

Agilent Purification System – Preventive Maintenance Checklist – Standard

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.
- Service engineer should contact the customer and discuss the system configuration and identify the specific kits needed for this service, based on the modules that are to be serviced.
- 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

- After replacement, run the Service Test for any module undergoing replacements of major components, which is described here.
- Ensure that a 5mL restrictor tube is connected in place of a column, and that solvent line A is placed in 100% LC grade water, before running a System Test.
- Check that the mobile phase and needle wash solvents previously used by the customer are compatible with the solvents used for the System Test. If the customer has been using normal phase solvents like hexane or dichloromethane, the system will have to be flushed out with an intermediate solvent like isopropanol (2-propanol). Similarly, an intermediate flush with isopropanol must be employed if the customer has been using GPC solvents such as tetrahydrofuran (THF) stabilised with butylated hydroxytoluene (BHT), chloroform or toluene.
- The System Test is run by performing 5 injections of a consistent volume of Caffeine standard (10µL for the Standard systems and 500µL for the Large Volume systems). The area is measured for each peak on the UV detector at 275nm. The Relative Standard Deviation of the area of the 5 peaks is used

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to determine the Injection Reproducibility. All systems must meet a reproducibility of $\pm 0.5\%$ RSD.

Eluent: HPLC grade water
 Sample: Caffeine Standard
 Injection volume: 10 μ L or 500 μ L (partial loopfill)
 Detector: UV 275 nm (noise 9×10^{-5} AU, Linearity 0-1.3AU)
 Pump: flowrate 2 mL/min

Method:

- Make an auto sampler method consisting:
 - a. Flush volume: minimal 2 x tubing volume
 - b. Partial loopfill: 10 μ L or 500 μ L, depending on the model
 - c. Number of injections per vial: 5
 - d. Headspace pressure On (except in case of open vials)
 - e. Syringe speed normal
 - f. Air segment On
 - g. Wash OFF
- Set pump flow to 2ml/min
- Insert sample vial 1 with Caffeine Standard
- Run the programmed method for vial #1
- Determine and record the results in the Checklist

$$\overline{Peak\ area} = \frac{\sum Peak\ area}{n}$$

$$\sigma_{n-1} = \sqrt{\frac{\sum (Peak\ area - \overline{Peak\ area})^2}{n-1}}$$

$$RSD\% = \frac{\sigma_{n-1}}{\overline{Peak\ area}} \times 100\%$$

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System Information

Guidance

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument system name and ID	
Instrument system site and location	
List system components	List the serial numbers of each component
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

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.

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Initial Check with System Test

- ☐ If the customer has indicated problems with the instrument, conduct a System Test, and make sure that it passes. Indicate this in the comments.
 - ☐ Print the results and attach to this checklist.

Maintenance to Agilent 210 or 218 Solvent Delivery Modules(s)

- ☐ **Section NOT Applicable**
- ☐ Check the service log for each of the following parts. If the number is approaching or exceeding the lifetime of the part, replace the part.
 - ☐ Piston seals.
 - ☐ Inlet check valve.
 - ☐ Outlet check valve.
 - ☐ SS mixer filter, and replace the magnetic stirrer if it looks damaged (if installed).
 - ☐ Solvent filters (if installed).
- ☐ Check battery voltage.
- ☐ Check the flow rate.
- ☐ Reset maintenance logs.

Maintenance to SD-1 Solvent Delivery Module(s)

- ☐ **Section NOT Applicable**
- ☐ Check the maintenance log for each of the following parts. If the number is approaching or exceeding the lifetime of the part, replace the part.
 - ☐ Piston seal for each pump head.
 - ☐ Inlet check valve for each pump head.
 - ☐ Outlet check valve for each pump head.
 - ☐ Solvent filters (if installed).
- ☐ Check battery voltage.
- ☐ Check the flow rate.
- ☐ Reset maintenance logs.

Maintenance to the Agilent 410 Auto Sampler

- ☐ **Section NOT Applicable**
- ☐ Check the number of strokes or the number of movements for each of the following parts. If the number is approaching or exceeding the lifetime of the part, replace the part.
 - ☐ Syringe valve.
 - ☐ Injection valve rotor.
 - ☐ Buffer tubing.

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- ☐ Check the needle dept and adjust if necessary.
- ☐ Check the needle penetration point and adjust if necessary.

Maintenance to the Manual Injector Module

- ☐ **Section NOT Applicable**
- ☐ Check the number of switches for each of the following parts. If the number is approaching or exceeding the lifetime of the part, replace the part.
 - ☐ Injection valve rotor.

Maintenance to the Agilent 325 UV/vis Dual Wavelength Detector

- ☐ **Section NOT Applicable**
- ☐ Check the number of ignitions and running hours for each of the following parts. If the number is approaching or exceeding the lifetime of the part, replace the part.
 - ☐ The D2 (UV) lamp. If you replace the lamp, run a lamp calibration.
 - ☐ The Quartz Halogen (Vis) lamp. If you replace the lamp, run a lamp calibration.
- ☐ Run a wave scan test and check to make sure that the lamp counts for the D2 lamp at maxima are above 6000 counts. Replace the D2 lamp, and/or the flow cell, if the number is less and run the test again. If still less than the minimum, contact the factory for advice on the repair options available.
- ☐ Clean the flow cell.

