ENGINEERING
TOMORROW

Data sheet

Pressure balanced valves (PN 25)

VM 2 – 2-way valve, external thread
VB 2 – 2-way valve, flange

Description

VM 2

VB 2

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

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

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

VM 2 (ext. thread)

DN	Ext. thread ISO 228/1	k_{VS} (m³/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**

VB 2 (flange)

DN	k_{VS}[1] (m³/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**

Spare parts VB 2

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

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)

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	

Δp 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	16	25
	25	6,3	16	25
	25	8,0	16	25
	32	10	16	25
	40	16	-	16
	50	25	-	16

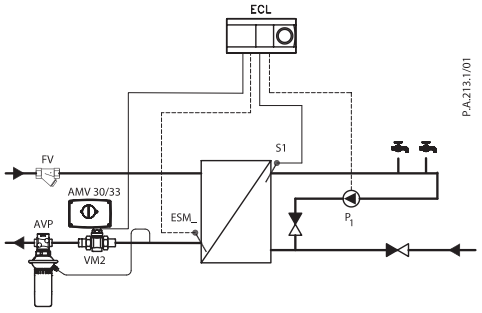
Δp closing pressure VB 2

Type	**DN** (mm)	**k_{VS}** (m³/h)	**AMV(E) 10/13** (bar)	**AMV(E) 20/23, 30/33** (bar)
VB 2	15-25	0,25-10	16	16
	32-50	16-40	-	16

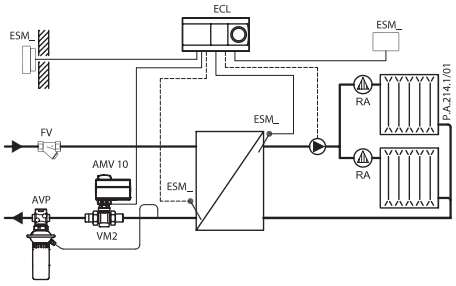
Max. closing pressure: *16bar or 25 bar (see table above) depends on valve and actuator combination.*
Max. closing pressure means that the valve can close against this pressure if the pressure is applied after closing of the valve.

Max. operating pressure: *12bar (recommended 4bar to avoid high noise level and cavitation).*
Max. operating pressure means no sucking will occur in entire valve stroke and valve can close against this pressure from open position.

Application principles

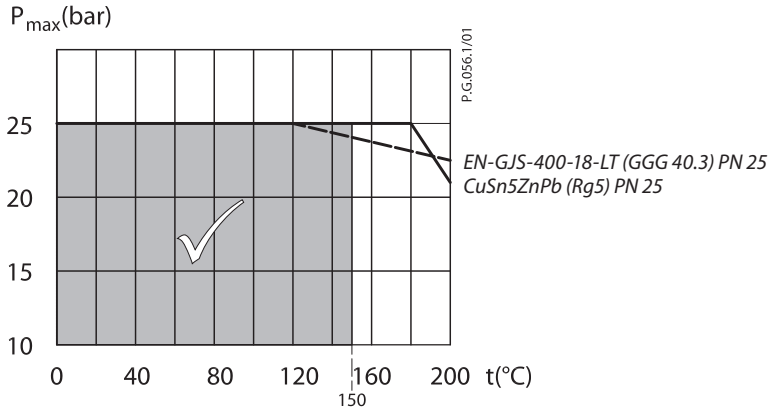


Hot water service application with heat exchanger



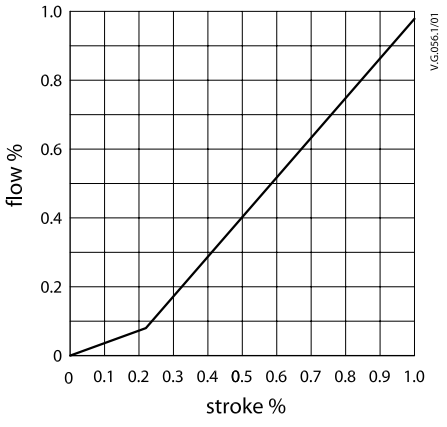
Heating application, indirect district heating substation

Pressure temperature diagram



Maximum allowed operating pressure as a function of medium temperature (according to EN 1092-2 and EN 1092-3).

