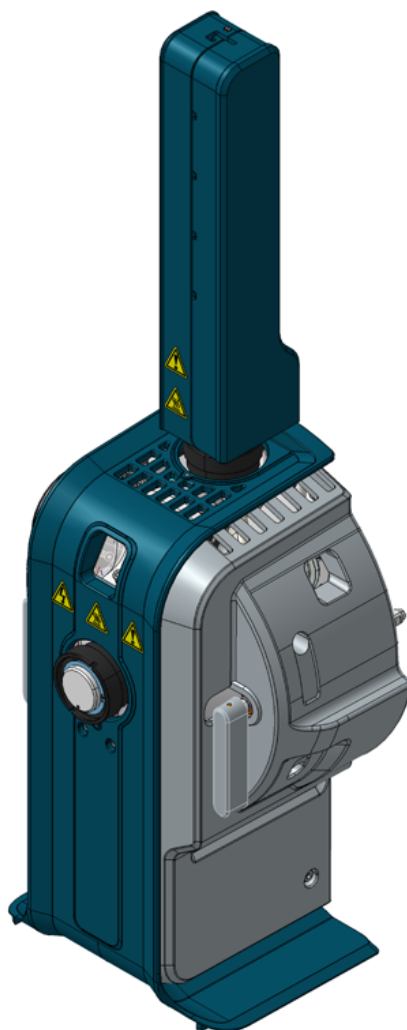


OptiFlow Turbo V Ion Source

Operator Guide



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Operational Precautions and Limitations

1

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 Turbo V ion source cool for at least 60 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 Turbo V ion source with micro flow rates under 10 $\mu\text{L}/\text{min}$ or nano flow rates. 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.

CAUTION: Potential System Damage. Do not submerge the end of the drain tubing in the waste liquid in the waste container.

- 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](https://www.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).
- 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 Turbo V ion source can be used with the SCIEX 5500, 5500+, 6500, 6500+, or 6600+ systems, Echo® MS system, or Echo® MS+ system.

The ion source can be configured with the Micro, Nano, Echo® MS probe. The following table lists the probes that are compatible with each supported mass spectrometer.

Table 2-1 Probe Compatibility

Probe	Mass Spectrometer				
	5500	5500+	6500	6500+	6600+
Micro 1–50 µL	Yes	Yes	Yes	Yes	Yes
Micro 50–200 µL	Yes	Yes	Yes	Yes	Yes
Nano < 1 µL	No	No	Yes	Yes	Yes
Echo® MS	No	No	No	Yes	No

Note: The ion source has two probe ports, a front port and a top port. Only one probe can be installed at a time. A probe port plug must be installed in the unused probe port.

The probes are configured for various flow rates and electrodes:

- Micro 1–50 µL probe: Flow rate of 1 µL/min to 50 µL/min. Compatible electrodes are:
 - Electrode 1–10 µL (1 µL/min to 10 µL/min)
 - Electrode 10–50 µL (10 µL/min to 50 µL/min)
- Micro 50–200 µL probe: Flow rate of 50 µL/min to 200 µL/min. Compatible electrodes are:
 - Electrode 50–200 µL (50 µL/min to 200 µL/min)
- Nano < 1 µL probe: Flow rate of 100 nL/min to 1000 nL/min. Compatible electrodes are:
 - Nano electrode (100 nL/min to 1000 nL/min)

Ion Source Components

Item	Description
1	Micro column heater

Ion Source Overview

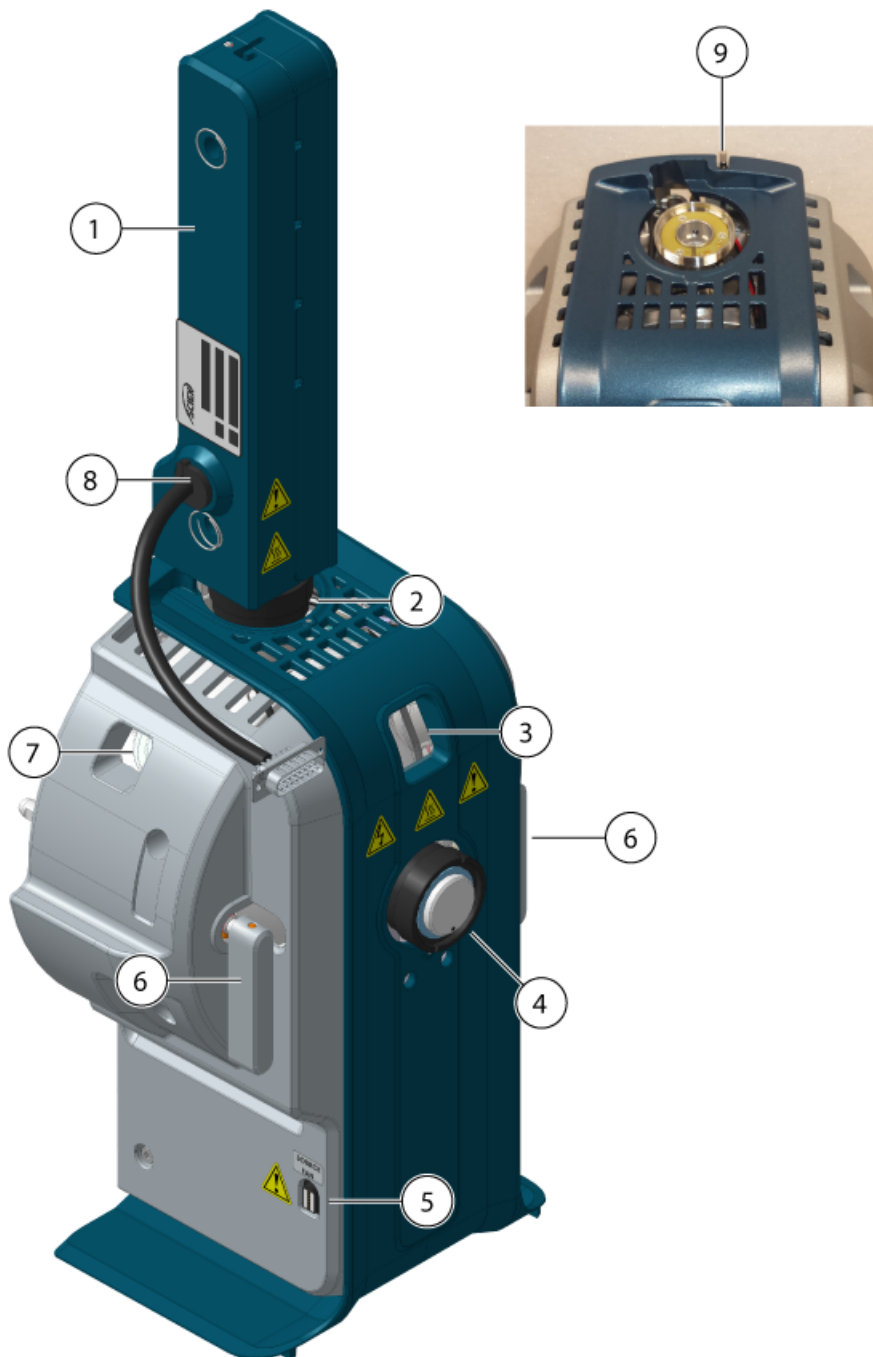
Item	Description
2	ESI module (Can be configured with a Micro or Analytical probe, with the E Lens probe or a probe port plug)
3	Side window glass
4	Source latch
5	Right side cover
6	Front cover
7	E Lens probe or probe port plug
8	Front window glass
9	Top probe port (Micro probe shown)
10	High-voltage indicator light. If the system is in Ready state and Ion source voltage or current setpoint is greater than 0, then the high-voltage indicator light is illuminated.
11	APCI module (can be configured for direct infusion)
12	Infusion adapter

Ion Source Components (Micro Probe)

Note: Micro functionality is supported on SCIEX 5500, 5500+, 6500, 6500+, and 6600+ systems.

Note: Only one probe can be installed at a time. If micro functionality is enabled, then a probe port plug must be installed in the front port (Nano).

Figure 2-1 Ion Source Components (Micro Probe)



Ion Source Overview

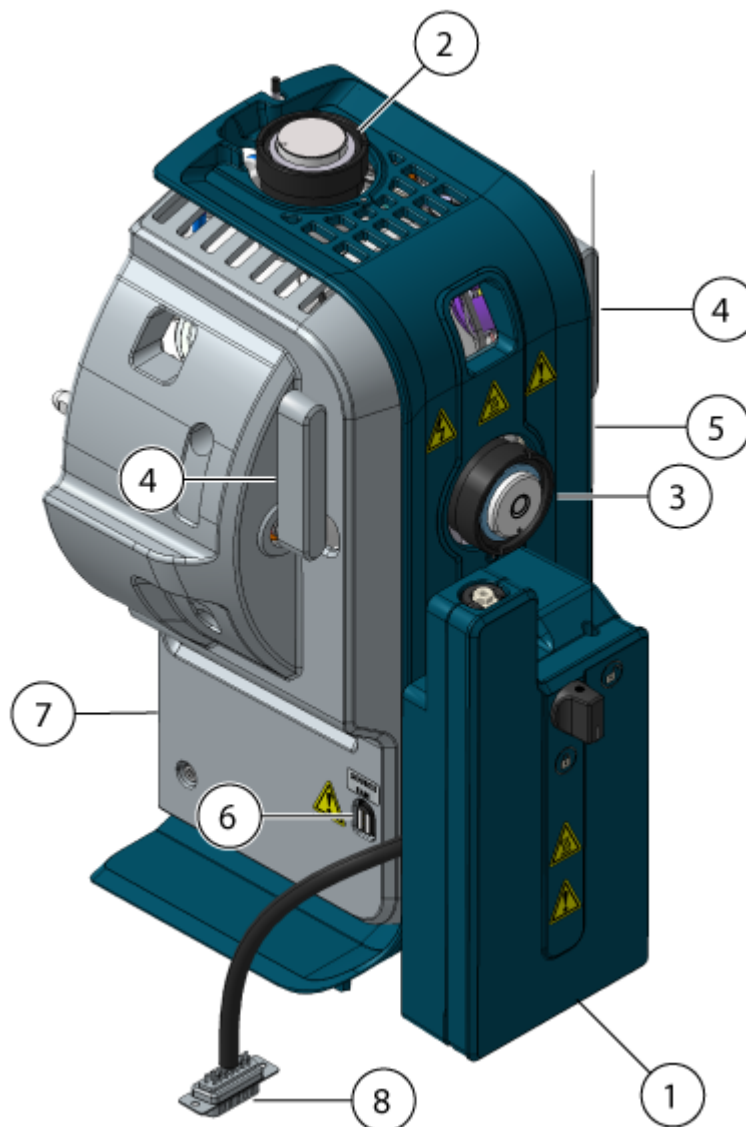
Item	Description
1	Micro column heater. The Micro column heater can be configured with the NanoLC 415, NanoLC 425, M3 MicroLC, or M5 MicroLC system. The maximum column heater temperature is 90 °C (194 °F).
2	Top port (Micro probe).
3	Front window port.
4	Front port (Nano probe). The probe port plug is shown in the figure.
5	Magnetic connector for ion source cooling fan power cable.
6	Source latch. The latches secure the ion source to the mass spectrometer.
7	Side window port.
8	Power and communication connector. Used only if the ion source is configured for use with the NanoLC 415, NanoLC 425, M3 MicroLC, or M5 MicroLC system.
9	High-voltage enable switch. The switch allows the firmware to supply power to the ion source when activated. The switch is not visible in the main illustration.

