Agilent

# Agilent High-Speed Pump Low-Gold Kit

# Installation Note

This Technical Note describes how to install the Agilent High-Speed Pump Low-Gold Kit (G7120-68001) in an Agilent 1290 Infinity III High-Speed Pump (G7120A).


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# Introduction

The G7120-68001 High-Speed Pump Low-Gold Kit replaces several parts in the pump head of the G7120A High-Speed Pump.

While gold is known for its excellent chemical inertness and mechanical properties, therefore used in LC instrumentation, it may form cyanoaurate complexes $[Au(CN)_2]^-$ with cyanide ions present in small amounts in acetonitrile that can be detected as m/z 248.9732 in mass spectrometers. This complex may be seen in negative ion mode, for example in HILIC applications in metabolomics, lipidomics, proteomics, and glycan analysis. This complex may cause ion suppression or interfere with isobaric target analytes.

Replacing standard parts by the ones provided in this kit can reduce formation of these complexes significantly and is recommended for applications mentioned above.

# Delivery Checklist

Ensure that all parts and materials have been delivered with the upgrade kit. The delivery checklist is shown below. Please report any missing or damaged parts to your local Agilent Technologies sales and service office.

| p/n | Description |
|---|---|
| G7120-60022 | Inlet Valve, gold-reduced |
| G7120-60028 | Outlet Valve, gold-reduced |
| G4220-20092 | Seal Cap, gold-reduced |
| G4220-20093 | Spacer Fitting, gold-reduced |

# Installation

## Before Kit Installation

Agilent highly recommends performing the Pump Leak Rate Test to confirm the leak tightness of the pump heads prior to the exchange of the parts.

### Pump Leak Rate Test

The Pump Leak Rate Test is a diagnostic test to check the integrity and tightness of the pump components. The test is started from the Services & Diagnostics section in the Agilent Lab Advisor Software. The test is first evaluating the tightness from the outlet valve downstream to the purge valve. First, the pistons are positioned; afterwards, the purge valve is switched to the closed position. By moving the secondary piston into the pump chamber, the system is pressurized to 1000 bar (or 800 bar for G7104C/G7131C). The flow rate to keep the pressure stable is the corresponding leak rate.

The second part of the test is designed to verify the tightness along the piston. Any irregularity on the piston surface (for example, scratches or deposits) will be detected. During this test, all components from the inlet valve downstream to the blocked purge valve are tested.

Now the primary piston is moving to deliver and generate pressure, and the secondary piston is retracting. The pressure is kept constant at 800 bar. The process is repeated for the second pump head, if applicable.

The Pump Leak Rate Test can also be performed at various pressures comparable to the pressure used during analysis. The procedure above describes the test using High Pressure. Other pressures available for the Pump Leak Rate Test are: Mid Pressure (600 bar secondary leak rate test, 600 bar primary leak rate test (N/A for G7104C/G7131C)) and Low Pressure (200 bar secondary leak rate test, 200 bar primary leak rate test).

**Preparations:**

1. Flush the system with HPLC grade water for several minutes from any solvent channel.
2. Start the Pump Leak Rate Test from Lab Advisor.
3. Choose the channel with HPLC grade water and if you want to include or skip an additional purging step.
4. Click OK and follow the instructions.

   The test runs automatically without any further user interaction.

**Evaluation:**

The result as well as the applied limits are displayed after the automatic evaluation. The limits are:

- The allowed leak limit for the secondary piston is ≤ 3 µL/min
- The allowed leak limit for the primary piston is ≤ 30 µL/min

A report can be displayed, saved or printed by opening it with the Print Result button at the lower right of the screen.

If the test does not pass, check the system for leaks or call a local Agilent representative.

Figure 1 on page 5 and Figure 2 on page 5 show a typical test run.

