Data sheet

2, 3 and 4 - way valves VZ

Description

VZ 2   VZ 3   VZ 4

VZ valves provide a high quality, cost effective solution for the control of hot and/or chilled water for fan coil units, small reheaters, and recoolers in temperature control systems.

The valves are used in combination with AMV(E) 130/140, AMV(E) 130H/140H and AMV(E) 13 SU actuators.

Main data:
- DN 15, 20
- k_{vs} 0.25 - 4.0 m³/h
- PN 16
- Logarithmic flow characteristic
- Temperature:
  - Circ. water / glycolic water up to 50%: 2 … 120 °C
- Reduced k_{vs} on B port (VZ3 & VZ4 only)
- Soft sealing on plug gives complete shut-off
- Linear bypass on 3 and 4 port valves
- Valves are supplied with screwed plastic cover for manual operation
- Connections: flat end or conex

Ordering

VZ 2 Valve

Picture	DN (mm)	k_{VS} (m³/h)	Max. Δp (bar)	Code No.	
				Flat End	Conex
	15	0.25	3.5 (1)*	**065Z5310**	**065Z5010**
		0.4		**065Z5311**	**065Z5011**
		0.63		**065Z5312**	**065Z5012**
		1.0		**065Z5313**	**065Z5013**
		1.6		**065Z5314**	**065Z5014**
		2.5		**065Z5315**	**065Z5015**
	20	2.5	2.5 (1)*	**065Z5320**	**065Z5020**
		4.0		**065Z5321**	**065Z5021**

VZ 3 Valve

Picture	DN (mm)	k_{VS} (A - AB) (m³/h)	k_{VS} (B - AB) (m³/h)	Max. Δp (bar)	Code No.	
					Flat End	Conex
	15	0.25	0.25	3.5 (1)*	**065Z5410**	**065Z5110**
		0.4	0.25		**065Z5411**	**065Z5111**
		0.63	0.4		**065Z5412**	**065Z5112**
		1.0	0.63		**065Z5413**	**065Z5113**
		1.6	1.0		**065Z5414**	**065Z5114**
		2.5	1.6		**065Z5415**	**065Z5115**
	20	2.5	1.6	2.5 (1)*	**065Z5420**	**065Z5120**
		4.0	2.5		**065Z5421**	**065Z5121**

(1)* recommended Δp

Data sheet   2, 3 and 4- way valves VZ

Ordering *(continuous)*

VZ 4 Valve

Picture	DN (mm)	k_{VS} (A - AB) (m³/h)	k_{VS} (B - AB) (m³/h)	Max. Δp (bar)	Code No.	
					Flat End	Conex
	15	0.25	0.25	3.5 (1)*	065Z5510	065Z5210
		0.4	0.25		065Z5511	065Z5211
		0.63	0.4		065Z5512	065Z5212
		1.0	0.63		065Z5513	065Z5213
		1.6	1.0		065Z5514	065Z5214
		2.5	1.6		065Z5515	065Z5215
	20	2.5	1.6	2.5 (1)*	065Z5520	065Z5220
		4.0	2.5		065Z5521	065Z5221

(1)* recommended Δp

NOTE:
kvs - is the flow in m³/h of water at a temperature between 5 °C and 40 °C which passes through a valve open at the nominal stroke with 100 kPa (1 bar) pressure drop.

Max. Δp is the physical limit of differential pressure the valve will close against. The recommended Δp - values in parantheses () is based on the generation of noise, plug erosion etc. It should be checked against the Δp figure calculated from the chart on page 4 or the equation below, with the valve fully opened at the designed flow rate.

$$\Delta p_{valve} = S \left(\frac{Q}{k_{vs}} \right)^2$$

S = specific gravity
Q = flow rate in m³/h
Δp_{valve} = pressure drop across valve in bar (fully open).