Split characteristic

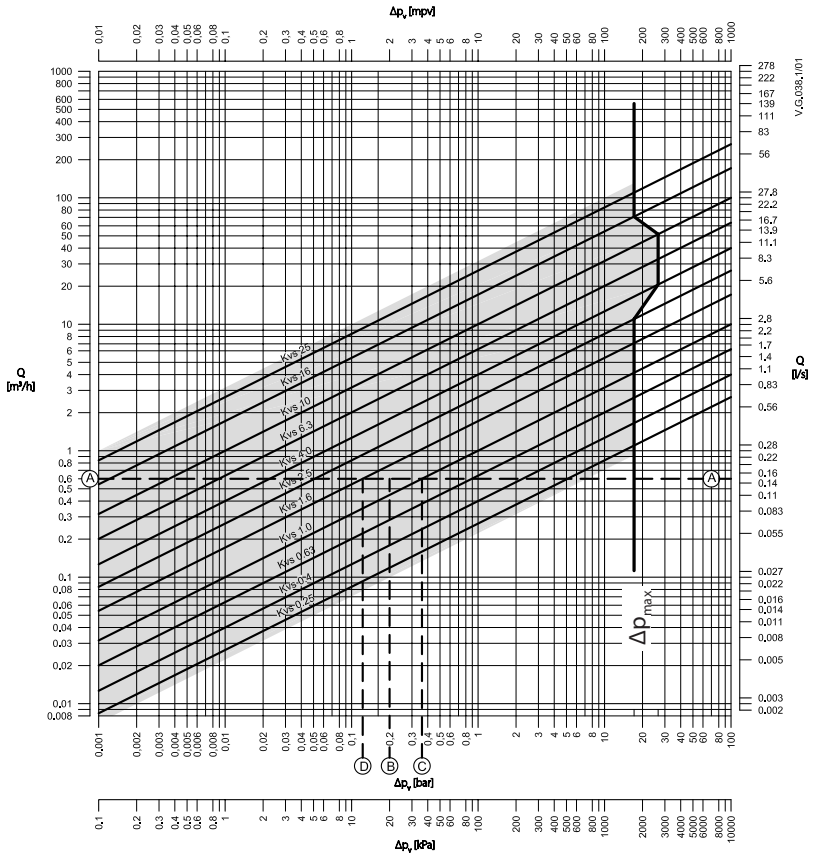


Fast and stable regulation also at small flow rates. Less temperature oscillation.

