Agilent

Agilent InfinityLab Pro iQ Series

User Guide

Notices

Document Identification

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5301 Stevens Creek Blvd.
Santa Clara, CA 95051

Software Revision

This guide is valid for LC/SQ Mass Detector systems running on OpenLab CDS 2.7 or 2.8 with 3.2 LC/MS Driver

Instrument Manufacturing

Manufactured by Agilent Technologies Singapore Pte. Ltd.
No. 1 Yishun Avenue 7, Singapore 768923

Operating Temperature

Operating Temperature: 15 °C to 35 °C
Storage Temperature: -40 °C to 70 °C

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In This Guide

This guide provides information on the Pro iQ and Pro iQ Plus LC/SQ Mass Detector systems running on OpenLab CDS 2.7 or 2.8 with 3.2 LC/MS Driver.

Additional Resources

User Documentation

Documentation can be found by scanning the code or navigating to **https://openlab.help.agilent.com**.

Instrument documentation, step by step videos, and more can be found by scanning the code or navigating to **https://aglt.co/LCMSUserDocs.**

Agilent Single Quadrupole LC/MS Supplies

Make sure that you don't run out of essential columns and supplies. Use this quick reference list to keep your shelves stocked by navigating to **https://aglt.co/LCMSDSupplies**.

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To find your local sales and support contact, visit the following page:

https://www.agilent.com/en/contact-us/page

For technical support, visit the following page:

https://www.agilent.com/en/support

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Content

1 Hardware Overview

InfinityLab Pro iQ Series

Front view

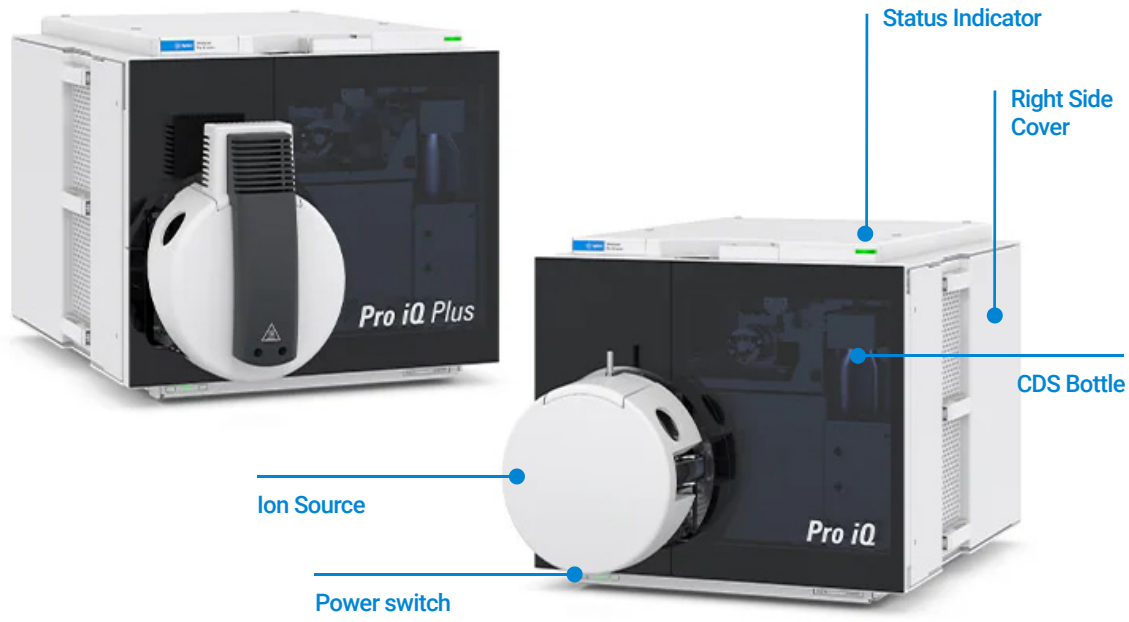


Figure 1. Front view of InfinityLab Pro iQ Series

Rear view

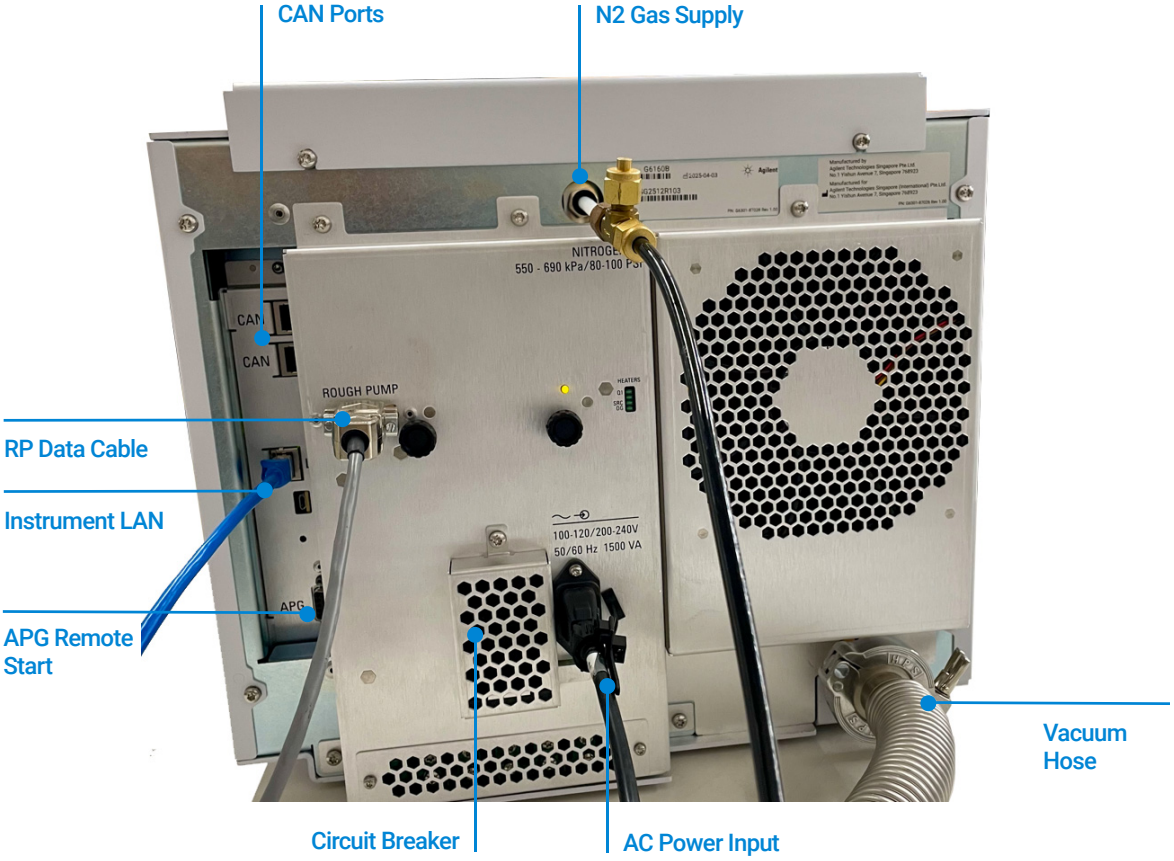


Figure 2. Rear view of InfinityLab Pro iQ Series

Calibrant Delivery System (CDS)

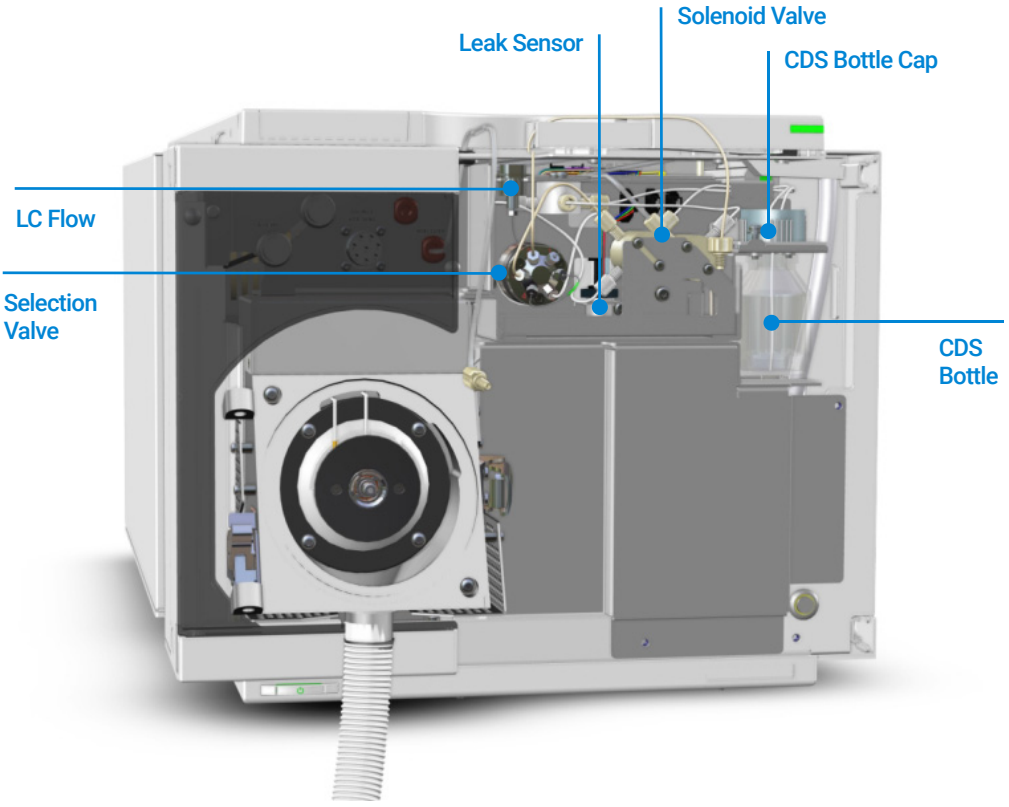
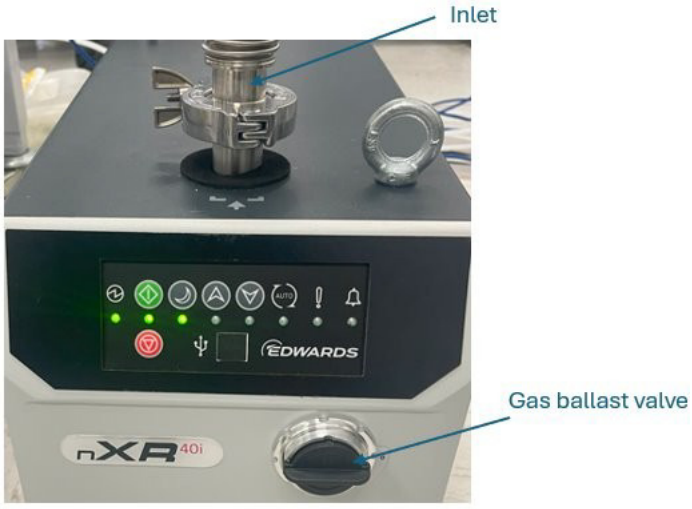


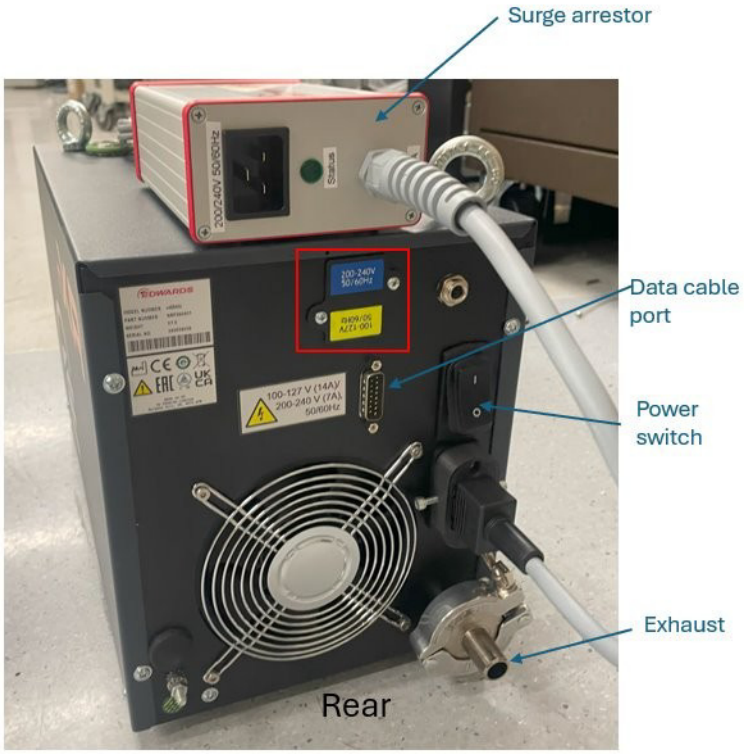
Figure 3. Calibrant Delivery System

Edwards nXR40i Dry Pump

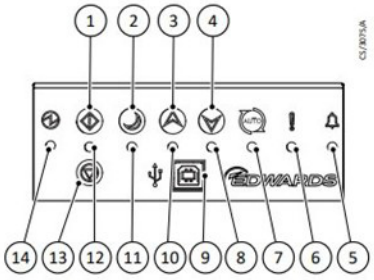
Front view



Rear view



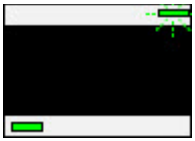
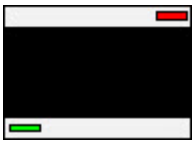
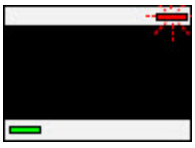
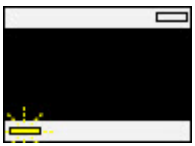
Interface panel



1. *Start button*
2. *Sleep button**
3. *Standby increase button*
4. *Standby decrease button*
5. *Alarm indicator LED*
6. *Service indicator LED*
7. *Auto-run indicator LED*
8. *Standby decrease indicator LED*
9. *USB port (not for operation)*
10. *Standby increase indicator LED*
11. *Standby indicator LED*
12. *Run indicator LED*
13. *Stop button*
14. *Power status LED*

Instrument Status Indicator Lights

Table 1 Status indicator lights on instrument

	Instrument State = BOOTING (FPGA Loaded) Status LED = Blinking Yellow Power Switch LED = Yellow		Instrument State = ACQUISITION Status LED = Blinking Green Power Switch LED = Green
	Instrument State = BOOTING (LINUX Loaded) Status LED = Yellow Power Switch LED = Green		Instrument State = FAULT Status LED = Red Power Switch LED = Green
	Instrument State = PUMPING DOWN Status LED = Blinking Yellow Power Switch LED = Green		Instrument State = VENTING Status LED = Blinking Red Power Switch LED = Yellow
	Instrument State = STANDBY Status LED = Yellow Power Switch LED = Green		Instrument State = Vented Status LED = Red Power Switch LED = Yellow
	Instrument State = IDLE Status LED = Yellow Power Switch LED = Green		Instrument State = POWERING DOWN Status LED = Off Power Switch LED = Blinking Yellow
	Instrument State = BACKGROUND SCAN Status LED = Green Power Switch LED = Green		Instrument State = Off Status LED = Off Power Switch LED = Off

Instrument Status Indicators in Acquisition

In OpenLab CDS Acquisition software, the Instrument Status window indicates the state of the instrument.

■ Gray

- Offline: The instrument is configured with the system and available to use, but the workstation or client is not currently running. The amount of time for an instrument to reach the Idle state depends on each instrument.
- Disconnected: The connection to the instrument has been closed.

■ Yellow - Unknown: The device is in an unknown run state.

■ Light Orange - Not Ready: The instrument is connected but is not ready to run (due to not reaching the correct temperature or pressure required by the method, for example).

■ Green - Idle: The instrument is on and ready to process samples.

■ Teal - Standby: The instrument is in a standby/sleep state. Put the instrument in Standby mode when it is not in use or when changing the ion source. When the instrument is in Standby mode:

- The source interface is on, the drying gas remains heated, and nebulizer flows are maintained.
- The source and ion optics voltages are turned off, and the mass spectrometer is not sending spectra to the computer.
- For APCI and multimode sources: Vaporizer gas heaters are turned down.
- For the Agilent Jet Stream (AJS) source: The sheath gas temperature, drying gas flow, and drying gas temperature are reduced.
- The spray chamber high voltages are turned off.
- The mass spectrometer stops generating spectra.

■ Magenta - Pre-run/Injecting: The instrument is on and is preparing to start acquisition.

■ Blue - Running, Post Run: The instrument is currently collecting data.

■ Orange - Tuning: The instrument is in the process of adjusting MS parameters.

■ Red - Instrument Error: The instrument has an error and cannot process samples.

Ion Sources

Electrospray Ionization (ESI) source

Electrospray relies in part on chemistry to generate analyte ions in solution before the analyte reaches the mass spectrometer. The LC eluent is sprayed (nebulized) into a chamber at atmospheric pressure in the presence of a strong electrostatic field and heated drying gas.

