7 Maintenance

This chapter describes the maintenance of the High Speed Pump.

Introduction to Maintenance

Figure 9 on page 104 shows the main user accessible assemblies of the Agilent 1290 Infinity II High Speed Pump. These parts can be accessed from the front (simple repairs) and don't require to remove the pump from the system stack.

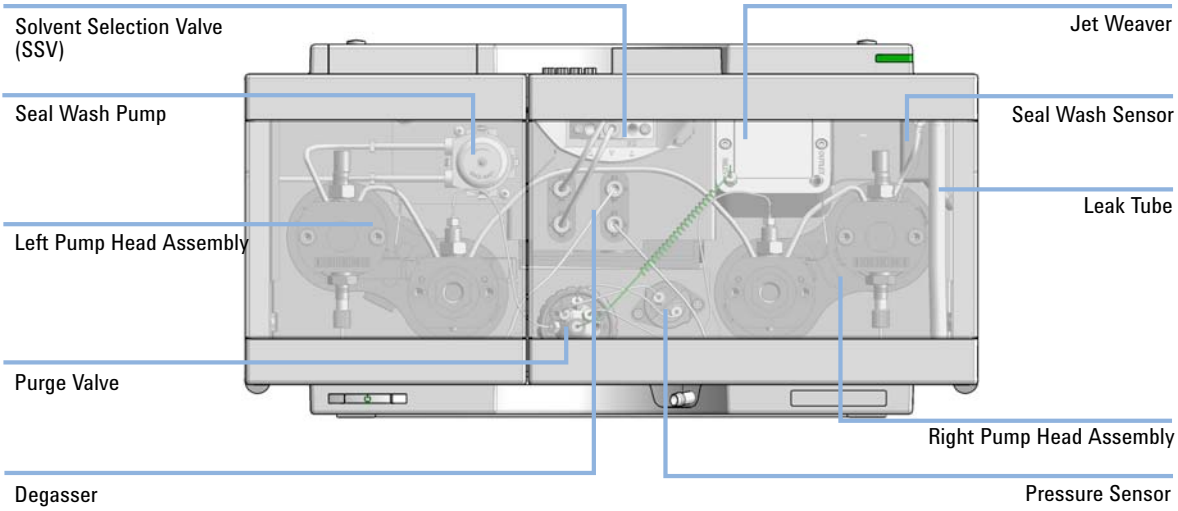


Figure 9 Maintenance parts

Figure 10 on page 105 shows the flow connections between these main assemblies.

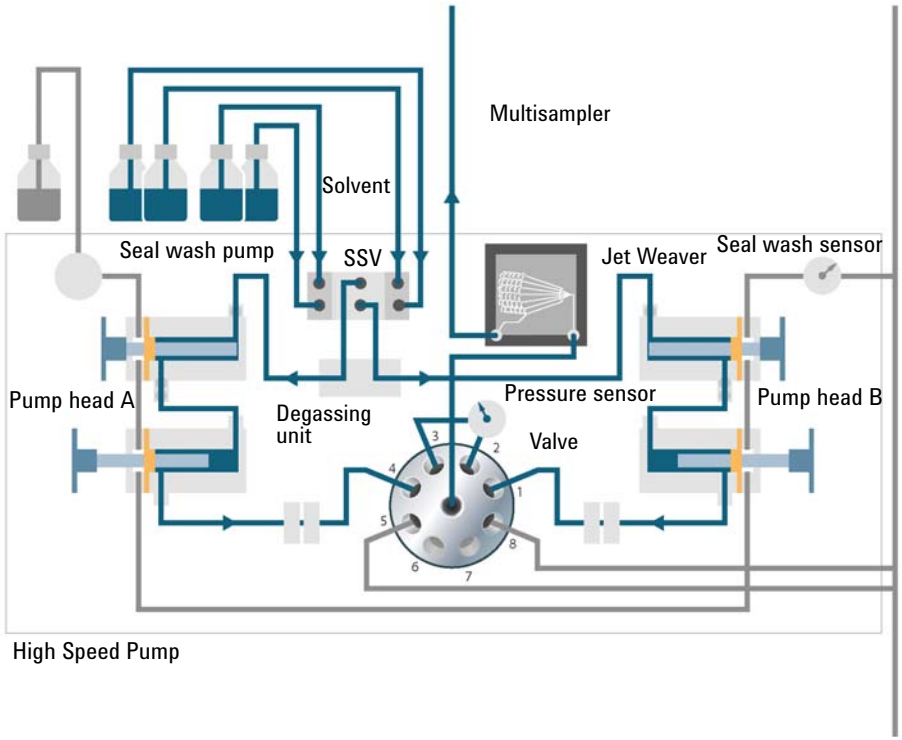


Figure 10 The hydraulic path

Recommended Interval for Preventive Maintenance

The recommended interval for preventive maintenance is:

- 100 L (150 L for Long Life Technology) or 1 year (whichever comes first).

This recommendation is valid for LC instruments on which “typical” applications are running.

A “typical” application can be characterized as follows:

- pressure range 100 – 800 bar,
- flow rates 0.5 – 3.5 mL/min,
- typical solvents used in reversed phase LC.

Warnings and Cautions

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- ➔ When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.
- ➔ The volume of substances should be reduced to the minimum required for the analysis.
- ➔ Do not operate the instrument in an explosive atmosphere.

WARNING

Electrical shock

Repair work at the module can lead to personal injuries, e.g. shock hazard, when the cover is opened.

- ➔ Do not remove the cover of the module.
- ➔ Only certified persons are authorized to carry out repairs inside the module.

WARNING

Personal injury or damage to the product

Agilent is not responsible for any damages caused, in whole or in part, by improper use of the products, unauthorized alterations, adjustments or modifications to the products, failure to comply with procedures in Agilent product user guides, or use of the products in violation of applicable laws, rules or regulations.

- ➔ Use your Agilent products only in the manner described in the Agilent product user guides.

WARNING

Heavy weight

The module is heavy (>22 kg (>46 lbs)).

- ➔ Carry the module at least with 2 people.
- ➔ Avoid back strain or injury by following all precautions for lifting heavy objects.
- ➔ Ensure that the load is as close to your body as possible.
- ➔ Ensure that you can cope with the weight of your load.

CAUTION

Safety standards for external equipment

- ➔ If you connect external equipment to the instrument, make sure that you only use accessory units tested and approved according to the safety standards appropriate for the type of external equipment.

Overview of Maintenance

The following pages describe maintenance (simple repairs) of the module that can be carried out without opening the main cover.

Cleaning the Module

To keep the module case clean, use a soft cloth slightly dampened with water, or a solution of water and mild detergent.

WARNING **Liquid dripping into the electronic compartment of your module can cause shock hazard and damage the module**

➔ Do not use an excessively damp cloth during cleaning.

➔ Drain all solvent lines before opening any connections in the flow path.

Install Fittings and Capillaries

WARNING

Solvent can spray under high pressure.

➔ Observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing), when opening flow path.

CAUTION

Deformation of fittings and seals

Liquid drops under high pressure up to 1200 bar act like solid parts. Tightening connections under high pressure can deform or destroy fittings and seals.

➔ Never tighten flow connections under pressure.

NOTE

The lifetime of a fitting depends on how firmly it has been tightened; firm tightening reduces the lifetime.

If fitting has been overtightened, replace it.

1 Install fittings and capillaries.

2 Tighten fittings and capillaries.

Remove and Install Doors

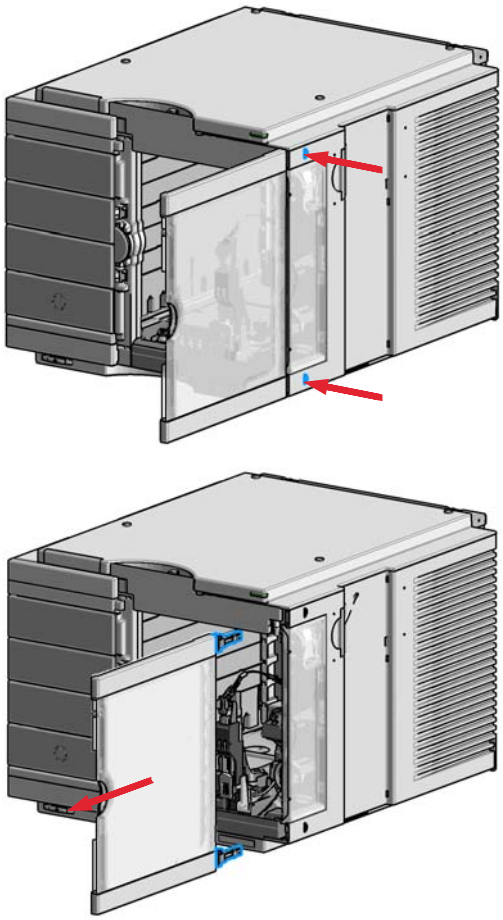
Parts required	p/n	Description
	5067-5767	Door assy 200 left IF II
	5067-5768	Door assy 200 right IF II

NOTE

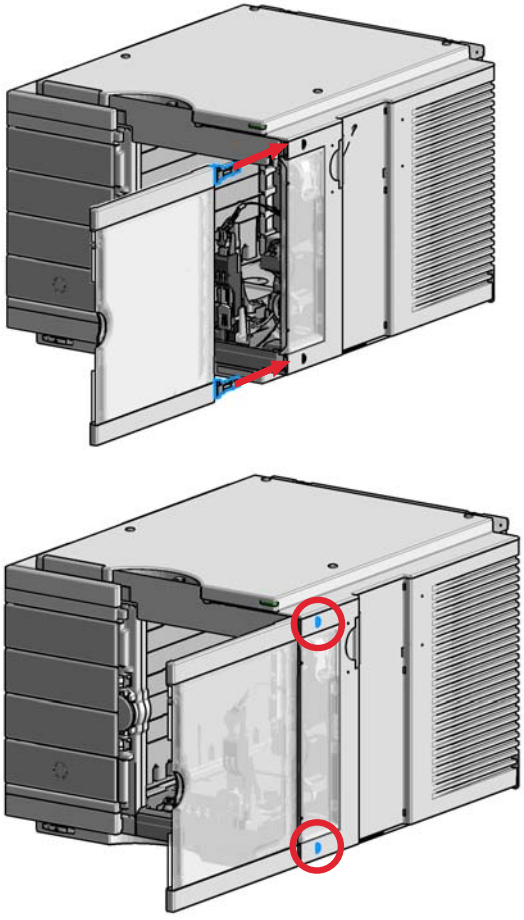
The figures shown in this procedure exemplarily show the Infinity II Multisampler module.

The principle of how to remove and/or install doors works in the same way for all Infinity II modules.

1 Press the release buttons and pull the front door out.



2 For the Installation of the front door. Insert the hinges into their guides and move the door in until the release buttons click into their final position.



Replace the Shutoff Valve Panel

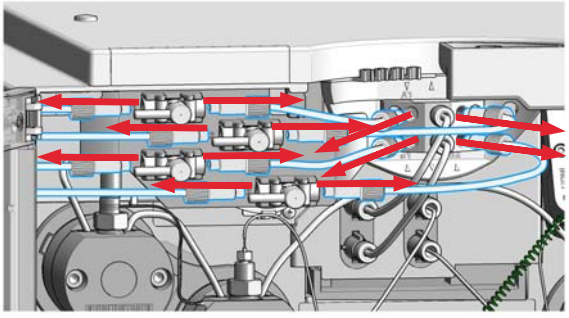
When If a shutoff valve is damaged or the panel needs to be removed for other repair procedures.

Parts required

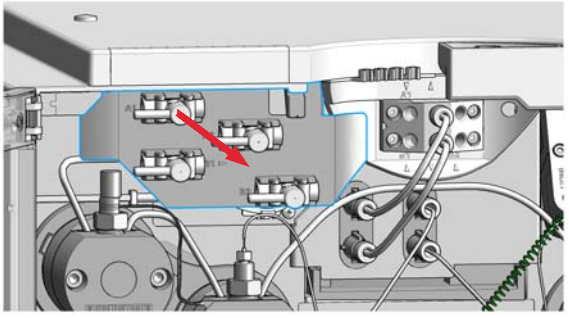
#	p/n	Description
4	5067-4124	Shutoff valve
1	G7120-40004	Valve Holder Left
1	G4220-60035	Tubing kit 140 mm, 2/pk SSV to shutoff valve or degassing unit

Preparations In order to avoid leaks, remove tubings from the solvent bottles.

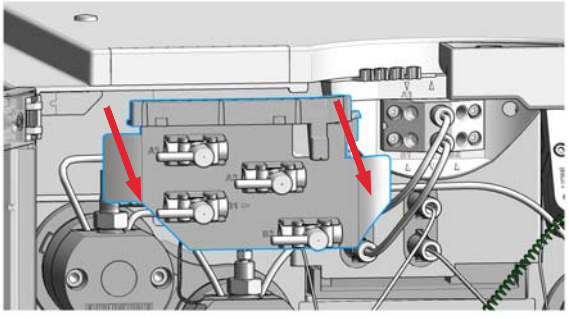
1 Unscrew tubing connections between shutoff valves, solvent bottles and the solvent selection valve.



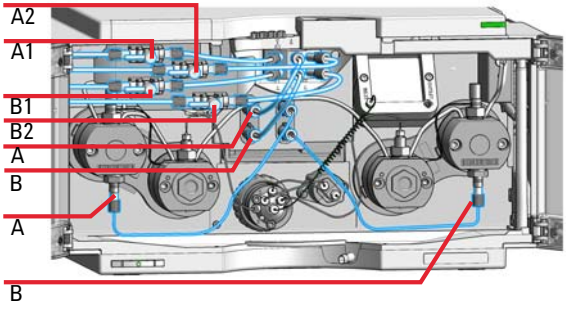
2 If a single valve shall be replaced, it can be pulled to the front for removing it from its mounting.