Ion Source Components (Nano Probe)

Note: Nano functionality is supported on SCIEX 6500, 6500+, and 6600+ systems.

Note: Only one probe can be installed at a time. If nano functionality is enabled, then a probe port plug must be installed in the top port (Micro).

Figure 2-2 Ion Source Components (Nano Probe)



Item	Description
1	Nano column heater. The Nano column heater can only be configured with the NanoLC 415 and NanoLC 425 systems. The maximum column heater temperature is 90 °C (194 °F).
2	Top port (Micro probe). The probe port plug is shown in the figure.
3	Front port (Nano probe).
4	Source latch. The latches secure the ion source to the mass spectrometer.
5	Front cover.

Ion Source Overview

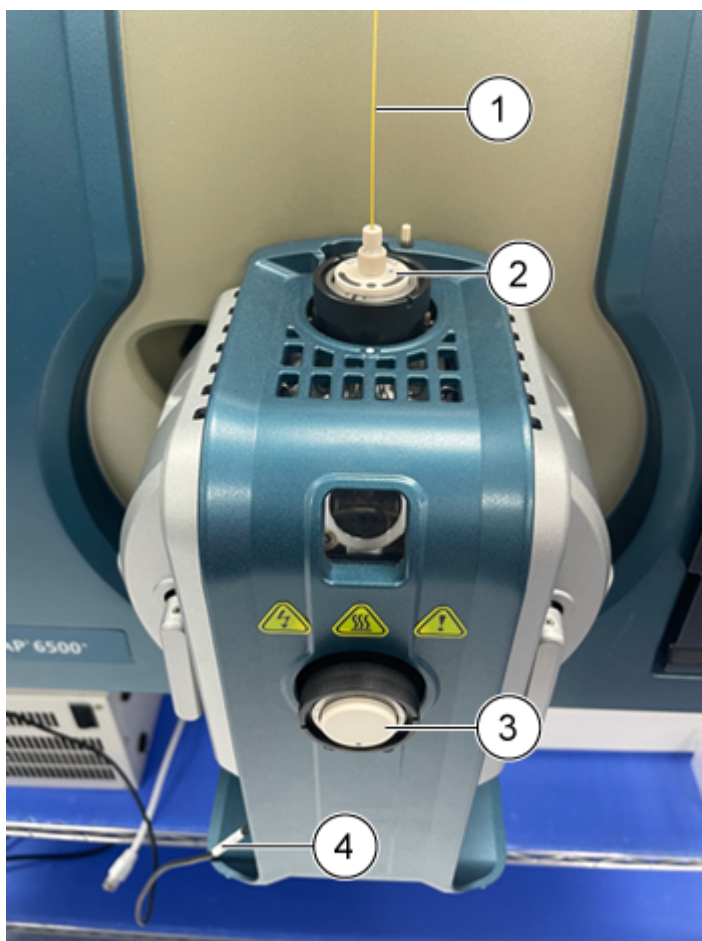
Item	Description
6	Magnetic connector for ion source cooling fan power cable.
7	Left cover.
8	Power and communication connector. Used only if the ion source is configured for use with the NanoLC 415 or NanoLC 425 system.

Ion Source Components (Echo[®] MS Probe)

Note: The Echo[®] MS functionality is supported on SCIEX Triple Quad 6500+ systems.

Note: Only one probe can be installed at a time. If Echo[®] MS functionality is enabled, then a probe port plug must be installed in the front port (Echo[®] MS).

Figure 2-3 Ion Source Components (Echo[®] MS Probe)



Item	Description
1	Echo [®] MS electrode
2	Echo [®] MS probe
3	Front port plug
4	Ion source cooling fan power cable

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.

The ion source has an additional connection for the cooling fan between the magnetic connector on the ion source and the ion source connector on the mass spectrometer.

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.
- A probe or plug is not installed or is incorrectly installed.
- The mass spectrometer senses a gas fault.
- The ion source has overheated.
- OptiFlow Turbo V ion source: The ion source cooling fan power cable between the magnetic connector on the ion source and the ion source connector on the mass spectrometer is not connected.

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 mass spectrometer 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

3



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 the molded grips on each side of the ion source.

CAUTION: Potential System Damage. Do not install the ion source with a nano curtain plate in position. The probe will contact the nano flow curtain plate and damage the components.

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

Required Materials

- Ion source
- Red PEEK tubing (0.005 inch bore)
- Ion source cooling fan power cable
- Echo® MS probe
- Column
- Infusion adapter and PEEK Tee
- Electrode
- PEEK-clad fused silica tubing
- Micro components:
 - Micro column heater
 - Micro probe
 - Top and bottom fittings for the Micro probe
- Nano components:
 - Nano column heater
 - Nano probe
 - Union and fitting for the Nano electrode

Install the Echo® MS or Micro Probe On the Ion Source

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

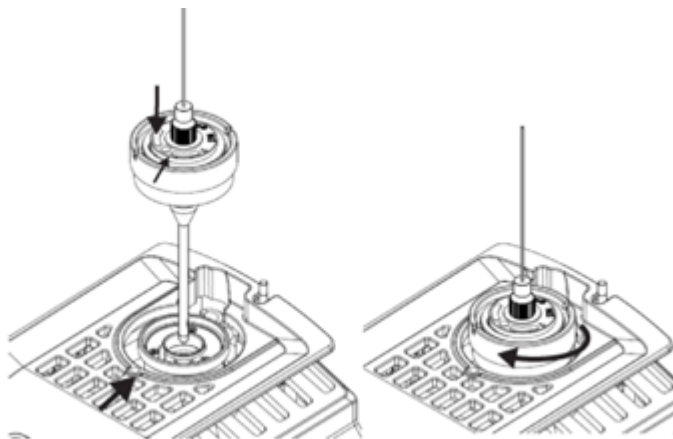
1. Slowly insert the micro probe or the Echo® MS probe to the top port of the ion source.

Note: If the Nano probe is inserted, then insert the nano probe to the front port of the ion source.

2. Align the dot on the probe with the corresponding dot on the ion source housing.

Ion Source Installation

Figure 3-1 Align the Dot On the Probe



3. Slowly turn the probe in the clock wise direction until it is fully tightened.
4. Install the electrode. Refer to the section: [Install the Electrode Assembly in the OptiFlow Turbo V System](#).

Note: Install the front port plug with Echo[®] MS probe.

Figure 3-2 Front Port Plug



Item	Description
1	Front port plug

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 12 o'clock position.
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.

Ion Source Installation

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.
4. Connect the cable for the ion source cooling fan between the magnetic connector ion source and the ion source connector on the mass spectrometer.

Install the Electrode in a Micro Probe



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! 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
<ul style="list-style-type: none">• Install the Echo® MS or Micro Probe On the Ion Source• Install the Ion Source on the Mass Spectrometer.

Note: Micro functionality is supported on SCIEX 5500, 5500+, 6500, 6500+, and 6600+ systems.

Figure 3-3 Ion Source Probes

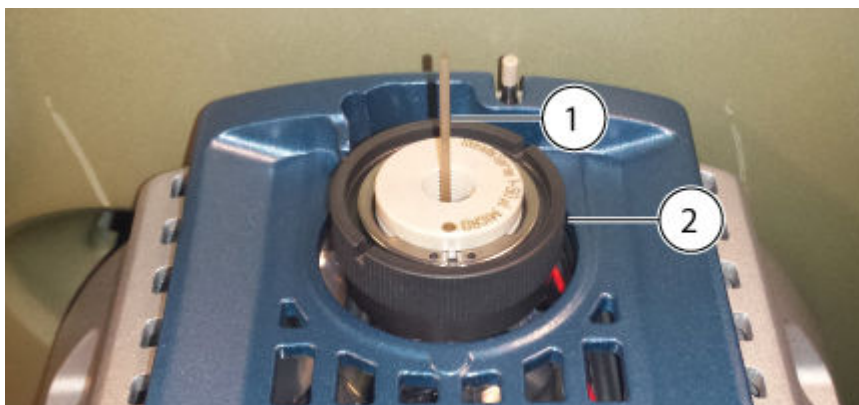


Item	Description	Comments
1	Micro probe	The probe is ready to have the electrode installed.
2	Front port plug	The probe port is capped with the plug.

1. Install the electrode in the probe, inserting the fused silica or steel end first.
2. 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 3-4 Electrode in the Micro Probe



Item	Description
1	Electrode
2	Micro probe

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

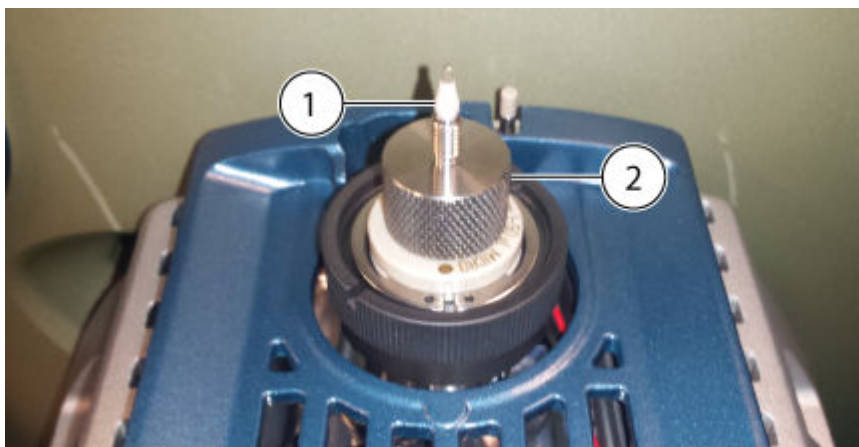
Figure 3-5 Bottom Fitting Installed



Item	Description
1	Bottom fitting

4. 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 3-6 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 an Infusion Line to a Micro Probe](#).

Install an Infusion Adapter and Connect an Infusion Line to a Micro Probe



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.

