



ExionLC™ PDA Detector

Operator Guide

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Contents

Chapter 1 Introduction.....	5
Electrical Precautions.....	5
AC Mains Supply.....	5
Protective Earth Conductor.....	6
Environmental Precautions.....	6
Electromagnetic Environment.....	6
Decommissioning and Disposal.....	6
Ventilation Precautions.....	7
Chemical Precautions.....	7
Static Electricity Precautions	7
Equipment Use and Modification.....	8
Chapter 2 Hazard Symbols.....	9
Occupational Health and Safety Symbols.....	9
Documentation Symbols and Conventions.....	10
Chapter 3 Overview.....	12
Chapter 4 Operating Instructions.....	17
Precautions.....	17
Preparation Before Operation.....	17
Precautions for Wavelength Calibration and Wavelength Accuracy Check.....	18
Precautions During Operation.....	18
Turn On the Module.....	18
Chapter 5 Service and Maintenance Information.....	20
Maintenance, Inspections, and Adjustment.....	20
Prior to Inspection and Maintenance.....	20
Periodic Inspection and Maintenance List.....	21
Clean or Replace the Flow Cell.....	22
Remove the Flow Cell.....	22
Clean the Flow Cell.....	23
Install the Flow Cell.....	27
Replace the D2 Lamp.....	28
Replace the Dust Filter.....	31
Clean the Module Surfaces.....	33
Chapter 6 Troubleshooting.....	34
Corrective Action for Bubbles.....	39
Insulation Tube.....	39
Corrective Action against Leaks from Cell Window.....	40
Appendix A Error Messages.....	41

Contents

Appendix B Status Panel.....	44
Appendix C Consumables and Spares.....	46
Revision History.....	47

Introduction

1

This guide describes the basic operation and troubleshooting for the ExionLC™ PDA Detector . Read this guide thoroughly before using the product and operate the product in accordance with the instructions in this guide.

This guide provides safety instructions and precautions to make sure that the user operates the system safely. Follow all Warning and Caution instructions provided in the guide. For more information, refer to the *Hardware User Guide* for the ExionLC™ system.

Keep this guide for future reference. Make sure that it is accessible to the operator of the system.

Electrical Precautions



WARNING! Electrical Shock Hazard. Do not remove the covers. Removing the covers might cause injury or malfunctioning of the system. The covers need not be removed for routine maintenance, inspection, or adjustment. Contact the SCIEX FSE for repairs that require the covers to be removed.

For information on system electrical specifications, refer to the *Site Planning Guide*.

AC Mains Supply

Connect the system to a compatible AC mains supply as instructed in this guide.



WARNING! Electrical Shock Hazard. Use only qualified personnel for the installation of all electrical supplies and fixtures, and make sure that all installations adhere to local regulations and safety standards.



WARNING! Electrical Shock Hazard. Make sure that the system can be disconnected from the AC mains supply outlet in an emergency. Do not block the AC mains supply outlet.

CAUTION: Potential System Damage. Do not unpack or connect any system components. The FSE will unpack, connect, and configure the system for the proper operating voltage.

Protective Earth Conductor

The mains supply must include a correctly installed protective earth conductor. The protective earth conductor must be installed or checked by a qualified electrician before the system is connected.



WARNING! Electrical Shock Hazard. Do not intentionally interrupt the protective earth conductor. Any interruption of the protective earth conductor will create an electrical shock hazard.

Environmental Precautions

Use qualified personnel for the installation of electrical mains, heating, ventilation, and plumbing supplies and fixtures. Make sure that all of the installations comply with local bylaws and biohazard regulations. For more information about the required environmental conditions for the system, refer to the *Site Planning Guide*.



WARNING! Biohazard. For biohazardous material use, always comply with local regulations for hazard assessment, control, and handling. This system or any part is not intended to act as a biological containment.

Electromagnetic Environment

CAUTION: Potential Wrong Result. Do not use this device in close proximity to sources of strong electromagnetic (EMC) radiation (for example, unshielded intentional RF sources), as EMC radiation might interfere with the proper operation and cause a wrong result.

Make sure that a compatible electromagnetic environment for the equipment can be maintained so that the device will perform as intended.

Decommissioning and Disposal

Before decommissioning, decontaminate the system following local regulations.

When removing the system from service, separate and recycle different materials according to national and local environmental regulations.

Do not dispose of system components or subassemblies, including computer parts, as unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of WEEE (waste, electrical and electronic equipment). To safely dispose of this equipment, contact a local Customer Service office for complimentary equipment pickup and recycling.

Note: SCIEX will not accept any system returns without a completed Decontamination Form. Contact an FSE to obtain a copy of the form.

Ventilation Precautions

The venting of fumes and disposal of waste must comply with all of the federal, state, provincial, and local health and safety regulations. It is the customer's responsibility to make sure that the air quality is maintained in compliance with local health and safety regulations.

Chemical Precautions

- Determine which chemicals have been used in the system prior to service and regular maintenance. Refer to Safety Data Sheets for the health and safety precautions that must be followed with chemicals.
- Work in a well-ventilated area.
- Always wear assigned personal protective equipment, including powder-free neoprene or nitrile gloves, safety glasses, and a laboratory coat.
- Follow required electrical safe work practices.
- Avoid ignition sources when working with flammable materials, such as isopropanol, methanol, and other flammable solvents.
- Take care in the use and disposal of any chemicals. Potential risk of personal injury if proper procedures for handling and disposing of chemicals are not followed.
- Avoid skin contact with chemicals during cleaning and wash hands after use.
- Comply with all of the local regulations for the storage, handling, and disposal of biohazardous, toxic, or radioactive materials.
- (Recommended) Use secondary containment trays beneath the solvent bottles and the waste collection container to capture potential chemical spills.

Static Electricity Precautions

Liquid chromatography (LC) uses flammable organic solvents as the mobile phase. LC systems are also often used where large amount of flammable substances are present. Thus, there is a risk of accidents involving fire or explosion.

The major cause of these accidents is static electricity. Devising preventative measures for static electricity can be difficult, because the symptoms before an accident vary and can be hard to detect, because such accidents occur

as a result of several simultaneous incidents. For recommended methods for preventing static electricity accidents, refer to the *Hardware User Guide* for the ExionLC™ system.

Equipment Use and Modification



WARNING! Electrical Shock Hazard. Do not remove the covers. Removing the covers might cause injury or malfunctioning of the system. The covers need not be removed for routine maintenance, inspection, or adjustment. Contact the SCIEX FSE for repairs that require the covers to be removed.



WARNING! Personal Injury Hazard. Use SCIEX-recommended parts only. Use of parts not recommended by SCIEX or use of parts for any use other than their intended purpose can place the user at risk of harm or negatively impact system performance.

Use the system indoors in a laboratory that complies with the environmental conditions recommended in the *Site Planning Guide*.

If the system is used in an environment or in a manner not prescribed by the manufacturer, then the protection provided by the equipment might be impaired.

Unauthorized modification or operation of the system might cause personal injury and equipment damage, and might void the warranty. Erroneous data might be generated if the system is operated either above or below the recommended environmental conditions or operated with unauthorized modifications. Contact an FSE for information on servicing the system.

Hazard Symbols

2

This section lists the hazard symbols and conventions used in the laboratory environment, on the system, and in the documentation.

Occupational Health and Safety Symbols

This section describes some occupational health and safety symbols found in the documentation and laboratory environment.

Table 2-1 General Hazard Symbols






Safety Symbol	Description
	Personal Injury Hazard

Table 2-2 Chemical Hazard Symbols

Safety Symbol	Definition
	Biohazard
	Explosion Hazard
	Toxic Chemical Hazard
	Fire Hazard

Hazard Symbols

Table 2-3 Electrical Hazard Warning Symbols


Safety Symbol	Definition
	Electrical Shock Hazard

Table 2-4 Mechanical Hazard Symbols



Safety Symbol	Definition
	Hot Surface Hazard

Table 2-5 Radiation Hazard Symbols

Safety Symbol	Definition
	Laser Radiation Hazard

Documentation Symbols and Conventions

The following symbols and conventions are used throughout the guide.



DANGER! Danger signifies an action which leads to severe injury or death.



WARNING! Warning signifies an action that could cause personal injury if precautions are not followed.

CAUTION: Caution signifies an operation that could cause damage to the system or corruption or loss of data if precautions are not followed.

Note: Note emphasizes significant information in a procedure or description.

