

Modular valve block

Operating manual

Series MVB 100/200



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We reserve the right to make technical changes.
Read carefully before use.
Save for future use.

1 About this document

This manual

- is part of the fitting
- applies to all series referred to
- describes safe and proper operation during all operating phases

1.1 Target groups



Operating company

- Responsibilities:
 - Keep this manual available at the place of operation, also for future use.
 - Ensure that employees read and observe this manual and other applicable documents, especially the safety instructions and warnings.
 - Observe any additional country-specific rules and regulations that relate to the system.

Qualified personnel, fitter








- Mechanics qualification:
 - Qualified employees with additional training for fitting the respective pipework.
- Electrical qualification:
 - Qualified electrician
- Responsibility:
 - Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

1.2 Other applicable documents

<p>Resistance Guide Chemical resistance of the materials used</p> <p>http://www.asv-stuebbe.de/pdf_resistance/300051.pdf</p>	
 <p>Data sheet technical specifications, operating conditions</p> <p>http://www.asv-stuebbe.de/pdf_datasheets/300633.pdf</p>	
<p>CE declaration of conformity Conformity with standards</p> <p>http://www.asv-stuebbe.de/pdf_DOC/300168.pdf</p>	


Tab. 1 Other application documents, purpose and where found

1.3 Warnings and symbols

Symbol	Meaning
	<ul style="list-style-type: none"> • Immediate acute risk • Death, serious bodily harm
	<ul style="list-style-type: none"> • Potentially acute risk • Death, serious bodily harm
	<ul style="list-style-type: none"> • Potentially hazardous situation • Minor injury
	<ul style="list-style-type: none"> • Potentially hazardous situation • Material damage
	Safety warning sign ► Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
	Instruction
1. , 2. , ...	Multiple-step instructions
✓	Precondition
→	Cross reference
	Information, notes

Tab. 2 Warnings and symbols


2 Safety instructions

 The manufacturer accepts no liability for damages caused by disregarding any of the documentation.

2.1 Intended use

- Only use the fitting to shut off pipes for appropriate media (→ Resistance list).
- Adhere to the operating limits (→ 9.1.4 Pressure and temperature limits, Page 13).

2.2 General safety instructions

 Read and observe the following regulations before carrying out any work.

2.2.1 Obligations of the operating company

Safety-conscious operation

- Only operate the fitting if it is in perfect technical condition and only use it as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Ensure that the following safety aspects are observed and monitored:
 - Intended use
 - Statutory or other safety and accident-prevention regulations
 - Safety regulations governing the handling of hazardous substances
 - Applicable standards and guidelines in the country where the pump is operated
- Make personal protective equipment available.

Qualified personnel

- Make sure all personnel tasked with work on the fitting have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organize responsibilities, areas of competence and the supervision of personnel.
- The following work should be carried out by specialist technicians only:
 - Installation, repair and maintenance work
 - Work on the electrical system
- Make sure that trainee personnel only work on the fitting under supervision of specialist technicians.

2.2.2 Obligations of personnel

- Observe the instructions on the fitting and keep them legible, e.g. nameplate, identification marking for fluid connections.
- Only carry out work on the fitting if the following requirements are met:
 - System is empty
 - System has been flushed
 - System is depressurized
 - System has cooled down
 - System is secured against being switched back on again
- Do not make any modifications to the device.

2.3 Specific hazards

2.3.1 Hazardous media

- When handling hazardous media (e.g. hot, flammable, explosive, toxic, hazardous to health or the environment), observe the safety regulations for the handling of hazardous substances.
- Use personal protective equipment when carrying out any work on the fitting.
- Collect leaking pumped liquid and residues in a safe manner and dispose of in accordance with environmental regulations.

3 Layout and Function

3.1 Marking

3.1.1 Name plate



Fig. 1 Nameplate (example)

- 1 Type
- 2 ID number
- 3 Nominal pressure [bar] / Nominal diameter [mm]
- 4 Materials (valve body, diaphragm, other gaskets)
- 5 Date of manufacture - Series number

3.2 Layout

Compressed air-operated diaphragm valve block for blocking, dosing, mixing and distributing liquids and rinsing system.

