

Versatile Solvent Selector

Technical Note

This technical note describes the installation and available flow path configurations depending on the connected hardware and switching states of the Agilent InfinityLab Quick Change 8-position/9-port valve head 5067-4237 in a 1290 Infinity II Multicolumn Thermostat (MCT) and 1290 Infinity II Valve Drive.

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Introduction

This guide describes how to install the 8-position/9-port Quick Change Valve Head and what flow path configurations it could be used with.

Table 1 5067-4237 compatibility and requirements

Software	Version
Lab Advisor	2.17 and above
LC Drivers	3.2 and above
Firmware (G7116B, G1170A)	C.07.20 and above ¹

¹ G7116B and G1170A are hosted modules and modules with Firmware B or D are required to enable the operation of the hosted modules. Firmware revisions of the hosted module and other modules in the LC stack must be compatible, from the same stack, and the same decade.

NOTE

Ensure that all Agilent LC modules in the LC system meet or exceed the minimum firmware requirements. Agilent proposes to use the latest available firmware set.

<https://www.agilent.com/en-us/firmwareDownload?whid=69761>

Table 2 5067-4237 8-position/9-port valve 1300 bar

Type	Specification
Maximum pressure	1300 bar
Port size	Accepts 10-32 male threaded fittings
Liquid contacts	PEEK, Stainless steel
pH range	0 – 14 ¹

¹ incompatible with some mineral acids. For more information see Solvent Information.

CAUTION

The 8-position/9-port valve (5067–4237) can be used only up to 80 °C. Operating at higher temperatures reduces the lifetime of the valve parts.

Reduced lifetime of the valve parts.

- ✓ Do not operate at temperatures above 80 °C.

Table 3 5067-4237 repair parts

#	Part Number	Description
1	5068-0202	Rotor seal, Multipurpose Valve, PEEK, 1300 bar
1	5068-0001	Stator head
3	1535-4857	Stator screws, 10/pk
1	5068-0120	Stator ring
1	1535-4045	Bearing ring
1	5068-0106	Spanner nut

Installation

Installation of the Valve Heads

If ordered, the valve drives are factory-installed in the Multicolumn Thermostat. The valve heads are interchangeable and can be easily mounted.

At the first installation, the transportation lock and the dummy valve have to be removed, see “[Remove the Transportation Lock and the Valve Dummy](#)” on page 4. 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

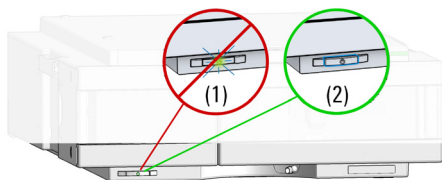
The valves are mounted on pull-out rails to allow easy installation of capillaries. Push the valve gently into its housing until it snaps into the inner position, push it again and it slides out.

Remove the Transportation Lock and the Valve Dummy

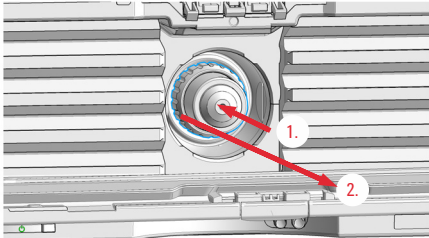
The following procedure demonstrates the necessary steps for installing the valve head to the valve drive of a Multicolumn Thermostat (MCT).

For the installation of a valve head to a G1170A Valve Drive you can ignore the steps that describe the MCT features of the transportation lock and spring loaded valve drive.

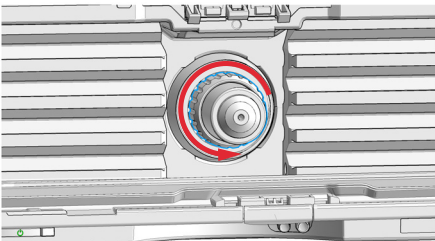
- 1 Switch off the module.



