

# LabSolutions

## GC Getting Started Guide

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# NOTICES

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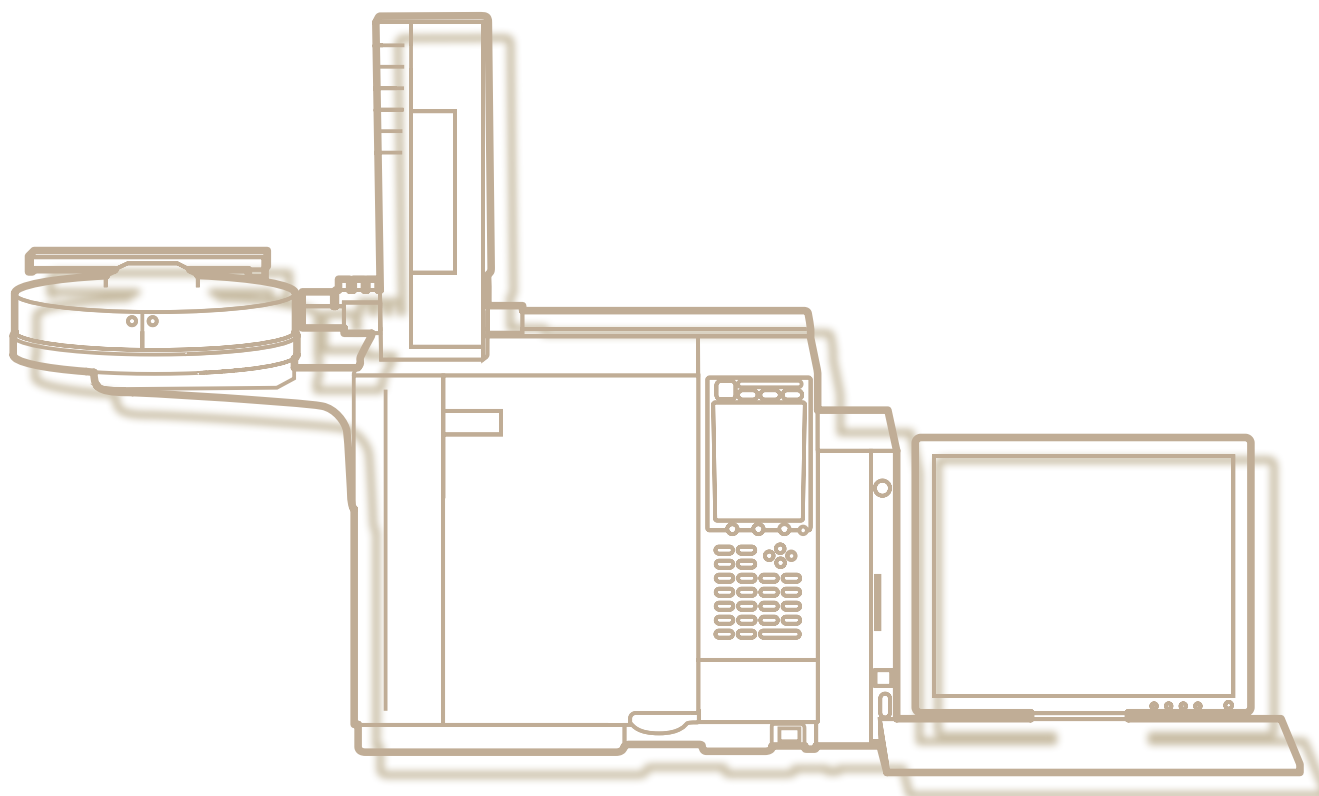
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# Types of Manuals

Five Instruction Manuals are provided with LabSolutions.  
You can also display the [Help] menu to confirm the meanings  
and setting ranges of parameters.  
The following shows how to make full use of the manuals.

## ■ Getting Started Guide

This manual is for first-time users.  
Follow the sequence of procedures in this guide to gain  
an understanding of basic LabSolutions operations.

## ■ Operators Guide

This manual gives comprehensive  
information about overall  
data acquisition operations in  
LabSolutions, such as system  
configuration, data analysis, batch  
processing, and report functions.

## ■ System Users Guide

This manual is for system  
administrators.  
This manual describes system  
administration and data  
management.

## ■ Data Acquisition & Processing Theory Guide

This manual describes peak  
detection and quantitation of sample  
components (for advanced users).

## ■ Installation & Maintenance Guide

This manual describes installation  
and maintenance of the LabSolutions  
software.

## ■ Help

Refer to [Help] to learn more about  
the displayed sub-window.  
Click the on-screen [Help] button  
or the [F1] key on the keyboard to  
display [Help].

The meanings of symbols used in this manual are  
as follows.



Useful advice for convenient  
instrument operation



Reference

Shows where to refer to in the  
*Operators Guide*

# What LabSolutions Can Do

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LabSolutions software is very easy to use, while incorporating high-grade functions. It provides powerful support for automating and improving the efficiency of sequential data acquisition and analysis operations.

Use LabSolutions to perform the following functions.

- Control of analytical instruments and data acquisition
- Data analysis and viewing of data
- Creation and printing of various customizable reports

## System Structure

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This Getting Started Guide describes data acquisition operations with the assumption that the system includes the following instruments.

### **Gas Chromatograph GC-2010**

- **Autosampler**                    **AOC-20i**
- **Split/Splitless**                **Injection unit (SPL)**
- **Capillary column:**        **Stabilwax 30 m × 0.32 mm I.D, 0.5 µm-thick film**
- **Flame ionization detector (FID)**

# File Types

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## **Data file (.gcd)**

This file contains all analysis results and acquisition information from the following files.

### **Method file (.gcm)**

Acquisition conditions,  
analysis conditions,  
calibration curve information,  
and etc.

### **Batch file (.gcb)**

This file is used for  
continuous data acquisition  
of sequential samples.

### **Report format file (.lsr)**

This file is used to print  
data acquisition results.

*-Checks Before Operation-*

# *Data Acquisition Flow*

## STEP ①

### Set Up the Conditions

#### Set up the data acquisition conditions to suit the component to be measured.

Before starting data acquisition, set up the data acquisition conditions on LabSolutions. For the data analysis operations described in this manual, set as follows:

Column oven temperature	50 °C (3 min retention) → 150 °C (2 min retention) (temperature rise speed 10 °C/min)
Injection unit temperature	250 °C
Carrier gas	He, linear velocity 40 cm/sec, linear velocity mode
Sample injection method	Split method
Split ratio	1:25
Detector temperature	250 °C
Sample	Alcohol mixed samples, 100, 500 and 1000 ppm standard samples, and 2 unknown samples

## STEP ②

### Data Acquisition

When you have finished setting up the data acquisition conditions,

#### start off by acquiring the data.

On LabSolutions, the operation of analysis samples one at a time is called "**single run**".

To evaluate the data acquisition conditions, change the data acquisition conditions, measure standard samples and unknown samples, and check the separation state of the target component.

Perform data acquisition on other samples using the data acquisition conditions that provided the optimum separation state.

 **3 single run** P.24

Setting up the data acquisition conditions and optimizing the data processing parameters are important for obtaining better data acquisition results. This section describes the basic flow of data analysis.

## STEP ③

# Analysis

Process the acquired data, and **apply the analysis conditions.**

Normally, multiple data is analyzed to determine peak integration conditions so that consistent results (e.g. repeatability of retention time and peak area, detection limits of target components, and linearity) can be acquired.

When the data analysis conditions have been fixed, quantitative calculation (i.e. investigation as to how much of the target component is contained in the sample) is performed on the unknown sample based on the data analysis results of the acquired standard sample.

To perform quantitation, a calibration curve must be made from the known concentrations and peak area values of the standard samples. This calibration curve is used to calculate the concentration of the unknown sample.



**4 Data Analysis** P.26

## STEP ④

# Realtime Batch

**Perform data acquisition on sequential samples together.**

Realtime batch is performed to measure sequential samples continuously when the data acquisition conditions have been fixed by performing a single run.




**5 Realtime Batch** P.32



**6 Multiple Data Analysis** P.40

# LabSolutions Main Window

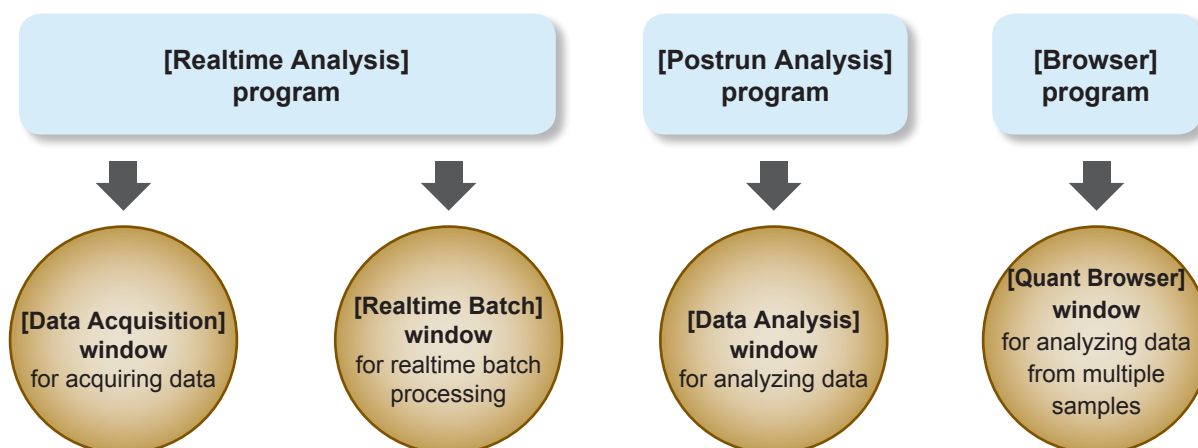
**[Instruments]**  
The analytical instruments connected to the PC are displayed as icons. Double-click  to start the [Realtime Analysis] program where data acquisition settings are set and data is acquired.

**[Postrun]**  
Displays the icons for the [Postrun Analysis] program (data analysis), and the [Browser] program (chromatogram display and quantitative calculation of results).

**[Administration]**  
Displays the icons of the system administration programs for setting security policies, user administration and the log browser.

**[Manual]**  
Displays the icons for the various PDF manuals and Help menu provided with LabSolutions.

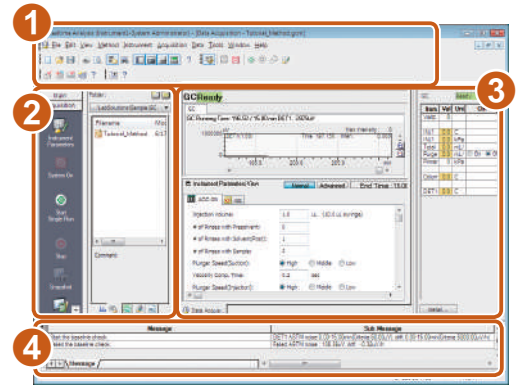
## LabSolutions Main Programs and Main Windows





# LabSolutions Windows

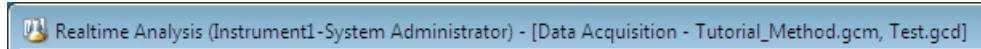
The following example describes the [Realtime Analysis] program window.



1

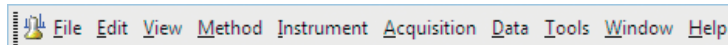
## Title Bar

This bar displays the names of the current program, window, loaded file, and other information.



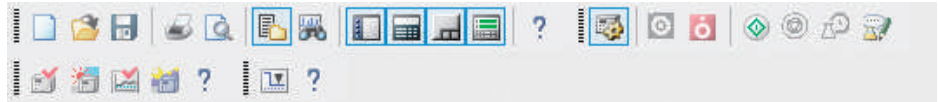
## Menu Bar

This bar displays the current window and menus that are available based on the operating rights of the current user.



## Toolbar

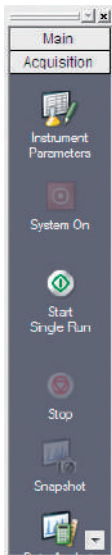
This bar displays icons of frequently used menu items and icons for operating analytical instruments.



2

## Assistant Bar

This bar displays icons for frequently used data acquisition operations.



## Data Explore

This sub-window displays the names of files in the selected folder.

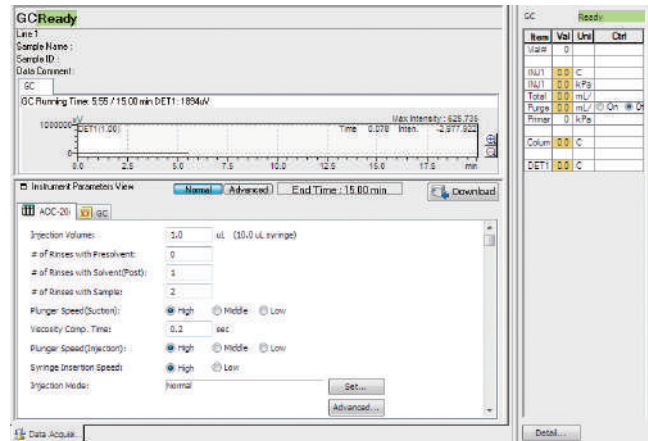


3

## Window

In the [Realtime Analysis] program, [Data Acquisition], [Realtime Batch] and other windows are displayed as icons on the assistant bar.

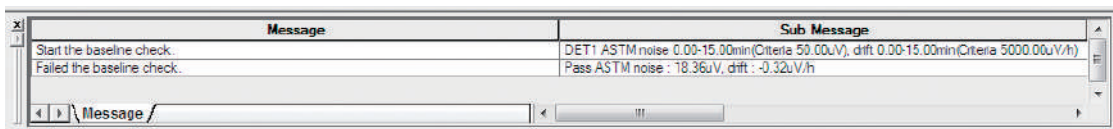
In the [Postrun Analysis] program, [Data Analysis], [Calibration Curve], [Report Format] and other windows are displayed. Switch the windows by clicking the icons on the assistant bar. Instrument Monitor (right side of the window) check the acquisition conditions and connections.



4

## Output Window

This window displays an operation history and error messages that occur.



# How to Open Windows

## Set the Data Acquisition Parameters and Execute a Single Run:

Open the [Data Acquisition] window from the main window.



**2** Set the Instrument Parameters P.18



**3** Single Run P.24

▼ [Realtime Analysis] program

▼ [Data Acquisition] window

▲ Main Window

**GCReady**  
 Line 1  
 Sample Name:  
 Sample ID:  
 Data Comment:  
 GC  
 GC Running Time: 4.78 / 15.00 min DET1 - 3115W/  
 1000000  
 DET1(1.00)  
 Max Intensity: 625.735  
 Time: 16.317 Inten.: 3.200

**Instrument Parameters View**  
 Normal | Advanced | End Time: 15.00 min | Download  
 Injection volume: 1.0 µL (10.0 µL syringe)  
 # of Rinses with Presolvent: 0  
 # of Rinses with Solvent(Post): 1  
 # of Rinses with Sample: 2  
 Plunger Speed(Suction): High | Middle | Low  
 Viscosity Comp. Time: 0.2 sec.  
 Plunger Speed(Injection): High | Middle | Low  
 Syringe Injection Speed: High | Low  
 Injection Mode: Normal

## Continuous Data Acquisition of Sequential Samples:

Open the [Realtime Batch] window from the main window.



**5** Realtime Batch P.32

▼ [Realtime Analysis] program

▼ [Realtime Batch] window

▲ Main Window

**Realtime Batch**

Analysis	Sample Type	Method File	Data File	Level(s)	Summary Type	Summary Report Format	File
1	Standard	Tutorial_Method.gcm	Tutorial_Std001.gcd	1	Summary Start		
2	Standard	Tutorial_Method.gcm	Tutorial_Std001.gcd	1	Summary Run		Summary_Report_1.rpt
3	Standard	Tutorial_Method.gcm	Tutorial_Std001.gcd	1	Summary End		
4	Standard	Tutorial_Method.gcm	Tutorial_Std004.gcd	2	Summary Start		
5	Standard	Tutorial_Method.gcm	Tutorial_Std005.gcd	2	Summary Run		Summary_Report_2.rpt
6	Standard	Tutorial_Method.gcm	Tutorial_Std008.gcd	2	Summary Start		
7	Standard	Tutorial_Method.gcm	Tutorial_Std001.gcd	3	Summary Run		Summary_Report_3.rpt
8	Standard	Tutorial_Method.gcm	Tutorial_Std005.gcd	3	Summary Start		
9	Standard	Tutorial_Method.gcm	Tutorial_Std003.gcd	3	Summary Run		Summary_Report_4.rpt
10	Standard	Tutorial_Method.gcm	Tutorial_Std001.gcd	3	Summary End		
11	Unknown	Tutorial_Method.gcm	Tutorial_Std001.gcd	0	Summary Start		Summary_Report_1.rpt

## Data Analysis and Quantitative Calculations:

Open the [Data Analysis] window from the main window.



4 Data Analysis P.26

▼ [Postrun Analysis] program

▼ [Data Analysis] window

Peak#	Ret. Time	Group	Area	Height
1	4.275	233059765	218228	
3	6.674	27562	131	
4	8.705	34335	153	
Total		233134761	219933	

▲ Main Window

## Multiple Data Analysis and Quantitative Calculations:

Open the [Quant Browser] window from the main window.



