DataApex
Clarity™
CHROMATOGRAPHY SOFTWARE

SHIMADZU GC-2030/GC-2050

Clarity Control Module ENG

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To facilitate the orientation in the **Shimadzu GC-2030/GC-2050** manual and **Clarity - Shimadzu Edition** chromatography station, different fonts are used throughout the manual. Meanings of these fonts are:

Open File (italics) describes the commands and names of fields in **Clarity - Shimadzu Edition**, parameters that can be entered into them or a window or dialog name.
WORK1 (capitals) indicates the name of the file and/or directory.
ACTIVE (capital italics) marks the state of the station or its part.
Chromatogram (blue underlined) marks clickable links referring to related chapters.

The bold text is sometimes also used for important parts of the text and the name of the **Clarity - Shimadzu Edition** station. Moreover, some sections are written in format other than normal text. These sections are formatted as follows:

Note: Notifies the reader of relevant information.

Caution: Warns the user of possibly dangerous or very important information.

Marks the problem statement or trouble question.

Description: Presents more detailed information on the problem, describes its causes, etc.

Solution: Marks the response to the question, presents a procedure how to remove it.

1 Shimadzu GC-2030/GC-2050

This manual describes the use of the **Shimadzu GC-2030/GC-2050** with the **Clarity - Shimadzu Edition** software.

Fig. 1: Shimadzu Nexis GC-2030

Shimadzu GC-2030/GC-2050 are controlled using RC.NET driver developed by **Shimadzu** running under the Agilent ICF (Instrument Control Framework) library developed by Agilent, which can be run within the **Clarity - Shimadzu Edition** environment.

2 Requirements

2.1 Software requirements

Shimadzu GC-2030/GC-2050 RC.net driver is exclusively available in **Clarity - Shimadzu Edition OEM** version. This OEM version is only available in selected countries in Europe region and sold through approved distributors. In terms of **Clarity - Shimadzu Edition** product numbers, this includes:

- Clarity - Shimadzu Edition (p/n C50-28)
- GC Control license (p/n A23)
- GC Shimadzu license (p/n A23-001)
- optionally AS Control License (p/n A26) - when the system contains an autosampler

Caution: A separate GC Shimadzu Control license (p/n A23-001) must be purchased for each controlled Shimadzu GC-2030/GC-2050 system. A similar license is required for **Shimadzu Nexera LC** systems.

Shimadzu GC-2030/GC-2050 requires **Microsoft .NET version 4.8** or higher for correct installation and operation. The version is already installed on majority of PCs.

For complete list of .NET requirements, see the .NET Framework System Requirements on Microsoft web page.

Supported operating systems:

- **Windows 10 (32/64 bit)**
- **Windows 11**

Note: Before installing Clarity - Shimadzu Edition, ensure that your Windows OS is updated to the latest version for optimal compatibility.

2.2 Hardware requirements

- A PC with a LAN interface is required.
- To ensure maximum compatibility, the module should run the latest firmware version (minimum 1.09).

For complete list of supported Windows OS and instrument firmwares, see Shimadzu webpages.

3 Installation procedure

Shimadzu GC-2030/GC-2050 is part of the **Clarity - Shimadzu Edition** *Typical* installation. To install it, in the *Choose Components*select the *Typical* installation or check the Shimadzu GC-2030/GC-2050 in *Instrument Control Framework (ICF)* section during the installation of **Clarity - Shimadzu Edition**.

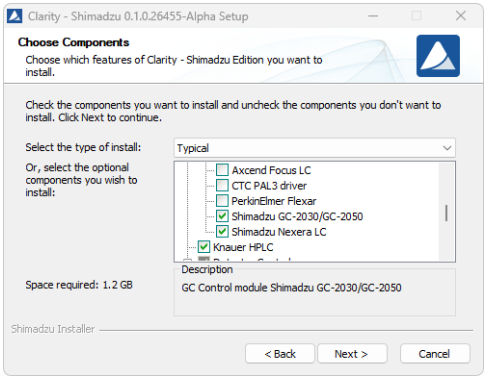


Fig. 2: Typical installation of Clarity - Shimadzu Edition

3.1 Installing Correct Version of ICF

Clarity - Shimadzu Edition expects a specific version of Agilent ICF. Because other programs may also be using Agilent ICF, it is possible they've installed a different version than is supported by Clarity - Shimadzu Edition. In that case in the installation you will be prompted to reinstall it in order to install correct version. Going forward with this step is crucial for correct functionality of **Clarity - Shimadzu Edition** and Shimadzu GC-2030/GC-2050.

