Online Total Sulfur Analyzer

Model: 800TS

BLUE DRAGON
TECHNOLOGY

- **Single-channel / Maximum Six-channel Rapid Switching (Optional)**: Enable fast measurement of sulfur content in liquid or gas samples.
- **Superior Accuracy and Analytical Precision**: Provide reliable data support for process adjustments.
- **Minimal On-site Installation Requirements**: Ensure maximum online operation time for process optimization.

Wide Range of Applications

Sulfur is one of the primary sources of environmental pollution. For example:

Sulfur dioxide (SO_2) generated from fuel combustion is a major cause of acid rain. Sulfur compounds in vehicle exhaust emissions pose significant health risks.

With increasing environmental awareness, stricter regulations on sulfur content in petrochemical products have emerged, demanding lower detection limits in measurement techniques.

The complexity of refining processes necessitates comprehensive online solutions to monitor and control sulfur content throughout production.

Series 800TS Online Total Sulfur Analyzer provides high-precision measurement of sulfur in liquid and gas samples, offering critical data for fuel quality control and process optimization. Main Applications

- Gasoline
- Naphtha
- Diesel
- Gas Oil
- Natural Gas
- Kerosene
- Automotive Gasoline
- Liquefied Petroleum Gas (LPG)

Design Concept – Simple & Reliable

The Series 800TS uses ultraviolet fluorescence (UVF) technology for sulfur content measurement. This method is a rapid and accurate analytical technique that complies with standards such as ASTM D6667, ASTM D5453, ISO 20846, GB/T 34100, and SH/T 0689.

UV Fluorescence Measurement Principle

Sulfur compounds in the sample are completely converted to gaseous SO_2 in a high-temperature combustion furnace. The SO_2 is exposed to a specific wavelength of ultraviolet light (hv_1), exciting it to an unstable energy state (SO_2*).

As unstable SO_2 returns to its ground state, it emits energy in the form of fluorescent radiation (hv_2). The total sulfur content in the sample is proportional to the emitted fluorescence, enabling precise quantification through fluorescence intensity measurement.

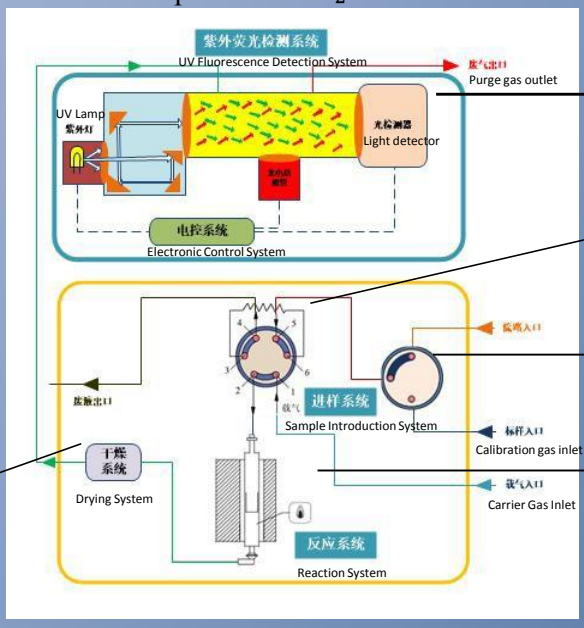
$$R-S+O_2 \quad * \quad SO_2+CO_2+H_2O$$

$$SO_2+h\gamma_1 \quad * \quad SO_2*$$

$$SO_2* \quad \rightarrow \quad SO_2+h\gamma_2$$

Patented Catalytic Combustion Technology

Series 800TS uses catalytic combustion technology, when automatic sample injection valve precisely controls sample introduction into the high-temperature combustion tube, which ensures complete conversion of sulfur compounds to SO_2 without carbon residue formation.



Exceptional Analytical Performance

Features & Benefits

- Ultraviolet Fluorescence Detection
- Patented Catalytic Combustion Technology: Ensure 100% conversion of sulfur compounds to SO_2.
- Max 6-stream Auto Switching Capacity: Even if adjacent streams differ by 10-fold in concentration (from high to low), switching requires only ~3 minutes to fully eliminate carryover interference, significantly reducing the analysis cycle time.
- Ultra-Low Detection Limit: 100 ppb.
- Excellent Repeatability & Linearity.
- Single-Point & Multi-Point Calibration Functions.

