

## **940 LC 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.
- 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 "Ü" 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**

- Run the appropriate Service test for any module undergoing replacements of major components.
- Ensure that a 5mL restrictor tube is connected in place of a column, that solvent line A is placed in 100% LC grade water and line B is placed in 0.5% v/v Acetone in LC grade water, before running a Full System Test.
- Execute a "Wash Buffer Coil" action in the IMS Autosampler section, to flush out old solvents, before starting any tests.
- Check that the mobile phase and needle wash solvents previously used by the customer are compatible with the solvents used for the IMS Full System Test (water and 0.5%acetone/water). 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.

## System Information

### Guidance

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

<b>Instrument system name and ID</b>	
<b>Instrument system site and location</b>	
<b>List system components (configuration)</b>	<b>List the serial numbers of each component</b>
1. Auto sampler (cooled/standard)	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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- q If the customer has indicated problems with the instrument, conduct a Full System Test in the IMS software, and make sure that it passes. Indicate this in the comments.
  - q Print the results and attach to this checklist.
- q Test the leak sensor on the leak tray.
  - q Enable the leak sensor on the leak tray by checking the "enable" leak sensor box in the system parameters page. The action should be "stop pumps immediately".
  - q Start the Pumps and spill enough water in the area of the leak sensor to see it pour down the drain tube. Ensure that the pumps go off line.
  - q Once finished, dry the sensor with some methanol. Do not dismantle the assembly.

**Maintenance to the Semi-Prep/Prep Flows Modules**

- q Check the counter for each of the following parts. If the number is approaching or exceeding the lifetime of the part, replace the part.
  - q Piston Seal for each pump in the system (A, B, and injector pump).
  - q Inlet check valve for each pump in the system (A, B, and injector).
  - q Outlet check valve for each pump in the system (A, B, and injector).
  - q SS mixer filter 1.2 ml. Also replace the magnetic stirrer if it looks damaged.
  - q Solvent filters.

**Maintenance to the Autosampler Module**

- q **Section NOT Applicable**
- q 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.
  - q Syringe.
  - q Injector port seal and needle N.
  - q Injection valve stator.
  - q Injection valve rotor.
  - q Syringe valve stator.
  - q Syringe valve rotor.

**Maintenance to the Manual Injector Module**

- q **Section NOT Applicable**
- q 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.
  - q Column valve rotor.
  - q Column valve stator.

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- q **Section NOT Applicable**
- q 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.
  - q The D2 (UV) lamp. If you replace the lamp, run a lamp calibration.
  - q The Quartz Halogen (Vis) lamp. If you replace the lamp, run a lamp calibration.
- q Check the number of running hours on the flow cell. If the number is approaching or exceeding the maximum, clean the flow cell. If a visual check indicates contamination, then replace the flow cell.
- q For the UV/Vis detector check the percentage of D2 Lamp intensity loss in the counter page. If the number is above the maximum, replace the lamp.
- q Under the service test tab in IMS run a wave scan test and check to make sure that the lamp counts for the D2 lamp at maxima are above 6000 counts. If the number is less than the minimum, replace the D2 lamp, and/or the flow cell, and run the test again. If the number is still less than the minimum, contact the factory for advice on the repair options available.

**Maintenance to the Refractive Index Detector Module**

- q **Section NOT Applicable**
- q Check the number of running hours on the LED. If the number is approaching or exceeding the lifetime of the part, replace the part.
- q Clean the flow cell. If replacing the flow cell, ensure that both flow cell seals are also replaced.

**Maintenance to the Evaporative Light Scattering Detector Module**

- q **Section NOT Applicable**
- q Check the number of running hours on the LED. If the number is approaching or exceeding the lifetime of the part, replace the part.
- q Check the number of running hours since the last Evaporator Tube cleaning. If the number is approaching or exceeding the maximum, clean the evaporator tube.

**Maintenance to the Scale Up Module**

- q **Section NOT Applicable**
- q 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.
  - q Column valve rotor.
  - q Column valve stator.

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- q Check the number of switches on the solenoid valve. If the number is approaching or exceeding the lifetime of the part, replace the part.

**Restore Instrument**

- q Conduct a System Test in the IMS software, and make sure that it passes.
  - q Print the results and attach to this checklist
- q 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

- q Attach available reports/printouts of all tests to this documentation.
- q Record the PM service activity in the customer's instrument records/logbook
- q Update/reset instrument maintenance counters as appropriate
- q Affix the PM sticker to the system or instrument logbook based on the customer's request.
- q Complete the Service Review Comments section below if there are additional comments
- q Review the Full System Test results with the customer.
- q 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.

