

Data sheet

Seated valves (PN 16)

VF 2 - 2-way valve, flange

VF 3 - 3-way valve, flange

Description



VF 2 and VF 3 valves provide a quality, cost effective solution for most water and chilled applications.

The valves are designed to be combined with following actuators:

- DN 15-50 with AMV(E) 335, AMV(E) 435 or AMV(E) 438 SU actuators.
With AMV(E) 25 (SU/SD) or AMV(E) 35 actuators (with adapter **065Z0311**)
- DN 65, 80 with AMV(E) 335 or AMV(E) 435 actuators.
With AMV(E) 56 actuator (with adapter **065Z0312**)
- DN 100 with AMV(E) 55/56 or AMV(E) 65x actuators
- DN 125, 150 with AMV(E) 55/56, AMV(E) 65x or AMV(E) 85/86 actuators
- DN 200-300 with AME 685 or AME 855 actuators

Combinations of actuators is evident under section "Dimension".

Features:

- Soft sealing design DN15-80, 200-300
- Snap mechanical connection together with AMV(E) 335, AMV(E) 435
- Dedicated 2 and 3-port valve
- Suitable for diverting applications (3-port)

Main data:

- DN 15-300
- k_{vs} 0.63 -1350 m³/h
- PN 16
- Up to close A-AB
- Down to close A-AB (VF 3 DN 200-300)
- Temperature:
 - Circulation water/glycolic water up to 50 %:
 - 2 (-10*) ... 130 °C (DN 15-100)
 - 2 (-10*) ... 200 °C (DN 125, 150)
 - 2 (-10*) ... 130 °C (DN 200-300)
 - * At temperatures from -10 °C up to +2 °C use stem heater
- Flange connections PN 16
- Compliance with Pressure Equipment Directive 97/23/EC

Ordering

Example:
2-way valve; DN 15; k_{vs} 1.6; PN 16;
 T_{max} 130 °C; flange connection;

- 1x VF 2 DN 15 valve
Code No.: **065Z0273**

2-way valve **VF 2**

| DN | k_{vs} (m ³ /h) | $T_{max.}$ (°C) | Code No. |
|-----|---------------------------------|--------------------|-----------------|
| 15 | 0.63 | 130 | 065Z0271 |
| | 1.0 | | 065Z0272 |
| | 1.6 | | 065Z0273 |
| | 2.5 | | 065Z0274 |
| | 4.0 | | 065Z0275 |
| 20 | 6.3 | | 065Z0276 |
| 25 | 10 | | 065Z0277 |
| 32 | 16 | | 065Z0278 |
| 40 | 25 | | 065Z0279 |
| 50 | 40 | | 065Z0280 |
| 65 | 63 | 065Z0281 | |
| 80 | 100 | 065Z0282 | |
| 100 | 145 | 065B3205 | |
| 125 | 220 | 200 | 065B3230 |
| 150 | 320 | | 065B3255 |

3-way valve **VF 3**

| DN | k_{vs} (m ³ /h) | $T_{max.}$ (°C) | Code No. |
|-----|---------------------------------|--------------------|-----------------|
| 15 | 0.63 | 130 | 065Z0251 |
| | 1.0 | | 065Z0252 |
| | 1.6 | | 065Z0253 |
| | 2.5 | | 065Z0254 |
| | 4.0 | | 065Z0255 |
| 20 | 6.3 | | 065Z0256 |
| 25 | 10 | | 065Z0257 |
| 32 | 16 | | 065Z0258 |
| 40 | 25 | | 065Z0259 |
| 50 | 40 | | 065Z0260 |
| 65 | 63 | 065Z0261 | |
| 80 | 100 | 065Z0262 | |
| 100 | 145 | 065B1685 | |
| 125 | 220 | 200 | 065B3125 |
| 150 | 320 | | 065B3150 |
| 200 | 630 | 130 | 065B4200 |
| 250 | 1000 | | 065B4250 |
| 300 | 1350 | | 065B4300 |

Accessories - **Adapter**

| DN | Actuators | max.Δp (bar) | Code No. |
|-------|---------------|-----------------|-----------------|
| 15-50 | AMV(E) 25, 35 | 4.0 | 065Z0311 |
| 65-80 | AMV(E) 56 | 2.5 | 065Z0312 |

Accessories - **Stem heater**

| DN | Actuators | Power supply (V/VA) | Code No. | |
|----------|--------------------|------------------------|-----------------|-----------------|
| | | | Stem Heater | Adapter |
| 15-80 | AMV(E) 335, 435 | 24/40 | 065Z0315 | / |
| 15-50 | AMV(E) 438 SU | | | enclosed |
| 15-50 | AMV(E) 25/35 | | | 065Z0311 |
| 65-80 | AMV(E) 56 | | | 065Z0312 |
| 100 | AMV(E) 55, 56, 65x | 24/15 | 065Z7020 | / |
| 125, 150 | AMV(E) 55, 56, 65x | 24/40 | 065Z7022 | / |
| 125, 150 | AMV(E) 85, 86 | 24/20 | 065Z7021 | / |
| 200-300 | AME 685, 855 | | | / |

Service kits

| Type | DN | Code No. |
|--------------|----------|-----------------|
| Stuffing box | 15 | 065Z0321 |
| | 20 | 065Z0322 |
| | 25 | 065Z0323 |
| | 32 | 065Z0324 |
| | 40, 50 | 065Z0325 |
| | 65, 80 | 065Z0327 |
| | 100 | 065B1360 |
| | 125, 150 | 065B0007 |
| | 200-300 | 065B3530 |

