

SCIEX 7500 System

System User 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 information about general safety and regulatory compliance. This section gives descriptions of possible hazards and the related warnings for the system, and the precautions that should be obeyed to minimize the hazards.

In addition to this section, for information about the symbols and conventions that are used in the laboratory environment, on the system, and in this documentation, refer to the section: [Glossary of Symbols](#). For site requirements, including mains supply, source exhaust, ventilation, compressed air, nitrogen, and roughing pump requirements, refer to the document: *Site Planning Guide*.

General Safety Information

To prevent personal injury or system damage, read, understand, and obey all of the safety precautions and warnings in this document, the manufacturer chemical safety data sheets (SDSs), and product label information. Labels are shown with internationally recognized symbols. Failure to heed these warnings could result in serious injury.

This safety information is intended to supplement federal, state, provincial, and local environmental health and safety (EHS) regulations. The information provided covers system-related safety information applicable to the operation of the system. It does not cover every safety procedure that should be practiced. Ultimately, the user and the organization are responsible for compliance with federal, state, provincial, and local EHS regulations and for maintaining a safe laboratory environment.

Refer to the correct laboratory reference material and standard operating procedures.

Documentation Symbols and Conventions

The following symbols and conventions are used throughout the guide.



DANGER! Danger identifies an action that can cause severe injury or death.



WARNING! Warning identifies an action that can cause personal injury if precautions are not obeyed.

Operational Precautions and Limitations

CAUTION: Caution identifies an operation that can cause damage to the system or corruption or loss of data if precautions are not obeyed.

Note: Notes supply important information in a procedure or description.

Tip! Tips supply information that helps to apply the techniques in a procedure or gives a shortcut, but that is not essential to the completion of a procedure.

Regulatory Compliance

This system complies with the regulations and standards listed in this section. For dated references, refer to the declaration of conformity included with the system and the individual system components. Applicable labels have been affixed to the system.

Australia and New Zealand

- **Electromagnetic Compatibility (EMC):** Radio Communications Act 1992 as implemented in these standards:
 - Electromagnetic Interference—AS/NZS CISPR 11/ EN 55011/ CISPR 11 (Class A). Refer to the section: [Electromagnetic Interference](#).
- **Safety:** AS/NZ 61010-1 and IEC 61010-2-061

Canada

- **Electromagnetic Interference (EMI):** CAN/CSA CISPR11. This ISM device complies with Canadian ICES-001. Refer to the section: [Electromagnetic Interference](#).
- **Safety:**
 - CAN/CSA C22.2 No. 61010-1
 - CAN/CSA C22.2 No 61010-2-061

Europe

- **Electromagnetic Compatibility (EMC):** Electromagnetic Compatibility Directive 2014/30/EU as implemented in these standards:
 - EN 61326-1
 - EN 55011 (Class A)Refer to the section: [Electromagnetic Compatibility](#).
- **Safety:** Low Voltage Directives 2014/35/EU as implemented in these standards:
 - EN 61010-1

- EN 61010-2-061
- **Waste Electrical and Electronic Equipment (WEEE):** Waste Electrical and Electronic Equipment Directive 2012/19/EU, as implemented in EN 40519. Refer to the section: [Waste Electrical and Electronic Equipment](#).
- **Packaging and Packaging Waste (PPW):** Packaging and Packaging Waste Directive 94/62/EC
- **RoHS Restriction of Hazardous Substances:** RoHS Directive 2011/65/EU and 2015/863/EU

United States

- **Radio Emissions Interference Regulations:** 47 CFR 15, as implemented in FCC Part 15 (Class A)
- **Safety:** Occupational Safety and Health Regulations, 29 CFR 1910, as implemented in these standards:
 - UL 61010-1
 - IEC 61010-2-061

International

- **Electromagnetic Compatibility (EMC):**
 - IEC 61326-1
 - IEC CISPR 11 (Class A)
 - IEC 61000-3-2
 - IEC 61000-3-3

Refer to the section: [Electromagnetic Compatibility](#).

- **Safety:**
 - IEC 61010-1
 - IEC 61010-2-061

Electrical Precautions



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. Contact a SCIEIX Field Service Employee (FSE) for repairs that require removal of the covers.

Operational Precautions and Limitations

- Obey the required electrical safe work practices.
- Use cable management practices to control electrical cables and decrease the risk of a tripping hazard.

For information about system electrical specifications, refer to the document: *Site Planning Guide*.

Mains Supply

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



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



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



WARNING! Electrical Shock Hazard. Use only the mains supply cables that are supplied with the system. Do not use mains supply cables that are not correctly rated for the operation of this system.

An external line transformer is not needed for the mass spectrometer, optional bench, or roughing pump.

Protective Earth Conductor

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



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



WARNING! Electrical Shock Hazard. Make sure that a protective earth conductor (grounding cable) is connected between the sample loop and an applicable grounding point at the ion source. This supplementary grounding reinforces the safety configuration specified by SCIEX.

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 which chemicals 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 safety data sheet or certificate of analysis, go to sciex.com/tech-regulatory.
- Always wear assigned personal protective equipment, including powder-free gloves, safety glasses, 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.

Operational Precautions and Limitations

- Obey all of the local regulations for the storage, handling, and disposal of biohazardous, toxic, and radioactive materials.
- Oil-sealed roughing pump: (Recommended) Use a secondary containment tray beneath the roughing pump.

Note: Secondary containment is not required for the dry roughing pump.

- (Recommended) Use secondary containment trays beneath the solvent bottles and the waste container to capture potential chemical spills.

System Safe Fluids

The following fluids can safely be used with the system. For information about safe cleaning solutions, refer to the section: [Required Materials](#).

CAUTION: Potential System Damage. Do not use any other fluid until confirmation is received from SCIEX that it does not cause a hazard. This is not an exhaustive list.

Note: Use only new, freshly prepared LC-MS-grade or better solvents for the LC mobile phases.

- **Organic Solvents**
 - LC-MS-grade acetonitrile; up to 100%
 - LC-MS-grade methanol; up to 100%
 - LC-MS-grade isopropanol; up to 100%
 - LC-MS-grade or higher water; up to 100%
- **Buffers**
 - Ammonium acetate; less than 100 mM
 - Ammonium formate; less than 100 mM
- **Acids and Bases**
 - Formic acid; less than 1%
 - Acetic acid; less than 1%
 - Trifluoroacetic acid (TFA); less than 1%
 - Heptafluorobutyric acid (HFBA); less than 1%
 - Ammonia/ammonium hydroxide; less than 1%

Ventilation Precautions

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

The source exhaust system and roughing pump must be vented to a dedicated laboratory fume hood or an external exhaust system.



WARNING! Fire Hazard. Make sure that the source exhaust system is connected and functioning, to prevent flammable vapor from accumulating in the ion source.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Take care to vent exhaust gases to a dedicated laboratory fume hood or exhaust system and make sure that the ventilation tubing is secured with clamps. Make sure that the laboratory has correct air exchange for the work performed.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Do not operate the mass spectrometer if the source exhaust drain and roughing pump exhaust hoses are not properly connected to the laboratory ventilation system. Examine the exhaust tubing regularly to make sure that there are no leaks. The use of mass spectrometers without proper system ventilation might constitute a health hazard and might result in serious injury.



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! 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.

Physical Precautions



WARNING! Hot Surface Hazard. Let the OptiFlow Pro ion source cool for at least 40 minutes before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Lifting Hazard. Use a mechanical lifting device to lift and move the mass spectrometer. If the mass spectrometer must be moved manually, then at least seven people are required to move it safely. Follow established safe lifting procedures. We recommend the use of a professional moving service. For the weights of system components, refer to the document: *Site Planning Guide*.

Environmental Precautions

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

When the system is set up, make sure that there is sufficient access space around the equipment.



DANGER! Explosion Hazard. Do not operate the system in an environment that contains explosive gases. The system is not designed for operation in an explosive environment.



WARNING! Biohazard. For biohazardous material use, always obey local regulations for hazard assessment, control, and handling. Neither this system nor any part is intended to be used as a biological containment.



WARNING! Environmental Hazard. Obey established procedures for disposal of biohazardous, toxic, radioactive, and electronic waste. The customer is responsible for the disposal of hazardous substances, including chemicals, waste oils, and electrical components, in accordance with local laws and regulations.

CAUTION: Potential Mass Shift. Maintain a stable ambient temperature. If the temperature changes by more than 2 °C per hour, then the resolution and mass calibration might be affected.

Electromagnetic Environment

Electromagnetic Compatibility

Basic Electromagnetic Environment: Environment existing at locations characterized by being supplied directly at low voltage from the public mains network.

Performance Criteria A (Criteria A): Equipment shall operate as intended with no degradation of performance and no loss of function during or after the test.

Performance Criteria B (Criteria B): Equipment may experience loss of function (one or more) during the test but shall operate as intended after the test.

Performance Criteria C (Criteria C): LOSS OF FUNCTION is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

The equipment is intended for use in a basic electromagnetic environment.

The permissible performance loss under the electromagnetic immunity conditions is less than 20% change in total ion count (TIC).

Make sure that a compatible electromagnetic environment for the equipment can be maintained so that the device will operate as intended. If the power supply line is subject to high electrical noise, then install a surge protector.

Electromagnetic Interference

Group 1 Equipment: This equipment is classified as industrial, scientific, and medical (ISM) equipment that might use RF energy for internal operation.

Class A Equipment: Equipment which is suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes. [Derived from CISPR 11:2009, 5.3] Class A equipment shall meet Class A limits.

CAUTION: Potential Radio Interference. This equipment is not intended for use in residential environments and may not supply adequate protection to radio reception in such environments.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC (Federal Communications Commission) Compliance Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the operator's manual, can cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case you will be required to correct the interference, at your own expense. Changes or

Operational Precautions and Limitations

modifications not expressly approved by the manufacturer could void your authority to operate the equipment.

Decommissioning and Disposal



WARNING! Environmental Hazard. Obey established procedures for disposal of biohazardous, toxic, radioactive, and electronic waste. The customer is responsible for the disposal of hazardous substances, including chemicals, waste oils, and electrical components, in accordance with local laws and regulations.