The electrostatic field causes further dissociation of the analyte molecules. The heated drying gas causes the solvent in the droplets to evaporate. As the droplets shrink, the charge concentration in the droplets increases. Eventually, the repulsive force between ions with like charges exceeds the cohesive forces and ions are ejected (desorbed) into the gas phase. These ions are attracted to and pass through a capillary sampling orifice into the mass analyzer.

Figure 4. ESI cover, ion source, and spray shield

Agilent Jet Stream (AJS) source

The Agilent Jet Stream (AJS) source uses:

- The same ionization technique as the ESI source.
- Thermal gradient focusing technology, which is a process in which super-heated nitrogen (N_2) is used to improve ion generation and desolvation.
- Improves sensitivity 5x or more for many small-molecule compounds that undergo electrospray ionization.

AJS source is supported only by the Pro iQ Plus instrument.

Figure 5. AJS cover, ion source, and spray shield

Atmospheric Pressure Chemical Ionization (APCI) source

In Atmospheric Pressure Chemical Ionization (APCI), the LC mobile phase is sprayed through a heated vaporizer (typically 250 °C to 400 °C) at atmospheric pressure. The heat vaporizes the liquid. The resulting gas-phase solvent molecules are ionized by electrons discharged from a corona needle.

The solvent ions then transfer charge to the analyte molecules through chemical reactions (chemical ionization). The analyte ions pass through a capillary sampling orifice into the mass analyzer. APCI is applicable to a wide range of polar and nonpolar molecules.

APCI rarely results in multiple charging, so APCI is typically used for molecules smaller than 1,500 amu.

Because high temperatures are also involved, APCI is not appropriate for analysis of large biomolecules. APCI is used with normal-phase chromatography more often than electrospray is because the analytes are usually nonpolar.

Figure 6. APCI cover, ion source, and spray shield

Multimode Ionization (MMI) source

The Multimode source for LC/MS can simultaneously do ESI and APCI ionization. The Multimode source can operate in ESI mode only, in APCI mode only, or in mixed ESI/APCI mode. This technology significantly improves the speed, accuracy, and productivity of high-throughput screening in drug discovery and other research applications.

Figure 7. MMI cover, ion source, and spray shield

Simultaneous ESI and APCI capability and high LC flow rate compatibility (up to 2 mL/min) means more compounds can be detected in less time with the Agilent Multimode source.

2 Tuning

About Tuning

When the MS is used as a detector for a liquid chromatograph, a mass spectrum is associated with each data point in the chromatogram. To obtain high quality, accurate mass spectra, the MS must be optimized to:

- Maximize sensitivity
- Maintain acceptable resolution
- Ensure accurate mass assignments.

Tuning is the process of adjusting MS parameters to achieve these goals.

Tuning is primarily concerned with finding the correct settings for the parameters that control the transmission, filtering, and detection of ions. It is accomplished by introducing a calibrant into the LC/MS and generating ions. Using these ions, the tune parameters are then adjusted to achieve sensitivity, resolution, and mass assignment goals. With a few exceptions, the parameters that control ion formation are not adjusted. They are set to fixed values known to be good for generating ions from the calibrant solution.

There are three different types of tunes that can be performed on your instrument, autotune, checktune, and diagnostic tune. All tunes, except for the diagnostic tune, can be scheduled to maximize instrument uptime.

Autotune and checktune

A checktune is used to determine if the tuning mix ion masses are properly assigned and if the response or sensitivity of these ions is within expectations. In other words, a checktune verifies peak width and mass axis to make sure they are correct before starting a data acquisition. See **"Calibrating the LC/SQ (Checktune)"** on page 26.

An autotune only needs to run after preventative maintenance or if there is a problem with checktune. Everything is automatic since the tuning mix is delivered by the calibrant delivery system, which is switched on automatically during the tune. See **"Calibrating the LC/SQ (Autotune)"** on page 27.

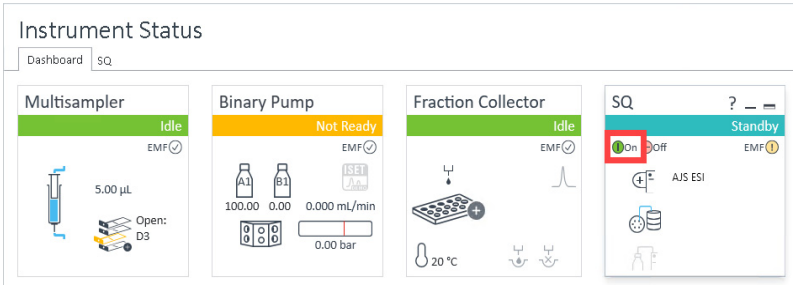
Use **Table 2** to select the correct tuning mix for the source installed.

Table 2 Tuning mixes

Source	Tuning mix	Part Number
ESI	ESI-L Low Concentration Tuning Mix	G1969-85000
AJS	ESI-L Low Concentration Tuning Mix	G1969-85000
MMI	MMI-L Low Concentration Tuning Mix	G1969-85020
APCI	APCI-L Low Concentration Tuning Mix	G1969-85010

Starting the Instrument

1. Follow the procedures in **"Starting Up and Shutting Down the Instrument"** on page 36 to begin operation of the instrument.
2. Display the Instrument Status window if it is not visible in the OpenLab CDS Acquisition program, in one of the following ways:
   - Open the Status layout.
   - On the ribbon, click **Instrument Status** in the **Windows** section.
3. Hover over the SQ device pane and click **On**.



Calibrating the LC/SQ (Checktune)

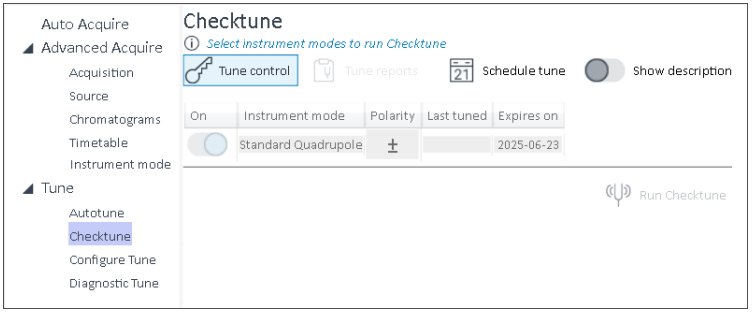
To run a Checktune, you must have the **Manual control (only when instrument is idle)** permission.

A Checktune can be run with the following ion sources: ESI, MMI, APCI, and AJS (AJS source is supported only by the Pro iQ Plus instrument).

1 In the Method Editor window, click the **SQ** tab.

2 Click **Tune > Checktune** in the left pane.

3 Click **Tune control**.



This button locks control of the SQ instrument. When tune has control of the SQ instrument, a single sample run or a sequence cannot be started and the method editor is locked.

4 Click **Run Checktune**.

- Once Checktune starts, the **Progress** bar and **Tune status** window display the progress and status of the tune.
- To stop the tune during operation, click **Stop tune**.
- To monitor the instrument signals during Checktune, open the **Spectrum** window.

5 When the tune completes, review and save the report(s).

- If Checktune is Out of Tolerance, please run an Autotune (see **"Calibrating the LC/SQ (Autotune)"** on page 27).

6 Click **Tune control** to release control of the SQ instrument.

Calibrating the LC/SQ (Autotune)

Autotune is an automated tuning program that adjusts the MS for good performance over the entire mass range. Autotune is primarily concerned with finding the correct settings for the parameters that control the transmission, filtering, and detection of ions. It is accomplished by introducing a calibrant into the MS and generating ions. Using these ions, the tune parameters are then adjusted to achieve sensitivity, resolution, and mass assignment goals.

Frequent tuning is not required for normal operation. Once tuned, the MS is very stable. Tuning is generally not needed more often than monthly, or at most weekly. If you suspect problems related to tuning, Run Checktune to confirm that the MS is out of adjustment before you retune it.

To run an Autotune, you must have the **Manual control (only when instrument is idle)** permission and either the **MS autotune** or **MS autotune and manual tuning** permission.

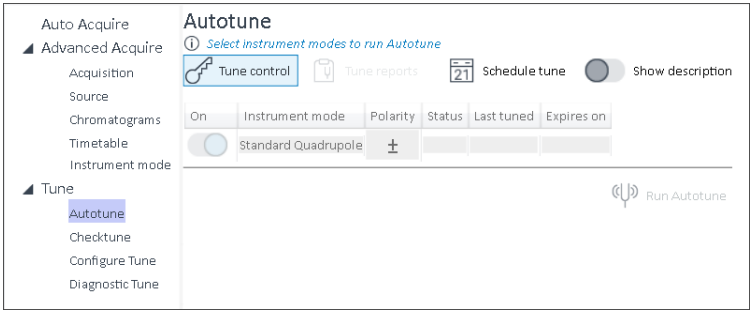
NOTE

Make sure that you wait for equilibration before running Autotune.

1 In the Method Editor window, click the **SQ** tab.

2 Click **Tune > Autotune** in the left pane.

3 Click **Tune control**.



This button locks control of the SQ instrument. When tune has control of the SQ instrument, a single sample run or a sequence cannot be started.

4 Click **Run Autotune**.

- To stop the tune during operation, click **Stop tune**.

- To monitor the instrument signals during Checktune, open the **Spectrum** window.

5 When the tune completes, review and save the report(s).

- If Autotune is Out of Tolerance, please contact Agilent.

6 Click **Tune control** to release control of the SQ instrument.

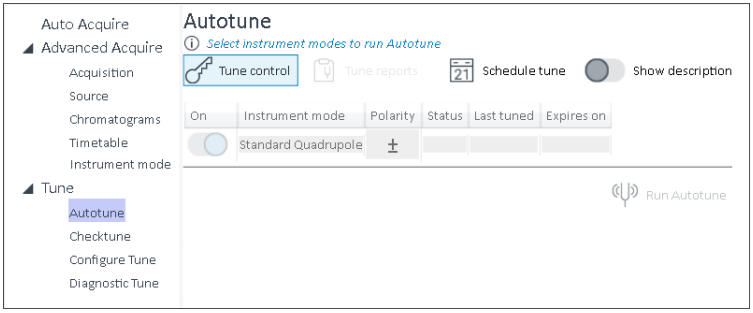
Generating a Detailed Tune Report

A detailed tune report can be generated after autotune or checktune has run. Only the latest tune report will generate a detailed report; e.g. if the last tune run was a checktune, then only a detailed checktune report will be generated.

1 In the Method Editor window, click the **SQ** tab.

2 Click **Tune > Checktune** or **Autotune** in the left pane.

3 Click **Tune control**.



This button locks control of the SQ instrument. When tune has control of the SQ instrument, a single sample run or a sequence cannot be started.

4 Click **Tune Reports**. If this button is not available, then run either a checktune or an autotune.

5 Click **Tune control** in the toolbar to release control of the SQ instrument.

Scheduling a tune

Schedule a Checktune or Autotune so that a tune is run automatically at specified times.

1 In the **Instrument Status** window, right-click the **SQ** device, and select **Schedule tune**. The Schedule tune dialog opens.

2 In the left pane, select to schedule a **Checktune** or **Autotune**.

3 In the right pane, toggle **Scheduling** on, and select to run the tune **Weekly** or **Monthly**.

- If you select **Weekly**, set the options for scheduling each week.
  - **a** Enter a value for the number of weeks until the tune is scheduled again. If you enter 1, then the tune is scheduled every week. If you enter 2, then the tune is scheduled every other week. If you enter 3, then the tune is scheduled every third week. Enter a value from 1 to 99.
  - **b** Select one or more days of the week to run the tune.
  - **c** Select the **Start** date. Either enter the date manually, or click  to select a date.
  - **d** Select the **Time** to run the tune.
- If you select **Monthly**, set the options for scheduling each month.
  - **a** Select when to run the tune.
  - **b** Select the **Start** date. Either enter the date manually, or click  to select a date.
    - **Day X of every Y month(s)** – Specify a specific date to use each month. If the current month has fewer days than the day entered, a message is shown to indicate the occurrence will fall on the last day of the month. This change is reflected in the **Day** box. You also specify the monthly recur value (from 1 to 99). If you specify 1, then the tune is performed on the specified date each month. If you specify 2, then the tune is performed every other month.

- **The X day of every Y month(s)** – Select a specific day of a specific week during the month. The options include **First**, **Second**, **Third**, **Fourth**, and **Last**. Then, select the day of the week, and enter the monthly recur value (from 1 to 99). If you specify 1, then the tune is performed on the specified day and week each month. If you specify 2, then the tune is performed every other month.

c Select the **Time** to run the tune.

4 Click **Save**.

Configure Tune

To configure tune, you must have the **Manual control (only when instrument is idle)** and **MS autotune and manual tuning** permission.

1. In the Method Editor window, click the **SQ** tab.
2. Click **Tune > Configure Tune** in the left pane.
3. Click **Tune control**.
4. Edit the **Polarity** and **Description** as needed.
5. Click **Tune control** to release control of the SQ instrument.

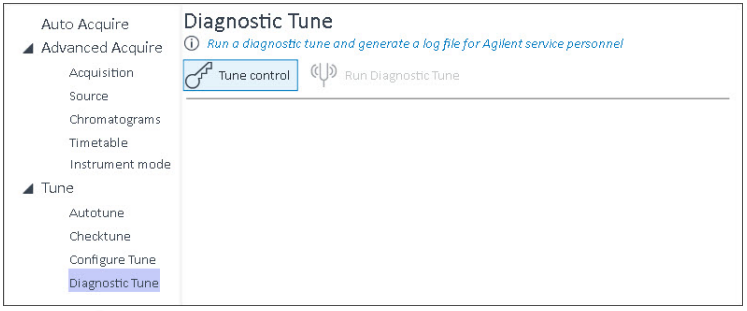
Diagnostic Tune

In the Diagnostic Tune section, execute a Diagnostic Tune to produce a log file that can be sent to Agilent service personnel. It is created and retrieved from the OpenLab Control Panel in the Logs section under **Administration > Diagnostics**. The log is named: TCDBackup.zip.

To run a diagnostics tune, you must have the **Manual control (only when instrument is idle)** permission and either the **MS Autotune** or **MS autotune and manual tuning** permission.

1 In the Method Editor window, click the **SQ** tab.

2 Click **Tune > Diagnostic Tune** in the left pane.



3 Click **Tune control** in the toolbar to lock control of the instrument.

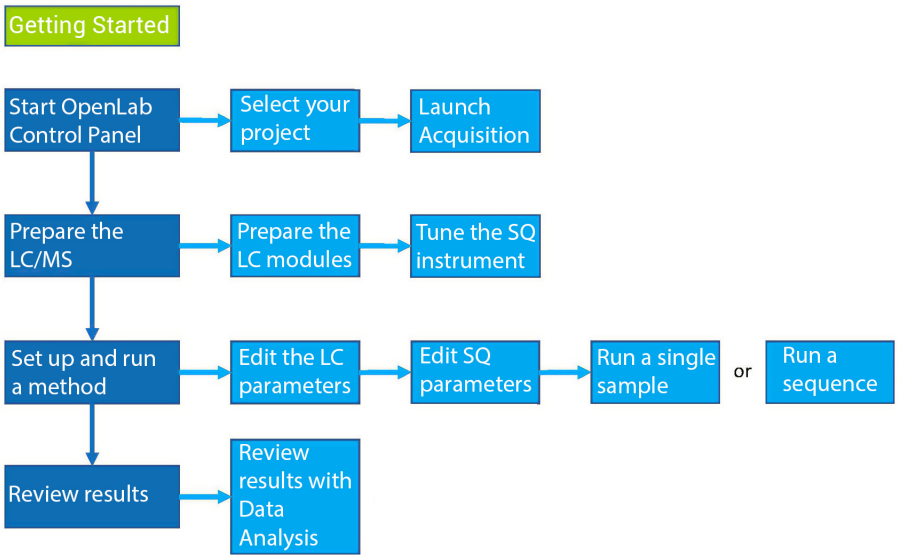
4 Click **Run Diagnostic Tune**. Once the diagnostic tune starts, the **Progress** bar and **Tune status** window display the progress and status of the tune.

5 Click **Tune control** to release control of the SQ instrument.

3 Basic Operation

Overview

The roadmap below shows the steps to set up and run a batch of samples from start to finish. Follow the instructions in this section to get started and review guiding information for each step.



Starting Up and Shutting Down the Instrument

Starting the instrument

1 Turn on the power to the instrument
2 Pump down the SQ.
3 In the Instrument Status window, right-click the **SQ** device, and select **On**.

Putting the instrument in Standby

In OpenLab CDS Acquisition, right-click the **SQ** device in the **Instrument Status** window, and select **Standby**.

Turning off the instrument

Before turning off the instrument, complete any data acquisition steps and save your data.

