DataApex
Clarity™
CHROMATOGRAPHY SOFTWARE

INTERLAB MAESTRO

Clarity Control Module ENG

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Contents

To facilitate the orientation in the **Interlab MAESTRO** 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 Interlab MAESTRO Control module

This manual describes the setting of the **Interlab MAESTRO** HPLC system. The control module enables direct control of the instrument over the USB port.

Fig. 1: Interlab MAESTRO

This control module operates the whole system (including pumps, detectors, autosampler, column ovens, etc.). Direct control means that the system can be completely controlled from the **Clarity** environment. Instrument method controlling the analysis conditions will be saved in the measured chromatograms.

Clarity can currently control the following modules:

- **Pump**
- **Detectors:** UV, PDA, Fluorometric , Refractive Index
- **Autosampler**
- **Column Oven**

The number of controlled modules continues to extend, for up to date list see the web site *www.dataapex.com*.

2 Requirements

- **Clarity** installation USB with **LC control** module (p/n A24) allowed. Other parts of the system may need other modules or extensions, namely the autosampler will need the **AS control** module (p/n A26) and the PDA detector will need the **PDA Extension** (p/n A29).
- The control of **Interlab MAESTRO** is available only in selected territories. Please contact us for details.

Note: Cables are not part of the **Clarity** Control Module. If you don't have the USB cable for connecting the Interface Board with the PC, you can order it as p/n SK06.

- **USB-IF Board** supplied by the system manufacturer must be installed in one of the modules (usually the autosampler). This board is connected to the computer over the USB port.

Caution: In case that **Interlab MAESTRO** system does not contain either autosampler or a detector controlled via this control module (or both), it is necessary to use a special cable (e-DIO cable, art.no. 890-6145) for start synchronization. With this cable, it is possible either to propagate the start signal from other device present on the **Clarity** Instrument or contrarily propagate the start signal from the autosampler to other device.

- The **Interlab MAESTRO** LC control for **Clarity**, the **Interlab MAESTRO** LC control for OpenLab/EZChrom or **Interlab MAESTROSystem Manager** must not be installed on the same computer as it may result in communication errors.

Supported operating systems:

- **Windows 7 (32/64 bit)**

Note: Although **Interlab MAESTRO** does not state other **Windows OS** between supported, the system may work on other OS versions as well e.g., Windows 10. This functionality is not guaranteed though.

3 Installation procedure

3.1 Interlab MAESTRO communication

It is possible to controlup to 4 **Interlab MAESTRO** systems configured on different Instruments of the same **Clarity** Chromatography Station. Then it is necessary to set the switch on the first **USB-IF Board** to *Sys1* , the second one to the *Sys2* and so on. Consult the **USB-IF Board** manual.

It is also possible to connect up to 2 detectors on one Instrument. In case one of the two detectors is not the **Diode Array Detector**, then it is necessary to set different channel number for each of them in the **Interlab MAESTRO** system and also in the Add Module dialog when configuring the **Interlab MAESTRO** in **Clarity**.

3.2 Clarity Configuration

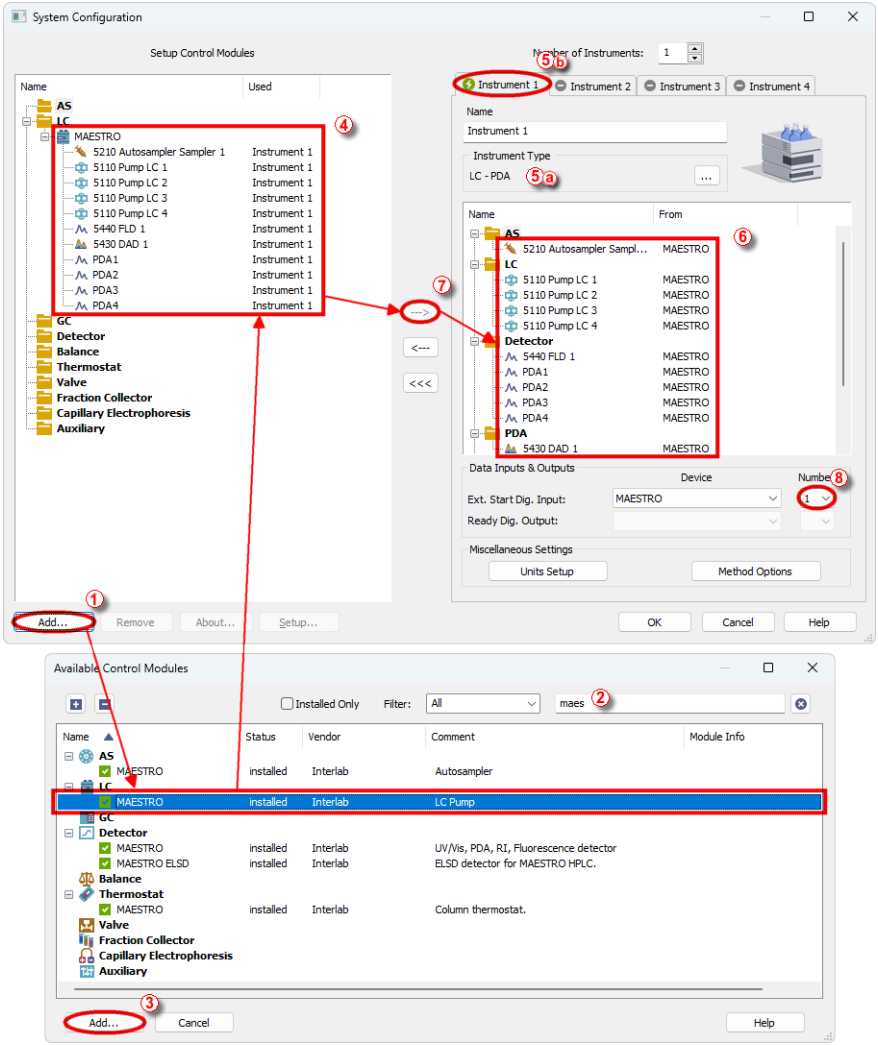

Fig. 2: Adding Interlab MAESTRO module

- Press the *Add* button ① in the ***System Configuration*** dialog to invoke the ***Available Control Modules*** dialog.
- You can use the filter ② to simplify the searching of the control module.

- Select the **Interlab MAESTRO** and click the *Add* ③ button. The MAESTRO Setup dialog will appear.

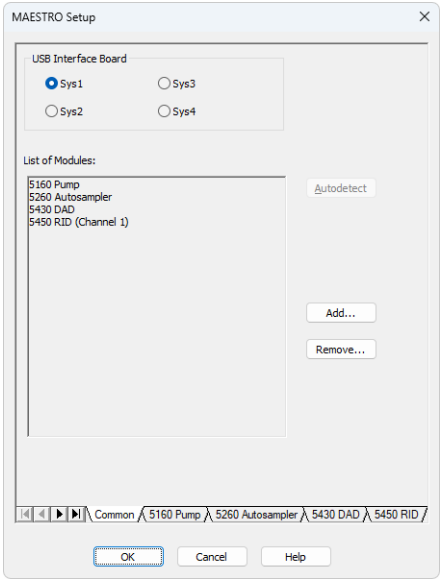

Fig. 3: Interlab MAESTRO Setup

- Select the corresponding *USB Interface Board* and click the *Autodetect* button to detect all modules including their *Serial* and *Program Numbers*. Alternatively you can click the *Add…* button and add the available modules manually. Each module will add its own tab to the Interlab MAESTRO Setup dialog. It will be described in the manual later. When you use two detectors in one system, it is required to change the channel number of one of them. In case there are more systems controlled by the same **Clarity** station, each of them must have different number of *USB Interface Board*. This number can be changed using a switch on the system's communication board.

- After clicking the *OK* button, the **Interlab MAESTRO** item ④ will appear in the *Setup Control Modules* list of the *System Configuration* dialog.
- Set the *Instrument Type* ⑤ ⓐ on the desired Instrument tab ⑤ ⓐ to LC (or LC-PDA if necessary).
- Drag the control module from the *Setup Control Modules* list on the left ④ to the *Instrument* tab on the right ⑥ , or use the --> button ⑦ .
- Set the digital input nr. 1 to be used for starting the acquisition ⑧ .

- In case the **Interlab MAESTRO** HPLC system contains both **Interlab MAESTRO** autosampler and **Interlab MAESTRO** detector, the *Ext. Start Dig. Input* item *Device* has to be set to 'MAESTRO' and the item *Number* to value '1'.
- In case of system with **Interlab MAESTRO** autosampler but without any **Interlab MAESTRO** detector the acquisition has to be started by digital input of some other device. It has to be any device available in the software which can be configured as *Ext. Start Dig. Input* device and provides digital input. The e-DIO cable should be used for transmitting the start marker signal from the autosampler to the device configured as *Ext. Start Dig. Input* device.
- In situation of a system with **Interlab MAESTRO** detector but without **Interlab MAESTRO** autosampler and if external contact (manual valve) is used then the same cable e-DIO cable needs to be used for starting of the **Interlab MAESTRO** detector. With such setup the *Ext. Start Dig. Input* needs to be set to 'MAESTRO' *Device* and *Number* item to value '1'.
- If there is not an e-DIO cable available it is possible to use a *Start Out* connector on the rear side of the autosampler. A contact is closed there at the moment of injection and it can be detected using left and center pins of this connector. This closure of the contact can work as an information for the other devices in the system and/or Clarity that injection occurred.

4 Using the control module

Several new tabs appear in the ***Method Setup*** dialog, based on the settings performed in the MAESTRO Setup dialog. These new tabs enable the setting of the **Interlab MAESTRO** system operation program.

Note: The instrument method is always sent to the **Interlab MAESTRO** as a whole.

4.1 MAESTRO Setup - Common

The *Common* tab serves for configuration of the communication with the **Interlab MAESTRO** system and for adding its modules you want to control.

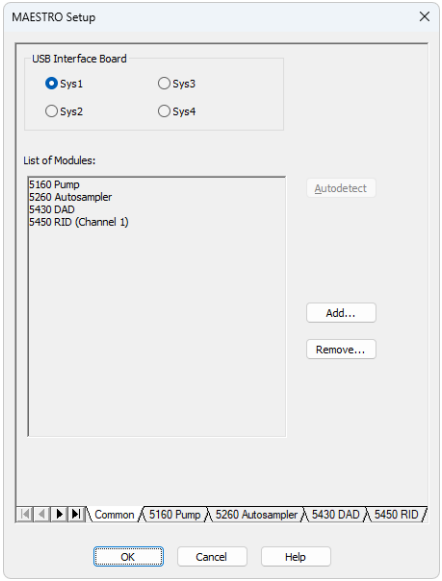

Fig. 4: MAESTRO Setup - Common tab

USB Interface Board

Depending on the switch configured on the **USB- IF Board** in the **Interlab MAESTRO** system, this option allows to select the matching *Sys1..4* setting.