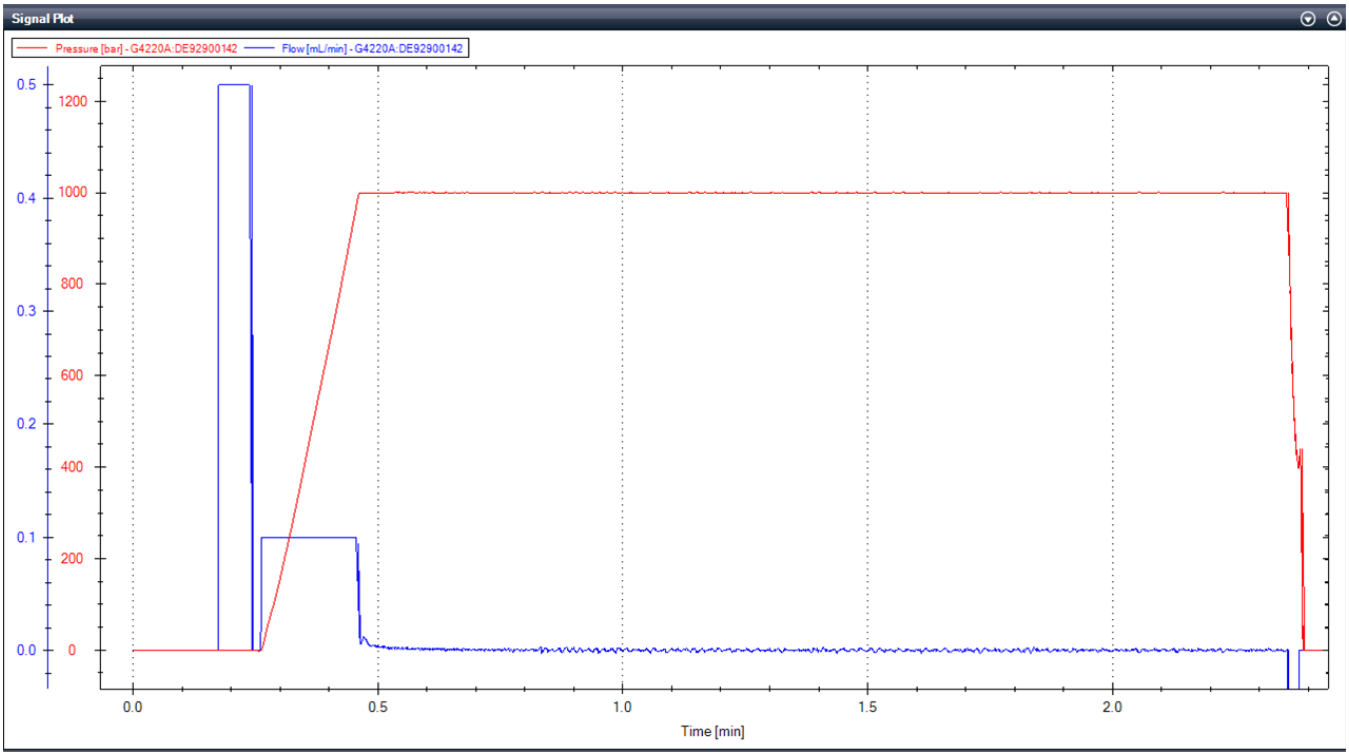



**Figure 1:** Static (secondary) Leak Test

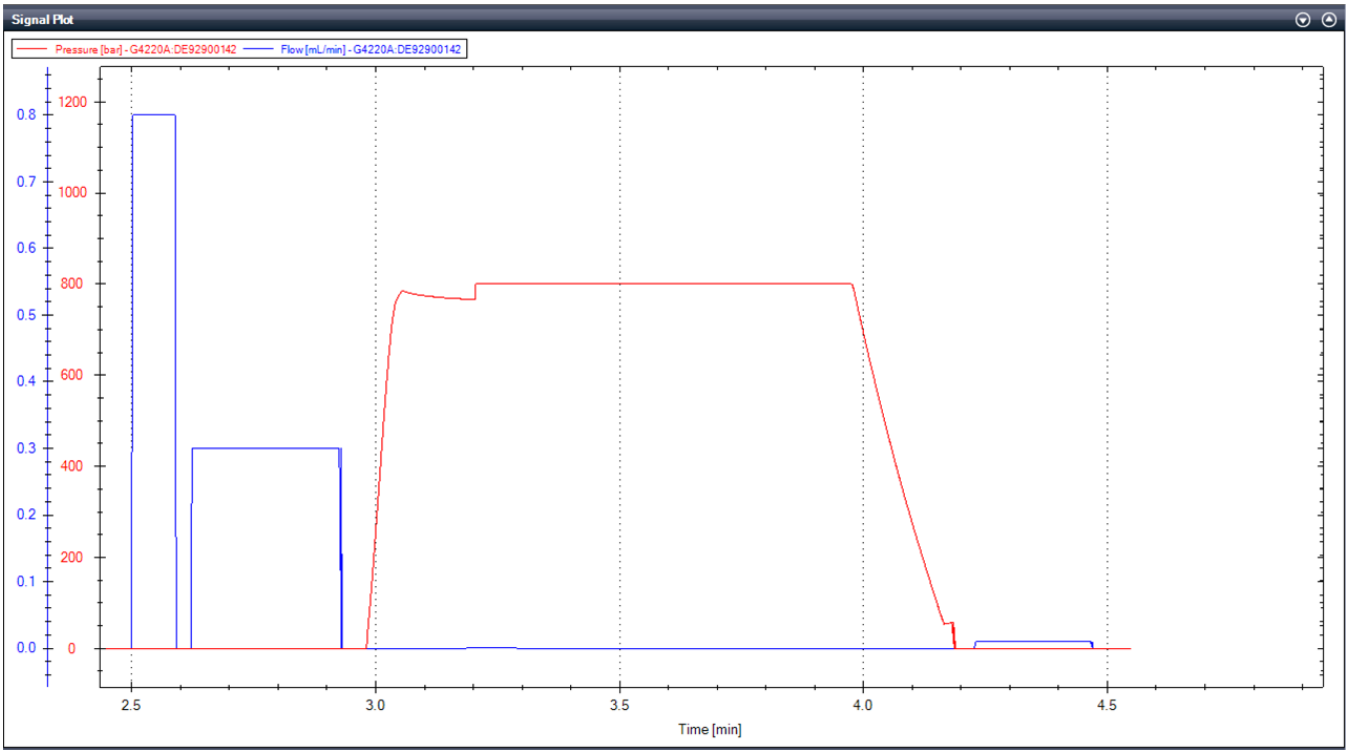



**Figure 2:** Dynamic (primary) Leak Test

## Troubleshooting the Pump Leak Rate Test

For troubleshooting the Pump Leak Rate Test, please consult the Agilent InfinityLab LC Series 1290 Infinity III High-Speed Pumps User Manual.

## Remove the Pump Head Assembly

**Tools required**

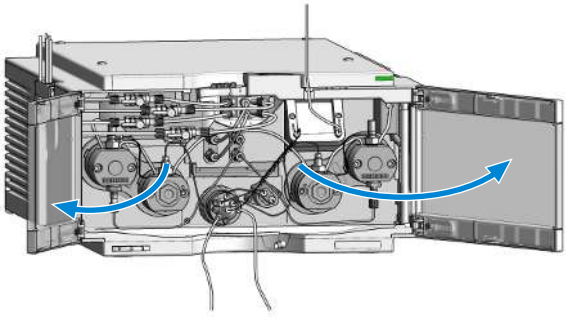
| Qty. | p/n | Description |
|---|---|---|
