

PRODUCT BROCHURE

# HALO™ 3 CO

## TRACE LEVEL CARBON MONOXIDE ANALYZER



### The HALO 3 CO ensures purity and process protection with:

- Parts per billion (ppb) carbon monoxide detection capability
- Wide measurement range, from 0 – 2500 ppm (in hydrogen)
- Freedom from calibration (absolute measurement technology)
- Low cost of ownership
- Compact design
- Simple software interface
- **NEW** optional Turbo Mode for lightning fast response of T90 < 10 seconds

## Measure CO with Confidence

Whether for process control or quality control, gas suppliers need accurate, low-level contaminant monitoring to ensure gas quality with no impurities. For refineries and chemical plants it is especially critical to measure carbon monoxide in hydrogen since high levels can poison a customer's process and a supplier's reputation. CO is also a critical impurity in fuel-cell-grade hydrogen that can poison the fuel cell's catalyst.

Monitor purity with the HALO 3 CO analyzer, designed to provide unparalleled accuracy and reliability for your most critical carbon monoxide measurements. Compact and easy to use, this analyzer features proven Cavity Ring-Down Spectroscopy to detect carbon monoxide as low as 40 ppb in your gas.

Users enjoy freedom from periodic sensor maintenance, and with no calibration gases required, operating costs are nearly eliminated. With drift-free stability and rapid response time, the HALO 3 CO is ideal for the continuous, online gas monitoring that is critical to process control in gas and chemical industries or anywhere purity is a necessity.

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## Specifications

### Performance

<b>Operating range:</b>	See table below
<b>Detection limit (LDL, 3<math>\sigma</math>/24h):</b>	See table below
<b>Precision (1<math>\sigma</math>, greater of):</b>	$\pm 0.75\%$ or 1/3 of LDL
<b>Accuracy (greater of):</b>	$\pm 4\%$ or LDL
<b>Speed of response:</b>	< 1 minutes to 90%
<b>Environmental conditions:</b>	10°C to 40°C, 30% to 80% RH (non-condensing)
<b>Storage temperature:</b>	-10°C to 50°C

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### Gas Handling System and Conditions

<b>Wetted materials:</b>	316L stainless steel (corrosive gas version optional) 10 Ra surface finish
<b>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>	10 – 125 psig (1.7 – 9.6 bara)
<b>Flow rate:</b>	Up to 1.8 slpm
<b>Sample gases:</b>	Most inert, toxic, passive and corrosive matrices
<b>Gas temperature:</b>	Up to 60°C

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## Dimensions & Weight

<b>Standard sensor:</b>	H × W × D: 8.73 x 8.57 x 23.6 in (222 x 218 x 599 mm)
<b>Sensor rack</b> (fits up to two sensors):	H × W × D: 8.73 x 19.0 x 23.6 in (222 x 483 x 599 mm)
<b>Standard sensor weight:</b>	28 lbs (12.7 kg)

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## Electrical and Interfaces

<b>Platform:</b>	Max series analyzer
<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>	40 Watts max.
<b>Signal output:</b>	Isolated 4–20 mA per sensor
<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

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## Performance, CO

	Range	LDL (3 $\sigma$ )	Precision (1 $\sigma$ ) @ zero
CO in N <sub>2</sub> :	0 – 2000 ppm	40 ppb	15 ppb
CO in O <sub>2</sub> :	0 – 1800 ppm	35 ppb	12 ppb
CO in Clean Dry Air (CDA):	0 – 2000 ppm	40 ppb	15 ppb
CO in Ar:	0 – 1600 ppm	30 ppb	10 ppb
CO in He:	0 – 1800 ppm	35 ppb	12 ppb
CO in H <sub>2</sub> :	0 – 2500 ppm	50 ppb	20 ppb

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## Performance, CO with Turbo Mode (see page 4)

	Range	LDL (3 $\sigma$ )	Precision (1 $\sigma$ ) @ zero
CO in N <sub>2</sub> :	0 – 2000 ppm	120 ppb	40 ppb
CO in O <sub>2</sub> :	0 – 1800 ppm	110 ppb	35 ppb
CO in Clean Dry Air (CDA):	0 – 2000 ppm	120 ppb	40 ppb
CO in Ar:	0 – 1600 ppm	90 ppb	30 ppb
CO in He:	0 – 1800 ppm	110 ppb	35 ppb
CO in H <sub>2</sub> :	0 – 2500 ppm	150 ppb	50 ppb

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

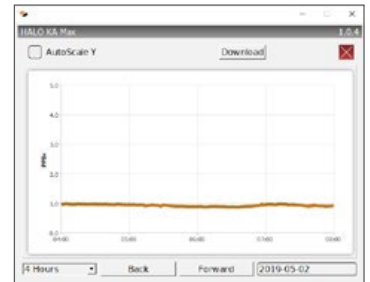
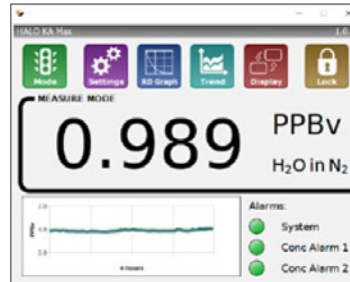


## Analyzer Upgrades

Add more value your Spark analyzer with these powerful options:

### Serani™ Max Analyzer Interface Software

- Connect to your analyzer remotely from your computer via Ethernet (Windows XP or higher required)
- Data recording, plotting and analysis in real-time with the click of a button
- One-step data collection and other service function shortcuts



### Turbo Mode

- Special software option to dramatically increase speed of response
- Fast process monitoring with  $T_{90} < 10$  seconds
- This option makes the analyzer a drift-free, maintenance-free replacement for traditional NDIR systems



### Annual Performance Verification

- Low-cost and easy remote verification process, with no need to return the analyzer to the factory
- Annual verification by Tiger Optics ensures that your analyzer continues to meet its original specifications
- Up-to-date Verification Certificate to comply with your QA/QC standards



### Installation & Commissioning Package

- On-site analyzer installation and start-up by Tiger Optics trained personnel
- Ensuring correct installation helps prevent future issues with the analyzer or your sampling system
- Gain peace of mind and save money in the long run



## GAIN REAL-TIME INSIGHT INTO YOUR PROCESS

Process Insights delivers premium analytical sensors, analyzers, instrumentation, software and solutions that are mission-critical to keep your operations, personnel, and the environment safe. Our commitment to customer satisfaction is evident through our diverse range of products, programs, and services, designed to accommodate various budgets and application needs.

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