

HITACHI CHROMASTER

Clarity Control Module

ENG

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To facilitate the orientation in the **Hitachi Chromaster** manual and **ClarityVA** 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 **ClarityVA**, 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 **ClarityVA** 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 Hitachi Chromaster Control module

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



Fig. 1: Hitachi Chromaster

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 **ClarityVA** environment. Instrument method controlling the analysis conditions will be saved in the measured chromatograms.

ClarityVA can currently control the following modules:

- Pumps: 5110, 5160
- Detectors: 5410 UV, 5420 UV/Vis, 5430 PDA, 5440 Fluorometric , 5450 Refractive Index
- Autosamplers: 5210, 5260, 5280
- Column Oven: 5310, 6310

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

2 Requirements

- ClarityVA 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 **Hitachi Chromaster** is available only in selected territories. Please contact us for details.

Note: Cables are not part of the **ClarityVA** 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 **Hitachi Chromaster** 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 **ClarityVA** Instrument or contrarily propagate the start signal from the autosampler to other device.
 - The Hitachi Chromaster LC control for ClarityVA, the Hitachi Chromaster LC control for OpenLab/EZChrom or Hitachi ChromasterSystem Manager must not be installed on the same computer as it may result in communication errors.

Caution: Hitachi-AID (analog input board) is not supported by **ClarityVA**. For analog signal acquisition please use **DataApex** A/D converter **Colibrick**.

Supported operating systems:

- Windows 10 (64 bit)
- Windows 11 (64 bit)
- *Note:* Although **Hitachi Chromaster** does not state other **Windows OS** between supported, the system may work on other OS versions as well e.g., Windows 7 SP1 (32/64 bit). This functionality is not guaranteed though.

3 Installation procedure

3.1 Hitachi Chromaster communication

It is possible to controlup to 4 **Hitachi Chromaster** systems configured on different Instruments of the same **ClarityVA** 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 **Hitachi Chromaster** system and also in the **Add Module** dialog when configuring the **Hitachi Chromaster** in **ClarityVA**.

3.2 ClarityVA Configuration



Fig. 2: Adding Hitachi Chromaster 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 **Hitachi Chromaster** and click the *Add* ③ button. The Chromaster Setup dialog will appear.

Chromaster Setup	×
USB Interface Board Sys1 Sys3 Sys2 Sys4	
List of Modules: CM 5110 Pump CM 5260 Autosampler CM 5420 UV-Vila Detector (Channel 1) CM 5430 Diode Array Detector	Autodetect
	Add Remove
Common (CM 5110 Pump) CM 520	50 Autosampler 👌 CM 5420 UV-Vis Help

Fig. 3: Hitachi Chromaster 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 <u>Hitachi Chromaster Setup</u> 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 **ClarityVA** 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 **Hitachi Chromaster** item ④ will appear in the Setup Control Modules list of the System Configuration dialog.
- Set the *Instrument Type* (5) (a) on the desired Instrument tab (5) (a) 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 Hitachi Chromaster HPLC system contains both Hitachi Chromaster autosampler and Hitachi Chromaster detector, the Ext. Start Dig. Input item Device has to be set to 'Chromaster' and the item Number to value '1'.
- In case of system with **Hitachi Chromaster** autosampler but without any **Hitachi Chromaster** 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 Hitachi Chromaster detector but without Hitachi Chromaster autosampler and if external contact (manual valve) is used then the same cable e- DIO cable needs to be used for starting of the Hitachi Chromaster detector. With such setup the *Ext. Start Dig. Input* needs to be set to 'Chromaster' *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 ClarityVA that injection occurred.

4 Using the control module

Several new tabs appear in the *Method Setup* dialog, based on the settings performed in the <u>Chromaster Setup</u> dialog. These new tabs enable the setting of the **Hitachi Chromaster** system operation program.

Note: The instrument method is always sent to the **Hitachi Chromaster** as a whole.

4.1 Chromaster Setup - Common

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

Chromaster Setup	×
USB Interface Board	
⊖ Sys1 ⊖ Sys3	
⊖ Sys2 OSys4	
List of Modules:	
CM 5110 Pump CM 5260 Autosampler CM 5420 UV: Bottector (Channel 1) CM 5430 Diode Array Detector	Autodetect
	Add
	Remove
CM 5110 Pump CM 5260 /	Autosampler CM 5420 UV-Vis
OK Cancel	Help

Fig. 4: Chromaster Setup - Common tab

USB Interface Board

Depending on the switch configured on the **USB-IF Board** in the **Hitachi Chromaster** 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 **Hitachi Chromaster** system and lists them in the *List of Modules* section.

Add...

Opens the *Add Module* dialog, which is used to select one of the Hitachi Chromaster 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 Chromaster 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 *Chromaster Setup* dialog.

Remove...

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

Remove Module		×
Module		
CM 5260 Autosampl	er, SN: 1, PN: 1	~
	Remove Cancel	
	Cancer	

Fig. 6: Remove Module dialog



4 1

4.2 Part Maintenance

Part Maintenance dialog can be invoked from module tab in<u>Chromaster Setup</u> 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.

CM5260 Sampler: Pa	art Maintenance					×
	Value	Soft limit	Unit	Changed Date		
Injection port	0	<u> </u>	Counts		Reset	
Injection valve	0		Counts		Reset	
Syringe	0		Counts		Reset	
Syringe valve	0		Counts		Reset	
Washing pump	0		Counts		Reset	
		ок	Cancel			

Fig. 7: Example of Part Maintenance dialog for AS

CM5430 PDA Detect	tor: Part Mainte	nance					×
	Value		Soft limit	Unit	Changed Date		
D2 Lamp Time	0			Hours		Reset	
D2 Lamp Count	0	4	이	Counts			
W Lamp Time	0			Hours		Reset	
W Lamp Count	0			Counts			
Hg Lamp Time	0			Hours		Reset	
Hg Lamp Count	0			Counts			
		0	к 🗌	Cancel			

Fig. 8: Example of Part Maintenance dialog for Detector

CM5110 LC: Part Mainte	nance					×
	Value	Soft limit	Unit	Changed Date		
Flow volume	ol		L		Reset	
Plunger washing volume						
Auto purge valve						
Dynamic mixer						
Solvent 1 valve	0		Counts		Reset	
Solvent 2 valve	0		Counts		Reset	
Solvent 3 valve	0		Counts		Reset	
Solvent 4 valve	0		Counts		Reset	
	C	K Car	ncel			

Fig. 9: Example of Part Maintenance dialog for Pump

CM5310 Thermos	tat: Part Maintenance	•				×
	Value	Soft limit	Unit	Changed Date		
Valve	이		Counts		Reset	
		C	ancel			

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 \triangle 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

The <u>Method Setup - LC Gradient</u> tab serves for setting the gradients of the pumps configured in the Hitachi ChromasterSetup - Pump dialog.

