



# 157/159 UV-VIS Detectors

## User's Guide

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LT1037-03



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# Safety

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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 157/159 UV-VIS Detectors are suitable for high-pressure liquid chromatography and are intended to be used in a laboratory environment by trained technical personnel.



Detector control is via Ethernet and TRILUTION LC v3.0 with Service Pack or via the front panel touchscreen.

## Symbols and Signs


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

Symbol	Meaning
	High-voltage hazard.
	Electrostatic discharge hazard, damages to system, device, or components can occur.
	General warning sign, moderate injuries can occur and damages to system, device, or components.
	UV-light hazard, eye injuries can occur.
	Caution, hot surface
	Pay attention to the torque for the fitting.

The following safety notices may appear in this document:

 <b>WARNING</b>	WARNING indicates a potentially hazardous situation which, if not avoided, may result in serious injury
 <b>CAUTION</b>	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury
<b>NOTICE</b>	NOTICE indicates a potentially hazardous situation which, if not avoided, may result in equipment damage

## Prohibited Use

 <b>WARNING</b>	Explosion hazard if the device is used in potentially explosive atmospheres without appropriate protective equipment!
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### Solvents

Observe safe laboratory practices when handling solvents. If dangerous liquids are used, adequate protection such as proper ventilation, safety glasses, etc., should be used.

Refer to the Material Safety Data Sheets for the solvents before use.

### Toxicity

Organic solvents are toxic above a certain concentration. Ensure that work areas are always well ventilated. Wear protective gloves and safety glasses when working on the detector.

### Flammability

Organic solvents are highly flammable. Since tubing can detach from fittings and allow solvent to escape, it is prohibited to have any open flames near the detector.

### Self-Ignition Point

Only use solvents that have a self-ignition point higher than 150°C under normal ambient conditions.

### Autozero

Perform an autozero each time you exchange the solvent.



### Solvent Tray

To avoid damage from leaks, always place solvent bottles in a solvent tray on the device.

### Leaks and Clogged Tubing

Regularly check for leaks and clogged tubing. Test back pressure without a column.

### Protective Measures

	<div> <b>WARNING</b></div> <div>Risk of electric shock! To avoid possible electric shock, turn off the detector and disconnect the power cord before opening or servicing the detector.</div>
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You are only permitted to perform the maintenance tasks described in this user's guide. If additional maintenance is required, contact your local Gilson representative.

### Personal Safety Equipment



When working with the detector, take measures according to lab regulations and wear protective clothing, such as safety glasses with side protection, protective gloves, and a lab coat.

### Adherence to Laboratory Regulations

Observe national and international regulations pertaining to laboratory work.

- Good Laboratory Practice (GLP) of the American Food & Drug Administration (FDA)
- For development of methods and validation of devices: Protocol for the Adoption of Analytical Methods in the Clinical Chemistry Laboratory, American Journal of Medical Technology, 44, 1, pages 30-37 (1978)
- Accident prevention regulations published by the accident insurance companies for laboratory work

### UV Light

	<div> <b>WARNING</b></div> <div>Irritation of retina through UV light! Concentrated UV light can disperse from a detector without a flow cell. Always turn off the detector and disconnect the power cord before opening or servicing the detector.</div>
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### Ozone Formation

UV light can generate ozone out of oxygen at a wavelength smaller than 180 nm. All detectors use safety glass, and are constructed to prevent UV light from escaping and creating ozone inside the detector.

### Voltage

Access to the rear panel is necessary because the detector must be detached from all voltage sources before service, repair, or exchange of parts.

Operate the instrument using the approved power supply and power cord provided and only at the voltage specified on the rear panel label of the instrument.

### Replacement Parts

Be sure to use only replacement parts mentioned in this user's guide.

# Sécurité

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Pour votre sécurité, lisez attentivement ce manuel, et respectez les informations et avertissements relatifs à la sécurité indiqués sur l'appareil et dans ce guide.

Les détecteurs 157/159 UV-VIS sont adaptés à la chromatographie liquide haute pression et sont destinés à être utilisés dans un environnement de laboratoire, par un personnel technique qualifié.



Le contrôle du détecteur s'effectue via Ethernet et TRILUTION LC v3.0 Service Pack ou via l'écran tactile du panneau avant.

## Symboles et Signes


Le tableau suivant détaille les symboles et signes utilisés sur le détecteur ou dans le guide de l'utilisateur:

Symbol	Signification
	Danger: Haute tension.
	Risque de décharges électrostatiques pouvant entraîner des dommages matériels sur le système, l'appareil ou ses composants.
	Avertissement général: risque pouvant entraîner des blessures mineures ou des dommages matériels sur le système, l'appareil ou ses composants.
	Risque UV, pouvant entraîner des blessures aux yeux.
	Attention, surface chaude
	Veiller à respecter le couple de serrage

Les notes de sécurité suivantes peuvent apparaître dans ce document:

 <b>WARNING</b>	AVERTISSEMENT: indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures graves
 <b>CAUTION</b>	ATTENTION: indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures mineures à modérées
<b>NOTICE</b>	AVIS: indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entraîner des dégâts matériels

## Restriction d'utilisation

 <b>WARNING</b>	Risque d'explosion si l'appareil est utilisé en atmosphère potentiellement explosive sans équipement de protection approprié !
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### Solvants

Respectez les Bonnes Pratiques de Laboratoire lors de la manipulation de solvants. Si des liquides dangereux sont utilisés, assurez-vous que la ventilation est adéquate et portez en permanence un équipement de protection individuelle (EPI), tel que: lunettes, gants et vêtements de protection.

Reportez-vous aux Fiches de Données de Sécurité pour les solvants avant toute utilisation.

### Toxicité

Les solvants organiques sont toxiques au-delà d'une certaine concentration. Veillez à ce que les zones de travail soient toujours bien ventilées! Portez des gants et des lunettes de sécurité lorsque vous travaillez sur l'appareil!

### Inflammabilité

Les solvants organiques sont hautement inflammables. Les tubulures pouvant éventuellement se dévisser, et permettre ainsi au solvant de s'échapper, il est interdit d'avoir une flamme nue à proximité de l'appareil.

### Point d'auto-inflammation

N'utilisez que des solvants dont le point d'auto-inflammation est supérieur à 150°C dans des conditions ambiantes normales!

### Autozéro

Effectuez une remise à zéro automatique à chaque changement de solvant.



### Plateau à solvants

Pour éviter les dommages causés par des fuites, placez toujours les bouteilles dans un plateau à solvants sur l'appareil.

### Fuite et obstruction des tubulures

Assurez-vous régulièrement de l'étanchéité et de la non obstruction des tubulures. Testez la contre-pression sans colonne.

### Mesures de Protection

	 <b>WARNING</b>	Risque de choc électrique! Pour éviter tout risque d'électrocution, éteignez le détecteur et débranchez le cordon d'alimentation avant toute intervention sur le détecteur.
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Vous n'êtes autorisés à effectuer que les tâches de maintenance décrites dans ce guide. Si cela s'avérait insuffisant, merci de contacter votre représentant Gilson.

### Équipement de protection individuelle



Lorsque vous travaillez avec le détecteur, observez les mesures relatives au travail en laboratoire et portez un équipement de protection adapté tel que lunettes de sécurité avec protection latérale, gants de protection et blouse.

### Réglementation au Laboratoire

Observez les réglementations nationales et internationales relatives au travail en laboratoire.

- Bonnes Pratiques de Laboratoire (BPL) de l'American Food & Drug Administration (FDA)
- Pour le développement de méthodes et la validation de dispositifs : Protocole pour l'adoption des méthodes d'analyse dans le laboratoire de chimie clinique, de l'American Journal of Medical Technology, 44, 1, pages 30–37 (1978)
- Réglementation de prévention des accidents publiés par les sociétés d'assurance pour le travail de laboratoire

### Rayonnement UV

	 <b>WARNING</b>	Irritation rétinienne due au rayonnement UV! Une lumière UV concentrée peut potentiellement s'échapper de la cellule de flux. Veillez toujours à éteindre le détecteur et débrancher le cordon d'alimentation avant toute intervention sur le détecteur.
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### Formation d'ozone

La lumière UV peut produire de l'ozone à partir de l'oxygène, à une longueur d'onde inférieure à 180 nm. Tous les détecteurs utilisent des verres de sécurité et sont conçus afin d'éviter la fuite de rayonnement UV et la formation d'ozone à l'intérieur du détecteur.

### Tension

L'accès au panneau arrière doit être libre car l'instrument doit pouvoir être déconnecté de sa source d'alimentation avant toute opération d'entretien, de réparation ou de remplacement de pièces.

Ne faites fonctionner l'appareil qu'en utilisant le bloc et le cordon d'alimentation fournis et uniquement à la tension indiquée sur l'étiquette située à l'arrière de l'instrument.

### Pièces détachées

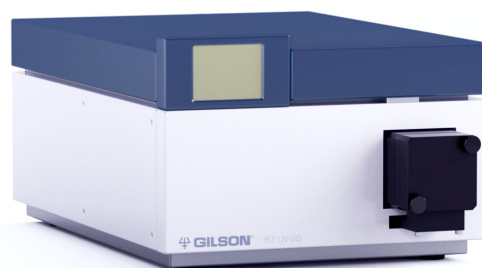
Assurez-vous de n'utiliser exclusivement que les pièces détachées mentionnées dans ce guide.

This chapter provides information on the following topics:

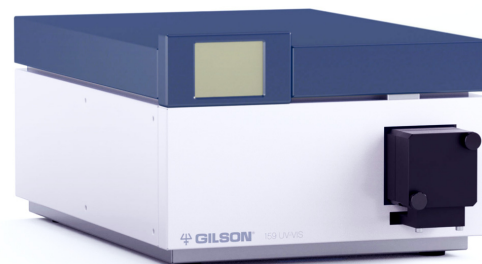
- [Unpacking](#)
- [Technical Specifications](#)
- [Customer Service](#)

The 157 UV-VIS Detector is a single, variable wavelength HPLC spectrophotometer detector for routine HPLC applications, including fast LC methods. This robust UV detector features a highly flexible and compact design. The detector offers a variable wavelength range of 190–750 nm and provides a competitive advantage for biological samples. A wide range of flow cells are available for practically any LC application, including PEEK flow cells for analytical and preparative HPLC and pilot scale flow cells for flow rates up to 1 L/min.

The 159 UV-VIS Detector is a multiple, variable wavelength detector that offers high sensitivity and baseline stability for HPLC applications, including fast LC methods. With its high speed scanning design, up to four different wavelengths can be monitored simultaneously while acquiring spectral data from 190–750 nm. With the ability to monitor four wavelengths simultaneously, researchers are more readily able to track impurities and see what they've previously been missing.



**Figure 1-1:** 157 UV-VIS Detector



**Figure 1-2:** 159 UV-VIS Detector

## 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.

To unpack the detector:

- 1 Open the box.
- 2 Remove the accessory box.
- 3 Remove the foam insert on the top of the detector.
- 4 Grip the detector and lift it out of the packaging.
- 5 Remove the protective film from the touchscreen. It prevents scratches during shipping.

## Standard Equipment

- 157 UV-VIS Detector or 159 UV-VIS Detector with test cell
- Power cord (110V)
- Ethernet cable
- Test Results
- Other items that will not be used

## Accessories

### Required

Some accessories are required, but are ordered separately:

- Standard Parts Package, which includes
  - Power cord (220V)
  - Installation Qualification (IQ) Procedure 157/159 UV-VIS Detectors
  - Declaration of Conformity
  - Gilson 157/159 UV-VIS Detectors Documentation CD, which includes
    - Gilson 157 UV-VIS Detector User's Guide
    - Gilson 159 UV-VIS Detector User's Guide
    - Installation Qualification (IQ) Procedure 157/159 UV-VIS Detectors
- Plumbing Package, which includes:
  - Flow cell inlet and outlet tubing
  - Fittings for connecting the column outlet to the detector inlet tubing
  - Fittings for connecting the outlet tubing to a back pressure regulator, fraction collector, or waste container
  - Couplers (optional)

### Optional

The following optional accessories are also available:

- Flow cells
- Shelf for stacking the detector with a Gilson pumping system

## Technical Specifications

Please be aware of the following before operating the detector.

**NOTICE**

Changes or modifications to this device not expressly approved by Gilson could void the warranty.

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

Shielded cables must be used with the detector to ensure compliance with the FCC Class A limits.

### 157/159 UV-VIS Detectors

Technical Specification	Definition						
Analog Output	1 × 0–5V scalable, 16 bit, offset adjustable (157 UV-VIS Detector) 2× 0–5V scalable, 20 bit, offset adjustable (159 UV-VIS Detector)						
Communication	Ethernet						
Contact Control	Inputs: Error (IN), Start (IN), Autozero Outputs: Events 1–3, + 5V, +24V Valve						
Data Acquisition	5, 8, 10, 20, 25, 40, or 50 points/sec with TRILUTION® LC Software						
Detection Channels	1 (157 UV-VIS Detector) 4 (159 UV-VIS Detector)						
Detector Type	Variable single wavelength UV-VIS detector (157 UV-VIS Detector) Variable multiple wavelength UV-VIS detector (159 UV-VIS Detector)						
Dimensions (W x H x D)	24.2 x 16.9 x 39.9 cm (9.5 x 6.7 x 15.7 in.)						
Drift	3.0 x 10 <sup>-4</sup> AU/h at 254 nm (157 UV-VIS Detector) 1.5 x 10 <sup>-4</sup> AU/h at 254 nm (159 UV-VIS Detector)						
	Refer to ASTM E1657-98.						
Environmental Conditions	Indoor use Altitude: up to 2000 m Temperature range: 4°–40°C Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C						
Expected Lamp Life	2000 hours						
Flow Cells	Part Number	Material	Pathlength	Volume	Pressure		
					psi	bar	MPa
	14100006	Stainless Steel	0.5 mm	3 µL	2900	200	20
	14100007	PEEK	0.5 mm	3 µL	1450	100	10
	14100008 (157 Detector) 14100012 (159 Detector)	Stainless Steel	10 mm	10 µL	4350	300	30
	14100009	PEEK	3 mm	2 µL	435	30	3
	14100010	Stainless Steel	0.5, 1.25, or 2 mm (adjustable)	25 µL	2900	200	20
14100013	PEEK	0.05 mm	0.16 µL	500	34	3	
Front Panel	Display and flow cell with holder						
Technical Specifications - 157/159 UV-VIS Detectors (Page 1 of 2)							

## 157/159 UV-VIS Detectors

Technical Specification	Definition
<b>Lamp Warm-Up Time</b>	15–30 minutes
<b>Light Source</b>	Deuterium (D2)
<b>Linearity</b>	>2.0 AU at 270 nm (157 UV-VIS Detector)
	>2.2 AU at 270 nm (159 UV-VIS Detector)
	Refer to ASTM E1657-98
<b>Maximum Data Rate</b>	50 Hz
<b>Noise</b>	$\pm 1.5 \times 10^{-5}$ AU at 254 nm (157 UV-VIS Detector)
	$\pm 0.75 \times 10^{-5}$ AU at 254 nm (159 UV-VIS Detector)
	Refer to ASTM E1657-98.
<b>Power Requirements</b>	Frequency: 50 to 60 Hz Voltage: 100–240V 75W
<b>Safety and Compliance</b>	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 found compliant.
<b>Software Control</b>	Computer control via Ethernet and TRILUTION® LC Software
<b>Spectral Bandwidth</b>	11 nm at H $\alpha$ line (FWHM) - 157 UV-VIS Detector
	6 nm at H $\alpha$ line (FWHM) - 159 UV-VIS Detector
<b>Time Constants</b>	0.1/ 0.2/ 0.5/ 1.0/ 2.0/ 5.0/ 10.0 s
<b>Wavelength Accuracy*</b> <small>*Verification with integrated holmium oxide filter</small>	$\pm 2.5$ nm (157 UV-VIS Detector)
	$\pm 2.0$ nm (159 UV-VIS Detector)
<b>Wavelength Precision</b>	0.3 nm (157 UV-VIS Detector)
	0.4 nm (159 UV-VIS Detector)
	Refer to ASTM E1657-98
<b>Wavelength Range</b>	190–750 nm
<b>Weight</b>	5.3 kg (11.7 lbs)
Technical Specifications - 157/159 UV-VIS Detectors (Page 2 of 2)	

## 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](http://www.gilson.com). To help us serve you quickly and efficiently, please refer to [Before Calling Us](#) on page 5-6.

