

## 10 Maintenance and Repair

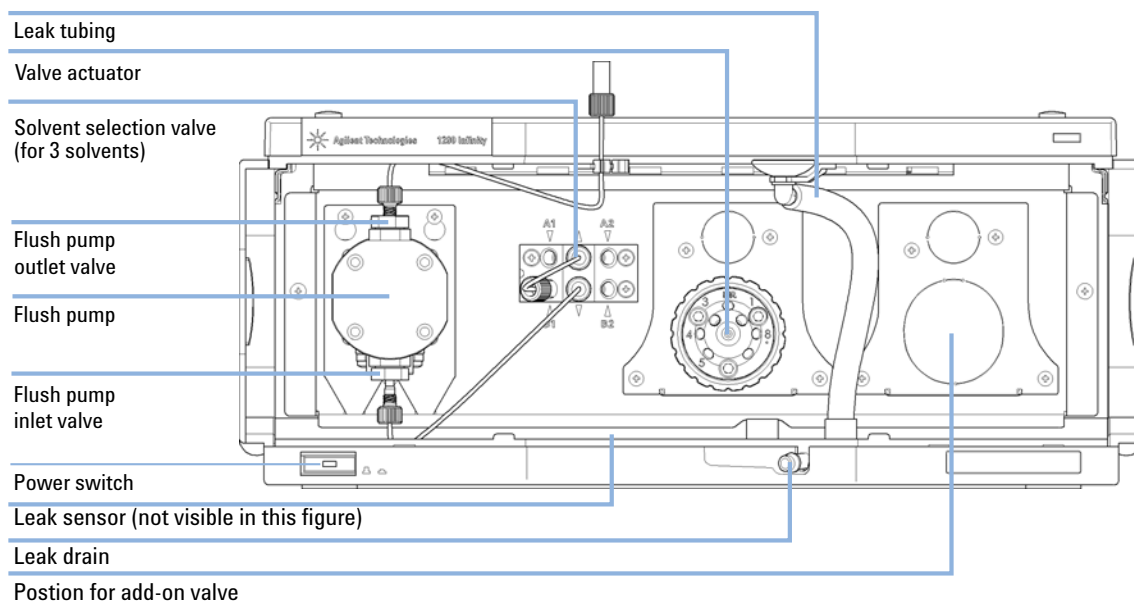
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This chapter describes the maintenance of the module.



## Introduction to Maintenance

Figure 37 on page 134 shows the main user accessible assemblies of the Agilent 1290 Infinity Flexible Cube. These parts can be accessed from the front (simple repairs) and don't require to remove the Flexible Cube from the system stack.



**Figure 37** Front of the Flexible Cube

## 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.
-

## 10 Maintenance and Repair

### Warnings and Cautions

#### 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 procedures (simple repairs) that can be done without opening the main cover.

**Table 7** Maintenance Procedures

Procedure	Typical Frequency	Notes
<a href="#">“Exchange Flush Pump Inlet Valve”</a> on page 139	When leaking	Run <b>Flush pump delivery test</b> for verification
<a href="#">“Exchange Flush Pump Outlet Valve”</a> on page 141	When leaking	Run <b>Flush pump delivery test</b> for verification
<a href="#">“Exchange Valve Rotor Seal”</a> on page 143	If damaged, blocked or leaking	Run <b>Pressure Test</b> for verification
<a href="#">“Installing the Capillaries”</a> on page 152	When new application requires a change	
<a href="#">“Replacing Valve Heads”</a> on page 148	If the valve performance shows indication of leakage or wear	
<a href="#">“Replacing Module Firmware”</a> on page 159	If required	

**NOTE**

Preventive maintenance is usually not necessary; only for the rotor seal!

## 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.
-

## Exchange Flush Pump Inlet Valve

**When** If the Flush pump delivery test fails or if the Inlet valve show signs of malfunction.

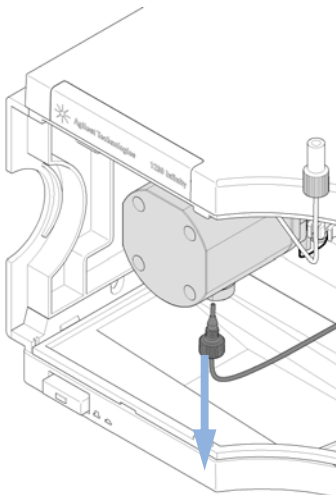
<b>Tools required</b>	<b>p/n</b>	<b>Description</b>
	8710-1924	Wrench open 14 mm

<b>Parts required</b>	<b>p/n</b>	<b>Description</b>
	5067-4717	Inlet valve

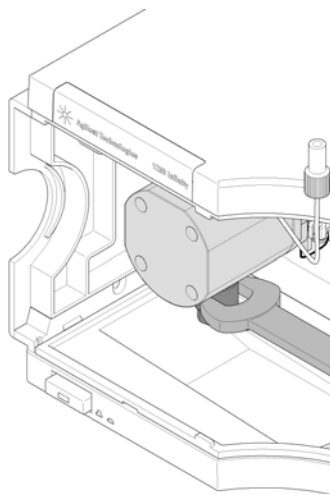
**Preparations**

- In order to avoid leaks, place the solvent bottles at or below the level of the pump head.
- Open the front door of the module.

**1** Disconnect the finger tight fitting of the Inlet capillary at the bottom of the Flush pump.



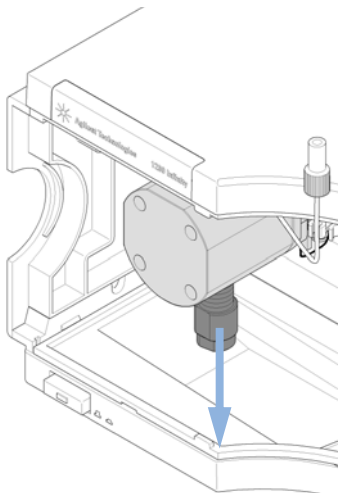
**2** With a 14 mm wrench on the flange closest to the pump head, unscrew the valve.



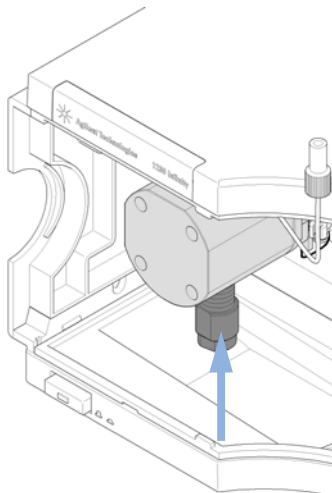
## 10 Maintenance and Repair

### Exchange Flush Pump Inlet Valve

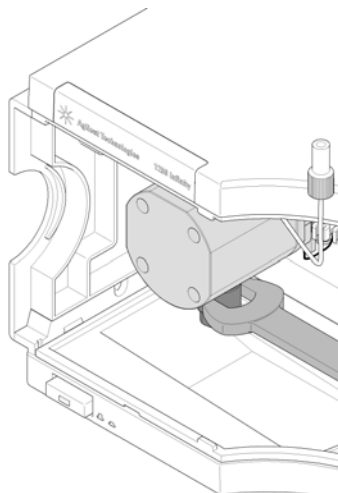
3 Remove the valve by moving it downwards.



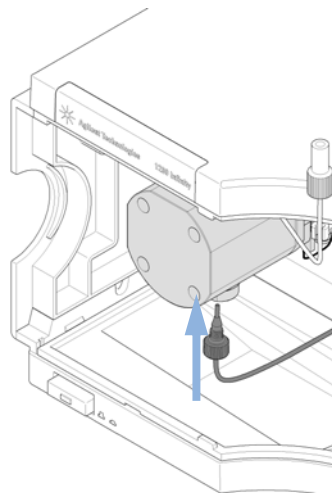
4 Insert the new valve.



5 Tighten the valve with a 14 mm wrench attached to the flange closest to the pump head.



6 Reconnect the finger tight fitting at the inlet of the flush pump.



7 Close the front cover and prime the flush pump before use to warrant trouble free usage.



## Exchange Flush Pump Outlet Valve

**When** If the Flush pump delivery test fails or if the Outlet valve show signs of malfunction.

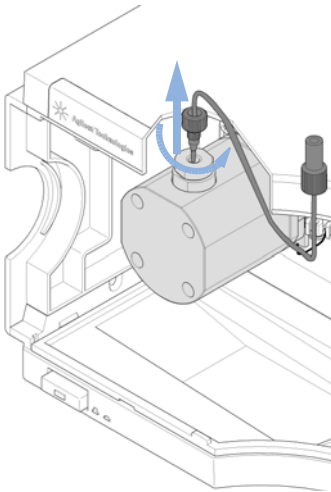
Tools required	p/n	Description
	8710-0510	Wrench open 1/4 — 5/16 inch
	8710-1924	Wrench open 14 mm

Parts required	p/n	Description
	5067-4716	Outlet valve

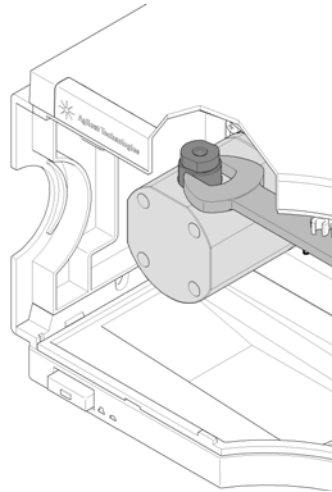
**Preparations**

- In order to avoid leaks, place the solvent bottles at or below the level of the pump head.
- Open the front door of the module.

**1** With a 1/4 inch wrench disconnect the capillary at the top of the Outlet valve.



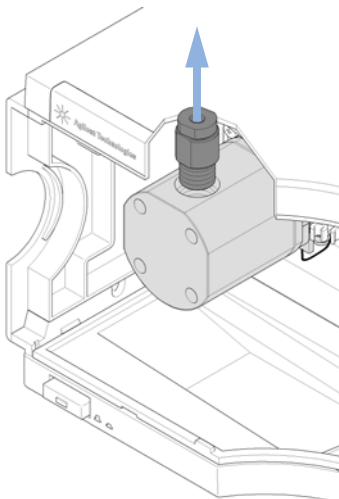
**2** With a 14 mm wrench on the flange closest to the pump head, unscrew the valve.