Long-Term Stability.

Time	Concentration (ppm)	Time	Concentration (ppm)	Time	Concentration (ppm)
Day 1	3.8	Day 4	3.8	Day 7	3.8
	3.7		3.7		3.8
	3.8		3.7		3.9
	3.8		3.7		3.8
	3.8		3.7		3.9
	3.7		3.6		3.9
	3.9		3.7		4.0
Average value	**3.8**	Average value	**3.7**	Average value	**3.9**
Day 2	3.7	Day 5	3.7	Day 8	3.9
	3.8		3.8		3.8
	3.7		3.8		4.0
	3.7		3.9		3.8
	3.8		3.8		3.7
	3.8		3.8		3.8
	3.9		3.7		3.8
Average value	**3.8**	Average value	**3.8**	Average value	**3.8**
Day 3	3.6	Day 6	3.9	Day 9	3.8
	3.8		3.8		3.7
	3.7		3.8		3.7
	3.7		3.8		3.9
	3.7		3.9		3.7
	3.8		3.7		3.7
	3.7		3.7		3.7
Average value	**3.7**	Average value	**3.8**	Average value	**3.7**

Reliable Accuracy & Precision

The Series 800TS provides highly accurate and precise sulfur measurements, reflecting true variations in sample sulfur content. Users can confidently

adjust process conditions based on real-time sulfur data, ensuring compliance with final product sulfur specifications.

The measurement results of the Series 800TS Online Total Sulfur Analyzer are compared with the ASTM D5453 (GB/T34100) laboratory method, after months of continuous testing, the measurement results of the analyzer are found to be fully consistent with those obtained using the laboratory method.

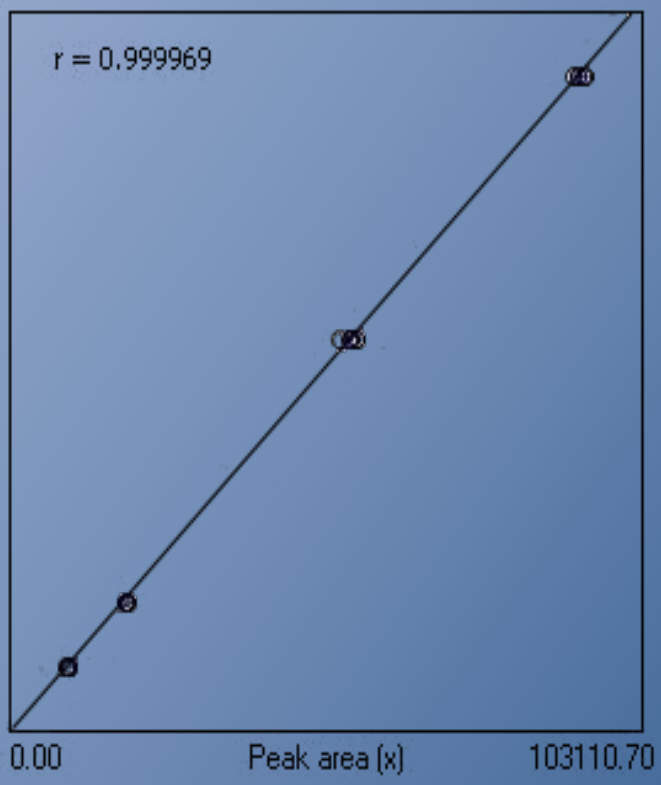
Measurement Range

The Series 800TS accurately measures sulfur concentrations from 0-100 ppm (customizable for wider ranges).

Measurement Precision

As shown in the figure below, multiple measurements were performed on gasoline and diesel samples with sulfur content below 5 ppm. The precision, expressed as relative standard deviation (RSD), was less than 3%, demonstrating exceptional measurement accuracy that fully meets the requirements of laboratory data analysis.

