

On-Line TOC Analyzer TOTAL ORGANIC CARBON ANALYZER

ON-LINE TOC-V_{CSH}



This on-line TOC analyzer offers both high sensitivity and superior oxidation performance for organic materials.

► On-line Models

ON-LINE TOC-VcSH

A function for continuous automatic measurement has been added to the ability of the combustion catalytic oxidation/NDIR TOC-V Series to perform high-performance,



Combines Combustion Catalytic Oxidation at 680°C and NDIR Method

Combustion catalytic oxidation at 680°C oxidizes even persistent or insoluble organic compounds. This method accurately measures any type of organic substance not affected by interfering substances or the sample properties such as pH or conductivity.

Easy Maintenance

Combustion catalytic oxidation at 680°C eliminates the need for oxidizing reagents, saving the tasks of procuring and preparing reagents. No special draining operations are needed.

Off-line Measurement Functions

A dedicated on-line measuring port is provided for easily conducting interrupting analyses. The optional OCT-1 allows the automatic measurement of up to 15 samples.

Wide Variety of TOC Measurement Methods

NPOC, IC, TC and TOC (TC-IC) measurements are possible with the On-line TOC-VcSH. TN measurement is also possible by adding an optional product. TOC and TN can be measured simultaneously.

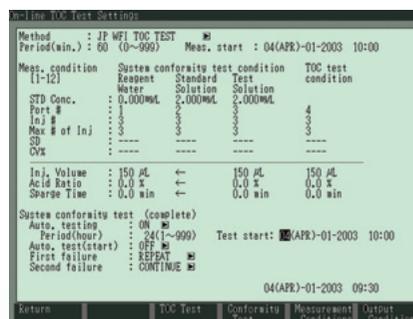
high-sensitivity measurement of organic substances. The On-line TOC-VcSH can be used for continuous automatic high-sensitivity monitoring of samples such as pure water and tap water.

Extremely wide range from 4 µg/L to 25,000 mg/L for applications from ultrapure water to highly contaminated water.

- Combination of highly sensitive NDIR with a high-volume sample combustion system achieves sub-10 µg/L level TOC analysis.
- Specify the blank check program to automatically conduct the blank check by creating and analyzing ultrapure water inside the system.
- High concentration samples are analyzed by diluting to 25,000 mg/L the built-in automatic dilution function.

Support Software for Pharmaceutical Water Management Applications

The On-line TOC-VcSH incorporates software for automatically performing tests specified by Japanese Pharmacopoeia (resolution test) and USP (system suitability test). Combining the On-line TOC-VcSH with an OCT-1 (optional) enables fully automatic testing; setting the reagent is the only requirement.

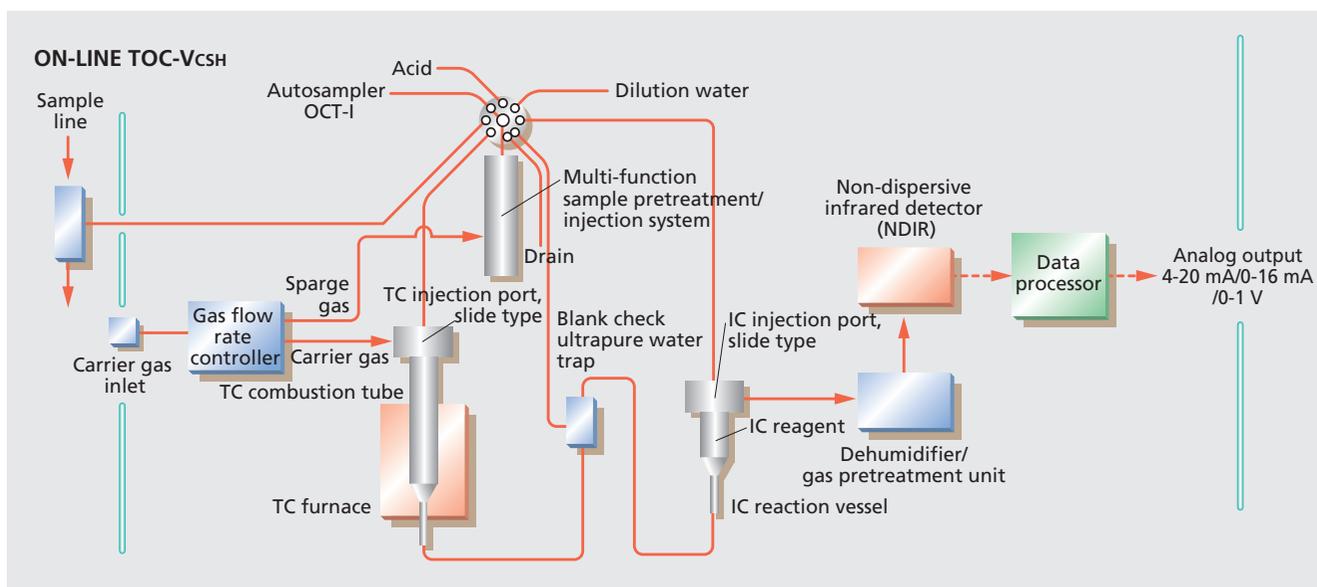


Main Applications

- Management of pharmaceutical water
- Management of ultrapure and recycled water for the semiconductor industry
- Management of mains water
- Impurity contamination management for all types of water used at plants (cooling water, recycled water, and boiler water)

► Combustion catalytic oxidation/NDIR method

Measurement flow line diagram



TC (Total Carbon) Measurement

Carrier gas (purified air) is passed at a controlled flow rate of 150 mL/min through an oxidation catalyst-filled TC combustion tube, heated to 680°C. When the sample pretreatment/injection system injects the sample into the combustion tube, the TC in the sample is oxidized or decomposes to create carbon dioxide. The carrier gas carrying the combustion products from the combustion tube is cooled and dehumidified in the dehumidifier before passing via the halogen scrubber into the sample cell of the non-dispersive infrared detector (NDIR), where the carbon dioxide is detected. The NDIR analog signal forms a peak, and the data processor calculates the peak area.

