Agilent G4234A/B Valve Kit

Instructions

Technical Information about Agilent Valve Kits G4234A and G4234B.

Contents

Agilent Technologies

Typical Applications of the G4234A/B Valve Kit

Multi Column Selection

Advantages:

- Increase productivity
- Higher instrument up-time

Quickly change between up to four different stationary phases for different applications, or use identical stationary phases in columns with different dimensions for either faster run-times (short columns) or higher resolution (long columns) or for loading studies with different internal diameters.

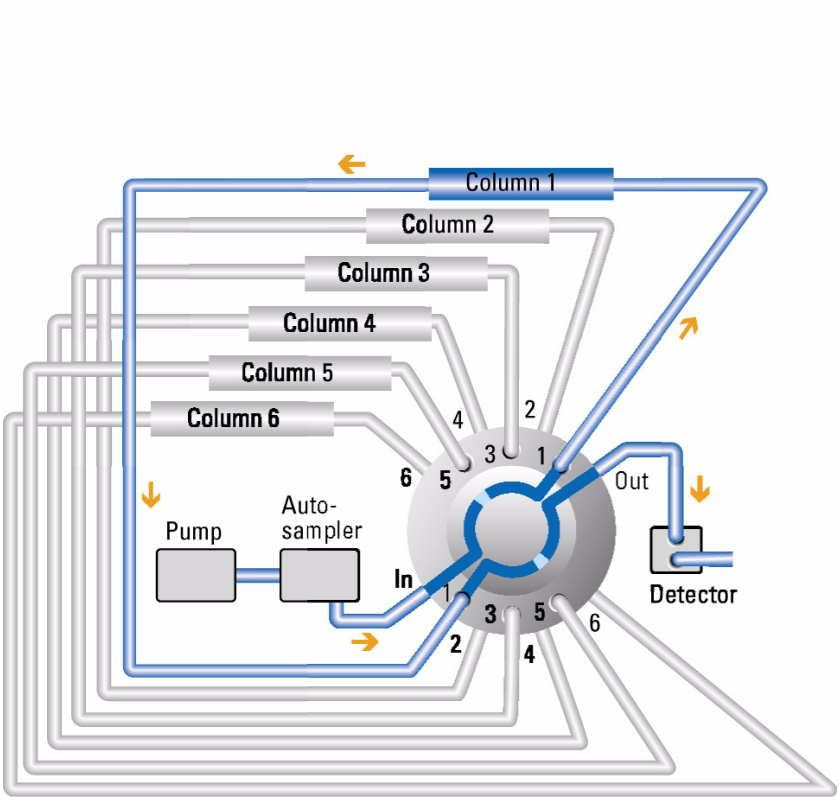


Figure 1 Multiple column selection
(example of schematic setup for 6 column selector G4234A/B)

Method Development

Advantages:

