

# Hydrogen Chloride (HCl) Gas Concentration Analyzer

# PICARRO



- Superb sensitivity, precision & accuracy with virtually no drift
- Fast, continuous, real time measurements without interference
- Large dynamic range with high linearity
- No consumables required
- Installed and operational in minutes
- Rugged and insensitive to changes in ambient temperature

The **Picarro G2108 Hydrogen Chloride Analyzer** is a real-time, trace gas monitor capable of measuring HCl with parts-per trillion (ppt) sensitivity. The analyzer is based on Picarro's unique Cavity Ring Down Spectroscopy (CRDS), a time-based measurement utilizing a near-infrared laser to measure a spectral signature of the molecule. Gas is circulated in an optical measurement cavity with an effective path length of up to 20 kilometers. A patented, high-precision wavelength monitor makes certain that only the spectral feature of interest is being monitored, greatly reducing the analyzer's sensitivity to interfering gas species, and enabling ultra-trace gas concentration measurements even if there are other gases present. As a result, the analyzer maintains high linearity, precision, and accuracy over changing environmental conditions with minimal calibration required. Precise temperature and pressure control systems designed into the Picarro G2108 ensure accurate measurements over long periods of time with minimal use of calibration gases. The analyzer is exceptionally rugged, essentially drift and maintenance free, and requires no consumables, thereby offering significant ease of use and cost of ownership benefits.

Easily transportable from site to site, the analyzer can be set up and running within minutes, with essentially zero sample preparation. The gas concentration is displayed in real-time with no post-processing requirements, and data is continuously archived to the analyzer's internal hard drive. Designed to operate both in laboratories and other, harsher, environments, it can operate for many months without user interaction. The analyzer can be configured to automatically export measurement data at regular intervals via an Ethernet connection or it can output real-time data in digital (via RS-232 interface) or optional analog formats. Users can connect remotely with the analyzer's internal Windows 7 OS PC and control it through a standard Remote Desktop connection or with similar remote login software. The analyzer can also use its modem or Ethernet connection to automatically synchronize with an atomic clock time service. The software includes a valve sequencer, capable of controlling up to six external solenoid valves and a rotary valve.

G2108 Performance Specifications	HCl	H <sub>2</sub> O
Precision (1 $\sigma$ , 10 sec/30 sec/300 sec)	45 ppt/30 ppt/10 ppt	20 ppm + 8 * H <sub>2</sub> O[%] (10 sec)
Lower Detectable Limit (300 sec, 3 $\sigma$ )	≤30 ppt	≤20 ppm
Zero Drift (24 Hour/1 Month)	±50 ppt/±250 ppt	±40 ppm/±200 ppm
Measurement Range	0–1000 ppb	0–40,000 ppm
Measurement Interval	<5 seconds	<5 seconds
Response Times	1-ppm challenge: Fall Time (90–10%): <1 min Rise Time (10–90%): <1 min	10,000-ppm challenge: Fall Time (90–10%): <20 sec Rise Time (10–90%): <20 sec

G2108 System Specifications	
Measurement Technique	Cavity Ring-Down Spectroscopy
Measurement Cell Temperature Control	±0.005°C
Measurement Cell Pressure Control	±0.0002 atm
Sample Temperature	-10 to 45°C
Sample Flow Rate	<1.8 sccm
Sample Pressure	600 to 850 Torr (80 to 113 kPa)
Sample Humidity	<99% R.H. non-condensing @40°C, no drying required
Ambient Temperature Range	15 to 35 °C (operating); -10 to 50°C (storage)
Ambient Humidity	<99% R.H. non-condensing @ 40°C, no drying required
Other Gases Measured	CH <sub>4</sub>
Accessories	Pump (external, included), keyboard & mouse (included), LCD monitor (optional)
Communication Interfaces	RS-232, Ethernet, USB
Fittings	1/4" Swagelok®
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: 12.8" L x 8.9" h x 6.2" w (32.4 x 22.6 x 15.8 cm)
Weight	73 lbs (33.18 kg) including pump
Power Requirements	100–240 VAC, 47–63 Hz (auto-sensing), <260 W start-up (total): 110 W (analyzer), 75 W (pump) at steady state