

Data sheet

Seated valves (PN 16)

VS 2 – 2-way valve, external thread

Description



VS 2 is two-way valve designed to work with Danfoss electric actuators AMV 150, AMV(E) 10, AMV(E) 20, AMV(E) 30 or Danfoss electric actuators with spring return function AMV(E) 13, AMV(E) 23 and AMV(E) 33.

VS 2 valve is generally recommended for use in most demanding conditions in systems such as:

- district heating,
- heating,
- hot water service with heat exchanger or storage tank, where they ensure long and unproblematic performance.

Features:

- SPLIT characteristic developed for most demanding applications (DN 20 and DN 25)
- Several k_{vs} values
- Push connection for easy mechanical connection with actuator
- Control range min. 50:1

Benefits:

- Fast and stable regulation
- More comfort due to stable DHW temp.
- Energy saving due to stable control
- Longer lifetime of components due to less temperature oscillation

Main Data:

- DN 15-25
- k_{vs} 0.25-4.0 m³/h
- PN 16
- Temperature:
 - Circulation water/glycolic water up to 30 %: 2 ... 130 °C
- Connections:
 - External thread

Type	AMV 150	AMV 10/13	AME 10/13	AMV 20/23	AME 20/23	AMV 30/33	AME 30/33
VS 2 DN 15 *	•	•	-	•	-	•	-
VS 2 DN 20	-	•	•	•	•	•	•
VS 2 DN 25	-	•	•	•	•	•	•

* VS2 DN 15 valve has linear characteristic and cannot be recommended for DHW production, particularly not in combination with modulating (AME) actuators, as precise control of DHW within such combinations is not ensured.

Ordering

Example:
2-way valve, DN 15, k_{vs} 1.6, PN 16,
 t_{max} 130 °C, external thread

- 1× VS 2 DN 15 valve
Code No.: **065F2115**

Option:

- 1× Tailpieces
Code No.: **003H6908**

DN	k_{vs} (m ³ /h)	PN	Ext. thread ISO 228/1	Code No.
15	0.25	16	G ¾ A	065F2111
	0.40			065F2112
	0.63			065F2113
	1.0			065F2114
	1.6			065F2115
20	2.5	16	G 1 A	065F2120
25	4.0		G 1¼ A	065F2125

Accessories-Tailpieces

DN	Weld-on tailpieces* Code No.	Tailpieces* with ext. threads Code No.
15	003H6908	003H6902
20	003H6909	003H6903
25	003H6910	003H6904

* set of 2 tailpieces

Data sheet

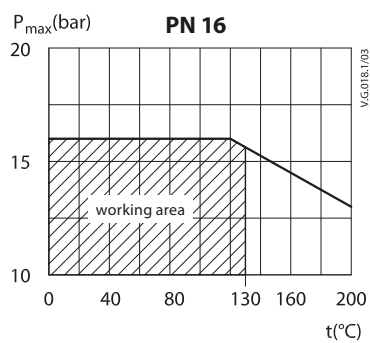
2-way valve VS 2

Technical data

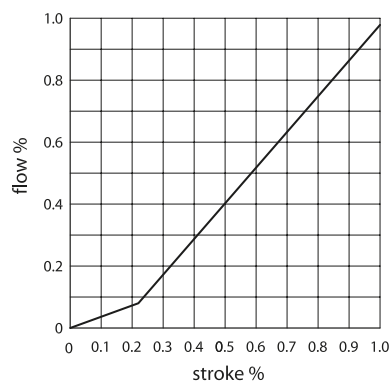
Nominal diameter	DN	15					20	25
k _{vs} value	m³/h	0.25	0.40	0.63	1.0	1.6	2.5	4.0
Stroke	mm	4					5	
Control range		> 50:1						
Control characteristic		lin					split	
Cavitation factor z		≥ 0.5						
Leakage acc. to standard IEC 534		Max. 0.05% of k _{vs}						
Nominal pressure	PN	16						
Max. operating pressure	bar	6 bar *						
Max. closing pressure		10						
Medium		Circulation water/glycolic water up to 30 %						
Medium pH		Min. 7, Max. 10						
Medium temperature	°C	2 ... 130						
Connections		Ext. thread						
Materials								
Valve body		Dezincing free brass						
Cone, seat and spindle		Stainless steel						

