified throughout the testing range.
Long-Term Thermal Testing (whole instrument)	One week operational temperature step testing from 30° to 40 °C with 40 minute soak at each 5 °C increment. Performance specs verified throughout the testing range.
Storage Testing (whole instrument)	-10 °C & 50 °C soak (non-oper) + post test performance confirm
Vibration Testing	2 axis, 25 Hz, 1gp-p acceleration, 15 minutes on each axis
Shock Testing Using MIL-STD 810F	Pivoted edge drops onto a hard surface (lab bench), from 4" height, all 12 edges (x,y,z axes), 2 drops each edge
Power Interruption Testing	Minimum 5 successful AC power cycle startups

Guaranteed Performance Specifications, in air	CO ₂	CH ₄	H ₂ O
Precision (1-σ of: Raw 5 sec / 5 min avg data) <i>Guaranteed over operating conditions specified below</i>	< 70 ppb / 25 ppb	< 0.5 ppb / 0.22 ppb	< 80 ppm / 30 ppm
Max Drift at STP (over 24 hrs / 1 month) *(peak-to-peak, 50-minute average) <i>Guaranteed over operating conditions specified below</i>	< 120 ppb / 500 ppb	< 1 ppb / 3 ppb	< 100 ppm ± 0.5% of reading
Automated Determination of Dry Mol Fraction	Included	Included	n/a
Operating Range	0 - 1000 ppm	0 - 20 ppm	0 - 7 %v (39 °C dew pt) non-condensing
Guaranteed Specifications Range	300 - 700 ppm	1 - 3 ppm	0 - 3 %v (25 °C dew pt) non-condensing
Measurement Interval (Data Rate)	< 5 seconds	< 5 seconds	< 5 seconds
Gas Response: Rise/Fall time (10-90 % / 90-10 %)	< 3 seconds	< 3 seconds	< 3 seconds
Measurement Cell Control	Temperature: +/- 0.005 °C & Pressure: +/- 0.0002 atm		

* Picarro calculates drift by subtracting the min from the max of 50 min averages taken over 30 hrs of testing

Guaranteed Operating Conditions	
Ambient Temperature Range	+10 °C to +35 °C operating / -10 °C to +50 °C storage
Ambient Humidity	< 99 % R.H. non-condensing
Sample Gas Pressure	300 to 1000 Torr (40 to 133 kPa)
Sample Gas Humidity	< 99 % R.H. non-condensing
Sample Gas Temperature	-10 to 45 °C
Sample Gas Flow Rate Req.	< 0.4 slm at 760 Torr / No filtration required

System Specifications	
Dimensions	Analyzer: 17" w x 7" h x 17.5" d (43.2 x 17.9 x 44.5 cm) not inc. 0.5" feet, External pump: 7.5" w x 4" h x 11" d (19 x 10.2 x 28 cm)
Weight	60.4 lbs (27.4 kg), including external pump
Power Requirements	100 - 240 VAC, 47 - 63 Hz (auto-sensing), < 260 W total at start-up 110 W (analyzer) + 80 W (pump) at steady state
Gas Inlet Fittings	1/4" Swagelok ®

Included Accessories: External vacuum pump, vacuum line & fittings, keyboard, mouse, LCD monitor, internal 160 GB hard drive

Installation: Bench-top (standard) or 19" rack mount (optional)

Data Outputs: RS-232, Ethernet, USB, Analog (optional) 0-10 V

Optional Accessories: Integrates seamlessly with Picarro's 16-Port Distribution Manifold to simplify multi-point sampling

This product is not optimized for vehicular deployment where there is a requirement for pin-pointing precise methane source locations while driving. As a result, we do not support this product's use for natural gas leak detection or other real-time methane emissions applications while driving. The Picarro Surveyor™ system is the optimal product for such studies.