CAUTION

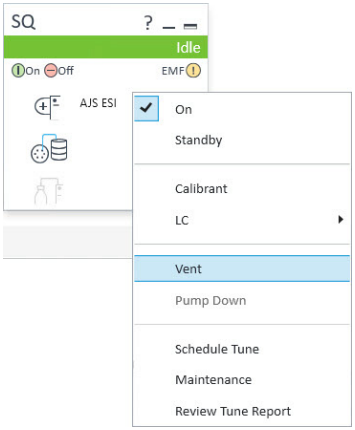
To prevent instrument damage, always vent the system before pressing the power button.

WARNING

Do not touch the spray shield and related spray chamber components. They are likely to be hot.

1 Put the SQ instrument in Standby. See **"Putting the instrument in Standby"**.

2 In OpenLab CDS Acquisition, right-click the **SQ** device in the **Instrument Status** window, and select **Vent** to vent the system. Click **Yes** to continue.



3 Wait until the instrument completely vents.

4 Close the OpenLab CDS Acquisition program and shut down the computer.

5 Turn off the power to the instrument.

Preparing the LC Modules

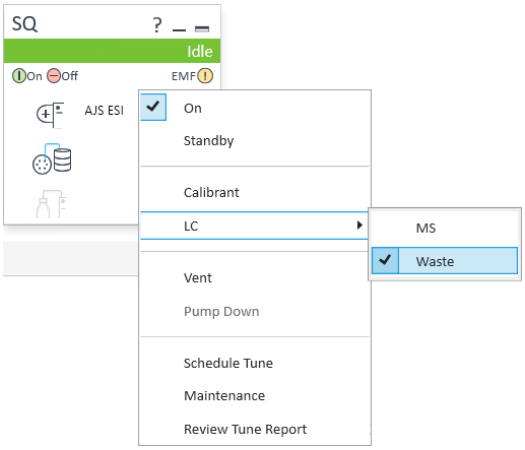
Switch LC stream to Waste

When not acquiring data, switch the direction of the LC stream away from the MS ion source and to waste.

When the is LC connected to a VWD or DAD, monitor the fluctuations of the VWD or DAD real-time chromatogram before a run.

1 Right-click the **SQ** device in the Instrument Status window.

2 Select **LC > Waste**.



3 Purge the LC pump.

- Follow the specific user guide directions for purging the installed pump model.

4 Set up to condition or equilibrate the column.

a In the Method layout, click **Download to instrument** to download the method parameters to the instrument.

b Right-click an LC module in the Instrument Status window and select one of the commands to change any non-method control parameters, if needed.

Preparing the Pro iQ Series LC/SQ

Performing a checktune or autotune

See **Chapter 2**, “Tuning”.

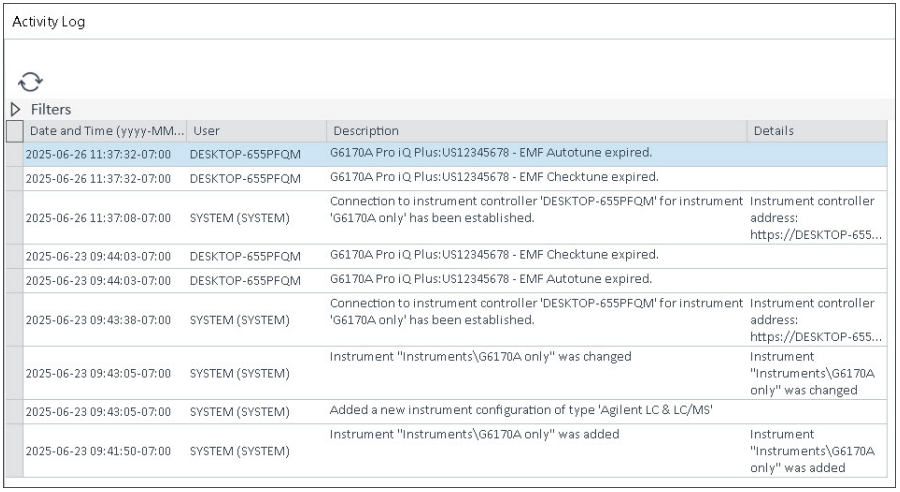
Switching LC stream to MS

After you condition the column and tune the instrument, switch the LC stream from **Waste** to **MS**. See **“Switch LC stream to Waste”** on page 38 for how to do this.

Viewing the System Activity Log for events and errors

The System Activity Log provides information regarding errors to assist with troubleshooting.

To view the log, click **Activity Log** from the Windows section in the ribbon, and view the logged events.



Setting Up an Acquisition Method

1 Open the **Method** layout.
2 Enter values for all of the LC modules under **Instrument Setup** in the left pane.
3 Set up a method using Auto Acquire or editing the Advanced Acquire sections.
   - **"Setting up an acquisition method using Auto Acquire"**
   - **"Setting up an acquisition method in Advanced Acquire"** on page 45.

To download the settings to the instrument, click .

To save the method, click **Save As**. Name the method and click **OK**.

Setting up an acquisition method using Auto Acquire

NOTE

Auto Acquire mode supports ESI source only.

Auto Acquire mode automatically sets optimized instrument parameters and does not require user input. Specify the liquid chromatography method, SIM ions, and/or m/z range for Scan. Source and ion optic parameters are then automatically set. The actual values for the source and ion optics settings in the method are viewed in the method report.

When creating a new Auto Acquire method with an LC configured and saving it (without making any changes to the method), the Audit Trail report shows that the Source parameters changed values. For example, when creating a method, the LC pump default Flow rate is 0.0 ml/min. When the method is saved, the new LC pump flow rate is read and the Source parameters are adjusted. The new Source parameters are then logged in the Audit Trail.

In the Auto Acquire user interface, all of the parameters for the SQ are shown in the same pane.

The columns available in the Scan Table change depending on whether the row has a Scan type of Scan or SIM.

You can add rows to the Acquisition Parameters table, delete rows, copy values, copy rows, move a scan segment, and copy a scan segment.

1 In the Method Editor window, click **Auto Acquire** in the left pane.

2 Select the **Stop time**. Select either **As pump/No limit** or **Limit (min)**.

3 Edit the **Acquisition Parameters** section:

a Enter the following information for a **Scan** row. You can have up to 4 Scan rows in the table. These 4 scans are acquired throughout the entire run. Do not specify a Time.

- Select **Scan** for the **Scan type**.
- Select the **Polarity**. An error is shown if the selected polarity does not match the autotuned polarities of the instrument.
- (optional) Enter the **Compound/Segment name**. **Compound name** is used if you wish to automatically build a quantitation method in Data Analysis.
- Enter the **Mass range start (m/z)**.
- Enter the **Mass range end (m/z)**.

b Enter the following information for a **SIM** row. You can have up to 500 SIM rows for a SIM only method, or up to 500 total rows with up to 4 Scan rows for a SIM/Scan method.

- Select **SIM** for the **Scan type**.
- Select the **Polarity**. An error is shown if the selected polarity does not match the autotuned polarities of the instrument.
- (optional) Enter the **Compound/Segment name**.
- Enter the **Mass (m/z)**.

c To add a row at the end of the table, click . A new row is added at the end of the table. It has the same values as the row that was selected. You can add up to 4 Scan rows.

d To insert a row in the middle of the table, first highlight a row, and then click . A new Compound/Segment row is added after the highlighted row. It has the same values as the row that was selected. You can add several rows.

e For a new Scan row, enter the **Polarity**, **Compound/Segment name**, **Mass range start (m/z)**, and **Mass range end (m/z)**.

f For a new SIM row, enter the **Polarity**, **Compound/Segment name**, **Mass (m/z)**.

g Select **Centroid** or **Profile** for the **Data storage**. This parameter is shown below the table.

h Enter the **Targeted points per second (Hz)**. You can then select the **Actual targeted points per second (Hz)** value from the list.

The **Estimated cycle time (ms/cycle)** is set automatically based on the number of compounds and the internal **Scan/Dwell** times.

The **SIM (%)** value is shown below the Acquisition Parameters table. It is a read-only value that shows the percentage of each cycle which is used by **SIM**.

4 Edit the **Chromatograms** section.

a Select the **Chrom type**. Select **TIC**, **Channel TIC**, **EIC**, or **BPC**.

- TIC - total ion chromatogram. The TIC is the overlay of all of the TICs of each scan segment. By default, there is one TIC per method for chromatograms.
- Channel TIC - a total ion chromatogram for a single scan segment. The channels correspond with the scan segments.
- EIC - extracted ion chromatogram.
- BPC - base peak chromatogram.

b If you select **EIC** (extracted ion chromatogram), enter the **Extracted mass (m/z)**. Enter a range by using a dash. For example, 300–350.

c If you select **BPC** (base peak chromatogram), enter the **Excluded masses (m/z)** or leave it blank so that no mass is excluded in the BPC. Enter a range by using a dash. For example, 100–200. Multiple individual masses or mass ranges may be entered. Each must be separated by a ";" (semi-colon). For example, 300; 400–500.

d To add another row to the table, click  .

e To delete a row from the table, select the row and then click  .

5 Edit the **Timetable** section.

a Enter the **Start Time** (min).

b Select the **Type**. You can select **Diverter**.

c Select the **Value**. You can select either **To MS** or **To waste**.

d Select or clear **Post-run diverter position** below the table. If **Post-run diverter position** is selected, select either **To MS** or **To waste**.

e To add another row to the table, click  .

f To delete a row from the table, select the row and then click  .

Setting up an acquisition method in Advanced Acquire

1 In the Method Editor window, edit the tab under **Advanced Acquire** in the left pane.

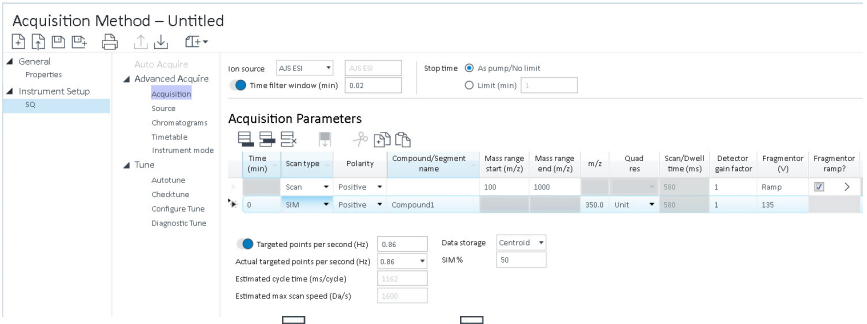
NOTE

Once you select a tab under **Advanced Acquire**, **Auto Acquire** becomes disabled.

2 Edit the **Acquisition** tab.

a Set the Scan type in each row of the Acquisition Parameters table. Different columns are available for Scan rows and SIM rows.

b If necessary, change the Acquisition values. Multiple SIM and Scan segments are allowed.



a To add a segment, click **Add Row** or **Insert Row**.

b Enter the parameters for each row.

3 *Optional.* Set the source parameters:

a Select the **Source** tab, and enter values for the Source Parameters. The actual values are shown in a read-only box next to the parameter.

4 *Optional*. Select which chromatograms are displayed in the Chromatograms window. These chromatograms are for online display only. The real-time chromatograms are not carried over to Data Analysis.

a Select the **Chromatograms** tab.

b Select the **Chrom type**, and type other plot values.

5 *Optional.* Use the Timetable to specify that the calibrant is on so that you can acquire in-acquisition calibration spectra or to change the direction of the diverter valve during the run to send the stream either to the MS or to Waste.

   a Select the **Timetable** tab.

   b Enter the **Start Time** in minutes, and select the Type and Type Value.

   - If the **Type** is **Diverter**, the **Value** can be **To MS** or **To waste**.
   - If the **Type** is **Calibrant**, the **Value** can be On or Off. When the Calibrant is off, the diverter will be set to MS. When the Calibrant is on, the diverter valve will be set to waste.

   c To set the diverter valve position at the end of the run, select **Post-run diverter position**. If selected, select either **To MS** or **To waste**. At the end of a run, you may want to divert the LC stream from the instrument.

6 Save the method.

   a Click **Save** or **Save As**.

   b If the Audit Trail Settings in Control Panel are set to prompt for a reason when the method is saved, enter the **Reason for creating a new version of this method**. Refer to the Control Panel online help for more information. Click **OK**.

   c If necessary, name the method and click **OK**.

Setting Up and Running a Single Sample

Enter the information in the Single Sample Analysis window before running the method; once the run has started, this information cannot be changed. The information in this window is not part of the method, and it is not saved when the method is saved. When you are running a sequence, enter the information in the Sequence window.

1. Click the **Single Sample** layout.
2. Enter the **Sample name**. The **Sample name** appears on reports that you may generate. Use the tokens to simplify this entry.
3. Select the **Acq. method**. This method is used to acquire the data. Click browse to open and select an acquisition method. An acquisition method has the extension .amx.
4. Select the **Proc. method**. This method is used to process the data. Click browse to open and select a processing method. A processing method has the extension .pmx.
5. Select the **Result path**. This path indicates where the data file will be saved. Click browse to open and select the directory path.
6. Enter the **Result** name. Use the tokens ▷ to simplify this entry. A token is a parameter in the system. You can include any of the following in any order: **Acq. method**, **Increment number**, **Instrument name**, **Local date & time**, **Proc. method**, **Sample name**, **Short local date & time**, **Username**, and **Vial**. When the run is started, the file name is determined based on the selected parameters.
7. Enter the **Autosampler** information:
   a. Select the **Injection source**.
   b. Enter the **Injection volume**.
   c. Enter the **Vial**.
8. Review the **Processing Section**. Click ▷ if the Processing Section is hidden.
9. *Optional.* Enter the **Sample Description**. Click ▷ if the Sample Description box is hidden.
10. Click **Run**.

Setting Up and Running a Sequence

A sequence can only be run after an acquisition method has been developed.

1. Click the **Sequence** layout.
2. In the Sequence window, enter the **Properties** information.
   a. In the navigation pane at the left of the window, click **General > Properties**.
   b. Select or clear **Audit Trail Activated**. You cannot turn off the Audit Trail once it has been enabled.
   c. Enter the **Description** for the sequence.
3. Enter the **Run Options** information:
   a. In the navigation pane at the left of the window, click **General > Run Options**.
   b. Select or clear **Use Barcode Reader Before Injection**.
   c. Click either **Inject anyway** or **Abort current injection**.
4. (optional) Add a column to the Sequence table.
   a. In the navigation pane at the left of the window, click **Injections > Table**.
   b. In the upper left corner of the Sequence table, click  . The Choose Columns dialog opens.
   c. Select the column (or columns) that you want to display.
   d. Click **Method Override Columns**.
   e. Select the column (or columns) that you want to display. See the online help for more information on overriding SIM ions or fraction collection parameters.
   f. Click **OK**.
5. Enter the **Table** information:
   a. In the navigation pane at the left of the window, click **Injections > Table**.
   b. Enter the information for each injection.
6. Select the rows to submit as part of the run. By default, all rows are selected.
7. To save your results to a sub-folder inside your Results folder, change the **Result Path** by clicking browse and creating a new folder. You cannot save your results to an existing .rslt folder.

8 The **Result name** defaults to the last filename used for this instrument and project. Enter a filename by typing in the field or using tokens. If left blank, the instrument name and local date & time is used for the filename.

9 Select to **Save result as**:

- **One result set** to save the data acquired for all sample injections in the sequence within a single result set. For example:
  - ResultSetName: A1, B1, A2, B2, A3, B3, A4, B4, A5, B5
- **Separate single injections** to save each sample injection in the sequence as an individual result set. When using this option, result set names will be based on the value of the **data file** column for each sequence row. For example:
  - DataFileName: A1
  - DataFileName: B1
  - DataFileName: A2
  - DataFileName: B2

10 (optional) Click **Validate** to validate the sequence against the specified acquisition method. The columns validated are **Acq. method**, **Volume**, and any override parameters. If invalid entries are found, correct those entries.

11 Click **Run**. If this is a new "Untitled" sequence, the sequence file is saved as the instrument name + the local date and time.

Submitted sequences are placed in the **Run Queue**, where you can stop or pause a run, or edit a sequence. A result folder (.rslt) is created when the run is added to the Run Queue.

Run a sequence to optimize a parameter

For detailed information on overriding the SIM ions in the method when running the sequence, see *Rules to override SIM ions from a sequence* in the online help.

Use a sequence to optimize a method parameter. For example, you may want to find a good overall Gas Temperature for your compounds. First, add a method override column to the sequence. You can override the Fragmentor voltage or one of the source parameters. Then, add multiple rows to the Sequence table which run the same sample. For each row in the Sequence table, vary the parameter that you want to optimize. For example, you can add five rows to the

table and set the Gas Temperature to 250, 260, 270, 280, and 290. By comparing the data files, you can determine which Gas temperature is best for your compounds.

1 Click the **Sequence** layout.

2 In the Sequence window, enter the Properties and Run Options information. For more information, see **step 2** and **step 3** in **"Setting Up and Running a Sequence"** on page 48.