4.3.1 Chromaster Setup - Pump

This tab of the <u>Chromaster Setup</u> dialog allows to set the parameters of the pump. For details, see the manual of the pump.

March des Trouver	CM 5110 Due	
Module Type:	CM 5110 Pun	ıp
Serial Number:	1	
Program Number:	1	
Low Pressure Limit:	이	MPa
High Pressure Limit:	40,011	MPa
Solvent 1 Name:	CM5110 LC 1	
Solvent 2 Name:	CM5110 LC 2	4
Solvent 3 Name:	CM5110 LC 3	4
Solvent 4 Name:	CM5110 LC 4	F
	Pump Off a	at Instrument Close
	Start Time	Program on Acquisition Start
	Pump Maint	enance
Note: Some values must be	Pump Maint	mance
Note: Some values must be not possible to read out ther (Use service program to cha	Pump Maint set manually to m from HW prog nge HW setting	enance match the HW settings as it is ramatically. s and set according values here.)
Note: Some values must be not possible to read out the (Use service program to cha	Pump Maint set manually to m from HW prog nge HW setting	enance match the HW settings as it is ramatically. s and set according values here.)

Fig. 11: Chromaster 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.

Start Time Program on Acquisition Start

Starts the Time Program of the pump when the acquisition is started. The pump must enable the usage of the time program in its firmware to use this option. The option must be switched on in case the pump is standalone and not connected to other system components through E-LINE.

Pump Maintenance

Opens *Pump: Part Maintenance* dialog. For more information refer to <u>Part</u> Maintenance.

4.3.2 Method Setup - LC Gradient

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

Gradient Table Time Acetonitrile Methanol Ethanol Flow, [%] Standby Flow 1 mm/,min 1 Initial 80,0 20,0 0,0 2,500 0 min 2 3,00 60,0 40,0 0,0 2,500 0 min 5 15,00 20,0 80,0 0,0 2,500 0 min 7 20,0 80,0 0,0 2,500 0 min 2,5 6 18,0.0 20,0 80,0 0,0 2,500 0 min 2,1	lew	Open	R Save	Save as	Repo	rt setup	Audit trail	Send method by e-mail	? Help			
Time (m) Acctonitrile (%4) Methanol (%4) Ethanol (%4) Flow (m, min) Standby Flow 1 mL/min 1 Initial 3 6,00 40,0 0,0 2,500 1 ml/min 2 3,00 80,0 20,0 0,0 2,500 1 ml/min 3 6,00 40,0 0,0 2,500 1 min 5 15,00 20,0 80,0 0,0 2,500 1 min 6 18,00 20,0 80,0 0,0 2,500 1 min 7 Acctonitrile Methanol Ethanol 1%0 0 min 2,5 4 10,00 60,0 0,0 2,500 1 min 7 Acctonitrile Methanol Ethanol 1%0 0 min 8 4 1 1 1 1 1 8 4 1 1 1 1 1			Gr	adient Table								
1 Initial 80,0 20,0 0,0 2,500 3 6,00 60,0 40,0 0,0 2,500 5 15,00 20,0 0,0 2,500 5 15,00 20,0 60,0 2,500 7 15,00 20,0 60,0 2,500		Time [min]	Acetonitrile [%]	Methanol [%]	Ethanol [%]	Flow [mL/min]	1	Standby Flow		1	ml /min	
2 3.00 80.0 20.0 0.0 2.500 3 6.00 60.0 40.0 0.0 2.500 4 10.00 60.0 40.0 0.0 2.500 5 15.00 20.0 80.0 0.0 2.500 7 20.0 80.0 0.0 2.500 8 90.0 0.0 2.500 1de State 9 9 9 1ritial 9 8 9 9 9 9	1	Initial	80.0	20.0	0.0	2,500		Standby How		·		
3 6,00 60,0 40,0 0,0 2,500 4 10,00 60,0 40,0 0,0 2,500 5 15,00 20,0 80,0 0,0 2,500 7	2	3,00	80,0	20,0	0,0	2,500		Time to Standby		0	min	
4 10,00 60,0 40,0 0,0 2,500 5 15,00 20,0 80,0 0,0 2,500 7 18,00 20,0 80,0 0,0 2,500 (mL/min) Acetonitrile Methanol Ethanol [%] 2,5 4 0 0,0 2,500 1 de State ○ Pump Off □ Initial ● Standby Yime	3	6,00	60,0	40,0	0,0	2,500		Time to Standby		-		
s 15,00 20,0 80,0 0,0 2,500 7 18,00 20,0 80,0 0,0 2,500 [ml_/min] Acetonitrile Methanol Ethanol [%] 22,5	4	10,00	60,0	40,0	0,0	2,500		Standby Time		0	min	
5 18,00 20,0 80,0 0,0 2,500	5	15,00	20,0	80,0	0,0	2,500	1	standby time			min	
7 [ml_/min] 2,5 2,5 40 8 40 9 40 10 10 10 10 10 10 10 10 10 1	5	18,00	20,0	80,0	0,0	2,500						
0,0 5 10 15 Time [min] Qptions	ſmi	./min] 4	Acetonitrile	Methanol	Ethanol	[%] -80 -60 -40 -20	Composition	Idle State Pump Off Initial Standby Initial - Standby				

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 the <u>Gradient Options</u> 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 **ClarityVA** 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 <u>Method Setup - LC Gradient</u> 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 <u>Chromaster Setup - Pump</u> 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.

Gradient Options				×
Min. Pressure:	0	[MPa]	Solvent 1	Acetonitrile
Max. Pressure:	40	[MPa]	Solvent 2	Methanol
Max. Pressure for Set Flow:	1	[MPa]	Solvent 3	Ethanol
			Solvent 4	D
	C	OK	Cancel	Help

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 **Hitachi Chromaster** 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 <u>Device Monitor</u>. 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.

