

Hach TOC Analyzers

***Training Presentation
Technical Support 2008***

Topics of the day !

- *How it works*
- *% deviation calculation*
- *Calibration, gas, liquid*
- *Maintenance*
- *Lamp replacement*
- *Alarms / Troubleshooting*

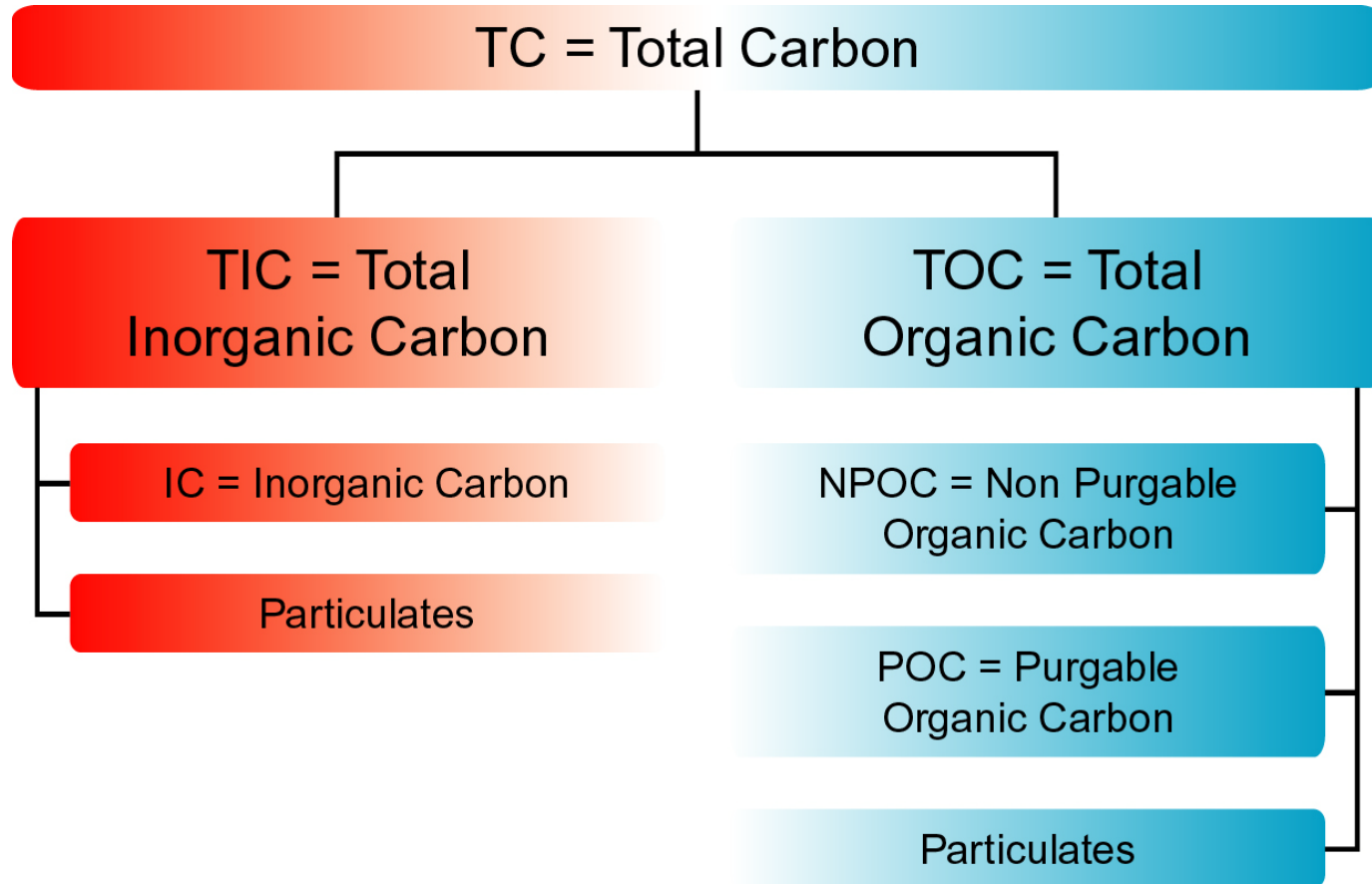
Total Organic Carbon - TOC

All carbon atoms covalently bonded in organic molecules

Total Carbon (TC) - Carbon from all sources, organic and inorganic

Inorganic Carbon (IC) - Carbon from carbonate, bicarbonate, dissolved CO₂

Total Organic Carbon - TOC



TC conversion

1. Remove the acid pump tube.
2. Remove the acid pump barbs and replace with ¼-28 blank plugs from the start-up kit.
3. Remove ¼-28 blank plug.
4. Remove barb fitting and install ¼-28 blank plug.
5. Connect the re-sample pump tube to the port labeled
6. Remove flow element (black slotted part).
7. Remove O-ring from the bottom of the flow element block
8. Replace O-ring with the rubber disc from the start-up kit.
9. Replace the flow element.