List of Modules

Displays the list of modules autodetected or manually added to the setup.

Autodetect

When used, this button automatically detects modules and their serial and program numbers installed in your **Interlab MAESTRO** system and lists them in the *List of Modules* section.

Add…

Opens the *Add Module* dialog, which is used to select one of the Interlab MAESTRO modules.

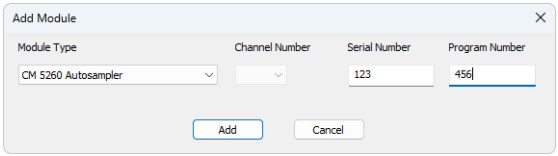

Fig. 5: Add Module dialog

In the *Add Module* dialog, select the *Module Type* you want to add to the configuration. If requested, select *Channel Number* which is set in the MAESTRO system for the selected module. Enter also the *Serial Number* and *Program Number* and click the *Add* button. The module is then listed in the *List of Modules* and has its own tab in the lower part of the *MAESTRO Setup* dialog.

Remove…

Open the *Remove Module* dialog, which is used to select the module you want to remove.

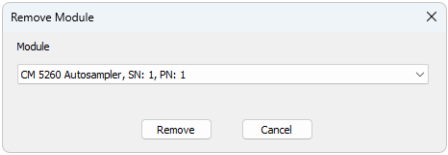

Fig. 6: Remove Module dialog

4.2 Part Maintenance

Part Maintenance dialog can be invoked from module tab in MAESTRO Setup dialog by clicking *<Module Type> Maintenance* button. The dialog can be also opened the same way from *Device Monitor* window. When the *Part Maintenance* dialog is opened from *Device Monitor* window, it cannot be edited. Every change must be made through *System Configuration* window.

Note: Possible <Module Type> labels on the button are: AS, Lamp, Oven, Pump.

Note: RI detector does not have *Part Maintenance* dialog, because no information can be read from the device.

Note: *Oven: Part Maintenance* dialog is only available when valve is connected.

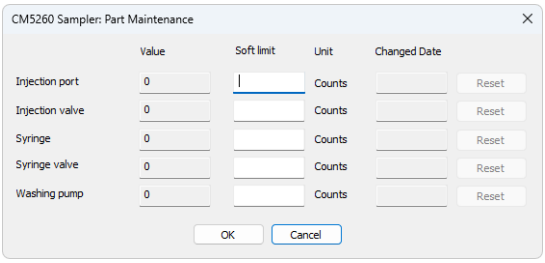

Fig. 7: Example of Part Maintenance dialog for AS

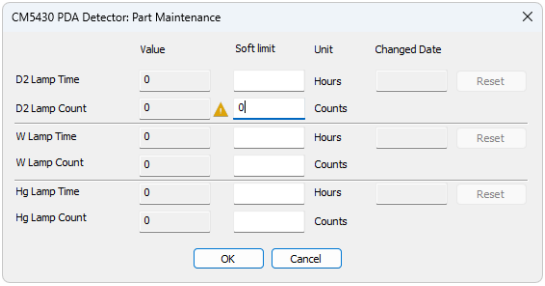

Fig. 8: Example of Part Maintenance dialog for Detector

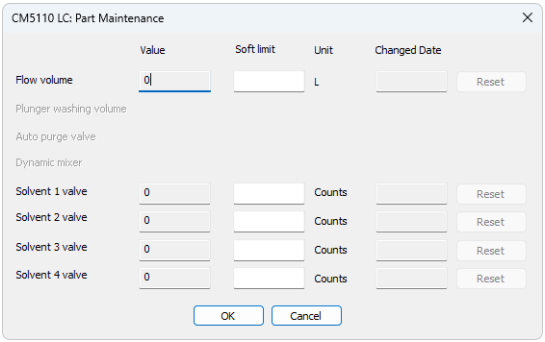

Fig. 9: Example of Part Maintenance dialog for Pump

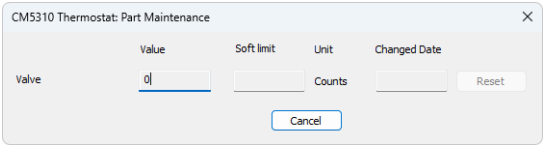

Fig. 10: Example of Part Maintenance dialog for Thermostat

Value

The column displays the value read from the device for each item. Hovering over the number with cursor displays tooltip with further information for each item. Warning ⚠ is displayed next to the field when the soft limit has been reached.

Note: The Value field can be reset to 0 by clicking *Reset button* for respective row. When clicked, the current date is filled in Changed Date field, and the information, including the last value before reset, is logged to *Station Audit Trail*.

Caution: Reset of the **Value** field cannot be reverted.

Caution: Values are read from a device after following actions; opening *Instrument* window, sending *Method*, opening *Part Maintenance* dialog, and automatically once per hour.

Soft Limit

Set by user, number represent the **Value** at which warning will be displayed. Maximum is limited by the maximal value that can be saved in device. When left empty no limit is set and warning will not be displayed.

Unit

Displays used unit for each row.

Change Date

Displays the date of the last **Value** reset. If the field is empty, the **Value** hasn't been reset up to this point.

4.3 Pump

TheMethod Setup - LC Gradient tab serves for setting the gradients of the pumps configured in the Interlab MAESTROSetup - Pump dialog.

4.3.1 MAESTRO Setup - Pump

This tab of the MAESTRO Setup dialog allows to set the parameters of the pump. For details, see the manual of the pump.

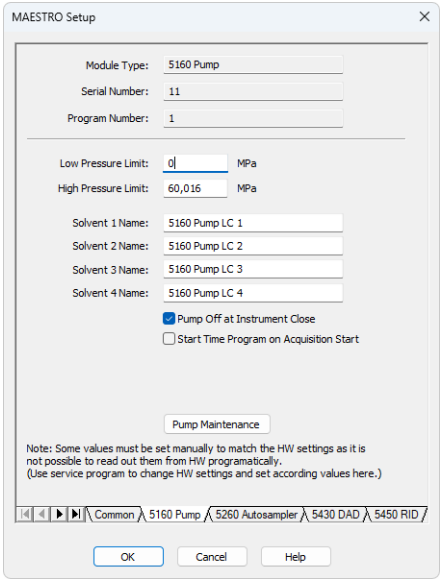

Fig. 11: MAESTRO Setup - Pump

Module Type
Displays the *Module Type* you have added.

Serial Number
Displays the Serial Number you have entered for the module.

Program Number
Displays the Program Number you have entered for the module.

Low Pressure Limit
Lower pressure limit. Number entered will be sent to the pump and checked by the pump firmware.

High Pressure Limit
Upper pressure limit. Number entered will be sent to the pump and checked by the pump firmware.

Solvent 1 (...4) Name
Change names for the particular solvent.

Pump Off at Instrument Close
Turn off the pump when the *Instrument* is closed.

Purge Valve Connected
Informs if the purge valve is connected. Available only when opened fromDevice Monitor by clinking on one of the detector's *Device Monitor - Det. Status* button.

Plunger Wash Pump Connected
Informs if the plunger wash pump is connected. Available only when opened fromDevice Monitor by clinking on one of the detector's *Device Monitor - Det. Status* button.

Pump Maintenance
Opens *Pump: Part Maintenance* dialog. For more information refer to Part Maintenance.

4.3.2 Method Setup - LC Gradient

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

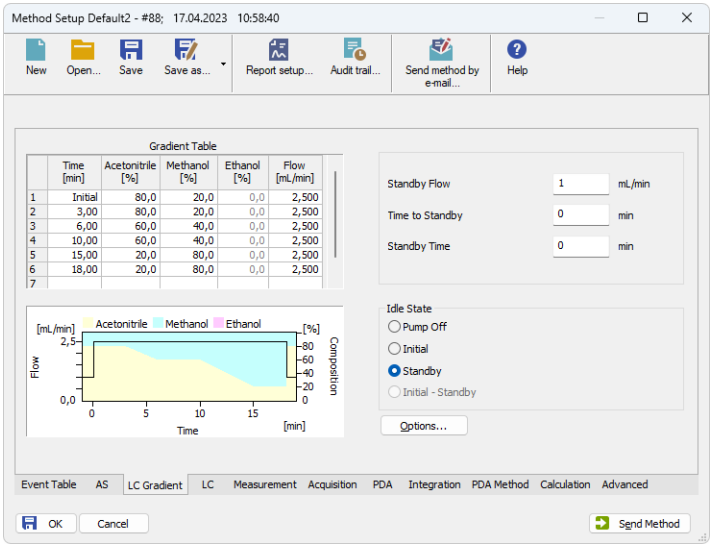

Fig. 12: Method Setup - LC Gradient

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 will correspond to the values entered in the corresponding row. (The flows change gradually from one time to the next in a manner ensuring that the conditions specified in the next row will be 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 theGradient Options dialog). Should you enter a component value such that the sum of all values exceeds 100 %, the percentage in the last column will be 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: The maximum flow may vary according to the pump type you have installed. Check the pump's manual. Pump 5160 accepts maximum flow of 5.0 ml/min.

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 the *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 will be steep change from the flow and components percentage specified on the last row of the 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

Not supported by these pumps.

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.

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).

Note: There is a steep 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*.

4.3.2.1 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 set whether they are used or not in the gradient and to set the warning levels for pressure to prevent the damage to hardware.

The above mentioned pressure limits are checked in the software. Pressure check for low pressure limit doesn't start immediately after pump is started, but with few minutes delay. During this delay the pressure in chromatographic system can stabilize.

In addition to *Min. Pressure* and *Max. Pressure*, there are pressure limits set in the MAESTRO Setup - Pump dialog. Those limits are checked in the pump firmware. As they will cause a system error, they should be set outside the limits defined here in the *Gradient Options* dialog.

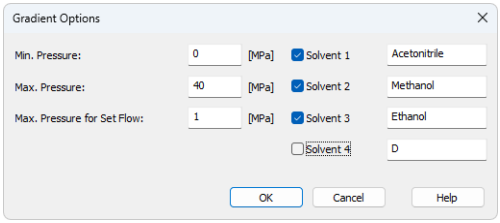

Fig. 13: Gradient Options

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, all pumps on the Instrument will shut down. This serves to prevent the damage to the pump when the column is blocked.

Note: *Min. Pressure* and *Max. Pressure* for the **Interlab MAESTRO** pumps vary in certain range according to the type of the pump and valves used. Check the device manual for valid values for your pump.

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.

4.3.3 Method Setup - LC

The *Method Setup - LC* dialog serves for setting the auxiliary parameters of the pump.

