IQ Sensor Net

The modular multi-parameter measuring system

- **Universal online measuring system**
- **For any parameter**
- **Upgradable, analog and digital connections**

NEW

System 184 XT now for 12 sensors

New components:
- Redundant controller in terminal
- Modbus connection
- FDT/DTM for PROFIBUS DP
- Power supply: More power for larger systems
- Output module with 6 analog outputs
- Universal Input module 0/4 - 20 mA

New sensors:
- Ammonium
- Nitrate
- Carbon

The IQ Net is a modular system for precise online measurements:

- pH, ORP, oxygen, temperature, turbidity/TSS, ammonium, nitrate, COD and more
- Single parameter units and multiparameter systems
- Analog outputs and relays, digital interfaces (RS 232, RS 485, PROFIBUS DP, Modbus RTU)

With special security features for fail-safe operation, such as:

- Integrated lightning protection (coarse and fine protection)
- Programmable status in case of error
- Automatic power fail restart
- Optional redundant controller for 100% availability
- Software for storing, saving and documenting system configuration

Simple installation using:

- 2-wire-connection technology
- Plug & play connection of any IQ sensor
- Simple system expansion by easily adding modules or sensors
- Install components where needed (e.g. analog signals directly in control room)

IP 66 CE ETLus cETL 2* Year Warranty

** 1 year for sensors*

TriOxmatic®
Dissolved Oxygen Sensors

- Drift-free > 6 months
- Calibration-free > 6 months
- Self-cleaning
- Maintenance-free

TriOxmatic® 700

TriOxmatic® 700 IQ

TriOxmatic®

The most critical component of every Dissolved Oxygen measurement system is its sensor. TriOxmatic® series D.O. sensors are the most advanced and reliable instruments available. These sensors have been designed and manufactured to meet the demanding application requirements for performance/ reliability and maintenance. Based upon the continuous efforts of improvement, the D.O. sensors of the TriOxmatic® Series are acknowledged today as the most advanced and reliable instruments available on the market.

Unlike conventional D.O. sensors, the WTW polarographic membrane sensors all feature a potentiostatic 3-electrode system. This unique measuring principle results in superb accuracy and enhanced stability of the sensor, and provides comprehensive self-diagnostics capability.

TriOxmatic® sensor's proven stability makes calibration necessary only once a year-if at all!

The TriOxmatic® sensor is maintenance free over its entire service life. Only extreme applications after years of use require routine maintenance.

IP 68 · CE · UL CUL · 1 Year Warranty

Practical experience...

Practice

...put into practice

Perfected technology

Optimum immunity to interference

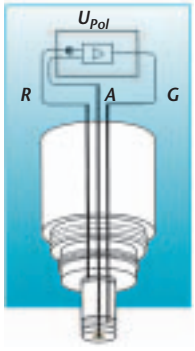
High level of accuracy and immunity to interference through built-in preamplifier. Its active electronics, located directly in the sensor, process the sensitive sensor signal on-site and convert it into a low impedance signal, which is immune to interference.

Integrated lightning protection

The highly efficient, built-in lightning protection device provides reliable protection to the sensor and transducer against high energy impulses often released by lightning strikes.

Patented Technology

3-electrode system



In contrast to conventional membrane covered oxygen sensors equipped with 2-electrode technology, the TriOxmatic® sensor functions with a potentiostatically driven 3-electrode system. In terms of measuring technology, this means that the measuring system has two silver electrodes and a gold cathode (A). One silver functions as a non-current bearing reference electrode (R). And, the other is the live, counter electrode (G). The reference electrode thus displays significantly improved potential constancy, which in turn leads to considerably improved sensor signal stability and thus higher measuring accuracy.

The 3-electrode technology additionally allows precise monitoring of the electrolyte supply, i.e. the system displays when the electrolyte solution needs to be replaced.

System monitoring

The sensor's built-in comprehensive monitoring system alerts the user of membrane damage. In addition, further important parameters are under constant monitoring, thus considerably improving operation safety.

