edaphic scientific
environmental research & monitoring equipment

dissolved oxygen sensor

OPTOD digital & optical DO sensor

overview

The OPTOD dissolved oxygen (DO) sensor is a low cost, low maintenance monitoring solution.

The OPTOD is based on optical technology, is delivered pre-calibrated and does not require regular re-calibration, and has digital outputs (SDI-12 or RS-485) to connect to existing SCADA, PLC or data acquisition systems.

The OPTOD sensor is a digital optical dissolved oxygen and temperature sensor that is ideal for waste water monitoring, aquaculture, environmental monitoring, and scientific research in shallow waters.

features

- Range : 0-20mg/L (0-200%)
- No calibration, no drift
- Calibration data inside
- Ultralow power consumption
- Very small size
- Titanium version available
- RS-485 or SDI-12 outputs

who uses the OPTOD dissolved oxygen sensor?

The OPTOD sensor is widely used among water quality managers, environmental

consultants, aquaculturalists, scientific researchers and students. Many government agencies around the world install the OPTOD as part of their water quality management monitoring.

The OPTOD has been cited in over 134 publications (as of August 2017) including studies in international peer reviewed journals Marine Biology, Journal of Experimental Biology, Hydrogeology Journal, Journal of Hydrology, Hydrology and Earth System Sciences, and many more.

optical technology

The OPTOD (Optical Dissolved Oxygen technology) is based on luminescent optical technology. The OPTOD sensor is approved by the ASTM International Method D888-05.

Without calibration requirements and thanks to an ultra low power technology, the OPTOD sensor meets the demands of field work and short or long term campaigns.

Without oxygen consumption, this technology allows you an accurate measure in all situations and especially in very low oxygen concentrations.

The “smart” OPTOD sensor stores calibration and history data within the sensor. This allows you a “plug and play” system without re-calibration.

DO measurements are automatically temperature compensated via an on-board temperature sensor and digital technology.

Thanks to the Universal Modbus RS485 protocol, the OPTOD can be connected to common data logging and management systems.

scientific study: OPTOD most accurate DO sensor available

A peer-reviewed scientific publication has found that the OPTOD dissolved oxygen sensor is one of the most accurate dissolved oxygen sensors available. Up to 18 different models of dissolved oxygen sensors were compared by scientists from 10 European scientific institutions. The study found that the OPTOD sensor is one of the best available. Read more here:

Leivuori et al (2014) Field measurement intercomparison of dissolved oxygen sensor

optical or electrochemical dissolved oxygen sensor?

Researchers, consultants, engineers and students need to consider whether an optical or electrochemical (galvanic) sensor is more suitable for their application. Both types of technology are excellent at measuring dissolved oxygen, however they also have their advantages and limitations.

This brief overview of electrochemical versus optical sensors mainly applies to macro sensors that maybe used in the wastewater or aquaculture industries. That is, this comparison does not necessarily apply to the oxygen microsensors and micro-optodes which have their own unique advantages and limitations that are discussed elsewhere.

Upfront versus ongoing costs – Electrochemical sensors tend to be cheaper to purchase upfront than optical sensors. However, electrochemical sensors need more ongoing maintenance, checking and calibration than optical sensors. These ongoing costs can be significant and need to be considered when purchasing dissolved oxygen sensors.

Accuracy – both electrochemical and optical sensors need to have a calibration in order to be accurate – particularly if salinity and temperature is a significant variation (see above for more details). A study by Leivouri et al (2014) compared 18 different types of dissolved oxygen sensors including optical and electrochemical sensors. They found that the optical sensors were generally more accurate and reliable than the electrochemical sensors. The major limitation for the electrochemical sensors, and why they performed poorly compared with optical sensors, was because they needed stirring or water movement around the sensor for accurate measurements.

Leivouri et al (2014) also found that the OPTOD Dissolved Oxygen Digital Optical Sensor was one of the most accurate of all of the dissolved oxygen sensors they compared.

Leivuori et al (2014) Field measurement intercomparison of dissolved oxygen sensor

whole system monitoring solutions

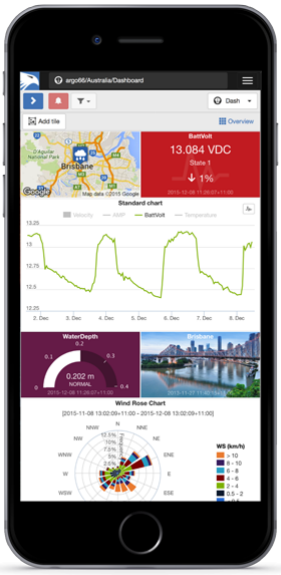
Edaphic Scientific is a one-stop shop for a whole system monitoring solution. We provide dissolved oxygen monitoring systems for industry, researchers, aquaculture and water quality monitoring.

Our systems not only support dissolved oxygen sensors but can support additional parameters including pH, EC/salinity, dissolved carbon dioxide, dissolved methane, hydrogen sulfide, water level and more.

At Edaphic Scientific we want to work with you from the start of your project through to its completion. We can provide:

- Assistance with project and experimental design
- Procurement of all monitoring equipment, including sensors, data loggers and data management software. Edaphic Scientific is a one-stop shop where we can source and find any necessary equipment for your project from our preferred suppliers or third party suppliers
- Installation and training
- On-going assistance with data interpretation and equipment maintenance
- Data correction and analysis, including statistical analysis with the R-package
- Report and publication preparation including tables, figures, graphs, and manuscript writing

advanced data collection and management solutions



Edaphic Scientific recognises the need for flexible and adaptable sensor and data logging solutions for experimental or environmental monitoring projects.

Data can be downloaded directly in the field from data loggers. A direct connection between the data loggers and your computer, via a USB cable, can be used for manual downloading of data.

Alternatively, data can be downloaded over the internet on your iPhone, iPad or desktop computer with the Eagle.io cloud-based, data management software solutions. Through this remote based downloading capabilities, you can download, view and manage your data, and system, anywhere in the world and at anytime.

specifications

feature	specification
Measurement Principle	Optical measure by luminescence
Measurement Ranges	0.00 to 20.00 mg/L | 0.00 to 20.00 ppm | 0-200%
Resolution	0.01
Accuracy	+/- 0.1mg/L | +/- 0.1 ppm | +/- 1 %
Response time (T90)	< 60 seconds

feature	specification
Water Movement?	No necessary water movement required
Minimum Measurement Interval	5 seconds
Storage Temperature	– 10°C to + 60°C
Signal Interface	Modbus RS-485 (standard) | SDI-12 (optional)
Sensor Power Supply	5 to 12 VDC
Power Consumption	Standby: 25 µA | Average RS485 per Measurement: 4.4 mA | Average SDI12per Measurement: 7.3 mA
Current Pulse	100 mA
Sensor Dimensions	Diameter: 25 mm | Length: 146 mm
Weight	Stainless steel model: 450g (sensor + cable 3 m) | Titanium model: 300 g (sensor + cable 3 m)
Material	Stainless Steel 316L (standard) | Titanium (optional)
Maximum Pressure	5 Bars
Connection	9 armoured connectors, polyurethane jacket, bare wires or waterproof Fisher connector
Environmental Protection	IP68

manual & docs

- OPTOD Dissolved Oxygen Sensor Specification Sheet
- OPTOD Dissolved Oxygen Sensor Manual

related products

- Portable DO meters
- Oxygen microsensors
- Deep sea dissolved oxygen sensors
- Portable, oxygen meter (atmospheric measurements)
- Dissolved gas sensors and meters
- Environmental monitoring systems
- Underwater data logger