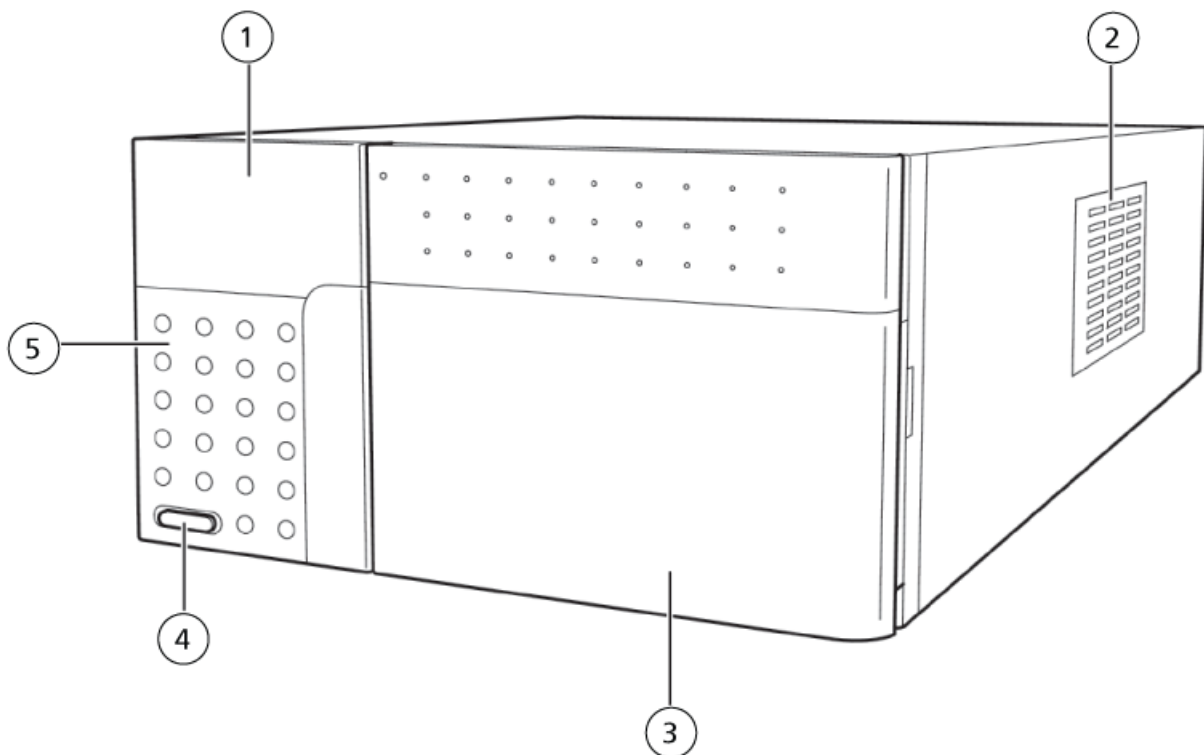
Tip! Tip provides useful information that helps apply the techniques and procedures in the text for a specific need and provides shortcuts, but is not essential to the completion of a procedure.

The ExionLC™ PDA Detector is a photodiode array (PDA), UV-Vis detector designed for use with an ExionLC™ ultra high performance liquid chromatograph system (HPLC), and was developed to satisfy demands for greater accuracy and sensitivity in analysis.

A photodiode array detector continuously monitors spectra over the entire wavelength range. Use of a deuterium (D2) lamp as the light source allows high sensitivity measurement of chromatograms and absorbance spectra over a wavelength range of 190 nm to 700 nm.

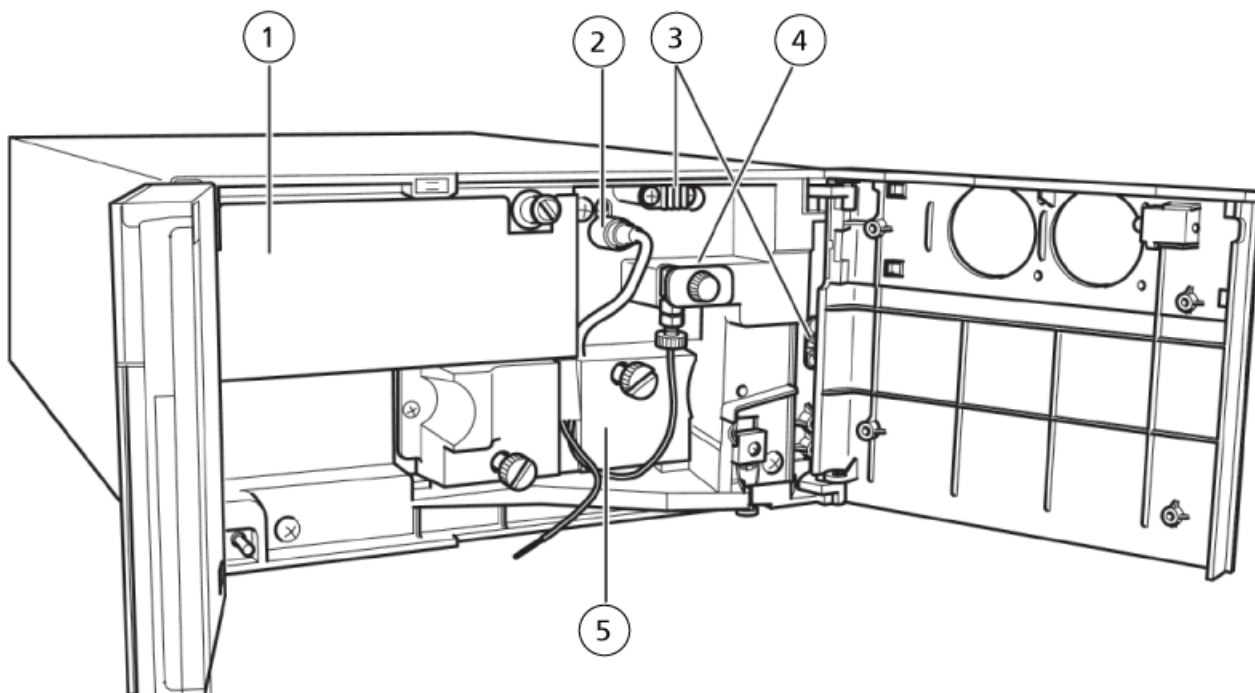
- Continuous monitoring of the absorbance spectra of eluted components can improve analysis reliability.
 - Identification of components from absorbance spectra
The combined use of retention time with absorbance spectra provides greater accuracy in identification.
 - Impurities check
Eluted peaks can be inspected to determine whether they are generated from a single component or mixed with impurities.
- An improved optical system provides high spectral resolution and excellent S/N performance.
A variable slit is incorporated to enable even higher sensitivity according to the application.
- Polychomator temperature control reduces baseline drift caused by fluctuations in room temperature.

Figure 3-1 Front



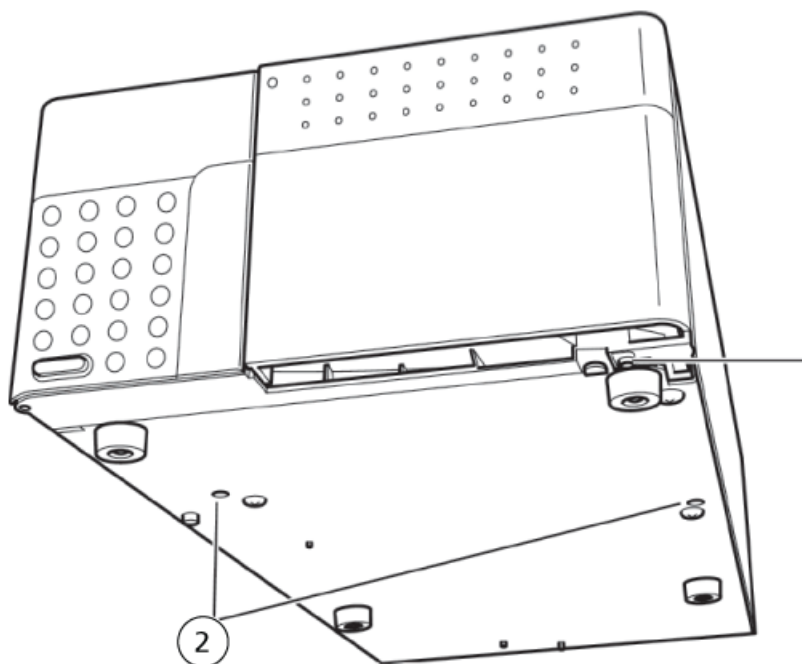
Item	Description
1	Display. Shows the statuses of lamps and the module.
2	Dust filter. Prevents dust from being sucked into the external air inlet, which draws in air to cool the inside of the module. Refer to Replace the Dust Filter .
3	Front cover. Open this cover to install or perform maintenance on the flow cell.
4	Power switch. Turns the power on and off.
5	Left-side cover. Open this cover to replace the lamp.

