

User's Guide

VERITY® 1741 UV-VIS Detector



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SAFETY

IN THIS CHAPTER:

- General Operating Instructions | 2
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For your own safety, read this user's guide and always observe the warnings and safety information on the detector and in this user's guide.

The VERITY® 1741 UV-VIS Detector is intended to be used in a laboratory environment by trained technical personnel.

VERITY 1741 Detector control is via Ethernet and TRILUTION® LC Software or via the front panel.



General Operating Instructions

CAUTION

The detector may not be used if it is leaking.

Do not place detector or any other equipment so that disconnecting power cord is difficult.

Never manipulate with the detector if the door is mounted. There is a danger of its damage.

UV light is dangerous for eyes. During regular operation of the detector, UV light is shielded. While exchanging or replacing the flow cell, never look in the cell area. Always put in at least the test cell. Always disconnect the power cord when replacing a lamp.

Never remove the cover. There is nothing needing customer service or maintenance inside the detector.

The detector may only be used in accordance with the precautions for handling liquid. For information on safety precautions when working with liquids, refer to the safety data sheets for each liquid.

Symbols and Signs

The following table explains symbols and labels that are used on the detector or in the user's guide:

Symbol	Meaning
	UV light is dangerous for your eyes. If the flow cell is installed in the detector, then the UV light is shielded. When performing flow cell maintenance, it is very important to protect your eyes with glasses that absorb UV light.
	The detector is an electrical device. Disconnect the power cord before servicing.
	Caution

Safety Notices

The following safety notices may appear in this document:

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, may result in serious injury

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury

NOTICE

NOTICE indicates a potentially hazardous situation which, if not avoided, may result in equipment damage



Chemical Hazards

Any chemicals used for analysis should be handled according to good laboratory practices. Chemicals should be stored, used, and disposed of in accordance with the manufacturer's specifications, as well as local and national regulations. Potentially hazardous chemicals and dangerous liquids can be used with the instrument. Use care when handling chemicals and solvents. Ensure proper ventilation and wear appropriate personal protective equipment (PPE), such as safety glasses, gloves, etc.

Be sure to follow guidance about exposure to hazardous levels of toxic substances as outlined in any applicable Safety Data Sheet (SDS), or any documentation provided by local governing bodies such as The Health Protection Agency (United Kingdom) or The Occupational Safety and Health Administration (United States).

Adherence to Laboratory Regulations

Observe national and international regulations pertaining to laboratory work.

Voltage

Ensure that the rear panel is accessible. Detach all sources of voltage from the instrument before the service, repair, or exchange of parts. Use only the grounded AC cord provided. Ungrounded power cords can result in electrical shock and serious personal injury. Use only approved fuses with the specified current rating. The instrument must be operated within the voltage specified on the rear panel of the instrument.

Replacement Parts

Be sure to use only replacement parts mentioned in this user's guide. Do not repair or change parts which are not listed in this user's guide. If it is necessary to change parts not listed, please contact your Gilson-authorized representative.

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INTRODUCTION

IN THIS CHAPTER:

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The VERITY® 1741 UV-VIS Detector is for use in semi-preparative to preparative high performance liquid chromatography (HPLC) purification systems and provides multiple-wavelength scanning detection from 200–800 nm. The VERITY 1741 Detector is controlled via its front panel or TRILUTION® LC Software as a component in an HPLC system. Multiple, different wavelengths can be used to simultaneously trigger fraction collection. With the real-time spectra display in TRILUTION LC, users can quickly identify co-eluting impurities and other purification issues. By offering an extensive range of flow cell pathlengths, a wide array of applications is possible. The VERITY 1741 Detector has long-lasting lamps, lamp life counters, and interchangeable flow cells.



Description

The images in this section show the main components of the VERITY 1741 Detector.

Front View

To prevent damage during shipping, the detector is shipped with the door removed.

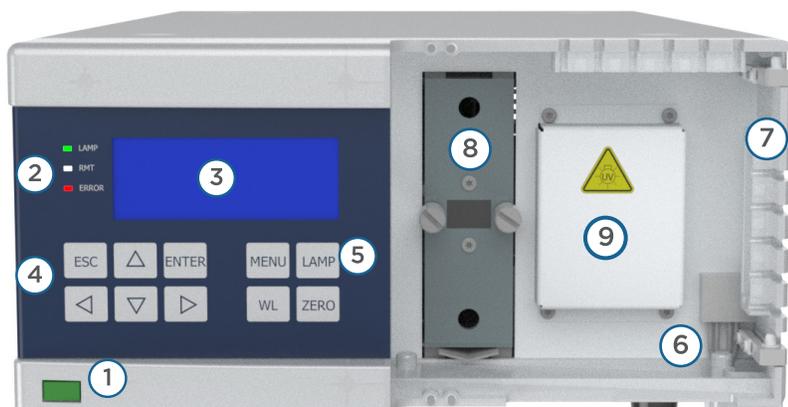


Figure 1
VERITY® 1741 UV-VIS Detector - Front View (Door Removed)

NO.	DESCRIPTION
1	Front power switch
2	Status LED lights: LAMP indicates the lamps are on (green). RMT indicates that the detector is connected to the remote control (orange). ERROR indicates an error (red).
3	Display
4	Keypad
5	LAMP key for turning lamps on for use with front panel control
6	Leak sensor
7	Door hinges
8	Flow cell compartment
9	Deuterium lamp access

Side View



Figure 2
VERITY® 1741 UV-VIS Detector - Side View

NO.	DESCRIPTION
1	Light sources are under a small cover. Remove the cover when replacing the lamp(s).

Rear View

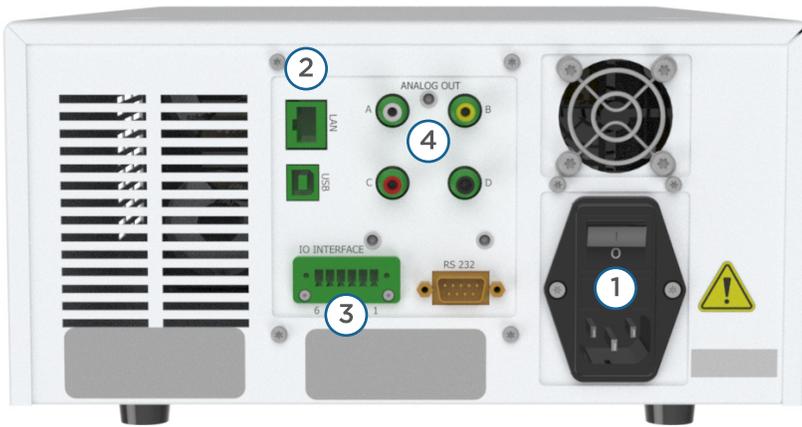


Figure 3
VERITY® 1741 UV-VIS Detector - Rear View

NO.	DESCRIPTION
1	Power switch, fuse drawer, and power receptacle
2	Connector Ethernet/LAN
3	Connector IO INTERFACE
4	Analog outputs A, B, C, D

Lamps

A deuterium lamp and a tungsten lamp are used in the detector.



Leak Sensor

The leak sensor contains a reference and a measuring sensor. If the measuring sensor is immersed in liquid, then the sensor generates a signal. Processing of this signal is handled in TRILUTION LC, or via front panel control. For more information about front panel control, refer to [Appendix B | Front Panel Control on page 37](#).

If a leakage occurs, it is first necessary to eliminate the leakage, and then dry the area of the liquid drain and the measuring sensor.

Unpacking

The detector is delivered with most of the major components already assembled. Retain all packing material so the detector may be shipped safely in the future. Store the installed test cell after removal as it is used when testing the lamp.

Standard Equipment

- VERITY 1741 Detector with test cell (installed)
- Screwdriver (for loosening the lamp cover and lamp holder)
- Open End Wrench (for loosening the lamp)
- Power Cord
- Fuse
- Ethernet Cable (1 m)
- Terminal Block Connector (6-pin)
- Waste Tubing Assembly
- Analog Output Cable (1 m)
- Removable Door
- VERITY® 1741 UV-VIS Detector Documentation USB that includes
 - User's Guide
 - Installation Qualification (IQ)
 - Declaration of Conformity
 - China RoHS Declaration Table
 - TRILUTION® LC Software for VERITY® 1741 UV-VIS Detector Instructions

Required Accessory

FLOW CELL

A flow cell is a required item, but is ordered separately, depending on your application. Inlet/outlet tubing and fittings are supplied with each flow cell. Refer to [Appendix A | Parts and Accessories on page 33](#) for part numbers.

Optional Accessory

SHELF

An optional stacking shelf that was designed for use with the VERITY 1741 Detector is ordered separately (part number 21040255). It allows for stacking a pump on top of the detector.

