Data sheet

Seated valves (PN 16)
VRB 2 – 2-way valve, internal and external thread
VRB 3 – 3-way valve, internal and external thread

Description


VRB 2 int. thread


VRB 2 ext. thread


VRB 3 int. thread


VRB 3 ext. thread

VRB valves provide a quality, cost effective solution for most water and chilled applications.

The valves are designed to be combined with AMV(E) 335, AMV(E) 435 or AMV(E) 438 SU actuators.

Combinations with other actuators could be seen under Accessories.

Features:
- Bubble tight design
- Snap mechanical connection together with AMV(E) 335, AMV(E) 435
- Dedicated 2-port valve
- Suitable for diverting applications (3-port)

Main data:
- DN 15-50
- k_{VS} 0.63-40 m³/h
- PN 16
- Temperature:
  - Circulation water / glycolic water up to 50 %: 2 (–10*) … 130 °C
  * At temperatures from –10 °C up to +2 °C use stem heater
- Connections:
  - External thread
  - Internal thread
- Compliance with Pressure Equipment Directive 97/23/EC

Ordering

Example:
3-way valve, DN 15, k_{VS} 1.6, PN 16, t_{max} 130 °C, ext. thread

- *1× VRB 3 DN 15 valve*
  Code No.: ***065Z0153***

Option:
- *3× Tailpieces*
  Code No.: ***065Z0291***

2 & 3-way valves **VRB (external thread)**

DN	k_{VS} (m³/h)	Code No.	
		VRB 2	VRB 3
15	0.63	065Z0171	065Z0151
	1.0	065Z0172	065Z0152
	1.6	065Z0173	065Z0153
	2.5	065Z0174	065Z0154
	4.0	065Z0175	065Z0155
20	6.3	065Z0176	065Z0156
25	10	065Z0177	065Z0157
32	16	065Z0178	065Z0158
40	25	065Z0179	065Z0159
50	40	065Z0180	065Z0160

2 & 3-way valves **VRB (internal thread)**

DN	k_{VS} (m³/h)	Code No.	
		VRB 2	VRB 3
15	0.63	065Z0231	065Z0211
	1.0	065Z0232	065Z0212
	1.6	065Z0233	065Z0213
	2.5	065Z0234	065Z0214
	4.0	065Z0235	065Z0215
20	6.3	065Z0236	065Z0216
25	10	065Z0237	065Z0217
32	16	065Z0238	065Z0218
40	25	065Z0239	065Z0219
50	40	065Z0240	065Z0220

Ordering *(continued)*

Accessories - **Tailpieces**

Type		DN	Code No.
Tailpiece [1]	Rp ½	15	**065Z0291**
	Rp ¾	20	**065Z0292**
	Rp 1	25	**065Z0293**
	Rp 1¼	32	**065Z0294**
	Rp 1½	40	**065Z0295**
	Rp 2	50	**065Z0296**

[1] *1 tailpiece internal thread for VRB ext. thread (Ms - CuZn39Pb3)*

Service kits

Type	DN	Code No.
Stuffing box	15	**065Z0321**
	20	**065Z0322**
	25	**065Z0323**
	32	**065Z0324**
	40/50	**065Z0325**

Accessories - **Adapter & stem heater**

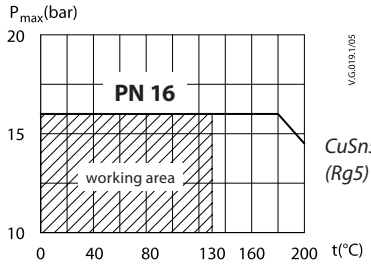
Type	for actuators	Code No.
Adapter	AMV(E) 15/25/35/323/423/523	**065Z0311**
Stem heater	AMV(E) 335/435	**065Z0315**

Technical data

Nominal diameter	DN	15					20	25	32	40	50
k_{VS} value	m^3/h	0.63	1.0	1.6	2.5	4.0	6.3	10	16	25	40
Stroke	mm	10							15		
Control range		30:1	50:1				100:1				
Control characteristic		LOG: port A-AB; LIN: port B-AB									
Cavitation factor z		≥ 0.4									
Leakage		A - AB bubble tight design									
		B - AB ≤ 1.0 % of k_{VS}									
Nominal pressure	PN	16									
Max. closing pressure	bar	Mixing: 4									
		Diverting: 1									
Medium		Circulation water / glycolic water up to 50 %									
Medium pH		Min. 7, Max. 10									
Medium temperature	°C	2 (–10 [1]) … 130									
Connections		Int. and ext. thread									
Materials											
Valve body		Red bronze CuSn5ZN5Pb5 (Rg5)									
Valve stem		Stainless steel									
Valve cone		Brass									
Stuffing box sealing		EPDM									

