PRODUCT INFORMATION
PROCESS ANALYSIS
OXYGEN SENSOR
ORBISPHERE 311XX

ORBISPHERE 311XX O_2 sensor from 0.1 ppb to 2,000 ppm

- **From trace levels to super saturation**
- **Unrivalled detection limit of ±0.1 ppb or 100 ppt**
- **Rugged construction for harsh chemicals, hot CIP and high pressures**

The ultimate in O_2 sensors

The patented polarographic sensor design is a proven performer wherever knowledge of O_2 content is critical. From beverage quality control to corrosion monitoring in power generators, from package sampling to chemical manufacturing, this sensor provides fast, accurate oxygen measurements, in gaseous or liquid samples.

A wide range of temperature and pressure ranges is made possible by ORBISPHERE's exclusive valve seat sealing, whereby the sensor cathode is mechanically tensioned against a ceramic valve seat to ensure the integrity of the seal. This design enables a vanishingly small residual signal, for improved accuracy.

All ORBISPHERE oxygen sensors use the deep-draw membrane mounting method for a uniformly thin layer of electrolyte for faster response and superior stability. Coupled with a screw-on protection cap, the sensor provides in-service intervals of up to a year.

Benefits

- ➔ Guard Ring Electrode design improves speed of response and reduces interferences.
- ➔ Installs in-line for process control, or in flow chamber for spot measurement.
- ➔ Cable detaches at sensor end for installation and maintenance flexibility.

Principle of measurement

The sensor is constructed of two metal electrodes, the gold working electrode and a counter electrode, immersed in an electrolytic solution, and separated by a gas-permeable membrane from the sample of interest.
An auxiliary guard ring electrode surrounds the working electrode to shield against the influence of other gases and improve stability.

Electrical potential is applied between the electrodes to reduce oxygen that is driven through the membrane by a partial pressure gradient. An electrical current results, which is proportional in magnitude to the concentration of interest. This is measured, scaled, displayed, and converted to analogue and digital outputs, by the instrument.

Membrane Model	2935A	2952A	2956A	2958A	29521A	29552A	2995A
Recommended applications	Saturated to super saturated levels	Corrosion control; in-line beverage; deaerated water			In-line hot wort (max. 70 °C)	In-line wort; air/O_2 injection; sewage treatment	Saturated to super saturated levels
Material	Halar®	Tefzel®	PFA	Tefzel®	Tefzel®	PTFE	Tedlar®
Thickness	25 µm	25 µm	25 µm	12.5 µm	125 µm	50 µm	12.5 µm
Integrated radiation dose limit	N/A	108 rads	2 x 104 rads	108 rads	108 rads	N/A	108 rads
Current in air at 25 °C	1 µA	5 µA	25 µA	8 µA	0.75 µA	5 µA	0.2 µA
Dissolved O_2 measurement range	10 ppb–400 ppm	1 ppb–80 ppm	0.1 ppb–20 ppm	1 ppb–40 ppm	10 ppb–400 ppm	2 ppb–80 ppm	50 ppb–2,000 ppm
Gaseous O_2 measurement range	20 Pa–1,000 kPa	5 Pa–200 kPa	0.25 Pa–50 kPa	2 Pa–100 kPa	20 Pa–1,000 kPa	5 Pa–200 kPa	100 Pa–5,000 kPa
Accuracy (Assuming correct calibration)	±1% of reading, or ± lower measurement range, whichever is greater						
Temperature compensated range	-5 to 60 °C	-5 to 60 °C	-5 to 60 °C	-5 to 60 °C	-5 to 60 °C	-5 to 60 °C	-5 to 60 °C
Response time	2.5 min	38 sec	7.2 sec	9.5 sec	18 min	90 sec	80 sec
Recommended liquid flow rate*, ml per min., in 32001 flow chamber	25	50	180	120	25	50	5
Recommended linear liquid flow rate* cm/sec	20	30	200	100	60	30	5
Recommended gaseous flow rate	0.1 to 3 l/min	0.1 to 3 l/min	0.1 to 3 l/min	0.1 to 3 l/min	0.1 to 3 l/min	0.1 to 3 l/min	0.1 to 3 l/min

* Flow rates for Model 32001 Flow Chamber are valid for sensor used with a Model 29104 Protection cap, without a stainless steel grill. Use of the grill as in protection cap model 29106 will require approximately 50% faster flow.

Sensor Model	Standard materials of construction				
	Measuring cell	Head**	Body***	Pressure rating (bar)	Weight (grams)
3111X	PEEK	PEEK	Delrin	20	200
3112X	PEEK	Stainless steel	Stainless steel	50	620
3113X	Titanium	Stainless steel	Stainless steel	100	640
3114X	Titanium	Stainless steel	Stainless steel	200	670
- - - A	Sensors with fast response to temperature changes				
- - - E	Intrinsically safe EEx certified sensors				
- - - s	Smart sensors to be used with ORBISPHERE 3680				

** Parts in contact with the sample, also available in the following materials: hastelloy, titanium, and monel. O-rings available in EPDM, Viton, Kalrez and Nitril.
*** O-rings are in EPDM. These datas are subject to change without notice.

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