| 1 | G7120-68708 | InfinityLab System Tool kit |

**NOTE**

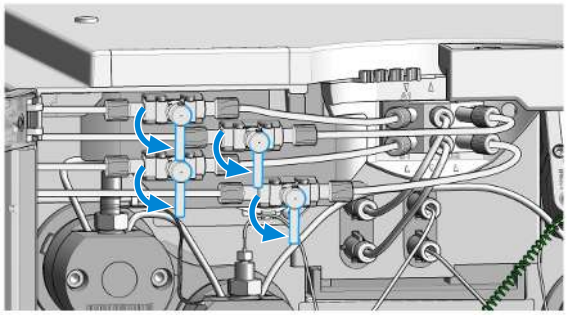
This procedure describes the replacement of the left pump head assembly (channel A). Similarly, the right pump head assembly (channel B) can be replaced.
One pump head assembly consists of two pump heads, which are both removed at the same time.

1 In Lab Advisor go to Service & Diagnostics > Remove/Install Pump Head and follow instructions given on the screen.

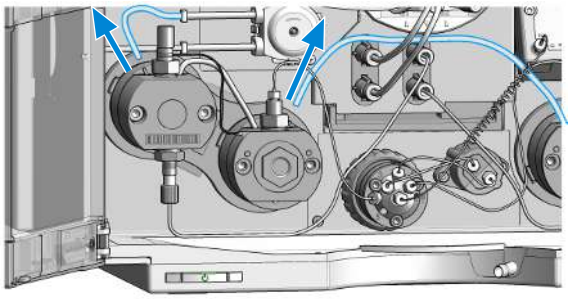
2 Open the doors.