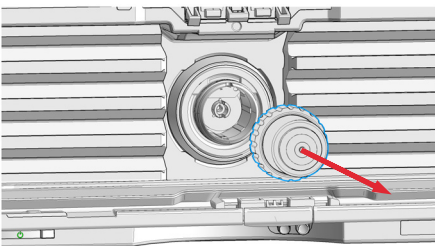
- 2 When unscrewing the transportation lock, push it back until the last screw is removed - the valve rail is spring-loaded.
- 3 Press on the valve dummy (1.) to release it (2.) (spring-loaded valve rail).



- 4 Unscrew the valve dummy.



- 5 Remove the valve dummy from the valve drive.



Install the Valve Head and Connect Capillaries

CAUTION

The valve actuator contains sensitive optical parts, which need to be protected from dust and other pollution. 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 applications, always use dedicated bio parts, which can be identified by the bio-inert symbol or other markers described in this manual.**
- ✓ **Do not mix bio, and non-bio modules or parts in a bio system.**

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.

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.

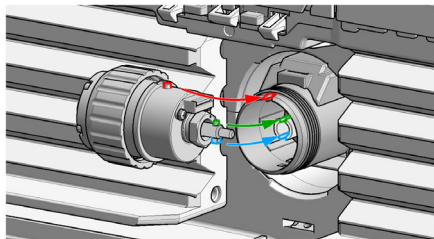
NOTE

To allow correct valve identification, power off the valve drive for at least 10 s.

Installation

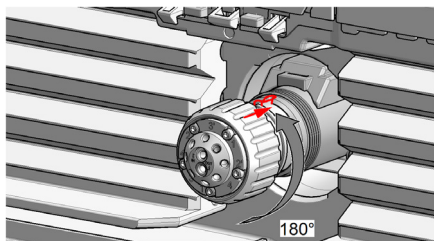
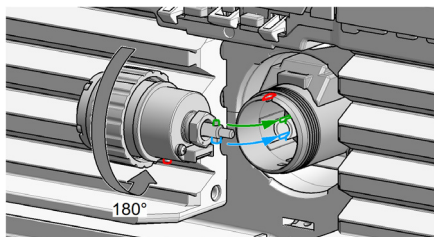
The following procedure shows the valve head installation with an G7116B (MCT) module as an example. For other modules it is similar.

- 1 Insert the valve head into the valve shaft.

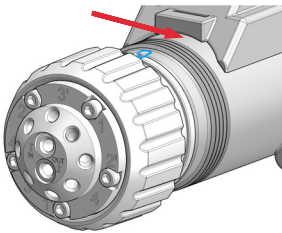


OR

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 continuously turning the valve head until the pin fits into the groove.



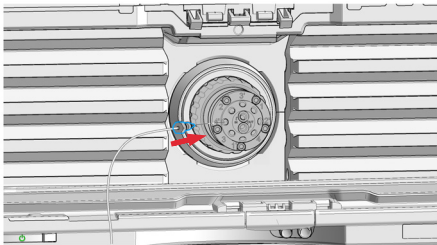
- 2 When the outer pin is locked into the groove, manually screw the nut onto the valve head.



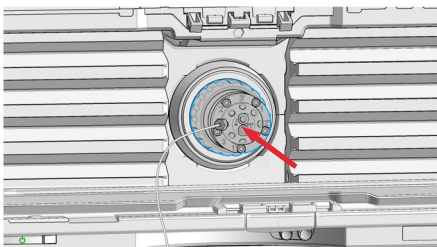
NOTE

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.



Installation

- 5 Power on or power-cycle your module, so the valve head gets recognized during module initialization.
- 6 When the 8-position/9-port valve is installed in the Multicolumn Compartment, it appears as a generic valve. The internal connections of the valve ports are not presented in the User Interface. When using the valve, see “Available Flow Paths of the 8-Position/9-Port Valve” on page 15 to picture the connected ports for each valve position.

