

E.J2KNpro

ecom-J2KNpro, the powerful portable analyser with radio remote control unit for bridging distances between measuring points.

Tested in accordance with
EN 50379-2 and 1st BImSchV



MOBILE FLUE GAS ANALYSIS

Made in Germany



Reliable

Precise measurement results even at low outside temperatures thanks to internal device heating



Efficient

Fast measurement results thanks to the largest pump in its class



Safe

Smooth operation thanks to multi-stage sample gas filtering



ecom GmbH
Am Großen Teich 2
58640 Iserlohn
info@ecom.de

ecom[®]
Measurement Technology

„Precisely measured values are essential for an optimal combustion process.“

THE PROFESSIONAL SOLUTION

Inspection and adjustment work on medium and large combustions



- Up to 9 gas sensors possible
- Radio remote control unit with coverage of up to 70 m
- Electronic level monitoring with automatic condensate draining
- CO sensor overload protection with free purging without measurement interruption
- Integrated soot measurement
- H₂ ready and solid fuel types analysis possible

● = Basis EC ● = Optional EC ● = Optional NDIR; ● = Optional Pellistor

O₂ CO NO NO₂ CO % SO₂ H₂ H₂S CO₂ CH₄ C_xH_y

Technical data				√ Standard	• Option
Measured values	Range	Resolution	Accuracy	* = Higher value applies	
Maximum number of gas sensors					6
O ₂	0...21/25 %	0,1 vol. %	± 0,2 vol. %	√	
CO (H ₂ -comp.)	0...2.500 ppm (10,000 ppm)	1 ppm	± 20 ppm / 5 % of reading*	√	
CO%	0...63,000 ppm	5 ppm	± 100 ppm / 10 % of reading*		•
CO ₂ IR-Sensor	0...20/100 vol. %	0,01 vol. %	± 0,5 vol. % / 5 % of reading*		•
NO	0...5,000 ppm	1 ppm	± 5 ppm / 5 % of reading*		•
NO _{ExtraLow}	0...300 ppm	0,1 ppm	± 2 ppm / 5 % of reading*		•
NO ₂	0...1,000 ppm	1 ppm	± 5 ppm / 5 % of reading*	√	
NO _{2Low}	0...100 ppm	0,1 ppm	± 5 ppm / 5 % of reading*		•
SO ₂	0...5,000 ppm	1 ppm	± 10 ppm / 5 % of reading*		•
SO _{2Low CO}	0...5,000 ppm	1 ppm	± 10 ppm / 5 % of reading*		•
SO _{2Low}	0...100 ppm	0,1 ppm	± 5 ppm / 5 % of reading*		•
H ₂	0...20,000 ppm	1 ppm	± 50 ppm / 5 % of reading*		•
H ₂ S	0...1,000 ppm	1 ppm	± 10 ppm / 5 % of reading*		•
CH ₄ IR-sensor	0...5 vol. %	0,01 vol. %	± 0,2 vol. % / 5 % of reading*		•
C _x H _y Pellistor	0...4 vol. %	0,1 Vol. %			•
Other measured values	Range	Resolution	Accuracy		
T-Gas	0...500 °C	1 °C	± 2 °C / 1,5 % of reading*	√	
	0...1.100 °C	1 °C	± 2 °C / 1,5 % of reading*		•
T-Air	0...99 °C	1 °C	± 1 °C	√	
Pressure ΔP	± 100 hPa	0,01 hPa	± 0,5 hPa / 1 % of reading*	√	

Technical data	
Calculation values	Range
CO ₂	0...CO _{2max}
Combustion efficiency (ETA)	0...120 %
Excess air (Lambda)	>1
Losses qA	0...100 %
CO _(U) undiluted	x ppm
Dew point	x° C
mg/m ³	x mg/m ³
mg/kWh	x mg/kWh
NH3 Range 0 to 1000 PPM, HCL 0 to 1000 PPM	

Options among others

- NO_x gas sampling hose for loss-free measurement of water-soluble NO₂ - and SO₂ - particles
- Gas cooler for sample drying before analysis

Heat protection shield
to protect the probe grip
against heat radiation



Probe attachments
in various lengths and temperature ranges



ecom-DP
for measuring different pressures



e.CLOUD by ecom
digital measurement data
and customer management



The high-end model combines the best of electrochemical and physical measuring sensors.

ecom[®] J2KN^{pro} TECH



ecom PRODUCTS OFFER YOU MANY BENEFITS...