This chapter takes you through the steps for setting up your detector, which includes:

- [Operating Environment](#)
- [Rear Panel Connections](#)
- [Plumbing Connections](#)
- [Flow Cell Installation](#)

## Operating Environment

You can use the detector in normal laboratory and cold room environments.

The following factors will influence the performance of your detector.

### Temperature

Changes in ambient temperature can produce noticeable output variations.

Avoid areas that are in direct sunlight for part of the day and those that are subject to draft; for example, do not place the detector near an open window or doorway.

### Contaminants

Vapors and acid fumes can cause baseline drift and noise and can cause damage to the detector.

### Ventilation

Allow a minimum of 15 cm (6 in.) space behind the detector for proper fan operation.

### Condensation

Before starting, the detector must have reached the temperature range specified (refer to [Environmental Conditions](#) on page 1-3 for more information). If the detector has been very cold, it should stand for at least 24 hours in its new environment in order to allow any condensation on the surfaces to evaporate.



## Rear Panel Connections

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

- 1 Serial number
- 2 Integrator outlet
- 3 LAN (Ethernet) connection
- 4 RS-232 port (for service use only)
- 5 Events and remote control terminal strip
- 6 Power switch
- 7 Mains power connection

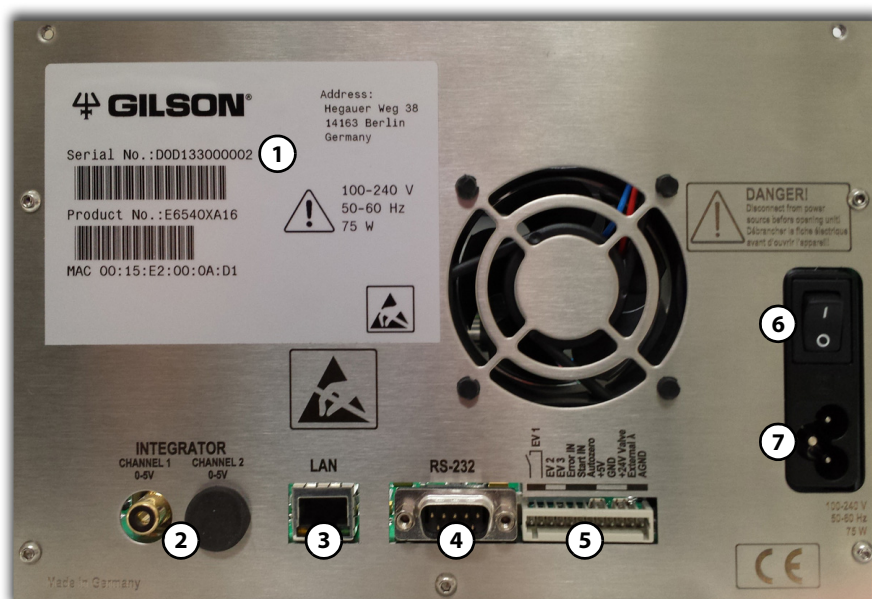


Figure 2-1: Rear Panel

## Ethernet

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

**Note:** The router is not available from Gilson, Inc.

### 1 Connect power to the router

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

### 2 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.

### 3 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.

## Events and Remote Control Terminal Strip

### Pin Header Assignments

Connection	Function
 EV 1	<b>Relay contact</b> Contact open 0 Contact closed 1 Pulse: (contact end 1000 ms) Permissible contact load 1A/30 V.
EV 2	<b>TTL output</b> Low (<0.4 V) High (>2.4 V) Pulse (high for 1000 ms) The load resistance should be >10 kΩ.
EV 3	Same as EV 2.
Error IN	TTL input With a high level, running programs are terminated and the message <b>Error input activated appears.</b>
Start IN	TTL input With a high level, a program is started in hold mode or a link with the corresponding wait parameter is started.
Autozero	Carry out zero balance.
GND	Reference point for the TTL level.
+5 V	Provides a voltage of 5 V with respect to GND. This makes it possible to supply a consumer switched with event EV 1 (relay). The output is secured at 62 mA.
+24 V Valve	Event-controlled switching of 24 V against GND. The output is secured at 250 mA. This output can be used to operate a fraction valve.
External λ	Allows external analog control over the detector. The control voltage must be applied against AGND.
AGND	Reference point of the voltage at the input external λ.

### Connecting the Connector Strip with the Cable

To control one device through another, you use the pin header. The single ports are used to exchange control signals.

To use remote control, you have to connect cables to the pin header. First connect the cables to the spring strip and then push the spring contacts of the spring strip onto the pins of the pin header.

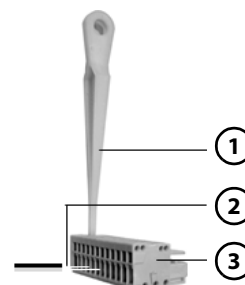
<b>NOTICE</b>	Electrostatic discharge hazard, damages to system, device, or components can occur. Wear an electrostatic discharge (ESD) grounding strap.
<b>CAUTION</b>	Short-circuit hazard. Turn off the detector and disconnect the power cord before connecting it to the pin header.

### Tools

Depressor tool

**Procedure**

- 1 Place the spring strip (3) on a suitable surface.
- 2 Push the depressor tool (1) into the opening on the spring strip.
- 3 Continue pushing the depressor tool down and lead the cable (2) into the front end of the spring strip.
- 4 Remove the depressor tool.
- 5 Check whether the cables are tightly attached.
- 6 Plug the spring strip onto the pin header.

**Figure 2-2:** Spring strip**Next steps**

Finish the installation and perform the initial startup.

Using the analog port, you can control the wavelength by changing the applied voltage. A Control Unit is required in order to select the option ANALOG in the SETUP menu.

**Example**

To use the analog port for controlling the detector, you have to set a zero point and enter a scaling value.

- Zero point at 0V = 000 nm
  - Scaling: 100 nm per Volt
- If 5V voltage is applied, the wavelength is 500 nm.

**Integrator Connector**

The integrator connector sends measuring signals from the detector.

- non-bipolar
- 1 channel
- 0 to 5V
- DAC 20 bit
- scalable
- adjustable to offset

**Power Cord Connection**

Locate the appropriate power cord for the voltage.

Use the power cord to connect the detector to a power source.

## Plumbing Connections

This section describes how to make inlet and outlet tubing connections and uses tubing and fittings supplied in the plumbing package (part number 14007001) and fittings supplied with the flow cell.

### Inlet/Outlet Tubing Preparation

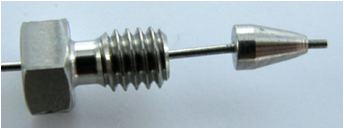

- 1 From the plumbing package, select the 0.010" or 0.030" PEEK tubing, depending on your application.
- 2 Cut the tubing into two pieces. One is used for the column outlet to detector inlet and the other is used for the detector outlet.

### Flow Cell Fittings

One of three types of fittings are supplied with the flow cell.

#### Standard Fittings

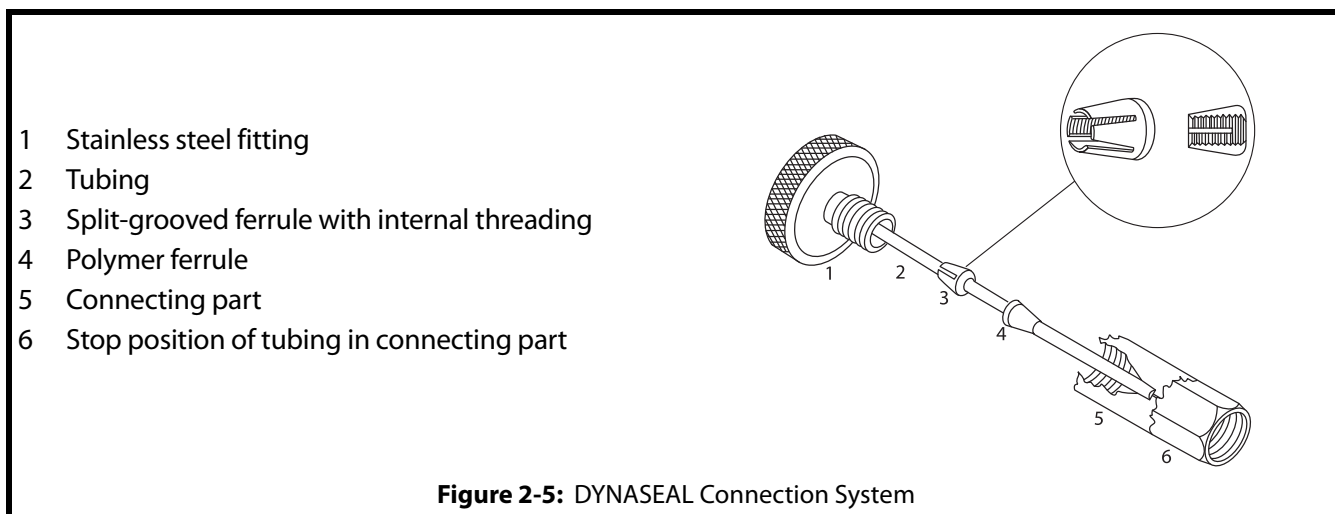
Standard fittings, similar to those shown, are supplied with the following flow cells:

Flow Cell Part Number	Material	Pathlength	Volume	Pressure			
				psi	bar	MPa	
14100008 (157 Detector) 14100012 (159 Detector)	Stainless Steel	10 mm	10 µL	4350	300	30	 <p><b>Figure 2-3:</b> Standard Flow Cell Fittings (Stainless Steel)</p>
14100010*	Stainless Steel	0.5, 1.25, or 2 mm (adjustable)	25 µL	2900	200	20	
14100013	PEEK	0.05 mm	0.16 µL	500	34	3	 <p><b>Figure 2-4:</b> Standard Flow Cell Fittings (PEEK)</p>
*Requires the Flow Cell Adapter Kit (part number 14100011) for connecting to 1/16" tubing							

## DYNASEAL Connection System

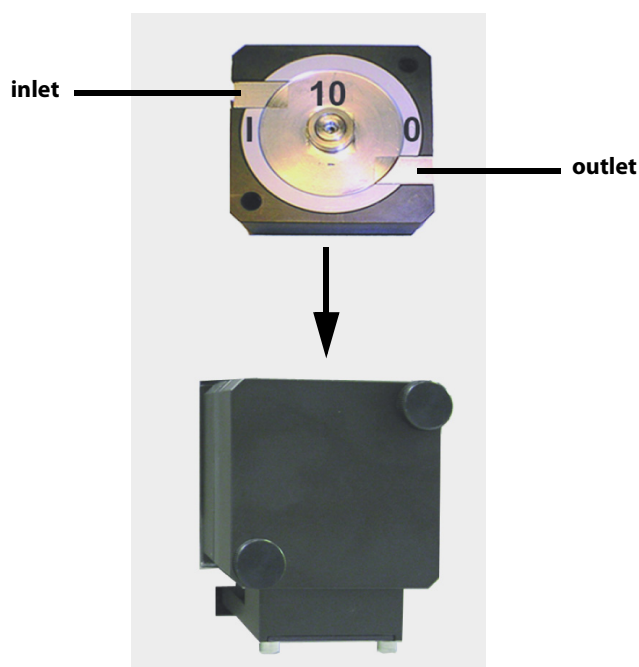
A double ferrule connection system (DYNASEAL) is supplied with the following flow cells:

Flow Cell Part Number	Material	Pathlength	Volume	Pressure		
				psi	bar	MPa
14100006	Stainless Steel	0.5 mm	3 $\mu$ L	2900	200	20
14100009	PEEK	3 mm	2 $\mu$ L	435	30	3



## Inlet Tubing Connection

- Connect one end of one piece of the cut tubing to the inlet of the flow cell using the fittings supplied with the flow cell.
  - Insert the fittings (either standard fittings or DYNASEAL connection system fittings) onto the tubing.
  - Screw the fittings into the inlet of the flow cell. Use a wrench to tighten standard fittings. Do not overtighten.
- Connect the other end of the tubing to the column outlet using the F-100N Fingertight fitting. This fitting accommodates most existing female column outlets.
  - Insert the fitting onto the tubing.
  - Screw the fitting into the column outlet and then finger tighten.



**Figure 2-6: Inlet and Outlet Tubing Connection**

## Outlet Tubing Connection

- 1 Connect one end of the other piece of cut tubing to the outlet of the flow cell using the fittings supplied with the flow cell.
  - a) Insert the fittings (either standard fittings or DYNASEAL connection system fittings) onto the tubing.
  - b) Screw the fittings into the outlet of the flow cell. Use a wrench to tighten standard fittings. Do not overtighten.
- 2 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 the appropriate coupler to make the connection. Universal couplers and fittings are included in the plumbing package.
  - a waste container if the column effluent does not need to be saved.

## Flow Cell Installation

The detector is shipped from the factory with a test cell (dummy cell) installed, which does not have connections for solvent. It is used, for example, to check the lamp intensity, as a dirty flow cell could distort this value. Before using the detector with solvents, the test cell must be removed and a flow cell must be installed.

Follow these instructions to change the pathlength of the flow cell (optional) and install the flow cell in the flow cell holder on the front of the detector.

**NOTICE**

Be extremely careful when working with the flow cell and its fittings. Flow cells are considered expendable and are not covered by warranty if damaged or broken during installation.

