Series 800TS Sulfur On-Line Analyzer

Operating Instruction Manual

BLUE DRAGON
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Statement

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Version Information

Version NO.: V1.0.0

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Validity

This manual is valid for all products manufactured after May 2025.

Content

This manual contains the following information about Series 800TS Sulfur On-Line Analyzer. Read this manual thoroughly before performing any works with Series 800TS. This manual contains the following contents, which are explained in detail

respectively:

- ✧ Sample Pretreatment System
- ✧ Analyzer Main Unit
- ✧ Working Principle
- ✧ Functional Modules
- ✧ Analyzer Setup and Operation
- ✧ Routine Maintenance and Troubleshooting

Scope of application

This manual is intended for personnel involved in the installation, operation, maintenance, and repair of the Series 800TS Sulfur On-line Analyzer.

Before installing, operating, maintaining, or repairing the Series 800TS Sulfur On-line Analyzer, all personnel should carefully read and fully understand the information provided in this manual.

Pictures

Due to differences in product model configurations, the images in this manual may not fully match the actual model in use. However, this will not affect the normal operation of the analyzer.

Store this manual

Store this manual carefully and make sure it is accessible for all relevant personnel.

Transfer this manual

If you transfer the Series 800TS to someone else or another user, remember always transfer along with this manual.

catalogue

Chapter 1: Safety

1.1 Safety signs

Pay special attention to the content covered in the relevant chapter when the symbols in the table below appear in the manual. These warning symbols indicate that improper operation may not only damage the analyzer but could also cause harm to the operator. During installation, operation, maintenance, and repair of the analyzer, strictly adhere to the corresponding instructions to avoid potential hazards

The safety instructions are categorized according to the following risk levels:

Risk level	Probability	Consequences
 Risk	Max	Fatal/ Severe injury
 Warning	High	Minor injury
 Caution	Medium	Damage to the property

1.2 Safety Precautions

The safety information in this manual is intended to assist personnel in properly installing, operating, and maintaining sulfur on line analyzer Series 800TS. Failure to comply with the safety measures specified in the manual or improper use, maintenance, or repair of the analyzer may result in damage to the analyzer components and could cause personal injury.

Incorrect execution of the instructions and procedures related to the analyzer as outlined in the corresponding sections of the manual may lead to analyzer malfunction, damage, or personal injury.

Series 800TS operates on 220V (±10%) AC power supply. The power source must be free from surges or spikes; the circuit breaker and wiring specifications must match the required current rating; and all wiring must comply with electrical codes.

Proper precautions must be taken to prevent spark generation. Additionally, safety measures must be implemented to avoid electric shock accidents caused by contact with high-voltage components inside the analyzer when the panel is opened.

Risk

Before opening the front panel of Series 800TS to perform internal operations, disconnect the power supply. The optional positive pressure control system's forced power-on mode should only be used for maintenance and servicing in non-hazardous areas.

All these operations must be performed in strict compliance with all specified regulations and procedures. Prior to conducting any operations, all potential hazards must be carefully assessed and appropriate measures implemented to prevent personal injury and equipment damage.

Warning

Even after disconnecting the power supply of Series 800TS , components such as the combustion furnace and reaction tube may remain at high temperatures. Appropriate precautions must be taken to prevent personal injury from contact with these high-temperature surfaces.

Proper protective equipment must be worn when maintaining Series 800TS, including but not limited to:

- ✧ *Heat-resistant gloves*
- ✧ *Chemical-resistant rubber gloves*
- ✧ *Safety goggles with side shields*
- ✧ *Protective masks*

1.3 Warning Labels

When performing maintenance or repairs on Series 800TS, pay attention to the warning labels attached to specific components of the analyzer, and exercise extra caution when handling these parts.

Warning Labels	Instruction
	Warning: Risk of Burns
	High Voltage: Risk of Electric Shock

1.4 Precautions

- ✧ Series 800TS should be installed in an analysis cabin, avoiding fluctuations in air, temperature, and humidity.
- ✧ The installation and maintenance of analyzers and related equipment should be carried out by authorized engineers.
- ✧ Before opening the analyzer panel, the power should be cut off.
- ✧ When maintaining Series 800TS, it is necessary to ensure that the combustion furnace and catalytic combustion tube have cooled down, or wear appropriate protective gloves and protective equipment, otherwise

there is a risk of burns or scalds.

- ✧ When operating or using chemical reagents, please strictly follow the safety instructions provided by the chemical reagent factory.
- ✧ When operating or using chemical reagents, corresponding protective equipment (such as gloves, protective masks, etc.) should be worn to prevent personal injury.

1.5 Applicability

1.5.1 Applicability

The Series 800TS is suitable for fully automatic online analysis of total sulfur content in liquid samples.

1.5.2 Applicable Samples

The Series 800TS is suitable for liquid samples that can be completely decomposed and burned under controlled combustion conditions

1.5.3 Unapplicable samples

- ✧ Series 800TS is not suitable for analyzing corrosive chemicals, acids, and samples that cause explosions.
- ✧ Series 800TS is also not applicable to samples containing fluoride, phosphorus containing compounds, and heavy metals, which can affect the analysis results or the lifespan of analyzer components.
- ✧ Series 800TS is also not suitable for high viscosity samples.

1.6 Waste disposal

When dealing with waste, the following principles should be followed:

- ✧ Deal with waste in accordance with relevant classification requirements.
- ✧ Dispose of waste according to the information provided in the corresponding Safety Data Sheet (SDS) of the chemical reagents.

1.7 Risks

1.7.1 High temperature scald

During the operation of the analyzer, the combustion furnace heats and maintains the catalytic combustion tube at a very high temperature (typically above 1000°C). Even after disconnecting the analyzer's power supply, some components may remain extremely hot for an extended period. Appropriate protective equipment should be worn, and relevant guidelines must be followed to avoid scalding.

1.7.2 High Voltage Electric Shock

The analyzer contains high-voltage electrical components, some of which may carry voltages as high as 220V. Incorrect operation poses a risk of electric shock. Never spray liquids or use leak detection fluid near live components. Strictly adhere to all relevant safety guidelines to prevent electric shock.

1.7.3 Spare Parts and Components

Only use spare parts and consumables that meet quality requirements obtained from our factory or you local authorized distributors. If inappropriate spare parts and components are used, the following risks may occur:

- ✧ • Personal injury to operators
- ✧ • Analyzer damage
- ✧ • Voided warranty
- ✧ • Inaccurate analysis results

1.7.4 samples

The sample may pose the following potential hazards:

- ✧ Risk of chemical burns or poisoning when in contact with the sample
- ✧ Risk of explosion during sample combustion

These samples include:

- ✧ Corrosive chemicals such as strong acid or strong alkali solutions
- ✧ Organic solvents
- ✧ Explosive substances
- ✧ Gas mixtures that can produce toxic or explosive effects

The operator must protect themselves from direct contact with toxic substances or control the amount of these substances within a safe dosage range.

The operator must comply with the safety instructions listed on the label or manual of the reagent bottle indicated by the corresponding manufacturer.

1.8 Knowledge and Skills

For different tasks, personnel must possess corresponding knowledge and skills. The table below outlines the required knowledge and skills for performing various tasks:

Tasks	**Required Knowledge and Skills**
settings and management	Personnel with good knowledge of the operating system and administrative settings
Starting up and shutting down the instrument	Personal authorized by BLUE DRAGON TECHNOLOGY or your local authorized agent. and been trained.
Using the instrument	Personal with basic knowledge of chemistry and experience with laboratory work.
Maintaining the instrument	Personal authorized by BLUE DRAGON TECHNOLOGY or your local authorized agent.
Repairing the instrument	Personal authorized by BLUE DRAGON TECHNOLOGY and been trained.

1.9 Protective equipment

When operating the analyzer, appropriate protective equipment should be worn according to the requirements of the workplace to protect oneself from accidents.

Ensure that this protective equipment is stored near the analyzer work site, and that personnel can obtain the corresponding protective equipment at any time when needed.

1.9.1 Protective goggles

Protective goggles can protect operators from damage caused by dust, smoke, metal and gravel debris, as well as chemical solution splashing in the work environment, and can also protect them from electromagnetic waves such as ultraviolet, infrared, and microwave radiation.

1.9.2 Protective gloves

- ✧ High temperature resistant gloves: protect workers from burns caused by high-temperature components.
- ✧ Leather gloves: avoid cutting when handling cold quartz components.

1.9.3 Work Clothing

- ✧ Work shoes suitable for the work site
- ✧ Cotton work clothes
- ✧ Hairpins used to tie up long hair

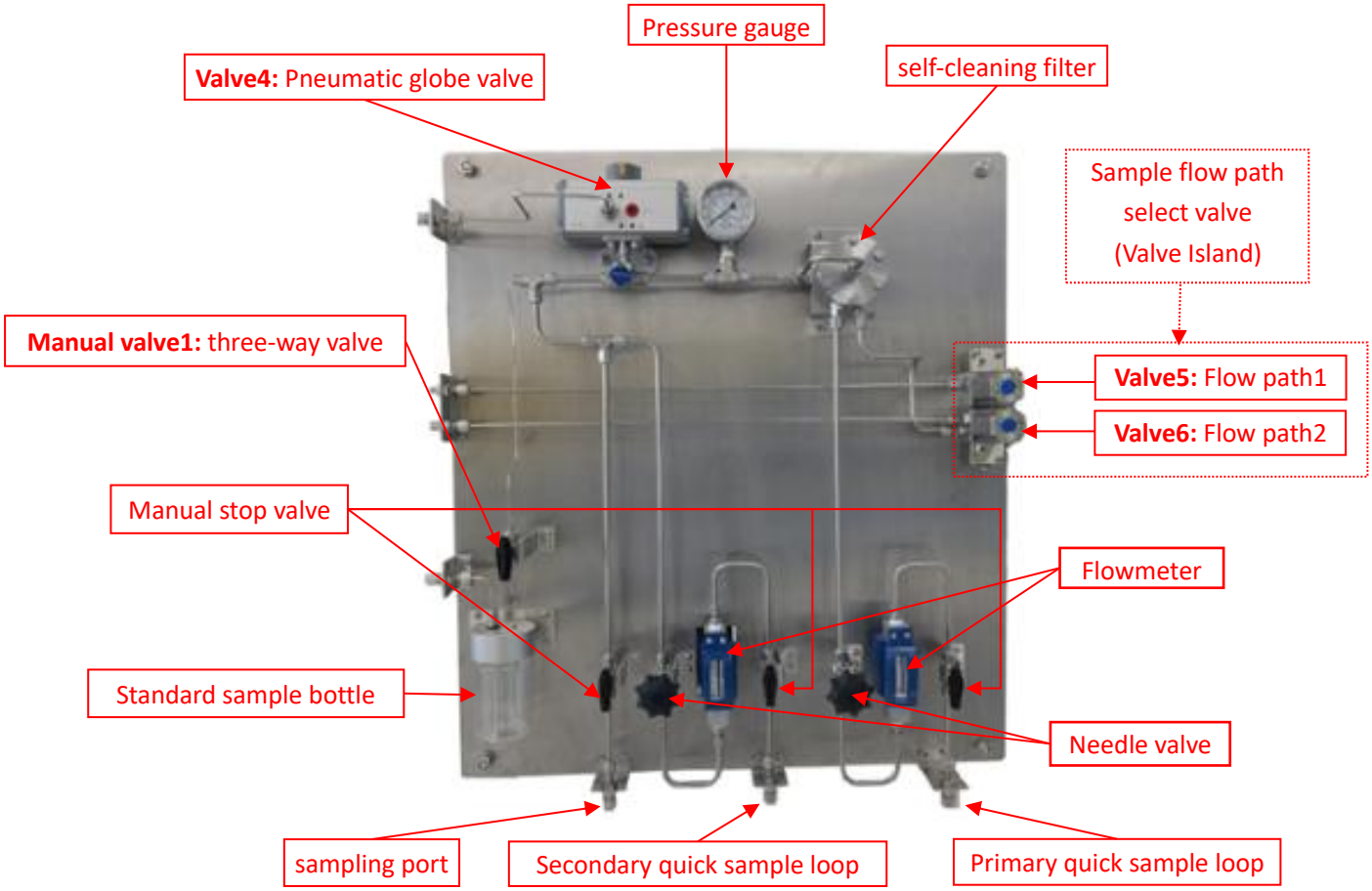
Chapter2: Product Overview

Series 800TS Sulfur on-line Analyzer usually consists of two parts: the sample pretreatment system and the main unit of the analyzer.

The sample pretreatment system filters and reduces the pressure of the sample in the pipeline to a state that meets the requirements of the analyzer, and can input the sample into the main unit of the analyzer at the specified time or interval.

The analyzer's main unit quantifies the sample and transfers it into the high-temperature catalytic pyrolysis tube. Under the combined action of carrier gas, auxiliary combustion gas, and catalyst, the sample undergoes complete combustion, converting sulfur into sulfur dioxide (SO_2). Moisture generated during combustion is removed by a membrane dryer, and the dried gas mixture is then directed into the ultraviolet fluorescence detector for analysis.

2.1 Sample pretreatment system



The sample pretreatment system is equipped with two sample flow select valves (valve island), a self-cleaning filter, a pressure gauge, a pneumatic globe valve, a sampling port, and two quick sample loops. It also includes a standard sample system for analyzer calibration.

The sample flow path select valve (valve island) can analyze up to six different flow path samples based on configuration requirements. Here are just two sample flow path select valves, corresponding to flow path1 and flow path2.

The self-cleaning filter can filter the sample in the sample pipeline, remove large particle impurities from the sample, and prevent blockage of the main sample pipeline.

The pressure gauge is used to display the sample pressure. During the operation of the analyzer, the reading of the pressure gauge should not be lower than 0.1MPa. Otherwise, the sample cannot enter the main unit for detection.

The sample pretreatment system has a primary sample loop outlet, and the flowmeter for sample loop is used to observe the flow rate of the sample into the recovery pipeline or recovery tank. The flow rate can be adjusted by the needle valve of the loop pipeline, and the pressure of the pressure gauge should ⩾0.1MPa.

The manual valve1 is a three-way valve, which used to switch between sample and standard sample analysis.

When calibrating the analyzer, simply install the standard sample bottle onto the rack in the pretreatment system and rotate the manual valve1 to the standard sample position.

Note: The direction indicated by the arrow of the manual valve1 is the analysis state of the sample or standard sample.

There are also manual stop valves before the sampling port, the primary quick sample loop outlet and the secondary quick sample loop outlet.

2.2 main unit

Series 800TS Sulfur On-Line Analyzer - Front View

The Series 800TS main unit consists of three independently accessible chambers:

- Upper chamber: Control compartment

- Lower chamber: Divided into
  - Left sub-chamber: Combustion chamber
  - Right sub-chamber: Gas distribution compartment

2.2.1 Safety lock

When the analyzer operates in a hazardous environment, it must always maintain instrument air purging to prevent hazardous gases from entering. The analyzer's chambers should only be opened for debugging, maintenance, or repair when the environment is confirmed to be safe.

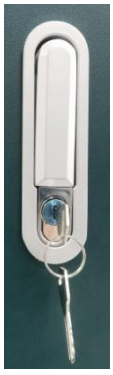
To prevent operator errors, the analyzer's control compartment and combustion chamber are equipped with safety locks, and the keys should be kept by authorized personnel only.

The gas distribution compartment is secured with nuts.

Steps to unlock the safety locks:

➢ Safety lock is in the locked position

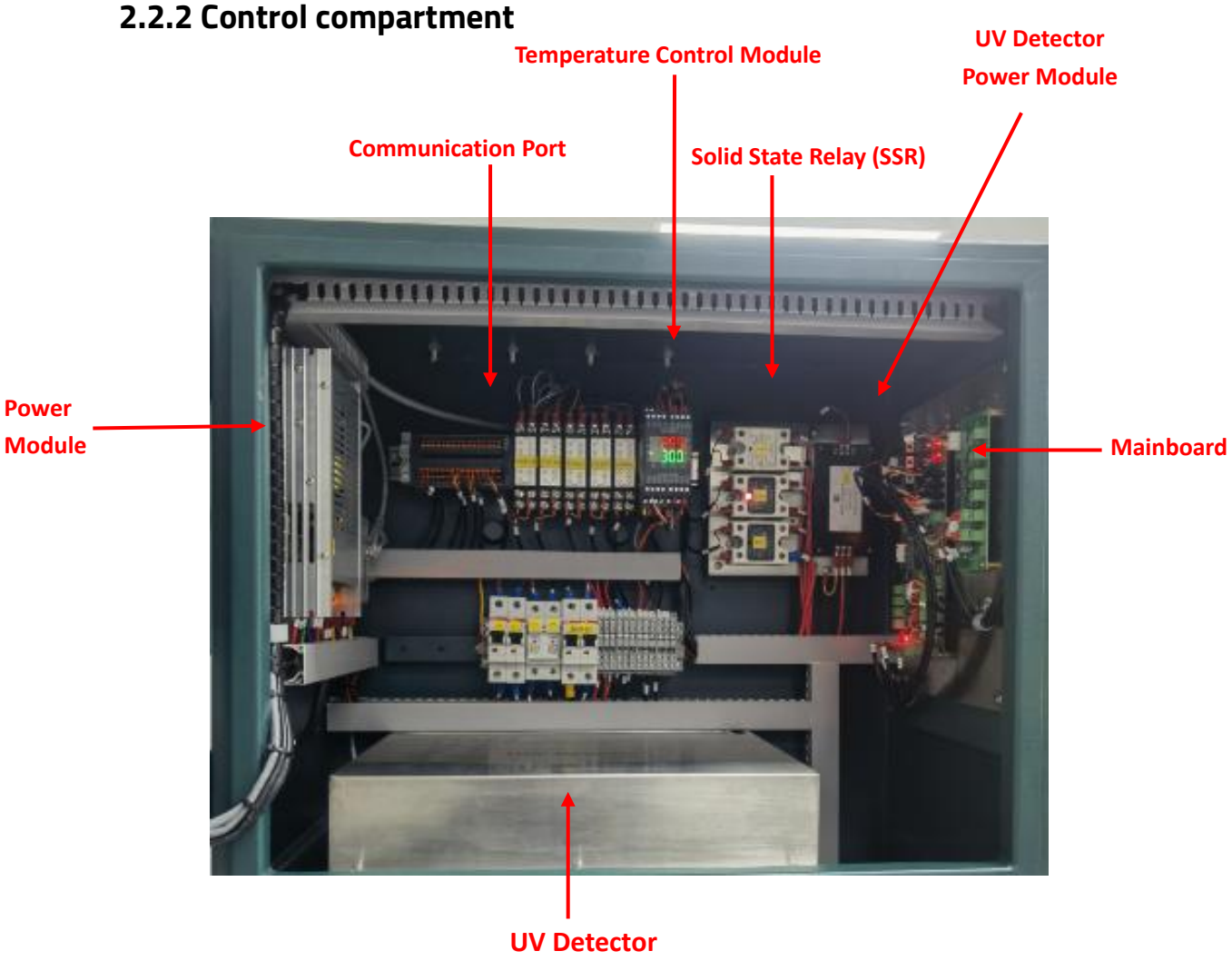
➢ To unlock the safety lock, obtain the key from the authorized key custodian and open the door lock



- Press the button below the keyhole, and the safety lock handle will release

- Rotate the safety lock handle clockwise to unlock it.

2.2.2 Control compartment



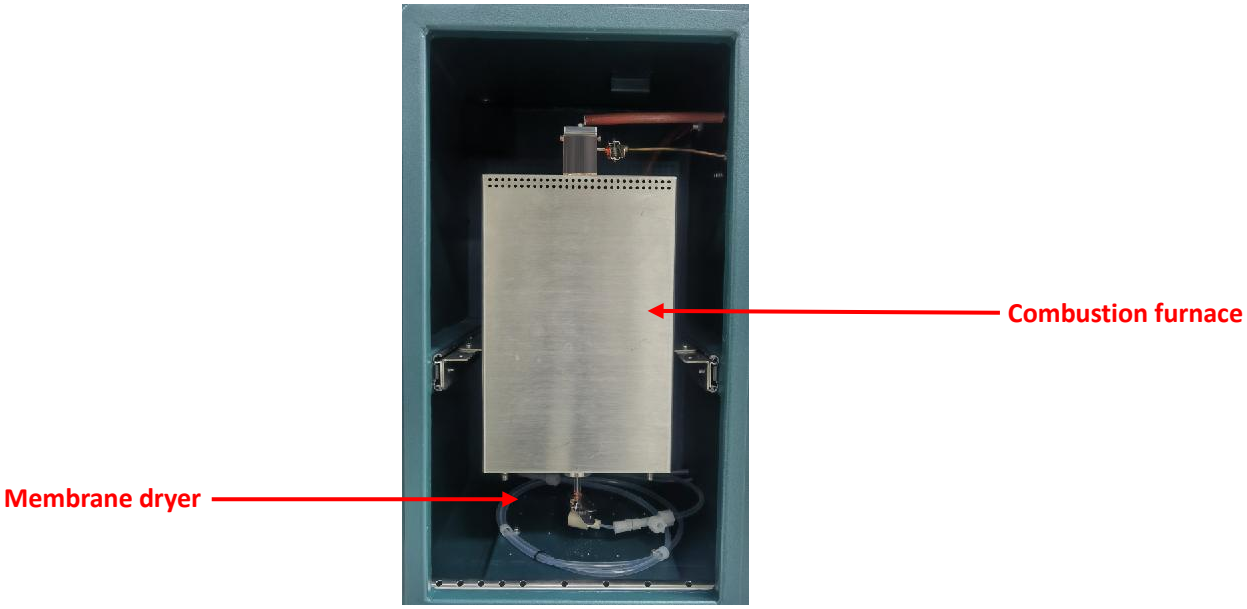
UV Detector, power modules, temperature control modules, solid state relay (SSR), communication port, and mainboard are installed in the control compartment. A touch screen explosion-proof computer is embedded on the control compartment door.

The power unit supplies power to various modules of the analyzer, including two 24VDC power modules and one 15VDC power module. One of the 24VDC power module supplies power to the UV detector only.

The communication ports are of two types: 4-20mA and RS485, used for communication output.

The temperature control module and solid state relay (SSR) are used to control the heating of the furnace, the heating of the sample injection tube, the heating of the ultraviolet fluorescence detector, and monitor the temperature inside the combustion chamber.

2.2.3 Combustion Chamber



The combustion furnace is installed on the slide rail of the combustion chamber. During transportation or operation of the analyzer, the slide rail should be fixed inside the combustion chamber. When installing or replacing the reaction tube, remove the screws on the slide rail fixing plate, and the combustion furnace can be pulled out from

the combustion chamber for easy installation or replacement of the combustion tube.

A catalyst-filled combustion tube is installed in the combustion furnace, which heats and maintains the reaction tube at a set temperature to ensure complete combustion of the samples.

