

High Readings at Low Dissolved Oxygen Concentrations

1 Introduction

High readings at low dissolved oxygen level are almost always caused by one of two possibilities. This document describes the problems and gives advice on how the situation can be rectified.

2 Details

Moisture in the rear of the sensor where the electrical contacts are situated.

This sets up an electrochemical cell on the outside producing a small zero offset current superimposed on the output from the sensor. This offset only produces high readings at low oxygen levels when it is proportionally higher than the normal sensor output. Moisture ingress at the back of the sensor can occur through the following causes:

1. Water in the rear of the Sensor when installed. The storage canister is filled with a small amount of water, which over time can penetrate the sealing cap. As stipulated in the instrument manual, the back of the sensor must be dry before installation.
2. Missing "O" rings at the front of the sensor or between the sensor and the connector.

It is important that the back of the sensor and the sensor connector are completely dry. The sensor can be dried overnight by leaving the sensor upside down in a little water to keep the membrane wet, at the same time leaving the back of the sensor open to the atmosphere. The sensor connector can be left open overnight but it is often better to replace the connector as water can get inside the body of the connector and even up into the cable. The important thing is to dry both parts not just one half of the connection and there must be no sign of corrosion on the sensor pins or contacts.

Air ingress into the sample lines.

This can occur either through pipe connections, fittings, and valves etc. When air dissolves in water, the concentration can reach 10mg l^{-1} , when the monitor is expected to measure down to less than $1\mu\text{g l}^{-1}$, the integrity of the sample pipework is very critical. This problem is often associated with variations in the displayed reading as the sample flowrate is adjusted. It is essential that the sample pipework material is either stainless steel or Nylon. No other type of plastic or rubber material can be used because they are, to a greater or lesser extent, permeable to oxygen.

All connections between the cooler and the monitor in the sample pipework, needs to be checked for air ingress. Air can migrate through a leak even though the pipe is under a moderate pressure when there is no evidence of sample leaking

out. Sample control valves frequently used in sampling system and not intended for this application can leak around the stem gland. Quick release connectors and solenoid valve again should be treated with suspicion.

The monitor flowcell is pressure tested and checked for air ingress during manufacture; it is very unwise to dismantle any part of the without the necessary facilities being available.

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