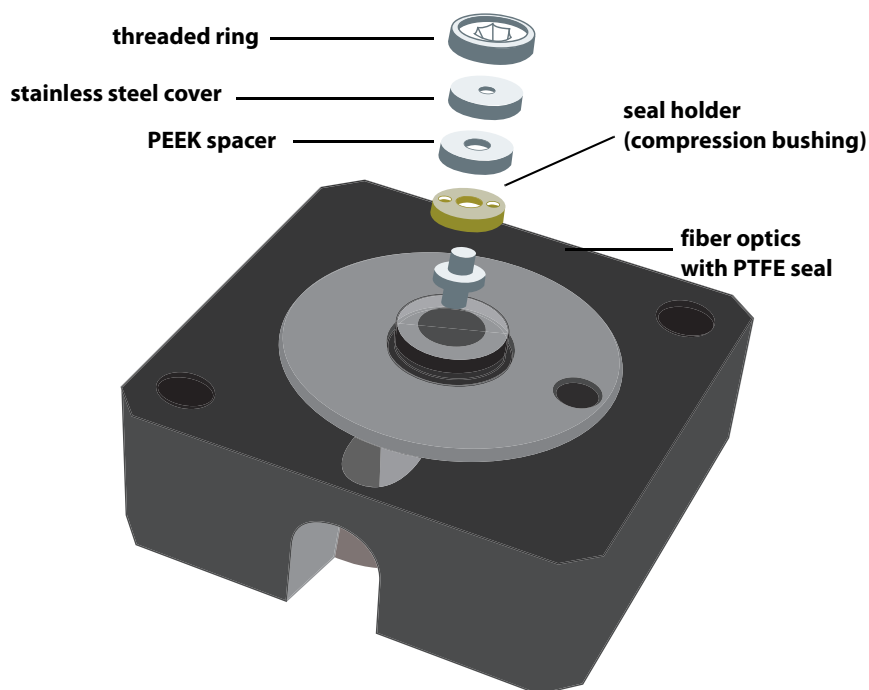
### Change the Pathlength of the Flow Cell (Optional)

Flow cell (part number 14100010) is an adjustable pathlength flow cell. At the factory, it was set to 2 mm, but it can be set to 2 mm, 1.25 mm, or 0.5 mm.

#### Shorten the Optical Pathlength

- 1 Loosen the threaded ring using the Allen wrench included with the flow cell.
- 2 Remove the stainless steel cover and the PEEK spacer.
- 3 Insert the stainless steel cover again and then use the Allen wrench to carefully tighten the threaded ring.

The missing spacer causes the fiber optics to be pushed deeper into the flow cell (0.75 mm), resulting in a shortened optical pathlength of 1.25 mm. To shorten to 0.5 mm, the PEEK spacer on the other side of the flow cell must also be removed.



**Figure 2-7:** Adjustable Pathlength Flow Cell (part number 14100010)

## Extend the Optical Pathlength

**NOTICE**

Be careful when working with the fiber optics and avoid touching them with your fingers.

To extend the optical pathlength in steps of 0.75 mm, reinstall the spacers.

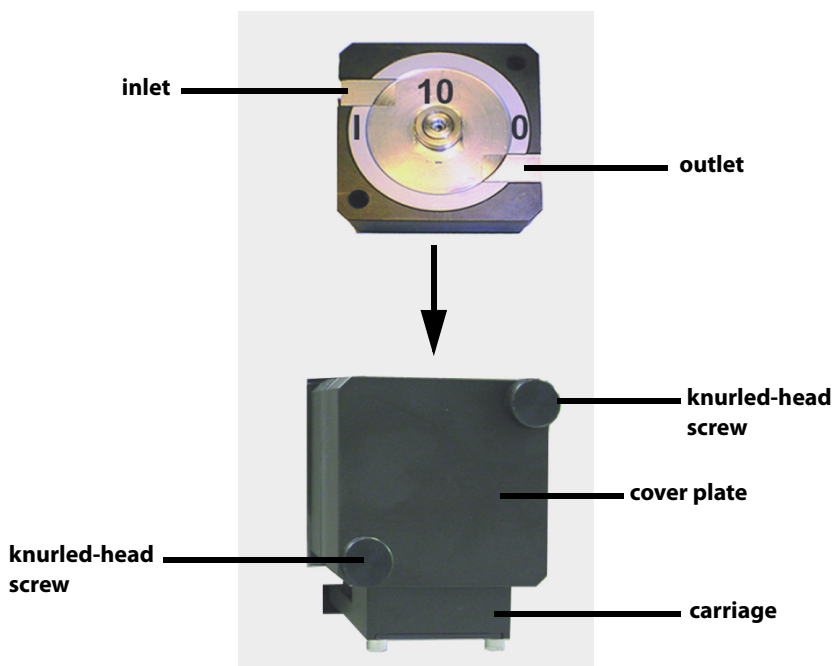
- 1 Loosen the threaded ring using the Allen wrench included with the flow cell.
- 2 Remove the stainless steel cover.
- 3 Use a tweezers to remove the fiber optics and PTFE seal together.
- 4 Use a clean cloth to grip the fiber optics and push the fiber optics out about 1 mm. Avoid touching the fiber optics with your fingers.
- 5 Push the fiber optics and PTFE seal back into the cell.
- 6 Insert the PEEK spacer.
- 7 Insert the stainless steel cover.
- 8 Use the Allen wrench to carefully tighten the threaded ring. When tightening the threaded ring, the rod-shaped fiber optics is pushed into the correct position in the cell.

Inserting a spacer extends the optical pathlength by 0.75 mm.

The PTFE seal does not need to be replaced when the pathlength is changed.

## Flow Cell Installation

- 1 Switch the detector off and disconnect it from the power source.
- 2 Hold the installed flow cell or test cell securely with your hand, and then unscrew the knurled-head screws of the cover plate.
- 3 Slide the carriage of the flow cell holder away from the detector.
- 4 Pull the flow cell toward the front, and then lift the flow cell up and out.
- 5 Insert the new flow cell into the flow cell carriage. Continue to hold the flow cell securely.
- 6 Slide the carriage back to the detector.
- 7 Screw the knurled-head screws back into the cover plate and then tighten.



**Figure 2-8:** Flow Cell Installation

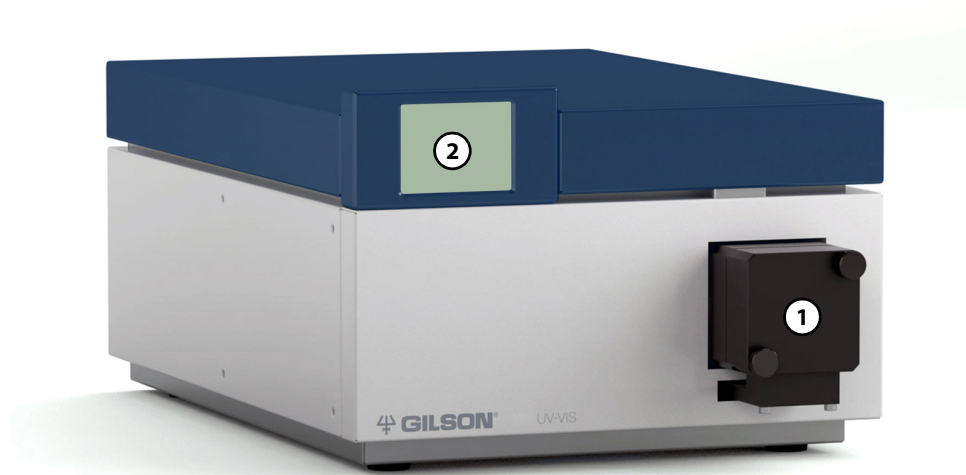


TRILUTION® LC Software provides software control of the 157 Detector or 159 Detector for setup and operation of the detectors in a chromatographic run. For more information about TRILUTION® LC Software, refer to its user's guide and on-line help.

This chapter provides the following information:

- A description of the [Front Panel](#) of the detector
- How to [Start Up](#) the detector
- Instructions for using TRILUTION LC to [Turn Lamp On](#)
- Instructions for [Detector Control from TRILUTION LC](#)
- Instructions for viewing [Results](#)

## Front Panel



**Figure 3-1:** Front Panel

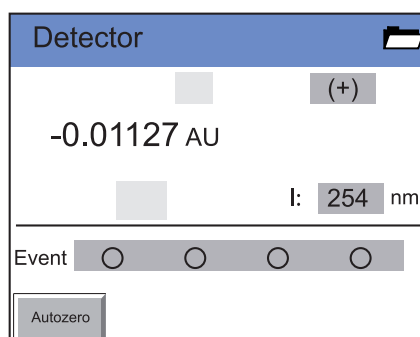
The front panel of the detector contains a:

- ① flow cell holder
- ② display

## Start Up

Follow the instructions in [Chapter 2, Installation](#), to make all rear panel and plumbing connections.

Ensure that the detector and the router are connected to a power source.

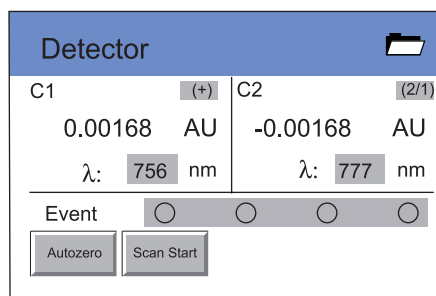


**Figure 3-2:** Start Up Display Example (157 UV-VIS Detector)

Switch the detector ON using the switch on the rear panel.

- The lamps initialize.
- A self-test and calibration runs.
- The display illuminates.

The detector is now ready to operate.



**Figure 3-3:** Start Up Display Example (159 UV-VIS Detector)

## Turn Lamp On

The detector lamp is automatically on when the detector is powered on, provided that it was on when the detector was powered off.

To use TRILUTION LC to turn the lamp on:


- 1 Create a TRILUTION LC method with the detector in the configuration.
  - a) Click **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 click **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 click .



Figure 3-4: Application Run Window

- 5 Click 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. Click **OK**.

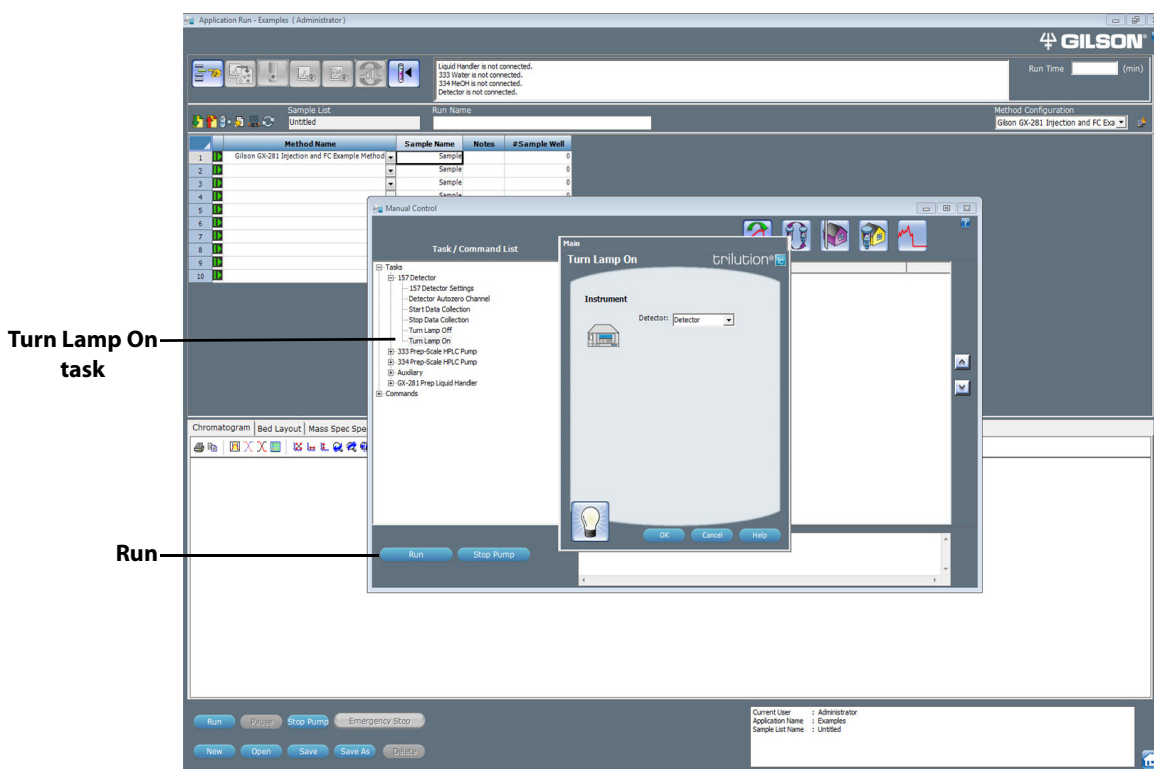


Figure 3-5: Turn Lamp On Task

- 7 Click **Run** on the Manual Control window.
- Note:** The detector requires a 15–30 minute warm-up period to achieve a stable baseline.

## Detector Control from TRILUTION LC

The following pages describe how to set conditions for detector control via TRILUTION LC. For additional information about method setup and the chromatography run in TRILUTION LC, refer to its on-line help or user's guide.


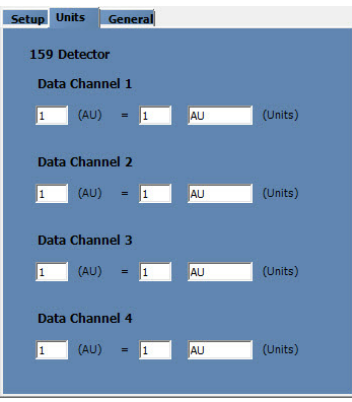
### Configuration

On the Configuration tab in the Method Builder, tell the software that a 157 Detector or 159 Detector will be used and how many data channels on the detector will be used.

- 1 In the Method Builder, select the Configuration tab.
- 2 Click **Scan**. The software searches for connected instruments.
- 3 From the Available Instruments window, drag and then drop the 157 Detector or 159 Detector in the workspace.
- 4 For the Detector, right-click on a data channel marked for use and then select **Primary Channel**. One channel per configuration must be specified as the primary channel. Fraction collection and sample re-injection are based on the primary channel.

### Configuration Properties

The configuration property pages are shown below. Descriptions of the properties are on the next page.

 <p>157 Detector</p>	 <p>Setup Units General</p> <p><b>157 Detector</b></p> <p><b>Data Channels</b></p> <p>Data Channel 1 157 Channel 1 Use <input checked="" type="checkbox"/></p> <p><b>Data Rate (points/sec)</b></p> <p>Data Channel 1 20</p>	 <p>Setup Units General</p> <p><b>157 Detector</b></p> <p><b>Data Channel 1</b></p> <p>1 (AU) = 1 AU (Units)</p>	 <p>Setup Units General</p> <p><b>157 Detector</b></p> <p>Instrument Name: Detector</p> <p><b>Communication</b></p> <p>Ethernet</p> <p>Instrument Serial Number: Example 1</p>
 <p>159 Detector</p>	 <p>Setup Units General</p> <p><b>159 Detector</b></p> <p><b>Data Channels</b></p> <p>Data Channel 1 159 Channel 1 Use <input checked="" type="checkbox"/></p> <p>Data Channel 2 159 Channel 2 Use <input type="checkbox"/></p> <p>Data Channel 3 159 Channel 3 Use <input type="checkbox"/></p> <p>Data Channel 4 159 Channel 4 Use <input type="checkbox"/></p> <p><b>Data Rate (points/sec)</b></p> <p>All Data Channels: 20</p>	 <p>Setup Units General</p> <p><b>159 Detector</b></p> <p><b>Data Channel 1</b></p> <p>1 (AU) = 1 AU (Units)</p> <p><b>Data Channel 2</b></p> <p>1 (AU) = 1 AU (Units)</p> <p><b>Data Channel 3</b></p> <p>1 (AU) = 1 AU (Units)</p> <p><b>Data Channel 4</b></p> <p>1 (AU) = 1 AU (Units)</p>	 <p>Setup Units General</p> <p><b>159 Detector</b></p> <p>Instrument Name: Detector</p> <p><b>Communication</b></p> <p>Ethernet</p> <p>Instrument Serial Number: Example 2</p>

**157 Detector and 159 Detector Properties**

Name	Brief Description	Default Value	Range
Data Channels	Optionally, type a unique description for each data channel. This description and the data channel's signal will be displayed in the status box while data is being collected during an Application Run if the Use check box is selected for that data channel. The Use check box for Data Channel 1 defaults selected. There is one data channel available for the 157 Detector (labeled 157 Channel 1), and there are four data channels available for the 159 Detector (labeled 159 Channel 1 through 159 Channel 4).	157 Channel 1 159 Channel 1	N/A
Data Rate (points/sec)	The number of data points collected per second for all channels. One rate is set for all channels.	20	5, 8, 10, 20, 25, 40, 50
Units	The user unit that corresponds to the AU value indicated and the label for those units.  Data scaled, plotted, and analyzed according to selected these units. All calculations (i.e., heights and areas) are reported according to these units. Units are shown on the graph axis (while running and in reports). Multiple graph axes are displayed if different user units are set for different data channels. A symbol is displayed on the graph axis to indicate which data channel is using that axis.	1 AU = 1 AU	N/A
Instrument Name	The name that will be used to identify this instrument in a task.	Detector	N/A
Instrument Serial Number	The serial number of the detector.	N/A	N/A
<b>157 Detector and 159 Detector Properties</b>			







**Control**

The Control tab window in the Method Builder is a graphical interface used to organize the tasks used in a method.

