



Oxygen Optode 4531

is a compact fully integrated sensor for measuring the O_2 concentration.

Advantages:

- Optical measurement principle
- Lifetime-based luminescence quenching principle
- Long time stability
- More than one year without recalibration
- Low maintenance needs
- Smart Sensor technology: presenting calibrated data directly
- Stand-alone sensor
- Output format: **4-20mA, 0-5V, 0-10V, RS-232**
- Customized cable length

Since oxygen is involved in most of the biological and chemical processes in aquatic environments and in the process industry, it is one of the most important parameters to be measured.

Monitoring the oxygen level is crucial in many applications, e.g. in:

- Industry processes
- Water and waste water systems
- Ship tanks
- Ballast water
- Aquaculture
- Fjords or other areas with limited exchange of water

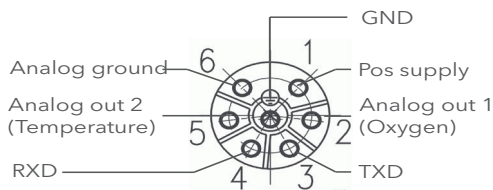
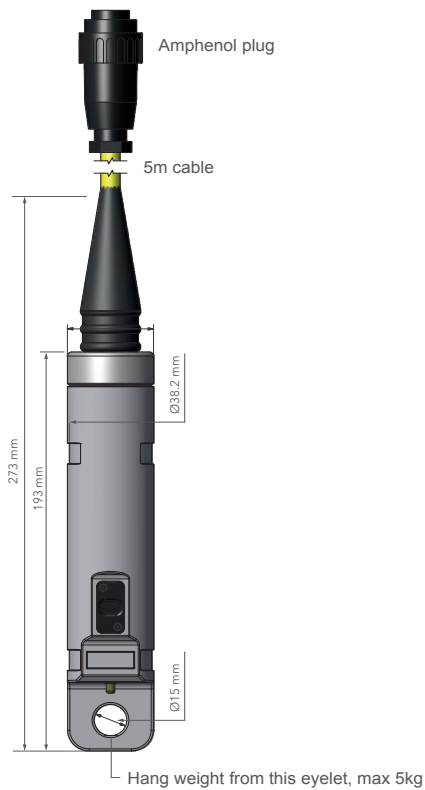
The Aanderaa oxygen optodes are based on the ability of selected substances to act as dynamic fluorescence quenchers. The fluorescent indicator is a special platinum porphyrin complex embedded in a gas permeable foil that is exposed to the

surrounding water. A black optical isolation coating protects the complex from sunlight and fluorescent particles in the water. This sensing foil is mounted on a sapphire window providing optical sampling from inside a watertight housing.

The lifetime-based luminescence quenching principle offers the following advantages over electro-chemical sensors:

- Not stirring sensitive (it consumes no oxygen)
- Less affected by fouling
- Measures absolute oxygen concentration without repeated calibrations
- Better long-term stability
- Not affected by pressure
- Faster response time

The oxygen optode outputs data in RS-232 and analog 0-5V, 0-10V or 4-20mA. The sensor can present the O_2 concentration in μM , Air Saturation in % and Temperature in $^{\circ}\text{C}$.



Amphenol pin configuration



Foil Service Kit 4733. PSt₃

Operating Principle

The sensing foil is excited by modulated blue light; the sensor measures the phase of the returned red light. For improved stability the optode also performs a reference phase reading by use of a red LED that do not produce fluorescence in the foil. The sensor has an incorporated temperature thermistor which enables linearization and temperature compensation of the phase measurements to provide the absolute O₂-concentration.

Oxygen:	O ₂ Concentration	Air Saturation
Operation Range:	0 - 800 µM ¹⁾	0 - 200%
Calibration Range:	0 - 500 µM ¹⁾	0 - 120%
Resolution:	<1 µM	0.4% ³⁾
Accuracy:	<8 µM or 5% ²⁾	<5% ³⁾
	whichever is greater	

Response Time (63%):	<30 sec
Temperature:	
Range:	-5 to +30°C (23 - 86°F)
Resolution:	0.01°C (0.018°F)
Accuracy:	±0.03°C (0.18°F) ⁴⁾
Response Time (63%):	<2 sec
Output format:	4531A: 0 - 5V, RS-232 4531B: 0 - 10V, RS-232 4531C: 4 - 20mA, RS-232 4531A: RS-232
Output Parameters:	
RS-232:	O ₂ Concentration in µM, Air Saturation in %, Temperature in °C, Oxygen raw data and Temperature raw data
Analog channel 1:	O ₂ Concentration in µM, or Air Saturation in %
Analog channel 2:	Temperature in °C
Sampling interval:	2 sec - 255 min
Supply voltage:	
RS-232:	5 to 30Vdc
Analog:	7 to 30Vdc, 12 to 30Vdc for 0-10V
Current drain:	
RS-232:	
Average:	0.16 +48mA/S where S is sampling interval in seconds
Maximum:	100mA
Quiescent:	0.16 mA
Analog:	20mA + RS-232 drain
Operating depth:	0-100 meters (0 - 328ft)

Elec. connection: Amphenol 16C or Subconn 8M
Dimensions : Ø38.2 x 193/273mm (Ø1.50 x 7.60/10.75in)

Weight: sensor: 160g (5.6oz)
5m cable: 500g (17.6oz)

Materials: PA

Cable:
Outer diameter: 9.9 +/- 0.4mm (0.39 +/-0.016in)
Min. bending radius: 155mm (6.10in)

Accessories:
Foil Service Kit 4733
Cable with Amphenol plug 5440
Cable with free end 5442
Cable with Subconn 5443
Bulkhead Subconn 5441

¹⁾ O₂ concentration in µM = µmol/l. To obtain mg/l, divide by 31.25
²⁾ requires salinity compensation for salinity variations > 1mS/cm, and pressure compensation for pressure > 100meter
³⁾ within calibrated range 0 - 120%
⁴⁾ within calibrated range 0 - 36°C

Specifications subject to change without prior notice.



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