Before decommissioning, obey local regulations to decontaminate the entire system.

When the system is removed from service, obey national and local environmental regulations to divide and recycle different materials. Refer to the section: [Storage and Handling](#).

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

Do not discard system components or subassemblies, including computer parts, as unsorted municipal waste.

Waste Electrical and Electronic Equipment

Obey local municipal waste ordinances for the correct disposal provisions to decrease the environmental impact of waste, electrical, and electronic equipment (WEEE). To discard this equipment safely, contact a local Customer Service office for complimentary equipment pick-up and recycling.

Qualified Personnel

Only qualified SCIEX personnel are permitted to install, examine, and supply servicing for the equipment. After the system has been installed, the Field Service Employee (FSE) uses the document: *Customer Familiarization Checklist* to help the customer become familiar with system operation, cleaning, and basic maintenance. If a system is under warranty, then SCIEX is not responsible for repairs required because of servicing by personnel who are not authorized by SCIEX.

Only personnel qualified by the manufacturer shall maintain the equipment. A laboratory designate can be familiarized with the Qualified Maintenance Person (QMP) procedures during the installation. A QMP is a person who is suitably aware of the electrical and chemical risks associated with servicing laboratory equipment.

Laboratory Conditions

Safe Environmental Conditions

The system is designed to operate safely in these conditions:

- Indoors
- Altitude: Up to 2,000 m (6,560 ft) above sea level
- Ambient temperature: 5 °C (41 °F) to 40 °C (104 °F)
- Relative humidity: 20% to 80%, noncondensing
- 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:

- An ambient temperature of 15 °C to 30 °C (59 °F to 86 °F)

Over time, the temperature must remain within a range of 4 °C (7.2 °F), with the rate of the change in temperature not exceeding 2 °C (3.6 °F) per hour. Ambient temperature fluctuations exceeding the limits might result in mass shifts in spectra.

- Relative humidity from 20% to 80%, non-condensing

Equipment Use and Modification



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



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. Contact a SCIEX Field Service Employee (FSE) for repairs that require removal of the covers.



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.

Operational Precautions and Limitations



WARNING! Lifting Hazard. Use a mechanical lifting device to lift and move the mass spectrometer. If the mass spectrometer must be moved manually, then at least seven people are required to move it safely. Follow established safe lifting procedures. We recommend the use of a professional moving service. For the weights of system components, refer to the document: *Site Planning Guide*.



WARNING! Crushing Hazard. Wear protective footwear when moving heavy objects.

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 in 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.

The system is designed for the qualitative and quantitative analysis of chemical species.

This section includes information about the mass spectrometer. For an overview of the ion source, refer to the document: *OptiFlow Pro Ion Source Operator Guide*.

System Overview

This system is intended for the qualitative and quantitative analysis of chemical species.

The SCIEX 7500 system comes with an upgrade path to QTRAP functionality. Users can purchase a QTRAP license to access the linear ion trap (LIT) features. For more information, visit the SCIEX website at sciex.com.

The system includes the following components:

- A SCIEX 7500 mass spectrometer.
- Roughing pumps. The following roughing pump configurations are available:
 - Two oil-sealed roughing pumps
 - Two dry roughing pumps

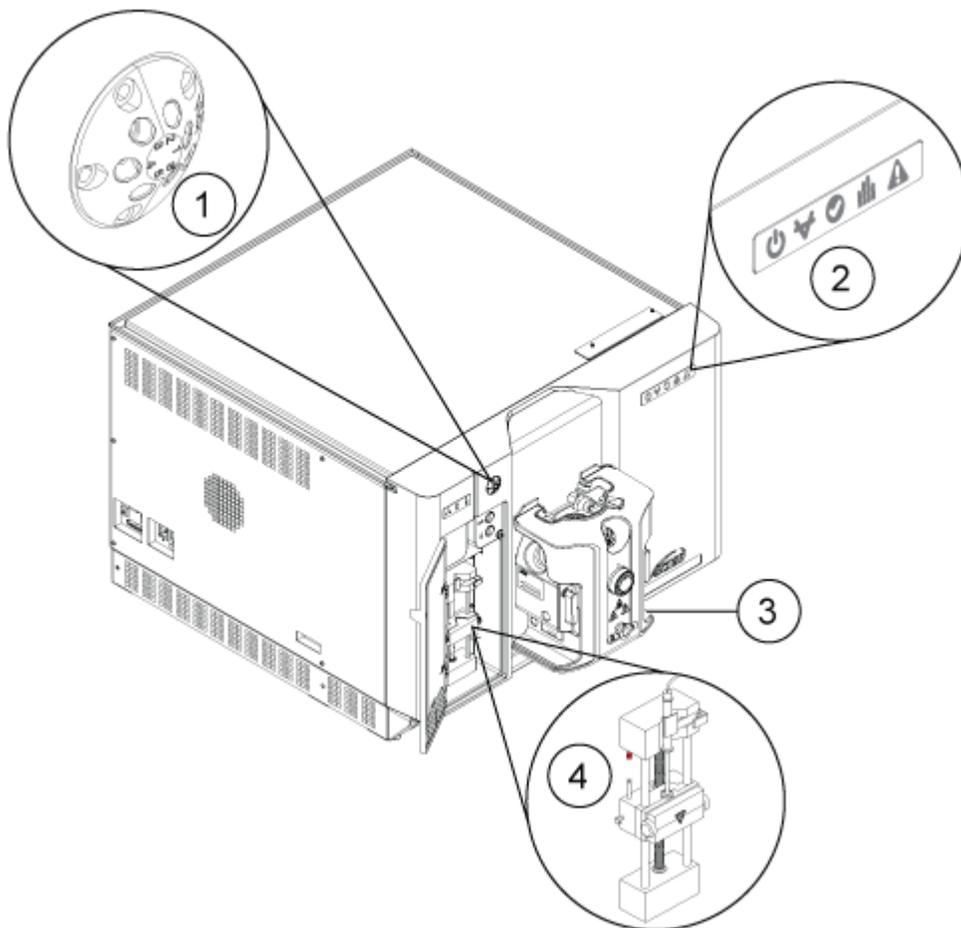
Note: This configuration requires the SCIEX OS software.

Note: Do not mix the oil-sealed roughing pump and the dry roughing pump configurations on the same mass spectrometer.

- An OptiFlow Pro ion source that uses the high flow ESI probe and the high flow E Lens Technology. Refer to the document: *OptiFlow Pro Ion Source Operator Guide*.
- A SCIEX-supplied computer and monitor with the control software for instrument optimization, acquisition method development, data acquisition, and processing. For computer specifications and requirements, refer to the software documentation.

Hardware Overview

Figure 2-1 Front View



Item	Description	Refer
1	Diverter valve	Diverter Valve.
2	Panel symbols	Panel Symbols.
3	Ion source	<i>OptiFlow Pro Ion Source Operator Guide</i> , available from the ion source documentation DVD, or from the SCIEX website, at sciex.com .
4	Syringe pump	Adjust the Integrated Syringe Pump Position.

Panel Symbols

The following table describes the mass spectrometer status LEDs.

Table 2-1 Panel Symbols

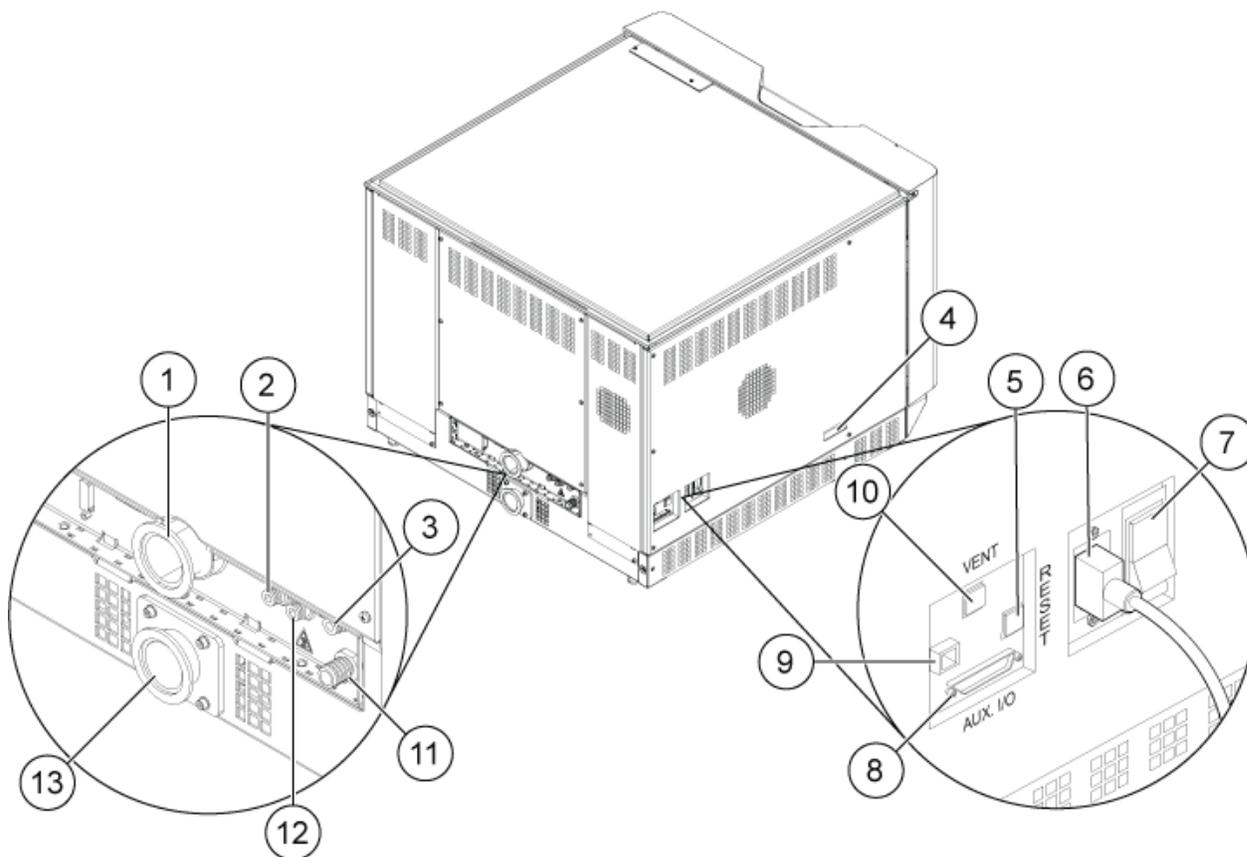
LED	Color	Name	Description
	Green	Power	Illuminated when the system is powered up.
	Green	Vacuum	Illuminated when the operating vacuum level has been achieved. Flashing if the vacuum is not at the correct level, that is, during pump down and venting.
	Green	Ready	Illuminated when the system is in the Ready state. The system must be in the Ready state to operate.
	Blue	Scanning	Flashing when the system is acquiring data.
	Red	Fault	Illuminated when the system encounters a system fault.