Technical Specifications



SPECIFICATION	DEFINITION OR VALUE																																																		
Communication Interface	LAN (Ethernet)																																																		
Control	Front panel control or computer control via Ethernet and TRILUTION® LC Software																																																		
Wavelength Range	200–800 nm (256 CCD elements)																																																		
Wavelength Accuracy	± 1 nm																																																		
Wavelength Reproducibility	± 0.5 nm																																																		
Noise	± 5 x 10 ⁻⁵ AU using a test cell (254 nm, time constant 1 s) Refer to ASTM																																																		
Drift	1 x 10 ⁻³ AU/hr using a test cell (254 nm after 1 h) Refer to ASTM																																																		
Maximum Data Rate	20 Hz																																																		
Flow Cells	<table border="1"> <thead> <tr> <th>Part Number</th> <th>Pathlength</th> <th>Internal Volume</th> <th>Maximum Flow Rate</th> <th>Connecting Thread Internal Tubing</th> </tr> </thead> <tbody> <tr> <td>14161011</td> <td>1.3 mm</td> <td>55 µL</td> <td>200 mL/min</td> <td>10-32 1/16" stainless steel tubing</td> </tr> <tr> <td>14161014</td> <td>0.5 mm</td> <td>50 µL</td> <td>200 mL/min</td> <td>10-32 1/16" stainless steel tubing</td> </tr> <tr> <td>14161012</td> <td>0.1 mm</td> <td>40 µL</td> <td>200 mL/min</td> <td>10-32 1/16" stainless steel tubing</td> </tr> <tr> <td>14161013</td> <td>0.05 mm</td> <td>40 µL</td> <td>200 mL/min</td> <td>10-32 1/16" stainless steel tubing</td> </tr> <tr> <td>14161015</td> <td>1.3 mm</td> <td>55 µL</td> <td>500 mL/min</td> <td>¼-28 1/8" FEP tubing</td> </tr> <tr> <td>14161018</td> <td>0.5 mm</td> <td>50 µL</td> <td>500 mL/min</td> <td>¼-28 1/8" FEP tubing</td> </tr> <tr> <td>14161016</td> <td>0.1 mm</td> <td>40 µL</td> <td>500 mL/min</td> <td>¼-28 1/8" FEP tubing</td> </tr> <tr> <td>14161017</td> <td>0.05 mm</td> <td>40 µL</td> <td>500 mL/min</td> <td>¼-28 1/8" FEP tubing</td> </tr> <tr> <td colspan="5" style="text-align: center;">Maximum pressure for all flow cells is 2 MPa (290 psi, 20 bar)</td> </tr> </tbody> </table>	Part Number	Pathlength	Internal Volume	Maximum Flow Rate	Connecting Thread Internal Tubing	14161011	1.3 mm	55 µL	200 mL/min	10-32 1/16" stainless steel tubing	14161014	0.5 mm	50 µL	200 mL/min	10-32 1/16" stainless steel tubing	14161012	0.1 mm	40 µL	200 mL/min	10-32 1/16" stainless steel tubing	14161013	0.05 mm	40 µL	200 mL/min	10-32 1/16" stainless steel tubing	14161015	1.3 mm	55 µL	500 mL/min	¼-28 1/8" FEP tubing	14161018	0.5 mm	50 µL	500 mL/min	¼-28 1/8" FEP tubing	14161016	0.1 mm	40 µL	500 mL/min	¼-28 1/8" FEP tubing	14161017	0.05 mm	40 µL	500 mL/min	¼-28 1/8" FEP tubing	Maximum pressure for all flow cells is 2 MPa (290 psi, 20 bar)				
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Maximum pressure for all flow cells is 2 MPa (290 psi, 20 bar)																																																			
Light Sources	Deuterium and tungsten lamps																																																		
Liquid Contact Materials	FEP, fused silica, stainless steel, PEEK, KEL-F																																																		
Time Constant	0.1 s, 0.2 s, 0.5 s, 0.75 s, 1 s, 2 s, 4 s, 8 s, 16 s																																																		

TECHNICAL SPECIFICATIONS CONTINUED ON PAGE 10



SPECIFICATION	DEFINITION OR VALUE
Typical Spectral Half-Width	10 nm
Digital Output	1 V/AU
Output Signal	Four wavelength (channels) or scan with speed up to 20 Hz with step of 1 nm
Ranges of Four Adjustable 1 V Analog Outputs	5, 2, 1, 0.5, 0.2, 0.1 AU/V
Fuse	T2.5A H 250V
Power Requirements	Voltage: 100–240 V AC Frequency: 50/60 Hz
Power Input	100 VA
Environmental Conditions	Indoor use only Altitude: up to 2000m Temperature: 5°C–40°C Humidity: maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C Voltage fluctuations: up to $\pm 10\%$ of nominal voltage Overvoltage category I Pollution degree 2
Safety and Compliance	The detector has been certified to safety standards specified for Canada, Europe, and the United States. Refer to the instrument rear panel label and the Declaration of Conformity document for the current standards to which the instrument has been tested.
Dimensions (W x H x D)	28.5 cm x 14.9 cm x 50 cm (11.2 x 5.9 x 19.7 in.)
Weight	7.5 kg (16.5 lb.)

Customer Service

Gilson, Inc. and its worldwide network of authorized representatives provide customers with the following types of assistance: sales, technical support, applications, and instrument repair.

If you need assistance, please contact your local Gilson representative. Specific contact information can be found at www.gilson.com. To help us serve you quickly and efficiently, please refer to [Before Calling Us on page 32](#).

INSTALLATION

IN THIS CHAPTER:

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- Flow Cell Installation | 12
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- Door Installation | 15
- Waste Tubing Assembly Installation | 15
- Rear Panel Connections | 16

Place the detector in a suitable location that satisfies the following conditions:

- Level surface.
- Keep at least 10 cm space behind the rear of the detector.
- Keep away from equipment generating a strong magnetic field.
- Sunlight does not shine directly on the instrument.
- Equipment is intended for use in regular laboratory environment only.



Test Cell Removal



Figure 4
Front View with Door Removed

The detector is shipped from the factory with the door removed and a test cell installed, which does not have connections for solvent. Before using the detector with solvents, the test cell must be removed and a flow cell must be installed.

Loosen the holding screws to remove the test cell. Store the installed test cell after removal as it is used when testing the lamp.

Flow Cell Installation

1. Insert the flow cell holder in the flow cell compartment on the front of the detector.
2. Tighten the holding screws.



Figure 8
Tighten the Holding Screws



Figure 5
Test Cell

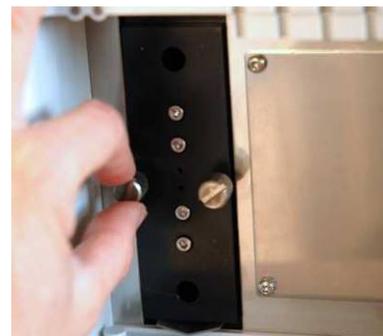


Figure 6
Test Cell Removal



Figure 7
Flow Cell Installation in the Flow Cell
Compartment on the Front of the Detector

Plumbing Connections

This section describes how to make inlet and outlet tubing connections and uses tubing and fittings supplied with the flow cell. The 1/8" flow cells are supplied with FEP tubing OD 1/8" and the 1/16" flow cells are supplied with PEEK tubing OD 1/16".

Inlet/Outlet Tubing Preparation

Cut the supplied tubing into two pieces. One is used for the column outlet to detector flow cell inlet and the other is used for the detector flow cell outlet.

Inlet Tubing Connection

- Put the fitting(s) supplied with the flow cell on one end of one piece of the cut tubing. Use only nuts and ferrules made of PEEK or KEL-F.
 - For 1/16" flow cells, put a PEEK one-piece nut on one end of the tubing.
 - For 1/8" flow cells, put a KEL-F ferrule 1/8" and a PEEK nut 1/8" on one end of the tubing. The ferrule tip should point to the nut.



Figure 9
One-piece Nut for
1/16" Flow Cells



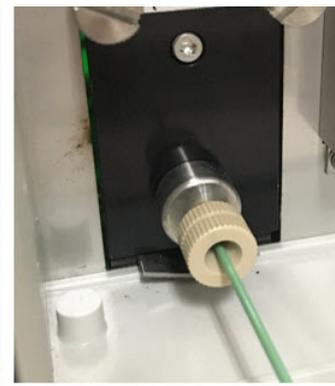
Figure 10
Nut and Ferrule for
1/8" Flow Cells

- Connect the tubing to the lower flow cell inlet. The column outlet must be connected to the lower flow cell inlet to allow liquid to flow upward. If connected otherwise, it may result in problematic degassing of the cell. Finger tighten the fitting.

NOTE

If placing the detector in direct sunlight, penetration of stray light to the flow cell may occur. In such case, protect the ends of the inlet tubing with dark plastic tubing.

- Connect the other end of the tubing to the column outlet (fitting not supplied).





