



Motorized control valves

AVT / VG (F)

Description

The AVT /VG(F) controller is a self-acting proportional temperature controller developed primarily for domestic hot water (DHW) production:

- Hot water tanks
- Storage charge systems
- Instantaneous domestic hot water production (AVT 255 mm version)

The controller has a control valve VG(F), thermostatic actuator and handle for temperature setting. Thermostatic actuator consist of bellows, capillary tube and sensor.

The temperature controller is type-tested according to EN 14597 and can be used in combinations with safety temperature monitors STM and safety temperature limiters STL.

Features & benefits

- It can be used in mixing loops and room heating systems as well.
- Controller closes on rising temperature.

Ordering

Product code numbers

Table: Type VG, VGF

Type	Diameter [mm]	Kvs values [m ³ /h]	Connection types	Connection size	Code number
VG	15	0.40	External Thread	G 3/4 A	065B0770
VG	15	1.00	External Thread	G 3/4 A	065B0771
VG	15	1.60	External Thread	G 3/4 A	065B0772
VG	15	2.50	External Thread	G 3/4 A	065B0773
VG	15	4.00	External Thread	G 3/4 A	065B0774
VG	20	6.30	External Thread	G 1 A	065B0775
VG	25	8.00	External Thread	G 1 1/4 A	065B0776
VG	32	12.50	External Thread	G 1 3/4 A	065B0777
VG	40	16.00	External Thread	G 2 A	065B0778
VG	50	20.00	External Thread	G 2 1/2 A	065B0779
VGF	15	4.00	Flange	15	065B0780
VGF	20	6.30	Flange	20	065B0781
VGF	25	8.00	Flange	25	065B0782
VGF	32	12.50	Flange	32	065B0783
VGF	40	20.00	Flange	40	065B0784
VGF	50	25.00	Flange	50	065B0785

Table: Type AVT, AVT (fast)

Type	Temperature setting range [°C] [Min]	Temperature setting range [°C] [Max]	Sensor pocket length [mm]	Code number
AVT	-10	40	170	065-0596
AVT	20	70	170	065-0597
AVT	40	90	170	065-0598
AVT	60	110	170	065-0599
AVT	-10	40	215	065-0600
AVT	20	70	215	065-0601
AVT	40	90	215	065-0602
AVT	60	110	215	065-0603
AVT (fast)	10	45		065-0604
AVT (fast)	35	70		065-0605
AVT (fast)	60	100		065-0606
AVT (fast)	85	125		065-0607

Note:

1. For AVT Thermostatic actuator, the following applies:

Codes **065-0600, 065-0601, 065-0602, 065-0603**: Conic male thread EN 10226-1

Codes **065-0604, 065-0605, 065-0606, 065-0607**: Conic male thread EN 10226-1, without immersion pocket

Example:

Temperature controller, DN 15; k_{vs} 1.6 ; PN 25; setting range 40 ... 90 °C; T_{max} 150 °C; ext. thread

- 1× VG DN 15 valve

Code No: **065B0772**

- 1× AVT thermostatic actuator, 40 ... 90 °C

Code No: **065-0598**

Option:

- 1× Weld-on tailpieces

Code No: **003H6908**

Accessories code numbers

Table: Type Flange tailpieces, Thread tailpieces, Weld-on tailpieces, Adapters, Immersion pockets, Combination pieces