After the system is turned on, all of the LEDs illuminate. The power LED remains illuminated. The other LEDs flash for two seconds and then turn off. The vacuum LED starts flashing. After the operating vacuum level is achieved, this LED remains illuminated.

Connections

The following figure shows the location of the mass spectrometer connections, including the locations of the **RESET** and **VENT** buttons and the mass spectrometer convenience switch.

Figure 2-2 Back and Side Views



Item	Description	For more information...
1	Roughing pump vacuum connection (MS 40 or MSR 90)	Contact an FSE.
2	Air supply (Gas 1/Gas 2)	Refer to the document: <i>Site Planning Guide</i> . Gas tubing from the Gas 1/Gas 2 supply connects to this port.
3	Source exhaust supply	Refer to the document: <i>Site Planning Guide</i> . Gas tubing from the source exhaust gas supply connects to this port.
4	Source communication connection	Contact an FSE.
5	RESET button	Refer to the section: Reset the Mass Spectrometer .

Item	Description	For more information...
6	Mains supply connection	Refer to the section: Start Up the System or Shut Down and Vent the System .
7	Mass spectrometer convenience switch (Up = On; Down = Off)	Refer to the section: Start Up the System or Shut Down and Vent the System .
8	Aux I/O connection	
9	Ethernet connection (connects the mass spectrometer and the computer)	Contact an FSE.
10	VENT button	Refer to the section: Start Up the System or Shut Down and Vent the System .
11	Source exhaust waste (to source exhaust drain bottle)	Refer to the document: <i>Site Planning Guide</i> .
12	Nitrogen gas supply (gas for the Curtain Gas interface, CAD gas)	Refer to the document: <i>Site Planning Guide</i> . Gas tubing from the nitrogen gas supply connects to this port.
13	Roughing pump vacuum connection (MS 120 or MSR 130)	Contact an FSE.

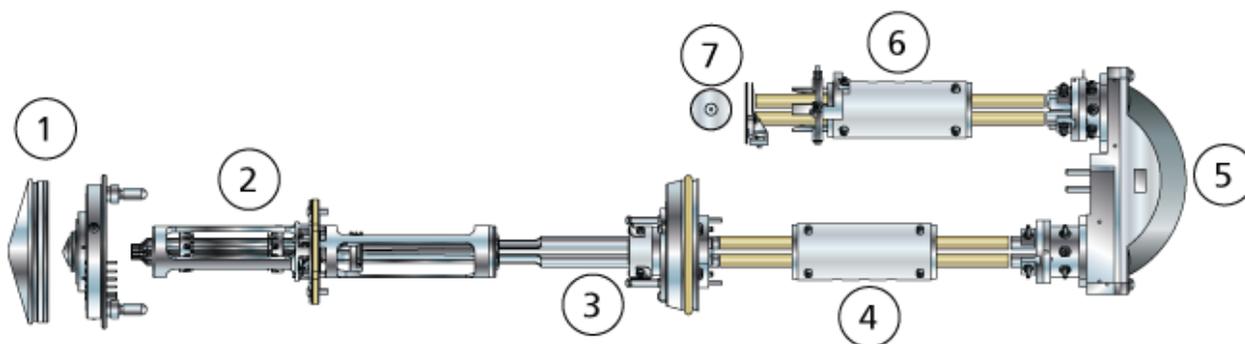
Theory of Operation—Hardware

Mass spectrometry measures the mass-to-charge ratio of ions to identify unknown compounds, to quantify known compounds, and to provide information about the structural and chemical properties of molecules.

The mass spectrometer has a series of quadrupole filters that transmit ions according to their mass-to-charge ratio (m/z). The first quadrupole in this series is the D Jet ion guide, located between the orifice plate and the Q0 region. The D Jet ion guide focuses the ions before they enter the Q0 region. By prefocusing the larger ion flux through the wider orifice, the D Jet ion guide increases system sensitivity and improves the signal-to-noise ratio. The D Jet ion guide helps to focus ions into the Q0 region. In the Q0 region, the ions are again focused before they enter the Q1 quadrupole.

Principles of Operation

Figure 2-3 Ion Path



Item	Description
1	Curtain plate and orifice plate
2	D Jet ion guide
3	Q0 region
4	Q1 quadrupole
5	Q2 collision cell
6	Q3 quadrupole
7	Detector

The Q1 quadrupole is a filtering quadrupole that sorts the ions before they enter the Q2 collision cell. In the Q2 collision cell the internal energy of an ion is increased through collisions with gas molecules until the molecular bonds break, creating product ions. This technique allows users to design experiments that measure the m/z of product ions to determine the composition of the parent ions.

After passing through the Q2 collision cell, the ions enter the Q3 quadrupole for additional filtering. Then they enter the detector. In the detector, the ions create a current that is converted into a voltage pulse. The voltage pulses leaving the detector are directly proportional to the quantity of ions entering the detector. The system monitors these voltage pulses and then converts the information into a signal. The signal represents the ion intensity for a particular m/z value and the system shows this information as a mass spectrum.

Note: Linear ion trap features are only available on systems that have the QTRAP feature activated.

The linear ion trap (LIT) functionality provides a number of Enhanced modes of operation. A common factor of the Enhanced modes is that ions are trapped in the Q3 quadrupole region and then scanned out to produce full spectrum data. Many spectra are rapidly collected in a

short period of time and are significantly more intense than spectra collected in a comparable standard quadrupole mode of operation.

During the collection phase, ions pass through the Q2 collision cell where the CAD gas focuses the ions into the Q3 region. The Q3 quadrupole is operated with only the main RF voltage applied. Ions are prevented from passing through the Q3 quadrupole and are reflected back by an exit lens to which a DC barrier voltage is applied. After the fill time elapses, a time defined by the user, or determined by the Dynamic Fill Time feature, a DC barrier voltage is applied to the Q3 entrance lens (IQ3). This voltage confines the collected ions in the Q3 region and stops additional ions from entering. The entrance and exit lens DC voltage barriers and the RF voltage applied to the quadrupole rods confine the ions within the Q3 region.

During the scan out phase, the voltage on the exit lens and the auxiliary RF voltage are ramped simultaneously with the main RF voltage for increased resolution and sensitivity as compared to quadrupole scan types. An auxiliary AC frequency is applied to the Q3 quadrupole. The main RF voltage amplitude is ramped from low to high values, which sequentially brings masses into resonance with the auxiliary AC frequency. When ions are brought into resonance with the AC frequency, they acquire enough axial velocity to overcome the exit lens barrier and are axially ejected towards the mass spectrometer ion detector. Full spectra data can be acquired from the ions collected in the Q3 region by rapidly scanning the main RF voltage.

For information about the available software parameters, refer to the document: *Help*.

Operating Instructions — Hardware 3



WARNING! Personal Injury Hazard. Follow the instructions in the documentation when using the system. The protection provided by the equipment might be impaired if the equipment is used in a manner not specified by SCIEX.

Start Up the System



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

Note: Before operating the instrument, read the safety information in the section: [Operational Precautions and Limitations](#).

Prerequisites

- The site requirements specified in the *Site Planning Guide* are met. The *Site Planning Guide* includes information on the mains supply and connections, compressed air, nitrogen, roughing pump, ventilation, exhaust, and site clearance requirements. Contact SCIEX for a copy of the *Site Planning Guide*, if required. For contact information, go to sciex.com/contact-us.
- The source exhaust gas, compressed air, and nitrogen gases are connected to the mass spectrometer.
- The 4 L source exhaust drain bottle is connected to the exhaust waste connection on the back of the mass spectrometer and to the laboratory ventilation system.
- The source exhaust hoses are securely clamped at the mass spectrometer, source exhaust drain bottle, and ventilation connections.
- The mass spectrometer convenience switch is turned off and the mains supply cable is connected to the mass spectrometer.
- The mass spectrometer and roughing pump mains supply cables are connected to the 200 VAC to 240 VAC mains supply.
- The Ethernet cable is connected to both the mass spectrometer and the computer.

1. Turn on the mass spectrometer convenience switch. Refer to the figure: [Figure 2-2](#).
2. Turn on the computer.

3. Open the control software.

Syringe Pump

Adjust the Integrated Syringe Pump Position



WARNING! Puncture Hazard. Take care when handling the syringe. The tip of the syringe is extremely sharp.



