

# HITACHI PRIMAIDE

Clarity Control Module

ENG

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To facilitate the orientation in the **Hitachi Primaide** 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 Primaide Control module

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



Fig. 1: Hitachi Primaide

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:

- Pump: 1110
- Detectors: 1410 UV, 1430 PDA
- Autosampler: 1210
- Column Oven: 1310

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 Primaide** 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 Primaide** 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 Primaide LC control for ClarityVA, the Hitachi Primaide LC control for OpenLab/EZChrom or Hitachi PrimaideSystem Manager must not be installed on the same computer as it may result in communication errors.

*Caution:* A single **ClarityVA** station can only control two **Hitachi Primaide** systems.

*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 7 (32/64 bit)
- *Note:* Although **Hitachi Primaide** 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 Hitachi Primaide communication

It is possible to controljust a single **Hitachi Primaide** system configured on different Instruments of the same **ClarityVA** Chromatography Station. The communication libraries do not support using more than one system at the same time.

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 Primaide** system and also in the <u>Add Module</u> dialog when configuring the **Hitachi Primaide** in **ClarityVA**.

# 3.2 ClarityVA Configuration

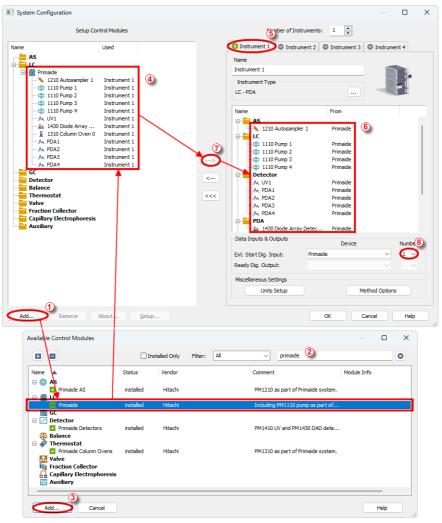


Fig. 2: Adding Hitachi Primaide module

- 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 Primaide** and click the *Add* ③ button. The <u>Primaide</u> <u>Setup</u> dialog will appear.

Primaide Setup	×
USB Interface Board Sys1 Sys2	
List of Modules: 1110 Pump 1210 Autosampler 1310 Column Oven 1410 UV Detector (Channel 1)	Autodetect
1430 Diode Array Detector	Add
	Remove
4 4 ▶ ▶ Common \ 1110 Pump \ 1210 A	utosampler
OK Cancel	Help

Fig. 3: Hitachi Primaide 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 Primaide 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 Primaide** item ④ will appear in the Setup Control Modules list of the System Configuration dialog.
- Set the *Instrument Type* on the desired Instrument tab (5) to LC.
- Drag the control module from the Setup Control Modules list on the left side to the desired Instrument tab (5) on the right side (6), or use the -> button (7) to do so.
- Set the digital input nr. 1 to be used for starting the acquisition 8.

- In case the **Hitachi Primaide** HPLC system contains both **Hitachi Primaide** autosampler and **Hitachi Primaide** detector, the *Ext. Start Dig. Input* item *Device* has to be set to 'Primaide' and the item *Number* to value '1'.
- In case of system with Hitachi Primaide autosampler but without any Hitachi Primaide 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 Primaide detector but without Hitachi Primaide 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 Primaide detector. With such setup the *Ext. Start Dig. Input* needs to be set to 'Primaide' *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>Primaide Setup</u> dialog. These new tabs enable the setting of the **Hitachi Primaide** system operation program.

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

# 4.1 Primaide Setup - Common

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

Primaide Setup	×
USB Interface Board Sys1 Sys2	
List of Modules: 1110 Pump 1210 Autosampler 1310 Column Oven 1410 UV Detector (Channel 1) 1430 Diode Array Detector	Autodetect
	Add Remove
Common (1110 Pump) 1210 Aut	iosampler à 1310 Column Oven à 14

Fig. 4: Primaide Setup - Common tab

# **USB Interface Board**

Depending on the switch configured on the **USB-IF Board** in the **Hitachi Primaide** 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 Primaide** 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 Primaide modules.