6 Multiple Data Analysis P.40

▼ [Browser] program

▼ [Quant Browser] window

▲ Main Window

## Chapter

# 1

## Start Up

This chapter describes how to start up LabSolutions.



Refer to "GC Data Acquisition" in *Operators Guide* for details on the "Data Acquisition" window.

### 1

#### Supply gas to the GC.

Open the main valve of the carrier gas and other gases to supply gas to the GC.

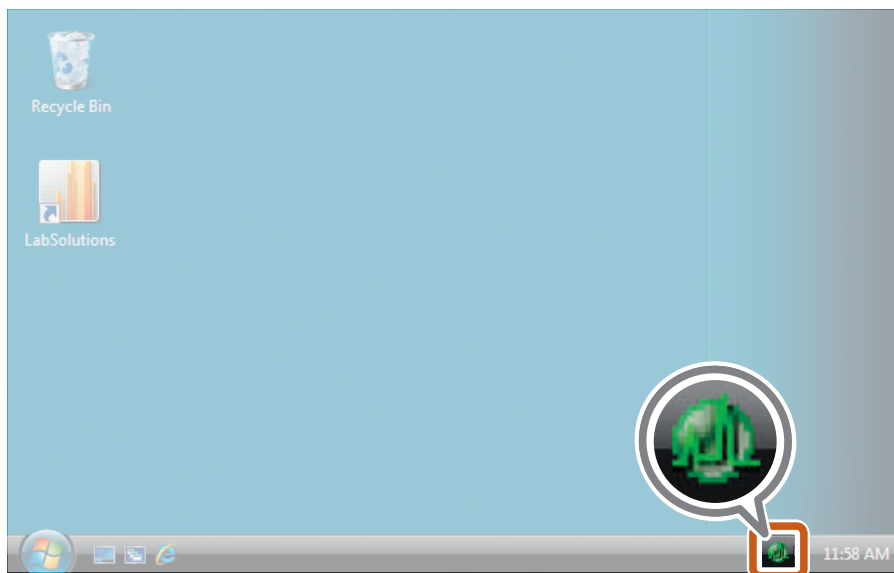
### 2

#### Turn the GC and peripheral devices on.

### 3

#### Turn the PC and printer on.

Verify that the [LabSolutions Service] icon in the systray on the taskbar is green after the PC starts up.

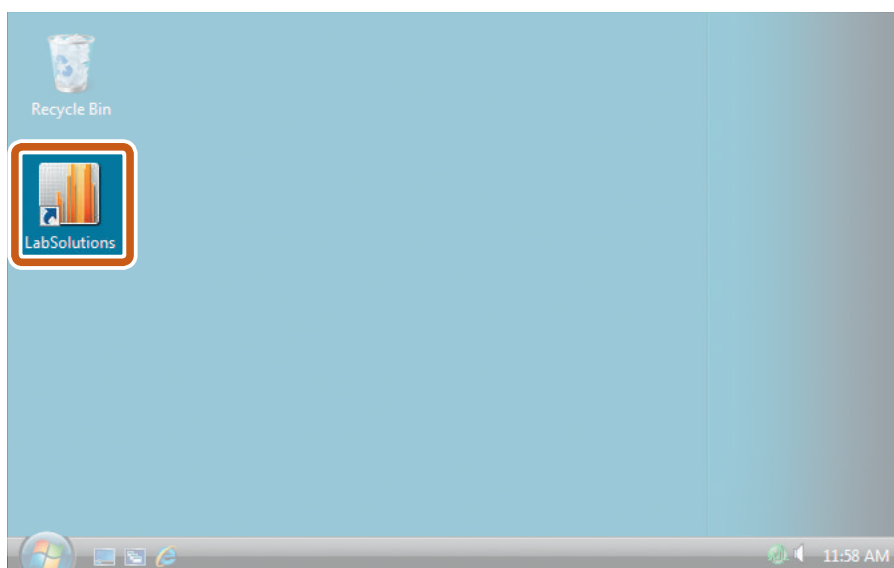


If the icon is yellow, this means that LabSolutions is in the process of starting up. Wait a while.

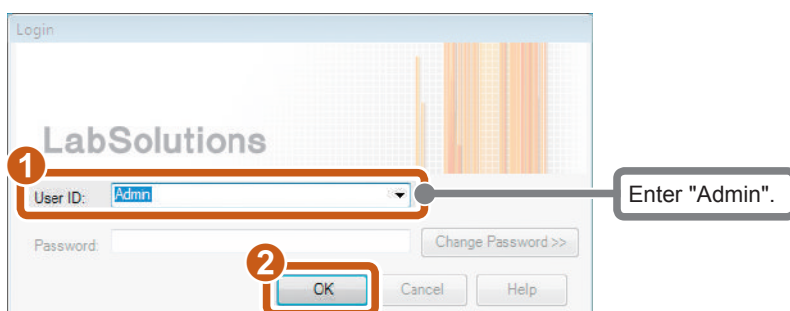
If the icon is red, this means that an error has occurred. Restart the PC.

# 4 Double-click on the desktop.

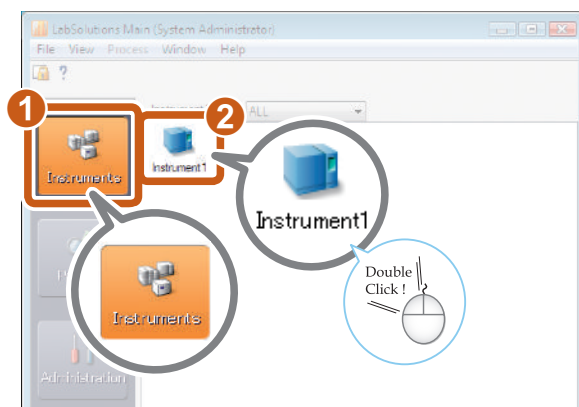
The [Login] sub-window opens.



# 5 Log in.



# 6 Open the [Realtime Analysis] program.

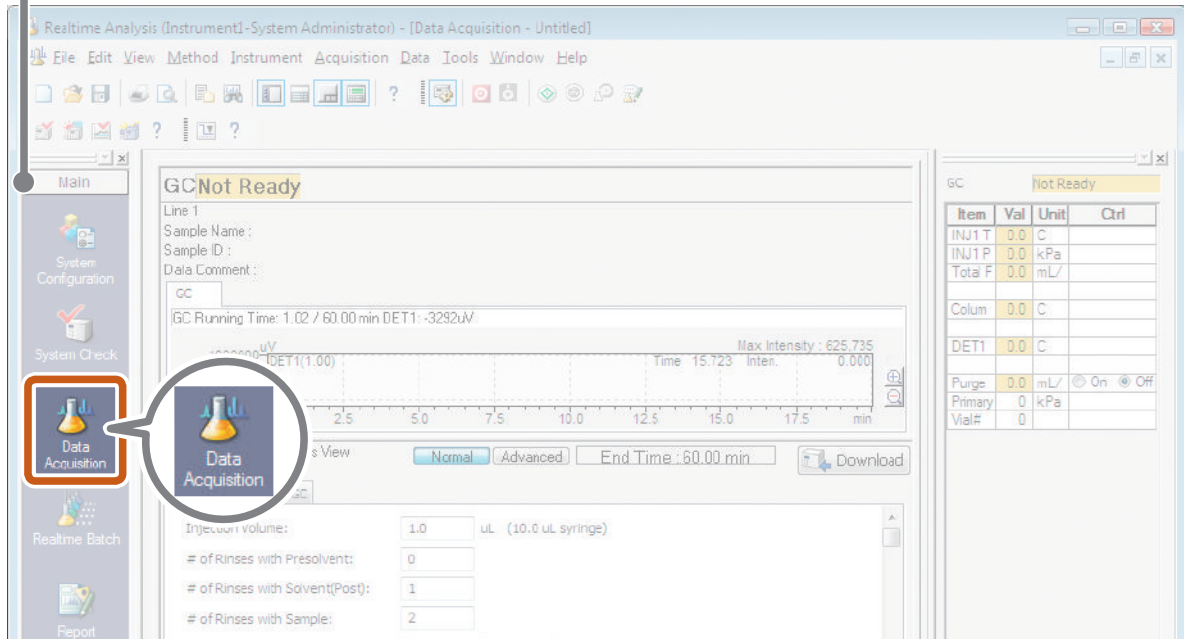


Continued on the following page 

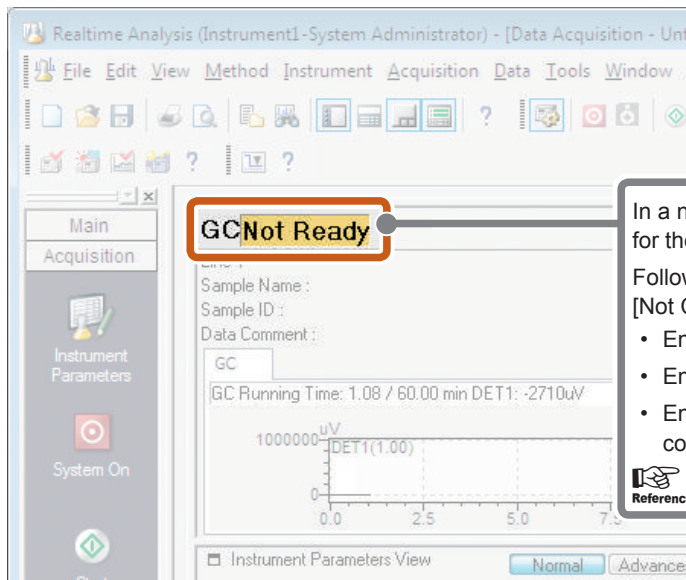
# 7 Open the [Data Acquisition] window.



Click here if the [Main] assistant bar is not displayed.



# 8 Check the status.



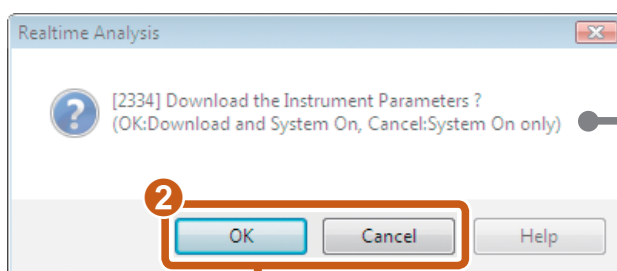
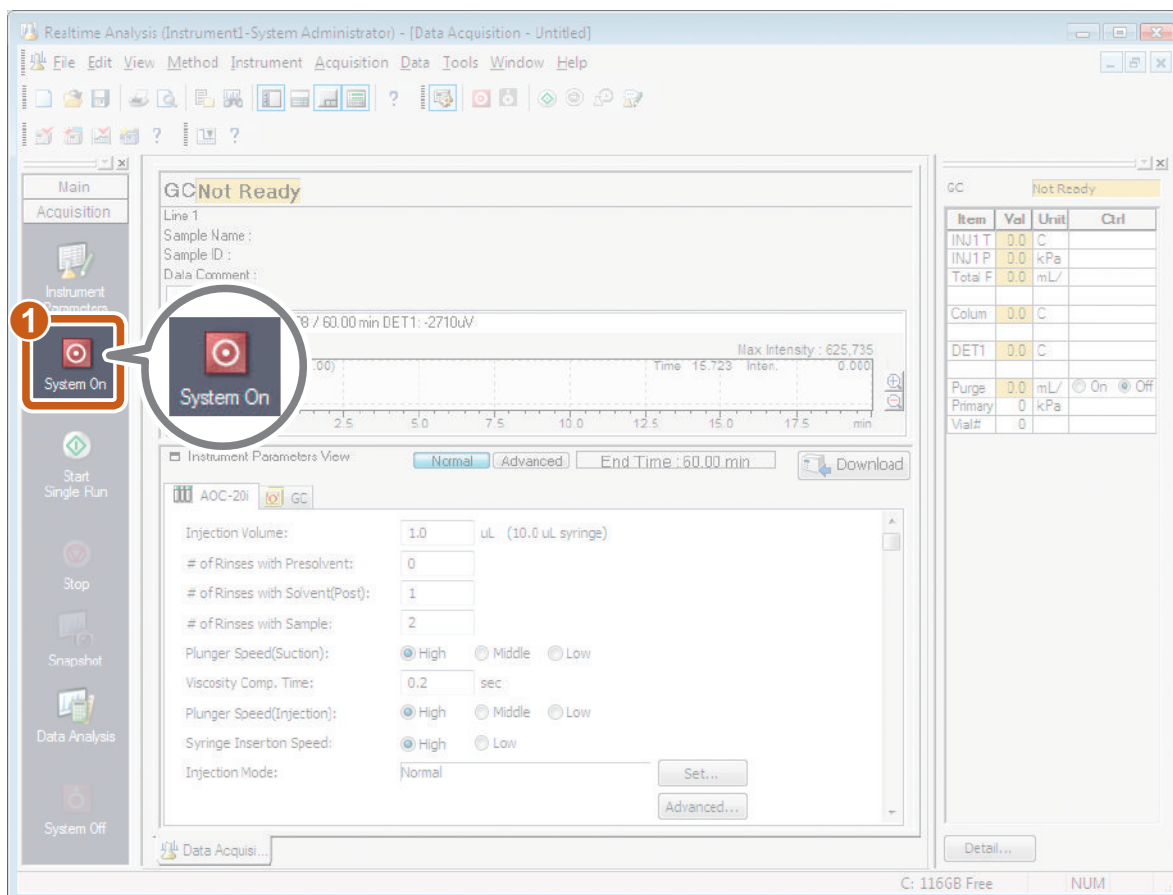
In a normal state, [Not Ready] or [Ready] is displayed for the status.

Follow the recommendations below if [Not Connected] is displayed.

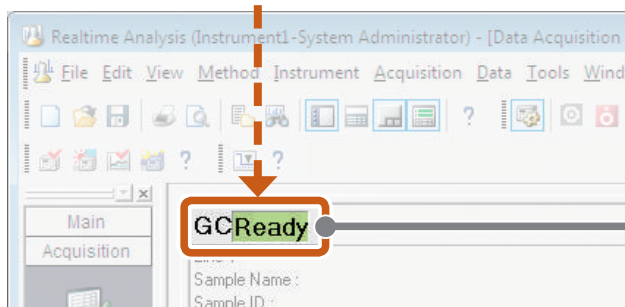
- Ensure that the power is ON.
- Ensure that instruments are connected correctly.
- Ensure that the system configuration settings are correct.

Reference P.16 for details.

# 9 Start the GC.



This message sometimes is not displayed.




Make sure that [Ready] is displayed for the status after the GC temperature and other preset values are reached.

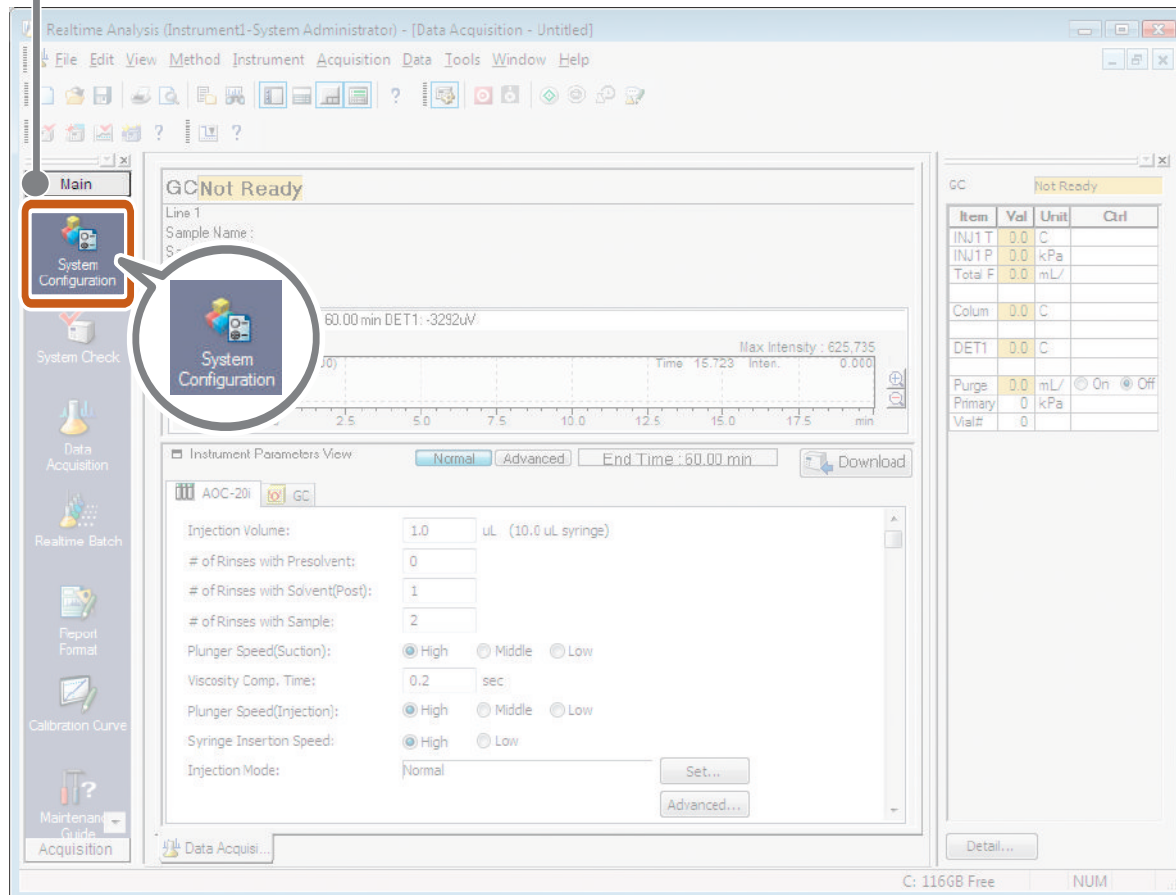
"I want to connect to the system."  
 "I want to change the system configuration."