- Optional flow direction
- Valve lift OPEN/CLOSE
- Optional installation position
- Valve functions
 - Normally closed (NC)
 - Normally open (NO)
 - Double acting (DA)

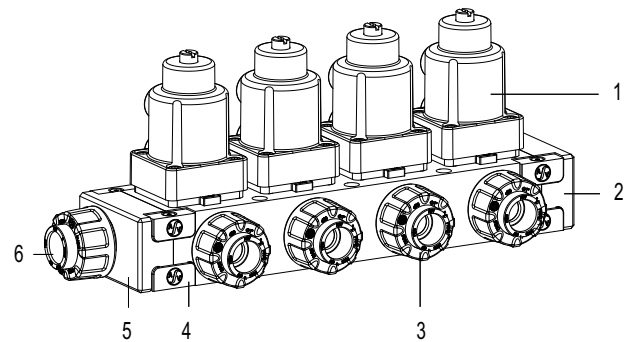


Fig. 2 Valve block layout

- 1 Drive
- 2 End plate
- 3 Nut (with union end)
- 4 Terminal block
- 5 Connection plate
- 6 Passageway

4 Transport, Storage and Disposal

4.1 Unpacking and inspection on delivery

1. Unpack the fitting when received and inspect it for transport damage.
2. Report any transport damage to the manufacturer immediately.
3. Ensure that the information on the type plate agrees with the order/design data.
4. For immediate installation, dispose of packaging material according to local regulations.
 - For later installation, leave the fitting in the original packaging.

4.2 Transportation

1. If possible, transport fitting (including drive) in original packaging.
2. To transport, lift the fitting by hand.

4.3 Storage

NOTE

Material damage due to inappropriate storage!

- ▶ Store the fitting properly.
-
- ▶ Make sure the storage room meets the following conditions:
 - Dry
 - Frost-free
 - Vibration-free
 - Not in direct sunlight
 - Storage temperature +10 °C to +60 °C

4.4 Disposal

- ▶ Plastic parts can be contaminated by poisonous or radioactive media to such an extent that cleaning will not be sufficient.


WARNING

Risk of poisoning and environmental damage from medium.

- ▶ Use personal protective equipment when carrying out any work on the fitting.
 - ▶ Before disposing of the fitting:
 - Collect escaping medium and dispose separately according to local regulations.
 - Neutralize residues of medium in the fitting.
 - ▶ Remove plastic parts and dispose of them in accordance with local regulations.
-
- ▶ Dispose of fitting in accordance with local regulations.

5 Installation and connection

5.1 Preparing for installation

5.1.1 Check operating conditions

1. Ensure the design of the fitting is consistent with the purpose intended:
 - Materials used (→ nameplate).
 - Medium (→ order and design data).
2. Ensure the required operating conditions are met:
 - Resistance of body and seal material to the medium (→ resistance lists).
 - Media temperature (→ 9.1.4 Pressure and temperature limits, Page 13).
 - Working pressure (→ 9.1.4 Pressure and temperature limits, Page 13).
 - Setting range
3. Consult with the manufacturer regarding any other use of the device.

5.2 Planning pipelines

5.2.1 Designing pipelines

WARNING

Risk of poisoning and environmental damage from medium.

Leaks due to impermissible pipework forces.

- ▶ Ensure that the fitting is not subject to any pulling or thrusting forces or bending moments.

1. Plan pipes safely:
 - No pulling or thrusting forces
 - No bending moments
 - Adjust for changes in length due to temperature changes (compensators, expansion shanks)
 - Optional flow direction
 - Optional installation position
2. Dimensions (→ Data sheet).

5.3 Planning control

WARNING

Risk of poisoning and environmental damage from medium.

Leakage due to incompatible media.

- ▶ Provide sufficiently long rinsing times when media are used that react exothermically when mixed.
 - ▶ Use neutral rinsing medium that does not react with the other media.
-
- ▶ Plan control and control times according to conditions of use.

5.4 Installing a valve block

WARNING

Risk of poisoning and environmental damage from medium.

Leak due to faulty installation.

- ▶ Installation work on the pipes should only be performed by technicians who have been specially trained for the pipework in question.

NOTE


Material damage due to contamination of the fitting!

- ▶ Make sure no contamination reaches the fitting.
- ▶ Flush the pipe with a neutral medium.


