Data sheet

Seated valves (PN 16)
VRG 2 – 2-way valve, external thread
VRG 3 – 3-way valve, external thread

Description

VRG 2 *VRG 3*

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

The valves are designed to be combined with following actuators:
- With AMV(E) 335, AMV(E) 435 or AMV(E) 438 SU actuators.
- With AMV(E) 25, 25 SU/SD, 35 actuators (with adapter **065Z0311**).

Combinations of actuators is evident under section “Dimension”.

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 m^3/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

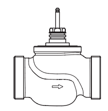
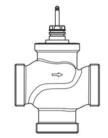
Ordering

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

- 1× VRG 3 DN 15 valve
*Code No.: **065Z0113***

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

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

Picture	DN	k_{VS} (m^3/h)	Code No.	
			VRG 2	**VRG 3**
 	15	0.63	**065Z0131**	**065Z0111**
		1.0	**065Z0132**	**065Z0112**
		1.6	**065Z0133**	**065Z0113**
		2.5	**065Z0134**	**065Z0114**
		4.0	**065Z0135**	**065Z0115**
	20	6.3	**065Z0136**	**065Z0116**
	25	10	**065Z0137**	**065Z0117**
	32	16	**065Z0138**	**065Z0118**
	40	25	**065Z0139**	**065Z0119**
	50	40	**065Z0140**	**065Z0120**

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 VRG 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) 25/35	**065Z0311**
Stem heater	AMV(E) 335/435	**065Z0315**
	AMV(E) 25(SU/SD)/35[2)]	**065B2171**

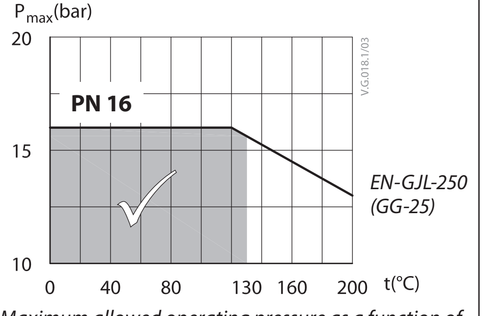
[2)] only in a combination with adapter 065Z0311

Technical data

Nominal diameter	DN	15					20	25	32	40	50
k_{vs} value	m³/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		ext. thread									
Materials											
Valve body		Grey cast iron EN-GJL-250 (GG-25)									
Valve stem		Stainless steel									
Valve cone		Brass									
Stuffing box sealing		EPDM									

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

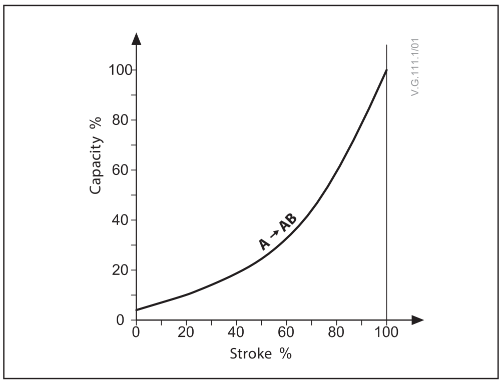
Pressure temperature diagram



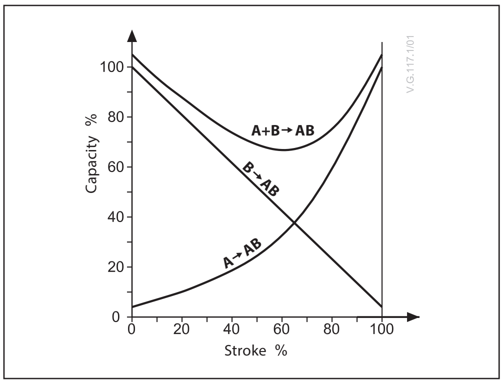
Maximum allowed operating pressure as a function of medium temperature.