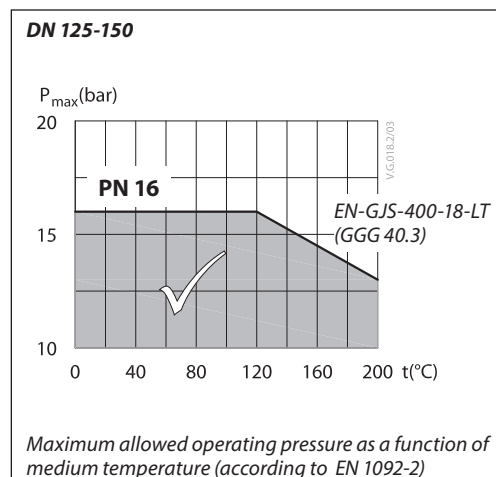
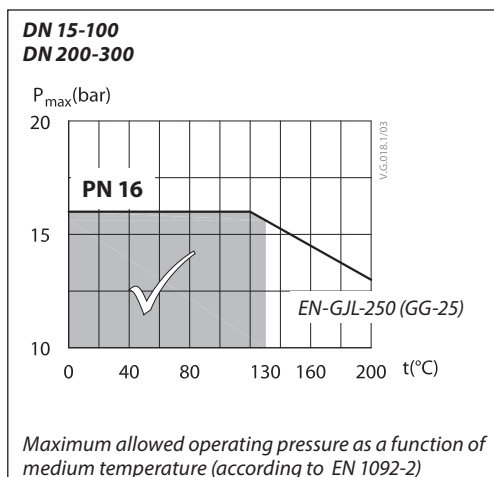
Technical data

| Nominal diameter | DN | 15 | | | | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | 300 | |
|-------------------------------------|-------------------|---|------|-----|-----|-----|-------------------------------------|-----------------|----|--------|----|--|-----------------|---------------------------------|-----|--------------------------------------|----------------------|------|------|
| k_{VS} value | m ³ /h | 0.63 | 1.0 | 1.6 | 2.5 | 4.0 | 6.3 | 10 | 16 | 25 | 40 | 63 | 100 | 145 | 220 | 320 | 630 | 1000 | 1350 |
| Stroke | mm | 10 | | | | 15 | | | 20 | | 30 | | | 40 | | | 57 | | 73 |
| Control range | | 30:1 | 50:1 | | | | 100:1 | | | | | | >50:1 | | | | | | |
| Control characteristic | | LOG: port A-AB; LIN: port B-AB | | | | | | | | | | | | | | | | | |
| Cavitation factor z | | ≥ 0.4 | | | | | | | | | | | | | | ≥ 0.45 | | | |
| Leakage | A-AB | ≤ 0.03 % of k_{VS} | | | | | | | | | | ≤ 0.05 % of k_{VS} | | | | | ≤ 0.01 % of k_{VS} | | |
| | B-AB | ≤ 1.0 % of k_{VS} | | | | | | | | | | | | | | | | | |
| Nominal pressure | PN | 16 | | | | | | | | | | | | | | | | | |
| Max. closing pressure ¹⁾ | | for VF 2 (up to DN 150) and for VF 3 (in mixing applications) | | | | | | | | | | | | | | | | | |
| AMV(E) 335/435 (400 N) | bar | 4 | | | | | | | | | | 2.5 | | - | | | | | |
| AMV(E) 25 (SU/SD)/438 SU (450 N) | | | | | | | | | | | | | | | | | | | |
| AMV(E) 35 (600 N) | | | | | | | | | | | | | | | | | | | |
| AMV(E) 25 (1000 N) | | | | | | | | | | | | | | | | | | | |
| AMV(E) 55/65x (2000 N) | | - | 1.5 | 1.0 | 0.5 | - | - | - | | | | | | | | | | | |
| AMV(E) 56 (1500 N) | | 2.5 | 1.0 | 0.5 | 0.2 | - | - | - | | | | | | | | | | | |
| AMV(E) 85/86 (5000 N) | | - | - | 3.0 | 1.5 | - | - | - | | | | | | | | | | | |
| AME 685 (5000 N) | | - | - | - | - | 1.5 | 1.2 | 0.8 | | | | | | | | | | | |
| AME 855 (15000N) | | - | - | - | - | 5.0 | 4.0 | 2.5 | | | | | | | | | | | |
| Max. closing pressure ¹⁾ | | for VF 3 (diverting applications) | | | | | | | | | | | | | | | | | |
| AMV(E) 335/435 (400 N) | bar | 1 | | | | | | | | | | 0.6 | | - | | | | | |
| AMV(E) 25 (SU/SD)/438 SU (450 N) | | | | | | | | | | | | | | | | | | | |
| AMV(E) 35 (600 N) | | | | | | | | | | | | | | | | | | | |
| AMV(E) 25 (1000 N) | | | | | | | | | | | | | | | | | | | |
| AMV(E) 55/65x (2000 N) | | - | 0.3 | 0.6 | 0.5 | - | - | - | | | | | | | | | | | |
| AMV(E) 56 (1500 N) | | 0.6 | 0.3 | 0.5 | 0.2 | - | - | - | | | | | | | | | | | |
| AMV(E) 85/86 (5000 N) | | - | - | 0.6 | 0.6 | - | - | - | | | | | | | | | | | |
| AME 685 (5000 N) | | - | - | - | - | 1.2 | 1.0 | 0.5 | | | | | | | | | | | |
| AME 855 (15000N) | | - | - | - | - | 4.0 | 3.5 | 2.0 | | | | | | | | | | | |
| Medium | | Circulation water/glycolic water up to 50 % | | | | | | | | | | | | | | | | | |
| Medium pH | | Min. 7, Max. 10 | | | | | | | | | | | | | | | | | |
| Medium temperature ²⁾ | °C | 2 (-10) ... 130 | | | | | | 2 (-10) ... 200 | | | | | 2 (-10) ... 130 | | | | | | |
| Connections | | Flange PN 16 acc. to EN 1092-2 | | | | | | | | | | | | | | | | | |
| Materials | | | | | | | | | | | | | | | | | | | |
| Valve body | | Grey cast iron EN-GJL-250 (GG-25) | | | | | | | | | | Ductile iron EN-GJS-400-18-LT (GGG 40.3) | | | | Grey cast iron EN-GJL-250 (GG-25) | | | |
| Valve stem | | Stainless steel | | | | | | | | | | | | | | | | | |
| Valve cone | | Brass | | | | | Red bronze CuSn5Zn5Pb5 (Rg 6) | | | GGG 40 | | | | non-magnetic stainless steel | | | | | |
| Stuffing box sealing | | EPDM | | | | | | | | | | PFTE | | | | EPDM | | | |

¹⁾ Maximum permissible differential pressure across the valve referred for the whole actuating range of motorised valve (a function of actuator's performance)

