

Monitor UV-900

Operating Instructions

Original instructions
Translation disc included



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1 Introduction

About this chapter

This chapter contains important user information, descriptions of safety notices, intended use of the Monitor UV-900 system, and lists of associated documentation.

In this chapter

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1.1 About this manual

Purpose of the Operating Instructions

The *Operating Instructions* provides you with the instructions needed to handle Monitor UV-900 in a safe way.

Typographical conventions

Software items are identified in the text by ***bold italic*** text.

Hardware items are identified in the text by **bold** text.

In electronic format, references in *italics* are clickable hyperlinks.

1.2 Important user information

Read this before operating the product



All users must read the entire *Operating Instructions* before installing, operating or maintaining the product.

Always keep the *Operating Instructions* at hand when operating the product.

Do not install, operate, or perform maintenance on the product in any other way than described in the user documentation. If you do, you may be exposed or expose others to hazards that can lead to personal injury and you may cause damage to the equipment.

Intended use

Monitor UV-900 is a UV-absorption monitor for use in liquid chromatography.

Monitor UV-900 is intended for research use only, and shall not be used in any clinical procedures, or for diagnostic purposes.

Prerequisites

In order to operate Monitor UV-900 in the way it is intended:

- The user must have a general understanding of bioprocessing equipment and with the handling of biological materials.
- The user should understand the concepts of liquid chromatography.
- The user must read and understand the Safety Instructions chapter in the *Operating Instructions*.
- Monitor UV-900 must be installed in accordance with the site requirements and instructions in the *Operating Instructions*.

Definitions

This user documentation contains safety notices (WARNING, CAUTION, and NOTICE) concerning the safe use of the product. See definitions below.

1 Introduction

1.2 Important user information



WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. It is important not to proceed until all stated conditions are met and clearly understood.



CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. It is important not to proceed until all stated conditions are met and clearly understood.



NOTICE

NOTICE indicates instructions that must be followed to avoid damage to the product or other equipment.

Notes and tips

Note: *A note is used to indicate information that is important for trouble-free and optimal use of the product.*

Tip: *A tip contains useful information that can improve or optimize your procedures.*

1.3 User documentation

In addition to these *Operating Instructions*, the documentation package supplied with Monitor UV-900 also includes product documentation binders containing detailed specifications and traceability documents.

The most important documents in the document package with regard to technical aspects of Monitor UV-900 are listed below.

System-specific documentation

User documentation	Content
<i>Monitor UV-900 Operating Instructions</i>	Instructions needed to prepare and operate the Monitor UV-900 system in a correct and safe way.
EU Declaration of Conformity for Monitor UV-900	Document whereby the manufacturer ensures that the product satisfies and is in conformity with the essential requirements of the applicable directives.

2 Safety instructions

About this chapter

This chapter describes safety compliance, safety labels, general safety precautions, emergency procedures and power failure of Monitor UV-900.

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2.1 Safety precautions

Introduction

The Monitor UV-900 is powered by mains voltage and handles pressurized liquids that may be hazardous. Before installing, operating or maintaining the monitor, you must be aware of the hazards described in this manual. Follow the instructions provided to avoid personal injury or damage to the equipment. The safety precautions in this section are grouped into the following categories:

- General precautions
- Using flammable liquids
- Personal protection
- Installing and moving the instrument
- System operation
- Maintenance

General precautions

Always follow these General precautions to avoid injury when using the Monitor UV-900 instrument.

**WARNING**

Do not operate Monitor UV-900 in any other way than described in this manual.

**WARNING**

Only properly trained personnel may operate and maintain the product.

**WARNING**

Do not use any accessories not supplied or recommended by Cytiva.

2 Safety instructions

2.1 Safety precautions



WARNING

Do not use Monitor UV-900 if it is not working properly, or if it has suffered any damage, for example:

- damage to the power cord or its plug
- damage caused by dropping the equipment
- damage caused by splashing liquid onto it

Using flammable liquids

When using flammable liquids with the Monitor UV-900, follow these precautions to avoid any risk of fire or explosion.



WARNING

Fire Hazard. Before starting the system, make sure that there is no leakage.



WARNING

A fume hood or similar ventilation system shall be installed when flammable or noxious substances are used.

Personal protection



WARNING

Always use appropriate Personal Protective Equipment (PPE) during operation and maintenance of this product.



WARNING

Hazardous substances and biological agents. When using hazardous chemical and biological agents, take all suitable protective measures, such as wearing protective clothing, glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation and maintenance of Monitor UV-900.

**WARNING**

Spread of biological agents. The operator must take all necessary actions to avoid spreading hazardous biological agents. The facility must comply with the national code of practice for biosafety.

Installing and moving the instrument

**WARNING**

Supply voltage. Before connecting the power cord, make sure that the supply voltage at the wall outlet corresponds to the marking on the instrument.

**WARNING**

Protective ground. The product must always be connected to a grounded power outlet.

**WARNING**

Power cord. Only use power cords with approved plugs delivered or approved by Cytiva.

**WARNING**

Access to power switch and power cord with plug. Do not block access to the power switch and power cord. The power switch must always be easy to access. The power cord with plug must always be easy to disconnect.

**WARNING**

High intensity UV light. This product uses high intensity ultra-violet light. Do not disconnect the optical fibers while the lamp is on.

2 Safety instructions

2.1 Safety precautions



CAUTION

Make sure that the system is placed on a stable, level bench with adequate space for ventilation.

System operation



WARNING

If liquid is spilled on the equipment, the electrical power supply must be disconnected immediately. The equipment must be completely dry on the inside and the outside before reconnecting the power supply.



WARNING

Hazardous biological agents during run. When using hazardous biological agents, run **System CIP** and **Column CIP** to flush the entire pump with bacteriostatic solution (e.g. 1M NaOH) followed by a neutral buffer and finally distilled water, before service and maintenance.



WARNING

Hazardous chemicals during run. When using hazardous chemicals, run **System CIP** and **Column CIP** to flush the entire system tubing with distilled water, before service and maintenance.

Maintenance



WARNING

Electrical shock hazard. All repairs should be done by service personnel authorized by Cytiva. Do not open any covers or replace parts unless specifically stated in the user documentation.



WARNING

Use only approved parts. Only spare parts and accessories that are approved or supplied by Cytiva may be used for maintaining or servicing the product.

**WARNING**

Corrosive substance. NaOH is corrosive and therefore dangerous to health. When using hazardous chemicals, avoid spillage and wear protective glasses and other suitable Personal Protective Equipment (PPE).

**WARNING**

Hazardous chemicals in UV flow cell. Make sure that the entire flow cell has been flushed thoroughly with bacteriostatic solution, for example NaOH, and distilled water, before service and maintenance.

**WARNING**

Hazardous chemicals or biological agents. When using hazardous chemicals or biological agents, make sure that the entire system has been flushed thoroughly with bacteriostatic solution (e.g., NaOH) and distilled water before service and maintenance.

**WARNING**

Disconnect power. Always disconnect power from the instrument before replacing any component on the instrument, unless stated otherwise in the user documentation.

2.2 Labels

Introduction

This section describes the system label on Monitor UV-900 and its meaning.

System label

The system label is located on the back of the equipment. The system label identifies the equipment and shows electrical data, regulatory compliance, and warning symbols.

The following symbols and text may be present on the system label:

Label text	Description
Code no:	Code number.
Serial no:	Serial number.
Mfg Year:	Year (YYYY) and month (MM) of manufacture.
Voltage:	Voltage.
Frequency:	Supply voltage frequency.
Max power:	Max power.
	Warning! Read the user documentation before using the system. Do not open any covers or replace parts unless specifically stated in the user documentation.

2.3 Emergency procedures

Introduction

This section describes how to perform an emergency shutdown of Monitor UV-900. The section also describes the result in the event of power failure.

Emergency shutdown

In an emergency situation, do as follows to stop the run:

Switch off power to the instrument by switching the **On/off** switch on the rear panel to the **(O)** position. If required, disconnect the mains power cord. The run is interrupted immediately.

Power failure

In the event of power failure the run is interrupted immediately.

3 System description

Monitor UV-900 is a UV-absorption monitor for use in liquid chromatography. Monitor UV-900 features:

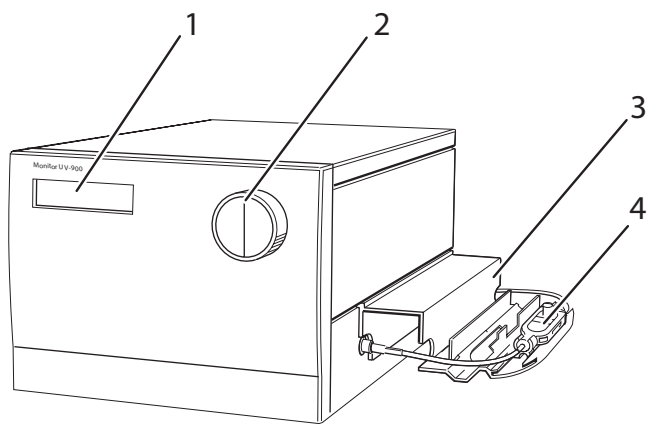
- Variable wavelength for detection in the range 190–700 nm.
- Up to 3 wavelengths can be monitored simultaneously.
- Two alternative flow cells with path length 2 mm and 10 mm.
- Accurate and reliable monitoring through self-test, self-calibration and fiber optics.

