



ONLINE TOC ANALYZER

B-Series



Features of Online TOC Analyzers

Unique, Patented Two Zone Furnace Design

Having two temperature zones assure complete combustion of carbon and nitrogen containing compounds while saving the catalyst life. This is based on the unique patented two-zone furnace design. Reactor design eliminates direct physical contact of the catalyst with the sample, reducing sulfur and halogen poisoning, thereby increasing catalyst service life.

Simultaneous Nitrogen Analysis is an Option

High temperature catalytic oxidation (HTCO) technology and the in-house developed catalyst allow simultaneous measurement of TC and TNb parameters. The same catalyst serves for combustion of compounds containing carbon and nitrogen.



Ease of Maintenance

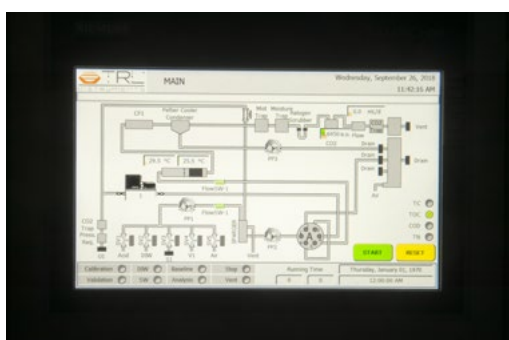
Design of TRL-onlineTOC Analyzer simplifies maintenance. Software generates warning messages for routine maintenance needs allowing the operator to recognize, remotely and take action in time. Maintenance and adjustment requirements are collected in a panel for easy access to each component.

Low Cost of Operation as Well as Very Low Maintenance Needs

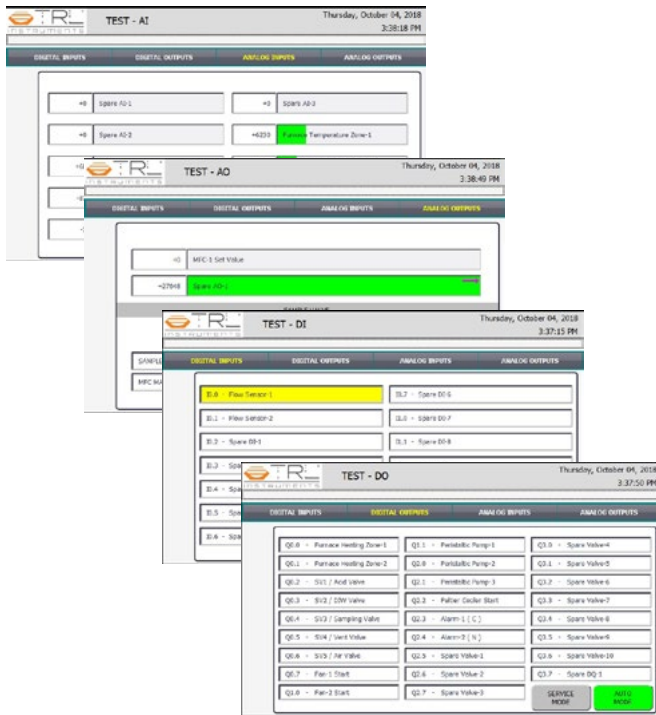
Long catalyst service life as well as extended life of consumable items allow maintenance free 80 days operation, based on hourly monitoring.

Operator Friendly Software Functions

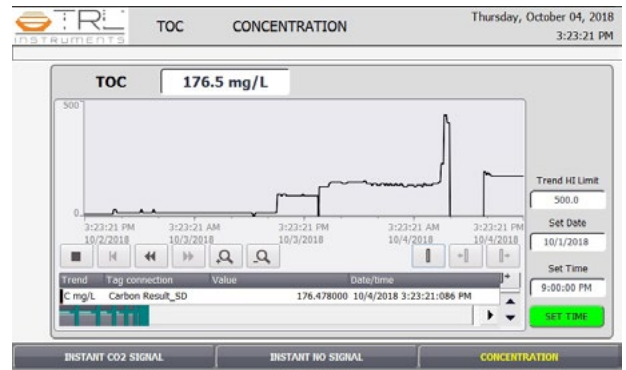
Maintenance chief and technicians can be listed in hierarchy of users and be classified in distribution of authorities. All events are logged and permanently saved. All settable parameters are under the control of the chief and any change is logged, in case. Graphical display of trend is easy to generate on the screen.