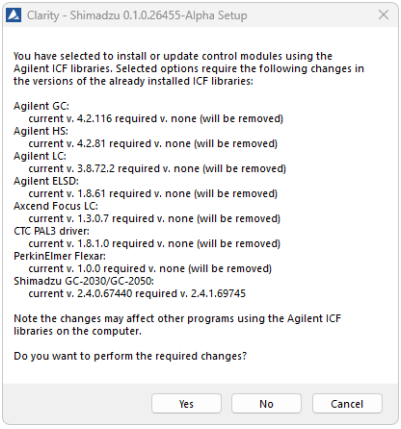


Fig. 3: Installing correct version of Agilent ICF

Note: This reinstallation of Agilent ICF may cause that other programs using it, may not function properly.

3.2 Network connections

The instrument Shimadzu GC-2030/GC-2050 has to be connected to a site network by LAN. It is recommended to attach the hardware directly to the PC avoiding hubs, switches etc. Always contact your local LAN administrator who can make the appropriate settings.

Caution: **Cross LAN** cable is primarily used for the direct connection of the instrument and the PC. This cable can also be used for the connection of the device to the switch or network socket, but with older switches, the **straight LAN** cable might be necessary.

LAN Settings

PC: LAN card, TCP/IP protocol.

Both PC and Shimadzu GC-2030/GC-2050 should be configured on the same IP range.

Firewall

Ensure that the firewall does not block communication from the Shimadzu GC-2030/GC-2050.

3.3 Installation Qualification of Shimadzu GC-2030/GC-2050

Shimadzu GC-2030/GC-2050is controlled via **Agilent ICF**, an external program developed by Agilent, and for that reason it must be validated using their utility. If you have installed Clarity - Shimadzu Edition with Agilent ICF, **the IQ is valid only if successful validation of ICF is attached**.

The validation of ICF can be performed directly from the *IQ Report.*

Caution: When Clarity - Shimadzu Edition expects *Agilent ICF* is installed then **IQ** expects the same. If (due to any reason) the *Agilent ICF* installation is not found within Clarity - Shimadzu Edition, the *Installation Qualification Test* status is set by default to *FAILED*. To resolve this, it is necessary to re-install **Agilent ICF** through Clarity - Shimadzu Edition reinstallation and then perform **IQ** again.

Fig. 4: IQ Report with ICF installation present

Click the link *"here"* ① , after that it is necessary to click *Run* in two pop-up windows. *Agilent Software Verification Tool* window will open. Select what report file type should be generated and define post-qualification actions. Click *Qualify* ② to run the IQ. The HTML reports are opened in the default browser if the *Open reports* option was enabled. Installed drivers and their versions are listed at the end of the report.

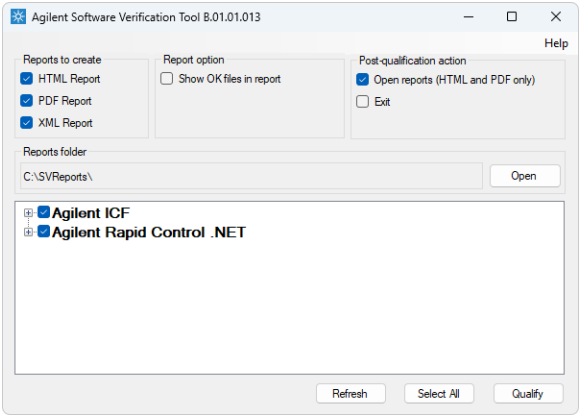
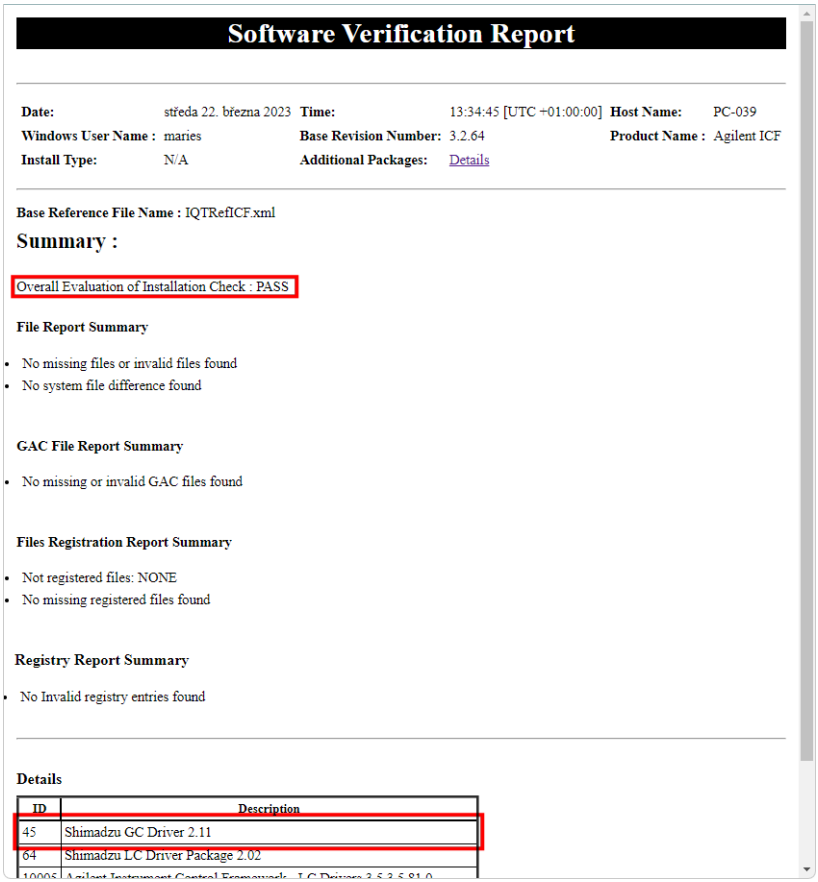


