SENSORS & CONTROLLERS

ANALYZERS & SAMPLERS

LEVEL, FLOW & PRESSURE

WEB APP & DATALOGGING

ACCESSORIES

S423 C OPT DATASHEET

OPTICAL OXYGEN SENSOR

MAIN FEATURES

- Reliable concentration measurement using optical measuring process
- Dynamic luminescence measuring method
- AISI 316 or Black rigid PVC sensor body
- Interchangeable cap for luminophore's replacement
- No mechanically moving parts
- Immediate installation and easy maintenance
- Ability to se salinity and barometric pressure for oxygen value

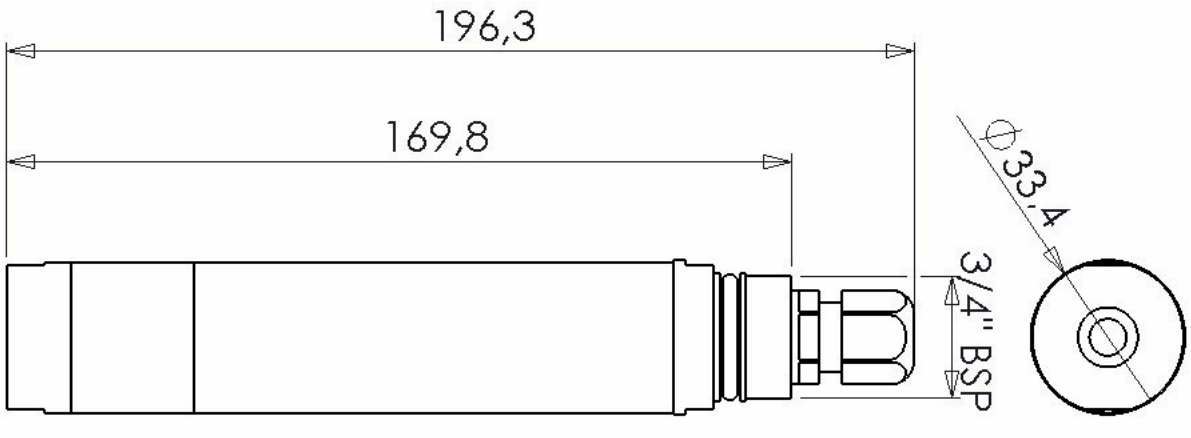
APPLICATIONS

- Measure of oxygen in wastewater
- Measure of oxygen in primary, industrial, recirculating water

TECHNICAL DATA

Materials	• AISI 316 and PVC body • Special glass optics • NBR and silicon O rings
Thread	3/4" BSP
Measuring ranges	0,00 mg/L to 20,00 mg/L
Measuring method	Optical measure by luminescence
Calibration method	Calibration on air: 1-point calibration, Water saturated with air at 100% Calibration through sample: comparison with a standard tool Calibration on 0% solution: 1-point calibration, specific solution at 0% of oxygen saturation
Resolution	0,01 mg/L
Accuracy	± 0,2 mg/L when < 5mg/L ± 0,3 mg/L when > 5mg/L
Repeatability	± 0,1 mg/L
Response	T90 < 60s
Maximum refreshing time	< 1 second
Working temperature	0÷50 °C Accuracy ± 0.2°C
Max working pressure	5 bar
Max absorption	2W
Mechanical protection	IP68 Sensor + cable
Cable	10m integral
Power supply	12…24Vdc
Signal interface	RS-485 Modbus RTU Protocol (4-20mA opt.)
Water move	No necessary move
Compensation of temperature	Via internal NTC
Luminophore diameter	10 mm
Connector IP67	Yes

DIMENSIONS



OPERATING PRINCIPLE

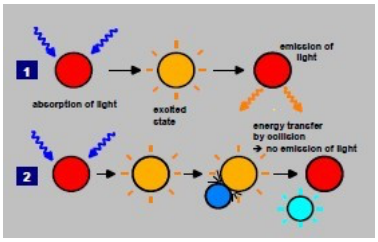
The collision between the luminophore in its excited state and the quencher (oxygen) results in radiation less deactivation and is called collisional or dynamic quenching. After collision, energy transfer takes place from the excited indicator molecule to oxygen which consequently is transferred from its ground state (triplet state) to its excited singlet state. As a result, the indicator molecule does not emit luminescence and the measurable luminescence signal decreases.

A relation exists between the oxygen concentration in the sample and the luminescence intensity as well as the luminescence lifetime which is described in the Stern Volmer equation (1) Here, T0 and T are the luminescence decay times in absence and presence of oxygen (I0 and I are the respective luminescence intensities) O2 the oxygen concentration and KSV the overall quenching constant.