Outlet Tubing Connection

1. Put the fitting(s) supplied with the flow cell on one end of the other piece of the cut tubing. Use only nuts and ferrules made of PEEK or KEL-F.
 - For 1/16" flow cells, put a PEEK one-piece nut on one end of the tubing.
 - For 1/8" flow cells, put a KEL-F ferrule 1/8" and a PEEK nut 1/8" on one end of the tubing. The ferrule tip should point to the nut.
2. Connect the tubing to the upper flow cell outlet. Finger tighten the fitting.
3. The other end of the tubing can be connected to:
 - a back pressure regulator
 - the inlet of the fraction collector in order to collect the column effluent. Use an appropriate coupler to make the connection. These fittings are not supplied.
 - a waste container if the column effluent does not need to be saved.

NOTICE

After making all tubing connections, turn on the mobile phase pump and check all connections for leaks. Control potential leaking not only after detector installation, but also during operation.

NOTE

Side and top slots on the detector front panel are designed to accommodate inlet and outlet tubing. The 1/8" OD FEP tubing is fitted by pressing the tubing into the slot. The 1/16" OD tubing can be fitted using a short piece of FEP tubing with outer diameter 1/8" and inner diameter 1/16", threaded on the 1/16" tubing. Tubing threaded this way cannot be pressed in and it is fitted by inserting from the side into the slot.



Side slots

Top slots



Door Installation

To prevent damage during shipping, the detector is shipped with the door removed. Slip the door on the hinges in the open position (see pictures below).



Waste Tubing Assembly Installation

The detector is equipped with a waste channel, directing the liquid away from the detector. The supplied waste tubing assembly includes silicone tubing and the necessary connectors.



Figure 11
Waste Tubing Assembly Installation

1. Remove the Y connector from the silicone tubing (1).
2. Connect the silicone tubing to the L connector (2)
3. Connect the L connector to the detector (3)
4. Place the end of the tubing in a waste container.

NOTE

Make sure the waste container is placed at a location that is lower than the detector for proper drainage.

Waste tubing from other system components can be connected using the Y connector removed in step 1 and part 4 and cutting another small piece of silicone tubing if desired.



Rear Panel Connections

Refer to the diagram below when making the connections described in this section.

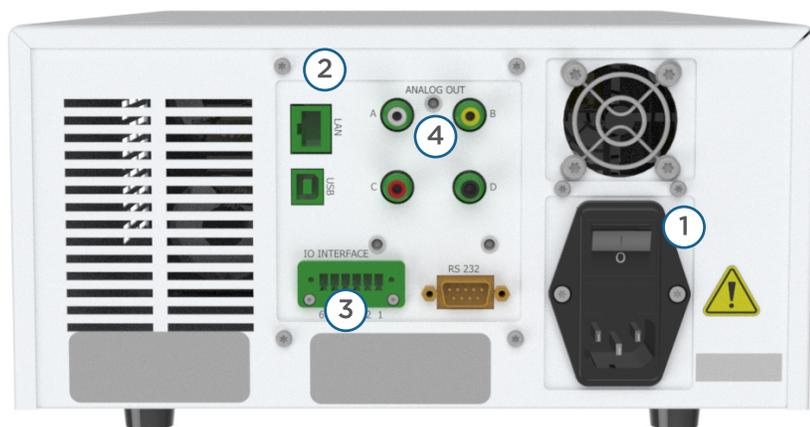


Figure 12
VERITY® 1741 UV-VIS Detector - Rear View

NO.	DESCRIPTION
1	Combined power socket with main switch and main fuse
2	Connector Ethernet/LAN
3	Connector IO INTERFACE
4	Analog outputs A, B, C, D

Ethernet

To make the Ethernet connection to the instrument, a router and Ethernet cables are needed.

CONNECT POWER TO THE ROUTER

Connect the power supply to the router and then connect the power supply to a power source.

CONNECT THE INSTRUMENT TO THE ROUTER

Before connecting, ensure that the instrument is powered OFF.

Locate the Ethernet cable that was included in the accessory kit. Plug one end of the cable into the LAN port on the detector and the other end to an Ethernet port on the router. Press the connector in until the safety pin snaps in.

CONNECT THE COMPUTER TO THE ROUTER

Connect one end of another Ethernet cable to an Ethernet port on the router and the other end to an Ethernet port on the network adapter in the computer.



Input/Output Connections

The VERITY 1741 Detector has an interface for connection to external devices. The interface has two universal inputs (DIN1 and DIN2) and two universal outputs (DOUT1 and DOUT2).

If input/output connections will be used, locate the terminal block connector provided with the detector and make the connection to the port labeled INTERFACE.

For more information about making the connections and using the inputs and outputs, refer to [IO Config on page 45](#).

Analog Outputs

The detector has four independent analog outputs with cinch connectors. On the rear side of the detector they are marked as ANALOG OUT and letters A to D.

Plug the supplied analog output cable into the cinch connector for connection to a data collecting device. Additional cables are available to be ordered.

For more information about making the connection and using the analog outputs, refer to [Analog Outputs on page 48](#).

Power Cord Connection

Use the power cord to connect the detector to a power source. Plug the power supply cord into the instrument socket on the detector rear panel.



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OPERATION

IN THIS CHAPTER:

- Front Panel | 20
- Start Up | 20
- Turn Lamp On | 21

TRILUTION® LC Software provides software control of the VERITY 1741 Detector for setup and operation of the detector in a chromatographic run. Instructions for controlling the VERITY® 1741 UV-VIS Detector using TRILUTION LC are provided on the documentation USB supplied with the detector. For more information about TRILUTION LC, refer to its user's guide and on-line help.

For instructions about using the front panel control, refer to [Appendix B | Front Panel Control on page 37](#).



Front Panel

The front panel of the detector contains a display and a keypad.



Figure 13
VERITY® 1741 UV-VIS Detector - Front View

NO.	DESCRIPTION
1	Front power switch
2	Status LED lights: LAMP indicates the lamps are on (green). RMT indicates that the detector is connected to the remote control (orange). ERROR indicates an error (red).
3	Display
4	Keypad
5	LAMP key for turning lamps on for use with front panel control

Start Up

1. Follow the instructions in [Chapter 2 | Installation](#) to make all rear panel and plumbing connections.
2. Ensure that the detector and the router are connected to a power source.
3. Check flow cell connections for leaks and fix, if necessary.
4. Switch the main power ON using the switch on the rear panel.
5. Switch the detector ON using the switch on the front panel.
6. If using front panel control, press the **LAMP** key to turn on the lamps. For instructions about using the front panel control, refer to [Appendix B | Front Panel Control on page 37](#).

NOTE

When the VERITY 1741 Detector is under TRILUTION LC control, the front panel keypad is locked.

Turn Lamp On

To use TRILUTION LC to turn the lamp(s) on:

NOTE The detector requires a 15–30 minute warm-up period to achieve a stable baseline.

1. Create a TRILUTION LC method with the detector in the configuration.
 - a. Select **Scan**. The software searches for the detector.
 - b. From the **Available Instruments** window, drag and then drop the detector in the workspace.
2. On the **Control** tab, drag and then drop the **Turn Lamp On** task into the control workspace.
3. Save the method, and then select **Run**. The **Application Run** window appears.
4. On the **Application Run** window, select the method name from the **Method Configuration** drop-down list and then select .



Figure 14
Application Run Window

5. Select the **Manual Control** icon. The **Manual Control** window appears.
6. Tasks are filtered by instrument name. Drag and then drop the **Turn Lamp On** task into the workspace. Select **OK**.

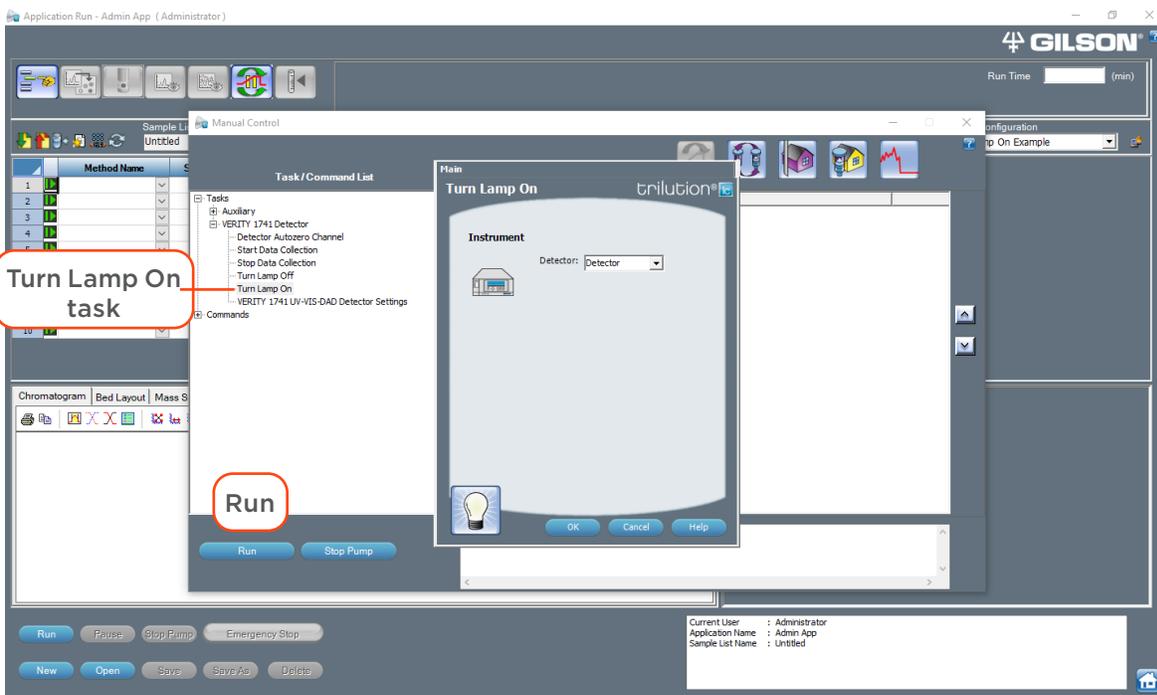


Figure 15
Turn Lamp On Task

7. Select **Run** on the **Manual Control** window.
The instrument is ready for operation.

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MAINTENANCE

IN THIS CHAPTER:

- Lamp Replacement | 24
- Intensity Calibration after Lamp(s) Replacement | 28
- Fuse Replacement | 29
- Cleaning and Decontamination | 30
- Flow Cell Replacement | 30



Lamp Replacement

It is recommended to replace both the deuterium lamp and tungsten lamp at the same time. When replacing the lamps, replace both lamps first and then calibrate the lamp intensity.

NOTE If replacing ONLY the tungsten lamp, then do NOT perform the lamp intensity calibration.

Deuterium Lamp Replacement

This operation may be performed only by a qualified person. Before replacing a lamp, always unplug the detector from power source by disconnecting main supply cable. Reconnect the detector to the power source only after the cover is mounted back in place.

CAUTION

UV light is dangerous for your eyes. If the flow cell is installed in the detector, then the UV light is shielded. When performing flow cell maintenance, it is very important to protect your eyes with glasses that absorb UV light. In case of any service requiring dismantling of any part covering optical unit and when the lamp is on, it is necessary to protect your eyes with glasses that absorb UV light.

OVERVIEW

1. Switch off the detector and disconnect it from the mains.
2. Remove the deuterium lamp and install a new one.
3. Connect the detector to the mains and switch it on.
4. Check that the new lamp is ignited correctly.
5. Use the front panel control to reset the lamp hours. Refer to [Service on page 52](#) for additional details.

INSTRUCTIONS

1. Disconnect the detector from the power source.
2. Unscrew the four screws and then remove the small cover on the side of the detector.
3. Unscrew the four screws on the front of the detector and then remove the cover.
4. Disconnect connectors from the compartment under the lamp socket. Pass the front of the connector into the front of the detector.



NOTICE

Never touch the quartz bulb with bare fingers because fingerprints will irreversibly damage the lamp after being switched on.

Clean any dust with air duster.

Avoid placing lamp cables into the fans space.

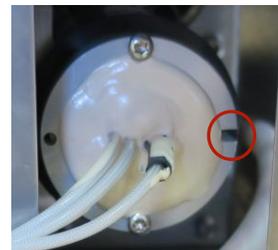
5. Loosen and remove the two screws on the lamp socket.
6. Remove the lamp from the lamp socket.
7. Insert the new lamp.

Construction of the lamp case allows only one correct position—it is impossible to insert the lamp incorrectly. Proper placement is ensured by a groove on the lamp case, leading toward the rear panel of the detector.

8. After inserting new lamp, the assembly steps are the same as those when removing, but in the reverse order.
9. Enter the full service menu by pressing **Menu | Service (7)**, and then pressing the left arrow, up arrow, right arrow, and down arrow buttons in sequence.

10. Select **PARTS REPLACEMENT** and then **DEUTERIUM LAMP (D2)** and confirm it.

If only changing the deuterium lamp, then calibrate the lamp intensity. Refer to [page 28](#). If also changing the tungsten lamp, follow the instructions to change the tungsten lamp and then calibrate the lamp intensity.





Tungsten Lamp Replacement

This operation may be performed only by a qualified person. Before replacing a lamp, always unplug the detector from power source by disconnecting main supply cable. Reconnect the detector to the power source only after the cover is mounted back in place.

CAUTION

UV light is dangerous for your eyes. If the flow cell is installed in the detector, then the UV light is shielded. When performing flow cell maintenance, it is very important to protect your eyes with glasses that absorb UV light. In case of any service requiring dismantling of any part covering optical unit and when the lamp is on, it is necessary to protect your eyes with glasses that absorb UV light.

OVERVIEW

1. Switch off the detector and disconnect it from the mains.
2. Remove the tungsten lamp (bulb) and install a new one.
3. Connect the detector to the mains and switch it on.
4. Check that the new bulb is lit correctly.
5. Use the front panel control to reset the lamp hours. Refer to [Service on page 52](#) for additional details.

DIAGRAM

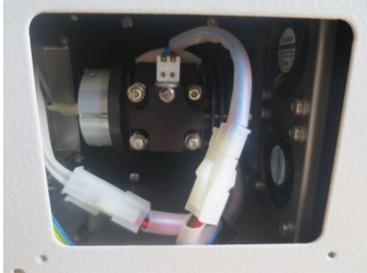


Figure 16
VERITY® 1741 UV-VIS Detector - Side View

NO.	DESCRIPTION
1	Light sources are under a small cover. Remove the cover when replacing the lamp(s).

INSTRUCTIONS

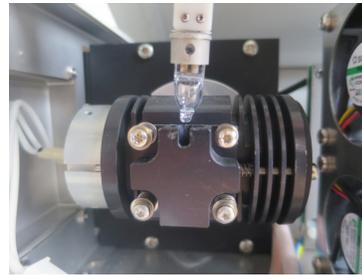
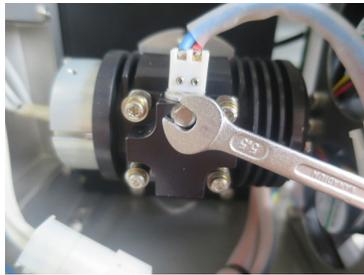
1. Disconnect the detector from the power source.
2. Unscrew the four screws and then remove the small cover on the side of the detector.
3. Disconnect the connectors; pull away the lamp conductors from the instrument.



NOTICE

Never touch the quartz bulb with bare fingers because fingerprints will irreversibly damage the lamp after being switched on.

4. Release the screw on the lamp holder using side wrench 5.5 mm.



5. Remove the lamp and insert a new one.
6. After inserting the new lamp, the assembly steps are the same as those when removing, but in the reverse order.

NOTE

It is recommended to replace the tungsten lamp every time when replacing the deuterium lamp.

NOTICE

Avoid placing lamp cables into the fans space.

7. Enter the full service menu by pressing **Menu | Service (7)**, and then pressing the left arrow, up arrow, right arrow, and down arrow buttons in sequence.
8. Select **PARTS REPLACEMENT** and then **TUNGSTEN LAMP (W)** and confirm it.





Intensity Calibration after Lamp(s) Replacement

After changing the deuterium lamp, the lamp intensity should be calibrated. If replacing both the deuterium and tungsten lamps, replace both lamps before performing the intensity calibration. Follow the instructions below to calibrate the intensity. Refer to [Service on page 52](#) for additional details.

Instructions

1. Switch on the detector.
2. Change the flow cell, if necessary.

NOTE

Calibrate only with the test cell, or with an empty, clean and dry measuring cell. If necessary, you can use a clean measuring cell filled with non-absorbent liquid (in the whole spectrum).

3. Switch on the lamps.
4. Wait 30 minutes to one hour for the lamps to stabilize.
5. Enter the full service menu by pressing **Menu | Service (7)**, and then pressing the left arrow, up arrow, right arrow, and down arrow buttons in sequence.
6. Select **CALIBRATIONS** and then **INTENSITY** and confirm it.
7. Wait for the calibration to complete (about 12 seconds).
8. Check the intensity value (100%) on the initial screen of the display.
9. Check for any errors.
10. Remove the test cell and then replace or reinstall the flow cell.

Fuse Replacement

CAUTION

Always disconnect the detector from the power source before replacing the line fuse.

1. Using a flat-tip screwdriver release the fuse holder from its bottom.
2. Take out the fuse holder.
3. Remove the old line fuse.
4. Insert a new line fuse with the specifications listed on the rear panel label. A spare fuse is included in the accessory package supplied with the detector.
5. Insert the fuse holder back into the receptacle.





Cleaning and Decontamination



UV light is dangerous for your eyes. If the flow cell is installed in the detector, then the UV light is shielded. When performing flow cell maintenance, it is very important to protect your eyes with glasses that absorb UV light.



