

IQ SENSOR NET

CONTINUOUS PROCESS MONITORING & CONTROL

WTW

a xylem brand

Innovative Solutions for Challenging Problems

WTW, a Xylem brand, is committed to providing our customers with solutions to their most challenging problems through the use of our expertise and innovative technology.

As part of that commitment, WTW continues to develop and launch new innovative product lines, building upon our proven sensor and analytics technology. We take pride in improving and setting new standards in the markets that we serve.

If you want to know more about Xylem,
please visit www.xylem-analytics.com.au

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Online Instrumentation

The IQ SENSOR NET has for many years set the standard for online measuring technology. It is suitable for conventional instrumentation with analog outputs as well as for field bus instrumentation.

The innovative digital sensors in this system represent the state of the art in process measuring. A new controller family MIQ/MC2 with integrated USB and LAN interfaces opens the IQ SENSOR NET system to the future-proof world of internet communication via TCP/IP technology. The new spectral UV-VIS sensors CarboVis®, NitraVis®, and NiCaVis® allow for chemical-free measurements of COD, TOC, BOD, SAC, NO_3, $NO_2$and TSS directly in the wastewater process.

Their new optical design, integrated ultrasonic cleaning system and high-tech materials Titanium and PEEK assure high measurement reliability, simple handling, and extreme durability. The new interface level sensor IFL 700 IQ is ideal for sludge management at wastewater treatment plants: based upon the ultrasonic measuring principle, it detects sludge-water interface levels via runtime of ultrasound signal echoes.

The IQ SENSOR NET system is therefore the most flexible, digitally based system that provides from 1 to 20 measuring points. For the measuring and control of wastewater, WTW offers the world's most complete line of pH/ORP, DO, Conductivity, Nitrogen, Carbon, Phosphate, and unique self-cleaning Turbidity instrumentation, as well as comprehensive accessories.

The dependability, reliability, and versatility of WTW field-proven Ammonium, Phosphate, Nitrite, and Nitrate analyzers, probes; and pH, ORP, DO, and Conductivity systems and meters have established WTW products as industry standards world-wide. WTW has built a solid reputation in its more than 60-year history by providing "best in class" products with unparalleled customer and technical support.

WTW strives to deliver solutions to our customers' measuring problems. Our Customer Care Centers are dedicated to ensuring each customer's individual success. WTW's extensive applications library, coupled with knowledgeable applications specialists, provide for rapid resolutions to technical challenges. With support facilities around the globe, the WTW manufacturing center, located just south of Munich, Germany, delivers quality technical instrumentation with continuous support. We are proud to present our product offering to you and look forward to serving your needs.

IQ SENSOR NET 2020 XT

Improve operational efficiency with continuous data. With an easily scalable solution, the 2020 XT allows for the connection of up to 20 sensors. Add sensors at any time and at any location or change them out with ease. This completely modular plug-and-play system allows you to monitor and control the water quality in your wastewater facility continuously and accurately.





Only WTW can offer:

- 3-year warranty
- Ultrasonic cleaning on some sensors
- System-wide lightning protection
- Modular expansion from 1 to 20 sensors
- Easily stack modules without extra wiring
- One cable for power and communications
- Factory-calibrated optical DO cap with a 2-year warranty
- USB interface (can be used for security)
- System redundancy for backup control