**157 Detector Tasks**

The table below lists the tasks for the 157 Detector.

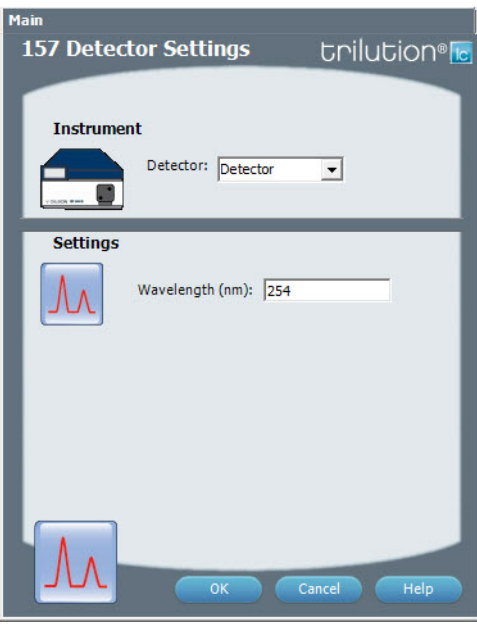
**157 Detector Tasks**

<i>Gilson Task Name and Description</i>	
	<b>157 Detector Settings</b> This task sets the wavelength for the 157 Detector.
	<b>Detector Autozero Channel</b> This task sets the signal of each channel on the selected Detector to zero.
	<b>Start Data Collection</b> This task tells TRILUTION LC to begin collecting data. This task has no properties to set.
	<b>Stop Data Collection</b> This task tells TRILUTION LC to stop collecting data. This task has no properties to set.
	<b>Turn Lamp Off</b> This task turns off power to the lamp(s) while maintaining power to the Detector.
	<b>Turn Lamp On</b> This task turns on the UV and visible lamp(s) for the specified Detector.
<b>157 Detector Tasks</b>	

## 157 Detector Settings

This task sets the wavelength for the 157 Detector.

**157 Detector Settings**







Property Name	Description	Default Value	Task Property Page
Detector	The detector that the task will affect.	Detector	
Wavelength	The monitor wavelength. Valid range is 190–750 nm.	254 nm	

**157 Detector Settings**

## 159 Detector Tasks

The table below lists the tasks for the 159 Detector.

**159 Detector Tasks**

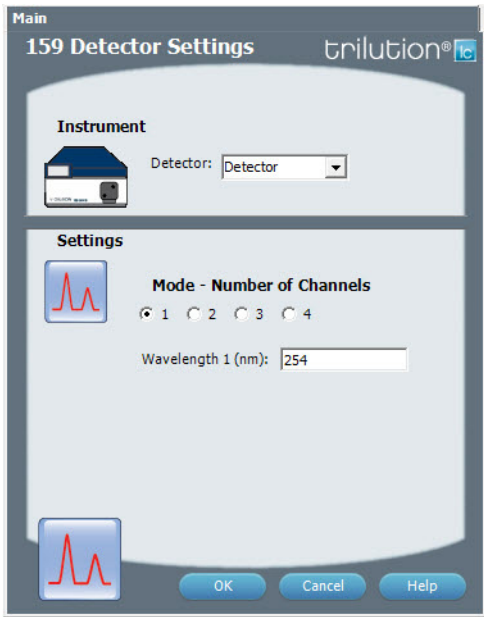
Gilson Task Name and Description	
	<b>159 Detector Settings</b> This task sets the wavelengths for the 159 Detector.
	<b>Detector Autozero Channel</b> This task sets the signal of each channel on the selected Detector to zero.
	<b>Start Data Collection</b> This task tells TRILUTION LC to begin collecting data. This task has no properties to set.
	<b>Stop Data Collection</b> This task tells TRILUTION LC to stop collecting data. This task has no properties to set.
	<b>Turn Lamp Off</b> This task turns off power to the lamp(s) while maintaining power to the Detector.
	<b>Turn Lamp On</b> This task turns on the UV and visible lamp(s) for the specified Detector.

**159 Detector Tasks**

## 159 Detector Settings

This task sets the wavelengths for the 159 Detector.

**159 Detector Settings**

Property Name	Description	Default Value	Task Property Page
Detector	The detector that the task will affect.	Detector	
Mode	Select the number of channels that will be used to collect data. The number of channels must match the number of 159 Detector channels set to 'Use' in the configuration.	1	
<b>Mode – Number of Channels = 1</b> Wavelength 1	The monitor wavelength. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 2</b> Wavelength 1	The monitor wavelength for channel 1. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 2</b> Wavelength 2	The monitor wavelength for channel 2. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 3</b> Wavelength 1	The monitor wavelength for channel 1. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 3</b> Wavelength 2	The monitor wavelength for channel 2. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 3</b> Wavelength 3	The monitor wavelength for channel 3. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 4</b> Wavelength 1	The monitor wavelength for channel 1. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 4</b> Wavelength 2	The monitor wavelength for channel 2. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 4</b> Wavelength 3	The monitor wavelength for channel 3. Valid range is 190 – 750 nm.	254 nm	
<b>Mode – Number of Channels = 4</b> Wavelength 4	The monitor wavelength for channel 4. Valid range is 190 – 750 nm.	254 nm	
			<b>159 Detector Settings</b>

## Control - Error Handling

Optionally, use error handling to check the status of the instrument. Run a stop method to shut down the system if an error is encountered.

Error	Description
Instrument Error	This error results when any scheduled command fails to execute or if the software loses communication with an instrument.

## Analysis

Using the options in the Method Builder - Analysis window, you indicate how collected data is analyzed and reported. TRILUTION LC uses the information in the analysis to report on peaks detected in samples.

To create an analysis, right-click on a data channel in the Configured Instruments Panel and then select **New Analysis**.

## Application Run

In the Application Run window, specify the list of steps, called a sample list, to execute during a run. A step in the sample list identifies the method to run. Access the Application Run window by:

- right-clicking an application in the Project Library and then selecting **Run** or
- selecting an application in the Project Library and then clicking **Run** or
- opening a saved method in the Method Builder and then clicking **Run**.


Ensure that the lamp is on before collecting any data, either during your run or while monitoring the baseline in Manual Control.

After setting up the sample list, click **Run** in the Application Run window to begin executing the steps in the run.



# Results

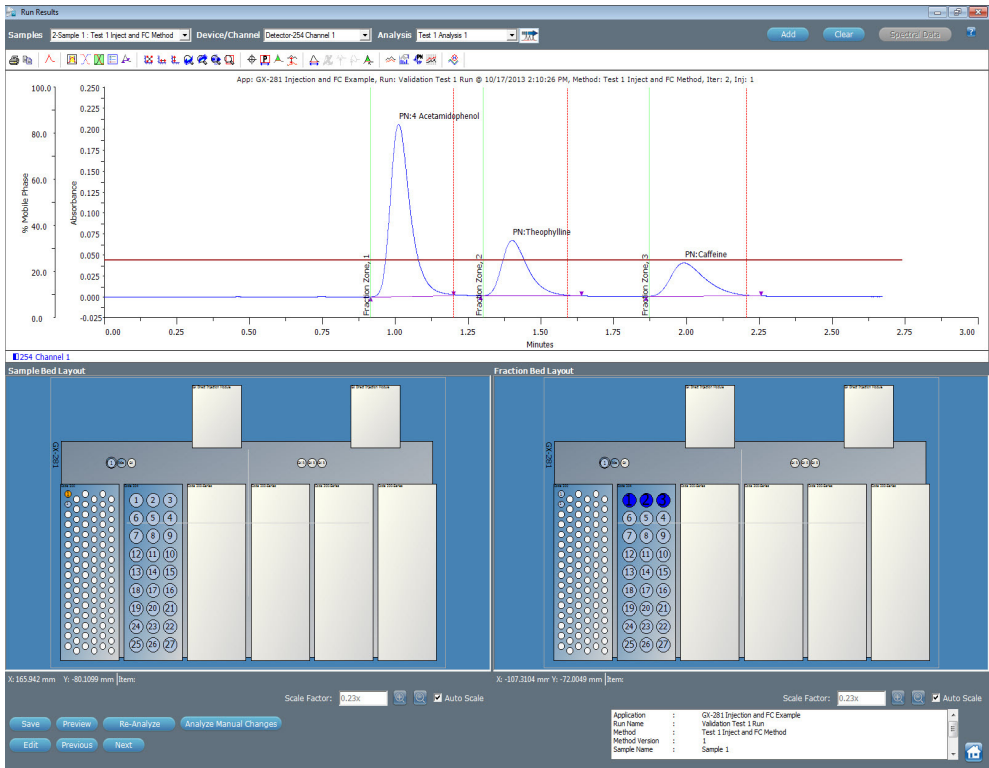
From a run, the software produces Results containing the channel data collected and stored for all injected samples. Results contain time and signal information for each sample.

Results are accessed in the Project Library. Click on an application and double-click the Results icon (  ). The Results window is displayed, listing all runs for the selected application.

Double-click on a Run Name to display the Run Results window.

## Run Results Window

The Run Results window enables viewing chromatogram plots and analysis information for collected data. To view chromatogram results, preview the report.



**Figure 3-6:** Run Results Window

This chapter contains the following information to help you maintain your detector:

- [Flow Cell Maintenance](#)
- [Lamp Replacement](#)

You are only permitted to perform the maintenance tasks described in this user's guide. If additional maintenance is required, contact your local Gilson representative.

All smooth surfaces of the device can be cleaned with a mild, commercially available cleaning solution, or with isopropanol.

**NOTICE**

Liquids can cause damage to the detector.

Place solvent bottles next to the device or in a solvent tray.

Moisten the cleaning cloth only slightly.

## Flow Cell Maintenance

Follow these instructions if you need to clean the flow cell, unclog the flow cell, replace the inlet or outlet tubing, or replace the flow cell.

**NOTICE**

Be extremely careful when working with the flow cell and its fittings. Flow cells are considered expendable and are not covered by warranty if damaged or broken during any maintenance procedure.

### Clean the Inside of the Flow Cell

Increased noise of the baseline and reduced sensitivity can be a result of a dirty flow cell.

Often it is sufficient to clean the flow cell to restore optimal sensitivity.

**CAUTION**

To prevent injury, observe good laboratory practices when handling solvents. Know the physical and chemical properties. Refer to the Material Safety Data Sheets for the solvents used.

The following solvents are recommended for cleaning:

- 1.0M HCl
- 1.0M NaOH
- Ethanol
- Acetone

To clean the inside of the flow cell:

- 1 Disconnect the inlet and outlet tubing from your system.
- 2 Fill a syringe with one of the recommended solvents.
- 3 Inject it into the inlet of the flow cell and allow it to act for 5 minutes.
- 4 Flush with water.
- 5 Dry the cell in a nitrogen stream.
- 6 Reconnect the inlet and outlet tubing to the system.
- 7 Check detector performance by running a sample through the system.

If the cleaning does not have the desired effect, clean the lens (refer to [Clean the Lens in the Flow Cell](#) on page 4-3) or fiber optics (refer to [Clean the Fiber Optics in the Flow Cell \(Adjustable Pathlength Flow Cell Only\)](#) on page 4-4).

## Clean the Lens in the Flow Cell

All available flow cells, except the adjustable pathlength flow cell, use a lens that may need to be cleaned.

The adjustable pathlength flow cell uses fiber optics that may need to be cleaned. For more information, refer to [Clean the Fiber Optics in the Flow Cell \(Adjustable Pathlength Flow Cell Only\)](#) on page 4-4.

To clean the lens in the flow cell:

- 1 Turn detector off and disconnect power cord.
- 2 Remove the flow cell:
  - a) Hold the flow cell securely with your hand, and then unscrew the knurled-head screws of the cover plate.
  - b) Slide the carriage of the flow cell holder away from the detector.
  - c) Pull the flow cell toward the front, and then lift the flow cell up and out.
- 3 Loosen the threaded ring with the 3 mm hexagonal spanner included with the flow cell.
- 4 Remove the lens holder with tweezers or by gently tapping on a clean surface.
- 5 The lens is protected by a PTFE seal. This must be renewed every time the lens is disassembled.
- 6 Remove the lens and clean with a clean, soft cloth, or with an appropriate solvent in an ultrasonic bath for a minimum of 10 minutes. Make sure that the clean lens is not touched by fingers.
- 7 Assemble the flow cell and make sure that the new PTFE seal does not interrupt the light path.
- 8 Tighten the threaded ring with the hexagonal spanner to avoid damage to the lens.