			×
New Open Save Save as Report setup Audit trail Send method by email			
Select LC CM5110 LC 1 \checkmark CE Enabled			
Chromaster LC Method			
and a state of the			
Plunger Wash 🔽 on			
Time 15 s			
Time 15 s Time Program Leak Sensor			
Time 15 s Time Program Leak Sensor On O on O on On O off O off Off			
Time 15 s Time Program On On Off Off Off			
Time 15 s Time Program On On Off C Status Deemo Mode: Nor Ready (Method has not been sent)			
Time 15 s Time Program Leak Sensor on on off on off off			
Time 15 s Time Program Leak Sensor on on off off LC Status Demo Mode: Not Ready (Method has not been sent) Event Table AS LC Gradent LC Measurement Acquisition PDA Integration PDA Method Calcul	ation Adva	anced	

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.

Met	hod !	Setup Def	ault1 - #5;	17.04.2023 1	1:11:43					-	⊐ ×
N	lew	Open	Save :	Save as	Report setup	Audit trail.	Send method e-mail	by Help			
Sele	ct LC			CM5110	LC 1	~	Enabled				
					Chromaster	LC Method					
	CM 5:	110 Pump	Time Progra	m							
		Time [min]	Event1	Event2	Event3	Event4					
	1	0,0	Off	On	Pulse						
	2	1,0	On	Pulse	Off						
	3										
LC	Stat	us	Demo Mod	le: Not Ready (Method has no	ot been sent)					
Ev	ent T	able As	LC Grad	ent LC I	Measurement	Acquisition F	DA Integration	PDA Method	Calculation	Advance	ed
F	0	кС	ancel							Seno	d Method

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.

lnstrument 1 - Device Monitor			— 🗆 🗙
<u>F</u> ile Co <u>n</u> trol <u>V</u> iew <u>W</u> indow <u>H</u> elp	🌠 🕨 🕨 🗈 🔯 🖉 🔳	681	0
LC Monitor			No method sent 🤒
Component Flow			Stop Flow
A 📮 🦳	Time [min]		Set Flow
в Б	-9		Resume Idle
	Total Flow [mL/min]	0,000	
	Pressure [MPa]		Hold
Figures in italics represent expect	ted and not actual values		Modify Gradient
Chromaster CM5110 LC 1 (SN 123)	Demo Mode: Not	Ready (Meth	nod has not been sent) 🤒
AutoPurge Purge Valve: Not C	onnected	LCS	Status

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.

Set Flow			×		
Total Flow		5,000	[mL/min]		
A		0	[%]		
В		0	[%]		
с		0	[%]		
D		100	[%]		
Max. Pressure:	▲	25	[MPa]		
Apply		Cancel			

Fig. 17: Set Flow

Resume Idle

Returns the pumps to *IDLE* state as defined in the appropriate field on the<u>LC</u> 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<u>LC Control Manual Flow</u> 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 <u>Chromaster Pump Setup</u> dialog which allows to set some of parameters of the pump and to view the <u>Part</u> <u>Maintenance</u>. For details, see the manual of the pump.

Warning **A** 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:

AutoPurge and Was	h	>
Auto Purge Valve		Plunger Wash
Solvent		Wash Time
○] ○ 2		150 s
O3 O4		
Purge Flow		
5000 µl/mir	1	
Time		
15 min		
Start		Start
Close Valve		
Close valve		

Fig. 18: AutoPurge - Wash

Caution: AutoPurge is limited to 50% of the maximum pressure. Value of maximum pressure is taken from <u>Chromaster Setup</u> 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 from<u>Device Monitor</u> window allows the user to set a custom mobile phase composition and flow while the analysis is running. It resembles the<u>Method Setup -</u> LC Gradient tab in functionality.

1 2 3 4 5	Time [min] Initial 3,00 6,00 10,00	Acetonitrile [%] 80,0 80,0 60,0	Methanol [%] 20,0 20,0	Ethanol [%] 0,0	Flow [mL/min]	Standby Flow	1 mL/
1 2 3 4 5	Initial 3,00 6,00 10,00	80,0 80,0 60,0	20,0 20,0	0,0	2 500		
2 3 4 5	3,00 6,00 10,00	80,0 60,0	20,0		2,000		
3 4 5	6,00 10,00	60,0		0,0	2,500	Time to Standby	0 min
4 5	10,00		40,0	0,0	2,500		
5		60,0	40,0	0,0	2,500	Standby Time	0 min
c	15,00	20,0	80,0	0,0	2,500	Brandby finite	
D	18,00	20,0	80,0	0,0	2,500		
Flow	2,5	5	10 Time	15	-80 -60 -40 -20 0 (min]	 Initial Standby Initial - Standby 	

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 **ClarityVA** station returns to the original method.

4.3.5 Report Setup

All of the pump settings accessible on the <u>Method Setup - LC Gradient</u> tab and in the <u>Gradient Options</u> 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.

C Print Preview								×
💼 Print 👔 Print to PDF 🤷 Send PDF 🤞	▶ 1 €	Q <u>C</u> lose						
Print Print to PDF See Send PDF	M Time [min] 3.00 6.00 15.00 18.00	Q Acatoritrile 9%] 80 80 60 60 20 20	0\DataFiles\WO Ide Sta Standby Max. Pr <i>Gradent</i> 7ab6 [%] 20 20 40 40 80 80	RC2\Default2.me te :Sance :0,00 Ssure :40,00 Bthanol [%5] 0 0 0 0 0 0 0 0 0 0 0	t day min D MPa How (<u>[mL/min]</u> 2,500 2,500 2,500 2,500 2,500 2,500 2,500	Page 1 d	f 1	
	LC How 5160 LC Pressure 5 LC How 5160 LC How 5160 LC How 5160	Sgr Pump LC1 5160 Pump LC1 Pump LC2 Pump LC3 Pump LC4	Auxiliary Signals nal Name		Sored			
Page 1								

Fig. 20: Report - pump part of the gradient

4.4 Autosampler

The autosampler used with the **Hitachi Chromaster** 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 Hitachi Chromaster Setup - Autosampler

Chromaster Setup		×
Module Type:	CM 5210 Autosampler	
Serial Number:	123	
Program Number:	6	
Sampler Name:	CM5210 Sampler 1	
Rack Properties		
Code:	1 ~	
Type:	Standard, 120 vials	~
	Large Syringe Volume Support	
Syringe Type:	175 µL	~
Loop Capacity:	100 µL	~
Note: Some values must be s not possible to read out then (Use service program to char	AS Maintenance et manually to match the HW setting n from HW programatically. nge HW settings and set according va	s as it is alues here.)
	M 5110 Pump CM 5210 Autosample	r CM 5420 UV-Vis
Creation Ct	M 5110 Pump \ CM 5210 Autosample	r (CM 5420 UV-Vis

Fig. 21: Chromaster 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.