In such cases

# Re-Set the System Configuration.

## 1 Open the [System Configuration] sub-window.

 Click here if the [Main] assistant bar is not displayed.



The screenshot shows the LabSolutions software interface. The 'Main' assistant bar is highlighted with a red box. A callout bubble points to the 'System Configuration' icon within the bar. The main window displays 'GC Not Ready' status, a chromatogram, and the 'Instrument Parameters View' for an AOC-201 GC. The parameters are as follows:

Item	Val	Unit	Ctrl
INJ1T	0.0	C	
INJ1P	0.0	kPa	
Total F	0.0	mL/	
Column	0.0	C	
DET1	0.0	C	
Purge Primary	0.0	mL/	On Off
Val#	0	kPa	

The 'Instrument Parameters View' shows the following settings:

- Injection Volume: 1.0 uL (10.0 uL syringe)
- # of Rinses with Presolvent: 0
- # of Rinses with Solvent(Post): 1
- # of Rinses with Sample: 2
- Plunger Speed(Suction):  High  Middle  Low
- Viscosity Comp. Time: 0.2 sec
- Plunger Speed(Injection):  High  Middle  Low
- Syringe Insertion Speed:  High  Low
- Injection Mode: Normal

The [System Configuration] sub-window opens.



## 2 Set up communications.

1 Double Click!

The [Instrument] sub-window opens.

2 Select the GC to use.

3 Click [Settings...]

4 Select [RS-232C] and [COM Port].

5 Click here to display each instrument currently connected to the GC at [Modules Used for Analysis] in the [System Configuration] sub-window.

## 3 Check that the system configuration is correct.

1 Double-click the unit, and set the properties of each unit.

2 Click here to send the settings to the GC.

# Chapter 2

## Set the Instrument Parameters

The data acquisition method (instrument parameters) are saved to the method file after they have been set in [Instrument Parameters View] in the [Data Acquisition] window. This chapter explains how to set the instrument parameters.

1 Open the [Data Acquisition] window.

2 Set the items on the [GC] tab.

GCReady

GC

GC Running Time: 4.63 / 60.00 min DET1: -2975uV

1000000 UV

0.0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 min

Max Intensity 625.735

2

1

Normal

Advanced

End Time: 60.00 min

Download

Acquisition Time

Detector: DET1

Stop Time: 60.00 min

3

Temperature

INJ1	250.0	C
Column Oven	50.0	C
DET1	250.0	C

Detector Advanced...

4

Click here to set the control mode.  
Control mode : Linear Velocity

5

Flow

Carrier Gas Type	He
Injection Mode	Split
Sampling Time	1.00 min
Linear Velocity	40.0 cm/sec
Total Flow	65.4 mL/min
Column Flow	2.40 mL/min
Split Ratio	25.0

Details...

Rate

Rate
0
1
0.00
0.00

Total Program Time

Column Information

Name:

Length: 25.0 m Inner Diameter: 0.32 mm ID

Set...

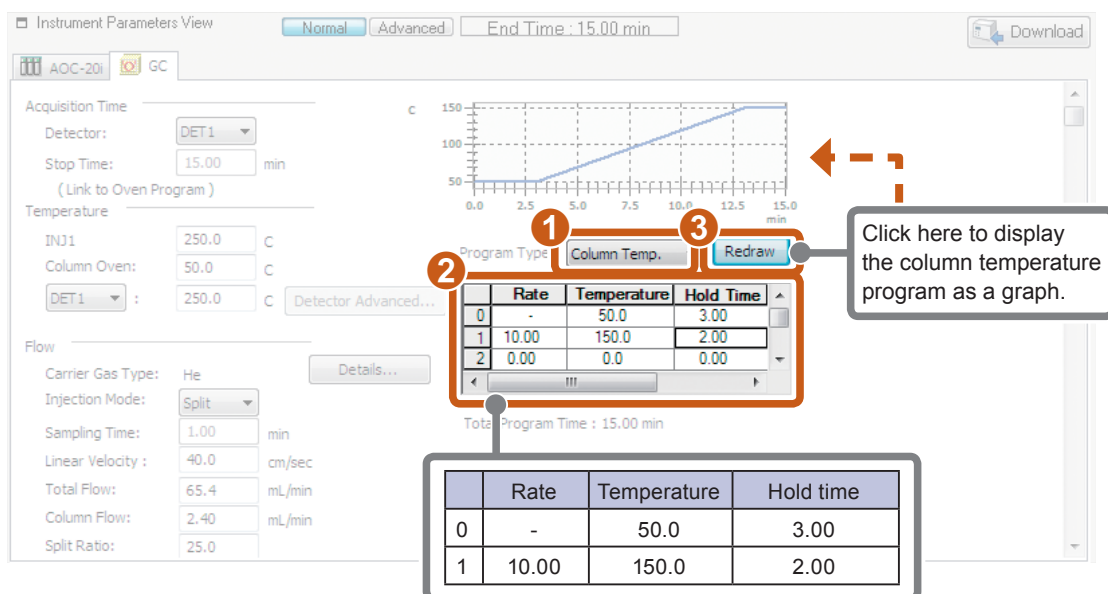
Linear Velocity : 40.0 cm/sec  
Split Ratio : 25.0

C: 116GB Free NUM

**Reference** Refer to P.6 for details on data acquisition conditions.

**Reference** Refer to "Set the Instrument Parameters" of the "GC Data Acquisition" chapter in *Operators Guide* for details on instrument parameters.

### 3 Edit the Time Table for the column temperature program.



Instrument Parameters View | Normal | Advanced | End Time : 15.00 min | Download

Acquisition Time  
 Detector: DET1  
 Stop Time: 15.00 min  
 (Link to Oven Program)

Temperature  
 INJ1: 250.0 C  
 Column Oven: 50.0 C  
 DET1: 250.0 C

Flow  
 Carrier Gas Type: He  
 Injection Mode: Split  
 Sampling Time: 1.00 min  
 Linear Velocity: 40.0 cm/sec  
 Total Flow: 65.4 mL/min  
 Column Flow: 2.40 mL/min  
 Split Ratio: 25.0

Program Type: Column Temp. | Redraw

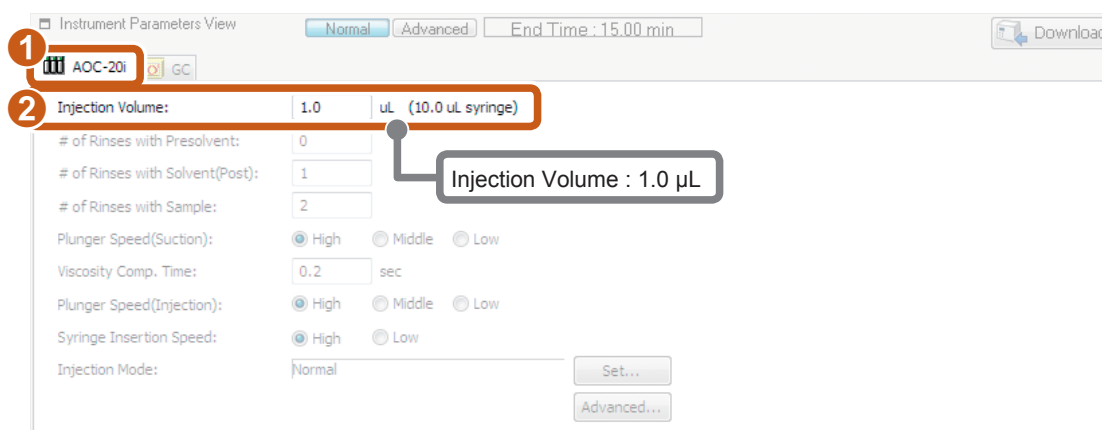
	Rate	Temperature	Hold Time
0	-	50.0	3.00
1	10.00	150.0	2.00
2	0.00	0.0	0.00

Total Program Time : 15.00 min

	Rate	Temperature	Hold time
0	-	50.0	3.00
1	10.00	150.0	2.00

Click here to display the column temperature program as a graph.

### 4 Set the injection volume.



Instrument Parameters View | Normal | Advanced | End Time : 15.00 min | Download

1 AOC-20i GC

2 Injection Volume: 1.0 uL (10.0 uL syringe)

# of Rinses with Presolvent: 0  
 # of Rinses with Solvent(Post): 1  
 # of Rinses with Sample: 2

Plunger Speed(Suction):  High  Middle  Low  
 Viscosity Comp. Time: 0.2 sec  
 Plunger Speed(Injection):  High  Middle  Low  
 Syringe Insertion Speed:  High  Low  
 Injection Mode: Normal

Injection Volume : 1.0  $\mu$ L

Set...  
Advanced...

Continued on the following page 

# 5 Save the data acquisition conditions.

The folder initially displayed here is the default folder.  
To change the default folder,  
 Reference "Default Folder and Change the Default Folder" P.23

Enter "Tutorial\_Method".

Click here to download the data acquisition conditions to the instrument.

Item	Val	Uni	Ctrl
Val#	0		
INJ1	0.0	C	
INJ1	0.0	kPa	
Total	0.0	mL	
Purge	0.0	mL	On
Primar	0	kPa	On
Colum	0.0	C	
DET1	0.0	C	

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# Baseline Check

By the baseline check, you can check whether or not noise and drift values on the baseline are within the preset time and at the threshold or below.

Baseline check parameters are saved in the method file.

## 1 Set [Baseline Check Parameters].

Set both [Noise] and [Drift] to , and enter [Start], [End] and [Threshold].



In the [Baseline Check] sub-window, the noise calculation method can be changed, and the maximum delay time when the result of the baseline check is [Fail] within the preset time. Help for details.

## 2 Perform the baseline check.

After measurement ends, the check results are displayed in [Baseline Check Results] sub-window and [Output Window].

[Output Window]

Message	Sub Message
Start the baseline check.	DET1 ASTM noise 0.00-15.00min(Criteria 50.00uV), drift 0.00-15.00min(Criteria 5000.00uV/h)
Failed the baseline check.	Pass ASTM noise : 18.36uV, drift : -0.32uV/h

Baseline Check Results

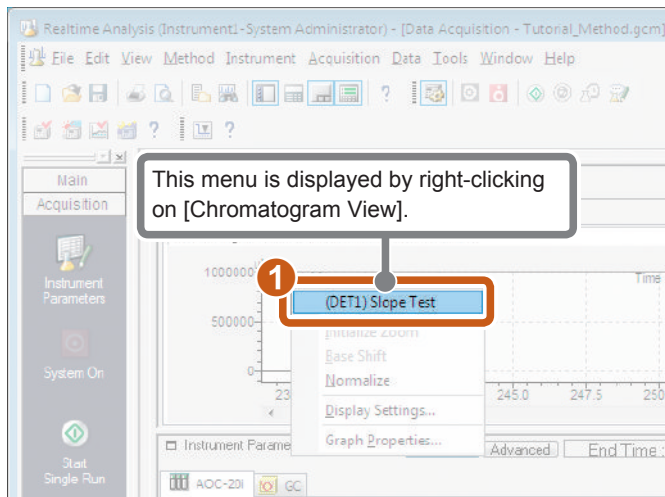
# Slope Test

By performing the Slope Test, the peak detection sensitivity (Slope value) of peak integration parameters can be automatically set from the status of the noise and drift appearing on the chromatogram before data acquisition.

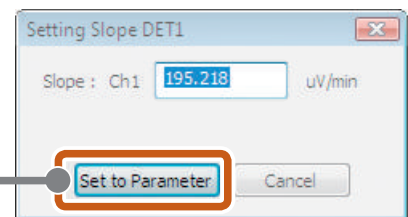
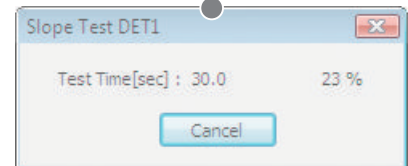
The slope value obtained by the slope test is effective when performing isothermal analysis. This section describes the Slope Test.



- Slope values refer to the numerical values for determining the peak start and end points. To be more precise, the peak start point is judged when an ascent slope exceeds the preset value, and, alternatively, the peak end point is judged when a descent slope falls below the preset value.
- Optimum Slope values can be obtained from the data by the Slope Test.



The measurement result is displayed when the test ends.



To apply the measurement result to the peak integration parameters, click here.



To make preset values clearer, set a value rounded up to the nearest integer larger than the displayed slope value. For example, set "200" for "195.218".

LabSolutions



## Default Folder and Change the Default Folder

1

This folder is the default folder.

Set this sub-window when changing the folder or creating a new folder.

Realtime Analysis (Instrument1-System Administrator) - [Data Acquisition - Tutorial\_Method.gcm]

File Edit View Window Help

Main

Acquisition

Folder: ... \Sample\GC

Filename

System On

Start Single Run

Stop

Snapshot

Data Analysis

System Off

Select Folder

Look in: C:\LabSolutions\Sample\GC

Close

New Folder...

Computer

Local Disk (C:)

LabSolutions

Common

Data

Manual

MSLibrary

Sample

GC

LC

System

Template

Help

GC Ready

Item	Val	Unit	Ctrl
Vial#	0		
INJ1 T	0.0	C	
INJ1 Pr	0.0	kPa	
Total F	0.0	mL/	
Purge	0.0	mL/	On Off
Primary	0	kPa	
Column	0.0	C	
DET1	0.0	C	

nd Time : 15.1

# of Rinses with Solvent(Post): 1

# of Rinses with Sample: 2

Plunger Speed(Suction): High

Viscosity Comp. Time: 0.2

Plunger Speed(Injection): High Middle Low

Syringe Insertion Speed: High Low

Injection Mode: Normal

Data Acquis...

C: 116GB Free NUM

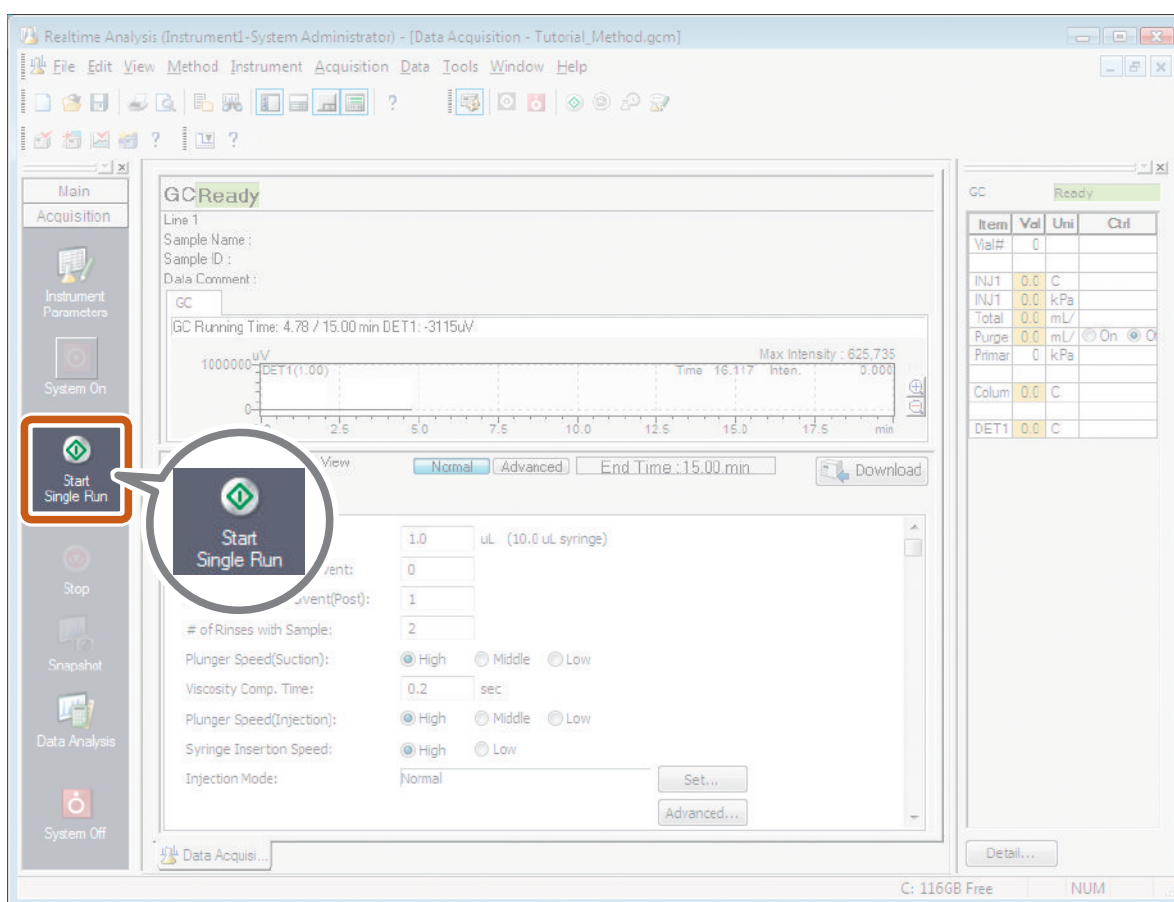
# Chapter 3

## Single Run

This chapter describes the operation of measuring a standard sample once only (single run) using a saved method file "Tutorial\_Method.gcm".  
First, perform single run using a standard sample.

