

AZURA

**AZURA® Valve V 4.1**  
Supplement



\* Exemplary representation

Document no. V6864

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UF6



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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

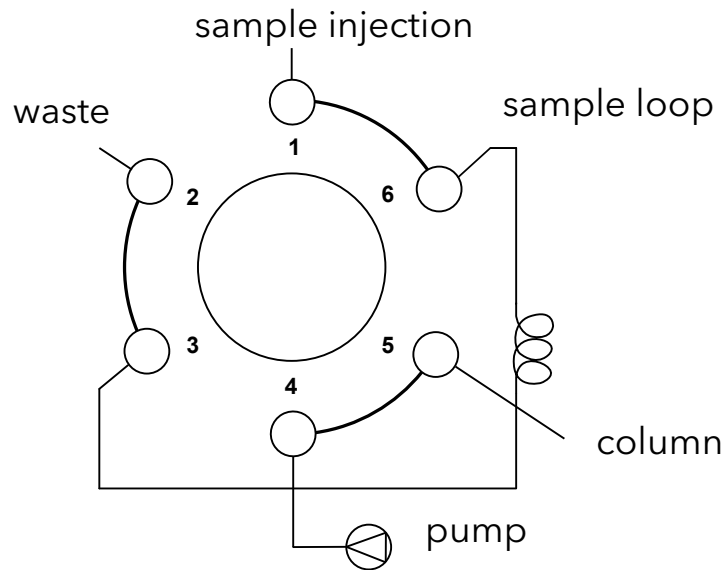
This chapter describes possible applications for the different valve types. Of course there are also other applications possible which are not listed here.

### 4.1 6 port valve

#### Injecting the sample

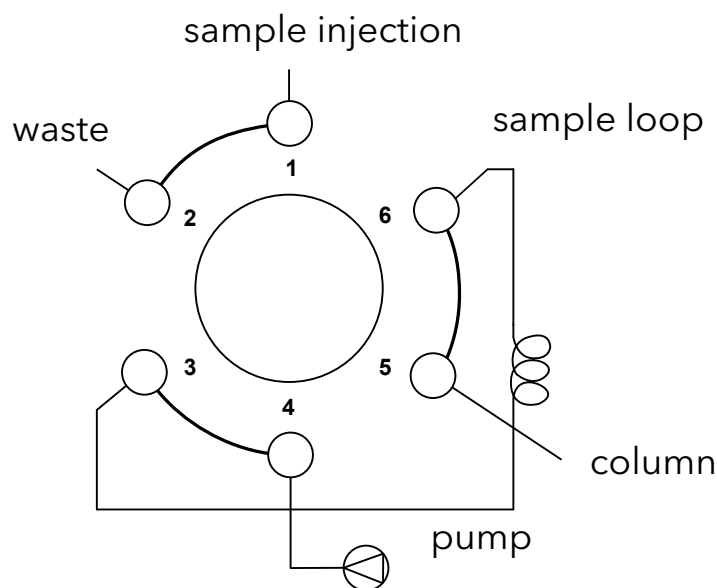
##### Functional principle

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

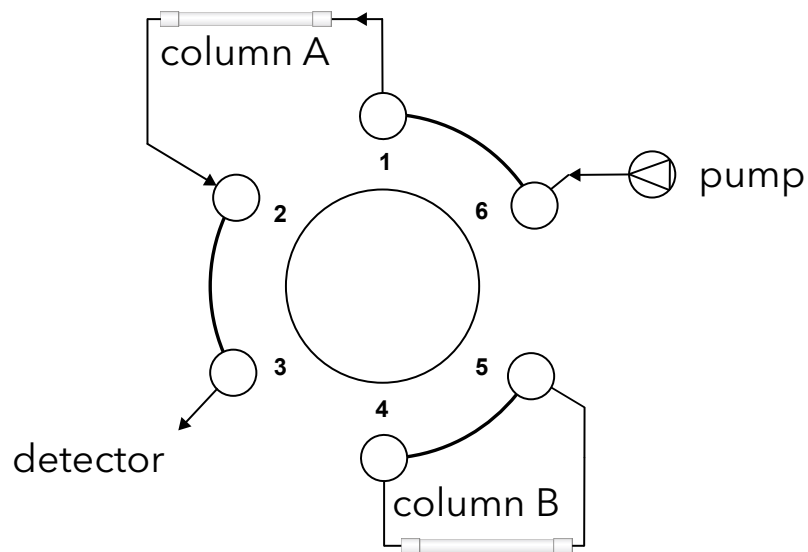
#### Device defect

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.

