



# IQ SensorNet

CONTINUOUS PROCESS MONITORING & CONTROL



a xylem brand



## Together, we're the smartest name in wastewater.

YSI has been a trusted partner in the municipal industry for decades, bringing customers products that are proven to be reliable and rugged. Being a trusted water quality partner takes continued support and innovation.

The first practical dissolved oxygen sensor was developed by YSI in the early 1960s and we continue to be the leader in laboratory BOD instrumentation and spot sampling instruments for aeration tanks and effluent sampling applications. YSI is renowned for its technical support with our dedicated team members to help our customers achieve the best data possible.

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And now more than ever, municipalities need a partner with the ability to improve their operational efficiency by providing innovative solutions for continuous process monitoring and control.

The YSI IQ SensorNet product line is the best solution for the municipal market - from small to large facilities. The network-based IQ SensorNet system is all about ease, scalability and performance; whether it is to monitor influent, reduce energy use during aeration, monitor effluent or control any part of the process such as biological nutrient removal, phosphorus removal or returned activated sludge. The IQ SensorNet system assists in the monitoring and control of your processes, often resulting in chemical and/or energy savings.

YSI is dedicated to remaining a trusted partner in the municipal industry. We are very excited to bring you our IQ SensorNet catalog to share our technology and continue to support our customers. With Your Brains and Our IQ, there's nothing we can't solve together.

*Cherie Buhle*

Process Product Manager



# Media

## VIDEOS

- [bit.ly/IQclean](http://bit.ly/IQclean) – UltraClean™ sensor cleaning
- [bit.ly/IQUVclean](http://bit.ly/IQUVclean) – UltraClean™ UV sensor cleaning
- [bit.ly/IQanimation](http://bit.ly/IQanimation) – IQ ease of use and setup
- [bit.ly/IQcolorado](http://bit.ly/IQcolorado) – IQ at WWTP testimonial
- [bit.ly/IQfeatures](http://bit.ly/IQfeatures) – IQ features and benefits
- [bit.ly/IQfdotip](http://bit.ly/IQfdotip) – FDO angled sensor bubble bypass

## APPLICATION NOTES

- [bit.ly/IQscada](http://bit.ly/IQscada) – WWTP using IQ with SCADA
- [bit.ly/IQammoniado](http://bit.ly/IQammoniado) – WWTP using IQ for ammonia and DO
- [bit.ly/IQturbiditytss](http://bit.ly/IQturbiditytss) – WWTP using IQ for turbidity and TSS
- [bit.ly/IQSNlittletonA600](http://bit.ly/IQSNlittletonA600) - WWTP Uses Process Monitoring and Control Technology for Increased Productivity and Efficiency
- [bit.ly/IQSNohioA619](http://bit.ly/IQSNohioA619) - Scioto Reserve WRRF Meets Discharge Limits for TIN with IQSN
- [bit.ly/IQSNorthoA620](http://bit.ly/IQSNorthoA620) - Monitoring Orthophosphate for Reduced Chemical Costs with the YSI IQSN

## WHITE PAPERS

- [How to Control Activated Sludge with Online Sensors -Bit.ly/IQSNsludgewhitepaper](http://bit.ly/IQSNsludgewhitepaper)
- [Solids Retention Time - bit.ly/SRTwhitepaper](http://bit.ly/SRTwhitepaper)
- [Dentrification - Bit.ly/IQSNdenitewhitepaper](http://bit.ly/IQSNdenitewhitepaper)

## HANDBOOKS

- [bit.ly/DOhandbook](http://bit.ly/DOhandbook)
- [bit.ly/YSIpHbook](http://bit.ly/YSIpHbook)



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# IQ SensorNet 2020 XT

Improve operational efficiency with continuous data. With an easily scalable solution, the 2020 XT allows for the measurement of up to 20 parameters. 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 process in your wastewater facility continuously and accurately.

## Only YSI can offer:

- 3-year warranty
- UltraClean™ ultrasonic cleaning on some sensors
- Modular expansion from 1 to 20 parameters per network
- Network modules by easily stacking, no need for extra cabling
- One cable for power and communications
- Factory-calibrated optical DO cap with a 2-year warranty
- USB interface (backs up system settings and locks to prevent accidental changes)
- System redundancy for backup control
- 12-month warranty on ISE sensors that are individually replaceable
- DC optional backup power