[1] *At temperatures from –10 up to +2 °C use stem heater*

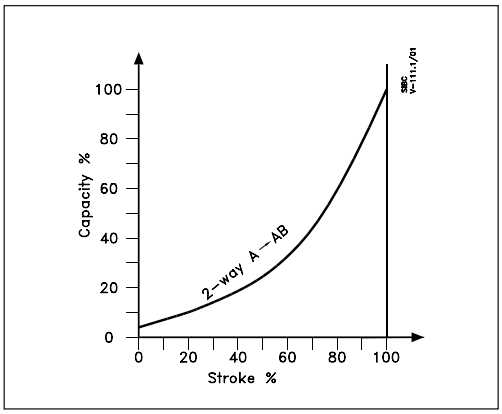
Pressure temperature diagram



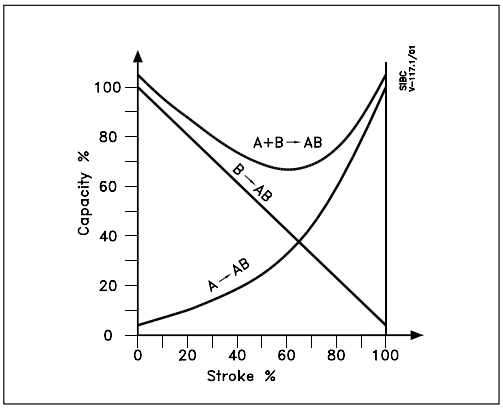
Maximum allowed operating pressure as a function of medium temperature.

Valve characteristics

Valve characteristics log (2-way)



Valve characteristics log/lin (3-way)

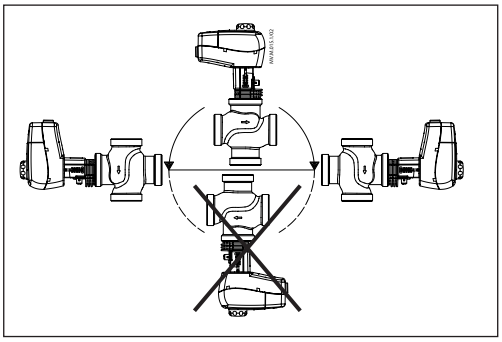


Installation

Valve mounting

Before valve mounting the pipes have to be cleaned and free from abrasion. Valve must be mounted according to flow direction as indicated on valve body. Mechanical loads of the valve body caused by the pipes are not allowed. Valve should be free of vibrations as well.

Installation of the valve with the actuator is allowed in horizontal position or upwards. Installation downwards is not allowed.



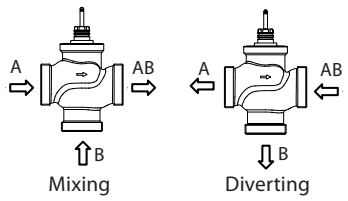


Fig. 1: Mixing or diverting connection

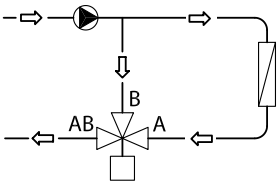


Fig. 3: Mixing valve used in diverting application

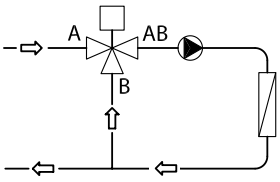


Fig. 2: Mixing valve used in mixing application

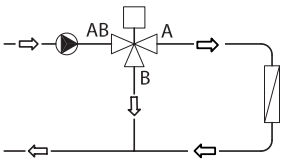


Fig. 4: Diverting valve used in diverting application

Mixing or diverting connection

3-way valve can be used either as mixing or diverting valve (fig.1).

If 3-way valve is installed as mixing valve meaning that A and B ports are inlet ports, and AB port is outlet port it can be installed in mixing (fig.2) or diverting application (fig.3).