3 Remove the shutoff valve panel by pulling it downwards.



4 After replacing the panel or after completion of other maintenance, re-install the panel and all flow connections.



Replace the Pressure Sensor

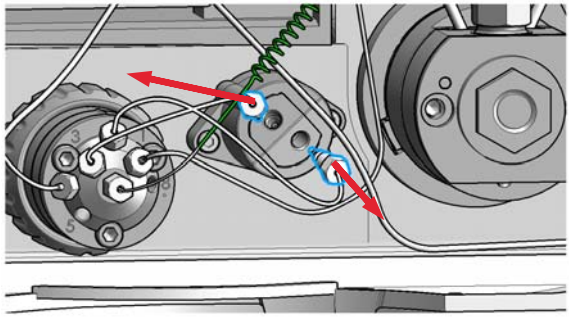
When	No or invalid pressure signal	
Tools required	**p/n**	**Description**
	8710-2412	Hex key 2.5 mm, 15 cm long, straight handle
	8710-0510	Wrench open 1/4 — 5/16 inch
		Screwdriver
Parts required	**p/n**	**Description**
	G7104-60001	Pressure sensor 1300 bar
Preparations	Turn off pump flow, switch off pump	

NOTE

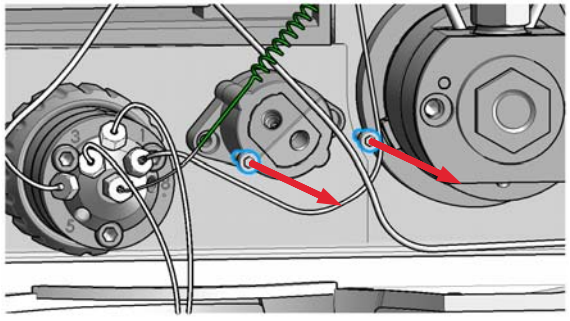
This procedure describes how to replace the pressure sensor.

In case the cable to the sensor shall be replaced as well, please contact your Agilent service representative.

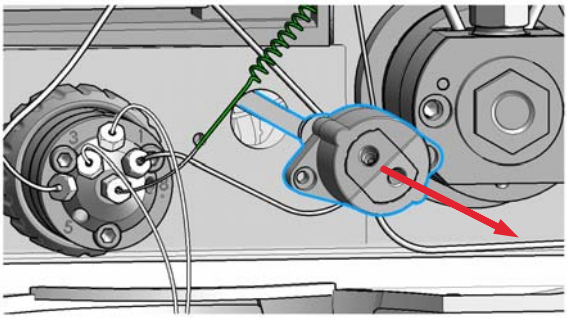
1 Remove capillary connections between the pressure sensor and purge valve.



2 Remove the screws that fix the pressure sensor to the chassis.

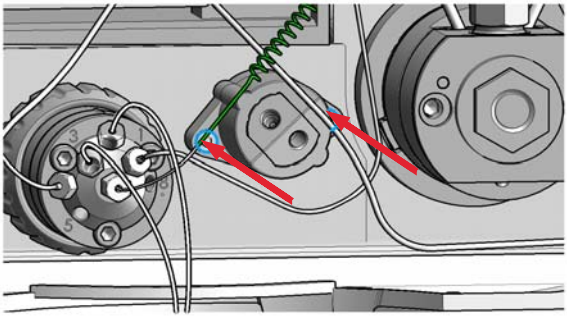


3 Carefully pull out the pressure sensor for about 2 cm. Then unscrew the cable from the pressure sensor.

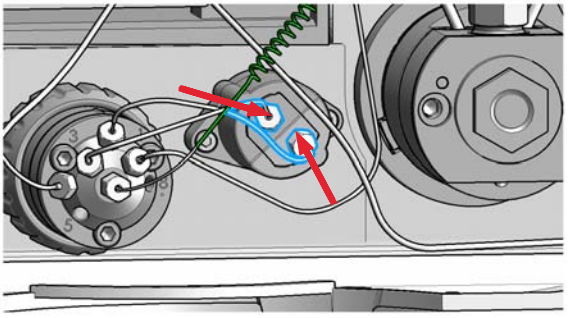


4 Connect the new pressure sensor to the pressure sensor connector.

5 Fix the pressure sensor to the instrument chassis.



6 Connect the capillaries from the valve to the pressure sensor: connect port 3 to the pressure sensor inlet and port 2 to the outlet.



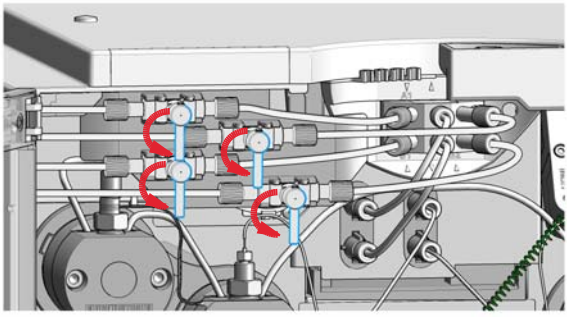
Replace the Solvent Selection Valve (SSV)

When In case of problems with the solvent selection valve

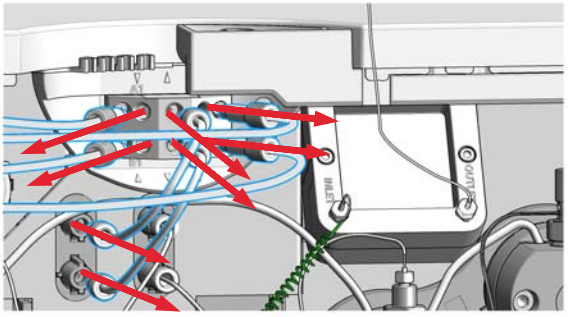
Parts required

#	p/n	Description
1	G7120-60029	SSV Valve Assembly
2	G4220-60035	Tubing kit 140 mm, 2/pk SSV to shutoff valve or degassing unit

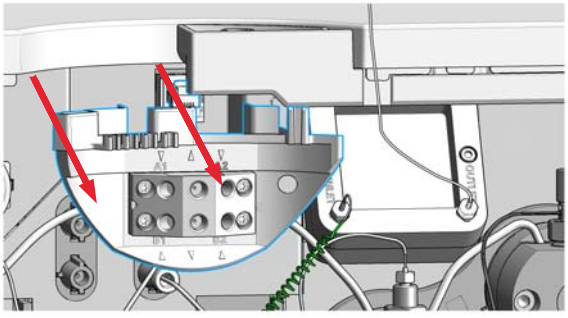
1 Close shut-off valve.



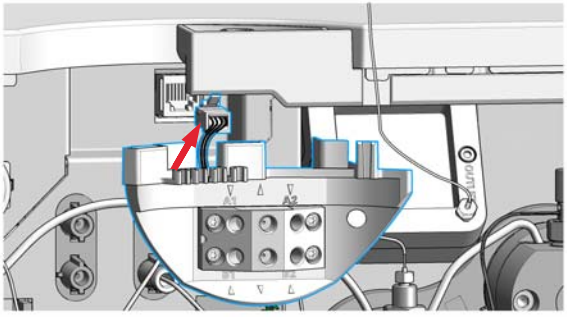
2 Remove tubing connections between the SSV and the solvent shut-off valves and the SSV and the degassing unit inlets.



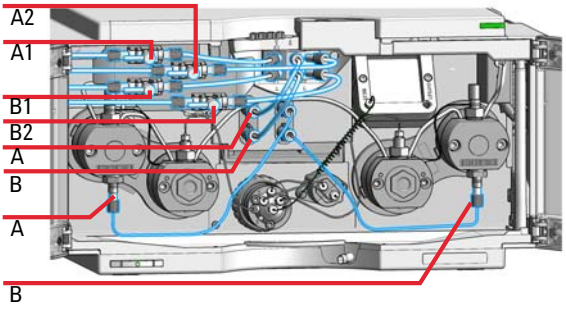
3 Push down the SSV panel for removing it.



4 Remove the connector by pushing up the small clip at the bottom of the connector.



5 Install a new SSV by inserting the connector and clipping the SSV panel to the module top panel. Then re-install all tubing connections, open shut-off valve and purge valve.



Change Configuration or Replace the Jet Weaver

When

For optimizing the pump configuration to mixing performance or low delay volumes/fast gradients, see chapter *Optimizing Performance*.

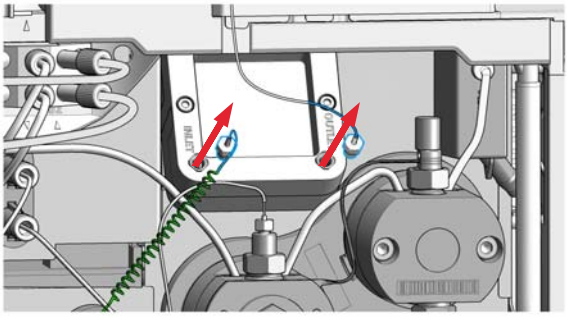
Tools required

p/n	Description
8710-0510	¼ inch wrench
	3 mm hex key

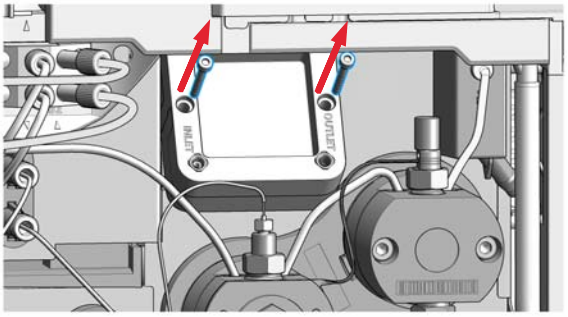
Parts required

#	p/n	Description
1	G4220-60027	Jet Weaver 35 µL/100 µL
1	G4220-60012	Jet Weaver 380 µL (OPTIONAL)
1	G4220-87000	Capillary ST 0.17 mm x 300 mm Valve to Jet Weaver

1 Remove capillary connections from the Jet Weaver.



2 Remove the hex screws that fix the Jet Weaver to the pump housing.

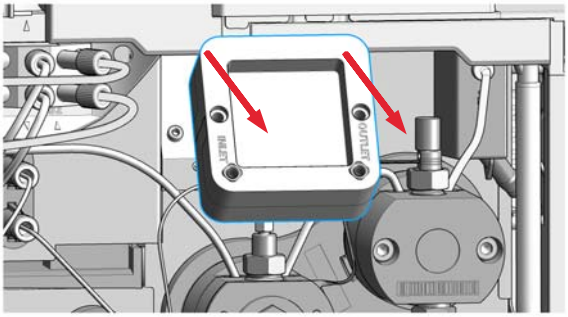


NOTE

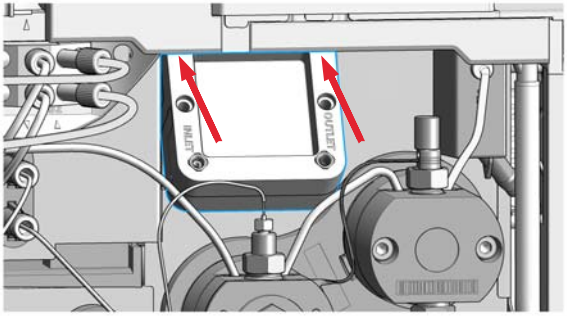
The standard Jet Weaver (Jet Weaver 35 µL/ 100 µL (G4220-60027)) has a front and a rear side with different internal volumes (35 / 100 µL) that are optimized for a low delay volume or best mixing performance.

The optional Jet Weaver (Jet Weaver 380 µL (G4220-60012)) is recommended for applications which are challenging with respect to mixing noise (e.g. TFA applications) and has just one side.

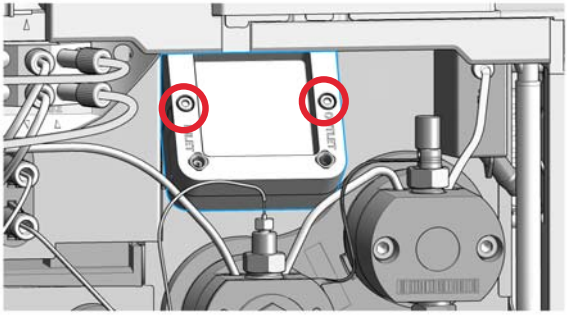
3 Remove the Jet Weaver



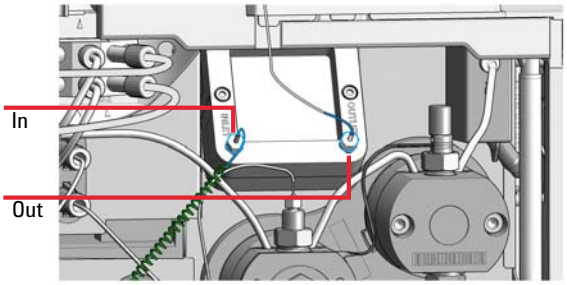
4 Install new Jet Weaver or flip the Jet Weaver for backside.



5 Fix the Jet Weaver with the screws.



6 Reinstall the capillary connections.



The inlet at the left side of the Jet Weaver is connected to the central port of the pump valve by a capillary (length 300 mm, 0.17 mm i.d.). The outlet at the right side is connected to the autosampler.

Replace the Seal Wash Pump

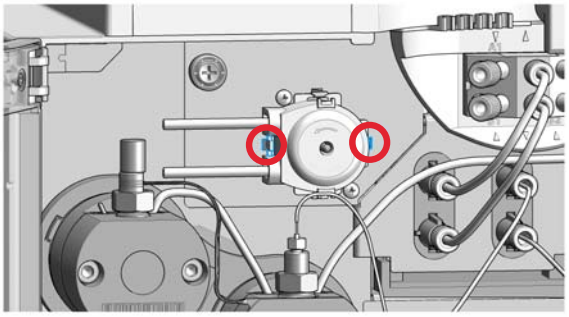
When In case of wear of the seal wash pump

Parts required

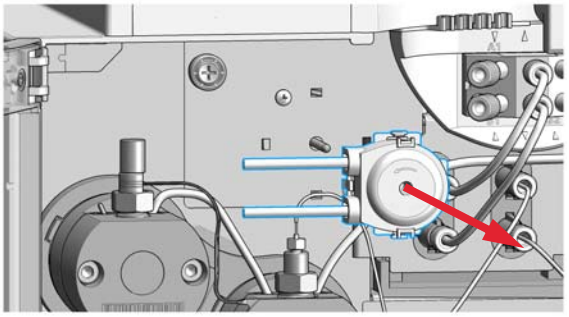
p/n	Description
5065-4445	Peristaltic pump with Pharmed tubing
5065-9978	Tubing, 1 mm i.d., 3 mm o.d., silicone, 5 m

Preparations Remove the flow connections from and to the seal wash pump

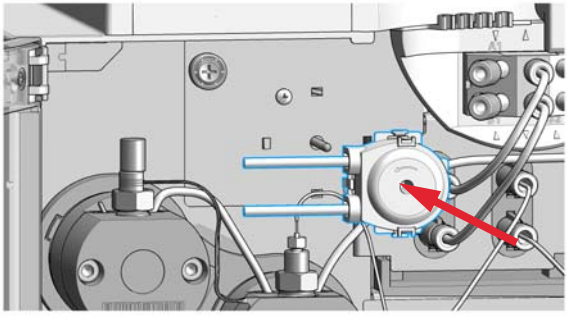
1 Press the clips.