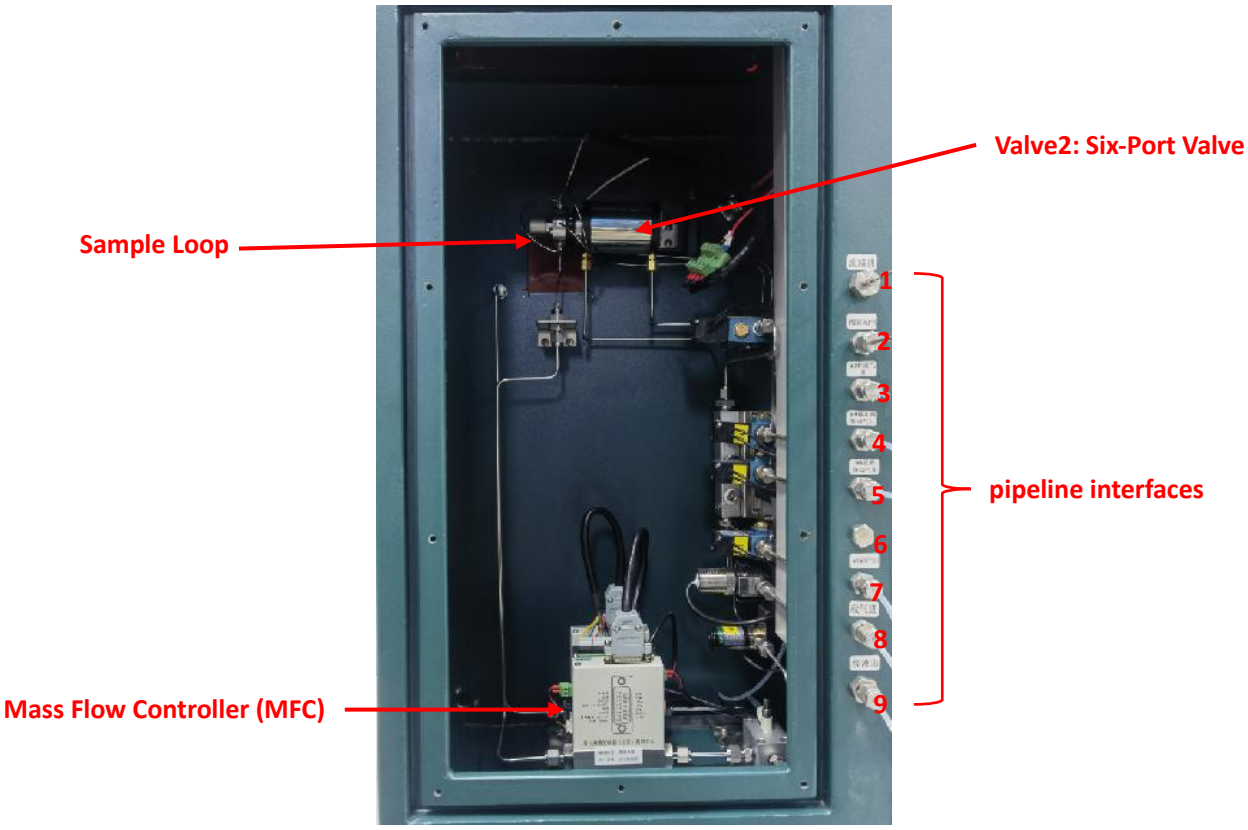
The maintenance-free membrane dryer can remove the moisture generated after the complete combustion of the sample, ensuring that the mixed gas is fully dried before entering the detector.

The temperature sensor installed in the combustion chamber continuously monitors the chamber temperature. When the temperature exceeds the set limit, the furnace will stop heating immediately.

The instrument air inlet of the combustion chamber is located at the front right side of the heating furnace and below the right side of the combustion chamber, while the outlet is positioned at the rear left side. This configuration ensures optimal cooling efficiency for the instrument air within the combustion chamber.

Additionally, the pressure tap for the pressure sensor is also situated inside the combustion chamber. By adjusting the inlet air pressure, both the internal analyzer pressure and combustion chamber temperature can be simultaneously maintained to meet operational requirements.

2.2.4 Gas distribution compartment and pipeline interface



Gas distribution compartment and pipeline ports

The gas distribution chamber and pipeline interfaces are located on the right side of the analyzer. During operation, the gas distribution chamber must remain closed, with its access door securely fastened by bolts to maintain continuous positive-pressure purging inside the analyzer. Detailed descriptions of each pipeline interface:

No.	English description
1	Flow path in
2	Valve driving gas in
3	V3 Calibration gas in
4	V4 Globe valve driving gas out
5	V5 flow path1 driving gas out
6	V6 flow path2 driving gas out
7	V3 Calibration gas out
8	Carrier gas in
9	waste out

The six-port valve is mounted inside the gas distribution chamber to quantify and transfer samples or standard samples from the sample pretreatment system into the combustion tube.

Series 800TS uses zero air as the carrier gas and auxiliary combustion gas. The driving gas for the six-port valve and sample pretreatment system usually uses zero air, but nitrogen can also be used.

The flow rates of the carrier gas and the auxiliary gas are controlled by high-precision mass flow controllers (MFC) to ensure the stability of the flow rates of the carrier gas and the auxiliary gas, providing a guarantee for obtaining stable and reliable test results. There are shut-off valves and pressure sensors installed at the inlet of the carrier gas and auxiliary gas. During the operation of the analyzer, when the pressure of the carrier gas and auxiliary gas exceeds the set range, the analysis will be automatically cut off by the solenoid valve, and the analysis will be stopped to avoid damage to the analyzer.

The zero air inlet, sample inlet, air source outlet for driving flow path valve and pneumatic stop valve, and waste liquid outlet are located on the right side of Series 800TS.

2.3 Working principle

The Series 800TS uses high-temperature catalytic combustion and ultraviolet fluorescence method to detect the sulfur content in light hydrocarbon samples.

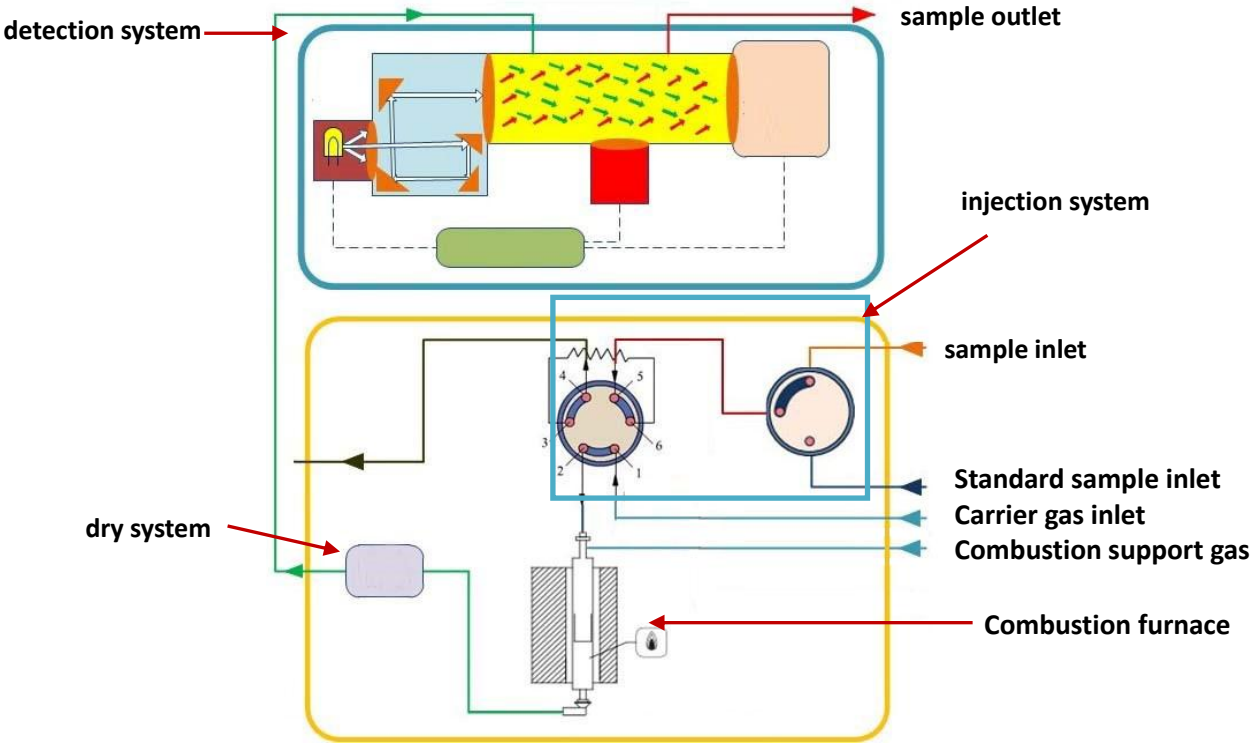
After high-temperature combustion of hydrocarbon samples, various sulfur-containing compounds (such as H_2S, COS, methyl mercaptan, benzothiophene, dibenzothiophene, sulfides, disulfides, and thiols) in the samples are converted to sulfur dioxide gas(SO_2). The sulfur dioxide gas is driven by a carrier gas and passes through an efficient membrane dryer, which removes water produced during the combustion process. Water removal sulfur dioxide is mixed with the carrier gas and detected by a UV fluorescence detector.

Normally, light hydrocarbon samples such as diesel, gasoline, or other common petroleum fractions (such as naphtha) are liquids. The injection system quantifies the

sample to be analyzed and injects it into the catalytic combustion tube (maintained above 1000℃). The sample is vaporized in the catalytic combustion tube filled with catalyst and fully burned in an oxygen atmosphere, generating a mixture of carbon dioxide, water vapor, and sulfur dioxide. The total amount of sulfur dioxide produced during the combustion process is proportional to the sulfur content in the sample.

2.4 Functional modules

Series 800TS integrates a stable and reliable injection system, an efficient reaction system, a maintenance-free drying system, and mature detection technology.

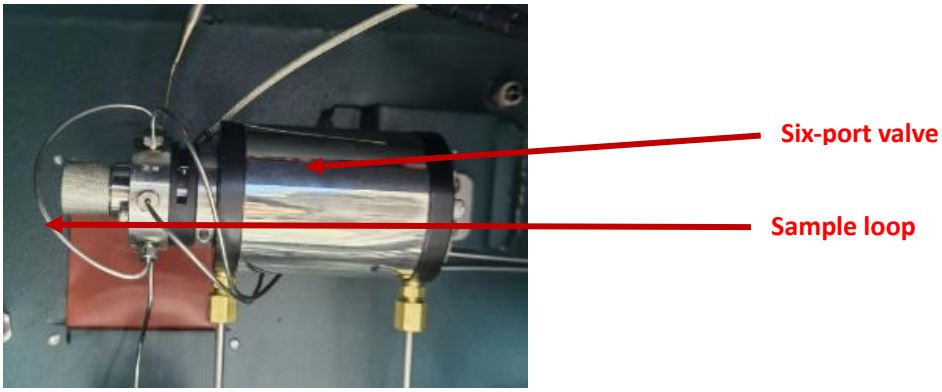


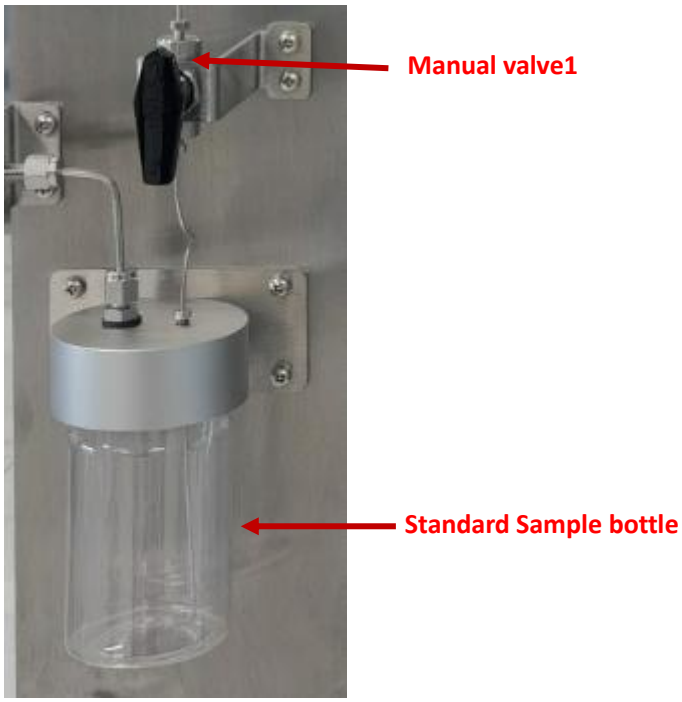
Functional modules

2.4.1 Injection system

Series 800TS achieves sample injection function through a six-port valve. The sample is quantified by a quantitative loop installed in the six-port valve and injected into a combustion tube filled with catalyst。 The manual valve1 installed on the automatic pre-processing system can switch between samples and standard

samples.





2.4.1.1 Six-port valve

The function of a six-port valve is to accurately quantify and transfer samples or standard samples to the reaction system.

Six-port valve is a highly mature precise quantification and injection technology, widely used in various analytical and detection systems, such as high-performance liquid chromatography and gas chromatography. Series 800TS can replace the quantitative ring with an appropriate capacity according to the sample concentration,

ensuring the accuracy and repeatability of sample quantification.

2.4.1.2 Manual Valve1

The pre-pretreatment system of the Series 800TS is equipped with a manual valve1, which facilitates the conversion between the sample flow path and the standard sample flow path. Usually, manual valves1 are located in the sample flow path and can be easily switched to the standard sample flow path without changing the pipeline, avoiding the risk of pipeline leakage caused by modifying the analyzer pipeline.

When calibrating Series 800TS, it is necessary to switch the manual valve1 to the standard sample flow path, install the sample bottle containing the standard sample, ensure that the plastic bottle containing the standard sample is firmly installed and there is no leakage, and then set the standard sample list in the calibration interface of the workstation to perform standard sample measurement, thereby achieving the calibration of the analyzer.

Due to the special design of the Series 800TS, calibration of the analyzer can be achieved with only a small amount of standard samples.

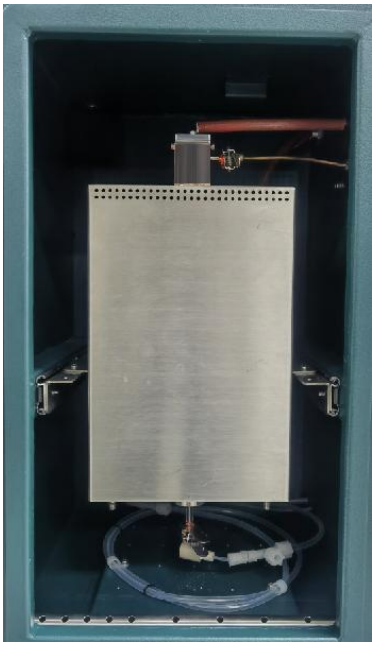
2.4.2 Reaction System

The reaction system consists of a combustion furnace and catalytic combustion tubes.

The combustion furnace will heat the catalytic combustion tube filled with catalyst and maintain it at 1000℃. The sample is injected into the catalytic combustion tube through the injection system, during which it is vaporized and ultimately fully burned and converted into the detection gas sulfur dioxide and other

oxides such as carbon dioxide and water vapor under oxygen rich conditions in the catalytic combustion tube.

2.4.2.1 combustion furnance



The combustion furnace control system has a self-protection function. When the following problems occur during heating, standby, and analysis, the system automatically stops analyzing and shuts off the combustion furnace power:

1. Failure to reach the set temperature within the specified time

2. Sensor malfunctions or displays abnormal values

3. Exceeding the set value

2.4.2.2 combustion tube with catalyst

The combustion tube filled with catalyst can ensure complete combustion of the sample, allowing the sulfur element in the sample to be completely converted into the required sulfur dioxide gas(SO_2) for detection.

The reaction system uses tungsten oxide as the catalyst, which is an efficient and high-temperature catalytic oxidant that can effectively suppress the generation of carbonyl sulfide (COS) and ensure the reliability of the analysis results.

2.4.3 dry system

Hydrocarbons generate large amount of water during combustion, which greatly interferes with the detection of sulfur elements. Therefore, an efficient gas drying system plays a decisive role in the analysis results.

Series 800TS uses an efficient maintenance-free membrane dryer. The membrane dryer consists of a protective sleeve and an inner tube made of special selective permeable material. The combustion products pass through the inner tube with the carrier gas, and the purge gas (usually zero air) flows between the protective sleeve and the inner tube in the opposite direction to the carrier gas. The water generated during the combustion permeates between the inner and outer tubes and is blown out by the blowing gas, ensuring that the sample is fully dried

2.4.4 detection system

The gas mixture such as sulfur dioxide (SO_2) and carbon dioxide (CO_2) generated after the sample combustion reaction is thoroughly dried by a membrane dryer and finally detected by a high-sensitivity ultraviolet fluorescence detector.

Detector principle

When the gaseous sample containing sulfur dioxide is irradiated with ultraviolet light, the ground state sulfur dioxide in the sample absorbs ultraviolet light and is in an excited state with higher energy. Due to the instability of excited sulfur dioxide molecules, they quickly release energy and return to the ground state, emitting light of different wavelengths. The irradiation light is usually referred to as excitation light, and the light released by sulfur dioxide returning to the ground state is called fluorescence. The intensity of fluorescence is measured by a photomultiplier tube. The sulfur content in the sample is directly proportional to the intensity of fluorescence, and this method of obtaining the sulfur content by measuring the fluorescence intensity is called ultraviolet fluorescence method (UV-F method).

$$SO_2 + hv1 \longrightarrow SO_2^* \longrightarrow SO_2 + hv2$$

* = excited state

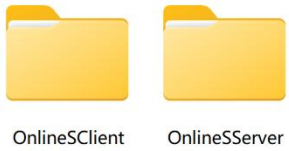
hv1= Excitation light of specific wavelength

hv2= Emission light of specific wavelengths

2.5 Workstation

Series 800TS integrates an explosion-proof computer and is equipped with a Windows operating system. The workstation is based on a Windows, which is easy to use and integrates diagnostic functions, providing unparalleled flexibility and reliability.

The workstation consists of two parts: the server software and the client software.

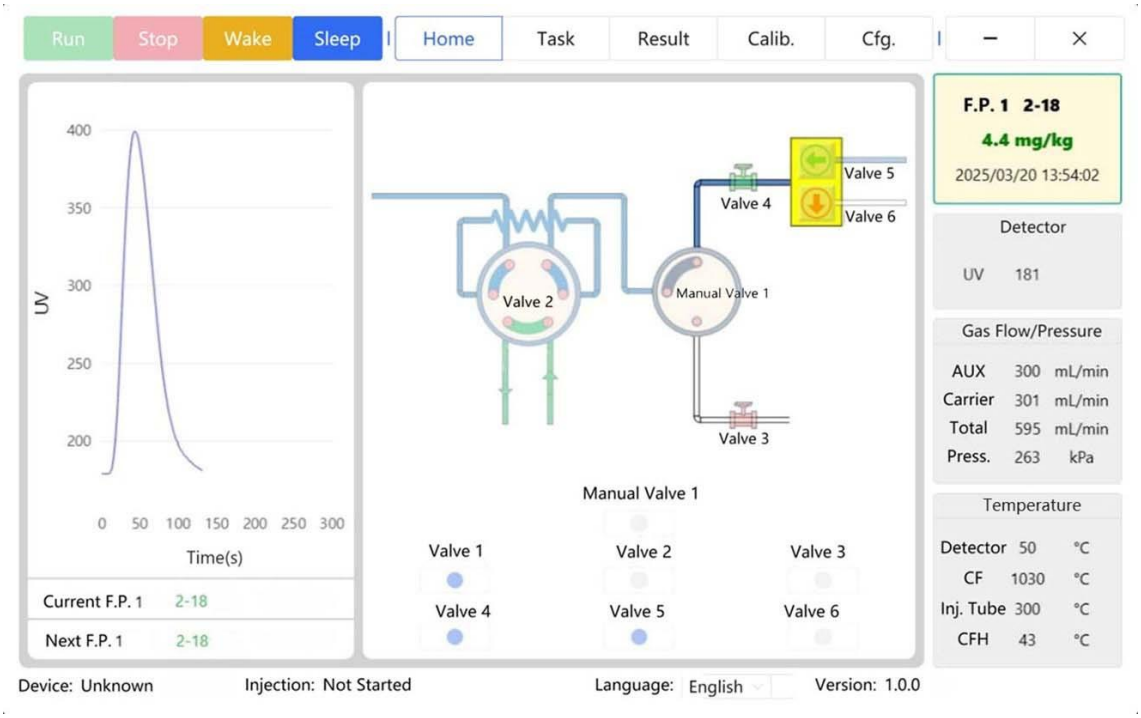


For ease of operation, you can create desktop shortcuts for both the client and server-side software.

During the operation of Series 800TS, the server software should always be in a running state. After closing the server software, the analyzer will stop analyzing.

Server software display the software version and local IP address. You can click right-click with the mouse or long-press with the stylus on the server software interface and choose “exit” to close the server

Users can set analyzer parameters and edit analysis tasks through the client software. It is also possible to observe the operating status of the analyzer and the test results of the sample flow path through the client software. Exiting the client after the analyzer starts running does not affect its operation, and the client can be reopened at any time as needed.



2.6 Specifications

2.6.1 Mechanical Specifications

Dimensions (L x W x H)	705 mm x 386 mm x1155 mm
weight	100 kg
Installation method	Wall mounted or rack mounted installation
temperature	0°C -40°C
Blowing air temperature	15°C-30°C
area classification	Equipped with a purging system, it can be used in Zone 2 hazardous areas with IIA-IIAC level and T1-T4 explosive gas mixtures

2.6.2 Analysis Specifications

detector	High sensitivity UV fluorescence detector
measuring range	Measurement range from 0-100 ppm (w/w) (For other measurement ranges, please consult the manufacturer) If multiple flow paths are selected, the highest concentration of the sample should not exceed 5 times of the lowest concentration
repeatability	± 1% of the full range
Analysis Time	Same sample flow path ≤ 5 minutes
Calibration method	External standard, multi-point or single point calibration

2.6.3. Interface

contents display	Flow path name, test results, time, status
Alarm	Temperature, flow rate of carrier gas and auxiliary gas, pressure of carrier gas and auxiliary gas, test results

2.6.4. site requirements

AC power supply	220±10 VAC，50-60Hz，1500W
Instrument air blowing	200L/min（Minimum）
Carrier gas and auxiliary gas	0.2-0.3MPa ≥1.5L/min (Clean air)
Nitrogen or air	≥0.4MPa (Pneumatic valve driven by air)
Standard sample gas	0.1-0.2MPa (Nitrogen or clean air)
sample pipeline	316L stainless steel, clean and free from oil, moisture, and impurities

Chapter3: Installation

Generally, Series 800TS analyzer host and the sample pretreatment system should be installed in an explosion-proof enclosure. Both the analyzer main unit and the pretreatment system can be mounted on the wall or installed on the floor. The following content describes the installation environment.

3.1 Installation Requirements

- **Materials:** 316L stainless steel tubing shall be used for all on-site gas and sample lines
- **Power Supply:** 220 V ±10%, 50-60 Hz
- **Operating Environment:** For optimal reliability and extended equipment service life, the installation site shall avoid extreme temperatures and airflow fluctuations. The analyzer performs best in stable ambient conditions. Both ambient temperature and purge air must not exceed the limits specified in the technical specifications.
- **Installation Location:** Series 800TS shall be installed as close to the sampling point as practicable. And avoid installation in extreme environments, particularly areas subject to severe vibration.

Caution

Series 800TS heavy and must always be operated with caution to avoid personal injury. Do not attempt to move it and ensure that the analyzer is securely installed.

3.2 Sample pipeline

Note: Accumulation of pressure or liquid at the analyzer exhaust port may impair analyzer performance. The exhaust line should be kept as short as possible to minimize pressure buildup and liquid retention.

No backpressure shall exist in vent or waste discharge lines, and all vent openings must maintain atmospheric pressure. If the analyzer is installed in a positively pressurized analyzer shelter, all purge gas and UV detector exhaust ports must be routed outside the shelter. All sample lines should be kept as short as practicable.

Improperly installed exhaust lines causing backpressure will lead to unstable analyzer readings.

Sample pipeine Preparation

It is very important to prepare the sample pipeline correctly before installation, and the sample pipeline should be prepared according to the following requirements.

