ECLASSICAL 3200 HPLC

USER MANUAL

Operation Manual

for D3230/40 Diode Array Detector

V1.0.7

Statement

The manual describes various contents of EClassical D3230/40 Diode Array Detector. It is intended to help users to understand, use and maintain the instrument of D3230/40. Dalian Elite Analytical Instruments Co., Ltd. does not assume the responsibility caused by the manual.

The manual is subject to change without notice.

This manual has been published after careful review. It is believed to be accurate and complete. Dalian Elite Analytical Instruments Co., Ltd is not responsible for any error that may appear in the manual and the resulting incidental or renewal of harm.

In any case, Dalian Elite Analytical Instruments Co., Ltd. is not responsible for the impact caused by the use of the manual and equipment.

Please read the directions before using.

Foreword

Thank you for purchasing our equipment. To ensure correct and safe use of the instrument, please read it carefully before using.

The details of the equipment's composition, installation, method of using, maintenance, parts selection and other points are described in the manual. After reading, please keep it carefully. Please delivery the manual with the instrument.

For safe operation, please read the following **Safety Precautions** before using the instrument.

Safety Precautions

According to the level of danger and harm, safety signs here are divided into the following three categories:

［**Warning**］Failure to properly follow the instructions and precautions indicated by this sign can result in serious injury or damage to health and property. The property damage includes the environment around and the instruments.

［**Caution**］Failure to properly follow the instructions and precautions indicated by this sign can result in slight injury or damage to health and property. Slight injury means no hospitalization is needed to the wounded. Slight property damage means the instruments can be recovery through simple maintenance.

［**Note**］The sign is used wherever information is given to ensure optimal performance of the instrument.

1. Precaution for usage

［**Warring**］**D3230/40** Diode Array Detector should only be used as a part of liquid chromatography. Do not use it for any other purpose. Except for special instructions, the instrument does not have explosion-proof function.

2. Ambient Conditions

［**Warning**］When the organic solvents are used，it is recommended that interior must be well ventilated and the firework should be prohibited. Also, a sink or equipment for washing eyes should be installed nearby in case of the organic solvent contacting with the eyes or skin.

［**Note**］In order to ensure high efficiency, keep the instrument away from caustic gas and dusty environment. The worktable should be neat, smooth, firm, and big enough. Ambient should be between 10℃ to 30℃ with a small fluctuation, and RH should be between 45% to 85%. Keep it away from cold or hot source as well as direct sunshine. The system should not be close to strong magnetic field.

3. Precaution for installation

［**Warning**］The instrument should be installed following the instructions strictly by professionals, make sure that the voltage of the power sockets the same as the power supply voltage indicated on the instrument. Using the wrong power voltage could result in danger and fire.

The accessory power cable should be used to connect the instrument to the power socket. Other cable should not be used.

Make sure the line cord is connected to a properly grounded power receptacle to prevent static and electric leakage.

［**Caution**］The instrument is so heavy, you should move it carefully and watch your hands at the same time.

［**Note**］The instrument should be connected following the instructions strictly. Wrong connection could cause communication error.

4. Precaution for use

［**Warning**］Do not use the instrument in places where heat resource, fire seat, magnetic resource, strong vibration exist or may exist. It is prohibited to play flammable nearby.

The bottle for storing the mobile phase should have pore in cap to prevent danger caused by negative pressure in the bottle.

A gap between waste tube and the cork of waste bottle is necessary to prevent the waste bottle bursting when it is overfilled. The gap should be smaller to insure less evaporate of hazardous solvents. Even though, the waste needs to be clean up promptly.

［**Caution**］When using organic solvents, please wear safety goggles, special lab coats, gloves mask etc. If your body is exposed to toxic solvent accidentally, wash it immediately, and then go to hospital for specialized treatment.

［**Note**］When preparing mobile phase, please use HPLC-grade or equivalent at this level solvents. Solvents must be prefiltered by the manufacturer with 0.45μm (or smaller) mesh filter. Degas all mobile phase before using it. Degassing can help to ensure a stable baseline and consistent analytical results.

Before first use, rinse the entire piping system according to the requirements of the manual, direct use is likely to block pipeline.

Before sample test, ensure that the pipeline in the system is filled with mobile phase without any bubble, otherwise it will affect the reliability of test results.

If an eluent is replaced with another eluent in which is insoluble, such as positive mobile phase (hexane) and reverse phase (methanol), be sure to operate according to the specified method in the manual, otherwise it will cause serious pipeline jam, and even system paralysis.

Do not use the following solvent: concentrated sulfuric acid, nitric acid, dichloroacetic acid, methylene chloride, chloroform, chloroform, dimethyl sulfoxide, acetone, tetrahydrofuran, etc. Such solvents always reduce the strength of the PEEK material, make it become fragile and broken, but the impact of short-term use of aqueous solution of acetone(lower than 0.5%) in gradient performance, the impact is receptible.

When using PEEK pipes, the pressure of system should be lower than the tolerance pressure of peek material, otherwise it may burst.

The bending radius of peek pipe should be more than 10mm, make the peek pipe natural relaxation during installation.

The PEEK pipe should be intercepted with professional tube cutter in order to make the pipe more smoothly. Pay attention to that there should be no cutting debris left in the pipe.

5. Repair, maintenance and parts replacement

［Warning］ Before repair, maintenance and parts replacement, please turn off the power in case of leakage and electric shock.

There is no need to open the host cover while daily maintenance and repair. If the repair needs to open the host cover please entrust agents or communicate with us.

Use dry cloth to wipe the instrument. Do not use water or alcohol. The use of these liquids may erase characters or color on the panel.

Do not replace parts (e.g., fuses, deuterium lamp, etc.) from other company or other type, all accessories are required to be specified to prevent danger.

6. Precaution for static electricity

［**Warning**］As the system may use a lot of flammable, explosive organic reagents which can contaminate laboratory air. When the reagent concentration is too high, any spark or flame could cause fire or explosion accidents. Do not use the instrument near any fire resource, hot resource, and static electricity resource. To reduce static electricity, please take the following measures:

1） Make the instrument grounded. It is very important, please pay attention to it.

2） Maintain proper indoor humidity (humidity is greater than 65% can prevent static electricity effectively) and keep the environment clean.

3） Metal waste bottles (external conductive) should be grounded (no ground insulation). When using other materials container, you can insert one end of the wire into liquid in the bottle and make the other end earthed.

4） Replace a larger I.D. pipe when the flow of mobile phase flow is higher.

5） Wipe the instrument regularly.

6） Staffs should wear anti-static clothing. An anti-static bag is needed on the floor.

7） People and objects with static electricity is prohibited to touch the instruments.

7. Warning label instructions

To ensure the safety of staffs, we attach warning labels on the equipment where are dangerous. If the label is missing, please request new ones from the company, and attach to the correct position.

Contents

1. Chapter One： Introduction

1.11 Introduction

EClassical 3200 High Performance Liquid Chromatograph is a new generation of devices developed by Dalian Elite Analytical Instruments Co., Ltd., with intellectual property.

D3230/40 Diode Array Detector (called D3230/40 for short), can be conveniently combined with pumps, autosamplers, column oven and other modules of HPLC, serving as a detection unit module, or used as an independent tool.

D3230/40 has an advanced optical system differing from single wavelength uv-vis detector. The light beam from the deuterium lamp was focused on the flow cell, passed through the slit and entered into the light-splitting optical system. The grating disperses light into bands of wavelengths and focuses the onto the plane of the photodiode array. The detector measures the amount of light striking the photodiode array to determine the absorbance of the sample in the flow cell. The detector provides with chromatograms at any wavelength, as well as spectra at any time. In this way, users obtain 3D spectrum.

1.12 Features and Functions

Excellent Design

- D3230/40 detector is a dedicated multiple wavelength detector, innovated by professional team. New optical system, corrected by unique wavelength calibration method, improves the detector's performance, with higher system light energy, lower baseline noise, higher S/N ratio, more excellent wavelength accuracy and wider wavelength detective range.
- Optical System, achromatic and aplanatic, constructed of ellipsoidal mirror and toroidal mirror, obtained higher light energy.
- Equipped with imported flat field imaging grating, the detector has higher diffraction efficiency and lower stray light.
- Using CMOS linear image sensor with 512/1024 pixels, the detector has spectral resolution of 1.2/0.6 nm.
- With excellent mechanical design, D3230/40 detector owns: optimized airduct system to lower the baseline drift; Reasonable cooling mode to extend the service life.
- Convenient operation on deuterium lamp replacement indicates that it is not necessary for users to recalibrate after that.

Intelligent System

- Fully automated power-on self-test to help users to realize circuit faults in time, avoids unnecessary damage.
- Integrated into Chromsoft data workstation, the detector is easily operated. The workstation implements automatic analysis and audit trail with comprehensive function.
- Real-time acquisition of both chromatograms and spectra makes it possible to obtain 3D spectrum for peak purity calculation and library searching.
- It displays signals from multiple channels, with flexible sample frequency, detection wavelength range and response time, better meeting demand for separating and analysis.
- The opening times and running time of deuterium lamp are recorded in the workstation so that users could get relevant information directly and easily.

1.13 Performance Specifications

Table 1-1 Performance specifications of D3230/40 detector

No.	Items	Specifications
1	Light source	Deuterium lamp (tungsten lamp, optional)
2	Exposure time	25ms, 50ms, 100ms
3	Sample frequency	5Hz (2, 10, 20)
4	Wavelength range	190-800nm
5	Wavelength repeatability	≤0.1nm
6	Wavelength accuracy	±1nm
7	Spectral resolution	1.2nm
8	Photodiode array	512/1024 element
9	Noise	≤$\pm 1.0\times10^{-5}$AU (dry flow cell, 254nm, 10Hz)
10	Drift	≤3×10^{-4}AU/h (dry flow cell, 254nm, 10Hz, temperature change below 2 ℃/hour)
11	Linearity range	≥2.0AU(5%)(254nm)
12	Maximum backpressure on flow cell	≤8MPa
13	Cell path length	10mm
14	Communication mode	UDP

1.14 Physical Specifications

Table 1-2 Physical Specifications of D3230/40 detector

No.	Items	Specifications
1	Weight	10Kg
2	Dimension	440*378*160 (mm)
3	Power requirements	AC220V±10%, 50/60Hz
4	Typical input power	100W

1.15 Principles

1.5.1 Optical System

The optical system of D3230/40 Diode Array Detector is shown as Fig. 1-1. The light of illumination source is reflected and focused on the flow cell, and then reflected and focused on the slit. Light passes through the slit onto a holographic grating. The grating separates the light beam into all its component wavelengths and reflects the light onto the photodiode array. Every individual photodiode transmits the light into circuit signal, after which, the analog signal is converted into digital signal by DAD Mainboard. In the D3230/40 optical system: The slit limits the spectral resolution and the light intensity as an entrance; The Diode Array is a series of 512/1024 linear photodiodes as a terminal. The widths of each photodiode and the adjacent photodiodes determine the diode resolution.

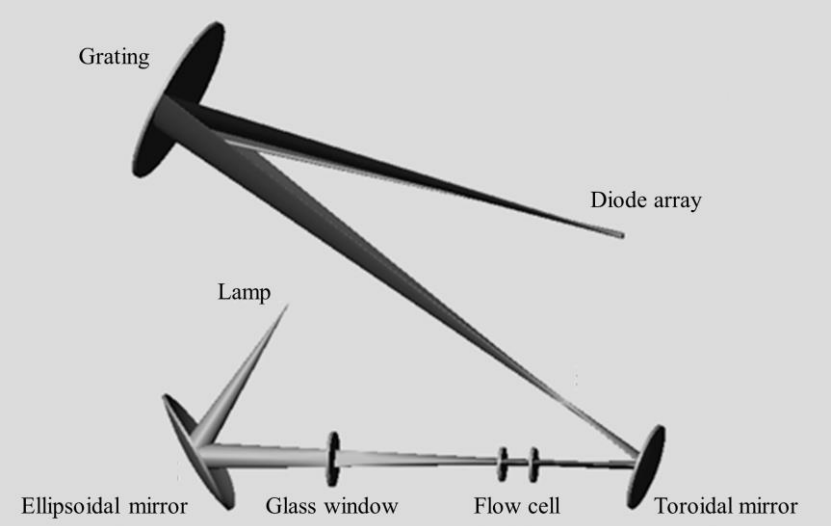


Fig. 1-1 Optical system of D3230/40 detector

1.5.2 Circuit System

In the circuit system of D3230/40 detector, optical signals collected by photoelectric sensor is converted to digital signal with pre-amplification electric circuit and AD converter. Then digital signals are transferred to DAD Mainboard CPU and processed; DAD Mainboard control the lamp, light filters and other functions. The DAD Mainboard communicates with the chromatography workstation with handshake agreement, in monitor of fault status as well. In the event of an exception, the mainboard upload error code to the workstation to prompt it. Two switching power supplies constitute the power supply system.

The circuit system is shown as Fig. 1-2.

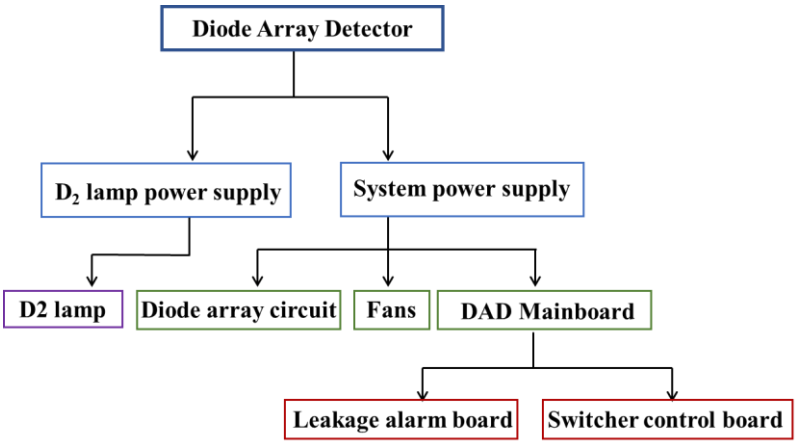


Fig. 1-2 Circuit system of D3230/40 detector

1.16 Appearance

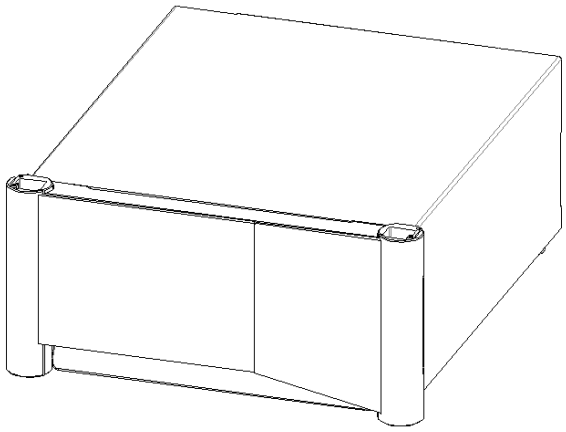


Fig. 1-3 3D view of D3230/40 detector

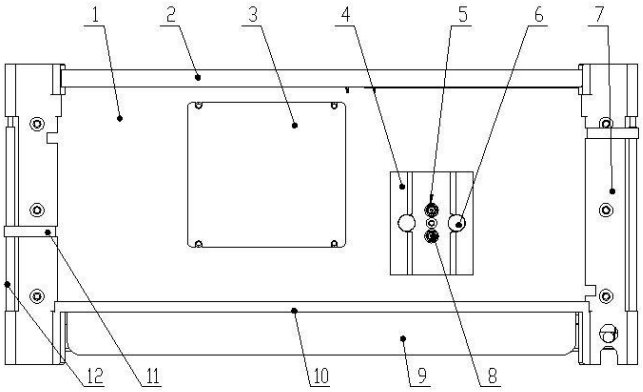


Fig. 1-4 Front view of D3230/40 detector

1.Front plate；2.Upper beam；3.Lamp cover plate；4.Flow cell；5.Export union；6.Finger-tight screw；7.Inner stand column；8.Entrance union；9.Bottom beam；10.LED bracket；11.Fixation clamp；12. Fixation stand column

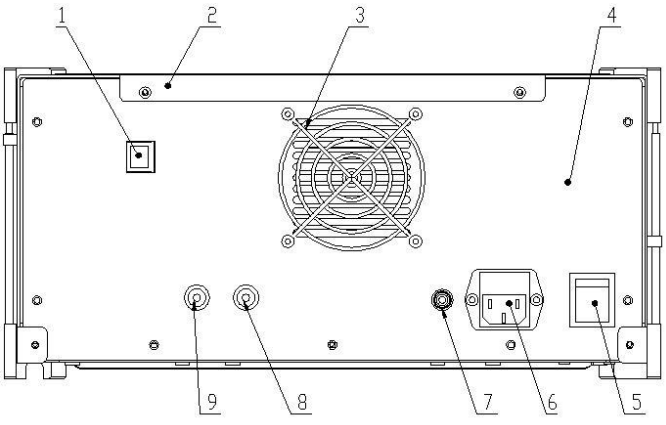


Fig. 1-5 Rear view of D3230/40 detector

1.LAN interface；2.Enclouser；3.Fan；4.rear plate；5.Power switcher；6.AC-IN power

interface；7. Ground terminal；8.Analog output；9. Trigger terminal

1.17 Structure and Layout

As shown in Fig. 1-6, D3230/40 detector is constructed of precision machinery structure, optical and electronic components. Reasonable layout and high precision machining make sure of excellent quality of the instruments.

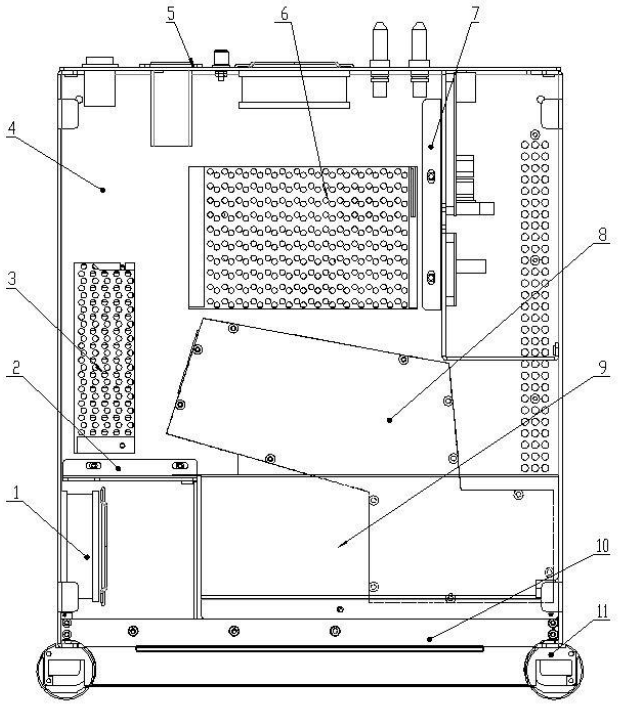


Fig. 1-6 Layout of D3230/40 detector

1.Lateral fan；2.Partition；3.D_2 lamp power supply；4.Bottom plate；5.Rear plate；6.System power supply；7.Circuit boards；8.Polychromator；9.Air duct；10.Upper beam；11.Stand column

2. Chapter Two：Installation and Transport

2.1 Standard Accessories

D3230/40 Detector is packed with corrugated boxes and foam lined structure. When you receive the instrument, check the packaging first. If the packaging is damaged, please contact with Dalian Elite Analytical Instruments CO., Ltd. or local dealer.

【Warning】 **If there are signs of damage, please do not attempt to install the module. Inspection by Dalian Elite Analytical Instruments CO., Ltd is required to evaluate if the instrument is in good condition or damaged.**

2.1.1 Unpacking

Put the detector on level ground with the face of the packing box up. Cut the tape on the top, take out the detector and accessories package, and place them on the table. Then, remove foam, open the instrument protective film.

2.1.2 Delivering Checklist

Table 2-1 Deliver list of D3230/40 detector

NO.	Items	Units	Qty
1	D3230/40 Diode Array Detector	pc.	1
2	User Manual (USB)	pc.	1
3	Certificate	pc.	1
4	Service Card	pc.	1

2.2 Stack Configuration

To ensure optimum performance of the detector, the following configuration is recommended as Fig. 2-1.

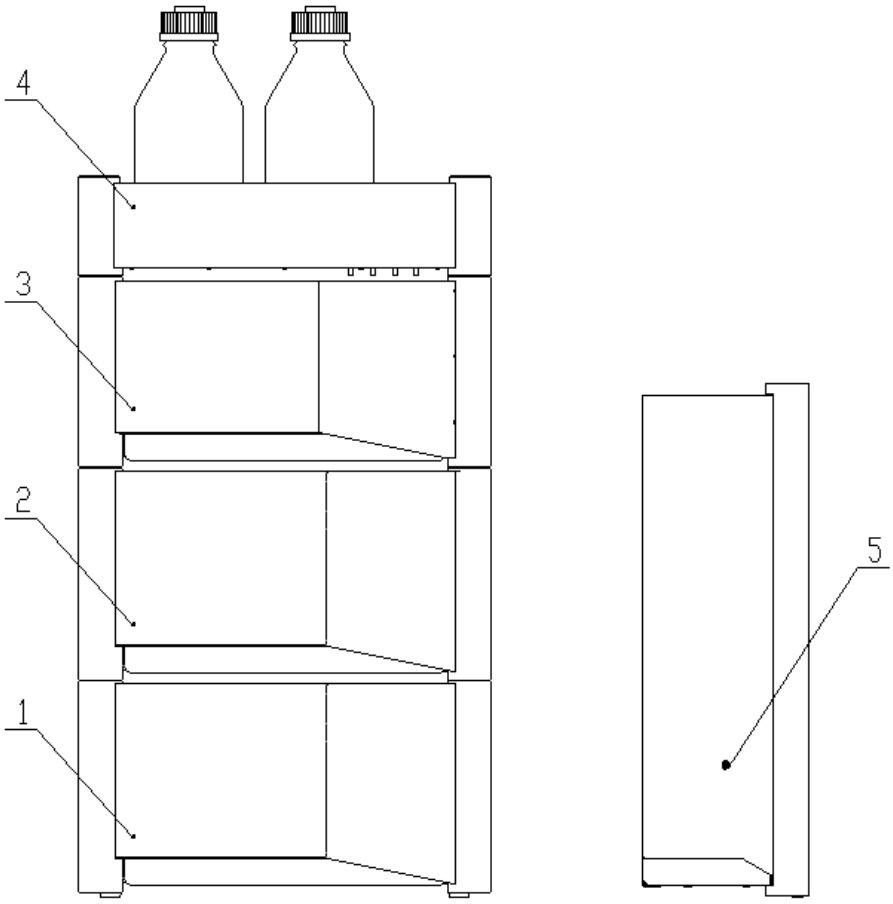


Fig. 2-1 Recommended Stack Configuration for EClassical 3200 HPLC

1. Pump；2. Autosampler；3. Detector；4. Solvent cabinet；5. Column oven

2.3 Installation Requirements

3.18.1 Site Requirements

- *Environment*

Detector need to work under ambient conditions in Table 2-2 below.

Table 2-2 Environment requirements

Items	Specifications	Requirements
1	Work environment	Room should be free of dust, inflammable and explosive materials, good ventilation is also important
2	electromagnetic field	No electromagnetic noise nearby
3	Operating temperature	4~40℃(39~104◦F)
4	Humidity	20%~80%, non-condensing
5	Temperature fluctuation	< ± 2°C /hour

【Caution】

Do not use the detector under conditions of temperature fluctuations. If the ambient temperature is too low, make the room temperature increase slowly to avoid condensation inside caused by rapid heating.

- *Bench space*

The D3230/40 detector can be placed on any normal laboratory bench. If you want to display the complete EClassical 3200 system on the bench, make sure that the table can bear the weight of all components. It needs additional space of 50 mm on the left,150 mm on the right, 150 mm on the back to facilitate the circulation of air and electrical connections.

【Warning】

The instruments should be placed on a horizontal position, otherwise there is a danger of falling!

3.18.2 Power and Power Line

To ensure the instrument can be normal and safe, please use a dedicated

power line within the specified voltage range.

- Grounding, ac power to 220 v ± 10%, 50 Hz;
- Please choose T2.5A (250 V) fuse.

【Warning】

- **The accessory power cable should be used to connect the pump with the power socket. Other cable should not be used in case of danger or damage to the instrument.**
- **If the instrument is connected to a grid above the scope of application, it may cause electrical shock or damage to the equipment and staff.**
- **Please unplug the power cord before replacing the fuse to avoid electric shock. The external fuse is installed in the back of instrument.**

3.18.3 Computer Requirements

- ***Hardware requirements***

1) The lowest hardware requirement：Intel Core 2 CPU，2G internal storage，more than 1G hard-disk space；(Refer to the use of workstation) ;
2) The lowest resolution of displayer：1024×800，64K(16 bit image);
3) Others：USB or RS232 interface for communication, CD-ROM driver for software installation.

- ***Operation system requirements***

Windows 7 or higher version (Refer to the use of workstation).

- ***Workstation requirements***

Use the HPLC workstation to control the instruments.

2.4 Communication Connection

Communication management of EClassical 3200 HPLC system is completed by P3200 infusion pump, via LAN cables. Communication and power connection is shown as Fig. 2-2.

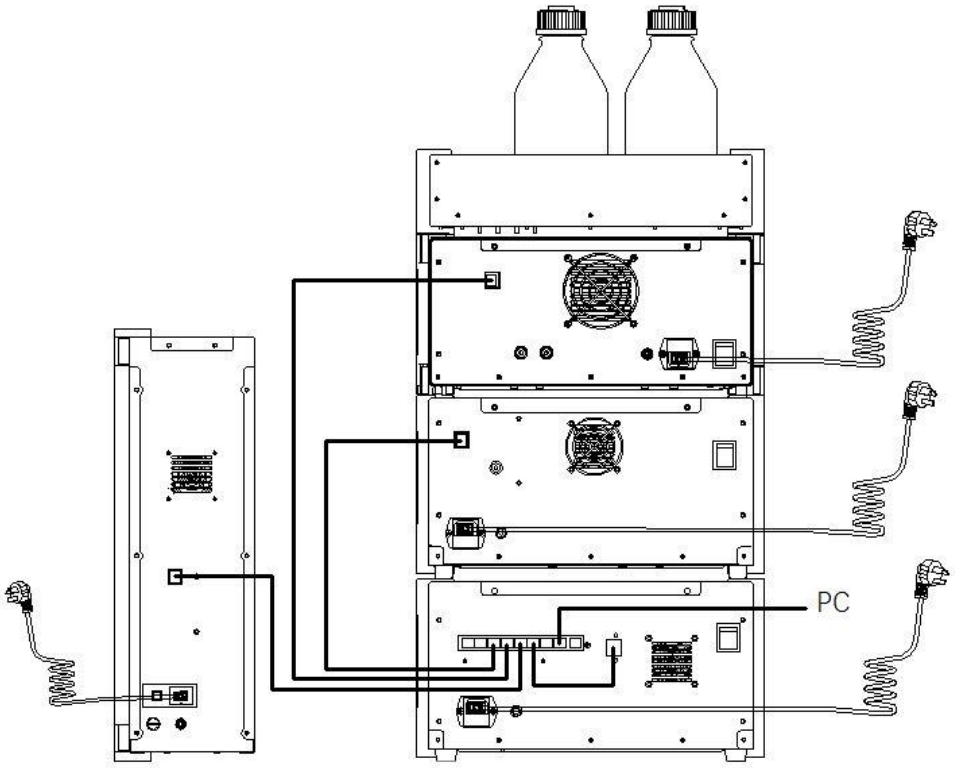


Fig. 2-2 EClassical 3200 HPLC communication

2.4.1 Power connection

Finish power connection of D3230/40 detector as follows:

1) Lay the detector as Fig. 2-1 and 2-2.

2) Plug the power cord into the power supply.

2.4.2 Communication connection

Finish communication connection D3230/40 detector as follows:

1) Make sure the power supplies of the detector and pump are “ON”.