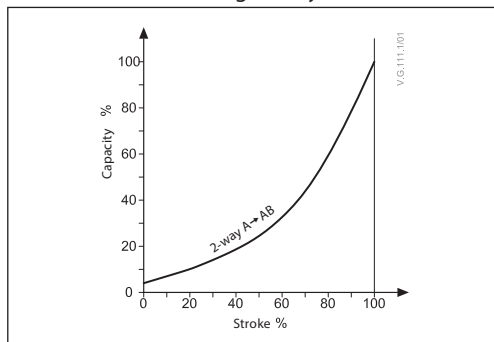
²⁾ At temperatures from -10 up to +2 °C use stem heater

Pressure temperature diagram

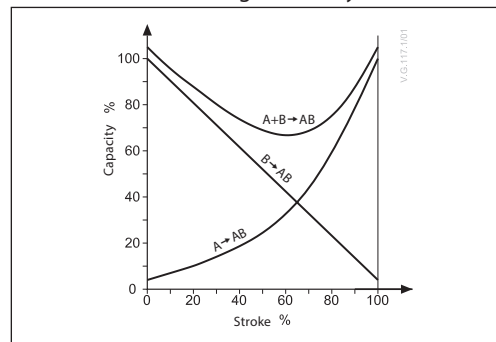


Valve characteristics

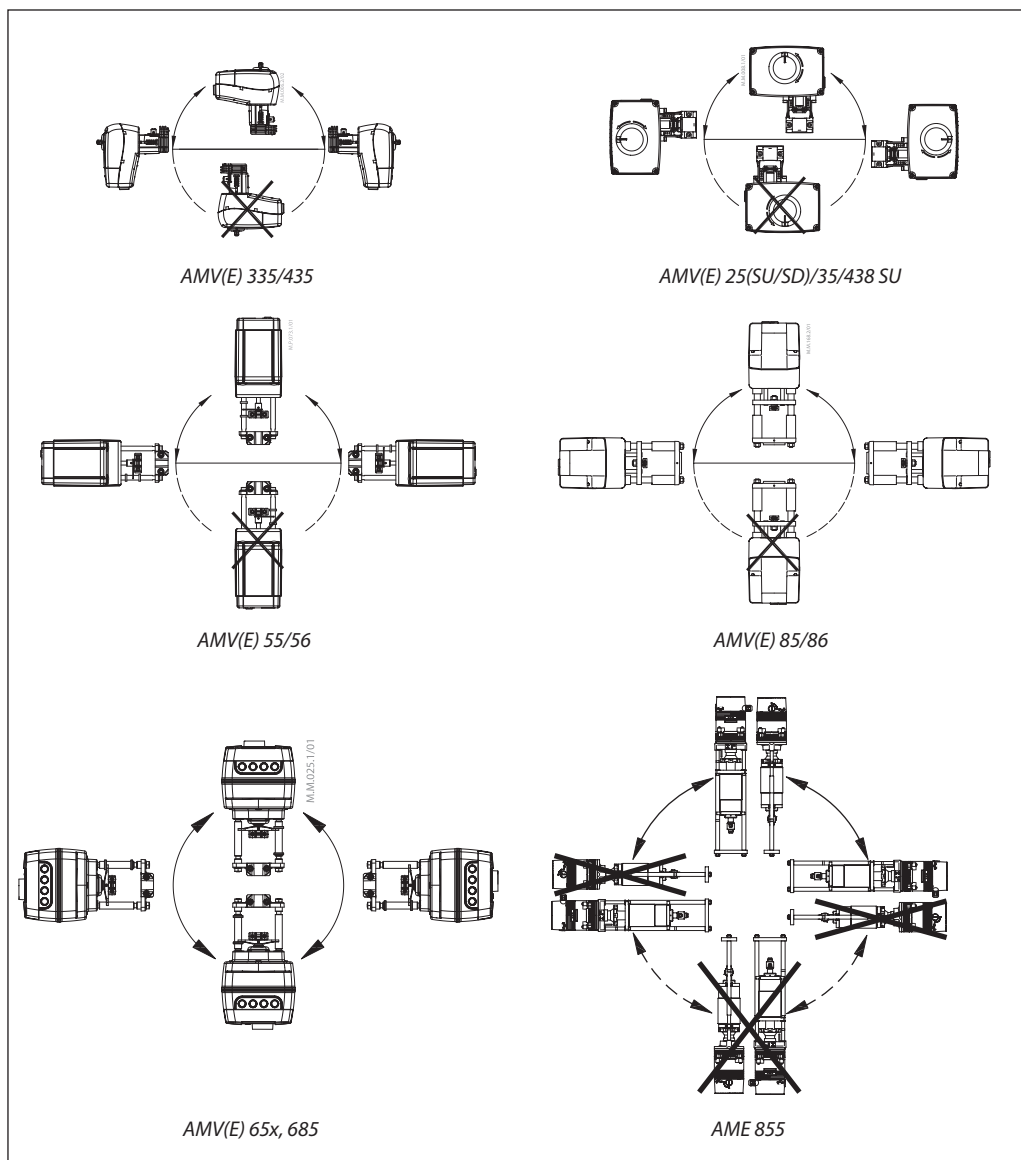
Valve characteristics log (2-way)



Valve characteristics log/lin (3-way)



Installation



Installation (continuous)

$T_{max} \leq 150\text{ }^{\circ}\text{C}$ for AMV(E) 25 (SU/SD), 35
 $T_{max} \leq 200\text{ }^{\circ}\text{C}$ for other AMV(E)
 $T_{max} = 150 \dots 200\text{ }^{\circ}\text{C}$ AMV(E) 25 (SU/SD), 35

Valve mounting

Before mounting the valve be sure that the pipes are clean and free from abrasion.

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 in accordance to recommendations described in Installation above.

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. After this operation retighten.

