FULI Instrument

FL9790 Workstation

Installation Manual

Thanks for your choosing FL9790 chromatogram workstation from FULI ANALYTICAL INSTRUMENT CO., LTD. In order to ensure the normal operation of the workstation, please read this manual carefully and keep it properly, which is helpful for your correct application and maintenance of the workstation.

ZHE JIANG FULI ANALYTICAL INSTRUMENT CO.,LTD

Contents

1. Product Introduction

1.1 Introduction to FL9790

FL9790 chromatogram workstation is an effective tool special for the anti-control and the data acquisition, analysis and assessment of GC9790III gas chromatogram analyzer.

Features and functions:

- Strong anti-control function: It can anti-controls GC9790III gas chromatogram analyzer in terms of its temperature setting, temperature rise and reduction, automatic ignition, high-pressure switching.
- Flow and pressure display: For GC9790III gas chromatogram analyzer with flow and pressure display function, it also has flow and pressure display function.
- High-efficient and simple operability: It adopts vivid graphic interfaces for anti-control purpose, largely increasing its operability.
- Real-time: Under Windows operating environment, it uses RS232 serial interface for real-time data acquisition, and also it can real-time analyze and storage the sampling data and real-time display the retention time of chromatogram peak.
- High precision: It adopts a high-precision A/D converter, with a resolution of ±1uV.
- Flexible peak identification and processing ability: It can achieve the identification, deletion and baseline cutting of chromatogram peak by the parameter and time program or the manual correction so that it is convenient for users to deal with tailing peak, small peak or overlapped peak. In addition, it can achieve such functions as the analysis and zoom-in of spectrogram, the addition and copy of component name, and the comparison of multiple spectrograms.
- Quantitative methods: Five common-used quantitative methods are available.
- Calibration: It can automatically calculate the calibration factor and provide single-point & multi-point averaging and multi-point calibration; also it can display calibration curve in a direct view.
- Storage of analysis methods and parameters: It can store the methods and parameters that are set by the user for the analysis of a specific sample, which are convenient for next analysis.
- Strong data importing function: It can import the spectrogram files of

multiple workstations and the text files for spectrogram analysis.

- Data storage in multiple formats: It allows the user to set the naming methods for spectrogram files at will and to store the analyzed spectrograms and related results; also, it allows the user to save the analyzed spectrogram files and related results in text format for redrawing and reanalyzing by means of other drawing tools.

- Flexible printing function: It allows the user to preview and print the spectrograms, result reports, analysis parameters and instrument conditions, to set the report head and adjust the printing mode at will so as to meet various printing requirements.

- Convenient and simple operation: It provides interfaces and on-line help all in Chinese, which is convenient for operation.

- Overall performance indexes:Number of supported detector channels: 2Input level range: -2.5V~+2.5VResolution: 1uvIntegral sensitivity: within ±0.1%

- Peak processing:

  Quantitative processing by area or height
  Automatic analysis or manual integration of spectrograms
  Deletion of unwanted peaks: setting time program or manual cutting
  Negative peak: manual identification

- Quantitative calculation:

  Five quantitative calculation methods are available, including:
  Normalization method
  Correction normalization method
  Internal standard method
  External standard method
  Index method

- Calibration:

  It can provide single-point calibration using the average value from several times of analysis.

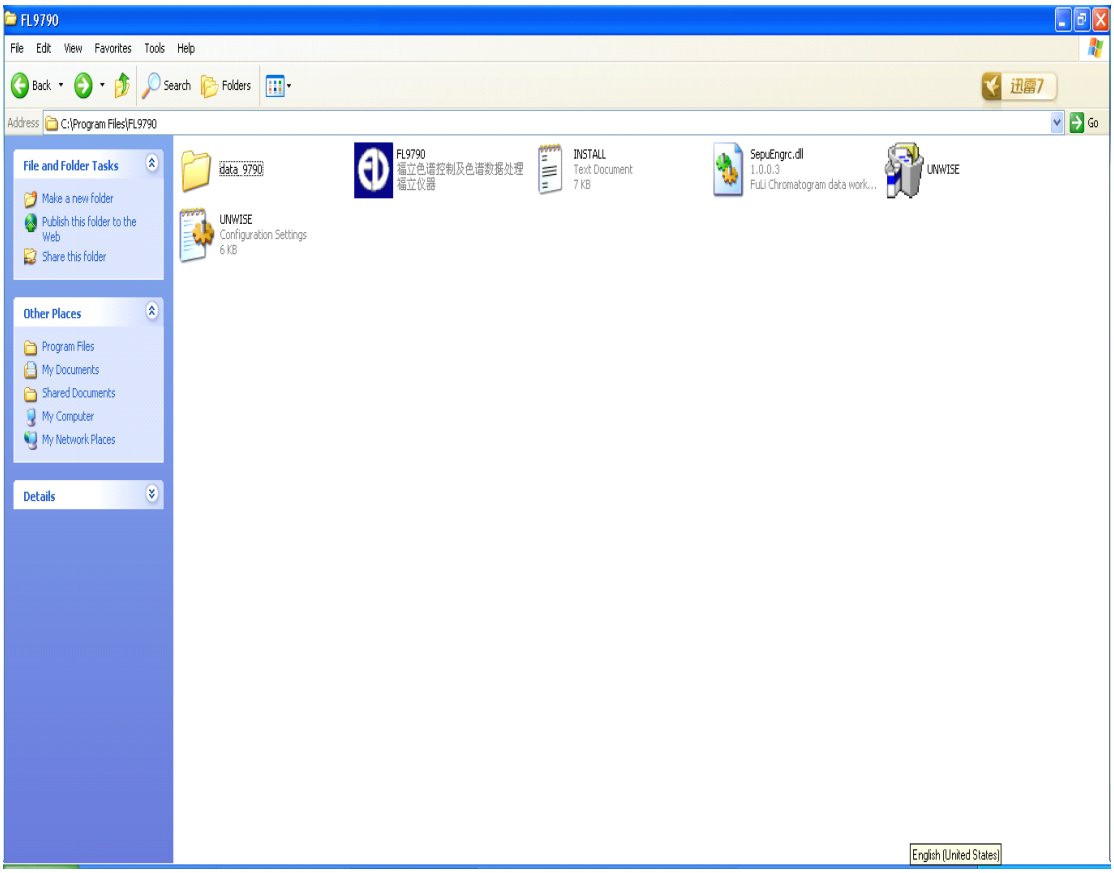
  It can provide multi-point calibration using standard samples with different concentrations.

1.2 Program Directory Structure

After FL9790 is installed, you can find the following files in the set installation

directory. See the following figure for details.

FL9790.exe: client programUnwise.exe: uninstall program
data_9790 directory: In default, the sample injection files for each project are stored in the subdirectory of this directory. Of course, the user can set the default directory of each project as required.



2. Quick Start

2.1 Installation and Uninstall of FL9790

2.1.1. System Configuration Required for the Installation of FL9790

This section will introduce the computer hardware and software configuration for the installation of the software for FL9790.

Basic configuration for FL9790 software:

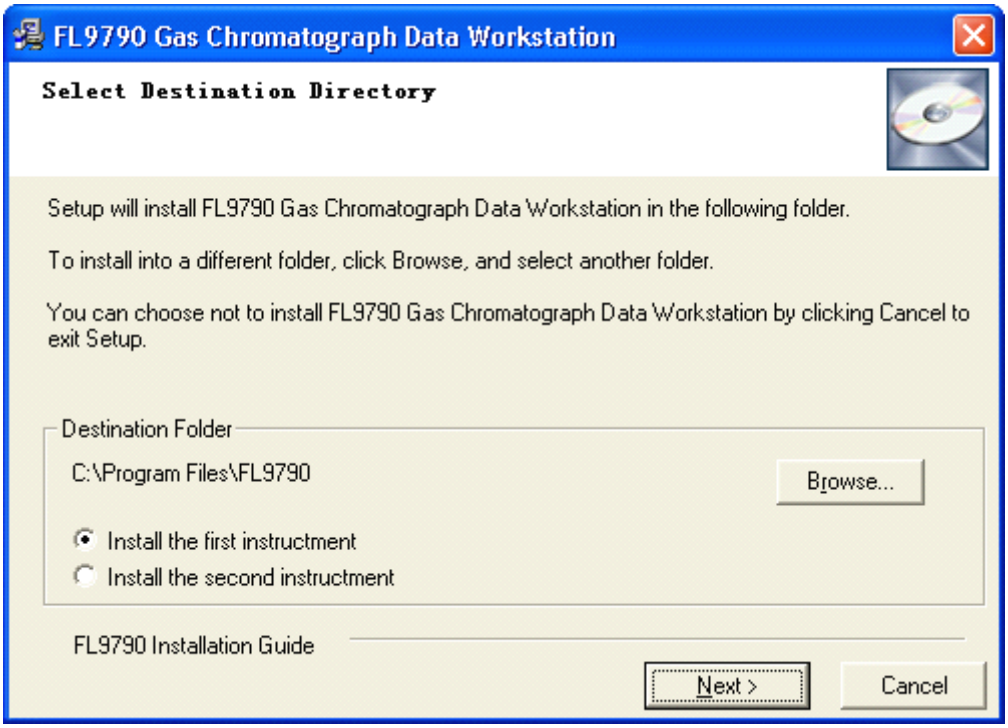
1. Operating system: Windows 98/2000/XP2. CPU: Pentium III 500MB or above3. Memory: 128MB at least4. Hard disk: 100MB at least5. Graphic card: 16MB video memory, 800×600 pixel6. RS232 serial interface output available

2.1.2 Installation of FL9790 Software

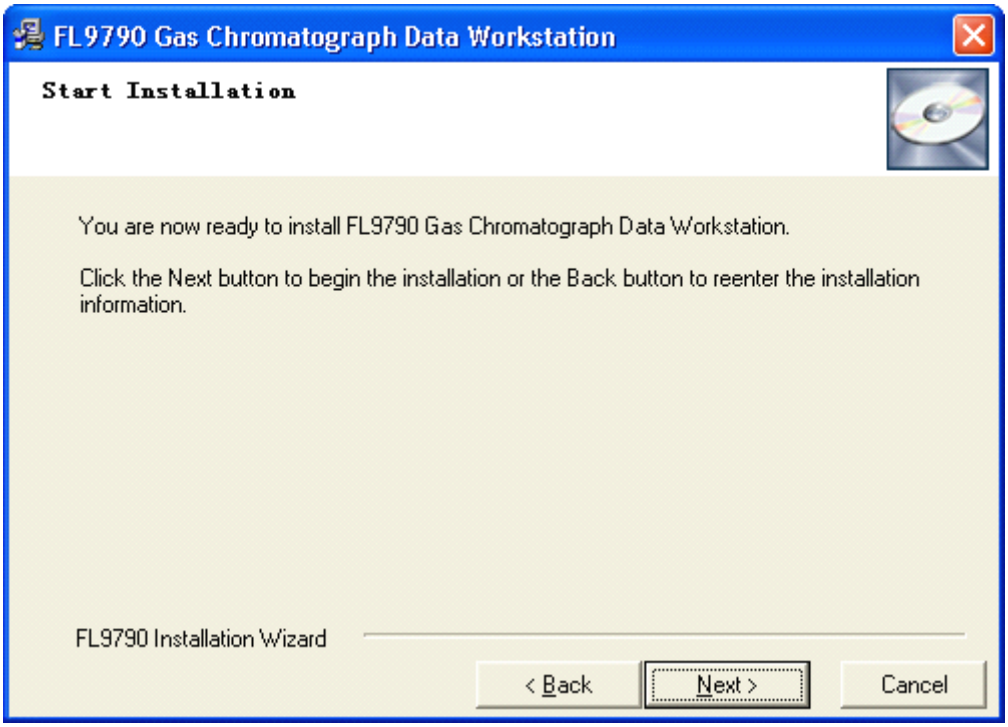
About 5~10M of available space is required for the installation of FL9790, depending on the default project setting and analysis methods provided by the system. The installation steps are given as follows:1. Insert the disc of FL9790 software into the CD/DVD-ROM.2. If the installation wizard is not started automatically, double click FL9790ISetup_nodoc.exe to run the installation wizard.3. The installation wizard will guide you to complete the installation of FL9790. Also, a work group icon and a shortcut icon for FL9790 will be created respectively under the “Program” option of “Start” menu and on the desktop.4. Connect the FL9790 chromatogram workstation with GC9790III chromatogram analyzer.5. Double click the shortcut icon on the desktop 

to run FL9790 software.The specific installation steps are given as follows: Step 1: Double click FL9790ISetup_nodoc.exe to start the installation wizard for FL9790.

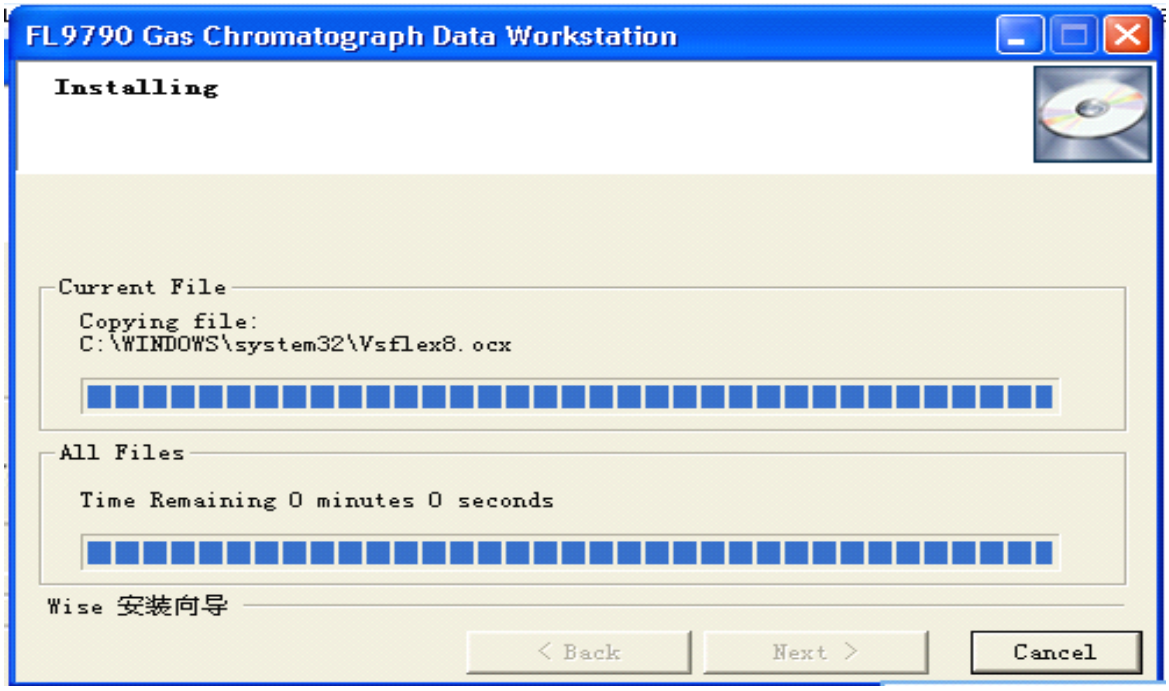
Step 2: Select the installation directory.



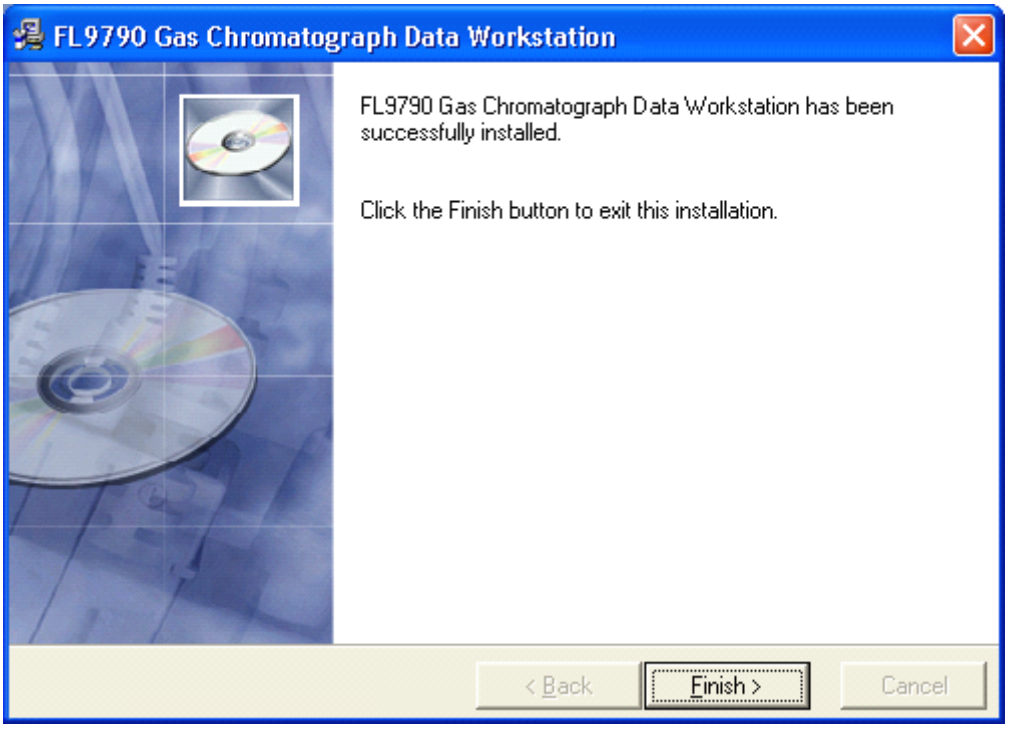
Step 3: The installation of FL9790 is started.



Step 4: The program is being installed.

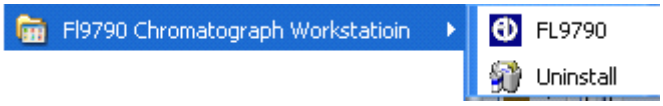


Step 5: The installation is completed.



Step 6: View the installation work group.

After FL9790 software is installed, a work group icon and a shortcut icon for FL9790 will be created respectively under the “Program” option of “Start” menu and on the desktop.



Click the icon FL9790 to run FL9790 software.

Click the icon Uninstall to uninstall FL9790 software.

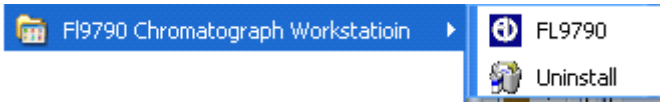
Double click the shortcut icon 

on the desktop to run FL9790 software.

2.1.3 Uninstall of FL9790 Software

The uninstall of a software is a reverse process to its installation. You can use the uninstall program attached with FL9790 to uninstall the FL9790 software.

Select the FL9790 work group in the “Program” of the “Start” menu.



Click the icon Uninstall, and the FL9790 software will start to be uninstalled automatically. See the following figure for details.

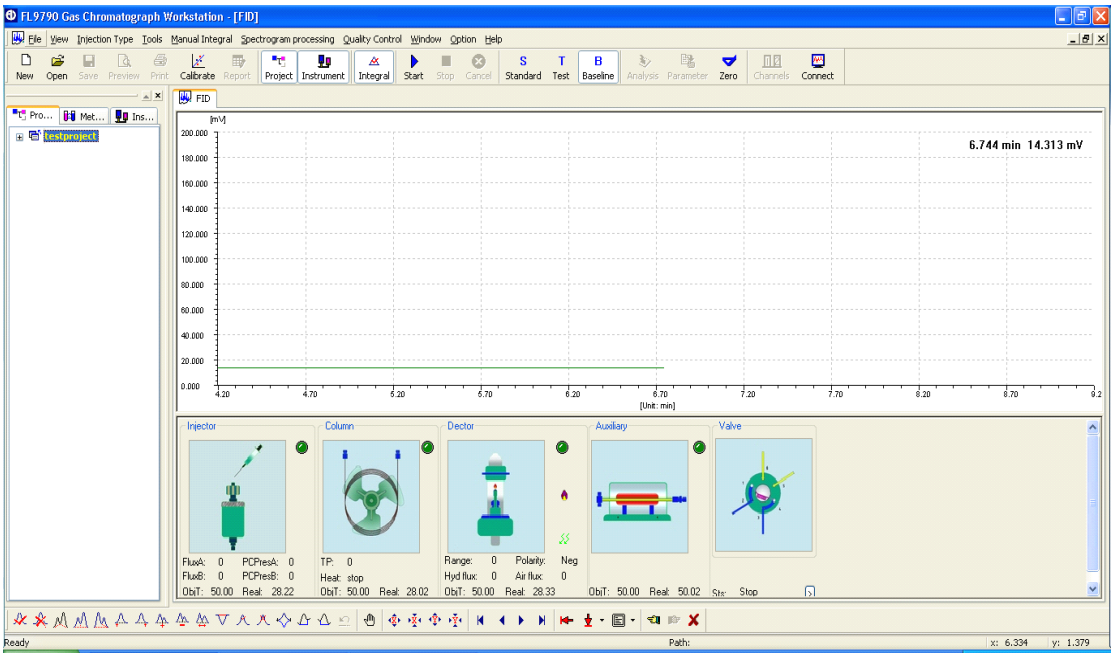
2.2 Learning the Main Window of FL9790

The main window of FL9790 software is FL9790 chromatogram workstation, which covers menu column, toolbar, project column, spectrogram working zone and anti-control working zone.

2.2.1 Starting the FL9790 Software

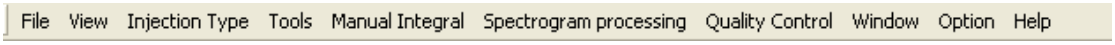
Check whether all connections of GC9790 III chromatogram analyzer are complete. Connect the computer serial port RS232 with the output port of GC9790 III chromatogram analyzer, and then turn on the power supply. Double click the icon 

to run the FL9790 software.



2.2.2 Main Menu of FL9790

As the same with mostly software under Windows operating system, the FL9790 software has its menu column. See the following figure for details.



2.2.3 Toolbar of FL9790

It is divided into standard toolbar and spectrogram toolbar.

Standard toolbar

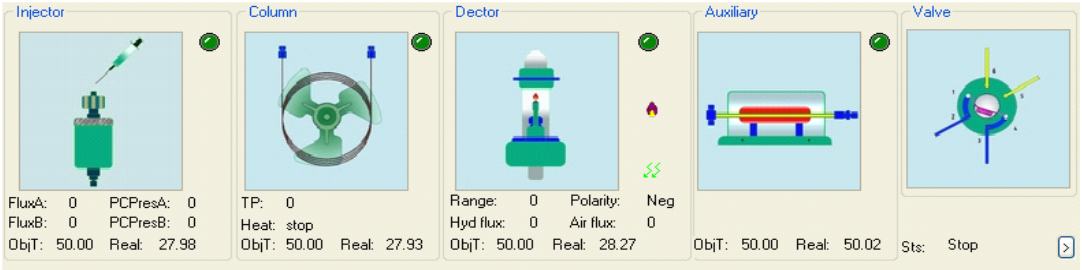
The spectrogram toolbar covers various spectrogram processing tools.

Spectrogram toolbar

2.2.4 Anti-control Working Zone of FL9790

The FL9790 software has anti-control function, which allows the user to set and control such testing conditions as column box temperature, detector temperature, sample injector temperature, automatic ignition, polarizing voltage and current signal just at the workstation.

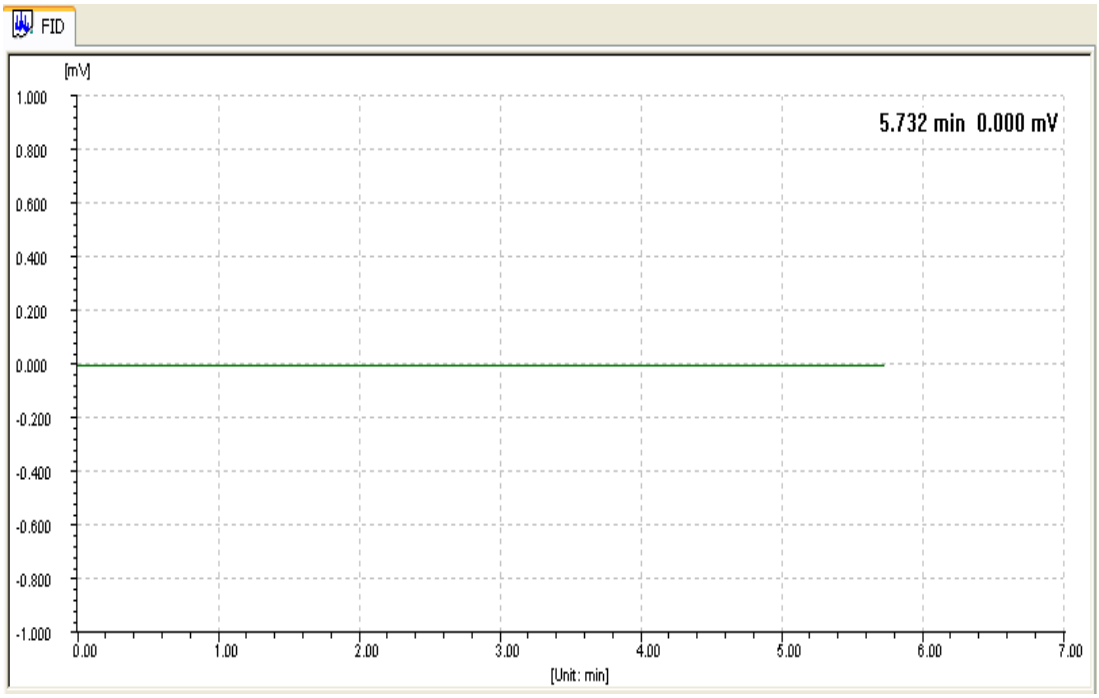
FID anti-control window:



Note: Since the capillary column and the FID detector are used in the demonstration of the workstation, so the sample injector given in the above anti-control window is the sample injector for capillary column, and the detector given is the FID detector.

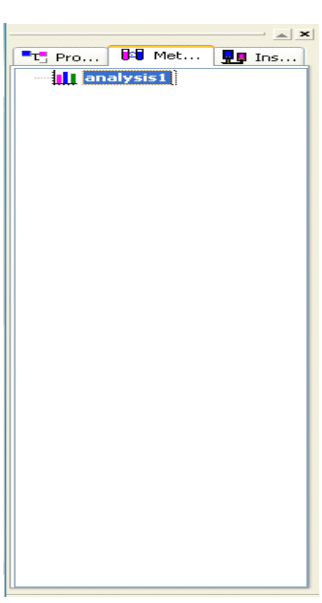
2.2.5 Spectrogram Window of Fl9790

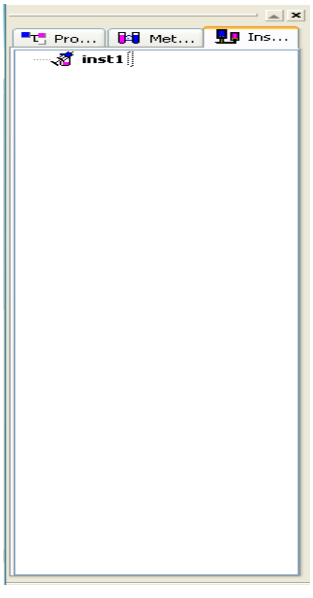
This window is used for the real-time sampling and display of spectrograms.



2.2.6 Project Window of FL9790

This window lists the directories of all projects as well as the existing analysis methods and instrument conditions, for which it is convenient for the user to extract, call or view such data.





Project page Method page Instrument page

2.3 Creating A New Project

You can create a new project conveniently using the project creation wizard.

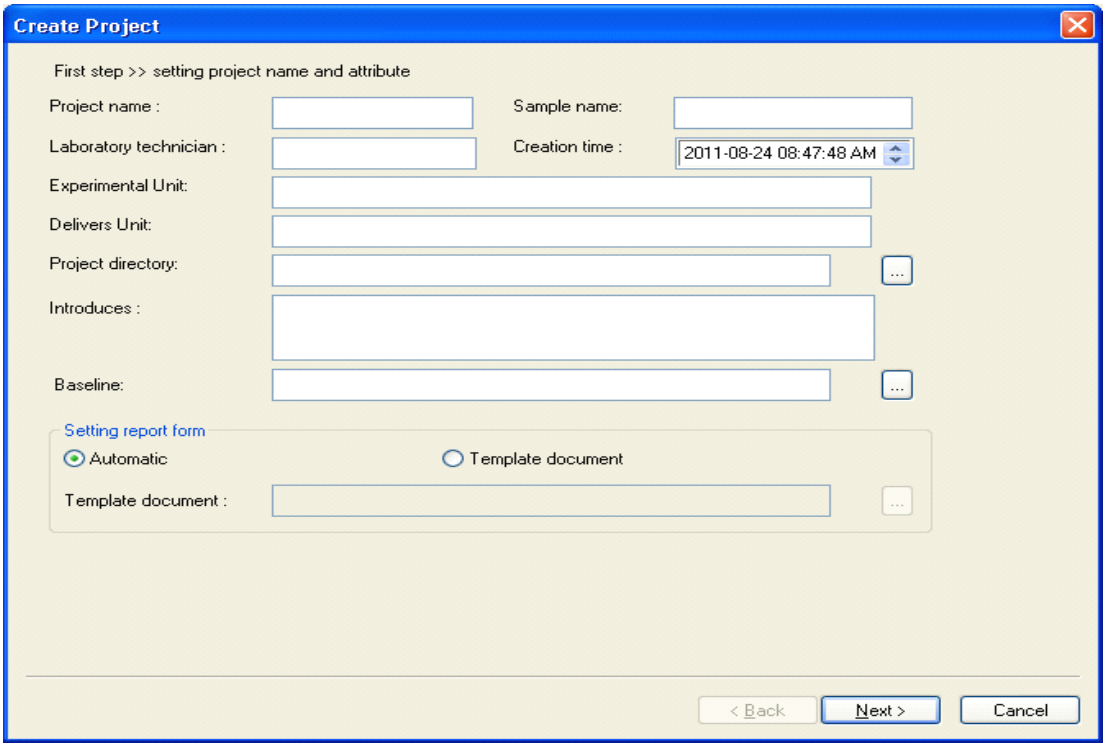
Left click the [New] button on the standard toolbar or right click on the project window and then select the option [New] on the pop-up menu, and the window [Create a project] will pop up and the project creation wizard will be started. You can quickly create a new project as indicated by the system.

The creation of a project mainly covers three parts:

I. Setting the project property
II. Setting the analysis method
III. Setting the instrument conditions

2.3.1 Setting the Project Property

1. Set the project name and property in the window [Create a project] and fill the relevant testing contents. Click the button [next] to call the window [Set the analysis method].



Project name: you can input the current project's name here.
Sample name: you can input the current sample's name here. (Default allowable)
Tester: you can input the current tester's name here. (Default allowable)
Creation time: you can set a time you want here. (Current time in default)
Testing unit: you can input the testing unit's name here. (Default allowable)
Applicant: you can input the applicant's name here. (Default allowable)

Project directory: Click the icon  to call the window [Select the project path], and you can select the saving path you want here. (Note: To protect your testing data from being lost when your computer has a virus, it is recommended not to set the saving path in the drive C or in default.)

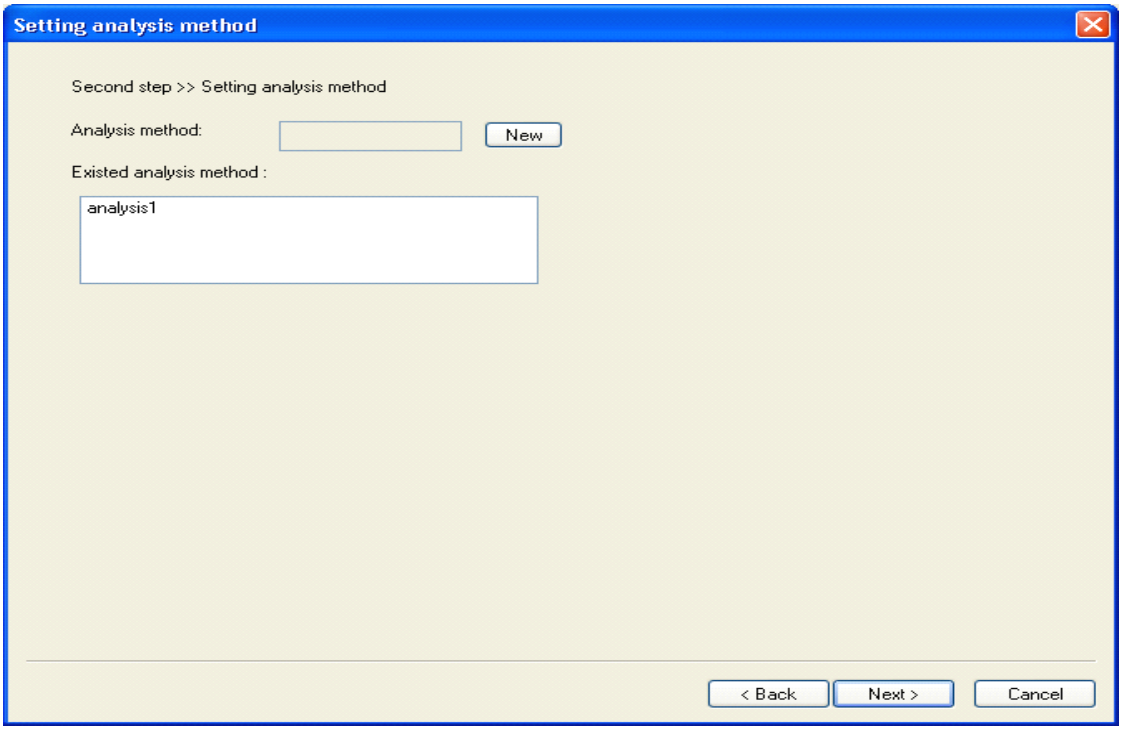
Test profile: you can fill the information related to the testing analysis here. (Default allowable)

Baseline: you can select an ideal baseline as the standard baseline for this project. (Default allowable)

Report setting: you can set the report format here or in default or set the template of your company as the report format for this project.

2.3.2 Setting the Analysis Method

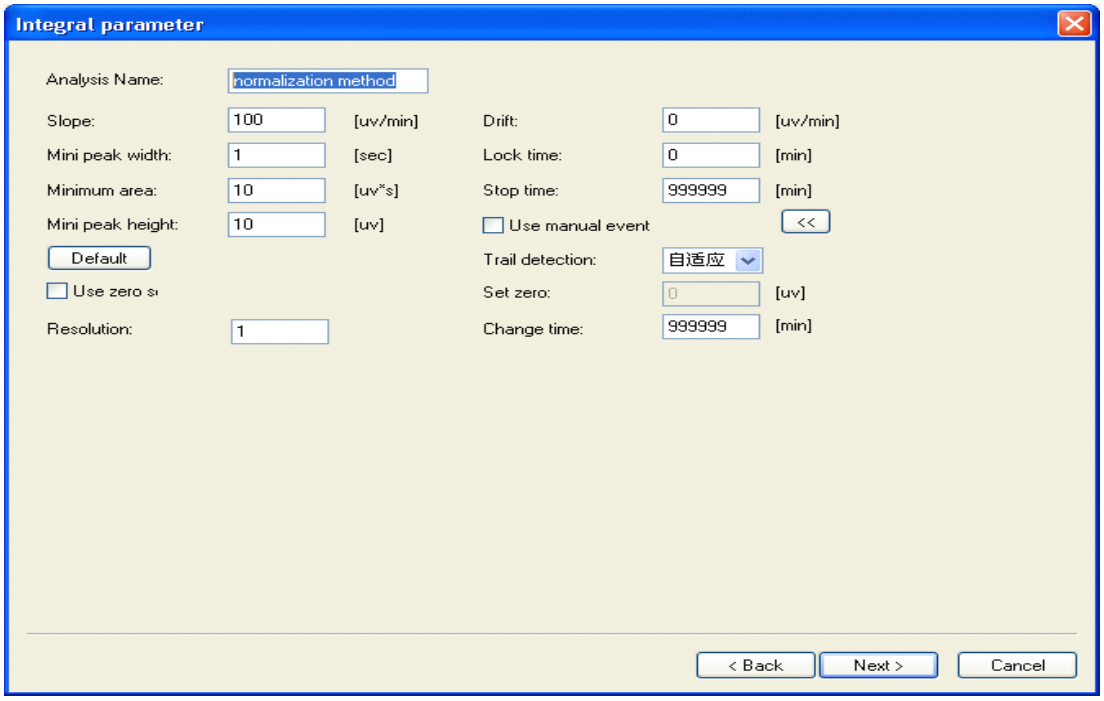
2. Setting the Analysis Method



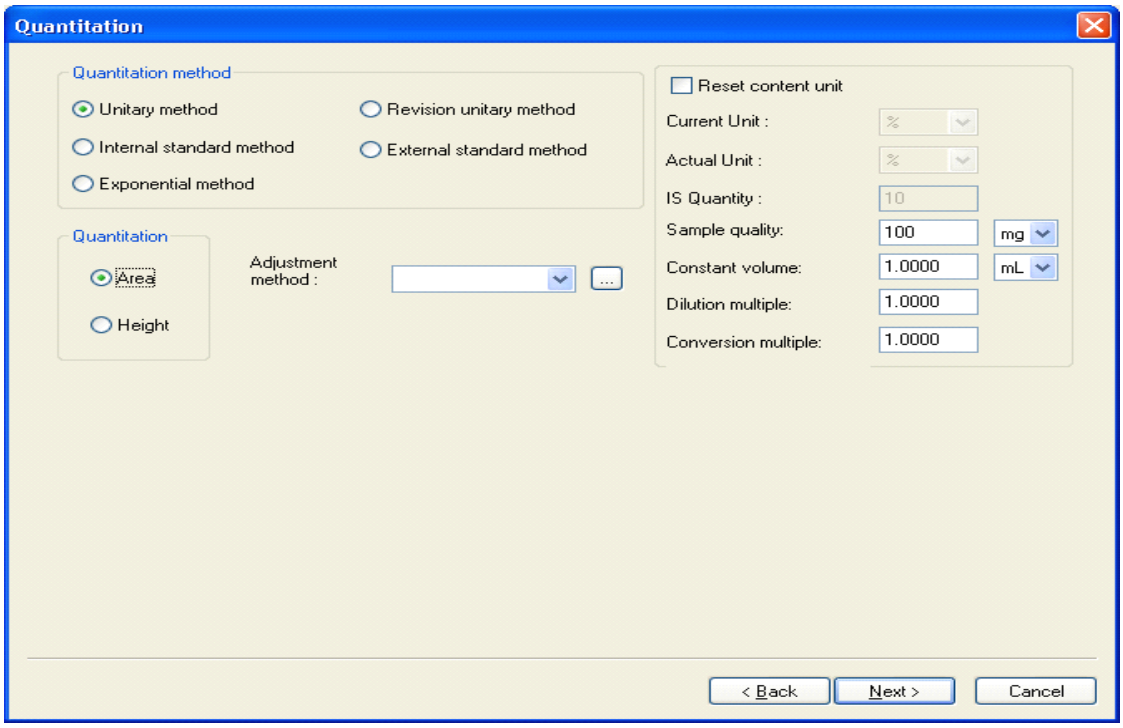
If the existing analysis methods can not meet your need, it is required to create a new analysis method. For this purpose, you can click the button [New] or directly the button [Next] (with the field "Analysis method" empty) to turn to the window [Integral parameters] for new analysis method.

If one of the existing analysis methods meets your need, you can select it and thus skip steps 3~7, and then click the button [Next] to directly turn to step 8. At that time, the window [Set the instrument conditions] will pop up.

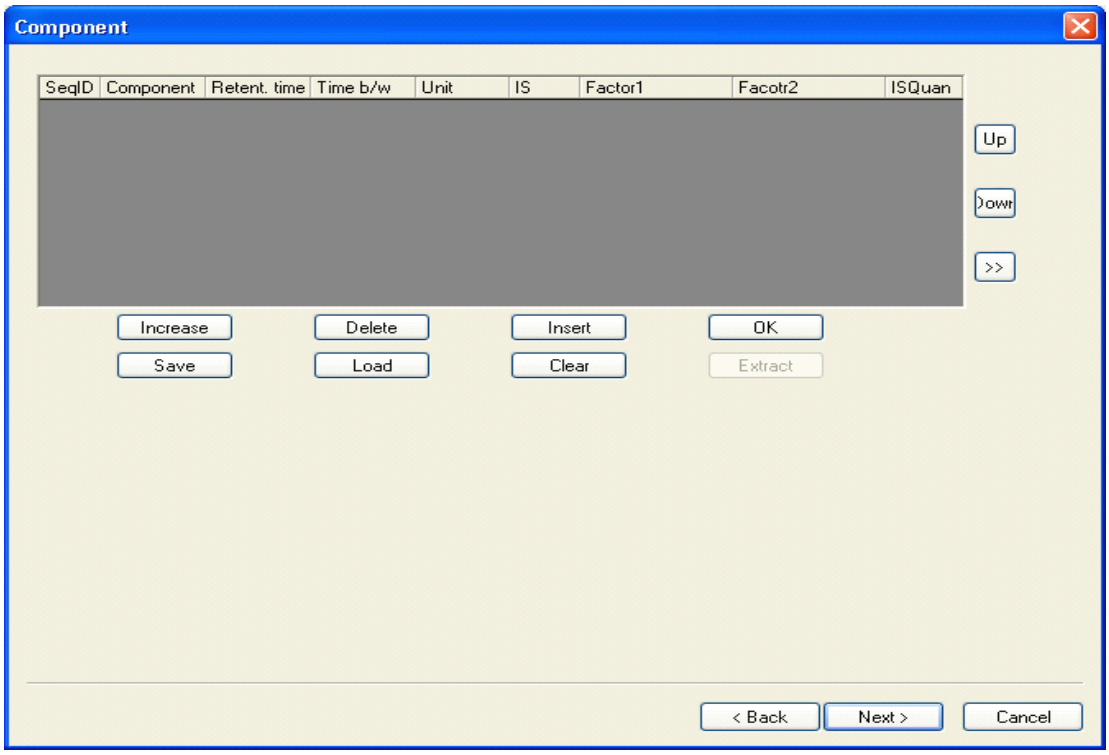
3. Set the name and integral parameters of the new analysis method and fill the corresponding integral parameters, and then click the button [Next].



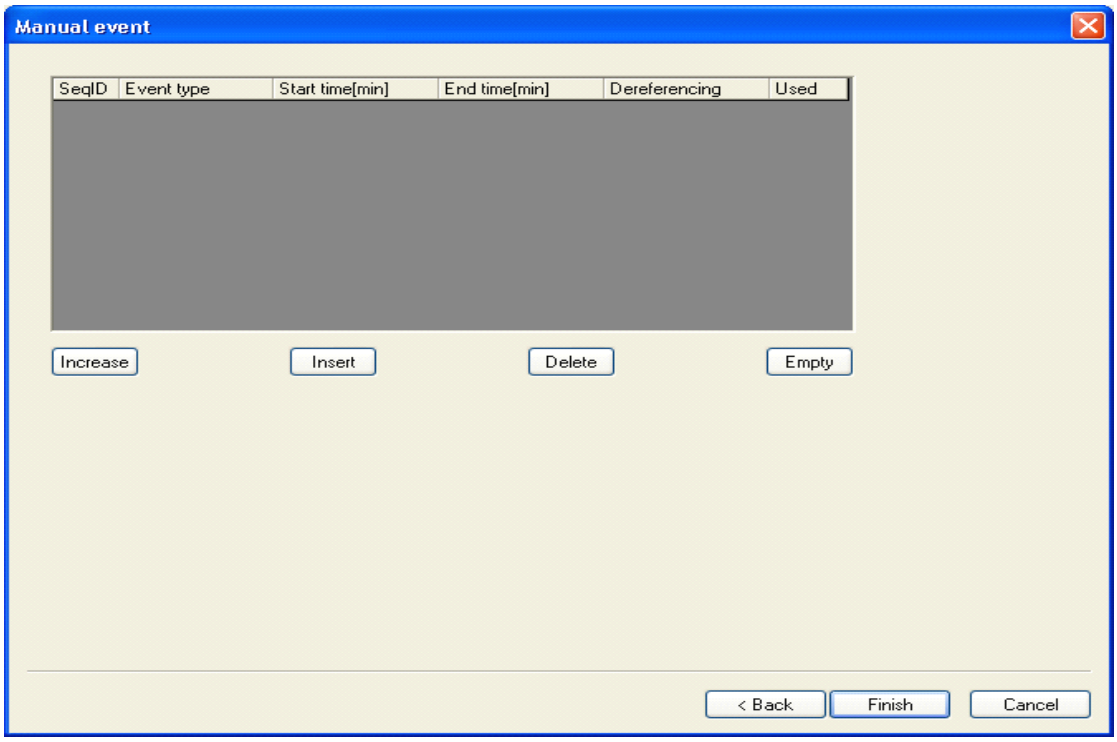
Analysis method name: you can input the analysis method name (necessary).4. Set the quantitative parameters of the new analysis method and fill the corresponding quantitative parameters, and then click the button [Next].



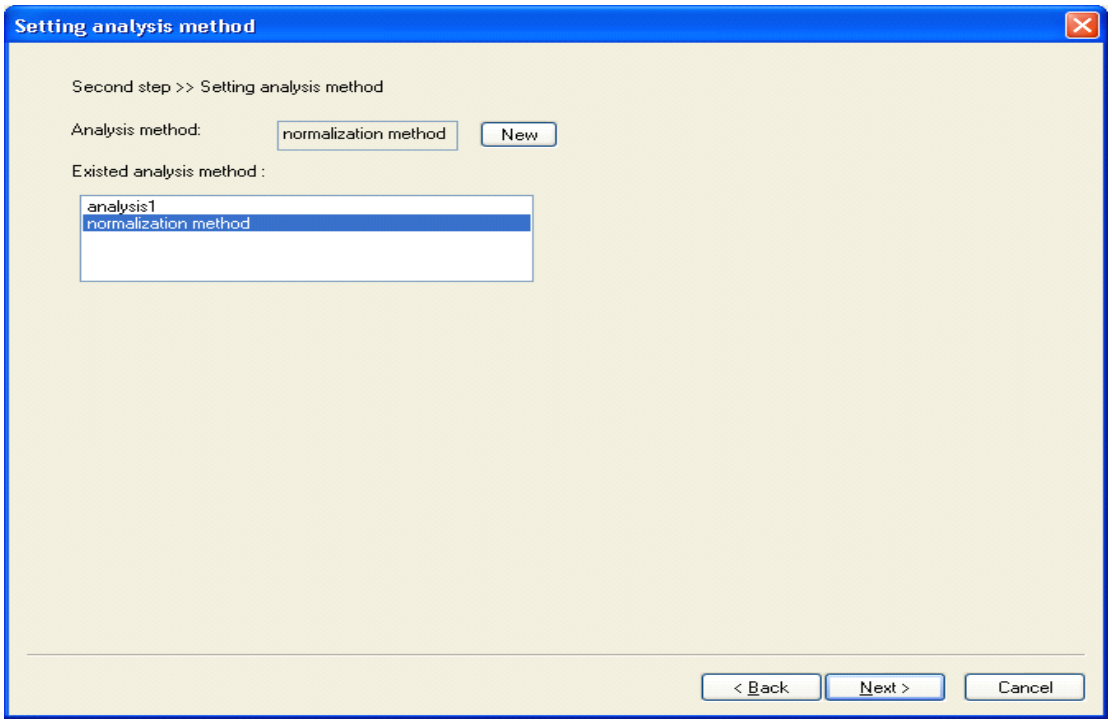
5. Set the component name of the new analysis method or load the saved component or leave it for edition later; fill the corresponding component parameters, and then click the button [Next].



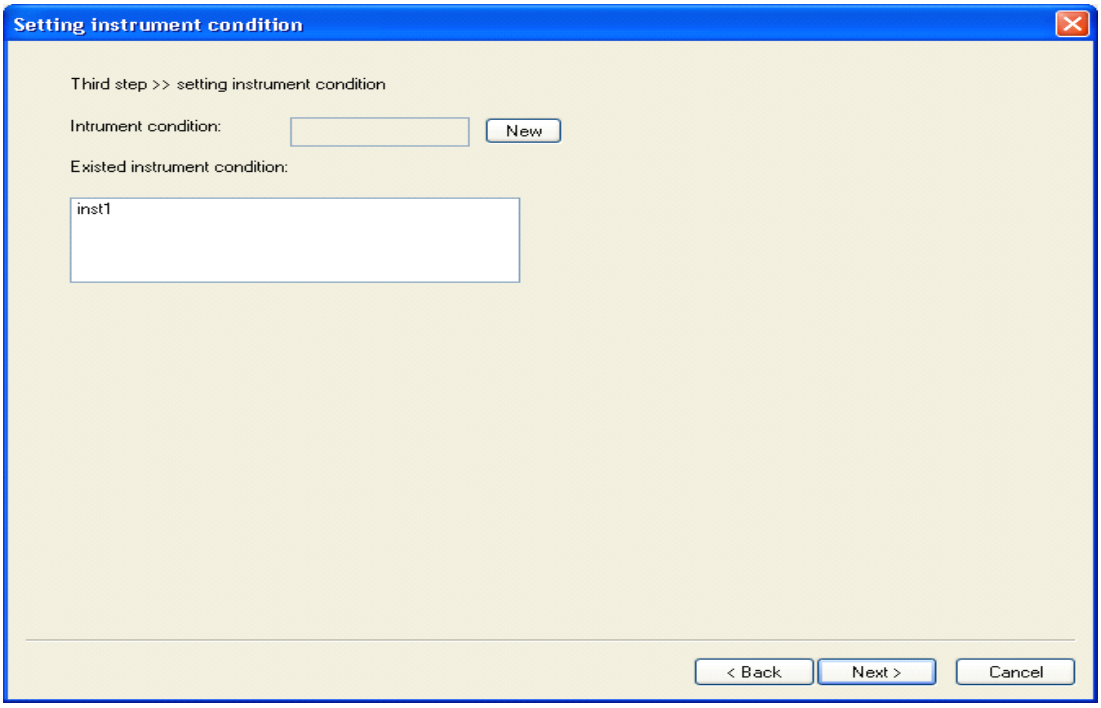
6. Set the manual event and click the button [Complete] to complete the creation of a new analysis method, and then the window [Set the analysis method] will pop up.



7. After the [Manual event] is set successfully, the window [Set the analysis method] will pop up. At that time, the new analysis method will appear in the existing analysis method list and the newly created analysis method is selected. You can left click the button [Next] to turn to the window [Set the instrument conditions].

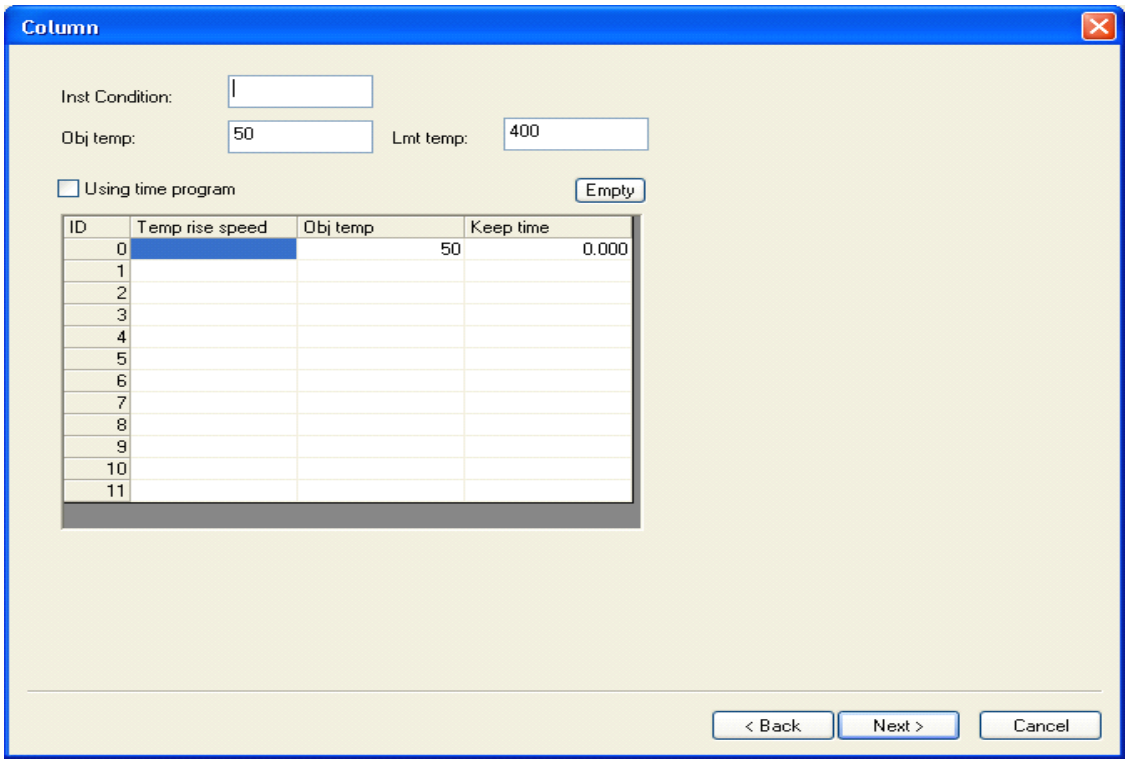


2.3.3 Setting the Instrument Conditions8. Setting the instrument conditions



If the existing instrument conditions can not meet your need, it is required to create a new instrument condition. For this purpose, you can click the button [New] or directly the button [Next] (with the field “Instrument condition” empty) to turn to the window [Column box] for setting its conditions.

If one of the existing instrument conditions meets your need, you can select it and thus skip steps 9~16, and then click the button [Next] to directly turn to the window [Project creation completed].9. Setting the parameters of column box

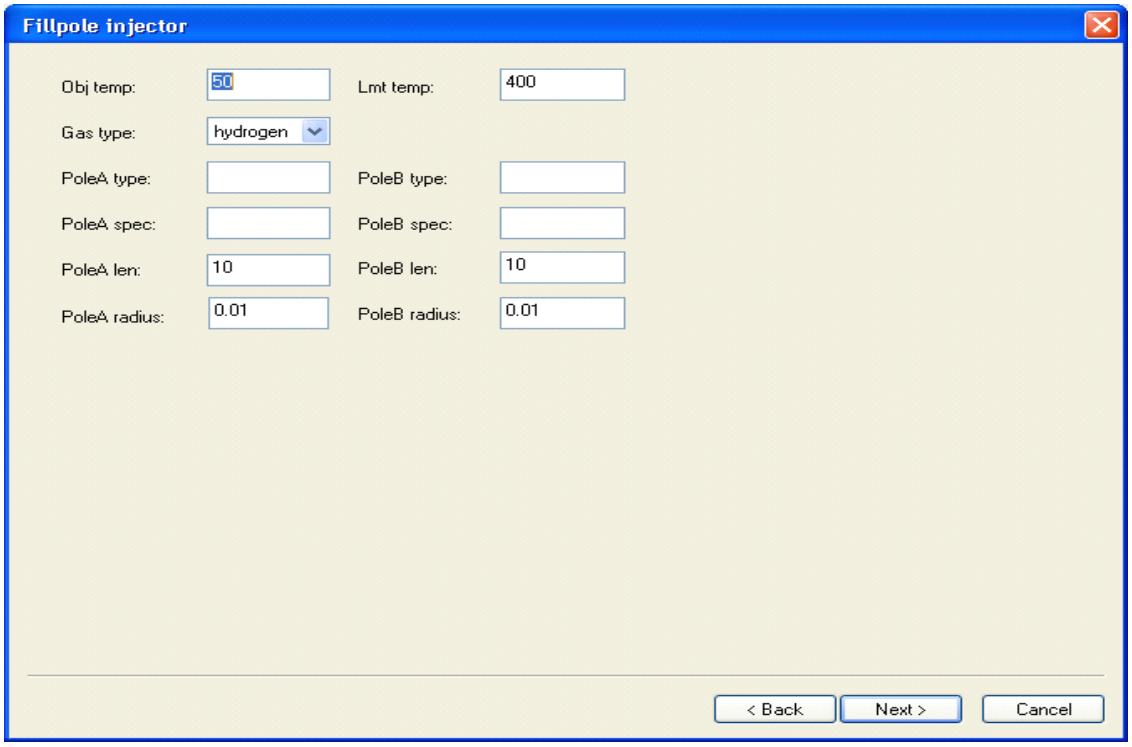


Instrument condition: you can input the name of instrument condition here (necessary).Target temperature: Preset temperature of the column box (℃)Limiting temperature: Protection temperature of the column box (℃)

Program-assisted temperature rise: You can left click the option [Program-assisted temperature rise] to select the constant temperature control or the program-assisted temperature rise control. If the option [Program-assisted temperature rise] is left unselected, the constant temperature control will be enabled; otherwise, the program-assisted temperature rise control will be enabled.

In the anti-control working zone, the target temperature, the limiting temperature and the program-assisted temperature rise all can be modified. After inputting the relevant parameters, left click the button [Next] to call the window [Sample injector 1] for setting purpose.

10. Setting the parameters of sample injector 1



Note: Since the capillary column sample injector is selected as the sample injector 1 in the demonstration of the workstation, so the [Capillary column sample injector 1] is displayed in this window.

Target temperature: Preset temperature of the sample injector (℃)

Limiting temperature: Protection temperature of the sample injector (℃)

[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

Carrier gas type: You can select the corresponding carrier gas type using the pull-down menu. Four options are available, i.e. hydrogen, nitrogen, helium gas and argon gas. (Note: The selected carrier gas type must correspond to the type of the actually-loaded gas; otherwise, the calculation of the flow sensor will be affected, thus affecting the reading of flow.)

There are three options for the shunt mode:

1. Shunt types: [Shunt], [Non-shunt], [Shunt\Non-shunt]. You can click the circle for selection purpose. The symbol indicates that a type is selected, while the symbol indicates that a type is not selected.

2. Shunt time: This option is available only when the option [Shunt\Non-shunt] is selected. The inputted shunt time takes effect only after the sample injection is started.

3. Non-shunt time: This option is available only when the option [Shunt\Non-shunt] is selected. The inputted non-shunt time takes effect only after the sample injection is started.

Column model: You can input the model of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

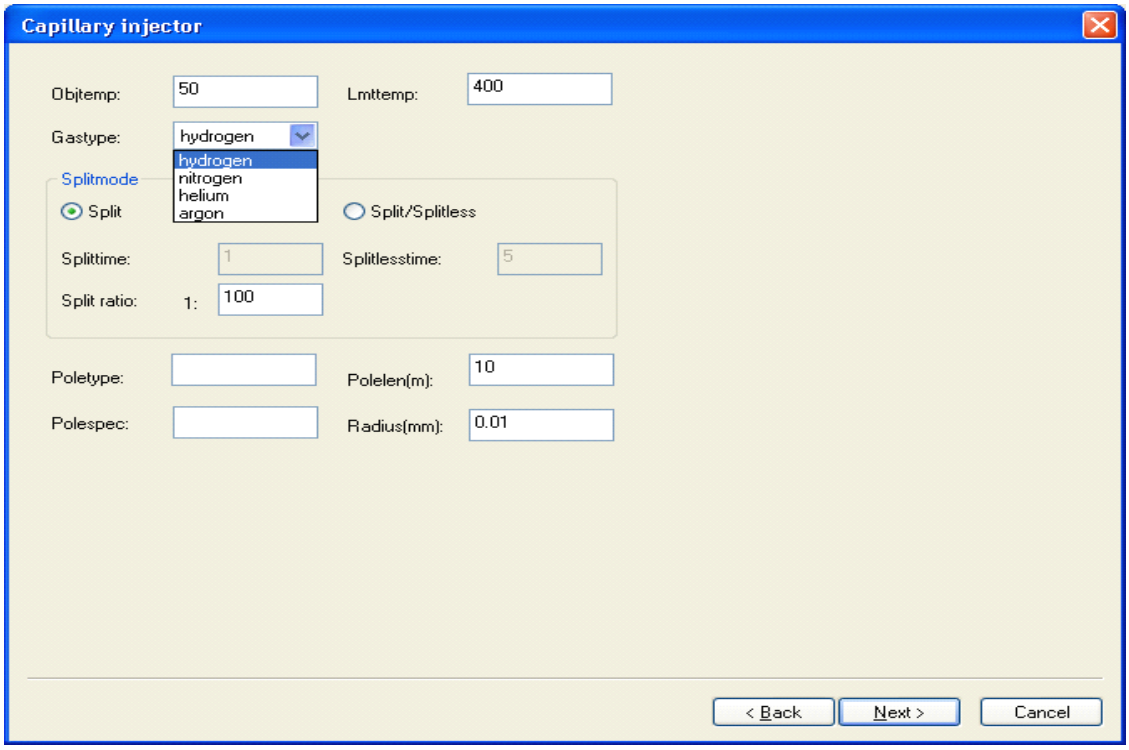
Column length: You can input the length of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column specification: You can input the specification of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column ID: You can input the ID (inside diameter) of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Each parameter of the sample injector 1 can be modified in the anti-control working zone. After inputting the relevant parameter, left click the button [Next] to call the window [Sample injector 2] for setting purpose.

11. Setting the parameters of sample injector 2



Note: Since the capillary column sample injector is selected as the sample injector 2 in the demonstration of the workstation, so the [Capillary column sample injector 2] is displayed in this window.

Target temperature: Preset temperature of the sample injector (℃)
Limiting temperature: Protection temperature of the sample injector (℃)
[Attention: The target temperature shall be less than the limiting temperature;

otherwise, an alarm will be given.]

Carrier gas type: You can select the corresponding carrier gas type using the pull-down menu. Four options are available, i.e. hydrogen, nitrogen, helium gas and argon gas. (Note: The selected carrier gas type must correspond to the type of the actually-loaded gas; otherwise, the calculation of the flow sensor will be affected, thus affecting the reading of flow.)

There are three options for the shunt mode:

1. Shunt types: [Shunt], [Non-shunt], [Shunt\Non-shunt]. You can click the circle  for selection purpose. The symbol  indicates that a type is selected, while the symbol  indicates that a type is not selected.

2. Shunt time: This option is available only when the option [Shunt\Non-shunt] is selected. The inputted shunt time takes effect only after the sample injection is started.3. Non-shunt time: This option is available only when the option [Shunt\Non-shunt] is selected. The inputted non-shunt time takes effect only after the sample injection is started.

Column model: You can input the model of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

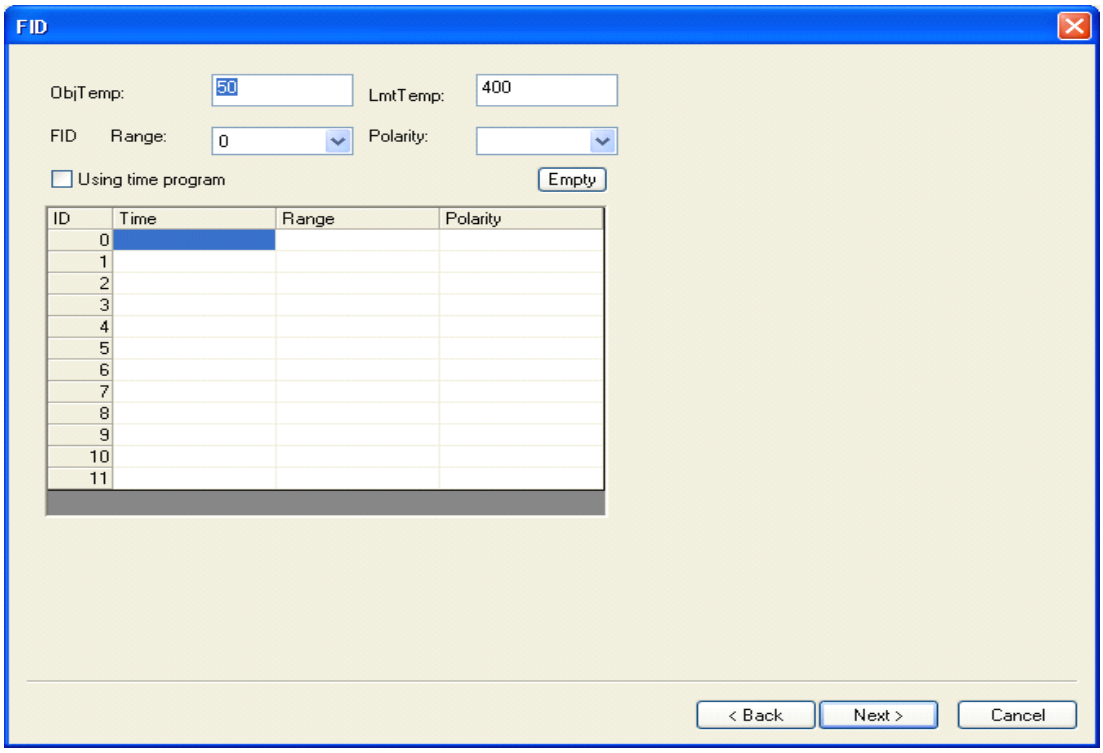
Column length: You can input the length of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column specification: You can input the specification of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column ID: You can input the ID (inside diameter) of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Each parameter of the sample injector 2 can be modified in the anti-control working zone. After inputting the relevant parameter, left click the button [Next] to call the window [Detector 1] for setting purpose.

12. Setting the parameters of detector 1



Note: Since the FID detector is selected as the detector 1 in the demonstration of the workstation, so the [FID 1] is displayed in this window.

Target temperature: Preset temperature of the detector (℃)Limiting temperature: Protection temperature of the detector (℃)

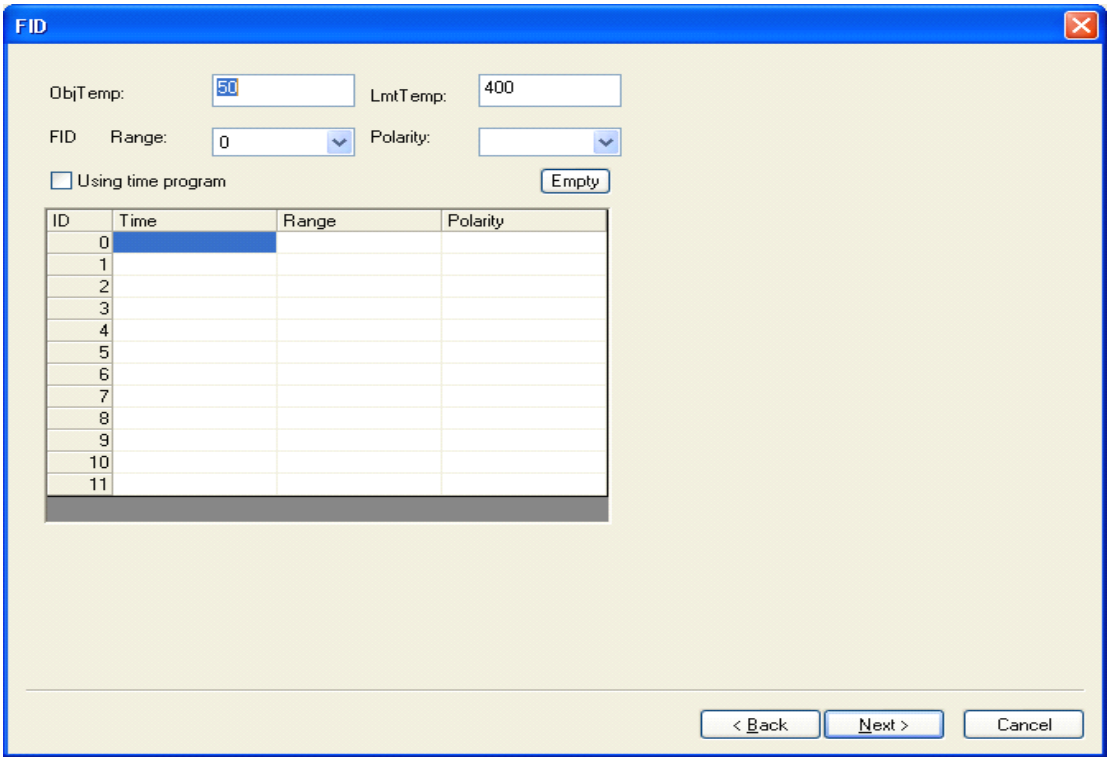
[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

FID range: You can select the range position of the FID detector using the pull-down menu. The range of the FID detector of the GC9790III gas chromatogram analyzer is divided into four positions which are 0, 1, 2 and 3 respectively.

Note: The sensitivity at position 0 is the highest and that at position 3 is the lowest.

Left click the option [Use the time program] to perform the switching between the fixed range and the range time program. When the option [Use the time program] is not selected, the detector performs analysis of fixed range; otherwise, it performs the analysis of range time program.

Each parameter of the detector 1 can be modified in the anti-control working zone. After inputting the relevant parameter, left click the button [Next] to call the window [Detector 2] for setting purpose. (If the detector 2 is not installed, the window [Detector 2] will not appear while the window [Valve] will appear directly.)13. Setting the parameters of detector 2



Note: Since the FID detector is selected as the detector 2 in the demonstration of the workstation, so the [FID 2] is displayed in this window. If the detector 2 is not installed, this setting option will be skipped.

Target temperature: Preset temperature of the detector (℃)

Limiting temperature: Protection temperature of the detector (℃)

[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

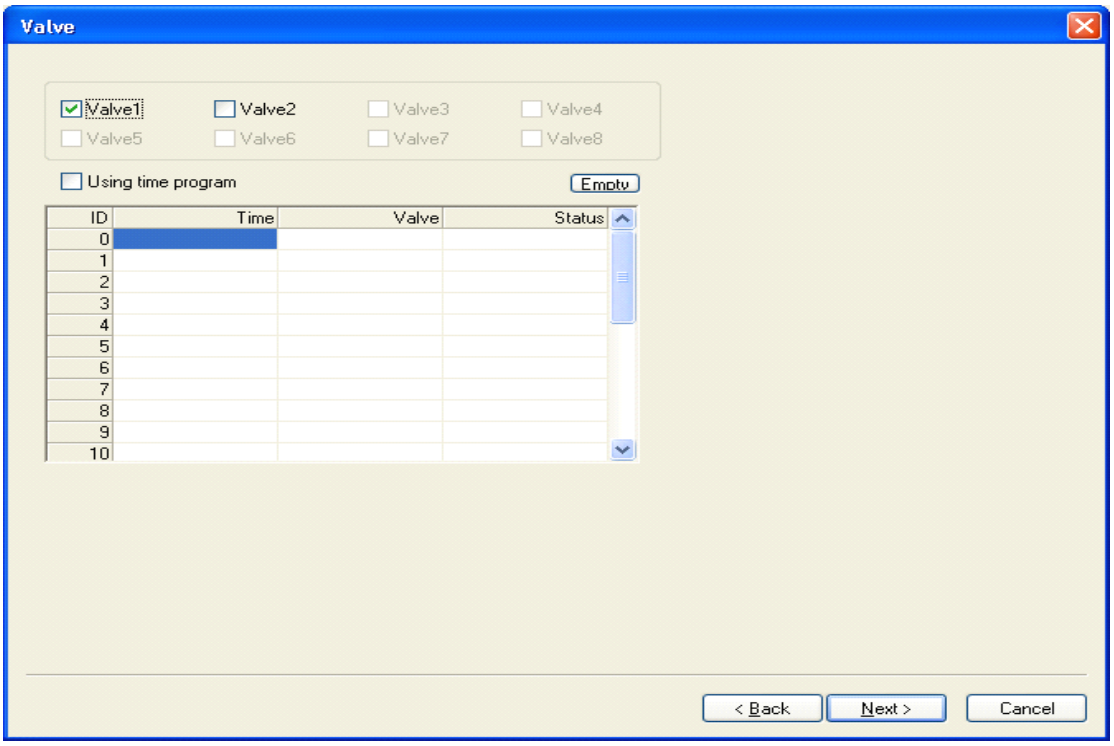
FID range: You can select a position within the range of FID detector. There are four positions within the range of the FID detector for GC9790 III chromatogram analyzer, i.e. positions 0, 1, 2 and 3.

Note: The position 0 is of the highest sensitivity, while the position 3 is of the lowest sensitivity.

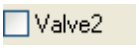
Left click the option [Use the time program] to perform the switching between the fixed range and the range time program. When the option [Use the time program] is not selected, the detector performs analysis of fixed range; otherwise, it performs analysis of range time program.

Each parameter of the detector 2 can be modified in the anti-control working zone. After inputting the relevant parameter, left click the button [Next] to call the window [Valve] for setting purpose.

14. Setting the parameters of valve



Valve 1: Out-mounted valve 1Valve 2: Out-mounted valve 2You can perform status switching by left clicking [Valve 1] or [Valve 2].Selected valve 1, as shown in the figure 

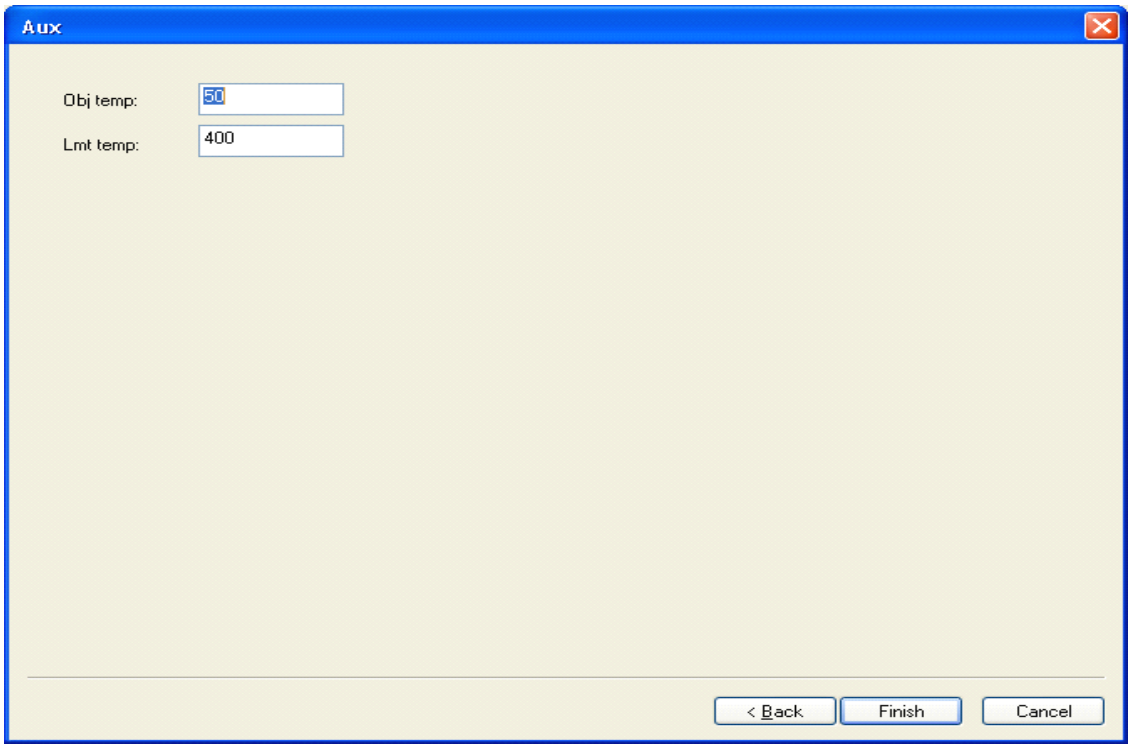
Unselected valve 1, as shown in the figure 

Left click the option [Use the time program] to activate the time program for valve status switching. When the option [Use the time program] is not selected, the valve performs analysis of fixed status; otherwise, it performs analysis of the time program for valve status switching.

If you want to activate the time program for valve status switching, left click the option [Use the time program] to make it selected, as shown in the figure .

If you want to deactivate the time program for valve status switching, left click the option [Use the time program] to make it unselected, as shown in the figure .

Each parameter of the valve can be modified in the anti-control working zone. After inputting the relevant parameter, left click the button [Next] to call the window [Auxiliary furnace] for setting purpose.15. Setting the parameters of auxiliary furnace



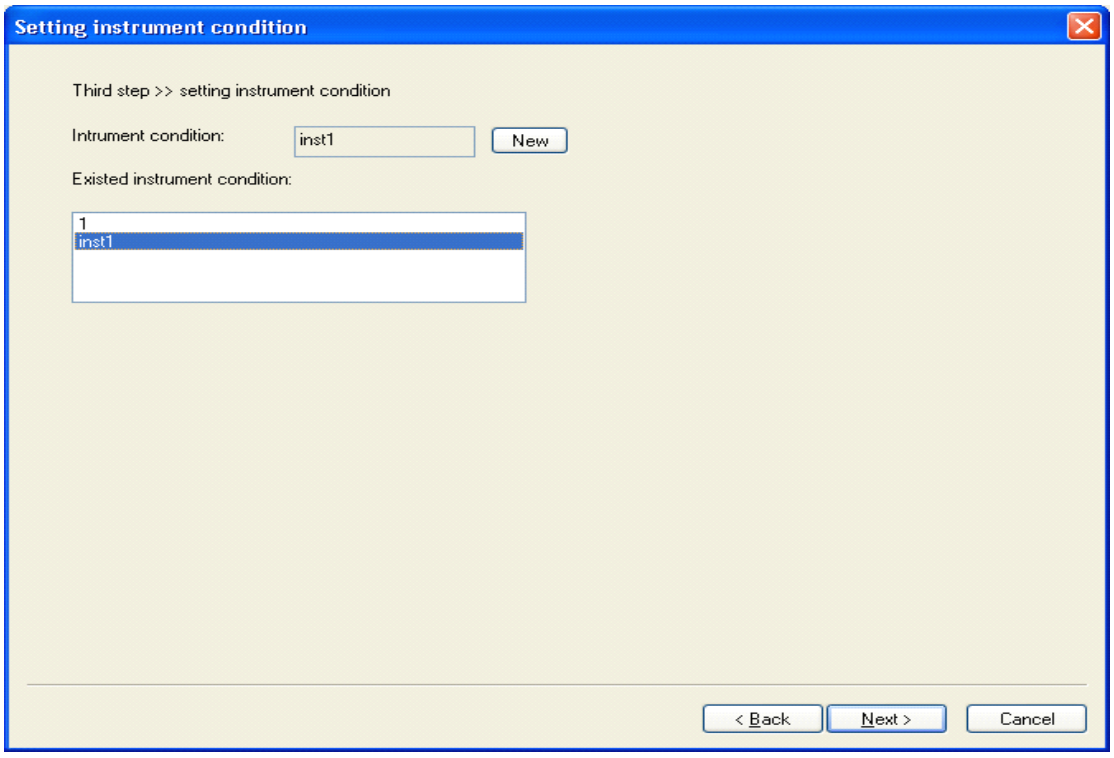
Target temperature: Preset temperature of the auxiliary furnace (℃)

Limiting temperature: Protection temperature of the auxiliary furnace (℃)

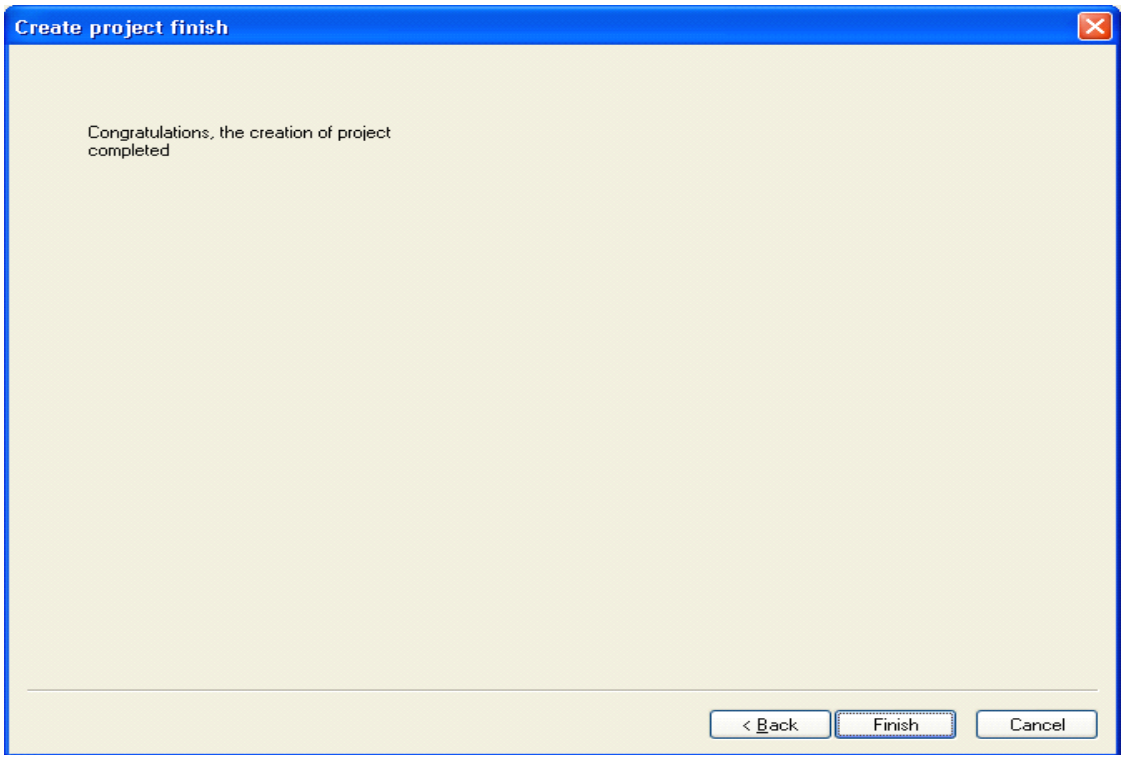
[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]Each parameter of the auxiliary can be modified in the anti-control working zone. After inputting the relevant parameter, left click the button [Complete] to complete the setting of new instrument conditions and to get out of the window [Set the instrument conditions].