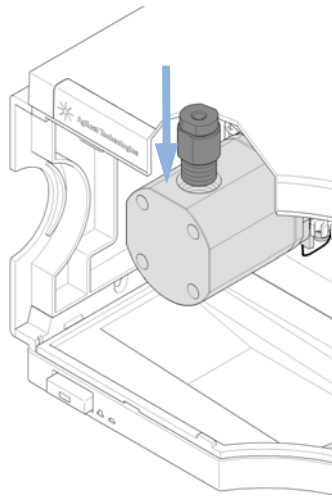
## 10 Maintenance and Repair

### Exchange Flush Pump Outlet Valve

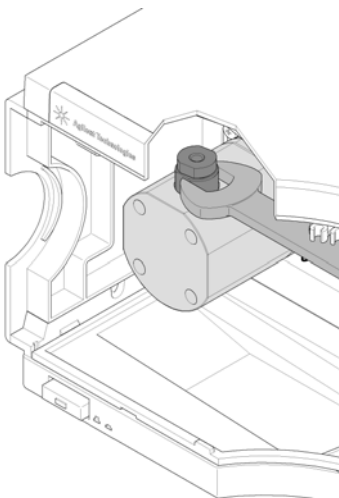
3 Remove the valve by lifting it upwards.



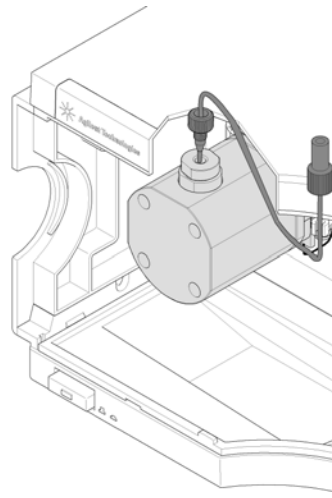
4 Insert the new valve.



5 Tighten the valve with a 14 mm wrench attached to the flange closest to the pump head.



6 Reconnect the capillary with a ¼ inch wrench at the outlet of the flush pump.



7 Close the front cover and prime the flush pump before use to warrant trouble free usage.

## Exchange Valve Rotor Seal

**When** When rotor seal is visibly damaged, blocked or leaks.

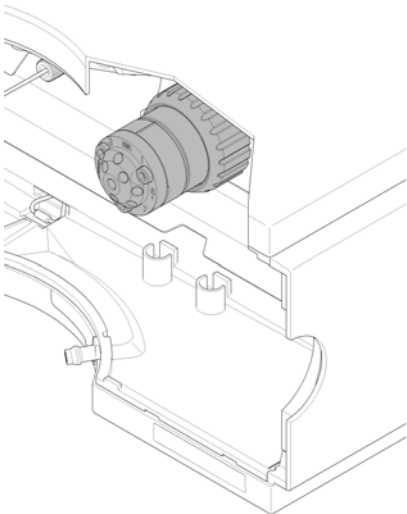
<b>Tools required</b>	<b>p/n</b>	<b>Description</b>
	8710-0510	Wrench open 1/4 — 5/16 inch
	8710-2394	Hex key 9/64 inch 15 cm long T-handle

<b>Parts required</b>	<b>p/n</b>	<b>Description</b>
	Part number depending on valve pod in use	Rotor seal

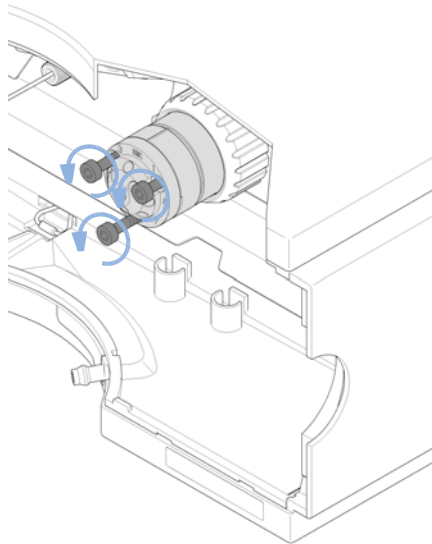
**Preparations**

- In order to avoid leaks, place the solvent bottles at or below the level of the pump head.
- Open the front door of the module.

**1** Remove all capillaries from the valve head.



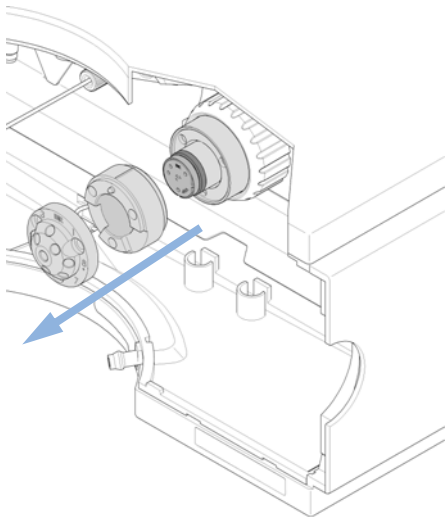
**2** With a 9/64 inch hex key unscrew the stator screws.



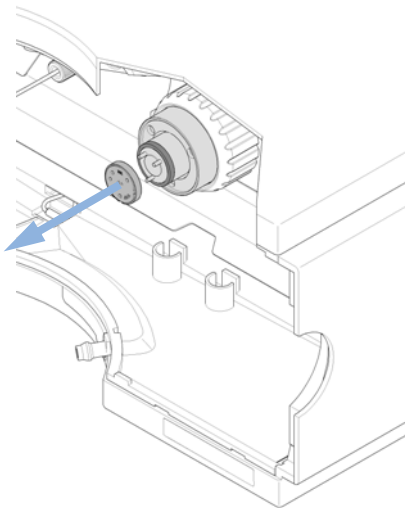
## 10 Maintenance and Repair

### Exchange Valve Rotor Seal

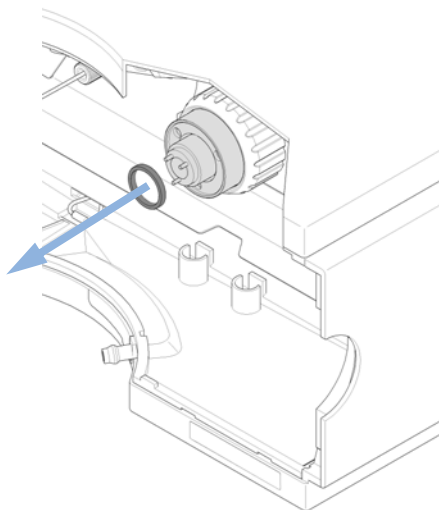
3 Remove the stator head and the stator ring.



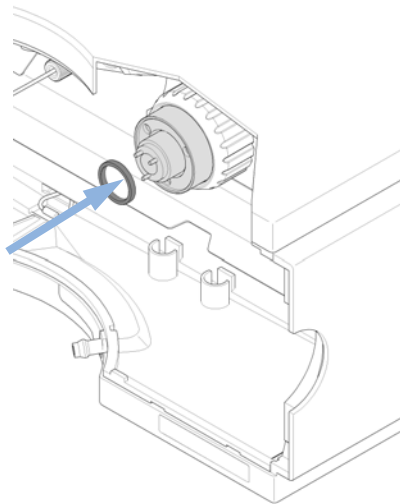
4 Remove the rotor seal.



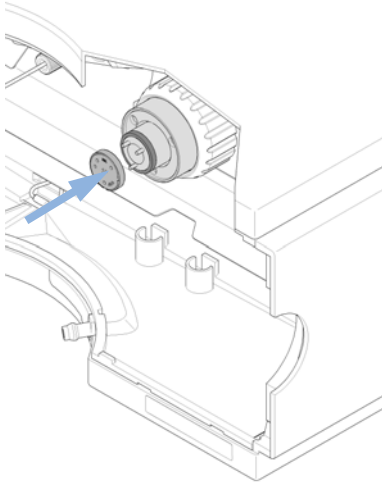
5 Remove the Isolation seal.



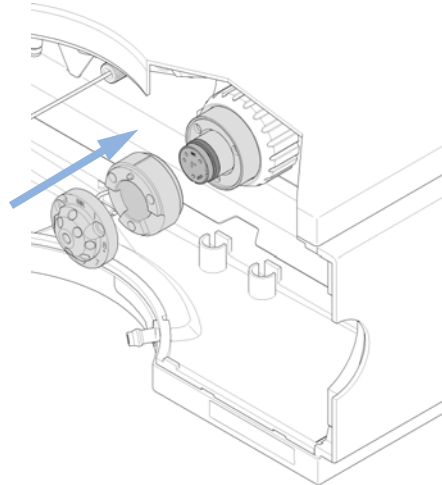
6 Replace the Isolation seal.



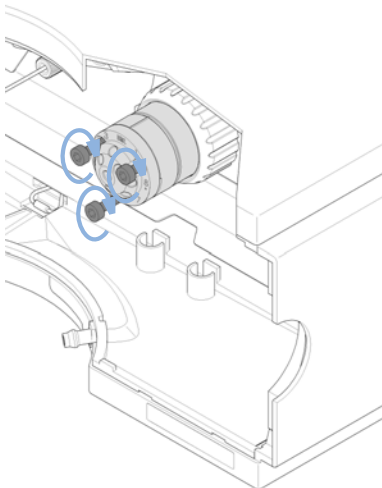
7 Install new rotor seal.



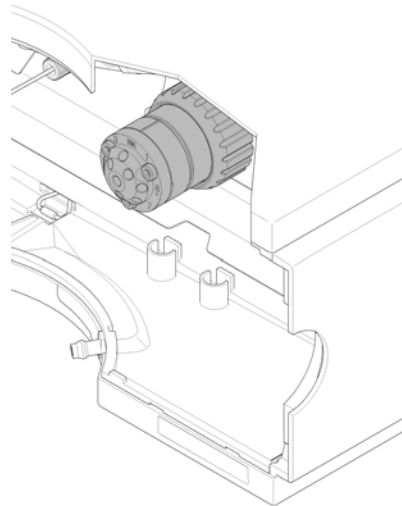
8 Install the stator head and the stator ring.



9 With a 9/64 inch hex key alternately tighten the stator screws.



10 Reinstall all capillaries to the valve head depending on the type and usage of the valve.



11 Close the front cover and prime the flush pump before use to warrant trouble free usage.

# Replacing Parts of the Valve Head

For details about the needed parts and orientation please refer to “[Parts and Materials for Maintenance](#)” on page 161.