NOTE


Material damage when using incorrect assembly oils/greases!

- ▶ Exclusively use silicone oil for assembly.
- ▶ For EPDM, do not use mineral oil or Vaseline.

 The fitting is installed according to the connection type of the pipes.

5.4.1 Preparing the valve block

 Not necessary for pre-assembled valve block

 Prepare MVB100/MVB200 valve block according to the requirements:

- Prepare valve block as transit fitting:
Install 2 connecting plates
- Prepare valve block as end fitting:
Mount 1 connecting plate and 1 end plate
- Directly connect multiple valve blocks:
Mount 1 or 2 strip connectors each

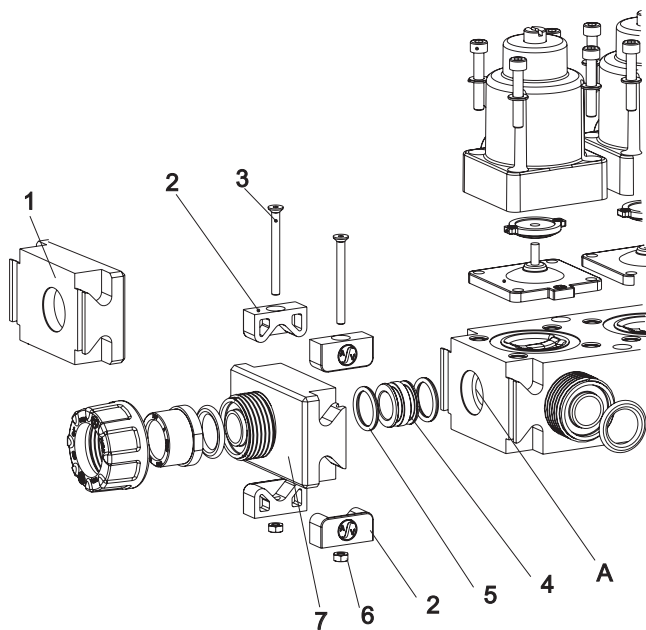


Fig. 3 Preparing the valve block

1. Mount connection plate:
 - Insert 1 or 2 strip connectors (4) with 2 O-rings (5) into the side connection
 - Attach connection plate (7) and press firmly
 - Insert 2 terminal blocks (2) per side
 - On each side, attach with screw (3) and nut (6) (just finger-tight)
2. Mount end plate:
 - Insert 1 or 2 strip connectors (4) with 2 O-rings (5) into the side connection
 - Attach end plate (1) and press firmly
 - Insert 2 terminal blocks (2) per side
 - On each side, attach with screw (3) and nut (6) (just finger-tight)
3. Directly connect valve blocks:
 - Insert 1 or 2 strip connectors (4) with 2 O-rings (5) into the passageway (A)
 - 2. Attach valve block and press firmly
 - Insert 2 terminal blocks (2) per side
 - On each side, attach with screw (3) and nut (6) (just finger-tight)

5.4.2 Pipe connection with fitting and insert

1. Prepare pipe ends according to connection type.
2. Unscrew union nuts and slide over free pipe ends.
 - Check mounting direction.
3. Connect inserts with pipe ends.
4. Position pipe ends at the connection without any strain
5. Hand-tighten the union nut.

5.4.3 Pipe connection with fitting and hose connector

1. Screw union nut with hose connector onto connection and tighten by hand.
2. Attach hose flush onto hose connector.
3. Secure hose onto hose connector using hose clamp.

5.4.4 Pipe connection with internal thread fixed

 Matching connection fittings (including O-ring) can be obtained from the manufacturer.

1. Prepare pipe ends according to connection type.
2. Screw connection fitting into the valve block.
 - Ensure correct seating of O-ring
3. Connect pipe ends with fitting.