Figure 3-2 Behind the Front Cover and Left-side Cover



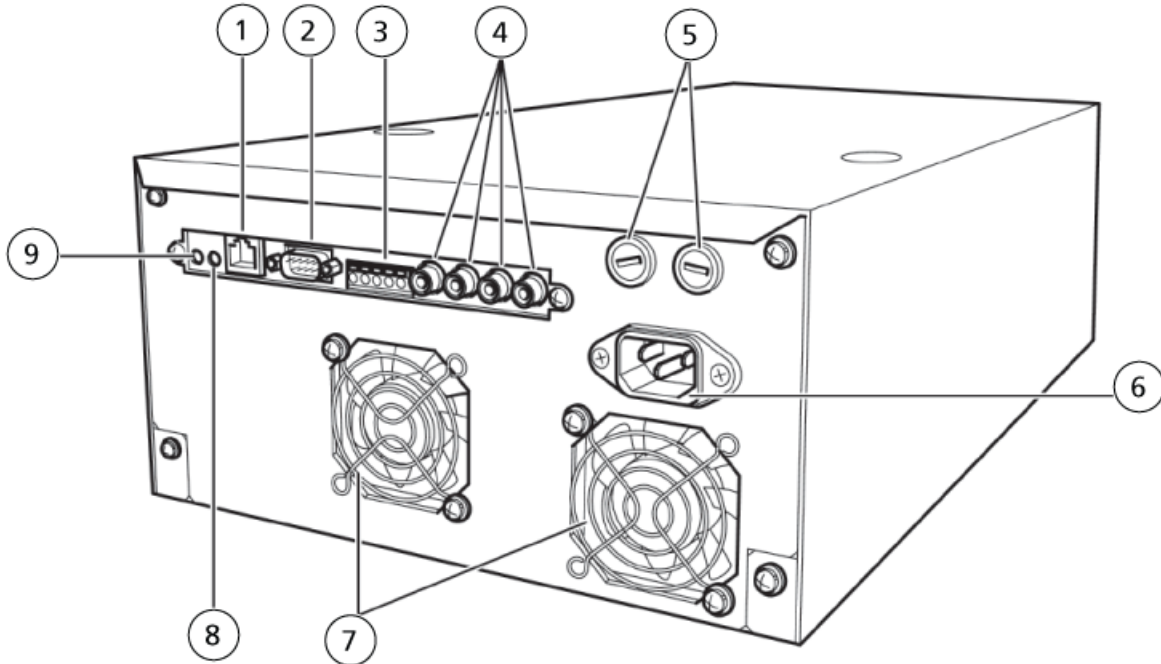
Item	Name	Function
1	Lamp cover	Remove the lamp cover to replace the D2 lamp inside. Refer to Replace the D2 Lamp . When the lamp cover is removed, the lamp is automatically turned off to ensure safety.
2	Flow cell connector	Connects to the flow cell.
3	Tubing holder	Secures the tubing.
4	Coupling holder	The retaining plate and screw secure the coupling in place.
5	Flow cell	Installation is performed using the coupling.

Figure 3-3 Base Panel



Item	Name	Function
1	Leakage drain outlet	Connects to the provided drain tubing. If liquid leaks inside the module, it is drained out through this opening.
2	Shipping screw	Protects the internal measurement components from vibration during transport. It is removed after installation.

Figure 3-4 Back



Item	Name	Function
1	ETHERNET connector	Used for the interface of control signals and analysis data through the network.
2	RS-232C connector	Reserved for use by service personnel.
3	External input/output terminals	Used for the input and output of analysis start and stop signals, and event signals when an error occurs. These are used to connect to external equipment. Refer to the <i>Peripheral Devices Setup Guide</i> for the Analyst [®] software.
4	INTEGRATOR connectors (four channels)	Not applicable.
5	Fuse holders	Contains the fuses.
6	Power cord connector	Connector for the power cable.
7	Cooling fan	Fan for internal cooling (keep a minimum of 100 mm between the rear of the module and the wall.)
8	INITIALIZE button	Used to initialize the module.
9	CLEAR button	Press this button to clear errors.

Precautions

Preparation Before Operation

- After starting up the module or turning on the lamp, it takes some time for the baseline to stabilize.
When high sensitivity is required, turn on the lamp in advance while taking into account the time required for baseline stabilization. As a guide, stabilization takes about 1.5 hours following startup.
- To prevent liquid leakage from the flow cell, tighten the cell window fixing screw on the flow cell every six months.

Refer to [Corrective Action against Leaks from Cell Window](#).

Fittings

Always use the fittings provided with the module. Otherwise, interior parts of the cell might be damaged due to high pressure generated within the cell when the cell plumbing is clogged.

Note: Any damage to the cell resulting from the use of fittings other than those provided voids the guarantee.

Refer to:

- Plumbing Between Column and Detector in the Hardware User Guide.
- [Remove the Flow Cell](#)
- [Install the Flow Cell](#)

Performance Checks

Perform these inspections daily to maintain module performance:

- Flow cell bubble removal and liquid leakage check
Refer to [Corrective Action against Leaks from Cell Window](#).
- Lamp light intensity check
- Wavelength accuracy check
Refer to [Service and Maintenance Information](#).

Precautions for Wavelength Calibration and Wavelength Accuracy Check

When conducting wavelength calibration or a wavelength accuracy check, perform one of the following flow cell preparation procedures.

- Flush the flow cell with a mobile phase that does not exhibit absorption in the wavelength region above 230 nm (such as water, acetonitrile, methanol).
- Fill the flow cell with one of these mobile phases.

Note: The wavelength calibration and wavelength accuracy check include measurement of the lamp light intensity as standard at the D2 lamp emission line wavelengths (656.1 nm, 486.0 nm) and holmium oxide filter absorption wavelengths (360.8 nm, 287.6 nm, 241.5 nm). If the flow cell contains air bubbles or residue from a light absorbing sample, wavelength calibration and wavelength accuracy check might not operate properly.

Precautions During Operation

- Be sure to close the cover during measurement. Opening the left or front covers during high sensitivity measurement might cause an increase in baseline fluctuation and noise.

Precautions for Air Conditioner

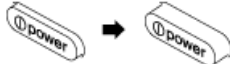
- When performing high sensitivity measurement, turn on the power to the PDA Detector after the room temperature is stabilized.
- Furthermore, when using a room air conditioner, keep it running during analysis to maintain a constant room temperature.

Note: The PDA Detector controls the temperature of the optical system to reduce absorbance baseline drift due to room temperature fluctuation. The detector measures ambient temperature for 15 minutes after the power is turned on and defines the temperature control level according to the measured temperature. If the room temperature is unstable after the power is turned on, the control temperature might be inaccurate and effects of room temperature change such as baseline drift in sync with temperature fluctuation, might appear during analysis. In addition, if the air conditioner is turned off, or if for some other reason the room temperature changes too much, the temperature control on the optical system might become inadequate.

Turn On the Module

- Press the power switch.

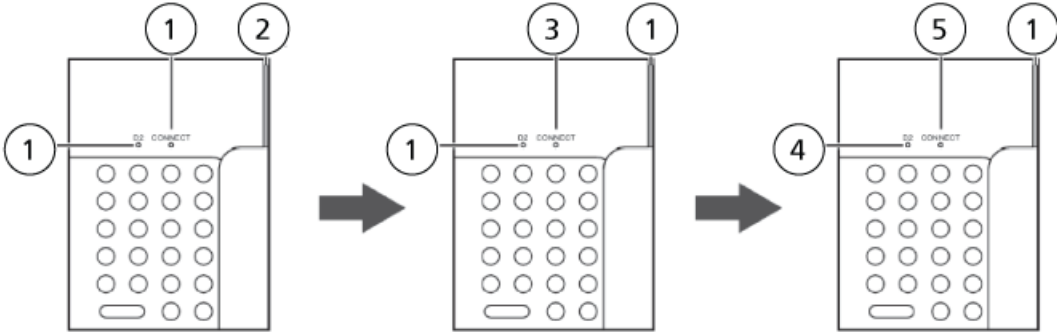
Figure 4-1 Power Button



The following events occur:

- a. The status indicator light is green and the **D2** and **CONNECT** LEDs begin blinking alternately. While this is occurring, the module performs the motor home position detection and slit initialization operations.
- b. The **D2** LED blinks more quickly and the light source lamp starts to turn on. The **CONNECT** LED illuminates when the module establishes communications with the system controller and acquisition computer.
- c. After the light source lamp is illuminated, the **D2** LED stops blinking and illuminates continuously.

Figure 4-2 Display



Item	Description
1	Green
2	Orange
3	Green blink
4	Fast Green blinking
5	Green or off

Note: Whether the D2 lamp is turned on or not is determined by the setting at the time of the last module shutdown. If an error occurs, the status indicator turns red.

Service and Maintenance Information

5

Regularly clean and maintain the system for optimal performance. Refer to [Periodic Inspection and Maintenance List on page 21](#).



WARNING! Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Determine whether mass spectrometer decontamination is required prior to cleaning or maintenance. The customer must decontaminate the system prior to cleaning or maintenance if radioactive materials, biological agents, or toxic chemicals have been used with a mass spectrometer.

Maintenance, Inspections, and Adjustment



WARNING! Personal Injury Hazard. Contact the SCIEX representative if product installation, adjustment, or relocation is required.



WARNING! Electrical Shock Hazard. Always turn off the power and then unplug the instrument prior to performing inspection and maintenance. Otherwise, fire, electric shock, or a malfunction might occur.

To maintain the performance of the module system and to obtain accurate measurement data, perform daily inspection and periodic calibration.

- For daily maintenance and inspection, refer to [Precautions](#).
- For planned maintenance, contact a SCIEX representative.
- For replacement parts, refer to [Consumables and Spares](#).
- Replacement cycles described for periodic replacement parts are estimates. Replacement might be required earlier than the described replacement cycles depending on usage environment and frequency.

