

OptiFlow Pro Ion Source

For SCIEX 7500/7500+ Systems

Operator Guide



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Operational Precautions and Limitations

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Note: Before operating the system, carefully read all of the sections of this guide.

This section contains general safety-related information. It also describes potential hazards and associated warnings for the system and the precautions that should be taken to minimize the hazards.

For information about the symbols and conventions used in the laboratory environment, on the system, and in this documentation, refer to the section: [Glossary of Symbols](#).

Operational Precautions and Hazards

For regulatory and safety information for the mass spectrometer, refer to the document: *System User Guide*.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Do not use the ion source without knowledge of and training in the proper use, containment, and evacuation of toxic or injurious materials used with the ion source.



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Pro ion source cool for at least 40 minutes. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Fire and Toxic Chemical Hazard. Before solvent leaks are corrected, make sure that the liquid flow to the ion source is stopped, that the ion spray voltage is off, that there are no open flames or other sources of fire nearby, and that the room is sufficiently ventilated. The fluid from a leak can be highly flammable. If the fluid is exposed to electrical discharges or a source of fire, then ignition can occur. If ventilation is not sufficient, then the fluid might cause poisoning.



WARNING! Toxic Chemical Hazard. Wear personal protective equipment (PPE), including a laboratory coat, gloves, and safety glasses, to avoid skin or eye exposure.

Operational Precautions and Limitations



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. In the event of a chemical spill, review product safety data sheets for specific instructions. Make sure that the system is in Standby state before cleaning a spill near the ion source. Use applicable personal protective equipment and absorbent wipes to contain the spill and dispose of it following local regulations.



WARNING! Environmental Hazard. Do not discard system components in municipal waste. To discard components correctly, obey local regulations.



WARNING! Electrical Shock Hazard. Avoid contact with the high voltages applied to the ion source during operation. Put the system in Standby state before adjusting the sample tubing or other equipment near the ion source.

Note: Use zero air when using the OptiFlow Pro ion source with micro flow rates under 10 $\mu\text{L}/\text{min}$. Do not use UHP nitrogen for Ion source gas 1 or Ion source gas 2, because there is an increased risk of corona discharge, which can damage the emitter tip.

Chemical Precautions



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Before cleaning or maintenance, identify whether decontamination is required. If radioactive materials, biological agents, or toxic chemicals have been used with the system, then the customer must decontaminate the system before cleaning or maintenance.



WARNING! Puncture Hazard, Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. If the ion source window is cracked or broken, then do not use the ion source. Contact a SCIEX field service employee (FSE). Any toxic or injurious materials introduced in the equipment will be present in the source exhaust output. Exhaust from equipment should be vented from the room. Dispose of sharps following established laboratory safety procedures.



WARNING! Environmental Hazard. Do not discard system components in municipal waste. To discard components correctly, obey local regulations.



WARNING! Biohazard or Toxic Chemical Hazard. To prevent leaks, connect the drain tubing to the mass spectrometer and the source exhaust drain bottle correctly.

- Before servicing and regular maintenance, identify the chemicals that have been used in the system. For the health and safety precautions that must be obeyed for a chemical, refer to the

safety data sheet (SDS). For storage information, refer to the certificate of analysis. To find a SCIEX SDS or certificate of analysis, go to sciex.com/tech-regulatory.

- Always wear assigned personal protective equipment, including powder-free gloves, protective eyewear, and a laboratory coat.

Note: Nitrile or neoprene gloves are recommended.

- Do work in a well-ventilated area or fume hood.
- When flammable materials such as isopropanol, methanol, and other flammable solvents are in use, do not go near ignition sources.
- Be careful with the use and disposal of any chemicals. If the correct procedures for chemical handling and disposal are not obeyed, then personal injury can occur.
- During cleaning, do not let chemicals touch the skin. Wash hands after use.
- Make sure that all exhaust hoses are connected correctly and that all connections are functioning as designed.
- Collect all spent liquids and discard them as hazardous waste.
- Obey all of the local regulations for the storage, handling, and disposal of biohazardous, toxic, and radioactive materials.

Laboratory Conditions

Safe Environmental Conditions

The system is designed to operate safely under these conditions:

- Indoors
- Altitude: Up to 2,000 m (6,560 ft) above sea level
- Ambient temperature: 10 °C (50 °F) to 35 °C (95 °F)
- Relative humidity: 20% to 80%, non-condensing
- Mains supply voltage fluctuations: $\pm 10\%$ of the nominal voltage
- Transient overvoltages: Up to the levels of Overvoltage Category II
- Temporary overvoltages on the mains supply
- Pollution Degree 2

Performance Specifications

The system is designed to meet specifications under these conditions:

- Ambient temperature is between 15 °C to 30 °C (59 °F to 86 °F).

Operational Precautions and Limitations

- Relative humidity is between 20% to 80%, non-condensing.

Equipment Use and Modification



WARNING! Electrical Shock Hazard. Do not remove the covers. If the covers are removed, then injury or incorrect system operation can occur. Removal of the covers is not required for routine maintenance, inspection, or adjustment. For repairs that require removal of the covers, contact a SCIEX field service employee (FSE).



WARNING! Personal Injury Hazard. Use SCIEX-recommended parts only. The use of parts that are not recommended by SCIEX or the use of parts for any purpose other than their intended purpose can put the user at risk of harm or have a negative effect on system performance.

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

If the system is used in an environment or with a method that is not approved by the manufacturer, then the performance and protection that is supplied by the equipment might be decreased.

Contact an FSE for information about servicing the system. Unauthorized modification or operation of the system might cause personal injury and equipment damage, and might void the warranty. If the system is operated outside the recommended environmental conditions or with unauthorized modifications, then the acquired data might be inaccurate.

Ion Source Overview

2

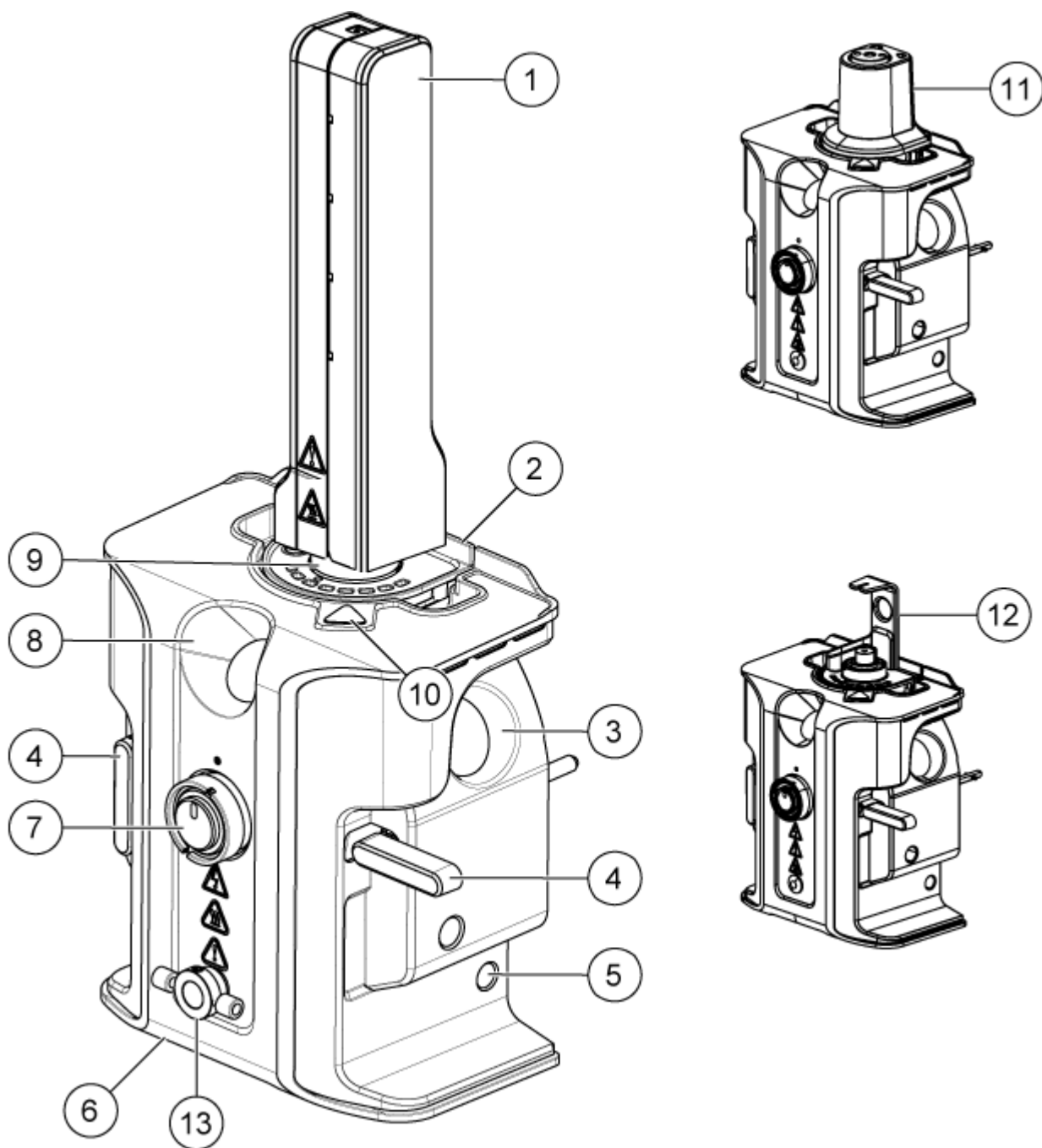
The OptiFlow Pro ion source can be used with the SCIEX 7500 and 7500+ systems.