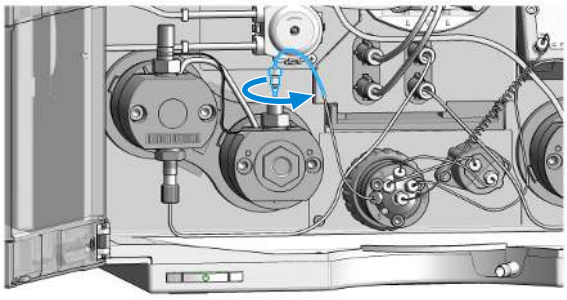
3 Close all shutoff valves.



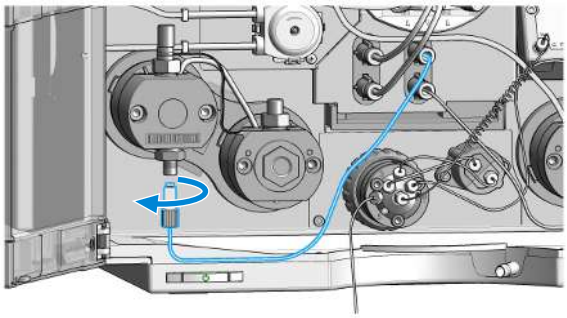
4 Remove the seal wash tubes.



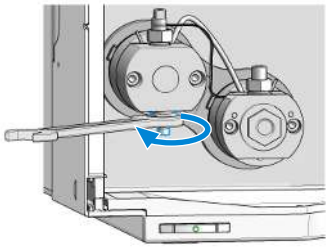
5 Remove the capillary connection at the top of the secondary pump head to the pump valve.



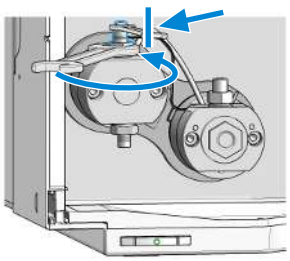
6 Remove the flow connection between the degassing unit and the primary pump head inlet.



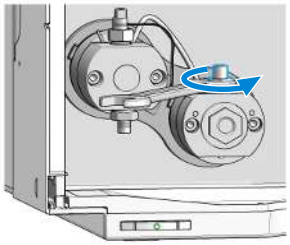
7 Loosen the inlet valve. Keep the inlet valve installed to the pump head assembly.



8 Counter the lock screw of the heat exchanger capillary while loosening the outlet valve. Keep the outlet valve installed to the pump head assembly.

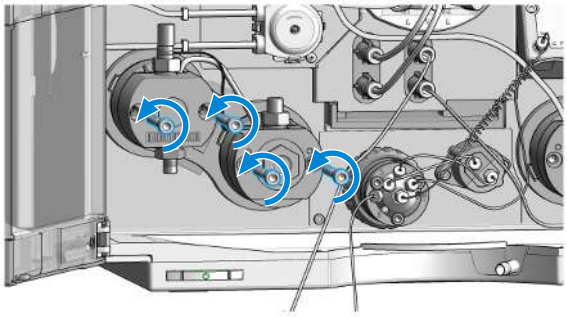


**9** Loosen the high pressure filter. Keep the filter installed to the pump head assembly.

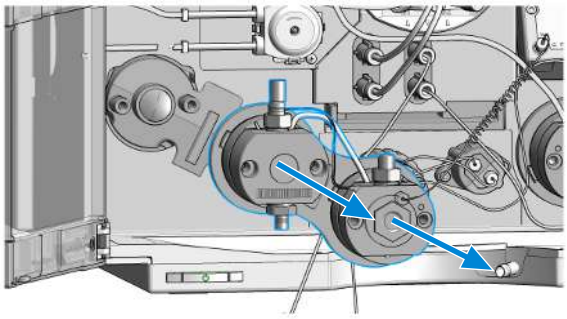


**10** Open the four screws holding the pump heads.

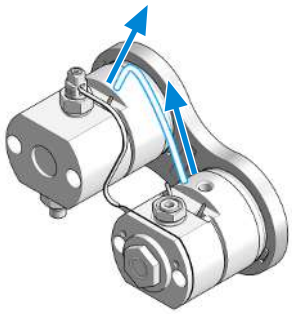
**NOTE** Open the screws step by step, not screw by screw.