Robust, fouling resistant special membrane

The proper sensor operation, especially in harsh industrial environments, e.g. found in wastewater treatment plants, can only be assured using a rugged and highly fouling resistant membrane. Therefore, WTW sensors are equipped with an optimally designed membrane using a specially selected, dirt repelling and durable material. Maintenance free operation of the sensors for several months is possible.

Drift-free/Calibration-free NEW

As a result of the further development of the potentiostatically driven 3-electrode system, a degree of sophistication has been achieved, which is so high that factors such as drift have become irrelevant due to their negligibility. Frequent sensor calibration is therefore no longer required.

Maintenance-free NEW

The membrane's high durability combined with its self-cleaning ability, the reduced electrolyte consumption and its superior stability result in a system which can operate reliably for years without requiring any maintenance.

IQ Sensor connection

TriOxmatic®

To optimally satisfy the various requirements for a wide range of wastewater and water applications, the TriOxmatic® Series offers the choice of several D.O. sensors with different operating specifications. All models are based on the potentiostatic 3-electrode principle (except TriOxmatic® 700 IN) and have the same reliability and precision; however, their resolutions, response times and required flow rates are adapted to suit different applications.

Analog

TriOxmatic® 700/700 IN

The standard Model TriOxmatic® 700 is a rugged dissolved oxygen sensor with a very durable 50 micron thick hydrophobic membrane, a minimal flow rate of 0.5 cm/sec and a medium response time of less than 180 sec. With these features, this membrane sensor is ideally suited for any D.O measurement in biological purification stages of municipal waste water treatment plants; e.g. **control of** the **oxygenation**. The response of the sensor prevents signal disturbances due to rising air bubbles thus eliminating false readings and improved stability. This is specially important for measurements in aeration tanks.

TriOxmatic® 690

This cost-effective D.O. sensor offers the same specifications and features as the Model TriOxmatic® 700, except it does not have the sensor monitoring function. This unit is primarily designed for conventional D.O. measurements, where a continuous membrane check is not needed; e.g. general applications in water quality analysis.

TriOxmatic® 701

Equipped with a special 25 micron thick membrane, the Model TriOxmatic® 701 features an enhanced resolution and a faster response time. This sensor is ideally suited for low level concentration applications; e.g. measurements of **residual oxygen** in the **denitrification** of biological sewerage treatment.

Digital

TriOxmatic® 700 IQ

Universal oxygen sensor for **measuring and controlling oxygen input in biological sewage treatment processes in wastewater treatment plants**. Membrane, flow rate and response times equivalent to TriOxmatic® 700, however as digital sensor with calibration value memory for connection to IQ Sensor Net.

TriOxmatic® 701 IQ

O_2 sensor with increased resolution and improved response times. Technical specifications equivalent to TriOxmatic® 701, however as digital sensor with calibration value memory for connection to IQ Sensor Net.

TriOxmatic® 702 IQ

Providing similar performance data as the TriOxmatic® 701, the 702 IQ model is specifically designed for trace level measurements in the ppb range. This sensor is ideally suited for use in ultrapure water applications; e.g. monitoring of boiler feed water or drinking water purification. The applied digital technology permits integrated storage of calibration values and simple connection to IQ Sensor Net.