5.5 Connecting the drive

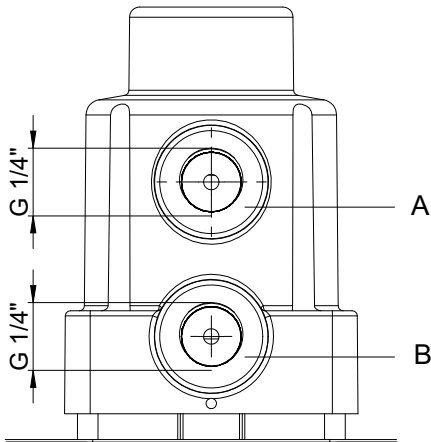



Fig. 4 compressed air

A closed

B open

5.5.1 Pneumatic connection

 Solenoid pilot valves are available for control of the compressed air drive:

- 3/2-way valve for single-acting drives
- 5/2-way valve for double-acting drives

CAUTION

Risk of injury from compressed air!

► All work on the compressed air system must be carried out by qualified technicians.

► Connect compressed air lines to the compressed air drive. (→ Figure compressed air, Page 8).


Function	Control pressure on	
	a	b
Normally closed (NC)	-	open
Normally open (NO)	close	-
Double acting (DA)	close	open

Tab. 3 Compressed air connection

5.5.2 Checking the function of the drive

- Open and close fitting using the pneumatic connection, the indicator pin signals the corresponding position
- lowered: Fitting is closed
 - protruding: Fitting is open

5.6 Performing the hydrostatic test

 Pressure test using neutral medium, e.g. water.

1. Pressurize the fitting, ensuring
 - Test pressure < permissible system pressure
 - Test pressure < 1.5 PN
 - Test pressure < PN + 5 bar
2. Check the fitting for leaks.

6 Operation

6.1 Commissioning

- ✓ Fitting correctly installed and connected

WARNING

Risk of injury and poisoning due to medium spraying out.

- ▶ Use personal protective equipment when carrying out any work on the fitting.
1. Open and close fitting, the indicator pin signals the corresponding position
 - lowered: Fitting is closed
 - protruding: Fitting is open
 2. After the initial stresses due to pressure and operating temperature, check if the fitting is sealed.

7 Maintenance

WARNING

Risk of injury and poisoning due to hazardous media liquids!

- ▶ Use personal protective equipment when carrying out any work on the fitting.

7.1 Servicing

1. Visual and function check (every three months):
 - Normal operating conditions unchanged
 - No leaks
 - No unusual operating noises or vibrations
2. Ensure that fitting functions properly (opening, closing)
3. Clean fitting with a moist cloth if necessary.
4. Retighten housing screws (→ 9.1.3 Tightening torques, Page 12).
5. Check diaphragm for wear and replace if necessary:

Diaphragm material	Max. number of operations
EPDM	200,000
FPM:	200,000
PTFE (EPDM)	200,000

Tab. 4 Diaphragm maintenance interval

7.2 Maintenance

WARNING

Risk of injury and poisoning due to hazardous or hot media.

- ▶ Use personal protective equipment when carrying out any work on the fitting.
- ▶ Safely collect the media and dispose of it in accordance with environmental regulations.

WARNING


Risk of injury during disassembly!


- ▶ Wear protective gloves, components can be very sharp-edged due to wear or damage.
- ▶ Remove components with springs (e.g. pneumatic drive) carefully, since spring tension can cause components to be ejected.

7.2.1 Removing fitting

1. Ensure that:
 - System is empty
 - System has been flushed
 - System is depressurized
 - System has cooled down
 - System is secured against being switched back on again
2. Remove fitting from the pipe.
3. Decontaminate fitting if required.
 - Dead space in the fitting may still contain medium.

7.2.2 Fixing leaks in the port

 Part drawing

1. Removing fitting (→ 7.2.1 Removing fitting, Page 10).
-  Before removing housing screws (1), note:
- For NC drives, apply compressed air pressure to connection B to bring the drive into the open position (→ Figure compressed air, Page 8).
 - For NO and DA drives, this is not necessary.
2. Unscrew housing screws (1).
 3. Unscrew diaphragm (18) and dispose of properly.
 4. Ensure that pressure piece (13) is exposed in the guides.
 5. Check state of sealing surfaces of the valve strip for damage.
 6. Lightly lubricate new diaphragm with special grease on top of curvature and on thread. (Recommended special grease: Syntheso ProAA2)
 7. Screw diaphragm into spindle (9) clockwise until resistance is felt.
 8. Unscrew diaphragm until the diaphragm hole pattern matches the valve strip (max. 180°).
 9. Tighten housing screws (1) crosswise. Ensure uniform contact pressure.
 10. Tighten housing screws (1) with tightening torque 2.5 Nm.