Fig. 5: Agilent Software Verification Tool

Address field of the generated report displays the location of the actual report.



Software Verification Report

Date:	středa 22. března 2023	**Time:**	13:34:45 [UTC +01:00:00]	**Host Name:**	PC-039
Windows User Name :	maries	**Base Revision Number:**	3.2.64	**Product Name :**	Agilent ICF
Install Type:	N/A	**Additional Packages:**	Details		

Base Reference File Name : IQTRefICF.xml

Summary :

Overall Evaluation of Installation Check : PASS

File Report Summary

- No missing files or invalid files found
- No system file difference found

GAC File Report Summary

- No missing or invalid GAC files found

Files Registration Report Summary

- Not registered files: NONE
- No missing registered files found

Registry Report Summary

- No Invalid registry entries found

Details

ID	Description
45	Shimadzu GC Driver 2.11
64	Shimadzu LC Driver Package 2.02

Fig. 6: ICF Report - PASS

4 Clarity - Shimadzu Edition Configuration

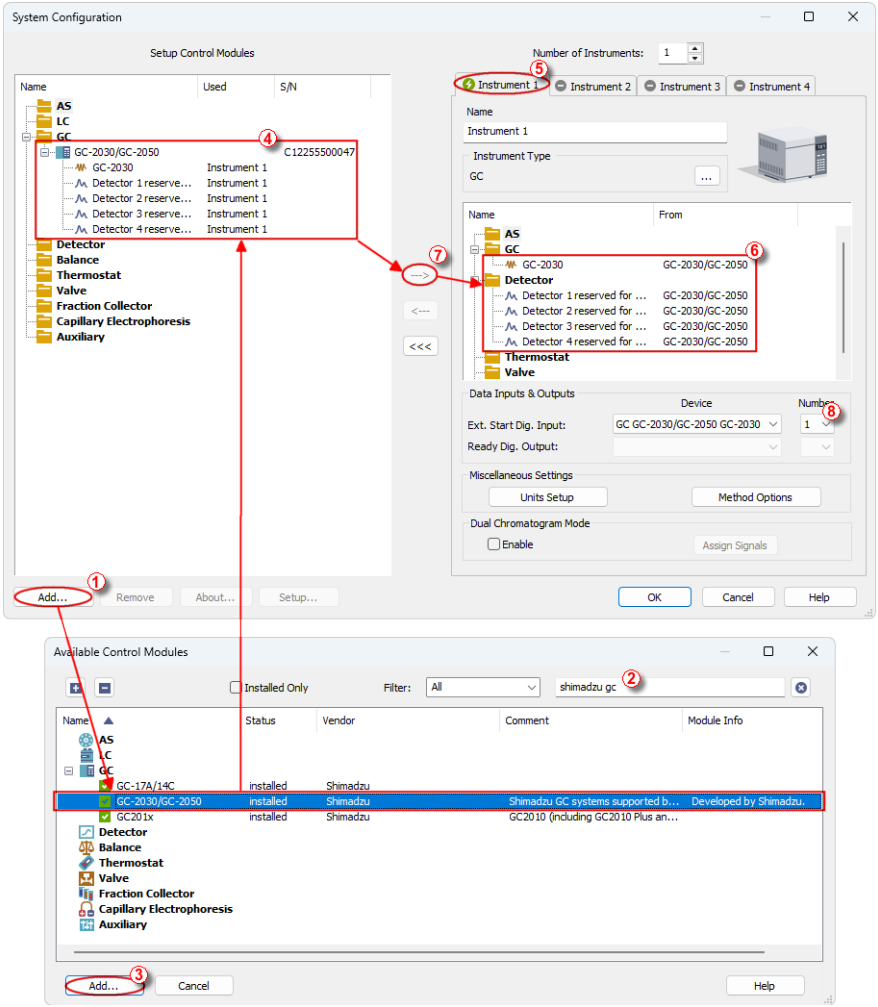


Fig. 7: System Configuration

- Start the **Clarity - Shimadzu Edition** station by clicking on the icon on the desktop.
- Open the *System Configuration* dialog accessible from the *Clarity - Shimadzu Edition* window using the *System - Configuration...* command.

- Press the *Add* button ① (See **4** on pg. **8**.) to invoke the ***Available Control Modules*** dialog.
