Operation Manual

BANA-606

TOC Analyzer

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Preface

Thank you for purchasing this product.
This Operation Manual is a user manual for BANA-606, which describes the usage of BANA-606, product-related accessories, optional accessories, etc. This product is suitable for people with certain basic knowledge of chemistry. Please use the instrument correctly after carefully reading the Operation Manual.
Please keep this manual properly for future reference.

Important Notes

1. If the user or place of use changes, please forward this manual to the subsequent users.
2. If this manual or warning label of this product is lost or damaged, please contact Biolab immediately.
3. To ensure safe operation, please read the “Instructions for Safe Operation” carefully before using this product.
4. To ensure safe operation, please entrust Biolab to install, debug or reinstall the instrument after moving it.

Instructions for Safe Operation

1. **Basic procedures**

For the safety of you and the instrument, and to ensure the normal use of the BANA-606 total organic carbon analyzer, please read this chapter carefully before operating it. Please follow all the safety tips in this manual and all the tips displayed by the software on the screen.

2. **Symbols and keywords**

Symbols and keywords used by this instrument indicate hazards and descriptions.

 Caution: It indicates a potentially dangerous environment. Failure to comply with this instruction may lead to minor injury or property damage.

 Caution Hot: Do not touch in high temperature.

 Danger Electricity: Do not touch when electrifying.

3. Warranty

Warranty period: The length of the warranty period shall be determined according to the terms of the contract signed with Biolab
Warranty content: During the warranty period, the failure caused by the product itself will be repaired or the relevant parts will be replaced free of charge.

Scope of responsibility:

(1) Under no circumstances shall our company be liable for the lost income, indirect damage and derivative damage of the user, nor shall it be liable for any damage compensation brought by the third party to the user.

(2) In any case, the maximum compensation amount for this product is limited to the ex-factory price or sales price.

Please check the following specifications:

Exemption from liability:
The warranty does not cover faults caused by the following reasons:
(1) Improper operation.
(2) Damage or missing components caused by unpacking the instrument without the permission of our company or failing to unpack the instrument according to the unpacking requirements.
(3) Repair or modification of this product by companies other than our company or companies designated by us.
(4) Use in conjunction with hardware or software not specified by our company.
(5) Failure of this product and software & data damage including basic software caused by a computer virus.
(6) Faults and software & data damage including basic software caused by power failures such as power cut or sudden voltage drop.
(7) Faults and software & data damage including basic software caused by the improper shutdown.
(8) Faults not caused by the product itself.
(9) Faults caused by the use of this product in harsh environments such as high temperature, high humidity, corrosive gas or vibration.
(10) Faults caused by fires, earthquakes, other natural disasters, contamination by radioactive and harmful substances, and irresistible accidents such as war riots and crimes.
(11) Faults caused by self-moving or transporting products after installation.
(12) Consumables or parts equivalent to consumables.

Note: If the product is accompanied by a warranty card or a contract including warranty items is signed separately, the warranty contents in the warranty card or contract should be observed.

4. After-sales service and parts delivery period
After-sales service:
(1) In case of any fault, please check and take appropriate measures according to the “Chapter VIII Maintenance and Repair” in the BANA-606 Operation Manual.
(2) If the fault has not been eliminated or other faults not described in this manual occur, please contact the after-sales engineer of Biolab
Parts delivery period:
The demand for units, electronic components and other parts purchased from component manufacturers has been estimated in time for the above period after receiving the product discontinuance notice from these manufacturers. However, it may not be possible to provide maintenance parts due to the manufacturer’s reasons or changes in demand when production is stopped.

5. Scrapping
(1) You should entrust an industrial waste disposal company to dispose of this instrument according to local regulations, and entrust an industrial waste disposal company with the license of “glass, concrete and ceramic waste” to dispose of the waste insulating materials sealed in plastic bags.

(2) The used catalyst shall be treated by a qualified industrial waste disposal company in accordance with the local industrial waste treatment regulations. When entrusting, you should clearly indicate that the catalyst used contains platinum.
(3) You should entrust a qualified industrial waste contractor to dispose of the used CO2 absorber.
(4) The halogen remover used shall be treated by a qualified industrial waste disposal company in accordance with the local industrial waste treatment regulations. When entrusting, you should clearly indicate that the halogen remover contains copper.

6. Operator requirements

(1) BANA-606 instrument should be operated by personnel with basic chemical professional knowledge and chemical operation ability and trained in instrument operation, including familiarity with the host operation of this instrument, the use and maintenance of system components and accessories, etc.
(2) Operation by untrained personnel or improper application may lead to danger.
(3) This user manual should be placed in a position where the operator can access it at any time.
(4) It is strictly forbidden to eat, drink, smoke or rub your eyes in the working area where this instrument is placed.
(5) Please check whether this instrument is damaged and ensure that it is in good working condition before operating it.
(6) This instrument can only be installed by the Service Department of Biolab and authorized and trained personnel.

7. Precautions

(1) When heating up, the temperature in the center of the cracking furnace (near the inlet of the combustion tube) is very high. Do not touch it with your hands to prevent scalding.
(2) When replacing the combustion tube, you must wait until the temperature of the cracking furnace drops to room temperature to prevent scalding.
(3) Do not start up before the combustion tube is installed. The sliding injection device at the TC injection port may be deformed by the heat radiation from the center of the cracking furnace. If it is necessary to heat the cracking furnace without installing a combustion tube, please remove the sliding injection device at the TC injection port to prevent deformation, or plug the opening in the center of the cracking furnace with heat insulation materials such as quartz wool.
(4) To reduce the negative pressure, you must ensure that the drain pipe connected to the waste liquid discharge port on the left side of the instrument does not contact the liquid level in the waste liquid cylinder. The height of the external pipe must always be lower than the height of the drain outlet. Excessive negative pressure will hinder the drainage of the drainage pipe, and waste liquid will overflow, resulting in the corrosion of components.
(5) When installing the connecting parts connected to the six-way valve, please tighten them by hand. Brute tightening with tools may cause internal deformation or liquid leakage of the valve.
(6) When maintaining any transmission parts (e.g., connecting the line to the six-way valve, or connecting or disconnecting the line on the sampler, etc.), please stop using the instrument. If these parts are maintained or the line is disconnected when using the instrument, the transmission parts may shift, causing injury or liquid outflow.

(7) When cleaning the instrument, please wipe the surface with a wrung-out soft cloth. Do not use chemical reagents.
(8) Do not spill liquid such as samples or chemicals on the control computer and printer.
(9) Repairs to the inside of the instrument may be hazardous. Please contact the Technical Department of Biolab which will send engineers to repair.
(10) Do not modify or disassemble the instrument except for the maintenance contents mentioned in this manual. Otherwise, the safety and accuracy of the product may be reduced.
(11) The waste liquid discharged from the instrument contains acid or other corrosive.
(12) Hot-line work is strictly prohibited for the disassembly and assembly of all parts of the instrument. Please beware of electric shock substances. Please be careful not to make the waste liquid contact your hands or spill to prevent corrosion.

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Chapter Overview

1.1Performance Characteristics

(1) The perfect operating software can realize the one-stop operation of instrument control, state monitoring, data processing and data access.
(2) The self-developed high-performance NDIR detector equipped with an imported light source and probe has high detection sensitivity and good stability.
(3) The core injection system is composed of a multi-channel rotary valve and precise dosing pump, which has the functions of automatic dilution, automatic acid addition and automatic purging of samples, and provides intelligent testing services for customers.
(4) The liquid line design is matched with a reasonable flow control system to ensure that the amount of samples entering the combustion tube is reduced as much as possible when switching and cleaning, thus fully prolonging the service life of catalysts and combustion tubes.
(5) The diluted water level and waste liquid level are monitored in real time to provide customers with intimate intelligent reminding service.
(6) Consumables management function is available to intelligently remind customers to replace consumables, and enhance user experience.
(7) Autosampler with 20 cup positions is optional to realize automatic user experience.
(8) Enhanced halogen remover is optional to reduce the influence of halogen substances on the detector and enhance the sensitivity and stability of detection.
(9) When testing samples, multiple standard curves can be selected for analysis, and the software automatically selects the best standard curve according to the response value of samples and brings it into the calculation.
(10) The IC reaction solution is regenerated automatically, ensuring the accuracy of IC test data.
(11) Multiple tasks can be added to the sample table for continuously test, thus improving the analysis efficiency.

1.2 Terminology

Total Carbon (TC)
It refers to the total content of organic carbon, inorganic carbon and elemental carbon in water.
Total Organic Carbon (TOC)
It refers to the carbon content of organic matter dissolved or suspended in water (in mass concentration), which is a comprehensive index to express the total amount of organic matter in water by carbon content.
Inorganic Carbon (IC)
It refers to the carbon content of elemental carbon, carbon dioxide, carbon monoxide, carbides, cyanates, cyanides, and thiocyanates in water.
Non-Purgeable Organic Carbon (NPOC)
It refers to the organic carbon that remains in the solution after the sample is purged by gas under the specified purging conditions.

1.3 Measurement Principle

1.3.1 Measurement principle of total carbon (TC)

BANA-606 uses carrier gas of 180mL/min, which flows in a combustion tube filled with an oxidation catalyst (the temperature of the platinum-aluminum catalyst is fixed at 680℃; the

temperature of the general catalyst can be adjusted with the difficulty of sample digestion, and can be heated up to 1000℃). The sampler system injects the sample into the combustion tube, and TC in the sample is combusted and decomposed into carbon dioxide. The mixed gas containing the reaction product from the combustion tube passes through the scrubber, enhanced halogen remover (optional), electronic cooler, filter, and then the halogen remover for halogen removal, and finally flows to the gas chamber of a non-dispersive infrared (NDIR) detector to detect the carbon dioxide concentration. After data processing of the NDIR detection signal (analog signal), the peak shape is displayed on the computer for calculating the peak area. Because of the correlation between peak area and TC concentration in the sample, the relationship between carbon content in TC standard solution and peak area (calibration curve) is obtained by an external standard method, and then TC concentration in the sample can be calculated according to the measured peak area value of the sample.

1.3.2 Measurement principle of inorganic carbon (IC)

IC is composed of carbonate, bicarbonate and carbon dioxide dissolved in water. When a small amount of phosphoric acid or hydrochloric acid is added to the sample to reduce the pH value to below 3, all carbon dioxide (CO2) in carbonate is dissociated under the following reaction.

$CO_3^{2-} + 2H^+ \rightarrow CO_2\uparrow + H_2O$

$HCO_3^- + H^+ \rightarrow CO_2\uparrow + H_2O$

The carrier gas passes through the sample to volatilize the carbon dioxide generated by the reaction and the dissolved carbon dioxide. The mixed gas containing the reaction product passes through the enhanced halogen remover (optional), electronic cooler, filter, and then the halogen remover for halogen removal, and finally flows to the gas chamber of a non-dispersive infrared (NDIR) detector to detect the carbon dioxide concentration. After data processing of the NDIR detection signal (analog signal), the peak shape is displayed on the computer for calculating the peak area. Because of the correlation between peak area and IC concentration in the sample, the relationship between carbon content in IC standard solution and peak area (calibration curve) is obtained by the external standard method, and then IC concentration in the sample can be calculated according to the measured peak area value of the sample.

1.3.3 Measurement principle of non-purgeable organic carbon (NPOC)

Acid (e.g., phosphoric acid) is added to the sample to make it acidified (pH 2 - 3), and then purged by the carrier gas. Under the action of carrier gas, IC in the sample becomes carbon dioxide and is removed from the sample. The treated sample was tested according to the measurement principle of TC.

When there are volatile organic compounds (POC) in the sample, POC may be lost from the sample during aeration treatment, so TOC obtained by removing IC in this measurement is called NPOC (Non-Purgeable Organic Carbon).

General natural water, public water and pure water contain less volatile organic compounds, so NPOC can be regarded as TOC.

1.3.4 Measurement principle of total organic carbon (TOC)

BANA-606 uses the following two TOC measurement methods:

(1) Subtraction method (TOC mode): TOC calculated from the difference between TC and IC

The system first measures the TC concentration of the sample, then measures the IC concentration of the sample, and takes the value of TC concentration minus IC concentration as TOC concentration.

Note: For the sample with much less TOC concentration than IC concentration (sample

with IC accounting for almost all TC), the TOC obtained by subtraction method has the error of TC measurement and IC measurement, and the error of TOC measurement is relatively large, so NPOC method is recommended.

(2) Direct method (NPOC mode): NPOC is used as TOC

The system directly uses the NPOC method to measure the sample, and takes the NPOC concentration as TOC concentration.

Note: As carrier gas purging is needed in the experiment, volatile organic compounds such as benzene, toluene, cyclohexane and chloroform will be purged out together with CO2, so the direct method is not suitable for samples containing volatile organic compounds. In this case, please use the subtraction method.

1.4 Application

BANA-606 analyzer is widely used in the quality control of drinking water, industrial water, domestic sewage and industrial wastewater, as well as the monitoring of rivers, lakes, oceans and surface water. It is also widely used in medicine, drug, biochemical technology, laboratory and hydropower station.

Chapter II Technical Specification

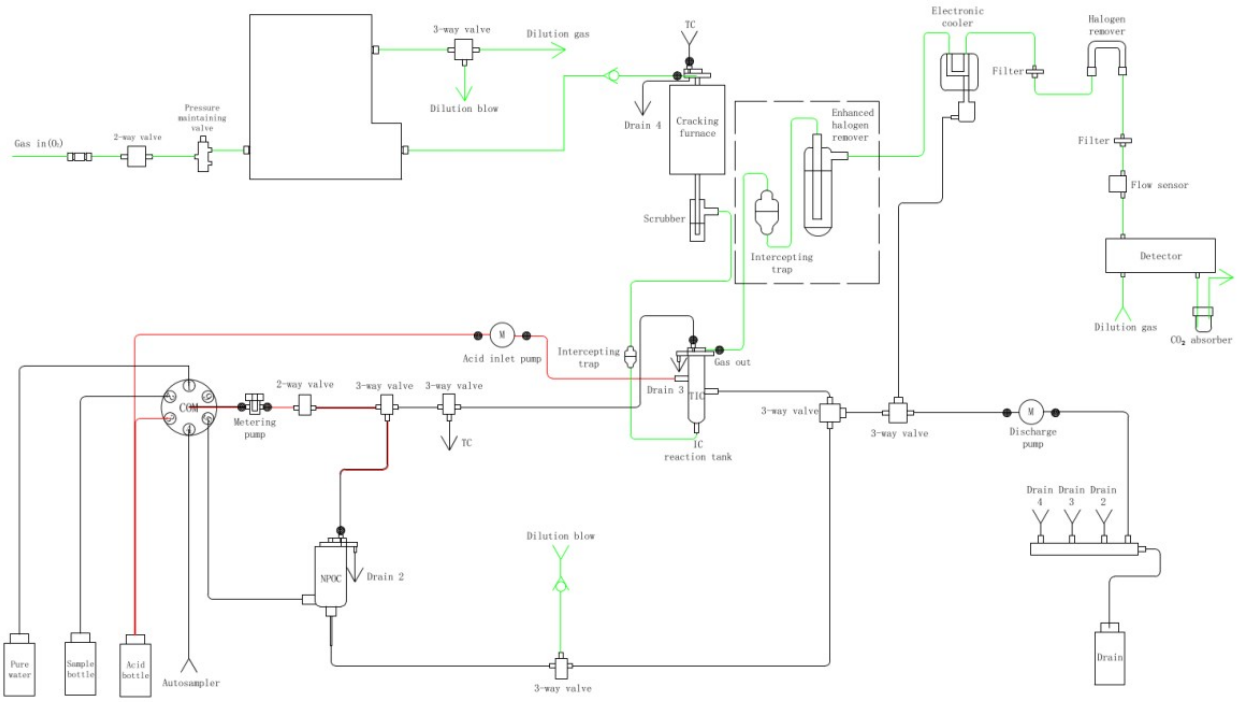
2.1 Technical Parameters

Table 2.1 Technical Parameters:

Analysis type	TC, IC, TOC (TC-IC), NPOC
Operation mode	Computer control
Application object	Liquid
Measurement principle	High-temperature catalytic combustion oxidation/non-dispersive infrared detection (NDIR)
Measurement range	0-1000mg/L, which can be extended to 0-50000mg/L
LOD	TC (Standard catalyst): 50 μg/L TC (platinum aluminum catalyst): 100 μg/L IC: 20 μg/L
Measuring time	TC: Approx. 4 min IC: Approx. 3 min
Maximum permissible error	TOC: ± 5% IC: ± 4%
Repeatability	≤3%
Injection volume	TC: 100-500 μL IC: 100-2000 μL
Sample dilution ability	1-100 times
Environmental conditions	Temperature: 5-35 ℃ Humidity: ≤ 80% RH, no condensation
Power supply	AC110V ± 10% or AC220V ± 10%, 50/60 Hz, 7A, power:

	＜700W
Size	631*450*478mm (Depth * Width * Height)
Mass	＜ 45kg

2.2 Flow Chart

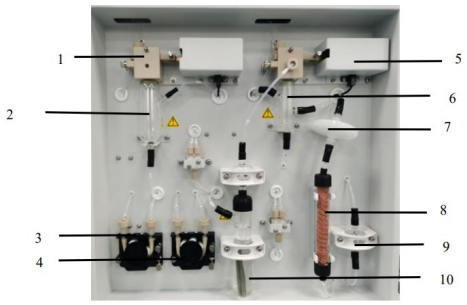


(Figure 2.1)
Note: The dotted line in the figure means the enhanced halogen remover (optional).

Chapter III Hardware Structure

3.1 Structure of BANA-606

3.1.1 Front View of Host (Figure 3.1)



(Figure 3.1)

1.Sliding injection of the dilution tank2.Dilution tank 3. Discharge pump
4.Acid inlet pump5. Sliding injection of IC tank6. IC reaction tank
7. Filter 18. Halogen remover 9. Intercepting trap10.Enhanced halogen remover

3.1.2 Left View of Host (Figure 3.2)

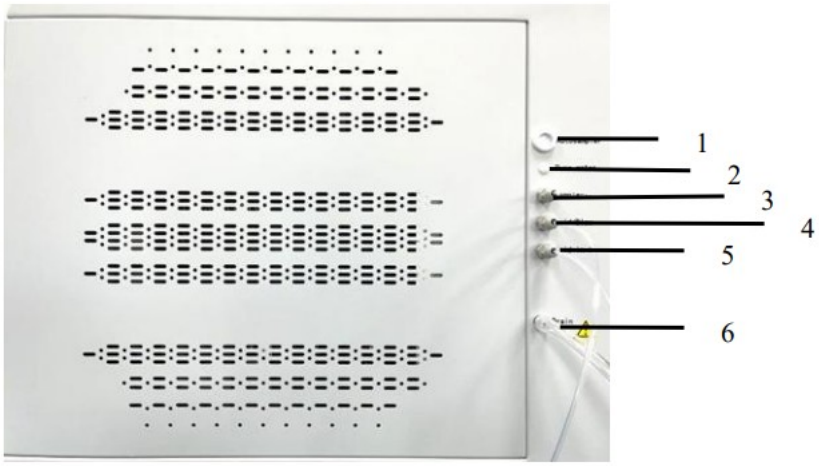
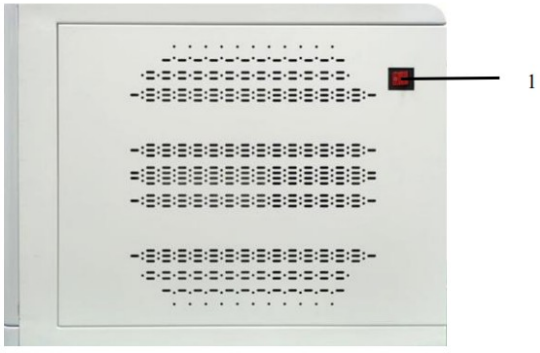


Figure 3.2)

1.Injection tube of autosampler 2. Dilution water 3.Injection tube
4. Acid inlet/purge pipe of the dilution tank 5.Acid inlet pipe of IC tank
6.Drain pipe



3.1.3 Right View of Host (Figure 3.3)

(Figure 3.3)
1. Power switch

3.1.4 Rear View of Host (Figure 3.4)

(Figure 3.4)

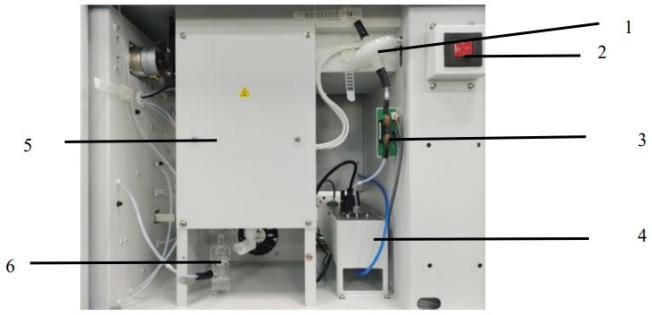
1.Power socket2.Fan 3 .Exhaust pipe
4. Intake pipe 5.USB 6. Liquid level sensor
7.Dust screen

3.1.5 Interior Left View (Figure 3.5)

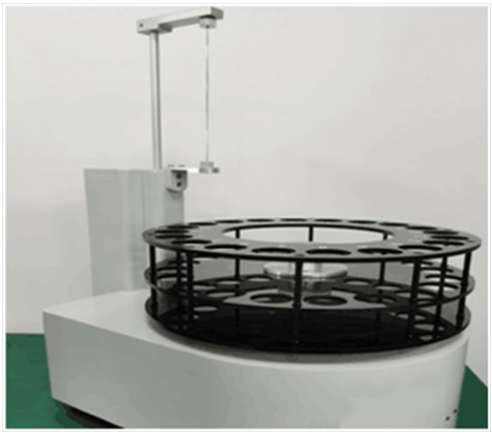
(Figure 3.5)

1. CKD three-way valve
2. Refrigeration module
3.Flow controller
4.Pressure maintaining valve
5.Detector
6. Two-way valve
7. Communication switch plate
8. Piston pump9.Six-way valve

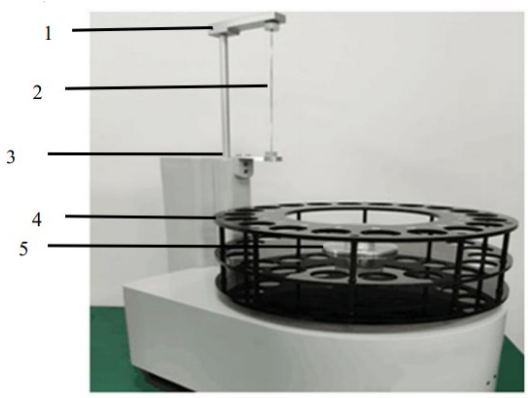
3.1.6 Interior Right View (Figure 3.6)



(Figure 3.6)
1. Filter 2 2. Power switch 3. Flow sensor 4. Detector
5.Cracking furnace 6. Scrubber



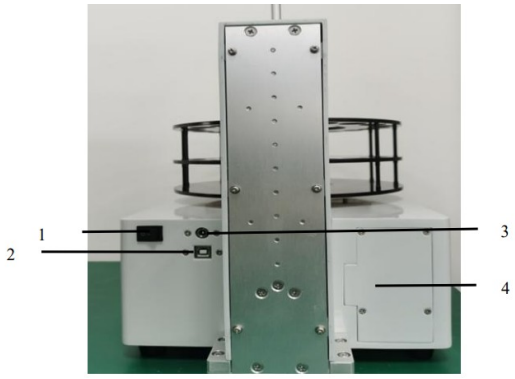
3.2 Optional Accessories
3.2.1 Autosampler
3.2.1.1Leftview (Figure 3.7)



(Figure3.7)

1.Mounting base 2.Injection needle 3.Positioning seat 4.Injection tray
5. Turntable handle

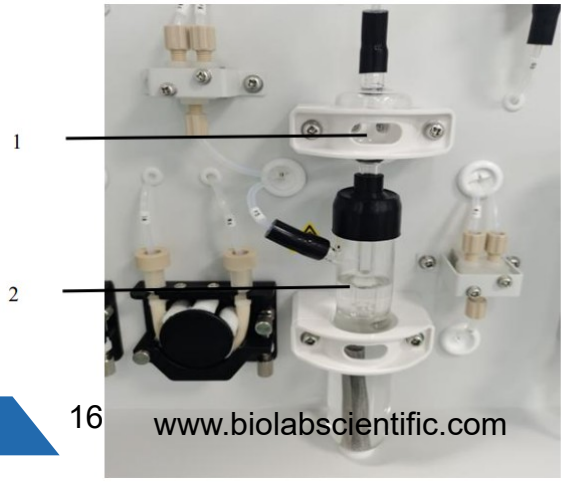
3.2.1.3 Rear view (Figure 3.8)



(Figure 3.8)

1.Power switch2.USB communication interface3.Power interface
4. Control panel protective cover

3.2.2 Enhanced halogen remover (Figure 3.9)



(Figure3. 9)

1. Intercepting trap 2. Enhanced halogen remover

Chapter IV Preparation for Installation and Testing

4.1 Installation Requirements

4.1.1 Power supply
Please connect this product to AC (220 ± 22) or AC (110 ± 11), 50/60 Hz, single-phase stable power supply with a capacity above 10A. When the power supply voltage exceeds the range of (220 ± 22) V, the abnormal operation will occur.
Note: When the voltage is unstable, faults will occur during high-sensitivity measurement.
4.1.2 Space
(1) Size of test bench: length: ≥ 200cm, width: ≥ 70cm, height: 70cm - 80cm. The table top should be able to bear at least 100kg of weight, the test bench should be stable without vibration, and the table top should be heat-resistant and acid-resistant.
(2) The rear of the test bench (back of the instrument) is ≤ 150cm away from the power socket, so as to connect the power supply easily. The computer and printer positions should be reserved on the right side of the instrument host, and the autosampler position should be reserved on the left side of the instrument host.
4.1.3 Environment
(1) Do not install the instrument at the window or door to avoid convection, dust, corrosive gas and vibration.
(2) Keep away from strong electromagnetic field interference.
(3) Please avoid the fire-forbidden place. Some internal components may cause fire after reaching high temperatures.
(4) Ambient temperature: 5 -35 ℃.
(5) Operating humidity: 10 - 80% RH.
4.1.4 Carrier gas
(1) The user provides oxygen cylinders and connects oxygen to the gas supply port.
(2) Type of gas: oxygen, with purity ≥ 99.995% (if the carrier gas contains too many impurities, the analysis accuracy will be reduced and the analysis results will be poor).
(3) Serious bending is prohibited in the pipeline.
(4) Special pipeline should be used. If other instruments are tapped, the measurement performance will be adversely affected due to the fluctuation of air supply pressure.

Note: With regard to high-pressure gas, there are strict regulations and restrictions on its

operation and security management in safety and technical specifications of special equipment and fire protection laws.
Although the gas used by this instrument is not dangerous, it is also very dangerous if the operation of a high-pressure gas cylinder is wrong. Please carefully read and strictly observe the following precautions:
(1) The gas cylinder must be placed in a well-ventilated place without direct sunlight.
(2) Do not make the gas cylinder reach a high temperature above 40 ℃.
(3) Fireworks are strictly prohibited within 2m around the gas cylinder.
(4) The gas cylinder shall not be upside down and tumbled, but shall be fixed with ropes.
(5) Please close the cock of the gas cylinder immediately after using.
(6) Please check the pressure gauge once every 3 months.

4.1.5 Computer

(1) Hardware configuration: CPU: above 3GHz; memory: above 4G; hard disk: above 500GB (divided into at least two disks).
(2) External interface: USB2.0 or above.
(3) Operating system: Flagship version above Windows 7.
(4) Pre-installed software: PDF reader with PDF printing function above Office 2007.
(5) Display: resolution ratio: above 1600*900. A widescreen display is recommended.
4.1.6 Reagent

Table 4-1:

No.	Name	Specification
1	Pure water	Water with TOC concentration not exceeding 0.5 mg/L
2	Potassium hydrogen phthalate	Standard reagent or guaranteed reagent
3	Anhydrous sodium carbonate	Standard reagent or guaranteed reagent
4	Sodium bicarbonate	Guaranteed reagent
5	Hydrochloric acid	Guaranteed reagent
6	Phosphoric acid	Guaranteed reagent
7	Soda lime	Chemically pure

4.2 Solution Preparation

4.2.1 Preparation of standard solution

4.2.1.1 Standard stock solution of organic carbon (ρ TOC = 1000 mg/L)
Accurately weigh 2.1255 g of potassium hydrogen phthalate (dried to constant weight at 110 ℃ - 120 ℃ in advance), put it in a beaker, dissolve it with pure water, transfer the solution in a 1000 mL volumetric flask, dilute it with pure water to the marking line, and mix well.

4.2.1.2 Standard stock solution of inorganic carbon (ρ IC=1000 mg/L)

Accurately weigh 4.4085 g of anhydrous sodium carbonate (dried to constant weight at 105 ℃ in advance) and 3.5000 g of sodium bicarbonate (dried in a dryer in advance), put them in a beaker, dissolve them with pure water, transfer the solution in a 1000 mL volumetric flask, dilute them with pure water to the marking line, and mix well.

4.2.1.3 Phosphoric acid solution (20%)
Add 20mL of phosphoric acid in a 100mL volumetric flask, dilute it with pure water to the marking line, and mix well.

4.2.1.4 Hydrochloric acid solution (0.05 mol/L)
Add 2.5 ml of hydrochloric acid (2.0 mol/L) in a 100ml volumetric flask, dilute it with pure water to the marking line, and mix well.

4.2.1.5 Standard working solution of TC (ρ TC = 200 mg/L, ρ IC = 100 mg/L)
Accurately transfer 20.00 mL standard stock solution of organic carbon (4.2.1.1) and 20.00 mL standard stock solution of inorganic carbon (4.2.1.2) into a 200 mL volumetric flask, dilute them with pure water to the marking line, and mix well.

4.2.1.6 Standard working solution of IC (ρIC = 100 mg/L)
Accurately transfer 20.00 mL standard stock solution of inorganic carbon (4.2.1.2) into a 200 mL volumetric flask, dilute it with pure water to the marking line, and mix well.

4.2.1.7 Standard working solutionof NPOC (ρTOC = 100 mg/L)
Accurately transfer 20.00 mL standard stock solution of organic carbon (4.2.1.1) into a 200 ml volumetric flask, dilute it with pure water to the marking line, and mix well.

4.2.2 Preparation of standard solution concentration point for the calibration curve

4.2.2.1 TC calibration curve
Accurately transfer 0.00, 2.00, 5.00, 10.00, 20.00, 40.00, and 100.00 mL standard working solution of TC (4.2.1.5) to seven 100 mL volumetric flasks, respectively, dilute them with pure water to the marking line, and mix well. Standard series solutions with total carbon concentrations of 0.0, 4.0, 10.0, 20.0, 40.0, 80.0, and 200.0 mg/L are prepared, and their response values are determined according to the test steps of the standard solution. TC calibration curve is drawn according to the carbon content of standard series solutions corresponding to the instrument response values.

4.2.2.2 IC calibration curve
Accurately transfer 0.00, 2.00, 5.00, 10.00, 20.00, 40.00, and 100.00 mL standard working solution of IC (4.2.1.6) to seven 100 mL volumetric flasks, respectively, dilute them with pure water to the marking line, and mix well. Standard series solutions with inorganic carbon concentrations of 0.0, 2.0, 5.0, 10.0, 20.0, 40.0, and 100.0 mg/L are prepared, and their response values are determined according to the test steps of the standard solution. IC calibration curve is drawn according to the carbon content of standard series solutions corresponding to the instrument response values.

4.2.2.3 NPOC calibration curve
Accurately transfer 0.00, 2.00, 5.00, 10.00, 20.00, 40.00, and 100.00 mL standard working solution of NPOC (4.2.1.6) to seven 100 mL volumetric flasks, respectively, dilute them with pure water to the marking line, and mix well. Standard series solutions with organic carbon

concentrations of 0.0, 2.0, 5.0, 10.0, 20.0, 40.0, and 100.0 mg/L are prepared, and their response values are determined according to the test steps of the standard solution. NPOC calibration curve is drawn according to the carbon content of standard series solutions corresponding to the instrument response values.
Note: The concentration range of the above calibration curves can be adjusted according to the different types of samples.

4.2.3 Preservation of standard solution

The concentration of the standard solution is easy to change, especially for low concentration, and the concentration changes in a short time. The high-concentration standard stock solution is sealed and stored in a dark place, diluted during use, and easy to prepare. Containers must be glass bottles.
Storage period: The storage period of the standard solution is approximately 2 months for 1000mg/L standard stock solution. After dilution, the storage period of 100mg/L standard working solution is approximately 1 week. But they all need to be sealed and stored in a refrigerator at 4 ℃.
Note: As IC standard solution absorbs carbon dioxide in the atmosphere, its concentration is easy to change. It is very important to seal and store it.

Please reprepare the standard solution in the following cases:
(1) When the reproducibility of the measured value deteriorates or the sensitivity changes.
(2) When a small number of turbid impurities are found in the standard solution.

4.2.4 Sample preparation

The water sample should be collected in brown glass bottles, which should be filled with the sampling bottle without headspace. The water sample should be measured within 24 hours after collection, otherwise, the water sample should be acidified to pH ≤ 2 by adding sulfuric acid (pH 2SO 4 = 1.84 g/mL), and can be stored for 7days at 4 ℃.
Generally, relatively clean surface water (e.g., source water), groundwater and drinking water (e.g., tap water) can be directly measured, while industrial wastewater (e.g., electroplating wastewater) and domestic sewage with relatively complex components need to be pretreated according to different characteristics of samples. Four sample characteristics and treatment measures are listed below but are not limited to.