2) Connect the computer and “PC” port of P3200 with LAN cable.

3) Connect the LAN port of P3200 and one port of switch.

4) Connect the LAN port of the detector and one port of switch on P3200.

【Caution】

- **There are 8 yellow LAN ports in parallel on the switch of P3200 pump. Connect each module to the pump separately.**
- **Please select dedicated communication lines provided by Elite. Otherwise failed communication maybe happens.**

2.5 Flow Connection

Fig. 2-3 shows the procedures of tube and flow connection of EClassical 3200 HPLC.

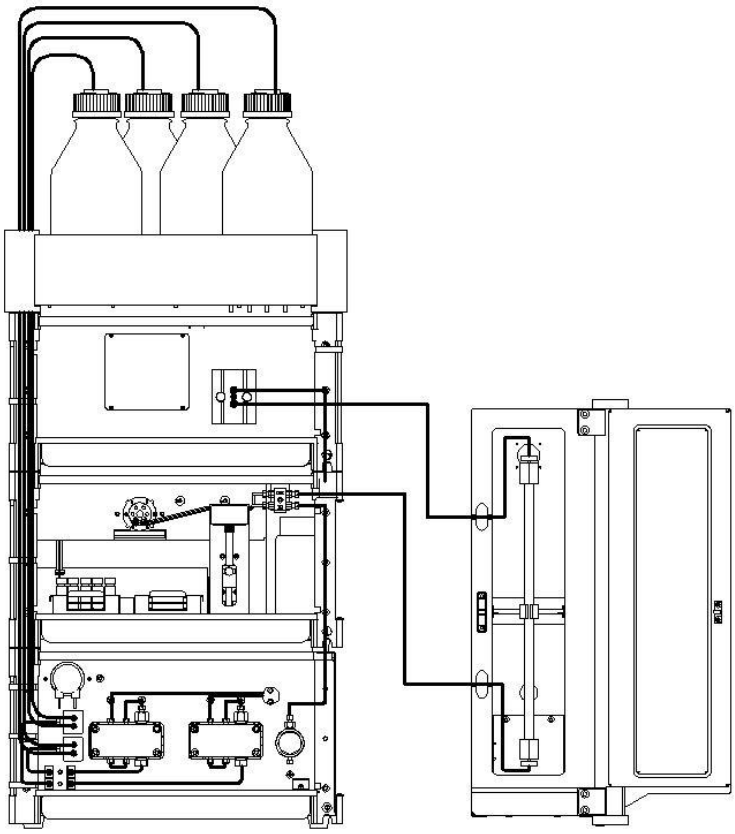


Fig 2-3 EClassical 3200 HPLC flow connection

2.5.1 Tube Connection

- ***Tubing cut***

Please select the dedicated stainless steel tubing cutter to cut tubing into proper lengths ensuring the cross-section clean and trouble-free. Bend it up and down and from side to side to cut off.

【Note】 **Make the cut surface as smooth and straight as possible to avoid extra-dead volume or clogged caused of inner diameter deformed,**

- ***Stainless steel fittings***

Mount a male stainless steel ferrule and nut to the tubing as shown in Fig.2-4 and 2-5.

【Note】 **Pleas match nuts with corresponded ferrules, Stainless steel with stainless steel, as well as PEEK with PEEK.**

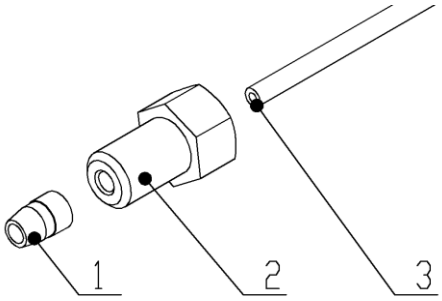


Fig. 2-4 Standard stainless steel fittings

1. Stainless steel nut；2. Stainless steel ferrules；3. Stainless steel tube

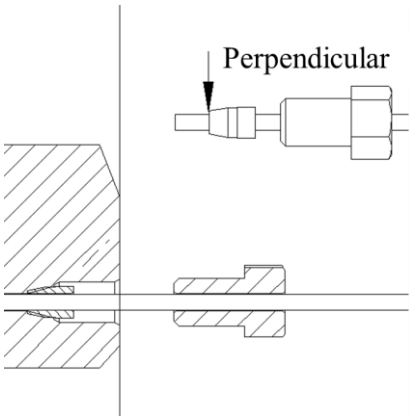


Fig. 2-5 Connection of stainless steel fittings

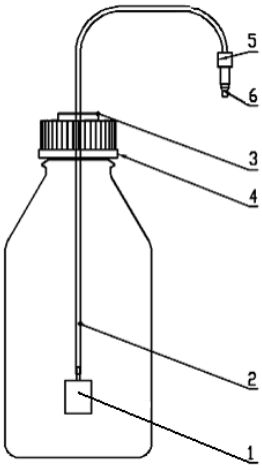
【Note】 **Insert the tubing completely into the opening until it butts against the end of the opening. Otherwise, dead volume will be created. Do not overtighten the male nut. Otherwise, the threads will be damaged.**

2.5.2 Flow Connection

The following procedures show flow connection of EClassical 3200 HPLC system:

1) ***Connecting the solvent inlet filter to one end of the solvent tube.***

Connect the parts in the order of the numbers on the picture.



1.Solvent filter；
2.Solvent tube；
3.PTFE cork；
4.Bottle cap (with hole)；
5.Flangeless nut；
6. Omni-Lok

Fig. 2-6 Solvent filter assemblies

2) ***Connecting solvent reservoir to the pump***

The FEP tubing and solvent filter assembies should be connected to the inlet of the pump as Fig. 2-7.

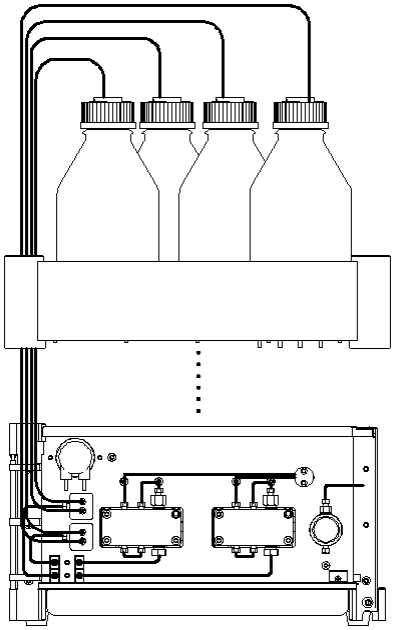


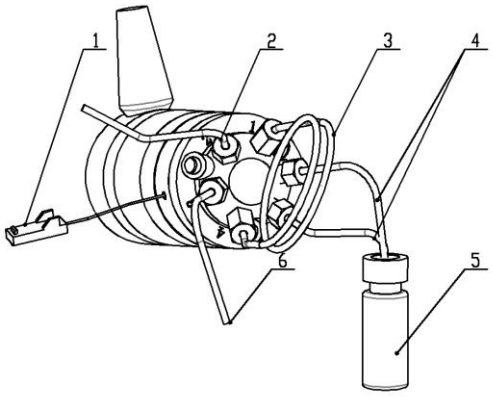
Fig. 2-7 Tubing connection between solvent reservoir to the pump

【Caution】

- **The solvent filter assemblies should keep clean to avoid polluted.**
- **To obtain stable analytical data, mobile phase must be degassed before use.**
- **Mobile phase must be filtered through 0.45-μm mesh filter.**

3) *Connecting injection valve to the pump*

Connect the outlet of the pump to the inlet of injection valve (Port 2# is usually the inlet for the mobile phase on Rheodyne valve) with stainless steel tube (with screw connection and sealing edge ring). Port #3 of injection valve should be connected to the inlet of column as shown in Fig.2-8.



1.Trigger port;
2.Mobile phase inlet;
3.Sample loop;
4.Waste tubing;
5.Waste bottle;
6.Mobile phase outlet

Fig. 2-8 Flow connections for sample injection valve

4) ***Connecting the inlet of autosampler to the pump***

Connect the outlet tubing from the pump to the inlet of the autosampler as Fig. 2-9.

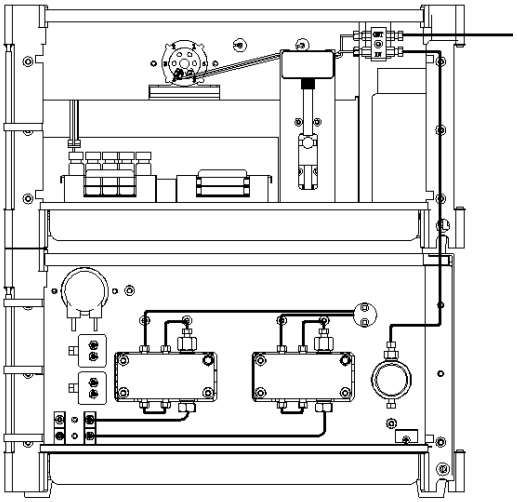


Fig. 2-9 Flow connections between pump and autosampler

5) Connecting autosampler to column

Autosampler is connected to the inlet of column, as Fig. 2-10.

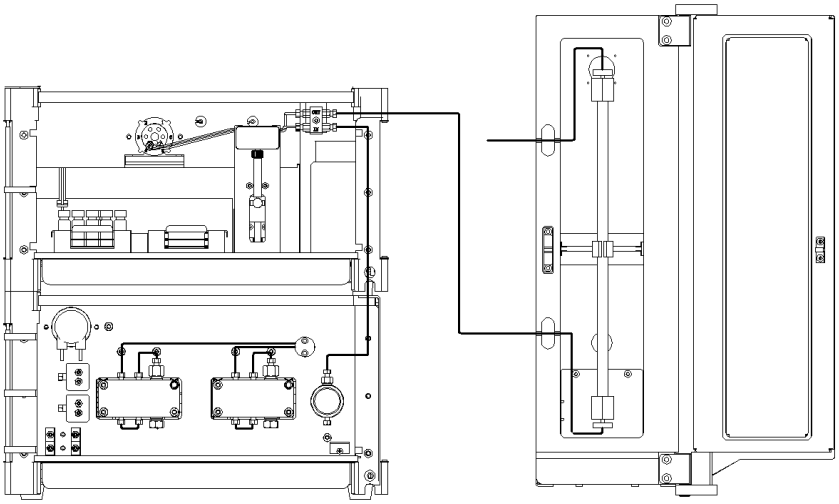


Fig. 2-10 Flow connections between autosampler and column

6) Connecting column to detector

The connection between column and detector is shown in Fig. 2-11. The outlet of column should be connected to the inlet of detector. The outlet of the flow cell is upside as well as the inlet is downside.

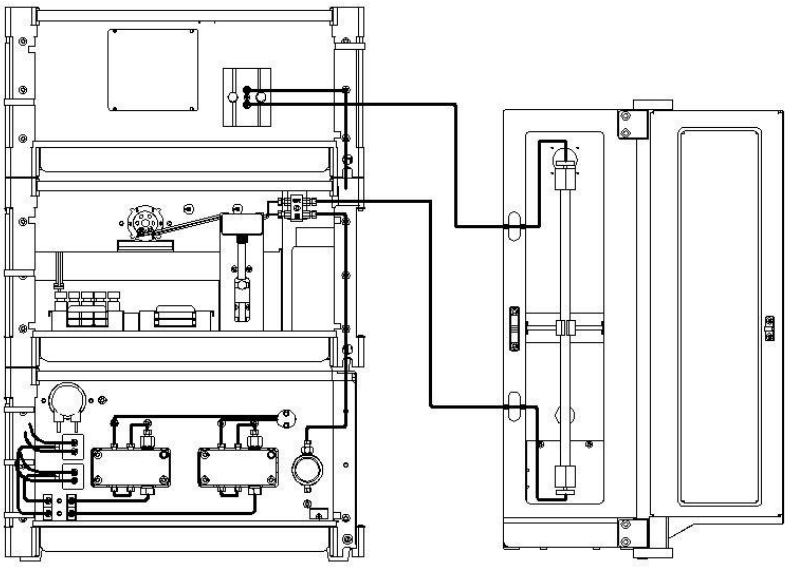


Fig. 2-11 Flow connections between column and detector

7) Piston clean flow connection

Silicon tubing from clean solvent reservoir is connected to the inlet of peristaltic pump. The outlet of peristaltic pump is inserted into the Y-type connector of the system waste tubing, as Fig.2-12.

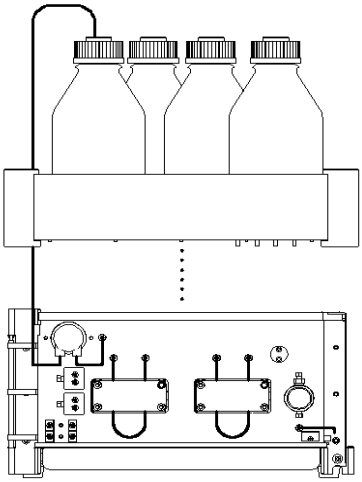


Fig. 2-12 Flow connection of piston clean tubing

【Caution】 **The solvent waste bottle should be place at a lower position with respect to the equipment**

8) Multi-channel body tubing connection

Multi-channel body binds system waste tubing, including mobile phase waste, clean solvent waste, relief tubing waste, and unexcepeted leakage. The outlet tubing from the multi-channel body is connected with the waste tubing of column oven by a Y-type connector. All waste is then discharged to the waste container.

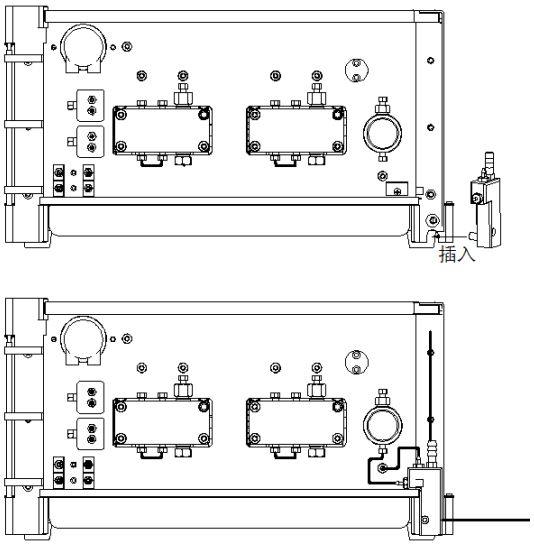


Fig. 2-13 Flow connection of multi-channel body

2.6 Air Remove

New installed HPLC system and solvent tubing must be filled up with mobile phase. Select isopropyl alcohol as the solvent for Normal Phase LC, because it is intermixed with almost any HPLC solvent, and has excellent wettability. Select methanol for Reverse Phase LC. Procedures are shown as follows:

1) Rotate relief valve to “ON”.
2) Set flow rate of one flow channel as 100%, 10.000mL/min.
3) Examine whether there is solvent out from the tubing. If there is no, draw the solvent out by a rubber pipette bulb or an injection, until it flows out.
4) Rotate relief valve to “OFF”.
5) Relieve about 30 mL solvent to remove air from the system.
6) Switch to other channels, respectively, and repeat step 1 to 5.

【Caution】 **Solvent may be harmful to health, if there is leakage from the interface of tubing. Please take precautions.**

2.7 Verification

Instruments are factory verified qualified products in normal situations, so users don’t have to do it again. If necessary to verify the instruments status and performance, follow these steps below.

1) Choose an applicable column, SiO_2 column for NPLC, or C18 column for HPLC.
2) Use mobile phase and sample following the column evaluation report offered by column producer.
3) After removing air bubbles from the HPLC system, inject test sample.
4) Compare the chromatogram and the column efficiency with data provided by producer. If it is in the allowed error range, the system

meets the demands.

2.8 Transportation

The detector is a precision instrument, please gently while long-distance transportation, severe vibration, drops are likely to cause damage to the internal parts of the instrument. The random original packaging can effectively protect the instrument. When the instrument is required to move or returned for service, please follow these steps for packaging.

1) Turn off the power.
2) Unplug the power cord and communication lines.
3) Removing the connecting pipe and other elements between components.
4) Remove the detector from chromatography system, put it into special sealed bag on a large platform.
5) Put the detector into the original packaging foam, and fix it.
6) Placed the fixed detector and other accessories into original packaging carefully.
7) Tape the box sealed to prevent liquid from entering. Cover the packaging box with plastic wrap is recommended.

【Warning】 **Before packing, please check the box, if the original packaging has been damaged, do not use it, you should consult your local dealer or Dalian Elite Analytical Instruments Co., Ltd. customer service staff to solve!**

3. Chapter Three: Basic Operation

3.1 Power On and Off

Power On: Please plug the power cord into the power outlet. The power switch is turned off at this time (“O” position). Turn on the power switch(“I” means on, and “O” means off, on the rear panel). While the power indicator light, detector begins power-on self-test. When detector enters the normal startup state, the status indicator will change from breathing beat to blue. (If the indicator blinks frequently, the detector sends out liquid leakage alarm.)

Power Off: Turn off the power switch (“I” means on, and “O” means off), and then the power indicator and lamp status indicator will be off, as well as the cooling fans.

【Warning】 **There is no electric charge inside the instrument after turn off the power switch on the rear. The instrument can be powered off by Unplugging the power cord, but this operation is not recommended.**
If the instrument is shutdown, an Interval of more than 10 minutes is need before it is turned on again.

【Caution】

- **The detection wavelength, wavelength range and other parameters are set as the last shutdown status.**
- **At the first time running, all parameters are default values for factory settings.**

3.2 Chromatographic Data Workstation Frame

All methods and most functions of the detector are completed by chromatographic data workstation. The frame scheme of workstation is showed as Fig. 3-1.

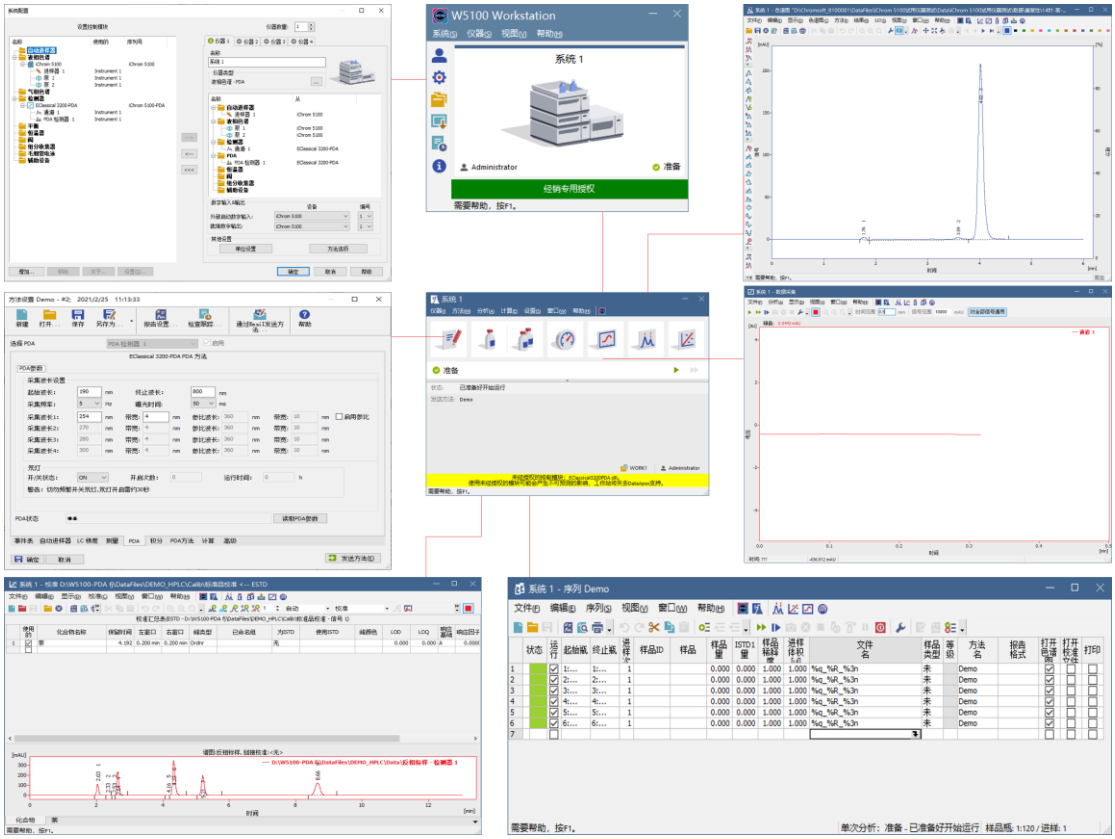


Fig. 3-1 Workstation frame scheme

3.3 Main Interface Introduction of Detector Control Module in Workstation

There are 3 parts of control module involved to D3230/40 detector in Data workstation.

1) Configuration Window

Users add D3230/40 detector control module and verify instrument communication status in the window.

Open “Configuration” window, shown as Fig. 3-2. Add D3230 or D3240 detector control module in the window: First, open “Instrument Type” as shown in Figure3-3 Step1, and click “OK” as shown in figure 3-4. Then, click “Add” button in “Configuration” window as shown in Figure3-3 Step2, to open “Available Control Modules” window. Choose “EClassical 3200-PDA” in Detector part and click “add” as shown in Figure3-5. Then enter D3230 or D3240 serial number, channel number and signal names, in the pop-up “EClassical 3200-PDA Setup” window. After setting, click “AutoDetect” window to check the communication status as shown in Figure 3-6. Click “OK” to return to “Configuration” window(Figure 3-3). Choose “EClassical 3200 PDA” in the left column, and click ---> to complete adding detector control module (Figure 3-3 Step3).

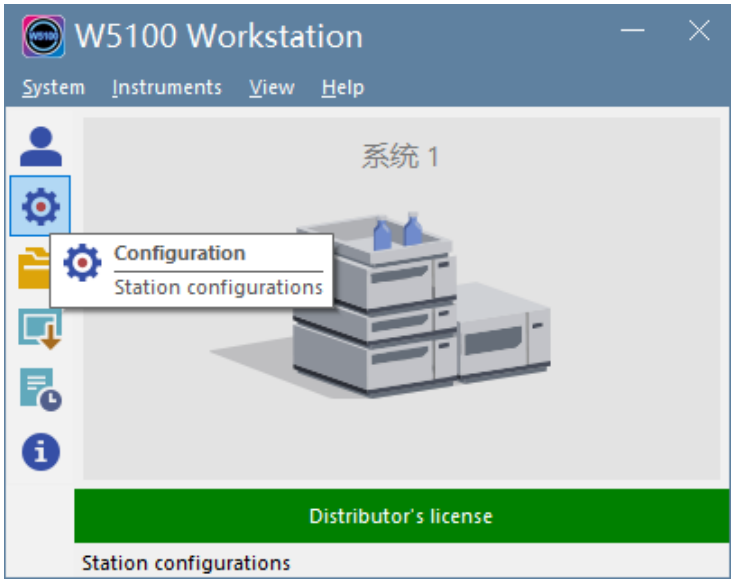


Fig. 3-2 Login window

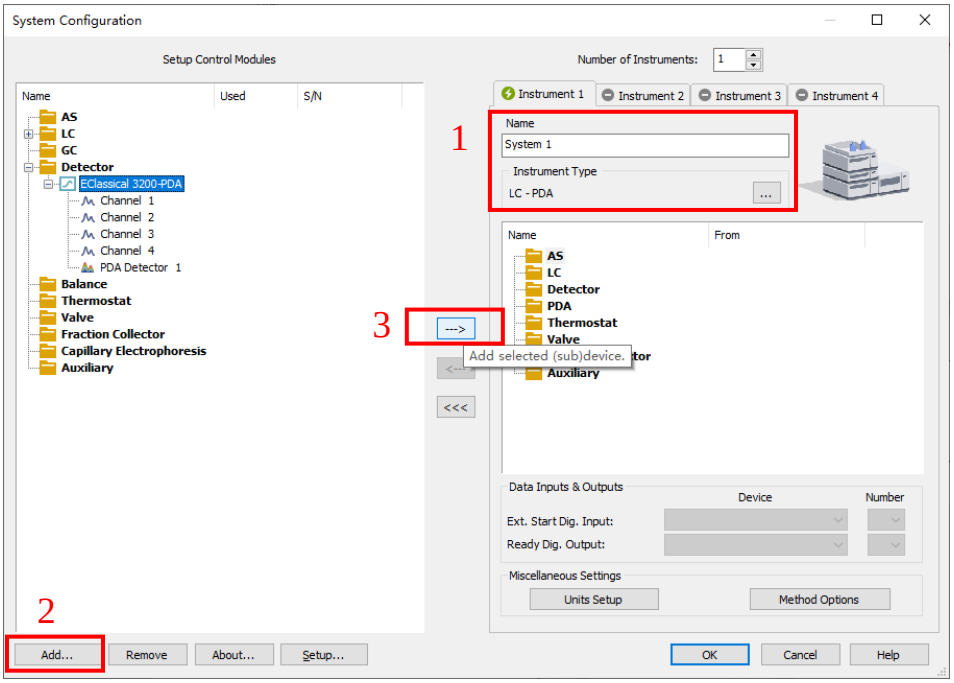


Fig. 3-3 System configuration window

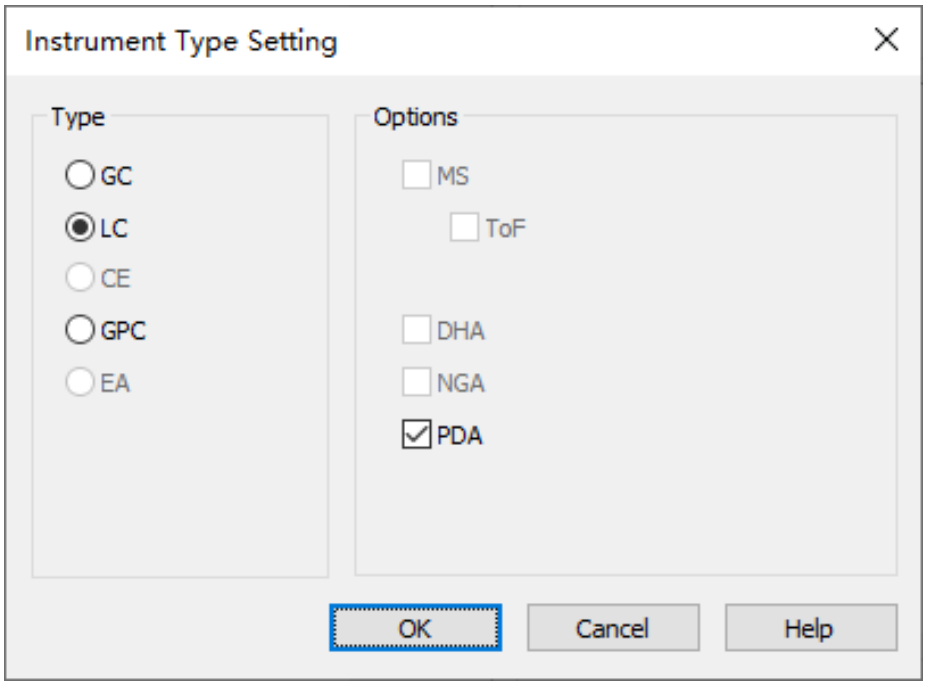


Fig. 3-4 Instrument Type Setting

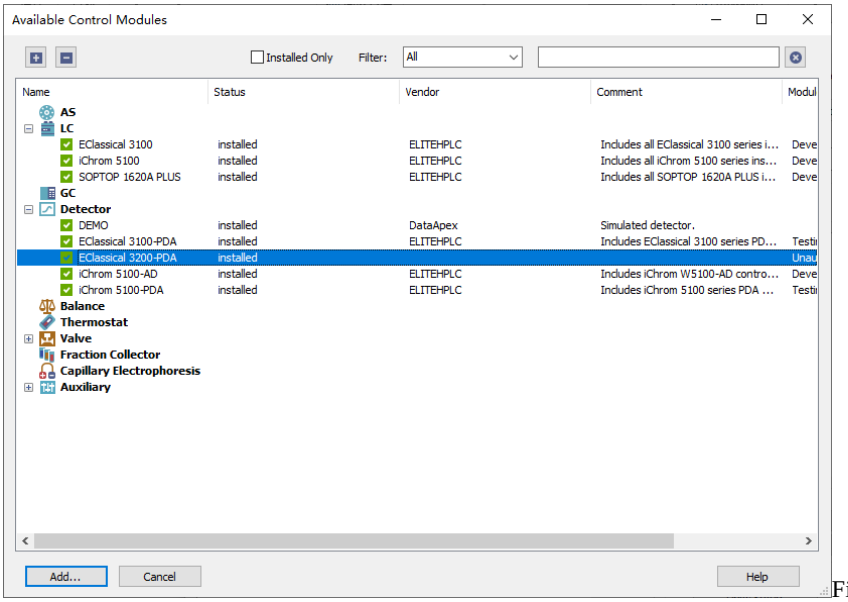
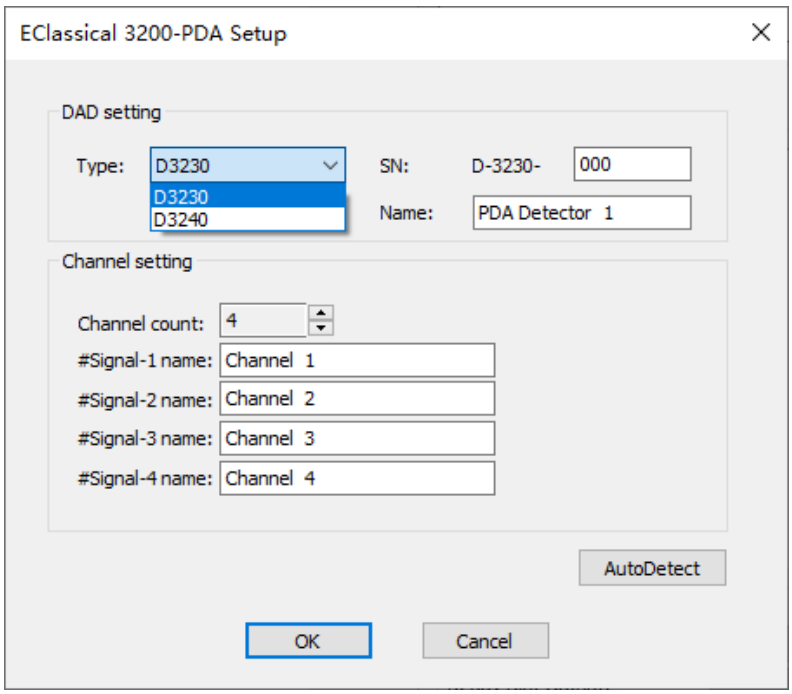


Fig. 3-5 Available Control Module



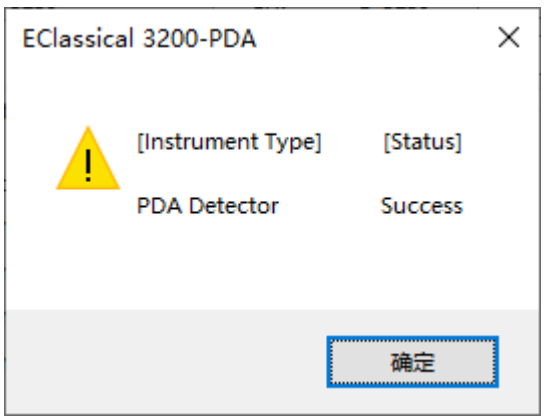


Fig. 3-6 EClassical 3200-PDA Setup window

2) Device Monitor Window

In the instrument main menu window, click “Device Monitor” in the drop-down menu of “Monitor” or directly click , by which you can open the device monitor window, as shown in Figure 3-7. Detection wavelength and warning information display under the monitor window.