EXTREMELY EFFICIENT.

The high output level (up to 2.6 liters/minute) not only enables ecom analyzers to provide a fast reading: It also makes it possible to bridge long distances during sampling, or negative pressure in the application. Manometers also provide readings in record time.



EXTREMELY ACCURATE.

The reading accuracy of gas sensors (CO, NO, SO₂) is determined and adjusted at 5, 20 and 40°C in the climatic test chamber using standardized test gases. High-quality sensors provide a perfect reading for pressure measurements.



EXTREMELY COMPLETE.

ecom analyzers are sold and designed as an entity (device, probe, probe hose, case). In addition: Printer paper and filter, a solid shoulder strap, PC software and Apps.



EXTREMELY COOL.

The drier, the better: The gas to be measured is continually cooled to 5°C using a gas cooler. This way, the drying process is controlled. Collected condensate can be easily emptied in some cases this occurs in automatic mode.



EXTREMELY FAR-REACHING.

ecom analyzers communicate wirelessly: Via Bluetooth as well as radio (highest range with the most stable connection). This way instruments can be remote-controlled via e.g. smartphones or ecom remote control unit.



EXTREMELY ROBUST.

Hard on the outside - even harder on the inside! Almost all ecom measuring devices are housed in an ultra-light aluminium casing. Its durability pays off in its daily use - especially in rougher conditions.



EXTREMELY SAFE.

The condensation control protects from moisture. An automatic CO shut-off (flushing of the CO sensor) without interruption of the measuring process ensures the long lifespan of the CO sensor. Each ecom instrument has its own „safety equipment.“



EXTREMELY LOSS-FREE.

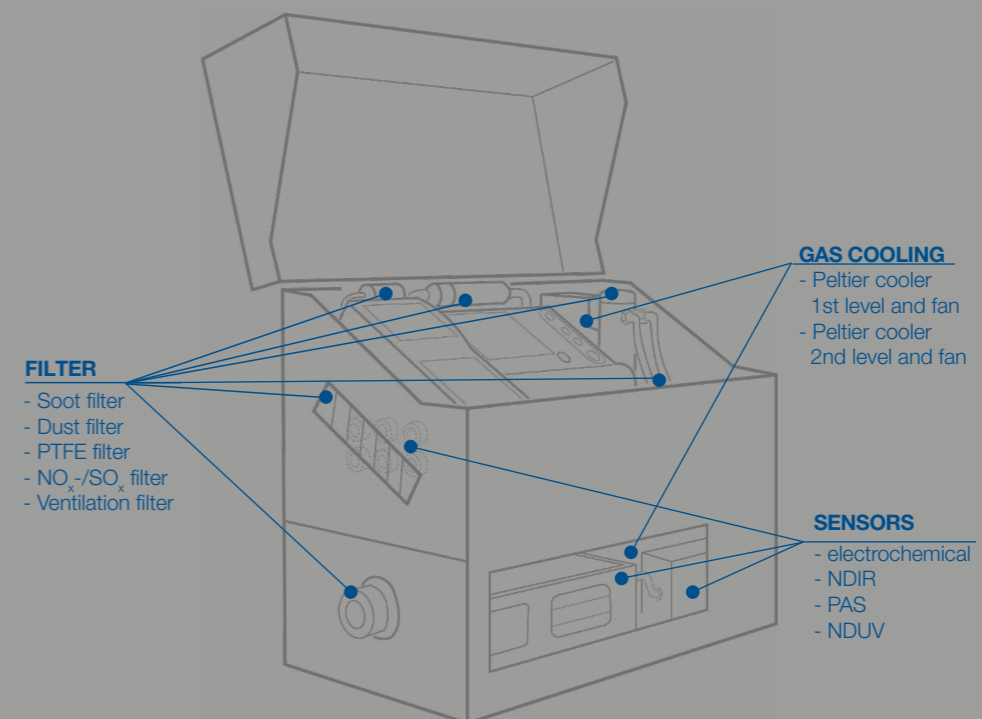
To measure the full concentration of extremely water soluble gases an inner PTFE coated hose or a heated sampling system are available. This guarantees the fast and condensate free flue gas transport.