4.2.4.1 Determination of samples containing suspended matter
As TOC is often contained in suspended matter, sometimes the results vary greatly in TOC analysis of samples containing suspended solids. This phenomenon is obvious when the same sample is analyzed by two different TOC analyzers. When collecting data about the correlation between biological oxygen consumption (BOD) and TOC, poor results are possible if the suspended solids are treated in a different way.
As the injection tube of this instrument is1.0 mm in diameter, the suspended matter that cannot pass through the injection tube will not be determined. For the particles that can pass through the injection tube, the reproducibility of the measured value will be very poor if the solid particles in the samples taken by the sampler are uneven. Therefore, the diameter of suspended particles in the samples entering the instrument should not exceed 0.2 mm.
When determining samples containing suspended solids, the following treatment measures are usually taken:
(1) TOC determination of upper clarified sample
When no attention is paid to the influence of suspended matters on the analysis results, the

suspended matter is usually precipitated in the sample container, and the upper clarified sample is taken. This method depends on the precipitation separation of suspended matter, and mainly measures the soluble TOC.
(2) TOC determination of filtrate
The glass fiber filter paper or membrane filter can be used to separate the suspended matters actively, and only measure the soluble TOC in the filtrate.
As the filter paper or filter used may contain TOC, it must be heated (for glass fiber filter paper) or cleaned in advance.
(3) TOC determination of suspended matter after treatment by homogenizer
After treatment by a high-speed homogenizer, the more fine and uniform is, the better the reproducibility of the measured value is, and the more accurate it is to reflect the TOC content in suspended matters. The homogenizer should be a high-speed stirring (like an agitator) and an ultrasonic (output power 150 - 300W) homogenizer.
Note: The effect of homogenization is different due to different types of suspended matter, and not all types of suspended matter can be homogenized. For example, sludge samples are easier to treat, while fibrous samples are more difficult.

4.2.4.2 Determination of samples containing acids
Samples with high acid concentrations should be diluted to a concentration below 1000mg/L. If the sample contains hydrochloric acid or sulfuric acid, it can be neutralized to pH 2 - 3 by potassium hydroxide or sodium hydroxide, and then determined and measured by the NPOC method.
Note: Because all nitrates produce acid gas during thermal decomposition, neutralization treatment is ineffective. When using heat-stable sodium chloride and sodium sulfate, it is necessary to prevent the production of acid gas during combustion. Attention must be paid to the TOC of impurities contained in alkaline reagents for neutralization.

4.2.4.3 Determination of samples containing alkalis

The alkali content in the sample entering the instrument system should be below 1000mg/L. In principle, the pH value of the alkaline sample should be adjusted to 2 - 3 first, and then the NPOC content of the sample should be tested.
When measuring the TC of alkaline samples, you may encounter the following problems:
(1) The sensitivity decreases and the reproducibility deteriorates in a short time.
(2) Catalyst and combustion tube are aging rapidly.
(3) IC may be high due to carbon dioxide absorption.
Therefore, alkaline samples can be tested by the NPOC method.
In case of the NPOC method, dilute hydrochloric acid is added to the sample to adjust the pH value to 2 - 3 and form salt. For example, when the sample contains alkali calcium hydroxide, salt calcium chloride is formed.
As the lower salt concentration is preferable, alkaline samples should also be diluted as much as possible.

4.2.4.4 Determination of samples containing salts
The salt content in the sample entering the instrument system should be below 1000mg/L. When the sample contains excessive salt, salt accumulates in the combustion tube, which increases the resistance of carrier gas passing through the tube, and may reduce the reproducibility of the measured value. Therefore, it is necessary to maintain the interior of the combustion tube regularly. In order to prolong the service life of the combustion tube or

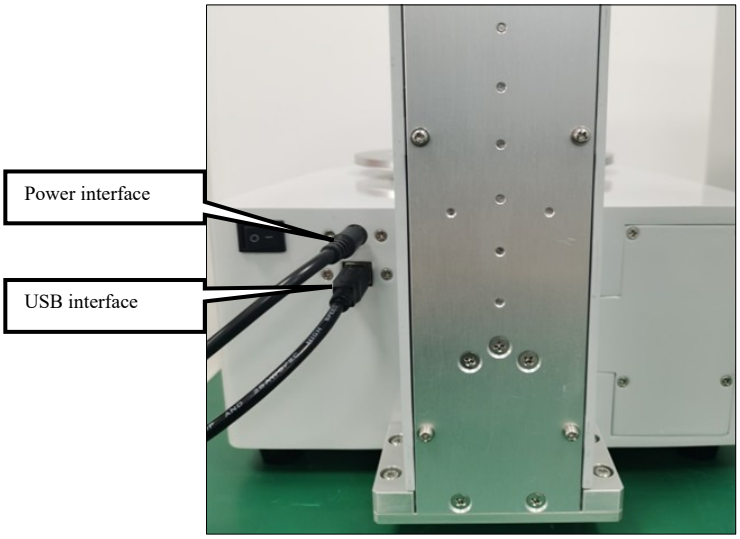
catalyst, the salt concentration must be reduced by dilution.

Chapter V Installation

5.1 Installation of Autosampler (Optional)

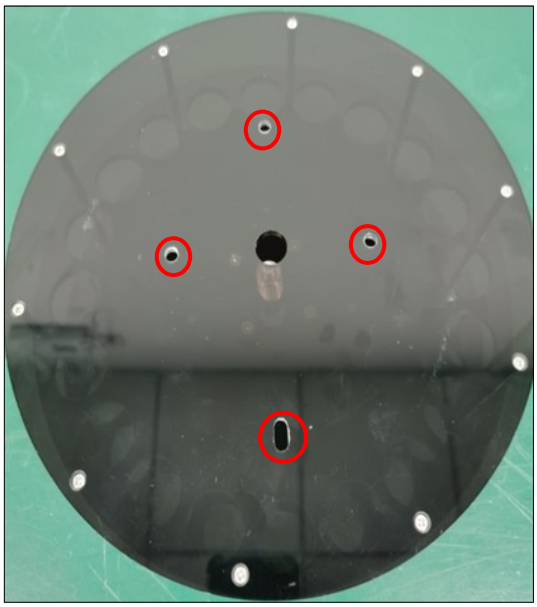
5.1.1 Installation of autosampler host

1) Connect the cylindrical connector (P1M) of the power adapter and the square interface of the USB cable to the autosampler host (Figure 5.1), and turn on the power supply (the injection needle will automatically rise and rotate for 1 turn to return to its position);

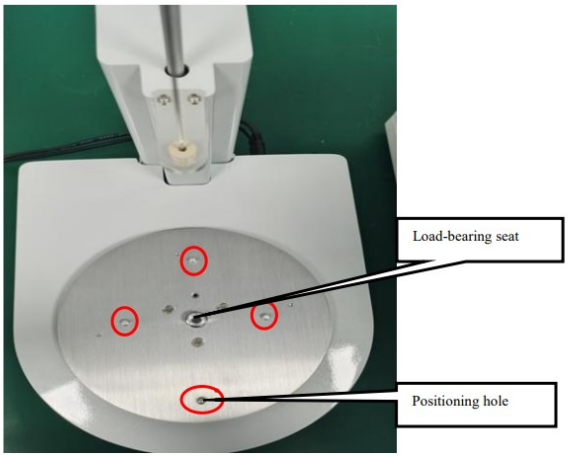


(Figure 5.1)

2) Take out the injection tray, insert the turntable handle into the hole of the load-bearing seat first, and then align the four positioning holes (Figure 5.2) on the injection tray with the corresponding four positioning holes (Figure 5.3) on the autosampler host;



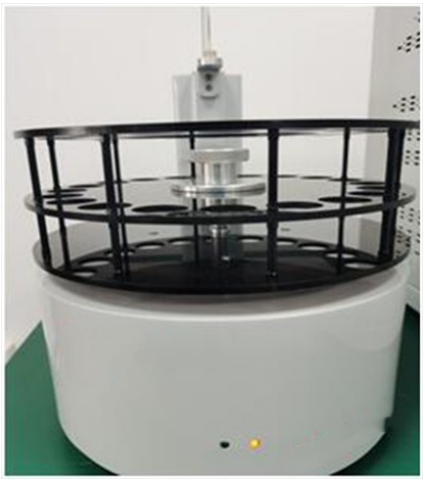
(Figure 5.2)



(Figure 5.3)

3) Tighten the turntable handle clockwise (Figure 5.4).

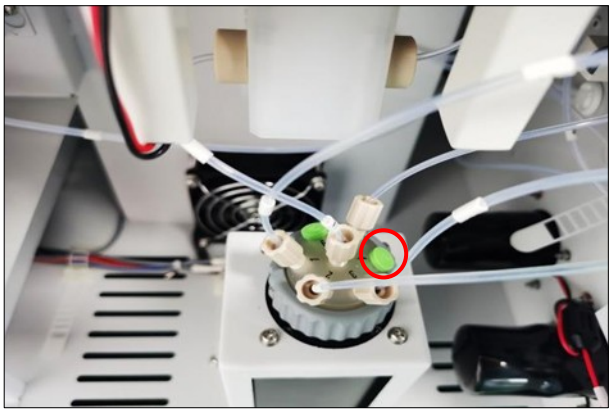
Turntable handle



(Figure 5.4)

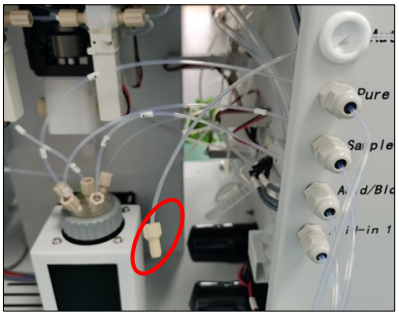
5.1.2 Installation of connecting pipe

1) Open the left side plate of the instrument and remove the rubber plug at No.4 port on the six-way valve (Figure 5.5);



(Figure 5.5)

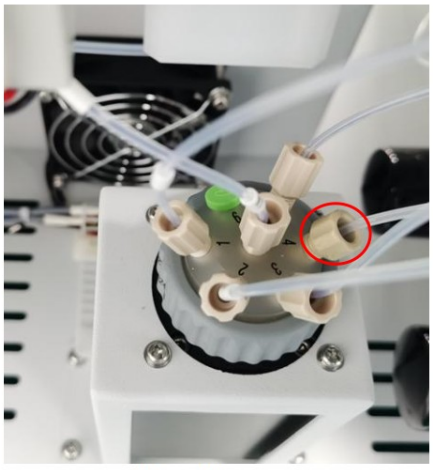
2) Take out the connecting pipe of the autosampler and pass it through the injection port of the autosampler on the left side of the instrument (Figure 5.6);



Injection port of autosampler

(Figure 5.6)

3) Connect one end of the connecting pipe to the No.4 port of the six-way valve (Figure 5.7)



(Figure 5.7)

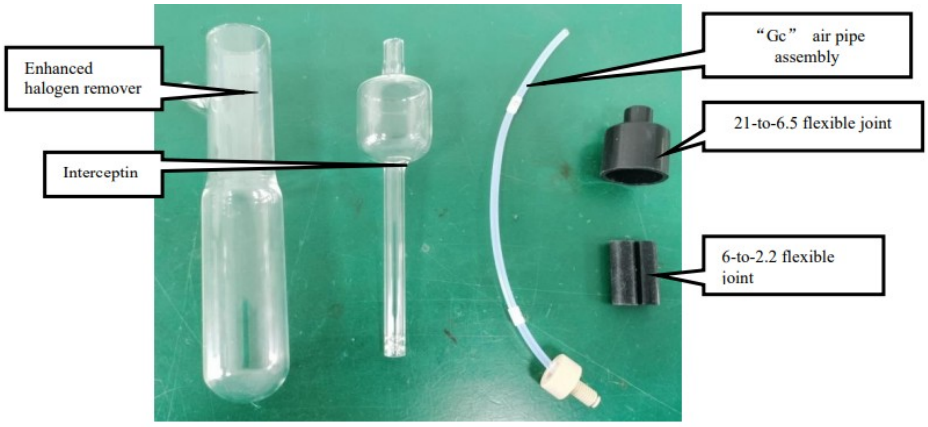
4) Connect the other end of the injection tube to the injection port of the autosampler (Figure 5.8).

(Figure 5.8)

Note: When connecting the parts of six-way valve, please tighten them by hand. Brute tightening with tools may cause internal deformation or liquid leakage of the valve.

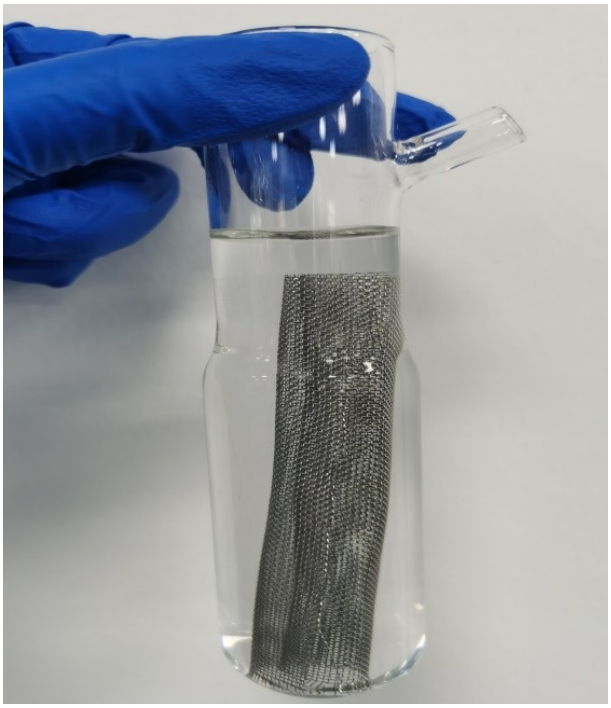
5.2 Installation of Enhanced Halogen Remover (Optional)

5.2.1 Preparation of enhanced halogen remover
1) Take the corresponding parts from the box (Figure 5.9)

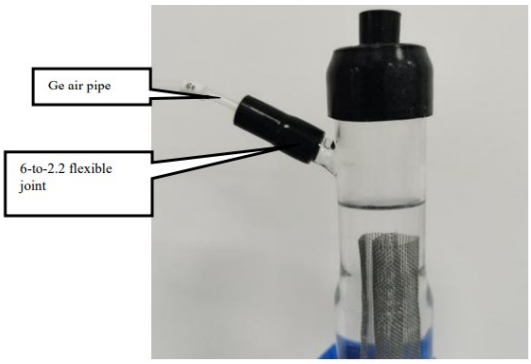


(Figure 5.9)

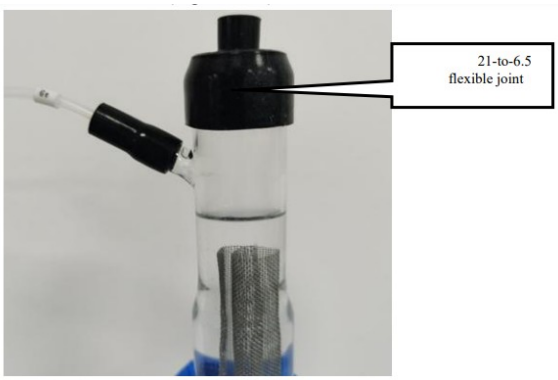
2) Add a stainless steel mesh and about 40ml of hydrochloric acid (0.05 mol/L) prepared in advance into the enhanced halogen remover (Figure 5.10);



3) Take out a 6-to-2.2 flexible joint, connect its one end to the air pipe with the line label “Ge” and the other end to the enhanced halogen remover branch (Figure 5.11); connect one end of the 21-to-6.5 flexible joint to the enhanced halogen remover for later use (Figure 5.12)

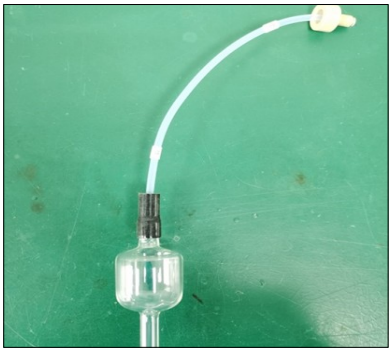


(Figure 5.11)



(Figure 5.12)

4) Take out a 6-to-2.2 flexible joint, connect its one end to the air pipe with the line label “Gc” and the other end to the upper end of the intercepting trap (Figure 5.13);



(Figure 5. 13)

5) Connect the intercepting trap to the enhanced halogen remover via a 21-to-6. 5 flexible joint (Figure 5.14)

(Figure 5.14)

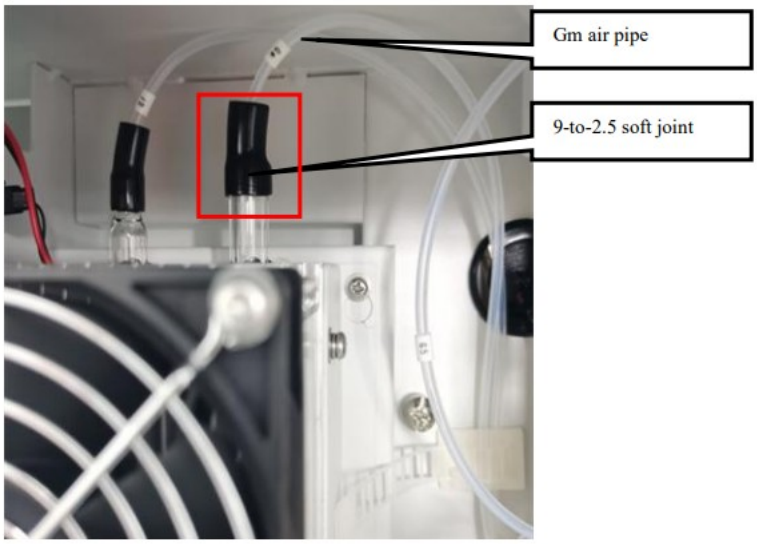
Note: 1. The hydrochloric acid solution added in the enhanced halogen remover should not be overfilled. In case of excessive hydrochloric acid, the liquid will overflow from the branch pipe during ventilation;
2. Attention should be paid to the hydrochloric acid solution in the pipe when connecting each joint of the enhanced halogen remover to prevent spilling;
3. When the “Ge” air pipe and “Gc” air pipe are connected with the flexible joint, the air pipe should expose about 1-2mm of the inner tube of the flexible joint;
4. When the intercepting trap is connected with the enhanced halogen remover, the bottom of the intercepting trap should be below the liquid level and above the stainless steel mesh, and the upper end should be exposed with a 21-to-6.5 flexible joint of about 5 mm.

5.2.2 Installation of enhanced halogen remover

1) Remove the clasp washer connector on the IC sliding injection (Figure 5.15);

(Figure 5.15)

2) Open the left side panel of the chassis, and remove the air pipe marked “Gm” on the refrigeration module and the 9-to-2.5 flexible joint(Figure 5.16);



(Figure 5. 16)

3) Open the two white buckles and remove the entire “Gm” air pipe assembly (Figure 5.17);

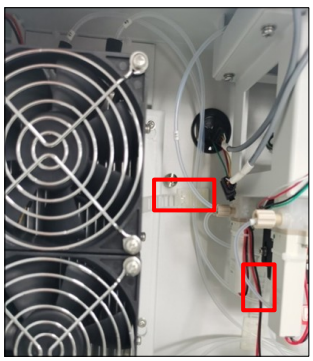
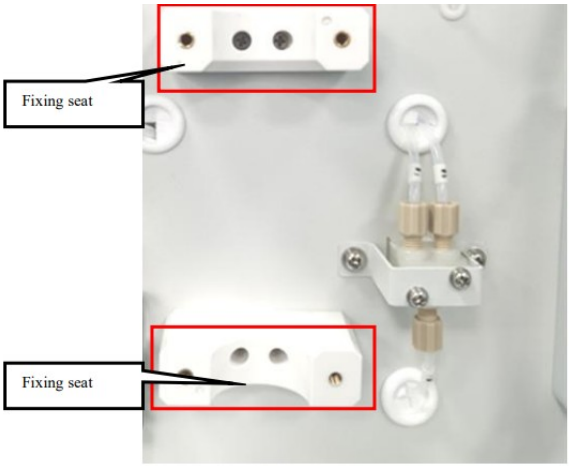


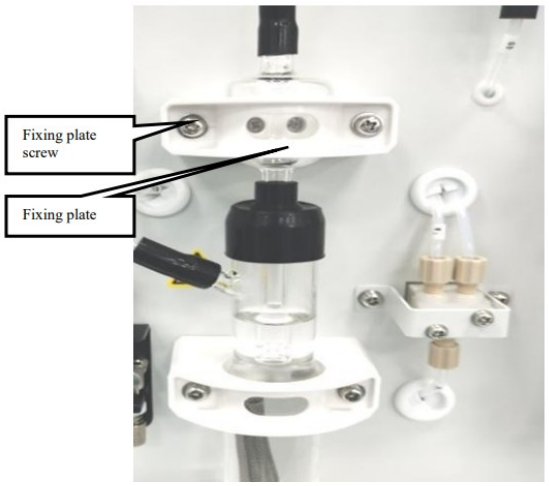
Figure 5. 17)

4) Fix the two fixing seats on the front panel of the instrument with two M3 screws respectively (Figure 5.18);



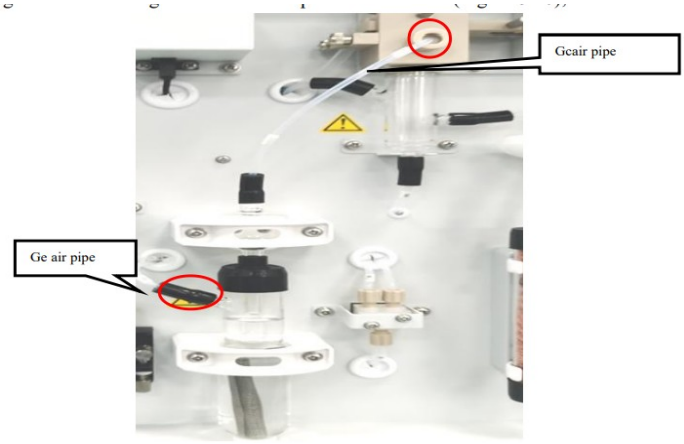
(Figure 5.18)

5) Fix an enhanced halogen remover fixing plate with two M4 screws (no tightening), put the prepared enhanced halogen remover in (adjust the position of the enhanced halogen remover so that the bottom of the tube is about 5mm away from the bottom of the chassis), tighten the fixing plate screws, and tighten and install the intercepting trap fixing plate (Figure 5.19);



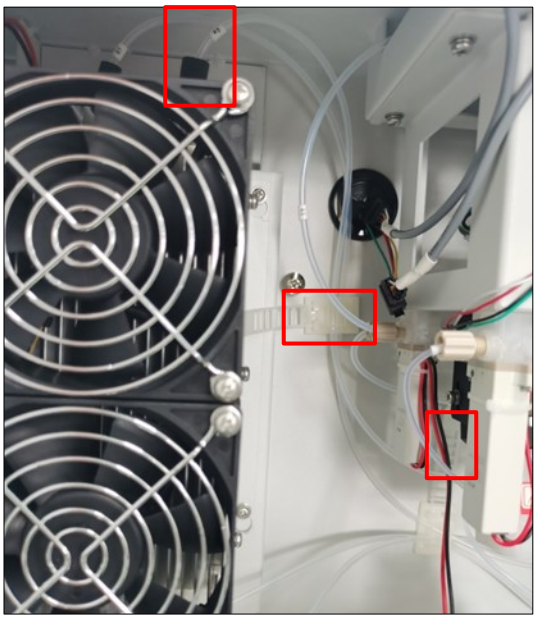
(Figure 5.19)

6) Connect the “Gc” air pipe on the intercepting trap with the IC reaction tank via the clasp gasket joint, and pass the “Ge” air pipe on the branch pipe of enhanced dehalogenremover through the hole on the panel for later use (Figure 5.20);



(Figure 5. 20)

7) Connect the “Gc” air pipe to the 9-to-2.5 adapter from the left side of the chassis, and connect the other end of the adapter to the refrigeration module, and then fix the connected air pipe by using two white buckles (Figure 5.21).



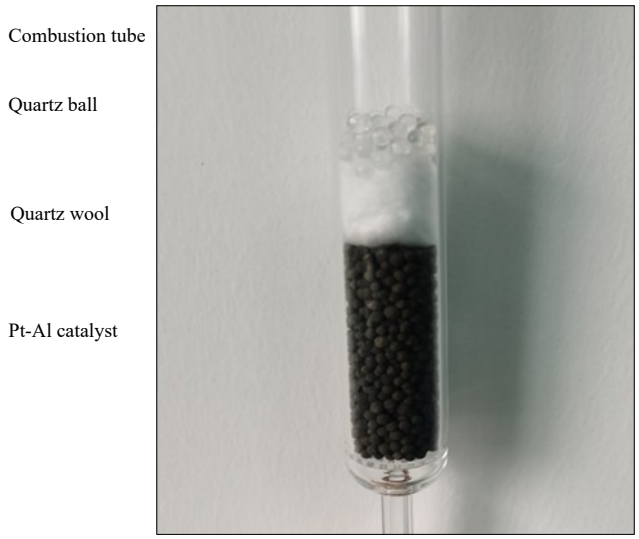
(Figure 5. 21)

The enhanced halogen remover can be removed by reverse operation.
Note: The reagent in the enhanced halogen remover should be replaced every three months with 0.05 mol/L hydrochloric acid, otherwise the absorption capacity of halogen will be affected.

5.3 Installation of Combustion Tube

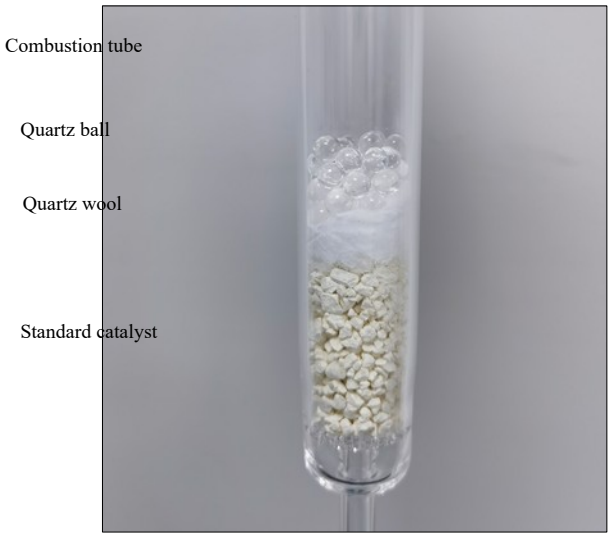
5.3.1 Filling of the combustion tube
5.3.1.1 Combustion tube filling (Pt-Al catalyst)
Fill the platinum-aluminum catalyst ,quartz wool and quartz ball into the combustion tube according to (Figure 5.22).

Filling steps:
1) Fill the combustion tube with 15g of platinum-aluminum catalyst in a whole package;
2) Tear about 0.05 g quartz wool into thin slices, and use stainless steel pipe to assist in filling it into the combustion tube (the filling height of quartz wool is about 10mm, which is fluffy, so do not extrude it);
3) Fill the cracking sleeve with about 6g of quartz ball.



(Figure 5. 22)

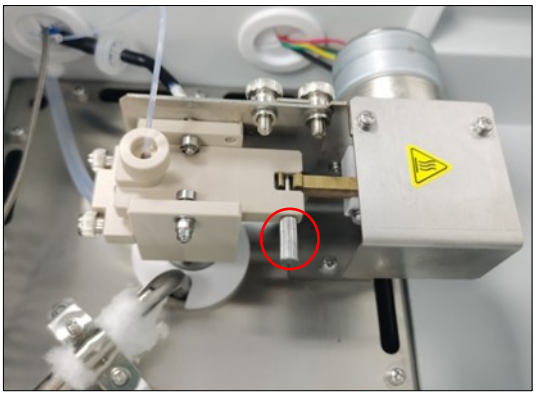
5.3.1.2 Combustion tube filling (Standard catalyst)
Fill the combustion tube with Standard catalyst, quartz wool and quartz ball according to (Figure 5.23).
Filling steps:
1) Fill the combustion tube with the whole bottle of 40g Standard catalyst;
2) Tear about 0.05 g quartz wool into thin slices, and use stainless steel pipe to assist in filling it into the combustion tube (the filling height of quartz wool is about 10mm, which is fluffy, so do not extrude it);
3) Fill the cracking sleeve with about 6g of quartz ball.



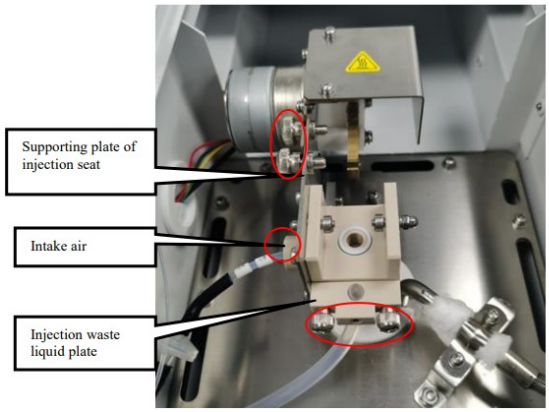
(Figure 5. 23)

Note: 1. When filling the catalyst, please wear gloves to ensure that the catalyst is not contaminated. Contamination will lead to increased blank value and abnormal analysis value;
2. In order to prevent the top of the combustion tube and the inner and outer surfaces of the joint from being polluted by organic matters such as silicone grease or grease, please wipe the combustion tube with alcohol after filling;
3. When the new catalyst is used for analysis for the first time, there will be a large blank peak. Before TC analysis, the catalyst must be cleaned to reduce the blank peak (it is recommended to clean the platinum-aluminum catalyst more than 10 times when it is first installed or unused for a long time, and clean it 3 times after normal startup; it is recommended to clean Standard catalyst 3 times when it is installed for the first time or unused for a long time, and there is no need to clean it after normal startup).
4. Please wear a mask when filling quartz wool to avoid inhaling it.

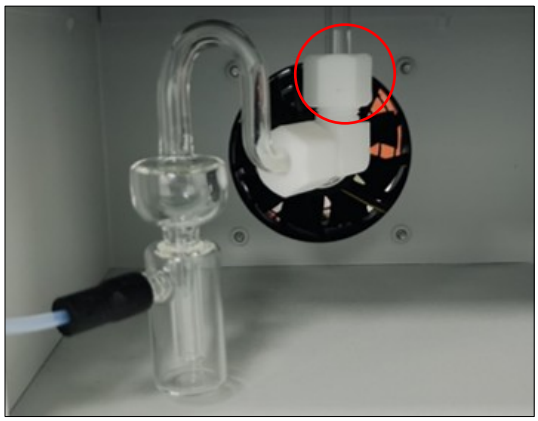
5.3.2 Installation and disassembly of the combustion tube
1) Unscrew the hand screw for TC sliding injection, slide to the left to take out TC sliding injection plate (Figure 5.24);



(Figure 5. 24)
2) Unscrew the air intake clasp washer joint first, then unscrew the two hand screws on the injection waste liquid plate, and finally loosen the two hand screws on the support plate of the injection seat (Figure 5.25);

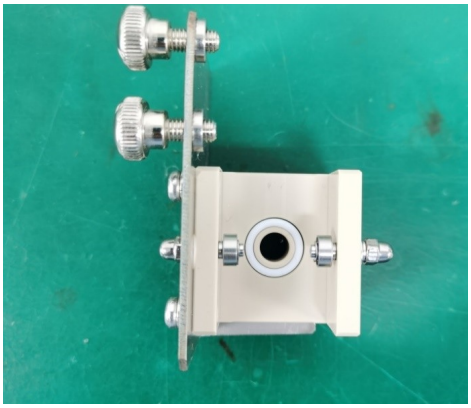


(Figure 5.25)
3) Remove the L-shaped bite type fitting that connects the scrubber and the combustion tube at the bottom of the cracking furnace (Figure 5.26);



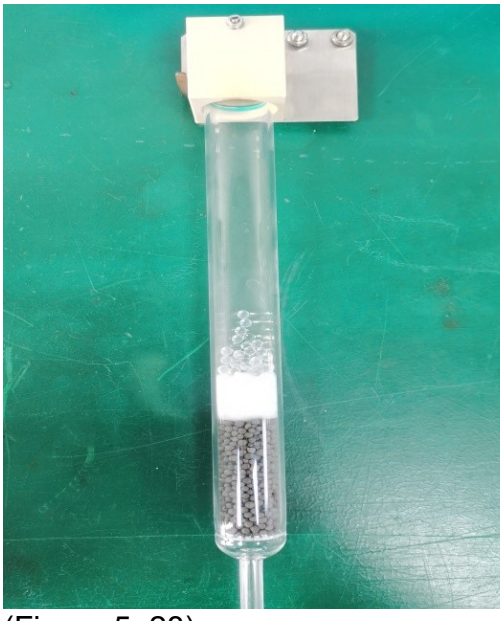
(Figure 5.26)

4) Pull the TC sliding injection module upward ,unplug the old combustion tube from the opening at the bottom of the TC sliding sample module (Figure 5.27);



(Figure 5.27)

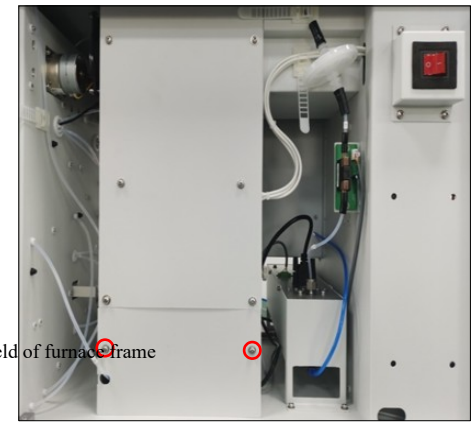
5) Insert the top of the new filled combustion tube firmly into the opening at the bottom of the TC sliding injection module (Figure 5.28);



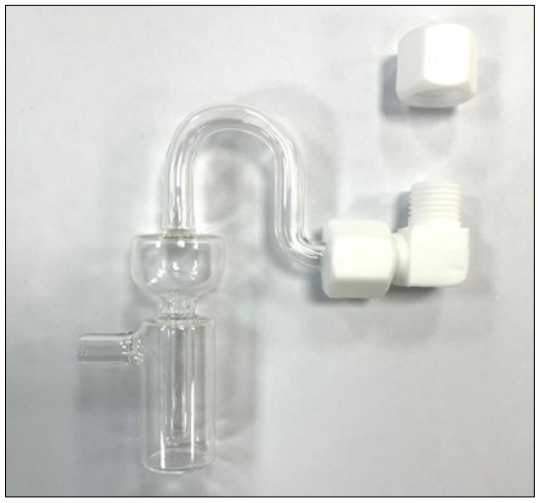
(Figure 5. 28)

6) Put the assembled combustion tube into the heating hole in the center of the cracking furnace.
The combustion tube can be installed by reverse operation.
Note: 1. Installation and disassembly of the combustion tube shall be carried out after the instrument power supply is turned off for more than 6 hours after exiting the program, and shall be carried out after the cracking furnace temperature drops to room temperature.
2. The combustion tube is made of quartz glass. Please wear gloves when operating. Do not use wrenches or tools to avoid breaking the combustion tube and hurting people.
3. In order to reduce the heat escape in the furnace, pyro cotton should be used to fill the upper space of the combustion tube installation hole and the bottom of the combustion tube after installation.