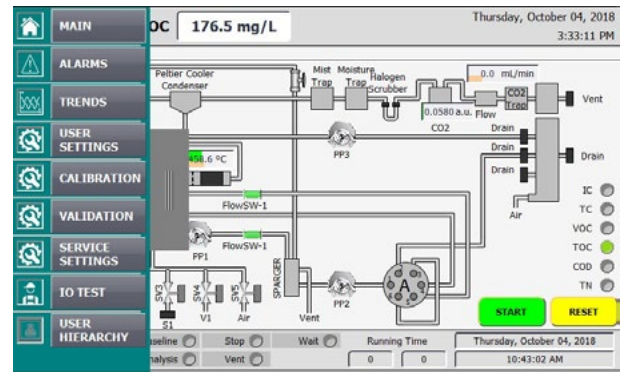
User Friendly Software Functions



Testing of analyzer functions by the operator



Recent value of concentration as well as trend graphics by date and time



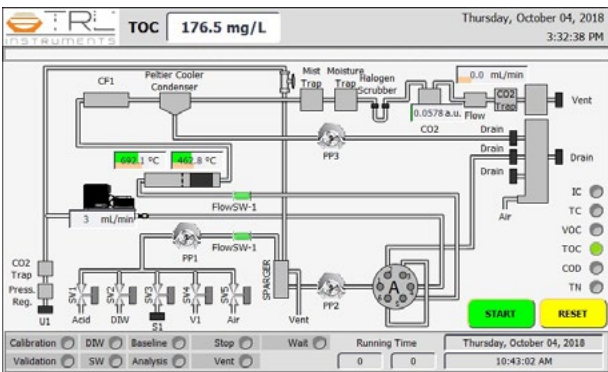
Menu options are on the left side of any page by touch screen

Parameters	No	Concentration	Raw Data	Repeat
IC	1	20.00 ppm	22.80 a.u.	REPEAT
TC	2	5.00 ppm	9.88 a.u.	REPEAT
VOC	3	10.00 ppm	13.29 a.u.	REPEAT

Calibrated parameter, calibration concentrations and number of calibration points are entered for each parameters

Parameters	Value	Unit
Furnace Zone-1 Set Value	800.0	°C
Flow Rate	200.0	ml/min
Furnace Zone-2 Set Value	500.0	°C
Analysis Wait Time	4	min

Parameters to be analyzed, temperatures in the furnace, air flow rate, time to wait for the next analysis, calibration file selection are under user selection



Instant values of temperature and flow and recent concentration are on the display; indicating the functioning component as green, on the process diagram



