S423/C/OPT Optical Oxygen Probe

The **S423/C/OPT probe** is used for the optical measure of oxygen in pure and process waters.
The principle of measurement is based on the effect of dynamic luminescence quenching by molecular oxygen.

Applications

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

Features and benefits

- 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 manteinance
- Ability to set salinity and barometric pressure for the compensation of the oxygen value

Chemitec
Water Monitoring Solutions

S423/C/OPT Optical Oxygen Probe

Data Sheet

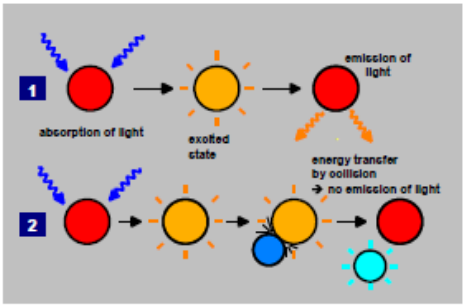
Oxygen measurement with the dynamic luminescence method

The collision between the luminophore in its excited state and the quencher (oxygen) results in radiationless 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, τ0 and τ are the luminescence decay times in absence and presence of oxygen (I0 and I are the respective luminescence intensities), $[O_2]$ the oxygen concentration and KSV the overall quenching constant.

Principle of dynamic luminescence method:

$$I0/I = T0/T = 1+Ksv*O_2$$
$$I=f(O_2) \quad T=f(O_2)$$

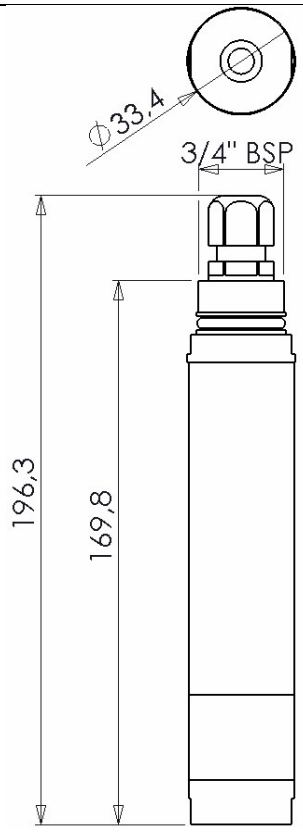
I: *Luminescence intensity in presence of oxygen*
I0: *Luminescence intensity in absence of oxygen*
τ: *Luminescence decay time in presence of oxygen*
τ0: *Luminescence decay time in absence of oxygen*
KSV: *Stern-Volmer constant (quantifies the quenching efficiency and therefore the sensitivity of the sensor)*
[O₂]: *Oxygen content*