3 Add a column to the Sequence table.

   a In the navigation pane at the left of the window, click **Injections > Table**.

   b In the upper left corner of the Sequence table, click  . The Choose Columns dialog opens.

   c Click **Method Override Columns**.

   d Select the column (or columns) that you want to display. You can only optimize one parameter at a time, but you can override multiple parameters in the method if desired.

   If you add a Method Override column and enter values in the column, then even if the column is hidden, the Method Override will work. The only way to make the override not happen for that parameters is to clear the values in that column.

   e Click **OK**.

4 Enter the **Table** information:

   a In the navigation pane at the left of the window, click **Injections > Table**.

   b Enter the information for each injection.

   c Repeat that row several times. Most of the values in these rows are the same. You only vary the sample name, the data file name, and the parameter that you want to op.timize. You can only optimize one parameter at a time.

   d For the parameter that you want to optimize, set the parameter in the first row to the lowest value that you want to check. The first data file contains the data with the parameter at this value.

   e In the second row, set the parameter to a slightly larger value. The second data file contains the data with the parameter at this higher value.

   f Continue to increase the value for that parameter in subsequent rows.

5 Continue with **step 6** in **"Setting Up and Running a Sequence"** on page 48

6 Review the data files to determine the optimum value to use for that parameter for your sample.

Run a sequence and override masses in the fraction collection trigger signals

Using the Fraction target mass Method Override parameters, you can override the compound name, monoisotopic mass, and formula for a fraction collection trigger signal in a method. The fraction collection peak trigger signal and all the instrument settings for the fraction collection trigger signal are preserved. You can override a single fraction target mass multiple times by specifying multiple compounds in the fraction target mass sequence column. For detailed information on setting up a mass-based fraction collection method and using it with Fraction target mass Method Override fields, see *Rules to override fraction collection parameters from a sequence* in the online help.

1 Click the **Sequence** layout.

2 In the Sequence window, enter the Properties and Run Options information. For more information, see **step 2** and **step 3** in **"Setting Up and Running a Sequence"** on page 48.

3 Add the override column(s) to the Sequence table.

   a In the navigation pane at the left of the window, click **Injections > Table**.

   b In the upper left corner of the Sequence table, click  . The Choose Columns dialog opens.

   c Select the column (or columns) that you want to display.

   d Click **Method Override Columns**.

   e Select the **SQ: T1 Fraction target mass 1**, **SQ: T2 Fraction target mass 2**, and/or **SQ: T3 Fraction target mass 3** column.

   If you add a Method Override column and enter values in the column, then even if the column is hidden, the Method Override will work. The only way to make the override not happen for that parameter is to clear the values in that column.

   Any fraction trigger signals in the original method that are not overridden will be acquired as specified in the original method.

   f Click **OK**.

4 Enter the **Table** information:

   a In the navigation pane at the left of the window, click **Injections > Table**.

   b Enter the information for each injection.

5 In the **SQ: T1 Fraction target mass 1**, **SQ: T2 Fraction target mass 2**, and/or **SQ: T3 Fraction target mass 3** column, for each compound, enter the formula

or monoisotopic mass and, optionally, the compound name. See Rules to override fraction collection parameters from a sequence (LC/MS). A formula or monoisotopic mass is required.

Fraction collection target mass overrides are recorded in the activity log.

6 Continue with **step 6** in **"Setting Up and Running a Sequence"** on page 48.

Analyzing Data and Reviewing Results with OpenLab CDS Data Analysis

Use the OpenLab CDS Data Analysis program to do these tasks and more:

- Review results for acquisition method development
- Review sample fractionation results
- Peak evaluation
- Identify compounds
- Quantitate samples
- Spectral deconvolution
- Report results

See **OpenLab Help & Learning** for more information.

4 Maintenance

Maintenance Overview

Your instrument needs to be serviced and maintained to avoid contamination, which prevents signal suppression, reduces background noise, minimizes adduct formation, and enables the instrument to operate at its peak performance. In order to achieve the most accurate results, routine and periodic maintenance is crucial.

The difference between routine and periodic maintenance is that routine maintenance is done regularly to keep the equipment in good working condition, while periodic maintenance is done at specific intervals to prevent breakdowns or failures.

Acquisition software keeps track of the number of injections and the number of days since a maintenance activity was performed for your SQ instrument using the Early Maintenance Feedback (EMF) dashboard. EMF allows you to plan for scheduled maintenance when it is convenient and increase the instrument uptime. If a limit is exceeded for an EMF item that is enabled, then the EMF icon changes to yellow, and the tooltip displays the cause in the device pane. Set the limits for each EMF item in the Maintenance dialog box following instructions detailed in online help.

This Maintenance chapter is broken down into maintenance procedures listed by routine, then periodic maintenance tasks with their recommended schedule of performance, with the EMF procedures cross referenced in the final section. Consult the online help or contact your Agilent consultant for further information.

LC/MS Maintenance Video Series

Procedures notated with the Video Support icon are linked to videos intended to support written content. These links are also found in the online help and/or the instrument user guides. Refer to these videos for supplemental instructions. View the full series at **https://aglt.co/LCMSMaintenance**.

Routine Tasks

Cleaning the spray chamber - daily

Perform this maintenance daily or at the end of each shift or anytime you suspect carryover contamination from one sample or analysis to another.

NOTE

Use the weekly cleaning procedure if symptoms of contamination persist or if the spray shield or capillary cap show significant discoloration that cannot be removed by the regular, daily cleaning.

WARNING

The spray chamber operates at very high temperatures. Do not continue until the spray chamber is cool. Set all heated zones to minimum temperature and wait 20 minutes.

Tools needed:

- Clean, powder-free nitrile gloves
- Clean lint-free cloth
- LC/MS-grade isopropanol
- LC/MS-grade water
- Clean wash bottle

To perform daily cleaning of the spray chamber,

1. Put on clean powder-free nitrile gloves.
2. Lower the drying gas temperature to the minimum level.
3. For APCI/multimode, lower the vaporizer heater temperature to the minimum level.

WARNING

Make sure the source is cooled before you clean the spray shield.

4 In a clean wash bottle, prepare a 50:50 mix of LC/MS-grade isopropanol and LC/MS-grade water.
5 Open the spray chamber.
6 Dampen a clean lint-free cloth with a mixture of LC/MS-grade isopropanol and LC/MS-grade water.
7 Wipe the spray shield and the area around the spray shield.
8 Close the spray chamber.

Checking and filling the calibrant bottle - weekly

Schedule

Perform this procedure monthly or weekly if you tune the instrument frequently, or if the calibrant has expired.

Equipment List

- APCI-L tuning mix
- ESI-L tuning mix
- MMI-L tuning mix
- Clean powder-free nitrile gloves

Steps for checking calibrant levels

1 Check to make sure that enough tuning mix is present to immerse the end of the intake tube.
2 If the tuning mix level is within a few millimeters of the end of the intake tube, refill the calibrant bottle.

Steps for refilling the calibrant bottle

1 Rinse the calibrant bottle once with water, then twice with ACN before refilling.

CAUTION

Dispose of rinsing agents appropriately.

2 Label the calibrant bottle with the tuning mix expiration date.

3 Refill the calibrant bottle with the appropriate tuning mix.

4 Put the intake tube into the calibrant bottle as you lift the calibrant bottle into position.

CAUTION

Do not touch the intake tube unless you are wearing clean gloves.

5 Attach the calibrant bottle onto the fixed bottle cap. Turn the calibrant bottle counterclockwise to tighten.

CAUTION

The bottle only needs to be snug. Do not over-tighten the bottle. A leaky bottle cap can prevent the bottle from pressurizing and can lead to the evaporation of the contents.

CAUTION

The tuning mixes are not interchangeable. Failure to change the tuning mix when the source or inlet assembly is changed can result in miscalibration of the instrument and errors in mass assignments.

Cleaning the spray chamber - weekly

Video Support

https://aglt.co/D0115679

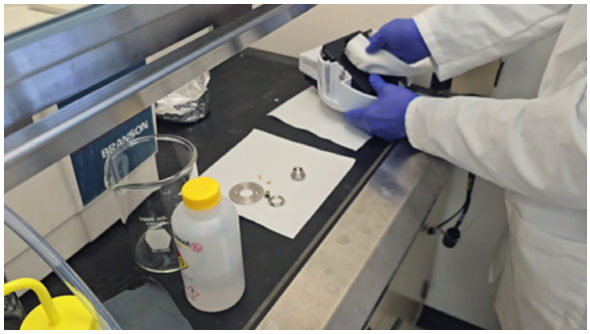
Perform this maintenance:

- Weekly.
- Whenever symptoms indicate that contamination exists in the spray chamber.
- If the spray shield or capillary cap shows significant discoloration not removed by daily cleaning.

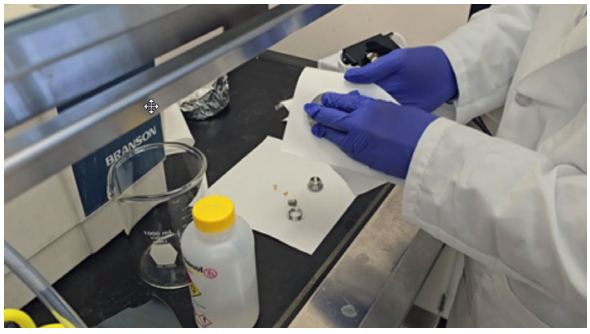
Tools needed:

- Clean powder-free nitrile gloves
- Clean lint-free cloth
- LC/MS-grade isopropanol
- LC/MS-grade water
- Clean wash bottle
- 4000 grit sandpaper

1. Put on clean powder-free nitrile gloves.
2. Disconnect the nebulizer sample line and sample nebulizer gas tubing from the nebulizer.
3. Disconnect all ion source connections to the instrument.
4. Open the latch of spray chamber.
5. Open the spray chamber.
6. Remove source and put the source under a fume hood.
7. Dampen a clean lint-free cloth with a mixture of LC/MS-grade isopropanol and LC/MS-grade water. For Multimode, be careful not to touch the thermocouple probe.
8. Wipe the interior of the spray chamber with a clean lint-free cloth.

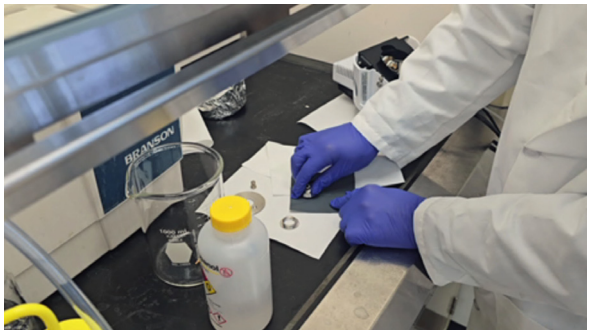


9 Make sure you wear clean gloves. Use a tech wipe to hold the parts as you remove them. They will be warm.



10 Clean the spray shield, capillary cap, end plates, and contact ring under fume hood. Carefully remove the canted coil spring from the capillary cap before cleaning.

11 (Optional) Abrasive cleaning for persistent contaminants: Use 4000-grit abrasive paper to clean contaminants from the parts.



12 Put the spray shield, capillary cap, end plates, and contact ring in the beaker.

13 Add a 50:50 mix of LC/MS-grade isopropanol and LC/MS-grade water in a beaker.

14 Put the beaker in sonication for 5 minutes.

15 Drain the solvent and remove the parts from the beaker.

16 Dry the parts by using nitrogen gas.

17 Carefully insert the canted coil spring back into the capillary cap.

18 Reinstall the spray chamber parts and source on the instrument. See **"Electrospray Ionization (ESI) source"** on page 109.

19 Reinstall the spray chamber on the instrument.

20 Connect all cables and tubing to the instrument.

21 Connect the nebulizer sample line and sample nebulizer gas tubing to the nebulizer.

Video Support

Cleaning the nebulizer - weekly

https://aglt.co/D0115677

Passing the vapors of solvents like IPA, methanol, acetonitrile, or water through the LC/MS system is called steam cleaning and is used to clean possible contamination in the LC/MS system. The usual conditions are:

- LC pump flow to 0.5 ml/min
- Nebulizer pressure to 60 psi
- Drying gas to 13 L/min
- Drying gas temp to 350 °C

Make sure the MS stream selection valve is set to go to the MS. Steam cleaning overnight has been shown to be one of the most important factors in improving the signal-to-noise level by reducing contamination.

To clean an MS, there are two options:

- Plain water/MeOH at high temp – 50:50 proportion
- IPA/MeOH/Water at high temperature

Schedule

Check the nebulizer weekly. If needed, flush traces of samples and buffers out of the tubing, valves, and nebulizer.

Equipment List

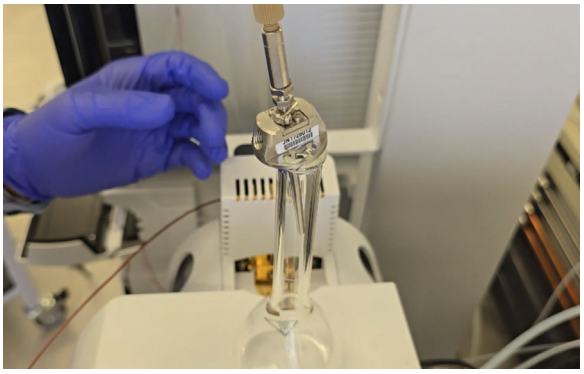
- LC/MS-grade methanol
- LC/MS-grade water

Steps

1 Install a mix of 30 to 70% methanol in water into a LC solvent bottle.

2 Remove the column from the LC column compartment.

3 Remove nebulizer from spray chamber and support the nebulizer so that it sprays into an appropriate waste container (beaker, bottle, etc.).



4 Control the LC flow through the acquisition software to pull from the solvent bottles.

5 Set flow rate to not more than 1 ml per minute.

6 Flush for 3 to 5 minutes. For heavy build up, additional flushing may be required.

Periodic Tasks

Checking the rough pump oil level

Schedule

Once every three months/once per quarter (recommended).

Equipment List

- Clean chemical-resistant gloves
- Safety glasses
- Funnel
- 10-mm hex key
- Paper towel or shop rag
- Small plastic tub
- AFV 60 Gold Oil

Steps

1. The oil level should be between the marks for Max and Min.
2. Check that the pump oil is clear and the color is lighter than amber.
3. If the pump oil is dark or full of suspended particles, replace it.

Video Support

Replacing the MS45+ pump oil and filter

https://aglt.co/D0115665

Schedule

Replace the pump oil every six months. Replace it sooner if the oil appears dark or cloudy.

Equipment List

- Clean chemical-resistant gloves
- Safety glasses
- Funnel
- Pair of pliers
- Filter
- Filter cap O-ring
- Small cap O-ring
- MS45+ exhaust filter cap removal tool
- 10-mm hex key
- Paper towel or shop rag
- Small plastic tub
- AFV 60 Gold Oil

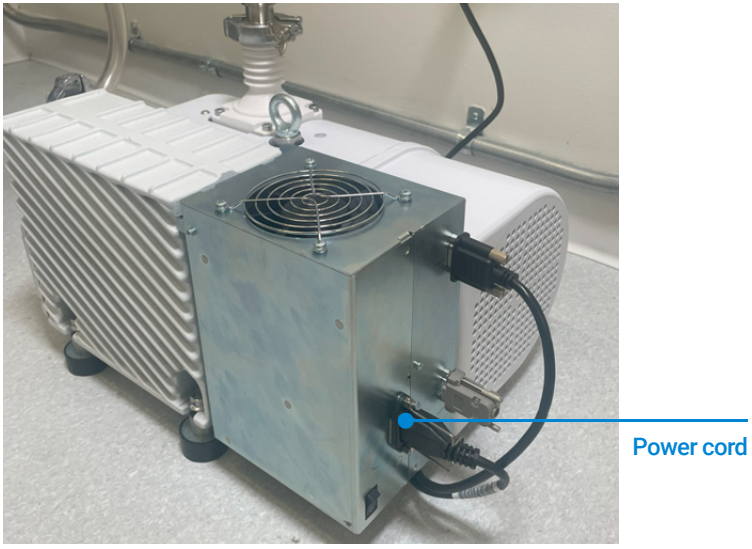
Draining the MS45+ pump oil

1 Put on clean, chemical-resistant gloves.

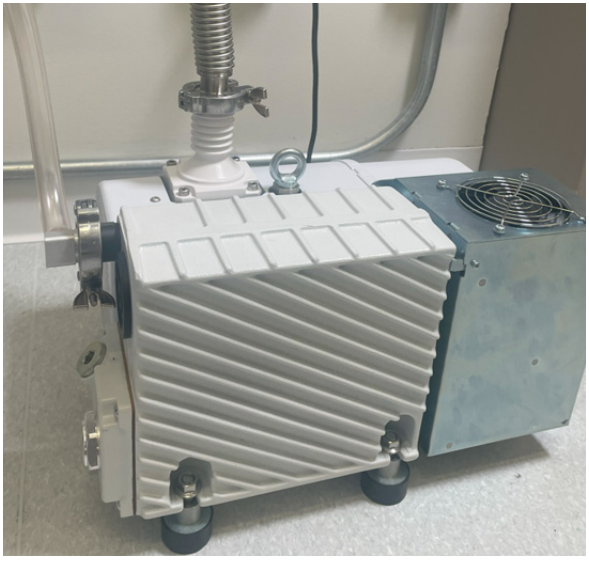
2 Place the instrument into 'Standby,' then 'Vent'.

