

LabSolutions

HS-10 Control Software

Instruction Manual

Read the instruction manual thoroughly before you use the product.
Keep this instruction manual for future reference.

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Introduction

Read this Instruction Manual thoroughly before using the product.

Thank you for purchasing Shimadzu analytical instrument workstation “LabSolutions HS-10 Control Software” (hereafter referred to as “the software”).

This software is for controlling the HS-10 unit in the LabSolutions system.

Installing this software allows you to develop methods for controlling the HS-10 unit or to control it from the LabSolutions.

The operating requirements for the PC are the same with those for LabSolutions.

This manual describes the procedures for operating this product. Read this manual thoroughly before using the product and operate the product in accordance with the instructions in this manual.

Also, keep this manual for future reference.

This manual assumes that the reader is knowledgeable of basic operations of Windows. For the operation of Windows, refer to the instruction manual that comes with that product.

Important

- If the user or installation location changes, ensure that this Instruction Manual is transferred with the product.
- If this manual is lost or damaged, immediately contact your Shimadzu representative to request a replacement.
- To ensure safe operation, contact your Shimadzu representative for product installation, adjustment, or re-installation (after the product is moved).

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Notice

- Information in this manual is subject to change without notice and does not represent a commitment on the part of the vendor.
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- Microsoft® Windows® 10 Operating System is referred to as “Windows 10”.
Microsoft® Windows® 7 Operating System is referred to as “Windows 7”.
Microsoft® Windows Vista® Operating System is referred to as “Windows Vista”.
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- Replacement parts for this product will be available for a period of seven (7) years after the product is discontinued. Thereafter, such parts may cease to be available. Note, however, that the availability of parts not manufactured by Shimadzu shall be determined by the relevant manufacturers.

Instruction Manuals

■ Indications Used in Instruction Manuals

Cautions and Notes are indicated using the following conventions, and the following symbols are used in this manual:

| Indication | Meaning |
|---|---|
|  NOTE | Emphasizes additional information that is provided to ensure the proper use of this product. |
|  Reference | Indicates the location of related reference information. |
| [] | Indicates the names of buttons, menu options, setting options, windows/sub-windows, and icons that are displayed in a window. Example: Click [OK]. |

Warranty

Shimadzu provides the following warranty for this product.

1. Period:

Please contact your Shimadzu representative for information about the period of this warranty.

2. Description:

If a product/part failure occurs for reasons attributable to Shimadzu during the warranty period, Shimadzu will repair or replace the product/part free of charge (including USB dongles). However, in the case of products which are usually available on the market only for a short time, such as personal computers and their peripherals/parts, Shimadzu may not be able to provide identical replacement products.

3. Limitation of Liability:

- (1) In no event will Shimadzu be liable for any lost revenue, profit or data, or for special, indirect, consequential, incidental or punitive damages, however caused regardless of the theory of liability, arising out of or related to the use of or inability to use the product, even if Shimadzu has been advised of the possibility of such damage.
- (2) In no event will Shimadzu's liability to you, whether in contract, tort (including negligence), or otherwise, exceed the amount you paid for the product.

4. Exceptions:

Failures caused by the following are excluded from the warranty, even if they occur during the warranty period.

- 1) Improper product handling
- 2) Repairs or modifications performed by parties other than Shimadzu or Shimadzu designated companies
- 3) Product use in combination with hardware or software other than that designated by Shimadzu
- 4) Computer viruses leading to device failures and damage to data and software, including the product's basic software
- 5) Power failures, including power outages and sudden voltage drops, leading to device failures and damage to data and software, including the product's basic software
- 6) Turning OFF the product without following the proper shutdown procedure leading to device failures and damage to data and software, including the product's basic software
- 7) Reasons unrelated to the product itself
- 8) Product use in harsh environments, such as those subject to high temperatures or humidity levels, corrosive gases, or strong vibrations
- 9) Fires, earthquakes, or any other act of nature, contamination by radioactive or hazardous substances, or any other force majeure event, including wars, riots, and crimes
- 10) Product movement or transportation after installation
- 11) Consumable items
Note: Recording media such as floppy disks and CD-ROMs are considered consumable items.

- * If there is a document such as a warranty provided with the product, or there is a separate contract agreed upon that includes warranty conditions, the provisions of those documents shall apply.
- * Warranty periods for products with special specifications and systems are provided separately.
- * **The license cannot be reissued if you lose the USB dongle or license certificate provided with the product.**





Contents

1 Installation

| | | |
|-----|-------------------------------------|---|
| 1.1 | Confirmation of parts | 1 |
| 1.2 | Notes of Installing | 1 |
| 1.3 | Connection..... | 1 |
| 1.4 | Software System Configuration | 2 |

2 Operations

| | | |
|-------|---|----|
| 2.1 | Method Development..... | 9 |
| 2.1.1 | Edit Method File | 9 |
| 2.1.2 | Parameters..... | 11 |
| 2.2 | Batch Processing..... | 13 |
| 2.2.1 | Preparing the batch table | 13 |
| 2.2.2 | Parameters (for HS only)..... | 14 |
| 2.2.3 | Precautions on batch table preparation | 15 |
| 2.2.4 | Starting the batch table | 15 |
| 2.2.5 | Running multiple batch files sequentially | 16 |
| 2.3 | Display the Pre-treatment Result..... | 17 |

3 Appendix

| | | |
|-----|----------------------|----|
| 3.1 | Operation Flow | 21 |
| 3.2 | About Overlap..... | 21 |

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1

Installation

1.1 Confirmation of parts

1

Please confirm that the following parts are contained:

- LabSolutions HS-10 Software
 - License certificate or USB Dongle 1
 - LabSolutions HS-10 control software instruction manual
- Start signal cable, READY signal cable and USB cable (attached to HS-10)

1.2 Notes of Installing

The communications between the PC and HS-10 are carried out via USB cable. You can use any USB port for communications; however, you are required to specify the Serial Number in the HS Communication Settings dialog box under the Instrument system configuration.

1.3 Connection

Reference

Refer to the instruction manual of the HS-10 main unit for details.

1

Connect the start start and ready signal cable.

Before connecting this cable, power switch to both the HS main unit and the GC must be turned off.

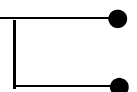
HS-10
I/O Port



GC

START IN

READY OUT



2


Connect the USB cable between HS-10 and PC.

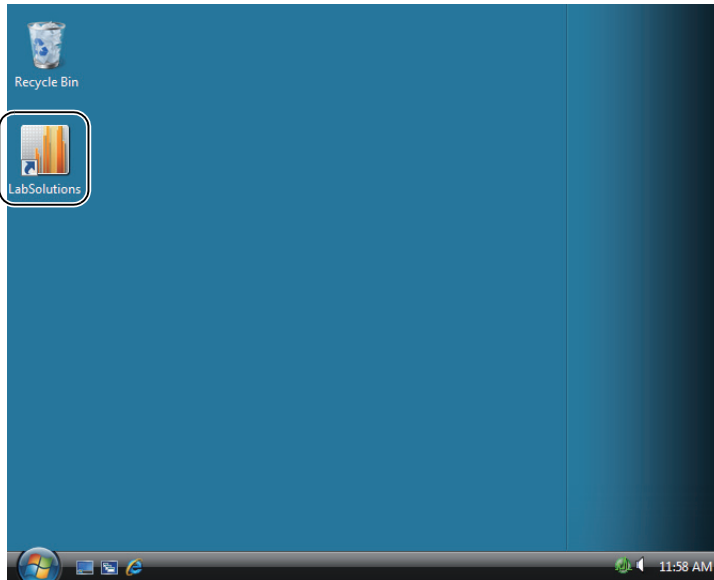
3

Turn ON the power and confirm that it starts correctly.

