Hydrogen Fluoride (HF) Gas Concentration Analyzer

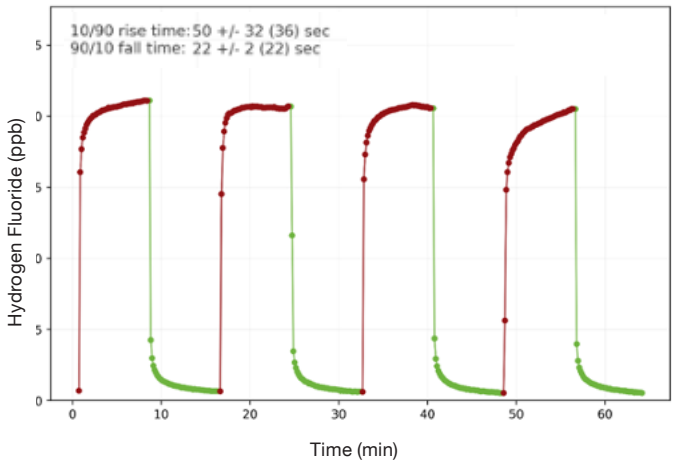
PICARRO

- Fast, continuous, real-time measurement of HF without interference
- Parts-per-trillion sensitivity, precision & accuracy with virtually no drift
- Long-term stability for infrequent calibration
- Small footprint, field or lab deployable with no consumables required
- Water correction automatically reports dry gas mole fractions
- Rugged and insensitive to changes in ambient temperature

The **Picarro SI2205 Gas Concentration Analyzer** is a real time, trace gas monitor capable of measuring Hydrogen Fluoride with parts-per- trillion (ppt) sensitivity with negligible drift for atmospheric science and air quality applications. 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 SI2205 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 and are ideal for continuous operation.

Easily transportable from site to site, the analyzer can be set up and running within minutes, with essentially zero sample preparation. Its built-in software includes a valve sequencer, capable of controlling up to six external solenoid valves and a rotary valve. 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 via Ethernet, RS-232 interface, Analog 4-20 mA or Modbus outputs. Users can connect remotely with the analyzer's Linux through a standard Remote Desktop connection or with similar remote login software.

Hydrogen Fluoride Response Time



Figures 1 - The Picarro SI2205 analyzer for hydrogen fluoride measurements provides fast response times.

SI2205 Performance Specifications*	HF (in air-like matrix)
Precision (1σ, 100 sec)	10 ppt
LOD/LDL (3σ, 100 sec)	30 ppt
Drift *(peak-to-peak, 50-minute average)*	±25 ppt
Measurement Range	0–1 ppm
Measurement Interval	<4 sec
Response Time (0–20 ppb) *(Rise/Fall Time 10–90%/90–10%)*	<1 min

**Guaranteed for the operating conditions given below, after 1-hour equilibration.*

SI2205 System Specifications	
Measurement Technique	Cavity Ring-Down Spectroscopy (CRDS)
Measurement Cell Temp. and Pressure Control	±0.005°C
Measurement Cell Pressure Control	±0.0002 atm
Sample Temperature	-10 to 45°C
Sample Flow Rate and Pressure	~ 2 slm at 760 Torr, no filtration required, 600 to 950 Torr (80 to 127 kPa)
Max. Rate of Change in Ambient Temp.	5°C / hr
Sample Temperature	<99% R.H. non-condensing @ 40°C. H_2O affects HF measurement. For optimal performance, either dry HF or provide a consistent H_2O concentration.
Temperature	10 to 35°C (operating) -10 to 50°C (storage)
Ambient Humidity	<85% R.H. non-condensing
Other Gases Measured	H_2O, O_2
Accessories	Included: Pump (external), keyboard, mouse Optional: LCD monitor (A0901), rack mount (A0954)
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 × 21.3 × 62 cm), including 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	<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
Applications Considerations	Calibration measurements for this instrument are limited by the ability to generate a constant concentration sample. The availability of commercially available standards suitable for your application should be investigated. Please contact Picarro for further information.

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

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LIT CODE: V1.0-230131

3105 Patrick Henry Drive, Santa Clara, CA 95054 USA | +1 408-962-3900 | sales@picarro.com | picarro.com