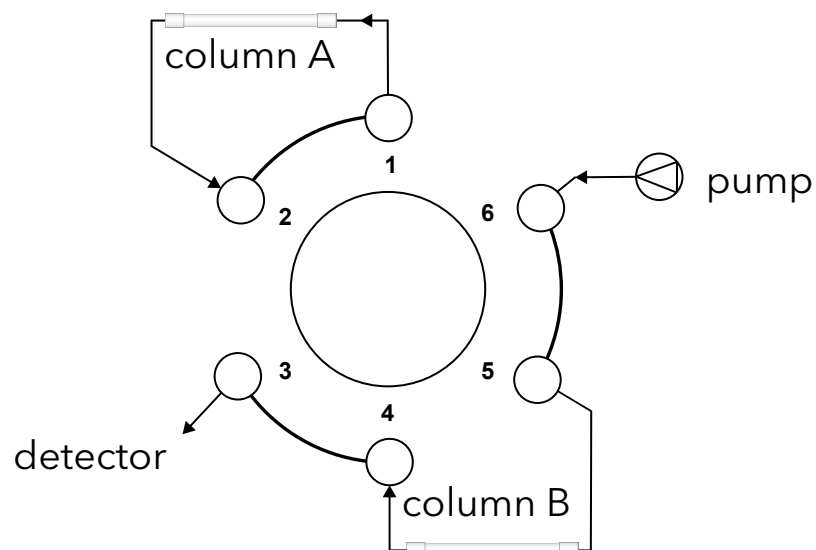
### Functional principle

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.



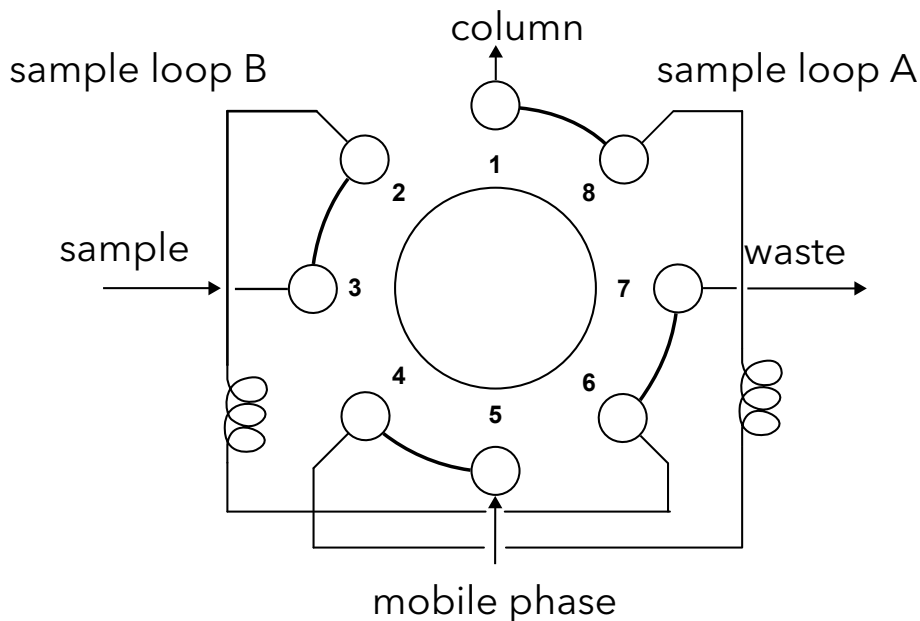
**Fig. 4** Column selection - usage of column B