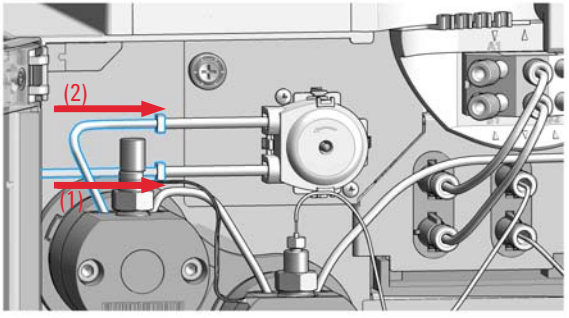
2 Pull the pump to the front.



3 Insert the pump clips to the holes in the pump housing.



4 Fix the seal wash tubings to the peristaltic pump inlet (1) and from the peristaltic pump outlet to the primary pump head inlet (2).



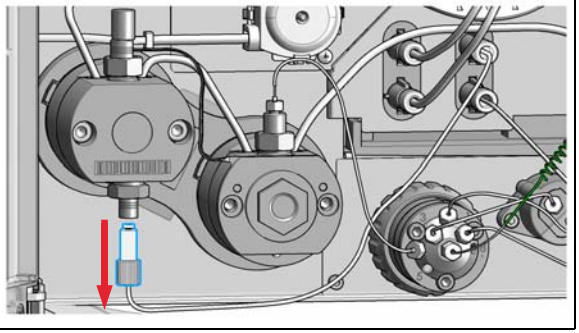
Replace the Inlet Valve

When	If Inlet valve is defective.	
Tools required	**p/n**	**Description**
		Wrench, 14 mm
	G4220-20012	Torque wrench 2 – 25 Nm
Parts required	**p/n**	**Description**
	G4220-60022	Inlet valve (primary pump head)

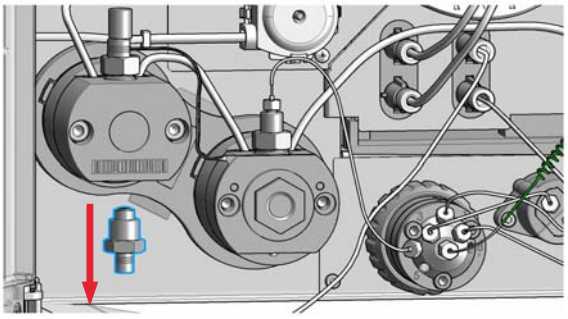
NOTE For best performance and life time and for avoiding leaks, use a torque wrench set to 10 Nm for fixing the inlet valve.

1 Close the shut off valves to avoid solvent leaks.

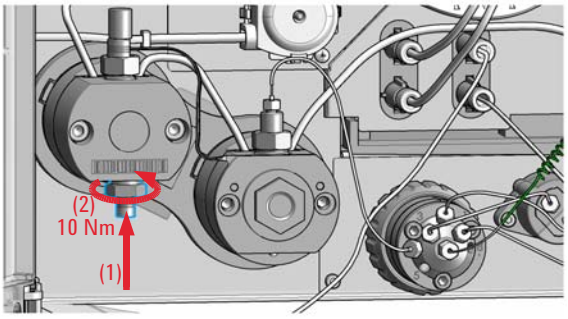
2 Unscrew the tubing at the inlet valve.



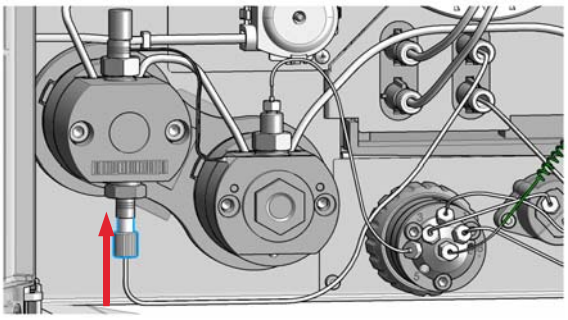
3 With a 14 mm wrench, unscrew the inlet valve and remove it.



4 Install inlet valve and tighten it at 10 Nm with a torque wrench (14 mm).



5 Attach the inlet tubing at the inlet valve.



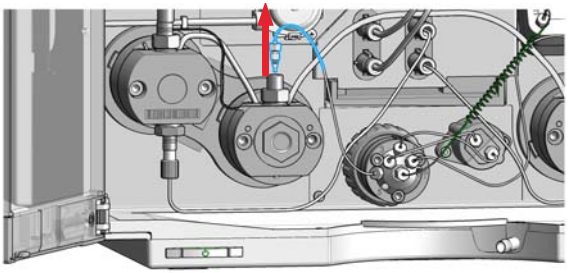
6 Open the shut off valves and purge the system to remove air.

Release a Stuck Inlet Valve

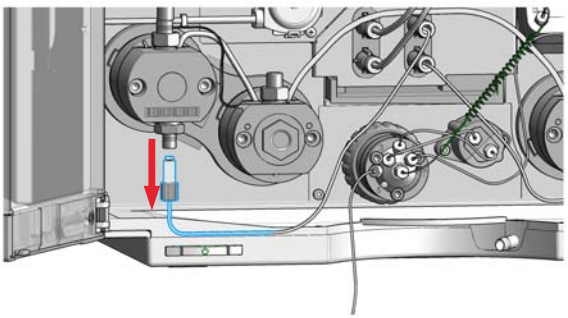
When If inlet valve is stuck, or if pump is not generating pressure after being turned off for an extended period of time.

NOTE Before the system is turned off for an extended period of time, it should be flushed with at least 10 % isopropanol to prevent inlet valves from getting stuck.

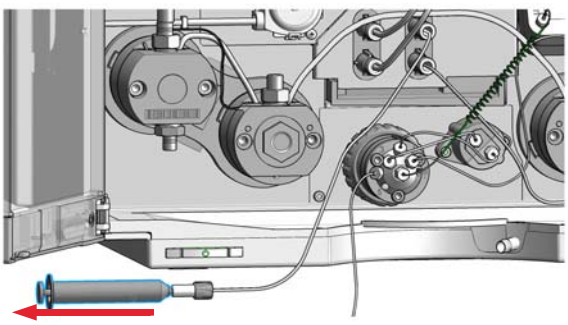
1 Remove the capillary connection from the outlet of the secondary pump head.



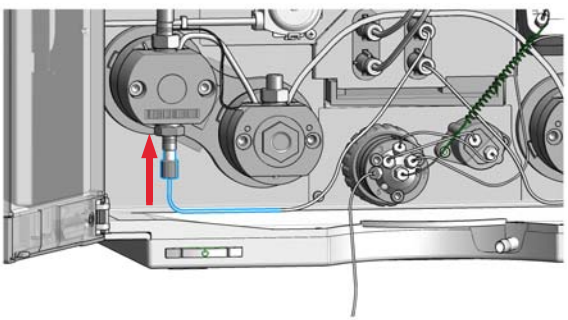
2 Unscrew the tubing at the inlet valve.



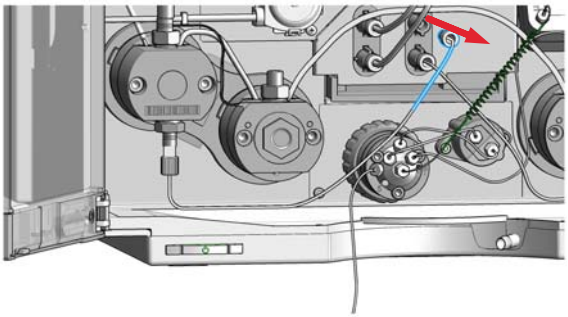
3 Attach a Luer lock syringe with adapter to the tubing and fill it with solvent.



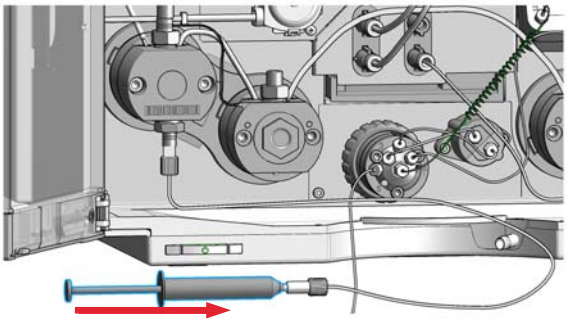
4 Reconnect tubing to inlet valve.



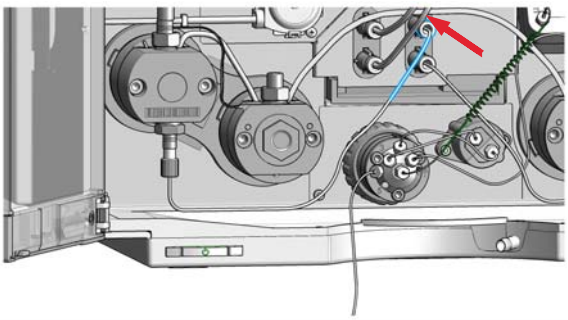
5 Unscrew tubing at degassing unit and attach the syringe to it.



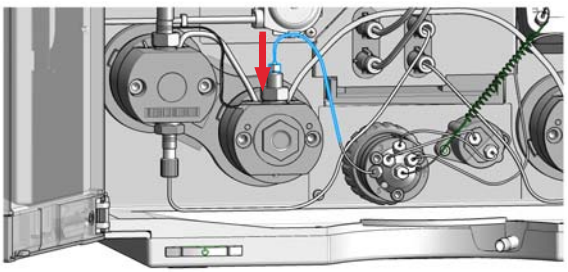
6 Push solvent with syringe until it comes out at the top of the High Pressure Filter Assembly.



7 Detach the syringe and reconnect the tubing into the degassing unit.



8 Reinstall the capillary connection to the High Pressure Filter Assembly.



9 Purge the system to remove air.

Remove the Pump Head Assembly

Tools required	p/n	Description
	G7120-68708	HPLC System Tool Kit-Infinity-II

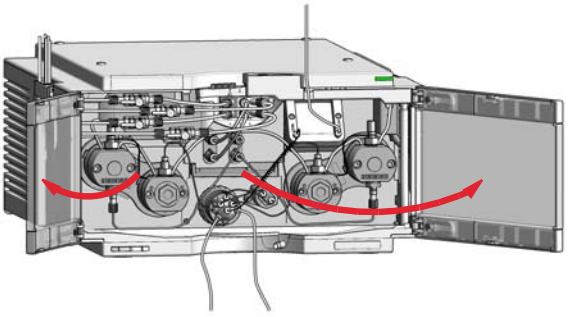
NOTE

This procedure describes the replacement of the left pump head assembly (channel A). Similarly, the right pump head assembly (channel B) can be replaced.

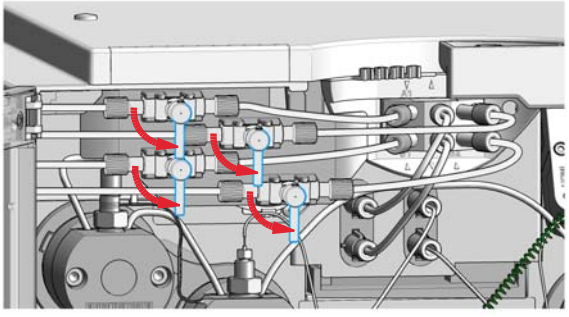
One pump head assembly consists of two pump heads, which are both removed at the same time.

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

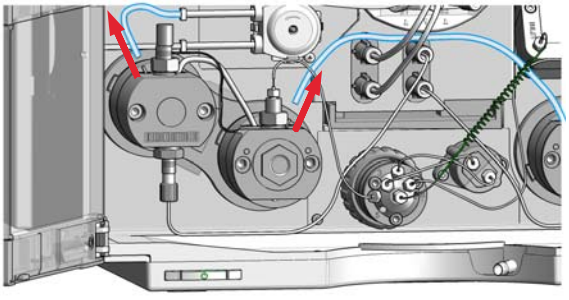
2 Open the doors.



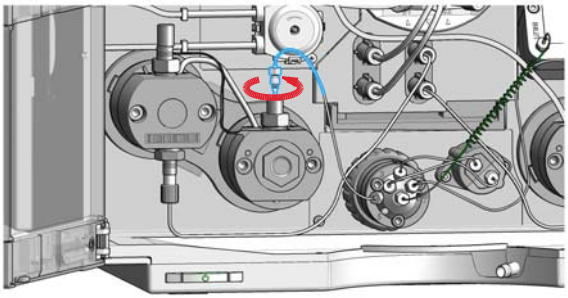
3 Close all shut-off valves.



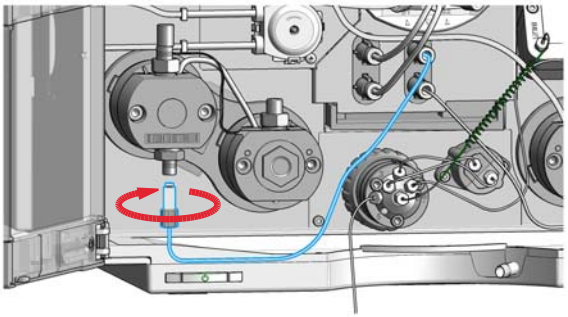
4 Remove the seal wash tubes.



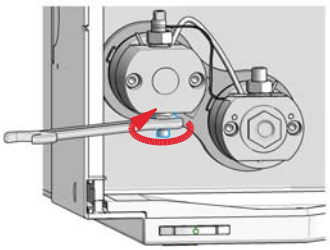
5 Remove the capillary connection at the top of the secondary pump head to the pump valve.



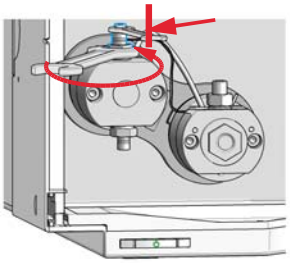
6 Remove the flow connection between the degassing unit and the primary pump head inlet.



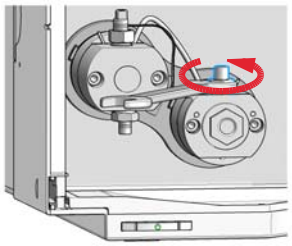
7 Loosen the inlet valve. Keep the inlet valve installed to the pump head assembly.



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.



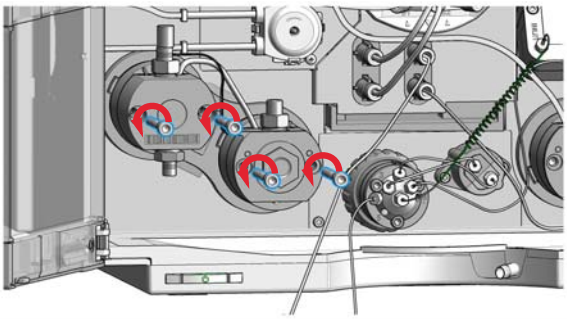
9 Loosen the high pressure filter. Keep the filter installed to the pump head assembly.