Ion Source Installation

Prerequisite Procedures

- [Install the Ion Source on the Mass Spectrometer.](#)
- [Install the Electrode in a Micro Probe.](#)

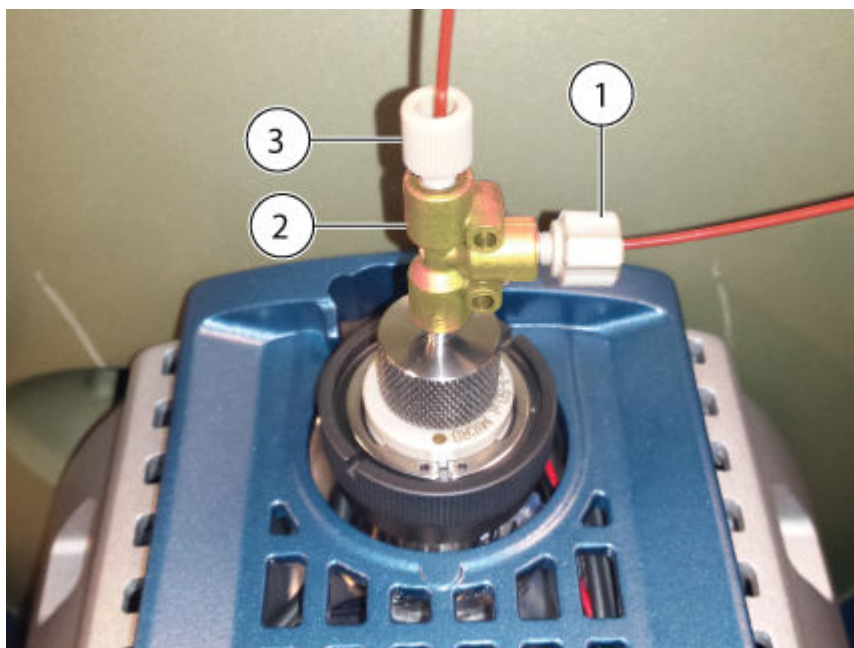
Note: Micro functionality is supported on SCIEX 5500, 5500+, 6500, 6500+, and 6600+ systems.

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.

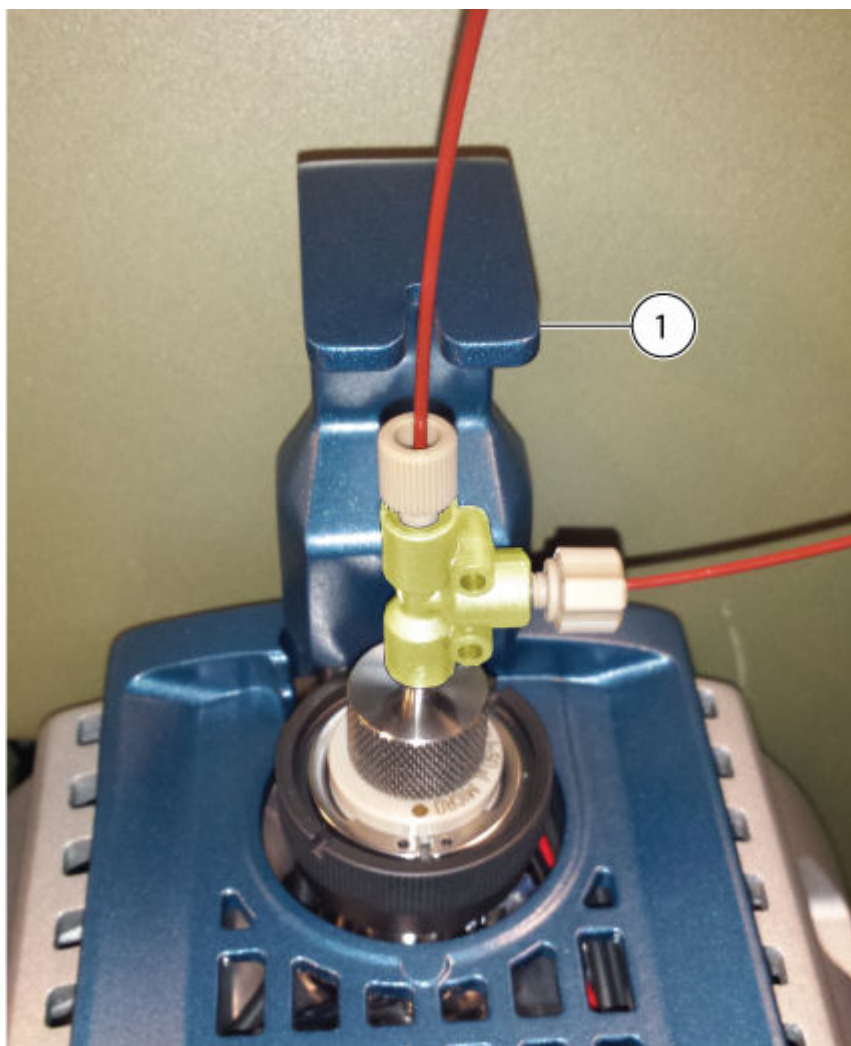
Figure 3-7 PEEK Tee



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

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 3-10](#).

Figure 3-8 Infusion Adapter



Item	Description
1	Infusion adapter

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! 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.

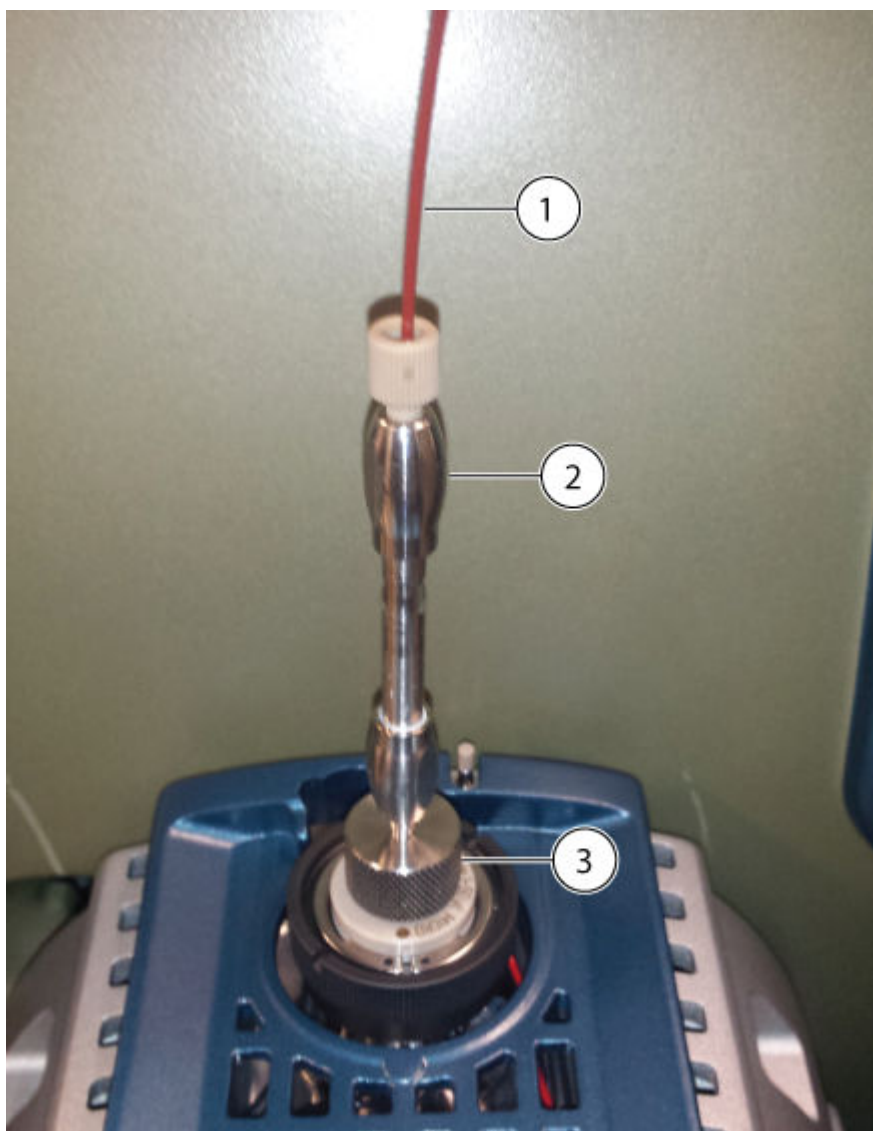
Prerequisite Procedures

- [Install the Ion Source on the Mass Spectrometer.](#)
- [Install the Electrode in a Micro Probe.](#)

Note: Micro functionality is supported on SCIEX 5500, 5500+, 6500, 6500+, and 6600+ series systems.

1. Install the sample tubing between the column and the LC system. If the ion source is configured for use with the NanoLC 415, NanoLC 425, M3 MicroLC, or M5 MicroLC system, then 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 the possibility of any dead volume. Hold the column, and then rotate the top fitting counterclockwise until it is finger tight.

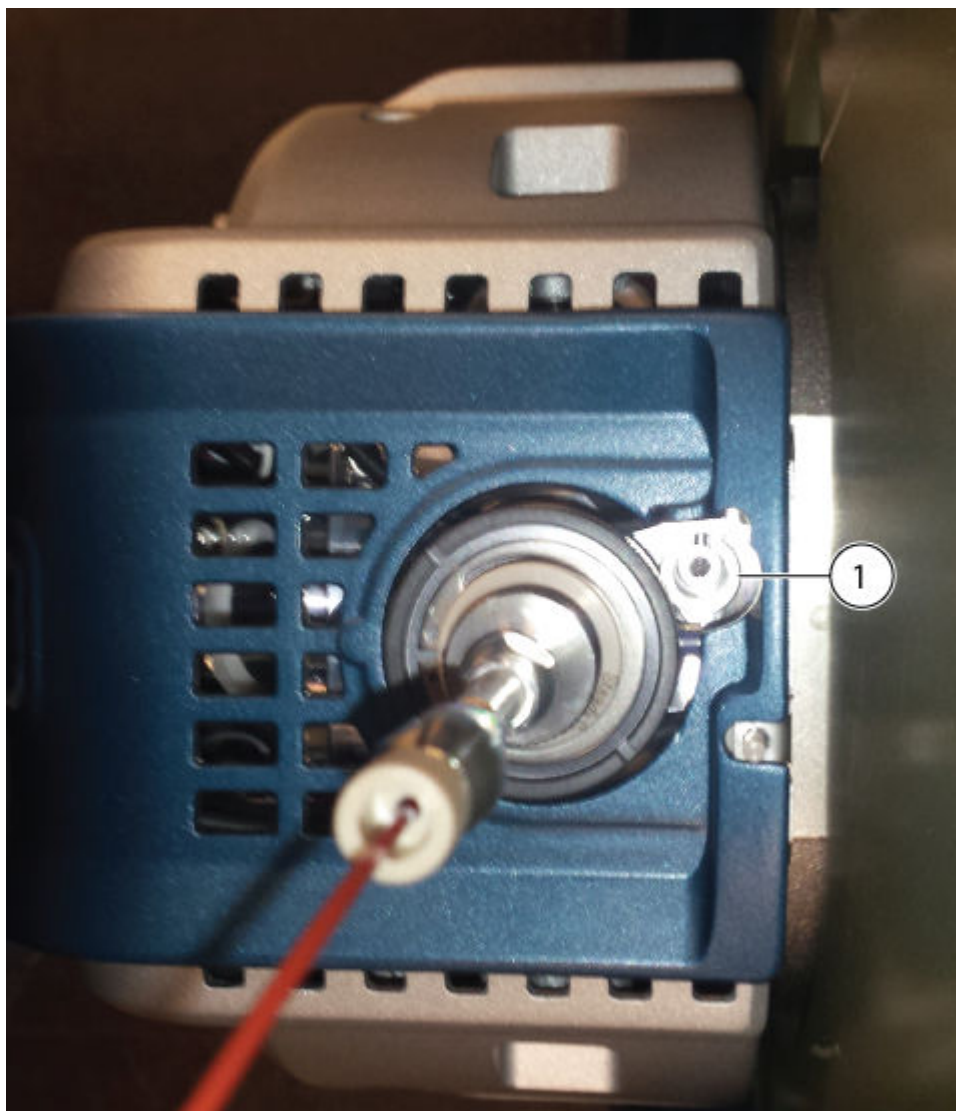
Figure 3-9 Column



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.