7.3 Replacement parts and return

1. Have the following information ready to hand when ordering spare parts (→ nameplate).
 - Fitting type
 - ID number
 - Nominal pressure and diameter
 - Body and seal material
2. Please complete and enclose the document of compliance for returns (→ <http://www.asv-stuebbe.com/service/downloads>).



3. Only use spare parts for ASV Stübbe.

8 Troubleshooting

WARNING

Risk of injury and poisoning due to hazardous or hot media.

- ▶ Use personal protective equipment when carrying out any work on the fitting.
- ▶ Safely collect the media and dispose of it in accordance with environmental regulations.


Consult with the manufacturer regarding faults which are not identified in the following table, or which cannot be traced to the indicated causes.

Error	Possible cause	Corrective action
Control function is not right	Control connections mixed up	▶ Connect control connections correctly.
	Compressed air connection mixed up at solenoid pilot valve	▶ Check compressed air connection and correct if necessary (→ supplementary instructions for drives).
	Electrical connection faulty	▶ Check electric connect and correct if necessary (→ supplementary instructions for limit switch).
Medium escapes between housing and diaphragm	Housing screws too loose	▶ Tighten housing screws (→ 9.1.3 Tightening torques, Page 12).
Medium escapes at the drive	Diaphragm leaky	▶ (→ 7.2.2 Fixing leaks in the port, Page 10).
Fitting does not close completely	Control pressure too low	▶ Check compressed air supply. ▶ Ensure sufficient air pressure (→ 9.1.2 Control air connections, Page 12).
	Diaphragm leaky	▶ (→ 7.2.2 Fixing leaks in the port, Page 10).

Tab. 5 Troubleshooting

9 Appendix

9.1 Technical specifications


 Technical data (→ Data sheet).

9.1.1 Mechanical specifications

Size	Value
Process conditions (medium)	
Pressure and temperature	See material-dependent pressure/temperature diagram (→ 9.1.4 Pressure and temperature limits, Page 13).
Materials in contact with medium	
Diaphragm	EPDM, FPM, PTFE (EPDM diaphragm, PTFE-coated on medium-side)
sealing	EPDM, FPM
Housing	PVC-U, PP, PVDF
Materials not in contact with medium	
Upper part	PP, glass fiber reinforced

Tab. 6 Mechanical specifications

9.1.2 Control air connections

 Maximum control pressure 7 bar.
 Compressed air classes according to ISO 8573-1:

- 2 or 3 at $T < 0\text{ °C}$
- 3 or 4 at $T > 0\text{ °C}$

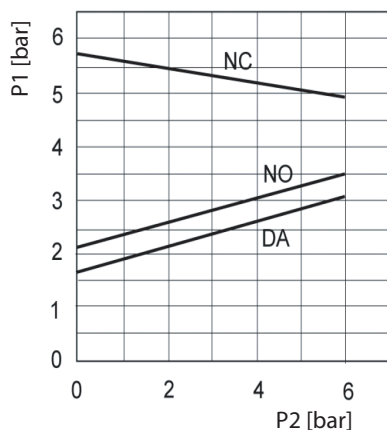


Fig. 5 Diagram for control pressure

P1 Control pressure

P2 Working pressure

9.1.3 Tightening torques

Pos. ¹⁾	Description	Size	Tightening torque [Nm]
18	Cylinder head screws	d12 (DN12) d20 (DN15)	2.5 2.5
13	Countersunk screw	–	2.0
1	Union nut	–	hand-tight

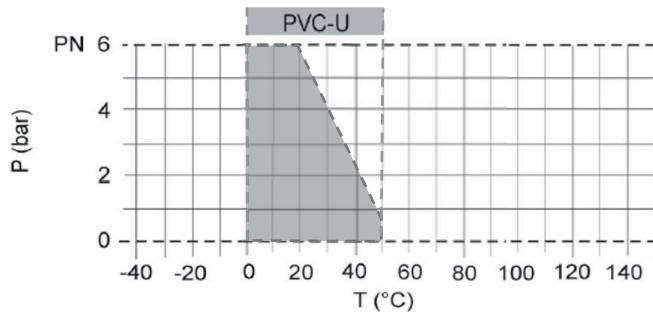
Tab. 7 Tightening torques

1) (→ Table 8 Part no. and designation of valve block, Page 14).