FREE COMBINATION AND PERFECT MATCH OF THE MEASUREMENT METHODS FOR EACH APPLICATION

- Electrochemical sensors for high measurement ranges
- Physical sensors for low-maintenance measurements, also in overload range
- High-precision PAS module, CLD standard method with converter, NDIR technology and NDUV module

SHORT CONTROLS OR CONTINUOUS MEASUREMENTS

- Completely ready for use for short and long term measurements
- High-quality sensor technology, efficient gas conditioning, reliable filtration
- Wireless remote control with high coverage and various data output possibilities



...BY EVERY APPLICATION.



REFINERY



INCINERATION PLANT



COGENERATION



INDUSTRIAL PROCESS



POWER PLANT

Overview of technical data

Measurement method	Electrochemical Sensors (EC)			Chemiluminescence (CLD)			Photoacoustic Spectroscopy (PAS)			Non dispersive Infra-red Technology (NDIR) ADVANCED			Non dispersive Infra-red Technology (NDIR) STANDARD			Catalytic Measurement (Pellistor)			Non dispersive Ultraviolet Technology (NDUV)		
APPLICATION	Quasi-continuous measurements (air purge after >120 minutes required; measurement > 48 h not recommended)			Continuous measurements also possible in mobile use with monitoring (filters, gas process etc.)			Continuous measurements also possible in mobile use with monitoring (filters, gas process etc.)			Continuous measurements also possible in mobile use with monitoring (filters, gas process etc.)			Quasi-continuous measurements (air purge after > 60 minutes required; measurement > 48 h not recommended)			Quasi-continuous measurements (air purge after > 60 minutes required; measurement > 48h not recommended)			Continuous measurements also possible in mobile use with monitoring (filters, gas process etc.)		
MAXIMUM NUMBER OF GAS COMPONENTS	6			2 (incl. converter)			1			max. 3 (also possible in connection with NDIR-STANDARD components)			3 (also possible in connection with NDIR-ADVANCED-components)			1			3 (2-channel with NO ₂ / SO ₂ or 3-channel with NO / NO ₂ / SO ₂)		
GAS COMPONENTS For a given gas component, one measurement method only can be chosen	Measurement Range	Resolution	Accuracy	Measurement Range	Resolution	Accuracy	Measurement Range	Resolution	Accuracy	Measurement Range	Resolution	Accuracy	Measurement Range	Resolution	Accuracy	Measurement Range	Resolution	Accuracy	Measurement Range	Resolution	Accuracy
Oxygen O ₂	0...21 %	0,01 vol. %	± 0,3 vol. %																		
Carbon Monoxide CO	0...10.000 ppm ⁽²⁾	1 ppm	± 20 ppm resp. 5% of measurement value ⁽¹⁾							0...1.000 ppm ⁽⁵⁾	1 ppm	± 2% of full scale	0..100.000 ppm	10 ppm	± 200 ppm resp. 3% of measurement value ⁽¹⁾						
	0...63.000 ppm	5 ppm	± 100 ppm resp. 10% of measurement value ⁽¹⁾																		
Carbon Dioxide CO ₂	Calculation via O ₂ -value									0...20 vol. %	0,01 vol. %	± 2% of full scale	0...20 vol. %	0,01 vol. %	± 0,3 vol. % resp. 3% of measurement value ⁽¹⁾						
Nitrogen Monoxide NO	0...5.000 ppm	1 ppm	± 5 ppm resp. 5% of measurement value ⁽¹⁾	0-1000 ppm	0,1 ppm	± 2% of full scale													0...300 (2.000) ppm	0,1 ppm	± 3 ppm (1 % of measurement value)
	0...500 ppm	0,1 ppm	± 2 ppm resp. 5% of measurement value ⁽¹⁾																		
Nitrogen Dioxide NO ₂	0...1.000 ppm	1 ppm	± 5 ppm resp. 5% of measurement value ⁽¹⁾	0-1000 ppm ⁽⁴⁾	0,1 ppm ⁽⁴⁾	± 2% of full scale	0-200 ppm	0,1 ppm	± 2% of full scale										0...300 (2.000) ppm	0,1 ppm	± 3 ppm (1 % of measurement value)
	0...100 ppm	0,1 ppm	± 5 ppm resp. 5% of measurement value ⁽¹⁾																0...100 ppm	0,1 ppm	± 2 ppm resp. 2% of measurement value ⁽¹⁾
Nitrogen Oxides NO _x	calculated out of NO/NO ₂ Measurement			via converter: Transformation of NO ₂ to NO + measurement via CLD: No original NO ₂ measurement possible Recommendation: Combination of NO measurement (CLD) and NO ₂ measurement (PAS)			In combination with CLD = perfect for an exact and continuous NO _x measurement														
Sulphur Dioxide SO ₂	0...5.000 ppm	1 ppm	± 10 ppm resp. 5% of measurement value ⁽¹⁾							0...1.000 ppm ⁽⁵⁾	1 ppm	± 2% of full scale							0...300 (2.000) ppm	0,1 ppm	± 3 ppm (1 % of measurement value)
																			0...100 ppm	0,1 ppm	± 2 ppm resp. 2% of measurement value ⁽¹⁾
Hydrogen H ₂	0...20.000 ppm	1 ppm	±100 ppm resp. 5% of measurement value ⁽¹⁾																		
Hydrogen Sulphide H ₂ S	0...1.000 ppm	1 ppm	±10 ppm resp. 5% of measurement value ⁽¹⁾																		
Hydrocarbons C _x H _y (calibrated on CH ₄)																0...4 vol. %	0,01 vol. %	upon request			
Hydrocarbons C _x H _y (calibrated on CH ₄)													0...30.000 ppm	10 ppm	± 50 ppm resp. 3% of measurement value ⁽¹⁾						
Hydrocarbons C _x H _y (calibrated on C ₃ H ₈)													0...2.000 ppm	1 ppm	± 4 ppm resp. 3% of measurement value ⁽¹⁾						