* Increased noise level when pressure is higher than 4 bar

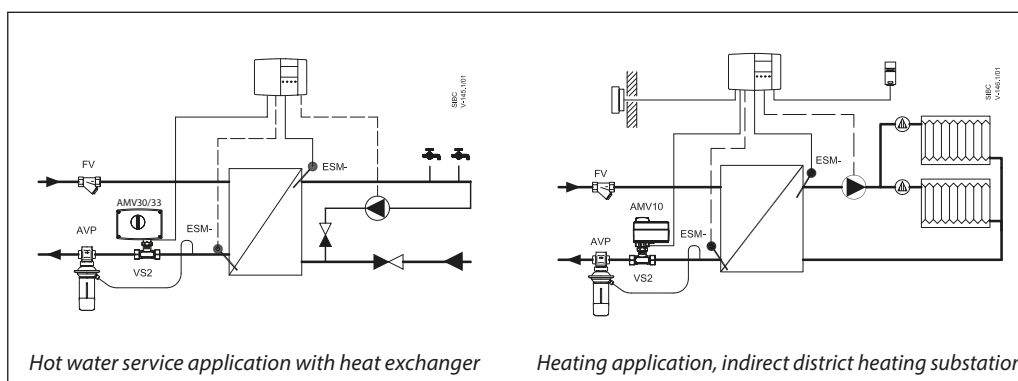
Pressure temperature diagram



Split characteristic



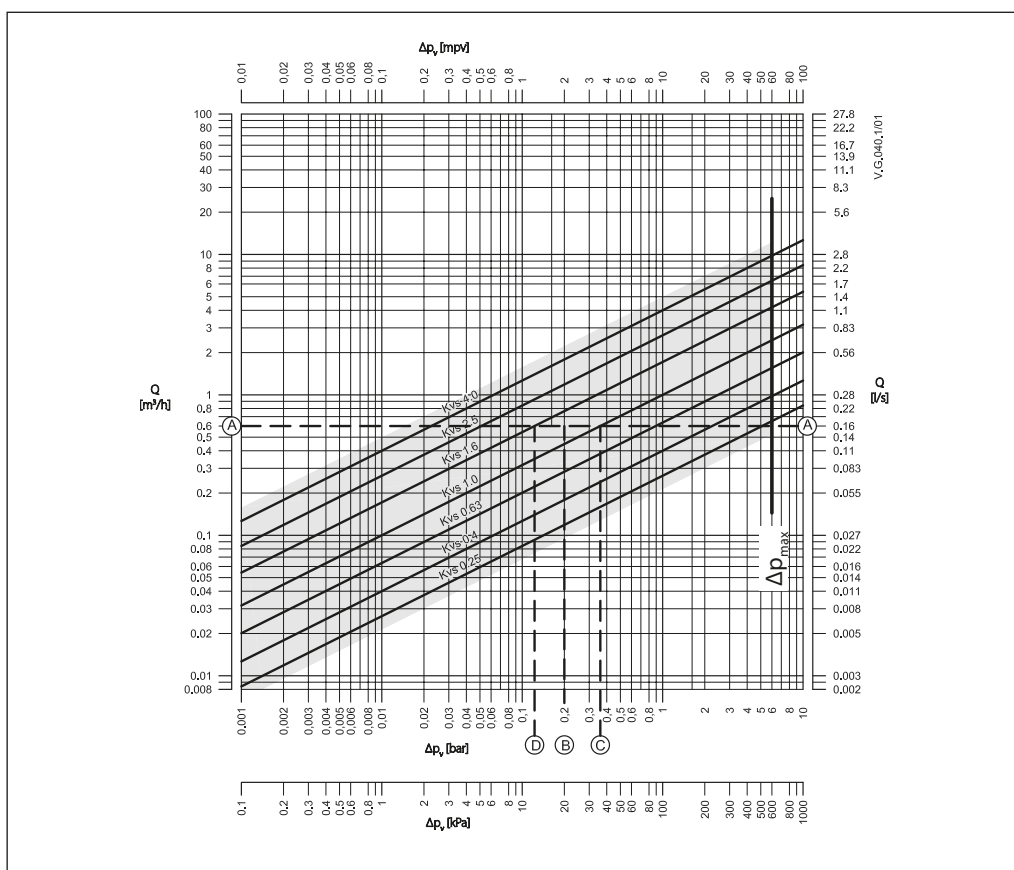
Application principles



Disposal

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

Sizing



Example

Design data:

Flow rate: 0.6 m³/h

System pressure drop: 20 kPa

Locate the horizontal line representing a flow rate of 0.6 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: $\Delta p_1 = \Delta p_2$

$$a = \frac{\Delta p_1}{2 \times \Delta p_1} = 0.5$$

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-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} 1.0 would give a pressure drop of 36.0 kPa (point C):

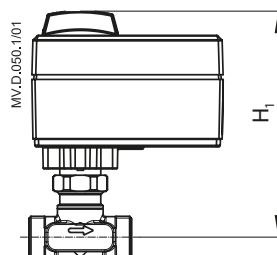
$$\text{hence valve authority} = \frac{36}{36 + 20} = 0.64$$

The second largest valve, with k_{vs} 1.6, would give a pressure drop of 14 kPa (point D):

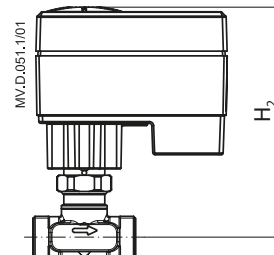