3 Allow the rough pump to turn off automatically, waiting for approximately 15 minutes.

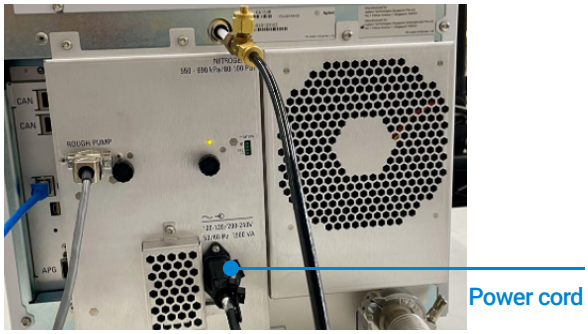
4 Unplug all power cords.



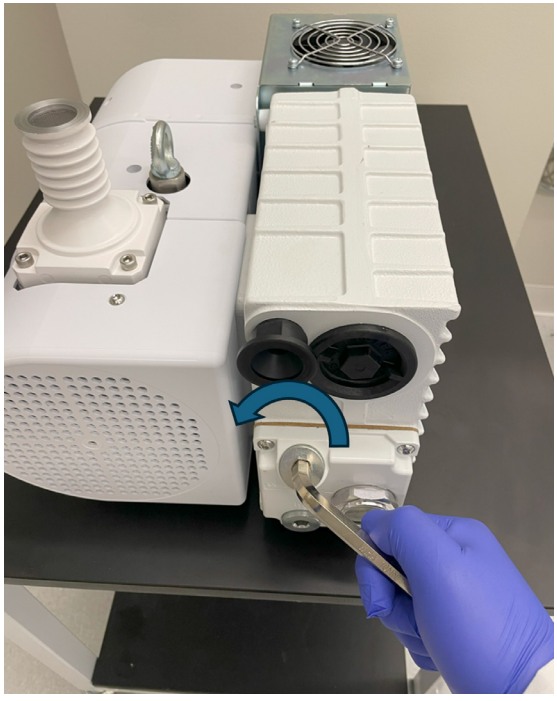
5 Disconnect the clamps on the inlet and outlet exhaust ports.



6 Unplug all power cords from the LC/MS instrument.

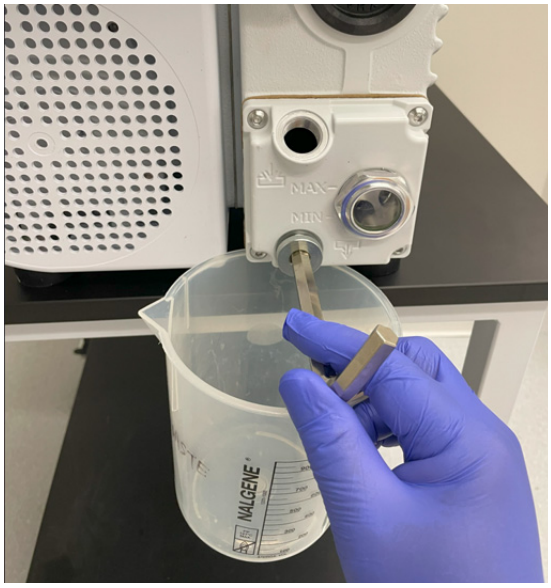


7 Unscrew the oil fill cap, rotating it counterclockwise using a 10-mm hex key. Remove it from the instrument and place it in a secure location.



8 Place a tank for waste oil, for example, a small plastic tub under the oil drain plug.

9 Unscrew slowly the oil drain cap by rotating it counterclockwise using the 10-mm hex key.

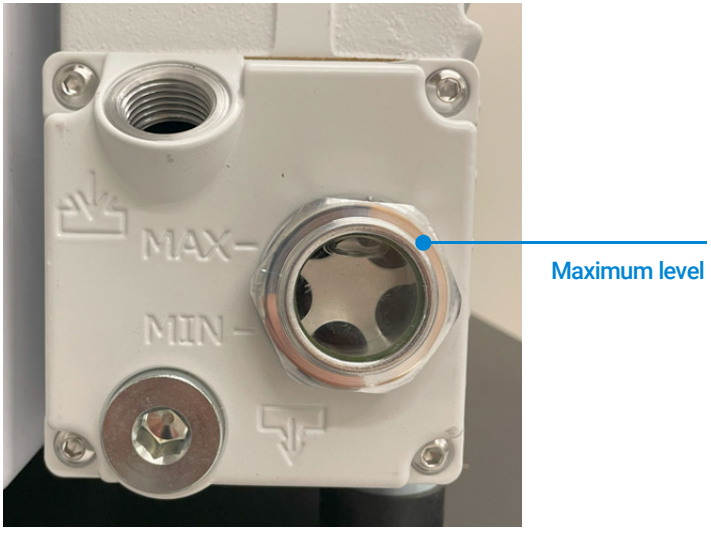


10 Let the oil flow out. In the meantime, clean the inside of the drain plug.

11 After the oil has been drained, close the drain plug tight.Take the tank of waste oil away and clean thoroughly, using rags of cotton or other suitable material to dry.

Replacing the MS45+ pump oil

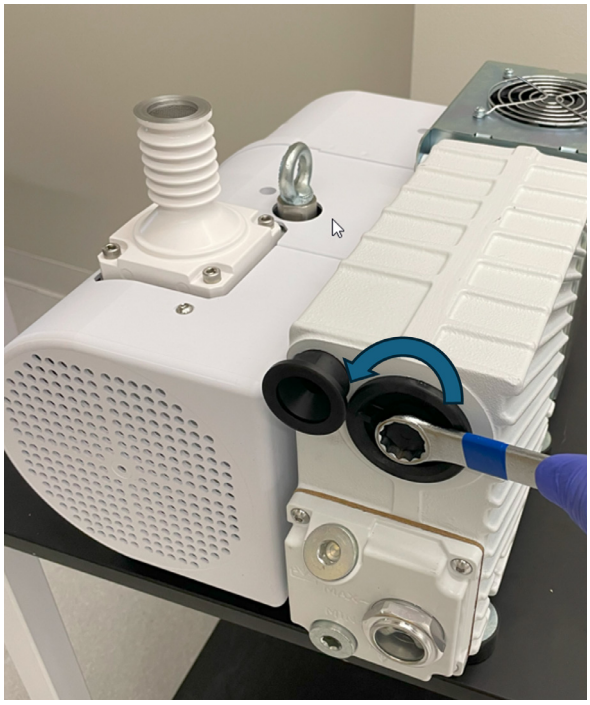
1 Add AVF 60 Gold oil until reaching the maximum level on the sight glass.



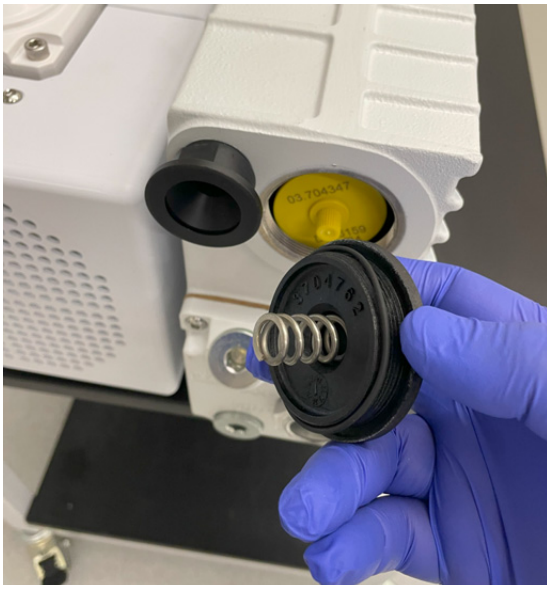
2 Close the oil fill cap tight using the 10-mm hex key.

Replacing the MS45+ oil mist filter

1 Unscrew the filter cap using the MS40 exhaust filter cap removal tool.

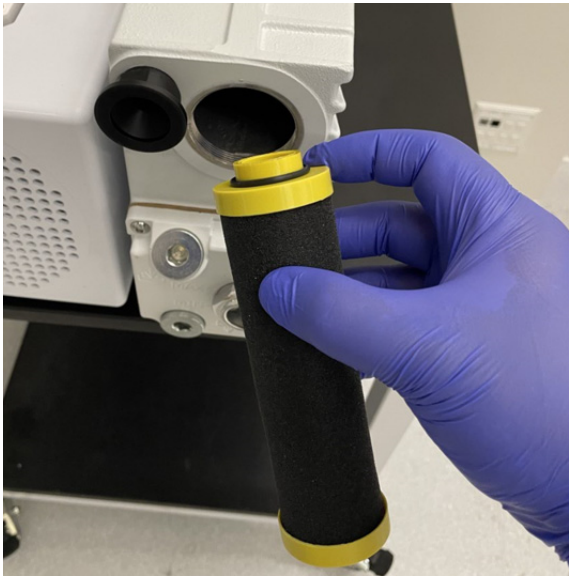


2 Remove the O-ring from the filter cap.

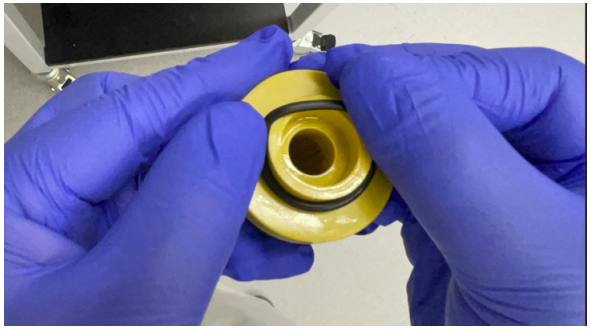


3 Remove the old filter from the instrument.

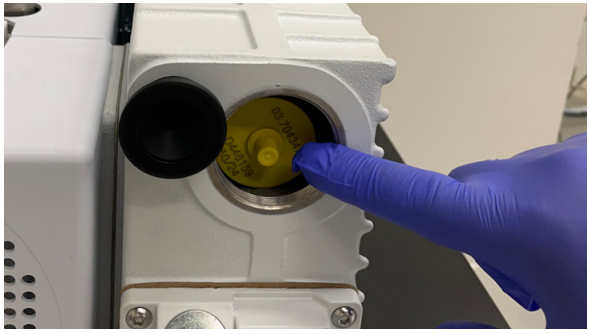
4 Remove the O-ring from the filter.



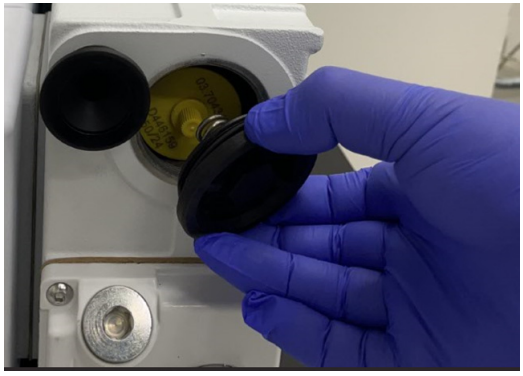
5 Install the new, small O-ring on the new filter, then install the filter into the pump in the proper orientation.



6 The distance of the filter should not be >2 cm from outside the cap threads.



7 Install the new, large O-ring and filter cap.



8 Connect the inlet and outlet pipes.

9 Plug in the rough pump and all power cords from the LC/MS instrument.

10 Press the front power switch to initiate pump down.

Replacing the nitrogen gas filters

Schedule

Yearly, or when flagged by EMF.

Equipment List

- 2 1/2-inch OD Mounting Clip for Big Universal Traps (2/pk) - Part number UMC-5-2
- RMSN—4 1/4-inch Nitrogen

Steps

NOTE

Before installing the trap, make sure the system is free of leaks and the system is generally in good working order.

- Maximum operating pressure is 250 PSIG.
- Maximum operating temperature is 100 °C.
- Maximum flow rate is 8 liters per minute.

CAUTION

If you are using stainless steel tubing, please order the purifier with stainless steel fittings RMSH-2-SS or RMSH-4-SS. Using brass fittings with stainless steel tubing increases the risk of cross-threading.

1. Shut down your LC/SQ or put the instrument in Standby.
2. Set the gas source supply pressure to 10–15 psi and maintain flow in the gas source line before disconnecting it from the inlet of the old trap.
3. Remove the protective nut and plug from the INLET end of the new trap. DO NOT open the plug on the OUTLET end.
4. Immediately attach the new trap to the gas source tubing using one of the included ferrule sets.

CAUTION

Failure to connect the trap immediately may cause contamination of the adsorbents inside. Reduced adsorption capacity will contribute to elevated levels of contaminants observed by the detector. This may result in the need for additional purge time.

5 Insert the tubing through the nut and ferrule set until the tubing rests firmly against the shoulder in the fitting.

6 Finger-tighten the nut, then use a wrench to tighten the nut 3/4 turn for 1/8-inch tubing and 1-1/4 turn for 1/4-inch tubing.

7 Wait 3 minutes for the gas pressure inside the new trap to stabilize.

8 Increase the gas source pressure to 60 psi.

9 Open the outlet fitting and purge the trap for 3 minutes.

10 Adjust the gas source pressure to a normal working level. Connect the outlet fitting of the trap to the instrument tubing as described in step 5 and step 6.

11 Secure the trap in a vertical orientation. The length of the trap should stand perpendicular to the floor.

Wait for at least 3 minutes to purge out any air that may have entered the instrument tubing line. The trap is now ready for use.

General Maintenance Tasks

Video Support

Replacing the nebulizer needle

https://aglt.co/D0115676

Schedule

Perform this procedure when you need to access the nebulizer for maintenance.

Equipment List

- Clean, powder-free nitrile gloves
- Replacement needle kit
- 1/4" -inch x 5/16-inch open-end wrench (Quantity: 2)
- Nebulizer adjustment fixture (GT430-20470)
- T6 Torx driver

Removing the nebulizer

1 Put on clean, powder-free nitrile gloves.
2 In OpenLab CDS Acquisition, shut off the LC solvent flow and nebulizing gas.
3 Disconnect the nebulizer sample line from the nebulizer.
4 Disconnect the sample nebulizer gas tubing from the nebulizer.

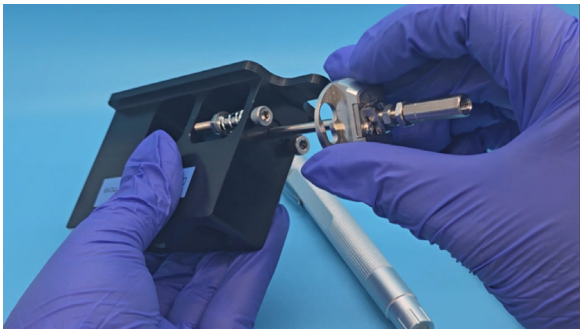
WARNING

The tip of the nebulizer can be very hot. Do not touch the nebulizer until it is cool.

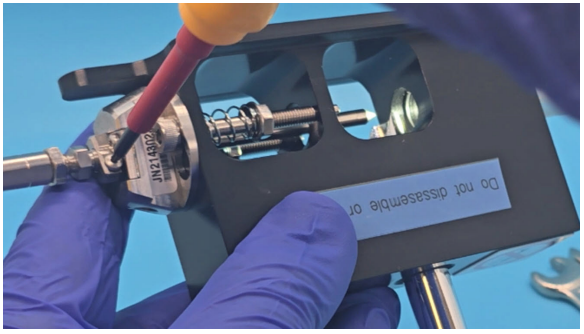
5 Turn the nebulizer counterclockwise until it disengages from the retaining screws.
6 Gently lift the nebulizer out of the spray chamber and place it in a safe location.

Replacing the nebulizer needle

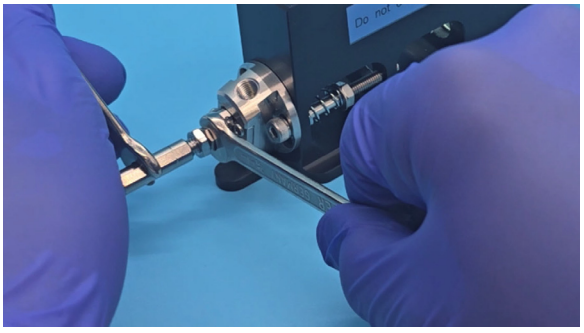
1 Determine your nebulizer type per the user guide or the document that comes with the kit.
2 Install the nebulizer in the Nebulizer Adjustment Fixture, turning clockwise to secure the nebulizer to the adjustment fixture.