**11** Remove the complete pump head assembly by holding both heads and pulling it to the front.



**12** Remove the seal wash tubing interconnecting the two pump heads.

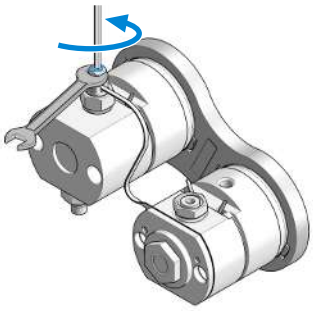


## Remove the Inlet and Outlet Valves

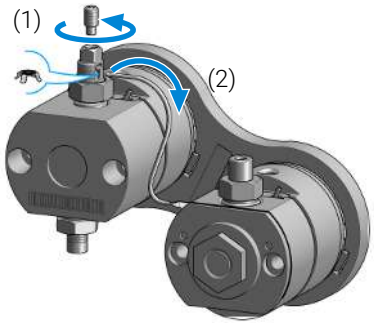
**Tools required**

| Qty. | p/n | Description |
|---|---|---|
| 1 | G7120-68708 | InfinityLab System Tool kit |
| 1 | 5043-1400 | Pump Head Holder |
| 1 | G4220-20092 | Seal Cap, gold-reduced |

**1** Counter the outlet valve while opening the lock screw of the heat exchanger capillary.

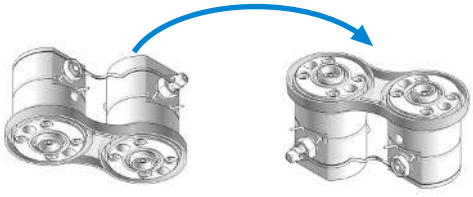


**2** Remove the heat exchanger capillary by pushing the connector up and pulling it out of the valve.

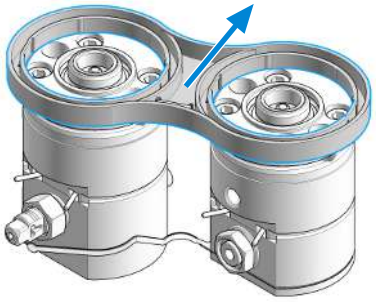



**NOTE** A gold seal between outlet valve and heat exchanger capillary is used for a tight connection.

**3** Turn the pump head assembly upside down.

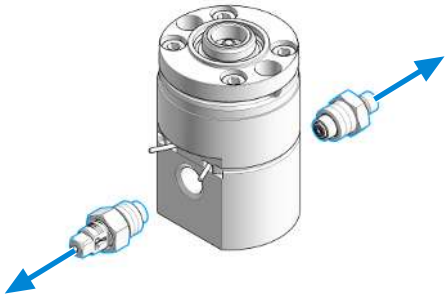


4 Remove the link plate by gently pulling it off the pump head assembly.

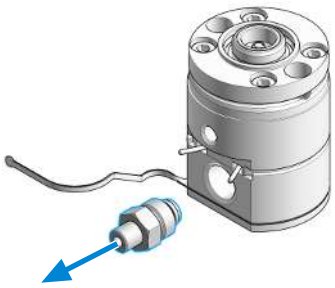


The two pump chambers are now isolated.

5 Remove the inlet valve and the outlet valve from the primary pump head.



6 Remove the high pressure filter from the secondary pump head.



7 Remove the gold-plated seal cap at the bottom of the high pressure filter and replace it with G4220-20092 (Seal Cap, gold-reduced) from the kit.

## Remove the Heat Exchanger and Replace the Spacer Fitting

**Tools required**

| Qty. | p/n | Description |
|---|---|---|
| 1 | | Wrench, 19 mm |
| 1 | 5023-2501 | Screwdriver Torx-T10 |
| 1 | 5067-5688 | Torque wrench 1 - 25 Nm with 14 mm wrench |
| 1 | G4220-20013 | 4 mm hex bit |
| 1 | G4220-20015 | Adapter ¼ in square to hex |
| 1 | G4220-20041 | Bit Torx 10x25 mm |

**Parts required**

| Qty. | p/n | Description |
|---|---|---|
| 1 | G4220-20093 | Spacer Fitting, gold-reduced |

**Prerequisites**

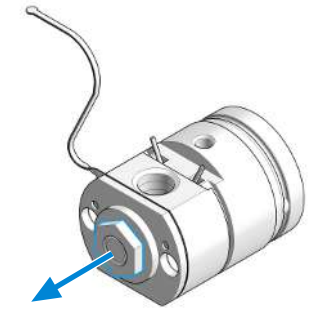
- Remove the pump head assembly from the pump
- Remove the secondary pump head from the link plate

**CAUTION**

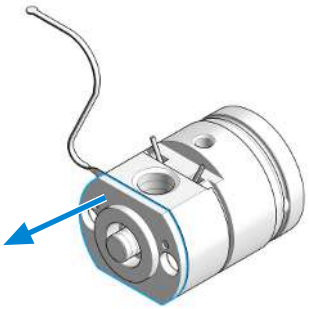
Loss of small spacer fitting

Inside the secondary pump head is a small spacer fitting, which can be dropped easily when removing the heat exchanger.