- Faster method development
- Automated method development possible

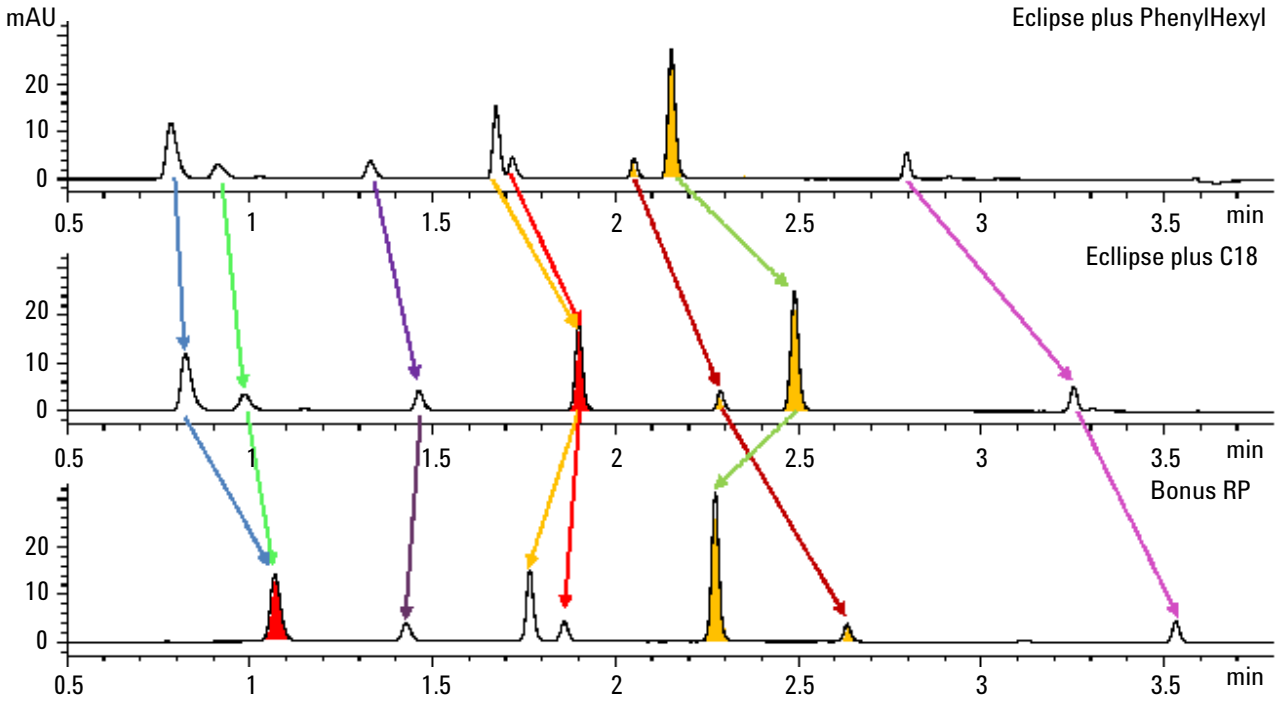


Figure 2 Totally different chromatographic results by using the same sample but three different stationary phases

Delivery Checklist (G4234A/B)

Delivery Checklist

p/n	Description
5067-4146	Valve head 6 column selector (600 bar) G4234A
5067-4142	Valve head 6 column selector (1200 bar) G4234B
5067-4729	Capillary kit low dispersion optional
5067-4234	Capillary Kit 0.17 mm ID optional

Capillary Kit (5067-4729)

#	p/n	Description
1	5067-4744	Capillary ST 0.12 mm x 340 mm SL/M Autosampler to valve*
1	5067-4745	Capillary ST 0.12 mm x 500 mm SLV/M Sampler (dual stack) to valve*
8	5067-4735	Capillary ST 0.12 mm x 130 mm SV/M Valve to heat exchanger and column to valve*
1	5067-4737	Capillary ST 0.17 mm x 150 mm M/M Valve to valve (bypass)*
1	5067-4746	Capillary ST 0.12 mm x 250 mm SV/M Valve to detector*
1	5023-2504	Hex driver SW-4 slitted
1	G1375-87326	Waste tube
2	G1316-80002	Heater long-up (0.12 mm i.d., 1.6 µL internal volume)
2	G1316-80003	Heater long-down (0.12 mm i.d., 1.6 µL internal volume)
2	G1316-89200	Carrier for heat exchanger TCC SL Plus
2	G1316-68706	Fitting holder assembly
1	5042-9918	Column clip set, 8 colors
2	5067-6141	M4 Blank nut for plugging unused valve ports

* Fittings: Removable fitting = connect to Column, Heat Exchanger; Metric M4 fitting = always connect to Valve Ports

Capillary kit (5067-4234)

#	p/n	Description
1	5067-5108	Capillary ST 0.17 mm x 340 mm SL/M Autosampler to TCC heater
2	5067-5113	Capillary ST 0.17 mm x 250 mm SL/M Heater to valve, valve to detector
4	5067-5112	Capillary ST 0.17 mm x 280 mm SV/M Valve to column
4	5067-5111	Capillary ST 0.17 mm x 150 mm SV/M Column to valve
1	5067-4737	Capillary ST 0.17 mm x 150 mm M/M Valve to valve (bypass)*
1	G1375-87326	Waste tube
1	5023-2504	Hex driver SW-4 slitted
1	5042-9918	Column clip set, eight colors
2	5067-6141	M4 Blank nut for plugging unused valve ports

Specifications (G4234A/B)

Table 1 G4234A, 6-position/14-port valve head, 600 bar

Type	Specification
Liquid contacts	Stainless Steel, PEEK
Maximum pressure	600 bar

Table 2 G4234B, 6-position/14-port valve head, 1200 bar

Type	Specification
Liquid contacts	Stainless Steel, Vespel
Maximum pressure	1200 bar

Installing the Valve Heads

The valve drives are factory-installed in the 1290 Infinity Thermostatted Column Compartment , in the 1290 Infinity Flexible Cube, and in the 1290 Infinity Universal Valve Drive. The valve heads are interchangeable and can be easily mounted.

