ADOS®
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Instrumentation and Control

GASTRANSMITTER

GTR 210

Ex SIL1

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GASTRANSMITTER GTR 210

Application

The gas transmitter ADOS GTR 210 is suitable for continuous measurement of gases in normal areas and areas where there are risks of explosion.

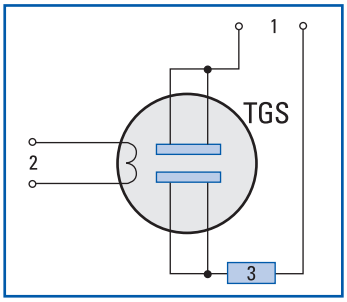
By employing 6 different types of sensor, noxious, explosive and non-combustible gases and vapours can be measured.

Display of the measured gas concentration and the adjustable alarm thresholds, are shown on a multi-colour graphic display. The keyboard input is by way of a touchpad.

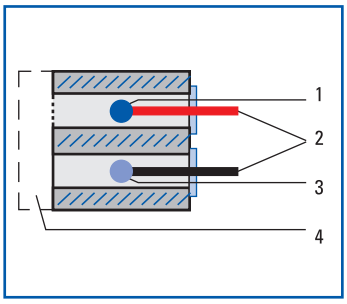
A current signal is generated that is proportional to the measured concentration of gas, which is transmitted to an evaluation unit placed in a safe area, away from any dangers of explosion.

The type test of the explosion-protected gas transmitter, is completed by the DEKRA.

ATEX test certificate: DEKRA 11 ATEX 0257 X
IECEx test certificate: IECEx DEK 11.0090 X
Type of protection: Ex d e ia mb IIC T4 Gb
SIL 1 & functional test:
ATEX Certificate –> BVS 12 ATEX G 001 X



1 = Circuit voltage
2 = Heating voltage
3 = Load resistor



1 = Catalyzer pellistor
2 = Electric connections
3 = Inert pellistor
4 = Diffusion filter

Fields of Application

- Chemical industry
- Manufacture of paints and varnishes
- Plastic processing plants
- Sewage works
- Gas-fired boiler systems
- Liquid gas storage houses
- Laboratories
- Oxygen concentration measurement
- Refineries
- Cold-storage houses (Ammonia monitoring)
- Paint spraying booths
- and many more

New: Advanced field of application: marine (option MED)
The gas transmitter product family GTR 210 with the option MED fulfills the requirements of the Marine Equipment Directive 96/98/EC and its annual updated addendum 2013/52EU. The conformity with the above mentioned regulation has been certified by the ship safety division of the German Government Safety Organisation for Transport and Transport Economies. The compliance with international IEC standards and the durability against saltwater was verified. The gastransmitter GTR 210 can now be installed under deck as well as on deck (weather zone) under harsh conditions. The field of application extends to:

- gas tankers
- container ships
- offshore platforms
- applications in aggressive environments

The TGS sensor

The TGS sensor contains a semiconductor sensor, which is constructed on SnO_2-sintered N-substrate.

When combustible or reducing gases are absorbed by the surface of the sensor, the concentration of the test gas is determined by the change in conductivity.

The VQ sensor

The head of the VQ sensor functions on the principle of heat reaction. When combustible or reducing gases or vapours come in contact with the measuring element, they are subjected to catalytic combustion, which causes a rise in temperature; this rise causes a change in the resistance of the measuring element which is used as a measure of the component of gas being tested.
The inert element is for compensating the temperature and conductivity of the test gas.