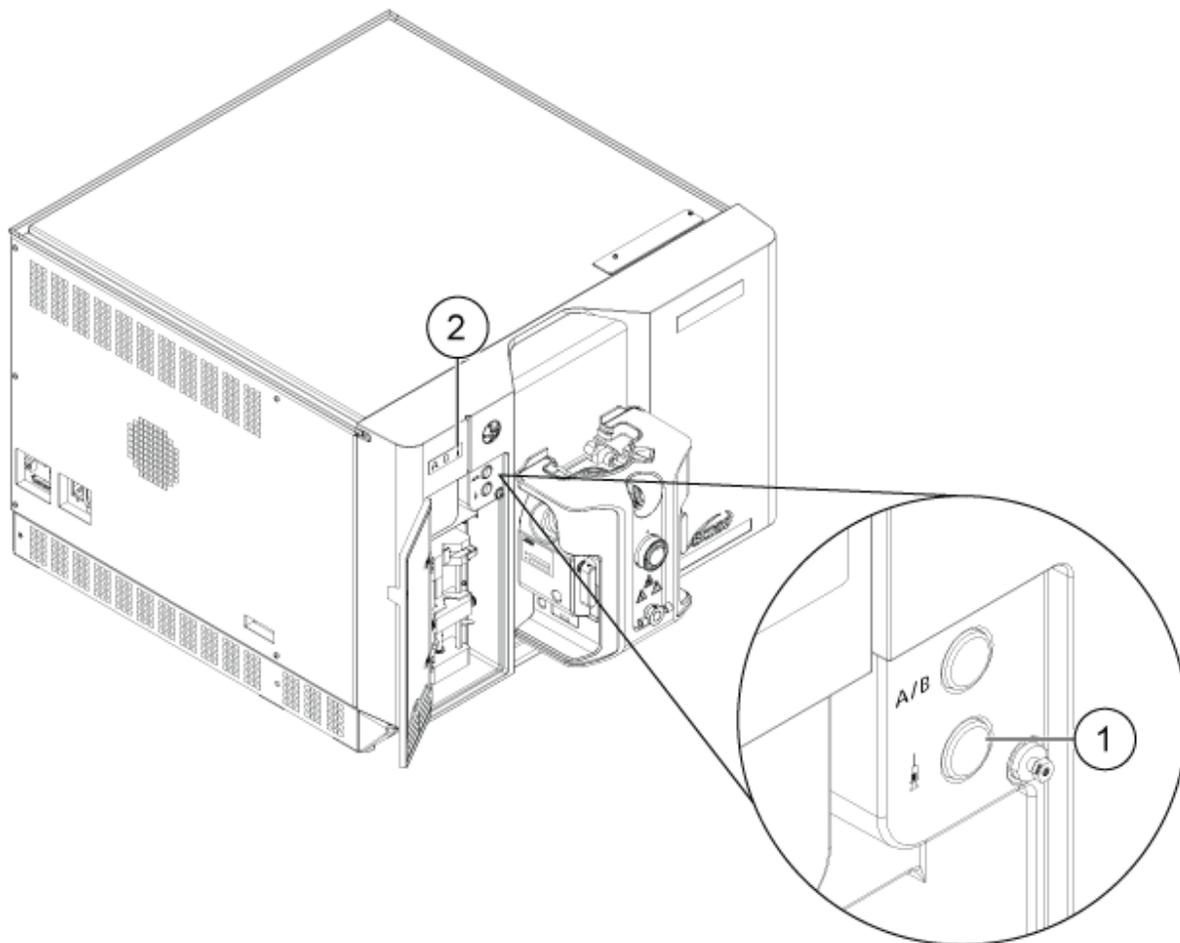
WARNING! Puncture Hazard. Make sure that the syringe is seated properly in the syringe pump and that the automatic syringe pump stop is adjusted properly to avoid damaging or breaking the glass syringe. If the syringe breaks, follow established safety procedures for sharps disposal.

For the location of the syringe pump on the mass spectrometer, refer to the figure: [Figure 2-1](#).

1. Open the syringe cover.
2. Press the Release button on the right side of the syringe pump to lower the base and then insert the syringe.
3. Make sure that the end of the syringe is flush with the base and that the shaft of the syringe rests in the cutout.
4. Adjust the post so that it triggers the automatic syringe stop before the syringe plunger hits the bottom of the glass syringe.
5. Make sure that the mass spectrometer and integrated syringe pump are activated in the software.

Note: For subsequent manual use, after the mass spectrometer is in Ready state, start the flow by pressing the button on the mass spectrometer that is to the right of the syringe. The LED above the syringe flashes when the syringe pump is in use. The syringe pump flow can also be controlled automatically by the control software.

Figure 3-1 Syringe Pump LED



Item	Description
1	Syringe pump on and off button
2	Syringe pump status LED

- Use the control software to start or stop the syringe pump.

Diverter Valve



WARNING! Electrical Shock Hazard. Ground the sample line through the diverter valve to avoid an electrical discharge from the high voltage between the ion source and the syringe pump.

The front panel of the mass spectrometer contains an integrated six-port, two position diverter valve. It can be configured as either a diverter valve, to move solvents to waste until sample is in the liquid stream, or an injector valve with an injector loop.

The diverter valve is located at the top left of the front cover. The stator face is visible when the front cover is closed under operating conditions.

Buttons inside the syringe panel, on the dress panel, can be used to manually change the state of the diverter valve.

CAUTION: Potential Wrong Result. Do not press the diverter valve button during a run. Doing so might result in incorrect data.

Plumb the Diverter Valve in Injector Mode

When the valve is in Position A, the sample flows through the external loop. When the valve switches to Position B, the sample is injected.

- Plumb the valve for Injector mode.

Figure 3-2 Diverter Valve—Injector Mode Position A

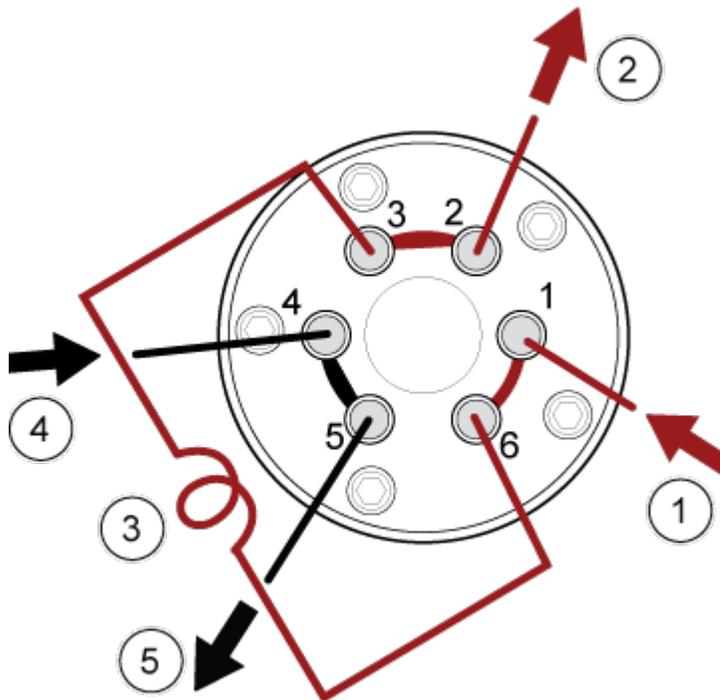
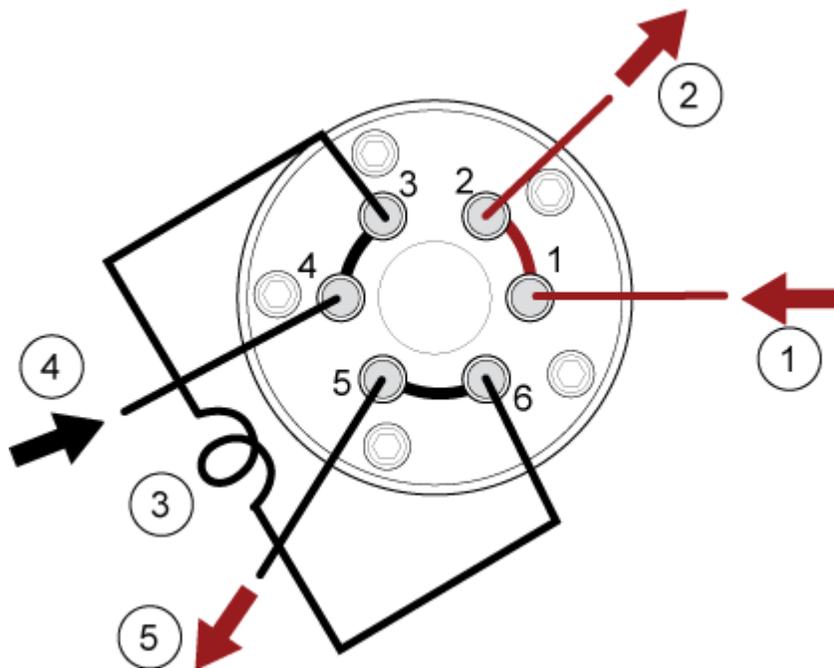


Figure 3-3 Diverter Valve—Injector Mode Position B



Item	Description
1	Sample in
2	Waste out
3	Sample loop (ports 3 and 6)
4	Mobile phase in
5	To column, or to the mass spectrometer, if a column is not installed

Plumb the Diverter Valve in Diverter Mode

When the valve is in Position A, the sample flow goes to the mass spectrometer. When the valve switches to Position B, the flow goes to waste.

- Plumb the valve for Diverter mode.