$$\text{hence valve authority} = \frac{14}{14 + 20} = 0.41$$

Generally, 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.

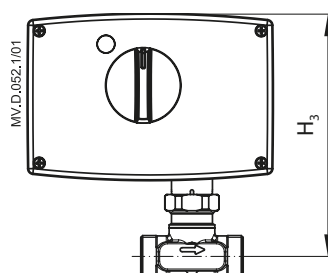
Dimensions



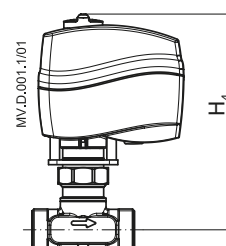
AMV(E) 10 +
VS 2 DN 15*-25



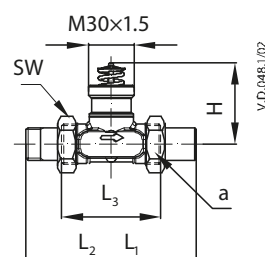
AMV(E) 13 +
VS 2 DN 15*-25



AMV(E) 20/30, 23/33 +
VS 2 DN 15*-25



AMV 150 +
VS 2 DN 15



DN	L ₁	L ₂	L ₃	H	H ₁	H ₂	H ₃	H ₄	a (ISO 228/1)	SW (mm)	Weight (kg)
	mm										
15	139	131	65	54	142	145	155	140	G ¾A	32	0.25
20	154	142	70	58	149	152	162	-	G 1A	41	0.35
25	159	159	75	58	155	158	168	-	G 1¼A	46	0.57

Type	AMV 150	AMV 10/13	AME 10/13	AMV 20/23	AME 20/23	AMV 30/33	AME 30/33
VS 2 DN 15 *	•	•	-	•	-	•	-
VS 2 DN 20	-	•	•	•	•	•	•
VS 2 DN 25	-	•	•	•	•	•	•

* VS2 DN 15 valve has linear characteristic and cannot be recommended for DHW production, particularly not in combination with modulating (AME) actuators, as precise control of DHW within such combinations is not ensured.