Prior to Inspection and Maintenance

- Purge the mobile phase in the flow lines with water.
- Wipe away any dirt from the front panel and the main cover.
- Wipe away any dirt from the screen with tissue paper or a soft cloth moistened with water.

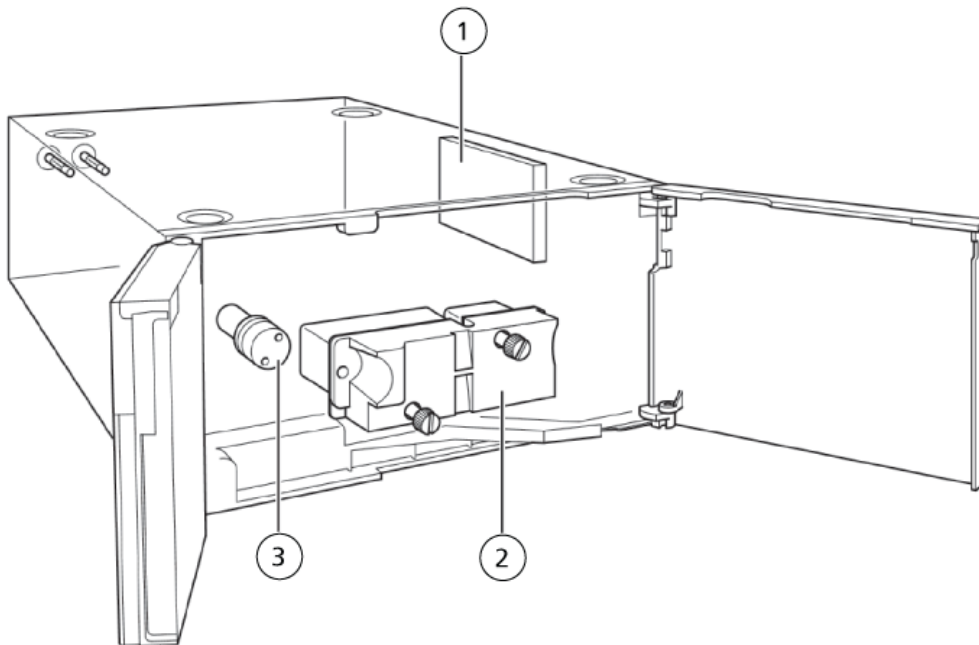
Refer to [Clean the Module Surfaces](#).

Periodic Inspection and Maintenance List

The replacement and maintenance periods listed in this table are presented only as guidelines. These are not guaranteed periods and will vary depending on the conditions of use.

Item	Inspection/ Maintenance Item	1 Year	2 Years	Remarks
1	Dust filter replacement	X		Replace the filter when it becomes discolored from the original white. Refer to Replace the Dust Filter .
2	Flow cell replacement	X		Replace the flow cell if it is unclean and light intensity is low even after cleaning it. Refer to Clean or Replace the Flow Cell .
3	D2 lamp replacement		X	Replace at about 2000 hours of total illumination time. Refer to Replace the D2 Lamp .

Figure 5-1 PDA Detector



After inspection and maintenance, inspect for any leakage during pumping. Refer to [Troubleshooting](#).

Clean or Replace the Flow Cell

Note: If cleaning above still does not improve light intensity, replace the flow cell assembly.

Required Materials

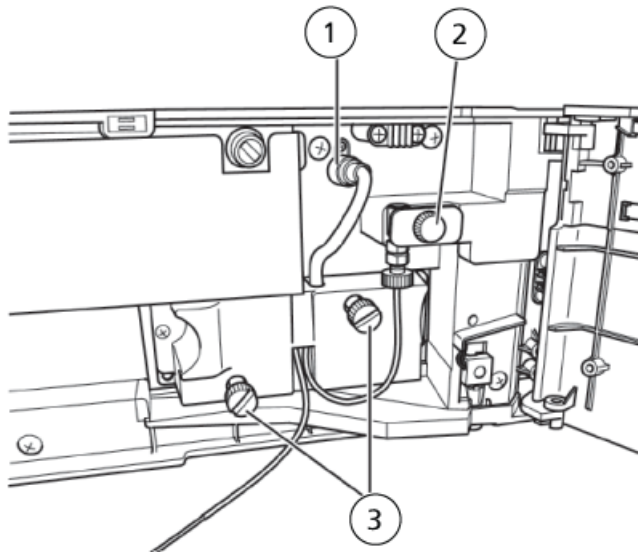
- 1 Flow cell ASSY

Remove the Flow Cell

CAUTION: Potential System Damage. Do NOT disassemble the flow cell. It might get damaged and become unusable.

1. Turn off the PDA Detector.
2. Open the front cover.
3. Loosen the coupling mounting screw and then remove the coupling.
4. Disconnect the connector.
5. Loosen the two cell mounting screws and then remove the cell.

Figure 5-2 Flow Cell



Item	Description
1	Connector
2	Coupling fixing screw
3	Cell fixing screw

Clean the Flow Cell

If the cell interior becomes dirty, use a syringe to flush the cell with a rinsing solution such as isopropanol to clean the cell interior. If the dirt is removed, flush the cell once more with isopropanol or mobile phase.

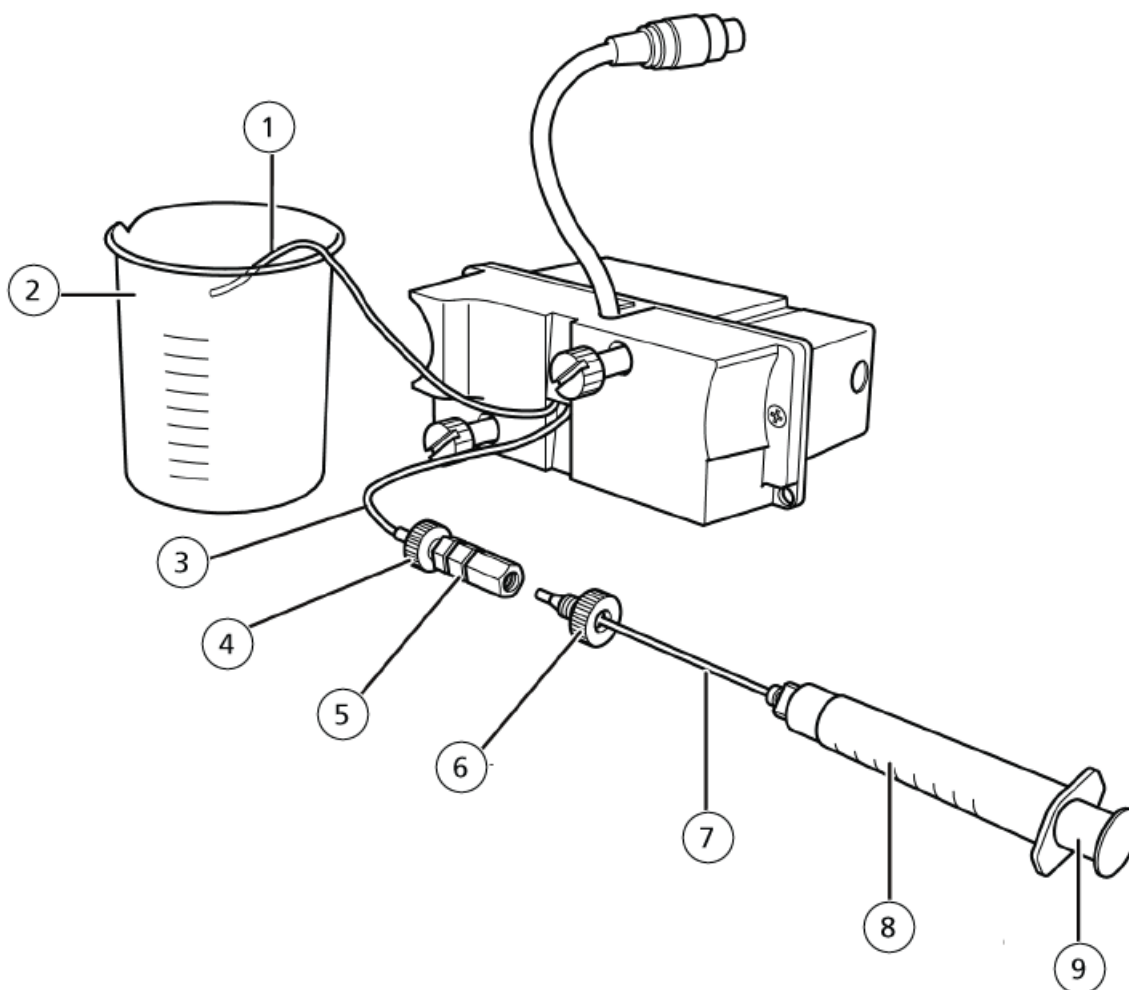
Note: Use of mobile phases containing amines, such as triethylamine, might contaminate the flow cell and increase noise. If this happens, use 2% formic acid solution for rinsing solution.