- You can specify the searching filter ② to simplify the finding of the driver.
- Select the **Shimadzu GC-2030/GC-2050** item and press the *Add* ③ button. The *GC-2030/GC-2050 Setup* dialog will open.

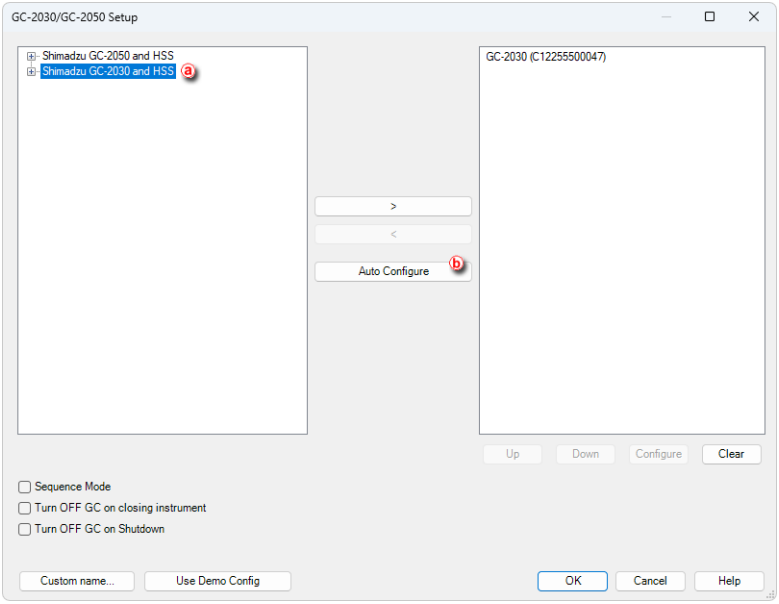


Fig. 8: GC-2030/GC-2050 Setup

Caution: The *Sequence Mode* enables autosampler to prepare next sample during previous run (sequence will lock one row ahead). For correct operation in the *Sequence Mode* there have to be set corresponding parameters (Enable Sample Overlap) in the ***ICF GC Method Setup*** dialog (GC tab, section ALS, item Tray/Other).

Note: The *Turn OFF GC on closing instrument* and *Turn OFF GC on Shutdown* checkboxes govern the behavior of the GC while the Instrument window is closed and when Shutdown event is invoked (by user, by error or as a reaction from Event Table). When the function is not checked Clarity - Shimadzu Edition will not be able to shut down the Shimadzu GC-2030/GC-2050.

Note: The *Custom name...* button can be used to alter the name of the module. This change propagates to the module name in the *Setup Control Modules* ④ and in the *Data Inputs & Outputs* ⑧ sections of the ***System Configuration*** dialog. Default name is used when the field is left empty.

- Select appropriate instrument type ⓐ and use Auto Configure ⓑ button to open *Automatic Configuration parameters* dialog.