Restore Instrument

- ☐ Conduct a System Test, and make sure that it passes.
 - ☐ Print the results and attach to this checklist
- ☐ Restore the instrument to the customer's conditions.

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.

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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 System 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.

Modular LC System Parts List Table

Part Description	Part Number	Model#	Product Number	Lifetime	Quantity Consumed
Piston seal (HDPE) (5ml)*	R007101446	210/218	G9300A,G9301A, G9306A	640 hrs	
Piston seal (HDPE) (10ml)*	R007101447	210/218	G9300A,G9301A, G9306A	640 hrs	
Piston seal (HDPE) (25ml)*	R007101643	210/218	G9300A,G9301A, G9306A	640 hrs	
Piston seal (HDPE) (50ml)*	R007101434	210/218	G9300A,G9301A, G9306A	640 hrs	
Piston seal (HDPE) (100ml)*	R007101774	210/218	G9300A,G9301A, G9306A	640 hrs	
Piston seal (HDPE) (200ml)*	393654101	210/218	G9300A,G9301A, G9306A	640 hrs	
Inlet check valve cartridge (5,10,25ml)*	R007101408	210/218	G9300A,G9301A, G9306A	4000 hrs	
Inlet check valve cartridge (50,100ml)*	R007101416	210/218	G9300A,G9301A, G9306A	4000 hrs	
Inlet check valve cartridge (200ml)	393654801	210/218	G9300A,G9301A, G9306A	4000 hrs	
Outlet check valve cartridge (5,10,25ml)*	R007101409	210/218	G9300A,G9301A, G9306A	4000 hrs	
Outlet check valve cartridge (50,100,200ml)*	R007101417	210/218	G9300A,G9301A, G9306A	4000 hrs	
Inlet solvent filter SS mixer (0.6,1.2mL)*	R007000054	210/218	G9300A,G9301A, G9306A	1920 hrs	
Magnetic stir bar (need 2 of these)	R002500002	210/218	G9300A,G9301A, G9306A	1920 hrs	

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Part Description	Part Number	Model#	Product Number	Lifetime	Quantity Consumed
Mobile phase inlet filter assy 5,10,25mL	R007101604	210/218	G9300A,G9301A, G9306A	1920 hrs	
Mobile phase inlet filter assy 50,100, 200mL	R007101804	210/218	G9300A,G9301A, G9306A	1920 hrs	
Piston seal HDPE 50mL	R007105650	SD-1	G9302A,G9303A	640 hrs	
Piston seal HDPE 200mL	R007105620	SD-1	G9302A,G9303A	640 hrs	
Piston seal HDPE 500mL	393548991	SD-1	G9302A,G9303A	640 hrs	
Piston seal HDPE 800mL	R007105680	SD-1	G9302A,G9303A	640 hrs	
Piston seal HDPE 3200mL	R007105734	SD-1	G9302A,G9303A	640 hrs	
Inlet check valve cartridge 50,200mL	R007105626	SD-1	G9302A,G9303A	4000 hrs	
Inlet check valve cartridge 500,800mL	R007105686	SD-1	G9302A,G9303A	4000 hrs	
Inlet check valve cartridge 3200mL	393518301	SD-1	G9302A,G9303A	4000 hrs	
Outlet check valve cartridge 50,200mL	R007105627	SD-1	G9302A,G9303A	4000 hrs	
Outlet check valve cartridge 500,800mL	R007105687	SD-1	G9302A,G9303A	4000 hrs	
Outlet check valve cartridge 3200mL	393518501	SD-1	G9302A,G9303A	4000 hrs	
Solvent filter 50,200mL	R007105629	SD-1	G9302A,G9303A	12 mth	
Solvent filter 500,800mL	R007105689	SD-1	G9302A,G9303A	12 mth	
Syringe valve	392607908	410	G9331A,G9332A	30,000 moves	
Injection valve rotor STANDARD (Valco)	190017500	410	G9331A,G9332A	10,000 moves	
Injection valve rotor PEEK (Valco)	392607981	410	G9331A,G9332A	10,000 moves	
Injection valve rotor PREP (Valco)	VLC230R6	410	G9331A,G9332A	10,000 moves	
Buffer tubing STANDARD	392607804	410	G9331A,G9332A	12 mth	
Buffer tubing PREP	392607805	410	G9331A,G9332A	12 mth	
D2 (UV) lamp	110715400	325	G9309A	1500 hrs	
Quartz Halogen (Vis) lamp (optional)	5610136500	325	G9309A	1500 hrs	

If pump seals or piston wash seals other than HDPE are needed, they will need to be ordered separate. Consult the manual for the correct part number.

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Calculated RSD%	Limit	Pass/Fail
	≤ 0.5%	

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write in this box.

Other Important Customer Web Links

- ☐ How to get information on your product: Literature Library - <http://www.agilent.com/chem/library>
- ☐ Need to know more? - www.agilent.com/chem/education
- ☐ Need technical support, FAQs? - www.agilent.com/chem/techsupp
- ☐ Need supplies? - www.agilent.com/chem/supplies

Service Completion

Service request number _____ Date service completed _____

Agilent signature _____ Customer signature _____