3 Loosen the fastener (locknut, 1.5-mm hex screw, or T6 Torx screw) that secures the needle holder in place.

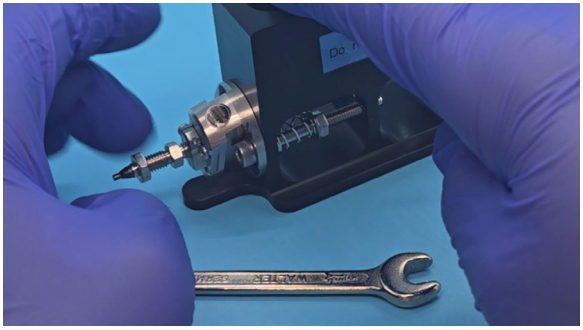


4 Loosen the locknut next to the zero-dead-volume (ZDV) union by placing the 5/16-inch wrench on the nut, and the 1/4-inch wrench on the union, and turning the 5/16-inch wrench clockwise.



5 Remove the union from the nebulizer needle holder.

6 Remove the union lock nut from the nebulizer.



7 Loosen the needle holder and pull it out of the nebulizer body. Dispose of the used needle properly.

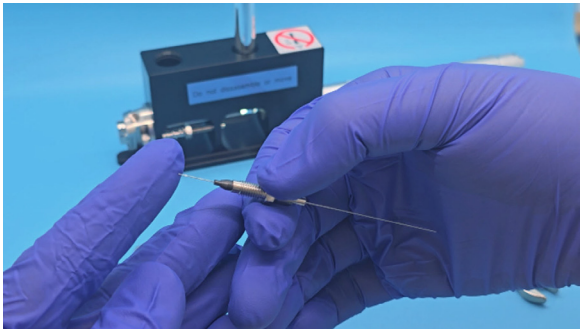
8 For more thorough cleaning, sonicate the nebulizer body. Pour isopropanol or methanol through the inside of the shaft.

9 Carefully remove the new needle from the shipping tube and adhesive strip. Identify the sharp end of the needle.

10 Carefully slide the sharp end of the needle through the ferrule until 1 cm of the needle remains at the ferrule.

CAUTION

Do not bend the needle as you slide it into the ferrule. The needle is fragile. A bent needle results in poor alignment with the nebulizer body.



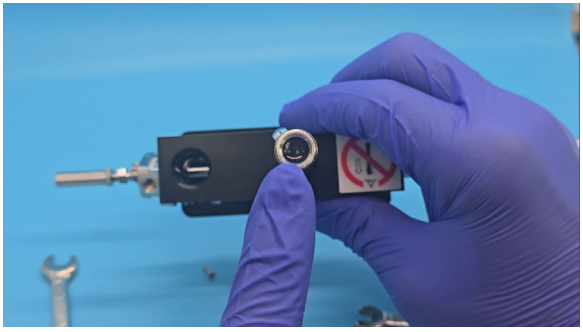
11 Push the needle into the ferrule until the needle is slightly visible flush with the ferrule.

12 Reinstall the locknut and the union. Hand-tighten the union.

13 Hold the needle holder steady with a 1/4-inch x 5/16-inch open-end wrench, depending on your nebulizer holder style.

14 Tighten the union one-half to three quarters of a turn, or until an audible squeak is heard. The ferrule is now compressed.

15 Adjust the electrospray needle position before reinstalling the nebulizer in the spray chamber.



16 Tighten the fastener (T6 Torx screw) that secures the needle holder in place.

Video Support

Inspecting and adjusting the nebulizer needle

https://aglt.co/D0115675

Schedule

Perform this procedure if there is increased LC back pressure, off-axis spraying, dripping from the nebulizer, or when the reference nebulizer needle is not spraying.

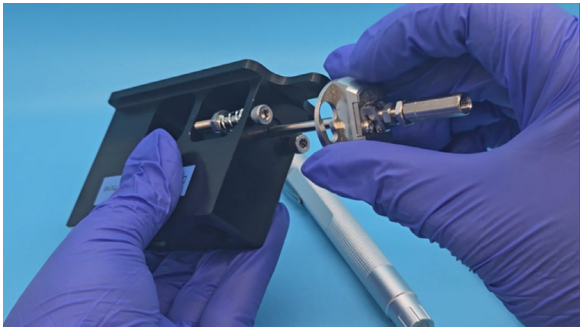
Equipment List

- Nebulizer Adjustment Fixture (GT430-20470) or Nebulizer adjustment kit (G1960-67470)
- Clean powder-free nitrile gloves
- T6 Torx driver
- 1/4-inch x 5/16-inch open-end wrench (Quantity: 2)

1 Put on clean, powder-free nitrile gloves.
2 Insert the tip of the nebulizer into the end of the Nebulizer Adjustment Fixture.
3 Slide the heads of the two spring loaded socket head cap screws through the mounting holes on the body of the nebulizer.
4 Turn the nebulizer body 1/8 turn counter-clockwise.

NOTE

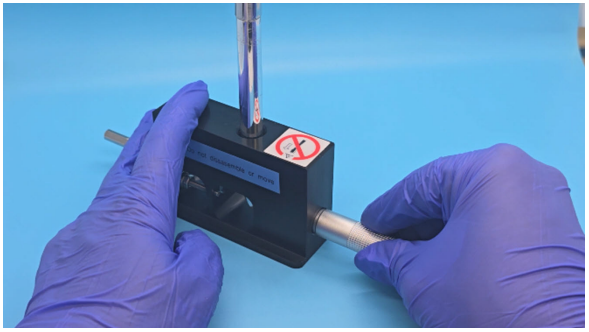
If the nebulizer is too tight or too loose, loosen or tighten the nut on the captured screws to adjust the tension on the spring. Turn clock wise to tighten, counter clock wise to loosen.



5 Push the 40 x Magnifier into the vertical end position of the Nebulizer Adjustment Fixture.

6 Align the tapered tip of the magnifier to the tip of the nebulizer needle.

7 Push the LED Flashlight into the Nebulizer Adjustment Fixture.



8 Turn on the flashlight and, while looking down the magnifier, adjust the height of the magnifier until the tip of the nebulizer is clearly in focus.

Table 1 Correct needle position

Nebulizer	Distance
Microflow Nebulizer Assembly	0.003 inch
ES Tested Nebulizer	0.000 (flush)
Tested ESI Nebulizer Assembly (older style)	0.003 inch
Tested APCI Nebulizer Assembly	0.000 (flush)

The distance shown is the distance that the needle tip protrudes from the tip of the nebulizer assembly in inches.

Note the scale shown in the magnifying lens is also in inches, with one division equaling 0. 001 inches.

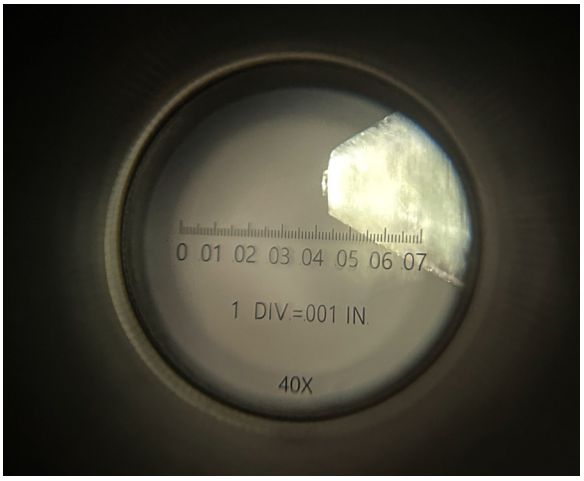
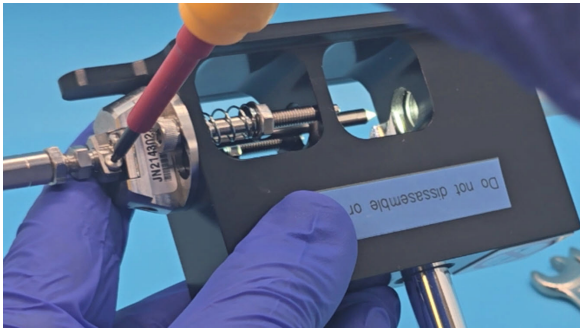


Figure 1. Correctly adjusted nebulizer needle.

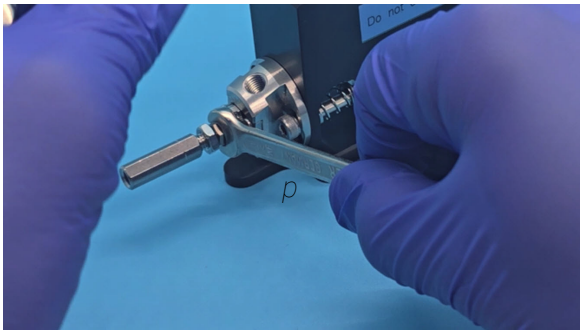
NOTE

If the needle tip looks pitted, clogged with salt, corroded, or is not square and has jagged edges then the needle will need to be replaced.

9 Using either a T6 Torx driver or 1.5 mm hex wrench, loosen the lock screw on the head of the nebulizer assembly. The nebulizer lock screw is either a T6 Torx or 1.5 mm hex bolt



10 Using the 1/4" end of the open-end wrench, rotate the needle assembly while looking down the magnifier. Turning the nut with either push the needle out or drawn it into the nebulizer tip. Adjust the needle so that the distance matches the specified distance for your nebulizer type.



11 If the needle distance looks correct, reverse the position of the magnifier and the flashlight so the flashlight is in the top port and the magnifier is in the side port of the fixture. Check that the needle tip is also centered (concentric) with the tip of the nebulizer assembly. If it is a long way off center after optimizing the distance, then the needle may need to be replaced.

12 Once the position of the needle has been optimized, carefully tighten the lock screw loosened earlier, while checking that the position of the needle has not moved during tightening.

The nebulizer needle adjustment is now complete.

Video Support

https://aglt.co/D0115671

Removing the capillary

Schedule

When you need to clean or replace the capillary.

Equipment List

- Clean powder-free nitrile gloves
- Capillary Puller tool
- LC/MS-grade isopropanol

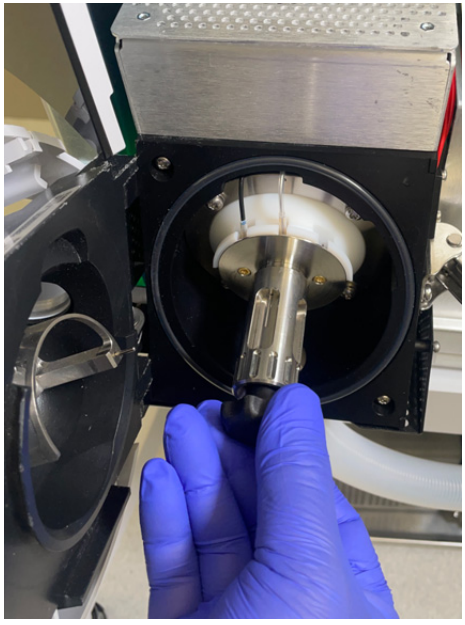
Steps

WARNING

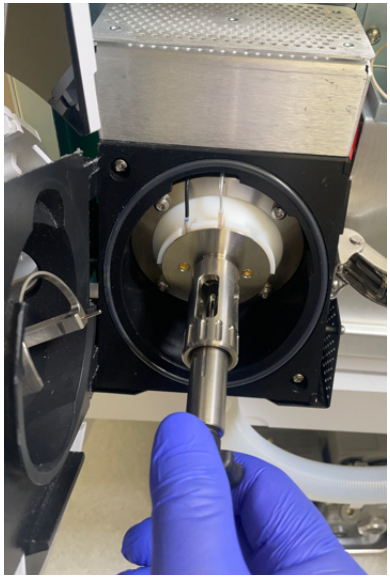
The spray chamber operates at very high temperatures. Do not continue until the spray chamber is cool.

1 Put on clean powder-free nitrile gloves.
2 Open the spray chamber.
3 Remove the capillary cap from the end of the capillary.
4 Screw the capillary puller tool fully into the spray shield mount.

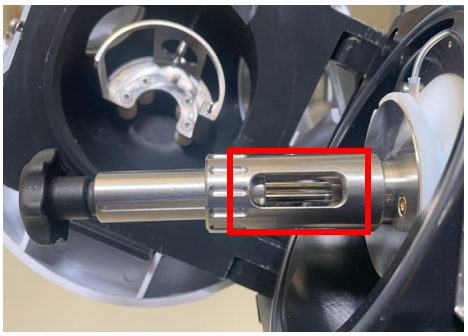
5 Push the collet assembly over the capillary and then tighten by holding the puller handle. Turn the collet clamping knob clockwise.



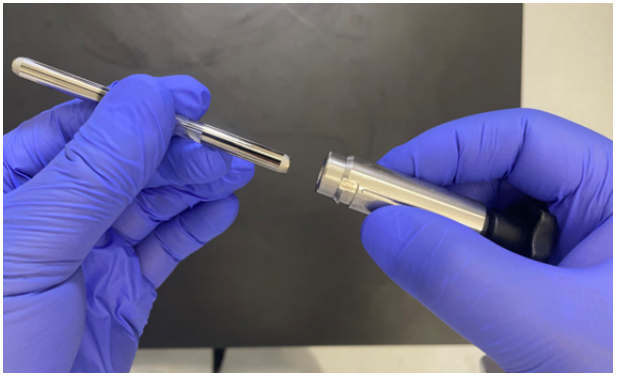
6 Pull on the knob until the collet assembly stops moving.



7 Visually check that the capillary has been pulled out by the collet by looking through the slots on the tool.



8 Rotate the knob assembly counterclockwise slightly, and pull out the assembly to unlock the collet assembly from the puller.



9 Pull the tool out.

10 Carefully pull the capillary out along its long axis.

11 Loosen the collet clamping knob slightly to loosen the capillary from the capillary puller tool.

12 Pull out the capillary from the collet.

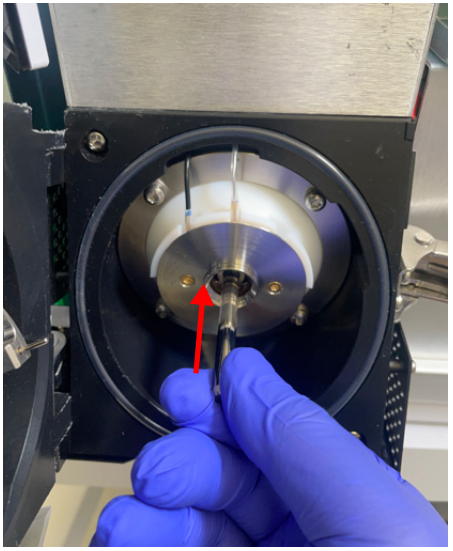
13 Unscrew the tool from the shield mount.

14 Lubricate the capillary entrance end with LC/MS-grade isopropanol.

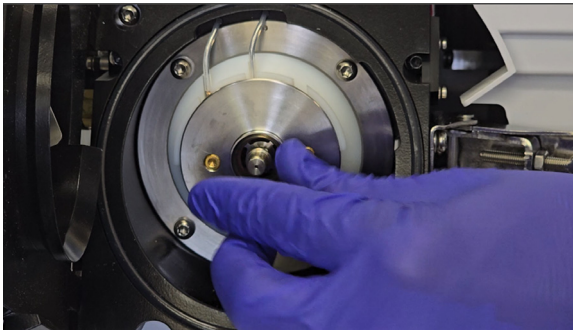
15 Carefully insert the capillary straight into the desolvation assembly.

16 Slightly increase the insertion force to push the capillary through the rear contract spring to fully insert the capillary.

17 Continue to apply pressure until approximately 1 cm remains from the desolvation assembly.



18 Install the capillary cap over the outer end of the capillary.



19 Install the spray shield.

20 Close the spray chamber.

Video Support

https://aglt.co/D0115670

Cleaning the capillary

Schedule

When you observe decreased sensitivity and decreased signal stability.

Equipment List

- Clean powder-free nitrile gloves
- LC/MS-grade isopropanol
- Alconox powdered precision cleaner
- Deionized (18 MΩ/cm) water
- 100-mL polypropylene graduated cylinder
- 10-mL polypropylene graduated cylinder
- Two 1-mL pipette tips

Steps

1 Put on clean, powder-free nitrile gloves.

CAUTION

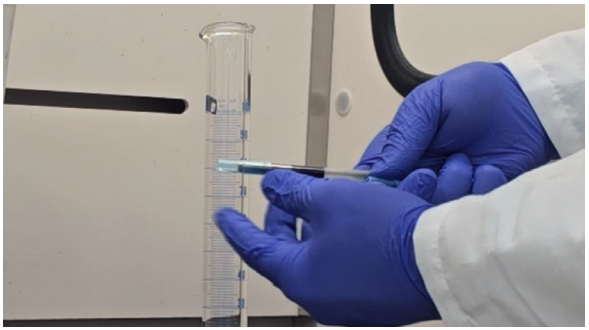
Ensure the source heated zones are cool before working on the instrument.

2 Dissolve 1 gram of Alconox Powdered Precision Cleaner in 100 mL of deionized (18 MΩ-cm) water. This concentration is the recommended concentration for both manual or ultrasonic cleaning.