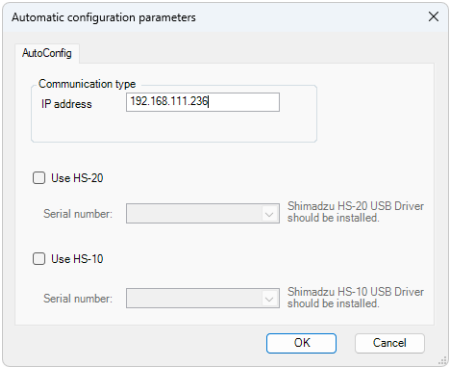


Fig. 9: Automatic configuration parameters dialog

- Insert the *IP address* of Shimadzu GC-2030/GC-2050 and confirm. The address can be found or set using instrument's touch panel.
- Then click *OK* button in the lower part of the *GC-2030/GC-2050 Setup* dialog and the instrument will then appear in ***System Configuration***, including all modules of the instrument (detector, autosampler etc.).
- After previous steps drag and drop the device icon from the *Setup Control Modules* list ④ on the left side of the ***System Configuration*** dialog to the desired *Instrument* ⑤ tab on the right side ⑥ (or use the `-->` button ⑦ to do so).
- *Ext. Start Dig. Input* setting ⑧ determines how Clarity handles external start signals from connected instruments:
  - *"--"* (dash) option - Use this if your autosampler and detectors are interconnected by synchronization cables (or built-in together) so that the information about performed injection is passed on without direct input from Clarity - Shimadzu Edition. Clarity - Shimadzu Edition will initiate recording when it detects that the detector has begun acquiring data. This is the most common setup with Shimadzu GC-2030/GC-2050.
  - *"1"* option – Use this setting if your autosampler and detectors are not directly interconnected by cables. Clarity - Shimadzu Edition will coordinate the measurement by receiving a signal when the autosampler finishes injection and then triggering the detectors to start measuring. This applies mainly if your GC has an autosampler detectors are not built-in, so it is not so common.
- More detailed configuration parameters can be opened by using *Configure* button in *GC-2030/GC-2050 Setup*. In *Configure GC-2030* window double click on specific module. More settings can be set in opened window, specific to the module.

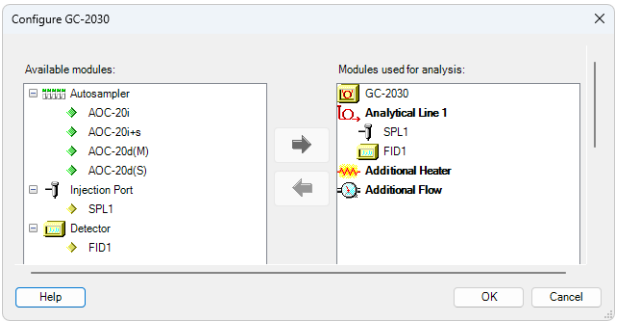


Fig. 10: Configure GC-2030 dialog

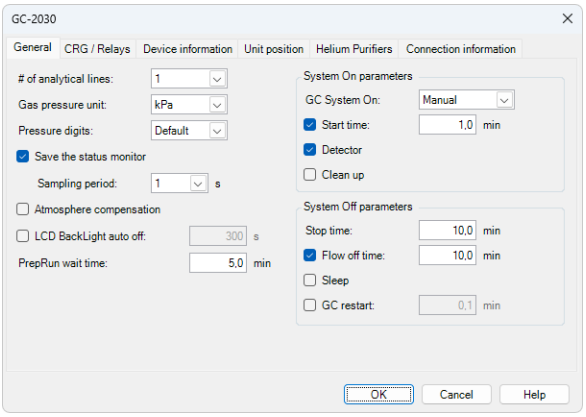


Fig. 11: Module configuration dialog

Note: Press the *F1* key to display the original **Shimadzu GC help** with detailed description of the dialog.

Note: The configuration dialog of the Shimadzu GC-2030/GC-2050 subcomponents (detector/s, inlet...) can be displayed any time by double-clicking on its icon.

5 Using the Shimadzu GC-2030/GC-2050

This chapter goes through the setting of the parameters of the **Shimadzu GC-2030/GC-2050** in the **Clarity - Shimadzu Edition**.

Caution: Before opening the *Instrument* window with configured **Shimadzu GC-2030/GC-2050** device, ensure there is not any other PC connected to GC. Otherwise there will be communication error upon opening.

5.1 Method Setup - GC

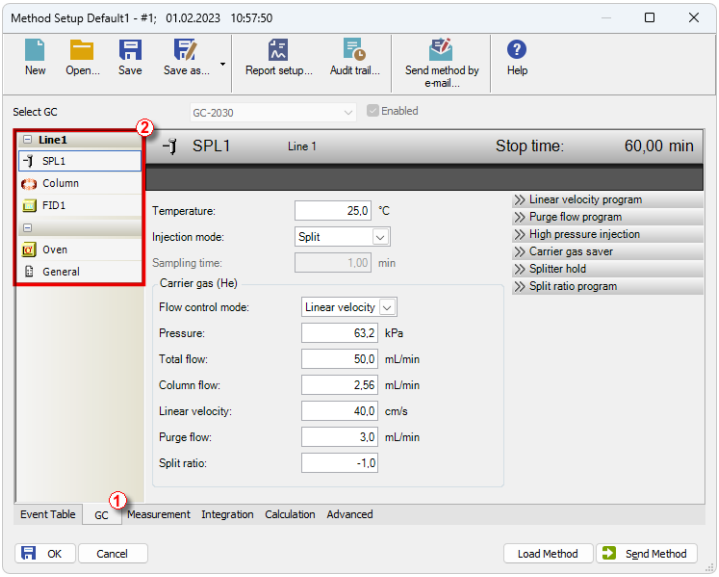


Fig. 12: Method Setup - GC

Note: Press the *F1* key to display the **Shimadzu GC-2030/GC-2050 help** with detailed description of the dialog.