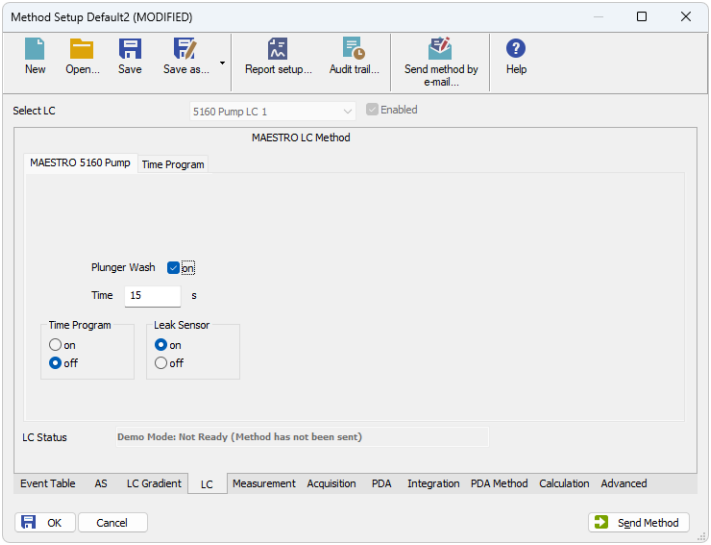

Fig. 14: Method Setup - LC Gradient

Time

Sets the time of plunger washing (beginning in the moment of start of the analysis). Available only with plunger wash pump installed.

Time Program

Turns the using of *Time Program* on and off.

Leak Sensor

Turns the using of *Leak Sensor* on and off.

Method Setup - LC - Time Program

This section contains *Time Program* table, which serves for controlling the Events (Digital outputs of the pump) during the analysis. For each row (time) it is possible to set the output to On, Off or Pulse. This table is active only with *Time Program* turned on.

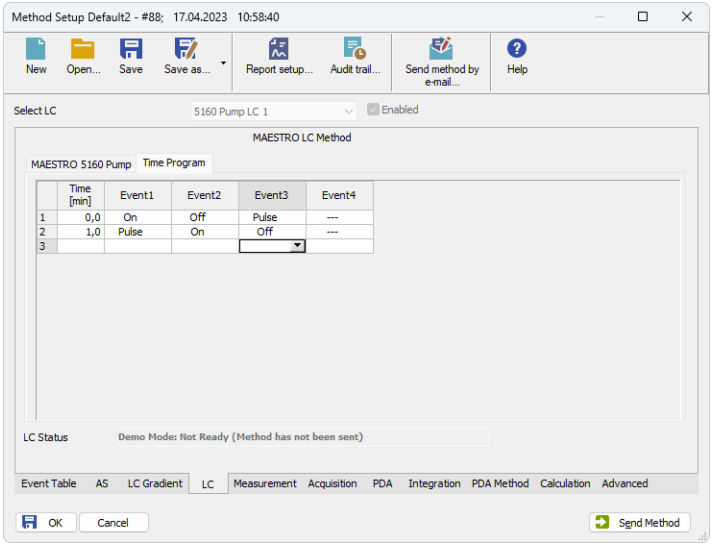

Fig. 15: Method Setup - LC - Time Program

4.3.4 Device Monitor

The pump status dialog can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window. It displays the actual flows of particular solvents, as well as the total flow, the total pressure and the analysis time.

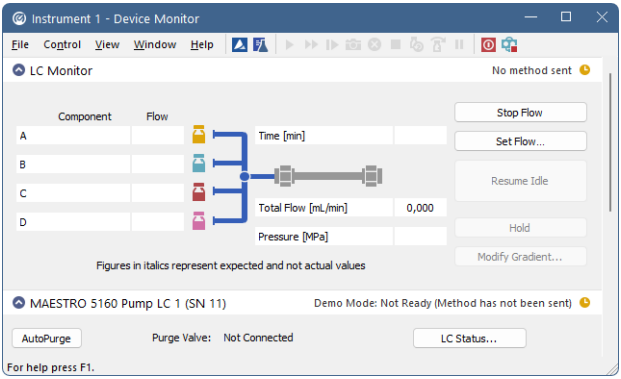

Fig. 16: Device Monitor - LC Monitor and Pump

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 separately by the *Stop*/*Abort* button in the toolbar.

Set Flow

Sets the desired total flow and solvent ratios in the opened *Set Flow* dialog. *Max. Pressure* sets the maximum pressure to be used. Initial value is *1* MPa.

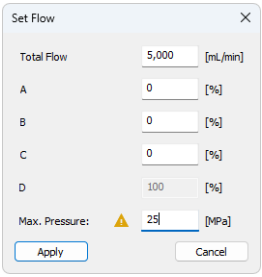

Fig. 17: Set Flow

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 the LC 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.

LC Status...

Button *LC Status...* invokes respective tab of the MAESTRO Pump Setup dialog which allows to set some of parameters of the pump and to view the Part Maintenance. For details, see the manual of the pump.

Warning ⚠ is displayed next to the button when *Soft Limit* has been reached.

AutoPurge

Allows to perform Auto Purge (when pump has this option enabled) using following dialog:

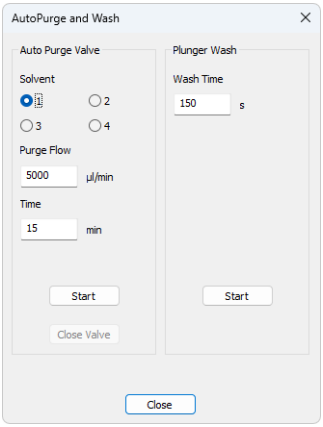

Fig. 18: AutoPurge - Wash

Caution: AutoPurge is limited to 50% of the maximum pressure. Value of maximum pressure is taken from MAESTRO Setup when no method is sent. When method is sent the value of maximum pressure is taken from ***Method Setup***.

Auto Purge Valve

Allows to set the solvent used for purging, Purge flow and time of purge. Available only when Auto Purge Valve is installed.

Plunger Wash

Allows to was the plunger for particular time. Available only when Plunger Wash pump is installed.

Purge Valve

Displays the state of *Purge Valve*.

4.3.4.1 LC Control Manual Flow

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

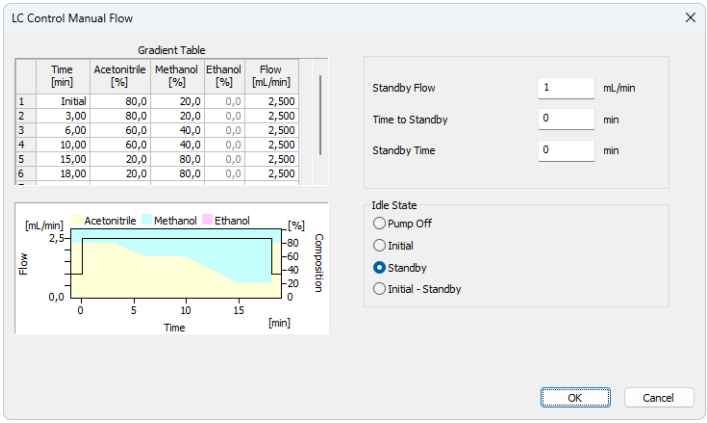

Fig. 19: LC Control Manual Flow dialog

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.

4.3.5 Report Setup

All of the pump settings accessible on theMethod Setup - LC Gradient tab and in theGradient Options dialog are reported, if the pump is configured as a part of the gradient. To do so, the *Instrument Control* parameter on the ***Method*** tab of the ***Report Setup*** dialog must be checked.

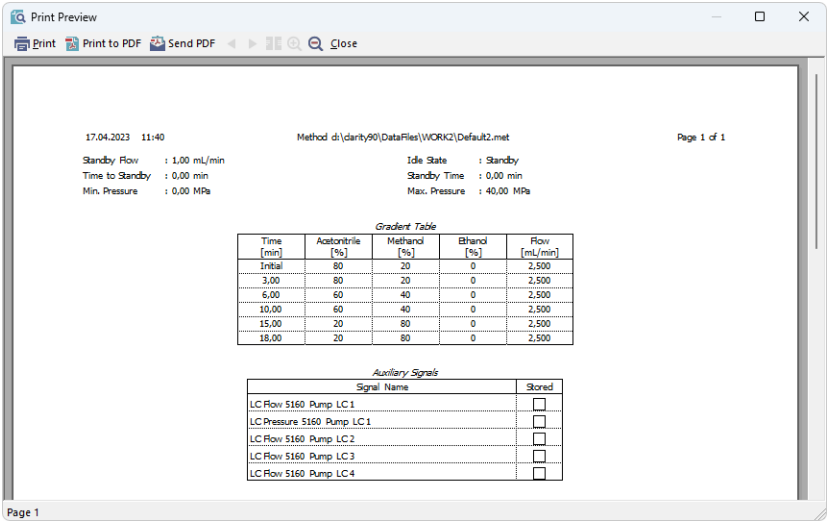

Fig. 20: Report - pump part of the gradient

4.4 Autosampler

The autosampler used with the **Interlab MAESTRO** allows for automated injection of samples either from the *Sequence* window or from *Single Analysis* dialog (*Use Autosampler* checkbox must be selected there).

4.4.1 Interlab MAESTRO Setup - Autosampler

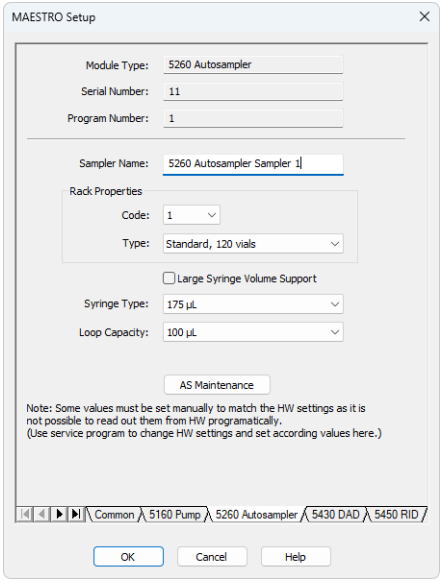

Fig. 21: MAESTRO Setup - Autosampler

Module Type
Displays the *Module Type* you have added.

Serial Number
Displays the Serial number you have entered for the module.

Program Number
Displays the Program Number you have entered for the module.

Sampler Name
Sets the name of the autosampler.

Rack Properties

Code
Sets the proper code of the rack.

Type
Sets the proper type of the rack.

Syringe Type
Sets the proper type of the syringe depending on its volume.

Loop Capacity
Sets the capacity of the loop.

AS Maintenance
Opens *AS: Part Maintenance* dialog. For more information refer to Part Maintenance.

