Data sheet

Seated valve (PN 16)
VFM 2 – 2-way valve, flange

Description

Valve for heating, district heating and district cooling systems.

VFM 2 valve can be used together with following Danfoss actuators:
- AMV(E) 655
- AMV(E) 658 SU/SD
- AME 659 SD
- AMV(E) 85/86 (for VFM 2 DN 150-250)

Features:
- Linear (30%) / logarithmic (70%) characteristic
- Rangeability >100:1
- Pressure relieved design

Main data:
- DN 65-250
- k_{vs} 63-900 m³/h
- PN 16
- Medium:
  Circulation water / glycolic water up to 50%
- Temperature:
  2 (−10*) … 150 °C

  At temperatures from −10 °C up to +2 °C use stem heater
- Flange PN 16 connections
- Push-pull connection between valve and actuator
- Compliance with Pressure Equipment Directive 97/23/EC

Ordering

Valve **VFM 2**

Picture	DN	k_{vs} (m³/h)	PN	Δp_s [2] (bar)	$\Delta p_{max.}$ (bar) [1] for **AMV(E)65x**	$\Delta p_{max.}$ (bar) [1] for **AMV(E)85/86**	Code No.
	65	63					**065B3500**
	80	100		16	8	-	**065B3501**
	100	160					**065B3502**
	125	250	16				**065B3503**
	150	400			4	10	**065B3504**
	200*	630		10		7	**065B3505**
	250*	900			3	5	**065B3506**

[1] **$\Delta p_{max.}$** is maximum permissible differential pressure across the valve reffered for the whole actuating range of motorised valve (a function of actuator's performance)

[2] **Δp_s** is maximum permissible closing differential pressure applied in fully closed position of the valve, at which valve will seal tightly (close off pressure)

* For DN 200 in combination with AMV(E)85/86: k_{vs} is reduced by 15%
  For DN 250 in combination with AMV(E)85/86: k_{vs} is reduced by 20%

Accessories

Type	DN	Code No.
Stem heater	65-125	**065Z7020**
	150-250	**065Z7022**

Service kits

Type		Code No.
Top cover sealing set VFM 2		**065B3528**
Stuffing box	DN 65-125	**065B3529**
	DN 150-250	**065B3530**

Technical data

Nominal diameter	DN	65	80	100	125	150	200	250
k_{vs} value	m³/h	63	100	160	250	400	630	900
Stroke	mm	30	34	40			50	
Rangeability		>100:1						
Control characteristic		Lin (30%) / log (70%)						
Cavitation factor z		0,45	0,40	0,35			0,30	
Leakage acc. to standard IEC 534		< 0,03 % of k_{vs}						
Nominal pressure	PN	16						
Medium		Circulation water / glycolic water up to 50 % (standard VDI 2035)						
Medium pH		Min. 7, Max. 10						
Medium temperature	°C	2 (–10 [1]) … 150						
Connections		Flange PN 16 acc. to EN 1092-2						
Materials								
Valve body and cover		Grey cast iron EN-GJL-250 (GG 25)						
Valve seat, cone and spindle		Stainless steel						
Stuffing box sealing		EPDM						

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

Pressure temperature diagram

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

Valve characteristics

Valve (2-way) characteristics - lin (30%)/log (70%)
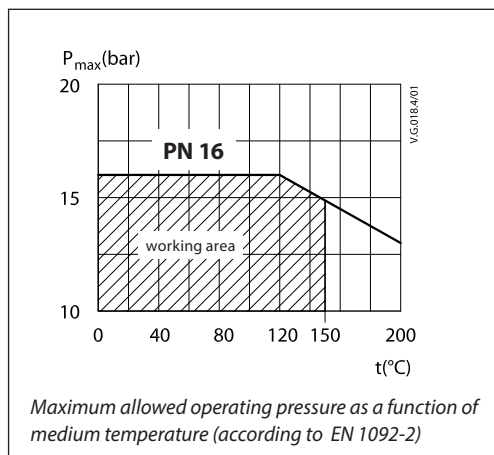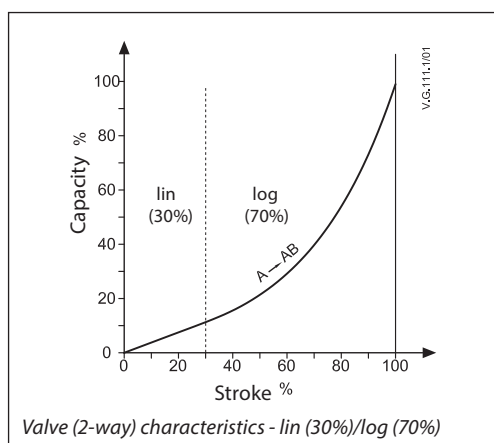
Installation

Hydraulic connections
Mount according to flow direction as indicated on valve body.