From **GC tab** ① you can set all parameters for individual subcomponents (detector/s, oven, inlet...) of instrument configuration.

For advanced setting of all other parameters use all tabs ② on the left side of the window in GC tab.

If there is configured any autosampler of AOC-20 family its parameters are about to set on **GC tab** in its respective section.

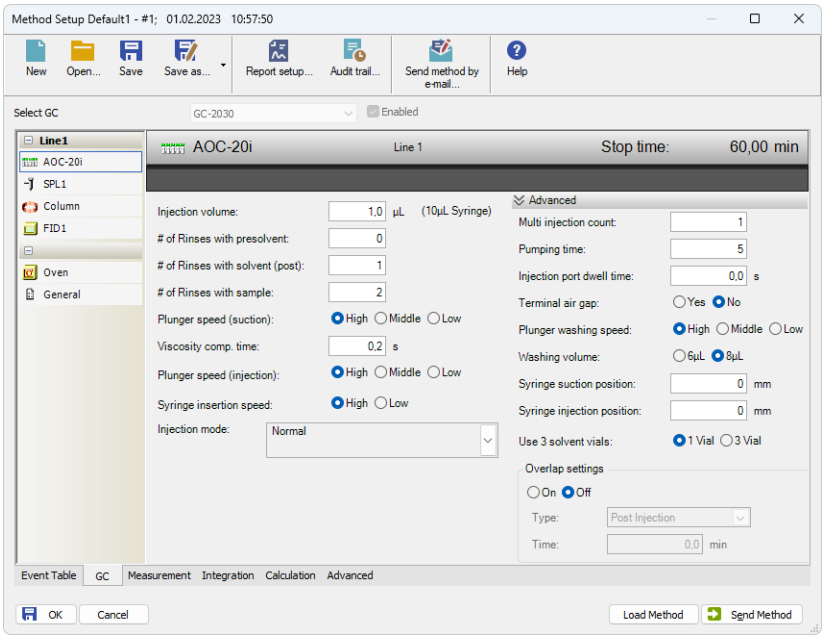


Fig. 13: Method Setup - GC - AOC autosampler

Note: Actual parameters read out from GC are used for new method or method adaptation instead of default parameters.

Note: For common analysis it is recommended to relate Oven temperature program via item *Link oven program and acquisition time* otherwise duration of the acquisition is governed by the item *Stop time* in the detector section.

If *Carrier Gas Saver* item is set *On* in the used method it is consequently required to trigger *Start Prep Run* manually by pushing *Prep Run* button above display of the GC or by some external contact. Any of these will transfer the GC to *Ready* state which is has to be reached prior actual analysis. If some external contact is about to be used the *Start Prep Run* has to be set as *External* in *General* section of the method. Besides that, it is necessary to have correctly set *Relays* in the *"Module configuration dialog" on page 11* in the System Configuration. Refer to images below.