Required Materials

- Syringe, 1ML
- Syringe needle
- Coupling 1.6-0.8C
- Male nuts 0.8MN-PEEK
- Male nuts ETFE
- Distilled or deionized water

Note: If an aqueous solvent (especially a solvent containing buffer salts) is used as the mobile phase, purge the solvent in the cell with water before flushing with isopropanol. If an organic solvent is mixed with a buffer solution, crystals will form and clog the tubing.

Figure 5-3 Required Materials

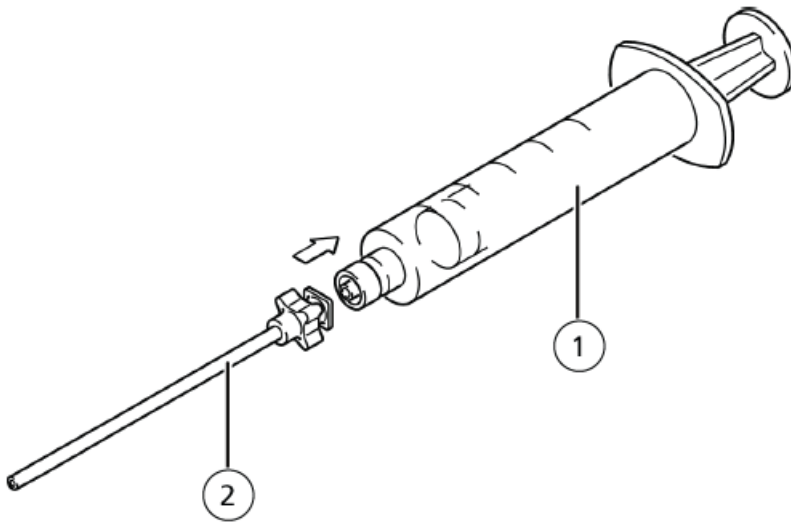


Item	Description
1	Cell inlet tubing
2	Waste container
3	Cell outlet tubing
4	Male nut EFTE
5	Coupling 1.6-0.8C
6	Male nut 0.8MN-PEEK
7	Syringe needle

Item	Description
8	Syringe
9	Plunger

1. Insert the syringe needle on the tip of the syringe and then turn it clockwise to fix it in place.

Figure 5-4 Syringe and Needle



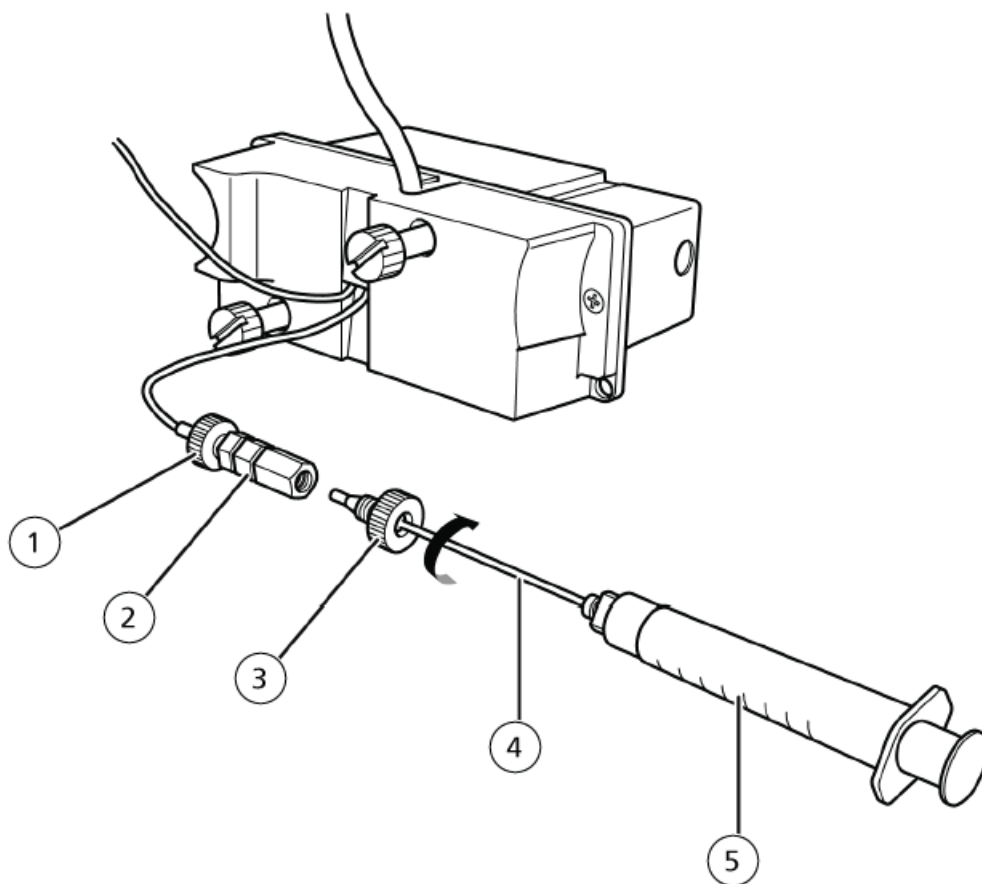
Item	Description
1	Syringe
2	Syringe needle

2. Remove the tubing on the cell outlet tubing (with a coupling) end.
3. Connect the syringe to the cell outlet tubing. (Attach the male nut 0.8MN-PEEK to the syringe needle and then connect the coupling 1.6-0.8C.)



WARNING! Puncture Hazard. Handle the needle with care. The tip of the needle is extremely sharp.

Figure 5-5 Syringe Connected to Cell Outlet Tubing

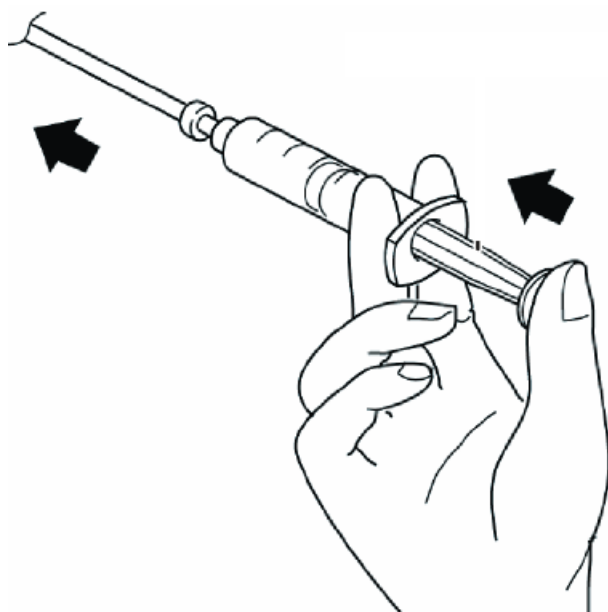


Item	Description
1	Male nut EFTE
2	Coupling 1.6-0.8C
3	Male nut 0.8MN-PEEK
4	Syringe needle
5	Syringe

4. Gently press the syringe plunger.

The isopropanol is injected into the cell interior and cleans the cell.

Figure 5-6 Pressing the Plunger



5. Purge the rinsing solution by using a syringe to flush the flow cell with distilled or deionized water.
6. If cleaning with a syringe does not improve light intensity, replace the column with a coupling, and then pump a rinsing solution into the flow cell assembly for about two hours.

Install the Flow Cell

1. Orient the flow cell with the connector end upward, align the pin holes in the cell with the positioning pins, install the cell on the pins, and then press the cell flush against the module. Refer to [Remove the Flow Cell](#).
2. While placing the flow cell onto the mounting surface, tighten the two cell fixing screws alternately.
3. Insert the connector in the module.
4. Affix the coupling to the module using the coupling mounting screw.
5. Connect the cell inlet tubing to the column and the cell outlet tubing to the waste container.

Note: When performing the above operation, do not let any air enter the flow lines.

6. Reattach the front cover.

Replace the D2 Lamp

A D2 lamp is the light source used in this module. It has a service life of 2000 hours. It is guaranteed for the lesser of 2000 hours or one year of service.

As the D2 lamp used in this module approaches the end of its service life, the light intensity of the lamp begins to decrease and baseline noise starts to increase. When the lamp approaches the end of its service life, replace the lamp with a new one.



WARNING! Electrical Shock Hazard. Fire Hazard. Before replacing a lamp, turn the detector power switch off and unplug the detector. Otherwise, fire, electric shock, or malfunction could result.



WARNING! Radiation Hazard. Do not turn on the power while the lamp housing is exposed to view. You could be exposed to harmful ultraviolet rays.



WARNING! Hot Surface Hazard. Allow the instrument to cool down adequately before performing the lamp replacement procedure. The lamp compartment is extremely hot just after the lamp is turned off.

