

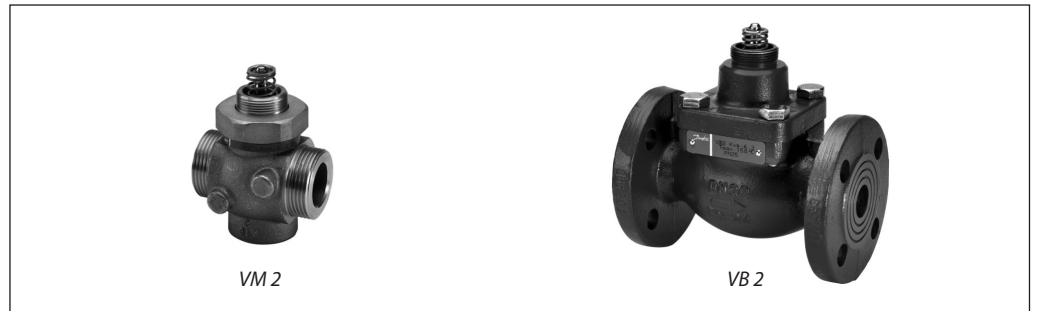
## Data sheet

# 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  $\Delta p$  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 m<sup>3</sup>/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 <sup>3</sup> /h)	Stroke (mm)	Code No.
15	G ¾ A	0,25	5	<b>065B2010</b>
		0,4	5	<b>065B2011</b>
		0,63	5	<b>065B2012</b>
		1,0	5	<b>065B2013</b>
		1,6	5	<b>065B2014</b>
		2,5	5	<b>065B2015</b>
		4,0	5	<b>065B2026</b>
20	G 1 A	4,0	5	<b>065B2016</b>
		6,3	7	<b>065B2027</b>
25	G 1¼ A	6,3	5	<b>065B2017</b>
		8,0	5	<b>065B2028</b>
32	G 1½ A	10	7	<b>065B2018</b>
	G 1¾ A	10	7	<b>065B2029</b>
40	G 2 A	16	10	<b>065B2019</b>
50	G 2½ A	25	10	<b>065B2020</b>

## VB 2 (flange)

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

<sup>1)</sup>  $k_{vs}$  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 <sup>1)</sup>	Tailpieces with ext. thread <sup>1)</sup>
		Code No.	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 <sup>2)</sup>	003H6905 <sup>2)</sup>
32	G 1½ A	003H6914 <sup>3)</sup>	003H6906 <sup>3)</sup>
40	G 2 A	065B2006	065B2004
50	G 2½ A	065B2007	065B2005

<sup>1)</sup> weld-on tailpieces (steel), ext thread (brass)

<sup>2)</sup> for valve code No. 065B2029 (G 1¾ A)

<sup>3)</sup> 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 <sub>vs</sub> value	VM 2	m <sup>3</sup> /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 <sub>vs</sub>														
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													
<b>Materials</b>		<b>VM2</b>							<b>VB2</b>							
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 <sub>vs</sub> (m <sup>3</sup> /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 <sub>vs</sub> (m <sup>3</sup> /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

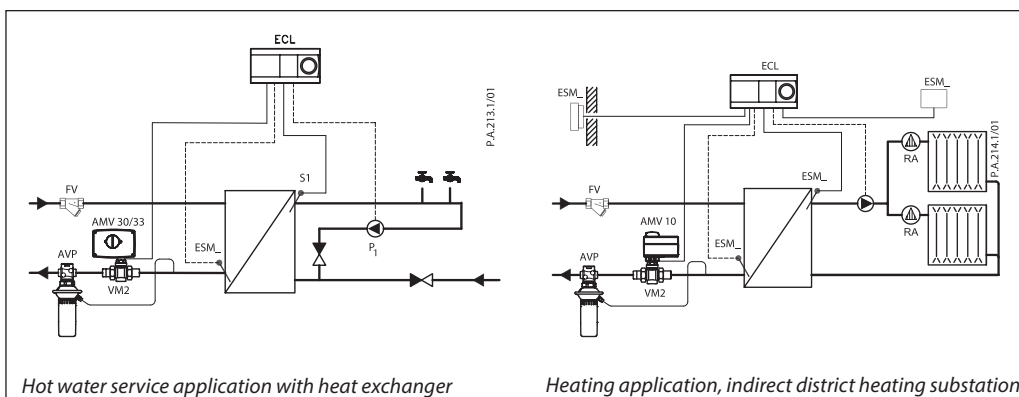
**Max. closing pressure:** 16bar or 25 bar (see table above) depends on valve and actuator combination.

Max. closing pressure means that the valve can close against this pressure if the pressure is applied after closing of the valve.

