

OXYGEN SENSOR

3838/4160/4175



Oxygen Sensor 3835 Oxygen/Temperature Sensor 4130 Oxygen Sensor w/analog output 4175

are compact fully integrated sensors for measuring the O₂ concentration. The 3835 model is designed to be mounted directly on the Top-end Plate of RCM 9 or RDCP as well as for stand-alone operation using SR10 or RS-232 interface. The 4130 model can be connected via cable to Aanderaa SR10/VR22 Datalogger, and the 4175 model provides analog output.

Advantages:

- Optical measurement principle
- Lifetime-based luminescence quenching principle
- Long time stability
- More than one year without recalibration
- Low maintenance needs
- User friendly
- Smart sensor technology - provides calibrated data directly
- Use with SmartGuard, RCM 9 and RDCP
- Use as stand-alone sensor
- Output format: SR10, RS232, Analog 0-5V/4-20mA

Since oxygen is involved in most of the biological and chemical processes in aquatic environments, it is one of the most important parameters 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 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 attached to a window providing optical access for the measuring system from inside a watertight housing. The foil is excited by modulated blue light, and the phase of a returned red light is measured. By linearizing and temperature compensating, with an incorporated temperature sensor, the absolute O₂ concentration can be determined.

The sensor is designed to operate down to 300 meters. 4130 is designed for use with Aanderaa sensor disk. As the 4130 can not be used with CSP (Cylindrical Sealing Plug), the 4130C can be used instead.

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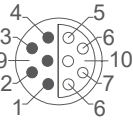
PARAMETER	OXYGEN OPTODE 3835		OXYGEN/TEMPERATURE OPTODE 4130/4130C		OXYGEN OPTODE 4175C	
	O ₂ Concentration	Air Saturation	O ₂ Concentration	Air Saturation	O ₂ Concentration	Air Saturation
Measuring Range	0 - 500µM ¹⁾	0 - 120% ²⁾	0 - 500µM ¹⁾	0 - 120% ²⁾	0 - 500µM ¹⁾	0 - 120% ³⁾
Resolution	<1µM	0.4%	<1µM	0.4%	<1µM	0.4%
Accuracy	<8µM or 5 % ⁴⁾ whichever is greater	<5% ⁴⁾	<8µM or 5 % ⁴⁾ whichever is greater	<5% ⁴⁾	<8µM or 5 % ⁴⁾ whichever is greater	<5% ⁴⁾
Settling Time (63%)	<25s		<25s		<25s	
TEMPERATURE						
Calibrated Range	-0°C to +36°C		-5°C to +40°C		-0°C to +36°C	
Resolution	0.01°C		0.05°C		0.01°C (0 - 5V)	0.02°C (4 - 20mA)
Accuracy	±0.05°C		±0.1°C		±0.1°C (0 - 5V)	±0.15°C (4 - 20mA)
Settling Time (63%)	<10s		30s		<10s	
Operating Temperature	-5°C - 40°C (23 - 104°F)		-5°C - 40°C (23 - 104°F)		-5°C - 40°C (23 - 104°F)	
Operating Depth	0 - 300m (984.3ft)		0 - 300m (984.3ft)		0 - 300m (984.3ft)	
Sampling Rate	SR10: controlled by Aanderaa Datalogger. RS-232: From 1 sec to 255 min		Controlled by Aanderaa Datalogger		From 1 sec to 255 min	
Output Formats	Aanderaa SR10 ⁵⁾ (Only Oxygen RS-232 ⁶⁾)		Aanderaa SR10 ⁵⁾ (Oxygen) and VR22 ⁵⁾ (Temperature)		0 - 5V outputs: ±0.1% of FS ⁷⁾ 4-20mA output: ±0.2% of FS ⁷⁾ RS-232 ⁶⁾	
Current Consumption	SR10: 10mA/T where T is recording interval in minutes RS-232: 80mA/S +0.3mA where S is recording interval in seconds		10mA/T where T is recording interval in minutes		80mA/S +0.3mA +Ia where S is recording interval in seconds and Ia is quiescent: 5 - 45mA when analog adapter enabled	
Supply Voltage	SR10: -6 to -14Vdc RS-232: +5 to +14Vdc		SR10: -6 to -14Vdc		Analog: +7 to +14Vdc RS-232: +5 to +14Vdc	
Dimensions	Ø36 x 86mm (Ø1.42 x 3.386in)		Ø40 x 184mm(OD1.58x 7.24in)		Ø40 x 184mm (Ø1.42 x 7.24in)	
Weight	120g (4.23oz)		435g (15.34oz)		420g (14.82oz)	
Materials	Titanium, Sapphire, POM		Titanium, Sapphire, POM		Titanium, Sapphire, POM	
Accessories	Tools		Tools		Tools	
Accessories not included	Sensor Cable 3854 ⁸⁾ Sensor Cable 4865 to PC ⁹⁾ ¹⁰⁾ Sensor Cable 4762 free end ¹⁰⁾ Foil Service Kit 3853 PSt ₃		Sensor Cable 4865 to PC ⁹⁾ ¹⁰⁾ Sensor Cable 4762 free end ¹⁰⁾ Foil Service Kit 3853 PSt ₃		Sensor Cable 4865 to PC ⁹⁾ ¹⁰⁾ Sensor Cable 4762 free end ¹⁰⁾ Foil Service Kit 3853 PSt ₃	

