6100 Series Single Quadrupole LC/MS –
Preventive Maintenance Checklist
Standard

Agilent Technologies

Agilent Preventive Maintenance provides factory recommended service for your analytical systems to assure reliable operation and the accuracy of your results. Delivered by highly-trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak.

For more information about Agilent Technologies services please visit our web site using the following URL http://www.chem.agilent.com/en-us/products/services/pages/default.aspx

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of additional or special procedures and/or parts for the instrument service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Service Engineer's Responsibilities

Only complete/printout pages that relate to the system or module being serviced.
Complete empty fields with the relevant information
Complete the relevant checkboxes in the checklist using a "X" or tick mark "✓" in the checkbox.
Complete Not Applicable check boxes to indicate services not delivered, as needed
Complete the PM service in the order of the tasks listed.
Complete the Service Review section together with the customer

Additional Instruction Notes

Two PM's per year are recommended; the Standard PM service will be performed annually with an Interim PM performed 6 months after the Standard PM.

This checklist documents the Standard PM service for the Agilent 6100 Series Single Quad LC/MS instruments.

System Information

Instrument System Name/I.D:	Instrument Location:
Record the list of system component product numbers below.	**List the serial numbers of the components present in the system below.**
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Guidance:

- ❑ Check box if instrument configuration report is attached instead of completing the table above.

Preparation

- ❑ Discuss any specific issues with the customer prior to starting.
- ❑ Review the instrument logbook.
- ❑ Save instrument control settings before starting the procedure.
- ❑ Perform general inspection of system for cleanliness
- ❑ Check for proper installation of safety-related parts, assemblies , sensors etc
- ❑ Check for required firmware updates and verify with customers if they would like it installed.
- ❑ Perform a dual polarity Autotune. If the Autotune does not complete successfully, do not proceed with the Preventative Maintenance before discussing the system with the customer.
- ❑ Record current vacuum readings:

  Rough Vacuum: _____

  High Vacuum: _____

General System Tasks

- ❑ **Section NOT Applicable**

- ❑ Vent the instrument and turn the front power switch off
- ❑ Perform general system inspection:
  Inspect vacuum hoses, pump exhaust tubing and power cords for excessive wear
  Look for any obvious external damage or problems.
  Note any obvious external damager or problems in the Service Engineer Comments section
- ❑ Verify system line voltage meets instrument specifications:
  Measured voltage (VAC): _____

Foreline Pump Service

- ❑ **Section NOT Applicable**

- ❑ Drain and replace foreline pump oil:
  6100A w/E1M18 – p/n 6050-0834 (Inland 45 Oil)
  6100B w/MS40+ – p/n 6040-1361 (SW60 Oil)
- ❑ E1M18 only: Tighten the four 6 mm bolts on the rough pump that hold the oil box on the pump
- ❑ Replace the Oil Mist Filter/Cartridge element:
  6100A w/E1M18 – p/n 1535-4970
  6100B w/MS40+ – p/n G1960-80039

LC/MS Instrument Service

- ❑ **Section NOT Applicable**

- ❑ Replace the nitrogen gas filter(s) based on the 6100 model:
  - 6100B Series
    - 1 x RMSN-4 – Non-AJS equipped
    - 2 x RMSN-4 plumbed in parallel – AJS equipped
  - 6100A Series
    - 1 x RMSN-4 – all models
    - or
    - 1 x BHT-4 – G6110A, G6120A
    - 1 x BHT-4 & 1 x BMT-4 plumbed in series – G6130A, G6140A
- ❑ Replace inlet filter assembly 5 µm frit, p/n 0100-2051
- ❑ Replace the rotor seal on the MS Selection Valve, p/n 0100-1855
  - Note: G6110A does not include the MS Selection Valve by default (available only as an option)
- ❑ Remove the desolvation assembly and then remove the capillary from the desolvation assembly
- ❑ Inspect the platinum plated ends of the capillary. Note any physical damage or wear in the Service Engineer Comments section
- ❑ Clean the capillary following the documented procedure using Alconox in solution
- ❑ Remove the ion optics assembly from the vacuum manifold. Disassemble and clean the ion optics assembly following the documented ion optics cleaning procedure
- ❑ Remove the spray shield, end plate, and capillary cap from the desolvation assembly and clean all
- ❑ Replace the 4 canted coil springs, p/n 1460-2571, in the end (exit) capillary cap, rear of the desolvation assembly, front of the desolvation assembly, and front (entrance) capillary cap
- ❑ Reinstall the spray shield, end plate, capillary and capillary cap
- ❑ Reinstall the ion optics and desolvation assembly
- ❑ Inspect the quad driver fan filter condition and replace
- ❑ Pump the system down

