

Azura

Valve V 4.1 Supplement



* exemplary representation

Document no. V6864



Note: Please read the corresponding technical documentation for handling and safety reasons.

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1. Product information



Note: Only use the device for applications that fall within the range of the intended use. Otherwise, the protective and safety equipment of the device could fail.

Various types of valves with different operating modes allow the use of these valves for a variety of applications. It is important that valve drive and valve are compatible.

The AZURA® Valve V 4.1 is available in several versions, which differ in valve type, port number, material and capillary connection.

2-position valves are used for injection, column switching, or column backflushing. Generally, 2-position valves can be operated manually through a lever or electrically through the valve drive. Multiposition valves can only be controlled through a valve drive and are suitable for fractionation or column switching of more than two columns.

2. Mounting the valve onto the valve drive

For this procedure, please refer to the instructions of the AZURA® Valve Unifier VU 4.1 valve drive (document no. [V6855](#)).

3. Mounting onto AZURA® L devices

Use the mounting bracket A9854-3 to attach the AZURA® Valve Unifier VU 4.1 valve drive on the side panel of an AZURA® L device.

The manual injection valves are delivered in mounted condition and have to be prepared and disassembled for mounting. For the exact procedure, please refer to the supplement of the respective mounting bracket (A9853) for AZURA® L devices (document no. [V6806](#)).

4. Application examples

This chapter describes possible applications for the different valve types. Of course there are also other applications possible which are not listed here.

4.1 6 port valve

Injecting the sample

Functional principle

In position 1, the sample loop is loaded with a sample via port 1.

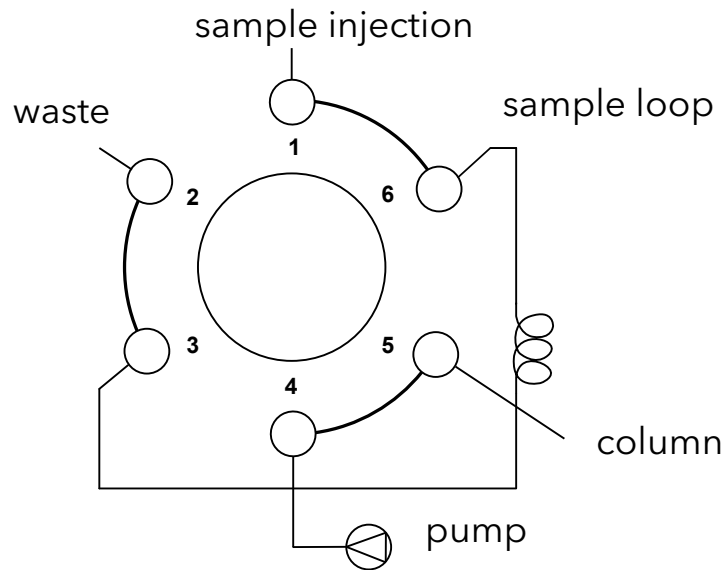


Fig. 1 Loading the valve position

In position 2, the sample of the sample loop is injected onto the column.

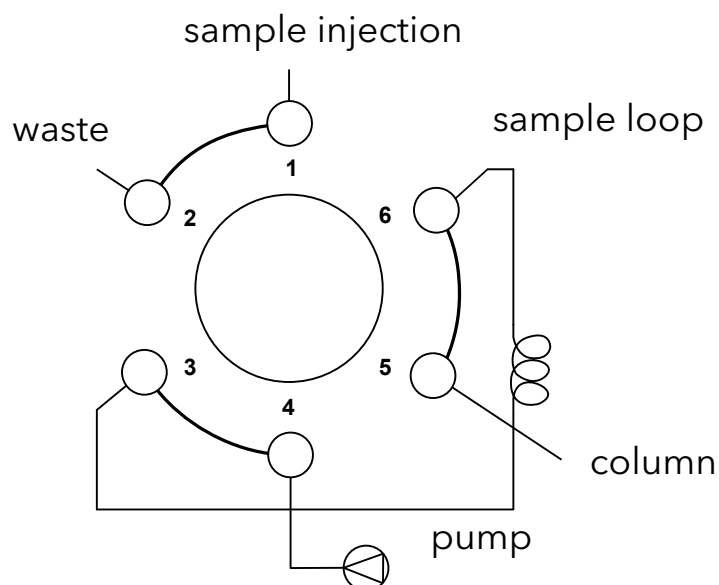


Fig. 2 Injecting the valve position

Column selection

NOTICE

Device defect

Damage of the column caused by switching under pressure.