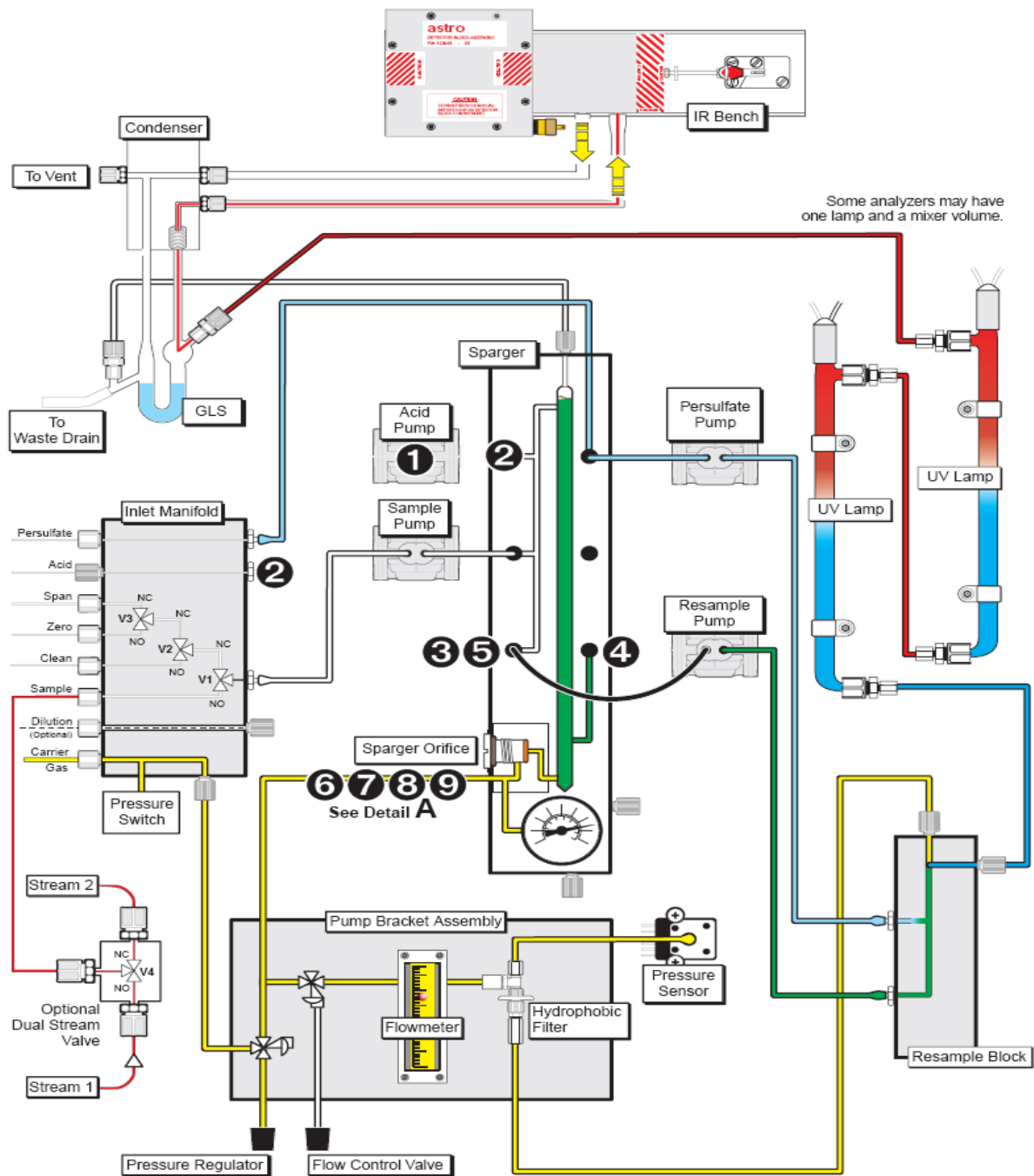
Figure 54 Detail A



1. O-ring

2. Rubber Disc

Figure 55 TC Conversion Flow Diagram—no Dilution (Two-lamp Analyzer Shown)



Acidification

The sample is brought together with Acid.

The Acid converts all of the Total Inorganic Carbon (TIC) into CO₂.