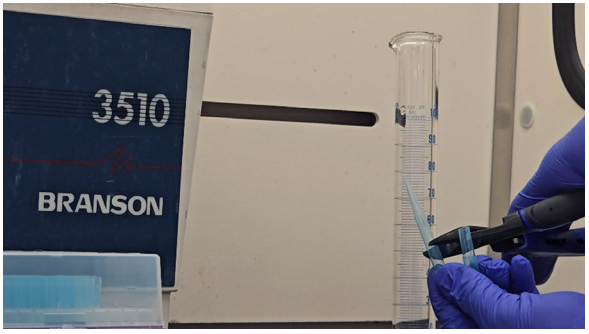
CAUTION

All cleaning and sonication should be done under a fume hood.

3 If you use a glass graduated cylinder, cover the end of the ion transport capillary with a 1-mL pipette tip to protect the metalized plating.



4 Trim the pipette tip to approximately 4 cm so that the capillary can be immersed in the cleaning solution.



5 Place the ion transport capillary upright in a graduated cylinder and fill with Alconox Powdered Precision Cleaner solution.

6 Sonicate the graduated cylinder that contains the ion transport capillary in an ultrasonic cleaner for 10 to 15 minutes. Do not clean longer than 15 minutes.

CAUTION

Sonication should be done under a fume hood.

7 Rinse the capillary and graduated cylinder several times with deionized water.

8 Fill the graduated cylinder with deionized water and sonicate for 10 to 15 minutes.

9 Remove the ion transport capillary from the graduated cylinder and remove the pipette tips (if any were used).

10 Blow out excess water from the ion transport capillary bore with nitrogen.

Installing the capillary

Schedule

After cleaning the capillary or when installing a new capillary.

Equipment List

- Clean powder-free nitrile gloves
- LC/MS-grade isopropanol

Steps

1 Put on clean, powder-free nitrile gloves.

2 Lubricate the capillary entrance end with LC/MS-grade isopropanol.

3 Carefully insert the capillary straight into the desolvation assembly. The capillary must be aligned correctly so that its end fits into a fixed capillary cap inside the desolvation assembly.

CAUTION

Putting vertical and horizontal pressure on the capillary can break it. Spray capillary with isopropanol to lubricate the capillary for easier insertion.

4 When 2 to 3 cm of the capillary remains extended from the desolvation assembly, the capillary rests against the rear contact spring, which slightly restricts further insertion of the capillary. Slightly increase the insertion force to push the capillary through the rear contact spring to fully insert the capillary.

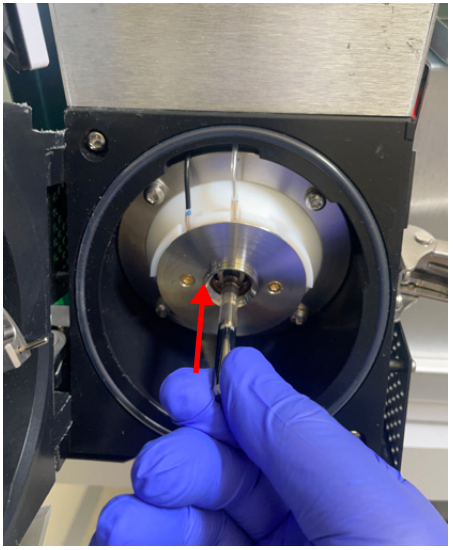
5 Continue to apply pressure until approximately 1 cm remains extended from the desolvation assembly.

CAUTION

Do not twist or turn the capillary cap when you install it or you can damage the metal plating.

6 Lubricate the capillary tip with LC/MS-grade isopropanol.

7 Insert the capillary in the desolvation assembly by hand.



8 Install the capillary cap over the outer end of the capillary

9 Install the spray shield.

10 Close the spray chamber.

Flushing the Calibrant Delivery System

Schedule

When there is suspected contamination of the calibrant delivery system, low tune response, or possible blockage in the calibrant delivery system, flushing the calibrant system may be required.

WARNING **This procedure risks exposure to hazardous, toxic, or flammable solvents and reagents. Wear appropriate Personal Protective Equipment as described in the material handling and safety data sheet supplied by the chemical vendor, and always follow good laboratory practice.**

Equipment List

- Clean, powder-free gloves
- Ultrapure LC/MS Grade Acetonitrile
- Ultrapure LC/MS Grade Water
- Tuning solution

Steps

1 Stop the LCcalibrant flow to the MS.

2 Disconnect sample tubing from the top of the nebulizer and place into a clean beaker or waste bottle.

3 Remove the calibrant bottle and discard any old tune solution.

4 Rinse the calibrant bottle with LC/MS grade acetonitrile and then LC/MS grade water.

NOTE In the case of a highly contaminated bottle, the bottle can be cleaned with Alconox and hot water (60 to 70 °C), then rinsed as per step 4.

5 Flush the CDS with 50/50 (v/v) LC/MS grade acetonitrile and LC/MS grade water:

   a Fill the rinsed CDS bottle with approximately 20 to 30 mL of the acetonitrile/water mixture.

   b Install the bottle and turn on the calibrant flow. See **"Changing to a source that uses a different tuning mix"** on page 107.

c Run the calibrant flush for at least 10 min.

6 Reattach the sample tubing to the top of the nebulizer.

7 Repeat step 5 with just LC/MS grade acetonitrile and flush for at least 10 min.

NOTE

To confirm cleaning procedures, monitor the MS spectrum and watch the contamination decrease over time.

8 Discard any remaining solvent and add fresh tune solution to the bottle.

9 Flush the fresh tune solution through the CDS for 5 min. Monitor tune ions to ensure that response is adequate.

Video Support

Replacing the electron multiplier horn

https://aglt.co/D0115669

Schedule

When sensitivity is poor and autotune consistently sets the detector gain to its maximum value.

Equipment List

- Clean, powder-free nitrile gloves
- Long-nose pliers
- Electron multiplier horn

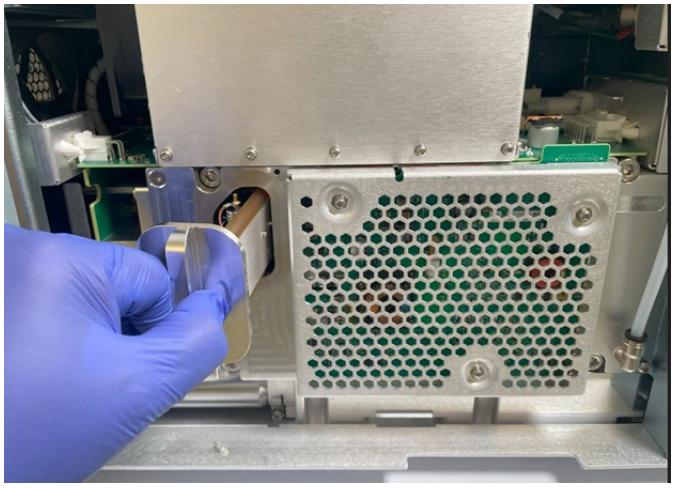
CAUTION

Take care when you perform this procedure. Damages that you cause during maintenance are not covered under warranty. If you need assistance, contact Agilent support.

Steps

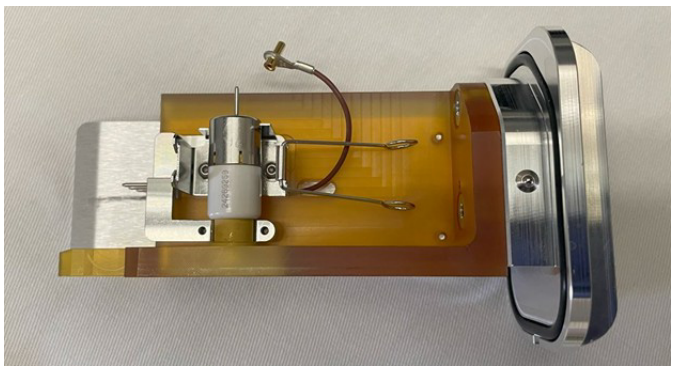
1 Remove the left side cover.

2 Remove the detector horn carrier.

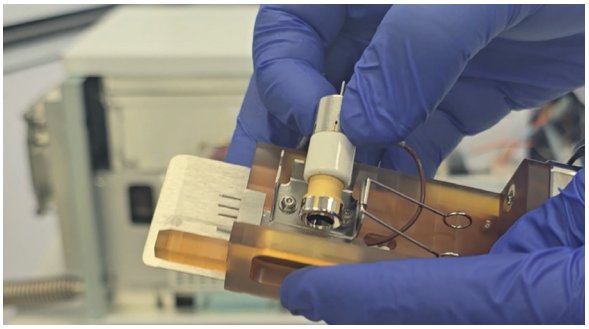


3 Disconnect the signal wire from the electron multiplier horn.

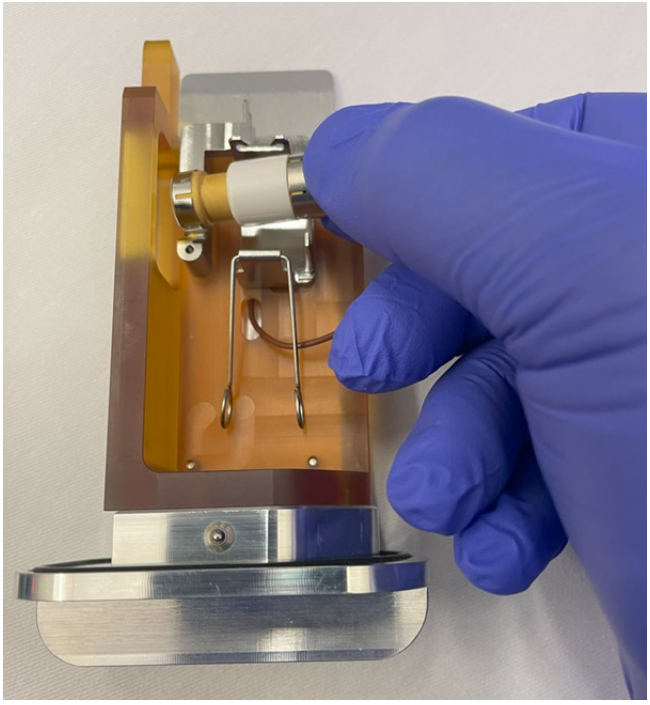
4 Open the retaining clip.



5 Remove the electron multiplier horn.



6 Install the new electron multiplier horn.



7 Close the retaining clip.

8 Connect the signal wire to the pin on the electron multiplier horn.

9 Install the detector horn carrier.

10 Install the left side cover.

Replacing the valve rotor seal

Schedule

After 10,000 diverter valve switches.

Equipment List

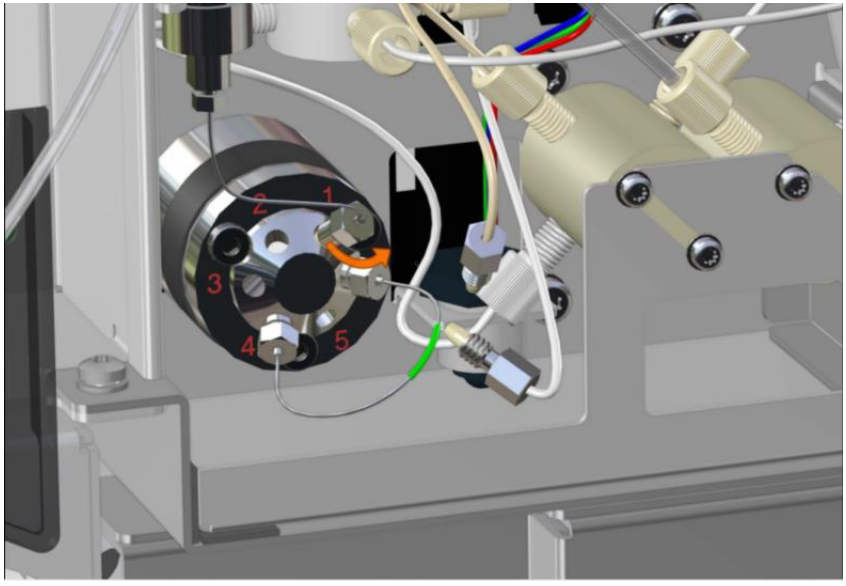
- 9/64-inch hex key
- MS selection valve rotor seal (0101-1409)

Steps

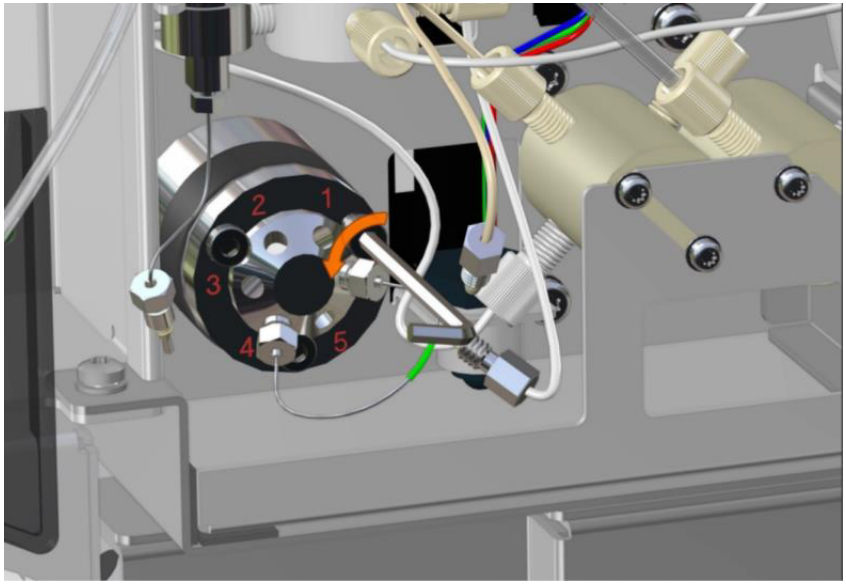
1 Stop the flow of LC solvent to the instrument via the acquisition software.

2 Open the CDS door.

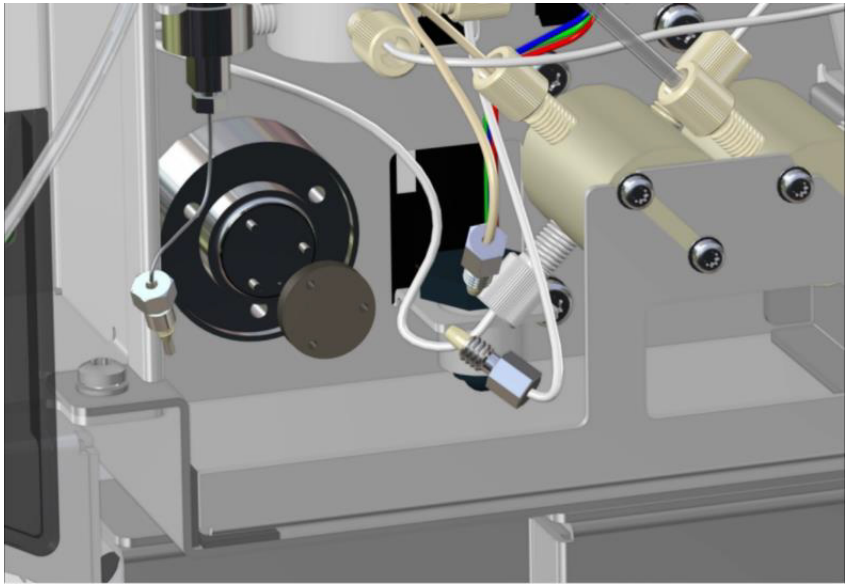
3 Make a note of which port is plumbed to which tubing and unplug all the connections of the MS selection valve.



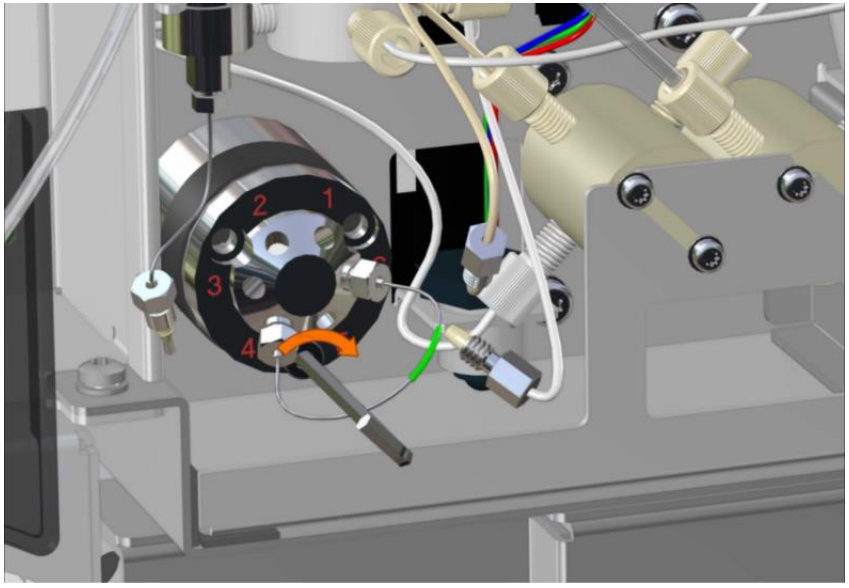
4 Use the 9/64-inch hex key to remove the three hex head screws from the stator face of the selection valve.



