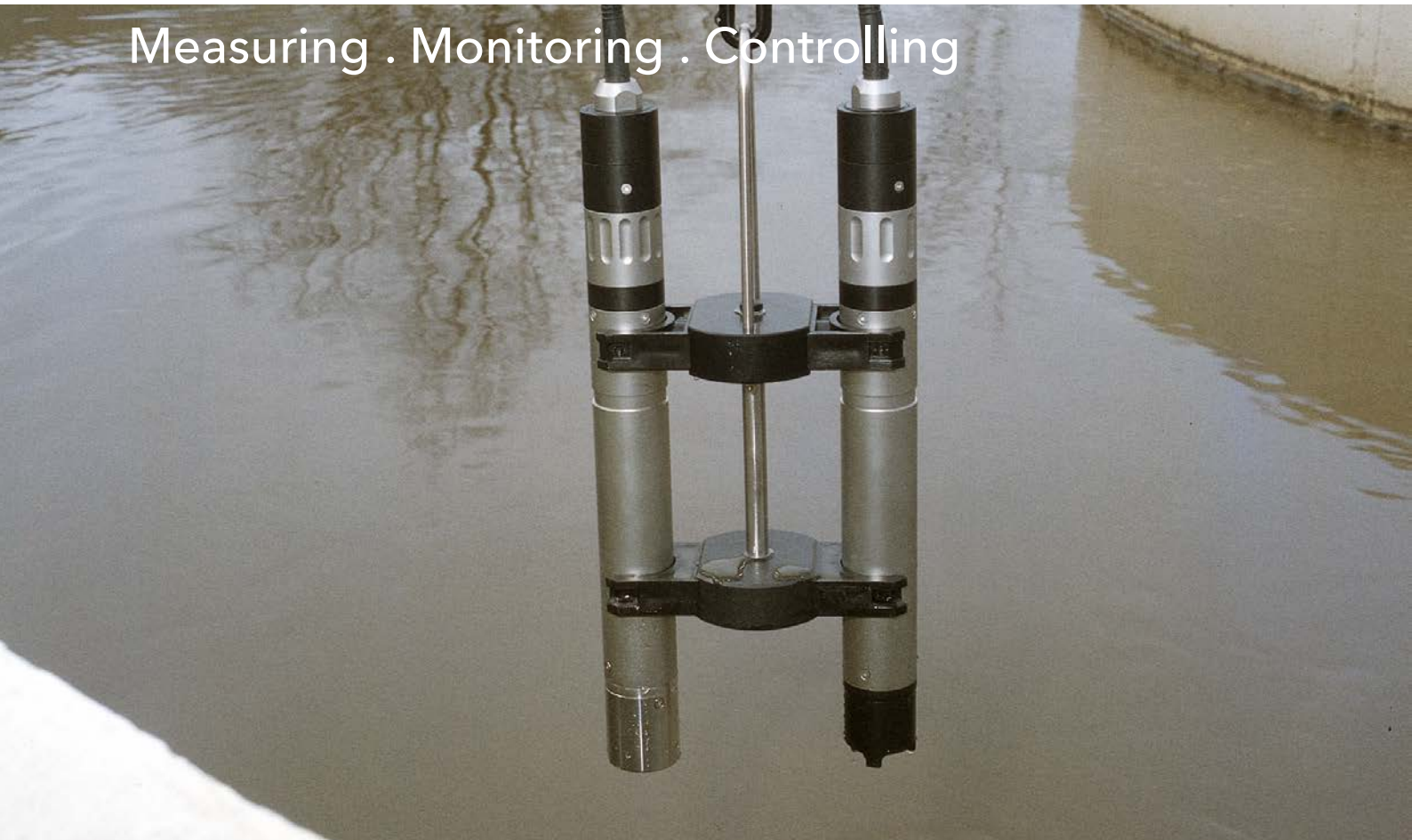


D.O. Measurement

Measuring . Monitoring . Controlling

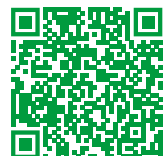


Reliable and continuous measurements of dissolved oxygen have become vitally important in many areas of the water/ wastewater treatment facilities. The availability of accurate and real-time measured concentrations is an absolute requirement for process monitoring and dynamic process control to ensure an efficient plant operation.