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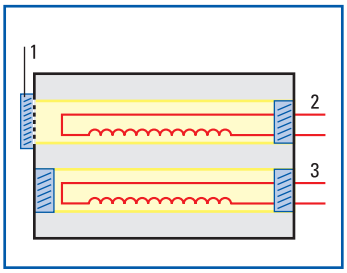
The GOW sensor

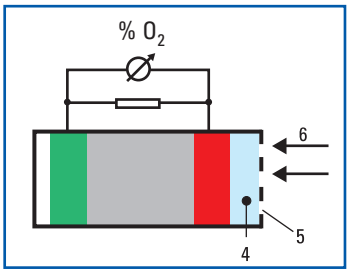
The GOW sensor functions on the principle of thermal conductivity. Two rhenium-tungsten resistors are used as a measuring element, where the comparison element is subjected to normal ambient air and the measuring element is subjected to the test gas. Any change in the concentration of gas at the measurement element, causes a change in temperature, which is due to the variation of conductivity.
The resultant change in resistance is a direct measure of the gas concentration.



1 = Diffusion filter
2 = Test resistor
3 = Comparison resistor

The TOX sensor

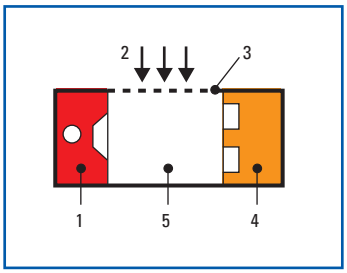
The TOX sensor is a measurement system with electro-chemical cell, where the sampled gas is measured by diffusion. In the case of oxygen measurement the oxygen content is in an electrolyte, thus producing a small flow of current (electro-chemical process).
At a constant air pressure, this current is directly proportional to the oxygen concentration in the sampled air.



1 = Anode
2 = Electrolyte
3 = Cathode
4 = Diffusion path
5 = Diffusion filter
6 = Test gas

The IR sensor

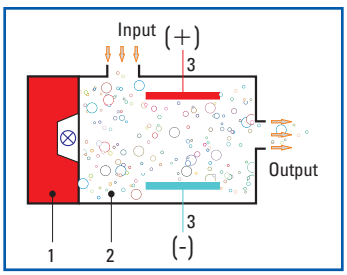
The test gas flows through a measurement chamber that incorporates an IR radiating source and a two-channel infrared detector. The intensity of the infrared radiation is reduced as it passes through the gas molecules. The concentration of the gas can then be calculated by the magnitude of the reduction in intensity.
Since only absorption of the wavelength specific to the gas under test in relation to the wavelength not absorbed by a test gas is considered, interference due to dust, ageing etc., is almost compensated.



1 = Infrared-radiating source
2 = Test gas
3 = Diffusion filter
4 = Infrared-detector
5 = Measurement chamber

The PID sensor

The sampled gas flows through a measurement chamber, that incorporates a UV radiating source and a pair of electrodes with opposing polarity. The gas molecules to be detected are ionized by the UV radiation.
The resulting positively charged molecules and the electrons are attracted to the relevant electrode. The current generated is a measure of the gas concentration.
Using the PID measuring head, volatile organic compounds (VOC) can be measured, the ionisation potential of which is less than the energy in the UV radiating source (10,6 eV), e.g. aromatic hydrocarbons like toluol (C_7H_8) and xylene (C_8H_{10}) as well as chlorinated hydrocarbons like trichloroethylene ($CHCl_3$). The detection of toxic gases like phosphine (PH_3) is also possible.



1 = UV radiating source
2 = Test gas
3 = Capacitive charge measurement

The output signal of each sensor is connected to the central unit via a multicore cable for further processing. All sensors are plug-in types and thus are easily replaceable.

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Technical data – for standard sensor elements