## The System 2020 XT

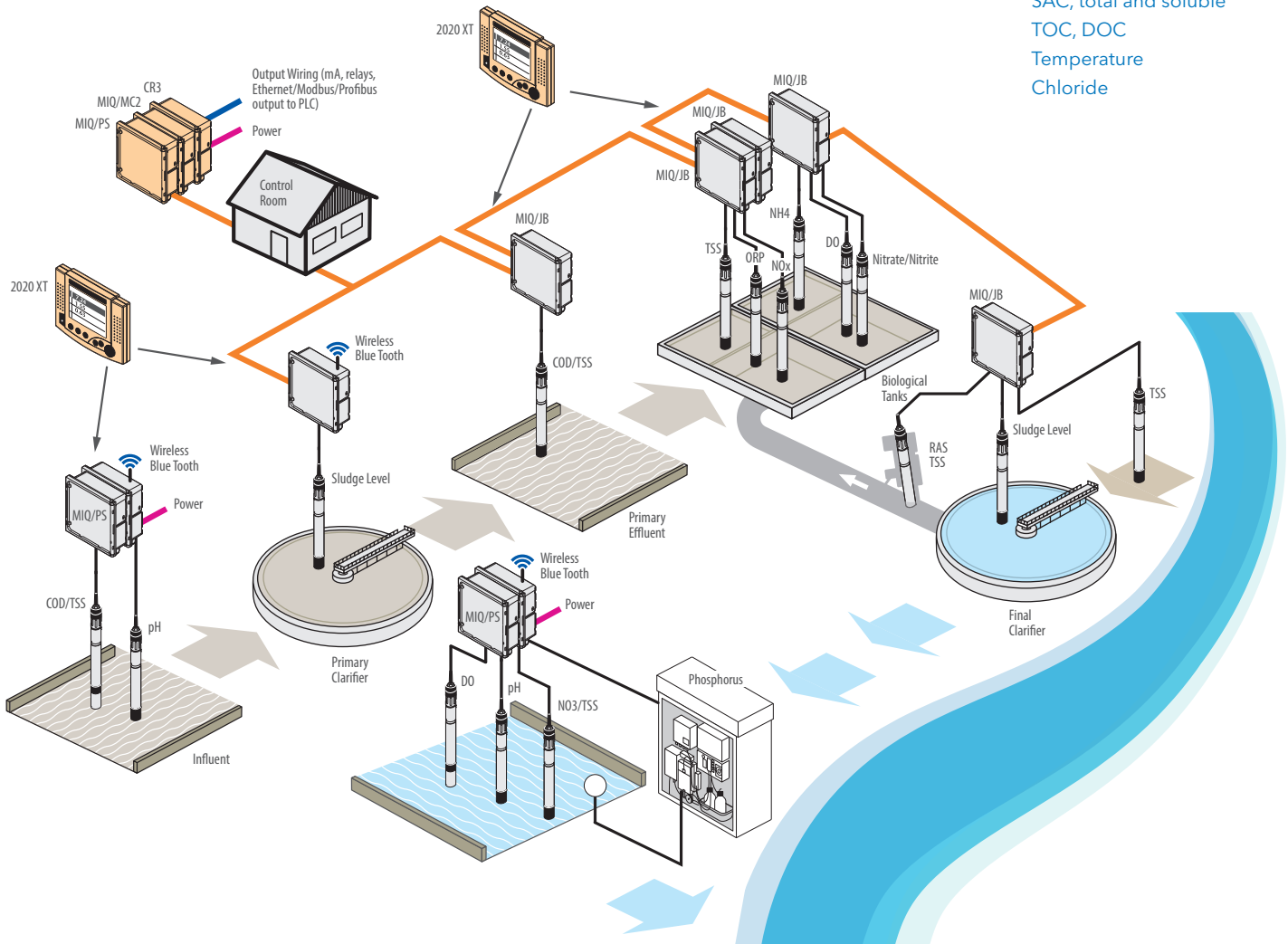
- Display up to 20 parameters plus temperature, in any combination
- Easy, intuitive system expansion
- Centralized power supply along entire network
- Numerous relays and outputs available
- Communications via modem, Bluetooth, radio transmission, Ethernet IP, LAN, USB/RS232, Modbus TCP/IP, Profibus, Modbus RTU
- LED status lights for quick visualization of system functionality
- Integrates into existing plant systems, such as PLCs and SCADA
- Change or move sensors at any time with ease

## 2020 XT Terminal Controller

<b>Certifications</b>	ETL, cETL (conforms with relevant UL and Canadian standards), CE
<b>Integrated Lightning Protection</b>	EN 61326 enhanced over voltage protection for entire system
<b>Electrical Connection</b>	Directly via IQ SensorNet when coupled to an MIQ module
<b>Datalogging</b>	525,600 data sets
<b>Display</b>	Graphic; 320 x 240 pixels; backlit, visible area: 4.49 x 3.39 in (114 x 86 mm)
<b>Warranty</b>	3 years
<b>Operating Temperature</b>	-4 to 131°F (-20 to 55°C)

### Parameters

Dissolved oxygen (optical or electrochemical)  
 TSS  
 Sludge Level  
 Turbidity  
 pH  
 ORP  
 Ammonium  
 Nitrate  
 Nitrite  
 NOx  
 Orthophosphate  
 Potassium  
 Conductivity/  
 Specific conductance  
 Salinity  
 UVT-254  
 BOD  
 COD, total and soluble  
 SAC, total and soluble  
 TOC, DOC  
 Temperature  
 Chloride



# IQ SensorNet 282/284



The YSI IQ SensorNet 282 and 284 are modular systems for a complete sensor network ideal for various installation needs. The modular system can accept additional sensors or output modules easily at any time. This is a powerful system to continuously measure water quality parameters anywhere in a facility for process monitoring and control.

## System 282/284

- Connect 1-4 digital sensors for monitoring up to 20 parameters
- One cable provides power and communications
- UltraClean™ ultrasonic cleaning on some sensors
- Analog or digital outputs; relays
- 3-year instrument warranty
- Tactile buttons; easily use while wearing gloves



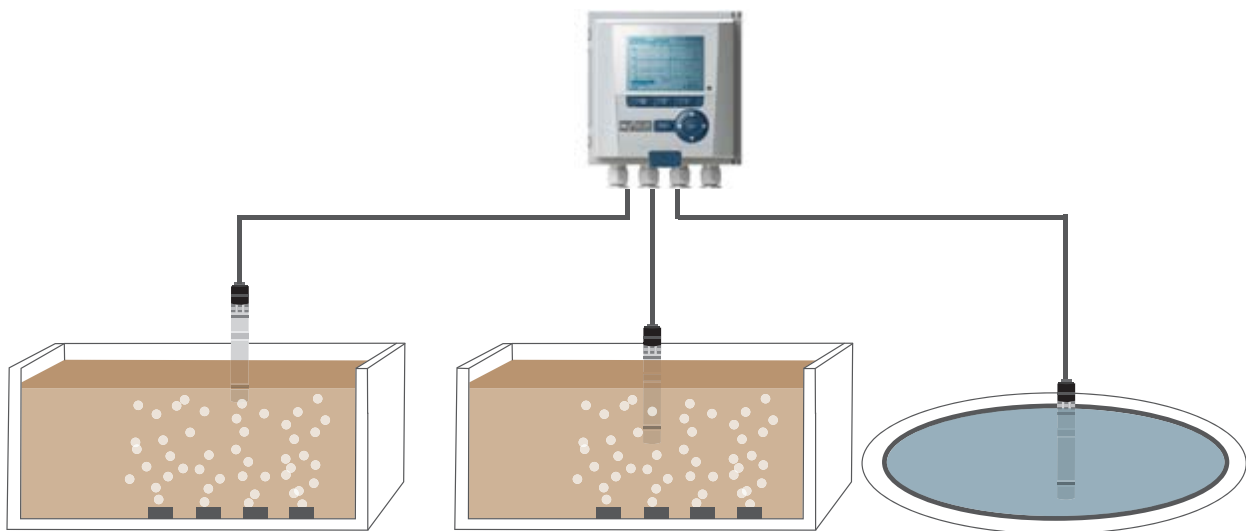
Model 282 shown stacked on one IQ SensorNet Module.