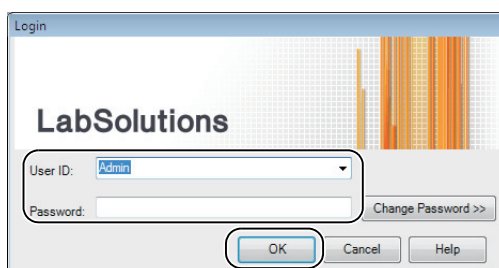
1.4 Software System Configuration

Registering the HS-10 enables analysis using the unit.

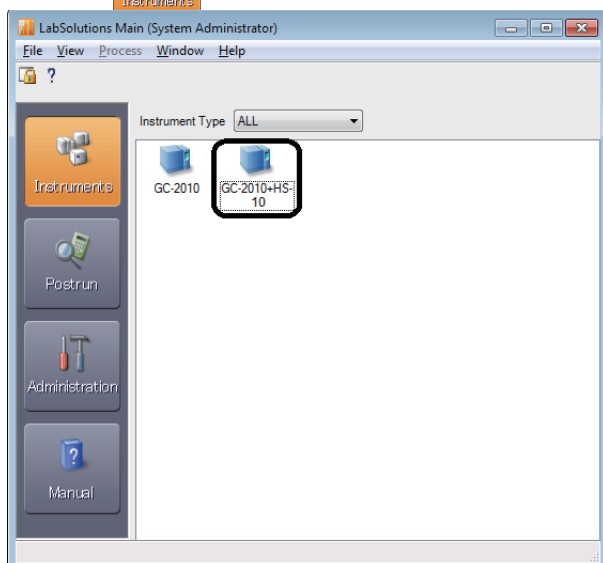
- 1** Turn each instrument on.
- 2** Turn the PC on, and start Windows.
- 3** Double-click the  (LabSolutions) icon displayed on the Windows Desktop.



- 4** Enter "Admin" at [User ID], and click [OK].

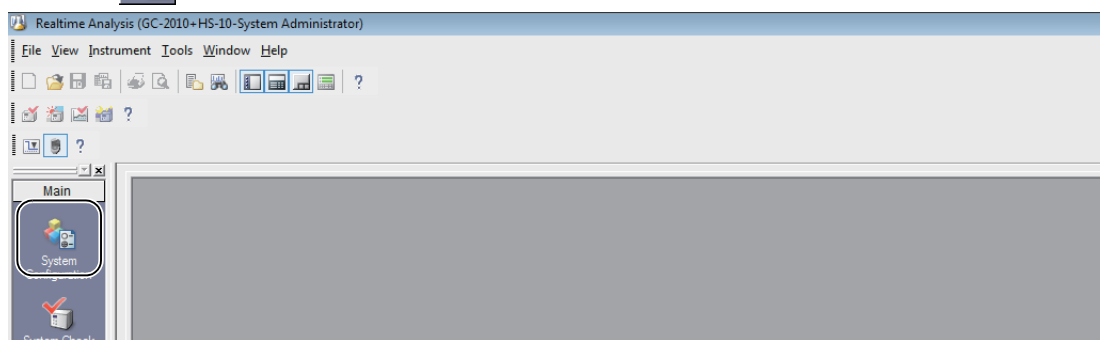


5 Click the  (Instruments) icon, and double-click the icon of the instrument to use.




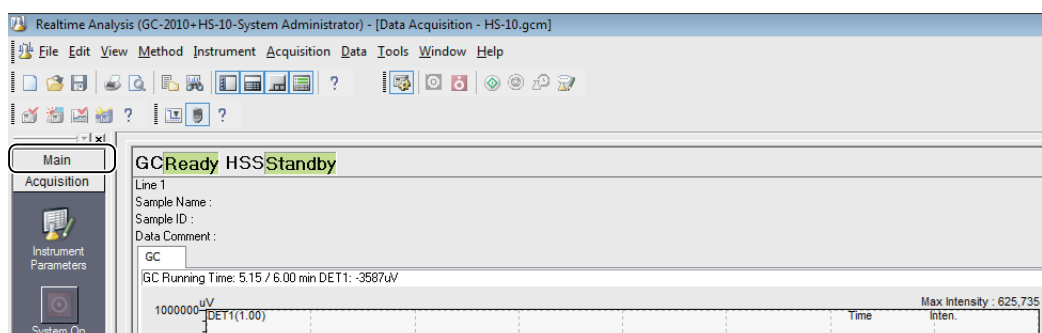
1

6 Click the  (System Configuration) icon on the [Main] assistant bar.

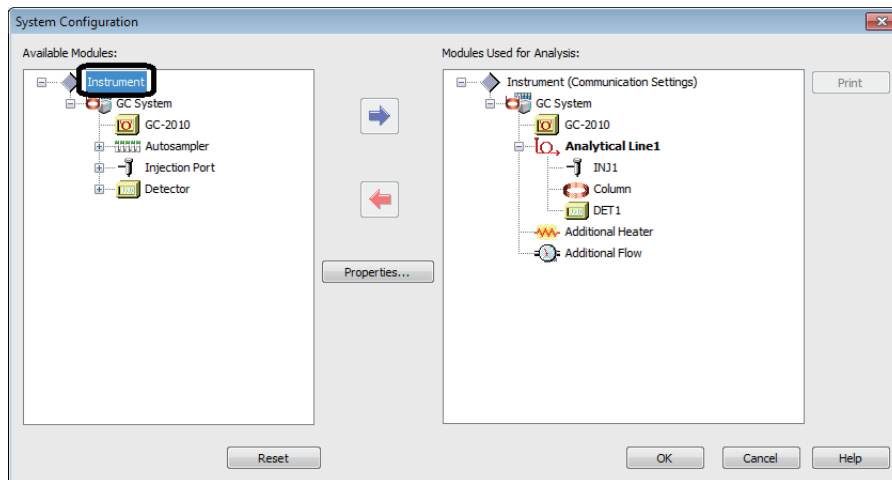


NOTE

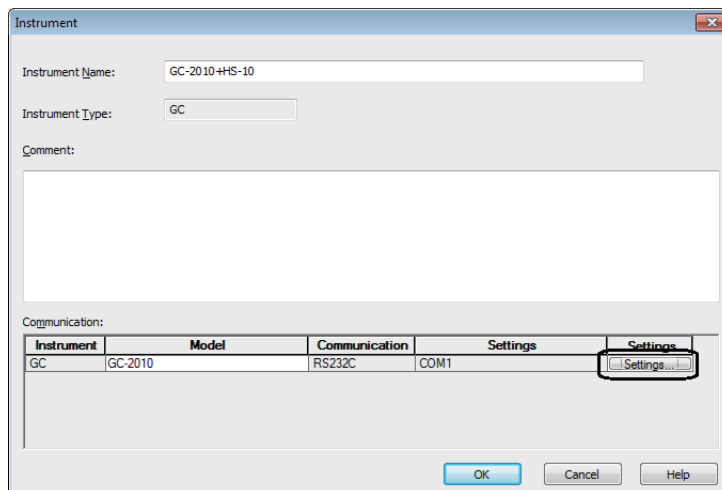
If the  (System Configuration) icon is not displayed, click on the title of the assistant bar.