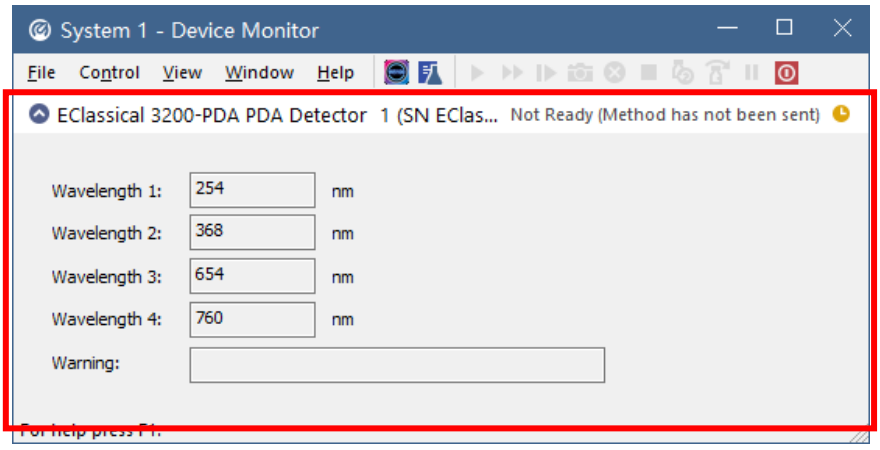


Fig. 3-7 Device Monitor window

3) Method Setup Tab

In the instrument main menu window, click “PDA Control” in the drop-down menu of “Method”, as shown in Figure 3-8. In “PDA” tab, users can set up PDA control parameters, such as detection wavelength, wavelength range, sample rate, lamp status and so on. By activating functional button “From PDA”, users can monitor the opening times and running time of the lamps.

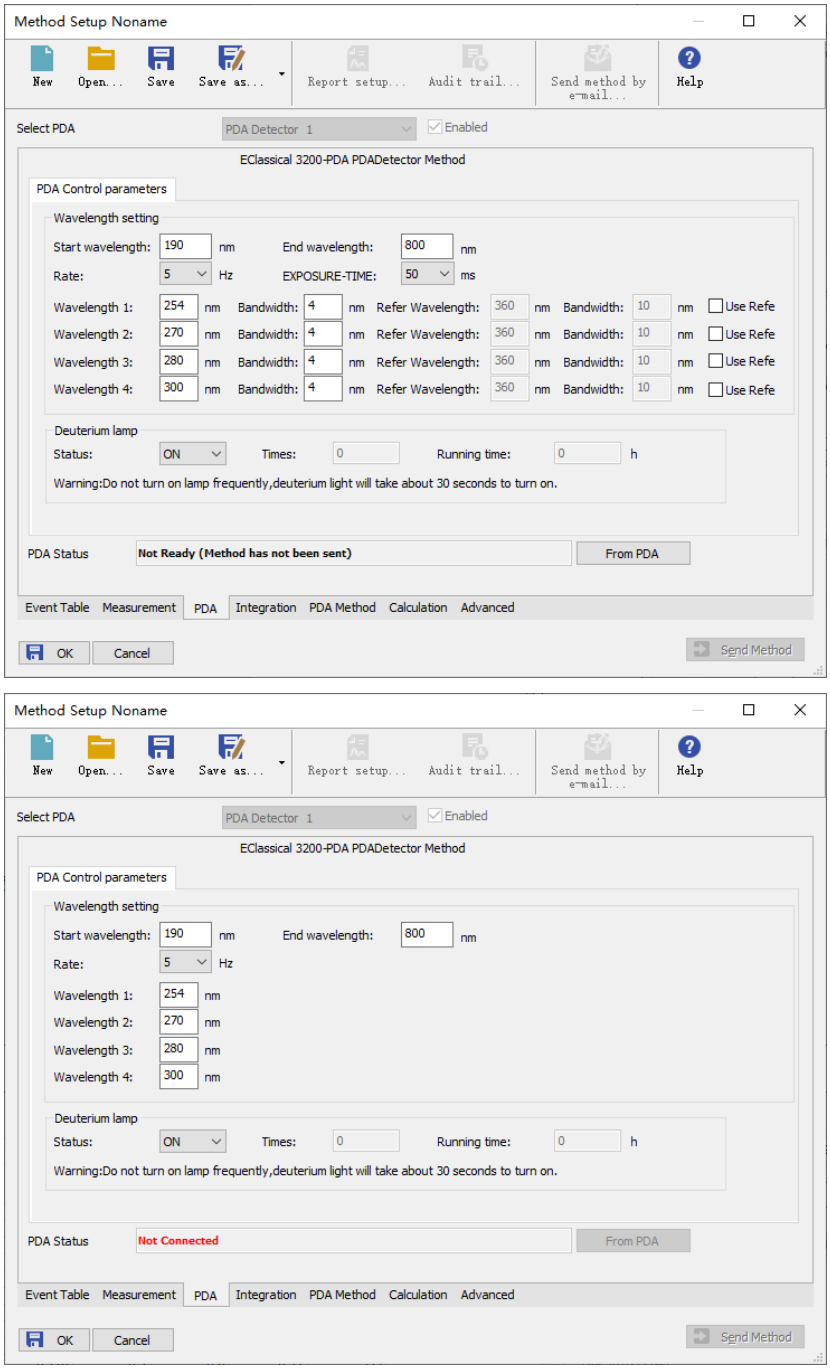


Fig. 3-8 Method Setup Window- PDA

3.4 Instrument Preheating Time

The purpose of instrument preheating is to stabilize the circuit system and light source. According to the properties of the circuit system and the usage requirement of the lamps, it is necessary to preheat for about half an hour.

3.5 Detection Method Setup

3.18.4 Turn on and off the Light Source

In general, it takes 2-3 minutes to power-on self test by default. In the process, the deuterium lamp is turned on automatically. Users can set the status of the deuterium lamp through “Method Setup” in the workstation. Specific operation steps are as described below.

1) After login, click “PDA Control” in the drop-down menu to open the setup window.

2) In the method setup window, choose “PDA” tab, and set the status of both lamps (on or off), as the red frame marked in Figure 3-9.

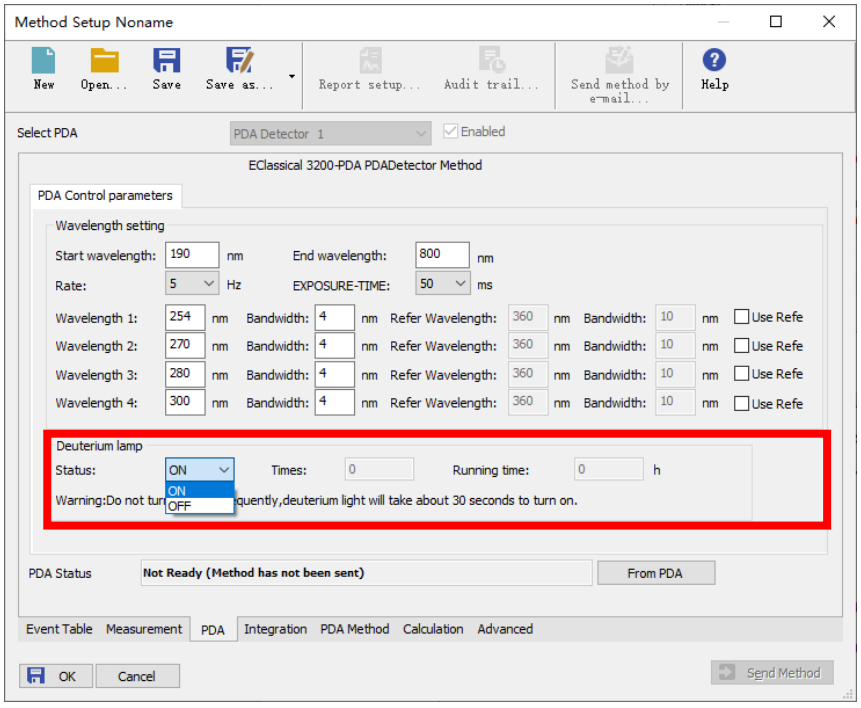


Fig. 3-9 Light source setup

By activating functional button “From PDA”, users can monitor the opening times and running time of the lamps. This feature is designed to make it easier for users to observe the status of the detector and determine the life of the light source.

【Note】 **Please do not continuously turn on and turn off the light source, for fear**

that the deuterium lamp and tungsten lamp are damaged. Suggest leave at least 5-minute interval between turning on and off each lamp.

3.18.5 Detection Channel Number Setup

As showed in Figure 3-6 of Section 3.3, in “EClassical DAD3200 Setup” Window, channel number and name can be set.

3.18.6 Sample Rate Setup

As shown in Fig. 3-9, Sample rate of D3230 can be set as 2, 5, 10, 20, 40 Hz, However, that of D3240 can be set as 2, 5 Hz. The signal-to-noise ratio differs at different sample rate. Users select appropriate sample rate according to analytical demand.

3.18.7 Exposure Time Setup

As shown in Fig. 3-9, Exposure time of D3230 can be set as 25, 50, 100 ms. Exposure time is the interval between 2 readings for recharging current of an individual diode. The longer the exposure time is, the higher energy the detector obtained. Users select appropriate exposure time according to detection wavelength and wavelength range.

3.18.8 Wavelength and Reference Wavelength Setup

As shown in Fig. 3-9, detection and reference wavelengths of each channel can be set for D3230, respectively. Users can optimize the detector baseline performance by setting proper reference wavelength. It is important to ensure the sample doesn’t absorb at the reference wavelength.

3.18.9 Peak Purity Option and Library Searching Option Setup

Choose “PDA Method” in method setup window, and set up peak purity parameters and spectral library searching conditions, as shown in Figure 3-10. The red frame in the figure displays the selectable searching libraries.

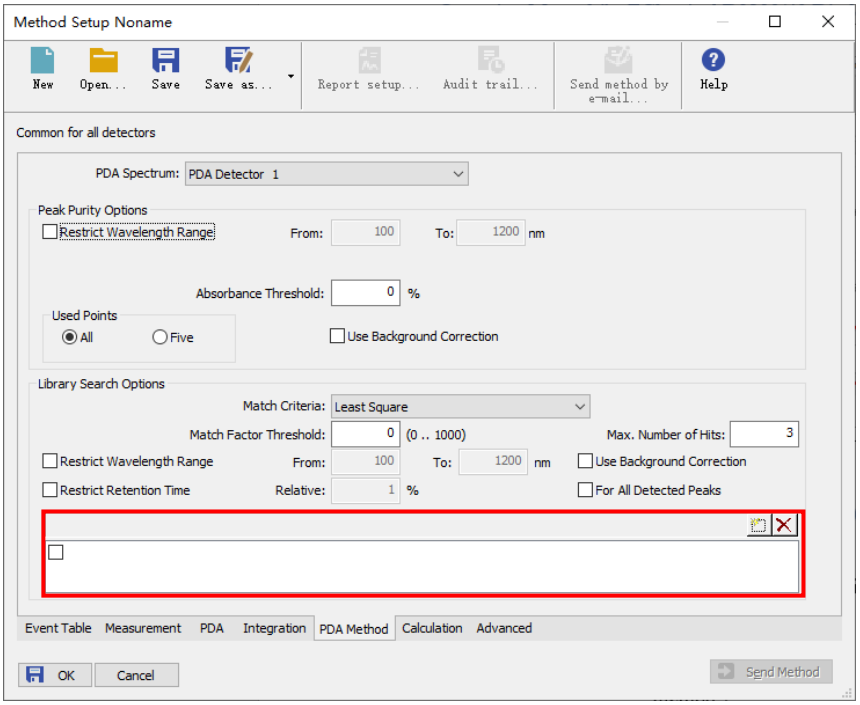


Fig. 3-10 Detector advanced conditions setup

3.6 Run the method

After editing the detection method, click “Yes”, and then there pops up “to send method” dialog, as shown in Figure 3-11. Once click “Yes”, the workstation would send method order to lower-computer and start to run the method.

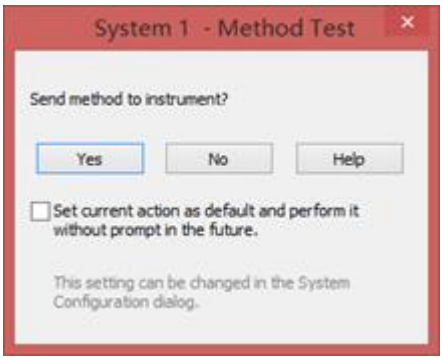


Fig. 3-11 “To send method” dialog

【Note】 **After editing the detection method, if click “No” in the pop-up “to send method” dialog, the new setup method would only be saved without running right now.**

3.7 Save the Method

After editing the detection method, click “OK” in the method setup window. Then click “File” in the instrument control window, and click “Save Method” or “Save Method As” in the drop-down menu, as shown in Figure3-12.

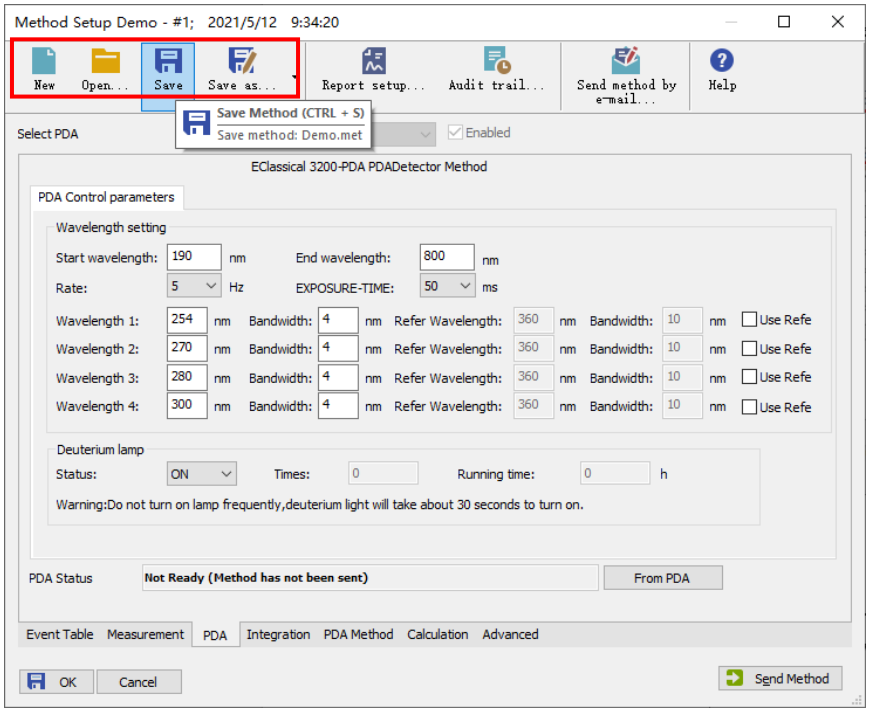


图 Fig. 3-12 To Save Method

“Save Method” refers to save and overwritten the current method without changing the file name. While “Save Method” refers to reset the file path and name the method without changing the current method. It is shown in Figure 3-13.

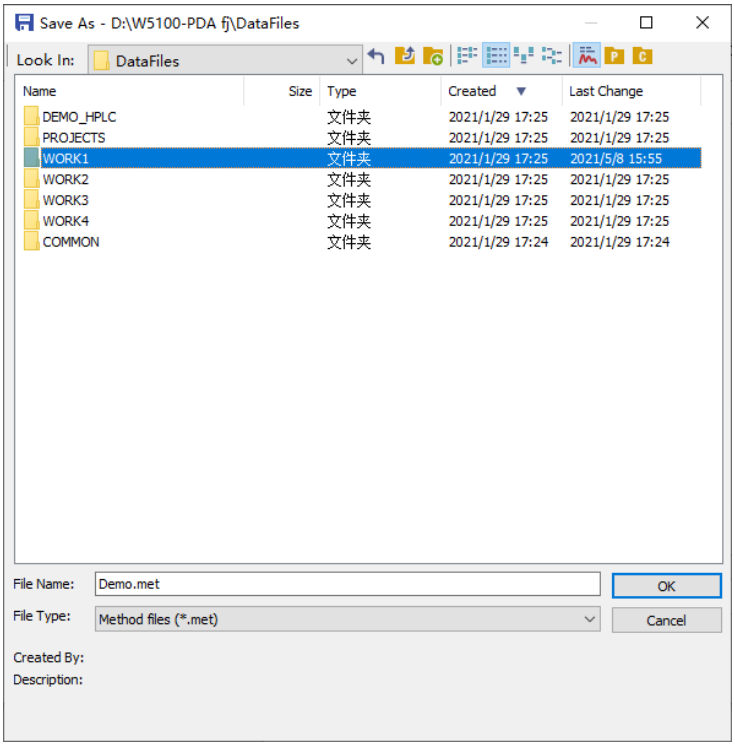


Fig. 3-13 To Save Method As

Before closing the instrument control interface, there pops up "File Manager" dialog, as shown in Figure 3-14. Choose "Yes" to overwritten, or choose "No" to maintain the original method.

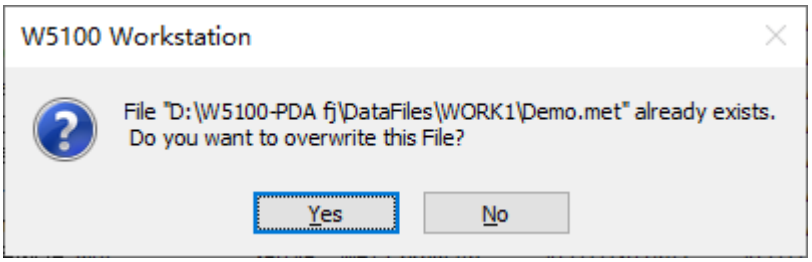


Fig. 3-14 File Manager

3.8 Baseline Monitoring

After sending the method, click  in the instrument control window to conduct the baseline monitoring.

【Note】 **It takes some time for the deuterium lamp to be stable. So please use the detector after lightening the lamp for 20 minutes.**

3.9 Data Acquisition

3.9.1 Open the Data Acquisition Window

As shown in Figure 3-15, in the drop-down menu of “Monitor”, choose “Data Acquisition”, or directly click data acquisition icon  to open the data acquisition window.

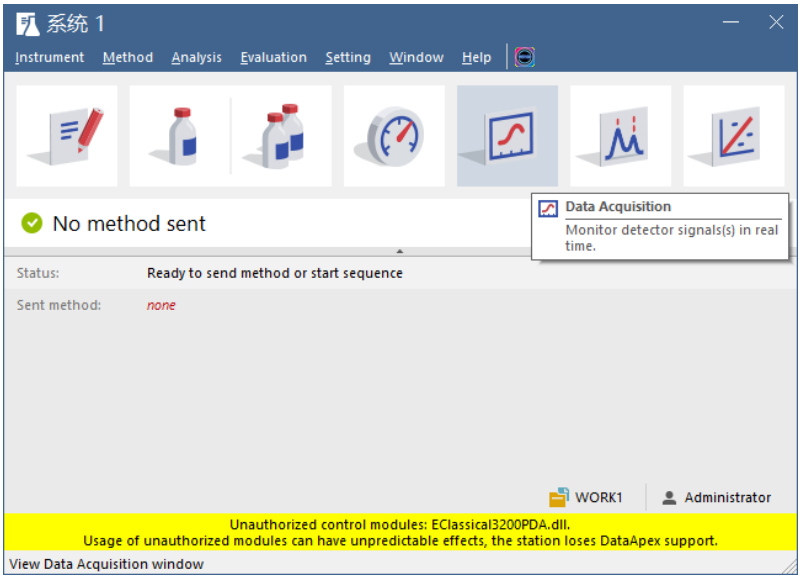


Fig. 3-15 Open the Data Acquisition Window

3.9.2 Data Acquisition Window

Click  in data acquisition window, and the workstation will be ready for data collection, as shown in Figure 3-16. The icon  indicates “Data acquisition” before collecting, but “Reacquisition” while collecting. Click this icon then workstation will stop collecting, generate chromatogram automatically and restart to run the same method.

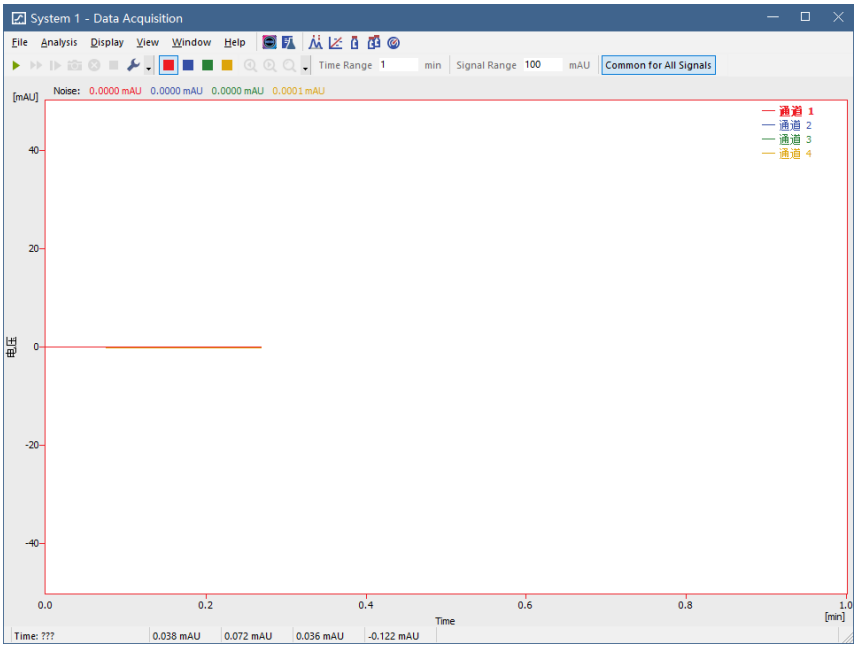


Fig. 3-16 Data Acquisition Window

3.10 Stopping Acquisition

Users can stop data acquisition by the following ways:

- First, click  in data acquisition window to stop data collection and save chromatogram in the same time.
- Second, click  in data acquisition window to give up data collection without saving chromatogram.
- Third, set run time in method setup dialog to stop data collection and save chromatogram in the same time.

3.11 Saving Data

The workstation will automatically save collected data in specified path according to preset file format with a .PRM extension. Users can set chromatograms under their preset path on the basis of their requirement. Please refer to the operation manual of workstation for setup method.

3.12 Data Viewing and Processing

There are both chromatogram window and PDA window in chromatography data workstation. The former window displays chromatograms; however the latter one shows UV-VIS spectra.

3.12.1 Chromatograms Viewing and Processing

Click  in instrument control window, or data acquisition window or calibration window to open chromatogram window. The collecting chromatogram will be opened by clicking snapshot button () in data acquisition window. It is the chromatogram window shown in Figure 3-17. Users view chromatogram data in the results table, summary table, performance table, integration table, measurement conditions, and SST results table. It is also easy for users to modify, add and delete peaks through the left-side shortcut icons. Activate the balloon help icon  to get indication of every functional button.

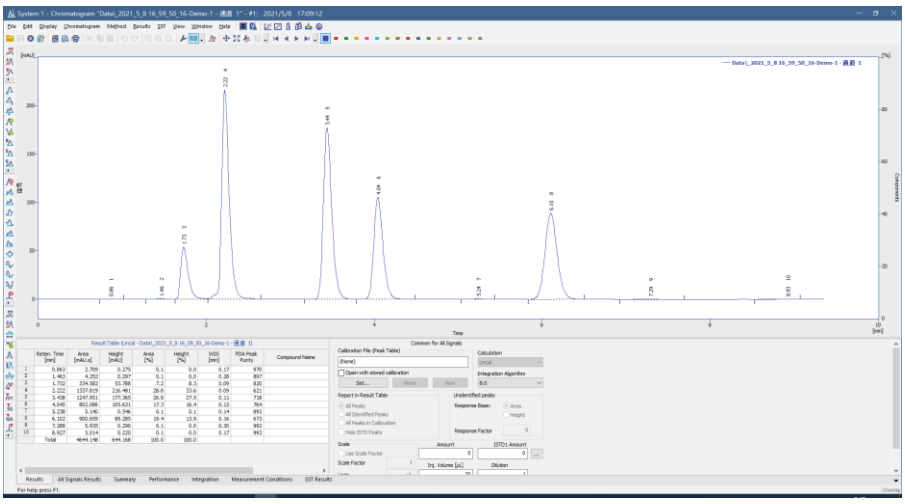


Fig. 3-17 Chromatogram window

Chromatograms can be output by the following way: Click “Export”in the drop-down menu in “File” option, then choose “Export Data”, “Export Chromatogram”, “Export Summary Table”, “Export as Picture to Clipboard” and “Export as Picture to File”, as shown in Figure 3-18.