## 282/284 Terminal

<b>Certifications</b>	ETL, cETL (conforms with relevant UL and Canadian standards), CE
<b>Integrated Lightning Protection</b>	EN 61326 enhanced over voltage protection for entire system
<b>Display</b>	Graphic; 320 x 240 pixels; backlit, visible area: 3.03 x 2.52 in (77 x 64 mm)
<b>Warranty</b>	3 years
<b>Operating Temperature</b>	-4 to 131° F (-20 to 55°C)
<b>Electrical</b>	100 to 240 VAC/DC (50-60 Hz), 24 VAC/DC
<b>Interfaces</b>	USB & data logger (standard); options for PROFIBUS (RS485), MODBUS (RS485), Ethernet/IP, MODBUS TCP, PROFINET (RJ45), RJ45 for remote control
<b>Connectable Sensors</b>	All IQ SensorNet sensors are available

## Parameters

Dissolved oxygen  
(optical or electrochemical)  
TSS  
Turbidity  
pH  
ORP  
Ammonium  
Nitrate  
Nitrite  
NOx  
Orthophosphate  
Potassium  
Conductivity/  
Specific conductance  
Salinity  
UVT-254  
BOD  
COD, total and soluble  
SAC, total and soluble  
TOC, DOC  
Temperature  
Chloride  
Sludge level

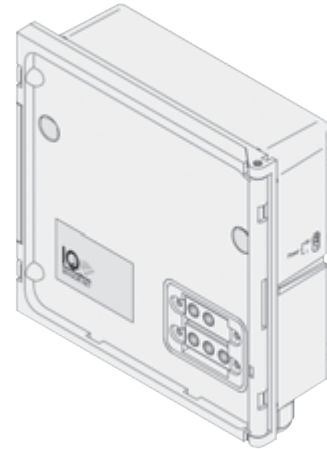


An example of the 284 using 3 sensors to monitor and control water quality throughout a facility.

# IQ SensorNet Modules

IQ SensorNet modules provide a variety of functions from power, to communications, to outputs, to controller, 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 parameters plus temperature)	284 (up to 4 parameters) 282 (up to 2 parameters)
Controller Modules with communications	Microcontroller (MIQ/MC3), Profibus (MIQ/MC3-PR), Modbus (MIQ/MC3-MOD) All include Ethernet IP and Modbus TCP/IP. Microcontroller can be used as main or backup controller.	
Power Supply Modules	110-240 VAC, 18 Watt (MIQ/PS) 24 VAC or 24 VDC (can be used as main or back-up) (MIQ/24V)	1-2 sensors, 3 outputs, 3 relays. 110-240 VAC, 18 Watt (DIQ/S 282-CR3) 24 VAC or 24 VDC option (DIQ/S 282-CR3/24V) 1-4 sensors, 6 outputs, 6 relays. 110-240 VAC (DIQ/S 284-CR6) 24 VAC or 240 VDC option (DIQ/S 284-CR6/24V)
Analog Output Modules	(3) relay and (3) current outputs (MIQ/CR3) (6) current outputs (MIQ/C6) (6) relays (MIQ/R6)	(3) relay and (3) current outputs (DIQ/S 282-CR3) (6) current outputs (DIQ/S 284-CR6) (6) relays (DIQ/S 284-CR6)
Interface Modules	Profibus DPV1 with FDT/DTM communication (MIQ/PR) Modbus Communication (MIQ/MOD)*	Profibus communication (DIQ/S 282-PR or DIQ/S 284-PR) Modbus communication (DIQ/S 282-MOD or DIQ/S 284-MOD)
Magnetic Valve Modules	Valve module for automatically controlled cleaning (MIQ/CHV Plus)	Valve module for automatically controlled cleaning (DIQ/CHV and MIQ/CHV Plus)
Bluetooth Communication Modules	Wireless connection (MIQ/WL PS Set, MIQ/WL PS)	Wireless connection (MIQ/WL PS Set, MIQ/WL PS)
Analog Input Modules	Current input module for connecting up to 2 "external" sensors via mA output signals (MIQ/IC2)	Current input module for connecting up to 2 "external" sensors via mA output signals (MIQ/IC2)
Extension Modules	4 IQ Connections - network or sensor (MIQ/JB) Repeater network to increase distance over 1 km (MIQ/JBR)	1-2 IQ Connections - network or sensor (DIQ/JB) 4 IQ Connections - network or sensor (MIQ/JB)

\*Optional: Profibus and Modbus modules with atmospheric pressure compensation for DO



# IQ SensorNet Sensors

All IQ SensorNet sensors are rugged, reliable digital sensors designed specifically for wastewater applications. Our sensors are detachable from the cable and can easily be switched out or moved. Just unscrew, move, and re-install.



## VisoTurb turbidity

- Multi-point factory calibration; no need to recalibrate; matrix adjustment is possible
- Ultrasonic cleaning with UltraClean™ technology prevents fouling and lowers maintenance
- 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 fouling and lowers maintenance
- Uses two measurement methods depending on concentrations - either scattered light or backscatter
- 2-year warranty
- Class I, Division 2 option (group D T6 rated - must be used with MIQ/BB2)

### VisoTurb and ViSolid Sensors

<b>SensCheck</b>	Continually monitors sensor functionality	
<b>Range VisoTurb</b>	FNU, NTU, TEF: 0.05 to 4000 FNU	g/L TSS: 0.0001 to 40 g/L TSS
<b>Range ViSolid</b>	mg/L TSS 0 to 400 mg/L 0 to 4000 mg/L 0 to 25,000 mg/L 0 to 40,000 mg/L	% TSS: 0.0003 to 100% TSS Practical range: 0.0003 to 4%



*"We were very surprised when we pulled it up for maintenance and it didn't need it. The UltraClean kept it totally clean."*