Туре

Sets the proper type of the rack.

Large Syringe Volume Support

This checkbox allows Chromaster 5210/5260 to use larger syringe volume.

Note: 3.5 ml syringe is supported since firmware version **CM5210** 8928120-02 or later, or 8928126-00 or later, **CM5260** 8928121-00 or later, or 8928127-00 or later

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 <u>Part</u> Maintenance.

4.4.2 Method Setup - AS

New Open Save Save as Report setup Audt trail Send method by email Help Het Sampler CM5210 Sampler 1 Image: CM5210		
Beet Sampler CMS210 Sampler 1 Enabled Chromaster Sampler Method Chromaster Sampler Method CM 5210 Sampler Washing + Leak Sensor Injection Injection Method Lead Volume 10 µl Vial Detection Rear Volume 10 Feed Volume 10 µl Feed Volume 10 µl		
Chromaster Sampler Method CM 5210 Sampler Washing + Leak Sensor Injection Method Cut Lead Volume 10 µl Vial Detection Rear Volume 10 µl © on Feed Volume 10 µl Inj Timing Thermo Unit		
CM 5210 Sampler Washing + Leak Sensor Injection Method Cut Lead Volume 10 µl Vial Detection Rear Volume 10 µl Ø on Feed Volume 10 µl Inj Timing Thermo Unit Thermo Unit		
Injection Speed Injection Method Cut Lead Volume 10 µl Vial Detection Rear Volume 10 µl Injection Feed Volume 10 µl Injection Needle Speed 2 Image: Speed 3 Image: Speed 3 Image: Speed 2 Image: Speed 3 Image:		
Injection Method Cut ✓ Aspiration Speed 3 ✓ Lead Volume 10 µl Vial Detection Dispense Speed 2 ✓ Rear Volume 10 µl Feed Volume 0 fast		
Lead Volume 10 µl Vial Detection Rear Volume 10 µl Inj Tming Thermo Unit Thermo Unit		
Rear Volume 10 µl Piced log Slow Feed Volume 10 µl Ing Timing Thermo Unit		
Rear Volume 10 µl O fast Feed Volume 10 µl Inj Tming Thermo Unit		
Feed Volume 10 µl Inj Timing Thermo Unit		
on Temperature		
Waste Volume 100 µl Use Tolerance on		
Air Volume 2 µl Tolerance		
When vial is missing stop sequence if vial is calibration standard \checkmark		
S Status Demo Mode: Not Ready (Method has not been sent)		
wastTable AC LC Cradient LC Measurement Acquisition DDA Television DDA Method Coloribian Advis	need	
Vent rable AS CC Gradient CC measurement Acquisition PDA Integration PDA Method Calculation Adva	nced	
Carrel S s	and Math	hod

Fig. 22: Method Setup - AS

Note: Depending on thy type of the sampler, some parameters may not be visible.

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.

Note: Thermo Unit of AS 5280 is capable of cooling only, if the set point is above ambient temperature, the device will not reach ready state. Thermo Unit of AS 5260 should be capable of cooling and heating.

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.

Method Setup Default1 - #5; 17.04.2023 11:11:43			×
New Open Save Save as Report setup Audit trail Send method by Help			
Select Sampler CM5210 Sampler 1			
Chromaster Sampler Method			
CM 5210 Sampler Washing + Leak Sensor			
Needle Wash before Injection			
Washing Solvent 1 O off			
Rinse Port Washing Time 15 s			
Needle Washing Time - Solvent 1 15 s			
Needle Washing Time - Solvent 2 15 s			
Pump Plunger Wash at Injection Wash on			
Plunger Washing Time 15 s			
AS Status Demo Mode: Not Ready (Method has not been sent)			
Event Table AS LC Gradient LC Measurement Acquisition PDA Integration PDA Method Calculated	ation Adv	anced	
Cancel	3	Send Meth	nod

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.

@ Instrument	1 - Device Monitor	r			—		×
<u>F</u> ile Co <u>n</u> trol	⊻iew <u>W</u> indow <u>H</u>	elp 🚺 🌠 🕨	▶ IÞ 🛍 🛇 ■		0 🛊		
Chromaster	CM5210 Sampler	1 (SN 123)	Demo Mode: Not R	Ready (Method	l has not been	sent)	۰,
Thermo Unit: Temperature:	Off 20,0 ℃	Idle Position	Wash	AS Stat	us		
For help press F1.							

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.

Wash				×
Needle Wash	Rinse Port Wash	Syringe Purge	Washing Pump Purge	Plunger Wash
Wash Solvent	Wash Time	Stroke Number	Wash Solvent	Wash Time
Solvent 1 Solvent 182 Wash Time Solvent 1 10 s Wash Time Solvent 2 10 s	s	1 Speed 5 V	• Solvent 1 Solvent 2	s
Start	Start	Start	Start	Start
		Close		

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 Chromaster *Setup* window displaying the information about the sampler. Warning \triangle 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.

	Module Type:	CM 5210 Autosampler	
	Serial Number:	123	
	Program Number:	6	
	Sampler Name:	CM5210 Sampler 1	
	Rack Properties		
	Code:	1 ~	
	Type:	Standard, 120 vials	~
		Large Syringe Volume Su	pport
	Syringe Type:	175 µL	
	Loop Capacity:	100 µL	\sim
		Thermo Unit Connected	
		AS Maintenance	
Note: S not pos (Use se	ome values must be s sible to read out then rvice program to char	set manually to match the HW n from HW programatically. nge HW settings and set acco	/ settings as it is ording values here.)
	1		

Fig. 26: Chromaster Setup - AS

4.4.4 Report Setup

The autosampler settings accessible from the <u>Method</u> <u>Setup</u> - <u>AS</u> tab and <u>Chromaster Setup</u> - <u>Autosampler</u> 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.