Valve mounting
Before mounting the valve be sure that the pipes are clean and free from swarf. It is essential that the pipes are lined up squarely with the valve at each connection and that they are free from vibrations. Install the motorized control valves with the actuator in a vertical or horizontal position.

Leave sufficient clearance to facilitate the dismantling of the actuator from the valve body for maintenance purposes.

Note that the actuator may be rotated up to 360° with respect to the valve body by loosening the retaining fixture.

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

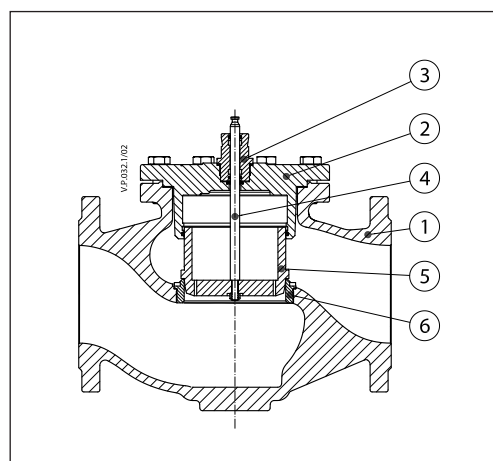VFM 2 DN 65 - 250 + AMV(E) 65x   VFM 2 DN 150 - 250 + AMV(E) 85 / 86
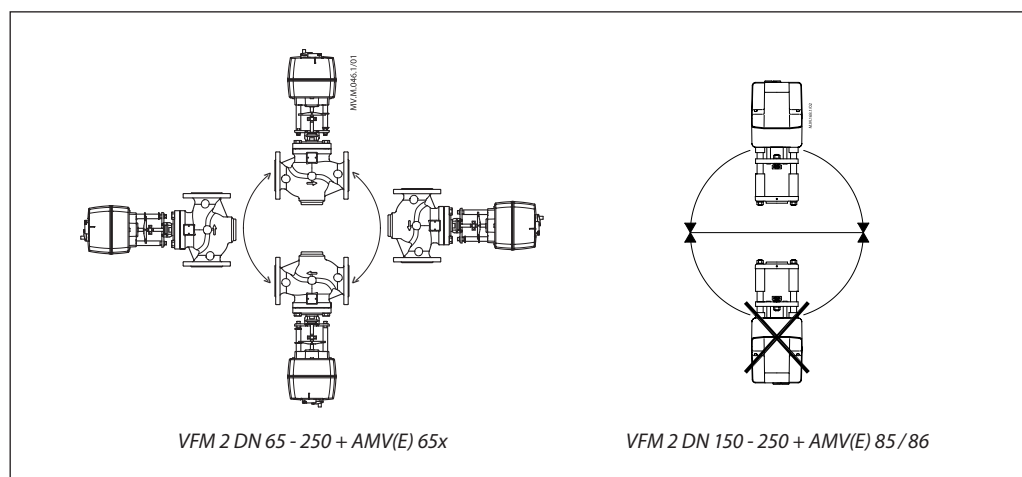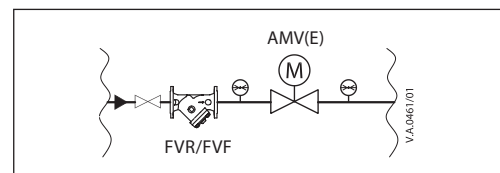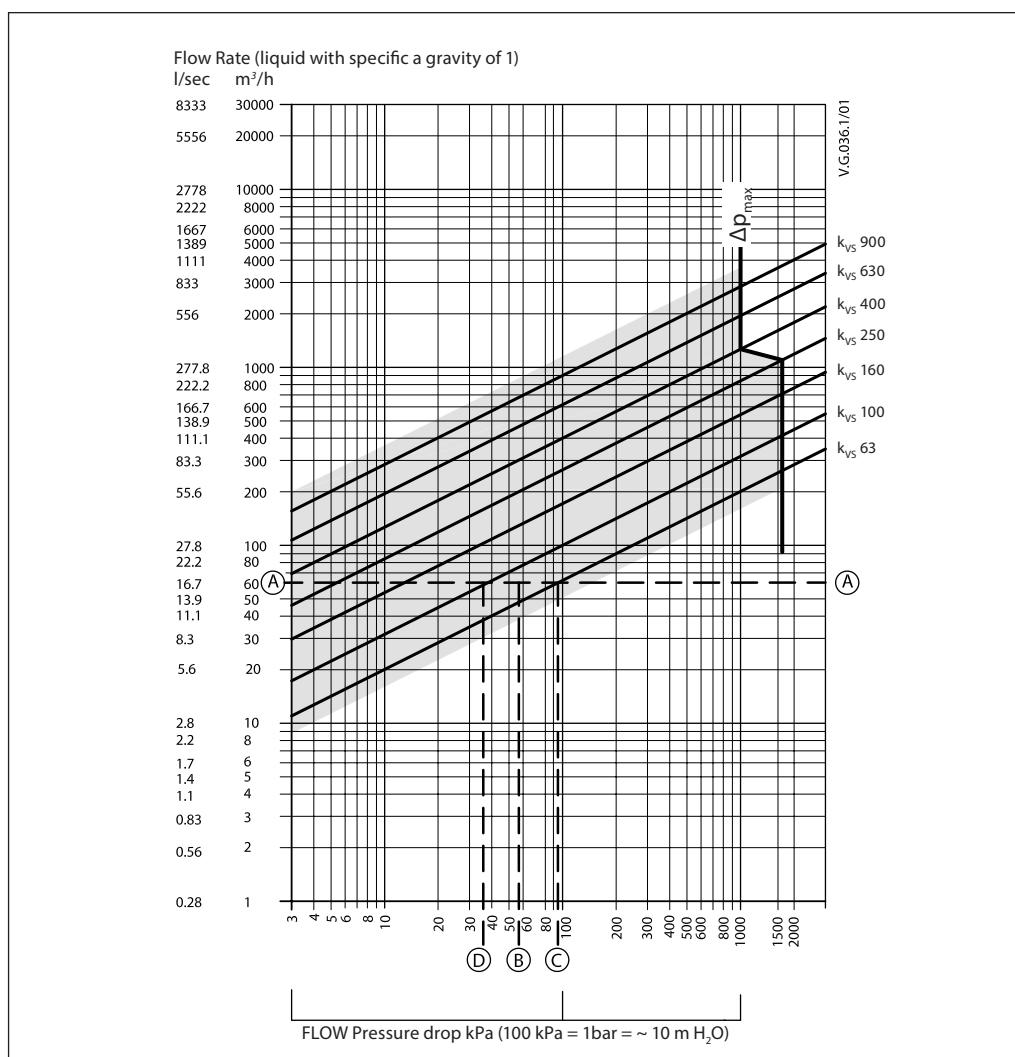
Disposal