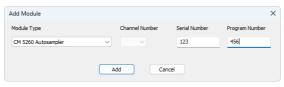


Fig. 5: Add Module dialog

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 Primaide 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 *Primaide 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	

Fig. 6: Remove Module dialog





# 4.2 Part Maintenance

*Part Maintenance* dialog can be invoked from module tab in<u>Primaide 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: Par	t Maintenance					×
	Value	Soft limit	Unit	Changed Date		
Injection port	0	1	Counts		Reset	
Injection valve	0		Counts		Reset	
Syringe	0		Counts		Reset	
Syringe valve	0		Counts		Reset	
Washing pump	0		Counts		Reset	
		ок С	ancel			

Fig. 7: Example of Part Maintenance dialog for AS

CM5430 PDA Detect	tor: Part Mainte	nance					$\times$
	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	ĸ	Cancel			

Fig. 8: Example of Part Maintenance dialog for Detector

CM5110 LC: Part Mainte	nance					$\times$
	Value	Soft limit	Unit	Changed Date		
Flow volume	이		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 Thermostat:	Part Maintenance					×
	Value	Soft limit	Unit	Changed Date		
Valve	이		Counts		Reset	
		Ca	ncel			

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 PrimaideSetup - Pump dialog.

# 4.3.1 Primaide Setup - Pump

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

Primaide Setup			×
Module Type:	1110 Pump		
Serial Number:	11		
Program Number:	1		
Low Pressure Limit:	o	MPa	
High Pressure Limit:	39,226	MPa	
Solvent 1 Name:	1110 Pump 1		
Solvent 2 Name:	1110 Pump 2		
Solvent 3 Name:	1110 Pump 3		
Solvent 4 Name:	1110 Pump 4		
	Pump Off a	t Instrument Close	
	Start Time	Program on Acquisition Start	
	Pump Mainte	enance	
Note: Some values must be s not possible to read out then (Use service program to char	n from HW prog	ramatically.	
Common 11	10 Pump / 12	10 Autosampler À 1310 Colu	mn Oven 入 14
ОК	Cancel	Help	

Fig. 11: Primaide 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> <u>Maintenance</u>.

# 4.3.2 Method Setup - LC Gradient

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

2         3.00         80,0         20,0         0,0         2,500           3         6,00         40,0         0,0         2,500         3tandby         0         min           4         10,00         60,0         40,0         0,0         2,500         Standby Time         0         min           5         15,00         20,0         80,0         0,0         2,500         Standby Time         0         min           7	lew	Open	R Save	Save as		rt setup	Audit trail	Send method by e-mail	? Help			
[min]         [%]         [%]         [%]         [%]         [mi,min]           1         mital         80,0         20,0         0,0         2,500         1         mi,min]           2         3,00         80,0         20,0         0,0         2,500         1         min           4         10,00         60,0         40,0         0,0         2,500         5         1         min           5         15,00         20,0         80,0         0,0         2,500         5         Standby Time         0         min           7         10,00         80,0         0,0         2,500         5         Standby Time         0         min           6         18,00         20,0         80,0         0,0         2,500         5         Standby Time         0         min           field State			Gr	adient Table								
1         Imital         80,0         20,0         0,0         2,500           2         3,00         80,0         20,0         0,0         2,500           3         6,00         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           6         18,00         20,0         80,0         0,0         2,500           7         7         Acetonitrie         Methanol         Ethanol         [%]							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           6         18,00         20,0         80,0         0,0         2,500           7	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           6         18,00         20,0         80,0         0,0         2,500           7         Idle State           [mt,/min]         Acetonitrile         Methanol         Ethanol         [%]	2	3,00						Time to Standby		0	min	
5         15,00         20,0         80,0         0,0         2,500         Standoy lime         0         min           5         18,00         20,0         80,0         0,0         2,500         Itele State         Itele State           [mit,/min]         Acetonitrile         Methanol         Ethanol         [%]         OPump Off	3	6,00			0,0	2,500		Time to Standby		-		
5         15,00         20,0         80,0         0,0         2,500         I           5         18,00         20,0         80,0         0,0         2,500         I           7         Image: Constraint of the state	4	10,00	60,0	40,0	0,0	2,500		Standby Time		0	min	
7 Ide State [mL/min] Acetonitrile Methanol Ethanol [%]	5	15,00	20,0	80,0	0,0	2,500	1	stanuby time			min	
[mL,/min]AcetonitrileMethanol[%]O Pump Off	5	18,00	20,0	80,0	0,0	2,500						
0,0 5 10 15 Time [min] Data	ſmi	./mmj	Acetonitrile	Methanol	Ethanol	-80 -60 -40	Compositi	<ul> <li>Pump Off</li> <li>Initial</li> <li>Standby</li> </ul>				

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>Primaide 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
	(	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 Primaide** 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.