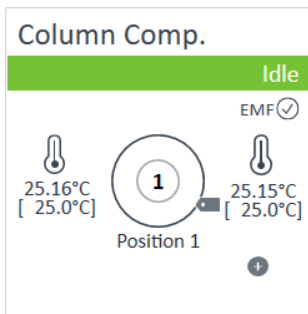


Figure 1 Appearance of the 8-position/9-port valve in the user interface

Operation of the 8-Position/9-Port Valve

To switch valve positions outside of a method, right-click the dashboard of the module in which the 8-position/9-port valve is installed, e.g. Multicolumn Thermostat. In the context menu, select **Switch valve...** option to select the desired valve position in the resulting **Switch valve position** window.

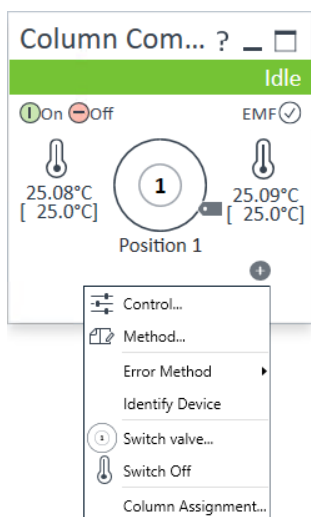


Figure 2 Context menu of the Multicolumn Thermostat

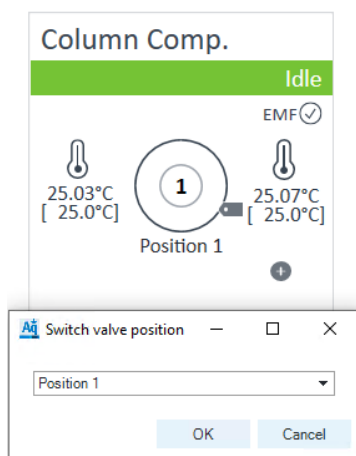
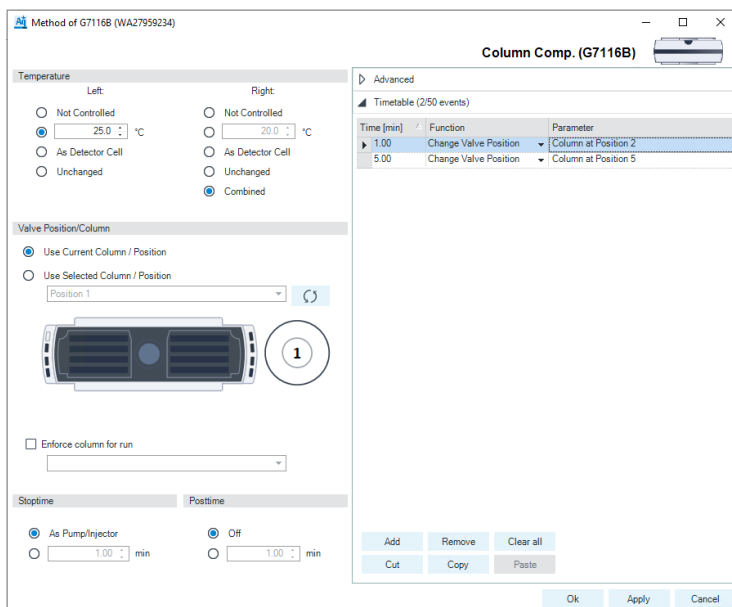


Figure 3 Switch valve position window

Operation of the 8-Position/9-Port Valve

Programming the valve switching as a part of the method can be configured in the **Timetable** section, see [Figure 4](#) on page 12.



The screenshot displays the 'Method of G7116B (WA27959234)' configuration window. The 'Column Comp. (G7116B)' sub-window is active, showing the 'Advanced' settings. The 'Timetable (2/50 events)' section is expanded, displaying a table with two events:

Time [min]	Function	Parameter
1.00	Change Valve Position	Column at Position 2
5.00	Change Valve Position	Column at Position 5

Below the table are buttons for 'Add', 'Remove', 'Clear all', 'Cut', 'Copy', and 'Paste'. At the bottom of the window are 'Ok', 'Apply', and 'Cancel' buttons. The left side of the window shows temperature and valve position settings, including a diagram of the valve with a circled '1' indicating the current position.