1. Thoroughly clean the interior of the pipeline with isopropanol or acetone to remove any possible oil stains.

2. Rinse the inside of the pipeline with deionized water.

3. Use isopropanol or acetone again to clean the inside of the pipeline.

4. Thoroughly dry the pipeline with clean air (free of oil and moisture).


Caution

Isopropyl alcohol is extremely flammable. It can be dangerous if inhaled, and skin contact may cause dryness. When using isopropyl alcohol, please avoid inhaling its vapors and coming into contact with the skin. Appropriate measures must be taken to prevent the ignition of isopropyl alcohol vapors. Use isopropyl alcohol only in locations with sufficient ventilation and where there are no ignition sources.


Caution

Acetone is highly flammable. It is hazardous if inhaled, and skin contact may lead to dryness. When using acetone, please refrain from inhaling its vapors and avoid skin contact. Appropriate measures must be taken to prevent the ignition of acetone vapors. Acetone should only be used in locations with adequate ventilation and where there are no ignition sources.


Caution

Acetone has the capability to dissolve a wide variety of plastics. It is essential to exercise due diligence and take great care to prevent acetone from coming into contact with materials that are susceptible to damage or deterioration upon exposure to it.


Caution

When samples are present within the sample pipeline, it is imperative to implement necessary precautionary measures to safeguard personnel from exposure to hazardous substances.

3.3 Electrical Connections

When connecting the power supply, please read the following AC power supply and wiring requirements：

Power specifications: 220 VAC ±10 %，50-60 Hz，1500 W

Power wiring specifications: The rated value should be 220VAC and 16A standard three core copper power cord.


Risk

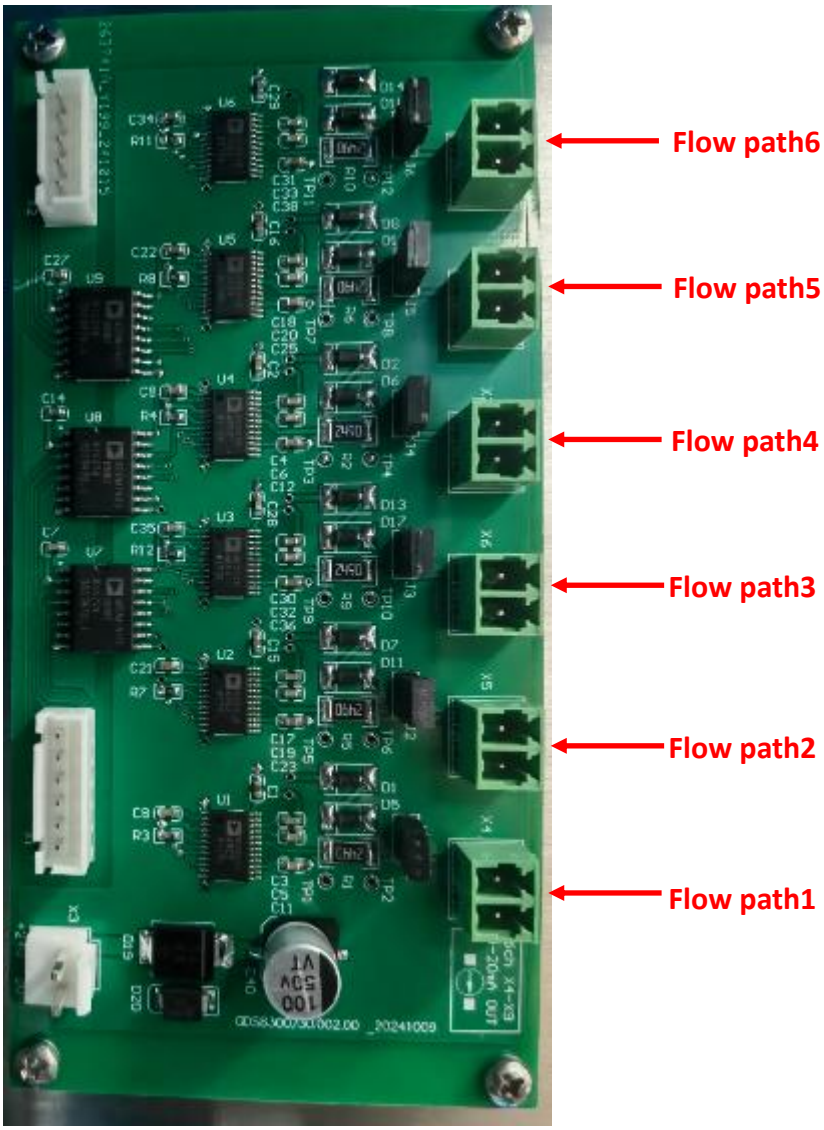
The installation of Series 800TS must be grounded

3.4 Analog Output

Series 800TS can output the analysis results as a 4-20 mA DC signal and represent the sulfur concentration in the sample flow path as a current value. Zero value (4 mA DC) represents the lowest measured concentration in the sample, and full scale (20 mA DC) represents the highest measured concentration.

The analyzer is only responsible for outputting analog output signals to the installation site of the analyzer, and providing corresponding wiring terminals and wiring diagrams.

Terminal Connection Diagram



3.5 Digital Output

Series 800TS integrated communication protocols

3.5.1 Communication Port Configuration

Data bits	8
stop bit	1
Parity check	No
Baud rate	9600

3.5.2 Communication Command Format

1) Read real-time results and sensor data

- **The format of the command sent:**

instrument address	function code (0x04) Read Input Registers	start address High Byte	start address Low byte	Register Quantity High Byte	Register Quantity Low byte	Checksum Low Byte	Checksum High Byte

- **Response:**

instrument address	function code (0x04) Read Input Registers	Byte Count	Data1 High Byte	Data1 Low byte	...	DataN High Byte	DataN Low byte	Checksum Low Byte	Checksum High Byte

Note: A floating-point number (float) occupies 2 registers, totaling 4 bytes. The order of the received bytes is 2, 1, 4, 3.

2) Alarm Signal Reading

- **The format of the command sent**

instrument address	function code (0x02) Read Discrete Input Registers	start address High Byte	start address Low byte	Register Quantity High Byte	Register Quantity Low byte	Checksum Low Byte	Checksum High Byte

- **Response:**

instrument address	function code (0x02) Read Discrete Input Registers	Byte Count	Data1	...	DataN	Checksum Low Byte	Checksum High Byte

Note: Each data byte of Data 1... Data N can contain 8 states. According to the binary system, each bit corresponds to the status value of a discrete input register, and the least significant bit corresponds to the status of the first register. For example, if you want to read 9 states starting from address 1, Response Data 1 accommodates the states of the first 8 registers. If its value is 0x08 (in binary is 00001000), it means that the status of the fourth register is ON. The status of the ninth register should be in the least significant bit of Data 2. If its value is 0x01 (in binary is 00000001), it indicates that the status of the ninth register is ON.

3.5.3 Register Address Definition

- **Results and Sensor Data Address Table (Input Registers)**

Address	Variable Name	Data Type	Byte Length
0	Flow path	UInt16	2
1	Result	float	4
3	Out of Range	UInt16	2
4	Density	float	4
6	Year	UInt16	2
7	Month	UInt16	2
8	Day	UInt16	2
9	Hour	UInt16	2
10	Minute	UInt16	2
11	Second	UInt16	2
12	UV	UInt16	2
13	Real-time Density	float	4
15	Combustion-supporting Gas	UInt16	2
16	Carrier Gas	UInt16	2
17	Total Flow Rate	UInt16	2
18	Pressure	UInt16	2
19	Detector Temperature	UInt16	2
20	Combustion Furnace Temperature	UInt16	2
21	Sample Needle Temperature	UInt16	2
22	Combustion Chamber Temperature	UInt16	2

- **Flow path 1 result（Input Registers）**

Address	Variable Name	Data Type	Byte Length
100	Result	float	4
102	Out of Range	UInt16	2
103	Density	float	4
105	Year	UInt16	2
106	Month	UInt16	2
107	Day	UInt16	2
108	Hour	UInt16	2
109	Minute	UInt16	2
110	Second	UInt16	2

- **Flow path 2 result（Input Registers）**

Address	Variable Name	Data Type	Byte Length
120	Result	float	4
122	Out of Range	UInt16	2
123	Density	float	4
125	Year	UInt16	2
126	Month	UInt16	2
127	Day	UInt16	2
128	Hour	UInt16	2
129	Minute	UInt16	2
130	Second	UInt16	2

- **Flow path 3 result（Input Registers）**

Address	Variable Name	Data Type	Byte Length
140	Result	float	4
142	Out of Range	UInt16	2
143	Density	float	4
145	Year	UInt16	2
146	Month	UInt16	2
147	Day	UInt16	2
148	Hour	UInt16	2
149	Minute	UInt16	2
150	Second	UInt16	2

- **Flow path 4 esult（Input Registers）**

Address	Variable Name	Data Type	Byte Length
160	Result	float	4
162	Out of Range	UInt16	2
163	Density	float	4
165	Year	UInt16	2
166	Month	UInt16	2
167	Day	UInt16	2
168	Hour	UInt16	2
169	Minute	UInt16	2
170	Second	UInt16	2

- **Flow path 5 result（Input Registers）**

Address	Variable Name	Data Type	Byte Length
180	Result	float	4
182	Out of Range	UInt16	2
183	Density	float	4
185	Year	UInt16	2
186	Month	UInt16	2
187	Day	UInt16	2
188	Hour	UInt16	2
189	Minute	UInt16	2
190	Second	UInt16	2

- **Flow path 6 result（Input Registers）**

Address	Variable Name	Data Type	Byte Length
200	Result	float	4
202	Out of Range	UInt16	2
203	Density	float	4
205	Year	UInt16	2
206	Month	UInt16	2
207	Day	UInt16	2
208	Hour	UInt16	2
209	Minute	UInt16	2
210	Second	UInt16	2

- **Control and Parameter Address Table (Holding Registers)**

Address	Variable Name	Type	Function
0	Flow path	Int16	Specify the flow path to be analyzed. -1: Do not specify the flow path (use other task lists of the non - single - path cycle of the client software) 0: Reserved 1 - 6: Correspond to flow path numbers.
1	Start/Stop	Int16	1: Start; 0: Stop. If the instrument is not in standby mode, it cannot be started. Operations need to be carried out in the client software.

- **Alarm Status Address Table (Discrete Input Register)**

Address	Variable Name	Type
0	Out of Range	bool
1	Combustion-supporting Gas Alarm	bool
2	Carrier Gas Alarm	bool
3	Total Flow Rate Alarm	bool
4	Pressure Alarm	bool
5	Detector Temperature Alarm	bool
6	Combustion Furnace Temperature Alarm	bool
7	Sample Needle Temperature Alarm	bool
8	Combustion Chamber Temperature Alarm	bool

3.6 Installation Checklist

You may copy the checklist below for use during system installation

☐ The materials used comply with the specifications defined in Chapter 3.

☐ Operating environment meets the requirements defined in Chapter 3.

☐ Installation site meets the requirements specified in Chapter 3.

Analyzer Status Check Summary：

☐ No physical damage, broken components, or observable defects were found.

☐ All components have been installed in place.

☐ All cable and wire connectors have been securely installed in place

☐ No loose parts (wires, nuts, screws, cables, etc.).

☐ All pipelines/tubing have been properly connected and securely fastened.

The sample flow path and gas pipeline connections comply with the followings:

☐ The pressure, flow rate, and temperature of the sample flow path have been properly adjusted according to system requirements.

☐ The sample pretreatment system should be installed as close as possible to the analyzer to achieve the fastest response time.

☐ The gas pipelines meet the requirements.

☐ All analyzer-connected tubing is properly sized to interface specifications.

☐ Conduct leak-check and torque verification on all piping connections (internal & external).）

Electrical connections shall comply with the following requirements:

☐ The AC power wiring complies with the applicable standards.

☐ The analyzer must be properly grounded.

☐ The signal wiring (DC signals, communications, etc.) complies with the requirements.

☐ The signal wires have been properly connected to the analyzer.

Chapter4: Analyzer Startup and Shutdown

4.1 System Startup Sequence

Initial Startup Procedure for Series 800TS Sulfur On-Line Analyzer as follows:

4.1.1 Power Supply

➢ Ensure that the power supply voltage, frequency, and power match the requirements of the analyzer.

➢ Ensure that the model of the power supply wiring of the analyzer is correct and has been connected.

➢ Ensure that the appropriate circuit breaker and power switch have been installed.

➢ Check all electrical connections. The wire and cable plugs must be fully in place to ensure there is no electrical short circuit.

➢ Ensure that the model of the signal wiring is correct and has been connected.

4.1.2 pipeline

➢ Ensure that the pipeline of the sample flow path is correctly connected to the analyzer.

➢ Before the initial installation, ensure that all sample pipelines connected to the analyzer are clean and dry.

➢ Check all pipeline connections and ensure they are tight and free of leaks. Conduct a pressure test on the pipelines to check for any leaks.

➢ Since it is equipped with a positive pressure control system, introduce purge air and observe whether the pressure reaches the operating requirements.

Alert

For Zone II, the initial purge must only be performed after confirming the area is free of hazards.

4.1.3 Analyzer Pre-Operation Preparation

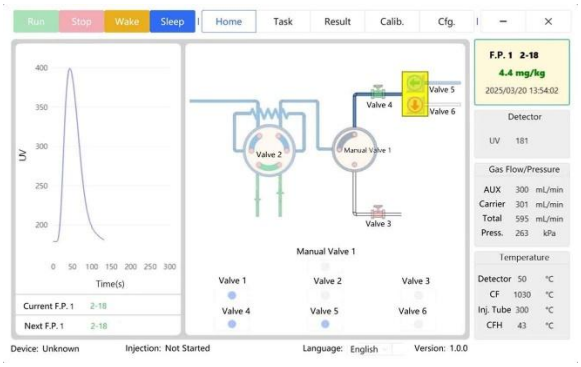
Series 800TS is equipped with a positive pressure control system. Before starting the analyzer, the instrument air should be turned on in advance to purge the interior of the main body of the analyzer. And adjust the purging pressure according to the pressure value displayed on the display panel of the positive pressure control system, so that the purging pressure of the instrument air meets the operating requirements of the instrument.

Adjust the purging pressure properly. Observe the pressure inside the main body chamber of the analyzer is between 200 Pa and 600 Pa on the interface of the positive pressure control system. Click "Start" on the interface of the positive pressure control system. After continuously purging for 5 minutes, the positive pressure control system supplies power to the host of the Series 800TS.

After the analyzer is powered on, perform the following operations according to the steps below:

（1） Launch the analyzer server software and wait for the server interface to fully initialize.

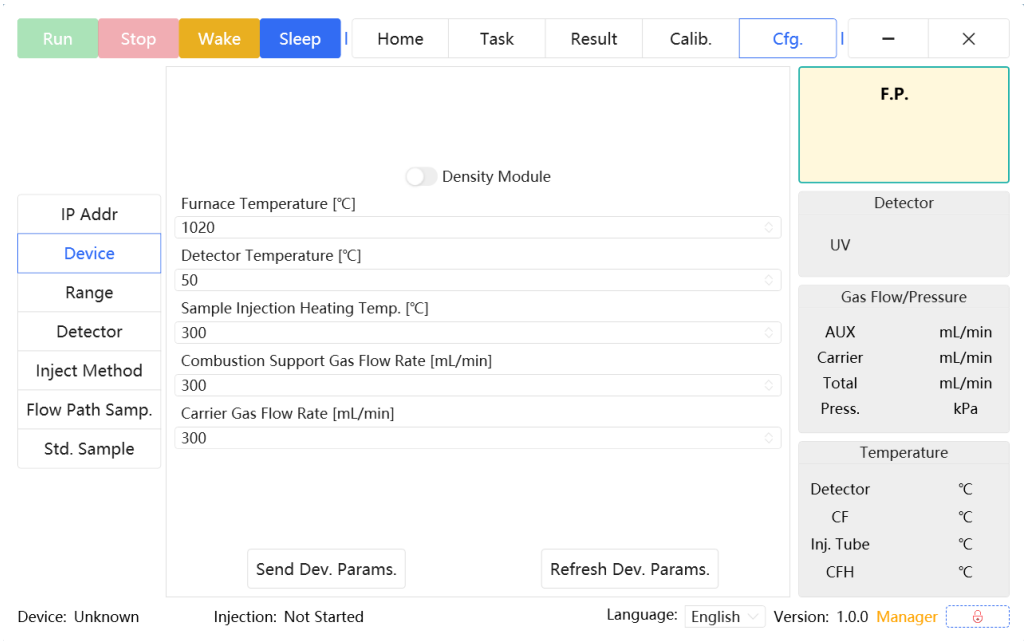
（2） Open the client app and verify normal startup of all analyzer components through the client interface.



（3） Open carrier gas and auxiliary gas stop valves, then adjust carrier gas pressure to approximately 0.25 MPa. Confirm pressure compliance via observing the right-side display of the client software.

（4） Open the stop valve on the analyzer's pneumatic valve drive gas supply and adjust the pressure to 0.4-0.6 MPa.

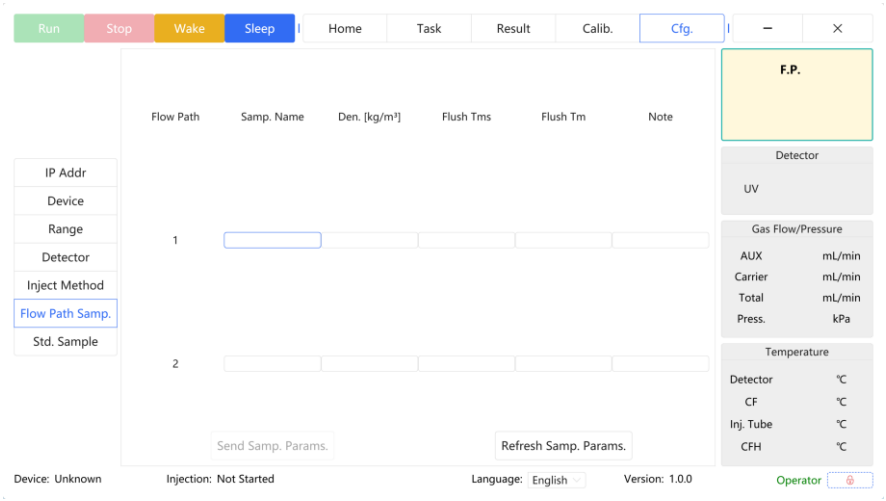
（5） In the client app, click "Cfg." icon to enter the configuration/settings. Click "Device" to set the Furnace Temperature, Detector Temperature, Sample Injection Heating Temp. Click “Send Dev. Params.” to send all the parameters to the server. Then click "Wake" icon, and the furnace, sample injection tube, and detector will start to heat up.



（6） Wait for the Series 800TS reach the normal operating conditions. Calibrate

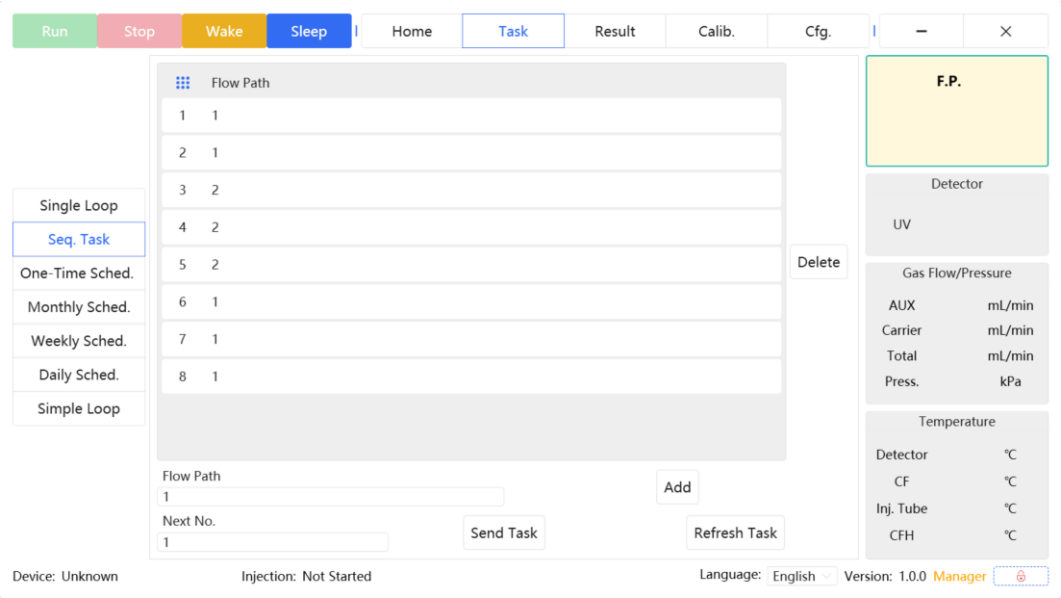
the analyzer according to the instructions in Chapter 6 as needed.

（7） After obtaining the standard curve, select "Flow path samples" in the "Cfg." of the client software to set the name, density and other information of each sample flow path.



（8） Open the stop valves at the inlets of each sample pipeline. Then, in the "Home" interface of the client software, click sample flow path select valve(Valve5 or Valver6) and Valve4 to open the pneumatic valves in the pretreatment system. Then open the manual stop valves of the primary and secondary sample loop. You can adjust the flow rate by adjusting the needle valves on the primary sample loop and the secondary sample loop, and observe the flow rate through the flow meters on the primary and secondary sample loop.

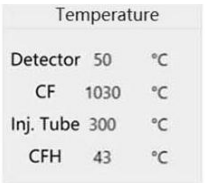
（9） Edit the analysis task in the "Task" interface of the client software, send the analysis task to the server. After waiting for the analyzer to reach the set conditions, click the "Run" icon to start the sample analysis.

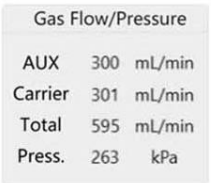


4.1.4 Operation of Series 800TS

Series 800TS s designed as an unattended automatic analytical instrument. After the analyzer is powered on, first open the server window on the computer. After the connection is established, open the client software. Click the "Wake" icon in the client software, and all components of the analyzer will start to enter the working state. For example, the combustion furnace will start to heat up, and the carrier gas and auxiliary gas will reach the set values, etc.

Before the analyzer analyzes the sample, check according to the following steps to ensure that the requirements for the operation of the instrument are met:





4.1.4.1 Carrier gas pressure

Observe on the client software whether the pressures of the carrier gas and the

auxiliary gas are within the allowable range (0.2 MPa - 0.3 MPa).

4.1.4.2 Auxiliary gas and carrier gas flow rates

Observe on the client software that the flow rates of both the auxiliary gas and the carrier gas should be 300 ml/min.

4.1.4.3 Total flow rate

The total flow rate is the flow rate value at the detector outlet. Observe the total flow rate on the client software, and its indicated value should not be lower than 550 ml/min.

4.1.4.4 Termperature

Observe on the client software whether the temperatures of the furnace, the sample injection tube, and the detector have reached the set values. Wait until the heating furnace reaches the set temperature and remains stable for over 30 minutes. Then, observe the temperature of the combustion chamber on the client window, and adjust the pressure of the instrument air to ensure that the ambient temperature of the combustion chamber does not exceed 60°C.

4.1.4.5 Valve driving gas pressure

The valve island and globe valves in the analyzer's pre-treatment system are all gas-driven valves. The pressure of the driving gas should be around 0.4-0.6 MPa.

4.1.4.6 Calibration pipeline gas pressure

The standard sample needs to be at a certain pressure to flow into the six - port valve for quantification. Therefore, corresponding stop valves and pressure - reducing

valves are installed in the standard sample pipeline.

When calibrating the analyzer, you should first open the stop valve in the standard sample gas pipeline and adjust the pressure to above 0.1 MPa.

4.2 Short-term Shutdown

When temporarily shutting down the analyzer, operate according to this procedure. For shutdowns for maintenance purposes or for a long period, please refer to the next section "Shutdown Maintenance".

1. Click the "Stop" icon in the client software.
2. Close the manual stop valves of the sample pipeline and the primary and secondary sample loop.