The ion source has two probe ports, a front port and a top port.

- If the ion source is configured for analytical flow ESI operation, the Analytical probe must be installed in the top port, and the E Lens probe (analytical) must be installed in the front port.
- If the ion source is configured for micro flow ESI operation, a Micro probe must be installed in the top port, and the E Lens probe (micro) or a probe port plug must be installed in the front port.
- If the ion source is configured with the APCI module, a probe port plug must be installed in the front port.

Ion Source Components

Figure 2-1 Ion Source Components



Item	Description
1	Micro column heater
2	ESI module (can be configured with a Micro or Analytical probe, with the E Lens probe or a probe port plug)
3	Side window glass
4	Source latch
5	Right side cover
6	Front cover
7	E Lens probe or probe port plug
8	Front window glass
9	Top probe port (Micro probe shown)
10	High-voltage indicator light. If the system is in Ready state and the ion source voltage or current setpoint is more than 0, then the high-voltage indicator is illuminated.
11	APCI module (can be configured for direct infusion)
12	Infusion adapter
13	Optional grounding union. Recommended for use with the Analytical > 200 μ L probe.

Ion Source Operation

The OptiFlow Pro ion source has three modes of operation. Components must be installed in the correct order for each mode to operate correctly.

- Analytical flow ESI
- Micro flow ESI
- APCI

Analytical Flow ESI

Required Materials
<ul style="list-style-type: none">• Ion source• ESI module• E Lens probe (analytical)• Infusion adapter• Electrode• PEEK fittings• (Optional) Grounding union

Table 2-1 Flow and Component Compatibility

Flow Rate	Probe	Electrode	E Lens Probe or Probe Port Plug
200 μ L/min to 3,000 μ L/min	Analytical > 200 μ L	Analytical	E Lens probe (analytical) > 200 μ L

Install the components for analytical flow ESI in the following order:

1. Install the ESI module. Refer to the section: [Install the ESI or APCI Module](#).
2. Install the Analytical probe in the top probe port. Refer to the section: [Install the Micro or Analytical Probe, the E Lens Probe, or the Probe Port Plug](#).
3. Install the electrode in the Analytical probe. Refer to the section: [Install the Electrode in the Analytical Probe](#).
4. Install the E Lens probe (analytical) > 200 μ L in the front probe port. Refer to the section: [Install the Micro or Analytical Probe, the E Lens Probe, or the Probe Port Plug](#).
5. (Optional) Install the grounding union. Refer to the section: [Install the Optional Grounding Union](#).
6. Install the ion source. Refer to the section: [Install the Ion Source on the Mass Spectrometer](#).
7. Connect the liquid tubing from the LC system to one of the following components:
 - Diverter valve (if used)
 - Grounding union on the ion source (if used)
 - Ion source probe

Refer to the section: [Configure the Diverter Valve for Analytical Flow ESI Operation](#).

8. Install the infusion adapter. Refer to the section: [Install an Infusion Adapter and Connect the Sample Tubing to the ESI Module](#).

Micro Flow ESI

Required Materials
<ul style="list-style-type: none"> • Ion source • ESI module • Micro probe • Electrode • E Lens probe (micro) or probe port plug • Column • Micro column and heater • Infusion adapter • PEEK Tee or union • PEEK-clad fused-silica tubing

Note: Connection of the liquid tubing to the grounding union or diverter valve is not recommended. The additional dead volume has an effect on low-flow chromatographic performance.

Table 2-2 Flow and Component Compatibility

Flow Rate	Probe	Electrode	E Lens Probe or Probe Port Plug
1 μ L/min to 10 μ L/min	Micro 1 — 50 μ L	Electrode 1 — 10 μ L	E Lens probe (micro) or probe port plug
10 μ L/min to 50 μ L/min	Micro 1 — 50 μ L	Electrode 10 — 50 μ L	E Lens probe (micro) or probe port plug
50 μ L/min to 200 μ L/min	Micro 50 — 200 μ L	Electrode 50 — 200 μ L	E Lens probe (micro) or probe port plug

Install the components for micro flow ESI in the following order:

1. Install the ESI module. Refer to the section: [Install the ESI or APCI Module](#).
2. Install the Micro probe in the top probe port. Refer to the section: [Install the Micro or Analytical Probe, the E Lens Probe, or the Probe Port Plug](#).

Ion Source Overview

3. Install the electrode in the Micro probe. Refer to the section: [Install the Electrode in a Micro Probe](#).
4. Install the E Lens probe (micro) in the front probe port. Refer to the section: [Install the Micro or Analytical Probe, the E Lens Probe, or the Probe Port Plug](#).
5. Install the ion source. Refer to the section: [Install the Ion Source on the Mass Spectrometer](#).
6. For analysis by infusion, do this:
 - a. Install a PEEK union or Tee. Refer to the section: [Install an Infusion Adapter and Connect the Sample Tubing to the ESI Module](#).
 - b. Install the infusion adapter. Refer to the section: [Install an Infusion Adapter and Connect the Sample Tubing to the ESI Module](#).
7. For analysis by LC-MS, do this:
 - a. Install a Micro column and heater. Refer to the section: [Install the Micro Column and Heater](#).
 - b. Connect the liquid tubing from the LC system to the ion source probe.

APCI

Required Materials
<ul style="list-style-type: none">• Ion source• APCI module• Probe port plug• Column• Infusion adapter• Electrode• Fittings• PEEK Tee• PEEK-clad fused silica tubing

Table 2-3 Flow and Component Compatibility

Flow Rate	Probe	Electrode	E Lens Probe or Probe Port Plug
200 $\mu\text{L}/\text{min}$ to 3000 $\mu\text{L}/\text{min}$	Integrated into the APCI module. The probe can not be removed	APCI electrode. The APCI electrode is pre- installed in the APCI module probe.	Probe port plug

Install the components in the following order:

1. Install the APCI module. Refer to the section: [Install the ESI or APCI Module](#).
2. If the probe in the APCI module does not have the electrode installed, then install the electrode in the probe.

Note: The APCI module is shipped with the probe and electrode pre-installed. The electrode can be replaced. However, the probe is integrated into the module and can not be removed.

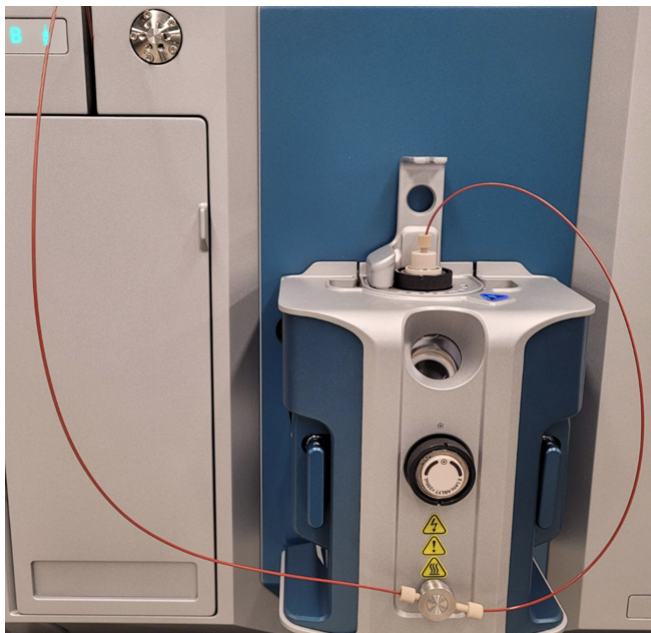
3. Install the probe port plug in the front probe port. Refer to the section: [Install the Micro or Analytical Probe, the E Lens Probe, or the Probe Port Plug](#).
4. Install the ion source. Refer to the section: [Install the Ion Source on the Mass Spectrometer](#).
5. Connect any liquid tubing.