Valve characteristics

Valve characteristics log (2-way)



Valve characteristics log/lin (3-way)



Installation

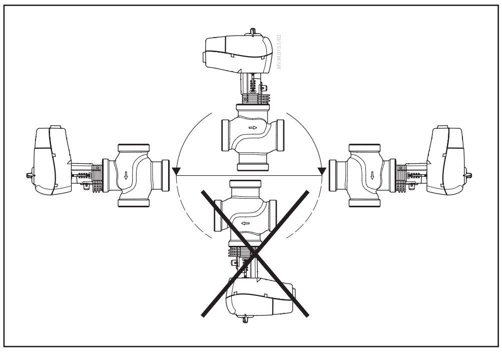
Valve mounting

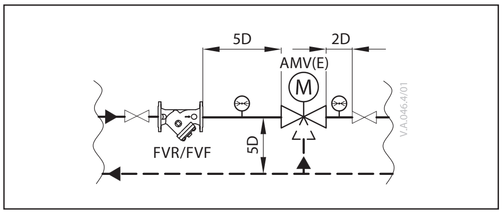
Before valve mounting the pipes have to be cleaned and free from abrasion. Valve must be mounted according to flow direction as indicated on valve body except by diverting, where valve can be mounted oposite to the flow direction (flow oposite to indication on the valve body). Mechanical loads of the 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.

Always install the valve with the arrow on the body in the same direction as the flow. In order to avoid turbulence, which will affect the measuring accuracy, it is recommended to have a straight length of pipe up and down stream from the valve as shown (D - diameter of pipe).

Note:
Install a strainer upstream of the valve (e.g. Danfoss FVR/FVF)





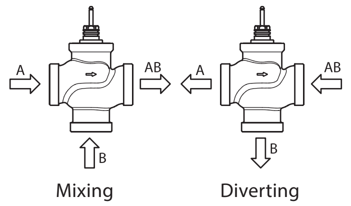


Fig. 1: Mixing or diverting connection

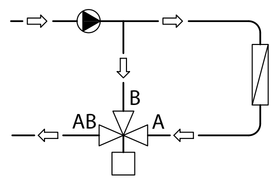


Fig. 3: Mixing valve used in diverting application

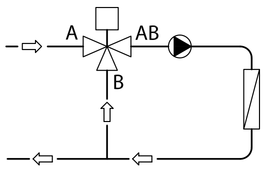


Fig. 2: Mixing valve used in mixing application

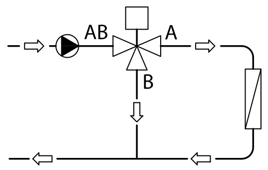


Fig. 4: Diverting valve used in diverting application

Mixing or diverting connection

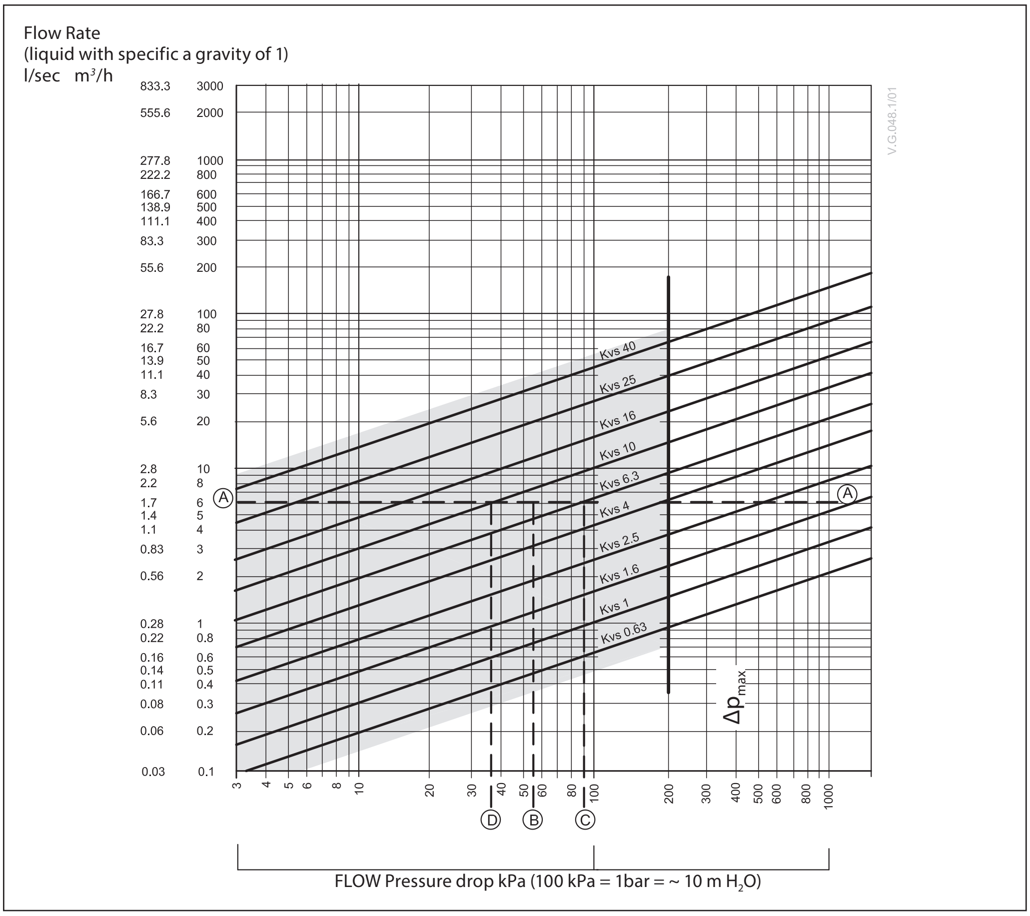
3-way valve can be used either as mixing or diverting valve (fig.1).