4.4.2 Method Setup - AS

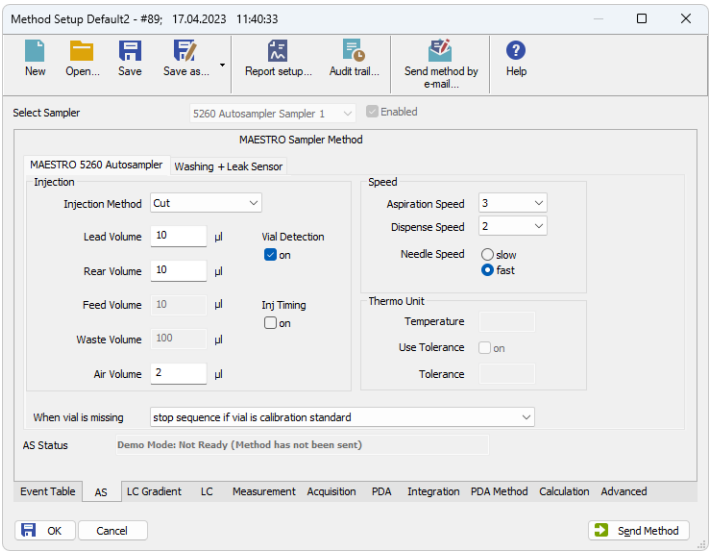

Fig. 22: Method Setup - AS

Injection

Injection Method
Sets the injection method of the autosampler.

Cut - The middle part of the sample is injected; the leading and trailing ends are not injected.

All - The entire sample withdrawn by the needle is transferred to into the sample loop and into the column.

Loop - The sample loop is filled with sample for measurement.

Lead Volume
Sets the Lead Volume of the autosampler.

Rear Volume
Sets the Rear Volume of the autosampler.

Feed Volume
Sets the Feed Volume of the autosampler.

Waste Volume
Sets the Waste Volume of the autosampler.

Air Volume
Sets the Air Volume of the autosampler.

Vial Detection
Turns on the detection of vials in the tray.

Inj Timing
Turns on the PASS function (Pump Autosampler Synchronisation). For proper function the system must be equipped with model 5110 pump with minimal flow of 0,2 ml/min set.

Speed

Aspiration Speed
Sets the speed of the syringe during aspiration.

Dispense Speed
Sets the speed of the syringe during dispense.

Needle Speed
Sets the speed of the needle.

Thermo Unit
This section is enabled, if the autosampler have installed the Thermo Unit.

Temperature
Sets the target temperature of the cooling.

Use Tolerance
Sets whether to use the tolerance.

Tolerance
If the *Use Tolerance* is checked, sets the tolerance.

When vial is missing
Sets the behavior when the vial is missing.

Washing + Leak Sensor

Parameters used during the washing.

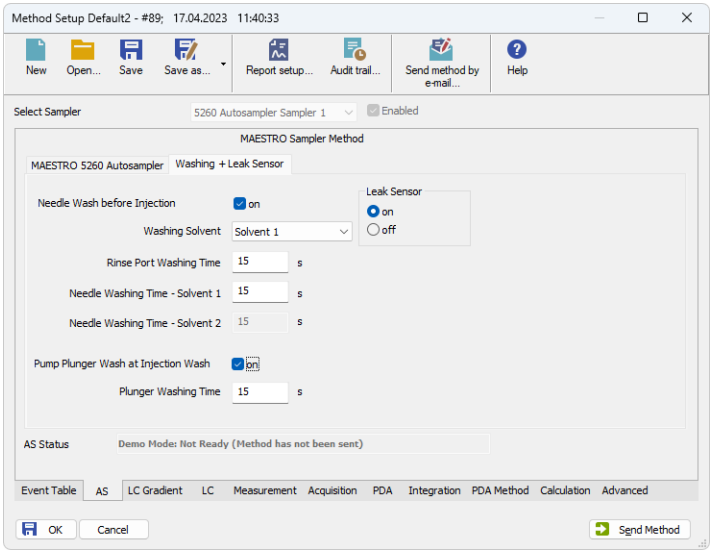

Fig. 23: Method Setup - AS - Washing

Needle Wash before Injection

Sets whether the needle will be washed before injection.

Washing Solvent

Select the solvent used for washing. In case the *Solvent 1&2* option is selected, the *Pump Plunger Wash at Injection Wash* is disabled.

Rinse Port Washing Time

Sets the Rinse Port Washing Time.

Needle Washing Time - Solvent 1 (2)

Sets the Needle Washing Time from particular solvent.

Pump Plunger Wash at Injection Wash

Sets whether the Pump Plunger will be washed at Injection Wash. This function requires corresponding plumbing between autosampler and pump.

Plunger Washing Time

Sets the Plunger Washing Time.

4.4.3 Device Monitor

The *Device Monitor* window can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window. It displays the actual cooler temperature (if configured) and allows to perform the *Purge* and *Rinse* actions.

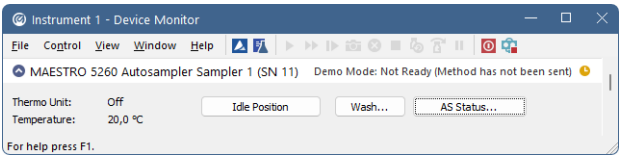

Fig. 24: Device Monitor - Autosampler

Idle Position

Move the autosampler to the initial position.

Wash…

Opens the *Wash* dialog used for performing wash actions on the autosampler.

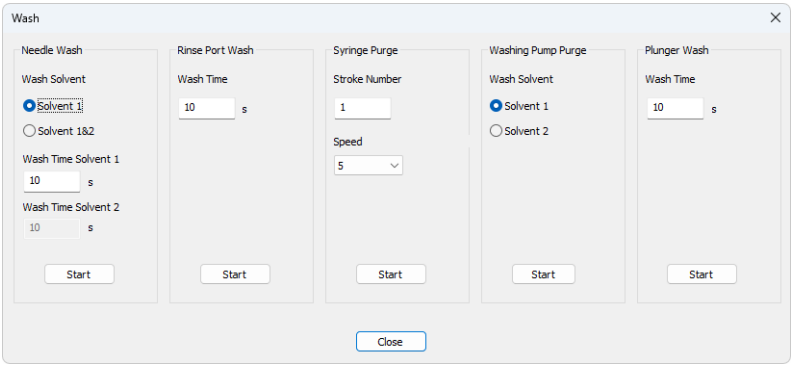

Fig. 25: Wash

You may decide to perform 5 different washes manually. Each wash is started by pressing the *Start* button in it's section, and either ends up automatically after the time set in the section expires (*Needle Wash*, *Rinse Port Wash*, *Plunger Wash*), after the set amount of strokes performed (*Syringe Purge*) or must be stopped by the *Stop* button in case of the *Washing Pump Purge*. When one wash routine is active, all other wash procedures are disabled until the previous wash program is finished.

AS Status…

Opens the MAESTRO *Setup* window displaying the information about the sampler. Warning ⚠ is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *AS Maintenance* button.

Note: When the Part Maintenance dialog is opened from *Device Monitor* it is in read-only mode.

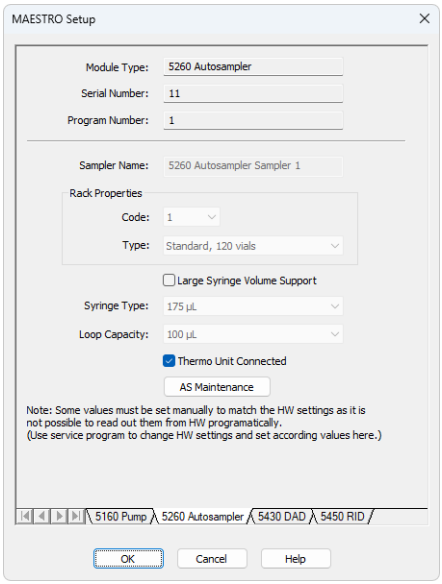

Fig. 26: MAESTRO Setup - AS

Thermo Unit (Not) Connected

Indicates whether Thermo Unit is connected or not.

4.4.4 Report Setup

The autosampler settings accessible from the Method Setup - AS tab and MAESTRO Setup - Autosampler dialog may also be included in the report. To do so, the *Injection Control* parameter on the ***Method*** tab of the ***Report Setup*** dialog must be checked.

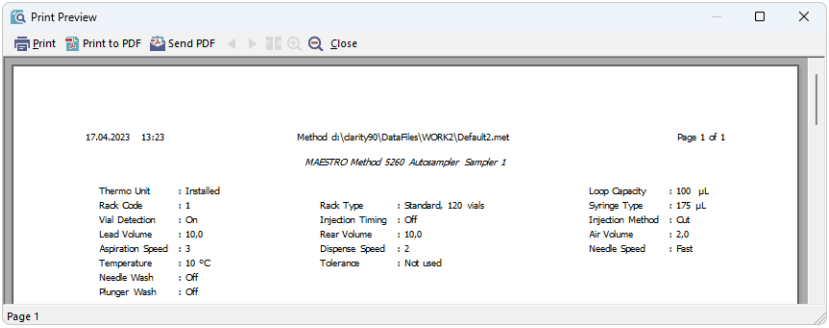

Fig. 27: Report - Autosampler

The first part of the parameters is taken from the MAESTRO Setup - Autosampler dialog settings, the second part contains parameters set on the Method Setup - AS tab.

4.5 Column Oven

TheMethod Setup - Thermostat tab serves for setting the temperature program of the analysis using the thermostat (column oven) configured in theMAESTRO Setup - Column Oven dialog.

4.5.1 Interlab MAESTRO Setup - Column Oven

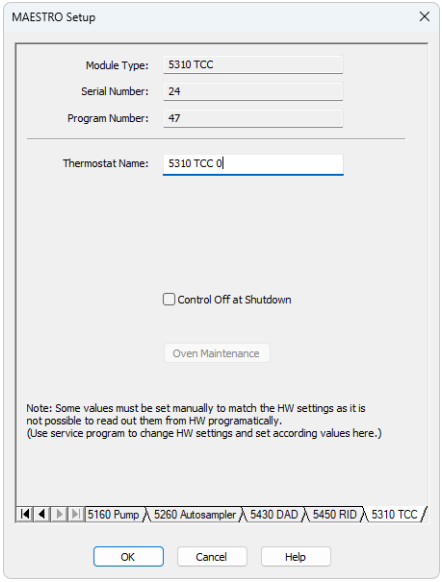

Fig. 28: MAESTRO Setup - Thermostat

Thermostat Name

Defines the name of the thermostat to be displayed in the Method Setup dialog and on other places.

Control Off at Shutdown

Sets whether the *Heat Control* should be turned off on shutdown.

Oven Maintenance

Opens *Oven: Part Maintenance* dialog. Button is enabled only when valve is connected. For more information refer to Part Maintenance.