Gasoline (ppm)	Diesel (ppm)
4.2	3.8
4.3	3.7
4.2	3.8
4.1	3.8
4.3	3.9
4.4	3.7
4.3	3.7
4.2	3.6
4.4	3.7
4.1	3.7
RSD=2.54%	RSD=2.25%

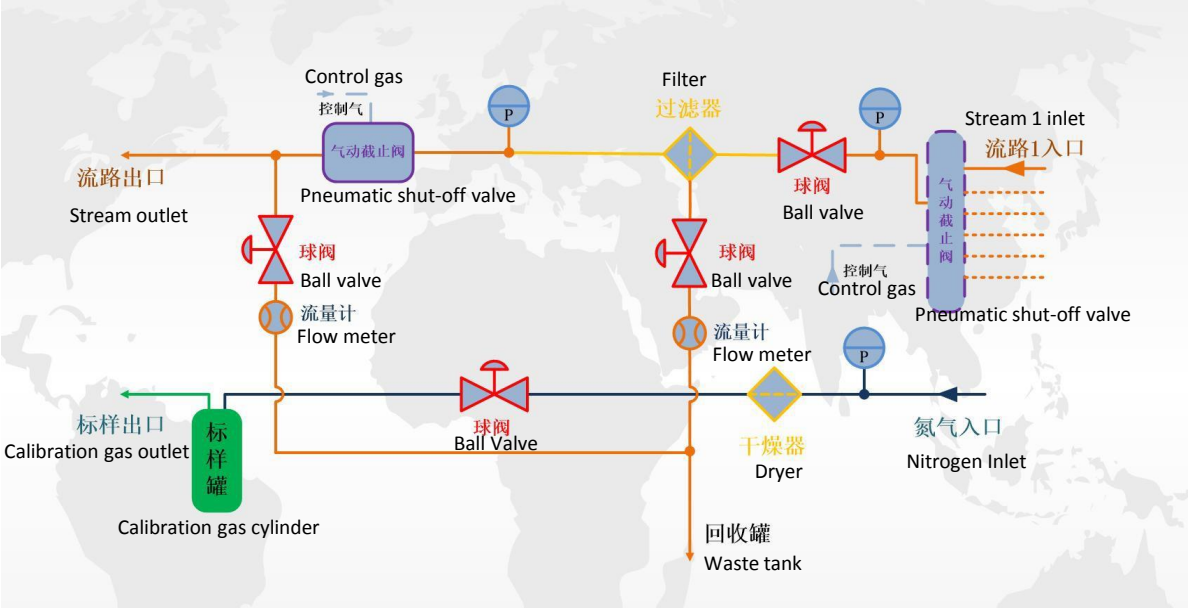


Reliable and Comprehensive Sample Pre-Treatment System

Comprehensive Sample Pre-Treatment System

Maintaining uniform sample state prior to analysis is critical for accurate sulfur measurement. The sample pretreatment system efficiently removes particulate matter that may affect measurement results, regulates the sample pressure before entering the analyzer, and controls the sample flow rate to ensure consistent analysis conditions.