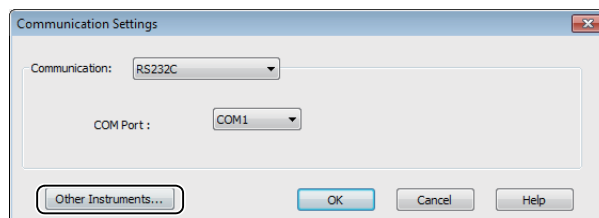
7 Double-click the [Instrument] icon at [Available Modules].



8 Click the [Settings] on [Communication].



9 Click the [Other Instruments].

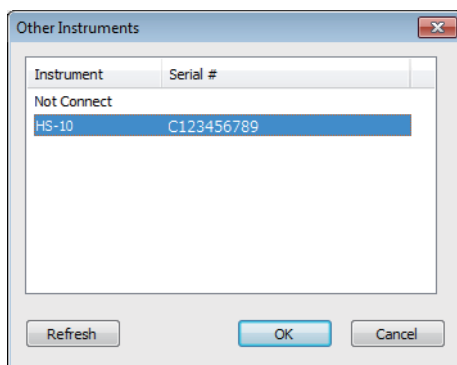


NOTE

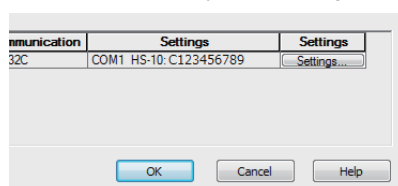
[Other Instruments] is available, if the License for HS is valid.

10

Select HS-10 Serial Number you use in the [Serial #] list, and click [OK].

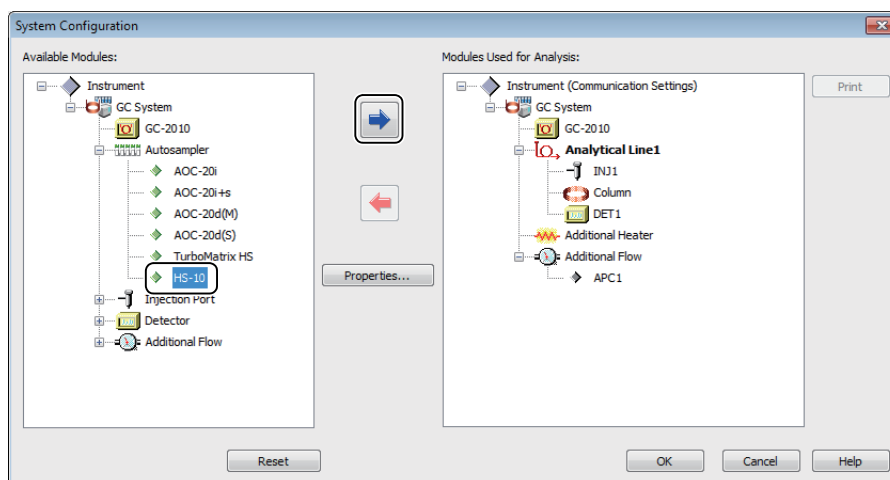


Serial number of HS-10 you select is appeared on [Settings] at [Communication], and [HS-10] icon is added to [Available Modules] at [System Configuration].



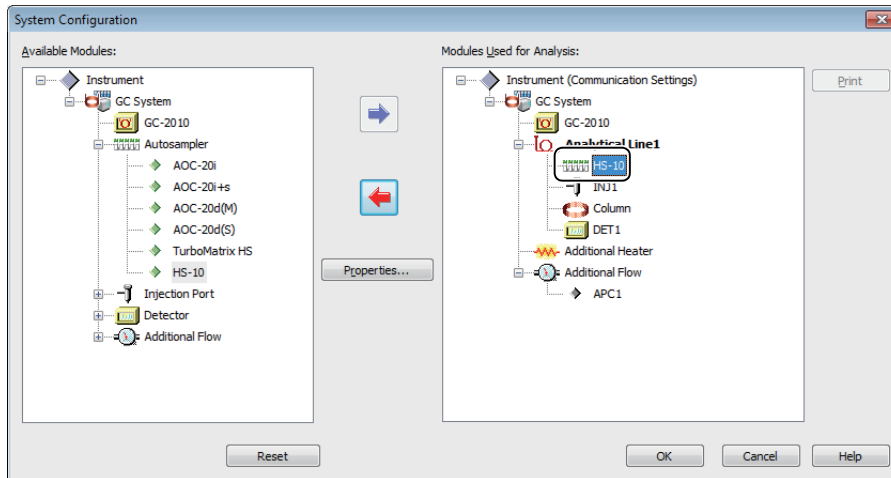
11

Select [HS-10] in the [Autosampler] list at [Available Modules], and click .

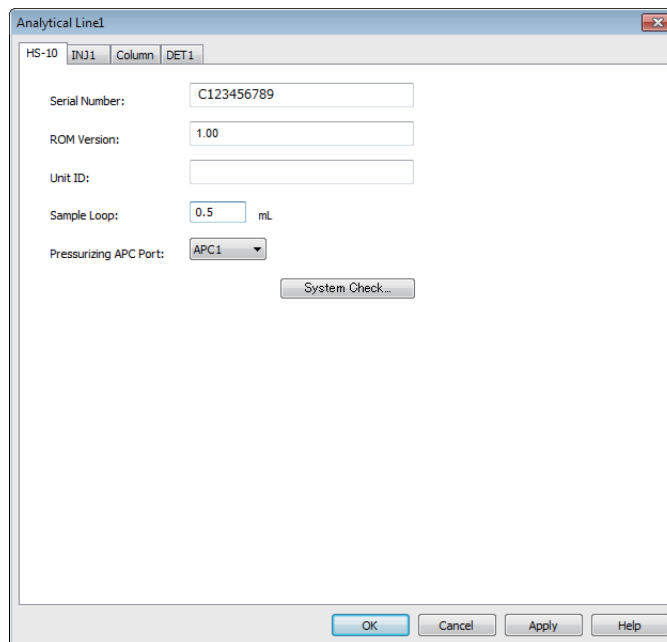


[HS-10] is added to [Modules Used for Analysis].