## Disassembling and reassembling the valve head



For bio-inert modules use bio-inert parts only!

When	Stator head: Scratches and damages on the inner surface, blockages
	Stator face assy: When visibly scratched, or when the valve performance shows indication of leakage or wear
	Rotor seal assy: After approximately 10000 to 20000 injections, or when the valve performance shows indication of leakage or wear

Tools required	Description
	Hex key

### WARNING

**Toxic, flammable and hazardous solvents, samples and reagents**

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

- Be sure that no solvent can drop out of the solvent connections when removing them from your valve head.
- 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.

- 1 Use the Hex Key to open and remove the Stator Screws from the Stator Head.
- 2 Carefully disassemble the necessary Valve Head parts to gain access to the one you want to replace. While doing so please observe the orientation of the parts.
- 3 Independent of the part you want to replace always inspect all parts for signs of damage.
- 4 Replace the proposed part.

**NOTE**

Always mind the correct orientation of the parts and avoid to touch their surfaces.

---

- 5 Turn each of the screws an equal amount until they are finger-tight, then tighten them for another half turn.

# Replacing Valve Heads

Several optional valve heads are available, which can be installed and exchanged easily.

Micro valves offer small internal volumes for minimum peak broadening, ideal for low flow rates in the nl/min and µl/min range.



For bio-inert modules use bio-inert parts only!

Parts required	#	p/n	Description
	1	5067-4121	8 pos/9 port valve head high pressure (1200 bar)
OR	1	5067-4107	Valve Head 8 Position/9 Port, 600 bar
OR	1	5067-4137	Valve Head 2 Position / 6 Port, 600 bar
OR	1	5067-4117	2 pos/6 port ultra high pressure (1200 bar) valve head
OR	1	5067-4144	Micro Valve Head 2 Position / 10 Port, 600 bar
OR	1	5067-4118	2 pos/10 port ultra high pressure (1200 bar) valve head
OR	1	5067-4146	Valve head 6 column selector (600 bar)
OR	1	5067-4142	Valve head 6 column selector (1200 bar)
OR	1	5067-4148	Bio-inert valve head 2 pos/6 port (600 bar)
OR	1	5067-4134	Bio-inert valve head 4 column selector (600 bar)
OR	1	5067-4159	Bio-inert selector valve 12 position/13 port (210 bar)

## WARNING

**Toxic, flammable and hazardous solvents, samples and reagents**

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

- Be sure that no solvent can drop out of the solvent connections when removing them from your valve head.
- 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.



**CAUTION**

Valve Damage

Using a low pressure valve on the high pressure side can damage the valve.

- When using multiple column compartments as part of a method development solution, make sure that the high pressure valve head is connected to the autosampler and the low pressure valve head is connected to the detector.
- 

**NOTE**

For details, please refer to the Agilent 1200 Infinity Series Method Development System - System Manual (G4230-90002).

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**CAUTION**

Column Damage or Bias Measurement Results

Switching the valve to a wrong position can damage the column or bias measurement results.

- Fit the lobe to the groove to make sure the valve is switched to the correct position.
- 

**CAUTION**

The valve actuator contains sensitive optical parts, which need to be protected from dust and other pollutions. Pollution of these parts can impair the accurate selection of valve ports and therefore bias measurement results.

- Always install a valve head for operation and storage. For protecting the actuator, a dummy valve head (part of Transportation Lock Kit (G1316-67001 )) can be used instead of a functional valve. Do not touch parts inside the actuator.
- 

**NOTE**

The tag reader reads the valve head properties from the valve head RFID tag during initialization of the module. Valve properties will not be updated, if the valve head is replaced while the module is on.

Selection of valve port positions can fail, if the instrument does not know the properties of the installed valve.

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**NOTE**

To have the valve correctly recognized by the Agilent Infinity Valve Drive you must have the valve drive powered off for at least 10 seconds.

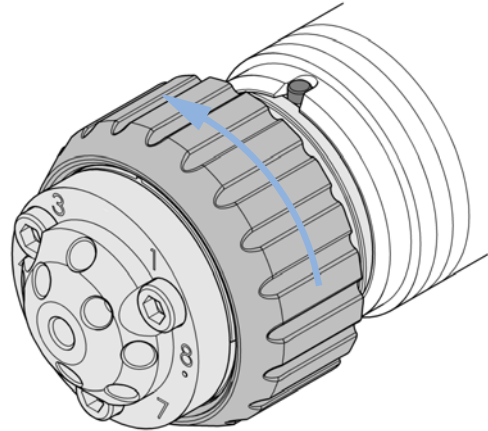
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## 10 Maintenance and Repair

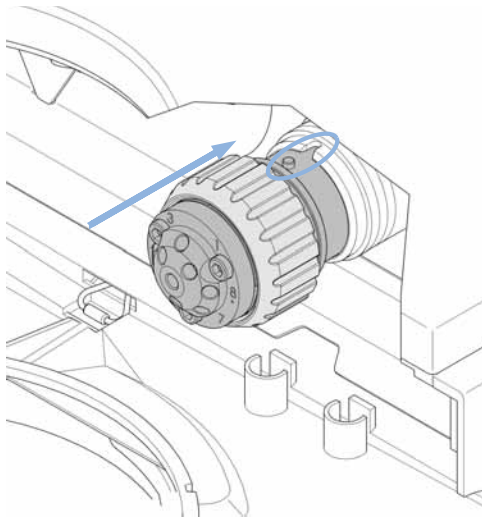
### Replacing Valve Heads

- 1 Switch off the module.
- 2 Remove all capillary connections from the valve head

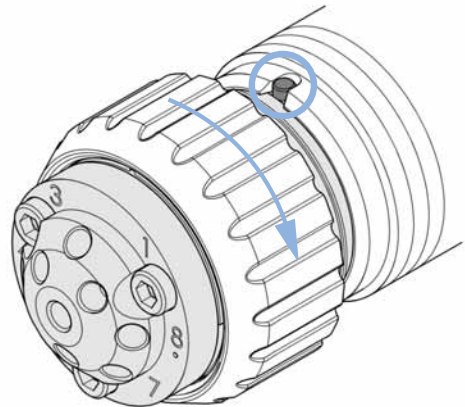
- 3 Unscrew the valve head.



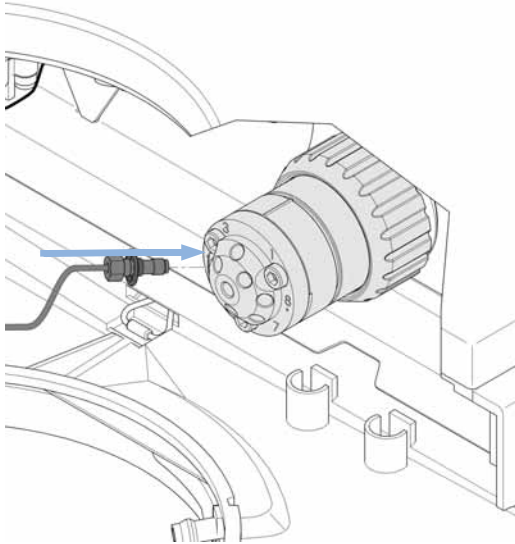
- 4 Put the new valve head onto the valve drive such that the lobe fits to the groove (see also "Installing the Valve Heads" on page 53).



- 5 Screw the valve head onto the valve drive using the union nut (see also "Installing the Valve Head and Connecting Capillaries" on page 54).



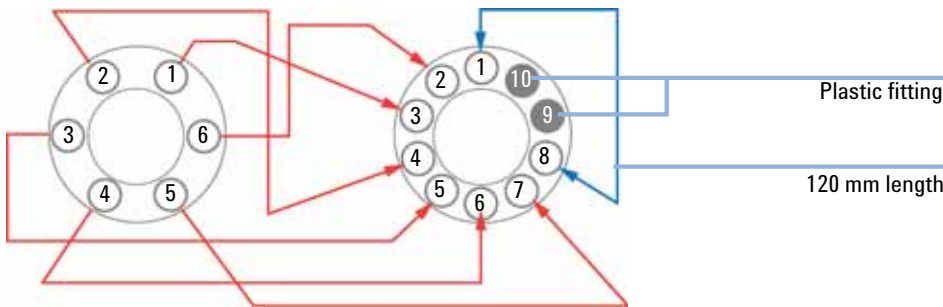
- 6 Install all required capillary connections to the valve head.



- 7 Switch on the module.

# Installing the Capillaries

The 2pos/10port valve can be used here in the same way as a 2pos/6port valve; just follow the re-routing diagram below. The red arrows mean that you have to take the according installation diagram of the 2pos/6port valve (Figure 38 on page 153, Figure 39 on page 155, Figure 40 on page 156) but have to mount for example the capillary connected to port 6 of the 2pos/6port valve at port 2 of the 2pos/10port valve. The ports 1 and 8 have to be connected with a 120 mm length capillary ( 0.12 mm i.d. depending on the capillary kit) (5067-4652) and the ports 9 and 10 need to be plugged with Plastic fittings (0100-1259).