🖸 Print Preview						×
💼 Print 📸 Print to PDF 🤷	Send PDF 🖪 🕨 🔠	Close				
17.04.2023 13:26 Thermo Unit Rack Code Vial Detection Laad Volume Aspiration Speed Temperature Neede Wash Punger Wash	: Installed : 1 : On : 10.0 : 3 : 10 °C : Off : Off	hod D:\(darityVA\)D <i>Chromaster Meb</i> Radk Type Injedion Tining Rear Volume Disperse Speed Toleranos	ataFiles/WORK1/Default1.met hod <i>GM5210 Sampler 1</i> : Standard, 120 vials : Off : 10,0 : 2 : Not used	Loop Capacity Syringa Type Injection Method Air Volume Needle Speed	Page 1 of 1 : 100 μL : 175 μL : Cut : 2.0 : Fast	
ade 1						

age 1

Fig. 27: Report - Autosampler

The first part of the parameters is taken from the <u>Chromaster Setup - Autosampler</u> dialog settings, the second part contains parameters set on the <u>Method Setup - AS</u> tab.

4.5 Column Oven

The <u>Method Setup - Thermostat</u> tab serves for setting the temperature program of the analysis using the thermostat (column oven) configured in the <u>Chromaster</u> <u>Setup - Column Oven</u> dialog.

4.5.1 Hitachi Chromaster Setup - Column Oven

Chromaster Setup	×
Module Type:	CM 6310 Column Oven
Serial Number:	123
Program Number:	45
Thermostat Name:	CM6310 Thermostat 0
	Control Off at Shutdown
	Oven Maintenance
Note: Some values must be not possible to read out ther (Use service program to cha	set manually to match the HW settings as it is n from HW programatically. noe HW settings and set according values here.)
	,
I I I I I I I I I I I I I I I I I I I	Column Oven CM 5420 UV-Vis Detector CM 5430 Dio
ОК	Cancel Help

Fig. 28: Chromaster 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

Method Setup Default1 - #9; 17.04.2023 14:09:30			×
New Open Save Save as Report setup Audit trail Send method by Help			
Select Thermostat CM6310 Thermostat 0 🗸 🖉 Enabled			
Chromaster Thermostat Method			
CM 6310 Thermostat Time Program			
Target Temperature: 40 °C Upper Limit Temperature: 60 °C Temperature Tolerance: 10 °C Wait Time: 1 min. Valve Position 1 2 3 4 5 6 6			
Th. Status Demo Mode: Not Ready (Method has not been sent) Event Table AS LC Gradent LC Measurement Acquisition PDA The	rmostat	Integratio	in
ROK Cancel	Huvariced	Send Metho	d

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.

New Open Save Save as Report setup Audt trail Send method by e-mail Select Thermostat CM6310 Thermostat 0 Image: CM6310 Thermostat 0 Image: CM6310 Thermostat Method CM 6310 Thermostat Time Program Time Valve	(2) Help			
Select Thermostat CM6310 Thermostat 0 Select Thermostat 0 Thermostat Method Chromaster Thermostat Method CM 6310 Thermostat Time Program				
Chromaster Thermostat Method CM 6310 Thermostat Time Program Time Valve				
CM 6310 Thermostat Time Program Time Temperature Valve				
Time Temperature Valve				_
[min] [°C] Position				
1 0,0 25				
2 5,0 35 3				
Th. Status Demo Mode: Not Ready (Method has not been sent) Event Table AS LC Gradient LC Measurement Acquisition	PDA	Thermostat	Integra	ation
PDA Method Calculation		Advanced	Send Met	had

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.

Ø Instrument 1 - De	evice Monit	tor			-		×
<u>F</u> ile Co <u>n</u> trol <u>V</u> iew	<u>W</u> indow	Help 🚺 🌠 🕨	>> > 🗃 🛇 ■	Ъ 🖀 н 🛛 🖸 🗳	1		
Chromaster CM6	310 Therm	ostat 0 (SN 45)	Demo Mode: Not R	eady (Method has no	t been se	nt) 🕒	
Oven Temperature:	21,0 °C	Current Wait Time:	0,0 min.	Th. Status			
Ambient Temperature:	20,0 °C	Valve Status:	1 ~	Switch Off			
For help press F1.							

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 Chromaster *Setup* window displaying the information about the column oven.

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

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



Fig. 32: Chromaster Setup - Column Oven

Menu Path: Report Setup (from all major windows)



4.5.4 Report Setup

命

Both parameters set on the <u>Chromaster Setup - Thermostat</u> tab (valve types used) and parameters set on the <u>Method Setup - Thermostat</u> 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 UV-Vis Detector

The<u>Method Setup - Acquisition</u> tab and its sub-tabs serve for setting the UV Detector parameters configured in theChromaster Setup - Detector dialog.

4.6.1 Hitachi Chromaster Setup - UV-Vis Detector

Chromaster Setup	×
Module Type: CM 5420 UV-Vis	Detector
Serial Number: 123	
Program Number: 7	
Wavelength Mode: Single V	
Signal 1 Name: UVVIS1	
Lamps Off at 1	Shutdown
Note: Some values must be set manually to ma not possible to read out them from HW program (Use service program to change HW settings a	tch the HW settings as it is natically. Id set according values here.)
III CM 5420 UV-Vis Det	ector 🗸 CM 5430 Diode Array Detector 🗸

Fig. 34: Chromaster Setup - UV-Vis 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. <u>Time Table</u> is available in Single mode only.

Signal 1 (2) Name

Sets the names of the signals acquired by the detector. Moreover, the used wavelenght is automatically propaged into the signal name.

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 - Acquisition - Detector Settings

Method Setup Default1 - #12; 18.04.2023 10:32:00					\times
New Open Save Save as	setup Audit trail	() Help			
Select Detector UVVIS1	Enabled				
Chromast	er Detector Method				
CM 5420 UV-Vis Detector Time Program					
Sample Period	Response Time				
200 ms 🗸 5 Hz	1,00 \checkmark s				
Lamp Mode	Processor Range				
D2 & W Mode 🗸	2,00 🗸 AUFS				
WL1	Offset				
250 nm	0 mAU				
Time Program Leak Sensor	Polarity				
O on O on	 positive 				
O off ○ off	○ negative				
Check Lamp Status	Recorder Range				
	mAUFS				
Det Status Demo Mode: Not Ready (Method h	as not been sent)				
Event Table AS LC Gradient LC	Measurement Acquisition	PDA	Thermostat	Integrat	ion
FDA MEJIOD	Calculation		Auvanced		
G Cancel			3	Send Meth	od
				-	

Fig. 35: 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. Set None to turn off both lamps.

WL1 (WL2)

Sets on which wavelength the detector will be measuring.

Time Program

Sets whether the Time Program will be turned on/off.