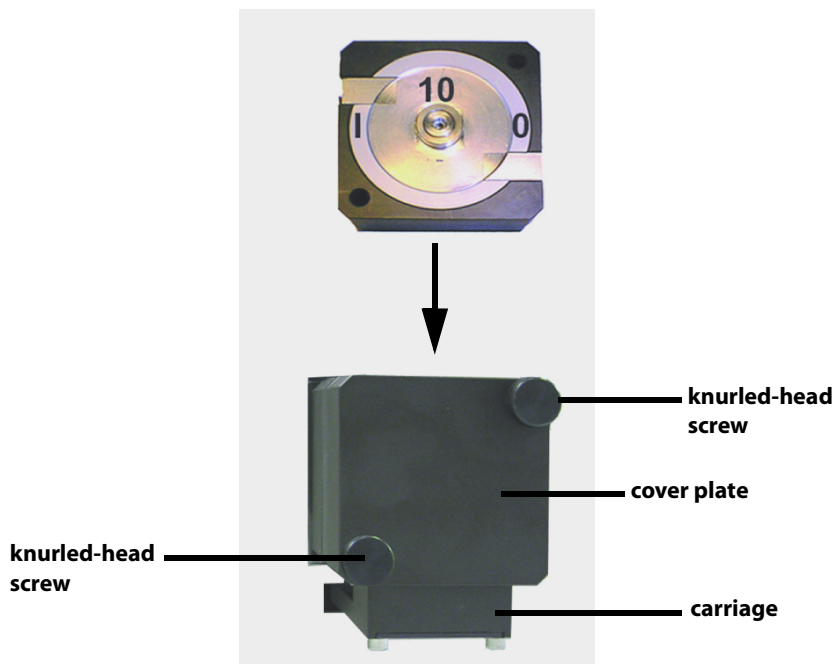


Figure 4-1: Flow Cell Removal

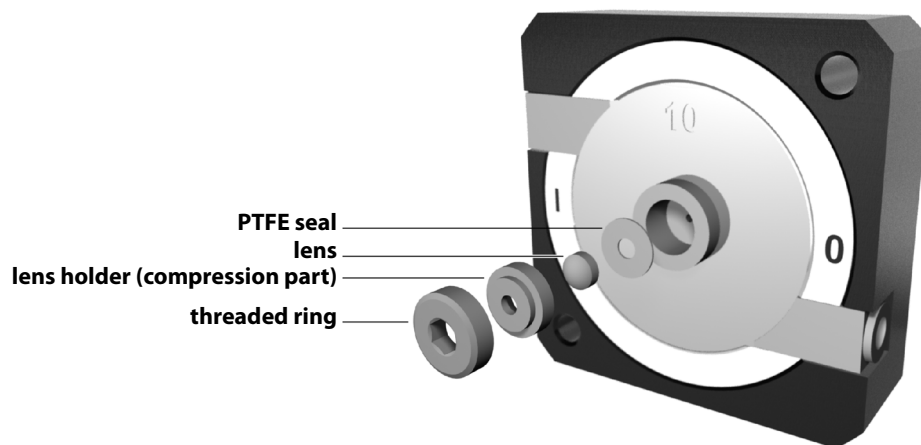


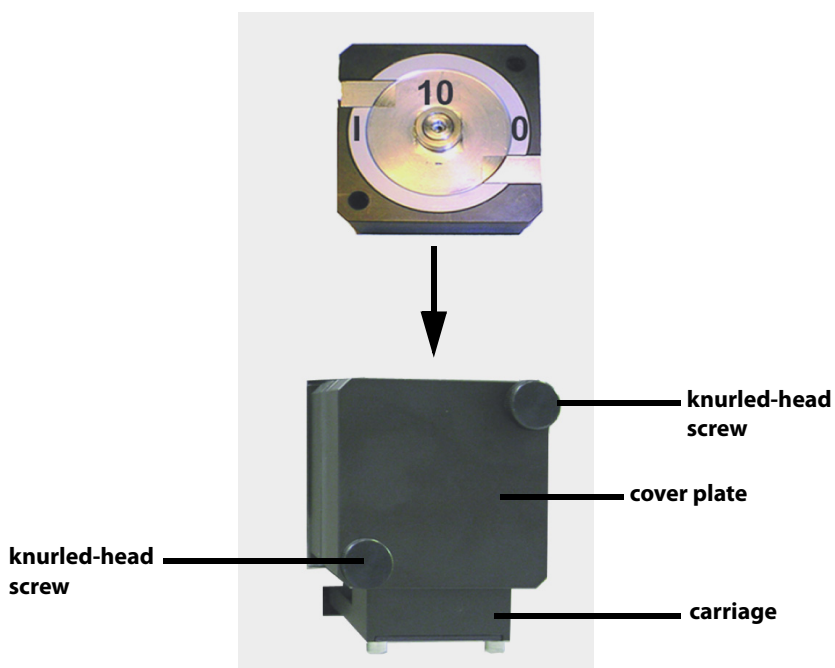
Figure 4-2: Flow Cell Lens Cleaning

## Clean the Fiber Optics in the Flow Cell (Adjustable Pathlength Flow Cell Only)

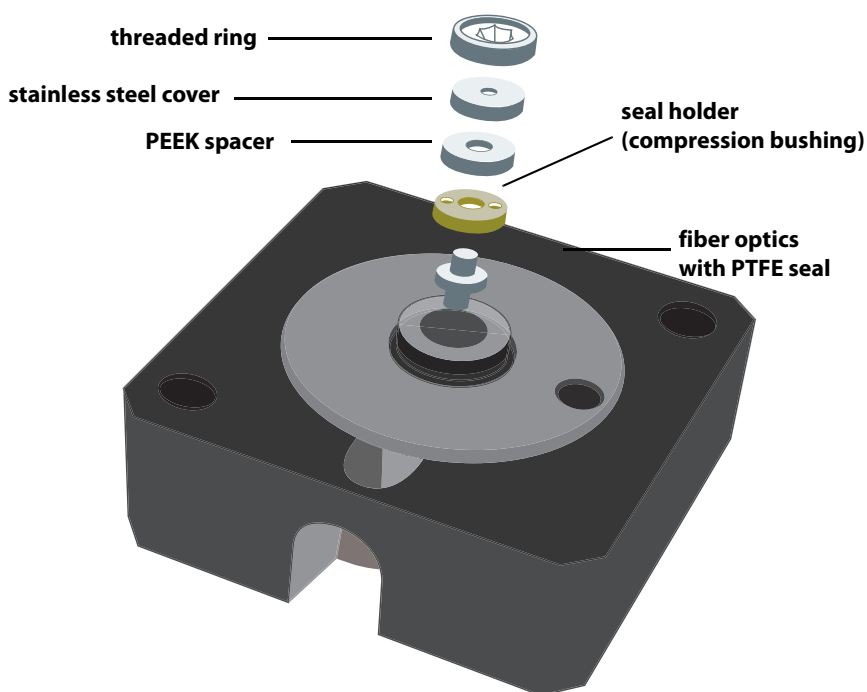
The adjustable pathlength flow cell (part number 14100010) has a rod-shaped fiber optic instead of a concave lens.

To clean the fiber optics in the flow cell:

- 1 Turn detector off and disconnect power cord.
- 2 Remove the flow cell:
  - a) Hold the flow cell securely with your hand, and then unscrew the knurled-head screws of the cover plate.
  - b) Slide the carriage of the flow cell holder away from the detector.
- 3 Pull the flow cell toward the front, and then lift the flow cell up and out.
- 4 Loosen the threaded ring using the Allen wrench included with the flow cell.
- 5 Remove the stainless steel cover.
- 6 Use a tweezers to remove the fiber optics and PTFE seal together.
- 7 Grip the fiber optics and push them out.
- 8 Separate the PTFE seal from the fiber optics as it should be replaced when cleaning the fiber optics.
- 9 Clean the fiber optics with a clean, soft cloth, or with an appropriate solvent in an ultrasonic bath for a minimum of 10 minutes. Make sure that the clean fiber optics are not touched by fingers.
- 10 Assemble the new PTFE seal and fiber optics and then push them back into the cell. Make sure that the new PTFE seal does not interrupt the light path.
- 11 Insert the PEEK spacer.
- 12 Insert the stainless steel cover.
- 13 Use the Allen wrench to carefully tighten the threaded ring. When tightening the threaded ring, the rod-shaped fiber optics is pushed into the correct position in the cell



**Figure 4-3:** Flow Cell Removal



**Figure 4-4:** Adjustable Pathlength Flow Cell (part number 14100010)

## Replace the Flow Cell

Refer to the instructions in this section when replacing the flow cell.

Refer to the table below for flow cell part numbers. Each flow cell includes standard flow cell fittings or the DYNASEAL connection system and an Allen wrench.

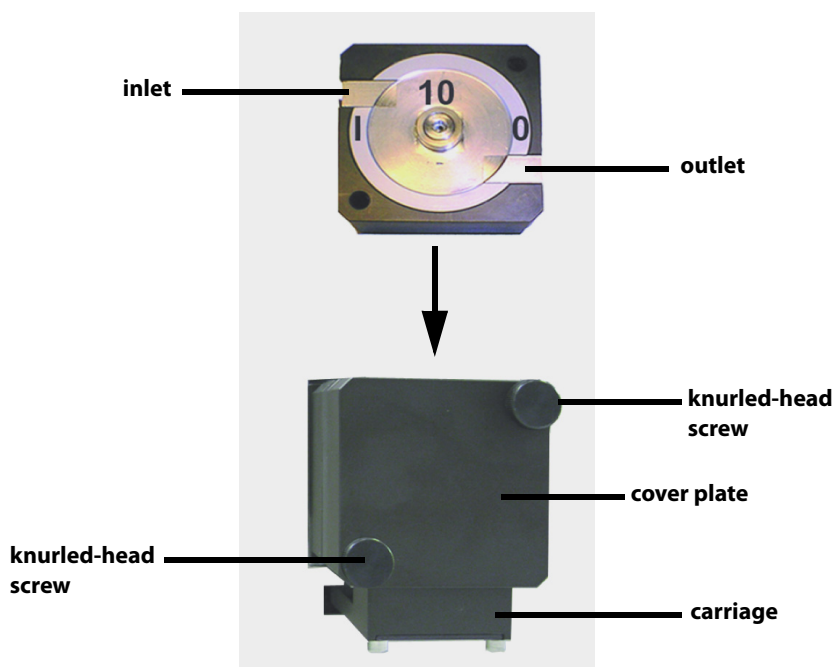
Flow Cells	Part Number	Material	Pathlength	Volume	Pressure		
					psi	bar	MPa
	14100006	Stainless Steel	0.5 mm	3 $\mu$ L	2900	200	20
	14100007	PEEK	0.5 mm	3 $\mu$ L	1450	100	10
	14100008 (157 Detector) 14100012 (159 Detector)	Stainless Steel	10 mm	10 $\mu$ L	4350	300	30
	14100009	PEEK	3 mm	2 $\mu$ L	435	30	3
	14100010	Stainless Steel	0.5, 1.25, or 2 mm (adjustable)	25 $\mu$ L	2900	200	20
	14100013	PEEK	0.05 mm	0.16 $\mu$ L	500	34	3

### Remove Installed Flow Cell

- 1 Turn detector off and disconnect power cord.
- 2 Hold the installed flow cell securely with your hand, and then unscrew the knurled-head screws of the cover plate.
- 3 Slide the carriage of the flow cell holder away from the detector.
- 4 Pull the flow cell toward the front, and then lift the flow cell up and out.
- 5 Disconnect the inlet and outlet tubing from the flow cell.

### Install New Flow Cell

- 1 Connect the inlet and outlet tubing to the new flow cell.
- 2 Insert the new flow cell into the flow cell carriage. Continue to hold the flow cell securely.
- 3 Slide the carriage back to the detector.
- 4 Screw the knurled-head screws back into the cover plate and then tighten.

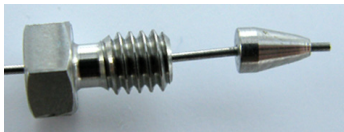
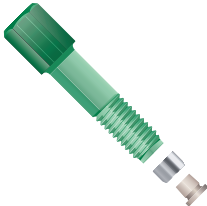


**Figure 4-5:** Flow Cell Installation

## Replace the Flow Cell Fittings

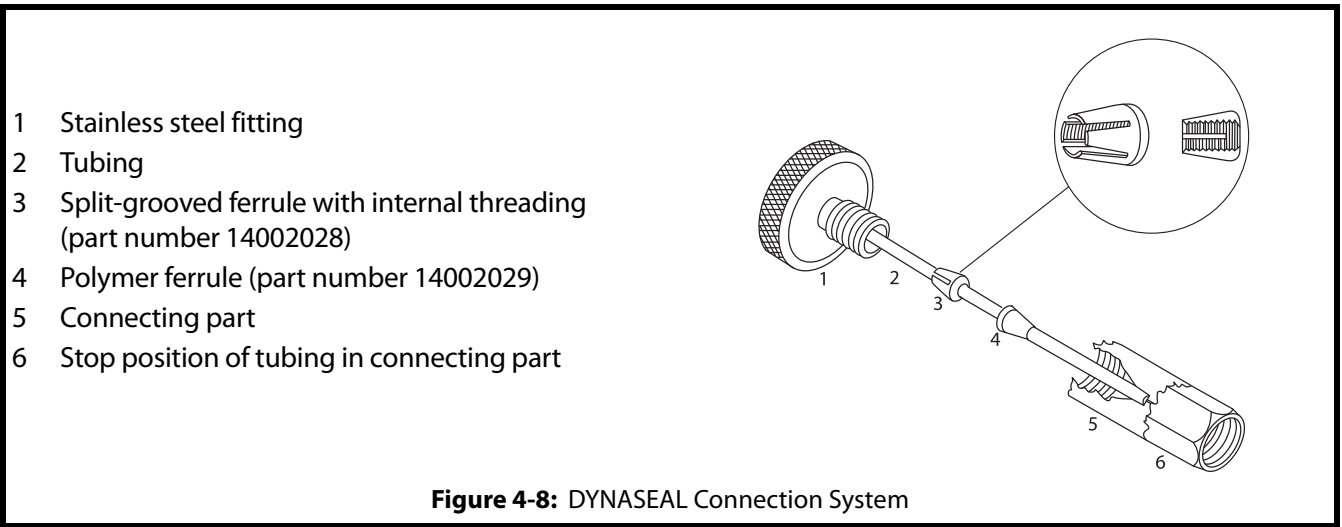
When replacing the fittings used to connect the inlet and outlet tubing to the flow cell, refer to the tables below for part numbers.

### Standard Fittings

Flow Cell Part Number	Pathlength	Replacement Fittings Part Number	Description	
14100008 (157 Detector)	10 mm	14002026	NUT, SS, 1/16" OD, 157/159	
14100012 (159 Detector)		14002027	FERRULE, SS, 1/16" OD, 157/159	
14100010*	0.5, 1.25, or 2 mm (adjustable)	14002026	NUT, SS, 1/16" OD, 157/159	
		14002027	FERRULE, SS, 1/16" OD, 157/159	
14100013	0.05 mm	49041078	FERRULE, 1/16" ANTI-TWIST, PEEK (M250)	
		49041079	NUT, 1/16" ANTI-TWIST, PEEK (M655)	
*Requires the Flow Cell Adapter Kit (part number 14100011) for connecting to 1/16" tubing				

DYNASEAL Connection System

Flow Cell Part Number	Pathlength	Replacement Fittings Part Number	Description
14100006	0.5 mm	14002031	DYNASEAL CONNECT SYS, 1/16" OD, 157/159
14100009	3 mm	14002028	FERRULE, SS, 1/16" OD, SPLIT GRV 157/159
		14002029	FERRULE, POLYMER, 1/16" OD, 157/159
		14002030	NUT, DYNASEAL, SS, 1/16" OD, 157/159





## Replace the Inlet and/or Outlet Tubing

When replacing the inlet or outlet tubing, ensure that its ID is appropriate for the flow cell. Refer to the table below for part numbers for replacement tubing and fittings.

<i>Part Number</i>	<i>Description</i>
49041001	FITTING,FINGERTIGHT,10-32,KEL-F(F-100N)
49041011	FERRULE, 1/16", RED (P-200R)
49041012	NUT, 1/16", BLACK (P-201)
49951059	TUBING,.010" X 5FT, PEEK
49953059	TUBING,.030" X 5FT, PEEK
F1410153	COUPLING, 1/4-28

To replace the tubing:


- 1 Disconnect the tubing from the flow cell and, if necessary, from the system.
- 2 Connect the fittings on the replacement tubing to the flow cell. Finger tighten the fitting.
- 3 Connect the other end of the tubing, if necessary.

## Lamp Replacement


The expected lamp life is 2000 hours. Replace the lamp if it malfunctions or its intensity is low.