The detector is an electrical device. Disconnect the power cord before servicing.

Use a dry or damp cotton cloth for cleaning the detector surface.

If the flow cell compartment is contaminated by liquid from the chromatography process, then read safety instructions for the liquid used and dry the compartment according to the safety instructions for liquid. Do not touch the flow cell window or lens using your fingers or sharp/hard tools as this may damage the optical parts surface. Turn the lamps off before cleaning the flow cell.

Cleaning the Flow Cell

Contamination of the flow cell results in lowered light transmission, which increases the noise level and makes zeroing difficult.

The simplest cleaning method is flushing a flow cell with suitable solvents. The flow cell must be removed from the detector before cleaning. Select the solvent type according to the character of contamination by a series of mutually miscible solvents. It is possible to use both organic and inorganic solvents and diluted solutions of acids (e.g., H_2SO_4 or HNO_3 diluted with distilled water in a 1:20 to 1:10 ratio).

After this operation is complete, flush the flow cell with pure solvent. Connect the flow cell to the system and then flow liquid through it and check for leaks. If flushing did not help, contact your local Gilson representative.

Flow Cell Replacement

The flow cell compartment is located at the front of the detector, behind the closed door. Open the door and then loosen the holding screws and then remove the flow cell.



Always turn the lamp off before performing any flow cell maintenance.



Inlet/Outlet Tubing Replacement Preparation

For part numbers for replacement tubing and fittings, refer to [Parts and Accessories on page 33](#).

Install the replacement fittings and/or tubing. Refer to [Plumbing Connections on page 13](#), as needed.

TROUBLESHOOTING

IN THIS CHAPTER:

- Troubleshooting | 31
- Repair and Return Policies | 32

Troubleshooting

PROBLEM	CAUSED BY / CONDITIONS	SOLUTION
After switching the detector on, no LED on the front panel is lit	Line fuse failure.	Check the main fuse on the rear of the detector see Fuse Replacement on page 29 .
	Electronics failure.	Contact your local Gilson representative.
Noisy or drifting baseline	Leaking or dirty flow cell, bubbles, or non-transparent mobile phase.	Check cell connections. Check mobile phase. Check cell purity.
	Electronics/optic failure.	Contact your local Gilson representative.
Warning or error message	-	Try resetting of error and if is not successful contact your local Gilson representative.
Leaking flow cell	Clogged tubing.	Check and replace flow cell inlet/outlet tubing, if necessary.
	Damaged or worn flow cell.	Replace the flow cell.



Repair and Return Policies

Before Calling Us

Your local Gilson representative will be able to serve you more efficiently if you have the following information:

- the serial number and model number of the instruments involved. The serial number is located on the rear panel.
- the installation procedure you used.
- list of concise symptoms.
- list of operating procedures and conditions you were using when the problem arose.
- list of other devices connected to the detector and a description of those connections.
- list of other electrical connections in the room.

Warranty Repair

Units covered under warranty will be repaired and returned to you at no charge. If you have any questions about applicability, please contact your local Gilson representative.

Non-Warranty Repair

For out-of-warranty repairs, contact your local Gilson representative who will discuss service options with you and can assist in making arrangements to return the equipment, if necessary.

Return Procedure

Contact your local Gilson representative to obtain authorization before returning any Gilson equipment. To return a piece of equipment:

- Carefully pack the unit to prevent damage in transit. Check with your local Gilson representative regarding proper method of shipment. No responsibility is assumed by Gilson or your local Gilson representative for damage caused by improperly packaged instruments. Indicate the authorization on the carton and on the packing slip.
- Always insure for the replacement value of the unit.
- Include a description of symptoms, your name, address, phone number, and purchase order to cover repair costs, return and shipping charges, if your institution requires it.

Unit End-of-Life

When a unit reaches the end of its useful life, refer to www.gilson.com for directions and information on the end-of-life policy. This is in accordance with the European Union Directive on Waste Electrical and Electronic Equipment .



PARTS AND ACCESSORIES

IN THIS CHAPTER:

- VERITY 1741 Detector and Shelf Accessory | 33
- Lamps | 33
- Miscellaneous | 34
- Flow Cells/Tubing/Fittings | 34

VERITY 1741 Detector and Shelf Accessory

PART NUMBER	DESCRIPTION
14161003	VERITY 1741 UV-VIS DETECTOR
21040255	SHELF,VERITY 1741 Optional shelf for stacking a pump on top of the VERITY 1741 Detector in a system

Lamps

PART NUMBER	DESCRIPTION
21040253	LAMP DEUTERIUM, PLCA, V2 Deuterium Lamp for VERITY 1741 Detector
21041038	LAMP HALOGEN, PLCA Tungsten Lamp for VERITY 1741 Detector



Miscellaneous

PART NUMBER	DESCRIPTION
36078142	CABLE,CAT5E,MODULAR RJ45,MOLDED BOOT,7' Ethernet Cable
14161023	ANALOG OUTPUT CABLE,1MTR
14161021	TERMINAL BLOCK 6PIN
14161024	DOOR,1741
14161022	WASTE SET 1741
21040256	1741 TEST CELL

Flow Cells/Tubing/Fittings

1/16" Flow Cells

PART NUMBER	DESCRIPTION
14161011	FLOW CELL,1.3MM,1/16,1741 Flow cell assembly with a 1.3 mm pathlength and 1/16" OD internal tubing for VERITY 1741 Detector
14161014	FLOW CELL,0.5MM,1/16,1741 Flow cell assembly with a 0.5 mm pathlength and 1/16" OD internal tubing for VERITY 1741 Detector
14161012	FLOW CELL,0.1MM,1/16,1741 Flow cell assembly with a 0.1 mm pathlength and 1/16" OD internal tubing for VERITY 1741 Detector
14161013	FLOW CELL,0.05MM,1/16,1741 Flow cell assembly with a 0.05 mm pathlength and 1/16" OD internal tubing for VERITY 1741 Detector

1/16" Tubing/Fittings

PART NUMBER	DESCRIPTION
49953059	TUBING,PEEK,0.030 X 5FT Inlet/Outlet Tubing for 1/16" Flow Cells for VERITY 1741 Detector
490410120 OR 4904F120X	F120, FINGERTIGHT FITTING Fitting for Inlet/Outlet Tubing (1/16" Flow Cells) for VERITY 1741 Detector FITTING,FINGERTIGHT,10-32,1/16 (10/PK) Fittings (pack of 10) for Inlet/Outlet Tubing (1/16" Flow Cells) for VERITY 1741 Detector

1/8" Flow Cells

PART NUMBER	DESCRIPTION
14161015	FLOW CELL,1.3MM,1/8,1741 Flow cell assembly with a 1.3 mm pathlength and 1/8" OD internal tubing for VERITY 1741 Detector
14161018	FLOW CELL,0.5MM,1/8,1741 Flow cell assembly with a 0.5 mm pathlength and 1/8" OD internal tubing for VERITY 1741 Detector
14161016	FLOW CELL,0.1MM,1/8,1741 Flow cell assembly with a 0.1 mm pathlength and 1/8" OD internal tubing for VERITY 1741 Detector
14161017	FLOW CELL,0.05MM,1/8,1741 Flow cell assembly with a 0.05 mm pathlength and 1/8" OD internal tubing for VERITY 1741 Detector

1/8" Tubing/Fittings

PART NUMBER	DESCRIPTION
499662600	TUBING,FEP,1/8 X 0.062,NAT,50' (1521L) Inlet/Outlet Tubing for 1/8" Flow Cells for VERITY 1741 Detector
49041015N OR 4904P300NX	FERRULE,1/8",ETFE,NATURAL (P-300N) Ferrule for Inlet/Outlet Tubing (1/8" Flow Cells) for VERITY 1741 Detector FERRULE,FLNGLSS,1/8,NAT,10/PK (P-300NX) Ferrules (pack of 10) for Inlet/Outlet Tubing (1/8" Flow Cells) for VERITY 1741 Detector
4904P330X	NUT,FLANGELESS,1/8,PEEK 10/PK (P-330X) Nuts (pack of 10) for Inlet/Outlet Tubing (1/8" Flow Cells) for VERITY 1741 Detector



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FRONT PANEL CONTROL

IN THIS CHAPTER:

- Description of Symbols on the Screen | 38
- Operating Modes | 39
- Working with the Menu | 41
- Parameters | 41
- Preferences | 43
- IO Config | 45
- Analog Outputs | 48
- Info | 48
- Diagnostics | 50
- Service | 52

The VERITY 1741 Detector includes a display and keypad for front panel control.