12 Double-click the [HS-10] icon at [Modules Used for Analysis].




13 Configure for HS-10 on [HS-10] Tab of [Analytical Line].



The Information of Serial Number and ROM Version type are sent from HS-10 and displayed. And then, configure following parameters.

| Parameters | Description | Setting Range (Unit) | Default |
|-------------|---|----------------------|---------|
| Unit ID | The instrument name or ID can be entered. The instrument name set here can be output to the system configuration report | Max. 15 characters | Blank |
| Sample Loop | Set the volume of sample loop. | 0.0 ~ 6000.0(mL) | 10.0 |

| Parameters | Description | Setting Range (Unit) | Default |
|-----------------------|--|--|---------|
| Pressurizing APC Port | Set the GC additional flow port No. for pressurizing.  NOTE <ul style="list-style-type: none"> • Be sure to set the APC port for use. When the APC port is set, the APC pressure is automatically set to "Pressurize Gas Pressure" + 100 kPa. • When performing the GC system check, the system check for the APC to be used by the HS-10 may result in an "NG". In such a case, set the "Pressurize Gas Pressure" value to 100 kPa or less and then perform the GC system check. | None, (APC Port of GC Additional Flow) | None |

14 Sets the check criteria of the consumables used count.

| Parameters | Description | Setting Range (Unit) | Default |
|-----------------|--|----------------------|---------|
| Switching valve | Sets the check criteria of the switching valve used count. | 0 ~ 999999 (times) | 8000 |
| Needle | Sets the check criteria of the needle used count. | 0 ~ 999999 (times) | 8000 |
| Loop | Sets the check criteria of the loop used count. | 0 ~ 999999 (times) | 8000 |

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2

Operations

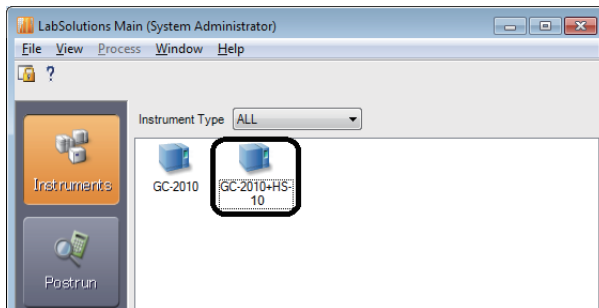
2.1 Method Development

2.1.1 Edit Method File

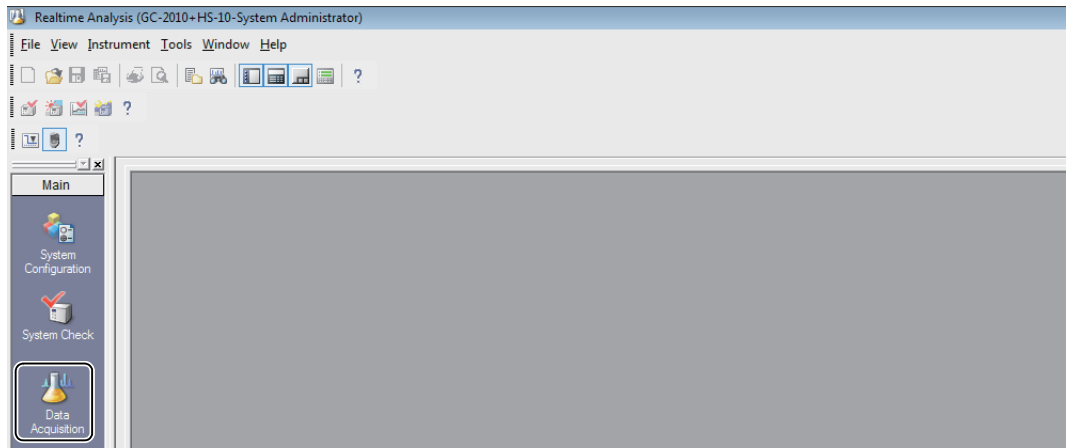
Set the control conditions for the HS in the [Instrument Parameter] view.

2


- 1 Click the  (Instruments) icon, and double-click the icon of the instrument to use.

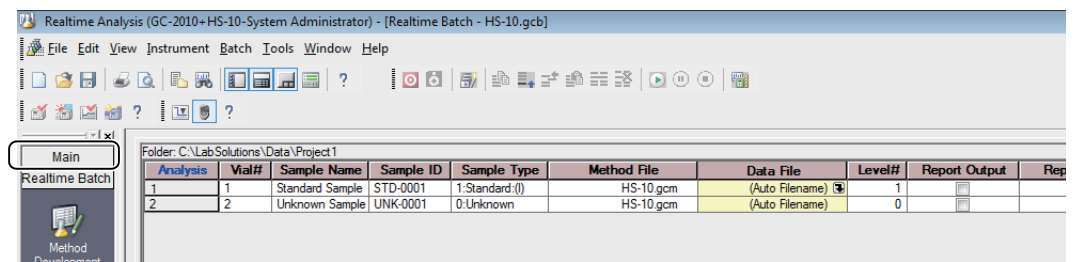


- 2 Click the  (Data Acquisition) icon on the [Main] assistant bar.



NOTE

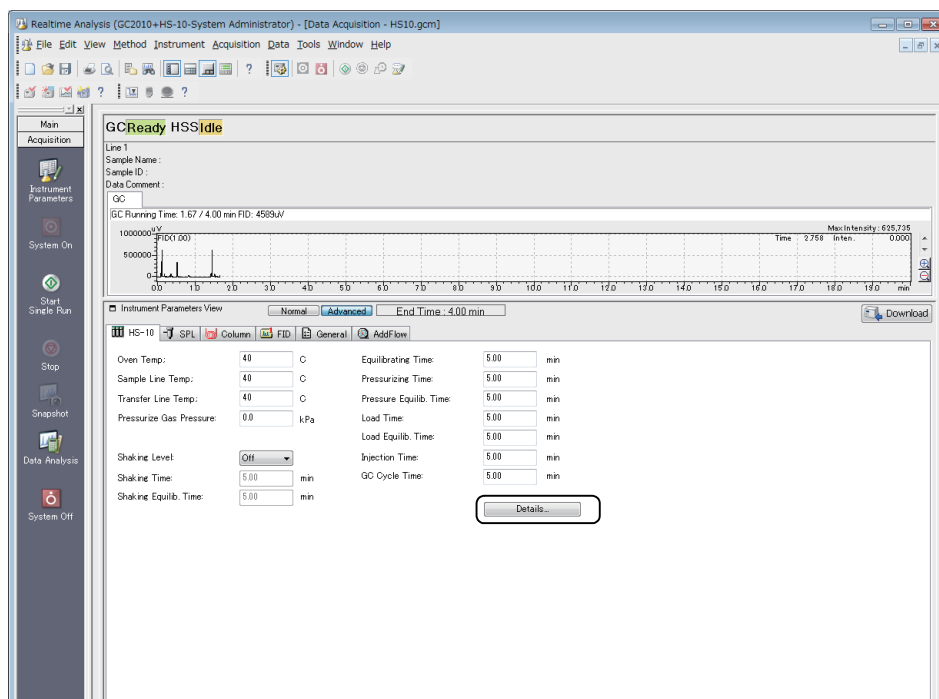
If the  (Data Acquisition) icon is not displayed, click on the title of the assistant bar.



3 Set the analysis conditions for the HS-10 on the [HS-10] tab in [Instrument Parameter View], and then click [Details].

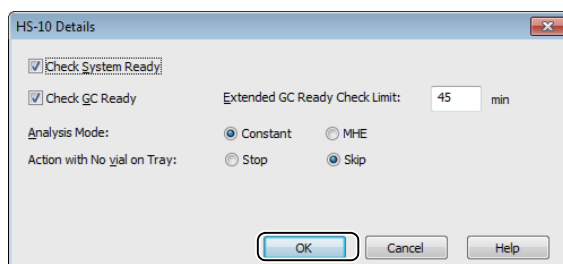
Reference

If the [HS-10] tab is not displayed in [Instrument Parameter View], refer to *"1.4 Software System Configuration" P.2.*






If Clicked [Detail], [HS-10 Detail] is displayed.