			$\times$
Image: New Open         Image: Save as         Image: Save as			
Select LC 1110 Pump 1 V Enabled			
Primaide LC Method			
1110 Pump Time Program			
Time Program Leak Sensor			
O on O on			
• off O off			
• off			
O off O off UC Status Demo Mode: Not Ready (Method has not been sent)			
LC Status Demo Mode: Not Ready (Method has not been sent) Event Table AS LC Gradient LC Measurement Acquisition PDA Th	ermostat	Integra	ion
LC Status Demo Mode: Not Ready (Method has not been sent)	ermostat Advanced	Integra	ion

Fig. 14: Method Setup - LC Gradient

# 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.

ethod S	etup Defa	ult1 (MOD	IFIED)							$\times$
New	Open	<b>Save</b>	Save as	Report setup	Audit trail	Send method by e-mail	? Help			
elect LC			1110 Pum	p 1	V 🛛 E	nabled				
				Primaide L	C Method					
1110 F	Pump Tim	e Program								
	Time [min]	Event1	Event2	Event3	Event4					_
1	0,0	Off	On	Pulse						
2	1,0	On	Pulse	Off						
LC Statu Event		Demo Moo	de: Not Ready (1	Method has no	t been sent) Measurement	Acquisition	PDA	Thermostat	Integrat	ion
	P	DA Method			Calculation			Advanced	Ĩ	
н ок	Ca	ncel						•	Send Meth	od

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.

© 1	nstrumen	t 1 - De	evice Moni	tor					-		×
<u>F</u> ile	Co <u>n</u> trol	<u>V</u> iew	<u>W</u> indow	<u>H</u> elp			I▶ 🛍 🛇	- 68	II 💿 📬		
۵ ۱	C Monito	r							No metho	d sent 🛛	0
	Compo	nent	Flow						Stop Flow		
Α				- E	Tin	ne (min)			Set Flow.		
B C					4-	• <b>=</b>			Resume Id	le	
D				Ξ.	To	tal Flow (m	L/min]	0,000			
U					Pre	essure [MP	a]		Hold		
		Figure	s in italics re	present e	expected a	nd not act	ual values		Modify Gradie	nt	
<b>O</b> P	rimaide 1	110 Pu	mp 1 (SN	11)		D	emo Mode: I	Not Ready (Me	ethod has not beer	n sent) (	0
								LC	Status		
For he	elp press F	1.									

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>Primaide Pump Setup</u> dialog which allows to set some of parameters of the pump and to view the <u>Part Maintenance</u>. For details, see the manual of the pump.

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

# 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.

2 3	Time [min] Initial	Acetonitrile [%]	Methanol [%]	Ethanol [%]	Flow
3				L /0J	[mL/min]
2 3	2.00	80,0	20,0	0,0	2,500
	3,00	80,0	20,0		2,500
	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
6	18,00	20,0	80,0	0,0	2,500
Flow	2,5	5	10 Time	15	-80 -60 -40 -20 0 (min)

Fig. 18: 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.

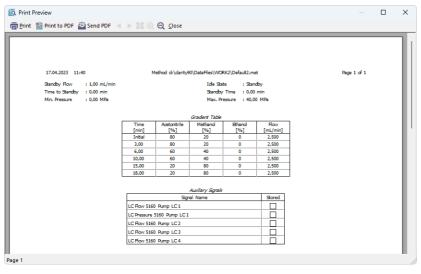


Fig. 19: Report - pump part of the gradient

# 4.4 Autosampler

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

rimaide Setup	>
Module Type:	1210 Autosampler
Serial Number:	11
Program Number:	1
Sampler Name:	1210 Autosampler 1
Rack Properties	
Code:	1 ~
Type:	200x1.5mL vials
Syringe Type:	500 µL. ~
	AS Maintenance
not possible to read out the	set manually to match the HW settings as it is m from HW programatically. nge HW settings and set according values here.)
<ul> <li>Image: Common 1     </li> </ul>	110 Pump 👌 1210 Autosampler 🔨 1310 Column Oven 👌 14

# 4.4.1 Hitachi Primaide Setup - Autosampler

Fig. 20: Primaide 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.