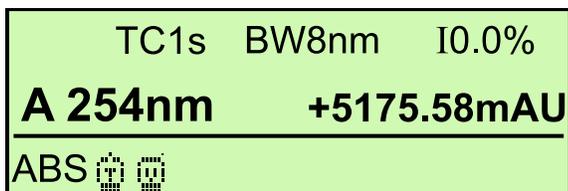
Figure 17

VERITY® 1741 UV-VIS Detector - Front View

NO.	DESCRIPTION
3	Display
4	Keypad



Description of Symbols on the Screen



TC1s	Time constant for signal filtering.
BW8nm	Electrical bandwidth for setting the range around a given wavelength.
I0.0%	Percentage of light intensity.
A254 nm	Wavelength set on channel A.
+5175.58mAU	Actual value of absorbance in mAU units.
ABS	Current detector mode.
 / 	Symbol of switched on deuterium lamp / Symbol of switched off deuterium lamp.
 / 	Symbol of switched on tungsten lamp / Symbol of switched off tungsten lamp.
Z!	Unsuccessful autozero process. A warning (W) is displayed with a description of the problem.
E(1)	Warning message about an error and number of errors in parenthesis. Press ENTER to view the list of errors and warnings.

Operating Modes

The detector may be in different operating modes depending on the desired operation. The detector enters some modes by command of the operator or control computer, others are invoked automatically to perform a sequence of different operations.

MODE ABBREVIATION	DESCRIPTION
START ---	Transient state after power up. This is the initial detector initialization.
IDLE IDD	Mode when light sources are off. Operational parameters can be preset and tasks performed for which it is not necessary to have the light source switched on. The instrument waits for the light source initialization command.
LAMPS IGNITION LPI	Mode when light sources change. Used when turning on (LAMPS IGNITION). No settings or commands are available in this mode. The mode can be interrupted by pressing the LAMP key.
AUTOZERO AZR	Mode in which the detector prepares the analog circuits of the instrument for absorbance measurement and resets the output signal. No settings or commands are available and this mode cannot be interrupted.
MEASURE ABSORBANCE ABS	Mode during absorbance measurement. Most commands are accessible.
SCAN SCN	Mode during measurement of intensity (INTENSITY) or energy (ENERGY) scan. No settings or commands are available and this mode cannot be interrupted.

After the detector starts, (START mode) the display shows the detector type.	
Next, the detector is in IDLE (IDD) mode, where the lamps are off.	
After pressing the LAMP key, the light sources turn on and the detector is in LAMPS IGNITION (LPI) mode, which is indicated by the flashing lamp symbol and the illuminated, green, LAMP status LED light to the left and next to the display.	





After successful calibration, the main screen displays the absorbance measurement. MEASURE ABSORBANCE (ABS) on channel A at the preset basic wavelength (254 nm). The wavelength now can be set for the displayed channel directly from this window, using the up and down arrows. During a wavelength change the detector signal is not automatically zeroed (Autozero). Autozero occurs after pressing **ZERO** on main panel.

TC1s	BW8nm	10.0%
A 254nm	+5175.58mAU	
ABS		

The wavelength can be set by pressing the **WL** key. Use the arrow keys to move the cursor left and right and then up and down change the value. Press **ENTER** to confirm the selected wavelength. It is set and overwrites the ACT value. Autozero the signal and wait for the detector to stabilize.

EDIT WAVELENGTH A [nm]	
ACT : 254	DESIRED VALUE:
MIN : 200	254
MAX : 800	

Use the right arrow key to change the channel selection (A, B, C, D). A different wavelength can be set for each channel. Press the **WL** key to set the wavelength for the selected channel. Use the left arrow key to return to the previous screen.

TC1s	BW8nm	10.0%
B 312nm	+3825.82mAU	
ABS		

Press the **ZERO** key to put the detector in AUTOZERO (AZR) mode and reset the absorbance.

AUTO ZERO	
Please wait ...	
AZR	



Working with the Menu

The menu screen enables setting all parameters and functions of the detector, its diagnostics, and service. The main menu is accessed by pressing the **MENU** key. Navigate the menu using the arrow keys, **ENTER** key, and **ESC** key. Press the **MENU** key to exit the current screen.

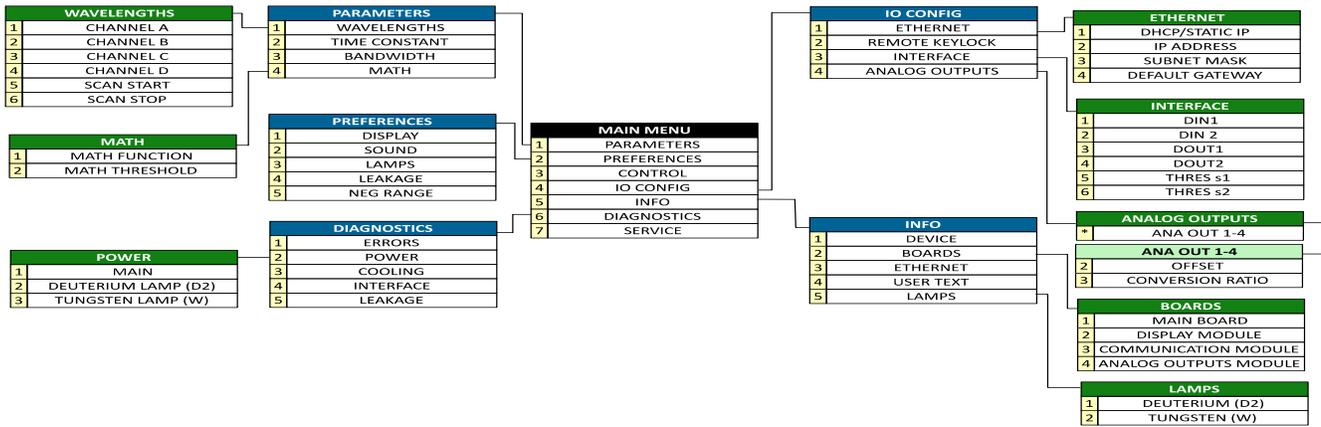


Figure 18
Menu Flow Diagram

Parameters

The basic parameters of the detector can be set here.

Wavelengths

Set the wavelength for each measurement channel and the scan range (SCAN START and SCAN END).

Wavelength Settings

SETTING	DESCRIPTION
CHANNEL (A-D)	The wavelength of the measurement channel. The default value is 254 nm.
SCAN START	The value at which scanning begins. Set the wavelength in the range of 200–800 nm. The default range is 200–780 nm.
SCAN STOP	The value at which scanning ends. Set the wavelength in the range of 200–800 nm. The default range is 220–800 nm.



Time Constant

The time constant represents the level of signal filtering. A preset value is used for both digital and analog outputs. A slower (longer) time constant value decreases the overall noise on the detector output, but also decreases the response speed (response delay- time lag) and changes the shape of peaks (they are wider and lower). Time constant does not have an influence on peak area size, even if the value widens and lowers the peak.

Recommended Time Constant Settings

Time Constant [s]	Peak Half Width for Narrowest Expected Peak in Analysis [s]
0.1	0.4
0.2	0.9
0.5	2.2
0.75	3.6
1 default	5
2	10
4	20
8	40
16	80

EXAMPLE

The narrowest, expected peak half width in the analysis is 8 s; therefore, the recommended time constant is 1 s.

For standard chromatography analysis, the 1 s default value is usually suitable.

Bandwidth

Setting math bandwidth in the 4-10 nm range. The left and right arrow keys move the cursor, and up and down arrow keys change the value. Press **ENTER** to confirm the selected bandwidth. The default bandwidth value is 8 nm.

Math

SETTING	DESCRIPTION
MATH FUNCTION	<p>Selecting a function on the mathematic channel D (OFF; A+B; A-B; AVG; SUB/2; MAX; A/B; NEG A; ABS A).</p> <p>OFF: Math functions are disabled.</p> <p>A+B: The absorbance of channels A and B is added.</p> <p>A-B: The absorbance of channels A and B is subtracted.</p> <p>AVG: Average of absorbances of channels A and B.</p> <p>SUB/2: Subtraction in absorbance of channels A and B divided by two.</p> <p>MAX: Maximum of signals A and B.</p> <p>A/B: Absorbance of channel A divided by absorbance of channel B.</p> <p>NEG A: Negative value of channel A absorbance.</p> <p>ABS A: Absolute value of channel A absorbance.</p> <p>The default set function is OFF.</p>
MATH THRESHOLD	<p>Setting math threshold in range 0.50 – 999.99 (mAU). The left and right arrow keys move the cursor, and up and down arrow keys change the value. Press ENTER to confirm the selected threshold. The default value is 1.00 mAU.</p>

Preferences

Set detector functions to satisfy user needs.

Display

Display settings.

BRIGHTNESS

The display brightness can be set to eight levels, where a value of 8 is maximum brightness. The default value is 4 (50%).



Sound

Set the sound signals for the detector. All items are activated by default.

