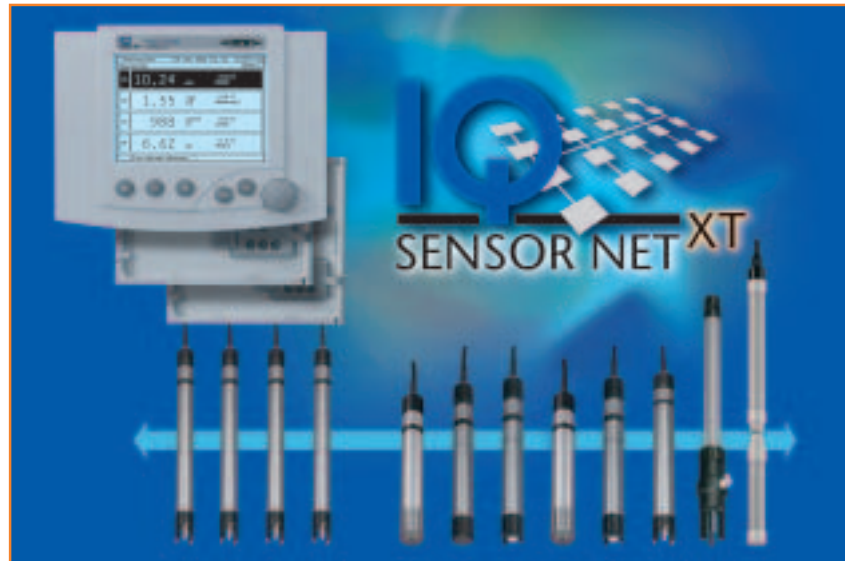


IQ SENSOR NET

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)



* 1 year for sensors



TetraCon® 700

Conductivity Cells

- 4-electrode Design
- No polarization effects
- Large measuring range with only a single cell
- Highly resistant to fouling



TetraCon® 700/700 IQ

The TetraCon® 4-electrode cell from WTW is the perfect result of an application-oriented development. Compared with conventional 2-electrode cells, this advanced design provides substantially better performance, particularly in the higher conductivity ranges.

TetraCon® 700 conductivity sensors are especially suitable for use in wastewater treatment plants dealing with highly loaded sewage. Due to the special measuring technique employed, severe influences from primary and secondary polarization effects are eliminated, resulting in improved accuracy of the sensor. Provided the devices are installed in accordance with the manufacturer's instructions, errors due to the distortion of the current and voltage fields are also avoided.

The special cell geometry of the TetraCon® 700 makes it impervious to fouling, and the abrasion resistant carbon electrodes are also easy to clean. The modern epoxy resin encapsulation technique used diminishes the likelihood of sensor breakage in harsh industrial environments.

The TetraCon® 700 as digital model TetraCon® 700 IQ is also available for connection to IQ SENSOR NET. This version is specially featured by a larger measuring range (10 µS/cm ... 500 mS/cm).

TetraCon® 700 IQ





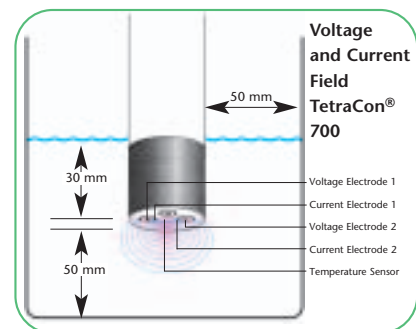
Conductivity Cells

TetraCon® 4-electrode Design

The conductivity of a given electrolyte is determined by an electro-chemical resistance measurement. In its simplest configuration, the measuring cell uses **two** electrodes to which an alternating voltage is applied. The electric current which is directly proportional to the free ions in the electrolyte is measured. The electronic instrument then calculates the conductivity of the solution, taking into account the absolute cell constant of the sensor.

With the **TetraCon® 4-electrode design**, two separate electrode pairs are used whereby the currentless voltage electrodes produce a stable and constant reference potential. The voltage drop at the current electrodes is regulated via a potentiostat circuit.