Figure 3-4 Diverter Valve—Diverter Mode Position A

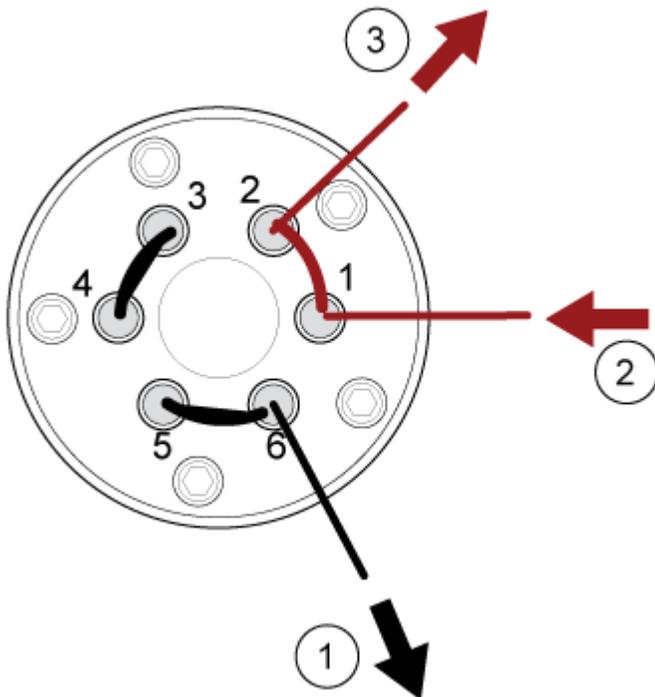
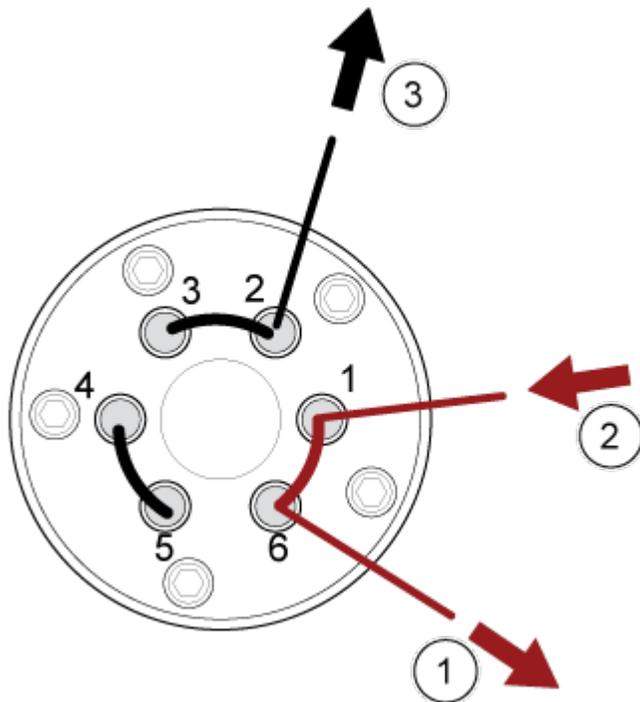


Figure 3-5 Diverter Valve—Diverter Mode Position B



Item	Description
1	To mass spectrometer
2	From column
3	Waste out

Shut Down and Vent the System

Note: If the input gas supply must be disconnected, then relieve the pressure in the gas lines before disconnecting it.

Tip! If the mass spectrometer must be shut down, then follow these instructions.

1. Complete or stop any ongoing scans.
-

CAUTION: Potential System Damage. Turn off the sample flow before the system is shut down.

2. Turn off the sample flow to the system.
 3. In the control software, deactivate the mass spectrometer if it is active. Refer to the document: *Software User Guide*.
 4. Close the software.
 5. Follow these steps to vent the system:
 - a. Press and hold the **Vent** button for three seconds. Refer to the figure: [Figure 2-2](#). The Vacuum LED begins flashing more quickly than during pump down. The turbo pump spins down gradually.
 - b. Allow the system to vent for 10 minutes.
 6. Turn off the mass spectrometer convenience switch.
 7. Disconnect the mass spectrometer mains supply cable from the mains supply outlet.
 8. (If venting the system) Disconnect the roughing pump mains supply cable from the mains supply outlet.
-

Note: Make sure to connect this cable before starting up the mass spectrometer. If it is not connected, then the mass spectrometer will remain in Idle state, and the pump down sequence will not be initiated.

Reset the Mass Spectrometer

CAUTION: Potential System Contamination. Make sure to vent the system, to avoid damage to the mass spectrometer.

1. Stop any ongoing scans and then turn off sample flow to the mass spectrometer.
2. In the control software, deactivate the mass spectrometer. Refer to the document: *Software User Guide*.
3. Close the control software.
4. Follow these steps to vent the system:
 - a. Press and hold the **Vent** button for three seconds. Refer to the figure: [Figure 2-2](#). The Vacuum LED begins flashing more quickly than during pump down. The turbo pump spins down gradually.
 - b. Allow the system to vent for 10 minutes.
5. Press and hold the **Reset** button for five seconds. A click is heard when the relay activates. After approximately 10 minutes, the mass spectrometer reaches operating pressure.

Operating Instructions — User Workflows

4

After the system is installed and configured, it is ready for use. The following table shows the workflows available. For each task, it lists a reference that contains more information.

Table 4-1 User Workflows

Task	Reference
Analyst	
Monitor the system status	<i>Software User Guide or Help System.</i>
Create and submit batches	<i>Software User Guide or Help System.</i>
View and manage samples in the queue	<i>Software User Guide or Help System.</i>
Explore data	<i>Software User Guide or Help System.</i>
Method Developer	
Configure the system	<ul style="list-style-type: none">• Configure the mass spectrometer: <i>Software User Guide or Help System.</i>• Create projects and data folders: <i>Software User Guide or Help System</i>• Configure the LC devices: <i>Software User Guide or Help System</i>
Tune the mass spectrometer	<i>Software User Guide or Help System.</i>
Create MS methods	<i>Software User Guide or Help System.</i>
Create LC methods	<i>Software User Guide or Help System.</i>
Develop processing methods	<i>Software User Guide or Help System.</i>
Administrator	
Set the Windows file permissions	<i>Laboratory Director Guide.</i>
Configure the LIMS	<i>Software User Guide or Help System.</i>
Add users to the software and assign roles	<i>Laboratory Director Guide or Help System.</i>
Archive logs	<i>Software User Guide or Help System.</i>
Reviewer	

Table 4-1 User Workflows (continued)

Task	Reference
Review processed results	<i>Software User Guide or Help System.</i>
Explore data	<i>Software User Guide or Help System.</i>
Review logs	<i>Software User Guide or Help System.</i>

Service and Maintenance Information

5

Regularly clean and maintain the system for optimal performance.



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. Contact a SCIEX Field Service Employee (FSE) for repairs that require removal of the covers.



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.

Recommended Maintenance Schedule

The following tables provide a recommended schedule for cleaning and maintaining the system.

Tip! Perform maintenance tasks regularly to make sure that the system is performing optimally.

- Perform periodic gas leakage tests and general maintenance inspections to be sure of safe operation of the system.
- Clean the system regularly to keep it in good working condition.
- During system maintenance, carefully examine parts of the external gas supply system, including tubing connected to the equipment, to confirm that the condition is satisfactory. Replace any cracked, pinched, or collapsed tubing.

For information on maintaining the ion source, refer to the document: *OptiFlow Pro Ion Source Operator Guide*.

To determine how often to clean or perform maintenance on the mass spectrometer and ion source, consider the following factors. These factors can cause changes in mass spectrometer performance, indicating that maintenance is required.

- Compounds tested
- Cleanliness of the samples and the sample preparation methods
- Amount of time that the probe is exposed to the sample

- Overall system run time

For information about tuning frequency, refer to the section: [Calibration Ions and Solutions](#).

To order consumable parts and for basic service and maintenance requirements, contact a QMP or refer to the document: *Parts and Equipment Guide*. Contact a SCIEX FSE for all other service and maintenance requirements.

Table 5-1 Mass Spectrometer Maintenance Tasks

Component	Frequency	Task	For More Information
System	Daily	Examine for leaks	Refer to the section: Chemical Precautions .
Curtain plate	Daily	Clean	Refer to the section: Clean the Curtain Plate .
Oil-sealed roughing pump ¹ : Roughing pump oil	Weekly	Examine the level	Refer to the section: Inspect the Roughing Pump Oil Level (Oil-Sealed Roughing Pump) . Contact the local QMP or FSE to add oil, if required.
Oil-sealed roughing pump ¹ : Roughing pump oil	Every 2 years, or as needed	Replace	Contact the local QMP or FSE.
Oil-sealed roughing pump ¹ : Roughing pump oil	As needed	Refill	Contact the local QMP or FSE.
Orifice plate (front)	As needed	Clean	Refer to the section: Clean the Front of the Orifice Plate .
Orifice plate (front and back)	As needed	Clean	Contact the local QMP or FSE.
Mass spectrometer air filter	As needed	Replace	Contact the local QMP or FSE.
Instrument surfaces	As needed	Clean	Refer to the section: Clean the Surfaces .
Source exhaust drain bottle	As needed	Empty	Refer to the section: Empty the Source Exhaust Drain Bottle .
Interface heater	As needed	Replace	Contact the local QMP or FSE.

¹ This procedure is not applicable for the dry roughing pump.

Service and Maintenance Information

Table 5-2 Ion Source Maintenance Tasks

Component	Frequency	Task	For More Information
OptiFlow Pro ion source: Probes	As needed	Examine and replace	Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .
OptiFlow Pro ion source: Electrodes	As needed	Examine and replace	Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .
Sample tubing	As needed	Replace	Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .
Pogo contact pads	As needed	Clean	Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .
E Lens Technology	As needed	Clean or replace	Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .

For “As needed” tasks, follow these guidelines:

- Clean the mass spectrometer surfaces after a spill or when they become dirty.
- Empty the source exhaust drain bottle before it becomes full.
- Clean the orifice plate if system sensitivity degrades. Refer to the section: [Mass Spectrometer Troubleshooting](#) or contact an FSE.
- Oil-sealed roughing pump: Refill the oil when the oil falls below the minimum oil level.
- Examine all of the exhaust connections at regular intervals to make sure that the integrity is maintained, and that any exhaust is removed from the customer lab.

Clean the Surfaces

Clean the external surfaces of the mass spectrometer after a spill or when they become dirty.

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

1. Wipe the external surfaces with a soft cloth dampened with warm, soapy water.
2. Wipe the external surfaces with a soft cloth dampened with water to remove any soap residue.

Clean the Front-End

The following warning applies to all of the procedures in this section:



WARNING! Hot Surface Hazard. Let the OptiFlow Pro ion source cool for at least 40 minutes before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation.

Clean the mass spectrometer front-end using the routine cleaning method, to:

- Minimize unscheduled system downtime.
- Maintain optimum sensitivity.
- Avoid more extensive cleaning that requires a service visit.