Fields of application:

- Nitrification/Denitrification
- Deammonification
- Inlet and Effluent Monitoring
- Water Pollution Control
- Fishfarming/Aquaculture

see also <https://www.xylymanalytics.com/en/parameters/dissolved-oxygen-do>



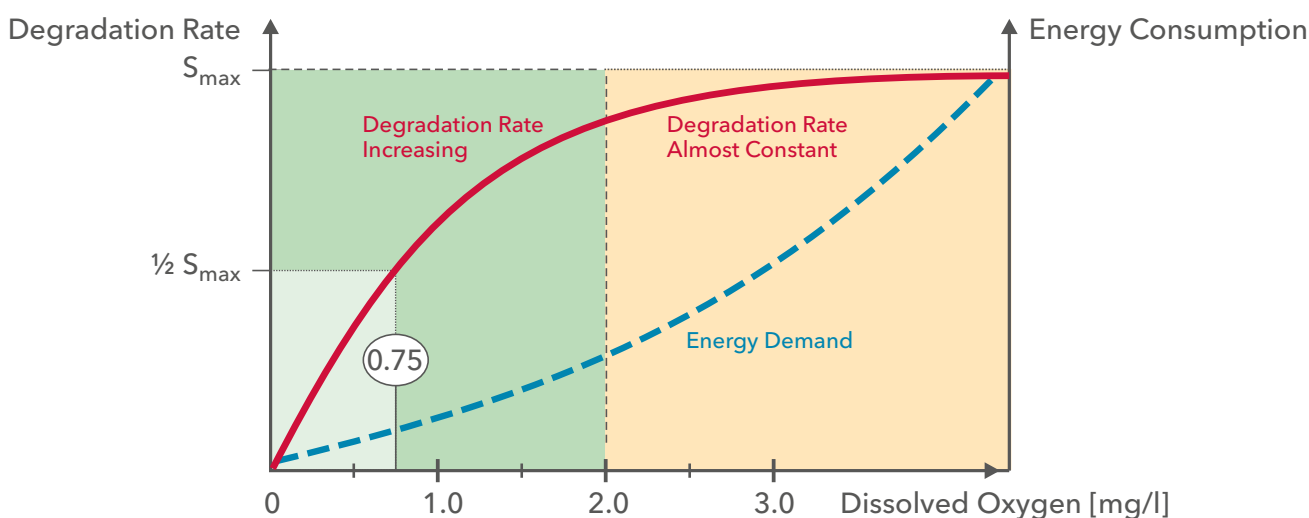
Monitoring and Control

In the **biological nutrient removal process** of wastewater treatment plants, continuous and precise measurement of dissolved oxygen concentration is of vital importance to an optimal and trouble free operation of the water/wastewater treatment facility. The efficiency and energy demand of the purification process, in the nitrification and denitrification phase, is mainly determined by the performance of the aeration control system; i.e. by a load-dependent regulation of the oxygen supply.

In the presence of dissolved oxygen, the nitrifying bacteria convert ammonium to nitrate. The activity of the microorganisms depends on the oxygen concentration, with an economic break point at about 2 mg/l. Higher oxygen concentrations do not increase the rate of degradation, but require significantly more energy for the oxygen blowers (see illustration).

The aerator equipment is responsible for the majority of energy consumption in a biological wastewater plant. To reduce the energy and maintenance costs, it is therefore important to reduce the aerator operation time to a minimum depending on the required dissolved oxygen concentration.

