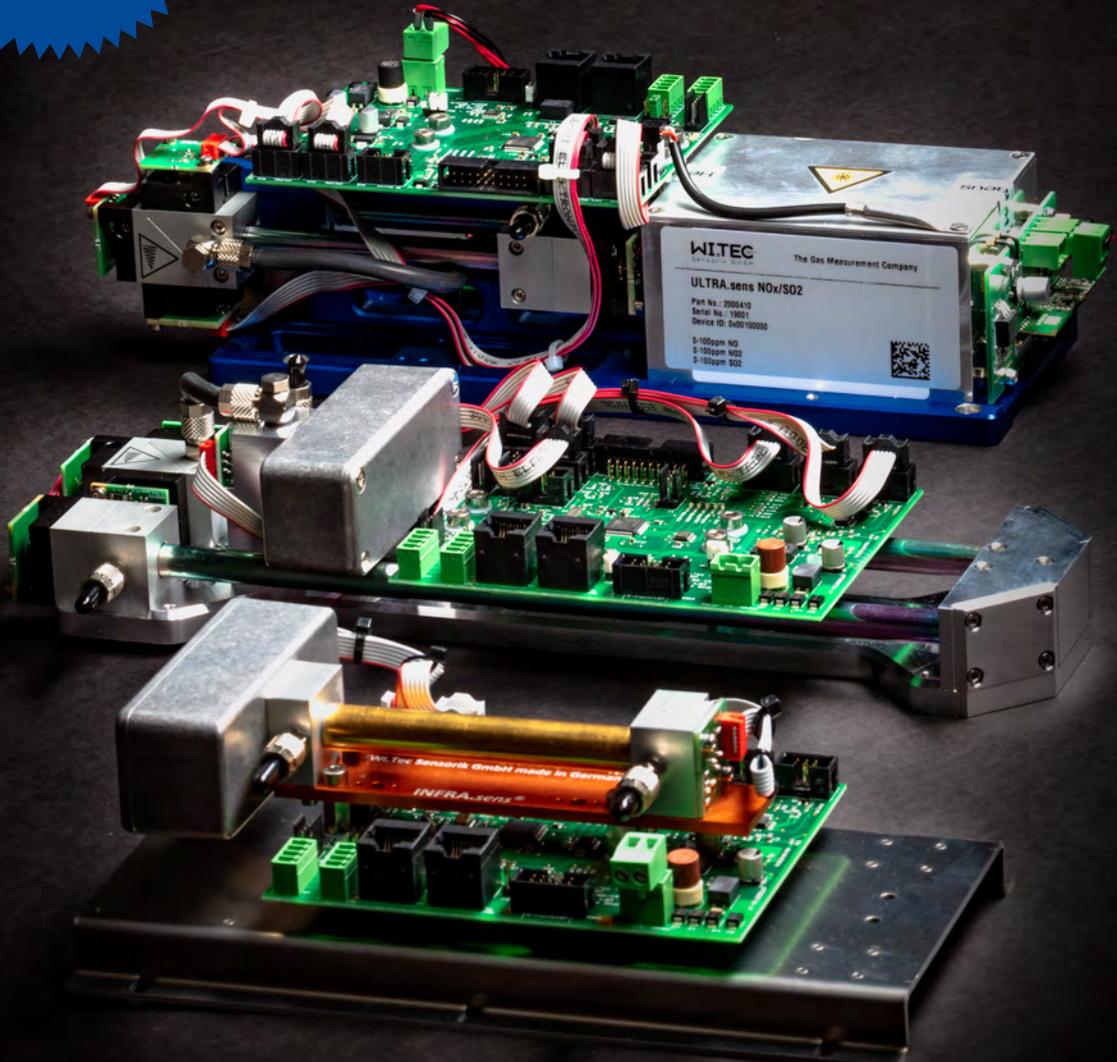




The Gas Measurement Company

CAUSE IT MAKES .SENS

**NEW**  
NOW AVAILABLE!  
**NO<sub>x</sub>**



**HIGH-PRECISION MODULAR**

**GAS MEASUREMENT TECHNOLOGY**

Configurable & combinable OEM sensors

# Analyze up to 4 different gases with one module

	Version	Line 1	Line 2	Line 3	Line 4	Line 5*	Line 6*	Line 7*
Single Gas Module	1.1	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>				O <sub>2</sub>	P	H
	1.2			NO / NO <sub>2</sub> / SO <sub>2</sub> / H <sub>2</sub> S / O <sub>3</sub> / CL <sub>2</sub>		O <sub>2</sub>	P	H
Dual Gas Module	2.1	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>			O <sub>2</sub>	P	H
	2.2			NO / NO <sub>2</sub> / SO <sub>2</sub> / H <sub>2</sub> S / O <sub>3</sub> / CL <sub>2</sub>	NO <sub>2</sub> / SO <sub>2</sub> / O <sub>3</sub> / CL <sub>2</sub>	O <sub>2</sub>	P	H
	2.3	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>		NO <sub>2</sub> / SO <sub>2</sub> / O <sub>3</sub> / CL <sub>2</sub>		O <sub>2</sub>	P	H
Triple Gas Module	3.1	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>		O <sub>2</sub>	P	H