The advantage of this technique is that it eliminates measurement errors usually caused by **polarization effects** which most likely build up at higher conductivity levels. Contact resistance problems caused by contaminated electrodes is also largely avoided by this design.



Minimal Distance: 1.97 in. (50 mm)
Minimal Immersion Depth: 1.18 in. (30 mm)

WTW Conductivity Sensors

TetraCon® 700

Rugged conductivity sensor (4-electrode design), with integrated dual thermistor, abrasion resistant carbon electrodes and break-proof epoxy body; measuring range 10 $\mu\text{S}/\text{cm}$ to 1000 mS/cm . Submersible sensor assembly specially designed for use in wastewater treatment plants.

TetraCon® 325

4-electrode conductivity cell with graphite electrodes, integral temperature probe; measuring range 1 $\mu\text{S}/\text{cm}$ - 2000 mS/cm . Suitable for universal applications.

TetraCon® DU/T

4-electrode conductivity cell with integral flow-thru chamber (7 ml volume), built-in temperature sensor; measuring range 1 $\mu\text{S}/\text{cm}$ to 2000 mS/cm . Recommended for standard industrial applications.

TetraCon® 700 IQ

Digital 4-electrode conductivity cell (same as TetraCon® 700). In addition to the general preferences of IQ technology the TetraCon® 700 IQ offers the benefit of a larger measuring range (10 $\mu\text{S}/\text{cm}$... 500 mS/cm).



LRD 01

LRD 325

LRD 01

316 Ti stainless steel conductivity cell for installation in pipes. Built-in temperature sensor (266 °F/130 °C max.), measuring range 0.01 to 200 $\mu\text{S}/\text{cm}$, pressure resistant up to 14 bar, 1/2 inch NPT thread.

LRD 325

Conductivity measuring cell for installation in pipes. With built-in temperature sensor (up to 212 °F/100 °C). Measuring range 1 $\mu\text{S}/\text{cm}$ to 2 S/cm , pressure resistant up to 10 bar. 1/2 inch NPT thread.

LR 325/01

Low-level conductivity cell with flow-thru chamber, integrated temperature sensor; measuring range 0.001 to 300 $\mu\text{S}/\text{cm}$. For use in ultra-pure water applications; e.g., boiler feed water.

LR 325/001

Like Model LRD 325/01, but with higher resolution; measuring range 0.0001 to 30 $\mu\text{S}/\text{cm}$. Sensor is especially designed for trace measurement in both aqueous and non-aqueous or partially aqueous media.