4 Set the HS-10 detail analysis conditions on the [HS-10 detail] and click [Ok].



2.1.2 Parameters

| Parameters | Description | Setting Range (Unit) | Default |
|-------------------------|---|---|---|
| Oven Temp. | Set the HS-10 Oven temperature. | 35 ~ 225 (C) | 35 |
| Sample Line Temp. | Set the HS-10 Sample Line temperature. | 35 ~ 225 (C) | 35 |
| Transfer Line Temp. | Set the HS-10 Transfer Line temperature. | 35 ~ 225 (C) | 35 |
| Pressurize Gas Pressure | Set the gas pressure for pressurize. | [kPa] 0.0 ~ 600.0 [bar] 0.00 ~ 6.00 [psi] 0.0 ~ 87.0 | [kPa] 0.0 [bar] 0.00 [psi] 0.0 |
| Shaking Level | Set the vial shaking level for gas-liquid / solid- gas equilibrium of vial.  NOTE When this parameter is set to [Off], the vial shaking phase is skipped. For details on the pre-treatment order, see "3.1 Operation Flow" P.21 | Off, 1 ~ 3 | Off |
| Shaking Time | Set the vial shaking time.  NOTE This parameter can not set when [Shaking Level] is off. | 0.00 ~ 10000.00 | 5.00 |
| Shaking Equilib. Time | Set the equilibration time after vial shaking for gas-liquid / solid- gas equilibrium of vial..  NOTE This parameter can not set when [Shaking Level] is off. | 0.00 ~ 10000.00 | 5.00 |
| Equilibrating Time. | Set the time for equilibrate vials. | 0.00 ~ 999.99 (min) | 5.00 |
| Pressurizing Time. | Set the time for pressurizing vials. | 0.00 ~ 9.99 (min) | 0.50 |
| Pressure Equilib. Time | Set the time for leak check after pressurizing vials. | 0.00 ~ 9.99 (min) | 0.10 |
| Load Time | Set the time for loading sample at the Loop. | 0.00 ~ 9.99 (min) | 0.50 |
| Load Equilib. Time | Set the time for equilibration after loading sample. | 0.00 ~ 9.99 (min) | 0.10 |
| Injection Time | Set the time for Injecting sample to GC. | 0.00 ~ 999.99 (min) | 0.50 |
| GC Cycle Time | Set the time from injecting sample to next sample injection. | 0.00 ~ 999.99 (min) | 5.00 |

Reference

- For GC Cycle Time, set a time longer than the total time of GC Analysis Time plus Cooling Time. Cooling time should be about 10 minutes when the initial temperature is 50°C or higher and about 15 minutes when less than 50°C.
In cases where your system has no gradient program for column oven or incorporates a cooling program, there is no need to worry about cooling time.
- The unit of pressure follows the <Configuration> - <GC> - <General> settings.

■ HS-10 Detail Parameters

| Parameters | Description | Setting Range (Unit) | Default |
|-----------------------------|---|----------------------|----------|
| Check System Ready | Set whether or not check the HS-10 system Ready. When this parameter is set to [Off], pre-treatment is started even if the HS-10 system is not Ready. | On, Off | On |
| Check GC Ready | Set whether or not check the GC Ready. When this parameter is set to [Off], pre-treatment is started even if the GC is not Ready. | On, Off | On |
| Extend GC Ready Check Limit | Set the extra time for GC Ready check when the check doesn't pass. | 1 ~ 60(min) | 45 |
| Analysis Mode | Set the HS-10 Analysis mode. | Constant, MHE | Constant |
| Action with No vial on Tray | Set the Action when there's no vial on specified tray. | Stop, Skip | Skip |

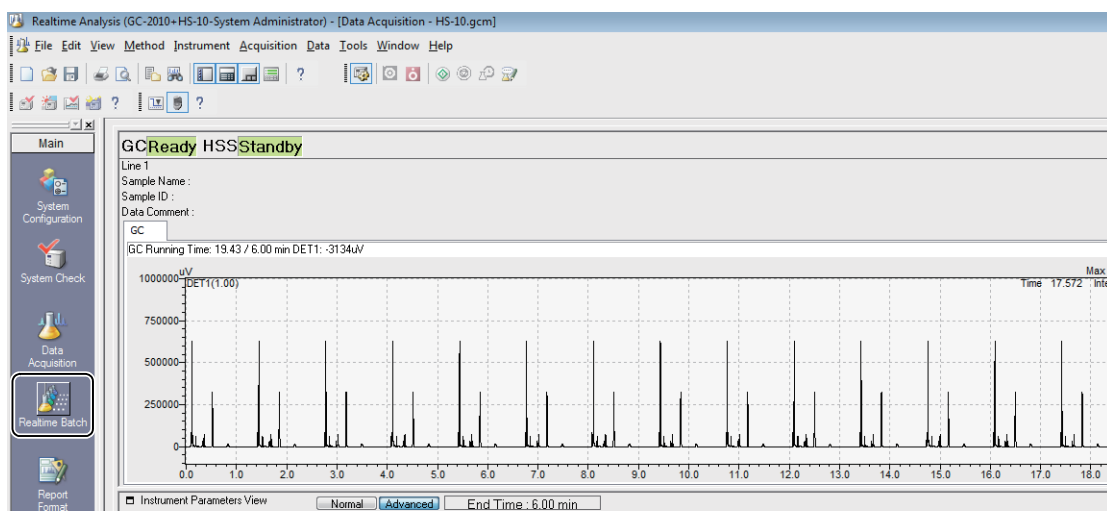
2.2 Batch Processing

In batch processing, the batch table in which injection conditions and analysis conditions for each sample are registered can be prepared.


2.2.1 Preparing the batch table

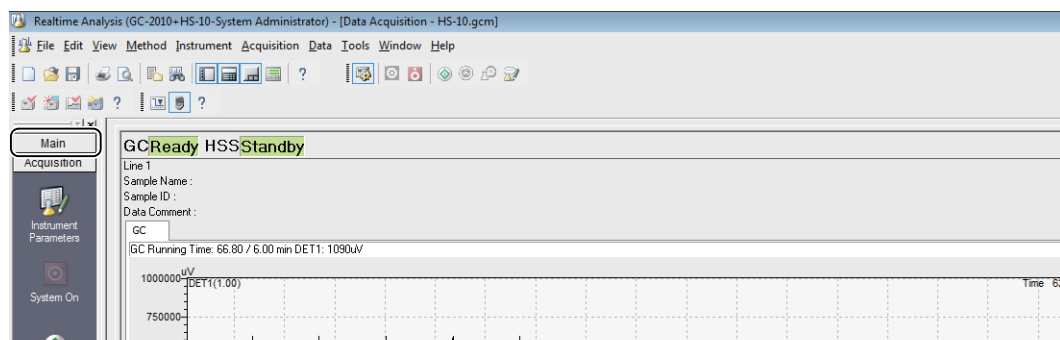
- 1 Click the  (Realtime Batch) icon on the [Main] assistant bar in the [Realtime Analysis] program.

