

THORNTON

Leading Pure Water Analytics

5000TOCe Sensor Enhanced

Fast, continuous measurements

No reagents or chemicals needed

No moving parts

Meets USP (643), (645),

EP 2.2.44, and JP requirements

Compact wall-mount sensor design/ NEMA 4X enclosure for skid mounting

770MAX Multiparameter Smart Sensor compatible

5000TOC

Continuous On-Line Measurements

Total Organic Carbon Monitoring



Features

- Advanced UV lamp design extends stability and wavelength emission over lamp life
- Sample Conditioning Coil (included) can prevent CO₂ permeation into the water sample and will stabilize inlet flow, pressure and temperature irregularities
- On-line continuous measurements, no batch measurement cycle
- 770MAX Smart Sensor interface
- Two TOC Sensors connect to one 770MAX, with four channels remaining for other available sensors
- Local LED Sensor status indication
- Integrates standard 770MAX Multiparameter Instrument features with specific TOC sensor functions
 - UV Lamp run time status and UV Lamp ON/OFF control
 - Fault and Error messages for TOC measurement
 - TOC Sensor key lock function for safe operation
 - Auto start function allows TOC Sensor to start automatically after power interruption

Benefits

- Continuous flow design provides rapid TOC response with complete oxidation
- No gases or reagents to handle, store or replace and no moving parts minimize routine maintenance and service intervals
- Smart sensor design reduces installation and setup time
- Real-time continuous monitoring for precise data trending and better process control
- Wide dynamic operating range meets the needs of pure and ultrapure water applications
- Meets USP (643), (645), EP 2.2.44 and JP requirements for the Pharmaceutical Industry
- Sensor platform allows easy integration into water purification make-up and distribution system designs
- Ultra low TOC detection for ultrapure water applications to continuously monitor critical organic levels in Semiconductor make-up, distribution and process systems
- Two TOC measurement points with one 770MAX instrument to manage performance of various unit processes within water purification systems
- Compact NEMA 4X rated enclosure for demanding industrial environments
- Meets ASTM D5173 standard test method for on-line TOC monitoring
- Conductivity/temperature sensor and measurements traceable to NIST and ASTM D1125 and D5391

Applications

Pure and Ultrapure water production requires monitoring of organic contamination throughout the treatment process. The 5000TOCe Sensor provides continuous, fast, and reliable monitoring of TOC levels from post RO waters to point-of-use. With continuous on-line measurements, the 5000TOCe Sensor ensures TOC excursions will not be missed.

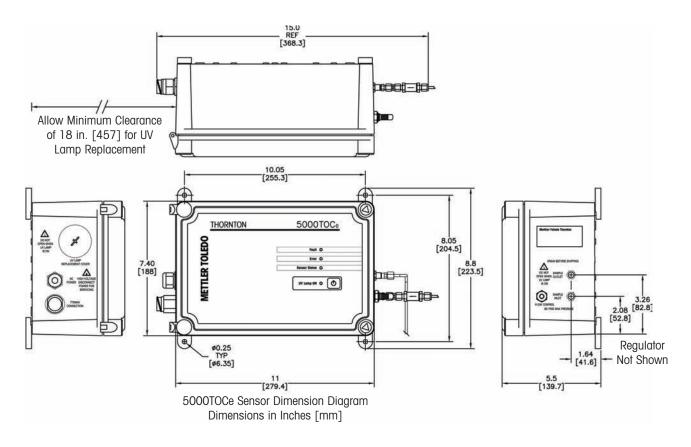
Pharmaceutical-grade waters must meet strict water quality requirements. This highly regulated industry mandates the monitoring of Total Organic Carbon levels for PW (Purified Water), WFI (Water for Injection) and HPW (Highly Purified Water). The instruments used in this application must also undergo periodic testing to verify the ability to completely oxidize and accurately measure TOC. Testing requirements are described in the USP Chapter $\langle 643 \rangle$ and EP 2.2.44. The 5000TOCe Sensor provides the performance needed to meet these requirements, and USP $\langle 645 \rangle$ for conductivity, while offering added benefits such as continuous on-line measurement in a low-maintenance, industrial package. The 5000TOCe Sensor can operate at elevated temperatures to 100°C, where steam and periodic hot water sanitizing is required.

Semiconductor manufacturing processes have some of the most stringent specifications for organic contamination in pure and ultrapure water systems. Use the 5000TOCe Sensor throughout the plant to monitor the integrity of reverse osmosis membranes, the effectiveness of TOC destruct UV lamps, resin bed performance, organics shedding, and the quality of the final rinse water.

Recycle and reclaim applications take advantage of the fast analysis time. The 5000TOCe Sensor provides continuous monitoring, not lengthy batch cycles. This provides the system operator with time to respond to TOC excursions due to process variability.