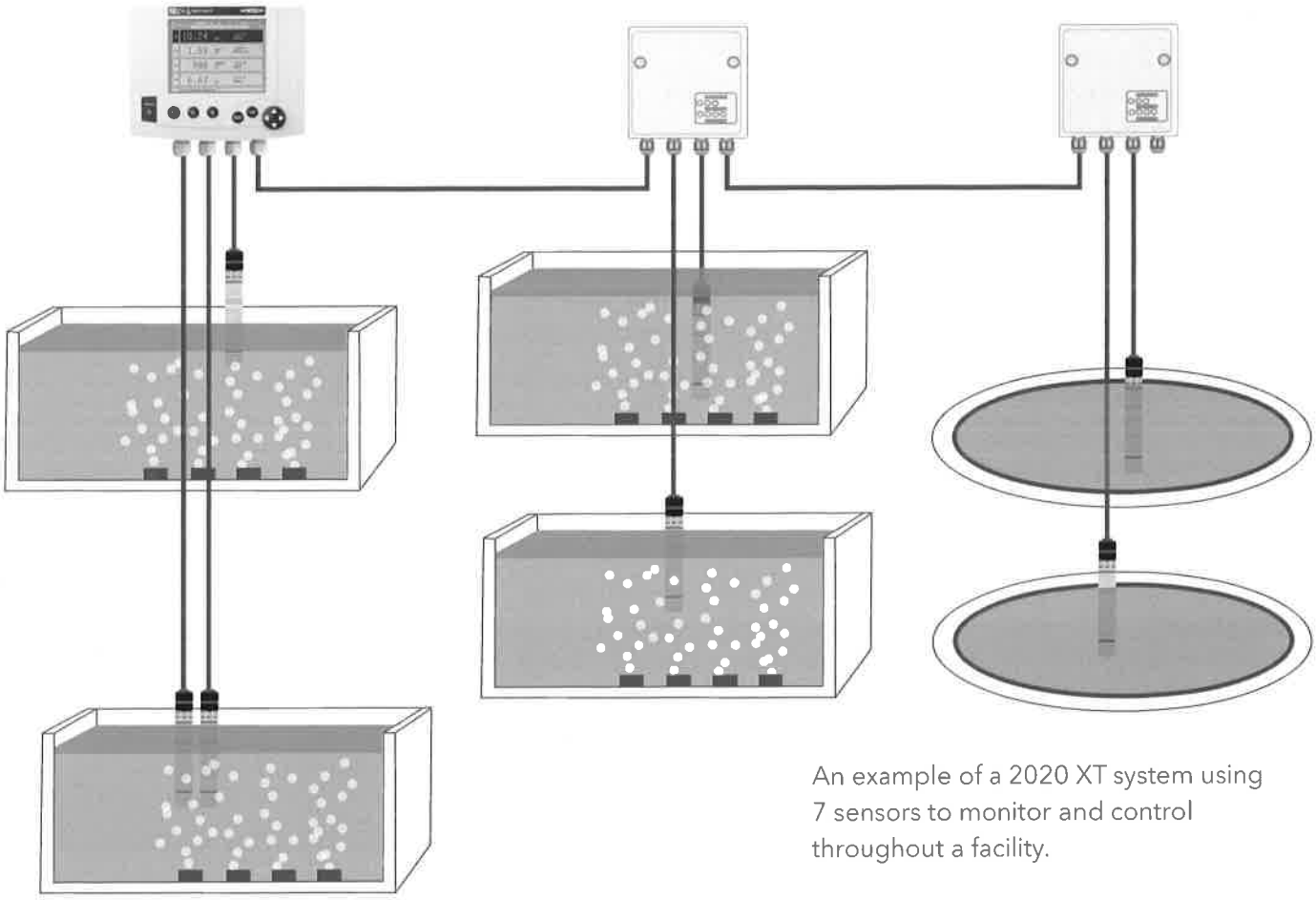


The System 2020 XT

- Up to 20 digital sensors, any combination
- Easy, intuitive system expansion
- Centralized power supply along entire network
- Numerous relays and outputs may be selected
- Communications via modem, wireless transmission, PROFIBUS, MODBUS, RS-232
- LED status update
- Integrates into existing systems
- Change or move parameters at any time with ease

Parameters

Temperature
Dissolved oxygen
(optical or electrochemical)
pH
ORP
Conductivity/
Specific conductance
Salinity
Turbidity
TSS
Ammonium
Nitrate
Nitrite
Potassium
COD, TOC, DOC,
SAC, BOD



An example of a 2020 XT system using 7 sensors to monitor and control throughout a facility.