*Littleton/Englewood WWTP*



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

# IQ SensorNet Sensors



FDO

TriOxmatic



Sensor cap with memory chip for calibration data

## FDO | DO optical

- No electrolyte, calibration, interferences, or warm-up period
- Zero oxygen consumption technology eliminates the need for stirring
- Reliable, accurate measurements with 45 degree angle cap
- Extremely long sensor cap life; factory calibrated
- 2-year warranty on cap and probe
- Class I, Division 2 rated option (groups A, B, C, D, T6) when used with MIQ/BB1



## TriOxmatic | DO electrochemical

- SensReg function monitors electrolytic solution
- SensLeak function monitors for membrane leakage
- No break-in period or long-term drift
- Digital sensors store calibrations
- 2-year warranty



## FDO Sensor

<b>Interferences</b>	None	
<b>Calibration</b>	Factory calibrated	
<b>Operating Temperature</b>	23 to 122°F (-5 to 50°C)	
<b>Sensor Type</b>	Optical DO	
<b>Range</b>	0 to 20.00 mg/L 0 to 200.0%	
<b>Resolution</b>	0.01 mg/L 0.1%	
<b>Response Time at 25°C</b>	FDO 700 IQ T90 = <150 seconds T99 = <200 seconds	FDO 701 IQ T90 = <80 seconds
<b>Minimum Flow Rate</b>	0 - none required	

## TriOxmatic Sensor

<b>Operating Temperature</b>	32 to 140°F (0 to 60°C)		
<b>Sensor Type</b>	Electrochemical DO		
<b>Range</b>	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%
<b>Resolution</b>	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%
<b>Response Time at 25°C</b>	T90 = 180 seconds	T90 = 30 seconds T99 = 90 seconds	T90 = 30 seconds T99 = 110 seconds
<b>Minimum Flow Rate</b>	0.05 m/s (1.9 in/sec)	0.23 m/s (9 in/sec)	0.3 m/s (11.8 in/sec)



## VARiON | ammonium/nitrate/potassium

- Single- or dual-measurement of ammonium and nitrate; compensation for potassium or chloride
- Factory calibrated & stable slope
- Compensation electrode; prevents interferences and improves accuracy
- 2-year warranty, industry-leading 1-year warranty on electrodes
- Stable reference system holds calibration providing reliable measurements and extended electrode life

## AmmoLyt | NitraLyt ammonium/potassium | nitrate/chloride

- Ammonium or nitrate measurement with continuous potassium or chloride compensation
- Factory calibrated & stable slope
- Compensation electrode; prevents interferences and improves accuracy
- 2-year warranty, industry-leading 1-year warranty on electrodes
- Stable reference system holds calibration providing reliable measurements and extended electrode life



ISE probes with individually replaceable electrodes, lowers consumable costs

 [ysi.com/varion](https://www.ysi.com/varion)

 [ysi.com/ammolyt](https://www.ysi.com/ammolyt)

 [ysi.com/nitralyt](https://www.ysi.com/nitralyt)

## VARiON, AmmoLyt and NitraLyt Sensors

### Operating Temperature and Compensation Temperature Range

32 to 104°F (0 to 40°C)

### Sensor Type

**ISE Ammonium  
(VARiON or AmmoLyt)**

**ISE Nitrate  
(VARiON or NitraLyt)**

### Range/Resolution VARiON

**NH<sub>4</sub>-N:**  
1 to 2000 mg/L / 0.1 mg/L  
0.1 to 100 mg/L / 0.1 mg/L

**NO<sub>3</sub>-N:**  
1 to 1000 mg/L / 0.1 mg/L  
0.1 to 100 mg/L / 0.1 mg/L

**NH<sub>4</sub><sup>+</sup>:**  
1 to 1290 mg/L / 0.1mg/L  
0.1 to 129.0 mg/L / 0.1 mg/L

**NO<sub>3</sub><sup>-</sup>:**  
5 to 4500 mg/L / 0.1 mg/L  
0.5 to 450.0 mg/L / 0.1 mg/L

**K<sup>+</sup>:**  
1 to 1000 mg/L / 0.1 mg/L

**CL<sup>-</sup>:**  
1 to 1000 mg/L / 0.1 mg/L

### pH Range

4 to 8.5 pH units

4 to 11 pH units

### Temperature Range

±5% of measured value ±0.2 mg/L in standard solution

# IQ SensorNet Sensors

## UV & UV/VIS

Nitrate, Nitrite, TSS, NO<sub>x</sub>, COD (total and soluble), TOC, DOC, BOD, UVT-254, SAC (total and soluble)

IQ SensorNet UV and UV/VIS sensors are optical-based, reagentless spectrophotometers built into rugged, corrosion-resistant probes that are designed to measure accurately in harsh applications. Single and broad spectrum options available. The spectral sensors scan 256 wavelengths per measurement for increased accuracy and single wavelength sensors with turbidity compensation are available for NO<sub>x</sub> and UVT-254 (SAC) measurements. All UV/ UV-VIS sensors utilize UltraClean™ ultrasonic technology to prevent fouling and lower maintenance requirements.



### All sensors:

- Ultrasonic cleaning with UltraClean™ technology prevents fouling and lowers maintenance requirements
- Built-in airholes for added air cleaning in high fouling applications
- No reagents required means reduced operational costs and less impact on the environment
- Durable, long-lasting materials: Titanium and PEEK will hold up in the toughest conditions
- 2-year warranty
- IP68
- Detection of organic loads immediately without reagents