(1) Higher value prevails
(2) H₂-compensated; safety shut-off at 4.000 ppm

(3) Because of solubility of these gas components a measurement is just possible under dry conditions

(4) NO_x measurement via converter
(5) The measurement accuracy with an IR-Sensor of SO₂ is only guaranteed up to max. 2.000 ppm CO



ecom® J2KN^{pro}TECH



ecom-J2KNpro TECH

POWERFUL EMISSION ANALYZER WITH DIFFERENT MEASURING METHODS

- Mobile emission analysis with physical measurement procedures
- Physical measurement procedures can be combined at choice with electrochemical procedures
- Measurement methods can be combined according to the needs in accuracy and duration
- Radio remote control with high coverage
- Multiple cooling of gas
- Brushless high-performing pump
- High-performance lithium ion battery
- Robust aluminum housing build in aluminum-framed case
- Maximum equipment of all sensor components possible
- Heated sampling system with pre-filter and heated tubing
- Multiple sampling gas filtering
- Electronic condensate monitoring
- Calibration certificate
- Wireless data interface (e.g. for connection to a smartphone or tablet)

Dimensions (W x H x D) 500 x 650 x 250 mm
(Device and heated system on trolley)

Weight app. 23 kg (in aluminum-framed transport case)

RADIO REMOTE CONTROL (INCLUDED IN DELIVERY)

- Wide coverage for bridging distances between the measuring point (exhaust opening) and setting point (e.g. burner, switch cabinet etc.)
- Includes thermocouple, mini-USB connection (data transfer to laptop/ PC), SD card slot
- Foil keypad with high-quality TFT color display
- Display, printing and storage of measurement data
- Full instrument operation (including manual CO shut off, starting and terminating measurements, data processing, ...)
- Reliable data transfer via radio (best-possible prevention of interferences, bypassing of metal or concrete obstacles, automatic connection establishment, no abrupt disruption of connection with maintenance of all measuring data, as well as automatic connection and re-establishment of a radio connection)

