

**PRODUCT DATASHEET**

# HALO™ LP H<sub>2</sub>O

TRACE MOISTURE IN HYDRIDE GASES



## HALO LP H<sub>2</sub>O offers:

- Low parts per billion (ppb) moisture detection capability in NH<sub>3</sub>, PH<sub>3</sub>, and more
- Absolute measurement (freedom from periodic calibration)
- Wide dynamic range – over four orders of magnitude
- Low cost of ownership and operational simplicity
- Clean technology – no external calibration gases required
- Compact analyzer footprint
- User-programmable alarms immediately notify on concentration upsets

# Specifications

## Performance

<b>Operating range:</b>	See detection performance table on next page
<b>Detection limit (LDL, <math>3\sigma/24h</math>):</b>	See detection performance table on next page
<b>Precision (<math>1\sigma</math>, greater of):</b>	$\pm 1\%$ or $1/3$ of LDL
<b>Accuracy (greater of):</b>	$\pm 4\%$ or LDL
<b>Speed of response:</b>	< 3 minutes 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

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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>	$1 \times 10^{-9}$ mbar l / sec
<b>Inlet pressure:</b>	10 – 125 psig (1.7 – 9.6 bara)
<b>Outlet pressure:</b>	<10 Torr (13 mbar)
<b>Flow rate:</b>	Up to 1.0 slpm
<b>Sample gases:</b>	NH <sub>3</sub> , PH <sub>3</sub> , AsH <sub>3</sub> & inert matrices
<b>Gas temperature:</b>	Up to 60°C

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## Dimensions & Weight

<b>Standard sensor</b> (incl. shutoff valves):	H × W × D 8.73 × 8.57 × 26.4 in (222 × 218 × 670 mm)
<b>Sensor rack</b> (fits up to two sensors):	H × W × D 8.73 × 19.0 × 26.4 in (222 × 483 × 670 mm)
<b>Standard sensor weight:</b>	33 lbs (15.0 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. (excluding vacuum pump)
<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

\*Vacuum source required

## Standard Model

### Performance, H<sub>2</sub>O

	Range	LDL (3σ)	Precision (1σ) @ zero
In Ammonia:	0 – 20 ppm	9 ppb	3 ppb
In Phosphine <sup>†</sup> :	0 – 10 ppm	9 ppb	3 ppb
In Nitrogen:	0 – 6 ppm	1.0 ppb	0.3 ppb
In Argon:	0 – 4 ppm	0.8 ppb	0.25 ppb
In Hydrogen <sup>†</sup> :	0 – 6 ppm	1.0 ppb	0.3 ppb
In Helium:	0 – 3 ppm	0.6 ppb	0.2 ppb
In Nitric Oxide <sup>†</sup> :	0 – 100 ppm	16 ppb	6 ppb
In Germane <sup>†</sup> :	0 – 18 ppm	20 ppb	7 ppb
H <sub>2</sub> O in 5% SiH <sub>4</sub> /95% N <sub>2</sub> <sup>†</sup> :	0 – 6 ppm	20 ppb	7 ppb

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## Arsine Model

### Performance, H<sub>2</sub>O

	Range	LDL (3σ)	Precision (1σ) @ zero
In Arsine <sup>†</sup> :	0 – 10 ppm	5 ppb	2 ppb
In Nitrogen:	0 – 6 ppm	1.0 ppb	0.3 ppb
In Argon:	0 – 4 ppm	1.0 ppb	0.3 ppb
In Hydrogen <sup>†</sup> :	0 – 6 ppm	1.0 ppb	0.3 ppb
In Helium:	0 – 3 ppm	1.0 ppb	0.3 ppb

<sup>†</sup>Low leak rate vacuum pump (safety certified for service in relevant gas) required.

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

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