In this chapter

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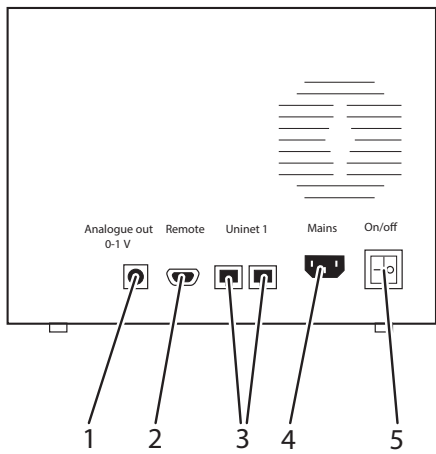
3.1 Illustrations

Main unit



Part	Function
1	Display
2	Menu selection dial
3	Cell holder
4	Flow cell

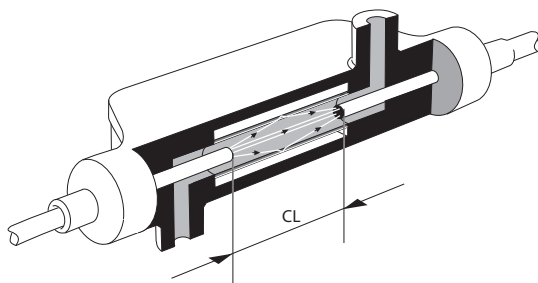
Main unit, rear panel



Part	Function
1	Analogue output 0-1 V. Recorder output, 3 channels 0 to 1 V
2	Remote. Digital signal inputs, lamp on/off, autozero, event mark.
3	Uninet 1. Computer network.
4	Mains power inlet. Supply voltage, grounded.
5	On/off. Instrument power switch.

3.2 Flow cell

The optical path length of the flow cell is 2 mm and 10 mm. The flow cell is made of quartz with a titanium housing. The illustration below highlights the optical path cell length (CL).



The design of the flow cell prevents the formation of distinct interfaces between eluent components with different refractive indices and eliminates the negative influence these would cause. The precision of monitoring is enhanced by the construction of the flow cell, which ensures total reflectance of light. This maintains a high intensity of light to the detector. The long path length combined with a small cell volume increases sensitivity.

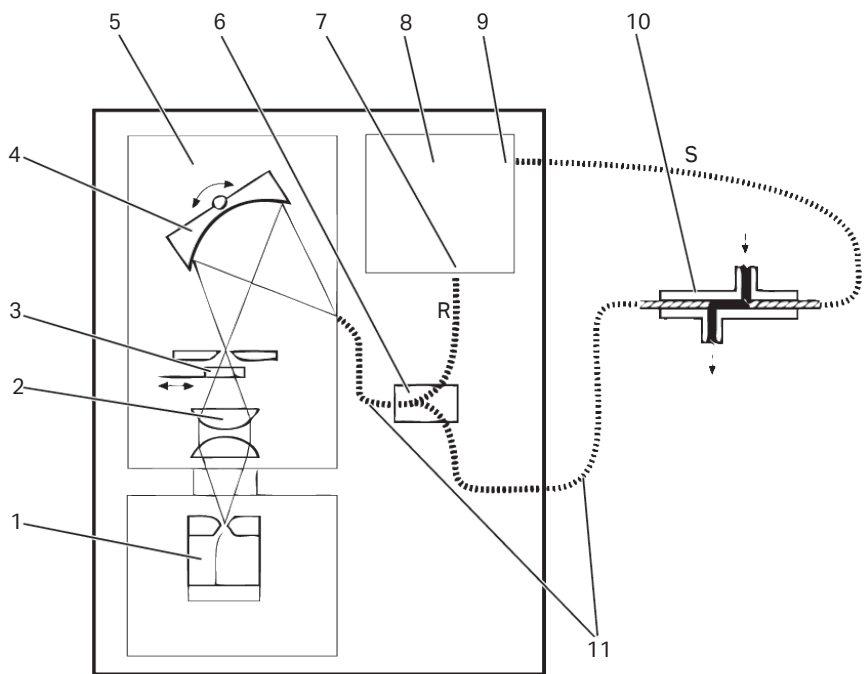
Optional flow cells

The following flow cells can also be used with Monitor UV-900:

- UV cell, 1/2/5 mm (ÄKTApilot™)
- Industrial flow cell 8 mm (tubing i.d. 8 mm)
- Industrial flow cell 1" (tubing i.d. 1")

3.3 Monitor principle

Functional diagram of the UV monitor



Part	Function
1	Flash lamp 100 Hz
2	Condensor
3	Blocking filter
4	Aberration corrected holographic grating
5	Monochromator
6	Beam splitter
7	Reference

Part	Function
8	Detectors and electronics
9	Signal
10	Flow cell
11	Optical fibers

Light source and monochromator

A Xenon flash lamp gives a high intensity, continuous spectrum throughout the range 160–2000 nm. The light enters a monochromator which includes a condensor, blocking filter, entrance slit and a concave aberration corrected holographic grating. Monochromatic light from the grating is directed to an optical fiber. The grating is turned by a stepping motor for wavelength selection between 190–700 nm, in steps of 1 nm. Up to 3 wavelengths can be monitored simultaneously.

Blocking filter

For wavelengths between 360–700 nm, a blocking filter is moved into the light path to filter out unwanted light, half a wavelength from the second order spectrum, before entering the monochromator.

Beam splitter

The light from the monochromator to the flow cell and from the cell to the detector electronics is guided by optical fibers. The full intensity of the light is focused on the liquid flow path, maximizing the sensitivity of the monitor. Before entering the flow cell, the monochromatic light is split in a beam splitter, with 50% of the light passing through the sample fiber (S) and the flow cell, and 50% being directed through the reference fiber (R). Two photodiodes with identical characteristics monitor the intensities of the sample and reference beams.

Detection system

The long path length and small volume of the flow cell ensure very high sensitivities and high signal-to-noise ratios. The detection system is also very stable and because the optical unit is located away from the lamp and electronics, noise and drift caused by temperature variations is avoided.

Calibration

At calibration the instrument automatically finds two persistent lines in the spectrum of Xenon. The wavelengths of these known lines are used to calibrate the stepper motor that turns the grating.

4 Installation

About this chapter

This chapter provides required information to enable users and service personnel to unpack, install, move and transport Monitor UV-900.

Precautions



WARNING

Before attempting to perform any of the procedures described in this chapter, you must read and understand all contents of the corresponding section(s) in the Safety instructions chapter as listed below:

- General Precautions
- Personal protection
- Installing and moving
- Power supply

In this chapter

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4.1 Unpacking

Unpack the instrument and check the items against the supplied packing list. Check the equipment for damage before starting assembly and installation. There are no loose parts in the transport box. All parts are either mounted on the system or located in the accessory kit box. If any damage is found, document the damage, and contact your local Cytiva representative.

It is recommended that all packing materials should be retained if onward transport of the instrument is expected.

4.2 Site requirements

Parameter	Requirement
Operation site	Indoor use
Altitude	Maximum 2000 m
Electrical power	100/240 V AC $\pm$ 10%, 50-60 Hz
Transient overvoltage	Overvoltage category II
Ambient temperature	4°C to 40°C
Placement	Stable laboratory bench or in ÄKTAexplorer or ÄKTApurifier.
Humidity	20% to 95% relative humidity (noncondensing)
Pollution degree	2

The instrument should be located in a place of low temperature variations, away from heat sources, draughts and direct sunlight.

To ensure correct ventilation a free space of 0.1 m is required behind and in front of the instrument. Do not use any soft material under the instrument, to ensure that the ventilation inlet in the front is not blocked.

The instrument should not be used in a corrosive atmosphere or in an atmosphere where deposits are liable to form on the optical surfaces.

4.3 Transport

Before moving the equipment: disconnect all connected cables and tubing.

4.4 Assembly

The following parts must be added to Monitor UV-900 before use:

- Flow cell
- Optical fibers
- Tubing

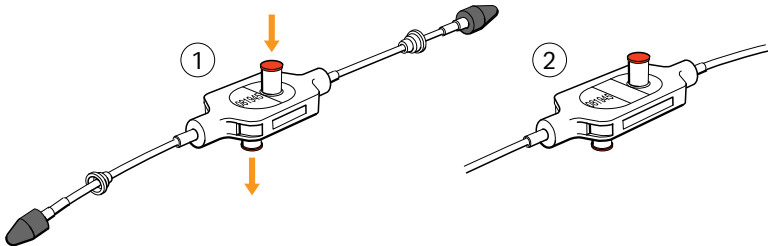
Fixing UV Flow Cell 2 mm and UV Flow Cell 10 mm



NOTICE

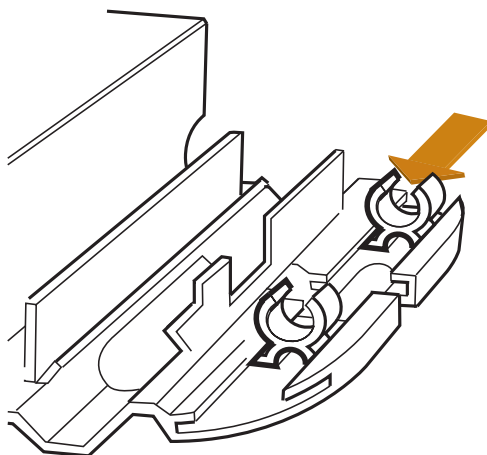
To avoid damaging the optical fibers, press only on the cell body, never on the optical fibers.

Step	Action
1	Unpack the flow cell. Do not remove the red protective caps from the inlet or outlet, or the black protective caps on the optical fiber connectors.

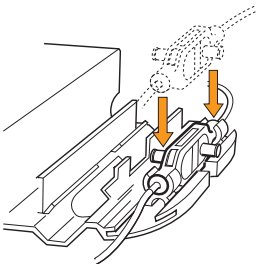
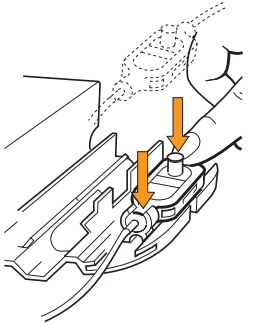


#	Designation	Light path length [mm]	Cell volume [μL]
1	UV-900/2	2	2
2	UV-900/10	10	8

Step	Action
2	Slide the rear white clip on the cell holder to its inner position for a 2 mm cell and to its outer position for a 10 mm cell.



Step	Action
3	Place the flow cell in the opening between the white clips. To improve the access to the tubing connections the cell can be positioned with the text and serial number facing upwards or sideways. Press the cell into the clips to fasten it.

If...	Then...
Placing the flow cell with the serial number facing upwards.	
Placing the flow cell with the serial number facing sideways.	

Connecting the optical fibers



WARNING
High intensity UV light. This product uses high intensity ultra-violet light. Do not disconnect the optical fibers while the lamp is on.