	3.2	CO <sub>2</sub> / CO / NO / N <sub>2</sub> O / CH <sub>4</sub> / C <sub>n</sub> H <sub>m</sub>		NO <sub>2</sub> / SO <sub>2</sub> / O <sub>3</sub> / CL <sub>2</sub>	NO <sub>2</sub> / SO <sub>2</sub> / O <sub>3</sub> / CL <sub>2</sub>	O <sub>2</sub>	P	H
	3.3			NO / NO <sub>2</sub> / SO <sub>2</sub>		O <sub>2</sub>	P	H

\* Option

## Modular sensor design

In order to be able to adapt gas analyses as flexibly as possible to individual measurement tasks, the individual components designed modularly. This resulted in a »modular system« in which the various photometric components such as detectors, emitters, measuring sample cell, etc. can be exchanged. Aluminium with bright gold coating and passivated stainless steel is used as the standard sample cell material. PEEK (polyetheretherketone) is also available for special applications.

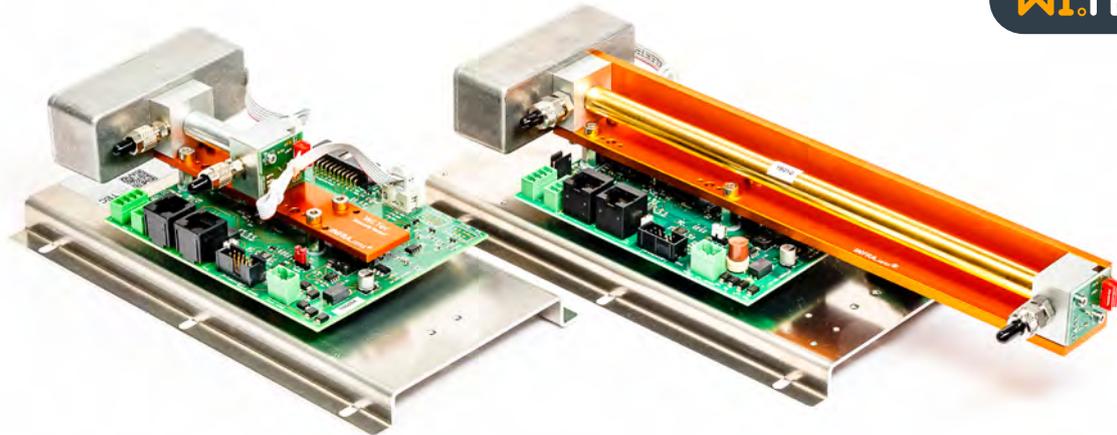
With this sophisticated sensor design, customer-specific applications can also be realized without the need for a completely new development. The modularity makes replacement and maintenance considerably easier when servicing is required. Completely bonded gas sensors, on the other hand, can only be replaced as a complete unit and thus generate high follow-up costs (total cost of ownership) in case of maintenance.

