DataApex
Clarity™
CHROMATOGRAPHY SOFTWARE

GILSON 30X

Clarity Control Module   ENG

Author: JK

Contents

To facilitate the orientation in the **Gilson 30X** manual and **Clarity** 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**, 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** 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 Gilson 30X control module

The **Gilson 30X control module** can be used to control high-pressure gradient of the following Gilson pumps series **302 - 307**.

Fig. 1: About Gilson

Gilson 30x series pumps communicate with the computer via GSIOC service, which is now embedded into the dedicated driver in **Clarity**. The hardware converter is still needed, for more details see the chapter **"Requirements"** on pg. **2**.

2 Requirements

- **Clarity** Installation with LC Control module (p/n A24).
- Free serial port in the PC

Note: Modern computers usually have only 1 (if any) serial (COM) port installed. To use more devices requiring the port, the **MultiCOM** adapter (p/n MC01) is available.

- GSIOC converter set (p/n IGLN1) for connection of up to 2 devices. For each further device, one IGLN2 adapter is necessary (p/n IGLN2) ("IGLN1 kit" on page 3 and "IGLN2 Adapter" on page 4).

Note: Cables are not part of **Clarity** Control Module. It is strongly recommended to order required cables together with the Control Module.

Alternatively, the converter can be bought from Gilson company (Gilson 605 RS-232C Adapter (ref. 360784) or Gilson 506C Interface Module (ref. 362831)).

3 Installation Procedure

3.1 Gilson 30x communication

The pump is controlled by **GSIOC** (Gilson Serial Input Output Communication) service. This service enables to connect several devices to the same communication line.

The devices are distinguished by a unique **device ID** - valid values that range from *0* to *63* can be set on the pumps by Dip switches or from the menu.

Refer to the respective pump manual.

Communication cable:

To convert the RS232 signals to the GSIOC (RS-422/485) standard you can use:

- The DataApex **IGLN1** converter ("IGLN1 kit" below) or
- Gilson 605 RS-232C Adapter (ref. 360784) or
- 506C Interface Module (ref. 362831)

For the connection of additional devices special Y shaped cable is used. This cable has one Sub D 9 pin plug Canon 9M) and two Sub D 9 pin receptacle (Canon 9F) connectors.

"IGLN2 Adapter" on the next page

The communication parameters are set directly in **Clarity** and must match the settings on the pump itself. The default value for Baud Rate is *19200*.

3.2 Hadware - wiring

3.2.1 IGLN1 kit

DataApex supplies the **IGLN1** kit (p/n IGLN1) as an optional accessory.

Fig. 2: IGLN1 Converter RS232/GSIOC for Gilson

The IGLN1 kit contains all the parts needed to control the binary gradient:

- The converter box with three connectors:

A **SUB-D 25 pin** (CANNON) receptacle (female) connector (RS232 side) and two **SUB-D 9 pin** receptacle connectors (for connecting two pumps or other GSIOC devices).

- Communication cables:

1x Modemcable straight DB9F-DB25M (SK12), 3m length.

2x Standard straight DB9F-DB9M (SK16) serial cable, 1.8 m length.

3.2.2 IGLN2 Adapter

Additional pumps or other devices can be connected to the converter by using the **IGLN2** adapter cable (each additional device might require an additional adapter standard straight DB9F- DB9M serial cable (SK12), depending on the distance between particular pumps. No additional cable is usually necessary).
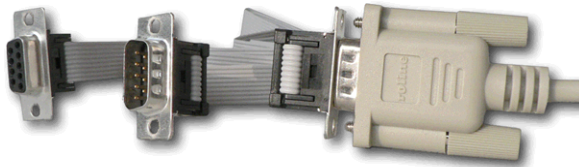

