



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

## Trace Level Moisture Analyzer

GASES & CHEMICALS

CEMS

ENERGY

ATMOSPHERIC

SEMI & HB LED

SYNGAS

LAB & LIFE SCIENCE

**Designed for trace level moisture analysis, the HALO LP H<sub>2</sub>O offers:**

- Low parts per billion (ppb) moisture detection capability in NH<sub>3</sub> and PH<sub>3</sub>
- Absolute measurement (freedom from calibration gases)
- 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 high events

### Simple Trace Moisture Detection in Hydride Gases

Semiconductor and High Brightness LED manufacturers rely on ultra-high purity process gases such as ammonia and phosphine to build the high-tech products such as smartphones, LED TVs and light bulbs, and CPU and memory chips that consumers desire. Residual moisture in these critical gases degrade device performance, reduce yield, and negatively impact product and corporate profitability. The HALO LP H<sub>2</sub>O analyzer is designed to provide users with a simple, cost-effective, and compact analyzer for ensuring trace levels of moisture in NH<sub>3</sub> and PH<sub>3</sub> are within the required specifications.

Incorporating an absolute pressure controller, the LP (low pressure) version of this analyzer allows users to measure moisture in hydride gases with unmatched accuracy, reliability, and speed of response. Evidenced by our global installed base of over 1600 sensors, users enjoy the freedom from requirements such as periodic sensor maintenance, span calibrations, purifier replacement and pump rebuilds that are commonplace with other technologies. As a result, Tiger Optics' HALO LP H<sub>2</sub>O is relied on as an industry leader in the detection of trace moisture levels in ammonia and phosphine for electronic manufacturers and specialty gas suppliers worldwide.

**Tiger**optics

21<sup>ST</sup> CENTURY SPECTROSCOPY

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

## Trace Level Moisture Analyzer



Performance	
Operating range	See table below
Detection limit (LDL, 24 h peak-to-peak variation)	See table below
Sensitivity (3σ)	See table below
Precision (1σ, greater of)	± 1% or 1/3 of Sensitivity
Accuracy (greater of)	± 4% or 1/2 of LDL
Speed of response	< 3 minutes to 95%
Environmental conditions	10°C to 40°C 30% to 80% RH (non-condensing)
Storage temperature	-10°C to 50°C

Gas Handling System and Conditions*	
Wetted materials	316L stainless steel (optional Hastelloy®) 10 Ra surface finish
Gas connections	1/4" male VCR inlet and outlet
Leak tested to	1 x 10 <sup>-9</sup> mbar l / sec
Inlet pressure	10 – 125 psig (1.7 – 9.6 bara)
Outlet pressure	<10 Torr (13 mbar)
Flow rate	Up to 1.0 slpm
Sample gases	NH <sub>3</sub> , PH <sub>3</sub> , and inert matrices
Gas temperature	Up to 60°C

Performance, H <sub>2</sub> O:	Range	LDL	Sensitivity
In Ammonia	0 – 20 ppm	12 ppb	9 ppb
In Phosphine <sup>†</sup>	0 – 10 ppm	12 ppb	9 ppb
In Nitrogen	0 – 6 ppm	1.4 ppb	1.0 ppb
In Argon	0 – 4 ppm	1.4 ppb	1.0 ppb

\*Vacuum source required

<sup>†</sup>Low leak rate vacuum pump required

Contact us for additional analytes and matrices.

U.S. Patent # 7,277,177

Dimensions	H x W x D [in (mm)]
Standard sensor	8.73 x 8.57 x 23.6 (222 x 218 x 599)
Sensor rack (fits up to two sensors)	8.73 x 19.0 x 23.6 (222 x 483 x 599)

Weight	
Standard sensor	33 lbs (15.0 kg)

Electrical	
Alarm indicators	2 user programmable 1 system fault Form C relays
Power requirements	90 – 240 VAC, 50/60 Hz
Power consumption	40 Watts max.
Signal output	Isolated 4–20 mA per sensor
User interfaces	5.7" LCD touchscreen 10/100 Base-T Ethernet 802.11g Wireless (optional) RS-232 Modbus TCP (optional)

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