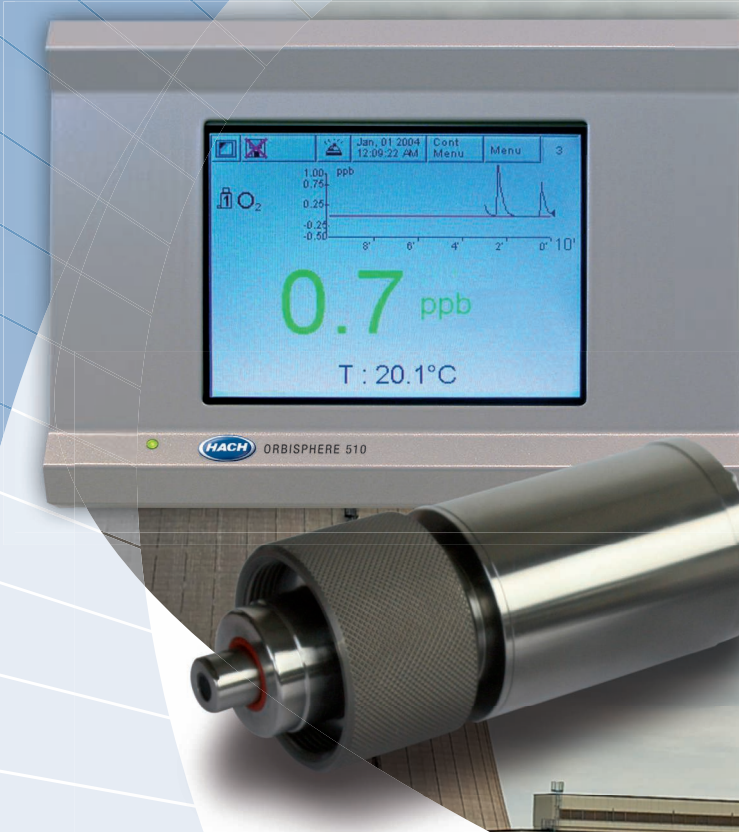


INFORMATION

PROCESS ANALYSIS
LUMINESCENT OXYGEN SENSOR
ORBISPHERE K1200



Optical sensor technology for oxygen monitoring

ORBISPHERE K1200 Luminescent oxygen sensor



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Oxygen monitoring in nuclear power plants

The ORBISPHERE K1200 optical sensor together with the ORBISPHERE 510 controller offers a new way of monitoring oxygen in nuclear power plants. ORBISPHERE sensors set the industry standards for oxygen measurement by offering “peace of mind” to every water chemistry manager. The new ORBISPHERE K1200 maintains this tradition and offers significant operating and cost benefits.

→ **Optical technology eliminates membrane and electrolyte minimising maintenance and intervention**

→ **Fast response and annual calibration – ideal for nuclear applications**

→ **Accuracy in ppb oxygen measurement for effective process control**

Optical technology eliminates membrane and electrolyte

The absence of membrane and electrolyte means that the sensor accuracy is unaffected by process changes such as changes in flow. Maintenance and operating costs are significantly reduced. The sensor has a robust design that extends its operational lifetime and optimises its total cost of ownership.

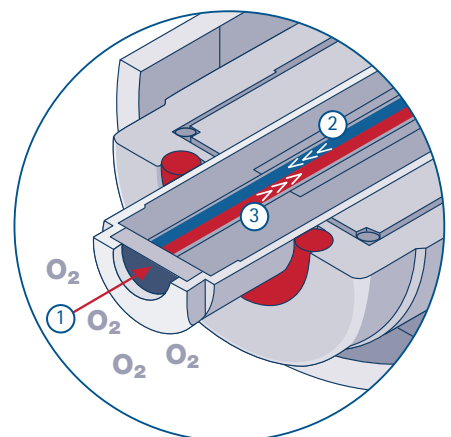
Fast response and annual calibration

The fast response time comes from the ORBISPHERE K1200 two second measurement frequency. Capable of measuring accurately at this frequency over a 12 month period is ideal for nuclear applications and promoting ALARA principles. The K1200 surpasses other optical and electrochemical sensors that display significant drift after only a few months in the same conditions. This optical sensor is designed for minimal drift, resulting in it being the most stable sensor with the longest calibration intervals achievable in the market. This is possible by its long-life spot and optimised controller software.

Maintenance intervention is limited to 2 minutes and a zero point calibration, offering significant cost benefits compared with traditional electrochemical sensors and other luminescent sensors. Using gas phase calibration means chemicals are not required, and therefore the task is easier and safer without reducing measurement precision.

Accuracy in ppb oxygen measurement

The optical sensor has an unbeatable precision of 0.8 ppb and a limit of detection of 0.6 ppb. Such accurate measurement readings are essential to control low oxygen levels in AVT power plants. This also allows operators to minimise system maintenance whilst being reassured of oxygen reading accuracy.



Oxygen interacts with the active luminescent sensor

1. Active luminescent spot
2. Blue light (excitation)
3. Red light (detection)

Optical sensor technology

The ORBISPHERE K1200 sensor uses luminescent measurement technology. An active fluorescent spot is excited with blue light and a red luminescent light is detected. The presence of oxygen changes the rate of fluorescence decay and this directly relates to the oxygen partial pressure value.

The complete system

The complete system consists of an ORBISPHERE 510 controller, a flow chamber, and the ORBISPHERE K1200 luminescent sensor. The sensor is compatible with 28 mm insertion devices and flow chambers, therefore minimising retrofit costs.