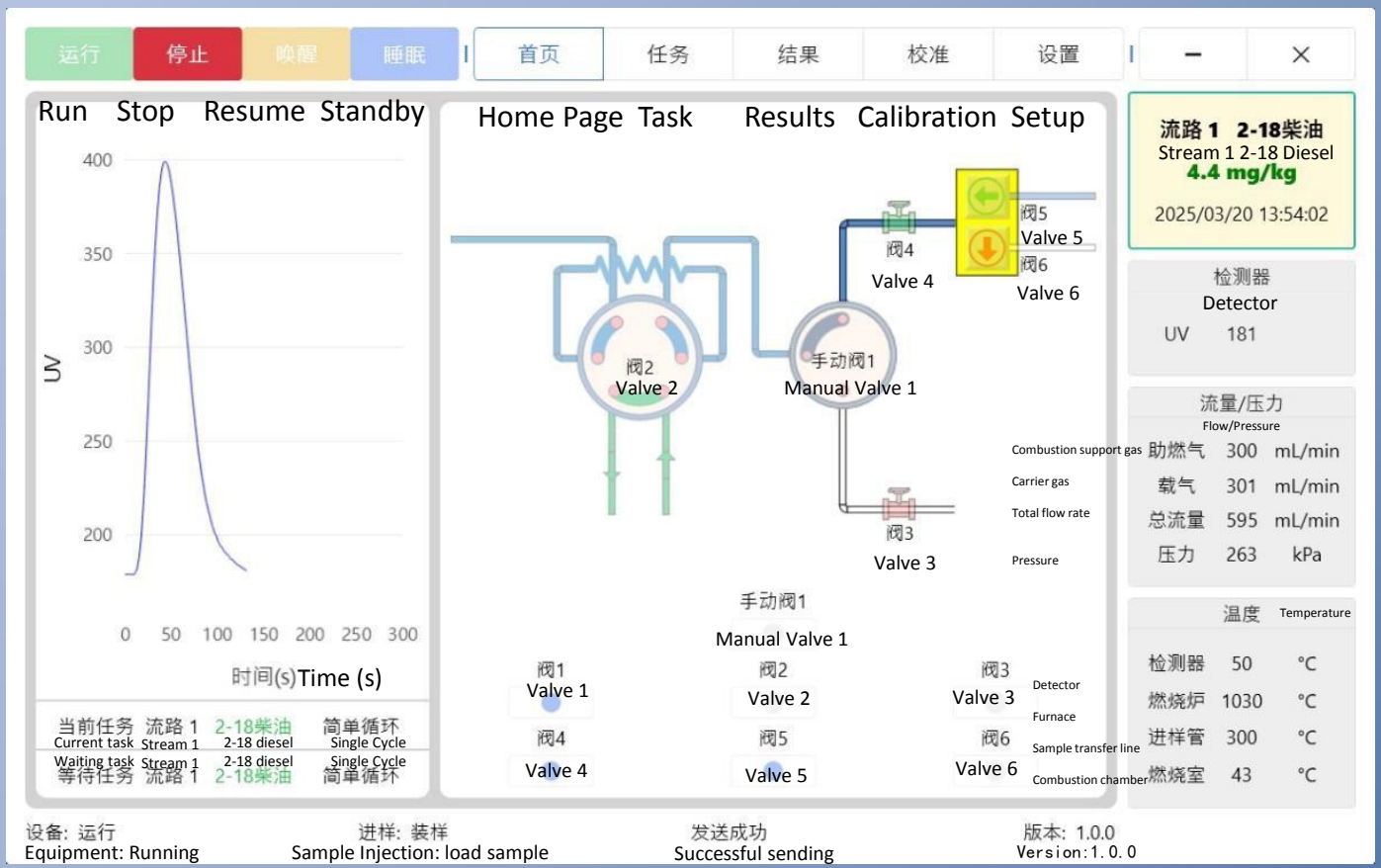
The sample pretreatment system consists of a sample pretreatment module and a calibration module. The sample pretreatment section includes a stream selection system (valve terminal), filters, pressure gauges, shut-off valves, flow meters, and a two-stage fast loop system.



Communication & Diagnostics

Series 800TS is a multi-stream online sulfur analyzer with calibration functionality. It communicates with the control system via 4~20mA signal output or RS-485, compliant with the RTU network communication protocol.

Series 800TS software displays real-time concentration data and analyzer status information. In the event of a malfunction, the display interface issues an alarm and provides corresponding fault information. Simultaneously, the analyzer automatically shuts off the sample stream and controls the furnace cooling process.



Communication & Diagnostics

- RS-485 communication, compliant with the RTU network protocol
- 4～20mA signal output per channel for data transmission
- Fault information displayed on the analyzer panel

Technical Specifications

Technical Parameters		
Detector:	Ultraviolet Fluorescence Detector	
Compliance Standards:	ASTM D6667,ASTM D5453、ISO	20846,GB/T 34100,SH/T 0689
Measurement Range:	0–100 ppm (customizable upon request)	
Detection Limit:	100ppb	
Repeatability:	±1% of full scale	
Linearity:	±2% of full scale	
Calibration Functionality:	Including	
Calibration Functionality:	per-stream 4–20mA calibration	
Digital Communication:	RS-485	
Alarm Output:	Furnace Temperature, System Pressure, etc.	
Operating Conditions		
Ambient temperature:	0–40°C	
Power Supply:	220 VAC, 50/60Hz, 3KVA	
Instrument Air:	0.6MPa, 200L/min, oil-free	
Zero Air :	0.2MPa ，1.5L/min	
Dimensions:	705x386x1155 (mm)	
Weight:	Approx. 100kg	