Options for Grounding the Liquid Flow

For analytical ESI operation, the liquid flow to the ion source must be electrically grounded. To ground the flow, we usually recommend that the tubing from the LC system be connected to the diverter valve. Refer to the section: [Configure the Diverter Valve for Analytical Flow ESI Operation](#).

As an alternative, connect the tubing to the grounding union. The grounding union has no effect on performance.

Figure 2-2 Tubing Connected to the Grounding Union



Gas and Electrical Connections

Gas and low- and high-voltage electrical connections are provided on the front plate of the vacuum interface and they connect internally through the ion source housing. When the ion source is installed on the mass spectrometer, all of the electrical and gas connections are complete.

Ion Source Sense Circuit

An ion source sense circuit disables the high-voltage power supply for the mass spectrometer and the source exhaust system under these conditions:

- The ion source is not installed or is incorrectly installed.
- The mass spectrometer senses a gas fault.
- The Micro column heater or infusion adapter is not installed.
- The ion source has overheated.

Source Exhaust System



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Make sure that the source exhaust system is connected and functioning, to safely remove sample vapor exhaust from the laboratory environment. Emissions from the equipment must be exhausted in the general building exhaust and not allowed to exhaust in the workspace of the laboratory. For requirements for the source exhaust system, refer to the document: *Site Planning Guide*.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Vent the source exhaust system to either a dedicated laboratory fume hood or an external ventilation system to prevent hazardous vapors from being released in the laboratory environment.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. If an LC system is used with the mass spectrometer, and if the source exhaust system is not functioning properly, then shut down the LC system until functionality of the source exhaust system has been restored.



WARNING! Fire Hazard. Do not direct more than 2 mL/min of flammable solvent in the ion source. Exceeding the maximum flow rate can cause solvent to accumulate in the ion source. Do not use the ion source if the source exhaust system is not enabled and functioning when the ion source and the probe are properly installed.

Note: Make sure that all of the exhaust tubing is securely connected to decrease the chance of equipment exhaust entering the room.

An ion source produces both sample and solvent vapors. These vapors are a potential hazard to the laboratory environment. The source exhaust system is designed to help the user safely remove and correctly handle the sample and solvent vapors. When the ion source is installed, the mass spectrometer does not operate unless the source exhaust system is operating.

An active exhaust system removes ion source exhaust, including gases, solvent, and sample vapor, through a drain port, without introducing chemical noise. The drain port connects through a drain chamber and a source exhaust pump to a drain bottle, and from there to a customer-supplied exhaust ventilation system. For information about the ventilation requirements for the source exhaust system, refer to the document: *Site Planning Guide*.

Note: Examine the source exhaust system periodically to make sure that the exhaust tubing is intact and that exhaust is not leaking in the room.

Ion Source Installation

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WARNING! Electrical Shock Hazard. Do not use electrically conductive tubing or fittings, such as stainless steel or any other metal or metallic compound, with the ion source. A static shock or equipment malfunction might occur. Use only non-electrically conductive tubing and fittings, such as PEEK or PEEK-clad fused silica.



WARNING! Electrical Shock Hazard. When introducing a sample through infusion, remove the infusion adapter to disable the high voltage before inspecting any fittings and tubing for leaks. Contact with liquid leaking from the probe fittings or tubing can result in a static shock if there is high voltage present.



WARNING! Electrical Shock Hazard. Install the ion source on the mass spectrometer as the last step in this procedure. High voltage is present when the ion source is installed.

CAUTION: Potential System Damage. Do not lift or carry the ion source with one hand. The ion source is designed to be lifted or carried using two hands, one on each side of the ion source.

When the ion source is installed, the software recognizes the ion source and shows the ion source identification.

Required Materials

- Ion source
- ESI module
- APCI module
- Micro column heater
- Micro or Analytical probe
- E Lens probe (Analytical or Micro) or the probe port plug
- Column
- Infusion adapter and PEEK Tee
- Electrode
- PEEK-clad fused silica tubing
- Top and bottom fittings for the Micro or Analytical probe

Install the ESI or APCI Module

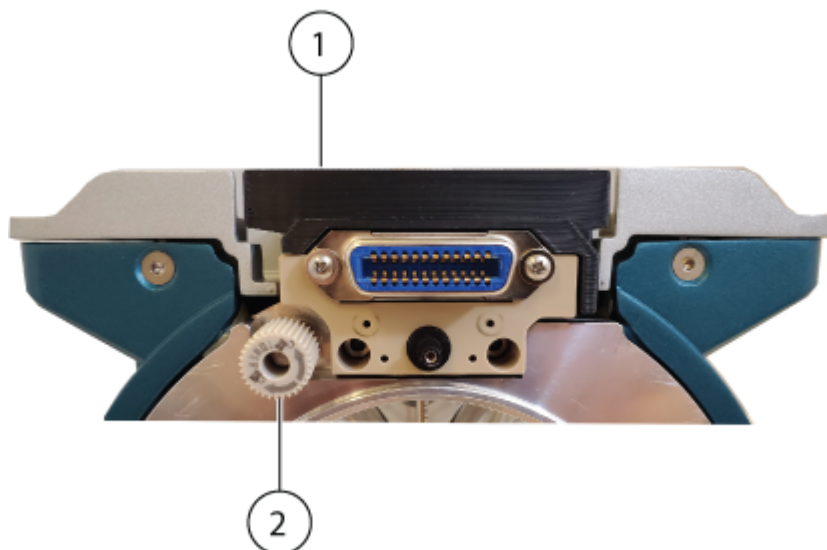


WARNING! Puncture Hazard. Be careful when handling the APCI module. The tip of the corona discharge needle is extremely sharp.

CAUTION: Potential System Damage. Do not let the protruding electrode tip or the corona discharge needle touch any part of the ion source housing, to avoid damaging the probe.

1. Lower the ESI or APCI module in the ion source housing. Make sure that the module is seated firmly with no movement.
2. Rotate the locking dial on the ion source clockwise until it stops turning.

Figure 3-1 Locking Dial



Item	Description
1	Module (ESI module is displayed)
2	Locking dial

Note: When removing the ESI or APCI module, rotate the locking dial counter-clockwise until it stops turning.

Install the Micro or Analytical Probe, the E Lens Probe, or the Probe Port Plug

The probes, E Lens probe, and probe port plug are all installing in the same method. The probes can only be installed in the top port. The E Lens probe or the probe port plug must be installed in the front port.

Prerequisite Procedures

- If the Micro or Analytical probe is being installed, then install the ESI module. Refer to the section: [Install the ESI or APCI Module](#)

1. If the Micro or Analytical probe is being installed, then follow these steps:

Tip! The probe contains a dot that must align with a corresponding dot on the ion source housing, when the probe is being installed in the ion source.

- a. Insert the probe in the top port.
 - b. Tighten the knurled ring of the probe.
2. If the E Lens probe or the probe port plug is being installed, then follow these steps:

Tip! The E Lens probe and the probe port plug contain a dot that must align with a corresponding dot on the ion source housing, when the E Lens probe or probe port plug is being installed in the ion source.

- a. Insert the E Lens probe or the probe port plug in the front probe port, as required for the ESI configuration.
- b. Tighten the knurled ring of the E Lens probe or the probe port plug.

Install the Optional Grounding Union



WARNING! Electrical Shock Hazard. Before this procedure is started, remove the ion source from the mass spectrometer. Obey all electrical safe work practices.

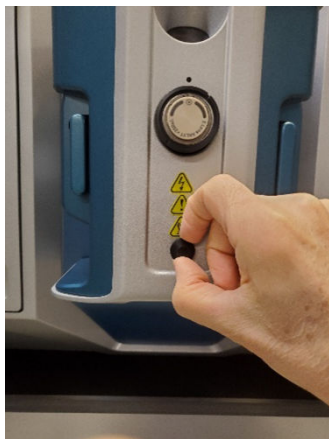
Required Materials
<ul style="list-style-type: none">• Phillips screwdriver• 3/32-inch hex key

Note: For information about the options for grounding the liquid flow, refer to the section: [Options for Grounding the Liquid Flow](#).