special versions on request

Type Measurement method	TGS Semiconductor	VQ Heat reduction	GOW Thermal conductivity	TOX Electro-chemical reaction	IR Infrared	PID Photo-Ionisation	TOX O_2 Electro-chemical reaction
Measurement range	ppm ranges to 100 % LEL	ppm ranges to 100 % LEL	from 0–2 Vol % to 0–100 Vol %	ppm ranges tp 0–100 Vol %	0-100 % LEL CH_4, C_3H_8, C_2H_2 0-100 Vol % CH_4 0–1, 2, 3, 4, 5 Vol % CO_2	0–200 ppm to 0–2.000 ppm	ppm ranges tp 0–25 Vol %
Percentage error of f.s.d.	± 5 %	± 5 %	± 5 %	± 3 %	± 3 %	± 5 %	± 2 %
Temperature effect	5 %	2 %	2 %	2 %	2 %	2 %	2 %
Response time (t_{90})	approx. 60 s	approx. 60 s	approx. 40 s	approx. 60 s	approx. 60 s CH_4 approx. 80 s CO_2	approx. 120 s	approx. 30 s
Pressure effect	1 %	1 %	1 %	1 %	1 %	1 %	1 %
Mounting position	optional ± 90° from the vertical mounting position	optional ± 90° from the vertical mounting position	optional ± 90° from the vertical mounting position	optional ± 90° from the vertical mounting position	optional ± 90° from the vertical mounting position	optional ± 90° from the vertical mounting position	optional ± 90° from the vertical mounting position
Application	Poisonous, combustible and explosive gases in the LEL region	Poisonous, combustible and explosive gases in the LEL region	gases exhibiting substantial differences in thermal conductivity, compared to air	CO, NH_3, NO_2, SO_2, H_2S and others	CH_4 (Vol %; LEL) Propane (LEL), CO_2 (Vol %)	e.g. C_7H_8, C_8H_{10} $CHCl_3$, PH_3	O_2
Versions available	industrial (Al), industrial (VA)- and Ex-version	industrial (Al), industrial (VA)- and Ex-version	industrial (Al), industrial (VA)- and Ex-version	industrial (Al), industrial (VA)- and Ex-version	industrial (Al), industrial (VA)- and Ex-version	industrial (Al), industrial (VA)- and Ex-version	industrial (Al), industrial (VA)- and Ex-version
Expected lifetime of the sensor	approx. 5 years, when used for gases not causing catalytic poisoning	approx. 4 years, when used for gases not causing catalytic poisoning	approx. 5 years, when used with gases that do not attack aluminium, rhenium-tungsten or gold	12 months to 7 years depending on the measuring cell	approx. 5 years	12 months	approx. 5 years
Warranty	2 years	2 years	2 years	12 months	2 years	6 months	12 months
Dimensions (W x H x D)	150 x 175 x 105 mm	150 x 175 x 105 mm	150 x 175 x 105 mm	150 x 175 x 105 mm	150 x 175 x 105 mm	150 x 175 x 105 mm	150 x 175 x 105 mm

Technical data – gas transmitter

Type	GTR 210 Ex-Version	GTR 210 Standard	GTR 210 Comfort
Supply voltage	24 V DC +10%/-25%	24 V DC +10%/-25%	230 V AC, 50 Hz 115 V AC, 60 Hz (optional)
Power consumption:	4 W	4 W	10 VA
Interface	3-wire techniques 4–20 mA	3-wire techniques 4–20 mA or LON®-4-wire techniques	1 current output 4-20 mA 4 potential-free changeover contact for alarm/failure 1 digital input for cancelling alarms
Equipment group / category	II 2G, II 2D		
Ignition protection	Ex db e ia mb IIC T4 Gb Ex tb IIIC T135 °C Db	none Ex	none Ex
Type of protection	**ATEX Certificate:** DEKRA 11 ATEX0257 X **IECEx Cert:** IECEx DEK 11.0090 X EN60079-29-1 EN50104		
Metrological Approval*	EN 60079-29-1, EN 50104, EN 50271 **ATEX Certificate:** BVS 12 ATEX G 001 X		
Safety*	SIL1	SIL1	SIL1
Option MED / Marine Equipment	Directive 2014/90/EU Approval MEDB00006EV		
Temperature range - possible limitations due to the used sensor element	-25 °C to +60 °C	-25 °C to +60 °C	-25 °C to +60 °C
Protection class	IP 66/IP67	IP 54 or IP 66/IP67	IP 54 or IP 66/IP67
Weight	2,3 kg	1,8 kg	2,0 kg

*Depending on sensor element and measuring range

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