G1948B API-Electrospray Source

Perform source maintenance on currently installed source only

- ❑ **Section NOT Applicable**

- ❑ Perform general inspection of the API-Electrospray source:
  - Inspect Vented Standoffs for chemical deposits or physical damage
  - Inspect nebulizer and needle for physical damage (dents or corrosion)
  - Note any obvious external damage or problems in the Service Engineer Comments section
- ❑ Remove the mesh assembly and clean it with an abrasive cloth, followed by wiping with a lint-free cloth and methanol. Clean the standoffs with a lint-free cloth and methanol
- ❑ Clean all other interior surfaces of the spray chamber, including the window, with a lint-free cloth and methanol
- ❑ Reinstall the mesh assembly
- ❑ Replace and properly adjust the nebulizer needle, p/n G1946-60136 or G1958-60136
- ❑ Install the spray chamber on the LC/MS

G1947B Atmospheric Pressure Chemical Ionization (APCI) Source

Perform source maintenance on currently installed source only

- ❑ **Section NOT Applicable**

- ❑ Perform general inspection of the APCI source:
  - Inspect corona needle holder for oxidation or physical damage
  - Inspect needle receptacle for oxidation or physical damage
  - Inspect nebulizer and needle for physical damage (dents or corrosion)
  - Note any obvious external damage or problems in the Service Engineer Comments section
- ❑ Using the abrasive cloth, abrasively clean the bottom of the vaporizer heater can, and then wipe with a lint-free cloth and methanol
- ❑ Clean all other interior surfaces of the spray chamber, including the window, with a lint-free cloth and methanol
- ❑ Replace the APCI corona needle, p/n G1947-20029
- ❑ Replace and properly adjust the nebulizer needle, p/n G1946-60190
- ❑ Install the spray chamber on the LC/MS

G1971B Atmospheric Pressure Photo Ionization (APPI) Source

Perform source maintenance on currently installed source only

- ❑ **Section NOT Applicable**

- ❑ Perform general inspection of the APPI source:
  Inspect nebulizer and needle for physical damage (dents or corrosion)
  Note any obvious external damage or problems in the Service Engineer Comments section.
- ❑ Allow the source to cool completely
- ❑ Using the abrasive cloth, abrasively clean the bottom of the vaporizer heater can, and then wipe with a lint-free cloth and methanol
- ❑ Clean all other interior surfaces of the spray chamber with a lint-free cloth and methanol
- ❑ Clean the lamp window with a lint-free cloth and methanol
- ❑ Replace and properly adjust the nebulizer needle, p/n G1946-60190
- ❑ Install the spray chamber on the LC/MS
- ❑ Check that the lamp lights
  Note: Replacement of the APPI lamp is not covered during the PM procedure

G1978B MultiMode (MM) Source

Perform source maintenance on currently installed source only

- ❑ **Section NOT Applicable**

- ❑ Perform general inspection of the MM source:
  - Inspect corona needle holder for oxidation or physical damage
  - Inspect needle receptacle for oxidation or physical damage
  - Inspect nebulizer and needle for physical damage (dents or corrosion)
  - Note any obvious external damage or problems in the Service Engineer Comments section
- ❑ Clean all other interior surfaces of the spray chamber with a lint-free cloth and methanol
- ❑ Replace the corona needle, p/n G1947-20029
- ❑ Replace and properly adjust the nebulizer needle, p/n G1946-60136 or G1958-60136
- ❑ Install the spray chamber on the LC/MS