1 Open the [Data Acquisition] window.

2 Open the [Single Run] sub-window.

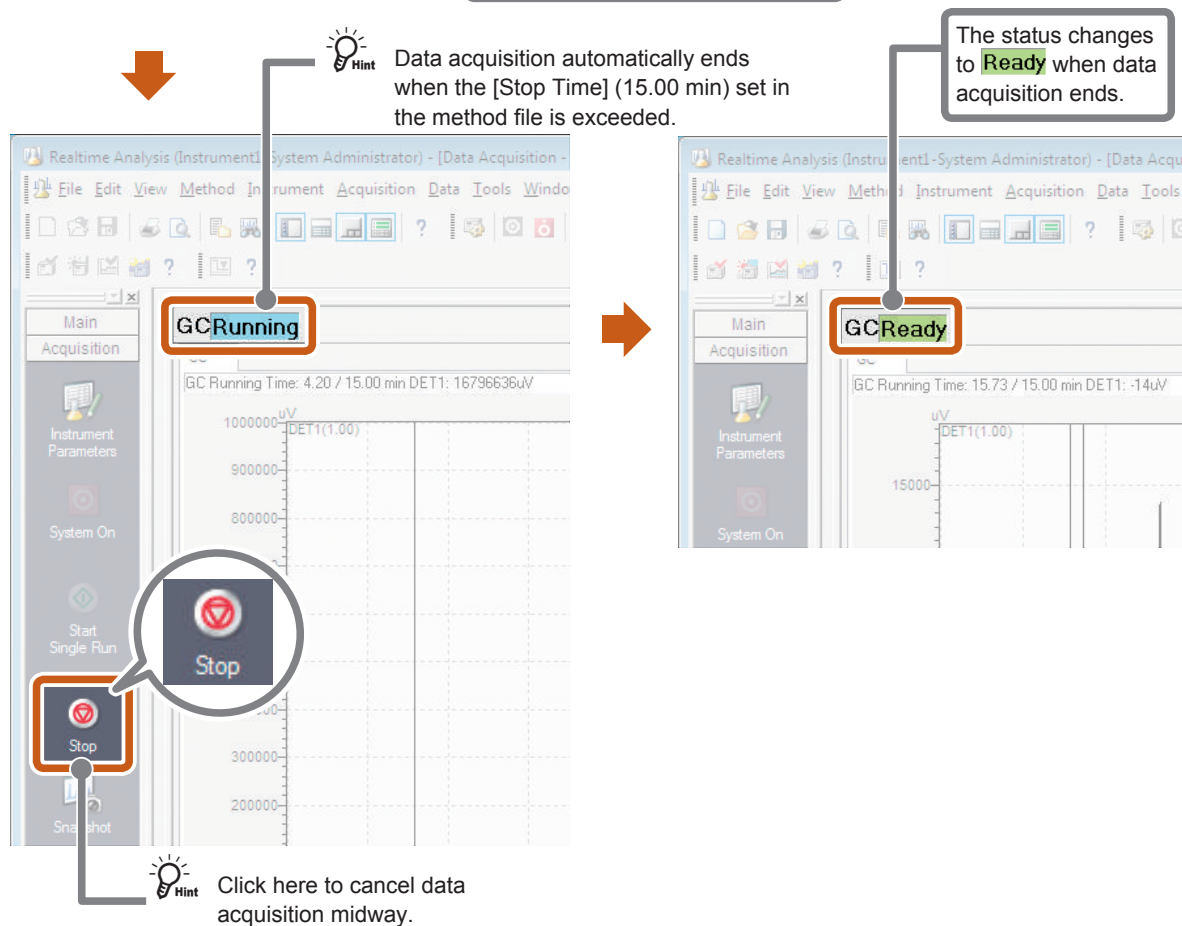
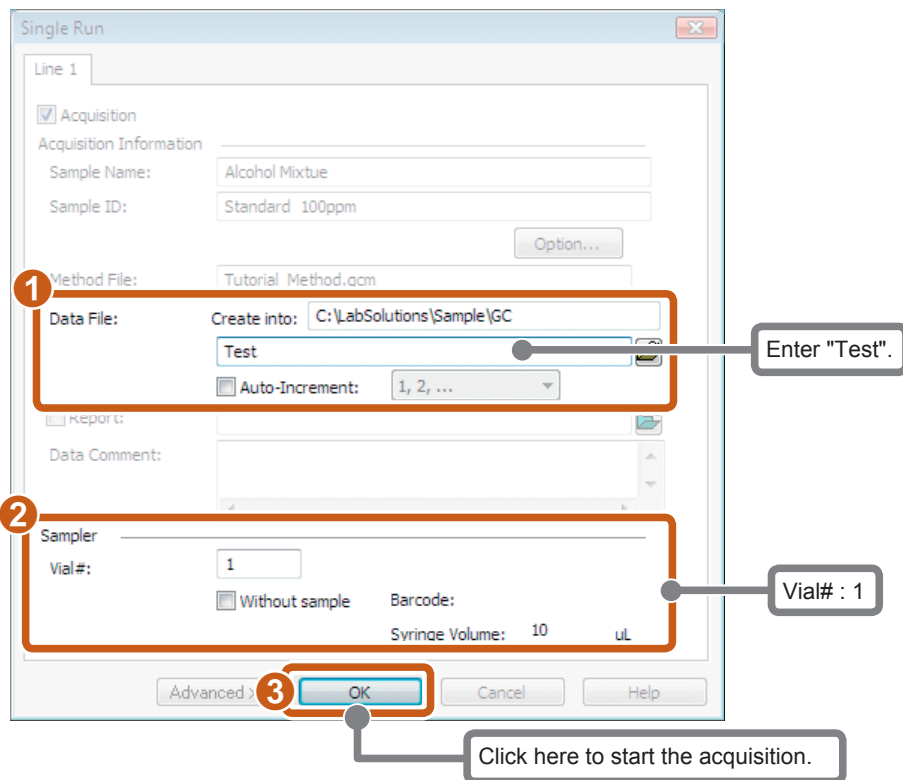


The [Single Run] sub-window opens.



# 3 Set the conditions for a single run.

In this example, set the conditions for pouring 100 ppm of alcohol mixed sample into vial No. 1 on the auto-sampler, and injecting that sample.

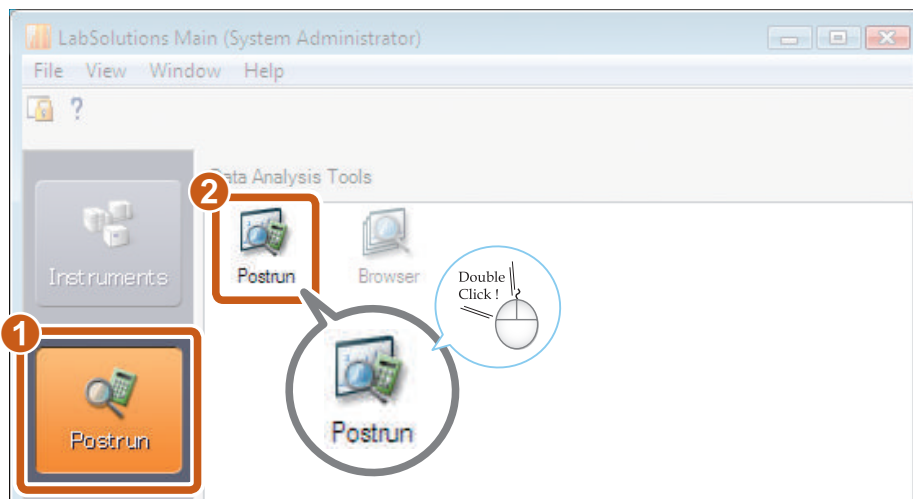


# Chapter 4

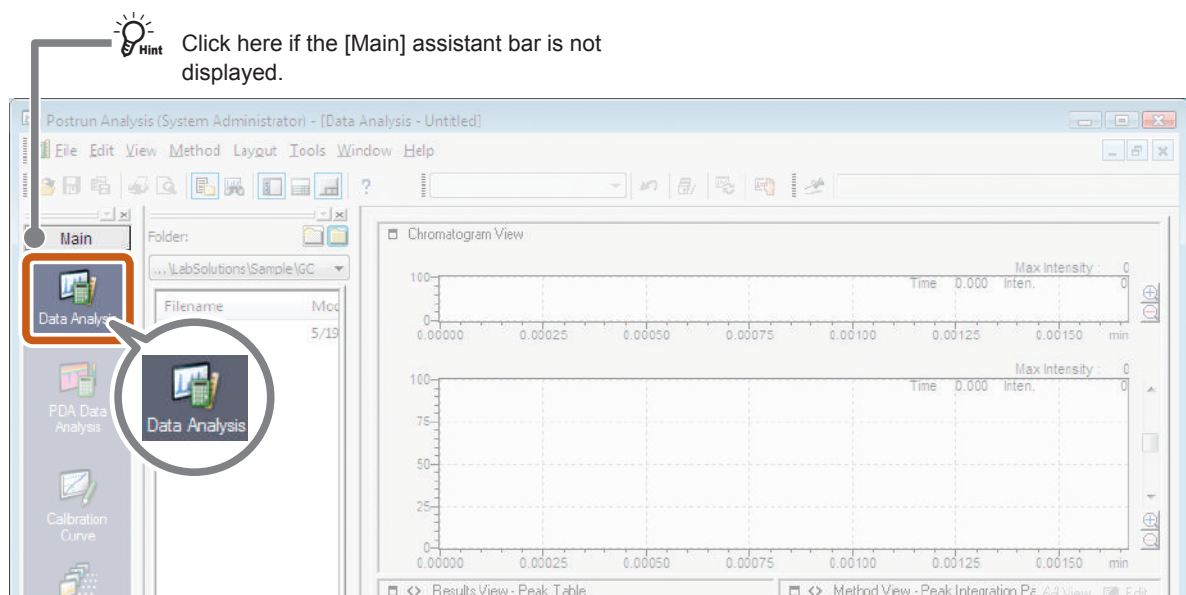
## Data Analysis

After single run ends, check the data to see if the peaks have been detected correctly. This chapter describes how to change the peak integration conditions of the data file "Test.gcd" obtained by performing single run to optimize the peak integration parameters.

### 1 Open the [Postrun Analysis] program.

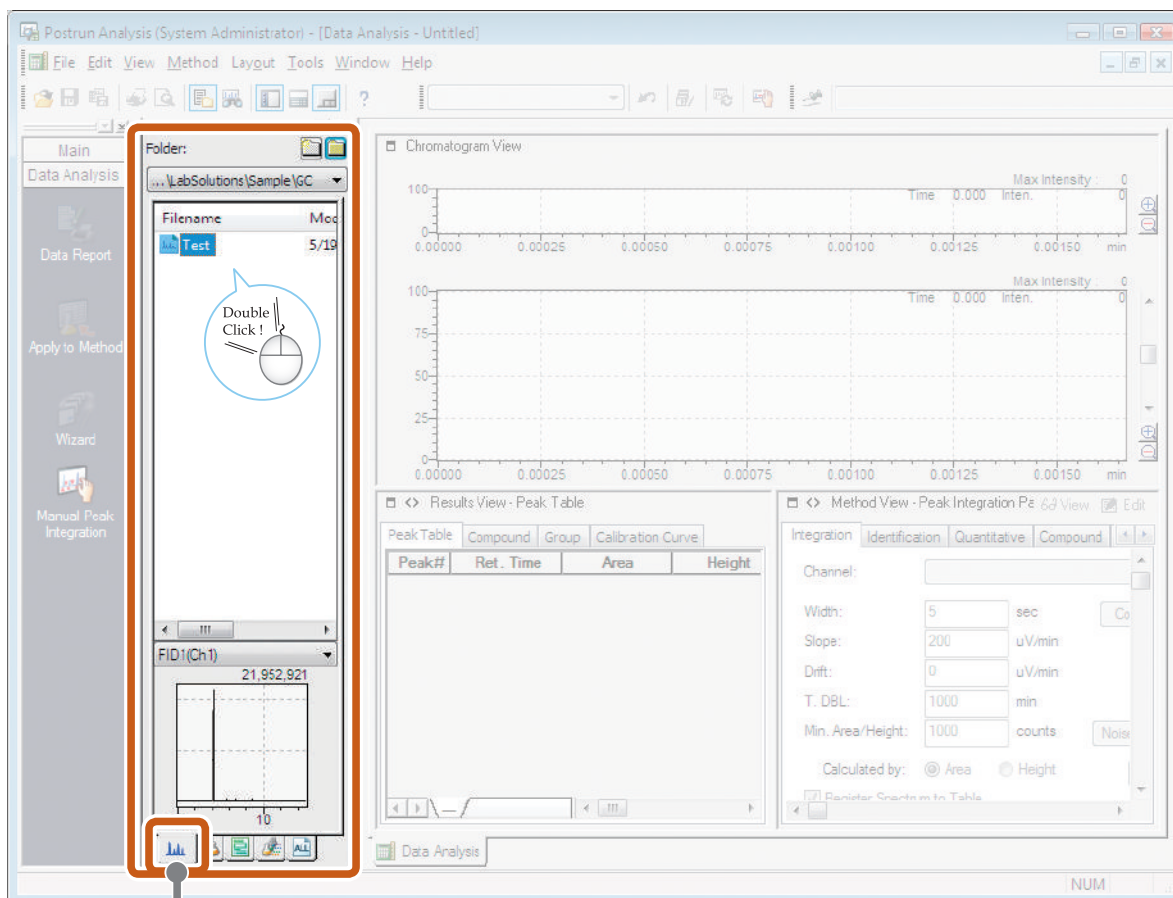



### 2 Open the [Data Analysis] window.



The [Data Analysis] window opens.

# 3 Display "Test.gcd".



Click  on the [Data Explorer] sub-window, and double-click "Test".



**Reference** Refer to "Data Analysis" chapter in *Operators Guide* for details on the "Data Analysis" window.

Continued on the following page 

# 4 Enter the peak integration parameters.

Click Edit to edit each parameter value.

Click View to perform processing on the data, and the processing results are displayed in [Chromatogram View] and [Results View - Peak Table].

Peak#	Ret. Time	Area	Height
1	4.276	233039765	218673
2	5.754	27542	
3	6.674	33118	
4	8.705	34336	
Total		233134761	218673

Integration parameters:  
 Width: 3 sec  
 Slope: 1000 uV/min  
 Drift: 0

Calculated by:  Area  Height



**Hint** Width values refer to the minimum half-width value (height 1/2 width) of the peak to detect.

Noise peaks are removed by optimizing the Width value.

Determine the start and end points of the peak by the Slope value.

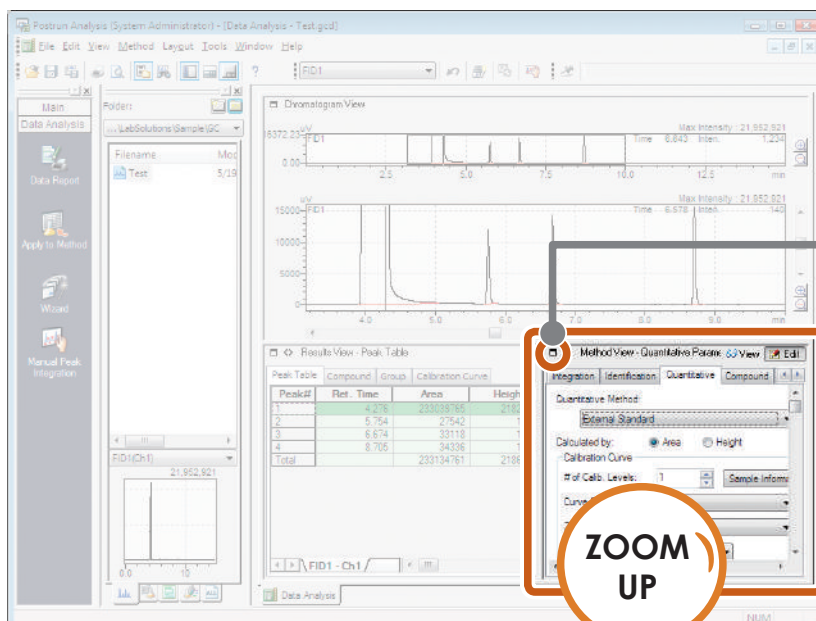
The positions where the absolute values of the baseline slope become these values are the start and end points of the peak.



**Reference**

Refer to "Peak Integration Parameters" of the "Data Analysis" chapter in *Operators Guide* for details on the Peak Integration Parameters.

# 5 Enter the quantitative parameters.



Hint Click to enlarge the window.

The 'Method View - Quantitative Parameters' window is shown with the following settings highlighted by numbered callouts:

- 1**: View/Edit buttons.
- 2**: 'Quantitative' tab selected.
- 3**: 'Quantitative Method' dropdown set to 'External Standard'.
- 4**: 'Calculated by' set to 'Area' and '# of Calib. Levels' set to '3'.
- 5**: 'X Axis of Calib. Curve' set to 'Conc.'.

