7 Maintenance

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This chapter describes the maintenance of the Agilent 1290 Infinity II Flexible Pump.

Introduction to Maintenance

Figure 15 on page 119 shows the main user-accessible assemblies of the Agilent 1290 Infinity II Flexible Pump. These parts can be accessed from the front (simple repairs) and don't require to remove the pump from the system stack.

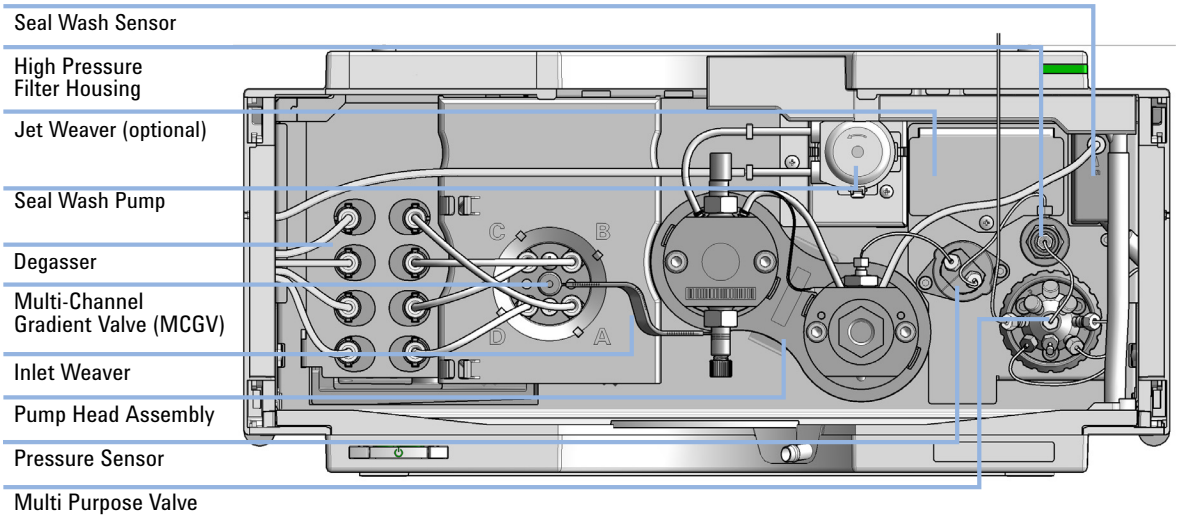


Figure 15 Overview of maintenance parts

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.

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

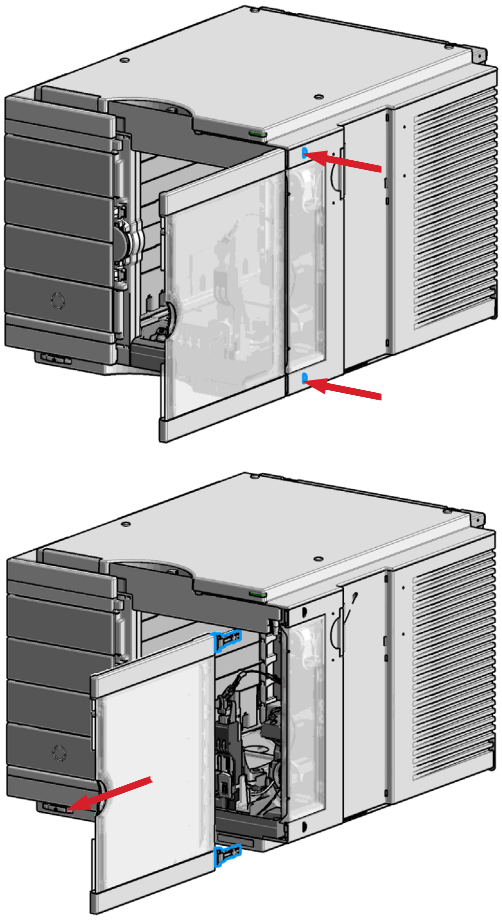
Parts required	p/n	Description
	5067-5745	Door Assembly Infinity 180 Left
	5067-5746	Door Assembly Infinity 180 Right

NOTE

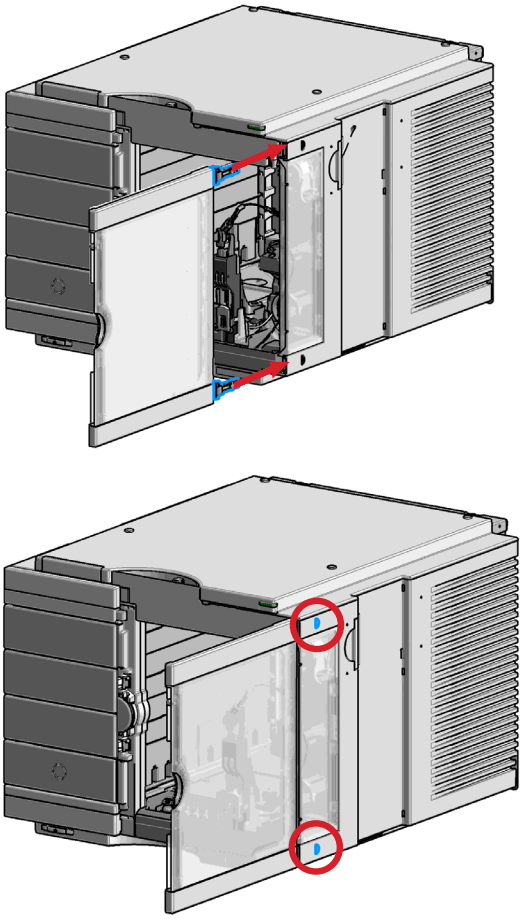
The figures shown in this procedure exemplarily show the Infinity II Multisampler module.

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 Pressure Sensor

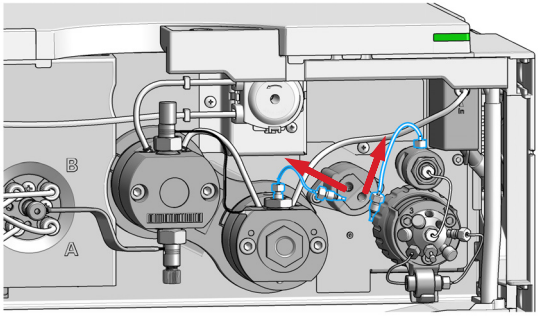
When	No or invalid pressure signal	
Tools required	**p/n**	**Description**
		Hexagonal key, 2.5 mm
	5023-2502	Hex driver SW-6.35, slitted
		Screwdriver
Parts required	**p/n**	**Description**
	G7104-60001	Pressure sensor 1300 bar
Preparations	Turn off pump flow, switch off pump	

NOTE This procedure describes how to replace the pressure sensor.

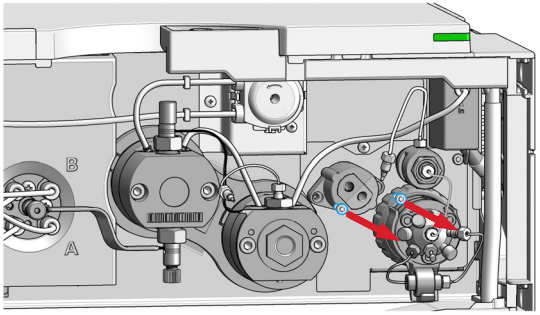
In case the cable to the sensor shall be replaced as well, please contact your Agilent service representative.

NOTE Working on connections to the pressure sensor may slightly change the displayed pressure. In case of a pressure offset at ambient pressure, a pressure offset calibration may be run.

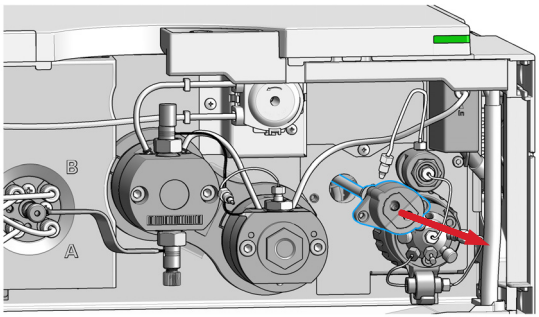
1 Remove capillary connections between the pressure sensor and the High Pressure Filter, and between the pressure sensor and the outlet adapter of the secondary pump head, respectively.



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

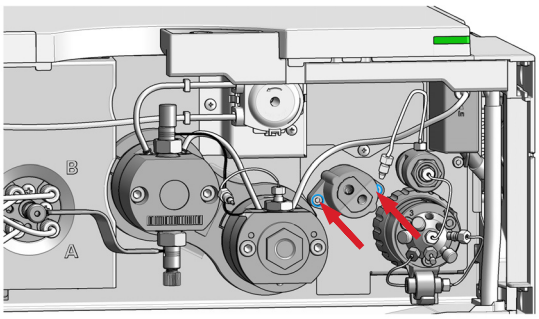


3 Carefully pull out the pressure sensor for about 2 cm. Then unscrew the cable from the pressure sensor.

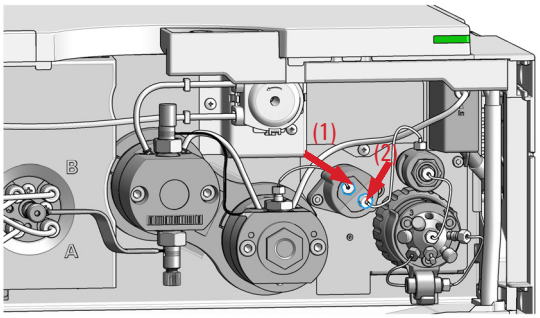


4 Connect the new pressure sensor to the pressure sensor connector.

5 Fix the pressure sensor to the instrument chassis.



6 Connect the capillary from the pump head outlet to the pressure sensor inlet (1). Connect the capillary from the high pressure filter to the pressure sensor outlet (2). Two arrow signs on the pressure sensor indicate the flow direction.



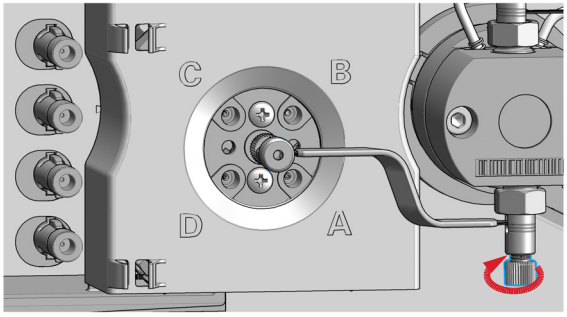
Replace the Inlet Weaver

Parts required	p/n	Description
	G4204-81090	1290 Infinity Quaternary Pump Inlet Weaver Assembly

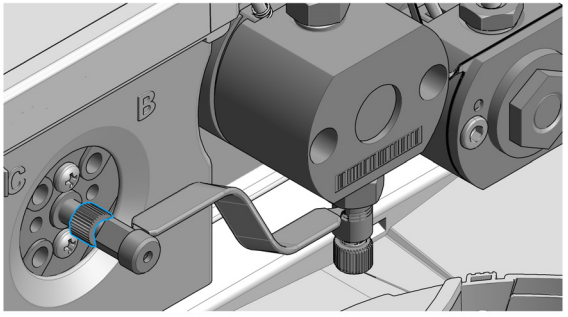
Preparations

- 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
- For easy access to the inlet weaver assembly, remove tubing connections between MCGV and degasser

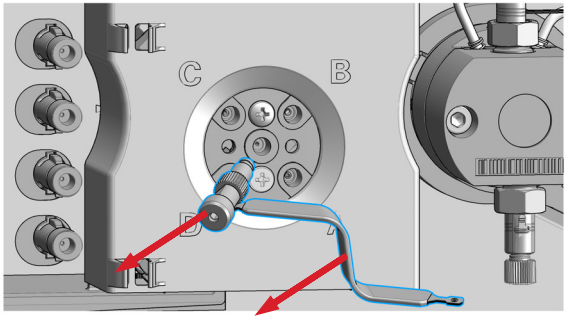
1 Open the screw at the bottom of the inlet valve.



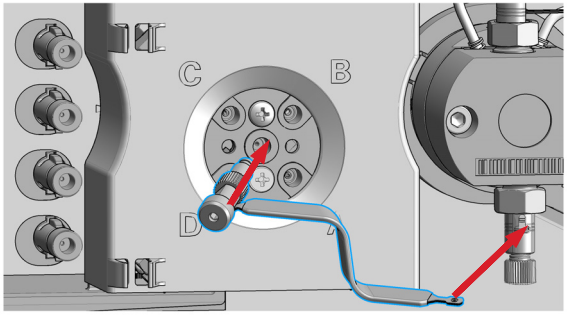
2 Open the fitting at the center of the multi-channel gradient valve (MCGV). Remove the inlet weaver from the MCGV.

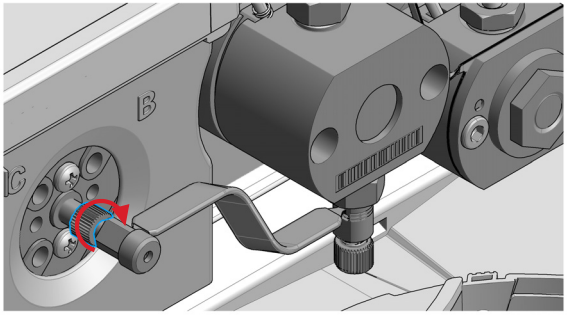


3 Pull the Inlet Weaver out of the Inlet Valve.



4 Insert the new inlet weaver to the inlet valve. Fix the weaver with the plastic screw.



5 Fix the fitting of the new inlet weaver to the MCGV. 	**6** Reconnect tubings between MCGV and degasser.

Replace the Inlet Valve

When If Inlet valve is defective.