5.4 Installation of Scrubber
1) Open the left side plate of the instrument and remove the lower wind shield of the furnace frame (Figure 5.29);



(Figure 5. 29)
2) Install one end of the L-shaped bite type fitting to the scrubber (Figure 5.30);



(Figure 5.30)

Note：It is necessary to pay attention to the strength when connecting the scrubber with the L-shaped sleeve joint to prevent the scrubber from breaking.

3) Add a certain amount of pure water via the branch pipe of the scrubber (the liquid level of

pure water should exceed the bottom of the inner pipe of the scrubber, at least 5mm below the branch)(Figure 5.31);

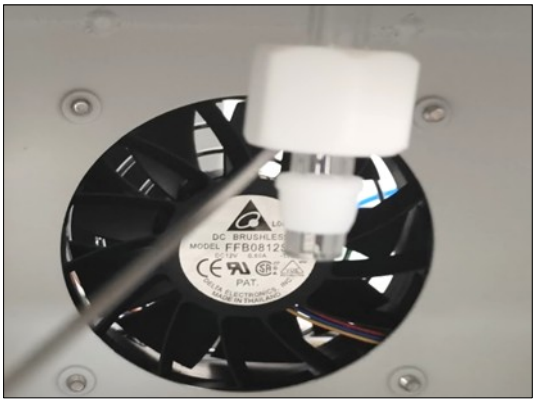
(Figure 5. 31)

4) Find the air pipe with the line mark “Ga” and connect this pipe to the scrubber by using a 6-to-2.2 flexible joint (Figure 5.32);

(Figure 5. 32)

5) Connect the other end of the L-shaped bite type fitting with the lower end of the combustion tube (Figures 5.33), tighten it by hand (Figures 5.34).

Blade ring



(Figure 5.33)

(Figure5.34)

Note: The blade ring must be installed 4mm from the lower end of the combustion tube. If the lower end is too long, it may be broken. Please be careful when tightening with a wrench, and do not force it too hard to prevent breaking.

5.5 Pipeline Connection

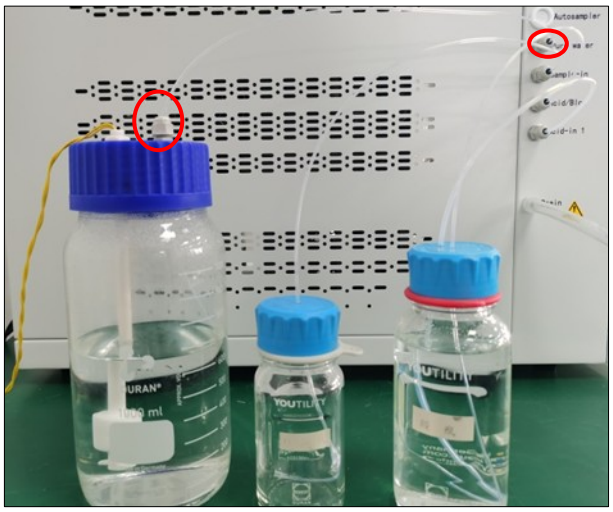
5.5.1 Carrier gas connection
1) Take out the oxygen pressure reducing valve from the accessory box and tighten it on the oxygen cylinder with a wrench;
2) Take out the air circuit connecting pipe from the accessory box and connect the air outlet of the oxygen pressure reducing valve (Figure 5.35) with the air inlet at the back of the host (Figure 5.36) with the connecting pipe.

(Figure5.35)

(Figure5.36)

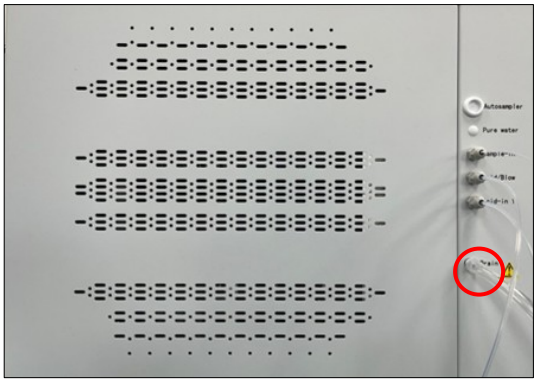
5.5.2 Connection of the dilution water bottle and waste liquid bucket

1) Take out the dilution water bottle and insert the dilution water injection tube on the host into the dilution water bottle (Figure 5.37);



(Figure 5.37)

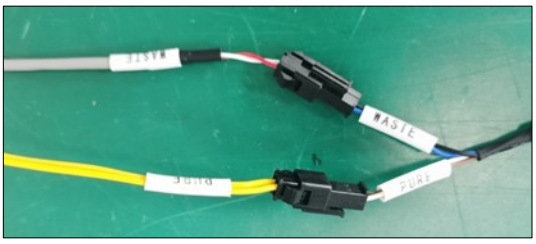
2) Take out the drain pipe and waste liquid bucket, connect one end of the drain pipe with the drain port of the host (Figure 5.38), and insert the other end into the waste liquid bucket (Figure 5.39);



(Figure 5.38)

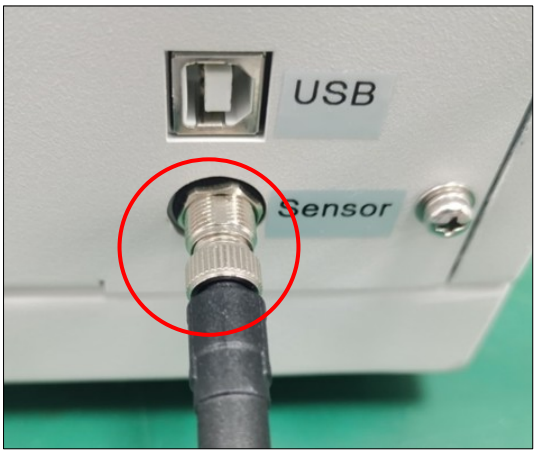
(Figure 5.39)

3) Take out the dilution water bottle and the waste liquid bottle, and connect the dilution water sensor connecting line with the line mark “PURE” and the waste liquid sensor connecting line with the line mark “WASTE” with the “PURE” and “WASTE” connectors on the liquid level monitoring cable respectively (Figure 5.40);



(Figure 5.40)

4) Connect the other end of the liquid level monitoring cable to the “Sensor” behind the host (Figure 5.41).



(Figure 5.41)

5.5.3 Connection of power cord and communication line

Take out the power cord and communication line, plug the power cord into the power socket, plug one end of the communication line into the USB communication interface behind the host (Figure 5.42), and plug the other end into the USB interface of the computer.

(Figure 5.42)

5.5.4 Connection ofCO2absorber

Take out the CO2 absorber, open the cap and remove the seal, and insert the exhaust pipe into the bottle (Figure 5.43).

(Figure 5. 43)

5.6 Software Installation

5.6.1 Installation Notes

（1）The Windows Version should be above Windows 7 SP1. And make sure that it is 32bit or 64bit.

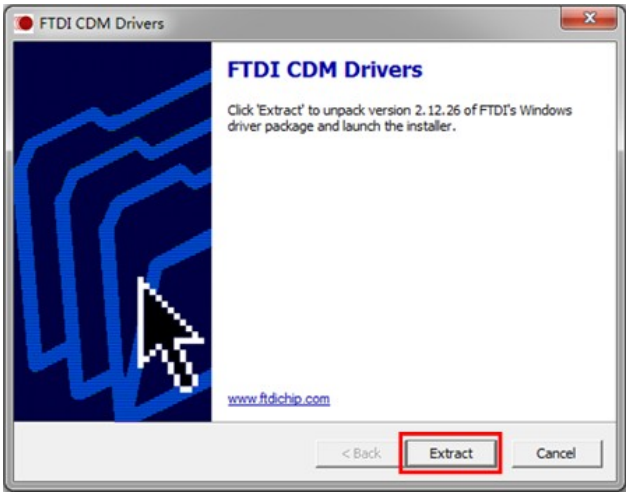
（2）For the hard disk of the computer system, at least two disks are needed, with C disk and D disk as the default. Copy the software installation file to D disk, and ensure that the software is authorized to run, that means it can run without administrator rights. Otherwise, you need to right-click and select administrator authorized to open the software.

Note：The USB flash drive is equipped with the installation software in the accessories shipped with the machine. Because the built-in encryption program of the installation software can only be used online with the machine, please take good care of the USB flash drive. If the software is lost and needs to be reinstalled, please contact our after-sales staff. Do not copy and mix the software from other places.

5.6.2 USB Driver Installation

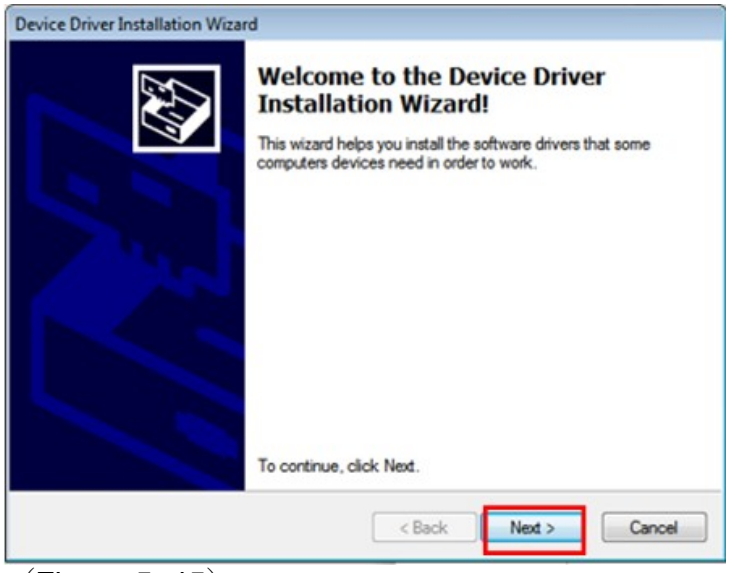
5.6.2.1 Software Installation Process with Windows 7 System

1）Open the USB Driver installation file in the software installation package with the right Windows version. Use Windows 64bit as an example, double click " CDM21226_Setup to enter the driver installation interface. Click 'Extract' (Fig. 5.44)



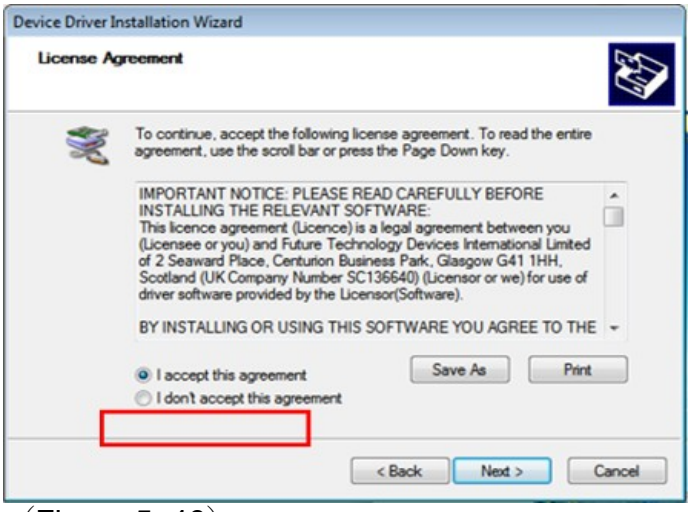
（Figure 5. 44）

2）Click 'Next' (Fig. 5.45)



（Figure 5. 45）

3）Select 'I accept this agreement' and click 'Next' (Fig. 5.46)



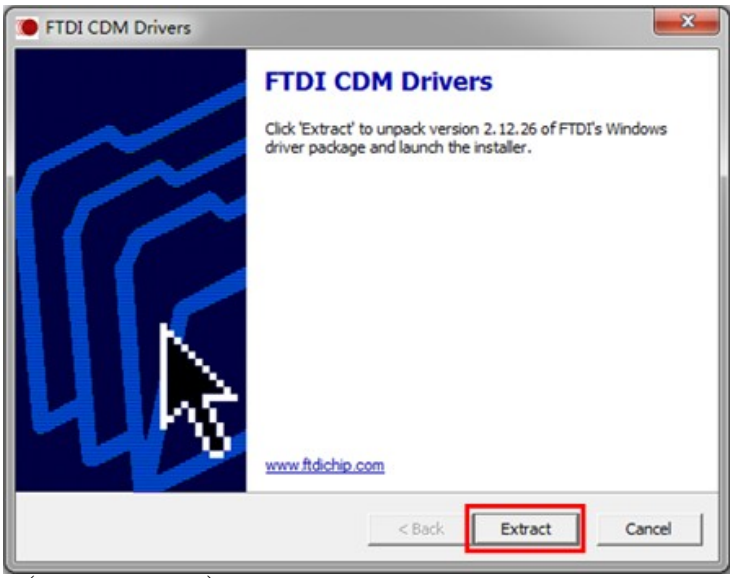
（Figure 5. 46）

4）Wait to complete the installation (Fig. 5.47).

（Figure 5. 47）

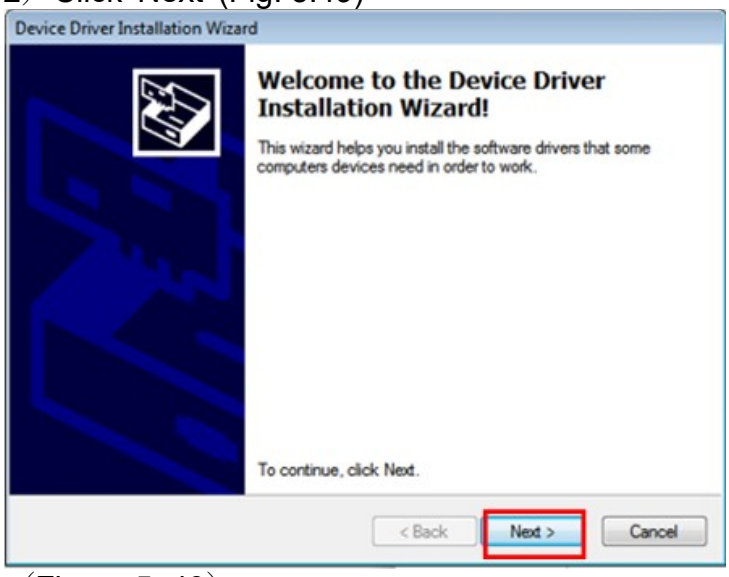
5.6.2.2Software Installation Process with Windows 10 System

1）Open the USB Driver installation file in the software installation package with the right Windows version. Use Windows 64bit as an example, double click " CDM21226_Setup to enter the driver installation interface. Click 'Extract' (Fig. 5.48)



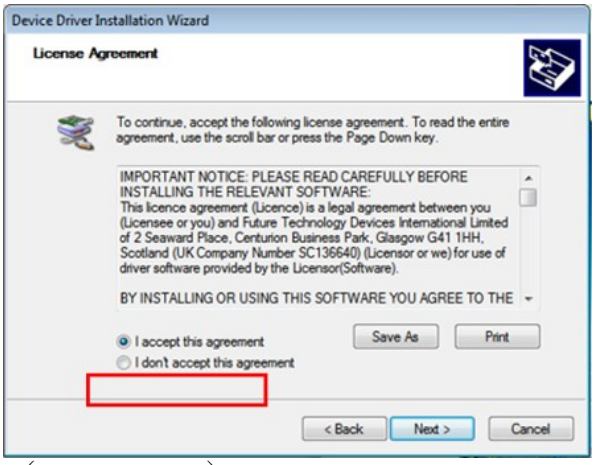
（Figure 5. 48）

2）Click 'Next' (Fig. 5.49)



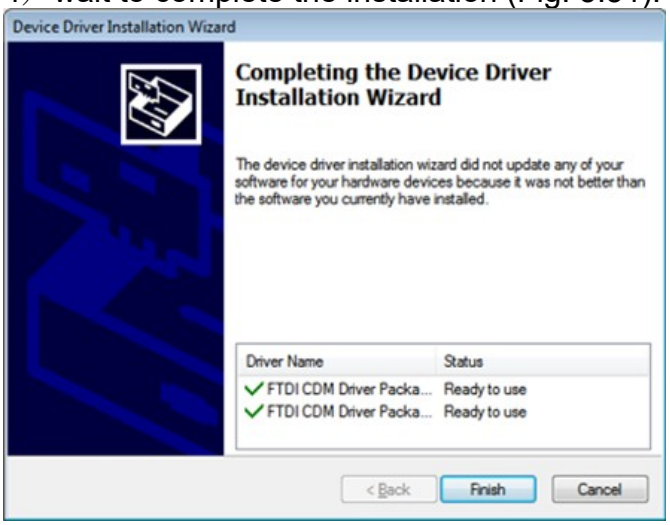
（Figure 5. 49）

3）select 'I accept this agreement' and click 'Next' (Fig. 5.50)



（Figure 5. 50）

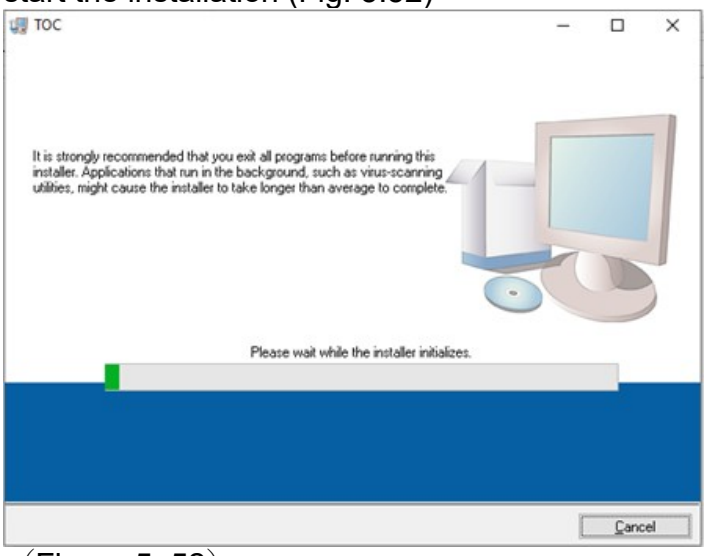
4）wait to complete the installation (Fig. 5.51).



（Figure 5. 51）

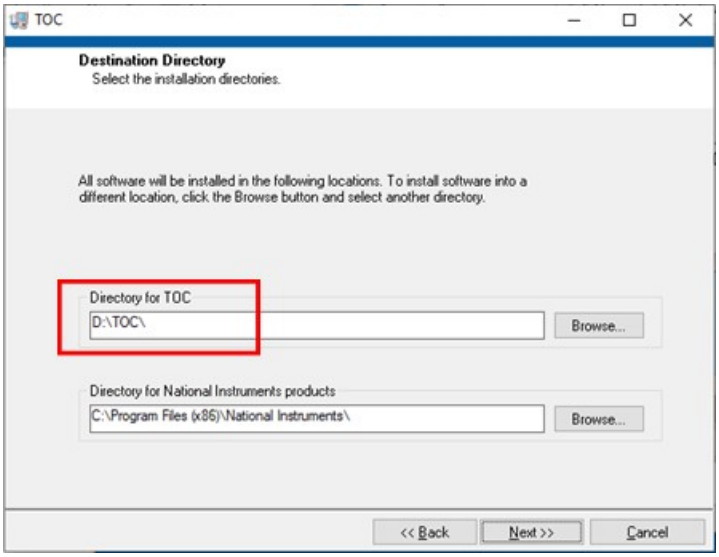
5.6.3 Software Installation

1）Open the installation file in the software installation package, double click " setup.exe to start the installation (Fig. 5.52)



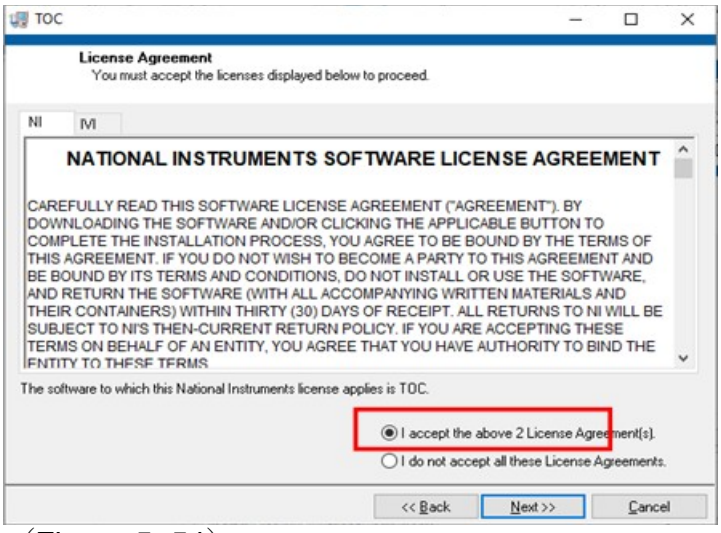
（Figure 5. 52）

2）The default installation path is D disk. User can set the disk with running authorization (Fig. 5.53).



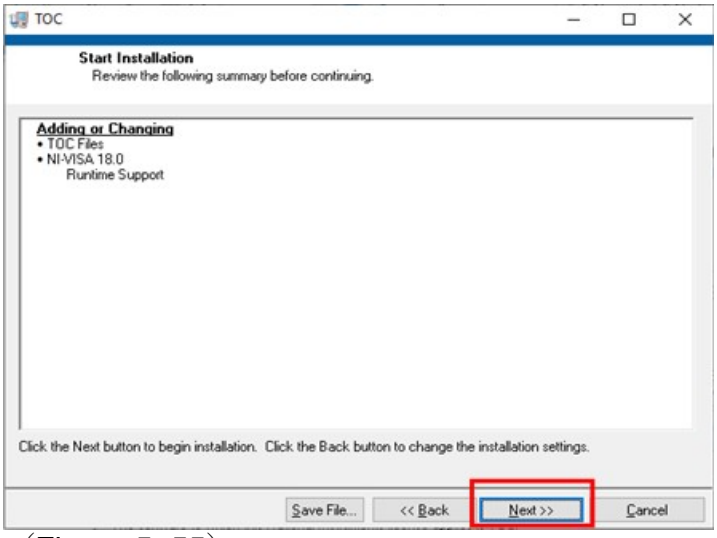
（Figure 5. 53）

3）Select 'I accept the above 2 License Agreements', and click 'Next' (Fig. 5.54).



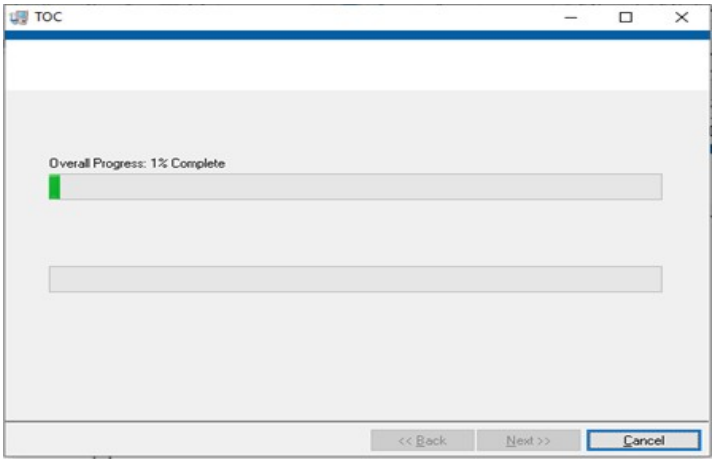
（Figure 5. 54）

4）Click 'Next' (Fig. 5.55).



（Figure 5. 55）

5）Wait to complete the installation (Fig. 5. 56)



（Figure 5. 56）

6）Re-start the computer after completing the installation. A shortcut icon of the software will be shown on the desktop.

Chapter VI Instrument Operation

6.1Instrument Operation

6.1.1 Startup

Turn on the computer, connect the host power cord, and turn on the power switch on the right panel of the host (Figure 6.1).

(Figure 6.1)

Note: If you need to use the autosampler, please turn on the power supply of the autosampler at the same time.

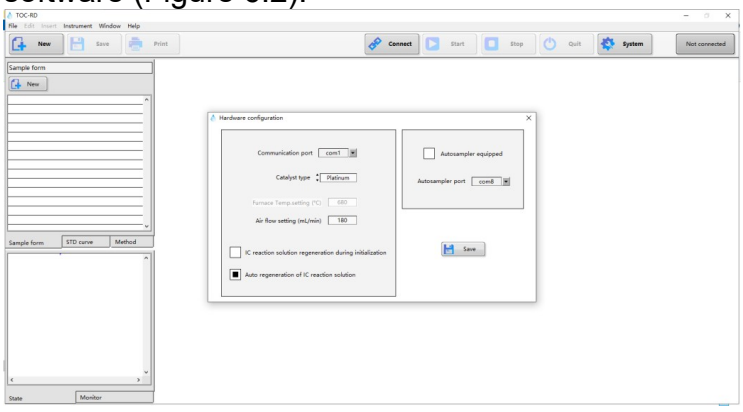
6.1.2 Gas activation

Unscrew the main valve of the oxygen cylinder, adjust the knob of pressure reducing device, and adjust the output pressure to about 0.2 Mpa.

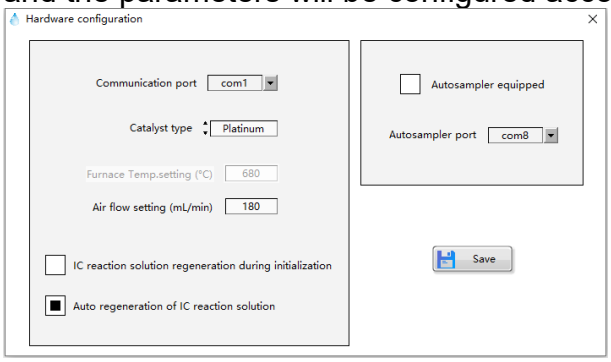
6.2 Software Operation

6.2.1 Open

Double click on the software icon TOC-RD.exe and then enter the main interface of the software (Figure 6.2).



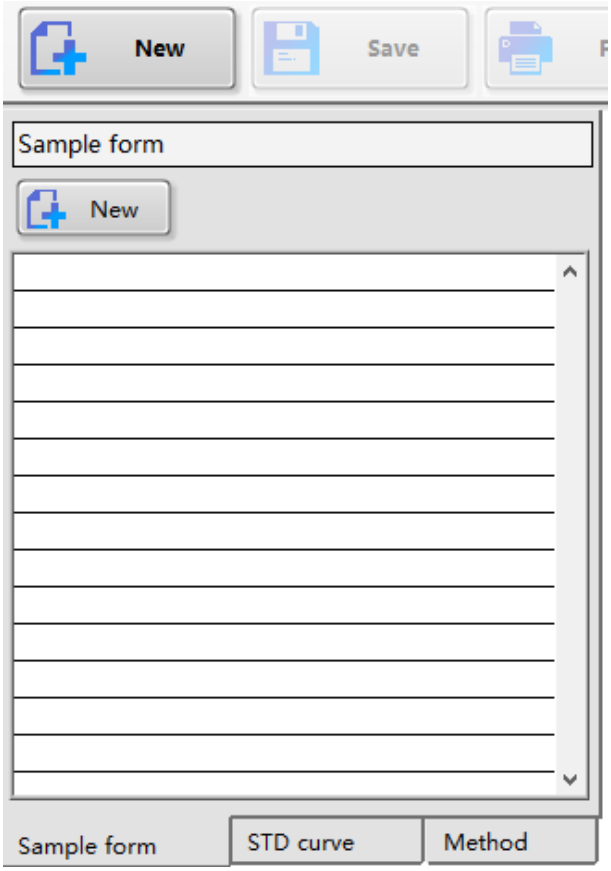
(Figure 6.2)
When the software is opened for the first time, the hardware configuration window will appear, and the parameters will be configured according to the hardware configuration. (Figure 6.3)



(Figure 6.3)

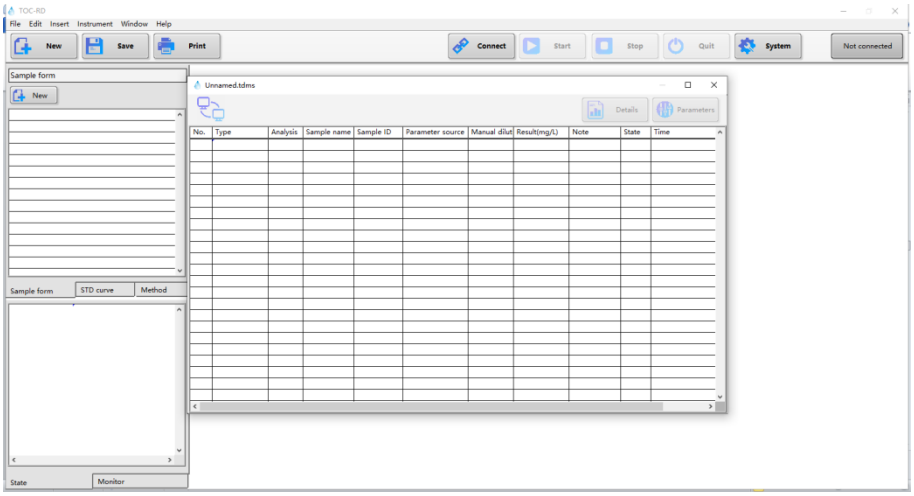
6.2.2 Create a sample table

Click on“New” in the “Sample Table” of the file browsing tab, or click on “New” in the toolbar. (Figure 6.4)



(Figure 6.4)

The new sample table is created. (Figure 6.5)



(Figure 6.5)

6.2.3 Create analysis parameters file

The standard curve file is created to set analysis parameters for measuring standard solutions and drawing a standard curve.

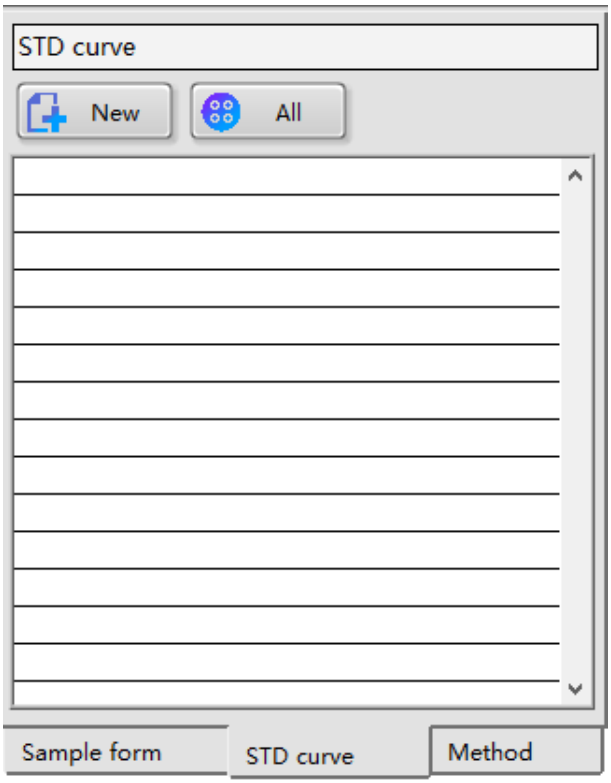
The method file is created to set analysis parameters for measuring unknown samples.

If these files already exist, the following actions can be omitted.

6.2.3.1 Standard curve file

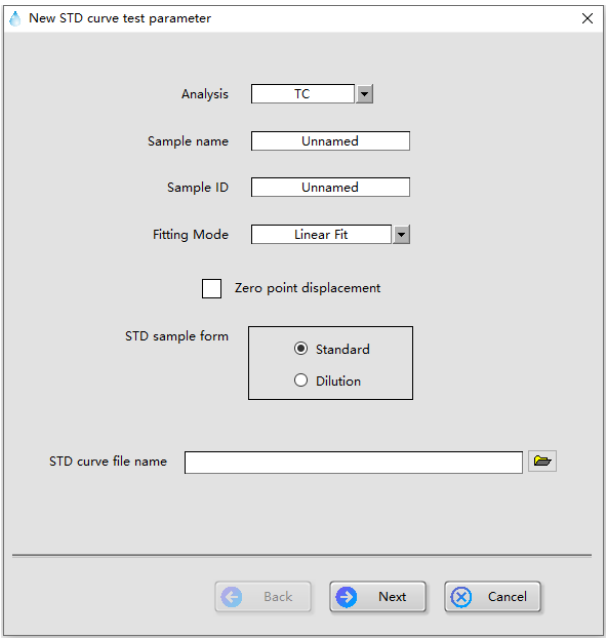
The steps for entering the main parameters of the standard curve file are described as follows. (This section only describes the setting of basic parameters. Please refer to “Creation of STD Curve File” in Chapter 7 for details.)