2

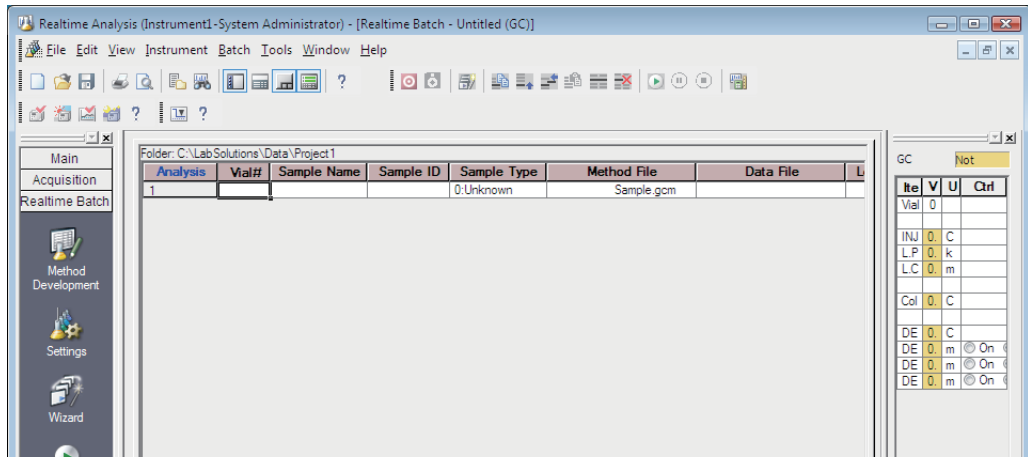


NOTE

If the  (Realtime Batch) icon is not displayed, click on the title of the assistant bar.



2 Edit a batch table by referring to "4. Realtime Batch" in the Operators Guide.



You can create a batch table with simple operations by using the wizard.

■ With the MHE mode

Prepare the table line for the number of MHE on each sample.

Example) 9 lines are prepared in the case of 3 samples X MHE 3 times.

| Analysis | Vial# | Sample Name | Sample ID | Sample Type | Method File | Data File | Level# | Report Output | Rep |
|----------|-------|-----------------|-----------|----------------|-------------|-----------------|--------|--------------------------|----------|
| 1 | 1 | Standard Sample | STD-0001 | 1-Standard (I) | HS-10.gcm | (Auto Filename) | 1 | <input type="checkbox"/> | one'Syst |
| 2 | 1 | Unknown Sample | UNK-0001 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |
| 3>> | 1 | Unknown Sample | UNK-0002 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |
| 4 | 2 | Unknown Sample | UNK-0003 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |
| 5 | 2 | Unknown Sample | UNK-0004 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |
| 6 | 2 | Unknown Sample | UNK-0005 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |
| 7 | 3 | Unknown Sample | UNK-0006 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |
| 8 | 3 | Unknown Sample | UNK-0007 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |
| 9 | 3 | Unknown Sample | UNK-0008 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | <input type="checkbox"/> | one'Syst |



NOTE

Set the [Analysis Mode] in HS-10 Detail Parameters to "MHE".

2.2.2 Parameters (for HS only)

| Parameter | Setting Range | Remarks |
|-------------|---------------|---------|
| Vial number | 1 - 20 | - |



NOTE

Be sure that the vial number settings in the batch table match the vial numbers of the HS main unit.

2.2.3 Precautions on batch table preparation

For MHE analysis, set the same vial number to the number of times equivalent to the number of repetitions.

| Examples) | Line Number | Vial # |
|-----------|-------------|--------|
| | 1 | 1 |
| | 2 | 1 |
| | 3 | 1 |
| | 4 | 2 |
| | 5 | 2 |
| | 6 | 3 |
| | . | . |
| | . | . |

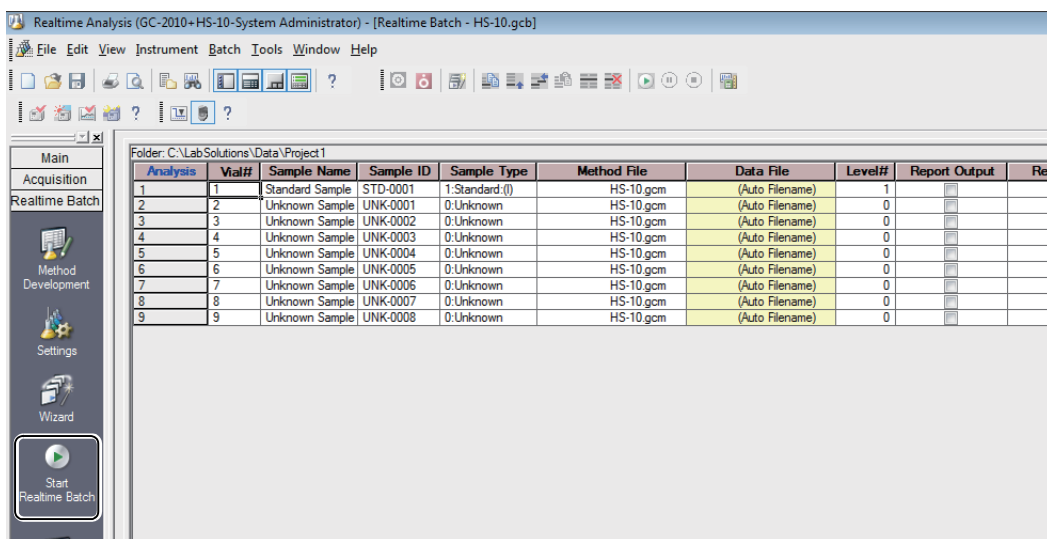


NOTE

- When different HS parameters are set, an error is generated at the time of batch processing.

2.2.4 Starting the batch table

Click the  (Start Realtime Batch) icon on the [Realtime Batch] assistant bar.



The screenshot shows the 'Realtime Analysis (GC-2010+ HS-10-System Administrator) - [Realtime Batch - HS-10.gcb]' window. The main area displays a table with the following data:

| Analysis | Vial# | Sample Name | Sample ID | Sample Type | Method File | Data File | Level# | Report Output | Res |
|----------|-------|-----------------|-----------|----------------|-------------|-----------------|--------|---------------|-----|
| 1 | 1 | Standard Sample | STD-0001 | 1-Standard (f) | HS-10.gcm | (Auto Filename) | 1 | | |
| 2 | 2 | Unknown Sample | UNK-0001 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |
| 3 | 3 | Unknown Sample | UNK-0002 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |
| 4 | 4 | Unknown Sample | UNK-0003 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |
| 5 | 5 | Unknown Sample | UNK-0004 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |
| 6 | 6 | Unknown Sample | UNK-0005 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |
| 7 | 7 | Unknown Sample | UNK-0006 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |
| 8 | 8 | Unknown Sample | UNK-0007 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |
| 9 | 9 | Unknown Sample | UNK-0008 | 0:Unknown | HS-10.gcm | (Auto Filename) | 0 | | |

The interface also shows a sidebar with icons for Main, Acquisition, Realtime Batch, Method Development, Settings, Wizard, and Start Realtime Batch.

Continuous data acquisition is performed based on the batch table settings.



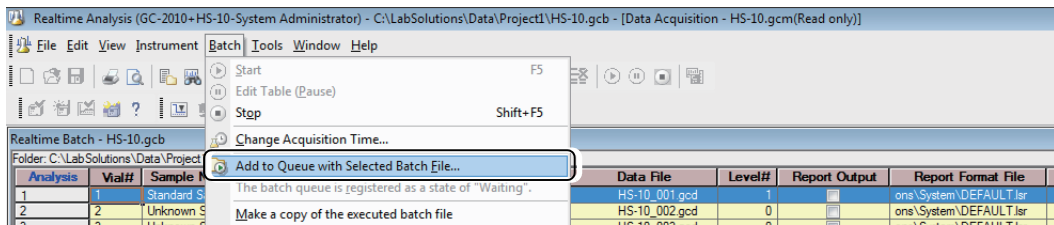
NOTE

- While [Initializing] is displayed on [Instrument Status], please don't start analysis.
- For HS-10 analysis, [Start/End Setting] and [Start Priority Batch] function are not available. Note that after batch analysis is stopped, it can restart only from the first row.

