



OXYGEN OPTODE 3830 and OXYGEN OPTODE/TEMPERATURE SENSOR 3930

These products use the latest technology for measuring dissolved oxygen in fresh and salt water. The principle of measurement is based on the effect of dynamic luminescence quenching (lifetime based) by molecular oxygen. Outputs data in both RS-232C and Aanderaa SR10 formats.



Since oxygen is involved in most of the biological and chemical processes in aquatic environments, it is the single most important parameter needing 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
- In areas interesting for dumping of mine or dredging waste

The Oxygen Optode 3830 is 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 attached to a sapphire window providing optical access for the measuring system from inside a water-tight titanium housing.

The foil is excited by modulated blue light, and the phase of a returned red light is measured (see illustration overleaf).

By linearizing and temperature compensating, with an incorporated temperature sensor, the absolute O₂ concentration can be determined.

The Optode outputs data in both RS-232C and Aanderaa SR10 format. On the RS-232C output both the absolute oxygen content in micro molar (µM) and the relative air saturation in % are available. The SR10 output can be configured to present oxygen content in µM or air saturation by connecting the sensor to a PC.

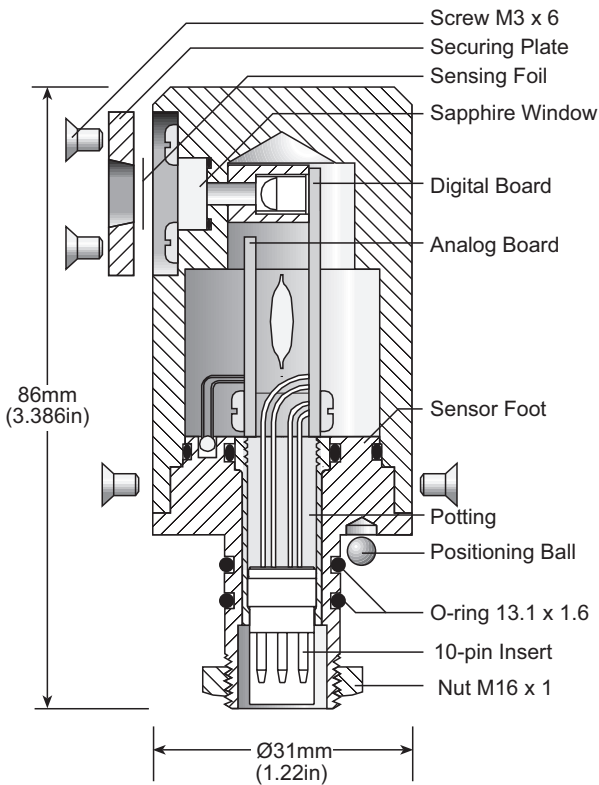
The lifetime-based luminescence quenching principle offers the following advantages over electrochemical sensors:

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

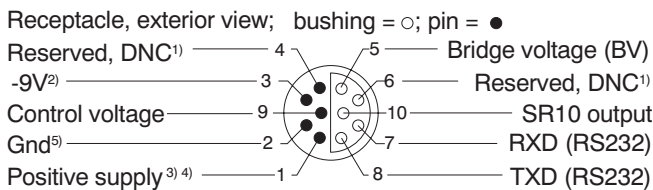
The sensor is designed to operate down to 6000 meters. It fits directly on to the top end-plate of Recording Current Meters RCM 9, RCM 11 and other Aanderaa instruments.

SPECIFICATIONS FOR OXYGEN OPTODE 3830

Preliminary



PIN CONFIGURATION



¹⁾ DNC: Do Not Connect
²⁾ Supply for SR10 Operation
³⁾ Ground for SR10 Operation
⁴⁾ Supply for RS-232C Operation
⁵⁾ Ground for RS-232C Operation

The sensor can be mounted directly on the top end-plate of the Aanderaa RCM 9 or RCM 11 and connected to the Main Control Board (Electronic Board) with a short cable, Sensor Cable 3854.

The Oxygen Optode can also be incorporated into other Aanderaa assemblages such as buoys, handheld profiling systems or hydrological monitoring.

For such use a sensor version model 3930 is available ensuring straightforward connection to a PC.

The 10-pin receptacle in the sensor foot mates with Aanderaa Plug 3216A giving access to RS-232C output. An additional USB plug is used for providing power to the sensor.

The distance from the PC can be extended to 15 meters by using a Cable Coupler 3472 and a standard Connecting Cable 3282 with watertight titanium plugs.