Check Lamp Status

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

Response Time

Defines the Time Constant of the detector's filter.

Leak Sensor

Allows to set the leak sensor on/off.

Processor Range

Sets the Processor Range.

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 will be positive/negative.

Recorder Range

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

4.6.3 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.

New	Open	Save	Save as	Report setup	Audit trail	Send method by	() Help			
	opon	0010	5476 45	noport octop	/ controlation	e-mail	nop			
ect De	etector		UVVIS 1		~ 2 8	abled				
				Chromaster Detec	tor Method					
CM 54	420 UV-Vis I	Detector	Time Program							
	Time [min]		Wavelength [nm]	В	ase					
1	0,0		450		-					
2	1,0		500		-					
3	1,5			Auto	Zero					
et Sta	atus	Demo M	4ode: Not Ready	(Method has not b	een sent)					
Det Sta	atus t Table	Demo M	4ode: Not Ready	(Method has not b	een sent) Measurement	Acquisition	PDA	Thermostat	Integra	atio

Fig. 36: Method Setup - Acquisition - Time Program

The wavelength settings defined on the <u>Detector Settings</u> 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.

4.6.4 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.

@ Instrument	- Device Monitor			- 0	×
<u>F</u> ile Co <u>n</u> trol	iew <u>W</u> indow <u>H</u> elp 🚺	🔨 🕨 🕨 🕨 🖾 🔇) 🔳 🧞 🔂 💷 🚺	Ú	
Chromaster	UVVIS1 (SN 123)	Demo Mode:	Not Ready (Method has	not been sent)	•
Zero Detector	D2 Lamp Switch Off	W Lamp Switch Of	ff Det Status		
	Wavelength A	bs Data Sample Ene	rgy RefEnergy		
WL1 WL2	250	0,432 12	345 12346		
Thermo Unit:	Off				
For help press F1.					

Fig. 37: Device Monitor - UV-Vis 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.

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.

Note: When using detector in Dual Mode, it is possible to monitor baseline process in Data Acquisition window also between analyzes.

Check Signal On/Off

Enables to monitor baseline process besides the analysis.

Det Status...

Opens the Status window showing the information about the detector.

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

Module Type:	CM 5420 UV-Vis Detector
Serial Number:	123
Program Number:	7
Wavelength Mode:	Single V
Signal 1 Name:	UVVIS1
	Lamps Off at Shutdown
	Lamps Off at Shutdown Thermo Unit Connected
	Lamps Off at Shutdown Thermo Unit Connected Lamp Maintenance
Note: Some values must be not possible to read out the (Use service program to cha	Lamps Off at Shutdown Thermo Unit Connected Lamp Maintenance set manually to match the HW settings as it is m from HW programatically. m FW settings and set according values here.)
Note: Some values must be not possible to read out the (Use service program to cha	Lamps Off at Shutdown Thermo Unit Connected Lamp Maintenance set manually to match the HW settings as it is m from HW programatically. nge HW settings and set according values here.)

Fig. 38: Chromaster Setup - UV-Vis Detector

Lamp Off at Shutdown

Turns the lamp off after shutdown.

Lamp Maintenance

Opens the *UV-Vis Detector: Part Maintenance* window displaying the information about the lamps.

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

4.6.5 Report Setup

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



Fig. 39: Report - UV-Vis 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. The other part of the report lists the detector specific parameters.

4.7 PDA Detector

The<u>Method Setup - PDA</u> tab and its sub-tabs serve for setting the PDA Detector parameters configured in theChromaster Setup - PDA Detector dialog.

4.7.1 Hitachi Chromaster Setup - PDA Detector

Chromaster Setup	×
Module Type:	CM 5430 Diode Array Detector
Serial Number:	1
Program Number:	12
Detector Name:	CM5430 PDA Detector 1
Number of Signals:	4 ~
Signal 1 Name:	PDA1
Signal 2 Name:	PDA2
Signal 3 Name:	PDA3
Signal 4 Name:	PDA4
Lamp	is Off at Shutdown
	Lamp Maintenance
Note: Some values must be s not possible to read out them (Use service program to chan	et manually to match the HW settings as it is from HW programatically. ge HW settings and set according values here.) 5420 UV-Vis Detector / CM 5430 Diode Array Detector /
ОК	Cancel Help

Fig. 40: Chromaster 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.

4.7.2 Method Setup - PDA - Detector Settings

Method Setup Default1 - #14; 19.04.2023	15:27:48				×
New Open Save Save as	Report setup Audit trai	I Send method t e-mail	ey Help		
Select PDA CM5430	PDA Detector 1	Enabled			
C	hromaster PDADetector Metho	bd			
CM 5430 PDA Detector					
Sample Period	Minimum WL	Signal 1 WL	Recorder Range		
400 ms 🗸 2,5 Hz	210 nm	250 nm	✓ AU		
Min Acquisition Time: 1,33 min	Maximum WL	Signal 2 WL	WL1		
Max Acquisition Time: 252 min	400 nm	250 nm	nm		
Lamp Mode	Bandwidth	Signal 3 WL	WL2		
D2 & W Mode \checkmark	1 ~ nm	250 nm	nm		
Slit	Response Time	Signal 4 WL	Leak Sensor		
Coarse ~	✓ s	250 nm	🔾 on		
Check Lamp Status			○off		
PDA Status Demo Mode: Not Ready	(Method has not been sent),	Lamp is off			
Event Table AS LC Gradient	LC Measureme	nt Acquisition	PDA Thermosta	t Integration	1
PDA Method	Calcula	tion	Advanc	ed	
					5
Cancel				Send Method	

Fig. 41: 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.

4.7.3 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. 42: 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 WLamp 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 Chromaster *Setup* window displaying the information about the detector. Warning \triangle is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *Lamp Maintenance* button.

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

Module Type:	CM 5430 Diode Array Detector
Serial Number:	1
Program Number:	12
Detector Name:	CM5430 PDA Detector 1
Number of Signals:	4 ~
Signal 1 Name:	PDA1
Signal 2 Name:	PDA2
Signal 3 Name:	PDA3
Signal 4 Name:	PDA4
Lamps Off at Shutdown	Thermo Unit Connected
	Lamp Maintenance
Note: Some values must be s not possible to read out then (Use service program to char	et manually to match the HW settings as it is from HW programatcally. nge HW settings and set according values here.)
A N March Chan & Ch	4 5420 LIV-Mis Detector & CM 5430 Diode Array Detect

Fig. 43: Chromaster 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.