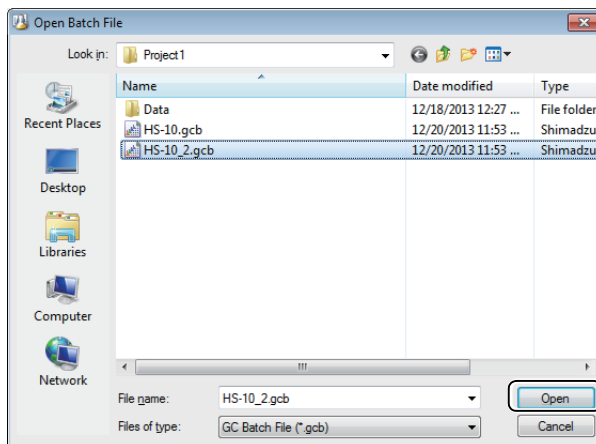
2.2.5 Running multiple batch files sequentially

In a batch table, you need to use the same HS parameters throughout all analyses. Therefore, when you wish to run multiple headspace analyses sequentially, you need to use the Batch Queue function.

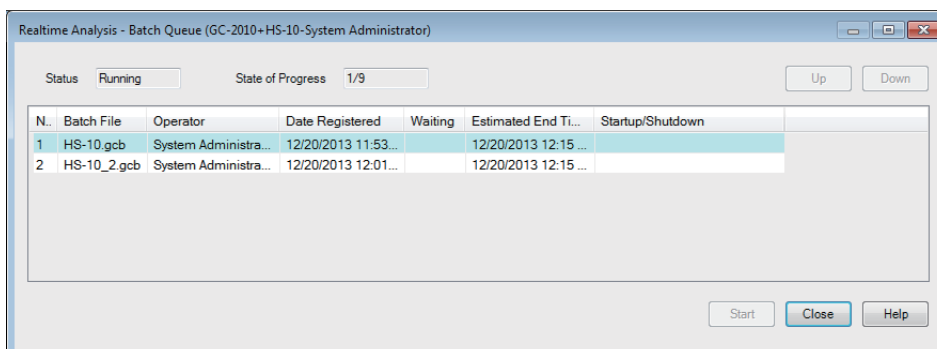
- 1 Select **[Add to Queue with Selected Batch File]** on the **[Batch]** menu during realtime batch.



- 2 Select the batch file to continuously perform realtime batch on in the **[Open Batch File]** sub-window, and click **[Open]**.



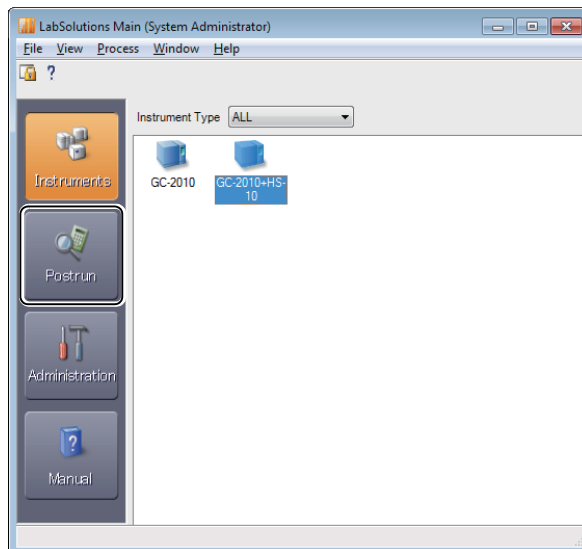
The batch file is added to the batch queue.



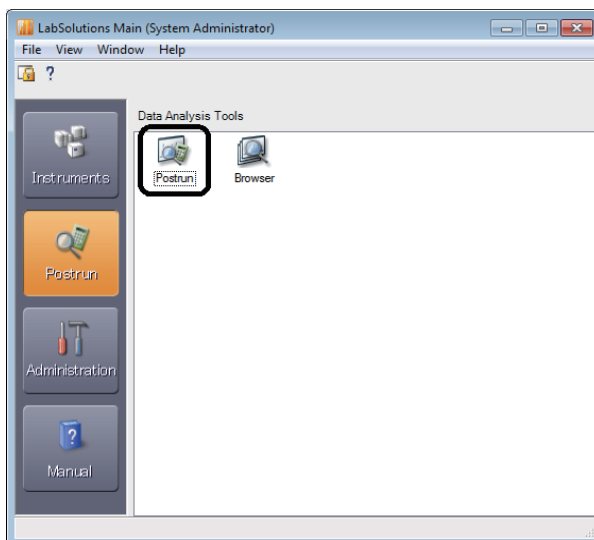
2.3 Display the Pre-treatment Result

You can check the HS-10 Pre-treatment result in the Data processing window.


- 1 Click the  icon in the [LabSolutions Main] window.



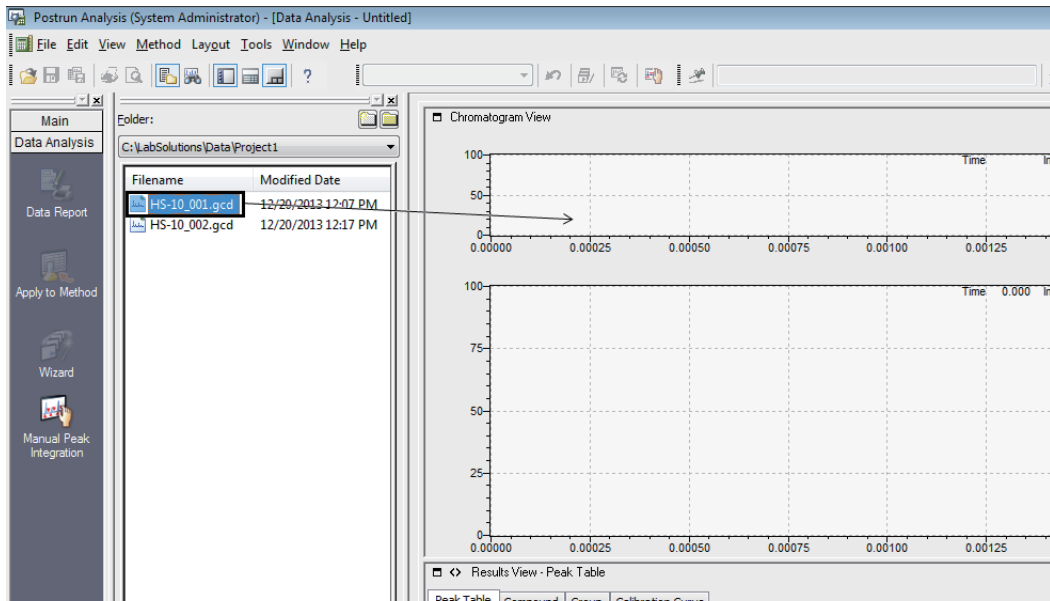
- 2 Double-click [Postrun].



