

PRODUCT BROCHURE

# ATOM TraceS-1000

Total Sulfur in Gas Analyzer for  
Trace Sulfur Measurement Applications



**Precise**

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**Consistent**

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**Reliable  
Analysis**

- Low Concentration Total Sulfur Analysis (100 ppb – 10 ppm)
- High Speed Analysis and Response Time
- User Defined Data Averaging
- Low Utility Consumption
- Compact Instrument Footprint
- Does Not Require Installation in Shelter

ATOM Instrument offers the most versatile Total Sulfur analyzers available. The ATOM TraceS-1000 has the fastest analysis time of any commercially available analyzer allowing user-defined, multiple cycle averaging to improve analyzer performance. The analyzer operating software is both intuitive and user-friendly. In addition, the ATOM TraceS-1000 only requires 50/50 Argon/Oxygen

(Argox) mixture for normal operation and does not require installation in a shelter.

The ATOM TraceS-1000 is an online process analyzer utilizing patented Excimer UV Fluorescence (EUVF) technology to measure Total Sulfur in a variety of refinery process applications.

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## Typical Applications for the TraceS-1000 includes Total Sulfur measurement in:

- LPG
- Natural Gas
- Reforming and Isomerization
- Catalyst Protection
- Blending Operations
- Flare and Stack Gas
- Refinery Grade Fuels

## Key Features

### Excimer UV Fluorescence (EUVF) Provides Low Range Detection and Stability

The Model TraceS-1000 with EUVF is a field proven technology that utilizes an excitation wavelength that achieves high detection sensitivity and detector stability. The TraceS-1000 is an excellent fit for applications in the 0 – 1 ppm range and is exceptionally stable, even at concentrations less than 1 ppm. The TraceS-1000 is designed for outdoor installation and use in harsh environments as may be required by the refining (LPG), Gas Processing (NGL) and Natural Gas industries.

### Simplified Design Improves Certification and Process Monitoring

The model TraceS-1000 Total Sulfur measurement provides complete analysis of all sulfur compounds potentially present in process gas streams and not just a few selected sulfur compounds as with some GC/TDL applications. Calibration and Validation is seamlessly incorporated with an optional calibration switching configuration and associated software for easy compliance or verification testing.

## Principle of Operation

One of the most simple and practical low-level sulfur analytical techniques that has been widely used and proven over many years of industrial utilization is the UV Fluorescence method (UVF). The UV Fluorescence method involves injection of a sample into a high-temperature oxidation or combustion furnace, which converts all hydrocarbons into water (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>) byproducts. Total sulfur content contained in any molecular-bound hydrocarbon species is similarly oxidized at temperatures in excess of 1000°C into sulfur dioxide (SO<sub>2</sub>) by the reaction:



The furnace effluent containing these combustion byproducts is directed into a detection chamber where it is excited by high-energy, short-wavelength emission from a UV excitation source. The UV photons from the excitation source or lamp, transfers energy into the SO<sub>2</sub> molecule and raises its energy level to create an excited singlet state. These excited molecules rapidly decay back to their lower energy ground state releasing the absorbed energy as a secondary emission known as fluorescence.



This low-level fluorescence emission is optically filtered to remove undesired wavelengths of the UV source and background scatter within the detector chamber. Detection of the filtered fluorescence emission is usually accomplished with a Photomultiplier Tube (PMT), Channel-Plate Multiplier (CPM) or other high gain, light-sensitive detector.

The TraceS software incorporates a user-friendly Graphical User Interface (GUI) designed to be both intuitive and easy to use. All aspects of analyzer operation are accessible from the Main toolbar utilizing drop down menu screens. The home screen displays 3 user selectable digital readout and analog bar graphs updated in real-time from the analysis. Run Cycle Status and current timed events are refreshed moment by moment. Major system control elements are also incorporated in this home screen.

The calibrate menu allows complete control of the calibration and validation processes, including manual or auto calibration and validation sequencing. Analytical results acquired during calibration events may be inspected at any time prior to any subsequent calibration.

All other menu screens such as Timed Events, Detector, Analog Output, Digital I/O and System Alarm Settings, allow the user to easily monitor or make changes to all aspects of analyzer control and operation.

The GUI software also includes user setup and password security, as well as plotting of real-time analysis data and historical settings.



## Remote ATOM ACCESS®

The Analyzer Central Communication Ethernet Server Software allows an authorized user to access any ATOM analyzer on the facility network from an internal office or work station. After a successful security login, the network will initiate communication to the selected instrument of choice. Once connected, the instrument can be operated and interfaced with just as if the user was standing directly in front of the instrument. Instead of utilizing the analyzer touch screen, the remote connection keyboard and mouse are used for all interface requirements.