PRINCIPLE OF DYNAMIC LUMINESCENCE METHOD:

I0/I = T0/T= 1+Ksv*O2
I=f(O2) T=f(O2)

Where:
I: Luminescence intensity in presence of oxygen
I_0: Luminescence intensity in absence of oxygen
τ: Luminescence decay time in presence of oxygen
τ_0: Luminescence decay time in absence of oxygen
KSV: Stern-Volmer constant (quantifies the quenching efficiency and therefore the sensitivity of the sensor)
$[O_2]$: Oxygen content



Principle of dynamic quenching of luminescence by molecular oxygen

Luminescence process in absence of oxygen

Deactivation of the luminescent indicator molecule by molecular oxygen

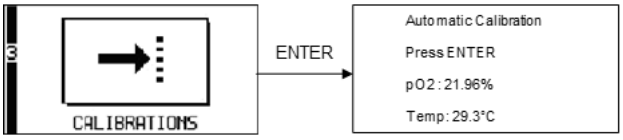
CALIBRATION OF THE SENSOR

This program step allows the calibration of the oxygen sensor. The calibration must necessarily be carried out:

- Every time the sensor cap is replaced
- When starting after a long period of non-use
- Whenever discrepancies occur, according to a known value

For proper operation it is necessary, in addition to the cases mentioned above, to verify calibration or recalibrate the probe periodically.
The frequency of this operation will be determined by the user, taking into account the type of application and the type of electrode used.

NOTE:
To perform a calibration in oxygen saturated solution immerse the probe in a container of clean water and wait 10 minutes for stabilization. Then continue with the Auto Calibration of the sensor



Wait for the values (O2 and °C) to stabilize, then press ENTER; if the procedure is successful the display will show "Calibration OK"

If "Faulty Probe" is displayed, we recommend:

- To check the removable protection cap
- To assure the integrity of the membrane placed on the top of the probe
- To check the cable integrity, the correct connection to the instrument and on the probe.

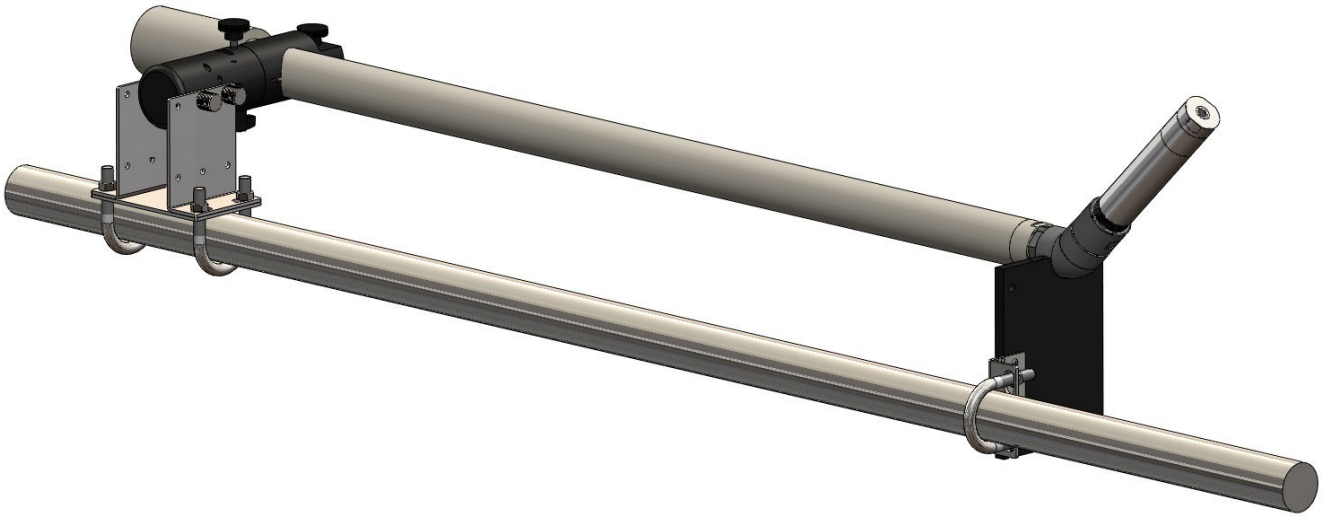
ELECTRIC INSTALLATION

Turn off the instrument, use the connector on the cable of the probe to connect with the device.
The measuring sensor is supplied with 10m cable kit, for connections at greater distances do not exceed 1000m cable. Do not run the cable near high power cables or inverter in order to avoid problems of noise on the measurement.

HYDRAULIC INSTALLATION

The S423/C/OPT probe is supplied with a circular ip67connector for the connection to the 42 and 50 series units, and can be provided with the appropriate probe holder S315 / O, available in various tube lengths.

Together with the probe holder is provided a device for positioning the probe at 45°; this device must always be used. It is also possible to equip the assembly with a swivel system that provides the ability to get almost any configuration, as well as easier cleaning and maintenance of the system (see figure below).



ORDER CODES

9700830067	S423/C/OPT Optical Oxygen and Temperature Probe
9700831067	S423/C/OPT PVC Optical Oxygen and Temperature Probe
9700832067	S423/C/OPT 4-20mA Optical Oxygen and Temperature Probe
9700833067	S423/C/OPT 4-20mA PVC Optical Oxygen and Temperature Probe
9400410134	Luminescent membrane with AISI316 support for S423/C/OPT
9400411112	Fish farming Cap Kit for S423/C/OPT