

Measure O₂: optical or amperometric?

HERE YOU WILL FIND THE RIGHT SOLUTION FOR YOUR APPLICATION

Optical and amperometric (electrochemical) sensors exist for the continuous measurement of dissolved oxygen or oxygen saturation. The selection depends essentially on the expected measuring range of the application and the maintenance effort.

Product selection

Application	Wastewater, surface waters, aquaculture, up to 20 mg/L or 200 %	Processes up to 60 mg/L or 600 %	Trace measurement, e.g. boiler feed water
Product	FDO® 700 IQ alternative FDO® 701 IQ for response time < 60 seconds	TriOxmatic® 700 IQ alternative TriOxmatic® 701 IQ for response time < 30 seconds	TriOxmatic® 702 IQ
Interfering substances	Erroneous measurements or damage to the sensor cap due to oxidizing agents	greater insensitivity to interfering substances e.g. organic compounds such as solvents or oil products e.g. Oxidizing agents such as ozone or chlorine	

The **FDO® 700 IQ** optical sensor is usually the first choice. The offered measuring range is sufficient and the effort for calibration and maintenance is zero or low.

Its response time is not a disadvantage, on the contrary:

In a "slow" process, such as nitrification, too high a sensitivity to small fluctuations in O₂ concentration is a disadvantage, because it interferes too quickly with the regulation/control. If a faster response time is required, the **FDO® 701 IQ** version is the alternative.

For **TriOxmatic® 700 IQ** and **701 IQ**, argumentation regarding the response time is analogous. The clear difference to the optical sensors lies in the measuring range.

The **TriOxmatic® 702 IQ** version is ideal for trace measurements due to its high accuracy with a small measuring range.

An advantage of amperometric sensors is not only the larger measuring range, but also greater insensitivity to interfering substances. These can be organic compounds such as solvents or oil products. Oxidizing agents (e.g. ozone, chlorine) can affect both types (optical and amperometric), but are better detected by the amperometric sensors. These compounds can cause erroneous measurements with the optical sensor or even damage a cap.

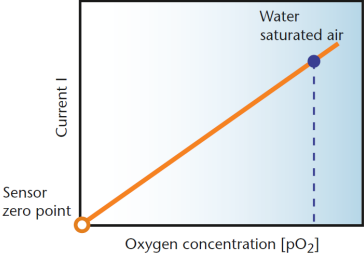


FDO® 700 IQ



TriOxmatic® 700 IQ

Product comparison

	Optical sensor	Amperometric Sensor
Measuring principle	<p>With the optical method a fluorescent dye is stimulated in the membrane of the FDO® 700 IQ by a short wave length lightsource. By falling back into the passive state, long wave light is emitted, which is recorded as a measurement signal. If oxygen contacts the dye by diffusing through the membrane the period of back scattering light is shortened according to the oxygen concentration of the sample.</p> <p>In principle the measurement of the fluorescent signal comes back to a highly precise time measurement.</p> <p>D.O. sensors of the first generation had a handful of technical issues to cope with:</p> <ul style="list-style-type: none"> • Sensor drift through watering impact of the membrane • Wearing of dye layer in the sensor through highly energetic blue light • Sensitivity of sensor towards air bubbles <p>Through consequent development work the difficulties appearing with the first generation sensors could successfully be eliminated with the second generation models.</p>	<p>With the electrochemical method the O₂ diffuses through the membrane of the TriOxmatic® sensor. The oxygen is transformed in a chemical reaction by using an electrolyte; an electric current flows during this process. The electrical current correlates to the oxygen concentration. Thus, the oxygen concentration can be displayed directly via the current consumption.</p> <p>For delivering precise results, the sensor will require the following conditions:</p> <ul style="list-style-type: none"> • Flow • Continuous exchange of electrolytes • Clean membrane <p>Linear dependency of current towards the O₂ concentration:</p> 
Products	<ul style="list-style-type: none"> • FDO® 700 IQ • FDO® 701 IQ 	<ul style="list-style-type: none"> • TriOxmatic® 700 IQ • TriOxmatic® 701 IQ • TriOxmatic® 702 IQ
Maintenance	<ul style="list-style-type: none"> • Cap replacement FDO® 700 IQ: 2-5 years • Cap replacement FDO® 701 IQ: 6 months • Cleaning as required with tap water and lint-free cloth 	<ul style="list-style-type: none"> • Change of membrane and electrolyte as required • Cleaning as required
Calibration	Calibration free	Calibration twice a year

Do you have further questions?
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