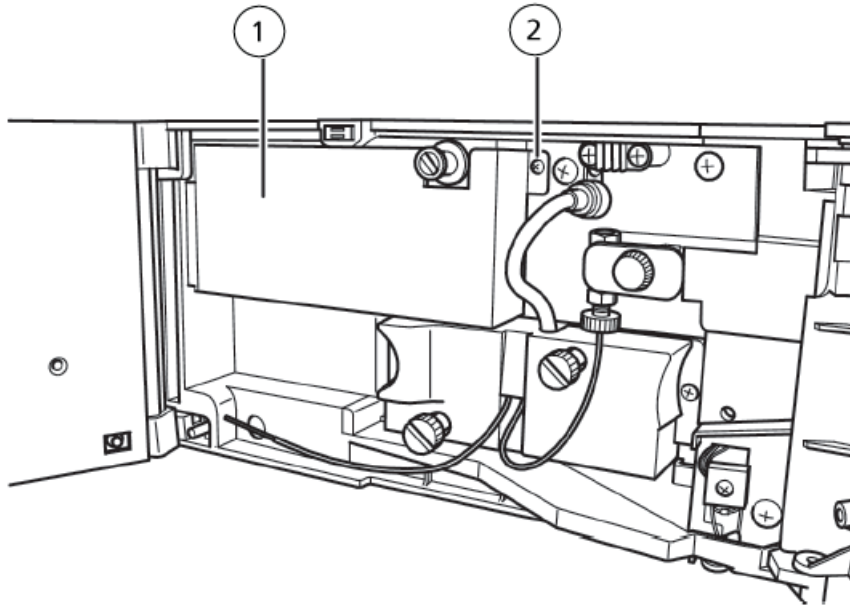
CAUTION: Potential System Damage:

- When holding the lamp, grasp it by the metal flange.
 - When the lamp is dirty, wipe it with lens paper soaked in ethanol.
 - If the lamp cover is removed when the lamp is on, the lamp is turned off automatically.
 - The lamp cannot be turned on while the lamp cover is removed. Be sure to install the lamp cover before turning on the lamp.
 - Be careful that the lamp does not break.
 - Do not shake the lamp.
-

Required Materials
<ul style="list-style-type: none">• D2 lamp

1. Turn off the module and unplug it from the wall.
2. Open the front cover and left side cover.
3. Loosen the lamp cover mounting screw and then remove the lamp cover.

Figure 5-7 Lamp Cover

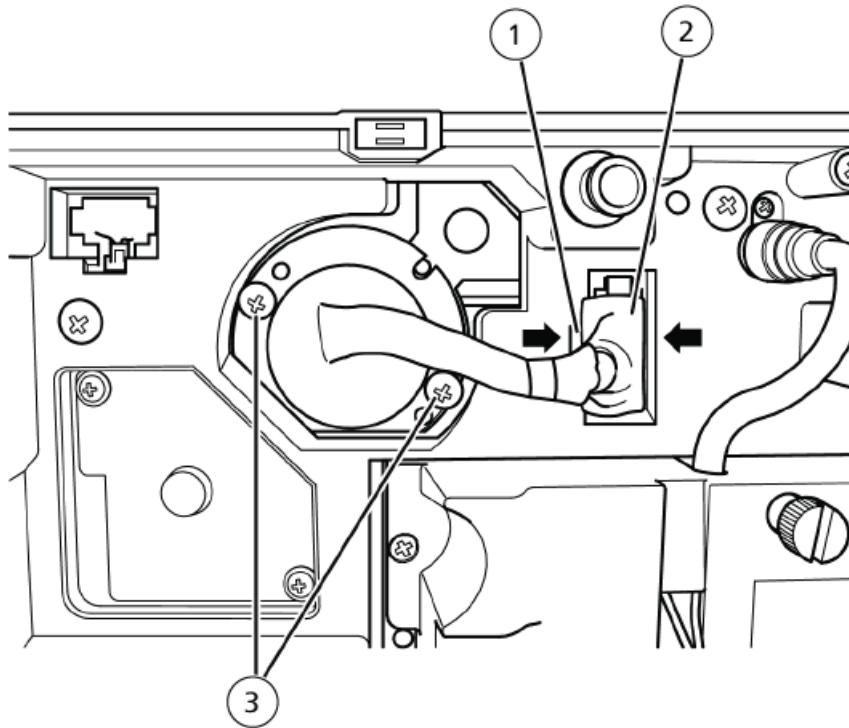


Item	Description
1	Lamp cover
2	Lamp cover fixing screw

4. Disconnect the connector.
5. Loosen the two D2 lamp mounting screws and then pull the lamp out of the module.

Release the stopper by pinching the part indicated by arrows in the [Figure 5-8 on page 30](#), and then pull out the connector.

Figure 5-8 Removing the Lamp



Item	Description
1	Stopper
2	Connector
3	D2 Lamp fixing screws

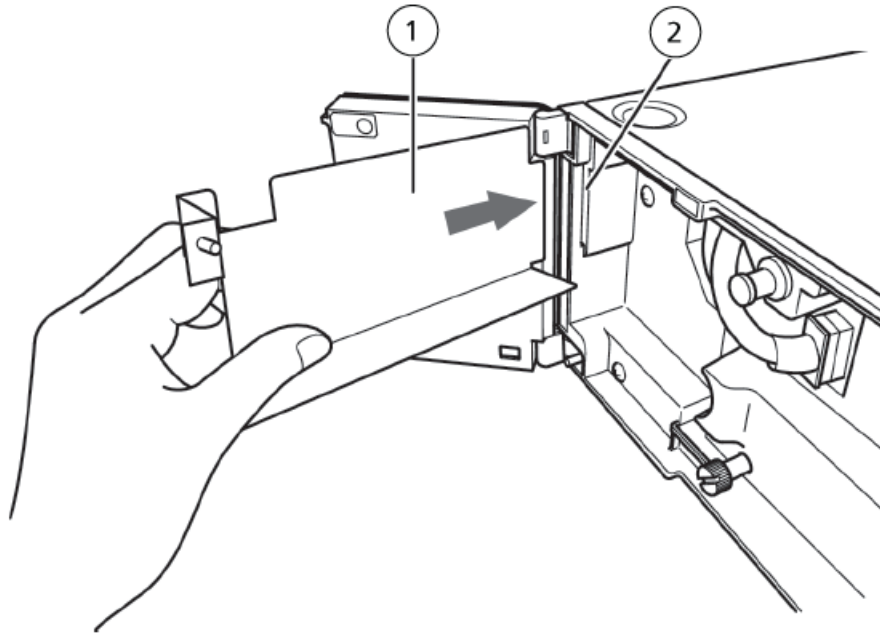
6. Install the new lamp the same way the old lamp was installed.

While placing the D2 lamp onto the mounting surface, tighten the two lamp fixing screws alternately.

7. Install the lamp cover in its original position on the module.

Install the lamp cover by inserting its edge into the slit in the panel and then secure it by tightening the lamp cover mounting screw.

Figure 5-9 Installing Lamp Cover



Item	Description
1	Lamp cover
2	Slit

8. After replacing the D2 lamp, reset the lamp usage time to 0 and set the exposure time.

Replace the Dust Filter

A dust filter is installed on the right side of the module. If the dust filter becomes clogged, the performance of the module deteriorates and even cause module failure. If the dust filter becomes discolored from its original white, replace it with a new one.

Service and Maintenance Information



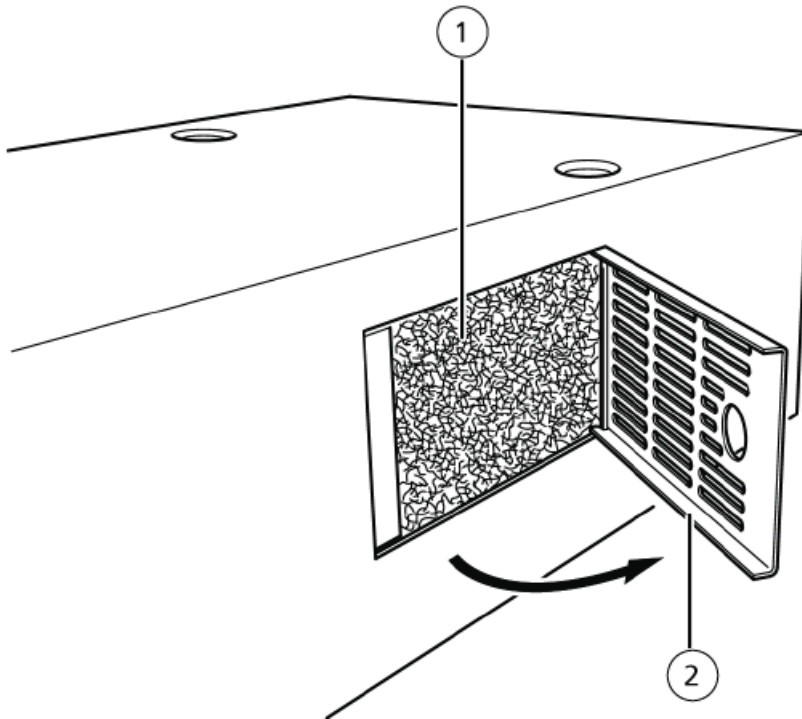
WARNING! Electrical Shock Hazard. Be sure to turn off power to the module before replacing the filter.

Required Materials

- Dust Filter

1. Hooking a finger into the hole in the filter cover on the right side, remove the filter cover, and then remove the filter.