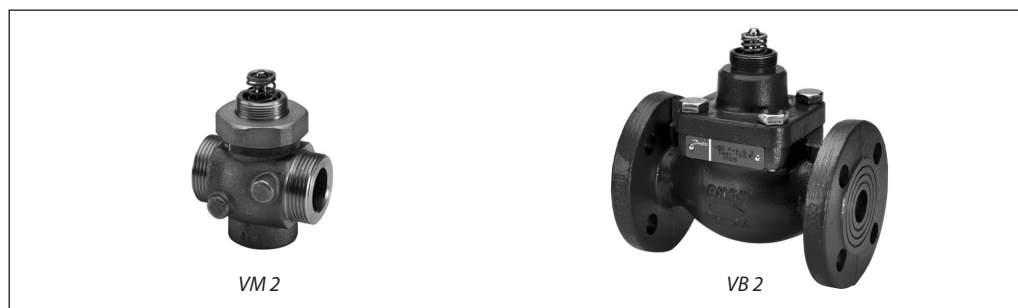
Data sheet

Pressure balanced valves (PN 25)

VM 2 – 2-way valve, external thread

VB 2 – 2-way valve, flange

Description



VM 2 and VB 2 are two-way valves designed to work with Danfoss electric actuators AMV(E) 10, AMV(E) 20, AMV(E) 30 or Danfoss electric actuators with spring return function AMV(E) 13, AMV(E) 23 and AMV(E) 33.

These VM 2 and VB 2 valves are generally recommended for use in most demanding conditions in systems such as:

- district heating,
- heating
- hot water service with heat exchanger or storage tank where they ensure long and unproblematic performance.

Features:

- SPLIT characteristic developed for most demanding applications
- High closing Δp with small sized actuators
- Several k_{VS} values
- Push connection for easy mechanical

connection with actuator

- Control range min. 50:1

Benefits:

- Fast and stable regulation
- More comfort due to stable DHW temp.
- Energy saving due to stable control
- Longer lifetime of components due to less temperature oscillation

Main data:

- DN 15-50
- k_{VS} 0,25-40 m³/h
- PN 25
- Temperature:
 - Circulation water/glycolic water up to 30 %: 2 ... 150 °C
- Connections:
 - External thread
 - Flange

Ordering

Example:

2-way valve VM 2; DN 15; k_{VS} 1,6;
PN 25; t_{max} 150 °C; ext. thread

- 1x VM 2 DN 15 valve
Code No.: **065B2014**

Option:

- 1x Tailpieces
Code No.: **003H6908**

VM 2 (ext. thread)

DN	Ext. thread ISO 228/1	k_{VS} (m ³ /h)	Stroke (mm)	Code No.
15	G ¾ A	0,25	5	065B2010
		0,4	5	065B2011
		0,63	5	065B2012
		1,0	5	065B2013
		1,6	5	065B2014
		2,5	5	065B2015
		4,0	5	065B2026
20	G 1 A	4,0	5	065B2016
		6,3	7	065B2027
25	G 1¼ A	6,3	5	065B2017
		8,0	5	065B2028
32	G 1½ A	10	7	065B2018 *
	G 1¾ A	10	7	065B2029
40	G 2 A	16	10	065B2019
50	G 2½ A	25	10	065B2020

* in discontinuation process

VB 2 (flange)

DN	k_{VS} ¹⁾ (m ³ /h)	Stroke (mm)	Code No.
15	0,25	5	065B2050
	0,4	5	065B2051
	0,63	5	065B2052
	1,0	5	065B2053
	1,6	5	065B2054
	2,5	5	065B2055
	4,0	5	065B2056
20	6,3	5	065B2057
25	10	7	065B2058
32	16	10	065B2059
40	25	10	065B2060
50	40	10	065B2061

¹⁾ k_{VS} according to VDI/VDE 2173

Ordering (continuous)

Spare parts VM 2

	Valve size	Code No.
Valve insert	DN 15/1,0	065B2033
	DN 15/1,6	065B2034
	DN 15/2,5	065B2035
	DN 15/4,0	065B2036
	DN 20/4,0	065B2036
	DN 20/6,3	065B2037
	DN 25/6,3	065B2037
	DN 25/8,0	065B2041
	DN 32/10	065B2038
	DN 40/16	065B2039
	DN 50/25	065B2040