1) Click on “New” in the “STD Curve” of the file browsing tab. (Figure 6.6)



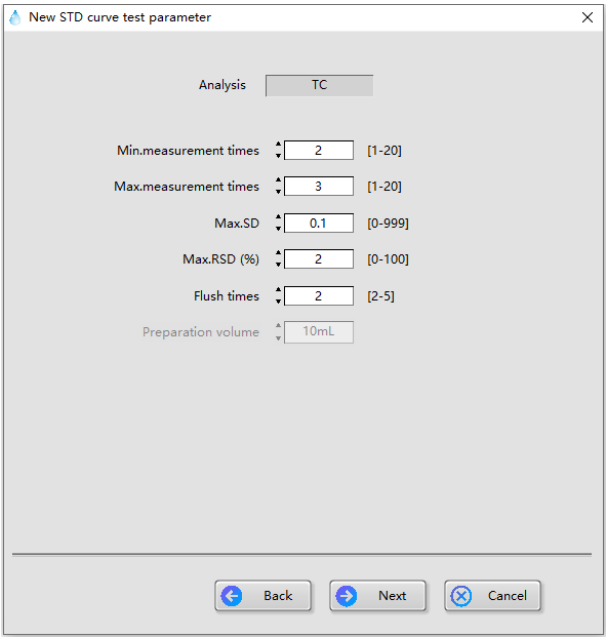
(Figure 6.6)

2) In the “New STD Curve Test Parameter” interface, select “Analysis ” and “ STD Sample Form” as required, select “Zero Point Displacement”, enter the name of the standard curve file in “STD Curve File Name”, and then click “Next” (Figure 6.7)



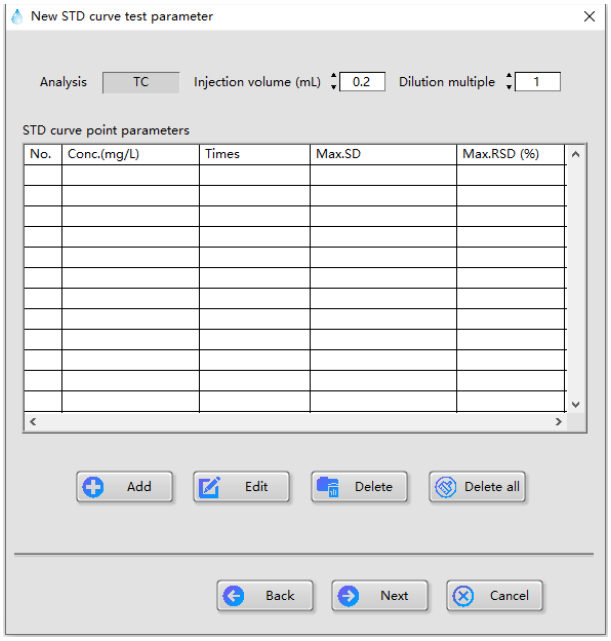
(Figure 6.7)

3) Configure the corresponding parameters according to the test requirements, and then click “Next”. (Figure 6.8)



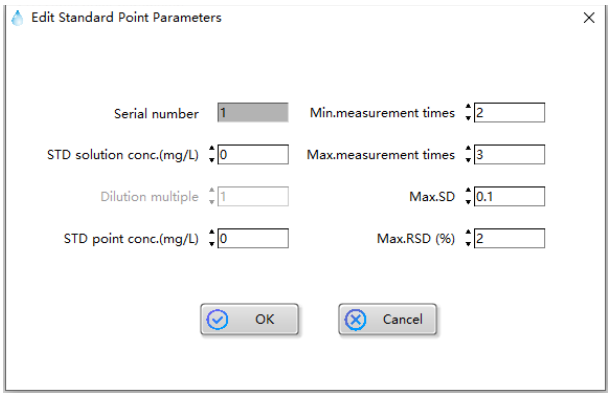
(Figure 6.8)

4) Click “Add”. (Figure 6.9)

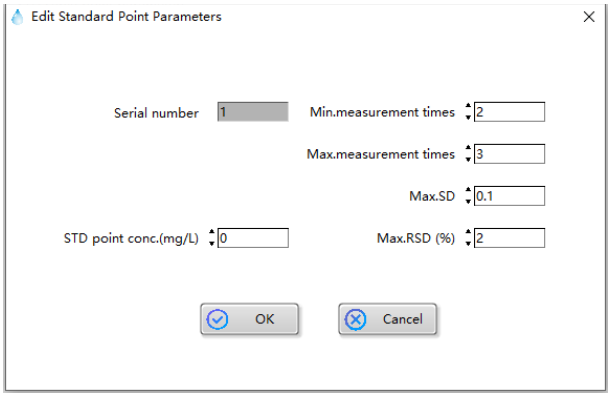


(Figure 6.9)

5) Set parameters in the “Edit Standard Point Parameters”window, and then click “OK” to complete the addition of standard points. The set parameters are as follows, depending on different standard sample forms. The main set parameters of the single-point dilution window interface (Figure 6.10.1) are “STD solution concentration”, “STD point concentration”, “Min measurement times”, “Max. measurement times”, “Max.SD ”, and “Max. RSD”, etc. The main set parameters of standard solution window interface (Figure 6.10.2) are “STD point concentration”, “Min measurement times”, “Max. measurement times”, “Max.SD ”, and “Max. RSD”, etc.

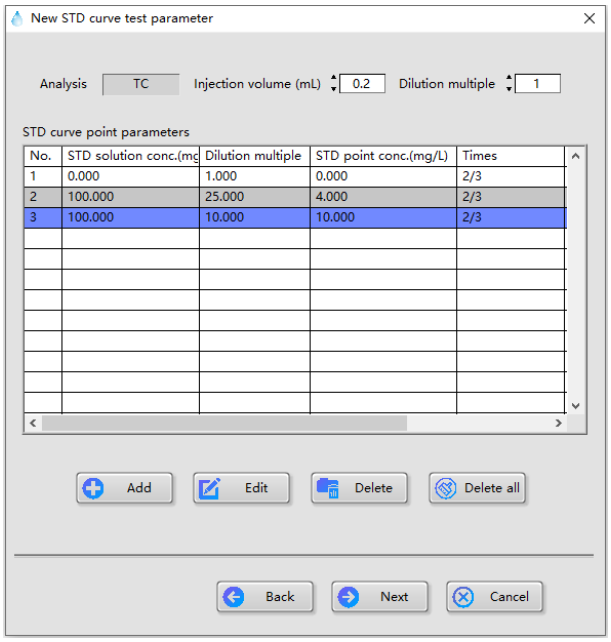


(Figure 6.10. 1)



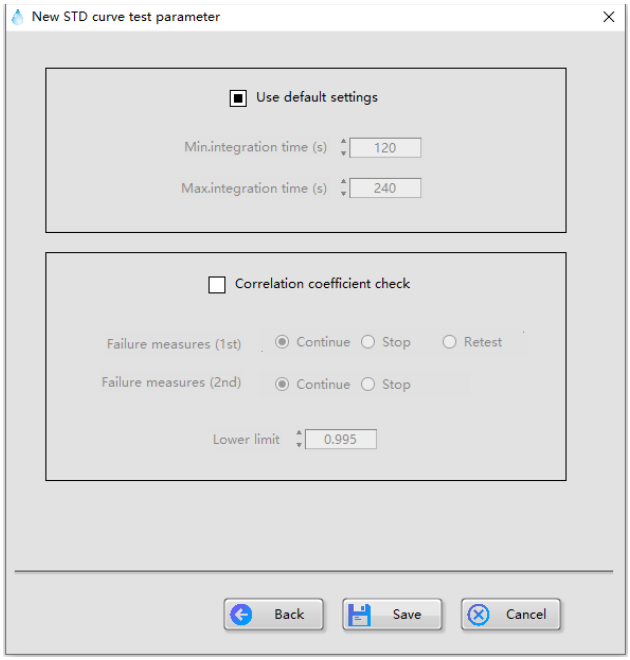
(Figure 6.10. 2)

6) Repeat steps 4) and 5) to complete the addition of all standard points, and then click “Next”.(Figure 6.11)



(Figure 6.11)

7) Select integration time and correlation coefficient check as needed, and click “Save” to complete the setting of the standard curve. (Figure 6.12)

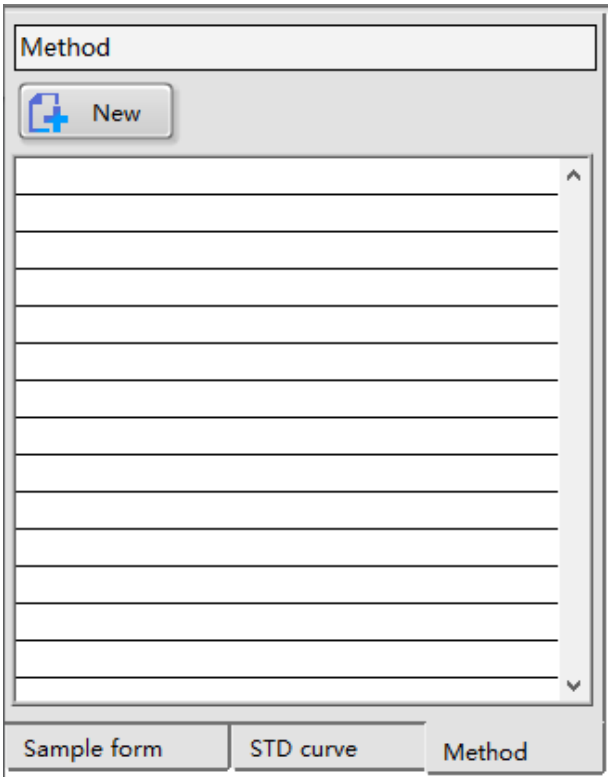


(Figure 6.12)

6.2.3.2 Method file

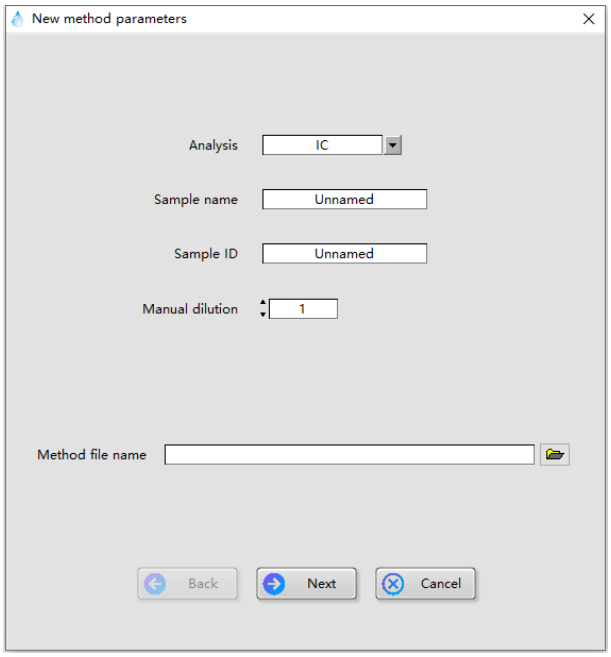
The steps for entering the main parameters of the method file are described below. (Only the basic parameters are described here. Please refer to “Creation of Method File” in Chapter 7 for details.)

1) Click on “New” in the “Method” of the file browsing tab. (Figure 6.13)



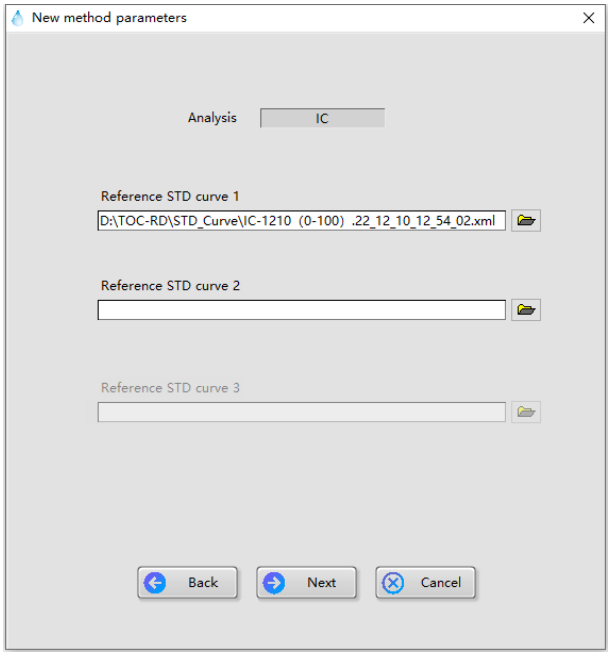
(Figure 6.13)

2) Pop up the “New Method Parameters” interface, select “Analysis” according to test requirements, enter the method file name in “Method File Name”, and then click “Next”. (Figure 6.14)



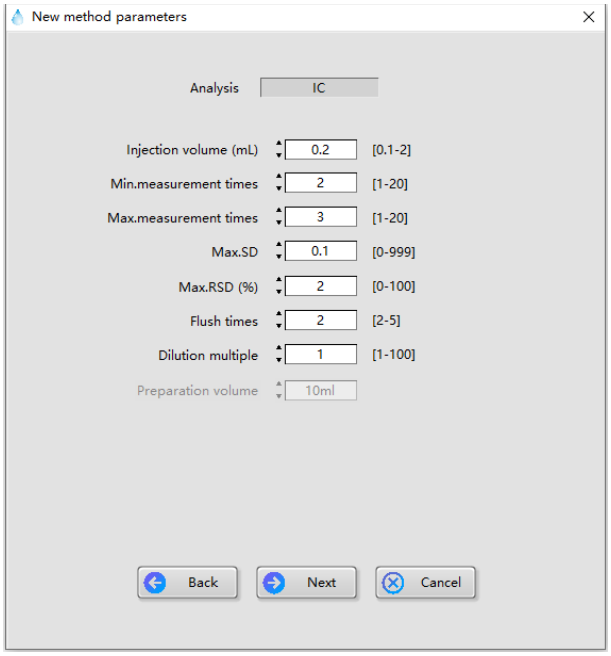
(Figure 6.14)

3) Select the reference standard curve according to the estimated sample concentration, and click “Next”. (Figure 6.15)



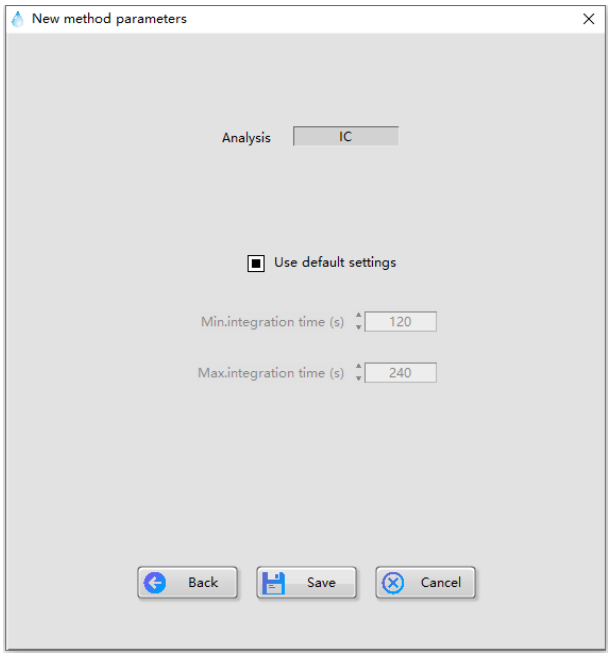
(Figure 6. 15)

4) Configure the parameters as required and click “Next”. (Figure 6.16)



(Figure 6.16)

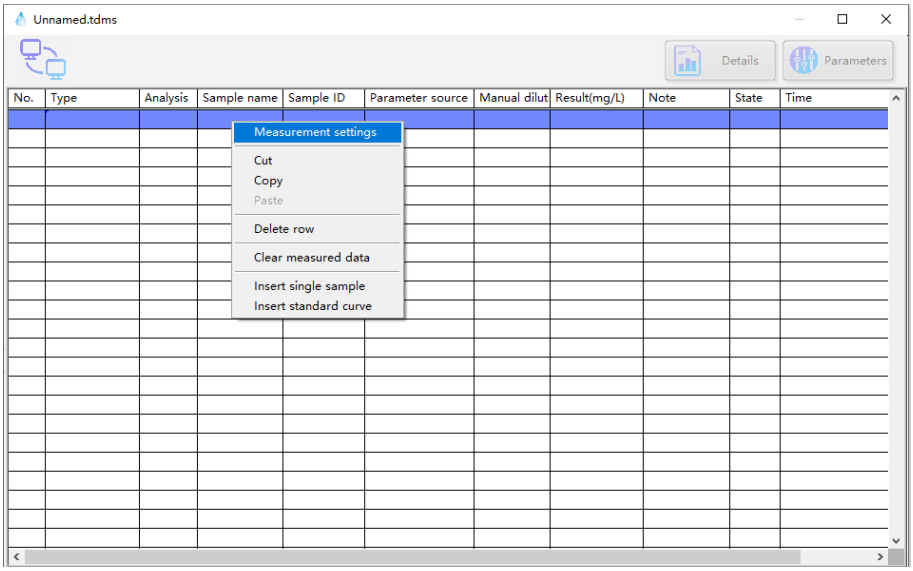
5) After confirming the setting, click “Save” to complete the setting. (Figure 6.17)



6.2.4 Edit sample table

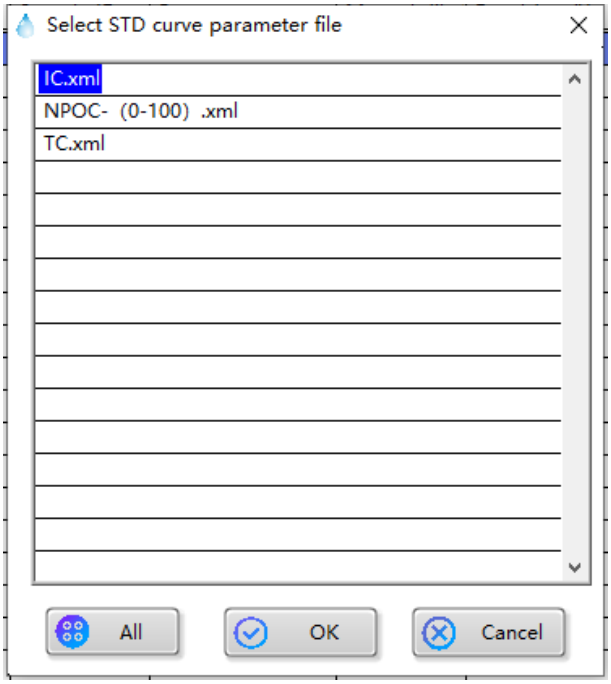
6.2.4.1 Insert standard curve into the sample table

1) Select the new sample table window, right-click the blank space of the sample table, and select “Insert Standard Curve” in the shortcut menu. (Figure 6.18)



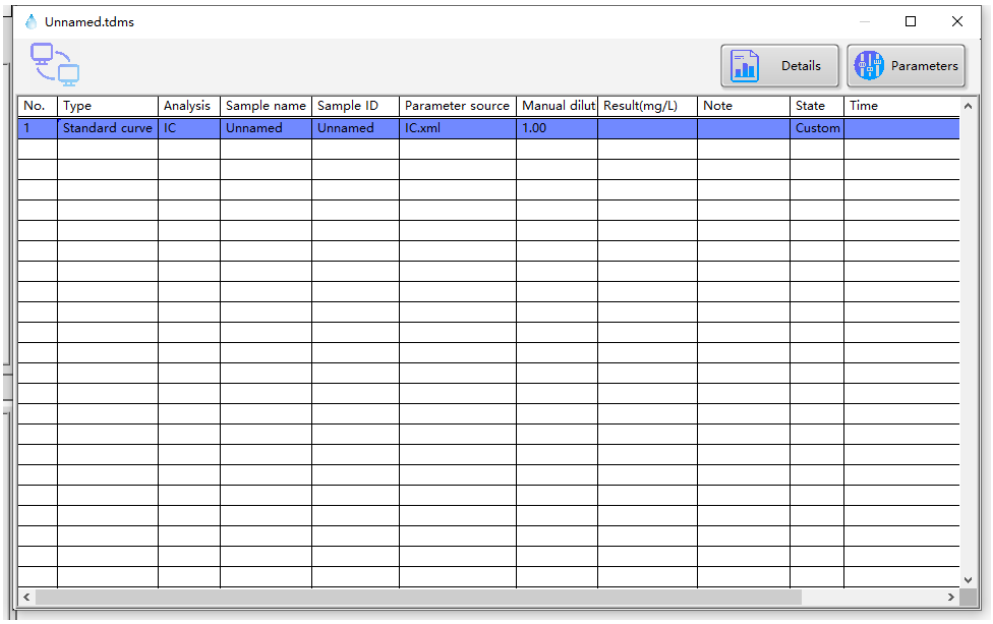
(Figure 6.18)

2) Select the configured standard curve file in the pop-up window and click “OK” (Figure 6.19)



(Figure 6.19)

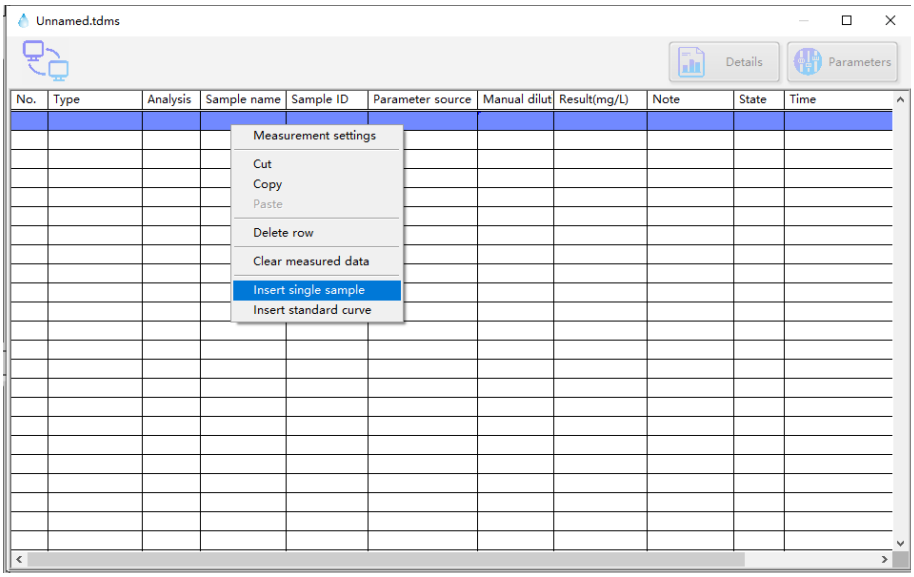
3) The standard curve test is added to the sample table. (Figure 6. 20)



(Figure 6. 20)

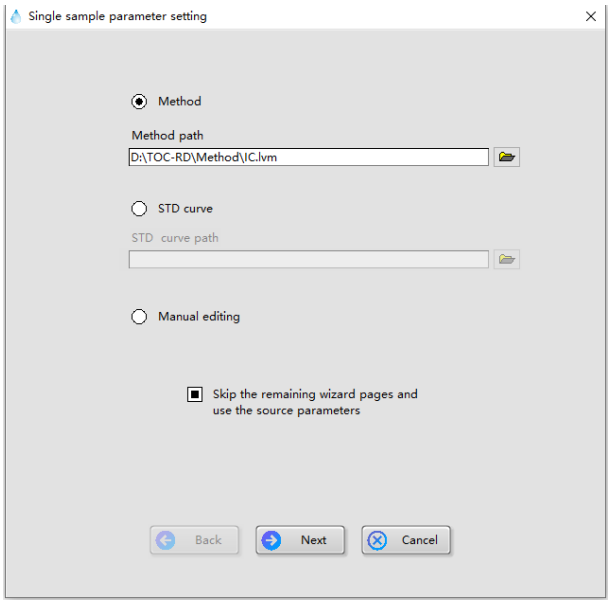
6.2.4.2 Insert unknown sample test into the sample table

1) Select the new sample table window, right-click the blank space of the sample table, and select “Insert Single Sample” in the shortcut menu. (Figure 6.21)



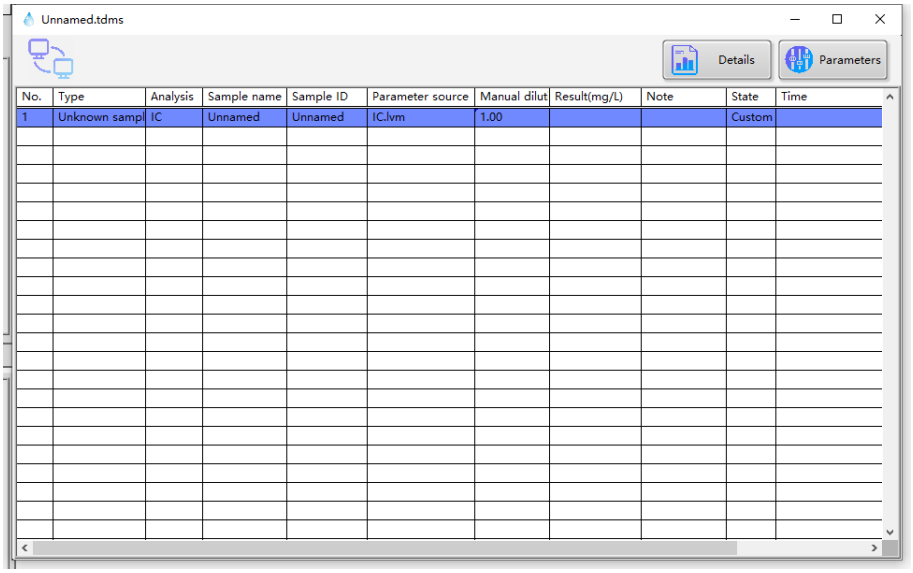
(Figure6. 21)

2) Pop up the “Single Sample Parameter Setting” window, select the method path, check “Skip the remaining wizard pages and use the source parameters”, and then click “Save”. (Figure 6.22)



(Figure6. 22)

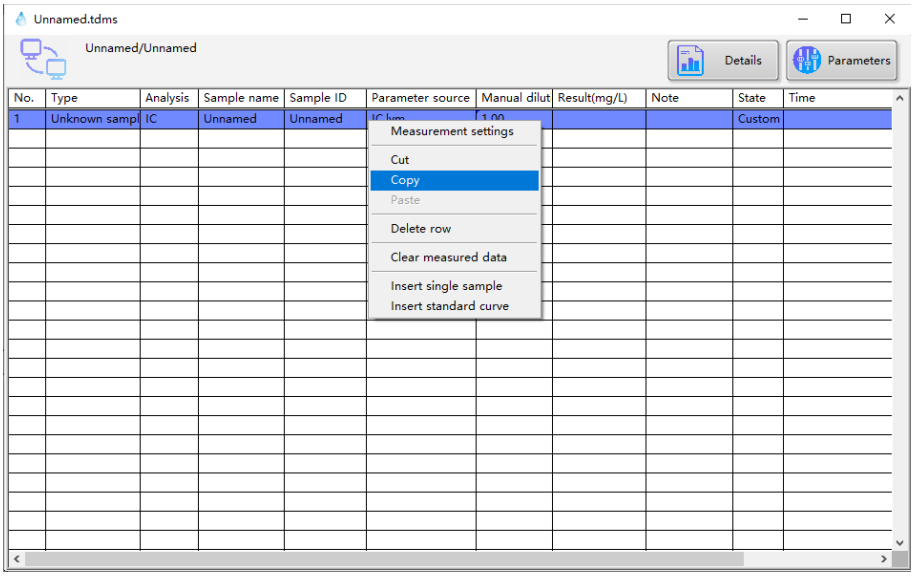
3) The unknown sample test is added to the sample table. (Figure6. 23)



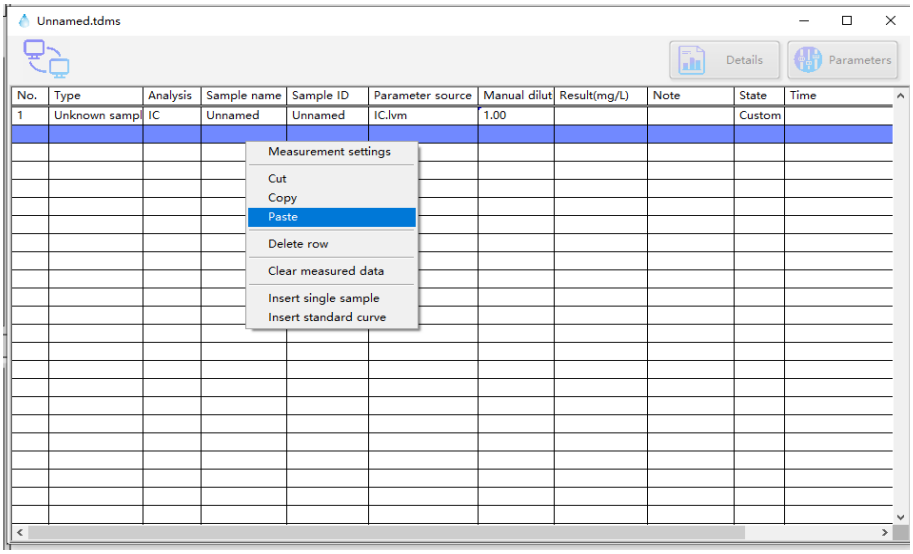
(Figure6. 23)

When analyzing multiple samples under the same conditions, samples can be reinserted into the sample table by “copying” and “pasting”.

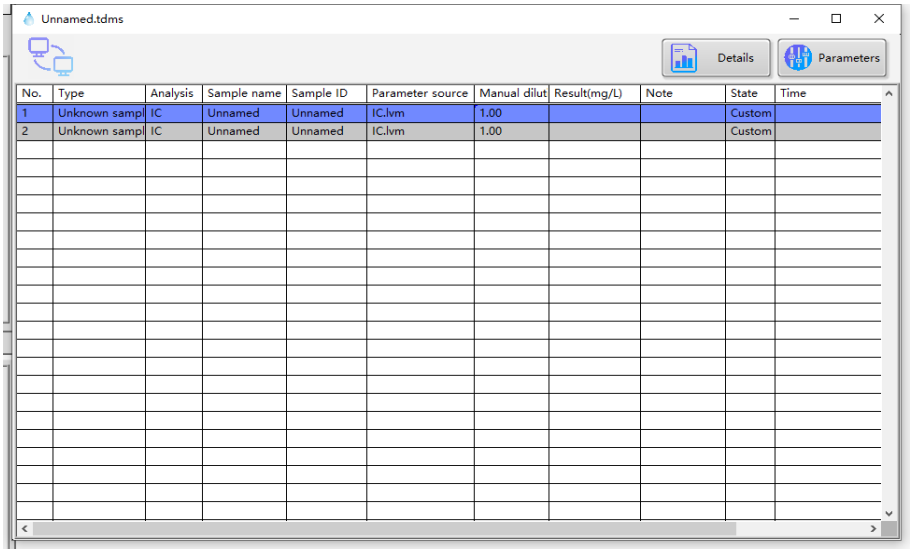
Select the required sample row in the table, right-click and select “Copy” (Figure 6.24), and right-click and select “Paste” (Figure 6.25) in the blank row of the table to complete the sample setting (Figure 6.26).