NOTICE
Do not touch the tips of the optical fibers with your fingers as this will result in poor monitor performance. If you accidentally touch the optical fiber tip, it can be wiped with 30% isopropanol using lens papers.

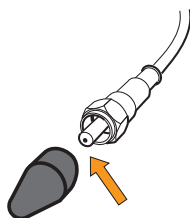


NOTICE

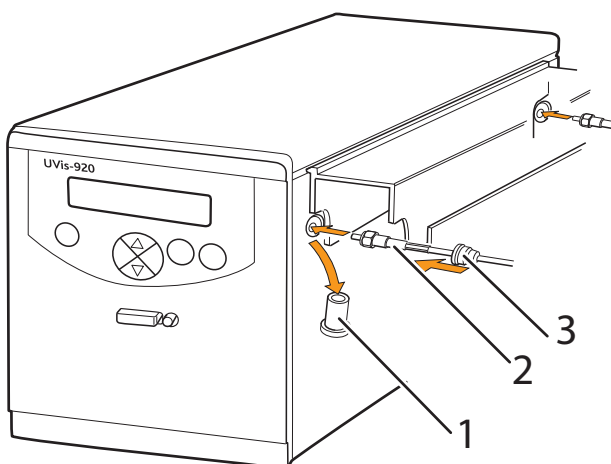
Do not twist the optical fibers during tightening.

Step Action

- 1 Remove the two black protective caps from the optical fiber connectors.

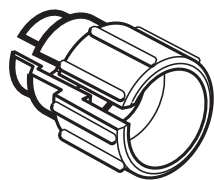


- 2 Remove the two rubber protective caps from the optical fiber receptacles on the right side of the housing.



Part	Function
1	Protective cap
2	Black heat shrink tubing
3	Rubber sleeve

Step	Action
3	Connect the two optical fibers to the housing by carefully inserting them into the sockets and tightening the nuts fingertight using the fiber detachment tool supplied. Do not overtighten.



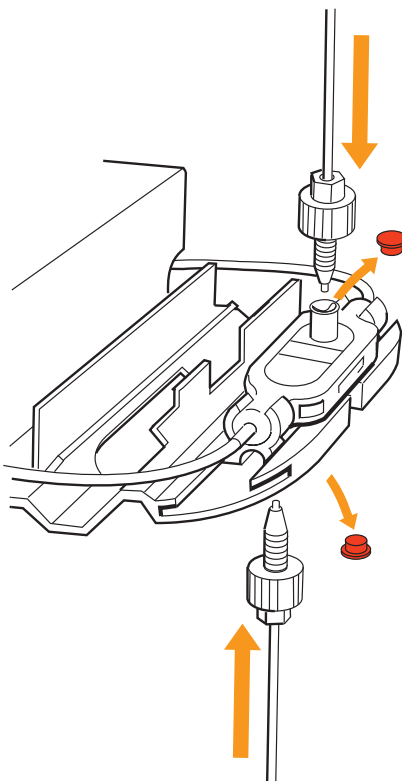
Note:

The optical fiber end with black heat shrink tubing shall be connected to the rear socket connector on the side of the monitor.

4	Slide the rubber sleeves on the two optical fibers onto the connectors. Make sure that the sleeves are pushed tight to the housing to prevent dust, fluid or light entering the connection.
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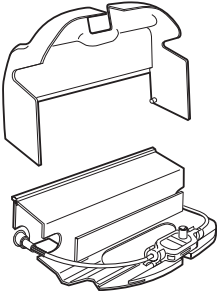
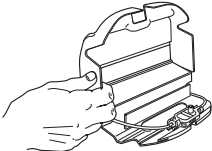
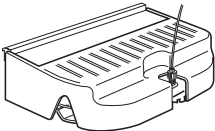
Connecting the tubing

Step	Action
1	Remove the red protective caps from the inlet and outlet of the flow cell. The inlet is on the top of the flow cell, the same side as the serial number.



2	Connect the tubing with 1/16" fingertight connectors.
---	---

Mounting the cell holder cover

Step	Action
1	Mount the cell holder cover by pushing it onto the cell holder. 
2	Fit the two small lugs on the cover in the holes at the sides of the cell holder. 
3	Lower the cover over the cell holder. 

4.5 Connecting electrical cables



NOTICE

The mains power to the product must be switched off before connecting the instrument to any cells or external equipment.

Connecting to recorder (if used)

Step	Action																		
1	Connect the recorder to the Analogue out socket using the cable supplied. Each wavelength signal is available on a separate channel using the following wires: <table><tr><td>$\lambda 1$</td><td>Wire 1</td><td>+</td></tr><tr><td></td><td>Wire 2</td><td>-</td></tr><tr><td>$\lambda 2$</td><td>Wire 3</td><td>+</td></tr><tr><td></td><td>Wire 4</td><td>-</td></tr><tr><td>$\lambda 3$</td><td>Wire 5</td><td>+</td></tr><tr><td></td><td>Wire 6</td><td>-</td></tr></table>	$\lambda 1$	Wire 1	+		Wire 2	-	$\lambda 2$	Wire 3	+		Wire 4	-	$\lambda 3$	Wire 5	+		Wire 6	-
$\lambda 1$	Wire 1	+																	
	Wire 2	-																	
$\lambda 2$	Wire 3	+																	
	Wire 4	-																	
$\lambda 3$	Wire 5	+																	
	Wire 6	-																	
	Note: <i>The signal cable is delivered with protective covers on each wire. Do not remove the protective covers from unused connections as a short circuit may disturb the measurements.</i>																		
2	Set the recorder to 0 to 1 V input, full scale, 0 V offset.																		

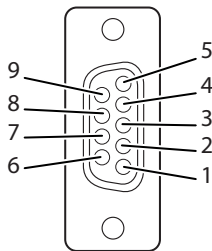
Connecting to auxiliary equipment (if used)



NOTICE

Any computer used with the equipment must comply with IEC 60950 or IEC 62368-1 and be installed and used according to the manufacturer's instructions.

Connect any auxiliary equipment to the **Remote** socket, 9-pole D-Sub female (5 V TTL signals only).



Pin	Signal	Function ¹
1	Remote on/off	Active = lamp on, inactive = lamp off
2	Autozero	From inactive to active > 100 ms = Autozero
3	Event mark	From inactive to active > 100 ms = Event mark
4	-	
5	0 V	Common ground for all signals
6-9	-	

¹ Active status = low or closed terminal to pin 5 (0V)

Connecting to communication link

When used as a stand alone module the monitor is controlled from the front panel. The monitor can also be used in ÄKTAexplorer or ÄKTApurifier and controlled from a PC running UNICORN™ version 3.21 or higher, using **UniNet cables**.

Connect two **UniNet** cables to the **UniNet-1** connectors. The instrument can be connected in series anywhere in the chain between the PC and the termination plug. The **UniNet-1** link connects, in series, the PC with Pump P-905, Monitor pH/C-900 and Monitor UV-900. The termination plug is connected to the last instrument in the chain.

Connecting to supply voltage

Step	Action
1	Make sure the On/off switch is in the OFF position (O).
2	Connect a mains cable between the instrument and a grounded mains socket. The instrument is delivered with both European and US type mains cables, as standard. Any voltage 100 to 240 VAC, 50 to 60 Hz, can be used.

5 Operation

About this chapter

This chapter provides the information required to safely operate Monitor UV-900.

Precautions



WARNING

Before attempting to perform any of the procedures described in this chapter, you must read and understand all contents of the corresponding section(s) in the Safety instructions chapter as listed below:

- General Precautions
- Personal protection
- System operation

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5.1 Starting the instrument

Step	Action
1	Turn on the On/off switch on the rear panel. The instrument performs a self test and then starts calibration. Selftest Please wait... Calibrating Please wait...
2	After approximately 1 minute the display shows the main operating menu and the instrument is ready to use. All parameters are factory set to default values. λ1(215) 1.12345 AU λ1(254) 0.02345 AU
3	If the instrument has a calibrated cell path length set that differs from the nominal length, a warning message appears on the monitor display. Another message, displaying the calibrated cell length, also appears. The display toggles between these messages.
4	To go to the main operating menu, press OK or wait for about 45 seconds to return automatically.

5.2 Reading absorbance values

Menu

$\lambda 1$ (215)	1.12345 AU
$\lambda 2$ (254)	0.02345 AU

$\lambda 3$ (280)	1.12345 AU
-------------------	------------

215nm	254nm	280nm
1.123	0.023	0.123

Description

The main operating menu shows the absorbance values with 5 digits for up to 3 active wavelengths. The menu is reached from any other menu by pressing the **ESC** button repeatedly.

The display for the third wavelength is reached by turning the **dial** clockwise.

As an alternative, all 3 wavelengths can be shown in a single display, but limited to 3 decimals. This alternative is reached by turning the **dial** clockwise.

5.3 Menu selection and settings

In this section

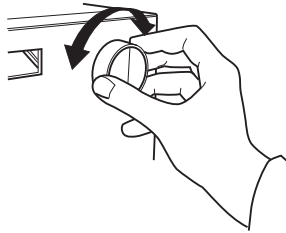
Section	See page
5.3.1 Moving between menus	41
5.3.2 Return to main menu	43
5.3.3 Select value	44
5.3.4 Main menu overview	45
5.3.5 Setting lamp on and off	46
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5.3.9 Event mark	51
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5.3.1 Moving between menus

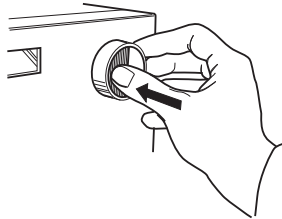
A specific menu is selected by turning the front selection **dial** clockwise or counter-clockwise. When the required menu is visible the menu or selection is accepted by pressing the **OK** button.