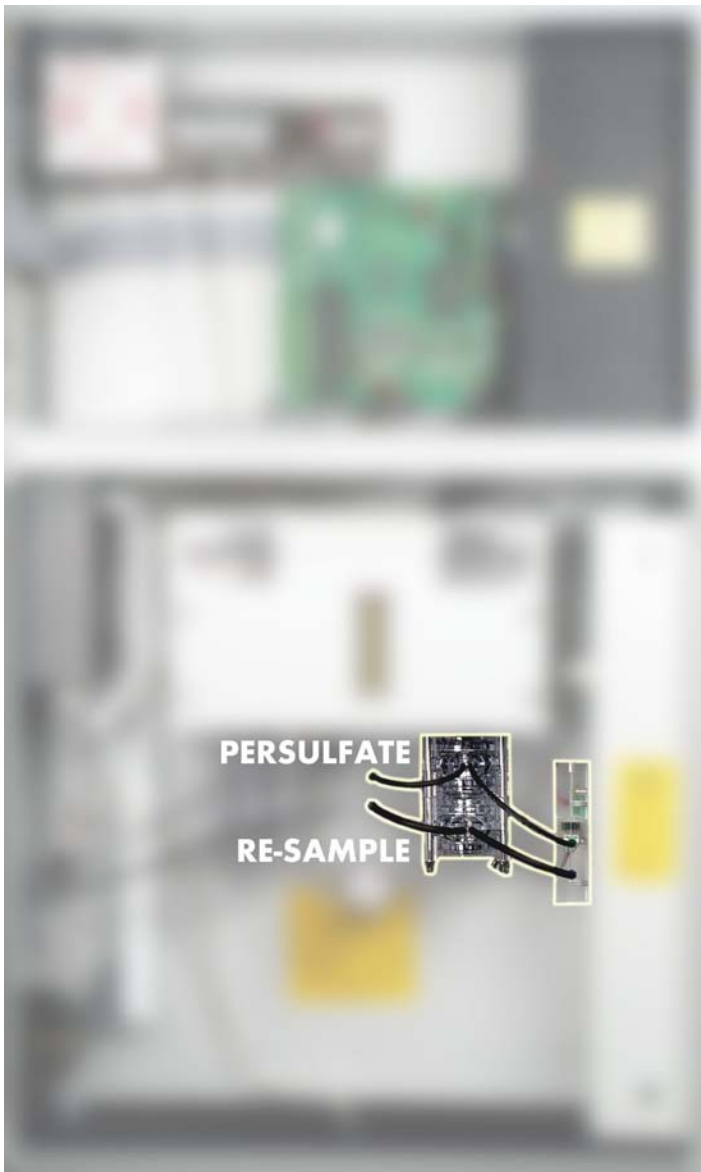
Sparging

The TIC-sparger removes all the CO₂ from the sample liquid.



Persulfate

The TIC-free sample is brought together with Sodium Persulfate.



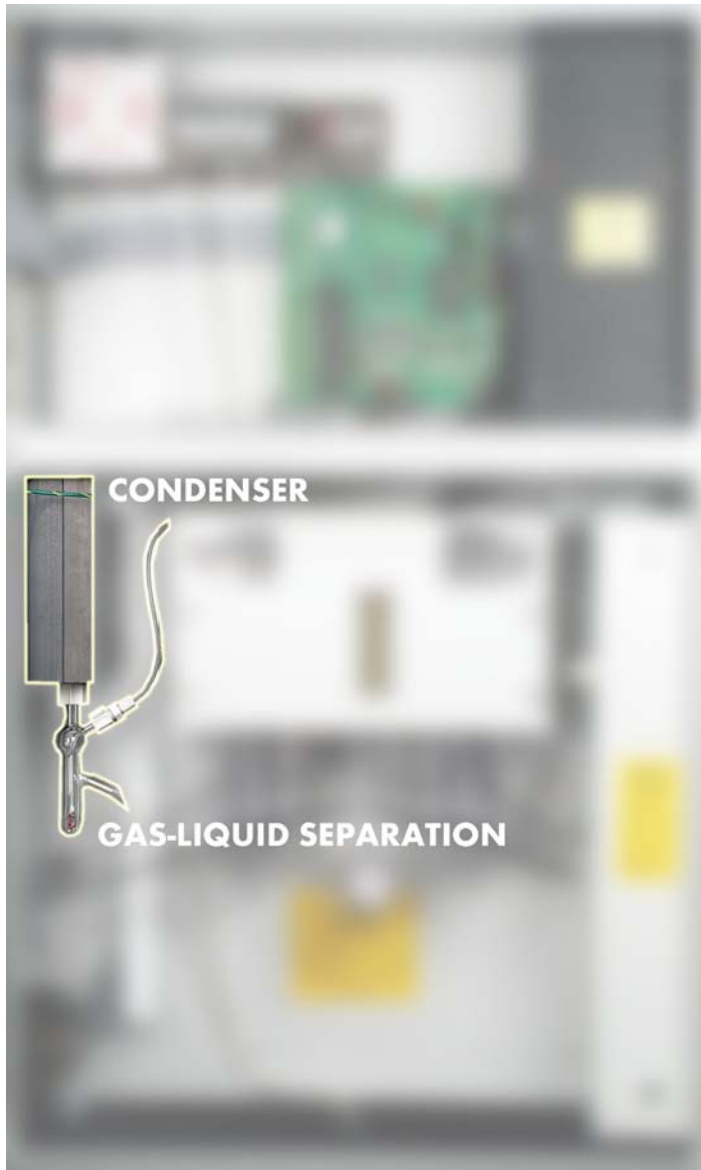
Oxidation

The UV-reactor oxidizes all of the TOC into CO₂.