→ Make sure there is no pressure when switching between the columns so that the columns are not damaged.

Functional principle

In position 1, the valve leads the sample to column A and the separated sample components to the detector.

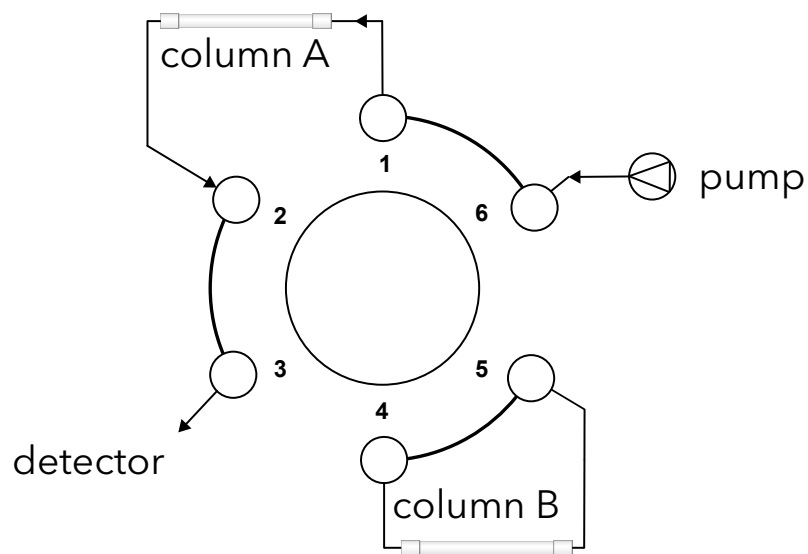


Fig. 3 Column selection - usage of Column A

In position 2, the valve leads the sample to column B and the separated sample components to the detector.

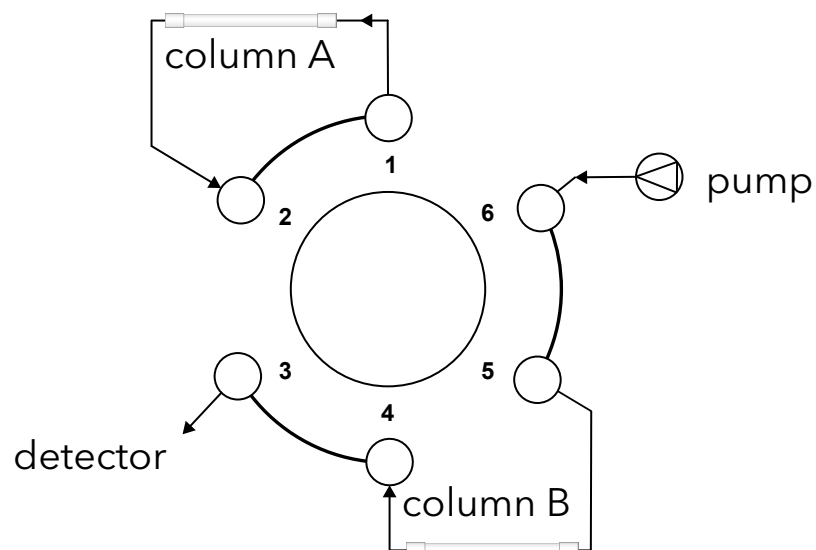


Fig. 4 Column selection - usage of column B

4.2 8 port valve

Sample loops loaded with the same sample

Functional principle

The sample loop loads in position 1. The mobile phase runs through sample loop A onto the column.