4.7.4 Report Setup

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

🔯 Print Preview	v						\times
💼 <u>P</u> rint 🔡 Pri	int to PDF 🛛 🏜 Send	I PDF 🤞 🕨 🔠 🔍 🔍 <u>C</u> lo	se				
		Chromas	ter Method CM5430 PD	A Detector 1			Т
	Sample Period Spectrum:	: 400 ms	Sit	: Coarse	Lamp Mode	D2 & W : Mode	L
	Minimum Wavelength Bandwidth	: 210 nm : 1 nm	Maximum Wavelength Response	: 400 nm : 0.00 s			E.
	Signal 1 Name	: PDA1	Wavelength	: 250 nm			11
	Signal 3 Name	: PDA3	Wavelength	: 250 nm			11
	Signal 4 Name	: PDA4	Wavelength	: 250 nm			
Page 1							

Fig. 44: 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.

4.8 UV Detector

The<u>Method Setup - Acquisition</u> tab and its sub-tabs serves for setting the UV Detector parameters configured in theChromaster Setup - UV Detector dialog.

4.8.1 Hitachi Chromaster Setup - UV Detector

Chromaster Setup	×
Module Type:	CM 5410 UV Detector
Serial Number:	45
Program Number:	75
Wavelength Mode:	Single V
Signal 1 Name:	UV1
	Lamp Off at Shutdown
Note: Some values must be a not possible to read out ther (Use service program to cha	set manually to match the HW settings as it is n from HW programatically. nge HW settings and set according values here.)
II I Column Oven	CM 5410 UV Detector (CM 5430 Diode Array Detector)

Fig. 45: Chromaster 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. <u>Time Table</u> 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.

4.8.2 Method Setup - Acquisition - Detector Settings

Method Setup Default1 (MODIFIED)		- D X
New Open Save Save as	Report setup Audit trail	y Help
Select Detector UV1	Enabled	
	Chromaster Detector Method	
CM 5410 UV Detector Time Program		
Sample Period	Response Time	
200 ms 🗸 5 Hz	1,00 \checkmark s	
Lamp Mode	Processor Range	
D2 Mode 🗸	2,00 🗸 AUFS	
WL1	Offset	
250 nm	0 mAU	
Time Program Leak Sensor	Polarity	
O on O on	O positive	
O off ○ off	negative	
Check Lamp Status	Recorder Range	
Autozero at Start	mAUFS	
Det Status Demo Mode: Not Ready	(Method has not been sent)	
Event Table AS LC Gradient	LC Measurement Acquisition	PDA Thermostat Integration
PDA Method	Calculation	Advanced
Cancel		Send Method

Fig. 46: 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.

4.8.3 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.

	setup Den		DIFIED)							
New	Open	Save	Save as	Report setup	Audit trail	Send method by e-mail	? Help			
lect De	tector		UV1		~ Z E	nabled				
				Chromaster De	tector Method					
CM 54	110 UV Det	ector Tim	e Program							
	Time [min]		Wavelength [nm]		Base					
1	0,0		550							
2	1,0		540							
3	1,5			A	utoZero					
4										
)et Sta	tus Table	Demo M	ode: Not Ready LC Gradient	(Method has no	ot been sent) Measurement	Acquisition	PDA	Thermostat	Integra	tion
Det Sta Event	tus Table	Demo M AS DA Metho	ode: Not Ready LC Gradient d	(Method has no	ot been sent) Measurement Calculation	Acquisition	PDA	Thermostat Advanced	Integra	tion

Fig. 47: Method Setup - Acquisition - Time Program

The wavelength settings defined on the <u>Detector Settings</u> 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.

4.8.4 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.

@ Instrument 1	- Device Moni	tor				-	- 0	×
<u>F</u> ile Co <u>n</u> trol <u>V</u>	/iew <u>W</u> indow	Help	1 F	> > iži (> =		0 🛊		
Chromaster	UV1 (SN 45)			Demo Mode: Not	Ready (Method	i has not b	een sent)	•
Zero Detector	D2 Lamp S	witch Off			Det Sta	tus		
	Waveleng	th A	bs Data	Sample Energy	RefEr	ergy		
WL1	2	50	0,432	12345	1	2346		
WL2								
Thermo Unit:	Off							
For help press F1.								

Fig. 48: 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.

Note: When using detector in Dual Mode, it is possible to monitor baseline process in Data Acquisition window also between analyzes.

Check Signal Switch On/Off

Enables to monitor baseline process besides the analysis.

Det Status...

Opens the Chromaster Setup window displaying the information about the module.

Warning \triangle is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *AS Maintenance* button.



Fig. 49: Chromaster 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.

4.8.5 Report Setup

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



Fig. 50: 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 <u>Method Setup - Acquisition - Time Program</u> tab.

4.9 RI Detector

The<u>Method Setup - Acquisition</u> tab serves for setting the RI Detector parameters configured in theChromaster Setup - RI Detector dialog.

4.9.1 Hitachi Chromaster Setup - RI Detector

Chromaster Setup		×
Module Type:	CM 5450 Refractive Index Detector	
Serial Number:	44	
Program Number:	11	
Signal Name:	CM5450 RI Detector 1	
III I B B sampler CM 6	G310 Column Oven À CM 5450 Refractive Ind	ex Detector /
ОК	Cancel Help	

Fig. 51: Chromaster 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.

4.9.2 Method Setup - Acquisition - Detector Settings

Method Setup Default1 (MODIFIED)	- D X
New Open Save Save as • Report setup Audt tr	al Send method by email
Select Detector $${\rm CM5450~RI}$$ Detector 1 $${\rm \sim}$$	C Enabled
Chromaster Detector Metho	d
Sample Period Response Time 200 ms 5 Hz 3,00 Processor Range 0 n 0 n 40 ac off Temperature off 40 ac off 50 off Baseline Shift 0 off polarity 5 ac 60 s	 ✓ s je ✓ jAIU 0 %
Check Temperature Autozero at Start Det Status Demo Mode: Not Ready (Method has not been sent)	
Event Table AS LC Gradient LC Measurement Acquisition	Thermostat Integration PDA Method Calculation Advanced Send Method

Fig. 52: 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 **ClarityVA** could be trimmed down or shifted into negative values.

Baseline Shift

Sets the baseline shift.

Polarity

Sets whether the Polarity is *positive/negative*.

4.9.3 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.