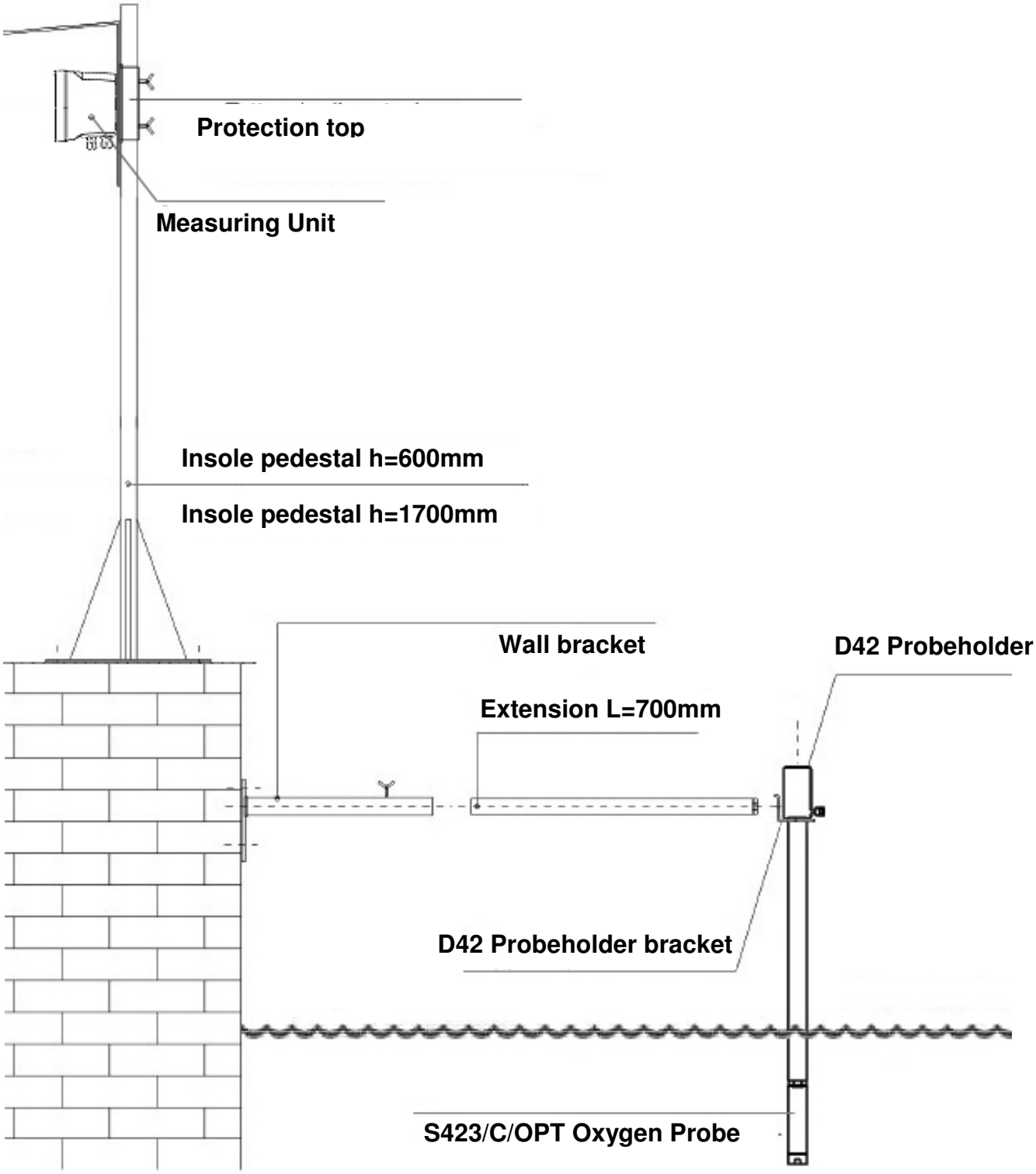
Principle of dynamic quenching of luminescence by molecular oxygen