Type	Description	Diameter [mm]	Code number
Weld-on tailpieces	Tailpiece weld-on PN25 DN15 (G3/4)	15	003H6908
Weld-on tailpieces	Tailpiece weld-on PN25 DN20 (G1)	20	003H6909
Weld-on tailpieces	Tailpiece weld-on PN25 DN25 (G1 1/4)	25	003H6910
Weld-on tailpieces	Tailpiece weld-on PN25 DN32 (G1 3/4)	32	003H6911
Weld-on tailpieces	WELD-ON TAILPIECE VM2 DN40	40	065B2006
Weld-on tailpieces	065Z7075 TAILPIECE VM2 DN50	50	065B2007
Thread tailpieces	Tailpiece ext.thr R1/2 PN25 DN15 (G3/4) Tailpiece ext.thr R1/2 PN25 (G3/4)	15	003H6902
Thread tailpieces	Tailpiece ext.thr R3/4 PN25 DN20 (G1)	20	003H6903
Thread tailpieces	Tailpiece ext.thr R1 PN25 DN25 (G1 1/4)	25	003H6904
Thread tailpieces	Tailpiece ext.th R1 1/4 PN25 DN32 (G1 3/4)	32	003H6905
Thread tailpieces	TAILPIECE WITH EXT. THR. VM2 DN40	40	065B2004
Thread tailpieces	TAILPIECE WITH EXT. THR. VM2 DN50	50	065B2005
Immersion pockets	Imm.pocket ,AVT; RAVI/K, 9.5mm,Brass(Sens.170)PN25 Imm.pocket, AVT; RAVI/K, 9.5mm,Brass(Sens.170)PN25		065-4414
Immersion pockets	Imm.pocket,AVT; RAVI/K,9.5mm,SS(Sensor 170),PN25		065-4415
Immersion pockets	Imm.pocket,AVT,16mm,Brass(Sens.210),PN25		065-4416
Immersion pockets	Imm.pocket,AVT,16mm,SS(Sensor 210),PN25		065-4417
Flange tailpieces	Tailpiece flange PN25 DN15 (G3/4)	15	003H6915
Flange tailpieces	Tailpiece flange PN25 DN20 (G1)	20	003H6916
Flange tailpieces	Tailpiece flange PN25 DN25 (G1 1/4)	25	003H6917
Combination pieces	Combination Piece K2, M45 / 2 x M45		003H6855
Combination pieces	Combination Piece K3, M45 / 3 x M45		003H6856
Adapters	Adapter M34 / M45		003H6927

Note:

1. **Immersion pockets 065-4416, 065-4417** - Not for AVT thermostatic actuator code numbers: **065-0604, 065-0605, 065-0606, 065-0607**

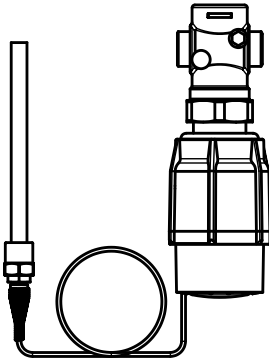
Spare parts code numbers

Type	Description	Valve size	Kvs values [m ³ /h]	Code number
Valve Inserts	Valve insert PN25 15/0,4 VG-flow	DN 15	0.40	003H6869
Valve Inserts	Valve insert PN25 15/1,0 VG-flow	DN 15	1.00	003H6870
Valve Inserts	Valve insert PN25 15/1,6 VG-flow	DN 15	1.60	003H6871
Valve Inserts	Valve insert PN25 15/2,5 VG-flow	DN 15	2.50	003H6872
Valve Inserts	Valve insert PN25 15/4,0 20/4,0 VG-flow	DN 15	4.00	003H6873
Valve Inserts	Valve insert PN25 20/6,3 25/6,3 VG-flow	DN 20	6.30	003H6874
Valve Inserts	Valve insert PN25 25/8 32/10 VG-flow	DN 25	8.00	003H6875
Valve Inserts	Valve ins PN25 32/12,5 40/16 50/20 VGflo	DN 32	12.50	003H6876
Stuffing box kits	Sensor stuffingbox set for AVT R 1/2#			065-4420
Stuffing box kits	Sensor stuffingbox set for AVT(-U) R 3/4			065-4421