2020 XT Terminal

Certifications	ETL, cETL (conforms with relevant UL and Canadian standards), CE
Integrated Lightning Protection	EN 61326 enhanced over voltage protection for entire system
Electrical	Directly via IQ SensorNet when coupled to an MIQ module
Datalogging	525,600 data sets
Display	Graphic; 320 x 240 pixels; backlit
Warranty	3 years
Operating Temperature	-4 to 131° F (-20 to 55°C)

IQ SENSOR NET 282/284



The WTW IQ SENSOR NET 282/284 is a modular system for a complete sensor network ideal for various installation needs. The modular system can accept additional sensors easily at any time. This is a powerful system to continuously measure water quality parameters anywhere in a facility for process control.

System 282/284

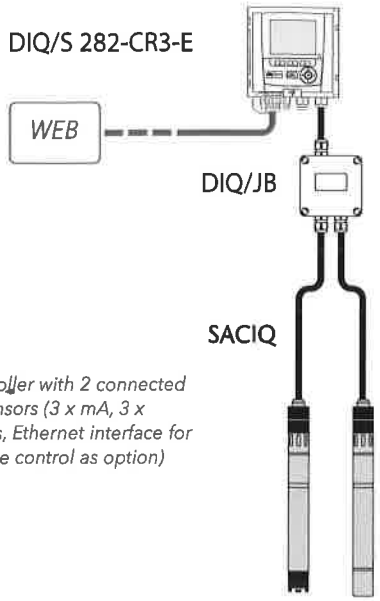
- Connect 1-4 digital sensors for a variety of parameters
- 2-wire cable provides power and communications
- Ultrasonic cleaning on some sensors
- Analog output, Relays, Modbus, Profibus and Ethernet interfaces available
- System-wide lightning protection
- 3-year warranty

Model DIQ/S 282 CR-3	Model DIQ/S 282 - PR	Model DIQ/S 282 - MOD	DIQ/S 282 CR3-E	DIQ/S 282 - EF
1-2 IQ sensors	1-2 IQ sensors	1-2 IQ sensors	1-2 IQ sensors	1-2 IQ sensors
3 x (0) 4-20mA, 3 x relays	PROFIBUS connection, 3 x relays. D-SUB connector required	MODBUS connection, 3 x relays. D-SUB connector required	3 x (0) 4-20mA, 3 x relays. RJ45 interface for internet connection and remote control	Ethernet fieldbus, internet connection, remote control, 3 x relays

Model DIQ/S 284 CR-3	Model DIQ/S 284 - PR	Model DIQ/S 284 - MOD	DIQ/S 284 CR3-E	DIQ/S 284 - EF
Upto 4 IQ sensors	Upto 4 IQ sensors	Upto 4 IQ sensors	Upto 4 IQ sensors	Upto 4 IQ sensors
6 x (0) 4-20mA, 6 x relays	PROFIBUS connection, 3 x relays. D-SUB connector required	MODBUS connection, 3 x relays. D-SUB connector required	6 x (0) 4-20mA, 6 x relays. RJ45 interface for internet connection and remote control	Ethernet fieldbus, internet connection, remote control, 3 x relays

Example 1

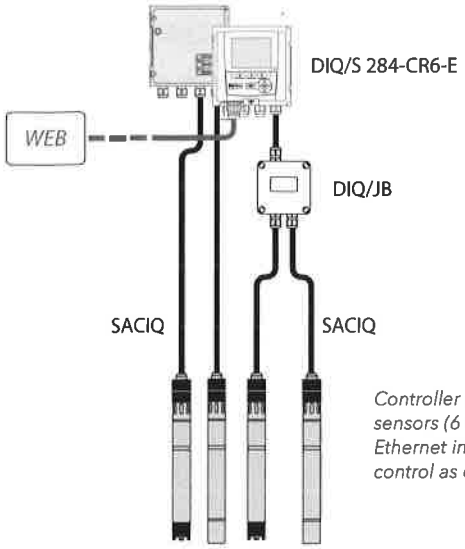
Example with 2 IQ sensors	Order no.
DIQ/S 282-CR3-E	472 113
2 x SACIQ-7,0	480 042
DIQ/JB	472 005
2 x IQ sensors	user selected



Controller with 2 connected IQ sensors (3 x mA, 3 x Relays, Ethernet interface for remote control as option)