## 4.2 8 port valve

### Sample loops loaded with the same sample

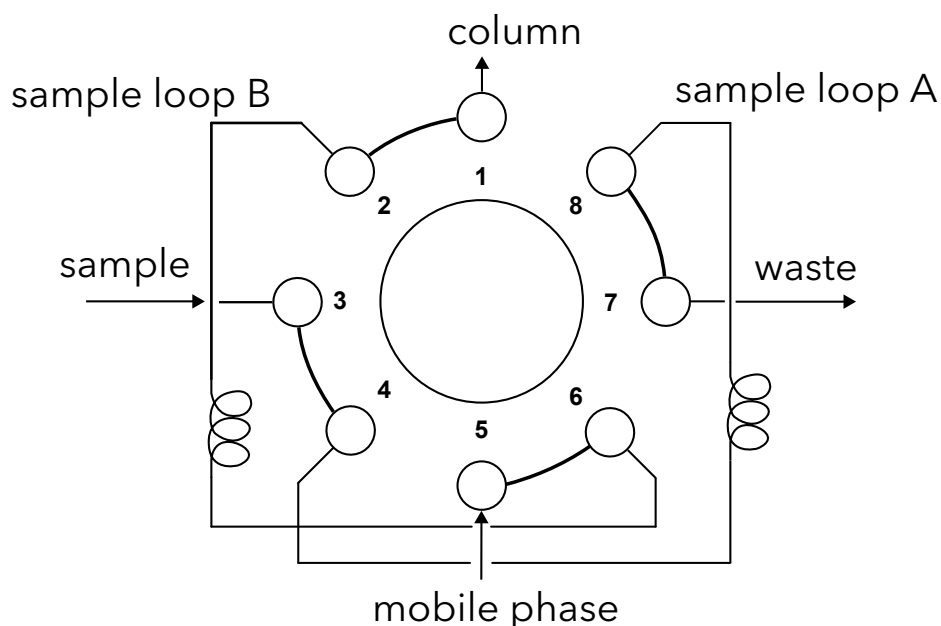
#### Functional principle

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.

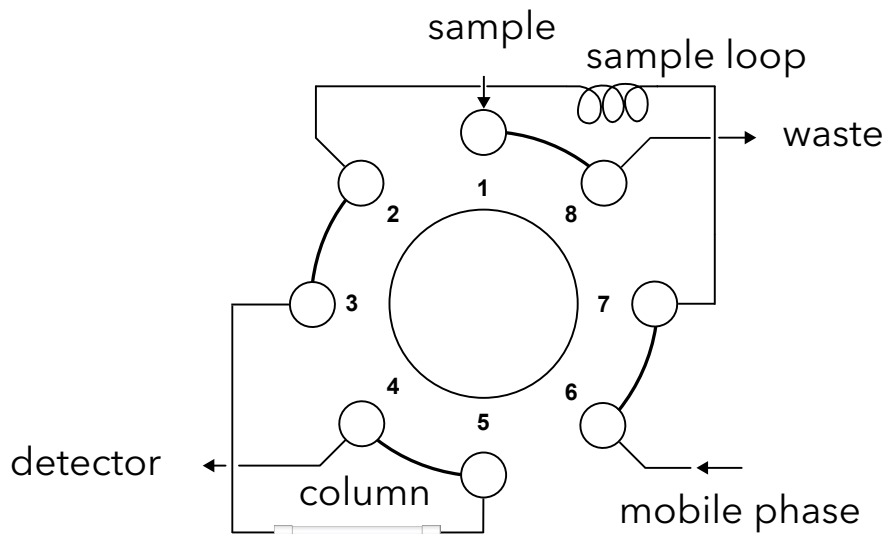


**Fig. 6** Injection of sample loop B onto the column

## Sample injection and column backflushing

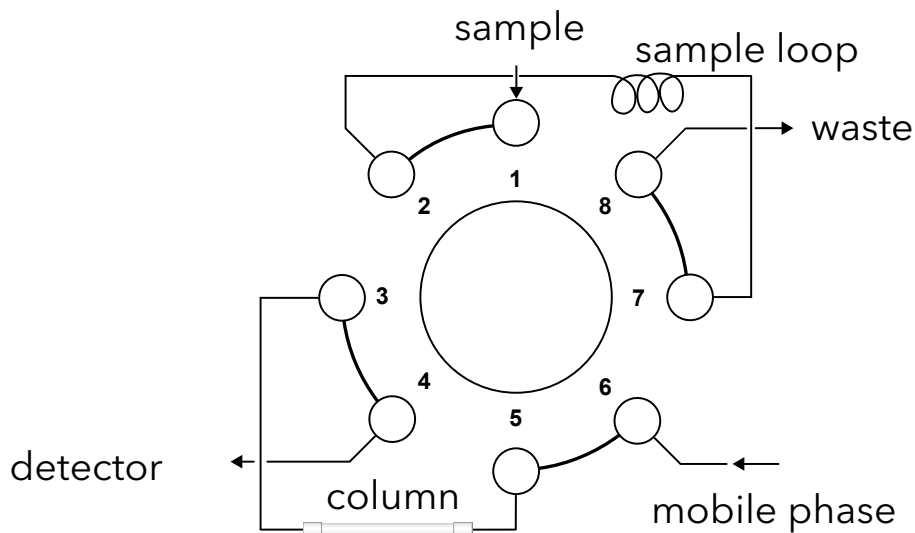
### Functional principle

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.