4.5.2 Method Setup - Thermostat

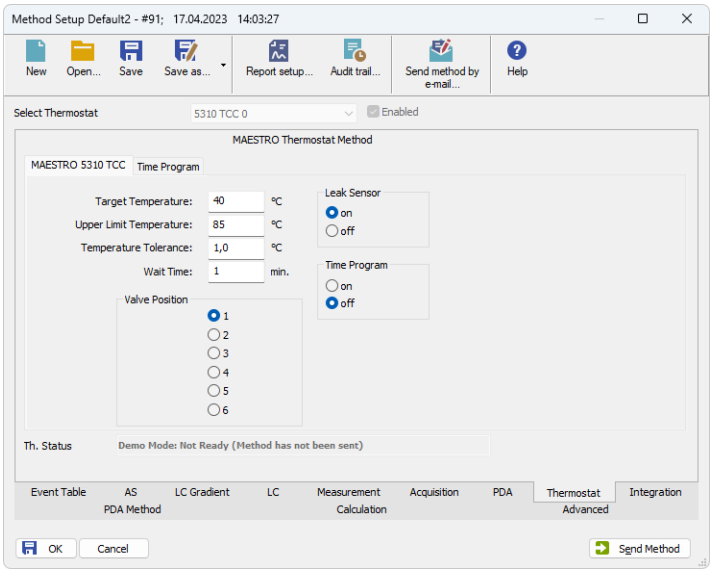

Fig. 29: Method Setup - Thermostat

Target Temperature
Sets the target temperature.

Upper Limit Temperature
Sets the maximal allowed temperature. When the temperature in the thermostat exceeds the value entered here, the controller will report error and the analysis will stop.

Temperature Tolerance
The control module will not switch to the *READY* state until the actual temperature will not be in the temperature tolerance and the *Wait Time* has elapsed.

Wait Time
Sets the time in min. until the Thermostat will report *READY* status.

Valve Position
Sets the initial position of the valves (if there are any installed).

Leak Sensor
Allows to set the leak sensor *on*/*off*.

Time Program

Allows to enable of disable using of the *Time Table*. When turned *on*, the *Time Program* table is editable.

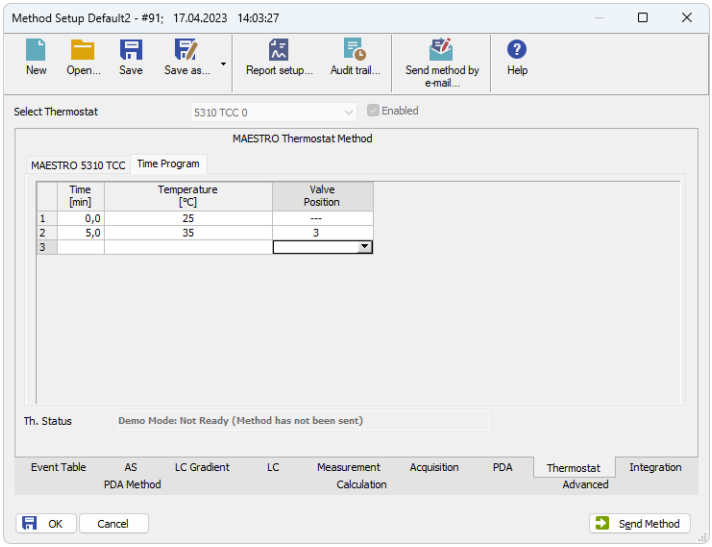

Fig. 30: Method Setup - Thermostat - Time Program

Time Program serves for programming the changes of temperature and state of valve during the analysis. Last completed row of the table indicates the time of the end of time program, after which the time program will be finished immediately.

4.5.3 Device Monitor

The *Device Monitor* window can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window. Thermostat *Device Monitor* serves for monitoring the actual thermostat temperature and allows to switch the thermostat on and off.

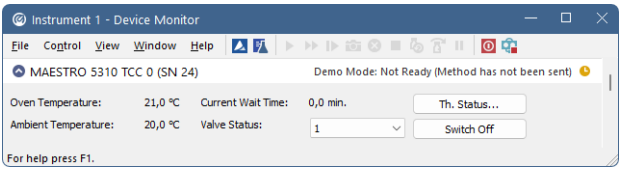

Fig. 31: Device Monitor - Thermostat

Oven Temperature
Field displaying the actual oven temperature.

Ambient Temperature
Field displaying the actual ambient temperature.

Current Wait Time
Information about the actual wait time duration.

Valve Status
Information about the valve status. When acquisition is not running (between the analyses) it is possible to directly switch the state of the valve.

Switch On (Off)
Turns the column oven on and off.

Th. Status…

Opens the MAESTRO *Setup* window displaying the information about the column oven.

Warning ⚠ is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *Oven Maintenance* button.

Note: When the Part Maintenance dialog is opened from *Device Monitor* it is in read-only mode.

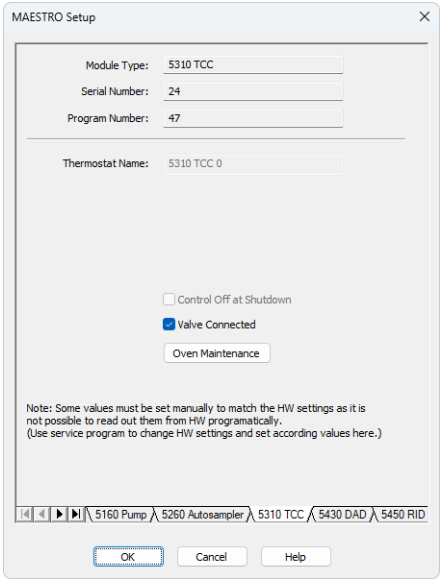

Fig. 32: MAESTRO Setup - Column Oven

Menu Path: Report Setup (*from all major windows*)

4.5.4 Report Setup

Both parameters set on theMAESTRO Setup - Thermostat tab (valve types used) and parameters set on theMethod Setup - Thermostat tab can be printed. To do so, it is necessary to check the *Instrument Control* option on the ***Method*** tab of the ***Report Setup*** dialog.

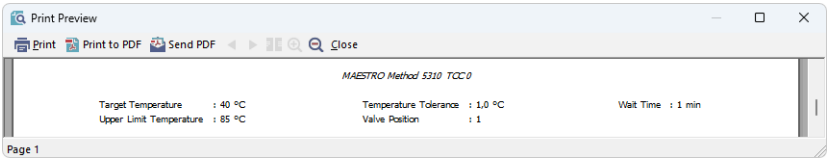

Fig. 33: Report - Thermostat

4.6 PDA Detector

TheMethod Setup - PDA tab and its sub-tabs serve for setting the PDA Detector parameters configured in theMAESTRO Setup - PDA Detector dialog.

4.6.1 Interlab MAESTRO Setup - PDA Detector

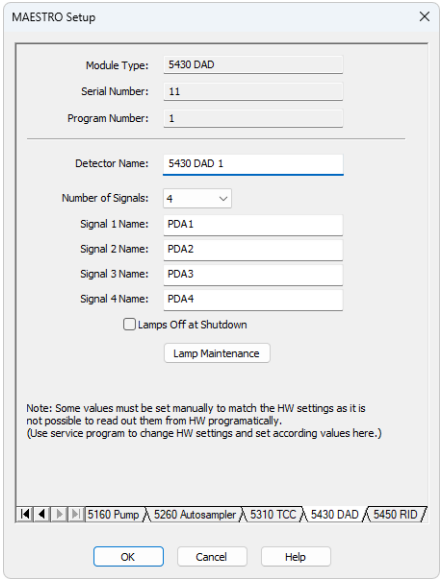

Fig. 34: MAESTRO Setup - PDA Detector

Module Type
Displays the *Module Type* you have added.

Serial Number
Displays the Serial number you have entered for the module.

Program Number
Displays the Program Number you have entered for the module.

Detector Name
Sets the name of the detector used through the software.

Number of signals
Sets the number of signals provided by the detector

Signal 1 (..4) Name
Sets the names of the signals acquired by the detector.

Lamp Off at Shutdown
Sets whether the Lamp should be turned off on shutdown. Lamp could be turned on again by sending the method to the detector, in case it is set in the method.

Lamp Maintenance
Opens *Part Maintenance* dialog. For more information refer to Part Maintenance.

4.6.2 Method Setup - PDA - Detector Settings

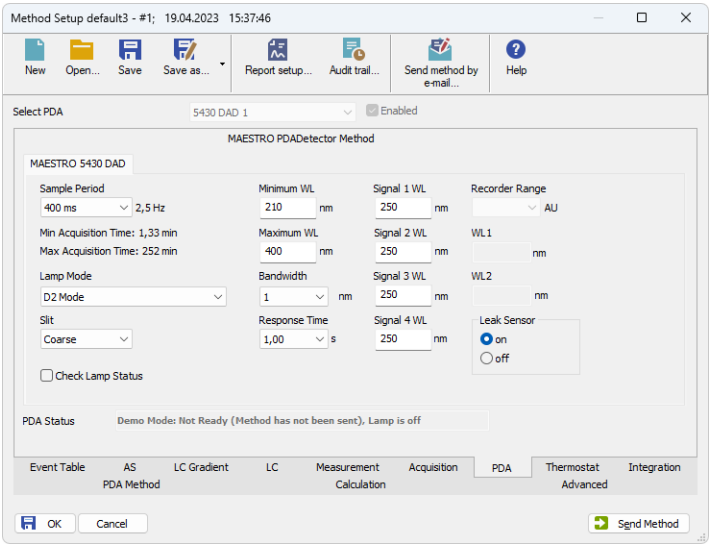

Fig. 35: Method Setup - PDA

Sample Period
Sets the period time in ms. Valid values are 10, 20, 50, 100, 200, 400, 800, 1600 and 3200 ms.

Note: If lower values are selected (e.g. 10 ms) lower filtering Response Time should be used (e.g. 0,01 s), otherwise the resulting chromatogram will not be smooth.

Lamp Mode
Sets the mode of the lamp. With *None* option set both lamps are turned off and detector stays in Not Ready state.

Slit
Sets if the Slit is *Coarse* or *Fine*.

Minimum WL
Sets the minimal wavelength for measurement.

Maximum WL
Sets the maximal wavelength for measurement.

Signal 1..4 WL
Sets the wavelength the detector will be measuring on each of the particular signals.

Check Lamp Status
If Checked, the status of the lamp will be detected before run.

Bandwidth
Sets the bandwidth used for measurement.

Response Time
Sets the response time.

Recorder Range
Sets the Recorder Range. Active only with *Analog Output Board* installed.

WL1 (WL2)
Sets the wavelengths used for recorder output.

Leak Sensor
Allows to set the leak sensor *on*/*off*.

4.6.3 Device Monitor

The *Device Monitor* window can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window. It displays the actual wavelength and also allows to perform the *Zero Detector* action and switch the lamp on and off.

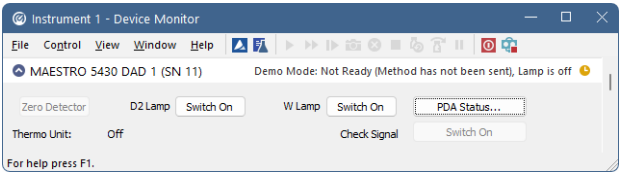

Fig. 36: Device Monitor - PDA Detector

It is possible to control the detector operation during the analysis in the *Device Monitor* window.