Figure 4 Timetable section of the Method configuration menu of the Multicolumn Thermostat

Alternatively, it is possible to switch the 8-position/9-port valve at the beginning and/or at the end of the analytical run. This functionality can be found as well in the **Method** settings of the Multicolumn Thermostat. In the **Valve Position/Column** section, choose between **Use Current Column / Position** and **Use Selected Column / Position**, see [Figure 5](#) on page 13.

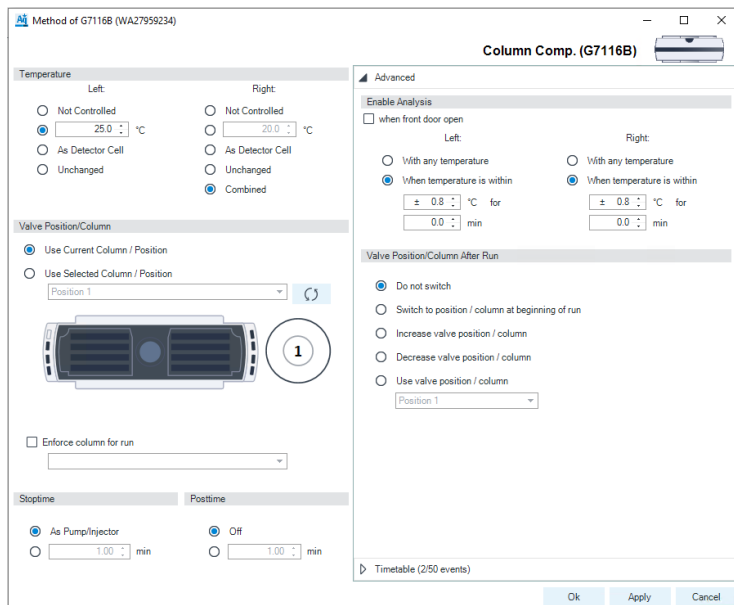


Figure 5 Pre- and postrun valve switching options available in the Method configuration menu of the Multicolumn Thermostat.

Operation of the 8-Position/9-Port Valve

Further options to switch the valve at the end of the run are available in the **Advanced** section of the **Method** configuration menu. The options are explained in Table 4 on page 14.

Table 4 Postrun valve switching options

Option	Description
Do not switch	Keeps the current valve position or column
Switch to position / column at beginning of run	Not valid for the 8-position/9-port valve
Increase valve position / column	Switches to the next valve position. After reaching position 8, the valve will be switched to position 1 and the process will continue
Decrease valve position / column	Switches to the previous valve position. After reaching position 1, the valve will be switched to position 8 and the process will continue
Use valve position / column	Switches to the specified valve position or column. Click the down-arrow and select the valve position or column from the drop-down list

Available Flow Paths of the 8-Position/9-Port Valve

The rotor seal of the 8-position/9-port valve has four grooves. Hence, at any time point, eight ports of the valve are connected internally via the rotor grooves. The following flow path schemata provide an overview of possible configurations.

In the following figures, **A**, **B**, and **C** are the elements that can be included or excluded from the flow path depending on the valve position. These elements could be filters, HPLC guards, cartridges, columns, detectors, modules, or bypass capillaries. The element labeled *I* refers to the valve inlet and elements *O1* and *O2* to outlets.

The main direction of elements **A**, **B**, and **C** is selected arbitrarily for each connection type group. In the following tables, **A'**, **B'**, and **C'** indicate the flow going in the opposite direction compared to the main direction.

NOTE

Do *not* compare directions between different connection type groups, i.e. different figures in this technical note (for example between [Figure 6](#) on page 16 and [Figure 7](#) on page 18).