1. Remove the plastic cap that is on the union mounting post on the front of the ion source.

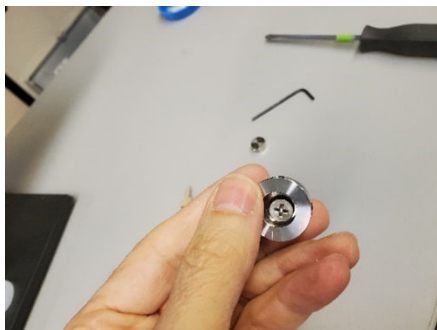
Ion Source Installation

Figure 3-2 Remove the Plastic Cap



2. Install the Phillips screw in the fitting for the grounding tee.

Figure 3-3 Screw Installed in the Fitting



3. Install the fitting for the grounding tee on the union mounting post, and then tighten the screw. Make sure that the input and output ports are in the correct orientation.

Figure 3-4 Tighten the Screw



4. Align the ports of the union with the two ports on the fitting for the grounding tee, and then install the union in the fitting for the grounding tee.

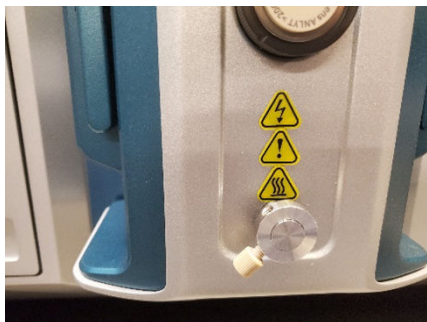
Figure 3-5 Install the Union



5. Install the 1/16-inch fittings to make sure that the union is correctly aligned with the fitting for the grounding tee.

Ion Source Installation

Figure 3-6 Fitting Installed on the Union



6. Tighten the captive 3/32-inch hex screw on the fitting for the grounding tee.

Figure 3-7 Tighten the Captive Screw



7. Install the ion source on the mass spectrometer. Refer to the section: [Install the Ion Source on the Mass Spectrometer](#).
8. Connect the PEEK tubing from the probe to the fitting for the grounding tee.

Figure 3-8 PEEK Tubing Connected



Install the Ion Source on the Mass Spectrometer

CAUTION: Potential System Damage. Do not let the protruding electrode touch any part of the ion source housing, to avoid damaging the electrode.

1. Make sure that the source latches on either side of the ion source are pointing up in the 9 o'clock and 3 o'clock positions.
2. Align the ion source with the vacuum interface, making sure that the guide pins on the ion source are aligned with the sockets in the vacuum interface.
3. Push the ion source gently against the vacuum interface, and then rotate the ion source latches down to lock the ion source in position.

Install the Electrode in the Analytical Probe



WARNING! Puncture Hazard. Be careful when handling the electrode. The tip of the electrode is extremely sharp.

CAUTION: Potential System Damage. Install the probe in the ion source before the electrode is installed in the probe. This reduces the risk of damaging the electrode tip while installing it in the ion source.

CAUTION: Potential System Damage. Do not let the protruding electrode tip touch any part of the ion source housing, to avoid damaging the electrode.

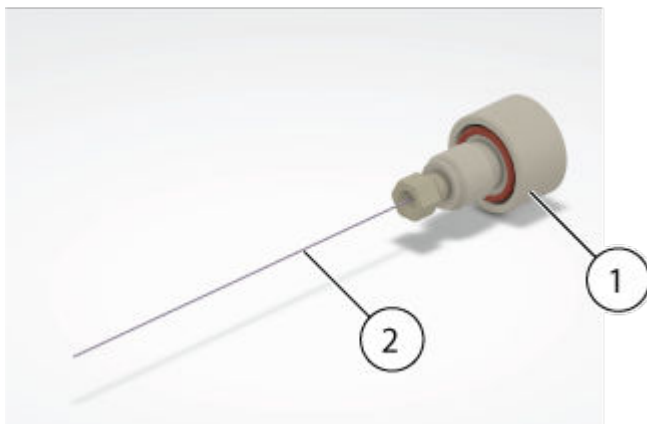
Prerequisite Procedures

- Install the ESI module. Refer to the section: [Install the ESI or APCI Module](#).
- [Install the Ion Source on the Mass Spectrometer](#).

The electrode is configured with the fitting pre-installed. Insert the electrode into the probe and tighten it until it is finger-tight.

Ion Source Installation

Figure 3-9 Electrode and Fitting



Item	Description
1	Threaded fitting
2	Electrode

Install the Electrode in a Micro Probe



WARNING! Puncture Hazard. Be careful when handling the electrode. The tip of the electrode is extremely sharp.

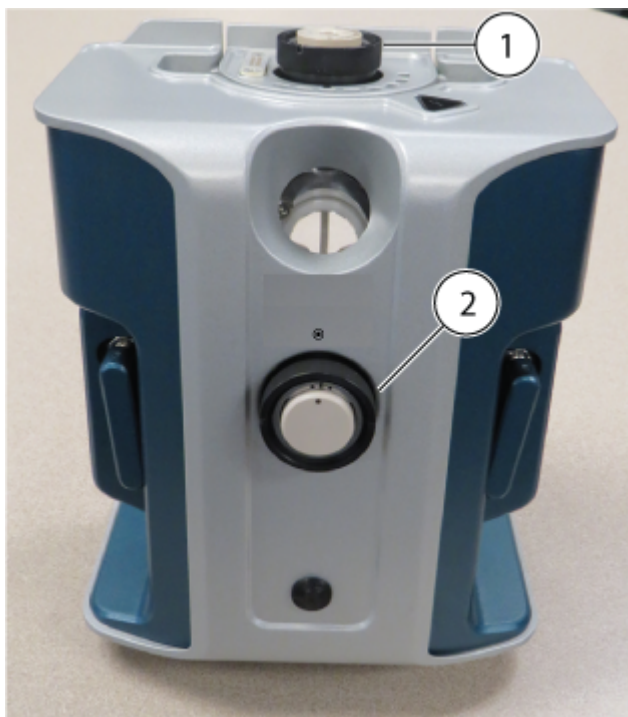
CAUTION: Potential System Damage. Install the probe in the ion source before the electrode is installed in the probe. This reduces the risk of damaging the electrode tip while installing it in the ion source.

CAUTION: Potential System Damage. Do not let the protruding electrode tip touch any part of the ion source housing, to avoid damaging the electrode.

Prerequisite Procedures

- Install the ESI module. Refer to the section: [Install the ESI or APCI Module](#) .
- [Install the Ion Source on the Mass Spectrometer](#).

Figure 3-10 Ion Source Probes



Item	Description	Comments
1	Micro or Analytical probe	The Micro probe is displayed in the figure.
2	E Lens probe or probe port plug	The probe port plug is displayed in the figure.

1. Install the probe in the ESI module. Make sure that the dot on the probe is aligned with the dot on the ESI module.
2. Install the electrode in the probe, inserting the fused silica or steel end first.
3. Rotate the electrode slightly to install against it in the probe, and then make sure that the tip of the electrode is visible below the end of the probe.
The nominal protrusion for the electrode is 1.0 mm.

Ion Source Installation

Figure 3-11 Electrode in the Micro Probe



Item	Description
1	Electrode
2	Micro probe

4. Install the bottom fitting over the electrode, and then tighten the fitting until it is finger tight.

Figure 3-12 Bottom Fitting Installed

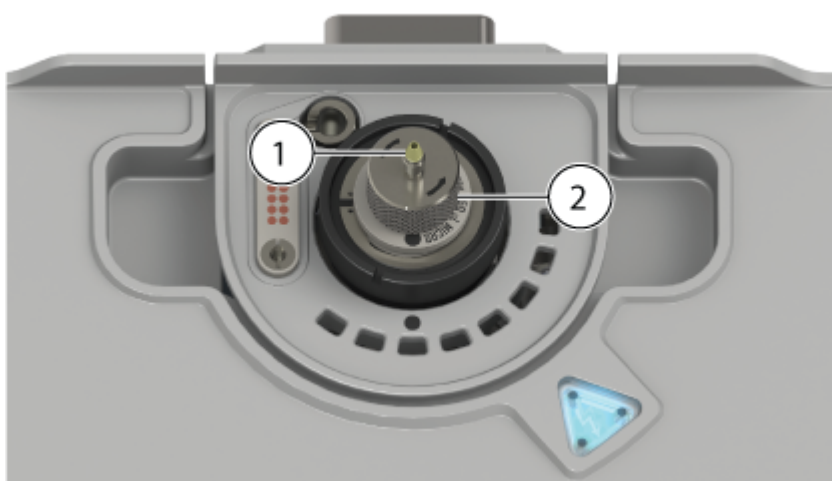


Item	Description
1	Bottom fitting

- Put the PEEK ferrule on the top fitting, and then put the top fitting on top of the bottom fitting.