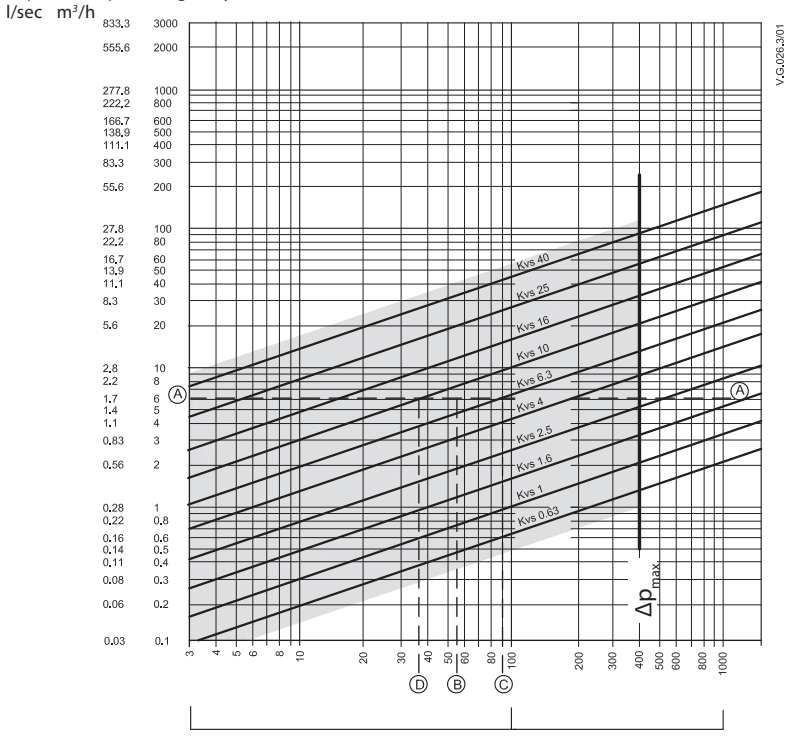
3-way valve can be also installed as diverting valve in diverting application (fig.4) meaning that AB port is inlet and A and B ports are outlets.

Note:
Maximal closing pressure for mixing and diverting installation are not the same. Please refer to values stated in Technical data section.

Disposal

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

Sizing



Example

Design data:
Flow rate: 6 m^3/h
System pressure drop: 55 kPa

Locate the horizontal line representing a flow rate of 6 m^3/h (line A-A). The valve authority is given by the equation:

$$\text{Valve authority, a} = \frac{\Delta p1}{\Delta p1 + \Delta p2}$$

Where:
Δp1 = pressure drop across the fully open valve
Δp2 = pressure drop across the rest of the circuit with a full open valve

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

if: $\Delta p1 = \Delta p2$

$$a = \frac{\Delta p1}{2 \times \Delta p1} = 0.5$$

In this example an authority of 0.5 would be given by a valve having a pressure drop of 55 kPa at that flow rate (point B). The intersection of line A–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–A with the diagonal lines gives the pressure drops stated by real, rather than ideal, valves. In this case, a valve with k_{VS} 6.3 would give a pressure drop of 90.7 kPa (point C):

$$\text{hance valve authority} = \frac{90.7}{90.7 + 55} = 0.62$$

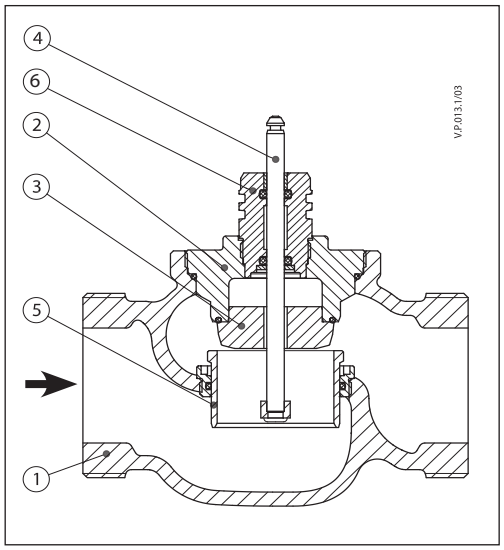
The second largest valve, with k_{VS} 10, would give a pressure drop of 36 kPa (point D):

$$\text{hence valve authority} = \frac{36}{36 + 55} = 0.395$$

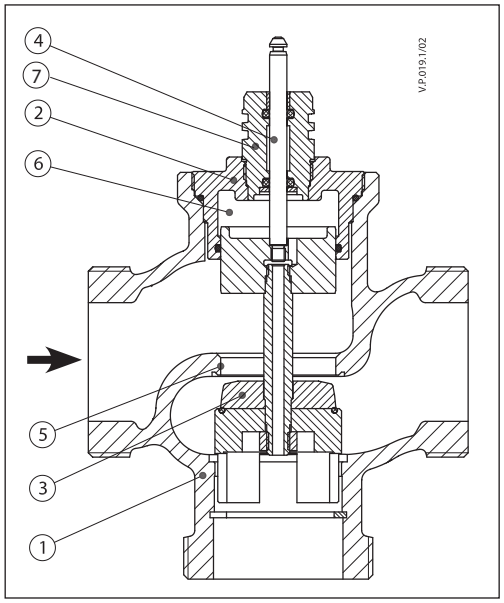
Generally, for a 3 port application, the smaller valve would be selected (resulting in a valve authority higher than 0.5 and therefore improved control). However, this will increase the total pressure and should be checked by the system designer for compatibility with available pump heads, etc. The ideal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