Zero Detector
Sets the response of the detector to *0*.

Switch On (Off)
Turns the *D2* or *W Lamp* on/off.

Thermo Unit Not Connected/ Off
Indicates whether Thermo Unit is connected or not.

Check Signal Switch On/Off
Enables to monitor baseline process besides the analysis.

PDA Status…
Opens the MAESTRO *Setup* window displaying the information about the detector.
Warning ⚠ is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *Lamp Maintenance* button.

Note: When the Part Maintenance dialog is opened from *Device Monitor* it is in read-only mode.

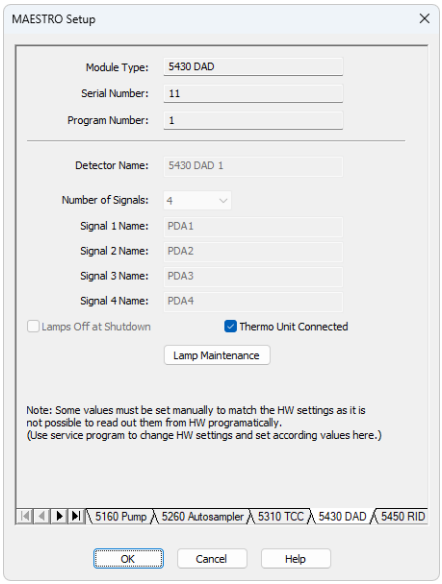

Fig. 37: MAESTRO Setup - Detector

Lamp Off at Shutdown

Turns the lamp off after shutdown.

Lamp Maintenance

Opens the Part Maintenance window displaying the information about the lamps.

4.6.4 Report Setup

All detector settings accessible on theMethod Setup - Acquisition tab (including sub-tabs) are reported if the *Instrument Control* parameter on the ***Method*** tab of the ***Report Setup*** dialog is checked.

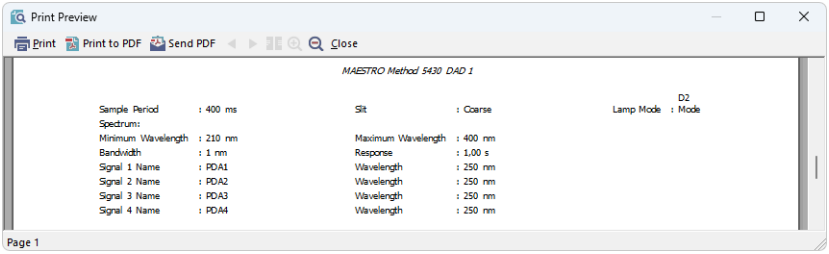

Fig. 38: Report - PDA Detector

Two groups of parameters will be then printed, one common to all channels of a given detector, the other specific to particular channels.

4.7 UV Detector

TheMethod Setup - Acquisition tab and its sub-tabs serves for setting the UV Detector parameters configured in theMAESTRO Setup - UV Detector dialog.

4.7.1 Interlab MAESTRO Setup - UV Detector

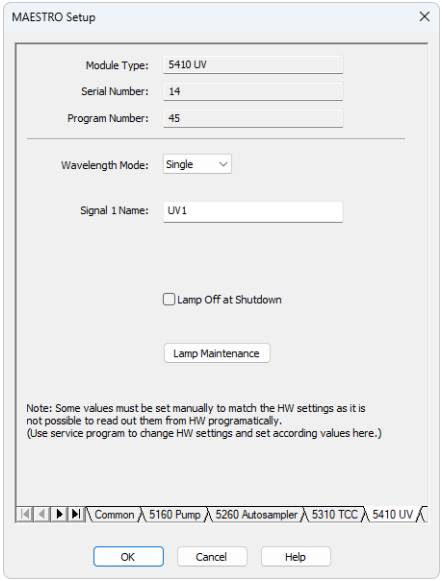

Fig. 39: MAESTRO Setup - UV Detector

Module Type
Displays the *Module Type* you have added.

Serial Number
Displays the Serial number you have entered for the module.

Program Number
Displays the Program Number you have entered for the module.

Wavelength Mode
Sets the number of signals acquired by the detector. Time Table is available in Single mode only.

Signal 1 (2) Name
Sets the names of the signals acquired by the detector.

Lamp Off at Shutdown
Sets whether the Lamp should be turned off on shutdown. Lamp could be turned on again by sending the method to the detector, in case it is set in the method.

Lamp Maintenance
Opens *Part Maintenance* dialog. For more information refer to Part Maintenance.

4.7.2 Method Setup - Acquisition - Detector Settings

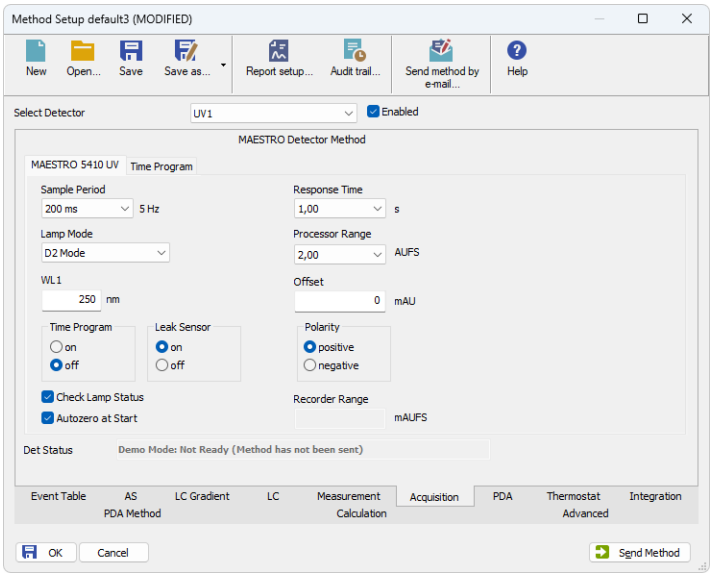

Fig. 40: Method Setup - Acquisition - Detector Settings

Sample Period
Sets the period time in ms. Valid values are 10, 20, 50, 100, 200, 400, 800, 1600 and 3200 ms for single mode and 400, 800, 1600 and 3200 ms for dual mode.

Note: If lower values are selected (e.g. 10 ms) lower filtering Response Time should be used (e.g. 0,01 s), otherwise the resulting chromatogram will not be smooth.

Lamp Mode
Sets the mode of the lamp. With *None* option set the lamp is turned off.

WL1 (WL2)
Sets the wavelength the detector is measuring on.

Time Program
Sets whether the *Time Program* is turned on/off. This option is available only when *Wavelength Mode* is set to *Single*.

Check Lamp Status
If Checked, the status of the lamp will be detected before run.

Autozero at Start
If checked, reset of the detector will be performed before each start.

Response Time
Defines the Time Constant of the detector's filter.

Processor Range
Sets the Processor Range.

Leak Sensor
Allows to set the leak sensor *on*/*off*.

Caution: Even when the values are 0.25; 0.50; 1.00 and 2,00 AUFS, the actual *Processor Range* is applied in double value than the selected one.

Offset
Sets the offset of the signal output.

Polarity
Sets whether the Polarity is positive/negative.

Recorder Range
Sets the Recorder Range. Active only with *Analog Output Board* installed.

4.7.3 Method Setup - Acquisition - Time Program

Time Program allows to set the detector wavelength parameter defined on previous tab based on the analysis time. It is available in *Single WL* mode only. This tab is active only when *Time Program* is turned on Detector tab. In order to modify wavelength for desired time by the *Time Program*, the table has to contain a row defining time when wavelength is about to switch to new one and successive row (with the same wavelength as on previous row) defining time interval for use of newly set wavelength. When a last row of the table is reached the time program is finished and initial conditions are set according to wavelength defined in the method tab. If *Time Program* is longer then *Autostop* time of the method the *Instrument* will in switch to *Control* after elapsing *Autostop* time.

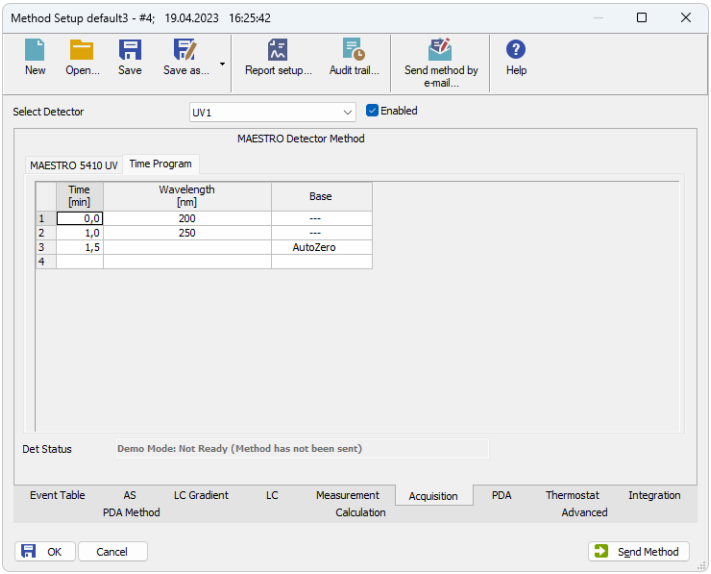

Fig. 41: Method Setup - Acquisition - Time Program

The wavelength settings defined on the Detector Settings sub-tab can be changed during the analysis by events programmed in the **Time Table**.

Time [min.]
Sets the time of the wavelength change in min.

Wavelength
Sets the wavelength which will be set in the defined time.

Base
Choose the *AutoZero* if you want to reset the Detector to zero or *Hold* if you want to keep the current value.

4.7.4 Device Monitor

The *Device Monitor* window can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window. It displays the actual wavelength and also allows to perform the *Zero Detector* action and switch the lamp off.

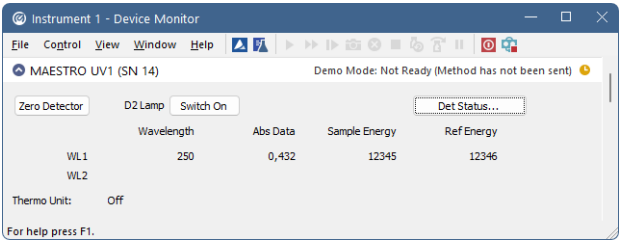

Fig. 42: Device Monitor - UV Detector

It is possible to control the detector operation during the analysis in the *Device Monitor* window.

Zero Detector
Sets the response of the detector to *0*.

Switch On (Off)
Turns the D2 Lamp on/off.

Wavelength
Current wavelength retrieved from the UV Detector.

Abs Data
Absolute data retrieved from the UV Detector.