At the first installation, the transportation lock (TCC only) and the dummy valve have to be removed, see "Removing the transportation lock and the valve dummy (only if used with TCC)" on page 6. The valve heads can be installed by mounting the valve heads onto the valve drives and fastening the nut manually (do not use any tools).

Be sure that the guide pin snaps into the groove of the valve drive thread.

NOTE

TCC only:

The valves are mounted on pull-out rails to allow easy installation of capillaries. Push the valve gently into its housing until it snaps into the inner position, push it again and it slides out.

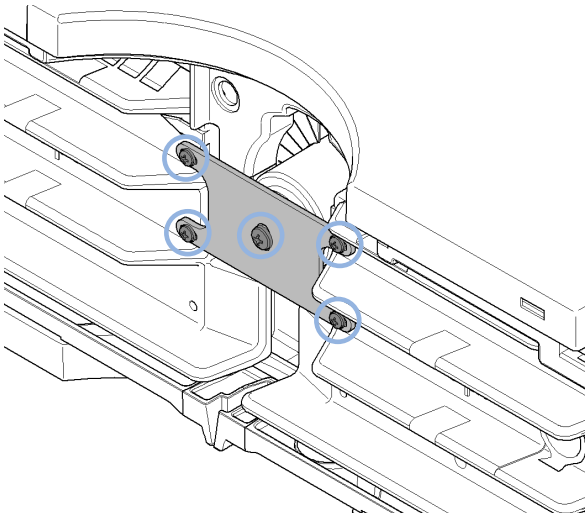
If all capillaries are installed, push the valve back into its housing, see section *Installing the Valve Head and Connecting Capillaries* in the TCC-Manual.

Removing the transportation lock and the valve dummy (only if used with TCC)

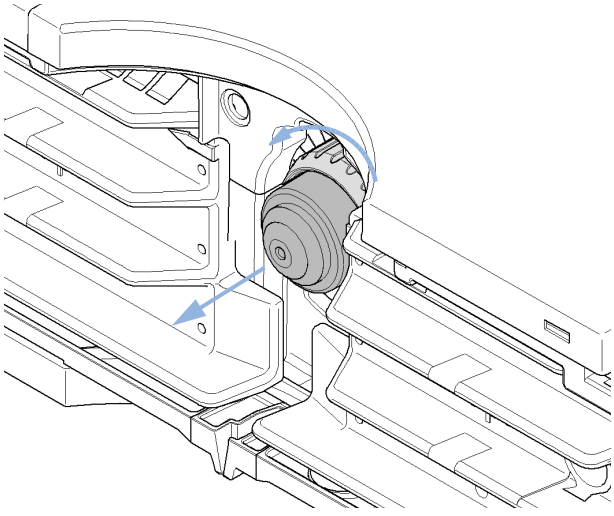
The following procedure demonstrates the necessary steps for installing the valve head to the valve drive of a TCC.

For the installation of a valve head to a G1170A 1290 Infinity Valve Drive or G4227A 1290 Infinity Flexible Cube you can ignore the steps that describe the TCC features of the transportation lock and spring loaded valve drive.

1 When unscrewing the transportation lock (TCC only), push it back until the last screw is removed - the valve rail is spring-loaded



2 To remove the valve dummy, loosen the nut manually.



Installing the valve head and connecting capillaries (with the TCC as an example)

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

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 can be used instead of a functional valve. Do not touch parts inside the actuator.

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

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.

CAUTION

Sample degradation and contamination of the instrument

Metal parts in the flow path can interact with the bio-molecules in the sample leading to sample degradation and contamination.

➔ For bio-inert applications, always use dedicated bio-inert parts, which can be identified by the bio-inert symbol or other markers described in this manual.

➔ Do not mix bio-inert and non-inert modules or parts in a bio-inert system.

NOTE

The tag reader reads the valve head properties from the valve head RFID tag during the initialization of the module. The 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.

NOTE

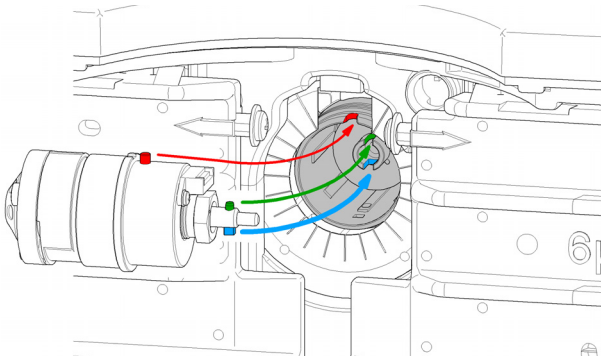
The Agilent 1290 Infinity Valve Drive recognizes the valve correctly, only if the valve drive was powered off for at least 10 s.