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)

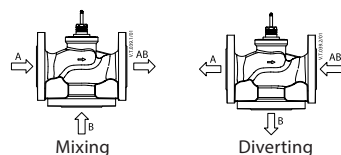
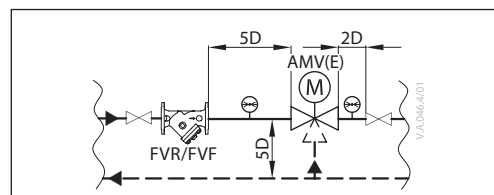


Fig. 1: Mixing or diverting connection

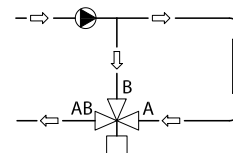


Fig. 3: Mixing valve used in diverting application

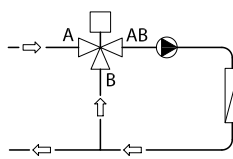


Fig. 2: Mixing valve used in mixing application

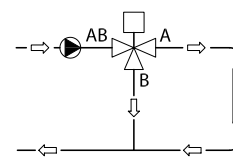


Fig. 4: Diverting valve used in diverting application

Mixing or diverting connection

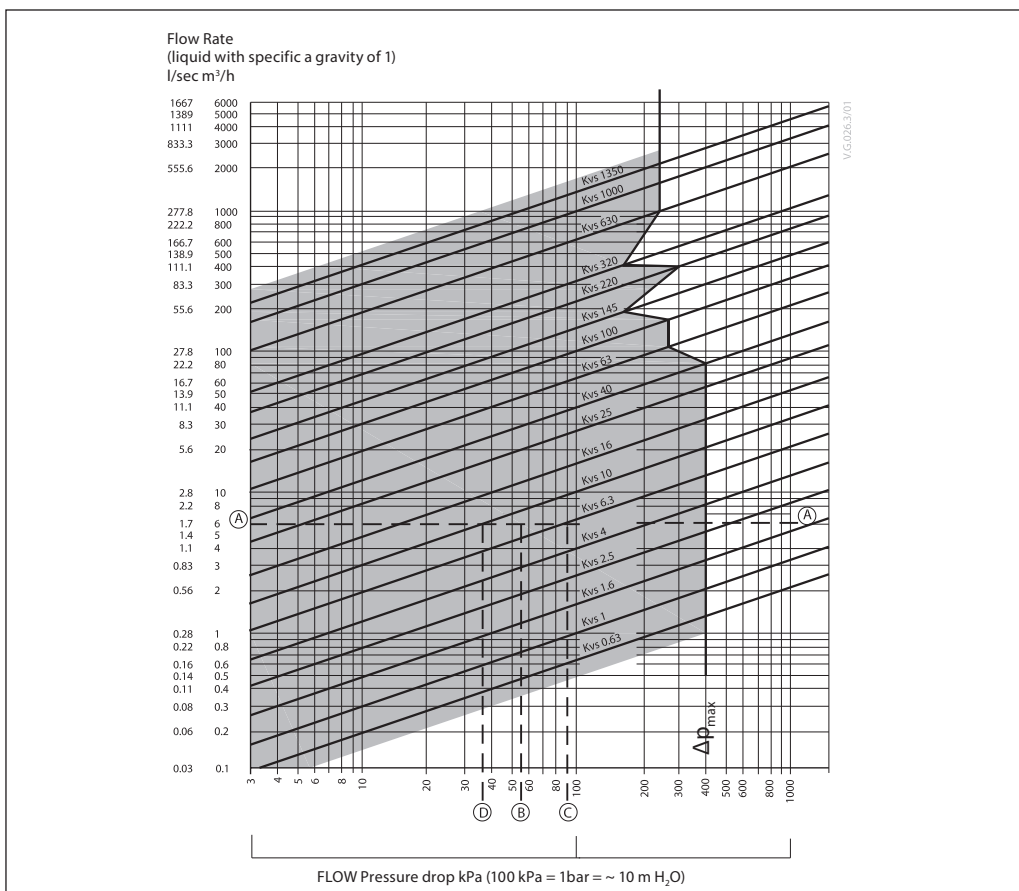
3-way valve can be used either as mixing or diverting valve (fig.1).

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: $\Delta p_1 = \Delta p_2$

$$a = \frac{\Delta p_1}{2 \times \Delta p_2} = 0.5$$

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):

$$\text{hence valve authority} = \frac{90.7}{90.7 + 55} = 0.62$$

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

$$\text{hence valve authority} = \frac{36}{36 + 55} = 0.395$$

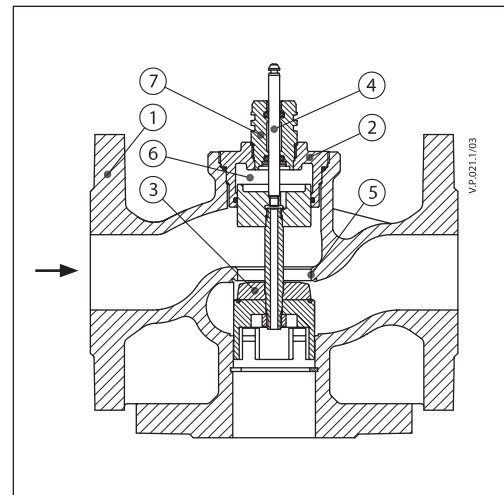
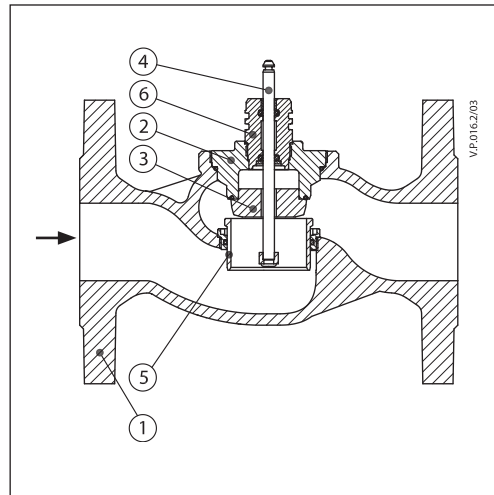
Generally, for a 3 port application, the smaller valve would be selected (resulting in a valve authority higher than 0.5 and therefore improved control). However, this will increase the total pressure and should be checked by the system designer for compatibility with available pump heads, etc. The ideal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

Design

(Design variations are possible)