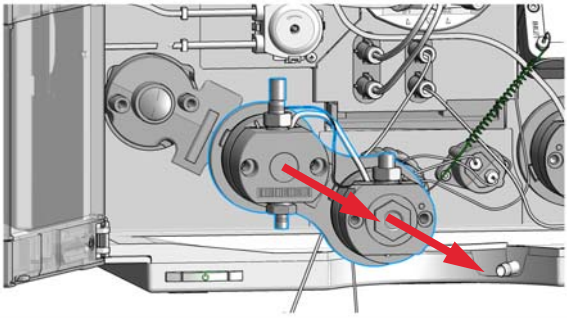
10 Open the four screws holding the pump heads.

NOTE

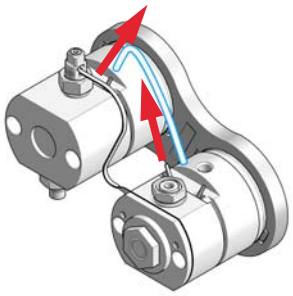
Open the screws step by step, not screw by screw.



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.



Pump Head Maintenance (Tool Free)

1290 Infinity II Flexible Pumps (G7104A) and 1290 Infinity II High Speed Pumps (G7120A) are equipped with Long Life Pump Heads.

Long Life Pump Heads offer a significantly increased lifetime of pistons and seals compared to other pump heads.

Maintenance of Long Life Pump Heads requires no special tool.

The following procedures explain the maintenance of Long Life Pump Heads.

Please refer to Agilent 1290 Infinity II Easy Maintenance Pump Head Technical Note (01200-90120) for instructions on maintenance of Easy Maintenance Pump Heads, or to Agilent 1290 Infinity Pump Head Maintenance Technical Note (G4220-90122) for instructions on maintenance of classical pump heads.

Disassemble LongLife Pump Heads

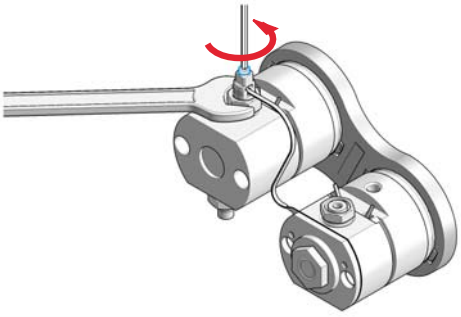
This procedure shows how to open the pump head assembly, exchange seals, and clean pistons.

Exchanging seals and cleaning pistons is exemplarily shown for the primary pump head, but works in the same way for the secondary pump head.

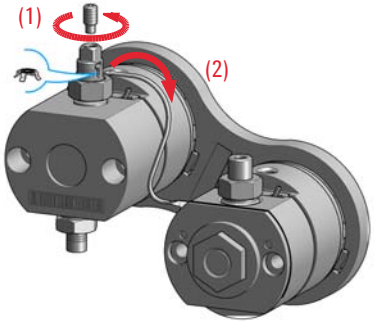
Tools required	p/n	Description
	G7120-68708	HPLC System Tool Kit-Infinity-II
	5043-1400	Pump Head Holder
	5067-6197	Seal Handling Device
	8660-0852	Abrasive mesh
		Isopropanol

NOTE Seals must be exchanged and pistons must be cleaned in both primary and secondary pump heads.

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



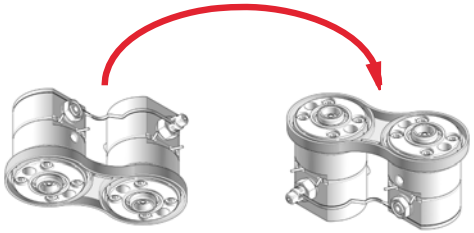
2 Remove the heat exchanger capillary by pushing the connector up and pulling it out of the valve.



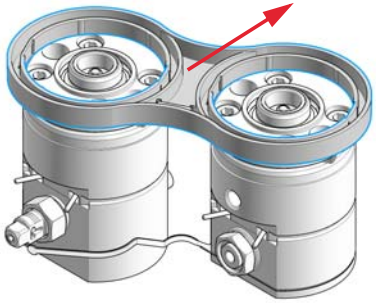
NOTE

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

3 Turn the pump head assembly upside down.

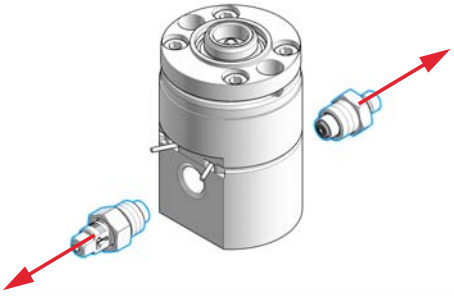


4 Remove the link plate by gently pulling it off the pump head assembly.



The two pump chambers are now isolated.

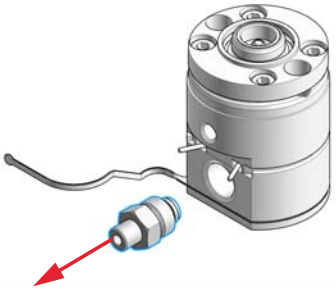
5 Remove the inlet valve and the outlet valve from the primary pump head.



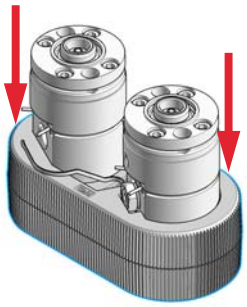
NOTE

Clean the valves by sonication, if appropriate. A good cleaning solution is 50 % isopropanol in water.

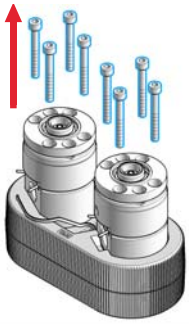
6 Binary/High Speed Pumps only: Remove the high pressure filter from the secondary pump head.



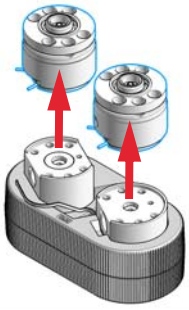
7 Place the two pump heads in the Pump Head Holder.



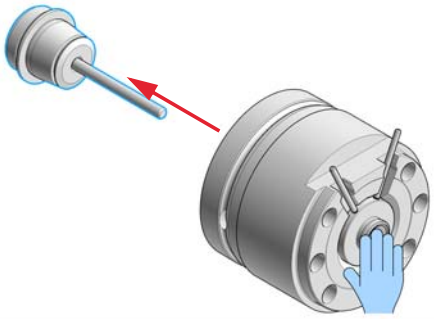
8 Remove the pump head screws from the back of the pump heads.



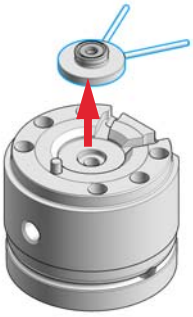
9 Open the pump heads and remove the piston housings from the pump chambers.



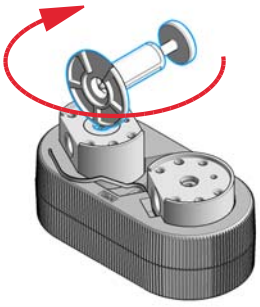
10 Remove the piston by pressing it out of the seal holder with a finger.



11 Remove the seal holder from the spring housing.



12 Screw the pin of the seal handling device into the piston seal.



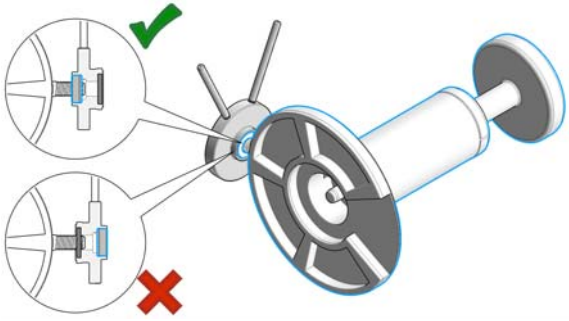
13 Pull out the Seal Handling Device with the piston seal in a straight movement with only gentle force.

14 Repeat for the other pump chamber.

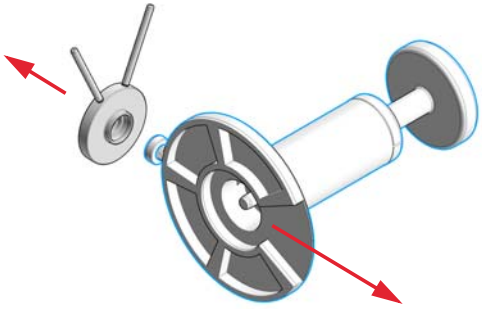
15 Screw the pin of the seal handling device into the wash seal.

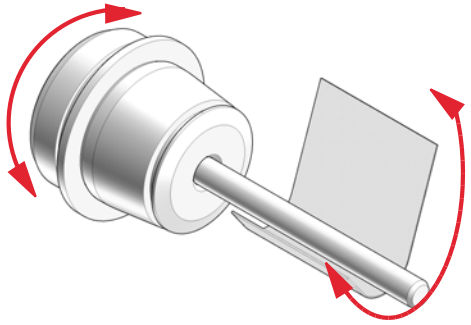
NOTE

The seal holder has two different sides. The black backup ring is supporting the piston seal and must not be removed. The side with the backup ring has a bigger diameter and a sharp edge to hold the piston seal. The other side has no sharp edge and holds the smaller wash seal.



16 Pull out the Seal Handling Device with the wash seal in a straight movement with only gentle force.



17 Repeat for the other seal holder.	**18** Clean the piston with abrasive paper. 
19 Rinse pump heads and pistons with isopropanol.	

Replace the Heat Exchanger

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

Parts required	#	p/n	Description
	1	G4220-81013	Heat Exchanger Channel A (secondary pump head only)
OR	1	G4220-81012	Heat Exchanger Channel B (secondary pump head only)

Preparations

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

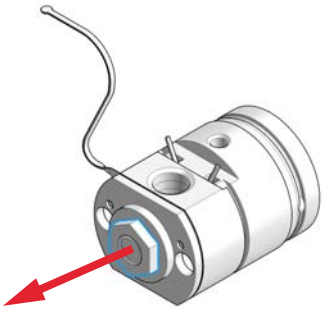
CAUTION

Loss of small spacer fitting

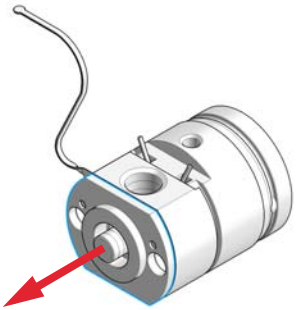
Inside the secondary pump head is a small spacer fitting, which can be dropped easily when removing the heat exchanger.

➔ The heat exchanger does not need to be removed for pump head maintenance.

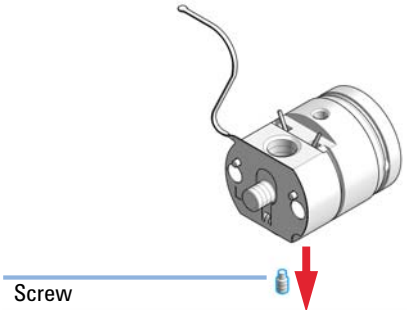
1 Remove the 19 mm screw at the front of the secondary pump head.



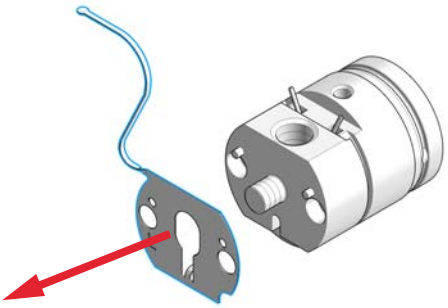
2 Remove the front plate.



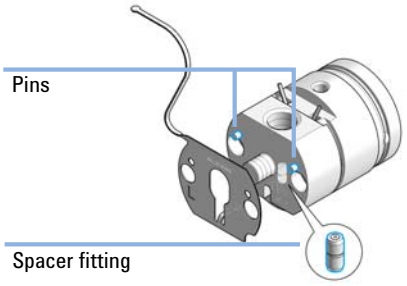
3 Remove the screw at the bottom of the pump head. Do not drop the golden spacer fitting.



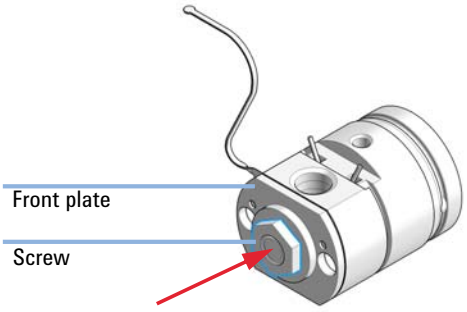
4 Lift out the heat exchanger.



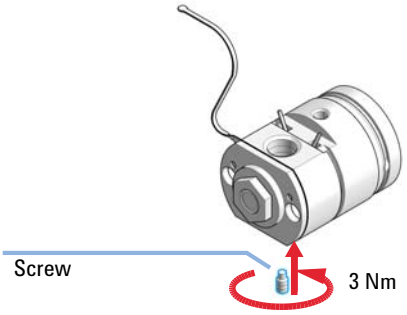
5 If removed, first insert the spacer fitting. Then insert the new heat exchanger to the opening in the pump head and lift it over the pins.



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



7 Insert and fix the screw.



Assemble LongLife Pump Heads

This procedure shows how to exchange seals, and reassemble the pump head assembly.

Exchanging seals is exemplarily shown for the primary pump head, but works in the same way for the secondary pump head.

Tools required

p/n	Description
G7120-68708	HPLC System Tool Kit-Infinity-II
5067-5688	Torque wrench 1 – 25 Nm with 14 mm wrench
G4220-20013	4 mm hex bit
G4220-20015	Adapter ¼ in square to hex
G4220-20041	Bit Torx 10x25 mm
5043-1400	Pump Head Holder
5067-6197	Seal Handling Device
	Isopropanol

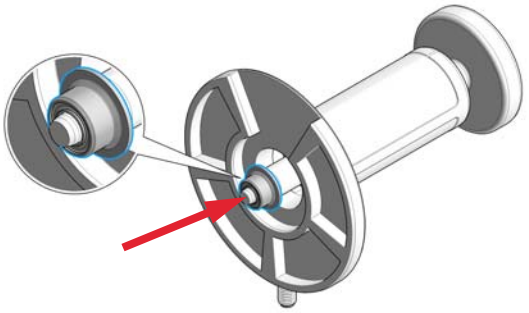
Parts required

#	p/n	Description
2	0905-1719	PE Seal
2	0905-1175	Wash seal (PTFE)

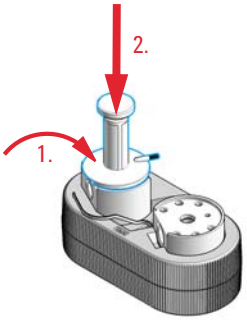
NOTE Seals must be exchanged in both primary and secondary pump heads.