NOTE

For a correct installation of the valve head, the outside pin (red) must completely fit into the outside groove on the valve drive's shaft (red). A correct installation is only possible if the two pins (green and blue) on the valve head fit into their corresponding grooves on the valve drive's actuator axis. Their match depends on the diameter of the pin and groove.

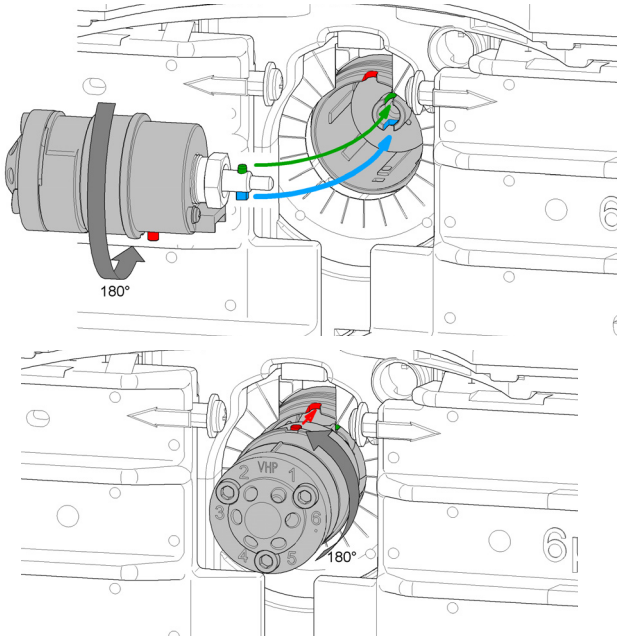
The following procedure demonstrates the necessary steps for installing the valve head to the valve drive of a TCC. For the installation of a valve head to a 1290 Infinity Valve Drive or 1290 Infinity Flexible Cube, you can ignore the steps that describe the TCC features of the spring loaded valve drive.

1 Insert the valve head into the valve shaft.

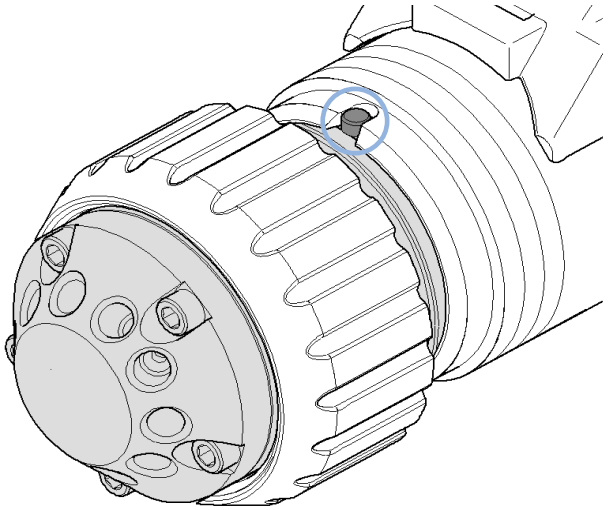


OR

If the outside pin does not fit into the outside groove, you have to turn the valve head until you feel that the two pins snap into the grooves. Now you should feel additional resistance from the valve drive while continue turning the valve head until the pin fits into the groove.



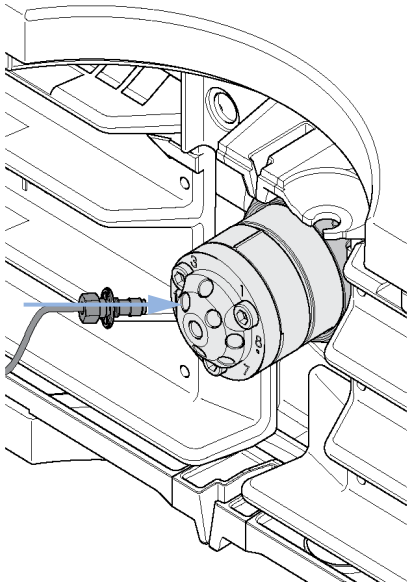
2 When the outer pin is locked into the groove, manually screw the nut onto the valve head.