Step	Action
------	--------

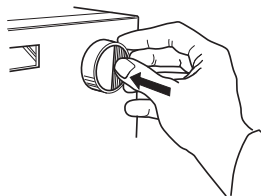
- | | |
|---|---|
| 1 | Turn dial clockwise or counterclockwise to select menus. |
|---|---|



- | | |
|---|--|
| 2 | Press OK button to select sub-menu. |
|---|--|



- | | |
|---|---|
| 3 | Press ESC button to return one menu level. |
|---|---|

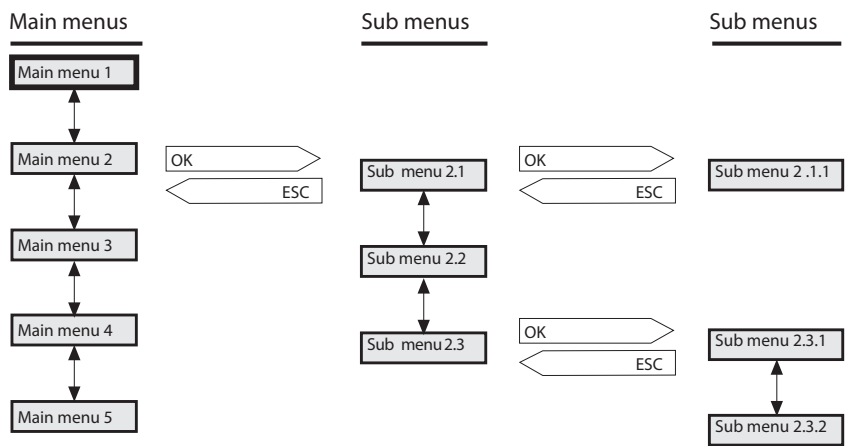


If a menu has sub levels, the sub menu is displayed by pressing the **OK** button. Pressing the **ESC** button moves back one menu level.

5 Operation

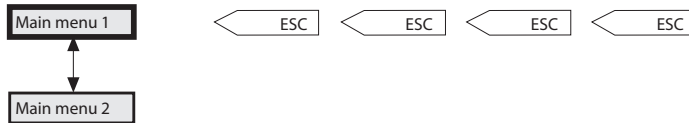
5.3 Menu selection and settings

5.3.1 Moving between menus



5.3.2 Return to main menu

Pressing **ESC** repeatedly, always returns to the **Main menu 2** which is the main operating menu. Press **ESC** once more to return to **Main menu 1**, the mode changing menu.



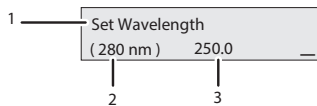
5 Operation

5.3 Menu selection and settings

5.3.3 Select value

5.3.3 Select value

A cursor below a text or numerical value shows what is affected by the **dial**. To increase the value turn the dial clockwise. To decrease the value turn the dial counterclockwise. The value can be reset by turning the dial several clicks counterclockwise. The parameter (1) being changed is shown in the top left of the display, the current value (2) is shown below the parameter and the new value to be (3) is shown in the lower right of the display.



When setting numerical values the cursor moves to the adjacent digit if the dial is turned quickly in one direction, to simplify entering large values. The cursor moves back one decimal place to the right every two seconds if the dial is not turned. The text or numerical value displayed is accepted by pressing the **OK** button. To cancel, press the **ESC** button.

5.3.4 Main menu overview

Menu	Description
Run Press OK to End —	Mode changing menu (Main menu 1). The menu is accessed from all positions by pressing the ESC button repeatedly.
λ1(215) 1.12345 AU λ1(254) 0.02345 AU	Main operating menu (Main menu 2). Wavelength display showing first two wavelengths and, if the instrument is in Run mode, their absorbance.
Autozero	Autozero the instrument.
Eventmark	Produce event mark.
Set Wavelength (215, 254, 280 nm)	Set wavelengths for the measurements.
Set Analogue Out (2.000AUFs, 10%)	Setting the recorder output.
Set Averaging Time (2,56s)	Noise filtering.
Check	Check internal operating values, see <i>Section 5.3.11 Check menu, on page 53</i> .
Setup	Setup language, unit number etc, see <i>Section 5.3.12 Setup menu, on page 57</i> .
Alarm/Timer 00:22:24	Set different timer options, see <i>Section 5.3.13 Setting and using the alarm timer, on page 59</i> .

Note: *The instrument has service displays for use by authorised service personnel. If the service display **Enter Access Code!** is accidentally selected, press the **ESC** button to exit to the normal operation display.*

5.3.5 Setting lamp on and off

The lamp should be switched off when no measurement is made to conserve the lamp operating time. The lamp is switched on when a run is started. No warm-up time is required.

Step	Action
1	Select the Mode changing menu . Run Press OK to End _
2	Switch the lamp on (Run) or off (End) by pressing OK . Its current status is shown in the upper left of the display.

5.3.6 Setting wavelength

The instrument can measure up to 3 wavelengths simultaneously and wavelength changes can be set at any time.

Step	Action
1	Select main menu Set Wavelength . Set Wavelength (215, 254, 280 nm)
2	Press OK .
3	Select sub menu Set Wavelength $\lambda 1$. Set Wavelength $\lambda 1$ (215, 254, 280 nm)
4	Press OK .
5	Set the value. Set Wavelength $\lambda 1$ (215nm) 23<u>4</u>
6	Press OK .
7	The next wavelength $\lambda 2$ is now shown. Set the value or turn the wavelength off, by turning the dial counter clockwise until the value passes through 190 nm. If only one wavelength is to be used, $\lambda 2$ and $\lambda 3$ should be set to off. Press OK . The first wavelength $\lambda 1$ can never be set to off. Set Wavelength $\lambda 2$ (254nm)
8	Repeat step 4 in the menu Set Wavelength $\lambda 3$.
9	Press ESC to return to the main operating menu.

5.3.7 Autozero

The autozero function sets the detected absorbance to zero when the OK button is pressed. All three wavelengths are autozeroed. Autozero is recommended after wavelength changes in a method and before the sample is injected.

Step	Action
1	Select main menu Autozero . Autozero
2	Press OK . The normal absorbance value display is then shown.

5.3.8 Setting analog output to an external chart recorder

The external chart recorder output from the instrument is always 0 to 1 V, but the absorbance value for full scale deflection (AUFS) and the zero absorbance level on the recorder can be set.

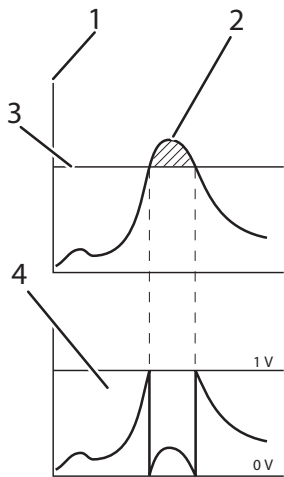
Step	Action
1	Select menu Analog Out, press OK. Set Analogue Out (2.000AUFS, 10%)
2	Select menu Set Range, press OK. The range is the full scale absorbance range for the chart recorder (1 V). Set Range (2.000AUFS)
3	Use the arrow keys to set the absorption range for recorder output in AUFS, press OK. Only fixed steps between 5.0 AUFS and 0.01 AUFS can be set and the value is the same for all 3 wavelengths. Set Range (0.050AUFS) <0.050>
4	Select menu Set Zero Level, press OK. This value determines where the zero absorbance level should be in relation to full scale on the recorder. Set Zero Level (10%)
5	Use the arrow keys to set the value and press OK.

5 Operation

5.3 Menu selection and settings

5.3.8 Setting analog output to an external chart recorder

The instrument has an automatic overrange function. If the monitor signal reaches the full scale value on the recorder, the signal will instantly drop to 0 V and give an accurate display of the peak starting from this position.



Part	Function
1	Measured absorbance level (absorbance units)
2	Overrange
3	Maximum range (absorbance units)
4	Signal to recorder (V)

5.3.9 Event mark

Event marks can be set, for example when the sample is injected, and are displayed as spikes on the chart recorder. The spikes are 10% of the full scale of the chart recorder which corresponds to 0.1 V.

Select main menu ***Event mark***, press **OK**, to insert an event mark.

5.3.10 Noise filtering

To filter the noise in the UV-signal, a moving average filter is used. The averaging time is the time interval used for calculating the moving average of the absorbance signal. A long averaging time will smooth out noise efficiently, but it will also distort the peaks. Peaks narrower than the minimum peak width value may be distorted. Because of this the averaging time should be as short as possible, see the table below. On delivery the averaging time is set to 2.56 s.

Step	Action
1	Select menu Set Averaging Time , press OK . Set Averaging Time (2.56s)
2	Use the arrow keys to set the value. Use the fixed values between 5.12 seconds and 0.08 seconds. When monitoring more than one wavelength, the recommended averaging time is a minimum of 1.28 s. Set Averaging Time (2.56s) <2.56>

Averaging time (s)	Time constant (s) (approximate)	Min. peak width at half height (s)
5.12	2.0	32
2.56	1.0	16
1.28	0.5	8.0
0.64	0.2	3.2
0.32	0.1	1.6
0.16	0.05	0.8
0.08	0.03	0.5

In UNICORN the averaging time is set with the instruction **AveragingTime** in **System Control** → **Manual** → **Alarm&Mon.**

5.3.11 Check menu

Checking autozero level

The instrument internal absorbance value for autozero can be checked to test the consistency in buffers.

Step	Action
------	--------

- | | |
|---|--|
| 1 | Select menu Check , press OK . |
|---|--|

Check Autozero	
AZ1 (215)	0.23456 AU

Result:

The autozero absorbance value for wavelength **1** is shown.

- | | |
|---|--|
| 2 | Turn the selection dial clockwise to display wavelengths 2 and 3 . |
|---|--|

AZ2 (254)	0.23775 AU
AZ3 (280)	0.12326 AU

Lamp intensity, Lamp on-time, Flip time, UV Flow cell

See Section 6.5 *Checking the instrument*, on page 74.

Checking the wavelength

If there is any doubt that the instrument is showing the correct values, the wavelength calibration can be checked.