Sound Settings

Setting	Description
KEYBOARD	At each touch of a button, a short beep will sound when the key does not have any significance at the moment, a mid-length beep for a value change and moving within a menu, and a longer beep for confirmation of a value change.
ERRORS	In the case of an error, three consecutive, longer beeps will sound. In the case of a fatal error, the three, consecutive, longer beeps will sound every 5 s. Stop the beeps by pressing any key.
OPERATIONS	A beep sounds at the beginning and end of an operation. During operation, a longer beep may sound.
STATES	A signal sounds when the mode is changed.

Lamps

Optionally, set up automatic lamp ignition.

Lamp Ignition Settings

SETTING	DESCRIPTION
LAMPS AUTOSTART OFF	The lamps do not turn on automatically when the detector is turned on. To ignite the lamps, press the LAMP key.
LAMPS AUTOSTART ON	The lamps turn on automatically when the detector is turned on.

Leakage

The leak sensor contains both a reference and a measuring sensor. If the measuring sensor is immersed in liquid, the sensor generates a signal. Signal processing is dependent on the setting:

Setting of Leak Sensor Behavior

Setting	Behavior
OFF	Signal is ignored.
STATE FLAG	Warning sign.
WARNING	Warning is displayed. Default setting.
FATAL ERROR	Invokes a fatal error, where light sources turn off and the detector goes to IDLE (IDD) mode.

To stop the leak sensor signal from sounding, it is necessary to remove the source of the liquid leak and thoroughly dry the sensor surroundings. After drying the sensor and its surroundings, the warning signal will stop within approximately 80 seconds.

Neg. Range

The negative dynamic range setting influences the range of absorbance measuring. This is a theoretical value. The range varies depending on lighting conditions when the signal is reset (autozero), and the range is different for each wavelength. In practice, it is necessary to reset the signal (autozero) on the non-absorbing liquid at a given wavelength to reach the maximum negative range.

Setting of Negative Dynamic Range

Setting	Description
NORMAL	-0.1 AU (default value)
MEDIUM	-0.3 AU
HIGHER	-0.7 AU

IO Config

The VERITY 1741 Detector has an interface for connection to external devices. The interface has two universal inputs (DIN1 and DIN2) and two universal outputs (DOUT1 and DOUT2).

Interface

INTERFACE SPECIFICATION

PIN	ABBR.	NAME	DESCRIPTION
1	+5V	-	Auxiliary supply +5V DC, maximum output current 50mA.
2	DIN1	DIGITAL INPUT 1	Digital input 1. Compatible with TTL, HC, HCT. Overvoltage category up to 24 V. Opened at level H. Active at level L.
3	DIN2	DIGITAL INPUT 2	Digital input 2. Compatible with TTL, HC, HCT. Overvoltage category up to 24 V. Opened at level H. Active at level L.
4	DOUT1	DIGITAL OUTPUT 1	Digital output 1. Compatible with TTL, HC, HCT. Maximum output current 24mA. Output resistance 75ohm.
5	DOUT2	DIGITAL OUTPUT 2	Digital output 2. Compatible with TTL, HC, HCT. Maximum output current 24mA. Output resistance 75ohm.
6	GND	GROUND	Ground. Internally connected with chassis.

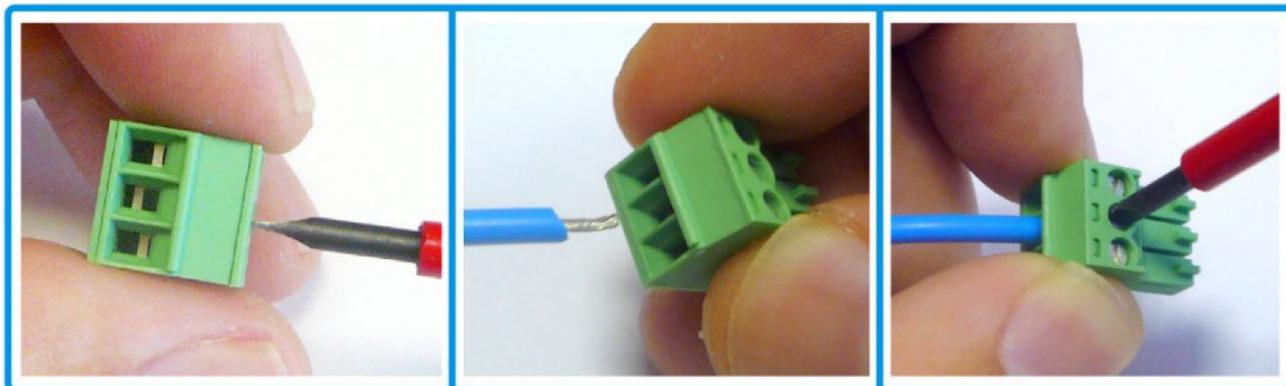
For external input/output interface, connector blocks are used (included in accessories).

To connect a cable to the connector block, loosen the nut using a small flat-tip screwdriver. Remove approximately 3 to 4 mm of isolation from the connected cable. Insert the skinned part of cable into the place under the nut and tighten the nut. Gently pull on the cable to ensure the conductor holds in the block. If the conductor is too thin, it is better to remove isolation from a longer section and bend the skinned part before inserting in the block.



NOTE

Connector blocks are meant for cables with size up to 1.5 mm².



Diagnostics of the actual IO INTERFACE status are accessed by pressing the **MENU** key and then selecting **Diagnostics | Interface**. For digital inputs value OPEN (H) means opened input, high level and CLOSE (L) means closed input, low level. For digital output is displayed OFF (for open switch) and ON (for closed switch).

The analog input, digital input 1 and 2, and digital output switches can be read through remote control (ETHERNET).

DIGITAL INPUT (DIN1 AND DIN2)

Function setting for inputs DIN1 and DIN2 on external interface:

SETTING	DESCRIPTION
OFF	No function.
MAKE AUTOZERO	Pulse L causes the detector to be reset - autozeroed (AUTOZERO).
LAMP INIT	Pulse L causes initialization of the light sources (LAMP ON).
LAMP DEINIT	Pulse L causes deinitialization of the light sources (LAMP OFF).

DIGITAL OUTPUT SWITCH (DOUT1 AND DOUT2)

Function setting for outputs DOUT 1 and DOUT 2 on external interface:

SETTING OF ACTIONS ON DIGITAL OUTPUT

SETTING	DESCRIPTION
OFF	No function.
RTM	The output is possible to control by commands from PC.
OVRs1	Level H, when the absorbance A is higher than THRESHOLD s1.
OVRs2	Level H, when the absorbance A is higher than THRESHOLD s2.
INs12	Level H, when the absorbance A is in the THRESHOLD s1 and s2 range.
OUTs12	Level H, when the absorbance A is out of the THRESHOLD s1 and s2 range.
DIN1	Level copies the input DIN1.
DIN2	Level copies the input DIN2.
LEAK	Level H, when the leak is detected (LEAKAGE).
FERR	Level H, when a fatal error occurs.
LEDER	Setting for externally connected ERROR LED, all errors.
LEDLP	Setting for externally connected LAMP LED.

If the detector is not in ABS mode and the digital output is controlled by threshold values s1 and s2, then the digital output is always disconnected.

Example

The threshold value s1 is set at 0.1 AU and the digital output at OVR s1. If the absorbance signal is lower than 0.1 AU, then the digital output is disconnected. If the value is higher, then the digital output is connected. With this type of connection, the output signal can be used for simple fraction collection.

THRES S1 AND THRES S2

Set the threshold value s1 and s2 in the range of -100 to +4000 mAU.





Analog Outputs

The detector has four independent analog outputs with cinch connectors. On the rear panel of the detector they are marked as ANALOG OUT and letters A to D.

Each of the analog outputs can be preset OFFSET in the range of preset values from -0.100 V to $+0.500\text{ V}$.

A conversion ratio can also be set for output voltage / 1 AU (absorbance unit). This can be set in the range of $0.2\text{ V} / 1\text{ AU}$ to $10.0\text{ V} / 1\text{ AU}$.

In case of a warning about overflow of some of the unused analog outputs, it is possible to turn off these analog outputs by setting the **Conversion Ratio** to off. Press the **MENU** key and then select **IO Config | Analog Outputs | ANA 1/2/3/4/ Conversion Ratio** to **OFF**.



Figure 19
Analog Output Cable

ANALOG OUTPUT CABLE MARKING

COLOR	SIGNAL	NOTE
BROWN	HI	AOUT (Analog output)
WHITE	LOW	AGND (Analog ground)
COPPER	SHIELD	AGND (Analog ground)

Offset

The offset of the analog output can be set in the range of -0.100 V to $+0.500\text{ V}$ (default value is 0.00 V).

Conversion Ratio

Conversion ratio of output voltage to AU can be set in six ranges: 0.2 V , 0.5 V , 1.0 V , 2.0 V , 5.0 V , or $10.0\text{ V} = 1\text{ AU}$ (default value is OFF). Option OFF turns off relevant analog output.

Info

Information about the detector, its components and their condition are displayed.