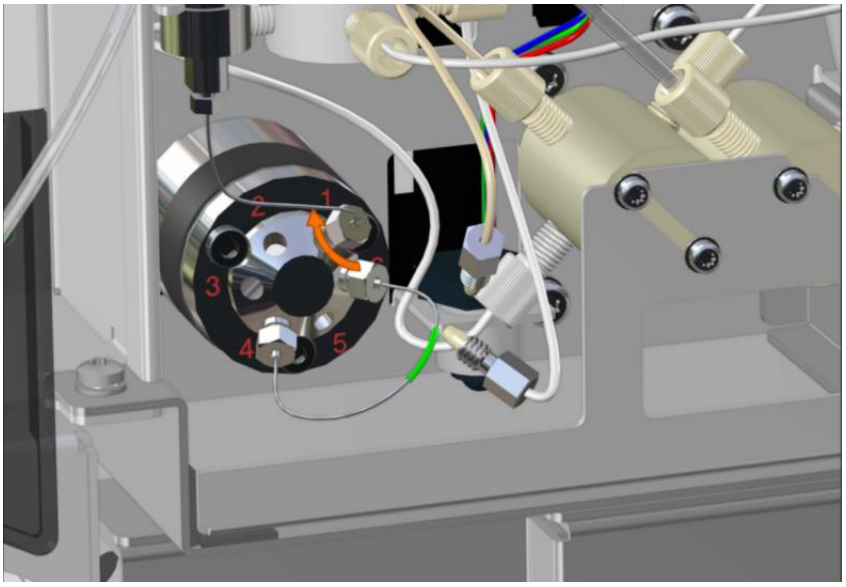
5 Remove the rotor seal and replace it with a new one. Be sure to install it in the proper orientation.



6 Use the 9/64-inch hex key to fix the three hex head screws from the stator face of the selection valve.



7 Plug in all the connections of the MS selection valve.



8 Close the CDS door.

Cleaning the corona needle

Schedule

When you observe decreased sensitivity, decreased signal stability and increased corona voltage during APCI operation.

Equipment List

- Clean, powder-free nitrile gloves
- Clean lint-free cloth
- LC/MS-grade isopropanol
- 4000 grid abrasive paper

Steps

1 Before beginning any steps in this maintenance procedure, put on clean, powder-free nitrile gloves.

WARNING **The needle and related parts can be very hot. Do not touch the needle or related parts until they are cool.**

2 Pull the corona needle assembly out of the spray chamber.

CAUTION **Do not bend or blunt the tip of the needle, it will decrease system performance. Sharpening the needle is not needed.**

3 Fold a piece of 4000 grit abrasive paper over the base of the needle.

4 Pull and twist the 4000 grit abrasive paper along the needle and off the tip of the needle.

CAUTION **Do not hit tip of the corona needle. The tip can bend, which can decrease system performance.**

5 Starting at the base of the needle, wipe the needle with a clean lint-free cloth. The cloth can be dry or dampened with LC/MS-grade isopropanol.

6 Reinstall the corona needle assembly in the spray chamber.

Replacing the corona needle

Schedule

Perform this procedure when symptoms indicate poor corona needle performance and cleaning the needle does not restore performance.

Equipment List

- Clean, powder-free nitrile gloves
- Corona needle (G1947-20029)

Steps

1 Before beginning any steps in this maintenance procedure, put on clean, powder-free nitrile gloves.

2 Pull the corona needle assembly out of the spray chamber.

3 Remove the needle collar from the corona needle shaft.

4 Remove the old corona needle from the collar.

5 Install a new corona needle, with its integral ferrule, in the collar.

6 Turn the collar onto the needle holder and tighten it by hand.

CAUTION

Do not hit tip of the corona needle. The tip can bend, which can decrease system performance.

7 Reinstall the corona needle assembly in the spray chamber.

Disinfection

Schedule

To prevent the spread of respiratory illness, disinfect your instrument as needed.

Equipment List

- Clean, powder-free nitrile gloves
- Clean lint-free cloth
- Gown
- Isopropanol
- Mask

Steps

1. Put on personal protective gear (gloves, mask, gown).
2. Make sure your instrument is cooled to room temperature.
3. Dampen a clean lint-free cloth with the 70:30 isopropyl alcohol:water mix.
4. Gently wipe external surfaces to be cleaned using moistened cloth. Do not allow any liquid to drip into the instrument.
5. Wipe the outer surface of cables and their connectors but do not touch the electrical connections (for example pins and plugs inside the cable or connection port).
6. Use one cloth per instrument to prevent cross contamination.
7. Dispose of the cloth appropriately.
8. Allow all surfaces to completely air-dry. No moisture should be present on the instrument surfaces.
9. Discard the gloves and other personal protective equipment or clean them in an approved process, then wash your hands.

Source Maintenance

Changing to a source that uses a different tuning mix

Schedule

Every time you change a source that uses a different tuning mix.

Equipment List

None

Steps

1. Prepare and install the calibrant for the new ion source.
   a. Rinse a clean calibrant bottle with LC/MS-grade acetonitrile.
   b. Pour the appropriate calibrant into the calibrant bottle for your source. See **Table 2**, "Tuning mixes," on page 24.
   c. Install the calibrant bottle into the calibrant delivery system.
2. Right-click the SQ device pane and select **Calibrant**.
3. Run the calibrant for 5 minutes.
4. Perform a checktune. See **"Calibrating the LC/SQ (Checktune)"** on page 26.
5. If the checktune results are not acceptable, run autotune on a supported tuning source. See **"Calibrating the LC/SQ (Autotune)"** on page 27.
6. When the instrument is ready, load or create the method to use with the source.
7. Change the method settings for the new source.

Installing and removing sources

Schedule

Every time you change a source that uses a different tuning mix.

Before you begin:

- Do a complete autotune (see **"Calibrating the LC/SQ (Autotune)"** on page 27). If an autotune is not available, do a checktune (see **"Calibrating the LC/SQ (Checktune)"** on page 26).
- If the tune report does not show good results, tune the instrument. If needed, change the source to one that supports autotune.
- Put the system in Standby mode.

NOTE

In OpenLab CDS Acquisition, turn down the gas temperature as low as possible. Leave the gas flow on for 30 minutes to cool the source.

Once complete, proceed to the desired source removal and installation instructions.

Electrospray Ionization (ESI) source

Removing

1 Disconnect the nebulizer sample line.
2 Disconnect the sample nebulizer gas tubing.
3 Open the latch of spray chamber.

WARNING **The spray chamber operates at very high temperature. Do not continue until the spray chamber is cool.**

1 Open the spray chamber.
2 Remove the ion source by lifting it along the axis of its hinges.

WARNING **The spray shield can be hot. Be careful not to burn yourself when you remove the spray shield.**

3 If you are changing to a different source type, remove the spray shield

Installing

1 Install the spray shield, making sure the small hole is at the top of the "12 o'clock position". If needed, use a T10 Torx screwdriver to loosen the two screws in the end plate.
2 Rotate the ESI spray shield clockwise until the hole is in the correct position.
3 Gently tighten the Torx screws again.
4 Install the source.
5 Close the source.
6 Connect the sample nebulizer gas tubing.
7 Connect the nebulizer sample line.
8 Perform the procedure in **"Changing to a source that uses a different tuning mix"** on page 107, if needed.

Agilent Jet Stream (AJS) source

Removing

1 Disconnect the nebulizer sample line and sample nebulizer gas tubing.
2 Disconnect the heating cable.
3 Disconnect the sheath gas line at the connector and unplug it.
4 Disconnect the AJS HV cable delivering AJS nozzle voltage.
5 Open the latch of the spray chamber.

WARNING **The spray chamber operates at very high temperature. Do not continue until the spray chamber is cool.**

6 Open the spray chamber.
7 Remove the ion source by lifting it along the axis of its hinges.

WARNING **The spray shield can be hot. Be careful not to burn yourself when you remove the spray shield.**

8 If you are changing to a different source type, remove the spray shield

Installing

1 Install the spray shield. If needed, use a T10 Torx screwdriver to loosen the two screws in the end plate.
2 Rotate the ESI spray shield clockwise until the hole is in the correct position.
3 Gently tighten the Torx screws again.
4 Install the spray chamber.
5 Close the spray chamber.
6 Close the spray chamber latch.
7 Connect the sheath gas line.
8 Connect the heater cable.
9 Connect the nebulizer sample line.
10 Perform the procedure in **"Changing to a source that uses a different tuning mix"** on page 107, if needed.

Atmospheric Pressure Chemical Ionization (APCI) source

Removing

1 Disconnect the nebulizer sample line.
2 Disconnect the sample nebulizer gas tubing.
3 Disconnect the heater cable.
4 Disconnect the corona needle voltage cable.
5 Open the latch of spray chamber.

WARNING

The spray chamber operates at very high temperature. Do not continue until the spray chamber is cool.

6 Open the spray chamber.
7 Remove the ion source by lifting it along the axis of its hinges.

WARNING

The spray shield can be hot. Be careful not to burn yourself when you remove the spray shield.

8 If you are changing to a different source type, remove the spray shield.

Installing

1 Install the spray shield, making sure the small hole is at the top of the "12 o'clock position". If needed, use a T10 Torx screwdriver to loosen the two screws in the end plate.
2 Rotate the ESI spray shield clockwise until the hole is in the correct position.
3 Gently tighten the Torx screws again.
4 Install the ion source, sliding it along the axis of its hinges.
5 Close the spray chamber.
6 Close the spray chamber latch.
7 Connect the heater cable.
8 Connect the corona needle voltage cable.
9 Connect the sample nebulizer gas tubing.
10 Connect the nebulizer sample line.
11 Perform the procedure in **"Changing to a source that uses a different tuning mix"** on page 107, if needed.

Multimode Ionization (MMI) source

Removing

1 Disconnect the nebulizer sample line.
2 Disconnect the sample nebulizer gas tubing.
3 Disconnect the heater cable.
4 Disconnect the charging electrode cable.
5 Disconnect the corona needle voltage cable.
6 Open the latch of spray chamber.

WARNING **The spray chamber operates at very high temperature. Do not continue until the spray chamber is cool.**

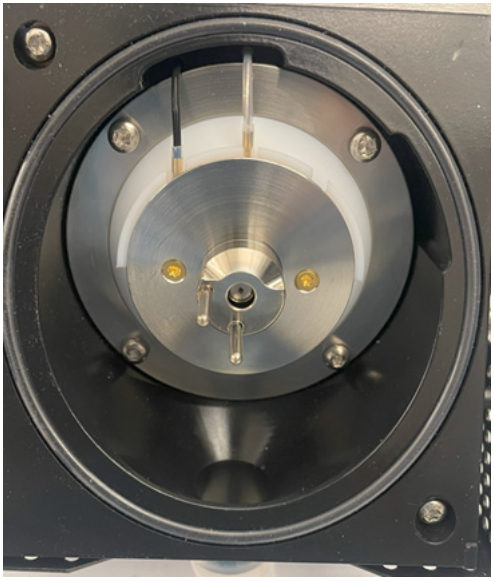
7 Open the spray chamber.
8 Remove the ion source by lifting it along the axis of its hinges.

WARNING **The spray shield can be hot. Be careful not to burn yourself when you remove the spray shield.**

9 If you are changing to a different source type, remove the spray shield.

Installing

1 Install the spray shield, making sure the dowels are at the 6 and 9 o'clock positions. If needed, use a T10 Torx screwdriver to loosen the two screws in the end plate.



2 Rotate the ESI spray shield clockwise until the hole is in the correct position.

3 Gently tighten the Torx screws again.

4 Install the spray chamber.

5 Close the spray chamber.

6 Close the spray chamber latch.

7 Connect the corona needle voltage cable.

8 Connect the charging electrode cable.

9 Connect the heater cable.

10 Connect the sample nebulizer gas tubing.

11 Connect the nebulizer sample line.

12 Perform the procedure in **"Changing to a source that uses a different tuning mix"** on page 107, if needed.

Edwards nXR40i Dry Pump

For information on maintaining the Edwards nXR40i - Dry Multistage Roots Pump, go to **https://us.my.edwardsvacuum.com** and search for your pump model.

5 Compliance

Sustainability Information

Packaging End-of-Life

The Agilent Single Quadrupole LC/MS system is packaged using cardboard, polyethylene foam, a polyethylene bag, and a wood pallet. In the US, cardboard is readily recyclable, and while plastic bags are recyclable, the infrastructure is not available in the majority of the market. In the US, Agilent is enrolled in the How2Recycle program (**https://how2recycle.info/**) to facilitate the communication of material recycling instructions. In select countries, Agilent participates in the EU/UK Green DOT Package Recycling Program to support the take-back and responsible management of the packaging materials at their end-of-life. In the remaining EU countries, the cardboard is readily recyclable and the plastic bag, foam and wood pallet are recycled, landfilled, or incinerated depending on the country and its available infrastructure.

Product End-of-Life

Agilent offers a take-back program for its Single Quadrupole LC/MS system customers in US, EU, and UK markets. Refer to **https://www.agilent.com/environment/product/index.shtml** for more information.

Agilent Regulatory Compliance Statement

CE Compliance

Your Agilent instrument has been designed to comply with the requirements of the applicable directives of the European Union, such as Electromagnetic Compatibility (EMC) Directive, Low Voltage Directive (LVD), Machinery Directive (MD), RoHS Directive, etc.

Agilent has confirmed that each product complies with the relevant Directives by testing samples against the harmonized EN (European Norm) standards published on the Official Journal of the European Union (OJEU).

Proof that a product complies with these directives is indicated by:

- the CE Marking appearing on the rear of the product, and
- the documentation package that accompanies the product containing a copy of the Declaration of Conformity. The Declaration of Conformity is the legal declaration by Agilent that the product complies with the relevant directives listed above, and shows the EN standards to which the product was tested to demonstrate compliance.

UK Compliance

Your Agilent instrument has been designed to comply with the requirements of the applicable regulations of the United Kingdom, such as The Electromagnetic Compatibility Regulations 2016, The Electrical Equipment (Safety) Regulations 2016, The Supply of Machinery (Safety) Regulations 2008, The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, etc.

Agilent has confirmed that each product complies with the relevant Regulations by testing samples against the designated standards published on GOV.UK.

Proof that a product complies with these regulations is indicated by:

- the UKCA Marking appearing on the rear of the product, and
- the documentation package that accompanies the product containing a copy of the Declaration of Conformity. The Declaration of Conformity is the legal declaration by Agilent that the product complies with the relevant regulations listed above, and shows the designated standards to which the product was tested to demonstrate compliance.

Electromagnetic Compatibility

This product conforms to the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI):

- CISPR 11/EN 55011: Group 1, Class A
- EC/EN 61326-1
- AUS/NZ 
- Canada ICES-001 (This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada).

Group 1 ISM equipment Group 1 contains all Industrial, Scientific, and Medical (ISM) equipment in which there is intentionally generated and/or used conductively coupled radio- frequency energy which is necessary for the internal functioning of the equipment itself.

Class A equipment This equipment 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.

This device complies with the requirements of CISPR11, Group 1, Class A as radiation professional equipment. Therefore, there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

1. Relocate the radio or antenna.
2. Move the device away from the radio or television.
3. Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
4. Make sure that all peripheral devices are also certified.
5. Make sure that appropriate cables are used to connect the device to peripheral equipment.
6. Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.

Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

EMC Declaration for South Korea

사용자안내문

This equipment has been evaluated for its suitability for use in a commercial environment. When used in a domestic environment, there is a risk of radio interference.

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환
경에서 사용하는 경우 전파간섭의 우려가 있습니다 .

※ 사용자 안내문은 " 업무용 방송통신기자재 " 에만 적용한다 .

Detachable Power Cord Declaration for Japan

電源コードセットの取扱いについて （日本国内向け）

製品には、同梱された電源コードセットをお使いください。同梱された電源コードセット
は、他の製品では使用できません。

Notice - The power cords for Japanese market

Your product must only use the power cord that was shipped with this product. Do not use this power cord with any other product.

Sound Emission Certification for Federal Republic of Germany

Sound pressure

Sound pressure Lp < 70 dB(A) according to DIN EN ISO 7779.

Schalldruckpegel

Schalldruckpegel LP < 70 dB(A) nach DIN EN ISO 7779.

Waste Electrical and Electronic Equipment (WEEE) Directive

This product complies with the European WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.

NOTE

Do not dispose of in domestic household waste.

To return unwanted products, contact your local Agilent office or refer to **https://www.agilent.com/environment/product/index.shtml** for more information.

www.agilent.com

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