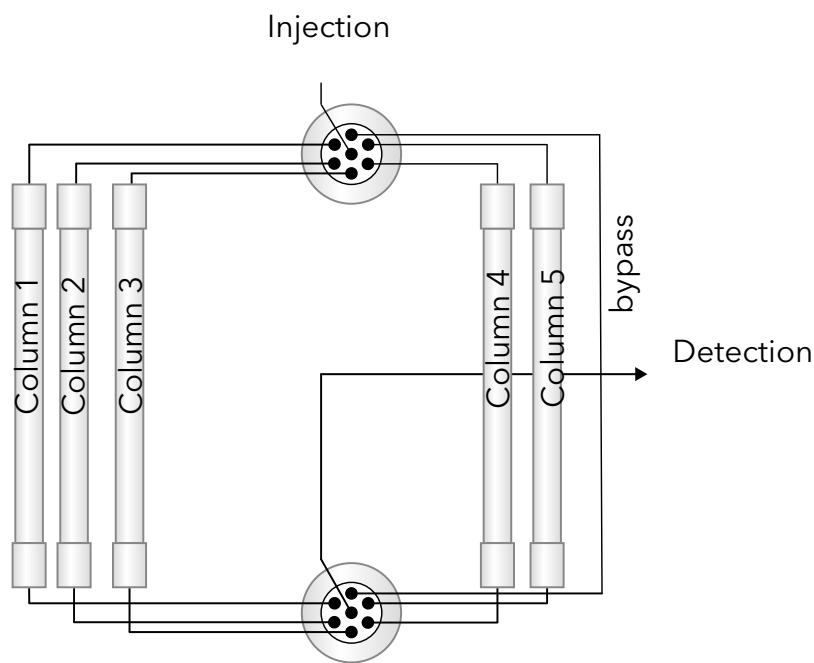
**Fig. 8** Backflushing of the column



## Column switching

### Functional principle

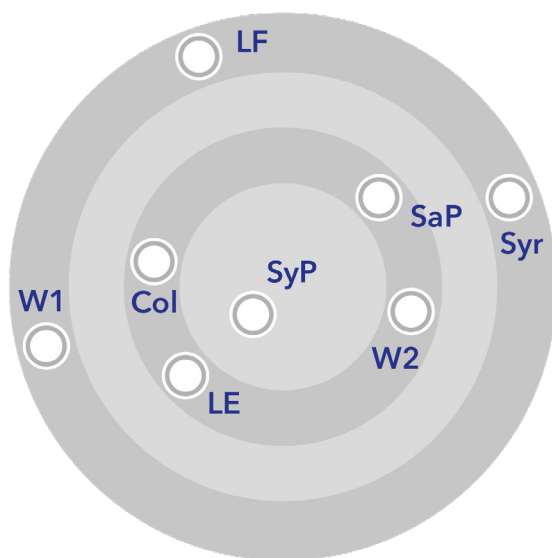
Two 6 port or two 8 port valves are required for a column switching. It is then possible to operate 5 columns and a bypass, or alternatively 7 columns and a bypass. Example for 6 port valve:



**Fig. 9** Column switching

## 4.3 Multi-injection valve (AVN94CE)

### Figure



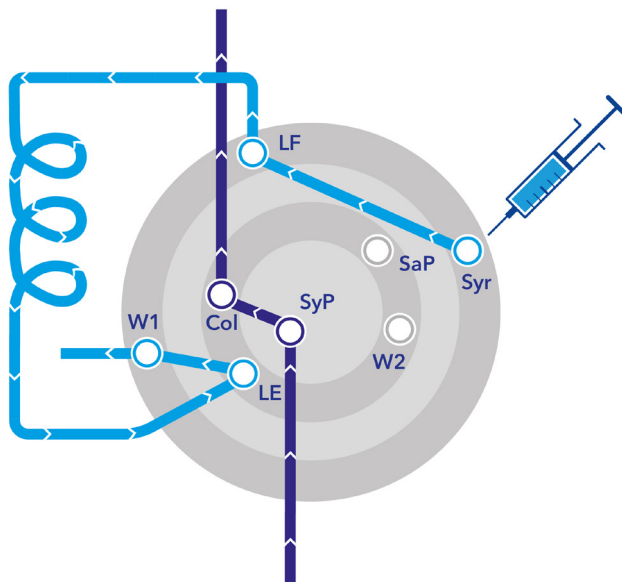
### Legend

- 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):**

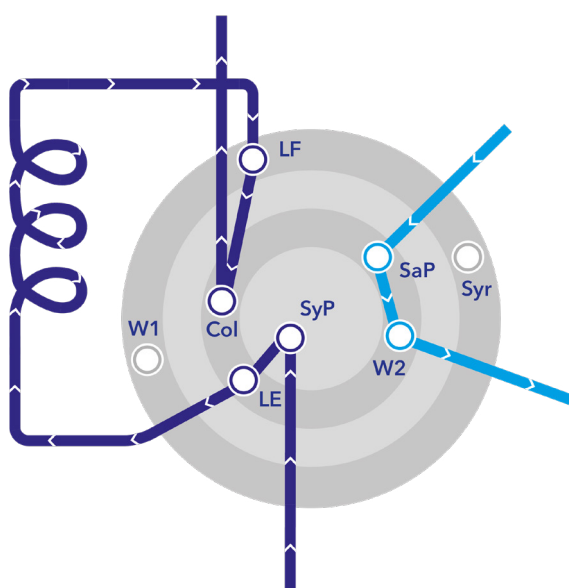
The sample loop is manually filled via a syringe and the column is equilibrated via the system pump.



**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.

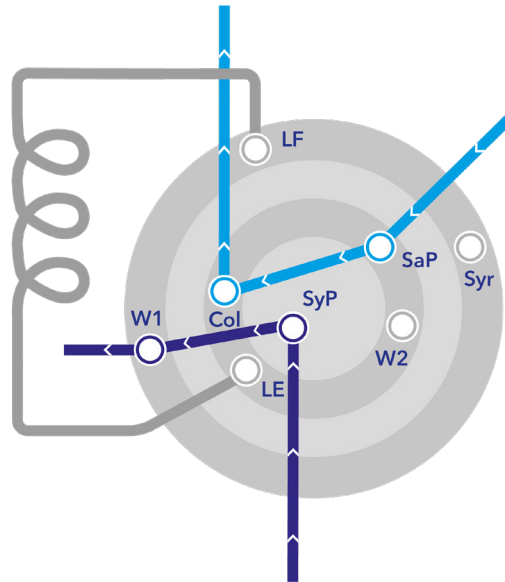


Fig. 13 Position 3

### 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.

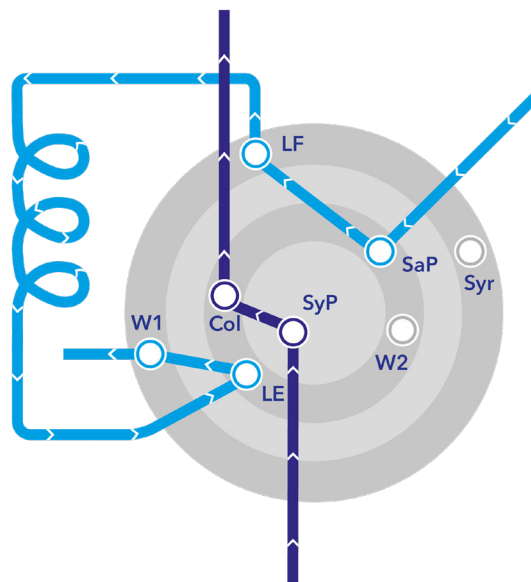


Fig. 14 Position 4



**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

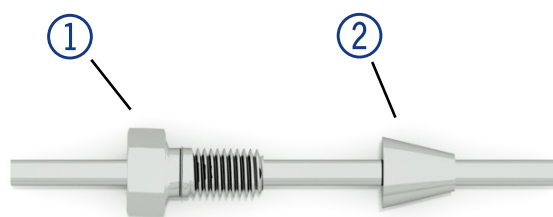
→ Use 5 Nm torque for stainless steel fittings.

→ Use 1 Nm torque for PEEK fittings.

**Tools:** Torque wrench

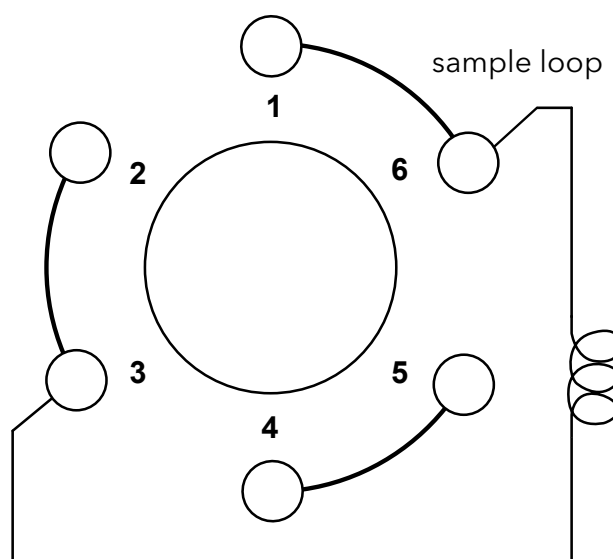
Process	Figure
---------	--------

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.