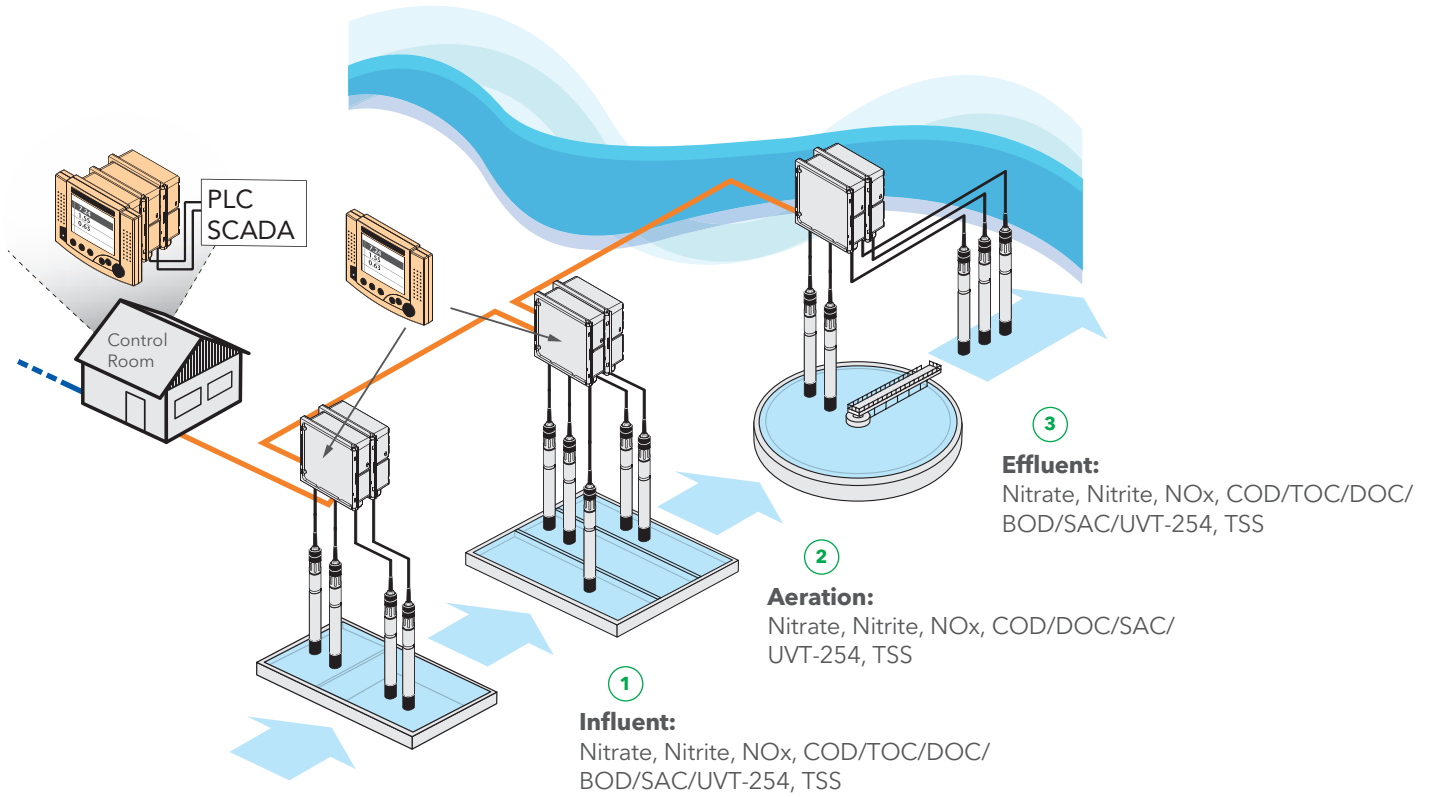
### Spectral Sensors (NitroVis, CarboVis, NiCaVis, NitroVis NI, NiCaVis NI, TSS):

- UV and UV/VIS sensors with 256 wavelength scan
- Scanning 256 wavelengths results in more accurate measurements and better compensation for interferences
- User calibration possible for improved accuracy
- Factory calibrated per location in the process (influent, aeration, effluent)
- Ability to differentiate between Nitrate and Nitrite concentrations (on NI sensors only)
- Display up to five parameters depending on the application
- Calculated parameters: COD, TOC, BOD, Nitrate, Nitrite, TSS (depending on sensor)

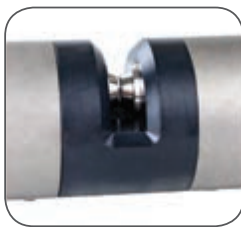
### Single Wavelength (UVT-254, NO<sub>x</sub>):

- Turbidity compensation
- Regulate and control UV disinfection with UVT-254
- Correlated parameters: COD, TOC, BOD, DOC from UVT-254 (SAC) measurement

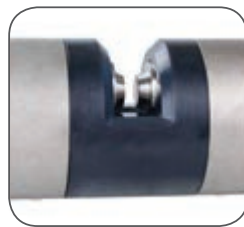




**Two gap sizes for higher and lower parameter concentrations:**



**701**  
1 mm  
Optimal for influent and aeration (higher concentrations)



**705**  
5 mm  
Optimal for effluent (lower concentrations)

**The spectral sensors at a glance:**

**CarboVis:** ① ② ③  
Measuring parameters: COD/TOC/DOC/BOD/SAC/UVT-254, optional TSS

**NitraVis (NI) (TSS):** ① ② ③  
Measuring parameters: Nitrate (Nitrite & TSS optional)

**NiCaVis:** ③  
Measuring parameters: Nitrate, COD/TOC/DOC/BOD/SAC/UVT-254

**NiCaVis NI:** ① ② ③  
Measuring parameters: Nitrate, Nitrite, COD/TOC/DOC/BOD/SAC/UVT-254

Online monitoring of the nitrate concentration at critical locations provides the information needed to achieve the three objectives for a denitrification control system:

- (1) meet discharge limits for nitrogen
- (2) maximize use of wastewater COD
- (3) minimize the addition of external carbon

# IQ SensorNet Sensors



## IFL Sludge Level Sensor

- Smart signal filters out interferences like sludge rakes for reliable sludge level measurements all the time
- Non-contact, maintenance-free automatic wiper option available
- Factory calibrated

## IFL 700 IQ Sensor

<b>Measuring Method</b>	Ultrasonic echo measurement
<b>Measuring Range</b>	0.4 to 15 m (1.3 to 49.2 ft)
<b>Resolution</b>	0.01 m (0.03 ft)
<b>Accuracy</b>	0.1 m (0.3 ft)
<b>Signal Filters</b>	Yes
<b>Flow Speed</b>	Maximum 4 m/s (13.1 ft/s)
<b>Immersion Depth</b>	Minimum 5 cm (1.9 in); maximum 3 m (9.8 ft)
<b>pH Range</b>	4 to 12 pH units
<b>Temperature Range</b>	Medium: > 32 to 122°F (0 to 50°C)



IFL with deflector for passing over a skimmer arm



IFL sensor with graph displaying sludge blanket level data



## YSI P700 Orthophosphate Analyzer

Monitor your biological phosphorus removal and control chemical dosing with the YSI IQ SensorNet P700 orthophosphate analyzer. The P700 measures the amount of orthophosphate throughout the wastewater treatment process – from primary settling to the biological tanks and the effluent. The analyzer provides continuous data to help improve operational efficiency, lower operational costs as well as verification of phosphate elimination in order to meet permit requirements.