1 Lubricate the seals, the seal holder, and the pump chambers with isopropanol.

2 Place the piston seal onto the designated nose of the Seal Handling Device. The metal spring of the piston seal must be visible.

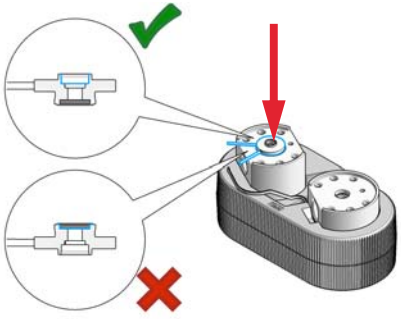


3 Take care that the Seal Handling Device is seating flush and press the seal into the pump chamber.



4 Repeat for the other pump chamber.

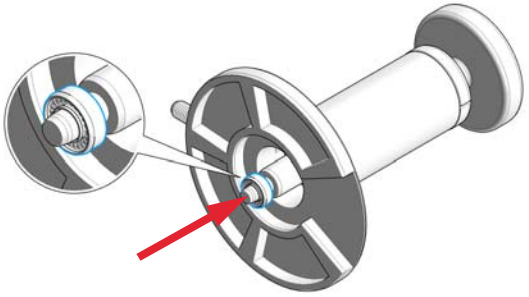
5 Place the seal holder onto the pump chamber.



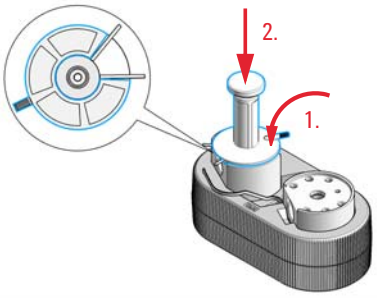
NOTE

Mind the correct orientation of the seal holder. The backup ring must face down.

6 Place the wash seal onto the designated nose of the Seal Handling Device. The metal spring of the wash seal must be visible.



7 Take care that the Seal Handling Device is seating flush and press the wash seal into the seal holder.

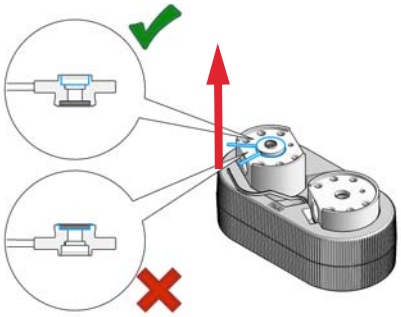


NOTE

The Seal Handling Device has a cavity to fit over the pins of the seal wash tubings.

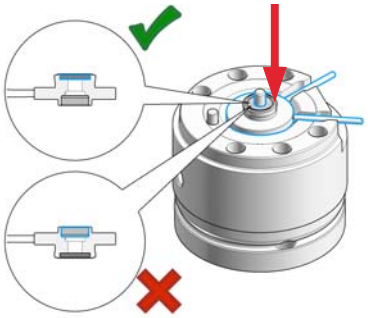
8 Repeat for the other seal holder.

9 Remove the seal holders from the pump chambers.



10 Lubricate the piston with isopropanol and place it into the spring housing.

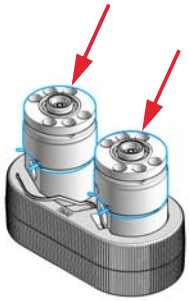
11 Place the seal holder onto the spring housing.



NOTE

Mind the correct orientation: The backup ring must face upwards and the seal holder must sit correcly.

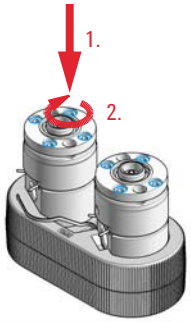
12 Place the assembled spring housings on top of the pump chambers.



NOTE

Both spring housings are identical, there is no risk when mixing them, but make sure that the seal holder is oriented correctly.

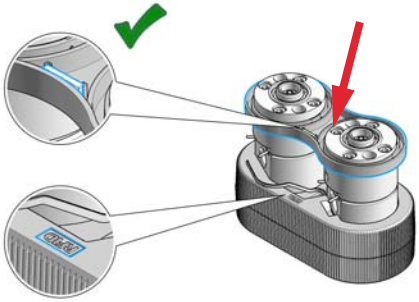
13 Place the screws into the pump heads and loosely tighten them in a crosswise manner.



NOTE

The spring housing will tilt slightly when the first screw is hand tightened. Stop at this point and continue to tighten the three other screws in a crosswise manner.

14 Mind the correct orientation of the link plate and click it into place.



NOTE

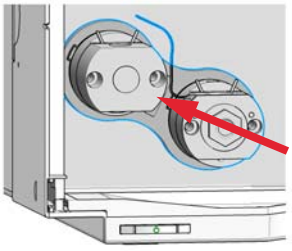
The Pump Head Holder has a marker to illustrate the correct placement of the link plate. The link plate holds an identification tag; this has to be placed onto the correct position to be readable by the pump.

15 Tighten the pump head screws with a torque wrench set to 5 Nm in a crosswise manner.

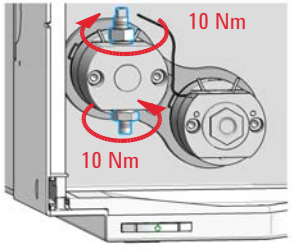
NOTE

When the wrench clicks, the set torque is reached. Do not overtighten the screws.

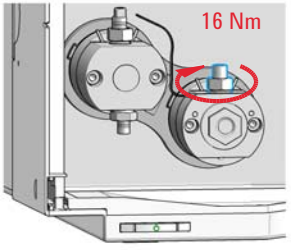
16 Mount the pump head to the module. Do not fix the screws at this stage!



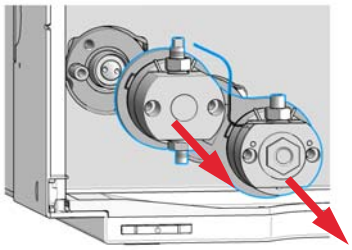
17 Screw in the inlet valve and the outlet valve and fix them with a torque wrench set to 10 Nm.



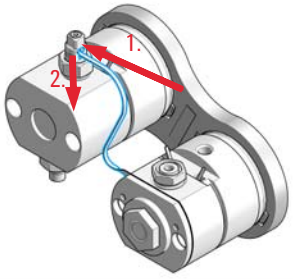
18 Binary/High Speed Pumps only: Screw in the high pressure filter and fix it with a torque wrench set to 16 Nm.



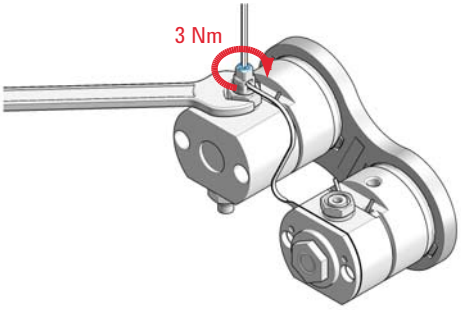
19 Remove the pump head from the module again.



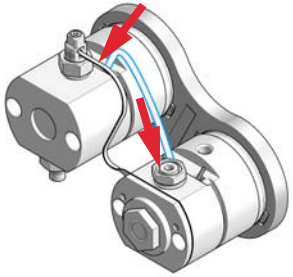
20 Position the entrance slit for the heat exchanger capillary to face exactly to it, and then seat the heat exchanger capillary back into the outlet valve by moving it into the valve and pressing it down.



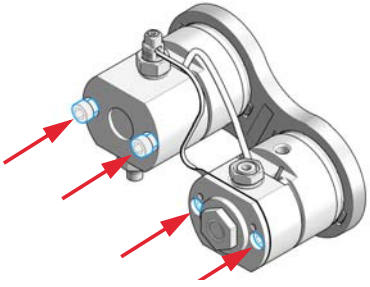
21 Counter the outlet valve and tighten the lock screw of the heat exchanger capillary with a torque wrench set to 3 Nm.



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



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



Install the Pump Head Assembly

Tools required	p/n	Description
	G7120-68708	HPLC System Tool Kit-Infinity-II
	5067-5688	Torque wrench 1 – 25 Nm with 14 mm wrench
	G4220-20013	4 mm hex bit
	G4220-20015	Adapter ¼ in square to hex

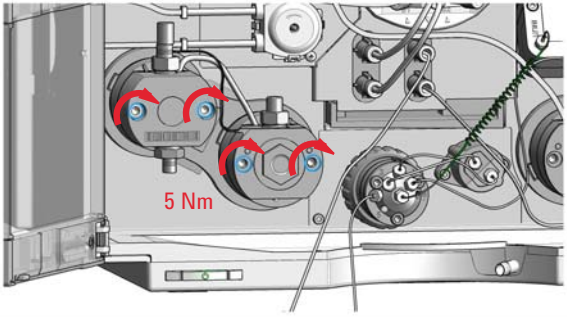
1 Bring the pump drive to the maintenance position using the Lab Advisor user interface: Go to **Service & Diagnostics > Remove/Install Pump Head** and follow instructions given on the screen. Both pump drives must be retracted.

CAUTION

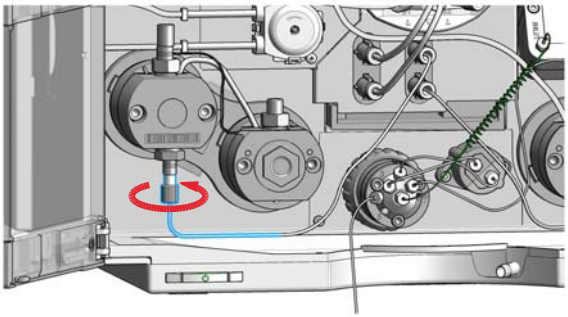
Damage to the pump head
Using a wrong torque will damage the pump head.

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

2 Install the new pump head assembly by tightening the screws step by step. Apply 5 Nm using a torque hex key, which is included to the 1290 Infinity Service Kit p/n 5067-4699.



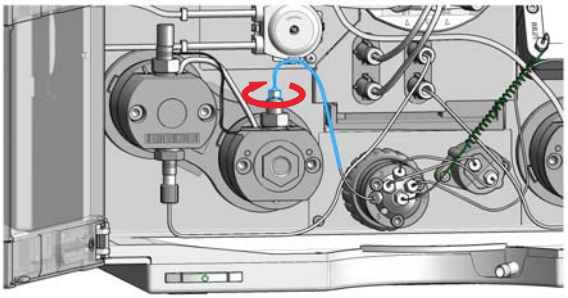
3 Connect the degassing unit outlet to the inlet of the primary pump head.



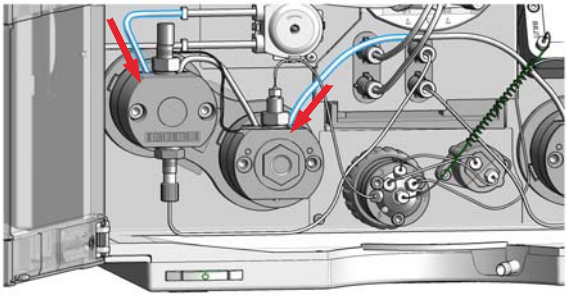
4 Connect the outlet of the secondary pump head to the inlet of the purge valve.

NOTE

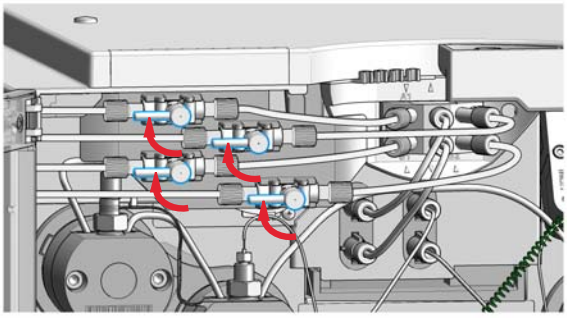
Channel A (left pump head assembly) is connected to port 4, channel B (right pump head assembly) to port 1 of the purge valve.



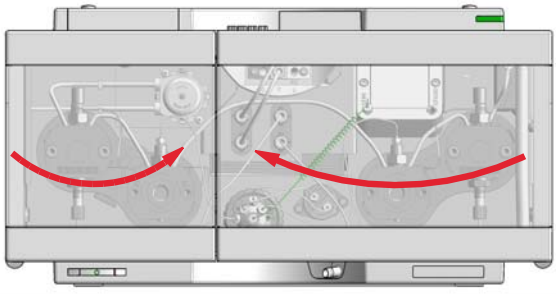
5 Replace the seal wash tubes.



6 Open the shut-off valves.



7 Close the doors.



8 Perform a Pump Leak Rate Test.

Replace the Outlet Valve

When If Outlet valve is defective.

Tools required

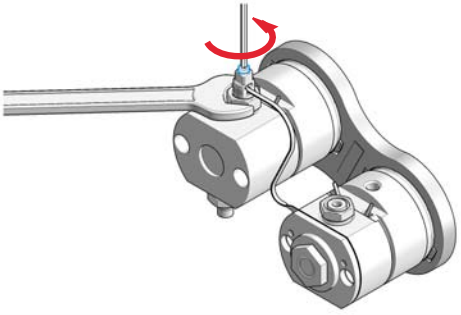
p/n	Description
8710-0510	Wrench open 1/4 — 5/16 inch
8710-2603	Spanner-double open ended 12X14 mm Chrome
G4220-20012	Torque wrench 2 – 25 Nm
G4220-20041	Bit Torx 10x25 mm

Parts required

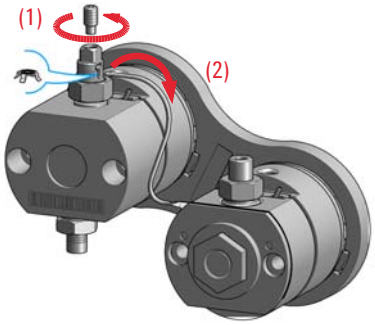
p/n	Description
G4220-60028	Outlet valve (primary pump head)
G4220-20020	Internal gold seal for Outlet Valve

Preparations

- Switch off pump at the main power switch
- Open the doors
- Use an optional solvent shutoff valve or lift up solvent filters inside solvent bottles for avoiding leakages
- Remove the pump head from the module

1 Remove the cap from the outlet valve.	**2** Counter the outlet valve while opening the lock screw of the heat exchanger capillary. 