Optionally, the different gas measurement modules can also be equipped with a pressure measurement (**P.sens**) oxygen measurement (**O2.sens**) or a humidity measurement (**HUMI.sens**).

## List of measurement ranges

Measuring range*	INFRA.sens® NDIR							ULTRA.sens® NDUV				UVRAS	
	CO <sub>2</sub>	CO	NO	CH <sub>4</sub>	C <sub>n</sub> H <sub>m</sub>	N <sub>2</sub> O	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>	CL <sub>2</sub>	H <sub>2</sub> S	NO	
100 Vol.-%	✓	✓		✓	✓	✓	✓						
30 Vol.-%	✓	✓		✓	✓	✓	✓						
10 Vol.-%	✓	✓		✓	✓	✓	✓						
5 Vol.-%	✓	✓		✓	✓	✓	✓			✓			
1 Vol.-%	✓	✓	✓	✓	✓	✓	✓			✓			
5,000 ppm	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
2,000 ppm	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	
1,000 ppm	✓	✓				✓	✓	✓	✓	✓	✓	✓	
500 ppm	✓	✓				✓	✓	✓	✓	✓		✓**	
100 ppm	✓						✓	✓	✓				
50 ppm	✓						✓		✓				
10 ppm									✓				

\* = Full scale value (F.S.) / \*\* = up to 300ppm



INFRA.sens® AK50 (CO,CO<sub>2</sub>,HC,CH<sub>4</sub>,N<sub>2</sub>O...) / INFRA.sens® AK250G with P.sens 800-1200 mBar

The **INFRA.sens®** was specially developed for high-quality NDIR gas analysis. In the design phase, special emphasis was placed on high stability and a low detection limit. With the use of high-performance light emitting diodes (IR-LED) and thermal micro radiators, which were adapted to the needs of gas measurement technology, these goals were achieved in full. In the spectral range from 2 µm to 12 µm, carbon dioxide, carbon monoxide, hydrocarbons and nitrous oxide can be reliably detected up to the ppm range with this new sensor platform.

## Applications

- > Environmental and Process Measurement Technology (CEM)<sup>2</sup>
- > Elemental analysis
- > TOC analyzers
- > Industrial gas analysis
- > Natural gas/biogas analysis

## Features & Benefits

- > Measuring accuracy: ±2 % F.S.<sup>1</sup>
- > Sensor sample cell: aluminium/gold
- > Fast response time, t<sub>90</sub> ≈ 3 s
- > High dynamic range, 1:100
- > Robust, dismantlable construction due to gas-tight O-ring connections
- > Temperature range 5°C - 45°C
- > Low power consumption < 10 Watt
- > RS 232, CAN, analog output (0-10 V) as option
- > Connection of 2 optical measuring systems to one basic electronic unit

<sup>1</sup> F.S. - Full scale value / <sup>2</sup> Continuous Emission Monitoring / <sup>3</sup> Portable Emission Monitoring System

## Options



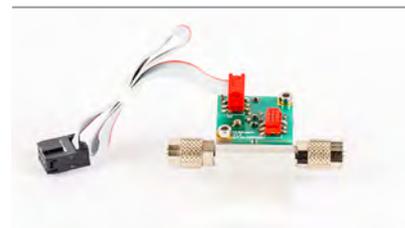
### O2.sens (Oxygen sensor)

- > Measuring range:  
0-100 Vol.-%, 0-25 Vol.-%
- > Response time (t<sub>90</sub>): 15 s;  
(5 s as automotive version)
- > Service life: approx. 5 years
- > Electrochemical sensor



