CO_2, CO, CH_4 and H_2O Gas Concentration Analyzer

PICARRO

- Parts-per-billion sensitivity, precision and accuracy
- Field and laboratory deployable
- Lowest drift of any continuous greenhouse gas measurement instrument
- Rugged and insensitive to change in ambient temperature
- Meets the WMO and ICOS Data Quality Objectives for CO, CO_2 and CH_4

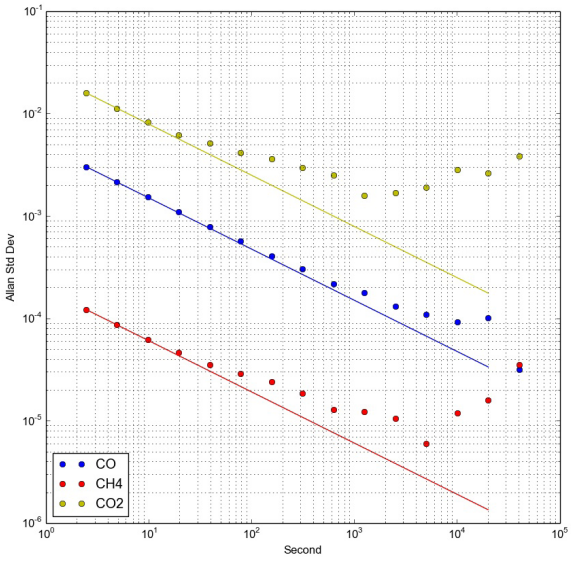
The **Picarro G2401 greenhouse gas concentration analyzer** enables simultaneous measurements of CO_2, CH_4, CO with part-per-billion (ppb) sensitivity and negligible drift over months of operation. The G2401 also features Picarro's unique algorithms to correct for the dilution effect of H_2O vapor and to report dry gas mole fractions of CO_2, CH_4 and CO.

The G2401 is compliant with performance requirements established by The World Meteorological Organization (WMO), and other international networks, such as the Integrated Carbon Observation System (ICOS) for atmospheric monitoring stations.

The unique combination of continuous 4-species measurement, high precision, field deployability, and long-term reliability makes the G2401 the instrument of choice for greenhouse gas measurements.

Patented Picarro cavity ring-down spectroscopy (CRDS) technology 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 analyzer. A meticulously designed small optical cavity incorporates precise temperature and pressure control. As a result, the analyzer delivers a best-in-class combination of precision, accuracy, low drift, and ease-of-use.

Allan Deviation Plot



G2401 Guaranteed Performance Specifications in dry air		CO_2	CO	CH_4	H_2O
Precision (1σ) **Reference gas not needed**	5 sec	<50 ppb **Typical = 17 ppb***	<15 ppb **Typical = 3.5 ppb***	<1 ppb **Typical = 0.10 ppb***	<30 ppm
	5 min	<20 ppb **Typical = 5.0 ppb***	<1.5 ppb **Typical = 0.4 ppb***	<0.5 ppb **Typical = 0.04 ppb***	<5 ppm
	1 hr	<10 ppb	<1 ppb	<0.3 ppb	-
Max Drift at STP (peak-to-peak, 50-minute average) **Reference gas not needed**	over 24 hrs	100 ppb **Typical = 17.0 ppb***	10 ppb **Typical = 2.7 ppb***	1 ppb **Typical = 0.10 ppb***	100 ppm ±5% of reading
	1 month	500 ppb	50 ppb	3 ppb	-
Max Uncertainty using Reference Gas (2σ, 1 hr average) **WMO Data Quality Objective for GAW Stations**		<50 ppb	<2 ppb	<1 ppb	-
Reproducibility (10 min, 1σ) [1] **ICOS Atmospheric Station Specification**		<50 ppb	<1 ppb	<0.5 ppb	-
Automated Determination of Dry Mol Fraction		Included	Included	Included	-
Operating Range		0–1000 ppm	0–5 ppm	0–20 ppm	0–7% v H_2O
Guaranteed Specifications Range		300–500 ppm	0–1 ppm	1–3 ppm	0–3% v H_2O
Measurement Interval		<5 sec **Typical = 2.5 sec***			
Rise/Fall Time (10–90%/90–10%)		<5 sec			

* Typical performance is defined as the median of testing results from 63 sequentially built G2401 analyzers.Results available upon request.

[1] When alternately measuring a dry natural air cylinder for 30 minutes and ambient air for 280 minutes with statistics based on last 10 minute average data of 30 minute cylinder measurement.

G2401 System Specifications	
Measurement Technique	Cavity Ring-Down Spectroscopy (CRDS)
Measurement Cell Temperature Control	±0.005°C
Measurement Cell Pressure Control	±0.0002 atm
Sample Temperature	-10 to 45°C
Sample Pressure	300 to 1000 Torr (40 to 133 kPa)
Sample Flow Rate	<0.4 slm at 760 Torr, no filtration required
Sample Humidity	<99% R.H. non-condensing @40°C, no drying required
Ambient Temperature Range	10 to 35°C (operating) -10 to 50°C (storage)
Ambient Humidity	<85% R.H. non-condensing
Accessories (Included)	Pump (external), keyboard, mouse, LCD monitor (optional)
Outputs	RS-232, Ethernet, USB, analog (optional) 0–10 V
Fittings	¼" Swagelok ®
Dimensions	Analyzer: 17" w x 7" h x 17.5" d (43.2 x 17.8 x 44.5 cm), not including 0.5" feet External Pump: 7.5" w x 4" h x 11" d (19 x 10.2 x 28 cm)
Installation	Benchtop (standard) or 19" rack mount chassis (optional)
Weight	59.3 lbs (26.9 kg), includes external pump
Power Requirements	100–240 VAC; 50/60 Hz (auto-sensing); < 375 W at start-up (total). Steady-state operation: 120 W (analyzer), 150 W (pump).

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