Fig. 3: IGLN2 Adapter GSIOC for GILSON

To order the Adapter GSIOC for **Gilson** from **DataApex** ask for the p/n IGLN2.
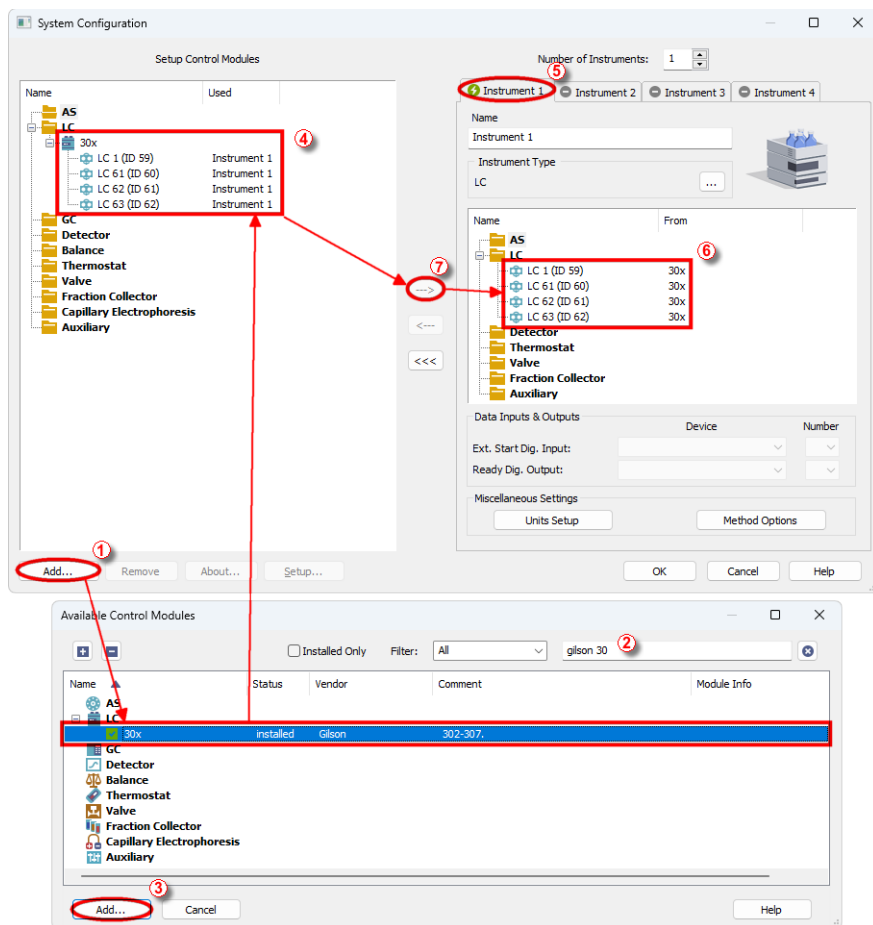
3.3 Clarity Configuration

Fig. 4: How to add Gilson 30X

- Start the **Clarity** station by clicking on the ◢ icon on the desktop.
- Invoke the *System Configuration* dialog accessible from the *Clarity* window using the *System - Configuration...* command.
- Press the *Add* button ① (see **Fig. 4** on pg. **5**.) to invoke the *Available Control Modules* dialog.
- You can specify the searching filter ② to simplify the finding of the driver.
- Select the **30x** pump and press the *Add* ③ button.

The Gilson 30X Setup dialog will appear.

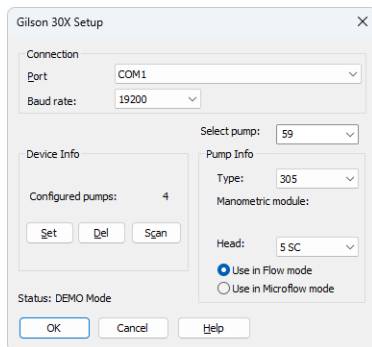*Fig. 5: Gilson 30X Setup*

- Select the correct *Port* and use the *Scan* button to detect the attached Gilson pump(s) and set its parameters.