Accessories for VM 2 (set of 2 tailpieces)

DN	Ext. thread ISO 228/1	Weld-on tailpieces ¹⁾ Code No.	Tailpieces with ext. thread ¹⁾ Code No.
15	G ¾ A	003H6908	003H6902
20	G 1 A	003H6909	003H6903
25	G 1¼ A	003H6910	003H6904
32	G 1¾ A	003H6911 ²⁾	003H6905 ²⁾
32	G 1½ A	003H6914 ³⁾	003H6906 ³⁾
40	G 2 A	065B2006	065B2004
50	G 2½ A	065B2007	065B2005

¹⁾ weld-on tailpieces (steel), ext thread (brass)

²⁾ for valve code No. 065B2029 (G 1¾ A)

³⁾ for valve code No. 065B2018 (G 1½ A)

Spare parts VB 2

	Valve size	Code No.
Stuffing box	DN 15-50	065B2070

Technical data

Nominal diameter	DN	15								20		25		32	40	50
k _{VS} value	VM 2	m³/h	0,25	0,40	0,63	1,0	1,6	2,5	4,0	4,0	6,3	6,3	8,0	10	16	25
	VB 2									6,3		10		16	25	40
Stroke	VM 2	mm	5							5	7	5	5	7	10	
	VB 2									5		7		10		
Control range		> 50:1														
Control characteristic		split characteristic														
Cavitation factor z		≥ 0,5														
Leakage acc. to standard IEC 534		max. 0,05% of k _{VS}														
Nominal pressure	PN	25														
Medium		Circulation water / Glycolic water up to 30 %														
Medium pH		Min. 7, Max. 10														
Medium temperature	°C	2 ... 150														
Connections	VM 2	External thread acc. to ISO 228-1														
	VB 2	Flange PN 25 ass. to EN 1092-2														
Materials		VM2								VB2						
Valve body		Red bronze (Rg 5)								Ductile iron EN-GJS-400-18-LT (GGG 40.3)						
Valve cover		-														
Valve cone, seat and stem		Stainless steel														
Stuffing box sealing		EPDM O-rings														

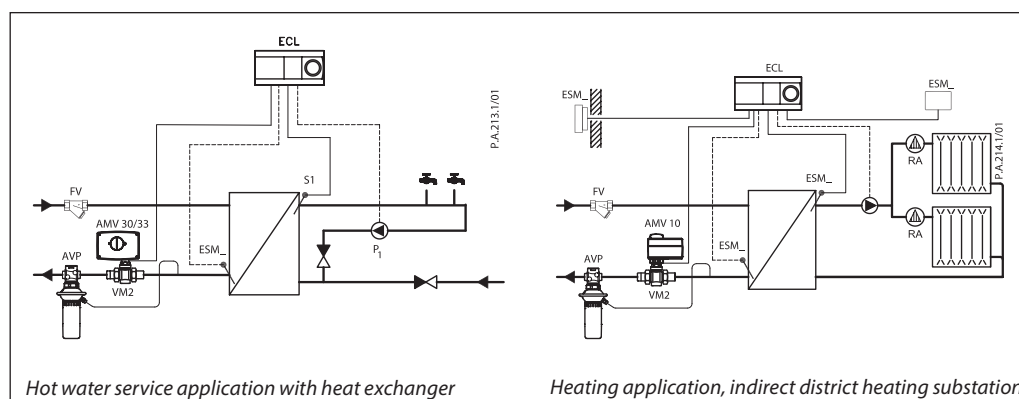
Ap closing pressure VM 2

Type	DN (mm)	k _{VS} (m³/h)	AMV(E) 10/13 (bar)	AMV(E) 20/23, 30/33 (bar)
VM 2	15	0,25-4,0	16	16
	20	4,0	25	25
	20	6,3	-	25
	25	6,3	16	25
	25	8,0	16	25
	32	10	-	25
	40	16	-	16
	50	25	-	16