When contamination occurs, perform an initial routine cleaning. Clean up to and including the front of the orifice plate. If routine cleaning does not resolve issues with sensitivity, then a full cleaning might be necessary. Contact an FSE.

This section provides instructions for performing routine cleaning without breaking vacuum.

Note: Follow all of the applicable local regulations. For health and safety guidelines, refer to the section: [Chemical Precautions](#).

Symptoms of Contamination

The system might be contaminated if any one of the following is observed:

- Significant loss in sensitivity
- Increased background noise
- Additional peaks that are not part of the sample in full scan or survey scan methods

If any of these issues are observed, then clean the mass spectrometer front-end.

Required Materials

Note: U.S. customers can call 877-740-2129 for ordering information and inquiries. International customers can visit sciex.com/contact-us.

- Powder-free gloves, nitrile or neoprene recommended
- Safety glasses
- Laboratory coat
- Fresh LC-MS-grade water. Old water can contain contaminants that can further contaminate the mass spectrometer.
- LC-MS-grade methanol, isopropanol (2-propanol), or acetonitrile
- Cleaning solution. Use one of:

Service and Maintenance Information

- 100% methanol
- 100% isopropanol
- 1:1 acetonitrile:water solution, freshly prepared
- 1:1 acetonitrile:water with 0.1% acetic acid solution, freshly prepared
- Clean 1 L or 500 mL glass beaker to prepare cleaning solutions
- 1 L beaker to catch used solvent
- Organic waste container
- Lint-free wipes. Refer to the section: [Tools and Supplies Available from the Manufacturer](#).
- (Optional) Polyester (poly) swabs

Tools and Supplies Available from the Manufacturer

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

- Small poly swab, thermally bonded. Also available in the Cleaning kit.
- Lint-free wipe (11 cm x 21 cm, 4.3 inches x 8.3 inches). Also available in the Cleaning kit.
- Cleaning kit. Contains the small poly swab, lint-free wipes, and Alconox.

Cleaning Best Practices



WARNING! Hot Surface Hazard. Let the OptiFlow Pro ion source cool for at least 40 minutes before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Toxic Chemical Hazard. Refer to the chemical product safety data sheets and follow all of the recommended safety procedures when handling, storing, and disposing of chemicals.



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

- Allow the ion source to cool before removing it.

- Always wear clean, powder-free gloves, nitrile or neoprene recommended, for the cleaning procedures.
- After cleaning the mass spectrometer components, and before reassembling them, put on a new, clean pair of gloves.
- Do not use cleaning supplies other than those specified in this procedure.
- If possible, prepare cleaning solutions just before cleaning.
- Prepare and store all of the organic solutions and organic-containing solutions in very clean glassware only. Never use plastic bottles. Contaminants can leach from these bottles and further contaminate the mass spectrometer.
- To avoid contaminating the cleaning solution, pour the solution on the wipe or swab.
- Allow only the center area of the wipe to contact the mass spectrometer surface. Cut edges can leave fibers behind.

Tip! Wrap the wipe around a thermally-bonded poly swab.

Figure 5-1 Example: Folding the Wipe



- To avoid cross-contamination, discard the wipe or swab after it has touched the surface once.
- If required, perform multiple cleanings, using multiple wipes for larger parts of the vacuum interface, such as the curtain plate.
- Only dampen the wipe or swab slightly when applying water or cleaning solution. Water, more often than organic solvents, might cause the wipe to deteriorate, leaving residue on the mass spectrometer.
- Do not rub the wipe across the aperture. Wipe around the aperture to prevent fibers from the wipes from entering the mass spectrometer.
- Do not insert the brush in the aperture on the curtain plate or orifice plate.

Prepare the Mass Spectrometer



WARNING! Hot Surface Hazard. Let the OptiFlow Pro ion source cool for at least 40 minutes before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation.

Service and Maintenance Information

1. Deactivate the devices. Refer to the document: *Software User Guide*.
2. Remove the ion source. Refer to the document: *OptiFlow Pro Ion Source Operator Guide*.
When the ion source is not in use, store it to protect it from damage and to maintain operating integrity.

Clean the Curtain Plate

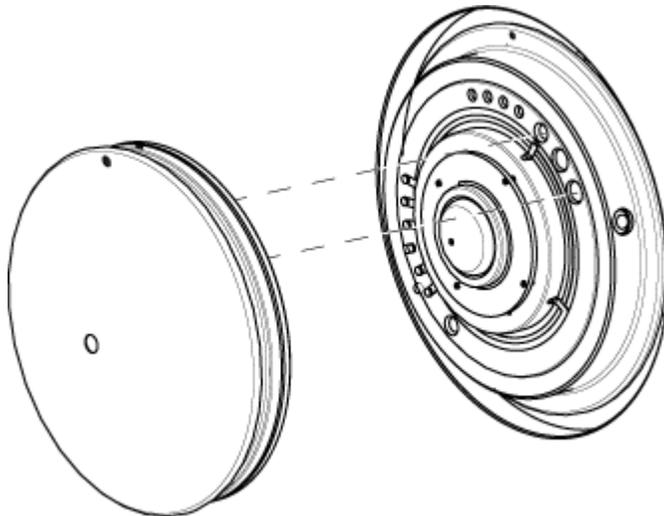
CAUTION: Potential System Damage. Do not rest the curtain plate or orifice plate on the aperture tip. Make sure that the conical side of the curtain plate faces up.

CAUTION: Potential System Damage. To prevent damage to the aperture, do not insert a wire or metal brush in the aperture on the curtain plate, orifice plate, or interface heater.

1. Pull the curtain plate straight off of the vacuum interface and then put it, conical side up, on a clean, stable surface.

CAUTION: Potential System Damage. Do not contact the surface of the orifice plate with the curtain plate.

Figure 5-2 Curtain Plate Removal



The curtain plate is held in place by three retaining ball catches mounted on the orifice plate.

2. Dampen a lint-free wipe with LC-MS-grade water and then clean both sides of the curtain plate.

Note: Use multiple wipes, as required.

3. Repeat step 2 using the cleaning solution.

4. Using a dampened wipe or small poly swab, clean the aperture.
5. Wait until the curtain plate is dry.
6. Inspect the curtain plate for solvent stains or lint, removing any residue with a clean, slightly damp, lint-free wipe.

Note: Persistent spotting or filming is an indicator of contaminated solvent.

Clean the Front of the Orifice Plate

CAUTION: Potential System Damage. When cleaning the surface of the orifice plate, do not remove the interface heater. Frequent removal of the interface heater can result in damage to the interface heater. Surface cleaning of the interface heater is adequate for routine cleaning.

CAUTION: Potential System Damage. To prevent damage to the aperture, do not insert a wire or metal brush in the aperture on the curtain plate, orifice plate, or interface heater.

1. Dampen a lint-free wipe with LC-MS-grade water and then wipe the front of the orifice plate, including the interface heater.
2. Repeat step 1 using the cleaning solution.
3. Wait until the orifice plate is dry.
4. Inspect the orifice plate for solvent stains or lint, removing any residue with a clean, slightly damp, lint-free wipe.

Note: Persistent spotting or filming is an indicator of contaminated solvent.

Put the Mass Spectrometer Back in Service

1. Install the curtain plate. Align the dot on the curtain plate with the reference dot on the orifice plate, if present. Make sure that the dot on the curtain plate is in the 12 o'clock position, and then insert the alignment pins in the holes on the orifice plate.

CAUTION: Potential System Damage. Do not contact the surface of the orifice plate with the curtain plate.

2. Install the ion source on the mass spectrometer. Refer to the document: *OptiFlow Pro Ion Source Operator Guide*.
Tighten the ion source by turning the source latches down in the locking position.
3. Activate the devices. Refer to the document: *Software User Guide*.

Empty the Source Exhaust Drain Bottle



WARNING! Hot Surface Hazard. Let the OptiFlow Pro ion source cool for at least 40 minutes before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Deposit hazardous materials in appropriately labeled waste containers and dispose of them according to local regulations.



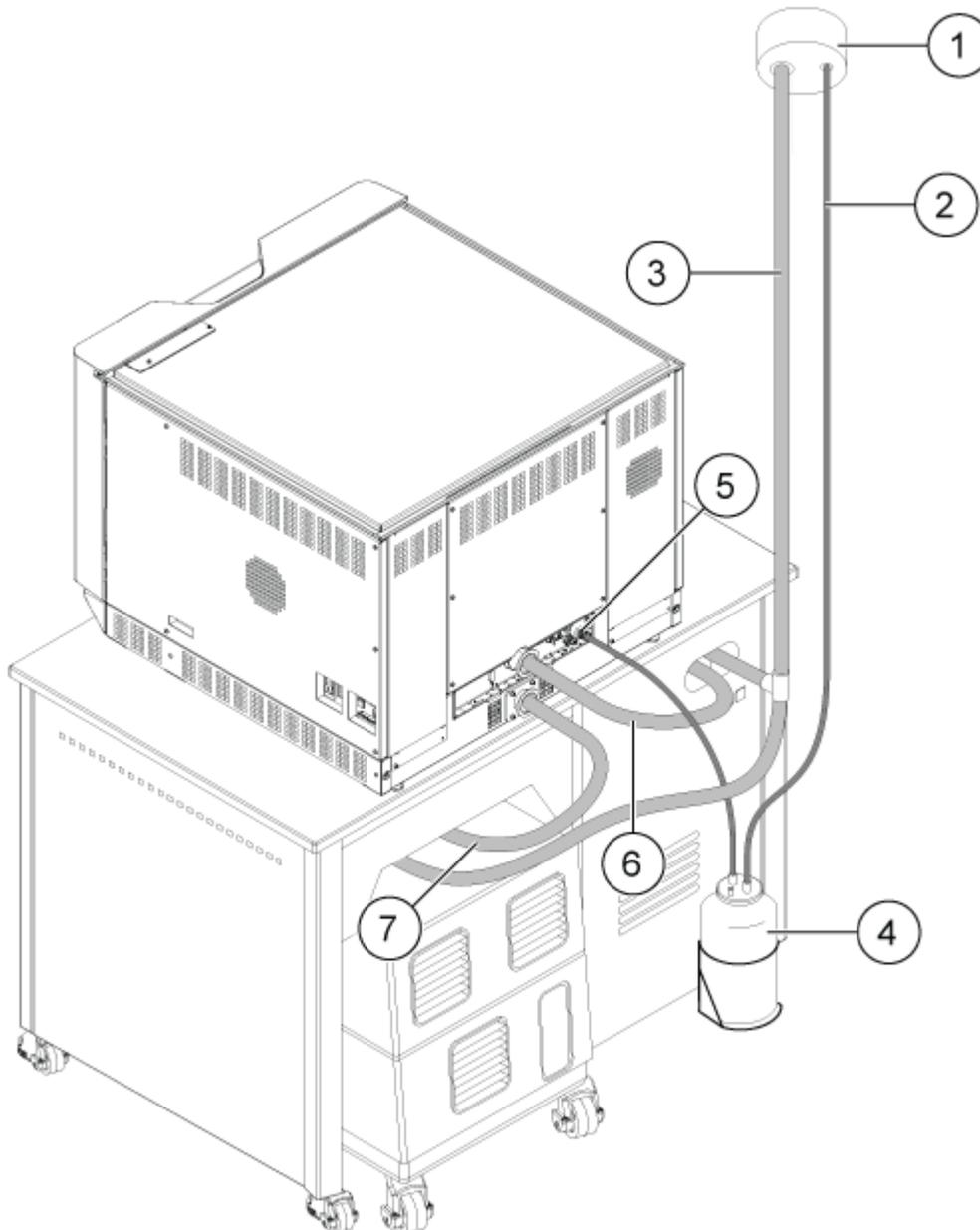
WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Take care to vent exhaust gases to a dedicated laboratory fume hood or exhaust system and make sure that the ventilation tubing is secured with clamps. Make sure that the laboratory has correct air exchange for the work performed.