Gas/Liquid Separation

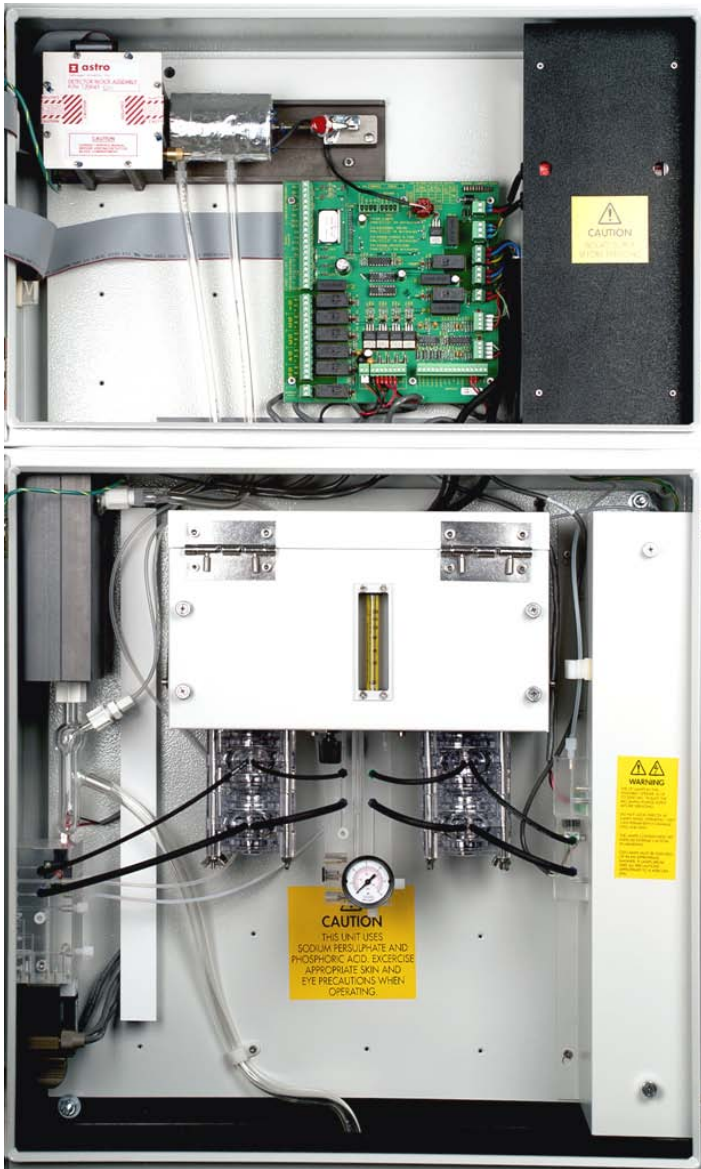
The liquid passes through the gas/liquid separator (GLS) and the condenser.





NDIR CO₂ Detection

The CO₂ laden sample gas is routed into the NDIR detector for the measurement.



Analysis Method

The ISO/EPA approved, UV-Persulfate Oxidation Method coupled with the NDIR CO₂ Detection provides the most reliable on-line TOC measurement.