Measurable Gases

O ₂	CO	C _x H _y	NO ₂	SO ₂	NO	
NO	NO ₂	SO ₂	H ₂ S	H ₂	CO%	
CO ₂	C _x H _y	CO%	SO ₂	NO	NO _x	NO ₂

● = Base; ● = Optional EC; ● = Optional NDIR; ● = Optional Pellistor; ● = Optional PAS; ● = Optional NDUV

FOR NEARLY CONTINUOUS MEASUREMENTS (UP TO 72 HOURS)

- Free combination of needed gas sensors (O₂ sensor = scope of delivery)
- Equipped for continuous measurement > 72 hours on systems with programmable measuring intervals
- Integrated thermal quick-printer
- Inner heating and ventilation cooling as required by real operational environment (0-40°C ambient temperature)
- Wide range of data processing capabilities
- Stainless steel gas cooler for perfect, dry gas preparation
- Electronic condensate monitoring and automatic condensate evacuation
- Additional display at the basic unit for fast reading of status and warning messages
- Basic unit build in ultralight robust aluminium housing
- T-room stick/ T-room probe
- Stored in spacious aluminium-framed transport case with optional trolley for eased mobility of the complete system
- Including all needed filters, printer paper etc; all consumables and filters can be easily replaced by the user

HEATED SAMPLING SYSTEM

- Heated probe with integrated PTFE filter and thermocouple for flue gas temperature measurement
- Heated tubing for loss-free transport of sampled gas (adjustable temperature)
- Incl. aluminium-framed transport case - perfect integration in the ecom-J2KNpro TECH transport system

ACCESSORIES

- Different filter options - including for intensive solid fuel measurement
- Various temperature feeler gauges (contact sensor, surface sensor,...) for differential temperature measurements (e.g. flow temperature and return temperature)
- Trolley for easy transport



ACCURATE



ROBUST



EFFICIENT



SAFE



FAR-REACHING



COMPLETE



COOL



LOSS-FREE

System construction J2KN^{pro} TECH



1
**ROBUST
TRANSPORT CASE**

3
**FAR-REACHING
RADIO REMOTE CONTROL**

2
**HIGH PERFORMANCE
HEATED SAMPLING SYSTEM**

4
**RELIABLE
HEATED TUBING**

1
**MODULAR
TRANSPORT CASE SYSTEM**

3
**ecom®
QUALITY**

**PROVEN
ecom-QUALITY**

2
**EASY DOCKING
TROLLEY SYSTEM**

4
**SLIDING MOTION
WHEELS WITH PARKING BREAK**



ACCURATE



ROBUST



EFFICIENT



SAFE



FAR-REACHING



COMPLETE



COOL



LOSS-FREE

Measuring methods of J2KNpro TECH in detail

Electrochemical Measurement (EC)

The principle of an electrochemical sensor is to have at least two electrodes (sensing and counter electrode) which are in contact with each other in two ways:
 1.) via an electrically conductive medium (electrolyte, i.e. liquid as an ion conductor)
 2.) via an external electric circuit (electron conductor).

The electrodes are made of a special material which is adapted to a special gas. They have a catalytic effect so that certain chemical reactions take place where gas, catalyst and electrolyte meet together.
 A two-electrode sensor is relatively cheap but has some disadvantages, especially by higher gas concentrations. This can lead to unusable measurement signals.

Therefore a third electrode is added to the sensor, the so-called reference electrode. It is not flown through by current and has a stable potential. The voltage of the measuring electrode to the counter electrode is constantly compared with the voltage of the reference electrode, so that corrections can be applied. This results in an improved measurement quality (e.g., in terms of linearity and selectivity) and a longer lifetime.