Step	Action
------	--------

- | | |
|---|--|
| 1 | Select menu Check , press OK . |
|---|--|

Step	Action						
2	Select sub menu Check Wavelength, press OK. Checking Wavelength Please wait... Result: The check starts and after approx. 20 seconds the message Wavelength OK or Wavelength not OK is shown together with the deviation values as below. If not OK, Recalibrate can be selected. <table><tr><th>Wavelength OK</th><th>Wavelength not OK</th></tr><tr><td>Wavelengths OK 230+0 459+0 542+0 <u>OK</u></td><td>Wavelengths not OK 230-4 459+3 542+4 <u>OK</u></td></tr><tr><td></td><td>Wavelengths not OK Recalibrate? <u>OK</u></td></tr></table> Note: If a deviation in wavelength occurs repeatedly when checked, contact Cytiva.	Wavelength OK	Wavelength not OK	Wavelengths OK 230+0 459+0 542+0 <u>OK</u>	Wavelengths not OK 230-4 459+3 542+4 <u>OK</u>		Wavelengths not OK Recalibrate? <u>OK</u>
Wavelength OK	Wavelength not OK						
Wavelengths OK 230+0 459+0 542+0 <u>OK</u>	Wavelengths not OK 230-4 459+3 542+4 <u>OK</u>						
	Wavelengths not OK Recalibrate? <u>OK</u>						

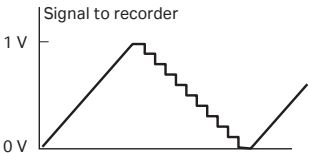
Recalibrate

If the instrument is left switched on for a long period (> 10 days), it may be necessary to recalibrate it. This calibration is identical to that done when the instrument is switched on.

Step	Action
1	Select menu Check , press OK .
2	Select sub menu Recalibrate, press OK. Recalibrating Please wait... Result: The recalibration starts and after approx. 60 seconds the message Recalibration finished is shown. Recalibration finished <u>OK</u>

Check Analogue Out

The function of the connected chart recorder can be tested.

Step	Action
1	Select menu Check , press OK .
2	Select sub menu Recalibrate , press OK . Check Analogue Out (off) <u>on</u>
3	Start the test by selecting On , press OK . <i>Result:</i> The test will ramp the signal on each channel up to 1 V and then decrease the signal in 10% steps back to 0 V. The test is run continuously. Compare the diagram of the chart recorder with the figure. 
4	Stop the test by pressing OK or ESC .

Check Service Mode

Service information relevant to the instrument can be checked. Information may not be available in all menus.

Step	Action
1	Select main menu Check , turn the selection dial clockwise for next display.
2	Select sub menu Check Service Mode , press OK . Check Service Mode
3	The service telephone number is displayed. Turn the selection dial clockwise to view the next display. Telephone Service 012345678901
4	The service contract number is displayed. Turn the selection dial clockwise to view the next display. Contract Number 012345678901

5 Operation

5.3 Menu selection and settings

5.3.11 Check menu

Step	Action
5	The instrument serial number is displayed. Turn the selection dial clockwise to view the next display. Serial Number 01234567 YM 012345
6	The instrument name and software version are displayed. Turn the selection dial clockwise to view the next display. Monitor UV-900 V1.06
7	The date of the last service is displayed. Turn the selection dial clockwise to view the next display. Date of Maintenance ?
8	Press OK to test the instrument buzzer. Buzzer Test.

Press **Esc** to return to the **Check Service Mode** menu.

5.3.12 Setup menu

Setup language

Sets the language used in the display.

Step	Action
1	Select main menu Setup , press OK .
2	Select sub menu Setup Language , press OK . Setup Language (GB) <u>GB</u> D F E I
3	Select the desired language. GB = British English D = German F = French E = Spanish I = Italian

Setup unit number

The unit number is the identification the UV monitor has on the UniNet-bus. It should correspond to the number set in UNICORN for the UV monitor. The number should be set to **0** if one UV monitor is used. If more than one UV monitor is used, they must all have different identification numbers.

Step	Action
1	Select main menu Setup , press OK .
2	Select sub menu Setup Unit Number , press OK . Setup Unit Number (0)
3	Select unit number (0 to 25).

Setup display angle

The display angle can be set to compensate for different viewing heights.

Step	Action
1	Select main menu Setup , press OK .

Step	Action
2	Select sub menu Set <i>Display Angle</i> , press OK . Setup Display Angle (->) ->\ -> ->/
3	Select viewing angle (-> \ Up, -> Mid, or -> / Down).

5.3.13 Setting and using the alarm timer

You can set the alarm function to either a fixed alarm time or using a count-down timer. The UV monitor can be started or stopped automatically, or an alarm can sound, at the set time. It is not possible to set both an alarm time and a count-down timer. Current values are shown in parentheses.

Step	Action
1	Select main menu Alarm/Timer, press OK. Alarm/Timer 12:30:52
2	Set the action to take place. Press OK to select action. Buzzer will generate an audible alarm for 15 s and a message. Run will start the pump at the set flow rate, End will stop the pump, each generating one beep and a message. Alarm/ Timer Action (Bzz) Buzzer Run End
3	Use the sub menu Set Alarm if you want to set an alarm at a fixed time. Press OK to enter the time value in the form HH.MM.SS, pressing the OK button after entering each time unit. Set Alarm 12:32:22 (0) 00.00.00
4	If you want to set a count-down timer, turn the dial to select sub menu Set Timer. Press OK to enter the countdown value in the form HH.MM.SS, pressing the OK button after entering each time unit. Set Timer (0) 00.00.00
5	Press ESC button to return to the Alarm/Timer menu which now shows the set alarm time or count-down time as BzzHH:MM:SS. Alarm/Timer 12:30:52 (Bzz 12:33:00)
6	When the alarm time is due or the count-down timer reaches 00:00:00, an alert display is shown and the instrument beeps, until the OK button is pressed. Bzz12:41:29 12:41:49 !! Alarm time !!

5 Operation

5.3 Menu selection and settings

5.3.13 Setting and using the alarm timer

The alarm timer is based on the internal instrument clock which can be set in the **Set Clock** menu placed after the **Alarm/Timer** menu. The clock will be reset when power is turned **OFF**.

Set Clock
00:32:22 (00:36:53)

An already set alarm/timer function can be reset by pressing **OK** in the menu **Alarm/Timer off?**.

Alarm/Timer off?
(Bzz 05:33:00)

5.3.14 Service displays

The instrument has service displays for use by authorised service personnel. If the service display **Enter Access Code!** is accidentally selected, press the **ESC** button to exit to the normal operation display.

Enter Access Code!

5 Operation

5.4 Changing flow cell

5.4 Changing flow cell

The flow cell can be changed when required, for example from 2 mm to 10 mm when the sensitivity of the measurement must change due to a small amount of sample being applied, or from a 10 mm to 2 mm when a lower sensitivity is desired, due to output signal limitation.

See *Section 4.4 Assembly, on page 28*.

5.5 UV cell calibration

The path length in the UV flow cell might differ from the nominal length (1, 2, 5 respective 10 mm) which interferes the calculation of the protein concentration in the eluate. To achieve normalized absorbance, the path length in the UV flow cell must be calibrated.

It is recommended to calibrate a new UV flow cell before use. An old flow cell can be calibrated whenever you think that a calibration is required.



WARNING

Hazardous substances and biological agents. When using hazardous chemical and biological agents, take all suitable protective measures, such as wearing protective clothing, glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation and maintenance of Monitor UV-900.

Equipment required

To perform the calibration you need test solutions, syringes and accessories for desired cell length. See *Calibration kits*, on page 102

Notification about old calibration setting

Display	Function
Please Check UV Cell! Press OK/Esc to cont.	If the instrument already has a calibrated cell length set that differs from the nominal length, a warning message appears on the UV monitor display at start-up.
Real UV Cell Length (?,??mm, SN??????)	Another message, displaying the calibrated cell length, also appears. The display toggles between these messages. The display automatically returns to the main operating menu after about 45 seconds, or if pressing OK .

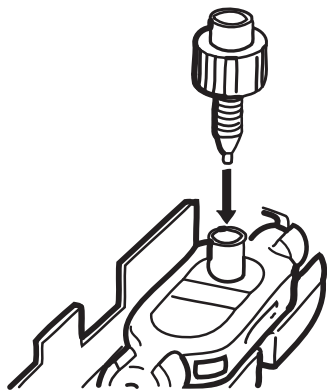
Instructions for removing an old calibration setting

Follow these steps in order to remove an old calibration value:

Step	Action
1	To remove an old calibration value, press Esc while the display toggles between the two messages. The Set UV Cell Length menu appears. Press OK . Set UV Cell Length (--,--mm, SN-----)
2	At the Set Calibr. Length menu, set the cell length to 0. Press OK . Set Calibr. Length (--,--mm) --.--

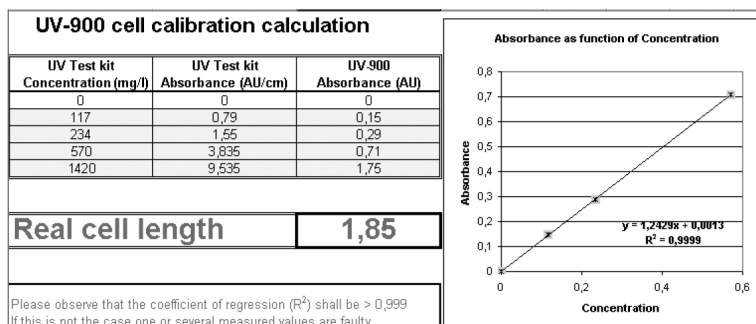
Preparing the calibration

Step	Action
1	Remove any old calibration value by setting the cell length to 0 (see above).
2	Unpack the UV Test kit.
3	Make sure that the Flow restrictor is connected in the flow path after the UV flow cell.
4	Mount the Union Luer female/ 1/16" male, included in the test kit, in the upper inlet of the UV flow cell.



Step Action

- 5 Open the UV-900 Cell Calibration Excel® file on the computer.



- 6 The solution bottles are marked with the concentration value and the reference absorbance value for each solution.
- Enter the concentration of the solutions in increasing order in the column **UVTest kit Concentration (mg/l)**.
- Enter the absorbance value in increasing order in the column **UVTest kit Absorbance (AU/cm)**.

Performing the absorbance measurements

For each of the four test solutions, the absorbance will be measured and automatically compared to its reference value.