(Figure 6. 24)

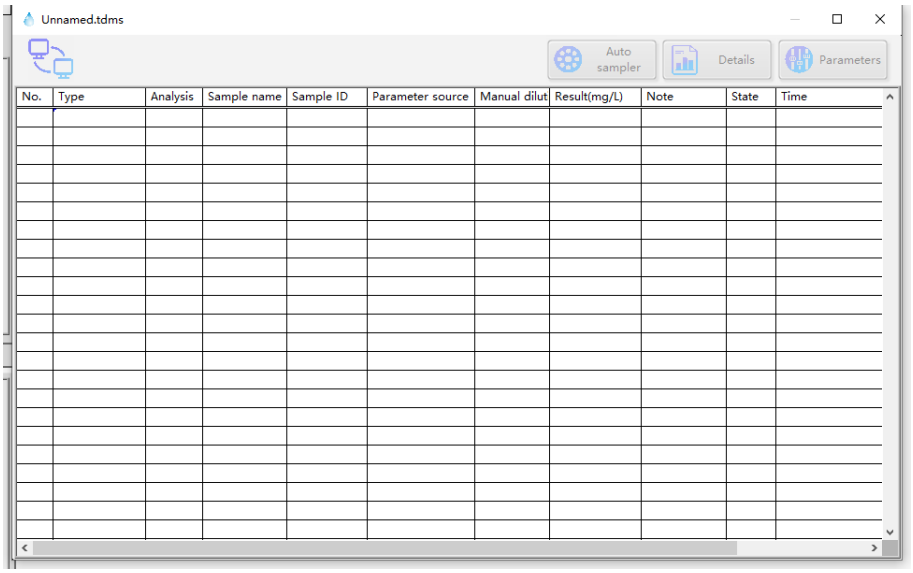


(Figure 6.25)



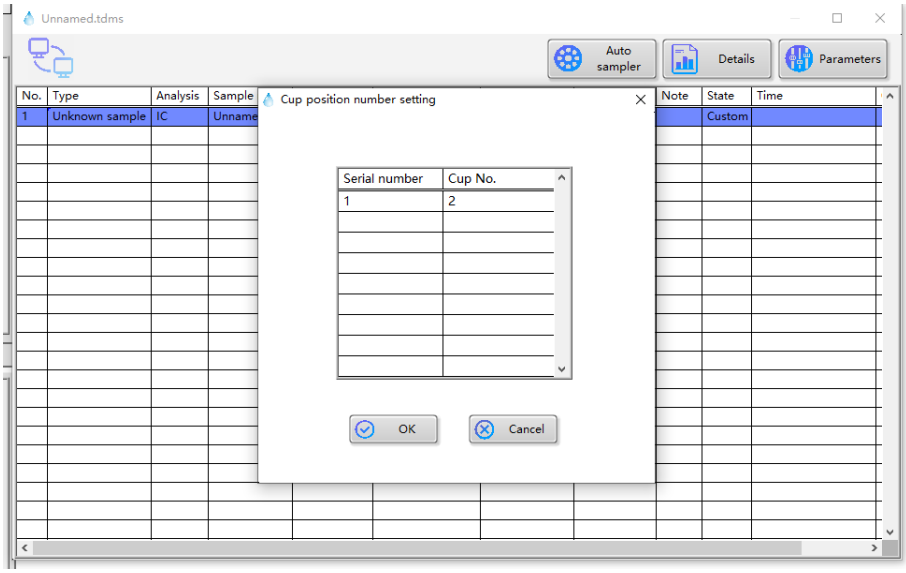
(Figure 6.26)

6.2.5Setting of autosampler (optional)
If an autosampler is used, please enter the sample cup tag number as follows.
1) Select the set row in the sample table and click “Autosampler” (Figure 6.27)



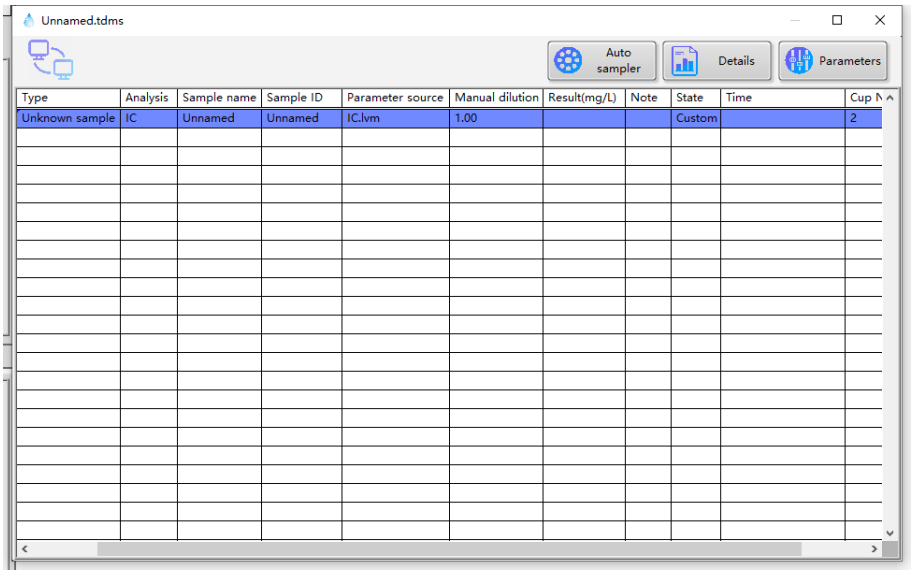
(Figure 6.27)

2) In the pop-up window, set the cup tag number in the table according to the number of samples placed on the autosampler. (Figure 6.28)



(Figure 6.28)

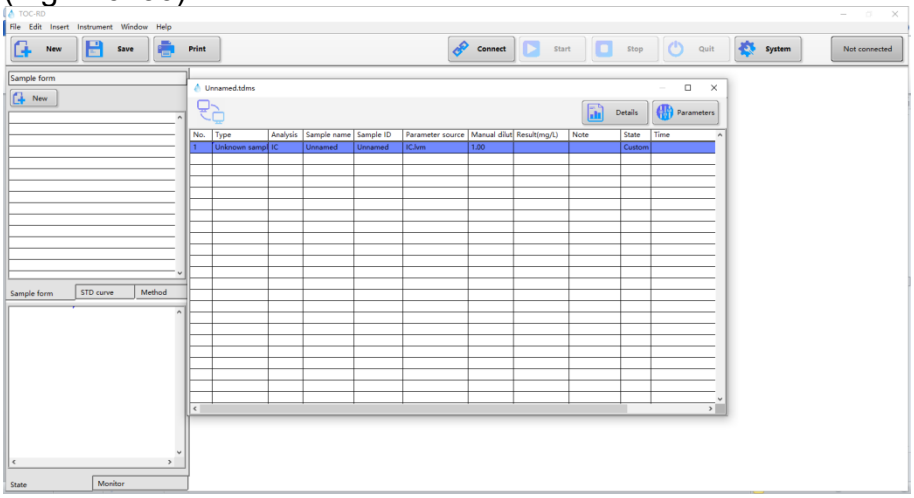
3) Click “OK” to close the window. The cup tag number is set. (Figure 6.29)



(Figure 6.29)

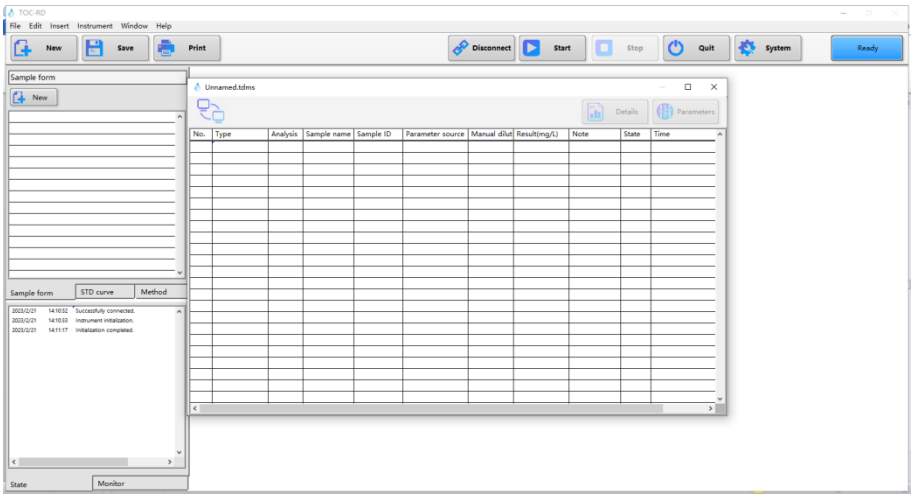
6.2.6 Connection

1) Open the sample table you want to use, and click “Connect” on the main interface. (Figure6. 30)



(Figure6. 30)

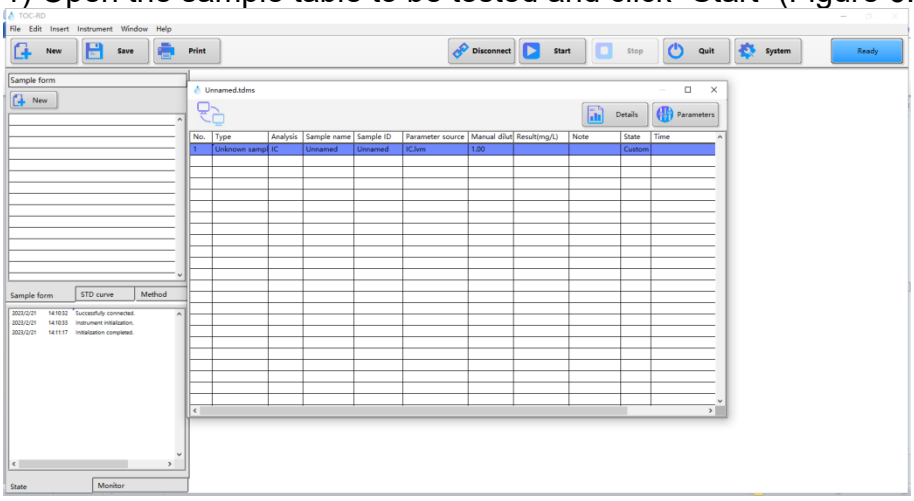
2) Wait until the online initialization of instruments is completed. (Figure 6.31)



(Figure 6.31)

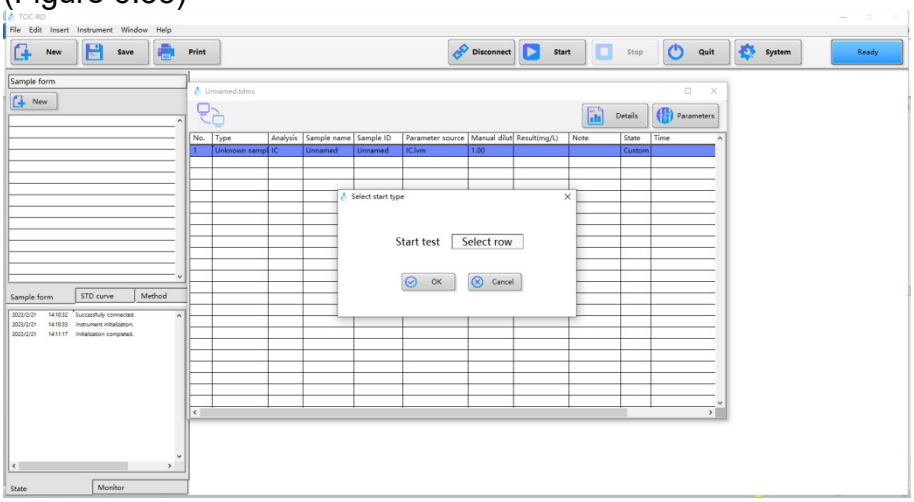
6.2.7 Sample analysis

1) Open the sample table to be tested and click “Start” (Figure 6.32)



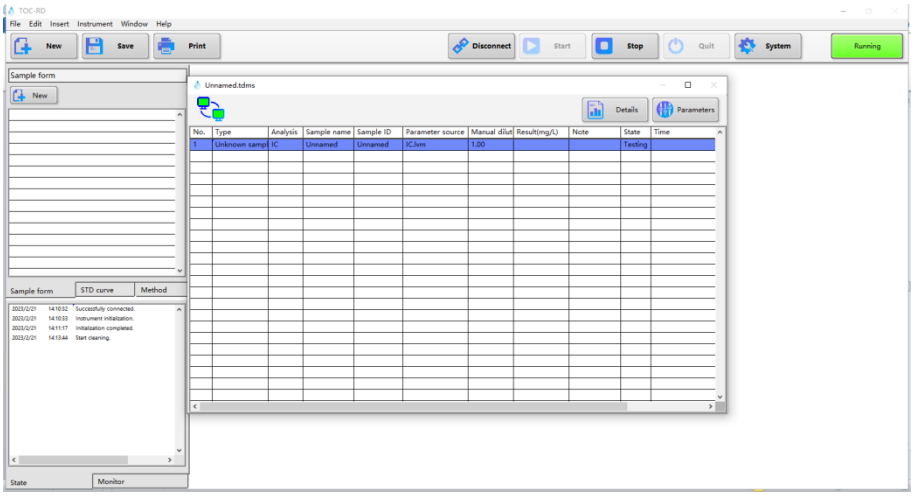
(Figure 6.32)

2) Select the corresponding test method in the pop-up window, and click “OK” after selection. (Figure 6.33)



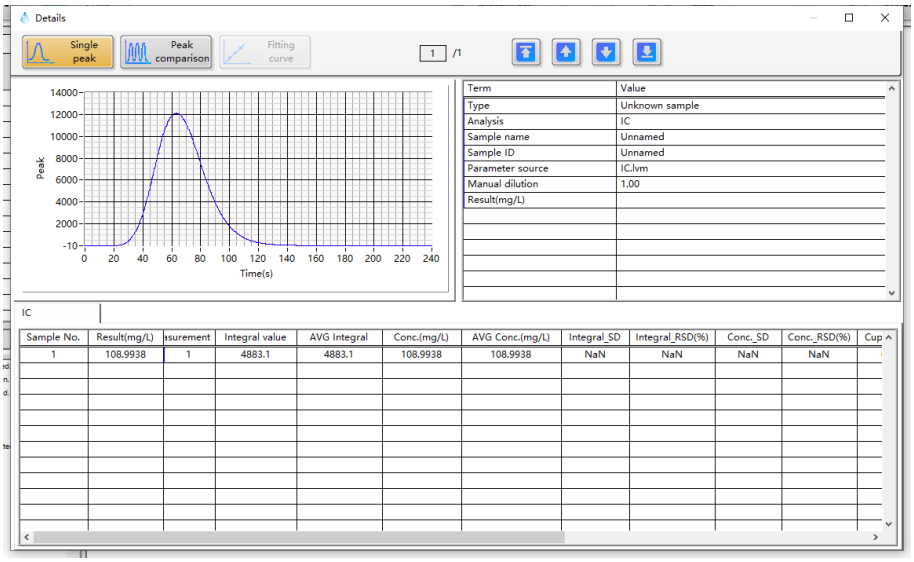
(Figure 6.33)

3) The instrument enters the analysis procedure and waits for the results to be displayed. (Figure 6.34)



(Figure 6.34)

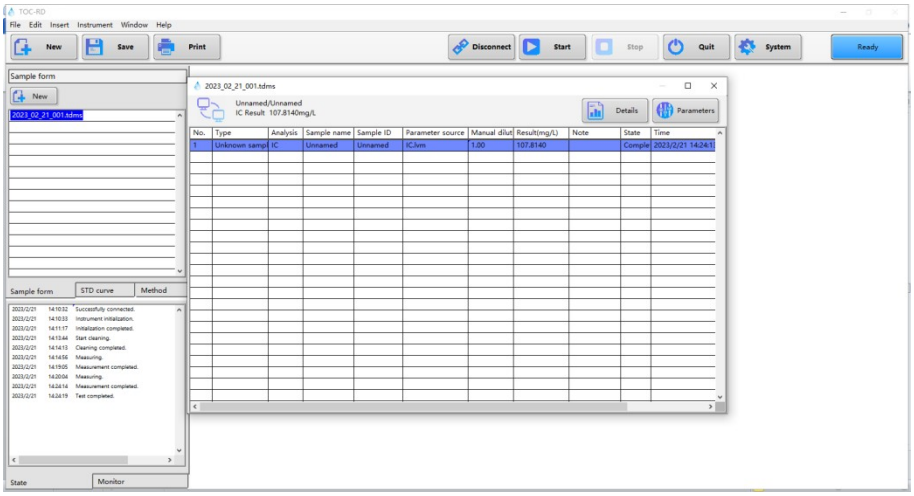
4) Click “Details” to view detailed test data. (Figure6. 35)



(Figure 6.35)

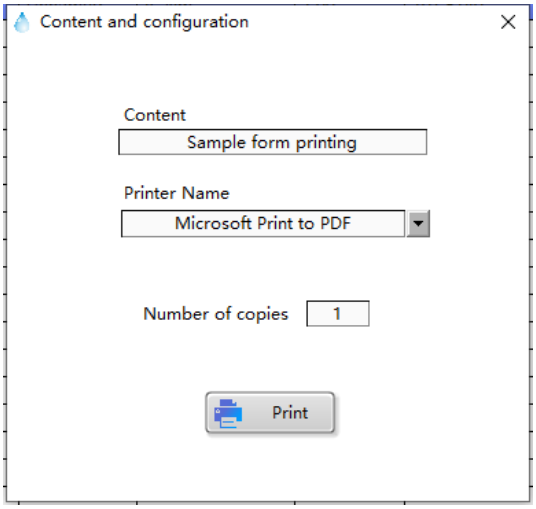
6.2.8 Data export

1) Open the sample table you want to print and export, and click “Print”. (Figure 6.36)



(Figure 6.36)

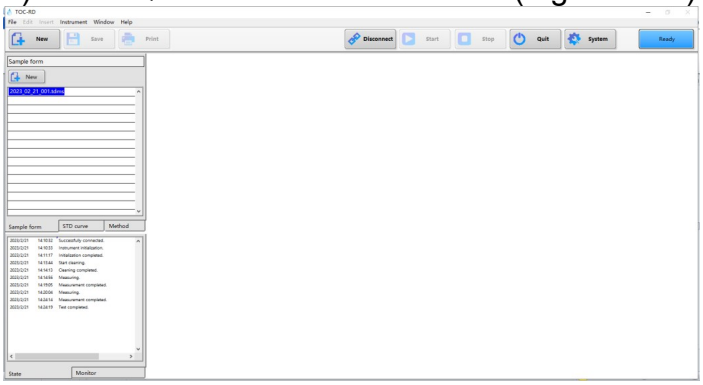
2) Configure print parameters in the pop-up window and click “Print”. (Figure 6.37) To print PDF, you need to select the save path.



(Figure 6.37)

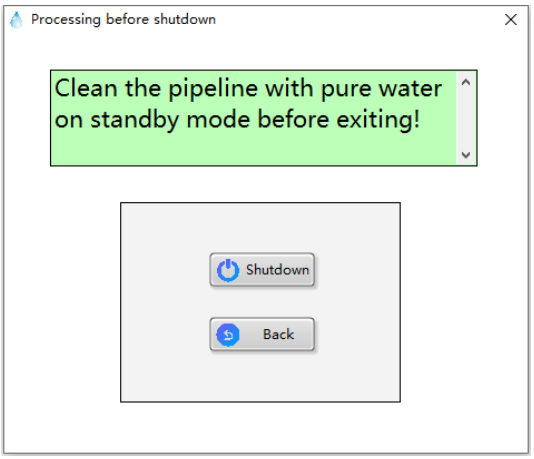
6.2.9 End of analysis

1) Click “Quit” in the main interface. (Figure 6.38)



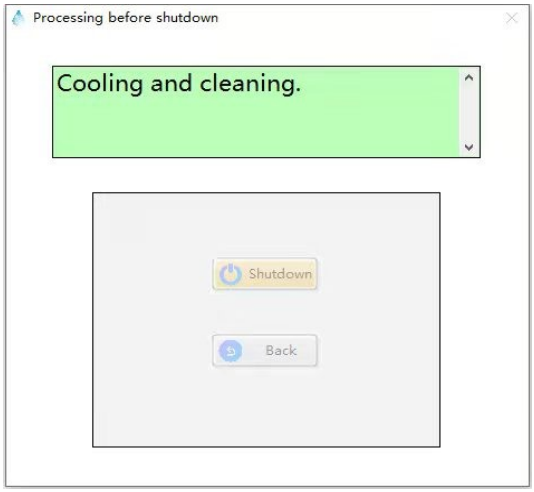
(Figure 6.38)

2) Click “Shutdown” as prompted. (Figure 6.39)



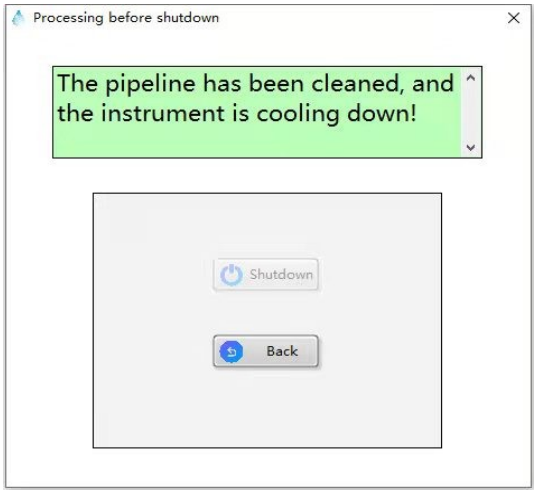
(Figure 6.39)

3) The interface is locked during the cleaning process before shutdown.（Figure 6.40）

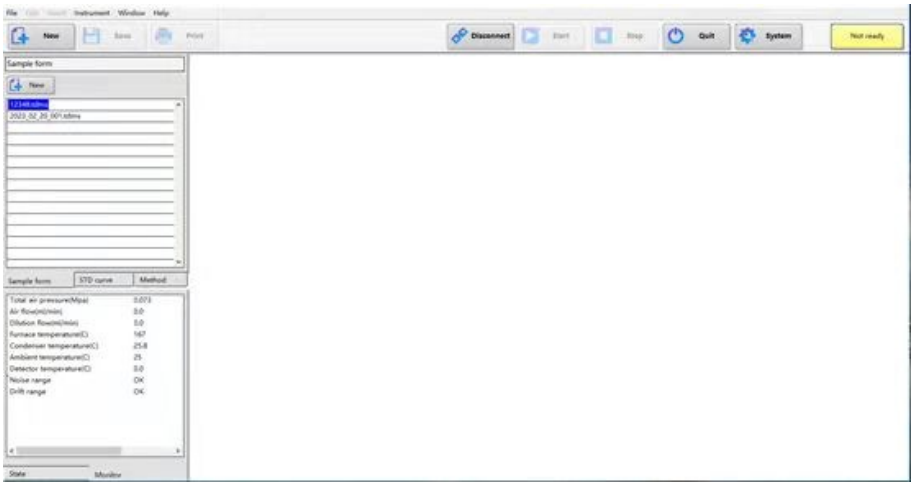


(Figure 6.40)

4) Wait for the end of cleaning, you can stay in this interface to wait for the instrument furnace temperature to drop to 200℃（Figure 6.41）, or click "return" to wait for the furnace temperature to drop below 200℃（Figure6.42）



(Figure 6.41)



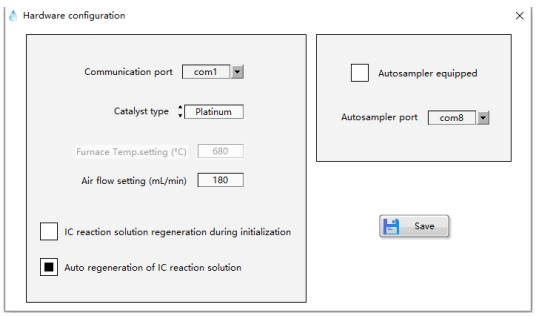
(Figure 6.42)

5）Tighten the cylinder main valve. Drain the residual gas in the pipeline until the hands of the total and partial pressure gauges return to zero.

Chapter VII Software Details

7.1 Initial Hardware Configuration Window

After installing the software and running it for the first time, the “Hardware Configuration” window will pop up. (Figure 7.1) Please click “Save” when the configuration is complete.



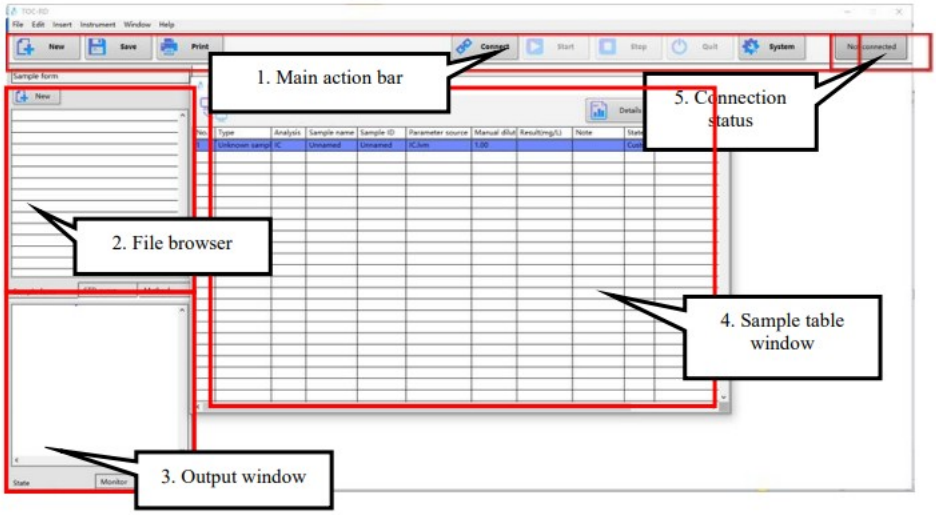
(Figure 7.1)

Item	Description
Communication port	It is the serial communication port used by the instrument when connecting to the software.
Catalyst type	It is the catalyst type to be selected, and the defaulttype is platinum catalyst. Platinum catalyst and general catalyst can be used in this instrument, which can be selected according to actual use.
Furnace Temp setting	It is the set temperature of the cracking furnace, and the default setting is 680 ℃. When platinum catalyst is used, it is fixed at 680 ℃; when general catalyst is used, it can be set in the range of 0-1000 ℃ according to the actual demand (the default setting is 800 ℃).
Air flow setting (mL/min)	It is the set carrier gas flow rate, and the default rate is 180mL/min.
IC reaction solution regeneration during initialization	When the connected instrument is initialized, the IC reaction solution is reconfigured. This function is disabled by default.
Auto regeneration of IC reaction solution	Whether to enable automatic regeneration of IC reaction liquid, when enabled, IC reaction liquid will automatically replace acid liquid in the test process.

Autosampler equipped	It is used to select whether an autosampler is used. The default is no autosampler.
Autosampler port	It is the serial communication port used by the instrument when connecting to th eautosampler.

7.2 Software Main Interface Window

The main interface window of the software is mainly composed of the following parts. (Figure 7.2)

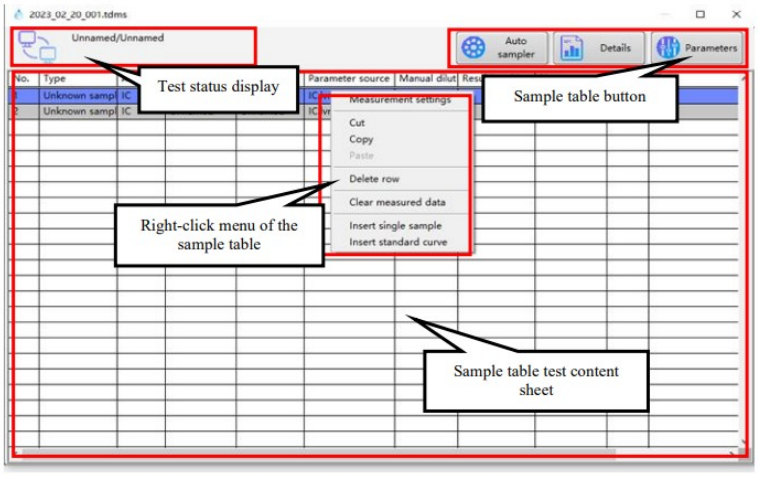


(Figure 7.2)

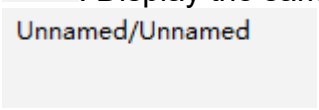
Item	Description
Main action bar	The main operations for software control and operation are carried out in this area.
File browser	There are 3 tabs that display existing file names. Click this tab to switch the display content. Double-click a file to open the saved file. 1. In the Sample Table tab, “New” can be clicked to create a new sample table. 2. In the STD Curve tab, “New” can be clicked to create a new standard curve test file, and “All” displays the configuration file and the measured data content of the standard curve. 3. In the Method tab, “New” can be clicked to create a new sample test file.
Output window	There are 2 tabs that display the main operation and monitoring information when the instrument is connected. 1. The Status Display tab will display the main flow information of the instrument when it is running. 2. The Background Monitoring tab will display the total air pressure, gas flow rate, dilution gas flow rate, the cracking furnace temperature, condenser temperature, ambient temperature, detector temperature, noise range, drift range and so on when the instrument is connected.
Sample table window	It displays the contents of the opened sample table.
Connection status	It displays status information of the instrument connection.

7.2.1 Sample table

The “Sample Table” window is mainly composed of the following contents (Figure 7.3).



(Figure 7.3)

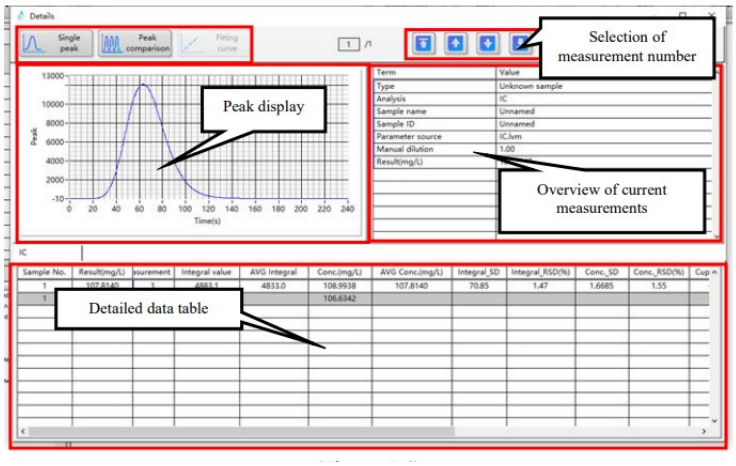
Item	Description
Test status display	 : Display the sample table connection status.  : Display the important parameters of the selected row/test row in the sample table.
Sample table button	Autosampler: Display when the autosampler is configured. Click to enter the autosampler setting window. Details: Click to enter the “Details” interface of the sample test. Parameters: Click to enter the “Parameters” interface of the selected row.

Item	Description
Right-click menu of the sample table	Measurement settings: Click to enter the “Parameters” interface of the selected row. If the selected row is empty, this option is invalid. Cut: Click to cut the selected row data to the copy board. Copy: Click to copy the selected row data to the copy board. Paste: Click to insert the data in the copy board into the selected row. If the selected row is empty, the pasted data will be added to the last row of the sample table by default. Delete row: Click to delete the selected row data. Clear measured data: Click to reset the selected row for test. All the stored data will be deleted. Insert single sample: Click to enter the “Single Sample Parameter Setting” window, and create a single sample test after configuration. Please refer to “Single Sample Window Setting” for details. Insert standard curve: Click to enter the “Select STD CurveFile”window, and create a single row standard curve test. Please refer to “Select STD Curve File” for details.
Sample table test content sheet	No.: Measurement number of the sample table. Type: “STD Curve” is the type of standard curve test. “Unknown Sample” is the type of sample test. Analysis: It displays analysis type, such as TC, IC, etc. Sample name: It displays the sample name. Sample ID: It displays the sample ID. Parameter source: It displays the file name of the measurement parameter file referenced by the settings. Manual dilution: It displays the manual dilution multiple, which is entered when setting. Results: It displays the concentration value measured, but the standard curve did not display this value. Status: It displays the measurement status. “Custom”

	means that no measurement has been carried out, “Under Measurement” means that the measurement is in progress, “Suspend” means that the measurement is stopped before it is completed, and “Complete” means that the measurement has been completed. Date: It displays the date and time of measurement. Cup tag number: It displays the cup tag number selected when configuring the autosampler.

7.2.2 Sample table details

The “Details” window is mainly composed of the following contents (Figure 7.4).



(Figure 7.4)

Item	Description
Peak display	Peak chart display area. Single-peak: It displays the peak shape of the measurement in real time or the peak shape of the selected row. Peak comparison: It displays multiple test peaks of the current measurement number. Fitting curve: When conducting the standard curve test, it displays the fitting curve after the standard point test is completed.
Selection of measurement number	Select the sequence number where you want to view the measurement content.
Overview of current measurements	It displays the selected main parameter content.

Item	Description

Detailed data table	**For standard curve test:** Sample No.: Serial number of the standard point. Standard concentration: Concentration value of the standard point. Injection times: Serial number of measurement times. Integral value: It displays the integral value result of the measurement. Average integral value: It displays the average integral value of test results. Integral SD: Standard deviation of the measured integral value. Integral RSD (%): Relative standard deviation of the measured integral value. Cup tag number: It displays the corresponding cup tag number when configuring the autosampler. It displays 0 when not configured. Exclusion: If it is displayed as “E”, it means that the data of this row is excluded and does not participate in data calculation. Injection volume (mL): Injection volume for measurement. Automatic dilution: It displays dilution multiple. Time: Completion time. **For sample test:** Sample No.: Serial number of samples. Results: It displays the concentration value of unknown sample analysis results. Injection times: Serial number of measurement times. Integral value: It displays the measured integral value. Average integral value: It displays the average integral value of test results. Concentration: It displays the measured concentration value. Average concentration: It displays the average concentration value of the test results. Integral SD: Standard deviation of the measured integral value. Integral RSD (%): Relative standard deviation of the measured integral value. Concentration SD: Standard deviation of the measured concentration value. Concentration RSD (%): Relative standard deviation of the measured concentration value. Exclusion: Displayed as "E" means that the data of this row is excluded and does not participate in data calculation. Cup tag number: It displays the corresponding cup tag number when configuring the autosampler. It displays 0 when not configured. Exclusion: If it is displayed as “E”, it means that the data of this row is excluded and does not participate in data calculation.

	Injection volume (mL): Injection volume for measurement. Automatic dilution: It displays automatic dilution multiple. Standard curve: Standard curve file selected for calculating concentration value. Time: Completion time.

7.3 File Creation

7.3.1 Creation of standard curve file

A standard curve file is used to draw the standard curve, which contains the concentration of the standard solution, measurement parameters and other information.

1) Click on “New” in the “STD Curve” of the file browsing tab. (Figure 7.5)

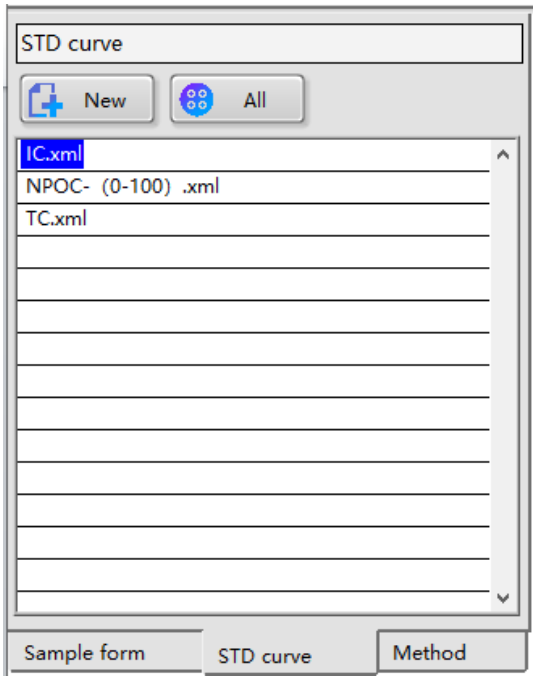
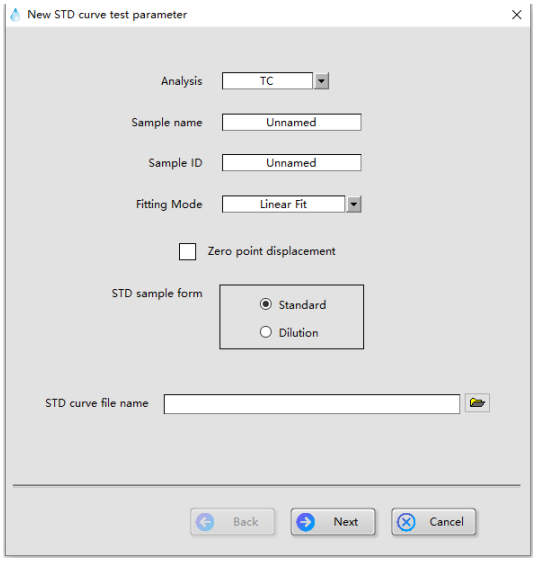


Figure 7.5)

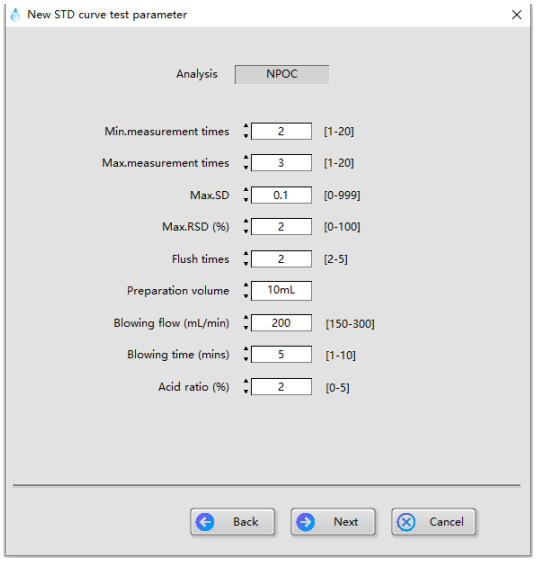
2) In the “New STD Curve Test Parameter” interface, select “Analysis ” and “STD Sample Form” as required, select “Zero Point Displacement”, enter the name of the standard curve file in “STD Curve File Name”, and then click “Next” (Figure 7.6)



(Figure 7.6)

Item	Description
Analysis	Click the drop-down menu and select the analysis type to test.
Sample name	Enter a sample name.
Sample ID	Enter the sample ID.
Fitting mode	Click the drop-down menu to select the fitting mode. We generally select the quadratic fitting.
Zero point displacement	By selecting this item, the fitting standard curve will pass through the original point.
STD sample form	Select the standard sample form for test. The default selection is single-point dilution. Standard solution: A series of required standard concentration solutions are prepared for testing. Single-point dilution: The instrument automatically uses dilution water to dilute a single high-concentration standard solution to the desired target concentration.
STD curve file name	Enter the standard curve file name.

