Since oxygen is involved in most of the biological and chemical processes in aquatic environments, it is a crucial parameter to measure. Oxygen can also be used as a tracer in oceanographic studies. Aanderaa revolutionized oceanographic oxygen monitoring/research with the introduction of oxygen optodes in 2002. Applications range from shallow creeks to the deepest trenches, from tropical to in-ice/in-sediment measurements. More than 150 scientific papers have so far been published using these Aanderaa optodes.

These sensors are based on the ability of selected substances to act as dynamic fluorescence quenchers. The fluorescent indicator is a special platinumporphyrin complex embedded in a gas permeable foil that is exposed to the surrounding water. This sensing foil is attached to a sapphire window providing optical access to the measuring system from inside a watertight housing. 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. The lifetime-based luminescence quenching principle offers the following advantages over electro-chemical sensors:

- Less affected by fouling
- Measures absolute oxygen concentration without repeated calibrations
- Excellent 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 O₂ concentration in μM, the air saturation in % and the temperature in °C.

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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.
Specifications

**Oxygen:**
- **Concentration Air Saturation**
- **Measurement Range:** 0 - 1000 µM
- **Calibration method:** 40-point automatic calibration, 20-point verification, 3 fully Winkler calibrated optodes for referencing
- **Foils:** Pre-burned PreSens Pst3 foils
- **Calibration Range:** 0 - 500 µM
- **Resolution:** < 0.1 µM 0.05 %
- **Accuracy:** < 2 µM or 1.5%
- **Response Time (63%):** 4330F (with fast response foil) <8 sec
  4330 (with standard foil) <25 sec
- **Typical field drift:** <0.5 % per year

**Temperature:**
- **Range:** -5 to +40°C (23 - 104˚F)
- **Resolution:** 0.01°C (0.018°F)
- **Accuracy:** ±0.03°C (0.054°F)
- **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 +48mA/S where S is sampling interval in seconds
- Maximum: 100mA
- Quiescent: 0.16mA

**Operating depth:**
- SW: 0-300m (0-984ft)
- IW: 0–3000m (0–9,845ft)
- DW: 0-6000m (0-19,690ft)
- Hadal: 0-12000m (0-39,380ft)

**Elec. connection:**
- 10-pin receptacle mating plug SP

**Dimensions (WxDxH):**
- Ø36 x 86mm (Ø1.4”x 3.4”)

**Weight:**
- 175g (6.17oz)

**Materials:**
- Epoxy coated Titanium, PA

**Accessories:**
- Foil Service Kit 4733/4733O
- not included:
  - SP to Free End Cable 4762
  - SP to PC Cable 4865
  - Setup and Config Cable 3855

**Specifications subject to change without prior notice.**

Misleading specifications

When Aanderaa states an absolute accuracy of e.g. (±1.5% or ±2 µM) we mean the accuracy of the sensor in the field over the entire range of oxygen concentrations and temperatures, others might refer to accuracy in the laboratory just after the sensor was calibrated. When Aanderaa give response time in water others refer to response time in air which is much faster. For more information read our Best Practice document on Oxygen Optodes.

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