



# HALO RP

## Reduced-Pressure Trace Level Analyzer

GASES & CHEMICALS

CEMS

ENERGY

SEMI & HB LED

ATMOSPHERIC

LAB & LIFE SCIENCE

**Designed for trace level analysis at reduced pressure conditions and available for the detection of H<sub>2</sub>O or HF, the HALO RP offers:**

- Low parts per billion (ppb) detection capability in inert, acid, and hydride background 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
- CRDS technology, designated by SEMI-F112 06-13 Standard

### Protect Your Product with the HALO RP

It's one thing to be monitoring and have high confidence in your high purity bulk and speciality gases at the post-purifier stage but a lot can change as that same gas then travels through the various fab distribution systems and arrives at the equipment or process chamber. Unless you are monitoring close to the substrate or in the process chamber exhaust, there is risk that high partial pressures of moisture are present during processing, resulting in defects causing yield loss and reliability issues.

For example, in semiconductor fabrication, moisture or hydrogen fluoride present in low-temperature epitaxy (LTE) can affect the quality and strain of the epi layers. In MOCVD processing

with hydride gases, excess moisture can lead to significant reduction in luminescence and yield loss.

This is where Tiger Optics comes in. Able to operate in a pressure range from 50 Torr to 15 psig, the HALO RP trace level analyzer provides users with the unmatched accuracy, reliability, speed of response and ease of operation that users of Tiger Optics' analyzers have come to expect. The HALO RP is available for two different analytes, H<sub>2</sub>O and HF, to ensure that your product is protected from all harmful molecules.

Monitoring for contaminants close to the substrate or in the process chamber exhaust, significantly reduces the risk of process issues that cause product yield losses.

**Tiger**optics  
a Process Insights Brand

# HALO RP

## Reduced-Pressure Trace Level Analyzer



Performance	
Operating range	See table below
Detection limit (LDL, 3 $\sigma$ /24h)	See table below
Precision (1 $\sigma$ , greater of)	$\pm$ 1% or 1/3 of LDL
Accuracy (greater of)	$\pm$ 4% or 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 (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	50 Torr – 15 psig (0.07 – 2 bara)
Outlet pressure	<10 Torr (13 mbar)
Flow rate	0.1 to 1.0 slpm
Sample gases	N <sub>2</sub> , H <sub>2</sub> , Ar, He, HCl, and others
Gas temperature	Up to 60°C

\*Vacuum source required

Dimensions	H x W x D [in (mm)]
Standard sensor (incl. shutoff valves)	8.73 x 8.57 x 26.4 (222 x 218 x 670)
Sensor rack (fits up to two sensors)	8.73 x 19.0 x 26.4 (222 x 483 x 670)

Weight	
Standard sensor	30 lbs (13.4 kg)

Electrical and Interfaces	
Platform	Max series analyzer
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
User interfaces	5.7" LCD touchscreen 10/100 Base-T Ethernet USB, RS-232, RS-485 Modbus TCP (optional)
Data storage	Internal or external flash drive
Certification	CE Mark

# HALO RP

## Reduced-Pressure Trace Level Analyzer



### HALO RP H<sub>2</sub>O – Trace Moisture Analyzer (Standard Model)

Performance, H <sub>2</sub> O:	Range	LDL (3 $\sigma$ )	Precision (1 $\sigma$ ) @ zero
In Nitrogen	0 – 20 ppm	1.5 ppb	0.5 ppb
In Argon	0 – 20 ppm	1.5 ppb	0.5 ppb
In Hydrogen <sup>†</sup>	0 – 20 ppm	1.5 ppb	0.5 ppb
In Helium	0 – 12 ppm	1.0 ppb	0.3 ppb
In Clean Dry Air (CDA)	0 – 20 ppm	1.5 ppb	0.5 ppb
In HCl <sup>†,‡</sup>	0 – 25 ppm	3 ppb	1.0 ppb
in CO <sup>†</sup>	0 – 20 ppm	2 ppb	0.7 ppb
In Phosphine <sup>†</sup>	0 – 10 ppm	9 ppb	3 ppb
In Germane <sup>†</sup>	0 – 18 ppm	20 ppb	7 ppb

### HALO RP H<sub>2</sub>O – Trace Moisture Analyzer (Arsine Model)

Performance, H <sub>2</sub> O:	Range	LDL (3 $\sigma$ )	Precision (1 $\sigma$ ) @ zero
In Arsine <sup>†</sup>	0 – 10 ppm	5 ppb	2 ppb
In Nitrogen	0 – 6 ppm	1.0 ppb	0.3 ppb
In Helium	0 – 3 ppm	1.0 ppb	0.3 ppb

### HALO RP HF – Trace Hydrogen Fluoride Analyzer

Performance, HF:	Range	LDL (3 $\sigma$ )	Precision (1 $\sigma$ ) @ zero
In Nitrogen	0 – 10 ppm	0.75 ppb	0.25 ppb
In Argon	0 – 10 ppm	0.75 ppb	0.25 ppb
In BF <sub>3</sub> <sup>†</sup>	0 – 13 ppm	0.9 ppb	0.3 ppb

<sup>†</sup>May require corrosive gas version, please contact us for more information

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

Contact us for additional analytes and matrices.

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