4.3 Shutdown Maintenance

When performing maintenance operations or shutting down the analyzer with a long-term power outage, please operate according to this procedure.

1. Click the "Stop" icon in the client software.
2. Close the stop valves of each sample flow path.
3. Close the manual stop valves of the sample pipeline, the primary and secondary sample loop..
4. Click the "Sleep" icon in the client software.
5. Wait until the temperature of the combustion furnace drops to room temperature, and then close all gas sources (carrier gas, purge gas, and driving gas).
6. Exit the client software and the server software.
7. Turn off the power supply of the analyzer (or the power supply of the positive

pressure system).


Caution

Before maintaining the catalytic combustion tube, sufficient cooling time should be left, otherwise it may cause equipment damage or personal injury


Caution

Even after a power outage, the main components of the analyzer may still be very hot. Before performing maintenance, wait for a period of time for the system to completely cool down

4.4 Emergency Shutdown

1. Turn off the power supply of the system
2. Close the stop valves on each sample flow path
3. Close the stop valves on the primary and secondary sample loop
4. Close the carrier gas, purge gas, and the stop valves of the drive gas

Chapter5: Configuration and Operation

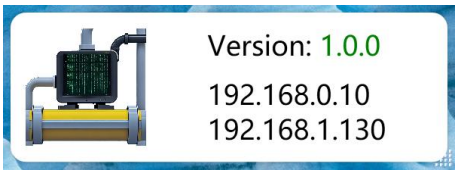
When initially installing Series 800TS or after any modifications to the sample flow path, the parameters should be configured according to the actual conditions.

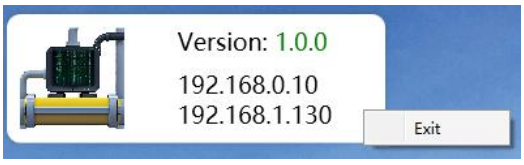
The parameter settings may affect the analysis results, so only trained personnel can adjust them. Once the parameters are determined, avoid unnecessary modifications. If changes are required, please contact our factory.

Series 800TS software consists of server software and client software. The server software runs in the background and is essential for analyzer operation. All parameter configurations, task editing, data output, and external communication are performed through the client software.

5.1 Server Software

The server software has two functions. Firstly, it connects the computer host with terminals such as the detector, mainboard, valve control system, combustion furnace, etc., to achieve the communication function. Secondly, through network connection, it enables customers to achieve remote control. After the server window is opened on the computer, it is shown as follows:





Note: The server software must be run on the build-in computer of the Series 800TS.

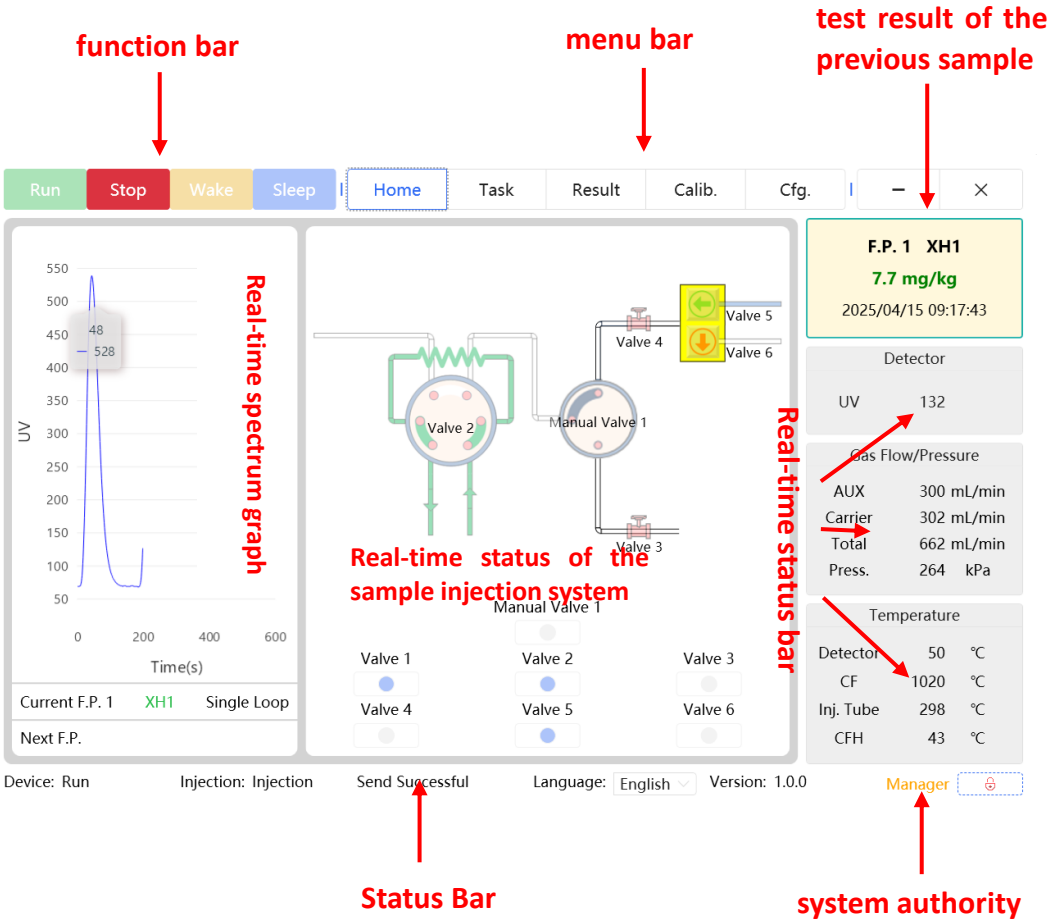
5.2 Client Software

The client software has the following functions:

1. Drawing of the standard curve.
2. Controlling the valve control system and realizing the analysis and testing of samples.
3. Outputting the analysis results in both digital and analog forms.
4. Real-time monitoring of various status parameters of the host computer, such as detector signals, temperature, flow rate, pressure, etc., and having the alarm function.

Note: The client software can be run not only on the computer of the Series 800TS ain unit but also on other computers. When it is run simultaneously on two computers, only the computer that opens the client software first can operate the analyzer, while the software on the computer that opens later can only be used for viewing. When running on other computers, it is necessary to connect to the computer of the GDS 8300 main unit via the network to achieve remote communication.

The window of the client software is divided into the function bar, menu bar, graph area, real-time status area of the sampling system, real-time result area, and real-time status area of the analyzer.


function bar
menu bar
test result of the previous sample
Run
Stop
Wake
Sleep
Home
Task
Result
Calib.
Cfg.
F.P. 1 XH1
7.7 mg/kg
2025/04/15 09:17:43
Detector
UV 132
Gas Flow/Pressure
AUX 300 mL/min
Carrier 302 mL/min
Total 662 mL/min
Press. 264 kPa
Temperature
Detector 50 ℃
CF 1020 ℃
Inj. Tube 298 ℃
CFH 43 ℃
Real-time spectrum graph
UV
Time(s)
Current F.P. 1 XH1 Single Loop
Next F.P.
Valve 1
Valve 2
Valve 3
Valve 4
Valve 5
Valve 6
Manual Valve 1
Real-time status of the sample injection system
Real-time status bar
Device: Run
Injection: Injection
Send Successful
Language: English
Version: 1.0.0
Manager
Status Bar
system authority

5.2.1 Function bar

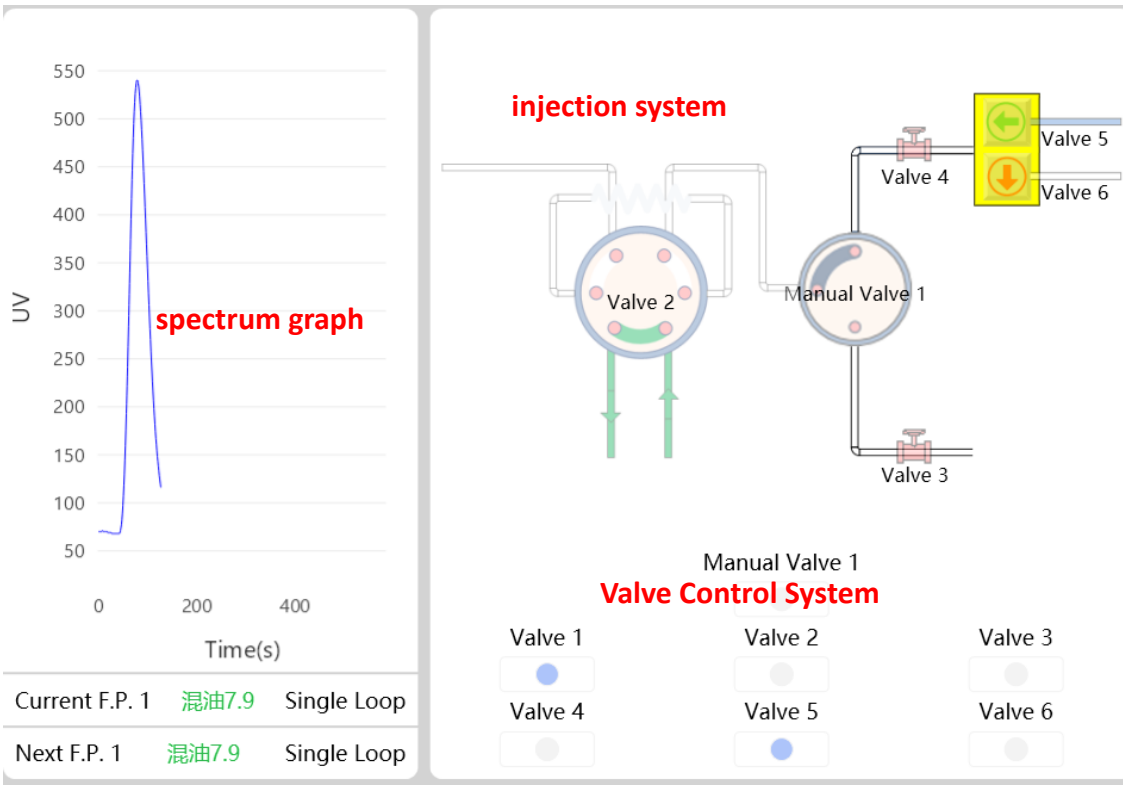
The function bar includes: Run, Stop, Wake, and Sleep.

Run	Start analyzing the sample
Stop	Stop analyzing the sample
Wake	Wake up the host, open the carrier gas solenoid valve, set the flow rate to the target value, and initiate furnace heating.
Sleep	Set the Series 800TS to sleep mode. Close solenoid valve of the carrier gas, set the flow rate to 0, and combustion furnace start to cool down.

5.2.2 Menu bar

The menu bar includes flow interfaces such as: Home, Task, Result, Calib.(Calibration), Cfg.(Configuration).

5.2.2.1 Home interface



This page contains the real-time spectrum graph of the sample, the valve control system, and the sample injection system. You can also view the flow path samples being analyzed and the flow path samples to be analyzed soon through the current tasks and pending tasks.

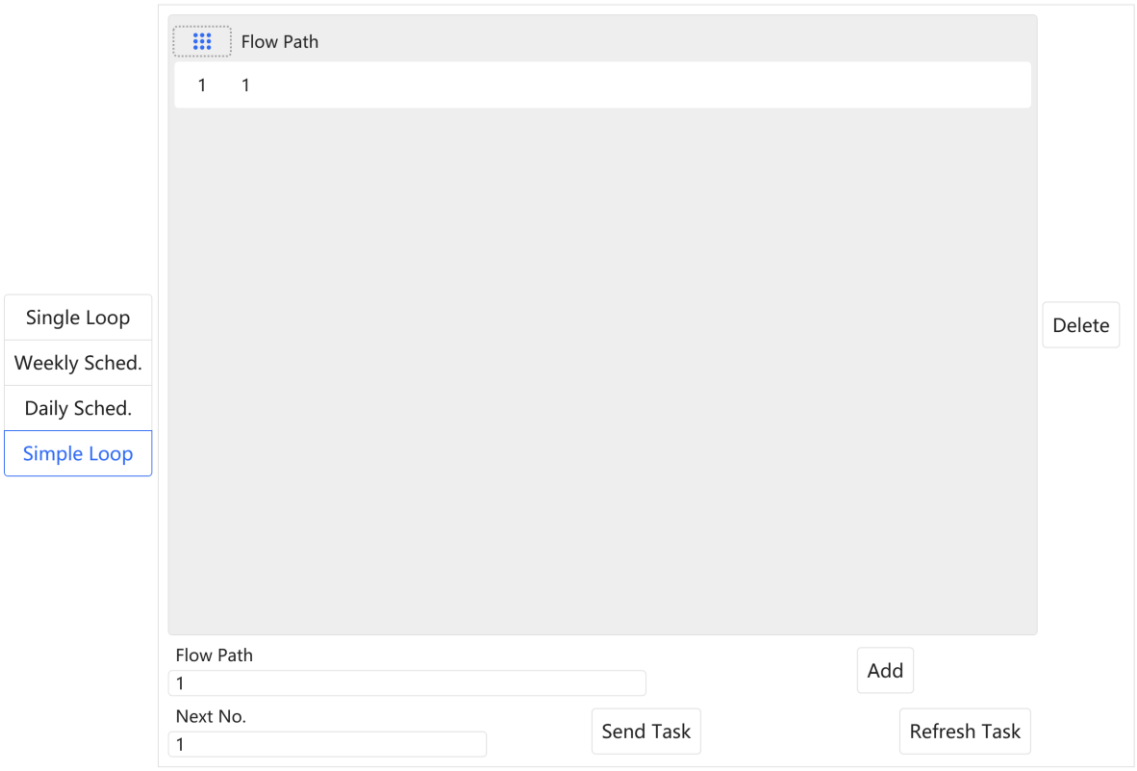
- **Valve control system：**

Valve1	Open/Close Carrier Gas and Auxiliary Gas Inlet
Valve2	Control the six-port valve for sample Loading/Injection
Valve3	Control the standard samples into the six-port valve for quantification or line flushing
Valve4	Control the Opening/Closing of sample into the six-port valve
Valve5	Control the Opening/Closing of Valve in the Sample Flow Path1
Valve6	Control the Opening/Closing of Valve in the Sample Flow Path2
Manual valve1	Switching of sample/standard sample in

- **Injection system**

Displays the real-time status of the injection system and the live status of each valve during the analysis process.

5.2.2.2 Task interface



The left panel of the task window displays seven analysis task modes:

Single Loop: Continuous analysis of one path flow

Weekly Sched.: Performs automated sample analysis at specified intervals on a weekly basis

Daily Sched.: Automatically performs sample analysis at preset time(s) each day

Simple Loop: Performs automated repetitive sample analyses at fixed intervals without complex scheduling requirements

The right panel displays the sample analysis list for each task mode. The list can be edited using function icons: "Flow Path", "Add", and "Delete". After editing, click the "Send Task" icon to transmit the tasks to the server software. The "Refresh Task" icon

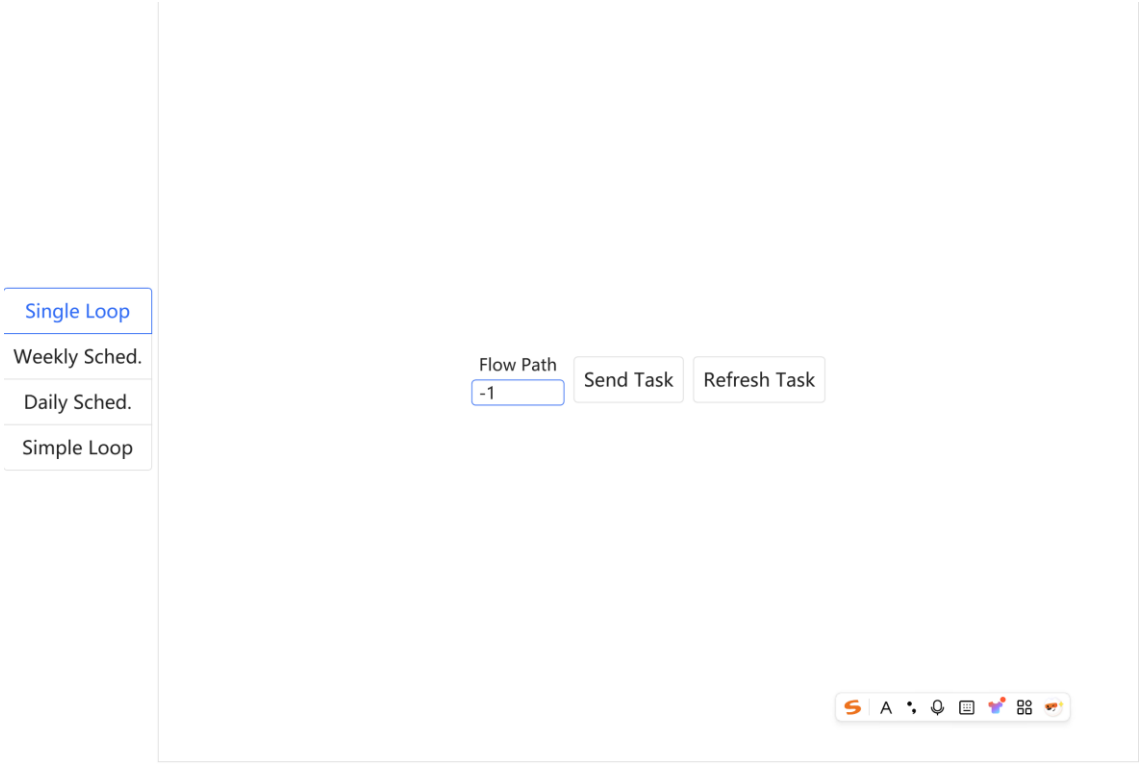
updates the display to show the currently running sample analysis list in the view window.

When deleting the sample analysis list, you need to first select the sample, then click "Delete" button, and finally click the button "Send Task " to send the task to the server software.

Note: The method of editing the sample list for the six modes is the same as above. When add or delete samples, you must click the button "Send Task " to send the task to the server software; otherwise, it will not take effect.

The following content provides a detailed introduction to the sample analysis list view under different task modes.

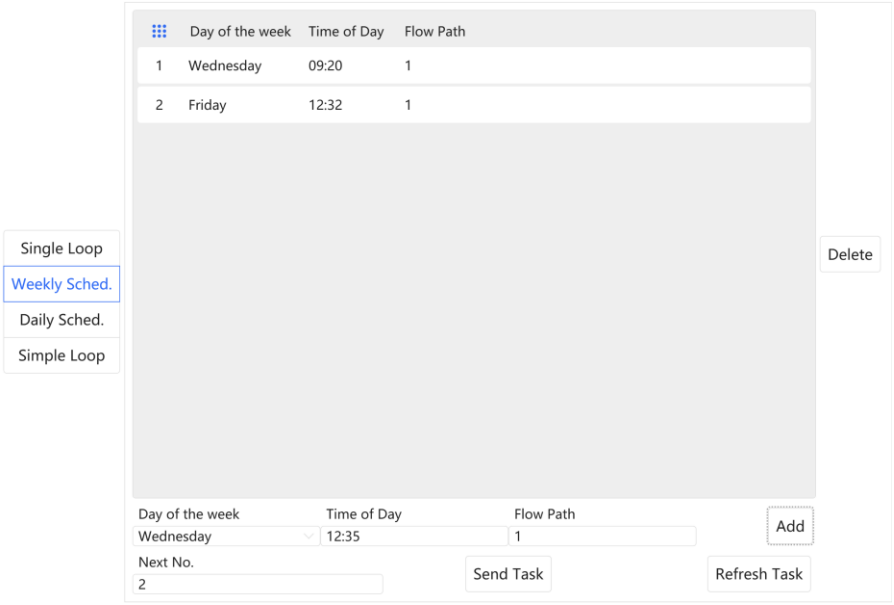
- **Single Loop**



Continuously analyze the sample from the select flow path in a cyclic manner until a stop command is issued.

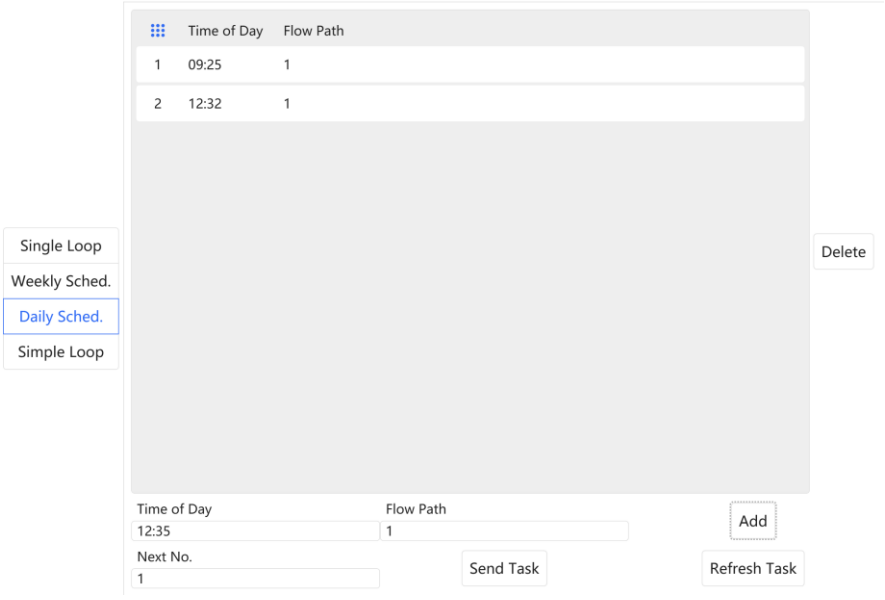
This is usually used for MODBUS control

- **Weekly Sched.**



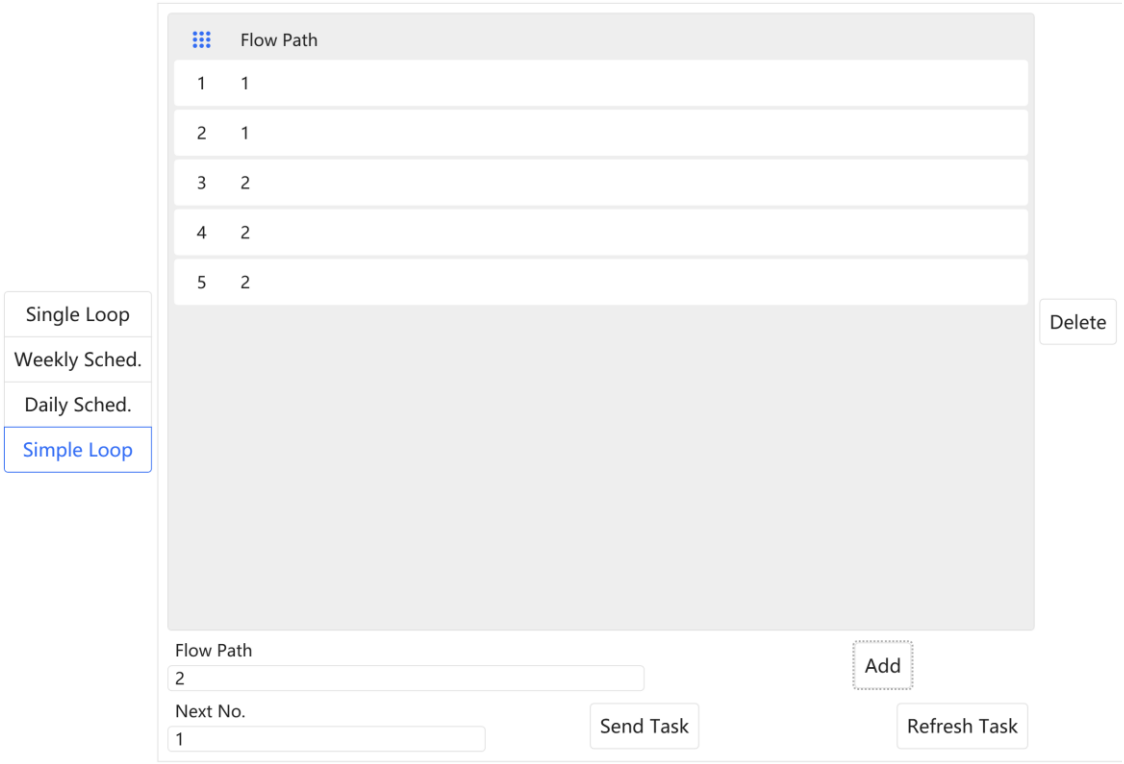
Analyze the samples successively according to the set day of the week and time, and this analysis will continue to cycle at this time point every week. The instrument remains in standby mode during the waiting process.