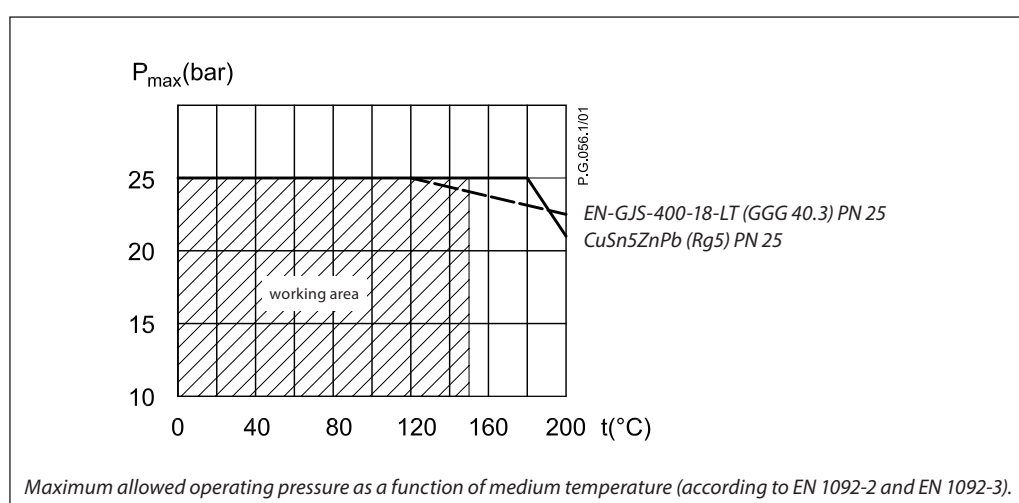
Ap closing pressure VB 2

Type	DN (mm)	k _{VS} (m³/h)	AMV(E) 10/13 (bar)	AMV(E) 20/23, 30/33 (bar)
VB 2	15-20	0,25-6,3	16	16
	25-50	10-40	-	16