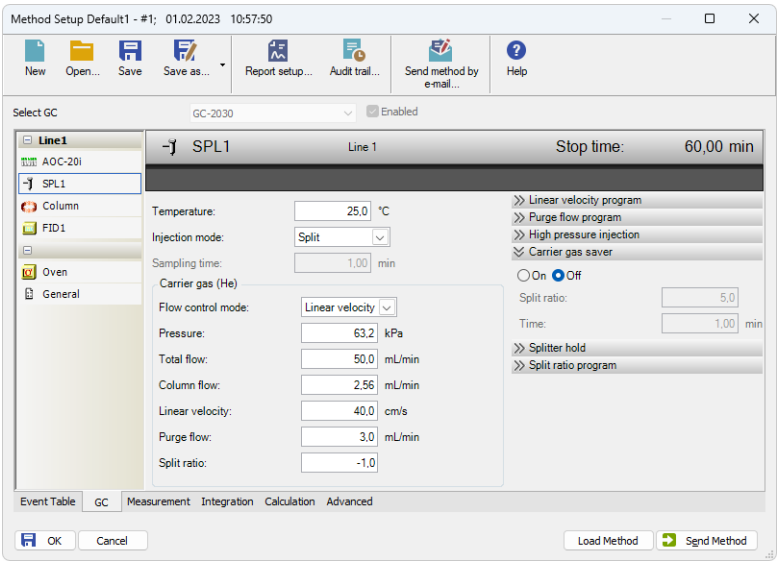


Fig. 14: Method Setup - GC - Gas Saver

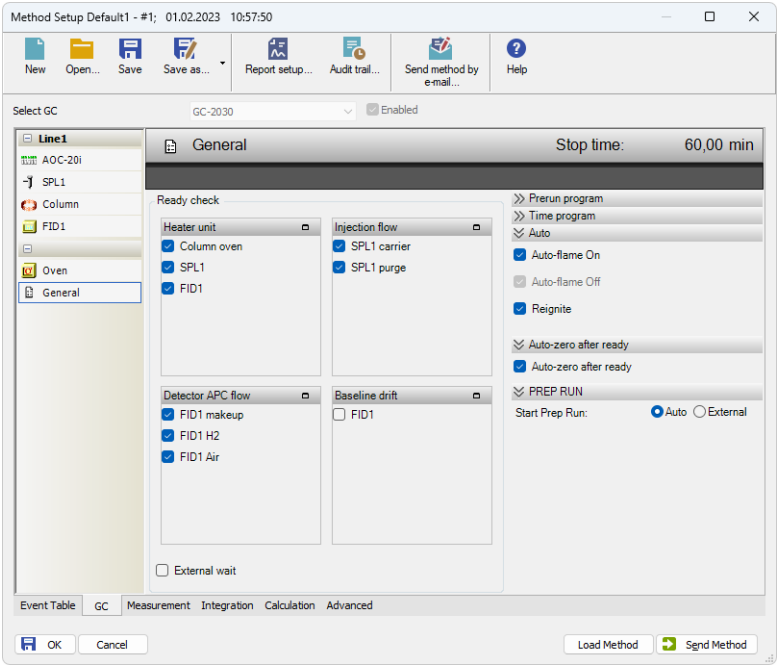


Fig. 15: Method Setup - GC - External Prep Run

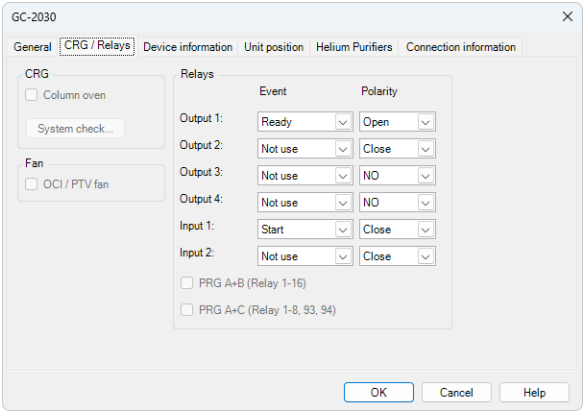


Fig. 16: Module configuration - CRG Relays

5.2 Device Monitor

The *Device Monitor* window can be opened by the *Device Monitor* command from the *Analysis* menu or using the **Device Monitor** icon in the *Instrument* window. You may use icon for accessing *Device Monitor* from all **Clarity - Shimadzu Edition** windows. In the Device Monitor window, it is possible to monitor the status of the connected instruments.

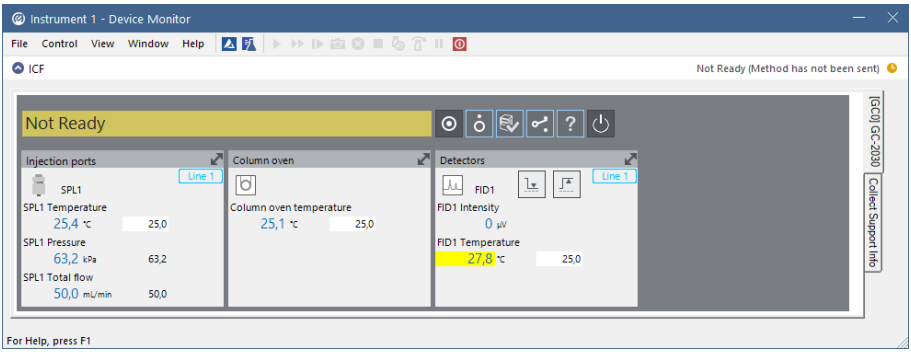


Fig. 17: Device Monitor

Note: Press the *F1* key to display the **Shimadzu GC-2030/GC-2050 help** with detailed description of the dialog.