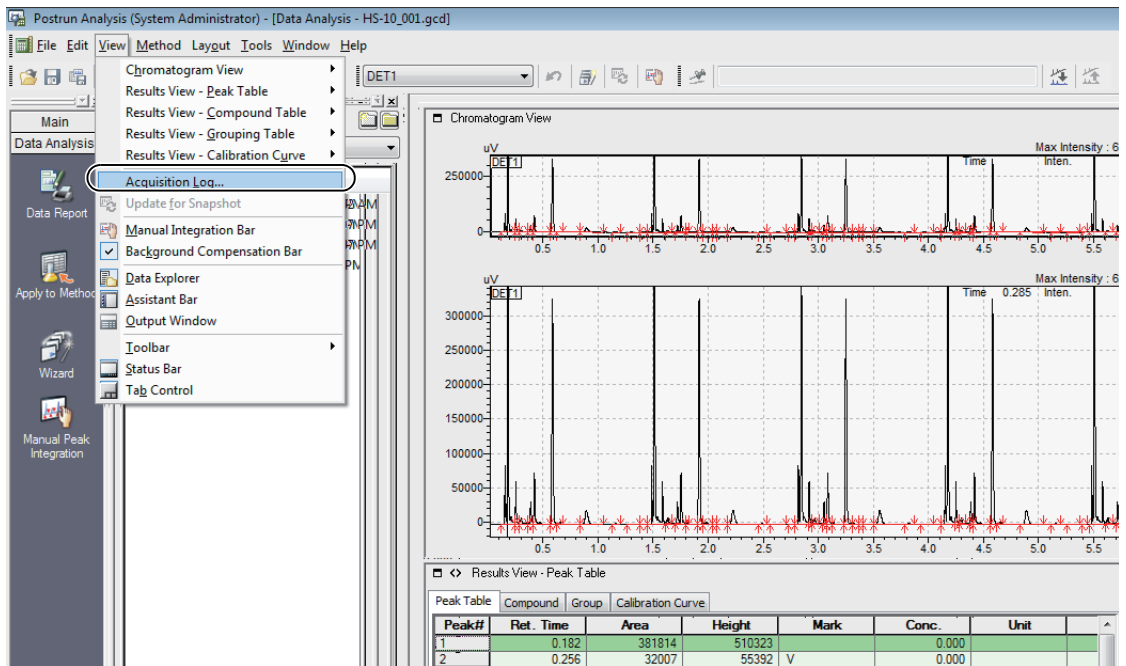
NOTE

The [Data Analysis] window can also be opened by clicking  (Data Analysis) icon on the [Acquisition] assistant bar.

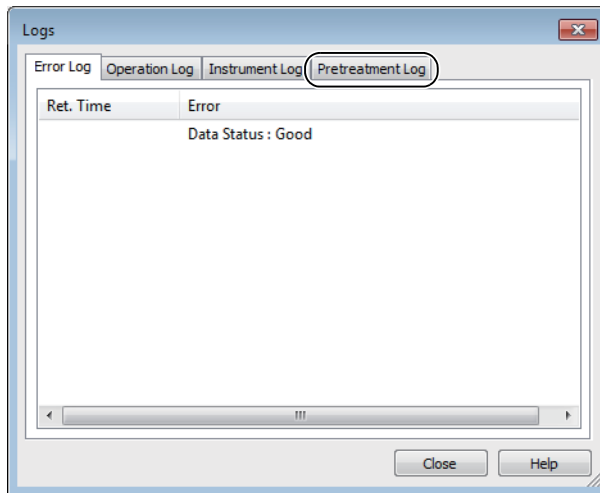
3 Drag-and-drop a data file onto the [Data Analysis] window from the [Data Explorer] sub-window.



4 Click menu [View] - [Acquisition Log].



5 Click the [Pretreatment Log] tab.

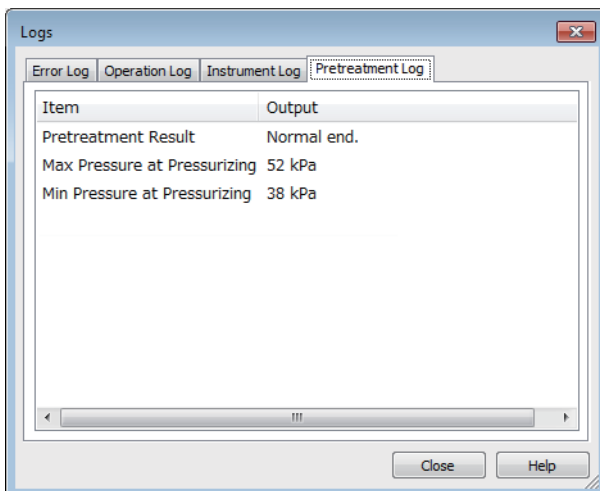


2

NOTE

[Pretreatment Log] tab is not displayed if the data file doesn't have HS-10 pretreatment result.

6 Check the HS-10 pretreatment log.



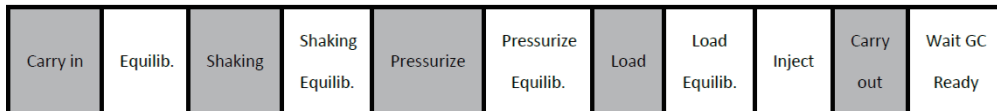
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3

Appendix

3.1 Operation Flow

The HS-10 performs pre-treatment in the following order.



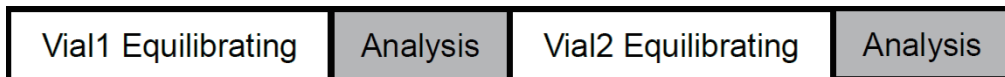
The phases shown in gray indicate that the next vial can be supplied. The phases shown in white indicate that the next vial cannot be supplied. The longer the time of the phases shown in white are, the easier it becomes to overlap the pre-treatment process of multiple vials.

3.2 About Overlap

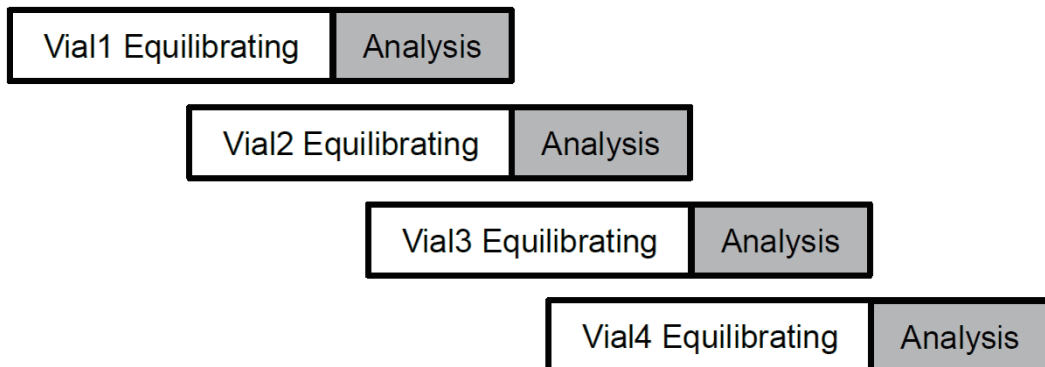
When the equilibration time is long, analysis will take a long time if the processes from equilibration to injection are performed one vial at a time.

In such a case, the total analysis time can be shortened by staggering and overlapping the equilibration times of multiple vials so that analysis can be performed without waiting time.

- No overlap



- Overlap



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