. . . .
Note: The Gilson 30X Setup dialog is more closely described in the chapter **"Gilson 30X Setup"** on pg. **14**.

The **Gilson 30X** pump item will appear in the *Setup Control Modules* list of the *System Configuration* dialog.

- Drag and drop the **30x** icon from the *Setup Control Modules* ④ list 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).

. . . .
Note: The pumps are controlled independently on the GSIOC service, thus it is possible to assign the configured pumps to separate instruments (for example to create two binary gradients).

4 Using the control module

New LC Control tab appears in the *Method Setup* dialog, enabling the setting of the LC control method.

4.1 Method Setup - LC Gradient

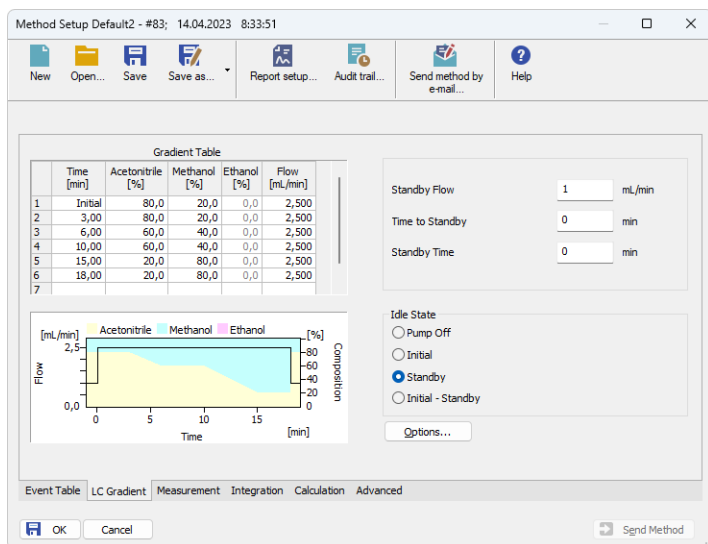The *Method Setup - LC Gradient* dialog serves for setting up the LC instrument method.

Fig. 6: Method Setup - LC Gradient

Gradient Table

A table for setting the composition of the mobile phase and the overall flow rate as a function of time. Operation is analogous to that of spreadsheets (Excel, Quatro Pro, etc.). To prepare the cell to receive values, click it by the left mouse button; the cell will highlight by dots. A cell that fails to highlight is not available for editing.

Time [min.]

Sets the time at which the ratio of flow rates and the overall flow rate correspond to the values entered in the corresponding row. (These values vary continuously from one time to the next in a manner ensuring that the conditions specified in the next row are satisfied).

XXX1 (..4) [%]

Represents the percentage of a component. The designation **XXX1-4** is in fact replaced by the name of the component (items *Solvent 1 - 4* in the Gradient Options dialog). Should you enter a component value such that the sum of all values exceeds 100 %, the percentage in the last

column is automatically adjusted; if the percentage of the last compound is already zero, the value of the currently entered component is adjusted instead. The flow rate of a compound is calculated by multiplying the overall flow rate (indicated in the *Flow* column) by the corresponding percentage divided by 100.

Flow [ml/min]

Indicates the overall flow rate through the column. The entered value applies to the time specified in the corresponding row.

. . . .

Caution: If the **flow rate** set for the given pump in the **Gradient Table** (calculated from percentage and total flow) will <u>exceed the maximum</u> flow rate for the set pump head, the change will not be accepted and may invoke a communication error.

Graph

The graph depicts the percentage of components as a function of time together with the overall flow rate. Data are taken over from the **Gradient Table**. Changes effected in this table are immediately reflected in the graph. Legend in the header of the graph indicates the assignment of colors to individual components. The assignment is fixed and individual components are displayed in the graph from bottom to top. The flow rate is displayed as a black line.

The graph has two vertical axes: the axis on the left refers to the mixing ratio, the one on the right to the overall flow rate.