The residual dissolved oxygen in the sludge, however, has a negative effect on the conditions in the denitrification stage. On the other hand in nitrification, a certain amount of dissolved oxygen is needed for optimal growth and ammonium oxidation. **Only the use of precise and reliable on-line measuring instruments will ensure an efficient and energy saving control of the process.**



NH₄-N degradation rate vs. D.O. concentration

Measurement Systems

For more than 70 years, WTW has been recognized as a leader in the field of Dissolved Oxygen measurements. Innovative technologies, creative and continuous product development, and extensive appli-

cation expertise have resulted in superior instruments and systems of outstanding performance, reliability and design for the most precise online measurements available.

FDO®: Optical D.O. Measuring

The innovative geometry of the membrane cap with a 45° angle enables the precise oxygen measurement and avoids false readings through air bubble adhesion. Due to the automatic recognition of the calibration free cap, a manual input of the serial number is not needed (potential source of error). The fast and easy cap change saves a lot of work and time.

The long lifetime of the cap (3-5 years) ensures sustainable operation and minimized maintenance costs. Further, the moveable sensor mounting enables a self cleaning effect at the measuring window.

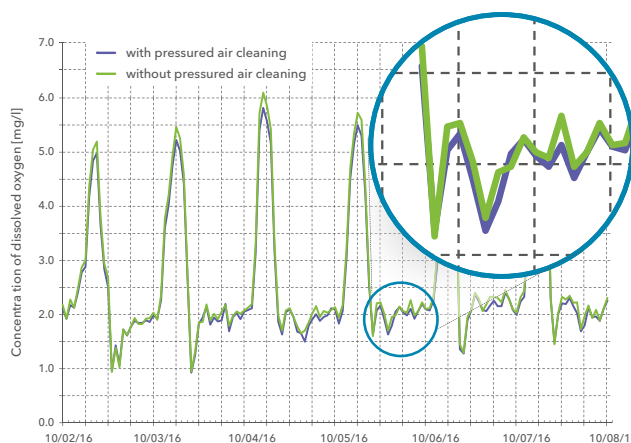
Additional cleaning with pressured air is possible for special applications but not required for typical municipal wastewater treatment plants (see figure).



FDO® 700 IQ



- Calibration and flow free
- Insensitive to air bubbles
- Low usage costs



Comparison of two FDO® sensors with and without pressured air cleaning

Sensor Caps

The caps for the digital FDO® sensors are calibration free and provide reliable DIN compliant results.

SC-FDO 700

for wastewater treatment plants, with a response time ideal for treatment processes

SC-FDO 701

with faster response time



Ordering Information

Model	Description	Order No.
SC-FDO 700	Universal sensor cap for FDO® 700 IQ/700 IQ SW	201654
SC-FDO 701	Fast response time sensor cap for FDO® IQ 701/IQ 701 SW	201655



For technical data please see datasheets D2.02 and D2.20

Optical FDO® D.O. sensors see from page 9

Information about IQ SENSOR NET system see from page 42

Digital

Calibration-free, reliable, DIN compliant - the optical FDO® oxygen sensors for the IQ SENSOR NET to regulate biological cleaning steps.



FDO® 700 IQ

for the IQ SENSOR NET



FDO® 700 IQ SW

for use in corrosive media



FDO® 700 IQ F

fixed cable model for IQ SENSOR NET system 181



FDO® 701 IQ

with a faster response time



FDO® 701 IQ SW

with a faster response time, for use in corrosive media



FDO® 701 IQ F

with a faster response time, fixed cable model for IQ SENSOR NET system 181



Ordering Information

Model	Description	Order No.
FDO® 700 IQ	Optical O ₂ sensor for connection to the IQ SENSOR NET.	201650
FDO® 701 IQ	like the FDO®700 IQ, but with a faster response time	201660
FDO® 700 IQ SW	like the FDO®700 IQ, but as sea water model with plastic arming (POM)	201652
FDO® 701 IQ SW	like the FDO®700 IQ SW, but with a faster response time	201653
FDO® 700 IQ F	Optical oxygen sensor, calibration-free, for DIQ/S 181/(24V), with 10 m fixed cable for DIQ/S 181/(24V)	201656
FDO® 701 IQ F	as above, but with a faster response time	201658



For technical data please see datasheets D2.02 and D2.20

Alternatives and accessories see brochure "Product Details" and website

Information about IQ SENSOR NET system see from page 42

Analog dissolved oxygen sensors see from page 11

TriOxmatic®: Electrochemical D.O. Measuring

Precise and accurate results with mature and proven oxygen sensors with 3 electrodes system.