Figure 5-10 Opening the Cover



Item	Description
1	Dust filter
2	Filter cover

2. Replace the filter and then return the filter cover to its original position.

Align the catch on the filter cover with the chassis of the module when fitting the cover.

Clean the Module Surfaces

Required Materials
<ul style="list-style-type: none">• Dry, soft rags, or tissue paper• For persistent stains<ul style="list-style-type: none">• Diluted, neutral detergent• Water

1. Wipe the module surfaces with the rag or tissue paper.
2. If the stains persist, follow these steps:
 - a. Moisten a rag in the diluted, neutral detergent and then wring it dry.
 - b. Wipe the module surfaces, scrubbing as necessary to remove the stains.
 - c. Moisten a rag in water and then wring it dry.
 - d. Wipe the module surfaces.
 - e. Dry with a dry rag.

CAUTION: Potential System Damage. Do not allow spilled water to remain on the instrument surface and do not use alcohol or thinner-type solvents to clean the surfaces. Doing so can cause rusting and discoloration.

Troubleshooting

6

If a problem cannot be resolved even after taking the corrective action specified in the table, or if a problem is not included in the following tables, contact your SCIEX representative.

Table 6-1 Electrical System Issues

Symptom	Probable Cause	Corrective Action
Power is not on even after the power switch is turned on.	A power cable is unplugged.	Properly connect the power cable plug.
	Internal wires of the power cable are cut.	Replace the power cable with the same type of cable.
	The supplied power does not meet specifications for this module.	Use electrical power that meets the specifications for this module.
	The fuse is blown.	Contact an FSE to replace the fuse.
The error indicator illuminates.	A transmission error or liquid leak has occurred.	Refer to the error code number and error message and perform the indicated measures. Refer to Error Messages .

Table 6-2 Baseline Issues

Symptom	Probable Cause	Corrective Action
Excessive noise	Lamp light intensity is insufficient.	Perform the lamp light intensity test. If the lamp light intensity is low, perform the corrective action for "Lamp light intensity is low" in this table. Contact an FSE.
	A strong draft (for example, from an air conditioner) is being drawn into the module.	<ul style="list-style-type: none">Use an appropriate barrier to block direct exposure of the module to drafts.Move the module to a different location.

Table 6-2 Baseline Issues (continued)

Symptom	Probable Cause	Corrective Action
	External vibrations are affecting the module.	<ul style="list-style-type: none"> • Move the module to a sturdy counter. • Take measures to reduce external vibrations.
Cyclical spike-like noise occurs.	The pump is generating a large pulse.	<ul style="list-style-type: none"> • Determine whether the noise disappears when the LC pump is stopped. • Verify the state of the LC pump (pulsation). Eliminate pulsation from the pump unit.
	The cell contains bubbles.	<ul style="list-style-type: none"> • Determine whether the baseline shows a significant change when solvent delivery is manually stopped. • If bubbles are flowing through the cell, perform corrective action for bubbles. Refer to Corrective Action for Bubbles.
Random spike-like noise occurs.	Bubbles are flowing through cell.	<ul style="list-style-type: none"> • Put the tip of the detector drain tube in liquid and determine whether bubbles are exiting the tube. • If bubbles are flowing through the cell, perform corrective action for bubbles. Refer to Corrective Action for Bubbles.

Troubleshooting

Table 6-2 Baseline Issues (continued)

Symptom	Probable Cause	Corrective Action
Sawtooth-like noise occurs. (Repeating pattern of baseline drifting upward, then suddenly changing to downward direction.)	Small bubbles are being trapped temporarily in the cell and then flowing out.	<ul style="list-style-type: none"> Put the tip of the detector drain tube in liquid and determine whether bubbles are exiting the tube. If bubbles are flowing through the cell, perform corrective action for bubbles. Refer to Corrective Action for Bubbles.
Baseline drifts.	Liquid is leaking.	<ul style="list-style-type: none"> Determine whether liquid is leaking from the cell inlet tubing or outlet tubing joints, or from the cell. If there is a leak, wipe off the leaked liquid and dry the affected area. Perform maintenance to eliminate the leak. In case of liquid leaks from the flow cell window, soak up the leak and then tighten the cell window fixing screw. Refer to Corrective Action against Leaks from Cell Window.
	There is looseness or a gap present where the lamp and flow cell are installed.	<p>If there is any looseness or a gap, re-install the item properly.</p> <p>Refer to Remove the Flow Cell and Replace the D2 Lamp.</p>
Large amount of drift	The mobile phase and column are unstable.	Determine whether the drift decreases when solvent delivery is stopped. If the degree of drift decreases, the mobile phase might have impurities or the column might be insufficiently equilibrated. Inspect the mobile phase, column, and analysis parameters.

Table 6-2 Baseline Issues (continued)

Symptom	Probable Cause	Corrective Action
	Measurement is being performed immediately after the lamp is turned on.	Module stabilization takes at least 1 hour after the lamp is turned on, or in the case of high sensitivity measurement, 1.5 hours after the lamp is turned on. Start measurement after waiting for stabilization to complete.
	The ambient temperature is fluctuating.	<ul style="list-style-type: none"> • Stabilize the ambient temperature. • Install the module in a location where there is little temperature fluctuation. • Attach the provided insulation tube to the inlet plumbing. Refer to <i>Insulation Tube</i>.
	Liquid is leaking from the cell.	<ul style="list-style-type: none"> • Determine whether liquid is leaking from the cell inlet tubing or outlet tubing joints, or from the cell. If there is a leak, wipe off the leaked liquid and dry the affected area. Perform maintenance to eliminate the leak. • In case of liquid leaks from the flow cell window, soak up the leak and then tighten the cell window fixing screw. • Refer to <i>Corrective Action against Leaks from Cell Window</i>.

Troubleshooting

Table 6-2 Baseline Issues (continued)

Symptom	Probable Cause	Corrective Action
	A strong draft (for example, from an air conditioner) is being drawn into the module.	<ul style="list-style-type: none"> Use an appropriate barrier to block direct exposure of the module to drafts. Move the module to a different location. Attach the provided insulation tube to the inlet plumbing. Refer to Insulation Tube.
Baseline is unstable with a large amount of drift and noise.	Bubbles are trapped in the cell.	<ul style="list-style-type: none"> Determine whether the baseline changes when the tip of the cell outlet tubing is blocked. If bubbles are flowing through the cell, perform corrective action for bubbles. Refer to Corrective Action for Bubbles.
Meandering baseline	A strong draft is being drawn into the detector.	<ul style="list-style-type: none"> Use an appropriate barrier to block direct exposure of the module to drafts. Install the module at a site where temperature fluctuations are small. Attach the provided insulation tube to the inlet plumbing. Refer to Insulation Tube.

Table 6-3 Lamp Light Intensity-Related

Symptom	Probable Cause	Corrective Action
Lamp light intensity is low.	The cell is dirty.	Clean the flow cell. Refer to Clean the Flow Cell .
	The mobile phase absorbs strongly.	Inspect the mobile phase solvent and flow lines, and remove any impurities.

Table 6-3 Lamp Light Intensity-Related (continued)

Symptom	Probable Cause	Corrective Action
	The lamp light intensity has deteriorated.	Verify the total lamp illumination time.
	The exposure time setting is not appropriate.	Perform automatic setting of the exposure time.

Table 6-4 Wavelength Issues

Symptom	Probable Cause	Corrective Action
Wavelength is shifted.	Wavelength calibration has not been performed correctly.	Perform wavelength calibration.

Corrective Action for Bubbles

- **Expelling Bubbles from the Cell:** If bubbles become trapped in the cell, expel the bubbles by rinsing the cell with degassed mobile phases.
- **Preventing the Formation of Bubbles:** Use mobile phase that has been adequately degassed. (Use a degasser.) For mobile phases that cannot be degassed or mobile phases in which bubble formation is likely even after degassing, connect 0.3 mm ID x 2 m tubing to the cell outlet. Connecting 0.3 mm ID x 2 m tubing will produce about 0.2 MPa (2 kgf/cm²) back pressure when water is flowing at 1 mL/min. When back pressure is to be applied, first remove the cell from the module to verify that there is no leakage, and then re-install the cell.

If the internal surface of the cell is dirty, bubbles have a tendency to collect on the surface, especially in case of aqueous mobile phases. Clean the cell using alcohol or another miscible liquid.

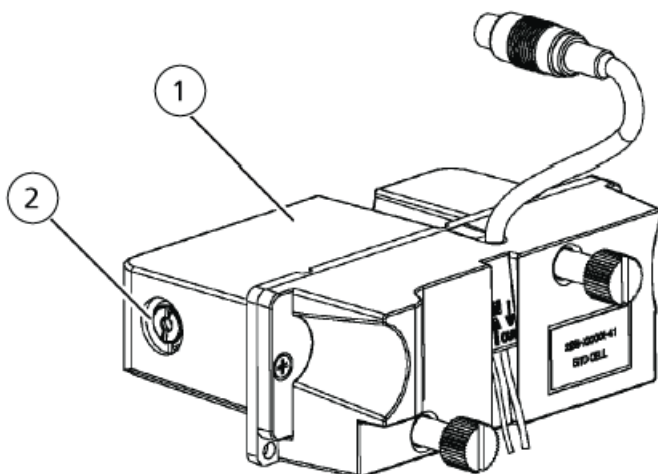
Insulation Tube

If the mobile phase contains substances with a large temperature coefficient of absorbance, such as triethylamine and phosphate buffer, baseline drift or wandering might occur. This effect is due to temperature change in mobile phase flowing into the detector, caused by ambient temperature fluctuation or air flowing directly to the module. In such a case, attach the provided insulation tube to the inlet plumbing. This will insulate the plumbing between the oven and detector, reducing the baseline fluctuation due to ambient temperature change.