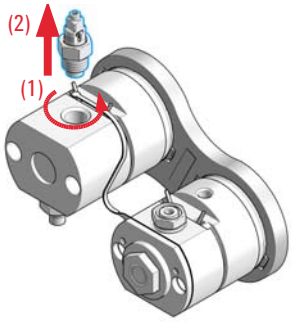
3 Remove the heat exchanger capillary by pushing the connector up and pulling it out of the valve.



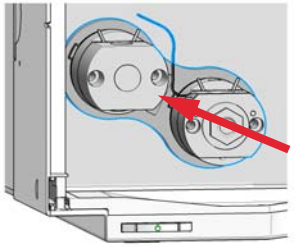
NOTE

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

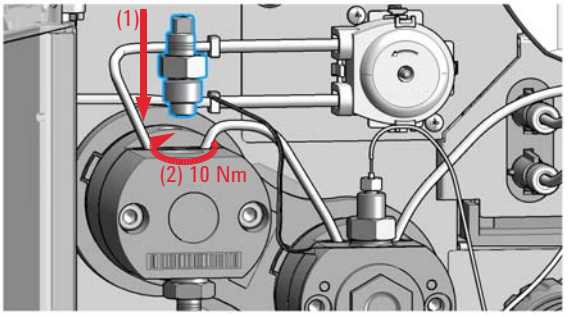
4 Unscrew the outlet valve with a 14 mm wrench (1) and remove it (2).



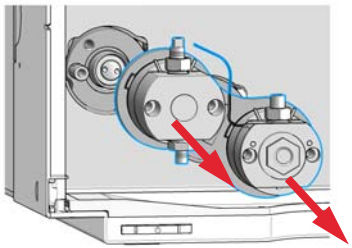
5 Mount the pump head to the module. Do not fix the screws at this stage!



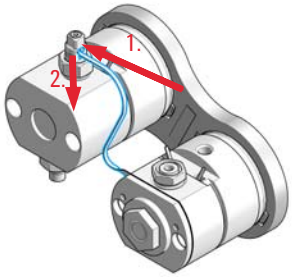
6 Insert the outlet valve into the pump head (1). Using a torque wrench, set 10 Nm and close the outlet valve (2).



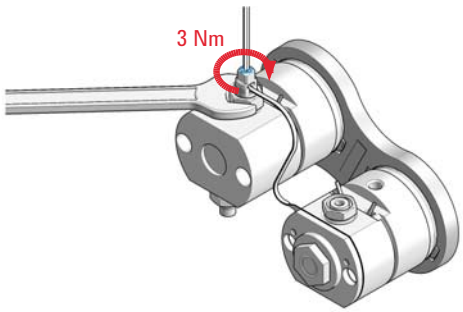
7 Remove the pump head from the module again.



8 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.



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



Next Steps:

10 Place the cap on the Outlet Valve.

11 Mount the pump head assembly to the module, reconnect all hydraulic connections, and power up the pump.

12 Open the shut off valves and purge the system to remove air.

Replace the Purge Valve Head

When In case of problems with the purge valve

Parts required

p/n	Description
5067-4236	Purge valve head
5067-4655	Capillary ST, 0.25 mm x 235 mm
G4220-87000	Capillary ST 0.17 mm x 300 mm
01090-87308	Capillary ST, 0.25 mm x 130 mm

Preparations Remove all capillary connections to the purge valve

CAUTION

Potential damage of valve head or malfunction of valve

When the pump is switched on, the valve tag is accessed (read/write) and used for correctly positioning the valve.

If the valve head is replaced while the pump is on, invalid information may be written to the valve head making it unusable, or positioning may be wrong resulting in wrong flow connections inside the valve potentially damaging parts.

➔ Switch off the pump before working on the purge valve.

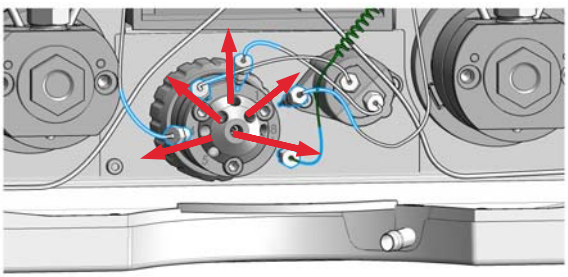
CAUTION

Bias measurement results

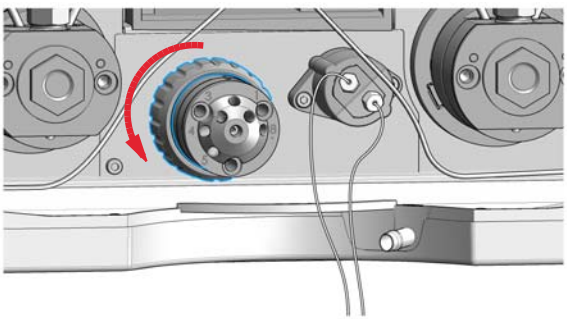
The valve drive contains sensitive optical parts. Pollution of these parts can impair the accurate selection of valve ports and therefore bias measurement results.

➔ Protect the optical parts from dust and other pollutions.

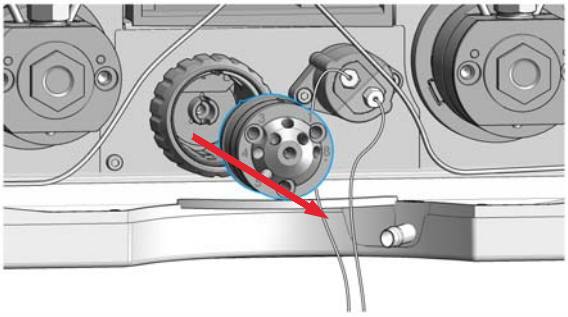
1 Remove all capillary connections.



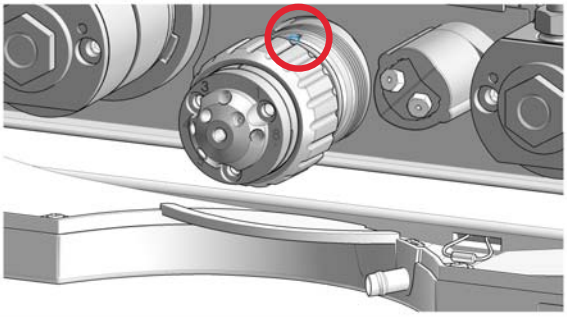
2 Unscrew the black union nut.



3 Remove the head of the purge valve by pulling it to the front.

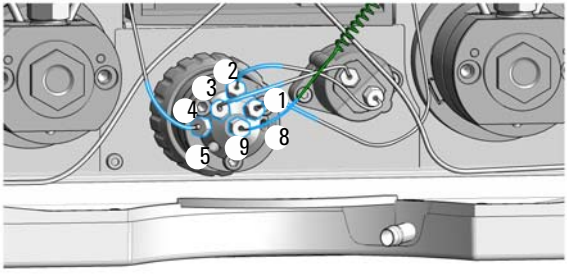


4 Put the new valve head onto the valve drive such that the lobe fits to the groove. Screw the valve head onto the valve drive using the union nut.



5 Install all flow connections:

- Port 1: Channel B
- Port 2: Pressure sensor, out
- Port 3: Pressure sensor, in
- Port 4: Channel A
- Ports 5 and 8: Waste capillaries, channels A and B
- Port 9: Central port, connected to the Jet Weaver inlet



Replace Parts of the High Pressure Filter Assembly

When

For removing blockages and leaks in the high pressure filter assembly. The filter frit in the outlet valve should be replaced regularly depending on the system usage.

Tools required

p/n	Description
5067-5688	Torque wrench 1 – 25 Nm with 14 mm wrench
8710-0510	Wrench open 1/4 — 5/16 inch

Parts required

p/n	Description
5067-4728	Seal cap
01018-22707	PTFE frits (pack of 5)

CAUTION

Leakage or damaged connection

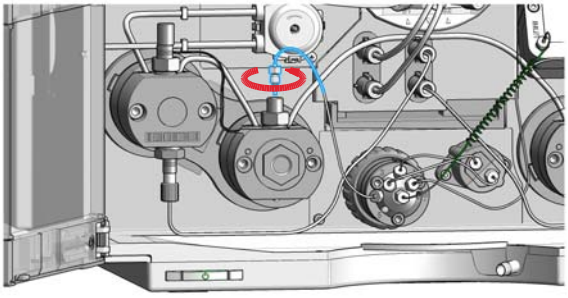
Opening the outlet of the primary pump head may cause leaks or damage the connection between the pump heads.

➔ Do not open the outlet of the primary pump head.

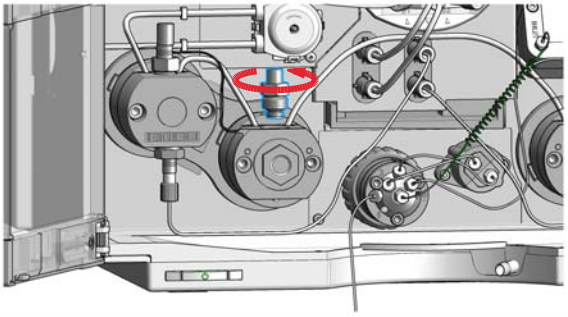
NOTE

This procedure describes replacements for channel A (left pump head assembly) and can be applied accordingly to channel B. In both cases, maintenance is done only at the secondary pump head outlet, which hosts the filter frit.

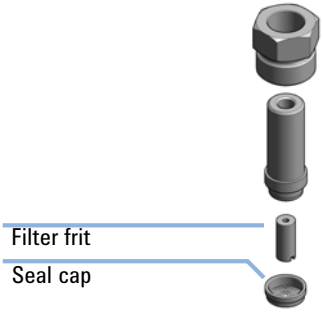
1 Remove the capillary connection from the outlet of the secondary pump head.



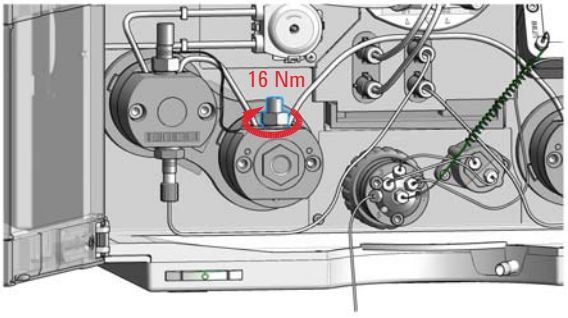
2 Use a 14 mm hex wrench for opening the filter assembly of the secondary pump head.



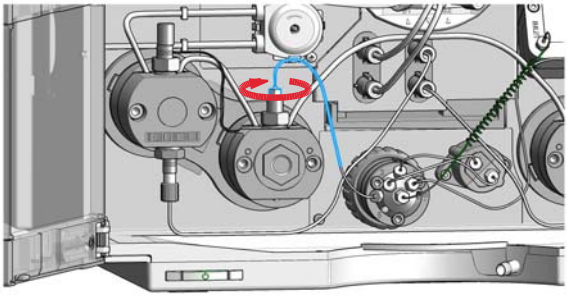
3 Replace the filter frit and seal cap as desired. Please note the correct orientation of the filter frit.



4 Re-install the filter assembly using the torque wrench (14 mm hex bit) set to 16 Nm.



5 Reconnect the capillary from the purge valve to the high pressure filter assembly.



Replace the Module Firmware

When

The installation of newer firmware might be necessary
- if a newer version solves problems of older versions or
- to keep all systems on the same (validated) revision.

The installation of older firmware might be necessary
- to keep all systems on the same (validated) revision or
- if a new module with newer firmware is added to a system or
- if third party control software requires a special version.

Tools required

	Description
	Agilent Lab Advisor software
OR	Instant Pilot G4208A (only if supported by module)

Parts required

#	Description
1	Firmware, tools and documentation from Agilent web site

Preparations

Read update documentation provided with the Firmware Update Tool.

To upgrade/downgrade the module's firmware carry out the following steps:

1 Download the required module firmware, the latest FW Update Tool and the documentation from the Agilent web.
http://www.agilent.com/en-us/firmwareDownload?whid=69761

2 For loading the firmware into the module follow the instructions in the documentation.

Module Specific Information

There is no specific information for this module.

Prepare the Pump Module for Transport

When If the module shall be transported or shipped.

Parts required

p/n	Description
9301-0411	Syringe; Plastic
9301-1337	Syringe adapter
G7120-44000	Protective Foam

Preparations Flush both solvent channels with isopropanol.

WARNING

Heavy weight

The module is heavy (>22 kg (>46 lbs)).

- ➔ Carry the module at least with 2 people.
- ➔ Avoid back strain or injury by following all precautions for lifting heavy objects.
- ➔ Ensure that the load is as close to your body as possible.
- ➔ Ensure that you can cope with the weight of your load.

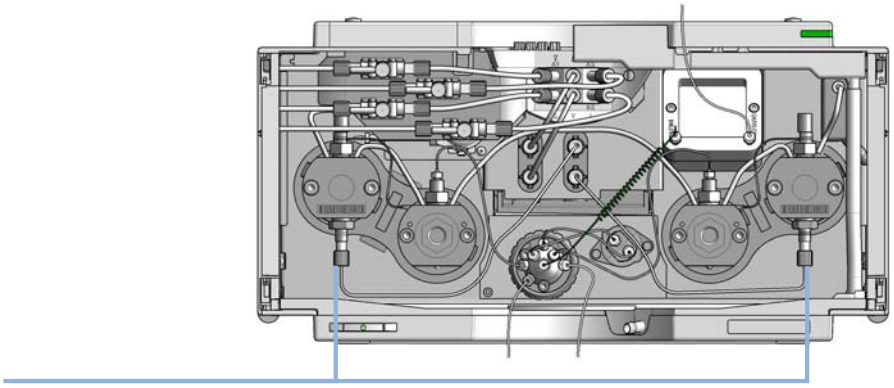
CAUTION

Mechanical damage

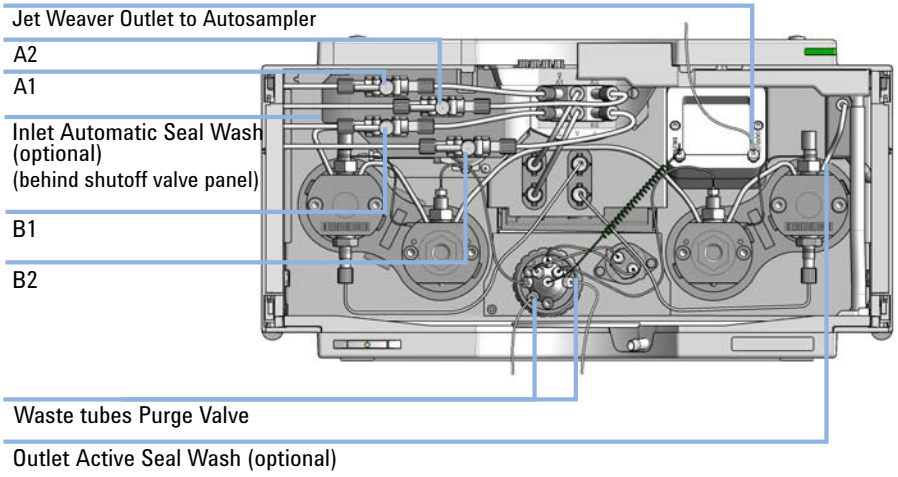
- ➔ For shipping the module, insert the Protective Foam to protected the module from mechanical damage.
- ➔ Be careful not to damage tubing or capillary connections while inserting the module in the Protective Foam.