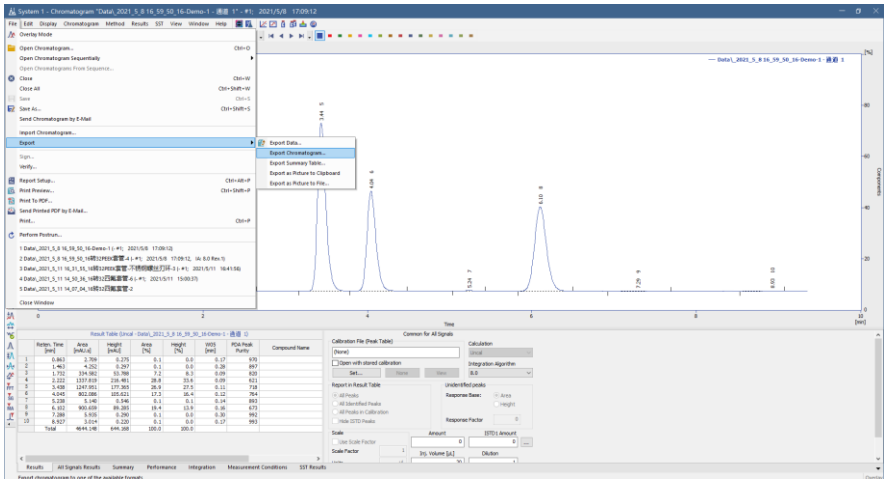


Fig. 3-18 Chromatogram window- Export Data

3.12.2Spectra Viewing and Processing

Click  in Chromatogram window to open PDA window to see spectra information. PDA window displays 4 views at the same time, as shown in Figure 3-19.

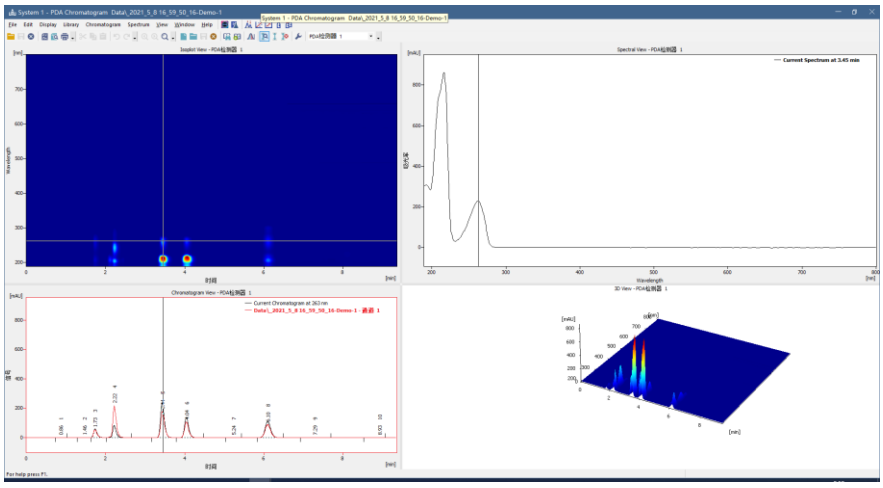


Fig. 3-19 PDA Window

1) View

The PDA window can display single view or can be split into two or four panes, including Isoplot View, Chromatogram View, Spectral View, 3D View, Peak Purity View, Peak Purity Spectra View, Spectral Library View and Spectral Search View. Right-click on one view area, and then select the desired view to change the current view.

2) File

Related shortcut buttons function as follows:

	Open chromatogram
	Save chromatogram
	Close chromatogram
	Report setup
	Print preview
	Print

3) Markers

Isoplot, Chromatogram, Spectral and 3D views feature one or two markers (thin lines of inverse color crossing the data plot) depicting current position in the data. They indicated time and wavelength separately. Markers can be moved by holding the left mouse button while cursor is over the marker (cursor changes to  or ) and dragging it with the mouse, meanwhile there shows the coordinate on the top-right of the view area.

4) PDA Properties

Invoking the command or using the  icon opens the PDA Properties dialog to simply set the graph properties. The “Chrom &Spectral View” tab enable to decide whether to show peak purity index or active signal, and normalize the spectral view. On the other hand, on the top of PDA window, there are shortcut buttons  representing normalizing the spectra in the zoomed range, on whole wavelength axis range and turning the normalization off, separately.

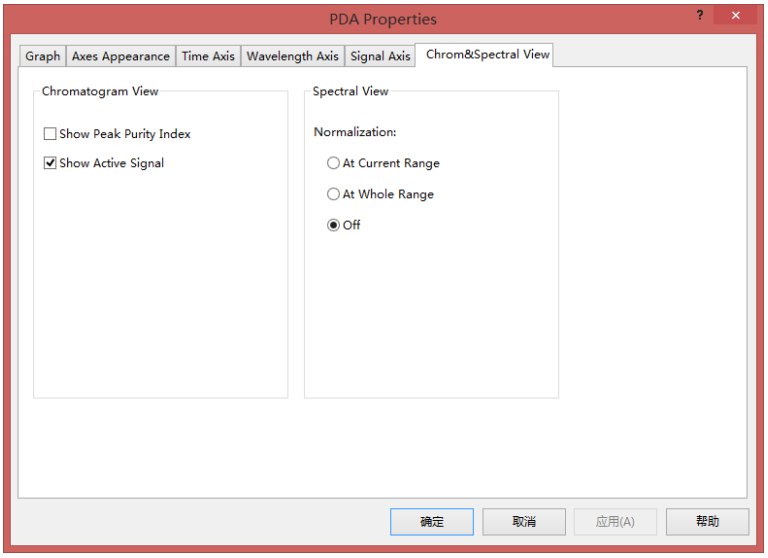


Fig. 3-20 PDA Properties window

5) Library

Related shortcut buttons function as follows:

	Creates a new empty spectral library
	Opens the spectral library file
	Saves spectral library
	Closes the spectral library

Click “Library”, and select “  Options” to set background correction and save a description of the library.

6) Chromatogram View

Click “Chromatogram”, and select “Add signal” in the drop-down menu to store a cut of the PDA data on the selected wavelength/range of wavelengths as a signal in the current chromatogram. The same option can be set by right-click on the chromatogram area. “Add Chromatogram Signal” window is shown in Figure 3-21.

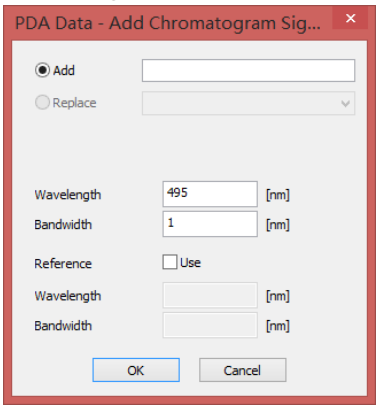


Fig. 3-21 PDA Data: Add Chromatogram Signal

Right-click on the chromatogram view area, and select “Properties”. Then choose “Display Peak Purity” to display peak purity curve in upper part of the view, as shown in Figure 3-22.

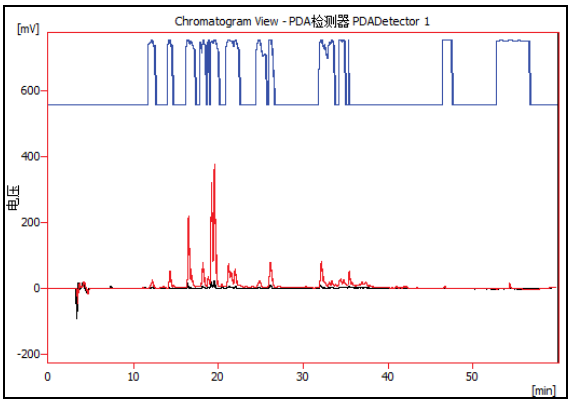


Fig. 3-22 Display peak purity in Chromatogram View

7) Spectral View

Related shortcut buttons function as follows:

	Search in Library
	Add Spectrum
	Normalize spectra over zoomed range
	Normalize spectra over whole range
	Spectra normalization OFF

"Add Spectrum" is referred to add the selected spectrum to the spectral library. Users can name the component and add comments to it before the spectrum is added to library, as shown in Figure 3-23.

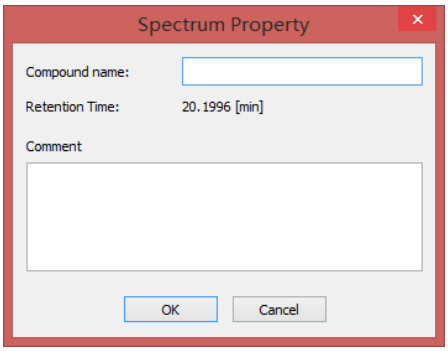


Fig. 3-23 Spectrum Property

8) Isoplot View

The Isoplot view is the basic view of PDA spectral data, as shown in Figure 3-23. It displays the spectral data viewed from above with the absorbance values distinguished by color. The lowest values are represented by dark blue, rising over light blue, green, yellow up to red and dark red being the highest.

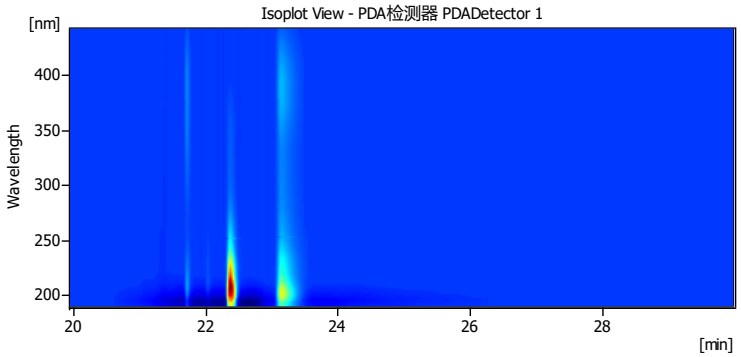


Fig. 3-24 Isoplot View

Markers can be moved by holding the left mouse button while cursor is over the marker (cursor changes to ⟺ or ⇕) and dragging it with the mouse, meanwhile the chromatogram and spectrum will display under the setting conditions.

9) Peak Purity View

Dragging the marker in chromatogram or isoplot on the desired chromatographic peak, and then right-click to select “Display Peak Purity” or directly click  icon. Users can get peak purity curve in the view, as shown in Figure 3-25.

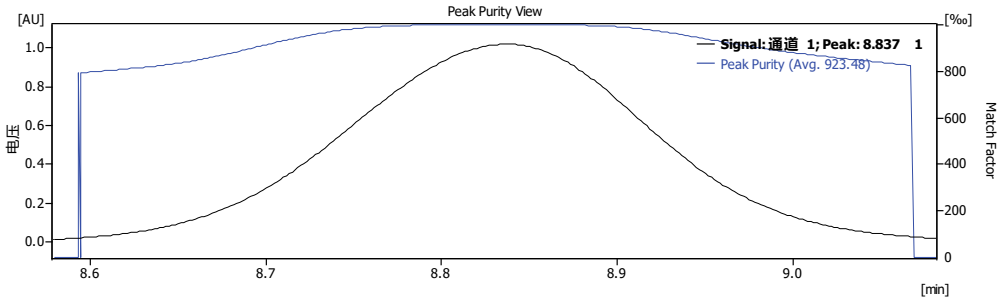


Fig. 3-25 Peak Purity View

10) 峰纯度光谱视图 Peak Purity Spectra View

The peak selecting operation in Peak Purity Spectra View is the same as that in Peak Purity View. The Peak Purity Spectra View displays the spectra in several significant points of the peak selected in the Peak Purity View. These points contain both threshold points (first and last point in which the Match Factor is computed for the given peak), both inflexion points and the peak apex.

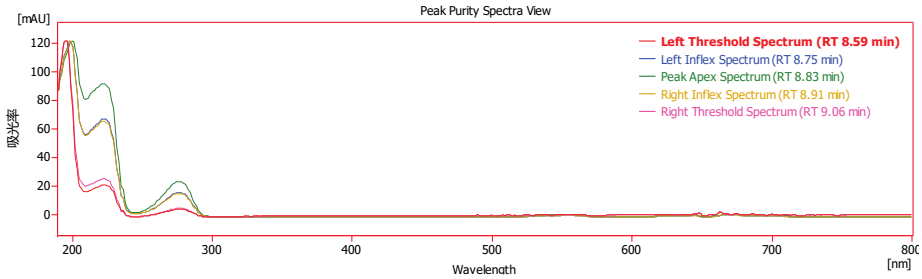


Fig. 3-26 Peak Purity Spectra View

11) Spectra Library View

The Spectral Library View displays the spectra information from the currently opened Spectral Library, as shown in Figure 3-27. The Spectrum Name and Comment columns can be edited. To delete a spectrum from the library, select its line and press the “Delete” key. The spectra may be overlaid to the current spectrum in the Spectral View by checking the checkbox in the “Show” column.

Spectral Library: Noname

Show	Spectrum Name	Reten. Time	From	To	Step	Apexes	Comment
☐	STD1	8.684	190	800	1	199, 222, 2	
☐	STD2	8.684	190	800	1	199, 222, 2	
☐	STD3	8.684	190	800	1	199, 222, 2	

Fig. 3-27 Spectral Library View

12) Spectral Search View

The Spectral Search View displays the matching spectra information found by the use of the Search in Library "…" command, as shown in Figure 3-28.

Library Search Result: Peak - 8.684 [min]

Show	Spectrum Name	Reten. Time	From	To	Step	Apexes	Data Source
☐	STD1	8.684	190	800	1	199, 222, 2	D:\数据备份\沙丁胺醇_2016_11_23 18
☐	STD2	8.684	190	800	1	199, 222, 2	D:\数据备份\沙丁胺醇_2016_11_23 18
☐	STD3	8.684	190	800	1	199, 222, 2	D:\数据备份\沙丁胺醇_2016_11_23 18

Fig. 3-28 Spectral Search View

13) Report Setup

The Report Setup command in the PDA Chromatogram window opens the Report Setup-PDA Dialog as Figure 3-29.

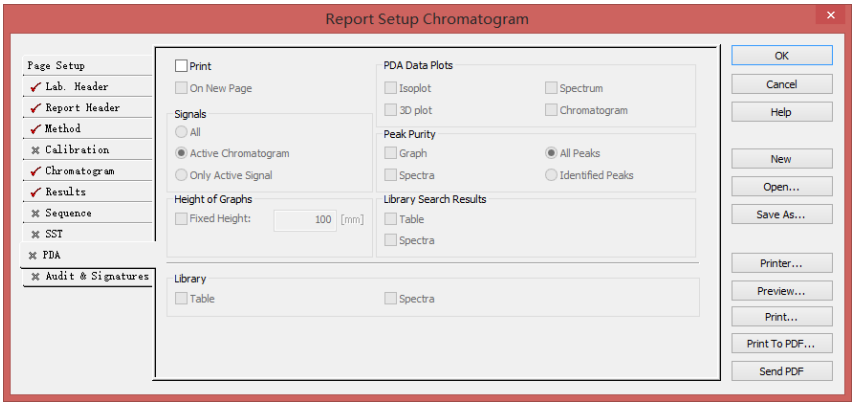


Fig. 3-29 Report Setup-PDA

3.13 Workstation structure

All the methods and most functions of the detector can be realized by the control of chromatographic data workstation. Fig. 3-30 shows the structure of the chromatographic data workstation.

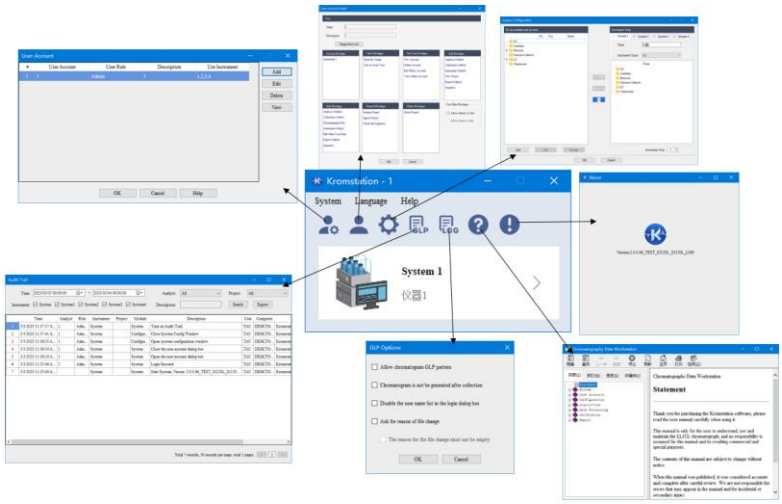


Fig.3-30 Kromstation workstation structure diagram

3.14 Installing Software

Diode array detector control software is divided into two types: Kromstation chromatography data workstation (including D3230/40 control module) and D3230/40 control module.

Users of our EClassical 3200 chromatographic system can use the Kromstation chromatographic data workstation (including the D3230/40 control module), which provides full control of the instruments and diode array detectors in the system.

Other customers can use the D3230/40 module to control the detector.

3.14.1 Selection of lotions

Hardware requirements

- Intel Core 2 CPU, more than 8G running memory (PDA module requires more than 16G memory); The data storage space in the Kromstation installation path is more than 4 GB. The recommended storage space is

more than 50 GB based on the actual test amount.

- Minimum display resolution: 1024 × 800, 64K color (16-bit true color).
- Computer accessories requirements: at least one USB port for the Hardware Key, at least one network interface (LAN) for device communication, and one USB port for software installation.
- Network management requirements: It is recommended that the computer used to connect the HPLC is not networked. If it is necessary to connect to the Internet, please complete the connection under the guidance of Dalian Yilit Analytical Instrument Co., LTD engineers.

Software requirement

- Confirm that the operating system used to run the Kromstation chromatography data workstation is genuine.
- Ensure that the firewall of the operating system is disabled.
- Sets the "Put your computer to sleep" option in your operating system to Never;
- Set the properties of the network adapter and make sure that "Allow computer to turn off this device to save power" in the Power Management option of the network adapter is not selected;
- Anti-virus software is not recommended for computers connected to the HPLC, and you must ensure that the mobile storage device used for data copying does not contain any computer viruses.

3.14.2 Computer network IP Settings

- Before installing software, you should set up your computer network.
- Right-click network places on your desktop and left-click properties.

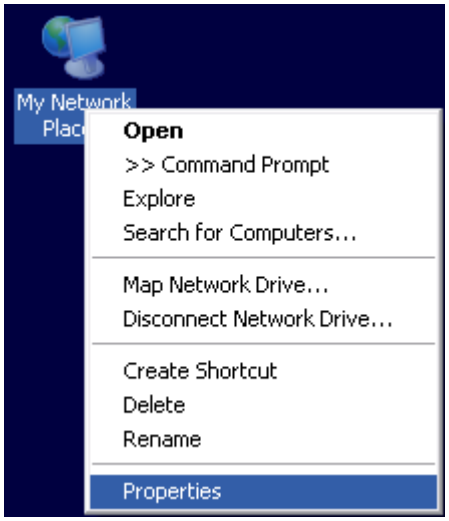


Fig. 3-31 Computer network Settings picture 01

After entering the network connection window, right-click local connection and left-click properties.

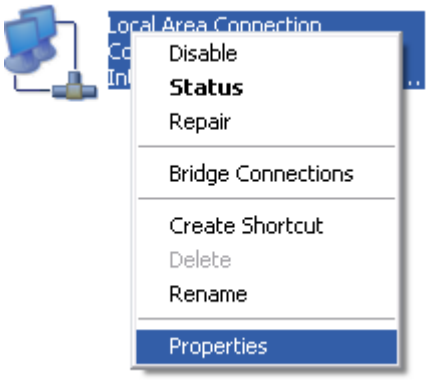


Fig. 3-32 Computer network Settings picture 02

After selecting Internet protocol (TCP/IP) in “this connection uses the following items”, click “Properties”.

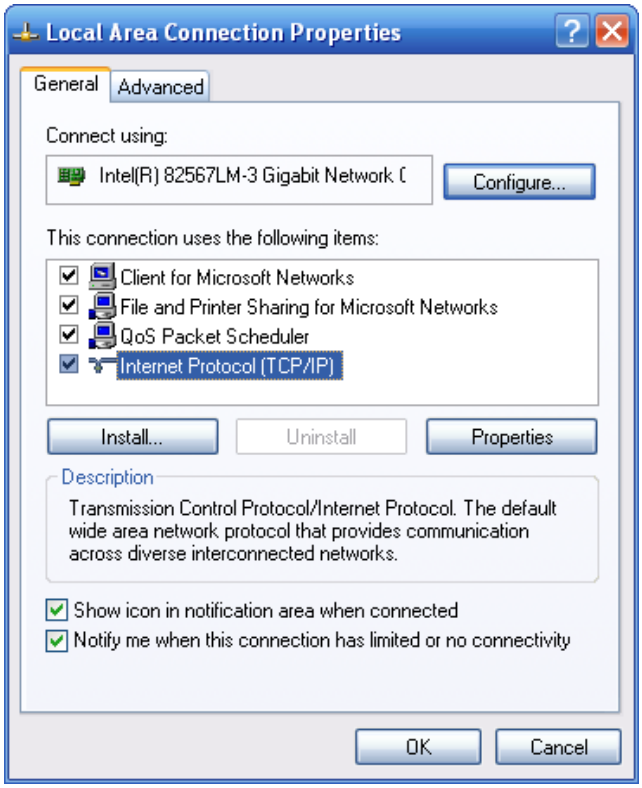


Fig. 3-33 Computer network Settings picture 03

After entering the “Internet protocol (TCP/IP) properties” dialog box, set the IP address as shown in Fig. 3-3. Click “ok” after setting.

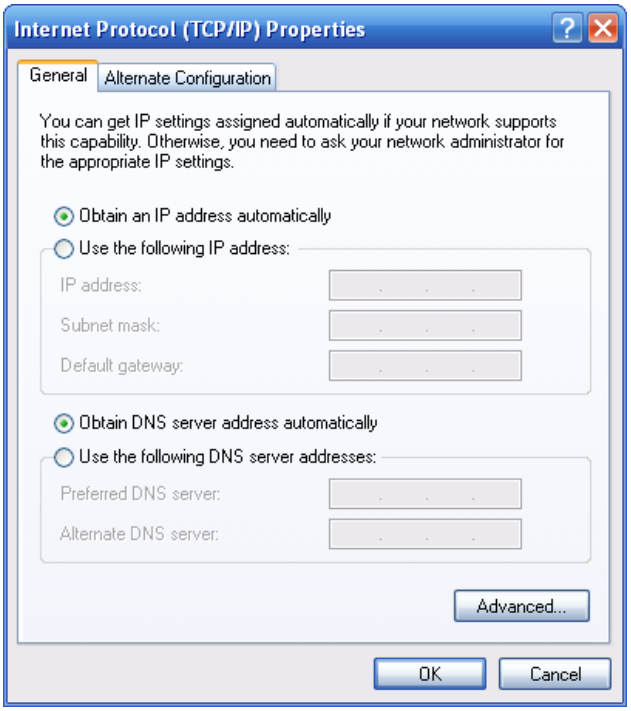


Fig.3-34 Computer network Settings picture 04

Click ok again in the local connection properties dialog box to make the system accept the above changes.

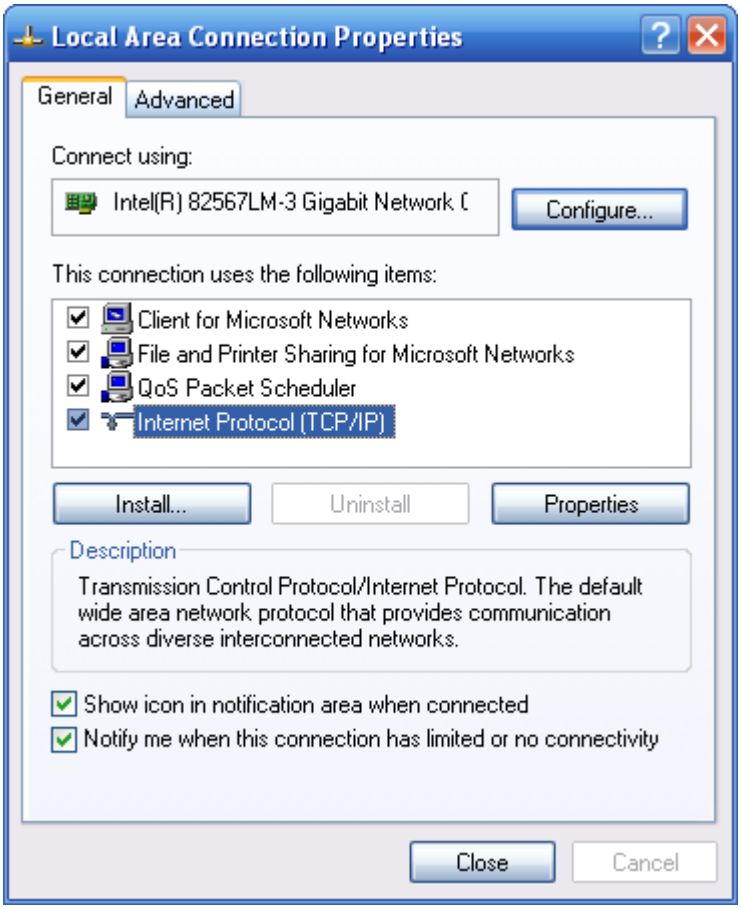


Fig.3-35 Computer network Settings picture 05

【Caution】 **Client-computers must be equipped with network communication and corresponding drivers in the form of LAN interfaces as hardware communication.**

3.14.3 chromatography data workstation installation

The installation method of Kromstation is shown in the operating instructions attached to the disk of Kromstation.