- **Daily Sched.**



Analyze the samples sequentially according to the set time, and this analysis will continue to repeat at the same time every day. The instrument will remain in standby mode during the waiting period.

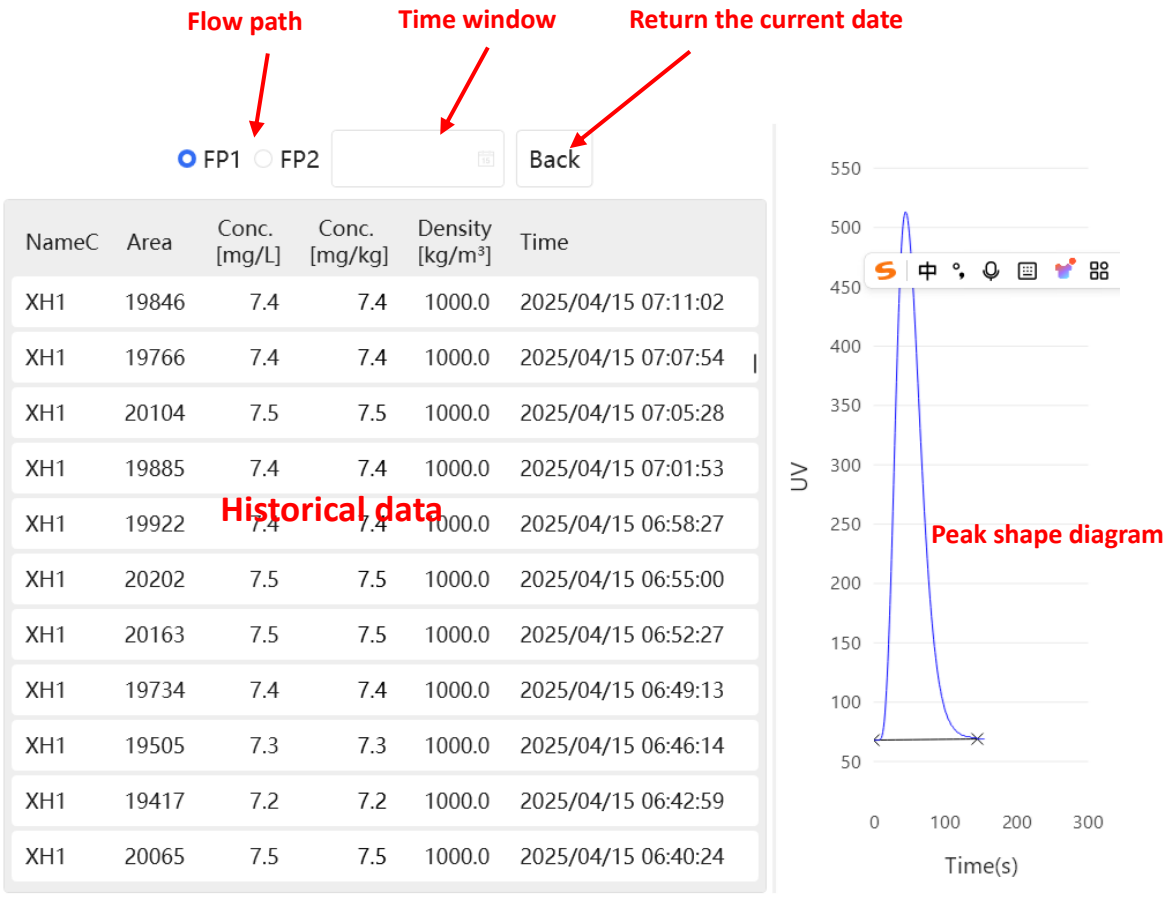
- **Simple loop**



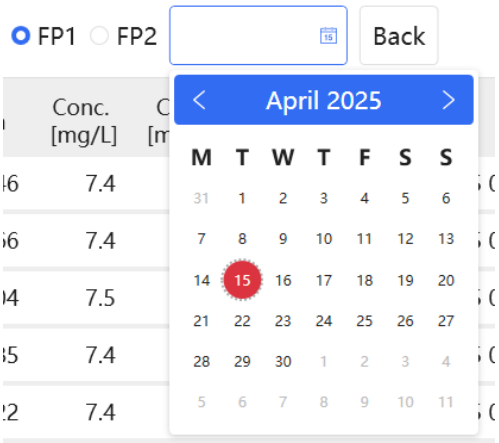
Analyze the samples continuously in the edited sequence order. After analyzing the last sample, repeat and cycle through this sequence.

5.2.2.3 Result interface

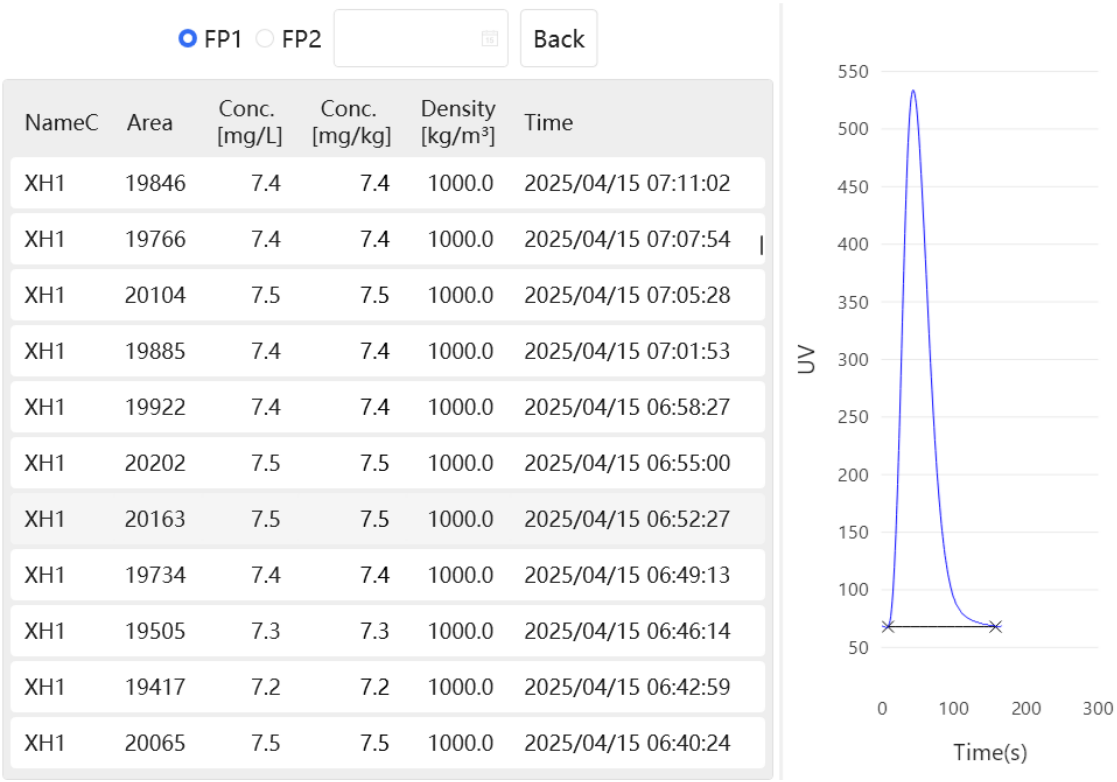
The following figure shows the test results of the flow path sample analysis.



By selecting different flow paths and time/date, you can view the corresponding historical data; click "Back" to see the current day's data for the selected flow path. If no samples from the current flow path were analyzed on the same day, the data interface will appear blank.

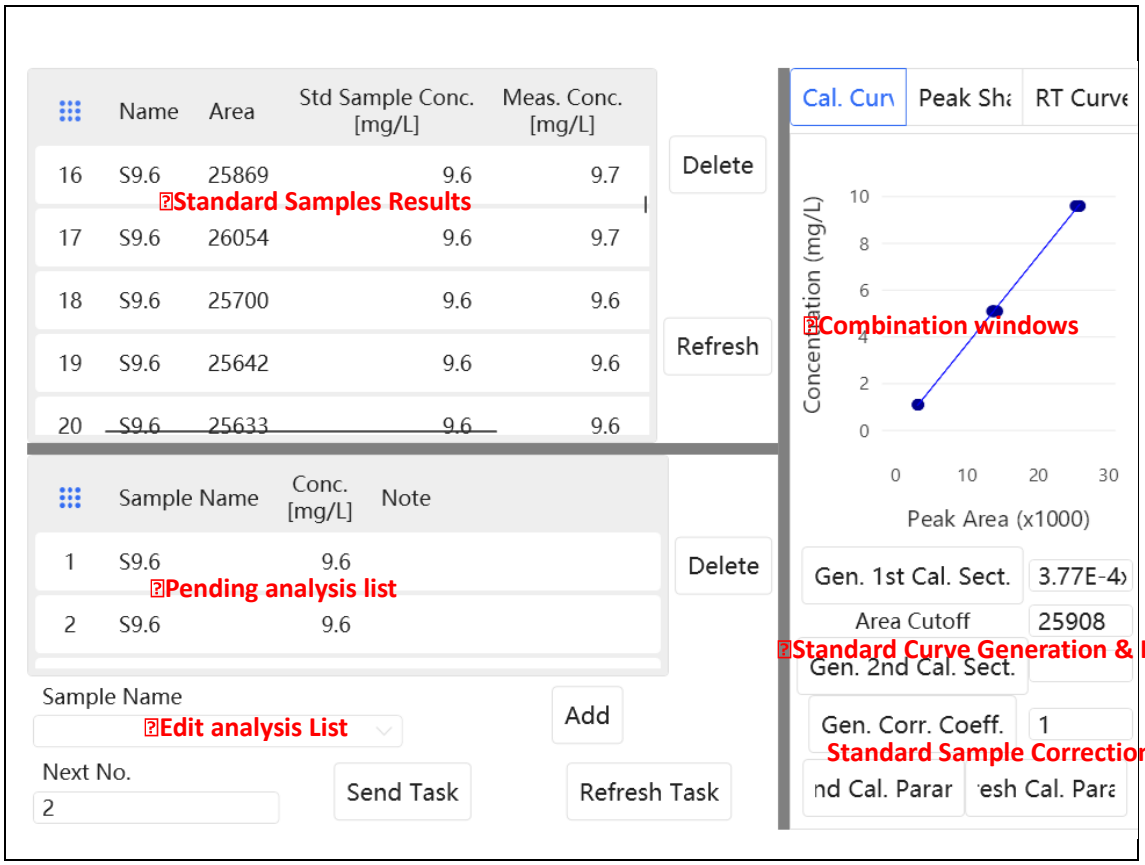


When you select a single sample from the historical data, its corresponding chromatogram (peak pattern) will be displayed.



5.2.2.4 Calibration

The calibration interface allows users to plot standard curves and make routine corrections, as illustrated below.



Includes the following sections: "Standard Sample Results", "Pending Analysis List", "Edit Analysis List", "Combination windows", " Standard Curve Generation & Information", and "Standard Sample Correction".

- **Edit Analysis List**

Select the standard sample from the "Sample Name" drop-down menu, then click the "Add" function button icon to add the standard sample to the Pending Analysis List. Enter the corresponding sequence number in the "Next Sample to Analyze" field, and finally click the "Send Task" function button icon to submit the task to the server software. Click the "Run" button icon to initiate the analysis.

- **Pending Analysis List**

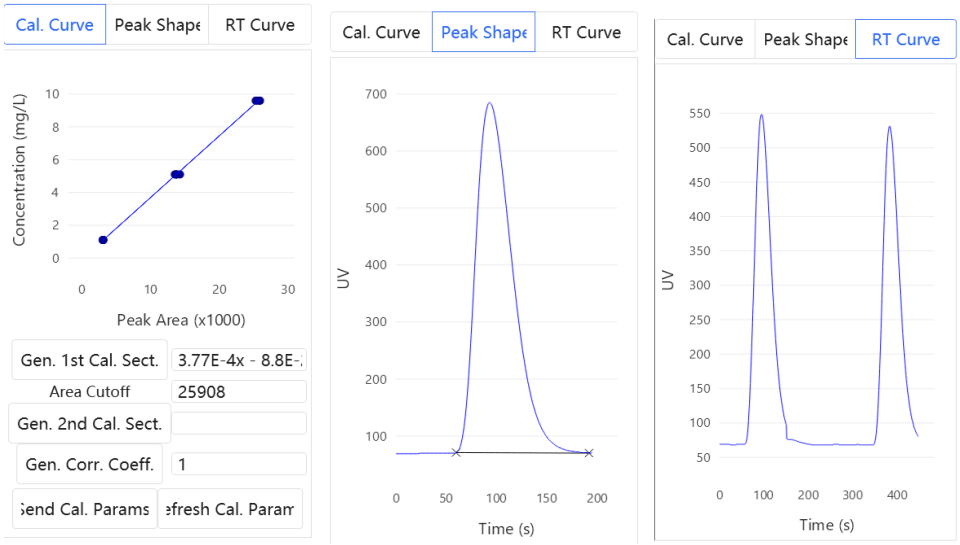
  Displays the current analysis list

- **Standard Samples Results**

  Displays the analyzed standard samples test results

- **Combination windows**

The combination windows consists of three viewing windows: Cal. Cure(Calibration Curve), Peak Shape, and RT Curve(Real time Curve), each displaying relevant data independently.



- **Standard Curve Generation & Information**

After completing the standard sample analysis, select the test result row for generating the standard curve in the "Standard Sample Results" column, then click the "Generate First Segment" function button icon to complete the standard curve plotting.

When the concentration range of standard samples is relatively wide, the entire range can be plotted as two separate standard curve segments using the same operation method described above.

After completing the calibration curve plotting, click the "Send Cal. Params." function button icon to send the standard curve to the server software.

Please refer Chapter6.3 Obtaining the Standard Curve for details.

- **Standard Sample Correction**

After the analyzer has been running for some time, as the efficiency of the catalyst in the reaction tube decreases, there may be certain deviations in the sample test results. The deviation from the true value can be obtained by testing standard samples, and this deviation becomes the correction factor.

Just analyze the standard sample some times, select the row of the standard sample data and click the button of “Gen.Corr.Coeffe.”, and we will get the correction factor.

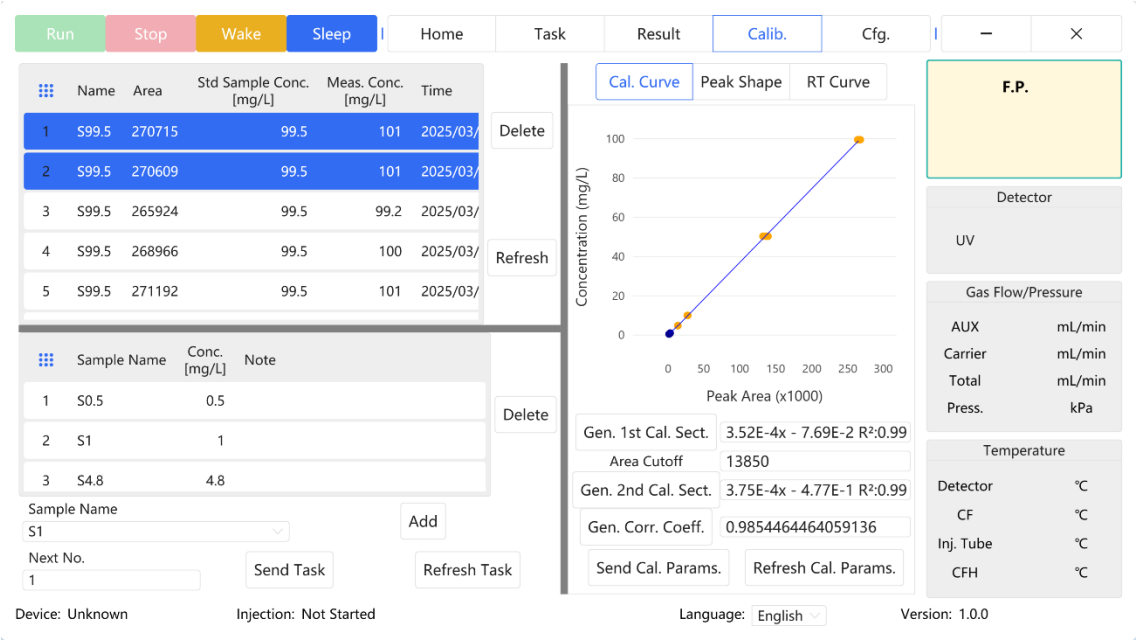
5.2.2.4.1 Standard Curve Plotting Procedure

- Prepare standard samples and place them in the positions of the standard sample bottles on the pre-treatment system.

- Add standard samples (refer to Settings - Standard Samples).
- Edit the standard sample list: Select the names of the standard samples to be analyzed, and then click "Add". Each added row represents one time analysis of the current standard sample. If multiple analyses are required, click "Add" multiple times.
- send Calibration Task
- Click“ Run ” button， and you will see a prompt window pops up, pay attention to rotating the manual valve on the pre-treatment system to the position for standard samples, and then click "OK" to start the analysis.

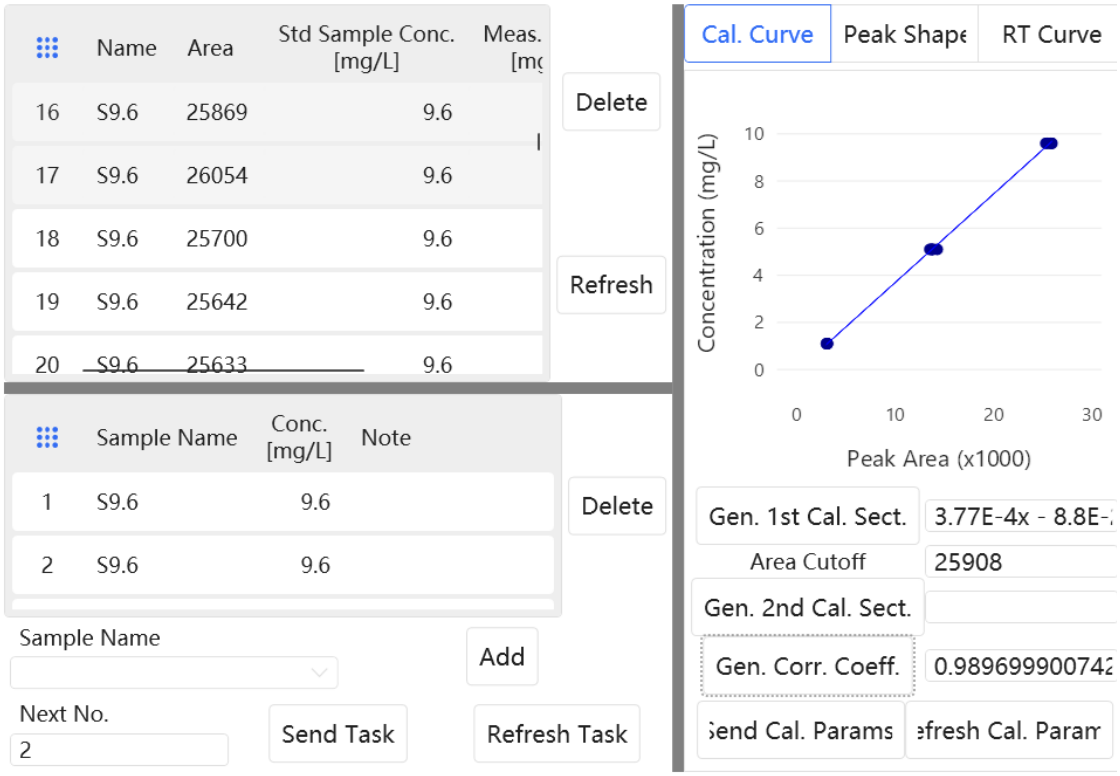
  Note: During the process of drawing the standard curve, you must click "Run" in the calibration interface and should not switch to other interfaces.
- After all the standard samples have been analyzed, select the standard samples involved in the calibration, and click "Gen.1st Cal. Sect.". If the analysis range of the standard samples is relatively large, you can choose to generate the second segment of the curve.

- Click “Send Cal. Params.” and complete Standard Curve Plotting


Run
Stop
Wake
Sleep
Home
Task
Result
Calib.
Cfg.
Name Area Std Sample Conc. [mg/L] Meas. Conc. [mg/L] Time
1 S99.5 270715 99.5 101 2025/03/
2 S99.5 270609 99.5 101 2025/03/
3 S99.5 265924 99.5 99.2 2025/03/
4 S99.5 268966 99.5 100 2025/03/
5 S99.5 271192 99.5 101 2025/03/
Delete
Refresh
Sample Name Conc. [mg/L] Note
1 S0.5 0.5
2 S1 1
3 S4.8 4.8
Delete
Sample Name
S1
Add
Next No.
1
Send Task
Refresh Task
Cal. Curve
Peak Shape
RT Curve
Concentration (mg/L)
Peak Area (x1000)
Gen. 1st Cal. Sect.
3.52E-4x - 7.69E-2 R²:0.99
Area Cutoff
13850
Gen. 2nd Cal. Sect.
3.75E-4x - 4.77E-1 R²:0.99
Gen. Corr. Coeff.
0.9854464464059136
Send Cal. Params.
Refresh Cal. Params.
F.P.
Detector
UV
Gas Flow/Pressure
AUX mL/min
Carrier mL/min
Total mL/min
Press. kPa
Temperature
Detector ℃
CF ℃
Inj. Tube ℃
CFH ℃
Device: Unknown
Injection: Not Started
Language: English
Version: 1.0.0

5.2.2.4.2 Calibration Curve Correction Factor

- Just analyze the standard sample some times, select the row of the standard sample(Multiple Selection Allowed)
- click the button of "Gen.Corr.Coeffe.", and we will get the correction factor.
- Click "Send Cal. Params.", submit calibration correction factor to server software.



The daily correction factor can also be provided through manual calculation. Directly enter the calculated correction factor, and then click " Send Cal. Params." to send the correction factor to the server software.

The calculation formula for the correction factor:

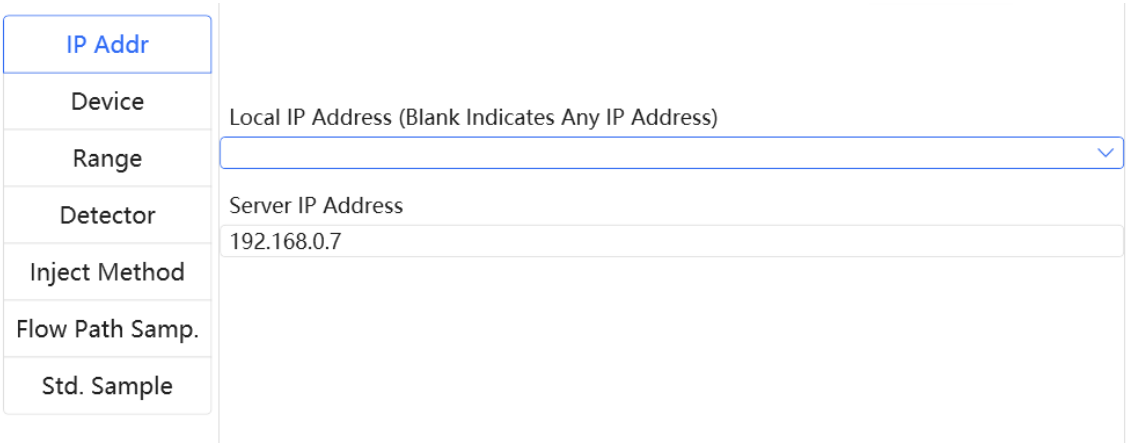
Correction factor = Theoretical value of the standard sample / Measured value.