16. Completing the setting of instrument conditions

Now, the new instrument condition will appear in the existing instrument condition list and the newly created instrument condition is selected. You can left click the button [Next] to turn to the window [End the creation of a project].



17. Ending the creation of a project

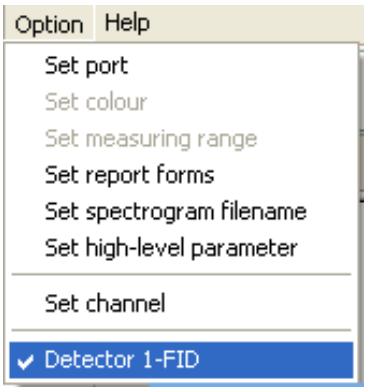


Left click the button [Complete] to close the current window and end the creation of a new project.

2.3.4 Selecting a Detector

Since FL9790 chromatogram workstation has the function to automatically identify a detector, so the FL9790 software will call multiple detector windows if more than one detector is installed on GC9790III chromatogram analyzer. Thus, in case of the sample analysis using single detector, you should close the unwanted detector windows.

You can select the [Detector 1] or [Detector 2] under the pull-down menu of the [Options] in the main menu column. If a detector is checked, it indicates that it is selected and will be used, and the corresponding detector window will be opened; if a detector is not checked, it indicates that it is not selected and will be closed, and the corresponding detector window will be closed.



2.4 Anti-control of FL9790

The FL9790 software has anti-control function, which allows the user to set and control such testing conditions as column box temperature, detector temperature, sample injector temperature, automatic ignition, polarizing voltage and current signal just at the workstation.

2.4.1 Anti-control of the Sample Injector

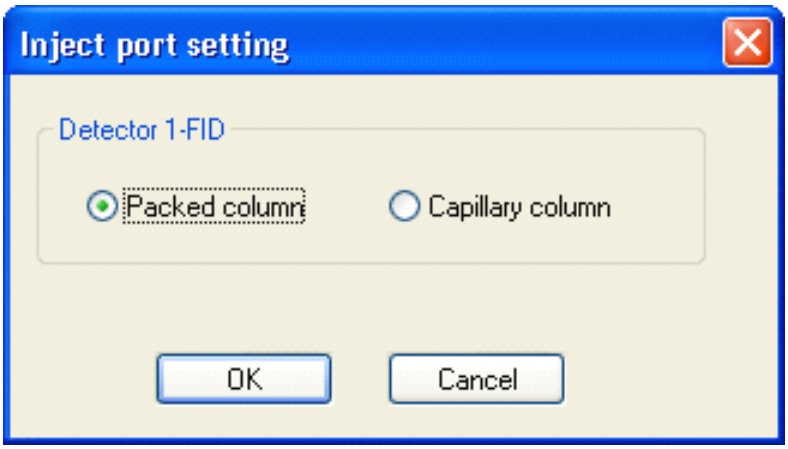
The GC9790III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. is an instrument integrated with multiple sample injectors. The GC9790 III gas chromatogram analyzer supports the application of capillary column sample injector and filling column sample injector. So only the correct configuration of FL9790 chromatogram workstation can ensure the normal operation

of GC9790 III gas chromatogram analyzer and FL9790 chromatogram workstation.

2.4.1.1 Configuration of the Sample Injector

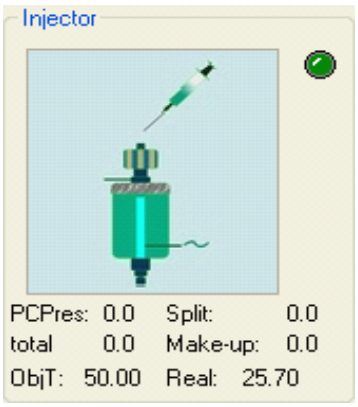
The configuration of the sample injector provides the correct matching between the sample injector and the column, thus ensuring the matching between each status display on the status column and the sample injector status and therefore ensuring the analysis of samples.

Left click the option [Options] - [Setting channel] under the main menu column to call the window [Set the sample injection channel]. See the following figure for details.

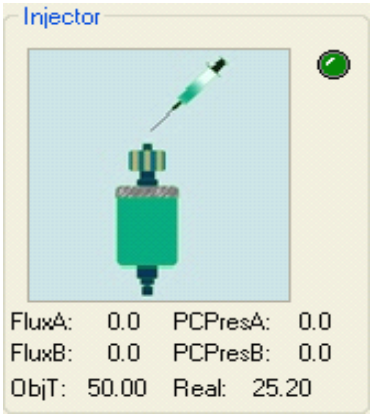


Click the circle ○ for selection purpose. ◉ indicates that it is selected, while ○ indicates that it is not selected.

After the correct configuration of the sample injector, click the button [Ok]. Close the window [Set the sample injection channel] and the detector anti-control window will display the corresponding sample injector icon as well as the corresponding flow status and pressure status. (Note: GC9790III gas chromatogram analyzer is supplied in two types, with or without the flow & pressure display. For the model without the flow & pressure display, the flow status and the pressure status are displayed as zero.)



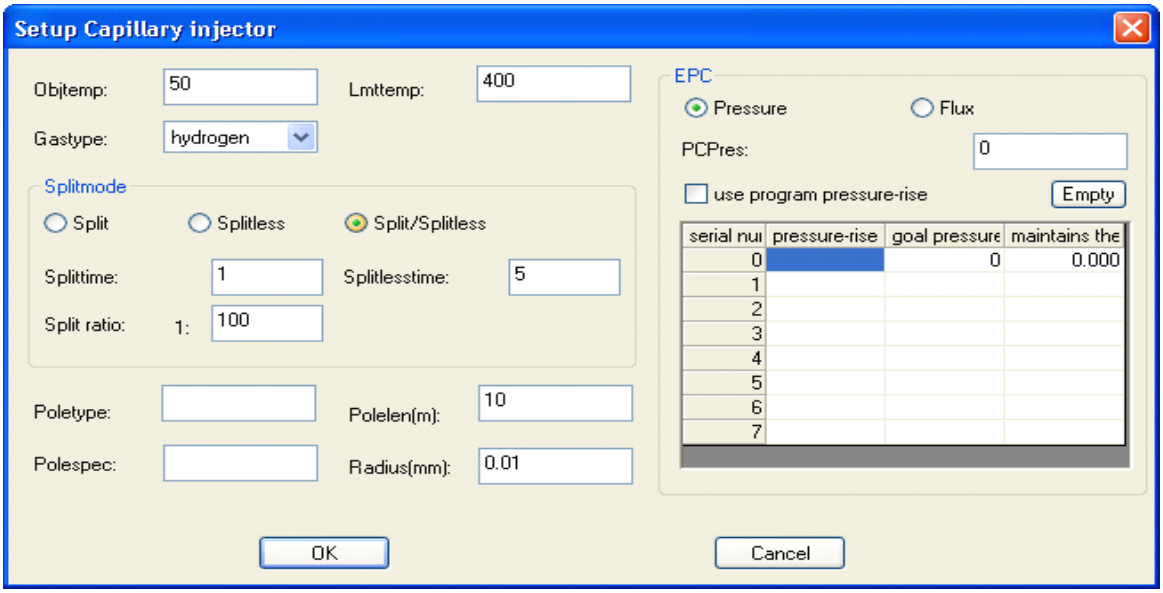
Capillary column sample injector



Filling column sample injector

2.4.1.2 Setting the Parameters of Capillary Column Sample Injector

Left click the capillary column sample injector icon  and the window [Set the capillary column sample injector] will pop up. You can set each parameter of the capillary column sample injector in this window. See the following figure for details:

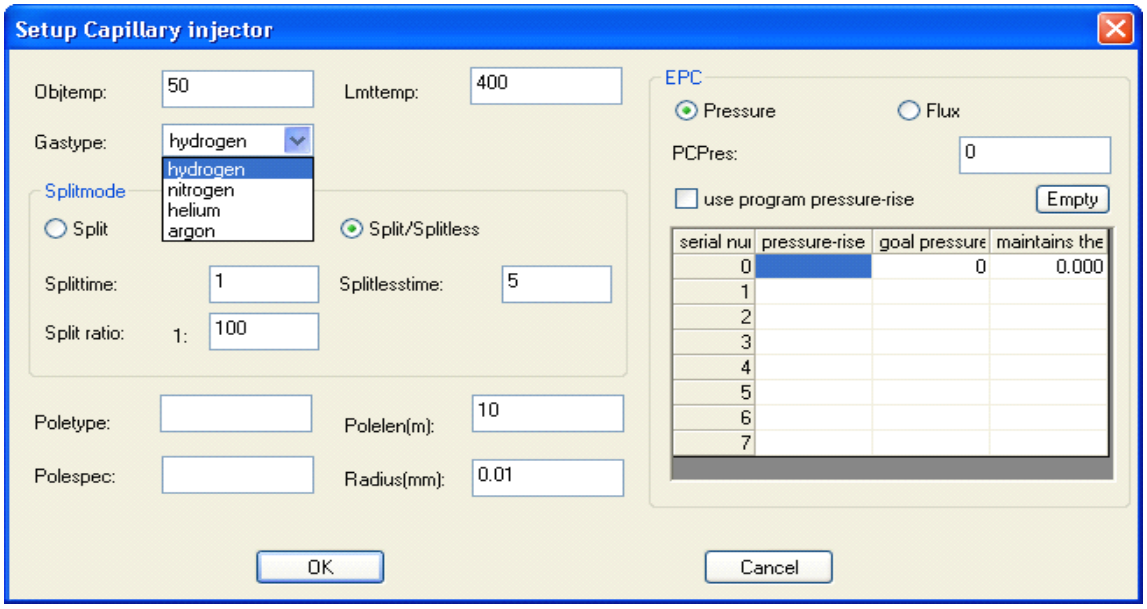


Target temperature: Preset temperature of the sample injector (℃)

Limiting temperature: Protection temperature of the sample injector (℃)

[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

Carrier gas type: You can select the corresponding carrier gas type using the pull-down menu. Four options are available, i.e. hydrogen, nitrogen, helium gas and argon gas. See the following figure for details.



(Note: The selected carrier gas type must correspond to the type of the

actually-loaded gas; otherwise, the calculation of the flow sensor will be affected, thus affecting the reading of flow.)

There are three options for the shunt mode:

1. Shunt types: [Shunt], [Non-shunt], [Shunt\Non-shunt]. You can click the circle  for selection purpose. The symbol  indicates that a type is selected, while the symbol  indicates that a type is not selected.2. Shunt time: This option is available only when the option [Shunt\Non-shunt] is selected. The inputted shunt time takes effect only after the sample injection is started.

3. Non-shunt time: This option is available only when the option [Shunt\Non-shunt] is selected. The inputted non-shunt time takes effect only after the sample injection is started.

Column model: You can input the model of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column length: You can input the length of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)Column specification: You can input the specification of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)Column ID: You can input the ID (inside diameter) of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)After all the parameters of the capillary column sample injector are set correctly, left click the button [OK] to close the window [Set the capillary column sample injector] and complete the setting of each parameter of the capillary column sample injector.

2..4.1.3 Control of the Capillary Column Sample Injector

The control of the capillary column sample injector mainly refers to the regulation of the capillary column sample injector temperature. Although the temperature setting for the capillary column sample injector is completed by the window [Set the capillary column sample injector], the heating relies on the control switch of the capillary column sample injector.The temperature control of the capillary column sample injector is achieved by left clicking the icon [Heating switch]  at the upper right corner of the capillary column sample injector icon.

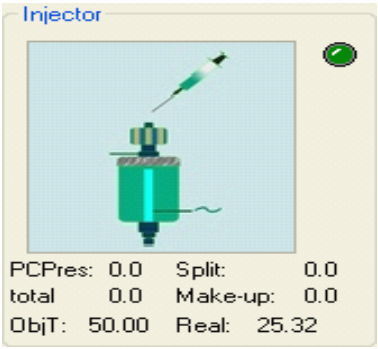
When the temperature control of the capillary column sample injector is unavailable, the icon is green  .

When the temperature control of the capillary column sample injector is available, the icon is red  .

After left clicking the green icon [Heating switch] , the icon immediately turns red , which indicates the temperature control begins. Left click the red icon [Heating switch] and the icon will immediately turn green , which indicates the temperature control is deactivated.

2.4.1.4 Display of the Capillary Column Sample Injector Status

After all the parameters of the capillary column sample injector are set correctly, you can view its status. See the following figure for details.

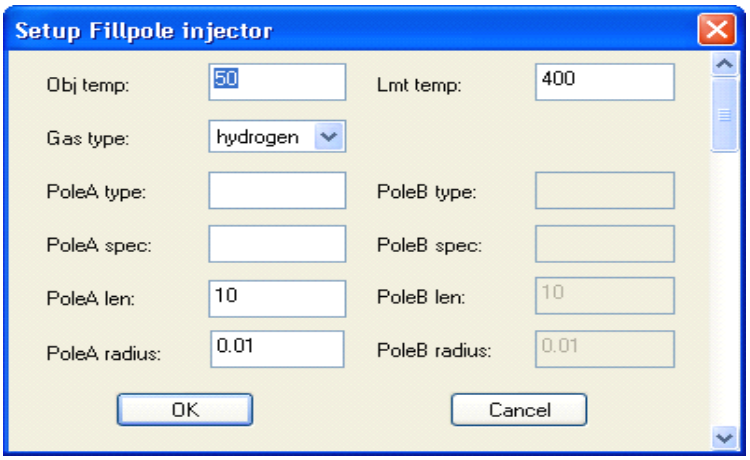


Head pressure: Pressure at the column head (KPa)Shunt flow: Shunt flow of the capillary column (mL/min)Makeup flow: Makeup flow of the capillary column (mL/min)Temperature: Target temperature of the capillary column sample injector (℃)Observed: Current temperature of the capillary column sample injector (℃)

: Indication of heating control switch and status of the sample injector. (Green: close; red: open)

2.4.1.5 Setting the Parameters of Filling Column Sample Injector.

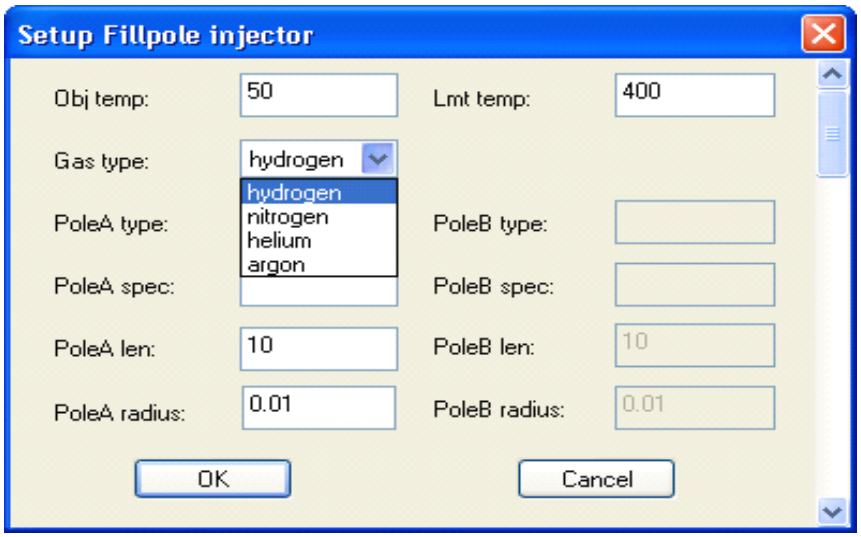
Left click the filling column sample injector icon and the window [Set the filling column sample injector] will pop up. You can set each parameter of the filling column sample injector in this window. See the following figure for details:



Target temperature: Preset temperature of the sample injector (℃)Limiting temperature: Protection temperature of the sample injector (℃)[Attention: The target

temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

Carrier gas type: You can select the corresponding carrier gas type using the pull-down menu. Four options are available, i.e. hydrogen, nitrogen, helium gas and argon gas. See the following figure for details.



(Note: The selected carrier gas type must correspond to the type of the actually-loaded gas; otherwise, the calculation of the flow sensor will be affected, thus affecting the reading of flow.)

Column A model: You can input the model of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)Column A specification: You can input the specification of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)Column A length: You can input the length of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column A ID: You can input the ID (inside diameter) of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column B model: You can input the model of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column B specification: You can input the specification of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column B length: You can input the length of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)

Column B ID: You can input the ID (inside diameter) of the column used for the current analysis here to provide a more accurate and real environment for sample analysis. (Default allowable)After all the parameters of the filling column sample

injector are set correctly, left click the button [OK] to close the window [Set the filling column sample injector] and complete the setting of each parameter of the filling column sample injector.

2.4.1.6 Control of the Filling Column Sample Injector

The control of the filling column sample injector mainly refers to the regulation of the filling column sample injector temperature. Although the temperature setting for the filling column sample injector is completed by the window [Set the filling column sample injector], the heating relies on the control switch of the filling column sample injector.

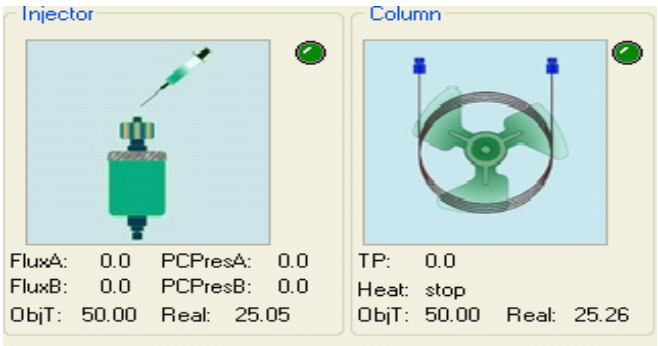
The temperature control of the filling column sample injector is achieved by left clicking the icon [Heating switch]  at the upper right corner of the filling column sample injector icon.

When the temperature control of the filling column sample injector is unavailable, the icon is green  .When the temperature control of the filling column sample injector is available, the icon is red  .

After left clicking the green icon [Heating switch]  , the icon immediately turns red  , which indicates the temperature control begins. Left click the red icon [Heating switch]  and the icon will immediately turn green  , which indicates the temperature control is deactivated.

2.4.1.7 Display of the Filling Column Sample Injector Status

After all the parameters of the filling column sample injector are set correctly, you can view its status. See the following figure for details.



Flow A: Flow of the filling column A (mL/min)

Flow B: Flow of the filling column B (mL/min)Head pressure A: Pressure at the head of filling column A (KPa)

Head pressure B: Pressure at the head of filling column B (KPa)

Temperature: Target temperature of the filling column sample injector (℃)

Observed: Current temperature of the filling column sample injector (℃)

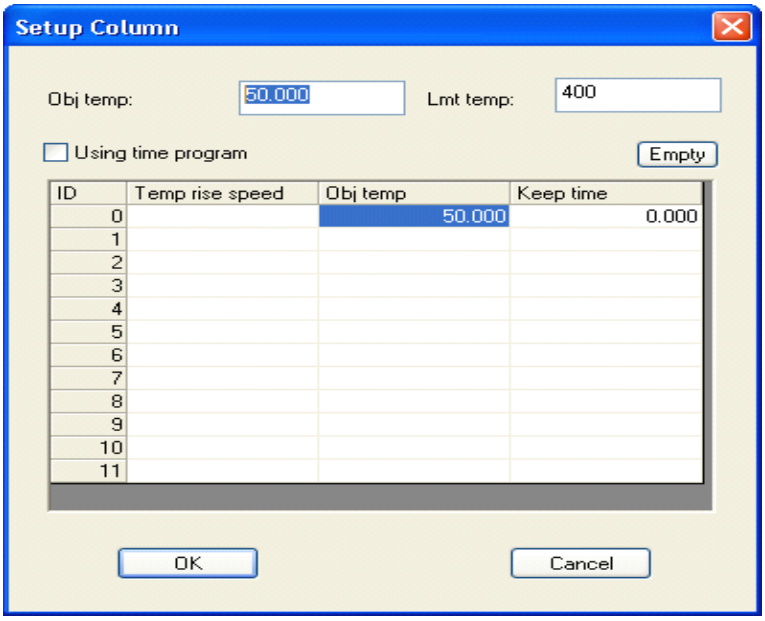
Total pressure: Total pressure of the filling column

 : Indication of heating control switch and status of the sample injector. (Green: close; red: open) 2.4.2 Anti-control of the Column Box

The GC9790 III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. is an instrument integrated with single column box. Thus, when multiple detectors are installed, the setting and control of the column box of each detector is equivalent for the FL9790 chromatogram workstation.

2.4.2.1 Setting the Parameters of Column Box

Left click the column box icon  and the window [Set the column box] will pop up. You can set each parameter of the column box in this window. See the following figure for details:



Target temperature: Preset temperature of the column box (℃)

Limiting temperature: Protection temperature of the detector (℃)

[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

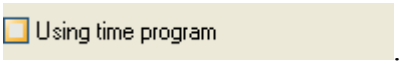
The temperature control of column box is an important means for the chromatogram analysis. It covers two control types, which are constant temperature rise and program-assisted temperature rise.

The GC9790III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. incorporates such two control functions, so the column box setting for FL9790 chromatogram workstation covers the setting for such two functions.

You can left click the option [Program-assisted temperature rise] to perform the constant temperature control and the program-assisted temperature rise control. If the option [Program-assisted temperature rise] is left unselected, the constant temperature control will be enabled; otherwise, the program-assisted temperature rise control will be enabled.

If you want to activate the program-assisted temperature rise function, left click the option [Program-assisted temperature rise] to make it selected, as shown in the figure .

If you want to deactivate the program-assisted temperature rise function, left click the option [Program-assisted temperature rise] to make it unselected, as shown in the figure



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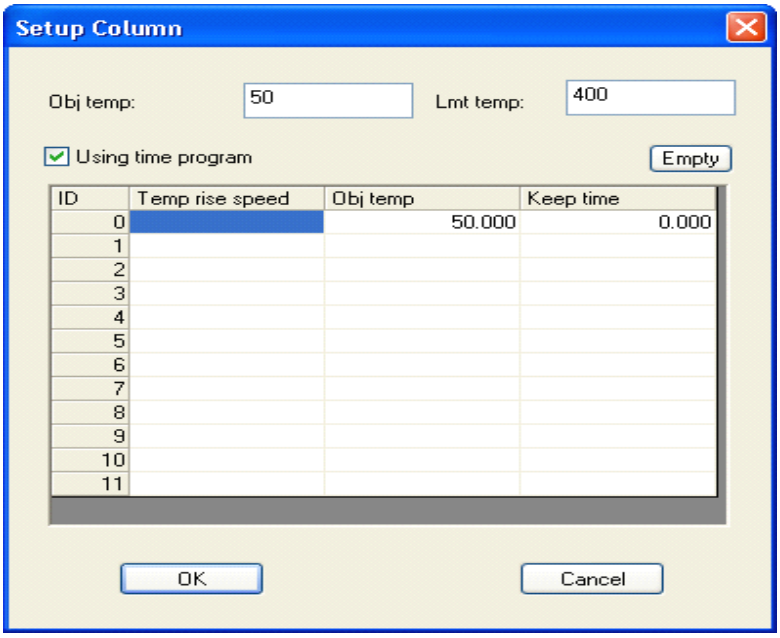
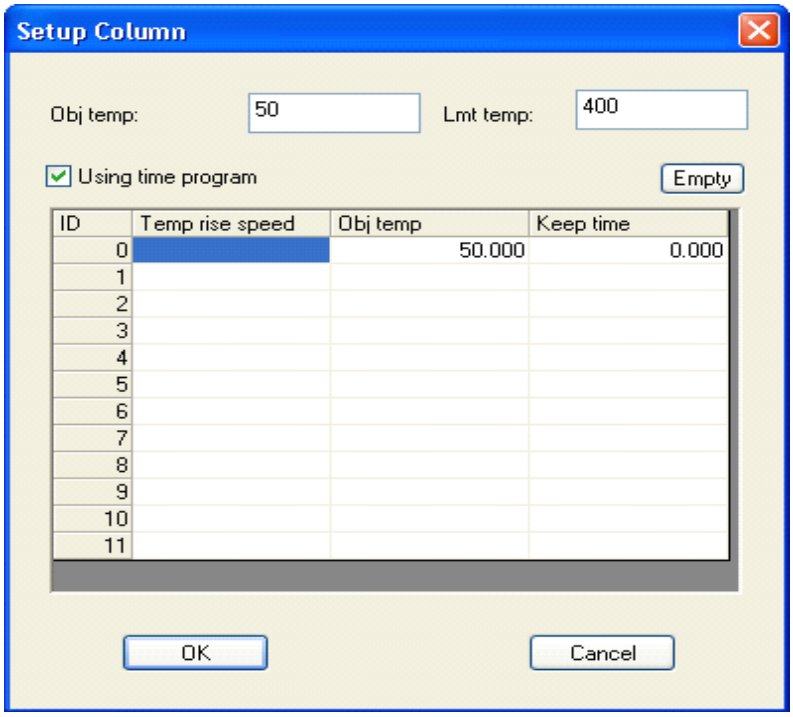
All content in the program-assisted temperature rise column is available only after the option [Program-assisted temperature rise] is selected. The GC9790III gas chromatogram analyzer supports 12-step program-assisted temperature rise, so the program-assisted temperature rise column of FL9790 chromatogram workstation includes 12 setting options. Each option corresponds to a step of program-assisted temperature rise. Click the corresponding input box to input the set value. See the following figure for details.



With the button [Empty], one-click clearing of the content in the program-assisted temperature rise column can be realized, which is efficient for operation. After the clearing operation mentioned above is done, it will turn to the following figure:



Input the ideal parameter values and left click the button [OK] to close the window [Set the column box] and complete the setting of each parameter of the column box.

2.4.2.2 Control of the Column Box

The control of the column box mainly refers to the regulation of the column box temperature. Although the temperature and control type of the column box are set is completed by setting the parameters of column box, the temperature control relies on the control switch of the column box.

2.4.2.2.1 Constant Temperature Control

[Attention: Make sure the column in the column box is under the protection of carrier gas before heating the column box; otherwise, the column may be burnt.]

The constant temperature control of the column box is achieved by left clicking the icon [Heating switch]  at the upper right corner of the column box icon.

When the temperature control of the column box is unavailable, the icon is green  .

When the temperature control of the column box is available, the icon is red  .

After left clicking the green icon [Heating switch]  , the icon immediately

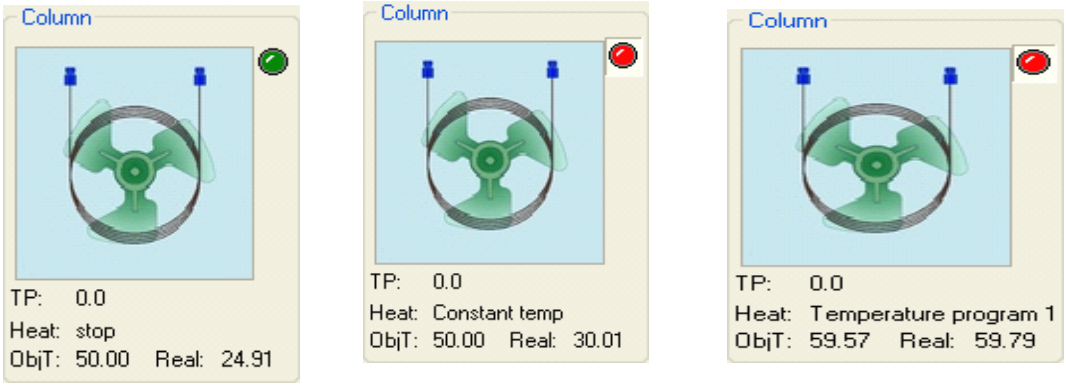
turns red , which indicates the temperature control begins. Left click the red icon [Heating switch] and the icon will immediately turn green , which indicates the temperature control is deactivated.

2.4.2.2.2 Program-assisted Temperature Rise

The program-assisted temperature rise function is available only the sample injection begins, and such control is subject to the sample injection operation. Only after the sample is injected into the sample injector, can the program-assisted temperature rise be executed.

2.4.2.3 Display of the Column Box Status

The status of the column box to be displayed mainly includes three modes: temperature control off, constant temperature control, and program-assisted rise.



Temperature control off Constant temperature control Program-assisted temperature rise

Heating: Heating status of column box. (Off/Constant temperature/ Program-assisted temperature rise)

Temperature: Preset target temperature of column box. (℃)

Observed: Actual observed temperature of column box. (℃) : Indication of heating control status. (Green: Off; red: On)

2.4.3 Anti-control of the Detector

Since FL9790 chromatogram workstation has the function to automatically identify a detector, so the chromatogram analyzer with multiple detectors has multiple anti-control windows, which are located below the spectrogram windows for the corresponding detectors respectively.

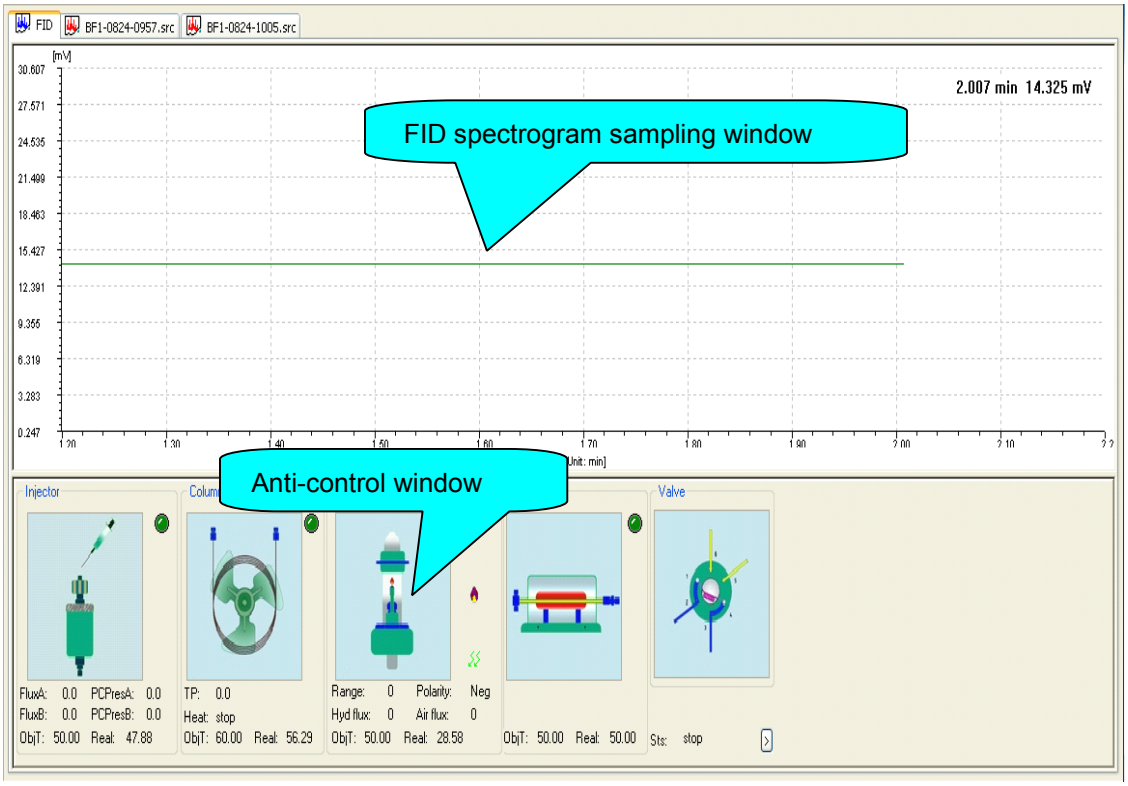
The types of detectors available for GC9790III chromatogram analyzer are given as follows:

1. FID detector
2. TCD detector

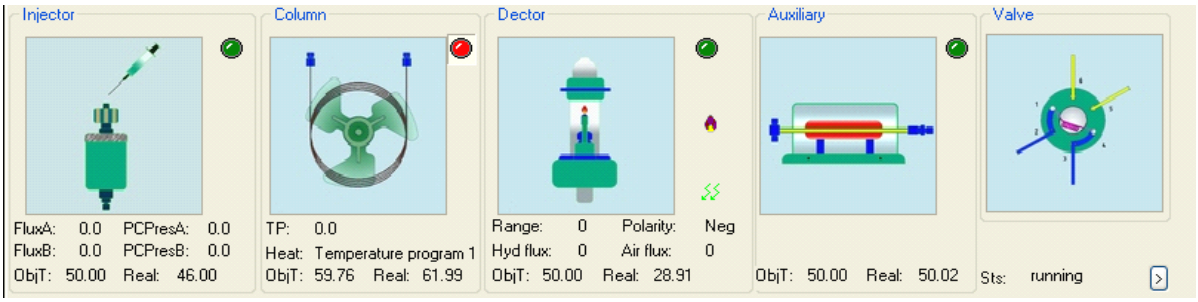
3. FPD detector
4. NPD detector
5. ECD detector

2.4.3.1 Anti-control of the FID Detector

If the GC9790III gas chromatogram analyzer is equipped with a FID detector, the FL9790 chromatogram workstation will display the FID detector window. See the following figure for details.



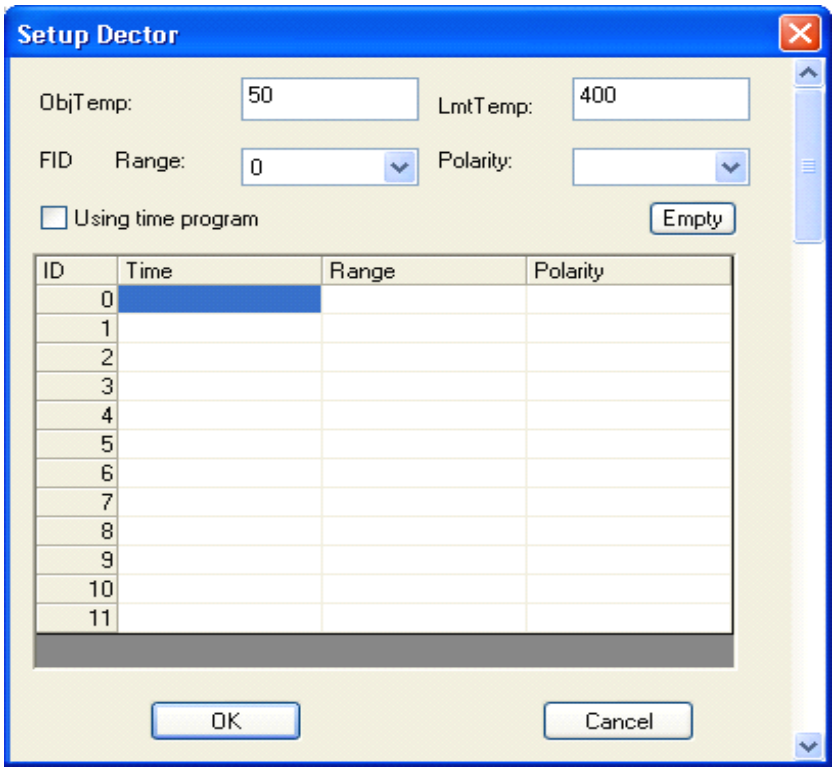
The status, setting and control switches of such equipment as sample injector, column box and detector matching with FID are displayed in the anti-control window. See the following figure for details.



2.4.3.1.1 Setting the Parameters of FID Detector

Left click the FID detector icon  and the window [Set the detector] will pop up. You can set each parameter of the FID detector in this window. See the

following figure for details:



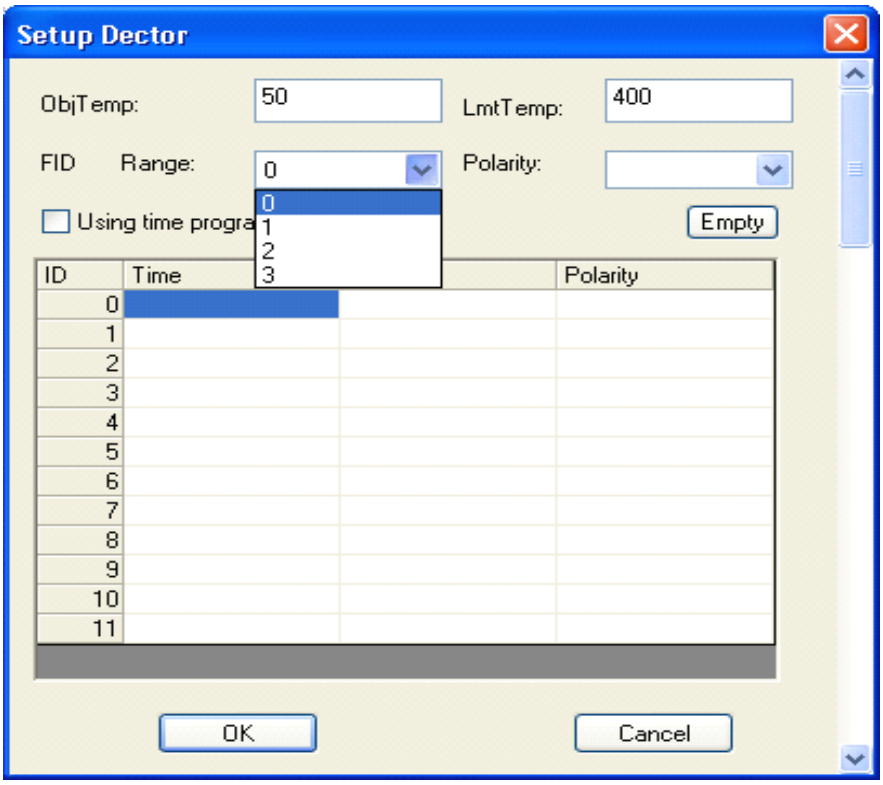
Target temperature: Preset temperature of the detector (℃)

Limiting temperature: Protection temperature of the detector (℃)

[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]FID range: You can select the range position of the FID detector using the pull-down menu. The range of the FID detector of the GC9790III gas chromatogram analyzer is divided into four positions which are 0, 1, 2 and 3 respectively.

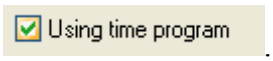
Note: The sensitivity at position 0 is the highest and that at position 3 is the lowest.

The pull-down menu for the range position of the FID detector is as shown in the following figure :



The GC9790 III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. supports the range time program switching, namely, analyzing the sample with different ranges within different periods to obtain more accurate results.

Left clip the option [Use the time program] to perform switching between the fixed range and the range time program of the detector. When the option [Use the time program] is unselected, the detector performs analysis of fixed range; otherwise, it performs the analysis of range time program.

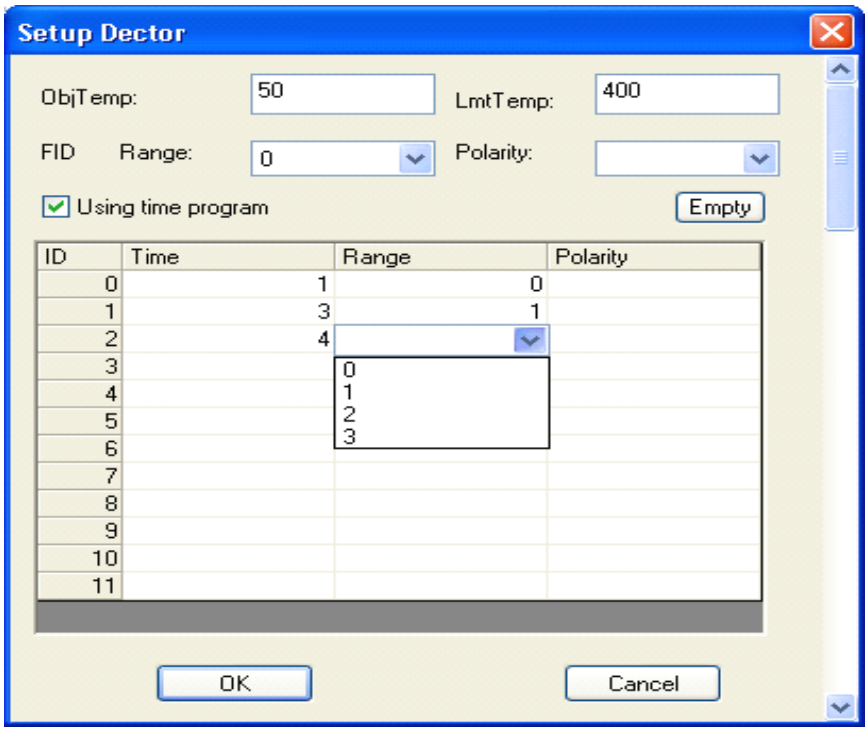
If you want to activate the range time program of the detector, left click the option [Use the time program] to make it selected, as shown in the figure 

.

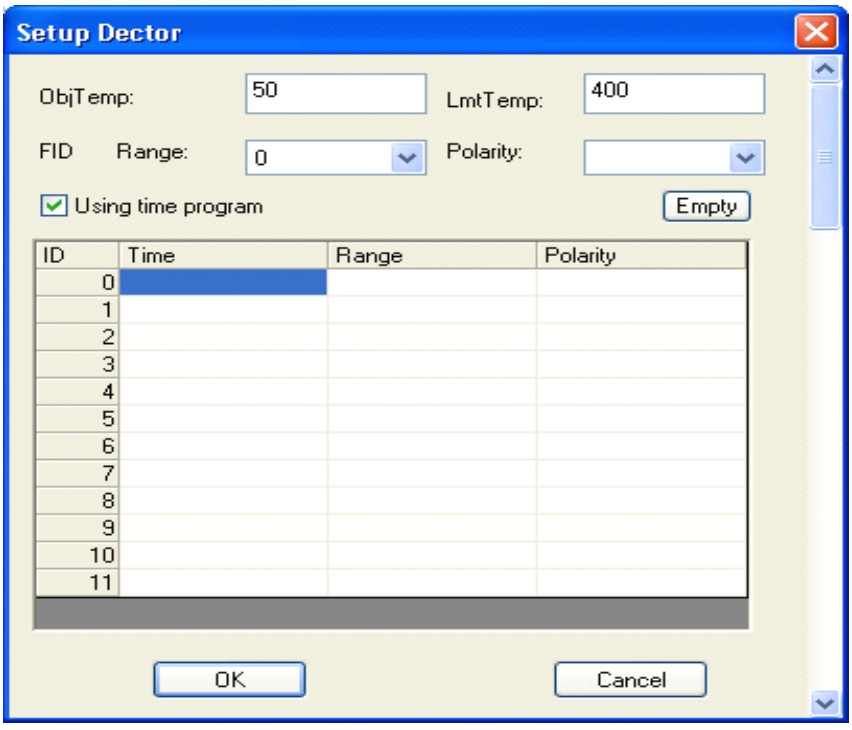
If you want to deactivate the range time program of the detector, left click the option [Use the time program] to make it unselected, as shown in the figure 

.

All content in the range time program column of the FID detector is available only after the option [Use the time program] is selected. The GC9790III gas chromatogram analyzer supports 12-step range time program, so the range time program column of FL9790 chromatogram workstation includes 12 setting options. Each option corresponds to a step of range time program. Click the corresponding input box to input the set value. See the following figure for details.



With the button [Empty], one-click clearing of the content in the time program column of the detector can be realized. After clicking the button [Empty] in the above figure, it will turn to the following figure:



Input the ideal parameter values and left click the button [OK] to complete the setting of each parameter of the FID detector. Then close the window [Set the detector].

2.4.3.1.2 Control of the FID Detector

The control of the FID detector mainly includes1. Temperature control of the FID detector2. Ignition control of the FID detector3. Polarizing voltage control of the FID detector

4. Range switching control of the FID detectorI. Temperature control of the FID detector

The temperature control of the detector is achieved by left clicking the icon [Heating switch]  at the upper right corner of the detector icon.When the temperature control of the detector is unavailable, the icon is green  .

When the temperature control of the detector is available, the icon is red  .

After left clicking the green icon [Heating switch]  , the icon immediately turns red  , which indicates the temperature control begins. Left click the red icon [Heating switch]  and the icon will immediately turn green  , which indicates the temperature control is deactivated.

II. Ignition control of the FID detector

[Attention: Make sure the detector temperature exceeds 120℃ before ignition operation; otherwise, it is possible that the vapor condenses on the detector.]

It is necessary to activate the temperature control of the detector to heat the detector to 120℃ above before ignition control. Afterwards, left click the ignition button  to perform automatic ignition control.The red icon  indicates the ignition control is in process.The dark icon  indicates the ignition control is ended.

After ignition, you can use a probe to check whether the ignition is successful. In case of ignition failure, check whether the gas source is turned on or whether the gas flow adjustment is correct and then perform ignition again.

III. Polarizing voltage control of the FID detector

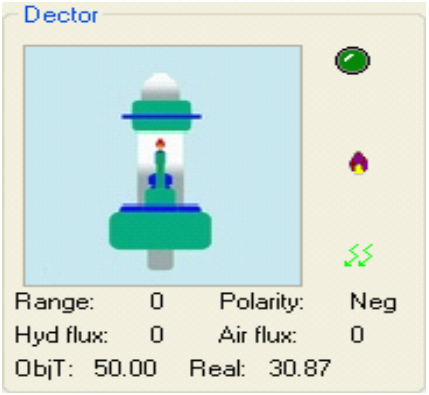
You can left click the high-voltage switch button  to control the polarizing voltage of the FID detector.

The green icon  indicates the polarizing voltage control of the FID detector is not activated.

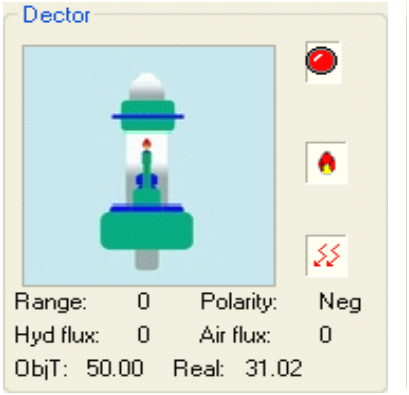
The red icon  indicates that the polarizing voltage control of the FID detector has been activated.IV. Range switching control of the FID detector

The range time program control of the FID detector is activated only after the sample injection is started. The control is achieved by sample injection operation. Only after the sample is injected to the sample injector, can the range time program control of the FID detector be executed.

2.4.3.1.3 Display of the FID Detector Status



FID detector control off



FID detector control on

Range: Range used by the FID detector at present

Hydrogen flow: Value of hydrogen flow (mL/min)Air flow: Value of air flow (mL/min)

Temperature: Preset target temperature of the FID detector (℃)

Observed: Observed temperature of the FID detector (℃)

 : Heating switch of the FID detector

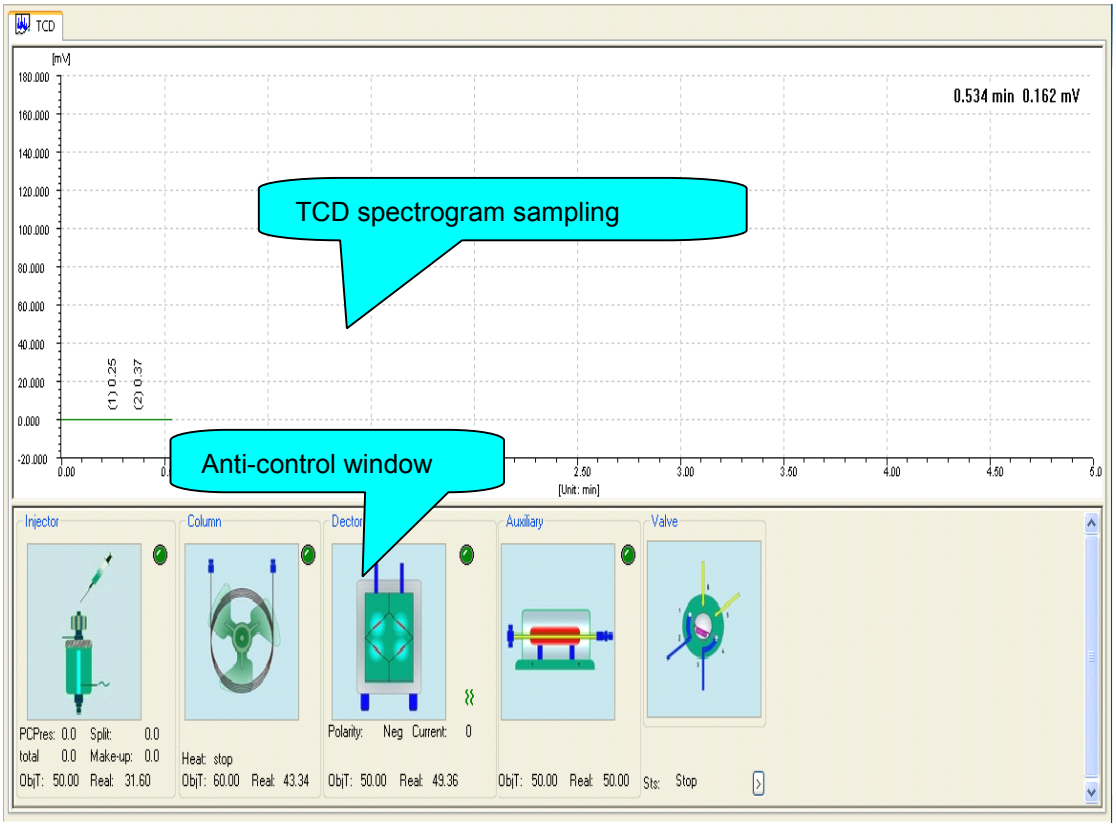
 : Ignition control switch of the FID detector

 : Polarizing voltage control switch of the FID detector

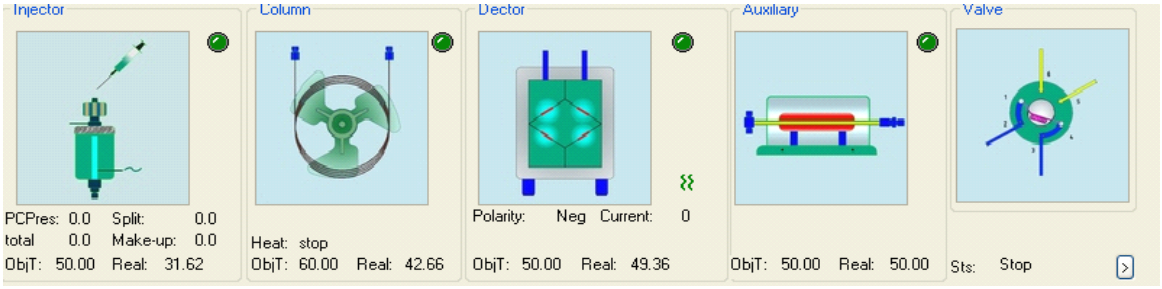
2.4.3.2 Anti-control of the TCD Detector

If the GC9790III gas chromatogram analyzer is equipped with a TCD detector, the FL9790 chromatogram workstation will display the TCD detector window. See the following figure for details.

■

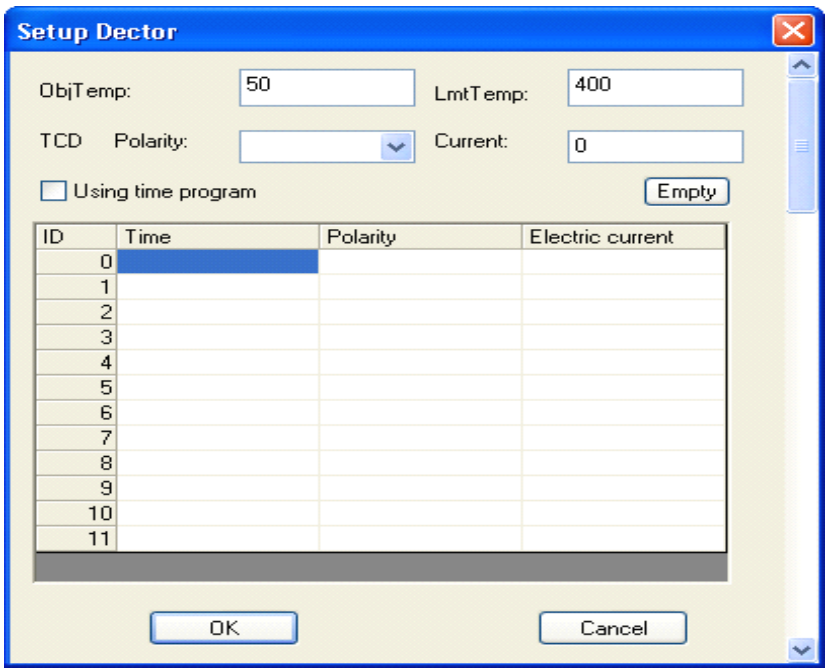


The status, setting and control switches of such equipment as sample injector, column box and detector matching with TCD are displayed in the anti-control window. See the following figure for details.



2.4.3.2.1 Setting the Parameters of TCD Detector

Left click the TCD detector icon  and the window [Set the detector] will pop up. You can set each parameter of the TCD detector in this window. See the following figure for details:



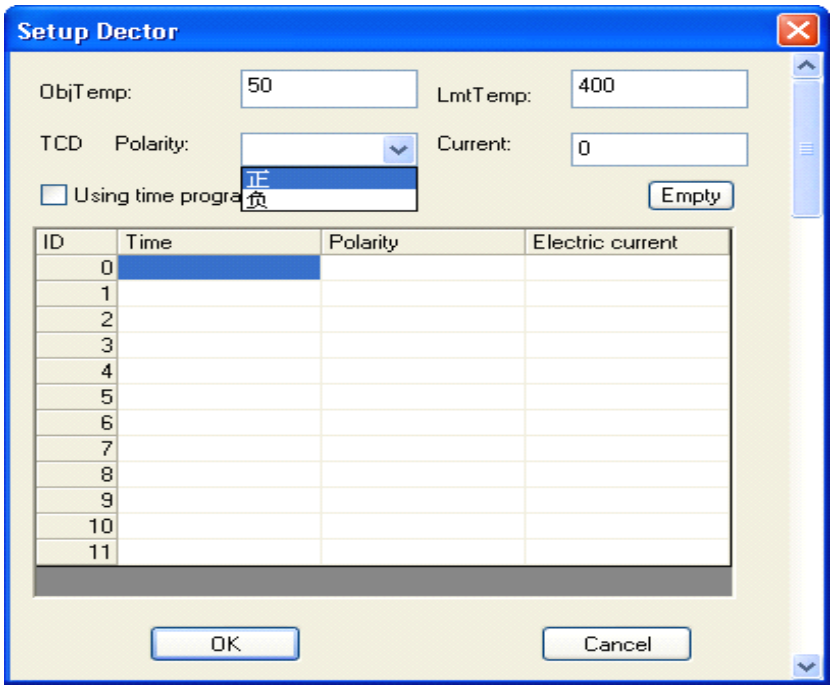
Target temperature: Preset temperature of the detector (℃)

Limiting temperature: Protection temperature of the detector (℃)

[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

Current: Current applied to the TCD detector (mA)

TCD polarity: Polarity of the TCD output signal includes positive polarity and negative polarity. You can select the polarity using the pull-down menu. See the following figure for details:



The GC9790III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. supports the time program switching of the TCD detector,

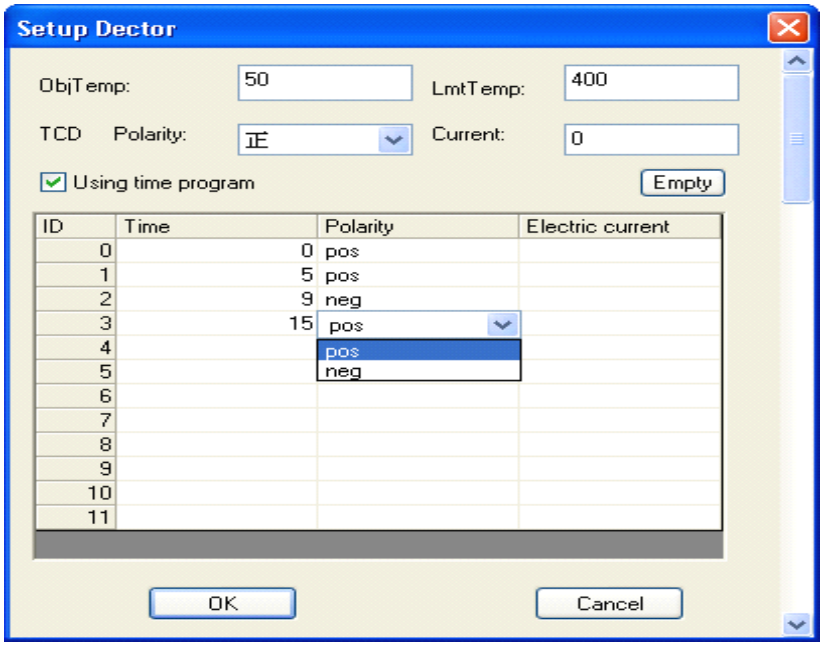
namely, analyzing the sample with different TCD currents within different periods to obtain more accurate results. As the TCD currents applied within different periods are different, the sample peak may be negative. In this case, you can inverse the negative peak using the TCD polarity time program.

Left click the option [Use the time program] to perform switching between the TCD polarity and the applied TCD current time program. When the option [Use the time program] is unselected, the TCD detector performs analysis of fixed polarity and fixed current; otherwise, it performs the time program analysis.

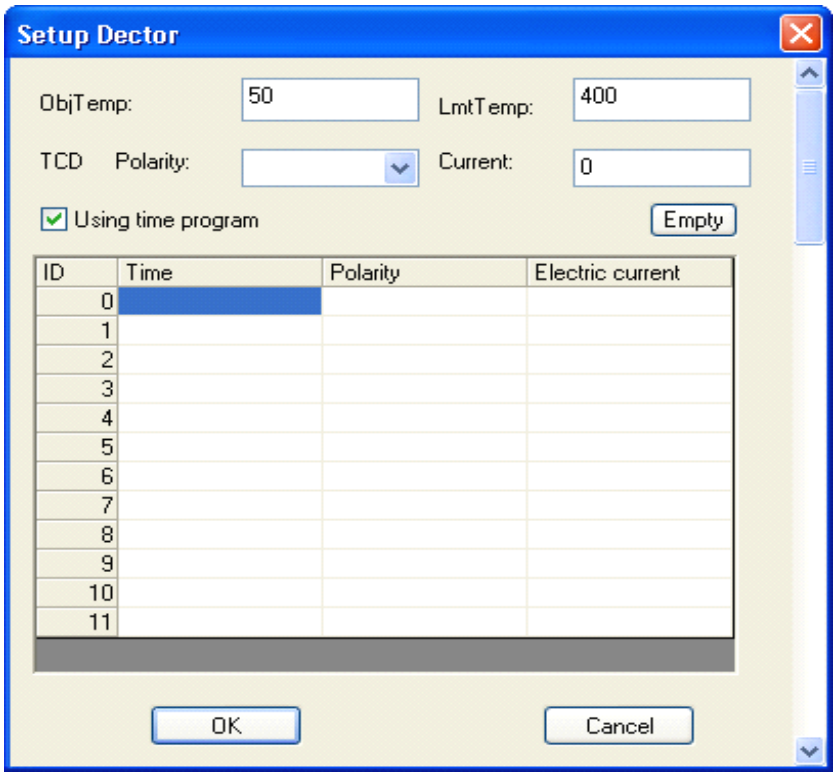
If you want to activate the time program of the TCD detector, left click the option [Use the time program] to make it selected, as shown in the figure

If you want to deactivate the time program of the TCD detector, left click the option [Use the time program] to make it unselected, as shown in the figure

All content in the time program column of the TCD detector is available only after the option [Use the time program] is selected. The GC9790III gas chromatogram analyzer supports 12-step time program, so the time program column of FL9790 chromatogram workstation includes 12 setting options. Each option corresponds to a step of time program. Click the corresponding input box to input the set value. See the following figure for details.



With the button [Empty], one-click clearing of the content in the time program column of the TCD detector can be realized. After clicking the button [Empty] in the above figure, it will turn to the following figure:



Input the ideal parameter values and left click the button [OK] to complete the setting of each parameter of the TCD detector. Then close the window [Set the detector].

2.4.3.2.2 Control of the TCD Detector

The control of the TCD detector mainly includes

1. Temperature control of the TCD detector
2. Current switch control of the TCD detector
3. Time program control of the TCD detector

I. Temperature control of the TCD detector

The temperature control of the detector is achieved by left clicking the icon [Heating switch]  at the upper right corner of the detector icon.

When the temperature control of the detector is unavailable, the icon is green  .

When the temperature control of the detector is available, the icon is red  .

After left clicking the green icon [Heating switch]  , the icon immediately turns red  , which indicates the temperature control begins. Left click the red icon

[Heating switch] and the icon will immediately turn green , which indicates the temperature control is deactivated.

II. Current switch control of the TCD detector

[Attention: Make sure the gas source is turned on and the heater is protected by carrier gas before turning on the current switch of the TCD detector.]

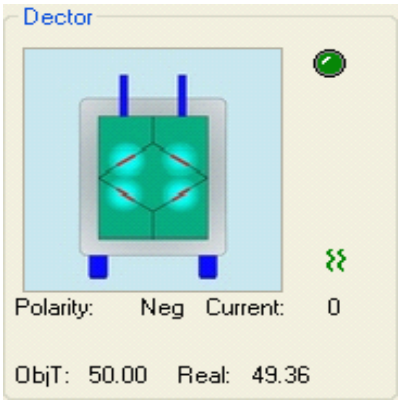
The current switch control of the TCD detector is achieved by left clicking the icon [Current switch] at the lower right corner of the detector icon.

When the current switch of the TCD detector is off, the icon is green .

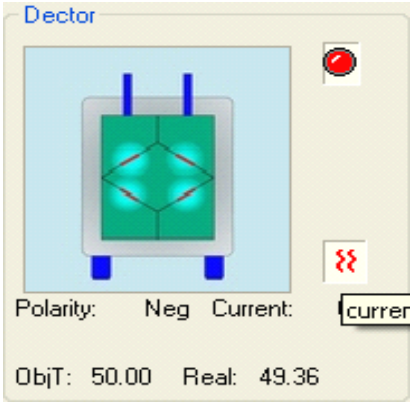
When the current switch of the TCD detector is on, the icon is red .III. Time program control of the TCD detector

The time program control of the TCD detector is activated only after the sample injection is started. The control is achieved by sample injection operation. Only after the sample is injected to the sample injector, can the time program control of the TCD detector be executed.

2.4.3.2.3 Display of the TCD Detector Status



TCD detector control off



TCD detector control on

TCD polarity: The set value for the polarity of output signal of the TCD detector includes positive polarity and negative polarity.

Current: Set value of the current applied on the TCD detector at present (mA)

Temperature: Preset target temperature of the TCD detector (℃)Observed: Observed temperature of the TCD detector (℃)

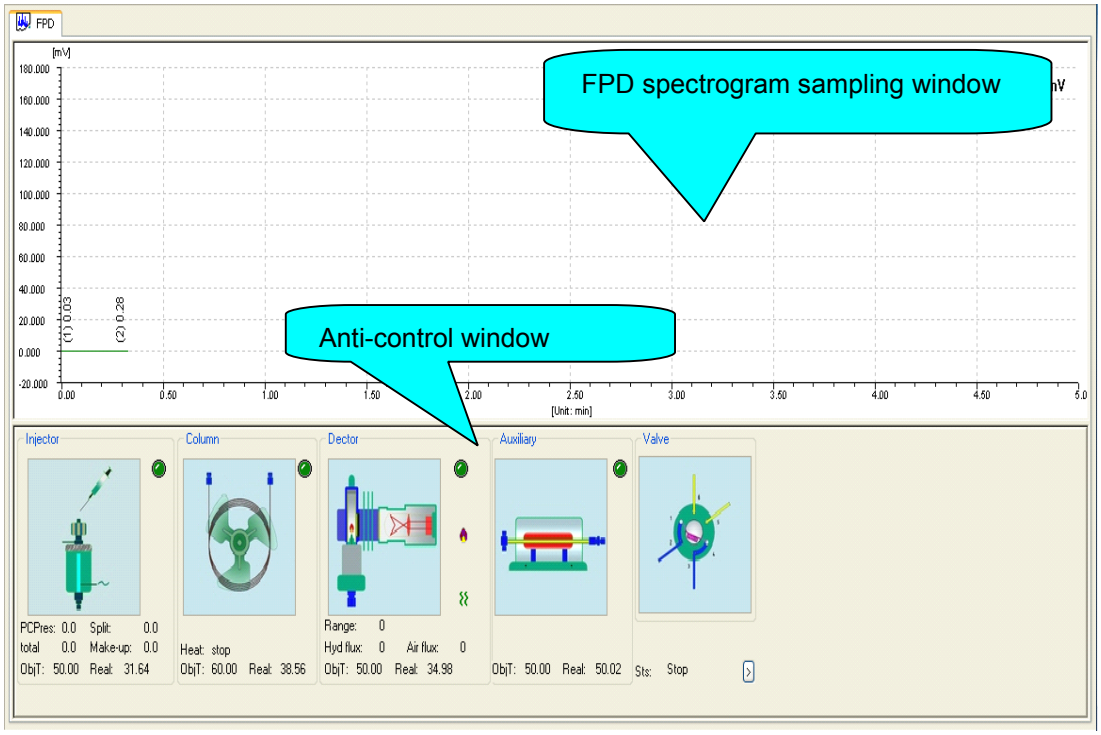
: Heating switch of the TCD detector (red: heating on; green: heating off)

: Current switch of the TCD detector (red: current on; green: current off)

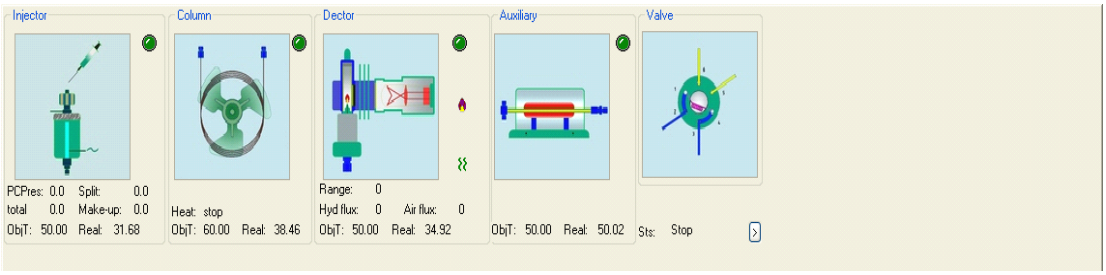
2.4.3.3 Anti-control of the FPD Detector

If the GC9790III gas chromatogram analyzer is equipped with a FPD detector,

the FL9790 chromatogram workstation will display the FPD detector window. See the following figure for details.

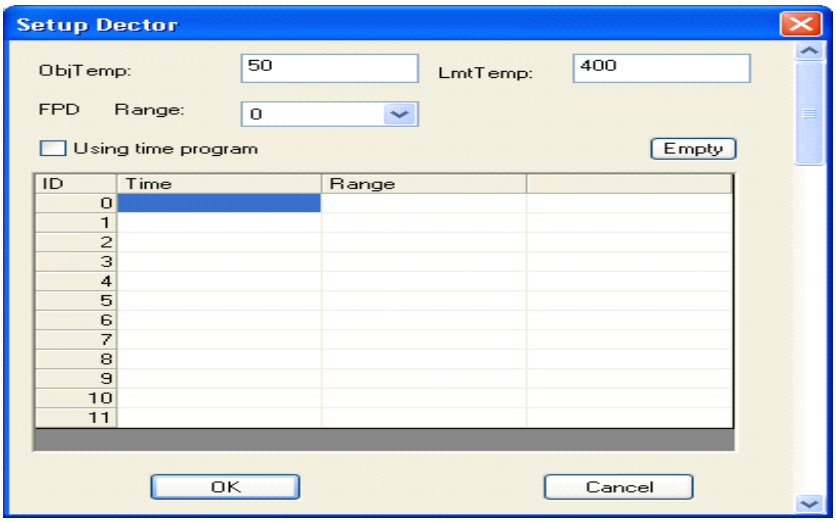


The status, setting and control switches of such equipment as sample injector, column box and detector matching with FPD are displayed in the anti-control window. See the following figure for details.



2.4.3.3.1 Setting the Parameters of FPD Detector

Left click the FPD detector icon  and the window [Set the detector] will pop up. You can set each parameter of the FPD detector in this window. See the following figure for details:

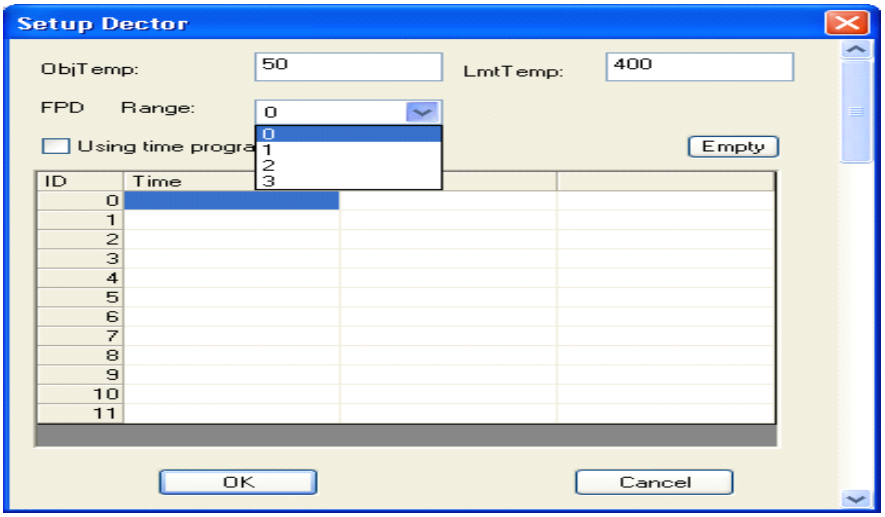


Target temperature: Preset temperature of the detector (℃)Limiting temperature: Protection temperature of the detector (℃)

[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

FPD range: You can select the range position of the FPD detector using the pull-down menu. The range of the FPD detector of the GC9790 III gas chromatogram analyzer is divided into four positions which are 0, 1, 2 and 3 respectively.Note: The sensitivity at position 0 is the highest and that at position 3 is the lowest.

The pull-down menu for the range position of the FPD detector is as shown in the following figure :



The GC9790III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. supports the range time program switching of the FPD detector, namely, analyzing the sample with different ranges within different periods to obtain more accurate results.

Left clip the option [Use the time program] to perform switching between the fixed range and the range time program of the detector. When the option [Use the time program] is unselected, the detector performs analysis of fixed range; otherwise, it performs the analysis of range time program.

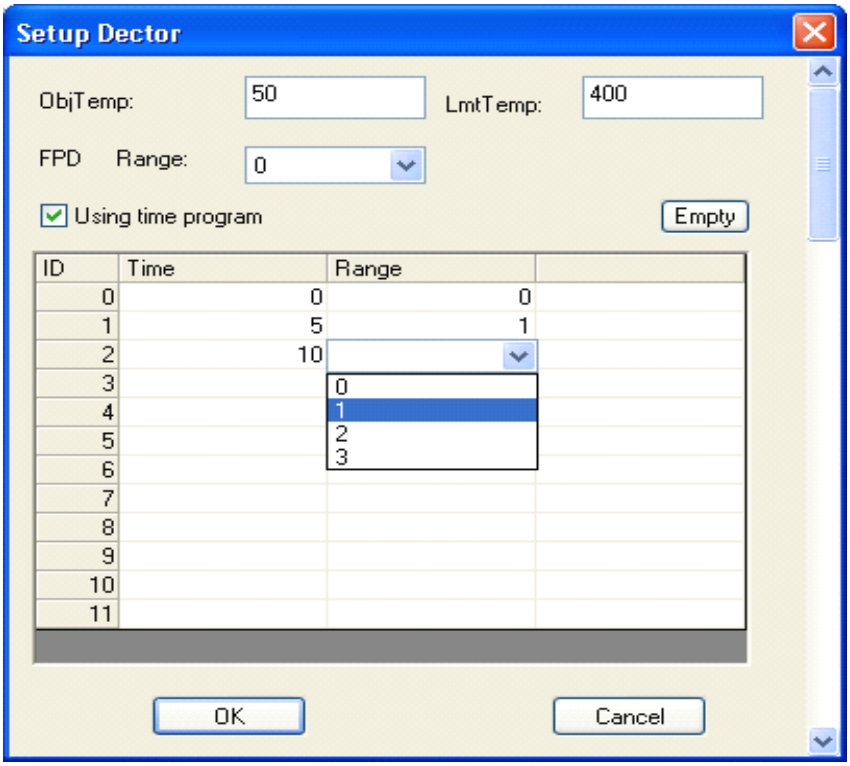
If you want to activate the range time program of the detector, left click the option [Use the time program] to make it selected, as shown in the figure

.

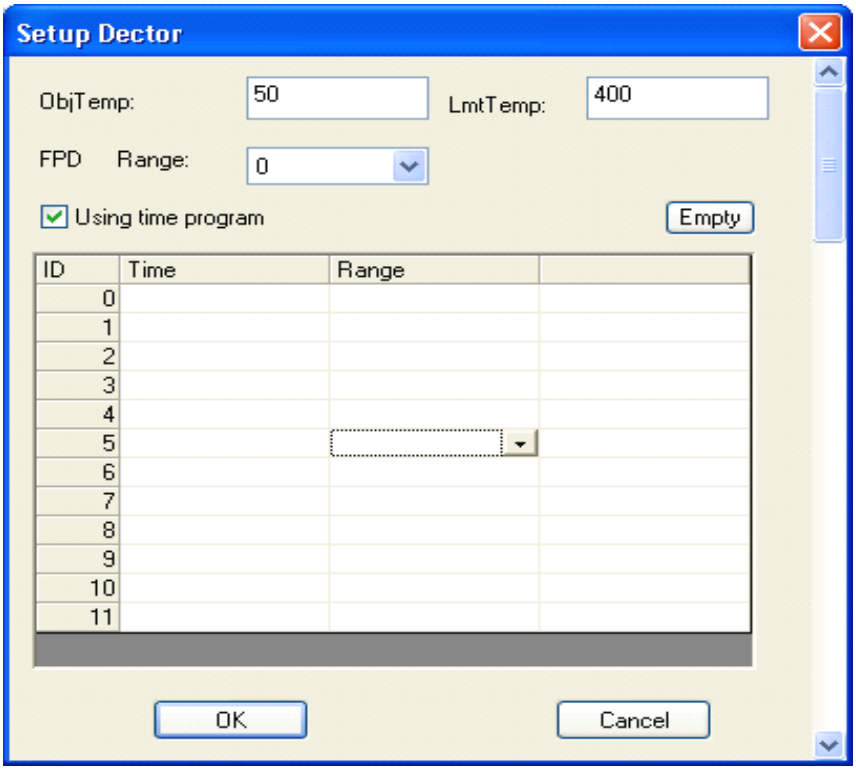
If you want to deactivate the range time program of the detector, left click the option [Use the time program] to make it unselected, as shown in the figure

.

All content in the range time program column of the FPD detector is available only after the option [Use the time program] is selected. The GC9790III gas chromatogram analyzer supports 12-step range time program, so the range time program column of FL9790 chromatogram workstation includes 12 setting options. Each option corresponds to a step of range time program. Click the corresponding input box to input the set value. See the following figure for details.



With the button [Empty], one-click clearing of the content in the time program column of the detector can be realized. After clicking the button [Empty] in the above figure, it will turn to the following figure:



Input the ideal parameter values and left click the button [OK] to complete the setting of each parameter of the FPD detector. Then close the window [Set the detector].

2.4.3.3.2 Control of the FPD Detector

The control of the FPD detector mainly includes

1. Temperature control of the FPD detector
2. Ignition control of the FPD detector
3. Polarizing voltage control of the FPD detector
4. Range switching control of the FPD detectorI. Temperature control of the FPD detector

The temperature control of the detector is achieved by left clicking the icon [Heating switch]  at the upper right corner of the detector icon.When the temperature control of the detector is unavailable, the icon is green  .

When the temperature control of the detector is available, the icon is red  .

After left clicking the green icon [Heating switch]  , the icon immediately turns red  , which indicates the temperature control begins. Left click the red icon [Heating switch]  and the icon will immediately turn green  , which indicates the

temperature control is deactivated.

II. Ignition control of the FPD detector

[Attention: Make sure the detector temperature exceeds 120℃ before ignition operation; otherwise, it is possible that the vapor condenses on the detector.]

It is necessary to activate the temperature control of the detector to heat the detector to 120℃ above before ignition control. Afterwards, left click the ignition button to perform automatic ignition control.

The red icon indicates the ignition control is in process.

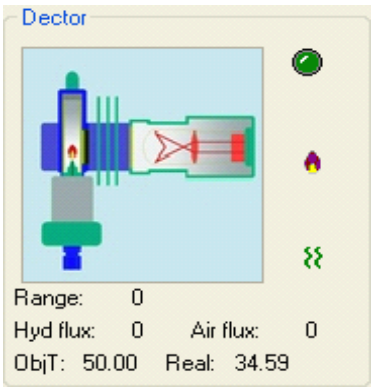
The dark icon indicates the ignition control is ended.After ignition, you can use a probe to check whether the ignition is successful. In case of ignition failure, check whether the gas source is turned on or whether the gas flow adjustment is correct and then perform ignition again.III. Polarizing voltage control of the FPD detectorYou can left click the high-voltage switch button to control the polarizing voltage of the FPD detector.

The green icon indicates the polarizing voltage control of the FPD detector is not activated.

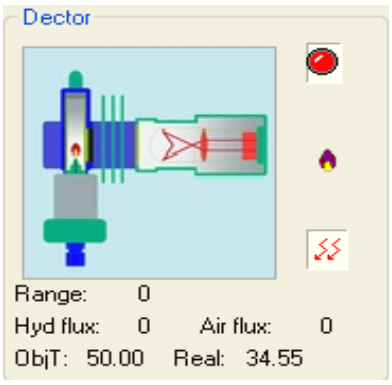
The red icon indicates that the polarizing voltage control of the FPD detector has been activated.IV. Range switching control of the FPD detector

The range time program control of the FPD detector is activated only after the sample injection is started. The control is achieved by sample injection operation. Only after the sample is injected to the sample injector, can the range time program control of the FPD detector be executed.

2.4.3.3.3 Display of the FPD Detector Status



FPD detector control off



FPD detector control on

Range: Range used by the FPD detector at present

Hydrogen flow: Value of hydrogen flow (mL/min)Air flow: Value of air flow (mL/min)

Temperature: Preset target temperature of the FPD detector (℃)Observed: Observed temperature of the FPD detector (℃)

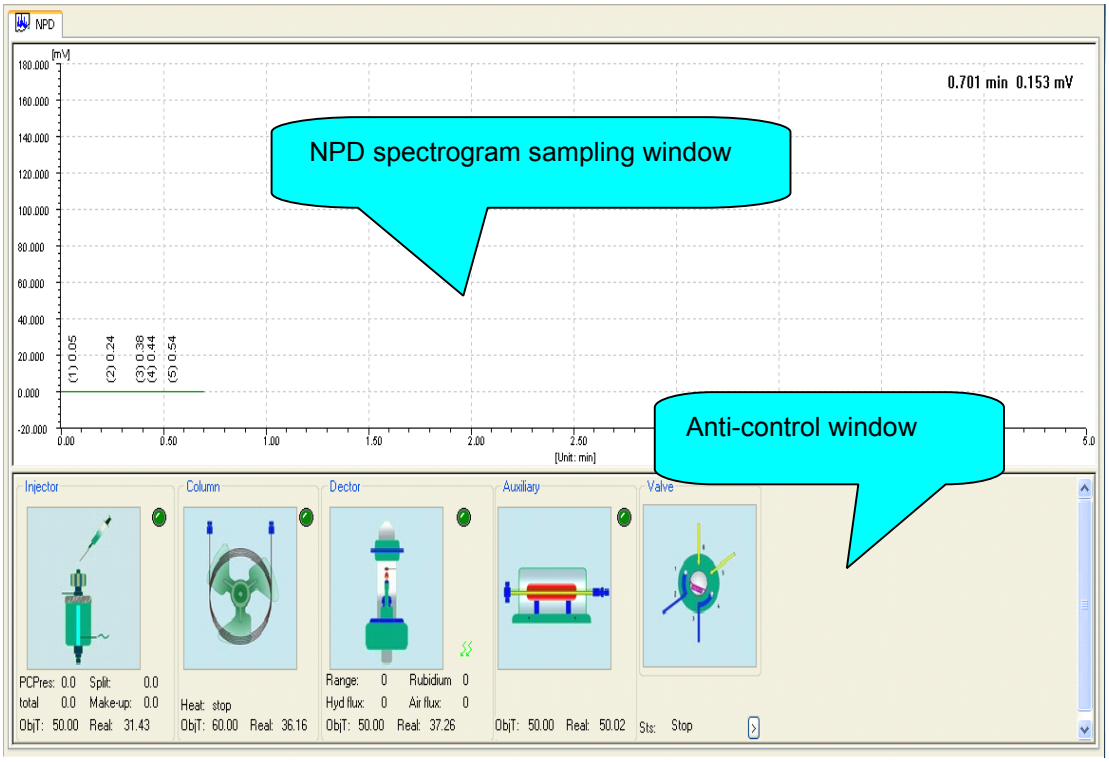
: Heating switch of the FPD detector

: Ignition control switch of the FPD detector

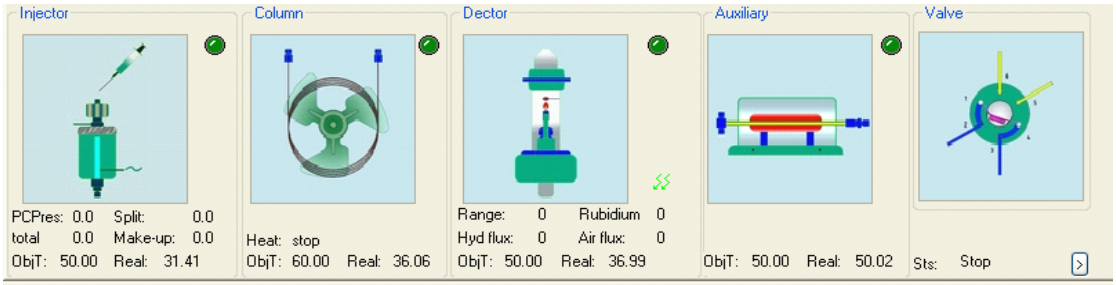
: Polarizing voltage control switch of the FPD detector

2.4.3.4 Anti-control of the NPD Detector

If the GC9790Ⅲ gas chromatogram analyzer is equipped with a NPD detector, the FL9790 chromatogram workstation will display the NPD detector window. See the following figure for details.