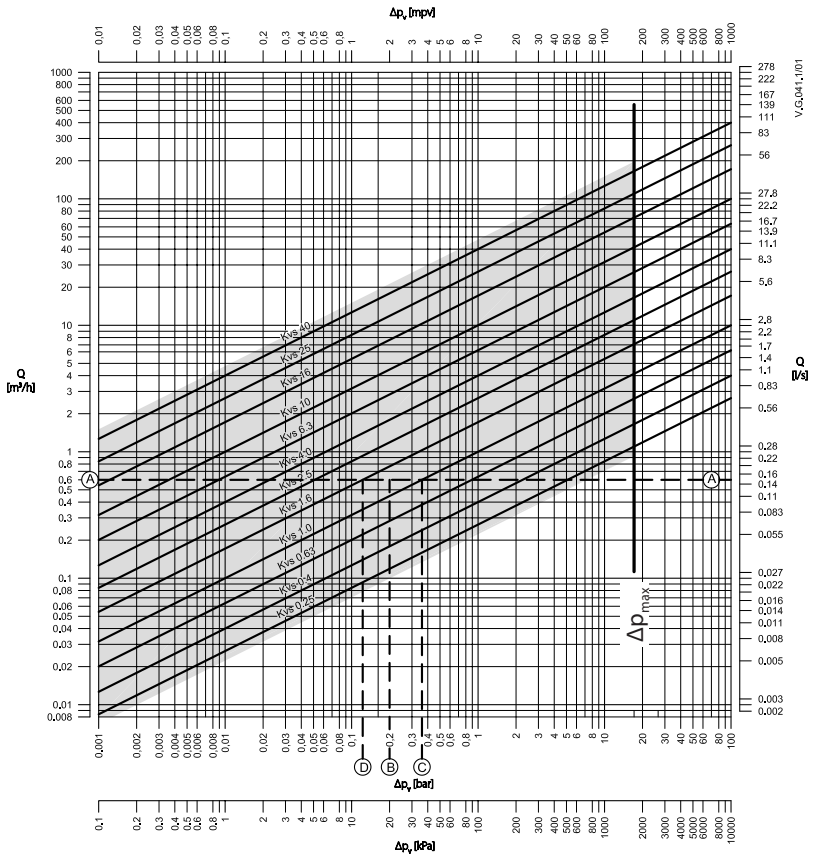
Disposal

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

Sizing



VM 2



VB 2

Sizing *(continuous)*

Example

Design data:
Flow rate: 0,6 m^3/h
System pressure drop: 20 kPa

Locate the horizontal line representing a flow rate of 0,6 m^3/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):

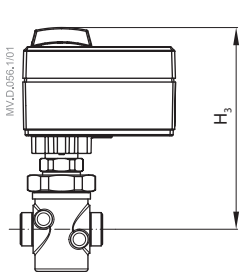
$$\text{hencevalveauthority} = \frac{36}{36 + 20} = 0{,}64$$

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

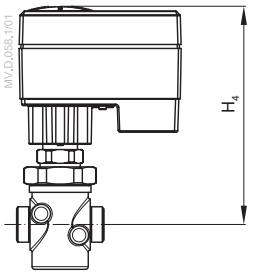
$$\text{hencevalveauthority} = \frac{14}{14 + 20} = 0{,}41$$

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.

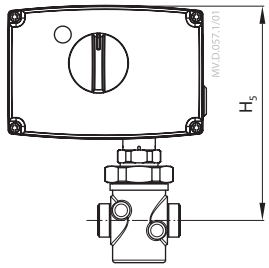
Dimensions



VM 2 + AMV(E) 10

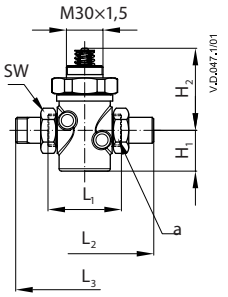


VM 2 + AMV(E) 13



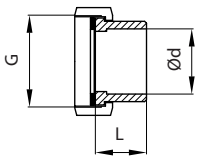
VM 2 + AMV(E) 20/30, 23/33

Type	H_1	H_2	H_3	H_4	H_5	L_1	L_2	L_3	SW	a ISO 228/1	Weight (kg)
	mm										
VM 2 15	33	70	163	166	176	65	139	120	30	G ¾A	0,80
VM 2 20/4,0	33	70	163	166	176	70	154	131	37	G 1A	0,83
VM 2 20/6,3	33	70	163	166	176	70	154	131	37	G 1A	0,83
VM 2 25	38	70	163	166	176	75	159	145	46	G 1¼A	0,98
VM 2 32	38	70	163	166	176	100	184	177	63	G 1½A	1,18
								182		G 1¾A	1,22
VM 2 40	38	88	-	-	194	110	244	200	64	G 2A	2,34
VM 2 50	44	88	-	-	194	130	298	244	81	G 2½A	3,25