NOTE

If you are using a configuration where the flow through a column can be switched to the opposite direction, verify in the *Column User Guide* (provided with the columns) if the column can be operated in both directions.

Available Flow Paths of the 8-Position/9-Port Valve

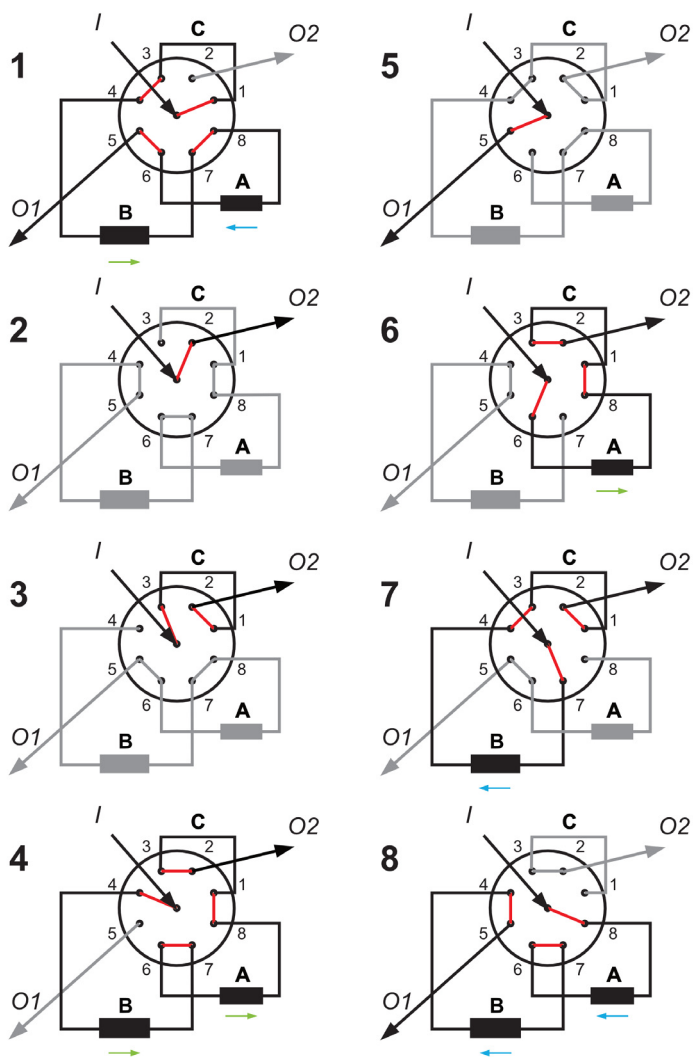


Figure 6 Valve switching alternatives with the inlet at port 9 and outlets at ports 2 and 5

Available Flow Paths of the 8-Position/9-Port Valve

Table 5 Valve switching alternatives with the inlet at port 9 and outlets at ports 2 and 5

Valve Position	Connected Elements	Outlet
1	C'-B-A'	01
2	-	02
3	C	02
4	B-A-C'	02
5	-	01
6	A-C'	02
7	B'-C	02
8	A'-B'	01