## Speed of Analysis and Response Time

The ATOM TraceS-1000 is specifically designed for high speed analysis and a fast response time. This feature enables more rapid, real-time measurements to be performed allowing process events and changes to be more timely monitored and quantified. Process variations and detail potentially obscured with slower responding analyzers, may be revealed or become more apparent. Although the cycle time is completely user selectable, a 100-180-second cycle time is standard. However, the TraceS-1000 can be easily reconfigured should the need for higher speed analysis be necessary or desired.

## Low Concentration Total Sulfur Analysis

The TraceS-1000 allows stable and accurate analysis at low sulfur concentrations below 1 ppm. Taking advantage of the lower cycle time, any number of standard analysis up to 10 sequential results can be seamlessly averaged to provide a more consistent and reliable concentration measurement, allowing optimization of low range detection performance and analyzer response time depending on application requirements.

## Most Compact Footprint

The following table allows direct comparison for size and occupied volume of the ATOM TraceS-1000 vs current standard instrument packages. (Dimensions do not include size of the mounting framework or stand)

	Package 1	Package 2	ATOM TraceS
Height	45/56 inches (D1/D2)	45.00 inches	38.00 inches
Width	24.00 inches	26.00 inches	27/32 inches
Depth	18.00 inches	17.00 inches	12.75 inches
Volume	11.25/14 ft <sup>3</sup>	11.50 ft <sup>3</sup>	8.10 ft <sup>3</sup>

## SPECIFICATIONS

### Analytical Performance

**Measurement Method:** Total Sulfur – Excimer UV Fluorescence (EUVF)

**Measurement Range:** 100 ppb – 10 ppm (as required for specific gas application)

**Repeatability:** 50 ppb SD or  $\pm 2\%$  of measured value, whichever is greater.  
30 ppb SD with 5-min. averaging or  $\pm 2\%$  of measured value, whichever is greater.

**Linearity:**  $\pm 2\%$  of full scale (dynamic range dependent)

**Response Time:** 99% (+) in one cycle (100 secs typical)

**Calibration:** Automatic or manual

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### Analog/Discrete Data Communications

**Analog Outputs:** Two 4-20 mA DC

**Alarm Outputs:** One global dry contact triggered by one or more of the following:  
Power failure, loss of purge, low oxidizer pressure, autocal fault, analyzer in calibration, analyzer not running

**Digital Data Communications:** RS-232/RS-485/RS-422 Modbus (with TCP/IP Ethernet)

**Local MMI (GUI):** 12" Touchscreen computer with embedded Windows 7 allows complete operation and control of all analyzer functions

**Remote Interface:** ATOM ACCESS allows complete control of TraceS-1000, including monitoring of analysis parameters and digital data values

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### Utility Requirements

**Ambient Temperature:** -20°C to +40°C  
(-4°F to +104°F)

**Instrument Air:** 70 psig (4.8 bar), 5 SCFM, Oil Free, -40°C (-40°F) dew point

**Power:** 120 VAC, 50/60 Hz  
at 2200 watts (max.)

**UHP Oxygen:** 40 psig (3 bar) 100 SCCM  
**UHP Argon:** 40 psig (3 bar) 120 SCCM

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### Physical Parameters

**Dimensions:** 965.2 mm (38.0 in) high x 660.4 mm (26.0 in) wide x 304.8 mm (12.0 in) deep

**Mounting:** Wall or Unistrut Stand

**Certifications:** Built to NEC Class 1, Div 2, Group B,C,D. CSA (optional)

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### COSA Xentaur

4140 World Houston Parkway  
Suite 180  
Houston, TX 77032  
USA  
+1 713 947 9591  
[www.atominstrument.com](http://www.atominstrument.com)  
[service@cosaxentaur.com](mailto:service@cosaxentaur.com)

### Process Insights – The Americas

4140 World Houston Parkway  
Suite 180  
Houston, TX 77032  
USA  
+1 713 947 9591  
[info@process-insights.com](mailto:info@process-insights.com)

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### Process Insights – EMEA

ATRICOM  
Lyoner Strasse 15  
60528 Frankfurt  
Germany  
+49 69 20436910  
[info@process-insights.com](mailto:info@process-insights.com)

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### Process Insights – APAC

Wujiang Economic and Technology  
Development Zone  
No. 258 Yi He Road, 215200 Suzhou  
Jiangsu Province China  
+86 400 086 0106  
[info@process-insights.com](mailto:info@process-insights.com)

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