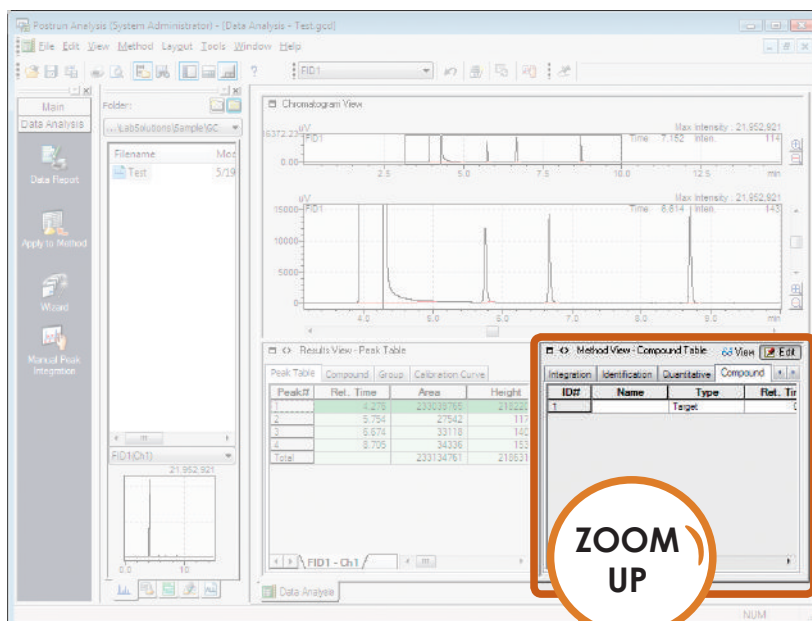
Other visible settings include: 'Curve Fit Type' set to 'Linear', 'Zero' set to 'Not Forced', 'Grouping Type' set to 'Not Used', and 'X Axis of Calib. Curve' set to 'Conc.'.



- The [External Standard] method involves calculating concentrations from the peak area (height) of unknown samples using a calibration curve made based on a standard sample.
- At [# of Calib. Levels], set the number of concentration points for the standard sample required for creating the calibration curve.
- When creating calibration curves with the least squares method, set [X Axis of Calib. Curve] to [Conc.].

Continued on the following page

# 6 Fill in the Compound Table.



This section provides a detailed view of the 'Method View - Compound Table' window. It features a tabbed interface with 'Integration', 'Identification', 'Quantitative', and 'Compound' tabs. The 'Compound' tab is active, displaying a table with the following data:

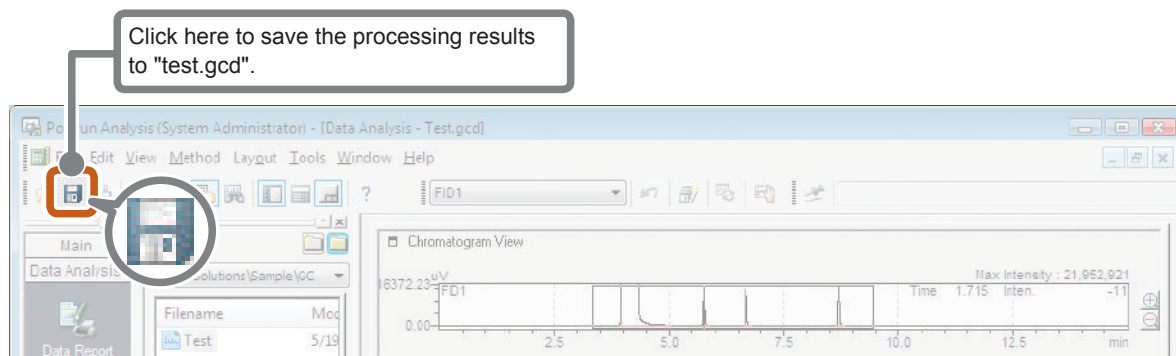
ID#	Name	Type	Ret. Time	Conc.(1)	Conc.(2)	Conc.(3)
1	1-Propylalcohol	Target	5.754	100.000	500.000	1000.000
2	Isobutylalcohol	Target	6.674	100.000	500.000	1000.000
3	Isoamylalcohol	Target	8.705	100.000	500.000	1000.000

Numbered callouts indicate: 1. The 'Compound' tab is selected. 2. The table data is highlighted. 3. The '63 View' button is highlighted. A callout box explains: 'Click **63 View** to change the cell background color to yellow to fix the newly edited parameters.'

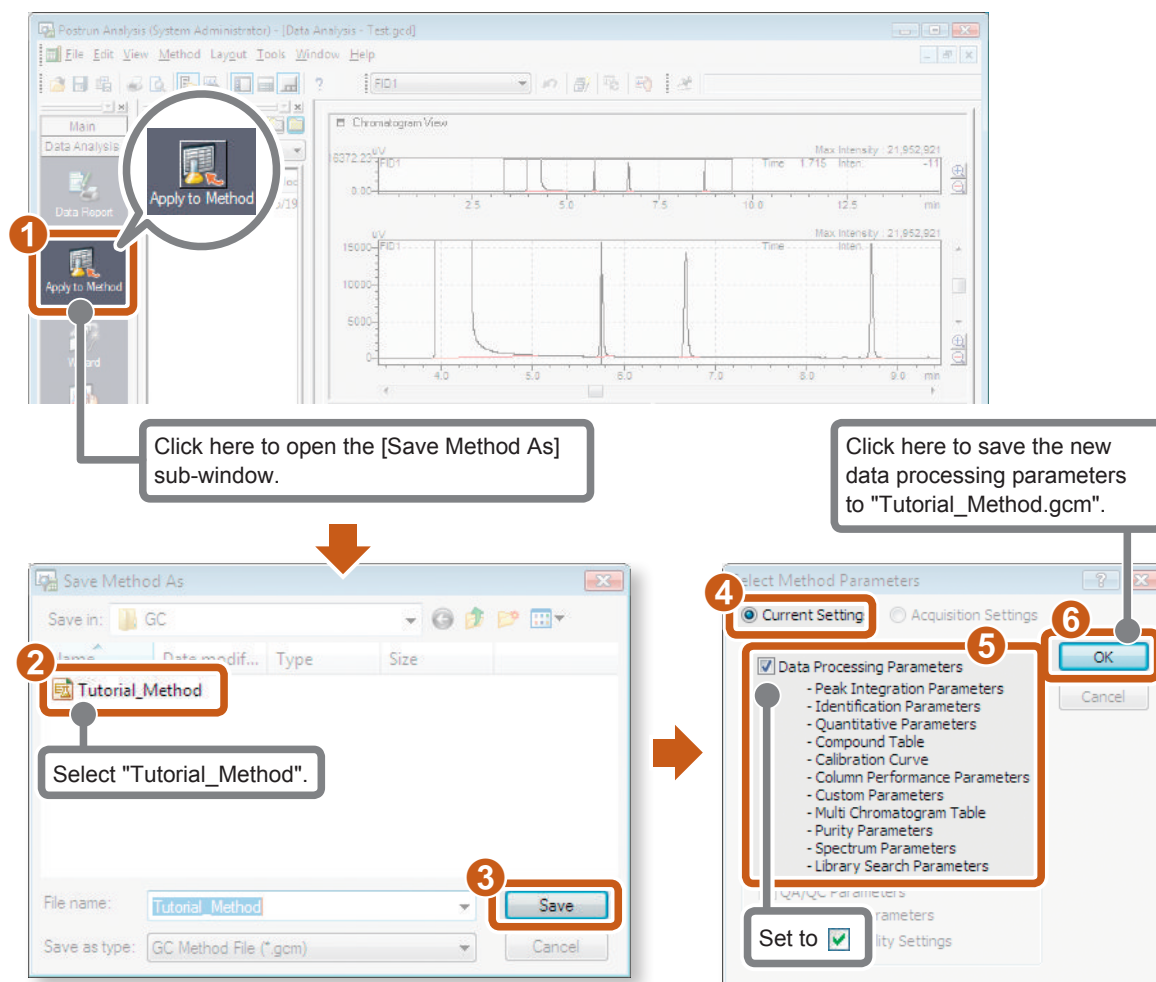
- Hint**
- The result obtained by performing data acquisition is used for [Ret. Time].
  - Selecting the [Ret. Time] cell, and clicking the peak in [Chromatogram View] automatically enters the retention time of that peak to the currently selected [Ret. Time] cell. The retention time can be set by simply clicking the mouse.



**Reference** Refer to "Compound Table Retention Times Using the Mouse" of the "Data Analysis" chapter in *Operators Guide* for details on setting retention times.

# 7 Save the processing results to a data file.



# 8 Save the method file.



-  **Hint** To use saved data processing parameters for other data, perform either of the following operations to save the new data processing parameters to the method file (in this example, "Tutorial\_Method.gcm").
- Click [Save Data and Method File] on the [File] menu.
  - Click  (Apply to Method) on the [Data Analysis] assistant bar (operation in step 8 above).

# Chapter 5

## Realtime Batch

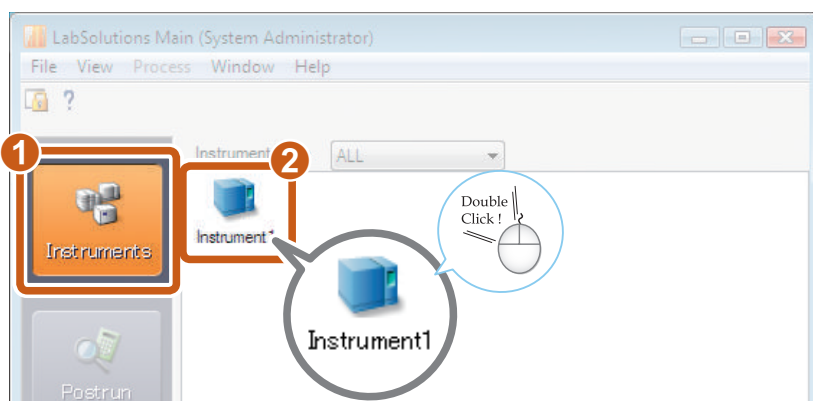
To perform data acquisition continuously on multiple samples (realtime batch), a Batch Table must first be created. Batch Tables can be easily created by using the table easy setting feature of LabSolutions.

### 5.1

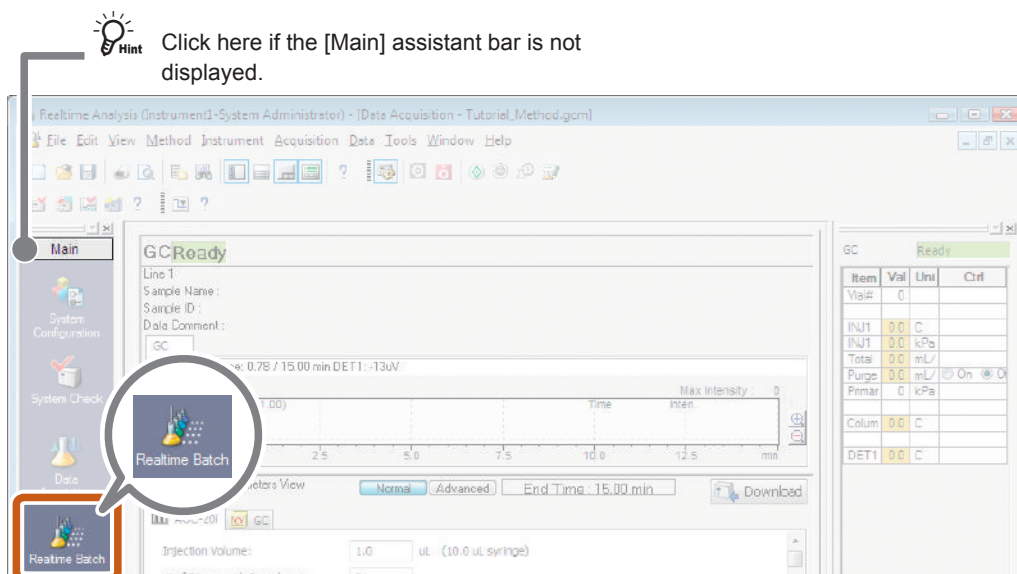
## Create a Batch Table

In the following example, create a Batch Table with standard samples set to 1st to 9th rows, and unknown samples set to the 10th and 11th rows.

### 1 Open the [Realtime Analysis] program.



### 2 Open the [Realtime Batch] window.



The [Realtime Batch] window opens.



# 3 Edit the Batch Table.

1 Select [Table Easy Settings...]

2 Select [New].

3 Set [Standard] to .  
Vial# : 1 to 3  
Injection Volume : 1 µL  
Repetitions : 3  
Data File : Tutorial\_Std

4 Set [Unknown] to .  
Vial# : 4 to 5  
Injection Volume : 1 µL  
Data File : Tutorial\_Unk

5 Click here to create a Batch Table made up of 11 rows.

Folder: C:\LabSolutions\Data\Project1

Analysis	Vial#	Sample Name	Sample ID	Sample Type	Method File	Data File	Level#	Report Output
1	1			1-Standard (I)	Tutorial_Method.gom	Tutorial_Std001.gcd	1	<input type="checkbox"/>
2	1			1-Standard	Tutorial_Method.gom	Tutorial_Std002.gcd	1	<input type="checkbox"/>
3	1			1-Standard	Tutorial_Method.gom	Tutorial_Std003.gcd	1	<input type="checkbox"/>
4	2			1-Standard	Tutorial_Method.gom	Tutorial_Std004.gcd	2	<input type="checkbox"/>
5	2			1-Standard	Tutorial_Method.gom	Tutorial_Std005.gcd	2	<input type="checkbox"/>
6	2			1-Standard	Tutorial_Method.gom	Tutorial_Std006.gcd	2	<input type="checkbox"/>
7	3			1-Standard	Tutorial_Method.gom	Tutorial_Std007.gcd	3	<input type="checkbox"/>
8	3			1-Standard	Tutorial_Method.gom	Tutorial_Std008.gcd	3	<input type="checkbox"/>
9	3			1-Standard	Tutorial_Method.gom	Tutorial_Std009.gcd	3	<input type="checkbox"/>
10	4			0-Unknown	Tutorial_Method.gom	Tutorial_Unk001.gcd	0	<input type="checkbox"/>
11	5			0-Unknown	Tutorial_Method.gom	Tutorial_Unk002.gcd	0	<input type="checkbox"/>



• In Batch Tables, you can set the sample information of each sample and output of reports.



Refer to "Edit Batch Tables" of the "Realtime Batch" chapter, "Edit Batch Tables" of the "Calibration Curves" chapter in *Operators Guide* for details on the editing batch tables.

• When performing cleanup, enter "-1" in [Vial#] if the autosampler is used.