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.

Sizing



Example

Design data:
Flow rate: 6 m³/h
System pressure drop: 55 kPa

Locate the horizontal line representing a flow rate of 6 m³/h (line A-A). The valve authority is given by the equation:

$$\text{Valve authority, } a = \frac{\Delta p_1}{\Delta p_1 + \Delta p_2}$$

Where:
- Δp_1 = pressure drop across the fully open valve
- Δp_2 = 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: $\Delta p_1 = \Delta p_2$

$$a = \frac{\Delta p_1}{\Delta p_1 - \Delta p_2} = 0.5$$

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):

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

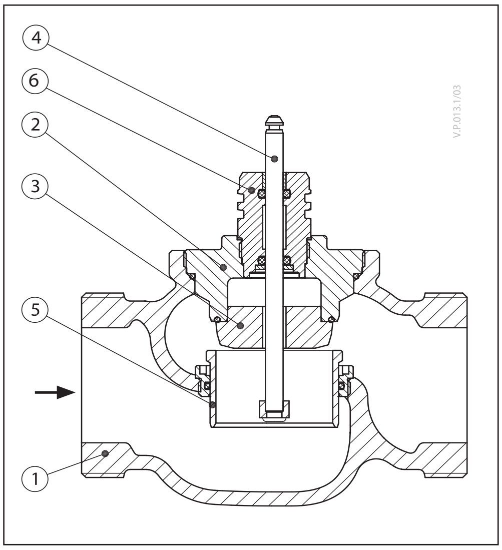
The second largest valve, with k_{VS} 10, would give a pressure drop of 36 kPa (point D):

$$\text{hence value autority} = \frac{36}{36 + 55} = 0.395$$

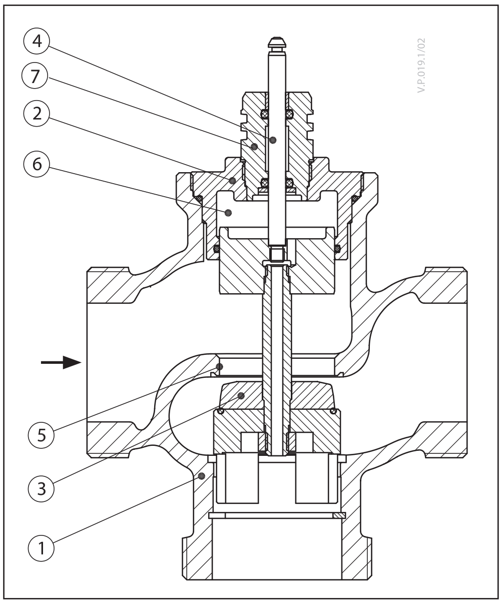
Generally, for a 3 port application, the smaller valve would be selected (resulting in a valve authority higher than 0.5 and therefore improved control). However, this will increase the total pressure and should be checked by the system designer for compatibility with available pump heads, etc. The ideal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

Design
(Design variations are possible)

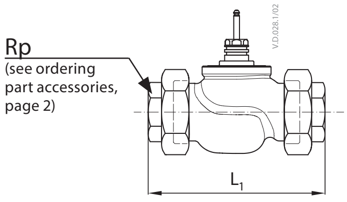
VRG 2
1. Valve body
2. Valve insert
3. Valve cone
4. Valve stem
5. Moving valve seat (pressure relieved)
6. Stuffing box

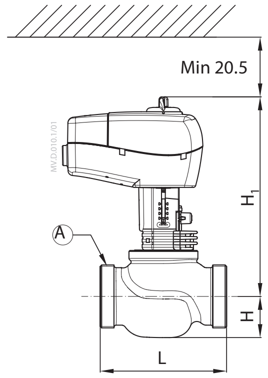


VRG 3
1. Valve body
2. Valve insert
3. Valve cone
4. Valve stem
5. Valve seat
6. Pressure relieve chamber
7. Stuffing box