The installation is fast and easy and does not require special preparation. The “plug and play” sensor is immediately ready for measurement.

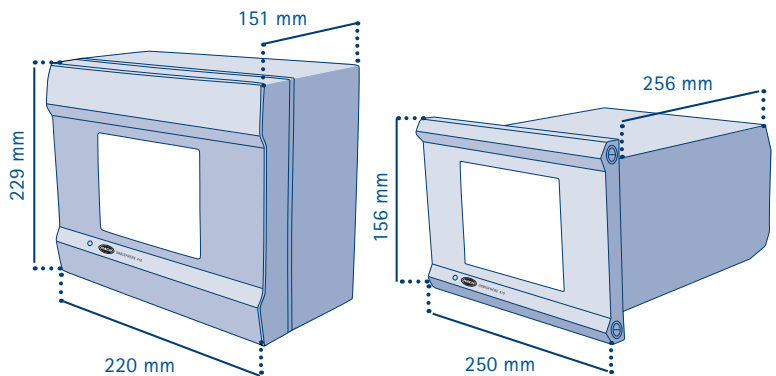


Controlling oxygen levels with the ORBISPHERE K1200 and 510 controller

Diagnostics

The ORBISPHERE 510 controller offers diagnostic features that informs users when a sensor service or calibration is due. This supports optimal preventative maintenance planning. It also notifies users of a system or sensor failure.

All diagnostic information as well as user programmable measurement alarms can be assigned to 1 of the 3 available relays or to 1 of the 3 smart analogue outputs.



ORBISPHERE 510 instruments are available in two versions.

Wall and pipe version: mounting is facilitated by use of simple to attach brackets that allow adjustment of the instrument to afford optimum screen viewing angle. Panel mount version: "quick and easy" mounting from the front of the panel using concealed screws.

Technical data

Sample	Temperature	Measurement from -5 to 50 °C / 23 to 122 °F Sensor resistant to temperature from -5 to 100 °C / 23 to 212 °F	
	Pressure	1 to 20 bar abs (14.5 to 290 psia)	
K1200 Sensor	Range	0 to 2,000 ppb (dissolved)	
	Repeatability	±0.4 ppb or 1%, whichever the greater	
	Reproducibility	±0.8 ppb or 2%, whichever the greater	
	Accuracy	±0.8 ppb or 2%, whichever the greater	
	Limit of detection	(LOD) Down to 0.6 ppb	
	Response time	(90%) <10 s (gas phase); <30 s in water	
	Display resolution	0.1 ppb	
	Calibration	Single point zero calibration	
	Calibration sample	Standard 99.999% Nitrogen (quality 50), or equivalent oxygen free gas	
	Radiation resistance level	Sensor body + cap (SS 316L): >>10 MGy; LDO Spot (Silicone): 10 kGy; O-Ring (MVQ): 0.4–0.5 MGy	
510 Controller	Enclosures	Wall (pipe) mounting, stainless steel, IP 65, NEMA 4x Panel mounting, aluminium, IP 65	
	Certifications	Electromagnetic compatibility standards: EN61326:1997/ A1:1998 / A2:2001 / A3:2003 Safety rating ETL, conforming to UL 61010-1 and CSA 22.2 No. 61010-1 Safety standard: EN61010-1: 2001 Directive 73/23/EEC	
	Display	Full color STN 320 × 240 pixels with CFL backlight	
	Analogue outputs	3 Smart 0/4–20 mA (500 Ohms), programmable as linear or tri-linear, configurable to send diagnostics or alarm information	
	Relays	3 measurement alarm relays (1 A - 30 V AC or 0.5 A - 50 V DC) per channel 1 instrument alarm relay (1 A - 30 AC or 0.5 A - 50 V DC)	
	Digital communication	RS485; Profibus DP; Ethernet; USB-client to download data and from a computer; USB-host to download data with a USB memory stick	
	Data storage	Rolling buffer or store once mode for up to 1,000 measurements and 10,000 operator actions Holds calibration records for the last 50 calibrations	
	User interface	Touch-screen panel: displays concentration, trend graph, diagnostics, alarm status, historical data Password protection: five levels of authorised access to configuration and data management	
Accessories	Active spots, spare sensors, tool kit, portable calibration setup... ask your local HACH LANGE representative for more details on all available spare parts and accessories		
Installation	In process sensor installation devices	Flow chamber in stainless steel (316) or Delrin with 1/4" or 6 mm fittings	
	Ambient temperature	-5 to 50 °C (23 to 122 °F)	
	Humidity	0 to 95 % non-condensing relative humidity	
	Power supply	Universal 85–264 V AC @ 50/60 Hz, 25 VA; 10–36 V DC, 25 W	
Weights	Transmitter	Wall (pipe) mount	3.8 kg
		Panel mount	2.9 kg
	Sensor	K1100 28 mm	0.74 kg
	Calibration	Device (excl. calibration gas)	0.7 kg

Ordering information

510K00/W1C10000	ORBISPHERE 510 Controller (wall mount)	
510K00/P1C10000	ORBISPHERE 510 Controller (panel mount)	
K1200-S00	ORBISPHERE K1200 28 mm Luminescent oxygen sensor for nuclear applications, compatible with ORBISPHERE insertion devices	
Accessories	32510.05	Sensor cable (5 m)
	32001.011	Flow chamber in stainless steel (316) with 1/4" fittings. Supplied with EPDM O-rings
	32001.010	Flow chamber in stainless steel (316) with 6mm fittings. Supplied with EPDM O-rings

Please discuss your specific needs with a HACH LANGE representative. This data is subject to change without notice.

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