Output Setting:

	<i>O₂</i> Concentration	Air Saturation
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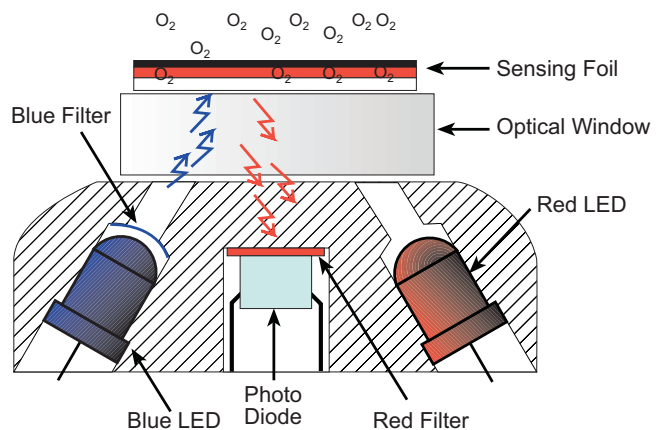
Measuring Range:	0-500 μM ¹⁾	0 - 120%
Resolution:	< 1 μM	< 0.4%
Accuracy:	< 8 μM or 5% ²⁾	< 5% ²⁾
	whichever is greater	
Settling Time (63%):	< 14 seconds	
Operating Temperature:	0 - 40°C (32 - 104°F)	
Operating Depth:	0 - 6000m (19,690ft)	
Sampling Interval:	SR10 Operation: SR10 controlled by Datalogger	
	RS-232C Operation: From 2 seconds to 255 minutes	
Output Formats:	Aanderaa SR10	
	RS-232C (9600 baud, 8 data bits, 1 stop bit, No parity, Xon/Xoff Handshake)	
Electrical Connection:	10-pin receptacle mating plug 3216A	
Current Consumption:	SR10 Operation: 13 mA/T where T is recording interval in minutes	
	RS-232C Operation: 110mA/S +0.3mA where S is the recording interval in seconds	

Supply Voltage:	SR10 Operation: -6 to -14 Vdc	
	RS-232C Operation: +5 to +14Vdc	
Dimensions:	Ø36 x 86 mm (Ø1.42 x 3.386in)	
Weight:	0.230kg (8.113oz)	
Materials:	Titanium, Hostaform(POM)	
Warranty:	Two years against faulty material and workmanship	
Accessories included:	Sensor Cable 3854	
(not included):	Sensor Cable 3855 to PC	
	Foil Service Kit 3853 MPST1	

¹⁾ *O₂* concentration in micro Molar = $\mu\text{ mol/l}$
 To obtain mg/l divide by 31.25.
²⁾ Valid for 0 to 2000m (6562ft) depth, salinity 33-37ppt

Specifications Subject to change without prior notice

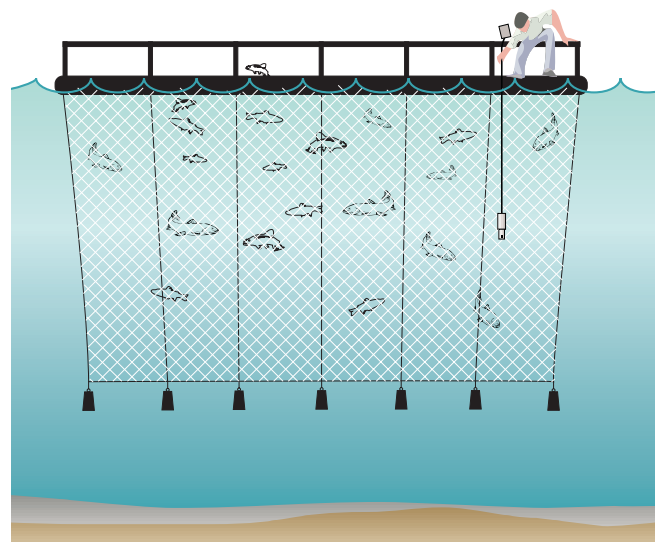
The Optical System





Dissolved oxygen (C_{sat}) values (mg/l) in water saturated with air in function of temperature ($^{\circ}C$) and salinity (ppt).