9.1.4 Pressure and temperature limits

Other media (→ resistance lists).
Use at temperatures under 0 °C should be agreed with the manufacturer.

MVB 100 pressure/temperature diagrams



MVB 200 pressure/temperature diagrams

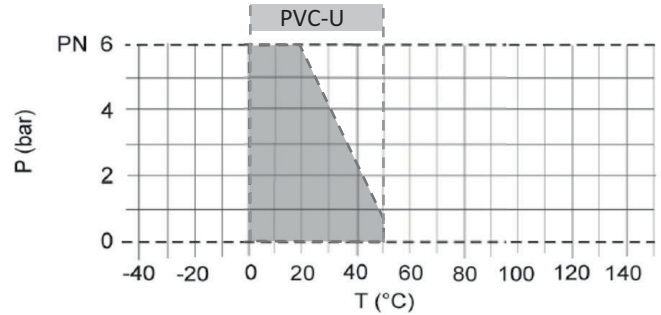


Fig. 6 Pressure and temperature limits PVC-U

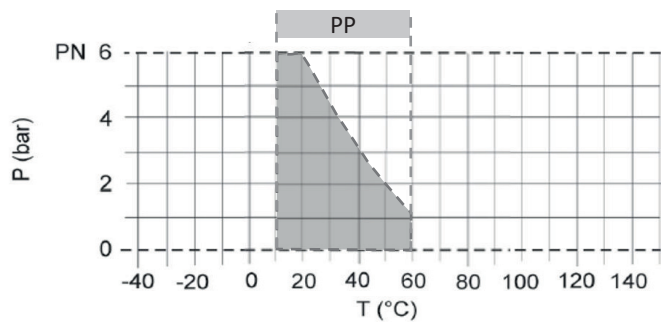
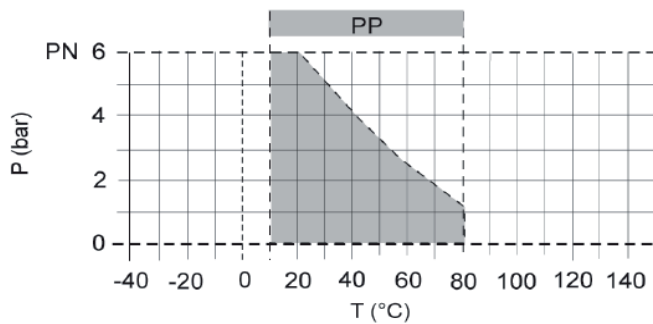


Fig. 7 Pressure and temperature limits PP

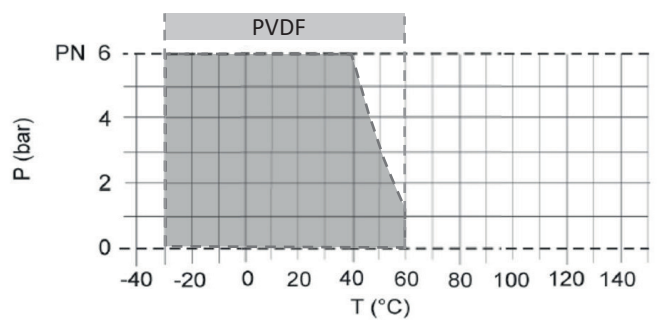
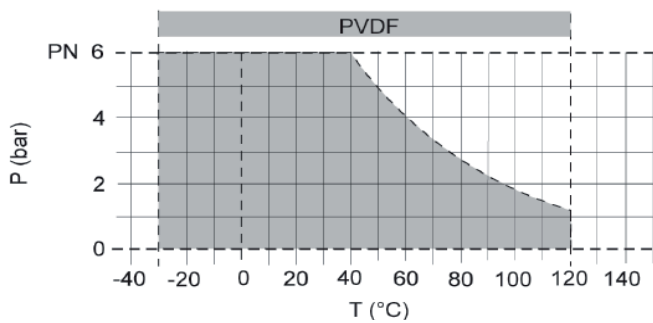