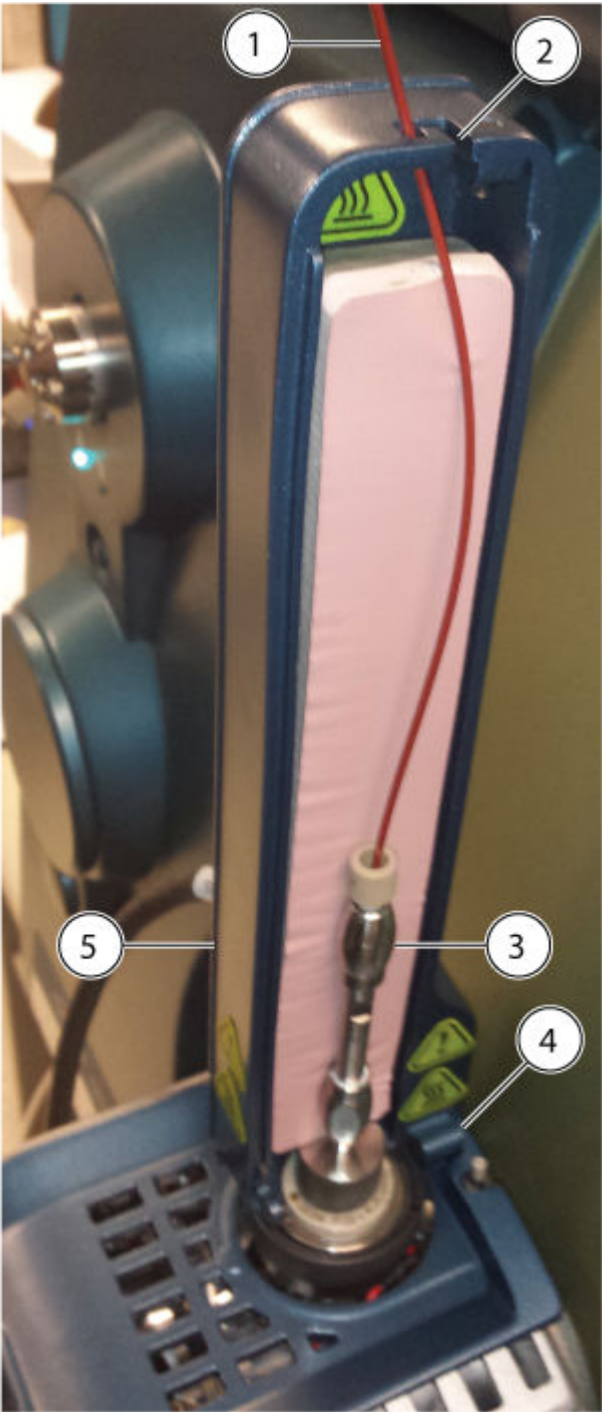
Figure 3-10 Position Hole



Item	Description
1	Position hole for the column heater mounting post

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

Figure 3-11 Column Heater, Left Side



Item	Description
1	Sample introduction tubing

Ion Source Installation

Item	Description
2	Guide slot for the sample tubing
3	Column
4	Hinge
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.

5. Route the PEEK-clad fused silica tubing through the entrance slot at the top of the column heater. Refer to the figure: [Figure 3-11](#).
6. 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 3-12 Column Heater



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

Install the Electrode in the Nano Probe



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.

Ion Source Installation



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 Ion Source on the Mass Spectrometer.](#)

Note: Nano functionality is supported on SCIEX 6500, 6500+, and 6600+ systems.

1. Install the fitting in the union and then rotate the fitting clockwise until it is finger tight.

Figure 3-13 Nano Electrode



Item	Description	Comments
1	Union	—
2	Fitting	The fitting is threaded into the union
3	Nano electrode	—

Note: The fitting is pre-installed on the electrode.

2. If the front probe port has a probe port plug installed, then remove the plug and then install the Nano probe.

- a. Loosen the knurled ring on the probe port plug, and then gently pull the plug straight out of the ion source.
- b. Install the Nano probe in the front probe port.

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

- c. Tighten the knurled ring on the Nano probe.

Figure 3-14 Nano Probe



Item	Description
1	Nano probe

Ion Source Installation

Item	Description
2	Dot on the probe Note: The dot on the probe shows the location of a pin on the ion source housing that fits in a hole in the back of the probe. When the dot on the probe is aligned with the dot on the ion source housing, the pin and the hole are aligned correctly.

3. Install the union, with the electrode attached, in the Nano probe, and then rotate the union clockwise to tighten it.

Figure 3-15 Union Installed in the Nano Probe



Item	Description
1	Nano probe

Item	Description
2	Union

Install the Nano Column Cartridge 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! 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. Do not connect the Nano column heater to a European style two-pin electrical outlet. Fire or electric shock might occur.



WARNING! Personal Injury Hazard. Always wear protective eyewear when handling the Nano column heater. A part of the fused silica tubing protrudes from the top of the column heater and can cause injury.

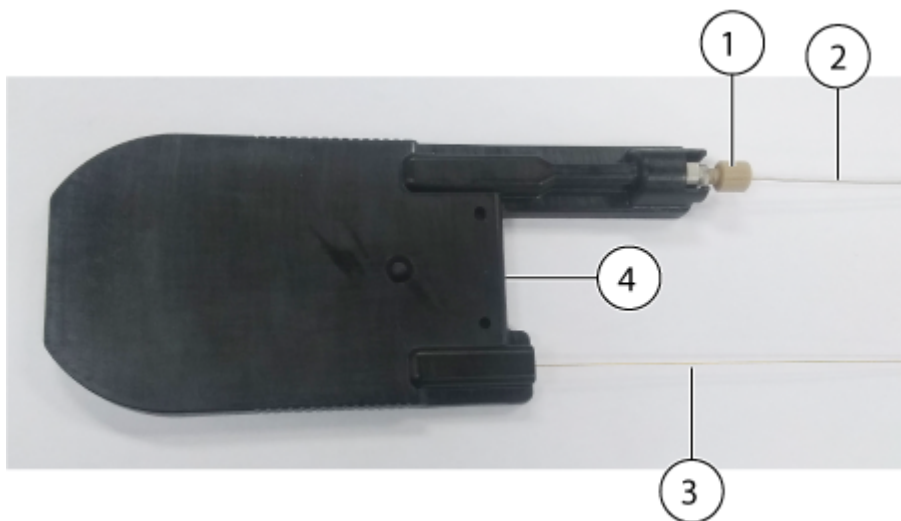
Prerequisite Procedures

- [Install the Ion Source on the Mass Spectrometer.](#)
- [Install the Electrode in the Nano Probe.](#)

Note: Nano functionality is supported on SCIEX 6500, 6500+, and 6600+ series systems.

1. If the ion source is to be connected to an LC system, then attach a fitting to the pre-column transfer tube, and then tighten the fitting clockwise in the Nano column cartridge until it is finger-tight.

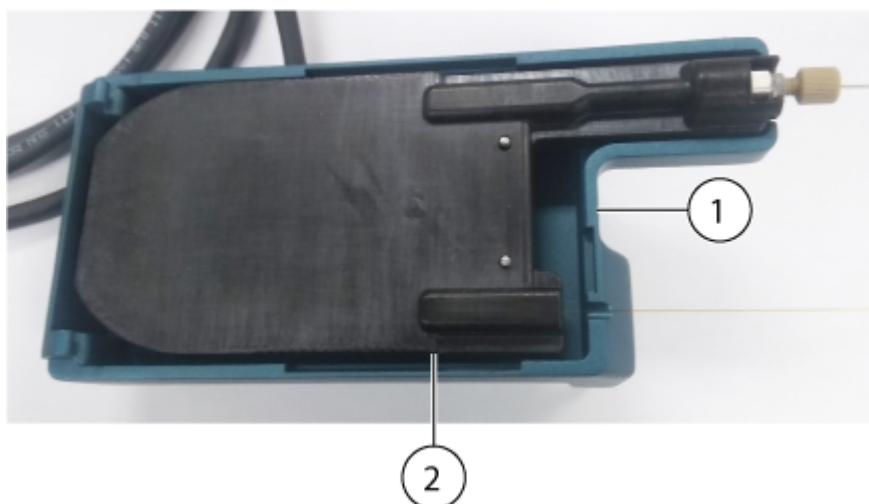
Figure 3-16 Nano Column Cartridge



Item	Description
1	Fitting
2	Pre-column transfer tube, connected to an LC system
3	Post-column transfer tube, connected to the Nano probe
4	Nano column cartridge

2. Position the column cartridge in the back part of the Nano column heater.

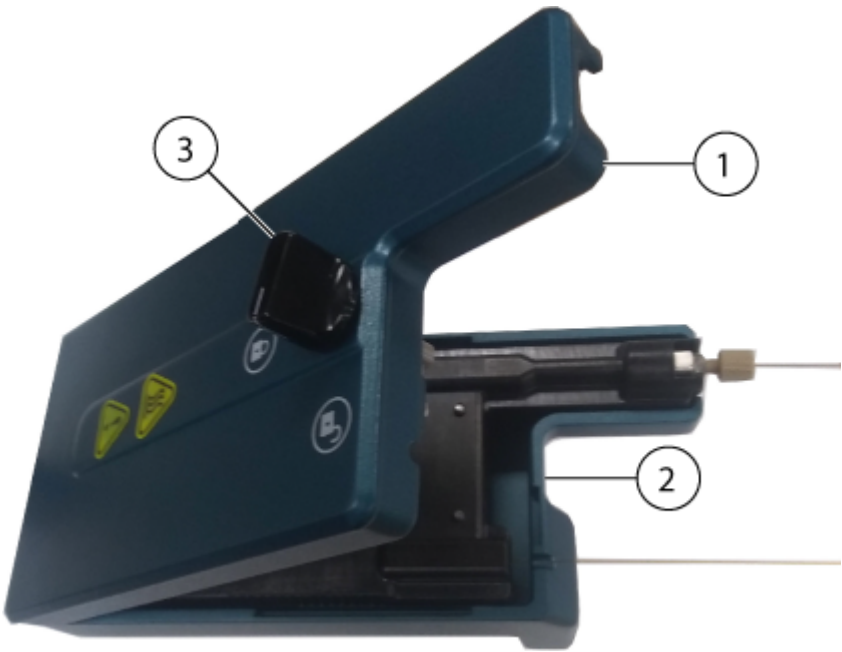
Figure 3-17 Back Part of the Nano Column Heater



Item	Description
1	Nano column heater
2	Column cartridge

3. Position the base of the front part of the column cartridge over the hinges of the back part, and then fold the front part down to close the column heater.