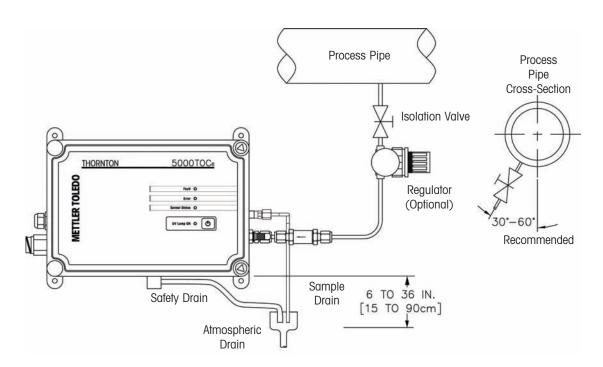
Power generation makeup water treatment – from reverse osmosis to demineralizers, the 5000TOCe Sensor provides fast reliable monitoring of TOC contamination in the water system. Organic contamination, can be detected before it enters the steam cycle where its breakdown to organic acids can accelerate corrosion.

Dimensional Data



5000TOCe Sensor Installation

The Thornton 5000TOCe Sensor minimizes installation and setup time. Two tubing connections are required, one for the sample inlet, and one for the oxidized sample outlet. An isolation valve is recommended at the sample point for shutoff, as needed (valve not supplied by Thornton).



5000TOCe Performance Specifications

TOC Sensor	
Measurement Range	0.05 - 1000 ppbC (μgC/L)
Accuracy	\pm 0.1 ppb C for TOC < 2.0 ppb (for water quality > 15 M Ω -cm [.067 μ S/cm])
Accuracy	\pm 0.2 ppb C for TOC > 2.0 ppb and < 10.0 ppb (for water quality > 15 M Ω -cm)
	\pm 5% of measurement for TOC > 10.0 ppb (for water quality 0.5 to 18.2 M Ω -cm)
Repeatability	± 0.05 ppb C < 5 ppb, $\pm 1.0\%$ > 5 ppb
Resolution	0.001 ppbC (μgC/L)
Analysis Time	Continuous
Initial response time	< 60 seconds
Limit of Detection	0.025 ppbC
Conductivity Sensor	0.020 ррво
Cell Constant Accuracy	± 2%
Temperature Sensor	Pt1000 RTD, Class A
Temperature Accuracy	± 0.25°C
Sample Water Requirement	
Temperature	0 to 100 °C *
Particle Size	<100 micron
Minimum Water Quality	$\geq 0.5 \text{ M}\Omega$ -cm ($\leq 2 \mu\text{S/cm}$), pH < 7.5 **
Flow Rate	> 20 mL/min
Pressure	4 to 200 psig (0.3 bar to 13.6 bar) at sample inlet connection ***
General Specifications	4 to 200 paig (0.0 but to 10.0 but) at outtiple title contribution
Case Dimensions	11" [280mm] W x 7.4" [188mm] H x 5.25" [133mm] D
Weight	5.0 lb. (2.3 kg)
Enclosure material	Polycarbonate plastic, flame retardant, UV and chemical resistant
Enologate malerial	UL # E75645, Vol.1, Set 2, CSA #LR 49336
Enclosure rating	NEMA 4X, IP65 Industrial environment
Ambient Temperature/	5 to 50°C / 5 to 80% Humidity, non-condensing
Humidity rating	o to do dy o to do to trainiany, non donadroning
Power requirements	100 - 130VAC or 200 - 240VAC, 50/60 Hz, 25W Maximum
Local Indicators	Four LED lights for Fault, Error, Sensor Status and UV Lamp ON
Ratings/Approvals	CE Compliant, UL and cUL (CSA Standards) listed, NEMA 4X, IP65
ramiger pproraie	Conductivity and temperature sensors traceable to NIST, ASTM D1125 and
	D5391. Meets ASTM D5173 Standard Test Method for On-Line Monitoring of
	Carbon Compounds in Water by UV Light Oxidation
Sample Connections	Sanson Sompounds in Maior by St. Eight Sineamon
Inlet connection	0.125" [3mm] O.D. (6' [2m] FDA compliant PTFE tubing supplied)
Outlet connection	0.125" [6mm] O.D. Barb connection (5' [1.5m] flexible tubing provided)
Inlet Filter	316SS, inline 60 micron
Wetted parts	316SS/Quartz/PEEK/Titanium/PTFE/Polyurethane (outlet tubing only)/EPDM
Wall Mount	Standard, mounting tabs provided
Pipe Mount	Optional, with pipe-mount bracket accessory
poouiii	(for nominal pipe sizes 1" [2.4 cm] to 4" [10 cm])
Maximum Sensor Distance	300ff [91m]

^{*} Temperature above 70°C requires Sample Conditioning Coil (included)

** For power plant cycle chemistry samples, pH may be adjusted by measurement after cation exchange.

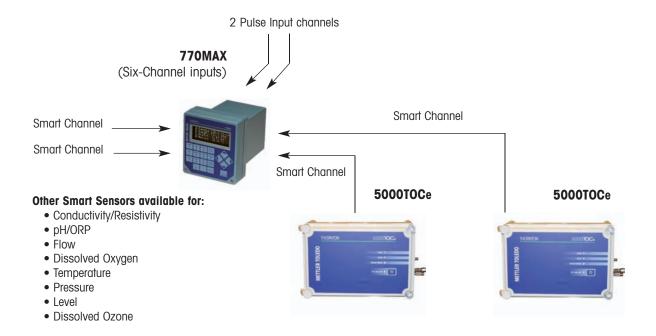
*** Process pressure above 85 psig (5.9 bar) requires optional High Pressure Regulator p/n 58 091 552.