Analog

Digital

Technical Data

Conductivity Cells	TetraCon® 700	LRD 01	LRD 325	TetraCon® 700 IQ
Sensor type	4-electrode cell	2-electrode cell	4-electrode cell	4-electrode cell
Measuring range	10 µS/cm ... 1000 mS/cm SAL: 0 ... 70	0.01 ... 200 µS/cm	1 µS/cm ... 2 S/cm	10 µS/cm ... 500 mS/cm SAL: 0 ... 70
Cell constants	K = 0.917 cm ⁻¹ , ±1.5 % (in free solution) K = 0.933 cm ⁻¹ , with EBST 700-DU/N flow-thru adapter	0.1 cm ⁻¹ , ±1.5 %	0.475 cm ⁻¹ , ±1.5 %	K = 0.917 cm ⁻¹ , ±1.5 % (in free solution) K = 0.933 cm ⁻¹ , with EBST 700-DU/N flow-thru adapter
Signal output	Analog	Analog	Analog	Digital
Sensor memory for calibration values	—	—	—	Yes
Power consumption	—	—	—	0.2 Watt
Temperature sensor	Integrated NTC	Integrated NTC	Integrated NTC	Integrated NTC
Temperature range	32...122 °F (0...+50 °C, ±0.2 K)	32...266 °F (0...+130 °C, ±0.2 K)	32...212 °F (0...100 °C, ±0.2 K)	23...140 °F (-5 °C ... +60 °C)
Maximum pressure	10 bar (at 68 °F/20 °C)	14 bar (at 68 °F/20 °C)	10 bar (at 68 °F/20 °C)	10 bar
Electrical connection	integrated PU connecting cable with fitted 7-pole screw connector (IP 65)			2-wire shielded cable with quick fastener to sensor
Certifications	CE, CUL, UL			CE, UL, CAN/CSA
Mechanical	Sensor head: PVC Body: 316 Ti stainless steel Protection rating: IP 68	Cell body: 316 Ti stainless steel Threaded 1/2 inch NPT Protection/Electrode: IP 68	Measuring cell: epoxy/graphite Thread: 316 Ti stainless steel Protection/Electrode head: IP 68	Sensor head: PVC Body: 316 Ti stainless steel Protection rating: IP 68
Dimensions	7.72 x 1.57 in. (196 x 40 mm) (length x diameter)	5.24 x 0.98 in. (133 x 25 mm) (length x diameter)	5.24 x 0.98 in. (133 x 25 mm) (length x diameter)	14.06 x 1.57 in. (357 x 40 mm) (length x diameter) incl. connection thread of sensor connection cable SACIQ
Weight	Approx. 1.46 lb (660 g)	Approx. 0.77 lb (350 g)	Approx. 0.66 lb (300 g)	Approx. 1.46 lb (660 g, without cable)

Conductivity Cells for Special Purposes

	TetraCon® 325	TetraCon® DU/T	LR 325/01	LR 325/001
Sensor Type	4-electrode cell		2-electrode cell	
Electrode	Carbon	Carbon	316 Ti stainless steel	316 Ti stainless steel
Measuring Ranges	1 µS/cm ... 2 S/cm	1 µS/cm ... 2 S/cm	0.001 µS/cm ... 300 µS/cm	0.0001 µS/cm ... 30 µS/cm
Cell Constant	K = 0.475 cm ⁻¹	K = 0.778 cm ⁻¹	K = 0.1 cm ⁻¹	K = 0.01 cm ⁻¹
Temperature Sensor	Integrated	Integrated	Integrated	Integrated
Flow-thru Measurement	No	Yes	Yes, with additional flow chamber D01/T	Yes, with integrated flow chamber
Length	4.72 in. (120 mm)	6.10 in. (155 mm)	4.72 in. (120 mm)	4.72 in. (120 mm)

Ordering Information – Conductivity Cells

		Order No
TetraCon® 700-7	Submersible conductivity sensor for water/wastewater, cable length 7.66 yds (7.0 m)	302 316
LRD 01-7	Submersible conductivity sensor for boiler feed water/ion exchanger, cable length 7.66 yds (7.0 m)	302 222
LRD 325-7	Submersible conductivity sensor for water/wastewater, cable length 7.66 yds (7.0 m)	302 229
TetraCon® 700 IQ	Submersible conductivity sensor for water/wastewater	302 500
SACIQ-7,0	Sensor connection cable for all IQ sensors, cable length 7.66 yds (7.0 m)	480 042
	Further cable length and accessories see brochure "Product Details"	