Continued on the following page



# 4 Copy a cell.

Folder: C:\LabSolutions\Sample\VC

Analysis	Vial#	Sample Name	Sample ID	Sample Type	Method File	Data File	Level#	Report Outp
1	1				Tutorial_Method.gcm	Tutorial_Std001.gcd	1	
2	1				Tutorial_Method.gcm	Tutorial_Std002.gcd	1	
3	1				Tutorial_Method.gcm	Tutorial_Std003.gcd	1	
4	2				Tutorial_Method.gcm	Tutorial_Std004.gcd	2	
5	2				Tutorial_Method.gcm	Tutorial_Std005.gcd	2	
6	2				Tutorial_Method.gcm	Tutorial_Std006.gcd	2	
7	3				Tutorial_Method.gcm	Tutorial_Std007.gcd	3	

Context menu: Fill Down, Cut, Copy, Paste

Sample Name dialog box:

Row #: 1

Sample Name: Alcohol Mixture

Auto-increment:  Repetitions: 1

Buttons: OK, Cancel, Help

Folder: C:\LabSolutions\Sample\VC

Analysis	Vial#	Sample Name	Sample ID	Sample Type	Method File	Data File	Level#	Report Outp
1	1	Alcohol Mixture		1:Standard (I)	Tutorial_Method.gcm	Tutorial_Std001.gcd	1	
2	1	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std002.gcd	1	
3	1	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std003.gcd	1	
4	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std004.gcd	2	
5	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std005.gcd	2	
6	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std006.gcd	2	
7	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std007.gcd	3	
8	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std008.gcd	3	
9	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std009.gcd	3	
10	4			0:Unknown	Tutorial_Method.gcm	Tutorial_Unk001.gcd	0	

# 5 Enter a numbered series.

Folder: C:\LabSolutions\Sample\VC

Analysis	Vial#	Sample Name	Sample ID	Sample Type	Method File	Data File	Level#	Report Outp
1	1	Alcohol Mixture		1:Standard (I)	Tutorial_Method.gcm	Tutorial_Std001.gcd	1	
2	1	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std002.gcd	1	
3	1	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std003.gcd	1	
4	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std004.gcd	2	
5	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std005.gcd	2	
6	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std006.gcd	2	
7	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std007.gcd	3	
8	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std008.gcd	3	
9	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std009.gcd	3	
10	4				Tutorial_Method.gcm	Tutorial_Unk001.gcd	0	
11	5				Tutorial_Method.gcm	Tutorial_Unk002.gcd	0	

Context menu: Fill Series

Sample ID dialog box:

Row #: 10

Sample ID: Unknown01

Auto-increment:  Repetitions: 1

Buttons: OK, Cancel, Help

Folder: C:\LabSolutions\Sample\VC

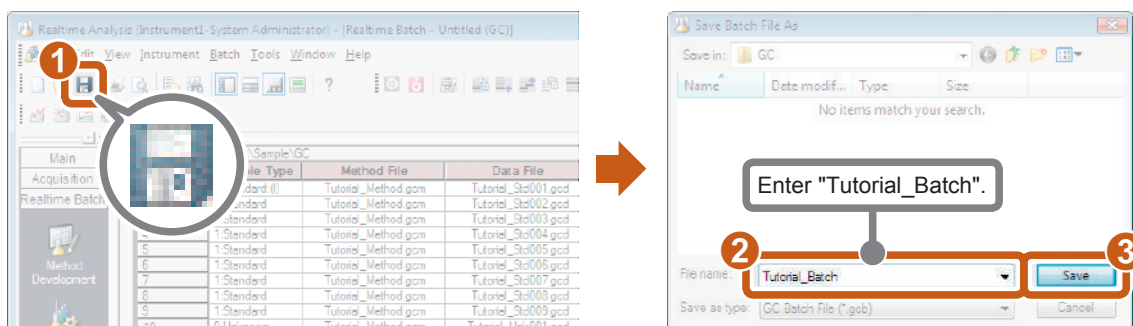
Analysis	Vial#	Sample Name	Sample ID	Sample Type	Method File	Data File	Level#	Report Outp
1	1	Alcohol Mixture		1:Standard (I)	Tutorial_Method.gcm	Tutorial_Std001.gcd	1	
2	1	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std002.gcd	1	
3	1	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std003.gcd	1	
4	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std004.gcd	2	
5	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std005.gcd	2	
6	2	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std006.gcd	2	
7	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std007.gcd	3	
8	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std008.gcd	3	
9	3	Alcohol Mixture		1:Standard	Tutorial_Method.gcm	Tutorial_Std009.gcd	3	
10	4		Unknown01	Unknown	Tutorial_Method.gcm	Tutorial_Unk001.gcd	0	
11	5		Unknown02	Unknown	Tutorial_Method.gcm	Tutorial_Unk002.gcd	0	

## 6 Directly enter remaining items to the Batch Table to create the Batch Table shown below.

Folder: C:\LabSolutions\Sample\GC

Analysis	Val#	Sample Name	Sample ID	Sample Type	Method File	Data File	Level#	Report Outp
1	1	Alcohol Mixture	Standard 100ppm	1:Standard (I)	Tutorial_Method.gcm	Tutorial_Std001.gcd	1	
2	1	Alcohol Mixture	Standard 100ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std002.gcd	1	
3	1	Alcohol Mixture	Standard 100ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std003.gcd	1	
4	2	Alcohol Mixture	Standard 500ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std004.gcd	2	
5	2	Alcohol Mixture	Standard 500ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std005.gcd	2	
6	2	Alcohol Mixture	Standard 500ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std006.gcd	2	
7	3	Alcohol Mixture	Standard 1000ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std007.gcd	3	
8	3	Alcohol Mixture	Standard 1000ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std008.gcd	3	
9	3	Alcohol Mixture	Standard 1000ppm	1:Standard	Tutorial_Method.gcm	Tutorial_Std009.gcd	3	
10	4	Liquor	Unknown01	0:Unknown	Tutorial_Method.gcm	Tutorial_Unk001.gcd	0	
11	5	Whiskey	Unknown02	0:Unknown	Tutorial_Method.gcm	Tutorial_Unk002.gcd	0	

## 7 Save the batch file.



# 5.2

## Realtime Batch Processing

Execute realtime batch using the Batch Table you created.

### 1 Place the samples in the autosampler.

Vial 1 (level 1)	Alcohol mixed sample	100 ppm solution (standard solution)
Vial 2 (level 2)	Alcohol mixed sample	500 ppm solution (standard solution)
Vial 3 (level 3)	Alcohol mixed sample	1000 ppm solution (standard solution)
Vial 4	Liquor (unknown sample)	
Vial 5	Whiskey (unknown sample)	

### 2 Start realtime batch processing.

Click here to open the [Realtime Batch] and [Data Acquisition] windows simultaneously, and starts data acquisition from the 1st row of the Batch Table.

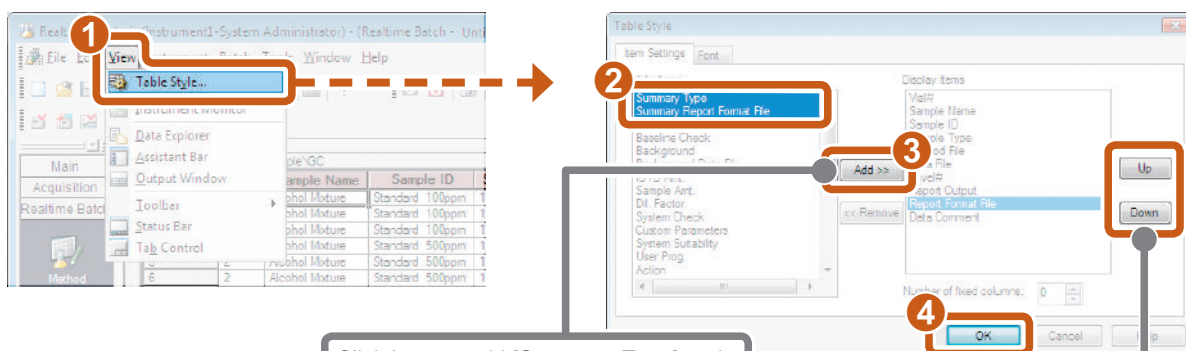
Click here to cancel data acquisition midway. To edit the content of the Batch Table during realtime batch, click [Pause] to pause realtime batch.

LabSolutions



# Print a Summary Report

## 1 Add items to display in the Batch Table.

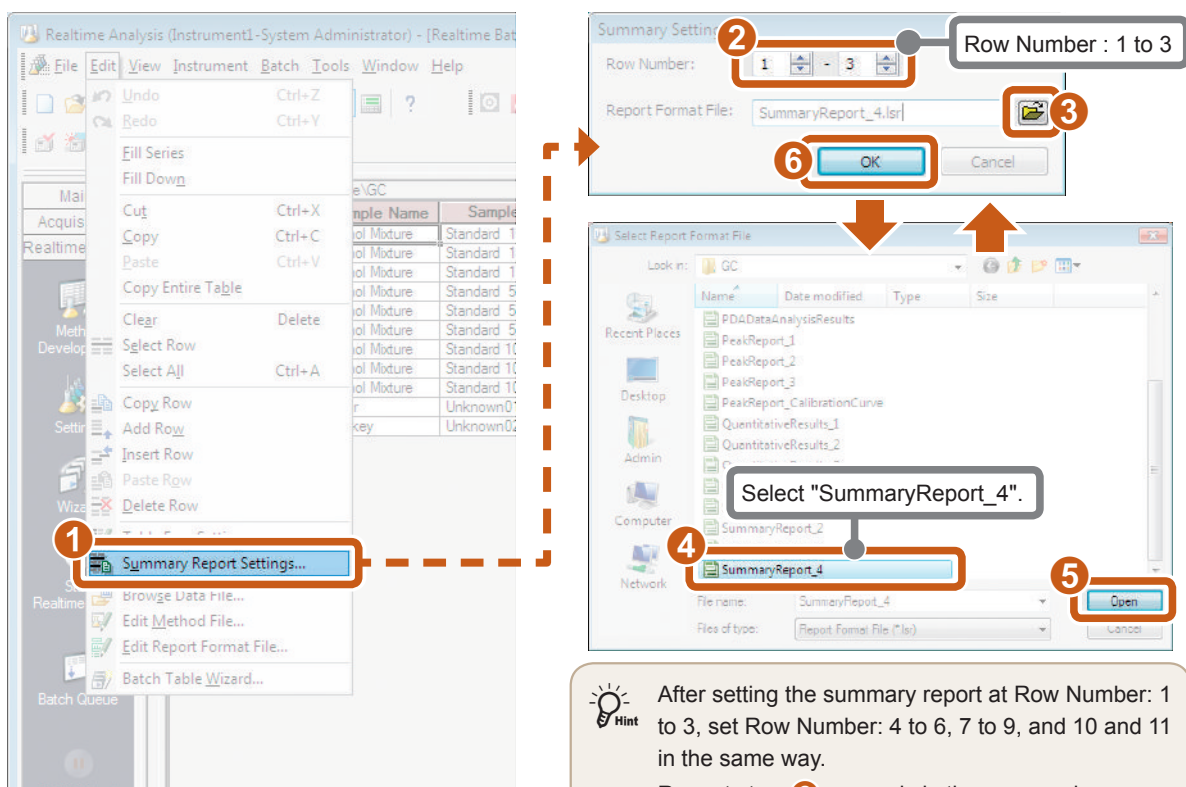


Click here to add [Summary Type] and [Summary Report Format File] to the items to display in the Batch Table.



The order of display items in the Batch Table can be changed by clicking [Up] or [Down].

## 2 Set up the summary report.



After setting the summary report at Row Number: 1 to 3, set Row Number: 4 to 6, 7 to 9, and 10 and 11 in the same way.

Repeat step 2 onwards in the same order.

Continued on the following page

# 3

## Check the output configuration of the summary report.

Analysis	Sample Type	Method File	Data File	Level	Summary Type	Summary Report Format File
1	1:Standard (I)	Tutorial_Method.gcm	Tutorial_Std001.gcd		Summary Start	SummaryReport_4.lsr
2	1:Standard	Tutorial_Method.gcm	Tutorial_Std002.gcd		Summary Run	
3	1:Standard	Tutorial_Method.gcm	Tutorial_Std003.gcd		Summary End	
4	1:Standard	Tutorial_Method.gcm	Tutorial_Std004.gcd		Summary Start	SummaryReport_4.lsr
5	1:Standard	Tutorial_Method.gcm	Tutorial_Std005.gcd		Summary Run	
6	1:Standard	Tutorial_Method.gcm	Tutorial_Std006.gcd		Summary End	
7	1:Standard	Tutorial_Method.gcm	Tutorial_Std007.gcd		Summary Start	SummaryReport_4.lsr
8	1:Standard	Tutorial_Method.gcm	Tutorial_Std008.gcd		Summary Run	
9	1:Standard	Tutorial_Method.gcm	Tutorial_Std009.gcd		Summary End	
10	0:Unknown	Tutorial_Method.gcm	Tutorial_Unk001.gcd		Summary Start	SummaryReport_1.lsr
11	0:Unknown	Tutorial_Method.gcm	Tutorial_Unk002.gcd		Summary End	

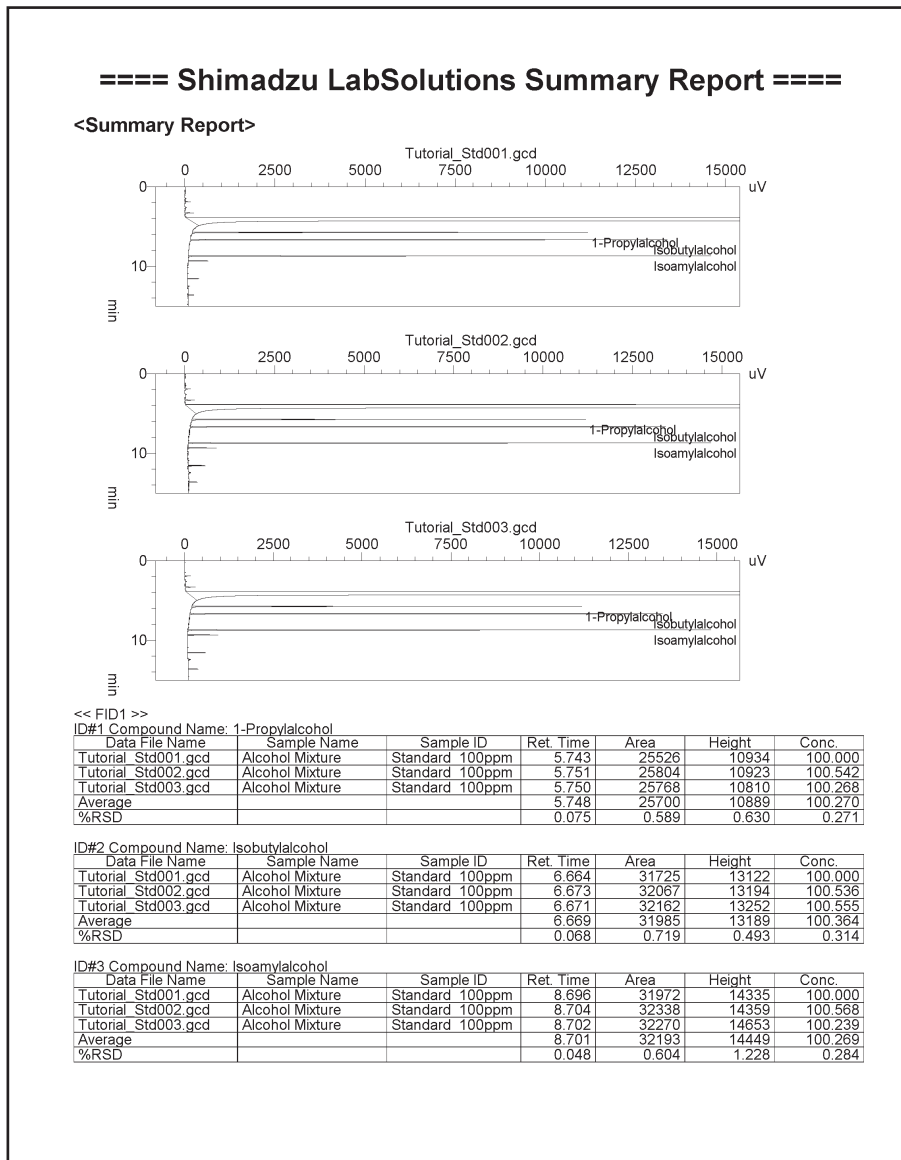
When you have finished the output configuration of the summary report, execute realtime batch to print the summary report.



Reference Refer to "5.2 Realtime Batch Processing" P.36 for details on executing realtime batch.

## [Printout Example]

Standard samples

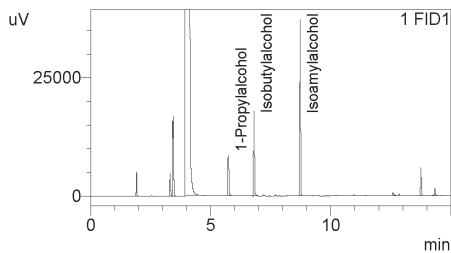


Unknown samples

==== Shimadzu LabSolutions Summary Report ====

Sample Name : Liquor  
 Sample ID : Unknown01  
 Data Filename : Tutorial\_Unk001.gcd  
 Method Filename : Tutorial\_Method.gcm  
 Batch Filename : Tutorial\_Batch.gcb  
 Vial # : 1-4  
 Injection Volume : 1 uL  
 Date Acquired : 4/9/2009 2:33:04 AM  
 Date Processed : 7/13/2010 2:24:41 PM

Sample Type : Unknown  
 Acquired by : System Administrator  
 Processed by : System Administrator

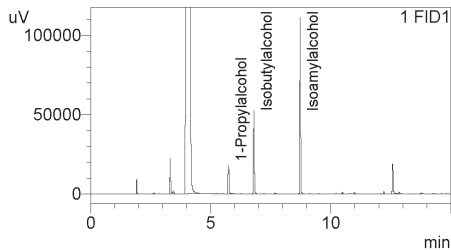


Peak#	Ret. Time	Area	Height	ID#
1	1.900	7737	5018	
2	3.299	10799	4830	
3	3.426	41993	16732	
4	4.080	42735188	8790611	
5	5.733	20659	8448	1
6	6.802	45081	17880	2
7	8.722	90812	36867	3
8	12.596	2747	680	
9	13.766	14329	5873	
10	14.336	3850	1453	
Total		42973196	8888393	

ID#	Name	Conc.	Unit
1	1-Propylalcohol	85.137	ppm
2	Isobutylalcohol	143.676	ppm
3	Isoamylalcohol	277.442	ppm

Sample Name : Whiskey  
 Sample ID : Unknown02  
 Data Filename : Tutorial\_Unk002.gcd  
 Method Filename : Tutorial\_Method.gcm  
 Batch Filename : Tutorial\_Batch.gcb  
 Vial # : 1-5  
 Injection Volume : 1 uL  
 Date Acquired : 4/9/2009 2:54:45 AM  
 Date Processed : 7/13/2010 2:24:42 PM

Sample Type : Unknown  
 Acquired by : System Administrator  
 Processed by : System Administrator



Peak#	Ret. Time	Area	Height	ID#
1	1.908	16371	9651	
2	2.632	1945	989	
3	3.305	49735	22059	
4	3.438	5679	1993	
5	4.118	64884225	11137946	
6	5.742	43193	17713	1
7	6.798	126351	52765	2
8	7.684	1424	666	
9	8.726	263828	110858	3
10	10.489	2765	1054	
11	10.983	2300	893	
12	12.223	2935	1336	
13	12.585	47370	18734	
14	12.869	2493	1116	
15	13.773	1625	623	
Total		65452236	11378396	

ID#	Name	Conc.	Unit
1	1-Propylalcohol	168.318	ppm
2	Isobutylalcohol	394.559	ppm

ID#	Name	Conc.	Unit
3	Isoamylalcohol	791.143	ppm

# Chapter 6

## Multiple Data Analysis

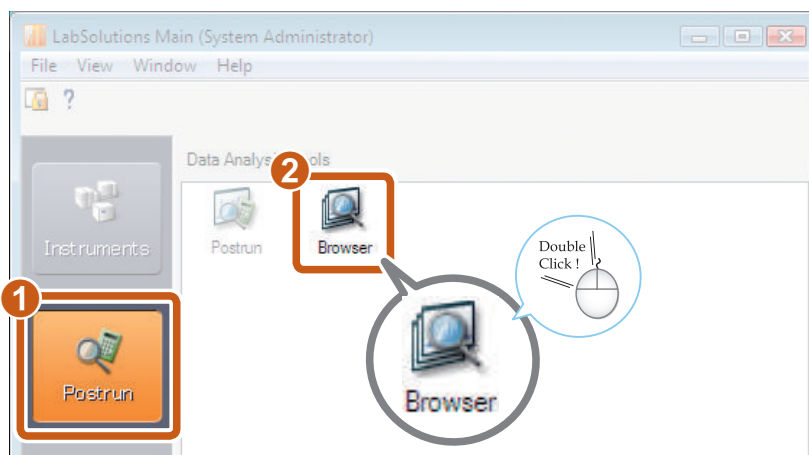
The LabSolutions [Browser] program is handy for checking the quantitative calculation results and chromatograms of multiple data.