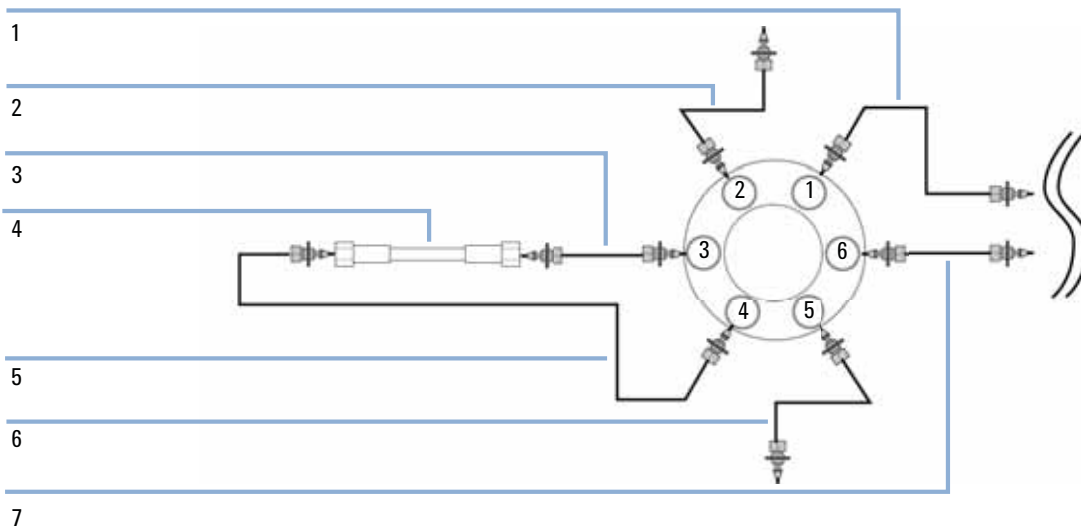
Parts required	p/n	Description
	G4231B	2pos/6port valve
	G4232B	2pos/10port valve
	0100-1259	Plastic fittings
	0890-1713	Waste tubing
	5067-4647	SST-Capillary 340 x 0.12 mm ps ps 1sh 1xlg
	5067-4648	SST-Capillary 700 x 0.17 mm ps ps 1sh 1xlg
	5067-4649	SST-Capillary 90 x 0.12 mm ps ps 1sh 1xlg
	5067-4650	SST-Capillary 150 x 0.12 mm ns ps 1lg 1xlg
	5067-4651	SST-Capillary 280 x 0.12 mm ns ps 1lg 1xlg
	5067-4652	SST-Capillary 120 x 0.12 mm ps ps 1xlg 1xlg
	5067-4653	SST-Capillary 200 x 0.12 mm ps ps 1sh 1xlg

**Preparations** Identify the required capillaries for your set up

**NOTE**

Use outmost care to avoid any void volumes caused by poor connections.

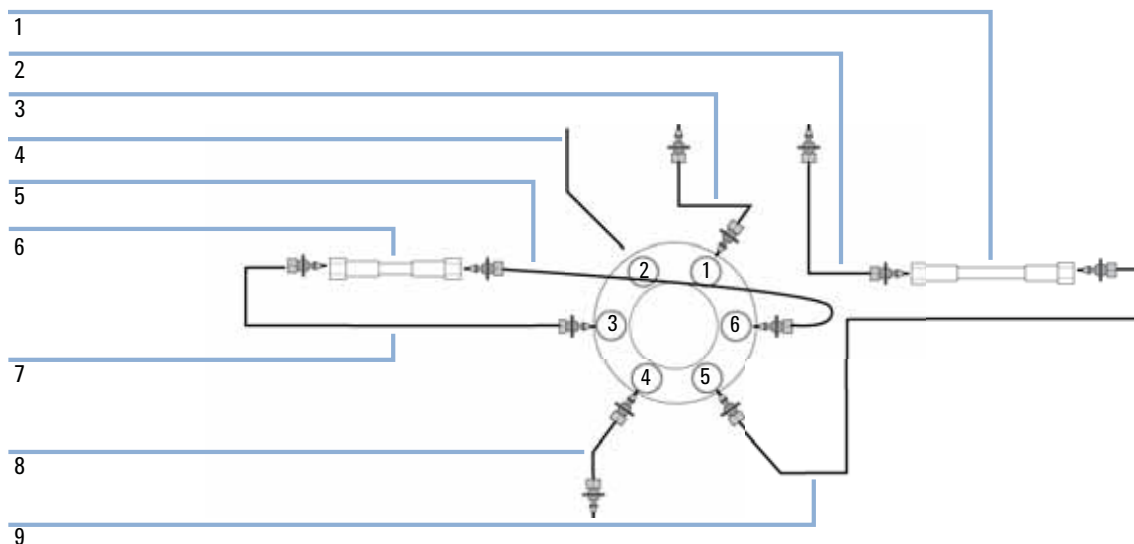
- 1 Install the capillaries depending on your application. Following configurations are available for listed applications. Please choose your appropriate configuration from this list:



**Figure 38** Installing the capillaries for a dual-column selection set-up (column of the second position omitted)

**10 Maintenance and Repair**  
Installing the Capillaries

1	150 mm length (column length up to 100 mm), 280 mm length (column length > 100 mm) From column Not pre-swaged on column-side!
2	200 mm length to detector
3	150 mm length (column length up to 100 mm), 280 mm length (column length > 100 mm) From column Not pre-swaged on column-side!
4	90 mm length capillary
5	Column
6	90 mm length capillary
7	90 mm length capillary to column
Pos. 1: Connection between ports 1-6, 4-5, 2-3, active column 1 = left Pos. 2: Connection between ports 1-2, 3-4, 5-6, active column 2 = right Example shows setup with flow directed from bottom to top. Flow direction from top to bottom needs switch of connected capillaries at ports 5 and 2. Also column inlet connections needed to be switched with outlet connections. (Port 4 to 3 and 6 to 1.)	

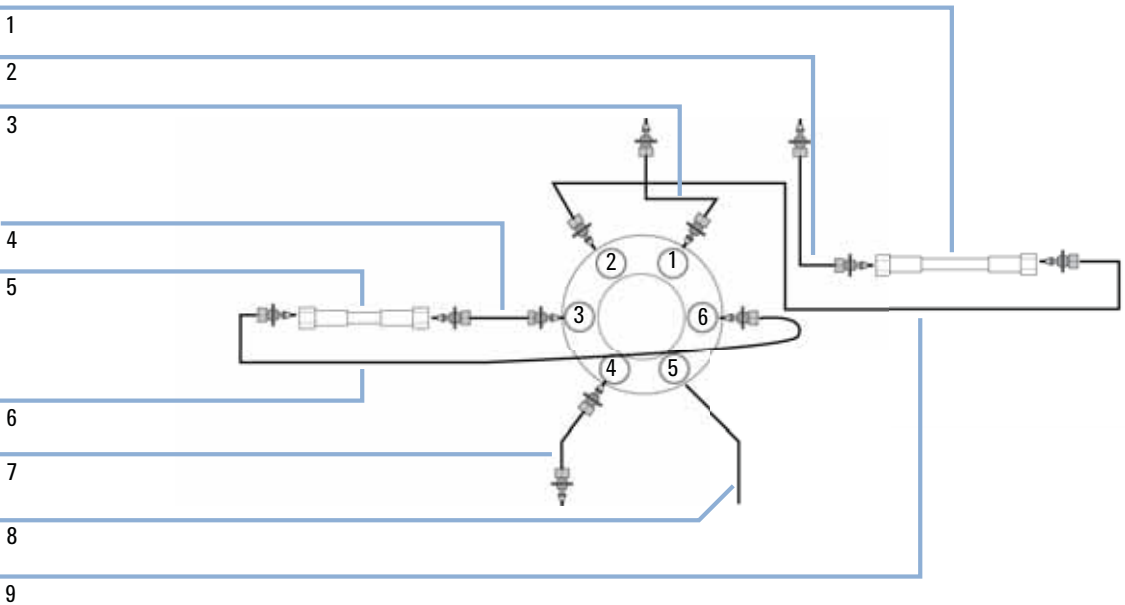


**Figure 39** Installing the capillaries for a sample enrichment set-up

1	<b>Analytical column</b>
2	280 mm length (column length > 100 mm) from analytical column to detector Not pre-swaged on column-side!
3	340 mm length from autosampler and loading pump
4	To waste
5	150 mm length (column length up to 100 mm), 280 mm length (column length > 100 mm) From column Not pre-swaged on column-side!
6	<b>Enrichment column</b>
7	90 mm length capillary to column
8	700 mm length (0.17 mm ID) from analytical pump
9	90 mm length capillary to column
Pos.1: Connection between ports 1-6 , 4-5, 2-3 , active column 1 = left (enrichment column)	
Pos. 2: Connection between ports 1-2, 3-4, 5-6 active column 2 = right (analytical column)	

# 10 Maintenance and Repair

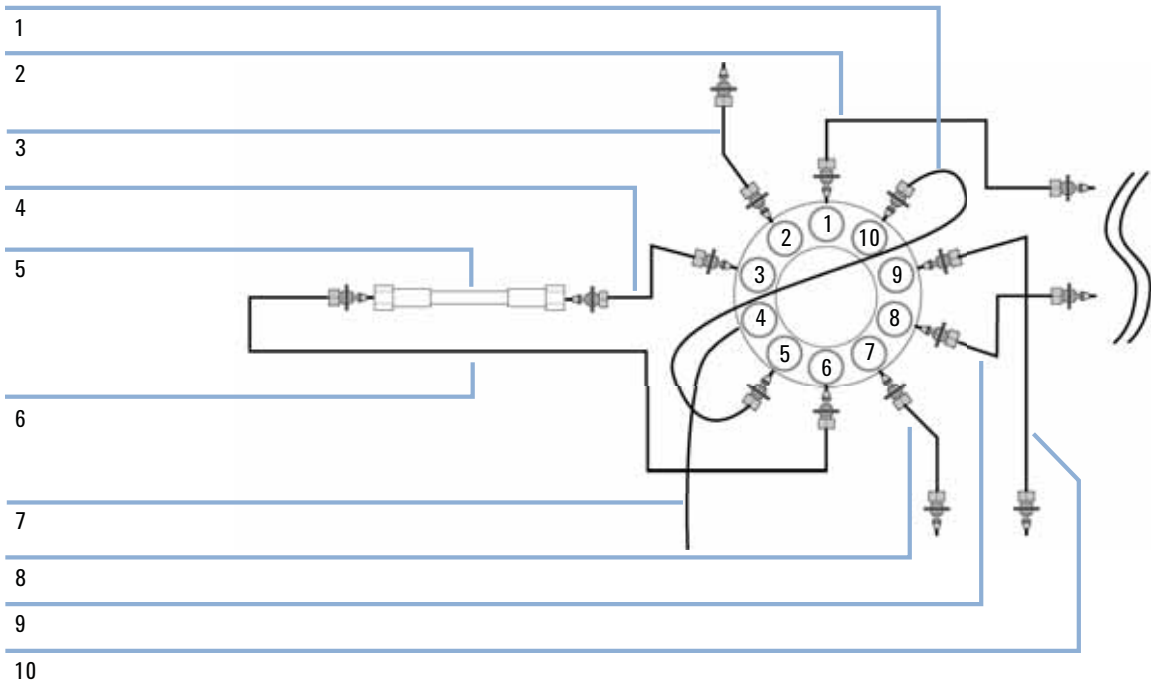
## Installing the Capillaries



**Figure 40** Installing the capillaries for a sample clean-up set-up

1	<b>Analytical column</b>
2	280 mm length (column length > 100 mm) from analytical column to detector Not pre-swaged on column-side!
3	340 mm length from autosampler and loading pump
4	150 mm length (column length up to 100 mm), 280 mm length (column length > 100 mm) From column Not pre-swaged on column-side!
5	<b>Pre-column</b>
6	90 mm length capillary to column
7	700 mm length (0.17 mm ID) from analytical pump
8	To waste
9	90 mm length capillary to column
Pos. 1: Connection between ports 1-6, 4-5, 2-3, active column 1 = left (enrichment column)	
Pos. 2: Connection between ports 1-2, 3-4, 5-6, active column 2 = right (analytical column)	