Note: Make sure that there are no kinks, sags, or twists in the source waste line.

Inspect the source exhaust drain bottle regularly, and empty it before it becomes full. Also inspect the bottle and the fitting for leaks, and tighten connections or replace components, if required. Follow the steps in this procedure to empty the bottle.

1. Remove the ion source. Refer to the document: *OptiFlow Pro Ion Source Operator Guide*.
2. Loosen the clamps connecting the hoses to the cap of the source exhaust drain bottle.

Figure 5-3 Source Exhaust Drain Bottle



Item	Description
1	Connection to vent
2	Source exhaust drain tubing: 2.5 cm (1.0 inch) inner diameter (i.d.)
3	Roughing pump exhaust hose: 3.2 cm (1.25 inch) i.d.

Service and Maintenance Information

Item	Description
4	Source exhaust drain bottle Make sure that the bottle is secured to prevent spillage.
5	Source exhaust connection to the mass spectrometer: 1.6 cm (0.625 inch) i.d.
6	Roughing pump vacuum inlet hose (MS 40 (as shown) or MSR 90).
7	Roughing pump vacuum inlet hose (MS 120 (as shown) or MSR 130).

Note: Source exhaust hose connections at the drain bottle, mass spectrometer, and the lab vent are attached with hose clamps.

3. If applicable, lift the drain bottle out of the holder.
4. Disconnect the hoses from the cap.
5. Remove the cap from the drain bottle.
6. Empty the drain bottle and then dispose of the waste according to laboratory procedures and local waste regulations.
7. Install the cap on the bottle and then put the bottle in the holder.
8. Attach the hoses to the cap and then secure them tightly with clamps.

Inspect the Roughing Pump Oil Level (Oil-Sealed Roughing Pump)

- Inspect the sight glass on the roughing pump to make sure that the oil is above the minimum level.

If the oil is below the minimum level, then contact the Qualified Maintenance Person (QMP) or SCIEX Field Service Employee (FSE).

Storage and Handling



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

If the mass spectrometer must be stored for a long time or prepared for shipping, then contact a SCIEX FSE for decommissioning information. To disconnect power from the mass spectrometer, remove the mains supply connector from the AC mains supply.

Note: The ion source and mass spectrometer must be transported and stored at a temperature between $-30\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$ ($-22\text{ }^{\circ}\text{F}$ to $140\text{ }^{\circ}\text{F}$) and relative humidity not exceeding 99%, non-condensing. Store the system at an altitude not exceeding 2,000 m (6,562 feet) above sea level.

Mass Spectrometer Troubleshooting 6

This section contains information for troubleshooting basic system issues. Certain activities can only be carried out by a SCIEX-trained Qualified Maintenance Person (QMP) in the laboratory. For advanced troubleshooting, contact a SCIEX Field Service Employee (FSE).

Table 6-1 System Issues

Symptom	Possible Cause	Corrective Action
The D Jet ion guide is extremely dirty or frequently becomes dirty.	The flow rate of the gas for the Curtain Gas interface is too low.	Examine the setting for the gas for the Curtain Gas interface and increase it, if applicable.
A system fault has occurred because the vacuum pressure is too high.	<ol style="list-style-type: none"> Oil-sealed roughing pump: The oil level is too low. There is a leak. The wrong orifice plate is installed. 	<ol style="list-style-type: none"> Oil-sealed roughing pump: Inspect the oil level in the roughing pump, and then contact the local QMP or an FSE to add oil. Refer to the section: Inspect the Roughing Pump Oil Level (Oil-Sealed Roughing Pump). Inspect and repair leaks. Install the correct orifice plate.
The mass spectrometer does not pump down to the correct base pressure.	There is a leak in the area of the orifice plate.	<ul style="list-style-type: none"> Remove and then reinstall the orifice plate, or replace it if it is cracked. Inspect all vacuum connections and vacuum seals

Table 6-1 System Issues (continued)

Symptom	Possible Cause	Corrective Action
<p>The mass spectrometer takes an excessive amount of time to pump down properly.</p> <hr/> <p>Note: The mass spectrometer reaches the base pressure only when aperture in the orifice plate is plugged. After the aperture is unplugged, the mass spectrometer base pressure increases rapidly and the mass spectrometer goes into pump down mode.</p> <hr/>	<ol style="list-style-type: none"> 1. The turbo pump controller is defective. The turbo pump controller is reading 35 watts power consumption. The typical reading should be 100 watts. 2. The orifice plate is not sealed properly. 	<ol style="list-style-type: none"> 1. Replace the turbo pump controller. 2. Do the following steps to seal the orifice plate properly: <ol style="list-style-type: none"> a. Press and hold the orifice plate in place to seal it. b. If the orifice plate is not sealed, then remove and reinstall it. c. Replace the orifice plate if it can not be sealed properly.
<p>A system fault has occurred because the QPS exciter module temperature is too high.</p>	<ol style="list-style-type: none"> 1. The mass spectrometer air filter is blocked. 2. The coil box is not tuned. 3. The ambient temperature is too high. 	<ol style="list-style-type: none"> 1. Contact the local QMP or FSE. 2. Contact the local FSE. 3. For the ambient temperature specifications, refer to the mass spectrometer document: <i>Site Planning Guide</i>.

Mass Spectrometer Troubleshooting

Table 6-1 System Issues (continued)

Symptom	Possible Cause	Corrective Action
The control software reports that the mass spectrometer is in Fault status because of the ion source.	<ol style="list-style-type: none"> 1. The probe is not installed. 2. The probe is not connected securely. 3. The E Lens Technology does not match the probe installed. 	<p>Confirm the fault in the Status panel of the device details page.</p> <ol style="list-style-type: none"> 1. Install the probe. Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i>. 2. Remove and then install the probe. Tighten the retaining ring securely. Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i>. 3. Install the E Lens Technology that matches the probe type.
The spray is not uniform.	The electrode is blocked.	Clean, adjust, or replace the electrode. Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .
The interface heater is not ready.	The interface heater is faulty.	Contact the local QMP or FSE.
The mass spectrometer resolution is poor.	The mass spectrometer is not tuned.	Use the control software to optimize the mass spectrometer. Refer to the document: <i>Software User Guide</i> .

Table 6-1 System Issues (continued)

Symptom	Possible Cause	Corrective Action
The mass spectrometer performance has degraded.	<ol style="list-style-type: none"> 1. The ion source conditions are not optimized. 2. The sample was not prepared correctly or the sample has degraded. 3. The sample inlet fittings are leaking. 	<ol style="list-style-type: none"> 1. Optimize the ion source conditions. 2. Confirm that the sample was prepared correctly. 3. Verify that the fittings are the right size and type and make sure that they are tight. Do not overtighten the fittings. Replace the fittings if leaks continue. 4. Install and optimize an alternate ion source. 5. Contact an FSE if the issue persists.

Table 6-2 Sensitivity is Decreased

Possible Cause	Corrective Action
The ion source parameters are not optimized.	Optimize the ion source parameters.
The mass spectrometer is not optimized.	Use the control software to optimize the mass spectrometer. Refer to the document: <i>Software User Guide</i> .
The curtain plate is dirty.	Clean the curtain plate. Refer to the section: Clean the Curtain Plate .
The orifice plate is dirty.	Clean the orifice plate. Refer to the section: Clean the Front of the Orifice Plate or contact the local QMP or FSE.
The Q0 region is dirty.	Verify the setting for the Curtain Gas parameter and increase it, if applicable. Contact the local QMP or FSE. Do a test for contamination of the Q0 region.
The syringe or sample line is leaking.	Examine the syringe or sample line for leaks and repair any leaks found. Make sure that all of the fittings are the correct type and size.

Mass Spectrometer Troubleshooting

Table 6-2 Sensitivity is Decreased (continued)

Possible Cause	Corrective Action
The sample has degraded or has a low concentration.	Make sure that the sample concentration is correct. Use a fresh sample.
There is an issue with the LC system or connections.	Troubleshoot the LC system.
The electrode is dirty or blocked.	Replace the electrode. Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .

Table 6-3 There is No Signal or the Signal is Unstable

Possible Cause	Corrective Action
The sample tubing is blocked.	Replace the sample tubing. Refer to the document: <i>OptiFlow Pro Ion Source Operator Guide</i> .

