

The ultimate in O₂ sensors

311XX Sensors

O₂

Sensitivity range meets any need, from trace levels to super saturation.

Precise measurement from 0.1 ppb to 2000 ppm

Unrivalled detection limit of +/- 0.1 ppb or 100 ppt

Rugged construction withstands harsh chemicals, hot cleaning in place and hydrostatic pressures up to 200 bars.

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 analog and digital outputs, by the instrument.

Description

Orbisphere's patented polarographic sensor design is a proven performer wherever knowledge of O₂ 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 yields in-service intervals of up to a year. Orbisphere sensors typically can be calibrated in air for ease of use, or against a sample of known oxygen content.



Application dependent membrane/Sensor specification

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	10 ⁸ rads	2 x 10 ⁴ rads	10 ⁸ rads	10 ⁸ rads	N/A	10 ⁸ 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-2000 ppm
Gaseous O ₂ measurement range	20 Pa-1000 kPa	5 Pa-200 kPa	0.25 Pa-50 kPa	2 Pa-100 kPa	20 Pa-1000 kPa	5 Pa-200 kPa	100 Pa-5000 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.

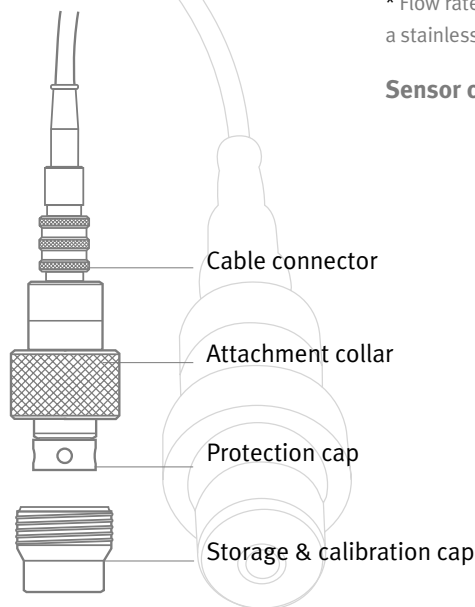
* Flow rates for Model 32001 Flow Chamber are valid for sensor used with a Model 29104 Protection Cap, without a stainless steel grill. Use of the grill as in protection cap model 29106 will require approximately 50% faster flow.

Sensor configurations

Sensor Model	Standard materials of construction			Pressure rating (bar)	Weight (grams)
	Meas. Cell	Head**	Body***		
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 Multi analyzer				

** 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.



In the interest of continued product development, Hach Ultra Analytics reserves the right to make improvements to this literature and/or the products it describes, without notice or obligation.

Hach Ultra Analytics

salesinfo@hachultra.com
 Tel. ++41 22 855 91 00
 Fax ++41 22 855 91 99
 6, route de Compois, C.P.212
 CH-1222 Vérenaz, Geneva
 Switzerland

Represented By