- Reliable sample delivery system – sample pump is housed in analyzer
- Low reagent consumption – solutions exchanged every 4 – 8 months, reducing operational costs
- Automatic or manual calibration (user-selectable)
- Automatic or manual cleaning (user-selectable)
- Proven Vanadomolybdate (yellow) method of detection
- Wide measuring range – two measuring ranges allow the P700 to be used throughout the facility
- Lightweight, easily accessible, 0.45 micron filter provides clean sample to analyzer
- Outdoor version with climate package and heated sample lines available



### P700 IQ Technical Specifications

<b>Measurement Method</b>	Vanadomolybdate (yellow)
<b>Measurement Range PO<sub>4</sub>-P</b>	Range A: 0.05 to 15.00 mg/L; Range B: 1 to 50 mg/L
<b>Resolution PO<sub>4</sub>-P</b>	Range A: 0.01 mg/L; Range B: 1 mg/L
<b>Accuracy PO<sub>4</sub>-P</b>	Range A: ±2% or ±0.05 mg/L, whichever is greater; Range B: ±2% or ±1 mg/L, whichever is greater
<b>Measurement Range PO<sub>4</sub></b>	Range A: 0.15 to 46.00 mg/L; Range B: 3 to 153 mg/L
<b>Resolution PO<sub>4</sub></b>	Range A: 0.01 mg/L; Range B: 1 mg/L
<b>Accuracy PO<sub>4</sub></b>	Range A: ±2% or ±0.15 mg/L, whichever is greater; Range B: ±2% or ±3 mg/L, whichever is greater
<b>Response Time T-90</b>	< 5 minutes
<b>Detection Limit</b>	Range A: 0.05 mg/L PO <sub>4</sub> -P; Range B: 1 mg/L PO <sub>4</sub> -P
<b>Calibration</b>	Automatic or manual (user selectable)
<b>Dimensions</b>	~26.69 x 30.71 x 15.55 in (~678 x 780 x 395 mm)
<b>Weight</b>	~66 lbs (~30 kg); without reagents
<b>Measuring Interval</b>	Range A: 5 minutes (adjustable) or greater; Range B: 10 minutes or greater
<b>Cleaning Solution</b>	1,000 mL for 4 months with cleaning every 24 hours
<b>Climate Control (optional)</b>	Heating, Cooling (fan)
<b>pH range</b>	5 to 9 pH units
<b>Operating Temperature</b>	-20 to 40°C (-4 to 104°F) without climate package 15 - 40° C (59-104° F)
<b>Storage Temperature</b>	-20 to 50°C (-4 to 122°F) without climate package 15 - 40° C (59-104° F)
<b>Sample Temperature</b>	4 to 45°C (39 to 113°F)
<b>Reagent Consumption</b>	2500 mL for 8 months with measuring range A and 10 minute measuring interval 2500 mL for 4 months with measuring range B and 10 minute measuring interval
<b>Outputs</b>	Relays, analog outputs, various communication protocols, interfaces directly with IQ SensorNet 2020 XT and 282/284 Controllers

# IQ SensorNet Sensors



## Sensolyt pH/ORP

- SensCheck function monitors sensors
- Electrodes are protected
- Easily replace electrodes without tools
- Pre-amplified sensors
- Digital sensors store calibration
- 2-year warranty (6-months electrodes)
- Replaceable combination electrode eliminates need for salt bridge
- Automatic temperature compensation

 [ysi.com/sensolyt](http://ysi.com/sensolyt)

### Sensolyt Sensor

<b>Operating Temperature</b>	32 to 140°F (0 to 60°C)			
<b>Electrode Type</b>	ECA pH (gel electrolyte with single pinhole diaphragm)	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)	PtA ORP mV (gel-polymer solid electrolyte with double pinhole diaphragm)
<b>Range</b>	2 to 12 pH units	SEA: 2 to 12 pH units SEA-HP: 4 to 12 pH units	0 to 14 pH units	±2000 mV (depends on terminal)
<b>Application</b>	standard wastewater	seawater/high pressure	drinking water	wastewater
<b>Accuracy</b>	+/- 0.2 pH	+/- 0.2 pH	+/- 0.2 pH	+/- 0.5 degrees K



## TetraCon conductivity/salinity/TDS

- 4-electrode design
- Robust and durable in the field
- Wide measurement range
- Fouling resistant
- 2-year warranty

 [ysi.com/tetracon](http://ysi.com/tetracon)

### TetraCon Sensor

<b>Operating Temperature</b>	32 to 140°F (0 to 60°C)
<b>Conductivity</b>	<b>Range:</b> 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  <b>Accuracy:</b> ±1.5% of reading without calibration ±0.7% of reading with calibration
<b>Salinity</b>	<b>Range:</b> 0 to 70 ppt
<b>TDS</b>	<b>Range:</b> 0 to 2000 mg/L
<b>Cell Constant</b>	K = 0.917 cm (in free solution) K = 0.933 cm (with flow thru adapter)
<b>Temperature - Integrated NTC</b>	<b>Range:</b> -5°C to 60°C (23 to 140°F)  <b>Accuracy:</b> ±0.5K





### Sensors / Analyzer

	1 TriOxmatic®	2 FDO®/C1D2	3 Sensolyt®	4 TetraCon®	5 VisoTurb®	6 ViSolid®/C1D2	7 VARiON®	8 Ammolyt®	9 Nitralyt®	10 IFL®	11 P700 IC
<b>Parameters</b>											
DO (electrochemical)	•										
DO (optical)		•									
pH			•								
ORP			•								
Conductivity				•							
Salinity + TDS				•							
Turbidity					•						
TSS						•					
Ammonium							•	•			
Nitrate							•		•		
Orthophosphate											•
Potassium							•	•			
Chloride							•		•		
Sludge Level										•	
Temperature	•	•	•	•			•	•	•		