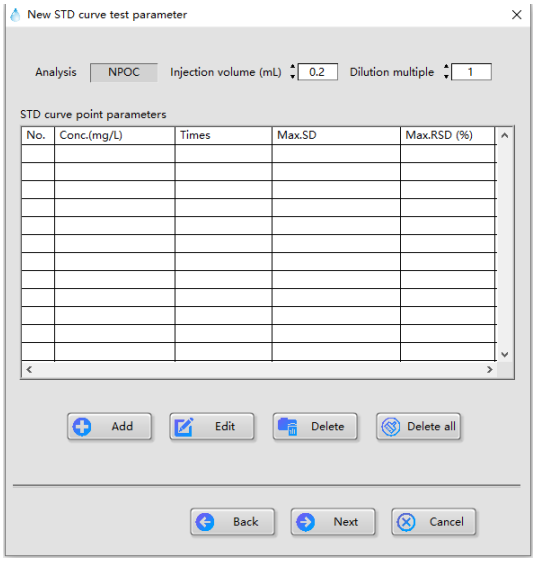
3) Configure the parameters according to the test requirements, and then click “Next”. (Figure 7.7)



(Figure 7.7)

Item	Description
Analysis	It displays the selected analysis type.
Min. Measurement times	It displays the minimum number of measurements for analyzing the sample injection result. The analysis is considered to be completed if either SD or RSD threshold is met under the set value number.
Max. Measurement times	It displays the maximum number of sample measurements when SD or RSD judgment conditions are not met.
Max. SD	It is the SD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 0.1.
Max. RSD	It is the RSD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 2.
Flush times	It displays the number of times of cleaning the flow path before the first injection. The default is twice.
Preparation volume	It displays the volume of the solution allocated in the dilution tank when diluting the solution. The default is 10mL.
Blowing flow (mL/min)	It displays the gas flow rate used for acid purging in the NPOC mode. The default is 200.
Blowing time (mins)	It displays the time of purging with acid in the NPOC mode. The default is 5.
Acid ratio (%)	It displays the volume ratio for adding acid in the NPOC mode. The default is 2.

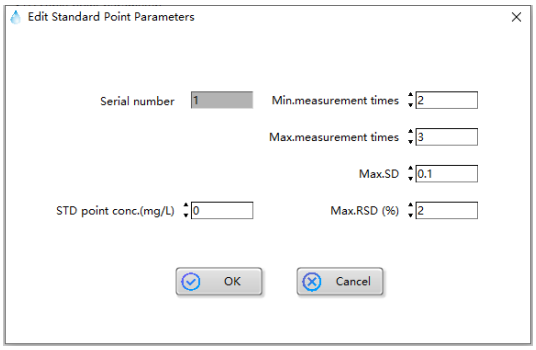
4) Set the standard poin tparameters interface (Figure 7.8).



(Figure 7.8)

Item	Description
Analysis	It displays the selected analysis type.
Injection volume (mL)	It displays the sample volume injected in each analysis.
New STD curve test parameter	It displays the set STD curve point parameter table.
Add	Add a new standard point parameter to the table.
Edit	Edit the selected standard point parameter.
Delete	Delete the selected standard point.
Delete all	Delete all standard points in the table.

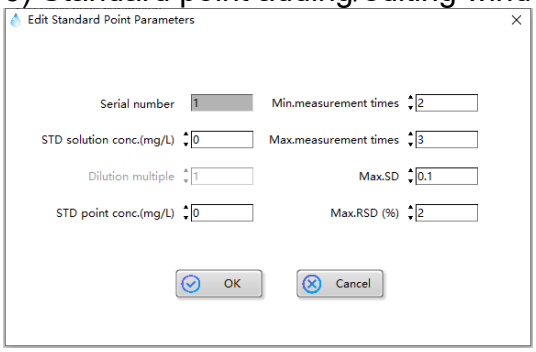
5) Standard point adding/editing window for the standard curve. (Figure 7.9)



Item	Description
Serial number	It displays the selected serial number of the standard point.
Min.Measurement times	It displays the minimum number of measurements for analyzing the sample injection result. The analysis is

	considered to be completed if either SD or RSD threshold is met under the set value number.
Max. Measurement times	It displays the maximum number of sample measurements when SD or RSD judgment conditions are not met.
Max. SD	It is the SD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 0.1.
Max. RSD (%)	It is the RSD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 2.
STD point concentration	Enter the standard point concentration.

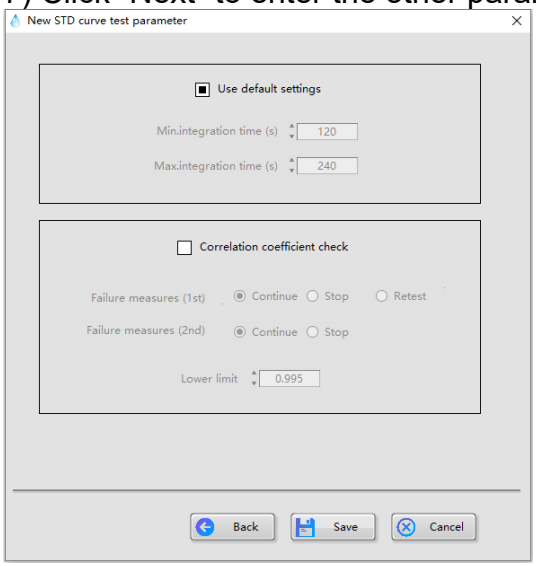
6) Standard point adding/editing window for single-point dilution (Figure 7.10).



(Figure 7. 10)

Item	Description
Serial number	It displays the selected serial number of the standard point.
Min. Measurement times	It displays the minimum number of measurements for analyzing the sample injection result. The analysis is considered to be completed if either SD or RSD threshold is met under the set value number.
Max. Measurement times	It displays the maximum number of sample measurements when SD or RSD judgment conditions are not met.
Max. SD	It is the SD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 0.1.
Max. RSD (%)	It is the RSD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 2.
STD solution concentration	Enter the standard solution concentration.
Dilution multiple	Dilution multiple is the ratio of standard solution concentration to standard point concentration.
STD point concentration	Enter the standard point concentration.

7) Click “Next” to enter the other parameter setting interface (Figure 7.11).



(Figure 7.11)

Item	Description
Use default settings	The minimum integration time and the maximum integration time are set to the default values and cannot be changed.
Minimum integration time	It refers to the minimum dereferencing time for test and detection.
Maximum integration time	It refers to the maximum detection time for test.
Correlation coefficient check	By selecting this option, the correlation coefficient will be judged in the test.
Failure measures (first time)	Measures taken when the correlation coefficient is lower than the lower limit for the first time. Continue: Record the error in the sample table and continue the analysis. Stop: Record the error in the sample table and stop the analysis. Repeat: Do not record wrong data, and re-test the standard curve.
Failure measures (second time)	Measures taken when the correlation coefficient is lower than the lower limit for the second time. Continue: Record the error in the sample table and continue the analysis. Stop: Record the error in the sample table and stop the analysis.
Lower limit	Enter the correlation coefficient to judge the minimum value, which will trigger the failure measures when it is lower than the lower limit. The default is 0.995.

8) Click “Save”. The new standard curve file is created.

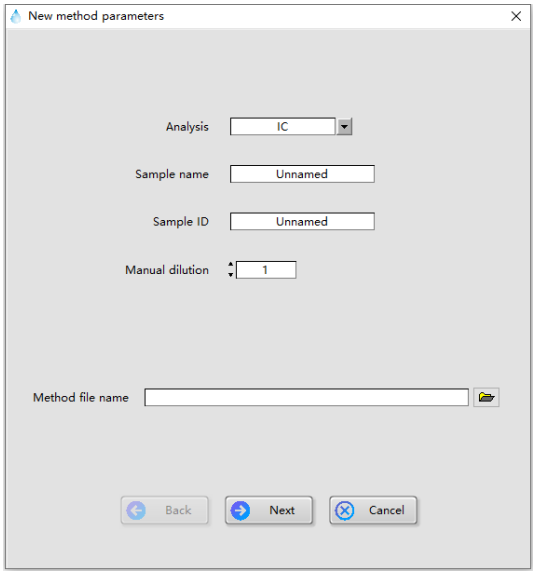
7.3.2 Creation of method file

The method file is a file convenient for setting parameters directly when testing unknown samples.

1) Click on “New” in the “Method” of the file browsing tab. (Figure7. 12)

(Figure7. 12)

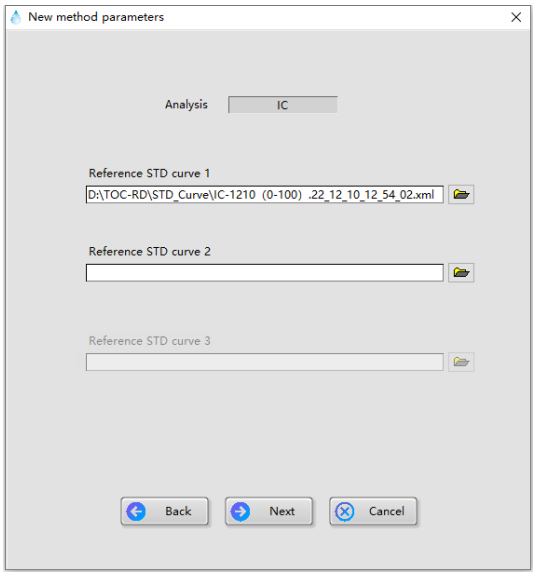
2) Enter the basic method information in the “New Method Parameter” interface (Figure 7.13).



(Figure 7.13)

Item	Description
Analysis	Click the drop-down menu and select the analysis type to test.
Sample name	Enter a sample name.
Sample ID	Enter the sample ID.
Manual dilution	If the sample is diluted manually, please enter the dilution multiple for sample preparation.
Method file name	Enter the method file name.

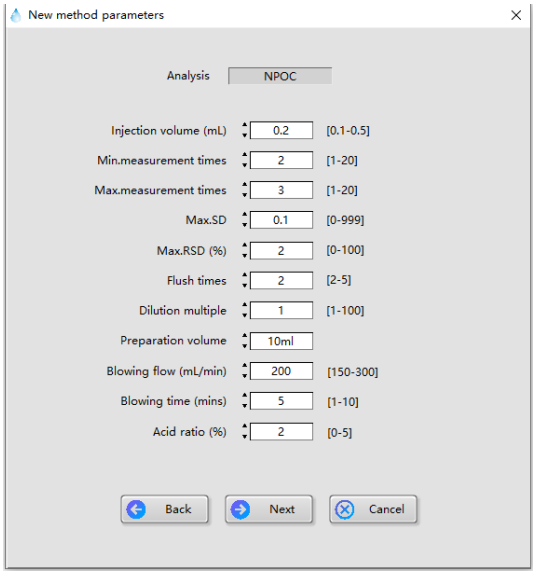
3) Click “Next” to enter the analysisstandard curve configuration interface (Figure 7.14).



(Figure7. 14)

Item	Description
Analysis	It displays the selected analysis type.
Reference STD curve 1 Reference STD curve 2 Reference STD curve 3	Select the standard curve used to analyze unknown samples. If multiple standard curves are selected, the software will select the best curve to calculate the concentration according to the response value.

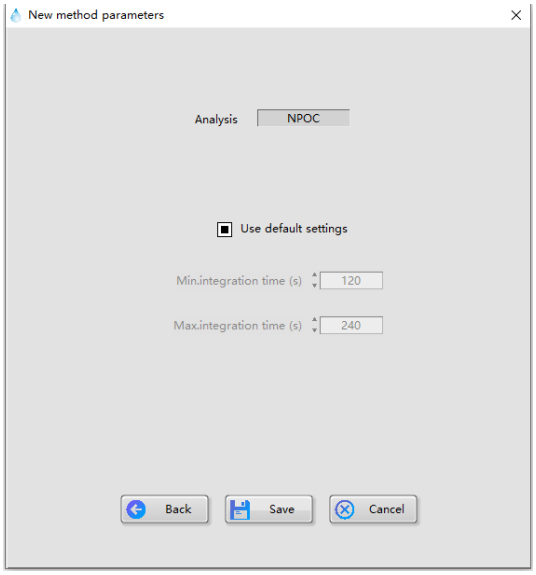
4) Click “Next” to enter the analysis parameter setting interface (Figure 7.15).



(Figure 7. 15)

Item	Description
Analysis	It displays the selected analysis type.
Injection volume (mL)	It displays the sample volume injected in each analysis.
Min.Measurement times	It displays the minimum number of measurements for analyzing the sample injection result. The analysis is considered to be completed if either SD or RSD threshold is met under the set value number.
Max. Measurement times	It displays the maximum number of sample measurements when SD or RSD judgment conditions are not met.
Max. SD	It is the SD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 0.1.
Max. RSD (%)	It is the RSD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 2.
Flush times	It displays the number of times of cleaning the flow path before the first injection. The default is twice.
Dilution multiple	Enter the dilution multiple of the sample.
Preparation volume	It displays the volume of the solution allocated in the dilution tank when diluting the solution. The default is 10mL.
Blowing flow (mL/min)	It displays the gas flow rate used for acid purging in the NPOC mode. The default is 200.
Blowing time (mins)	It displays the time of purging with acid in the NPOC mode. The default is 5.
Acid ratio (%)	It displays the volume ratio for adding acid in the NPOC mode. The default is 2.

5) Click “Next” to enter the other parameter setting interface (Figure 7.16).



(Figure 7. 16)

Item	Description
Analysis	It displays the selected analysis type.
Use default settings	The minimum integration time and the maximum integration time are set to the default values and cannot be changed.
Minimum integration time	It refers to the minimum dereferencing time for test and detection.
Maximum integration time	It refers to the maximum dereferencing time for test and detection.

6) Click “Save”. The new method file is created.

Note: When the TOC analysis mode is set, TC and IC need to be set in three steps (3), 4) and 5), and the operation flow is consistent.

7.3.3 View and modification ofstandard curve file
1) Locate the saved file in the list of “STD Curve” of the file browsing tab, and double-click to open it.(Figure 7. 17)

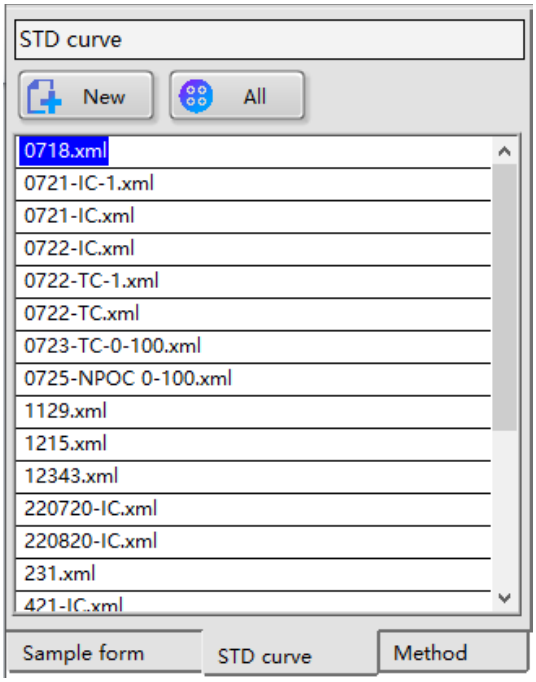
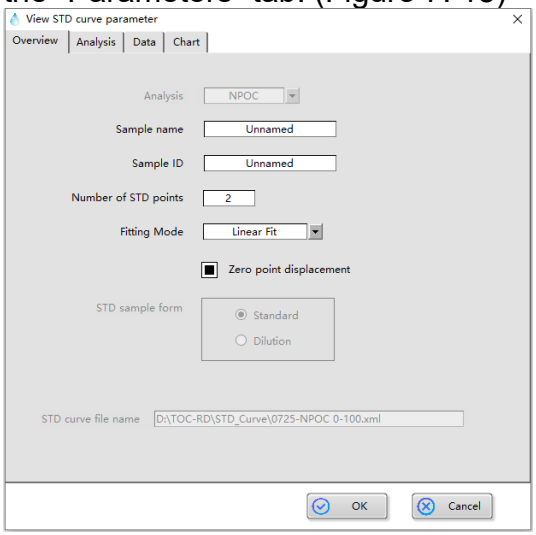


Figure 7. 17)

2) In the “View STD curve parameters” window, click the corresponding tab to view and edit the “Parameters” tab. (Figure 7. 18)

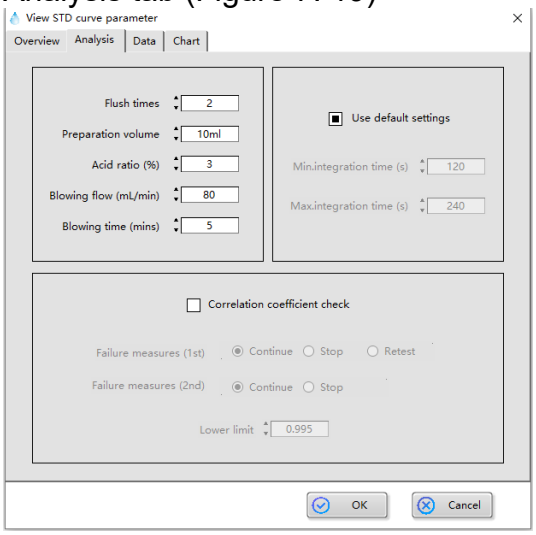


(Figure 7.18)

Item	Description
Analysis	Click the drop-down menu and select the analysis type to test.
Sample name	It displays the sample name.
Sample ID	It displays the sample ID.
Number of STD points	It displays the number of standard points and cannot be edited.
Fitting mode	It displays the fitting mode.

Zero point displacement	It displays the selection of whether the standard curve is blank or not.
STD sample form	It displays the selected standard sample form for test. It cannot be modified. Standard solution: A series of required standard concentration solutions are prepared for testing. Single-point dilution: The instrument automatically uses dilution water to dilute a single high-concentration standard solution to the desired target concentration.
STD curve file name	Enter the standard curve file name.

Analysis tab (Figure 7. 19)

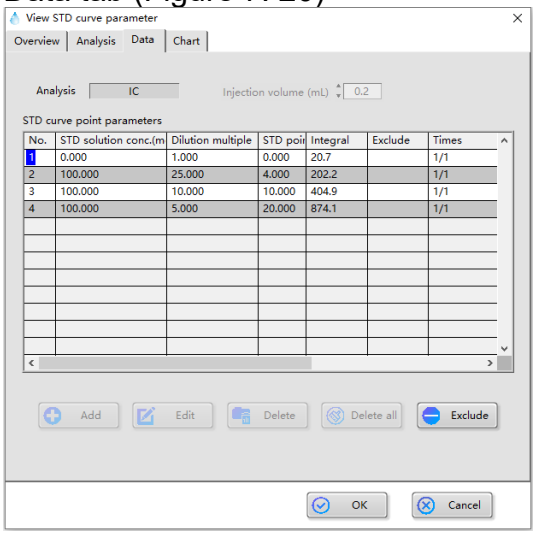


(Figure 7. 19)

Item	Description
Flush times	It displays the number of times of cleaning the flow path before the first injection. The default is twice.
Preparation volume	It displays the volume of the solution allocated in the dilution tank when diluting the solution. The default is 10mL.
Blowing flow (mL/min)	It displays the gas flow rate used for acid purging in the NPOC mode. The default is 200.
Blowing time (mins)	It displays the time of purging with acid in the NPOC mode. The default is 5.
Acid ratio (%)	It displays the volume ratio for adding acid in the NPOC mode. The default is 2.
Use default settings	The minimum integration time and the maximum integration time are set to the default values and cannot be changed.
Minimum integration time	It refers to the minimum dereferencing time for test and detection.
Maximum integration time	It refers to the maximum dereferencing time for test and detection.

Correlation coefficient check	By selecting this option, the correlation coefficient of the fitting curve will be judged in the test.
Failure measures (first time)	Measures taken when the correlation coefficient is lower than the lower limit for the first time. Continue: Record the error in the sample table and continue the analysis. Stop: Record the error in the sample table and stop the analysis. Repeat: Do not record wrong data, and re-test the standard curve.
Failure measures (second time)	Measures taken when the correlation coefficient is lower than the lower limit for the second time. Continue: Record the error in the sample table and continue the analysis. Stop: Record the error in the sample table and stop the analysis.
Lower limit	Enter the correlation coefficient to judge the minimum value, which will trigger the failure measures when it is lower than the lower limit. The default is 0.995.

Data tab (Figure 7. 20)

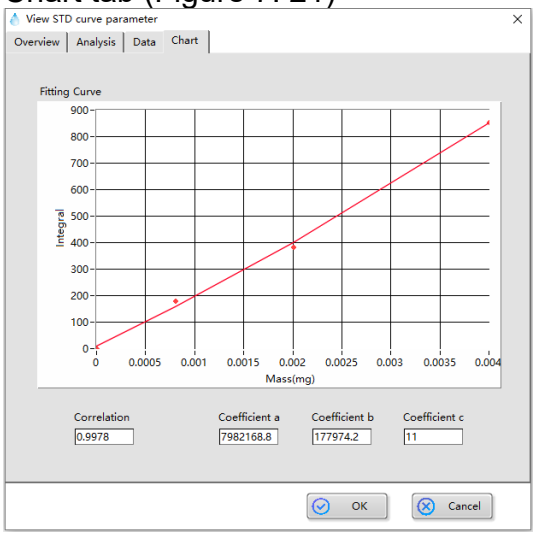


(Figure 7. 20)

Item	Description
Analysis	It displays the selected analysis type.
Injection volume (mL)	It displays the sample volume injected in each analysis.
Standard curve point parameters	It displays information about each standard point.
Add	Add a new standard point parameter to the table.
Edit	Edit the selected standard point parameter.

Delete	Delete the selected standard point.
Delete all	Delete all standard points in the table.
Exclude	Exclude the selected standard points from the analysis results. This function can only be enabled when the standard curve status is complete.

Chart tab (Figure 7. 21)



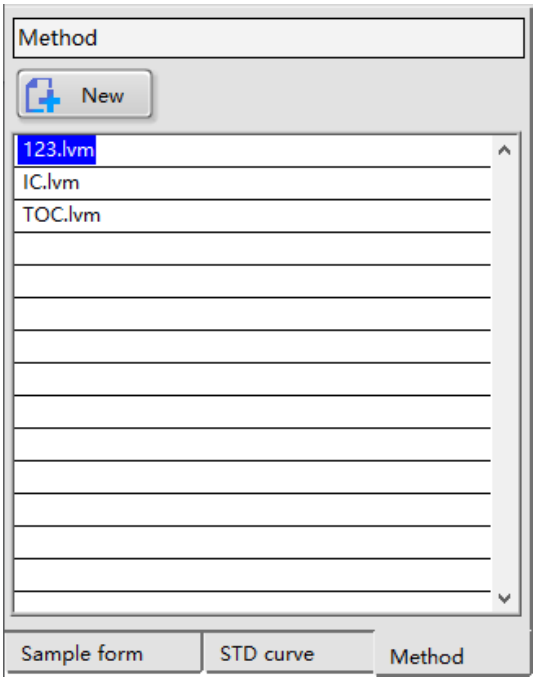
(Figure 7. 21)

Item	Description
Fitting Curve	It displays the curve fitted by the standard point data.
Coefficient	It displays the correlation coefficient of fitting standard curve of standard point data.
Coefficient a Coefficient b Coefficientc	It displays the parameters of fittingstandard curve equation.

3) Click “OK” to finish the viewing and editing of standard curve parameters.

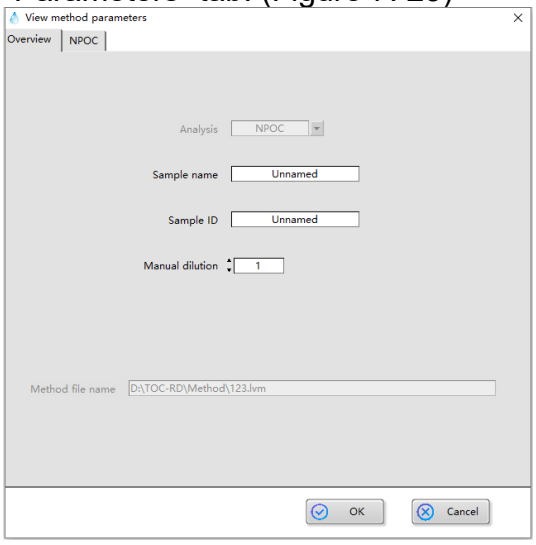
7.3.4 Viewand modification of method file

1) Locate the saved file in the list of “Method” of the file browsing tab, and double-click to open it. (Figure 7. 22)



(Figure 7. 22)

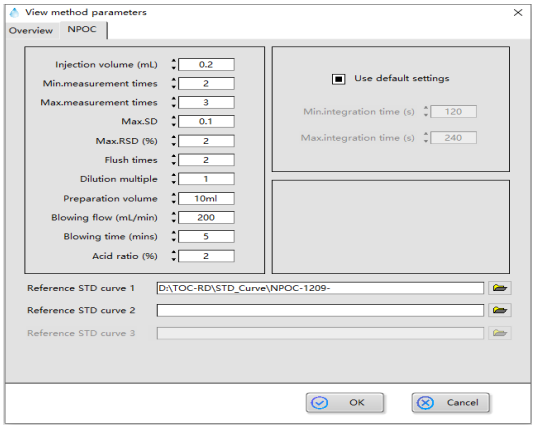
2) In the “View method parameters” window, click the corresponding tab to view and edit “Parameters” tab. (Figure 7. 23)



(Figure 7. 23)

Item	Description
Analysis	Click the drop-down menu and select the analysis type to test.
Sample name	It displays the sample name.
Sample ID	It displays the sample ID.
Manual dilution	If the sample is diluted manually, please enter the dilution multiple for sample preparation.
Method file name	Enter the method file name.

Analysis tab (Figure 7. 24)



(Figure 7. 24)

Item	Description
Injection volume (mL)	It displays the sample volume injected in each analysis.
Min.Measurement times	It displays the minimum number of measurements for analyzing the sample injection result. The analysis is considered to be completed if either SD or RSD threshold is met under the set value number.
Max. Measurement times	It displays the maximum number of sample measurements when SD or RSD judgment conditions are not met.
Max. SD	It is the SD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 0.1.
Max. RSD (%)	It is the RSD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 2.
Flush times	It displays the number of times of cleaning the flow path before the first injection. The default is twice.
Dilution multiple	Enter the dilution multiple of the sample.
Preparation volume	It displays the volume of the solution allocated in the dilution tank when diluting the solution. The default is 10mL.
Blowing flow (mL/min)	It displays the gas flow rate used for acid purging in the NPOC mode. The default is 200.
Blowing time (mins)	It displays the time of purging with acid in the NPOC mode. The default is 5.
Acid ratio (%)	It displays the volume ratio for adding acid in the NPOC mode. The default is 2.
Use default settings	The minimum integration time and the maximum integration time are set to the default values and cannot be changed.
Minimum integration time	It refers to the minimum dereferencing time for test and detection.

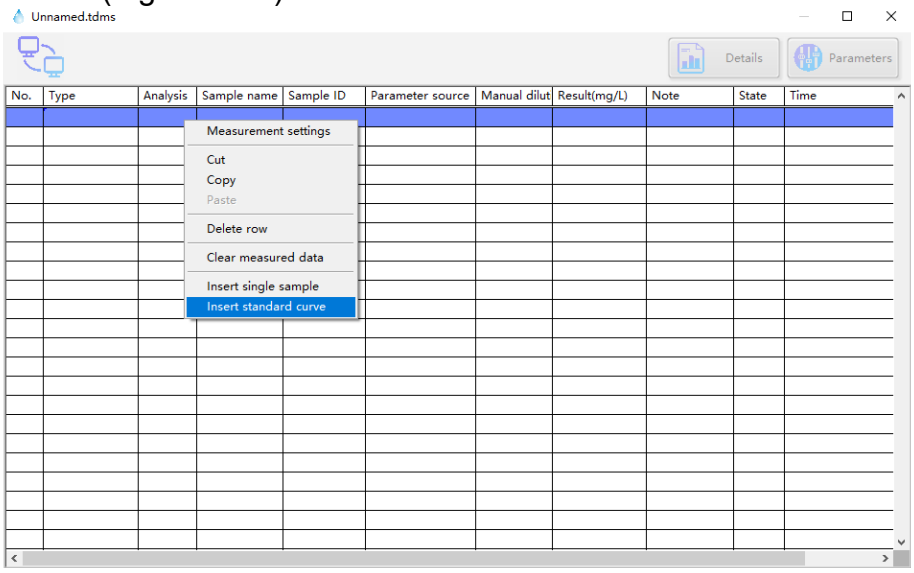
Maximum integration time	It refers to the maximum dereferencing time for test and detection.
Reference STD curve 1 Reference STD curve 2 Reference STD curve 3	It displays the standard curve used to analyze unknown samples.

3) Click “OK” to complete the viewing and editing of method parameters.

7.4 Edit Sample Table

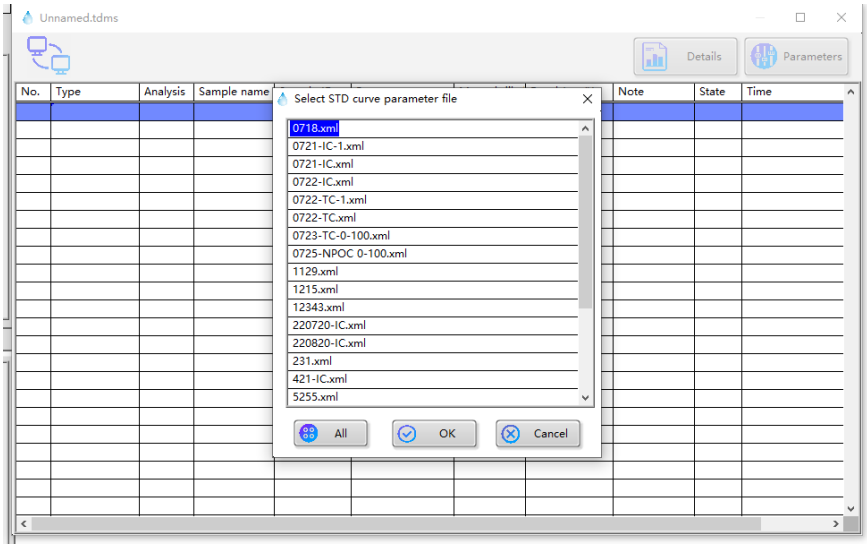
7.4.1 Insert standard curve test

1) Right-click in the open sample table to open the menu bar and select “Insert standard curve” (Figure 7.25).



(Figure 7. 25)

2) Select the standard curve file in the “Select STDcurve parameter file”window (Figure 7.26).



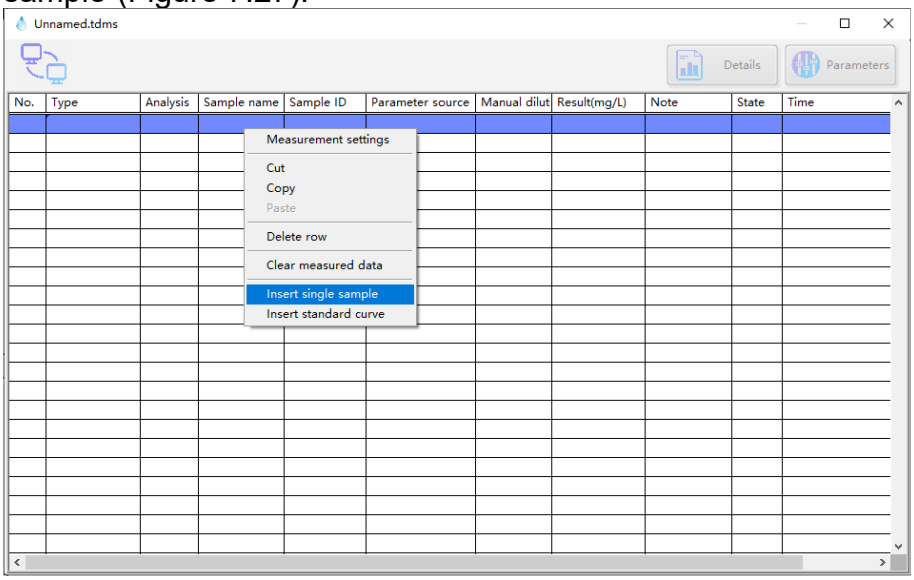
(Figure 7.26)

Item	Description
List of standard curve files	It displays the saved standard curve files.
All	Saved files and tested standard curve files are displayed in the list of standard curve files

3) Click“OK”.The standard curve test is added to the sample table.

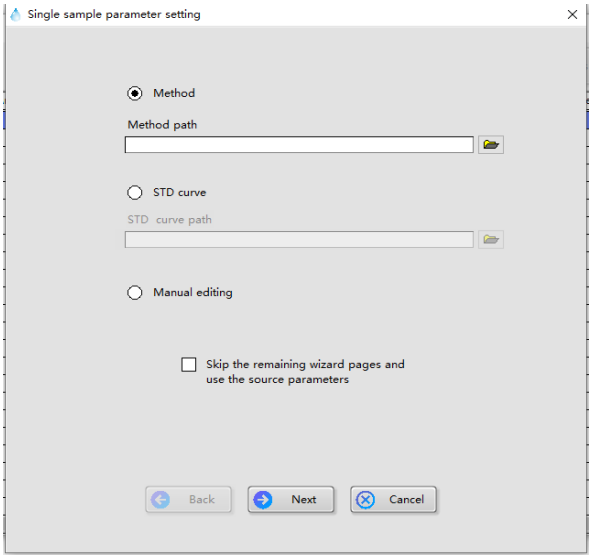
7.4.2 Insert sample test

Sample tests can be inserted into the sample table by right-clicking the menu.
1) Right-click in the open sample table to open the menu bar and select “Insert single sample”(Figure 7.27).



(Figure 7.27)

2) Pop up the “Single sample parameter setting” window. (Figure 7.28)

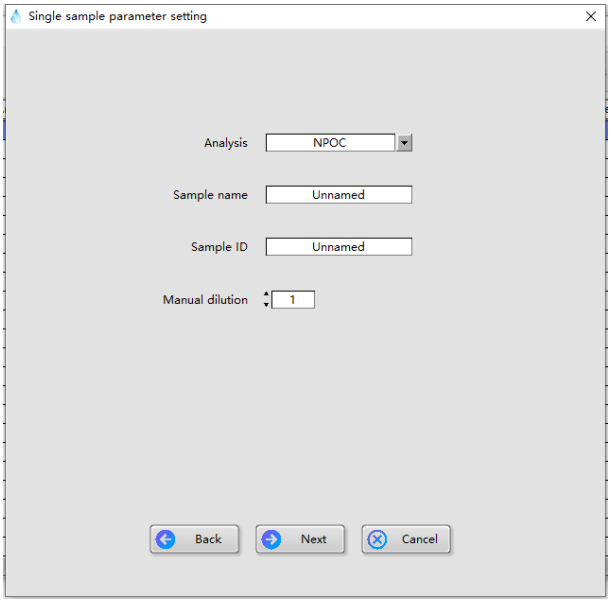


(Figure 7.28)

Item	Description
Method path	When the Method is checked, the method path is enabled, and the existing method parameter file is selected for analysis parameters.
STD curve path	When the STD curve is checked, the STD curve path is enabled, and the existing standard curve file is selected for analysis parameters.
Manual Editing	Set the analysis parameters manually, without using the parameters in the existing files.