Conversion factors
1 bar = 100 kPa = 14.5 psi
1 l/s = 1 kg/s = 3.6 m³/h

Accessories

| Type designation	k_{vs} (m³/h)	Code No.
Valve insert	0.25	065Z5610
	0.4	065Z5611
	0.63	065Z5612
	1.0	065Z5613
	1.6	065Z5614
	2.5	065Z5615
	4.0	065Z5621

Connection	Pipe size	DN	Description	Code No.
Tailpieces with external thread	R ³/₈″	15	Consist of 2 union nuts, 2 tailpieces and 2 gaskets (Ms 58)	065Z7015
	R ½″	20		003H6902

Connection	Pipe size	DN	Description	Code No.
Tailpieces for soldering	12 mm	15	Consist of 2 union nuts, 2 solder bushes and 2 gaskets (Ms 58)	065Z7016
	15 mm	20		065Z7017

Data sheet   **2, 3 and 4- way valves VZ**

Technical data

Control characteristic	Logarithmic
Control range	min. 50:1
Leakage loss, closed valve	A - AB ≤ 0.05 % of k_{VS}
	B - AB ≤ 1 % of k_{VS}
Medium	Circulation water / Glycolic water up to 50 %
Medium temperature	2 … 120 °C
Max. operating pressure	16 bar
Stroke	5.5 mm
Connection	External thread (flat connection (MS 58) or conex))
Materials	
Body, seat and cone	Dezincing free brass CuZn36Pb2As
Stem	Stainless steel
Stuffing box	EPDM

Pressure temperature diagram
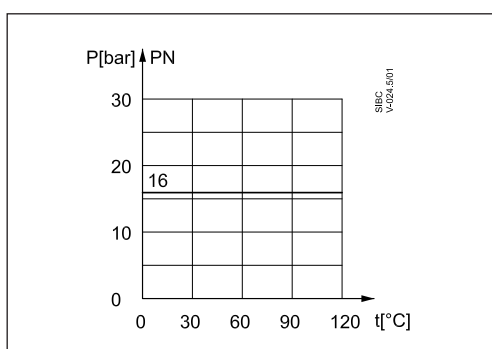
Disposal

The valve must be dismantled and the elements sorted into various material groups before disposal.

Data sheet

2, 3 and 4- way valves VZ

Installation

Hydraulic connections

Mount according to flow direction as indicated on the valve body. AB is always the outlet port; inlets are A (two port) or A and B (three or four port).

The valve is supplied complete with installation instructions. The water quality should meet VDI 2035 requirements.

Valve mounting

Before mounting the valve be sure that the pipes are clean and free from swarf. It is essential that the pipes are lined up squarely with the valve at each connection and are free from vibrations.

The valve should be adequately supported to prevent stress being applied to the connections during operation. A maximum tightening torque of 25 to 30 Nm should be applied to the connections.

Install the valve so that the actuator will be mounted in a vertical or horizontal position but not upside down.

Leave sufficient clearance to allow the dismantling of the actuator from the valve body for maintenance purposes.

The valve must not be installed in an explosive atmosphere or at an ambient temperature higher than 50 °C or lower than 2 °C. It must not be subjected to steam jets, water jets or dripping liquid.

Note that the actuator may be rotated up to 360° with respect to the valve body, by loosening the retaining fixture. After this operation retighten.

AMV(E) 130/140, AMV(E) 130H, 140H + VZ

AMV(E) 13 SU + VZ
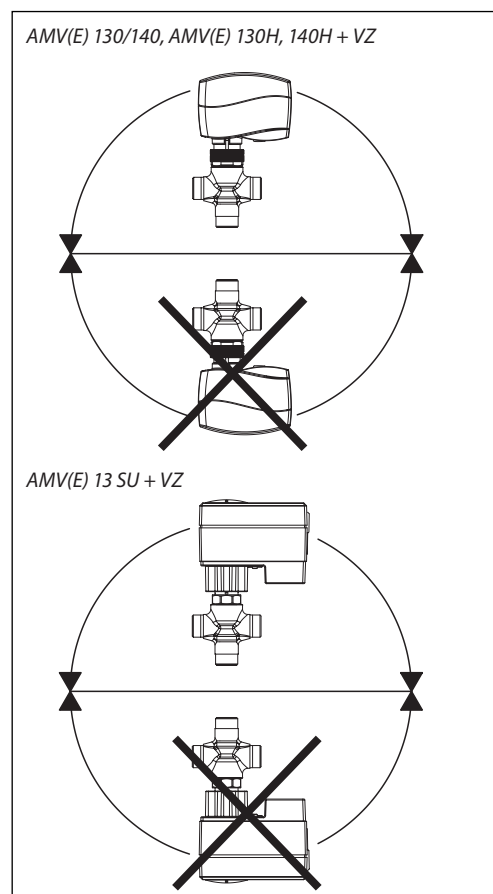
Ensure that the direction of flow is correct as shown in typical application examples (fig.1 and 2). The three way valve must be installed as a mixing valve. If possible the valves should be positioned in the return side.