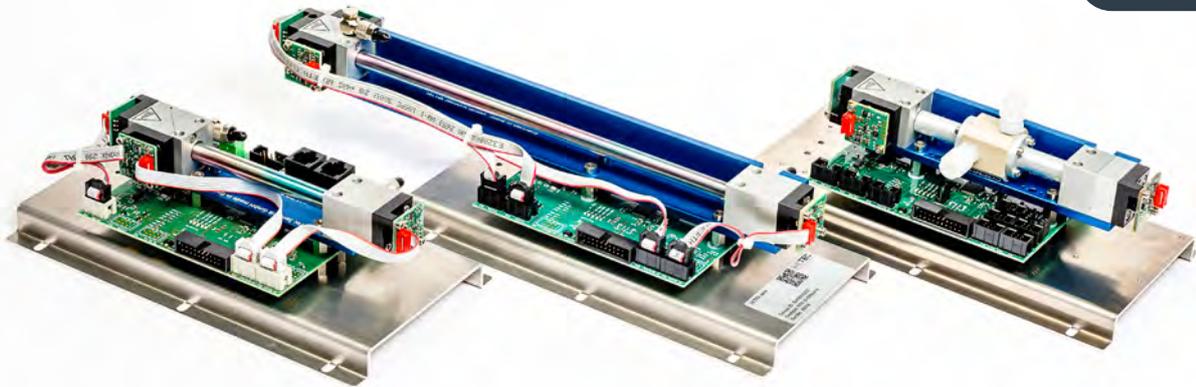
### P.sens (Pressure sensor)

- > Meas. range: 800-1,200 mbar
- > Resolution: 1 mbar
- > Response time (t<sub>90</sub>): 1 s
- > Pressure compensation of the  
gas measured values
- > Optional: stainless steel version



### HUMI.sens® (Humidity sensor)

- > Measuring range: 0-100 % RH
- > Resolution: ±1 % RH
- > Response time (t<sub>90</sub>): 12 s
- > Absolute Humidity in g/m<sup>3</sup>
- > I2C protocol
- > Polymer humidity sensor



ULTRA.sens® AK100 (SO<sub>2</sub>,NO<sub>2</sub>,O<sub>2</sub>,CL<sub>2</sub>...) / ULTRA.sens® AK250 (SO<sub>2</sub>,NO<sub>2</sub>) / ULTRA.sens® with PEEK Process gas sample cell (e.g.: Chlorine measurement 5 Vol.%)

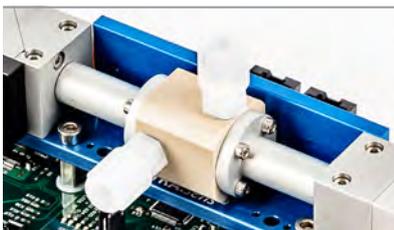
The **ULTRA.sens®** is the world's first OEM gas measurement module based on miniaturized UV LEDs. The stability and lifetime of these UV-LEDs enables high-precision gas analyses down to the ppb range. By using two UV-LEDs 2 gases can be detected simultaneously. With this approach, 2 measuring ranges from ppm to Vol.-% can also be realized. In the spectral range from 200 nm to 500 nm, nitrogen oxides (NO+NO<sub>2</sub>), aromatic hydrocarbons, hydrogen sulphide, ozone, sulphur dioxide and chlorine can be reliably detected with this novel sensor platform.

## Applications

- › Environmental Metrology (CEM)<sup>2</sup>
- › Engine development
- › Elemental analysis
- › Industrial gas analysis
- › Process measurement technology
- › Biogas research

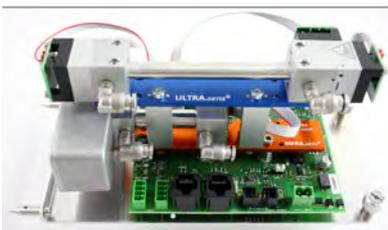
## Features & Benefits

- › Measuring accuracy: ±2 % F.S.<sup>1</sup>
- › Sensor sample cell: stainless steel with inert coating (inside and outside)
- › PEEK cell for corrosive gases (H<sub>2</sub>S, chlorine) on request
- › Fast response time, t<sub>90</sub> < 1 s possible
- › High dynamic range, 1:100
- › No water vapour cross sensitivity as with NDIR gas sensors
- › Robust, dismountable construction due to gas-tight O-ring connections
- › Low power consumption < 3 Watt @ 24 VDC
- › RS 232, CAN, analog output (0-10 V) as option
- › Connection of 2 optical measuring systems to one basic electronic unit
- › Temperature range 5°C - 45°C