Parameters

Standby Flow

Sets the overall flow rate through the column in the *STANDBY* state reached after the last row of the table has been performed and the time period defined in the *Time to Standby* field has passed. The duration of this state is defined by the *Standby Time* item. The ratio of individual components in the respective *STANDBY* and *IDLE* states is given by the first row of the **Gradient Table** (the *Initial* row).

Time to Standby [min]

Indicates the time during which the flow rate and mobile phase composition changes continuously between the last values entered in the table and the values defined by *Standby Flow* field and the *Initial* row mobile phase composition.

This time is included in the analysis time (the Instrument is in the *CONTROL* state). In case when the *Time to Standby* is zero, there is step change from flow and components percentage specified on the last row of gradient table to that specified for *STANDBY* state.

Standby Time [min]

The time during which the flow rate is maintained at *Standby Flow*. This time is included in the analysis time (the Instrument is in the *CONTROL* state).

Idle State

An item specifying the overall flow rate through the column outside the instrument method. The following options are possible:

Pump Off

The flow rates of all components are zero.

....

Caution: Be careful as this setting may damage the column in some cases.

Initial

The flow rate is defined by the first row of the gradient table (the *Initial* row).

Standby

The flow rate is the same as in the *STANDBY* mode and, accordingly, corresponds to the value entered in *Standby Flow* field.

Initial - Standby

The *IDLE* state comes into effect each time an Instrument is opened, at the end or after abortion of an analysis by the *Abort* command, and is also maintained after the **Clarity** program is shut down.

After Send Method the flow is defined by the first row of the gradient table (the Initial row) and after the method finishes the pump keeps Standy Flow.

The mixing ratio of individual components in both the *IDLE* and *STANDBY* states is given by the first row of the **Gradient Table** (the *Initial* row).

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Note: There is a step change in the flow and components percentage from the values specified for the *STANDBY* state to those specified for the *IDLE* state if the *Idle State* field is not set to *Standby*.

Options…

Opens the Gradient Options dialog that allows the setting of minimum and maximum pressure limits and solvent names.

4.1.1 Gradient Options

Invoke the *Options...* button in the Method Setup - LC Gradient dialog to open the *Gradient Options* dialog. This dialog allows to set the custom name for particular solvents, to switch whether they are used or not in the gradient and to set the warning levels for pressure to prevent the damage to hardware.
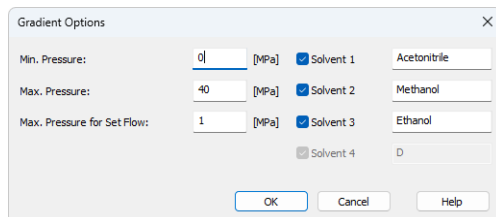

Fig. 7: Gradient Options

Min. Pressure
Sets the minimum pressure for the given pump. When pressure drops to the set value, the pump will shut down. This prevents the solvent leakage.

Max. Pressure
Sets the maximum pressure for the given pump. When pressure reaches the set value, the pump will shut down. This serves to prevent the damage to the pump when the column is blocked.

- -
Note: Pressure limits are checked in the pump hardware. Pressure checking doesn't start immediately after the pump is started, but with a few minutes delay. During this delay the pressure in chromatographic system can stabilize.

Max. Pressure for Set Flow
Sets the maximum pressure to be used in the *Set Flow* dialog in the Device Monitor. Initial value is *1* MPa.

