



Since oxygen is involved in most of the biological and chemical processes in aquatic environments, it is one of the most important parameters needed to be measured. Oxygen can also be used as a tracer in oceanographic studies. For environmental reasons it is critical to monitor oxygen in areas where the supply of oxygen is limited compared to demand, e.g.

- In shallow coastal areas with significant algae blooms
- In fjords or other areas with limited exchange of water
- Around fish farms
- Areas of interest for dumping of mine or dredging waste

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. For the standard version 4330 a black optical isolation coating protects the complex from sunlight and fluorescent

Oxygen Optode 4330/4330F

is a compact fully integrated sensor for measuring the O_2 -concentration.
Fast Response Foil (4330F, refer overleaf)

Advantages:

- Optical measurement principle
- Lifetime-based luminescence quenching principle
- Long time stability
- More than one year without recalibration
- Low maintenance needs
- User friendly
- Use with Aanderaa SeaGuard and SmartGuard Platform
- Automatically detected and recognized
- Use as stand-alone sensor
- Output format: CANbus AiCaP, RS232
- Three depth ranges, maximum 6000 meters

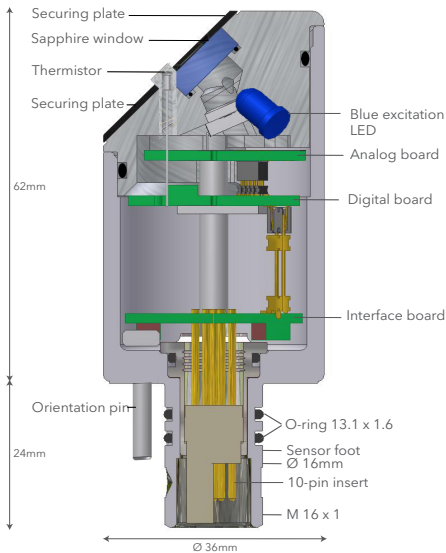
particles in the water. This sensing foil is attached to a sapphire window providing optical access for the measuring system from inside a watertight housing.

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

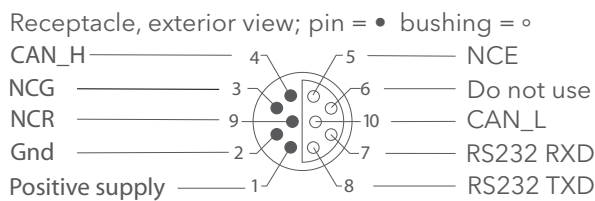
- Not stirring sensitive (it consumes no oxygen)
- Less affected by fouling
- Measures absolute oxygen concentration without repeated calibrations
- Better long-term stability
- Less affected by pressure
- Pressure behaviour is predictable
- Faster response time

The oxygen optode outputs data in AiCaP CANbus and RS-232. The sensor can present the O_2 concentration in μM , the air saturation in % and the temperature in $^{\circ}C$.

The SeaGuard/SmartGuard datalogger and the Smart Sensor are interfaced by means of a reliable CANbus interface (AiCaP), using XML for plug and play capabilities.



PIN CONFIGURATION



Cable from sensor to:	Cable
PC with waterproof SP (Sealing Plug), RS-232	4865
Seaguard as sixth sensor on top-end plate	4999
Seaguard with waterproof top end plate connection	4793
SmartGuard single sensor with SP	5236
User furnished datalogger, SP to free end	4762

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.

Sensing Foil Considerations

The standard sensing foil is protected by an optical isolation layer which makes the foil extra rugged and insensitive to direct sunlight. The fast response sensing foil is not equipped with this layer; ambient light intensity higher than 15000 lux may cause erroneous readings. To avoid potential bleaching the fast response foil should be protected from ambient light when storing the sensor. We recommend the standard foil in applications where fast response time is not needed.



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Oxygen: O₂-Concentration Air Saturation
 Measurement Range: 0 - 500 μM¹⁾ 0 - 150%
 Resolution: < 1 μM 0.4 %³⁾
 Accuracy: <8 μM or 5%²⁾ <5 %³⁾
 Multipoint Calibration: <2.5 μM or 1.5%²⁾ <1.5 %³⁾
 (available for additional cost)
 Response Time (63%): 4330F (with fast response foil) <8 sec
 4330 (with standard foil) <25 sec

Temperature:
 Range: -5 to +40°C (23 - 104°F)
 Resolution: 0.01°C (0.018°F)
 Accuracy: ±0.03°C (0.18°F)⁴⁾
 Response Time (63%): <2 sec

Output format: AiCaP CANbus, RS-232
 Output Parameters: O₂-Concentration in μM, air saturation in %, temperature in °C, oxygen raw data and temperature raw data

Sampling interval: 2 sec - 255 min
 Supply voltage: 5 to 14Vdc

Current drain:
 Average: 0.16 +48 mA/S where S is sampling interval in seconds

Maximum: 100 mA
 Quiescent: 0.16 mA
 Operating depth: SW: 0-300m (0-984ft)
 IW: 0-3000m (0-9,845ft)
 DW: 0-6000m (0-19,690ft)

Elec. connection: 10-pin receptacle mating plug SP
 Dimensions (WxDxH): Ø36 x 86 mm (Ø1.4" x 3.4")
 Weight: 175g (6.17oz)

Materials: Epoxy coated Titanium, PA
 Accessories: Foil Service Kit 4733/4733O (standard)/4794(fast)
 (not included): AiCap extension cable with SP 4793
 SP to Free End Cable 4762
 SP to PC Cable 4865
 Setup and Config Cable 3855⁵⁾/3855A⁵⁾

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% / 0 - 30°C
⁴⁾ within calibrated range 0 - 36°C for standard version and 0 - 30°C for multipoint version
⁵⁾ only for laboratory use

Specifications subject to change without prior notice.



Optode with SP, Sealing Plug



Foil Service Kit 4733/4733O/4794. PSt₃

Aanderaa Data Instruments AS
 Sanddalsringen 5b, Postboks 103 Midtun,
 5843 Bergen, Norway
 Tel +47 55 60 48 00
 Fax +47 55 60 48 01