3.15 This section describes the Main page of the detector control module in the Kromstation

There are three main parts of the control module related to the D3230/D3240 detector in the workstation:

3.15.1 Configuration Window

As shown in the Fig. below, complete the configuration of the diode array detector module step by step

Once the Kromstation workstation is installed, double-click the workstation 

icon on your desktop

Enter the login page, select an account (you need to create a new account for the first login), enter the password, click the "Confirm" button, and log in to the main page of the workstation

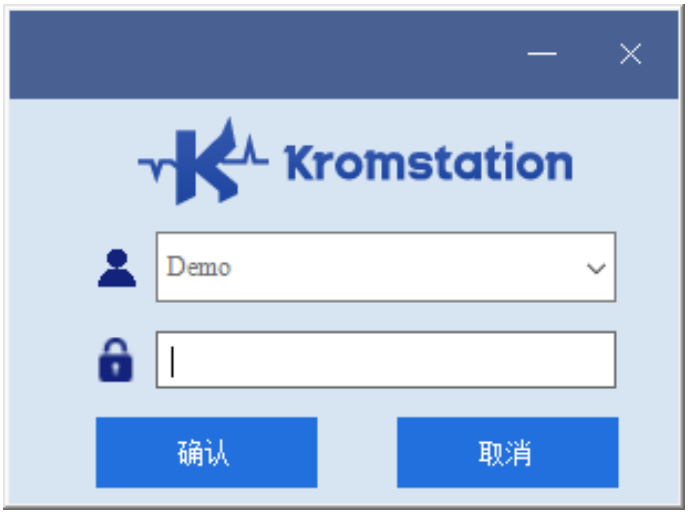
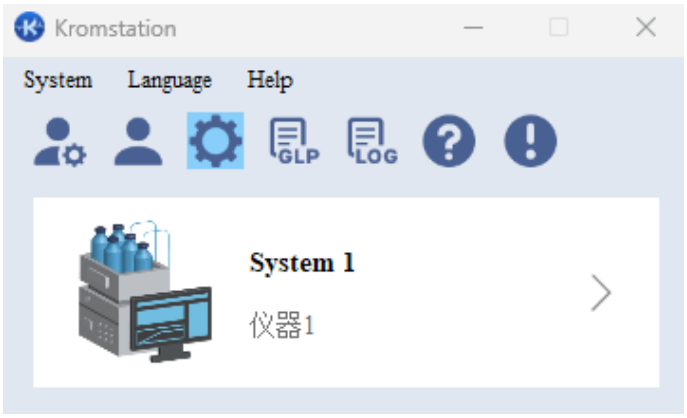


Fig. 3-36 Kromstation login page

On the home page of the workstation, click the  icon to open the System Configuration page



Or click "System" in the upper left corner of the main page. In the expanded list, select "Configuration" and click to open the "System Configuration" page

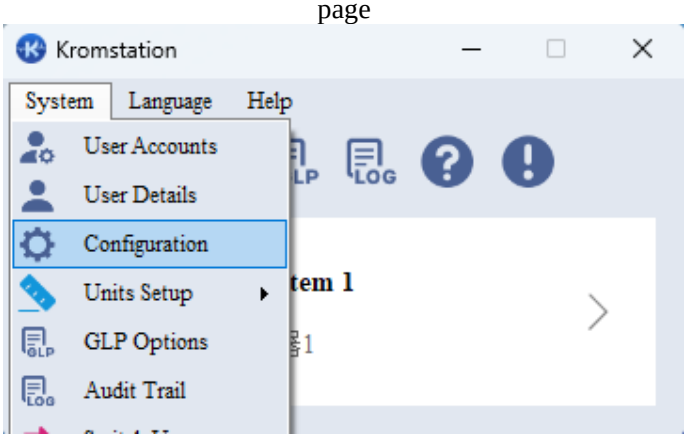


Fig. 3-37 Entering the configuration page

In the open "System Configuration" page, click the "Add" button in the lower left corner to open the "Available Control Modules" page

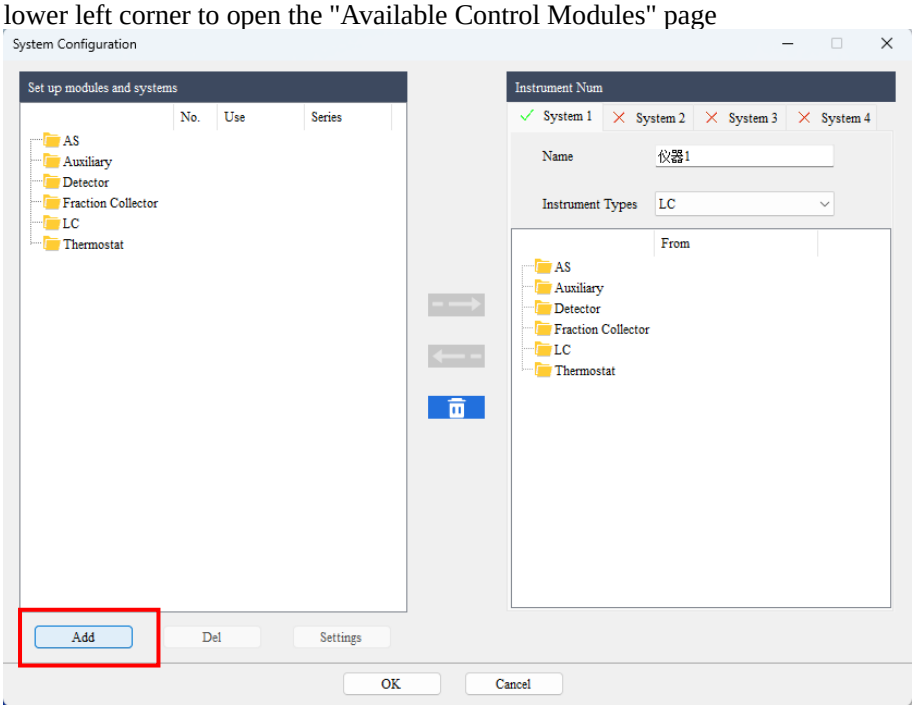


Fig. 3-38 Click "Add" to open the Available Control Modules page

In the displayed "Available Control Modules" page, select "PDA Controller" and double-click it to open the "PDA Controller Configuration" page

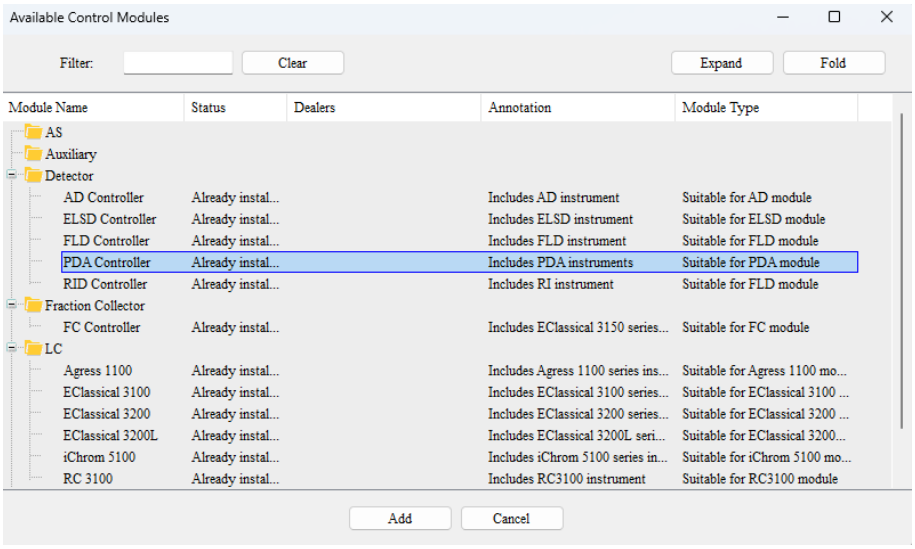


Fig. 3-39 Select PDA Controller and double-click the PDA Controller Configuration page

In the open "PDA Controller Configuration" page, click the "Type" menu, select the correct instrument model in the expanded list, such as: D3230/40 and click

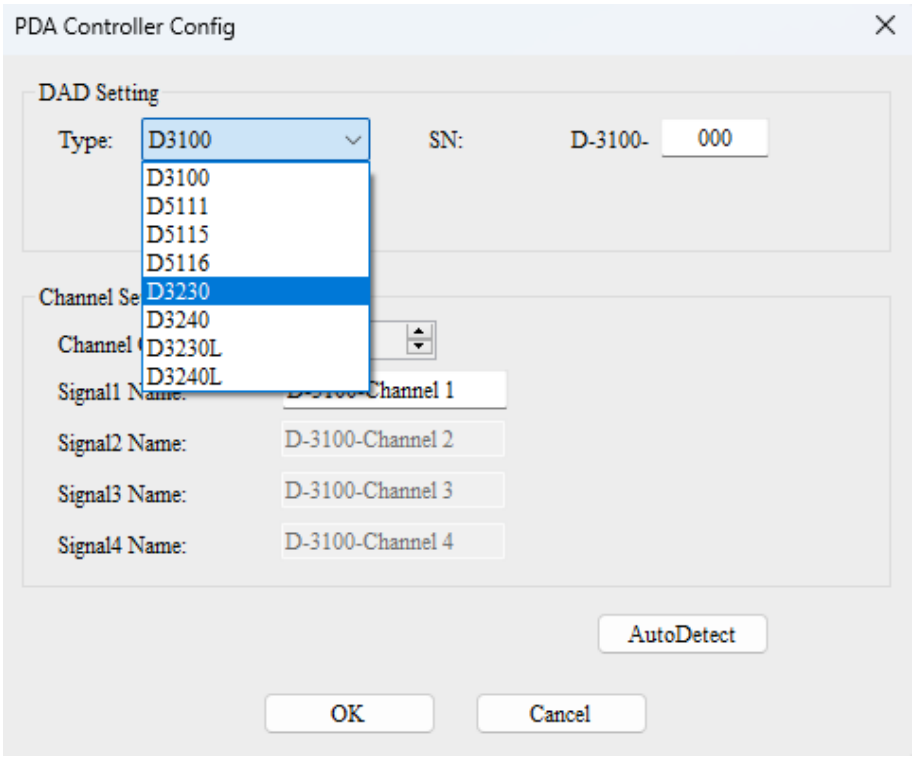


Fig. 3-40 Select a model from the drop-down list
(In the user manual, take D3230 as an example)

After selecting the detector model, enter the last three digits of the serial number of the instrument in the "Serial number" input box, usually the serial number of the instrument is on the instrument nameplate on the back panel of the instrument, and add the number of detector channels as required

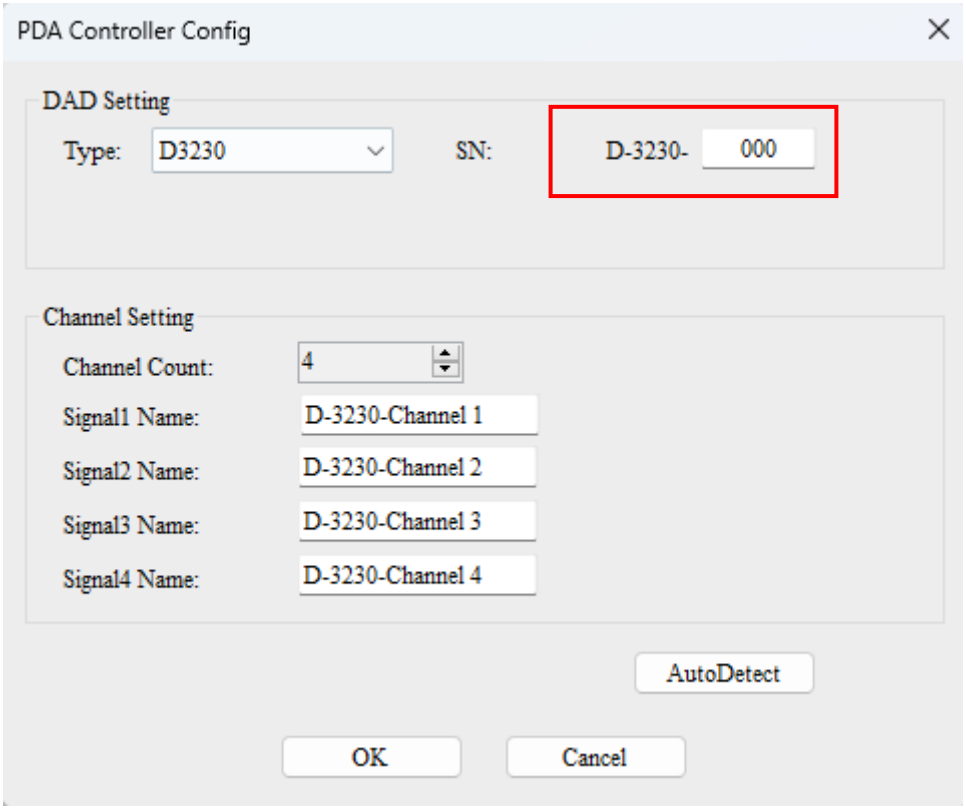


Fig. 3-41 Enter the instrument serial number and select the number of channels

After the above steps are completed, click the "Verify System configuration" button at the lower right corner of the page. If the pop-up window "Connection Status" shows "Success", click the "OK" button to return to the page of "PDA Controller Configuration". Please confirm whether the instrument is turned on, whether the network cable is correctly connected, network configuration, serial number and other related issues, and verify the system configuration again. After completing the system configuration, click the "OK" button at the lower left of the page to exit the "PDA Controller Configuration" page

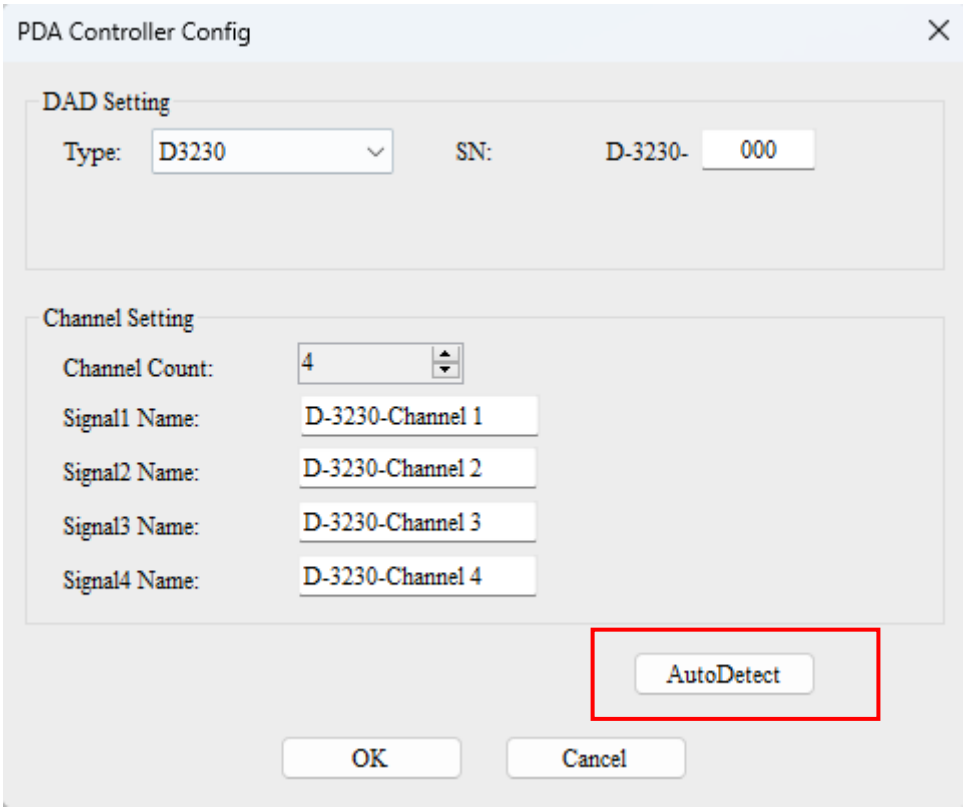


Fig. 3-42 Click Verify System Configuration to verify the connection. After the connection is successfully verified, click OK

Return to the "System Configuration" page. In the "Module configuration" list on the left, expand the "detector" folder and select the added "PDA Controller" module. Click in the middle of the page to add the "PDA Controller" module to the list on the right. At this time, it means that the "PDA Controller" module has been conFig.d in the system. If you want to remove the conFig.d module, select the module and click in the middle of the page, or click in the lower middle of the page to delete it

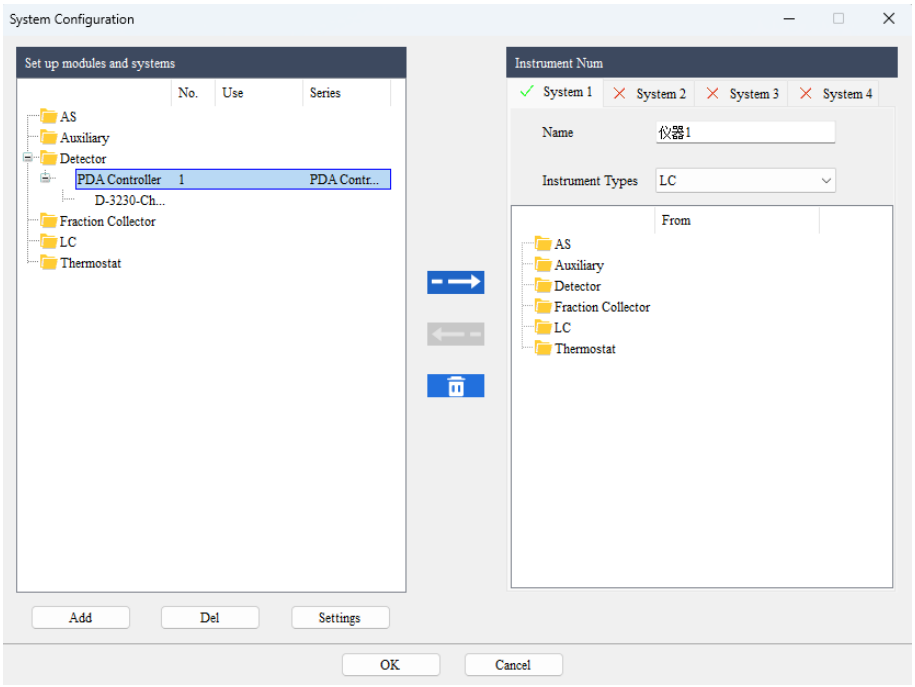


Fig. 3-43 Return to the system configuration page. The PDA module appears under the detector. Click the blue arrow in the middle of the page to import the module into the system

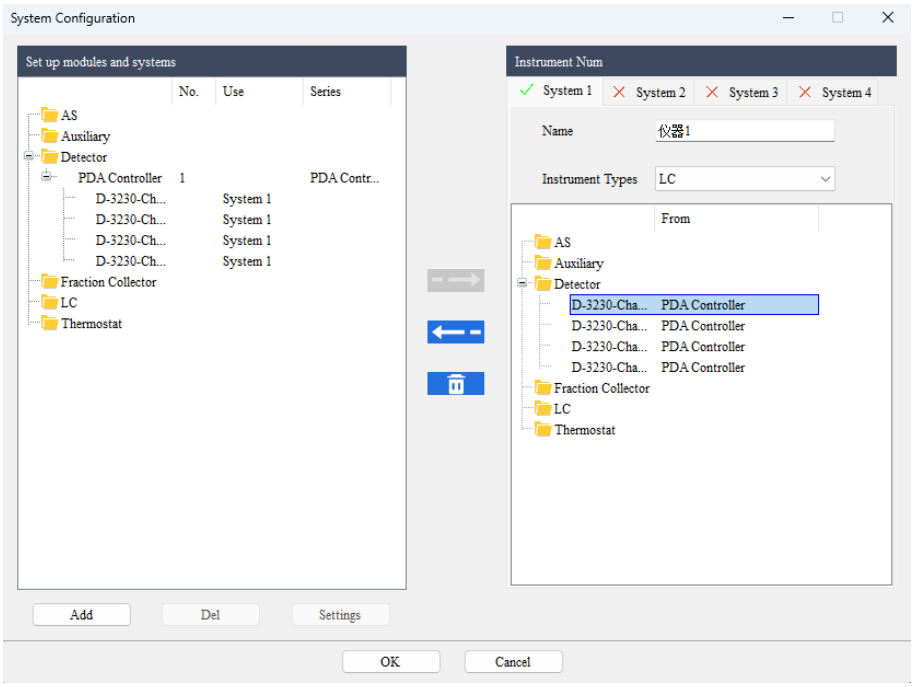


Fig. 3-44 Select four channels and insert them into the system, as shown in Fig. 3-44 After all modules are conFig.d, click the "OK" button at the bottom of the "System Configuration" page to return to the main page of the workstation.

3.15.2 Device Monitor Window

The device monitor window is on the left side of the main page of the system, through which you can view the acquisition wavelength of the diode array detector, alarm information, and related information of other modules conFig.d

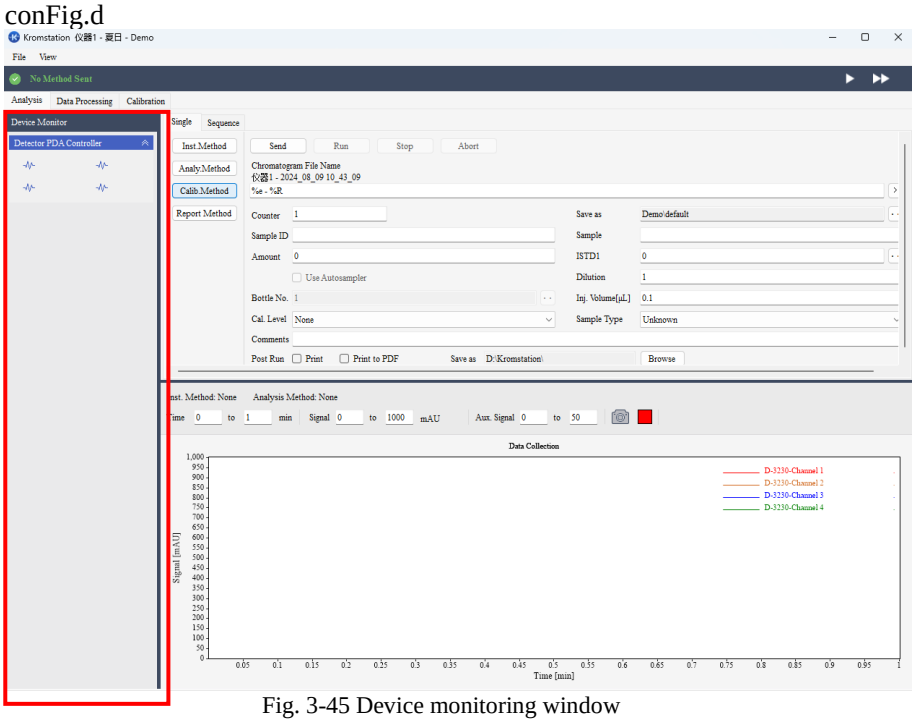


Fig. 3-45 Device monitoring window

3.15.3 Instrument Method page

On the main page of the system, click the button of "Instrument Method" to enter the page of "Instrument Method", and click "PDA" to enter the page of PDA parameter setting, as shown in Fig. 3-47. In the "PDA parameters" page, you can set the collection wavelength range, display collection wavelength, collection frequency, light source status, etc., and by clicking the "read light source status" button, you can monitor the number of light source, running time, etc.

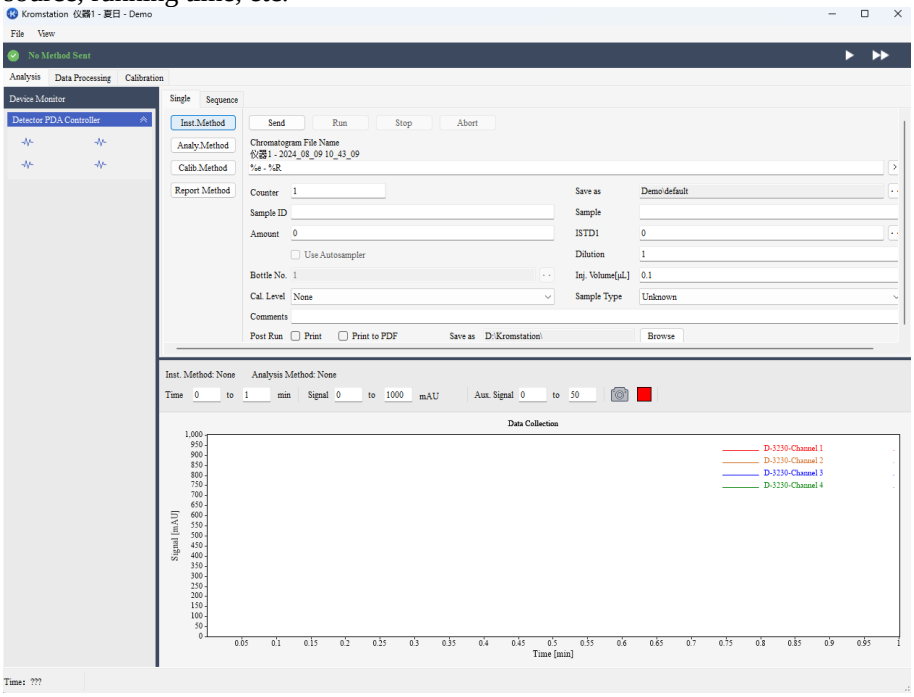


Fig. 3-46 Opening the device

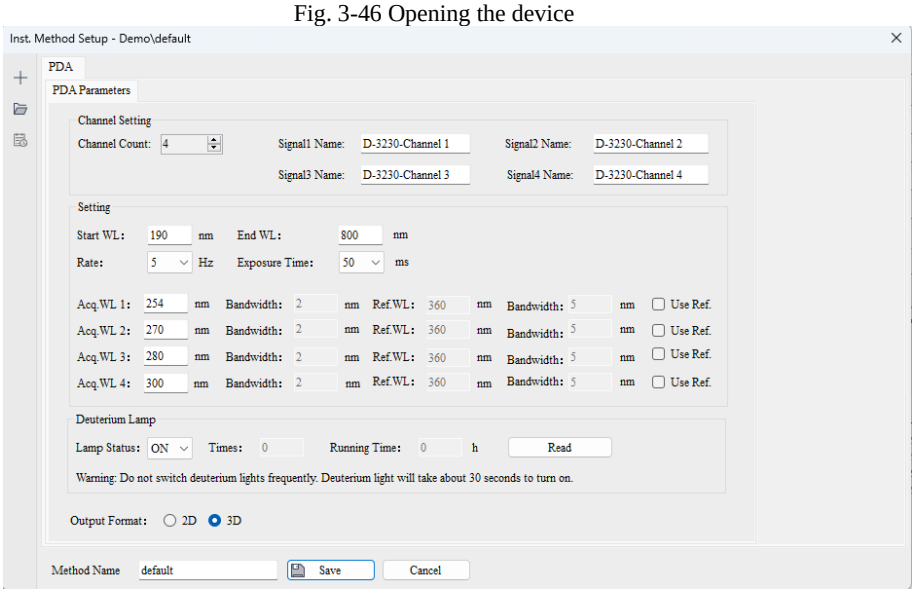


Fig. 3-47 Device Method page PDA parameter Settings

3.16 Access and New Construction

3.16.1 Entering a Project

On the main page, click in the system at the bottom of the page. Select a project from the pop-up page and click "Confirm" for a moment to enter the project

Fig. 3-48 On the home page, tap System to select a project and click OK

3.16.2 New Project

On the home page, click in the system area at the lower part of the page. On the displayed page, click Project Management to enter the Project Management page

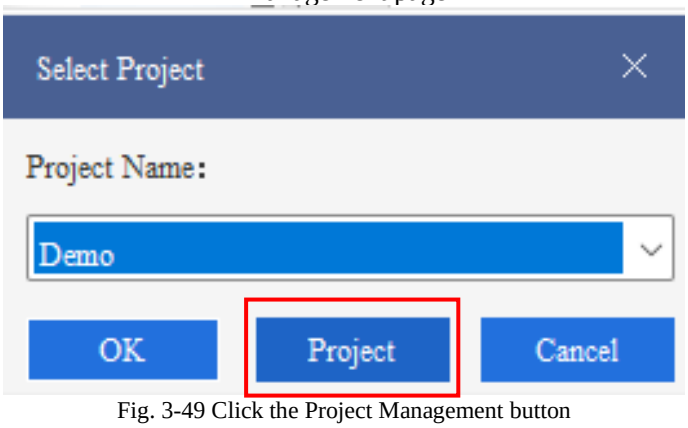


Fig. 3-49 Click the Project Management button

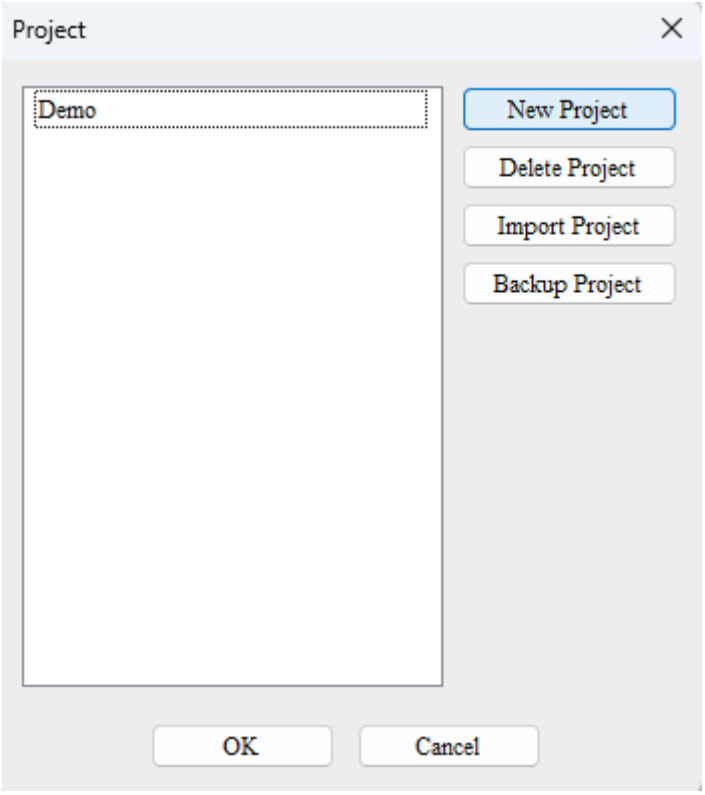


Fig. 3-50 Project Management page

On the Project Management page, click the New Project button in the upper right corner. In the New Project window that is displayed, enter a project name and click OK to create a project. You can also delete, import, and back up a project by clicking Delete Project, Import Project, and Backup Project

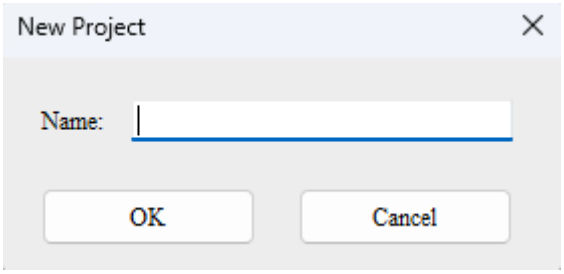


Fig. 3-51 New project

3.17 Instrument preheating time

The purpose of detector preheating is to make the circuit system and the light source reach a stable state. Circuit board electrical performance and light source to achieve a stable state, the general preheating time takes about 30 minutes.