Sample Energy
Sample energy retrieved from the UV Detector.

Ref Energy
Reference energy retrieved from the UV Detector.

WL1 (WL2)
Depending on the *Wavelength Mode* indicates the values from *Signal 1* or both *Signal 1* and *2*.

Thermo Unit Not Connected/ Off
Indicates whether Thermo Unit is connected or not.

Det Status…
Opens the MAESTRO *Setup* window displaying the information about the module.
Warning ⚠ is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *AS Maintenance* button.

Note: When the Part Maintenance dialog is opened from *Device Monitor* it is in read-only mode.

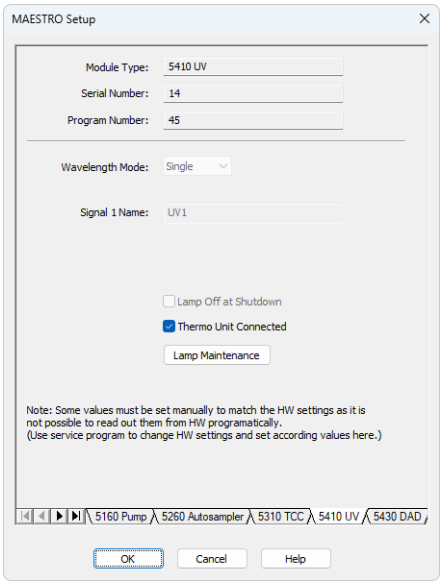

Fig. 43: MAESTRO Setup - Detector

Lamp Off at Shutdown
Turns the lamp off after shutdown.

Lamp Maintenance
Opens the Part Maintenance window displaying the information about the lamps.

4.7.5 Report Setup

All detector settings accessible on the Method Setup - Acquisition tab (including sub-tabs) are reported if the *Instrument Control* parameter on the ***Method*** tab of the ***Report Setup*** dialog is checked.

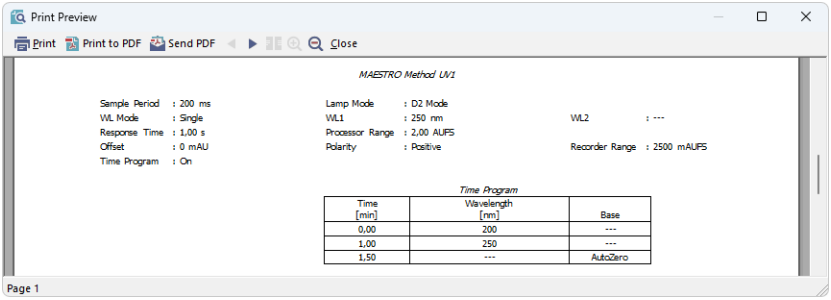

Fig. 44: Report - UV Detector

Two groups of parameters will be then printed, one common to all channels of a given detector, the other specific to particular channels. The first section also includes the **Time Program** from the Method Setup - Acquisition - Time Program tab.

4.8 RI Detector

TheMethod Setup - Acquisition tab serves for setting the RI Detector parameters configured in theMAESTRO Setup - RI Detector dialog.

4.8.1 Interlab MAESTRO Setup - RI Detector

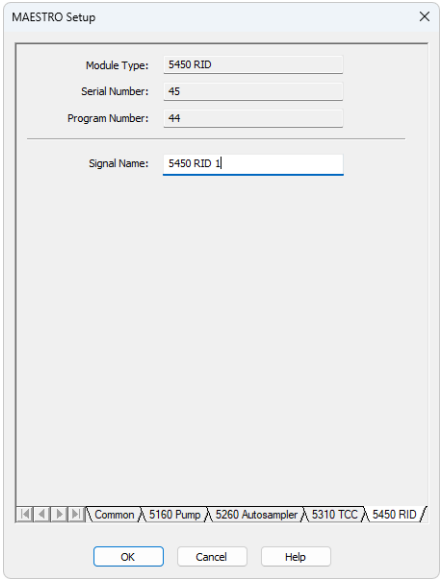

Fig. 45: MAESTRO Setup - Refractive Index Detector

Module Type
Displays the *Module Type* you have added.

Serial Number
Displays the Serial number you have entered for the module.

Program Number
Displays the Program Number you have entered for the module.

Signal Name
Sets the name of the signal acquired by the detector.

4.8.2 Method Setup - Acquisition - Detector Settings

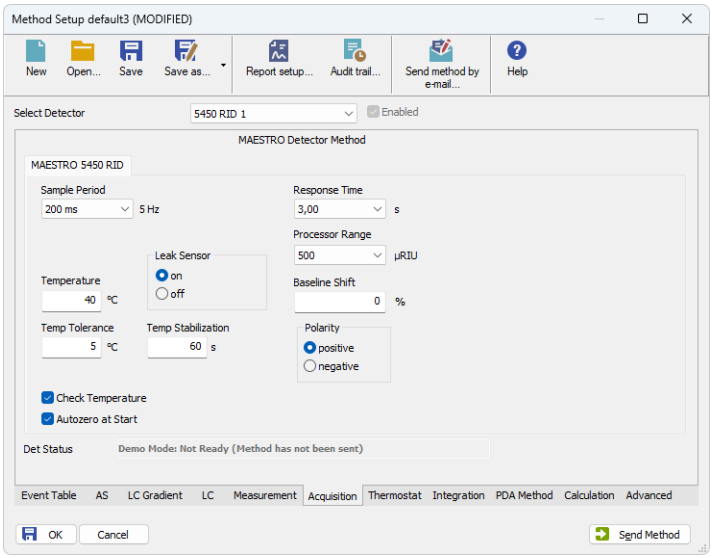

Fig. 46: Method Setup - Acquisition - Detector Settings

Sample Period
Sets the period time in ms.

Temperature
Sets the temperature.

Temp Tolerance
Sets the tolerance for changing the temperature.

Leak Sensor
Allows to set the leak sensor *on*/*off*.

Temp Stabilization
Sets the period after the changed temperature is stabilized.

Check Temperature
Sets if the temperature is automatically stabilized.

Autozero at Start
Sets if the Autozero is performed at the start of the acquisition.

Time Constant
Defines the Time Constant of the detector's filter.

Processor Range
Sets the Processor Range. In case that actual value of signal exceeds the range, the signal received by **Clarity** could be trimmed down or shifted into negative values.

Baseline Shift
Sets the baseline shift.

Polarity
Sets whether the Polarity is *positive*/*negative*.

4.8.3 Device Monitor

The *Device Monitor* window can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window or using the Device Monitor icon. It displays the actual signal and temperature in the cell. Also it is possible to perform Purge and reset the response of the detector.

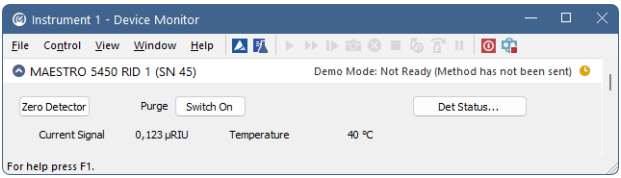

Fig. 47: Device Monitor - RI Detector

It is possible to control the detector operation during the analysis in the *Device Monitor* window.

Zero Detector
Sets the response of the detector to *0*.

Purge Switch On (Off)
Turns on/off the purging. Detector stays in Not Ready state during purging.

Current Signal
Displays current value of the detector signal.

Temperature
Displays the temperature of the cell.

Det Status…

Opens the Status window showing the information about the detector.

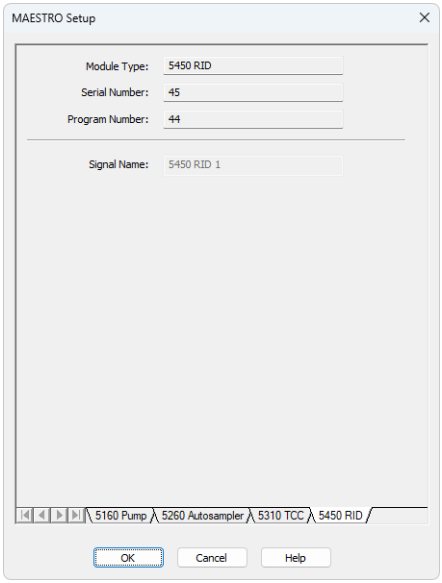

Fig. 48: Setup - Detector

4.8.4 Report Setup

All detector settings accessible on the[Method Setup - Acquisition](#) tab are reported if the *Instrument Control* parameter on the ***Method*** tab of the ***Report Setup*** dialog is checked.

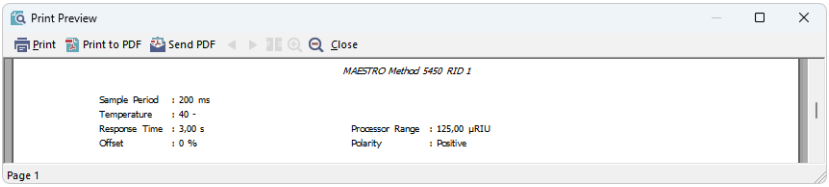

Fig. 49: Report - RI Detector

4.9 FL Detector

TheMethod Setup - Acquisition tab and its sub-tabs serve for setting the FL Detector parameters configured in theMAESTRO Setup - Fluorescence Detector dialog.

4.9.1 Interlab MAESTRO Setup - FL Detector

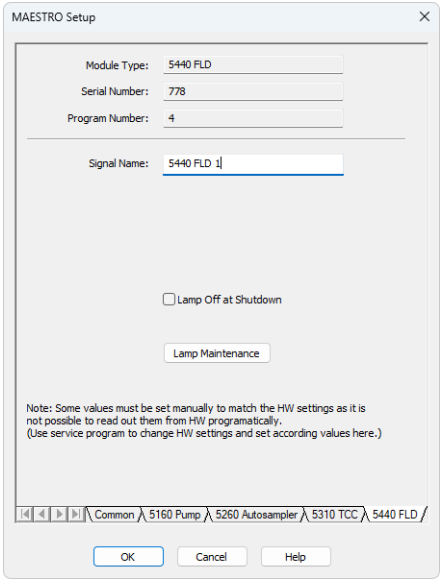

Fig. 50: MAESTRO Setup - FL Detector

Module Type
Displays the *Module Type* you have added.

Serial Number
Displays the Serial number you have entered for the module.

Program Number
Displays the Program Number you have entered for the module.

Signal Name
Sets the name of the signal acquired by the detector.

Lamp Off at Shutdown
Sets whether the Lamp should be turned off on shutdown. Lamp could be turned on again by sending the method to the detector, in case it is set in the method.

Lamp Maintenance
Opens *Part Maintenance* dialog. For more information refer to Part Maintenance.