Tools required

p/n	Description
	Wrench, 14 mm
5067-5688	Torque wrench 1 – 25 Nm with 14 mm wrench

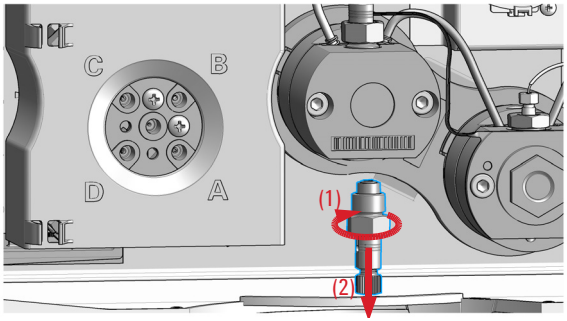
Parts required

p/n	Description
G4204-60022	Inlet Valve 1290 Infinity Quaternary Pump

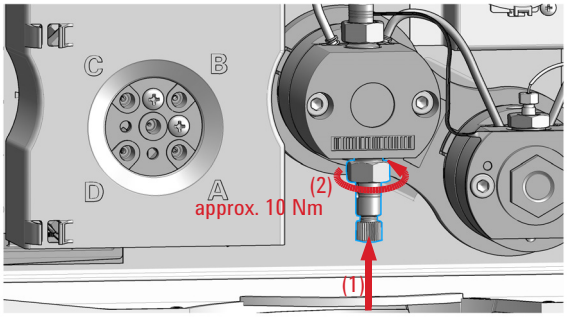
Preparations

- 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 inlet weaver, see "Replace the Inlet Weaver" on page 128

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



2 Install the new inlet valve and tighten it using a torque wrench with a 14 mm bit set to approximately 10 Nm.



Next Steps:

3 Insert the inlet weaver, see "Replace the Inlet Weaver" on page 128.

4 Purge and condition the system to remove air.

Remove the Jet Weaver

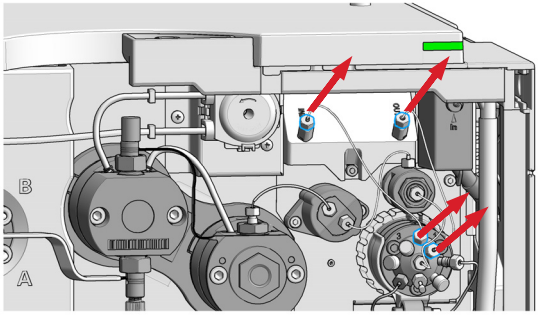
Tools required	p/n	Description
	8710-0510	Wrench open 1/4 — 5/16 inch
	8710-0899	Pozidriv screwdriver
	5023-2502	Hex driver SW-6.35, slitted

Parts required	p/n	Description
	0100-1259	Plastic fittings
	G4204-04002	Cover RFID Tag Metal lid for Jet Weaver

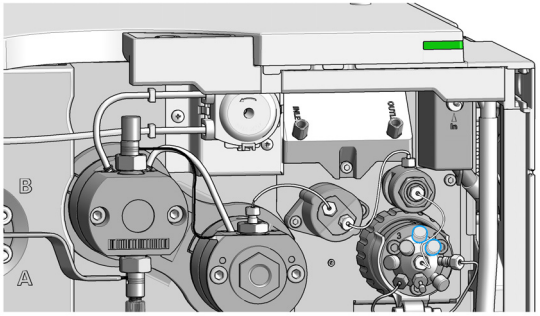
Preparations

- Select **Do not use mixer** in ChemStation.
- Switch off the pump at the main power switch.

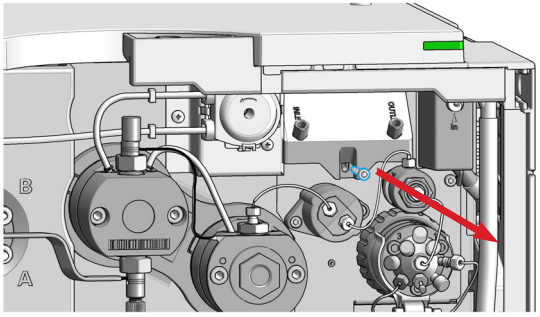
1 Remove capillary connections from the Jet Weaver to the Multi Purpose Valve.



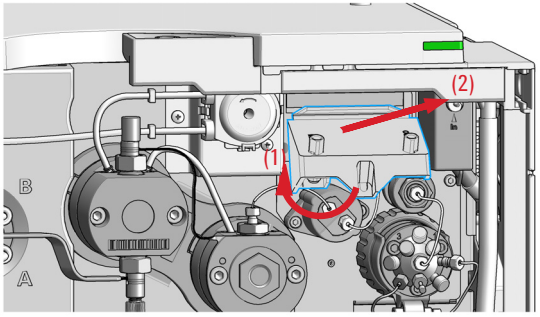
2 Plug the valve ports 1 and 2 with two plastic fittings.



3 Open the screw which fixes the Jet Weaver to the front panel.



4 Lift up the Jet Weaver (1) and pull it out of the front panel (2).

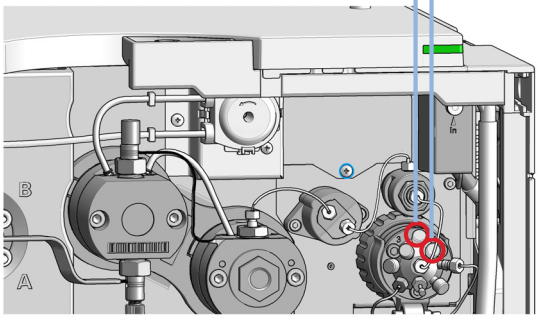


5 If no other Jet Weaver shall be installed, use plastic fittings for closing unused ports of the valve and install the metal lid.

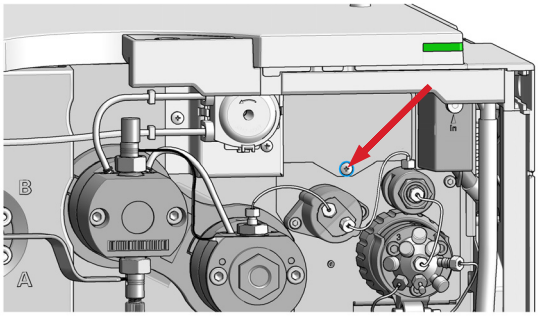
OR

Otherwise continue at "Install the Jet Weaver" on page 133.

Plastic fittings



6 Fix the metal lid to the instrument chassis with a screw.



Install the Jet Weaver

When

The optional Jet Weaver 380 µL for 1290 Infinity Quaternary Pump (G4204-68000) is available for applications which require highest mixing performance, see chapter *Optimizing Performance*.

Tools required

p/n	Description
8710-0510	Wrench open 1/4 — 5/16 inch
8710-0899	Pozidriv screwdriver
5023-2502	Hex driver SW-6.35, slitted

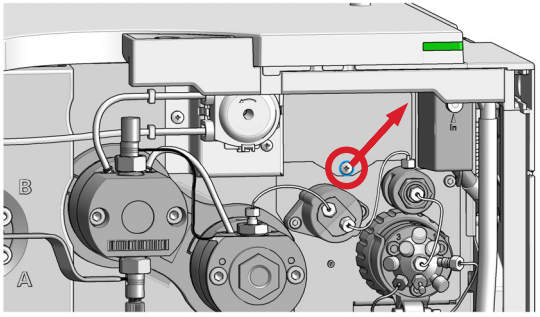
Parts required

#	p/n	Description
1	G4204-68000	Jet Weaver 380 µL for 1290 Infinity Quaternary Pump containing
2	5500-1253	Capillary ST 0.17 mm x 130 mm SX/S Jet Weaver to Multi Purpose Valve

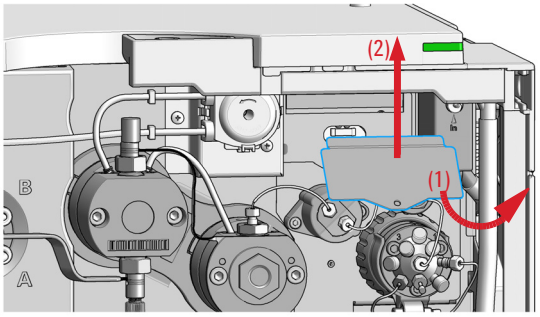
Preparations

Switch off the pump at the main power switch

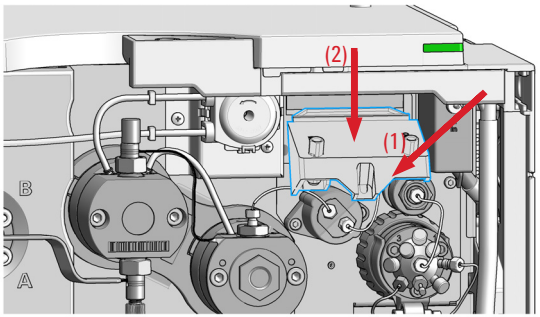
1 Open the screw of the Jet Weaver metal lid.



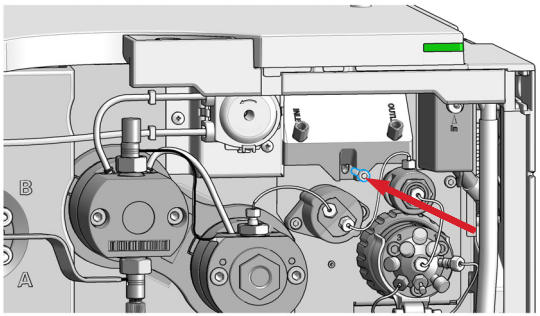
2 Remove the metal lid by lifting it up (1) and pulling it out of the front panel (2).



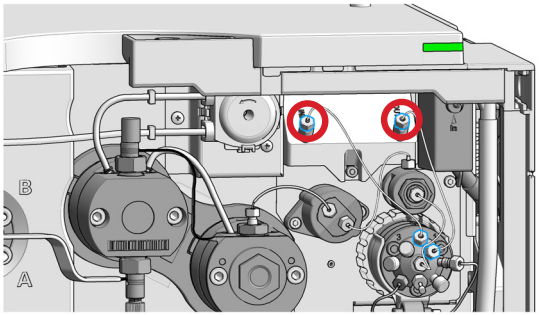
3 Insert the Jet Weaver to the opening in the front panel (1) and push it down (2).



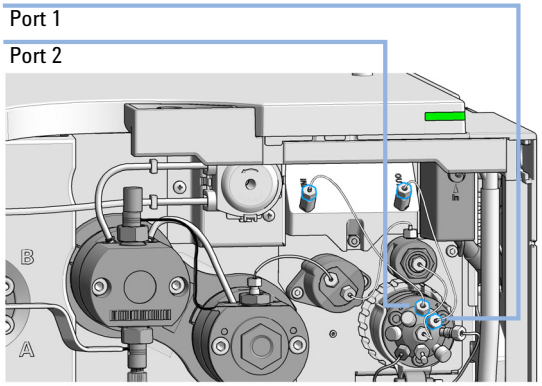
4 Fix the Jet Weaver with a screw.



5 Mount both capillary connections to the Jet Weaver observing the correct orientation (long fitting to Jet Weaver).



6 Connect the inlet capillary of the Jet Weaver to port 2 of the Multi Purpose Valve. Connect the outlet capillary to port 1.



7 Configure the Jet Weaver as mixer in the user interface.

Replace the Seal Wash Pump

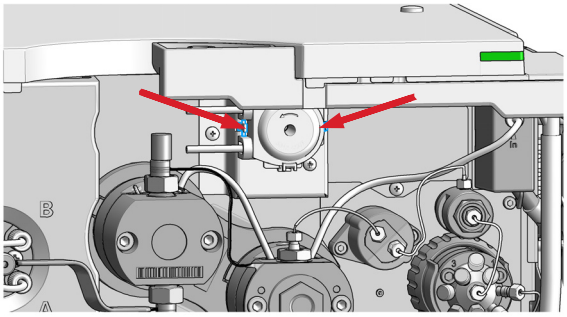
When In case of wear of the seal wash pump

Parts required

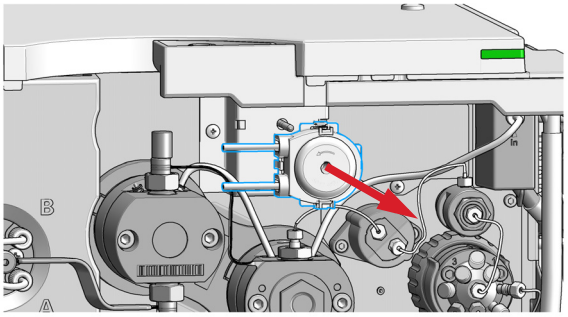
p/n	Description
5065-4445	Peristaltic pump with Pharmed tubing
5065-9978	Tubing, 1 mm i.d., 3 mm o.d., silicone, 5 m

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

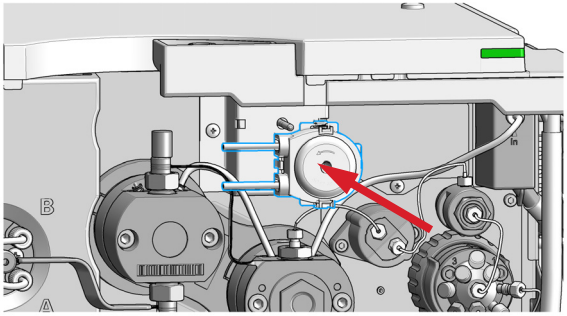
1 Press the clips.



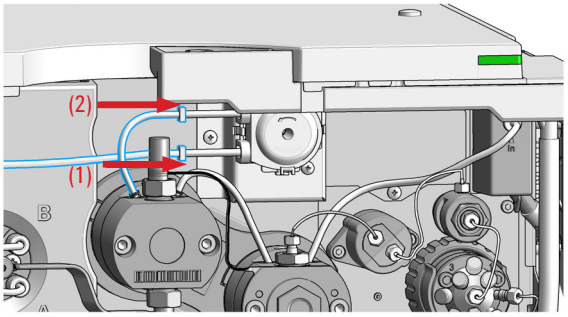
2 Pull the pump to the front.



3 Insert the pump clips to the holes in the module 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 Multi-Channel Gradient Valve (MCGV)

Tools required	p/n	Description
	0100-1710	Mounting Tool for Tubing Connections
	8710-0899	Pozidriv screwdriver

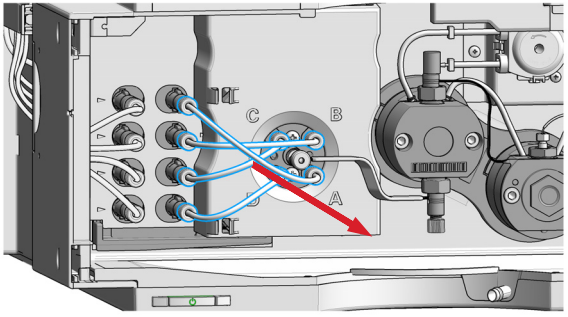
Parts required	p/n	Description
	G1311-67701	Multi channel gradient valve (MCGV)

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

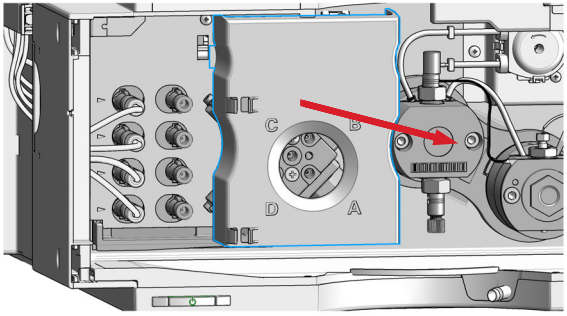
NOTE For best performance and life time, use lower channels A and D for aqueous solvents in buffer applications.