¹⁾ O₂ Concentration in µM = µmol/l. To obtain mg/l, divide by 31.25
²⁾ The saturation range covered by SR10 is 0-150%, the temperature range covered by SR10 is -5°C to 40°C.
³⁾ The saturation range covered by analog 0-5 V and 4-20 mA is 0-150%, the temperature range covered is -5°C to 40°C.
⁴⁾ requires salinity compensation for salinity variations > 1mS/cm, and pressure compensations for pressure > 100 meters
⁵⁾ SR10/VR22 are signal protocols that are used with AADI equipment only.
⁶⁾ 9600 Baud, 8 data bits, 1 stop bit, No Parity, Xon/Xoff Handshake.

⁷⁾ The accuracy of the Analog Adapter in 0-5V output mode is specified to 0.1% of FS. Note however that at the end of the scale (<0.0-0.07> and <4.93-5.0>) the error may be larger.
⁸⁾ When mounted on RCM 9 or RDCP Top-end Plate.
⁹⁾ In order to change settings or calibrating the Optode the Sensor has to be connected to a PC. To gain access to the 4130 Optode's RS-232 signals its cylindrical body must be removed, see Operating Manual TD218.
¹⁰⁾ With Cylindrical Sealing Plug for field use.

Pin Configuration

Receptacle, exterior view;
pin = ●, bushing = ○



- A) Ground for SR10
- B) Supply for RS-232
- C) Ground for RS-232
- D) Supply for SR10

3835	4130/4130C	4175C	When used with Cable 4762	
			Plug	Colour
1: Positive Supply ^{A), B)}	1: System Ground	1: Positive Supply	8	Green
2: Ground ^{C)}	2: Not Connected	2: Ground	7	Black
3: -9V ^{D)}	3: -9V	3: Analog Output 1	6	White
4: Reserved, DNC	4: Not Connected	4: Return Ground 1	5	Blue
5: Bridge Voltage	5: Bridge Voltage (BV)	5: Analog Output 2	4	Violet
6: Reserved, DNC	6: SR10 (Oxygen)	6: Return Ground 2	3	Yellow
7: RXD (RS-232)	7: Not Connected	7: RXD (RS232)	2	Brown
8: TXD (RS-232)	8: Bridge Ground	8: TXD (RS232)	1	Grey
9: Control Voltage	9: Control Voltage	9: Not Connected	10	Red
10: SR10 (Oxygen)	10: VR22 (Temperature)	10: Not Connected	9	Orange

