

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

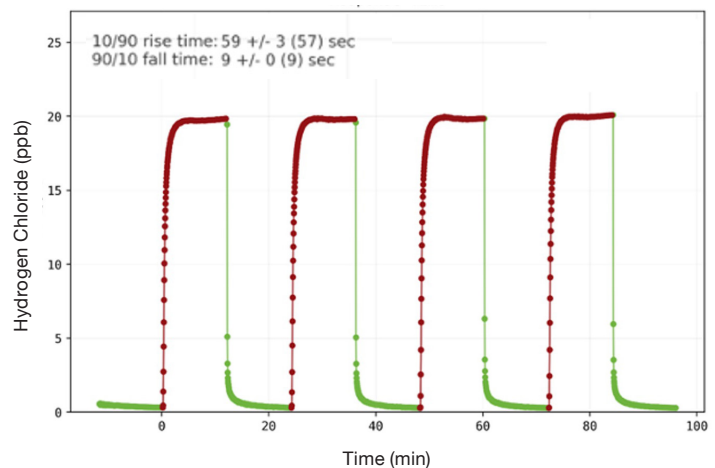
The **Picarro SI2108 Gas Concentration Analyzer** is a real-time, trace gas monitor capable of measuring hydrogen chloride with parts-per trillion (ppt) sensitivity. The analyzer is based on Picarro's unique Cavity Ring-Down Spectroscopy (CRDS), a time-based measurement utilizing a near-infrared laser 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 SI2108 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. Its built-in software includes a valve sequencer, capable of controlling up to six external solenoid valves and a rotary valve. The analyzer can be configured to automatically export measurement data at regular intervals via Ethernet, RS-232 interface, Analog 4-20mA or Modbus outputs.

Hydrogen Chloride Response Time



Figures 1 - Multiple cycles of response time testing at 20 ppb of hydrogen chloride on a SI2108 Analyzer. A fast gas response rate ensures even short-duration plumes are detected with high confidence.

SI2108 Performance Specifications	HCl	H ₂ O
Lower Detection Limit (3 σ , 100 sec)	≤ 45 ppt	≤ 30 ppm
Zero Drift (peak-to-peak, 50-minute average)	± 50 ppt	± 40 ppm
Precision (1 σ , 10 sec) Precision (1 σ , 100 sec)	45 ppt 15 ppt	20 ppm + 8 x H ₂ O[%] 10 ppm + 4 x H ₂ O[%]
Measurement Interval*	<3 seconds	<3 seconds
Response Time (Rise/Fall Time 10–90% / 90–10%)	1-ppm challenge: <1 min	10,000-ppm challenge: <10 sec
Measurement Range	0–2 ppm	0–40,000 ppm

* Measurement interval at span may increase as much as 2x above listed values.

SI2108 System Specifications	
Measurement Technique	Cavity Ring-Down Spectroscopy (CRDS)
Measurement Cell Temp. and Pressure Control	$\pm 0.005^{\circ}\text{C}$; ± 0.0002 atm
Sample Temperature	-10 to 80°C
Sample Flow Rate and Pressure	~ 2 slm, 600 to 950 Torr (80 to 127 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	<85% R.H. non-condensing
Other Gases Measured	H ₂ O, CH ₄
Accessories	Included: Pump (external), keyboard, mouse Optional: LCD monitor (A0901)
Operating System and Data Outputs	RS-232, Ethernet, USB, analog 0–10 V, Modbus, 4-20mA (optional)
Fittings	¼" Swagelok® SS fittings (recommended ¼" OD PFA Tubing)
Dimensions	Analyzer: 17" w x 8.38" h x 24.4" d (43.2 x 21.3 x 62 cm), including feet External Pump: 6.2" w x 8.9" h x 12.8" d (15.8 x 22.6 x 32.4 cm)
Installation	Benchttop or 19" rack mount chassis
Weight	<55 lbs (25 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).
Certifications	CE Mark