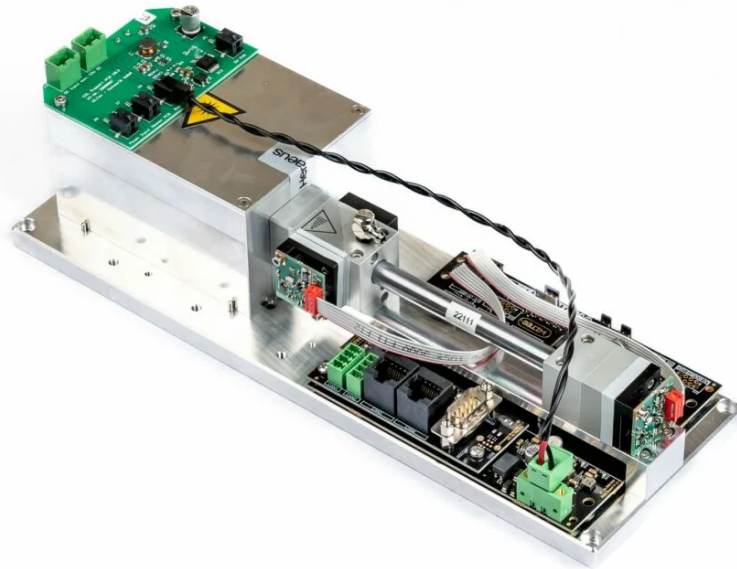


# RITTER »MultiGas« Ultraviolet Module NDUV / H<sub>2</sub>S



RITTER DATA SHEET / SENSORS, NON-DISPERSIVE ULTRAVIOLET SENSOR (NDUV) / MULTIGAS



## Description

The H<sub>2</sub>S sensor works according to the principle of non-dispersive UV absorption (NDUV). The measuring wavelength used is in the lower nanometer range, which enables interference-free measurements with water vapour and hydrocarbons. This makes the sensor ideal for use in biogas measurements, as accompanying gases such as NH<sub>3</sub>, CO<sub>2</sub>, CH<sub>4</sub> and H<sub>2</sub>O do not affect the accuracy of the measurements.

In contrast to photometric NDUV sensors the **lifetime of electrochemical sensors for measurement of H<sub>2</sub>S** is limited. Please note that lifetime data for such sensors are given for air and not for measurement of H<sub>2</sub>S. For H<sub>2</sub>S concentrations > 200 ppm the lifetime is reduced, for concentrations > 1000 ppm critical. While the measurement performance of UV-LED is constant, EC sensors are becoming »deaf«.

## Applications

- › Biogas analysis
- › Environmental and Process Measurement
- › Leakage detection
- › Industrial gas analysis
- › Renewable Gas Monitoring

## Specifications

### General features

Measurement technology:	Innovative NDUV Sensor (non-dispersive ultraviolet sensor) Dual beam
Detectable gases:	<b>SO<sub>2</sub> H<sub>2</sub>S</b>
Number of simultaneously detectable gases:	max. 2
Measurement ranges:	See <a href="#">Table of Measurement Ranges</a>
Flow rate range:	5 – 300 ltr/h For higher flow rates the sensor can be operated in bypass
Max. gas inlet pressure:	300 mbar
Pressure loss (without additional optional sensors):	10 @ 100 / 35 @ 200 / 70 @ 300 (mbar @ ltr/h)
Temperature compensation:	Yes
Data acquisition software:	Yes
Lifetime of UV radiation source:	> 8 000 h
Measurement cuvette:	Stainless steel with silicone coating inside
Cuvette sealing:	Viton O-ring
Internal tubing:	FKM / Viton (fluorinated rubber)
Casing:	High-quality table-top casing, aluminium
Dimensions (W x H x L):	300 x 100 x 81 mm
Weight:	approx. 1670 g
Gas connections:	PVDF screw-type tube connection for tube Ø <sub>i</sub> 4 mm, Ø <sub>o</sub> 6 mm

### Measuring response

Linearity error:	< ± 1% F.S.
Repeatability:	± 0.5% F.S.
Long term stability zero:	< ± 1% F.S. / 24 h
Long term stability span:	< ± 1% F.S. / month
Temperature influence of zero point:	< 1% F.S. / 10K
Temperature influence of span:	< 2% F.S. / 10K
Cross sensitivity:	< 2% F.S.
Pressure influence:	< 1.5% / 10 hPa of reading
Warm-up time:	1 min (initial), < 15 min for full specification
Response time (t <sub>90</sub> ):	1.5 – 15 sec
Sampling frequency by software:	≤ 10 Hz
Detection limit:	See <a href="#">Table of Measurement Ranges</a>
Resolution:	0.5 x detection limit

## Electrical features

Power supply:	24 VDC incl. power plug 100 ~ 240 VAC 50/60 Hz: 24 VDC
Supply current (peak):	< 0.4 A
Average power consumption:	< 7.5 W
Interface:	USB (standard) RS232 / CANbus / CANopen (options) incl. data transmission cable 1 m
Analogue voltage output (option):	0-2 V / 0-5 V / 0-10 V

## Climatic conditions

Operating temperature:	+5 ~ +45 °C
Storage temperature:	-20 ~ +60 °C
Operating pressure:	800 ~ 1200 hPa (mbar)
Ambient humidity:	0 ~ 95% rel. humidity <b>Condensing inside of sensor must be prevented!</b>

## List of standard measurement ranges <sup>\*1</sup> (and detection limits <sup>\*2</sup>)

	Standard Measuring Ranges with respective Detection Limits (% of F.S. <sup>*3</sup> )															
	100 Vol.%	50 Vol.%	30 Vol.%	20 Vol.%	10 Vol.%	5 Vol.%	1 Vol.%	5,000 ppm	2,000 ppm	1,000 ppm	500 ppm	300 ppm	100 ppm	50 ppm	10 ppm	1 ppm
SO <sub>2</sub>					✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.5%)	✓ (< 0.5%)	✓ (< 0.5%)	✓ (< 0.5%)
H <sub>2</sub> S							✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.1%)	✓ (< 0.2%)	✓	✓ (< 0.5%)			

<sup>\*1</sup> A standard measurement range is defined by ✓ / <sup>\*2</sup> (= 3 σ) in Percent of Full Scale / <sup>\*3</sup> F.S. = Full Scale / <sup>\*4</sup> Calibration with Propane

### Definition of Detection Limit

The Detection Limit is the smallest measurement value which can be obtained with a specific uncertainty. This uncertainty includes the resolution, noise and stability of the gas sensor for a specific gas and specific measurement range. For evaluation of the detection limit value, several single measurements are taken at the identical measurement conditions. With the obtained single measurement results the standard deviation "Sigma" (σ) is calculated. The values given in the table equal the triple amount of Sigma.

### Recalibrations

The following recalibration intervals are recommended for UV sensors:

- Zero-point:
  - Concentrations < 300 ppm: Every 48 hours with inert gas, e.g. Nitrogen
  - Concentrations ≥ 300 ppm: Every 24 hours with inert gas, e.g. Nitrogen
 The recalibration of the zero point is described in the software manual.
- End-point (full scale): Every 3 months with suitable calibration gas

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The most recent version of this data-sheet can be found at ...

<https://www.ritter.de/en/multigas-nduv-h2s-ultraviolet-modules/>

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