Process & supply connections

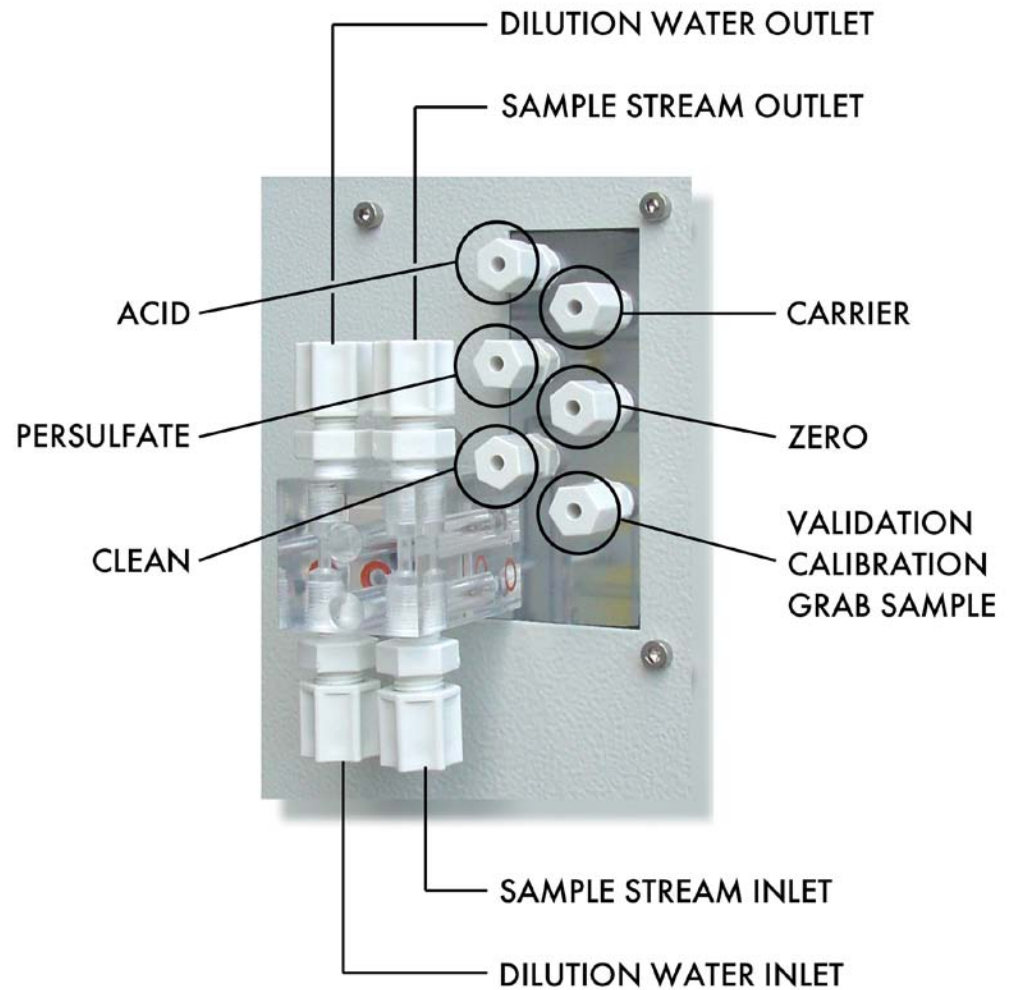
Easily accessed customer connection ports are located on the outside of the analyzer.

The sample & dilution water fast-loop manifold reduces the stream pressure without sacrificing analysis response time.



Process & supply connections

Auto-cleaning, as well as auto-validation or auto-calibration are standard on this advanced control software.



Process & supply connections

The optional dual-steam valve manifold handles 2 sample streams independently and reports the concentrations on 2 analog outputs.

With a typical cycle time of 15 minutes, the astroTOC HT can provide up to 48 TOC measurements per day per sample stream.



Fluidics improvements

The clear acrylic valve manifold with wide-bore flow paths reduces the number of connection points, tee connectors, and tube fittings. This greatly simplifies the maintenance of the fluidic system.



Sparger design improvements

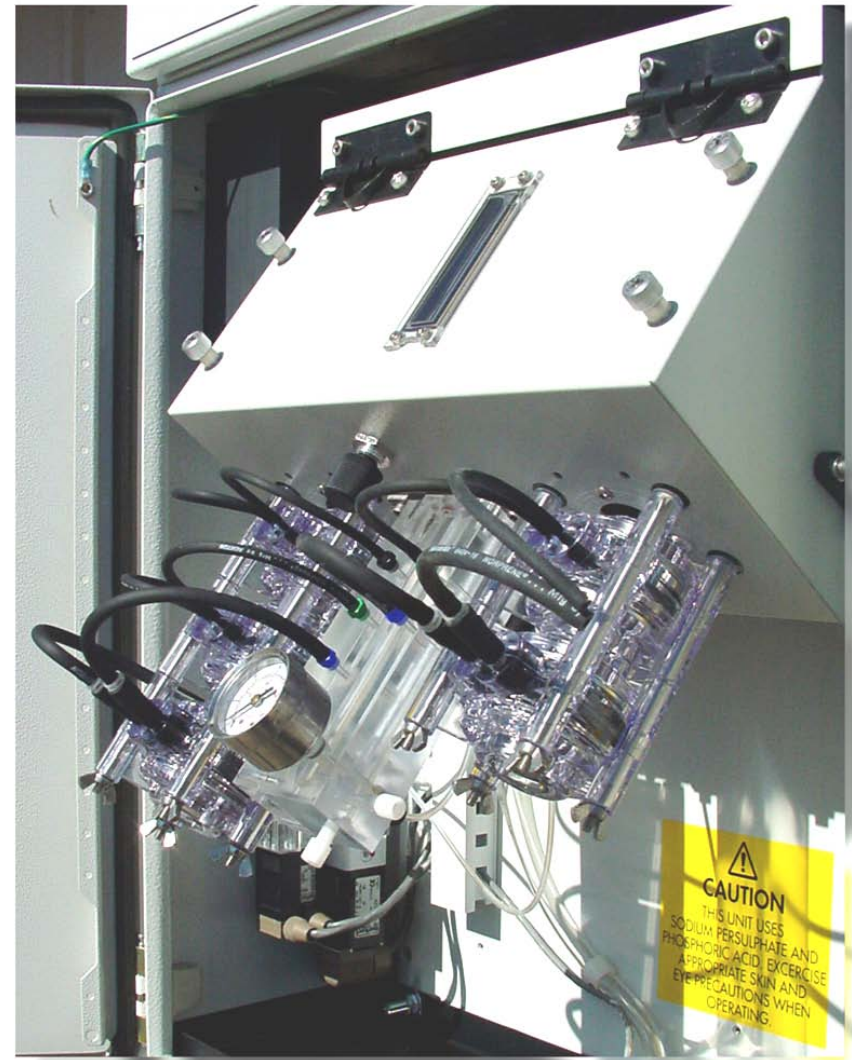
The new two-piece, counter flow TIC sparger assembly allows easy access for cleaning.