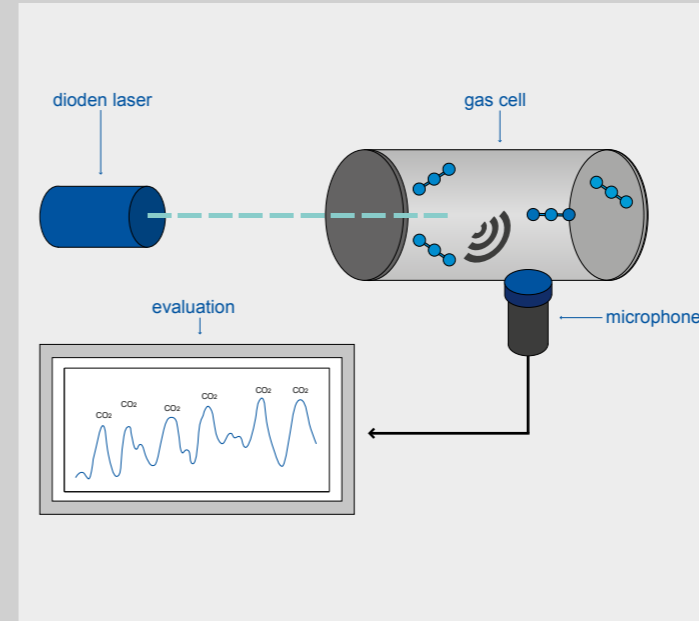
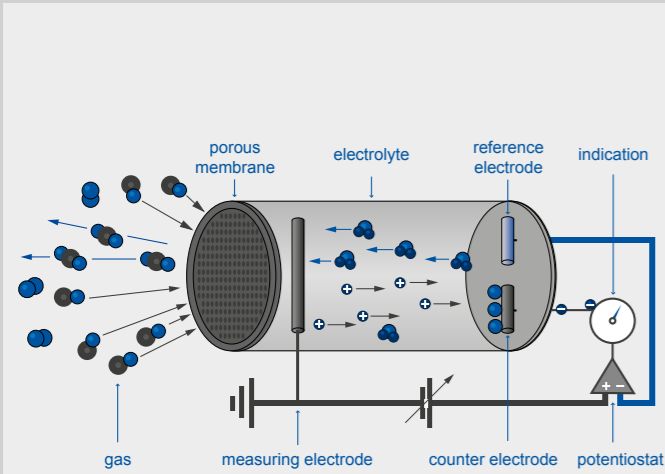
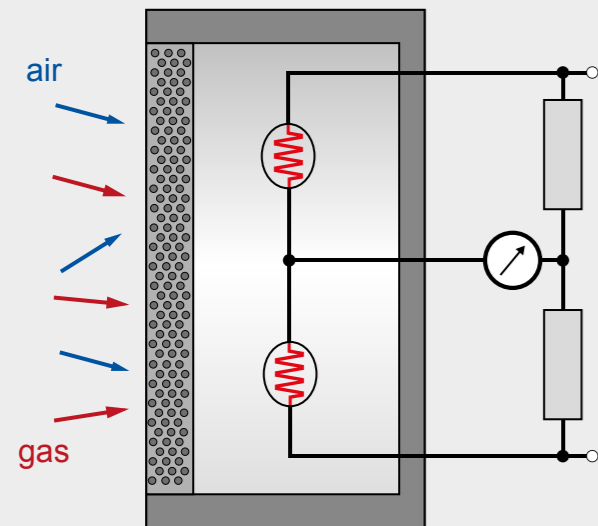


Photo-Acoustic Spectroscopy (PAS)

The photoacoustic spectroscopy (PAS) is a spectroscopic method which utilises the photoacoustic effect. For example, gas, irradiated with modulated light of a predefined wavelength. A certain part of light energy is absorbed by the sample and is converted into acoustic waves. These signals can be detected by a microphone and then evaluated. Gas molecules absorb a portion of light when the light frequency corresponds with an absorption band of the gas in the cell. The higher the concentration of the gas, the more light is absorbed.
 As a light source, infrared laser diodes are frequently used, because the specific wavelength (color) of the investigated material is in the infrared range in many applications. The light is modulated in an electronic or mechanical way, for example with a chopper.