Example 2

Example with 4 IQ sensors	Order no.
DIQ/S 284-CR6-E	472 133
4 x SACIQ-7,0	480 042
DIQ/JB	472 005
4 x IQ sensors	user selected



Controller with 4 connected IQ sensors (6 x mA, 6 x Relays, Ethernet interface for remote control as option)

System 282/284 Technical Data

Connectable sensors	all IQ sensors, at DIQ/S 282: 2, at DIQ/S 284:4
Parameters	ph/ORP, O2, Cond, Turbidity, TSS, NH4+, NO2, NO3, NOx, PO4, COD, BOD, TOC, DOC, SAC, UVT, sludge level
Interfaces	USB and data logger (as standard); as option: PROFIBUS (RS 485) or MODBUS (RS 485) or Ethernet/IP, MODBUS TCP, PROFINET (RJ45) or RJ45 for remote control
Overall cable length	250m (820ft.)
Power supply	Wide range power supply (100...240VAC) or 24V DC

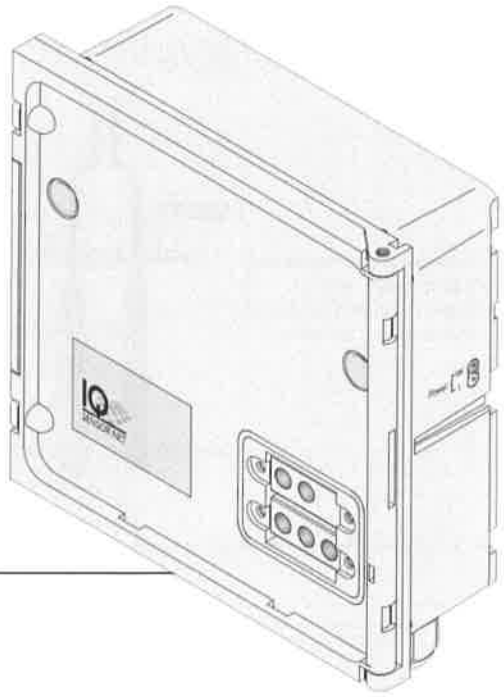
Parameters

Temperature
Dissolved oxygen (optical or electrochemical)
pH
ORP
Conductivity/ Specific conductance
Salinity
Turbidity
TSS
Ammonium
Nitrate/Nitrite
Potassium
COD, TOC, DOC, SAC, BOD

IQ SENSOR NET Modules

IQ SENSOR NET modules provide a variety of functions from power, to communications, to outputs in order to improve your system's efficiency. All modules can be installed anywhere in the system, either individually or in stacks.

Up to three modules can be mechanically connected to form a stack. Simultaneous mechanical and electrical connections are instantaneous once stacked.



Module Options

	2020 XT (up to 20 sensors) **Model Numbers**	284 (up to 4 sensors) 282 (up to 2 sensors) **Part Numbers**
Power Supply Modules	MIQ/PS, MIQ/24V	MIQ/PS, MIQ/24V
Analog Output Modules	MIQ/CR3, MIQ/C6, MIQ/R6	MIQ/CR3, MIQ/C6, MIQ/R6
Interface Modules	MIQ/IF232, MIQ/2-MOD, MIQ/2-PR	DIQ/S 282-PR, DIQ/S 282-MOD, DIQ/S 282-CR3-E, DIQ/S 282-EF, DIQ/S 284-PR, DIQ/S 284-MOD, DIQ/S 284-CR3-E, DIQ/S 284-EF
Magnetic Valve Modules	MIQ/CHV Plus	DIQ/CHV, MIQ/CHV Plus
Wireless Communication Modules	MIQ/WL Set	MIQ/WL Set
Analog Input Modules	MIQ/IC2	MIQ/IC2
Extension Modules	MIQ/JB, MIQ/JBR,	DIQ/JB, MIQ/JB
Compensation Modules	MIQ/MC2, MIQ/2-PR, MIQ/2-MOD	
Controller Modules	MIQ/MC2, MIQ/MC2-PR, MIQ/MC2-MOD	

IQ SENSOR NET Sensors

All IQ SENSOR NET sensors are rugged, reliable digital sensors designed specifically for wastewater applications. Once a sensor is fixed at a location, it can easily be moved by the user. Sensors can also be switched out with different sensor parameters without rewiring or running conduit. Simply unscrew one and put the new one in place.



