

# Methane (CH<sub>4</sub>) and Hydrogen Sulfide (H<sub>2</sub>S) Gas Concentration Analyzer

# PICARRO



- Real-time CH<sub>4</sub> and H<sub>2</sub>S measurements for fenceline monitoring and mobile surveys
- Best-in-class sensitivity for the most demanding regulatory requirements
- Excellent stability and continuous operation minimize downtime and data gaps
- Easy operation and no consumables or pre-concentration reduce costs
- Small footprint and quick installation simplify new deployments

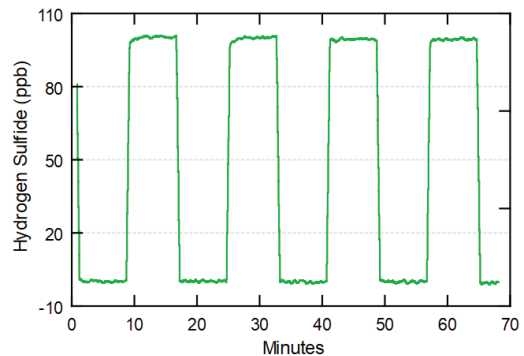
The **Picarro G2204 gas concentration analyzer** delivers precise, real-time monitoring of methane (CH<sub>4</sub>) and hydrogen sulfide (H<sub>2</sub>S). The analyzer features a parts-per-trillion (ppt) lower limit of detection (LOD), a small footprint, and is easy to install and use.

The G2204 analyzer is a breakthrough field deployable analyzer that supports multiple applications. It can be used to monitor ambient air quality, stack emissions, and map emission plumes of methane and hydrogen sulfide. It can be used as a proxy for plumes of toxic volatile organic compounds such as benzene, xylene, and toluene, and acidic gases from chemical and industrial facilities. It can be installed as a stationary monitor along a facility's fenceline, or when used in conjunction with a mobile weather station, a GPS system, and an inverter, it can also be configured for mobile leak detection and surveys.

All Picarro analyzers feature a full diagnostic software suite that continuously measures and records 38 parameters for rigorous quality control and assurance of data integrity. If the analyzer is connected to the Internet, Picarro's service organization can access it remotely to provide rapid support and problem resolution.

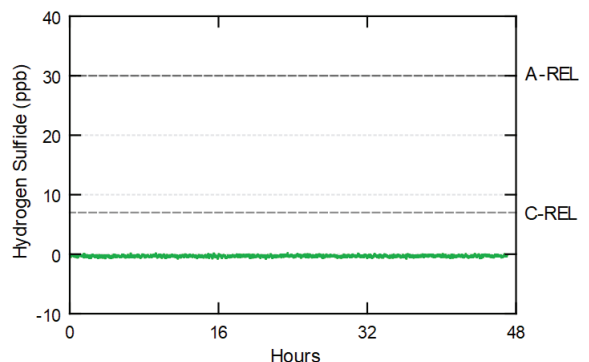
Picarro's patented Cavity Ring-down Spectroscopy (CRDS) technology enables Picarro analyzers to deliver real-time monitoring with parts-per-trillion (ppt) levels of detection, excelling over traditional technologies such as Fourier-Transform Infrared Spectroscopy (FTIR) or Gas Chromatography (GC). Because it uses a small 35 cc volume cavity, it delivers fast gas response times (Figure 1), lower noise, and higher sensitivity (Figure 2).

## G2204 Gas Response



**Figure 1** - Multiple cycles of response time testing at 100 ppb of H<sub>2</sub>S on a G2204. A gas response rate of <5 sec ensures even short-duration plumes are detected with high confidence.

## G2204 Performance on Ambient Air



**Figure 2** - Continuous monitoring of hydrogen sulfide in ambient air (green line) over ~48 hrs with no zero reference measurements or recalibrations. The instrument sensitivity enables accurate determination of any exceedence of Acute Reference Exposure Levels (A-REL, 30 ppb) and Chronic Reference Exposure Levels (C-REL, 7.1 ppb; California OEHHA). Dataset mean of 0.31 ppb and a standard deviation (1 sigma) of 0.12 ppb (5 min moving average).

G2204 Performance Specifications	CH <sub>4</sub>		H <sub>2</sub> S	
	Guaranteed*	Typical**	Guaranteed*	Typical**
Precision (1σ, 5 sec)	1 ppb + 0.2% of reading	0.15 ppb	3 ppb + 0.4% of reading	1.49 ppb
Precision (1σ, 5 min)	0.5 ppb + 0.05% of reading	0.05 ppb	1 ppb + 0.1% of reading	0.21 ppb
LOD/LDL (3σ, 5 min)***	1.5 ppb [0.98 µg/m <sup>3</sup> ]	0.15 ppb	3 ppb [4.2 µg/m <sup>3</sup> ]	0.62 ppb
Drift (24 hrs)**** (peak-to-peak, 50 min average)	<2 ppb	0.26 ppb	<3 ppb	0.39 ppb
Measurement Range	0–3 ppm (guaranteed specification) 0–20 ppm (operating range)		0–20 ppm (guaranteed specification) 0–300 ppm (operational range)	
Measurement Interval	~5 sec		~5 sec	
Response Time (Rise/Fall Time 10-90%/ 90-10%)	≤5.0 sec		≤5.0 sec	

\* Specifications and an instrument-specific testing report (Certificate of Compliance) provided with every analyzer purchase.

\*\* Typical performance is defined as the median of testing results from 30 sequentially built G2204 analyzers. Results available upon request.

\*\*\* Conversion to µg/m<sup>3</sup> at 1 atm and 25°C.

\*\*\*\* Picarro analyzers do not require a zero reference gas or zero cartridge to operate or meet specifications.

G2204 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 Flow Rate	<0.45 slm at 760 Torr, no filtration required
Sample Pressure	300 to 1000 Torr (40 to 133 kPa)
Max. Rate of Change in Ambient Temp.	5°C / hr
Sample Humidity	<99% R.H. non-condensing @ 40°C, no drying required
Temperature	10 to 35°C (operating) -10 to 50°C (storage)
Ambient Humidity	<85% RH non-condensing
Other Gases Measured	H <sub>2</sub> O (Typical Precision: ≤0.02% of reading)
Accessories	Included: Pump (external), keyboard, mouse Optional: LCD monitor (A0901), 16-port sampling manifold (A0311, A0311-S), rack mount (A0950)
Operating System and Data Outputs	Windows 10 [RS-232, Ethernet, USB, analog (optional) 0–10 V]
Fittings	¼" Swagelok® fittings
Dimensions	Analyzer: 17" w x 7" h x 17.5" d (43.2 x 17.9 x 44.6 cm), not including 0.5" feet External Pump: 6.1" w x 8.7" h x 13.6" d (15.5 x 22 x 34.5 cm)
Installation	Benchtop or 19" rack mount chassis
Weight	47.0 lbs (21.3 kg) for analyzer and 14.3 lbs (6.5 kg) for external pump
Power Requirements	100–240 VAC; 47–63 Hz (auto-sensing); <375 W at start-up (total). Steady-state operation: 120 W (analyzer), 150 W (pump).
Applications Considerations	Requires an air-like matrix. Interference can occur for concentrations of H <sub>2</sub> O, CO <sub>2</sub> , and CH <sub>4</sub> well above normal ambient levels, as well as for organics, including, but not limited to ethane, acetylene and also other nitrogen and sulfur containing compounds. H <sub>2</sub> S accuracy is ±3% plus cylinder accuracy. Please contact us to discuss the experimental conditions.

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