9210e

On-line Total Organic Carbon Analyzer

Innovative Technology for Water Quality Monitoring

O·I·Analytical

Opportunity through Innovation™

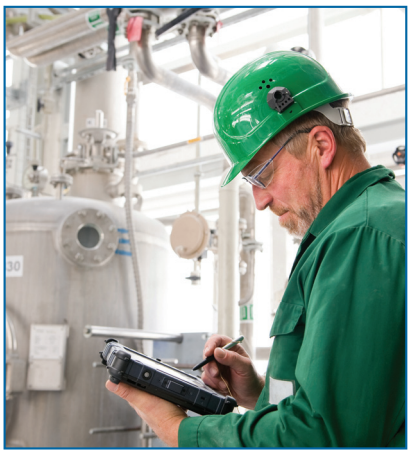
In 2006, OI Analytical began work on a project to develop a Total Organic Carbon Analyzer (TOCA) for use on the International Space Station. The successful culmination of the project came on November 14th, 2008, with NASA's launch of the Space Shuttle Endeavor carrying the TOCA for installation in the water recycling system on board the space station. The TOCA is used to analyze the organic carbon level in water that has been processed and purified ensuring it is safe for human consumption.

The innovative electrochemical-oxidation technology OI Analytical developed to produce the TOCA for the space station has been applied to designing the 9210e On-line Total Organic Carbon Analyzer.

The 9210e On-line TOC Analyzer is specifically engineered for operation in process environments. The instrument can be wall or rack mounted in indoor or shade-sheltered outdoor locations. Instrument calibration is accomplished in minutes using a simple protocol. 9210e TOC analyzers maintain excellent long-term calibration stability providing accurate and dependable data with minimal maintenance.

State-of-the-art Technology

State-of-the-art electrochemical oxidation technology in the 9210e opens new possibilities for deploying on-line TOC monitoring in water quality monitoring applications.



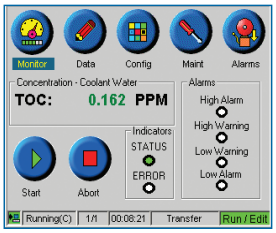
Simple Operation and Reliable Data for Process Control

The 9210e On-line TOC Analyzer employs a "reagentless" electrochemical oxidation technique to continuously monitor the total organic carbon level in process water streams.

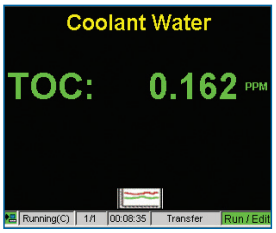
In operation, samples are drawn into the 9210e at 5 to 10 minute intervals from a fill and spill sampling system. Phosphoric acid is introduced into the syringe to sparge and remove the inorganic (TIC) content. The TIC-free sample is then transferred into the reaction chamber and oxidized by hydroxyl radicals, peroxides, and ozone formed by special boron doped diamond (BDD) electrodes.*

Organic compounds are oxidized and converted to CO_2, which is measured by a solid state non-dispersive infrared (SSNDIR)* detector to calculate the TOC content. Results for each sample are shown on the touch-screen display and can be output to a Supervisory Control and Data Acquisition (SCADA) system, PC via Ethernet connection, relay/alarm closure, or as a 4-20mA analog signal.

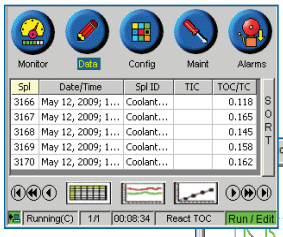
A color touch-screen display with Windows® CE-based user interface simplifies instrument set-up, and access to data, trending, and diagnostic screens. Result data can be sent to a LAN network in a Microsoft® Excel®-ready .csv format as each sample is processed, or retrieved using a USB memory stick.



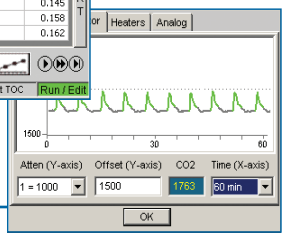
Start/Edit Screen



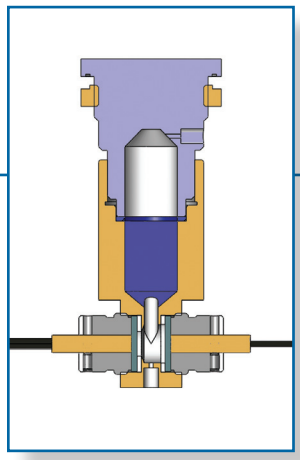
Run Screen



Data



Detector Response



Water-tight, Dust-tight Housing for Indoor or Outdoor Installation

The 9210e instrument housing has a sealed electronics compartment designed to meet NEMA 4X and IEC class IP56 standards. A locking hinged door provides access to the modular fluid components for simple low-cost maintenance.

Reagentless Electrochemical Oxidation

The reaction chamber of the 9210e is equipped with Boron Doped Diamond (BDD) electrodes that generate hydroxyl radicals, peroxides, and ozone to oxidize organic compounds.

*Patent Pending

9210e Specifications

Operating Principle	Electrochemical oxidation
Measurement Technique	Non-dispersive infrared (NDIR) detection
Measurement Range (ppm)	0.100 to 25-ppm carbon
Calibration	2 point (KHP two standards)
Measurement Accuracy	±10%
Sample Introduction	Continuous On-line, or Manual Sipper Mode
Sample Processing / Analysis Time	5 to 10 minute intervals
Operating Environment	5 – 45 °C, up to 90% humidity (non-condensing)
Operator Interface	Windows® CE-based, Color touch-screen display
Reagents Required	Phosphoric acid for TIC removal
Gas Requirements	< 200 mL/min. 99.99% N_2 or CO_2-free air
Power Requirements	$24V_{DC}$ (Optional $24V_{DC}$ power supply allows operation with 90-$250V_{AC}$ 50/60Hz source)
Input Relays	2 (Remote Start, Remote Stop)
Output Relays	2 (System Alarm, Sample Alarm)
Analog Outputs	2 4-20mA (User-configurable concentrations)
Data Export	To PC via Ethernet, or using a USB memory stick (Microsoft® Excel®-ready .csv file format)
Instrument Enclosure	NEMA 4X / IEC Class IP-56
External Dimensions	48.3 cm H x 31.1 cm W x 31.1 cm D (19 " H x 12.25 " W x 12.25 " D)
Weight	11 kg (24 lbs.)
Certifications	CE, EMC EN50082-1 and EN 55011 Group 1 Class A

Aurora 1030 Laboratory TOC Analyzers

OI Analytical has been an innovator in instrumentation for TOC analysis since 1972. Our Aurora 1030 laboratory TOC analyzers provide useful supplemental data for regulatory compliance purposes.

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