Device

Displays detector name (**NAME**), its serial number (**SN**) and total operating time (**TIME**) - **HH:MM:SS** (H - hour, M - minute, S - second).



Boards

The printed circuits information of the main board, display module, communication module, and analog output module is displayed.

MAIN BOARD

BN - board name, HW - board version, FW - firmware version, UN - board identification number.

DISPLAY MODULE

BN - board name, HW - board version, FW - firmware version, UN - board identification number.

COMMUNICATION MODULE

BN - board name, HW - board version, FW - firmware version, UN - board identification number.

ANALOG OUTPUTS MODULE

BN - board name, HW - board version, CD - calibration date.

Ethernet

Displays actual setting of Ethernet, IP (IP address), MASK (subnet mask), GATE (Default gateway) and MAC (Unique hardware address) address of the detector.

User Text

Default is empty. The user may input supplementary information about the detector when using software (location in the laboratory, for example). USER TEXT is then a part of the protocol.

Lamps

Shows detailed information about light sources:

DEUTERIUM (D2)

TYPE- lamp type, **TIME-** total operating hours of the lamp, in parenthesis is actual time from last lamp ignition.

TUNGSTEN (W)

TYPE- tungsten lamp type, **TIME-** total operating hours of the lamp, in parenthesis is actual time from last lamp ignition.



Diagnostics

The detector diagnostics is displayed.

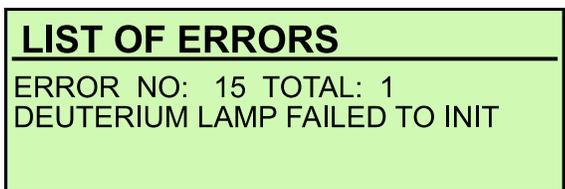
Errors

When a serious problem occurs, the display shows an **E** in the lower right corner with the number of errors in parenthesis. When this occurs, it is usually impossible to continue with measuring and the detector switches to IDLE mode.

By pressing the **ENTER** key, a **LIST OF ERRORS** screen appears for fast access to the error description.

The **LIST OF ERRORS** screen displays the error number (ERROR NO:), a description of the error, and the total number of errors that occurred (TOTAL:), Arrows enable browsing if there is more than one error. To update the status on this screen, exit the screen, and enter it again.

The list of actual errors can also be entered by pressing the **MENU** key and then selecting **Diagnostics | Errors**.



Power

Allows for viewing some real-time measured values for hardware diagnostics. The data are divided into three groups. The voltages and currents at the light sources (D2, W) may differ from the stated values (lamp manufacturing tolerances).

MAIN

The following values are displayed:

Main Supply Voltage Values Control

NAME	DESCRIPTION
VSY	Internal System voltage (+24 V).
VDD	Positive Low Digital power supply (+5 V).
VAP	Positive Analog power supply (+6.8 V).
VAN	Negative Analog power supply (-3.2 V).
VRC	Central Processor detector reference voltage (+1.21 V).

DEUTERIUM LAMP (D2)

The following values are displayed:

Current Values of D2 (Deuterium Lamp) Control

NAME	DESCRIPTION
VA3	Voltage at the output of the current regulator behind the measuring resistor (approx. +72 V).
VA4	Voltage at the output of the current regulator in front of the measuring resistor (approx. +82 V).
VA5	Voltage at the anode of the lamp (approx. +71 V).
IAD	Anode lamp current (approx. +0.282 A).
VHT	Heating voltage in steady state (approx. +1 V).
IHT	Heating current (approx. +2 A).

TUNGSTEN LAMP (W)

The following values are displayed:

Current Values of W (Tungsten Lamp) Control

NAME	DESCRIPTION
VLO	Current regulator Lo voltage (approx. +0.9 V).
VHI	Current regulator Hi voltage (approx. +11.7 V).
VBL	Lamp voltage (approx. +10.8 V).
IBL	Lamp current (approx. +0.8 A).

Cooling

Shows temperature of illuminator TEMP - If the cooling sensor is not connected, the display will show **TEMP: SENSOR NOT INSTALLED**, rotation speed of fans FAN1 and FAN2 (rpm) and their voltage (V).

Interface

Shows the status of the analog and digital IO INTERFACE:

Status of digital inputs DIN1 and DIN2 and digital output DOUT1 and DOUT2.





Leakage

Allows for viewing some real-time measured values for leakage sensor diagnostics. If the leakage sensor is not connected, the display will show **MODE: SENSOR NOT CONNECTED** and the voltages VLKR and VLKS will be out of range below.

Leakage Screen

SETTING	DESCRIPTION
VLKR	Voltage at the reference sensor (approx. +0.65 V / +0.95 V).
VLKS	Voltage at the sample sensor (approx. +0.65 V / +0.95 V).
MODE	Mode of the sensor - OFF, STATE FLAG, WARNING, FATAL ERROR.

Service

The partial service menu provides access to the most common operations and is also compatible with the service menu in older devices.

To access the partial service menu, press the **MENU** key, select **SERVICE (7)**, and then press and hold the **ENTER** key for three seconds.

PARTIAL SERVICE	
1	PARAMETERS TO DEFAULTS
2	RESET WEB PASSWORD
3	CLEAR ERRORS LOG
4	CLEAR ACTIONS LOG

Figure 20
Partial Service Menu

The full service menu provides access to all available service operations.

To access the full service menu, press the **MENU** key, select **SERVICE (7)**, and then press the left arrow, up arrow, right arrow and down arrow buttons in sequence.

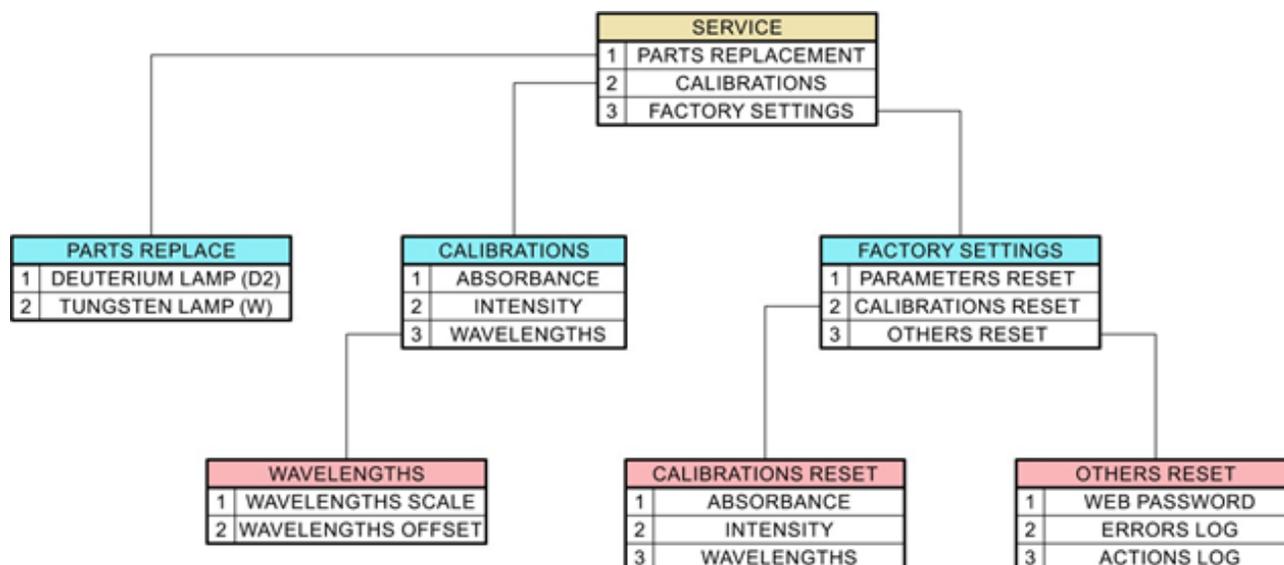


Figure 21
Full Service Menu



Parts Replacement

DEUTERIUM LAMP (D2)

Resets the deuterium lamp age time and sets a new index of time counter.

TUNGSTEN LAMP (W)

Resets the tungsten lamp age time.

Calibrations

ABSORBANCE

Using this item, the absorption response can be slightly corrected. The absorbance coefficient is the multiplier of the basic calculated value.

INTENSITY

This item is used to automatically calibrate the spectral intensity to 100%. The instrument must be in measuring mode (lamps on). Calibration takes about 12 seconds and the service menu is exited, when finished. For more information, refer to [Intensity Calibration after Lamp\(s\) Replacement on page 28](#)

WAVELENGTHS

Use this item to manually adjust the wavelengths settings (scale and offset).

NOTE

The setting is related to the mechanical setting of the monochromator.

Factory Settings

PARAMETERS RESET

Use this item to set all device parameters to default values.

CALIBRATIONS RESET

Use this item to set device calibrations to default values, individually for absorbance, intensity, and wavelengths.

OTHERS RESET

Use this item to reset other device records, individually for web password, errors log, and action log.