In the [Quant Browser] window of the [Browser] program, you can check multiple data, and change the data processing parameters of the currently displayed method file to modify calibration curves and perform postrun batch on multiple data.

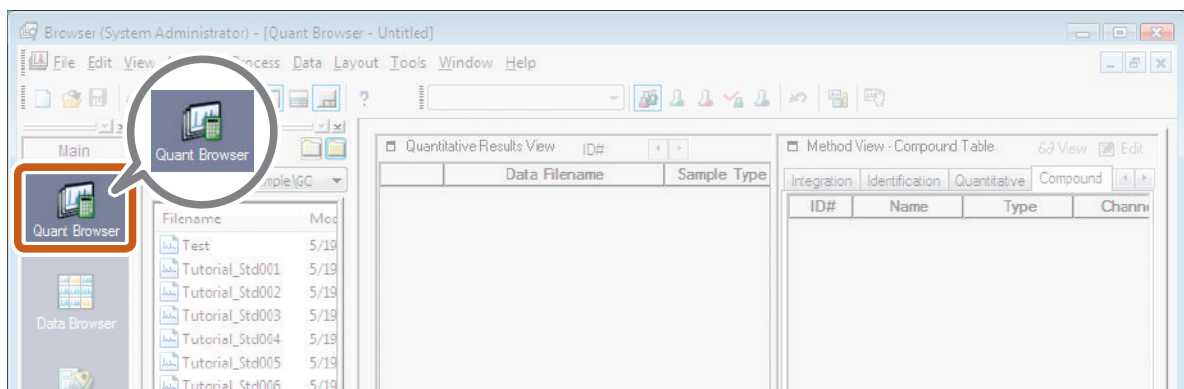


**Reference** Refer to "Quant Browser" chapter in *Operators Guide* for details on the "Quant Browser" window.

### 1 Open the [Browser] program.



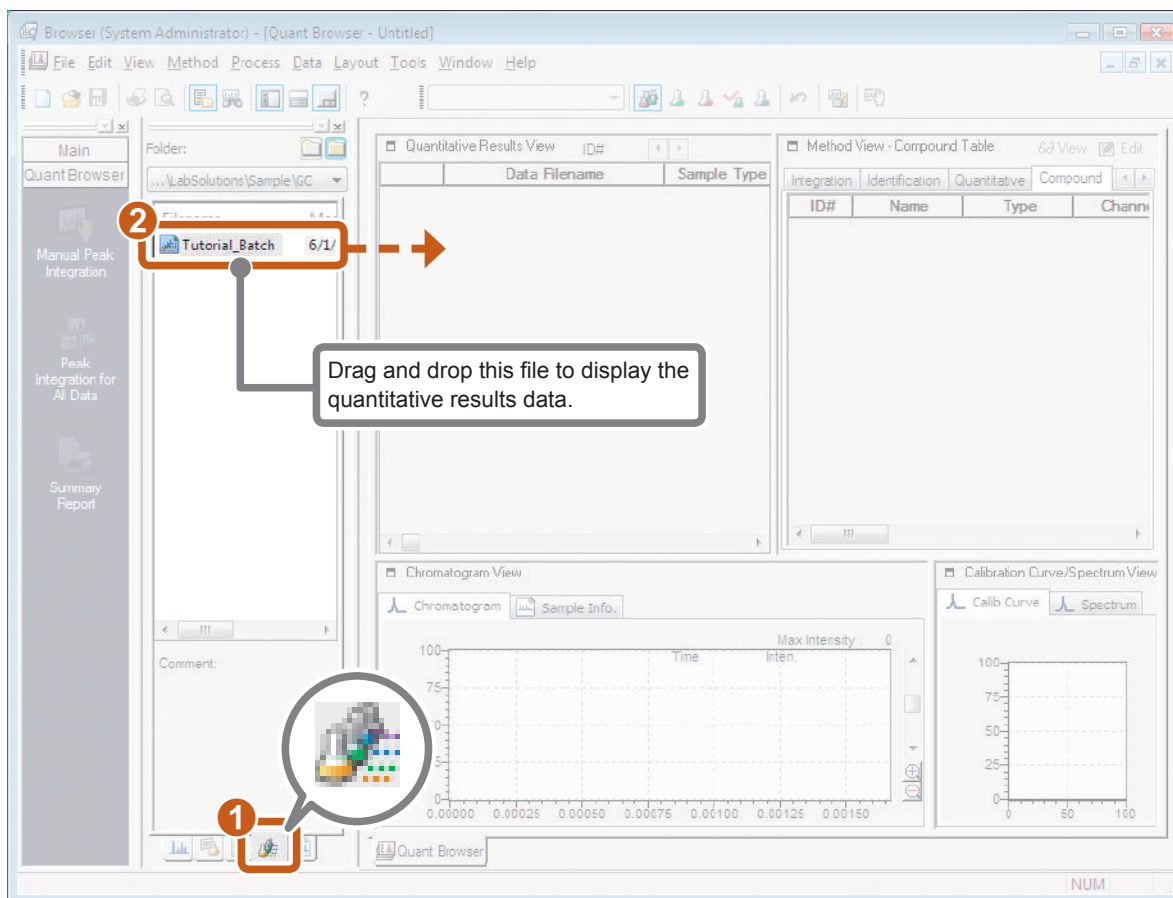
### 2 Open the [Quant Browser] window.



Open the [Quant Browser] window.

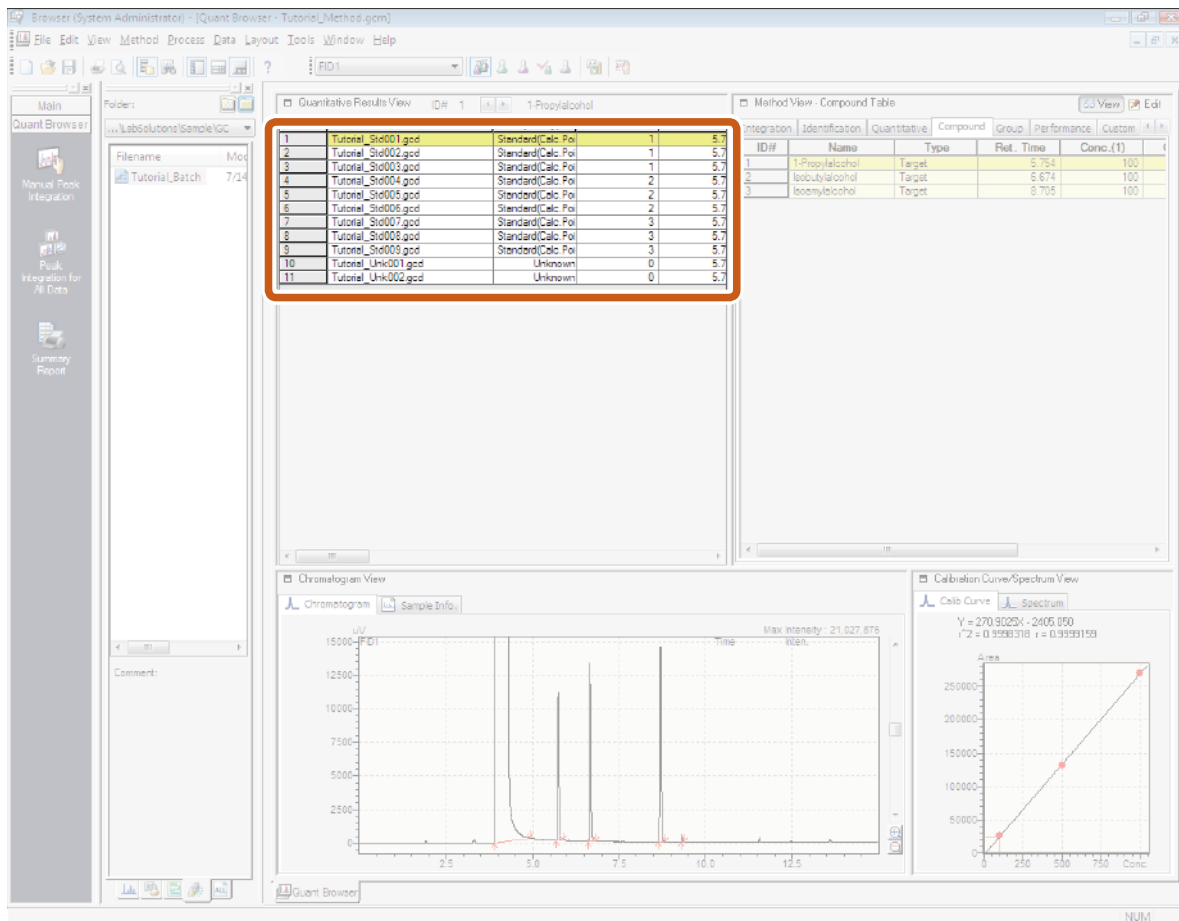


# 3 Load the batch file.



Continued on the following page 

# 4 Confirm quantitative results.



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# Modify Calibration Curves

## 1 Confirm peak integration parameters.

Confirm the peak integration parameters when peak detection is inappropriate.

**Quantitative Results View**

Data	Filename	Sample Type	Level#	Ret. Time
1	Tutorial_Stk001.gsd	Standard Calc. Poi	1	5
2	Tutorial_Stk002.gsd	Standard Calc. Poi	1	5
3	Tutorial_Stk003.gsd	Standard Calc. Poi	1	5
4	Tutorial_Stk004.gsd	Standard Calc. Poi	2	5
5	Tutorial_Stk005.gsd	Standard Calc. Poi	2	5
6	Tutorial_Stk006.gsd	Standard Calc. Poi	2	5
7	Tutorial_Stk007.gsd	Standard Calc. Poi	3	5
8	Tutorial_Stk008.gsd	Standard Calc. Poi	3	5
9	Tutorial_Stk009.gsd	Standard Calc. Poi	3	5
10	Tutorial_Unk001.gsd	Unknown	0	5
11	Tutorial_Unk002.gsd	Unknown	0	5

**Method View - Peak Integration Parameters**

Width: 3 sec  
 Slope: 1000 uV/min  
 Drift: 0 uV/min  
 T. DBL: 1000 min  
 Min. Area/Height: 1000 counts  
 Calculated by:  Area  Height

**Calibration Curve/Spectrum View**

Y = 270.8025X - 2476.060  
 $r^2 = 0.999318$   $r = 0.999654$

Annotations:

- ZOOM UP**: Callout pointing to the 'View' button in the 'Method View - Peak Integration Parameters' dialog.
- Click here to perform postrun batch on all data.**: Callout pointing to the 'View' button in the 'Method View - Peak Integration Parameters' dialog.
- Make sure that these values are appropriate.**: Callout pointing to the 'Width', 'Slope', 'Drift', 'T. DBL', and 'Min. Area/Height' fields in the 'Method View - Peak Integration Parameters' dialog.

Continued on the following page

# 2

## Confirm identification parameters.

Confirm the identification parameters and Compound Table when peaks are not identified correctly.

**ZOOM UP**

1 View Edit

2 Identification

3 Window/Band:  Window  Band  
Window: 5 %  
Default Bandwidth: 0.01 min  
Identification Method: Absolute Rt  
Peak Selection: All Peaks  
 Display not identified peaks as peaks with zero area(height)  
 Add the peaks with zero area(height) to calibration level  
Retention Time Update:  None  Replace  Average

4 View Edit

Make sure that these values are appropriate.

Calibration Curve/Spectrum View  
Y = 220.908X - 2406.060  
r<sup>2</sup> = 0.9899318 r = 0.9899159

# 3

## Confirm the Compound Table.

**ZOOM UP**

1 View Edit

2 Compound

3 Ret. Time

4 View Edit

Make sure that these time settings are appropriate.

ID#	Name	Type	Ret. Time	Conc. (1)	Conc. (2)	Conc. (3)
1	1-Propylalcohol	Target	5.754	100	500	1000
2	Isobutylalcohol	Target	6.674	100	500	1000
3	Isoamylalcohol	Target	8.705	100	500	1000
4			0.001	100	500	1000

Calibration Curve/Spectrum View  
Y = 220.908X - 2406.060  
r<sup>2</sup> = 0.9899318 r = 0.9899159

# 4 Confirm calibration points.

Quantitative Results View

Data Filename	Sample Type	Level#	Ret. Time
Tutorial_Std001.gcd	Standard/Calc Poi	1	5.7
Tutorial_Std002.gcd	Standard/Calc Poi	1	5.7
Tutorial_Std003.gcd	Standard/Calc Poi	1	5.7
Tutorial_Std004.gcd	Standard/Calc Poi	2	5.7
Tutorial_Std005.gcd	Standard/Calc Poi	2	5.7
Tutorial_Std006.gcd	Standard/Calc Poi	2	5.7
Tutorial_Std007.gcd	Standard/Calc Poi	3	5.7
Tutorial_Std008.gcd	Standard/Calc Poi	3	5.7
Tutorial_Std009.gcd	Standard/Calc Poi	3	5.7
Tutorial_Unk001.gcd	Unknown	0	5.7
Tutorial_Unk002.gcd	Unknown	0	5.7

Method View - Compound Table

ID#	Name	Type	Ret. Time	Conc (1)
1	1-Propylalcohol	Target	5.764	100
2	isobutylalcohol	Target	6.674	100
3	isamylalcohol	Target	8.705	100

Calibration Curve/Specs View

$Y = 270.9025X - 2405.050$   
 $r^2 = 0.9980218$   $r = 0.9990159$

Quantitative Results View

Data Filename	Height	Conc. (ppm)	Std. Conc.	Area%	Height%	Accuracy	Cal. Point	Sample Type
Tutorial_Std001.gcd	10.934	103.103	100	0.012	0.052	104 u	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std002.gcd	10.923	104.131	100	0.012	0.052	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std003.gcd	10.810	103.999	100	0.012	0.052	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std004.gcd	56.785	493.976	500	0.061	0.269	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std005.gcd	56.542	492.957	500	0.061	0.269	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std006.gcd	56.645	492.848	500	0.061	0.269	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std007.gcd	118.063	1004.735	1000	0.126	0.512	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std008.gcd	117.871	1003.076	1000	0.126	0.512	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Std009.gcd	116.155	1001.176	1000	0.126	0.512	98.8	<input checked="" type="checkbox"/>	Standard/Calc Poi
Tutorial_Unk001.gcd	9.448	85.137	---	0.048	0.226	98.8	<input type="checkbox"/>	Unknown
Tutorial_Unk002.gcd	17.713	168.318	---	0.066	0.306	98.8	<input type="checkbox"/>	Unknown

# 5 Save the method file and data file.

Browser (System Administrator) - [Quant Browser - TutorialMethod.gcm]