# Syringe Type

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

#### **AS Maintenance**

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

# 4.4.2 Method Setup - AS

Method S	etup Defa	ult1 (MC	DIFIED)							×
New	Open	Rave	Save as		dit trail	Send method by e-mail	Y Help			
Select Sam	pler		1210 A	utosampler 1	🗸 🖉 En	abled				
				Primaide Sampler Met	hod					
1210 A	utosample	r Washi	ng + Leak Sens	or						
Inject	ion				Spee	ł				
					s	yringe Injection	5 .	2		
						Syringe Wash	5	-		
				Vial Detection		Needle Speed	Oslow			
						necule opeco	<ul> <li>fast</li> </ul>			
				Inj Timing	Therr	no Unit				
				n		Temperature				
				0		Use Tolerance				
							on			
						Tolerance				
AS Statu	IS	Demo M	lode: Not Ready	(Method has not been s	ent)					
Event1		AS DA Metho	LC Gradien		urement alculation	Acquisition	PDA	Thermostat Advanced	Integra	ation
		DA HEUIO	u	, c	carcuid 0011			Auvanceu		
П ок	Ca	ncel						3	Send Met	hod

Fig. 21: Method Setup - AS

# Injection

#### **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

# Syringe Injection

Sets the speed of the syringe during injection.

#### Syringe Wash

Sets the speed of the syringe during wash.

#### **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.

Method Setup Default1 (MODIFIED)			X
New Open Save Save as Report setup Audt trail Send method by email			
Select Sampler 1210 Autosampler 1			
Primaide Sampler Method			
1210 Autosampler Washing + Leak Sensor			
Leak Sensor         O on         O off         Syringe Stroke No at Inj Wash         Needle Washing Time         10         s			
Plunger Washing Volume 50 µL			
AS Status Demo Mode: Not Ready (Method has not been sent)			
	ermostat Advanced	Integration	
Cancel	3	Send Method	

Fig. 22: Method Setup - AS - Washing

# Syringe Stroke Number at Injection

Sets the number of times syringe is washed at the injection.

#### **Needle Washing Time**

Sets the Needle Washing Time.

#### 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 Monit	or —		×
<u>File</u> Control	<u>V</u> iew <u>W</u> indow	Help 🚺 🚺 🕨 🕨 🕪 🕸 📾 🕲 🔳 🗞 🕄 💷 🔯 🏟		
O Primaide 1	210 Autosampler	1 (SN 11) Demo Mode: Not Ready (Method has not been	sent)	•
Thermo Unit: Temperature:	Off 20,0 ℃	Idle Position Wash AS Status		
For help press F1				

Fig. 23: 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		×
	Wash	Plunger Wash
	Stroke Number	Wash Volume
	8	50 µL
	Speed	
	5 ~	
	Start	Start
	Close	

Fig. 24: Wash

You may decide to perform 2 different washes manually. Each wash is started by pressing the *Start* button in it's section, and either ends up automatically after the set amount of strokes or volume performed. When one wash routine is active, other wash procedures are disabled until the previous wash program has been finished.

# AS Status...

Opens the Primaide Setup window displaying the information about the sampler.

Warning **A** 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.

Primaide Setup	>
Module Type:	1210 Autosampler
Serial Number:	11
Program Number:	1
Sampler Name:	1210 Autosampler 1
Rack Properties	
Code:	1 ~
Type:	200x1.5mL vials
Syringe Type:	500 µL. 🗸
	Thermo Unit Connected
	AS Maintenance
not possible to read out ther	set manually to match the HW settings as it is n from HW programatically. nge HW settings and set according values here.)
I I Pump	1210 Autosampler 🔨 1310 Column Oven 🔪 1410 UV Dete
ОК	Cancel Help