The top fitting fits loosely on top of the bottom fitting, to accommodate different column fitting depths.

Figure 3-13 Top Fitting



Item	Description
1	PEEK ferrule
2	Top fitting

The electrode installation is complete. The sample tubing, either a column or an infusion adapter and PEEK Tee, can be installed. To install the column, refer to the section: [Install the Micro Column and Heater](#). To install an infusion adapter and PEEK Tee, refer to the section: [Install an Infusion Adapter and Connect the Sample Tubing to the ESI Module](#).

Install an Infusion Adapter and Connect the Sample Tubing to the ESI Module



WARNING! Take care not to contact any fluid connections or spilled liquids on or near the ion source. High voltages are present when a Micro column heater or an infusion adapter is installed. The high-voltage indicator light will be illuminated.

Ion Source Installation

Prerequisite Procedures

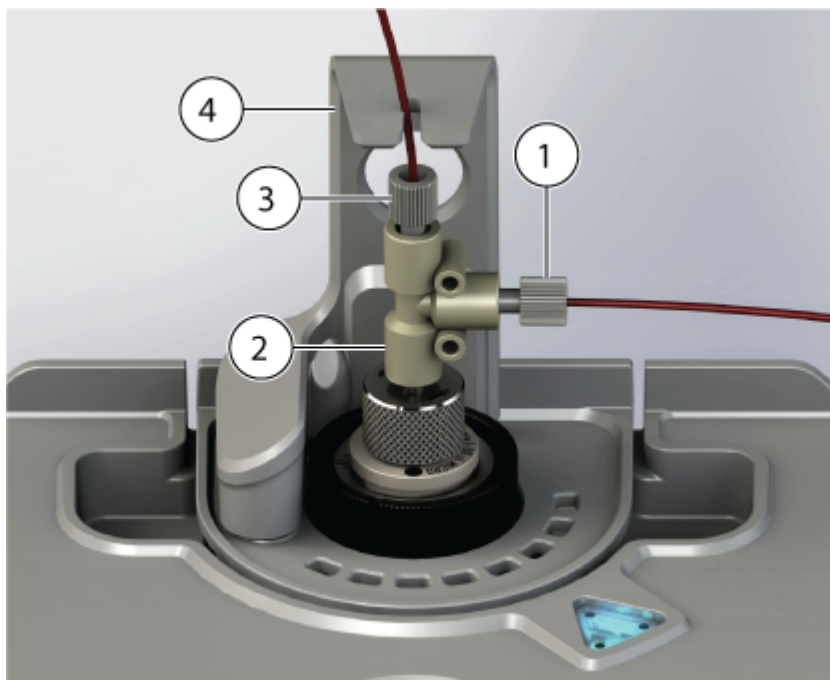
- Install the ESI module. Refer to the section: [Install the ESI or APCI Module](#).
- [Install the Ion Source on the Mass Spectrometer](#).
- [Install the Electrode in a Micro Probe](#).

Samples can be introduced through a direct connection to the electrode to optimize the ion source and mass spectrometer. This is done by using a PEEK union for direct infusion from a syringe pump, or by using a PEEK Tee to combine syringe pump flow with LC mobile phases, such as Tee infusion. Tee infusion is effective for ion source optimization because the solvent composition can be adjusted through the LC system to be similar to the LC elution composition of the subject analyte, thus achieving optimal system performance.

Note: This procedure describes Tee infusion. For direct infusion, substitute a PEEK union for the PEEK Tee.

1. Put the top fitting on top of the bottom fitting. Install the top fitting in the PEEK Tee, and then hold the PEEK Tee and the top fitting clockwise until the fitting is finger tight.

Figure 3-14 PEEK Tee and Infusion Adapter



Item	Description
1	Infusion inlet
2	PEEK Tee
3	Mobile phase inlet from the LC system
4	Infusion adapter

2. Connect the mobile phase line from the LC system to one inlet of the Tee.
3. Install the infusion line between the infusion inlet and the syringe pump.
4. To make the system operational, install the infusion adapter on the ion source. Install the adapter mounting post in the position hole on the ion source to enable operation of the system. Refer to the figure: [Figure 3-16](#).

Install the Micro Column and Heater



WARNING! Electrical Shock Hazard. Make sure that the ion source is completely disconnected from the mass spectrometer before proceeding.



WARNING! Hot Surface Hazard. Beware of burns. The column can become hot during operation. Allow the column to cool before removing it or replacing the PEEK clad fused silica tubing.



WARNING! Take care not to contact any fluid connections or spilled liquids on or near the ion source. High voltages are present when a Micro column heater or an infusion adapter is installed. The high-voltage indicator light will be illuminated.

Note: The Micro column and heater can only be installed if the ESI module and a Micro probe are installed in the ion source.

Prerequisite Procedures

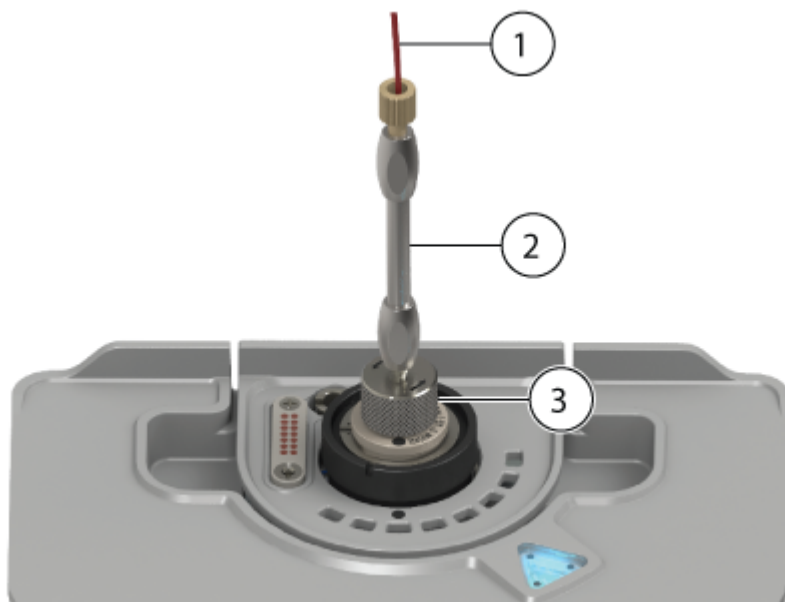
- Install the ESI module. Refer to the section: [Install the ESI or APCI Module](#).
- [Install the Ion Source on the Mass Spectrometer](#).
- [Install the Electrode in a Micro Probe](#).

1. Install the sample tubing between the column and the LC system. Use the sample tubing provided with the LC system. Refer to the LC System document: *Operator Guide*.
2. Attach the column to the top fitting on the probe, and then tighten the fitting until it is finger tight. Make sure that the electrode is fully seated in the column fitting to minimize

Ion Source Installation

the possibility of any dead volume. Hold the column, and then rotate the top fitting counterclockwise until it is finger tight.