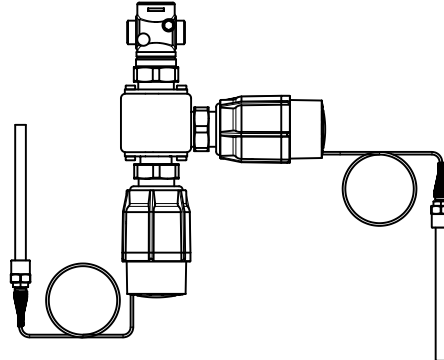
Overview

Product portfolio

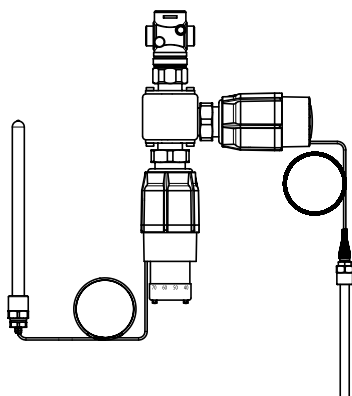
Combinations



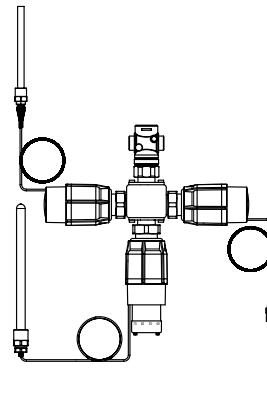
AVT / VG
- temperature controller



AVT / AVT / VG
- two temperature controllers



STM / AVT / VG
- temperature controller with safety temperature monitor



STM / AVT / AVT / VG
- two temperature controllers with safety temperature monitor

Example:

Temperature controller with safety temperature monitor, DN 15; k_{vs} 1.6 ; PN 25; setting range 40 ... 90 °C; T_{max} 150 °C; ext. thread

- 1×VG DN 15 valve

Code No: **065B0772**

- 1×AVT thermostatic actuator, 40 ... 90 °C

Code No: **065-0598**

- 1×STM thermostat, 30 ... 110 °C

Code No: **065-0608**

- 1×K2 combination piece

Code No: **003H6855**

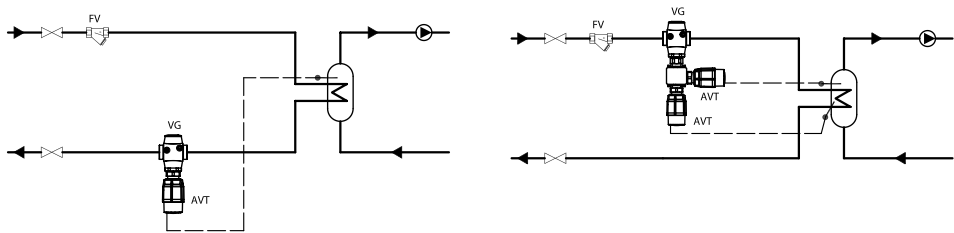
Products will be delivered separately.

Note: For safety temperature monitor STM / VG(F) data and safety temperature limiter STLV data see relevant data sheet.



Application examples

Application principles



Functions

Medium temperature changes cause pressure changes in temperature sensor. Resulting pressure is being transferred through the capillary tube to the bellows. Bellows moves thermostat stem and opens or closes the valve. By increasing of medium temperature valve cone moves towards the seat (valve closes), by decreasing of medium temperature valve cone moves away from the seat (valve opens).

Handle for temperature setting can be sealed.

Settings

Temperature setting

Temperature setting is being done by the adjustment of the setting spring for temperature control. The adjustment can be done by means of handle for temperature setting and/or temperature indicators.

Adjustment diagram

Temperature setting

Relation between scale numbers 1-5 and closing temperature.

Note: The values given are approximate.