UV & UV/VIS sensors can be found on page 10 & 11

# Mounting Options



**Handrail Mount**  
 Monitor shown with sun shield. Both sensor and monitor shown with hand-rail mounts



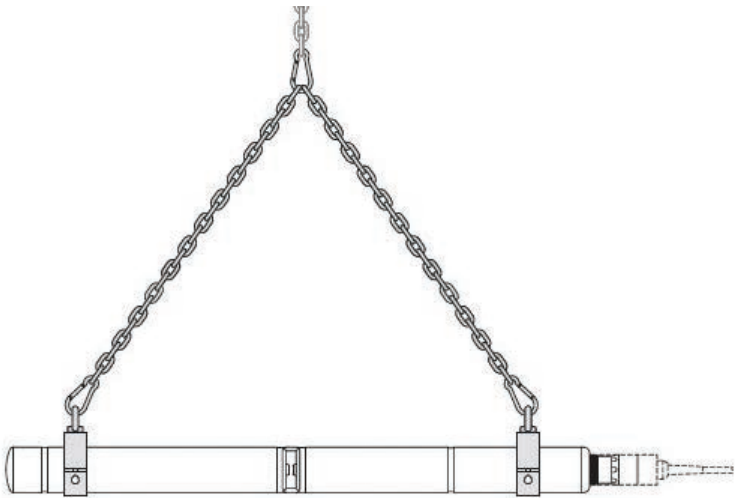
**Chain Mount**  
 Provides self cleaning, shown with single sensor holder



With extensions and triple sensor holder



With dual sensor holder



**Horizontal Chain Mount for UV and UV/VIS sensors** (optional)

## Flow Thru and Insertion Mounts (additional options available)



**Float Mount**  
Available as single, dual, or 4-sensor mount

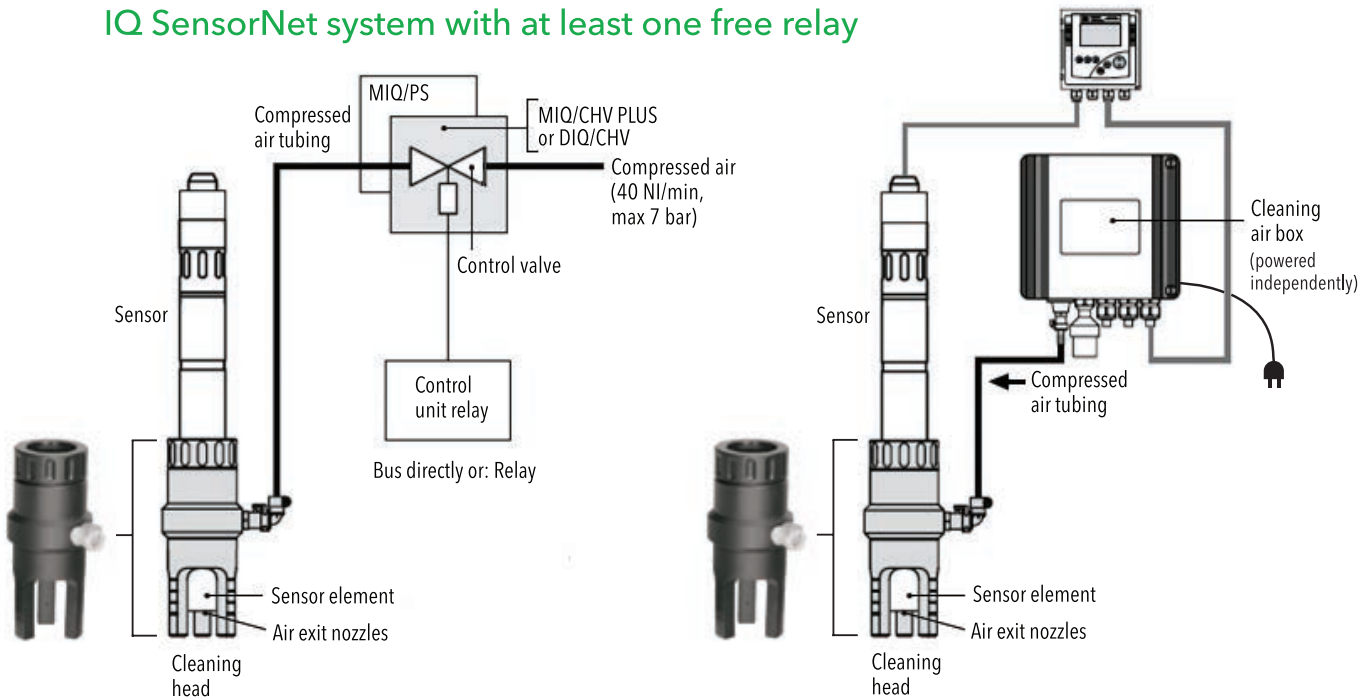


**Pressurized, retractable insertion mount**  
2 bar or 10 bar overpressure



**Flow thru for 2 inch PVC**  
Available with and without cleaning connections

## IQ SensorNet system with at least one free relay



# System-wide Process Monitoring & Control

## IQ SensorNet 2020 XT

### Influent:

pH, Conductivity, Ammonium, Nitrate, COD, TOC, DOC, BOD, SAC

### Aeration:

D.O., BOD, Ammonium, Nitrate, Nitrite, NOx, TSS, pH, Phosphate



**Effluent:**

Ammonium, Nitrate, Nitrite,  
UVT-254, Orthophosphate,  
pH, Conductivity, D.O.,  
Turbidity, COD, TOC, DOC,  
BOD, SAC



**Back-up Terminal**

**Final Settling:**  
Turbidity, TSS, Sludge Level



# Only YSI

The modular YSI IQ SensorNet water quality monitoring and control system is a complete sensor network for a variety of application needs. This powerful system lets you easily add more modules or sensors at any time while continuously measuring water quality anywhere in your facility for the ultimate process control. In addition, you receive the exclusive benefits below, as provided only by YSI. Sheer genius.