Fig. 25: Primaide Setup - AS

# 4.4.4 Report Setup

The autosampler settings accessible from the <u>Method Setup - AS</u> tab and <u>Primaide</u> <u>Setup - 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 Previe	5W					×
💼 <u>P</u> rint  🔡 F	Print to PDF 🛛 🐴 Send PDF 🚽	( ) II 🔍 🖸	<u>C</u> lose			
	17.04.2023 13:27	Metho	od D:\ClarityVA\DataFiles\WORK1\C Primaide Method 1210 Autosamp		Page 1 of 1	
	Thermo Unit Rack Code Vial Detection Syringe Injection Temperature Syringe Stroke No at Inj Wash Plunger Wash	: Installed : 1 : On : 5 : 10 °C : 0 s : Off	Syringe Type Injection Timing Syringe Wash Tolerance Neede Washing Time Plunger Washing Volume	: 500 µL : Off : 5 : Not used : 10 s : 50,0 µL	Needle Speed : Fast	
Page 1						

Fig. 26: Report - Autosampler

The first part of the parameters is taken from the <u>Primaide 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>Primaide Setup -</u><u>Column Oven</u> dialog.

# 4.5.1 Hitachi Primaide Setup - Column Oven

Primaide Setup	×
Module Type:	1310 Column Oven
Serial Number:	11
Program Number:	1
Thermostat Name:	1310 Column Oven þ
	Control Off at Shutdown
	Oven Maintenance
not possible to read out then	set manually to match the HW settings as it is n from HW programatically. nge HW settings and set according values here.)
[4] ● ▶ ▶ Common \ 11	110 Pump 👌 1210 Autosampler 👌 1310 Column Oven 📈 14
ОК	Cancel Help

Fig. 27: Primaide 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 (MODIFIED)			(				
New Open Save Save as Report setup Audt trail Send method by email							
Select Thermostat 1310 Column Oven 0 Select							
Primaide Thermostat Method							
1310 Column Oven							
Target Temperature:     40     °C       Upper Limit Temperature:     60     °C       Temperature Tolerance:     1,0     °C       Wait Time:     1     min.       Valve Position     1     2       3     3							
Th. Status Demo Mode: Not Ready (Method has not been sent)							
Event Table AS LC Gradient LC Measurement Acquisition PDA Th PDA Method Calculation	ermostat Advanced	Integration					
Cancel	3	Send Method					

Fig. 28: 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.

# 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.

Instrument 1 - D	evice Moni	tor			- 0	>
<u>F</u> ile Co <u>n</u> trol <u>V</u> iew	<u>W</u> indow	Help 🚺 🌠 🕨	>>  > iii (0 = 1	Ъ 🖀 н 🛛 🖸 📬		
Primaide 1310 C	olumn Over	n 0 (SN 11)	Demo Mode: Not Re	eady (Method has not	been sent)	0
Oven Temperature:	21,0 °C	Current Wait Time:	0,0 min.	Th. Status		
Ambient Temperature: 20,0 °C Valve Status:		Valve Status:	1 ~	Switch Off		
For help press F1.						

Fig. 29: 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 Primaide 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. 30: Primaide Setup - Column Oven



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

# 4.5.4 Report Setup

Both parameters set on the <u>Primaide 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.

C Print Preview		×
💼 Print 📷 Print to PDF 🖄 Send PDF 🔌 🕨 🏭 🕙 🥥 📿 Glose		
Primaide Method 1310 Column Oven 0 Target Temperature : 40 ℃ Temperature Tolerance : 1,0 ℃ Upper Limit Temperature : 60 ℃ Valve Postion : 1	Wait Time :1 min	I
Page 1		

Fig. 31: Report - Thermostat

# 4.6 PDA Detector

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

# 4.6.1 Hitachi Primaide Setup - PDA Detector

Primaide Setup	×
Module Type:	1430 Diode Array Detector
Serial Number:	11
Program Number:	1
Detector Name:	1430 Diode Array Detector 1
Number of Signals:	4 ~
Signal 1 Name:	PDA1
Signal 2 Name:	PDA2
Signal 3 Name:	PDA3
Signal 4 Name:	PDA4
Lamp	os Off at Shutdown
	Lamp Maintenance
not possible to read out them (Use service program to char	et manually to match the HW settings as it is from HW programatically. gige HW settings and set according values here.) Oven \ 1410 UV Detector \ 1430 Diode Array Detector /
OK	Cancel Help

