

Oxy 4100 / Oxy 5100

The Oxy 4100 Transmitter and the Oxy 5100 Sensor enable highly accurate inline oxygen measurements in **liquids** and **gases** by using the optical principle called fluorescence phase shift.

Liquids: dissolved oxygen, partial pressure

Gases: O₂ monitoring (at constant pressure)

One sensor can measure in different ranges:

	Oxy 4100 Transmitter	Oxy 5100 Sensor	
	Liquids	Liquids	Gases
Trace range	0 - 2000 ppb	0 - 2000 ppb	0 - 4.2 %
Wide range	0 - 22.5 ppm	0 - 22.5 ppm	0 - 50 %
Ultra-wide range	n/a	0 - 45 ppm	0 - 100 %
Ultra-trace range	n/a	n/a	0 - 200 ppmv

Simply choose the corresponding configuration for your application. The sensor caps with Toolmaster™ technology are detected by the sensor and all required configuration and calibration parameters are automatically transferred.



- Real-time, accurate, drift-free measurements
- Immediate and reliable results at any location
- Minimum maintenance
- Toolmaster™
- *Lifetime Estimator (LTE)**
- Suitable for hygienic applications in the beverage and pharmaceutical industry and water treatment plants*
- Connectivity by fieldbus communication such as PROFIBUS DP, Modbus TCP, PROFINET IO and EtherNet*

* only for Oxy 5100

Measuring principle of the Oxygen Sensors

The determination of oxygen concentration is based on the fluorescence phase-shift principle. An oxygen-sensitive luminophore is excited by absorbing light of a defined wavelength. A part of this absorbed light is released by emitting fluorescent light at a higher wavelength. In the presence of oxygen as the quencher molecule, a fluorescence phase-shift between excitation of the luminophore and fluorescence emission occurs. The Oxy 4100/5100 inline sensors detect this fluorescence quenching, and the resulting phase shift is a direct measure of the oxygen content. When measuring in gas, the Oxy 5100 uses a stored process pressure value for the calculation of the oxygen content.

Technical specifications of the Oxygen Sensors

General	Oxy 4100 Transmitter	Oxy 5100 Sensor
Application	Liquid	Liquid or gas phase (CO ₂ /N ₂)
Line pressure	max. 12 bar abs. (174 psi abs.) max. 5 bar abs. (72 psi abs.) for measurements in gas phase	
Airborne noise emission	< 70 dB (A)	
Self-diagnosis	Compliant with NAMUR NE 107 (self-monitoring and self-diagnosis)	
Housing materials	Electronics housing: Stainless steel 1.4404 (AISI 316L), PA66 GF30 HMI: Glass	
Wetted materials (sensor)	Process sensor connection: Stainless steel 1.4404 (AISI 316L) O-ring: VARIVENT® connection - EPDM 70.10-02 (FDA approved)	
Measuring interval	15 s	1 to 360 s
Weight	Approx. 3.5 kg with Pico 3000	
Dimensions (HxWxD) [mm]	162x162x215	
Helium leak rate		< 10 ⁻⁷ mbar·L/s, gas-tight, max. 5 bar abs. (72 psi abs.)
Certifications (sensors)	---	EHEDG (Type EL - Class I)
Pressure Equipment Directive (2014/68/EU)	The Oxy is excluded from the Pressure Equipment Directive (2014/68/EU) according to Art. 1 Para. 2 of this directive.	

Ambient conditions	Oxy 4100 Transmitter	Oxy 5100 Sensor
Ambient temperature	-5 °C to 50 °C	
Humidity	0 to 90 % rH (non-condensing)	
Overvoltage category	II	
Degree of protection	IP 65 and IP 67/NEMA 6	
Pollution degree	2	

Electrical connections	Oxy 4100 Transmitter	Oxy 5100 Sensor
Power supply	SELV/PELV DC 24 V ± 20 %	
Power consumption	max. 5 W	
Cable gland	max. 6 pcs. M16x1.5 EMC, grounding cones acc. to DIN 89345, brass nickel-plated for cable OD 4.5 to 10 mm	
Connection terminals	Push-in spring connection, 0.2 to 1.5 mm ² / AWG 24 to 16	

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Cables	Oxy 4100 Transmitter	Oxy 5100 Sensor
Cables must comply with the intended area of use, the cable gland type and the relevant national regulations and requirements.		
Supply cable: Recommended cable type Cable cross section Diameter of cables	SiYCY shielded 2 pole cable min. 0.34 mm ² , max. 1.5 mm ² without wire end ferrule; max. 0.75 mm ² with wire end ferrule 4.5 to 10 mm to ensure optimal sealing against the cable gland	
CANopen: Cable type: Wire cross section Diameter of cables Max. length	---	CANopen/DeviceNet cable, 120 Ω shielded twisted pair Min. 0.20 mm ² , max. 1.5 mm ² without wire end ferrule; max. 0.75 mm ² with wire end ferrule 4.5 to 10 mm to ensure optimal sealing against the cable gland 250 m (with Pico 3000) 50 m (with mPDS 5)