Note: “Skip the remaining wizard pages and use the source parameters”, which can be selected when “Method” or “STD Curve” is checked, and the wizard process can be omitted and the insertion can be completed directly.

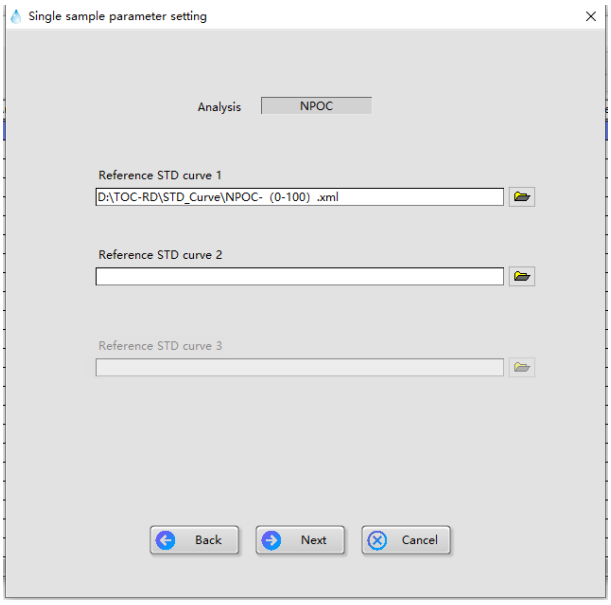
3) Click “Next” to enter the interface for setting basic information of the sample. (Figure 7.29)



(Figure 7. 29)

Item	Description
Analysis	Click the drop-down menu and select the analysis type to test.
Sample name	Enter the sample name.
Sample ID	Enter the sample ID.
Manual dilution	If the sample is diluted manually, please enter the dilution multiple for sample preparation.

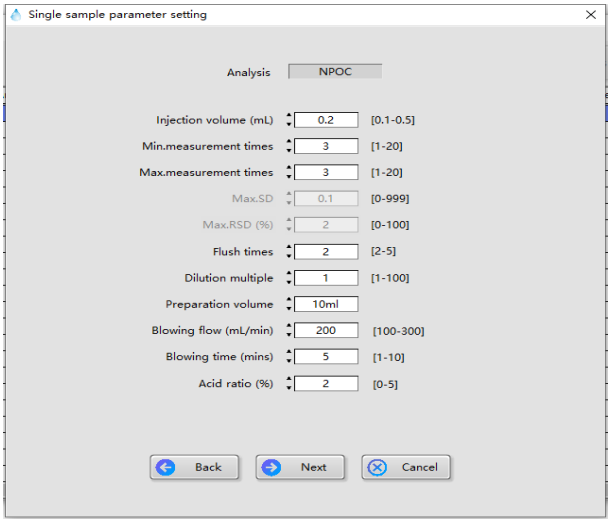
4) Click “Next” to enter the interface for setting the standard curve file for quantitative use. (Figure 7.30)



(Figure 7. 30)

Item	Description
Analysis	It displays the selected analysis type.
Reference STD curve 1 Reference STD curve 2 Reference STD curve 3	Select the standard curve used to analyze unknown samples.

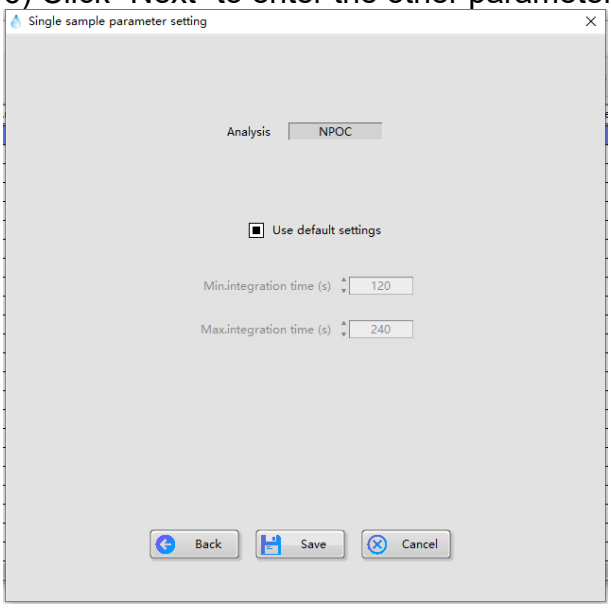
5) Click “Next” to enter the analysis parameter setting interface (Figure 7.31)



(Figure 7.31)

Item	Description
Analysis	It displays the selected analysis type.
Injection volume (mL)	It displays the sample volume injected in each analysis.
Min.Measurement times	It displays the minimum number of measurements for analyzing the sample injection result. The analysis is considered to be completed if either SD or RSD threshold is met under the set value number.
Max. Measurement times	It displays the maximum number of sample measurements when SD or RSD judgment conditions are not met.
Max. SD	It is the SD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 0.1.
Max. RSD (%)	It is the RSD value of the integral value of the standard sample, which is used as the threshold to judge whether the test is finished or not. The default is 2.
Flush times	It displays the number of times of cleaning the flow path before the first injection. The default is twice.
Dilution multiple	Enter the dilution multiple of the sample.
Preparation volume	It displays the volume of the solution allocated in the dilution tank when diluting the solution. The default is 10mL.
Blowing flow (mL/min)	It displays the gas flow rate used for acid purging in the NPOC mode. The default is 200.
Blowing time (mins)	It displays the time of purging with acid in the NPOC mode. The default is 5.
Acid ratio (%)	It displays the volume ratio for adding acid in the NPOC mode. The default is 2.

6) Click "Next" to enter the other parameter setting interface (Figure 7.32).



(Figure 7. 32)

Item	Description
Analysis	It displays the selected analysis type.
Use default settings	The minimum integration time and the maximum integration time are set to the default values and cannot be changed.
Minimum integration time	It refers to the minimum dereferencing time for test and detection.
Maximum integration time	It refers to the maximum dereferencing time for test and detection.

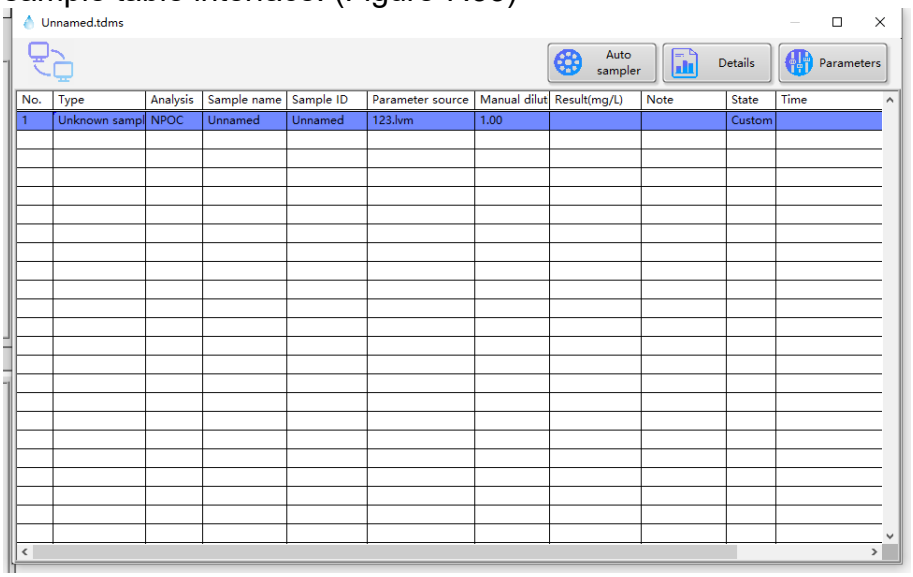
7) Click “OK”. The unknown sample test is inserted into the sample table.

7.4.3 View saved sample table

You can view the data from previous tests by opening the saved files in the list of sample tablesin the file browsing tab “Sample Table”. The method is to find the sample table record you want to view in the list of sample tables and double-click to open it.

7.4.4 Autosampler

If the instrument is equipped with an autosampler, the “Autosampler” button will appear in the sample table interface. (Figure 7.33)



(Figure 7.33)

1) Click “Autosampler” to enter the cup tag number setting interface. (Figure 7.34)

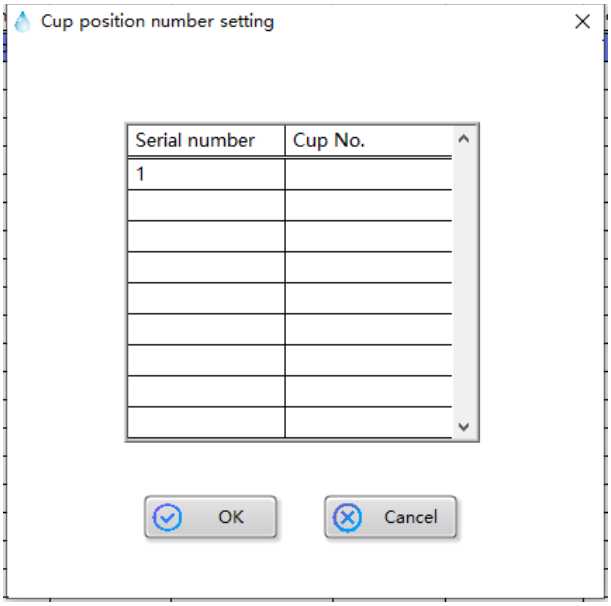
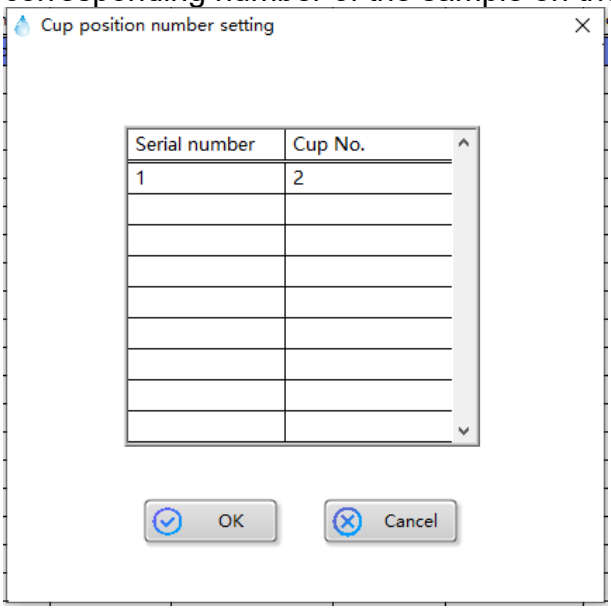


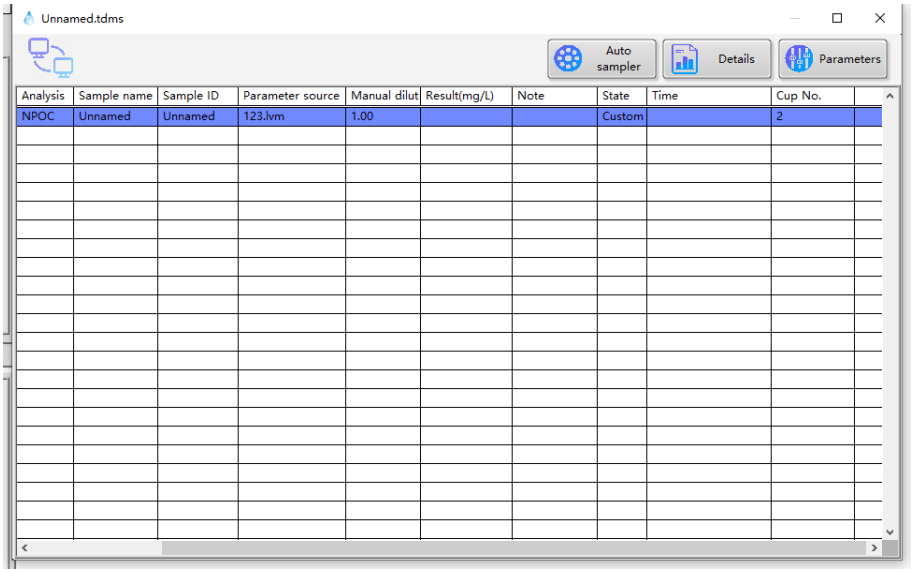
Figure 7.34)

2) Click the “Cup No.” column corresponding to the serial number in the table, and enter the corresponding number of the sample on the autosampler. (Figure 7.35)



(Figure 7.35)

3) Click “OK” to complete the cup tag number setting. (Figure 7.36)



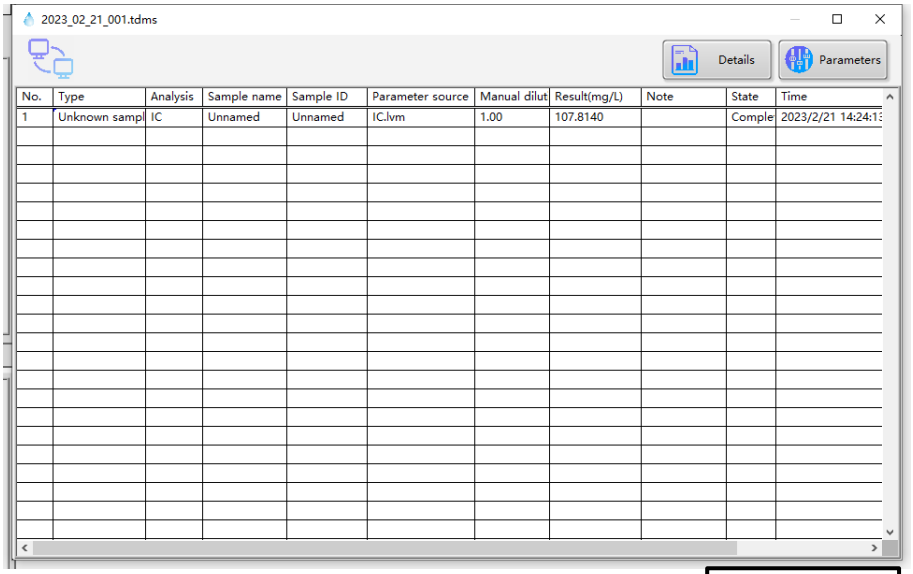
(Figure 7.36)

7.5 View Details and Parameters

7.5.1 Details

“Details” displays the data content of each analysis injection, and also displays the injection peak shape and detailed information. During the analysis, the real-time peak shape can also be observed in this window.

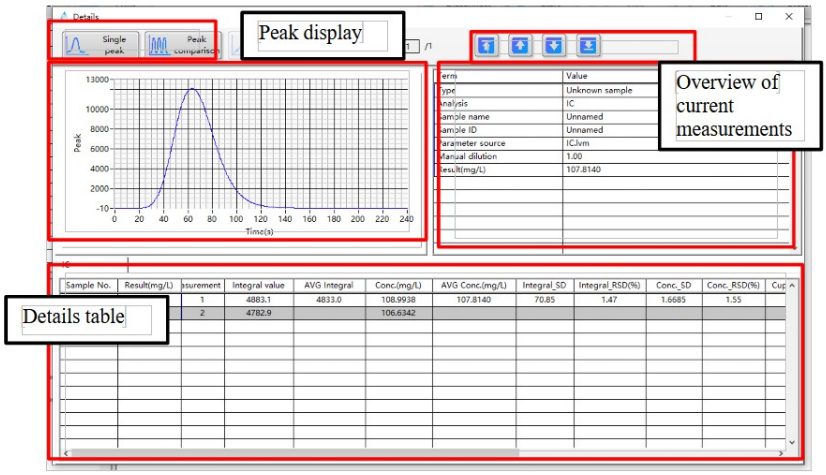
1) Click “Details” in the “Sample Table” window. (Figure 7.37)



(Figure 7.37)

Selection of measurement number

2) Pop up the “Sample details window" (Figure 7.38).



(Figure 7.38)

Item	Description
Peak display	Peak chart display area. Single-peak: It displaysthe peak shape of the measurementin realtime or the peak shape of the selected row. Peak comparison: It displays multiple test peaks of the current measurement number. Fitting curve: When conducting the standard curve test, it displaysthe fitting curve after the standard point test is completed.
Selection of measurement number	Select the sequence number where you want to display the measurement content.
Overview of current measurements	It displays the selected main parameter content.
Details table	**For standard curve test:** Sample number: Serial number of the standard point. Standard concentration: Concentration value of the standard point. Injection times: Serial number of measurement times. Integral value: It displays the integral value result of the measurement. Average integral value: It displays the average integral value of test results. Integral SD: Standard deviation of the measured integral value. Integral RSD (%): Relative standard deviation of the measured integral value. Cup tag number: It displays the corresponding cup tag number when configuring the autosampler. It displays 0 when not configured.

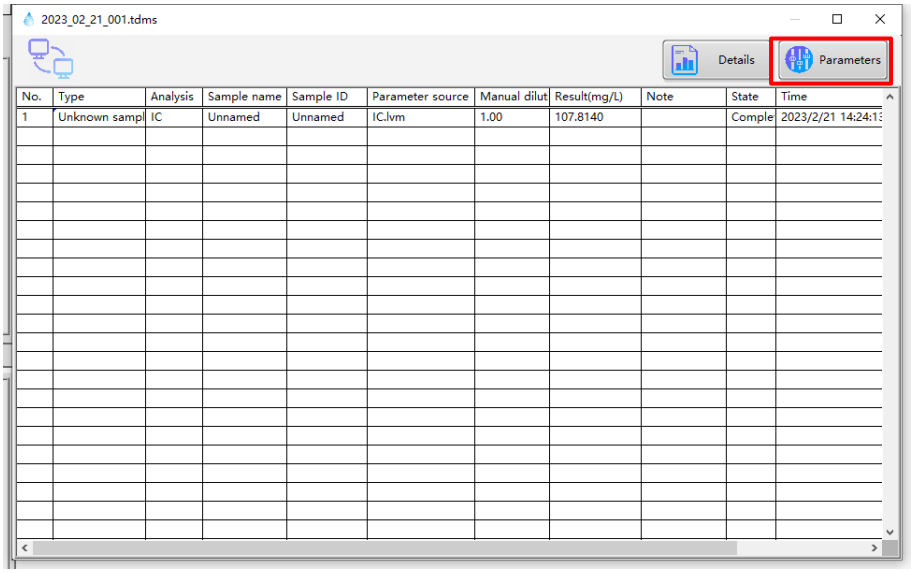
	Exclusion: If it is displayed as “E”, it means that the data of this row is excluded and does not participate in data calculation. Injection volume (mL): Injection volume for measurement. Automatic dilution: It displays dilution multiple. Time: Completion time. **For sample test:** Sample number: Serial number of samples. Results: It displays the concentration value of unknown sample analysis results. Injection times: Serial number of measurement times. Integral value: It displaysthe measured integral value. Average integral value: It displays the average integral value of test results. Concentration: It displaysthe measured concentration value. Average concentration: It displaysthe average concentration value of the test results. Integral SD: Standard deviation of the measured integral value. Integral RSD (%): Relative standard deviation of the measured integral value. Concentration SD: Standard deviation of the measured concentration value. Concentration RSD (%): Relative standard deviation of the measured concentration value. Exclusion: Displayed as "E" means that the data of this row is excluded and does not participate in data calculation. Cup tag number: It displays the corresponding cup tag number when configuring the autosampler. It displays 0 when not configured. Exclusion: If it is displayed as “E”, it means that the data of this row is excluded and does not participate in data calculation. Injection volume (mL): Injection volume for measurement. Automatic dilution: It displays automatic dilution multiple. Standard curve: Standard curve file selected for calculating concentration value. Time: Completion time.

7.5.2 Parameters

Open the “Parameters” window to display the analysis parameters of the selected row in the sample table.

Click “Parameters” on the sample table window. (Figure 7.39) If the analysis type is a standard curve, you may enter the “View standard curve parameter” interface and refer to

"7.3.3 View and modification of standard curve file". If the analysis type is an unknown sample, you may enter the "View method parameter" interface and refer to "7.3. 4 View and modification of method file".

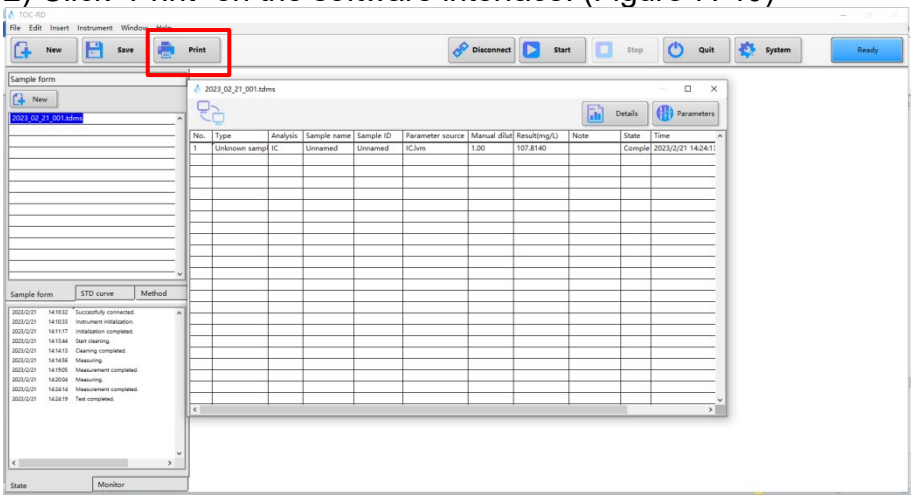


(Figure 7. 39)

7.6 Data Printing

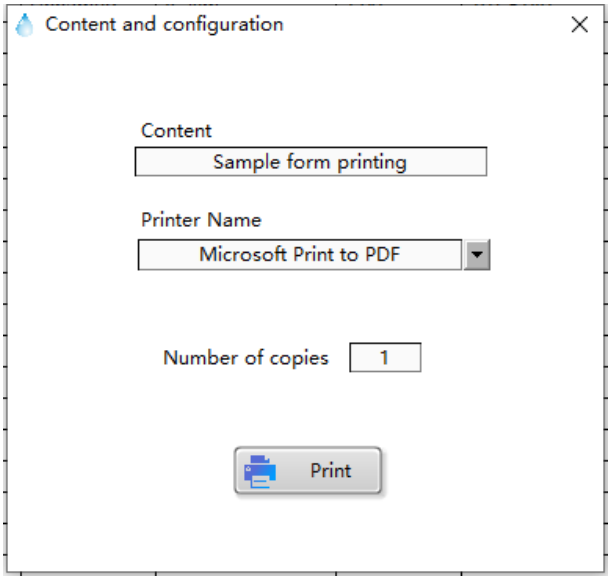
1) Select the sample table to be printed and open it. Please refer to "7.4.3 View saved sample table".

2) Click "Print" on the software interface. (Figure 7. 40)



(Figure 7. 40)

3) Pop up the "Print content and configuration" window. (Figure 7. 41)



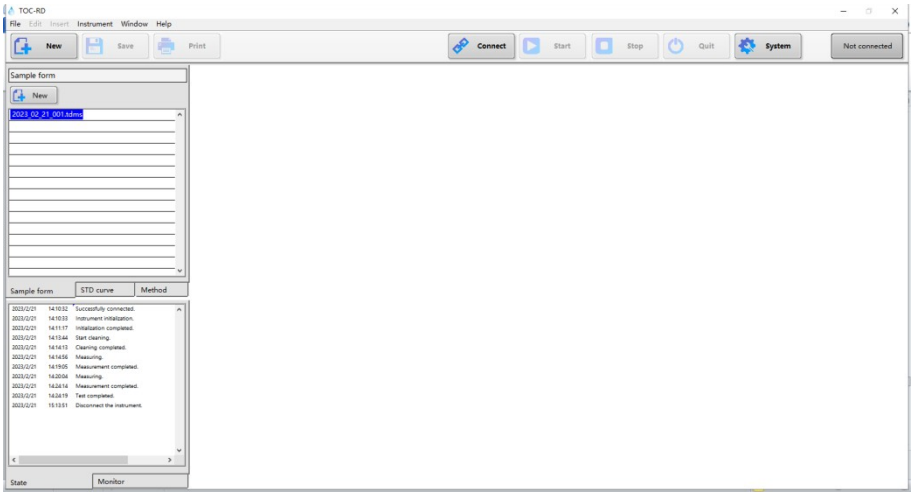
(Figure 7.41)

Item	Description
Content	Sample form printing: The selected sample table is output with the whole table overview. Print detailed data: The selected sample table is output according to the row-by-row data content and details content.
Printer Name	Select the printer to be used.
Number of copies	Enter the number of copies of tables.

7.7 Operation and Analysis

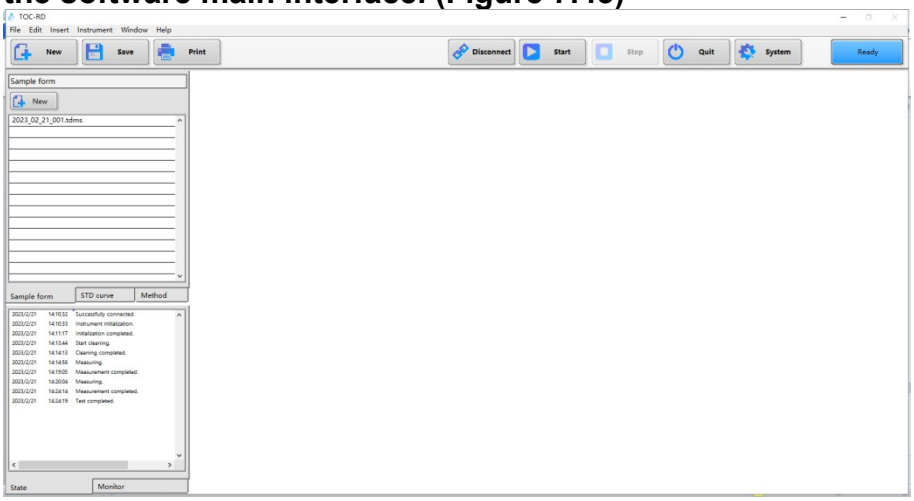
7.7.1 Connect

Software and instrument must be connected before analysis. Click “Connect” on the software interface. (Figure 7.42)



(Figure 7.42)

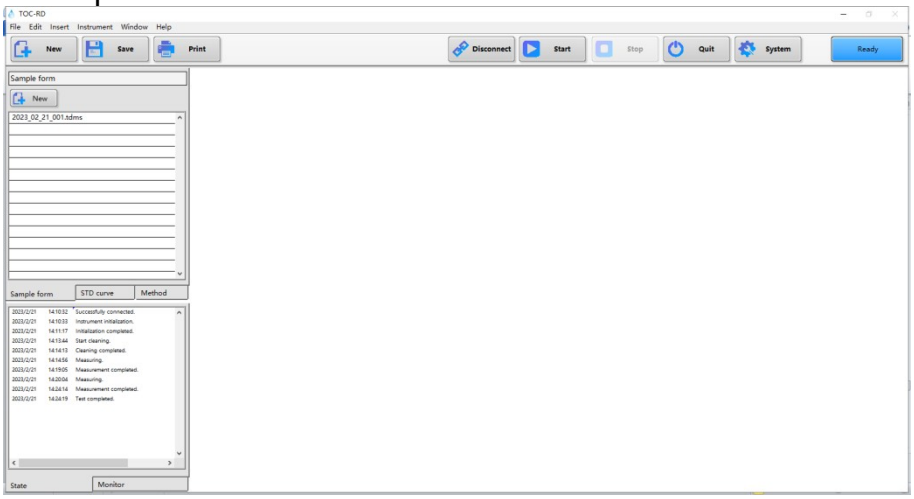
Note: The software will enter the instrument initialization state after clicking “Connect”. In this state, the software interface cannot be operated until “Instrument initialization is completed” appears in the “Status” tab in the output window at the lower left corner of the software main interface. (Figure 7.43)



(Figure 7.43)

7.7.2 Disconnect

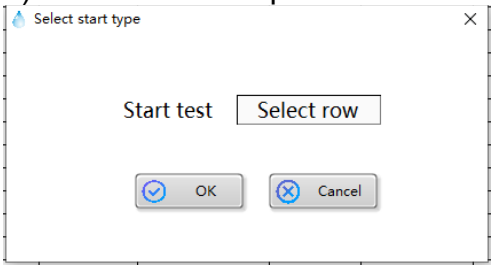
If the instrument is connected, you may click “Disconnect” on the software interface to interrupt the communication between the software and the host. (Figure 7. 44)



(Figure 7. 44)

7.7.3 Start

1) Connect the instrument. Please refer to “7.7.1 Connect”.
2) Create/open a sample table. Please refer to “7.4.3 View saved sample table”.
3) Select what you want to test.
4) Click “Start” to open the “Start Test Mode” window. (Figure 7.45)



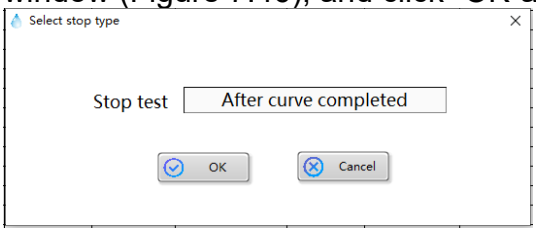
(Figure 7.45)

Item	Description
Start Test Mode	Selected row test: Test the selected row of the sample table in a single row. Full table test: Test all rows in the sample table row by row.

5) Click “OK”and the software will start the analysis. After the measurement is completed, the results will be displayed in the sample table and the analysis is finished.
Note: If no autosampler is configured, the software will prompt to change the sample during the full-table test. The measurer can continue the test by clicking “OK” after changing the sample according to the actual situation.

7.7.4 Stop

In the process of testing samples, you may click “Cancel” to pop up the “Stop test mode” window (Figure 7.46), and click “OK”after selection.

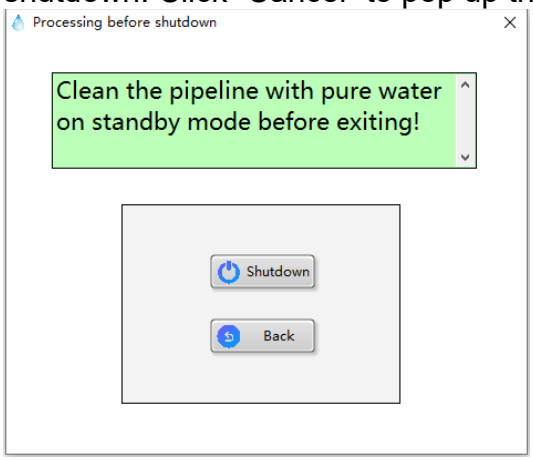


(Figure 7.46)

Item	Description
Stop test mode	After curve completed: Stop the test after the current injection analysis is finished. After current test completed: Stop the test after the analysis of the current row is finished. Immediately: Interrupt the current analysis immediately.

7.7.5 Quit

After the instrument is used, the shutdown process of the instrument is required before shutdown. Click “Cancel” to pop up the “Processing before shutdown” window. (Figure 7.47)

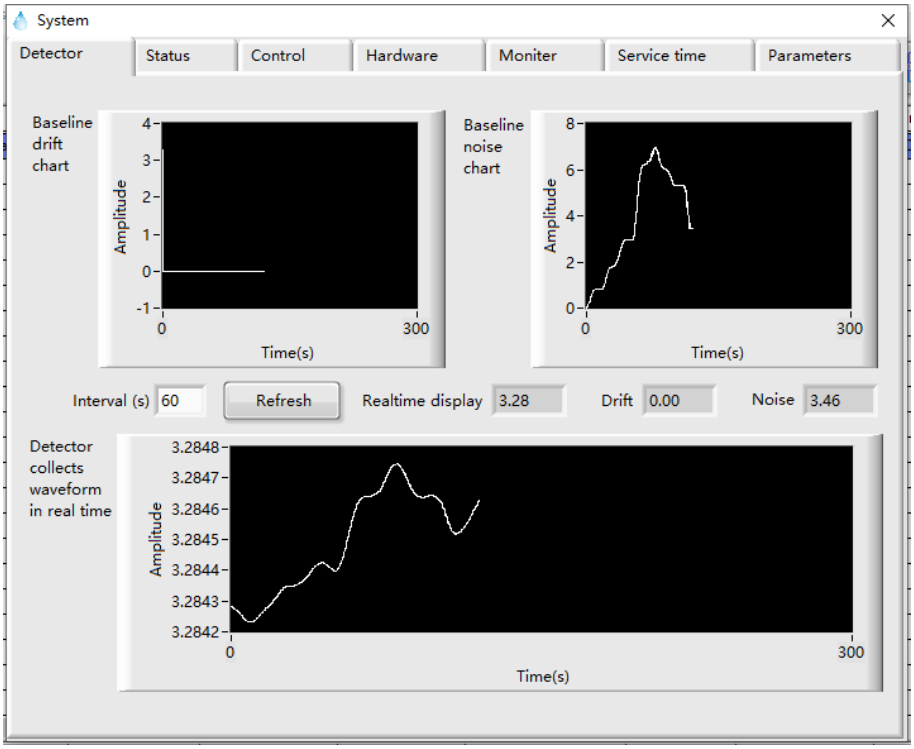


(Figure 7.47)

Item	Description
Operation prompt window	It displays the actions that need to be taken before exiting.
Shutdown	Clean the instrument pipe with pure water and reduce the temperature to 200℃. When pure water is used to clean pipes, the software interface is locked and cannot be used.
Back	After cleaning before shutdown, you can return to the main screen.