VF 2 DN 15-80

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

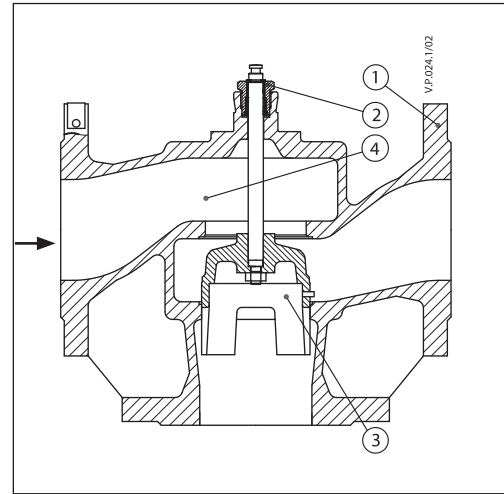
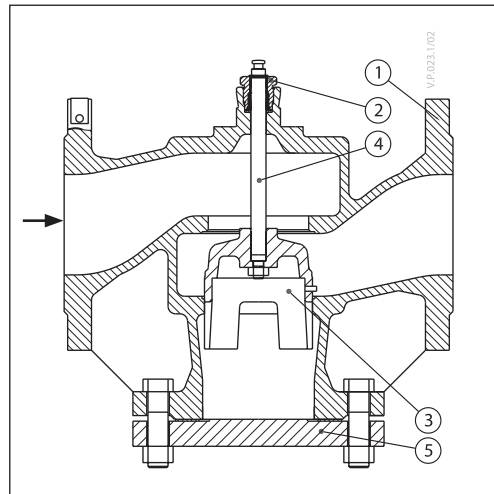


VF 3 DN 15-80

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

VF 2 DN 100

1. Valve body
2. Stuffing box
3. Valve cone
4. Valve stem
5. Blind flange

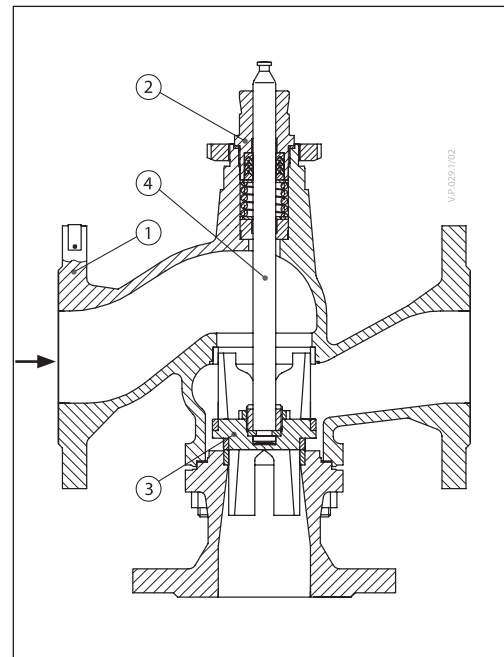
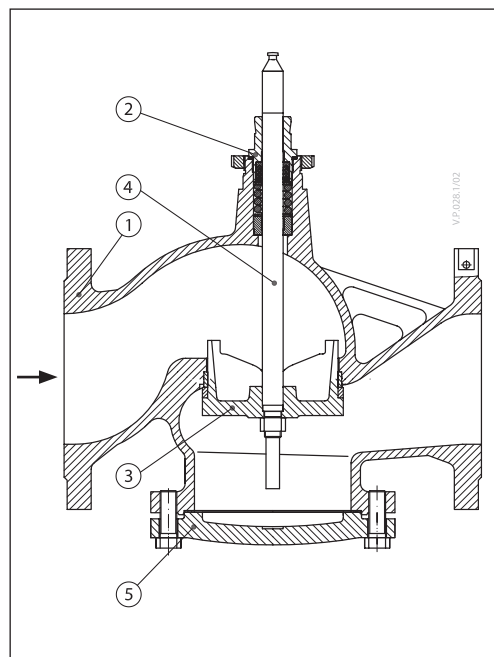