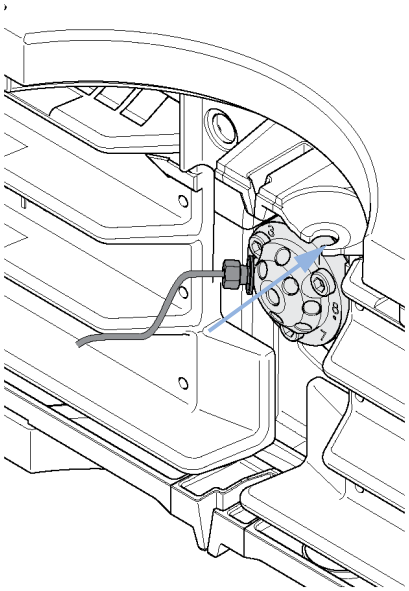
NOTE

Fasten the nut manually. Do not use any tools.

3 Install all required capillary connections to the valve.



4 Push the valve head until it snaps in and stays in the rear position. (TCC only)



5 Power on or power-cycle your module, so the valve head gets recognized during module initialization.

NOTE

Power Off the Infinity valve drive for at least 10 s.

Connecting Valves, Heat Exchanger and Columns

Installing the Low Dispersion Heat Exchangers

The provided valve head is in principal able to switch between up to six columns but the G1316C 1290 Infinity Thermostatted Column Compartment can be equipped only with up to four low dispersion heat exchanges (see Figure 3 on page 10). Thus, if column thermostatting is required only four columns plus a waste-tubing and a bypass-line can be installed. By installing the low dispersion heat exchangers for up to four columns the positions of the column RFID tag readers will be blocked. Analytical columns of up to 100 mm length can always be installed without limitations; longer columns can also be installed, e.g. 150 mm length, but they will extend into the area of the opposing temperature zone. Thus, only same temperature settings of the left and right temperature zone are recommended. The installation of columns with length >100mm length might be also be limited if their end-fittings are very big.

The carriers for the low-dispersion heat exchangers must be attached to the standard built-in heat exchangers of the TCC (see Figure 4 on page 11). Remove the protective foil from the gray thermal conductive foil of the carrier and fasten the three screws. Mount the Fitting holder assembly (G1316-68706) on the carrier. The fitting clips hold the capillary unions from the low dispersion heat exchangers and make plumbing of capillaries much easier. Finally, attach the low dispersion heat exchanger. It is important to fix them tightly so that a good thermal conductivity is achieved. The columns are held by Column clip set, 8 colors (5042-9918) for more convenient installation; mark the nuts of the capillaries attached to the columns as well with color code tags (small rings) to easily follow the flow paths in your system.