Configuration Guide

		1. Measuring range 2. Cell constant 3. Probe type 4. Temperature compensation 5. Temperature range 6. Pressure range 7. Protection rating	LF 170 Field Monitor	LF 296 Panel mount Monitor	IQ SENSOR NET
Analog	TetraCon® 700	1.: 10 µS/cm..1000 mS/cm 2.: K=0.917 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32...122 °F (0...50 °C) 6.: 10 bar 7.: IP 68 (electrode)	Water / Wastewater Usable Measuring Range: 0,0..199,0 µS/cm 0,000..1,999 mS/cm 0,00..19,99 mS/cm 0,0..199,9 mS/cm 32...122 °F (0...50 °C)		—
	LRD 01	1.: 0,01...200 µS/cm 2.: K=0.1 cm ⁻¹ 3.: 2-electrode cell 4.: NTC 5.: 32...266 °F (0...130 °C) 6.: 14 bar (68 °F/20 °C) 7.: IP 68 (electrode)	Boiler Feed Water/Ion Exchanger; In-Line Measurements/ Pipework Mounting 1/2" NPT Thread Usable Measuring Range: 0,00..19,99 µS/cm 0,0..199,9 µS/cm 32...266 °F (0..130 °C); 14 bar (68 °F/20 °C)		—
	LRD 325	1.: 1 µS/cm..2 S/cm 2.: K=0.475 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32...212 °F (0..100 °C) 6.: 10 bar 7.: IP 68 (electrode)	Large Usable Measuring Range; In-Line Measurements/ Pipework Mounting 1/2" (3/4" Adapter) NPT Thread 0,0..199,0 µS/cm 0..1999 µS/cm 0,00..19,99 mS/cm 0,0..199,9 mS/cm (MR: 0,0..199,9 mS/cm to 110,0 mS/cm at 122 °F/50 °C) 32...212 °F (0..100 °C); 10 bar at 68 °F (20 °C)		—
	LR 325/01	1.: 0.001...300 µS/cm 2.: K=0.1 cm ⁻¹ 3.: 2-electrode cell 4.: NTC 5.: 32...212 °F (0...100 °C) 6.: 2 bar 7.: IP 68 (electrode)	Boiler Feed Water/Ion Exchanger; Conductivity Cell with Flow-thru Chamber; Usable Measuring Range: 0,00..19,99 µS/cm 0,0..199,9 µS/cm 0,000..0,300 mS/cm 32...122 °F (0..50 °C)		—
	LR 325/001	1.: 0.0001..30 µS/cm 2.: K=0.01 cm ⁻¹ 3.: 2-electrode cell 4.: NTC 5.: 32...212 °F (0...100 °C) 6.: 2 bar 7.: IP 68 (electrode)	Boiler Feed Water/Ion Exchanger; Conductivity Cell with Flow-thru Chamber, Trace Measurements Usable Measuring Range: 0.000..1.999 µS/cm 0.00..19.99 µS/cm 32...122 °F (0..50 °C)		—
	TetraCon® 325	1.: 1 µS/cm..2 S/cm 2.: K=0.475 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32...212 °F (0...100 °C) 6.: 2 bar 7.: IP 68 (electrode)	General Application/Water; Large Measuring Range 0.00..19.99 µS/cm 0.0..199.9 µS/cm 0.000..1.999 mS/cm 0.00..19.99 mS/cm 0.0..199.9 mS/cm (32...77 °F/0..25 °C) 32...122 °F (0..50 °C) (MR: 0.0..199.9 mS/cm up to 110.0 mS/cm at 122 °F/50 °C)		—
	TetraCon® DU/T	1.: 1 µS/cm..2 S/cm 2.: K=0.778 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32...140 °F (0...60 °C) 6.: 2 bar 7.: IP 65	Flow-thru cell Usable Measuring Range: 0.00..19.99 µS/cm 0.0..199.9 µS/cm 0.000..1.999 mS/cm 0.00..19.99 mS/cm 0.0..199.9 mS/cm 32...122 °F (0..50 °C)		—
Digital	TetraCon® 700 IQ	1.: 10 µS/cm..500 mS/cm 2.: K=0.917 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32...140 °F (0...60 °C) 6.: 10 bar 7.: IP 68 (electrode)	—	—	Water/Wastewater; Usable Measuring Range: 0.00...20.00 µS/cm 0.0...200.0 µS/cm 0.000...2.000 mS/cm 0.00...20.00 mS/cm 0.0...200.0 mS/cm 0...500 mS/cm

— Not Applicable



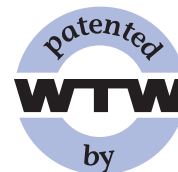
IQ SENSOR NET

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



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.