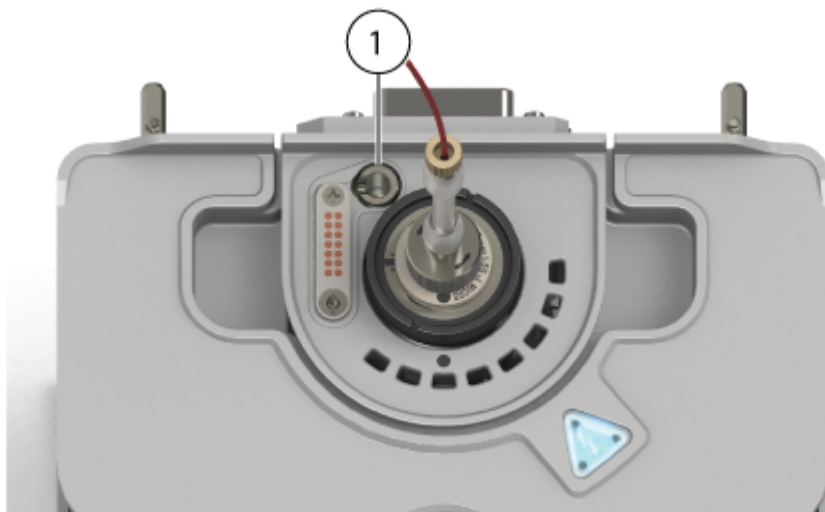
Figure 3-15 Column



Item	Description
1	Sample tubing
2	Column
3	Top fitting

3. Install the mounting post of the column heater in the position hole on the ion source.

Figure 3-16 Position Hole

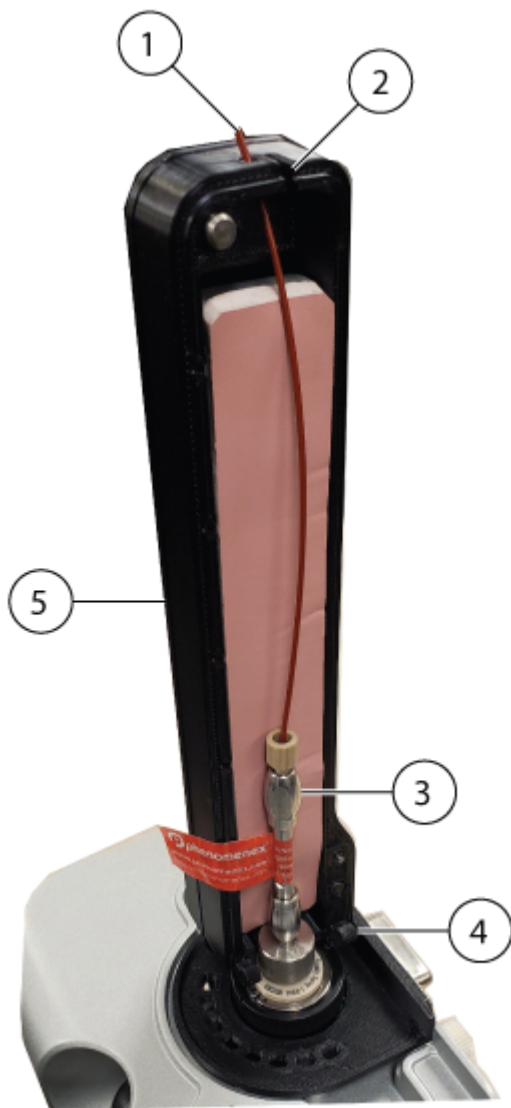


Item	Description
1	Position hole for the column heater mounting post

4. Rotate the left side of the column heater toward the column.

Ion Source Installation

Figure 3-17 Column Heater, Left Side



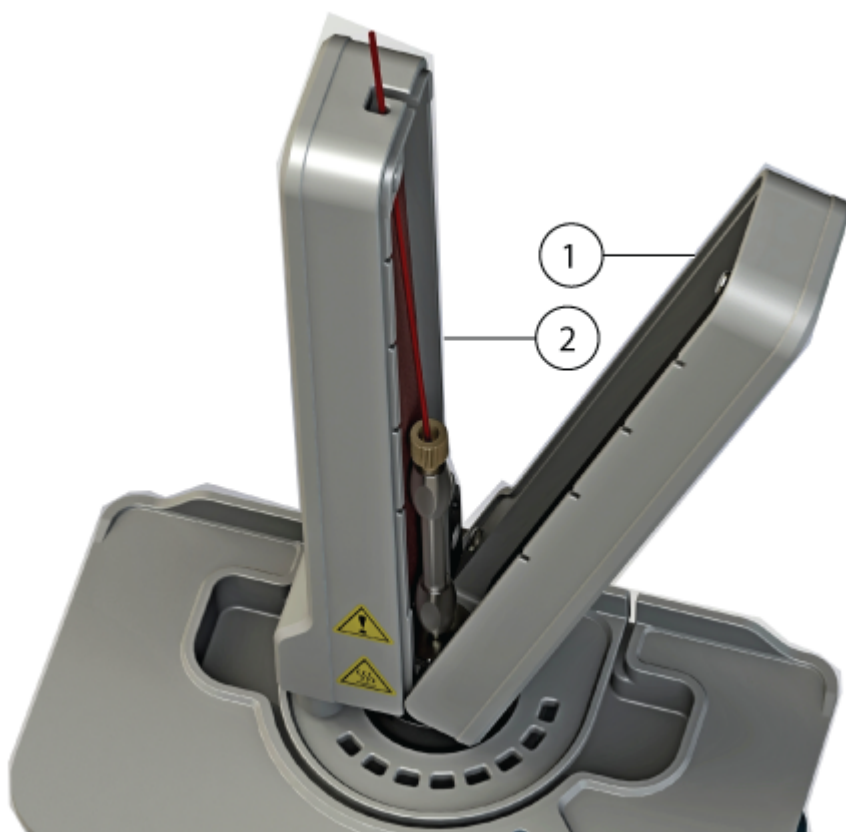
Item	Description
1	Sample introduction tubing
2	Guide slot for the sample tubing
3	Column
4	Hinge

Item	Description
5	Left side of column heater Note: The heater is made of two parts which must be assembled around the column.

Make sure that the mounting post is seated firmly in the position hole on the ion source.

- Route the PEEK-clad fused silica tubing through the entrance slot at the top of the column heater. Refer to the figure: [Figure 3-17](#).
- Put the right side of the column heater on the hinge at the base of the left side of the column heater, and then close both sides of the heater until they lock together.

Figure 3-18 Column Heater



Item	Description
1	Right side of the column heater
2	Left side of the column heater

Install the Electrode in the APCI Module and Connect the Sample Tubing

Prerequisite Procedures

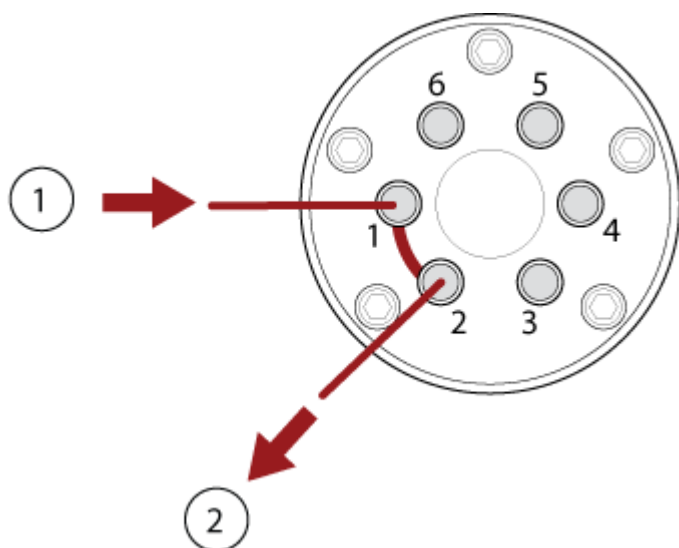
- Install the APCI module. Refer to the section: [Install the ESI or APCI Module](#)
- [Install the Ion Source on the Mass Spectrometer](#)

1. Insert the electrode with the attached lower fitting in the probe, and then tighten it until it is finger-tight.
The electrode is configured with the fitting pre-installed.
2. Connect the sample tubing to the LC system.

Configure the Diverter Valve for Analytical Flow ESI Operation

If the ion source is configured for analytical flow ESI operation, then connect the liquid tubing between the ion source, LC system, and mass spectrometer diverter valve. Connect the tubing to the diverter valve ports as shown in the following figure. The diverter valve must be connected correctly to make a grounded flow path.

Figure 3-19 Diverter Valve: Diverter Mode Position A



Item	Description
1	From the LC system
2	To the ion source

Note: For information about the options for grounding the liquid flow, refer to the section: [Options for Grounding the Liquid Flow](#).

Sample Inlet Requirements

- Prefilter samples so that the capillary tubing in the sample inlets is not blocked by particles, precipitated samples, or salts.
- Make sure that all of the connections are tight enough to prevent leaks. Do not over-tighten.

Examine for Leaks



WARNING! Toxic Chemical Hazard. Wear personal protective equipment (PPE), including a laboratory coat, gloves, and safety glasses, to avoid skin or eye exposure.

- Examine fittings and tubing to make sure that there are no leaks.

Ion Source Maintenance

4

The following warnings apply to all of the maintenance procedures in this section.



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Pro ion source cool for at least 40 minutes. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Fire and Toxic Chemical Hazard. Keep flammable liquids away from flame and sparks and use them only in vented chemical fume hoods or safety cabinets.



WARNING! Toxic Chemical Hazard. Wear personal protective equipment (PPE), including a laboratory coat, gloves, and safety glasses, to avoid skin or eye exposure.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. In the event of a chemical spill, review product safety data sheets for specific instructions. Make sure that the system is in Standby state before cleaning a spill near the ion source. Use applicable personal protective equipment and absorbent wipes to contain the spill and dispose of it following local regulations.



WARNING! Electrical Shock Hazard. Avoid contact with the high voltages applied to the ion source during operation. Put the system in Standby state before adjusting the sample tubing or other equipment near the ion source.