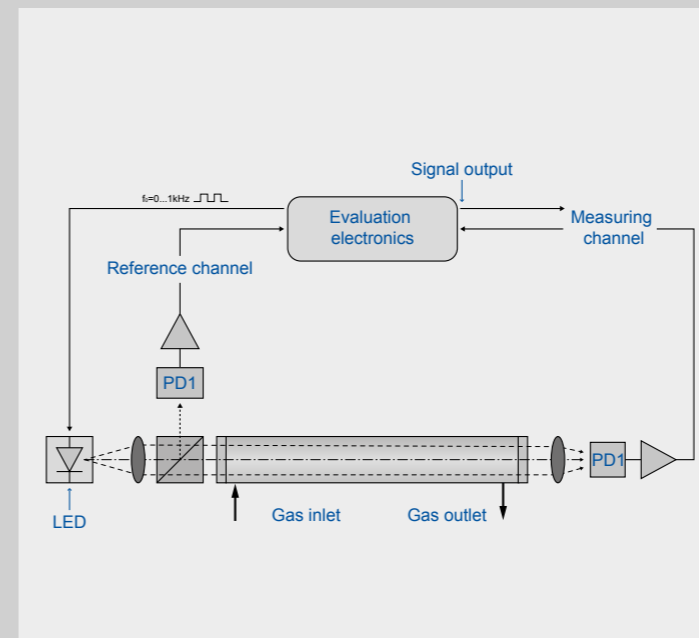
Combustible gas sensor (PEL)

Two platinum spirals are each embedded in a ceramic layer and electrically connected via a bridge switch. The surface of the one platinum spiral is activated by a catalyst which boosts oxidation – the other platinum spiral is inactivated. Current flows thru the spirals and heats them up to approx. 500°C. The air oxygen reacts with the flammable gas on the surface of the active spiral. As a result, temperature and resistance increase in the active platinum spiral. The bridge gets out of balance and is hereby a measure for the presence of flammable substances.



Non dispersive Ultraviolet sensor (NDUV)

The NDUV measurement principle bases on the selective absorption of ultraviolet radiation in a range from 200 nm to 450 nm. Numerous important gases like sulphur dioxide (SO₂), nitrogen dioxide (NO₂), nitrogen monoxide (NO) aromatic hydrocarbons (e.g. benzene) and ozone (O₃) can be measured within this spectral range. This kind of gas analysis is not influenced by disturbing steam concentrations. The radiation source is a special LED (light emitting diode). Using the AlGaIn LED technology enables to consistently cover spectral ranges from 360 nm to 230 nm. The absorption of the radiation in the sample cell bases on the Lambert-Beer law.



The physical construction consists of a photometer with two receiving detectors. The reference detector controls continuously the radiation intensity of the UV LED a serves herewith to offsetting aging effect and temperature influences.

In the photometer, the radiation of the LED is reproduced with a UV lens so that a parallel radiation beam path forms. This radiation is split in a successional radiation beam splitter in a measuring and a reference paths. At the end of the measuring cuvette, the radiation is further conveyed by another UV lens to a high-sensitive UV detector which converts the radiation into a measuring voltage. The radiation absorption in the cuvette is then a measure for the gas concentration.

Non dispersive Infra-red Sensor (NDIR)

NDIR sensors analysers are particularly suitable for the determination of the concentration of carbon monoxide, carbon dioxide or hydrocarbons in a gas.

The main components are:

- a source of infrared radiation
- a tube (cuvette) irradiated with the gas to be analysed
- a wavelength filter
- an infrared detector – the recipient for the infrared rays

The infrared light irradiates the gas in the measuring cell and is partly absorbed by the molecules of the gas to be analysed. Subsequently the rest of the infrared light irradiates the wavelength filter and meets with the infrared detector.

Ideally only the gas to be measured should absorb the light of the corresponding wavelength. But since a gas mixture contains several gases, absorption areas can overlay, raising a crosssensitivity. This must either be compensated –in order not to falsify the measurement resultsor be avoided by a skilful selection of the frequency bands.

With NDIR sensors over 100 different gases can be detected from ppm to percentage range. In many fields of application they are the default method because the measurement method is non-contact and free of consumption.