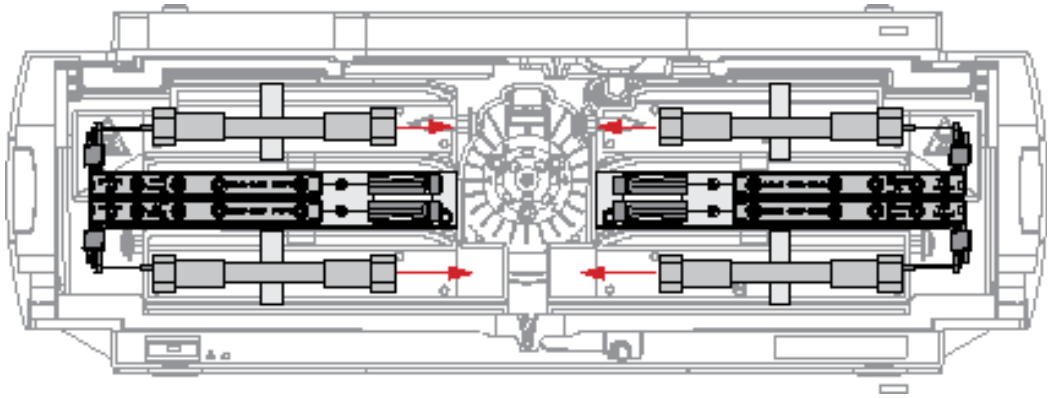


Figure 3 Typical positions of the low dispersion heat exchangers

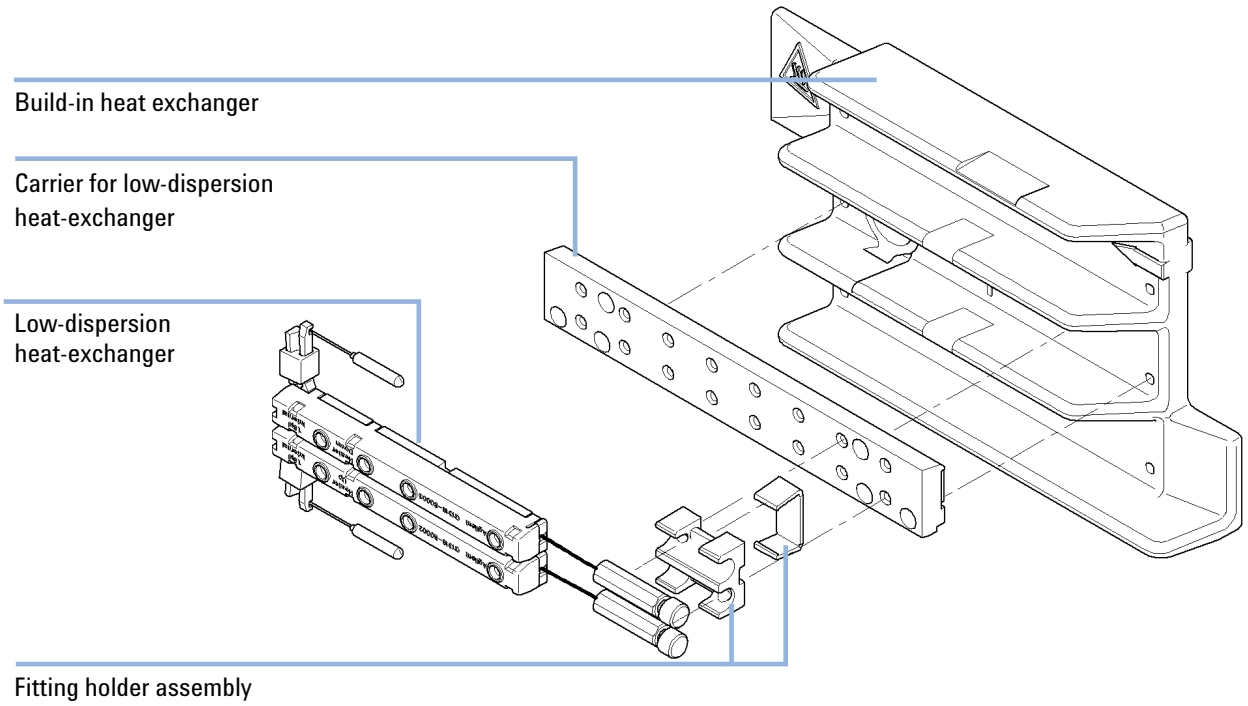


Figure 4 Installing the low dispersion heat exchangers

Installing the capillaries

CAUTION

Damage to the rotor seal

Instant pressure release within the valve will lead to water jet effects that can harm internal parts of the valve. This pressure release typically happens if the valve gets switched under high pressure over unused or open channels.

➔ Block all unused channels properly with the M4 blank nut.

NOTE

To minimize valve movement over open connections it is recommended to plumb the column connected channels in one row.

e.g.:

- channel 1 – column 1
- channel 2 – column 2
- channel 3 – column 3
- channel 4 – column 4
- channel 5 – blocked
- channel 6 – blocked
- channel 7 – waste
- channel 8 – bypass

NOTE

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

1 First identify the required capillaries in your capillary kits (see "Delivery Checklist (G4234A/B)" on page 4).
   - All capillaries that connect to the **valve** should be equipped with **small diameter fittings**.
   - Capillaries from the valve to a **heat exchanger** are pre-swaged on the second side with a **standard fitting**.
   - All capillaries that **connect** to a column are non-swaged on one side.

2 Install the capillaries according to Figure 5 on page 14.

   The valve has one inlet-port (IN) that has to be connected to the autosampler and one outlet port (OUT) that has to be connected to the detector. Furthermore there are six ports marked with 1...6 and six corresponding ports marked with 1'...6'. A column always has to be connected to a corresponding x...x'-pair of ports with the column inlet at the x-port and the column-outlet to the x'-port. A typical installation would be according to Table 3 on page 13.