1 Use the mounting tool for removing tubing connections between the degassing unit and the MCGV.

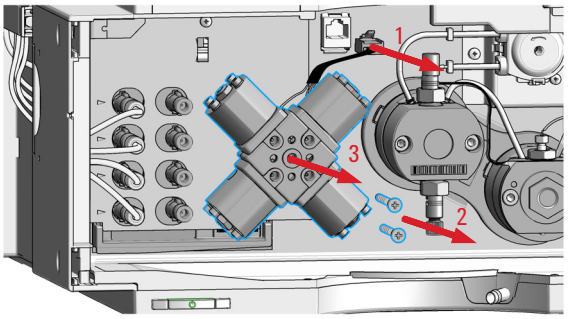


2 Remove the inlet weaver, see "Replace the Inlet Weaver" on page 128.

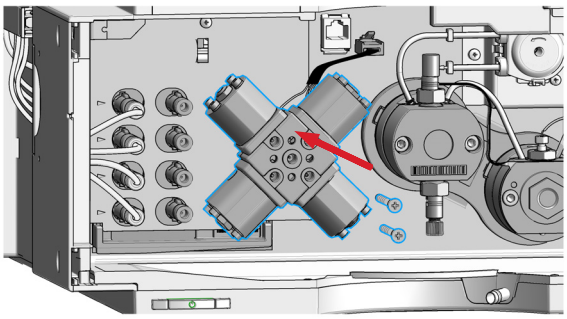
3 Remove the cover from the MCGV.



4 Disconnect the MCGV cable (1), unscrew the two screws (2) and remove the valve (3).



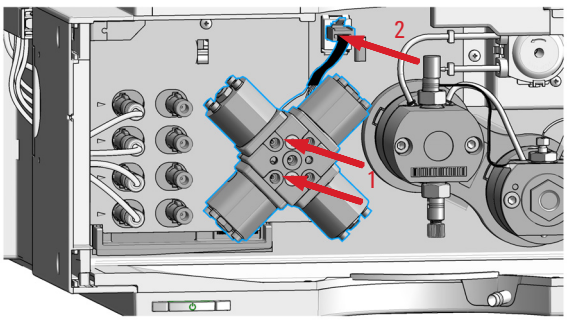
5 Place the new MCGV into position.



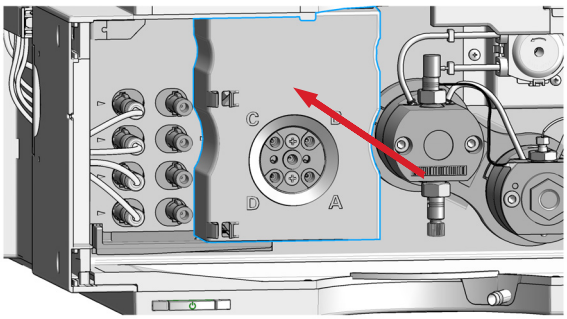
NOTE

Make sure that channel A of the MCGV is put at the bottom-right position.

6 Tighten the two screws (1) and connect the cable to its connector (2).



7 Install the MCGV cover.



Next Steps:

8 Install the inlet weaver, see "Replace the Inlet Weaver" on page 128.

9 Reconnect solvent tubes for channels A-D from the MCGV to the degasser outlets.

Release a Stuck Inlet Valve

Tools required	p/n	Description
	9301-0411	Syringe, Plastic
	9301-1337	Syringe adapter
	0100-1710	Mounting Tool for Tubing Connections
		Beaker

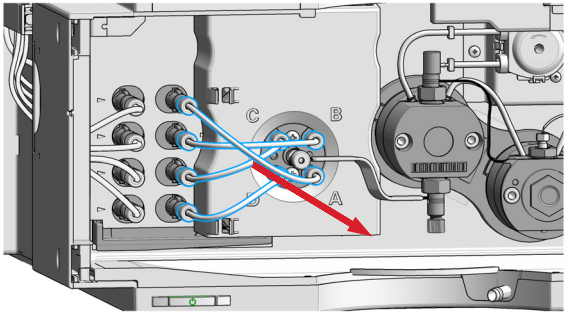
CAUTION

Pressure damages the multi-channel gradient valve (MCGV) and/or degasser

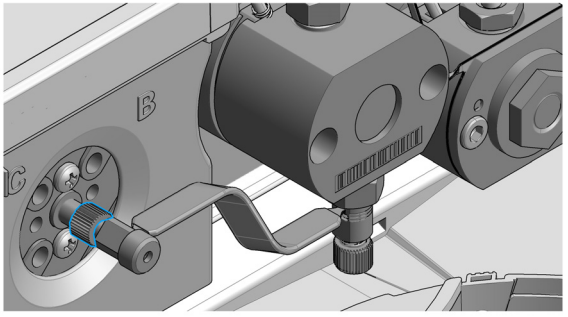
➔ Never apply pressure to the MCGV or degasser.

➔ Directly connect the syringe to the inlet weaver.

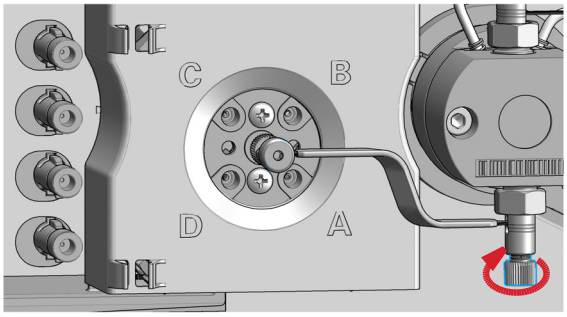
1 Remove tubing connections channels A, B, C and D to the MCGV such that you can access the inlet weaver.



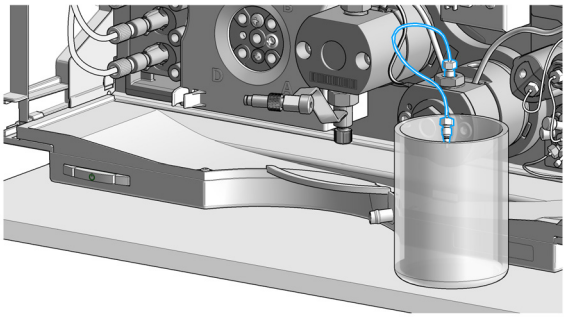
2 Open the fitting at the center of the multi-channel gradient valve (MCGV). Remove the inlet weaver from the MCGV.



3 Slightly open the black plastic screw at the bottom of the inlet valve, and rotate the inlet weaver to the front. Then retighten the screw.



4 Disconnect the capillary from the pressure sensor inlet and route the capillary to a small beaker.

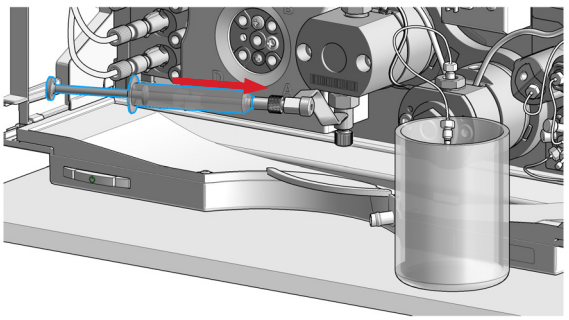


5 Fill the syringe with a suitable wash solvent.

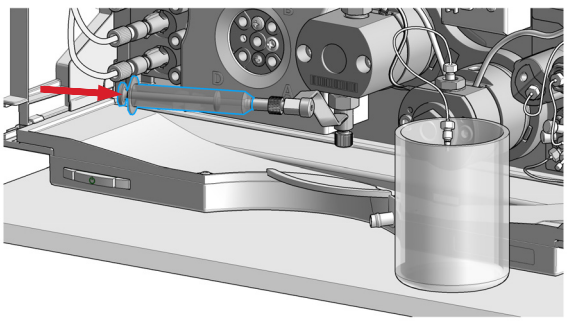
NOTE

For salt deposits, warm water is a good choice. For organic deposits, use ethanol or acetone.

6 Connect the syringe and adapter to the inlet weaver.



7 Push the syringe for flushing the inlet valve and pump head.



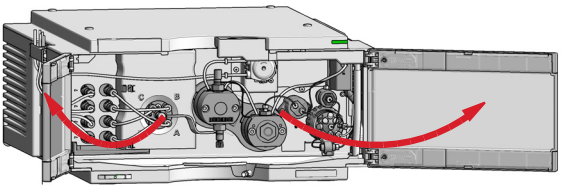
8 Restore original connections. Flush the system for several minutes.

Remove the Pump Head Assembly

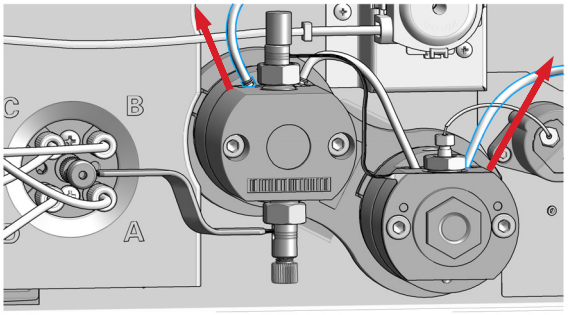
Tools required	p/n	Description
	G7120-68708	HPLC System Tool Kit-Infinity-II

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

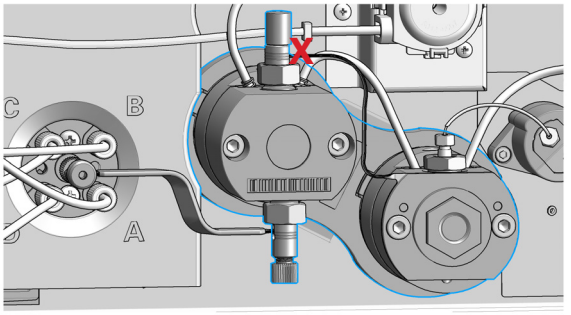
2 Open the doors.



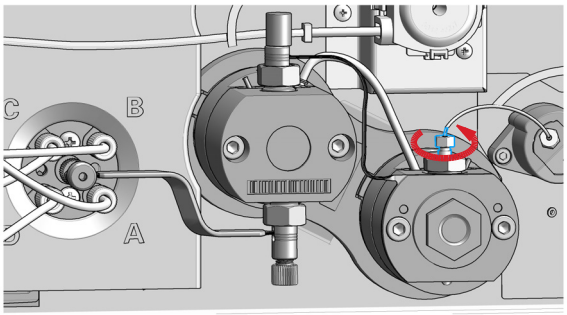
3 Remove the seal wash tubes.



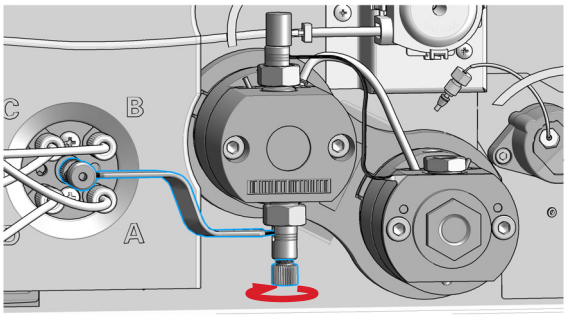
4 DO NOT REMOVE the heat exchanger connection between the pump heads marked by the red X.



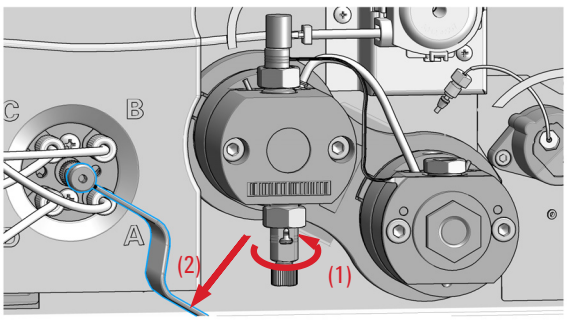
5 Remove the capillary connection from the outlet adapter on the secondary pump head to the pressure sensor.



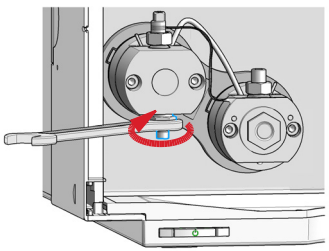
6 Open the black plastic screw of the inlet valve at the bottom of the primary pump head.



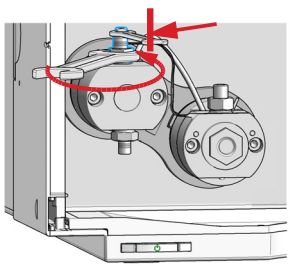
7 Turn the inlet valve 90 ° counterclockwise (1) and remove the inlet weaver from the inlet valve (2).



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



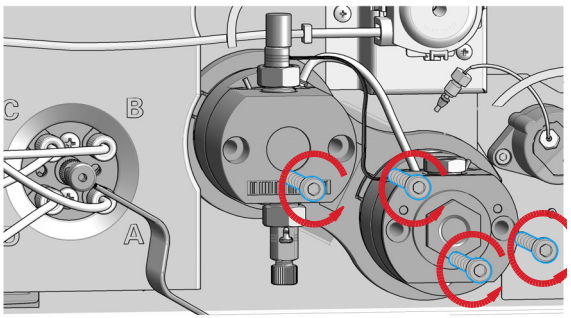
9 Counter the lock screw of the heat exchanger capillary while loosening the outlet valve. Keep the outlet valve installed to the pump head assembly.



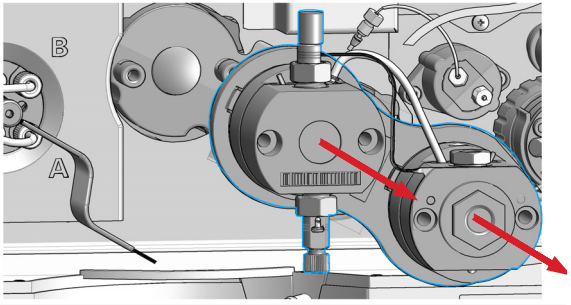
10 Remove the four screws holding the pump heads.

NOTE

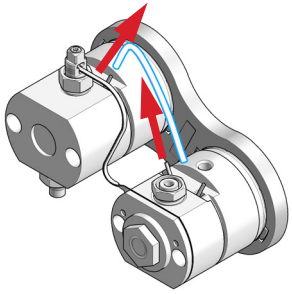
Open the screws step by step, not screw by screw.



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

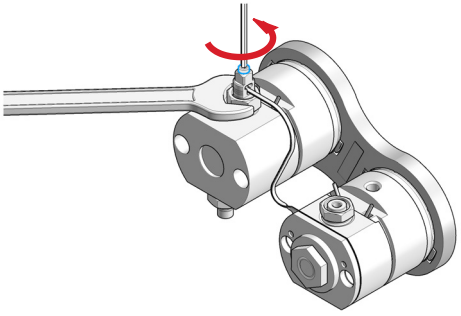
This procedure shows how to open the pump head assembly, exchange seals, and clean pistons.