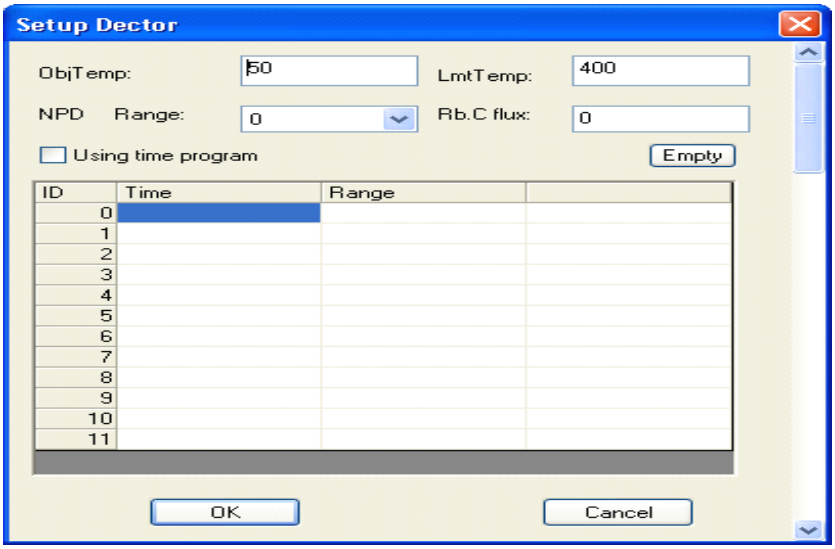


The status, setting and control switches of such equipment as sample injector, column box and detector matching with NPD are displayed in the anti-control window. See the following figure for details.



2.4.3.4.1 Setting the Parameters of NPD Detector

Left click the detector icon  and the window [Set the detector] will pop up. You can set each parameter of the detector in this window. See the following figure for details.

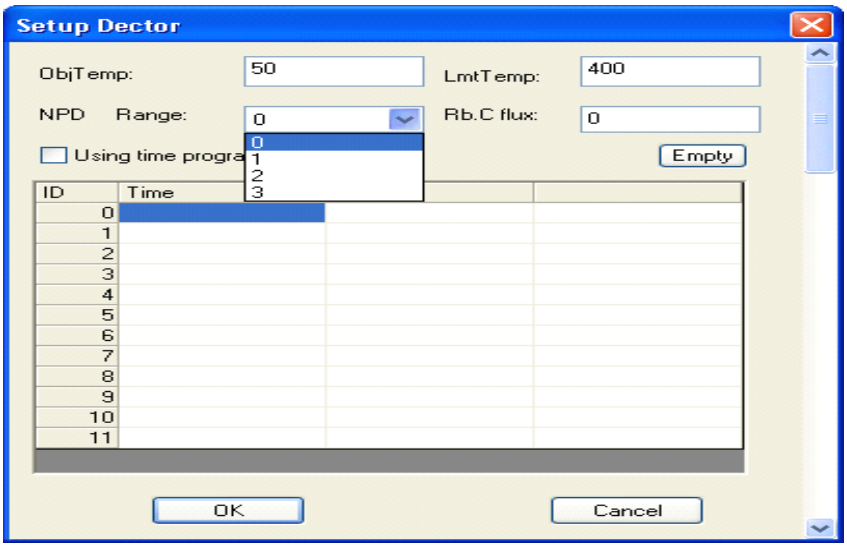


Target temperature: Preset temperature of the detector (℃)Limiting temperature: Protection temperature of the detector (℃)[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]Bead current: Current applied on the bead (A)

[Attention: The bead current will be effective once after the set value is input. Make sure the bead is protected by carrier gas before setting the bead current.]

NPD range: You can select the range position of the NPD detector using the pull-down menu. The range of the FPD detector of the GC9790 III gas chromatogram analyzer is divided into four positions which are 0, 1, 2 and 3 respectively.

Note: The sensitivity at position 0 is the highest and that at position 3 is the lowest.The pull-down menu for the range position of the NPD detector is as shown in the following figure :



The GC9790 III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. supports the range time program switching of the NPD detector, namely, analyzing the sample with different ranges within different periods to obtain more accurate results.

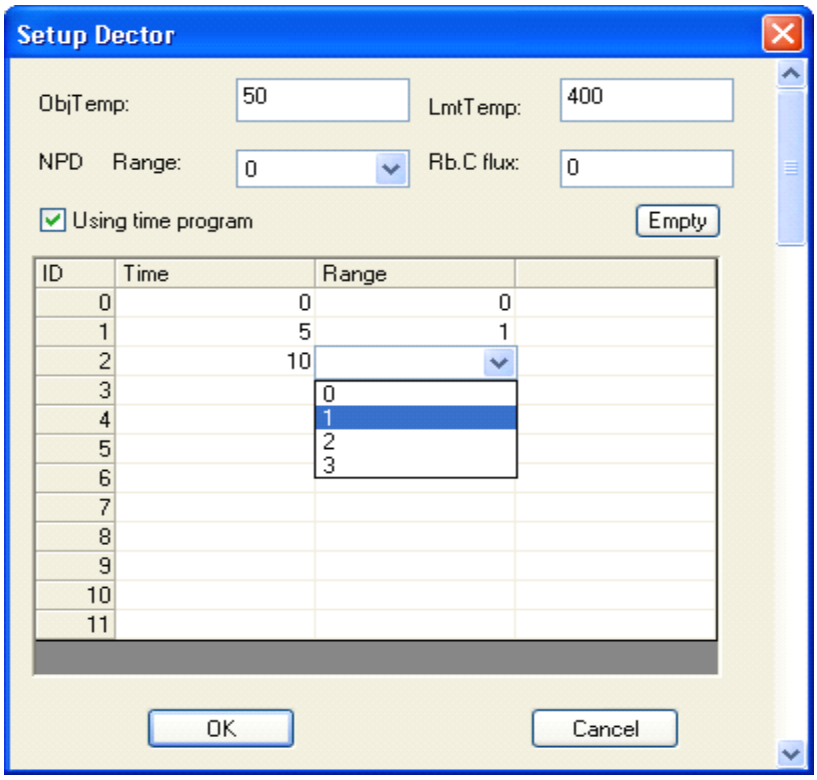
Left click the option [Use the time program] to perform switching between the fixed range and the range time program. When the option [Use the time program] is unselected, the detector performs analysis of fixed range; otherwise, it performs the analysis of range time program.

If you want to activate the range time program of the detector, left click the option [Use the time program] to make it selected, as shown in the figure

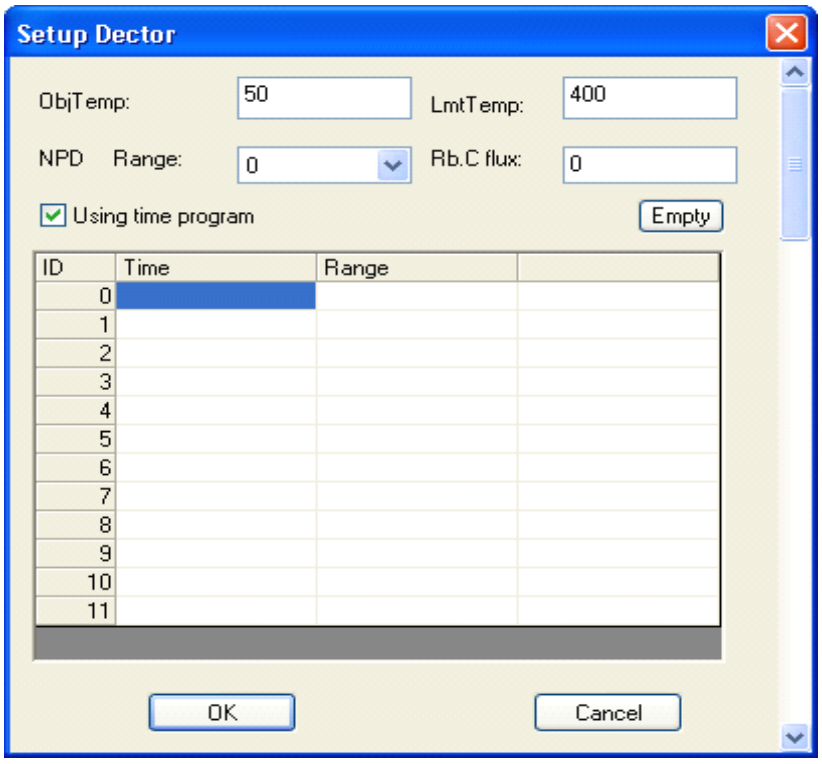
.

If you want to deactivate the range time program of the detector, left click the option [Use the time program] to make it unselected, as shown in the figure .

All content in the range time program column of the detector is available only after the option [Use the time program] is selected. The GC9790 III gas chromatogram analyzer supports 12-step range time program, so the range time program column of FL9790 chromatogram workstation includes 12 setting options. Each option corresponds to a step of range time program. Click the corresponding input box to input the set value. See the following figure for details.



With the button [Empty], one-click clearing of the content in the range time program column of the detector can be realized. After clicking the button [Empty] in the above figure, it will turn to the following figure:



Input the ideal parameter values and left click the button [OK] to complete the setting of each parameter of the NPD detector. Then close the window [Set the detector].

2.4.3.4.2 Control of the NPD Detector

The control of the NPD detector mainly includes1 Temperature control of the NPD detector2. Ignition control of the NPD detector3. Polarizing voltage control of the NPD detector

4. Range switching control of the FPD detector

I. Temperature control of the NPD detector

The temperature control of the detector is achieved by left clicking the icon [Heating switch]  at the upper right corner of the detector icon.

When the temperature control of the detector is unavailable, the icon is green  .

When the temperature control of the detector is available, the icon is red  .

After left clicking the green icon [Heating switch]  , the icon immediately turns red  , which indicates the temperature control begins. Left click the red icon [Heating switch]  and the icon will immediately turn green  , which indicates the temperature control is deactivated.

II. Ignition control of the NPD detector

[Attention: Make sure the detector temperature exceeds 120℃ before ignition operation; otherwise, it is possible that the vapor condenses on the detector.]

It is necessary to activate the temperature control of the detector to heat the detector to 120℃ above before ignition control. Afterwards, left click the ignition button  to perform automatic ignition control.The red icon  indicates the ignition control is in process.The dark icon  indicates the ignition control is ended.After ignition, you can use a probe to check whether the ignition is successful. In case of ignition failure, check whether the gas source is turned on or whether the gas flow adjustment is correct and then perform ignition again.

III. Polarizing voltage control of the NPD detectorYou can left click the high-voltage switch button  to control the polarizing voltage of the NPD detector.

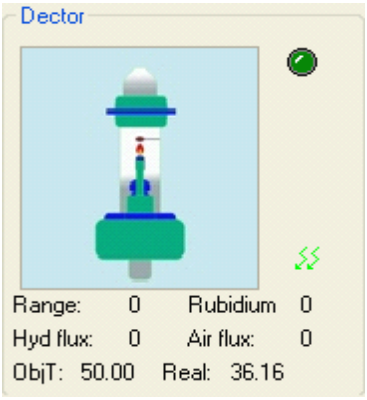
The green icon  indicates the polarizing voltage control of the FPD detector is not activated.

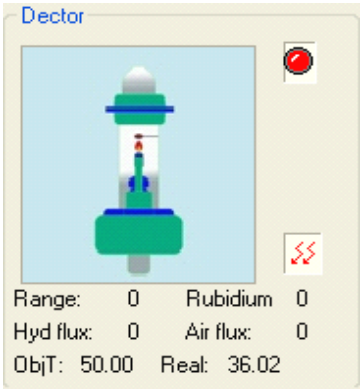
The red icon  indicates that the polarizing voltage control of the FPD detector has been activated.IV. Range switching control of the NPD detector

The range time program control of the NPD detector is activated only after the sample injection is started. The control is achieved by sample injection operation.

Only after the sample is injected to the sample injector, can the range time program control of the NPD detector be executed.

2.4.3.4.3 Display of the NPD Detector Status





NPD detector control off NPD detector control onRange: Range used by the NPD detector at present

Bead current: Value of the current applied on the bead at present (A)Hydrogen flow: Value of hydrogen flow (mL/min)Air flow: Value of air flow (mL/min)Temperature: Preset target temperature of the NPD detector (℃)

Observed: Observed temperature of the NPD detector (℃)

: Heating switch of the NPD detector

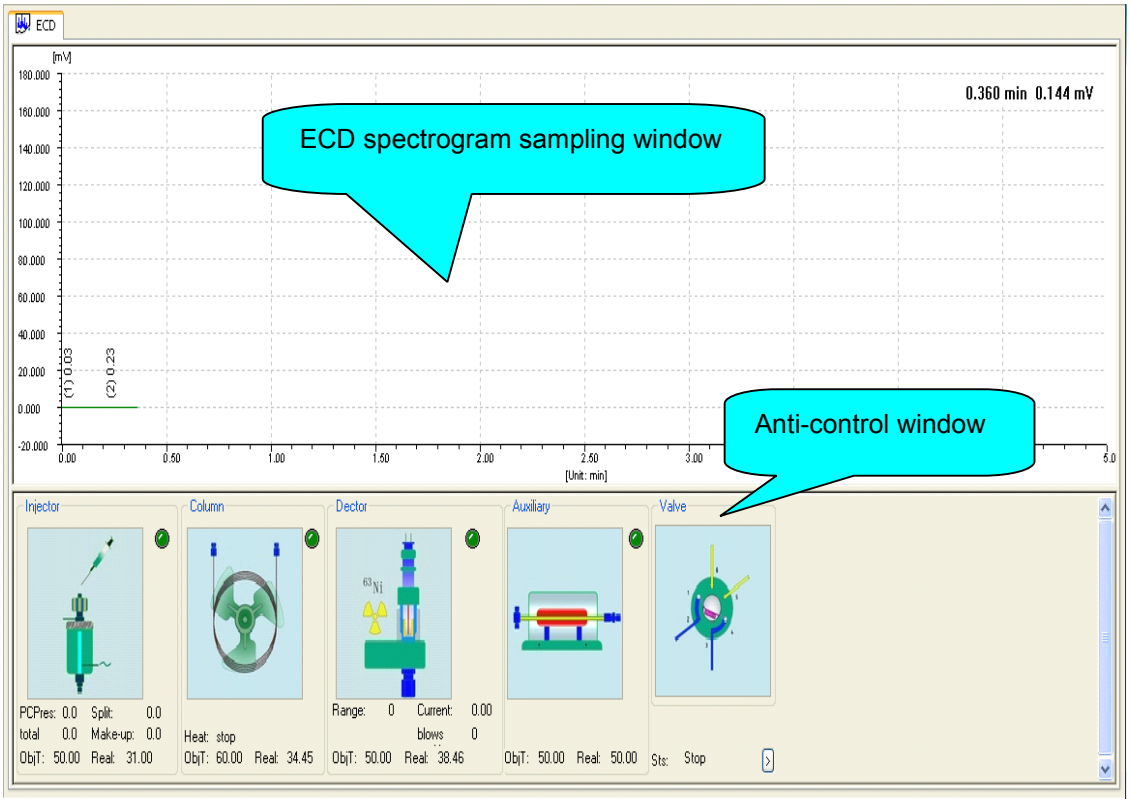
: Ignition control switch of the NPD detector

: Polarizing voltage control switch of the NPD detector

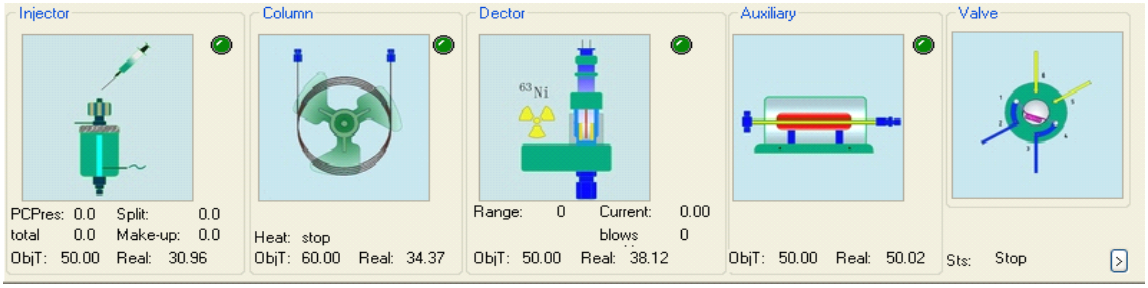
2.4.3.5 Anti-control of the ECD Detector

If the GC9790III gas chromatogram analyzer is equipped with an ECD detector,

the FL9790 chromatogram workstation will display the ECD detector window. See the following figure for details.

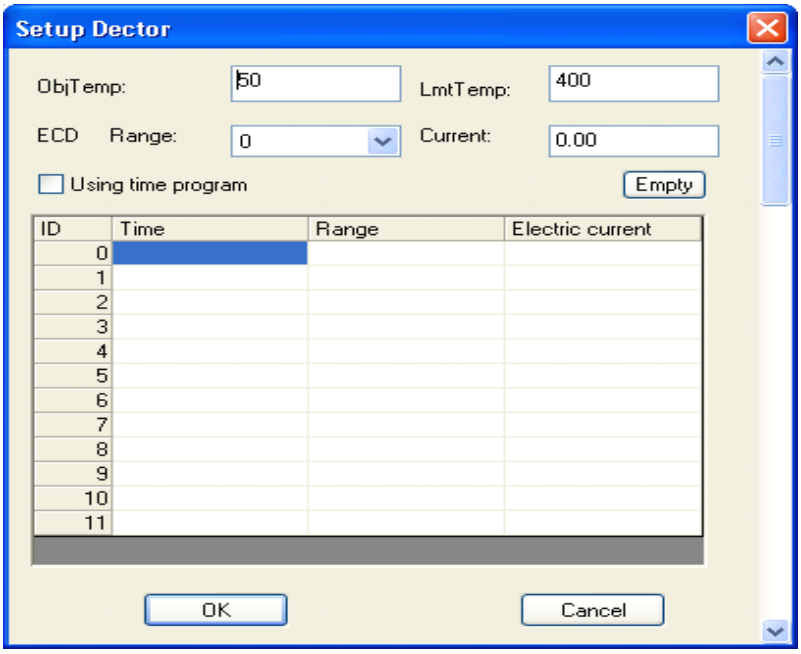


The status, setting and control switches of such equipment as sample injector, column box and detector matching with ECD are displayed in the anti-control window. See the following figure for details.



2.4.3.5.1 Setting the Parameters of ECD Detector

Left click the detector icon  and the window [Set the detector] will pop up. You can set each parameter of the detector in this window. See the following figure for details.



Target temperature: Preset temperature of the detector (℃)Limiting temperature: Protection temperature of the detector (℃)

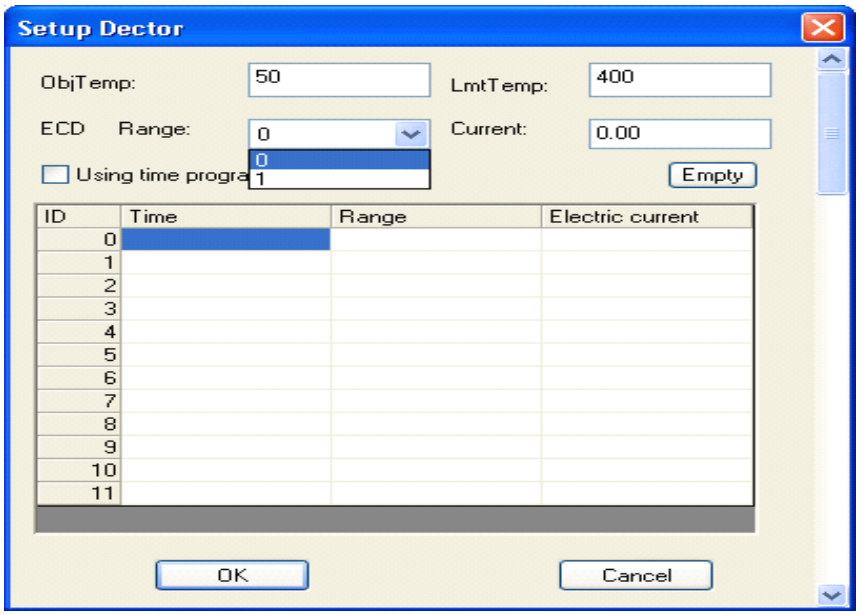
[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

ECD range: You can select the range position of the ECD detector using the pull-down menu. The range of the ECD detector of the GC9790III gas chromatogram analyzer is divided into two positions which are 0 and 1 respectively.

Note: The sensitivity at position 0 is the highest and that at position 1 is the lowest.

The sensitivity at position 0 is 10 times higher than that at position 1.

The pull-down menu for the range position of the ECD detector is as shown in the following figure :



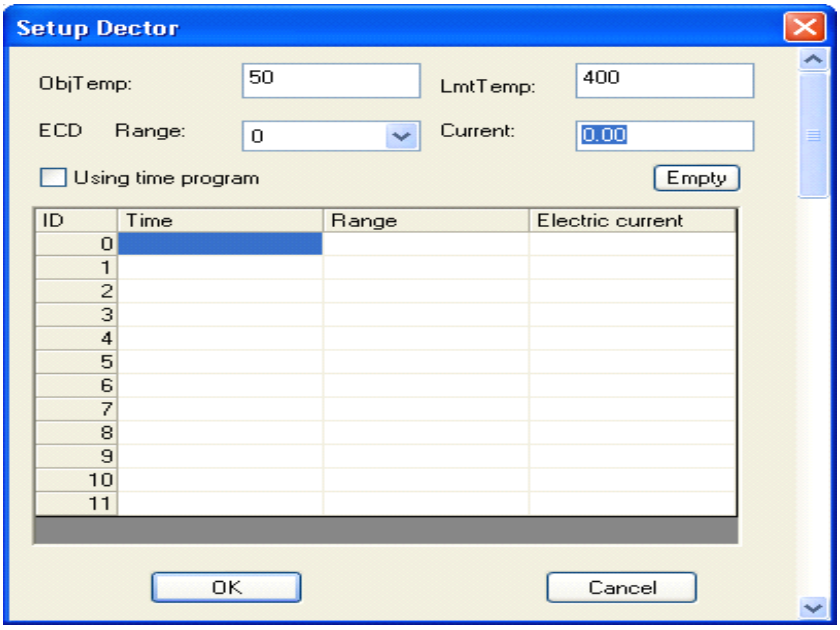
Current: Current range of the ECD detector. The current range of the ECD detector of the GC9790III gas chromatogram analyzer is divided into three positions which are 0, 1 and 2 respectively.

The current at position 0 is 0.5 nA;

The current at position 1 is 1 nA;

The current at position 2 is 2 nA.

The pull-down menu for the current range position of the ECD detector is as shown in the following figure :



The GC9790III gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. supports the range time program switching and current time program switching of the ECD detector, namely, analyzing the sample with different ranges and currents within different periods to obtain more accurate results.

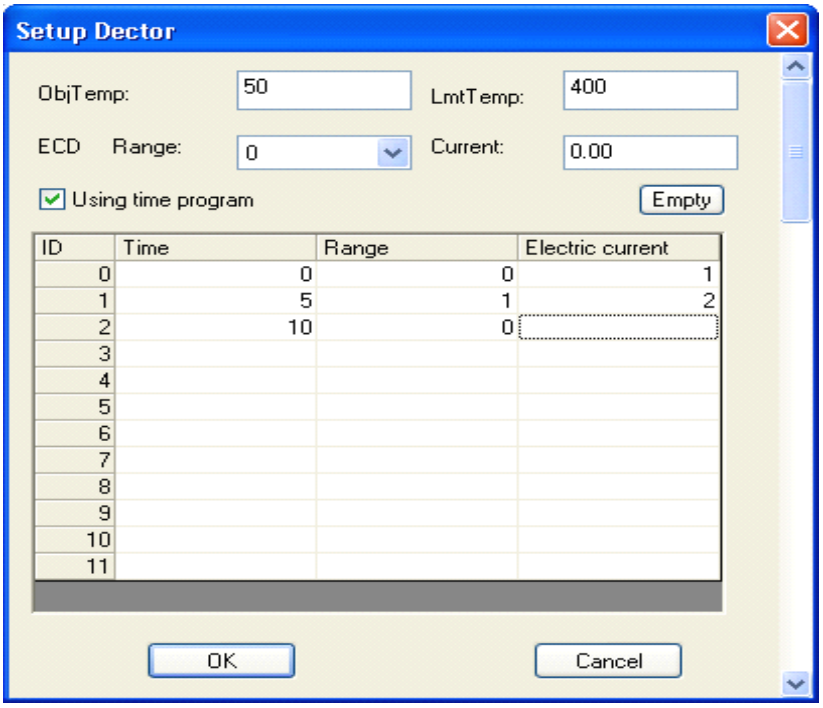
Left click the option [Use the time program] to perform switching between the fixed range and the range time program as well as between the fixed current and the current time program. When the option [Use the time program] is unselected, the TCD detector performs analysis of fixed range and fixed current; otherwise, it performs analysis of range time program and current time program.

If you want to activate the range time program or current time program of the detector, left click the option [Use the time program] to make it selected, as shown in the figure. 

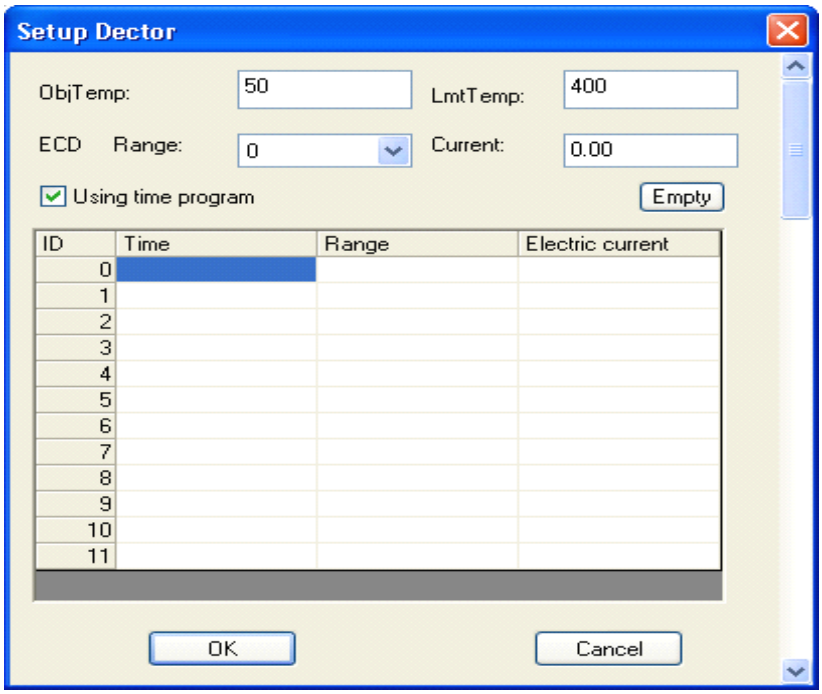
If you want to deactivate the range time program or current time program of the detector, left click the option [Use the time program] to make it unselected, as shown in the figure. 

All content in the time program column of TCD detector is available only after the option [Use the time program] is selected. The GC9790III gas chromatogram analyzer supports 12-step time program, so the time program column of FL9790

chromatogram workstation includes 12 setting options. Each option corresponds to a step of time program. Click the corresponding input box to input the set value. See the following figure for details.



With the button [Empty], one-click clearing of the content in the time program column of the detector can be realized. After clicking the button [Empty] in the above figure, it will turn to the following figure:



Input the ideal parameter values and left click the button [OK] to complete the setting of each parameter of the ECD detector. Then close the window [Set the

detector].

2.4.3.5.2 Control of the ECD Detector

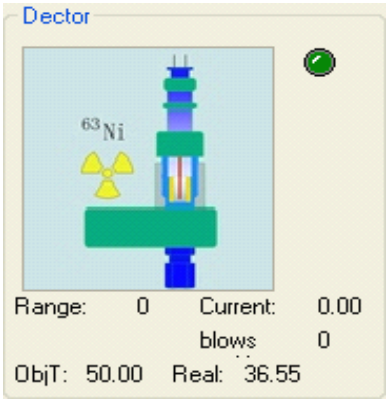
The control of the ECD detector mainly includes:
1. Temperature control of the ECD detector
2. Time program control of the ECD detector
I. Temperature control of the ECD detector
The temperature control of the detector is achieved by left clicking the icon [Heating switch] at the upper right corner of the detector icon.

When the temperature control of the detector is unavailable, the icon is green.

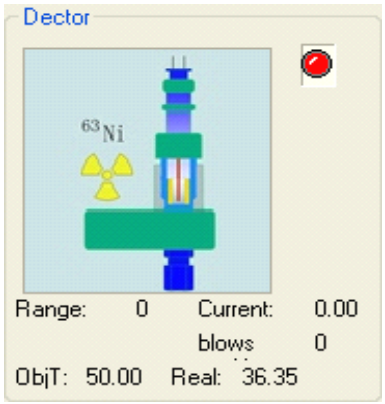
When the temperature control of the detector is available, the icon is red.

After left clicking the green icon [Heating switch], the icon immediately turns red, which indicates the temperature control begins. Left click the red icon [Heating switch] and the icon will immediately turn green, which indicates the temperature control is deactivated.
II. Time program control of the ECD detector
The time program control of the ECD detector is activated only after the sample injection is started. The control is achieved by sample injection operation. Only after the sample is injected to the sample injector, can the time program control of the ECD detector be executed.

2.4.3.5.3 Display of the ECD Detector Status



ECD detector control off



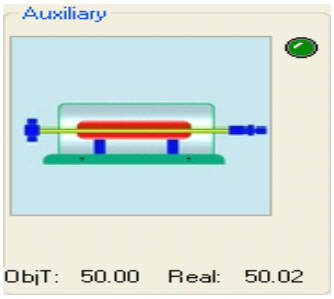
ECD detector control on

Range: Range used by the ECD detector at present

Current: Current used by the ECD detector at present
Sweeping flow: Value of sweeping flow (mL/min)
Temperature: Preset target temperature of the ECD detector (℃)
Observed: Observed temperature of the ECD detector (℃)
: Heating switch of the ECD detector

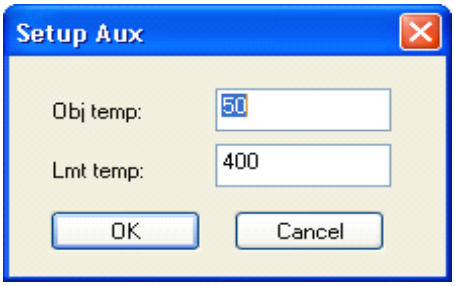
2.4.4 Anti-control of Auxiliary Furnace

The auxiliary furnace, as an out-mounted equipment of GC9790III gas chromatogram analyzer, plays an important role in the gas chromatogram. The anti-control window of the auxiliary furnace is given in the following figure.



2.4.4.1 Setting the Parameters of Auxiliary Furnace

Left click the auxiliary furnace icon  and the window [Set the auxiliary furnace] will pop up. You can set each parameter of the auxiliary furnace in this window. See the following figure for details.



Target temperature: Preset temperature of the auxiliary furnace (℃)
Limiting temperature: Protection temperature of the auxiliary furnace (℃)
[Attention: The target temperature shall be less than the limiting temperature; otherwise, an alarm will be given.]

Input the ideal parameter values and left click the button [OK] to complete the setting of each parameter of the auxiliary furnace. Then close the window [Set the auxiliary furnace].

2.4.4.2 Control of the Auxiliary Furnace

The control of the auxiliary furnace is simple, which only includes temperature control.

The temperature control of the auxiliary furnace is achieved by left clicking the

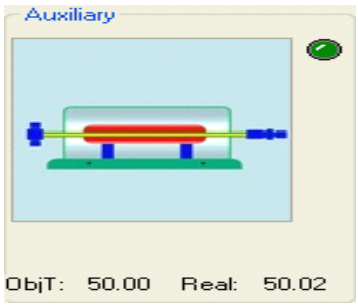
icon [Heating switch] at the upper right corner of the auxiliary furnace icon.

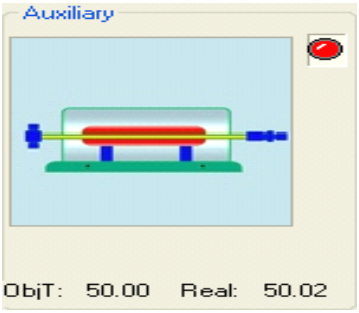
When the temperature control of the auxiliary furnace is unavailable, the icon is green.

When the temperature control of the auxiliary furnace is available, the icon is red.

After left clicking the green icon [Heating switch], the icon immediately turns red, which indicates the temperature control of the auxiliary furnace begins. Left click the red icon [Heating switch] and the icon will immediately turn green, which indicates the temperature control of the auxiliary furnace is deactivated.

2.4.4.3 Display of the Auxiliary Furnace Status





Auxiliary furnace control off Auxiliary furnace control on

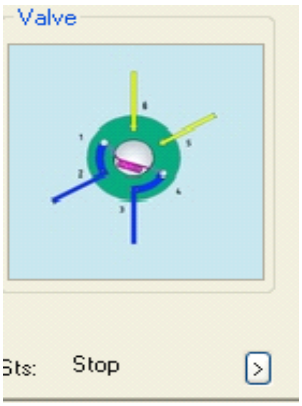
Temperature: Preset target temperature of the auxiliary furnace (℃)

Observed: Observed temperature of the auxiliary furnace (℃)

: Heating switch of the auxiliary furnace

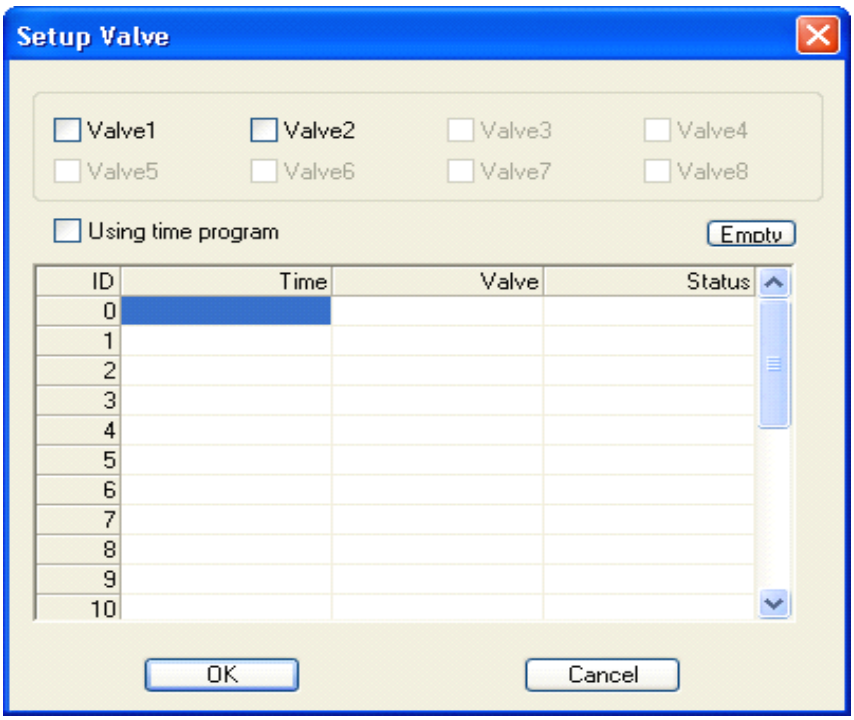
2.4.5 Anti-control of the Valve

The use of out-mounted control valves achieves a function expansion for the use of GC9790 III gas chromatogram analyzer. The anti-control window of the out-mounted control valves is given in the following figure.



2.4.5.1 Setting the Parameters of Valve

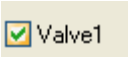
Left click the valve icon  and the window [Set the valve] will pop up. You can set each parameter of the out-mounted control valve in this window. See the following figure for details.



Valve 1: Out-mounted valve 1

Valve 2: Out-mounted valve 2

You can perform status switching by left clicking [Valve 1] or [Valve 2].

Selected valve 1, as shown in the figure 

Unselected valve 1, as shown in the figure 

The selected valve and unselected valve are under different status. You can open or close a valve by selecting or unselecting it. The out-mounted valves include normally opened valves and normally closed valves, so for anti-control of valve,

selecting a valve doesn't indicate this valve is opened. The valve may be opened or closed depending on its type. However, it is certain that the selected valve and unselected valve are under different status.

：Example:

If there is an out-mounted valve 1 and it is closed when it is not selected, when you select valve 1 in the window [Set the valve], it will be opened.

The GC9790Ⅲ gas chromatogram analyzer from FULI ANALYTICAL INSTRUMENT CO., LTD. supports the time program switching of valve, namely switching the out-mounted valve between opening status and closing status within different periods to obtain more accurate results.

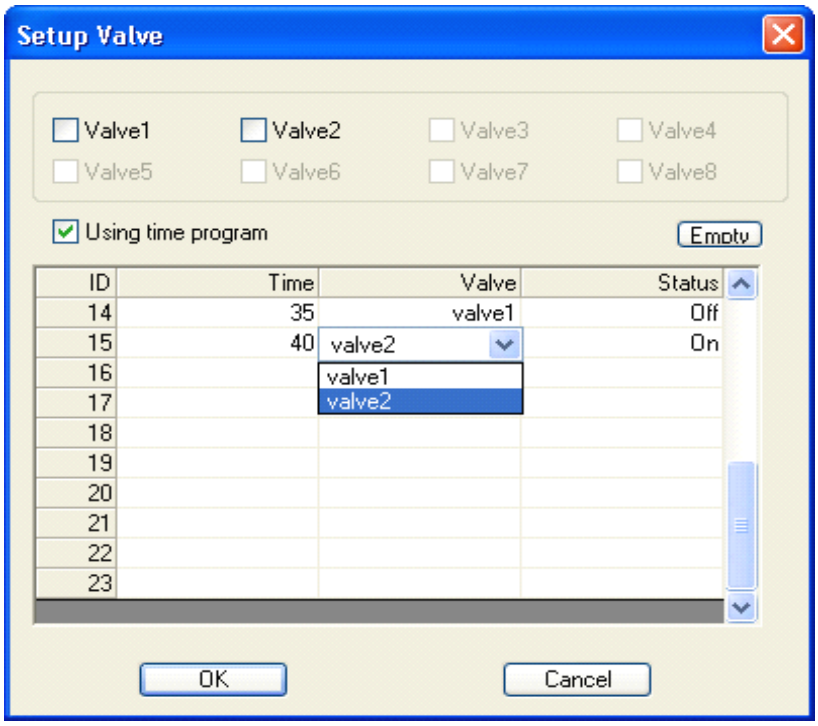
Left click the option [Use the time program] to activate the time program for valve status switching. When the option [Use the time program] is unselected, the valve performs analysis of fixed status; otherwise, it performs analysis of time program for valve status switching.

If you want to activate the time program for valve status switching, left click the option [Use the time program] to make it selected, as shown in the figure. 

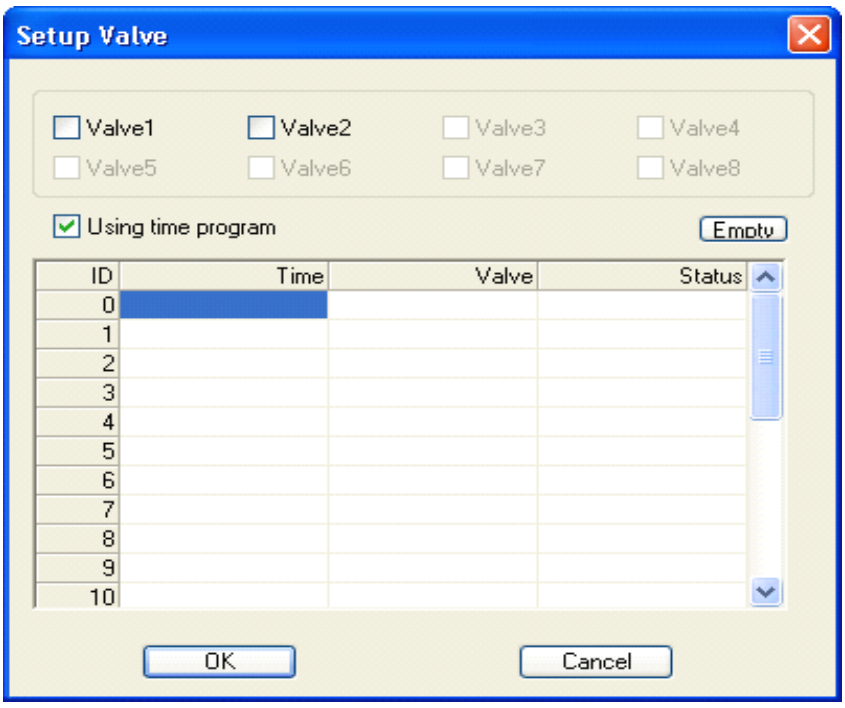
If you want to deactivate the time program for valve status switching, left click the option [Use the time program] to make it unselected, as shown in the figure 

.

All content in the time program column for valve status switching is available only after the option [Use the time program] is selected. The GC9790Ⅲ gas chromatogram analyzer supports 24-step time program, so the time program column of FL9790 chromatogram workstation includes 24 setting options. Each option corresponds to a step of time program for valve status switching. Click the corresponding input box to input the set value. See the following figure for details.



With the button [Empty], one-click clearing of the content in the time program column for valve status switching can be realized. After clicking the button [Empty] in the above figure, it will turn to the following figure:



Input the ideal parameter values and left click the button [OK] to complete the setting of each parameter of the auxiliary furnace. Then close the window [Set the valve].

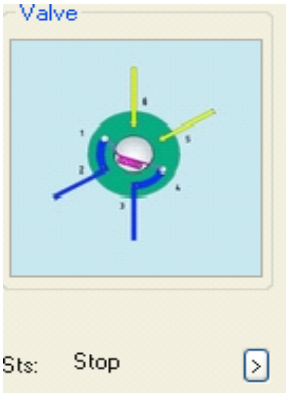
2.4.5.2 Control of the Valve

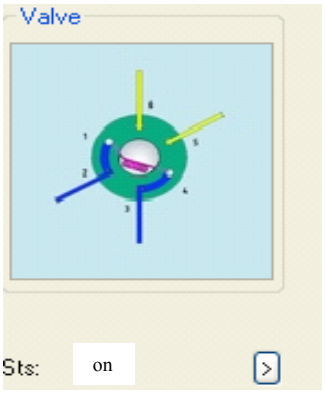
The control of the valve mainly includes two modes:

1. Fixed valve status switching mode: opening or closing the valve by selecting or unselecting. Its control will be immediately effective after each parameter of the auxiliary furnace is set.

2. Time program for valve status switching: changing the time status of the valve periodically using the time program in the process of sample injection. The control of time program for valve status switching is activated only after the sample injection is started. The control is achieved by sample injection operation. Only after the sample is injected to the sample injector, can the time program control for valve status switch be executed.

2.4.5.3 Display of the Valve Status





Valve control off Valve control on

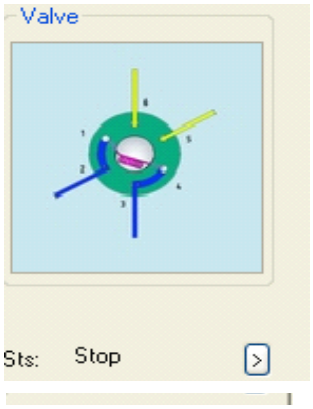
Status: Current operation status of the out-mounted valves

: Instrument alarm list (See 2.4.6 Instrument alarm list for details.)

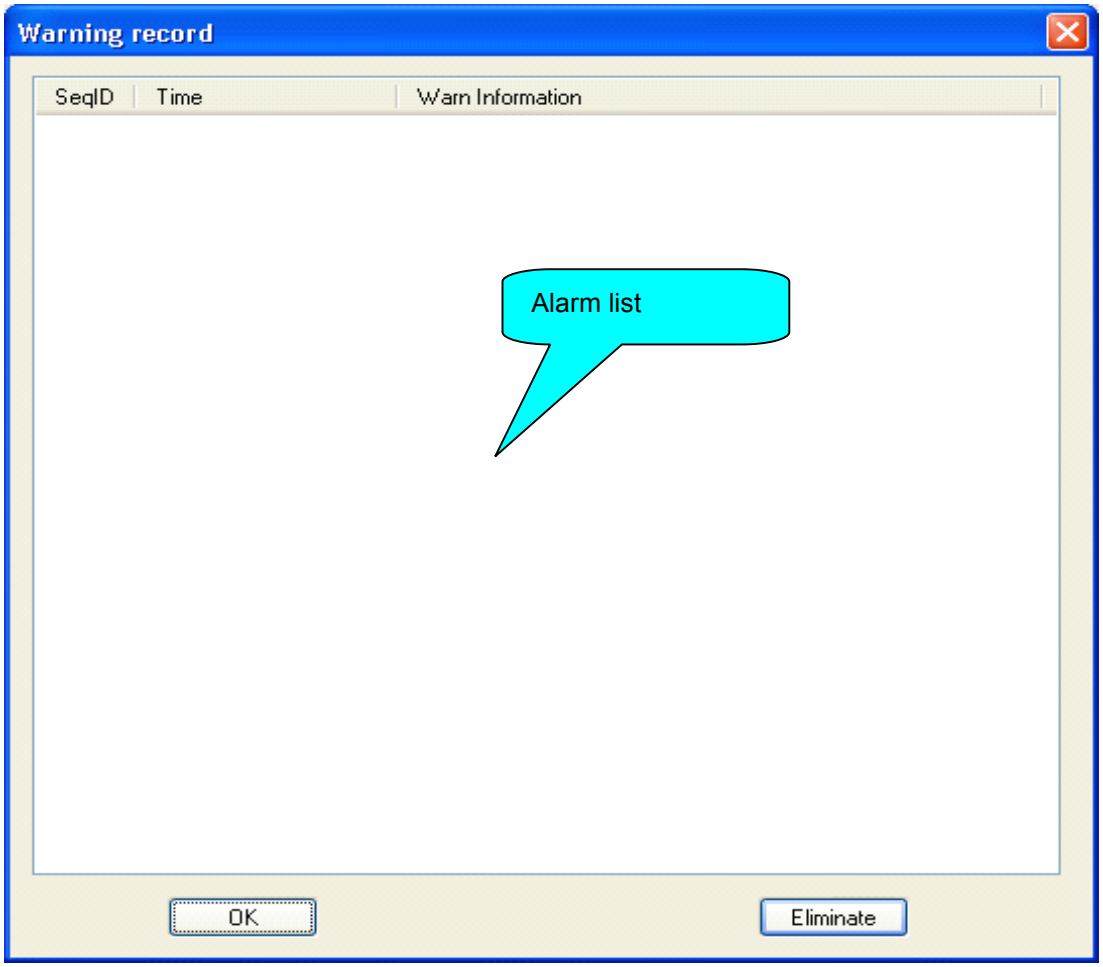
2.4.6 Instrument Alarm List

In case of any misoperation or instrument fault during the operation of GC9790III gas chromatogram analyzer, FL9790 chromatogram workstation will receive some alarm information. Such information will be recorded so that the users or maintenance personnel can browse it for faster instrument fault locating and repair.

Left click the button at the lower right corner of the window [Valve]. See the following figure for details.



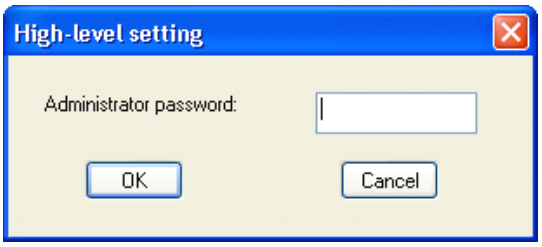
The window [Alarm record] will pop up. See the following figure for details.



From this window, you can browse the details related to alarm such as alarm type and accurate time.

Left click the button [OK] to close the window [Alarm record].

Left click the button [Empty] and the window [Advanced setup] will pop up. See the following figure for details.



The operation of the button [Empty] is available only after the administrative password is input. In order to make the maintenance personnel correctly judge the fault of the faulty instrument, this function is inaccessible to the users.

2.5 Sample Injection and Analysis

2.5.1 Sample Injection and Sampling

1. Starting the FL9790 chromatogram workstation program

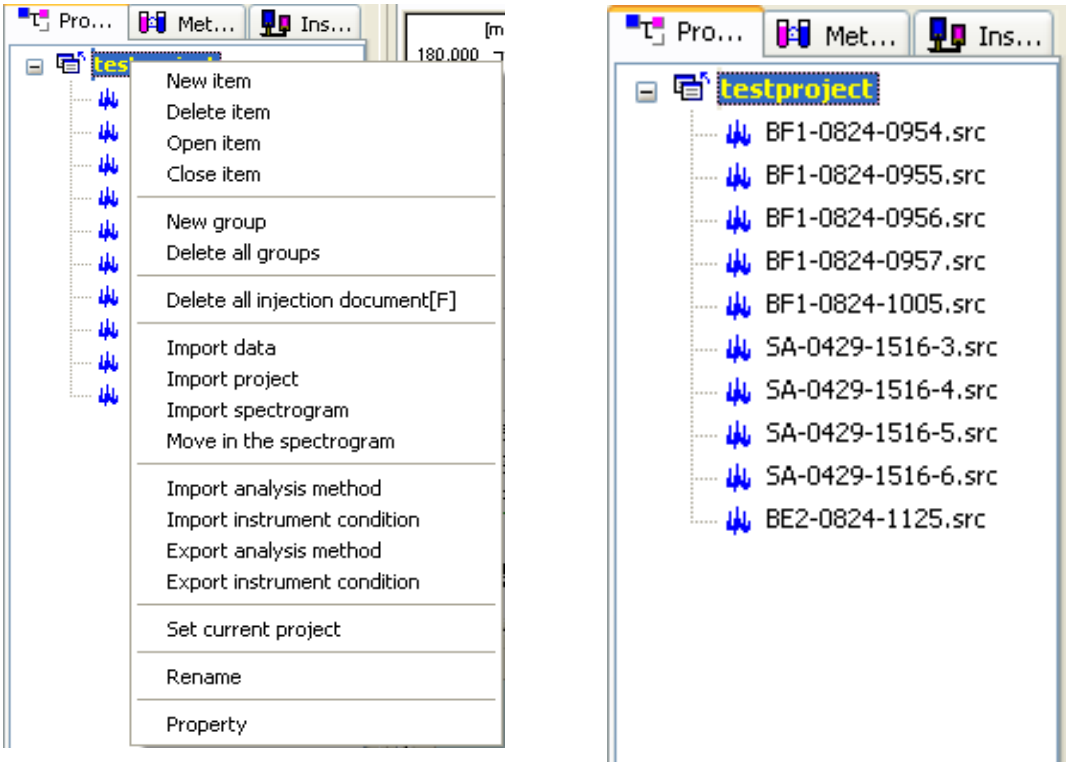
Select the Windows [Start]-[Program]-[FL9790 chromatogram workstation], and click FL9790;

Or, double click the desktop FL9790 shortcut, and activate the FL9790 chromatogram workstation program.

2. Create a new project; see 2.3 New Project Creation in page 11 for details.

Set the new project as the current project.

Select the [Project] page in the [Project window], and select the newly-established project. After that, right click the pop-up menu to select the [Current project settings]. After settings are completed, the new project font will be changed to blue color for display. See the following figure for details:



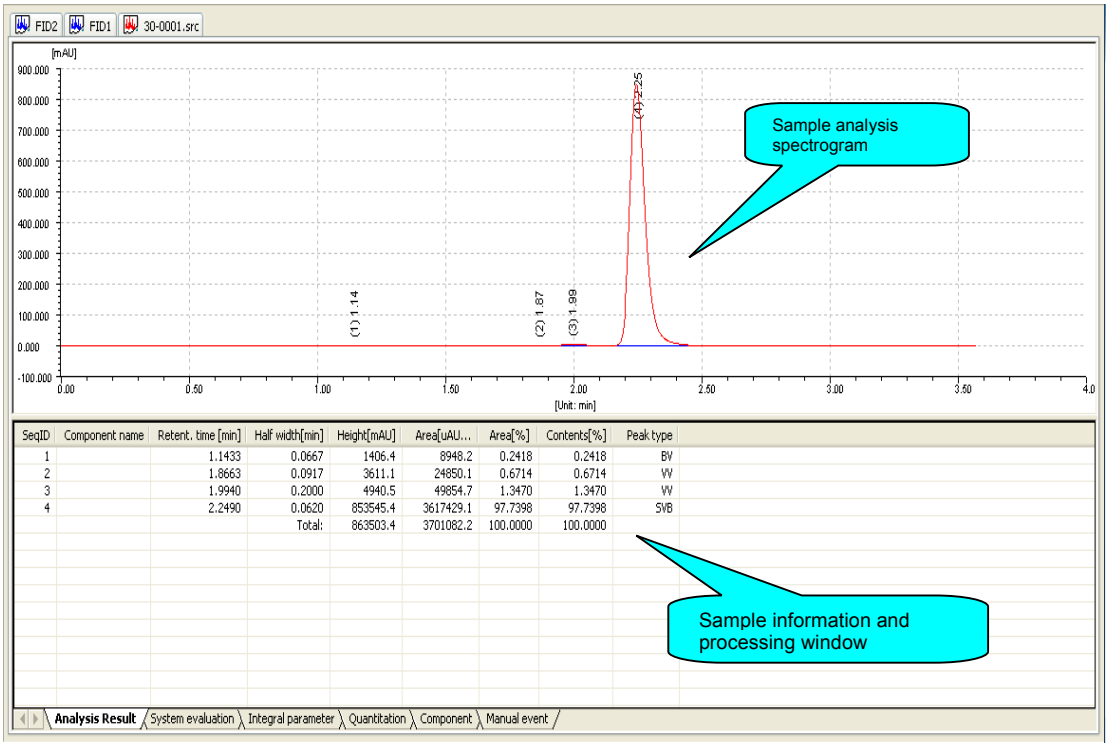
4. On the analysis requirements of the sample, set all parameters of the type GC9790 III chromatography instrument, so as to make it be qualified.

5. Inject the sample into the sample injector; the FL9790 chromatogram workstation will automatically start to record the sampling data.

6. After the sample analysis is completed, manually stop the data sampling of the FL9790 chromatogram workstation.

And, left click the [Stop] button 

of the standard toolbar; the sampling data will be automatically saved to the current project. See the following figure for details:

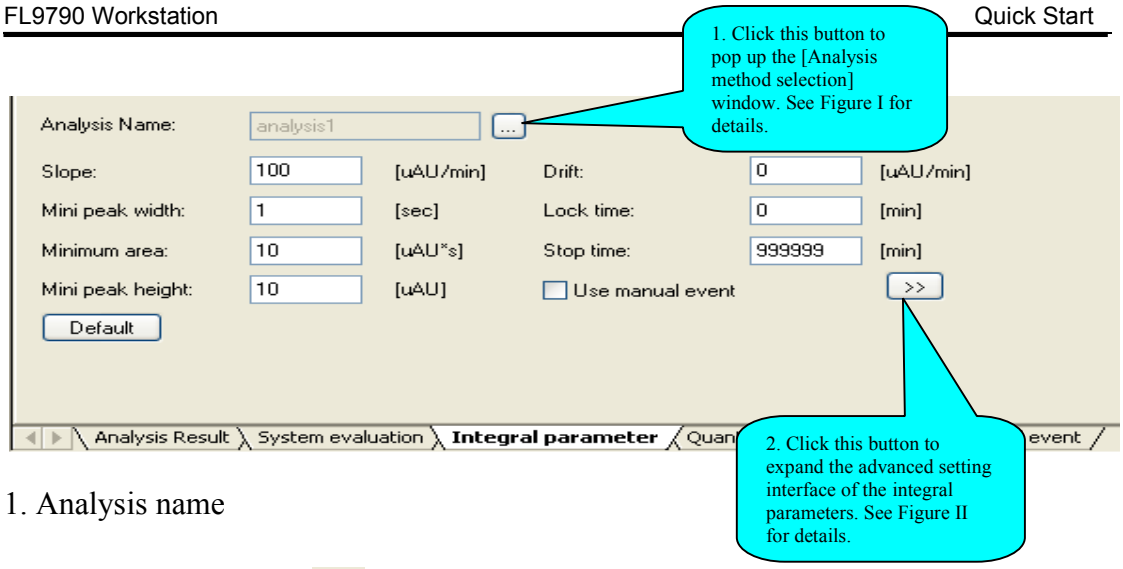


Standard Sample X Spectrogram

2.5.2 Settings of Integral Parameter

As variations of the instrument conditions and the sample component, the preset analysis method fails to accurately analyze each sample peak. Here, we can achieve an ideal analysis result through the post-processing of the spectrogram. Furthermore, the post-processing of the spectrogram will not modify the real data of the workstation or impact the authenticity of the spectrogram, which is a basic requirement for a superior workstation.

See the following figure for details of the setting interface of the integral parameter:



1. Analysis name

Left click the button  , and the [Analysis method selection] window will be popped up. By means of this window, the existing analysis method can be switched to an ideal analysis method. See Figure I for details:

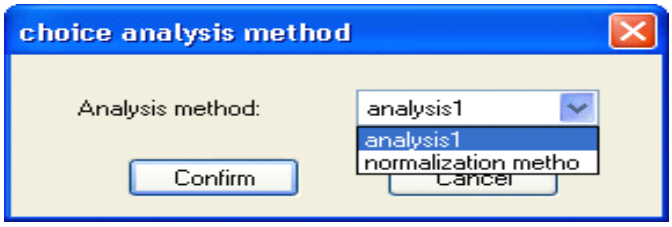


Figure I

Left click the button  , and open the advanced option of the integral parameter. See Figure II for details:

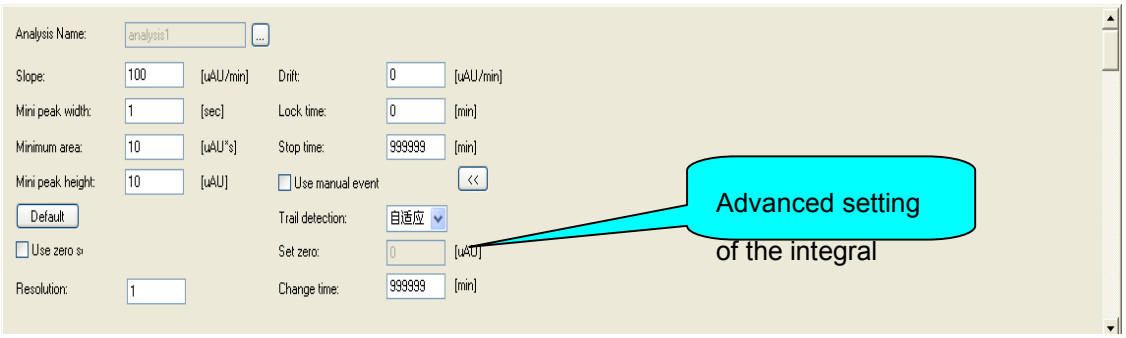
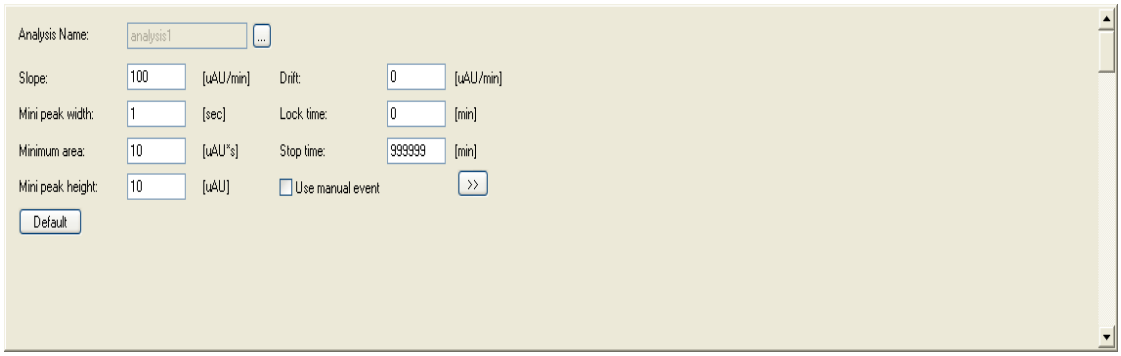


Figure II

Left click the button  , and close the advanced option of the integral parameter. See Figure III for details:



2. Slope

The slope is also called as the peak detection sensitivity. When the waviness during the spectrogram analysis is larger than such value, the peak processing program will be deemed as the peak shape; otherwise, if it is smaller than such value, it will be deemed as the normal fluctuation of the baseline. And, the slope is one of the most important ones in the peak processing parameter. (Unit: microvolt/minute)

3. Minimum peak width

The minimum peak width is one of the most important ones in the peak processing parameter. On the basis of such value, the peak processing program will forecast the peak shape in the analysis process and adopt the condition very suitable for this peak for processing. Accordingly, the smaller the difference between the minimum peak width setting and the actually-analyzed half-peak width is, the more precise the analysis result is. The parameter of the minimum peak width setting shall be consistent with the actually-analyzed half-peak width value as much as possible, which can be achieved by setting the peak width value according to the half-peak width or slightly smaller one of the peak with the minimum width of the actual spectrogram. The unit of the minimum peak width is S (second).

4. Minimum area

After above parameters are set, some irrelative small peaks can't be deleted yet; however, some proper minimum area values can be set for deletion. The peak which is smaller than such value in the processing result shall be deleted, which will not be used in the following quantitative calculation, and the unit is (microvolt*second).5. Minimum peak height

The minimum peak height is also the same as the minimum area, which will be used as the filter condition for deleting some irrelative small peaks. The peak which is shorter than such value in the processing result shall be deleted, which will not be used in the following quantitative calculation, and the unit is (microvolt).6. Default parameter

If the button is pressed, the analysis parameter will be set to the default value.7. Application of zero setting

During the sampling process, press the zero setting button of the standard toolbar; make the recorded current sampling value as one offset, and the sampling curve will

make zero setting. Here, the function of the applied zero setting in the recorded spectrogram is marked; if you want to check current real experimental data, this tagged value can be removed, and your can find out that the curve varies upwards and downwards.8. Resolution

Generally, the default is 1, which needs of no variation. If the value is increased, some small peaks can be filtered; if the value is reduced, the small peak can be identified. The parameter is mainly used to improve the precision of the automatic identification peak.9. Drift

It means the range of the baseline variation. This value can be set as 0 or nonzero value, and the unit is (microvolt/minute).10. Lock time

The default is set as 0, which means that the data are analyzed since the sample injection. If this parameter is varied, it means that no sample injection analysis is made during the period prior to setting values, and the unit is (minute).11. Stop time

The default is set as 999999, and the parameter is used for automatically stopping analysis. The data will not be used in the following sample injection, and the unit is (minute).12. Application of manual event

During the peak identification process, the data sample injection analysis in the manual event list will be applied.13. Tailing detection

It is an important parameter of the tailing peak identification, and following three methods of “self-adaption”, “weakness detection”, and “intensity detection” are available.14. Parametric variation time

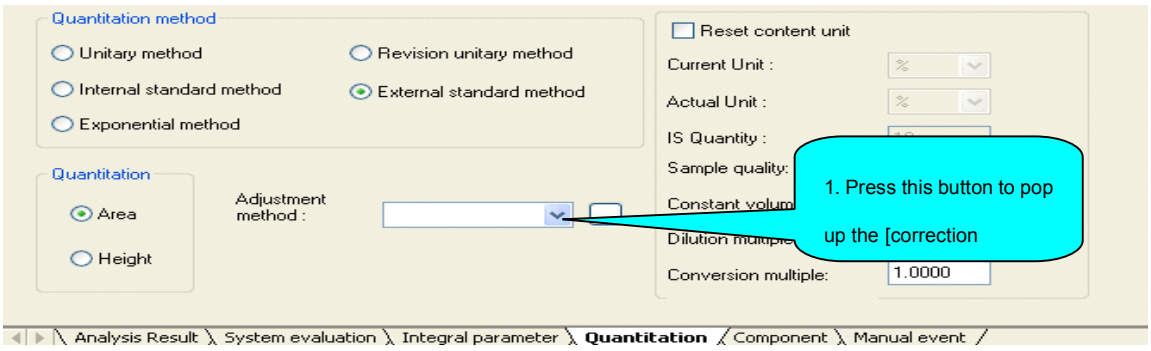
The default is set as 999999, and set the parametric variation time as the value beyond the default value. Since this time, change the peak detection sensitivity to 2 times of the original value, and automatically reduce the peak width to 1/2 of the original value, and the unit is (minute).

Attention: After setting the integral parameter, left click the [Analysis] button 

of the standard toolbar, and the integral parameter will become effective formally.

2.5.3 Settings of Quantitative Parameter

The quantitative parameter is one property page of the analysis method, and the quantitative parameter interface is as follows:



Set the quantitative benchmark, and determine if the area or height is applied for the content calculation.

Set the quantitative method, and determine which one of five quantitative methods is applied for the content calculation.

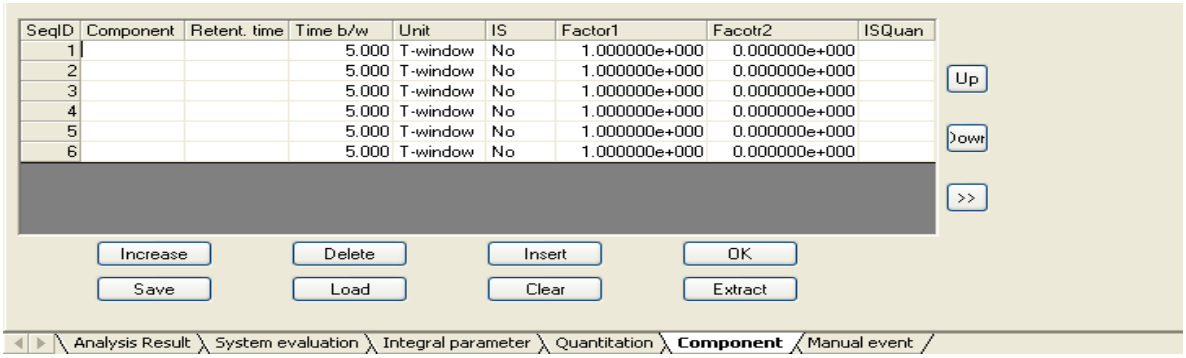
Set the sample amount and internal standard group quantity, which shall be set when the internal standard method is applied for analysis. Further, these two values shall also be used in the content calculation formula.

Set the correction method; after changing the correction method, the correction factor 1 and correction factor 2 in the component form as well as the content calculation results will be impacted.

2.5.4 Settings of Component Form

The component form is one property page of the analysis method; after setting the component form, the system will automatically identify the component on the basis of the retention time, time window, and time slot settings of the component in the current component form. If the component is identified, its name shall be correctly displayed in the component name column of the analysis result page.

See the following figure for details of the setting interface of the component form:



2.5.4.1 Introduction to Functions of the Component Button

1.[Add] Add one line in the component form.
2.[Delete] Delete one selected-line component in the component form.
3.[Insert]Insert-line prior to the current position in the component form.
4.[OK] Confirm the current input component line, and the system will automatically fill the default settings into the column which is not entered.
5.[Save component] Save the current component form to the component file.
6.[Load component] Load the saved component file in the current component form.
7. [Empty component]Empty the current component form, and all the entered information will be emptied.8. [Peak extraction]

Extract the retention time of all peaks in the current analysis result, and fill in the component form. If the name in the analysis result is empty, the default component name will be component 1 and component 2 in turn.9. [Move up]

Move up one selected line in the component form by one line; if the correction is made by the internal standard method, the component of the internal standard shall be moved to the first line. 10. [Move down]

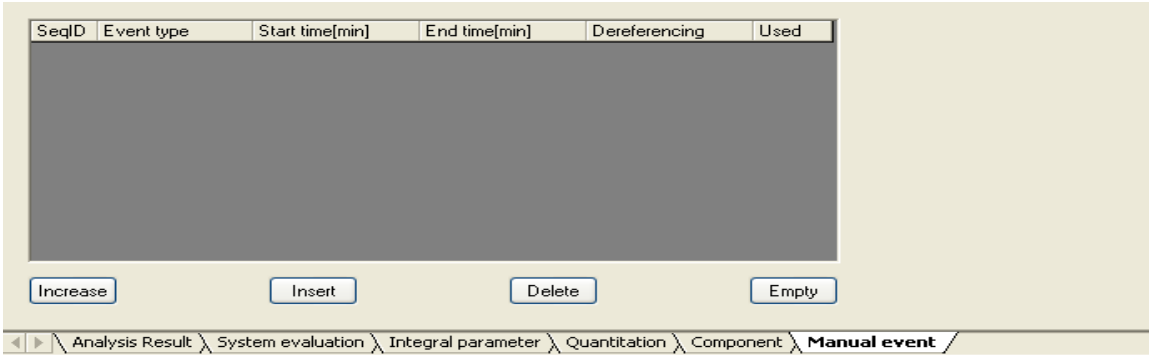
Move down one selected line in the component form by one line.2.5.4.2 Component listThe component list is composed of the [Serial number], [Component name], [Retention time], [time slot/window], [Unit], [Internal standard], [Factor 1], [Factor 2], and [Internal standard quantity].Serial number: It is numbered based on the retention time of the sampling peak. The one with short time will be followed by the one with long time.Retention time: Unit (minute);Time slot/window: Time slot, unit (minute); time window, unit (%);Unit: The time slot/time window can determine the significance of the retention data in the previous column;Internal standard substance: It can determine if the current component is the internal standard.

Factor 1: Correction factor, which can be inputted manually or saved in the sample file by the correction calculation.

Factor 2: Correction factor, which can be inputted manually or saved in the sample file by the correction calculation.2.5.5 Settings of Manual EventThe manual event is a kind of manual event program which is set for segmentation of the peak processing program.

If the general peak processing parameters act on the whole spectrogram analysis and individual peaks are not accurately identified or the baseline is wrongly cut, the parameter can be segmentally set or the baseline can be cut by the manual event program command. For example: When the peak width is set as 5, the wider peak in the whole spectrogram can't be identified; however, when the peak width is set as 10, such peak can be identified. In order not to impact the small peak identification, the manual event program can set the peak width of the time period which contains the unidentified peak as 10 and that of other time periods as 5.

The manual event setting window is the same as that of the manual event. See Figure I for details:



Manual Event Figure I

Introduction to functions of the manual event button

1. [Add]

Add one new manual event operation.

2. [Insert]

Insert one new manual event operation before the selected manual event operation in the manual event list.

3. [Delete]

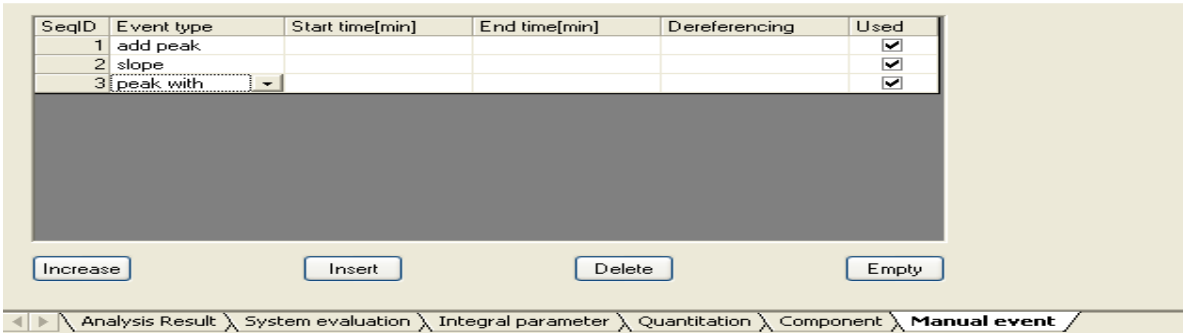
Delete one selected manual event operation project.

4. [Empty]

Delete all manual event operation projects in the manual event list.

All parameters in the manual event operation project

Each manual event operation project in the manual event list consists six parameters, including the [Serial number], [Event type], [Start time], [End time], [Valuing], and [Application].



1. Serial number: The number will be given based on the sequence of the generation time; the first one will be numbered as 1 and the second one will be numbered as 2, and the rest may be deduced by analogy.

2. Event type: It is the manual operation command type, and there are 16 kinds of commands in all. These commands can change the peak processing parameters or forcedly disturb process of normal peaks and make the shape process of some peaks with special requirements. The following pull-down menus can be applied for selection.3. Start time: It is the corresponding start time of the manual event operation project command, and the unit is (minute).4. End time: It is the corresponding end time of the manual event operation project command, and the unit is (minute)

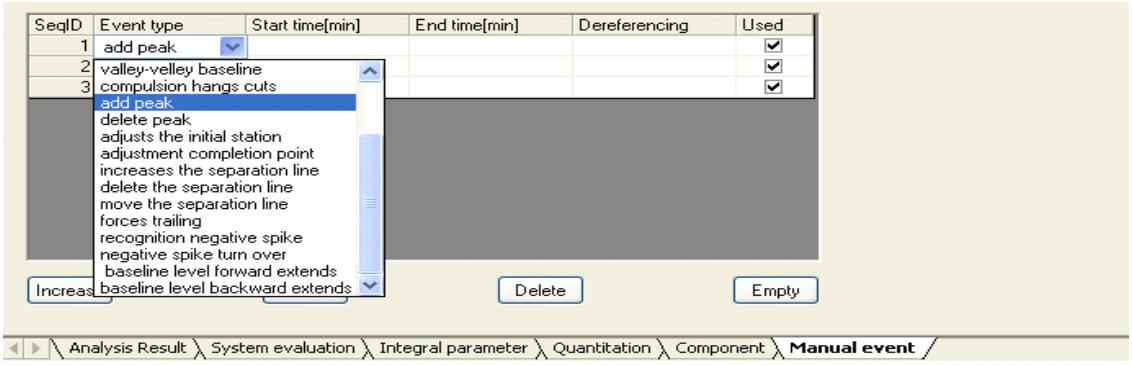
5. Valuing: It is the value set by the manual event operation project command, and its unit is the same as that of the peak processing parameters.

6. Application: The default is the selected status, which shows the command to execute this manual event operation project. The parameter settings in the manual event program can determine if the manual event operation project is used for the manual operation.

Note: All operations under manual processing will be automatically recorded in the time program, and the activation of the manual integration can be selected in the integral parameter page. If it is necessary to set the manual event program, the prior selection of the applied manual event shall be made in the integral parameter page.

All parameters of the [Event type] in the manual event operation project

There are 16 kinds of parameters of the [Event type] in the manual event operation project, which show 16 kinds of commands of 16 kinds of peak processing.



1. [Peak width]

If the current peak width value is set within the time period from start to end, the value is the set peak width value, and the unit is (second).

2. [Slope]

If the current slope value is set within the time period from start to end, the value is the set slope value, and the unit is (microvolt/minute).

3. [Drift]

If the baseline size is changed within the time period from start to end, the value can be set as 0 or nonzero value, and the unit is (microvolt/minute).

4. [Minimum area]

If the current minimum area is set within the time period from start to end, the value is the set minimum area, and the unit is (microvolt*second).

5. [Lock time]

The value is the set lock time, and the start time and end time are useless. And, when selecting the applied manual event in the integral parameter, the lock time in the manual event prevails (the lock time can also be set in the integral parameter).

6. [Valley-valley baseline]

The baseline forces the valley-valley baseline within the time period from start to end, which is not subject to the impact of the drift set value. And, the valuing parameter is 0, which is insignificant.

7. [Compulsory vertical cutting]

The baseline forces the horizontal baseline within the time period from start to end, which is not subject to the impact of the drift set value. And, the valuing parameter is 0, which is insignificant.8. [Peak increase]One peak is added within the time period from start to end, and the valuing parameter is 0, which is insignificant.

9. [Peak deletion]All peaks are deleted within the time period from start to end, and the valuing parameter is 0, which is insignificant.10.[Start point adjustment]Adjust the start point of the peak as the set value of the start time, and other parameters are 0, which are insignificant.11.[End point adjustment]

Adjust the end point of the peak as the set value of the start time, and other parameters are 0, which are insignificant.12.[Add line-between]Add one vertical line-between at the value set by the start time, and other parameters are 0, which are insignificant.13.[Delete line-between]

Delete one vertical line-between at the value set by the start time, and other parameters are 0, which are insignificant.14.[Move line-between]

Move the line-between to the value set by the start time, and other parameters are 0, which are insignificant.15.[Compulsory tailing]Make the tailing peak processing within the time period from start to end; however, the command that the tailing peak is judged according to the "tailing detection" in the "integral parameter" is neglected.16. [Negative peak identification]Make the negative peak identification within the time period from start to end.

2.5.6 Analysis Result

After a series of analysis or adjustment, the spectrogram analysis has become ideal. Through the [Analysis result] page, all analysis results of the sample can be viewed.

SeqID	Component name	Retent. time [min]	Half width[min]	Height[mAU]	Area[uAU...	Area[%]	Contents[%]	Peak type
1		0.0503	0.0607	12.6	41.5	0.0011	0.0011	BV
2		0.0967	0.1763	12.3	108.4	0.0029	0.0029	VV
3		1.1433	0.0667	1406.4	8948.2	0.2416	0.2416	BV
4		1.2500	0.0840	764.4	3630.1	0.0980	0.0980	VV
5		1.3960	0.1523	332.8	3175.9	0.0857	0.0857	VV
6		1.6960	0.0920	284.8	1617.8	0.0437	0.0437	VV
7		1.8663	0.0917	3611.1	20050.3	0.5413	0.5413	VV
8		1.9940	0.2000	4940.5	49854.7	1.3459	1.3459	VV
9		2.2490	0.0620	853544.3	3613450.0	97.5474	97.5474	SVV
10		2.9357	0.0947	176.1	895.6	0.0242	0.0242	TBV
11		3.0640	0.0783	408.1	2049.1	0.0553	0.0553	TVB
12		3.2343	0.0977	68.3	479.9	0.0130	0.0130	TBB
			Total:	865561.6	3704301.7	100.0000	100.0000	

Analysis Result | System evaluation | Integral parameter | Quantitation | Component | Manual event

The analysis result list includes 9 kinds of parameters, that is: [Peak sequence], [Component name], [Retention time], [Half-peak width], [Peak height], [Peak area uv*s], [Peak area %], [Content], and [Peak type].

2.5.7 System Evaluation

Through the [system evaluation], the system evaluation of the sample injection can be viewed; further, it can be made as a standard to evaluate the effectiveness of the sample injection.

SeqID	Component name	Retent.time[min]	Half width[min]	Oretical plate number	Degree of dissociation	Tailing factor
1		0.0503	0.0607	3	0.000	0.739
2		0.0967	0.1763	1	0.230	4.809
3		1.1433	0.0667	1629	5.071	0.686
4		1.2500	0.0840	1226	0.834	1.544
5		1.3960	0.1523	465	0.727	1.970
6		1.6960	0.0920	1882	1.446	0.766
7		1.8663	0.0917	2296	1.092	0.734
8		1.9940	0.2000	550	0.515	1.520
9		2.2490	0.0620	7289	1.146	1.321
10		2.9357	0.0947	5327	5.161	0.808
11		3.0640	0.0783	8476	0.873	1.066
12		3.2343	0.0977	6075	1.140	1.123

Analysis Result | System evaluation | Integral parameter | Quantitation | Component | Manual event

The system evaluation list includes 7 kinds of system evaluation parameters, that is: [Peak sequence], [Component name], [Retention time], [Half-peak width], [Number of theoretical plates], [Resolution], and [Tailing factor].

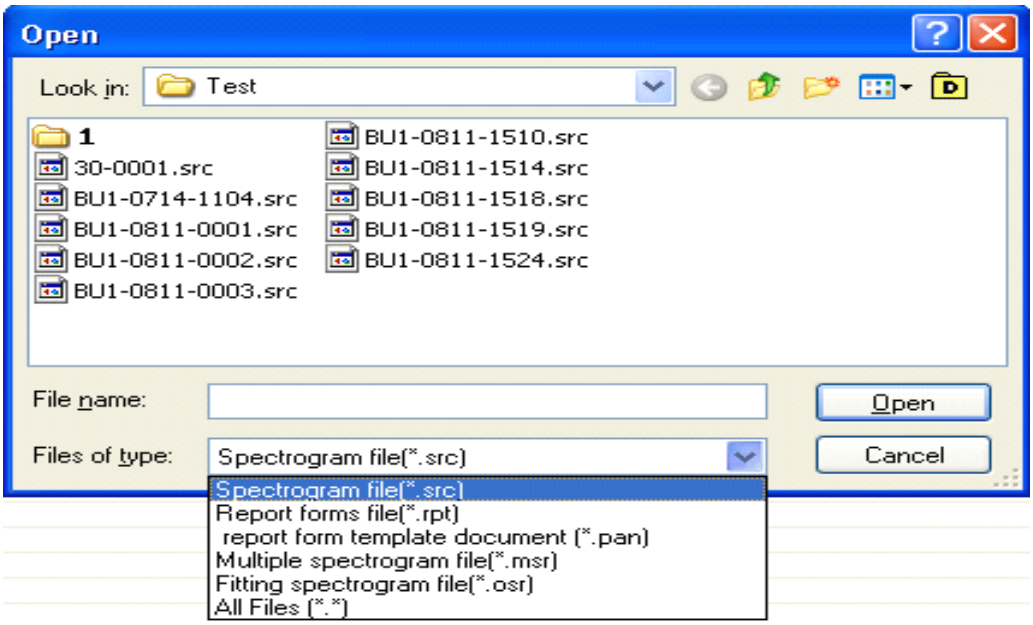
3. Spectrogram Processing

3.1 Toolbar Application

3.1.1 Standard Toolbar

1. New: Create a project, and activate the new project wizard mode. The user can create a self-owned project based on the system prompt.

