Clarity Controls

FIux RHEOS 2000

LC **ENG**

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1 Flux Rheos 2000 Communication

This manual describes the setting of the **Flux Rheos 2000** pump. The control module enables direct control of the instrument over serial line.

Fig. 1. Flux Rheos 2000 Pump

Direct control means that the pump can be completely controlled from the **Clarity** environment. Instrument method controlling the analysis conditions will be saved in the measured chromatograms.

2 Requirements

- Clarity Installation CD ROM 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.*

- Straight serial DB9F-DB9M cable (p/n SK02) and the DB9F-DB9F reduction (p/n SK07). The straight serial DB9F-DB9F cable could be used as well, but it is not widely available.

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

3 Clarity User Interface

3.1 HW setup – Flux Rheos 2000 communication

The pump communicates with the PC using serial straight RS232-compliant DB9F-DB9F cable. COM port settings on the PC side are:

19200, n, 8, 1 (check only in case of problems with communication).

Note: *If serial communication cannot be established and all parameters of communication are correctly set (speed, parity, etc.), then we recommend to remeasure the cable according to the following scheme (especially pin connection 2 and 3).*

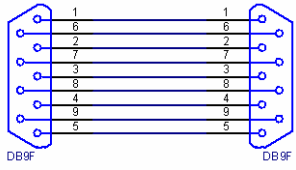

Fig. 2. Serial cable DB9F – DB9F

Note: *Serial cable DB9F–DB9F is not standard, therefore we supply cable DB9F–DB9M with DB9F–DB9F reduction.*

The synchronisation (gradient start) is performed on the software level, no additional cables are needed.

3.2 Clarity configuration

- In the **System Configuration** dialog press the **Add** button to invoke the **Available Control Modules** dialog.

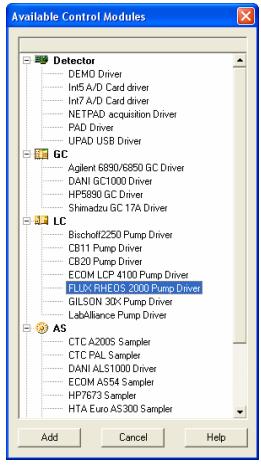

Fig. 3. Available Control Modules

- Select the **FLUX RHEOS 2000 Pump Driver** and press the **Add** button.
- The **Rheos 2000 Setup dialog** will appear.

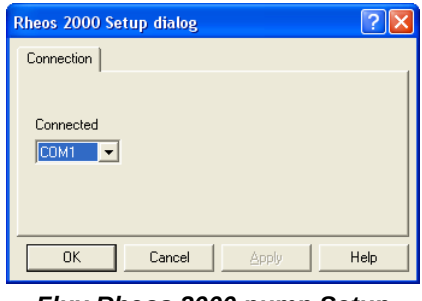

Fig. 4. Flux Rheos 2000 pump Setup

- Only communication port is set in the **Rheos 2000 Setup** dialog
- Fill in the **Connected** field and press **OK**.

  The *FLUX RHEOS 2000 Pump Driver* will appear in the **Setup Control Modules** list of the **System Configuration** dialog.

  Then drag the pump icon from the **Setup Control Modules** list on the left side of the **System Configuration** dialog to the desired instrument tab on the right side.

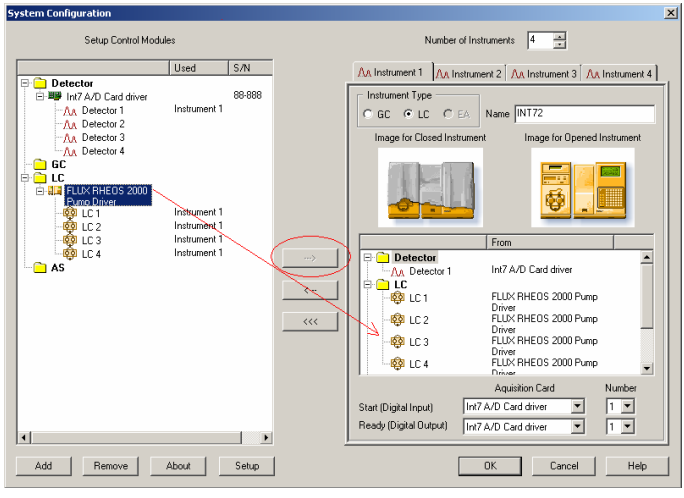

Fig. 5. System Configuration

Note: *Allways drag all solvent icons to the instrument, even if your pump has less than four valves for mixing gradient*

Caution! *Solvents must not be configured on different instruments.*

3.3 Method Setup

In **Method Setup** dialog of the instrument with assigned pump a new **LC Control** tab will appear. The **Method Setup – LC Control** dialog serves for setting up the LC instrument method.

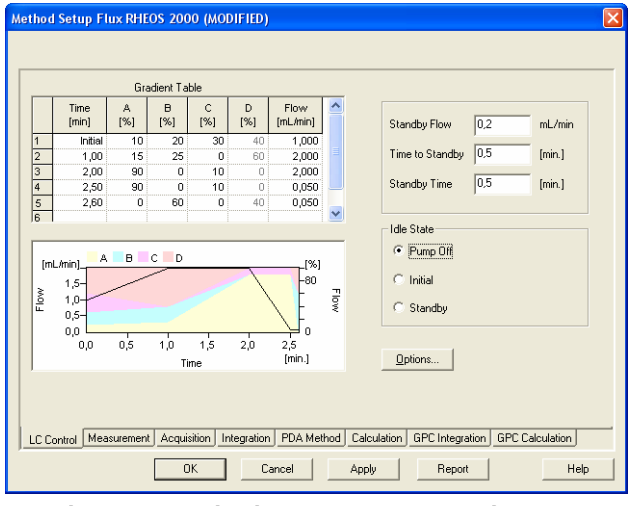

Fig. 6. Method Setup – LC Control

3.3.1 Gradient Table

A table for setting the composition of the mobile phase and the overall flowrate as a function of time. Operation is analogous to that of spreadsheets (Excel, Quatro Pro, ...). Upon clicking a cell by the left mouse button that cell is highlighted by dots and ready to receive values. A cell that fails to highlight is not available for editing.