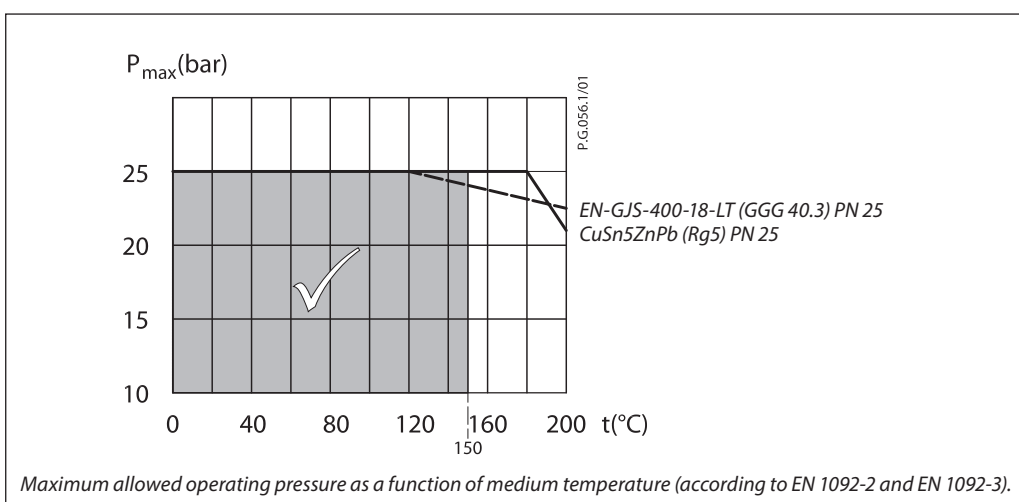
**Max. operating pressure:** 12bar (recommended 4bar to avoid high noise level and cavitation).

Max. operating pressure means no sucking will occur in entire valve stroke and valve can close against this pressure from open position.