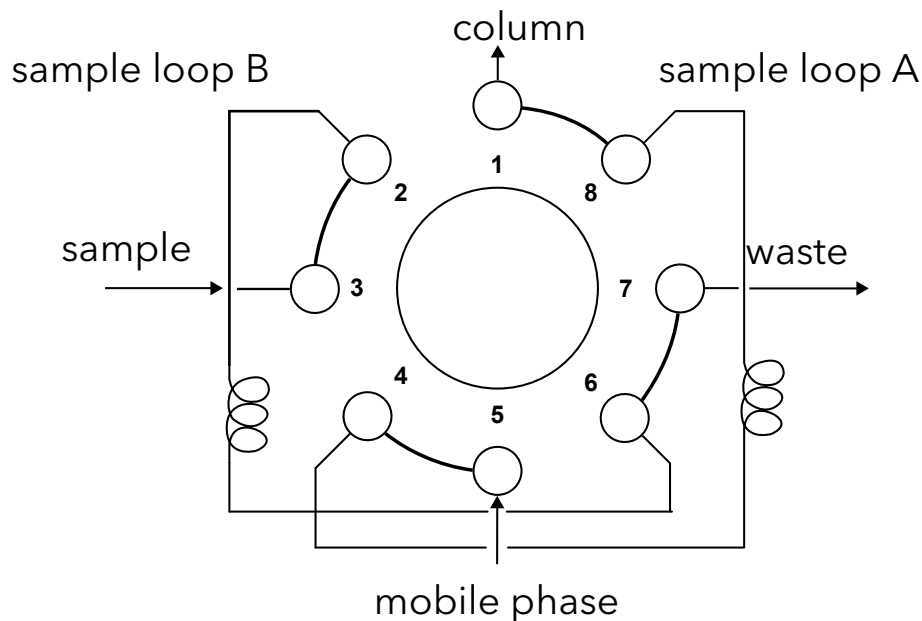


Fig. 5 Loading of sample loop B

In position 2, the sample of sample loop B is injected onto the column. Sample loop A can be loaded with an additional sample. When switching into position 1 again, the sample of sample loop A is injected onto the column and sample loop B can be loaded again.

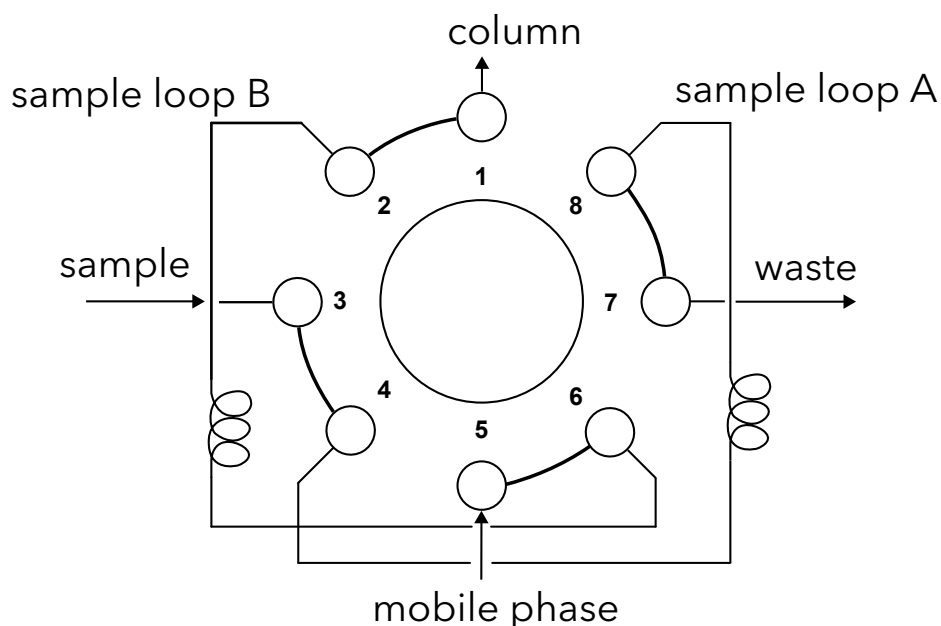


Fig. 6 Injection of sample loop B onto the column

Sample injection and column backflushing

Functional principle

In position 1, the sample is injected onto the column.

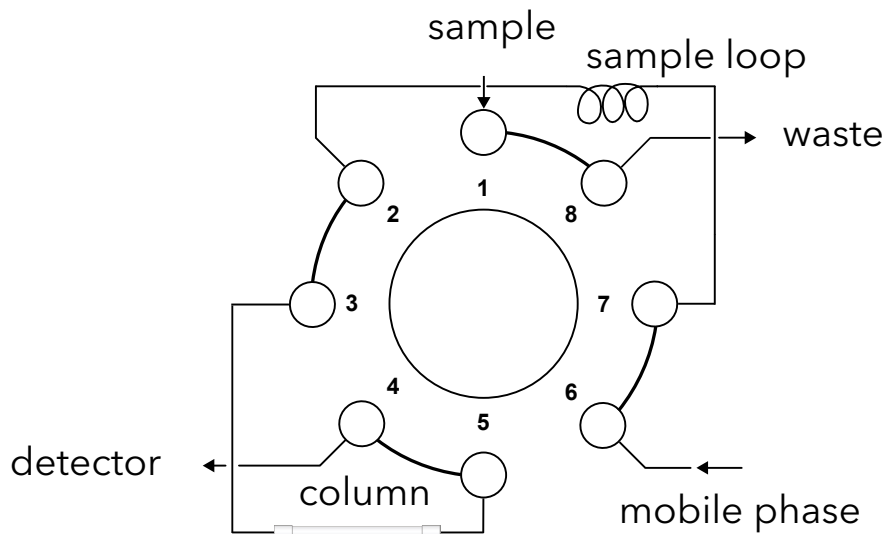


Fig. 7 Sample injection

In position 2, the sample loop is loaded and strongly retarded substances are backflushed and removed.