Integrated carrier gas flow system provides trouble-free flow control without using capillary flow restriction.



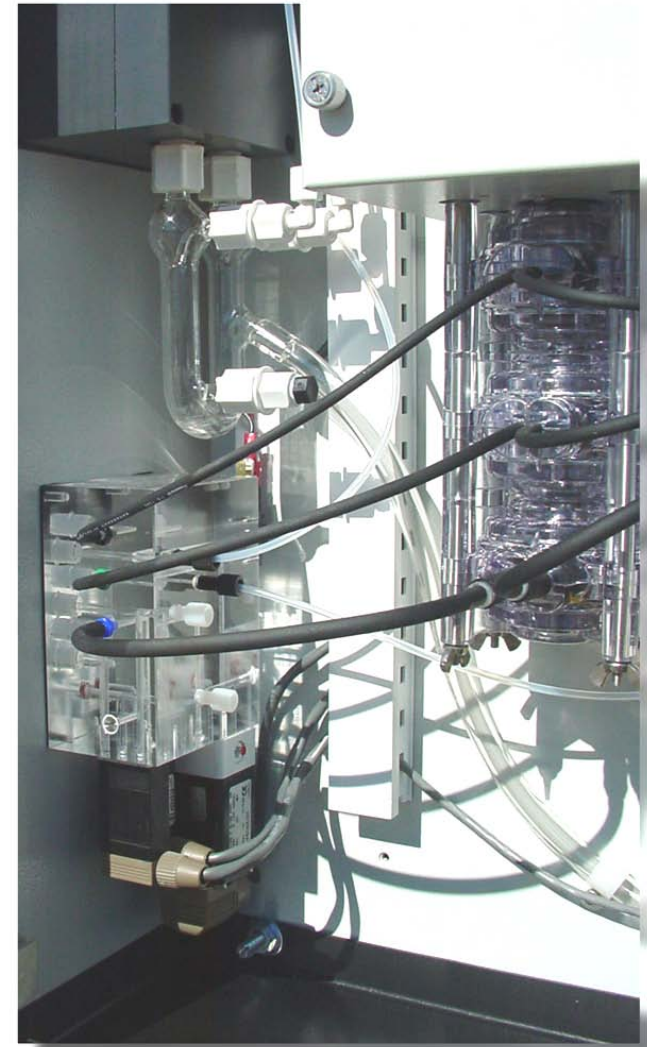
Easy access

Swing hinges provide easy access to the pump heads for pump tube replacement every **three** months.