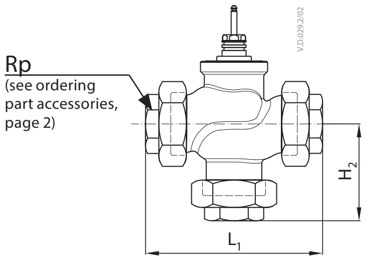


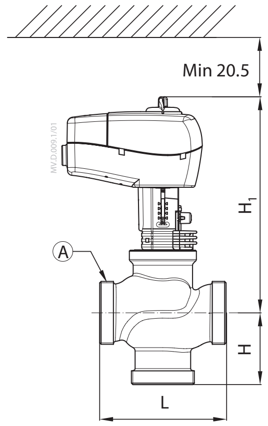
Dimensions



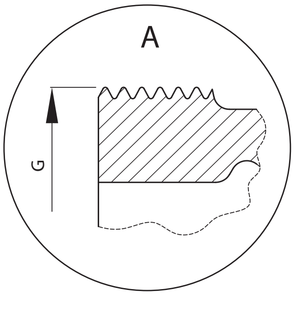


AMV(E) 335, 435 + VRG 2





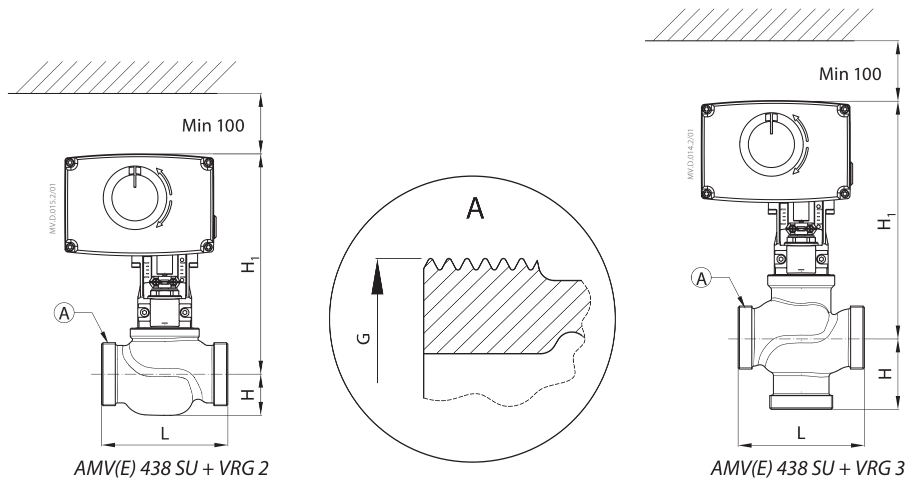
AMV(E) 335, 435 + VRG 3



Type	DN	G[1]	L	H	H_1	L_1	H_2	Weight
		Connection	mm					kg
VRG 2	15	1	80	29	191	128	-	0.66
	20	1¼	80	31	193	128		0.78
	25	1½	95	32	197	151		1.07
	32	2	112	35	201	178		1.48
	40	2¼	132	45	213	201		2.60
	50	2¾	160	48	217	234		3.64
VRG 3	15	1	80	40	191	128	64	0.71
	20	1¼	80	45	193	128	69	0.90
	25	1½	95	50	196	151	78	1.22
	32	2	112	58	201	178	91	1.82
	40	2¼	132	75	230	201	110	3.17
	50	2¾	160	83	243	234	120	5.01

[1] G … external thread DIN ISO 228/01
If stem heater is used dimension H_1 is increased for 31 mm.

Dimensions *(continued)*



AMV(E) 438 SU + VRG 2
AMV(E) 25/35 + VRG 2 +
adapter ***065Z0311***

AMV(E) 438 SU + VRG 3
AMV(E) 25/35 + VRG 3 +
adapter ***065Z0311***

Type	DN	G[1)]	L	H	H_1
		Connection	mm		
VRG 2	15	1	80	29	216
	20	1¼	80	31	218
	25	1½	95	32	222
	32	2	112	35	226
	40	2¼	132	45	237
	50	2 ¾	160	48	242
VRG 3	15	1	80	40	216
	20	1¼	80	45	218
	25	1½	95	50	222
	32	2	112	58	226
	40	2¼	132	75	255
	50	2 ¾	160	83	268

[1)] G … external thread DIN ISO 228/01
If stem heater is used dimension H_1 is increased for 5 mm.

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