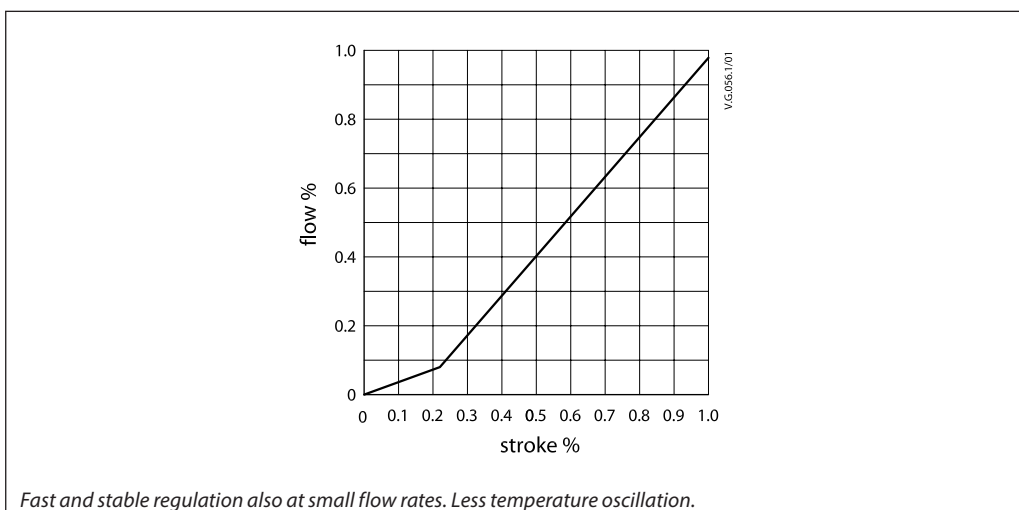
Application principles



Pressure temperature diagram



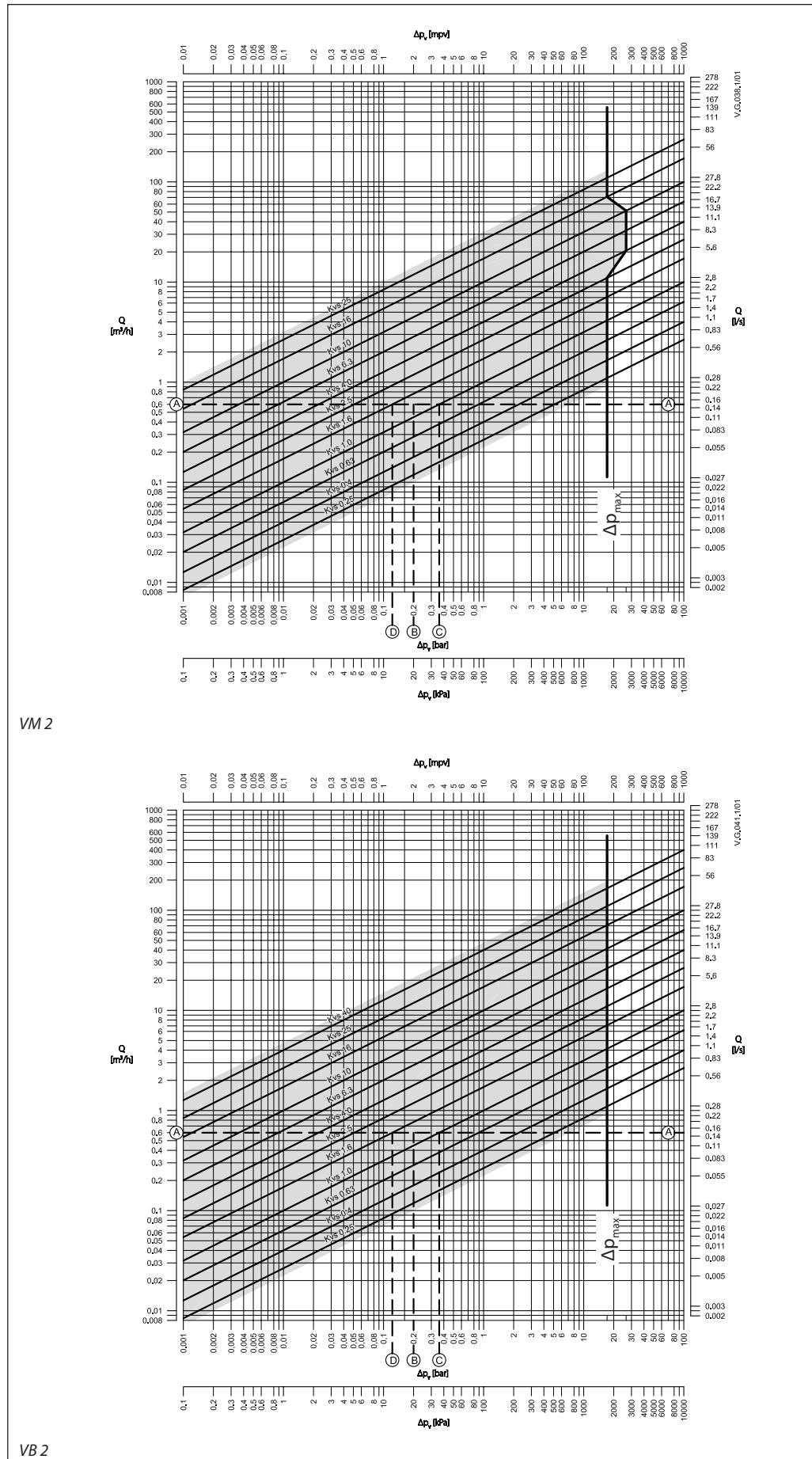
Split characteristic



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 m<sup>3</sup>/h

System pressure drop: 20 kPa

Locate the horizontal line representing a flow rate of 0,6 m<sup>3</sup>/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:

$\Delta p_1$  = pressure drop across the fully open valve

$\Delta p_2$  = 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):

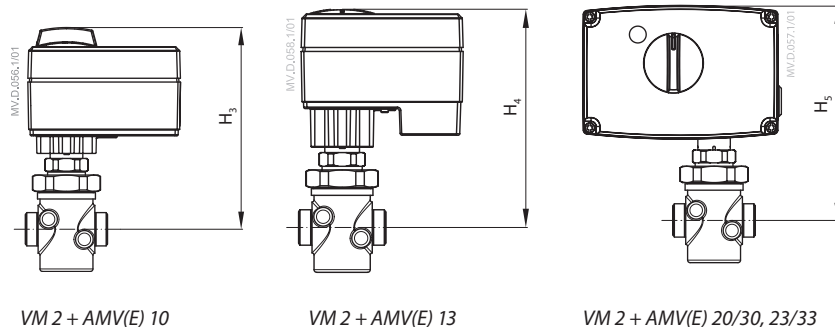
$$\text{hence valve authority} = \frac{36}{36 + 20} = 0,64$$

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

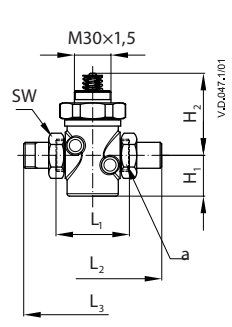
$$\text{hence valve authority} = \frac{14}{14 + 20} = 0,41$$

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



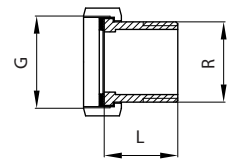
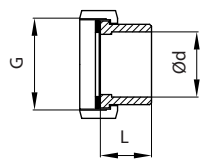
Type	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	SW	a	Weight (kg)
	mm										
VM 2 15	33	70	163	166	176	65	139	120	30	G ¾A	0,80
VM 2 20/4,0	33	70	163	166	176	70	154	131	37	G 1A	0,83
VM 2 20/6,3	33	70	163	166	176	70	154	131	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 <sub>vs</sub> (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	x	✓
	50	25	x	✓

Weld-on tailpieces

Tailpieces with external threads



Weld on

DN	G (")	Ød		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	"		L (mm)	Weight (kg)
	G	R		
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)