Applications

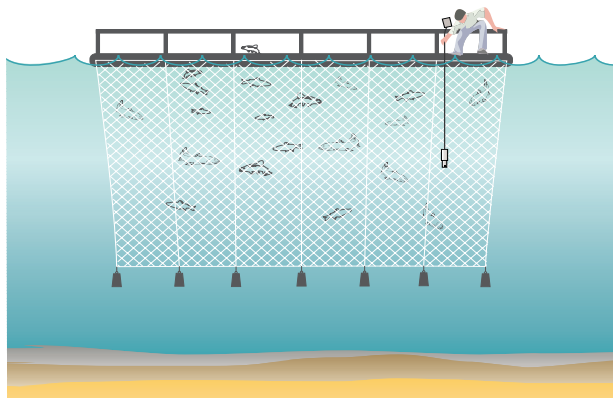
Model	3835	4130/4130C	4175C
Description	Integrally/Direct Mounted or cable	Immersion Body for cable or sensor string	Immersion Body with Analog and Serial Outputs
Output	Dual Channel: RS-232 data string (Oxygen,Temp.) or Single SR10 (Oxygen) channel to RCMs or RDCPs	Dual Channel: SR10 (Oxygen) and VR22 (Temp.)	Dual Channel: 0 - 5V (Oxygen, Temp.) or 4 - 20mA (Oxygen, Temp.) and/or RS-232 (Oxygen, Temp)
Application	Add sensor(s) to Top end-Plate of our RCM 9, RDCP 600 or for OEM/Third party use With Cable to PC or SmartGuard	4130 : For use with Aanderaa sensordisk 4130C : For use with Aanderaa dataloggers on cable or in fastening fixture with sensor string, added sensors to Weather Stations AWS 2700, Data Buoys 4700 or our self-contained recording instruments	General Purpose use with third party data loggers, e.g. CTDs, ARGO floats, ROVs; PLCs, process industry controllers, recorders, data acquisition and control systems
Sample Rate	Set by host. RCM : continuously* - 120 min RDCP : 1 min - 8 hours. Internal interval setting for input to third party RS-232 interface	Set by host. 3634/3660 : 0.5 min - 180 min SmartGuard : 0.5 min - 180 min DB 4700 : continuously* - 180 min AWS 2700 : continuously* - 180 min	
Multi-sensor Configuration	RCM 9 or RDCP 600 : Yes, 2nd 3835 via Cable 4944/5089 3634/3660/SmartGuard : Max 4/17 sensors, depending on the configuration DB 4700 : Max 10 sensors, depending on the configuration	3634/3660/SmartGuard : Max 4/17 sensors, depending on the configuration DB 4700 : Max 10 sensors, depending on the configuration Sensor attachment : single points on cable use 3913; In-line 3-Sensor Disk 3822, only 4130 RCM/RDCP : via Cable 5088	
Stand-alone Sensor (0-300m)	Use Cable 4865/4762 Output : RS-232 (Oxygen,Temp.). Sampling Rate : 1 sec to 255 min		User furnished Datalogger or controller, Analog: use 4762 Cable. RS-232: use 4865/4762 Cable Output : 0 - 5Vdc; 4 - 20mAdc; or RS-232 (Oxygen, Temperature) Sampling Rate : 1 sec to 255 min

*) Note that when the Optode is connected to an instrument like the RCM, CMB, AWS or a Datalogger, the sampling rate in a continuous recording mode depends on the number of channels for storage etc.

EXAMPLES OF APPLICATIONS

To the right: The Oxygen Optode 3835 used with a Recording Current Meter to measure dissolved oxygen and temperature as part of environmental monitoring.

Below: The Oxygen/Temperature Sensor 4130C used with SmartGuard to measure dissolved oxygen and temperature in a fish mare.



Accessories

Cable from sensor to:	3835	4130/4130C	4175C
PC with waterproof CSP(Cylindrical Sealing Plug), RS-232	4865	4865 ³⁾	4865
RCM-9 or RDCP internal connection	3854/4994		
RCM-9 or RDCP with waterproof Top-end Plate connection	4944/5089	5088	
AADI data logger 1 ch. (Oxygen), SR-10	4946		
AADI data logger 2 ch. (Oxygen, Temperature), SR-10		4945 ¹⁾ /4943 ²⁾	
User furnished Datalogger, CSP to free end	4762	4762	4762

¹⁾ CSP to 2 x 6-pin plug, split cable

²⁾ CSP to 10-pin plug

³⁾ Adapter must be removed to gain access to RS-232



CSP. Cylindrical Sealing Plug



Foil Service Kit 3853. PS₃

Oxyview® Program

Oxyview®, has been designed for use with Oxygen Optode Temperature Sensor 3830/3835. The program allows display of Oxygen Concentration, Oxygen Saturation and Temperature both in tables and graphical forms.

A Calibration Wizard is included in the program. This Wizard helps calibrate the Optode.

Oxyview® can also be used to configuring the Oxygen Optode.