**Figure 41** Installing the capillaries for alternating column regeneration (column of the second position omitted)

## 10 Maintenance and Repair

### Installing the Capillaries

1	Valve-Valve connector, 120 mm length
2	150 mm length (column length up to 100 mm), 280 mm length (column length > 100 mm) From column Not pre-swaged on column-side!
3	200 mm length to detector
4	150 mm length (column length up to 100 mm), 280 mm length (column length > 100 mm) From column Not pre-swaged on column-side!
5	Column
6	90 mm length capillary to column
7	To waste
8	From autosampler
9	700 mm length (0.17 mm ID) from regeneration pump
10	90 mm length capillary
Pos. 1: Connection between ports 1-10, 2-3, 4-5, 6-7, 8-9, active column 1 = left / regenerating column = right Pos. 2: Connection between ports 1-2, 3-4, 5-6, 7-8, 9-10, active column 2 = right / regenerating column = left	

- 2 Connect the capillaries connected directly to a column and fasten them immediately with a spanner.
- 3 Finger-tighten all remaining capillaries.
- 4 Fasten all fittings with a spanner.
- 5 Starting from position one through six (ten, respectively), fasten the fittings on the valve head.
- 6 Fasten all fittings on attached modules (autosampler, detector, additional pumps). Fit all unused valve ports with a plastic plug.
- 7 Place the capillaries that go to another module or waste into the capillary guides to prevent squeezing them when closing the front cover.
- 8 Stow any excess lengths of the capillaries.
- 9 Perform a final leak-check.



## Replacing 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**

	LAN/RS-232 Firmware Update Tool
OR	Agilent Diagnostic 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 LAN/RS-232 FW Update Tool and the documentation from the Agilent web.
  - [http://www.chem.agilent.com/\\_layouts/agilent/downloadFirmware.aspx?whid=69761](http://www.chem.agilent.com/_layouts/agilent/downloadFirmware.aspx?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.



## 10 Maintenance and Repair

### Replacing Module Firmware

# 11

## Parts and Materials for Maintenance

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2 Pos/6 Port Ultra High Pressure Valve Head 1200 bar	169
2 Pos/6 Port Valve Head 600 bar (Bio-inert)	170
2 Pos/10 Port Micro Valve Head 600 bar	171
2 Pos/10 Port Ultra High Pressure Valve Head 1200 bar	172
8 Pos/9 Port Valve Head 600 bar	173
8 Pos/9 Port Ultra High Pressure Valve Head 1200 bar	174
Valve Head 4 Column Selector 600 bar (Bio-inert)	175
Valve Head 6 Column Selector 600 bar	176
Valve Head 6 Column Selector 1200 bar	177
12 Pos/13 Port Valve Head 210 bar (Bio-inert)	178

This chapter provides information on parts and material required for the module.

# Parts overview

Item	p/n	Description
1	5067-4717	Inlet valve
2	5067-4716	Outlet valve
3	G4280-67304	Solvent selection valve to flush pump tubing
4	5067-4680	Tubing Kit 600 mm; 130 bar
5	5067-4697	Solvent selection valve bridge tubing

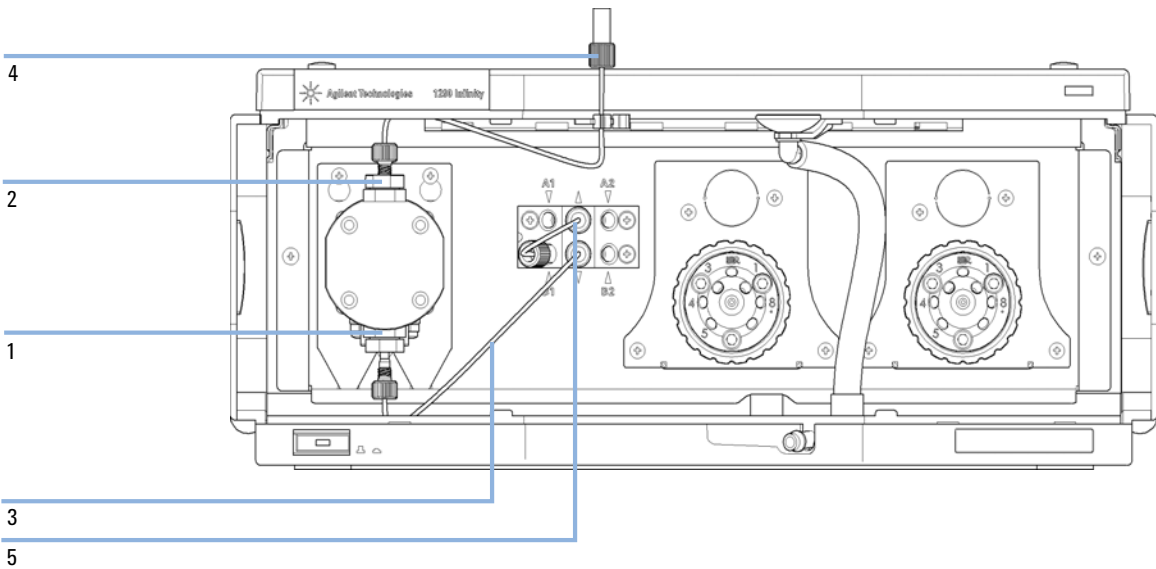


Figure 42 Parts overview

## Capillaries

Item	p/n	Description
1	5067-4680	Tubing Kit 600 mm; 130 bar
2	G4280-67304	Solvent selection valve to flush pump tubing
3	5067-4697	Solvent selection valve bridge tubing

## Accessory Kits

### HPLC System Tool Kit

The HPLC System Tool Kit (G4203-68708) contains some accessories and tools needed for installation and repair of the module.

p/n	Description
0100-1681	Adapter syringe/seal wash tube
0100-1710	Mounting Tool for Tubing Connections
01018-23702	Insert tool
5023-0240	Hex driver, ¼", slitted
8710-0060	Hex-key wrench, 9/64 inch
8710-0510 (2x)	Wrench open 1/4 — 5/16 inch
8710-0641	Hex key set 1 – 5 mm
8710-0899	Pozidriv screwdriver
8710-1534	Wrench, 4 mm both ends, open end
8710-1924	Wrench open 14 mm
8710-2392	Hex key 4 mm 15 cm long T-handle
8710-2393	Hex key 1.5 mm, straight handle 10 cm
8710-2394	Hex key 9/64 inch 15 cm long T-handle
8710-2409	Wrench open end, 5/16 – 3/8 inch
8710-2411	Hex key 3 mm 12 cm long
8710-2412	Hex key 2.5 mm, 15 cm long, straight handle
8710-2438	Hex key 2.0 mm
8710-2509	Screwdriver Torx TX8
8710-2594	Double open end wrench 4 mm



p/n	Description
9301-0411	Syringe, Plastic
9301-1337	Adapter syringe/solvent tube with fitting

## Flexible Cube Accessory Kit

The Flexible Cube Accessory Kit (G4227-68705) contains some accessories and tools needed for installation and repair of the module.

p/n	Description
0100-1816	Fitting Waste Tube to Purge Valve
0890-2207	Tubing/Sleeving-Flex
5067-4680	Tubing Kit 600 mm; 130 bar
5181-1519	CAN cable, Agilent module to module, 1 m
9301-1420	Solvent bottle, transparent
G4220-60007	Bottle Head Assembly
G4226-87012	Needle seat
5043-0909	Tubing-Flex PE, 3 m

## Valve Options Overview

This overview gives a summary of the main parts and assemblies. More details are available with each valve option in this chapter.

**Table 8** Agilent Quick Change Valve Heads

Kit description <sup>1</sup>	Valve head	Rotor seal	Stator heads
Method development valves kit (G4230A) <sup>2</sup>	Valve Head 8 Position/9 Port, 600 bar (5067-4107)	Rotor Seal, PEEK (5067-4111)	Stator head (5068-0001)
Method development valves kit (G4230B) <sup>2</sup>	8 pos/9 port valve head high pressure ( 1200 bar) (5067-4121)	Rotor seal (Vespel) (5068-0002)	Stator head (5068-0001)
2pos/6port valve (G4231B)	2 pos/6 port ultra high pressure ( 1200 bar) valve head (5067-4117)	Rotor seal (Vespel) (5068-0008)	Stator head (5068-0006)
2pos/6port valve (G4231A)	Valve Head 2 Position / 6 Port, 600 bar (5067-4137)	Rotor Seal, PEEK (0101-1409)	Stator head (0101-1417)
2pos/10port valve (G4232B)	2 pos/10 port ultra high pressure ( 1200 bar) valve head (5067-4118)	Rotor seal (Vespel) (5068-0012)	Stator head (5068-0011)
2pos/10port valve (G4232A)	Micro Valve Head 2 Position / 10 Port, 600 bar (5067-4144)	Rotor Seal, PEEK (0101-1415)	Stator Head (0101-1421)
6 column selector valve (G4234A)	Valve head 6 column selector ( 600 bar) (5067-4146)	Rotor seal, PEEK (5068-0076)	Stator Head (5068-0077)
6 column selector (G4234B)	Valve head 6 column selector ( 1200 bar) (5067-4142)	Rotor seal (Vespel) (5068-0067)	Stator Head (5068-0077)

- <sup>1</sup> Valve kits include the valve head, optional capillary kits, manual, access material and installation and familiarization service. For more details refer to the 'Parts and Material' section.
- <sup>2</sup> G4230A includes 2 x 8Pos/9Port 600bar valve heads. G4230B includes 1x 8Pos/9Port 600bar and 1x 8Pos/9Port 1200bar valve head.

