

PRODUCT DATASHEET

# HALO 3 NH<sub>3</sub>™

TRACE AMMONIA ANALYZER



## Designed for trace ammonia analysis in laboratory and process applications:

- Accuracy traceable to the world's major national reference labs
- Industry-proven technology
- Freedom from the need for span calibrations
- No periodic sensor replacement/maintenance
- Wide dynamic range and no drift, different ranges available
- "Standard Model" for sub-part-per-billion (ppb) detection limit in N<sub>2</sub>, H<sub>2</sub> & CO<sub>2</sub>
- "N<sub>2</sub>O Model" for single-digit ppb detection limit in N<sub>2</sub>O & N<sub>2</sub>

## Versatile, sensitive and hassle-free trace ammonia analysis

Ammonia (NH<sub>3</sub>) is a key impurity in many applications, ranging from industrial process control to the analysis of fuel cell hydrogen. Tiger Optics delivers a powerful analytical tool for the measurement of NH<sub>3</sub>, based on Cavity Ring-Down Spectroscopy (CRDS). The HALO 3's low detection limit, drift-free operation, and compatibility with many different sample gases makes it an ideal tool for monitoring trace amounts of ammonia, for example, to ensure compliance with SAE J2719, ISO 14687 or similar purity standards for hydrogen used for fuel cell electric vehicles (FCEVs).

Highly specific to the target molecule, CRDS also prevents cross-interferences from distorting your measurement. Plus, there is no need to perform costly and time-consuming zero and span calibrations, saving both time and money with continuous, online service.

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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>	< 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, 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>	~1 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>	34 lbs (15.4 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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## Standard Model

Performance, NH <sub>3</sub>	Range	LDL (3σ)	Precision (1σ) @ zero
<b>In Nitrogen (Low Range):</b>	0 – 7 ppm	0.5 ppb	0.2 ppb
<b>In Nitrogen (Mid Range):</b>	0 – 35 ppm	2.5 ppb	0.8 ppb
<b>In Nitrogen (High Range):</b>	0 – 130 ppm	20 ppb	7 ppb
<b>In Hydrogen (Low Range):</b>	0 – 6 ppm	0.4 ppb	0.15 ppb
<b>In Hydrogen (Mid Range):</b>	0 – 30 ppm	2.0 ppb	0.7 ppb
<b>In Hydrogen (High Range):</b>	0 – 110 ppm	15 ppb	5 ppb
<b>In Carbon Dioxide<sup>†</sup>:</b>	0 – 30 ppm	2.5 ppb	0.8 ppb

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## N<sub>2</sub>O Model

Performance, NH <sub>3</sub>	Range	LDL (3σ)	Precision (1σ) @ zero
<b>In Nitrogen:</b>	0 – 150 ppm	9 ppb	3 ppb
<b>In Nitrous Oxide (N<sub>2</sub>O):</b>	0 – 200 ppm	10 ppb <sup>‡</sup> / 50 ppb	3.5 ppb <sup>‡</sup> / 20 ppb

\*Analysis in some specialty gases and certain applications may require a vacuum pump for operation. Please contact us to discuss your specific requirements.

<sup>†</sup>Cannot be combined with Low or High Range detection in N<sub>2</sub>/H<sub>2</sub>

<sup>‡</sup>Dry vacuum pump required

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

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