Corrective Action against Leaks from Cell Window

1. In case of liquid leaks from the flow cell window, first use a laboratory wiper to soak up the leak, and then firmly tighten the cell window fixing screw (groove width 1 mm, groove length 8 mm) clockwise with a flat-bladed screwdriver.
2. If the leak does not stop even after tightening the screw, contact your SCIEX representative.

Figure 6-1 Corrective Action Against Leaks from Cell Window



Item	Description
1	Flow cell
2	Cell window fixing screw

Error Messages

A

The following table shows the error messages that can appear on the acquisition computer, along with their probable causes and corrective action.

Error Code	Error Message	Probable Cause	Corrective Action
0x8952	TCP/IP communications timed out.	The ethernet communication with the computer timed out.	Verify the operating state of the acquisition computer and the LAN cable connection.
0x8954	CBM LAN timeout.	The ethernet communication with the controller timed out.	Verify the operating state of the controller and the LAN cable connection.
0x8965	Cell is not calibrated.	An unregistered cell was installed in the module.	Perform cell registration, exposure time adjustment, and wavelength calibration.
		The cell ID could not be read.	Verify the connection of the cell cable.
0x8966	The exposure time of the not adjusted. Set the exposure time.	The exposure time of the installed cell is not adjusted.	Set the exposure time.
0x8967	The wavelength of the installed cell is not calibrated. Perform wavelength calibration.	The wavelength of the installed cell is not calibrated.	Perform wavelength calibration.
0x89D2	Temperature is increasing inside the module.	The dust filter on the back of the module is clogged.	If the filter is clogged, replace the filter.
0x8921	Leak is detected.	The mobile phase is leaking inside the system.	Inspect the tubing. Refer to Corrective Action against Leaks from Cell Window and Clean the Flow Cell .
0x89C2	D2 lamp is over current.	The D2 has lamp malfunctioned.	Replace the D2 lamp. Refer to Replace the D2 Lamp .
		The lighting circuit has malfunctioned.	Turn off the power and then contact the FSE.

Error Messages

Error Code	Error Message	Probable Cause	Corrective Action
0x89C3	There is a problem with the D2 lamp. Inspect the lamp connections and the lamp for defects.	The D2 has lamp malfunctioned.	Replace the D2 lamp. Refer to Replace the D2 Lamp .
		Lighting circuit malfunction	Turn off the power and then contact the FSE.
0x89C7	D2 lamp heater is over current.	Lighting circuit malfunction	Turn off the power and then contact the FSE.
0x89CA	D2 lamp heater current is low.	The D2 has lamp malfunctioned.	Replace the D2 lamp. Refer to Replace the D2 Lamp .
		Lighting circuit malfunction	Turn off the power and then contact the FSE.
0x89C8	Lamp housing is overheated.	The dust filter on the back of the module is clogged.	If the filter is clogged, replace the filter. Refer to Replace the Dust Filter .
0x89D6	Lamp housing fan rotation error.	Lamp compartment fan malfunction	Turn off the power and then contact the FSE.
0x89D7	Power heat exhaust fan rotation error.	Power heat exhaust fan malfunction	Turn off the power and then contact the FSE.
0x89D8	Polychromator is overheated.	A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x89D9	Heater sensor is open.	A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x89DA	Room sensor is open.	A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x8904	Invalid EEPROM parameter.	EEPROM malfunction occurred inside the module.	Turn off the power and then contact the FSE.
0x8941	Communications to PC data buffer overflow.	Failed to send detector data to the acquisition computer, or the computer stopped during analysis.	Verify the connection to the computer (network and so on).
0x8944	Buffer memory overflow in detector during analysis. It is not possible to send the data again.	Failed to send detector data to the acquisition computer, or the computer stopped during analysis.	Verify the connection to the computer (network and so on).
0x8945	Photo diode is saturated.	The signal is saturated because the exposure time for the PDA elements is inappropriate.	Perform exposure time optimization using SPDM30A Utility.

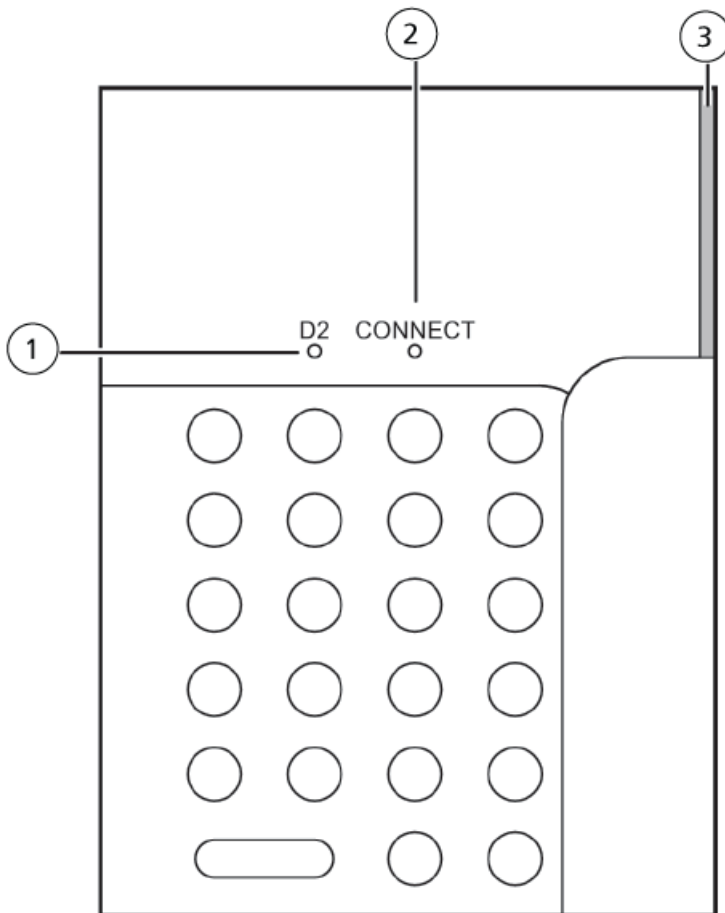
Error Code	Error Message	Probable Cause	Corrective Action
0x897A	Lamp housing temperature sensor is open.	A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x8978	Leak sensor is short-circuited.	A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x8979	Leak sensor is open.	A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x8956	IP resource contention.	A device with the same IP address as the module exists on the same network.	Change the IP address of the module or device to resolve the collision.
0x8964	Failed to detect Cell.	The cell is not installed or the cell cable is not connected.	Install the cell and connect the cable correctly. Refer to Install the Flow Cell .
0x89C6	The light source compartment cover is open. Close the cover.	The lamp compartment cover was opened during D2 lamp illumination. The lamp has been turned off to prevent electric shocks and exposure to ultraviolet light.	Close the lamp cover. Refer to Replace the D2 Lamp .
0x89CB	Failure to detect D2 lamp.	The D2 lamp is not installed.	Install the D2 lamp. Refer to Replace the D2 Lamp .
0x89D1	Failure to detect light shutter/filter origin.	A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x89D3	Abnormal high temperature is detected inside the module.	The dust filter on the back of the module is clogged.	If the filter is clogged, replace the filter.
		A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x89D4	D2 lamp overvoltage.	The D2 has lamp malfunctioned.	Replace the D2 lamp. Refer to Replace the D2 Lamp .
		A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.
0x89D5	D2 lamp overvoltage.	The D2 has lamp malfunctioned.	Replace the D2 lamp. Refer to Replace the D2 Lamp .
		A malfunction has occurred inside the module.	Turn off the power and then contact the FSE.

Status Panel

B

Note: The status panel screen might become hot when in use.

Figure B-1 Status Panel: Names and Functions



Item	Description
1	D2 (D2 lamp). Illuminates when the D2 lamp is turned on. The LED blinks while the lamp is warming up.
2	CONNECT. Illuminates when the module is connected to the system controller and the computer.
3	Status indicator: <ul data-bbox="418 520 711 651" style="list-style-type: none">• Green: Power is on• Red: Error• Orange: In sleep mode

Consumables and Spares

C

Option	Part No.	Features
D2 (deuterium) lamp	228-54515	
Dust filter	228-54534	
Male nuts ETFE	S228-5675	
Insulation tube	S228-56760	
Flat-bladed screwdriver	S086-10504-18	

Revision History

Revision	Description	Date
A	First release of document.	April 2015
B	Remove incorrect graphics from Troubleshooting section.	October 2015