### 940 LC System Parts List Table

Part Description	Part Number	Lifetime	Product or Model# where used	Quantity Consumed
Piston Seal (HDPE) (10 ml)	R007101637	640 hrs	940 Pump	
Piston Seal (HDPE) (25 ml)	R007101643	640 hrs	940 Pump	
Piston Seal (HDPE) (100 ml)	R000400124	640 hrs	940 Pump	
Inlet check valve cartridge (10 ml)	R007101408	4,000 hrs	940 Pump	
Inlet check valve cartridge (25 ml)	R007101408	4,000 hrs	940 Pump	
Inlet check valve cartridge (100 ml)	R007101416	4,000 hrs	940 Pump	
Outlet check valve cartridge (10 ml)	R007101409	4,000 hrs	940 Pump	
Outlet check valve cartridge (25 ml)	R007101409	4,000 hrs	940 Pump	
Outlet check valve cartridge (100 ml)	R007101417	4,000 hrs	940 Pump	
Inlet solvent filter SS Mixer (2um, 10 mm)	R007000054	1920 hrs	940 Pump	
Mobile Phase Inlet Filter 1/8 IN. Tubing	AL9402	1920 hrs	940 Pump	
Magnetic stir bar (need 2 of these)	R002500002	1920 hrs	940 Pump	
Syringe	4710003590	20,000 moves	940 Autosampler	
Injector port seal & needle N	9910137800	10,000 moves	940 Autosampler	
Injection valve stator	6910048290	30,000 moves	940 Autosampler	
Injection valve rotor	6910048490	10,000 moves	940 Autosampler	

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Part Description	Part Number	Lifetime	Product or Model# where used	Quantity Consumed
Syringe valve stator	6910047990	60,000 moves	940 Autosampler	
Syringe valve rotor	6910048090	20,000 moves	940 Autosampler	
D2 (UV) lamp	110715400	1,500 hrs	940 PDA/UV-Vis	
Quartz Halogen (Vis) lamp	5610136500	1,500 hrs	940 PDA/UV-Vis	
Flow Cell 9 x 0 (optional)	210181800	1920 hrs	940 PDA/UV-Vis	
Flow Cell 9 x 1 (optional)	210181900	1920 hrs	940 PDA/UV-Vis	
Flow Cell 4 x 0.15 (optional)	210182000	1920 hrs	940 PDA/UV-Vis	
Flow Cell 4 x 0 (optional)	210182100	1920 hrs	940 PDA/UV-Vis	
Flow Cell 4 x 0.25 (optional)	210224200	1920 hrs	940 PDA/UV-Vis	
Rheodyne 7900 Rebuild Kit (with rotor)	9910136100	40,000 moves	940 Manual Injector	
Rheodyne 7900 valve stator	5410058500	120,000 moves	940 Manual Injector	
Rheodyne 7900 Rebuild Kit (with rotor)	9910136100	40,000 moves	940 Scale Up Module	
Rheodyne 7900 valve stator	5410058500	120,000 moves	940 Scale Up Module	
Assy. Loom 3-way Valve (includes solenoid)	110824700	100,000 moves	940 Fraction Collector	
Kit Probe 0.020 ID SS Sleeved	9910130800	1 year	940 Fraction Collector	



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**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**

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

**Service Completion**

Service request number \_\_\_\_\_ Date service completed \_\_\_\_\_

Agilent signature \_\_\_\_\_ Customer signature \_\_\_\_\_



**940 LC System  
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Revision	Date	Reason For Update
1.0	1-Jul-2008	Initial release of HPLC Preventative Maintenance 85-102447-00.
2.0	4-Mar-2011	Varian checklist content migrated into the Agilent template. Petro van Poppel and Jeff Kibby reviewed and approved content.
2.1	4-Mar-2011	Added "once finished" to initial system check. Added "additional instruction notes. Added instruction to leak sensor test. Split up all parts replacements to have their own check box. Made initial System Test conditional. Corrected P/N for Mixer filter. Removed evaporator tube cleaning from Fraction collector section. Updated check valve cartridge P/N's.
2.2	6-Sep-2011	Replaced the part number and description of Injection Port Seal to Injection Port Seal & Needle N, which are to be replaced at the same time.

**Approval Log**

Revision	Approver	Title of Approver
2.1	Dirk Fulle	Product support manager
2.2	Dirk Fulle	Product support manager