### Safety


#### Protective Measures - Hot Lamp

	<p>Caution, hot surface</p> <p><b>CAUTION</b></p> <p>Never touch a hot lamp.</p> <p>Turn off the lamp, but leave the detector on (fan running) for 15–30 minutes before replacing a lamp.</p>
---	---


#### Protective Measures - Risk of Electric Shock

	<p>Risk of electric shock!</p> <p><b>WARNING</b></p> <p>To avoid possible electric shock, turn off the detector and disconnect the power cord before opening or servicing the detector.</p>
---	---


#### Protective Measures - UV Light

	<p>Irritation of retina through UV light!</p> <p><b>WARNING</b></p> <p>Concentrated UV light can disperse from a detector without a flow cell.</p> <p>Always turn off the detector and disconnect the power cord before opening or servicing the detector.</p>
---	--

#### Protective Measures - Electrostatic Discharge Hazard

	<p>Electrostatic discharge hazard. Damages to system, device, or components can occur.</p> <p><b>NOTICE</b></p> <p>Wear an electrostatic discharge (ESD) grounding strap.</p>
---	---

#### Protective Measures - Wear Protective Gloves

	<p>Wear protective gloves!</p> <p><b>NOTICE</b></p> <p>Do not touch the glass body with hands. Deposits can falsify measuring results and can damage the lamp.</p>
---	--

### Required Tools

- 2 mm Allen wrench
- Screwdriver

## Overview

Lamp replacement requires access to the rear panel of the detector.

Steps are completed in the following order:

- 1 Turn detector off and disconnect power cord.
- 2 Remove cover.
- 3 Disconnect lamp.
- 4 Remove lamp.
- 5 Install replacement lamp.
- 6 Connect lamp.
- 7 Install cover.
- 8 Reconnect power cord and turn detector on.

## Remove Cover

**WARNING**

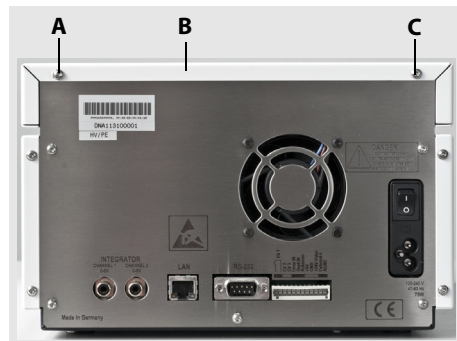
Risk of electric shock!

To avoid possible electric shock, turn off the detector and disconnect the power cord before opening or servicing the detector.

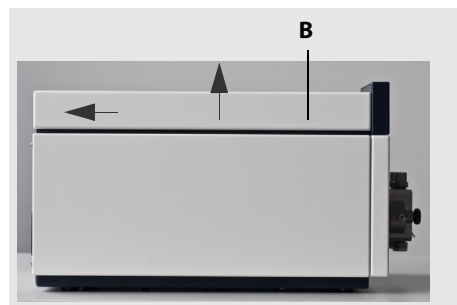
- 1 Turn detector off and disconnect power cord.
- 2 Remove the two 2 mm Allen screws (labeled A and C in the figure below) that secure the cover to the detector.
- 3 Push the cover back and then lift up to remove.

**Legend**

- A** Allen screw  
**B** Cover  
**C** Allen screw





**Figure 4-9:** Remove Allen Screws

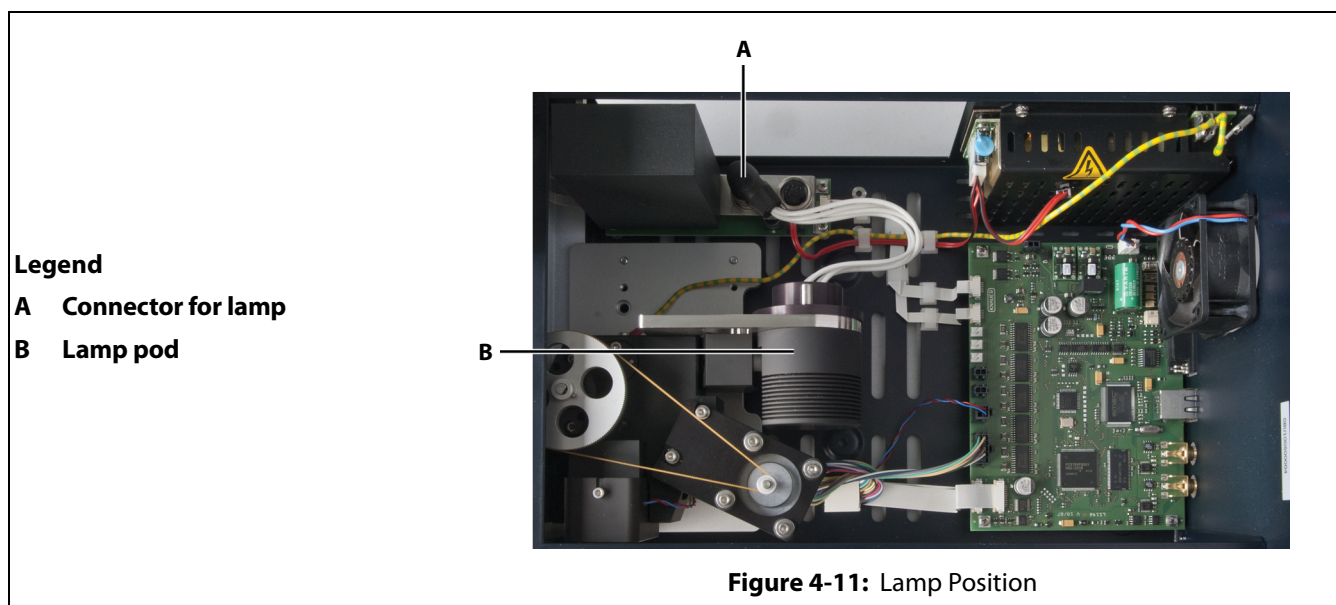


**Figure 4-10:** Remove Cover

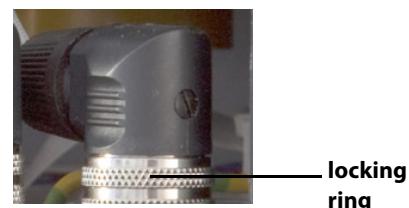
## Disconnect Lamp

Disconnect the lamp before removing it.

	<p>Caution, hot surface</p> <p><b>CAUTION</b></p> <p>Never touch a hot lamp.</p> <p>Turn off the lamp, but leave the detector on (fan running) for 15–30 minutes before replacing a lamp.</p>
	<p><b>NOTICE</b></p> <p>Wear protective gloves!</p> <p>Do not touch the glass body with hands. Deposits can falsify measuring results and can damage the lamp.</p>



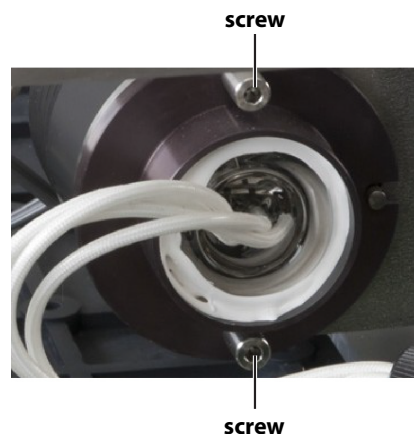
Turn the locking ring on the lamp connector and then disconnect.



**Figure 4-12: Turn Locking Ring to Disconnect Lamp**

## Remove Lamp

- 1 Remove the two screws that secure the lamp in the lamp pod.
- 2 Remove the lamp from the lamp pod.



**Figure 4-13: Remove Screws**

## Install Lamp

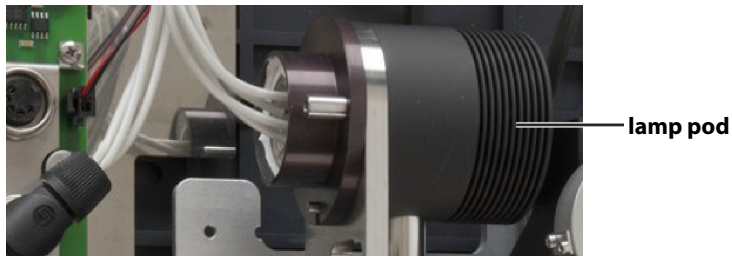


Wear protective gloves!

**NOTICE**

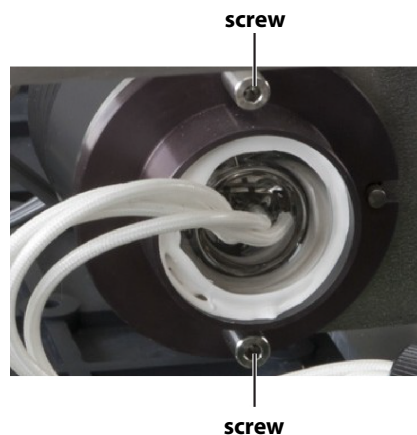
Do not touch the glass body with hands. Deposits can falsify measuring results and can damage the lamp.

- 1 Hold the lamp at the lamp socket and guide the glass body into the lamp pod.



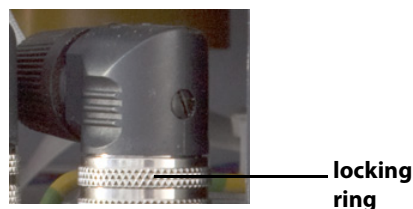
**Figure 4-14:** Installed Lamp

- 2 Secure the lamp in the lamp pod using the two screws that were removed when the old lamp was removed.



**Figure 4-15:** Install Screws

- 3 Plug in the connector and then turn the locking ring until the connector is secured.



**Figure 4-16:** Connector with Locking Ring

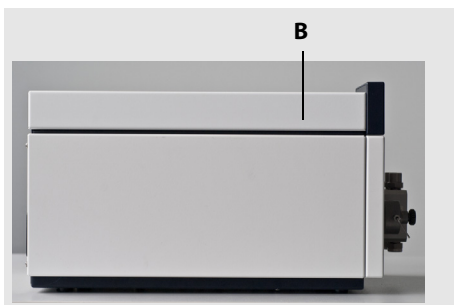
## Install Cover

**WARNING**

Risk of electric shock!

Do not attempt to operate the detector with the cover and/or side panel removed.

- 1 Place the cover on the detector.
- 2 Secure the cover to the detector using the two 2 mm Allen screws.



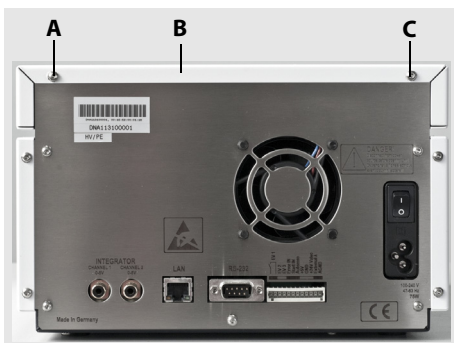
**Figure 4-17:** Place Cover

**Legend**

**A** Allen screw

**B** Cover

**C** Allen screw



**Figure 4-18:** Install Allen Screws

This chapter provides information on the following topics:

- [Troubleshooting](#)
- [Solvent and Buffer Compatibility](#)
- [Repair and Return Policies](#)

## Troubleshooting

When troubleshooting a problem, first do the following:

- 1 Check all cabling.
- 2 Check all fittings.
- 3 Check for air in the tubing.
- 4 Check for leaks.
- 5 Look for system messages on the display.

### Device Will Not Turn On

Inspect the power cable to be sure it is plugged into the power supply.

### Device Cannot Be Calibrated

- Tighten the knurled-head screws on the cover plate to prevent incursion from interfering light or an electronic error.
- Insert the test cell.
- Inspect the calibration with a weak absorbing eluent.

### Relationship of the Signal to the Light Path Reference is Low

- Purge the flow cell.
- Clean the flow cell window.
- Exchange lamp (spectrum source).

### Baseline Noise

- Tighten the knurled-head screws on the cover plate to prevent incursion from interfering light or an electronic error.
- Allow the lamp to warm up for at least 15–30 minutes.
- Eliminate drafty air currents and variations in ambient temperature. Move the detector away from windows or doors.
- Check grounds on all instruments. Eliminate ground loops by connecting the detector and recorder to the same power outlet.
- Be sure solvents are degassed.
- If you see baseline deflection when back pressure is exerted on the flow cell, you probably have bubbles trapped in the cell. Try one of these methods to eliminate bubbles:
  - Increase back pressure on the cell by connecting pressure regulator tubing to the flow cell outlet.
  - Increase back pressure by raising flow rate and using a syringe or septum to momentarily block exit stream.
  - Flush flow cell using a syringe filled with fresh solvent.
  - Raise the fraction collector to a level higher than the flow cell.
- The lamp intensity may be weak. Refer to [Lamp Replacement](#) on page 4-9.
- Check flow cell for contamination. Refer to [Flow Cell Maintenance](#) on page 4-2.



## Baseline Drift

- Maintain constant temperature conditions during the measurement.
- Allow the lamp to warm up for at least 15–30 minutes.
- Eliminate changes in ambient temperature. If drift is dependent on temperature, eliminate drafts and avoid areas of direct sunlight.
- Check for contaminated or “bleeding” column. If drift disappears after removing column connections, regenerate or replace column.
- Be sure solvents are degassed.
- If you see baseline deflection when back pressure is exerted on the flow cell, you probably have bubbles trapped in the cell. Try one of these methods to eliminate bubbles:
  - Increase back pressure on the cell by connecting pressure regulator tubing to the flow cell outlet.
  - Increase back pressure by raising flow rate and using a syringe or septum to momentarily block exit stream.
  - Flush flow cell using a syringe filled with fresh solvent.
  - Raise the fraction collector to a level higher than the flow cell.
- Check pump or delivery system to determine that flow rate is constant.
- The lamp intensity may be weak. Refer to [Lamp Replacement](#) on page 4-9.
- Check flow cell for contamination. Refer to [Flow Cell Maintenance](#) on page 4-2.

## LAN (Ethernet) Connection

For communication to occur, the instrument must be connected via a LAN (Ethernet) connection to a router. If there are communication problems between the instrument and the computer, verify that the procedure below has been followed.

- 1 Connect the router to a power source and then wait 30 seconds for the router to initialize.
- 2 With the instrument powered OFF, connect one end of an Ethernet cable to a port on the router and the other end to the ETHERNET port on the rear panel of the instrument.
- 3 Power the instrument ON and then wait 1 minute for it to initialize. The instrument will be assigned an IP address via DHCP from the router at this time.
- 4 Using an Ethernet cable, connect one end of the cable to the connector on the computer and the other end to a port on the router.

## Confirm Communication

After the connections have been verified, use the procedure below to confirm communication.

- 1 Reboot the computer.
- 2 Turn off power to the router and the detector.
- 3 Wait five minutes.
- 4 Turn power on to the router.
- 5 Turn power on to the detector.
- 6 Start TRILUTION® LC Software.

# Solvent and Buffer Compatibility

Even small quantities of other substances, such as additives, modifiers, or salts can influence the durability of the materials.

**Note:** The list of selected solvents and buffers was compiled based on research in the pertinent literature and is only a recommendation.