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

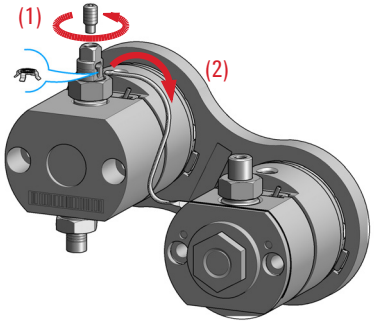
Tools required	p/n	Description
	G7120-68708	HPLC System Tool Kit-Infinity-II
	5043-1400	Pump Head Holder
	5067-6197	Seal Handling Device
	8660-0852	Abrasive mesh
		Isopropanol

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.



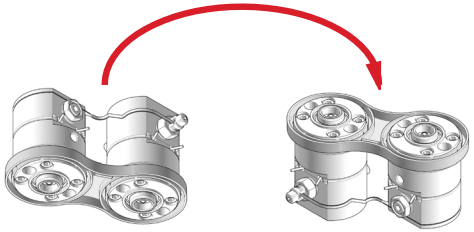
2 Remove the heat exchanger capillary by pushing the connector up and pulling it out of the valve.



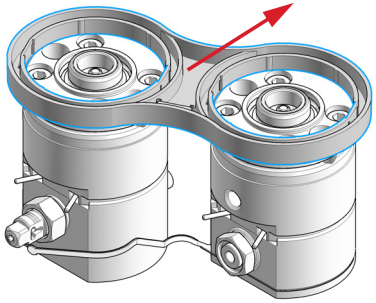
NOTE

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

3 Turn the pump head assembly upside down.

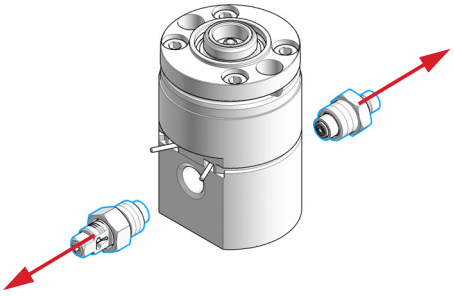


4 Remove the link plate by gently pulling it off the pump head assembly.



The two pump chambers are now isolated.

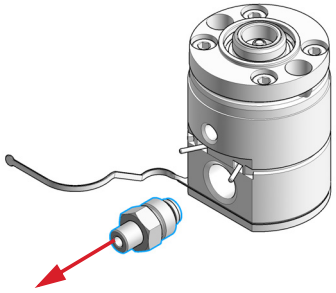
5 Remove the inlet valve and the outlet valve from the primary pump head.



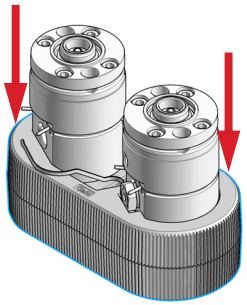
NOTE

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

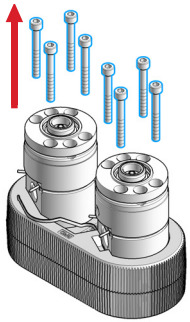
6 Binary/High Speed Pumps only: Remove the high pressure filter from the secondary pump head.



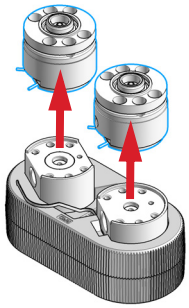
7 Place the two pump heads in the Pump Head Holder.



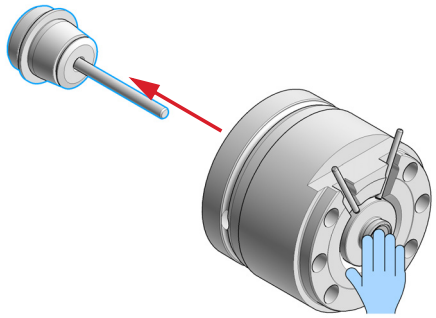
8 Remove the pump head screws from the back of the pump heads.



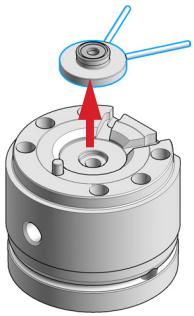
9 Open the pump heads and remove the piston housings from the pump chambers.



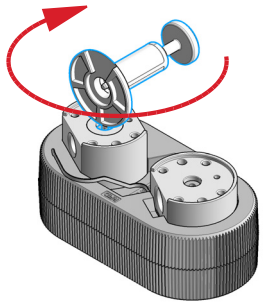
10 Remove the piston by pressing it out of the seal holder with a finger.



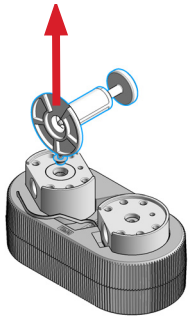
11 Remove the seal holder from the spring housing.



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.

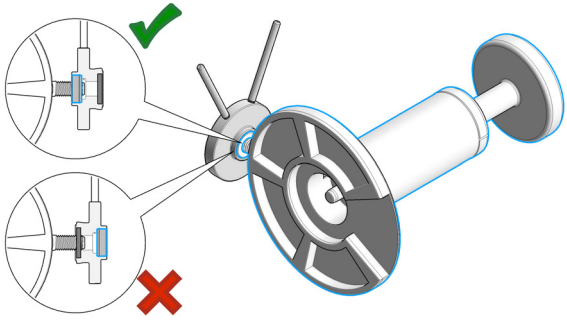


14 Repeat for the other pump chamber.

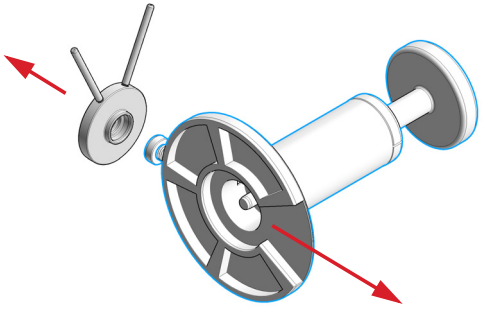
15 Screw the pin of the seal handling device into the wash seal.

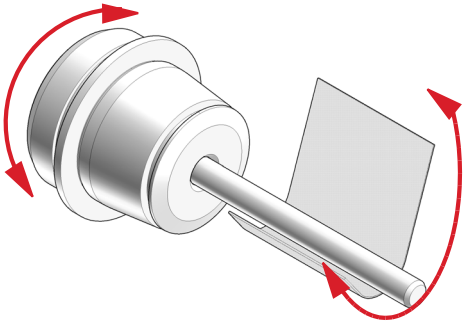
NOTE

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
	G4220-81013	Heat Exchanger Channel A (secondary pump head only)

Preparations

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

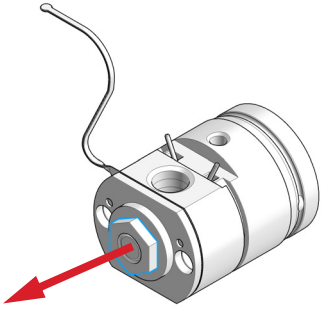
CAUTION

Loss of small spacer fitting

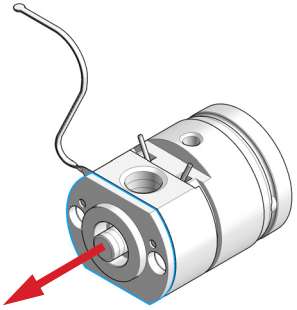
Inside the secondary pump head is a small spacer fitting, which can be dropped easily when removing the heat exchanger.

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

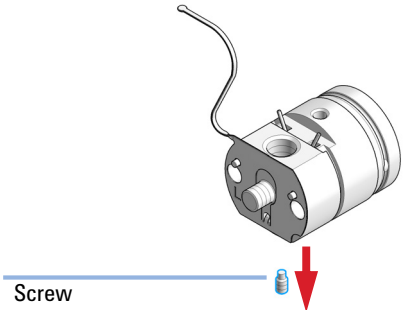
1 Remove the 19 mm screw at the front of the secondary pump head.



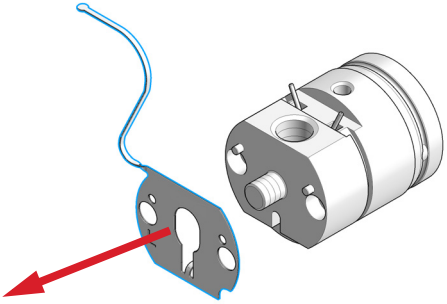
2 Remove the front plate.



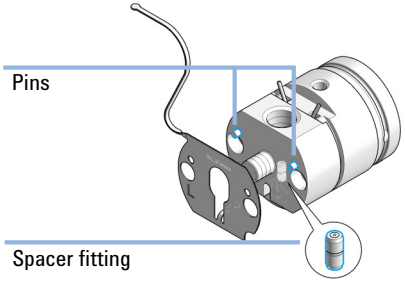
3 Remove the screw at the bottom of the pump head. Do not drop the golden spacer fitting.



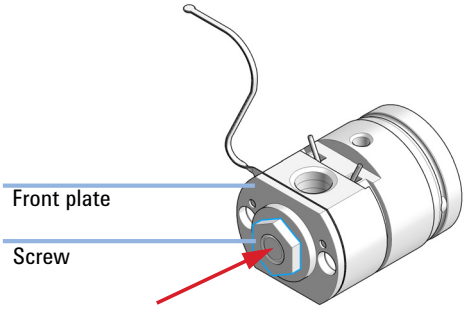
4 Lift out the heat exchanger.



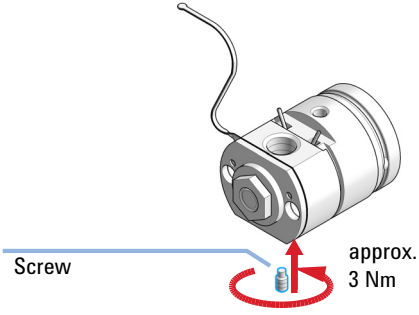
5 If removed, first insert the spacer fitting. Then insert the new heat exchanger to the opening in the pump head and lift it over the pins.



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

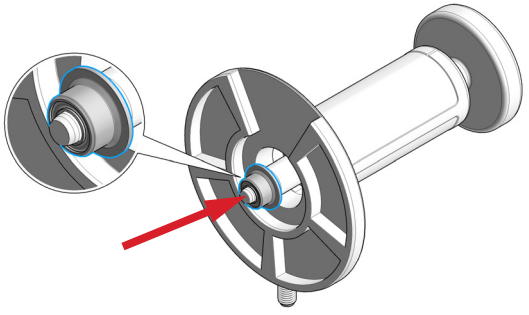
Parts required

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

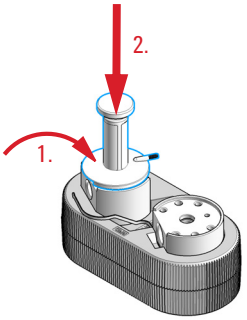
NOTE Seals must be exchanged in both primary and secondary pump heads.

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.

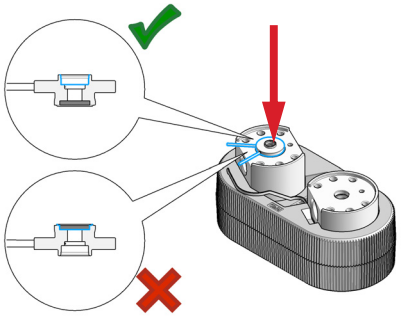


3 Take care that the Seal Handling Device is seating flush and press the seal into the pump chamber.



4 Repeat for the other pump chamber.

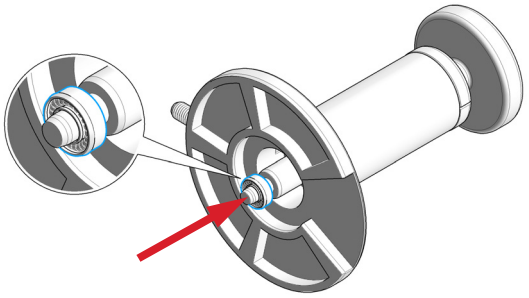
5 Place the seal holder onto the pump chamber.



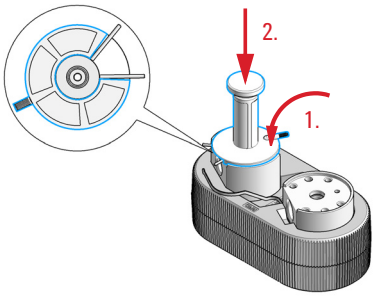
NOTE

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.

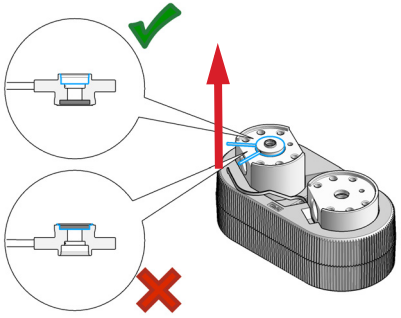


NOTE

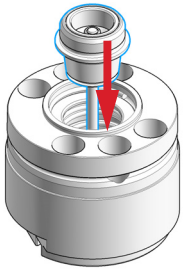
The Seal Handling Device has a cavity to fit over the pins of the seal wash tubings.

8 Repeat for the other seal holder.

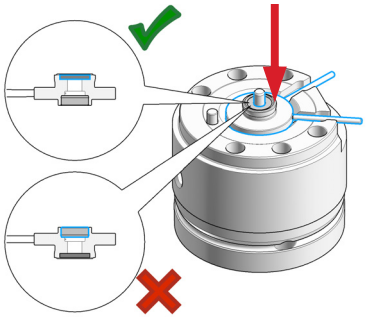
9 Remove the seal holders from the pump chambers.



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



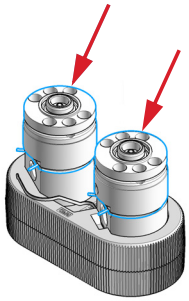
11 Place the seal holder onto the spring housing.



NOTE

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

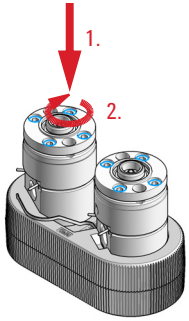
12 Place the assembled spring housings on top of the pump chambers.



NOTE

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

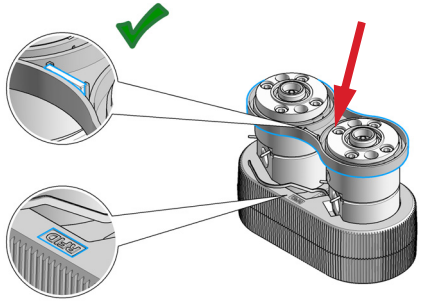
13 Place the screws into the pump heads and loosely tighten them in a crosswise manner.