	Oxy 4100 Transmitter	Oxy 5100 Sensor
Communication	Analog/Digital	Several fieldbuses and analog interfaces are available depending on the used version/mPDS 5 board (please see mPDS 5 and Pico 3000 instruction manuals).
Integrated display	Yes	Optional (Pico 3000 HMI)
Process Connections	Tuchenhagen VARIVENT® Type N	

All inputs and outputs (including relay outputs) connected to the Oxy have to be in accordance with PELV (Protective Extra Low Voltage) of EN 61140 or with SELV specification of EN 60950, i.e. maximum voltage U_{\max} must not exceed $24\text{ V} + 20\% = 28.8\text{ V}$ and a maximum current $I_{\max} = 0.75\text{ A}$.

Technical Specifications of the Oxygen Sensor Caps

Sensor cap	Oxy 4100 / 510 / 5100 Sensor cap trace range 0 to 2000 ppb / 0 to 4.2 % O₂ (DO / GAS)	
Application	Liquid	Gas
Compatible with	Oxy 4100 Transmitter Oxy 510 Sensor Oxy 5100 Sensor	CO₂ Purity Monitor Oxy 5100 Sensor
Measuring range¹	0 to 2000 ppb	0 to 4.2 % O ₂ (0 to 40 hPa)
Resolution¹	0 - 1 ppb ± 0.4 ppb 1 - 10 ppb ± 0.4 ppb 10 - 100 ppb ± 0.5 ppb 100 - 1000 ppb ± 3.5 ppb 1000 - 2000 ppb ± 10.0 ppb	0 - 25 ppmv ± 10 ppmv 25 - 200 ppmv ± 10 ppmv 200 - 2500 ppmv ± 12 ppmv 0.25 - 2.5 % O ₂ ± 0.01 % O ₂ 2.5 - 4.2 % O ₂ ± 0.025 % O ₂
Accuracy two point adjusted^{1,2}	≤ ± 1 ppb or ± 3 %	≤ ± 25 ppmv or ± 3 %
Storage³	3 years	
Response time [s] at interval 1 s	t ₉₀ < 15 s t ₉₉ < 20 s t _{99.9} < 40 s	t ₉₀ < 6 s
Sensibility to other substances	Chlorine gas (Cl ₂), free radicals, organic solvents (acetone, toluene, chloroform, methylene chloride, ...)	
Sample temperature (non-freezing)	Oxy 4100 / 510: - 5 °C to 40 °C Oxy 5100: - 5 °C to 65 °C	- 5 °C to 65 °C
CIP/SIP temperature (at max. ambient temperature)	max. 99 °C, max. 130 °C (max. 30 min) (Oxy 510: max. 99 °C)	
Wetted materials (sensor cap)	Sensor cap: Stainless steel 1.4404 (AISI 316L) Sensor spot coating: Silicone (FDA approved) O-Ring: FKM 75.16 - 04 (FDA approved)	
Certificates (sensor caps)	EHEDG (Type EL - Class I)	

¹ at 20 °C, 960 - 980 hPa; humidified gas mixture

² the higher value is valid

³ storage conditions: dry at 20 °C, protection of the sensor cap from light

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Oxygen Sensors

Oxy 4100 / Oxy 5100

Sensor cap	Oxy 4100 / 510 / 5100 Sensor cap wide range 0 to 22.5 ppm / 0 to 50 % O ₂ (DO / GAS)	
Application	Liquid	Gas
Compatible with	Oxy 4100 Transmitter Oxy 510 Sensor Oxy 5100 Sensor	CO₂ Purity Monitor Oxy 5100 Sensor
Measuring range¹	0 to 22.5 ppm	0 to 50 % O ₂ (0 to 500 hPa)
Resolution¹	0 - 0.5 ppm ± 0.02 ppm 0.5 - 10 ppm ± 0.08 ppm 10 - 22.5 ppm ± 0.21 ppm	0 - 1 % O ₂ ± 0.05 % O ₂ 1 - 21 % O ₂ ± 0.2 % O ₂ 21 - 50 % O ₂ ± 0.5 % O ₂
Accuracy two point adjusted^{1,2}	≤ ± 0.042 ppm or ± 3%	≤ ± 0.1 % O ₂ or ± 3 %
Storage³	max. 3 years	
Response time [s] at interval 1 s	t ₉₀ < 15 s t ₉₉ < 20 s t _{99.9} < 40 s	t ₉₀ < 6 s
Sensibility to other substances	Chlorine gas (Cl ₂), free radicals, organic solvents (acetone, toluene, chloroform, methylene chloride, ...)	
Sample temperature (non-freezing)	Oxy 4100 / 510: - 5 °C to 40 °C Oxy 5100: - 5 °C to 65 °C	- 5 °C to 65 °C
CIP/SIP temperature (at max. ambient temperature)	max. 99 °C, max. 130 °C (max. 30 min) (Oxy 510: max. 99 °C)	
Wetted materials (sensor cap)	Sensor cap: Stainless steel 1.4404 (AISI 316L) Sensor spot coating: Silicone (FDA approved) O-Ring: FKM 75.16 - 04 (FDA approved)	
Certificates (sensor caps)	EHEDG (Type EL - Class I)	