5.2.3 Cfg.(Configuration)

The Configuration interface includes: IP Addr, Device, Range, Detector, Inject Method, Flow Path Samp and Std. Sample

5.2.3.1 IP Address

You can set the Local IP address and the server IP address.

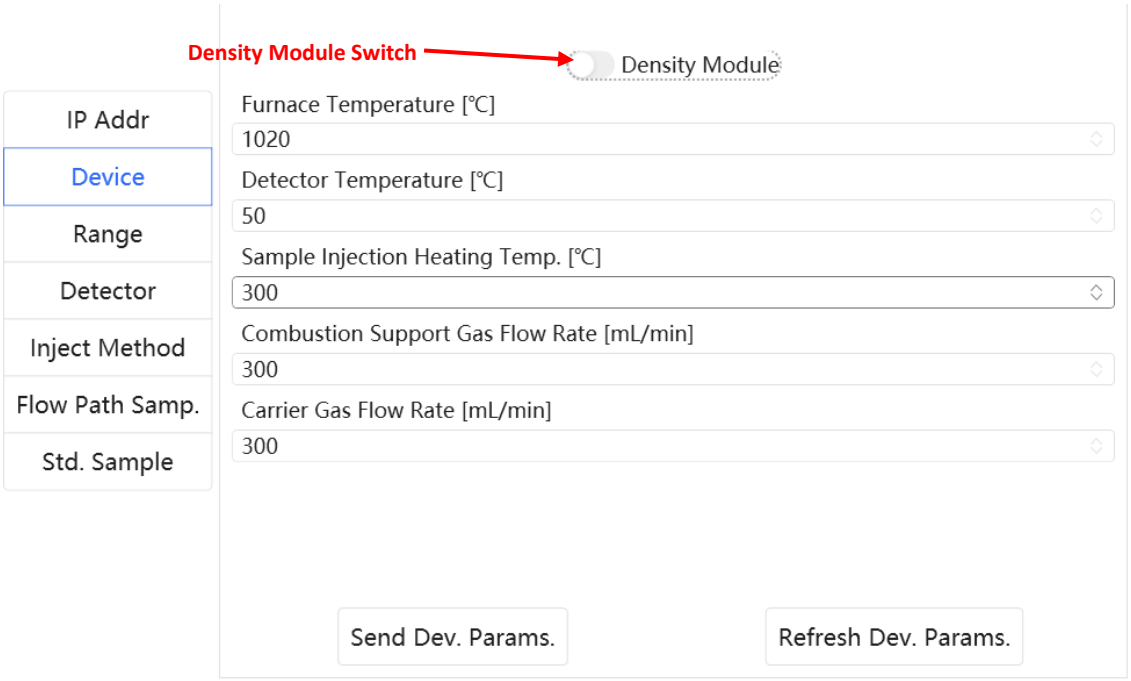


Local IP Address: It is generally left blank and does not need to be entered.

Server IP Address: Enter the IP address of the server side.

This function is used for communication between the remote client and the server.

5.2.3.2 Device



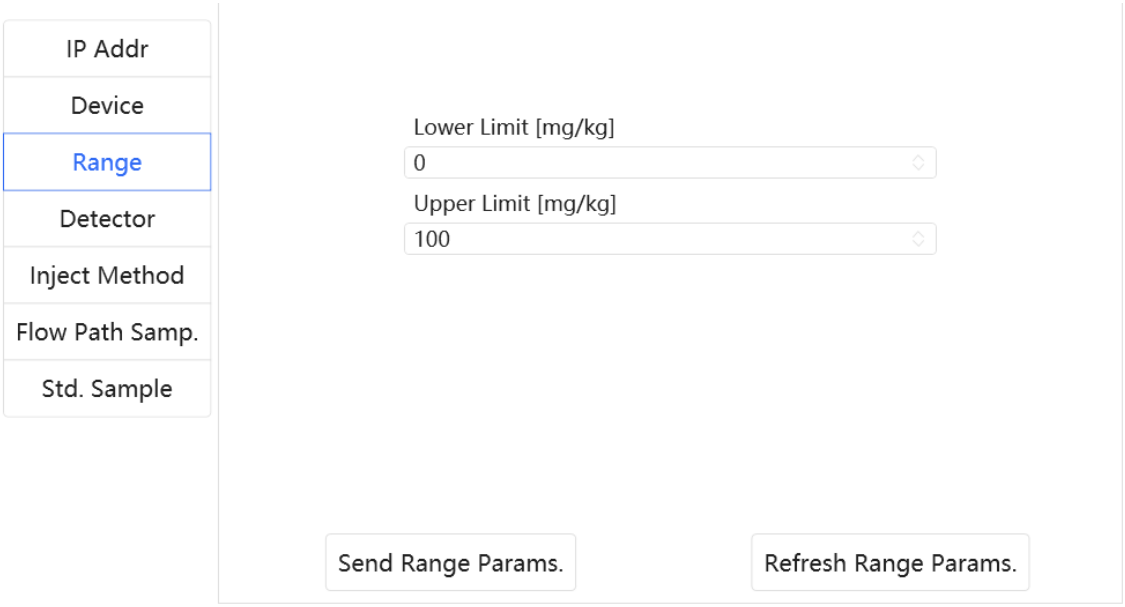
In the device settings, you can set the Furnace Temperature (1020°C), Detector Temperature (50°C), Sample Injection Heating Temp. (300°C), Combustion Support Gas Flow Rate (300 ml/min), and carrier gas flow rate (300 ml/min). After setting the parameters, click "Send Dev. Params." to send the**m** to the server software.

The values in the brackets are the settings when the device leaves the factory. Please consult the manufacturer's engineer before making any modifications.

If the density module is bought and installed (optional), check the density module option on this interface, then click " Send Dev. Params." to transmit to the server software. The density results will then be displayed in the software.

"Refresh Dev. Params." displays the current parameters in this interface.

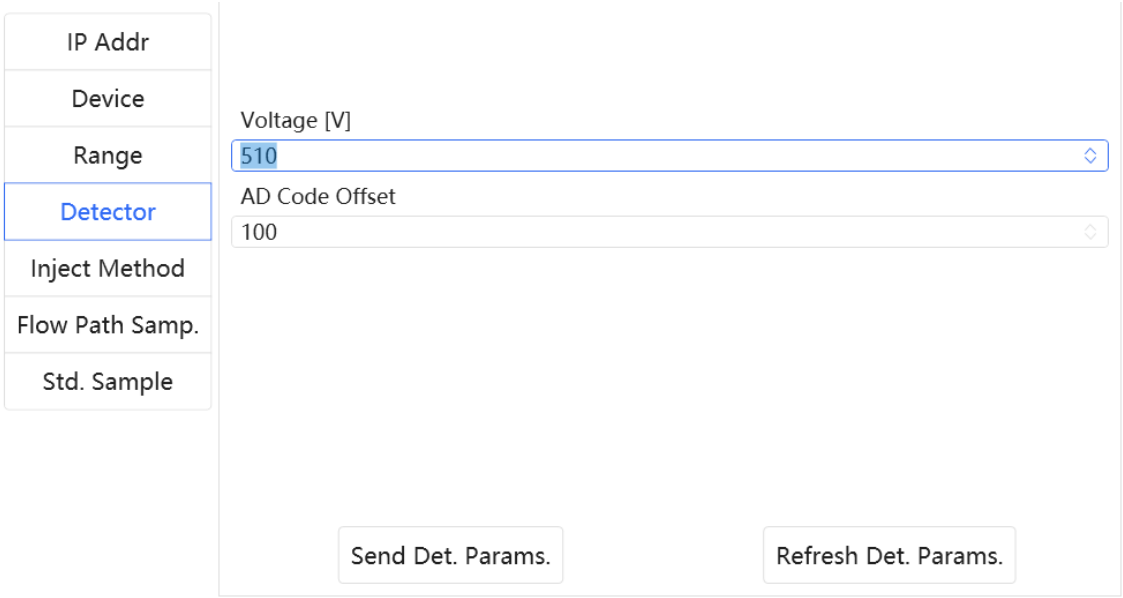
5.2.3.3 Range



Set the appropriate measurement range based on the actual sample concentration. After configuring the range, click the "Send Range Parameters" function button icon to transmit the settings to the server software.

“Refresh Range Params” displays the current range settings in this interface.

5.2.3.4 Detector



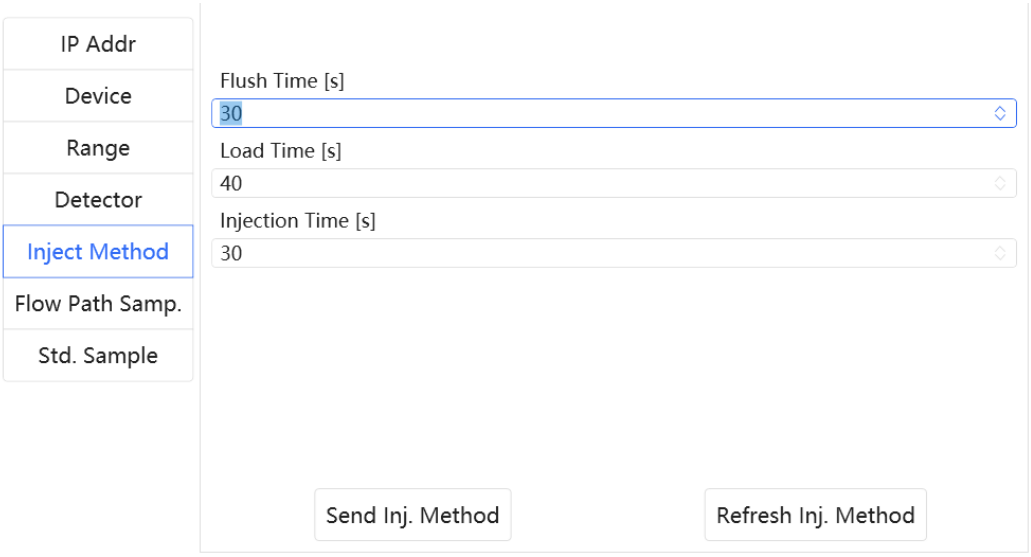
Adjusting the voltage to modify the detector's sensitivity, while the offset controls

the detector's baseline.

Click "Send Det. Params." button to transmit detector parameters settings to the server software after modification.

"Refresh Det. Params." displays the current detector settings in this interface.

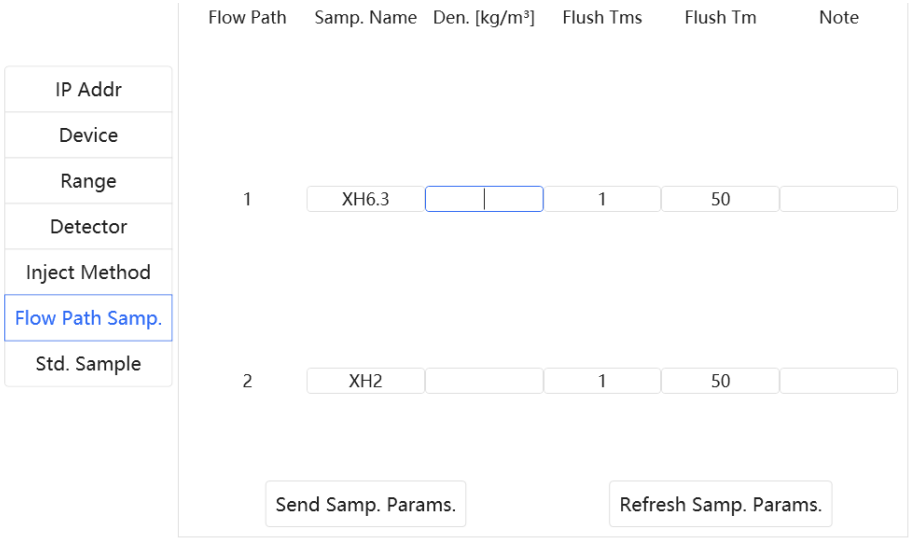
5.2.3.5 Inject method



The system allows configuration of Flush time, sample loading time, and injection time. After modifying these parameters, click "Send Inj. Method" to transmit the settings to the server software.

"Refresh Inj. Method" displays the current inject method settings in this interface.

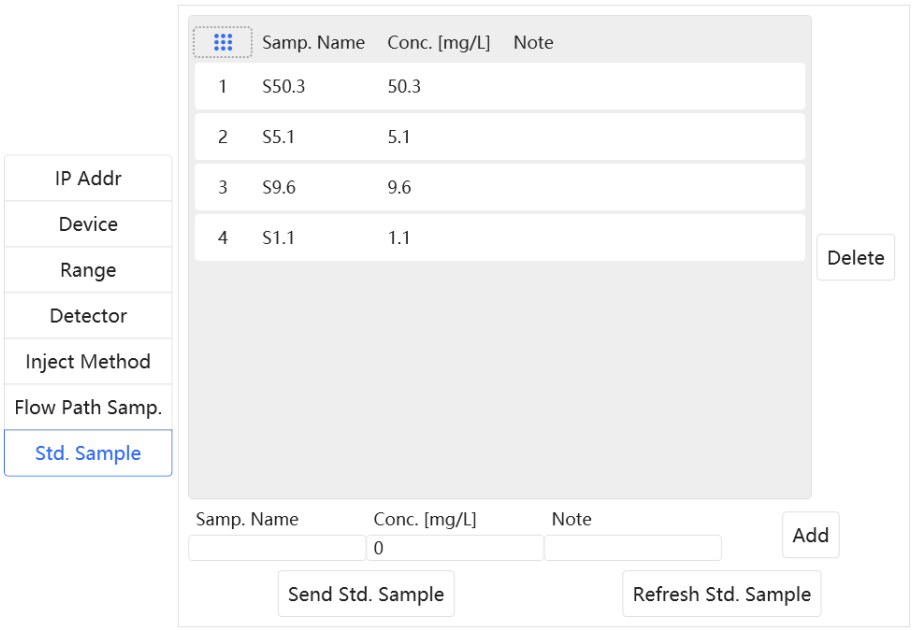
5.2.3.6 Flow path sample



Flow path sample information can be configured, including sample name, density parameters, flush time and flush cycles . After setting up the flow path samples, click the "Send Samp. Params." to transmit the data to the server software.

"Refresh Samp. Params." displays the current flow path sample settings in this interface.

5.2.3.7 Standard sample

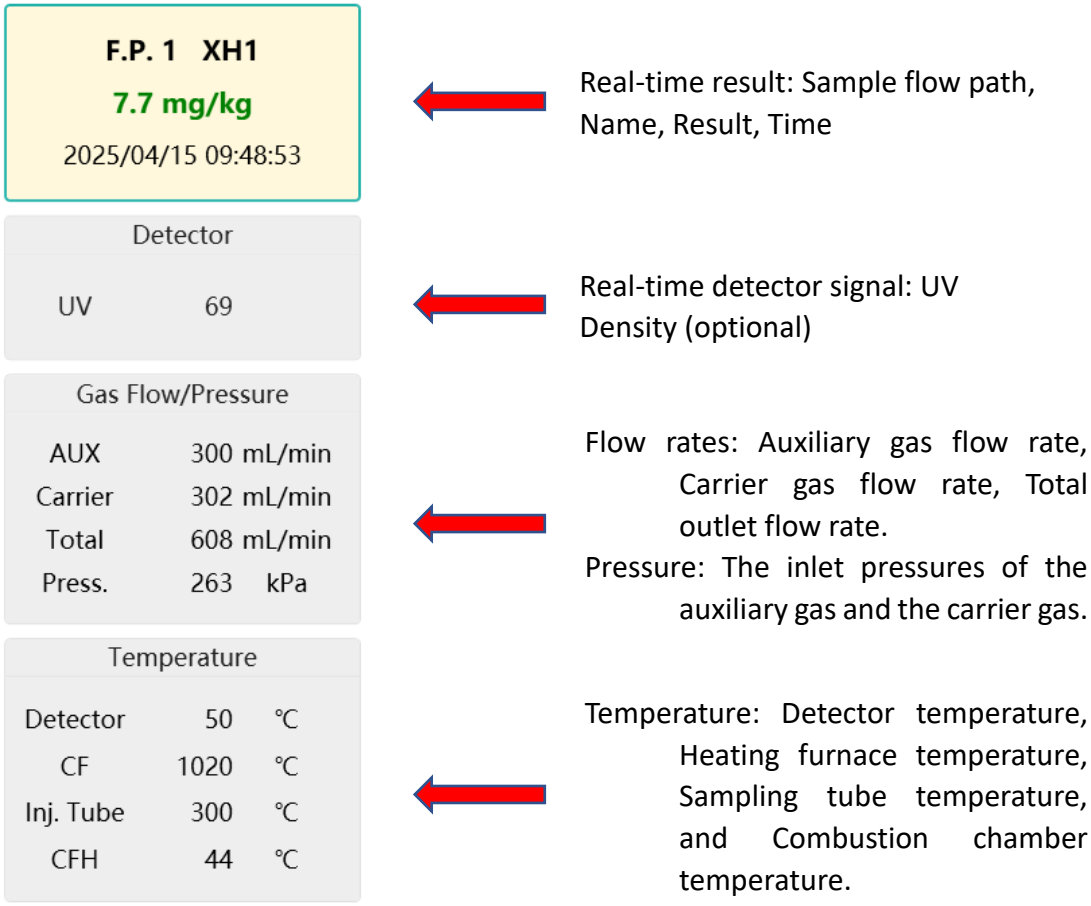


Add standard samples: Enter the name of the standard sample in the "Samp. Name" field, input the theoretical concentration value of the standard sample in the "Conc.(mg/L)" field, click "Add", and finally click the button "Send Std. Sample" to send the standard information to the server software.

Delete standard samples: Select the standard sample you want to delete, then click "Delete". Finally, click the button "Send Std. Sample" to send the updated information to the server software.

Click "Refresh Std. Sample" can display the current standard samples in this interface.

5.2.4 Real-time Results and Parameter Column



5.2.5 Status Bar

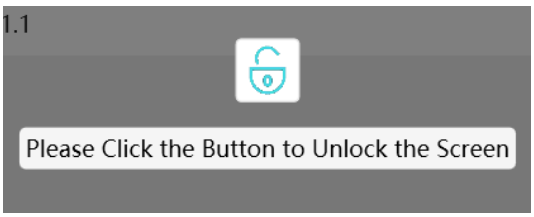
The status bar includes the current status of the device, the real-time status of sampling, language options and the software version.

5.2.6 Authority

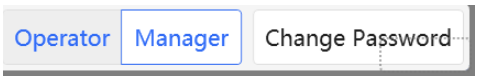
The authority divided into two levels: operator level and manager level, and passwords can be set separately for each level.

The operator's authority only allows access to the “Home” and “Result” menus, while the administrator's authority enables access to all menus.

Click the lock icon  , software enters the lock screen state. When unlocking the software, you need to enter the password corresponding to the relevant authority according to the reminder.



Click the lock screen icon  , the mutual switching between Manager and Operator authorities, and you can also change the password in this interface.



Note: For the sake of safety, when the opertator leave the analyzer Shelter, they can click the "Lock" key on the keyboard to prevent unauthorized personnel from making accidental operations.

Chapter6: Calibration

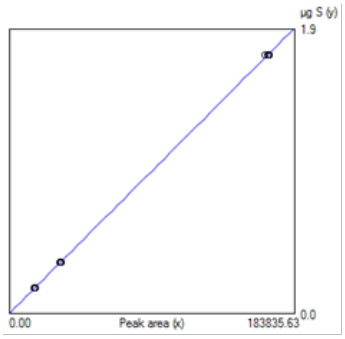
6.1 overview

Series 800TS Sulfur On-line Analyzer does not directly measure the content of sulfur elements in the sample. Instead, it determines the compositional change of sulfur dioxide gas, which is the oxidation product generated after the sample is combusted in the mixed gas. By integrating the compositional change over time, the correlation between the integration result and the total amount of sulfur elements in the sample can be obtained. Therefore, it is necessary to calibrate the analyzer when it is installed for the first time.

In order to ensure the reliability of the analysis results, the instrument should be recalibrated after replacing the instrument components or after the instrument has been shut down for a certain period and then restarted. Alternatively, refer to Chapter 7.5 "Analyzer Deviation Correction" to perform a system correction on the analyzer.

Analyze a series of certified sulfur-containing standard samples using identical injection volumes. The software records the integration results of each standard sample in real time to obtain the relationship between the absolute amount of sulfur elements and the integration results, which we called the standard curve.

The following figure shows the typical standard curve of the Series 800TS.



When calibrating the analyzer, it is mandatory to input the standard sample name and its concentration. The procedures for entering standard sample names and concentrations are detailed in Chapter 5.2.3.6 "Standard Sample."

Selection of standard samples should cover the concentration range of unknown samples to prevent measurement deviations caused by sample concentrations falling outside the calibrated range of the analyzer.

6.2 Optimal Conditions for Calibration

To obtain the best calibration results, the analyzer should meet the following conditions:

- There should be no leakage in the system.
- The standard samples should meet the quality requirements.
- The contents of the standard samples should cover the entire measurement range.

6.3 Calibration Formula

6.3.1 Obtaining the absolute quantity of sulfur elements

After determining the same injection volume of the standard samples, the absolute amount of sulfur elements in the standard sample can be calculated by using the content and density of sulfur elements in the standard sample.

$$a = \frac{c \cdot v \cdot d}{1000}$$

a = The absolute amount of sulfur [µg]

c =Sulfur content [%]

v = Volume of Standard Sample [µl]

d = Density of Standard Sample [mg/µl]

6.3.2 Obtaining the Integral Area

When standard samples of varying concentrations are analyzed at identical injection volumes, they undergo complete combustion in the catalytic combustion tube. After dehydration and drying, the resulting gases enter the detector, inducing time-dependent variations in the detector's electrical signal. The software records these signal fluctuations in real-time and performs time integration to obtain the integrated signal area (signal intensity × time).

6.3.3 Obtaining the Standard Curve

After obtaining the absolute amount of sulfur elements and the corresponding integral area for each standard sample, introducing this pair of data into the coordinate system will form the standard curve.

6.3.4 Obtaining the Content of the Unknown Sample

Inject and measure the unknown sample with the same volume as that of the standard sample, so as to obtain the integral area formed by the sulfur elements in the unknown sample. Then, we can calculate the content of sulfur elements in the unknown sample through the standard curve.