CAUTION: Potential System Damage. Do not lift or carry the ion source with one hand. The ion source is designed to be lifted or carried using two hands, one on each side of the ion source.

This section contains general maintenance procedures for the ion source. To identify how often to clean or do maintenance on the ion source, consider the following:

- Compounds tested
- Cleanliness of the samples and sample preparation techniques
- Amount of time an idle probe contains a sample
- Overall system run time

These factors can cause changes in ion source performance, indicating that maintenance is required.

Make sure that the installed ion source is fully sealed to the mass spectrometer with no evidence of gas leaks. Regularly examine the ion source and its fittings for leaks. Clean the ion source components regularly to keep the ion source in good working condition.

CAUTION: Potential System Damage. Use only the recommended cleaning methods and materials to avoid damaging the equipment.

Required Materials
<ul style="list-style-type: none"> • Poly swab or lint-free wipes • LC-MS-grade methanol • LC-MS-grade deionized water • Safety glasses • Breathing mask and filter • Powder-free gloves, nitrile or neoprene recommended • Lab coat

Recommended Maintenance Schedule

The following table provides a recommended schedule for cleaning and servicing the ion source. For a list of consumable and spare parts, refer to the document: *Parts and Equipment Guide*.

Tip! Do maintenance tasks regularly to make sure that system performance is optimal.

Contact a Qualified Maintenance Person (QMP) to order consumable parts and for basic service and maintenance requirements. Contact a SCIEX Field Service Employee (FSE) for all other service and maintenance requirements.

Note: For part numbers, refer to the document: *Parts and Equipment Guide*.

Table 4-1 Maintenance Tasks

Component	Frequency	Task	For more information...
Electrode	As needed	Examine and replace	Refer to the section: Install the Electrode in a Micro Probe
Electrode	As needed	Clean	Refer to the section: Clean the Electrode .

Ion Source Maintenance

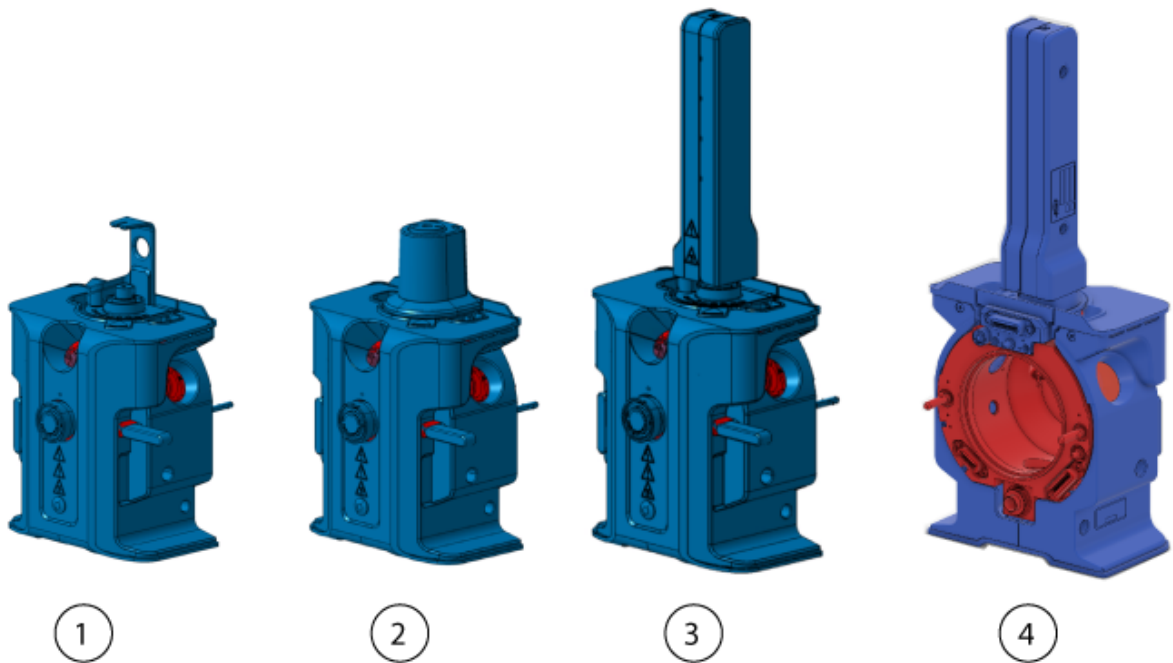
Table 4-1 Maintenance Tasks (continued)

Component	Frequency	Task	For more information...
Micro or Analytical probes	As needed	Replace	Refer to the section: Remove the Probe .
E Lens probe	As needed	Replace	Refer to the section: Remove the E Lens Probe .
Sample tubing	As needed	Replace	Refer to the section: Install the Micro Column and Heater or Install an Infusion Adapter and Connect the Sample Tubing to the ESI Module .
Ion source surfaces	As needed	Clean	Refer to the section: Clean the Ion Source Surfaces .
Pogo contact pads and pogo pin	As needed	Clean	Refer to the section: Clean the Spring-Loaded Pins and the Contact Pad for the Spring-Loaded Pins .

OptiFlow Pro Ion Source Handling

The surfaces of the ion source get hot during operation. The following figures show surfaces that are cooler (blue) and surfaces that stay hot for an extended period of time (red). During use or removal of the ion source, do not touch the surfaces shown in red.

Figure 4-1 OptiFlow Pro Ion Source Hot Surfaces (Red=Hot, Blue=Handle with Care)



Item	Description
1	Front view, with the ESI module installed
2	Front view, with the APCI module installed
3	Front view, with the Micro column heater installed
4	Back view, with the Micro column heater installed

Remove the Ion Source



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Pro ion source cool for at least 40 minutes. Some surfaces of the ion source and vacuum interface become hot during operation.

CAUTION: Potential System Damage. Do not let the protruding electrode tip or the corona discharge needle touch any part of the ion source housing, to avoid damaging the probe.

The ion source can be removed quickly and easily, without tools. SCIEX recommends that the ion source be removed from the mass spectrometer before any maintenance activities are performed.

1. Stop any ongoing scans.

Ion Source Maintenance

2. Put the mass spectrometer in Standby state.
3. Wait at least 40 minutes for the ion source to cool.
4. If the ion source has a Micro column installed, then remove the column heater and disconnect the column from the probe fitting. Refer to the section: [Install the Micro Column and Heater](#).
5. If the ion source has an infusion adapter and PEEK Tee connected to the Micro or Analytical probe, then disconnect the infusion adapter and PEEK Tee from the probe fitting. Refer to the section: [Install an Infusion Adapter and Connect the Sample Tubing to the ESI Module](#).
6. If the ion source has the APCI module installed and is connected to an LC system, then disconnect the sample line from the probe.
7. Rotate the two source latches to the 9 o'clock and 3 o'clock positions to release the ion source.
8. Pull the ion source gently away from the vacuum interface.
9. Put the ion source on a clean, safe surface.
10. If the ion source has the ESI or APCI module installed, then remove the module. Refer to the section: [Install the ESI or APCI Module](#).

Clean the Ion Source Surfaces



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Pro ion source cool for at least 40 minutes. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Electrical Shock Hazard. Before this procedure is started, remove the ion source from the mass spectrometer. Obey all electrical safe work practices.

Prerequisite Procedures
<ul style="list-style-type: none">• Remove the Ion Source.• Remove the Probe.

Clean the surfaces of the ion source after a spill or when they become dirty.

- Wipe the surfaces of the ion source with a soft, damp, cloth.

Clean the Spring-Loaded Pins and the Contact Pad for the Spring-Loaded Pins

Prerequisite Procedures

- [Remove the Ion Source](#)



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Pro ion source cool for at least 40 minutes. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Electrical Shock Hazard. Before this procedure is started, remove the ion source from the mass spectrometer. Obey all electrical safe work practices.

Clean the spring-loaded pins and the contact pad for the spring-loaded pins when the ion source is removed. The contact pad is on the left side of the ESI module. The spring-loaded pins are on the bottom of the Micro column heater and infusion adapter. The spring-loaded pins cannot be seen when the Micro column heater and infusion adapter are installed.

- Wipe the surfaces of the contact pads or the spring-loaded pins with a poly swab or lint-free wipe soaked in methanol.

Figure 4-2 Contact Pad on ESI Module



Ion Source Maintenance

Item	Description
1	Contact pad for the spring-loaded pins

Remove the Probe



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Pro ion source cool for at least 40 minutes. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Electrical Shock Hazard. Before this procedure is started, remove the ion source from the mass spectrometer. Obey all electrical safe work practices.