Table 6-4 Background Noise Issues

Possible Cause	Corrective Action
The syringe or sample tubing is dirty.	Clean or replace the syringe or sample tubing.
The curtain plate is dirty.	Clean the curtain plate. Refer to the section: Clean the Curtain Plate .
The orifice plate is dirty.	Clean the front of the orifice plate. Refer to the section: Clean the Front of the Orifice Plate .
The Q0 region is dirty.	Clean the Q0 region. Contact the FSE.
The mobile phase is contaminated.	Replace the mobile phase.

Table 6-4 Background Noise Issues (continued)

Possible Cause	Corrective Action
The ion source is contaminated.	Clean or replace the ion source components and then condition the ion source and front end: <ol style="list-style-type: none"><li>1. Infuse or inject 50:50 methanol:water with a pump flow rate of 1 mL/min.<li>2. In the control software, set the temperature to 650, ion source gas 1 to 60, and ion source gas 2 to 60.<li>3. Set the flow rate for the gas for the Curtain Gas interface to 45 or 50.<li>4. Run for a minimum of 2 hours, or preferably overnight, for best results.

For sales, technical assistance, or service, contact an FSE or visit the SCIEX website at sciex.com for contact information.

Calibration Ions and Solutions

A

CAUTION: Potential Wrong Result. Do not use expired solutions or solutions that have not been stored at the indicated storage temperature.

Note: Immediately after use, put a cap on the bottle and then store it at 2 °C to 8 °C. Refer to the information on the label. Refer to the section: [Hazardous Substance Information](#).

Table A-1 Tuning Frequency

Calibration		Resolution Optimization
Scan Type	Frequency	Frequency
Q1 and Q3	3 months to 6 months	3 months to 6 months
LIT	3 months to 6 months	3 months to 6 months

Table A-2 Suggested Tuning Solutions

System	Tuning Solution
SCIEX 7500	MS Single Tuning Solution Kit 5077206 <ul style="list-style-type: none">MS Single Tuning SolutionMS Wash Solvent

Table A-3 Q1 , Q3, and LIT Scans for the SCIEX 7500

Polarity	Masses							
Low Mass								
Positive	42.03	132.91	266.16	422.27	609.28	829.54	922.01	N/A
Negative	45.00	126.90	265.15	514.28	827.52	966.00	N/A	N/A
High Mass								
Positive	42.03	132.91	266.16	422.27	609.28	829.54	922.01	1,521.97
Negative	45.00	126.90	265.15	514.28	827.52	966.00	1,565.96	N/A

Prepare the Mass Spectrometer to Infuse the Calibration Solution

Required Materials

- Syringe
- Needle
- PEEK tubing
- Syringe adapter
- 1/16" finger-tight fitting
- MS Wash Solvent
- MS Single Tuning Solution

Note: Shake bottles before use. Slight precipitation or inhomogeneity might occur if the solution is stored at refrigerated temperatures for extended periods of time.

CAUTION: To prevent interfering peaks or background noise due to the high sensitivity of the mass spectrometer, make sure to use dedicated tubing and a dedicated syringe with the MS Single Tuning Solution and MS Wash Solvent. Doing so will prevent potential solution interaction with the metal tips used in other syringe fittings.

Note: The MS Wash Solvent must be used to rinse the syringe and tubing before and after use.

1. Connect the syringe and needle and then fill the syringe with the MS Wash Solvent.
 2. Disconnect the needle.
 3. Connect the tubing to the syringe and then rinse the syringe and tubing with the MS Wash Solvent.
 4. Repeat steps 1 and 2 with the MS Single Tuning Solution.
-

5. Immediately after filling the syringe, install the bottle cap on the MS Single Tuning Solution bottle and tighten it to make sure that the bottle is properly closed. Then store the bottle following the instructions in the *Certificate of Analysis*.
The *Certificate of Analysis* is available at sciex.com/tech-regulatory.
6. Allow the solution to reach room temperature before infusing it in the system.
7. Disconnect the needle and then connect the tubing and finger-tight fitting to the syringe.
8. Set up the system for infusion using the syringe pump. Refer to the document: *Software User Guide*.

Calibration Ions and Solutions

Note: Make sure that the syringe tubing is grounded to the diverter valve before connecting it to the ion source inlet.

Figure A-1 Syringe Tubing Connections



9. Open SCIEX OS and then open the MS Tune workspace. Follow the onscreen instructions. Refer to the document: *Software User Guide* for more information on how to perform tuning as well as examples of expected spectra.

Note: Make sure to select the correct flow rate and syringe diameter.

Tip! After starting the quadrupole tuning using the MS Scan Tuning procedure, confirm that there are no contamination peaks around masses 132.9 Da and 922 Da before continuing with tuning. Refer to the document: *Software User Guide*.

10. After calibration is complete, disconnect the syringe and tubing from the mass spectrometer, and then clean the lines by repeating steps 1 and 2.
11. Install the bottle cap on the MS Wash Solvent bottle and then tighten it to make sure that the bottle is properly closed. Then store the bottle following the instructions in the *Certificate of Analysis*.

Hazardous Substance Information

B

Classification according to OSHA Hazard Communication Standard (29 CFR 1910.1200)

The following information must be noted and the relevant safety measures taken. Refer to the respective safety data sheets for more information. The safety data sheets are available upon request or can be downloaded from our website, at sciex.com/tech-regulatory.

MS WASH SOLVENT



DANGER! Highly flammable liquid and vapor. Causes serious eye irritation. May cause drowsiness or dizziness. May cause damage to organs through prolonged or repeated exposure. (blood system, cardiovascular system)

MS SINGLE TUNING SOLUTION



DANGER! Highly flammable liquid and vapor. Causes serious eye irritation. May cause drowsiness or dizziness. May cause damage to organs through prolonged or repeated exposure. (blood system, cardiovascular system)

Glossary of Symbols

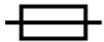
C

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

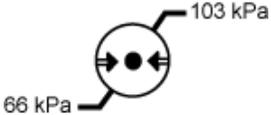
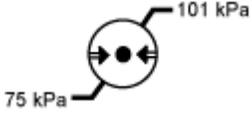
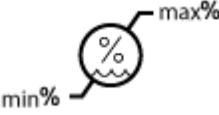
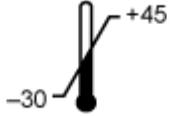
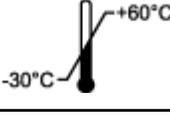
Glossary of Symbols

Symbol	Description
	<p>Caution. Consult the instructions for information about a possible hazard.</p> <hr/> <p>Note: In SCIEX documentation, this symbol identifies a personal injury hazard.</p>
	<p>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.</p>
	<p>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.</p>
	<p>Consult instructions for use.</p>
	<p>Crushing Hazard</p>
	<p>cTUVus mark for TUV Rheinland of North America</p>
	<p>Data Matrix symbol that can be scanned by a barcode reader to obtain a unique device identifier (UDI)</p>
	<p>Environmental Hazard</p>
	<p>Ethernet connection</p>

Symbol	Description
	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
	Ionizing Radiation Hazard

Glossary of Symbols

Symbol	Description
	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.
	Pinching Hazard

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

Glossary of Symbols

Symbol	Description
	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

Glossary of Warnings

D

Note: If any of the labels used to identify a component become detached, then contact a Field Service Employee (FSE).

Label	Translation (if applicable)
FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.	FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.
IMPACT INDICATOR SENSITIVE PRODUCT WARNING	IMPACT INDICATOR SENSITIVE PRODUCT WARNING Note: If the indicator is tripped, then this container has been dropped or otherwise mishandled. Make a note on the Bill of Lading and then check for damage. Any claims for shock damage require a notation.
IMPORTANT! RECORD ANY VISIBLE CRATE DAMAGE INCLUDING TRIPPED "IMPACT INDICATOR" OR "TILT INDICATOR" ON THE WAYBILL BEFORE ACCEPTING SHIPMENT AND NOTIFY YOUR LOCAL AB SCIEX CUSTOMER SUPPORT ENGINEER IMMEDIATELY. DO NOT UNCRATE. CONTACT YOUR LOCAL CUSTOMER SUPPORT ENGINEER FOR UNCRATING AND INSTALLATION.	IMPORTANT! RECORD ANY VISIBLE CRATE DAMAGE INCLUDING TRIPPED "IMPACT INDICATOR" OR "TILT INDICATOR" ON THE WAYBILL BEFORE ACCEPTING SHIPMENT AND NOTIFY YOUR LOCAL AB SCIEX CUSTOMER SUPPORT ENGINEER IMMEDIATELY. DO NOT UNCRATE. CONTACT YOUR LOCAL CUSTOMER SUPPORT ENGINEER FOR UNCRATING AND INSTALLATION.
MINIMUM OF SIX PERSONS REQUIRED TO SAFELY LIFT THIS EQUIPMENT	MINIMUM OF SIX PERSONS REQUIRED TO SAFELY LIFT THIS EQUIPMENT

Glossary of Warnings

Label	Translation (if applicable)
TIP & TELL	<p>Tilt Indicator</p> <hr/> <p>Note: Indicates whether the container was tipped or mishandled. Write on the Bill of Lading and inspect for damage. Any claims for tipping require a notation.</p> <hr/>
TiltWatch PLUS ShockWatch	<p>Tilt Indicator</p> <hr/> <p>Note: Indicates whether the container was tipped or mishandled. Write on the Bill of Lading and inspect for damage. Any claims for tipping require a notation.</p> <hr/>
WARNING: DO NOT OPERATE WITHOUT FIRST ENSURING BOTTLE CAP IS SECURED.	<p>WARNING: DO NOT OPERATE WITHOUT FIRST ENSURING BOTTLE CAP IS SECURED.</p> <hr/> <p>Note: This warning is attached to the source exhaust waste bottle.</p> <hr/>
WARNING: NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.	<p>WARNING: NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.</p> <hr/> <p>Note: Consult instructions for use.</p> <hr/>

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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