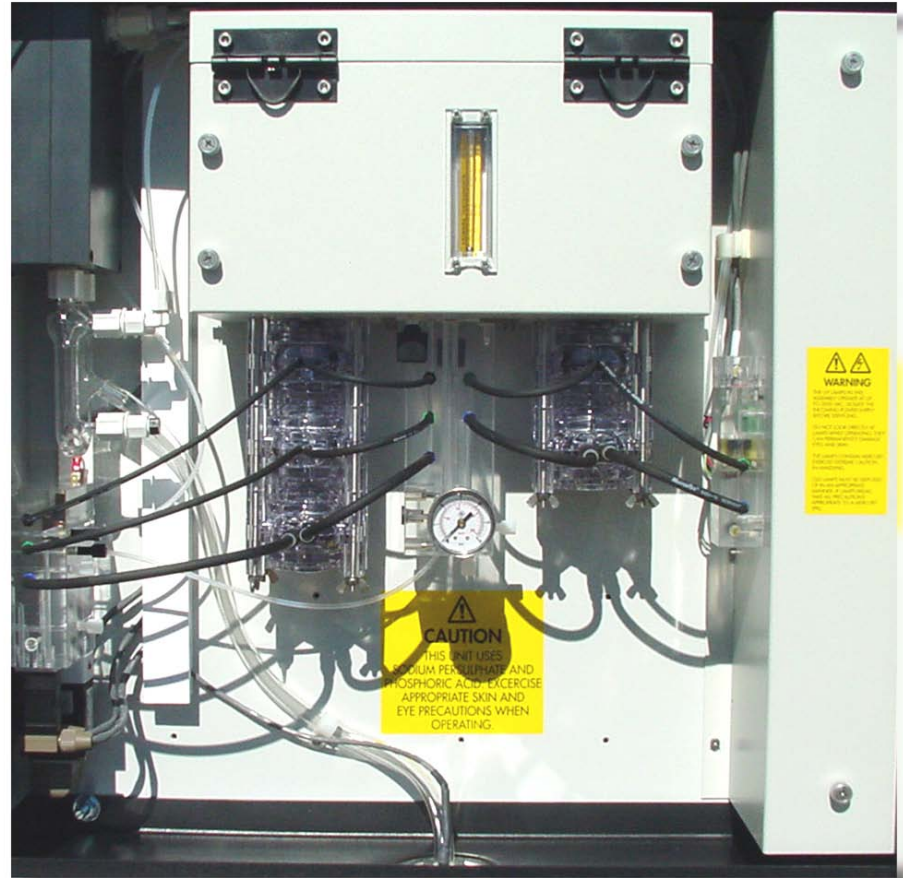
Easy access & maintenance

Disconnect two Polypropylene fittings to quickly remove the GLS U-tube for cleaning.



Simplicity rules

If bench maintenance of the pump or UV-reactor module is needed, press-in the hinge snaps for the pump module, or remove two thumb screws for the UV-reactor module.



Front panel features



A front panel membrane keypad featuring a large, backlit LCD display provides user-friendly operator interface.

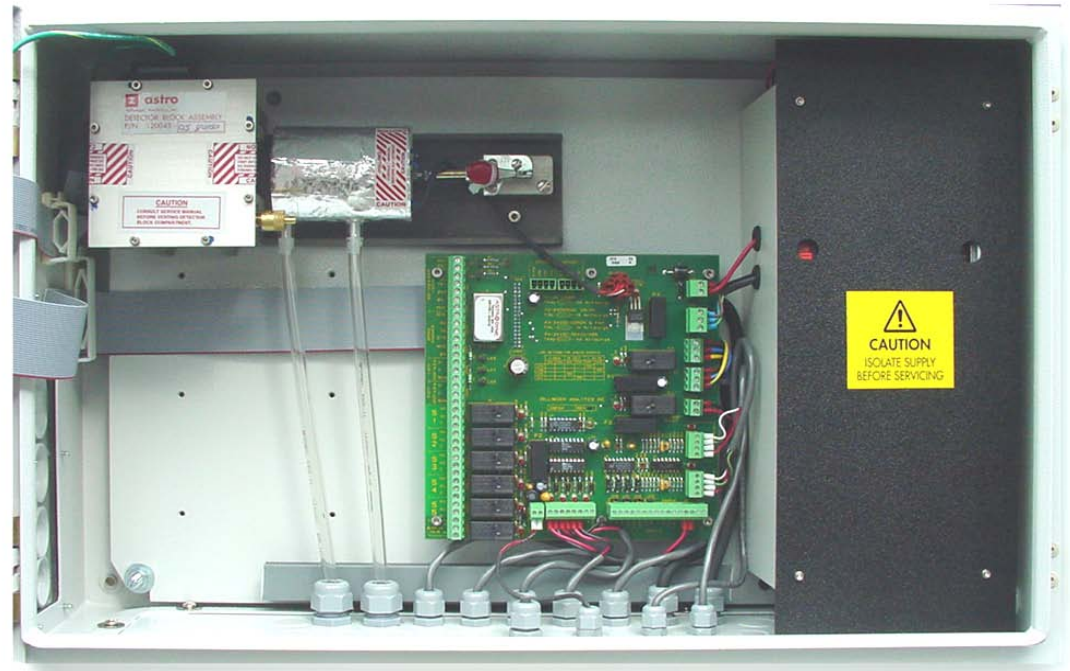
Electronics Compartment Door

A single printed circuit board equipped with the microprocessor controls the Input/Output interface board and manages the IR signal processing.