**Fig. 15** Screw fitting and ferrule

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. 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.

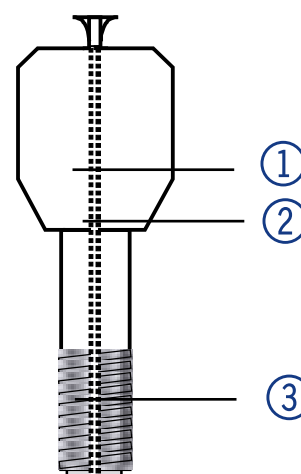


**Note:** The DYNASEAL fitting is screwed together hand-tight. The DYNASEAL fitting sits adequately tight when you feel a resistance at pulling the needle.

#### 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



**Note:** Replace the rotor seal in the following cases:

- If the pressure is not kept stable
- If leakage occurs at the valve
- If the rotor seal has been used more than 50 000 times (Check the entry „Cycles“ in „VALVE GLP“ menu of the valve drive when the valve is mounted.)

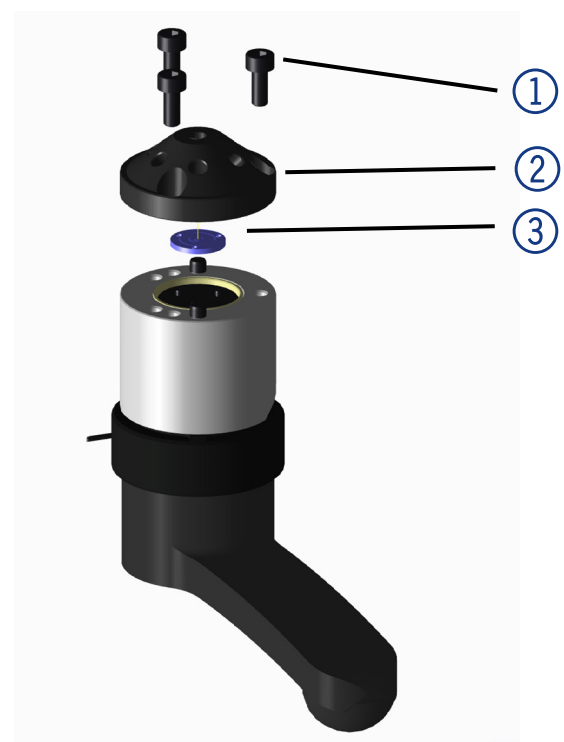
**Prerequisites:** Valve has been removed from valve drive.

**Tools:** Torx screwdriver, T20

#### Process

1. Loosen the 3 screws ① alternately at the front of the valve. Ensure to loosen the screws each time only by half a turn to allow an even release of pressure.
2. Lift the stator ② from the valve body and rest it on its outer surface to avoid damage of the sealing surface.
3. Gently pry of the rotor seal ③ from the rotor.
4. Replace the rotor seal with a new one. Ensure that the groove(s) point away from the valve body and towards the stator.
5. To reassemble the valve proceed in reverse order. A sealing is ensured when there is no gap between stator and valve body, take care to not overtighten the screws.
6. If the valve is operated with a VU 4.1 valve drive please ensure to also update the information on the RFID tag of the valve (s. Instruction of AZURA Valve Unifier VU 4.1, V6855).

#### Figure



**Fig. 18** Replacing the rotor seal

## 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
AVL23CE	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 (AWA01XA) 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
AVF23CE	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 (AWA01XA) 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
AVT53AE	12	SST DLC*	PEEK	100 bar	1.5 mm	1/8", UNF 1/4-28 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	AWA01XA

\* 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
AVF23CE	6 Port 2-position valve, 100 bar, bioinert	A205157	A205156
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
AVL23CE	Manual 6 Port 2-position valve, 100 bar, bioinert	A205157	A205156
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
AVT53AE	12 Port multiposition valve, 100 bar	A205155	A205154
AVU32CE	8 Port multiposition valve, 50 bar, bioinert	A205129	A205130
AVU34AE	8 Port multiposition valve, 200 bar	A205149	A205150

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