Design
(Design variations are possible)

VRB 2
1. Valve body
2. Valve insert
3. Valve cone
4. Valve stem
5. Moving valve seat (pressure relieved)
6. Stuffing box

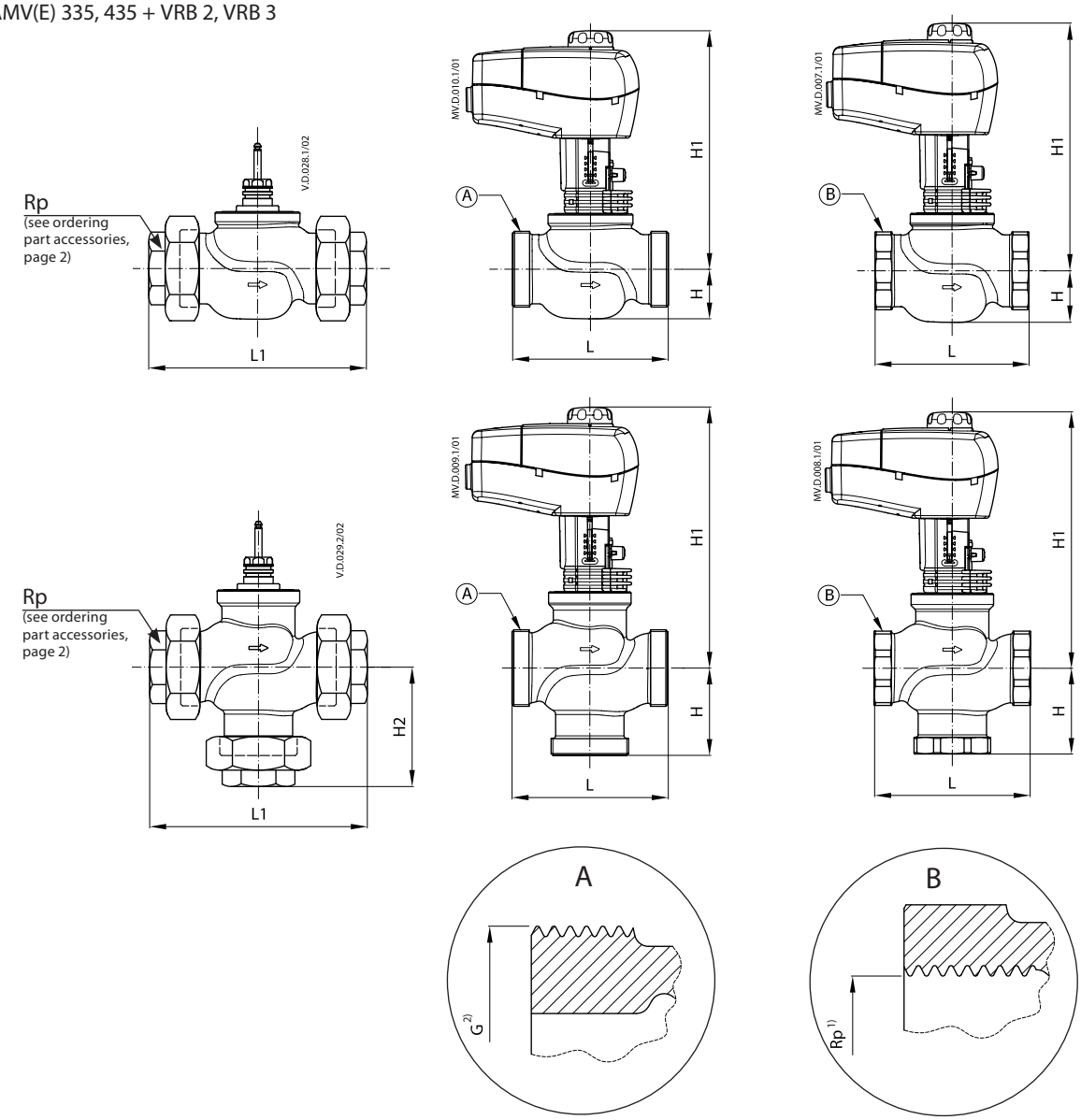


VRB 3
1. Valve body
2. Valve insert
3. Valve cone
4. Valve stem
5. Valve seat
6. Pressure relieve chamber
7. Stuffing box