6.4 Calibration Process

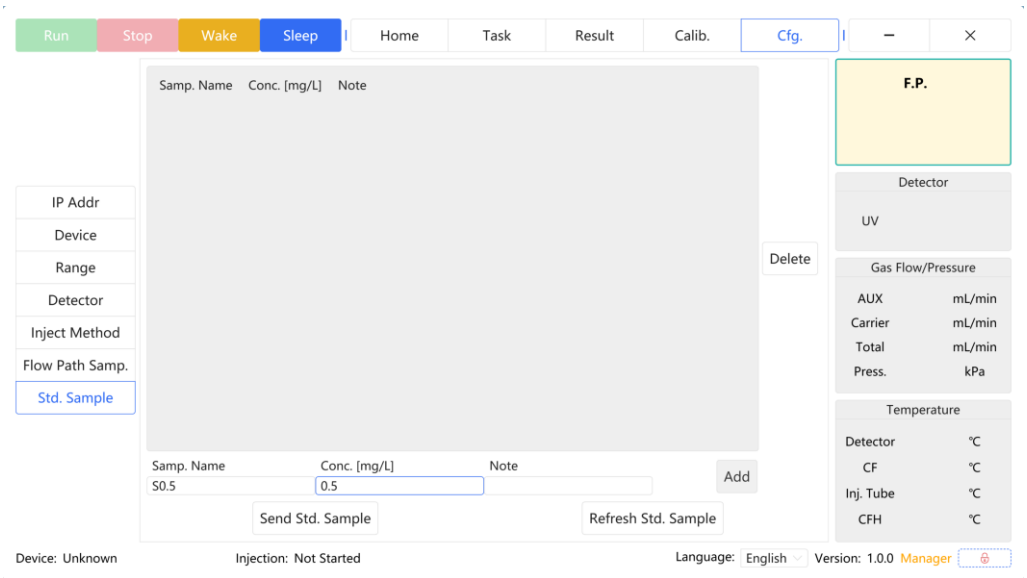
➢ Install the bottle containing the standard sample on the bottle rack of the calibration pipeline, and ensure that there is no air leakage (do not tighten it too much, as over-tightening may actually cause air leakage).

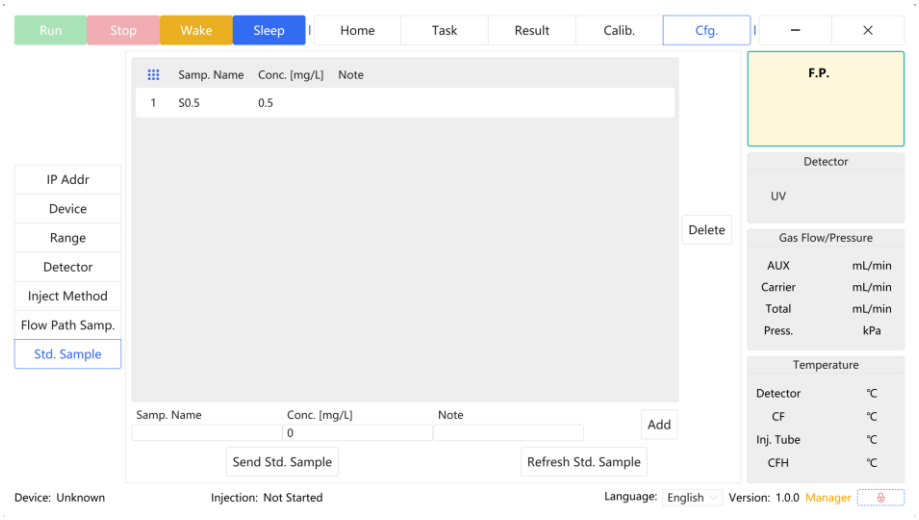
➢ Adjust the pressure gauge of the gas pipeline installed on the calibration pipeline to keep the pressure above 0.1 MPa.

➢ Rotate the manual calibration valve located in the sample pre-treatment system towards the direction of the standard sample bottle.

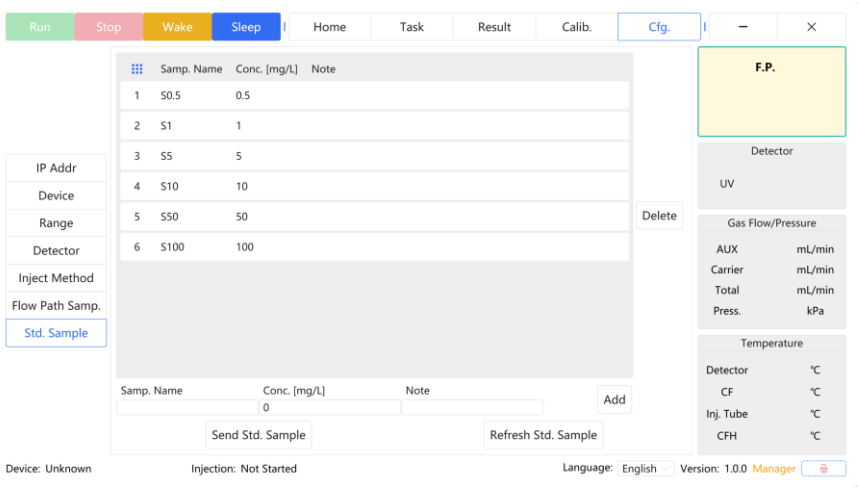
➢ Set standard sample information in the client software “Cfg.”→”Std. sample”

If we want to add 0.5mg/L standard, just input the Samp. Name “S0.5”, input the Conc.[mg/L] “0.5”, click “Add”

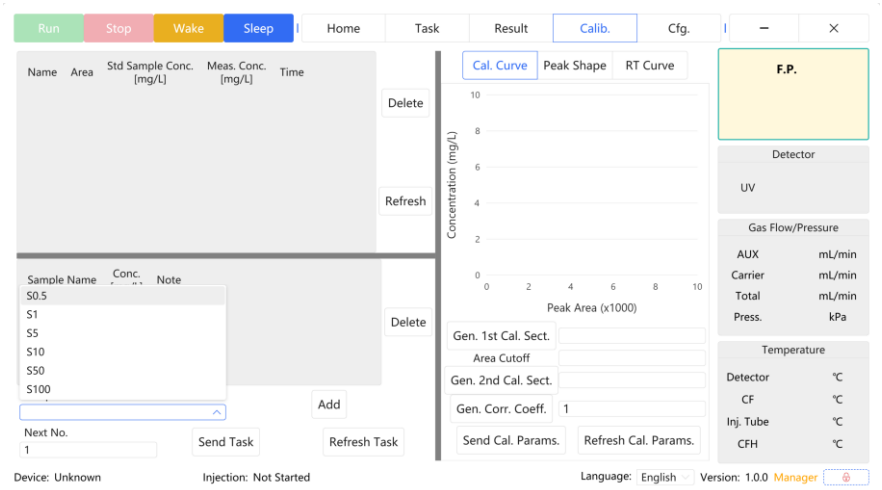




You can also add other standard like this:



After add all the standard sample information, just click “Sen Std. Sample” to send the standard samples information to the server. And then you can find the standard name in the “Calib.” Interface

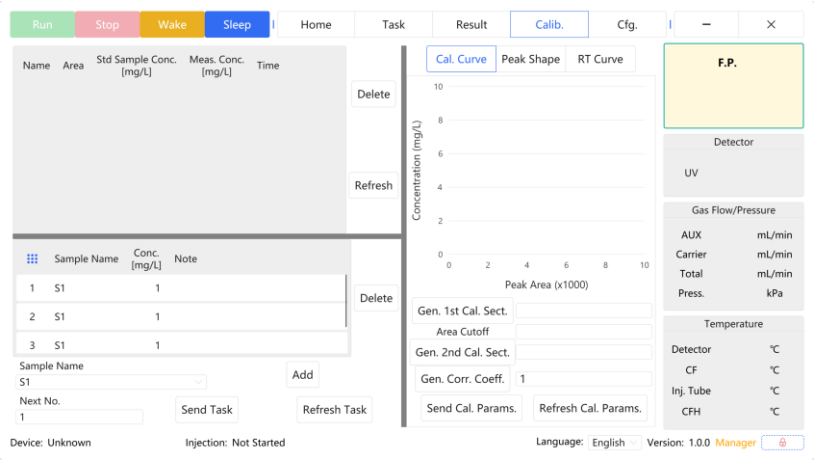


➢ Edit the analysis task in the "Calibration" interface of the client software and send it to the server software.

In the “Calib.” Interface, choose the standard sample you want to use, for example now we just want to use 1mg/L standard sample:

Just in the click “Sample Name” and choose S1, click add, if you want analyze this S1 five times, just click “Add” five time. Then click “Send Task” to send this task to the server.

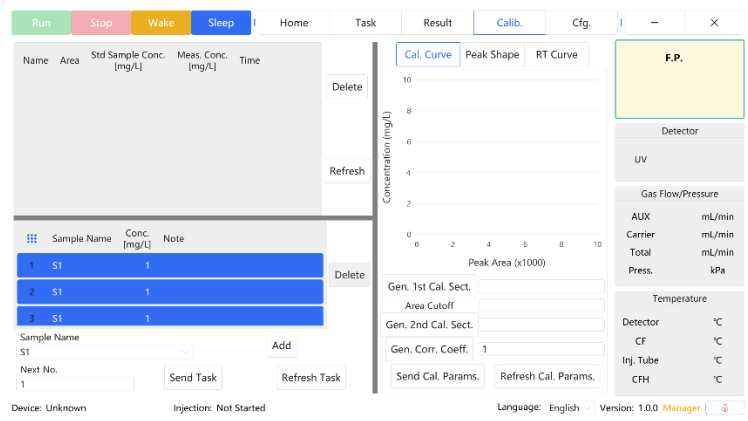
Click the button "Run. After the prompt dialog box appears, carefully read the content of the dialog box and conduct inspections according to the content. After confirming that there are no errors, click "OK" and wait for the automatic analysis of the S1 standard sample.

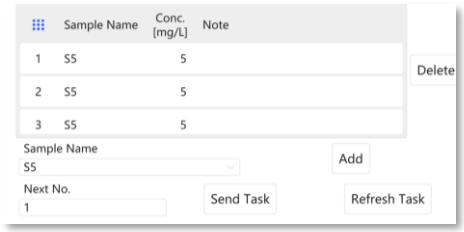


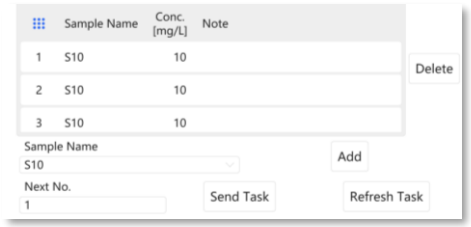
We can only analyze different concentration standard sample step by step.

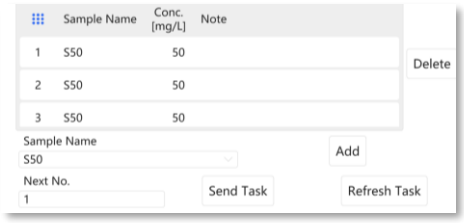
After finished the analysis of S1, just select all the standard name and click “Delete” to delete the S1 standard.

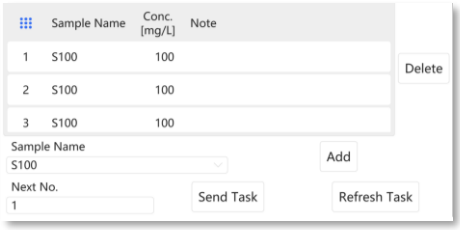
Repeat above operation to analyze S5, S10 , S50 and S100 or other standard sample you want to do. Then you will get all the standard information.





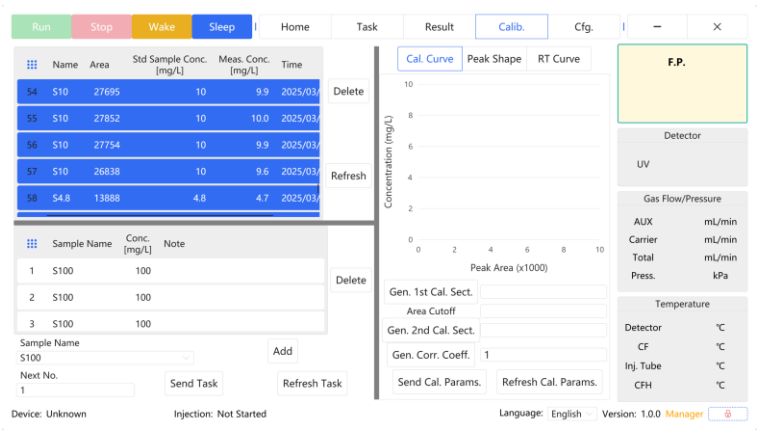




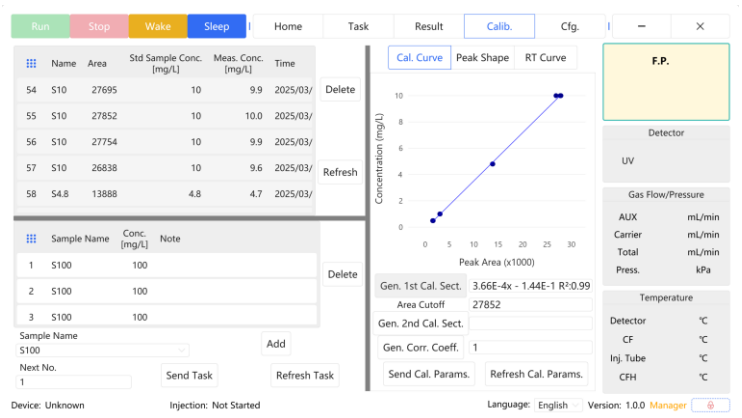


➢ After analysis of all standard samples finished, select the sample rows for calculating the standard curve to generate the standard curve.

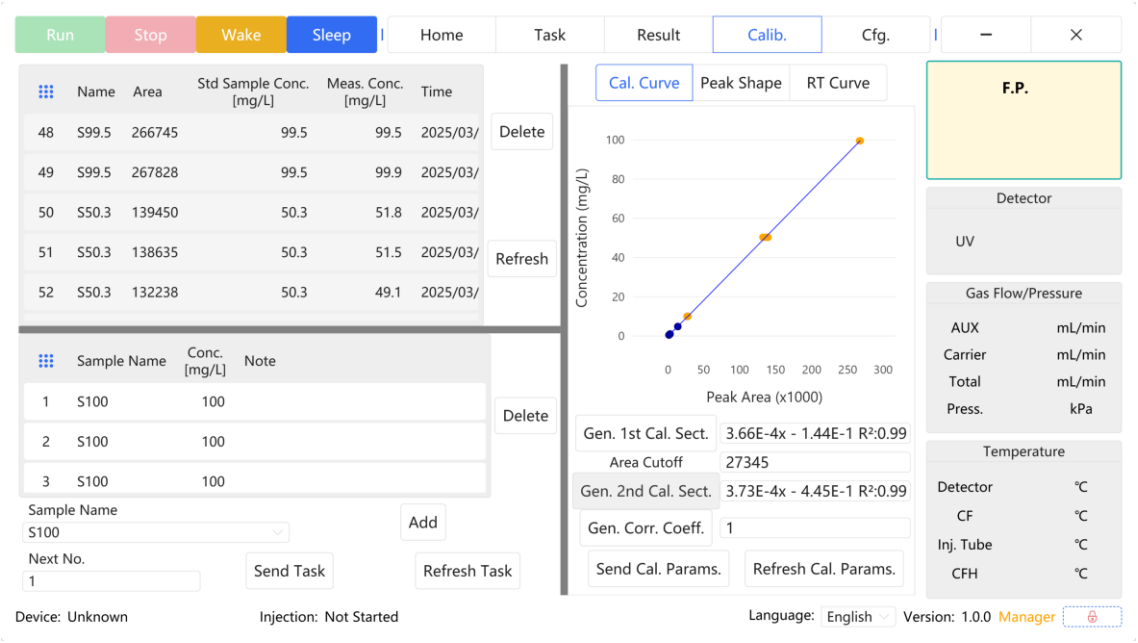
Choos the standard you want to use to generate standard curve, for example, just choose S0.5, S1, S5, S10 result, Click "Gen. 1st. Sect."



Then you will get the standard curve of 0.5-1-5-10 standard sample.



If we have analyze S50, S100, we can also choose the result of S10, S50, S100, click "Gen. 2nd cal. Sect" to get the second standard curve, which will integrated with the 1st standard curve. Blue points and curve is the 1st, and the orange point is the 2nd curve.



Note: When performing calibration, there should be at least two or more standard samples with different concentrations.

6.5 Deviation Correction

After the analyzer has been running for a period of time, the measured value may deviate. A standard sample (or a sample with known concentration) can be selected for measurement in the calibration mode, so as to obtain the difference between the measured value and the actual value, that is the correction coefficient f.

The calculation method of the correction coefficient is as follows:

$$f = \frac{C_{theoretical}}{C_{measured}}$$

f= Correction coefficient

$C_{theoretical}$= Theoretical value of the standard sample

$C_{measuired}$= Measured value of the standard sample

The Series 800TS can automatically calculate the calibration coefficient and integrate it into the standard curve. This calibration coefficient is only valid for the data generated after the calibration coefficient is generated.

Please refer Chapter5.2.2.4 for details.

Chapter7: Maintenance and Troubleshooting

7.1 Safety Precautions

Caution

When handling high-temperature components and chemical reagents, wear the corresponding protective equipment.

Caution

Some internal components are prone to be damaged by static electricity. When maintaining the circuit boards and components, please take appropriate preventive measures (use an anti-static wrist strap with proper grounding

- When handling the high-temperature catalytic combustion tube, wear the protective gloves included with the device to avoid scalding.
- When handling chemical reagents, wear the corresponding protective equipment to prevent burns caused by chemical reagents.
- Wear an anti-static wrist strap when coming into contact with the circuit board. If there is no anti-static wrist strap, before touching any internal components, please touch a grounded metal object in advance to release the static electricity on your body.
- When handling all printed circuit boards, hold the edges of the circuit board.
- Comply with the instructions in each procedure.

7.2 Maintenance Schedule

The content in the following table is a recommended maintenance items list. Please make appropriate adjustments according to the on-site situation.

Maintenance Items List:

Frequency	Items
Monthly	System leak detection; Check the pipelines
Every three months	Check or replace the filter screen of the self-cleaning filter; Check the catalytic combustion tube
Every six months	Analyzer calibration or standardization

7.3 Daily Inspection and Cleaning

The analyzer should be inspected irregularly for any obvious visible defects, such as loose connectors, loose joints, blockages, and excessive accumulation of dust or dirt. The accumulated dust and dirt can cause the components of the analyzer to overheat and even malfunction. The dirt on the components prevents effective heat dissipation and can lead to short circuits.

Warning

Disconnect the power supply of the analyzer before cleaning the electronic components,

7.4 Leakage Test

1. Air tightness of the analysis and detection system
2. Leakage detection of the calibration flow path

   Install the standard sample into the calibration flow path, open the manual shut-off valve of the calibration gas pipeline, and adjust the pressure of air or nitrogen to 0.1-2MPa. Open the shut-off valve (V3) of the calibration pipeline in

the client window, and observe the connections of the standard sample flow path. There should be no liquid leakage.

3. Leakage detection of the sample pipeline

   After connecting the sample pipeline, close the primary and secondary circuit outlet shut-off valve. In the client software, open any sample flow path of the valve island and open the pneumatic shut-off valve. Observe each connection of the pipeline. There should be no liquid leakage.

7.5 General Troubleshooting

Series 800TS features high reliability. It is assembled with high - quality components to ensure that no overall failure will occur. If there are problems or malfunctions with the components, please refer to the troubleshooting guide in the following table. This table lists most of the faults and remedial measures, but the faults are not limited to those listed in the table. If you are unable to troubleshoot the problem, please contact the factory's maintenance department promptly.

- **Troubleshoot the faults**

Faults	Possible Causes	Remedial Measures
Power Supply Failure	1. There is no positive pressure purging pressure or the pressure is too low. 2. The pressure sensor is faulty. 3. The fuse tube is faulty. 4. The positive pressure control system is not working properly.	1. Check whether the instrument air pressure is normal. 2. Replace the pressure sensor. 3. Replace the fuse tube. 4. Replace the positive pressure control system.

The temperature of the combustion furnace doesn't rise.	1. The temperature of the combustion furnace is not set correctly. 2. The temperature in the combustion chamber is too high. 3. The relay is faulty. 4. The heating furnace is malfunctioning.	1. Set the temperature of the heating furnace correctly. 2. Adjust the positive pressure purging pressure so that the temperature of the combustion chamber is within the normal range. 3. Replace the relay. 4. Replace the heating furnace.
Low carrier gas pressure	The carrier gas pressure has not been adjusted correctly.	Adjust the carrier gas pressure correctly.
The flow rate of the tail gas is high	The flow controller for the carrier gas or combustion-supporting gas is faulty.	Replace the flow controller for the carrier gas or combustion - supporting gas.
The flow rate of the tail gas is low	1. The pipeline is blocked. 2. There is a fault in the flow control of the carrier gas or combustion-supporting gas.	1. Replace the blocked component. 2. Replace the flow controller of the carrier gas or combustion-supporting gas.

Troubleshoot the faults

Faults	Possible Causes	Remedial Measures
The result is unstable	1. The catalyst is ineffective. 2. The membrane dryer fails.	1. Replace the catalytic combustion tube. 2. Replace the membrane dryer.
The sample cannot enter the catalytic combustion tube	1. The pressure of the valve driving gas is too low. 2. The six-port valve is malfunctioning. 3. The pipeline is blocked.	1. Adjust the pressure of the valve driving gas correctly. 2. Replace the corresponding valve body. 3. Replace the corresponding pipeline.
There is no measurement result.	The detector is malfunctioning	Contact the maintenance department of the factory
There is no output for 4-20mA.	1. The communication line is not connected correctly. 2. The parameter setting is incorrect. 3. The communication board is faulty.	1. Connect the communication correctly. 2. Set the parameters correctly. 3. Replace the communication board.

7.6 Technical Support and Product Return

You can contact local authorized agent to get support. You can also support by contacting the maintenance department of the factory directly.

Note: To ensure the completeness of the analyzer information, the manuals and drawings accompanying the analyzer may provide information about optional

accessories that are not included with the analyzer.

If it is necessary to contact the factory due to software or hardware issues, please provide the following information:

- Valve type
- Sample composition
- Installed components
- Measuring range

7.7 Warranty

The factory guarantees that there are no defects in materials and workmanship at the time of shipment and within one year thereafter. Any product defects must be reported within the warranty period. The company has the right to inspect such products at the buyer's site and, if product defects are found, has the right to request the buyer to return such products to the factory.

If the factory requests the return of its products, the buyer shall ship the products and pay the transportation costs himself. The factory is only responsible for replacing or repairing free of charge the products with defects in materials or workmanship that are reported to the factory within the above-specified warranty period.

The factory shall not be liable for any labor costs or other losses, including but not limited to incidental, special or consequential damages caused by defective products. This warranty will be void if the methods of operation, use and storage provided by the factory or the engineer are not complied with, or if the products are exposed to harsh environments.

The materials and/or products supplied by other suppliers as accessories for the analyzer are not covered by this warranty, unless these suppliers provide a warranty regarding the materials and workmanship. The factory refuses to recognize all warranties, whether express or implied, related to such products.

Unless otherwise agreed in writing by the company, the warranty provided above shall replace all other warranties (express or implied), and the company hereby refuses to recognize all other warranties, including those for the purposes of merchantability and fitness for a particular purpose.

7.8 Items not covered by the warranty

The following components are regarded as consumables and are not covered by the warranty:

- Filter screen
- Ultraviolet lamp
- Catalytic combustion tube
- Sampling needle
- Various sealing rings
- Membrane dryer
- Various filter membranes

Appendix A: Common Spare Parts

The table below lists the commonly used spare parts/consumables for the Series 800TS:

No.	Details	Art-No.
1	Combustion tube	C83.01-0001
2	Injection needle	C83.01-0002
3	Stainless Steel Ferrule 1/16’	C83.01-0008
4	Sample Loop，Stainless Steel	I83.01-0001
5	Grease	I16.01-0005
6	O-ring, 20*2mm	C16.01-0006
7	Square ring	C16.01-0005
8	Membrane dryer	I16.00-0001
9	800 mesh filter screen for self-cleaning filter	C83.01-0015
10	Pneumatic Globe Valve	I83.01-0002
11	Flow path select valve(2-way Valve Island)	I83.01-0003/2
12	6-way valve	I83.01-0004
13	Manual valve for calibration	I83.01-0005
14	solenoid Valve, 2/2, carrier Gas	I83.01-0006
15	Solenoid Valve, 2/3, pneumatic valve	I83.01-0007
16	Solenoid valve, 2/4, six-port valve	I83.01-0008
17	Heat-resistant gloves	I16.01-0003
18	Cotton gloves	I16.01-0029

Appendix B: Replace Combustion Tube

The catalytic combustion tube filled with catalyst will gradually lose efficiency after analyzing a large number of samples. The operator should replace the catalytic combustion tube periodically to ensure the reliability of analysis results.