AVT Thermostat ... 170 mm, 210 mm

I	II	III	IIII	IIIII	
-10	3	15	28	40	°C
20	33	45	58	70	
40	53	65	78	90	
60	73	85	98	110	

AVT Thermostat ... 255 mm

I	II	III	IIII	IIIII	
10	19	28	36	45	°C
35	44	53	61	70	
60	70	80	90	100	
85	95	105	115	125	

Product details

General data

Technical data

Valves

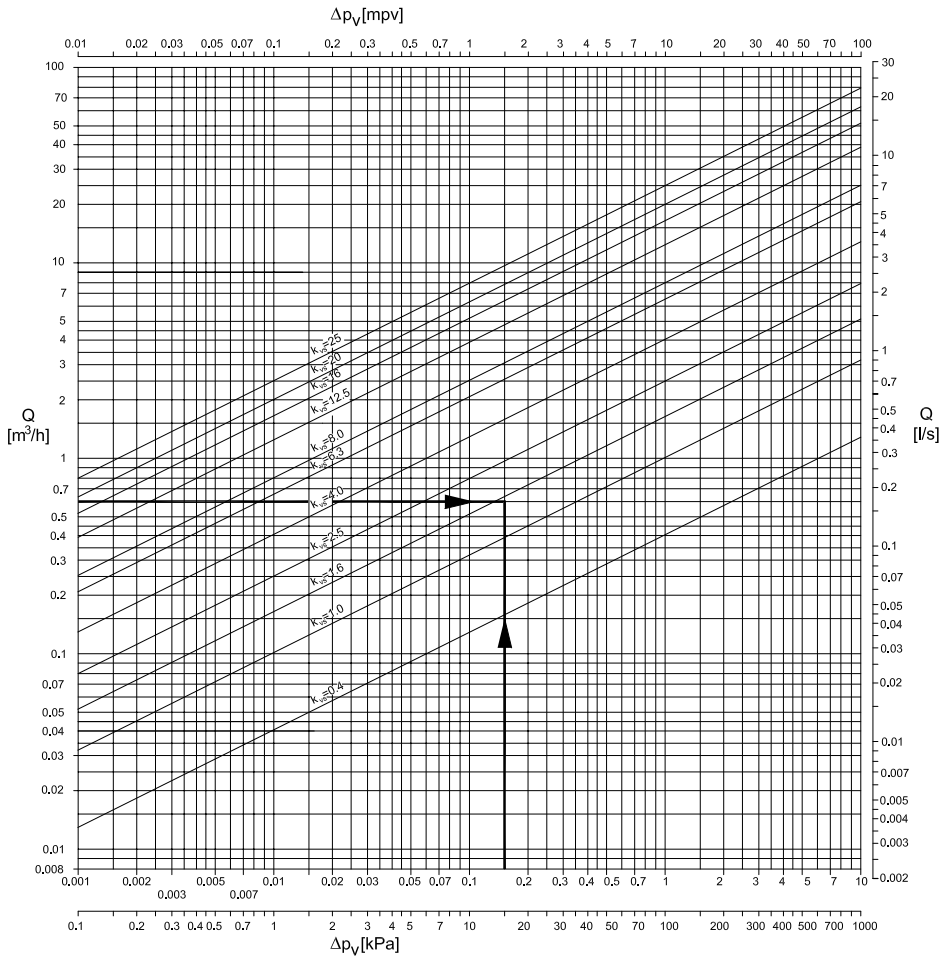
Nominal diameter, DN	15	15	15	15	15	20	25	32	40	50
k_{VS} value (m ³ /h)	0.4	1.0	1.6	2.5	4.0	6.3	8	12.5	16 / 20 ¹⁾	20 / 25 ¹⁾
Stroke (mm)	3	3	5	5	5	5	5	10	10	10
Control ratio	> 1:50	> 1:50	> 1:50	> 1:50	> 1:50	> 1:50	> 1:50	> 1:50	> 1:50	> 1:50
Control characteristic	linear	linear	linear	linear	linear	linear	linear	linear	linear	linear
Cavitation factor z	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.55	≥ 0.55	≥ 0.5	≥ 0.5
Leakage acc. to standard IEC 534, % of k_{VS}	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.05	≤ 0.05	≤ 0.05
Nominal pressure, PN	25	25	25	25	25	25	25	25	25	25
Max. differential pressure (bar)	20	20	20	20	20	20	20	16	16	16
Medium	Circulation water / glycolic water up to 30 %									
Medium pH	Min. 7, max. 10									
Medium temperature (°C)	2 ... 150									
Connections, valve	External thread					External thread, flange				
Connections, tailpieces	Flange, weld-on and external thread							Weld-on and external thread		

¹⁾ Flange valve body

Thermostatic actuator

Setting range X_s (°C)	–10 ... 40 / 20 ... 70 / 40 ... 90 / 60 ... 110 10 ... 45 / 35 ... 70 / 60 ... 100 / 85 ... 125
Time constant T acc. to EN 14597 (s)	max. 50 (170 mm, 210 mm), max. 30 (255 mm)
Gain K_s (mm / °K)	0.2 (170 mm), 0.3 (210 mm), 0.7 (255 mm)
Max. adm. temperature at sensor	50 °C above maximum setpoint
Max. amb. temperature at sensor (°C)	0 ... 70
Nominal pressure sensor, PN	25
Nominal pressure immersion pocket, PN	25
Capillary tube length	5 m (170 mm, 210 mm), 4 m (255 mm)

Valve sizing



Given data:

$$P_{\max} = 14 \text{ kW}$$

$$\Delta t = 20 \text{ K}$$

$$\Delta p_v = 0.15 \text{ bar}$$

$P_{\max}$ - heating power (kW)