VF 3 DN 100

1. Valve body
2. Stuffing box
3. Valve cone
4. Valve stem

VF 2 DN 125-150

1. Valve body
2. Stuffing box
3. Valve cone
4. Valve stem
5. Blind flange



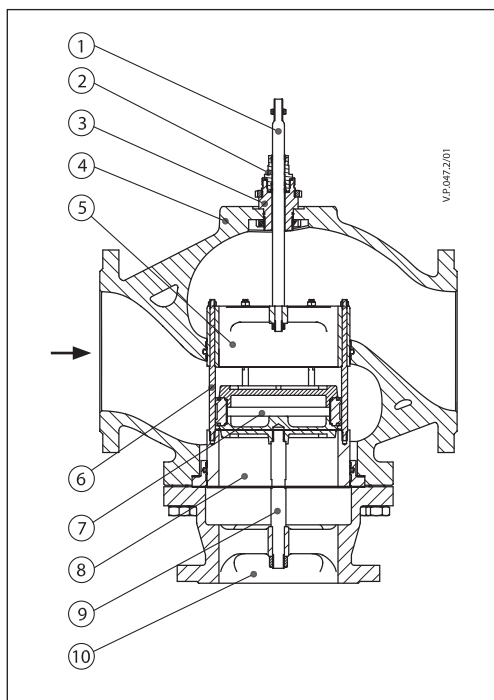
VF 3 DN 125-150

1. Valve body
2. Stuffing box
3. Valve cone
4. Valve stem

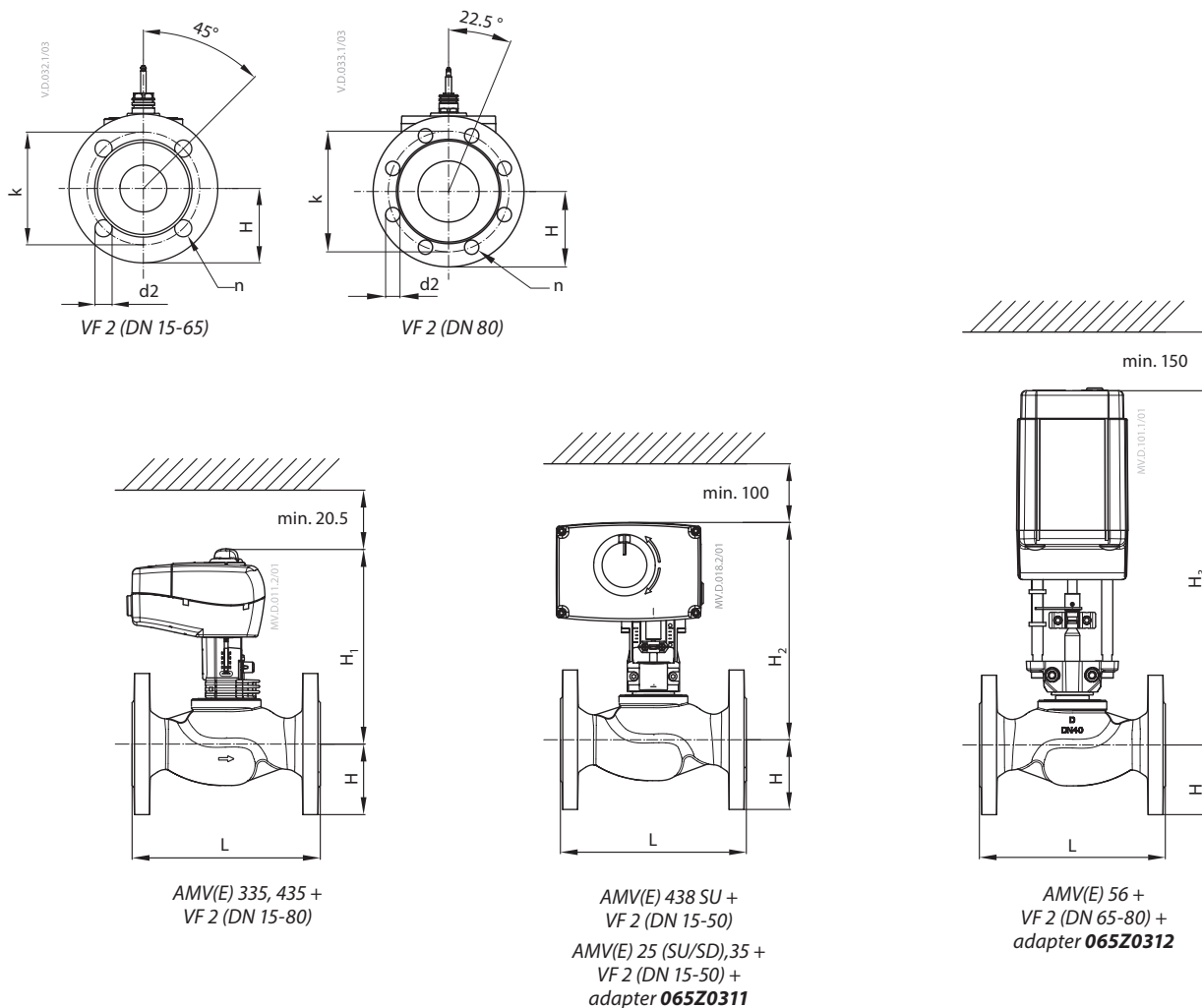
Design (continuous)

VF 3 DN 200-300

- 1. Stem
- 2. Stuffing box
- 3. Insert body
- 4. Valve body
- 5. Seat A
- 6. Studdle stem
- 7. Cone component
- 8. Seat B
- 9. Support stem
- 10. Valve body extension



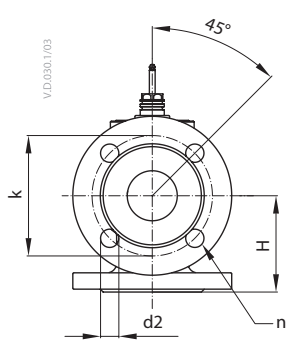
Dimensions



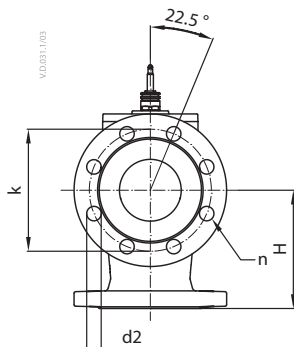
| Type | DN | L | H | H ₁ | H ₂ | H ₃ | k | d2 | n | Weight (kg) |
|------|-----|-----|------|----------------|----------------|----------------|-----|----|-------|-------------|
| | | mm | | | | | | | | |
| VF 2 | 15 | 130 | 47.5 | 191 | 216 | - | 65 | 14 | 4 | 1.93 |
| | 20 | 150 | 52.5 | 194 | 218 | - | 75 | 14 | 4 | 2.65 |
| | 25 | 160 | 57.5 | 197 | 222 | - | 85 | 14 | 4 | 3.23 |
| | 32 | 180 | 70 | 202 | 226 | - | 100 | 19 | 4 | 4.97 |
| | 40 | 200 | 75 | 213 | 237 | - | 110 | 19 | 4 | 6.59 |
| | 50 | 230 | 82.5 | 218 | 242 | - | 125 | 19 | 4 | 8.53 |
| | 65 | 290 | 92.5 | 254 | - | 428 | 145 | 19 | 4 | 15.92 |
| 80 | 310 | 100 | 258 | - | 432 | 160 | 19 | 8 | 18.13 | |

Note:
If stem heater is used dimension H₁ is increased for 28 mm and H₂ for 32 mm.

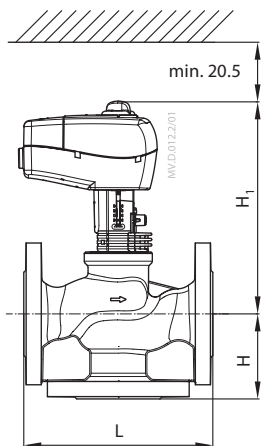
Dimensions (continued)



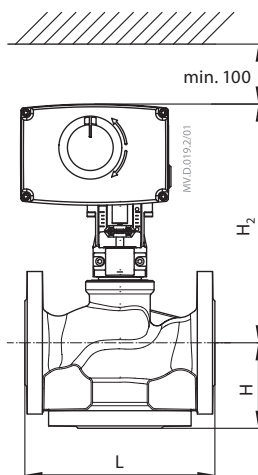
VF 3 (DN 15-65)



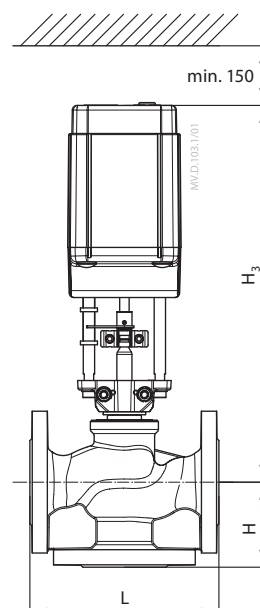
VF 3 (DN 80)



AMV(E) 335, 435 +
VF 3 (DN 15-80)



AMV(E) 438 SU +
VF 3 (DN 15-50)
AMV(E) 25 (SU/SD), 35 +
VF 3 (DN 15-50) +
adapter 065Z0311