The amperometric sensors provide an outstanding high accuracy - without startup phase. The robust teflon membrane is resistant towards organic deposits. The self diagnostic systems SensLock and SensReg are continuously monitoring the membrane and the electrolyte consumption.



TriOxmatic® 700 IQ



- Low investment costs
- No startup time, no long-term drift - stable from the beginning to the end
- Self-diagnosis system SensReg/ SensLock by means of 3 electrodes system



Digital

TriOxmatic® IQ: The digital amperometric oxygen sensors are automatically recognized by the IQ SENSOR NET.



TriOxmatic® 700 IQ

for the IQ SENSOR NET

TriOxmatic® 700 IQ SW

for use in corrosive media

TriOxmatic® 701 IQ

for the measurement of trace oxygen

TriOxmatic® 700 IQ F

fixed cable model for IQ SENSOR NET system 181

TriOxmatic® 702 IQ

trace sensor (ppb range) - for pure or boiler feed water

Ordering Information

Model	Description	Order No.
TriOxmatic® 700 IQ	Universal oxygen sensor for the measurement and regulation of oxygen input in wastewater treatment plants	201640
TriOxmatic® 700 IQ SW	Like TriOxmatic®700 IQ, but as a sea water model	201641
TriOxmatic® 701 IQ	Like TriOxmatic®700 IQ, but with faster response times	201644
TriOxmatic® 702 IQ	Like TriOxmatic®700 IQ, but as a trace sensor (ppb area) suitable for pure or boiler feed water	201646
TriOxmatic® 700 IQ F	Electro-chemical oxygen sensor, for DIQ/S 181(/24V), with 10 m fixed cable, for DIQ/S 181(/24V)	201643



For technical data please see datasheets D2.01 and D2.20

Alternatives and accessories see brochure "Product Details" and website

Information about IQ SENSOR NET system see from page 42

Optical IQ dissolved oxygen sensors see from page 9

Analog

Analog oxygen sensors to be connected to the analog transmitters Oxi 298.

TriOxmatic® 690



suitable for pure measuring tasks in wastewater/water

TriOxmatic® 701

increased resolution for the residual oxygen in the denitrification



analog TriOxmatic® sensor

Ordering Information

Model	Description	Order No.
TriOxmatic® 690-7	Universal oxygen sensor without self diagnosis, with normal response time, cable length 7 m	201690
TriOxmatic® 701-7	Oxygen sensor with automatic self diagnosis and faster response time, cable length 7 m	201678



For technical data please see datasheet D3.02

Alternatives and accessories see brochure "Product Details" and website

Analog monitors see from page 56

Optical IQ dissolved oxygen sensors see from page 9

Further analog Sensors

For drinking water monitoring: The sensor can be connected to the Oxi 298 Pt1000 transmitter as well as to the multiparameter system MULTILINE 1000 with the open wires.



- Including cable
- Integrated temperature sensor
- Easy handling



D7.04

Ordering Information

Model	Description	Order No.
Oxi ML 41	Electrochemical D.O. sensor with 1 m (3.3 ft) fixed cable for transmitter MULTILINE 1000 or Oxi 4000. Range: 0-20 mg/l or 0 - 200%, temperature range: -5-45 °C, with temperature sensor Pt 1000; open cable ends.	201931



For technical data please see datasheet D7.04

Alternatives and accessories see brochure "Product Details" and website

Analog monitors see from page 56

Optical IQ dissolved oxygen sensors see from page 9