Fig. 1 Mixing valve used on flow line

Fig. 2 Mixing valve used on return line
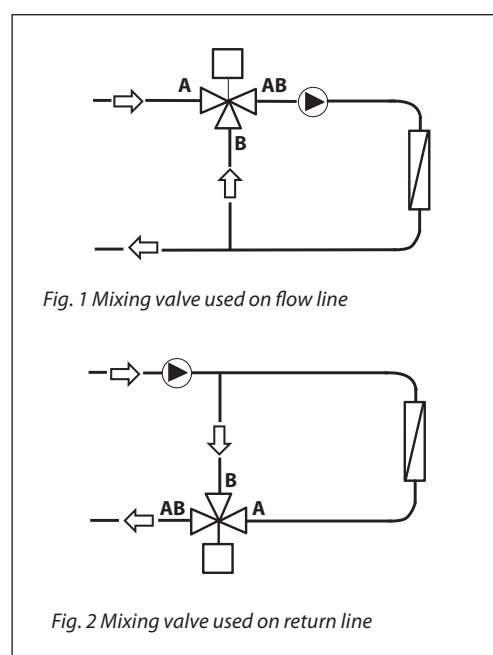
Sizing

Example

Flow rate: 0.3 m³/h
System pressure drop: 20 kPa

Locate the horizontal line representing a flow rate of 0.3 m³/h (line A). The valve authority is given by the equation:

$$\text{Valve authority}, N = \frac{\Delta P1}{\Delta P1 + \Delta P2}$$

Where:
$\Delta P1$ = pressure drop across the fully open valve,
$\Delta P2$ = pressure drop across the rest of the circuit with a fully open valve

The ideal valve would give a pressure drop equal to the system pressure drop (i.e. an authority of 0.5):

If P1 = P2,
N = P1/2P1 = 0.5

In this example an authority of 0.5 would be given by a valve having a pressure drop of 20 kPa at that flow rate (point B).

The intersection of line A with a vertical line drawn from B lies between two diagonal lines; this means that no ideally-sized valve is available. The intersection of line A with the diagonal lines gives the pressure drops stated by real, rather than ideal, valves. In this case, a valve with k_{vs} 0.6 would give a pressure drop of 25 kPa (point C):

$$\text{hence valve authority} = \frac{25}{25 + 20} = 0.56$$

The second-largerst valve, with k_{vs} 1, would give a pressure drop of 9 kPa (point D):

$$\text{hence valve authority} = \frac{9}{9 + 20} = 0.31$$

Generally, for a 3 port application, the smaller valve would be selected (resulting in a valve authority higher than 0.5, and therefore improved controlability). However, this will increase the total pressure and should be checked by the system designer for compatibility with available pump head, etc. The ideal authority is 0.5 with a preferred range of between 0.4 and 0.7.