Figure 3-18 Front and Back Parts of the Nano Column Heater

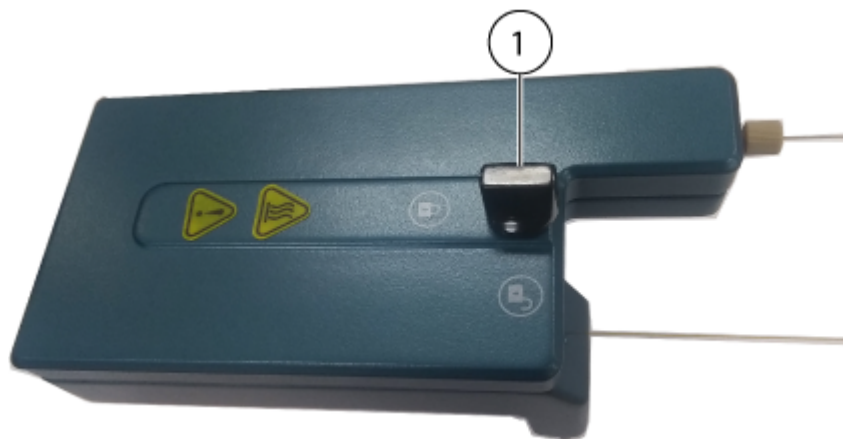


Item	Description
1	Front part of the Nano column heater
2	Back part of the Nano column heater
3	Locking dial in unlocked position

4. Rotate the locking dial clockwise to secure the column cartridge in the Nano column heater.

Ion Source Installation

Figure 3-19 Nano Column Heater Closed



Item	Description
1	Locking dial in locked position

5. Find the connection points on the front of the ion source, and then install the Nano column heater on the ion source. Gently press the column heater onto the ion source. Do not use excessive force.

Note: The column heater has two pins that fit in the connection points.

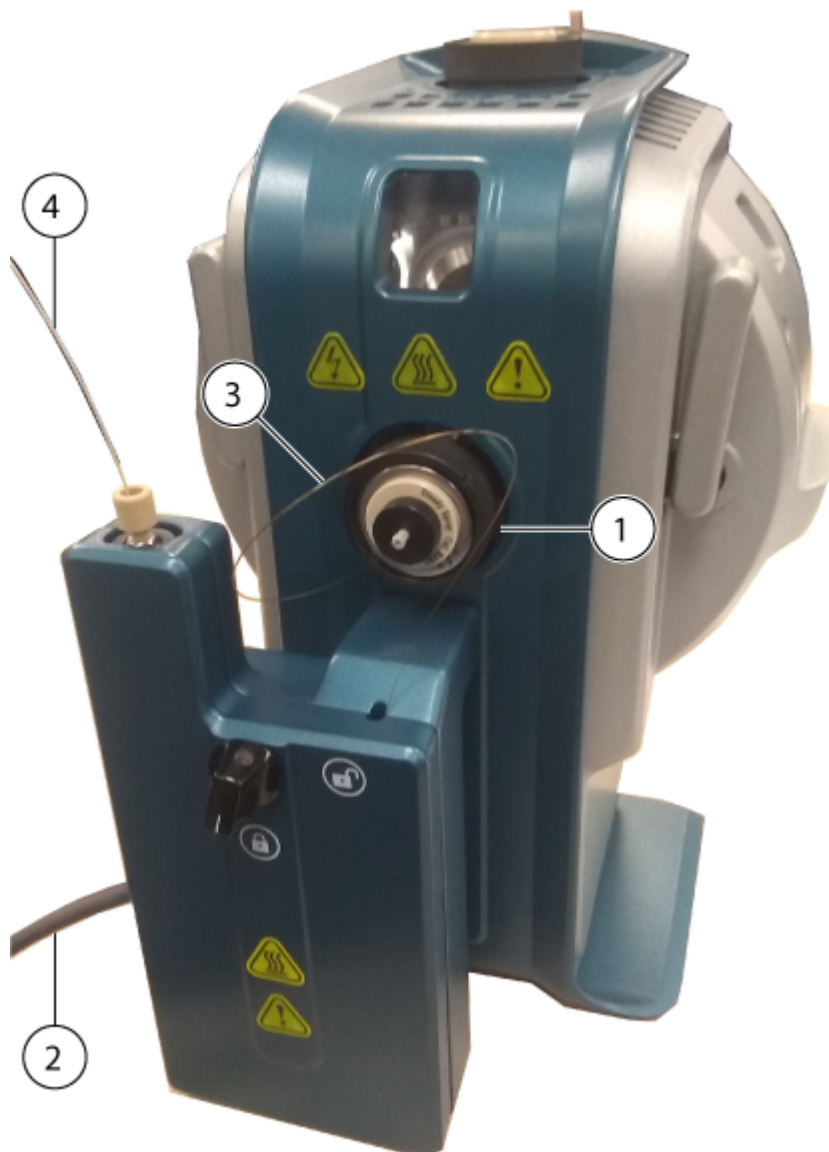
Figure 3-20 Nano Column Heater Connection on the Ion Source



Item	Description
1	Nano probe
2	Connection points for the Nano column heater

6. Attach a fitting to the post-column transfer tube, install the fitting in the union installed in the Nano probe, and then rotate the fitting clockwise until it is finger tight.

Figure 3-21 Nano Column Heater Installed on the Ion Source



Item	Description
1	Nano probe
2	Power and communication cable to the LC system
3	Post-column transfer tube
4	Pre-column transfer tube

7. Connect the pre-column transfer tube to the LC system.

-
8. Connect the power and communication cable to the LC system.

Connect an Infusion Line to the Nano Probe



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.

Prerequisite Procedures
<ul style="list-style-type: none">• Install the Electrode in the Nano Probe.

Note: Nano functionality is supported on SCIEX 6500, 6500+ and 6600+ systems.

Use direct infusion from a syringe pump to introduce a sample. A direct connection to the electrode optimizes the source and mass spectrometer conditions.

- Attach a fitting to the infusion line, and then rotate the fitting clockwise until it is finger tight in the union.

Note: The electrode is installed in the union and then the union is installed in the probe.

Figure 3-22 Infusion Line



Item	Description
1	Nano probe
2	Fitting
3	Infusion line
4	Union

Sample Inlet Requirements

Note: This section is not applicable for the Echo[®] MS system or the Echo[®] MS+ system. Use applicable analytical procedures and practices to minimize external dead volumes.

- 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.

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

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 Turbo V ion source cool for at least 60 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 the molded grips 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.

Recommended Maintenance Schedule

The following table supplies a recommended schedule for cleaning and maintenance of 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 , or Install the Electrode in the Nano Probe . To replace the Echo [®] MS electrode, refer to the documents: <i>Echo[®] MS+ System User Guide</i> . or the <i>Echo[®] MS System Addendum</i> .
Electrode	As needed	Clean	Refer to the section: Clean the Electrode .
Echo [®] MS probe	As needed	Examine	Refer to the documents: <i>Echo[®] MS+ System User Guide</i> . or the <i>Echo[®] MS System Addendum</i> .
Micro and Nano probes	As needed	Replace	Refer to the section: Remove the Probe .

Table 4-1 Maintenance Tasks (continued)

Component	Frequency	Task	For more information...
Sample tubing	As needed	Replace	Refer to the section: Install the Micro Column and Heater or Install an Infusion Adapter and Connect an Infusion Line to a Micro Probe .
Ion source surfaces	As needed	Clean	Refer to the section: Clean the Ion Source Surfaces .