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.

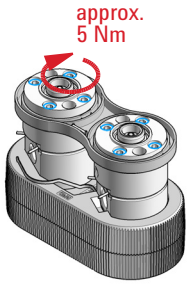
14 Mind the correct orientation of the link plate and click it into place.



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.

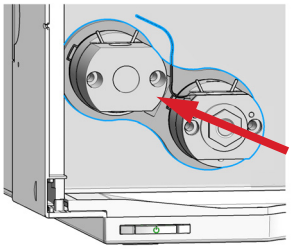
15 Tighten the pump head screws with a torque wrench set to approx. 5 Nm in a crosswise manner.



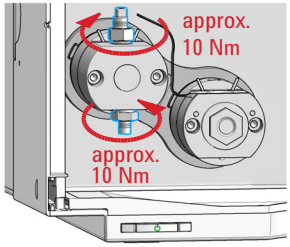
NOTE

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

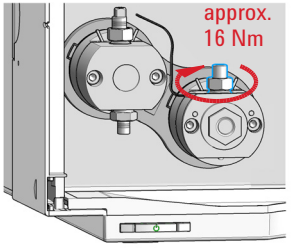
16 Mount the pump head to the module. Do not fix the screws at this stage!



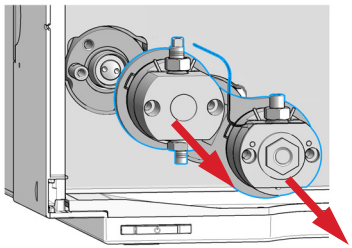
17 Screw in the inlet valve and the outlet valve and fix them with a torque wrench set to approx. 10 Nm.



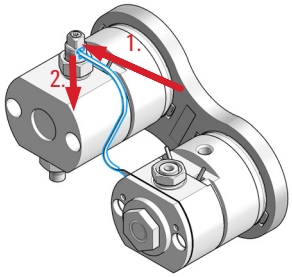
18 Binary/High Speed Pumps only: Screw in the high pressure filter and fix it with a torque wrench set to approx. 16 Nm.



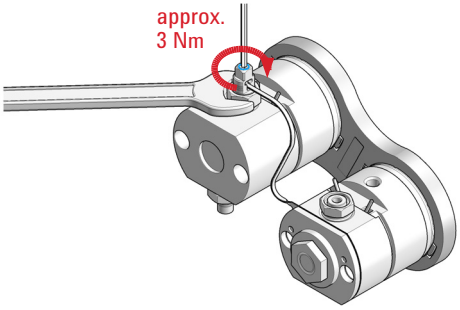
19 Remove the pump head from the module again.



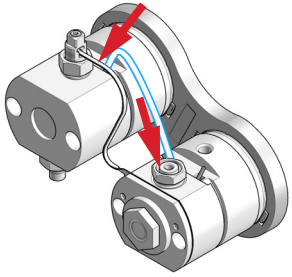
20 Position the entrance slit for the heat exchanger capillary to face exactly to it, and then seat the heat exchanger capillary back into the outlet valve by moving it into the valve and pressing it down.



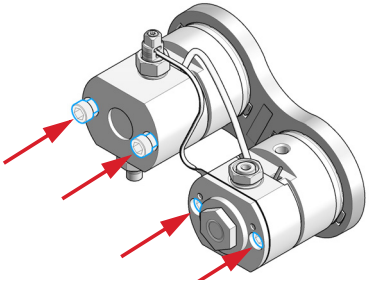
21 Counter the outlet valve and tighten the lock screw of the heat exchanger capillary with a torque wrench set to approx. 3 Nm.



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



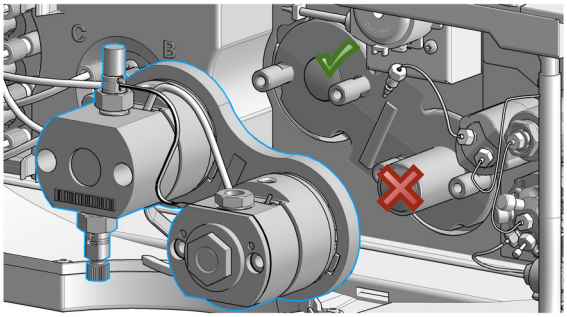
23 Insert the screws that later fix the pump head assembly to the module housing.



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.

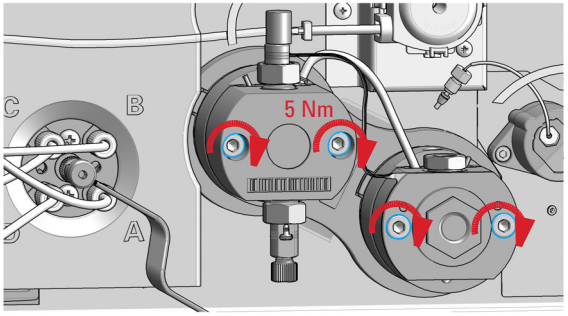


CAUTION

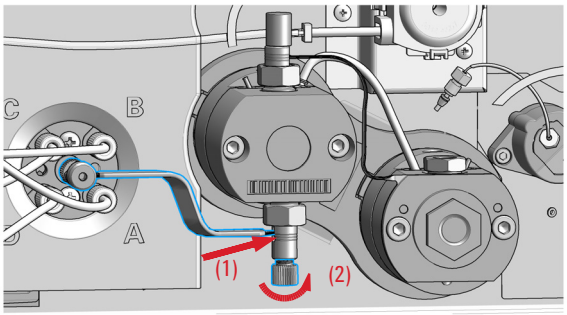
Damage to the pump head
Using a wrong torque will damage the pump head.

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

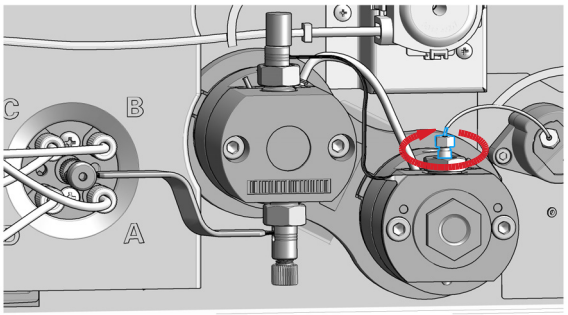
2 Install the new pump head assembly by tightening the screws step by step. Apply 5 Nm using a torque hex key, which is included to the 1290 Infinity Service Kit p/n 5067-4699.



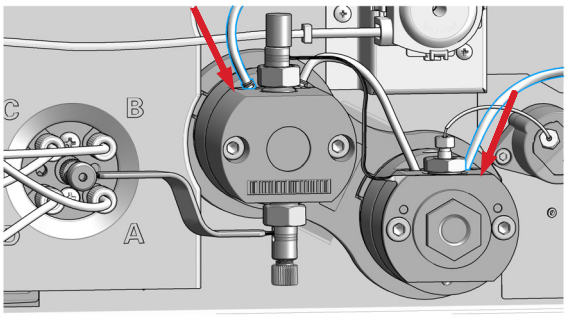
3 Insert the inlet weaver to the inlet valve (1). Fix the weaver with the plastic screw to the inlet valve (2).



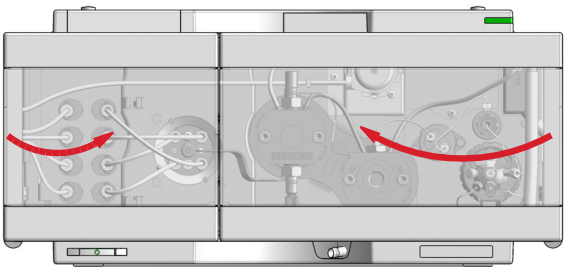
4 Connect the capillary from the outlet adapter on the secondary pump head to the pressure sensor.



5 Connect the seal wash tubes.



6 Close the doors.



7 Perform a Pump Leak Rate Test.

Replace the Outlet Valve

When If Outlet valve is defective.

Tools required

p/n	Description
	Wrench, 14 mm
5067-5688	Torque wrench 1 – 25 Nm with 14 mm wrench
G4220-20015	Adapter ¼ in square to hex
G4220-20041	Bit Torx 10x25 mm

Parts required

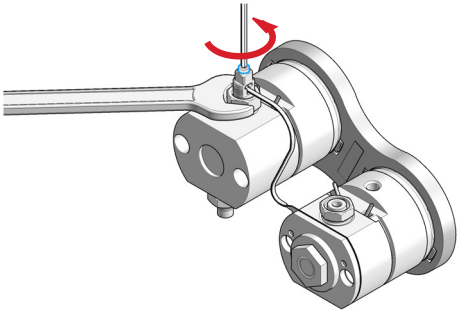
p/n	Description
G4220-60028	Outlet valve (primary pump head)
G4220-20020	Internal gold seal for Outlet Valve

Preparations

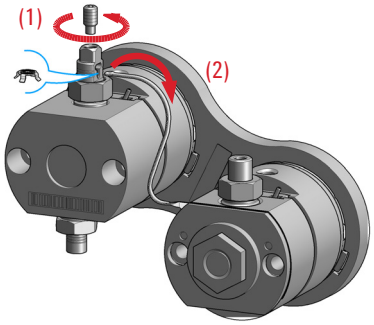
- Switch off pump at the main power switch
- Open the doors
- Use an optional solvent shutoff valve or lift up solvent filters inside solvent bottles for avoiding leakages
- Remove the pump head from the module

1 Remove the cap from the outlet valve.

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



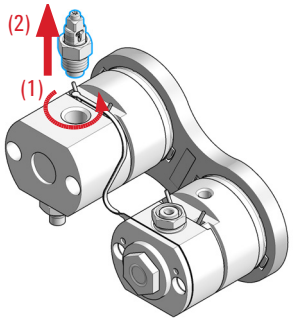
3 Remove the heat exchanger capillary by pushing the connector up and pulling it out of the valve.



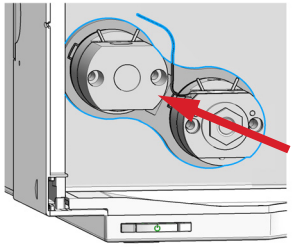
NOTE

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

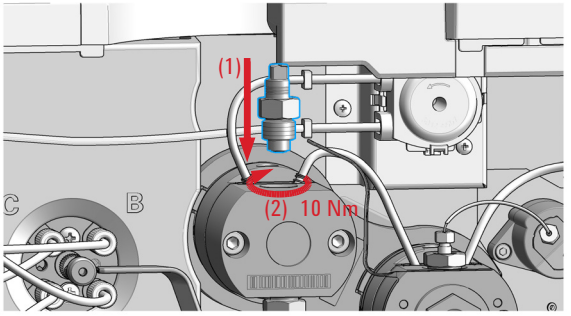
4 Unscrew the outlet valve with a 14 mm wrench (1) and remove it (2).



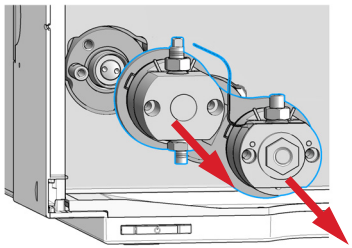
5 Mount the pump head to the module. Do not fix the screws at this stage!



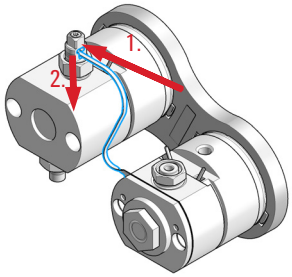
6 Insert the new outlet valve and tighten it using a torque wrench with a 14 mm bit set to 10 Nm.



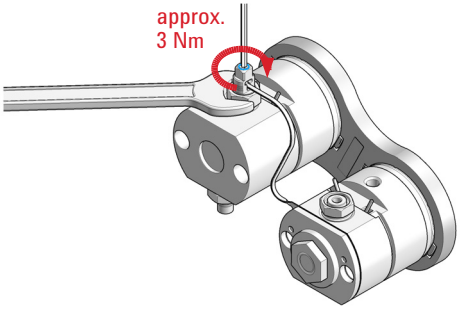
7 Remove the pump head from the module again.



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 approx. 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.

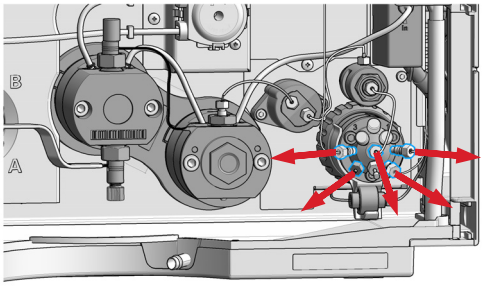
12 Purge the system to remove air.

Replace the Multi Purpose Valve

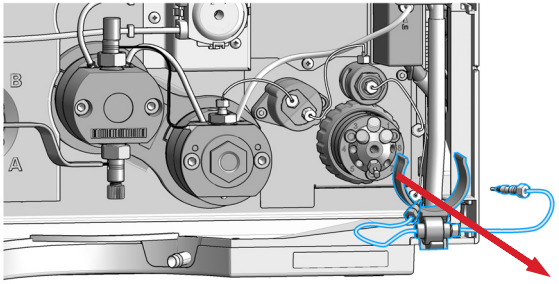
Tools required	p/n	Description
	5023-2502	Hex driver SW-6.35, slitted

Parts required	#	p/n	Description
	1	0100-1259	Blank nut (plastic)
	1	01080-83202	Blank nut (stainless steel)
	1	5067-4237	Multi Purpose Valve Head
	2	5500-1253	Capillary ST 0.17 mm x 130 mm SX/S (OPTIONAL)

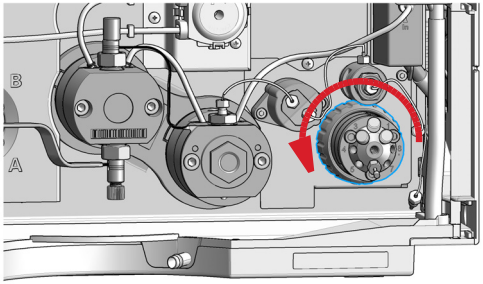
1 Remove all capillary connections from the Multi Purpose Valve.



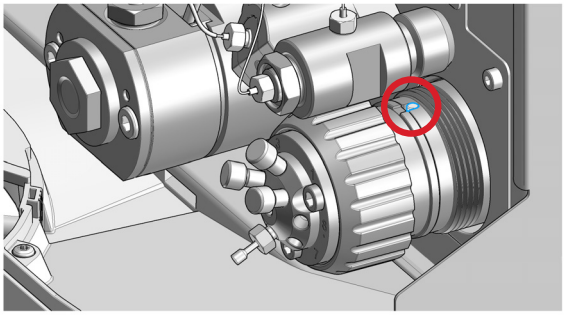
2 Remove the clamp with the inline filter (if installed).