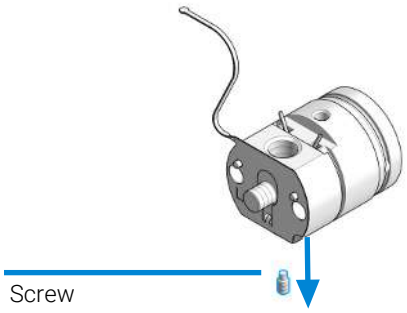
1 Remove the 19 mm screw at the front of the secondary pump head.



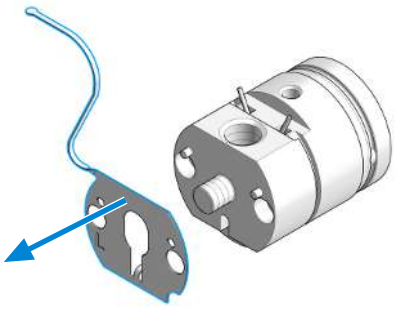
2 Remove the front plate.



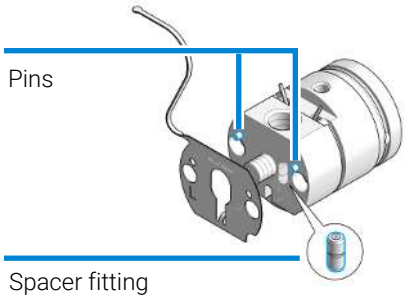
3 Remove the screw at the bottom of the pump head. Do not drop the golden spacer fitting.



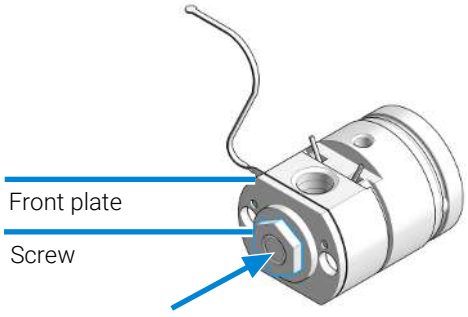

4 Lift out the heat exchanger.



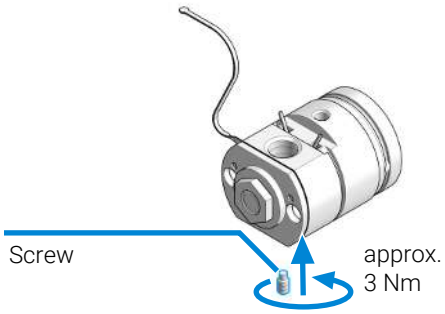
5 Remove the gold-plated spacer fitting and insert G4220-20093 (Spacer Fitting, gold-reduced) from the kit. Then insert the heat exchanger to the opening in the pump head and lift it over the pins.




6 Use the 19 mm screw for fixing the front plate.



7 Insert and fix the screw.



## Install the Inlet and Outlet Valves

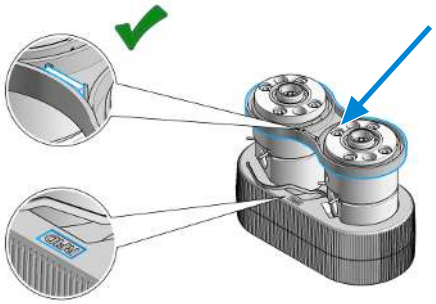
**Tools required**

| Qty. | p/n | Description |
|---|---|---|
| 1 | G7120-68708 | InfinityLab System Tool kit |
| 1 | 5043-1400 | Pump Head Holder |

**Parts required**

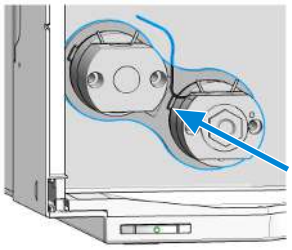
| Qty. | p/n | Description |
|---|---|---|
| 1 | G7120-60022 | Inlet Valve, gold-reduced |
| 1 | G7120-60028 | Outlet Valve, gold-reduced |

**1** Place the two pump heads in the Pump Head Holder. Mind the correct orientation of the link plate and click it into place.