Analog Digital

Technical Data

TriOxmatic®	690/700/700 IN	701	700 IQ	701 IQ	702 IQ
Measuring Ranges (25 °C) O_2 concentration O_2 saturation	0.0 ... 60.0 mg/l 0 ... 600% (depending upon the selected monitor model)	0.00 ... 20.00 mg/l 0.0 ... 60.0 mg/l 0.0 ... 200.0% 0 ... 600%	0.0 ... 60.0 mg/l 0 ... 600 %	0.00 ... 20.0 mg/l 0.0 ... 60.0 mg/l 0.0 ... 200.0 % 0 ... 600 %	0 ... 2000 µg/l 0.00 ... 10.00 mg/l 0 ... 110 %
Resolution O_2 concentration O_2 saturation	0,1 mg/l 1%	0,01 mg/l 0,1 mg/l 0,1 % 1%	0.1 mg/l 1%	0.01 mg/l 0.1 mg/l 0.1% 1 %	0.001 mg/l 0.01 mg/l 0.1%
Response time at 25 °C	t_{90}: 180 s	t_{90}: 30 s t_{99}: 90 s	t_{90}: 180 s	t_{90}: 30 s t_{99}: 90 s	t_{90}: 30 s t_{99}: 110 s
Minimum flow rate	0.05 m/s	0.23 m/s	0.05 m/s	0.23 m/s	0.3 m/s
SensCheck	SensLeck (700/700IN) SensReg (700)	SensLeck SensReg	SensLeck SensReg	SensLeck SensReg	– SensReg
Signal output	Analog	Analog	Digital	Digital	Digital
Sensor memory for calibration values	–	–	Yes	Yes	Yes
Power consumption	–	–	0.2 Watt	0.2 Watt	0.2 Watt
Temp. measurement	Integrated NTC, 23 ... 122 °F (-5 °C ... +50 °C)		Integrated NTC, 23 ... 140 °F (-5 °C ... +60 °C)		
Temp. compensation	32 ... 122 °F (0 °C ... +50 °C)		32 ... 140 °F (0 °C ... +60 °C)		
Maximum pressure	10 bar		10 bar (incl. sensor connection cable)		
Ambient conditions	Operating temperature: 32 ... 122 °F (0 °C ... +50 °C) Storage temperature: 32 ... 122 °F (0 °C ... +50 °C)		Operating temperature: 32 ... 140 °F (0 °C ... +60 °C) Storage temperature: 23 ... 149 °F (-5 °C ... +65 °C)		
Electrical connections	Integrated PU connecting cable with fitted 7-pole screw connector (IP 65)		2-wire shielded cable with quick fastener to sensor		
Input power	Powered by WTW D.O. monitor		Powered by IQ Sensor Net		
Translent voltage protection	Yes		Yes		
EMI/RFI Conformance	EN 61326 class B, FCC Class A		EN 61326 class B, FCC Class A		
Certifications	CE, CUL, UL		CE, UL, CAN/CSA		
Mechanical	Membrane head assembly, locking cap: POM Sensor body: 316 Ti stainless steel Protection rating: IP 68		Membrane head assembly, locking cap: POM Sensor body: 316 Ti stainless steel Protection rating: IP 68		
Dimensions (length x diameter)	7.83 x 1.57 in. (199 x 40 mm)		14.17 x 1.57 in. (360 x 40 mm), incl. connection thread of SACIQ sensor connection cable		
Weight	Approx. 1.46 pounds (660 g)		Approx. 1.46 pounds (660 g, without sensor connection cable)		

Ordering Information

		Order No.
TriOxmatic® 700-7	D.O. sensor for water/wastewater; oxygenation determination; cable length 7.66 yds (7,0 m)	201 670
TriOxmatic® 690-7	Same as model 700-7, but without SensCheck function; cable length 7.66 yds (7,0 m)	201 690
TriOxmatic® 701-7	D.O. sensor for water/wastewater; oxygenation/residual oxygen determination; cable length 7.66 yds (7,0 m)	201 678
TriOxmatic® 700 IN-7	D.O. sensor for highly polluted industrial wastewater; cable length 7.66 yds (7,0 m)	201 695
TriOxmatic® 700 IQ	D.O. sensor for water/wastewater; oxygenation determination	201 640
TriOxmatic® 701 IQ	D.O. sensor for water/wastewater; oxygenation/residual oxygen determination	201 644
TriOxmatic® 702 IQ	D.O. sensor, ppb measuring range; ultrapure water/boiler feedwater	201 646
SACIQ-7,0	Sensor connection cable for all IQ sensors, cable length 7.66 yds (7,0 m)	480 042
	Further cable lengths see brochure "Product Details"	