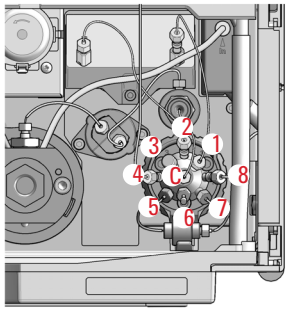


3 Unscrew the black union nut and remove the head of the purge valve by pulling it to the front.



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.





The central (C) port is connected to the outlet of the filter outlet.

- Port 1 is connected to the outlet of the optional Jet Weaver
- Port 2 is connected to the inlet of the optional Jet Weaver
- Port 3 is blocked by a blank nut (plastic)
- Port 4 is connected to the system (typically multisampler)
- Port 5 is connected to the outlet of the optional inline filter
- Port 6 is blocked by a blank nut (SST)
- Port 7 is connected to the waste capillary
- Port 8 is connected to the inlet of the optional inline filter

Block unused ports with blank nuts.

If the optional inline filter is not installed, connect ports 5 and 8 with a capillary (Capillary ST 0.17 x 120 mm, SLV/SV (5067-5416)).

If the optional Jet Weaver is not installed, connect ports 1 and 2 with a capillary (Capillary ST 0.17 mm x 130 mm SX/S (5500-1253)).

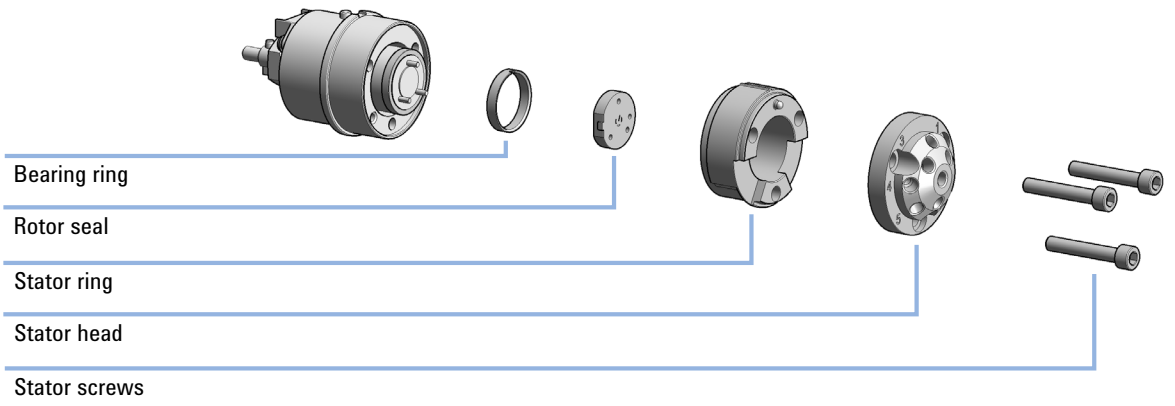
Replace Parts of the Multi Purpose Valve

Tools required	p/n	Description
	8710-2394	9/64 inch hex key

Parts required	p/n	Description
	1535-4045	Bearing ring
	5068-0202	Rotor seal, Multi Purpose Valve, 1300 bar
	5068-0120	Stator ring
	5068-0001	Stator head
	1535-4857	Stator screws, 10/Pk

Preparations Remove all capillary connections from the Multi Purpose Valve.

1. Use the 9/64 inch hex key for opening the valve head.
2. Replace parts as required.
3. Reassemble the valve head and mount it to the valve drive.



Replace the High Pressure Outlet Filter or Filter Frit

When For removing blockages and leaks in the high pressure filter assembly. The outlet filter should be replaced as required depending on the system usage.

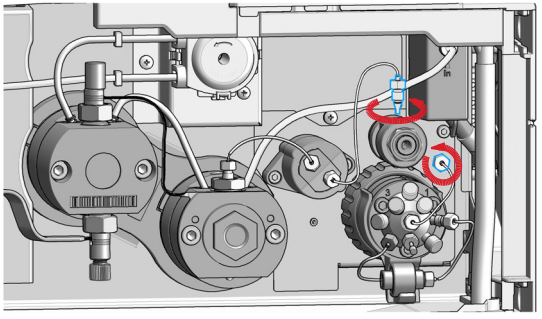
Tools required

p/n	Description
5023-2502	Hex driver SW-6.35, slitted
8710-0510	Wrench open 1/4 — 5/16 inch
8710-1924	Wrench open 14 mm
5067-5688	Torque wrench 1 – 25 Nm with 14 mm wrench
5067-5690	Torque wrench head, 14 mm, for torque wrench

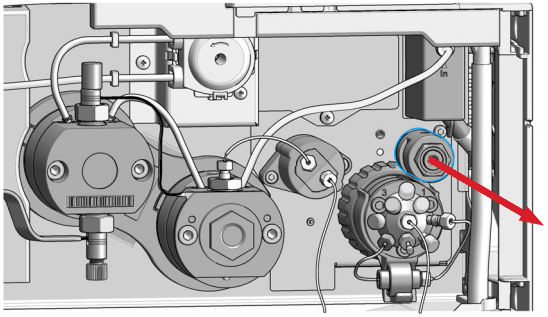
Parts required

	#	p/n	Description
	1	G4204-60004	Outlet filter 1290 Infinity Quaternary Pump
OR	1	5067-5716	Frit for 1290 pump outlet filter 2/pk

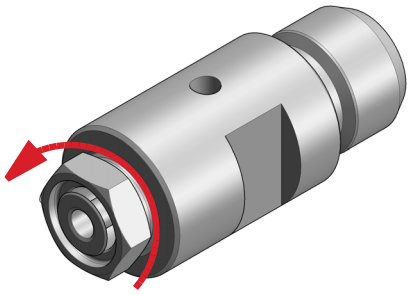
1 Remove the capillary from the high pressure outlet filter to the pressure sensor (1) and from the high pressure outlet filter to the Multipurpose valve (2).



2 Remove the high pressure outlet filter from the filter holder.



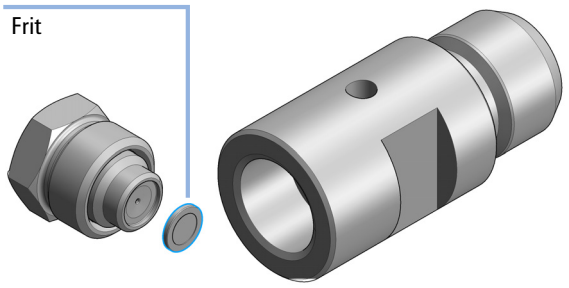
3 Unscrew the high pressure outlet filter.



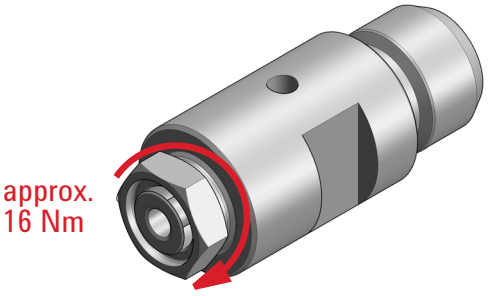
4 Replace the filter frit.

NOTE

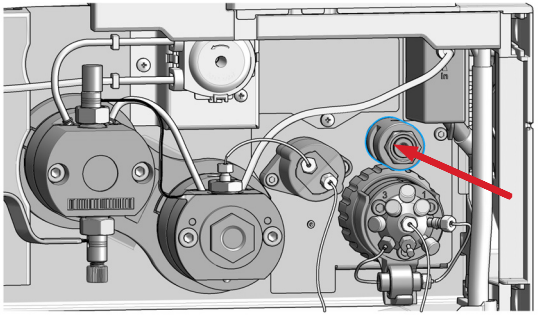
Remove the old filter frit with the sharp side of the blade of a knife.



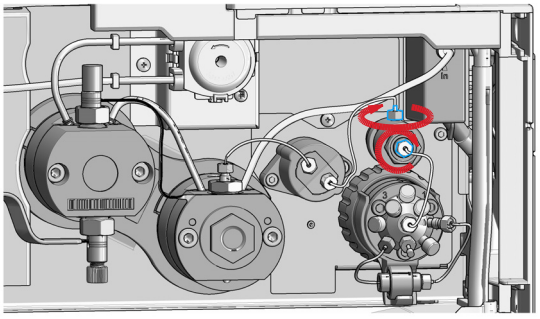
5 Reassemble the high pressure outlet filter (approx. 16 Nm).



6 Reinstall the high pressure outlet filter to the filter holder.



7 Mount the capillary connection to the pressure sensor (1) and to the Multipurpose valve (2).



Install the Inline Filter

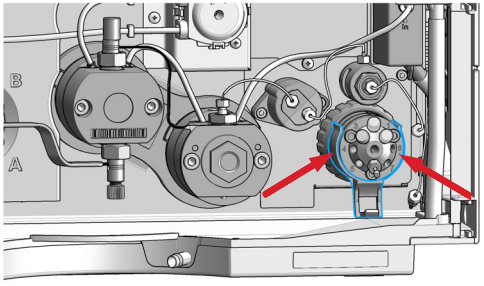
Tools required	p/n	Description
	8710-0510	Wrench open 1/4 — 5/16 inch

Parts required	p/n	Description
	G7104-68000	Inline Filter Upgrade Kit The kit includes:
	5067-5407	Inline Filter Assembly
	5067-4748	Capillary ST, 0.17 mm x 90 mm
	G4204-40000	Clamp for In-Line Filter

Preparations Turn the pump off.

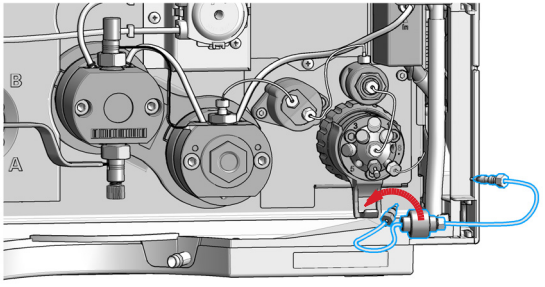
1 Remove the capillary between ports 5 and 8 from the Multi Purpose Valve.

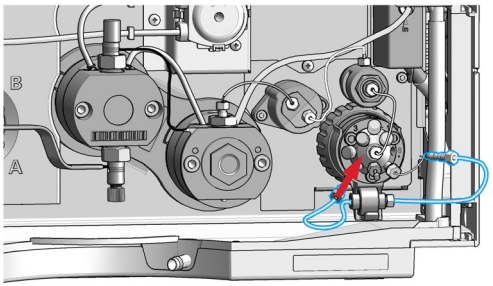
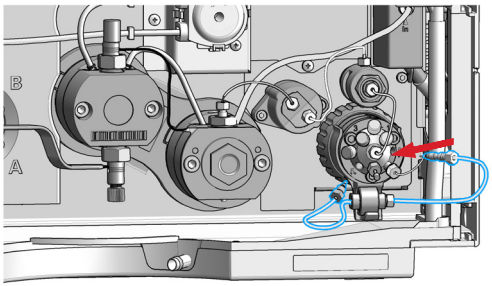
2 Clip the inline filter clamp to the Multi Purpose Valve.



3 Connect the 90 mm capillary (part of the upgrade kit) to the filter outlet.

4 Fix the inline filter to the clamp.



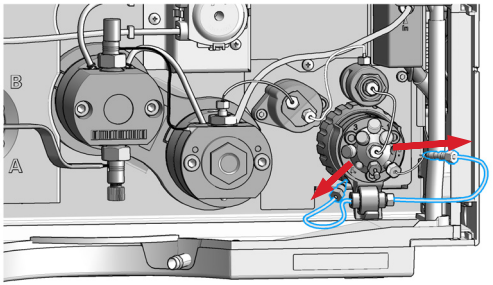
5 Install the integrated capillary of the inline filter to port 5 of the Multi Purpose Valve. 	**6** Install the removable capillary of the inline filter to port 8 of the Multi Purpose Valve. 

Remove the Inline Filter

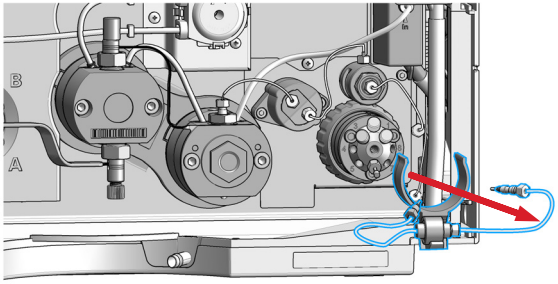
Tools required	p/n	Description
	8710-0510	Wrench open 1/4 — 5/16 inch

Parts required	p/n	Description
	5067-5416	Capillary ST 0.17 x 120 mm, SLV/SV

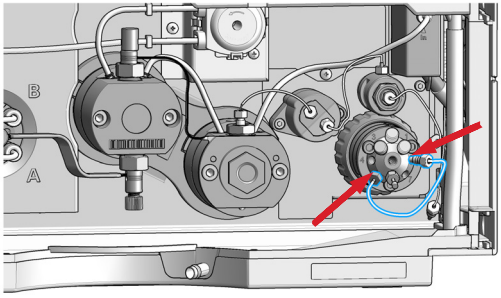
1 Remove the capillaries from the Multi Purpose Valve to the inline filter.



2 Remove the clamp with the inline filter.



3 Install the capillary between ports 5 and 8 of the Multi Purpose Valve.



Replace Parts of the Inline Filter

Tools required	p/n	Description
	8710-0510	Wrench open 1/4 — 5/16 inch

Parts required	p/n	Description
	5023-0271	Frit 0.3 µm for inline filter, 5/pk

CAUTION

Stuck Capillary in Multi Purpose Valve

Shortcutting the inline filter by directly connecting its right capillary to valve port 5 can damage the Multi Purpose Valve.

The size/position of this capillary in its fitting is incompatible, so it may get stuck irreversibly to the valve.

➔ Do not shortcut the filter by directly connecting its right capillary to valve port 5 in case the inline filter cannot or shall not be used.

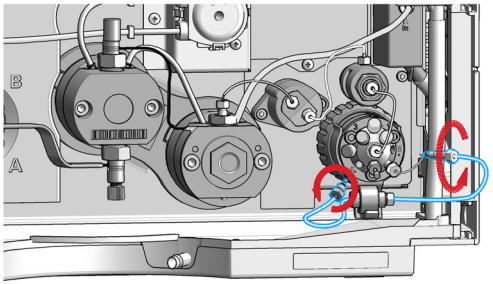
➔ Use Capillary ST 0.17 x 120 mm, SLV/SV (5067-5416) instead.