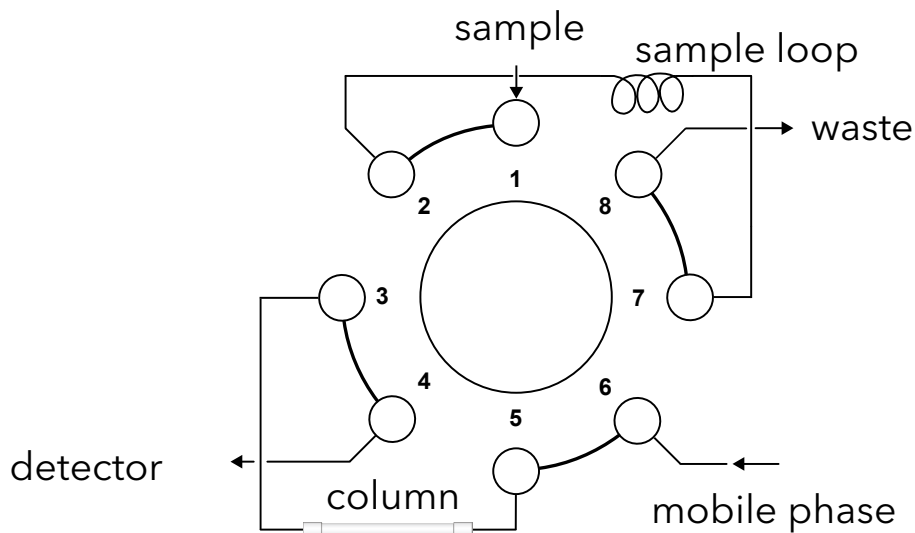


Fig. 8 Backflushing of the column

Column switching

Functional principle

Two 6 port or two 8 port valves are required for a column switching. It is then possible to operate 5 columns and a bypass, or alternatively 7 columns and a bypass. Example for 6 port valve:

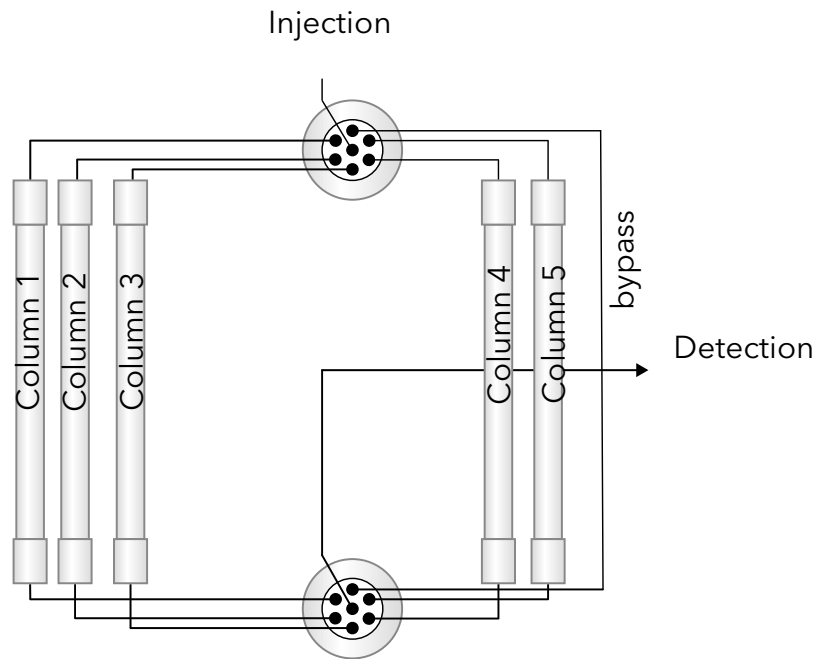
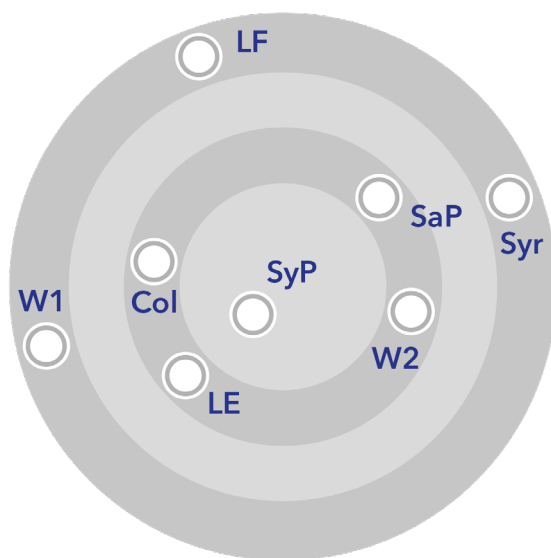