Acceptable Solvents	Acceptable Solvents (Stainless Steel Configurations ONLY)	Solvents NOT Recommended
<ul style="list-style-type: none"> <li>Acetone at 4°–25°C (39.2°–77.0°F)*</li> <li>Acetonitrile</li> <li>Benzene</li> <li>Chloroform</li> <li>Ethyl acetate</li> <li>Ethanol</li> <li>Hexane/heptane at 4°–25°C (39.2°–77.0°F)*</li> <li>Isopropanol</li> <li>Carbon dioxide (liquid 99.999% CO<sub>2</sub>)</li> <li>Methanol</li> <li>Phosphate buffer solutions (0.5 M)</li> <li>Toluol</li> <li>Dilute ammonia solution</li> <li>Dilute acetic acid (10–50%), at 25°C/77.0°F</li> <li>Dilute sodium hydroxide (1M)</li> <li>Water</li> </ul>	<ul style="list-style-type: none"> <li>Dimethyl sulfoxide (DMSO)</li> <li>Slightly volatile eluents</li> <li>Methylene chloride</li> <li>Tetrahydrofuran (THF)</li> <li>Dilute phosphoric acid</li> </ul>	<ul style="list-style-type: none"> <li>Halogenated hydrocarbons (e.g., Freon®)</li> <li>Concentrated mineral and organic acids</li> <li>Concentrated bases</li> <li>Eluents containing particles</li> <li>Perfluorinated eluents (e.g., Fluorinert® FC-75, FC-40)</li> <li>Perfluorinated polyether (e.g., Fomblin®)</li> </ul>

\* valid for the specified temperature range

<b>NOTICE</b>	Liquids can cause damage to the detector.
	Place solvent bottles next to the device or in a solvent tray.
	Moisten the cleaning cloth only slightly.

## Efficient HPLC Separations

To make your HPLC separations as efficient as possible, pay close attention to the following:

### Avoid Additional Dead Volume

- 1 Once they have been used, never re-use tubing in other areas of the HPLC system.
- 2 Only use a given PEEK fitting for one specific port and never re-use it for other ports. Always install new PEEK fittings on each separate port.

### Use Special Columns

When using special columns, follow the manufacturer's instructions on caring for the columns!

### Use Filtered Solvents

- 1 Use ultra-pure, filtered solvents for HPLC – gradient grade.
- 2 Filtration of substances under analysis.
- 3 Use of inline filters.

### Check for Clogged Tubing

Regularly check for clogged tubing. Test back pressure without a column.

## 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](http://www.gilson.com) for directions and information on the end-of-life policy. This is in accordance with the European Union Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

## Detectors

Part Number	Description
14100001	157 UV-VIS DETECTOR - SINGLE WV
14100002	159 UV-VIS DETECTOR - MULTI WV

## Lamp

Part Number	Description
14002007	LAMP, CERAMIC DEUTERIUM, 157
14002021	LAMP, CERAMIC DEUTERIUM, 159

## Flow Cells

Part Number	Description
14100006	FLOW CELL UV, 0.5MM 1/16 SS, 157/159
14100007	FLOW CELL UV, 0.5MM 1/16 PEEK, 157/159
14100008	FLOW CELL UV, 10MM 10µL 1/16 SS, 157
14100009	FLOW CELL UV, 3MM 2µL 1/16 PEEK, 157/159
14100010	FLOW CELL UV, 2MM 1/8 SS, 157/159, 0.5-2
14100011	FLOW CELL ADAPTER KIT, 157/159
14100012	FLOW CELL UV, 10MM 10µL 1/16 SS, 159
14100013	FLOW CELL UV, 0.05MM 1/16 PREP, 157/159

## Flow Cell Fittings

Part Number	Description
14002026	NUT, SS, 1/16" OD, 157/159
14002027	FERRULE, SS, 1/16" OD, 157/159
14002028	FERRULE, SS, 1/16" OD, SPLIT GRV 157/159
14002029	FERRULE, POLYMER, 1/16" OD, 157/159
14002030	NUT, DYNASEAL, SS, 1/16" OD, 157/159
14002031	DYNASEAL CONNECT SYS, 1/16" OD, 157/159
49041078	FERRULE, 1/16" ANTI-TWIST, PEEK (M250)
49041079	NUT, 1/16" ANTI-TWIST, PEEK (M655)

## Inlet/Outlet Tubing and Fittings

Part Number	Description
14007001	PLUMBING PACKAGE, 157/159 FLOW CELL
49041001	FITTING,FINGERTIGHT,10-32,KEL-F(F-100N)
49041011	FERRULE, 1/16", RED (P-200R)
49041012	NUT, 1/16", BLACK (P-201)
49951059	TUBING,.010" X 5FT, PEEK
49953059	TUBING,.030" X 5FT, PEEK
F1410153	COUPLING, 1/4-28

## Miscellaneous

Part Number	Description
36070905	Back pressure regulator (75 psi), PEEK, for flow rates up to 10 mL/min
36070906	Back pressure regulator (75 psi), stainless steel, for flow rates up to 10 mL/min
4320302	Allen wrench, 3 mm
7080318116	PWR CORD, EURO 250VAC 2.5A IEC320-C5
7080318117	PWR CORD, UL CSA 125VAC 10A IEC320-C5
14100005	SHELF, 157/159 DETECTOR

Front panel control is available from the touchscreen.

To use front panel control when the detector is under remote control, reboot the computer, then turn the detector off and then on again.

## Touchscreen

The touchscreen is suitable for the following procedures:

- Monitoring the module functions
- Using special programs for laboratory work:
  - Scan program (159 UV-VIS Detector only)
  - LAN configuration program
  - Combination of programs (in the **Link** menu)
  - Checking the system conditions as part of quality assurance measures in accordance with good laboratory practices (in the **GLP** menu)
- Standby and wake-up programs (Wake Up)
- Configuring programs for the device (**Setup** menu)





With the touchscreen it is possible to input data and commands by touching certain areas on the screen. These areas are highlighted in gray.

Touching such buttons often calls up a menu with further, self explanatory buttons.

## Overview of the Function Buttons

### Navigation




The display has buttons to perform the following functions:

Button	Function	Explanation
	Scroll	Scroll through all functions
	One level higher up	Touch briefly to move up one level
	Go to device status display	Press and hold for 2 seconds
	Go to Main menu	Touch to go to the Main menu
	Save the entry	Touch to save the entry



## Program Control

Further buttons help control the program:

Button	Function	Explanation
	Run a program	Starts previously configured program in <b>Program</b> menu
	Pause a program	-
	Stop a program	-

Other buttons have their functions displayed in plain text:

Button	Function	Explanation
Restart	Repeat the program	-
Finish	Exit loaded program	-
Day	Confirm the day	-
Month	Confirm month	-
Year	Confirm the year	-
Autozero	Carry out zero balance	
Scan (159 UV-VIS Detector only)	Acquire spectra	
Scan Out (159 UV-VIS Detector only)	Move spectra to the integration output	
Disable	Deactivate, skip	
New	Create a new program line with time indicator	-
Load	Load program	-
Edit	Edit the program	-
Del/Delete	Delete the program	-
Tab	Table	Program line display

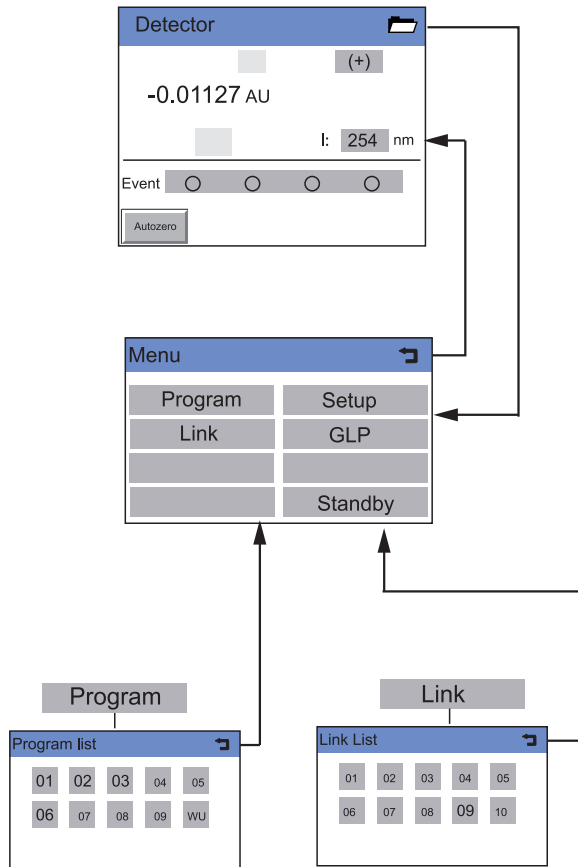
### Autozero Scan (159 UV-VIS Detector Only)

The detector must perform an autozero scan before recording UV spectra. Here the solvent's spectrum is measured to correct the corresponding scan values.

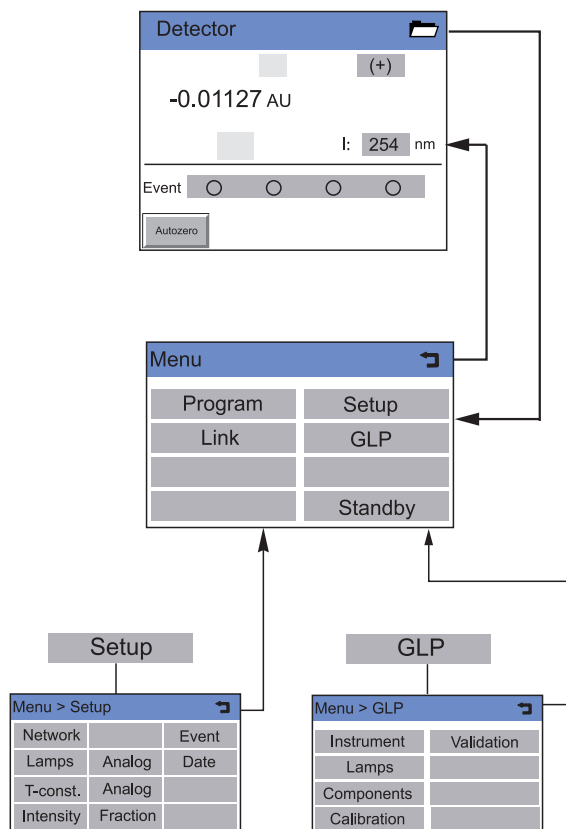
## Graphical User Interface Structure

The user interface is divided into various areas.

- Program: Device programming
- Link: Creating combination programs
- Scan: Wavelength scan (159 UV-VIS Detector only)
- Setup: Device presets
- GLP: Device status displayed according to good laboratory practice (GLP)
- Standby mode



**Figure B-1:** User interface structure (1/2)



**Figure B-2:** User interface structure (2/2)

# Status Display Settings

## Signal Options

Select the top gray field on the status display to select a signal output option.

Option	Explanation
(-)	Signal is inverted
(+)	Signal remains unchanged
(1/2)	Displays signal 1 divided by signal 2 (159 UV-VIS Detector only)
(2/1)	Displays signal 2 divided by signal 1 (159 UV-VIS Detector only)

With options (1/2) and (2/1) the absorption ratio can be generated to check the chromatographic separation quality with two wavelengths. The result appears in the window half C1 or C2, respectively. The unit AU has no pertinent meaning.

## Wavelengths

Touching the gray fields next to  $\lambda$  opens a virtual number pad in which the measuring wavelengths can be specified. The entry is confirmed with the **return** key. The entry is deactivated with the **disable** key.

## Events

Events are electric signals that are effective on the terminal strip events and remote control and are used to control the detector and other devices.

Up to four events can be activated by touching the gray **Event** button.

## Autozero

Touch **Autozero** to perform an autozero scan.

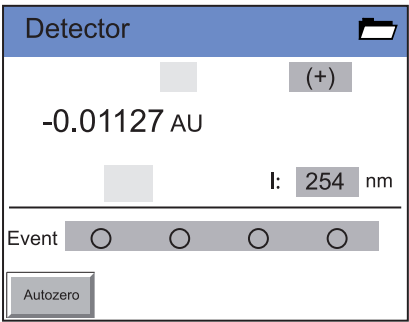


Figure B-3: Status Display

## Main Menu

### Navigation

Touch  in the status display to go to the Main menu.

The individual menus are opened by touching the its name.

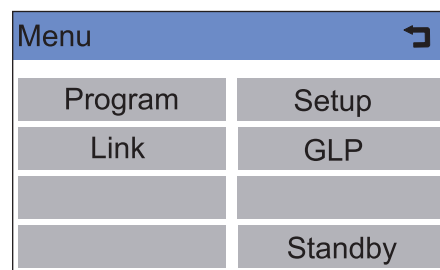



Figure B-4: Main Menu

## Program Menu

The detector can store ten programs with 99 program lines each. Program 10 (WU) is reserved for a wake-up program for a time-delayed execution of the links or programs.

The individual programs are labeled with numbers.

### Navigation

- 1 Touch **Program** to display the program list.
- 2 Touch the desired program number to edit, open or delete the program.
- 3 Touch **Load** to run a program.
- 4 Touch **Edit** to enter the edit mode.
- 5 Touch **Delete** to delete a program.
- 6 Touch **Tab** to display a program line in a table.
- 7 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.

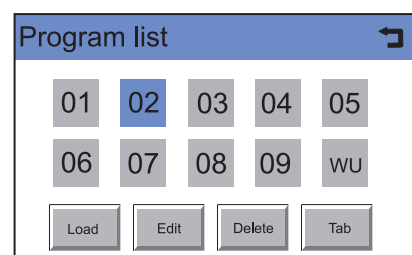




Figure B-5: Program List

## Creating a Program

**Note:** Occupied programs are represented by large displayed numbers, and free programs are represented by small displayed numbers.

### Procedure

- 1 Touch **Program** to display the program list.
- 2 Touch the desired program number and then **Edit** to edit the program. (Diagram A)
- 3 Enter the desired signal options.
- 4 Enter the desired wavelengths and then  to save.
- 5 Enter the event settings.
- 6 Touch **New** to specify the time. (Diagram B).
- 7 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.

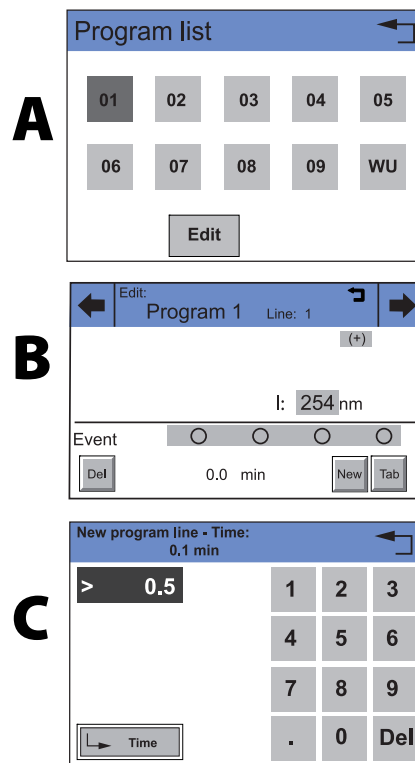


Figure B-6: Creating a Program

## Creating Program Lines

New program lines can be created while creating a program.

- 1 Touch **Tab** in the program's editing window to display the program lines.
- 2 Touch **New** to create a new program line.
- 3 Enter the time value.
- 4 Save setting.
- 5 Enter value of desired channel.
- 6 Save setting.

Program 1				Line 2
min	nm	nm	Events	
0.0	254	<overf	○○○○	
0.5	254	<overf	●○○○	

Figure B-7: Creating Program Lines

## Deleting Program Lines

Program lines can be deleted while creating a program.