(1) Luminescence process in absence of oxygen

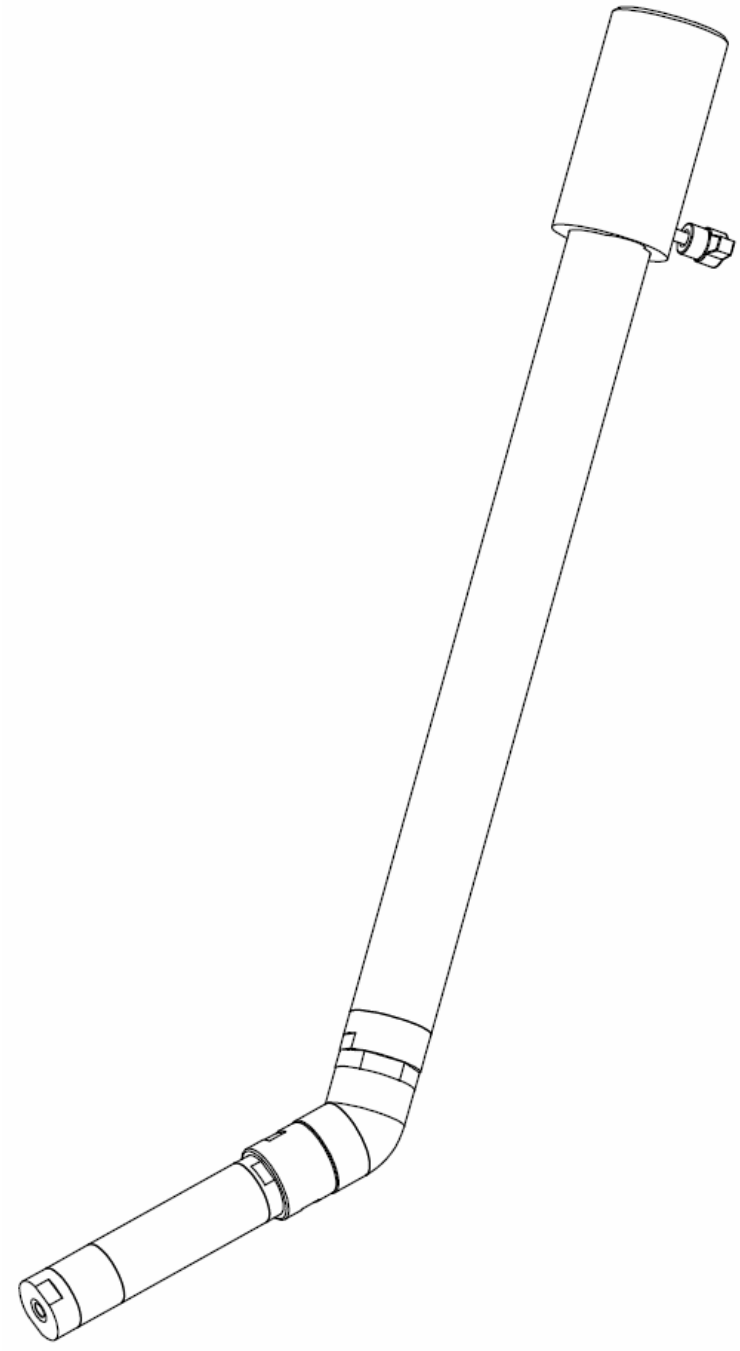
(2) Deactivation of the luminescent indicator molecule by molecular oxygen

TECHNICAL DATA	DIMENSIONS
Materials : — AISI 316 Body (PVC Body optional) — Special Glass Optics — NBR and Sylicon O-Rings	
Thread: 3/4" BSP	
Measuring ranges: 0,00 to 20,00 mg/L 0-200%	
Measuring method: Optical measure by luminescence	
Accuracy: +/-0,1mg/L or +/-1 %	
Response: 90% of the value in less than 60 seconds	
Maximum refreshing time: < 1 second	
WorkingTemperature: -10÷60 °C	
Max Working Pressure: 5 bar	
Mechanical Protection: IP68 Sensor+cable	
Cable: 10m integral	
Power Supply: 12…24Vdc	
Signal interface: RS-485 Modbus RTU Protocol	
Water move: No necessary move	
Compensation of temperature: Via internal NTC	
Luminophore diameter: 10mm	
Connector IP67: yes	

Anchoring to poolside devices



S315/O/ Probeholder



Together with the probe holder is provided a device for positioning the probe at 45°, and this avoids the presence of air bubbles that could distort the measurement of oxygen.

Precautions and warnings

Remove the black rubber protection cap from the probe before installing.
Warning: it is strictly recommended not to remove the interchangeable cap from the probe unless there is a malfunction of the probe itself due to the luminophore and is absolutely necessary to replace the glass containing the polymer (see figure below):

Cable Connection

RED	+12V …24V
BLACK	GROUND
YEOLLOW	A+ RS485
GREEN	B- RS485

Furthermore, it is necessary to pay particular attention to the substances with which the part of the probe deputed to measurement can come into contact: for example, organic acids such as acetic acid does not affect the sensor. However, avoid the exposure of the luminophore in organic solvents such as acetone, chloroform, benzene and toluene.Chlorine gas can even destroy the sensor or otherwise affect the measurements.

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