NOTE

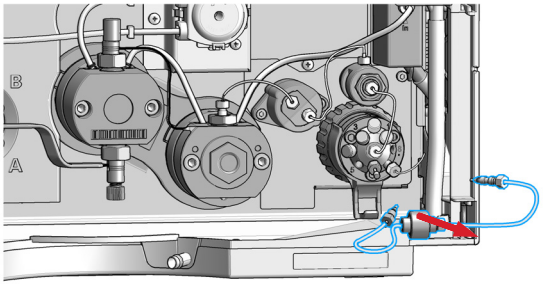
The inline filter can be cleaned using the back-flush function in the user interface of your Agilent instrument control software.

Only use the back-flush option, if an inline filter is installed.

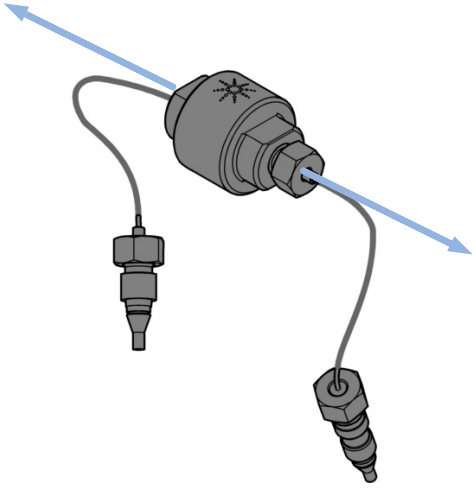
1 Remove the capillaries from the Multi Purpose Valve to the inline filter.



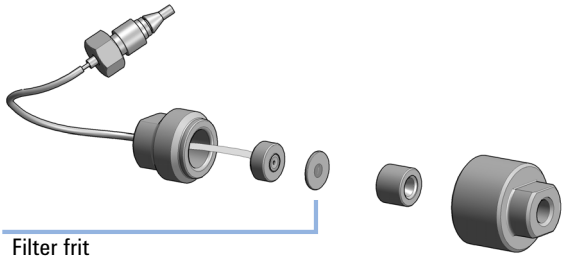
2 Remove the inline filter from the clamp attached to the Multi Purpose Valve.

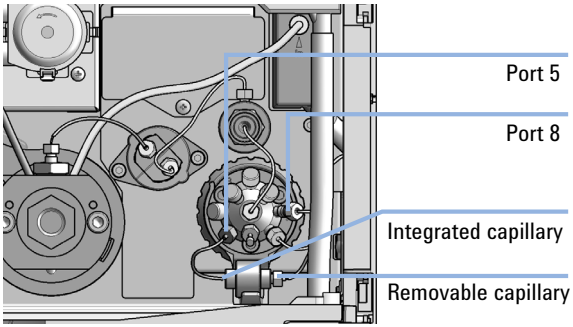


3 Use two 5/16 wrenches for opening the inline filter.



4 Replace the filter frit and reassemble the inline filter.



5 Put the inline filter to the clamp and install its capillaries. The integrated capillary is connected to port 5 of the Multi Purpose Valve. The removable capillary is connected to port 8.  	

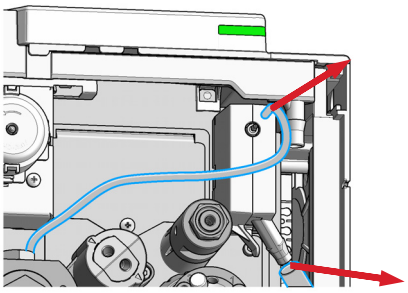
Replace the Seal Wash Sensor

Parts required	p/n	Description
	5067-6172	Seal Wash Sensor Pre Assembly

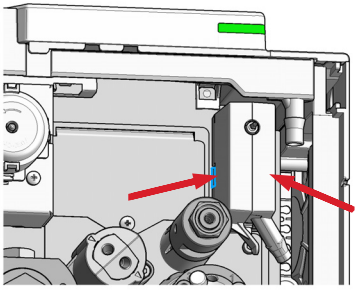
Preparations

- Shut-down the pump.
- Remove the seal wash tubing from the seal wash solvent bottle.

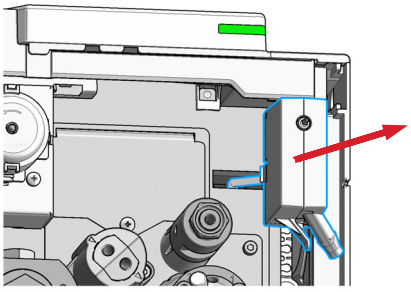
1 Remove the solvent inlet and outlet tubes from the seal wash sensor.



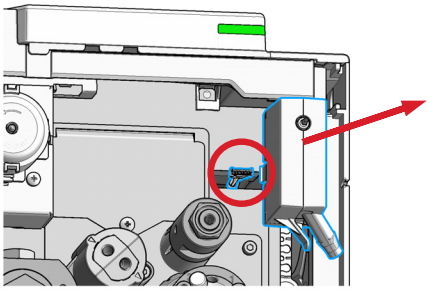
2 Press at the sides of the seal wash sensor.



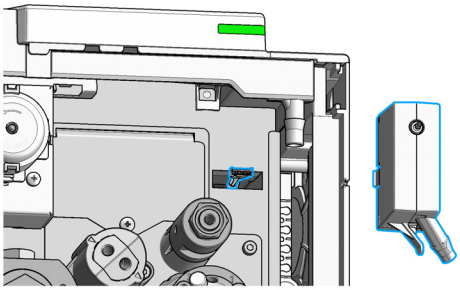
3 Remove the seal wash sensor from the module chassis.



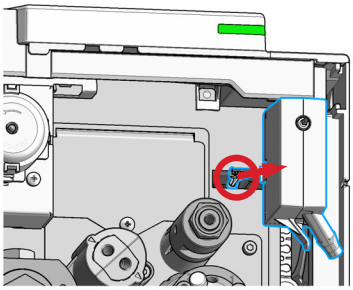
4 Remove the cable.



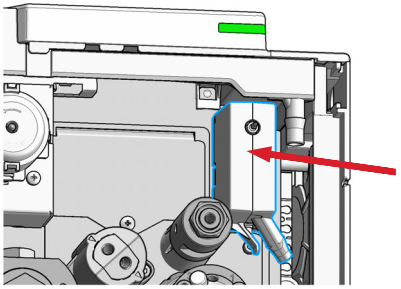
5 Remove the seal wash sensor completely.



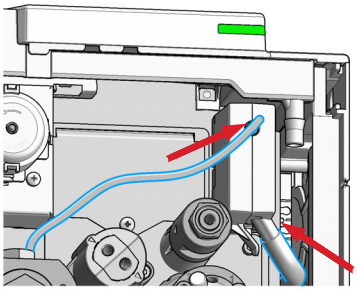
6 Connect the cable to the new seal wash sensor.



7 Install the new sensor to the module chassis.



8 Install the solvent inlet and outlet tubes to the seal wash sensor.



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

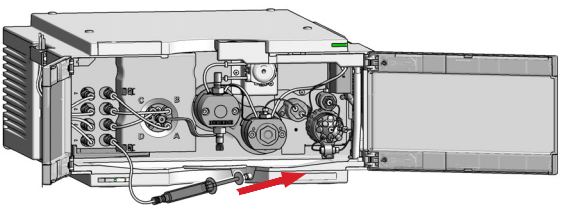
p/n	Description
9301-0411	Syringe; Plastic
9301-1337	Syringe adapter
G7104-44000	Transport protection foam

CAUTION Mechanical damage

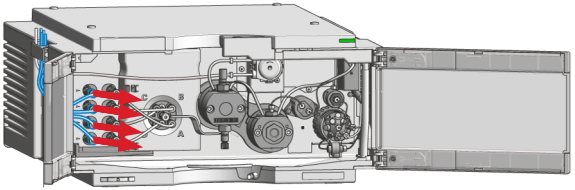
➔ For shipping the module, insert the Protective Foam to protected the module from mechanical damage.

➔ Be careful not to damage tubing or capillary connections while inserting the module in the Protective Foam.

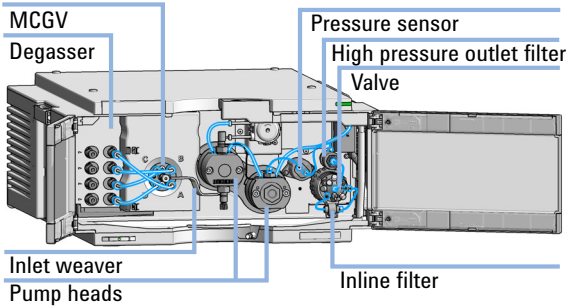
1. Flush all solvent channels with isopropanol.
2. Remove solvent inlet tubes from solvent reservoirs and tubing clips at other modules.
3. Remove tubings between the seal wash function and solvent bottle/waste.
4. Turn off the pump.
5. Remove cable and capillary connections to other modules.
6. Remove the waste tube.
7. Remove the module from the stack.
8. Disconnect the degasser outlet tubings at the MCGV one after another. Use a syringe for removing liquid from the degasser and the solvent tubings.



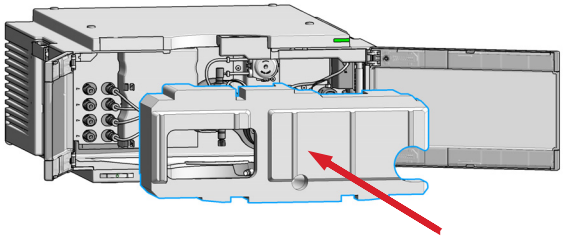
9 Reconnect the degasser outlet tubings to the MCGV. Remove the degasser inlet tubings.



10 You may keep internal tubing and capillary connections.



11 Carefully insert the protective foam to the front part of the instrument. Do not damage any tubing or capillary connections.



Next Steps:

12 Close the doors.

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

8
Parts and Materials

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Flow Connections 182
Pump Heads 184
- Pump Head Assembly Parts 185
- Primary Pump Head Parts 186
- Secondary Pump Head Parts 187

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Accessory Kit 190
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This chapter provides information on parts for maintenance.

Overview of Main Assemblies

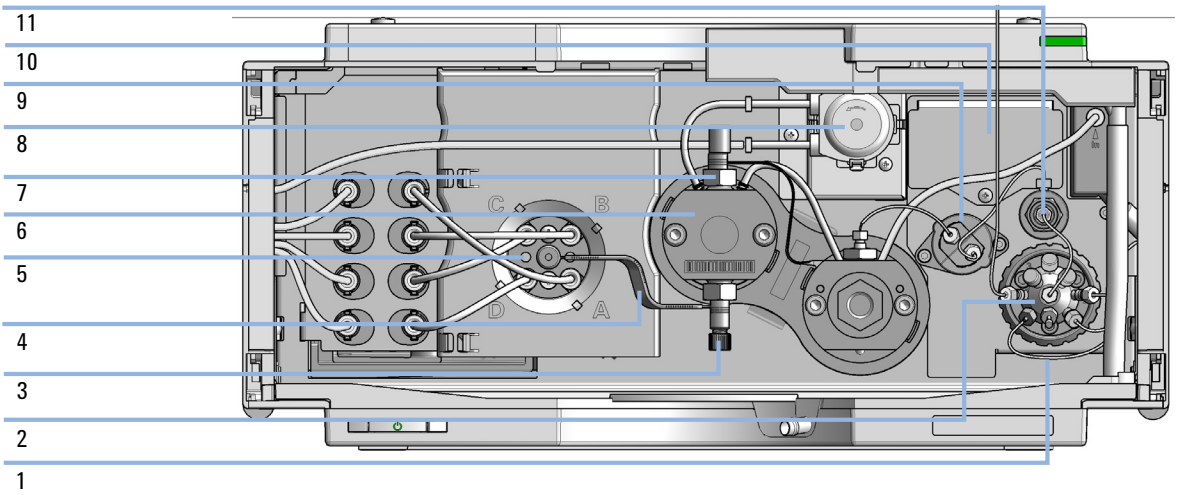


Figure 16 Overview of main assemblies

Item	p/n	Description
1	5067-5416	Capillary ST 0.17 x 120 mm, SLV/SV
1	5067-5407	Inline Filter Assembly (OPTIONAL)
	5023-0271	Frit 0.3 µm for inline filter, 5/pk (OPTIONAL)
	G4204-40000	Clamp for In-Line Filter (OPTIONAL)
2	5067-4237	Multi Purpose Valve Head
3	G4204-60022	Inlet Valve 1290 Infinity Quaternary Pump
4	G4204-81090	1290 Infinity Quaternary Pump Inlet Weaver Assembly
5	G1311-67701	Multi channel gradient valve (MCGV)
	5041-8365	Blank plug for MCGV
6	G4204-60350	Long Life Pump Head Quat
7	G4220-60028	Outlet valve (primary pump head)
8	5065-4445	Peristaltic pump with Pharmed tubing
9	G7104-60001	Pressure sensor 1300 bar
10	G4204-68000	Jet Weaver 380 µL for 1290 Infinity Quaternary Pump (OPTIONAL)
11	G4204-60004	Outlet filter 1290 Infinity Quaternary Pump
	5067-5716	Frit for 1290 pump outlet filter 2/pk

Flow Connections

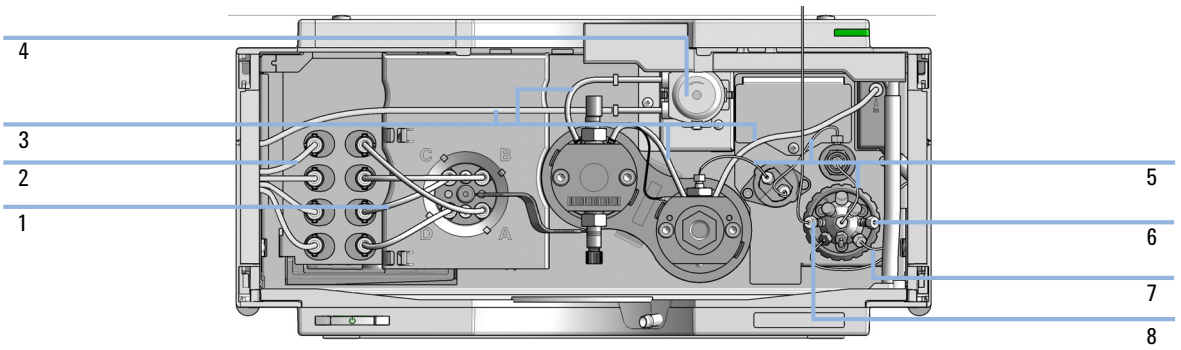


Figure 17 Flow connections of the pump

Item	p/n	Description
1	G4220-60035	Tubing kit 140 mm, 2/pk Degasser to MCGV
2	G7120-60007	Bottle Head Assembly
	5067-5760	Solvent Cabinet Kit (not shown)
3	5065-9978	Tubing, 1 mm i.d., 3 mm o.d., silicone, 5 m
4	5065-4445	Peristaltic pump with Pharmed tubing
5	5067-4656	Capillary ST, 0.25 mm x 80 mm Pressure Sensor to Outlet Filter, to Pump Head, and to Multi Purpose Valve
6	5067-4748	Capillary ST, 0.17 mm x 90 mm Multi Purpose Valve to Inline Filter
7	G4220-67000	Waste Tubing with Fitting
8	5500-1217	Capillary ST 0.17 mm x 900 mm SI/SX ps-ps Pump to Multisampler
	5500-1245	Capillary ST 0.17 mm x 400 mm SI/SI
	5500-1253	Capillary ST 0.17 mm x 130 mm SX/S for Jet Weaver (not shown)
	G7120-68070	Ultra Clean Tubing Kit (includes bottle head assemblies and tubing connections within the pump)
	G4220-60070	Tubing Kit 140 mm - Ultra Clean Tubing (tubes from SSV to shutoff valve or degassing unit to MCGV)
	G7120-60017	Bottle Head Assembly Ultra Clean Tubing (bottle heads and tubing to shutoff panel / degasser)