Solvent 1 (..4)
It is possible to enable/disable particular solvent, as well as to set custom name to it.
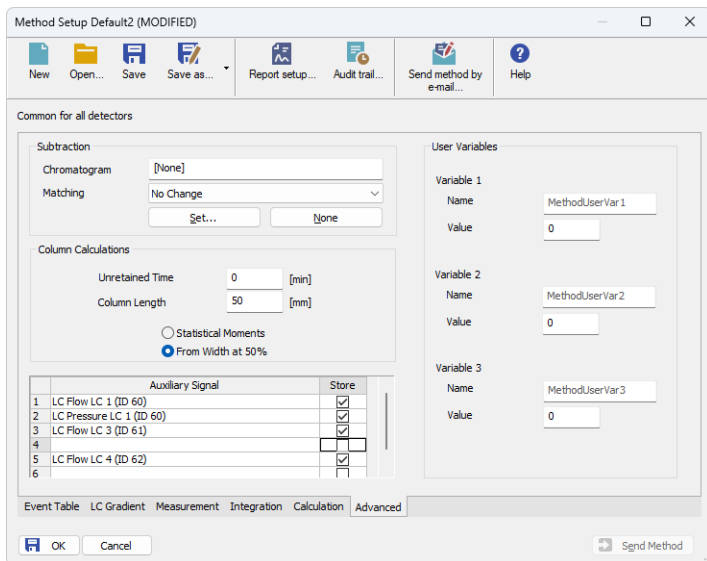
4.2 Method Setup - Advanced

Fig. 8: Method Setup - Advanced

Gilson 30X provides the pump flow and pressure auxiliary signals for use in **Clarity**. To save the auxiliary signals into each chromatogram measured according to the given method, check the particular checkbox in the lower section of the Method Setup - Advanced dialog.

4.3 Device Monitor

The pump status dialog can be invoked by the *Monitor - Device Monitor* command from the *Instrument* window or using the Device Monitor 🎯 icon. It displays the actual flows of particular solvents, as well as the total flow, the total pressure and the analysis time.
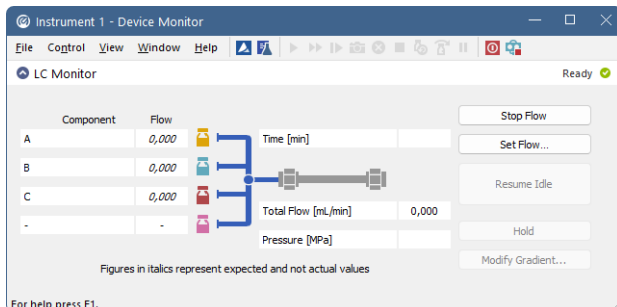
Fig. 9: LC monitor

Stop Flow

The pumps can be stopped from this window using the *Stop Flow* button. This action will stop the pump only, the analysis run will continue and must be stopped or aborted from the Data Acquisition window or *Single Analysis* dialog.

Set Flow...

Sets the desired total flow and solvent ratios in the opened *Set Flow* dialog. *Max. Pressure* allows to set a different pressure than set in the "Gradient Options" on page 10 of a given method.
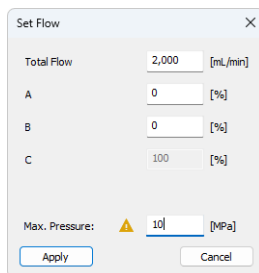
Fig. 10: Set Flow

The number of solvents and their names displayed in the Set Flow dialog correspond to the solvent number and names set in the Gradient Options dialog. The last available solvent field is always grayed and is automatically counted as a rest of the percentage of the other solvents.

Resume Idle

Returns the pumps to *IDLE* state as defined in the appropriate field on the LC Gradient tab of the *Method Setup* dialog.

Hold / Resume

Clicking on the *Hold* button will keep the current gradient conditions until *Resume* is clicked.

Modify Gradient...

Opens theLC Control Manual Flow dialog allowing to set custom flow and mobile phase composition, disregarding the **Gradient Table** set in the method. The command is only available during the analysis run.