Step Action

- 1 Switch on the UV lamp, see *Section 5.3.5 Setting lamp on and off, on page 46*.
- 2 Select a main menu on the monitor display that shows wavelength 254 nm.
- 3 Fill one of the supplied syringes with 1.5 to 2 mL of the 0 AU/cm solution. Make sure that there is no air in the syringe!
- 4 Fit the syringe in the Union Luer connector and inject the solution. Do NOT remove the syringe.
- 5 Wait until the monitored absorbance value is stable.
- 6 Perform an **Autozero** operation. See *Section 5.3.7 Autozero, on page 48*.
- 7 Remove the syringe.

Step	Action
8	Inject the other four test solutions in increasing concentration order. Use a new syringe for each solution. Note: <i>Air trapped in the UV cell causes inaccurate measurements. To avoid introducing air into the cell, gently fill the Luer union up to the edge using test solution from the syringe that is next. Then insert the syringe into the Luer union.</i>
9	After each injection, wait for a stable absorbance value and enter the measured values in the Excel column UV-900 Absorbance (AU) in the UV-900 Cell Calibration Excel file.
10	When all absorbance values have been entered, the real cell length is shown next to the Real cell length Excel cell. Note: <i>The regressions coefficient should be larger than 0.999. If not, one or several measured values are faulty.</i>

Entering the new real length

Step	Action
1	Select menu Set UV Cell Length in the UV monitor. Press OK. The Set Calibr. Length menu appears. Press OK. Set UV Cell Length (--,--mm, SN-----)
2	Enter the Real cell length value (from the Excel file) and press OK. Set Calibr. Length (--,--mm) --.---
3	The Set UV Cell Type menu appears. Check the cell type value. If the value is correct, turn the selection dial clockwise to go to next menu. If the value has to be changed, press OK to change it Set UV Cell Type (2 mm)
4	At the Set Cell Serial No. menu press OK. Set Cell Serial No. (SN -----) -----

Step	Action
5	Enter the serial number of the cell (see the label on the flow cell). Press OK .

5 Operation

5.6 Restart after power failure

5.6 Restart after power failure

If the power supply to the instrument is interrupted, the instrument automatically restarts itself and displays the main operating window. All set values are retained in the instrument but the instrument starts with the lamp switched-off.

6 Maintenance

About this chapter

This chapter provides required information to enable users and service personnel to clean and maintain the Monitor UV-900. The instrument contains no internal user replaceable parts.

Precautions



WARNING

Before attempting to perform any of the procedures described in this chapter, you must read and understand all contents of the corresponding section(s) in the Safety instructions chapter as listed below:

- General Precautions
- Personal protection
- Power supply
- Maintenance

In this chapter

Section	See page
6.1 Cleaning before planned service	70
6.2 Cleaning the instrument housing	71
6.3 User maintenance schedule	72
6.4 Cleaning-in-place	73
6.5 Checking the instrument	74
6.6 Cleaning the flow cell and optical connectors	76
6.7 Storage	78

6 Maintenance

6.1 Cleaning before planned service

6.1 Cleaning before planned service

Cleaning before planned maintenance/service

To ensure the protection and safety of service personnel, all equipment and work areas must be clean and free of any hazardous contaminants before a Service Engineer starts maintenance work.

Please complete the checklist in the *On Site Service Health and Safety Declaration Form* or the *Health and Safety Declaration Form for Product Return or Servicing*, depending on whether the instrument is going to be serviced on site or returned for service, respectively.

Health and safety declaration forms

Health and safety declaration forms are available for copying or printing in the *Reference information* chapter of this manual, or on digital media supplied with the user documentation.

6.2 Cleaning the instrument housing

Step	Action
1	Wipe the instrument housing regularly with a damp cloth. Do not allow spilled liquid to dry on the instrument.
2	Remove dirt from the surface using a cloth and a mild cleaning agent.
3	Let the instrument dry completely before using it.

6.3 User maintenance schedule

Interval	Action
Every 3 months	Check the equipment. See <i>Section 6.5 Checking the instrument, on page 74.</i>
Every 6 months or more often if required	Clean the flow cell and optical fiber connectors. See <i>Section 6.6 Cleaning the flow cell and optical connectors, on page 76.</i>

6.4 Cleaning-in-place



WARNING

Hazardous substances and biological agents. When using hazardous chemical and biological agents, take all suitable protective measures, such as wearing protective clothing, glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation and maintenance of Monitor UV-900.



WARNING

Hazardous chemicals or biological agents. When using hazardous chemicals or biological agents, make sure that the entire system has been flushed thoroughly with bacteriostatic solution (e.g., NaOH) and distilled water before service and maintenance.



WARNING

Corrosive substance. NaOH is corrosive and therefore dangerous to health. When using hazardous chemicals, avoid spillage and wear protective glasses and other suitable Personal Protective Equipment (PPE).



NOTICE

The flow cells must not be used at pressures above specified pressure. At higher pressures the flow cell may break.

Pump a cleaning or sanitizing agent through the flow cell. The standard recommendation is to pump 1 M NaOH at 1 mL/min for 30 minutes and then wash out with buffer.

6.5 Checking the instrument

Lamp intensity

Step	Action
1	Select menu Check , press OK . Check
2	Select menu Check Lamp Intensity . Check Lamp Intensity 210nm 85% 300nm 95%

If the lamp intensity is less than 20%, contact Cytiva for lamp replacement or change of internal optical fiber.

Lamp on-time

Step	Action
1	Select menu Check , press OK . Check
2	Select menu Check Lamp Run Time . Check Lamp Run Time 200h

Flip time

The flip time is the time the monochromator stepper motor has been in operation.

Step	Action
1	Select menu Check , press OK . Check

Step	Action
2	Select menu Check Flip Time . Check Flip Time 50h

If the flip time is more than 2000 hours, contact Cytiva for maintenance.

UV flow cell

This menu shows the set path length and the serial number of the UV flow cell.

Step	Action
1	Select menu Check , press OK . Check
2	Select menu UVFlow Cell . UV Flow Cell (--,--mm, SN -----)

6.6 Cleaning the flow cell and optical connectors

A clean flow cell and optical connectors are essential for ensuring the correct operation of the UV-monitor.



WARNING
Hazardous chemicals or biological agents. When using hazardous chemicals or biological agents, make sure that the entire system has been flushed thoroughly with bacteriostatic solution (e.g., NaOH) and distilled water before service and maintenance.



CAUTION
Hazardous chemicals or biological agents in UV flow cell. Make sure that the entire flow cell has been flushed thoroughly with bacteriostatic solution (e.g., NaOH) and distilled water, before service and maintenance.



NOTICE
Keep UV flow cell clean. Do not allow solutions containing dissolved salts, proteins or other solid solutes to dry out in the flow cell. Do not allow particles to enter the flow cell, as damage to the flow cell may occur.

Cleaning the flow cell

Step	Action
1	Connect a syringe to the inlet of the flow cell and squirt distilled water through the cell in small amounts. Then fill the syringe with a 10% surface active detergent solution like Decon™ 90, Deconex™ 11, RBS 25 or equivalent, and squirt five times.
2	After five squirts, leave the detergent solution in the flow cell for at least 20 minutes.
3	Pump the remaining detergent solution through the flow cell.
4	Rinse the syringe and flush the cell with distilled water (10 mL).

Cleaning the optical fiber connectors

When required, wipe the optical fiber connectors with 30% isopropanol on lens paper.

6.7 Storage



NOTICE

Keep UV flow cell clean. Do not allow solutions containing dissolved salts, proteins or other solid solutes to dry out in the flow cell. Do not allow particles to enter the flow cell, as damage to the flow cell may occur.

Overnight

The flow cell can be left filled with buffer.

Weekend and long term storage

Flush the flow cell with distilled water and then fill it with 20% ethanol.

The flow cell can also be stored dry by flushing as above with distilled water and then blowing a compressed inert gas such as nitrogen (N₂) through the cell. Replace the protective caps. Never use compressed air as this may contain droplets of oil.

7 Troubleshooting

About this chapter

This chapter provides information required to enable users and service personnel to identify and correct problems that may occur when operating Monitor UV-900.

If the suggested actions in this guide do not solve the problem, or if the problem is not covered by this guide, contact your Cytiva representative for advice.

In this chapter

Section	See page
7.1 General	81
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Precautions



WARNING

Before attempting to perform any of the procedures described in this chapter, you must read and understand all contents of the corresponding section(s) in the Safety instructions chapter as listed below:

- General Precautions
- Personal protection
- Power supply
- Maintenance



WARNING

Hazardous chemicals or biological agents. When using hazardous chemicals or biological agents, make sure that the entire system has been flushed thoroughly with bacteriostatic solution (e.g., NaOH) and distilled water before service and maintenance.



WARNING

When using hazardous chemicals, make sure that the entire flow cell has been flushed thoroughly with bacteriostatic solution, e.g. NaOH, and distilled water before service and maintenance.



WARNING

Electrical shock hazard. All repairs should be done by service personnel authorized by Cytiva. Do not open any covers or replace parts unless specifically stated in the user documentation.

7.1 General

When contacting Cytiva for support, state the program version of the instrument, which is shown for 2 seconds after the selftest, during switch-on, or in the menu **Check Service Mode**.

Monitor UV-900 V1.06

7.2 Faults and actions

If the suggested actions do not correct the fault, call Cytiva.

Fault	Possible cause	Corrective action
No text on the front display	No power to the monitor	Check that the mains cable is connected and the On/off switch is in ON-position (I)
Noisy UV-signal, signal drift or instability	The buffer may be impure	Check with water if the signal is still noisy
	Dirt in the flow cell or fiber connectors	Clean the UV cell, see <i>Cleaning the flow cell</i> , on page 76
	There may be air in the flow cell	Allow buffer mixtures to stabilize before use (1 to 2 h)
		Check that the flow restrictor (used at flow rates < 50 µL) gives a back-pressure of 0.3 to 0.5 MPa
		If there is a lot of air in the water, degas the buffer continuously (we recommend helium sparging).
		Check the connections of the UV cell optical fibers.
Ghost peaks	Air in the eluents	Degas if necessary (we recommend helium sparging)
	Dirt or residues in the flow path from previous runs	Clean the flow cell and flow path
	Residues in the column from previous runs	Clean the column in accordance with the column instructions

Fault	Possible cause	Corrective action
	Bad mixing of the eluents	Check that the mixer is functioning correctly and that the correct chamber volume is being used (0.2 mL is default)
Error in external chart recorder	The recorder not properly set up	Check the chart recorder in accordance with its manual
	Monitor UV-900 not properly set up	Test the recorder function by selecting recorder test according to <i>Check Analogue Out</i> , on page 54.