- 1 Touch **Tab** in the program's editing window to display the program lines.
- 2 Touch **← →** to mark the desired program line.
- 3 Touch **Del** to delete the desired program line.
- 4 Confirm the query.
- 5 Touch **↶** to go to a higher level, or hold for two seconds to go to the Main menu.

## Running a Program

- 1 Touch **Program** to display the program list.
- 2 Touch the desired program number and then **Load** to load the program.
- 3 Touch **▶** to start the program (Diagram A).
- 4 Touch **⏏** to interrupt the program.
- 5 Touch **■** to stop the program.
- 6 Touch **Restart** to repeat the program (Diagram B).
- 7 Touch **Finish** to exit the loaded program.

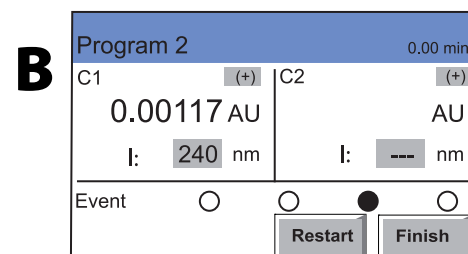
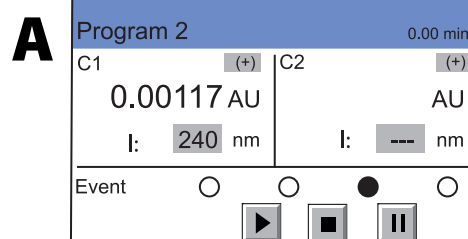

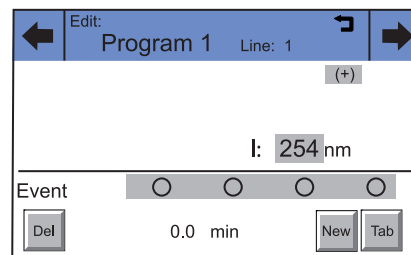


Figure B-8: Running a Program


## Changing a Program

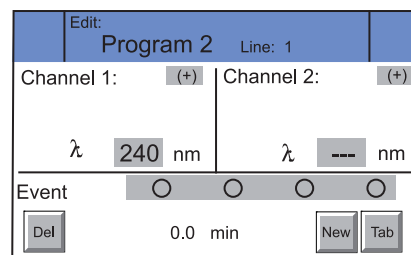
- 1 Touch **Program** to display the program list.
- 2 Touch the desired program number and then **Edit** to edit the program.
- 3 Change the desired value.
- 4 Save setting.
- 5 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.



**Figure B-9:** Program 2 > Edit  
(157 UV-VIS Detector)


## Displaying the Program Lines

- 1 Touch **Program** to display the program list.
- 2 Touch the desired program number and then **Tab** to reach the program line display.
- 3 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.



**Figure B-10:** Program 2 > Edit  
(159 UV-VIS Detector)

## Deleting the Program

- 1 Touch **Program** to display the program list.
- 2 Touch the desired program number and then **Delete** to delete the program.
- 3 Confirm the query.
- 4 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.





## Creating a Program with a Starting Time

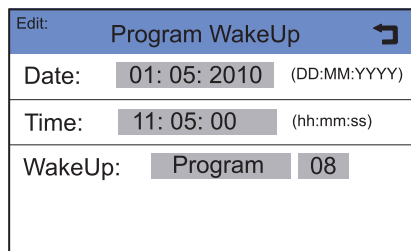
### Program WU

The program labeled WU serves as a wake-up program. It can be used to load a program or link and can be started at a predetermined time.

**Note:** Make sure that the date and time configured in the Setup menu are correct.

### Procedure

- 1 Touch **Program** to display the program list.
- 2 Touch **WU** and **Edit** to edit the program.
- 3 Enter the program or link to be run at the wake-up time in the wake-up line and confirm it with .
- 4 Enter the program start-date and confirm it with .
- 5 Enter the program start-time and confirm it with .
- 6 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.



**Figure B-11:** Program > WU > Edit

### WU > Load


The WakeUp control mode can be started with WU > load after answering the security query “load wakeup program?”. The screen will display the characters WAKEUP, as well as the detector’s wake-up time and the current time. The screen turns on the power saving mode.

## Link Menu

Links contain connections between existing programs, which can be defined and edited, like the programs themselves.

A maximum of 10 links between defined programs can be created and saved.

### Navigation

- 1 Touch **Link** to display the Link list.
- 2 Touch the desired link number to edit, open or delete the link.
- 3 Touch **Load** to run a link.
- 4 Touch **Edit** to enter the edit mode.
- 5 Touch **Delete** to delete a link.
- 6 Touch **Tab** to display the program line.
- 7 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.

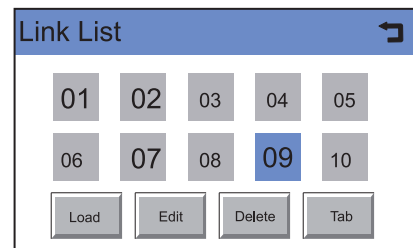


Figure B-12: Link List




### Creating a Link

A link can contain up to 99 lines (line).

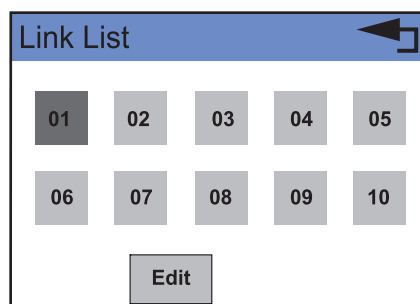
Each link contains

- the number of a to be connected program (line program, 1 through 9),
- the number of repetitions (line repeat, 1 through 99)
- the wait status i.e., waiting for an external signal (for external signal) or continue without interruption (no wait).

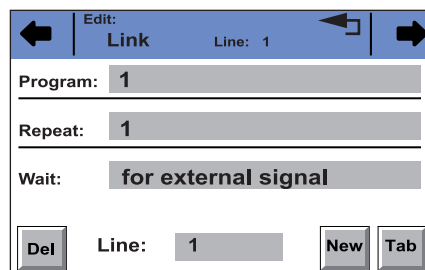
### Procedure

- 1 Touch **Link** to display the Link list (Diagram A).
- 2 Touch the desired link number to edit the link.
- 3 Enter program number (Diagram B).
- 4 Touch  to save the settings.
- 5 Enter the number of repetitions (Repeat) for the previously specified program.
- 6 Touch  to save the settings.
- 7 Select the desired option for wait (Diagram C).
- 8 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.

A



B



C

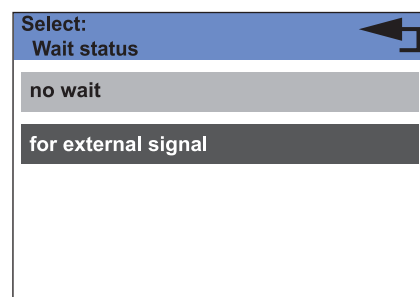








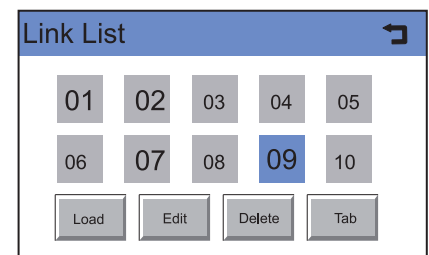
Figure B-13: Creating a Link

## Executing a Link

- 1 Touch **Link** to display the Link list.
- 2 Touch the desired link number and then **Load** to load the link.
- 3 Touch  to start the link.
- 4 Touch  to interrupt the link.
- 5 Touch  to stop the link.
- 6 Touch  to be able to repeat the link.
- 7 Touch  to exit the loaded link.

## Deleting a Link

- 1 Touch **Link** to display the Link list.
- 2 Touch the desired link number and then **Delete** to delete the link.
- 3 Confirm the query.
- 4 Touch  to go to a higher level, or hold for two seconds to go to the Main menu.




**Figure B-14:** Deleting a Link



# Scan Menu (159 UV-VIS Detector Only)

## Navigation

- 1 Touch **Scan** in the Main menu to display options.
- 2 Touch the gray highlighted values in the Range line to determine the wavelength range for autozero and scan.
- 3 Enter the desired wavelength values and confirm each with .
- 4 Touch the gray highlighted values in the Short key line to determine the scan start area display in the status display.

Option	Explanation
<Scan Start>	The button <b>Scan Start</b> appears in the status display.
<Enter screen Scan>	The button <b>Scan</b> appears in the status display.
Disable	Removes the <b>Scan</b> button

- 5 Touch the gray highlighted area of the Monitor line to make the following selections:
  - absorption
  - intensity of signal channel
  - intensity of reference

Now there are the following options:

- 6 Touch **Autozero** to carry out the zero balance of the measuring signal.
- 7 Touch **Scan Start** button to start the scan.
- 8 Touch **Scan Out** to output the scan data to the selected integrator output (RCA port on the back of the device).

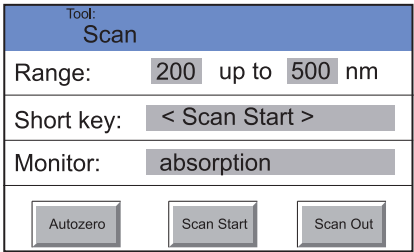


Figure B-15: Scan Menu

## Setup Menu

In the Setup menu, fundamental parameters for controlling the detector are specified.

### Navigation

- 1 Touch **Setup** to display options.
- 2 Touch this option to see current parameters selected. The option **Scan** is only available for multiple wavelength detectors.
- 3 Touch the gray highlighted values to display all available parameters.
- 4 Touch the desired parameters.
- 5 Touch ◀ ▶ to scroll through the other options in the setup menu.
- 6 Touch ◀ to go to a higher level, or hold for two seconds to go to the Main menu.

### Setup Menu Parameters

#### Network

The network configuration is displayed.

Touching the gray areas opens a list of further configuration options.

#### Lamps

The deuterium lamp can be switched and calibrated.

**Note:** The Halogen lamp is not currently offered.

#### T-const.

Here a time constant can be selected from prescribed values from 0.1 s to 10.0 s, to smooth the analog output signal.

Menu > Setup		
Network		Event
Lamps	Analog	Date
T-const.	Analog	
Intensity	Fraction	

**Figure B-16:** Setup menu  
(157 UV-VIS Detector)

Menu > Setup		
Network	Scan	Event
Lamps	Analog	Date
T-const.	Analog	
Intensity	Fraction	

**Figure B-17:** Setup Menu  
(159 UV-VIS Detector)

Setup: Network configuration

◀ ▶

RS232 - 115200

**Figure B-18:** Setup > Network

Setup: Lamps

◀ ▶

D2 lamp: ON

Halogen lamp: OFF

Procedure: Calibration

**Figure B-19:** Setup > Lamps

Setup: Time constant

◀ ▶

Time constant: 0,1 s (analog)

**Figure B-20:** Setup > T-const.

## Intensity

The intensities in channel C1 are displayed. Monitor source can be selected (absorption, signal channel, reference channel).

For check the functionality of the lamp, the two light intensity values I-sig and I-ref provide useful information. The right column notes the absolute light intensity that the signal and reference channels in the UV-maximum measure after a calibration. The values are independent from the integration time default setting and can, therefore, be used as a spectra sources quality gauge. The value I-sig allows you to draw conclusions about the measurement situation (installed flow cell type, solvent used, bubble free, etc.).

Setup: intensities - channel 1	
I-sig: 0.0562	I-sig: 511 nW
I-ref: 0.0275	I-ref: 220 nW
756 nm	Integr.: ms
Monitor source: absorption	

Figure B-21: Setup > Intensity

## Scan (159 UV-VIS Detector Only)

The integrator channel and the speed can be specified for the scan output. The detector offers two integrator outputs that are accessible at the RCA ports on the back of the detector.

Setup: Scan	
Out:	integrator channel 1
Speed:	0 nm/s

Figure B-22: Setup > Scan

## Analog out

Here the offset (moving the baseline) and scaling (in AU/V) of the integrator outputs can be set.

Setup: Analog out	
Offset:	4.00
Scale:	2.000 AU/V

Figure B-23: Setup > Analog out  
(157 UV-VIS Detector)

Setup: Analog out	
Offset-1:	4.00
Scale-1:	2.000 AU/V
Offset-2:	5.00
Scale-2:	5.000 AU/V

Figure B-24: Setup > Analog out  
(159 UV-VIS Detector)

## Analog in

The external I input on the back of the device enables external control of the detector through a positive analog voltage that is applied against AGND.

By selecting Set to zero, a voltage can be defined as the spectral zero point for the wavelength 000 nm. Typically, a voltage of 0 is used in this case.

If the control voltage is raised, then the actual interpreted wavelength field shows the corresponding wavelength with a scaling of 100 nm/V. The scaling can be changed with the number keys that appear after touching the field.

**Note:** For optimal linearity, a scaling of 100 nm/V is recommended.

Setup: Analog in	
Actual interpreted wavelength: 000 nm	
Procedure:	Set to Zero

Figure B-25: Setup > Analog in

## Fraction

A fraction collector can be controlled through the terminal strip on the back of the detector.

### Setup > Fraction > Level

The Level line is used to specify the signal height that needs to be exceeded to switch to the next position on the fraction collector.

Setup: Fraction collection	
Level:	1.00000 AU
Delay:	0.0 s
Port:	Event 4 (24 V)

**Figure B-26:** Setup > Fraction

### Setup > Fraction > Delay

With the value in the Delay line, the propagation delay due to the dead volume of the capillaries between detector and fraction collector is taken into account.

### Setup > Fraction > Port

When the set threshold in the Level is exceeded, the event output selected in the Port line is switched and remains active until the signal drops below the threshold value. The threshold always relates to the signal on the first measuring channel C1. If in the first channel the result of an offset (1/2) or (2/1) is displayed, then the result of the offset is valid; the unit AU has no meaning in this case.

The following event outputs can be selected in the Port line:

- Event 1 (relay contact EV 1)
- Event 2, Event 3 (TTL outputs EV 2, EV 3)
- Event 4 (switch voltage +24V valve)

### Setup > Event

Touch the gray field in the Active only line, to check the condition of the event connections.

Setup: Event check	
Start-IN:	0
Error-IN:	0
AutoZero-IN:	0
Active only:	Event 3

**Figure B-27:** Setup > Event

### Setup > Date

Touch the gray buttons next to Date and Time to set the date and time for the detector.

Setup: Date	
Date:	02.05.2010 (DD.MM.YYYY)
Time:	12:48:23 (hh:mm:ss)

**Figure B-29:** Setup > Date

GLP Menu

The GLP menu is for information purposes only. The submenus provide information about the use of the detector, deliver an overview of the configuration and inform as to the condition of the device. The data can be viewed by touching the corresponding buttons.

Navigation

- 1 Touch **GLP** to display operating parameters.
- 2 Touch the gray highlighted values to display all available options.
- 3 Touch **◀ ▶** to scroll through the other options in the GLP menu.
- 4 Touch **⏮** to go to a higher level, or hold for two seconds to go to the Main menu.

Standby

By touching the Standby button, the detector goes into the energy saving standby mode. The word **STANDBY** is displayed on the touchscreen and the standby lamp goes on. The event inputs and communication interfaces remain active.

The return from standby mode is made by touching the touchscreen. The standby lamp goes out, and the device behaves as it would if turned on with the power switch. No calibration takes place, as the set wavelength has been fixed

Menu > GLP	
Instrument	Validation
Lamps	
Components	
Calibration	

Figure B-31: GLP Menu