$^{\circ}C$	0ppt	10ppt	20ppt	30ppt	40ppt	$^{\circ}C$	0ppt	10ppt	20ppt	30ppt	40ppt
0	14.6	13.8	13.0	12.1	11.3	16	9.8	9.5	9.0	8.5	8.0
1	14.2	13.4	12.6	11.8	11.0	17	9.6	9.3	8.8	8.3	7.8
2	13.8	13.1	12.3	11.5	10.8	18	9.4	9.1	8.6	8.2	7.7
3	13.4	12.7	12.0	11.2	10.5	19	9.2	8.8	8.5	8.0	7.6
4	13.1	12.4	11.7	11.0	10.3	20	9.1	8.7	8.3	7.8	7.4
5	12.7	12.1	11.4	10.7	10.0	21	8.9	8.6	8.1	7.7	7.3
6	12.4	11.8	11.1	10.5	9.6	22	8.7	8.4	8.0	7.6	7.1
7	12.1	11.5	10.9	10.2	9.6	23	8.6	8.3	7.9	7.4	7.0
8	11.8	11.2	10.6	10.0	9.4	24	8.4	8.1	7.7	7.3	6.9
9	11.5	11.0	10.4	9.8	9.2	25	8.2	8.0	7.6	7.2	6.7
10	11.3	10.7	10.1	9.6	9.0	26	8.1	7.8	7.4	7.0	6.6
11	11.0	10.5	9.9	9.4	8.8	27	8.0	7.7	7.3	6.9	6.5
12	10.7	10.3	9.7	9.2	8.6	28	7.8	7.6	7.1	6.8	6.4
13	10.5	10.1	9.5	9.0	8.5	29	7.7	7.4	7.0	6.6	6.3
14	10.3	9.9	9.3	8.8	8.3	30	7.6	7.3	6.9	6.5	6.1
15	10.1	9.7	9.1	8.6	8.1						



The Oxygen/Optode Temperature Sensor 3930 used with Display Unit 3315 to measure dissolved oxygen and temperature in a fish mare

Oxygen Optode 3930 is specially designed for use together with our own monitoring systems and as an OEM product for use in customer designed systems.

It can be used together with Coastal Monitoring Buoy 4280, Sensor Discs 3722/3829 for three and five sensors, Automatic Monitoring Stations and together with Display Unit 3315 as a stand-alone system for single sensor measuring system.

The sensor is equipped with a VR22 temperature sensor. It can be used for on-line monitoring of surface water from ships and is ideal for local monitoring systems e.g. fish farming applications, waste water treatment plant, drinking water plant where regular monitoring of the local environ-

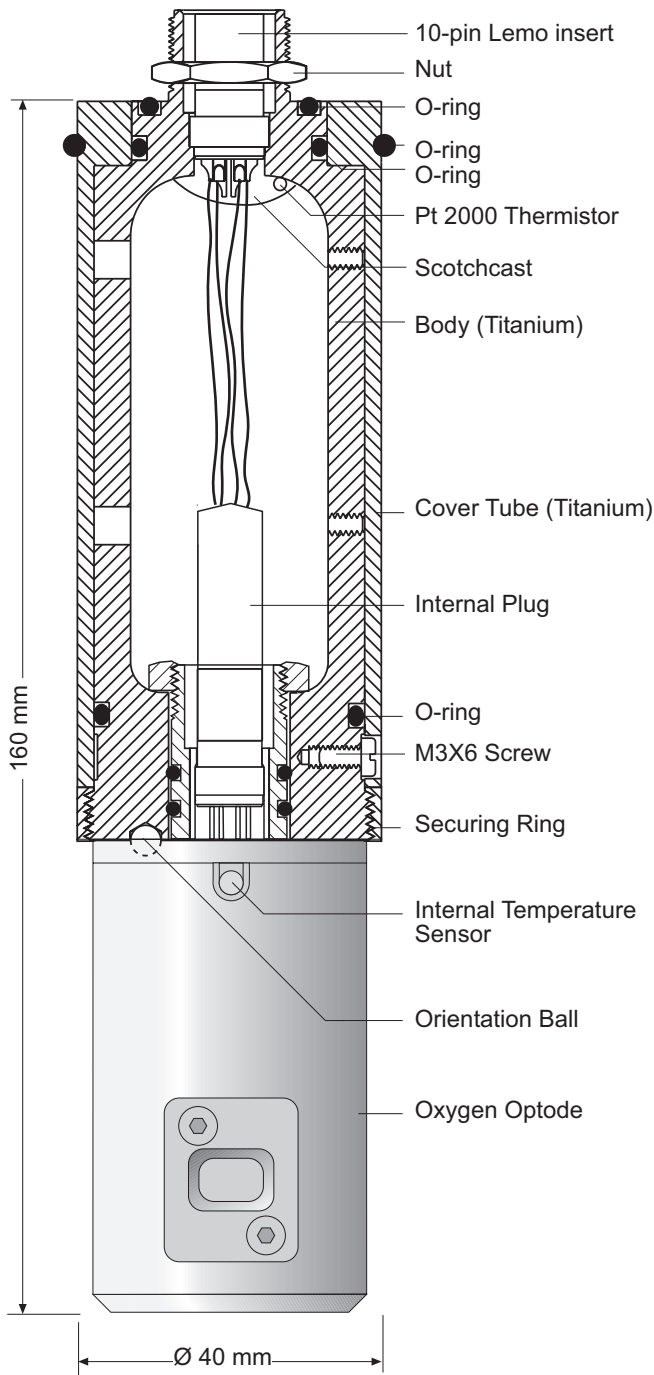
mental conditions is required by statute, regulation or ordinance and spillage tracking.

