

**PRODUCT DATASHEET**

# HALO Max QCL™

QCL-CRDS ANALYZER FOR PPT LEVEL  
CO AND CO<sub>2</sub> DETECTION



**Our first analyzer series based on Quantum Cascade Laser Cavity Ring-Down Spectroscopy (QCL-CRDS), the HALO Max QCL offers:**

- Parts-per-trillion (ppt) detection capability for carbon monoxide (CO) and carbon dioxide (CO<sub>2</sub>) in UHP bulk gases
- Incorporates mid-infrared QCL technology to achieve the ultimate sensitivity
- Absolute measurement (freedom from calibration)
- Excellent speed of response at ppb levels and below
- Continuous measurement – no batch processing typical with GCs
- Robust design & maximum ease of use

# Specifications

## Performance

<b>Operating range:</b>	See gas performance table on the next page
<b>Detection limit (LDL, 3<math>\sigma</math>/24h):</b>	See gas performance table on the next page
<b>Precision (1<math>\sigma</math>, greater of):</b>	$\pm 0.75\%$ or see table on the next page
<b>Accuracy (greater of):</b>	$\pm 4\%$ or LDL
<b>Speed of response:</b>	< 1 min to 95%
<b>Environmental conditions:</b>	10°C to 40°C, 30% to 80% RH (non-condensing)
<b>Storage temperature:</b>	-10°C to 50°C

---

## Gas Handling System and Conditions

<b>Sample gas connections:</b>	1/4" male VCR inlet and outlet
<b>Leak tested to:</b>	1 x 10 <sup>-9</sup> mbar l / sec
<b>Inlet pressure:</b>	6 – 125 psig (1.4 – 9.6 bara)
<b>Flow rate:</b>	<1 slpm in N <sub>2</sub> (gas dependent)
<b>Sample gases:</b>	Most inert and passive gases
<b>Gas temperature:</b>	Up to 60°C
<b>Purge gas</b> (CO <sub>2</sub> only):	Inert gas (e.g. N <sub>2</sub> ), <1 ppm CO <sub>2</sub> , 30 – 150 psig, 4 – 5 slpm
<b>Purge gas connection:</b>	1/8" Swagelok®

---

## Dimensions & Weight

<b>Standard sensor</b> (19" rack-mountable):	H x W x D 8.75 x 19.0 x 24.0 in (222 x 483 x 610 mm)
<b>Standard sensor weight:</b>	40 lbs (18 kg)

---

## Electrical and Interfaces

<b>Alarm indicators:</b>	2 user programmable, 1 system fault Form C relays
<b>Power requirements:</b>	90 – 240 VAC, 50/60 Hz
<b>Power consumption:</b>	100 Watts max.
<b>Signal output:</b>	Isolated 4–20 mA
<b>User interfaces:</b>	5.7" LCD touchscreen, 10/100 Base-T Ethernet. USB, RS-232, RS-485. Modbus TCP (optional)
<b>Data storage:</b>	Internal or external flash drive
<b>Certification:</b>	CE Mark (pending)

## HALO Max QCL CO

### Performance, CO

	Range	LDL (3 $\sigma$ )	Precision (1 $\sigma$ ) @ zero
In Nitrogen:	0 – 0.5 ppm	200 ppt	70 ppt
In Helium:	0 – 0.35 ppm	130 ppt	45 ppt
In Argon:	0 – 0.4 ppm	150 ppt	50 ppt
In Hydrogen:	0 – 0.5 ppm	200 ppt	70 ppt
In Oxygen:	0 – 0.45 ppm	170 ppt	60 ppt
In Clean Dry Air (CDA):	0 – 0.5 ppm	200 ppt	70 ppt

---

## HALO Max QCL CO<sub>2</sub>

### Performance\*, CO<sub>2</sub>

	Range	LDL (3 $\sigma$ )	Precision (1 $\sigma$ ) @ zero
In Nitrogen:	0 – 2.5 ppm	100 ppt	35 ppt
In Helium:	0 – 2 ppm	90 ppt	30 ppt
In Argon:	0 – 2 ppm	80 ppt	25 ppt
In Oxygen:	0 – 2 ppm	90 ppt	30 ppt
In Clean Dry Air (CDA):	0 – 2.5 ppm	100 ppt	35 ppt

\*Due to the high abundance of CO<sub>2</sub> in air, purging of the analyzer housing is required to achieve specified LDL (see previous page for purge gas requirements).

Contact us for additional analytes and matrices.  
U.S. Patent # 7,277,177

## GAIN REAL-TIME INSIGHT INTO YOUR PROCESS

Process Insights manufactures and delivers premium sensors, monitors, detectors, analyzers, instrumentation, and software that are mission-critical to keep your operations, personnel, and the environment safe – every day across the globe.

Get the most reliable, precision analytical technologies available on the market today. We will work to match your needs and budget, and provide the optimal, and most stable process analysis solution for your application.

---

## CENTERS OF EXCELLENCE | PROVIDING PROVEN SOLUTIONS

Process Insights is committed to solving our customers' most complex analytical, process, and measurement challenges everyday.

### Process Insights – The Americas

4140 World Houston Parkway Suite 180, Houston, TX 77032, USA +1 713 947 9591

### Process Insights – EMEA

ATRICOM, Lyoner Strasse 15, 60528 Frankfurt, Germany +49 69 20436910

### Process Insights – APAC


Wujiang Economic and Technology, Development Zone, No. 258 Yi He Road, 215200 Suzhou, Jiangsu Province, China +86 400 086 0106

---

For a complete range of products, applications, systems, and service options, please contact us at: [info@process-insights.com](mailto:info@process-insights.com)

For a complete list of sales & manufacturing sites, please visit: <https://www.process-insights.com/about-us/locations/>

COSA Xentaur, Tiger Optics, Extrel, Alpha Omega Instruments, ATOM Instrument, MBW Calibration, MGA, Guided Wave, ANALECT and LAR TOC Leader are trademarks of Process Insights, Inc.



REVOLUTIONIZING MEASUREMENT

**EVERYWHERE**