Δt - temperature difference (K)

Δp_v - differential pressure across the valve

Maximum flow $Q_{\max}$ (m^3/h) through the valve is calculated according to formula:

$$Q_{\max} = \frac{P_{\max} \times 0.86}{\Delta t} = \frac{14 \times 0.86}{20}$$

$$Q_{\max} = 0.6 \text{ m}^3/\text{h}$$

k_v value is calculated according to formula:

$$k_v = \frac{Q_{\max}}{\sqrt{\Delta p_v}} = \frac{0.6}{\sqrt{0.15}}$$

$$k_v = 1.5 \text{ m}^3/\text{h}$$

Chosen $k_{vs} = 1.6 \text{ m}^3/\text{h}$

or read from the sizing diagram by taking a line through Q scale ($0.6 \text{ m}^3/\text{h}$) and Δp_v scale (0.15 bar) to intersect k_v -scale at $1.5 \text{ m}^3/\text{h}$

Chosen $k_{vs} = 1.6 \text{ m}^3/\text{h}$

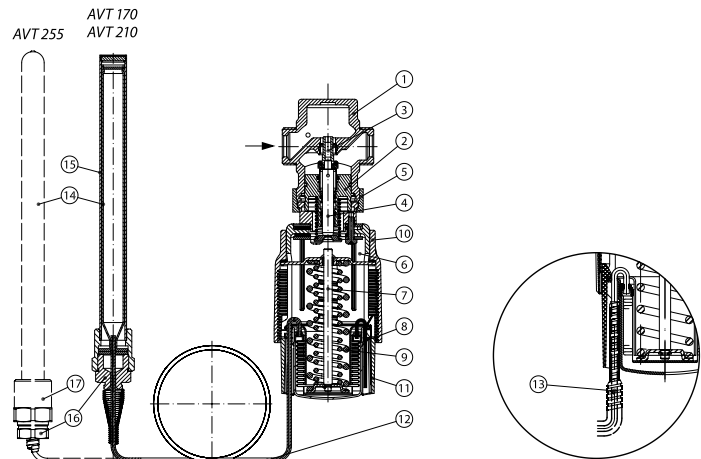
Solution:

The example selects

- 1) ext. thread valve VG DN 15, k_{vs} value 1.6 or
- 2) flange valve VGF DN 15, k_{vs} value 1.6

Design

- 1 Valve VG(F)
- 2 Valve insert
- 3 Pressure relieved valve cone
- 4 Valve stem
- 5 Union nut
- 6 Thermostatic actuator AVT
- 7 Thermostat stem
- 8 Bellows
- 9 Setting spring for temperature control
- 10 Handle for temperature setting, prepared for sealing
- 11 Scale carrier
- 12 Capillary tube
- 13 Flexible protected pipe (only at AVT 255 mm)
- 14 Temperature sensor
- 15 Immersion pocket
- 16 Sensor stuffing box
- 17 Housing of sensor stuffing box



Materials

Valves

Nominal diameter, DN	15	15	15	15	15	20	25	32	40	50
k _{VS} value (m ³ /h)	0.4	1.0	1.6	2.5	4.0	6.3	8	12.5	16 / 20 ¹⁾	20 / 25 ¹⁾
Valve body, thread	Red bronze CuSn5ZnPb (Rg5)							Ductile iron EN-GJS-400-18-LT (GGG 40.3)		
Valve body, flange	-				Ductile iron EN-GJS-400-18-LT (GGG 40.3)					
Valve seat	Stainless steel, mat. No. 1.4571									
Valve cone	Dezincing free brass CuZn36Pb2As									
Sealing	EPDM									
Pressure relieve system	Piston									