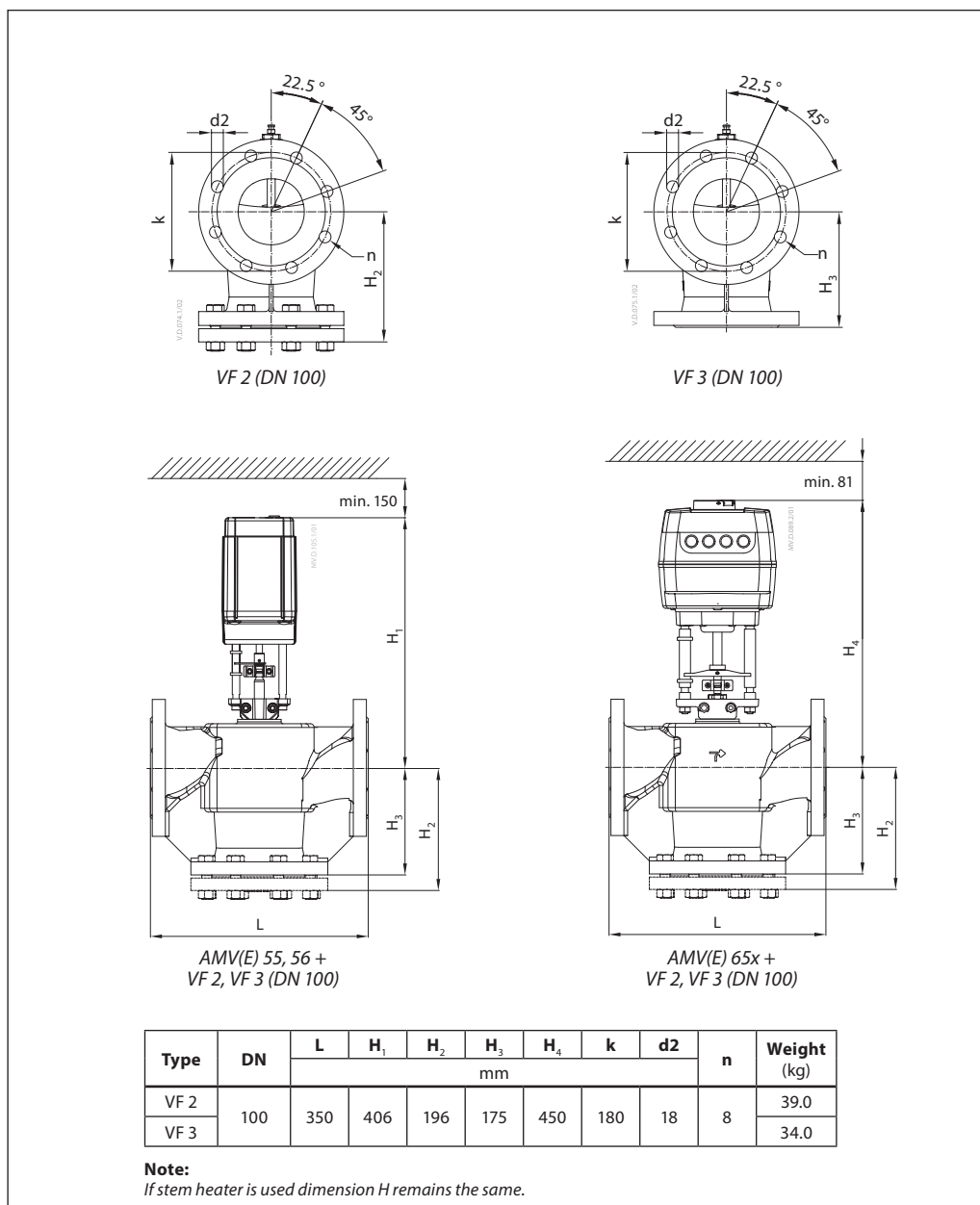


AMV(E) 56 +
VF 3 (DN 65-80) +
adapter 065Z0312

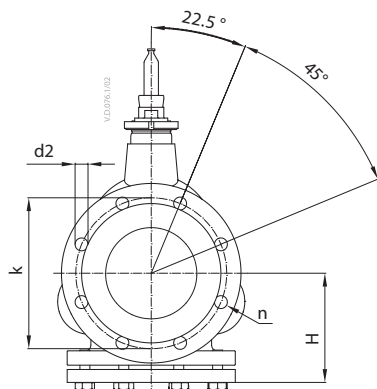
| Type | DN | L | H | H ₁ | H ₂ | H ₃ | k | d2 | n | Weight (kg) |
|------|-----|-----|-----|----------------|----------------|----------------|-----|----|-------|-------------|
| | | | | | | | | | | |
| VF 3 | 15 | 130 | 63 | 191 | 216 | - | 65 | 14 | 4 | 2.61 |
| | 20 | 150 | 70 | 194 | 218 | - | 75 | 14 | 4 | 3.55 |
| | 25 | 160 | 75 | 197 | 222 | - | 85 | 14 | 4 | 4.54 |
| | 32 | 180 | 80 | 202 | 226 | - | 100 | 19 | 4 | 6.90 |
| | 40 | 200 | 90 | 230 | 255 | - | 110 | 19 | 4 | 9.05 |
| | 50 | 230 | 100 | 243 | 267 | - | 125 | 19 | 4 | 12.79 |
| | 65 | 290 | 120 | 254 | - | 428 | 145 | 19 | 4 | 19.18 |
| 80 | 310 | 155 | 270 | - | 444 | 160 | 19 | 8 | 23.73 | |

Note:
If stem heater is used dimension H₁ is increased for 28 mm and H₂ for 32 mm.