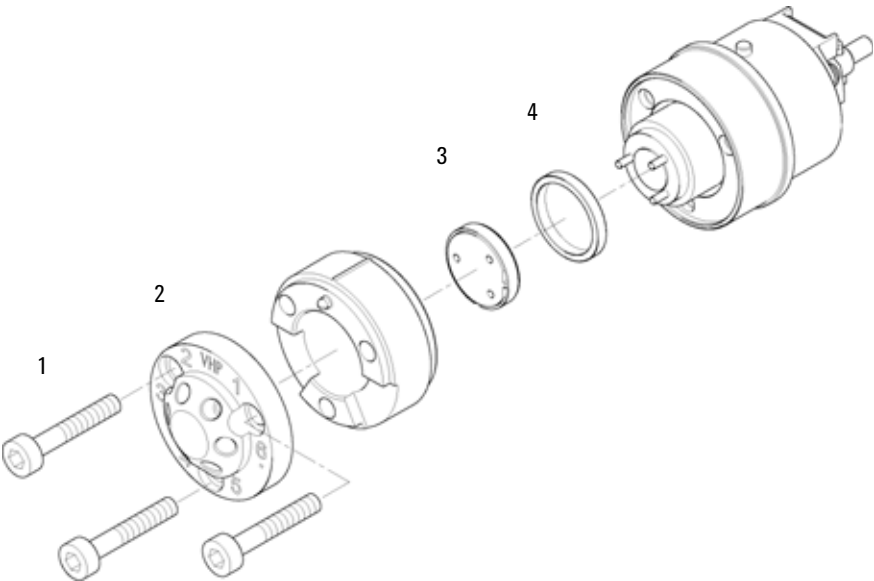
**Table 9** Agilent Quick Change Valve heads (Bio-inert)

Kit description	Valve head	Rotor seal	Stator heads
2pos/6port valve, bio-inert (G5631A)	Bio-inert valve head 2 pos/6 port ( 600 bar) (5067-4148)		
12pos/13port valve, bio-inert (G4235A)	Bio-inert selector valve 12 position/13 port ( 210 bar) (5067-4159)	Bio-inert rotor seal and stator face kit (0101-1288)	Bio-inert stator head (5068-0097) <sup>1</sup>
4 column selector valve, bio-inert (G5639A)	Bio-inert valve head 4 column selector ( 600 bar) (5067-4134)	Bio-inert rotor seal, PEEK (5068-0045)	Bio-inert stator head (5068-0044)

- <sup>1</sup> kit with stator face and rotor seal

# 2 Pos/6 Port Valve Head 600 bar

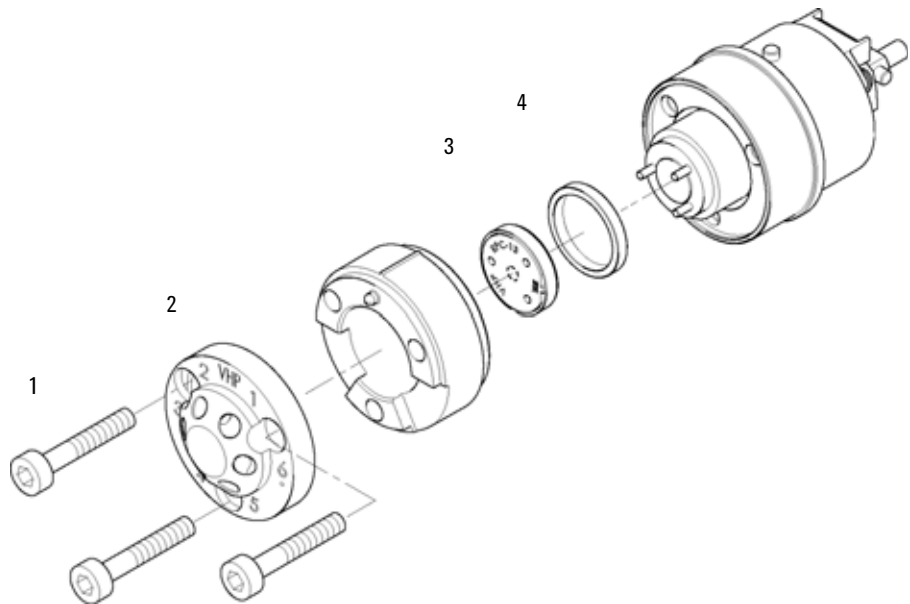
Item	p/n	Description
	5067-4137	Valve Head 2 Position / 6 Port, 600 bar
1	1535-4857	Stator screws, 10/Pk
2	0101-1417	Stator head
3	0101-1409	Rotor Seal, PEEK
4	1535-4045	Bearing ring



**Figure 43** Column Switching Valve Parts (5067-4137)

## 2 Pos/6 Port Ultra High Pressure Valve Head 1200 bar

Item	p/n	Description
	5067-4117	2 pos/6 port ultra high pressure (1200 bar) valve head
1	1535-4857	Stator screws
2	5068-0006	Stator head
3	5068-0008	Rotor seal (Vespel)
4	1535-4045	Bearing ring



**Figure 44** Column Switching Valve Parts (5067-4117)

## 2 Pos/6 Port Valve Head 600 bar (Bio-inert)



For bio-inert modules use bio-inert parts only!

Item	p/n	Description
	5067-4148	Bio-inert valve head 2 pos/6 port (600 bar)
1	5068-0020	Stator Screws, 10/pack
2	5068-0060	Bio-inert stator head
3	0100-1851	Stator face, ceramic
4	0101-1409	Rotor Seal, PEEK
5	1535-4045	Bearing ring

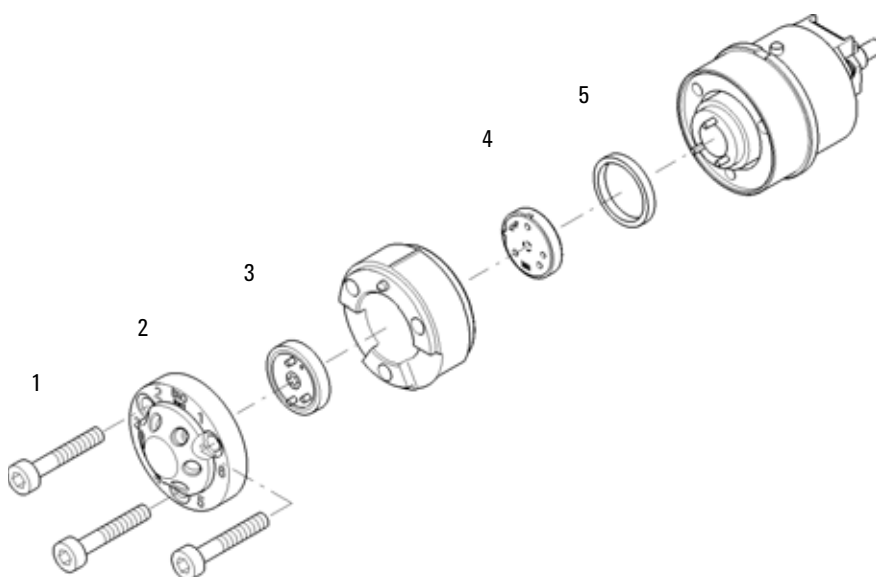
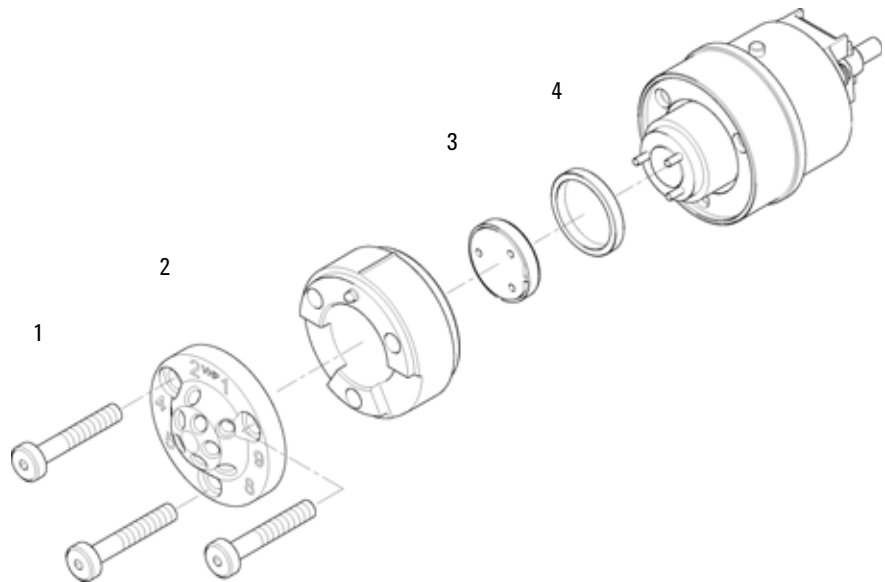


Figure 45 Column Switching Valve Parts

## 2 Pos/10 Port Micro Valve Head 600 bar

Item	p/n	Description
	5067-4144	Micro Valve Head 2 Position / 10 Port, 600 bar
1	5068-0054	Stator screws, 10/Pk
2	0101-1421	Stator Head
3	0101-1415	Rotor Seal, PEEK
4	1535-4045	Bearing ring



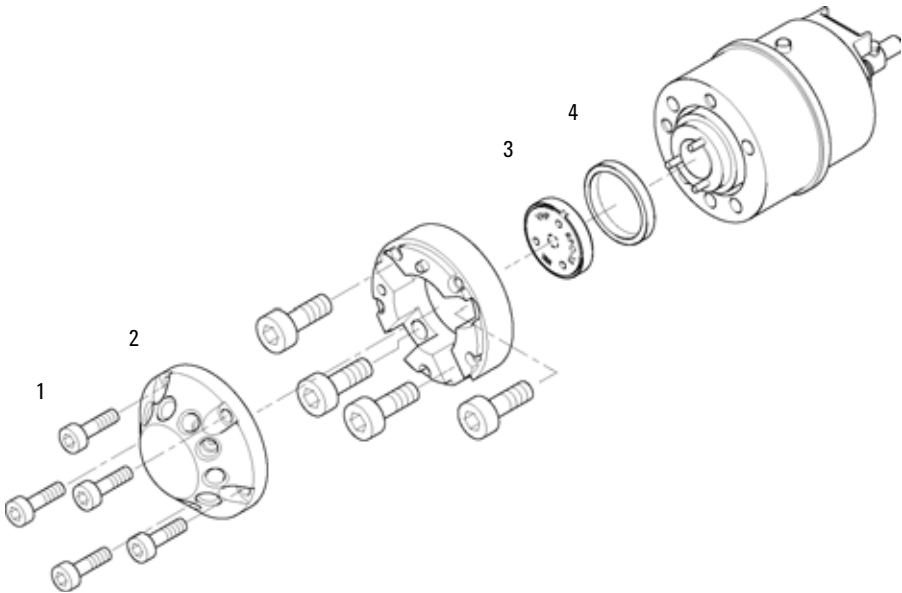
**Figure 46** Column Switching Valve Parts (5067-4144)