- UltraClean™ ultrasonic cleaning integrated into turbidity, TSS, UV and UV-VIS sensors
- One cable for power and communication – send measurement data back to control room via IQ SensorNet cable. No need for 4 - 20 mA cable, extra power drops and conduit runs.
- Display terminal connects to any module or network
- 3-year warranty, terminals and displays
- 2-year warranty, sensors
- Terminals, modules, and sensors can be placed anywhere in the network
- Measure up to 20 parameters per network
- Network scales easily without new hardware or engineering
- Smart technology recognizes and displays sensors
- Network outputs analog and digital signals
- Detachable sensors that use a universal sensor cable
- USB electronic key function 'locks' and saves system settings from accidental changes
- No calibration required on most sensors; automatic drift compensation
- Measures DO, conductivity, temperature, pH, ORP (Redox), nitrate, nitrite, NOx, soluble and total for COD and SAC, UVT-254, orthophosphate, sludge level, ammonium, potassium, turbidity, TSS, BOD, DOC, TOC, chloride
- Optical DO sensor is immune to bubble interference with unique angled design
- Back-up controller function with 2 display terminals or 1 display and 1 MC3 module



# Order Guide

Building a system is easy. Just choose an IQ SensorNet controller, select which modules you'll need, determine your distances for cabling, and select your parameters. And don't forget your accessories. Let's get started.

## First, ask yourself this:

- 1) Which location are you monitoring?  
(influent, biological tank, RAS line, effluent, etc.,)
- 2) Which parameters do you need to monitor? Select sensors.
- 3) What type of outputs are required and how many of each signal type? Select modules.
- 4) Which controller do you need?  
(based on the number of parameters, outputs and relays needed) Select controller.
- 5) What is the distance between modules? Select cable length.
- 6) How will the sensors and modules be mounted?  
Select mounting.

## Second, select your system:

### Controller\*

#### 282

- Sensor network for up to 2 sensors and up to 20 parameters
- DIQ/S 282-CR3 (up to 2 sensors, 3 analog outputs, 3 relays)
- DIQ/S 282-PR (up to 2 sensors, with PROFIBUS, 3 relays)
- DIQ/S 282-MOD (up to 2 sensors, with MODBUS, 3 relays)
- DIQ/S 282-CR3-E (up to 2 sensors, 3 analog outputs, 3 relays, with RJ45 interface for internet access and remote control)
- DIQ/S 282-EF (up to 2 sensors, 3 relays, Ethernet fieldbuses, internet access and remote control)

#### 284

- Sensor network for up to 4 sensors and up to 20 parameters
- DIQ/S 284-CR6 (up to 4 sensors, 6 analog outputs, 6 relays)
- DIQ/S 284-PR (up to 4 sensors, with PROFIBUS, 3 relays)
- DIQ/S 284-MOD (up to 4 sensors, with MODBUS, 3 relays)
- DIQ/S 284-CR6-E (up to 4 sensors, 6 analog outputs, 3 relays, with RJ45 interface for internet access and remote control)
- DIQ/S 284-EF (up to 4 sensors, 3 relays, Ethernet fieldbuses, internet access and remote control)

#### 2020 XT

- Sensor network and 1-20 parameters
- MIQ/TC 2020 XT

### Modules\*\* (I)

#### Power Supply

- MIQ/PS: 100 -240 VAC
- MIQ/24V: 24 VAC or 24 VDC

#### Analog Outputs

- MIQ/CR3: 3 current outputs, 3 potential-free relays
- MIQ/C6: 6 current outputs
- MIQ/R6: 6 potential-free relays

\* Power supply included for 282 and 284 only

\*\* Modules can be stacked without using cables (maximum of 3 modules)

#### Interfaces

- MIQ/PR: PROFIBUS DPV1 with FDT/DTM communication
- MIQ/MOD: Modbus communication
- MIQ/MC3(S) backup controller. Ethernet IP and Modbus TCP/IP standard. Modbus RTU, Profibus and Profinet can be added.

#### Magnetic Valve

- MIQ/CHV Plus: Valve module for automatically controlled cleaning
- DIQ/CHV: Valve module for System 282 or 284

#### Bluetooth Communication

- MIQ/WL PS Set, MIQ/WL PS: wireless connection

### Modules (II)

#### Analog Inputs

- MIQ/IC2: current input module for connecting up to 2 "external" sensors via mA output signals

#### Extension

- MIQ/JB: 4 IQ connections (network or sensor)
- MIQ/JBR: repeater module to increase the maximum distance over 1 km
- DIQ/JB: 2 IQ connections (network or sensor)

## Third, choose parameters and sensors:

- VisoTurb® (turbidity) with UltraClean™
- ViSolid® (TSS) with UltraClean™
- FDO® (DO optical)
- TriOxmatic® (DO electrochemical)
- VARiON® (ISE)
- AmmoLyt® (ISE)
- NitraLyt® (ISE)
- NitraVis (spectral) with UltraClean™
- CarboVis (spectral) with UltraClean™
- NiCaVis (spectral) with UltraClean™
- NitraVis NI (spectral) with UltraClean™
- NiCaVis NI (spectral) with UltraClean™
- UV701 NOx (single wavelength) with UltraClean™
- UV705 NOx (single wavelength) with UltraClean™
- UV701 UVT-254 (single wavelength) with UltraClean™
- UV705 UVT-254 (single wavelength) with UltraClean™
- IFL® (sludge level)
- P700 IQ (orthophosphate)
- SensoLyt® (pH/ORP)
- TetraCon® (conductivity/salinity/TDS)



## Xylem |'zīl m|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team 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.

For more information on how Xylem can help you, go to [xylem.com](http://xylem.com)

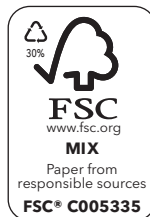


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YSI, Inc. saved the following resources by using U2:YG paper made with 30% post-consumer recovered fiber.				
trees	energy	greenhouse gas	waste water	solid waste
2.1	.10 million BTUs	669 lbs CO <sub>2</sub>	1,015 gal	68 lbs
U2:YG is FSC-certified, contains 30% post consumer recovered fiber, and is manufactured with electricity in the form of renewable energy.				
U2:YG is manufactured by Appleton Coated <a href="http://www.appletoncoated.com">www.appletoncoated.com</a>				