During the combustion process, sample residues may clog the sample injection needle. If it is confirmed that the sample cannot be properly introduced into the catalytic combustion tube, the injection needle should be replaced.

Before replacing the catalytic combustion tube or the sampling needle, please refer to Chapter 4 " Commission & Decommission ", close the sample flow path globe valve and the primary & secondary circuit outlet globe valve, and let the temperature of the catalytic combustion tube drop to room temperature.

When replacing the catalytic combustion tube, the corresponding protective equipment should be worn to avoid scalds or cuts.

Warning

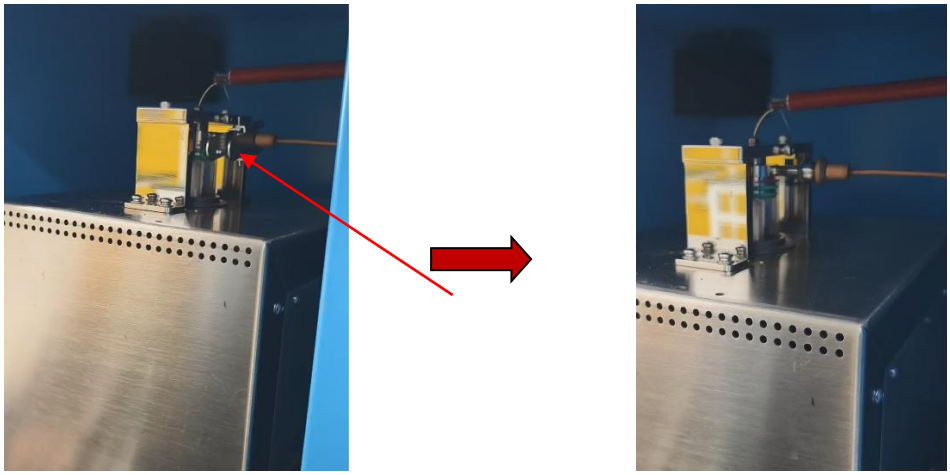
Even after the power supply is turned off, the catalytic combustion tube may still remain in a high-temperature state. Please wear the corresponding gloves to avoid scalds.

Replace the catalytic combustion tube according to the following steps:

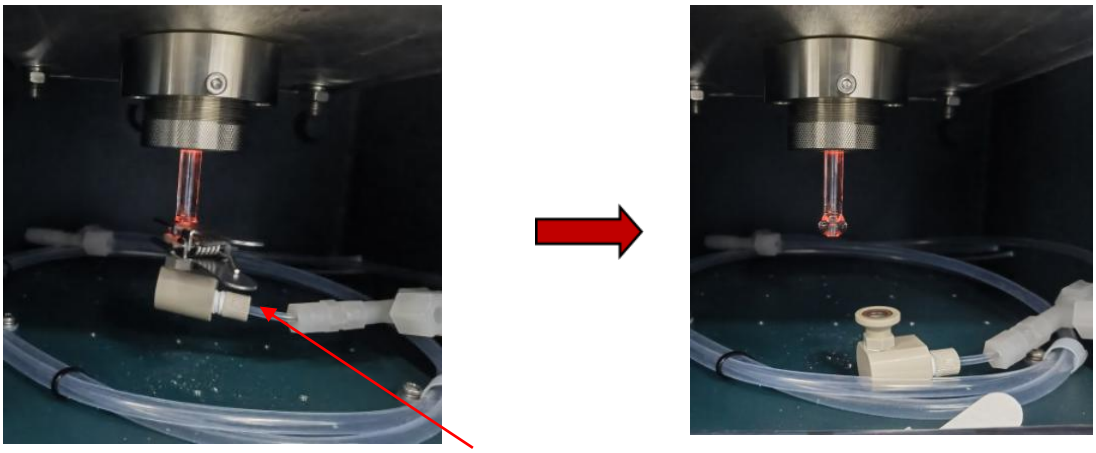
- Click the "Sleep" button on the client software.
- Wait for the temperature of the combustion furnace to drop to room temperature.
- Turn off the power supply of the analyzer
- Turn off the positive pressure purging gas.

➢ Unlock the safety lock of the combustion chamber and open the door, as shown in the following figure.

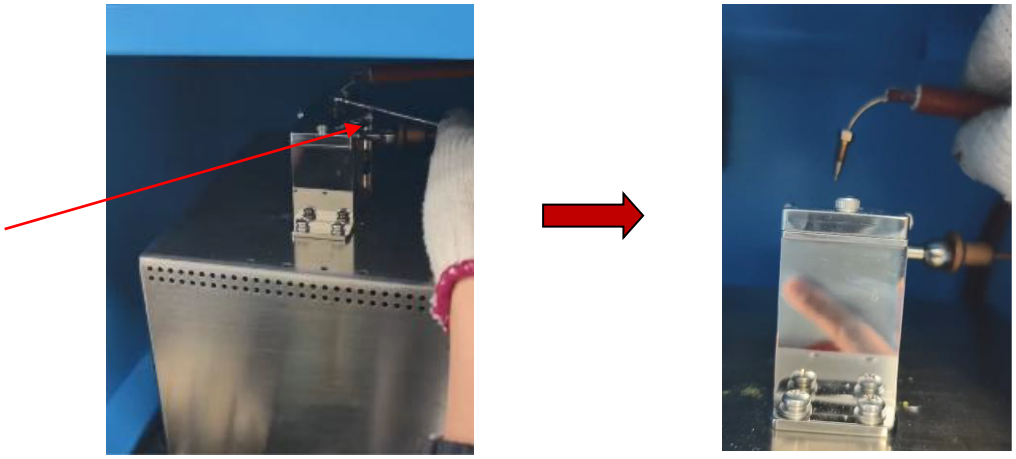
➢ Remove the clamp of the combustion-supporting gas pipeline above the furnace



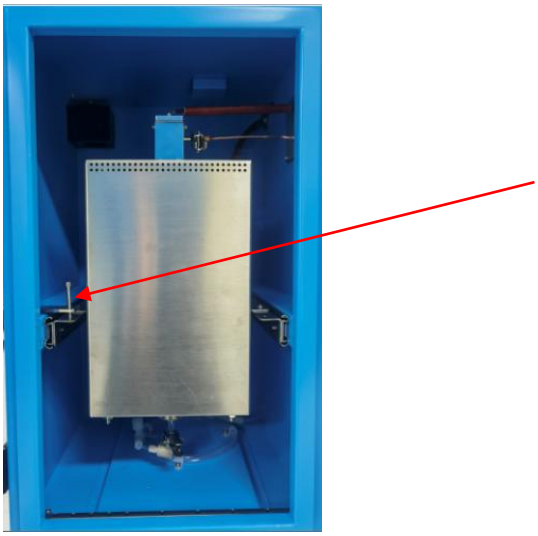
➢ Remove the clamp between the combustion tube and the membrane dryer(below the furnace)



- Use a wrench to remove the fixing screw of the carrier gas pipeline, as shown in the following figure.

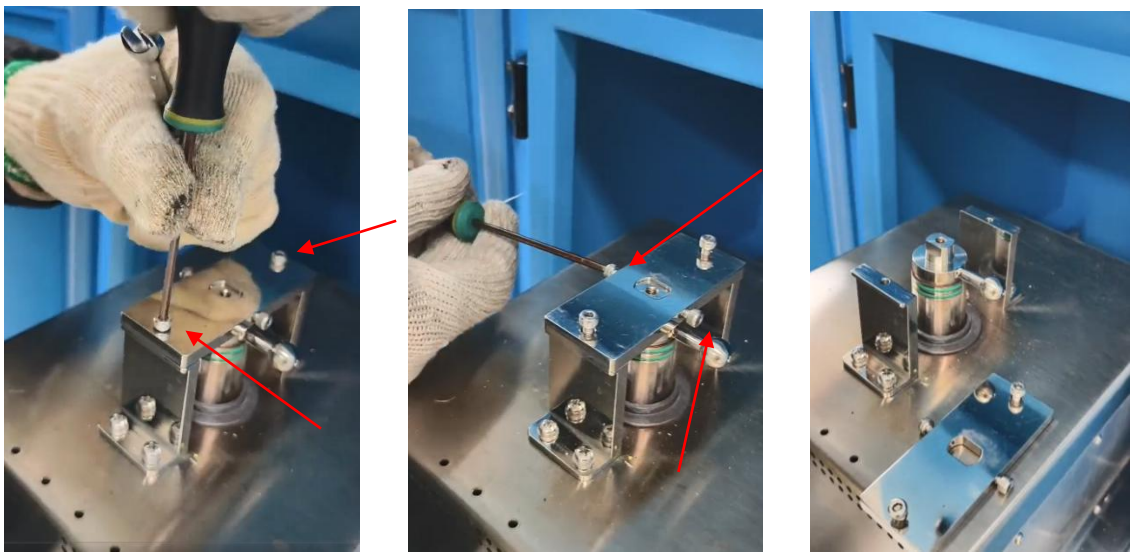


- Remove the screw fixed on the left side of the heating furnace.

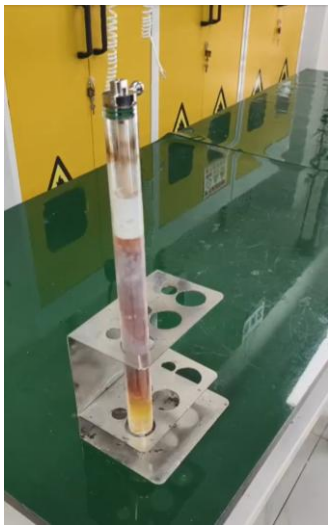


➢ Pull the furnace out of the combustion chamber.

➢ Remove the four screws on the fixing plate of the pipe plug of the combustion tube.



➢ Take out the catalytic combustion tube from the heating furnace and remove the pipe plug.



Note: When removing the pipe plug, you should be extremely careful. Pull the pipe plug vertically upwards to prevent breaking the sampling needle tube.

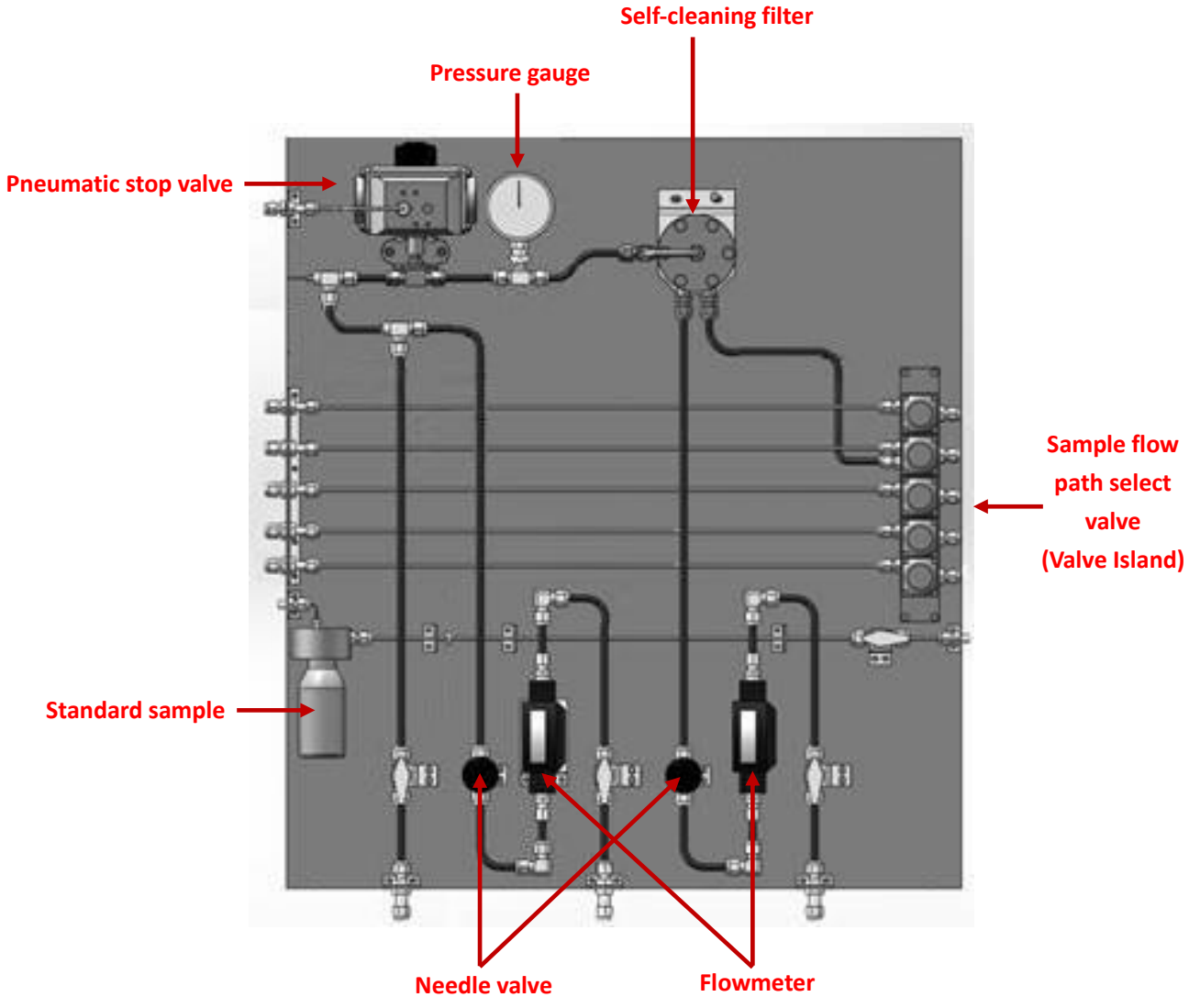
- Replace with a new catalytic combustion tube.
- Connect the components in the reverse order of the above steps and restore the analyzer to its normal state.

Appendix C: Pretreatment System

Instructions

The sample pretreatment system is mainly used to process the sample to be tested into a sample suitable for analysis by the Series 800TS, including pressure stabilization, current limiting, filtration, loop, etc.

Before entering the main analysis unit of the Series 800TS, the sample should be filtered to remove large particles, dewatered and stabilized in pressure. The sample pretreatment system integrates the calibration pipeline and necessary components of the analyzer.



The components of the sample pretreatment system.

According to the types of samples analyzed on site, a typical sample pretreatment system include the following main components:

（1） Sample flow path select valve(Valve island): Open or close a specific flow path at the specified time according to the schedule of the analysis task list.

（2） Self-cleaning filter: Filter the particles in the sample of the flow path, process the sample into a sample that can be analyzed by the Series 800TS, and avoid pipeline blockage.

（3） Pneumatic stop valve: Open or close the sample flow path, and introduce the sample into the six-port sampling valve for quantification according to the predetermined program.

（4） Flowmeter: Observe the flow rate of the sample in the fast loop of the sample pretreatment system.

（5） Pressure gauge: Display the pressure of the sample flow path in the sample pretreatment system.

（6） Needle valve: Adjust the flow rate of the sample in the fast loop of the sample pretreatment system.

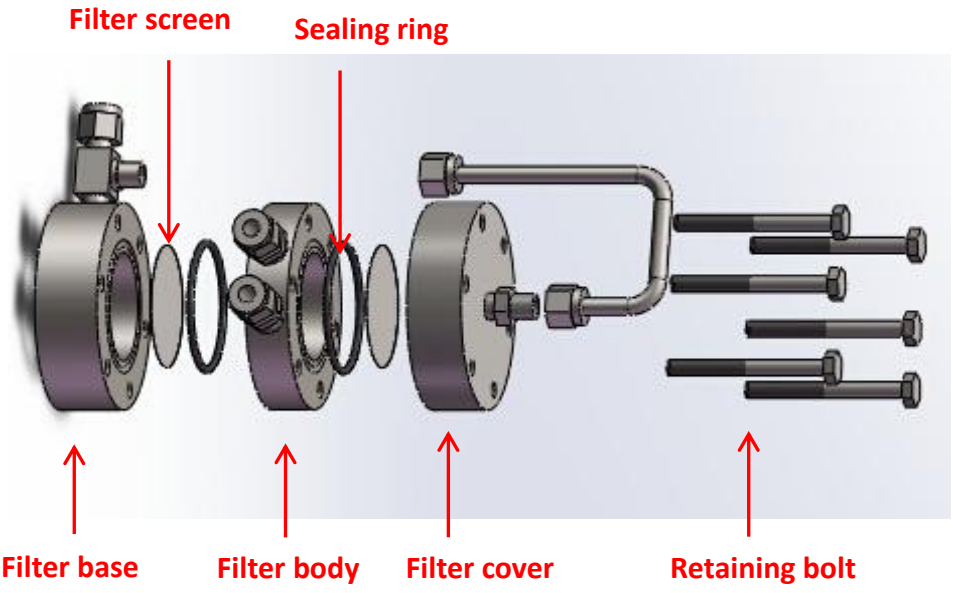
（7） Standard sample flow path component: Connect the standard sample bottle to the standard sample flow path bottle rack, and introduce the standard sample into the Series 800TS Sulfur On-Line Analyzer according to the calibration program under a certain pressure, so as to realize the analysis of the standard sample.

（8） Sampling port: The sample obtained at the sampling port can be sent to the laboratory for testing, so as to judge the reliability of the measurement results of the on-line sulfur analyzer.

All of the above components are installed on a stainless steel backplate, and all components that contact with the sample are made of suitable materials.

- The sample flow path uses stainless steel pipe with diameter of 1/4 inch.
- The standard sample flow path uses stainless steel pipes with diameters of 1/8 inch and 1/16 inch. Among them, the stainless steel pipe with a diameter of 1/8 inch is the calibration gas pipeline of the instrument, and the 1/16-inch stainless steel pipe is the standard sample pipeline.

Self-cleaning filter



The filter screen should be cleaned or replaced periodically according to the cleanliness of the sample, and the wear degree of the sealing ring should be checked. Replace with a new sealing ring if necessary. We provide some filter screen and sealing ring for replacement. Please see Appendix A for details.

Appendix D: Positive Pressure Control System

Caution

Disconnect the power supply first before opening the positive pressure control system.

Positive Pressure Control System

Instructions

The positive pressure control system is used to ensure the safe operation of the analyzer in the hazardous area of the explosive gas mixture in Zone 2.

The positive pressure system is designed to monitor the purging pressure of

Series 800TS. The internal pressure of Series 800TS chamber should be between 200-600 Pa, which can ensure that hazardous substances cannot leak into the analyzer.

The system has safety interlock functions such as upper and lower limit alarms for positive pressure protection and automatic power cut-off. When the system detects that there is no purging pressure in the analyzer or the purging pressure exceeds the preset range, it will automatically cut off the power supply to ensure safety.

Explosion-proof rating:

- Exd II C T4 Gb
- Execution standards: GB3836.1 - 2010, GB3836.2 - 2010

Application area:

- Zone 2 of explosive hazardous locations

Requirements:

- Quality of purging gas: Free of moisture, oil, and hydrocarbons.
- Purging pressure: ≥ 200 Pa
- Purging flow rate: ≥ 200 L/min

Installation

Caution

Before attempting to install the positive pressure system controller, review the contents of Chapter 1 along with all safety information in this manual and other applicable documentation.

Caution

During system installation, prior authorization must be obtained and appropriate precautions shall be taken to prevent potential personal injury or equipment damage.

Power Requirements

Power supply must be free from spikes, sags, surges, or electronic noise.

Caution

All AC power supplies used with the positive pressure system must be directly connected to the positive pressure system. The positive pressure system controls the input power to the analyzer to ensure safe operation in hazardous areas.

Start-up

Caution

Before initial system start-up, the power cable specifications and routing must be verified. All sample pipelines shall be thoroughly tested for leaks.

Start-up Procedure for Positive Pressure Control System Power Supply:

- Close the door of the Series 800TS chamber and ensure its airtightness.
- Switch on the power supply of the positive pressure control system.
- Adjust the positive pressure control system to the operating state.
- Click the "Start" button on the panel of the positive pressure control system. After the pre - set purging time (usually set to 5 minutes), the positive pressure control system will automatically switch on the power supply of Series 800TS.

The above steps only illustrate the operation steps for starting the positive pressure system to power on the analyzer's main unit. For the steps regarding the analyzer startup, please refer to the section "Series 800TS Startup and Shutdown" in Chapter 4.

Caution

Do not open the casing of the positive pressure control system unless the power supply of the positive pressure control system has been cut off and it has been confirmed that there is no danger in this area.

If the positive pressure system fails to supply power to the analyzer after the required time, please check the following possible issues:：

- Whether the system purging pressure exceeds the set value.
- Whether the door of the analyzer's main unit is open or there is an air leak.

- Malfunction of the positive pressure control system.

Shut down

When the positive pressure purging pressure of the system is lower than 200 Pa, the positive pressure control system automatically cuts off the power supply and stops supplying power to the analyzer's main unit.

To manually disconnect the power supply of the analyzer, please follow these steps:

- Refer to the section "Analyzer Startup and Shutdown" in Chapter 4 and operate according to the analyzer shutdown steps
- Set the switch of the positive pressure control system to the stop position.

Power outage or abnormal purging

If there is a power outage or abnormal purging during the operation of Series 800TS, the positive pressure control system will stop supplying power to the Series 800TS main unit.

The positive pressure control system cannot automatically resume power supply to the analyzer's main unit. You need to manually set the switch of the positive pressure control system to the stop position. After the AC power is restored and the system purging pressure reaches the system - set value, you can then set the switch of the positive pressure control system to the operating position again. Once the purging time reaches the system - set value, the positive pressure system will automatically supply power to the analyzer's main unit.

When the positive pressure system interrupts the power supply to the analyzer's main unit, the 4–20 mA output power will be interrupted.

Caution

The forced power-on mode of the positive pressure control system is only used when maintaining the analyzer, and it can only be used when the analyzer needs to be maintained and it is confirmed that there is no danger in this area.

Caution

Do not open the explosion-proof casing of the positive pressure control system until it is confirmed that there is no danger in this area.

Caution

After the maintenance is completed, adjust the positive pressure control system to the working state. When the positive pressure system is in the maintenance state, the analyzer must be supervised by someone. In case of a dangerous situation, the staff must immediately cut off the power supply.

Start, Stop:

Press the start button (START) and the system will start to operate. Press the stop button (STOP) and the system will return to the initial interface. After starting, the positive pressure control process is divided into the purging stage (see the attached Figure 1 above) and the normal operation stage (see the attached Figure 2 above).

1） Forced power-on

Press the test button (**TEST)** to enter the password prompt interface. Use the up and down（▲/▼）keys and the shift (**SHIFT/MUTE**) key to enter the password (the initial password is: 1111). Finally, press the confirm button (**FUN**) to confirm. If the password is entered correctly, the main output contacts (terminals 6 and 7) will be engaged for output.

Warning

The forced power-on function is only limited for system debugging and is prohibited from being used in the positive pressure systems of places where flammable, explosive and dangerous gases exist.

2） Parameter setting

The function key (**FUN**) is used for setting the system parameters. The up and down（▲/▼）keys are used for modifying the values, and the shift key (**SHIFT/MUTE**) is used for moving the position to the right. After the settings are completed, press the function key to save them.

During the parameter setting process, the stop key **(STOP**) is used as the exit key.

For detailed information, please refer to the instruction manual of the Positive Pressure Control System.

Appendix E: Wiring Diagram of Series 800TS