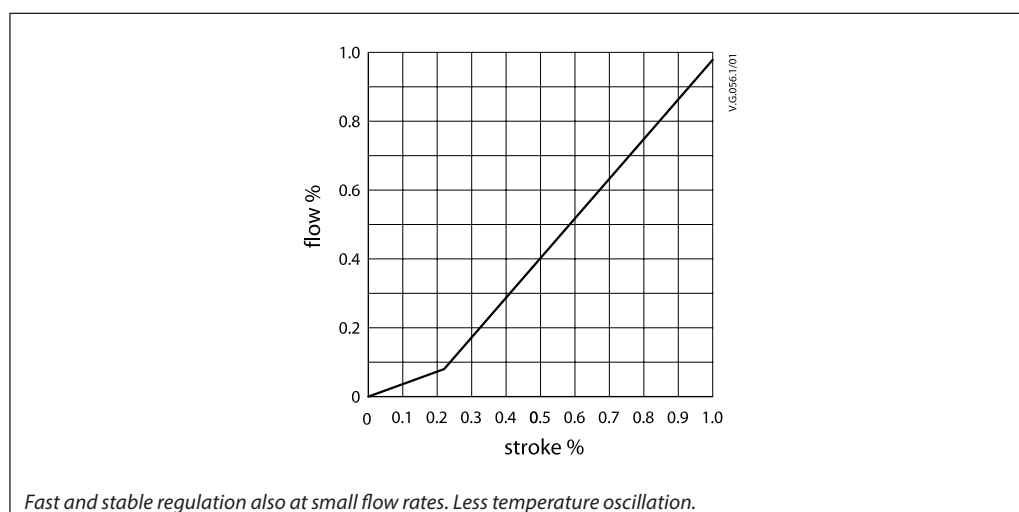
Application principles



Pressure temperature diagram



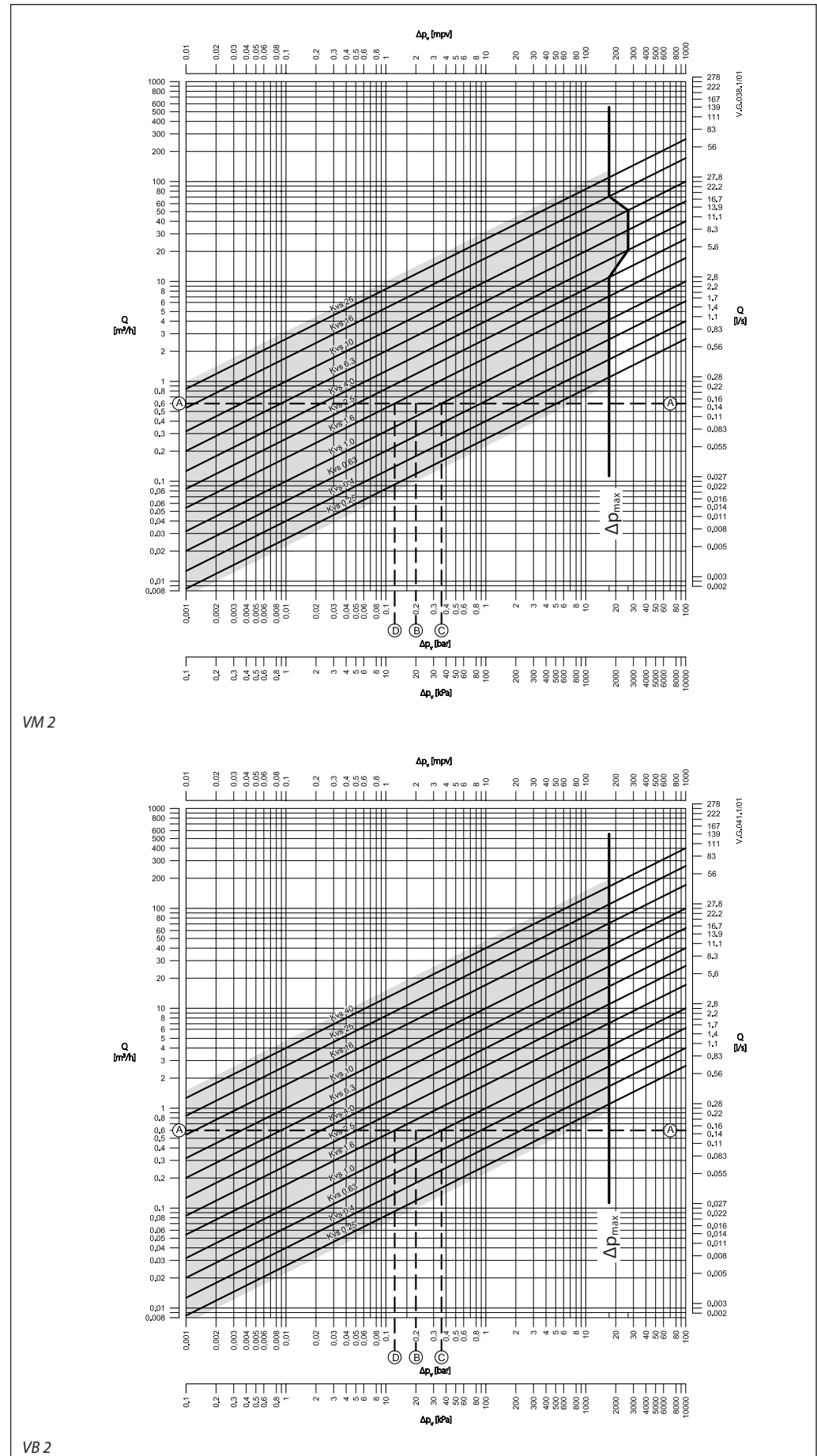
Split characteristic



Disposal

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

Sizing



Sizing (continuous)

Example

Design data:

Flow rate: 0,6 m³/h

System pressure drop: 20 kPa

Locate the horizontal line representing a flow rate of 0,6 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):

$$\text{if: } \Delta p_1 = \Delta p_2$$

$$a = \frac{\Delta p_1}{2 \times \Delta p_1} = 0,5$$

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-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} 1,0 would give a pressure drop of 36,0 kPa (point C):

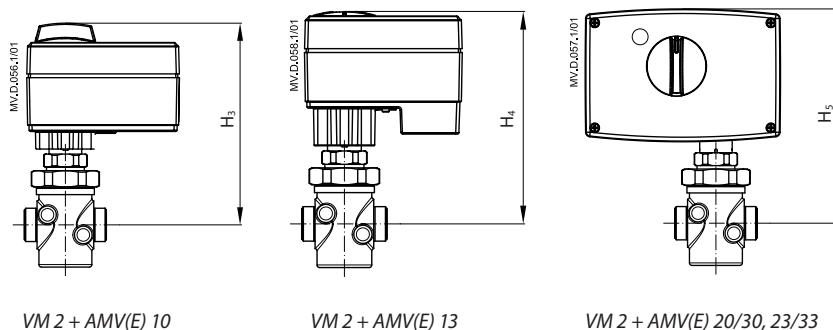
$$\text{hence valve authority} = \frac{36}{36 + 20} = 0,64$$

The second largest valve, with k_{vs} 1,6, would give a pressure drop of 14 kPa (point D):

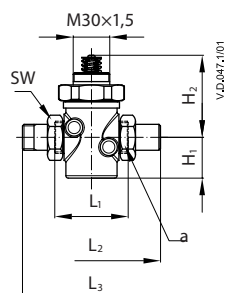
$$\text{hence valve authority} = \frac{14}{14 + 20} = 0,41$$

Generally, 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.

Dimensions

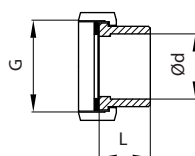


Type	Stroke	H ₁	H ₂	H ₃	H ₄	H ₅	L ₁	L ₂	L ₃	SW	a	Weight (kg)
											ISO 228/1	
VM 2 15	5	33	70	163	166	176	65	139	120	30	G ¾A	0,80
VM 2 20/4,0	5	33	70	163	166	176	70	154	131	37	G 1A	0,83
VM 2 20/6,3	7	33	70	-	-	176	70	154	131	37	G 1A	0,83
VM 2 25	5	38	70	163	166	176	75	159	145	46	G 1¼A	0,98
VM 2 32	7	38	70	-	-	176	100	184	177	63	G 1½A	1,18
									182		G 1¾A	1,22
VM 2 40	10	38	88	-	-	194	110	244	200	64	G 2A	2,34
VM 2 50	10	44	88	-	-	194	130	298	244	81	G 2½A	3,25

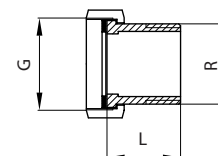


Type	DN	k _{vs} (m³/h)	AMV(E) 10/13	AMV(E) 20/23; AMV(E) 30/33
VM 2	15	0,25-4,0	•	•
	20	4,0	•	•
	20	6,3	-	•
	25	6,3-8,0	•	•
	32	10	-	•
	40	16	-	•
	50	25	-	•

Weld-on tailpieces



Tailpieces with external threads



Weld on

DN	G (")	Ød	L	Weight (kg)
		mm	mm	
15	¾	15	35	0,18
20	1	20	40	0,26
25	1 ¼	27	40	0,38
32	1 ½	35	40	0,48
	1 ¾	37	40	0,48
40	2	40	65	0,90
50	2 ½	50	82	1,70

Ext. thread

DN	"		L (mm)	Weight (kg)
	G	R	mm	
15	¾	½	25,5	0,18
20	1	¾	28,5	0,26
25	1 ¼	1	33	0,38
32	1 ½	1 ¼	36,5	0,62
	1 ¾	1 ¼	36,5	0,62
40	2	1 ½	43	0,90
50	2 ½	2	55	1,70

Dimensions (continuous)