TetraCon®

conductivity/salinity/TDS

- 4-electrode design
- robust and durable in the field
- wide measurement range
- fouling resistant
- 2-year warranty

TetraCon® Sensor

Operating Temperature	32 to 140°F (0 to 60°C)
Conductivity	Range: 0.00 to 20.00 µS/cm 0.0 to 200.0 µS/cm 0.000 to 2.000 mS/cm 0.00 to 20.00 mS/cm 0.0 to 200.0 mS/cm 0 to 500 mS/cm Accuracy: ± 1.5% of reading without calibration ± 0.7% of reading with calibration
Salinity	Range: 0 to 70 ppt
TDS	Range: 0 to 2000 mg/L

IQ SENSOR NET Sensors



SensoLyt®
pH/ORP

- SensCheck function monitors sensors
- electrodes are protected
- easily replace electrodes without tools as needed
- pre-amplified sensors
- integral temperature sensor
- digital sensors store calibration
- 2-year warranty (6-months electrodes)

SensoLyt® Sensor

Operating Temperature	32 to 140°F (0 to 60°C)			
Electrode Type	SEA and SEA-HP pH (gel-polymer solid electrolyte with double pinhole diaphragm; AgCl free and resistant to sulfides)	DWA pH (modified gel electrolyte with single pinhole diaphragm)	ECA pH (gel electrolyte with single pinhole diaphragm)	PtA mV (gel-polymer solid electrolyte with double pinhole diaphragm
Range	0 to 12 pH units and 4 to 12 pH units	0 to 14 pH units	0 to 12 pH units	± 2000 mV (depends on terminal)



TriOxmatic



FDO

TriOxmatic®
DO electrochemical

- SensReg function monitors electrolytic solution
- SensLeak function monitors for membrane leakage
- fouling resistant
- no break-in period or long-term drift
- digital sensors store calibrations
- 2-year warranty

FDO®
DO optical

- no electrolyte, calibration, interferences, or warm-up period
- zero oxygen consumption technology eliminates the need for stirring
- resistant to bubbles bursting on the sensor with 45 degree angle membrane
- extremely long sensor cap life; factory calibrated
- 2-year warranty

TriOxmatic® Sensor

Operating Temperature	32 to 140°F (0 to 60°C)		
Electrode Type	Electrochemical DO with reference electrode		
Range	700 IQ (700 IQ SW) 0.0 to 60.0 mg/L 0 to 600%	701 IQ 0.00 to 20.00 mg/L 0.0 to 60.0 mg/L 0.0 to 200.0% 0 to 600%	702 IQ 0 to 2000 µg/L 0.00 to 10.00 mg/L 0 to 110%
Resolution	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	T95 = <200 sec	T90 = <60 sec T95 = <80 sec	T90 = 30 sec T99 = 110 sec
Minimum Flow Rate	0.05 m/s (1.9 in/sec)	0.23 m/s (9 in/sec)	0.3 m/s (11.8 in/sec)

FDO® Sensor

Interferences	None	
Calibration	Factory calibrated	
Operating Temperature	23 to 122°F (-5 to 50°C)	
Electrode Type	Optical DO	
Range	0 to 20.00 mg/L 0 to 200.0%	
Resolution	0.01 mg/L 0.1%	
Response Time at 25°C	FDO 700 IQ T90 = <150 seconds T95 = <200 seconds	FDO 701 IQ T90 = <80 seconds
Minimum Flow Rate	0 - none required	

IQ SENSOR NET Sensors



VisoTurb®
turbidity

- multi-point factory calibration; no need to recalibrate; matrix adjustment is possible
- ultrasonic cleaning with UltraClean technology; prevents initial biofouling from taking place
- nephelometric measurement technology
- sample discoloration does not affect measurements
- 2-year warranty