Available Flow Paths of the 8-Position/9-Port Valve

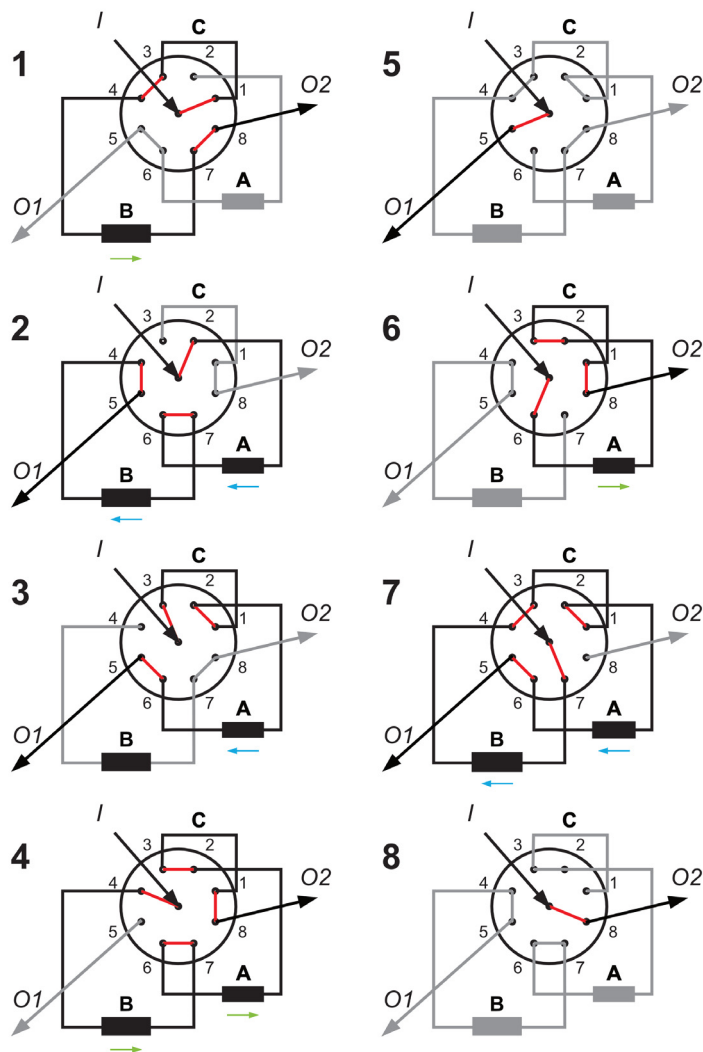


Figure 7 Valve switching alternatives with the inlet at port 9 and outlets at ports 5 and 8

Available Flow Paths of the 8-Position/9-Port Valve

Table 6 Valve switching alternatives with the inlet at port 9 and outlets at ports 5 and 8

Valve Position	Connected Elements	Outlet
1	C'-B	02
2	A'-B'	01
3	C-A'	01
4	B-A-C	02
5	-	01
6	A-C	02
7	B'-C-A'	01
8	-	02