4.3.1 LC Control Manual Flow

The *LC Control Manual Flow* dialog accessible through using the *Manual Flow…* button fromDevice Monitor window allows the user to set a custom mobile phase composition and flow while the analysis is running. It resembles the Method Setup - LC Gradient tab in functionality.
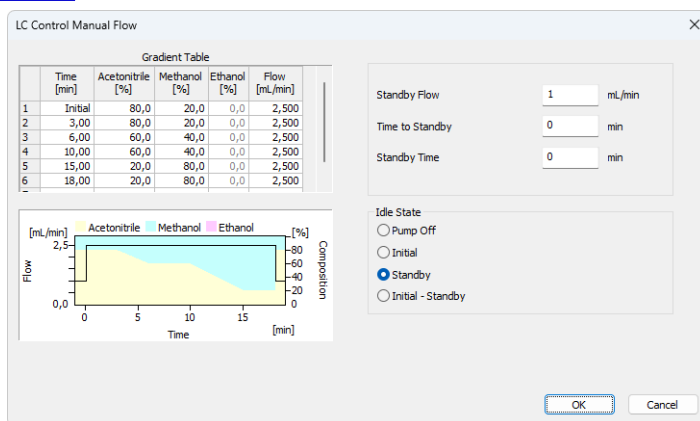

Fig. 11: LC Control Manual Flow dialog

The *LC Control Manual Flow* dialog is only available during the analysis run. When it is invoked and the *OK* button is pressed, the original **Gradient Table** from the acquisition method is discarded and replaced by the **Gradient Table** from the *LC Control Manual Flow* dialog. Any such operation is recorded in the audit trail of the measured chromatogram.

Caution: After the analysis run which used manual flow changes ends, the original method is automatically sent to all controlled devices to make sure **Clarity** station returns to the original method.

4.4 Gilson 30X Setup

The *Gilson 30X Setup* dialog sets the properties of the individual (also of disconnected) pumps.

Invoke the dialog from the *System Configuration* dialog by selecting *Gilson 30X* item and clicking the *Setup* button.

Note: You can also simply double-click the "*Gilson 30X Pump Driver*" in the "*Setup Control Modules*" list on the left.
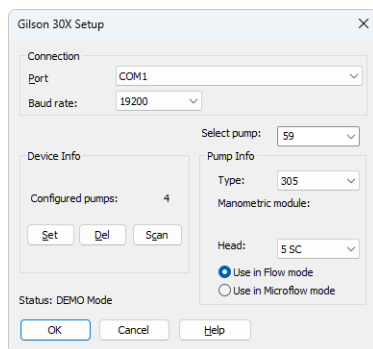

Fig. 12: Gilson 30X Setup

Connection
Defines the communication parameters for the **Gilson** pumps governed through this control module.

    Port
        Defines the COM port used for the communication with the pumps. All **Gilson** pumps are connected to the same COM port and identified using their unique ID's.

    Baud Rate
        Sets the *Baud Rate* of the communication. The default value is *19200*.

Select pump
Contains list of the IDs of the detected pumps or pumps added manually by the user. User can add unattached pump to the list by writing its ID number to the *Select pump* field and confirming by the *Set* or *OK* buttons.

The respective ID numbers are set on the individual pumps.

Device Info
All **Gilson** pumps are connected to a single COM port controlled by **GSIOC** service outside **Clarity**, consequently all the information about COM is displayed as informative only.

    Set
        Confirms the modifications made in the current pump setting.

Changes in the setting will not be applied until the *Set* or *OK* buttons are pressed.

Del
Deletes current pump and its settings from the configuration.

Scan
Detects all attached **Gilson** pumps. Reads their assigned numbers and stores the settings into the configuration file.

Pump Info
Shows the information on the current **Gilson** pump selected.

Type
Setting of the pump type.

Newer models detect the type automatically (using the *Set* button), older models have to be entered manually.

Manometric module
Displays the detected type of manometric module.

Head
Setting of the attached head.

Caution: Must be set **manually** according to the head actually mounted on the pump.

Use in Flow Mode / Use in Microflow mode
Sets the operating mode of the pump.

Microflow enables 10x lower flow with 10x higher precision than the *Flow* mode. It is not possible to change the mode during the run, because switching the mode requires stopping the pump or step change of the flow.