CAUTION: Potential System Damage. Do not let the protruding electrode touch any part of the ion source housing, to avoid damaging the electrode.

The probe can be removed quickly and easily, without tools.

Note: If the probe is not correctly installed in the ion source, then the high-voltage power for the mass spectrometer and the source exhaust system are turned off.

Prerequisite Procedures

- Remove the column from the probe. Refer to the section: [Install the Micro Column and Heater](#).
- [Remove the Ion Source](#).

1. If a Micro or Analytical probe is used, then remove the top fitting, with the integrated PEEK ferrule, and the bottom fitting from the probe. Refer to the section: [Install the Electrode in a Micro Probe](#).
2. Remove the electrode from the probe, and then put it on a safe, clean surface. Refer to the sections: [Install the Electrode in a Micro Probe](#).

CAUTION: Potential System Damage: Make sure that the electrode is removed from the probe before removing the probe from the ion source. Otherwise the electrode tip can be damaged.

3. Loosen the knurled ring on the probe, and then gently pull the probe straight up out of the source housing.

- Put the probe on a clean, safe surface.

Tip! During installation of the probe in the ion source, align the dot on the probe with the corresponding dot on the ion source housing.

Tip! Clean the probe while it is removed from the ion source. Wipe the surfaces with a poly swab or lint-free wipe soaked in methanol.

Clean the Electrode

CAUTION: Potential System Damage. Do regular tests of the LC back pressure to make sure that the electrode is not blocked. Factors that can cause more frequent blockages include sample type, mobile phase type, usage time, and liquid that collected and dried in the electrode. We recommend that the LC back pressure be tested with a new, clean electrode to set a baseline. Then, do regular tests and compare the results with the baseline. If the back pressure increases very much, then clean or replace the electrode.

Required Materials

- | |
|---|
| <ul style="list-style-type: none"> LC-MS–grade methanol or LC-MS–grade isopropanol, at ambient temperature |
|---|

- Remove the probe, with the electrode, from the ion source.
- Connect the probe to the LC system.
- Use the LC system to flush the probe with methanol or isopropanol at a minimum flow rate of 1 mL/min, until the back pressure is stable.

Remove the E Lens Probe



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Pro ion source cool for at least 40 minutes. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Electrical Shock Hazard. Before this procedure is started, remove the ion source from the mass spectrometer. Obey all electrical safe work practices.

The E Lens probe can be removed quickly and easily, without tools.

Ion Source Maintenance

Prerequisite Procedures

- [Remove the Ion Source](#)

1. Loosen the knurled ring on the E Lens probe, and then gently pull the E Lens probe straight out of the source housing.
2. Put the E Lens probe on a clean, secure surface.

Tip! When installing the E Lens probe in the ion source, align the dot on the E Lens probe with the corresponding dot on the ion source housing.

Tip! Clean the E Lens probe while it is removed from the ion source. Wipe the surfaces with a poly swab or lint-free wipe soaked in methanol.

Storage and Handling



WARNING! Environmental Hazard. Do not discard system components in municipal waste. To discard components correctly, obey local regulations.

The environmental requirements for the storage and transport of the ion source:




- Ambient temperature between $-30\text{ }^{\circ}\text{C}$ and $+60\text{ }^{\circ}\text{C}$ ($-22\text{ }^{\circ}\text{F}$ and $140\text{ }^{\circ}\text{F}$)
- Atmospheric pressure between 75 kPa to 101 kPa
- Relative humidity not exceeding 99%, non-condensing

Labels on the Ion Source

A

In accordance with regulatory requirements, all warning labels shown on the ion source are documented in this guide. Warnings and labels on the ion source use international symbols.









Table A-1 Warning Labels

External Labels	Definition	Location
	ISO 7000-0434B (2004-1) CAUTION consult documentation	External
	CAUTION possibility of electric shock	External
	IEC 60417-5041 (2002-10) Caution hot surface	External









Glossary of Symbols

B







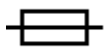



Note: Not all of the symbols in the following table are applicable to every instrument.











Symbol	Description
	Australian Regulatory Compliance Mark. Indicates that the product complies with Australian Communications Media Authority (ACMA) EMC and Electrical Safety Requirements.
	Alternating current
A	Amperes (current)
	Asphyxiation Hazard
	Authorized representative in the European community
	Biohazard
	CE Marking of Conformity
	cCSAus mark. Indicates electrical safety certification for Canada and USA.
	Catalog number

Glossary of Symbols








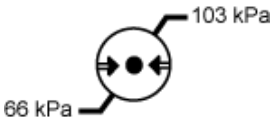
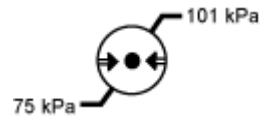
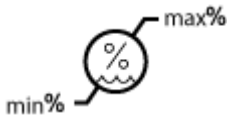

Symbol	Description
	Caution. Consult the instructions for information about a possible hazard. Note: In SCIEX documentation, this symbol identifies a personal injury hazard.
	China RoHS Caution Label. The electronic information product contains certain toxic or hazardous substances. The center number is the Environmentally Friendly Use Period (EFUP) date, and indicates the number of calendar years the product can be in operation. Upon the expiration of the EFUP, the product must be immediately recycled. The circling arrows show the product is recyclable. The date code on the label or product indicates the date of manufacture.
	China RoHS logo. The device does not contain toxic and hazardous substances or elements above the maximum concentration values and the device is an environmentally-friendly product that can be recycled and reused.
	Consult instructions for use.
	Crushing Hazard
	cTUVus mark for TUV Rheinland of North America
	Data Matrix symbol that can be scanned by a barcode reader to obtain a unique device identifier (UDI)
	Environmental Hazard

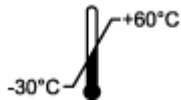






Glossary of Symbols

Symbol	Description
	Ethernet connection
	Explosion Hazard
	Eye Injury Hazard
	Fire Hazard
	Flammable Chemical Hazard
	Fragile
	Fuse
Hz	Hertz
	International safety symbol "Caution, risk of electric shock" (ISO 3864), also known as High Voltage symbol If the main cover must be removed, then contact a SCIEX representative to prevent electric shock.
	Hot Surface Hazard
	In Vitro Diagnostic Device

Symbol	Description
	Ionizing Radiation Hazard
	Keep dry. Do not expose to rain. Relative humidity must not exceed 99%.
	Keep upright.
	Lacerate/Sever Hazard
	Laser Radiation Hazard
	Lifting Hazard
	Magnetic Hazard
	Manufacturer
	Moving Parts Hazard
	Pacemaker Hazard. No access to people with pacemakers.

Glossary of Symbols

Symbol	Description
	Pinching Hazard
	Pressurized Gas Hazard
	Protective Earth (ground)
	Puncture Hazard
	Reactive Chemical Hazard
	Serial number
	Toxic Chemical Hazard
	Transport and store the system within 66 kPa to 103 kPa.
	Transport and store the system within 75 kPa to 101 kPa.
	Transport and store the system within the specified minimum (min) and maximum (max) levels of relative humidity, noncondensing.
	Transport and store the system within $-30\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$.

Symbol	Description
	Transport and store the system within $-30\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$.
	USB 2.0 connection
	USB 3.0 connection
	Ultraviolet Radiation Hazard
	United Kingdom Conformity Assessment Mark
UKRP	United Kingdom Responsible Person
VA	Volt Ampere (apparent power)
V	Volts (voltage)
	WEEE. Do not dispose of equipment as unsorted municipal waste. Environmental Hazard
W	Watts (power)
	<i>yyyy-mm-dd</i> Date of manufacture

Contact Us

Customer Training

- In North America: NA.CustomerTraining@sciex.com
- In Europe: Europe.CustomerTraining@sciex.com
- Outside the EU and North America, visit sciex.com/education for contact information.

Online Learning Center

- [SCIEX Now Learning Hub](#)

SCIEX Support

SCIEX and its representatives maintain a staff of fully-trained service and technical specialists located throughout the world. They can answer questions about the system or any technical issues that might arise. For more information, visit the SCIEX website at sciex.com or contact us in one of the following ways:

- sciex.com/contact-us
- sciex.com/request-support

Cybersecurity

For the latest guidance on cybersecurity for SCIEX products, visit sciex.com/productsecurity.

Documentation

This version of the document supersedes all previous versions of this document.

To find software product documentation, refer to the release notes or software installation guide that comes with the software.

To find hardware product documentation, refer to the documentation that comes with the system or component.

The latest versions of the documentation are available on the SCIEX website, at sciex.com/customer-documents.

Note: To request a free, printed version of this document, contact sciex.com/contact-us.