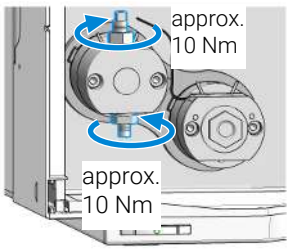


**NOTE** The Pump Head Holder has a marker to illustrate the correct placement of the link plate. The link plate holds an identification tag; this has to be placed onto the correct position to be readable by the pump.

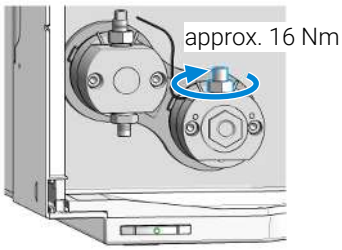
**2** Mount the pump head to the module. Do not fix the screws at this stage!



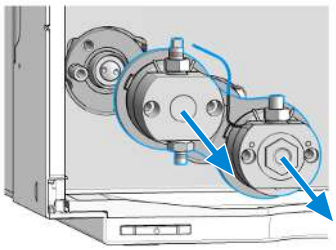
**3** Screw the inlet and the outlet valves from the kit and fix them with a torque wrench set to approx. 10 Nm.



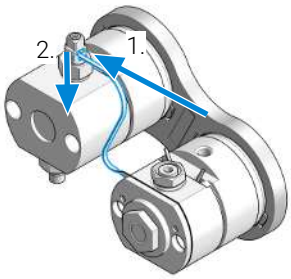
4 With the seal cap from the kit installed at the bottom of the high pressure filter (as described in Remove the Inlet and Outlet Valves on page 10), screw the filter and fix it with a torque wrench set to approx. 16 Nm.



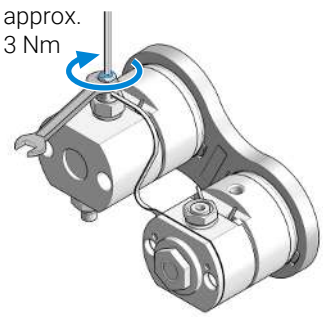

5 Remove the pump head from the module again.



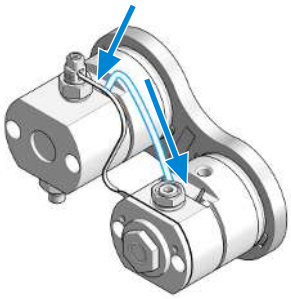
6 Position the entrance slit for the heat exchanger capillary to face exactly to it, and then seat the heat exchanger capillary back into the outlet valve by moving it into the valve and pressing it down.



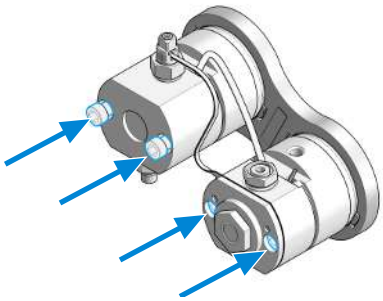

7 Counter the outlet valve and tighten the lock screw of the heat exchanger capillary with a torque wrench set to approx. 3 Nm.



8 Attach the seal wash tubing interconnecting the two pump heads.



9 Insert the screws that later fix the pump head assembly to the module housing.



## Install the Pump Head Assembly

**Tools required**

| Qty. | p/n | Description |
|---|---|---|
| 1 | G7120-68708 | InfinityLab System Tool kit |
| 1 | 5067-5688 | Torque wrench 1 - 25 Nm with 14 mm wrench |
| 1 | G4220-20013 | 4 mm hex bit |
| 1 | G4220-20015 | Adapter ¼ in square to hex |

**Prerequisites**

- Bring the pump drive to the maintenance position using the Lab Advisor user interface: Go to **Service & Diagnostics** > **Remove/Install Pump Head** and follow instructions given on the screen. Both pump drives must be retracted.