Data can be displayed in the 3710 Display Program, designed to collect, save and display data from Aanderaa datalogging equipment.

A program, Oxyview[®], has been designed for use with Oxygen Optode/Temperature Sensor 3930. The program will allow display of Oxygen Concentration, Oxygen Saturation and Temperature in table and graphical forms. Included in the program is a Calibration Wizard to help calibrate the sensor. The program can also be used to configuring the sensor.

SPECIFICATIONS OXYGEN OPTODE/TEMPERATURE SENSOR 3930

Preliminary



Output Setting:		
O ₂ : CHANNEL 1	O ₂ Concentration	Air Saturation
Measuring Range:	0-500 µM ¹⁾	0 - 120%
Resolution:	< 1 µM	< 0.4%
Accuracy:	< 8 µM or 5% ²⁾	< 5% ²⁾
	whichever is greater	

Settling Time (63%): < 20 seconds
 Operating Temperature: 0 - 40°C (32 - 104°F)

TEMPERATURE: CHANNEL 2	
Range:	- 7.5 to + 41°C
Accuracy:	± 0.1°C
Resolution:	0.05°C
Time Constant (63%):	30s
Operating Depth:	0 - 2000m (6,562ft)
Sampling Interval:	Controlled by Datalogger
Output Formats:	Aanderaa SR10

RS-232C (9600 baud, 8 data bits, 1 stop bit, No parity, Xon/Xoff Handshake (used for configuration and calibration))

Electrical Connection: 10-pin receptacle mating plug 3216A
 Current Consumption: 13 mA/T where T is recording interval in minutes

Supply Voltage: SR10 Operation: -6 to -14Vdc
 RS-232C Operation: +5 to +14Vdc

Dimensions: Ø40 x 168mm (OD1.575 x 6.614in)
 Weight: 495g (17.5oz)
 Materials: Titanium, Hostaform(POM)
 Warranty: Two years against faulty material and workmanship

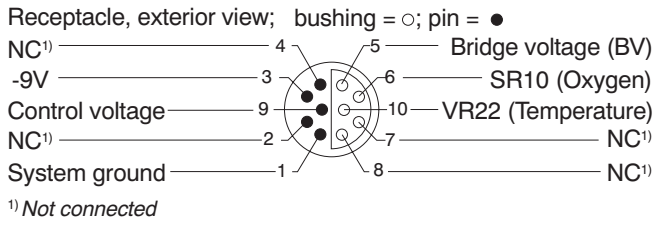
Accessories (not included): Sensor Cable 3855 to PC
 Foil Service Kit 3853 MPST1

¹⁾ O₂ concentration in micro Molar = µ mol/l
 To obtain mg/l divide by 31.25.
²⁾ Valid for 0 to 2000m (6562ft) depth, salinity 33-37ppt
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In order to change settings or calibrating the 3930 Optode Sensor the sensor has to be connected to a PC. To gain access to the Optode's RS-232C signals its cylindrical body must be removed, see the Operating Manual TD218, chapter 9 RS-232C protocol for communicating with the sensor.

Representatives Stamp

PIN CONFIGURATION



Latest version is on the Internet

PO BOX 160, NESTTUN 5852 BERGEN, NORWAY
 NESTTUNBREKKEN 97 5221 NESTTUN, NORWAY
 TEL. +47 55 109900 FAX. +47 55 109910
 E-MAIL: info@aanderaa.no WEB: http://www.aanderaa.com