# 11 Parts and Materials for Maintenance

## 2 Pos/10 Port Ultra High Pressure Valve Head 1200 bar

### 2 Pos/10 Port Ultra High Pressure Valve Head 1200 bar

Item	p/n	Description
	5067-4118	2 pos/10 port ultra high pressure (1200 bar) valve head
1	5068-0019	Stator screws
2	5068-0011	Stator head
3	5068-0012	Rotor seal (Vespel)
4	1535-4045	Bearing ring

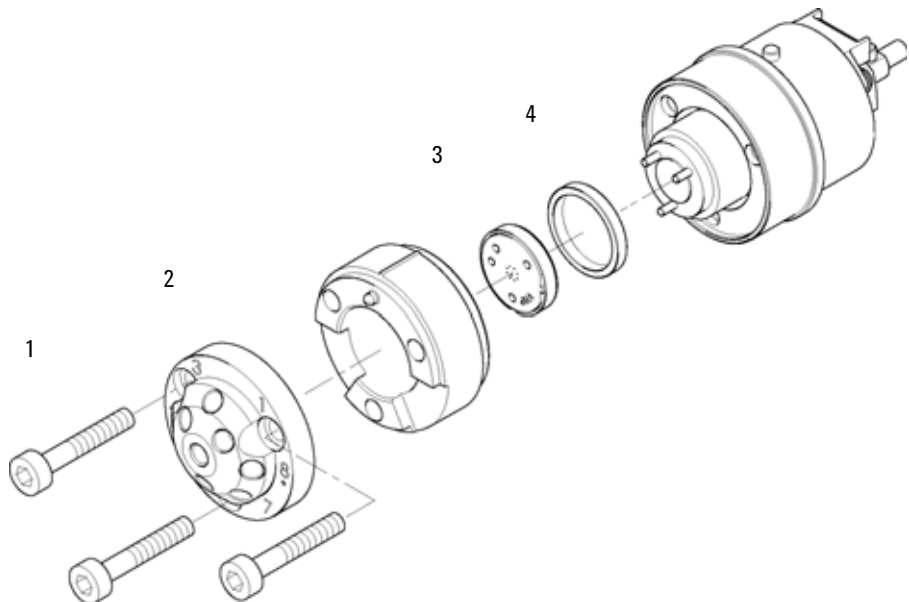


**Figure 47** Column Switching Valve Parts (5067-4118)



## 8 Pos/9 Port Valve Head 600 bar

Item	p/n	Description
	5067-4107	Valve Head 8 Position/9 Port, 600 bar
1	1535-4857	Stator screws
2	5068-0001	Stator head
3	5067-4111	Rotor Seal, PEEK
4	1535-4045	Bearing ring



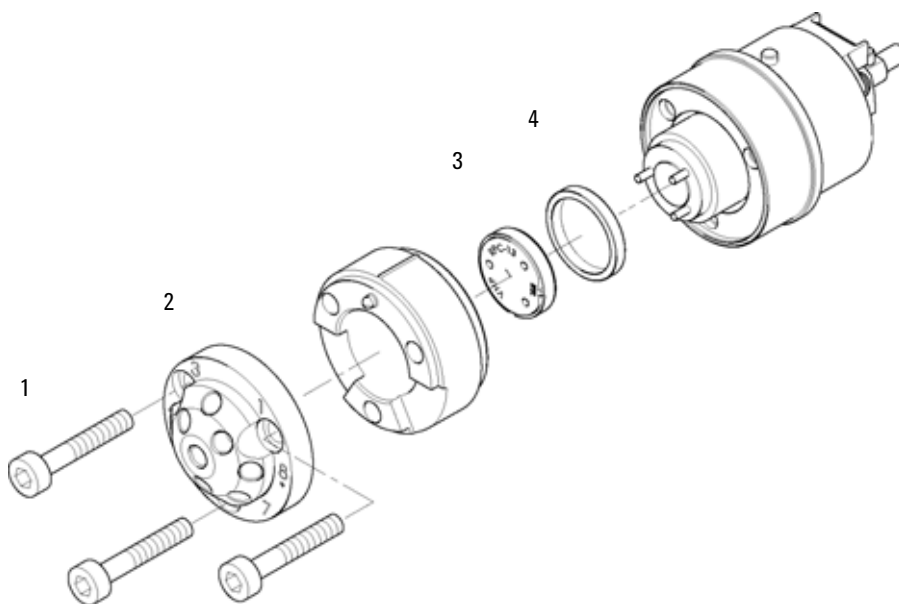
**Figure 48** Column Switching Valve Parts (5067-4107)

## 11 Parts and Materials for Maintenance

8 Pos/9 Port Ultra High Pressure Valve Head 1200 bar

### 8 Pos/9 Port Ultra High Pressure Valve Head 1200 bar

Item	p/n	Description
	5067-4121	8 pos/9 port valve head high pressure (1200 bar)
1	1535-4857	Stator screws
2	5068-0001	Stator head
3	5068-0002	Rotor seal (Vespel)
4	1535-4045	Bearing ring



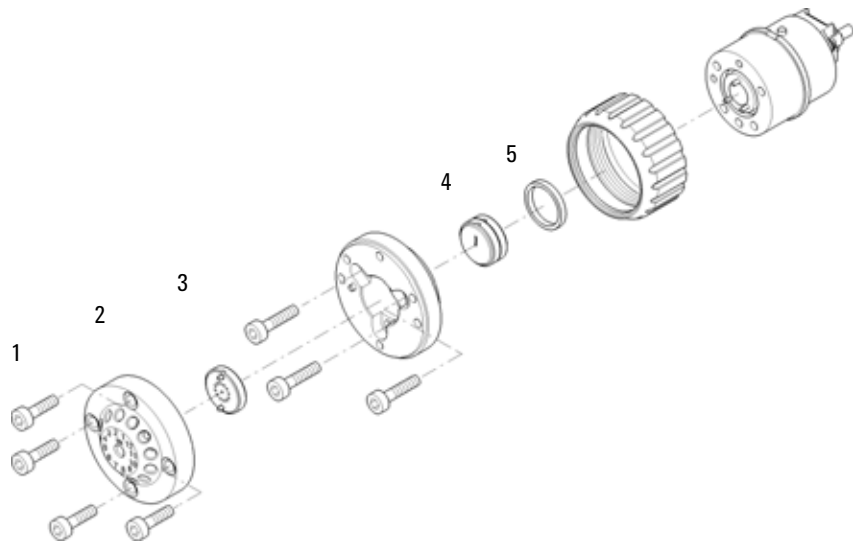
**Figure 49** Column Switching Valve Parts (5067-4121)

## Valve Head 4 Column Selector 600 bar (Bio-inert)



For bio-inert modules use bio-inert parts only!

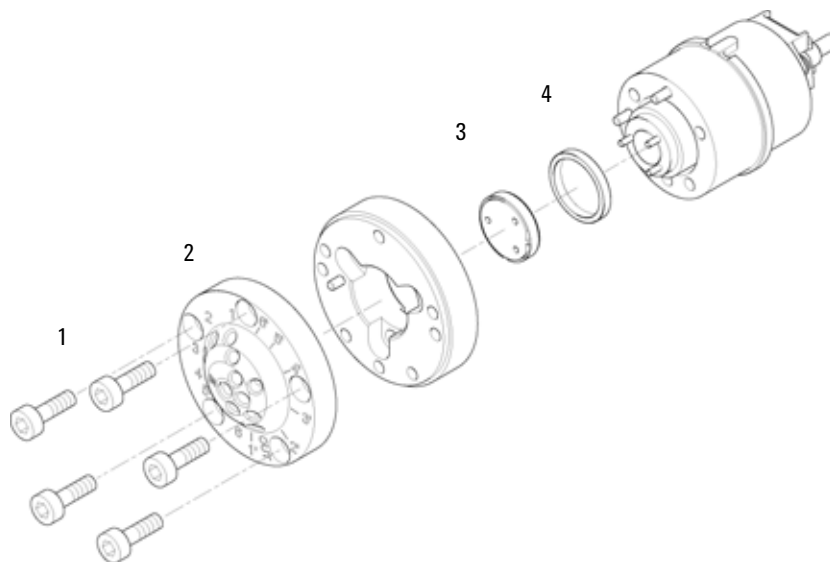
Item	p/n	Description
	5067-4134	Bio-inert valve head 4 column selector (600 bar)
1	5068-0059	Stator screws
2	5068-0044	Bio-inert stator head
3	5068-0093	Stator face assy
4	5068-0045	Bio-inert rotor seal, PEEK
5	1535-4045	Bearing ring



**Figure 50** Column Switching Valve Parts

## Valve Head 6 Column Selector 600 bar

Item	p/n	Description
	5067-4146	Valve head 6 column selector (600 bar)
1	5068-0089	Stator screws
2	5068-0077	Stator Head
3	5068-0076	Rotor seal, PEEK
4	1535-4045	Bearing ring



**Figure 51** Column Switching Valve Parts

# Valve Head 6 Column Selector 1200 bar

Item	p/n	Description
	5067-4142	Valve head 6 column selector (1200 bar)
1	5068-0089	Stator screws
2	5068-0077	Stator Head
3	5068-0067	Rotor seal (Vespel)
4	1534-4045	Bearing ring