### Process gas sample cell

- › For corrosive gases (e.g. Chlorine)
- › O-ring seal
- › Different materials possible
- › Pressure resistant
- › Different cell lengths / measuring ranges available



### KOMBI.sens®

- › Combination of IR and UV technology
- › Up to 3 gases + O<sub>2</sub>
- › Space-saving construction
- › Cross allocation among each other possible



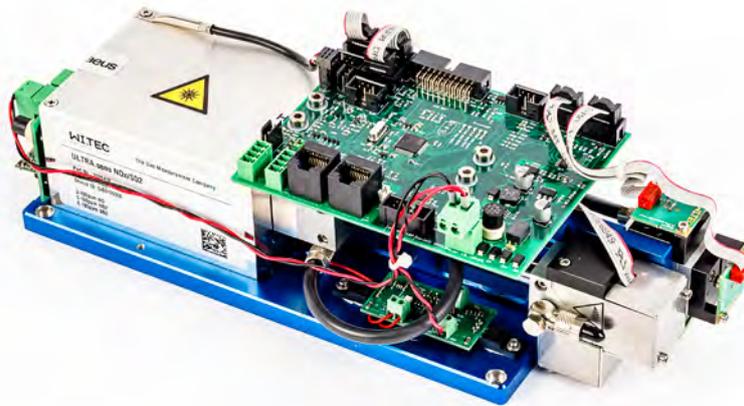
### Thermobox

- › For thermal insulation
- › Temperature controlled up to 55 °C
- › Optionally **ULTRA.sens®** or **INFRA.sens®**
- › With dust filter
- › Temperature range 5°C - 45°C

# ULTRA.sens® UVRAS

NO / NO<sub>2</sub> / SO<sub>2</sub> / H<sub>2</sub>S

WI.TEC



ULTRA.sens® AK100 (NO<sub>x</sub>/SO<sub>2</sub>)

For the detection of NO and H<sub>2</sub>S an EDL (electrodeless gas discharge lamp) is used. A combination of both technologies (UVRAS & UVLEDs) allows simultaneous gas analysis of NO, NO<sub>2</sub> and SO<sub>2</sub> in the lower ppm range, which is particularly important in flue gas analysis (CEM)<sup>2</sup>.

In the EDL, N<sub>2</sub> and O<sub>2</sub> are converted to NO and produce selective UV radiation. With this radiation a cross sensitivity free NO measurement is made possible. This method is called UV resonance spectroscopy (UVRAS).

## Applications

- › Exhaust gas monitoring (CEM)<sup>2</sup>
- › Laboratory area
- › Biogas research
- › Industrial gas analysis
- › Engine test benches
- › Portable gas analysis (PEMS)<sup>3</sup>

## Features & Benefits

- › Simultaneous NO<sub>x</sub> and SO<sub>2</sub> analysis
- › Temperature controlled up to 55°C
- › Fast response time < 3 seconds
- › Durable EDL (> 16000h)
- › Flow-independent measurement 0-2L/min
- › No influence of gas humidity
- › No NO<sub>x</sub> converter required
- › High accuracy
- › Low power consumption
- › Compact size

Subject to change without notice.

## Accessories



### Thermostat heating module

- › Temperature controller 30-55°C
- › Control accuracy ± 0,2 K
- › 12 Watt heating power
- › 30 Watt with external heating element



### Analogboard

- › 0-10 V; 0-5 V; 0-2 V
- › 16 bit resolution
- › 1 second Update rate
- › 4 parallel signal outputs



### MARS Tool

- › PC evaluation software
- › Measurement data logging
- › Calibration / adjustment
- › Save and load sensor parameters



#### Headquaters / Production

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