2. Open: Pop up the [Open] dialog. There are six kinds of file types, including: the spectrogram file, statement file, statement template file, multiple spectrogram file, fitting spectrogram file, and all files.



[Open] Dialog

3. Save: Save files.4. Preview: Preview a statement file.5. Print: Print statement files.6. Correction: Open the correction window. Create or modify the correction method, and calculate correction factors following the sample injection.

7. Statement: After opening one spectrogram file, the statement button will be activated. Further, after clicking the statement button, the statement will be automatically generated based on original relevant conditions. If the new statement shall be generated, reset relevant conditions in the “statement setting” of the “option”; after that, click the statement button, and the new statement will be re-generated.8. Project: Under the down status, the project window will be displayed; under the pop-up status, the project window will be hidden. Under the

default status, the project window will be displayed. And, left click the [Project] button for status switchover.

9. Instrument: Under the down status, the anti-control window of instrument will be displayed; under the pop-up status, the anti-control window of instrument will be hidden. Under the default status, the anti-control window of instrument will be displayed. And, left click the [Instrument] button for status switchover.10. Integration: Under the down status, the sample injection will make the real-time integration; under the pop-up status, the sample injection will not make the real-time integration. Under the default status, the real-time integration will be made. And, left click the [Instrument] button for status switchover.11. Start: Under the down status, it will begin to record the sample injection curve.

12. Stop: Under the down status, it will stop to record the sample injection curve, and generate a new sample injection file under the current project. If the stop button is pressed, the start button will pop up, which means that the sample injection is ended.13. Cancel: Under the down status, it will cancel the recording of sample injection curve, and generate a new sample injection file under the current project. If the cancel button is pressed, the start button will pop up, which means that the sample injection is cancelled.14. Standard sample, specimen, and baseline: Only one of these three buttons can be selected, which means the sample injection type. If first two modes are applied for setting the spectrogram file name, it will impact the selection of initial letters of the sample injection file name. For the standard sample and spectrogram files, the initial letter is S; for the specimen and spectrogram files, the initial letter is T; for the baseline and spectrogram files, the initial letter is B. If the spectrogram file name is set as the customized definition, there will be no impact on the spectrogram file name. (The spectrogram naming can only be made as a specification; no compulsory requirements will be made. It means that, the naming mode of all spectrograms is related to the name difference, and no substantial difference will be involved. For example, you can make the spectrogram file with the initial letter of B as the sample file for processing.)

15. Analysis: After opening one spectrogram file, the button will be activated. Under the down status, the re-analysis will be made to the sample injection. And, after adjusting the analysis parameter, the button shall be pressed again for re-analysis.

16. Parameter: After opening one spectrogram file, the button will be activated. Under the down status, the new analysis parameter of the spectrogram file will be saved in the project file.17. Zero setting: After pressing the zero setting, the baseline will return to the zero point.18. Channel: Insignificant.19. Connection: Based on the existing setting, reconnect the FL9790 workstation with the type GC9790 III instrument.3.1.2 Spectrogram ToolbarThere are various kinds of spectrogram process tools in the spectrogram toolbar. See the following figure for details:

 : Peak increase by manual mode

 : Peak deletion by manual mode

 : Adjusting the baseline of certain time period to the valley-valley baseline by manual mode.

 : Adjusting the baseline of certain time period to the vertical line-between by manual mode.

 : Compulsory tailing process by manual mode.

 : Adjustment of the peak start point by manual mode.

 : Adjustment of the peak end point by manual mode.

 : Adding of vertical line-between by manual mode.

 : Deletion of vertical line-between by manual mode.

 : Movement of vertical line-between by manual mode.

 : Identification of negative peak by manual mode.

 : Movement of spectrogram

 : Spectrogram window zoom in along the X axis

 : Spectrogram window zoom out along the X axis

 : Spectrogram window zoom in along the Y axis

 : Spectrogram window zoom in along the Y axis

 : Spectrogram window goes to homepage

 : Spectrogram window goes to previous page

 : Spectrogram window goes to next page

 : Spectrogram window goes to last page

 : Time zeroing

 : Baseline zeroing

 : Spectrogram panorama

 : Spectrogram window returns to previous zoom window

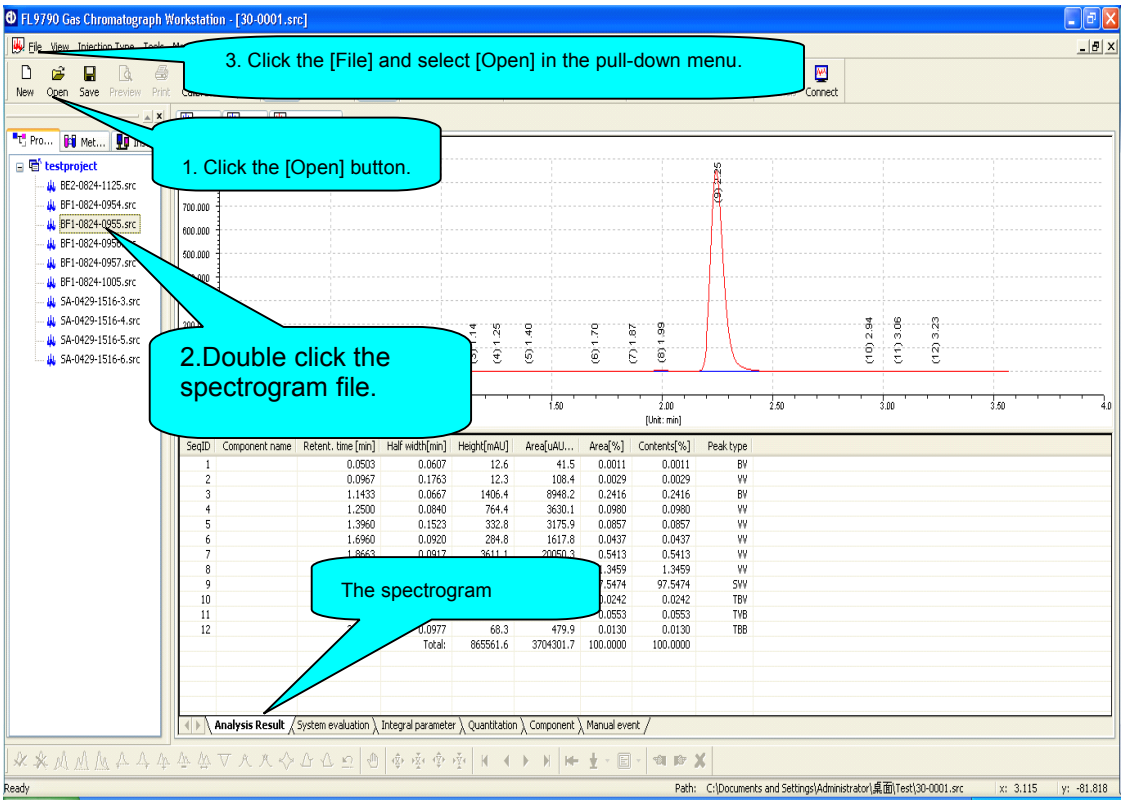
 : Spectrogram window returns to next zoom window

Spectrogram window clears all zoom windows

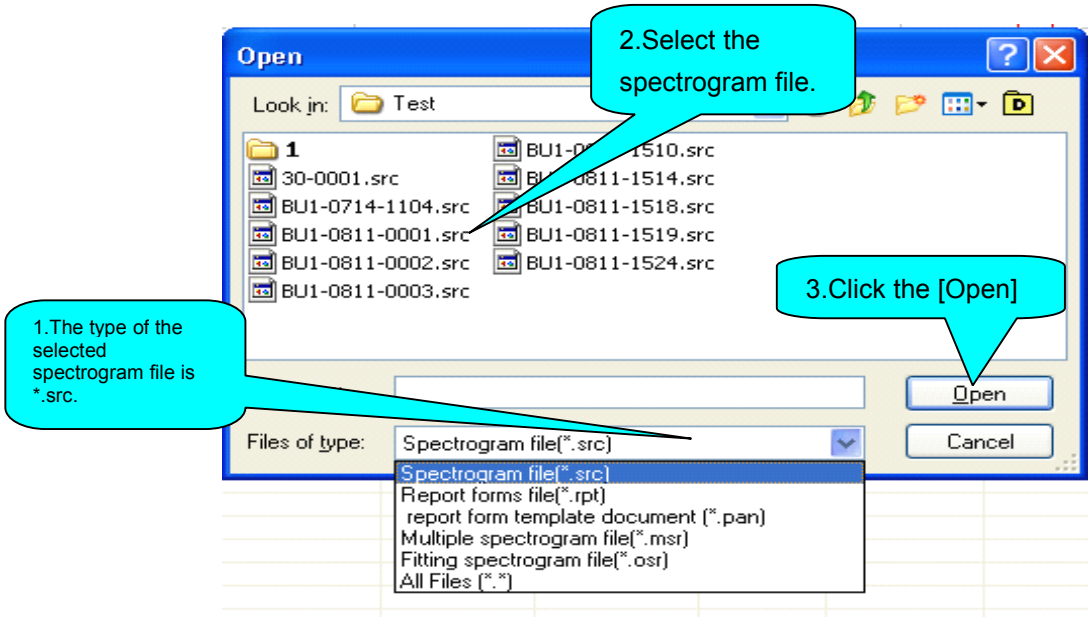
3.1.2.1 Open the Spectrogram File

1. Open the spectrogram file to be processed

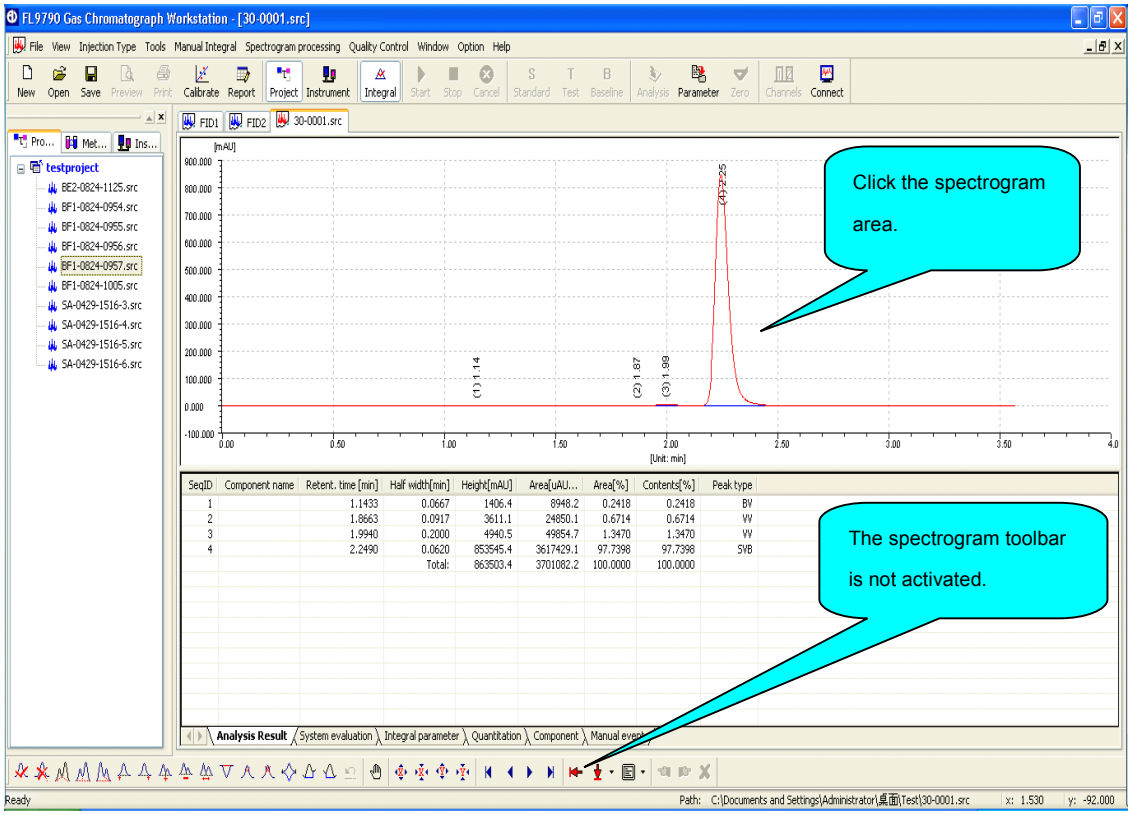
The spectrogram file can be opened by different ways: 1. Click the [Open] button in the standard toolbar; 2. Directly select the sample injection file from the project window, and double left click it for opening; 3. Click the [File] of the main menu and select the [Open] from the pull-down menu of the file. The opened spectrogram is as follows:



Left click the [Open] button in the standard toolbar or click the [File] of the main menu, and select the [Open] from the pull-down menu of the file. The above methods can pop up the [Open] dialog of the spectrogram; after the spectrogram is selected, left click the [Open]. See the following figure for details:



2. Left click the spectrogram area, and activate the spectrogram toolbar. See the following figure for details:

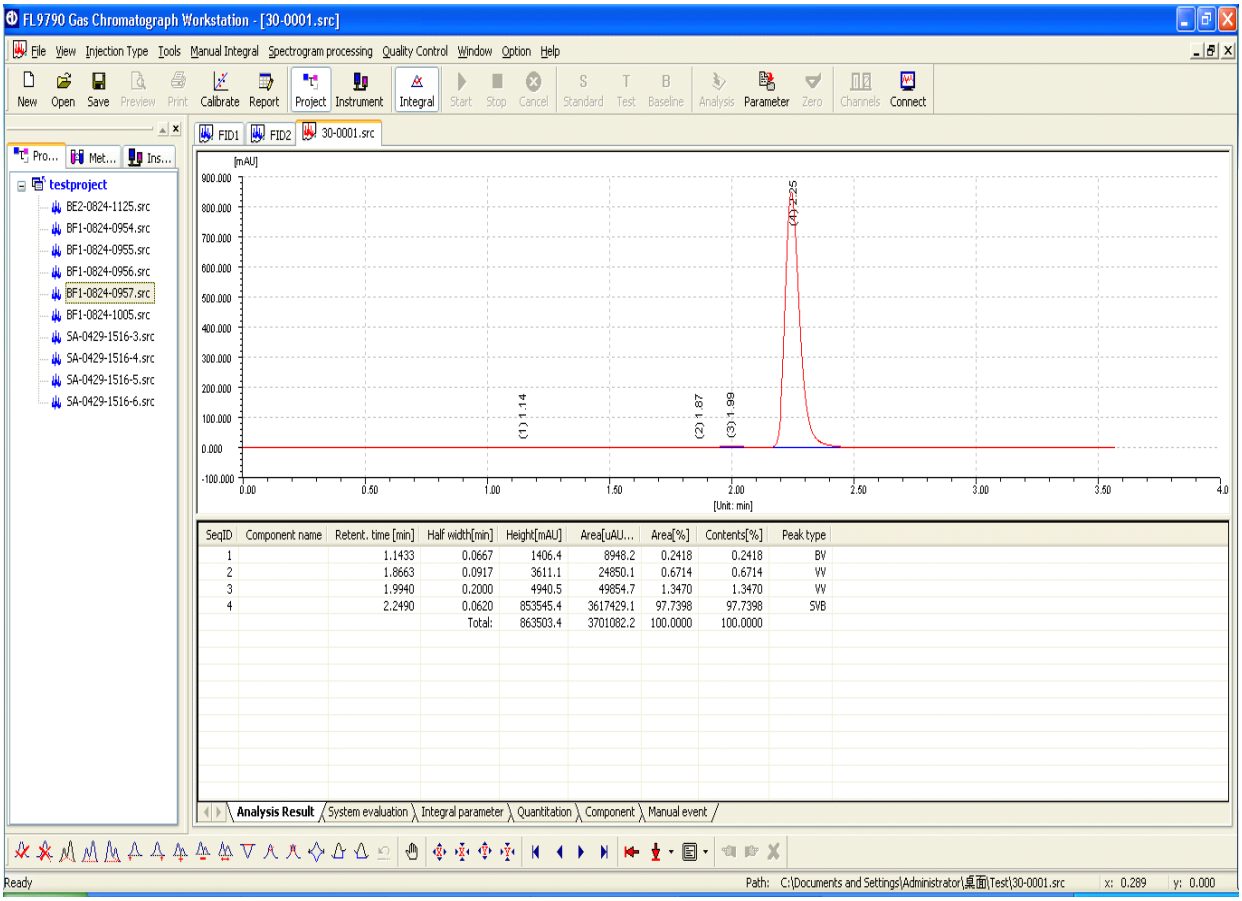


Here, any tools in the spectrogram toolbar can be selected to make the manual operation to the opened spectrograms. After such operation, the manual operation will be recorded in the manual event list of the [Manual event] page.

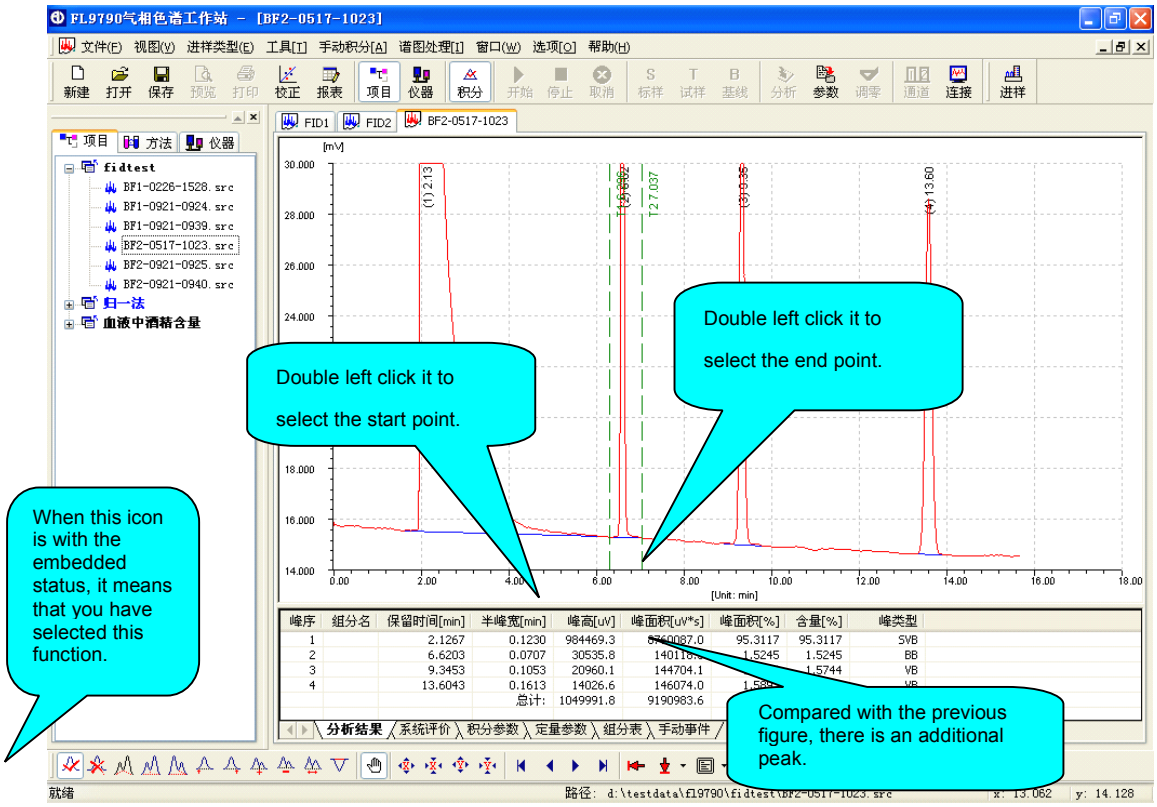
Note: The following spectrogram is only used for demonstration functions of the workstation, which can't be deemed as the real sample.

3.1.2.2 Peak Increase by Manual Mode1.

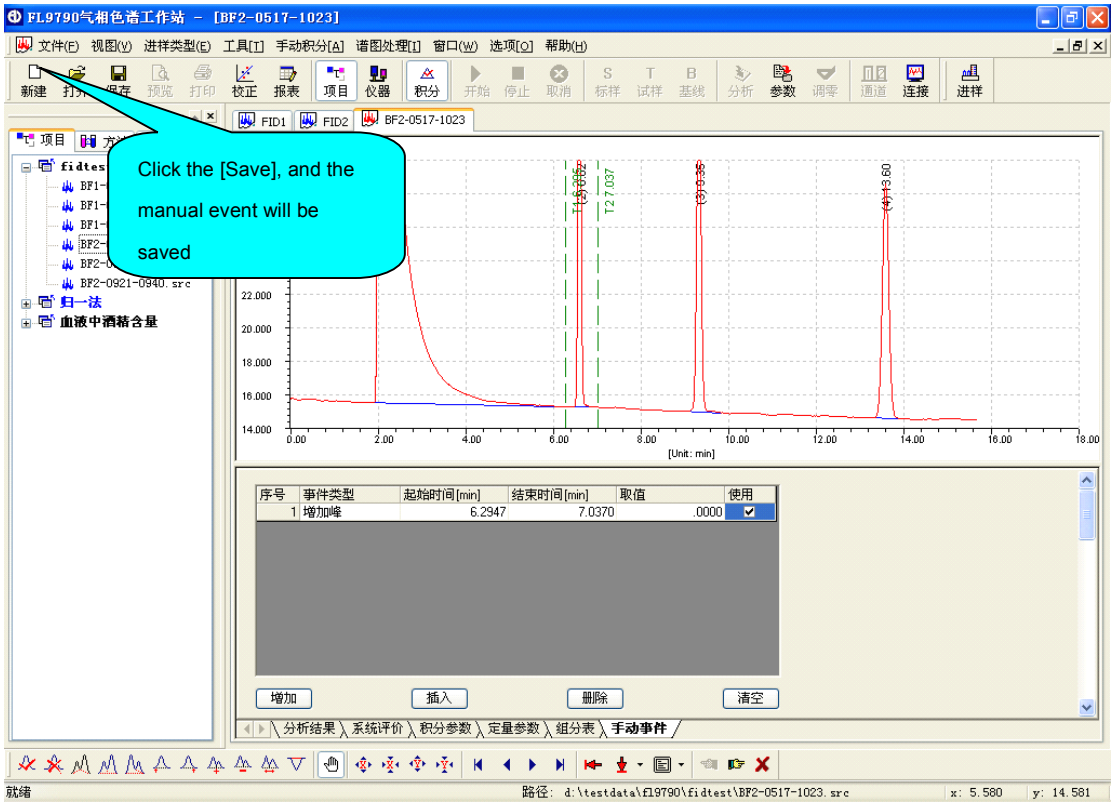
See the following figure for details of the way to open the spectrogram file to be processed:



2. By observing the spectrogram in the above figure, we find out that, another peak between No.1 peak and No. 2 peak is not accurately identified. Thus, we can add one peak by manual mode. Left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected this function. Move the mouse to the spectrogram area; place the pointer on the start point position of the peak; double left click the start point; move it to the end point of the peak, and double left click it to select the end point. And, the workstation will automatically add one peak between the start point and the end point. See the following figure for details:

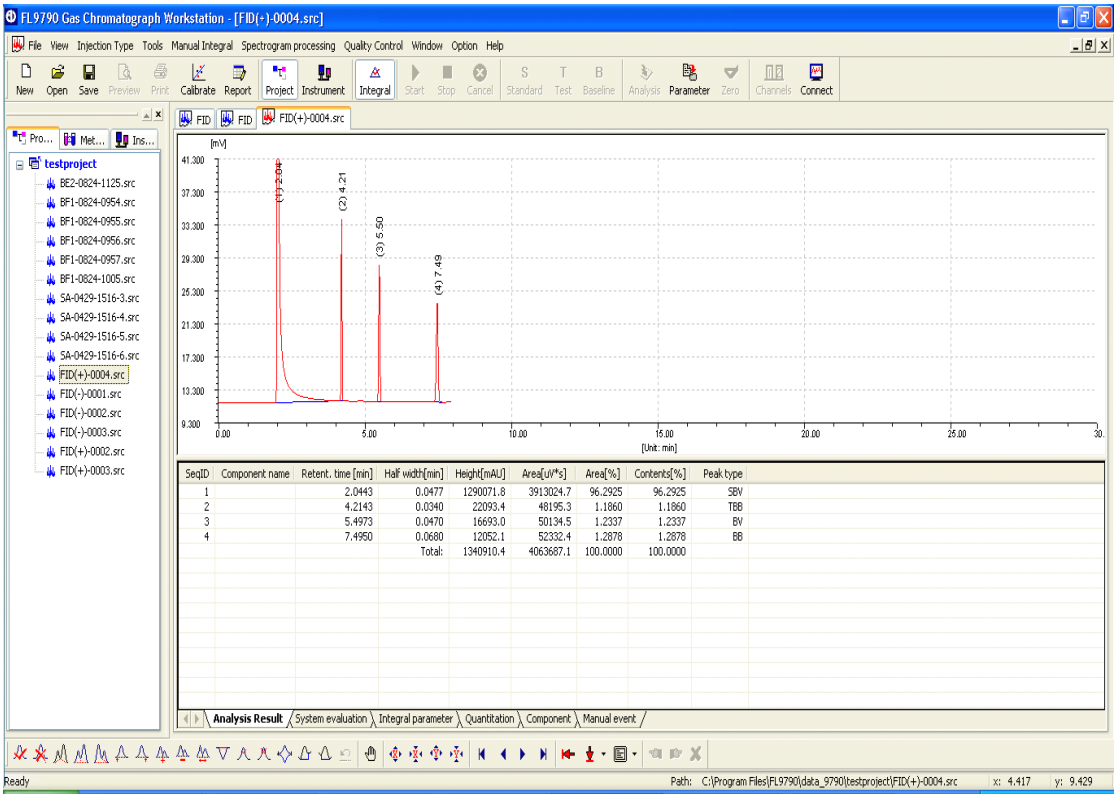


3. After opening the manual event page, it can be found out that one operated [Peak increase] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:

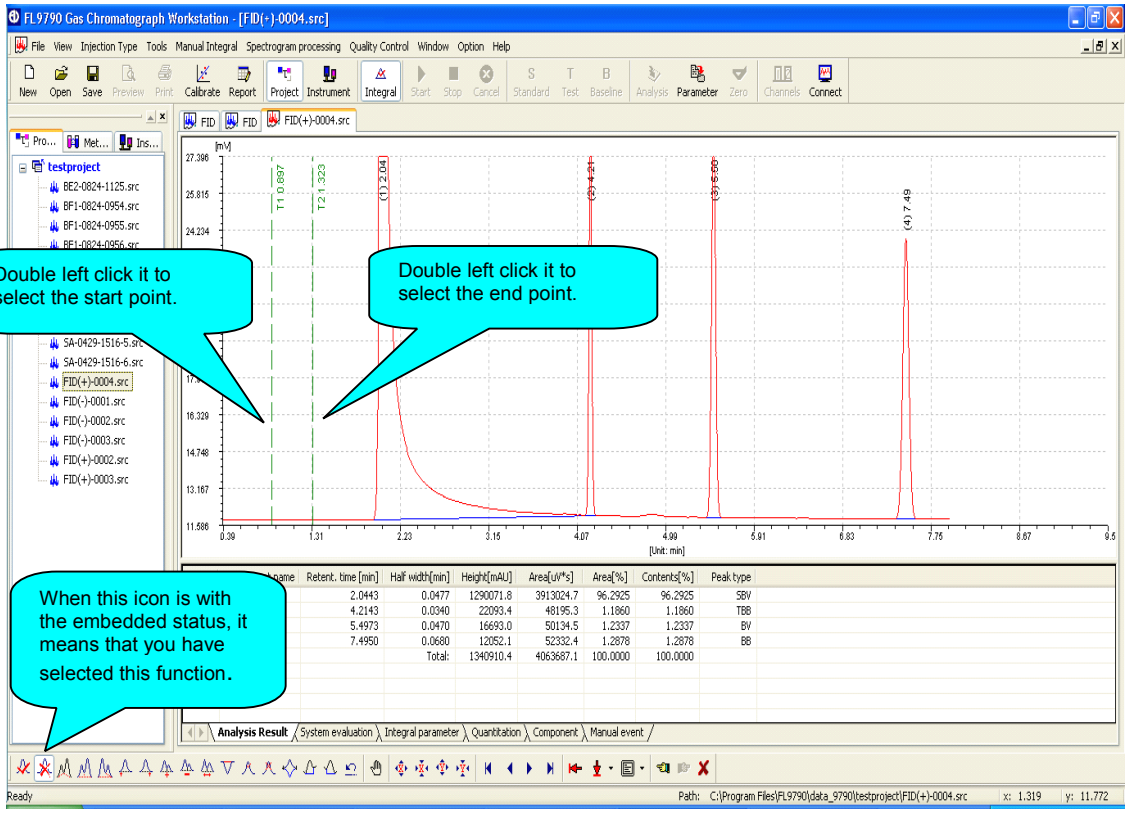


3.1.2.3 Peak Deletion by Manual Mode1.

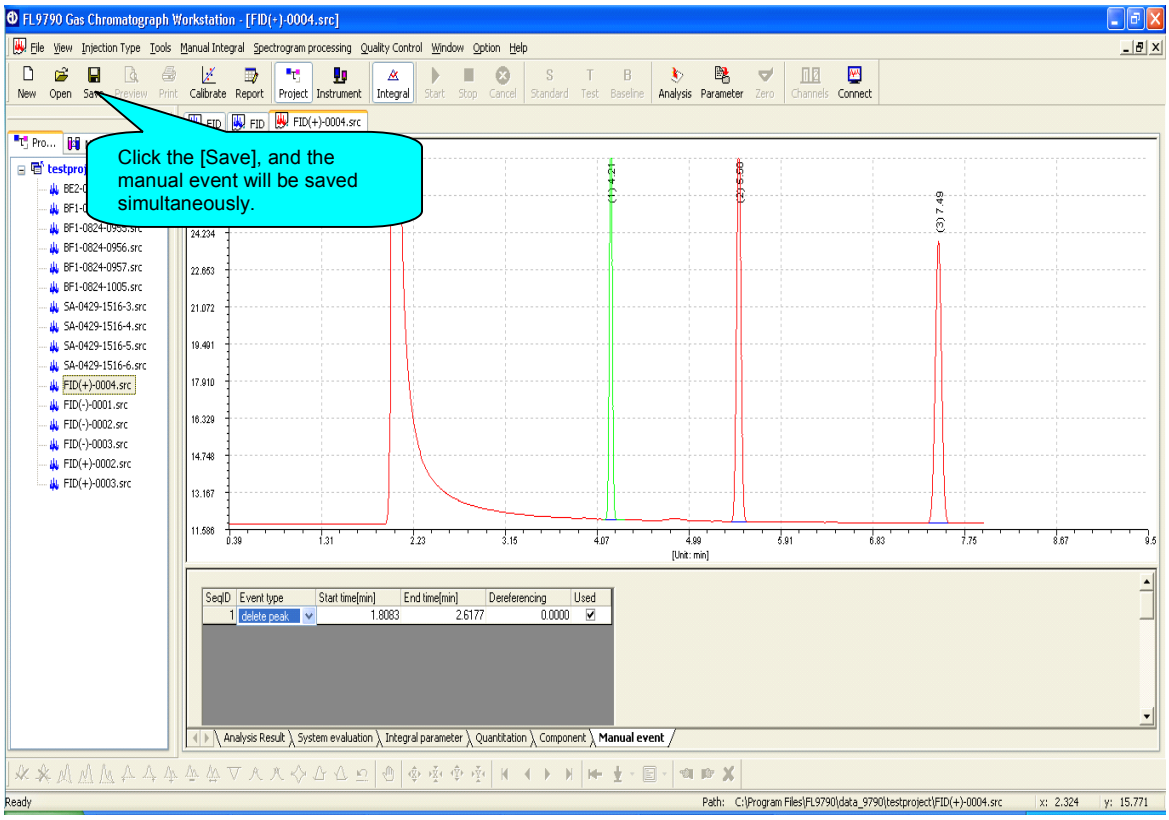
See the following figure for details of the way to open the spectrogram file to be processed



2. By observing the spectrogram in the above figure, we find out that, the No.1 peak and No. 2 peak are not the stripping peaks of the sample. Left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected this function. Move the mouse to the spectrogram area; place the pointer on the start point position of the peak; double left click the start point; move it to the end point of the peak, and double left click it to select the end point. And, the workstation will automatically delete all peaks between the start point and the end point. See the following figure for details:

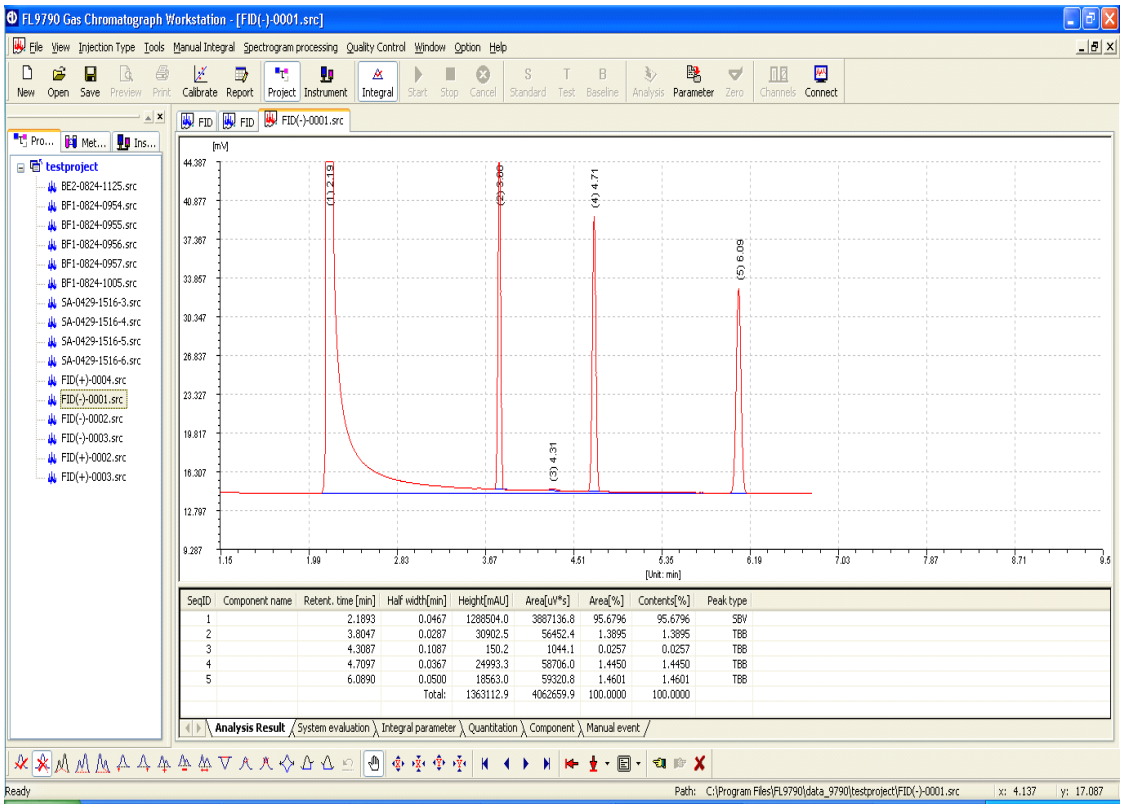


3. After opening the manual event page, it can be f rated [Peak deletion] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:

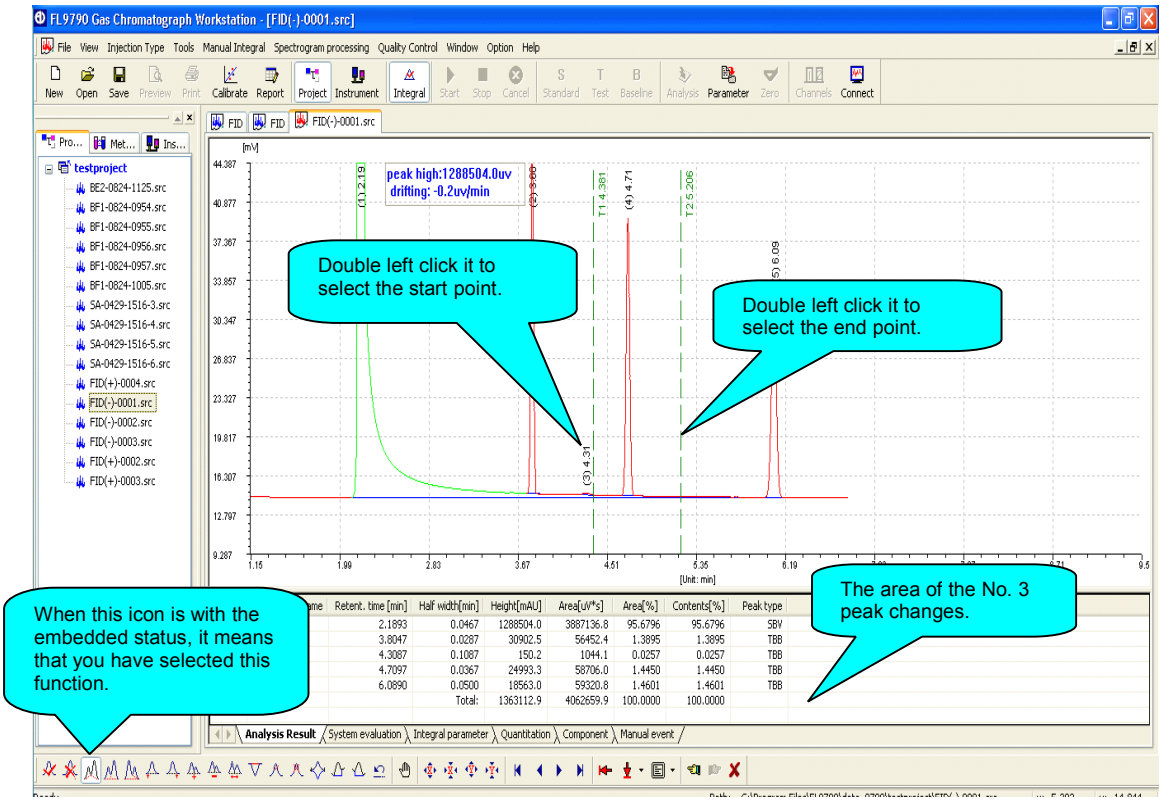


3.1.2.4 Valley-valley Baseline Adjustment

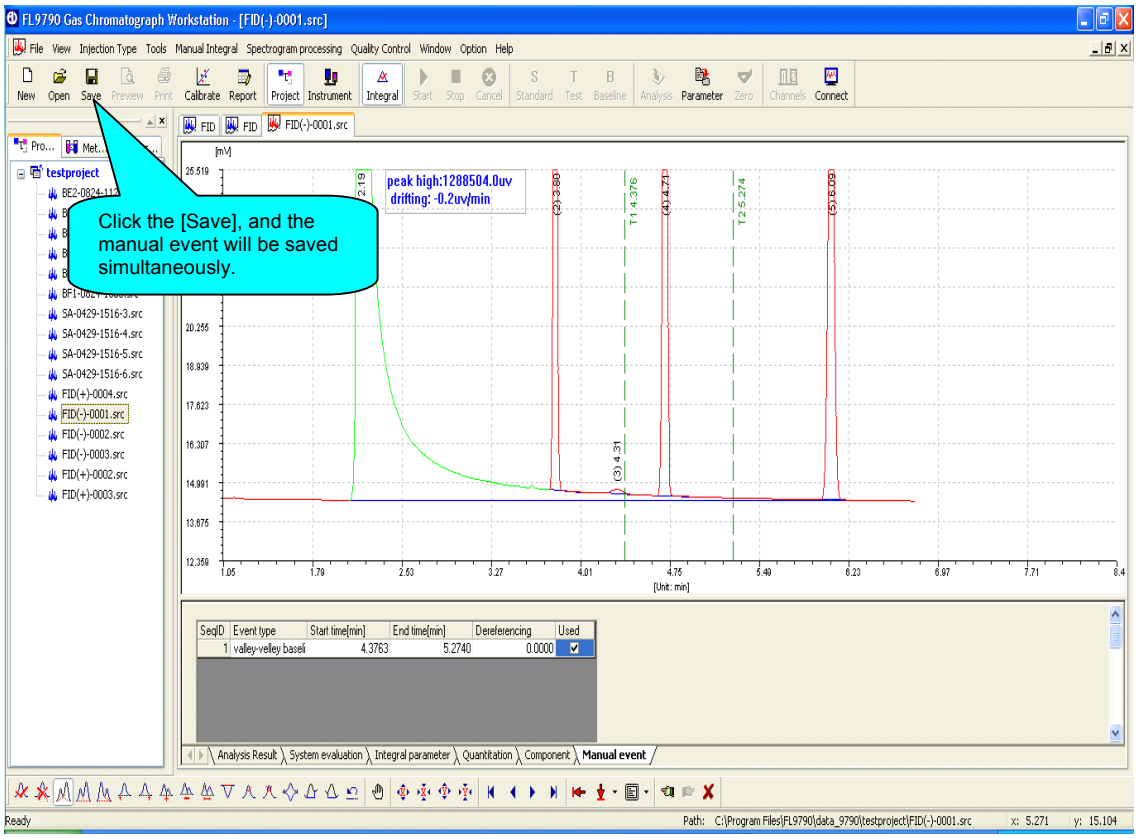
1. See the following figure for details of the way to open the spectrogram file to be processed:



2. During the demonstration, apply the valley-valley baseline for the No. 3 peak of the spectrogram in the above figure, and the area of the No. 3 peak will change along with changes of the baseline. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the valley-valley baseline functions. Move the mouse to the spectrogram area; place the pointer on the start point position of the peak; double left click the start point; move it to the end point of the peak, and double left click it to select the end point. And, the workstation will automatically change the baseline processing of the No. 3 peak. See the following figure for details:

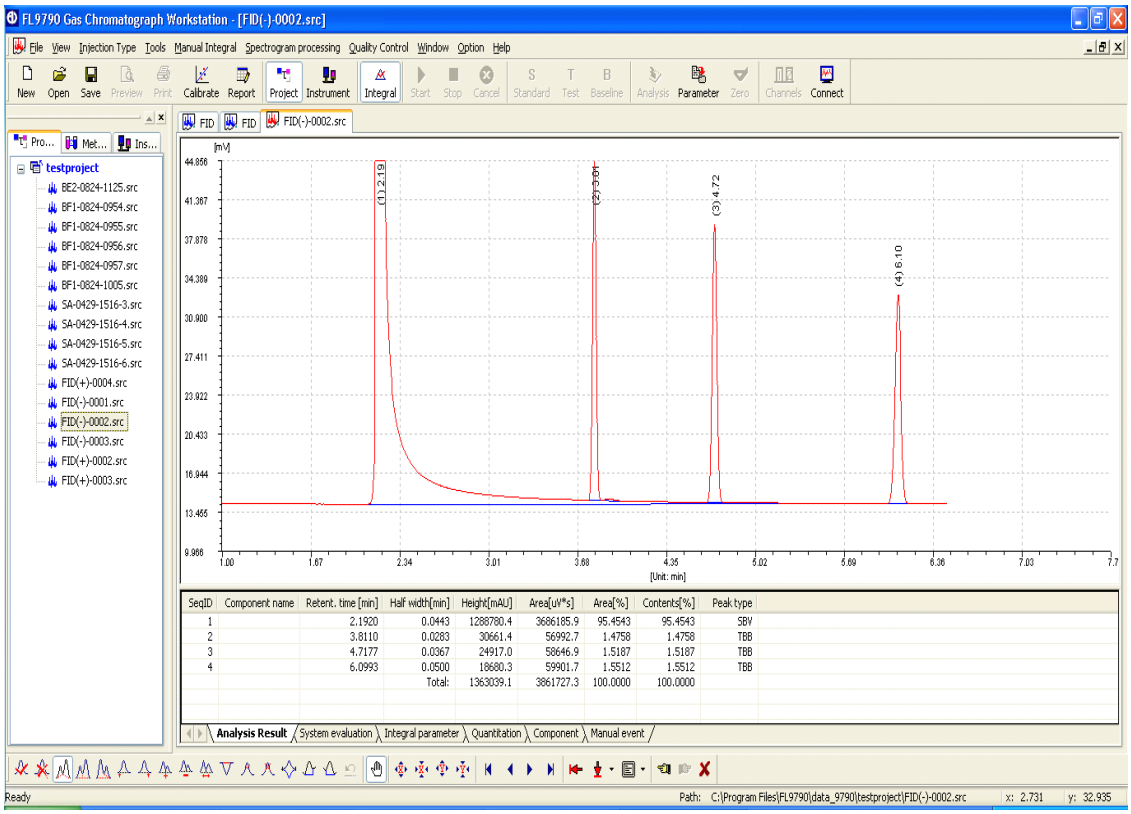


3. After opening the manual event page, it can be found out that one operated [Valley-valley baseline] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:

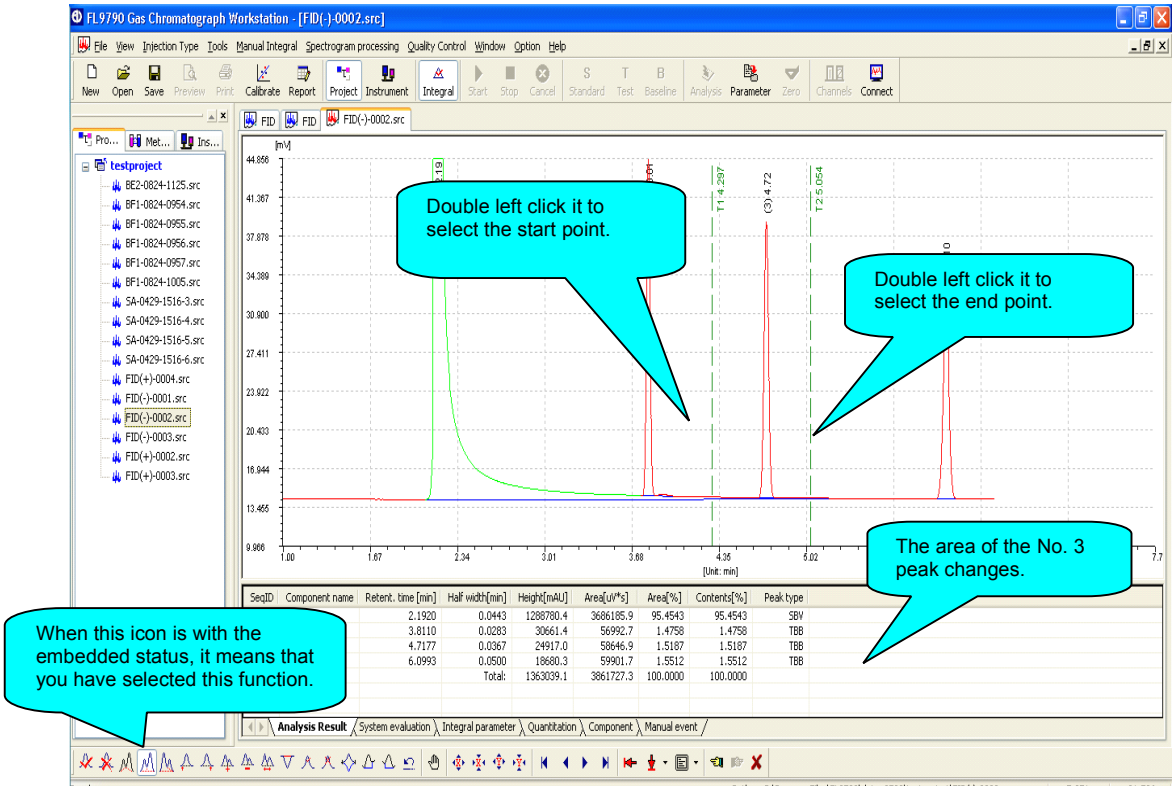


3.1.2.5 Compulsory Vertical Cutting1.

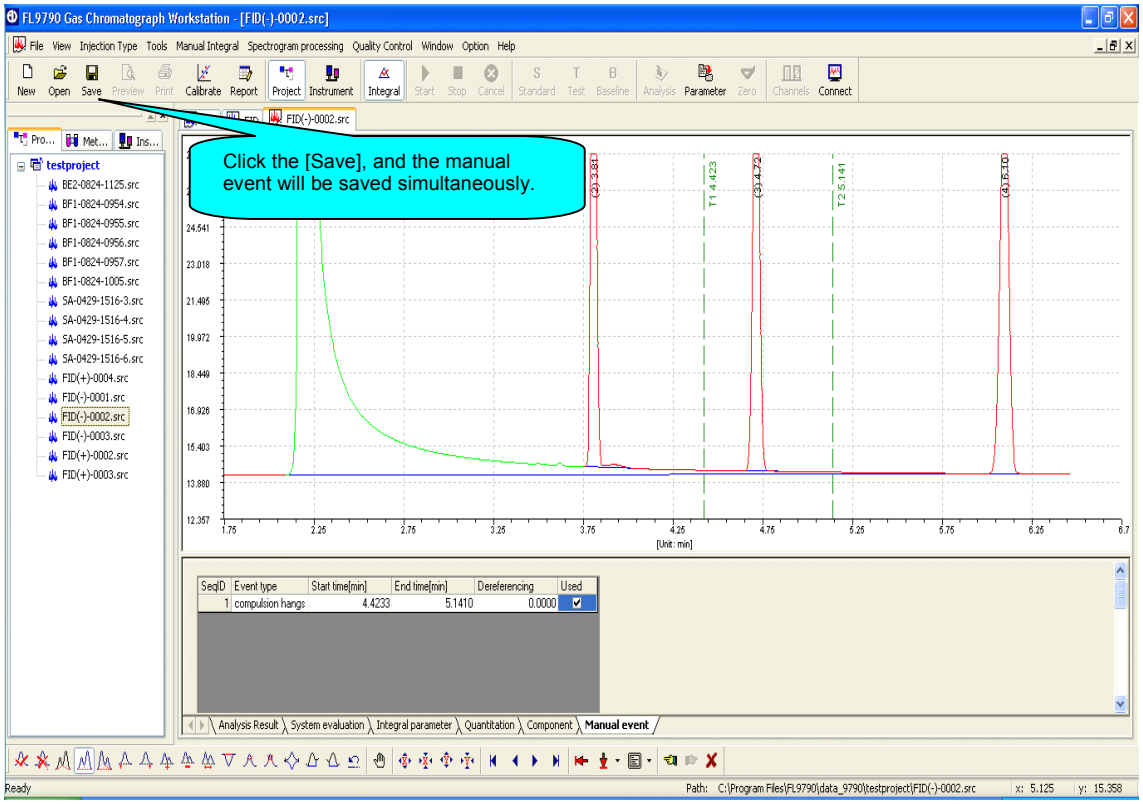
See the following figure for details of the way to open the spectrogram file to be processed



2. During the demonstration, apply the compulsory vertical cutting for the No. 3 peak of the spectrogram in the above figure, and the area of the No. 3 peak will change along with changes of the baseline. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the compulsory vertical cutting functions. Move the mouse to the spectrogram area; place the pointer on the start point position of the peak; double left click the start point; move it to the end point of the peak, and double left click it to select the end point. And, the workstation will automatically change the baseline processing of the No. 3 peak. See the following figure for details:

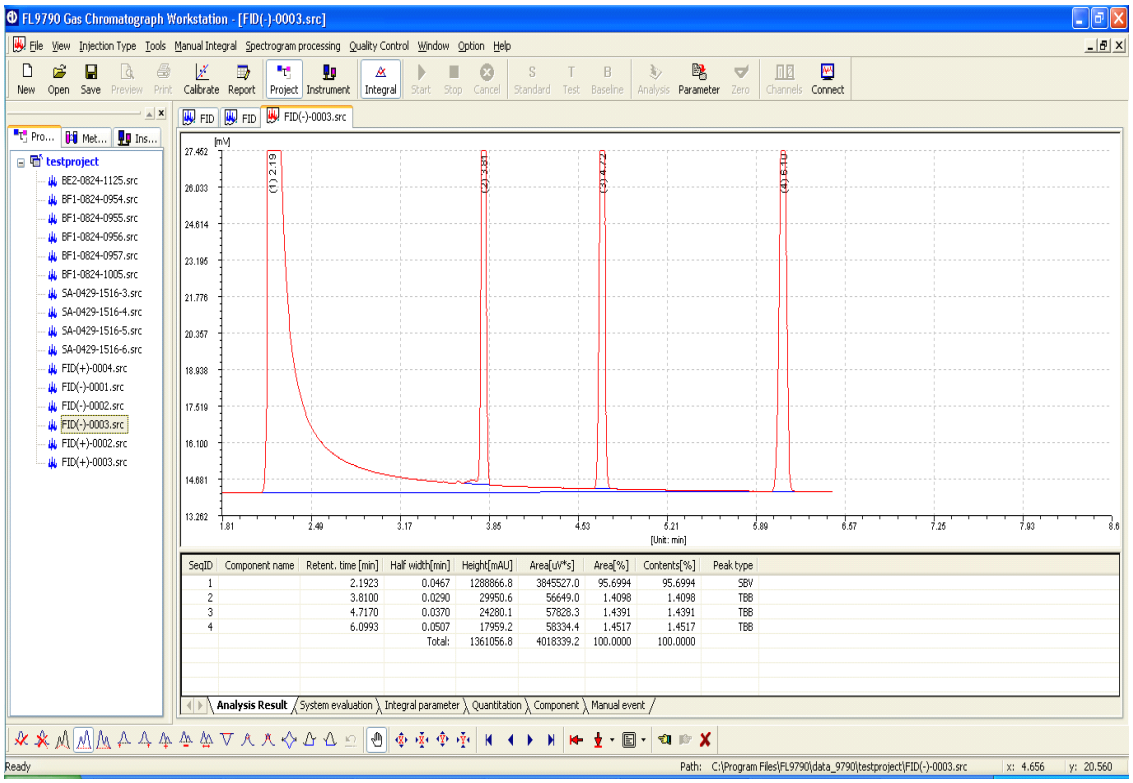


3. After opening the manual event page, it can be found out that one operated [Compulsory vertical cutting] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:



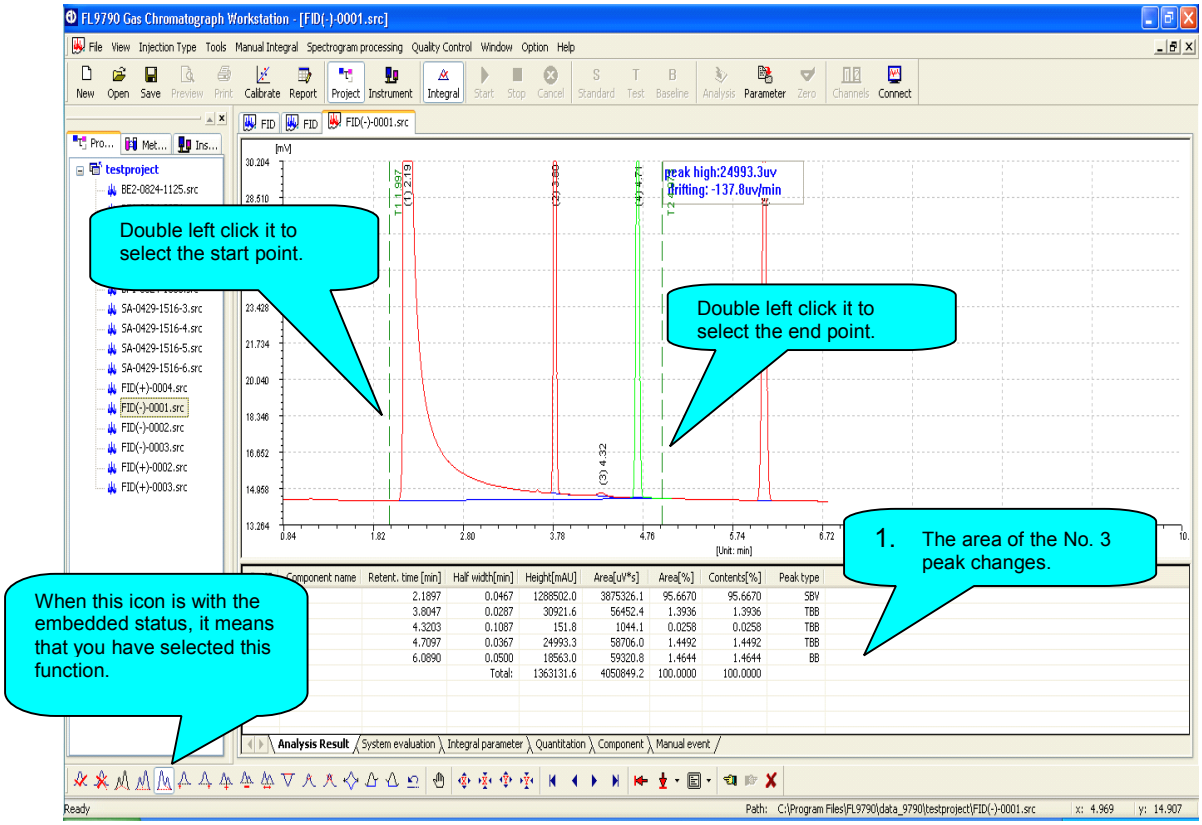
3.1.2.6 Compulsory Tailing1

See the following figure for details of the way to open the spectrogram file to be processed

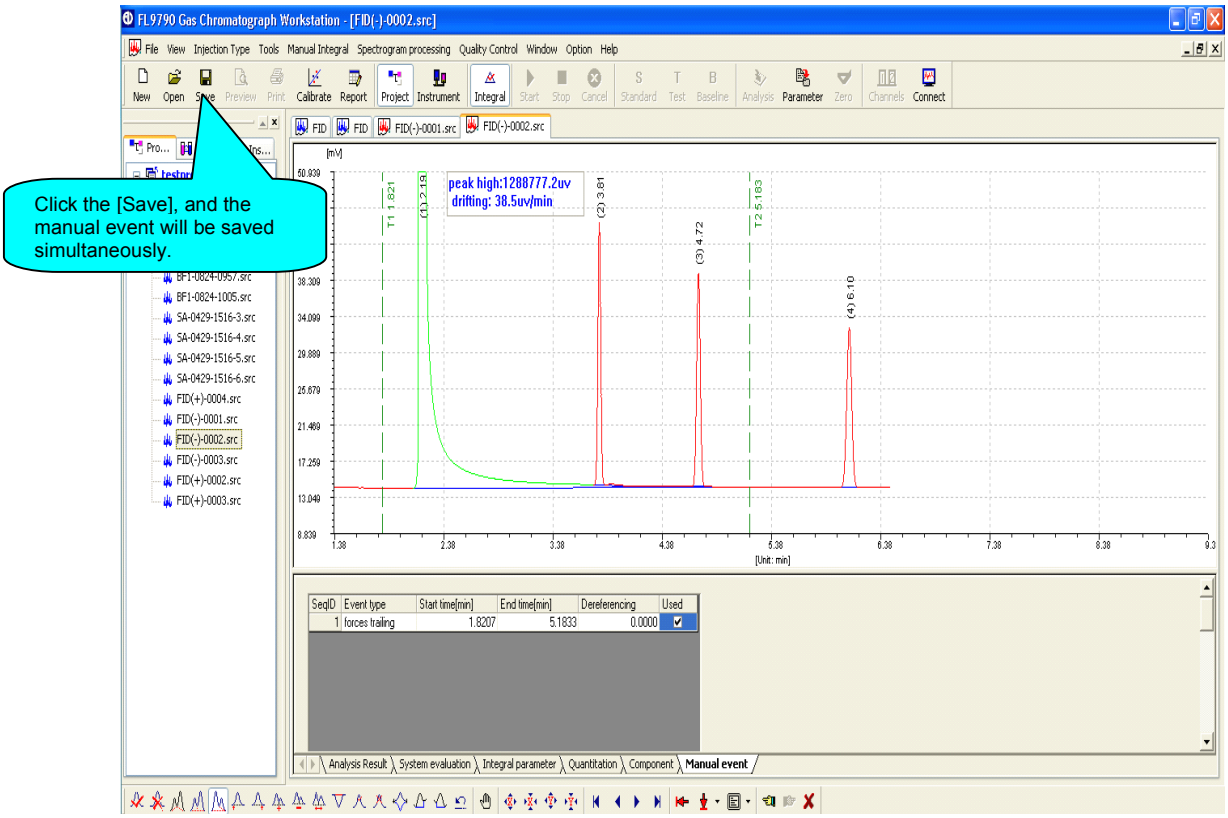


2. During the demonstration, apply the compulsory tailing for the No. 1 peak of

the spectrogram in the above figure, and the area of the No. 1 peak and No. 3 peak will change along with changes of the baseline. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the compulsory tailing functions. Move the mouse to the spectrogram area; place the pointer on the start point position of the peak; double left click the start point; move it to the end point of the peak, and double left click it to select the end point. And, the workstation will automatically change the baseline processing of the peak. See the following figure for details:

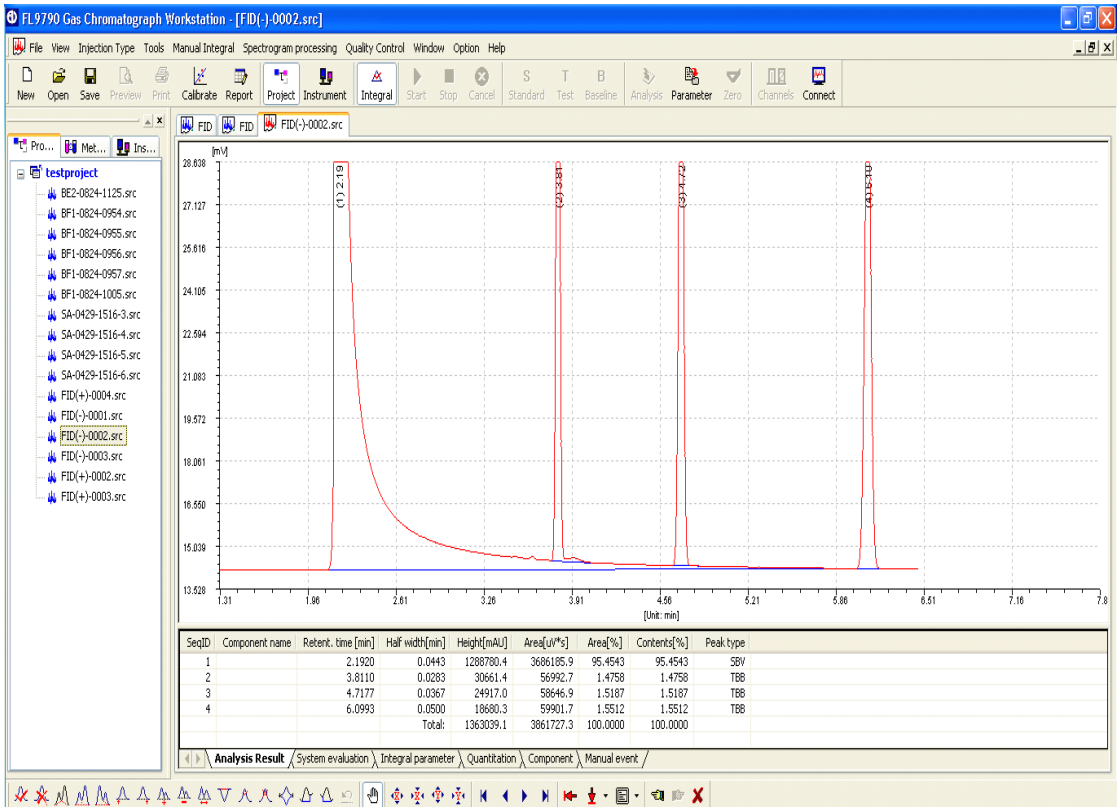


3. After opening the manual event page, it can be found out that one operated [Compulsory tailing] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:

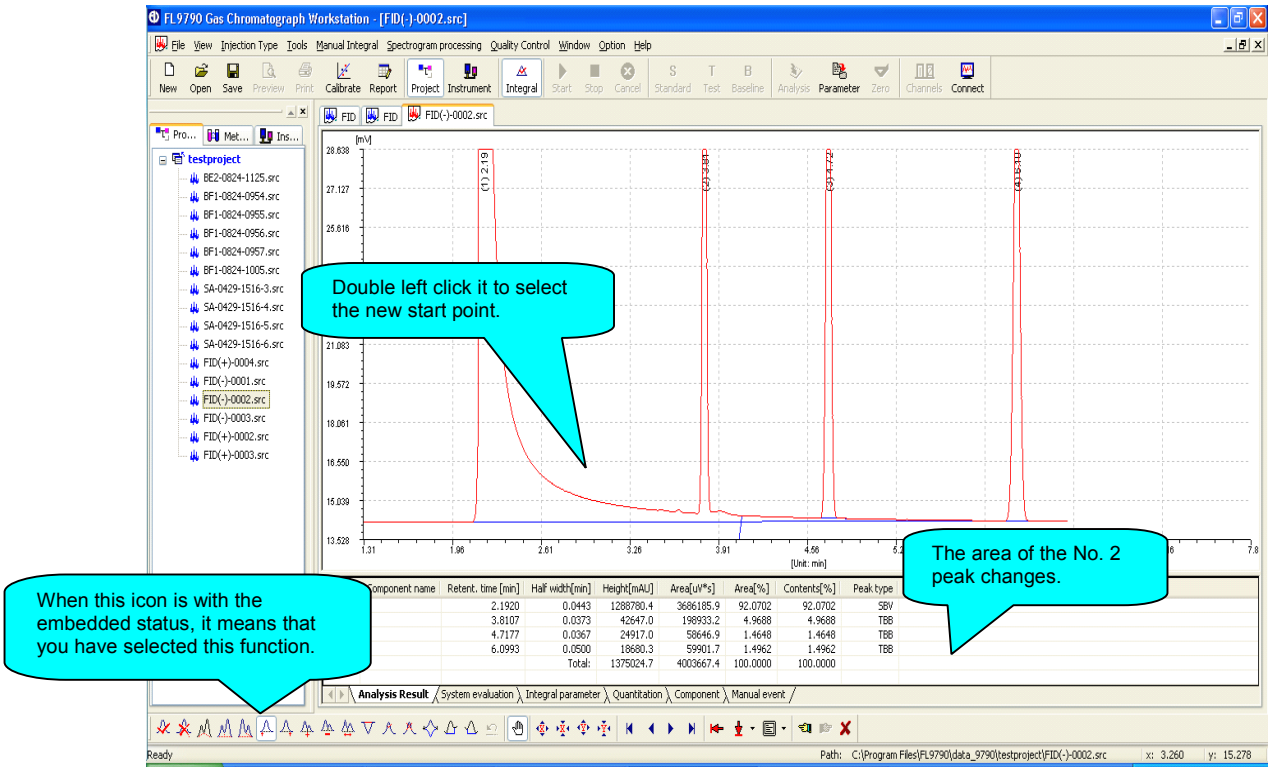


3.1.2.7 Adjustment of the Peak Start Point

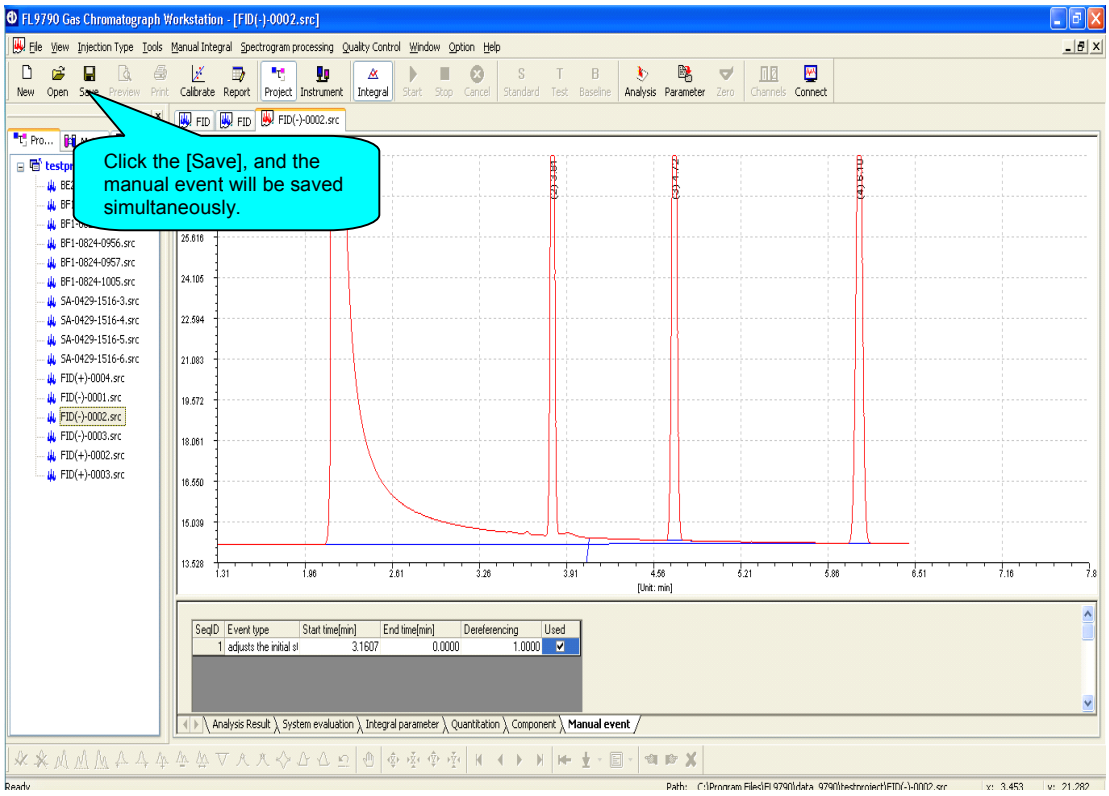
1. See the following figure for details of the way to open the spectrogram file to be processed:



2. During the demonstration, adjust the start point of the No. 2 peak of the spectrogram in the above figure, and the area of the No. 2 peak will change along with changes of the baseline. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the start point functions of the peak. Move the mouse to the spectrogram area; place the pointer on the start point position of the peak, and double left click it to select the start point. Further, this point will be made as the new start point of the No. 2 peak; moreover, the start point of the peak area integration will change accordingly. And, the workstation will automatically change the baseline processing of the peak. See the following figure for details:

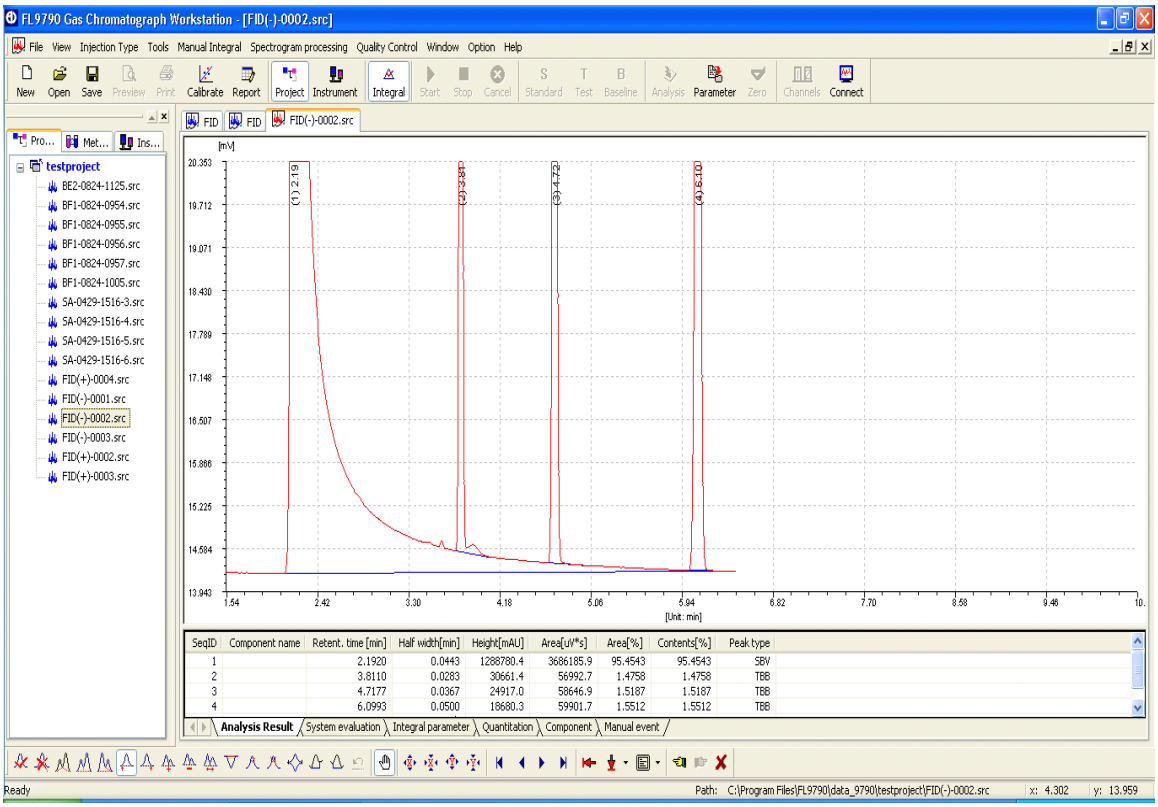


3. After opening the manual event page, it can be found out that one operated [Start point adjustment] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:



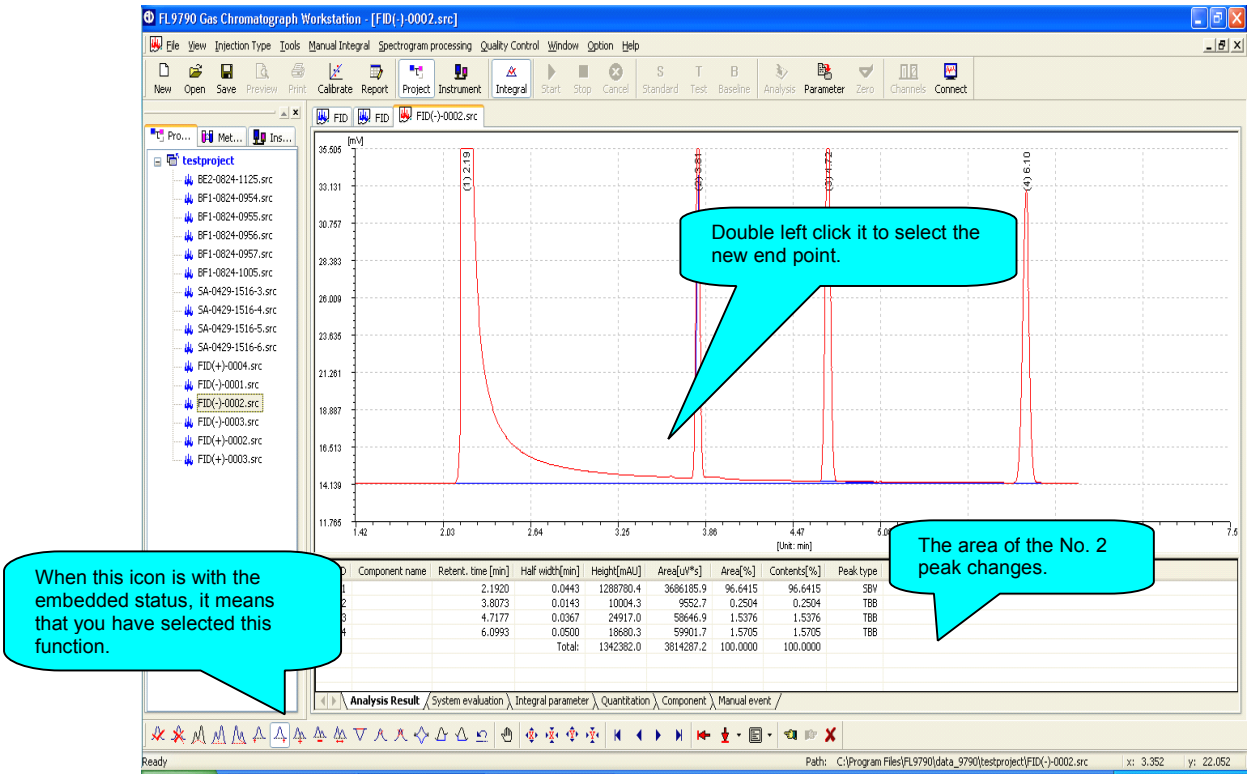
3.1.2.8 Adjustment of the Peak End Point1.