Instrument 1 - Device Monitor	— 🗆 ×	ł
Eile Co <u>n</u> trol View Window Help 🚺 🕨 ► ► ► 🗈 💿 🛙	I 🐻 🖀 II 🛛 🖸 🤹	
Chromaster CM5450 RI Detector 1 (SN 44) Demo Mode: Not	t Ready (Method has not been sent) 🕒	
Zero Detector Purge Switch On	Det Status	'
Current Signal 0,123 µRIU Temperature 40 °C		
For help press F1.		

Fig. 53: 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.

Module Type:	CM 5450 Refractive Index Detector	
Serial Number:	44	
Program Number:	11	
Signal Name:	CM5450 RI Detector 1	

Fig. 54: Setup - Detector

4.9.4 Report Setup

All detector settings accessible on the <u>Method Setup - Acquisition</u> tab are reported if the *Instrument Control* parameter on the *Method* tab of the *Report Setup* dialog is checked.



Fig. 55: Report - RI Detector

命

4.10 FL Detector

The<u>Method Setup - Acquisition</u> tab and its sub-tabs serve for setting the FL Detector parameters configured in the<u>Chromaster Setup - Fluorescence Detector</u> dialog.

4.10.1 Hitachi Chromaster Setup - FL Detector

Chromaster Setup		×
Module Type:	CM 5440 Fluorescence Detector	
Serial Number:	12	
Program Number:	15	
Signal Name:	CM5440 FL Detector 1	
	Lamp Off at Shutdown	
	Lamp Maintenance	
Note: Some values must be a not possible to read out ther (Use service program to char	set manually to match the HW settings as it is n from HW programatically. nge HW settings and set according values here.)	
utosampler CI	M 6310 Column Oven 🔪 CM 5440 Fluorescence Detec	tor /
ОК	Cancel Help	

Fig. 56: Chromaster 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.

4.10.2 Method Setup - Acquisition - Detector Settings

Method Setup Default1 (MC	DDIFIED)		— D X
New Open Save	Save as	p Audit trail Send method by e-mail	(?) Help
Select Detector	CM5440 FL Detector 1	Enabled	
	Chromaster D	etector Method	
CM 5440 FL Detector Tin	ne Program		
Sample Period		Response Time	
200 ms ~	5 Hz	1,00 \checkmark s	
Lamp Mode		PMT Voltage	
Xe Mode ~	•	Medium ~	
ExWL	EmWL	Offset	
250 nm	350 nm	0 FL	
Time Program	Leak Sensor	Em Bandwidth	
Oon	O on	 standard 	
O off	Ooff	⊖ wide	
Check Lamp Status		Recorder Range	
Autozero at Start		FL	
Det Status Demo M	1ode: Not Ready (Method has n	not been sent)	
Event Table AS LC Gr	adient LC Measurement	Acquisition Thermostat Integration	PDA Method Calculation Advanced
G Cancel			Send Method

Fig. 57: 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.

4.10.3 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.

/lethod	Setup Defa	ult1 - #24; 25	5.04.2023	9:29:11						×
New	Open	Save Sav	e as	Report setup	Audit trail	Send method by e-mail	? Help			
Select De	etector		CM5440	FL Detector 1	~ 🖉 E	nabled				
				Chromaster De	tector Method					
CM 5	440 FL Dete	tor Time Prog	gram							
	Time [min]	Ex WL [nm]	Em WL [nm]	PMT Volta	ge Ba	ise				
1	0,0	200	260	Medium	AutoZ	'ero				
2	5,0	300	380	High	Hol	d				
3										
				(mark-1						
Det Sta	atus	Demo Mode: I	lot Ready	(Method has no	t been sent)					
Event T	Table AS	LC Gradient	LC	Measurement	Acquisition The	rmostat Integratio	n PDA Method	Calculation	Advance	đ

Fig. 58: Method Setup - Acquisition - Time Program

The wavelength settings defined on the <u>Detector Settings</u> 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.

4.10.4 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.

@ Instrument	1 - Device Mo	nitor					-		×
<u>F</u> ile Co <u>n</u> trol	<u>V</u> iew <u>W</u> indow	/ <u>H</u> elp	A 🕅 🕨 🖻) iii ()		0 후			
Chromaster	CM5440 FL D	etector 1 (S	N 12)	Demo Mode: Not Re	ady (Metho	i has not b	een s	ent) (۰.
Zero Detector	Xe Lamp	Switch Off	Thermo Unit:	Not Connected	Det Sta	tus			1
	Wavele	ngth	Energy						
ExWL		250	123	FL Data	1.23	14			
EmWL		350	133	12000	1/20				
For help press F1.									

Fig. 59: 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 **A** is displayed next to the button when *Soft Limit* has been reached. Warning is also displayed next to *Lamp Maintenance* button.

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

Serial Number:	12
Program Number:	15
Signal Name:	CM5440 FL Detector 1
	Lamp Off at Shutdown
	Thermo Unit Connected
	Lamp Maintenance
Note: Some values must be s	set manually to match the HW settings as it is
not possible to read out then (Use service program to char	n from HW programatically. nge HW settings and set according values here.)

Fig. 60: Chromaster 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.

4.10.5 Report Setup

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



Fig. 61: Report - FL Detector

This section also includes the **Time Table** from the <u>Method Setup - Acquisition -</u> Time Program tab.

5 Troubleshooting

When the remedy for some problem cannot be discovered easily, the recording of communication between **ClarityVA** 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 **ClarityVA** installation directory (C:\CLARITYVA\CFG by default). The file can be edited in any text editor (e.g. Notepad). Following section should be edited or added:

[CHROMASTER 1]

echo=on textmode=on filename=Comm_Chromaster_%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 ClarityVA 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 **ClarityVA** Configuration).

It is not possible to start the Acquisition from ClarityVA 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 ClarityVA (set properly *Ext. Start Dig. Input* of the device used in the ClarityVA Configuration).
In case that communication between the computer and CM5430 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. 62: IFC USB driver in Device manager

It is not possible to install Chromaster 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.

Problems after upgrade from version 8.x to version 9.x

Solution: The Chromaster configuration created in previous versions may be incompatible. As a remedy, remove the Chromaster system, close configuration and add it again.

5.1 Chromaster 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 **Chromaster Maintanace Software** located in C:\CLARITYVA \HW_ DRIVERS\CHROMASTERDRIVERKIT\TOOLS. This application can be also used for evaluation of communication troubles between **ClarityVA** and **Chromaster** system.