¹ at 20 °C, 960 - 980 hPa; humidified gas mixture

² the higher value is valid

³ storage conditions: dry at 20 °C, protection of the sensor cap from light

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Oxygen Sensors

Oxy 4100 / Oxy 5100

Sensor cap	Oxy 5100 Sensor cap ultra-wide range 0 to 45 ppm / 0 to 100 % O₂ (DO / GAS)	
Application	Liquid	Gas
Compatible with	Oxy 5100 Sensor	CO₂ Purity Monitor Oxy 5100 Sensor
Measuring range¹	0 to 45 ppm	0 to 100 % O ₂ (0 to 1000 hPa)
Resolution¹	0 - 0.5 ppm ± 0.025 ppm 0.5 - 10 ppm ± 0.1 ppm 10 - 45 ppm ± 0.25 ppm	0 - 1 % O ₂ ± 0.05 % O ₂ 1 - 21 % O ₂ ± 0.2 % O ₂ 21 - 50 % O ₂ ± 0.5 % O ₂
Accuracy two point adjusted^{1,2}	≤ ± 0.1 ppm or ± 5 %	≤ ± 0.2 % O ₂ or ± 5 %
Storage³	max. 3 years	
Response time [s] at interval 1 s	t ₉₀ < 15 s t ₉₉ < 20 s t _{99.9} < 40 s	t ₉₀ < 6 s
Sensibility to other substances	Chlorine gas (Cl ₂), free radicals, organic solvents (acetone, toluene, chloroform, methylene chloride, ...)	
Sample temperature (non-freezing)	- 5 °C to 40 °C	
CIP/SIP temperature (at max. ambient temperature)	max. 99 °C, max. 130 °C (max. 30 min)	
Wetted materials (sensor cap)	Sensor cap: Stainless steel 1.4404 (AISI 316L) Sensor spot coating: Silicone (FDA approved) O-Ring: FKM 75.16 - 04 (FDA approved)	
Certificates (sensor caps)	EHEDG (Type EL - Class I)	

¹ at 20 °C, 960 - 980 hPa; humidified gas mixture

² the higher value is valid

³ storage conditions: dry at 20 °C, protection of the sensor cap from light

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Oxygen Sensors

Oxy 4100 / Oxy 5100

Sensor cap	Oxy 4100 / 5100 Sensor cap trace range PTFE 0 to 2000 ppb (DO)	Oxy 5100 Sensor cap ultra-trace range 0 to 200 ppmv (GAS)
Application	Liquid	Gas
Compatible with	Oxy 5100 Sensor	CO ₂ Purity Monitor Oxy 5100 Sensor
Measuring range	0 to 2000 ppb ¹	0 to 200 ppmv (0 to 0.2 hPa) ³
Resolution	0 - 1 ppb ± 0.4 ppb ¹ 1 - 10 ppb ± 0.4 ppb ¹ 10 - 100 ppb ± 0.5 ppb ¹ 100 - 1000 ppb ± 3.5 ppb ¹ 1000 - 2000 ppb ± 10.0 ppb ¹	0 - 10 ppmv ± 0.5 ppmv ³ 10 - 100 ppmv ± 0.8 ppmv ³ 100 - 200 ppmv ± 1.5 ppmv ³
Accuracy two point adjusted ²	≤ ± 0.1 ppb or ± 3 % ¹	≤ ± 0.2 ppmv or ± 5 % ³
Storage ⁴	max. 3 years	
Response time [s] at interval 1 s	t ₉₀ < 100 s	t ₉₀ < 5 s
Sensibility to other substances	Chlorine gas (Cl ₂), free radicals, organic solvents (acetone, toluene, chloroform, methylene chloride, ...)	
Sample temperature (non-freezing)	- 5 °C to 40 °C	0°C to 40 °C
CIP/SIP temperature (at max. ambient temperature)	max. 99 °C, max. 130 °C (max. 30 min)	
Wetted materials (sensor cap)	Sensor cap: Stainless steel 1.4404 (AISI 316L) Sensor spot coating: Silicone (FDA approved) O-Ring: FKM 75.16 - 04 (FDA approved)	
Certificates (sensor caps)	EHEDG (Type EL - Class I)	

¹ at 20 °C, 960 - 980 hPa; humidified gas mixture

² the higher value is valid

³ at 20 °C, 960 - 980 hPa; dry gas mixtures

⁴ storage conditions: dry at 20 °C, protection of the sensor cap from light

Dimensions of Oxy 4100 Transmitter and Oxy 5100 Sensor