See the following figure for details of the way to open the spectrogram file to be processed

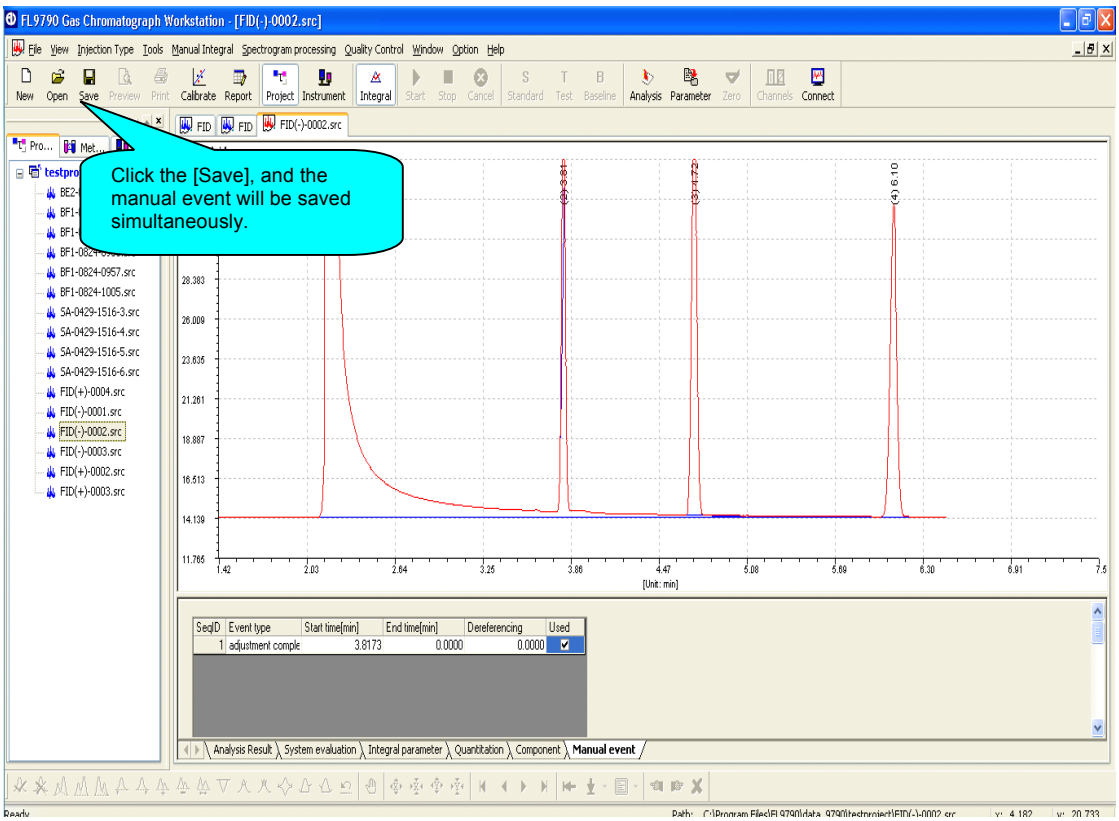


2. During the demonstration, adjust the end point of the No. 2 peak of the

spectrogram in the above figure, and the area of the No. 2 peak will change along with changes of the baseline. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the end point functions of the peak. Move the mouse to the spectrogram area; place the pointer on the end point position of the peak, and double left click it to select the end point. Further, this point will be made as the new end point of the No. 2 peak; moreover, the end point of the peak area integration will change accordingly. And, the workstation will automatically change the baseline processing of the peak. See the following figure for details:

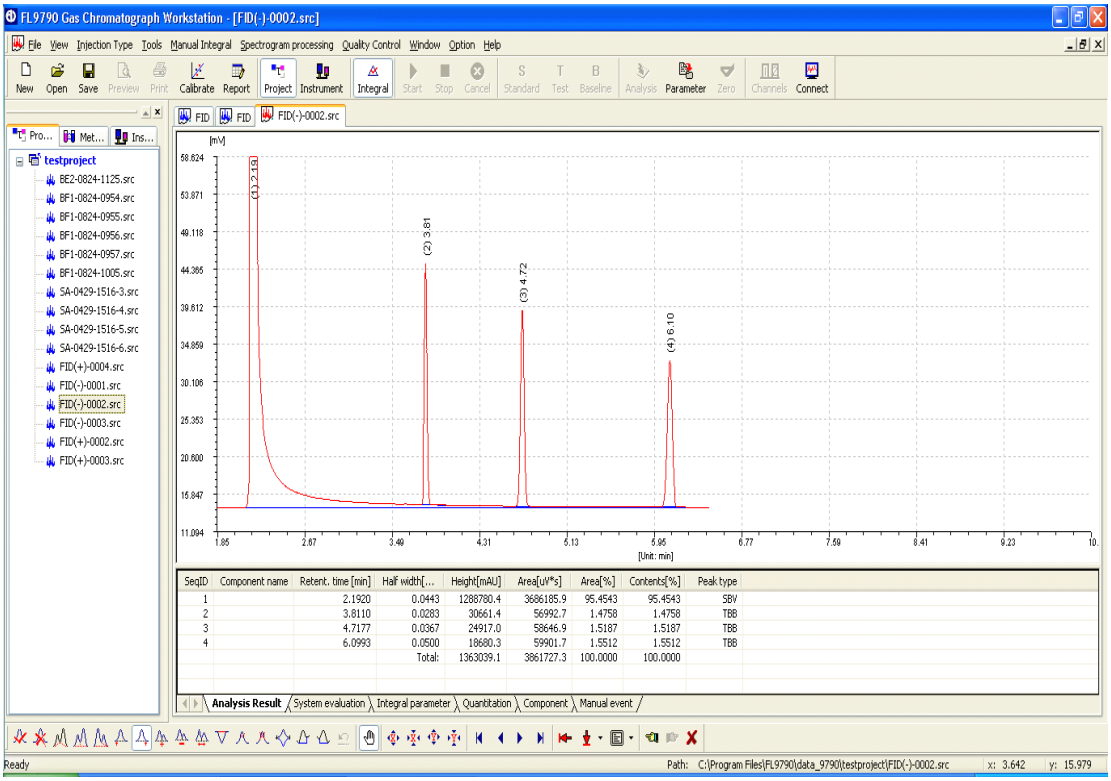


3. After opening the manual event page, it can be found out that one operated [End point adjustment] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:

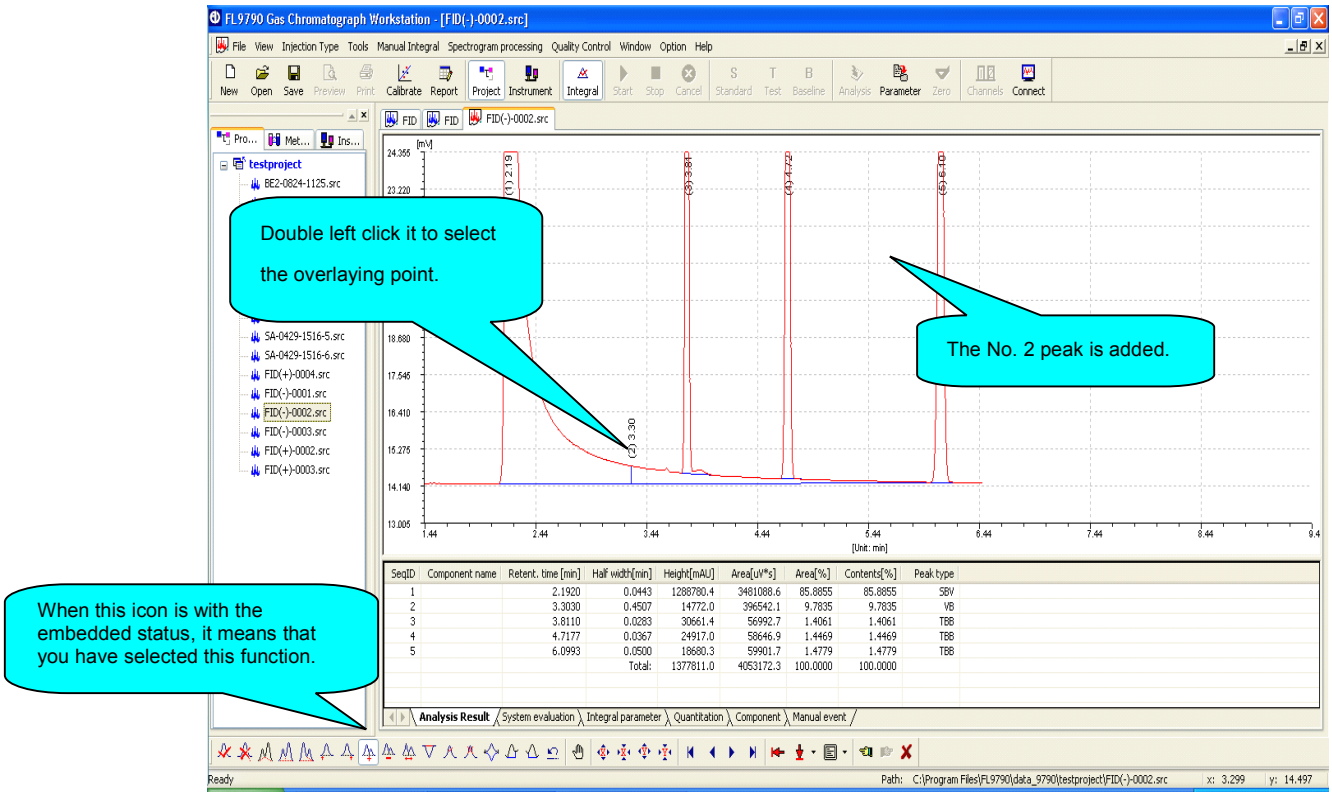


3.1.2.9 Vertical Line-between Adding1

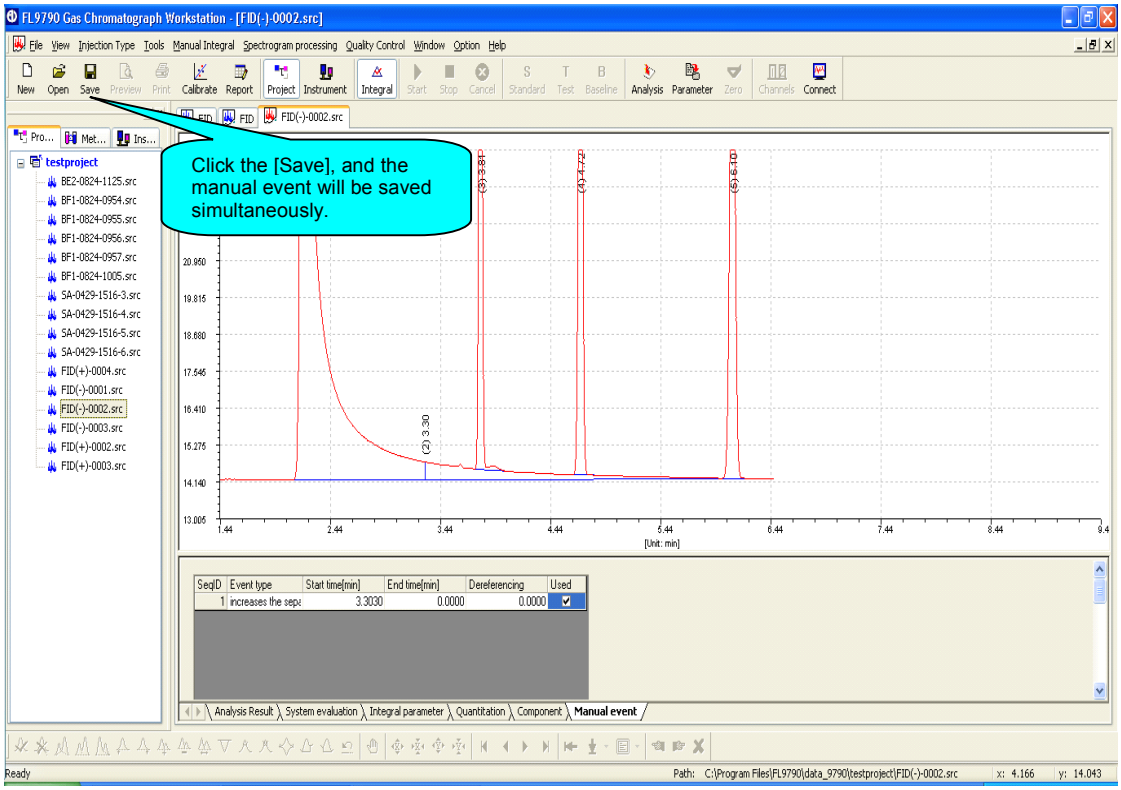
See the following figure for details of the way to open the spectrogram file to be processed



2. During the demonstration, apply the vertical line-between adding for the No. 1 peak of the spectrogram in the above figure to compulsorily separate it from the No. 2 peak. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the vertical line-between adding functions. Move the mouse to the spectrogram area; place the pointer on the start point position of the No. 1 peak and the overlaying point of next peak; and double left click the overlaying point. And, the workstation will automatically change the baseline processing of the peak. This method is mainly used for the processing of the overlaying peak, and the processed spectrogram is shown in the following figure:

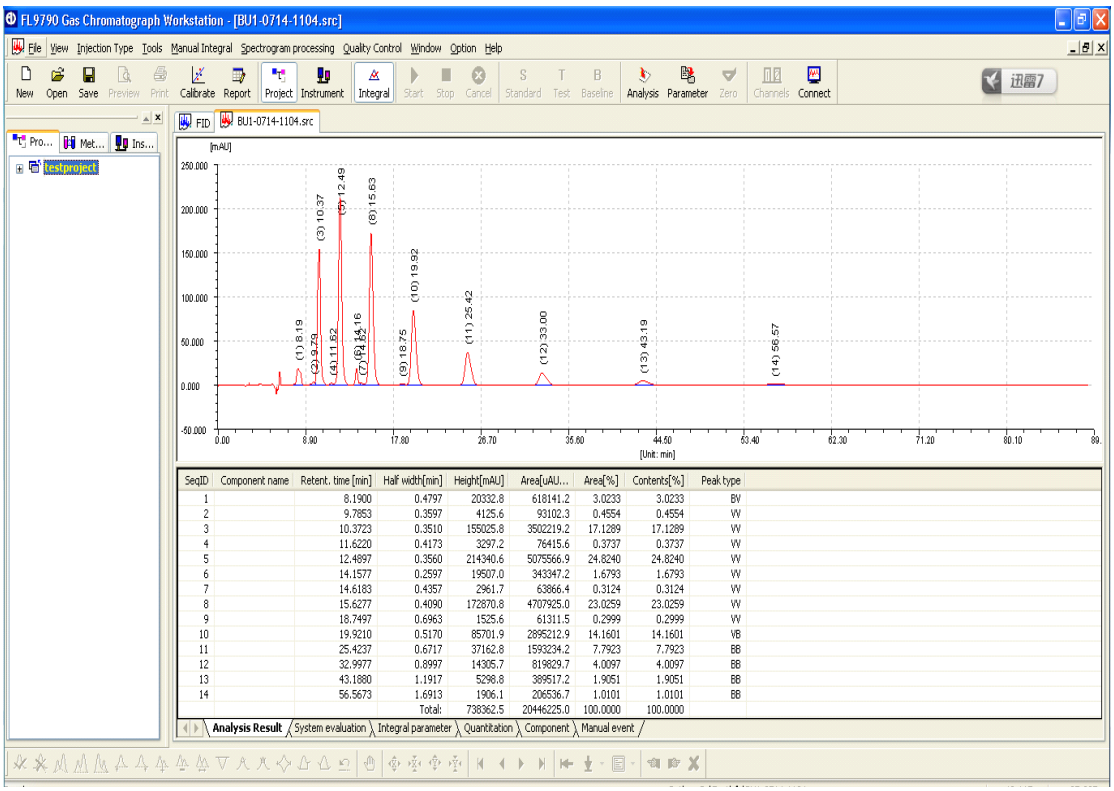


3. After opening the manual event page, it can be found out that one operated [Add Line-between] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:



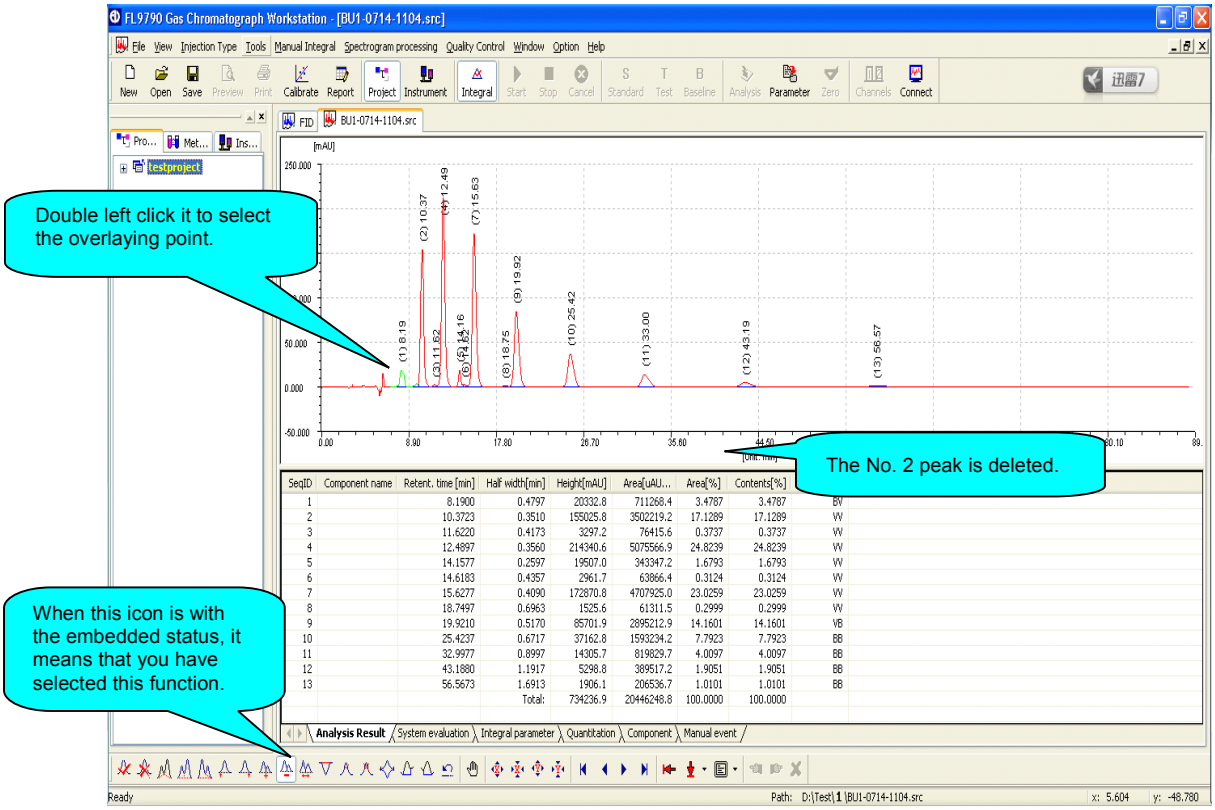
3.1.2.10 Vertical Line-between Deletion1.

See the following figure for details of the way to open the spectrogram file to be processed

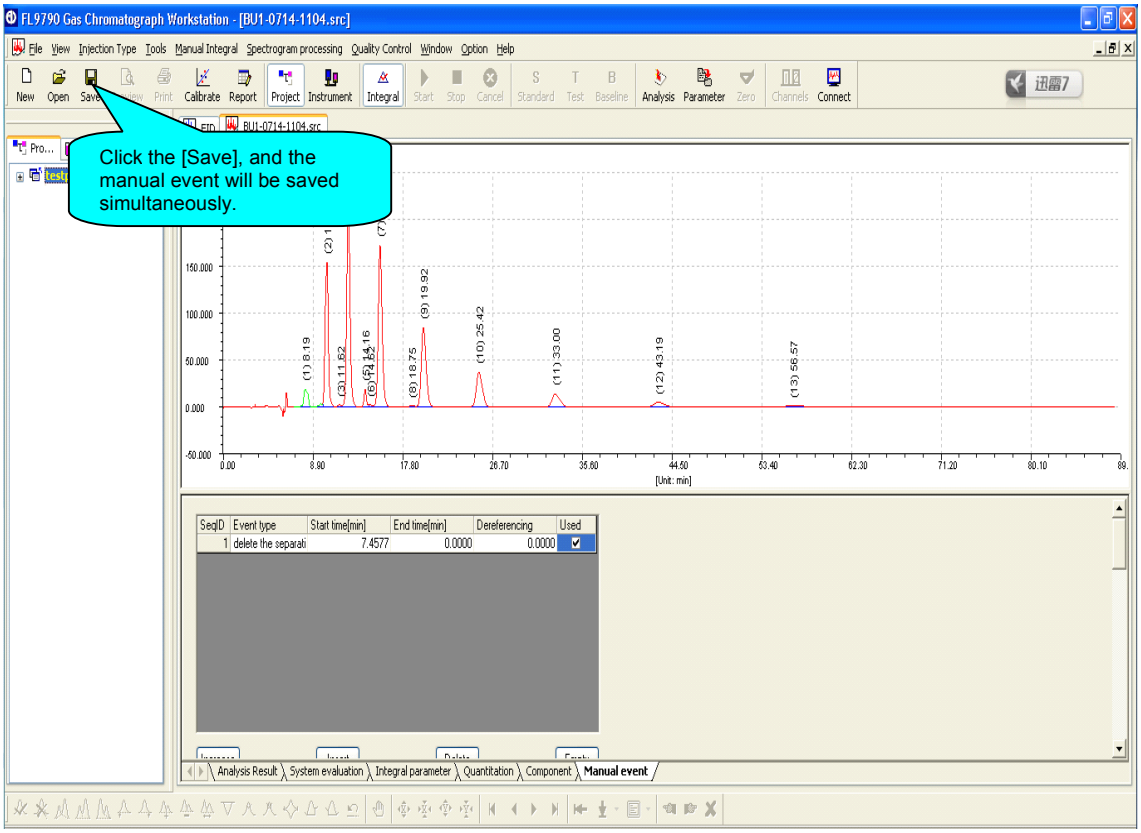


2. During the demonstration, apply the vertical line-between deletion for the No.

1 peak of the spectrogram in the above figure to compulsorily remove the No. 2 peak. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the vertical line-between deletion functions. Move the mouse to the spectrogram area; place the pointer on the vertical line-between between the No. 1 peak and No. 2 peak, and double left click the vertical line-between. After removing the vertical line-between between the No. 1 peak and No. 2 peak, the workstation will automatically change the baseline processing of the peak. The processed spectrogram is shown in the following figure:

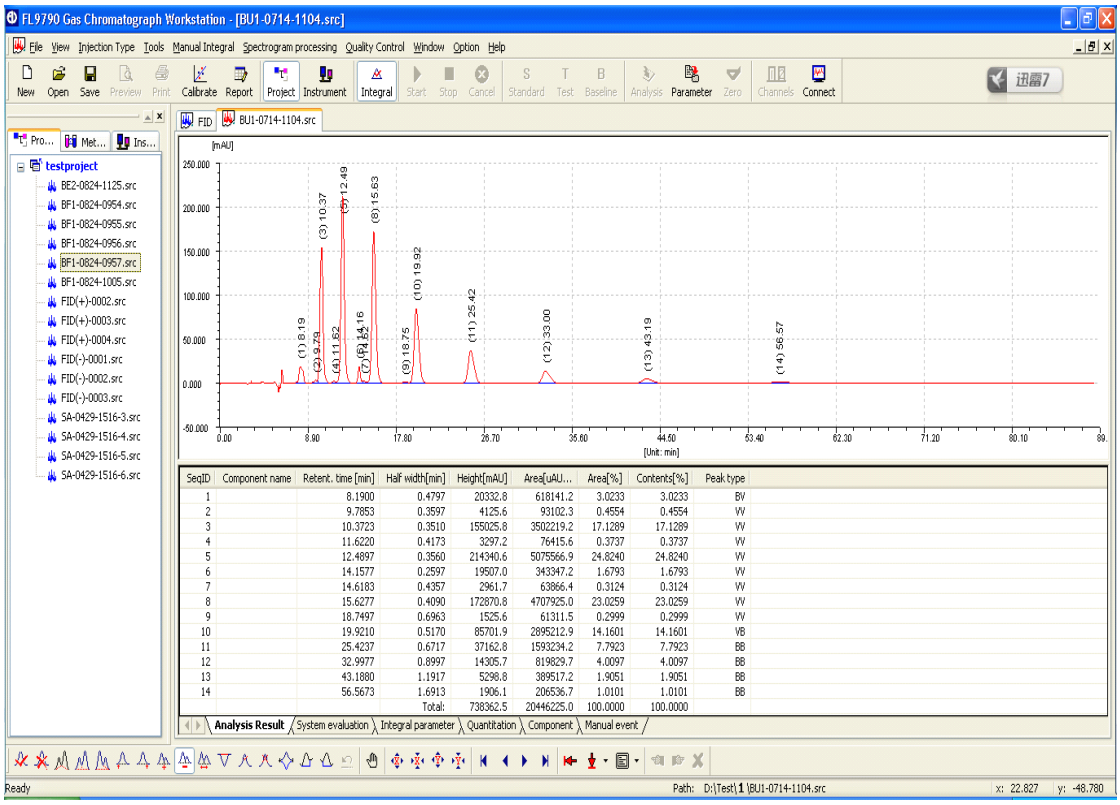


3. After opening the manual event page, it can be found out that one operated [Delete Line-between] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:

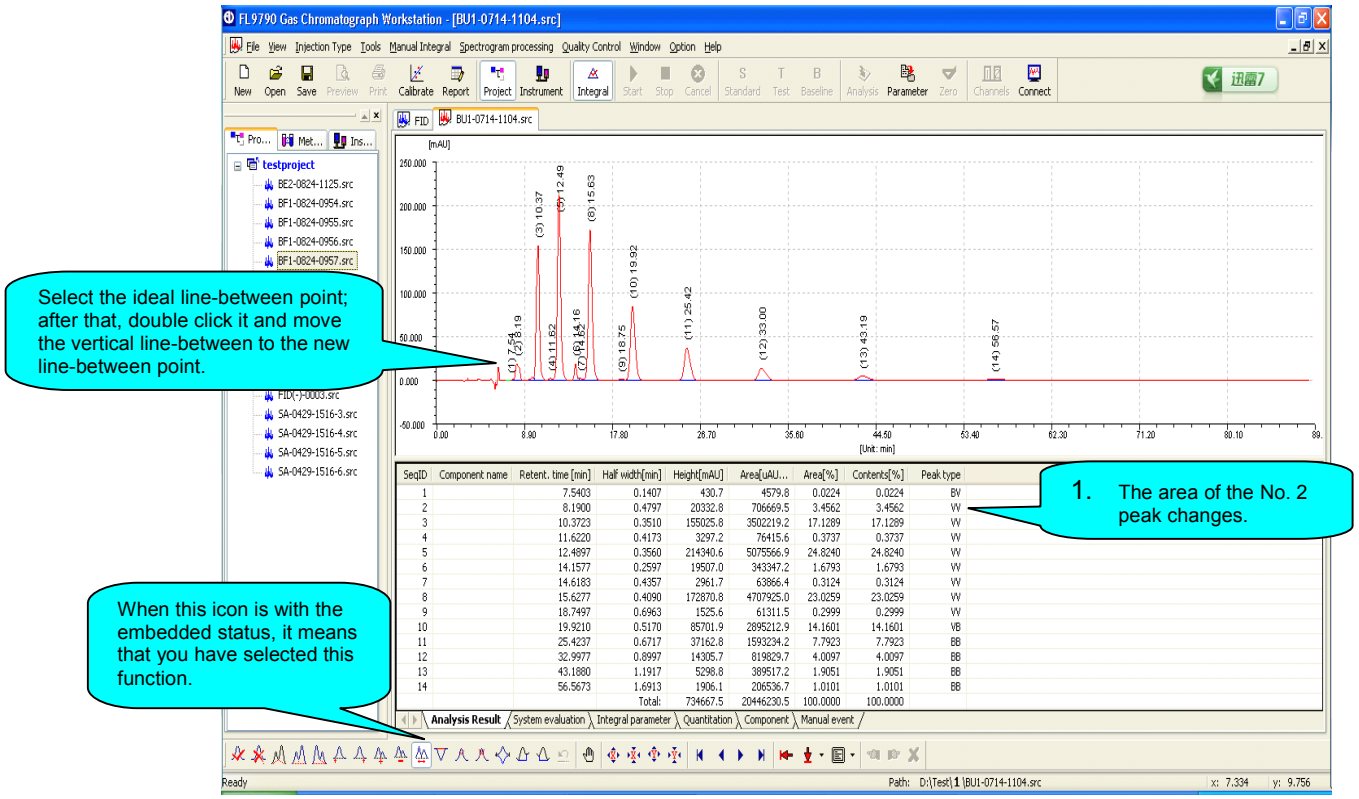


3.1.2.11 Vertical Line-between Movement1.

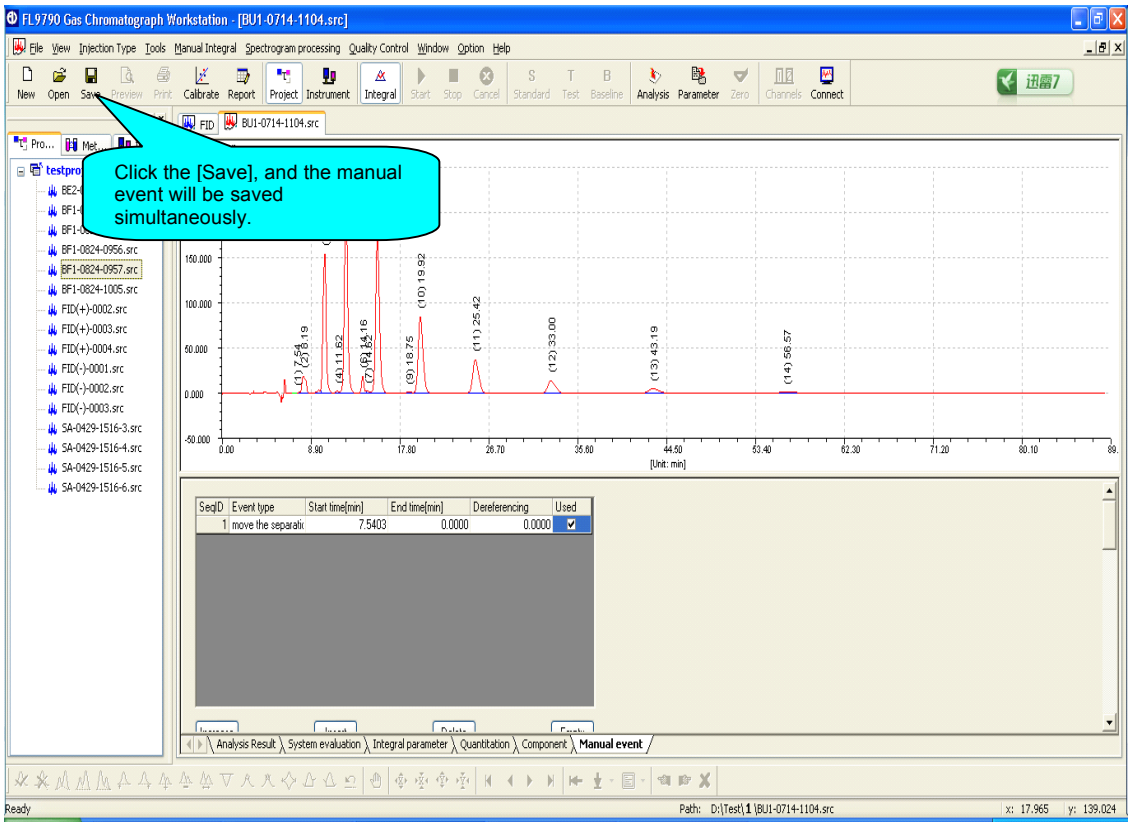
See the following figure for details of the way to open the spectrogram file to be processed



2. During the demonstration, as the vertical line-between between the No.1 peak and No. 2 peak is inaccurate, it is forbidden to move the vertical line-between. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the vertical line-between movement functions. Move the mouse to the spectrogram area; place the pointer on the position where the vertical line-between is rationally cut, and double left click it. And, the workstation will automatically change the selected position of the vertical line-between; the spectrogram baseline also changes. See following figure for details:

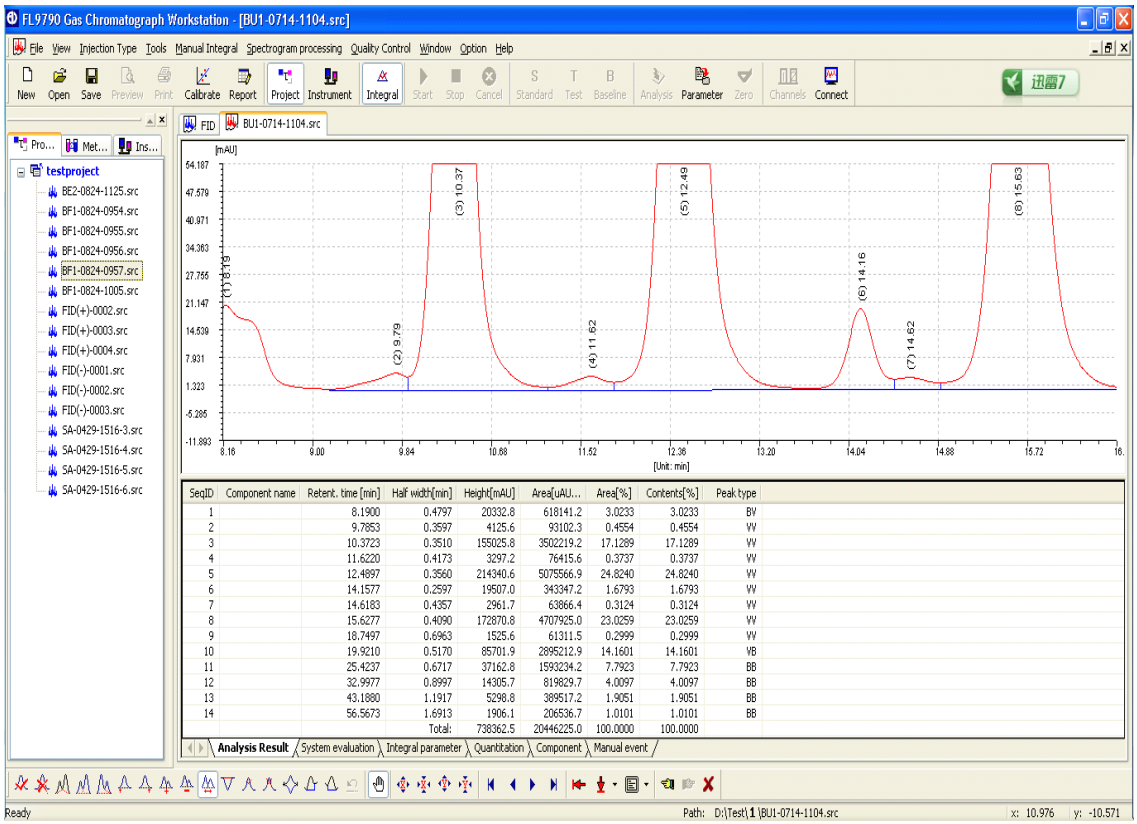


3. After opening the manual event page, it can be found out that one operated [Move Line-between] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:

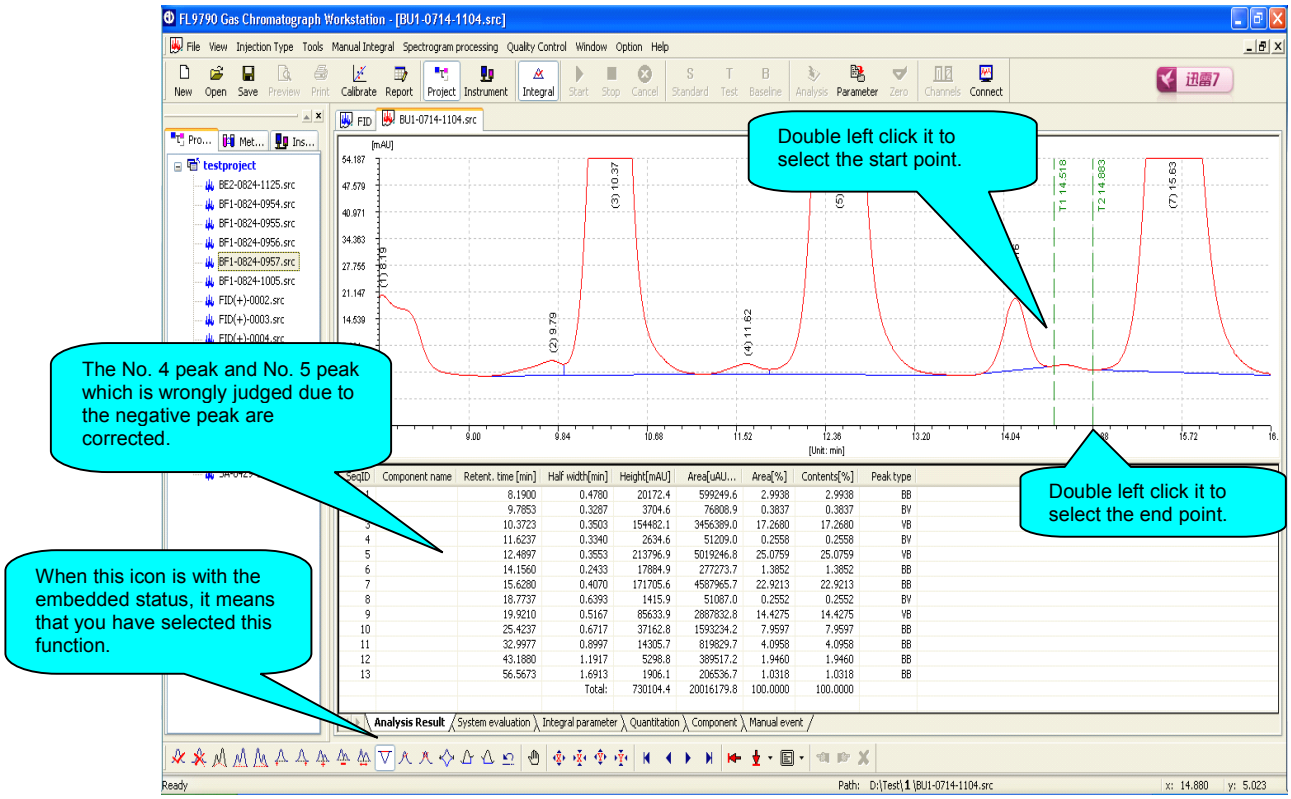


3.1.2.12 Negative Peak Identification1

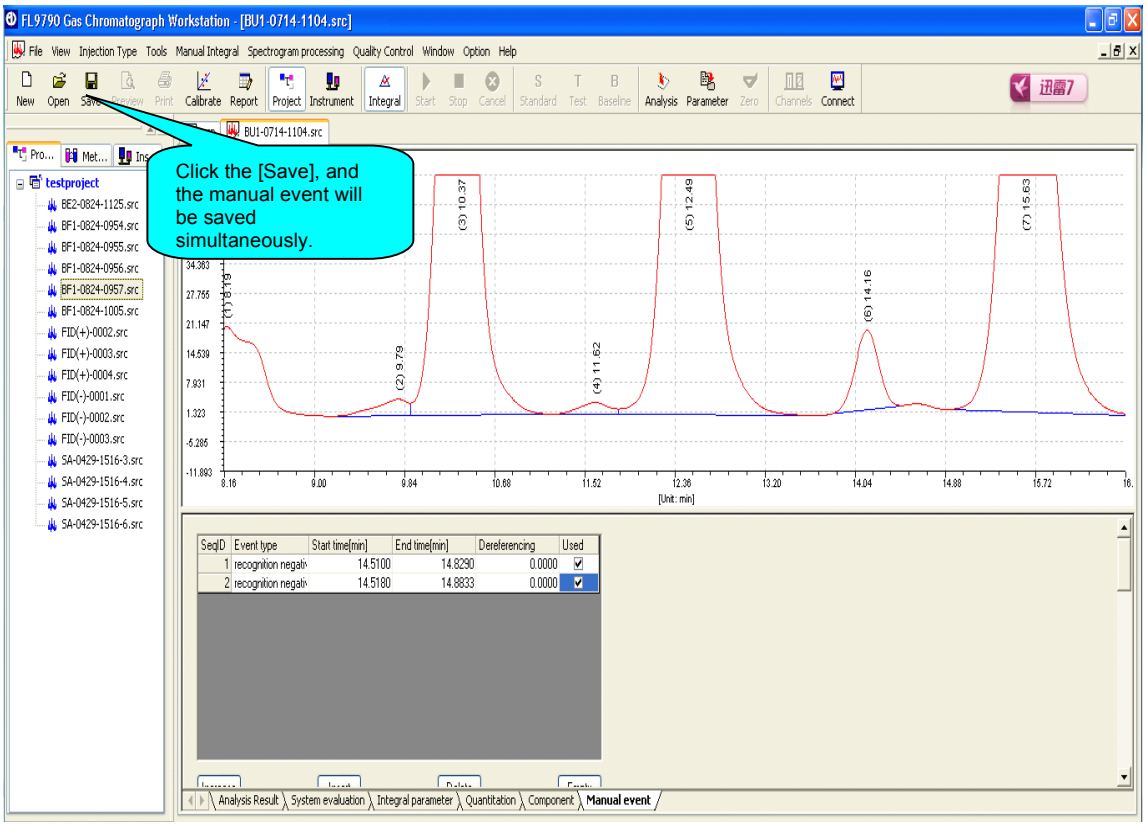
See the following figure for details of the way to open the spectrogram file to be processed



2. During the demonstration, as the spectrogram in the above figure has negative peak, the judgment of the baseline is inaccurate and the No. 4 peak and No. 5 peak are also inaccurate. And, left click  in the spectrogram toolbar. When this icon changes to the embedded status,  means that you have selected the negative peak identification functions. Move the mouse to the spectrogram area; place the pointer on the start point position of the negative peak, and double left click it to select the start point; after that, move it to the end point position of the negative peak, and double left click it to select the end point. And, the workstation will automatically change the baseline processing and correct the judgment of the peak. See following figure for details.



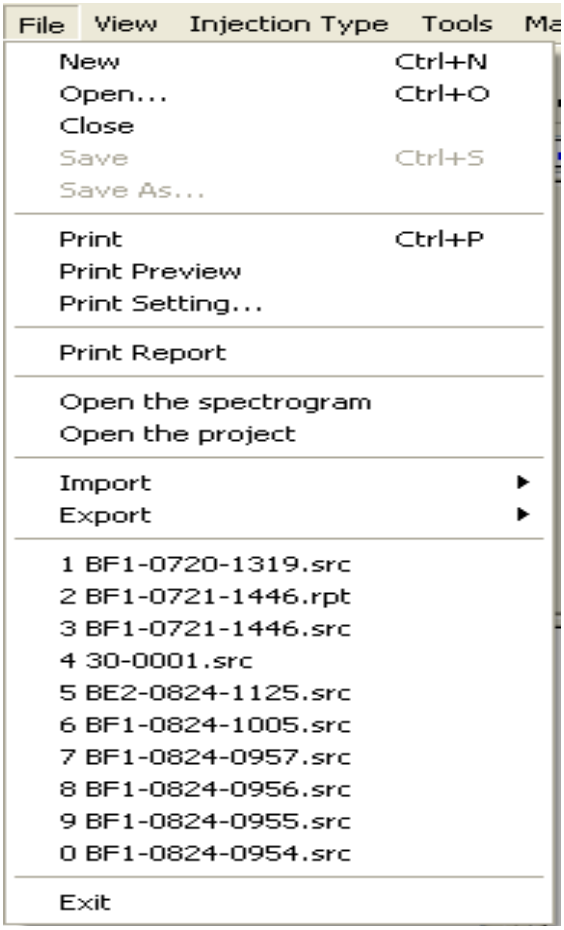
3. After opening the manual event page, it can be found out that one operated [Negative peak identification] manual event has been added in the manual event list. After saving the spectrogram, the information will be saved simultaneously. See the following figure for details:


FL9790 Gas Chromatograph Workstation - [BU1-0714-1104.src]
File View Injection Type Tools Manual Integral Spectrogram processing Quality Control Window Option Help
New Open Save Preview Print Calibrate Report Project Instrument Integral Start Stop Cancel Standard Test Baseline Analysis Parameter Zero Channels Connect
BU1-0714-1104.src
Click the [Save], and the manual event will be saved simultaneously.
testproject
BE2-0824-1125.src
BF1-0824-0954.src
BF1-0824-0955.src
BF1-0824-0956.src
BF1-0824-0957.src
BF1-0824-1005.src
FID(+)-0002.src
FID(+)-0003.src
FID(+)-0004.src
FID(-)-0001.src
FID(-)-0002.src
FID(-)-0003.src
SA-0429-1516-3.src
SA-0429-1516-4.src
SA-0429-1516-5.src
SA-0429-1516-6.src
(1) 8.19
(2) 9.79
(3) 10.37
(4) 11.62
(5) 12.49
(6) 14.16
(7) 15.63
[Unit: min]
SeqID Event type Start time[min] End time[min] Dereferencing Used
1 recognition negati 14.5100 14.8290 0.0000
2 recognition negati 14.5180 14.8833 0.0000
Analysis Result System evaluation Integral parameter Quantitation Component Manual event

3.2 Main Menu

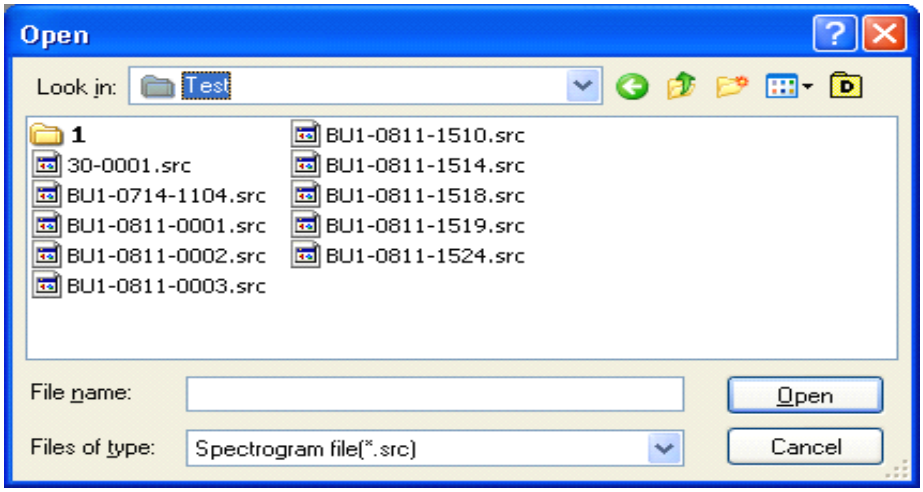
3.2.1 File MenuFile menu

If clicking the [File] menu in the main window, the file submenu will pop up. See following figure for details:

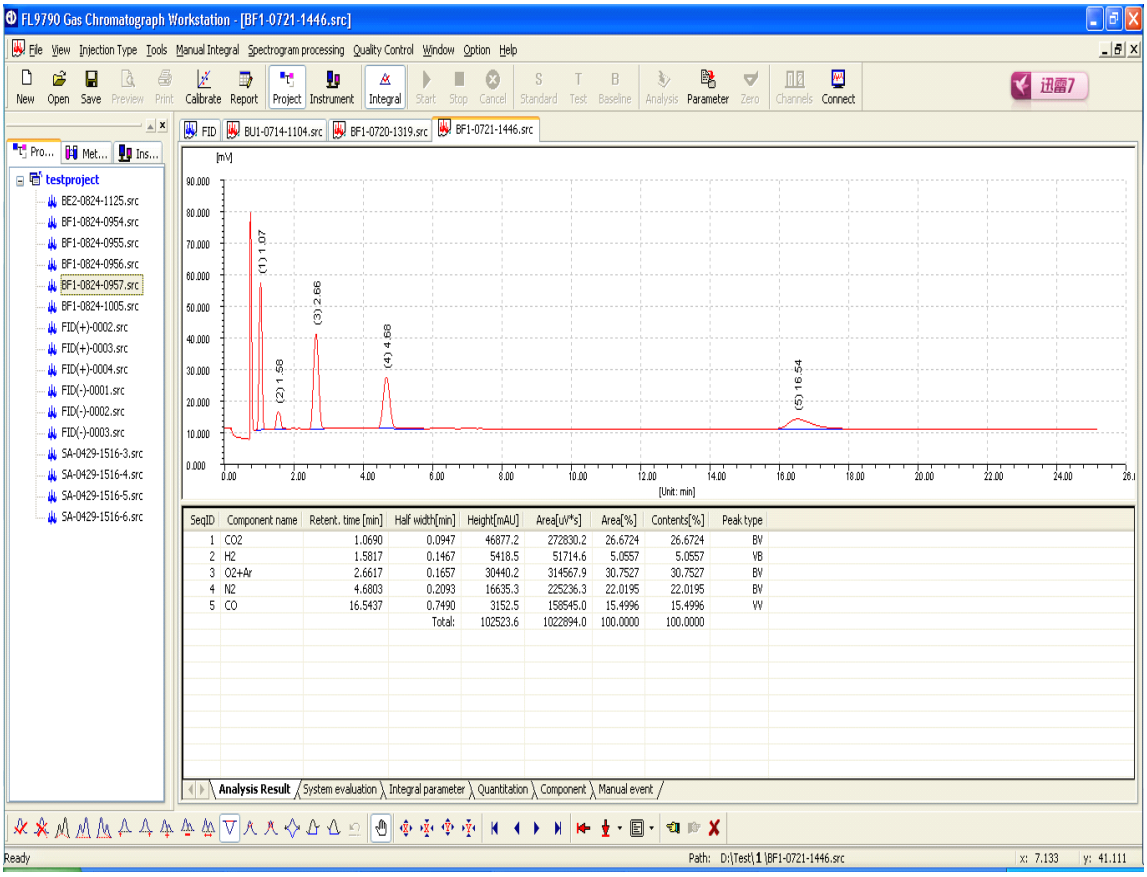


[New]: Create a project.

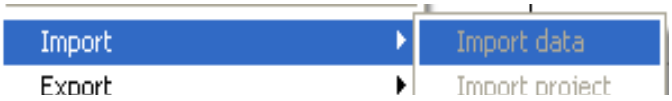
[Open] Pop up the [Open] dialog. The file has six types, including the spectrogram file, statement file, statement template file, multiple spectrogram file, fitting spectrogram file, and all files. It can also be achieved by pressing the [Open] button of the standard toolbar.[Close]: Close the current spectrogram window.[Save]: Save the current spectrogram file or statement file.[Save as]: Save the current spectrogram file or statement file as other file names.[Print]: Print the current statement file.[Print preview]: Preview the current statement file before print.[Print setting]: Set print options.[Statement print]: Click this option, the following dialog will pop up; thus, you can select the target statement file.



[Spectrogram open]: It will pop up the [Open] window with the spectrogram preview functions as well as display relevant information of the saved spectrogram. See following figure for details:

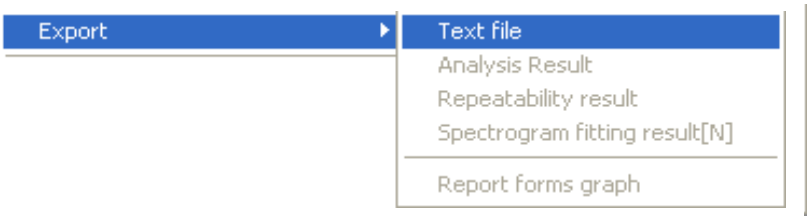


[Project open]: It is used to open the existing project.
[Import]:



Data import: Select the target project, and import the multiple data formats into the selected project and generate the spectrogram file with the FL9790 format.

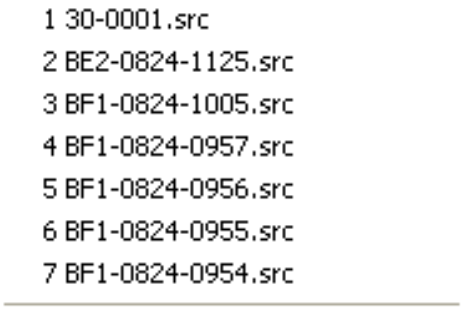
Project import: Select the project page, and import the original projects into one new project.[Export]:



File export: Export the data of the spectrogram file as the data file with the file format.

Analysis result export: Export the analysis result of the spectrogram file as the file with the file format.Repeatability result export: Open the multiple spectrogram window, and the menu can be activated and the repeatability results can be exported.

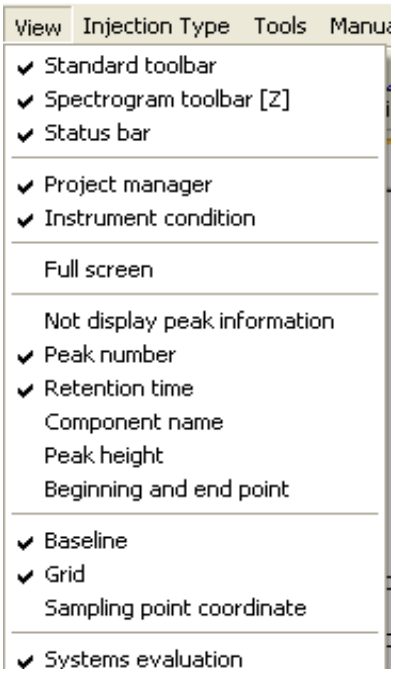
Spectrogram fitting result export: Open the spectrogram fitting window, and the menu can be activated and the spectrogram fitting results can be exported.Statement graphics export: Open the statement file window, and the menu can be activated and generate the statement file of each page as the (.bmp) graphics file.



The above figure shows recent ten files and provide the mode to quick open files.[Exit]: Exit from the system of the FL9790 chromatogram workstation.

3.2.2 View MenuView menu

If clicking the [View] menu in the main window, the view submenu will pop up. See following figure for details:

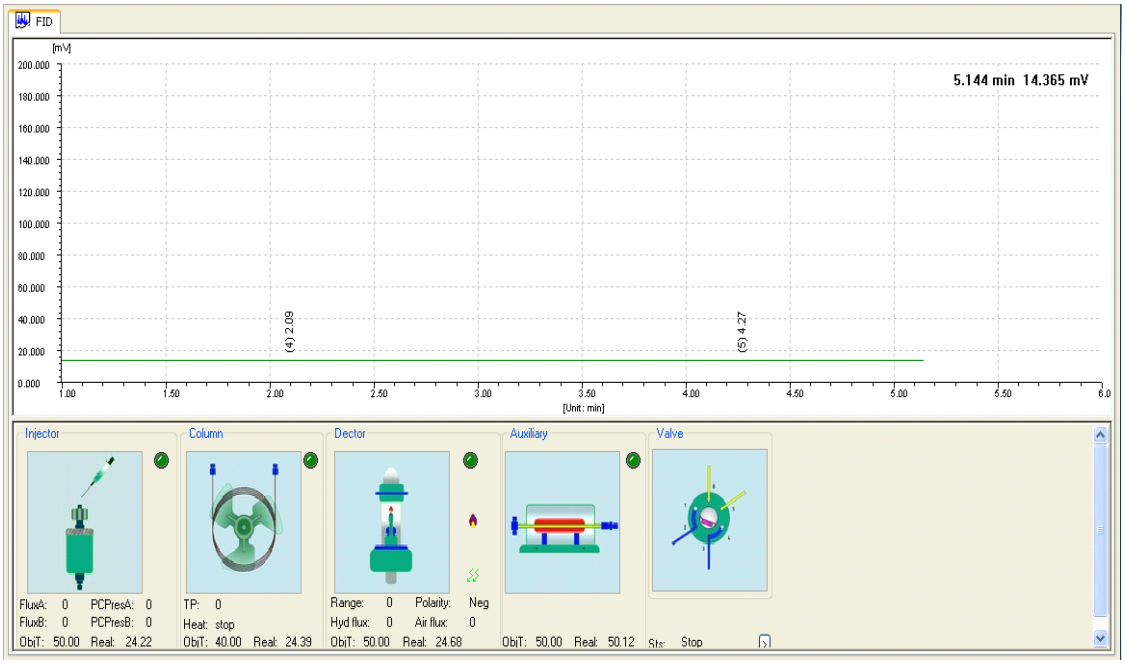


Standard toolbar: It can select to display or hide the standard toolbar. Ticketing means display; otherwise means hide.

Spectrogram toolbar: It can select to display or hide the spectrogram toolbar. Ticketing means display; otherwise means hide.Status bar: It can select to display or hide the status bar. Ticketing means display; otherwise means hide.

Project explorer: It can select to display or hide the project explorer. Ticketing means display; otherwise means hide. If left clicking the [Project] button in the standard toolbar, status switching can also be achieved. Instrument status: It can select to display or hide the anti-control window of instrument. Ticketing means display; otherwise means hide. If left clicking the [Instrument] button in the standard toolbar, status switching can also be achieved.

Full screen: It can be used for the full screen of the spectrogram window (see following figure for details). If left clicking the top left icon, the spectrogram window will restore to the original status.



No display of the peak information: No peak information will be displayed in the real integration or the displayed spectrogram file. If this option is selected, settings of other relevant peak information will be insignificant.

Peak number: The peak sequence column number will be displayed in the real integration or the displayed spectrogram file.Retention time: The peak retention time will be displayed in the real integration or the displayed spectrogram file.Component name: The peak component name will be displayed in the real integration or the displayed spectrogram file with the preconditions that the component name matched with the current peak is found in the analysis method.

Peak height: The start point and end point of the peak height will be displayed in the real integration or the displayed spectrogram file

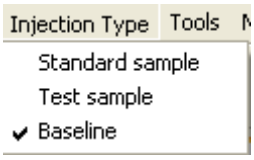
Identify the start point and end point of the peak in the real integration or the displayed spectrogram file.

Baseline: The baseline will be displayed in the real integration or the displayed spectrogram file. Grid: The grid is displayed in the sample injection window or the spectrogram window.

System evaluation: The system evaluation page is added in the window of the opened spectrogram file.

3.2.3 Sample Injection Type Menu

Sample injection type menu:If clicking the [sample injection type] menu in the main window, the sample injection type submenu will pop up. See following figure for details:



Standard sample, specimen, and baseline: Only one of these three buttons can be selected, which means the sample injection type. If first two modes are applied for setting the spectrogram file name, it will impact the selection of initial letters of the sample injection file name. For the standard sample and spectrogram files, the initial letter is S; for the specimen and spectrogram files, the initial letter is T; for the baseline and spectrogram files, the initial letter is B. If the spectrogram file name is set as the customized definition, there will be no impact on the spectrogram file name. And the specific functions are same as that of the [Standard sample], [Specimen], and [Baseline] in the standard toolbar.

3.2.4 Tool MenuTool menu

If clicking the [tool] menu in the main window, the tool submenu will pop up. See following figure for details:

[Correction]: Open the correction window, and click the [Correction] button in the standard toolbar.[Statement]: Open the statement window, and click the [Statement] button in the standard toolbar.

[Template]: Open the statement template window, and design a statement with the defined format by means of tools in the following statement template toolbar. And, the statement toolbar is as follows:

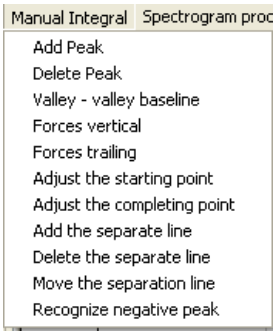
[Start]: Start to record the sample injection curve, and click the [Start] button in the standard toolbar

[Stop]: Stop to record the sample injection curve, and a new sample injection file will be generated under the current project, which means that the sample injection is ended. And, this can also be achieved by clicking the [Stop] button in the standard toolbar.

[Cancel]: Cancel to record the sample injection curve, and no new sample injection file will be generated under the current project, which means that the sample injection is cancelled. And, this can also be achieved by clicking the [Cancel] button in the standard toolbar.

3.2.5 Manual Integration Menu

If clicking the [manual integration] menu in the main window, the manual integration submenu will pop up. See following figure for details:



Peak adding: Manually add a peak, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.

Peak deletion: Manually delete a peak, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.Valley-valley baseline: Manually adjust the time period baseline to the valley-valley baseline, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.Compulsory vertical cutting: Manually adjust the time period base line as the vertical line-between, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.Compulsory tailing: Make the compulsory tailing operation to the spectrogram manually, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.

Start point adjustment: Manually adjust the start point of the peak, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.

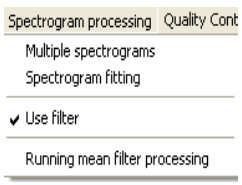
End point adjustment: Manually adjust the end point of the peak, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.Line-between adding: Manually add the vertical line-between, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.

Line-between deletion: Manually delete the vertical line-between, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.

Line-between movement: Manually move the vertical line-between, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.Negative peak identification: Manually identify the negative peak, which can also be achieved by selecting corresponding tools in the spectrogram toolbar.

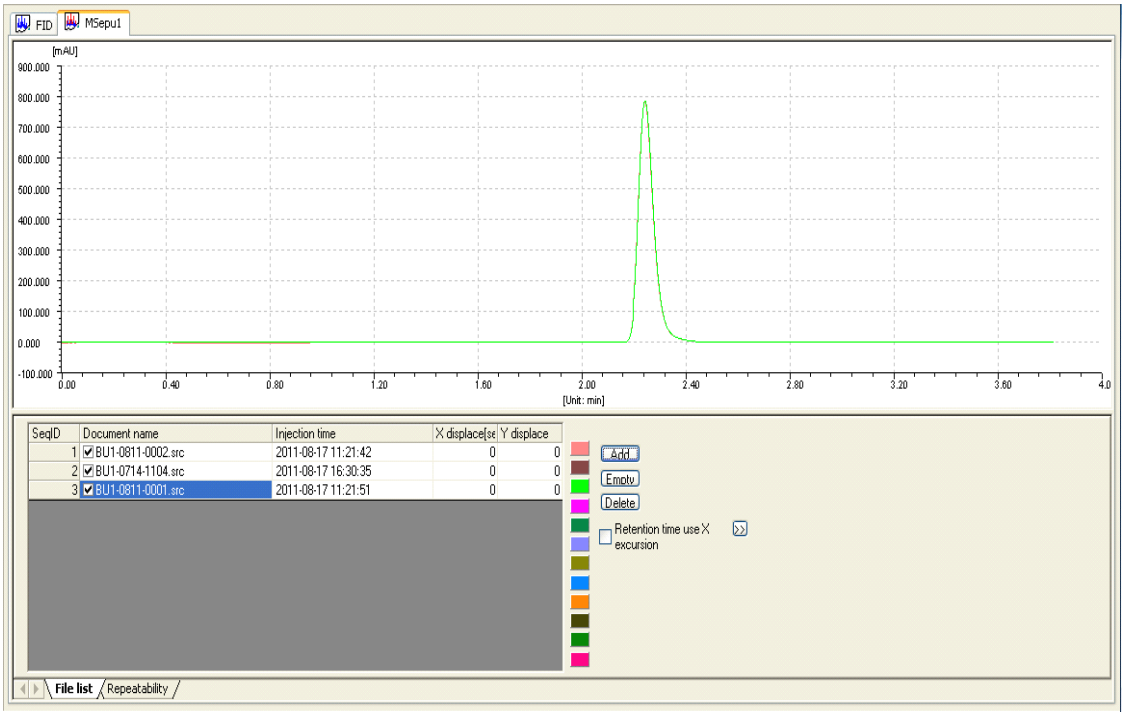
3.2.6 Spectrogram Process Menu

If clicking the [Spectrogram process] menu in the main window, the spectrogram process submenu will pop up. See following figure for details:

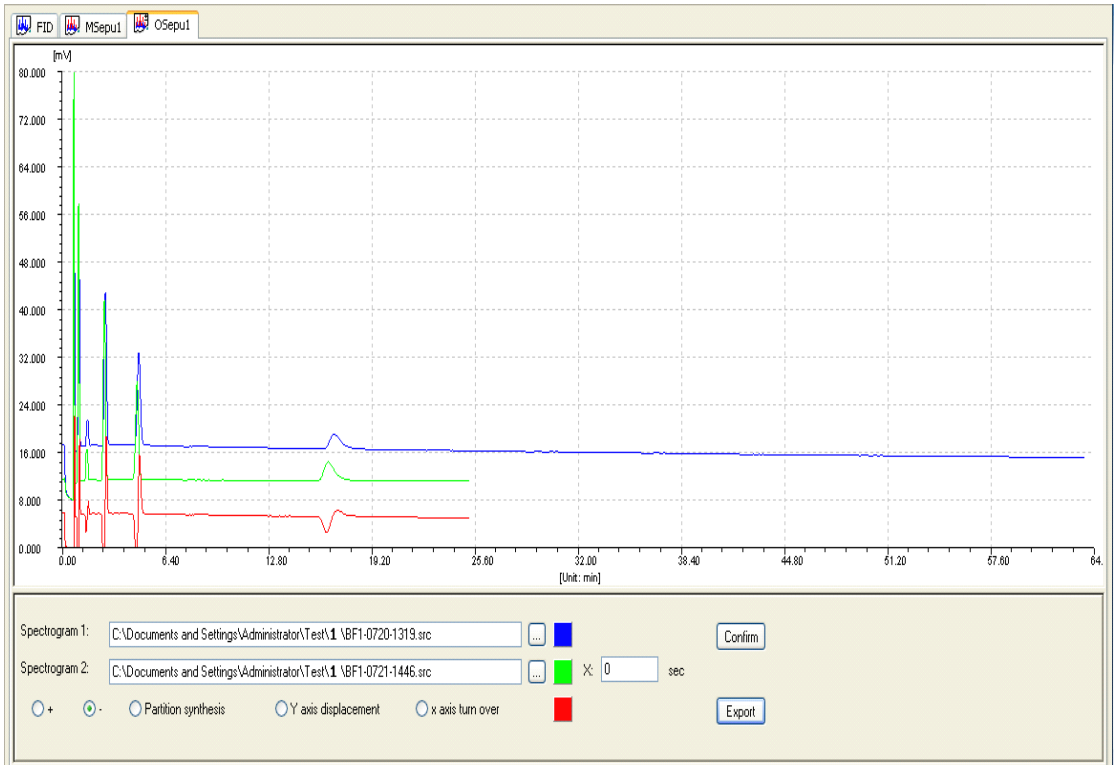


[Multiple spectrogram]: Open the multiple spectrogram window, and eight spectrogram curves can be simultaneously opened in the multiple spectrogram

window at the most. Furthermore, each curve can be set as different colors, the offset of X axis and Y axis can be set, and the multiple spectrogram can be saved, printed, and previewed.The multiple spectrogram window is as follows:



[Spectrogram fitting]: Open the spectrogram fitting window, and addition and subtraction can be made to two spectrogram curves.The spectrogram fitting window is as follows:

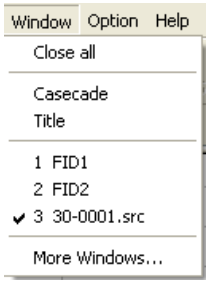


[Filtering application]: If the filtering process is needed for selection of the

sampling data. The noise from the signal can be shielded by the filtering process.

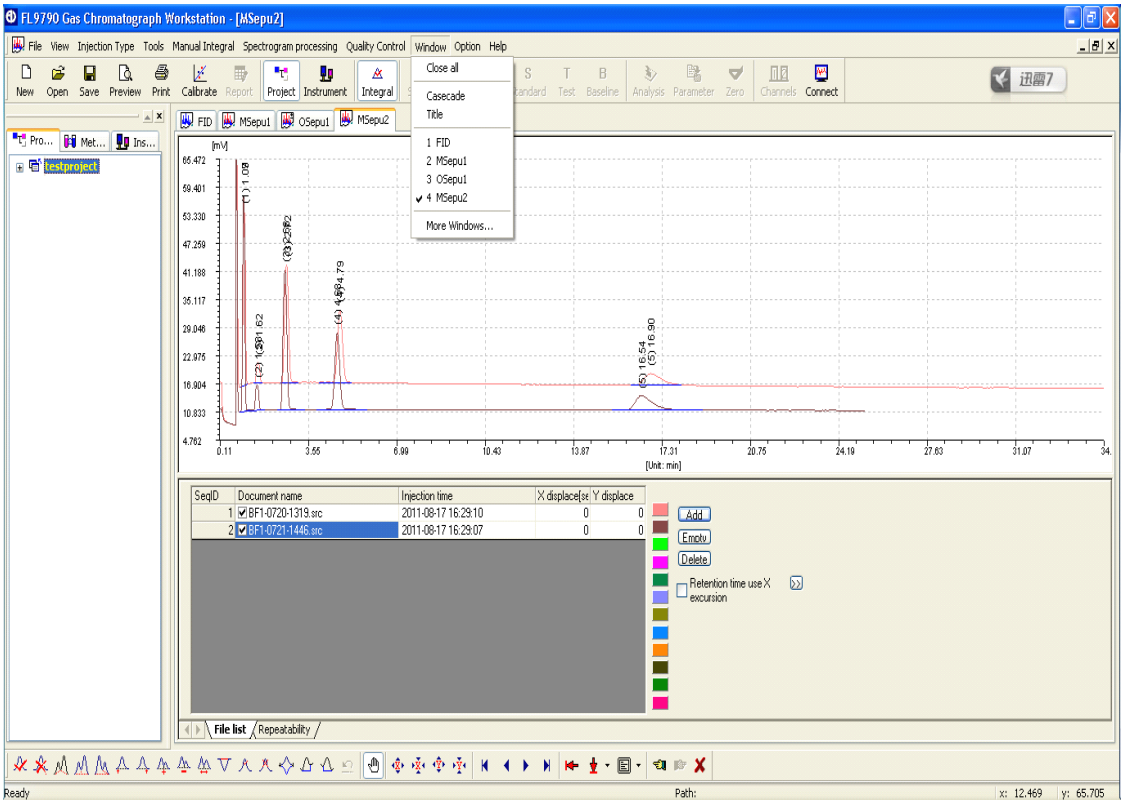
3.2.7 Window MenuWindow menu:

If clicking the [Window] menu in the main window, the window submenu will pop up. See following figure for details:

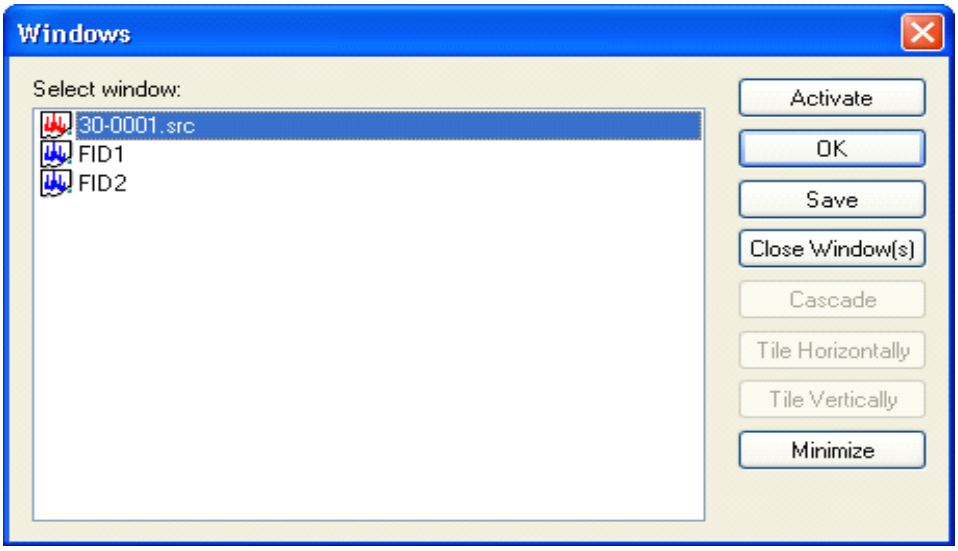


[Close all]: Close all opened windows.[Overlapping]: All opened windows will be arranged and expanded by the overlapping mode. [Tile]: All opened window will be arranged by the tile mode.

MSepu1 MSepu1: It is the currently opened window; ticketing means the target window under operation. See following figure for details:



[More windows]: Make more operations to the selected window. See following figure for details:



Activation: Set the selected window as the current operation window.

OK: Confirm operations and close the dialog.

Save: Save the selected window data.

Close window: Close the selected window.

Overlapping: It will be activated when selecting more windows. All selected windows will be arranged and expanded by the overlapping mode.

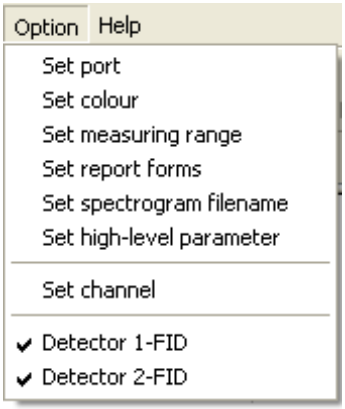
Horizontal arrangement: It will be activated when selecting more windows. All selected windows will be arranged and expanded by the horizontal mode.

Vertical layout: It will be activated when selecting more windows. All selected windows will be arranged and expanded by the vertical mode.

Minimization: Minimize the selected window.

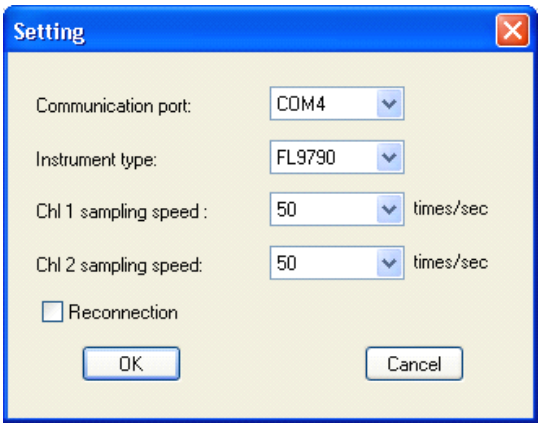
3.2.8 Option Menu

Option menu: If clicking the [Option] menu in the main window, the option submenu will pop up. See following figure for details:



1. Setport

Click the setport, and the [Set] dialog will pop up.



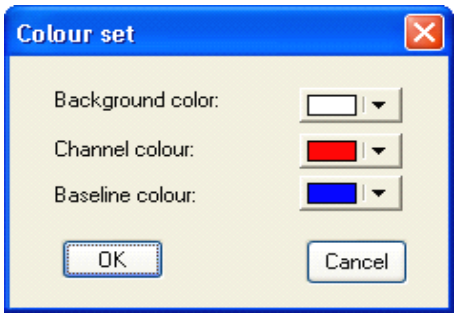
Communication interface: The communication port of the client.

Instrument type: The type of the FL9790 chromatogram workstation.

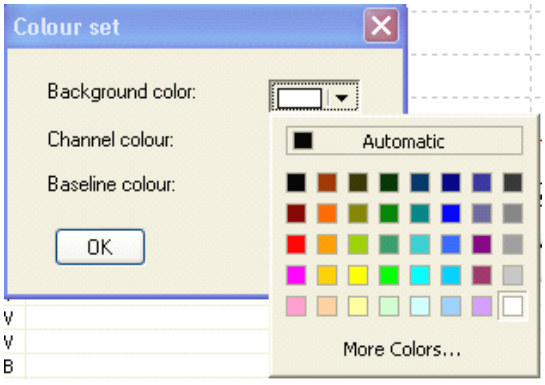
Sampling speed of the detector 1: The sampling speed of the channel of the instrument detector 1, and the unit is times/second.

Sampling speed of the detector 2: The sampling speed of the channel of the instrument detector 2, and the unit is times/second.

Reconnection: Under the default conditions, if the setting is not changed, the program will not re-connect with the port when pressing the button [OK]. Here, you can select the reconnection. No matter the setting is changed or unchanged, the program will reconnect with the port.2. Color settingClick the color setting, and the [Color setting] dialog will pop up. See following figure for details:



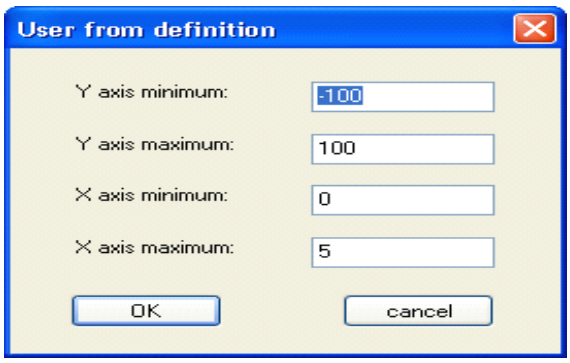
The color can be selected through the pull-down menu. See following figure for details:



3. Range setting

Click the range setting, and the [Customized definition] window will pop up. Set

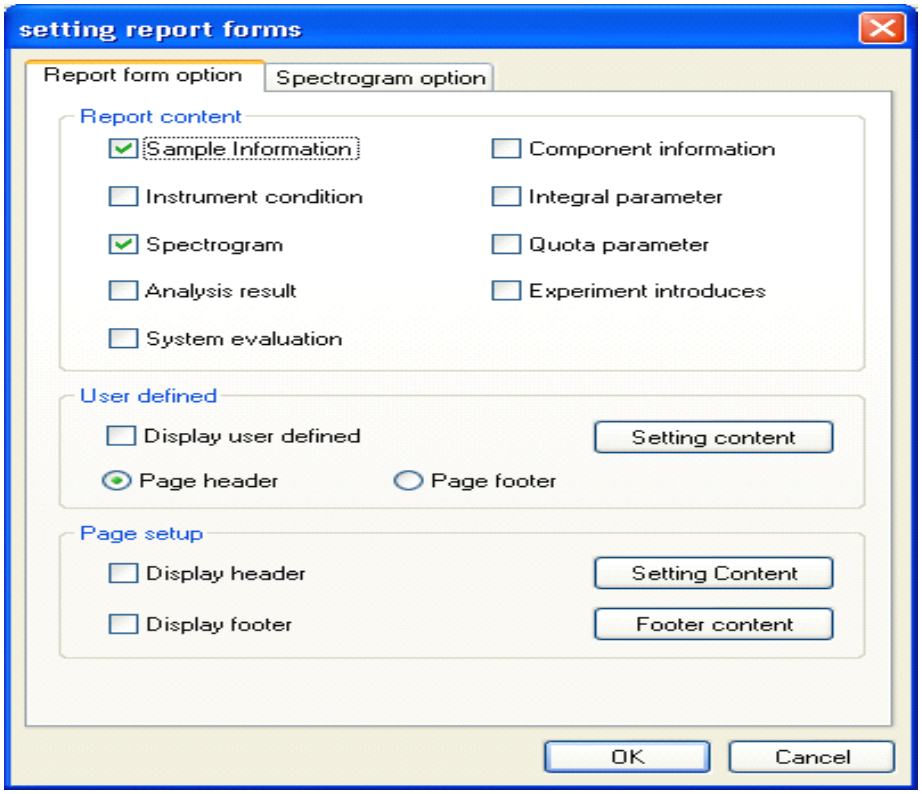
the max. and min. ranges of the X axis and Y axis of the drawing window, and the information concerning the customized definition range will be recorded.



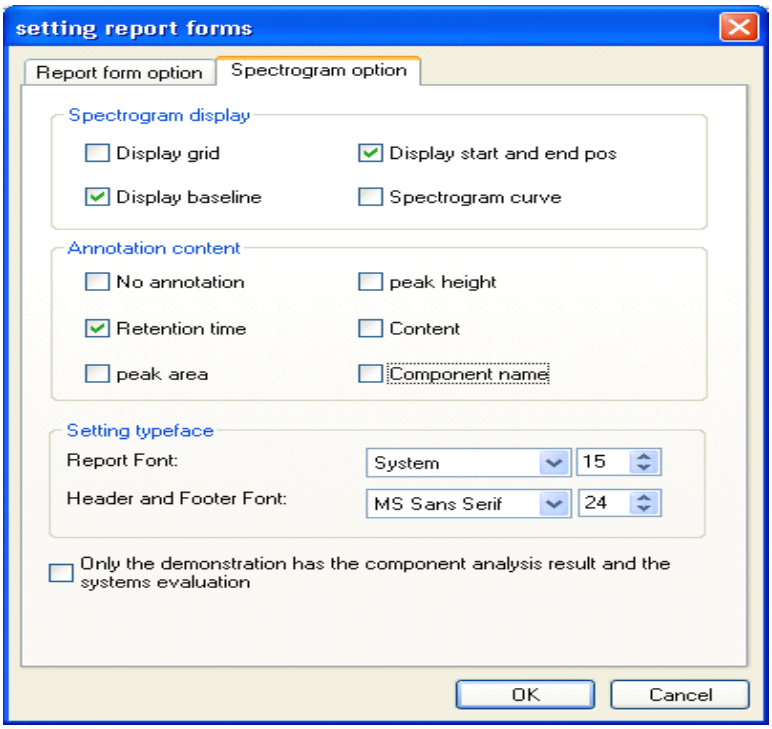
4. Statement setting

Click the statement setting, and the [Statement setting] window will pop up, which contains two property pages.

Statement option: The setting of the statement setting content and page, which can be selected of the display or hide of the page header and page footer, By clicking the content of the page header and page footer, they can be automatically set. See following figure for details:

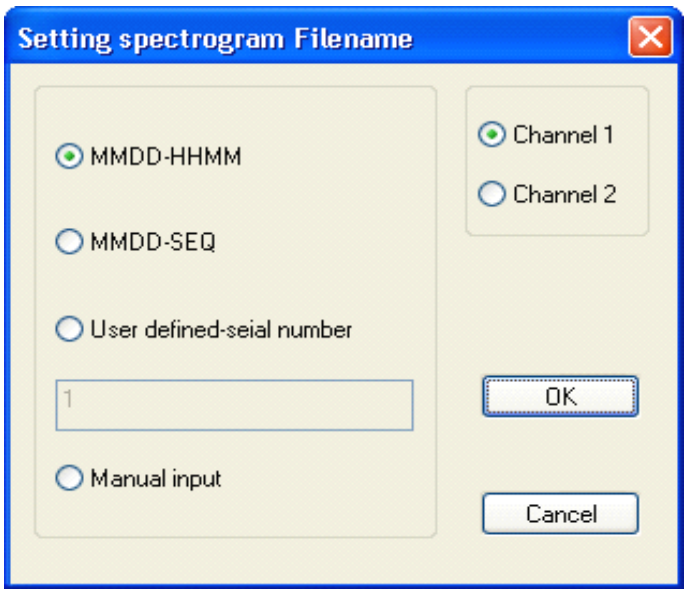


Spectrogram option: Set the information and annotations displayed by the spectrogram. See following figure for details:



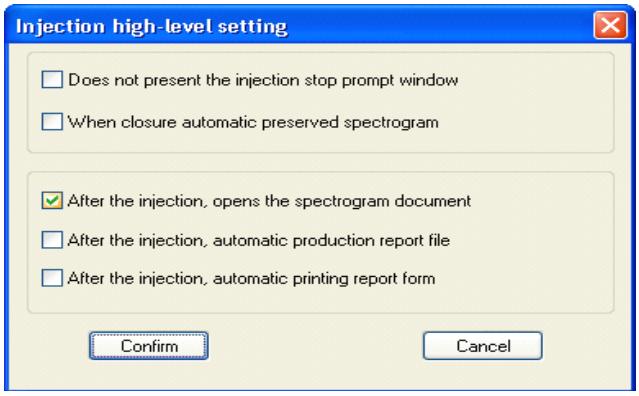
5. Spectrogram file name setting

Click the spectrogram file name setting, the [Spectrogram file name setting mode] window will pop up. The file name setting has four modes, the first two modes take the sample injection time as the benchmark; the third customized definition-serial number mode can be used to set the expected file name, the fourth manual input mode can be used to provide the user with the prompt of the sample injection file input upon completing the sample injection.



6. Advanced parameter settingClick the advanced parameter setting, the [Advanced setting of the sample injection] window will pop up, and the default setting after the workstation installation is shown in the following figure. On the basis

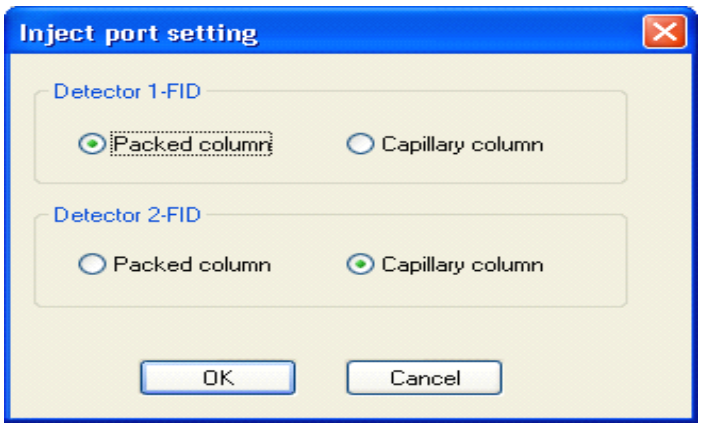
of special requirements, you can adjust the advanced parameters; please not change such parameters if not necessary.



Prior to the sample injection, select the [Automatic generation of statement files after the sample injection] in the dialog, and the statement will be automatically generated according to your statement setting and setting of the affiliated project of the spectrogram after the sample injection. If the automatically-generated statement is dissatisfactory, the [Statement setting] window can be used to change relevant settings or relevant property of the affiliated project of the sample injection file; after that, click the [Statement] button in the standard toolbar, new statement will be generated.

Prior to the sample injection and after selecting the [Automatic print of statements after the sample injection] in the dialog, the statement will be automatically printed according to your statement setting and setting of the affiliated project of the spectrogram after the sample injection.

If the [Automatic generation of statement files after the sample injection] and [Automatic print of statements after the sample injection] are not selected prior to the sample injection, double left click the spectrogram file after completing the sample injection as well as click the [Statement] button in standard toolbar, and the statement file will be automatically generated according to your setting and setting of the affiliated project of the spectrogram.7. Channel setting If clicking the channel setting, the [Sample injection channel setting] window will pop up. See following figure for details:



Make matching based on the actual configuration of the type GC9790 III

chromatogram analyzer. The detector 1-FID in the figure is the condition automatically identified by the FL9790 chromatogram workstation based on actual configuration conditions, which can't represent all instruments. And the detector 1 is the FID detector. If in the actual configuration, the detector 1 is connected with the capillary column, it shall be configured as the capillary.Click the [OK], close the [Sample injection channel setting] window, and complete the sample injection channel setting.

Attention: The accurate setting of the sample injection channel is vital to the sample analysis of the GC9790 III gas chromatogram analyzer. Please confirm the setting accuracy prior to the sample injection analysis.

8. Display and hide of the detector window

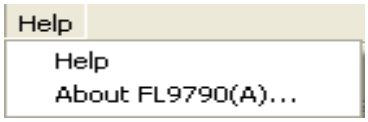
The bottom of the option submenu is the display and hide of the detector window.