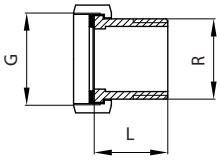


Type	DN	k_{VS} (m^3/h)	AMV(E) 10/13	AMV(E) 20/23; AMV(E) 30/33
VM 2	15	0,25-4,0	✓	✓
	20	4,0	✓	✓
	20	6,3	✓	✓
	25	6,3-8,0	✓	✓
	32	10	✓	✓
	40	16	×	✓
	50	25	×	✓

Weld-on tailpieces



Tailpieces with external threads



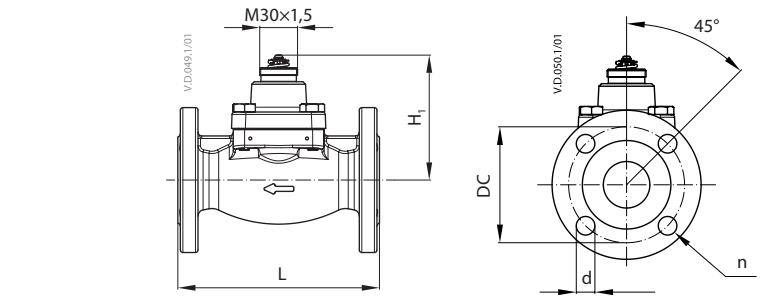
Weld on

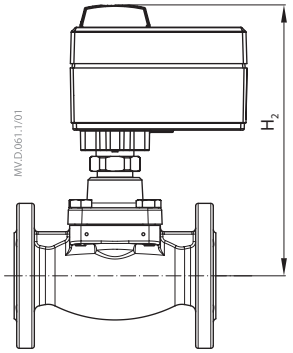
DN	G (")	Ød	L	Weight (kg)
		mm		
15	¾	15	35	0,18
20	1	20	40	0,26
25	1 ¼	27	40	0,38
32	1 ½	35	40	0,48
	1 ¾	37	40	0,48
40	2	40	65	0,90
50	2 ½	50	82	1,70

Ext. thread

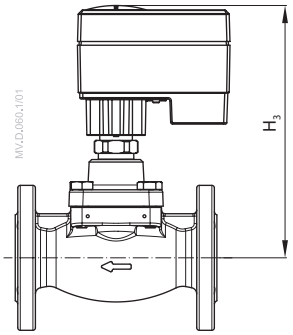
DN	G	R	L (mm)	Weight (kg)
	"			
15	¾	½	25,5	0,18
20	1	¾	28,5	0,26
25	1 ¼	1	33	0,38
32	1 ½	1 ¼	36,5	0,62
	1 ¾	1 ¼	36,5	0,62
40	2	1 ½	43	0,90
50	2 ½	2	55	1,70

Dimensions *(continuous)*

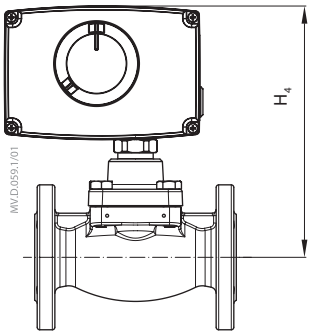




VB 2 + AMV(E) 10



VB 2 + AMV(E) 13



VB 2 + AMV(E) 20/30, 23/33

Type	H_1	H_2	H_3	H_4	L	DC	d	n	Weight (kg)
	mm								
VB 2 15	99	192	195	205	130	65	14	4	3,40
VB 2 20	99	192	195	205	150	75	14	4	4,23
VB 2 25	99	192	195	205	160	85	14	4	4,65
VB 2 32	123	-	-	229	180	100	18	4	8,40
VB 2 40	123	-	-	229	200	110	18	4	9,24
VB 2 50	123	-	-	229	230	125	18	4	10,91

Type	DN	k_{VS} (m^3/h)	AMV(E) 10/13	AMV(E) 20/23; AMV(E) 30/33
VB 2	15-25	0,25-10	✓	✓
	32-50	16-40	×	✓