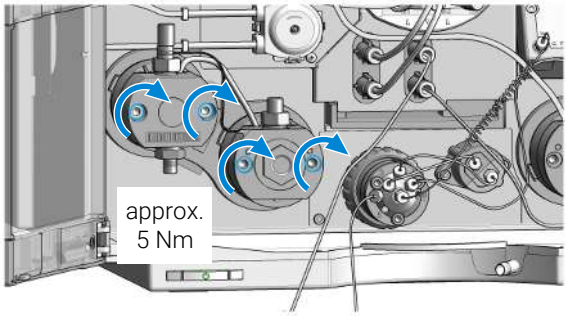
**CAUTION**

Damage to the pump head

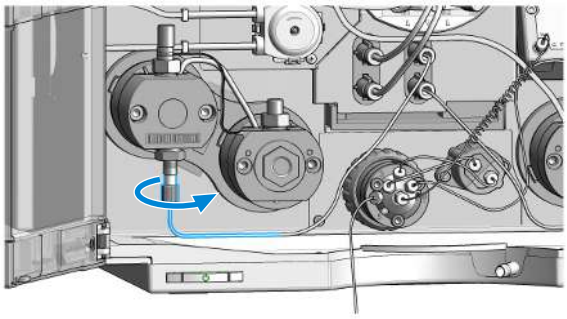
Using a wrong torque will damage the pump head.

— For handling the torque wrench, setting and applying the right torque, consult the manual of your torque wrench.

1 Install the pump head assembly by tightening the screws step by step to approx. 5 Nm.



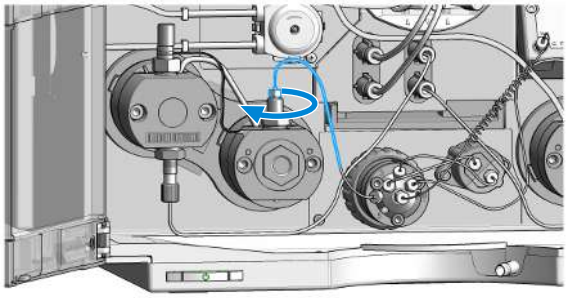

2 Connect the degassing unit outlet to the inlet of the primary pump head.



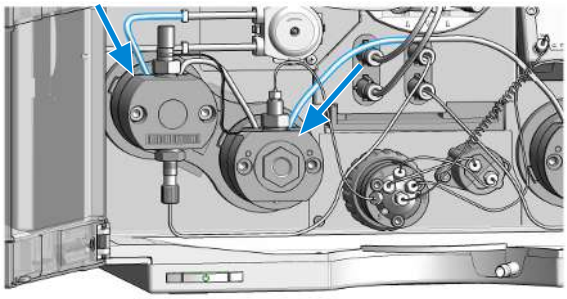
3 Connect the outlet of the secondary pump head to the inlet of the purge valve.

NOTE

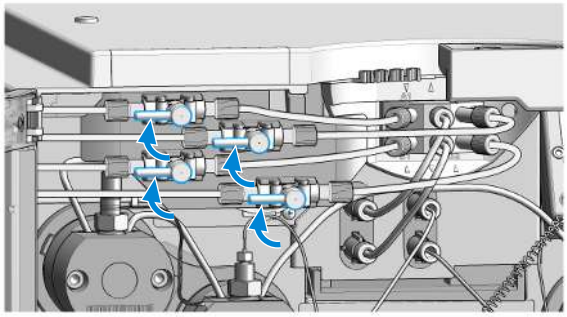
Channel A (left pump head assembly) is connected to port 4, channel B (right pump head assembly) to port 1 of the purge valve.



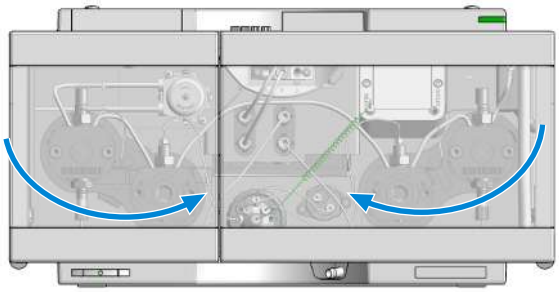
4 Reinstall the seal wash tubes.



5 Open the shutoff valves.



6 Close the doors.



7 Perform a Pump Leak Rate Test.

**NOTE** Before performing the Pump Leak Rate Test, sufficiently purge both pump heads with isopropanol.

**www.agilent.com**


Edition: 09/2025

Document No: D0134753 Rev. A.00

Agilent