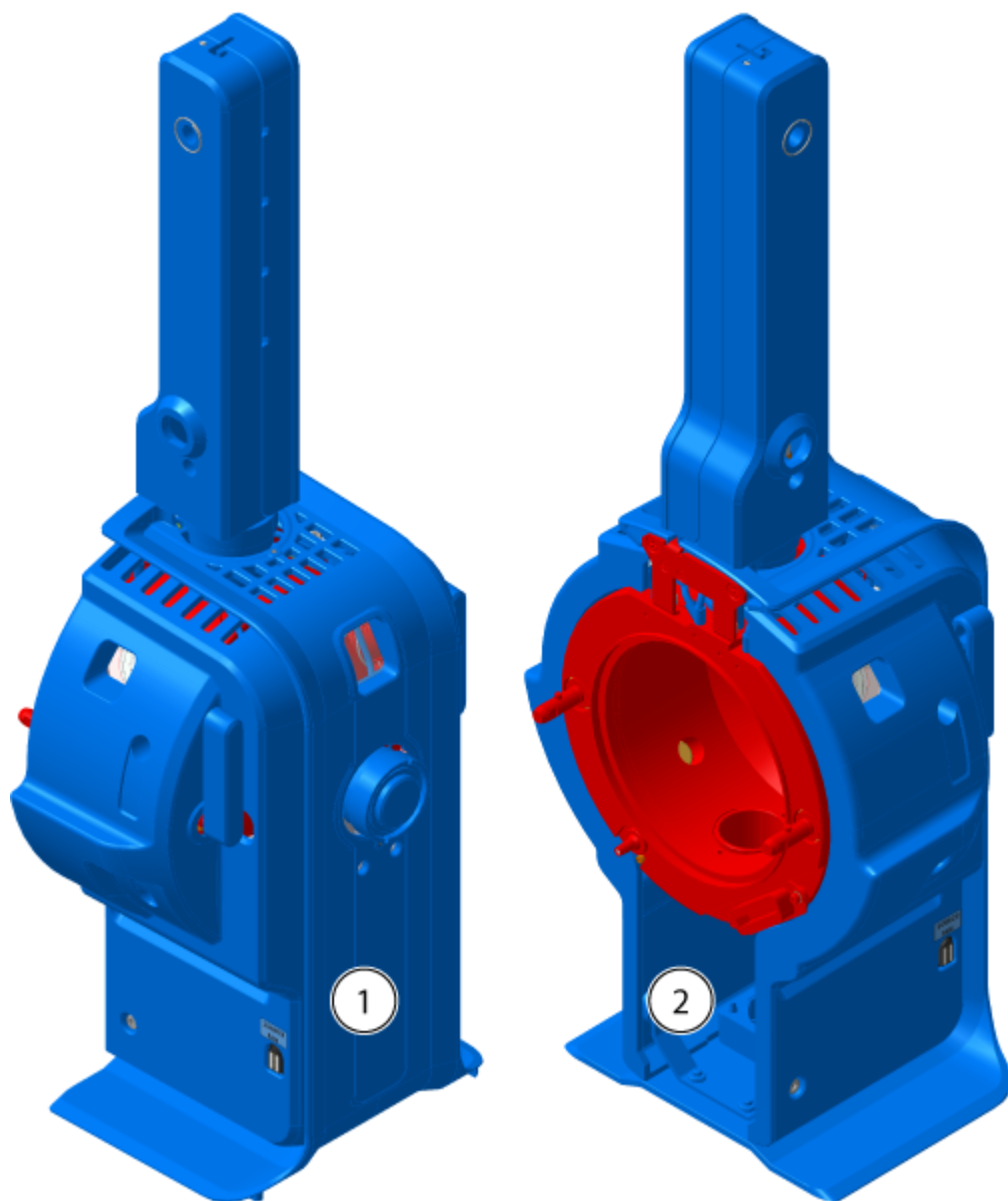
OptiFlow Turbo V Ion Source Handling



WARNING! Personal Injury Hazard. Always wear protective eyewear when handling the Nano column heater. A part of the fused silica tubing protrudes from the top of the column heater and can cause injury.

Surfaces of the ion source become hot during operation. The following figures show surfaces that are cooler (blue) and surfaces that remain hot for an extended period of time (red). Do not touch the surfaces shown in red while using or removing the ion source.

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



Ion Source Maintenance

Figure 4-2 OptiFlow Turbo V Ion Source Nano Hot Surfaces (Red=Hot, Blue=Handle with Care)

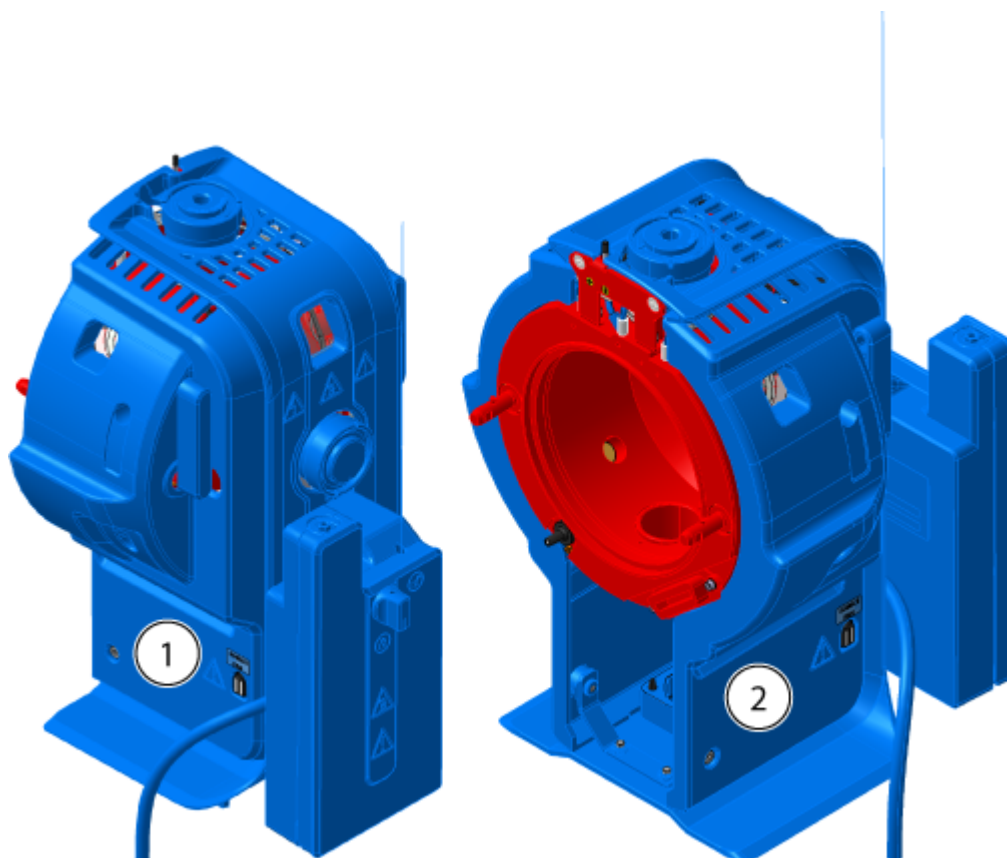
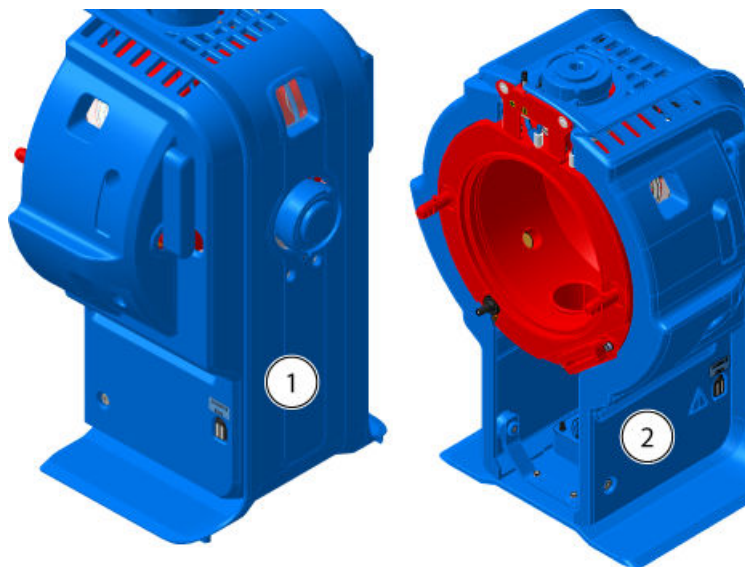


Figure 4-3 OptiFlow Turbo V Ion Source Hot Surfaces For the Echo® MS+ And the Echo® MS System (Red=Hot, Blue=Handle with Care)



Item	Description
1	Front
2	Back

Remove the Ion Source



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Turbo V ion source cool for at least 60 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.
2. Put the mass spectrometer in Standby state.
3. Wait at least 60 minutes for the ion source to cool.

Ion Source Maintenance

4. If the ion source is configured for use with the NanoLC 415, NanoLC 425, M3 MicroLC, or M5 MicroLC System, then disconnect the power and communication cable from the column heater. Refer to the LC System document: *Operator Guide*.
5. Remove the column and column heater.
 - 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](#).
 - If the ion source has a Nano column cartridge and heater installed, then remove the column heater and disconnect the post-column transfer tube. Refer to the section: [Install the Nano Column Cartridge and Heater](#).
 - If the ion source has an Echo[®] MS probe installed, then disconnect the electrode from the Echo[®] MS+ system or the Echo[®] MS system. Refer to the documents: *Echo[®] MS System user guide* or *Echo[®] MS System Addendum*.
6. Disconnect the infusion line.
 - If the ion source has an infusion adapter and PEEK Tee connected to the Micro probe, then disconnect the infusion adapter and PEEK Tee from the probe fitting. Refer to the section: [Install an Infusion Adapter and Connect an Infusion Line to a Micro Probe](#).
 - If the ion source has an infusion line connected to the Nano probe, then disconnect the infusion line from the probe. Refer to the section: [Connect an Infusion Line to the Nano Probe](#).
7. Disconnect the ion source cooling fan power cable from the magnetic connector on the ion source.
8. Rotate the two source latches upward to the 12 o'clock position to release the ion source.
9. Pull the ion source gently away from the vacuum interface.
10. Put the ion source on a clean, safe surface.

Clean the Ion Source Surfaces



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Turbo V ion source cool for at least 60 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

- [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.

Remove the Probe



WARNING! Hot Surface Hazard. Before any maintenance procedures are started, let the OptiFlow Turbo V ion source cool for at least 60 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](#) or [Install the Nano Column Cartridge and Heater](#).
- [Remove the Ion Source.](#)

1. If a Micro 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](#) or [Install the Electrode in the Nano Probe](#) or [Install the Electrode Assembly in the OptiFlow Turbo V System](#).

Ion Source Maintenance

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.
 4. 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.

Note: To clean the Echo[®] MS electrode, refer to the section, "OPI Port Wash", in the document: *Echo[®] MS+ System User Guide*.

Required Materials
<ul style="list-style-type: none">• LC-MS-grade methanol or LC-MS-grade isopropanol

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

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 °C and +60 °C (–22 °F and 140 °F)
- Atmospheric pressure between 75 kPa to 101 kPa
- Relative humidity not exceeding 99%, non-condensing