Specifications subject to change without notice.

770MAX Capability

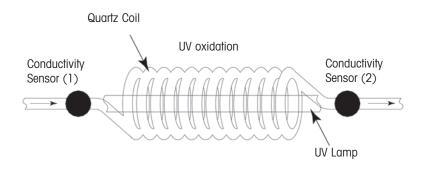
The 5000TOCe Sensor uses Smart Sensor technology interfacing with the 770MAX Multiparameter Analyzer/Transmitter. The 770MAX instrument will allow up to two 5000TOCe Sensors to be connected to any of the four Smart input channels, leaving the two remaining channels for use with all other 770MAX Smart Sensors. The 770MAX also provides two pulse input channels for additional flow measurements. The Sensor connects directly to the 770MAX instrument using standard patch cables.

The 5000TOCe Sensor is designed to meet the requirements of today's industrial facilities with its UL rating and NEMA 4X enclosure. Combined with the 770MAX instrument it provides the most versatile and flexible TOC measurement platform available.



Measurement technology - UV Oxidation / Differential Conductivity

The 5000TOCe Sensor uses proven ultraviolet oxidation with differential conductivity (see schematic below) as the method to effectively determine TOC concentrations. High performance Thornton conductivity sensors provide continuous conductivity measurement before and after sample oxidation. This is accomplished using a continuous flow-through spiral quartz tube design that allows the sample to flow continuously through the sensor. This design maximizes exposure to the 185 nanometer UV light, while minimizing measurement response time and providing complete oxidation. This simple and effective design requires no reagents or chemicals and includes no moving mechanical components.



5000TOCe Sensor Ordering information

Description	Part N	
5000TOCe Sensor, 110 VAC, 50/60 Hz		001
5000TOCe Sensor, 220 VAC, 50/60 Hz		002
5000TOCe Sensor for low TOC 110 VAC, 50/60 Hz		003
5000TOCe Sensor for low TOC 220 VAC, 50/60 Hz		004
Accessories		
Printer, Serial Thermal, 110V *		010
Printer, Serial Thermal, 220V *		011
Kit, Tool, 5000TOCe Sensor		520
Kit, Pipe mounting, for 1-1/2" nominal pipe size		521
Kit, Pipe mounting, for 2" nominal pipe size		522
Kit, Pipe mounting, for 3" nominal pipe size	58 091	523
Kit, Pipe mounting, for 4" nominal pipe size	58 091	524
Adapter, 0.25" tube to 0.125" tube, compression type	58 091	
Adapter, 0.125" tube to 0.25" NPT-male connection	58 091	541
Adapter, 0.125" tube to 0.25" NPT-female connection	58 091	
Adapter, 0.125" tube to 0.5" 316 Stainless Steel pipe (0.75" Tri-Clamp Connection)		543
High Pressure Inlet Regulator, 1/4" NPT-female		552
Outlet Drain Tube	58 091	553
System Suitability and Calibration		
Kit, Calibration & System Suitability Test (SST & Calibration Standards Sold Seperately)		559
Validation Support Package		558
Combined System Suitability Standards and Calibration Solutions Set (Use with SST/Cal Kit 58 091 559. Includes solutions from 58 091 526 & 58 091 529)		537
System Suitability Standards (for use with SST/Cal Kit 58 091 559, includes 500 ppb as Sucrose, 500 ppb as p-Benzoquinone and reagent water for one test)	58 091	526
Calibration Solutions (for use with SST/Cal Kit 58 091 559, includes 500 ppb as Sucrose, 250 ppb as Sucrose verification, and reagent water)	58 091	529
Replacement Parts		
Replacement Inlet Filter Element, 60 micron (Pkg.2) (Recommended w/ lamp change)		551
Replacement UV lamp (recommended every 4500 hours of operation)		513
Kit, Fuse, Sensor PCB (for use on both 110 and 220 VAC models)		519
Replacement thermal paper (for printer)		012
* Printer connects to 770MAY PS_232 Serial output		

^{*} Printer connects to 770MAX RS-232 Serial output.

Product Support

The following 5000TOCe products and services are also available:

- Factory Instrument Calibration
- Customized Hands-On-Training
- Service and Calibration Contracts
 System Suitability Testing
- On-Site Calibration

Please contact your local Mettler-Toledo Thornton office for more information.

www.mt.com/thornton

Visit for more information

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Quality certificate.

Development, production and testing to ISO 9001.



A certified ServiceXXL provider.



CE Compliant



UL listed Meets Canadian Standards