Table 3 Typical connections for a four column, bypass and waste set-up

Port		Connects to
IN		Autosampler
	OUT	Detector
1		Column 1 - Inlet
	1'	Column 1 - Outlet
...		
4		Column 4 - Inlet
	4'	Column 4 - Outlet
5		Bypass-capillary
	5'	Bypass-capillary
6		Waste-tubing
	6'	Waste-tubing

3 Connect the capillaries connected directly to a column and fasten them immediately with a spanner.

4 Finger-tighten all remaining capillaries.

5 Clip the unions into the corresponding clips of the low dispersion heat exchangers.

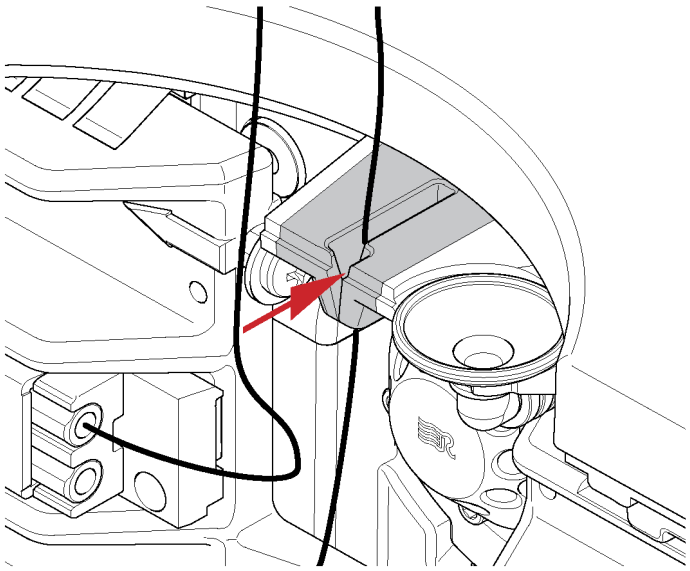
6 Fasten all fittings attached to the valve with a spanner.

7 Fasten the fittings on the heat exchangers.

8 Fasten all fittings on attached modules (autosampler, detector, additional pumps). Fit all unused valve ports with a plastic plug.

9 Push the valves into the rear positions.

10 Place the capillaries that go to another module or waste into the capillary guides to prevent squeezing them when closing the front cover.