Time [min.]

The entered value represents the time at which the ratio of flowrates and the overall flowrate 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 box). 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 flowrate of a compound is calculated by multiplying the overall flowrate (indicated in the **Flow** column) by the corresponding percentage divided by 100.

Flow [ml/min]

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

3.3.2 Graph

The graph depicts the percentage of components as a function of time together with the overall flowrate. Data are taken over from the Gradient Table. Changes effected in this table are immediately reflected in the graph. Assignment of colours to individual components is shown in the header. The assignment is fixed and individual components are displayed in the graph from bottom to top.

The flowrate is displayed in black.

The graph has two vertical axes: the axis on the right refers to the mixing ratio, that on the left to the overall flowrate.

3.3.3 Parameters

Standby Flow

Indicates the overall flowrate through the column in the *STANDBY* state reached after the last row of the table has been performed and the **Time to Standby** has passed. The time period during which the flowrate is so

maintained is defined by item **Standby Time**. (The ratio of individual components in the respective *STANDBY* and *IDLE* states is given by the first row of the Table (the **Initial** row).

Time to Standby [min]

Indicates the time during which the flowrate varies continuously between the last values entered in the table and the value defined by *Standby Flow*. This time is included in the analysis time (the *CONTROL* state).

Standby Time [min]

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

Idle State

An item specifying the overall flowrate through the column outside the instrument method. The following states are possible:

Pump Off
The flowrates of all components are zero.

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

Standby
The flowrate is the same as in the *STANDBY* state and, accordingly, corresponds to the value entered in **Standby Flow**.

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

Note: *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).*

3.3.4 Options

By invoking the **Options** button, the **Gradient Options** dialog will appear.

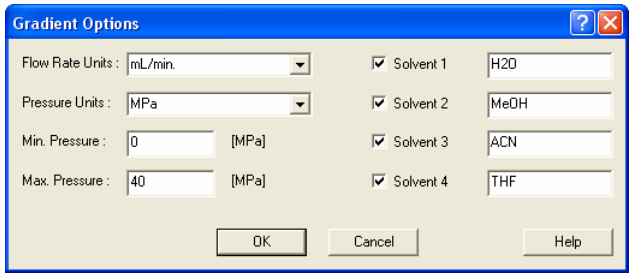

Fig. 7. Gradient Options

In this dialog, the **Flow Rate** and **Pressure** units can be selected, the pressure limits set and **Solvents** can be enabled and named.

Note: *In case your pump has less then four mixing valves, disable the unused solvents here according to the physical configuration of your pump – for binary pump usually Solvent 1 (Valve A) and Solvent 4 (Valve D) are normally used.*

3.4 LC Monitor

The **LC Monitor** dialog displaying the pump status can be invoked by the **Monitor - LC Chromatograph** command or by the **LC/GC Monitor** icon from the **Instrument** window.

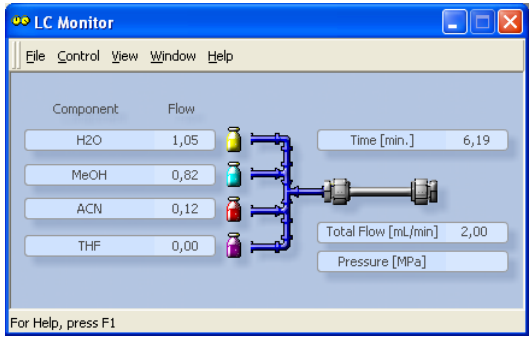

Fig. 8. LC Monitor

This dialog provides actual condition readings from the pump.

Caution! *The **Rheos 2000 pump** does not return the actual **Total Flow** during a flow gradient; the last value sent to the pump is displayed instead.*

The pump can be stopped from this dialog by using the **Control - Stop** command or by the  icon. This will stop the pump only, the analysis run is continuing and must be stopped or aborted from the **Data Acquisition** or **Single Analysis** dialogs. The flow will be resumed by using the **Apply** or **OK** butons in the **Method Setup** dialog.

The individual solvent flow can be displayed either in flow units or as a percentage of total flow by checking the **View - Component flow in %** command. (For this pump, use the latter option preferably)

3.5 Pump Homing

The **Rheos 2000 pump** supports so called **Homing** to improve gradient precission especially for low flow rate gradients. With this feature, the gradient is always started from defined piston cam position.

The function will be invoked automaticaly whenever the run has been started from pump in off state, i.e. the pump is always homed before stop.

To use this feature, select the **Pump Off** option in the **Idle state** group of the **Method Setup** dialog.

Caution! *The pump may give a possition error when stopped abruptly during single cam cycle. To prevent this situation, decrase the flowrate gradually (i.e. when going from 1.0 ml/min to 0 ml/min, insert a line with flow rate 0.5 ml/min and time 0,01min greater.*