Available Flow Paths of the 8-Position/9-Port Valve

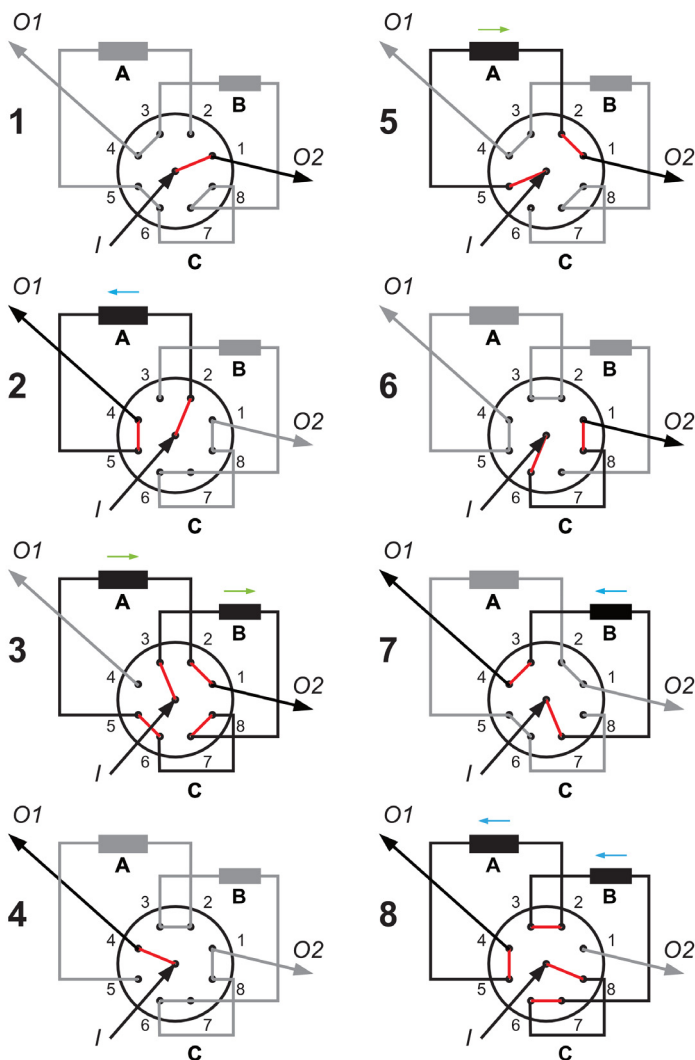


Figure 8 Valve switching alternatives with the inlet at port 9 and outlets at ports 1 and 4

Available Flow Paths of the 8-Position/9-Port Valve

Table 7 Valve switching alternatives with the inlet at port 9 and outlets at ports 1 and 4

Valve Position	Connected Elements	Outlet
1	-	02
2	A'	01
3	B-C'-A	02
4	-	01
5	A	02
6	C	02
7	B'	01
8	C'-B'-A'	01

Available Flow Paths of the 8-Position/9-Port Valve

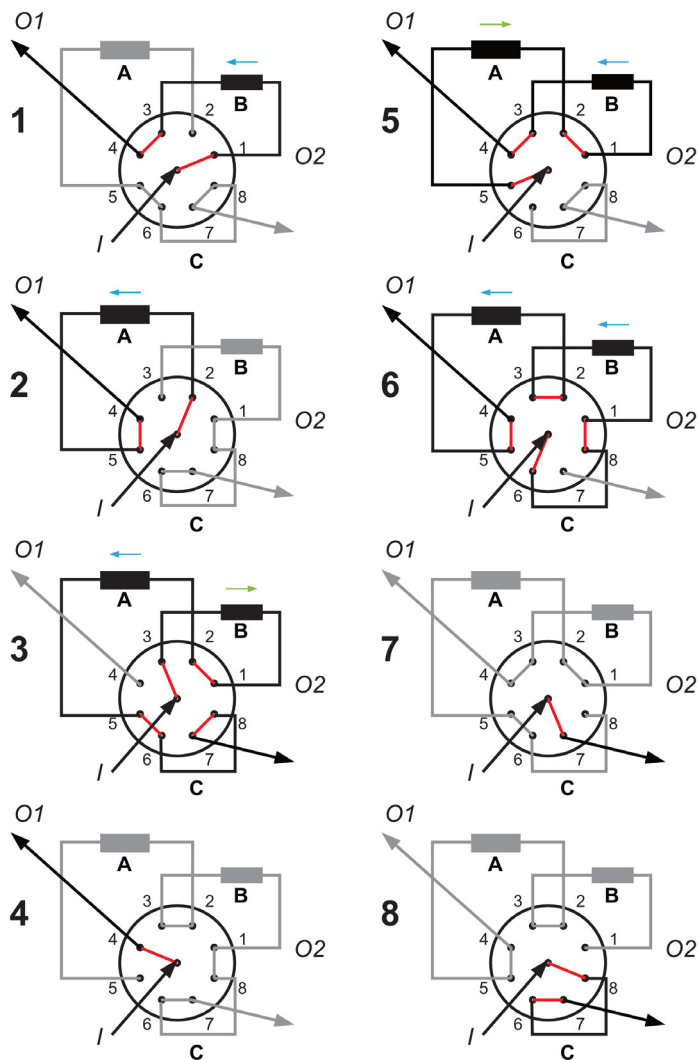


Figure 9 Valve switching alternatives with the inlet at port 9 and outlets at ports 4 and 7

Table 8 Valve switching alternatives with the inlet at port 9 and outlets at ports 4 and 7

Valve Position	Connected Elements	Outlet
1	B'	01
2	A'	01
3	B-A'-C	02
4	-	01
5	A-B'	01
6	C-B'-A'	01
7	-	02
8	C'	02

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