7.3 Error messages

If the suggested actions do not correct the fault, call Cytiva.

Message	Description/Action
Sample fiber failure	Check the connections of the UV cell optical fibers.
	Check the liquid.
	Make sure that there are no air bubbles in the system.
	Clean the UV cell, see <i>Cleaning the flow cell</i> , on page 76.
Not calibrated Calibration failed	Recalibrate by switching the instrument off and then back to on, or choose Recalibrate in the Check menu.
Change lamp	Contact Cytiva for xenon lamp exchange.
Mode fiber failure Reference fiber failure Lamp module failure Low light intensity Block filter is defect	Contact Cytiva.
High intensity in Reference fiber	Recalibrate by switching the instrument off and on.
High intensity in Sample fiber	1. Disconnect the optical fiber connectors. 2. Recalibrate by switching the instrument off and on.
ERROR Number 10 ERROR Number 16 ERROR key(OK) ERROR key(Esc) ERROR key(OK+Esc) ERROR 100 ERROR 109-113 ERROR 120-121	1. Switch off the instrument. 2. Check all connections. 3. Switch on the instrument.
ERROR 106-108 ERROR 118	1. Switch off the instrument. 2. Check all UniNet connections. 3. Switch on the instrument.

8 Reference information

About this chapter

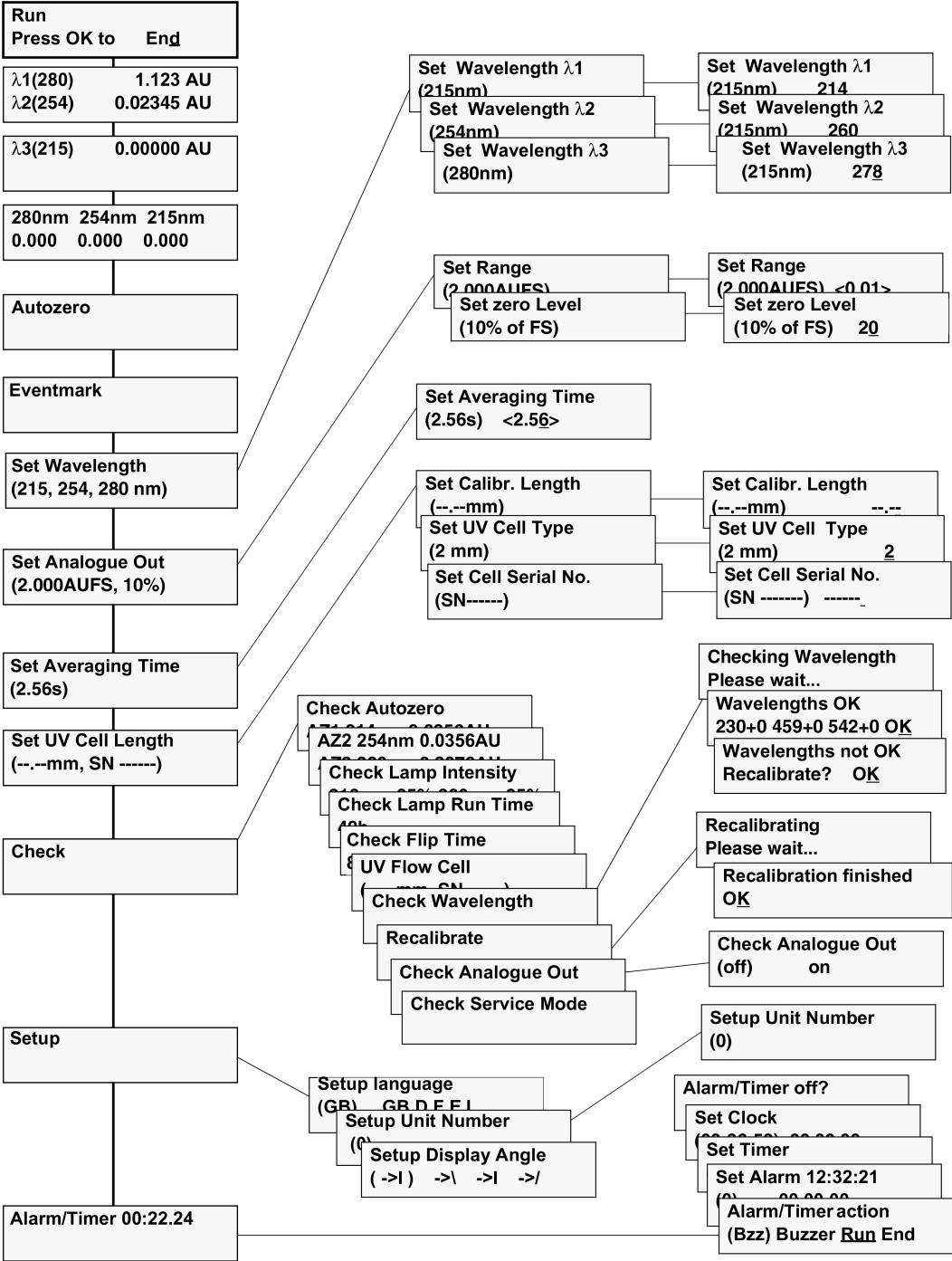
This chapter provides technical reference information and a list of spare parts and accessories for Monitor UV-900.

In this chapter

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8.3 Procedures for decommissioning	90
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8.1 Menu overview

The illustration below shows the full menu tree of Monitor UV-900.



8.2 Technical specifications

Operating data

Wavelength range	190 to 700 nm in steps of 1 nm, 3 wavelengths simultaneously
Wavelength accuracy	±2 nm
Wavelength reproducibility	±0.01 nm
Wavelength switch time	< 500 ms (one cycle from 214 to 254 nm and back to 214 nm)
Filter bandwidth	< 10 nm
Linearity	< 2% deviation up to 2 AU at 260 nm with Uracil at pH 2
Noise (specified for 10 mm flow cell), single wavelength, short term (0.5 min to 1 min) ^{1 2}	< 6x10 ⁻⁵ AU at 230 nm
Noise (specified for 10 mm flow cell), single wavelength, long term (1 min to 10 min) ^{1 2}	< 6x10 ⁻⁵ AU at 230 nm
Noise (specified for 10 mm flow cell), dual wavelengths, short term (0.5 min to 1 min) ^{1 2}	< 2x10 ⁻⁴ AU at 230 and 254 nm
Noise (specified for 10 mm flow cell), dual wavelengths, long term (1 min to 10 min) ^{1 2}	< 2x10 ⁻⁴ AU at 230 and 254 nm
Drift ²	< 2x10 ⁻⁴ AU/h at 254 nm
Environment	4°C to 40°C 20% to 95% relative humidity (noncondensing) 84 to 106 kPa (840 to 1060 mbar) atmospheric pressure

¹ Measured with water at 1 mL/min, time constant 1 second, 10 mm flow cell.

² Typical values at room temperature after 2 hours with lamp on.

Physical data

Light source	Xenon flash lamp
--------------	------------------

8 Reference information

8.2 Technical specifications

Lamp lifetime	> 4000 hours
Control	Stand alone or from a computer running UNICORN 3.21 or higher through UniNet-1 connection
Power consumption	65 VA
Power requirement	100/240 V AC $\pm$ 10%, 50/60 Hz
Analog output	3 signals, 0 to 1 V full scale, overrange function
Digital inputs	5 V, 1 mA current sinking, lamp on/off, autozero, event mark
Display	2 rows with 20 characters each
Dimensions (H x W x D)	200 x 260 x 370 mm
Weight	8.5 kg
Degree of protection	IP 20
Noise emission	< 80 dB A

UV flow cell, 2 and 10 mm

Recommended maximum flow rate	100 mL/min
Maximum pressure	2 MPa (20 bar, 290 psi)
Backpressure	Maximum 0.5 bar at 2 mL/min with water at 25°C
Liquid temperature range	4°C to 40°C
Optical path length, 2 mm cell	2 mm
Optical path length, 10 mm cell	10 mm
Cell volume, 2 mm cell	2 μ L
Cell volume, 10 mm cell	8 μ L
Wetted materials	PTFE (polytetrafluoroethylene) PEEK (polyetheretherketone) Titanium (palladium alloy) Quartz (synthetic fused silica)
pH stability range	1–13, 13–14 (< 1 days exposure)

Chemical resistance	The wetted parts are resistant to organic solvents and salt buffers commonly used in chromatography of biomolecules, except 100% Ethyl acetate, 100% Hexane, and 100% Tetrahydrofuran (THF).
Tubing connections	UNF 10-32 fingertight connectors for capillary tubing with 1/16" outer diameter

8.3 Procedures for decommissioning

Introduction

This section contains information about the decommissioning of Monitor UV-900.

Decontamination

The product must be decontaminated before decommissioning. All local regulations must be followed with regard to scrapping of the equipment.

Disposal of the product

When taking the product out of service, the different materials must be separated and recycled according to national and local environmental regulations.

Recycling of hazardous substances

Monitor UV-900 contains hazardous substances. Detailed information is available from your Cytiva representative.

Disposal of electrical components

Waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.



8.4 Regulatory information

Introduction

This section lists the regulations and standards that apply to the product.

In this section

Section	See page
8.4.1 Contact information	92
8.4.2 European Union and European Economic Area	93
8.4.3 Eurasian Economic Union Евразийский экономический союз	94
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8.4.1 **Contact information**

Contact information for support

To find local contact information for support and sending troubleshooting reports, visit *cytiva.com/contact*.

Manufacturing information

The table below summarizes the required manufacturing information.