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

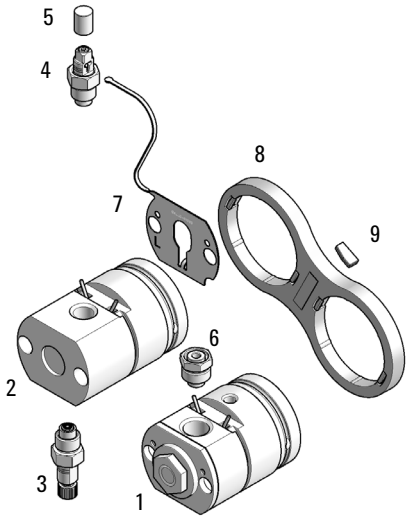
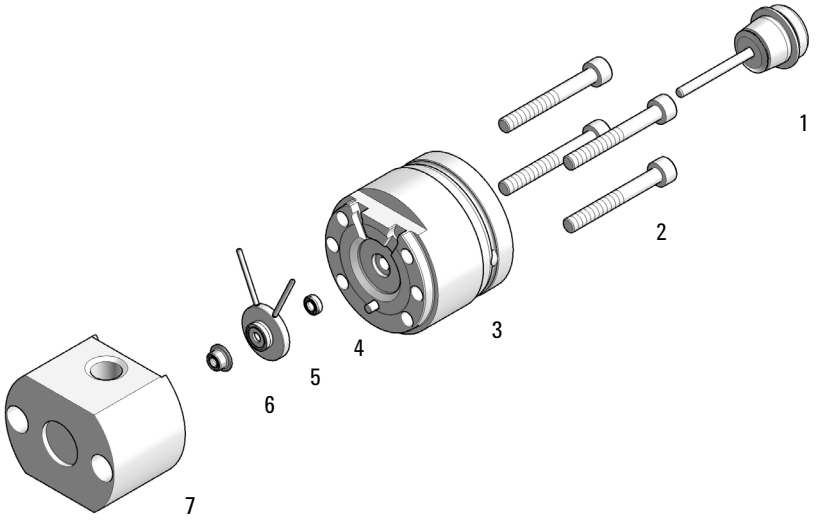


Figure 18 Pump head assembly parts

Long Life Pump Head Quat (G4204-60350)

Item	p/n	Description
1	G4220-60660	Secondary Pump Head Assembly Pendulum
2	G4220-60661	Primary Pump Head Assembly Pendulum
3	G4204-60022	Inlet Valve 1290 Infinity Quaternary Pump
4	G4220-60028	Outlet valve (primary pump head)
	G4220-20020	Internal gold seal for Outlet Valve (not shown)
5	5042-9966	Cap Outlet Valve
6	G1312-60001	Adapter
7	G4220-81013	Heat Exchanger
8	G4220-40001	Link Plate
9	0960-2971	RF Transponder

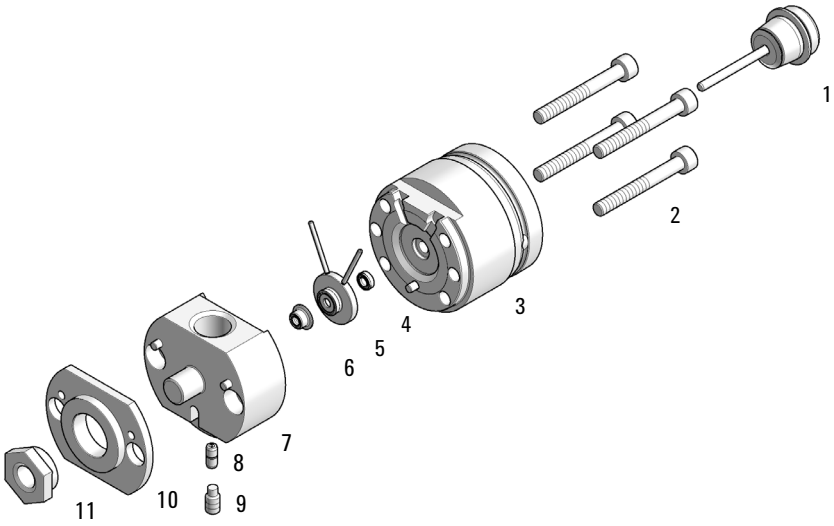
Primary Pump Head Parts



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

Multi Purpose Valve

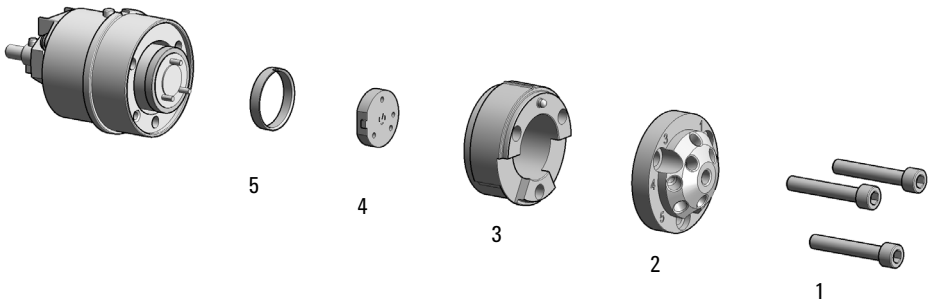
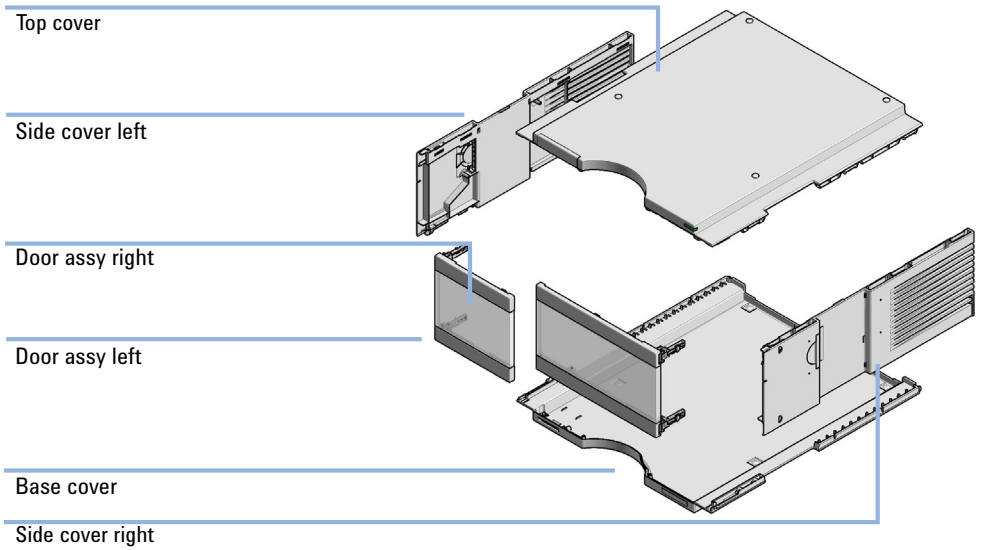


Figure 19 Multi Purpose Valve parts

Item	p/n	Description
1	1535-4857	Stator screws, 10/Pk
2	5068-0001	Stator head
3	5068-0120	Stator ring
4	5068-0202	Rotor seal, Multi Purpose Valve, 1300 bar
5	1535-4045	Bearing ring

Cover Parts



p/n	Description
G7104-68713	Cabinet Kit 180 Infinity II (includes sides, bottom, top, leak adapter top and Status Indicator Insert)
5043-0286	Base Cover
G7104-60200	Cover Side Right
G7104-60201	Cover Side Left
5067-5908	Top Cover
5043-0856	Leak Adapter (not shown)
5067-5745	Door Assembly Infinity 180 Left
5067-5746	Door Assembly Infinity 180 Right

Accessory Kit

G7104-68705

#	p/n	Description
2	0100-1816	Fitting Waste Tube to Purge Valve
1	0890-2207	Tubing/Sleeving-Flex
2	5043-1013	Tubing Clip
3	5063-6527	Tubing assembly, i.d. 6 mm, o.d. 9 mm, 1.2 m (to waste)
1	5067-5443	Inlet tubing
1	5181-1519	CAN cable, Agilent module to module, 1 m
6	5500-1155	Tube Connector, 90 degree, ID 6.4
1	5500-1245	Capillary ST 0.17 mm x 400 mm SI/SI
1	9301-6476	Syringe with luerlock 5 mL Polypropylene
1	G1311-90107	Algae note
1	9301-1337	Syringe adapter
1	5500-1156	T-Tube Connector ID6.4
3	5500-1169	Y Tube Connector ID6.4
1	5500-1217	Capillary ST 0.17 mm x 900 mm SI/SX ps-ps
1	01200-90091	1290 Infinity Pump Quick Reference Sheet
1	5067-6197	Seal Handling Device
1	5043-1400	Pump Head Holder
1	5067-5716	Frit for 1290 pump outlet filter 2/pk

Tool Kit


5023-2504
(Hex Driver SW-4 slitted)
8710-0899
(Screwdriver Pozidrive Shaft)
5023-2503
(Hex Driver
SW-5 slitted)
5023-2502
(Hex Driver SW-6,
35/ ¼" slitted)
8720-0025
8710-1924
8710-2409
8710-0510
8710-0510
5023-2500
8710-1534
8710-2394
(Hex Key 9/64", 15cm)
Box with:
9301-0411 (Syringe, Plastic)
9301-1337 (Syringe Adapter)
0100-1710 (Mounting tool for flangeless nut)
0100-1681 (Adapter luer/barb)
01018-23702 (Seal Insert tool)
5067-6127 (Blank Nut V)
5023-2653 (Hex Key 3/32")
5023-2501
(Screwdriver Torx-T10)
5023-2499
(Hex Key Set)
5043-1361
(Hex Key Set Driver)

9 Identifying Cables

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CAN/LAN Cables 202
Agilent Module to PC 203
USB Cables 204

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
5188-8059	ERI-Extension-Cable 1.2 m
5061-3378	Remote Cable to 35900 A/D converter
01046-60201	Agilent module to general purpose
5188-8057	Fraction Collection ERI remote Y-cable

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)

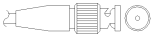
RS-232 cables (not for FUSION board)

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

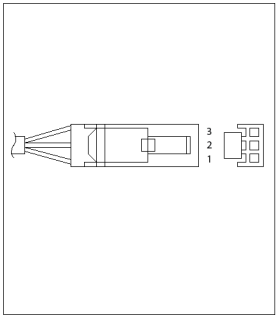
p/n	Description
5188-8050	USB A M-USB Mini B 3 m (PC-Module)
5188-8049	USB A F-USB Mini B M OTG (Module to Flash Drive)

Analog Cables

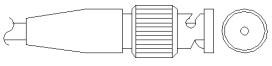


One end of these cables provides a BNC connector to be connected to Agilent modules. The other end depends on the instrument to which connection is being made.

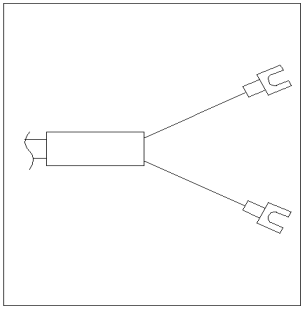
Agilent Module to 35900 A/D converters

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 +

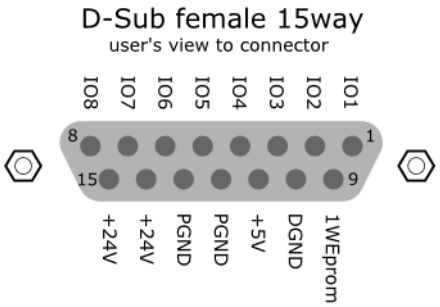
Agilent Module to General Purpose

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 (D-Sub 15 pin male - open end)
- 5188-8044 ERI to ERI (D_Sub 15 pin male - male)
- 5188-8059 ERI-Extension-Cable 1.2 m (D-Sub15 pin male / female)

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			

- 5188-8045 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	

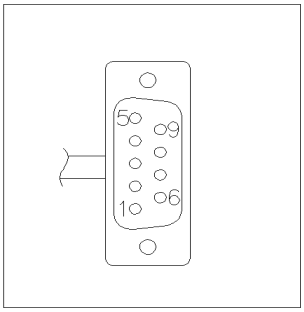
- 5188-8057 ERI to APG and RJ45 (Connector D_Subminiature 15 pin (ERI), Connector D_Subminiature 9 pin (APG), Connector plug Cat5e (RJ45))

Table 9 5188-8057 ERI to APG and RJ45

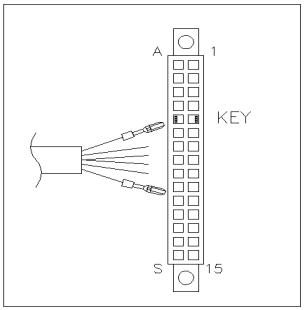
p/n 5188-8057	Pin (ERI)	Signal	Pin (APG)	Active (TTL)	Pin (RJ45)
					
	10	GND	1		5
	1	Start Request	9	High	
	2	Stop	8	High	
	3	Ready	7	High	
	4	Fraction Trigger	5	High	4
	5	Power on	6	High	
	6	Shut Down	4	High	
	7	Start	3	High	
	8	Prepare	2	High	
	Ground	Cable Shielding	NC		

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.

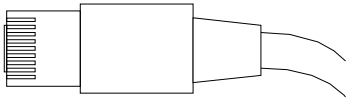
Agilent Module to Agilent 35900 A/D Converters

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 Cables

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)