Fig. 9 Column switching

4.3 Multi-injection valve (AVN94CE)

Figure



Legend

- LF:** Port to connect a loop. Used to fill the loop.
- Col:** Outlet to column
- W1:** Outlet to waste 1
- LE:** Port to connect a loop. Used to empty the loop.
- W2:** Outlet to waste 2
- Syr:** Syringe inlet
- SaP:** Sample pump inlet
- SyP:** System pump inlet

Fig. 10 Multi-injection valve scheme

Functional principle**Manual load & column equilibration (Position 1):**

The sample loop is manually filled via a syringe and the column is equilibrated via the system pump.

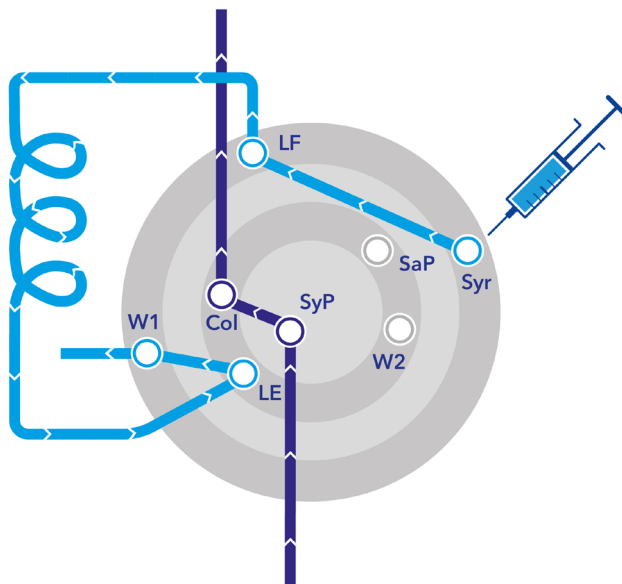


Fig. 11 Position 1

Sample injection (Position 2):

The flow of the system pump is directed through the loop and sample is injected onto the column. Additionally, the flow of the sample pump is directed to Waste 2.

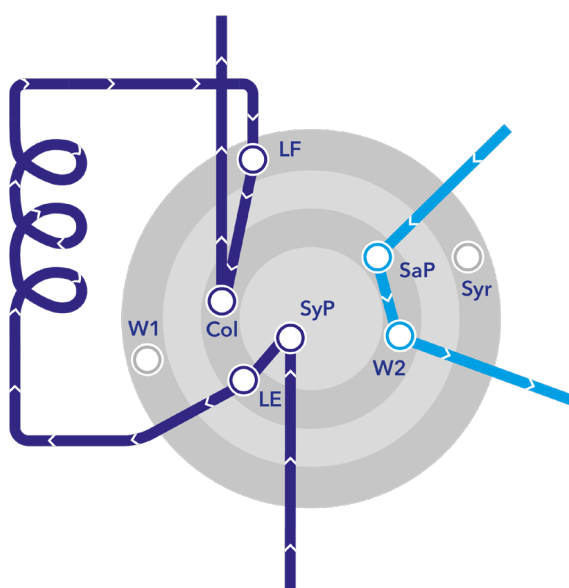


Fig. 12 Position 2

Functional principle

Direct injection (Position 3):

Sample is loaded directly onto the column via the sample pump. Additionally, the flow of the system pump is directed to Waste 1.