3.18 Method for Setting the instrument

Under normal circumstances, the system defaults that after the detector is turned on, the deuterium lamp is automatically lit, while the tungsten lamp is not lit. The deuterium lamp and tungsten lamp on state can usually be set by the ″instrument method″ in the workstation, the setting method is as follows:

1) After entering the project, click the "Instrument Method" button on the page to enter the "Instrument Method Setting" page.

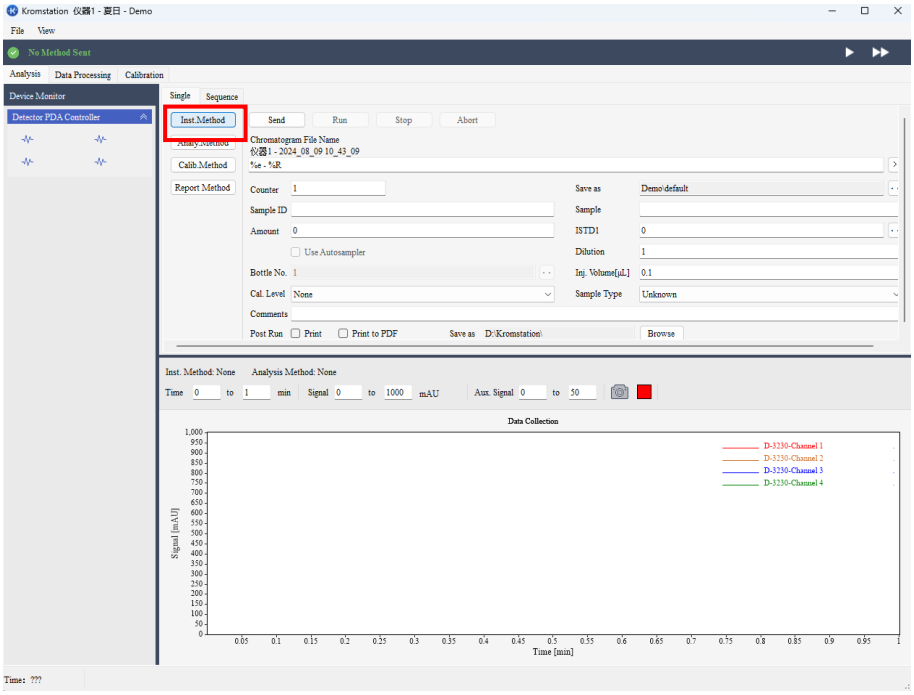


Fig 3-51 Device method

2) In the "Instrument Method Settings" page, select the "PDA" TAB, you can set the light source status (on or off) in the "PDA Parameters" page, as shown in the red box in Fig. 3-52.

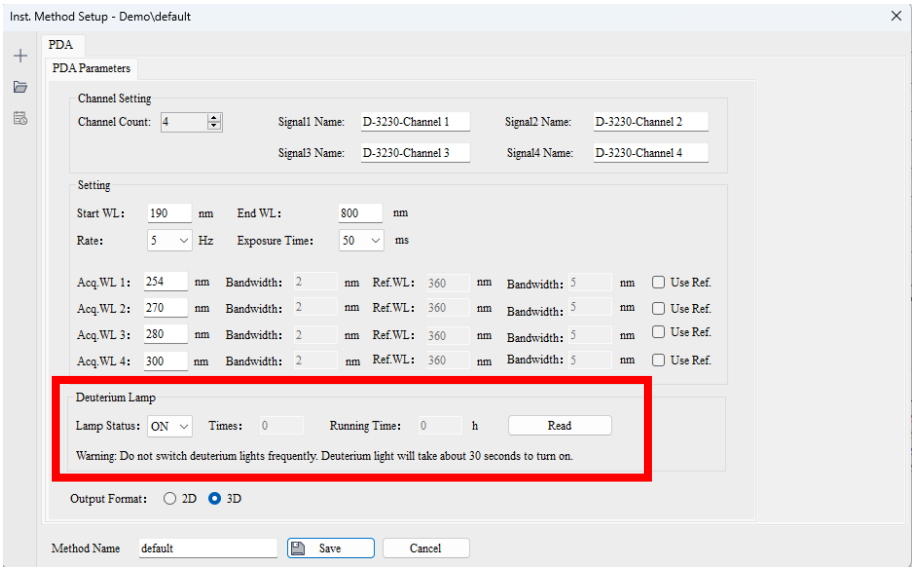


Fig.3-52 Setting light source status

By clicking the "Read light source status" button, you can monitor the opening times and running time of the light source. This part of the function is mainly to facilitate the user to observe the use of the detector and judge the life of the light source.

【Note】 **Do not turn on or off the light source continuously to avoid damage to the deuterium lamp and tungsten lamp. It is recommended to turn on and off the time interval of more than 5 minutes.**

After completing the light source setting and clicking "OK" to save it, the detector will turn on and off the light source according to the light source state set by the method after sending the method

3.18.1 Setting the number of display collection channels

On the PDA Parameters page, set the number of channels and channel name, as shown in Fig. 3-53.

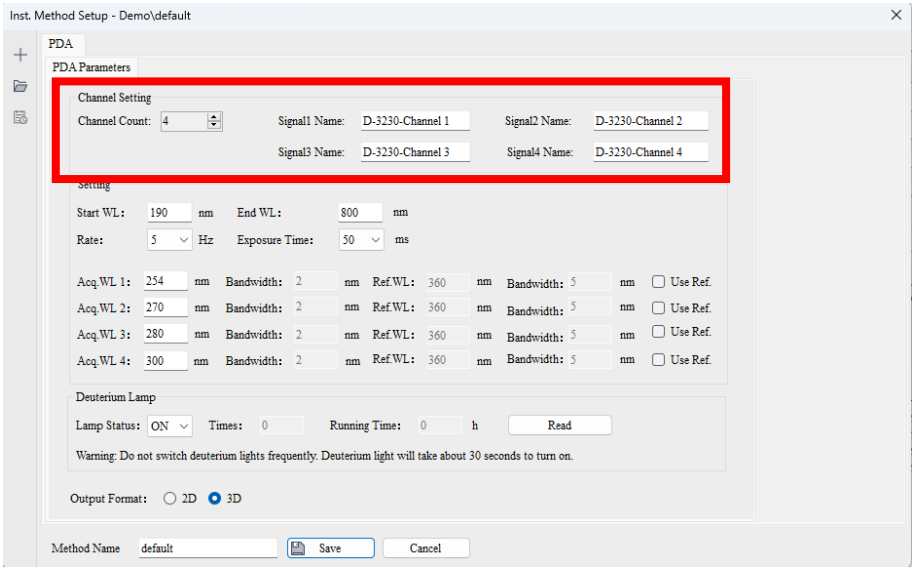


Fig. 3-53 Setting the number of collection channels

3.18.2 Setting the Collection frequency

As shown in Fig. 3-53, the collection frequency of the D3230 detector can be set to 2, 5, 10, and 20Hz, and the collection frequency of the D3240 detector can be set to 2, 5, and 10Hz. The SNR of the detector is different with different acquisition frequency, so the user should select the appropriate acquisition frequency according to the actual detection requirements.

3.18.3 Setting the exposure time

As shown in Fig. 3-53, the exposure time of the D3230/40 detector can be set to 25, 50, and 100ms. Exposure time refers to the time that the detector sensor diode array receives light energy, and the longer the exposure time, the higher the detector receives light energy. Users need to choose the best exposure time according to the actual detection wavelength and wavelength range Settings.

3.18.4 Set the collection wavelength and reference wavelength

As shown in Fig. 3-53, the multi-channel acquisition wavelength can be set

for the D3230/40 detector, and the corresponding reference wavelength can be set respectively. Appropriate setting of reference wavelength can reduce detector drift and deviation. However, it is necessary to ensure that there is no absorption of the analytical sample in the selected reference wavelength region.

3.18.5 Output format

As shown in Fig. 3-54, the user selects the output format of the data according to the actual analysis and experiment requirements. If the user wants to view the spectrogram information of the sample, the output format needs to be selected as "3D"; otherwise, the spectrogram window cannot be opened in the data processing stage.

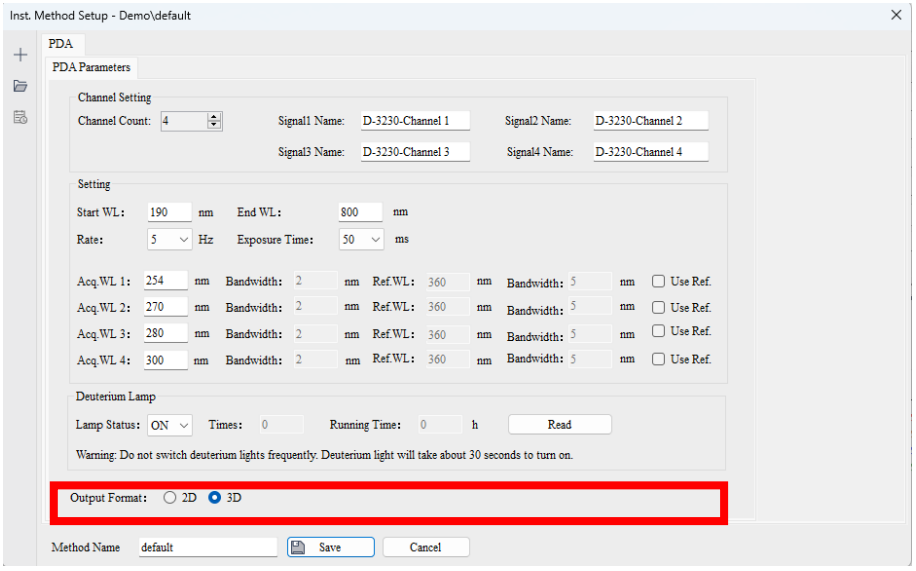


Fig. 3-54 Output format Settings

【Note】 If you want to view the spectrogram of the sample during data processing, you need to check "3D" in the output format below when setting parameters.

3.18.6 Method of preserving the instrument

As shown in Fig. 3-54, after setting all detector parameters and parameters of pump, automatic sampler and other modules in the system, enter the method name you want to name in the "Method Name"

input box, and click the "OK" button on the right to save the instrument method. If you want to save the method, enter the new method name in the "Method Name" input box. Click the "OK" button again to save the method.

3.18.7 How to turn on the instrument

Click the icon on the left  of the "Instrument Method Settings" page, select in the "Instrument Method List" that opens or search for the instrument method file that you want to open in the search bar above, and click "Confirm" to open the method

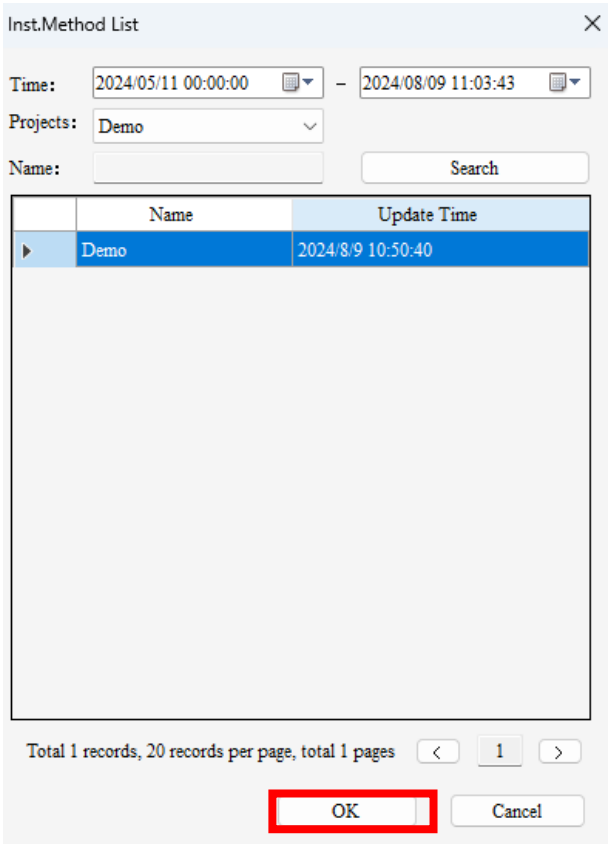


Fig. 3-55 List of device methods

3.18.8 Method of creating an instrument

Click the icon  on the left of the "Instrument Method Settings" page to create a new method

3.19 Setting Analysis Method

3.19.1. Measurement Settings

After entering the project, click the "Analysis Method" button to enter the "Analysis Method Setting" page, as shown in Fig. 3-56.

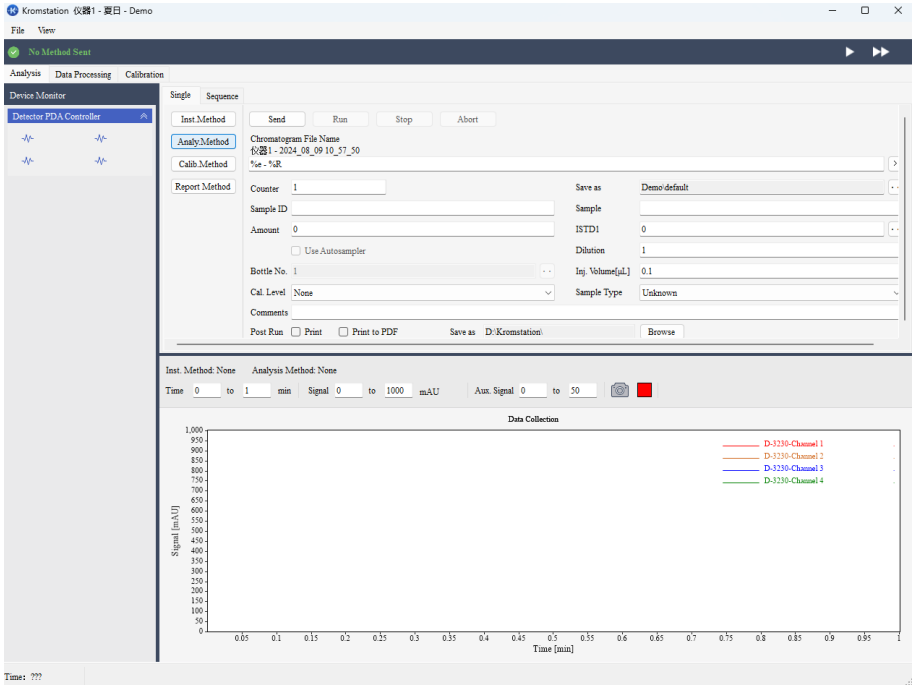


Fig. 3-56 Establishing an analysis method

On the Measurement page of Analysis Method Settings, enter column, column length, and pressure, as shown in Fig. 3-57.

If the detector is used with the EC3200 system, check "Enable automatic stop" in the upper right corner and set the running time. Generally, it is recommended to set the running time for unknown samples to be longer to ensure that all sample peaks are detected. The running time of subsequent experiments should be appropriately adjusted according to the experimental results. Enter the method name you want to name in the "Method name" input box, and click the "Confirm" button on the right, you can save the analysis method.

The method of opening and creating the analytical method is the same as the instrument method

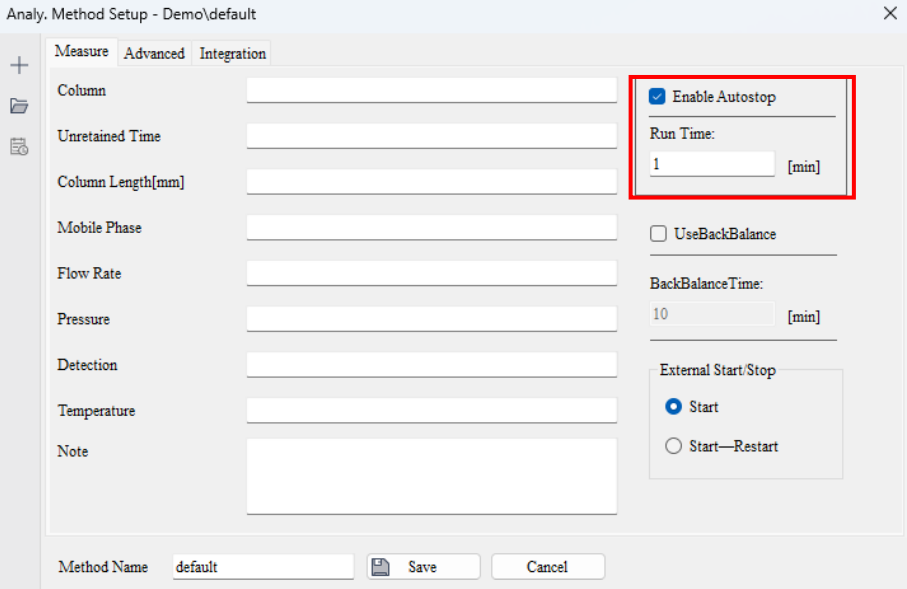


Fig. 3-58 Setting analysis methods

【Note】 Column length is a required field, and the entered column length value will affect the calculation result of column efficiency during data processing

3.19.2. Advanced Settings

As shown in Fig. 3-59, if the system is equipped with other modules, you can select the auxiliary signals that you want to observe on the collection page in the Advanced page of "Analysis Method Settings", such as the pressure curve of the pump and the temperature curve of the column temperature tank, and click "OK" to save the selected signals.

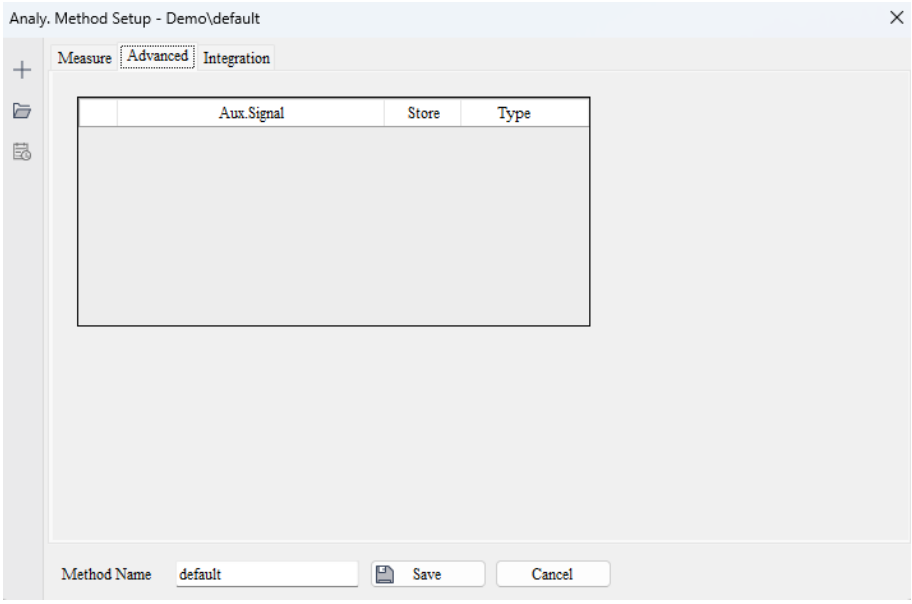


Fig. 3-59 Advanced Settings

3.19.3. Point setting

As shown in Fig. 3-60, you can set the integration event in "Analysis Method Setting", select the desired integration event in the drop-down list of "Chromatogram Operation", such as: noise calculation, drift calculation, peak start and fall point, etc., enter the start and end time of the integration time and the corresponding judgment value in the column of "Time A and B", and click "OK" button to save.

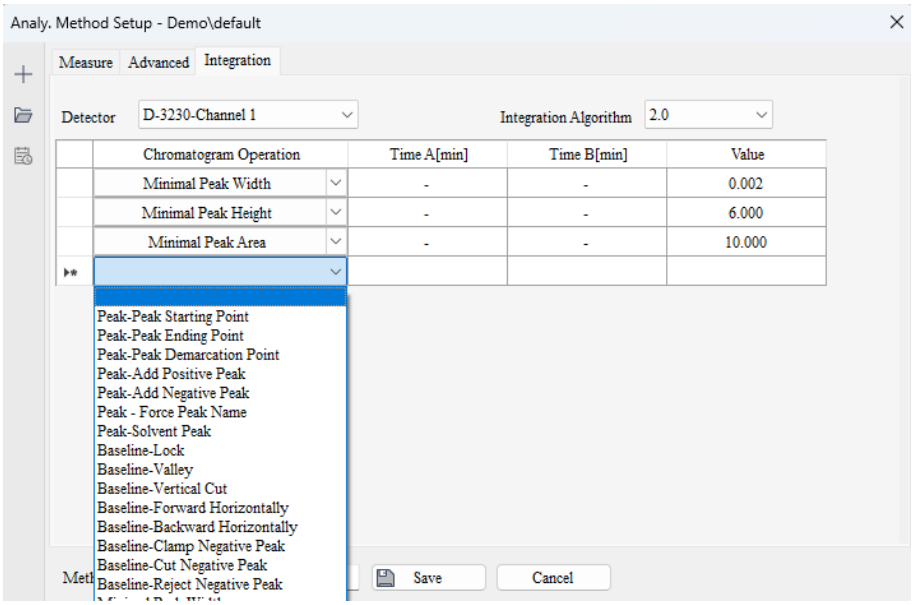


Fig. 3-60 Integral Settings

3.20 Running Detection Methods

As shown in Fig. 3-61, open and select the instrument method and analysis method you want to use respectively, click the "Send method" button on the main page, and the workstation will immediately send the method command to the next computer and start running.

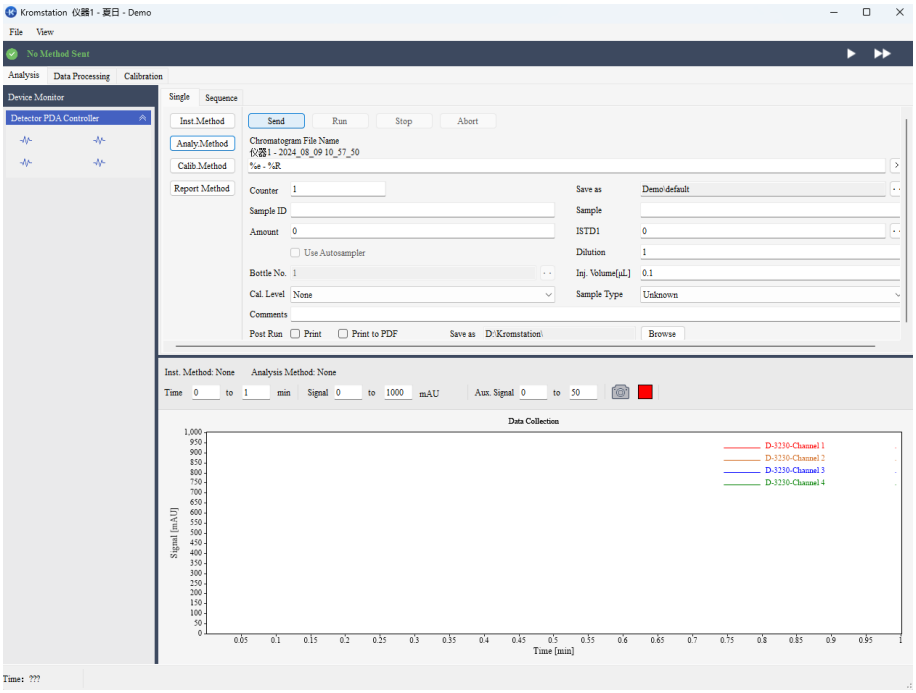


Fig. 3-61 Running detection method

【Note】 Method After setting, only click "OK" and do not click "Send method". After setting, the method is to save the not send state.

3.21 Baseline monitoring

As shown in Fig. 3-62, after the detection method is run, the detector and other modules start to run according to the set parameters. At this time, the baseline appears on the collection page. Generally, the system is considered to be balanced if the baseline fluctuations are stable.

In the collection page, the coordinate size of the collection page and the

coordinate size of the auxiliary signal can be adjusted through the input box of "time source" and "signal" at the top, or the data of the current time can be captured through the click icon  and opened on the data processing page for users to analyze and process the experimental results in advance

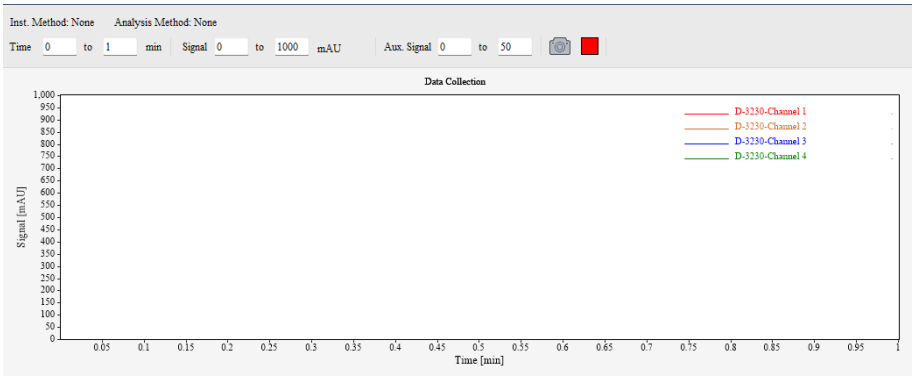


Fig. 3-62 Baseline monitoring

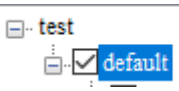
3.22 Data Collection

3.22.1. Single run data collection

1) In the single analysis page, after the method is set, click "Send method", the system begins to balance, and the collection page starts baseline monitoring.

图 3-63 单次分析页面

2) At the bottom of the single analysis page, use the "Chromatogram file name" input box to name the experimental spectrum to be analyzed.