Fig. 32: Primaide 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

New Open Save Save as	Report setup	Audit tr	ail Send	method method	l by Help			
lect PDA 1430 Dio	de Array Detec	tor 1 $\sim$	Enabled					
	Primaide PDADe	tector Metho	d					
1430 Diode Array Detector								
Sample Period	Minimum \	NL	Signal 1 WL		Recorder Range			
400 ms 🛛 🗸 2,5 Hz	210	nm	250	nm	$\sim$ AU			
Min Acquisition Time: 0,50 min	Maximum	WL	Signal 2 WL		WL1			
Max Acquisition Time: 232 min	400	nm	250	nm	nm			
Lamp Mode	Bandwidt	ı	Signal 3 WL		WL2			
D2 & W Mode $\vee$	1	∨ nm	250	nm	nm			
Slit	Response	Time	Signal 4 WL		Leak Sensor			
Coarse $\checkmark$		∨ s	250	nm	🔾 on			
					○off			
Check Lamp Status								
PDA Status Demo Mode: Not Ready	(Marked has a		1 1					
Senio Houe, not ready i	(Freehold has he	e seen sency	, comp 15 011					
Event Table AS LC Gradient	LC	Measurem	ient Acqu	uisition	PDA Therm	iostat	Integra	tio
PDA Method		Calcul	ation		Ad	vanced		

Fig. 33: 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. 34: 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 and W Lamps 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 Primaide 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:	1430 Diode Array Detector
Serial Number:	11
Program Number:	1
Detector Name:	1430 Diode Array 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
not possible to read out then	set manually to match the HW settings as it is from HW programatically. froe HW settings and set according values here.)
	Oven λ 1410 UV Detector λ 1430 Diode Array Detect

Fig. 35: Primaide 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 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.

C Print Preview	N						×
📑 <u>P</u> rint   Br	int to PDF 🛛 🔷 Send	PDF 🔺 🕨 📗 🔍 🖯	<u>C</u> lose				
		Pr	rimaide Method 1430 Diode Arr	ayDetector 1			
	Sample Period	: 400 ms	Sit	: Coarse	Lamp Mode	D2 & W : Mode	L
	Spectrum: Minimum Wavelength		Maximum Wavelength				
	Bandwidth Signal 1 Name	: 1 nm : PDA1	Response Wavelength	: 0,00 s : 250 nm			1
	Signal 2 Name Signal 3 Name	: PDA2 : PDA3	Wavelength Wavelength	: 250 nm : 250 nm			
	Signal 4 Name	: PDA4	Wavelength	: 250 nm			
Page 1							

Fig. 36: 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

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

# 4.7.1 Hitachi Primaide Setup - UV Detector

Primaide Setup	×
Module Type:	1410 UV Detector
Serial Number:	11
Program Number:	1
Signal Name:	UV1
	Lamp Off at Shutdown
	Lamp Maintenance
not possible to read out ther	
(Use service program to cha	nge HW settings and set according values here.)
I ▲ ► ► λ 1310 Column	Oven 👌 1410 UV Detector 🖌 1430 Diode Array Detector /
	orein/(1410 ov baccas)/(1400 block mby baccas)/
ОК	Cancel Help

Fig. 37: Primaide 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.

#### 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.

# 4.7.2 Method Setup - Acquisition - Detector Settings

Method Setup Default1 - #18; 19.04.2023 1	16:17:14	– o x
New Open Save Save as	Report setup Audit trail	Peip
Select Detector UV1	Enabled	
	Primaide Detector Method	
1410 UV Detector Time Program		
Sample Period	Response Time	
200 ms 🗸 5 Hz	4,00 $\checkmark$ s	
Lamp Mode	Processor Range	
D2 Mode 🗸	2,00 🗸 AUFS	
WL1	Offset	
250 nm	0 mAU	
Time Program Leak Sensor	Polarity	
🔿 on 💽 on	<ul> <li>positive</li> </ul>	
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		PDA Thermostat Integration
PDA Method	Calculation	Advanced
R Cancel		Send Method

Fig. 38: 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.