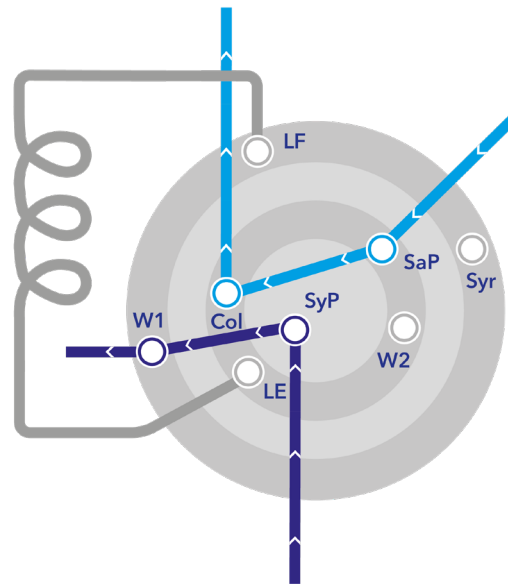


Fig. 13 Position 3

Automatic load & column equilibration (Position 4):

The sample loop is automatically filled via the sample pump and the column is equilibrated via the system pump.

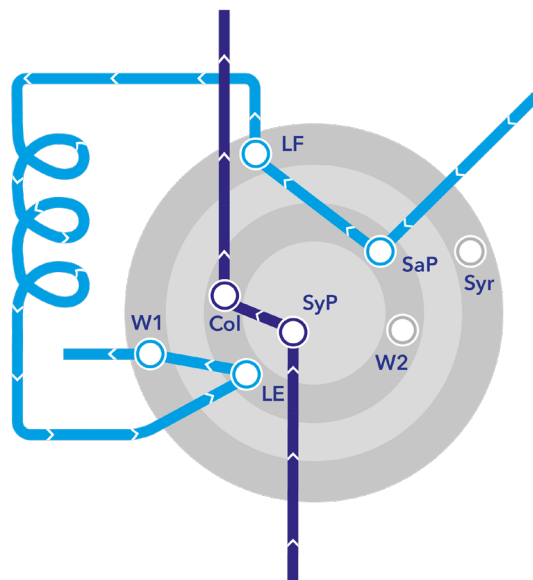


Fig. 14 Position 4



Note: If no sample pump is used, close the SaP port with a blind plug.

5. Installation

5.1 Sample loop

To ensure the full functionality, follow the steps below:

- Use the appropriate sample loop diameter.
- Keep the connections as short as possible.
- Check the pressure resistance of the screw fittings.

NOTICE

Component defect

Damage to components due to excessive tightening possible.

Observe the torque of the screw connection

→ Use 5 Nm torque for stainless steel fittings.

→ Use 1 Nm torque for PEEK fittings.

Tools: Torque wrench

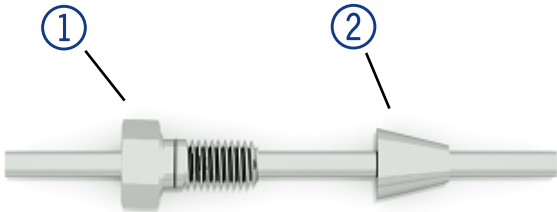
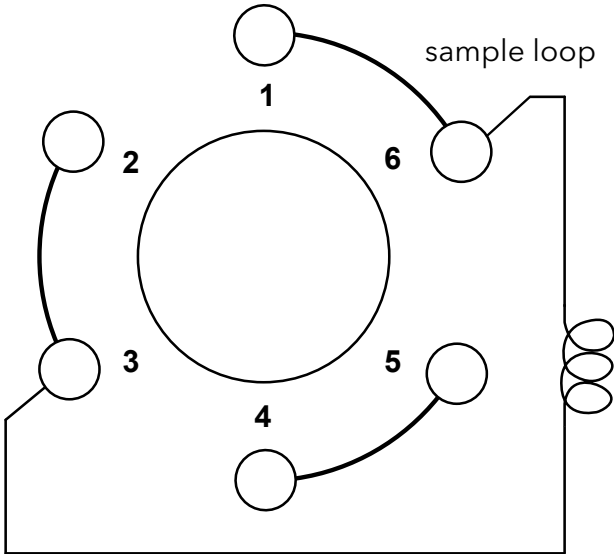
Process	Figure
<ol style="list-style-type: none"> 1. Insert one end of the sample loop into the screw fitting ①. 2. Attach the ferrule ②. 3. Repeat the first steps on the other end of the sample loop. 	
<ol style="list-style-type: none"> 4. Fixate the first screw fitting by screwing it into port 3. Afterwards unscrew again. 5. Fixate the second screw fitting in port 6 and unscrew again. 6. Screw the sample loop evenly and simultaneously into port 3 and port 6. 	