ViSolid®
TSS

- multi-point factory calibration; no need to recalibrate; matrix adjustment is possible
- ultrasonic cleaning with UltraClean technology; prevents initial biofouling from taking place
- uses two measurement methods depending on concentrations - either scattered light or backscatter
- 2-year warranty

VisoTurb® and ViSolid® Sensors

SensCheck	Continually monitors sensor functionality		
Range VisoTurb	The measuring range can be selected from the following measuring ranges on site		
	FNU, NTU, TEF:	**mg/L SiO_2; ppm SiO_2:**	**g/L TSS:**
	0 to 4000 FNU	0.1 to 4000 mg/L SiO_2	0.0001 to 400 g/L TSS
	0-0.4	0-0.400	0-0.400mg/L
	0-4	0-4.00	0-4.00 mg/L
	0-40	0-40	0-40mg/L
	0-400	0-400	0-400mg/L
	0-4000	0-4000	0-4.00 g/L
			0-40g/L
			0-400 g/L
Range ViSolid	The measuring range can be selected from the following measuring ranges on site		
	g/L SiO_2, % SiO_2:	**g/L TSS, % TSS:**	**g/L TSS**
	0.01 to 300 g/L SiO_2	0.003 to 1000 g/L TSS	0-0.400
	0.001 to 30% SiO_2	0.0003 to 100% TSS	0-4.00
			0-25
			0-40
			0-400
			0-1000



UltraClean technology keeps sensor clean even after a 30-day deployment.

UltraClean TECHNOLOGY



VARiON®

ammonium/nitrate/potassium

- single- or dual-measurement of ammonium and nitrate; compensation for potassium/chloride
- factory calibrated
- reference electrode; prevents interferences
- matrix adjustment is possible
- 2-year warranty

AmmoLyt® | NitraLyt®

ammonium/potassium | **nitrate**

- ammonium or nitrate measurement with continuous compensation
- factory calibrated
- reference electrode prevents interferences (potassium for AmmoLyt® and chloride for NitraLyt®)
- matrix adjustment is possible
- 2-year warranty

VARiON®, AmmoLyt® and NitraLyt® Sensors

Operating Temperature	32 to 140°F (0 to 40°C)	
Electrode Type	**ISE Ammonium (VARiON® or AmmoLyt®)**	**ISE Nitrate (VARiON® or NitraLyt®)**
Range/Resolution VARiON®	NH_4-N: 1 to 2000 mg/L / 1 mg/L 0.1 to 100 mg/L / 0.1mg/L	NO_3-N: 1 to 1000 mg/L / 1 mg/L 0.1 to 100 mg/L / 0.1 mg/L
	NH_4: 1 to 2580 mg/L / 1mg/L 0.1 to 129.0 mg/L / 0.1 mg/L	NO_3: 1 to 4500 mg/L / 5 mg/L 0.5 to 450.0 mg/L / 0.5 mg/L
	K+ (compensation): 1 to 1000 mg/L / 1 mg/L	CL- (compensation): 1 to 1000 mg/L / 1 mg/L
pH Range	4 to 8.5 pH units	4 to 11 pH units

IQ Sensor Net Sensors



NitraVis®
nitrate/nitrite*/TSS**

- optical spectral measurement
- factory calibrated
- ultrasonic cleaning with UltraClean technology; prevents initial biofouling from taking place
- 2-year warranty

CarboVis®
COD/TOC/DOC/BOD/SAC/TSS

- optical spectral measurement
- ultrasonic cleaning with UltraClean technology; prevents initial biofouling from taking place
- continuous real-time values; no sample transport or sample preparation needed
- compensates for interferences and turbidity
- compressed air cleaning available
- 2-year warranty

NiCaVis®
nitrate/nitrite/COD/TOC/DOC/BOD/SAC

- optical spectral measurement
- continuous real-time values; no sample transport or sample preparation needed
- compensates for interferences and turbidity
- compressed air cleaning available
- 2-year warranty