New	Open	Save	Save as	Report se		. Send method by e-mail	(2) Help			
ect De	etector		UV1		~ 2	e-maii				
				Primaide D	etector Method					
1410	UV Detecto	r Time Pr	rogram							
	Time [min]		Wavelength [nm]		Base					
1	0,0		550							
2	1,0		540							
3	1,5				AutoZero					
4										
-										
1										
7	L									
	L	Deres M		(11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1						
	atus	Demo M	lode: Not Ready	(Method has	not been sent)					
et Sta	atus	Demo M	iode: Not Ready	(Method has	s not been sent)					
et Sta	atus t Table	Demo M	iode: Not Ready		: not been sent) Measuremen	t Acquisition	PDA	Thermostat	Integra	atio
et Sta	t Table		LC Gradient				PDA	Thermostat Advanced	Integra	atio

Fig. 39: 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.

# 4.7.4 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.

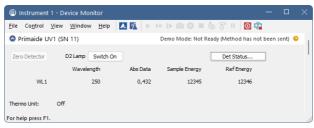


Fig. 40: Device Monitor - UV Detector

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 Primaide 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.

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

Module Type:	1410 UV Detector
Serial Number:	11
Program Number:	1
Signal Name:	11/1
	Lamp Off at Shutdown
	Thermo Unit Connected     Lamp Maintenance
not possible to read out ther	set manually to match the HW settings as it is n from HW programatically. nge HW settings and set according values here.)
4 4 N N mp à 1210 Art	tosampler à 1310 Column Oven à 1410 UV Detector √

Fig. 41: Primaide 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 <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. 42: 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.

# **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:

[PRIMAIDE 1]

echo=on textmode=on filename=Comm\_Primaide\_%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 PM1430 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 establish communication with Hitachi Primaide after previous usage.

 Solution:
 It is possible that driver related processes were not terminated automatically after closing ClarityVA and it is necessary to terminate them manually via Task Manager before starting ClarityVA again.

A	Task Manager		Q T	ype a nam	e, publisher,	or PID t	o search								-	
≡		Details										E	Rur	new task	⊘ End	task •••
₽	Processes	Name	PID	Status	User name	CPU	Working se	Memory (a	Commit	н	Th	Us	G	Comma	Archite	Descripti
4	Performance	Coad print Process Coad print Co. and			11154	Ξ	1484	10.4	1.000	Ē	1	1	1	0.000	-	10010
9	App history	LeASSrv.exe	9616	Running	admin	00	11,432 K	2,272 K	4.064 K	194	12	19	23	/1/2	×86	LeASSrv
r.g.	Startup apps	LeDADSrv.exe LeDriver.exe	4612 11468	Running Running	admin admin	00	9,268 K 10,968 K	1,540 K 1,516 K	3,160 K 2,128 K	144	8	10	23	/1/2	x86 x86	LeDADS
8;	Users	LeIFBServer.exe LePumpSrv.exe	8236 5460	Running Running	admin admin	00	11,012 K 11,532 K	2,100 K 2,300 K	3,120 K 4,096 K	215	14	24	29 23	/2 /1/2	x86 x86	LeiFBSer LePump
:=		LeSpooler.exe	1724	Running	admin	00	9,836 K	2,728 K	4,576 K	376	38	71		/2	x86	LeSpool
3	Services	Concess Mc Tracklass		Access of the second	and the second	1	10,024-0	10101	1,000.0	5	5	1	÷	com.	-	Local Day
ŝ	Settings	manlage of the Land		Access of the second	-	-	10, 104 A 20, 204 A	4,124	0,004	2	2	4	4	Cire.	-	Manager 1
425	settings	manufacture and	1000	Raming	and the second		10,754	6,714	10,000 4	-				10 Perc.		Manual.

Fig. 43: Driver related processes in Task Manager.

#### It is not possible to autodetect the device.

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

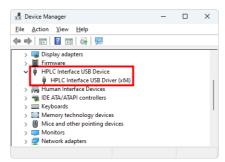


Fig. 44: HPLC Interface USB driver in Device manager

It is not possible to install Primaide HPLC USB Interface device 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 Primaide Maintenance Software

For service purposesor setting of the *Gas Leak Sensor* install the **Primaide Maintanace Software** located in C:\CLARITYVA \HW\_ DRIVERS\PRIMAIDEDRIVERKIT\TOOLS. This application can be also used for evaluation of communication troubles between **ClarityVA** and **Primaide** system.