11 Stow any excess lengths of the capillaries.

12 Perform a final leak-check.

Configurations and Capillary Set-up

NOTE The port number is relevant for the connection not the shown orientation

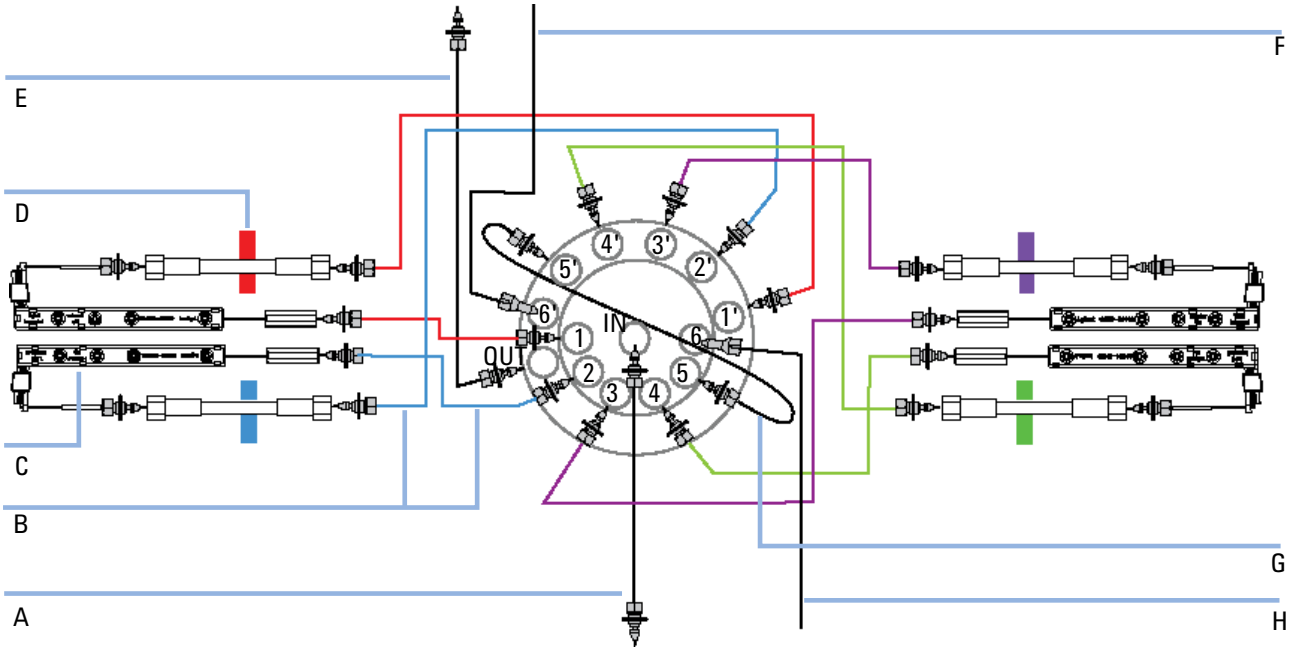


Figure 5 Installing the capillaries

A	5067-4744 From autosampler
B	5067-4735 Valve head to heat exchanger and column to valve RF Fitting to column, M4 fitting to valve
C	G1316-80002 or G1316-80003
D	Column with Color Code Clip (part of 5042-9918)
E	5067-4746, 250 mm length To detector
F	5022-6503 w. G4240-43200 to waste
G	Valve to valve connector, 120 mm length
H	5022-6503 w. G4240-43200 to waste

Parts (G4234A/B Valve Kit)

Replacement Parts for the G4234A/B Valve Kit

Table 4 Replacement parts

Valve	Rotor Seal	Stator Head	Stator Screws (pack of 10)	Bearing Ring
5067-4146 6 Column Selector, 600 bar	5068-0076 (PEEK)	5068-0077	5068-0089	1535-4045
5067-4142 6 Column Selector, 1200 bar	5068-0067 (Vespel)	5068-0077	5068-0089	1535-4045

Valve Head Parts for the G4234A/B Valve Kit

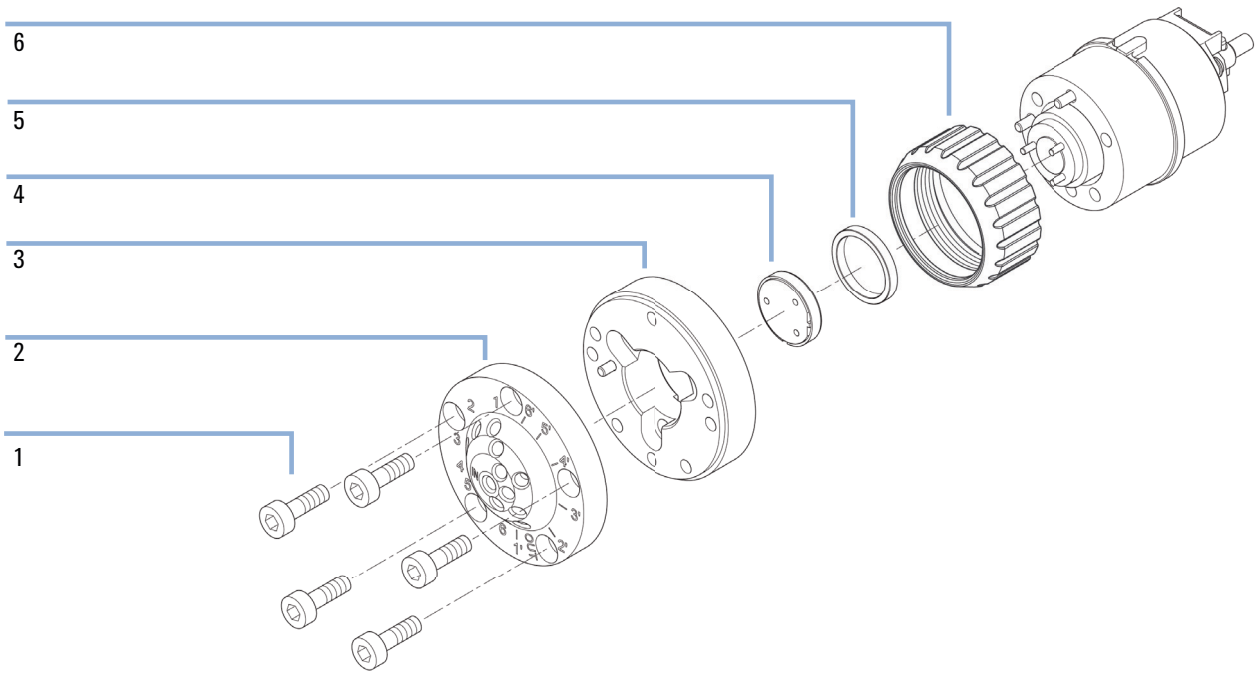


Figure 6 Valve Head Parts (G4234A/B)

1	Stator screws
2	Stator head assembly
3	Stator ring (available for service only
4	Rotor seal
5	Bearing ring
6	Spanner nut (available for service only)

G4234-90002

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