



# HALO 3 H<sub>2</sub>O

## Trace Level Moisture Analyzer

GASES & CHEMICALS

CEMS

ENERGY

SEMI & HB LED

ATMOSPHERIC

LAB & LIFE SCIENCE

### Designed for trace level moisture analysis, the HALO 3 H<sub>2</sub>O offers:

- Sub parts per billion (ppb) moisture detection capability in an array of gases
- 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
- Low gas consumption to conserve rare and costly gas
- Versatility—trace-level detection in various gas matrices

The HALO 3 H<sub>2</sub>O analyzer provides users with the unmatched accuracy, reliability, speed of response and ease of operation that users of Tiger Optics analyzers know and expect. Featuring Tiger Optics' powerful Cavity Ring-Down Spectroscopy-based moisture sensor in a very compact and economic analyzer design, this versatile analyzer allows users to measure moisture in most inert, corrosive and toxic gases with just one device. Users also enjoy freedom from requirements

such as periodic sensor maintenance, span calibrations, purifier replacement and pump rebuilds. As a result, the HALO 3 H<sub>2</sub>O analyzer is ideally suited to many applications where moisture measurement is extremely critical. These applications include fixed bulk gas continuous quality control, portable mobile analytical carts, process tool monitoring, air separation, gas cylinder quality control and many other demanding applications.

**Tiger**optics

21<sup>ST</sup> CENTURY SPECTROSCOPY

# HALO 3 H<sub>2</sub>O

## Trace Level Moisture Analyzer



Performance	
Operating range	See table on next page
Detection limit (LDL, 3σ/24h)	See table on next page
Precision (1σ, greater of)	± 0.75% or 1/3 of LDL
Accuracy (greater of)	± 4% or LDL
Speed of response	< 1 minute to 90%
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 (corrosive gas version optional) 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)
Flow rate	0.05 – 1.8 slpm
Sample gases	Most inert, toxic, passive and corrosive matrices
Gas temperature	Up to 60°C

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	28 lbs (12.7 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)
Certification	CE Mark

# HALO 3 H<sub>2</sub>O

## Trace Level Moisture Analyzer

Performance, H <sub>2</sub> O:		Range	LDL (3σ)	Precision (1σ) @ zero
INERT GASES	In Nitrogen	0 – 20 ppm	1.2 ppb	0.4 ppb
	In Helium	0 – 4 ppm	0.25 ppb	0.1 ppb
	In Argon	0 – 9 ppm	0.6 ppb	0.2 ppb
	In Hydrogen	0 – 16 ppm	1.0 ppb	0.4 ppb
OXYGENATED GASES	In Oxygen	0 – 12 ppm	0.7 ppb	0.25 ppb
	In Clean Dry Air (CDA)	0 – 18 ppm	1.2 ppb	0.4 ppb
	In CO	0 – 24 ppm	1.5 ppb	0.5 ppb
	In CO <sub>2</sub> (low range)	0 – 25 ppm	2.0 ppb	0.7 ppb
	In CO <sub>2</sub> (high range)	0 – 70 ppm	8 ppb	3 ppb
RARE GASES	In Neon	0 – 5 ppm	0.3 ppb	0.1 ppb
	In Krypton	0 – 11 ppm	0.6 ppb	0.2 ppb
	In Xenon	0 – 13 ppm	0.8 ppb	0.3 ppb
CORROSIVE GASES	In Cl <sub>2</sub>	0 – 25 ppm*	1.5 ppb	0.5 ppb
	In HCl	0 – 50 ppm <sup>†</sup>	3 ppb	1.0 ppb
	In HBr	0 – 100 ppm <sup>‡</sup>	12 ppb	4 ppb
FLUORINATED GASES	In SF <sub>6</sub>	0 – 15 ppm	1.0 ppb	0.4 ppb
	In NF <sub>3</sub>	0 – 20 ppm	2.5 ppb	0.9 ppb
	In CF <sub>4</sub>	0 – 15 ppm	4 ppb	1.2 ppb
	In C <sub>2</sub> F <sub>6</sub>	0 – 15 ppm	3 ppb	1.0 ppb
	In C <sub>3</sub> F <sub>8</sub>	0 – 20 ppm	3 ppb	1.0 ppb
	In C <sub>4</sub> F <sub>6</sub>	0 – 25 ppm	150 ppb	50 ppb
	In C <sub>4</sub> F <sub>8</sub>	0 – 20 ppm	3 ppb	1.0 ppb
	In C <sub>5</sub> F <sub>8</sub>	0 – 32 ppm	30 ppb	10 ppb

\*Corrosive gas version recommended for H<sub>2</sub>O concentration that could exceed 10 ppm

<sup>†</sup>Corrosive gas version recommended for H<sub>2</sub>O concentration that could exceed 1 ppm

<sup>‡</sup>Corrosive gas version required

Contact us for additional analytes and matrices.

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