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

Design

1. Valve body
2. Valve cover
3. Stuffing box
4. Valve stem
5. Valve cone (pressure relieved)
6. Valve seat

Data sheet   **Two way valve VFM 2**

Sizing

Flow Rate (liquid with specific a gravity of 1)

V.G.036.1/01

Δp_{max}

k_{vs} 900
k_{vs} 630
k_{vs} 400
k_{vs} 250
k_{vs} 160
k_{vs} 100
k_{vs} 63

FLOW Pressure drop kPa (100 kPa = 1bar = ~ 10 m H$_2$O)

Example

Design data:
Flow rate: 60 m^3/h
System pressure drop: 55 kPa

Locate the horizontal line representing a flow rate of 60 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:
$\Delta p1$ = pressure drop across the fully open valve
$\Delta p2$ = 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$_{vs}$ 63 would give a pressure drop of 90,7 kPa (point C):

$$\text{hence valve authority} = \frac{90,7}{90,7 + 55} = 0,62$$

The second largest valve, with k$_{vs}$ 100, would give a pressure drop of 36 kPa (point D):

$$\text{hence valve authority} = \frac{36}{36 + 55} = 0,395$$

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Dimensions

VFM 2 DN 200, 250

VFM 2 DN 80-150

VFM 2 DN 65

AMV(E) 65x + VFM 2 (DN 65-250)

AMV(E) 85/86 + VFM 2 (DN 150-250)

Type	DN	L	L$_1$	H	H$_1$	H$_2$	H$_3$	k	d$_2$	n	Weight (kg)
		mm									
VFM 2	65	185	290	114	290	493,5	-	145	19	4	25
	80	200	310	114	310	494,5	-	160	19	8	33
	100	242	350	148	350	528,5	-	180	19	8	48
	125	242	400	149	400	529,5	-	210	19	8	57
	150	310	480	182,5	512	628,5	639	240	22	8	101
	200	389	600	245	600	686	685	295	23	12	208
	250	500	730	267	730	732	732	355	26	12	348