1 Flush system with appropriate storage solution, for example 20 % isopropanol in water.

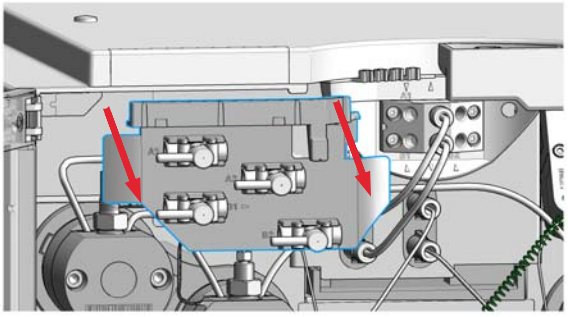
2 Remove solvent inlets from solvent reservoirs. Disconnect the solvent tubing from the inlet of primary pump heads for both solvent channels. Use a syringe for removing liquid from the solvent tubings between solvent reservoir, shutoff valve panel, solvent selection valve, degassing unit and pump inlets. Switch the solvent selection valve if applicable.



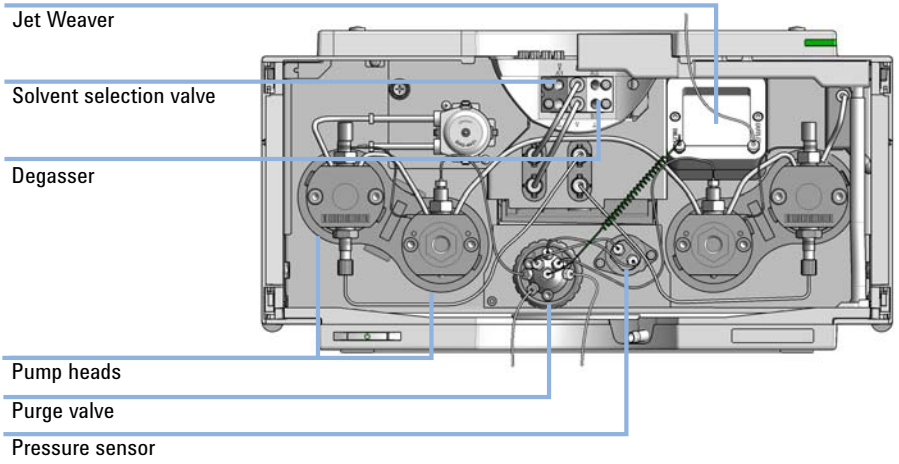
3 Remove tubing and capillary connections to other modules and the solvent cabinet. Remove tubing plugs.



4 Remove the shutoff valve panel by pulling it downwards.

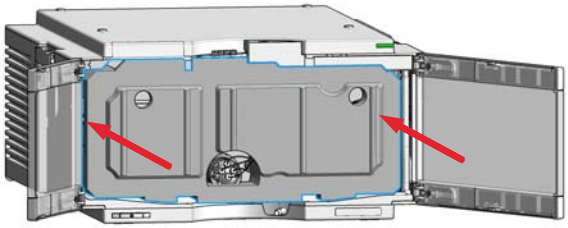


5 You may keep internal tubing and capillary connections.



6 Remove cable connections to other modules. Remove the module from the stack.

7 Carefully insert the Protective Foam to the front part of the instrument. Do not damage any tubing or capillary connections.



8 Close the front cover.

9 For transport or shipment, put the module and accessory kit to the original shipment box.

8
Parts and Materials for Maintenance

This chapter provides information on parts for maintenance.

Overview of Maintenance Parts

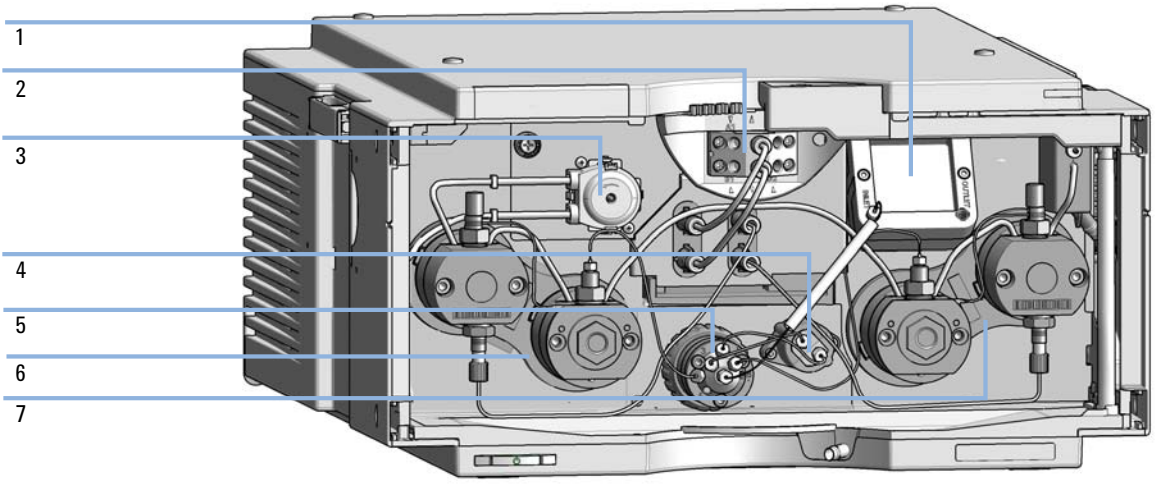


Figure 11 Overview of main assemblies

Item	p/n	Description
1	G4220-60027	Jet Weaver 35 µL/100 µL
1	G4220-60012	Jet Weaver 380 µL (OPTIONAL)
2	G7120-60029	SSV Valve Assembly
3	5065-4445	Peristaltic pump with Pharmed tubing
4	G7104-60001	Pressure sensor 1300 bar
5	5067-4236	Purge valve head
6	G4220-60350	Long Life Pump Head Channel A
7	G4220-60360	Long Life Pump Head Channel B

Flow Connections

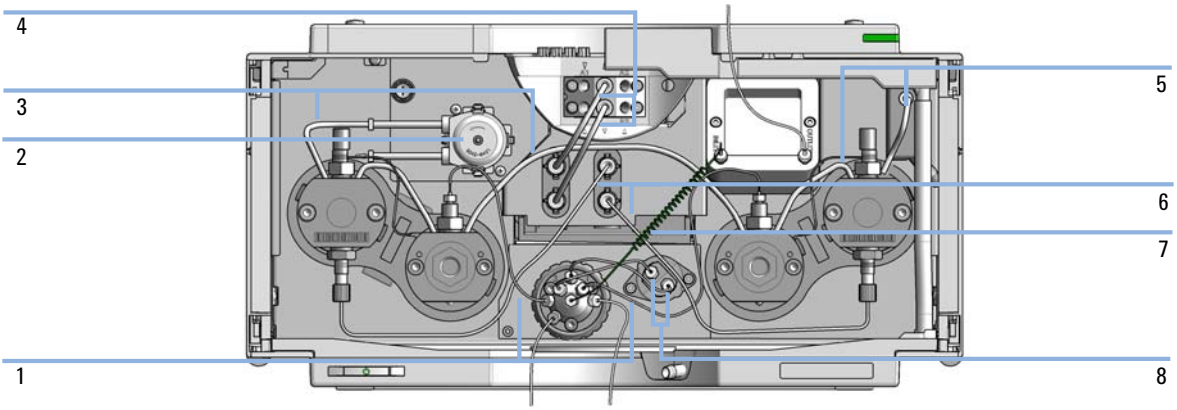


Figure 12 Flow connections of the High Speed Pump

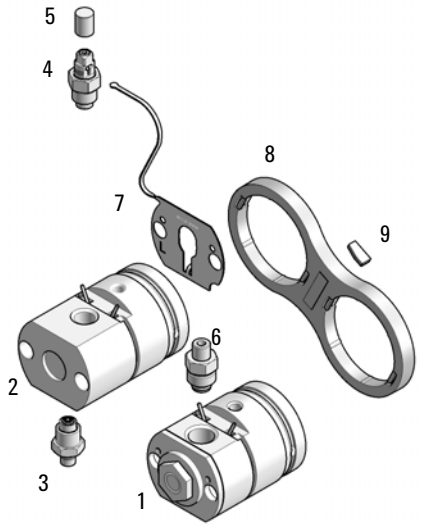
Item	#	p/n	Description
1	2	5067-4655	Capillary ST, 0.25 mm x 235 mm purge valve to pump head assemblies channel A and B
2	1	5065-4445	Peristaltic pump with Pharmed tubing
3, 5	1	5065-9978	Tubing, 1 mm i.d., 3 mm o.d., silicone, 5 m
4	2	G4220-60035	Tubing kit 140 mm, 2/pk SSV to shutoff valve or degassing unit
6	1	5067-4661	Tubing kit 270 mm for connection of degassing unit to inlet valve (set of 2 tubes)
7	1	G4220-87000	Capillary ST 0.17 mm x 300 mm Valve to Jet Weaver
8	2	01090-87308	Capillary ST, 0.25 mm x 130 mm purge valve to pressure sensor
	1	G7120-40004	Valve Holder Left (not shown)
	4	5067-4124	Shutoff valve (not shown)
	4	G7120-60007	Bottle Head Assembly (not shown)
	1	G7120-68070	Ultra Clean Tubing Kit (includes bottle head assemblies and tubing connections within the pump)
	2	G4220-60070	Tubing Kit 140 mm - Ultra Clean Tubing (tubes from SSV to shutoff valve or degassing unit to MCGV)
	4	G7120-60017	Bottle Head Assembly Ultra Clean Tubing (bottle heads and tubing to shutoff panel / degasser)
	1	5067-5760	Solvent Cabinet Kit (not shown)

Pump Heads

The following pages contain parts information for LongLife Pump Heads.

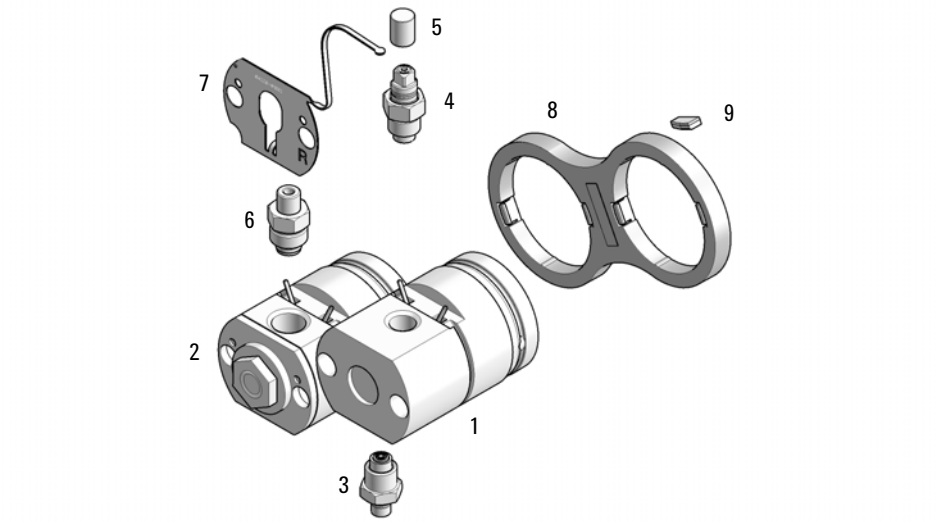
For parts information on other pump head types, please refer to Agilent 1290 Infinity II Easy Maintenance Pump Head Technical Note (01200-90120) and to Agilent 1290 Infinity Pump Head Maintenance Technical Note (G4220-90122).

Pump Head Assembly Parts



Long Life Pump Head Channel A (G4220-60350)

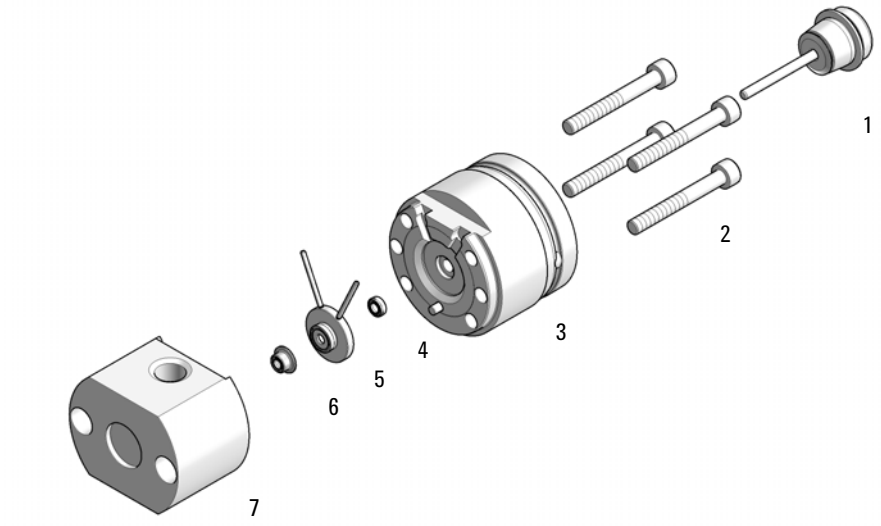
Item	p/n	Description
1	G4220-60660	Secondary Pump Head Assembly Pendulum
2	G4220-60661	Primary Pump Head Assembly Pendulum
3	G4220-60022	Inlet valve (primary pump head)
4	G4220-60028	Outlet valve (primary pump head)
5	5042-9966	Cap Outlet Valve
6	G4280-60026	High Pressure Filter Assembly (secondary pump head)
7	G4220-81013	Heat Exchanger Channel A (secondary pump head only)
8	G4220-40001	Link Plate
9	0960-2971	RF Transponder



Long Life Pump Head Channel B (G4220-60360)