Remote access to the HMI for maintenance and service is possible

Specifications of TRL-onlineTOC Analyzers

- The monitor is designed for **continuous operation**
- **Measured parameters:** TC or TOC, by operator's selection; IC and TN are optional additions
- Instrument has **dual zone high temperature combustion technology** and the higher temperature zone is adjustable between 600-1000°C
- **Range is set from 0-5mg/L to 0-1,000mg/L TOC, operator adjustable.** 1000mgTOC/L is achieved without dilution of the sample
- **Limit of Detection** is 0.1mgC
- **Measuring method:** High Temperature Catalytic Oxidation (HTCO); TOC is analyzed by direct NPOC measurement, IC removal is achieved by air sparging and acidification
- **Sensor** for carbon analysis is nondispersive infrared detector (NDIR)
- **Analysis cycle time** depends on number of wash cycles, however it is arranged by the operator; nominally between 5 to 20 minutes
- **Samples at 1 to 2 bar-absolute** are introduced without problem, by getting use of internal sampling pump
- **Air flow rate** is operator adjustable and nominally about 200mL/min,
- **Sample temperature** of 5°C to 50°C is affordable
- **Fluid flow for accurate and repeatable injection** is achieved through 3 peristaltic pumps plus a 6-port solenoid driven valve
- **Waste liquid disposal** is achieved automatically by peristaltic pump
- **Ambient temperature** of between 5°C and 40°C is good for proper operation
- **Communication and available digital outputs:** via RS232; date and time, up to 3 measured parameters and error messages; profibus, modbus and ethernet options are available as adders
- 0-10 VDC and 4-20 mA **analog output options** are available for future upgrade
- **2 dry contact alarm limits** are set by user
- **Data storage and data presentation:** up to 9999 recent results should be saved and stored, on the basis of "first in first out" method; **graphical trend presentation** is available on the display and initiated by the operator
- Following **software functions** are available:
 - System diagnostics, data storage, optional single or multipoint calibration file storage; single validation cycle;
 - Design of an analytical cycles as to include as many DI wash and sample wash runs as required; maintenance cycle management and warning of replacement parts based on run cycles;
 - Continuous control of sample, acid and DI water flows, liquid leakage, furnace
 - Temperature, air flow rate; air leakage;
 - Auto-stand-by in case of: emptied acid bottle, sample-acid-DI water leakage, air leakage, furnace temperature failure;
 - Graphical presentation of trend between settable date and time
- **Power requirement** is 230 VAC 50/60 Hz; 1200VA
- **Carrier Gas:** hydrocarbon and CO2 free air at 2-6 bar
- **Compliance with standard methods:** 5310B, EPA 415.1, ISO 8245:1999, DIN1484:1997
- **The enclosure** is NEMA 4 / IP54 compliant and either wall mount or floor standing use is possible
- **Dimensions** (HWD): 138x70x36cm, including wall mount and hanging attachments
- **Weight:** 90 kg
- **A start up kit** is included in the standard pack, for immediate commissioning to operate the instrument at site, for limited number of runs, however **a consumables** kit is recommended for a year of smooth operation
- **Shipment** is via airfreight. The equipment is **packed in a wooden cradle**
- **Lifelong remote support** is available

Optional TN Parameter

- Range: from 0-5 up to 0-1,000mg/L TOC, without dilution, operator adjusted
- Accuracy: $\pm 5\%$ of range
- Limit of Detection: 20ugC/L
- Measuring method: HTCO,
- TN should be analyzed by NO detection
- Sensor for nitrogen analysis is chemiluminescence detector
- Ozone generator should be built in the analyzer

Optional IC Parameter

- Range: up to 0-2,000mg/L IC, without dilution, operator adjusted
- Accuracy: $\pm 5\%$ of range at ranges less than 1000mg/L; $\pm 2\%$ of reading at ranges over 1000mg/L
- Limit of Detection: 0.25ugC/L
- Measuring method: by air sparging and acidification
- Detection of CO₂ by NDIR detector

Optional Higher Range

For very polluted samples up to 0-50,000mg/L TOC, operator settable, achieved by dilution with DI water

Optional TOC Quality Air Generator

- Integrated into the system
- Should provide quality of air to achieve the given specifications
- 1 set of spare sorbents for maintenance and refilling

Optional 6 Port Multi Sampling Apparatus

- 6 sample lines can be connected
- All functions are controlled through the software of the main system
- Sequence of the sample lines is adjustable
- Washing the collection cup by the sample is achieved

- Discharge is achieved by peristaltic pumps
- Inlet pressure of the sample lines should not exceed 2 bars absolute

Optional analog output-mA

- 4-20mA analog output for the measured parameters
- up to 3 parameters

Optional analog output-VDC

- 0-10VDC for the measured parameters
- Up to 3 parameters

Communication options

- Profibus
- Modbus RS485
- Ethernet
- Web monitoring

Optional Consumables Kit

Recommended for one year of operation; includes: 20 gr/pk of catalyst; pk of glass wool; pk of quartz wool, pk of o-rings, pk of moisture trap filling, pk of halogen trap packing, peristaltic tubes

Optional and Spares Parts

Followings are recommended to be kept in stock to assure minimum down time in case of failure of parts:

- 3 ea trap tubes
- 1 ea combustion tube
- 1 ea peristaltic pump
- 1 ea solenoid valve
- 1 ea filter on CO₂ detector
- 1 ea gas flow meter
- 3 ea GL14 cap with PTFE quoted septa

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