Configuration Guide

		1. Measuring Ranges 2. Response Time t_{90} 3. SensCheck Function	Oxi 170 Field Monitor	Oxi 296 Panel Mount	IQ Sensor Net
Analog	**TriOxmatic® 690** D.O. sensor for water/wastewater	1.: 0.0 … 60.0 mg/l 0 … 600 % 2.: < 180 s 3.: –	• Low-cost system without sensor diagnostic • Water/wastewater • Oxygenation		—
	TriOxmatic® 700 D.O. sensor for water/wastewater	1.: 0.0 … 60.0 mg/l 0 … 600 % 2.: < 180 s 3.: SensLeck SensReg	• Water/wastewater • Oxygenation		—
	TriOxmatic® 700 IN D.O. sensor for water/wastewater with permanent polarization	1.: 0.0 … 60.0 mg/l 0 … 600 % 2.: < 180 s 3.: SensLeck	• Industrial wastewater • Oxygenation		—
	TriOxmatic® 701 D.O. sensor for water/wastewater	1.: 0.00 … 20.00 mg/l 0.0 … 60.0 mg/l 0.0 … 200.0 % 0 … 600 % 2.: < 30 s 3.: SensLeck SensReg	• Water/wastewater • Oxygenation • Residual D.O.		—
Digital	**TriOxmatic® 700 IQ** D.O. sensor for water/wastewater	1.: 0.0 … 60.0 mg/l 0 … 600 % 2.: < 180 s 3.: SensLeck SensReg	—	—	• Water/wastewater • Oxygenation
	TriOxmatic® 701 IQ D.O. sensor for water/wastewater	1.: 0.00 … 20.00 mg/l 0.0 … 60.0 mg/l 0.0 … 200.0 % 0 … 600 % 2.: < 30 s 3.: SensLeck SensReg	—	—	• Water/wastewater • Oxygenation • Residual D.O.
	TriOxmatic® 702 IQ Trace Level D.O. Sensor	1.: 0 … 2000 µg/l 0.00 … 10.00 mg/l 0 … 110 % 2.: < 30 s 3.: SensReg	—	—	• ppb measuring range • Ultrapure water • Boiler feedwater

— Not Applicable

The IQ sensors with digital interface enable:

- large distances in-between sensors and between sensors and measuring system
- signal transmission which is immune to interference
- calibration data are stored in the sensor, calibration can be performed in the laboratory

Stackable modules and digital communication of the IQ system allows:

- analog and digital world combinations
- well laid-out graphic display of measured values
- digital transmission, storage and analysis of measured values

patented WTW by

U.S. patent granted (US 6,655,233 B2)

Systems 184 XT and 2020 XT

Choose the system that's right for your application:

	System 184 XT		System 2020 XT	
Max. number of sensors	12		20	
Output signals	**ANALOG:**	**DIGITAL:**	**ANALOG:**	**DIGITAL:**
	Analog outputs (0/4 - 20 mA), relays	• via RS 232 – PC software terminal and data server function	Analog outputs (0/4 - 20 mA), relays	• via RS 232 – PC software terminal and data server function • **RS 232 – modem** • **RS 485**
				• **PROFIBUS DP** • **Modbus RTU**
			(digital parallel to analog possible)	
Knowledge of special automation technology required	No		Principally no, in PROFIBUS/Modbus systems yes	
Additional Options				
Additional Displays	Yes		Yes	
Redundant controller	Yes		Yes	
Datalogger	Yes		Yes, enhanced performance	
Modem-capable interface	No		Yes	

System 184 XT

particularly suitable for conventional facilities, in which the user wishes to combine the advantages of digital sensor technology with the simplicity of conventional instrumentation. Signal relaying is generally performed by means of 0/4-20 mA analog outputs and relays.

System 2020 XT

is the system of choice for a large number sensors, for digital interfaces and as futureproof instrumentation, if for example a PROFIBUS control is planned in an upcoming extension phase.

As a PROFIBUS subsystem, System 2020 XT also has considerable advantages over instruments equipped directly with PROFIBUS interface:

- Direct connection to PLC via PROFIBUS DP, but with the ease of use of Profibus PA (2-wire technology, any bus topology, configuration and parameterization per FDT/DTM) and including power supply for sensors with high power demand and cleaning devices
- No specialized personnel required for replacement of sensors or other components
- Sensor calibration in the laboratory and on-site connection of pre-calibrated sensor possible
- For particularly critical applications, parallel installation of analog outputs and relays in addition to digital signal transmission is possible, in order to implement prescribed safety strategies in the case of control system failure.