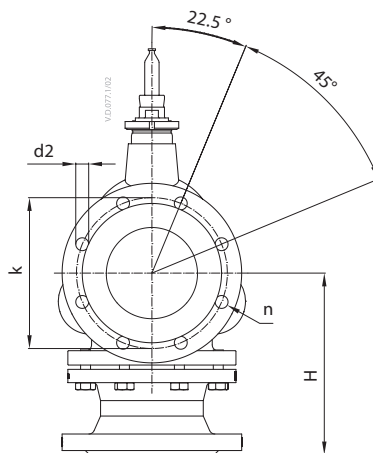
Dimensions (continued)



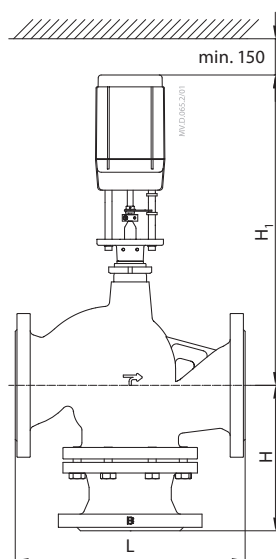
Dimensions (continued)



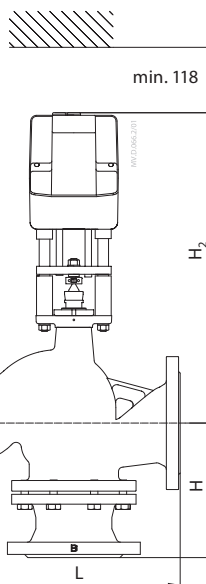
VF 2 (DN 125, 150)



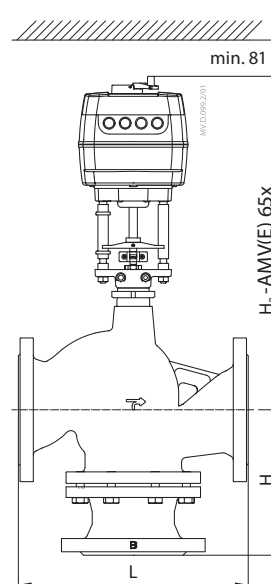
VF 3 (DN 125, 150)



AMV(E) 55, 56 +
VF 2, VF 3 (DN 125, 150)



AMV(E) 85, 86 +
VF 2, VF 3 (DN 125, 150)

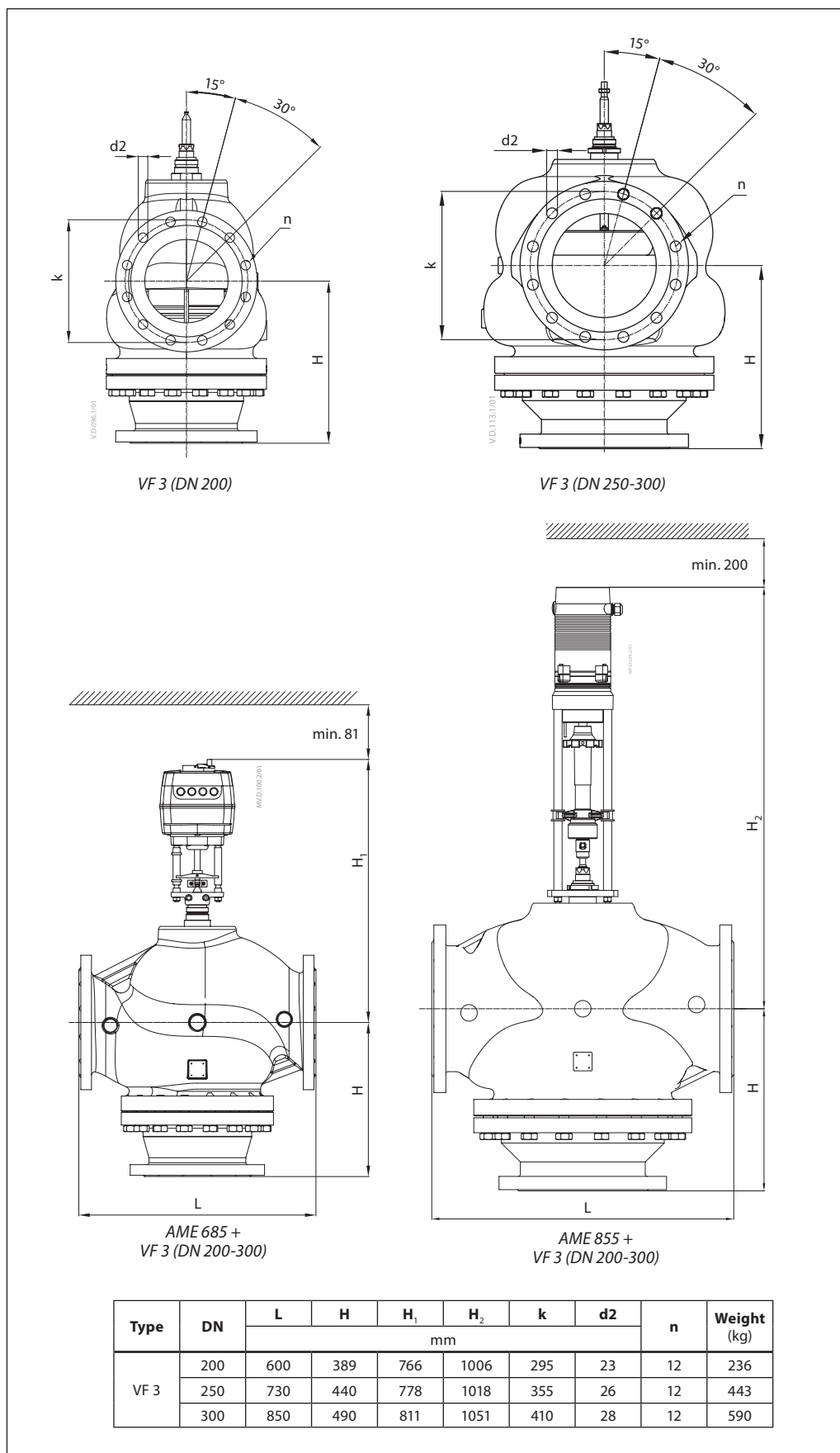


AMV(E) 65x +
VF 2, VF 3 (DN 125, 150)

| Type | DN | L | H | H ₁ | H ₂ | H ₃ | k | d2 | n | Weight (kg) |
|------|-----|-----|-----|----------------|----------------|----------------|-----|----|---|-------------|
| | | | | | | | | | | |
| VF 2 | 125 | 400 | 160 | 555 | 629 | 595 | 210 | 18 | 8 | 54.0 |
| | 150 | 480 | 200 | 560 | 682 | 648 | 240 | 22 | 8 | 79.0 |
| VF 3 | 125 | 400 | 250 | 555 | 629 | 595 | 210 | 18 | 8 | 65.3 |
| | 150 | 480 | 300 | 560 | 682 | 648 | 240 | 22 | 8 | 92.0 |

Note:
If stem heater is used dimensions H₁ and H₂ remain the same.

Dimensions (continued)





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