Ticketing means that the detector window is in the display status, otherwise means that it is in the hide status, and the detector function will be closed.

The number of the displayed detector means the number of the detector configured for the GC9790 III gas chromatogram analyzer.

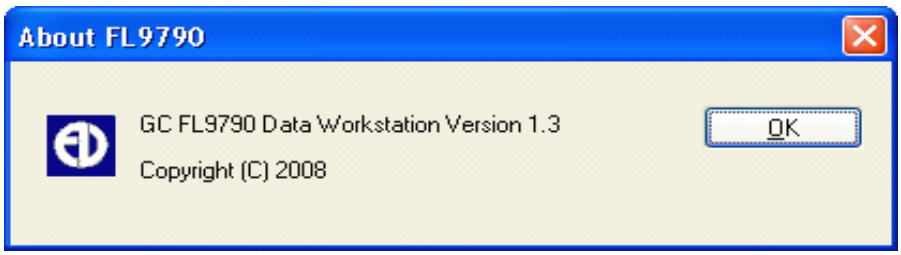
3.2.9 Help Menu

Help menu: Click the [Help] menu in the main window, and the help submenu will pop up. See following figure for details:



Help: None.

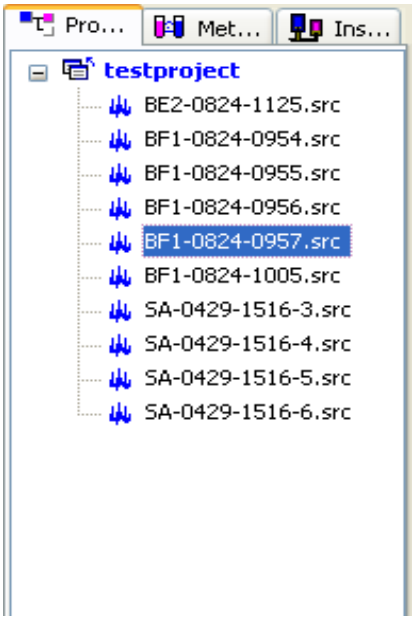
About FL9790: The window with the pop-up FL9790 edition information. See following figure for details:



3.3 Window

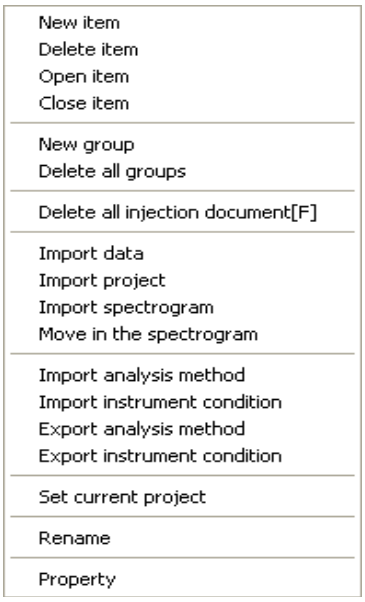
3.3.1 Project Window

3.3.1.1 Project Page



The project page is mainly used to manage numerous project files and spectrogram files.After being selected to serve as the current project, the project font color will be changed to blue. And, the font of other inactive projects is black. All spectrograms collected by the sample injection will be saved in the target project.

Select one project in the project page and right click it, and the project page menu will pop up. The project page menu is as follows:



New: Create a project, which can also be achieved by clicking the [New] button in the standard toolbar.

Project deletion: Delete a project, and all sample injection files of the project and project property setting will be deleted. Project open: Open an old project, and re-open the closed project.

Project close: If there are numerous projects, it is difficult to look up a project within the limited space of the project window, and scrolling of scroll bar is needed. If

one project is completed, all sample injection data has become the historical data, and the project will not be applied in short term, it can be closed. Furthermore, this project will not be displayed in the project window anymore; however, it is not deleted but hidden, and you can re-open it at any time.

Deletion of all sample injection files: Select one project, and delete all sample injection files below it. Data import: Import the data file with multiple formats into the selected target project and generate the spectrogram file with the FL9790 format. Project import: Re-import a project.

Spectrogram import: Import the spectrogram files of other projects into the selected target project.

Analysis method import: Import the existing analysis methods into the selected target project, which is the fact that the existing matured analysis method is made as the project analysis method.

Instrument condition import: Import the existing instrument conditions into the selected target project, which is the fact that the existing matured instrument conditions are made as that for the project analysis.

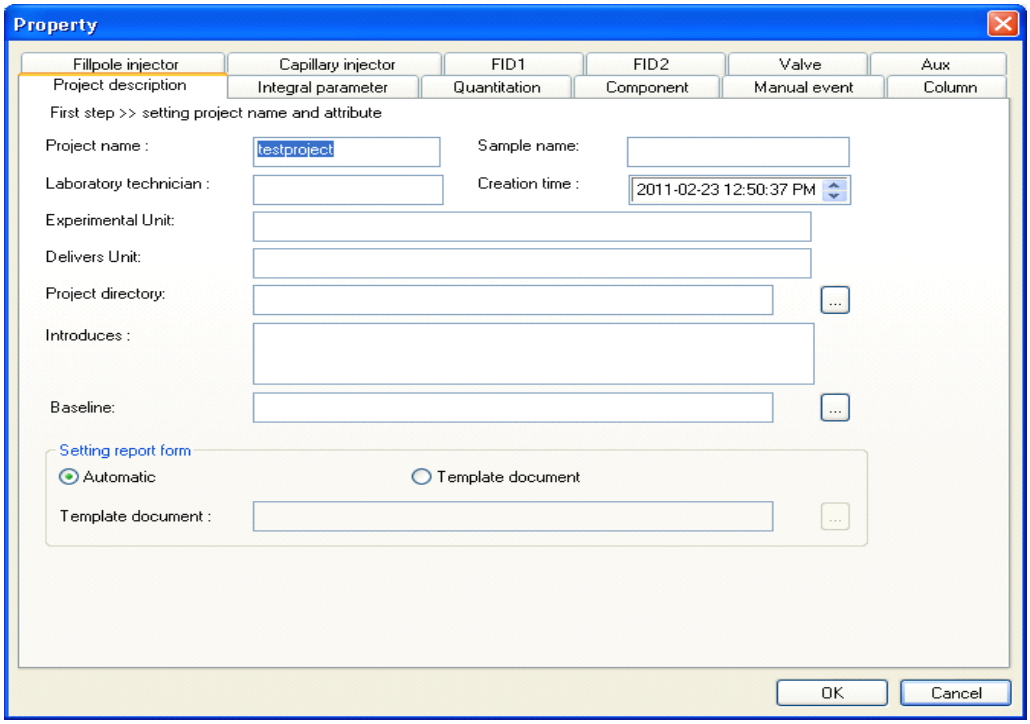
Analysis method export: The analysis method of the selected target project is exported and saved for future use.

Instrument condition export: The instrument conditions of the selected target project are exported and saved for future use.

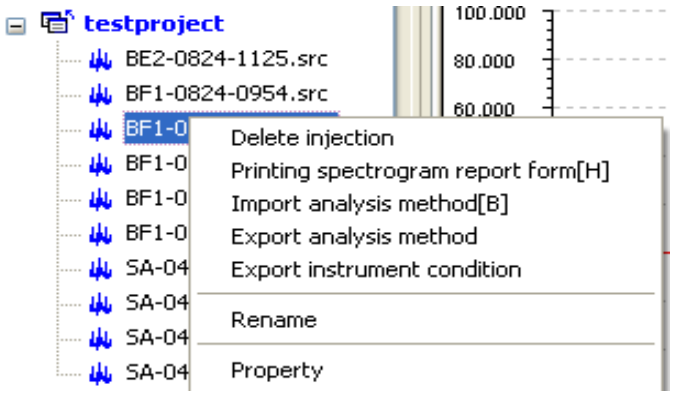
Current project setting: After the selected target project is selected to serve as the current project, all the spectrograms collected by the sample injection will be saved in the target project. Subsequently, the project font color will be changed to blue. And, the font of other inactive projects is black. Further, the current project setting will be recorded in the registry, and the selected current project upon the last startup will be recorded in the next startup. And, the new sample injection data will be saved in the current project.

Rename: Change the name of the selected project.

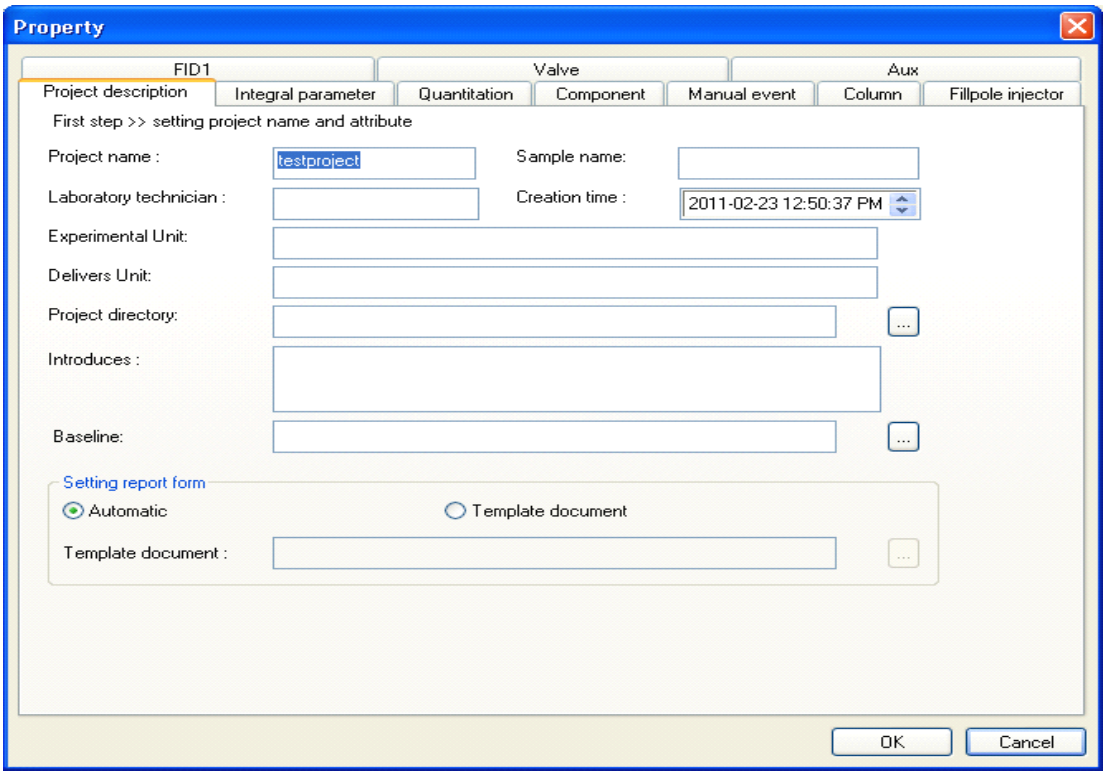
Property: The [Property] dialog of the selected project will pop up. And, it can open several property pages, including the project descriptions, integral parameter, quantitative parameter, component form, manual event, etc. See following figure for details:



All parameters of the project can be reset in the [Property] dialog.Select one sample injection file in the project page and right click it; after that, the sample injection file menu will pop up. And, the sample injection file menu is as follows:



Deletion of sample injection: Delete this sample injection, and the sample injection file will be deleted.Print of spectrogram statement: The statement file of the selected spectrogram will be generated and printed according to the previous statement setting. Analysis method import: Import the existing analysis method into this selected target spectrogram. And the existing analysis method is applied for the spectrogram processing.Analysis method export: The analysis method of the spectrogram is exported and acts as the classical analysis method for future use. Instrument condition export : The instrument conditions of the selected target project are exported and saved for future use.Rename: Change the name of the selected sample injection file.Property page: It can display the property of the selected sample injection file. And, it can open several property pages, including the property page, project descriptions, integral parameter, quantitative parameter, component form, manual event, etc. See following figure for details:

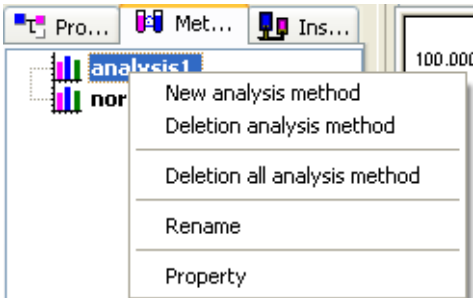


3.3.1.2 Method Page

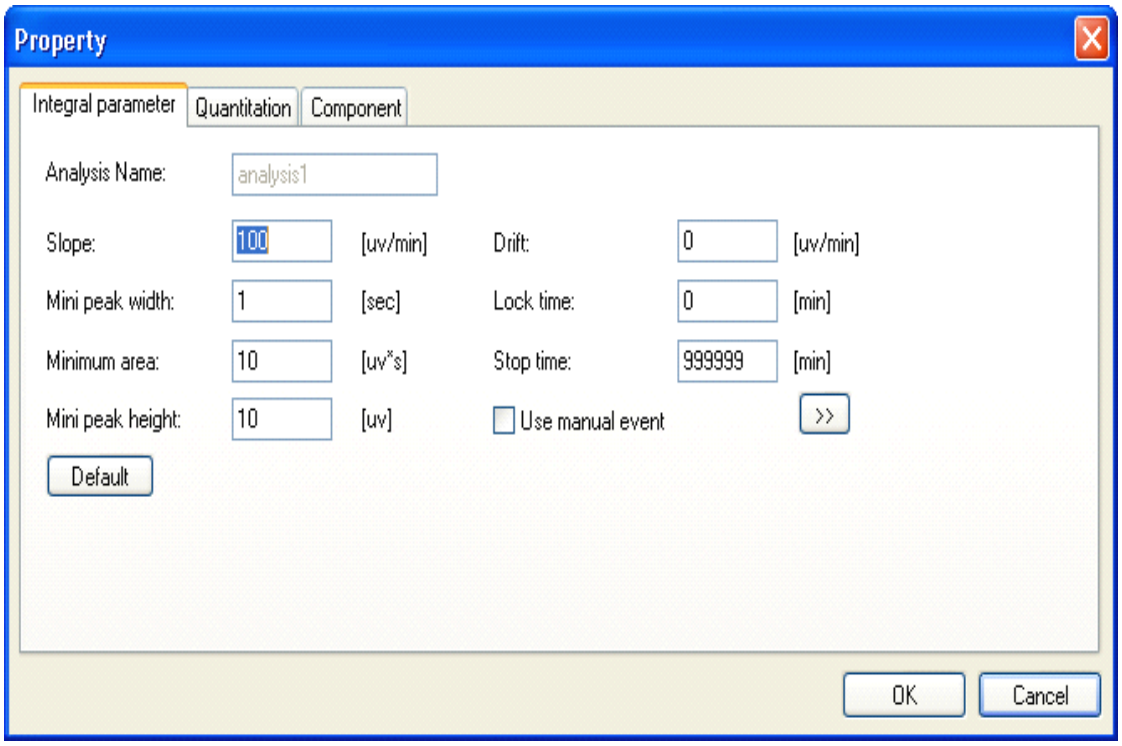
The method page can manage several analysis methods, which can predefine several analysis methods for users' use and export the classical analysis method from the previous project or spectrogram for users' use. Furthermore, the user can also create his own analysis method based on individual demands.

Right click the method page, and the analysis method menu will pop up. See

following figure for details:

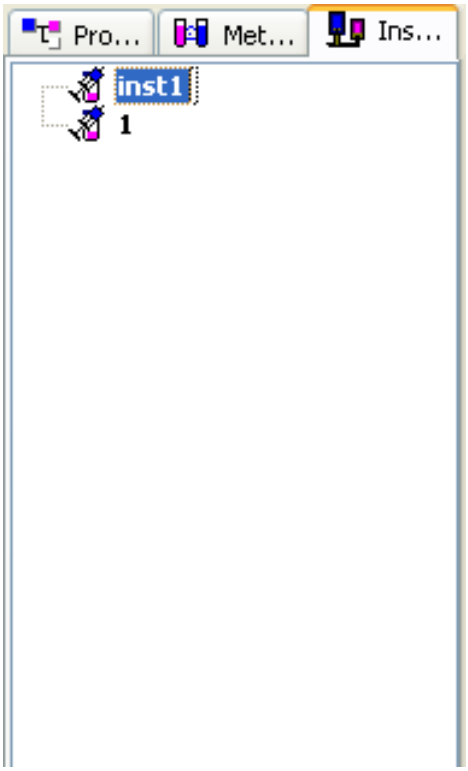


Analysis method adding: Add one new analysis method.Analysis method deletion: Delete the selected analysis method.Deletion of all analyses: Delete all analysis methods. Rename: Change the name of the selected analysis method.Property: Pop up the [Property] dialog of the selected analysis method. See following figure for details:

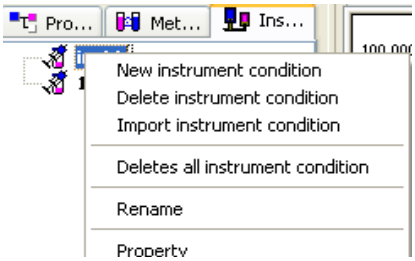


The dialog will display the property of the selected analysis method and all parameters of the analysis method can be modified in the property, so as to make an ideal analysis method.

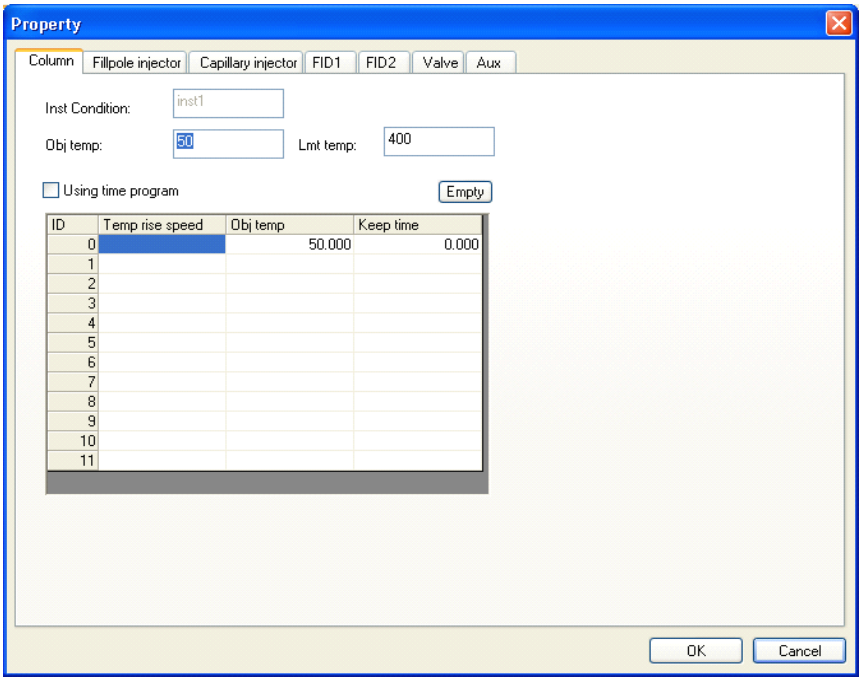
3.3.1.3 Instrument Page



The instrument page can manage several management methods, which can predefine several instrument conditions for users' use and export the classical instrument conditions from the previous project or spectrogram for users' use. Furthermore, the user can also create his own instrument conditions based on individual demands.Right click the instrument page, and the instrument condition menu will pop up. See following figure for details:



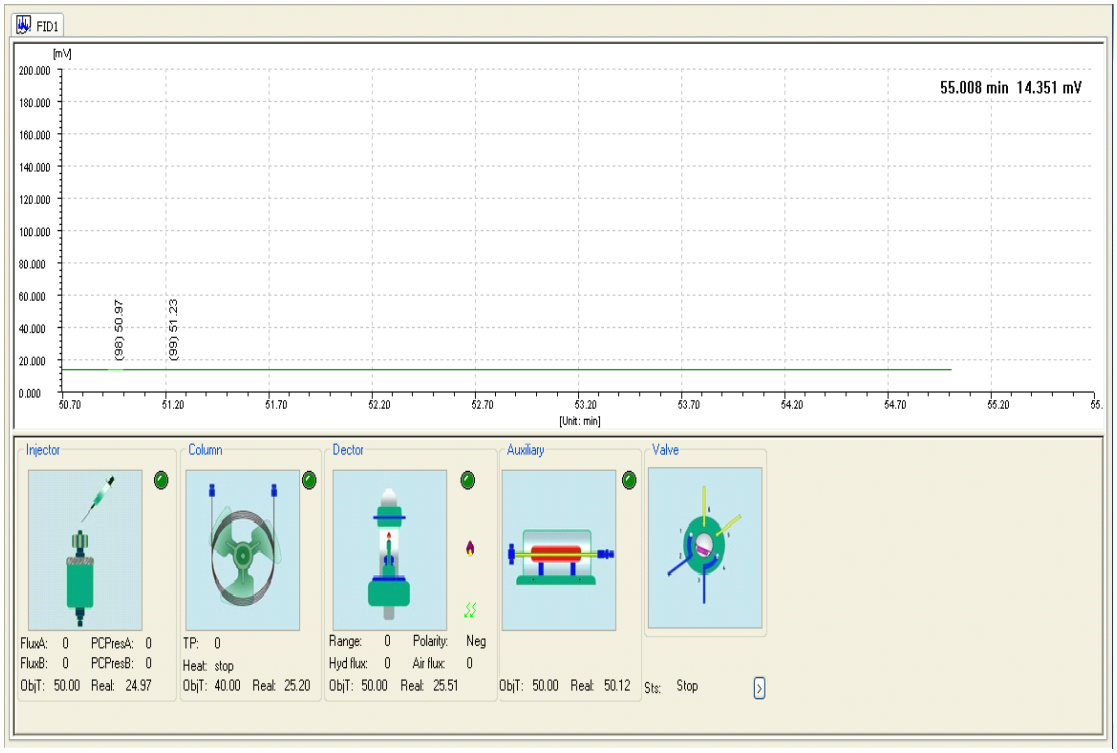
Instrument condition adding: Add one new instrument condition.Instrument condition deletion: Delete the selected instrument condition.Deletion of all instrument conditions: Delete all instrument conditions in the instrument page. Rename: Change the name of the selected instrument condition.Property: Pop up the [Property] dialog of the instrument condition. See following figure for details:



The dialog will display the property of the selected instrument condition and all parameters of the instrument condition can be modified in the property, so as to make an ideal instrument condition

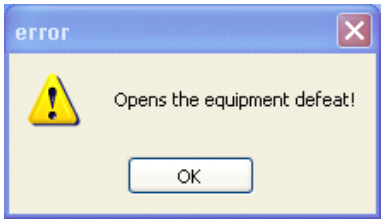
3.3.2 Sample Injection Window

If the parameter setting in the [Setport] window is accurate after starting the FL9790 workstation, the sample injection window will automatically pop up. See following figure for details:

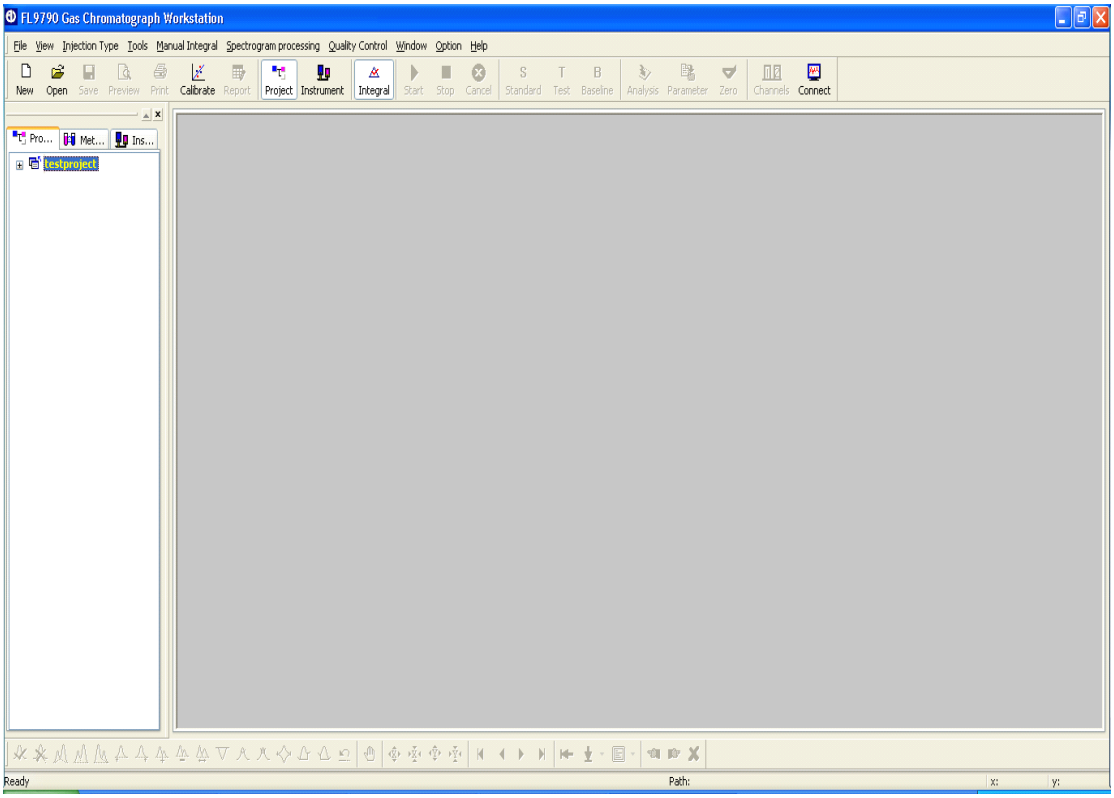


If the [Setport] setting is incorrect or the GC9790 gas chromatogram analyzer is

not connected with the computer or the connection is wrong, the [Error] window will pop up. See following figure for details:



After Clicking the [OK], both the sample injection window and the anti-control area will become grey. See following figure for details:



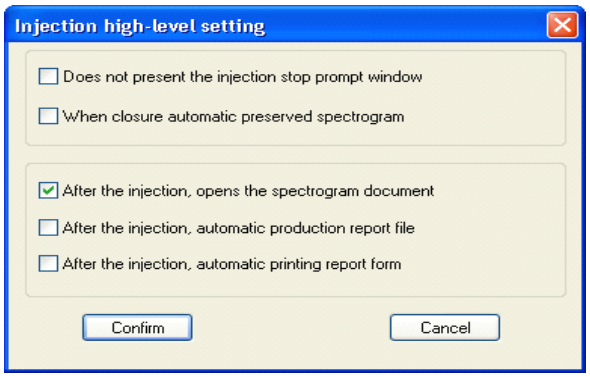
Click the [Setport] of the [Option] menu under the main menu column, so as to check the accuracy of the communication settings. In addition to the above, check if the cable connection between the GC9790 III gas chromatogram analyzer and the computer is proper.

When the cursor is moved to the spectrogram area, pressing the [shift] key to change the mouse pointer. When the mouse is of the hand shape, pressing the left mouse button can drag the spectrogram; when the mouse is of the arrow shape, pressing the left mouse button can drag the spectrogram to bottom right and zoom in the spectrogram; pressing the left mouse button can drag the spectrogram to top left and zoom out the spectrogram. After the zoom in or zoom out is made to the spectrogram, the mouse will be of the magnifying glass shape; if clicking the left mouse button, the mouse will be of the arrow shape again. Furthermore, you can also select  in the spectrogram toolbar to drag the spectrogram.

Note: When the mouse is of the magnifying glass shape or the arrow shape, the left mouse button can be pressed to form the dashed block and make zoom out and zoom in to the interior spectrogram by dragging.If clicking the left mouse button, the mouse will change to the arrow shape from the hand shape; however only the [shift] key is pressed or  in the spectrogram toolbar is selected, the mouse will change to the hand shape from the arrow shape.(All spectrograms can be moved, zoomed in, and zoomed out according to above methods.)

3.3.3 Statement Window

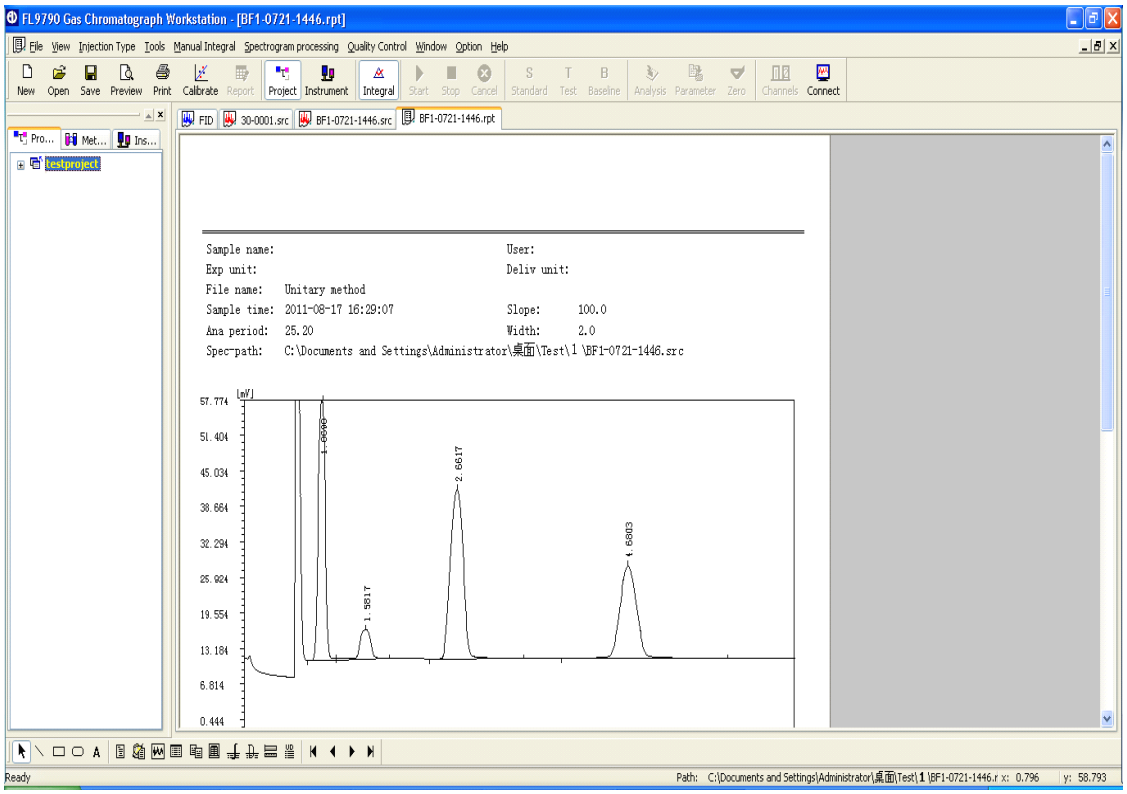
Click the [Advanced parameter setting] of the [Option] of the main menu column, and the [advanced setting of the sample injection] window will pop up. See following figure for details:



Prior to the sample injection and after selecting the [Automatic generation of statement files after the sample injection] in the dialog, the statement window of the spectrogram file will be automatically opened; if the [Automatic generation of statement files after the sample injection] is not selected prior to the sample injection, click the [Statement] button in the standard toolbar in the opened spectrogram window after completing the sample injection; subsequently, the corresponding statement file of the spectrogram file will be opened. If this statement file is not created, the system will automatically generate one statement according to the default statement setting. If such statement file is generated, open this statement file.

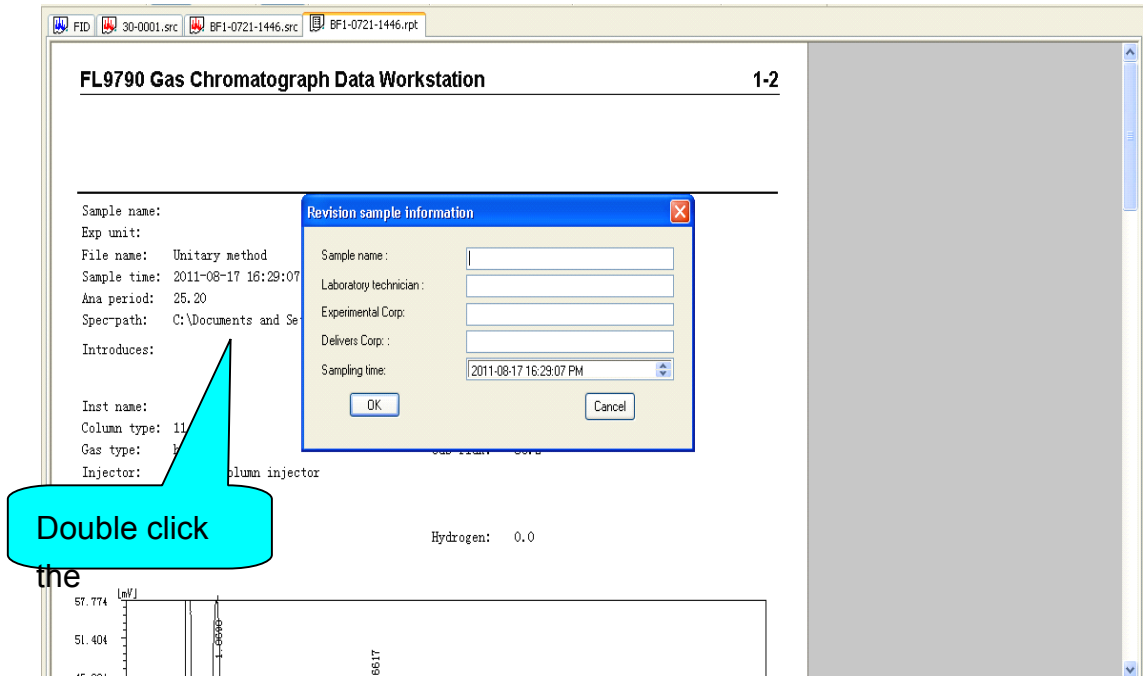
For the existing statement file, you can click the [Open] button in the standard toolbar or select the [Open] of the [File] submenu, set the file as the statement file, and select the target statement file.

The statement window is as following figure:

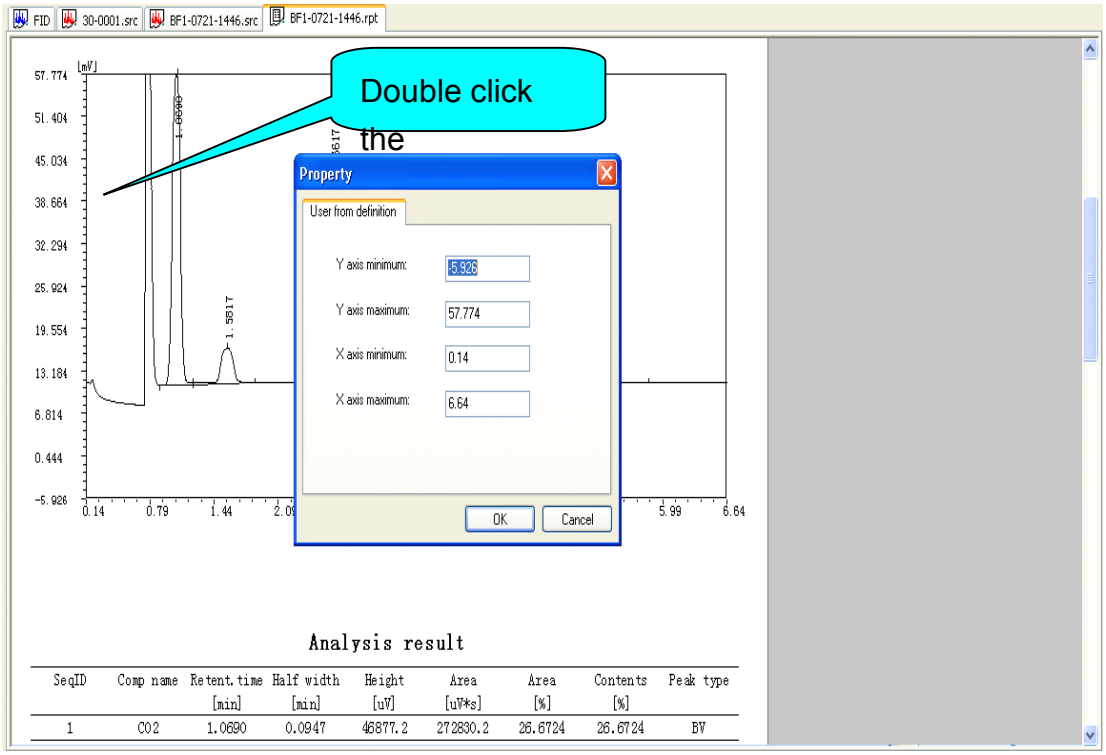


Double click the sample information column in the statement, the [Sample information modification] window will pop up, and you can modify partial content of the sample information in the window. See following figure for details:

Double click the experiment info column in the statement, the [experiment info setting] window will pop up, and you can modify the experiment info content in the window. See following figure for details:

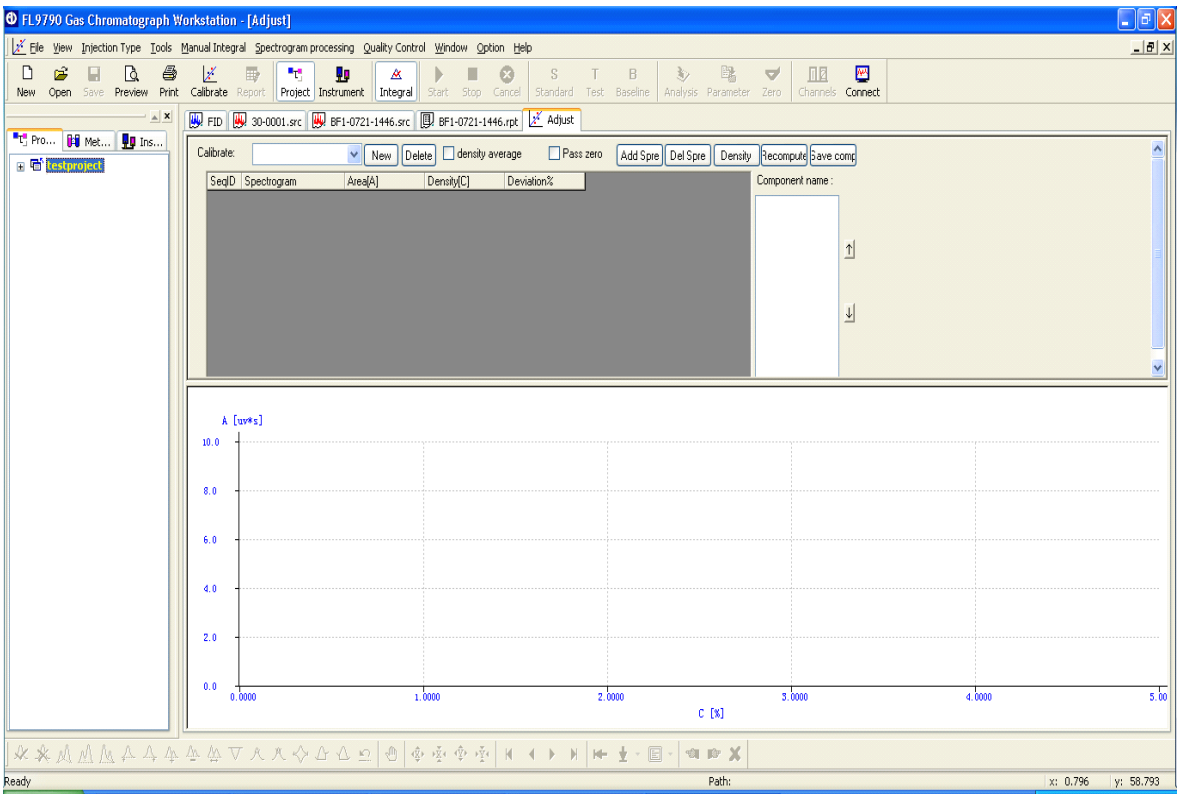


Double click the spectrogram column in the statement, the [Property] window pop up, and you can modify the vertical coordinates and horizontal coordinates of the spectrogram in the window. See following figure for details:



3.3.4 Correction Window

Click the [Correction] button of the standard toolbar, and open the correction window. See following figure for details:

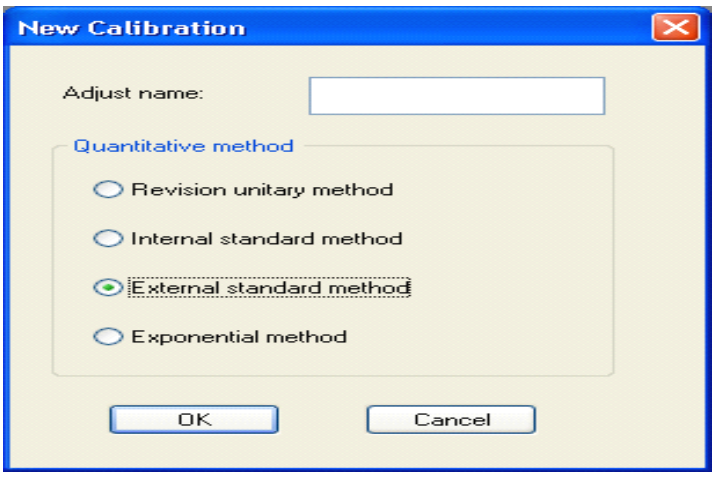


The correction window is composed of upper and lower windows; the upper window is used to select the correction name and set the information and concentration of the standard sample, and the lower window is used to display the correction curve. The sizes of upper and lower windows can be freely adjusted.

[New]: Create a correction.

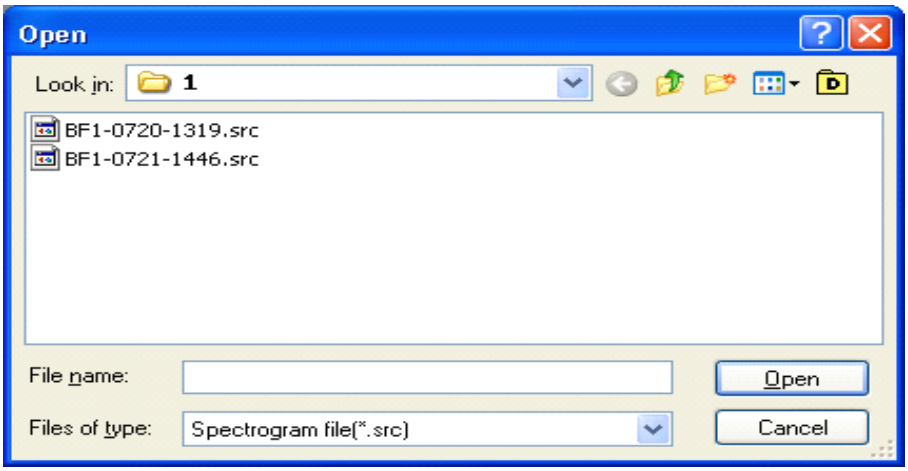
Click the [New] button, the [New correction] dialog will pop up. After inputting the correction name, selecting the quantitative method of correction, and clicking the [OK] button, the new correction will be included in the current correction list.

The new correction window is as follows:



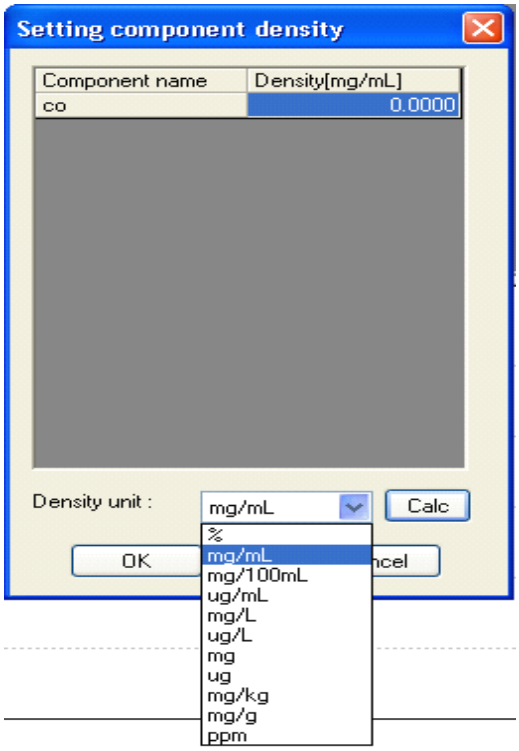
[Delete]: Delete one established correction. Select the correction name to be deleted in the correction name list and click the [Delete] button, and the selected correction will be deleted.

[Standard sample adding]: After creating a correction or opening the existing correction, click the [Standard sample adding] button, the [Open] dialog will pop up; after that, select the target file and click the [Open]. See following figure for details.



[Standard sample deletion]: Select one project in the spectrogram list window, and click the [Standard sample deletion] button. Here, the spectrogram file will be deleted from the spectrogram list.

[Concentration modification]: Select one project in the spectrogram list window, and click the [Concentration modification] button. Here, the [Component concentration setting] dialog will pop up, and the concentration of each component can be modified, and press [OK] after modification is ended.



[Recalculation]: After modifying the concentration of all sample files, click the [Recalculation] button, and the system will automatically calculate and correct the curve as well as update and correct the correction curve of the curve window simultaneously.

Save the currently-calculated correction factor to the component forms of all spectrogram files and corresponding files.

[Average calculation of same concentration]: The startup is optional, which will impact the calculation of the correction factor.

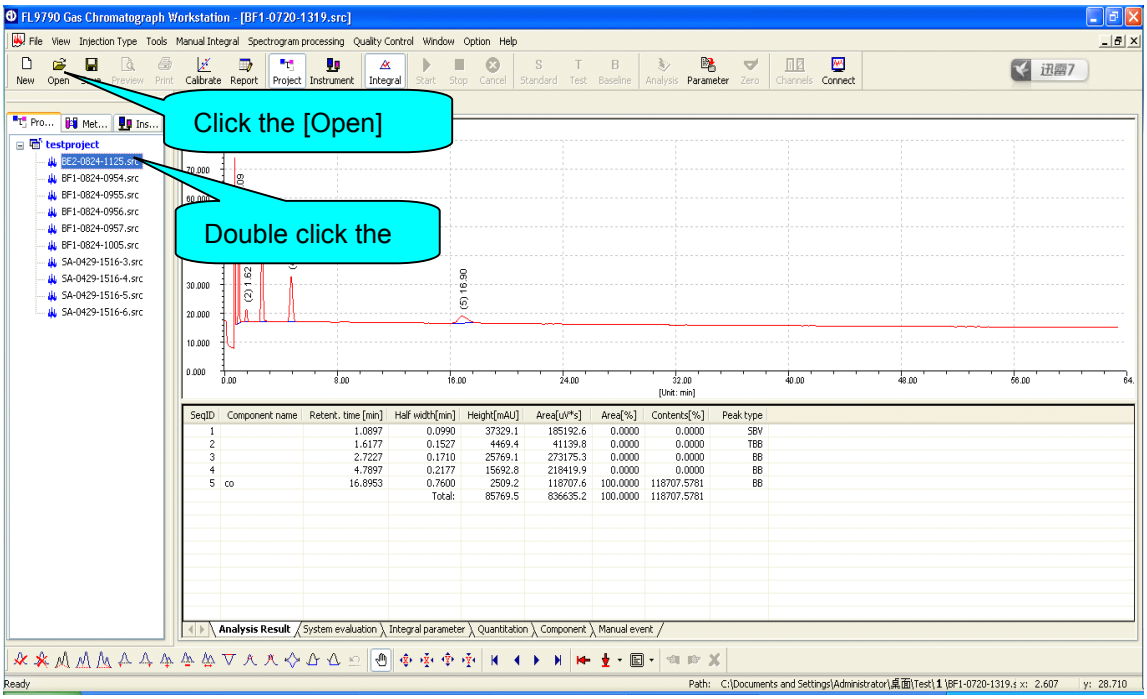
4. Analysis Method

4.1 Internal Standard Method

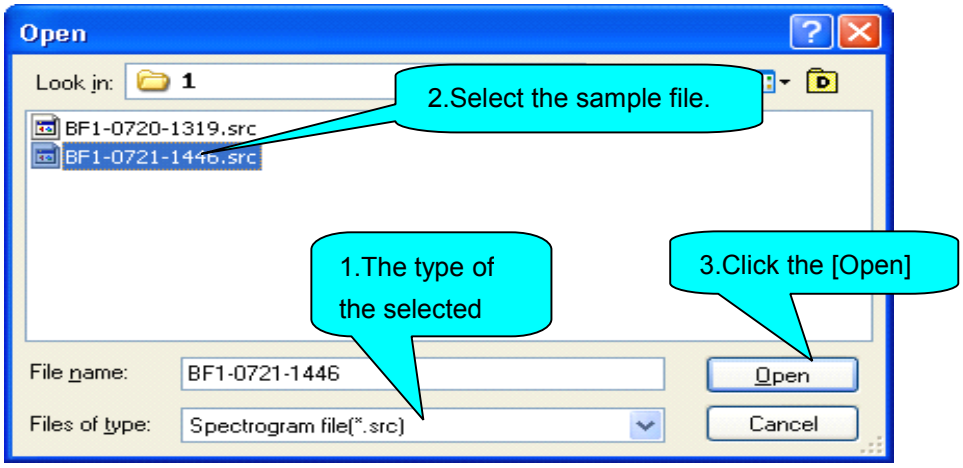
4.1.1 Standard Sample Analysis

1. Open the standard sample spectrogram file

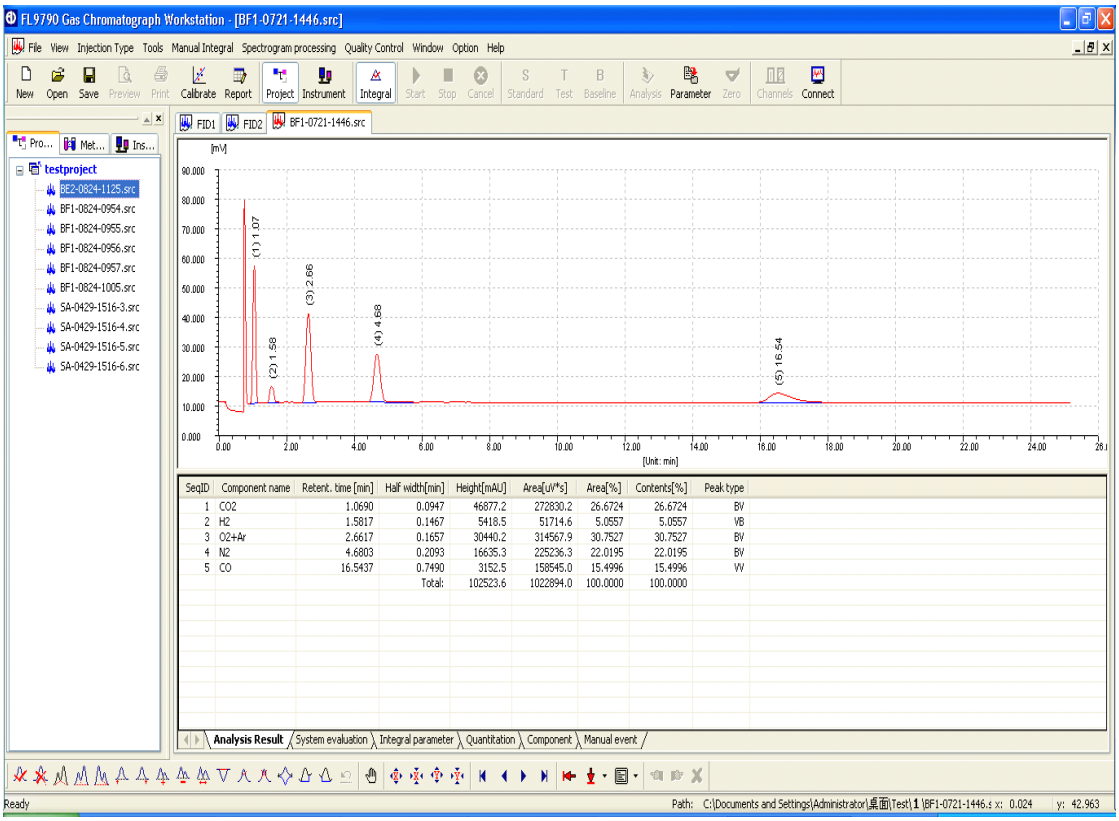
Many modes can be applied to open the spectrogram file, including, clicking the [Open] button in the standard toolbar or directly selecting the sample injection file from the project window and double left clicking it. The opened spectrogram is as follows:



Click the [Open] button in the standard toolbar, and the [Open] window will pop up. See following figure for details:

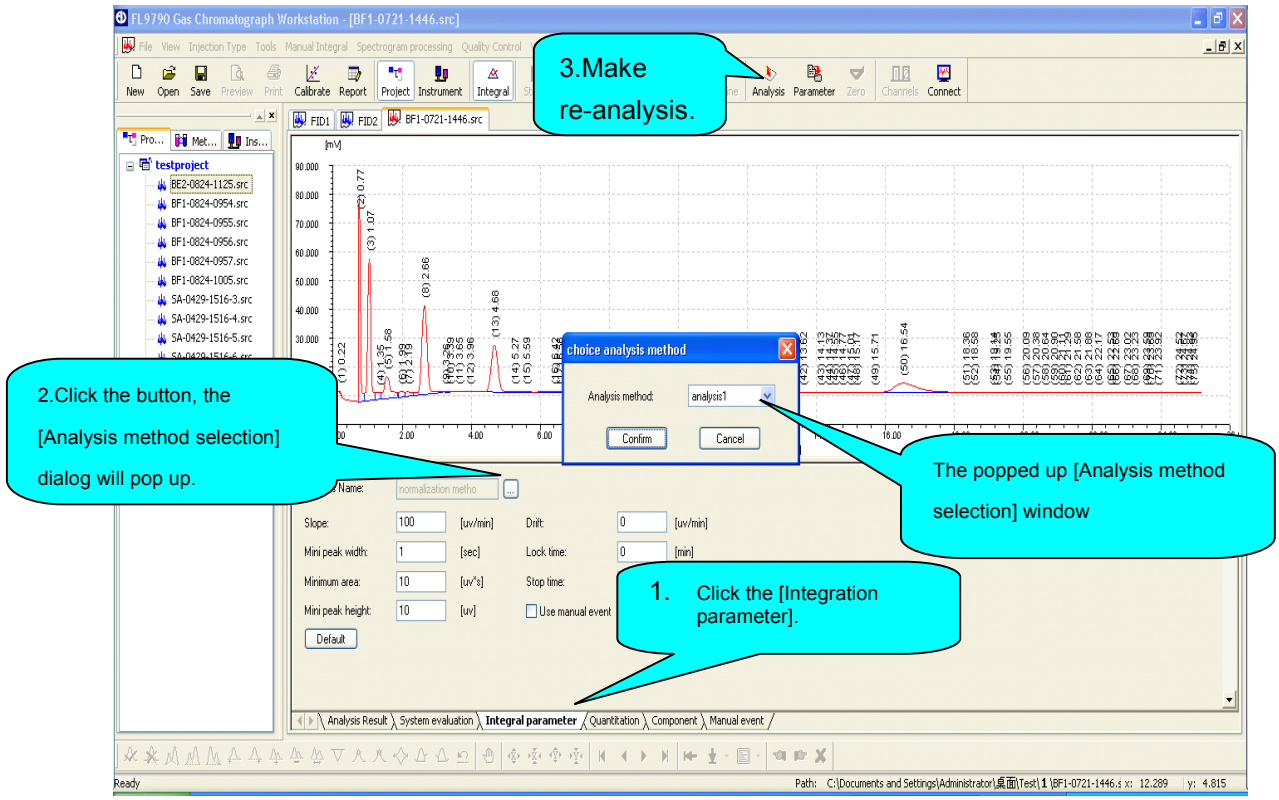


After selecting the spectrogram, click the [Open]. Here, you can see the spectrogram of the opened standard sample. See following figure for details:



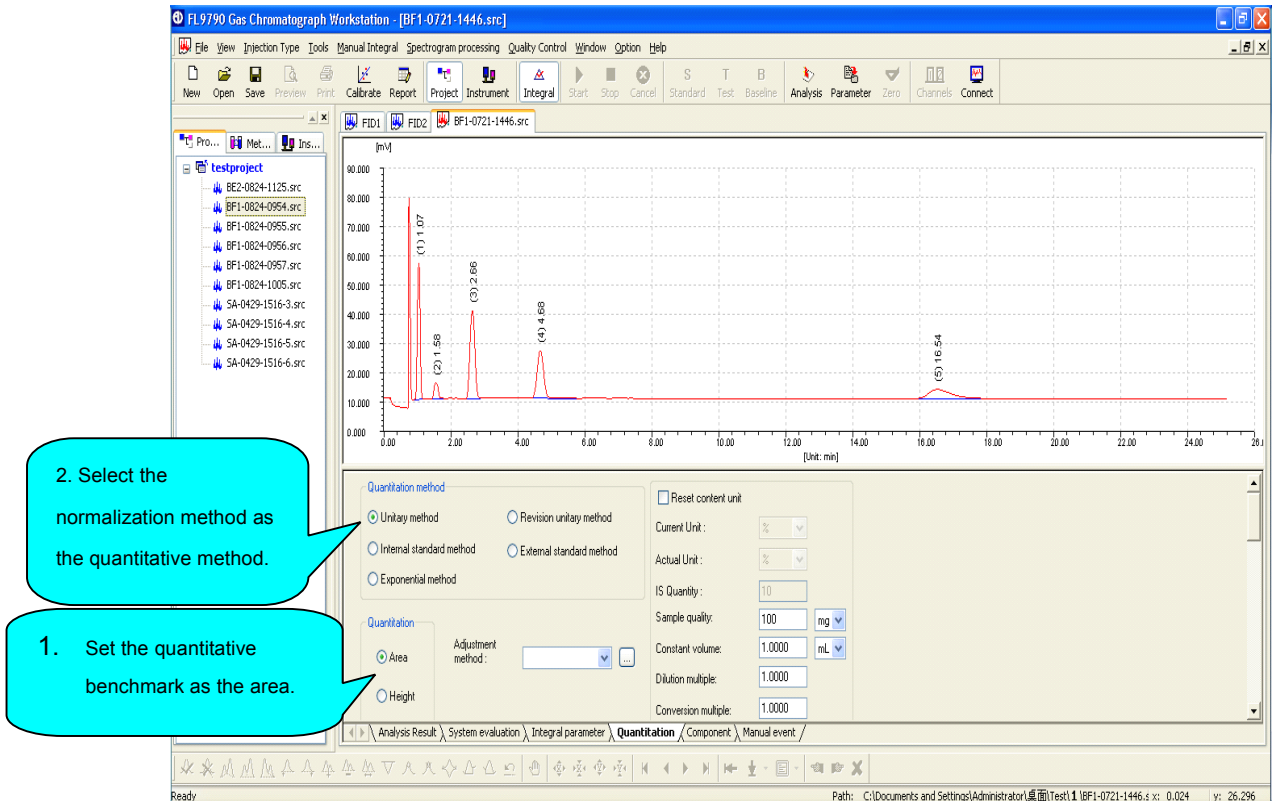
2. Integral parameter setting

If the analysis result is unsatisfactory, you can click the [integral parameter] page to modify the integral parameter and adjust the slope, minimum peak width, minimum area, minimum peak height, resolution, and other parameters. Also, you can click the [Analysis name] in the [Integral page] (step 2 in the following figure); select the existing analysis method in the popped-up [Analysis method selection] window; click the [Analysis] button in the standard toolbar for re-analysis; make the automatic integral result meet your requirements, and adjust the analysis result by the manual integration again.

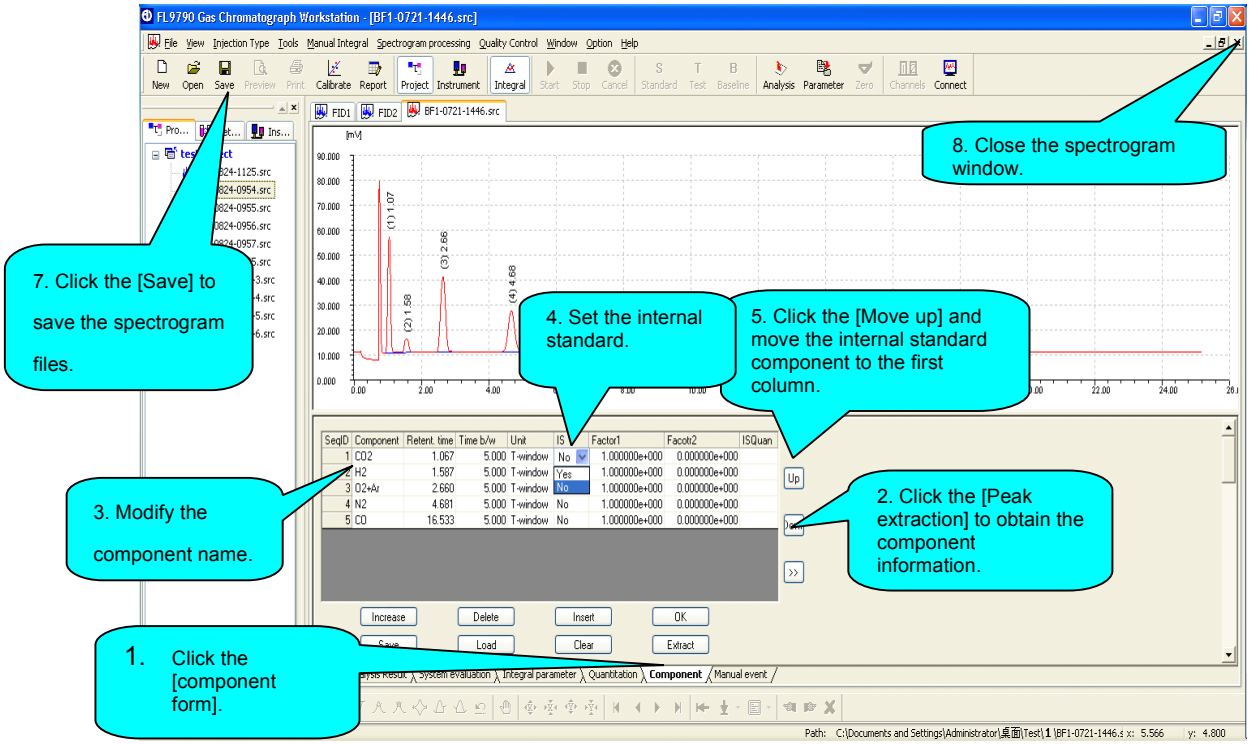


3. Quantitative parameter setting

Set the quantitative benchmark as the area, with the normalization method as the quantitative method.



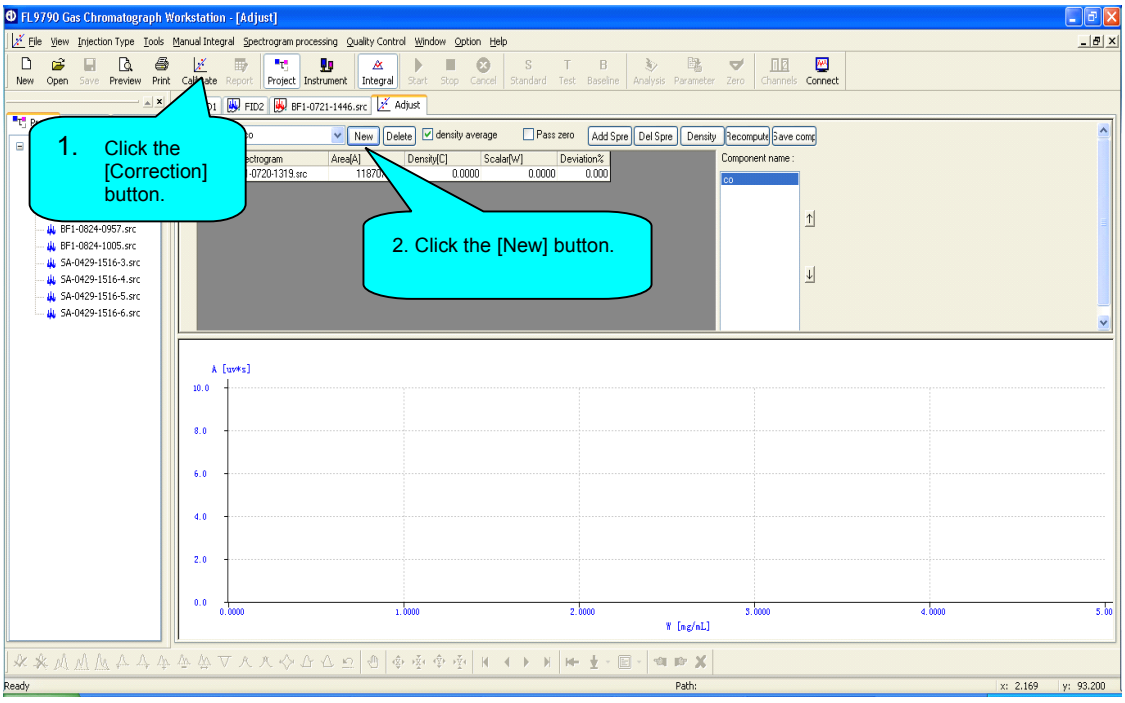
4. Component parameter setting



5. If more sample files are in need of processing, following 1-4 steps can be repeated for analysis.

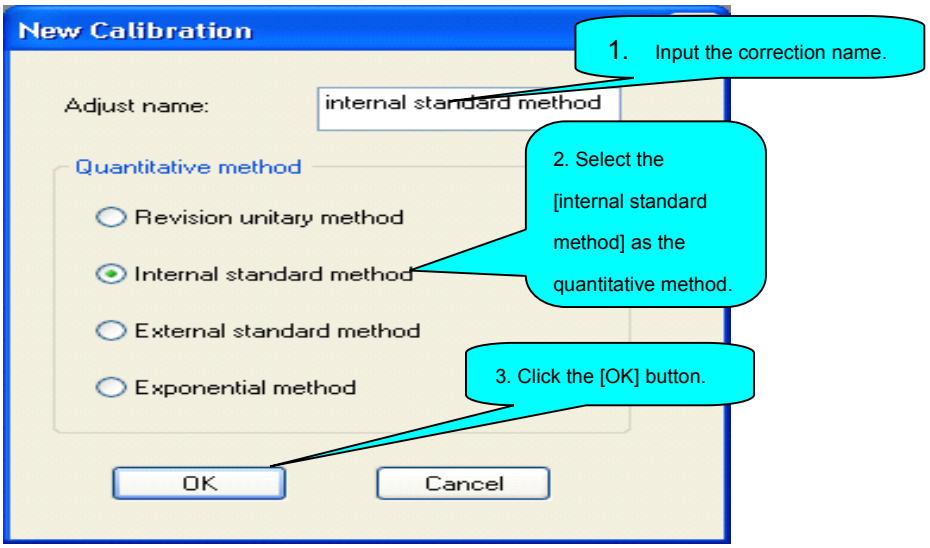
4.1.2 Correction Curve

1. After the standard sample data analysis is ended, the correction curve can be generated. First of all, click the [Correction] button in the standard toolbar and open the [Correction] window. See following figure for details:

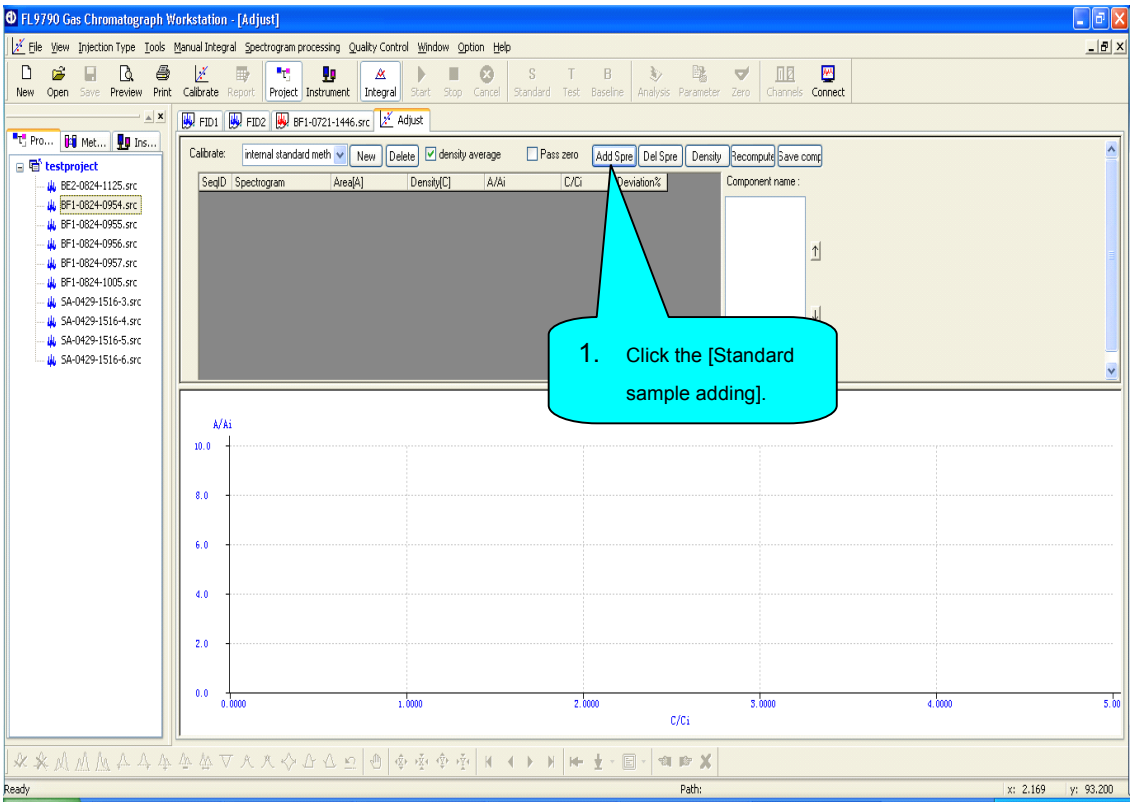


2.Create a new correction.

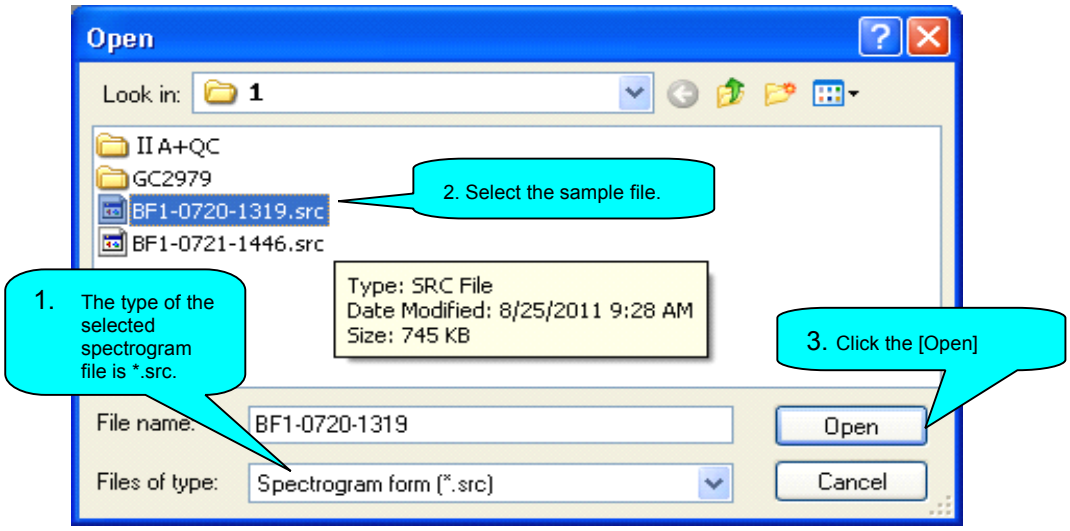
Click the [New] button, the [New correction] window will pop up. See following figure for details:



3. Add sample files.

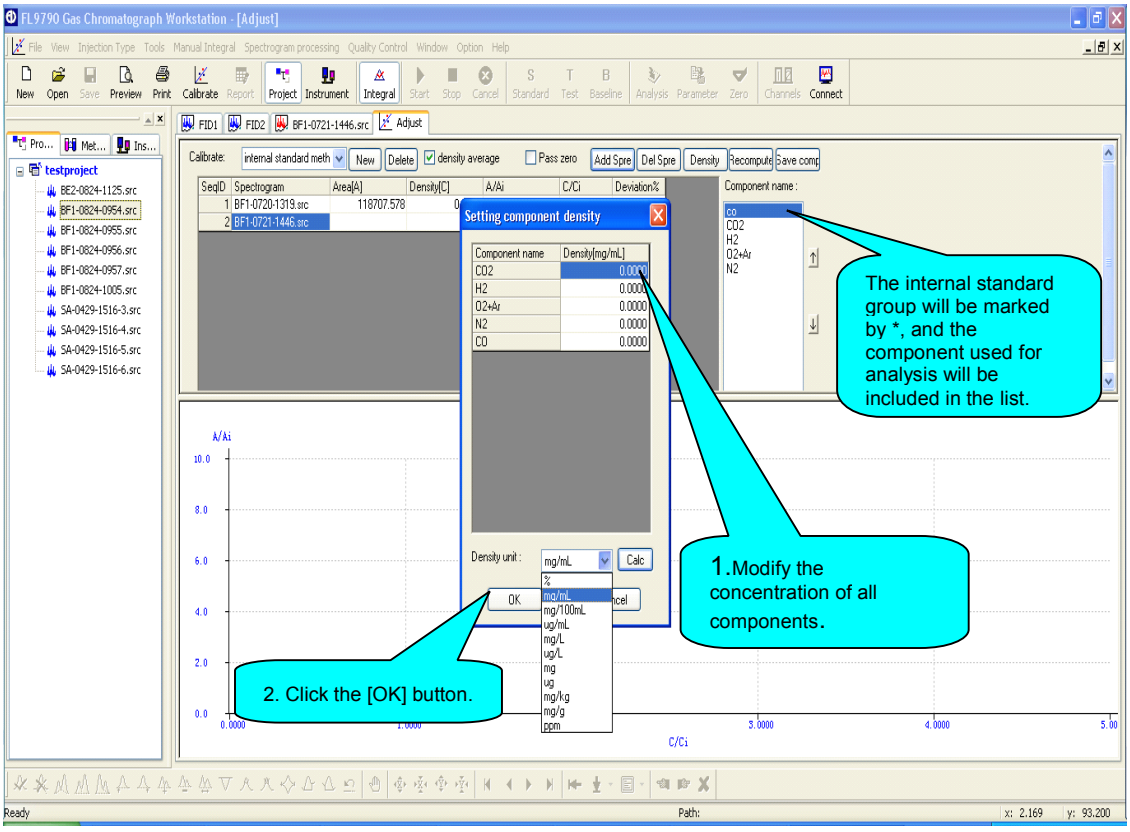


Click the [Standard sample adding], and the [Open] dialog will pop up. See following figure for details:

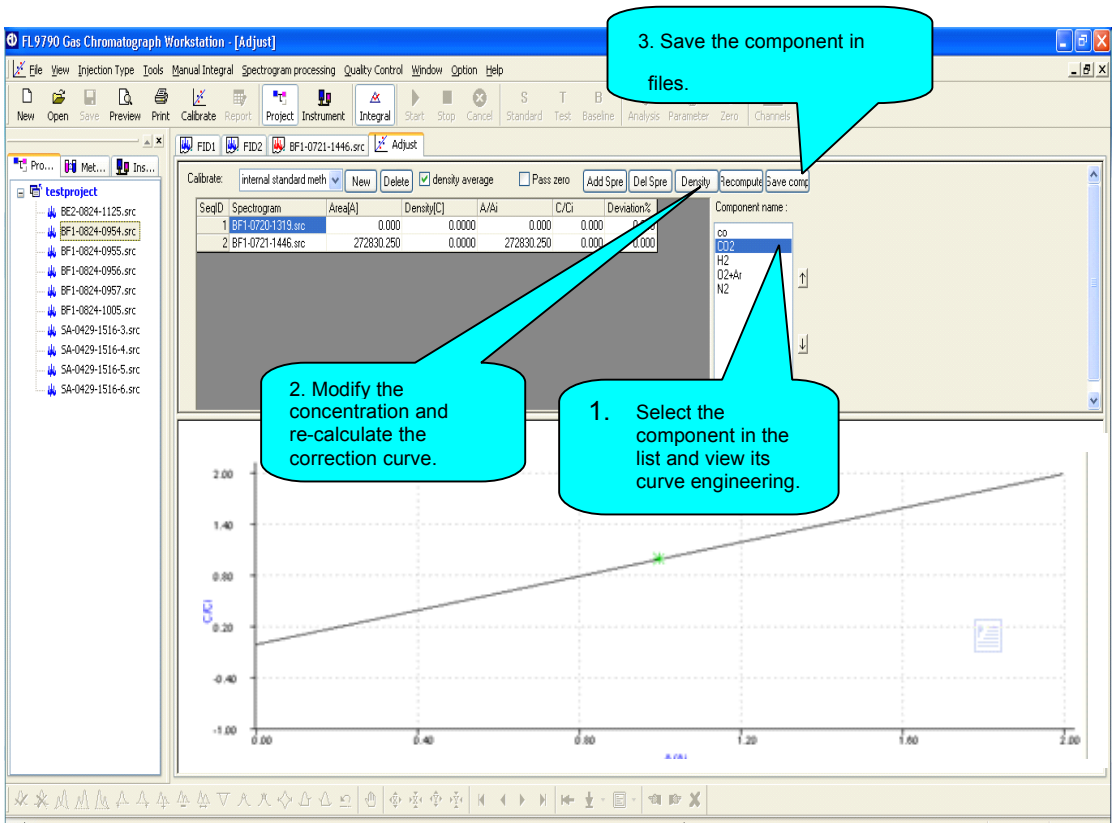


4. Setting of the component concentration of the sample file

After selecting the standard sample spectrogram, press the [Open] button, and the [Component concentration setting] window will pop up. See following figure for details:

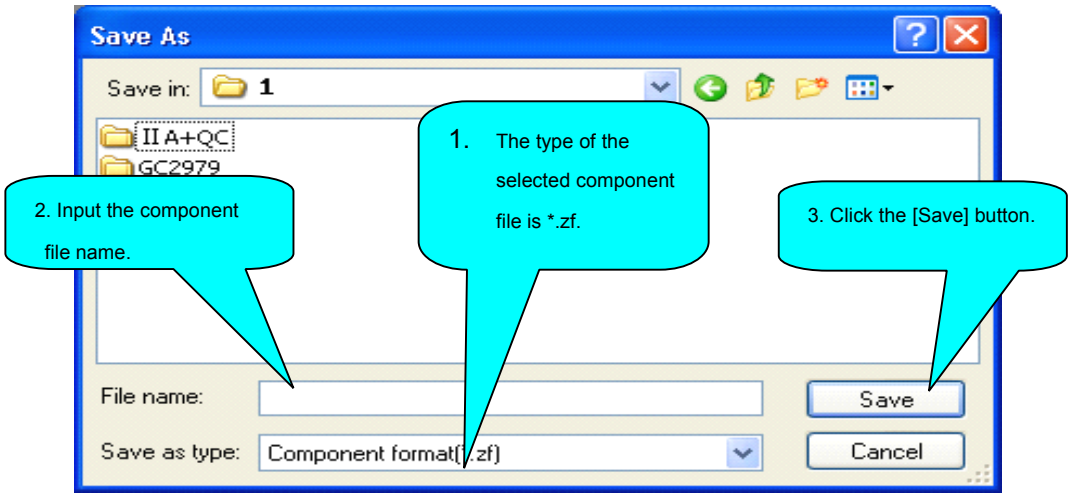


5. After setting all component concentrations, click the [OK], and the correction curve of all components will be calculated and drawn. See following figure for details:



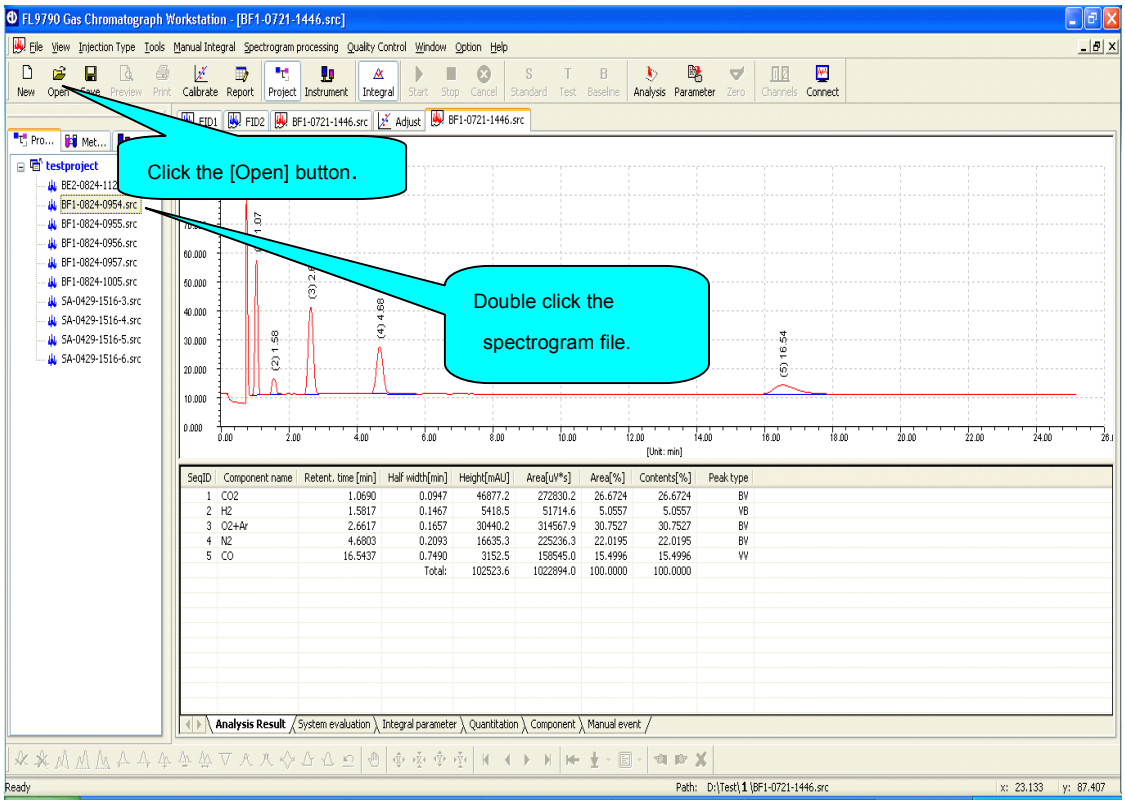
If more sample files shall be added, only 3-4 steps shall be repeated.