Design

2 Port   3 Port   4 Port

Data sheet   2, 3 and 4- way valves VZ
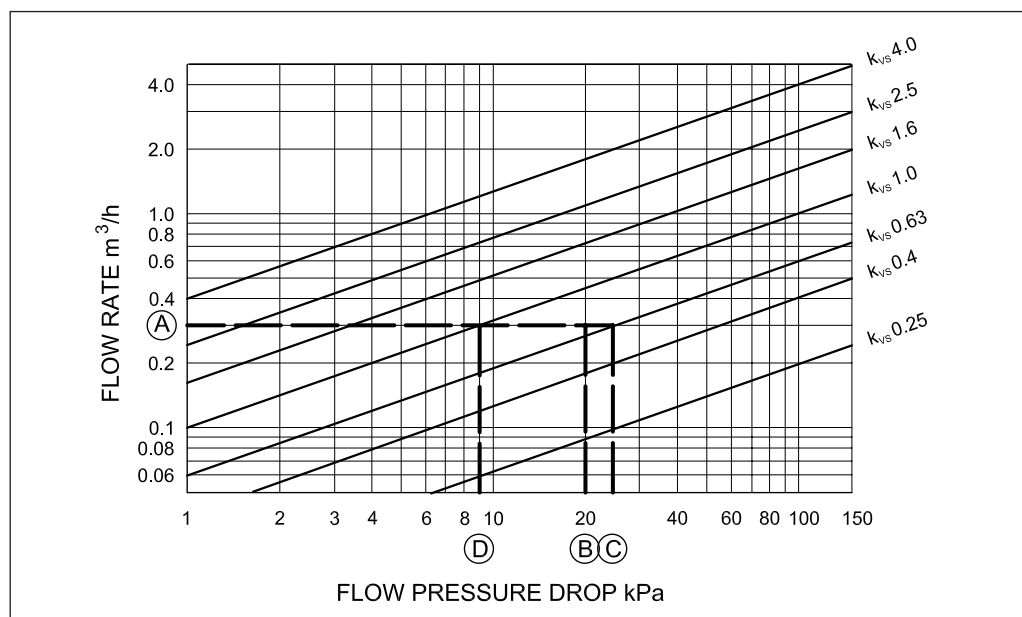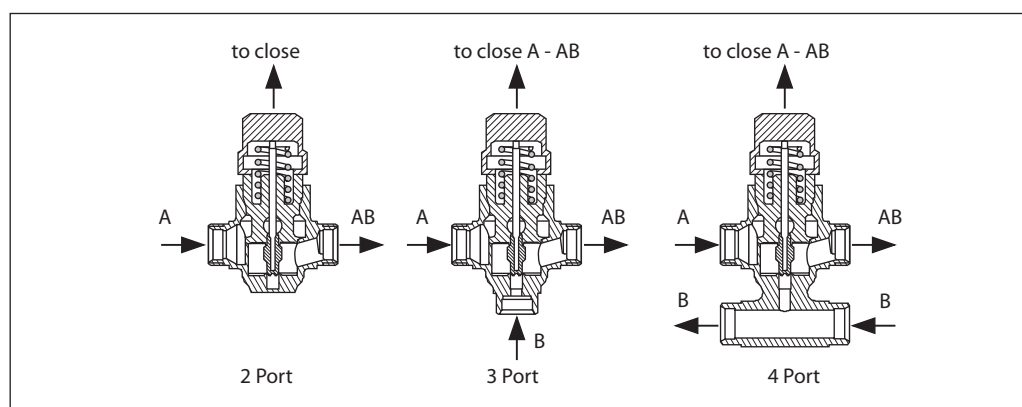
Dimensions

AMV(E) 130/140 + VZ 2   *AMV(E) 130/140 + VZ 3*   *AMV(E) 130/140 + VZ 4*

AMV(E) 130H/140H + VZ .   *AMV(E) 13 SU + VZ .*

Valve type	d	L (mm)	H (mm)			h (mm)	h₁ (mm)	c (mm)	Valve weight (kg)
			AMV(E) 13 SU	AMV(E) 130/140	AMV(E) 130H/140H				
VZ 2 / DN 15	G ½"	65				26.5			0.38
VZ 2 / DN 20*	G ¾"	77						-	0.49
VZ 3 / DN 15	G ½"	65	155	119	125	35	52.5		0.39
VZ 3 / DN 20*	G ¾"	77							0.50
VZ 4 / DN 15	G ½"	65				65		40	0.51
VZ 4 / DN 20*	G ¾"	77						50	0.62

* conex valves DN 20 - G 1⅛" 14 TPI

Tailpieces for soldering

G	Ød (mm)	L (mm)	Weight (kg)
½"	12	15	0.11
¾"	15	20	0.17

Tailpieces with external thread

G	R (")	L (mm)	Weight (kg)
½"	³⁄₈	23	0.11
¾"	½	26	0.17