4.9.2 Method Setup - Acquisition - Detector Settings

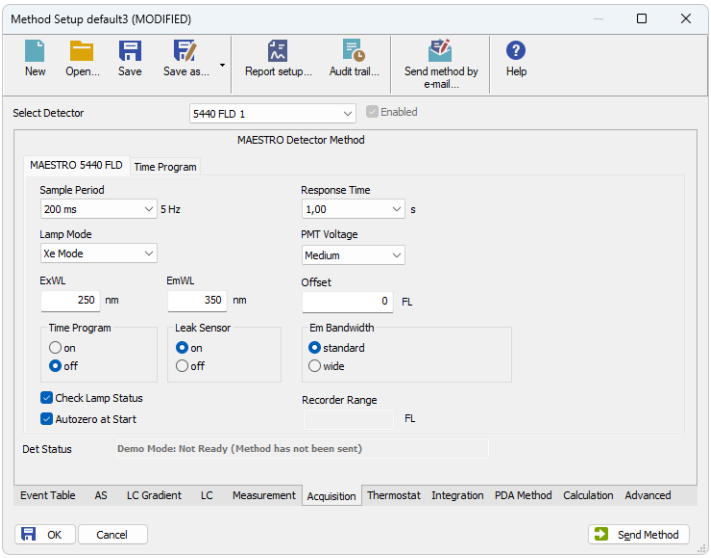

Fig. 51: Method Setup - Acquisition - Detector Settings

Sample Period
Sets the period time in ms. Valid values are 10, 20, 50, 100, 200, 400, 800, 1600 and 3200 ms.

Note: If lower values are selected (e.g. 10 ms) lower filtering Response Time should be used (e.g. 0,01 s), otherwise the resulting chromatogram will not be smooth.

Lamp Mode
Sets the mode of the lamp. With *None* option set lamp is turned off.

ExWL
Sets the excitation wavelength of the detector.

EmWL
Sets the emission wavelength the detector is measuring on.

Time Program
Sets whether the Time Program is turned on/off.

Leak Sensor
Allows to set the leak sensor *on*/*off*.

Check Lamp Status
If Checked, the status of the lamp will be detected before run.

Autozero at Start
Sets if the Autozero is performed at the start of the acquisition.

Response Time
Defines the Time Constant of the detector's filter.

PMT Voltage
Sets the voltage of the photomultiplier.

Offset
Sets the offset of the signal output.

Em Bandwidth
Sets the bandwidth of the emission filter.

Recorder Range
Sets the Recorder Range. Active only with *Analog Output Board* installed.

4.9.3 Method Setup - Acquisition - Time Program

Time Program allows to set the detector wavelength parameter defined on previous tab based on the analysis time. It is available in *Single WL* mode only. This tab is active only when *Time Program* is turned on Detector tab. In order to modify wavelength for desired time by the *Time Program*, the table has to contain a row defining time when wavelength is about to switch to new one and successive row (with the same wavelength as on previous row) defining time interval for use of newly set wavelength. When a last row of the table is reached the time program is finished and initial conditions are set according to wavelength defined in the method tab. If *Time Program* is longer then *Autostop* time of the method the *Instrument* will in switch to *Control* after elapsing *Autostop* time.

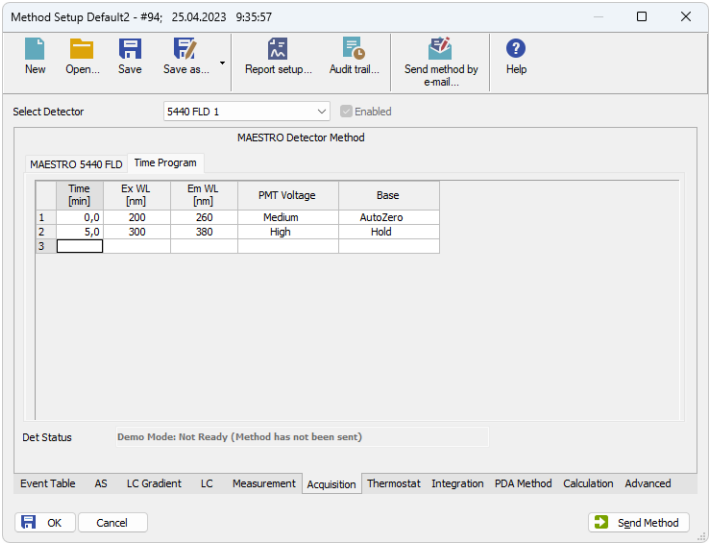

Fig. 52: Method Setup - Acquisition - Time Program

The wavelength settings defined on theDetector Settings sub-tab can be changed during the analysis by events programmed in the **Time Table**.

Time [min.]
Sets the time of the wavelength change in min.

Ex WL
Sets the excitation wavelength which will be set in the defined time.

Em WL
Sets the emission wavelength which will be set in the defined time.

PMT Voltage
Sets PMT Voltage which will be set in the defined time.

Base

Choose the *AutoZero* if you want to reset the Detector to zero or *Hold* if you want to keep the current value.

4.9.4 Device Monitor

The *Device Monitor* window can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window or using the Device Monitor icon. It displays the actual wavelengths retrieved from the detector. Also allows to perform the *Zero Detector* action and switch the Xe Lamp off.

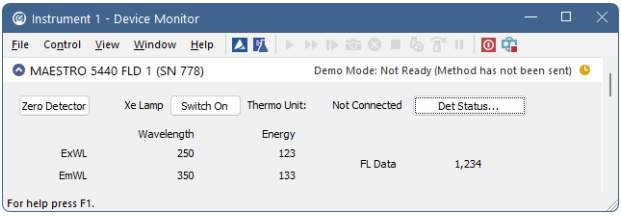

Fig. 53: Device Monitor - FL Detector

It is possible to control the detector operation during the analysis in the *Device Monitor* window.

Zero Detector
Sets the response of the detector to *0*.

Switch On (Off)
Turns the *Xe Lamp* on/off.

Wavelength and Energy
Current wavelength and energy retrieved from the detector.

FL Data
Displays actual value of detector signal.

Thermo Unit Not Connected/ Off
Indicates whether Thermo Unit is connected or not.

Det Status…

Opens the Status window showing the information about the detector.

Warning ⚠ is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *Lamp Maintenance* button.

Note: When the Part Maintenance dialog is opened from *Device Monitor* it is in read-only mode.

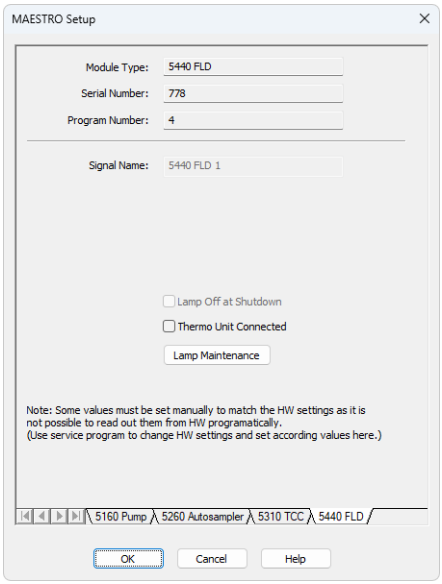

Fig. 54: MAESTRO Setup - FL Detector

Lamp Off at Shutdown

Turns the lamp off after shutdown.

Lamp Maintenance

Opens the Part Maintenance window displaying the information about the lamps.

4.9.5 Report Setup

All detector settings accessible on theMethod Setup - Acquisition tab (including sub-tabs) are reported if the *Instrument Control* parameter on the ***Method*** tab of the ***Report Setup*** dialog is checked.

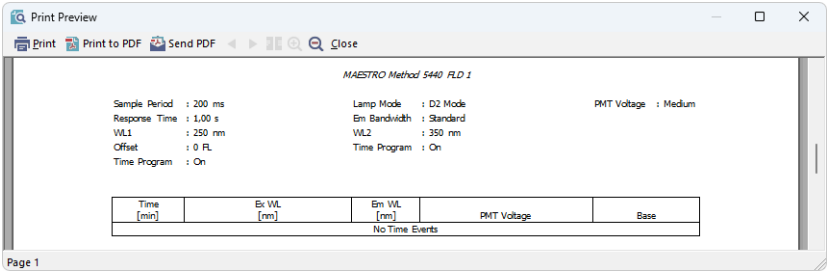

Fig. 55: Report - FL Detector

This section also includes the **Time Table** from theMethod Setup - Acquisition - Time Program tab.

5 Troubleshooting

When the remedy for some problem cannot be discovered easily, the recording of communication between **Clarity** and the chromatograph can significantly help to discover the cause of the problem.

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

```
[MAESTRO 1]
        echo=on
        textmode=on
        filename=Comm_MAESTRO_%D.txt
        reset=off
```

The created *.TXT files will greatly help in diagnosis of unrecognized errors and problems in communication.

Note: In case your system uses other USB Interface Board than Sys 1, you should change the number in the section header to the proper value.

It is not possible to start the Acquisition from Clarity when using the detector without the included autosampler.

Solution: When using the detector itself without internal autosampler, start the *Acquisition* by the external start from your autosampler (set properly the *Ext. Start Dig. Input* of the detector in the **Clarity** Configuration).

It is not possible to start the Acquisition from Clarity when using the system without the included detector.

Solution: When used the system without internal detector, start the *Acquisition* by the external start to the digital input of some other device connected to the **Clarity**(set properly *Ext. Start Dig. Input* of the device used in the **Clarity** Configuration).

In case that communication between the computer and DAD Detector gets freezed, error message "Server Busy" occurs.

Solution: In that case it is necessary to restart the detector, by turning it off and on again.

It is not possible to autodetect the device.

Solution: It is possible that the IFC USB driver is not installed properly. To make sure the HW driver is installed properly, go to the Device manager. Find IFC USB driver and check if it is installed properly. Eventually, try to reinstall it.

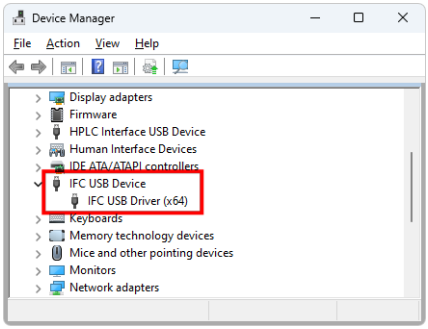

Fig. 56: IFC USB driver in Device manager

It is not possible to install Maestro IFC USB driver. Installation failed with error code 39 (can be found in Device Manager - driver details).

Solution: Memory Integrity setting (to be found in Windows security - Device security - Core Isolation details) may be switched on. To install the driver this setting must be switched off.

5.1 MAESTRO Maintenance Software

For service purposes, setting of the *Gas Leak Sensor* or assigning communication channel in case there are more detectors in the system install the **MAESTRO Maintanace Software** located in C:\CLARITY \HW_ DRIVERS\INTERLABDRIVERKIT\TOOLS. This application can be also used for evaluation of communication troubles between **Clarity** and **MAESTRO** system.