6. Click the [Save component], the [Save as] window of the component will pop up. Input the component file name in the popped-up [Save as] window; save the component file; click the [Save], close the [Save as] window of the component, and complete the component saving. See following figure for details:

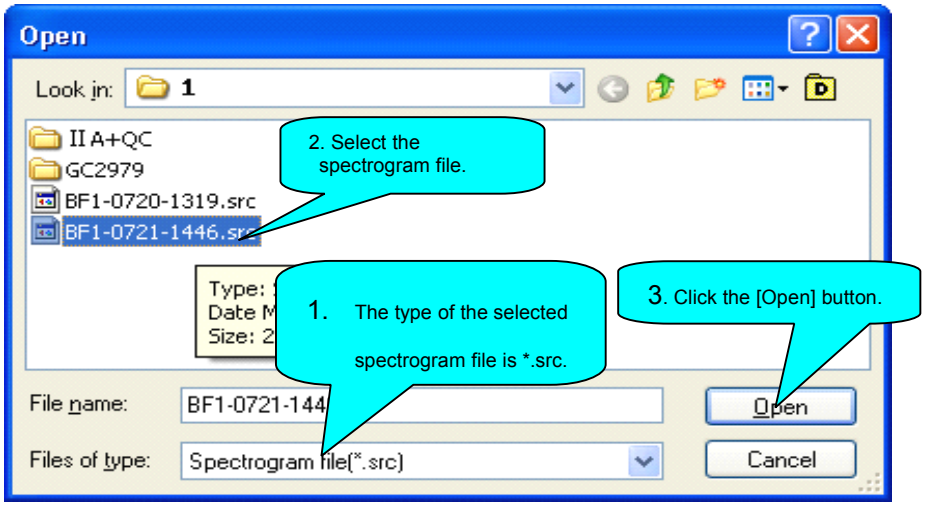


4.1.3 Specimen Analysis

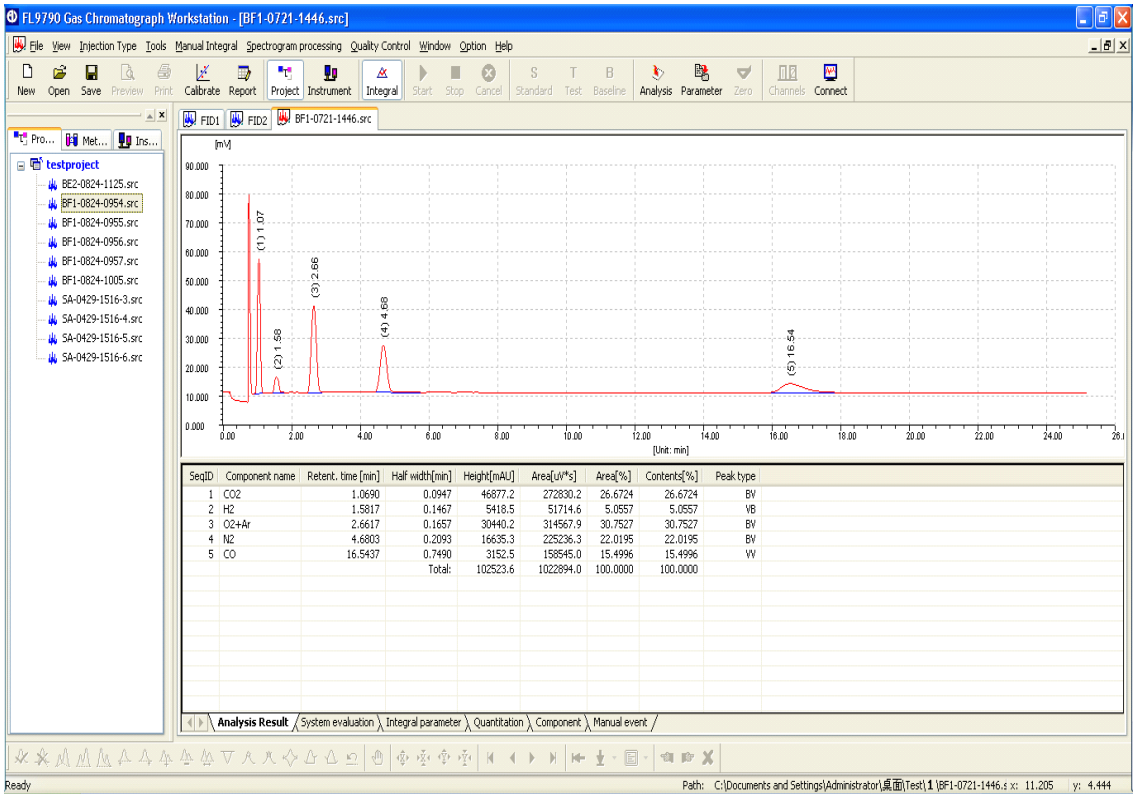
1. Open the specimen spectrogram fileMany modes can be applied to open the spectrogram file, including, clicking the [Open] button in the standard toolbar or directly selecting the spectrogram file from the project window and double left clicking it. The opened spectrogram is as follows:



Click the [Open] button in the standard toolbar, the [Open] window will pop up. See following figure for details:

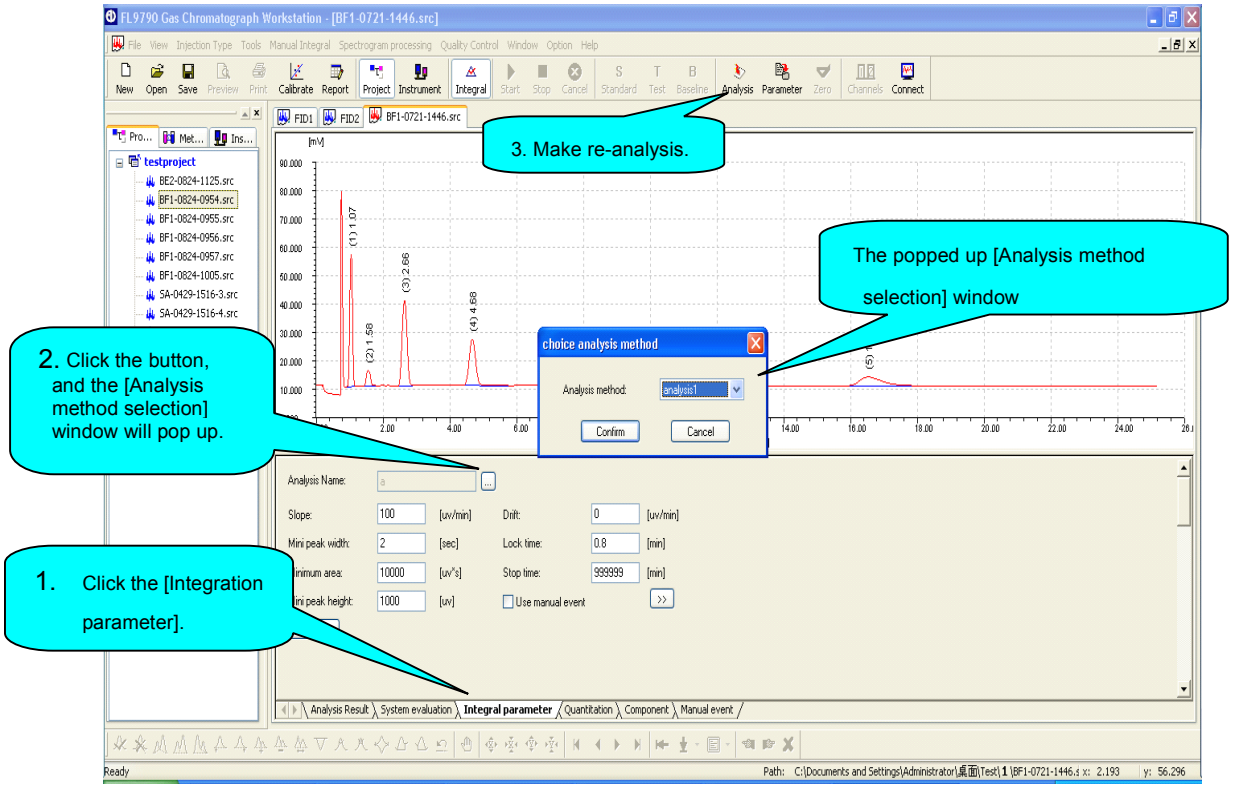


After selecting the spectrogram, click the [Open], and you can see the opened specimen spectrogram. See following figure for details:



2. Integral parameter setting

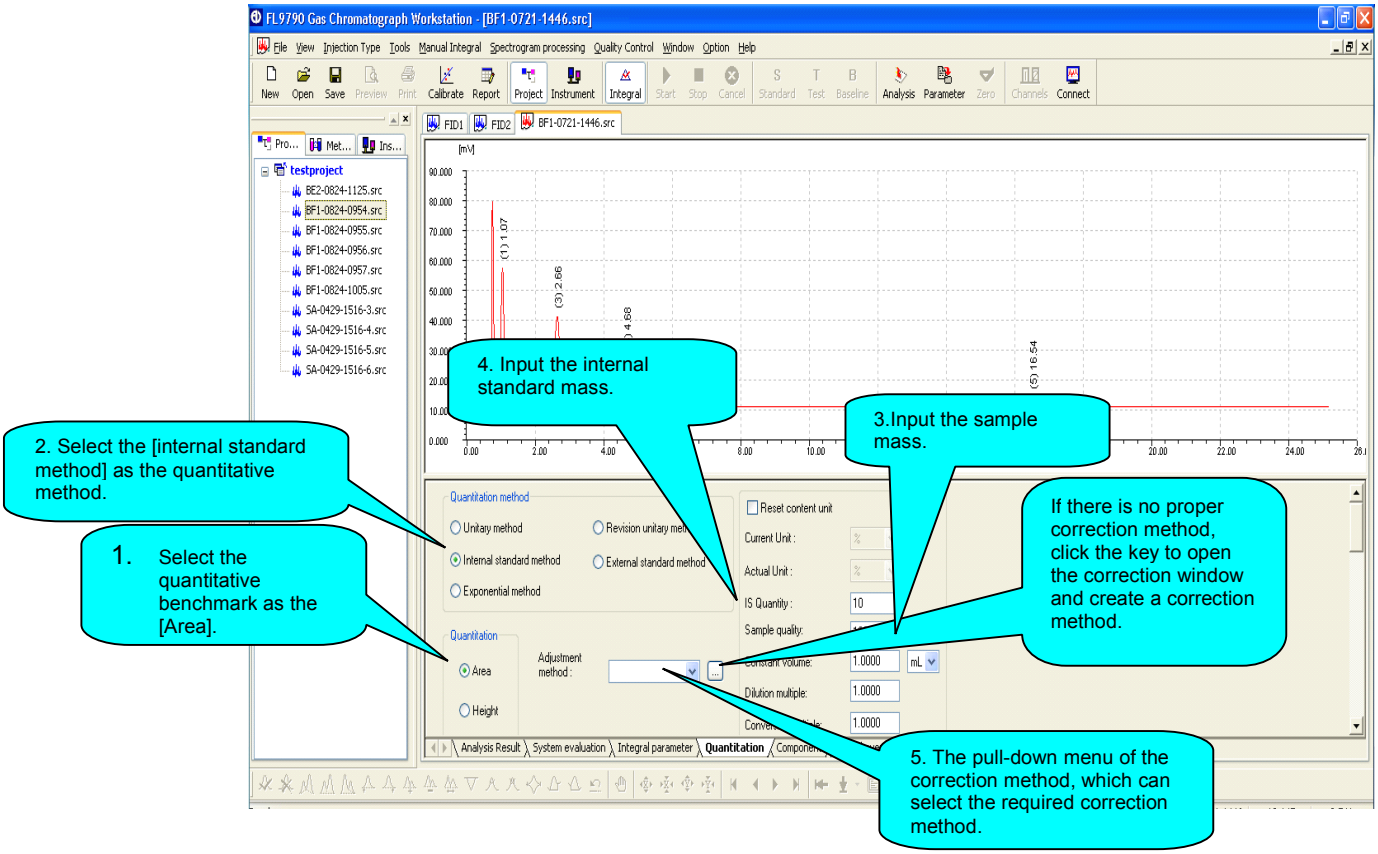
If the analysis result is unsatisfactory, you can click the [integral parameter] page to modify the integral parameter and adjust the slope, minimum peak width, minimum area, minimum peak height, resolution, and other parameters. Also, you can click the [Analysis name] in the [Integral page] (step 2 in the following figure); select the existing analysis method in the popped-up [Analysis method selection] window; click the [Analysis] button in the standard toolbar for re-analysis; make the automatic integral result meet your requirements. If you are still not satisfied with the result, you can adjust the analysis result by the manual integration till your requirements are met. See following figure for details:



3. Quantitative parameter setting

Set the quantitative benchmark as the area, with the internal standard method as the quantitative method.

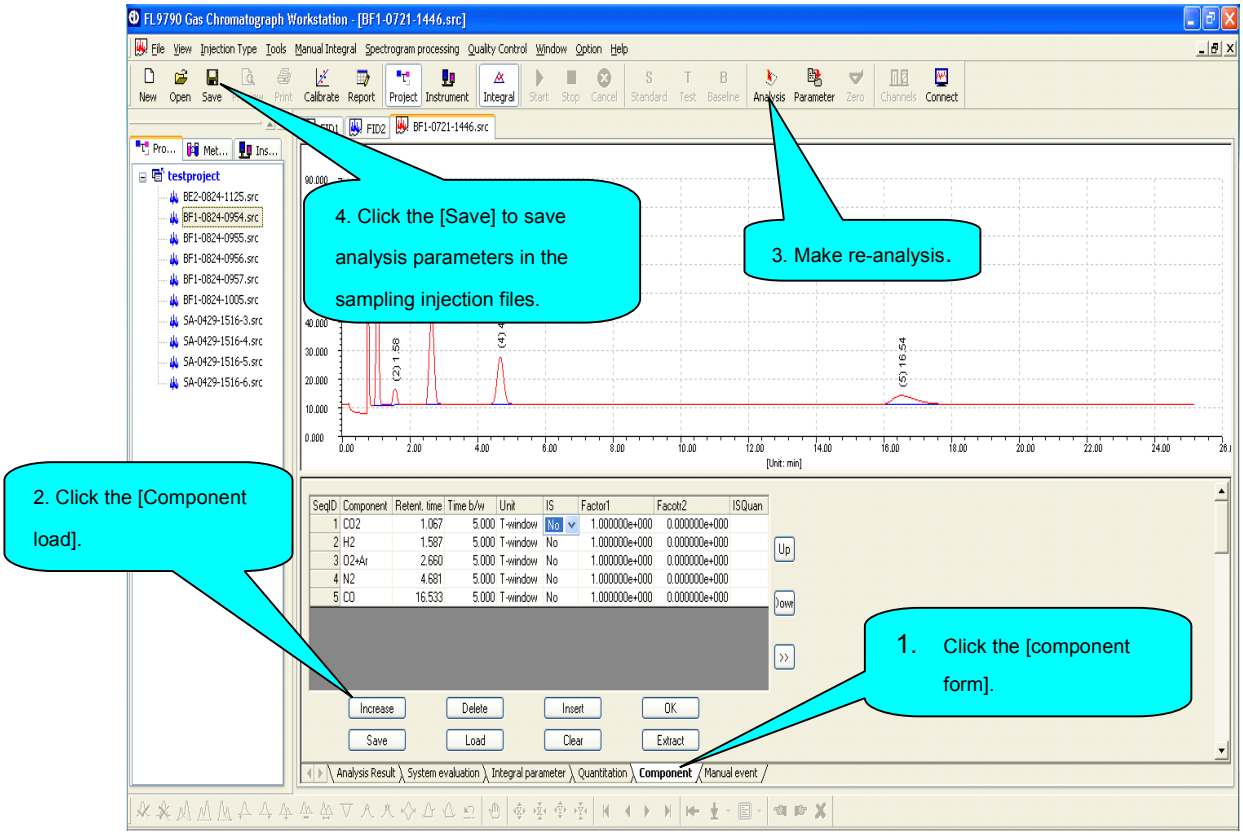
Sample amount and internal standard group component: Input the actual sample amount and internal standard mass during the experiment (unit: g).



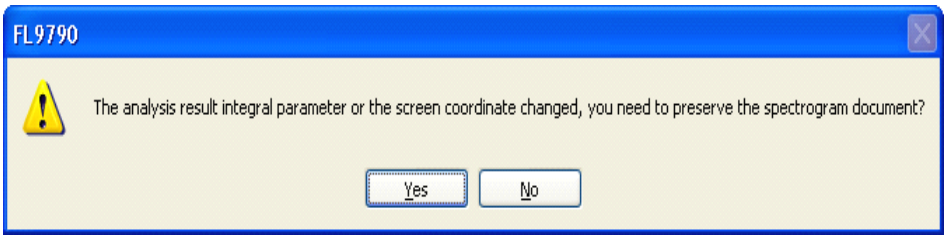
4. Component form page viewing

Open the specimen file and select the component page. If the component form is normally loaded with the accurate component, step 2 in the following figure can be skipped, and it is not necessary to load the component.

Open the specimen file and select the component page. If the component form is still empty, it is determined to load the component. After selecting the component file saved by the correction window, press [OK]. Here, you can see that the corrected component form is loaded in the current component page.



5. Click the [Save] button in the standard toolbar, and the [FL9790] warning dialog will pop up. After that, click the [Yes] and close the warning dialog, and the specimen analysis is ended. See following figure for details:

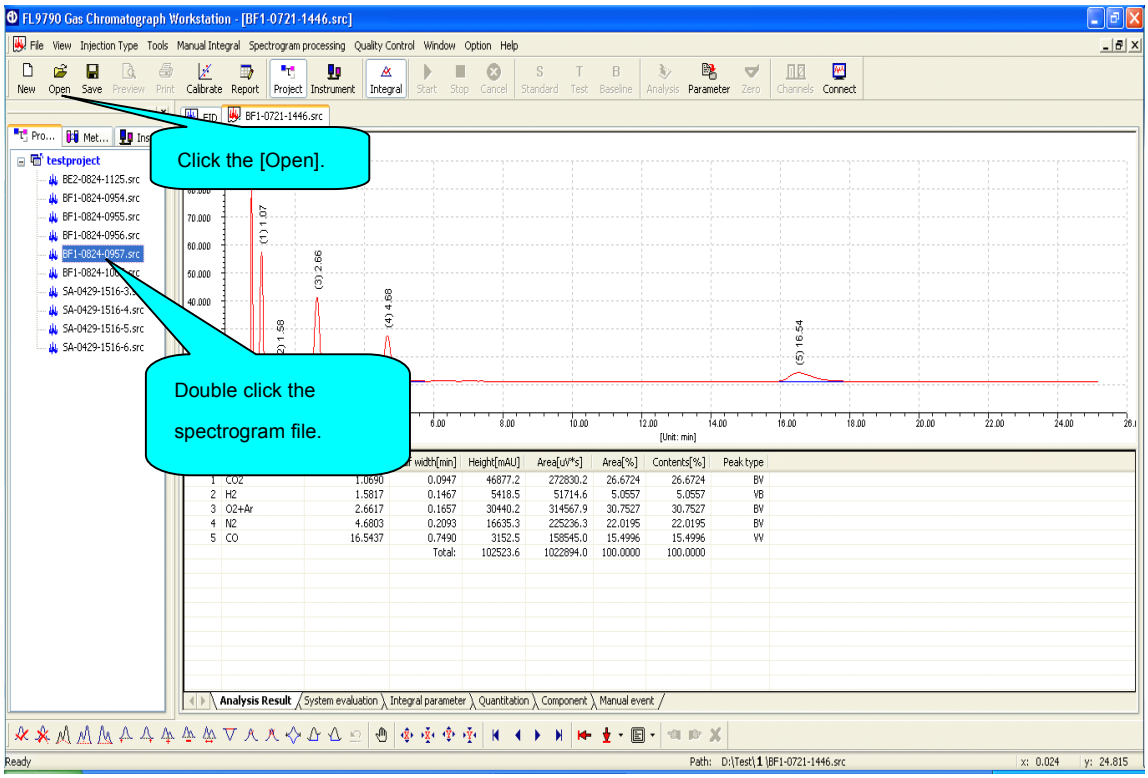


4.2 External Standard Method

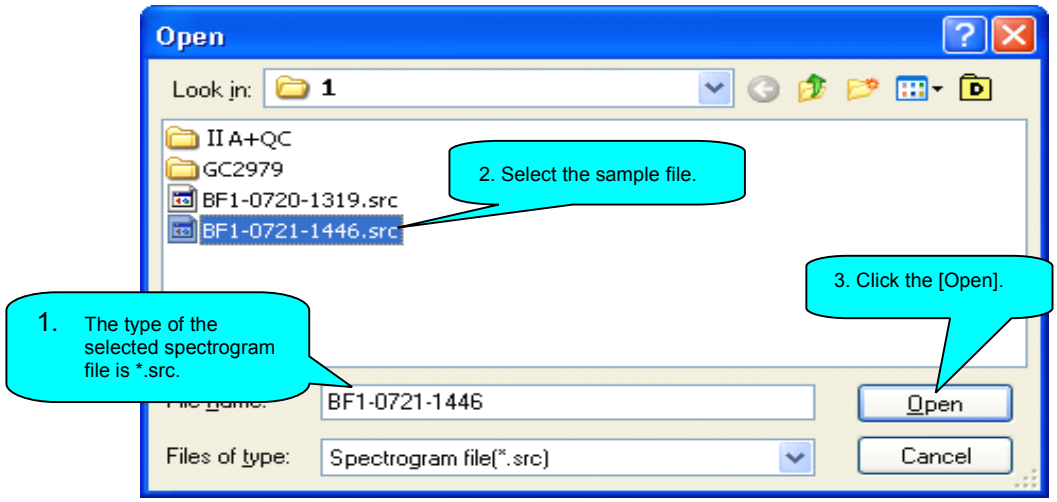
4.2.1 Standard Sample Analysis

1. Open the standard sample spectrogram file

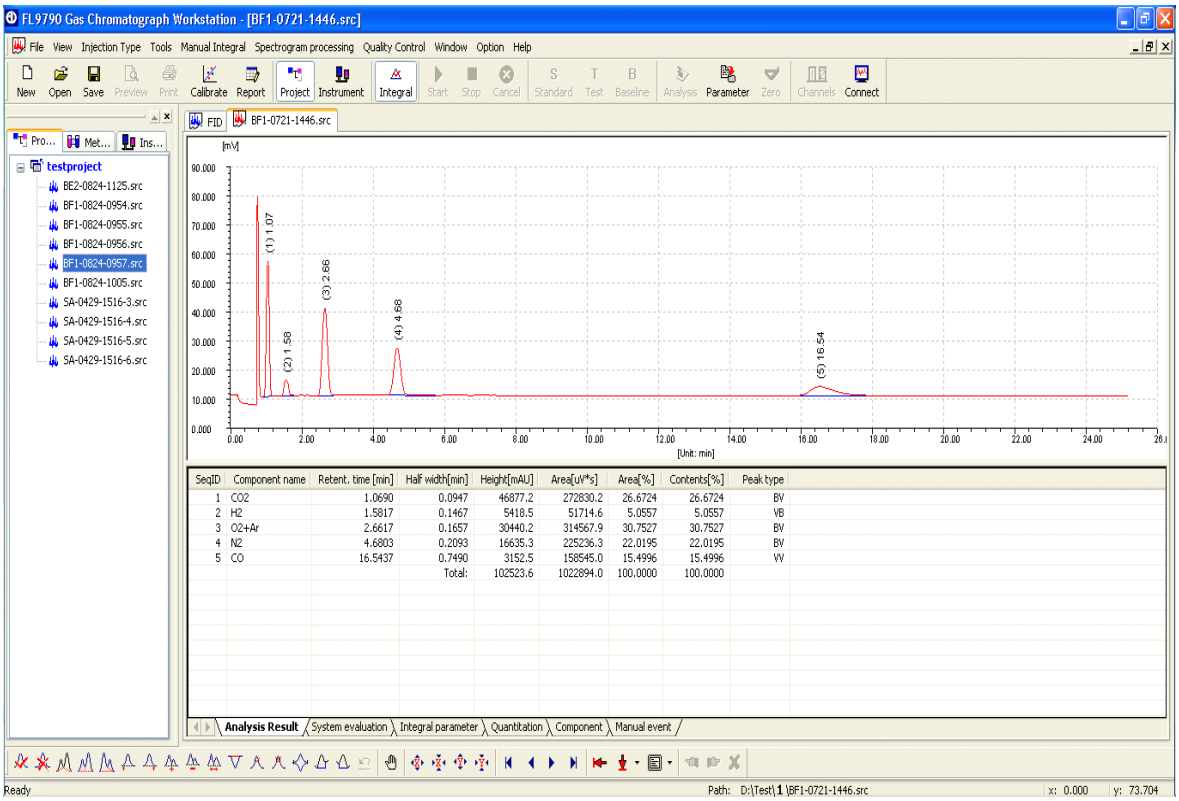
Many modes can be applied to open the spectrogram file, including, clicking the [Open] button in the standard toolbar or directly selecting the sample injection file from the project window and double left clicking it. The opened spectrogram is as follows:



Click the [Open] button in the standard toolbar, and the [Open] window will pop up. See following figure for details:

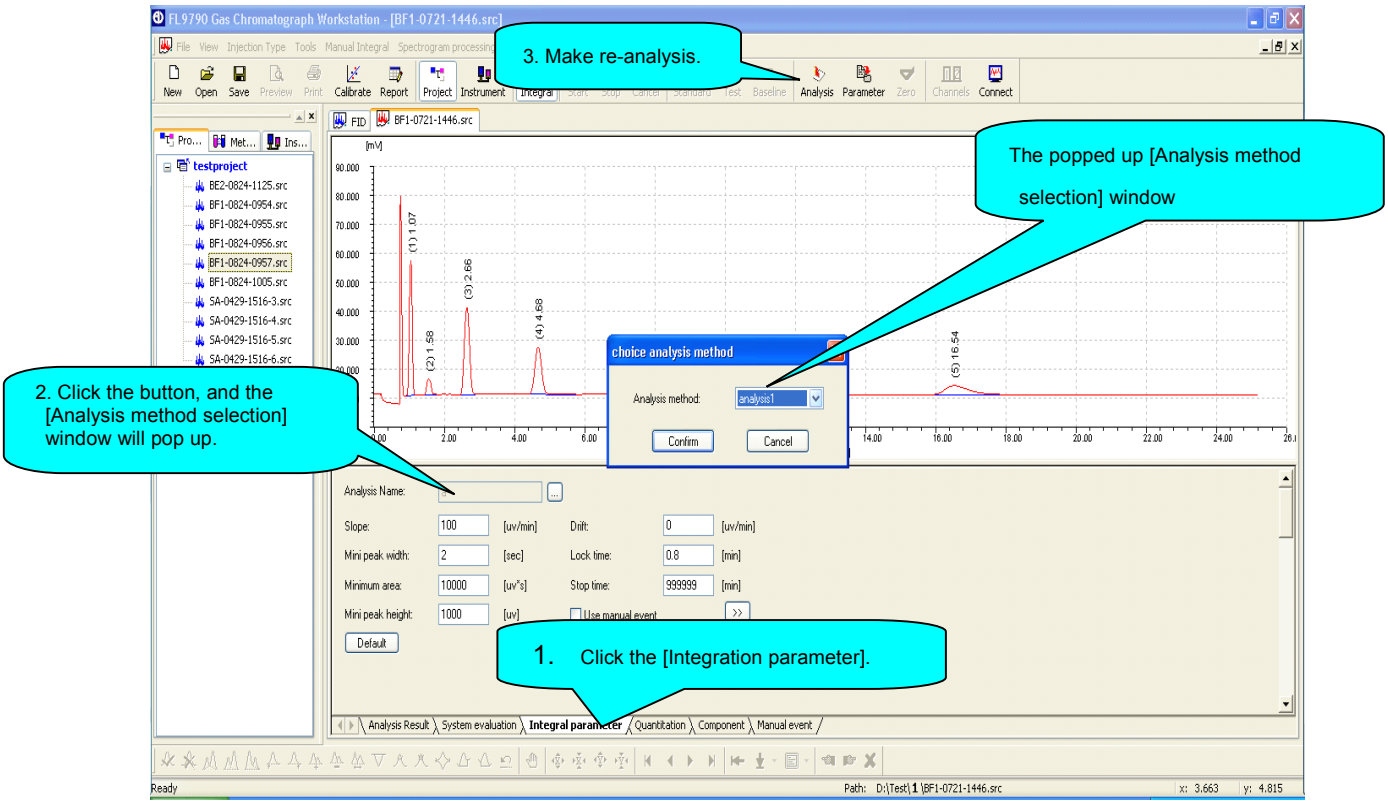


After selecting the spectrogram, click the [Open]. Here, you can see the spectrogram of the opened standard sample. See following figure for details:



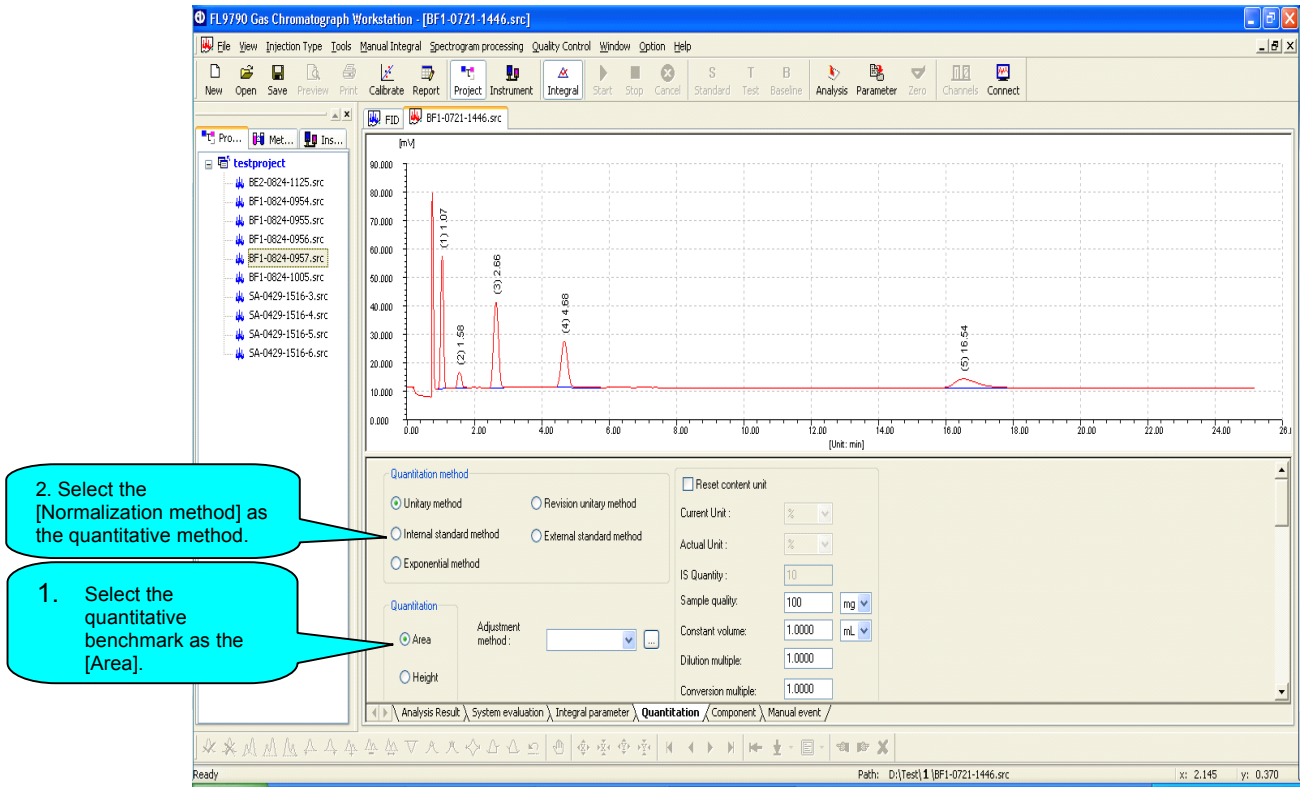
2. Integral parameter setting

If the analysis result is unsatisfactory, you can click the [integral parameter] page to modify the integral parameter and adjust the slope, minimum peak width, minimum area, minimum peak height, resolution, and other parameters. Also, you can click the [Analysis name] in the [Integral page] (step 2 in the following figure); select the existing analysis method in the popped-up [Analysis method selection] window; click the [Analysis] button in the standard toolbar for re-analysis; make the automatic integral result meet your requirements, and adjust the analysis result by the manual integration again. See following figure for details:

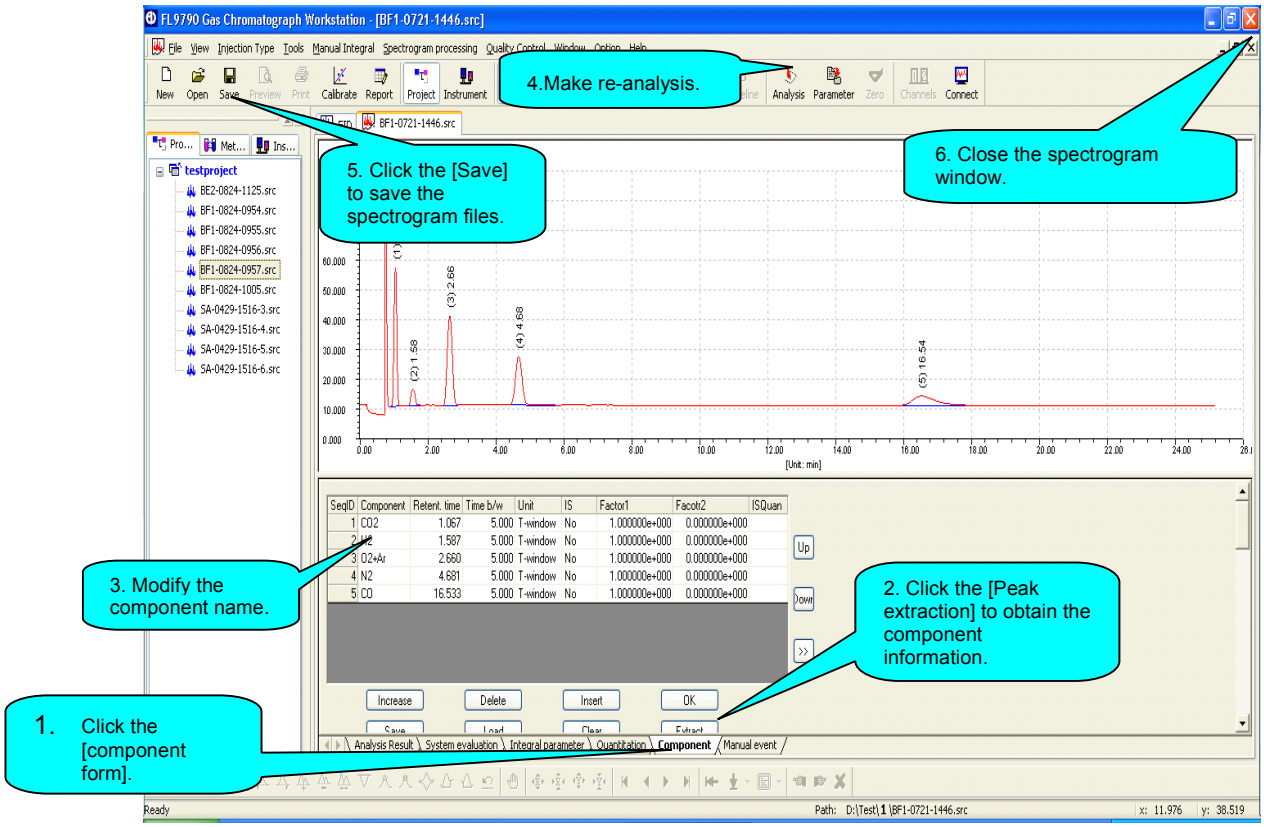


3.Quantitative parameter setting

Set the quantitative benchmark as the area, with the normalization method as the quantitative method.



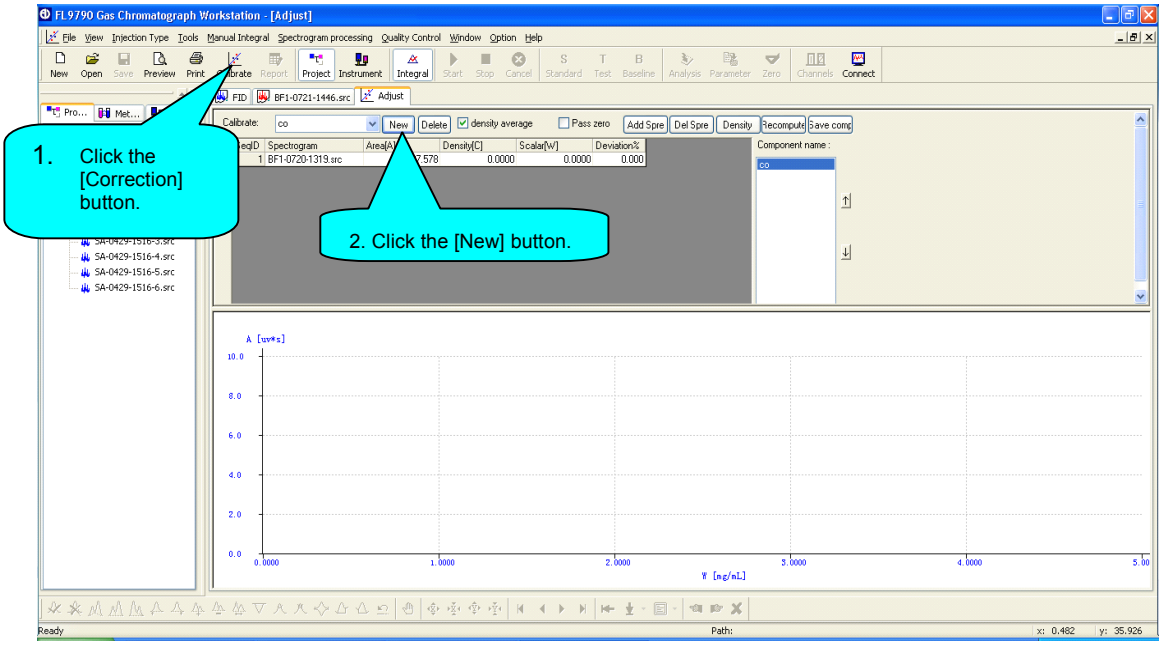
4. Component parameter setting



5. If more sample files are in need of processing, following 1-4 steps can be repeated for analysis.

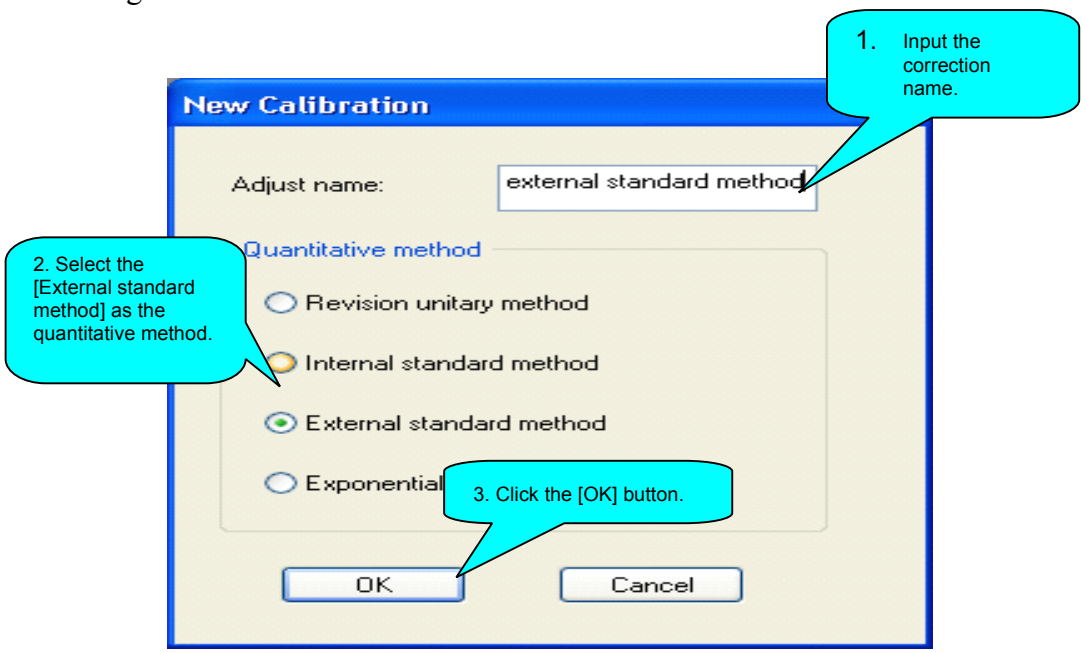
4.2.2 Correction Curve

1. After the standard sample data analysis is ended, the correction curve can be generated. First of all, click the [Correction] button in the standard toolbar and open the [Correction] window. See following figure for details:

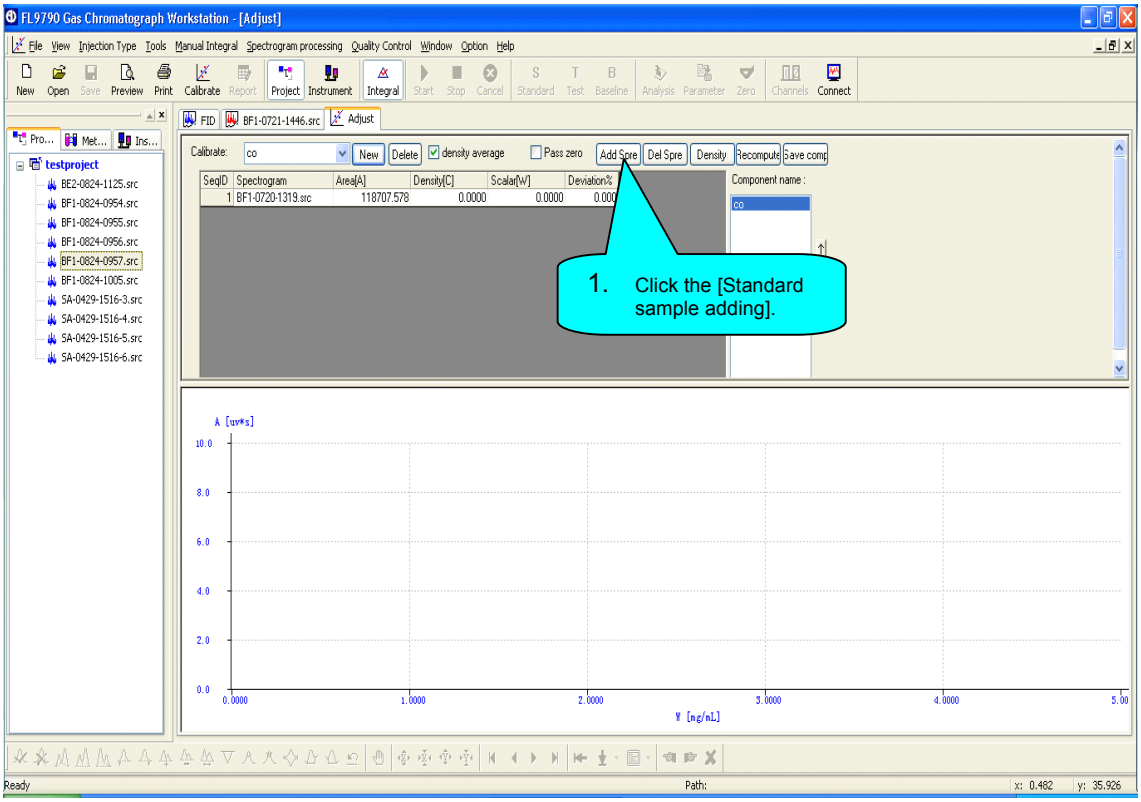


2.Create a new correction.

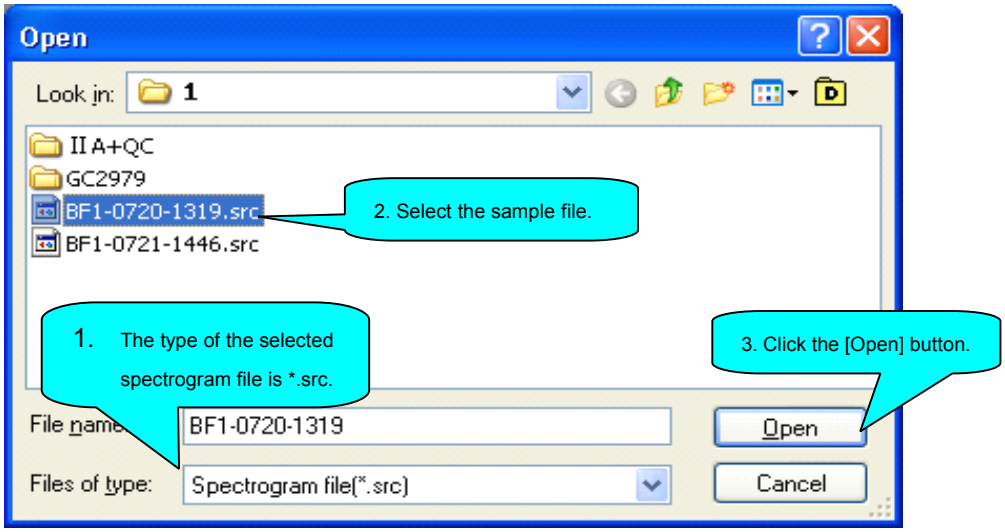
Click the [New] button, the [New correction] window will pop up. See following figure for details:



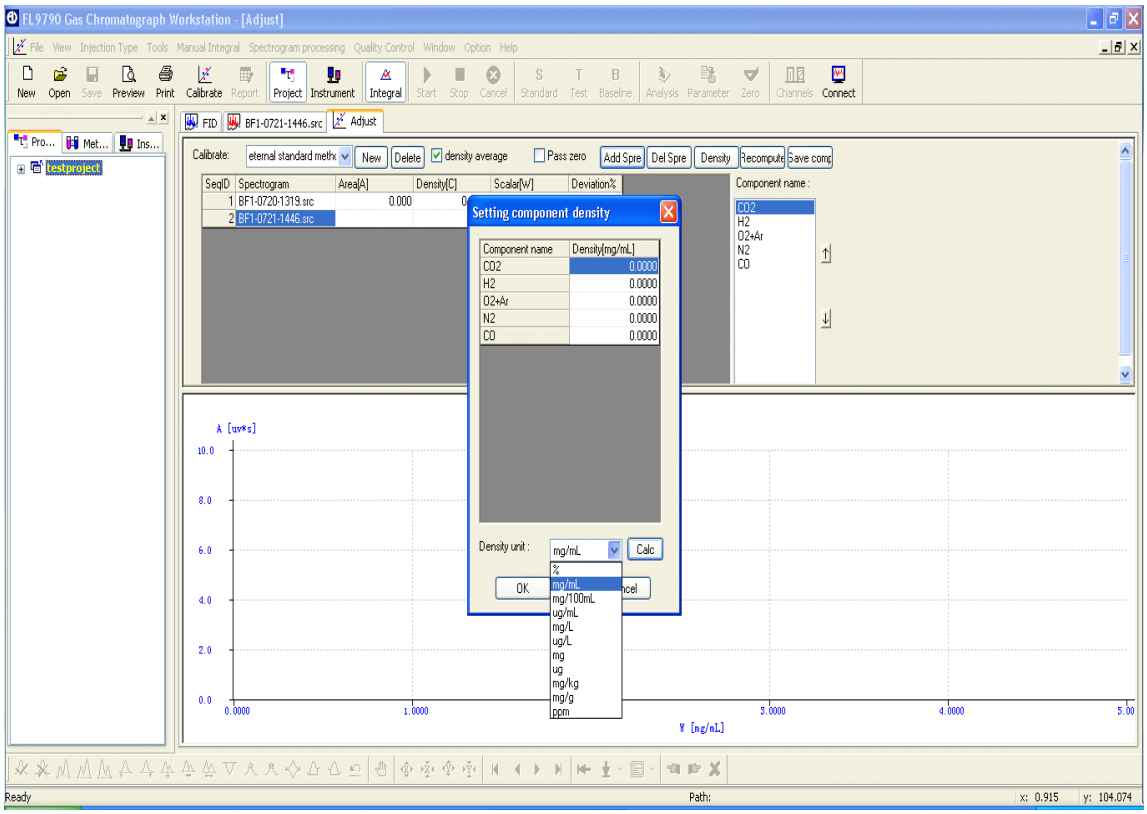
3. Add sample files.



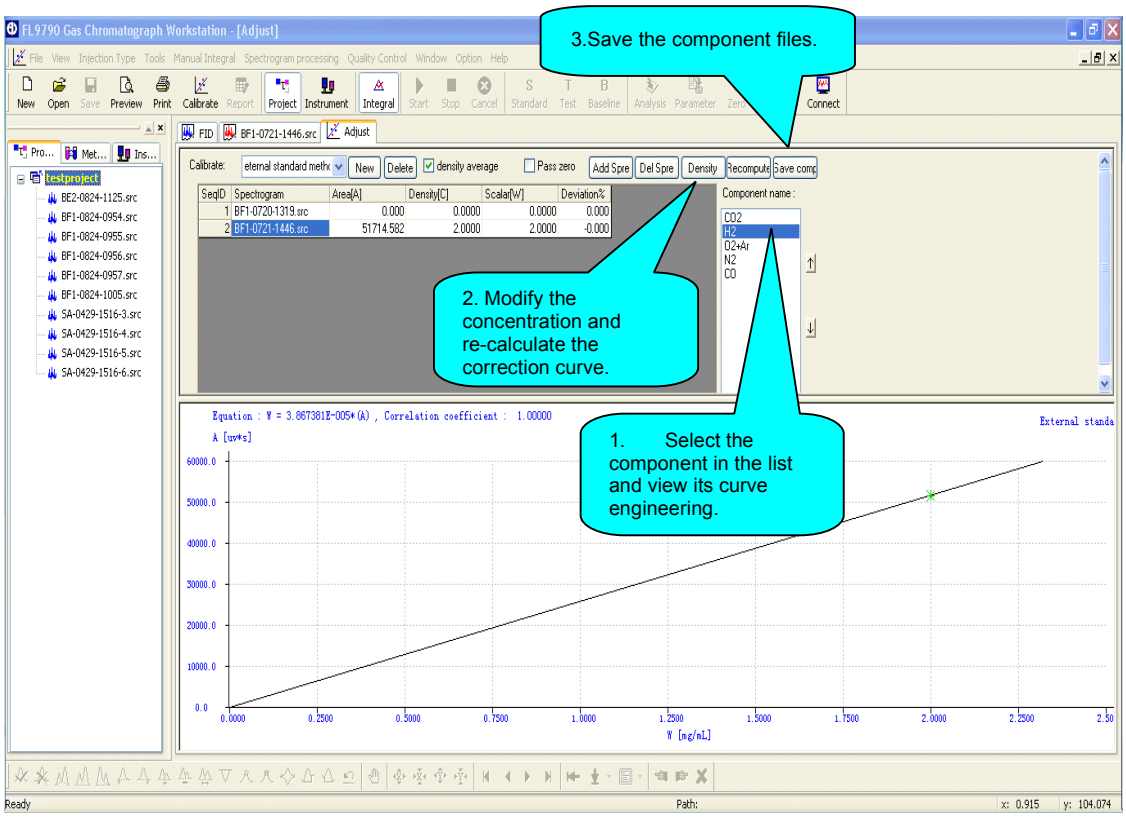
Click the [Standard sample adding], and the [Open] dialog will pop up. See following figure for details:



4. Setting of the component concentration of the sample file

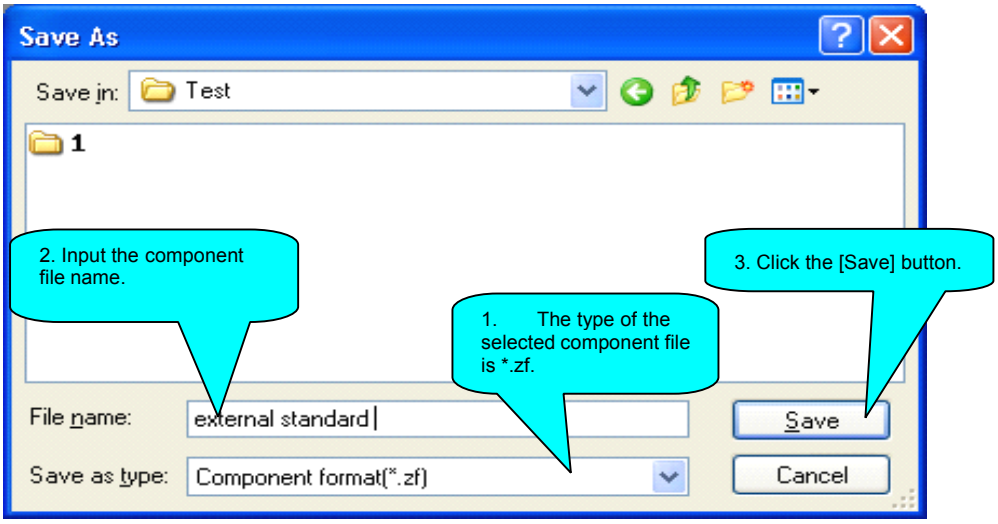


5. After setting all component concentrations, click the [OK], and the correction curve of all components will be calculated and drawn. See following figure for details:



Note: If more sample files shall be added, only 3-4 steps shall be repeated.

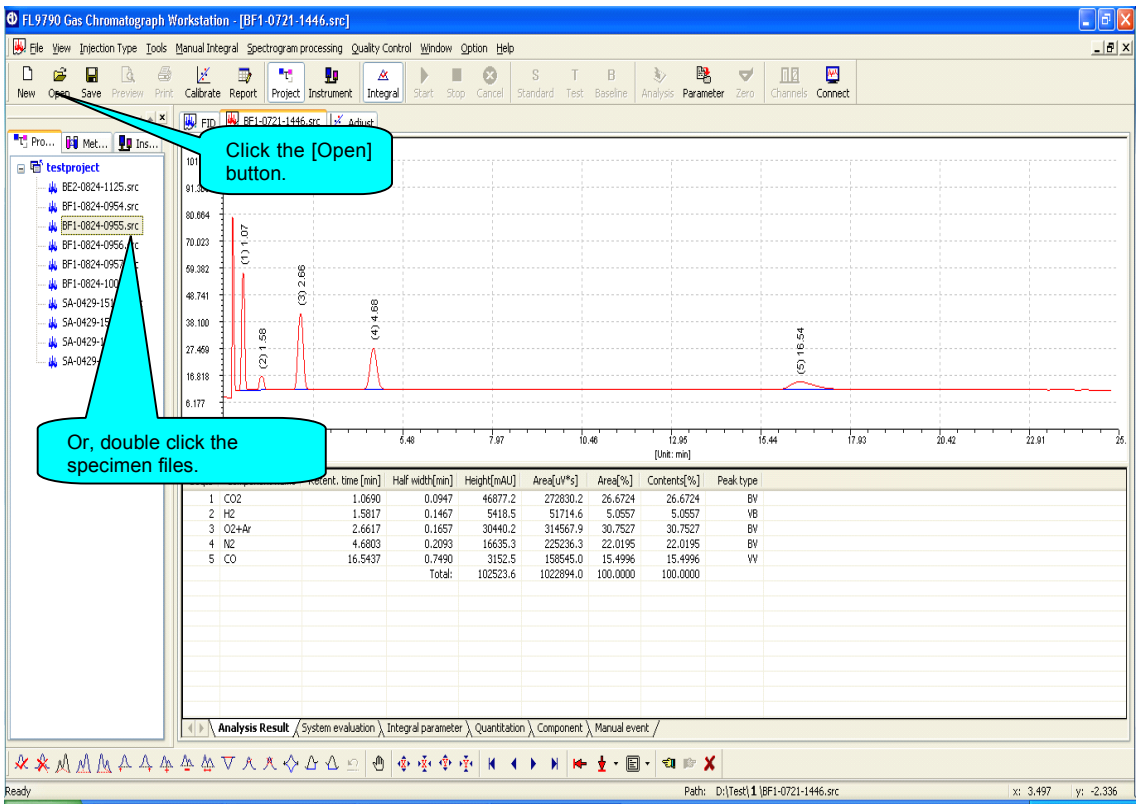
6. Click the [Save component], the [Save as] window of the component will pop up. Input the component file name in the popped-up [Save as] window; save the component file; click the [Save], close the [Save as] window of the component, and complete the component saving. See following figure for details:



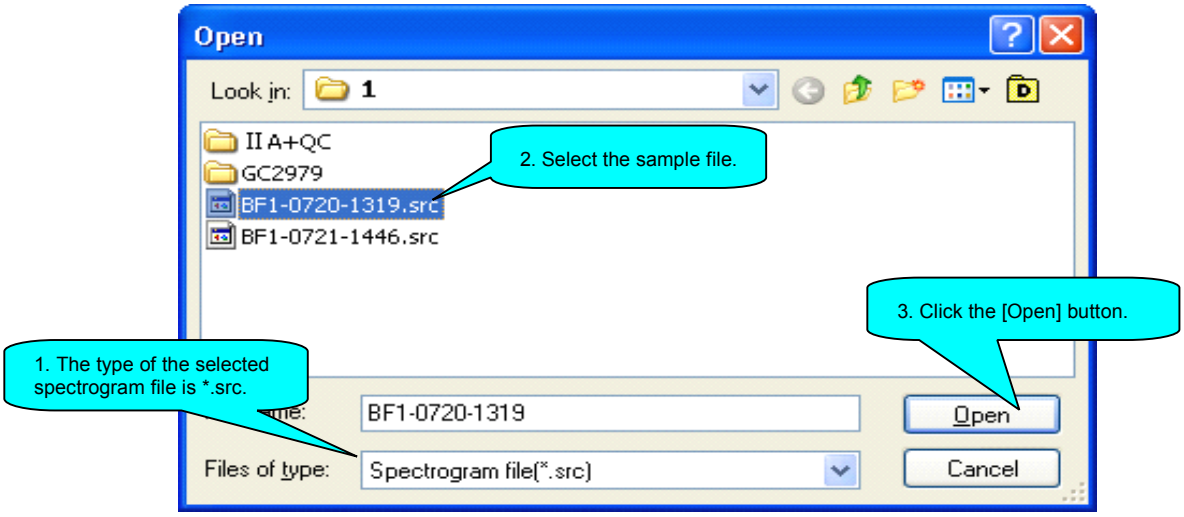
4.2.3 Specimen Analysis

1. Open the specimen spectrogram file

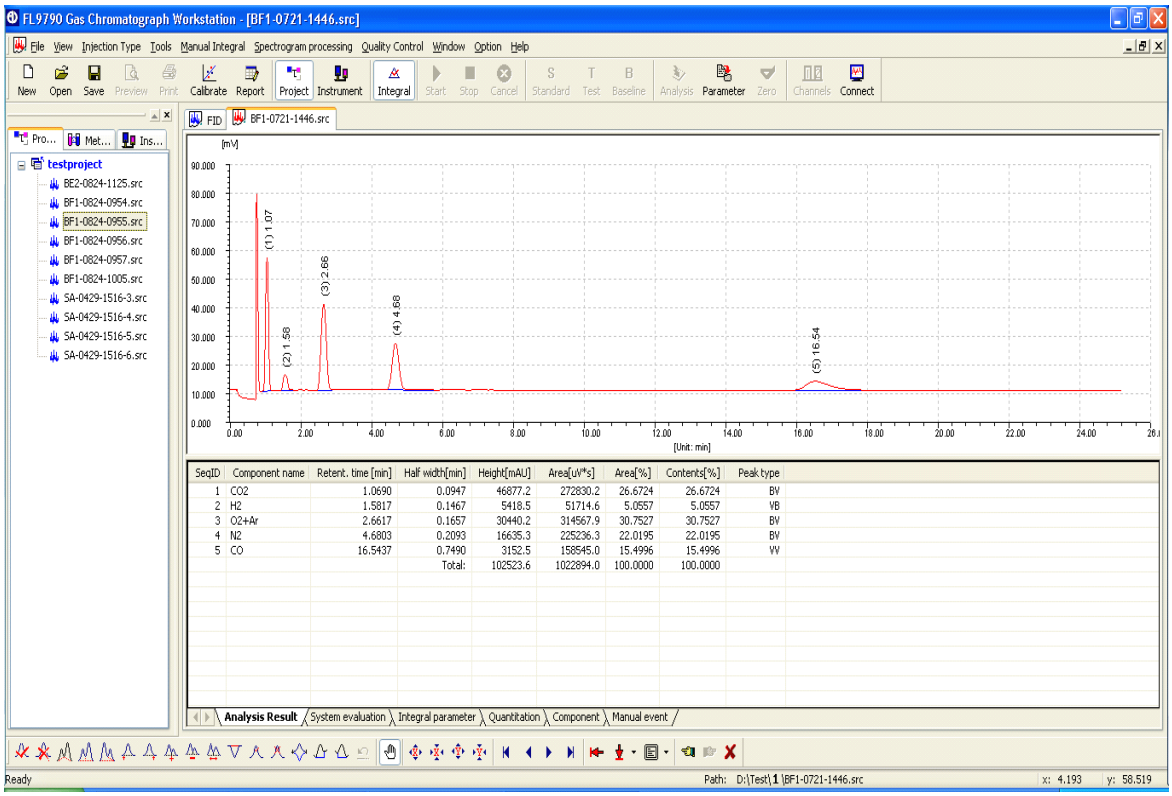
Many modes can be applied to open the spectrogram file, including, clicking the [Open] button in the standard toolbar or directly selecting the sample injection file from the project window and double left clicking it. The opened spectrogram is as follows:



Click the [Open] button in the standard toolbar, and the [Open] window will pop up. See following figure for details:

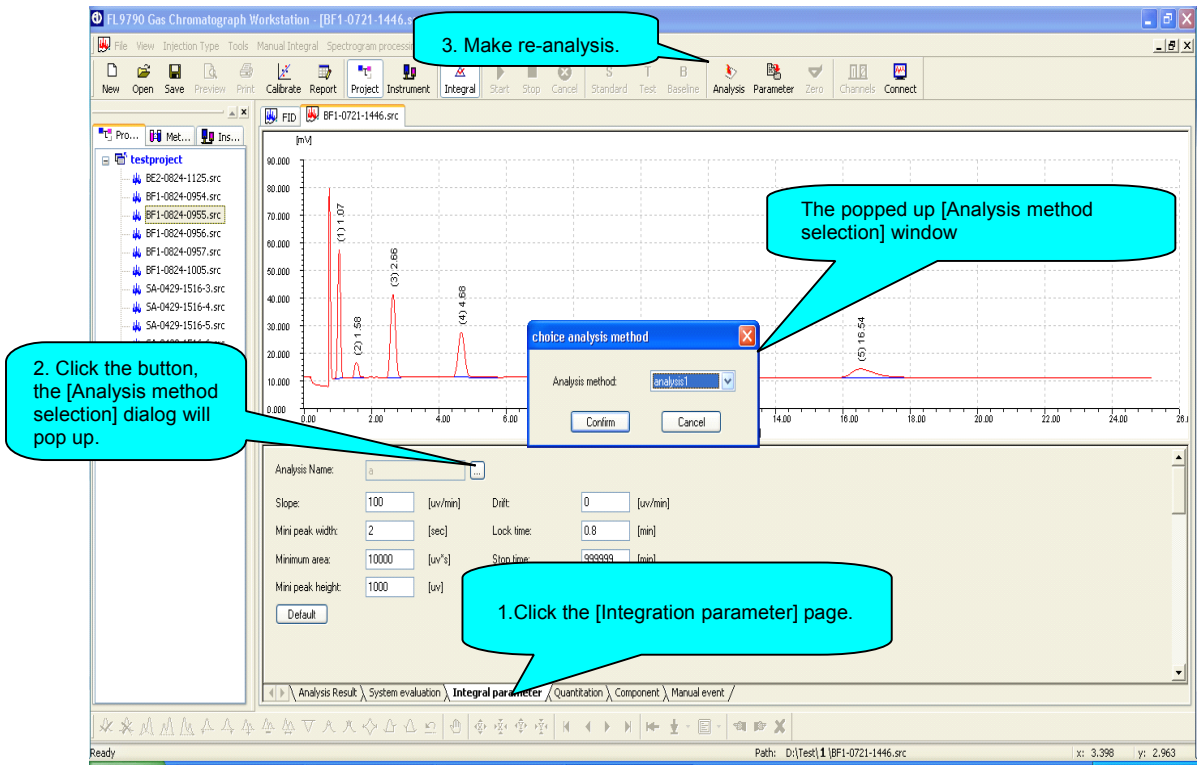


After selecting the spectrogram, click the [Open]. Here, you can see the spectrogram of the opened standard sample. See following figure for details:



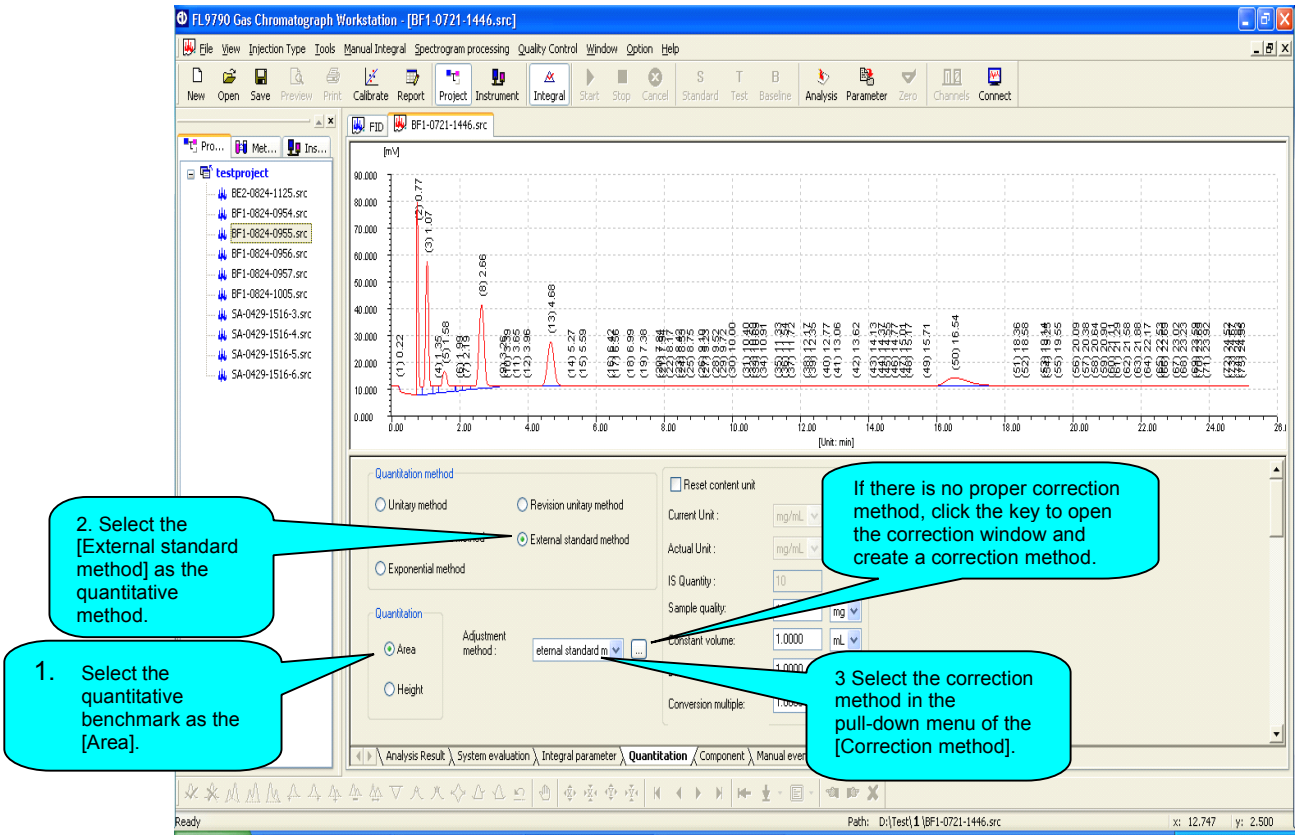
2. Integral parameter setting

If the analysis result is unsatisfactory, you can click the [integral parameter] page to modify the integral parameter and adjust the slope, minimum peak width, minimum area, minimum peak height, resolution, and other parameters. Also, you can click the [Analysis name] in the [Integral page] (step 2 in the following figure); select the existing analysis method in the popped-up [Analysis method selection] window; click the [Analysis] button in the standard toolbar for re-analysis; make the automatic integral result meet your requirements. If you are still not satisfied with the result, you can adjust the analysis result by the manual integration till your requirements are met. See following figure for details:



3.Quantitative parameter setting

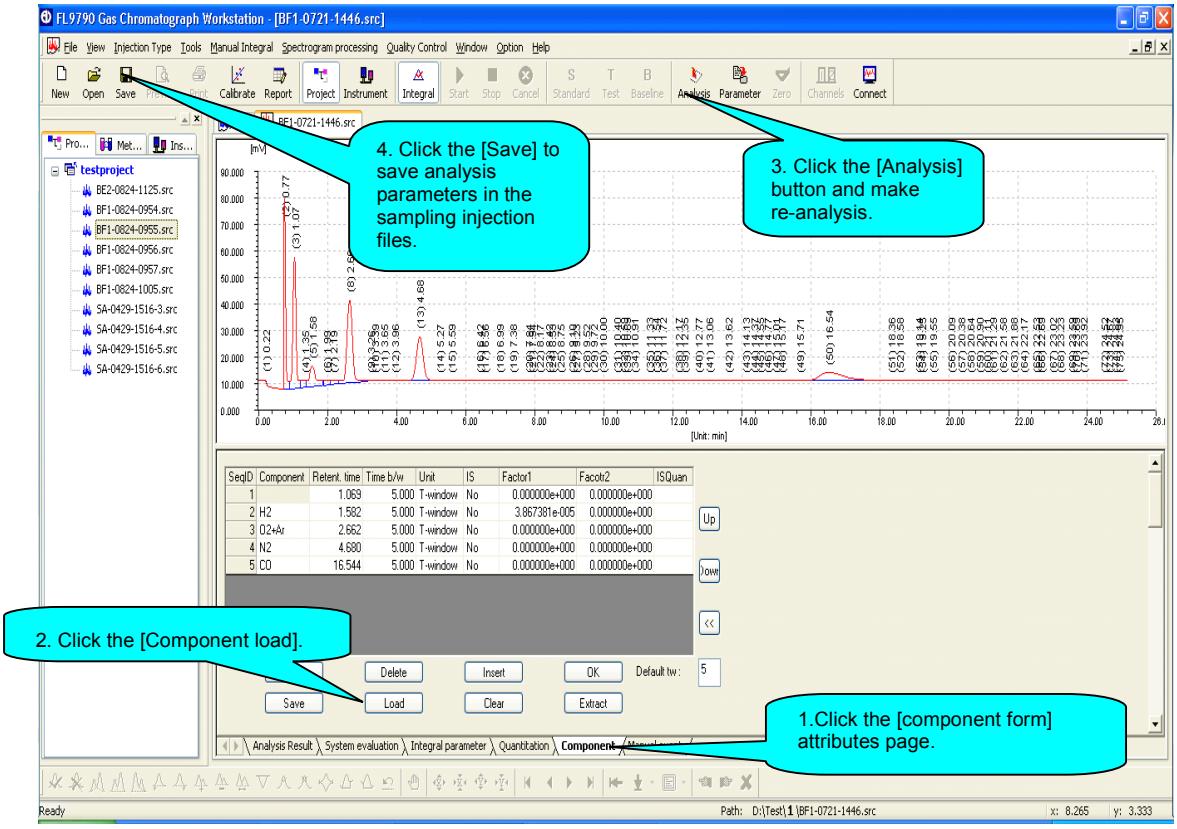
Set the quantitative benchmark as the area, with the external standard method as the quantitative method.



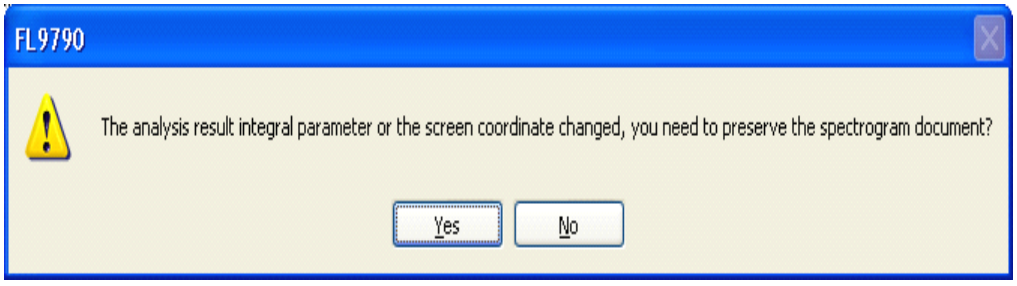
4. Component form page viewing

Open the specimen file and select the component page. If the component form is normally loaded with the accurate component, step 2 in the following figure can be skipped, and it is not necessary to load the component.

Open the specimen file and select the component page. If the component form is still empty, it is determined to load the component. After selecting the component file saved by the correction window, press [OK]. Here, you can see that the corrected component form is loaded in the current component page.



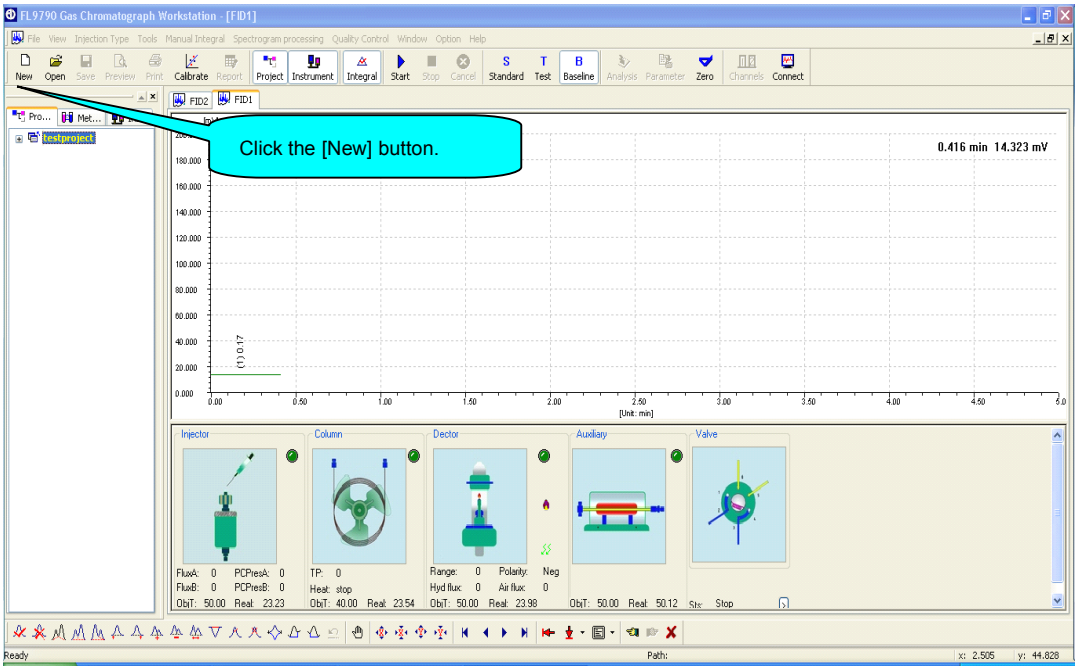
5. After the specimen analysis is ended, click the [Save] button in the standard toolbar, and the [FL9790] warning dialog will pop up. After that, click the [Yes] and close the warning dialog, and the specimen analysis is ended. See following figure for details:



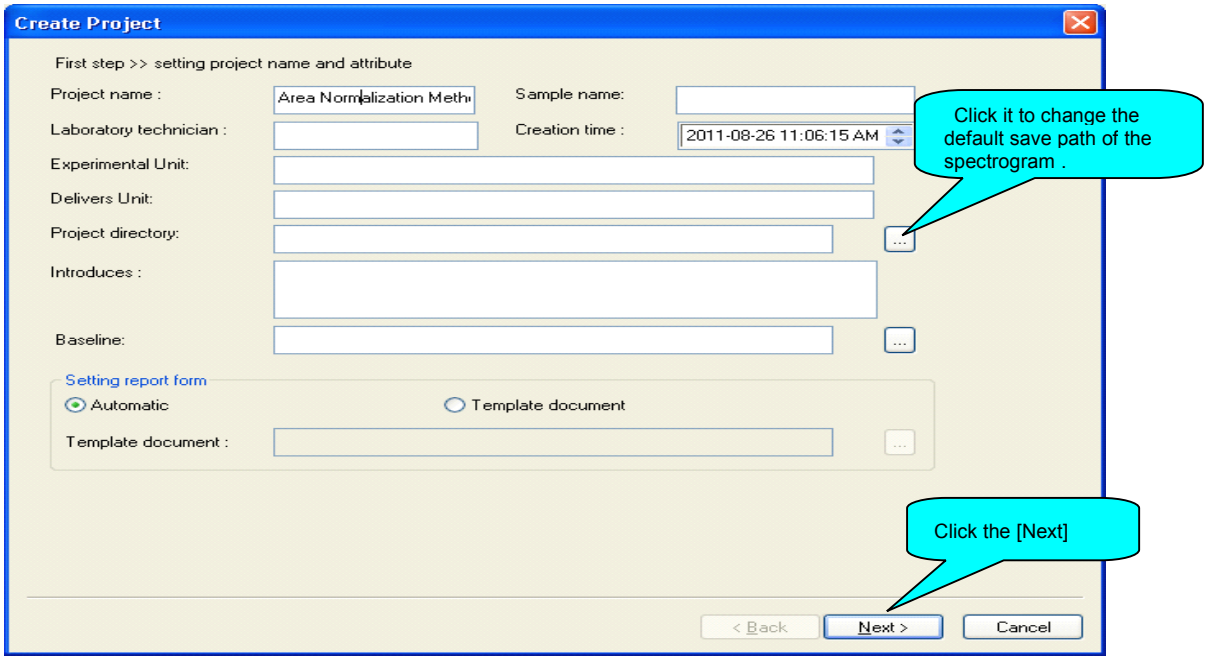
4.3 Area Normalization Method

4.3.1 Establishment of Project and Analysis Method

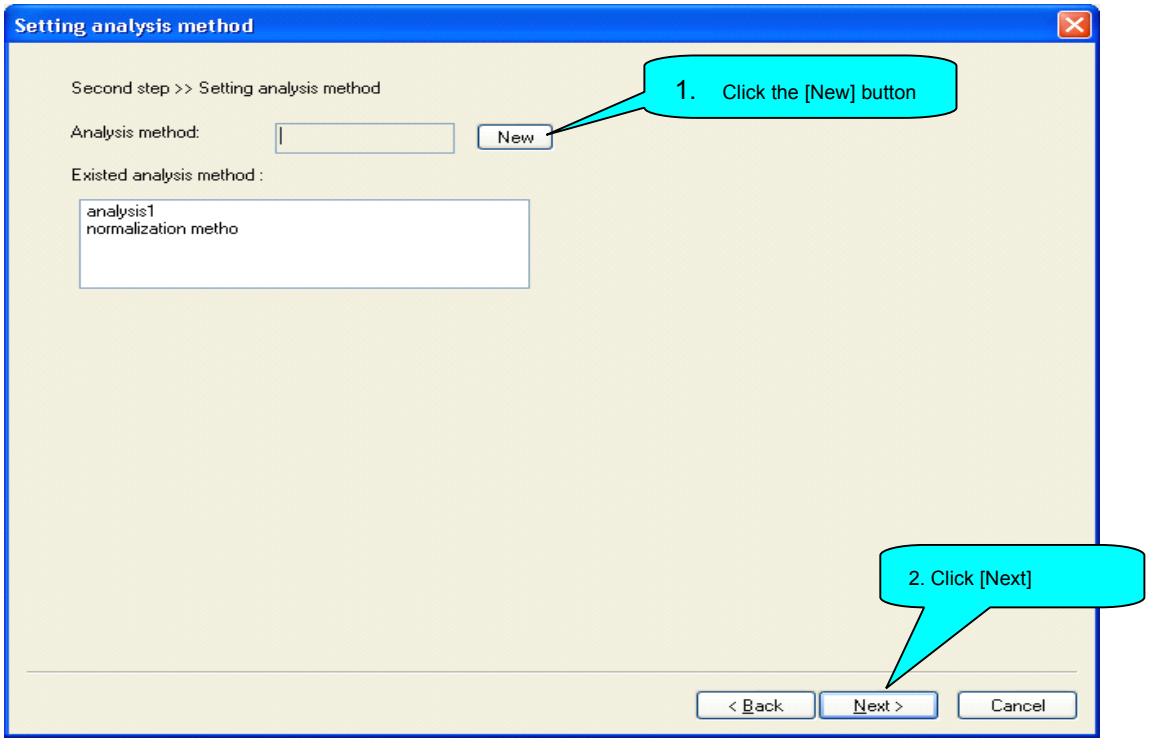
1. Click the [New] button, and establish corresponding new projects and new analysis methods according to different analysis projects.