3) As shown in Fig. 3-64, click the  icon behind the display box of "Storage Location", and the page of "Select Storage Location" will pop up. On this page, click the right mouse button to prompt "Add Directory", click "Add Directory", enter the folder name in the pop-up dialog box, and click "OK" to generate a folder. Check the 

box in front of the folder to save the diagram file in this directory

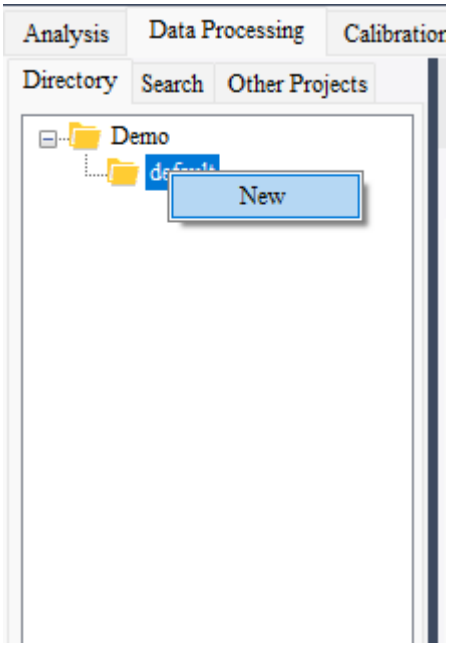


Fig. 3-64 Add storage directory

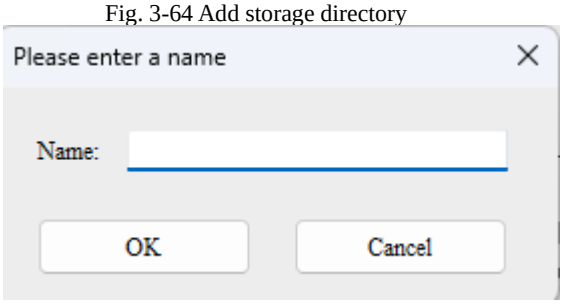


Fig. 3-65 Naming a folder

4) If automatic sampler is conFig.d in the system, select the check box before "Whether to use automatic sampler" to use automatic sampler, otherwise the parameters related to injection are invalid, select and set the parameters such as injection volume and sample type, and click "Run" to start sample analysis after the system is balanced.

3.22.2. Serial operation data acquisition

1) For the same single analysis, after the method is set, click "Send method", the system begins to balance, and the collection page starts baseline monitoring.

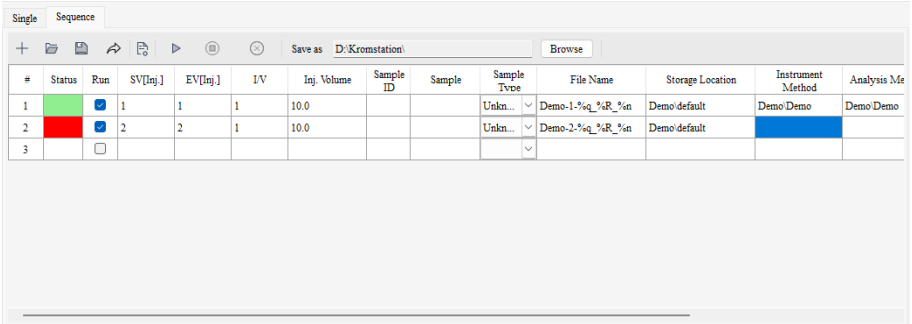


Fig. 3-66 Sequence analysis - Data collection

2) Check "Run" in the sequence table to add a new line, and enter the location of sample bottle, sample volume, sample number, sample type, spectrum name, etc., in the order of the list

3) Click the mouse "spectrum saving location", "instrument method", "analysis method" and then select the file saving location, instrument method, analysis method and so on in the pop-up page.

4) If all the sequences are normal, the color of the sequence status display is green, otherwise there are problems in the current sequence, please check.

5) Through the upper toolbar, you can create a sequence, open a sequence, save a sequence, export a sequence, report Settings and other operations 

3.22.3. Stop data collection

Data collection can be stopped in several ways:

- On the data collection page, click the  icon to stop data collection and save the spectrum;
- On the data collection page, click the  icon to give up data collection but not save the spectrum;
- In the analysis method, the running time is shortened, the data acquisition is ended earlier, and the spectra are saved.

3.23 Data viewing and processing

3.23.1. Chromatogram viewing and processing

After the collection, click "Data processing" in the upper left corner of the main page to enter the data processing page.

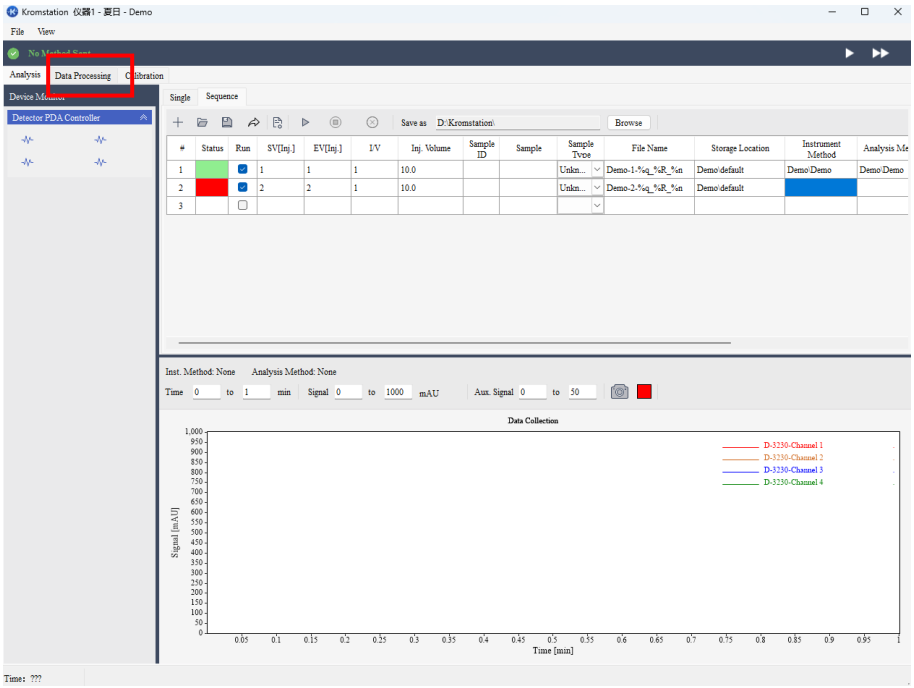


Fig.3-67 The data processing page is displayed

Find the spectrum you want to view or work with in the folder on the left and open it.

The chromatogram can be integrated through the right toolbar, and the processing file can be saved, exported, and printed through the upper toolbar. For details, see the Kromstation Chromatographic Data Workstation user manual.

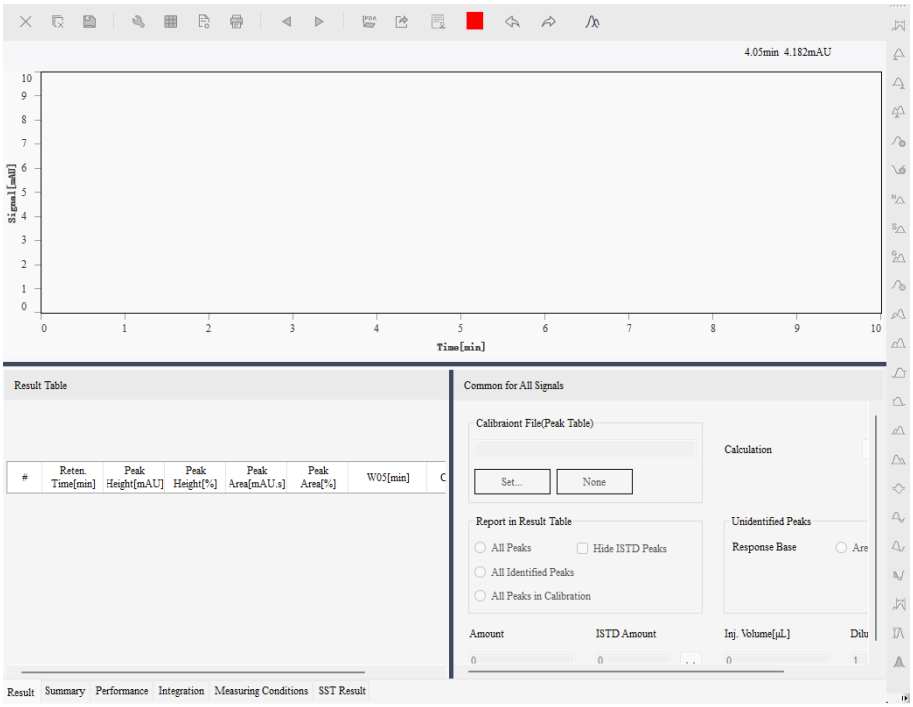


Fig. 3-68 Spectrum diagram page

3.23.2. Spectrogram viewing and processing

(1) PDA Chromatogram Interface

Click button  in the status bar above the chromatogram of the "Data Processing Interface" to open the "PDA chromatogram" interface. The PDA chromatogram interface is shown in Fig.3-69. By default, only chromatogram, spectrum, contour line view and peak purity spectrum view are enabled in this interface.

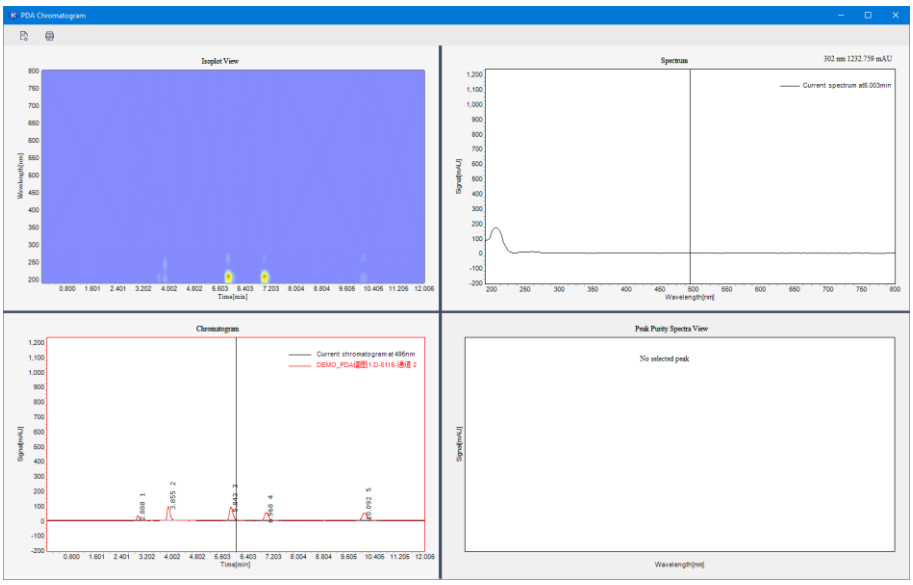


Fig.3-69 PDA Chromatogram Interface

(2) 3D View

Right-click in the "Chromatogram" area of the "PDA Chromatogram" interface - select "Show 3D View" to open the "3D View" interface (as shown in Fig. 3-70). The 3D view interface is shown in Fig. 3-71.

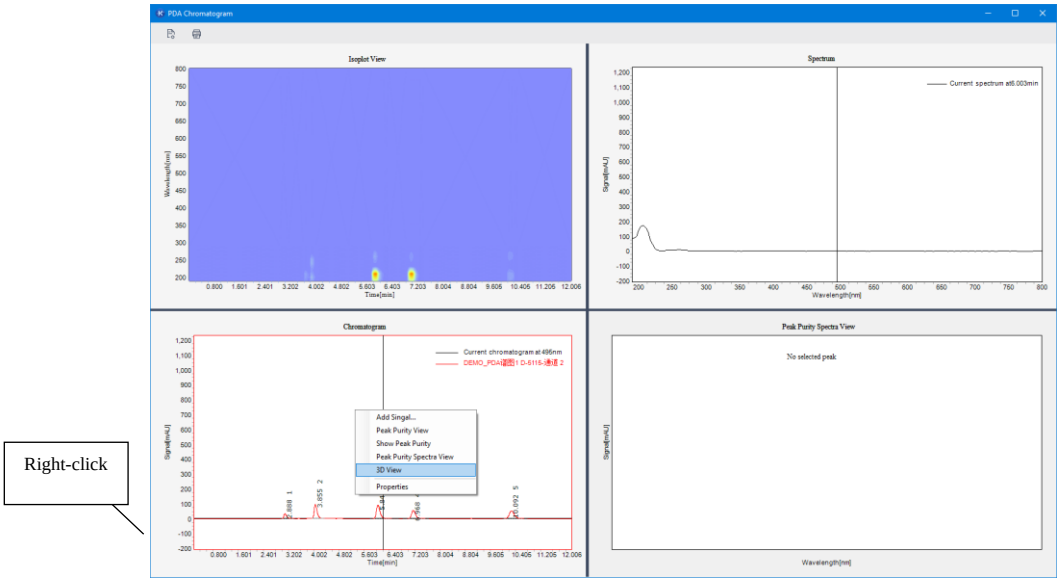


Fig. 3-70 Open the 3D View Interface

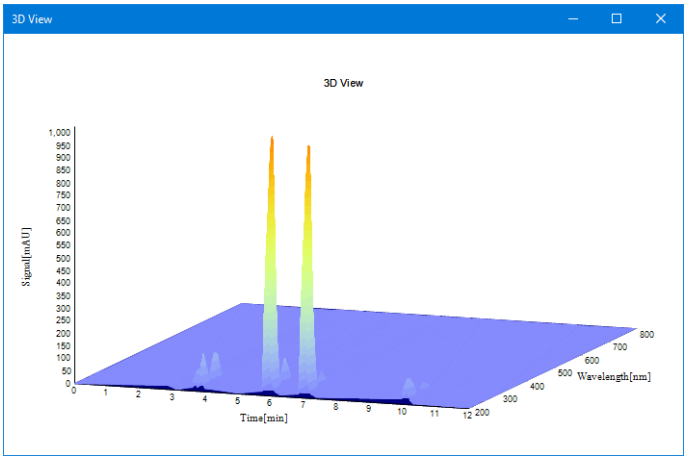


Fig.3-71 3D View Interface

(3) Peak Purity Spectrum View

Drag the marker line in the "Chromatogram" area to move the selected peak, then right-click in the "Chromatogram" area, and select Show Peak Purity Spectral View to open it.

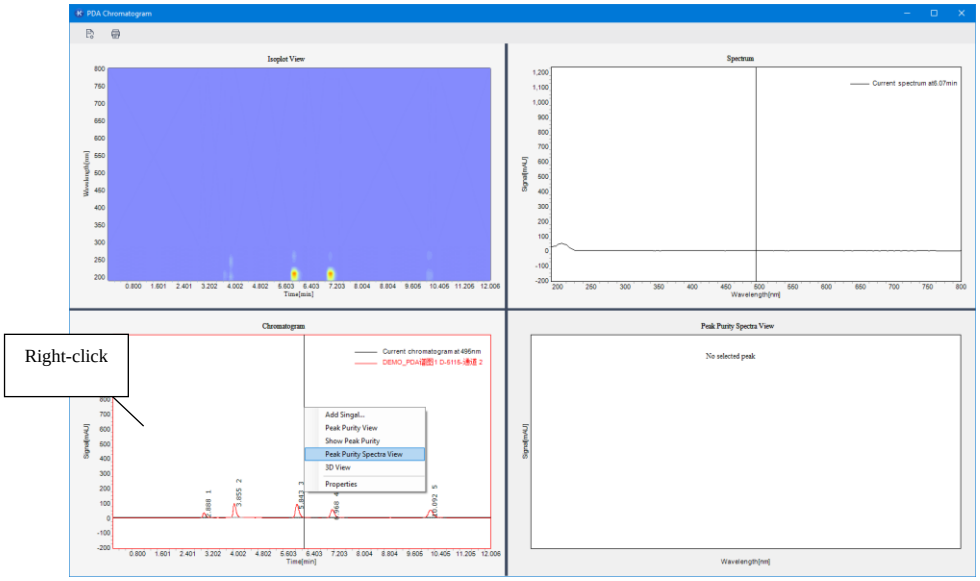


Fig. 3-72 Display Peak Purity Spectra

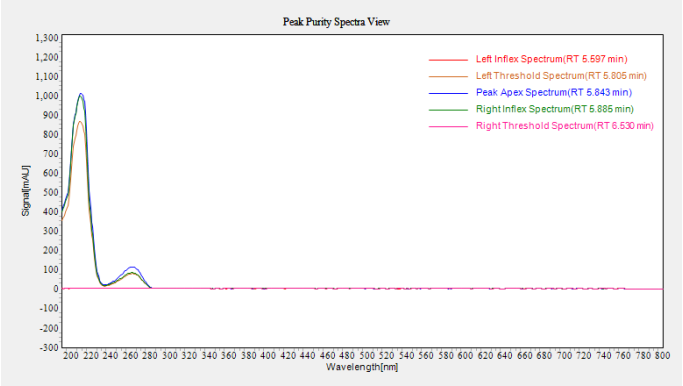


Fig.3-73 Peak Purity Spectrum

(4) Peak Purity Curve

Right-click in the "Chromatogram" area and select "Peak Purity Curve" to display the peak purity curve in the chromatogram, as shown in Fig.3-74 and 3-75.

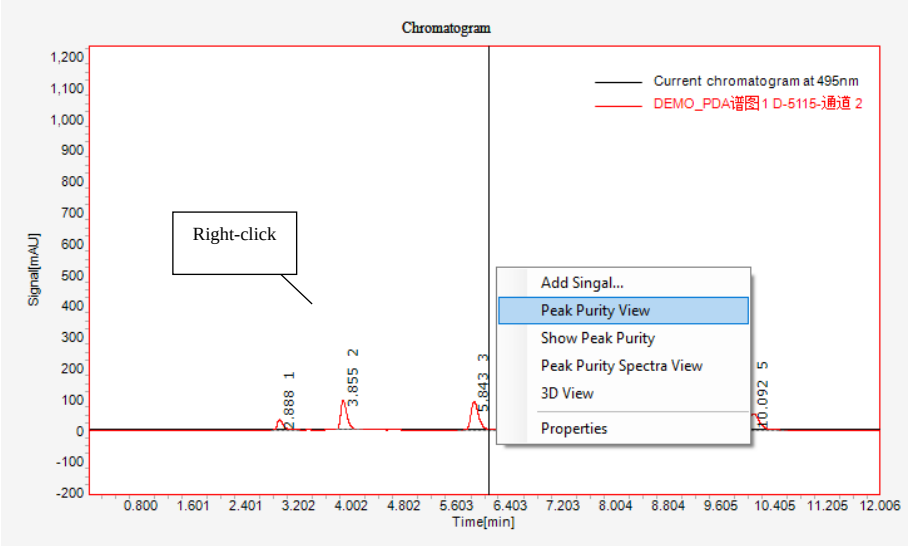


Fig. 3-74 Display Peak Purity Curve

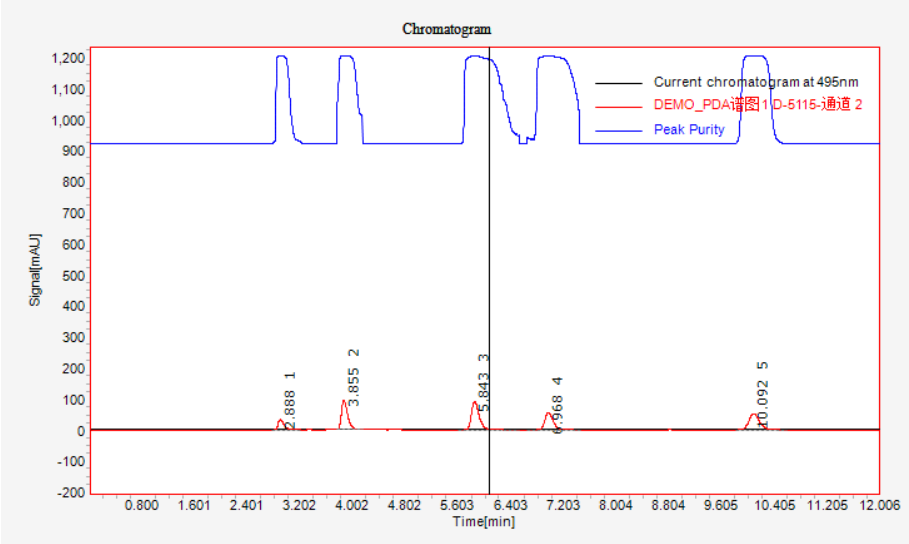


Fig.3-75 Peak Purity Curve

(5) Peak Purity View

Right-click in the "Chromatogram" area and select "Display Peak Purity" to pop up the "Peak Purity View" window, as shown in Fig. 3-75.

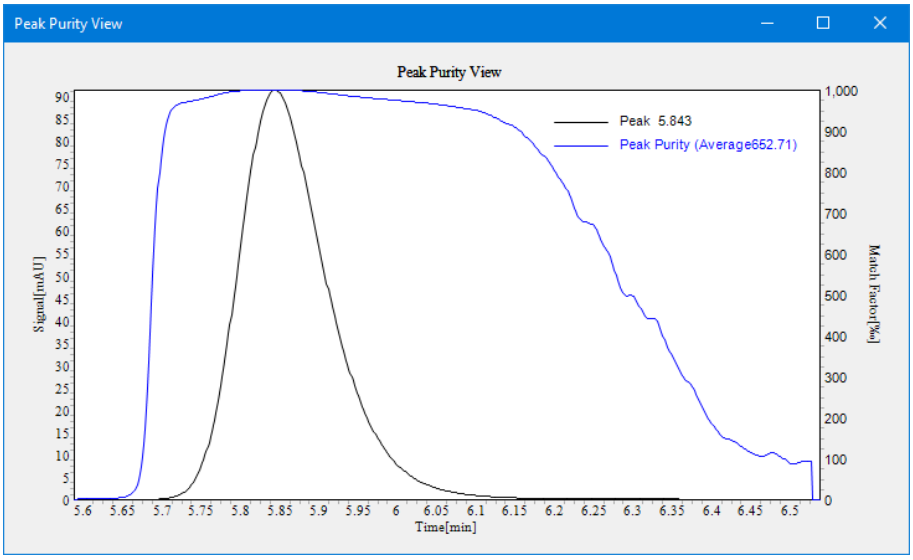


Fig. 3-76 Peak Purity View

(6) Add Chromatogram Signal

Right-click in the "Chromatogram" area and select "Add Signal" to pop up the "Add Chromatogram Signal" window, as shown in Fig. 3-77. In this window, you can set the wavelength, reference, etc. to increase the chromatogram.

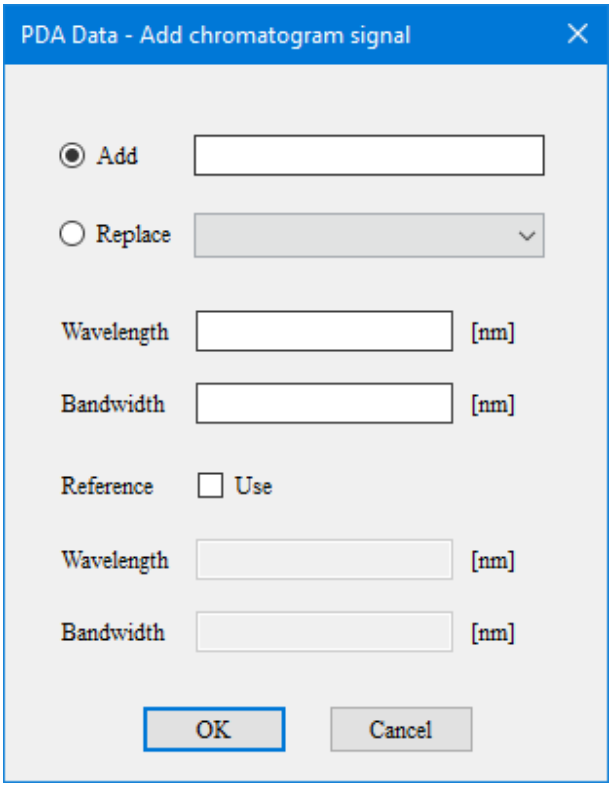


Fig.3-77Add Chromatogram Signal

(7) Attributes

Right-click in the "Chromatogram" area or the "Spectrum" area, and select

the "Attributes" option to pop up the "PDA Attributes" setting window, as shown in Fig. 3-78. In this window, you can set the coordinate axis parameters, etc.

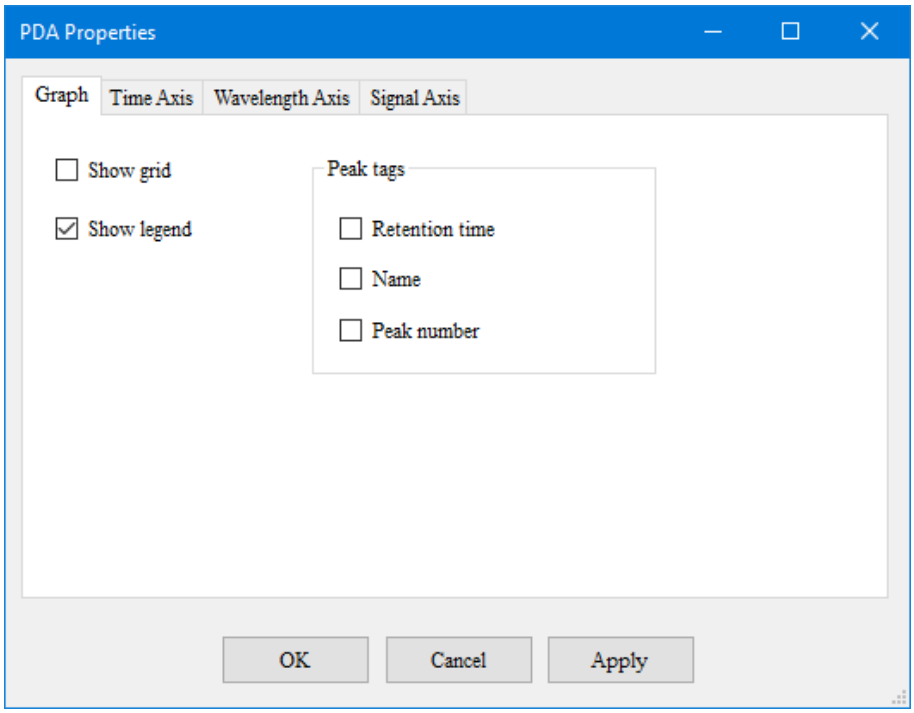


Fig. 3-78 PDA Attributes window

(8) Spectral Library

Right-click in the "Spectrum" area, and the related options of the spectral library will pop up. Contains functions such as creating a new library, opening a library, adding to a library, and searching in a library. As shown in Fig. 3-79.