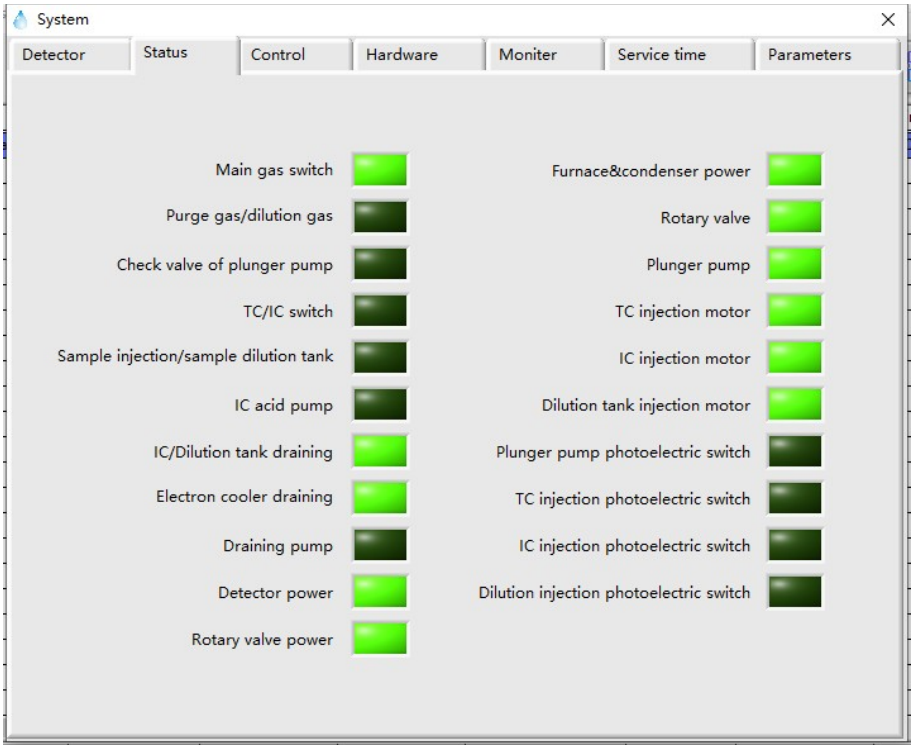
7.7.6 System

Click “System” on the software interface to pop up the “System” window.
Detector status (Figure 7. 48)



(Figure 7.48)

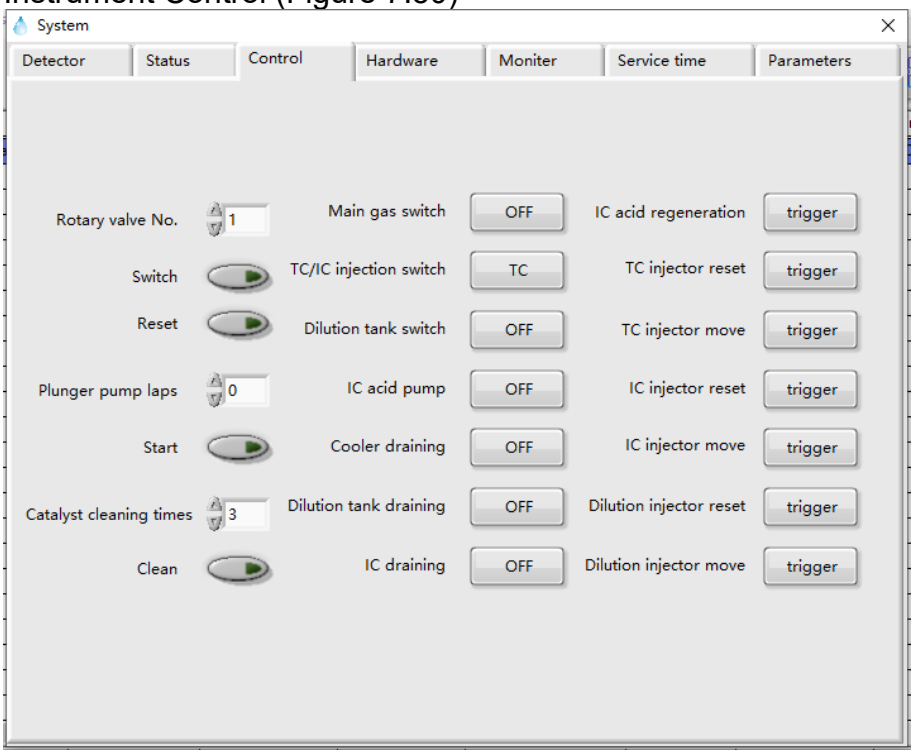
The interface mainly displays some real-time data and a peak chart of the detector, which is used to judge whether the detector is abnormal in case of an abnormal situation.
Instrument status (Figure 7.49)



(Figure 7.49)

The interface shows the status of the main accessories of the instrument, which is used to assist in judging the causes of the abnormal situation.

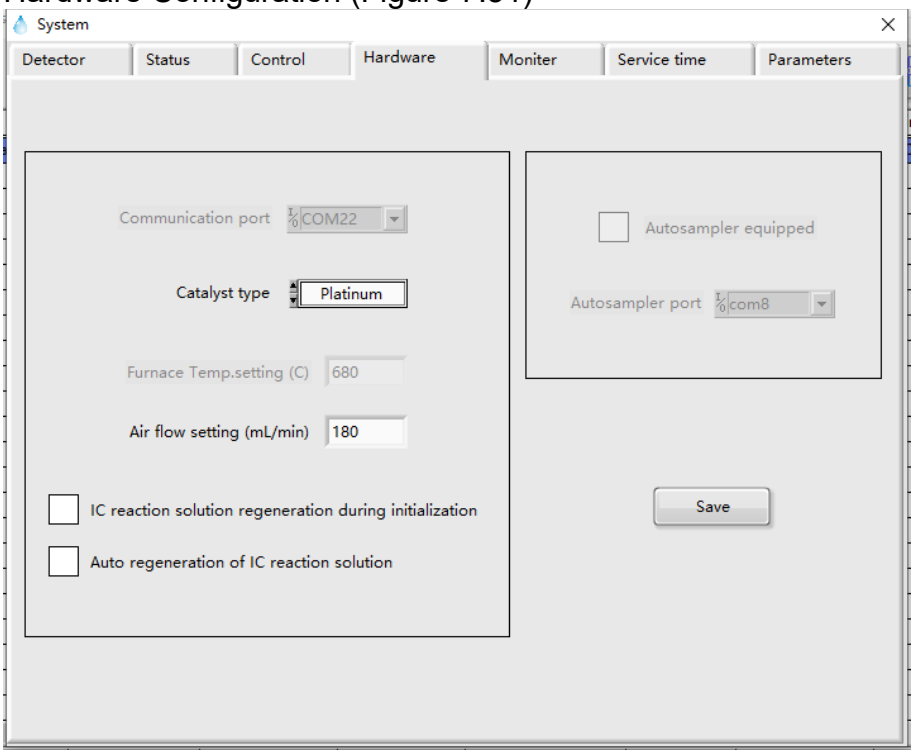
Instrument Control (Figure 7.50)



(Figure 7.50)

The interface shows the basic control operations of the instrument, which is used to assist in debugging instruments.

Hardware Configuration (Figure 7.51)

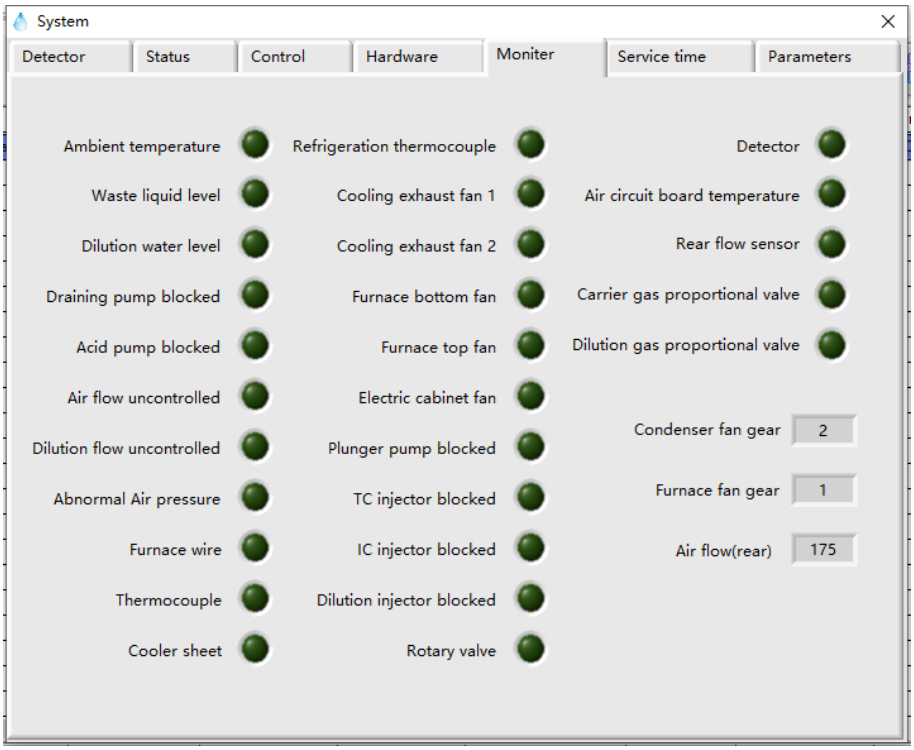


(Figure 7.51)

When the instrument configuration changes, it can be updated in this interface.
Note: After updating the configuration, you need to exit the software and re-enter the updated configuration before it can take effect.

Item	Description
Communication port	It is the serial communication port used by the instrument when connecting to the software.
Catalyst type	It is the catalyst type to be selected, and the defaulttype is platinum catalyst. Platinum catalyst and general catalyst can be used in this instrument, which can be selected according to actual use.
Furnace temperature setting	It is the set temperature of the cracking furnace, and the default setting is 680 ℃. When platinum catalyst is used, it is fixed at 680 ℃; when general catalyst is used, it can be set in the range of 0-1000 ℃ according to the actual demand (the default setting is 800 ℃).
Air flow setting (mL/min)	It is the set carrier gas flow rate, and the default rate is 180mL/min.
Auto regeneration of IC reaction solution	It is used to select whether to enable the automatic regeneration of IC reaction solution.When it is enabled, the IC reaction solution will automatically carry out acid replacement during the test process.
Autosampler equipped	Whether an autosampler is used. The default is no autosampler.
Autosampler port	It is the serial communication port used by the instrument when connecting to theautosampler.

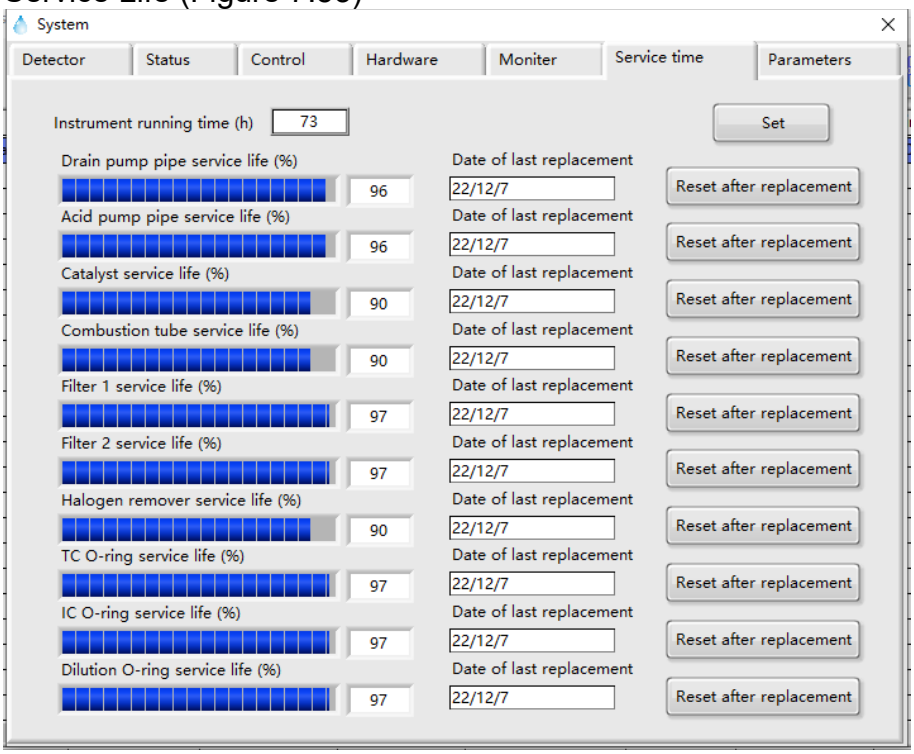
Debug Monitoring (Figure 7.52)



(Figure 7.52)

The interface displays the hardware status that is mainly viewed when the instrument is debugged.

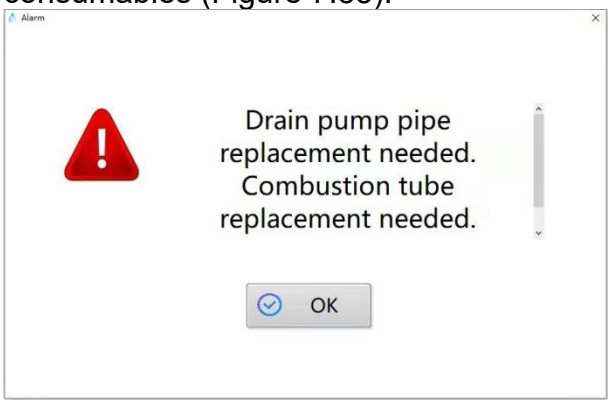
Service Life (Figure 7.53)



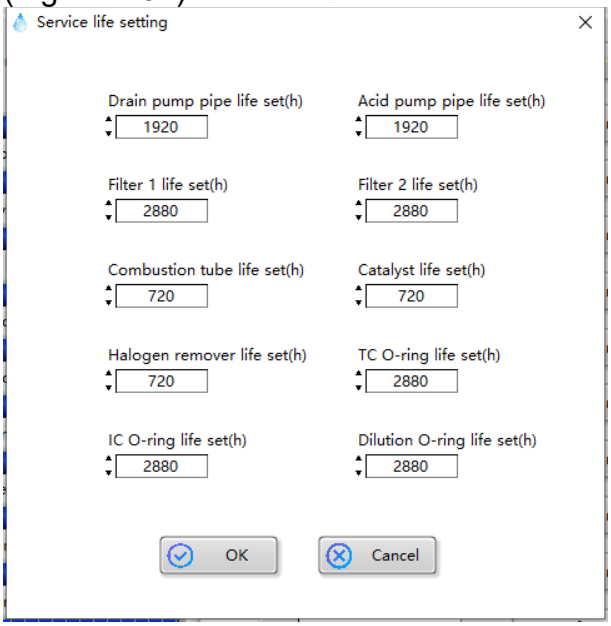
(Figure 7.53)

The interface displays the service life of the instrument and the use of main consumables,

which isused to reflect the service time of main consumables in time. When the service life expires, the software will prompt when entering the main interface (Figure 7.54). You may click “Set” on this interface to enter the interface for setting the service life of main consumables (Figure 7.55).



(Figure 7.54)



(Figure 7.55)

Chapter VIII Maintenance and Repair

8.1 Daily Inspection

Table 8.1

Parts	Inspection content	Inspection cycle	Solutions
Gas cylinder	Check the total pressure	Every day	Replace the cylinder when the total gauge pressure is less than 3MPa
Scrubber	Check the solution height	Every day	Replenish/replace the solution when the solution level in the scrubber is lower than the height of the branch pipe or when the solution is turbid

Acid bottle	Check theacid liquid level	Every day	Replenish acid when the solution in the acid bottle is less than 10mL
Halogen remover	Check the discoloration of halogen catches	Every day	Replace it as described in “8.2.1” when halogen catches change color by more than half
Enhanced halogen remover (optional)	Check the acid liquid level and residual amount of stainless steel mesh	Every day	Add the solution or stainless steel mesh as described in “8.2.1” when the liquid level is lower than the branch pipe or the stainless steel mesh dissolves

8.2 Consumables

Table 8.2

Name of consumables	Specification/ item number	Replacement cycle	Replacement method
Combustion tube	/	Three months or when it is damaged	Replace them as described in “5.3.1” and “5.3.2”
Standard catalyst	40g/bottle	Three months or when the response value of the standard solution decreases greatly or when replacing the combustion tube	
Platinum catalyst	15g/bottle		
Quartz ball	10g/bottle	Three months or when replacing the combustion tube	
Quartz wool	0.5 g/pack	Three months or when replacing the combustion tube and halogen catches	
Halogen catches	0.4m	Three months or when the discoloration fails	Replace it as described in “8.2.1”
Stainless steel mesh (Optional)	/	Complete dissolution	Replace it as described in “8.2.2”
Flexible joint	21 to 6.5 6 to 2.2 9 to 2.5	A year or when it is broken	/

	4 to 2.2		
Peristaltic pump tube	BPT NSF-51	Eight months	Replace it as described in “8.2.3”
Alkali lime	500g/bottle	One year	/
Filter	φ50mm*0.45μm	One year or suffocation	/
O-ring	φ13.6*1.8mm	Oneyear or sliding injection air leakage	Replace it as described in“8.2.4”

8.2.1 Replacement of halogen catches
1) Pull out the halogen remover with a slight outward force (Figure 8.1);

(Figure 8.1)

2) Remove the 9-to-2.5 flexible joint at the upper end of the halogen remover, and replace the quartz wool and halogen catches in the halogen remover (Figure 8.2).

(Figure 8.2)
Halogen remover can be installed by reverse operation.
Note: The halogen remover is made of quartz glass. Pleasebe careful andavoid breaking when replacing it.

8.2.2 Replacement of stainless steel mesh

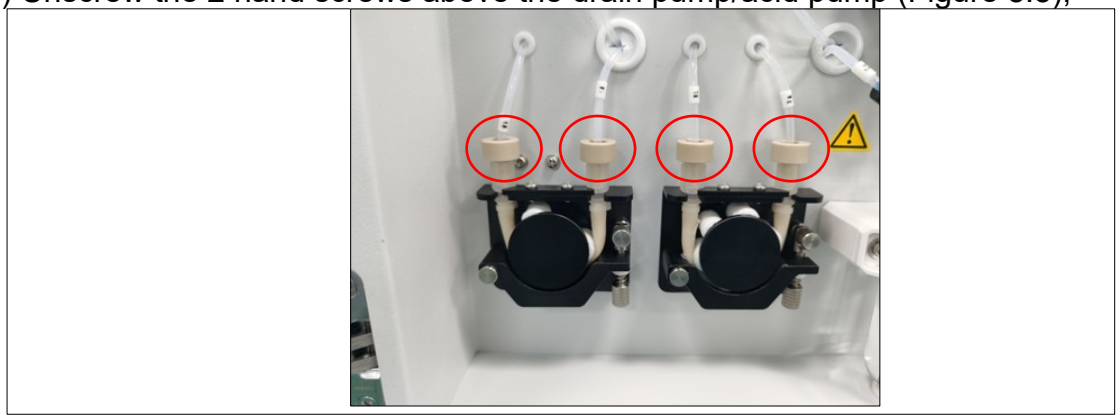
1) Unscrew the 4 screws on the 2 fixing plates, remove the 2 fixing plates, and then remove the enhanced halogen remover assembly (Figure 8.3);

(Figure 8.3)
2) Remove the 21-to-6.5 flexible joint from the enhanced halogen remover and add 0.05 mol/L hydrochloric acid and stainless steel mesh to it (Figure 8.4).

(Figure 8.4)
The enhanced halogen remover can be installed by reverse operation.
Note: 1. Intercepting trap and enhanced halogen remover are all made of quartz glass. Pleasebe careful and avoid cracking when replacing them;
2. Hydrochloric acid is a dangerous chemical. Pleasebe careful and avoid contact with the human body or leakage during treatment;
3. In order to avoid being scratched by stainless steel mesh, please be careful and protect yourself during the operation.

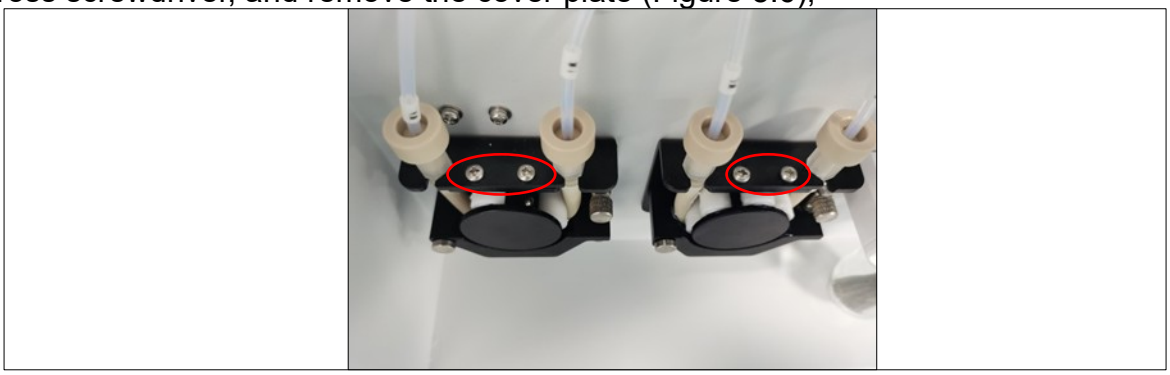
8.2.3 Replacement of pump pipe of drain/acid peristaltic pump

1) Unscrew the 2 hand screws above the drain pump/acid pump (Figure 8.5);



(Figure 8.5)

2) Unscrew the screws on the pump pipe fixing plateof the drain/acid peristaltic pump with a cross screwdriver, and remove the cover plate (Figure 8.6);



(Figure 8.6)

3) Loosen the hand screw nut of the peristaltic pump tube gland (Figure 8.7), and remove the pump pipe by translating outward.

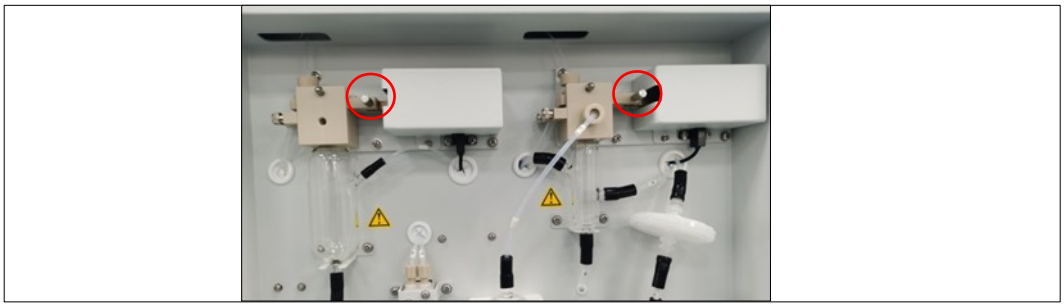
(Figure 8.7)

4) Take out the spare pump pipe and complete the installation by reverse operation of the above steps.

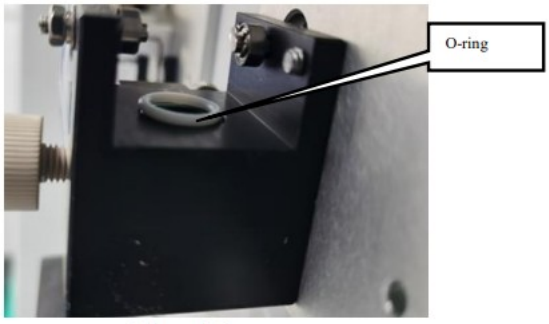
8.2.4 Replacement of O-ring

8.2.4.1 Replacement of sliding injection O-ring in dilution/IC tank

1) Unscrew the hand screw on the sliding injection rack of the dilution/IC tank (Figure 8.8);



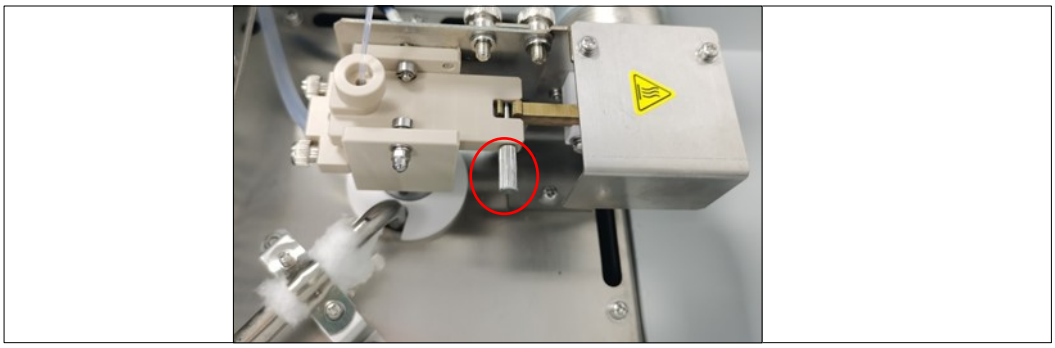
2) Move that sliding injection plate to the left and take it out;
3) Replace the O-ring (Figure 8.9) and complete the installation by reverse operation of the above steps.



(Figure 8.9)

8.2.4.2 Replacement of TC sliding injection O-ring

1) Unscrew the hand screw on the TC sliding injection rack (Figure 8.10);



(Figure 8. 10)

2) Move the sliding injection plate backward, and take it out;
3) Replace the O-ring (Figure 8.11) and complete the installation by reverse operation of to the above steps.
Note: When replacing the O-ring, please place it in the clamping slot, otherwise it will adverselyaffect the installation of the sliding injection plate.

8.3 Fault Analysis and Diagnosis

8.3.1 Error messages

The following error messages will appear on the computer screen. Please take proper measures in the table below.
If the same error message still appears after taking corresponding measures, please contact our after-sales engineer.
Table 8.3

Error message	Description	Corrective measures
Abnormal ambient temperature	Chassis temperature is too high	Put the instrument on standby and control the room temperature
Abnormal liquid level of waste liquid	The waste liquid bucket is full	Pour out the waste liquid
Abnormal dilution water level	Dilution water level is lower than the liquid level sensor	Supplementdilution water
Abnormal drainage pump	The drain pump cannot rotate normally	Turn off the instrument and contact our after-sales engineer
Abnormal acid pump	The acid pump cannot rotate normally	Turn off the instrument and contact our after-sales engineer
Abnormal carrier gas flow rate	The carrier gas flow rate is inconsistent with the set value	Contact our after-sales engineer to check the gas circuit
Abnormal diluent gas flow rate	The diluent gas flow rate is inconsistent with the set value	Contact our after-sales engineer to check the gas circuit
Abnormal air	The carrier gas pressure	Check the supply of carrier

pressure	is too low	gas
Abnormalfurnace wire	The the cracking furnace cannot heat up	Turn off the instrument and contact our after-sales engineer
Abnormal thermocouple	Abnormal temperature display of the cracking furnace	Turn off the instrument and contact our after-sales engineer
Abnormal refrigeration sheet	The refrigeration temperature cannot be lowered	Turn off the instrument and contact our after-sales engineer
Abnormal thermal resistance of refrigeration	/	Turn off the instrument and contact our after-sales engineer
Abnormal refrigeration exhaust fan 1	Abnormal operation of refrigeration exhaust fan 1	Turn off the instrument and turn on the power again. Please pay attention to whether the same error reappears after running the instrument again
Abnormal refrigeration exhaust fan 2	Abnormal operation of refrigeration exhaust fan 2	Turn off the instrument and turn on the power again. Please pay attention to whether the same error reappears after running the instrument again

Error message	Description	Corrective measures
Abnormal fan at the bottom of the cracking furnace	Abnormal operation of fan at the bottom of the cracking furnace	Turn off the instrument and turn on the power again. Please pay attention to whether the same error reappears after running the instrument again
Abnormal fan at the top of the cracking furnace	Abnormal operation of fan at the top of the cracking furnace	Turn off the instrument and turn on the power again. Please pay attention to whether the same error reappears after running the instrument again
Abnormal fan of the electric cabinet	Abnormal operation of electric cabinet fan	Turn off the instrument and turn on the power again. Please pay attention to whether the same error reappears after running the instrument again
Piston pump motor stalling	The plunger pump does not work properly	Turn off the instrument and contact our after-sales engineer
TC sliding injection	TC sliding injection does	Turn off the instrument, check

motor stalling	not work properly	the slider and remove any foreign particles from the sliding injection device
IC sliding injection motor stalling	IC sliding injection does not work properly	Turn off the instrument, check the slider and remove any foreign particles from the sliding injection device
Sliding injection motor stalling in the dilution tank	Sliding injection of the dilution tank does not work properly	Turn off the instrument, check the slider and remove any foreign particles from the sliding injection device
Abnormal rotary valve	Abnormal operation position of the six-way valve	Turn off the instrument, take out the rotor of the six-way valve, remove debris and other objects, and then clean the six-way valve.
Abnormal detector	The benchmark value fluctuates greatly and cannot be stabilized for a long time	Turn off the instrument and contact our after-sales engineer
Abnormal temperature of the gas circuit plate	/	Turn off the instrument and contact our after-sales engineer
Abnormal post-stage flow sensor	Abnormal gas flow display	Turn off the instrument and contact our after-sales engineer
Abnormal carrier gas proportional valve	Abnormal carrier gas flow display	Turn off the instrument and contact our after-sales engineer
Abnormal diluent gas proportional valve	Abnormal diluent gas flow display	Turn off the instrument and contact our after-sales engineer

8.3.2 Troubleshooting

Table 8.4

Fault information	Phenomenon	Cause	Countermeasures

Abnormal gas flow rate	The gas flow rate displayed on the main interface is inconsistent with the gas flow parameter set in the software	** Expression is faulty **The pressure reducing valve is not adjusted ** Expression is faulty **Air leakage in the sliding injection ** Expression is faulty **Glass fittings are broken or blocked ** Expression is faulty **Aging or breakage of flexible joints ** Expression is faulty **Filter blockage	** Expression is faulty **Adjust the partial pressure of the pressure reducing valve ** Expression is faulty **Replace O-ring ** Expression is faulty **Replace glass fittings or internal fillers ** Expression is faulty **Replace the soft connector ** Expression is faulty **Replace the filter
Abnormal display of IC refrigeration temperature	The displayed IC refrigeration temperature is inconsistent with the set value	IC refrigeration module failure	Turn off the instrument and contact our after-sales engineer
Abnormal temperature display of the cracking furnace	The displayed temperature of the cracking furnace is inconsistent with the set value	Cracking furnace failure	Turn off the instrument and contact our after-sales engineer
Abnormal detector reference value	The benchmark value fluctuates greatly and cannot be stabilized for a long time	** Expression is faulty **Leakage in the gas circuit ** Expression is faulty **There is a big difference in environmental temperature and humidity ** Expression is faulty **The internal components of the detector are damaged or aged	** Expression is faulty **Check the gas circuit for leakage ** Expression is faulty **Reboot after stabilizing the ambient temperature and humidity ** Expression is faulty **Turn off the instrument and contact our after-sales engineer

Poor test repeatability	RSD of multiple test results > 3%	** Expression is faulty **The sample is not uniform ** Expression is faulty **Residual bubbles in the injection tube ** Expression is faulty **The pipeline is not cleaned before the injection ** Expression is faulty **Leakage in the gas circuit ** Expression is faulty **The internal components of the detector are damaged or aged ** Expression is faulty **The carbon content of the sample is too low	** Expression is faulty **Mix the sample evenly ** Expression is faulty **Clean the injection tube many times ** Expression is faulty **Sample injection after cleaning the pipeline ** Expression is faulty **Check the gas circuit for leakage ** Expression is faulty **Turn off the instrument and contact our after-sales engineer ⑥ Increase the sample injection test
No peak after sample injection	The response value is extremely low	** Expression is faulty **The sample is not injected ** Expression is faulty **Abnormal carrier gas ** Expression is faulty **Abnormal detector	** Expression is faulty **Observe whether the sample is injected into the combustion tube or IC reaction tank with naked eyes ** Expression is faulty **Check the gas circuit ** Expression is faulty **Turn off the instrument and contact our after-sales engineer

Chapter IX Reference Information

9.1 Standard Accessories

Table 9.1 List of Standard Accessories 1 (BANA-606)

No.	Item	Model/Specs	Unit	Qty.	Note
1	TOC analyzer	BANA-606	pcs	1	
2	Dilution bottle assembly	/	pcs	1	
3	Absorbing bottle assembly	/	pcs	1	
4	Waste liquid tank assembly	/	pcs	1	
5	Standard catalyst	40g	pcs	2	
6	Gas pipe	1m	pcs	1	
7	Rubber hose	50mm	pcs	1	

8	Stainless steel tube	300mm	pcs	1	
9	Platinum aluminum catalyst	15g	pcs	2	
10	Connection pipe A	8m	pcs	1	
11	Quartz ball	10g	pcs	2	
12	Quartz wool	0.5g	pcs	2	
13	Halogen Complementary	0.4m	pcs	2	
14	Quartz cotton	5g	pcs	1	
15	Drain Tube	1.5m	pcs	1	
16	Connecting wire of liquid level switch	/	pcs	1	
17	Scrubber A	/	pcs	1	
18	Combustion tube B	/	pcs	2	
19	Power cable	1.8m	pcs	1	
20	USB Cable	2m	pcs	1	
21	L-type ferrule joint	φ8-φ8	pcs	1	
22	Oxygen regulator (metric)	YQJ-5	pcs	1	
23	Sample bottle	125mL	pcs	1	
24	Acid bottle	250mL	pcs	1	
25	Filter	φ50mm*0.45um	pcs	2	
26	O-rings	φ14*2mm	pcs	3	
27	O-rings	φ31*3.1mm	pcs	3	
28	O-rings	φ13.6*1.8mm	pcs	6	
29	Software	/	pcs	1	U disk
30	Manual	/	pcs	1	

9.2 Optional Accessories

Table 9.2 List of Standard Accessories 2 (BANA-607)

Part name	Specification/item number	Unit	Quantity
Autosampler	BANA-607	pcs	1
Sample plate	/	pcs	1
Clamp joint wrench	/	pcs	1
Power cord	GB 3-hole, 10A, 1.5 mm ® * 1.8 m	pcs	1
Power adapter	GST120A24-P1M	pcs	1
USB communication	A to B, 2m	pcs	1

line			
Injection bottle	/	pcs	22
Sample injection pipe assembly	/	pcs	1
Software	/	pcs	1
Manual	/	pcs	1

Table 9.3 List of Optional Accessories (Enhanced Halogen Remover)

Part name	**Specification/item number**	**Unit**	**Quantity**
Fixing seat	/	pcs	2
Fixing plate	/	pcs	2
Flexible joint	6 to 2.2	pcs	2
Flexible joint	21 to 6.5	pcs	1
Connecting pipe	/	pcs	2
PEEK joint	/	pcs	1

Email: contact@biolabscientific.com
Website: www.biolabscientific.com