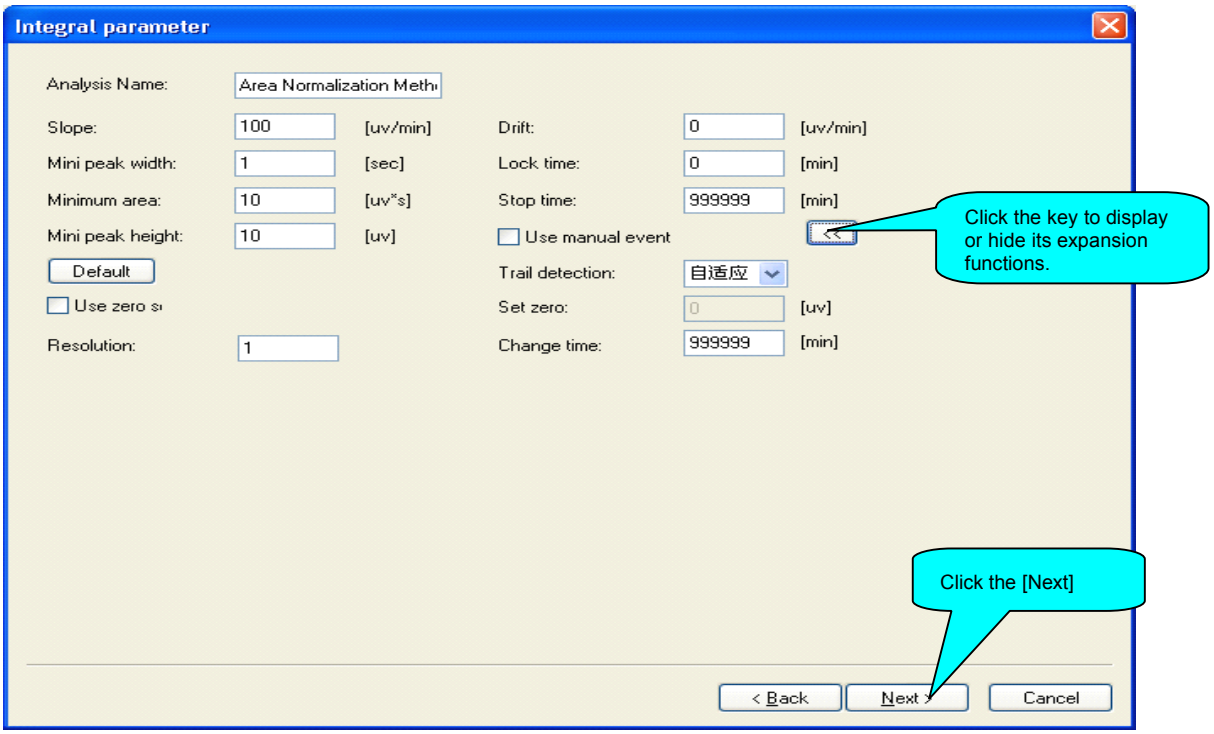
2. Set the project name and property in the popped-up [Project creation] window (following figure), and fill in relevant experiment content. After that, click the [Next], and the [Analysis method setting] window will pop up.



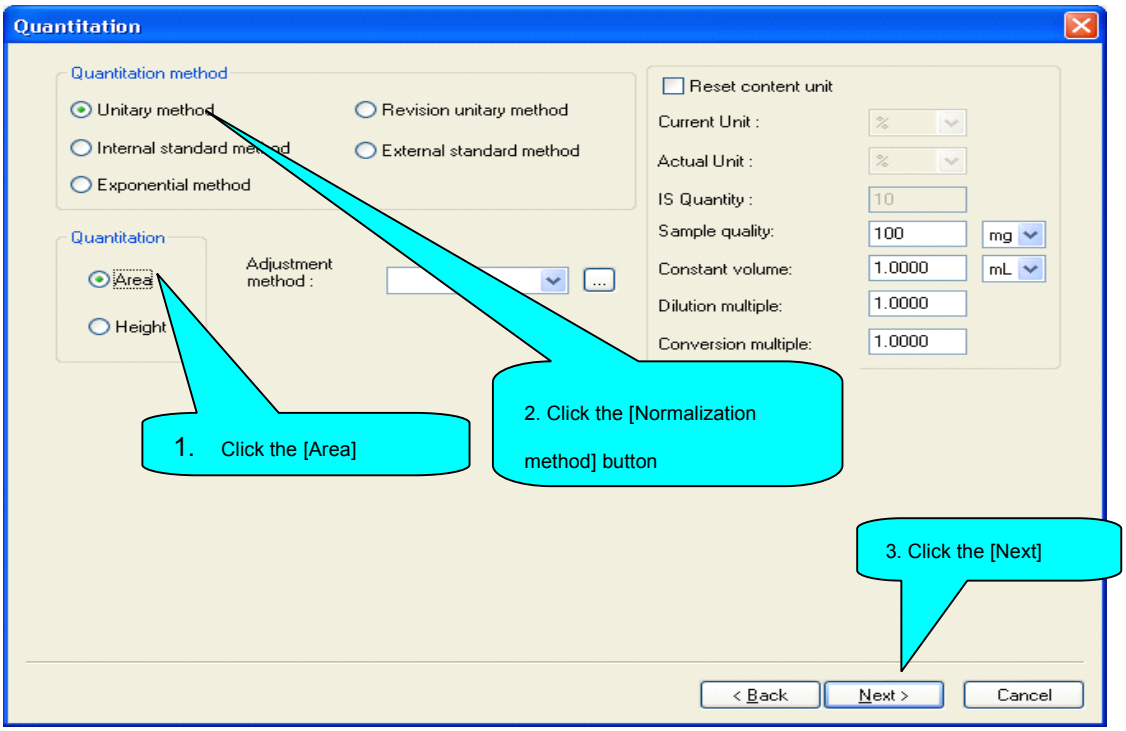
3. One [Analysis method] project can be selected from the existing analysis method list; after that, directly go to the [Instrument condition setting] window. If the existing analysis method can't meet the demands, an analysis method can be created. Click the [New] or empty [Analysis method] project. Here, click the [Next], and the [Integral parameter] window will pop up.



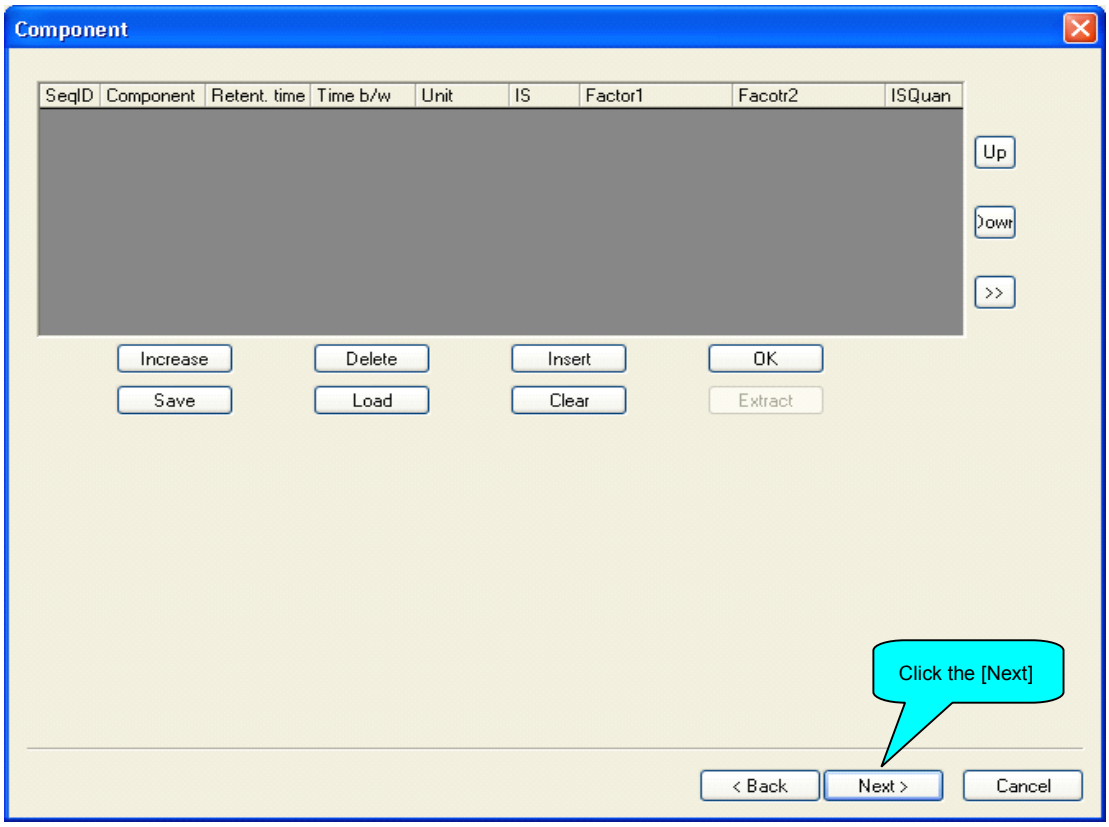
4. Set the name and integral parameter of the new analysis method; fill in corresponding integral parameters, and click the [Next].



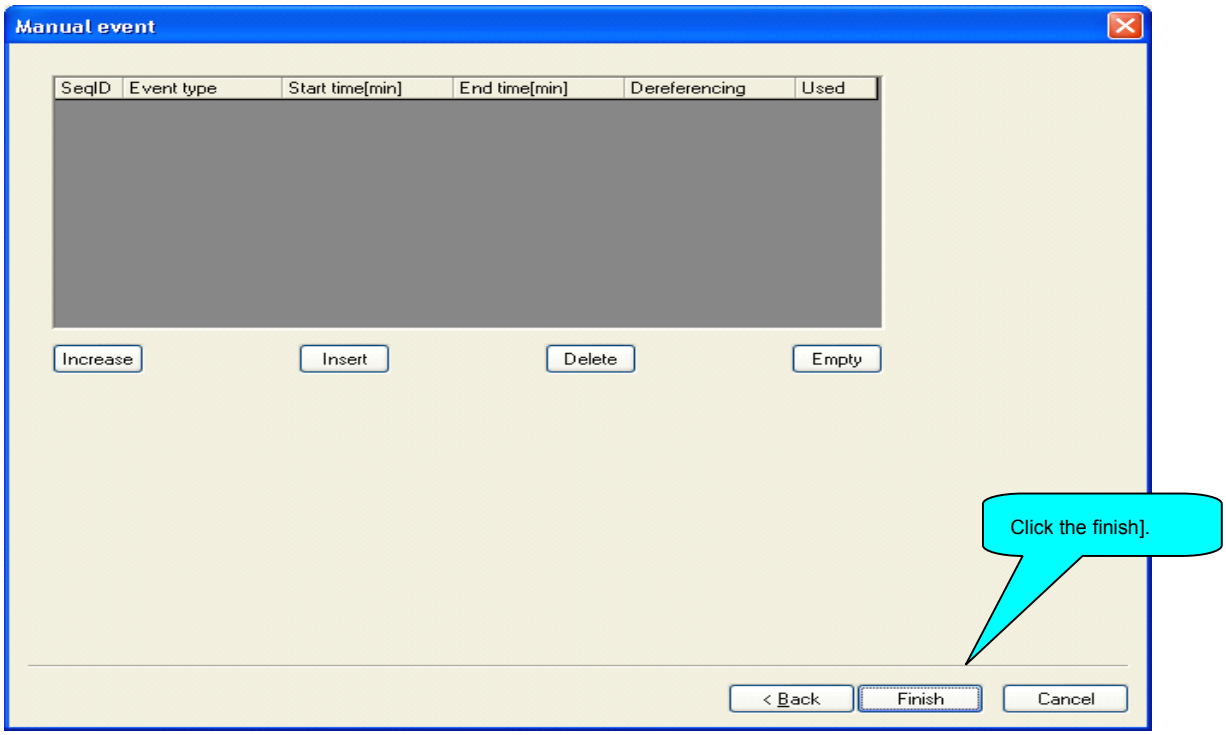
5. Set the quantitative parameter of the new analysis method, with application of the area normalization method.



6. Enter into the component form; input relevant information, and click the [Next].

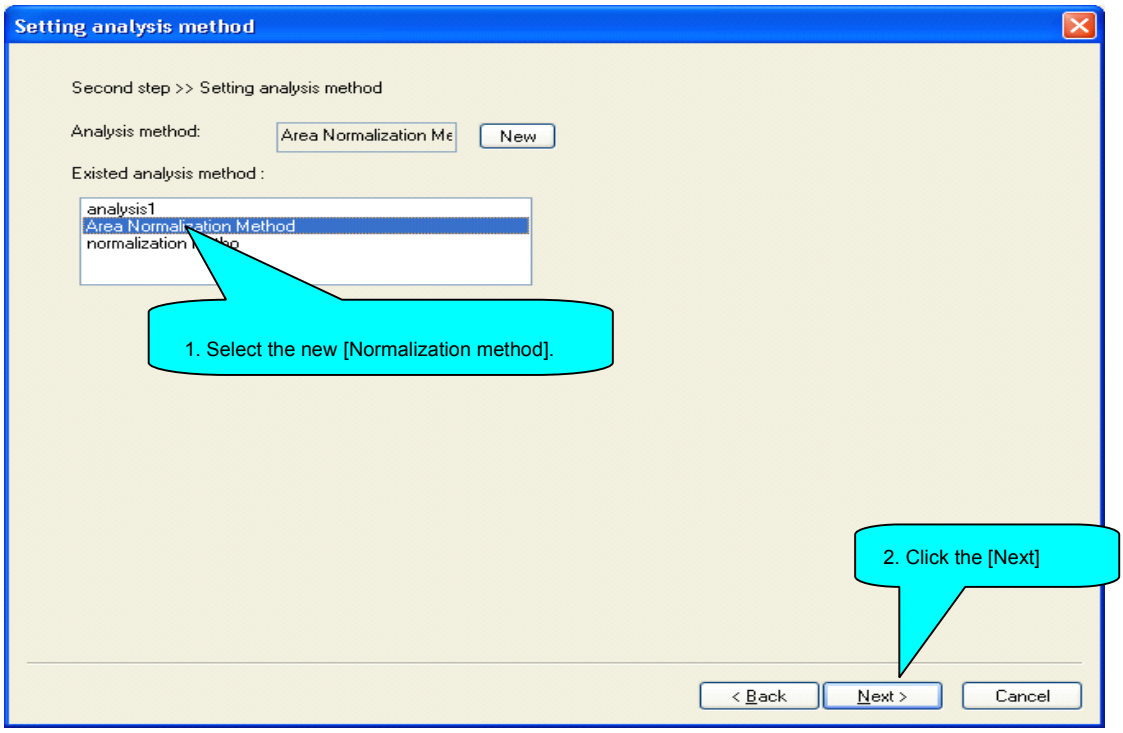


7. Input parameters to set the manual event, and the new analysis method will be established after clicking [Complete]. After that, it will go to the [Analysis method setting] window.

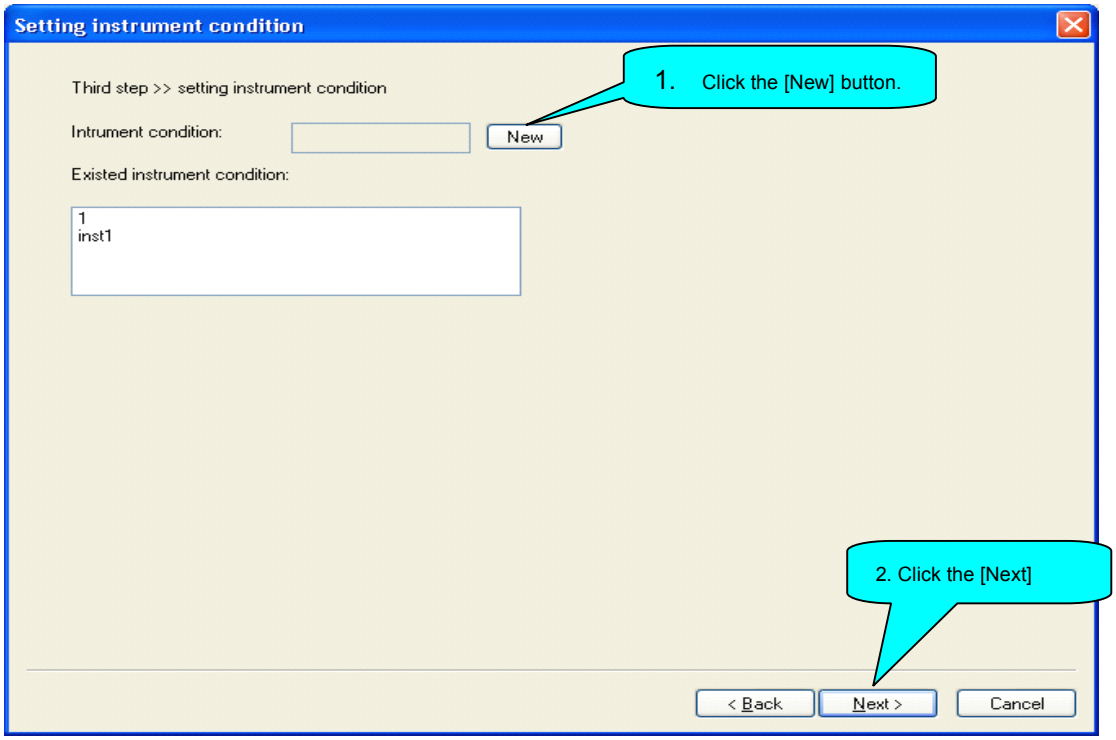


8. After the [Manual event] is set, it will go to the [Analysis method setting] window; furthermore, the new analysis method is included in the existing analysis

method list and the currently-selected analysis method is the new analysis method. And, click the [Next], and go to the [Instrument condition setting] window.

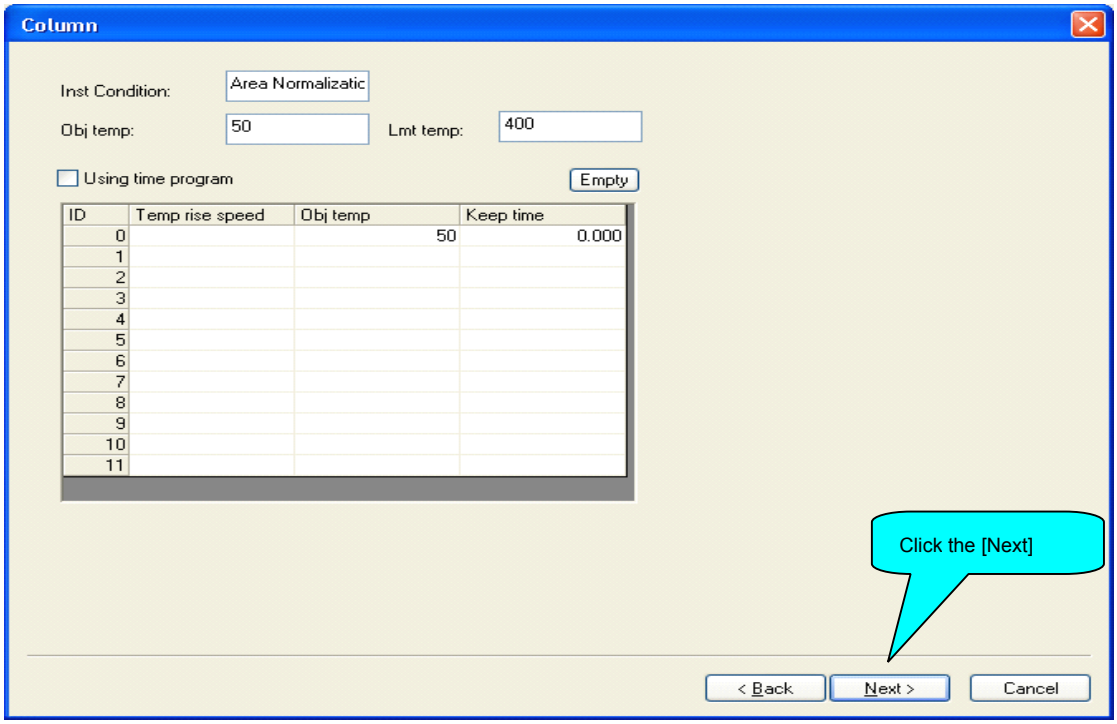


9. Instrument condition setting. If the existing instrument condition in the instrument condition list can't meet the demands, just click the [New] button or directly click the [Next] ([instrument condition] column is empty) and go to the [cabinet] condition setting window.

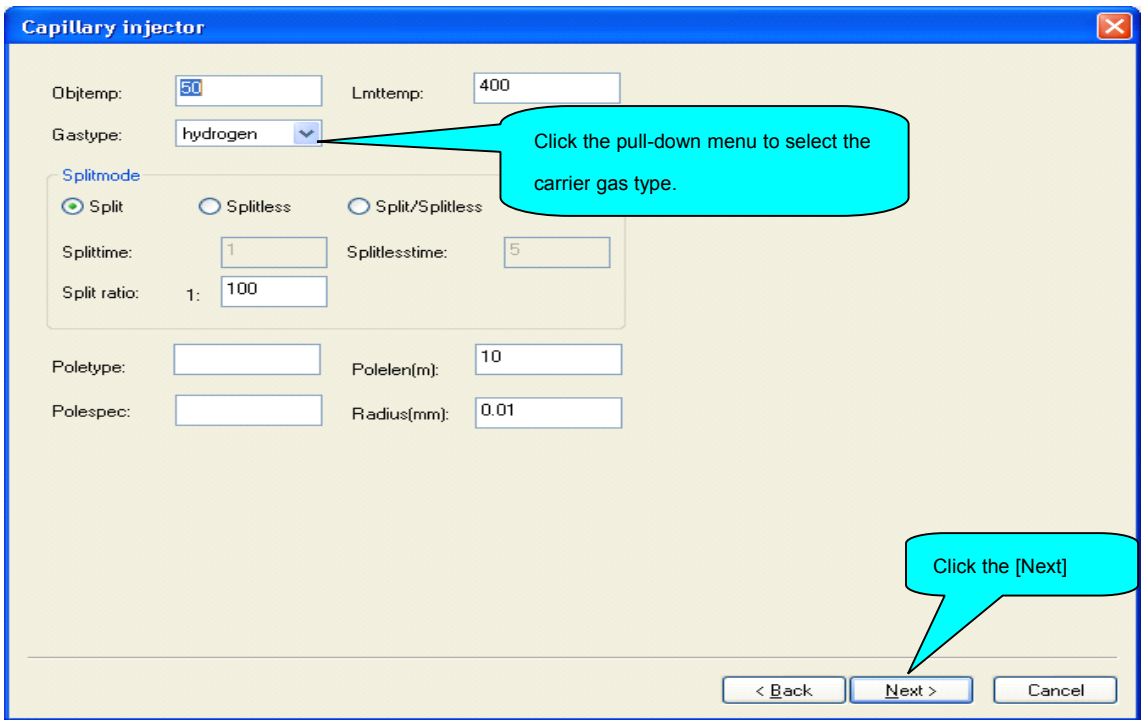


10. Cabinet parameter setting. Set the new instrument condition name and cabinet condition. After that, click the [Next], and the [Sample injector 1] setting

window will pop up.



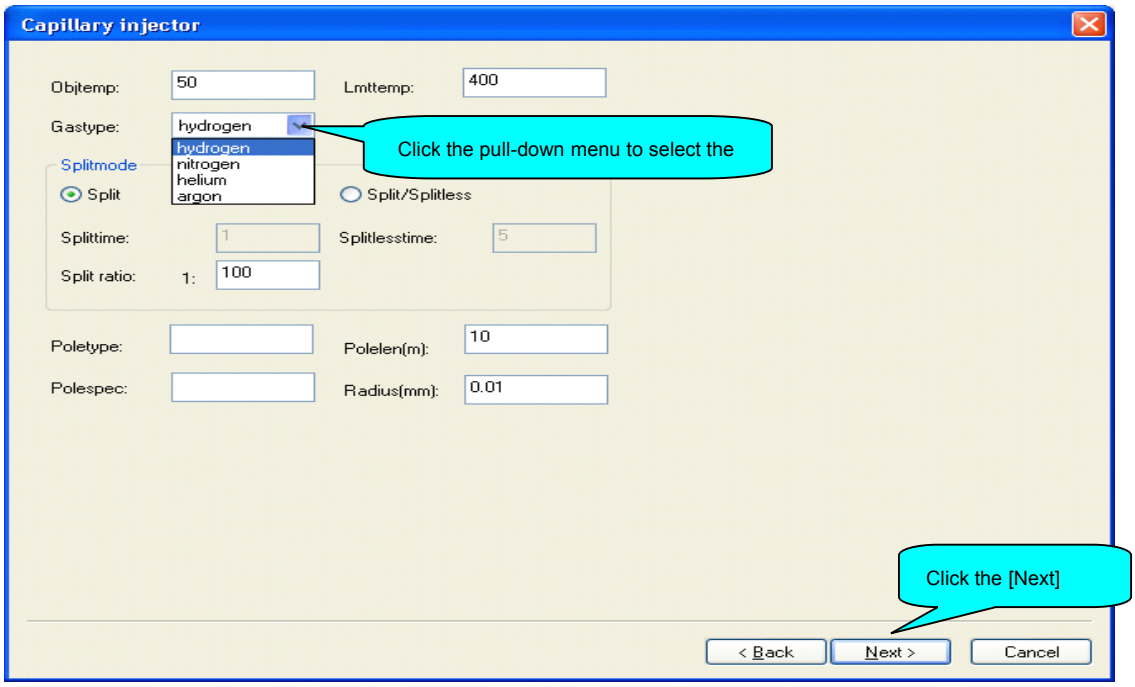
11. Setting of parameters of the sample injector 1. After inputting corresponding parameters, click the [Next] to enter into the [Sample injector 2] setting window.



Note: As the sample injector 1 selects the capillary column sampler during the workstation redemonstration, the window displays the [capillary sampler1].

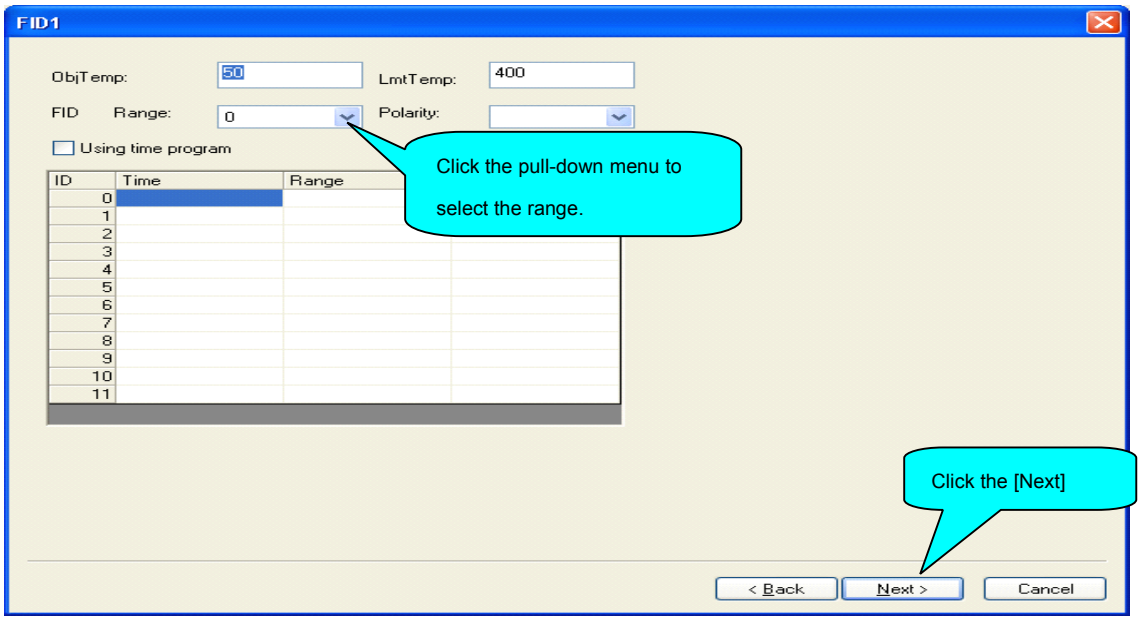
12. Setting of parameters of the sample injector 2. After inputting corresponding

parameters, click the [Next] to enter into the [Detector 1] setting window.



Note: As the sample injector 2 selects the capillary column sampler during the workstation redemonstration, the window displays the [capillary sampler 2].

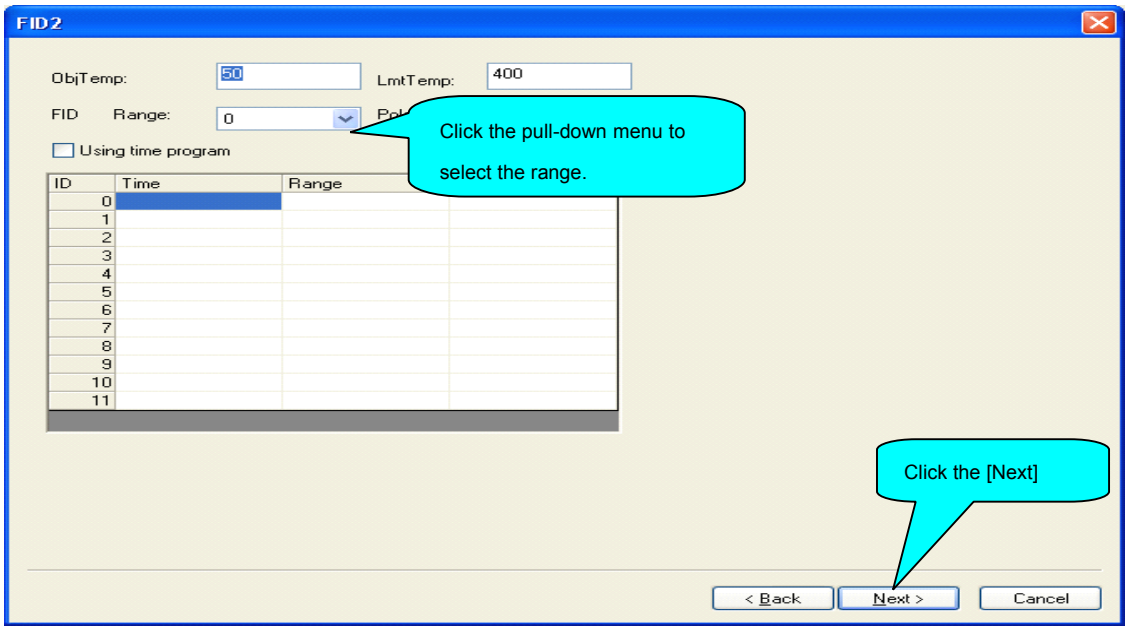
13. Setting of parameters of the detector 1. After inputting corresponding parameters, click the [Next] to enter into the [Detector 2] setting window. (If no detector 2 is installed, the setting window of [Detector 2] will not pop up. And, the [Valve] setting window will directly pop up.)



Note: As the detector 1selects the FID detector during the workstation redemonstration, the window displays the [FID1] detector.

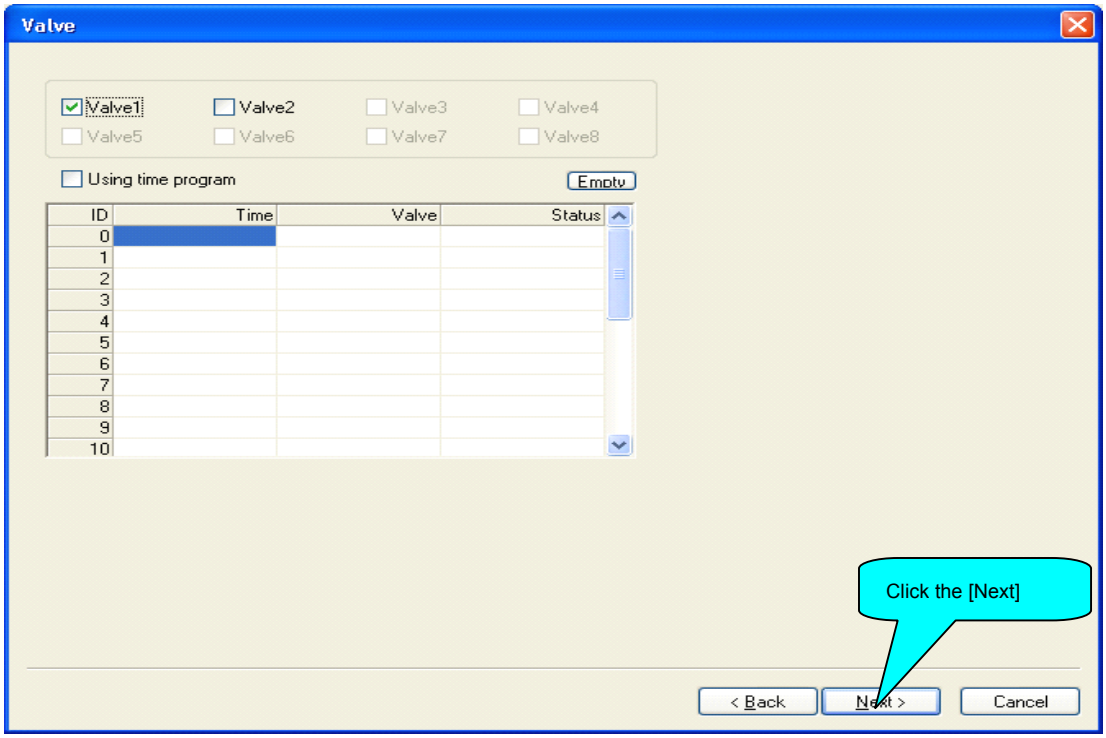
14. Setting of parameters of the detector 2. After inputting corresponding

parameters, click the [Next] to enter into the [Valve] setting window.



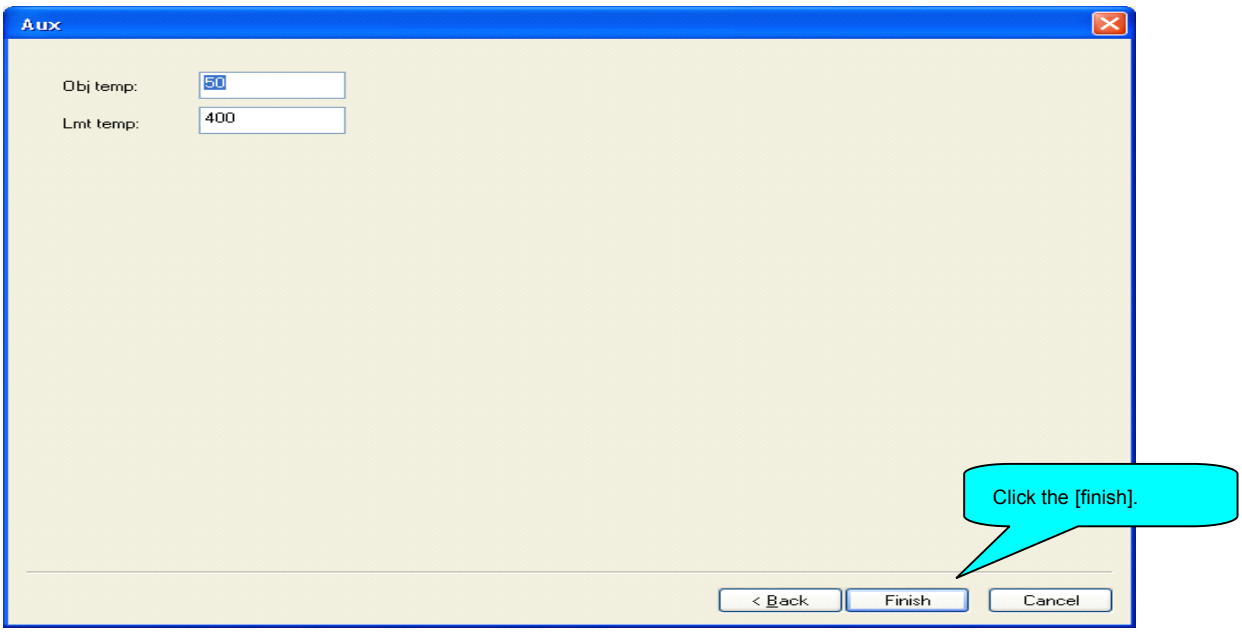
Note: As the detector 2 selects the FID detector during the workstation redemonstration, the window displays the [FID2] detector. If no detector 2 is installed, this setting will be skipped.

15. Setting of valve parameters. After inputting corresponding parameters, click the [Next] to enter into the [Auxiliary furnace] setting window.

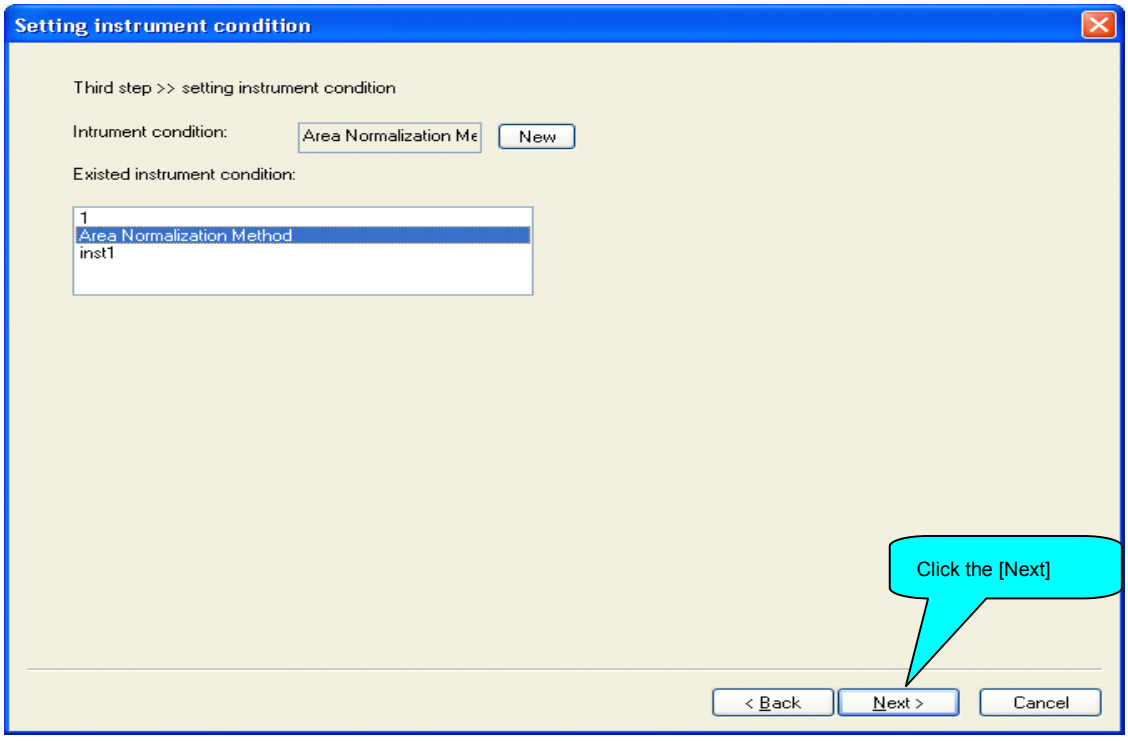


16. Setting of parameters of the auxiliary furnace. After inputting corresponding parameters, click the [Complete], and the new instrument condition setting is ended.

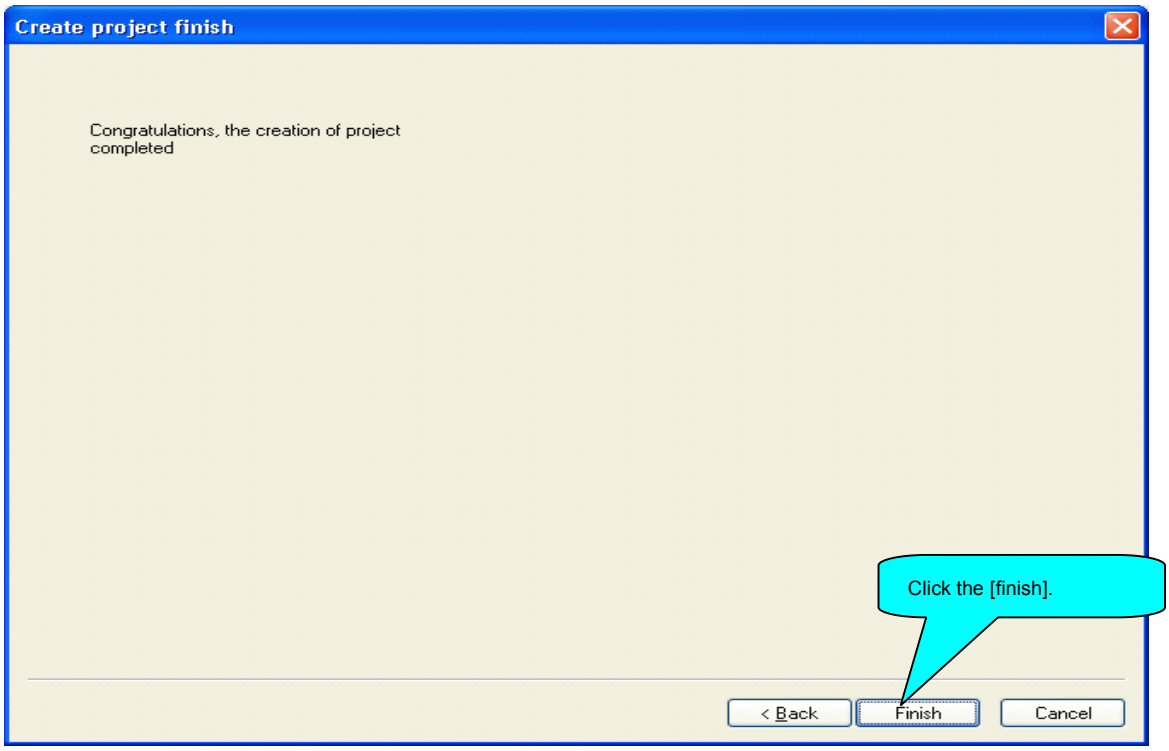
And, the [Instrument condition setting] window will be skipped.



17. Completion of the instrument condition setting. The new instrument condition is included in the existing instrument condition list and the currently-selected instrument condition is the new instrument condition. And, click the [Next], and the [Project creation ending] window will pop up.

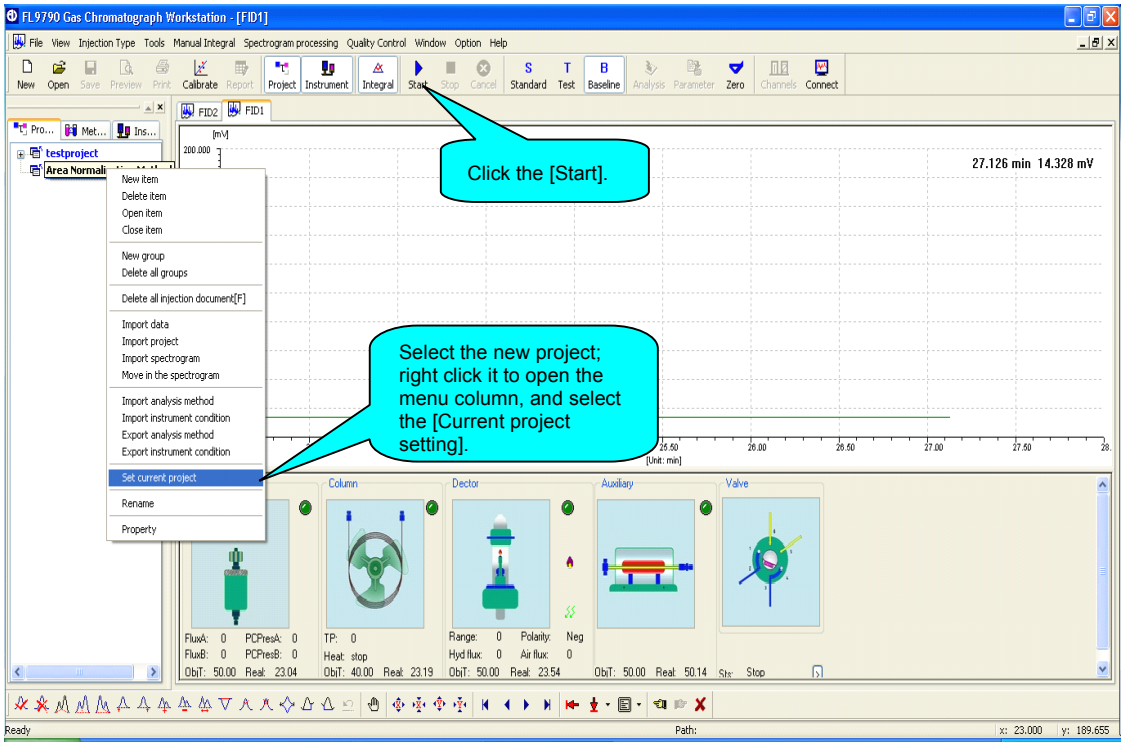


18. Click the [Complete], close the project creation window, and complete the new project creation.



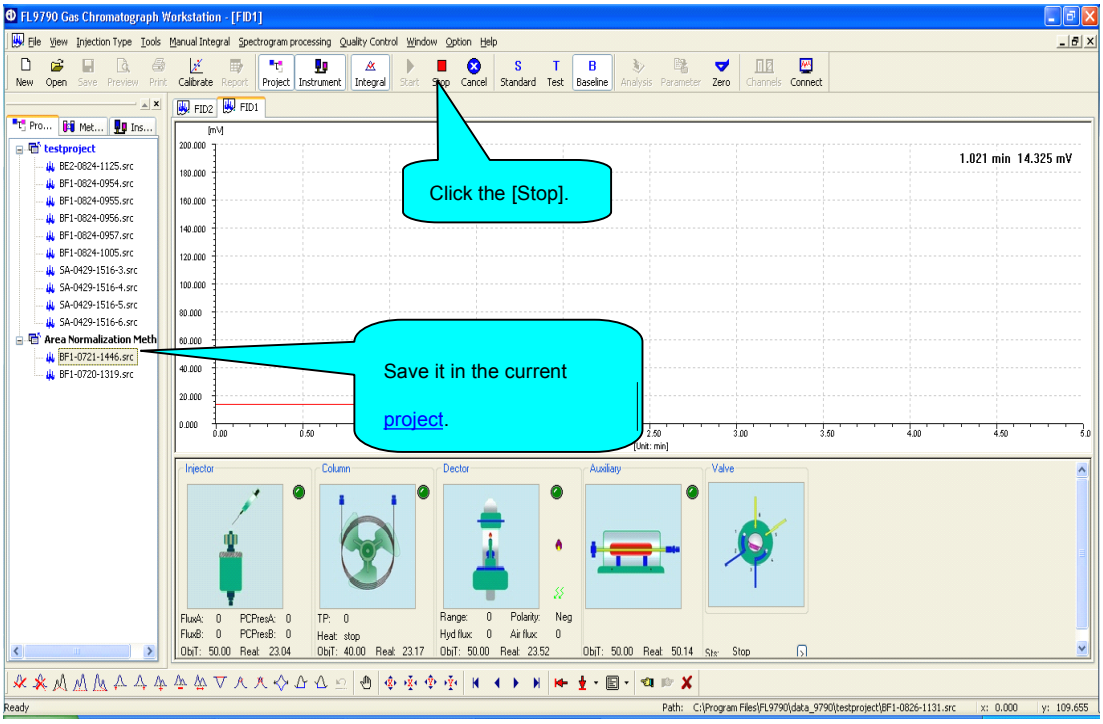
4.3.2 Analysis Sample

Set the new project as the current project; click the [Start] button of the standard toolbar for the spectrogram sampling analysis.



2. Click the [Start] button of the standard toolbar to complete one sample injection. And, the spectrogram after one sample injection will be displayed.

Furthermore, the spectrogram is saved in the current project content.



5. Statement Generation

The statement has two generation modes, including:

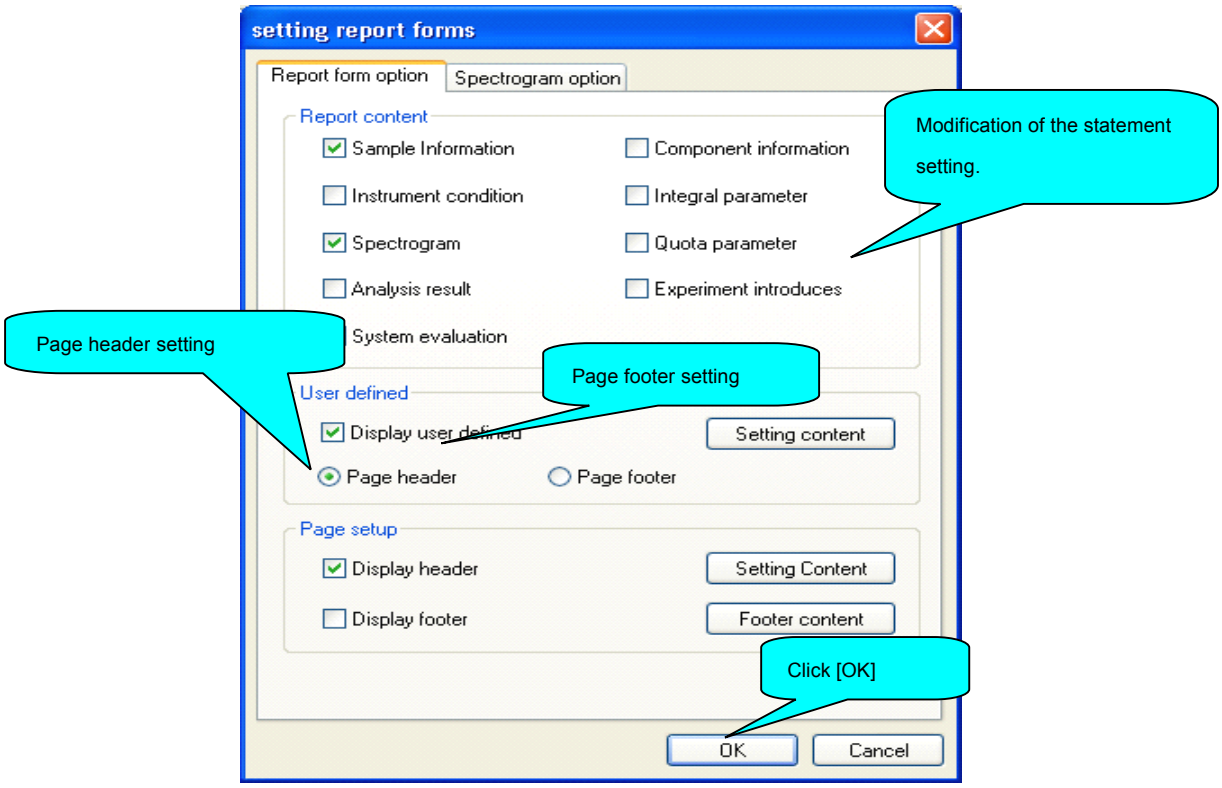
* Automatic generation
* Generation by template files

5.1 Automatic Generation

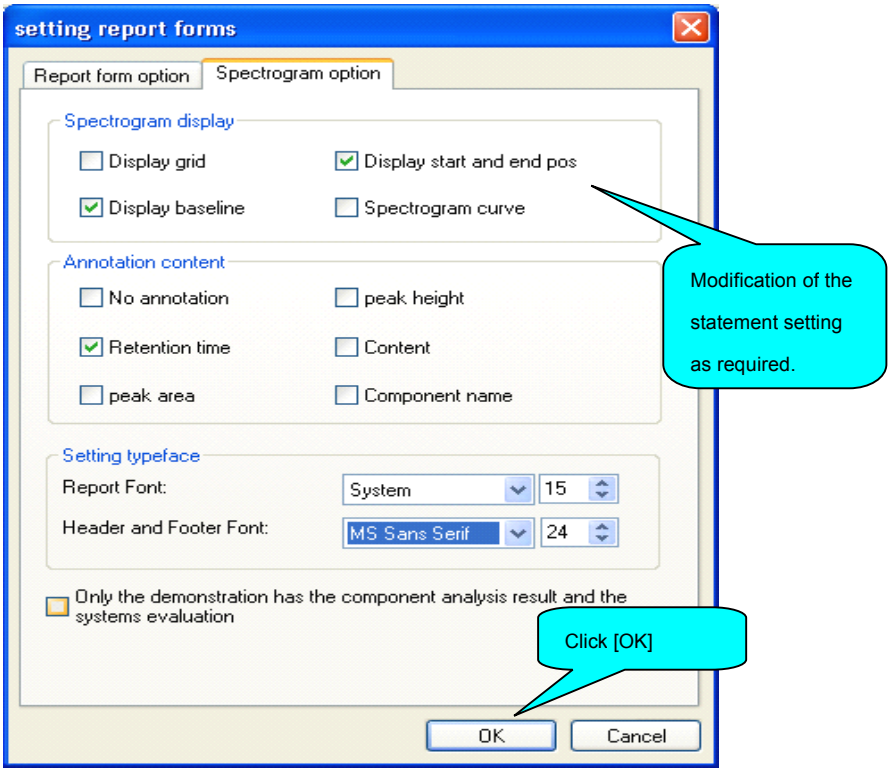
The statement generation mode of spectrogram files will be determined by the property of the affiliated project and the [statement setting] submenu in the [Option] menu. And, the user can change current settings by modifying the property of projects or statement files as required.

Click the [Option] of the main menu, and the pull-down menu will pop up. And, select the [statement setting] of the pull-down menu, and the [Statement setting] window will pop up, which contains two property pages.

Statement option: The setting of the statement setting content and page, which can be selected of the display or hide of the page header and page footer, By clicking the content of the page header and page footer, they can be automatically set. See following figure for details of the statement option page:

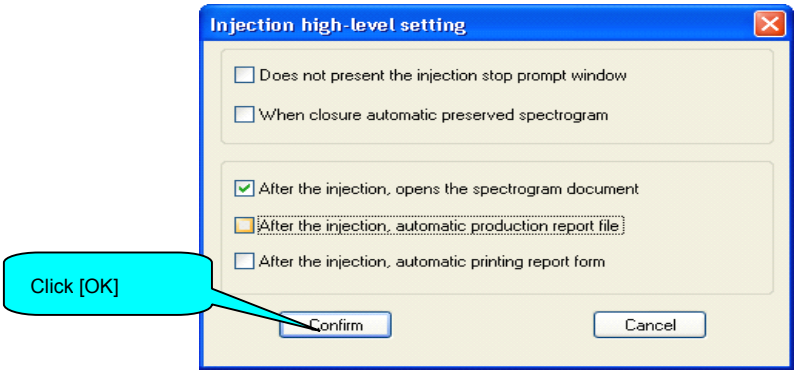


Spectrogram option: Set the information and annotations displayed by the spectrogram. See following figure for details:



After current settings are modified according to actual demands, press the [OK] button and close the statement setting window.

After completing the statement setting, click the [Setting of advanced parameters] in the [Option] menu, and the [Advanced setting of the sample injection] window will pop up. The default setting after installation of the workstation is shown in the following figure. The advanced parameters will be adjusted according to specific demands.



Prior to the sample injection, select the [Automatic generation of statement files after the sample injection] in the dialog, and the statement will be automatically generated according to your statement setting and setting of the affiliated project of the spectrogram after the sample injection. If the automatically-generated statement is dissatisfactory, the [Statement setting] window can be used to change relevant settings

or relevant property of the affiliated project of the sample injection file; after that, click the [Statement] button in the standard toolbar, new statement will be generated.

Prior to the sample injection and after selecting the [Automatic print of statements after the sample injection] in the dialog, the statement will be automatically printed according to your statement setting and setting of the affiliated project of the spectrogram after the sample injection.

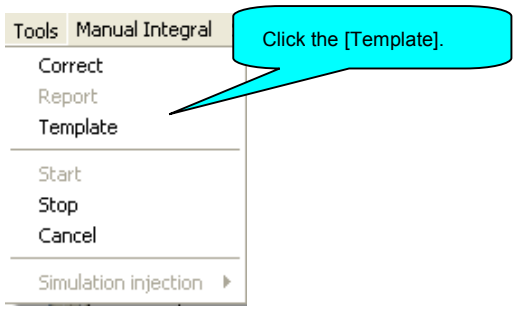
If the [Automatic generation of statement files after the sample injection] and [Automatic print of statements after the sample injection] are not selected prior to the sample injection, double left click the spectrogram file after completing the sample injection as well as click the [Statement] button in standard toolbar, and the statement file will be automatically generated according to your setting and setting of the affiliated project of the spectrogram.

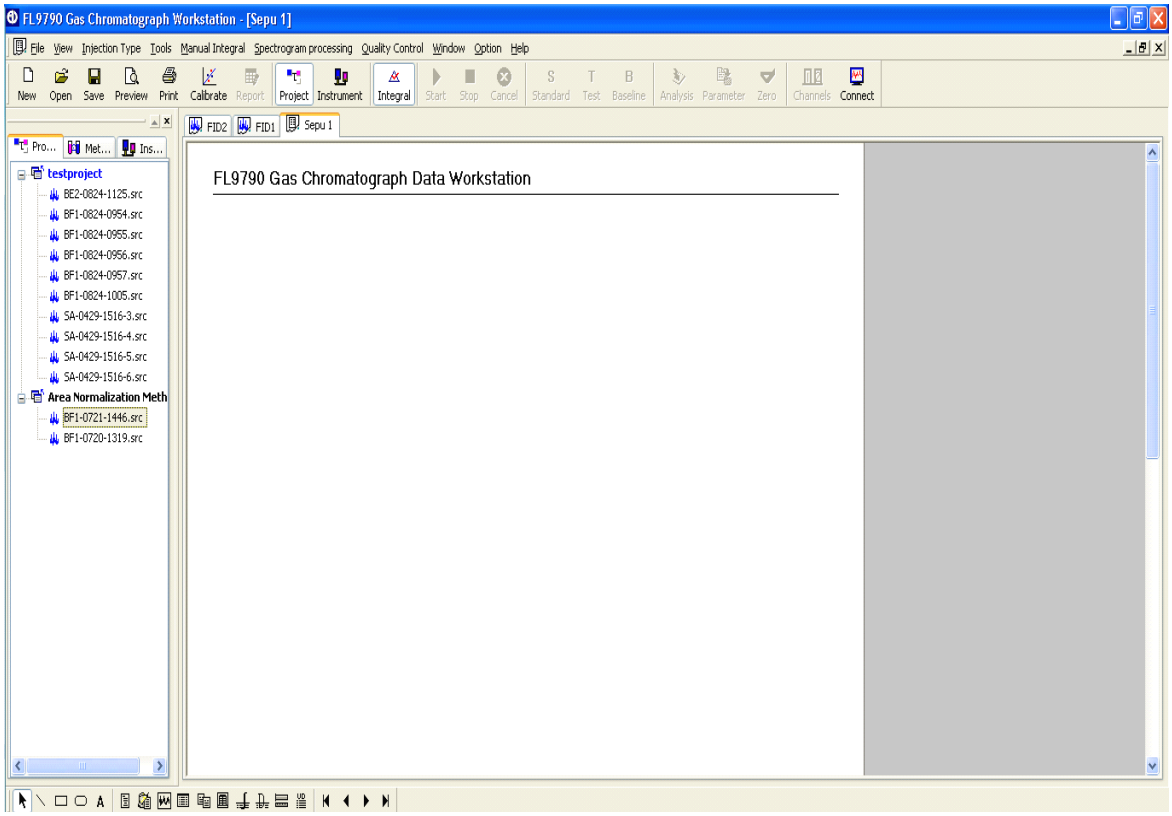
5.2 Generation by Template Files

If the customized template file shall be applied; first of all, we shall design our own statement templates; after that, we shall modify the property of the project or spectrogram file; finally, the statement file will be generated.

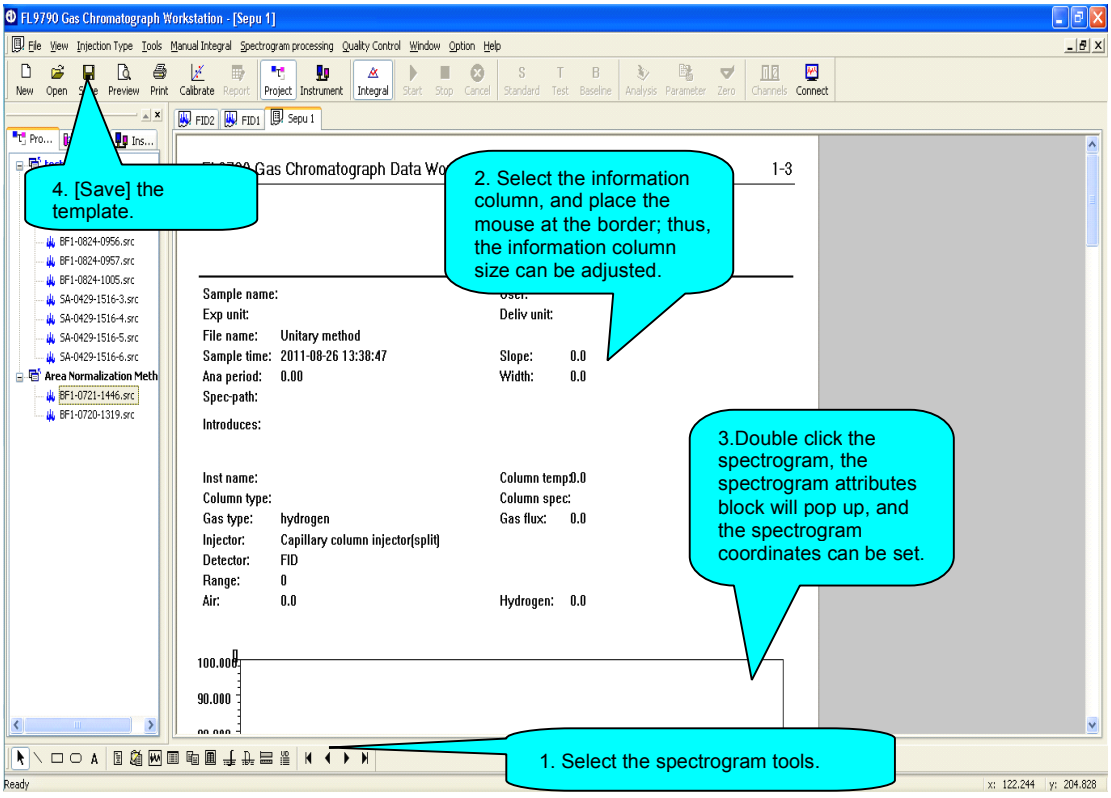
5.2.1 Statement Template Making

1. Click the [Template] of the [Tool] project in the main menu and open the design window of the statement template. See following figure for details:



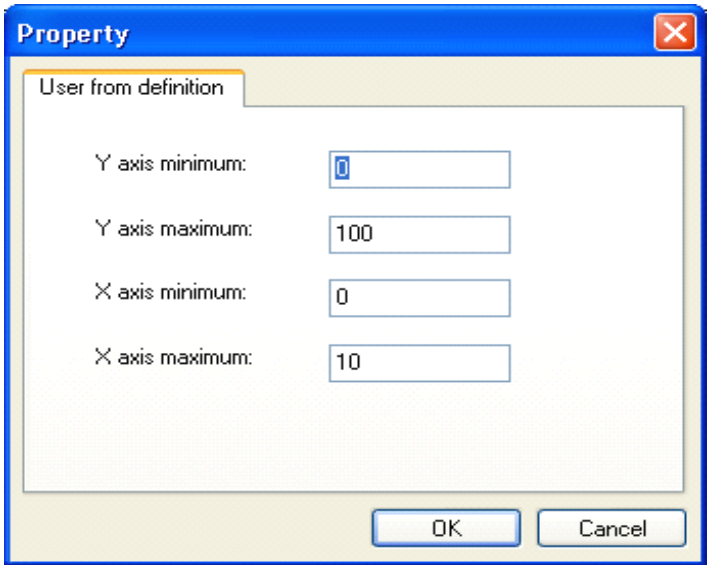


2. Select the statement tool in the spectrogram toolbar and drag it in the statement window. See following figure for details.

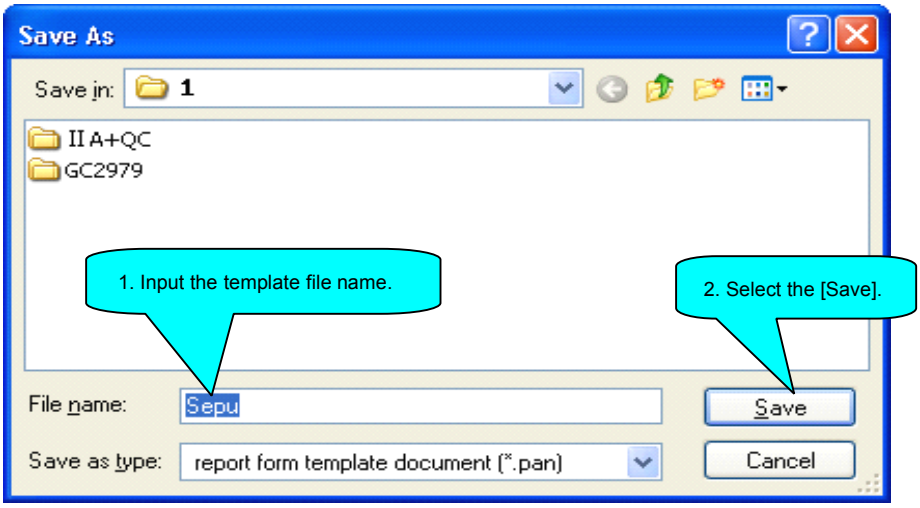


3. As shown in the project 3 in the above figure that double click the spectrogram,

the spectrogram property block will pop up, and the spectrogram coordinates can be set. See following figure for details:



4. Select the [Save] button of the standard toolbar and save the template files, and the [Save as] dialog will pop up. See following figure for details:



5.2.2 Statement Toolbar Application

The statement toolbar can only be activated when the statement is operated. For example, the statement is generated or the statement template is made. See following figure for details:

 : Switch the mouse back to the pointer.

 : Tool to draw straight line. After selection, the mouse pointer will be of the

crossed status, and the straight line can be drawn in the spectrogram statement.

 : Tool to draw rectangle. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the rectangle with grey back can be drawn in the spectrogram statement.

 : Tool to draw ellipse. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the ellipse with grey back can be drawn in the spectrogram statement.

 : Tab tool. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the tab can be drawn in the spectrogram statement. Further, the font can be inserted in the lab.

 : Sample information module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the sample information module can be laid in the spectrogram statement template.

 : Instrument condition module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the instrument condition module can be laid in the spectrogram statement template.

 : Instrument spectrogram module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the instrument spectrogram module can be laid in the spectrogram statement template.

 : Analysis result module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the analysis result module can be laid in the spectrogram statement template.

 : Experiment info module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the experiment info module can be laid in the spectrogram statement template.

 : Component form module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the component form module can be laid in the spectrogram statement template.

 : Integral parameter module. After selection, the mouse pointer will

be of the crossed status. By pressing the left mouse button to make drag and drop, the integral parameter module can be laid in the spectrogram statement template.

 : Quantitative parameter module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the quantitative parameter module can be laid in the spectrogram statement template.

 : System evaluation module. After selection, the mouse pointer will be of the crossed status. By pressing the left mouse button to make drag and drop, the system evaluation module can be laid in the spectrogram statement template.

 : Homepage turning tools. When the statement template has numerous pages, it can return to the homepage quickly. And, click it to return to the homepage of the template.

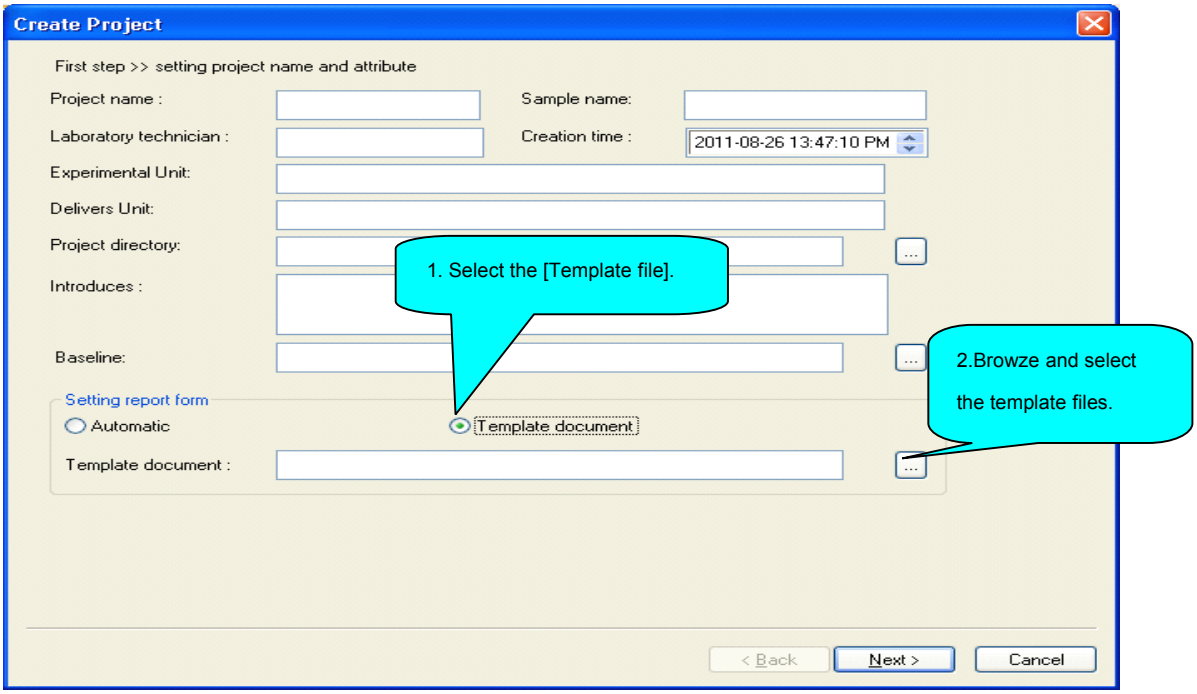
 :Previous page turning tools. When the statement template has numerous pages, click it to turn pages from back to front.

 : Next page turning tools. When the statement template has numerous pages, click it to turn pages from front to back.

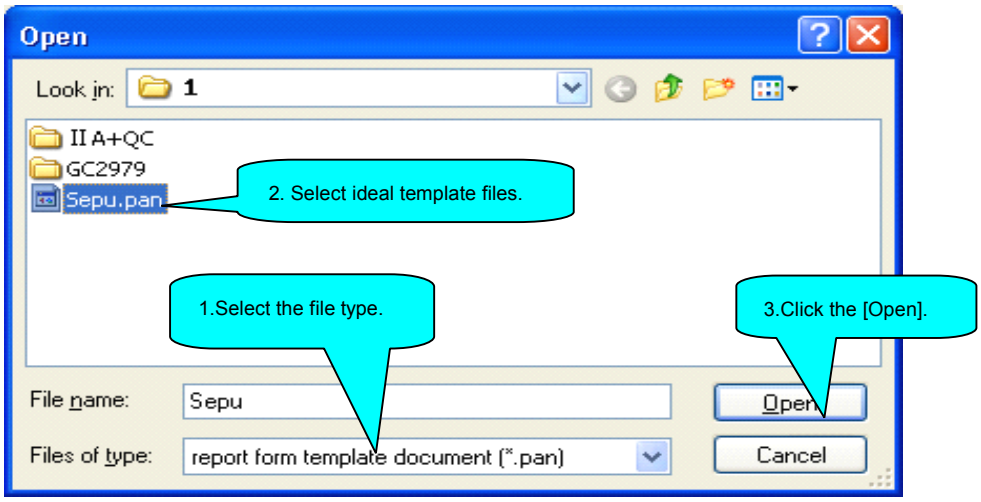
 : Last page turning tools. When the statement template has numerous pages, it can quickly turn to the last page. And, click it to turn to the last page of the template.

5.2.3 Statement Template Application

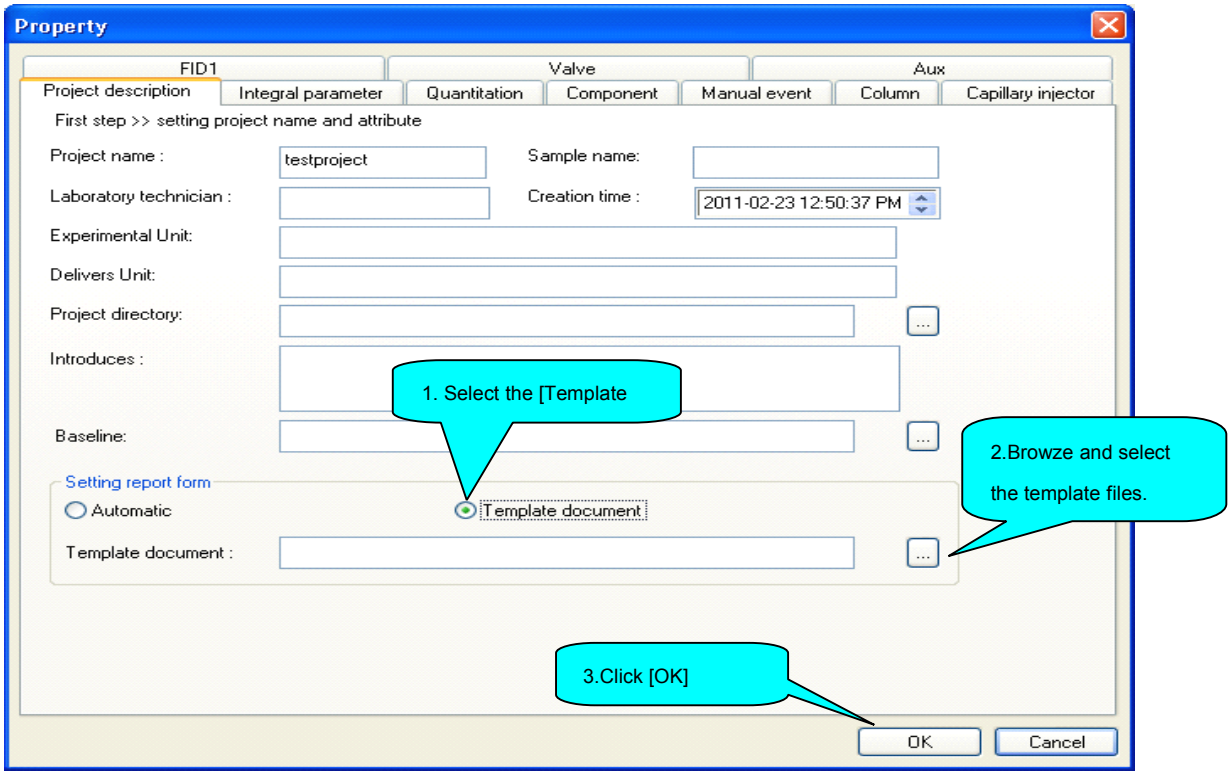
1. Set the statement in the [Project creation] dialog as the [template file] during the new project. When the setting becomes valid, all sample injection files of the project will apply the statement setting as the default setting; namely, all sample spectrograms of the project will apply the template file as the statement template. See following figure for details:



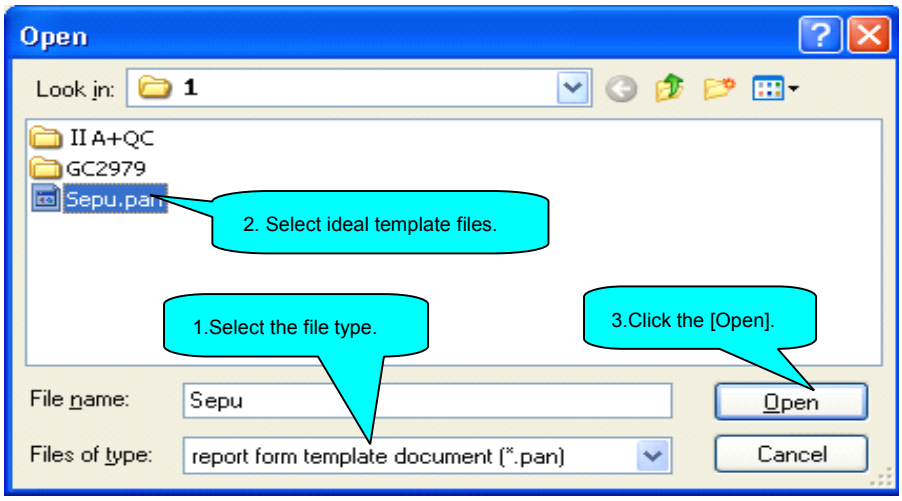
Select the template file. In the [Project creation] dialog, click the button of the [Template file] project (step 2 in the following figure), and the [Open] dialog of the template file will pop up. Furthermore, select the ideal template file in the existing template files and use it as the statement template of the project. See following figure for details:



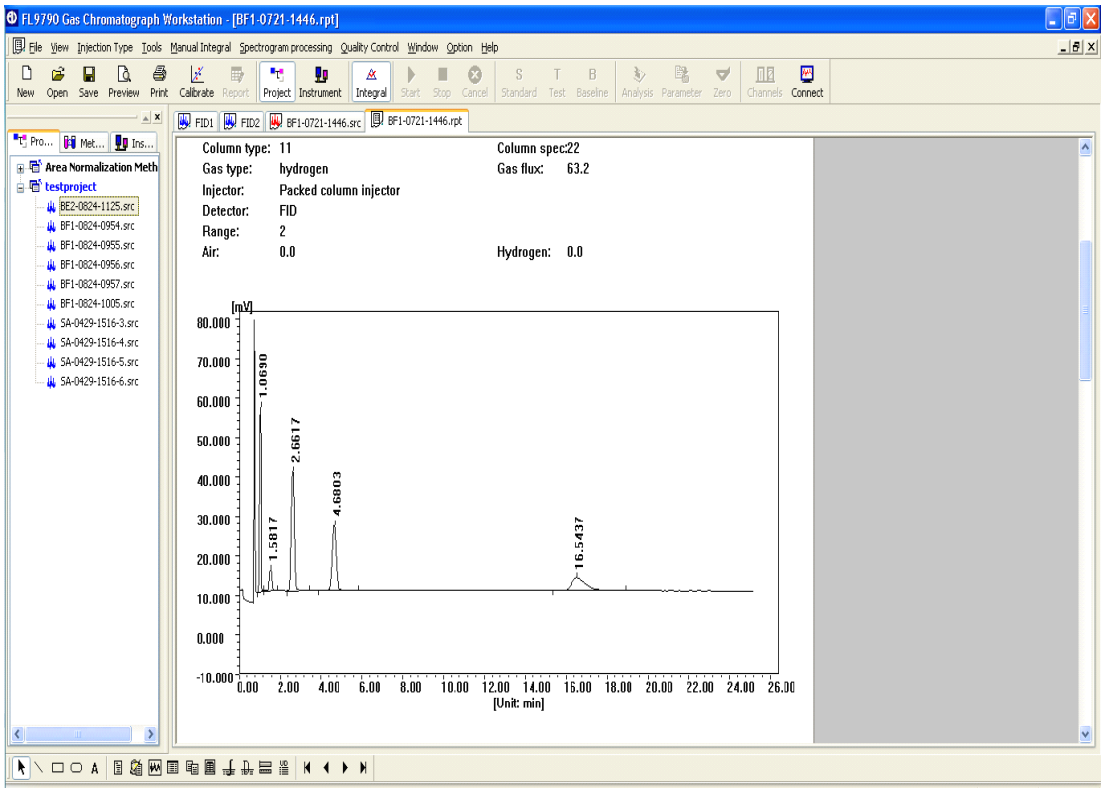
2. For the file whose sample injection has been completed, the spectrogram file can be selected in the project window. Right click it, and the right click menu column will pop out; select the [Property] in the menu, the [Project descriptions] window of the spectrogram will pop up. And, modify the property of the spectrogram file in the window. See following figure for details:



Select the template file. In the [Project descriptions] dialog, click the button of the [Template file] project (step 2 in the following figure), and the [Open] dialog of the template file will pop up. Furthermore, select the ideal template file in the existing template files and use it as the statement template of the project. See following figure for details:



3. Open the sample injection file spectrogram and click the [Statement] button in the standard toolbar. Here, the statement file will be generated according to the set template file. The generated statement file is shown in the following figure:


FL9790 Gas Chromatograph Workstation - [BF1-0721-1446.rpt]
File View Injection Type Tools Manual Integral Spectrogram processing Quality Control Window Option Help
New Open Save Preview Print Calibrate Report Project Instrument Integral Start Stop Cancel Standard Test Baseline Analysis Parameter Zero Channels Connect
FID1 FID2 BF1-0721-1446.src BF1-0721-1446.rpt
Area Normalization Meth
testproject
BE2-0824-1125.src
BF1-0824-0954.src
BF1-0824-0955.src
BF1-0824-0956.src
BF1-0824-0957.src
BF1-0824-1005.src
SA-0429-1516-3.src
SA-0429-1516-4.src
SA-0429-1516-5.src
SA-0429-1516-6.src
Column type: 11
Column spec:22
Gas type: hydrogen
Gas flux: 63.2
Injector: Packed column injector
Detector: FID
Range: 2
Air: 0.0
Hydrogen: 0.0
[mV]
80.000
70.000
60.000
50.000
40.000
30.000
20.000
10.000
0.000
-10.000
1.0690
2.6617
4.6803
1.5817
16.5437
0.00 2.00 4.00 6.00 8.00 10.00 12.00 14.00 16.00 18.00 20.00 22.00 24.00 26.00
[Unit: min]

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