Quantitative Results View

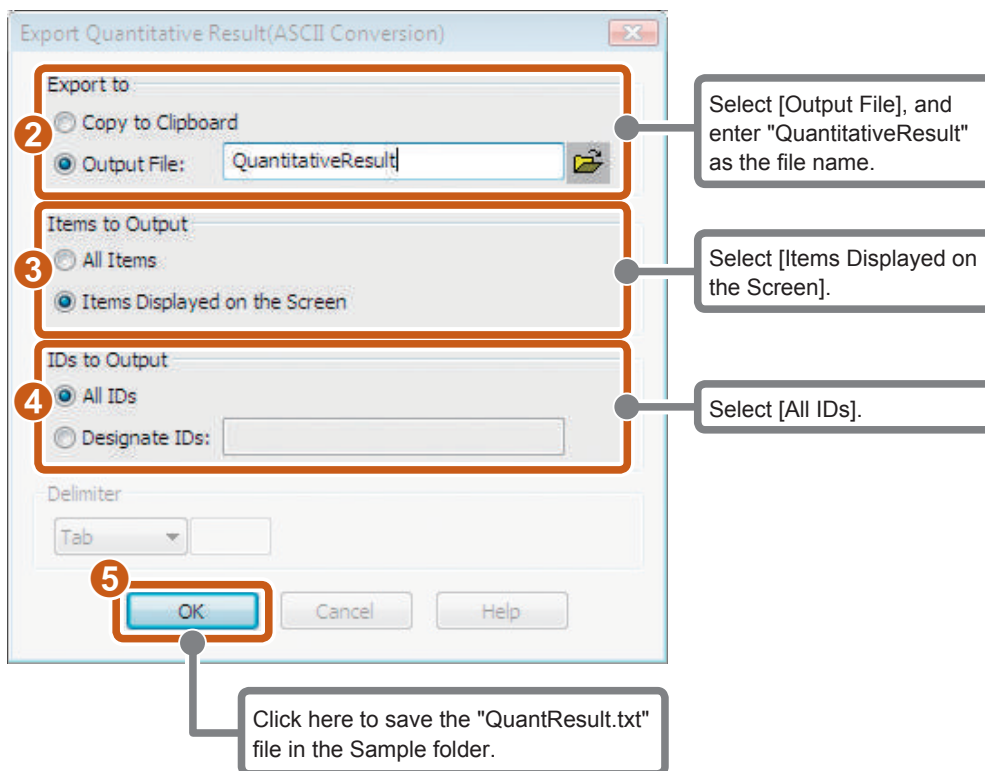
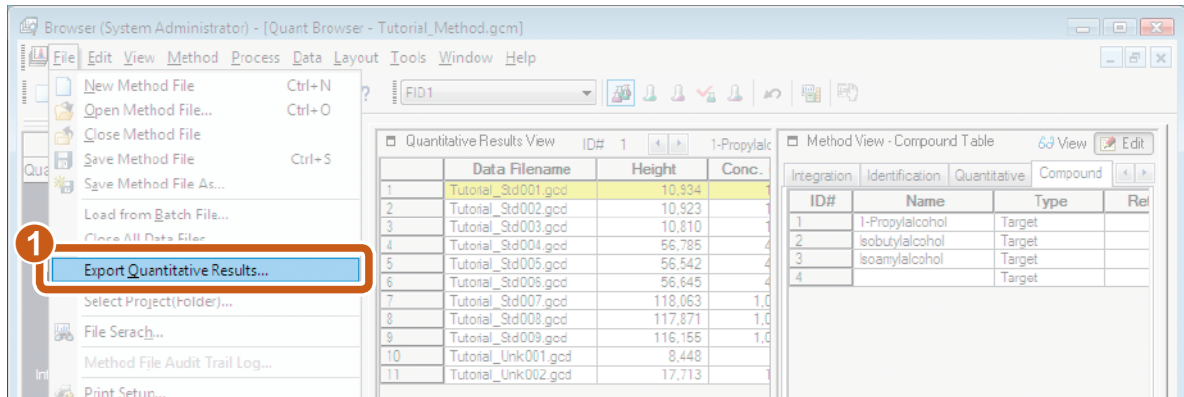
Data Filename	Sample Type
Tutorial_Std001.gcd	Standard/Calc Poi
Tutorial_Std002.gcd	Standard/Calc Poi
Tutorial_Std003.gcd	Standard/Calc Poi
Tutorial_Std004.gcd	Standard/Calc Poi
Tutorial_Std005.gcd	Standard/Calc Poi
Tutorial_Std006.gcd	Standard/Calc Poi
Tutorial_Std007.gcd	Standard/Calc Poi
Tutorial_Std008.gcd	Standard/Calc Poi
Tutorial_Std009.gcd	Standard/Calc Poi
Tutorial_Unk001.gcd	Unknown
Tutorial_Unk002.gcd	Unknown

Method View - Compound Table

ID#	Name	Type	Ret
1	1-Propylalcohol	Target	
2	isobutylalcohol	Target	
3	isamylalcohol	Target	

# Export Quantitative Calculation Results

This section describes how to save quantitative calculation results as a text file.



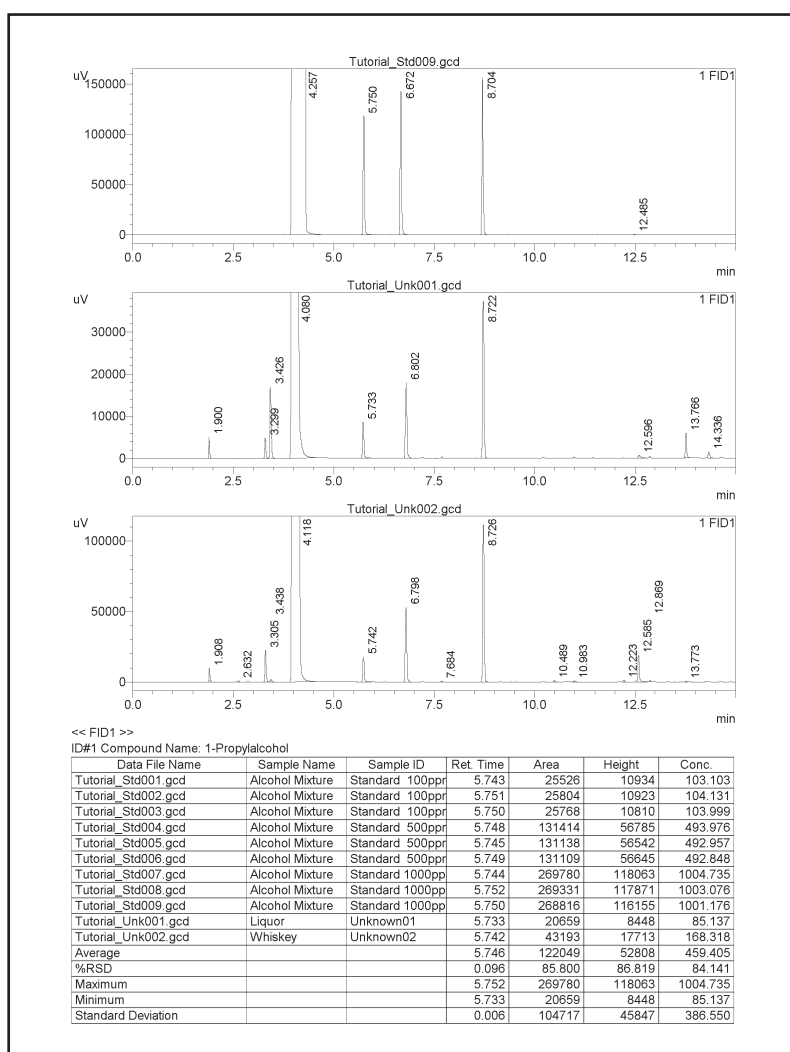
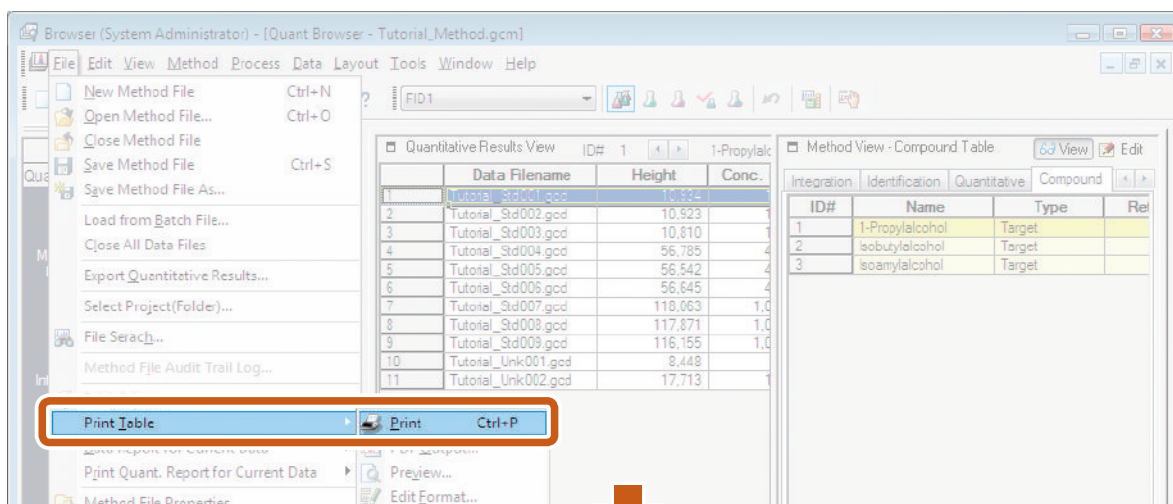
Refer to "Export the Quantitative Results" of the "Quant Browser" chapter in *Operators Guide* for details on exporting quantitative results.

LabSolutions



# Print the Quantitative Results Table

To print a browser report, select [Print] at [Print Table] on the [File] menu.

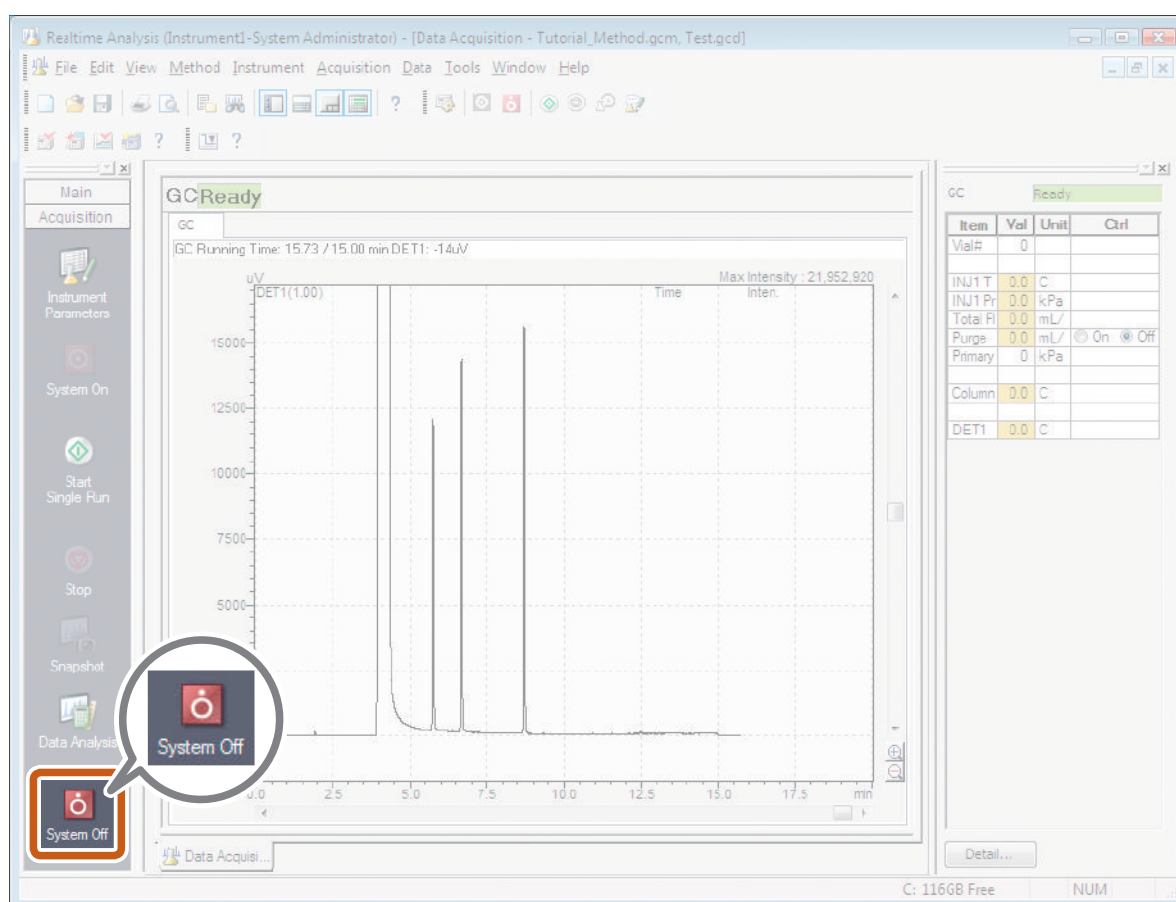


Select [Edit Format] from [Print Table] on the [File] menu to edit the report format.

# Chapter 7 ShutDown

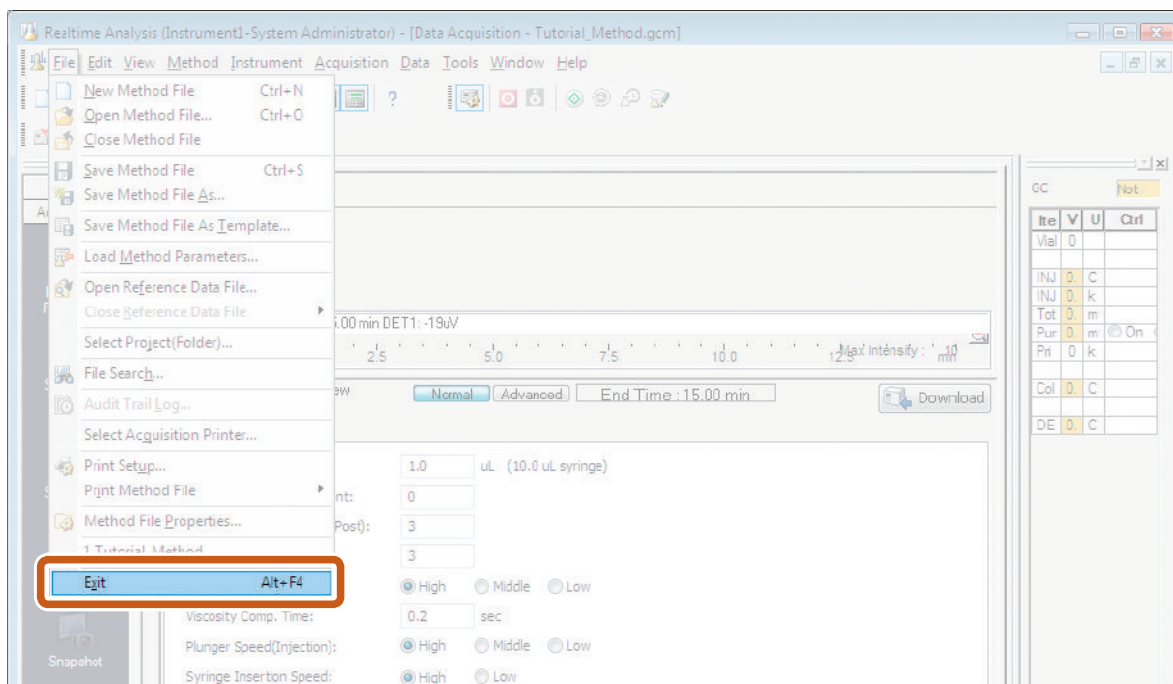
Last of all, this chapter describes how to exit LabSolutions.

## 1 Stop the GC.

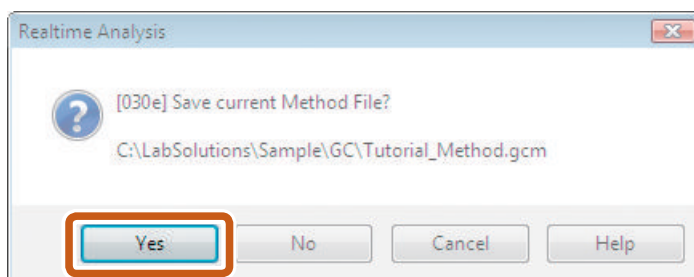




## 2 Select [Exit] when the oven has cooled down.



## 3 Click [Yes].



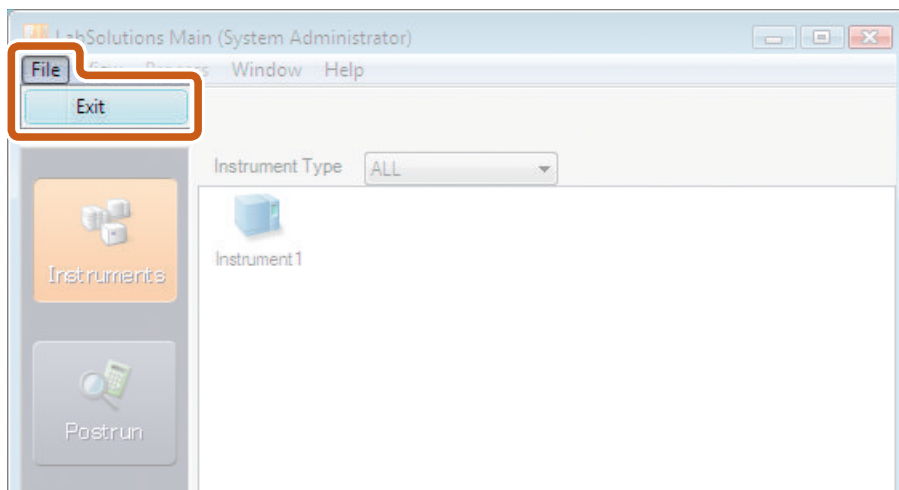
When there is a file that has not yet been saved, a window to confirm whether or not to save the file when exiting the [Realtime Analysis] program opens.

Continued on the following page 

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## 4 Exit LabSolutions.

If the [Postrun Analysis] program or [Browser] program is open, click [Exit] on the [File] menu of each program to exit the respective program.



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5 Shutdown Windows, and turn the PC and printer off.

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6 Turn the GC and peripheral devices off.

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7 Close the main valve of the carrier gas and other gases.