Requirement	Information
Name and address of manufacturer	Cytiva Sweden AB Björkgatan 30 SE 751 84 Uppsala Sweden
Telephone number of manufacturer	+ 46 771 400 600

8.4.2 European Union and European Economic Area

Introduction

This section describes regulatory information for the European Union and European Economic Area that applies to the equipment.

Conformity with EU Directives

See the EU Declaration of Conformity for the directives and regulations that apply for the CE marking.

If not included with the product, a copy of the EU Declaration of Conformity is available on request.

CE marking



The CE marking and the corresponding EU Declaration of Conformity is valid for the instrument when it is:

- used according to the *Operating Instructions* or user manuals, and
- used in the same state as it was delivered, except for alterations described in the *Operating Instructions* or user manuals.

8.4.3 Eurasian Economic Union
Евразийский экономический союз

This section describes the information that applies to the product in the Eurasian Economic Union (the Russian Federation, the Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, and the Kyrgyz Republic).

Introduction

This section provides information in accordance with the requirements of the Technical Regulations of the Customs Union and (or) the Eurasian Economic Union.

Введение

В данном разделе приведена информация согласно требованиям Технических регламентов Таможенного союза и (или) Евразийского экономического союза.

Manufacturer and importer information

The following table provides summary information about the manufacturer and importer, in accordance with the requirements of the Technical Regulations of the Customs Union and (or) the Eurasian Economic Union.

Requirement	Information
Name, address and telephone number of manufacturer	See <i>Manufacturing information</i>
Importer and/or company for obtaining information about importer	Cytiva RUS LLC 109004, Russian Federation Moscow Stanislavskogo str., 21, building 3, premises I, room 57 Telephone: +7 495 7877617 E-mail: <i>rucis@cytiva.com</i>

Информация о производителе и импортере

В следующей таблице приводится сводная информация о производителе и импортере, согласно требованиям Технических регламентов Таможенного союза и (или) Евразийского экономического союза.

Требование	Информация
Наименование, адрес и номер телефона производителя	См. <i>Информацию об изготовлении</i>
Импортёр и/или лицо для получения информации об импортёре	ООО "Цитива РУС" 109004, Российская Федерация город Москва, ул. Станиславского, д. 21, строение 3, помещение I, комната 57 Телефон: +7 495 7877617 Адрес электронной почты: <i>rucis@cytiva.com</i>

Description of symbol on the system label

Описание обозначения на этикетке системы



This Eurasian compliance mark indicates that the product is approved for use on the markets of the Member States of the Customs Union of the Eurasian Economic Union

Данный знак о Евразийском соответствии указывает, что изделие одобрено для использования на рынках государств-членов Таможенного союза Евразийского экономического союза

8.4.4 Regulations for North America

Introduction

This section describes the information that applies to the product in the USA and Canada.

FCC compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: *The user is cautioned that any changes or modifications not expressly approved by Cytiva could void the user's authority to operate the equipment.*

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

8.4.5 Regulatory statements

Introduction

This section shows regulatory statements that apply to regional requirements.

EMC emission, CISPR 11: Group 1, Class A statement



NOTICE

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

South Korea

Regulatory information to comply with the Korean technical regulations.



NOTICE

Class A equipment (equipment for business use).

This equipment has been evaluated for its suitability for use in a business environment.

When used in a residential environment, there is a concern of radio interference.



주의사항

A급 기기(업무용 방송통신기자재)

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기

로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

8.4.6 Declaration of Hazardous Substances (DoHS)

根据 SJ/T11364-2014 《电子电气产品有害物质限制使用标识要求》特提供如下有关污染控制方面的信息。

The following product pollution control information is provided according to SJ/T11364-2014 Marking for Restriction of Hazardous Substances caused by electrical and electronic products.

电子信息产品污染控制标志说明 Explanation of Pollution Control Label



该标志表明本产品含有超过中国标准 GB/T 26572 《电子电气产品中限用物质的限量要求》中限量的有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。

为保证所声明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的定期维修和保养要求。

产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所声明的整个产品的环保使用期限。

本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。

This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T 26572 Requirements of concentration limits for certain restricted substances in electrical and electronic products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions so that the use of such electrical and electronic products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year".

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures.

This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

有害物质的名称及含量

Name and Concentration of Hazardous Substances

产品中有害物质的名称及含量

Table of Hazardous Substances' Name and Concentration

部件名称 Component name	有害物质 Hazardous substance					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
18110835	X	0	0	0	0	0
28923194	X	0	0	0	0	0

0: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

- 此表所列数据为发布时所能获得的最佳信息。

0: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572

- Data listed in the table represents best information available at the time of publication.

8.5 Health and Safety Declaration Form

On site service



On Site Service Health & Safety Declaration Form

Service Ticket #:	
-------------------	--

To make the mutual protection and safety of Cytiva service personnel and our customers, all equipment and work areas must be clean and free of any hazardous contaminants before a Service Engineer starts a repair. To avoid delays in the servicing of your equipment, complete this checklist and present it to the Service Engineer upon arrival. Equipment and/or work areas not sufficiently cleaned, accessible and safe for an engineer may lead to delays in servicing the equipment and could be subject to additional charges.

Yes	No	Review the actions below and answer "Yes" or "No". Provide explanation for any "No" answers in box below.
☐	☐	Instrument has been cleaned of hazardous substances. Rinse tubing or piping, wipe down scanner surfaces, or otherwise make sure removal of any dangerous residue. Make sure the area around the instrument is clean. If radioactivity has been used, perform a wipe test or other suitable survey.
☐	☐	Adequate space and clearance is provided to allow safe access for instrument service, repair or installation. In some cases this may require customer to move equipment from normal operating location prior to Cytiva arrival.
☐	☐	Consumables, such as columns or gels, have been removed or isolated from the instrument and from any area that may impede access to the instrument.
☐	☐	All buffer / waste vessels are labeled. Excess containers have been removed from the area to provide access.
Provide explanation for any "No" answers here:		
Equipment type / Product No:		Serial No:
I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible.		
Name:		Company or institution:
Position or job title:		Date (YYYY/MM/DD):
Signed:		

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For local office contact information, visit [cytiva.com/contact](https://www.cytiva.com/contact).

28980026 AD 04/2020

Product return or servicing



Health & Safety Declaration Form for Product Return or Servicing

Return authorization number:		and/or Service Ticket/Request:	
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To make sure the mutual protection and safety of Cytiva personnel, our customers, transportation personnel and our environment, all equipment must be clean and free of any hazardous contaminants before shipping to Cytiva. To avoid delays in the processing of your equipment, complete this checklist and include it with your return.

1. Note that items will NOT be accepted for servicing or return without this form
2. Equipment which is not sufficiently cleaned prior to return to Cytiva may lead to delays in servicing the equipment and could be subject to additional charges
3. Visible contamination will be assumed hazardous and additional cleaning and decontamination charges will be applied

Yes	No	Specify if the equipment has been in contact with any of the following:		
☐	☐	Radioactivity (specify)		
☐	☐	Infectious or hazardous biological substances (specify)		
☐	☐	Other Hazardous Chemicals (specify)		
Equipment must be decontaminated prior to service / return. Provide a telephone number where Cytiva can contact you for additional information concerning the system / equipment.				
Telephone No:				
Liquid and/or gas in equipment is:		☐	Water	
		☐	Ethanol	
		☐	None, empty	
		☐	Argon, Helium, Nitrogen	
		☐	Liquid Nitrogen	
		Other, specify		
Equipment type / Product No:			Serial No:	
I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible.				
Name:		Company or institution:		
Position or job title:		Date (YYYY/MM/DD)		
Signed:				

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For local office contact information, visit cytiva.com/contact.
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To receive a return authorization number or service number, call local technical support or customer service.

8.6 Accessories and spare parts

For up to date information on spare parts and accessories visit:
cytiva.com/akta

Flow cells

Item	Quantity per pack	Code no.
UV Flow Cell 2 mm, including optical fibers	1	18111110
UV Flow Cell 10 mm, including optical fibers	1	18111111

Signal cables

Item	Quantity per pack	Code no.
Signal cable for recorder. Length 1.5 m	1	18111064

Calibration kits

Item	Quantity per pack	Code no.
UV-900 1 mm Calibration kit	1	18632401
UV-900 2 mm Calibration kit	1	18632402
UV-900 5 mm Calibration kit	1	18632404
UV-900 10 mm Calibration kit	1	18632405
UV-900 Cell calibration Excel-file	1	18632406

Tubing and connectors

Item	Quantity per pack	Code no.
FEP tubing, i.d. 1/8", o.d. 3/16"	3 m	18111247
Tubing connector for 3/16" o.d. tubing	10	18111249
Ferrule for 3/16" tubing	10	18111248

Item	Quantity per pack	Code no.
Stop plug, 5/16"	5	18111250
Stop plug, 1/16"	5	18111252
Union Luer female/ 1/16" male	2	18111251
Union 1/16" female/ M6 male	6	18111257
Union M6 female/ 1/16" male	8	18111258
Union 1/16" male/ 1/16" male, i.d. 0.25 mm	2	18112092
Union 1/16" male/ 1/16" male, i.d. 0.50 mm	2	18112093
PEEK tubing, i.d. 0.15 mm, o.d. 1/16"	2 m	18115659
PEEK tubing, i.d. 0.25 mm, o.d. 1/16"	2 m	18112095
PEEK tubing, i.d. 0.50 mm, o.d. 1/16"	2 m	18111368
PEEK tubing, i.d. 0.75 mm, o.d. 1/16"	2 m	18111253
PEEK tubing, i.d. 1.0 mm, o.d. 1/16"	2 m	18111583
ETFE tubing, i.d. 0.25 mm, o.d. 1/16"	2 m	18112136
ETFE tubing, i.d. 0.75 mm, o.d. 1/16"	2 m	18111254
Fingertight connector 1/16"	10	18111255

Tools

Item	Quantity per pack	Code no.
Fiber detachment tool	1	18111116

8 Reference information

8.7 Ordering information

8.7 Ordering information

For ordering information visit:

cytiva.com/akta

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cytiva.com/akta

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28962214 AF V:9 02/2021