To measure the TC concentration of the sample, the relationship between the TC concentration and peak area (calibration curve) is predetermined using a TC standard solution, to express the peak area as a ratio of the TC concentration.

TC comprises TOC (Total Organic Carbon) and IC (Inorganic Carbon).

IC (Inorganic Carbon) Measurement

The acidified sample is sparged with the carrier gas (purified air) to convert only the IC in the sample to carbon dioxide. This carbon dioxide is detected by the NDIR and the sample IC concentration is measured in the same way as TC. The IC is a combination of carbonate and bicarbonate.

TOC (TC-IC) Measurement

Subtracting the IC concentration from the TC concentration determines the TOC concentration.

NPOC Measurement (TOC by acidification/ sparging method)

A small amount of hydrochloric acid is added to acidify the sample, which is then sparged with sparge gas. This converts all IC in the sample to carbon dioxide and drives the CO₂ out of the sample solution. The TOC concentration is determined by measuring the TC of the sample after the IC is eliminated. NPOC measurement is equivalent to TOC measurement using acidification and sparging (IC elimination) defined for official test methods (EPA, ASTM, EN, etc.). As any purgeable organic compounds may be lost from the sample during sparging, the TOC measured by this method can be called NPOC (Non-Purgeable Organic Carbon).

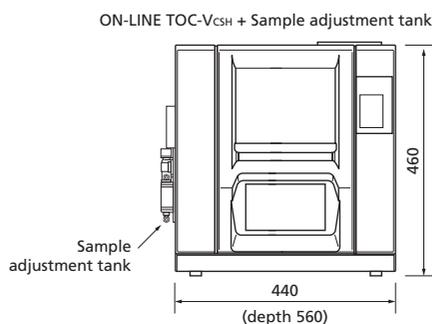
► Specifications

Measured items	NPOC (TOC by IC subtraction using acid sparging), TC, IC, TOC (TC-IC), TN (optional TNM-1 required)
Measurement method	680°C combustion catalytic oxidation/NDIR method 720°C combustion catalytic oxidation/chemiluminescence method (when TNM-1 is connected)
Measurement range	TC: 0-500 µg/L to 0-25,000 mg/L variable IC: 0-500 µg/L to 0-30,000 mg/L variable
Measurement cycle	Approx. 5 to 999 minutes (for NPOC measurement)
Number of measurement channels	1 channel
Reproducibility	CV 1.5% max.
Linearity	±2% F.S. max.
Zero stability	±2% F.S. max. per day
Span stability	±2% F.S. max. per day (ambient temperature fluctuations within 5°C)
Calibration cycle	Variable in the range 1 to 999 hours
Sample injection method	Automatic injection using syringe pump/slider
Sample injection volume	Variable in the range 10 to 2,000 µL
Sample dilution function	Diluted in syringe; dilution factor: 2 to 50
IC pretreatment	Automatic acidification and sparging
Carrier gas	High-purity air or oxygen (1 ppm max. of CO, CO ₂ , or HC) High-purity nitrogen (1 ppm max. of CO, CO ₂ , or HC) (when using optional nitrogen gas carrier kit) Supply pressure: Approx. 600 kPa Flow rate: 150 mL/min (230 mL/min with sparging)
Measurement value output	Analog output (1 output): Select from 4 to 20 mA, 0 to 16 mA (insulation, load resistance: 750 Ωmax.), and 0 to 1VDC RS-232C: Baud rate; 9,600 bps, Data length; 8 bits, Parity; none, Stop bits; 1
Alarm output	Measurement value upper limit and upper upper limit alarms, system error alarm: No-voltage contact output (maximum: 5VA, 0.1A, 50V)
Control input	Remote stopping and starting of sample measurement and calibration
Sample conditions	Flow rate: Approx. 0.1 to 1 L/min Sample volume: 5 to 7 mL per measurement Temperature: 0 to 90°C
Ambient temperature	5 to 35°C
Power supply	AC 100 - 127V ±10% MAX 800VA 50/60 Hz AC 200 - 240V ±10% MAX 1200VA 50/60 Hz
Dimensions	Approx. W440 x D560 x H460 mm (excluding protrusions)
Weight	Approx. 40 kg

► Special Accessories

	Part Number	Description
OCT-1	638-93150-01	Permits the automated measurement of up to seven samples, in addition to an on-line flow line.
OCT-1 (second unit)	638-93150-11	Second unit to expand OCT-1. Permits the automated measurement of up to 15 samples, in addition to an on-line flow line.
TNM-1	638-91065	Permits TN (total nitrogen) measurements.
Nitrogen carrier gas kit	638-42054	High-purity N ₂ gas (1 ppm max. of CO, CO ₂ , or HC) can be used as the carrier gas. *Simultaneous use of TNM-1 and this option is not possible. *The measuring range with this option becomes 0-500 µg/L to 0-100 mg/L for TC and IC both.
Sample adjustment tank	638-42053	Used when bubbles are contained within the sample.

► External Dimensions Diagram



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Printed in Japan 3655-06230-10A1T