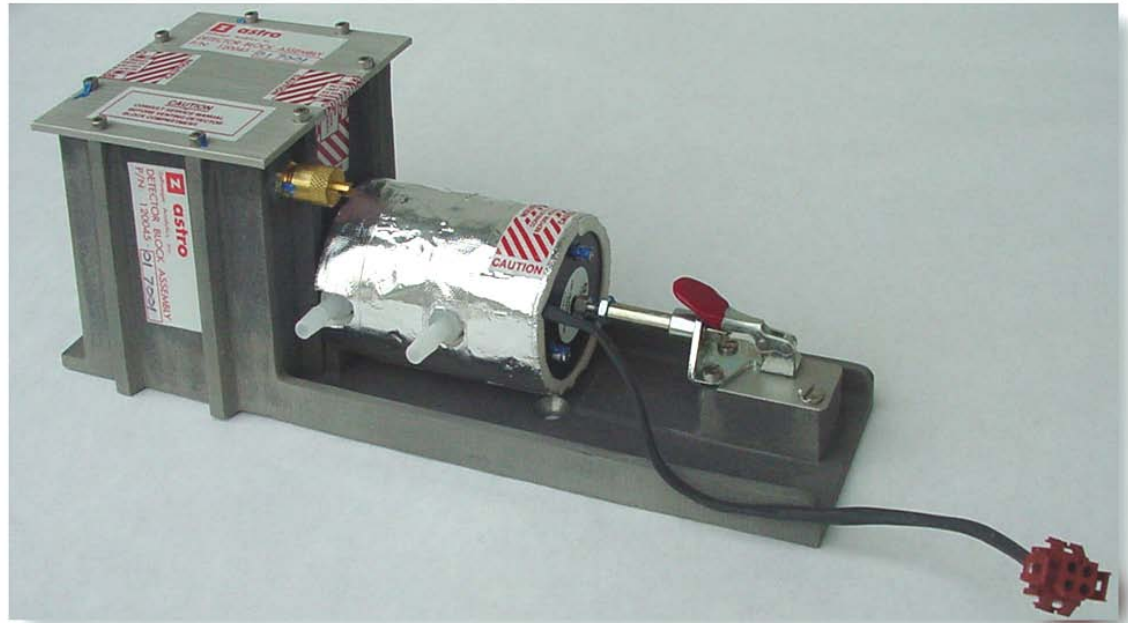
Simplified Electronics Compartment

Only 2 printed circuit boards, a power supply module and the IR detector are required to operate this advanced TOC analyzer.

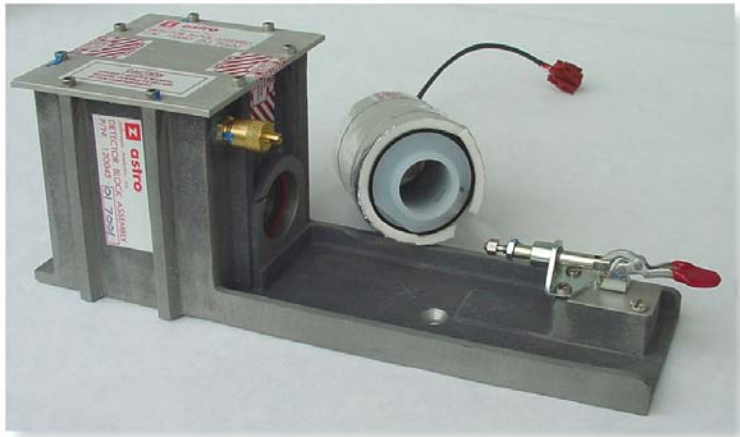


Infrared Detection System

A proven design with unsurpassed stability and reliability provides the accurate CO₂ measurement utilized in the TOC analysis.



Infrared Detection System



The simplistic, rugged design allows for end-user maintenance.



User outputs

A break-out panel mounted on the left-hand side of the electronics enclosure allows for easy customer interface connections.



User output/input

- Five function mapped, volt free relay output contacts. Each relay may be mapped to alarm 1, alarm 2, fault, online, offline, maintenance or individual diagnostic features.
- One function mapped contact input for remote calibration, validation, analyzer start/stop or other functions.
- Two channel, parameter mapped 4-20 mA analog outputs.
- One RS232 serial output for CSV data logging, half duplex X 3.28 communication and multi stream sequencer.

Software

Software navigation is intuitive with dialog prompted analyzer operations for:

- | Analyzer Calibration
- | Analyzer Validation
- | Grab Sample Analysis

The astroTOC HT software is available in five user-selectable languages.

Software features

Diagnostics for:

- loss of sparger flow
- loss of carrier gas
- elevated reactor pressure
- pump tube deterioration
- process spill threshold

Optional diagnostics for:

- reagent levels
- enclosure spills

Questions so far?

Troubleshooting Alarm codes. Refer to document.