Install the Electrode Assembly in the OptiFlow Turbo V System

A


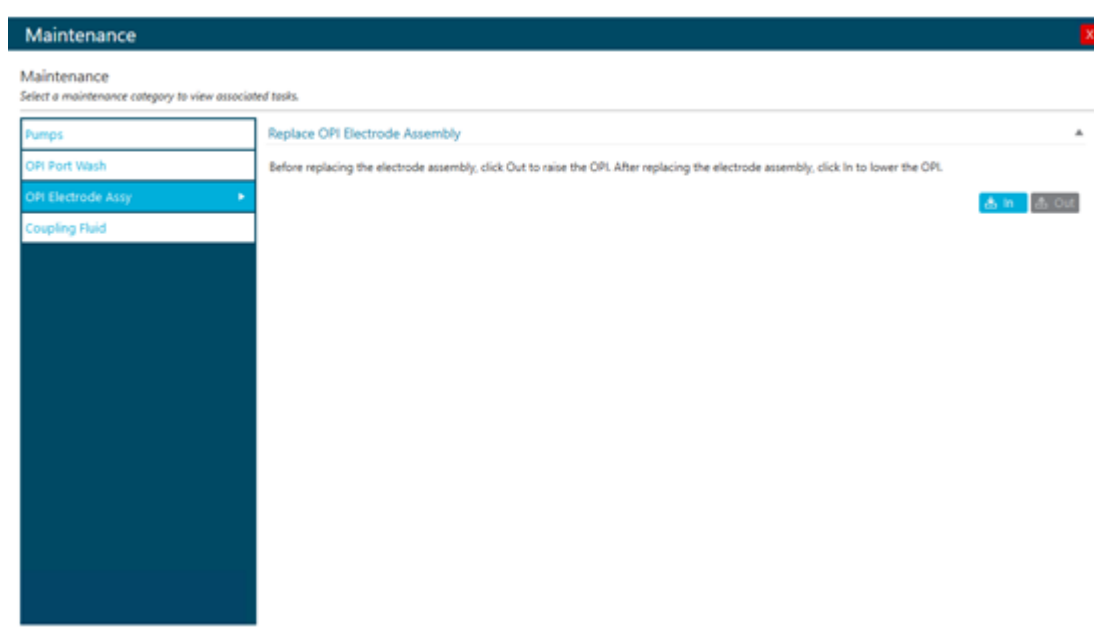
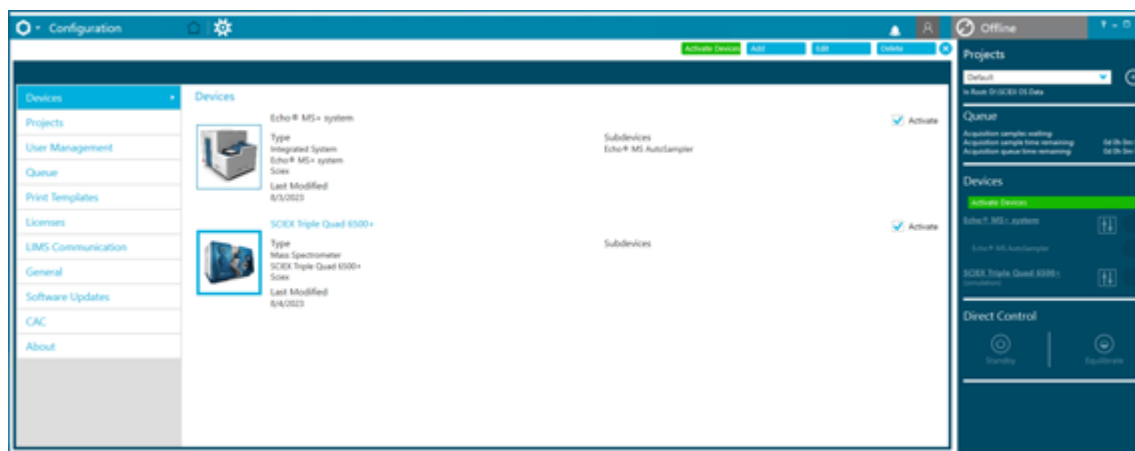
1. In the status panel, click  (Direct device control).
2. Click **Tools > Maintenance**.
3. In the Replace OPI Electrode Assembly section, click **Out**.

Figure A-1 Maintenance: OPI Electrode Assy



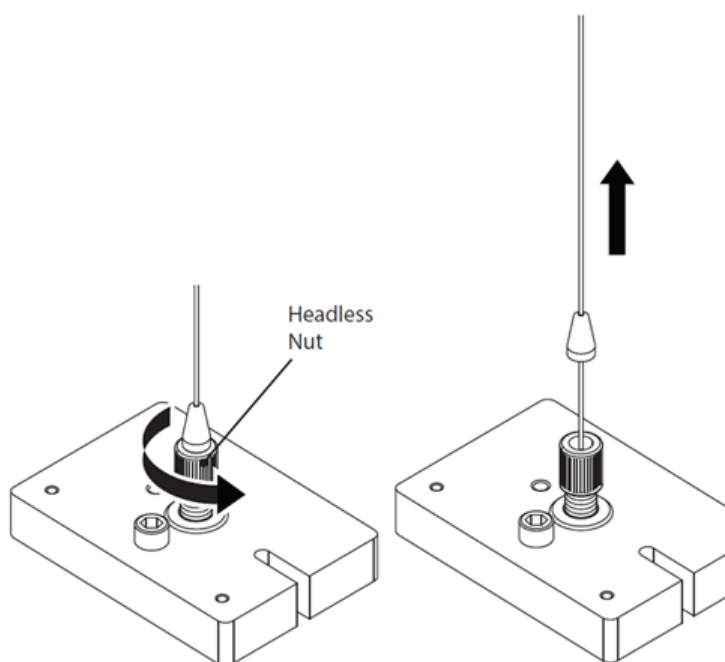
4. Deactivate the devices.

Figure A-2 Deactivate Devices



5. Disconnect the tubing from the Open Port Interface (OPI).

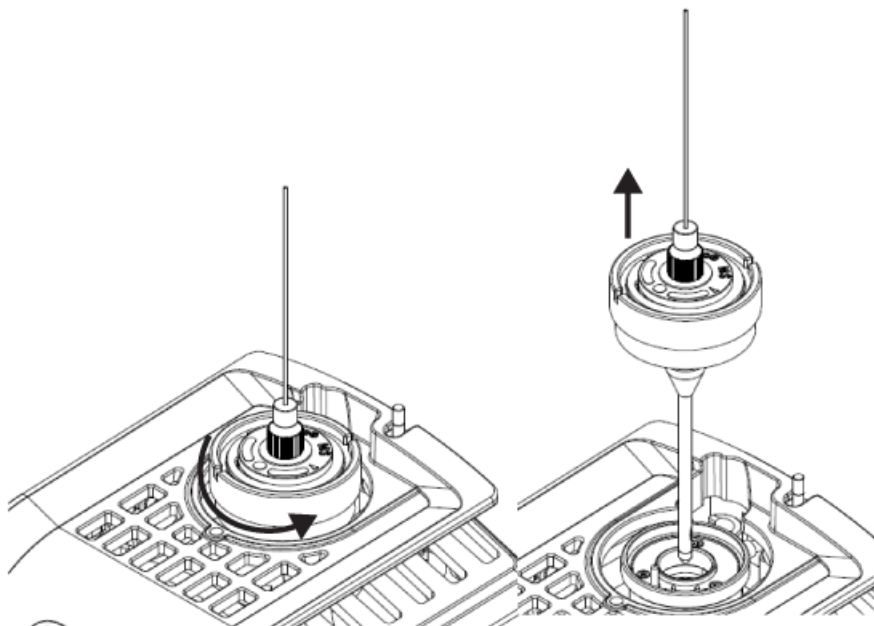
Figure A-3 Disconnect Tubing From the OPI



- a. Loosen the headless nut.
 - b. Disconnect the tubing from the OPI. Do not remove the headless nut.
6. Remove the probe from the OptiFlow Turbo V ion source.

Install the Electrode Assembly in the OptiFlow Turbo V System

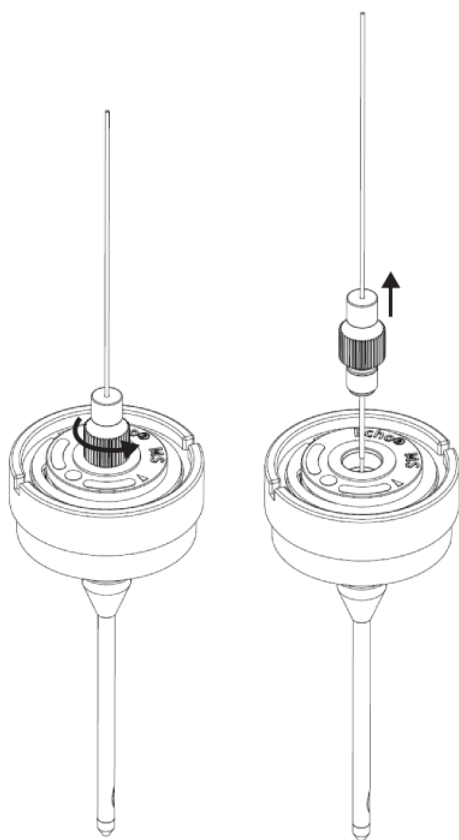
Figure A-4 Remove the Probe



7. Remove the electrode assembly from the probe.

Note: Do not rotate the top fitting.

Figure A-5 Remove the Electrode Assembly



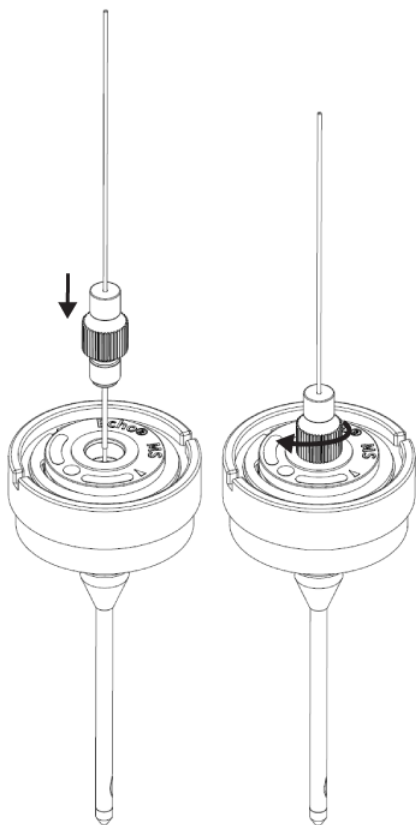
8. Remove the protective tubing from the new electrode assembly.

Note: Make sure to use the electrode assembly that comes with the probe.

9. Install and then fully tighten the new electrode assembly.

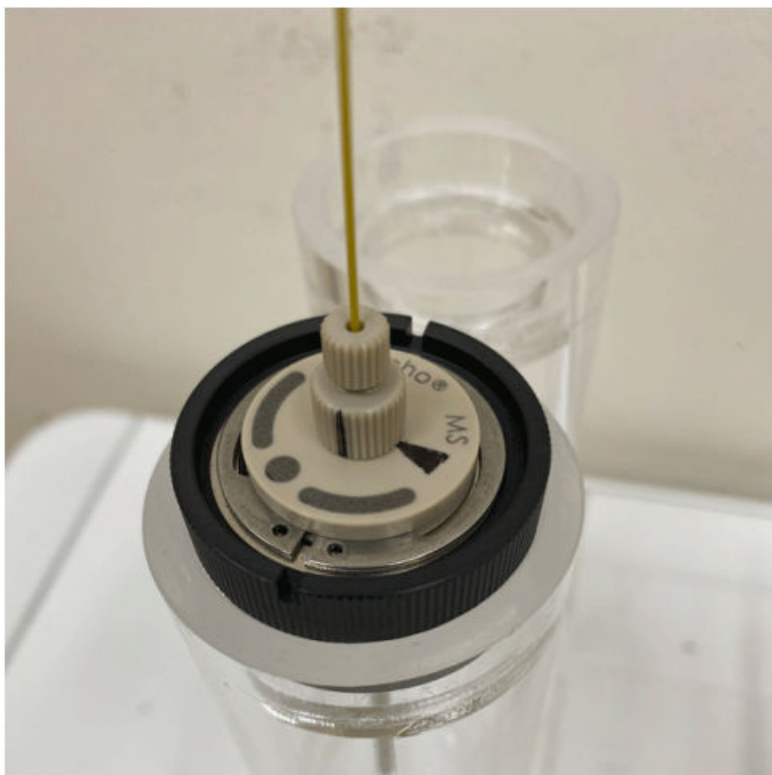
Install the Electrode Assembly in the OptiFlow Turbo V System

Figure A-6 Install the New Assembly



Note: The marking on the electrode assembly is not aligned with the marking on the probe.