NitraVis® Sensor

Operating Temperature	32 to 113°F (0 to 45°C)	
Electrode Type	Spectral measurement in the UV/VIS range (200 to 720 nm)	
	NitraVis® 701 (influent/aeration)	**NitraVis® 705 (effluent)**
Range* **	NO_3-N: 0 to 60mg/L N02-N - 0-30mg/L (for inlet/activation) and 0-25mg/L (for effluent) TSS (Optional) : 0 to 10.00 g/L	NO_3-N: 0 to 50mg/L TSS (Optional) : 0 to 900.0 mg/L
Accuracy	± 3% of mesured value ± 0.5 mg/L	
pH Range	4 to 9 pH units	

CarboVis® and NiCaVis® Sensors

Operating Temperature	32 to 113°F (0 to 45°C)			
Electrode Type	Spectral measurement in the UV/VIS range (200 to 720 nm)			
	CarboVis® 701 (influent/effluent)	**CarboVis® 705 (effluent)**	**NiCaVis 701 IQ NI (influent/effluent)**	**NiCaVis 705 IQ Ni (effluent)**
Measuring Range* **	COD: 0 ... 20,000 mg/l TOC: 0 ... 20,000 mg/l SAC: 0 ... 5,000 m-1 DOC: 0 ... 12,500 mg/l BOD: 0 ... 8,000 mg/l UVT: 0.0 ... 100.0 %	COD: 0.0 ... 800.0 mg/l TOC: 0.0 ... 500.0 mg/l SAC: 0.0 ... 600.0 m-1 DOC: 0.0 ... 500.0 mg/l BOD: 0.0 ... 500.0 mg/l UVT: 0.0 ... 100.0 %	NO3-N: 0.0 ... 150.0 mg/l NO2-N: 0.00 ... 75.00 mg/l COD: 0 ... 20,000 mg/l TOC: 0 ... 20,000 mg/l SAC: 0 ... 5,000 m-1 DOC: 0 ... 12,500 mg/l BOD: 0 ... 8,000 mg/l UVT: 0.0 ... 100.0 %	NO3-N: 0.00 ... 50.00 mg/l NO2-N: 0.00 ... 25.00 mg/l COD: 0.0 ... 800.0 mg/l TOC: 0.0 ... 500.0 mg/l SAC: 0.0 ... 600.0 m-1 DOC: 0.0 ... 500.0 mg/l BOD: 0.0 ... 500.0 mg/l UVT: 0.0 ... 100.0 %
pH Range	4 to 12 pH units			

*For models with NI option. ** For models with TSS option.
***Measurement ranges dependent on measuring location and application.



	Sensors												
Parameters	**1** TriOxmatic®	**2** FDO®	**3** SensoLyt®	**4** TetraCon®	**5** VisoTurb®	**6** ViSolid®	**7** NitraVis®	**8** CarboVis®	**9** NiCaVis®	**10** VARiON®	**11** AmmoLyt®	**12** NitraLyt®	**13** IFL
Temperature	•	•	•	•	•	•	•	•	•	•	•	•	
DO (electrochemical)	•												
DO (optical)		•											
pH			•										
ORP			•										
Conductivity				•									
Salinity				•									
Turbidity					•								
TSS						•	•	•	•				
Ammonium										•	•		
Nitrate							•		•	•		•	
Nitrite							•		•				
Potassium										•	•		
Chloride*										•		•	
COD (chemical oxygen demand)								•	•				
TOC (total organic carbon)								•	•				
BOD (biochemical oxygen demand)								•	•				
DOC (dissolved organic carbon share of TOC)								•	•				
SAC (spectral absorption coefficient)								•	•				
Interface (Sludge) Level Measurement**													•

*Chloride is used as compensation only and is not a visible parameter on the IQSN system. Please contact us for more information.

System-wide Process Monitoring & Control

IQ Sensor Net 2020 XT

Influent:
pH, Conductivity, Ammonium, COD, TOC, DOC, BOD, SAC

Aeration:
D.O., Ammonium, Nitrate, TSS, pH

Effluent:
Ammonium, Nitrate, pH, Conductivity, D.O., Turbidity, COD, TOC, DOC, BOD, SAC

Back-up Terminal

Final Settling:
Nitrogen, Turbidity, TSS, pH, Sludge Blanket Level

What can Xylem do for you?

We're 12,500 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

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