Fig. 15 Screw fitting and ferrule

Fig. 16 Installed sample loop

5.2 Inserting the injection port

NOTICE

Component defect

Valve damage when using pointed injection syringes.

→ Use only injection syringes with luer lock and flat-ground cannula.



Note: The DYNASEAL fitting is screwed together hand-tight. The DYNASEAL fitting sits adequately tight when you feel a resistance at pulling the needle.

Process

1. Insert the needle seal ① into the DYNASEAL fitting ② .
2. Put the biconical seal ③ onto the needle seal.
3. Insert the needle into the needle seal.
4. Insert the needle seal including the needle into the port and screw together hand-tight.

Figure

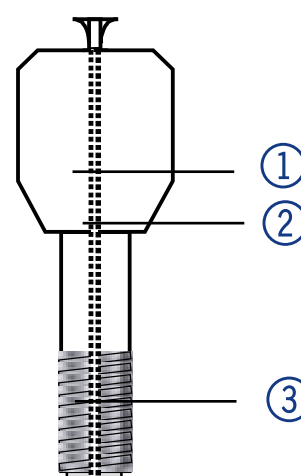


Fig. 17 Syringe port

Result

The AZURA® Valve V 4.1 is prepared for the injection of sample solutions in the sample loop via a glass syringe with luer lock.

6. Maintenance

6.1 Cleaning and maintaining the valve

All smooth surfaces of the valve can be cleaned with a mild, commercially available cleaning solution, or with isopropanol.

6.2 Replacing the rotor seal

The valve contains a rotor in its housing which keeps the pressure stable with the help of cup springs.



Note: Replace the rotor seal in the following cases:

- If the pressure is not kept stable
- If leakage occurs at the valve

However, the rotor seal should be replaced after 50,000 cycles at the latest..

Proceed as follows:

Tools: Allen screwdriver, size 3

Process	Figure
<ol style="list-style-type: none"> 1. Undo the 3 screws ① of the valve head. 2. Remove the valve head ② . 3. Replace the old rotor seal with the new rotor seal ③ in the same position. 4. Attach the valve head ② . 5. Fixate the 3 screws ① of the valve head evenly and crosswise. 	
<p>Fig. 18 Replacing the rotor seal</p>	

7. Technical data

7.1 General

Ambient conditions	Temperature: 4 - 40 °C; 39.2 - 104 °F; Air humidity: below 90 %
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7.2 Valves

Manual valves

Art. no.	Ports	Stator material	Rotor material	Max. pressure	Bore size	Connection
AVG24CE	6	PEEK	PEEK	240 bar	0.75 mm	1/16", UNF 10-32 coned
AVK25AE	6	SST DLC*	PEEK	300 bar	1.5 mm	1/8", UNF 1/4-28 coned
AVJ26AE	6	SST DLC*	PEEK	500 bar	0.75 mm	1/16", UNF 10-32 coned
AVI28AC	6	SST DLC*	Vespel®	1200 bar	0.3 mm	1/16", UNF 10-32 coned
AVL22CE	6	PEEK	PEEK	100 bar	2 mm	1/8", UNF 1/4-28 coned
AVJ36AE	8	SST DLC*	PEEK	500 bar	0.75 mm	1/16", UNF 10-32 coned
AVI38AC	8	SST DLC*	Vespel®	1200 bar	0.3 mm	1/16", UNF 10-32 coned

2-position valves



Note: To operate these valves the valve drive VU 4.1 (AWA01) is required.

Art. no.	Ports	Stator material	Rotor material	Max. pressure	Bore size	Connection
AVD24CE	6	PEEK	PEEK	240 bar	0.75 mm	1/16", UNF 10-32 coned
AVE25AE	6	SST DLC*	PEEK	300 bar	1.5 mm	1/8", UNF 1/4-28 coned
AVD26AE	6	SST DLC*	PEEK	500 bar	0.75 mm	1/16", UNF 10-32 coned
AVC28AC	6	SST DLC*	Vespel®	1200 bar	0.3 mm	1/16", UNF 10-32 coned
AVF22CE	6	PEEK	PEEK	100 bar	2 mm	1/8", UNF 1/4-28 coned
AVD36AE	8	SST DLC*	PEEK	500 bar	0.75 mm	1/16", UNF 10-32 coned
AVC38AC	8	SST DLC*	Vespel®	1200 bar	0.3 mm	1/16", UNF 10-32 coned

* SST DLC = Stainless steel, coated with diamond-like carbon

Multiposition valves



Note: To operate these valves the valve drive VU 4.1 (AWA01) is required.