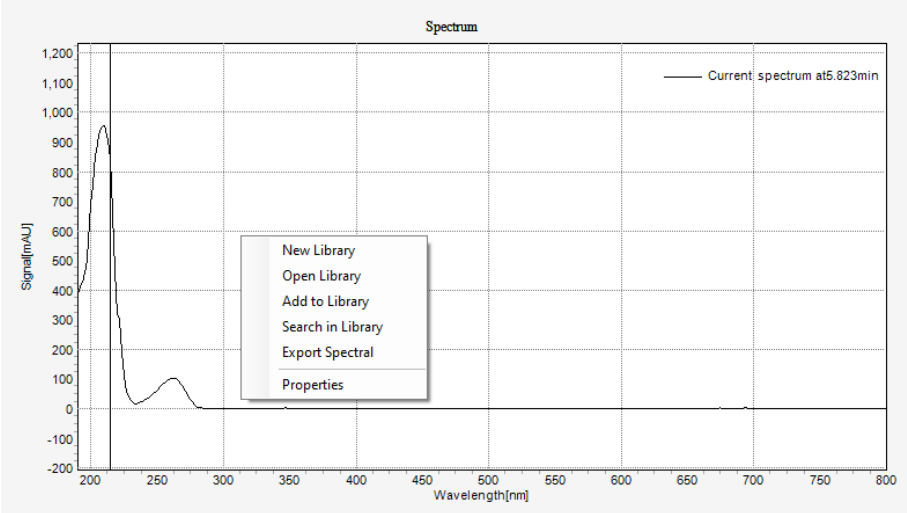


Fig. 3-79 Right-click function in the "Spectrum" area

(9) Spectral Library View

This view displays spectral information for an open spectral library. Spectrum names and annotations can be changed in this view. If "Show Spectrum" is checked, the library spectrum and instant spectrum can be displayed in the spectrum view at the same time. As shown in Fig. 3-80

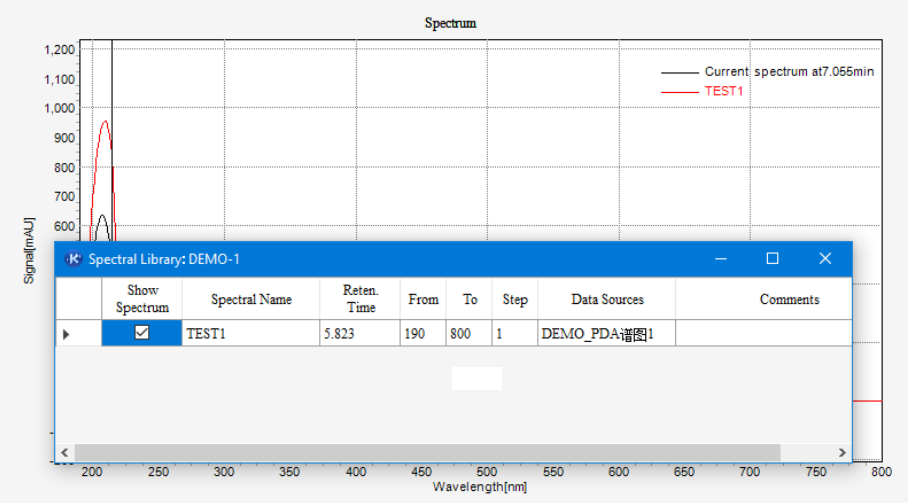


Fig. 3-80 Spectral Library View

(10) Spectral Library Search Results View

This view displays the spectral library search results. As shown in Fig. 3-81.

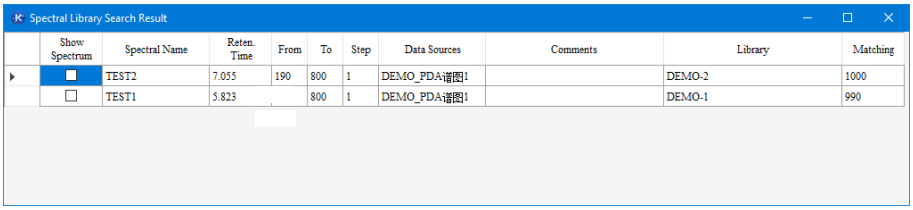


Fig.3-81 Spectral Library Search Results View

4. Chapter Four: Maintenance and Repair

4.1 Indicator Status and Meaning

An LED light is installed below the front panel of the detector, serving as the status indicator, as Figure 4-1.

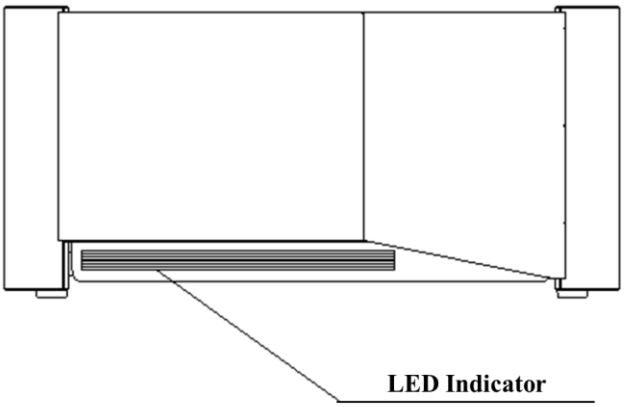


Fig. 4-1 LED indicator on the front panel

The indicator light is blue in design, with combination status of breathing pulsation, frequent flashing, and constant, to indicate the status of existing instruments and a failure alarm. Refer to Figure 4-2 for the meanings.

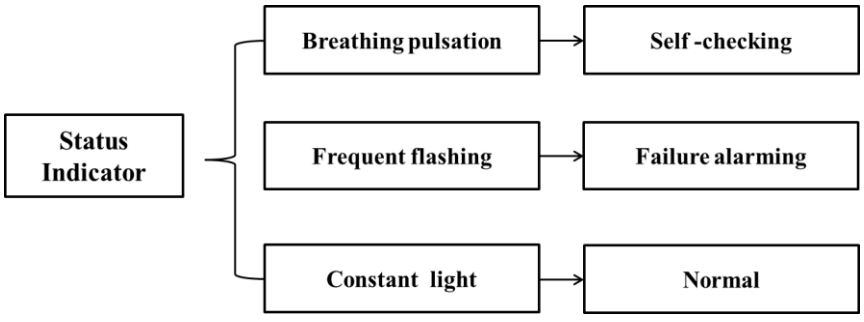


Fig. 4-2 Indicator status diagram

4.2 Error Code

There will pop out error dialog box if the workstation detects failure. Users judge the troubles and take proper measures to solve according to the error codes.

Table 4-1 Error code

No.	Code	Trouble	Indicator
1	DB00	System CPU fault	----
2	DB01	EEPROM fault	----
3	DB02	8M crystal vibration fault	----
4	DB03	32K crystal vibration fault	----
5	DB04	Operation fault	----
6	DB05	Leakage	Blue light flash
7	DS00	System CPU fault	----
8	DS01	EEPROM fault	----
9	DS02	8M crystal vibration fault	----
10	DS03	Wavelength stepper motor fault	----
11	DS04	Eliminating secondary spectral device fault	----
12	DS05	Deuterium lamp power supply fault	----
13	DS06	Wavelength calibration failure	----
14	DS07	Light intensity over range	----

4.3 Other Faults

Table 4-2 A summary of other faults

No.	Symptoms	Cause	Solutions
1	Detector doesn’t work	Fuse burn-out	Change fuse
		Power supply interruption	Power recover
2	Deuterium lamp is out	Lamp beyond service life	Change lamp
		Deuterium lamp wiring malfunction	Rewire
		Deuterium lamp power supply fault	Check the power supply

No.	Symptoms	Cause	Solutions
		Deuterium lamp switching off	Switch on the lamp
3	Energy of the sample and reference ends display as 0	Lamp burn-out	Change lamp
		Lamp switching off	Switch on the lamp

4.4 Examples of Abnormal Detector Signals

4.4.1 Periodically changing abnormal signals

There is regular cycle of change of abnormal signals, shown as Figure 4-3.

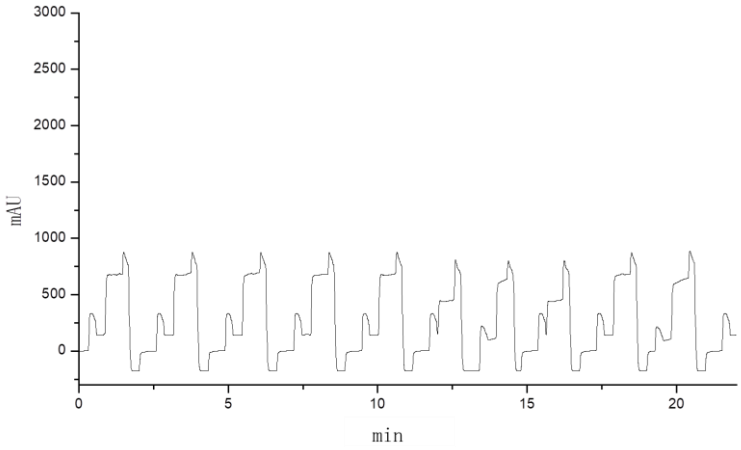


Fig. 4-3 Periodically changing abnormal signal 1

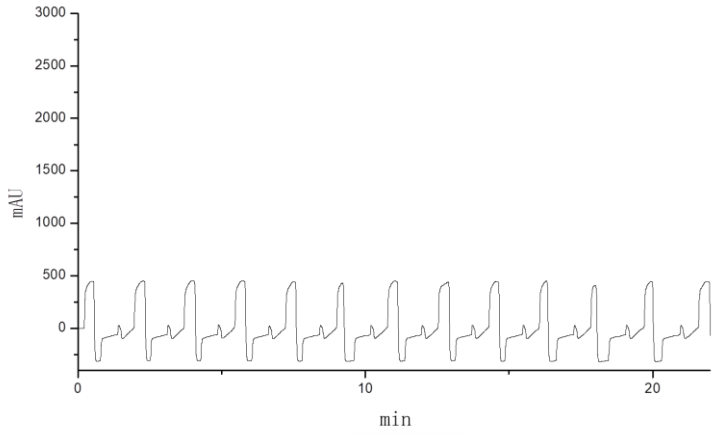


Fig. 4-4 Periodically changing abnormal signal 2

If there regular cycle of change of abnormal signals, as shown above, it is generally caused by air bubbles mixed in flow cell. To drive out bubbles, replace the column to a two-way joint and then increase the flow rate to 3-5 mL/min.

4.4.2 Straight baseline with large signals fluctuated

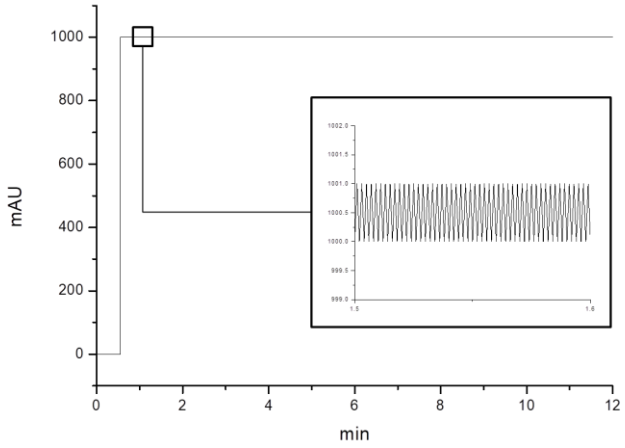


Fig. 4-5 Baseline without signals

If baseline performs straight with large signals fluctuated, as Fig. 4-5, it is usually caused by that Deuterium lamp failed to light. Check whether the lamp setup option is “ON”. If not, switch to “ON”.

5. Chapter Five: Components Replace

In order to guarantee the normal run of the detector, it is necessary to maintain or replace some components. Maintenance is referred to easy repair operations, where there is no need to open the cover. However repair is referred to get rid of the cover and change internal parts.

If you encounter any repair issue, contact with Dalian Elite Analytical Instrument Co., Ltd.

【Note】 **Without guidance, please do not open the detector cover, in case of any damage to body or instrument.**

5.1 Cleaning the Flow Cell Online

Please follow these steps to clean the flow cell online:

1) Turn off the pumps, and take off the column.

2) Connect the flow cell entrance to the sampler export, and then pump miscible solvent or water (for example, mobile phase is with water miscibility) into the flow cell and rinse it. If mobile phase is immiscible with water, rinse it with transitional solvent.

3) Add the column again.

4) If impurities cannot be cleared, please contact with Dalian Elite Customer Service.

【Warning】 **Please do not flush the flow cell with nitric acid nor acetone！Flow cell may be polluted by these solvents.**

5.2 Cleaning the Tubing

Newly acquired tube needs to be cleaned before use.

Solvent for cleaning stainless tube should be in the following sequence: CCl3-Methanol (or absolute alcohol)- water- 1.0mol/L HNO3 aq.- Methanol- Nitrogen. For PTFE, clean with methanol before use.

5.3 Flow Cell Replacement (Please contact Customer Service)

If flow cell is damaged or broken, replace the new one as following:

1) Unpack and check the new flow cell.

2) Please keep the detector power off, and then remove the entrance/ export connection tubing.

3) Unscrew the two thumb screws and gently remove the flow cell.

4) Install the new flow cell in the proper direction.

5) Tighten the two thumb screws.

6) Once again connect the entrance/ export tubing and clean it with suitable solvent.

7) Turn on the detector.

5.4 Deuterium Lamp Replacement

Depending on the self-property of deuterium lamp, lamp energy decreases while the working time increases. As a result, the signal to noise ratio decreases. To keep the optimum performance of the lamp, once it runs more than 2000 hours, users have to consider changing a new one. If the testing consequence is not influenced, users may go on using it with periodic maintenance and observation. It is suggested to get good prepared for the lamp replacement, avoiding a bad influence on experiments.

When the following conditions are met, please replace the deuterium lamp:

- The deuterium lamp cannot be lit while starting the detector.
- The baseline noise is too high, meanwhile the sensibility is too low.

【Note】 **If the deuterium lamp cannot be lit for many times, it is suggested to replace it. In general, the service life of the lamp is 2000 hours.**

【Warning】 **Before take off the deuterium lamp, please make sure the detector is powered off. Because there will be intense ultraviolet radiation directly harm eyes or skin if you do not do this.**

【Caution】 **The temperature of the lamp box and around is so high to burn skin. So, please take off the deuterium lamp after turning off the detector power for 30 minutes.**

Please replace the deuterium lamp as following:

1) Unscrew two fixing screws of the front panel, and remove the front panel lamp cover, as shown in Figure 5-1.

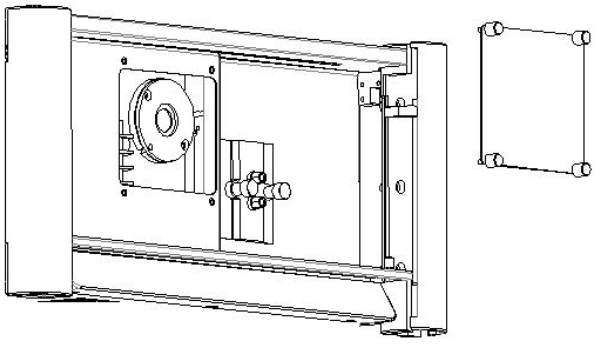


Fig. 5-1 Remove the front lamp cover

2) Remove the inner lamp cap, as shown in Figure 5-2.

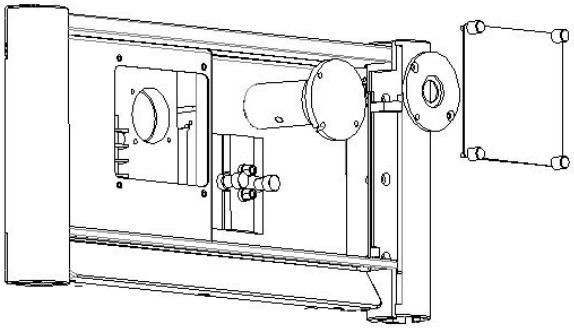


Fig. 5-2 Remove the lamp cap

3) Unscrew the 3 lamp connecting terminals, as shown in Figure 5-3. Then loosen the 2 deuterium lamp mounting screws, and pull the lamp out of the lamp housing.

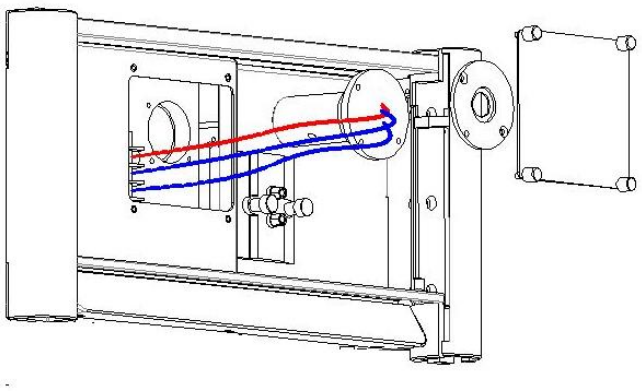


Fig. 5-3 Pull the lamp out

4) Re-install the D2 lamp assembly to its original condition in the instrument.

5) Fasten the 3 lamp connecting terminals referring to the color (red-red, blue-blue, blue-blue). Double check the line sequence and tighten the screws.

6) Re-install the front panel lamp cover.

【Note】

◆ **Glass covers the deuterium lamp, so please handle it gently. Fingers and other hard things can not touch the lamp aperture. Do not touch the lamp glass directly. Hold its lamp lines or flange.**

◆ **Never observe alight deuterium lamp with naked eye. Please put on UV protective goggles while observing it. Make a short observation after replacing a new deuterium lamp.**

【Note】 **Make sure that the detector power is cut off during replacement of the deuterium lamp. After the replacement, make sure to turn on the detector and preheat for at least 10 minutes.**

6. Chapter Six: Appendix

6.1 Consumption parts

NO.	Describe	PN
1	Trigger line	18020091
2	Pre-Cut Tubing 1/16"-30mm-1/32"-500mm-0.007"	18990147
3	PEEK Tubing OD1/16″*ID0.007″	13010014
4	PEEK ferrule	14990128
5	SS Finger Tight	14993017
6	T2.5 A fuse	15080006
7	Tee	14992904
8	Power Cable	17000014
9	LAN cable	17000035
10	Silicon Tubing	13010050
11	Finger Tight I (PEEK)	3215F-120X

6.2 Renewal Parts

NO.	Describe	PN
1	Deuterium Lamp	16010005
2	Tungsten Lamp	16020004
4	Tungsten Lamp Fixing Screws	14070229
5	Deuterium Lamp Fixing Screws	14992352

Safety information

General safety information

At different stages of the instrument operation, maintenance and repair, everyone should abide the following general safety rules.Breaking these rules may cause damage to instruments or staffs, Dalian Elite Analytical Instruments Co., Ltd. will not be responsible for the impact s caused by non-standard operation.

Standard of security

For marked with this symbol of the equipment, the user should refer to the instruction manual, so as not to cause harm to the operator and equipment damage.

Symbols	Descriptions
	Please do not operate beyond the scope of caution, unless you have been fully understand and meet the required conditions.
［Warning］	Casualties may appear. Please do not operate beyond the scope of warning, unless you have been fully understand and meet the required conditions.
［Caution］	Data loss or equipment damage may appear. Please do not operate beyond the scope of caution, unless you have fully understood and met the required conditions.
［Note］	Unsatisfactory experimental data and instrument failure may appear. Please do not operate beyond the scope of note, unless you have been fully understand and meet the required conditions.

Absorptive character of some typical functional groups

Name	Groups	λ_{max}	ε_{max}	λ_{max}	ε_{max}	λ_{max}	ε_{max}
ether	-O-	185	1000				
thioether	-S-	194	4600	215	1600		
amine	$-NH_2$	195	2800				
mercaptan	-SH	195	1400				
disulphide	-S-S-	194	5500	255	400		
bromide	-Br	208	300				
monoiodide	-I	260	400				
oximido	-NOH	190	5000				
nitrine	>C=N-	190	5000				
ethylene	-C=C-	190	8000				
keto-	>C=O	195	1000				
thioketone	>C=S	205	Strong	270-285	18-30		
aldehyde	-CHO	210	Strong				
acid	-COOH	200-210	50-70				
sulfoxide	>S→O	210	1500				
nitro	$-NO_2$	210	Strong				
Nitrous acid ester	-ONO-	220-230	1000-2000				
	(no-loop)						
	$-(C=C)_3-$	260	25000				
	$-(C=C)_4-$	300	52000				
	$-(C=C)_6-$	330	118000				
	$-(C=C)_8-$	230-260	3000-8000				
	(annulate)						
	C=C-C≡C	219	6500				
	C=C-C=N	220	23000				
	C=C-C=O	210-250	10000-20000				
	$C=C-NO_2$	229	9500				
benzene		184	46700	202	6900	255	170
biphenyl		246	20000				
naphthalene		220	112000	275	5600	312	175
anthracene		252	199000	375	7900		
pyridine		174	80000	195	6000	251	1700
quinoline		227	37000	270	3600	314	2750
isoquinoline		218	80000	266	4000	317	3500

【State】When choosing the best absorption wavelength, the lowest wavelength getting through mobile ph ase ought to be considered at the same time(UV cutoff wavelength in the appendix 2). To sample who h

ave multiple characteristic absorption wavelength, the wavelength corresponding to the biggest ε_{max} is the best choice.

Features of some organic solvents

	Solvent* 7<.5cP,<45	source	UV Cutoff	R.I. 25℃	boiling point ℃	viscosity cP,25℃	p'	ea	w%	e	p'+ 0.25e
1	FC-78* FC-75(fluorous solvent) F-43	LC character	210 (Opaque or below)	1.267 1.276 1.291	50 102 174	0.4 0.8 2.6	< -2 < -2 < -2	-.25 -.25 -.25		1.88 1.86 1.9	p' And the dielectric constant
2	isooctane*	LC	197	1.389	99	0.47	0.1	0.01	0.011	1.94	0.1
3	n-heptane*	LC	195	1.385	98	0.40	0.2	0.01	0.010	1.92	0.5
4	n-hexane*	LC	190	1.372	69	0.30	0.1	0.01	0.010	1.88	0.5
5	n-pentane**	LC	195	1.355	36	0.22	0.0	0.00	0.010	1.84	0.5
6	cyclohexane	LC	200	1.423	81	0.90	-0.2	0.04	0.012	2.02	0.5
7	cyclopentane	LC	200	1.404	49	0.42	-0.2	0.05	0.014	1.97	0.6
8	1-chlorobutane*	LC	220	1.400	78	0.42	1.0	0.26		7.4	2.8
9	carbon disulfide	LC	380	1.642	46	0.34	0.3	0.15	0.005	2.64	1.7
10	2- chloride**	LC	230	1.375	36	0.30	1.2	0.29		9.82	3.7
11	carbon tetrachloride	LC	265	1.457	77	0.90	1.6	0.18	0.008	2.24	2.3
12	n-butyl ether		220	1.397	142	0.64	2.1	0.25	0.19	2.8	2.4
13	triethylamine			1.398	89	0.36	1.9	0.54		2.4	2.4
14	bromoethane*			1.421	38	0.38	2.0	0.35		9.4	4.3
15	isopropyl ether*		220	1.365	58	0.38	2.4	0.28	0.62	3.9	3.2
16	methylbenzene	LC	285	1.494	110	0.55	2.4	0.29	0.046	2.4	2.9
17	P-xylene		290	1.493	138	0.60	2.5	0.26		2.3	3.0
18	chlorobenzene			1.521	132	0.75	2.7	0.30		5.6	4.1
19	bromobenzene			1.557	156	1.04	2.7	0.32		5.4	4.1
20	iodobenzene						2.8	0.35			
21	diphenyl ether			1.580	258	3.3	3.4			3.7	3.7
22	phenetole			1.505	170	1.14	3.3			4.2	4.9
23	diethyl ether*	LC	218	1.350	35	0.24	2.8	0.38	1.3	4.3	4.0
24	benzene	LC	280	1.498	80	0.60	2.7	0.32	0.058	2.3	3.6
25	phosphotriester(p-tolyl)			1.510	72	0.57	2.2			7.8	4.2
26	iodoethane			1.510	72	0.57	2.2			7.8	4.2
27	n-caprylic alcohol		205	1.427	195	7.3	3.4	0.5	3.9	10.3	5.8
28	fluorobenzene			1.46	85	0.55	3.1			5.4	4.6
29	benzyl oxide			1.538	288	4.5	4.1				
30	dichloromethane**	LC	233	1.421	40	0.41	3.1	0.42	0.17	8.9	5.6
31	anisole			1.514	154	0.9	2.8			4.3	4.6
32	isoamyl alcohol			1.405	130	3.5	3.7	0.61	92	14.7	7.3
33	2-Dichloroethane	LC	228	1.442	83	0.78	3.5	0.44	0.16	10.4	6.3
34	tert-butyl alcohol			1.385	82	3.6	4.1	0.7	Dissolved	12.5	

35	n-butyl alcohol	LC	210	1.397	118	2.6	3.9	0.7	20.1	17.5	8.3
36	n-propyl alcohol	LC	240	1.385	97	1.9	4.0	0.82	Dissolved	20.3	
37	tetrahydrofuran*	LC	212	1.405	66	0.46	4.0	0.57	Dissolved	7.6	
38	propylamine*			1.385	48	0.35	4.2		Dissolved	5.3	
39	ethyl acetate	LC	256	1.370	77	0.43	4.4	0.58	8.8	6.0	5.8
40	isopropyl alcohol	LC	205	1.384	82	1.9	3.9	0.82	Dissolved	20.3	
	Solvent* 7<.5cP,<45	**source**	**UV Cutoff**	**R.I. 25℃**	**boiling point ℃**	**viscosity cP,25℃**	**p'**	**ea**	**w%**	**e**	**p'+ 0.25e**
41	chloroform*	LC	245	1.443	61	0.53	4.1	0.40	0.072	4.8	5.6
42	acetophenone			1.532	202	4.8				17.4	8.7
43	MEK*	LC	329	1.376	80	0.38	4.7	0.51	23.4	18.3	9.1
44	cyclohexanone		215	1.450	156	20	4.7			18.3	9.1
45	nitrobenzene			1.550	211	1.8	4.4			34.8	13.2
46	phenylcyanide			1.536	191	4.8				25.2	10.9
47	dioxane	LC	215	1.420	101	1.2	4.8		Dissolved	2.2	
48	tetramethylurea	LC	265	1.449	175		6.0	0.56		23.0	10.7
49	quinoline			1.625	237	3.4	5.0			9.0	7.4
50	pyridine			1.507	115	0.88	5.3		Dissolved	12.4	
51	nitroethane		380	1.390	114	0.64	5.2		0.9		
52	acetone*	LC	330	1.356	56	0.30	5.1	0.71	Dissolved		
53	phenethyl alcohol			1.538	205	5.5	5.7			13.1	8.8
54	tetramethyl guanidine						6.1	0.6			
55	methyl cellosolve	LC	210	1.400	125	1.60	5.5		Dissolved	19.9	
56	CIS Cyanide Oxide	GC					6.6				
57	1,2-Propyl carbonate	LC					6.1				
58	ethyl alcohol	LC	210	1.359	78	1.08	4.3		Dissolved	24.6	
59	diether	GC					6.8				
60	aniline			1.584	184	3.77	6.3			6.9	8.1
61	acetic acid			1.370	118	1.1	6.0		Dissolved	6.2	
62	acetonitrile*	LC	190	1.341	82	0.34	5.8		Dissolved	37.5	
63	dimethylacetamide	LC	268	1.436	166	0.78	6.5	0.88		37.8	
64	dimethylformamide	LC	268	1.428	153	0.80	6.4			36.7	
65	dimethyl sulfoxide	LC	268	1.477	189	2.00	7.2	0.62	Dissolved	4.7	
66	N-methyl-2-pyrrolidone	LC	285	1.468	202	1.67	6.7			32	
67	Hexamethylphosphoric triamide			1.457	233	3	7.4	0.65		30	
68	methyl alcohol*	LC	205	1.326	65	0.54	5.1		Dissolved	32.7	
69	nitromethane		380	1.380	101	0.61	6.0		2.1		
70	m-cresol			1.540	202	14	7.4			11.8	10.0
71	n-methyl formamide			1.447	182	1.65	6.0		Dissolved	182	
72	ethanediol			1.431	182	16.5	6.9		Dissolved	37.7	
73	methyl aldehyde			1.447	210	3.3	9.6		Dissolved	111	
74	water	LC		1.333	100	0.89	10.2			80	

【State】

1.Organic solvent have low boiling point(≤45 ℃), low viscosity (≤0.5cp) is easy to use. Marked with (*) number of organic solvents is preferred for high performance liquid chromatography (HPLC) mobile phase solvent. Marked with (*) is with very low boiling point and low viscosity solvent.*

2.In the "source" column with LC means the mobile phase can be purchased from the following companies: Burdick & Jackson, Baker Chemical, Mallinkrodt Chemical, Fischer Scientific, Manufacturing Chemicals, inc.etc.

3.In the "source" column with GC means the mobile phase can be used as gas chromatographic stationary phase, and can be purchased from the distribution company and GC column stationary phase

4.“UV Cutoff”—Mobile phase is ultraviolet transparent over the wavelength

5.“R .I .25”the index of refractive index (25 ℃).

6.“p” the polarity parameters of mobile phase.

7.“ea” Flow intensity parameter when alumina is use for liquid - solid adsorption.

8.“w%”Water Solubility w% in 20 ℃ Solvent。

9.“e”Dielectric Constant e。

*10.“p+0.25E”E*lectric constant function.

ELITEHPLC

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