Agilent Jet Stream Technology

Perform source maintenance on currently installed source only

- ❑ **Section NOT Applicable**

- ❑ Perform general inspection of the API-Electrospray with Agilent Jet Stream Technology:
  Inspect nebulizer and needle for physical damage (dents or corrosion)
  Note any obvious external damage or problems in the Service Engineer Comments section
- ❑ Remove the mesh assembly and clean it with an abrasive cloth, followed by wiping with a lint-free cloth and methanol. Clean the standoffs with a lint-free cloth and methanol
- ❑ Clean all other interior surfaces of the spray chamber with a lint-free cloth and methanol
- ❑ Reinstall the mesh assembly
- ❑ Replace and properly adjust the nebulizer needle, p/n G1958-60136
- ❑ Install the spray chamber on the LC/MS

Restore Instrument

- ❑ Verify that the system is pumped down
- ❑ Record current vacuum readings:
  Rough Vacuum: _____
  High Vacuum: _____
- ❑ Verify that all temperature, pressures, and gas flows reach tune file set points
- ❑ Check manually that there are tune peaks in positive and negative mode
- ❑ Generate tune reports in positive and negative mode

Guidance:

The purpose of generating tune reports after preventive maintenance is to verify that the system is functional in positive and negative modes. Autotune should NOT be performed at this time.

- ❑ An Autotune should be run by the customer after the system has been allowed to thermally equilibrate for at least 11 hours following a system vent. During this time, it is not unusual for the instrument to exhibit mass assignment shifts, poor peak shapes and/or poor resolution.

Guidance:

If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Service Review

- ❑ Attach available reports/printouts of all tests to this documentation.
- ❑ Record the PM service activity in the customer's instrument records/logbook
- ❑ Update/reset instrument maintenance counters as appropriate
- ❑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ❑ Complete the Service Review Comments section below if there are additional comments
- ❑ Review the service and any test results with the customer.
- ❑ If the Instrument firmware was updated, record the details of the change in the Service Engineer's Comments box below or if necessary, in the customer's IQ records.

6100 Single Quad LC/MS Test Results Table:

Test Description	Expected Test Result	Actual Test Result
Manual Tune Peaks – Positive Ionization Mode	Peaks Present	
Manual Tune Peaks – Negative Ionization Mode	Peaks Present	

6100 Single Quad LC/MS Parts List Table:

☐ **Section NOT Applicable**

Part Description	Part Number	Product/Model # where used	Quantity Consumed
SW60 Oil	6040-1361	6100B – Varian MS40+ equipped	
Cartridge Filter Element	G1960-80039	6100B – Varian MS40+ equipped	
LC/MS PM Kit – contains all parts marked with *	5190-1443	6100A	
*Inland 45 Oil	6040-0834	6100A – Edwards E1M18 equipped	
*Oil Mist Filter Element	1535-4970	6100A – Edwards E1M18 equipped	
*Nitrogen Gas Filter (hydrocarbon)	BHT-4	6100A/B	
*Inlet Filter, 5 µm frit, qty 5	0100-2051	6100A/B	
*Canted coil spring qty 4	1460-2571	6100A/B	
*Rotor seal, Vespel ®	0100-1855	6100A/B	
Quad Driver Fan Filter	3160-4235	6100 A/B	
Additional BHT-4	BHT-4	G6150B with AJS	
Nitrogen Gas Filter (moisture) (2 required for AJS systems)	BMT-4	G6130A/B, G6140A. G6150B	
Nebulizer Needle Kit, ES	G1946-60136	G1948B, G1978B	
Nebulizer Needle Kit, APCI	G1946-60190	G1947B, G1971B	
Nebulizer Needle Kit, new ES	G1958-60136	Agilent Jet Stream	
Corona Needle, APCI	G1947-20029	G1947B, G1978B	
The following required parts are supplied with the instrument in the shipping kit:			
Abrasive cloth, 4000 grit	8660-0827	6100 Series	N/A
Lint-free cloth, 1 pack	05980-60051	6100 Series	N/A
Cotton swabs, 1 pack	5080-5400	6100 Series	N/A
Alconox	5190-1401	6100 Series	N/A

Service Engineer Comments (optional):

If there are any specific points you wish to note as part of delivering the PM service including any follow-up activities, specific observations made or other items of interest for the customer, please write in this box.

Service Completion

Service Request number..... Date service completed.....

Agilent Signature..... Customer Signature.....

Total no. of pages for this document: .....