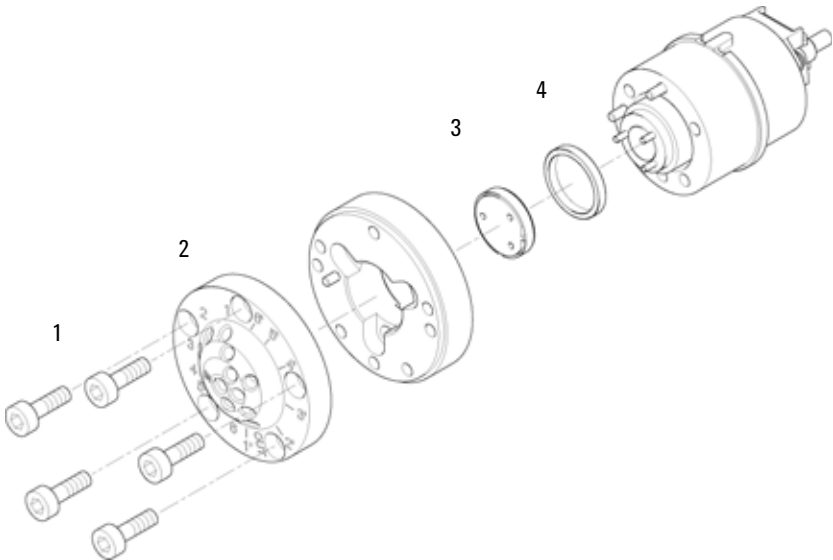


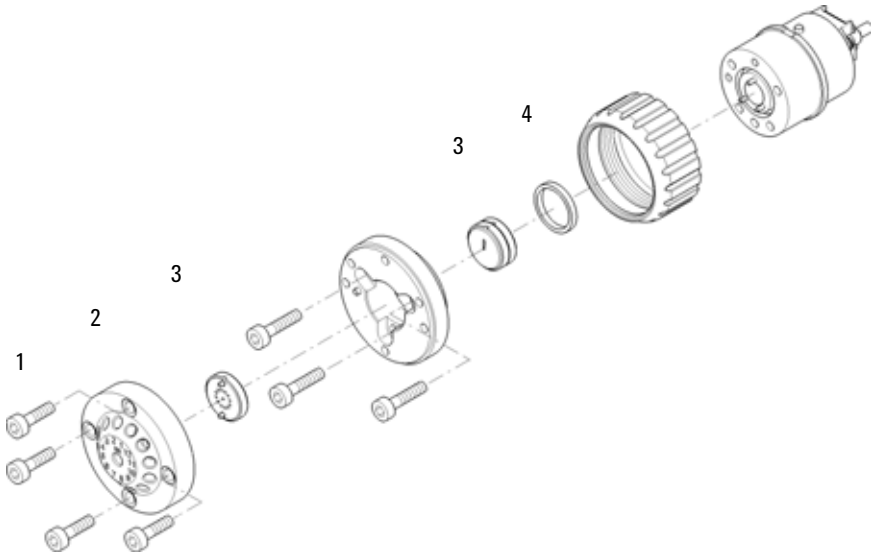
Figure 52 Column Switching Valve Parts



# 12 Pos/13 Port Valve Head 210 bar (Bio-inert)

**BIO**  
**inert** For bio-inert modules use bio-inert parts only!

Item	p/n	Description
	5067-4159	Bio-inert selector valve 12 position/13 port (210 bar)
1	5068-0059	Stator screws
2	5068-0097	Bio-inert stator head
3	0101-1288	Bio-inert rotor seal and stator face kit
4	1535-4045	Bearing ring



**Figure 53** Column Switching Valve Parts

## 12 Identifying Cables

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This chapter provides information on cables used with the 1290 series of HPLC 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 module to 3394/6 integrators
35900-60750	Agilent 35900A A/D converter
01046-60105	Analog cable (BNC to general purpose, spade lugs)

**Remote cables**

p/n	Description
03394-60600	Agilent module to 3396A Series I integrators 3396 Series II / 3395A integrator, see details in section <a href="#">“Remote Cables”</a> on page 184
03396-61010	Agilent module to 3396 Series III / 3395B integrators
5061-3378	Remote Cable
01046-60201	Agilent module to general purpose

**BCD cables**

p/n	Description
03396-60560	Agilent module to 3396 integrators
G1351-81600	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)

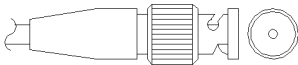
### External Contact Cable

p/n	Description
G1103-61611	External contact cable - Agilent module interface board to general purposes

### RS-232 cables


p/n	Description
G1530-60600	RS-232 cable, 2 m
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

# Analog Cables

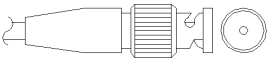


One end of these cables provides a BNC connector to be connected to Agilent modules. The other end depends on the instrument to which connection is being made.

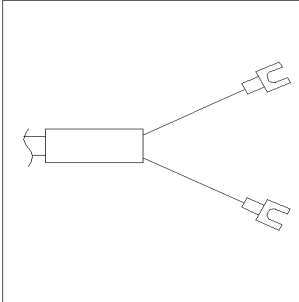
## Agilent Module to 3394/6 Integrators

p/n 35900-60750	Pin 3394/6	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



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.

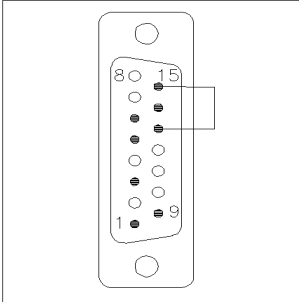
## Agilent Module to 3396A Integrators

p/n 03394-60600	Pin 3396A	Pin Agilent module	Signal Name	Active (TTL)
	9	1 - White	Digital ground	
	NC	2 - Brown	Prepare run	Low
	3	3 - Gray	Start	Low
	NC	4 - Blue	Shut down	Low
	NC	5 - Pink	Not connected	
	NC	6 - Yellow	Power on	High
	5,14	7 - Red	Ready	High
	1	8 - Green	Stop	Low
	NC	9 - Black	Start request	Low
	13, 15		Not connected	

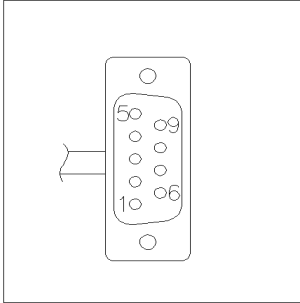
## Agilent Module to 3396 Series II / 3395A Integrators

Use the cable Agilent module to 3396A Series I integrators (03394-60600) and cut pin #5 on the integrator side. Otherwise the integrator prints START; not ready.

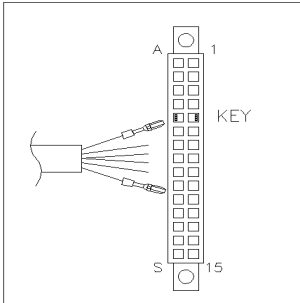
Agilent Module to 3396 Series III / 3395B Integrators

p/n 03396-61010	Pin 33XX	Pin Agilent module	Signal Name	Active (TTL)
	9	1 - White	Digital ground	
	NC	2 - Brown	Prepare run	Low
	3	3 - Gray	Start	Low
	NC	4 - Blue	Shut down	Low
	NC	5 - Pink	Not connected	
	NC	6 - Yellow	Power on	High
	14	7 - Red	Ready	High
	4	8 - Green	Stop	Low
	NC	9 - Black	Start request	Low
	13, 15		Not connected	

### 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

# BCD Cables

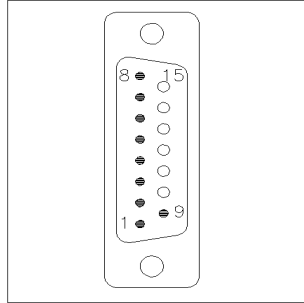


One end of these cables provides a 15-pin BCD connector to be connected to the Agilent modules. The other end depends on the instrument to be connected to

## Agilent Module to General Purpose

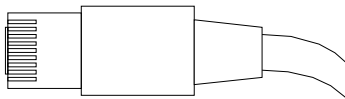
p/n G1351-81600	Wire Color	Pin Agilent module	Signal Name	BCD Digit
	Green	1	BCD 5	20
	Violet	2	BCD 7	80
	Blue	3	BCD 6	40
	Yellow	4	BCD 4	10
	Black	5	BCD 0	1
	Orange	6	BCD 3	8
	Red	7	BCD 2	4
	Brown	8	BCD 1	2
	Gray	9	Digital ground	Gray
	Gray/pink	10	BCD 11	800
	Red/blue	11	BCD 10	400
	White/green	12	BCD 9	200
	Brown/green	13	BCD 8	100
	not connected	14		
	not connected	15	+ 5 V	Low

Agilent Module to 3396 Integrators

p/n 03396-60560	Pin 3396	Pin Agilent module	Signal Name	BCD Digit
	1	1	BCD 5	20
	2	2	BCD 7	80
	3	3	BCD 6	40
	4	4	BCD 4	10
	5	5	BCD0	1
	6	6	BCD 3	8
	7	7	BCD 2	4
	8	8	BCD 1	2
	9	9	Digital ground	
	NC	15	+ 5 V	Low



# CAN/LAN Cables



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

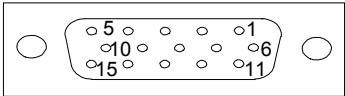
## CAN Cables

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

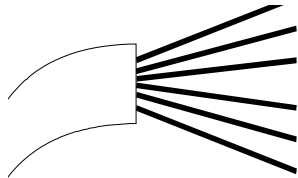
p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

# External Contact Cable



One end of this cable provides a 15-pin plug to be connected to Agilent modules interface board. The other end is for general purpose.

## Agilent Module Interface Board to general purposes

p/n G1103-61611	Color	Pin Agilent module	Signal Name
	White	1	EXT 1
	Brown	2	EXT 1
	Green	3	EXT 2
	Yellow	4	EXT 2
	Grey	5	EXT 3
	Pink	6	EXT 3
	Blue	7	EXT 4
	Red	8	EXT 4
	Black	9	Not connected
	Violet	10	Not connected
	Grey/pink	11	Not connected
	Red/blue	12	Not connected
	White/green	13	Not connected
	Brown/green	14	Not connected
	White/yellow	15	Not connected



# Agilent Module to PC

p/n

G1530-60600

RS232-61601

5181-1561

**Description**

RS-232 cable, 2 m

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.

RS-232 cable, 8 m



## 12 Identifying Cables

Agilent 1200 Module to Printer

### Agilent 1200 Module to Printer

p/n	Description
5181-1529	Cable Printer Serial & Parallel, is a SUB-D 9 pin female vs. Centronics connector on the other end (NOT FOR FW UPDATE). For use with G1323 Control Module.