Art. no.	Ports	Stator material	Rotor material	Max. pressure	Bore size	Connection
AVT25AE	6	SST DLC*	PEEK	300 bar	1.5 mm	1/8", UNF 1/4-28 coned
AVS26AE	6	SST DLC*	PEEK	500 bar	0.75 mm	1/16", UNF 10-32 coned
AVR28AC	6	SST DLC*	Vespel®	1200 bar	0.3 mm	1/16", UNF 10-32 coned
AVU32CE	8	PEEK	PEEK	50 bar	2 mm	1/8", UNF 1/4-28 coned
AVU34AE	8	SST DLC*	PEEK	200 bar	1.5 mm	1/8", UNF 1/4-28 coned
AVN94CE**	8	PEEK	PEEK	240 bar	0.75 mm	1/16", UNF 10-32 coned
AVS34CE	8	PEEK	PEEK	240 bar	0.75 mm	1/16", UNF 10-32 coned
AVS35AE	8	SST DLC*	PEEK	300 bar	0.75 mm	1/16", UNF 10-32 coned
AVS36AE	8	SST DLC*	PEEK	500 bar	0.75 mm	1/16", UNF 10-32 coned
AVR38AC	8	SST DLC*	Vespel®	1200 bar	0.3 mm	1/16", UNF 10-32 coned
AVS62CE	16	PEEK	PEEK	50 bar	0.75 mm	1/16", UNF 10-32 coned
AVQ66AE	16	SST DLC*	PEEK	500 bar	0.6 mm	1/16", UNF 10-32 coned

8. Reorders

8.1 Devices & accessories

Article	Art. no.
Reed contact	G0365
Magnetic core	M0527
Injection port	A0328
Mounting bracket AZURA® L for valve drive VU 4.1	A9854-3
Mounting bracket AZURA® L for manual injection valves	A9853
AZURA® Valve Unifier VU 4.1 valve drive	AWA01

* SST DLC = Stainless steel, coated with diamond-like carbon

** Multi-injection valve

8.2 Valves

Valve Art. no.	Description	Rotor seal Art. no.	Stator Art. no.
AVC28AC	6 Port 2-position valve, 1200 bar	A0611.2	A205118
AVC38AC	8 Port 2-position valve, 1200 bar	A0611.3	A205120
AVD24CE	6 Port 2-position valve, 240 bar, bioinert	A205101	A205102
AVD26AE	6 Port 2-position valve, 500 bar	A205145	A205140
AVD36AE	8 Port 2-position valve, 500 bar	A205144	A205142
AVE25AE	6 Port 2-position valve, 300 bar	A205147	A205146
AVG24CE	Manual 6 Port 2-position valve, 240 bar, bioinert	A205101	A205102
AVI28AC	Manual 6 Port 2-position valve, 1200 bar	A0611.2	A205118
AVI38AC	Manual 8 Port 2-position valve, 1200 bar	A0611.3	A205120
AVJ26AE	Manual 6 Port 2-position valve, 500 bar	A205145	A205140
AVJ36AE	Manual 8 Port 2-position valve, 500 bar	A205144	A205142
AVK25AE	Manual 6 Port 2-position valve, 300 bar	A205147	A205146
AVN94CE	8 Port multi-injection valve, 240 bar, bioinert	A205131	A205132
AVQ66AE	16 Port multiposition valve, 500 bar	A205151	A205152
AVR28AC	6 Port multiposition valve, 1200 bar	A0880.2	A205118
AVR38AC	8 Port multiposition valve, 1200 bar	A0880.4	A205120
AVS26AE	6 Port multiposition valve, 500 bar	A205139	A205140
AVS34CE	8 Port multiposition valve, 240 bar, bioinert	A205103	A205104
AVS35AE	8 Port multiposition valve, 300 bar	A205141	A205142
AVS36AE	8 Port multiposition valve, 500 bar	A205141	A205142
AVS62CE	16 Port multiposition valve, 50 bar, bioinert	A250105	A205106
AVT25AE	6 Port multiposition valve, 300 bar	A205148	A205146
AVU32CE	8 Port multiposition valve, 50 bar, bioinert	A205129	A205130
AVU34AE	8 Port multiposition valve, 200 bar	A205149	A205150

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