Dimensions

AMV(E) 335, 435 + VRB 2, VRB 3

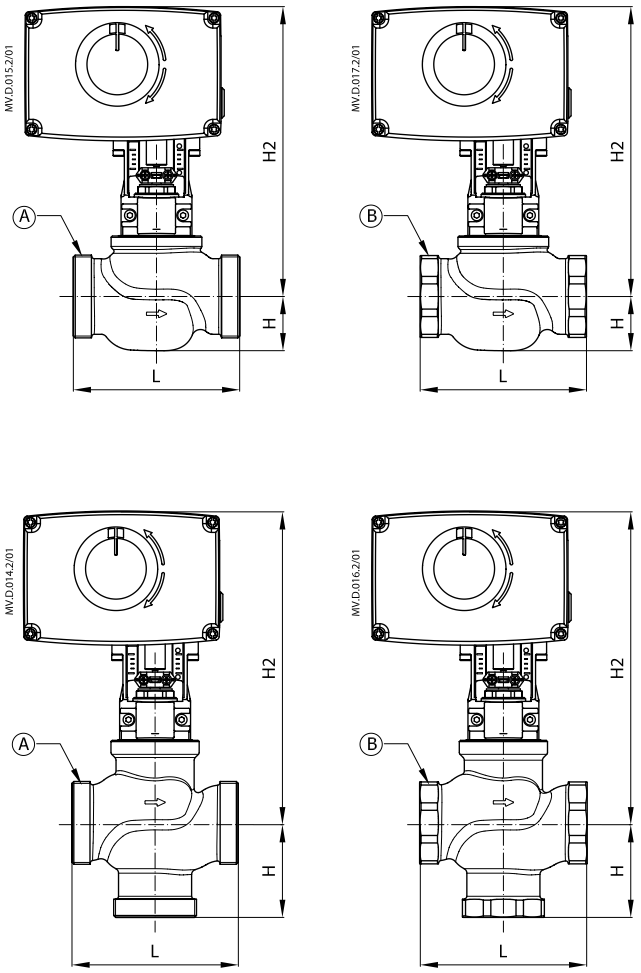


Type	DN	Connection		L	H	H1	L1	H2	Weight (kg)	
		Rp [1]	G [2]	mm					ext. thread	int. thread
VRB 2	15	½	1	80	25	191	128	-	0.61	0.60
	20	¾	1¼	80	29	194	128		0.78	0.77
	25	1	1½	95	29	197	151		1.00	0.98
	32	1¼	2	112	33	202	178		1.57	1.43
	40	1½	2¼	132	43	213	201		2.62	2.54
	50	2	2 ¾	160	47	217	234		3.76	3.49
VRB 3	15	½	1	80	40	191	128	64	0.70	0.71
	20	¾	1¼	80	45	194	128	69	0.93	0.91
	25	1	1½	95	50	197	151	78	1.21	1.15
	32	1¼	2	112	58	202	178	91	1.95	1.81
	40	1½	2¼	132	75	230	201	110	3.39	3.35
	50	2	2 ¾	160	83	243	234	120	5.46	5.13

[1] Rp … internal thread EN 10226-1
[2] G … external thread DIN ISO 228/01
If stem heater is used dimension H1 is increased for 31 mm.

Dimensions *(continued)*

AMV(E) 438 SU + VRB 2, VRB 3



Type	DN	Connection		L	H	H1
		Rp [1]	G [2]	mm		
VRB 2	15	½	1	80	25	216
	20	¾	1¼	80	29	218
	25	1	1½	95	29	222
	32	1¼	2	112	35	226
	40	1½	2¼	132	43	237
	50	2	2 ¾	160	47	242
VRB 3	15	½	1	80	40	216
	20	¾	1¼	80	45	218
	25	1	1½	95	50	222
	32	1¼	2	112	58	226
	40	1½	2¼	132	75	255
	50	2	2 ¾	160	83	268

[1] Rp … internal thread EN 10226-1
[2] G … external thread DIN ISO 228/01
If stem heater is used dimension H1 is increased for 5 mm.