Item	p/n	Description
1	G4220-60660	Secondary Pump Head Assembly Pendulum
2	G4220-60661	Primary Pump Head Assembly Pendulum
3	G4220-60022	Inlet valve (primary pump head)
4	G4220-60028	Outlet valve (primary pump head)
5	5042-9966	Cap Outlet Valve
6	G4280-60026	High Pressure Filter Assembly (secondary pump head)
7	G4220-81012	Heat Exchanger Channel B (secondary pump head only)
8	G4220-40001	Link Plate
9	0960-2971	RF Transponder

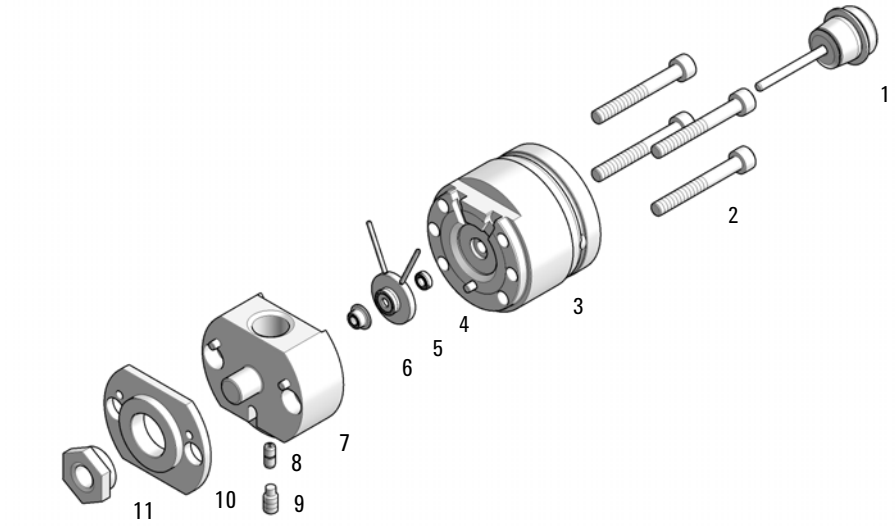
Primary Pump Head Parts



Primary Pump Head Assembly Pendulum (G4220-60661)

Item	p/n	Description
1	5067-5975	Plunger Assy ZrO_2 LL
2	0515-6154	Screw-Socket-HD-Cap Hex-Recess M5X0.8 40
3	G4220-60046	Preload-Support Assembly LL
4	0905-1175	Wash seal (PTFE)
5	G4220-60616	Seal Holder Integrated Assembly EM/LL
6	0905-1719	PE Seal
7	G4220-60533	Body Head Primary EM/LL

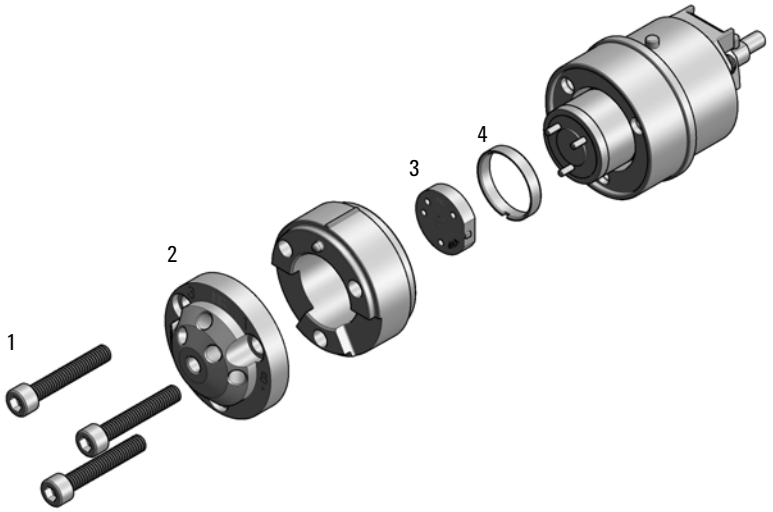
Secondary Pump Head Parts



Secondary Pump Head Assembly Pendulum (G4220-60660)

Item	p/n	Description
1	5067-5975	Plunger Assy ZrO_2 LL
2	0515-6154	Screw-Socket-HD-Cap Hex-Recess M5X0.8 40
3	G4220-60046	Preload-Support Assembly LL
4	0905-1175	Wash seal (PTFE)
5	G4220-60616	Seal Holder Integrated Assembly EM/LL
6	0905-1719	PE Seal
7	G4220-25513	Body Head Secondary EM/LL
8	G4220-20001	Spacer Fitting
9	G4220-20028	Headless screw for 1290 Infinity pump heads
10	G4220-20000	LID
11	G4220-20003	Pump Head Screw

Purge Valve



Item	p/n	Description
	5067-4236	Purge valve head
1	1535-4857	Stator screws
2	5068-0004	Purge Valve Stator
3	5068-0201	Purge Valve Rotor Seal, polyimide, 1300 bar
4	1535-4045	Bearing ring

Cover Parts

p/n	Description
G7120-68713	Cabinet Kit Infinity II 200 (includes sides, bottom, top, leak adapter top and Status Indicator Insert)
5043-0286	Base Cover
5067-5908	Top Cover
G4224-60200	Side Cover Right 200
G4224-60201	Side Cover Left 200
5043-0856	Leak Adapter (not shown)
5067-5767	Door assy 200 left IF II
5067-5768	Door assy 200 right IF II

Accessory Kit

Accessory kit (G7120-68705) contains the following parts:

p/n	Description
0100-1816	Fitting Waste Tube to Purge Valve
0890-2207	Tubing/Sleeving-Flex
5043-1013	Tubing Clip
5067-4124	Shutoff valve
5500-1245	Capillary ST 0.17 mm x 400 mm SI/SI
5181-1519	CAN cable, Agilent module to module, 1 m
5500-1155	Tube Connector, 90 degree, ID 6.4
5965-0050	CARTON-CORRUGATED
9222-0518	Bag - plastics
9301-1337	Syringe adapter
9301-6476	Syringe with luerlock 5 mL Polypropylene
G4220-60035	Tubing kit 140 mm, 2/pk
5063-6527	Tubing assembly, i.d. 6 mm, o.d. 9 mm, 1.2 m (to waste)
5500-1156	T-Tube Connector ID6.4
5500-1169	Y Tube Connector ID6.4
5500-1217	Capillary ST 0.17 mm x 900 mm SI/SX ps-ps
G7120-60005	Valve Holder left assembly INF II
01200-90091	1290 Infinity Pump Quick Reference Sheet
5067-6197	Seal Handling Device
5043-1400	Pump Head Holder

HPLC System Tool Kit

HPLC System Tool Kit-Infinity-II (G7120-68708) contains the following items:

p/n	Description
9301-0411	Syringe; Plastic
9301-1337	Syringe adapter
0100-1710	Mounting Tool for Tubing Connections
8710-0510	Wrench open 1/4 — 5/16 inch
8710-1924	Wrench open 14 mm
01018-23702	Insert tool
0100-1681	Syringe adapter luer/barb
8710-2394	Hex key 9/64 inch 15 cm long T-handle
8710-1534	Wrench, 4 mm both ends, open end
8710-2409	Wrench open end, 5/16 – 3/8 inch
8710-0899	Pozidriv screwdriver
5974-0052	Case (LC tool KIT)
5974-0055	Corrigated carton for LC tool KIT
5023-2500	Spanner double open ended SW-5
5023-2504	Hex driver SW-4 slitted
5023-2503	Hex driver SW-5 slitted
5023-2502	Hex driver SW-6.35, slitted
5023-2501	Screwdriver Torx-T10
5023-2499	Hex Key Set
5043-1361	Hex Key Set Driver
8720-0025	Wrench, 1/2 inch & 9/16 inch
5067-6127	Blank Nut SL
G7120-90120	1290 IF-II System tool Kit Tech Note ENG

9
Identifying Cables

This chapter provides information on cables used with the modules.

Cable Overview

NOTE Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

Analog cables

p/n	Description
35900-60750	Agilent 35900A A/D converter
01046-60105	Analog cable (BNC to general purpose, spade lugs)

Remote cables

p/n	Description
5188-8029	ERI to general purpose
5188-8044	Remote Cable ERI – ERI
5188-8045	Remote Cable APG – ERI
5061-3378	Remote Cable to 35900 A/D converter
01046-60201	Agilent module to general purpose

CAN cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN cables

p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

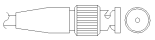
RS-232 cables (not for FUSION board)

p/n	Description
RS232-61601	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

USB cables

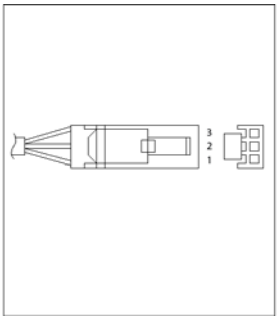
p/n	Description
5188-8050	USB A M-USB Mini B 3 m (PC-Module)
5188-8049	USB A F-USB Mini B M OTG (Module to Flash Drive)

Analog Cables

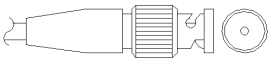


One end of these cables provides a BNC connector to be connected to Agilent modules. The other end depends on the instrument to which connection is being made.

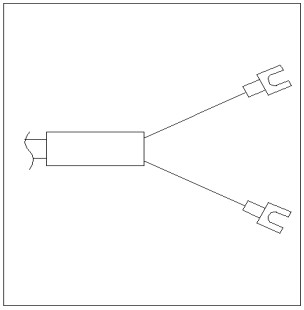
Agilent Module to 35900 A/D converters

p/n 35900-60750	35900	Pin Agilent module	Signal Name
	1		Not connected
	2	Shield	Analog -
	3	Center	Analog +

Agilent Module to BNC Connector

p/n 8120-1840	Pin BNC	Pin Agilent module	Signal Name
	Shield	Shield	Analog -
	Center	Center	Analog +

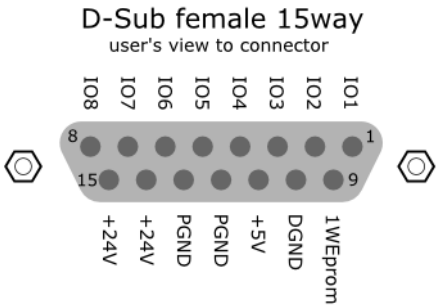
Agilent Module to General Purpose

p/n 01046-60105	Pin	Pin Agilent module	Signal Name
	1		Not connected
	2	Black	Analog -
	3	Red	Analog +

Remote Cables

ERI (Enhanced Remote Interface)

5188-8029 ERI to general purpose

p/n 5188-8029	pin	Color code	Enhanced Remote	Classic Remote	Active (TTL)
	1	white	IO1	START REQUEST	Low
	2	brown	IO2	STOP	Low
	3	green	IO3	READY	High
	4	yellow	IO4	POWER ON	High
	5	grey	IO5	NOT USED	
	6	pink	IO6	SHUT DOWN	Low
	7	blue	IO7	START	Low
	8	red	IO8	PREPARE	Low
	9	black	1wire DATA		
	10	violet	DGND		
	11	grey-pink	+5V ERI out		
	12	red-blue	PGND		
	13	white-green	PGND		
	14	brown-green	+24V ERI out		
	15	white-yellow	+24V ERI out		
	NC	yellow-brown			

5188-8044 ERI to ERI (Connector D_Subminiature 15 pin)

Table 9 5188-8044 ERI to ERI

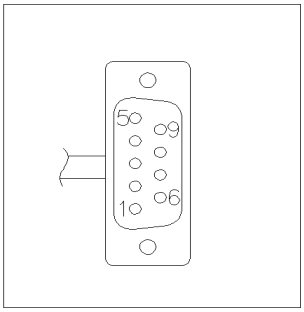
p/n 5188-8044	Pin (ERI)	Signal	Pin (ERI)	Active (TTL)
	10	GND	10	
	1	Start Request	1	Low
	2	Stop	2	Low
	3	Ready	3	High
	5	Power on	5	High
	4	Future	4	
	6	Shut Down	6	Low
	7	Start	7	Low
	8	Prepare	8	Low
	Ground	Cable Shielding	NC	

5188-8045 ERI to APG (Connector D_Subminiature 15 pin (ERI), Connector D_Subminiature 9 pin (APG))

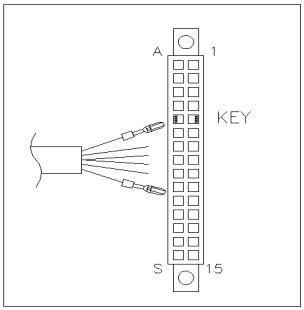
p/n 5188-8045	Pin (ERI)	Signal	Pin (APG)	Active (TTL)
	10	GND	1	
	1	Start Request	9	Low
	2	Stop	8	Low
	3	Ready	7	High
	5	Power on	6	High
	4	Future	5	
	6	Shut Down	4	Low
	7	Start	3	Low
	8	Prepare	2	Low
	Ground	Cable Shielding	NC	

One end of these cables provides a Agilent Technologies APG (Analytical Products Group) remote connector to be connected to Agilent modules. The other end depends on the instrument to be connected to.

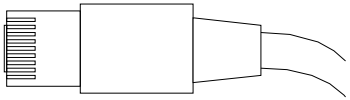
Agilent Module to Agilent 35900 A/D Converters

p/n 5061-3378	Pin 35900 A/D	Pin Agilent module	Signal Name	Active (TTL)
	1 - White	1 - White	Digital ground	
	2 - Brown	2 - Brown	Prepare run	Low
	3 - Gray	3 - Gray	Start	Low
	4 - Blue	4 - Blue	Shut down	Low
	5 - Pink	5 - Pink	Not connected	
	6 - Yellow	6 - Yellow	Power on	High
	7 - Red	7 - Red	Ready	High
	8 - Green	8 - Green	Stop	Low
	9 - Black	9 - Black	Start request	Low

Agilent Module to General Purpose

p/n 01046-60201	Wire Color	Pin Agilent module	Signal Name	Active (TTL)
	White	1	Digital ground	
	Brown	2	Prepare run	Low
	Gray	3	Start	Low
	Blue	4	Shut down	Low
	Pink	5	Not connected	
	Yellow	6	Power on	High
	Red	7	Ready	High
	Green	8	Stop	Low
	Black	9	Start request	Low

CAN/LAN Cables



Both ends of this cable provide a modular plug to be connected to Agilent modules CAN or LAN connectors.

CAN Cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN Cables

p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

Agilent Module to PC

p/n	Description
RS232-61601	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

USB

To connect a USB Flash Drive use a USB OTG cable with Mini-B plug and A socket.

p/n	Description
5188-8050	USB A M-USB Mini B 3 m (PC-Module)
5188-8049	USB A F-USB Mini B M OTG (Module to Flash Drive)