Figure A-7 Electrode Assembly and Probe Markings Not Aligned



Note: Make sure that there is no gap between the bottom fitting and the probe.

Install the Electrode Assembly in the OptiFlow Turbo V System

10. Loosen the electrode assembly slowly, and then align the electrode assembly marking with the probe marking.

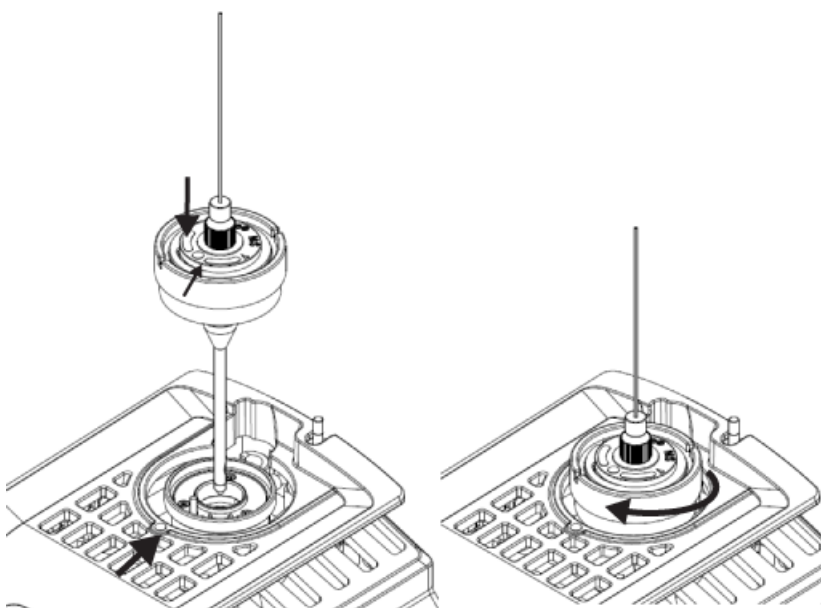
The marking identifies the position of the probe and electrode set after the assembly is optimized in the factory.

Figure A-8 Electrode Assembly and Probe Markings Aligned



11. Install the probe in the ion source.

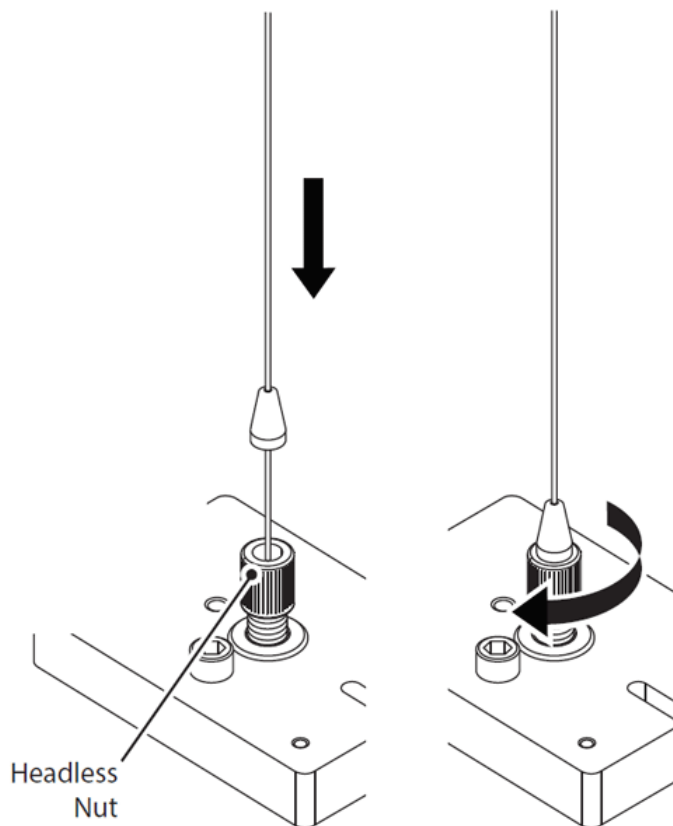
Figure A-9 Install the Probe



Install the Electrode Assembly in the OptiFlow Turbo V System

12. Connect the tubing to the OPI.

Figure A-10 Connect the Tubing

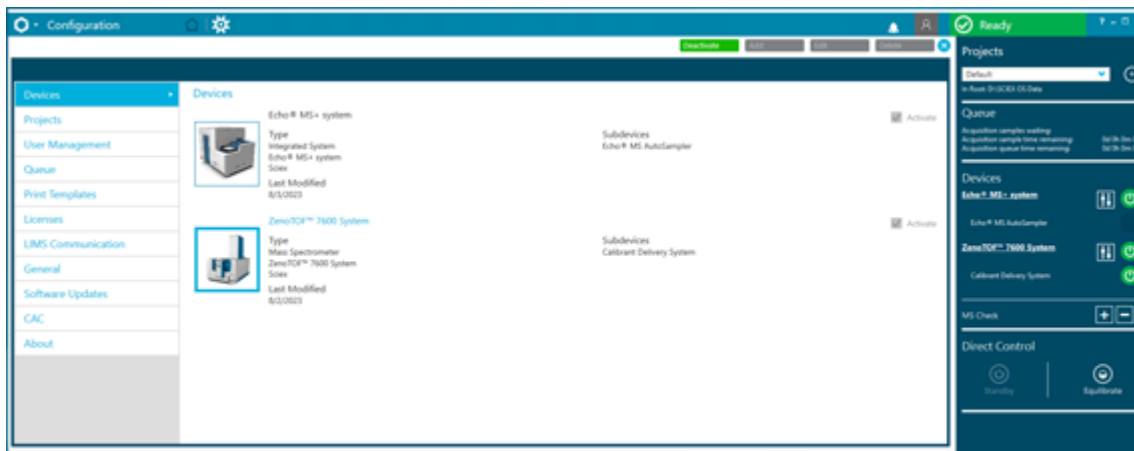


- a. Install the tubing through the headless nut until the stopper is flush with the nut.
- b. Tighten the nut.

Note: Make sure that there is no gap between the stopper and the headless nut.

13. Activate the devices.

Figure A-11 Activated Devices

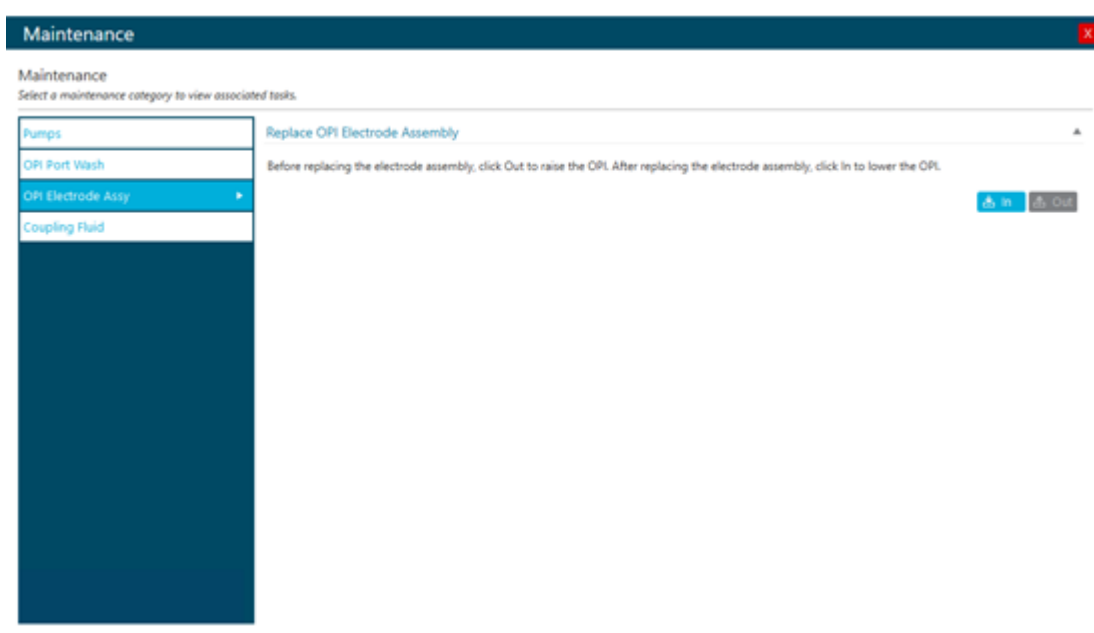


Note: An OPI Drip Sensor Fault detected error might occur if the system is initiated immediately after the electrode assembly is replaced. This error occurs when the carrier solvent flows out after the vacuum in the OPI is released. Wait at least 15 minutes for the sensor to dry and for the system to recover. To dry the OPI overflow sensor manually, refer to the section, "Clean the OPI Wash Tray" in the document: *Echo® MS+ System User Guide*.

14. In the Replace OPI Electrode Assembly section, click **In**.

Install the Electrode Assembly in the OptiFlow Turbo V System

Figure A-12 Maintenance: OPI Electrode Assy






Labels on the Ion Source

B


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 B-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

In addition to warning labels, the ion source contains labels for information purposes.









Table B-2 Information labels









External Labels	Definition	Location
	The label is placed beside the magnetic connector for the ion source cooling fan	External

Glossary of Symbols







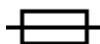



C











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








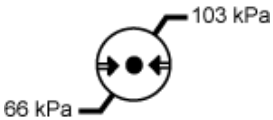
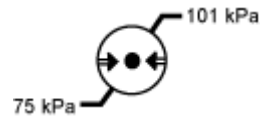
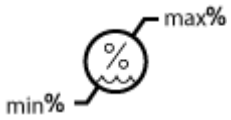

Symbol	Description
	Caution. Consult the instructions for information about a possible hazard. Note: In SCiEX documentation, this symbol identifies a personal injury hazard.
	China RoHS Caution Label. The electronic information product contains certain toxic or hazardous substances. The center number 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

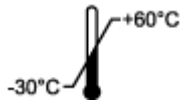






Glossary of Symbols

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 °C to +45 °C.

Symbol	Description
	Transport and store the system within –30 °C to +60 °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.

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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.

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