Note: Tabs on right side of the *Device Monitor* allowing setting collection of diagnostic information are displayed only when **Clarity - Shimadzu Edition** is started under Administrator Windows account.

Note: The *Shutdown* command works as expected only if item *Turn OFF GC on Shutdown* in the *"GC-2030/GC-2050 Setup" on page 9* dialog of the *System Configuration* is checked. If it is checked, and Shutdown is performed, the setting defined in section *System Off parameters* from the tab *General* of the *"Module configuration dialog" on page 11* dialog will be applied.

Note: Some errors cannot be cleared using *Device Monitor* and have to be cleared via manual commands using display of the GC.

6 Troubleshooting

When the solution for some problem cannot be discovered easily, the recording of communication between **Clarity - Shimadzu Edition** and Shimadzu GC-2030/GC-2050 control module can significantly help the **DataApex** support to discover the cause of the problem. The created *.TXT files will greatly help in diagnosis of unrecognized errors and problems.

The recording can be enabled by adding or amending the LOGGING.INI file in the **Clarity - Shimadzu Edition** installation directory (C:\CLARITYSHIMADZU\CFG by default). The file can be edited in any text editor (e.g. Notepad). Following section should be edited:

```
[Log]
echo = ON
filename = log_%D.txt
reset = OFF
; Sections List:
AuditTrail = ON
BadTrace = ON
CommandLine = ON
Acquisit = ON
AgilentICF = ON
SST = OFF
Internet = OFF
FractionCollector = OFF
```

Note: *%D* (or *%d*) in the filename parameter means that the log will be created separately for each day. The *reset = OFF* parameter disables deleting the content of the log each time the station is started during the same day.

In case you cannot establish communication with instruments connected through ICF, please review the following issues:

Check the network connection using the Ping command

The problem in communication between **Clarity - Shimadzu Edition** and Shimadzu GC-2030/GC-2050 may be caused by wrong network configuration, firewall preventing the connection, etc. Run the command line in Windows (for example by pressing the **Windows key** together with the **R** key, in the displayed *Run* window type *cmd* and press *Enter*).

In the command line type ping <ip-address-of-instrument> and press *Enter*. The *IP Address* is the same you entered during the configuration.

6.1 Problems specific to the Shimadzu GC-2030/GC-2050

Clarity - Shimadzu Edition can't be run and it displays "Agilent ICF is not installed correctly." message.

Cause: The cause of the problem is that the Agilent ICF has a different version than expected by Clarity - Shimadzu Edition. It can typically happen when other software also using Agilent ICF decides to reinstall it. Thus next time Clarity - Shimadzu Edition expects different version than is installed.

Solution: Solution is to reinstall Agilent ICF during Clarity - Shimadzu Edition installation. Follow steps described in the chapter **"Installation procedure"** on pg. **3**.

Print of *Injection Control* is not functional.

Cause: Agilent ICF is incompatible with some Clarity - Shimadzu Edition printing procedures.

Solution: Method parameters of autosampler control are printed together with another GC control method parameters using *Instrument Control* item within *Method* section in *Report Setup* dialog.

ICF problems during installation or operation.

Cause: The cause of the problem might be that *Microsoft .NET Framework* is not enabled. Agilent ICF requires *Microsoft .NET Framework* enabled for its function.

Solution: Check if *Microsoft .NET Framework* is enabled in *Turn Windows features on or off* dialog. *Turn Windows features on or off* dialog is accessible in *Control Panel* window under section *Programs* in its subsection *Programs and Features*. The *Microsoft .NET Framework* related items are disabled by default in some *Windows* versions.

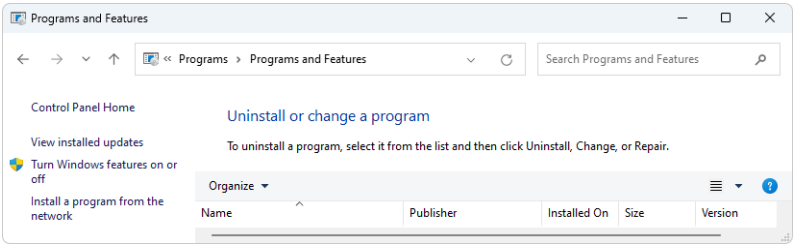


Fig. 18: Location of Turn Windows features on or off in Windows 10

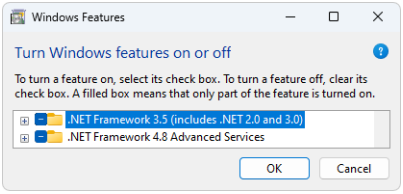


Fig. 19: Turn Windows features on or off - Windows 10