Fig. 8 Pressure and temperature limits PVDF

9.2 Parts

9.2.1 Valve block

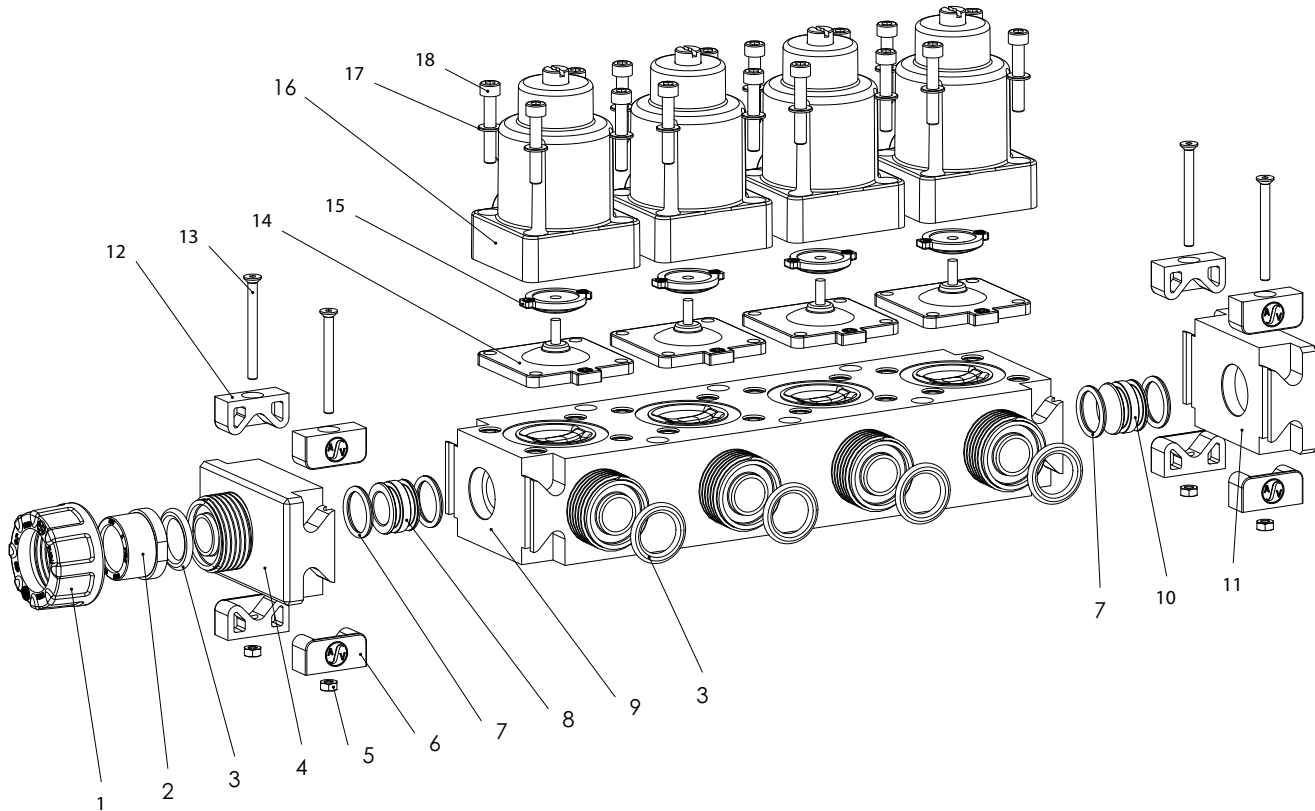


Fig. 9 Valve block

Pos.	Quantity	Designation
1	1	Union nut
2	1	Union end
3	5	O-ring
4	1	Connection plate AG
5	4	Hexagon nut
6	4	Terminal block (below)
7	4	O-ring
8	1	Strip connector (open)
9	1	valve body

Pos.	Quantity	Designation
10	1	Strip connector (plug)
11	1	End plate
12	4	Terminal block (above)
13	4	Countersunk screw
14	4	Diaphragm
15	4	pressure piece
16	4	Drive
17	16	Washer
18	16	Cylinder head screw

Tab. 8 Part no. and designation of valve block