¹⁾ Flange valve body

Thermostatic actuator

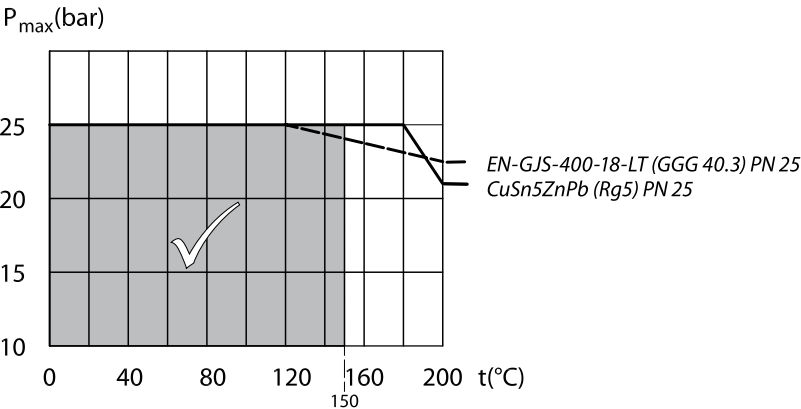
Temperature sensor	Cooper
Immersion pocket ¹⁾ , Ms design	Brass, nickel-plated
Immersion pocket ¹⁾ , Stainless steel design	Mat. No. 1.4571 (170 mm), mat. No. 1.4435 (210 mm)
Handle for temp. setting	Polyamide, glass fiber-reinforced
Scale carrier	Polyamide

¹⁾ for sensor 170 and 210 mm



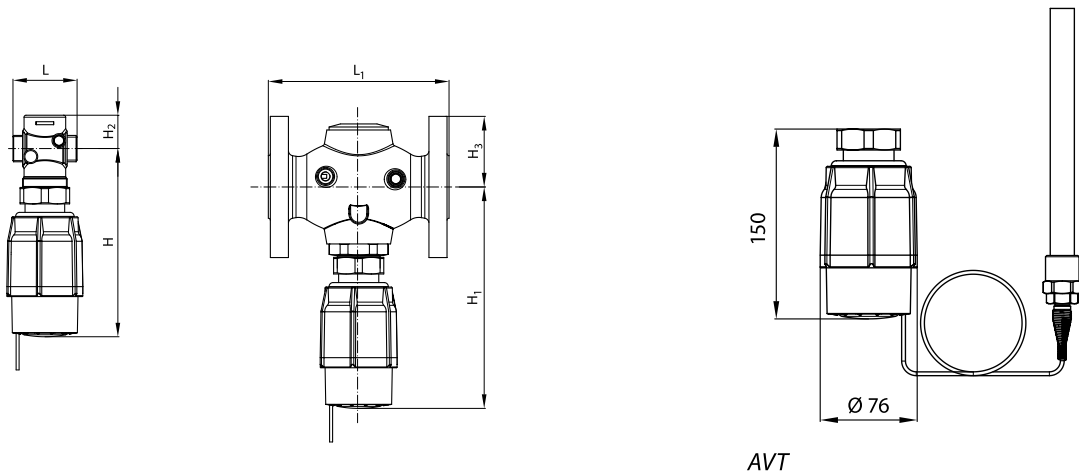
Pressure and temperature data

Pressure temperature diagram



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

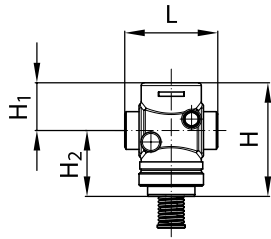
Dimensions



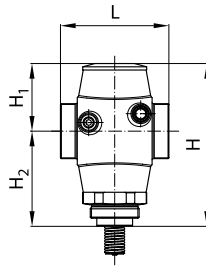
DN	L (mm)	L ₁ (mm)	H (mm)	H ₁ (mm)	H ₂ (mm)	H ₃ (mm)
15	65	130	180	229	34	47
20	70	150	180	229	34	52
25	75	160	180	229	37	57
32	100	180	221	221	62	70
40	110	200	221	221	62	75
50	130	230	221	221	62	82

Note: other flange dimensions - see table for tailpieces.

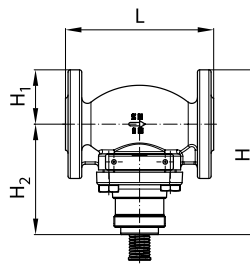
Type	Weight (kg)
sensor 170 mm	1.3
sensor 210 mm	1.5
sensor 255 mm	1.6



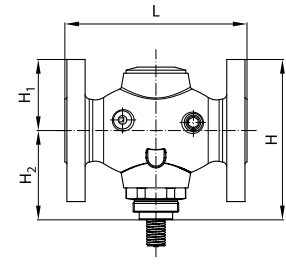
VG DN 15-25



VG DN 32-50



VGF DN 15-25



VGF DN 32-50

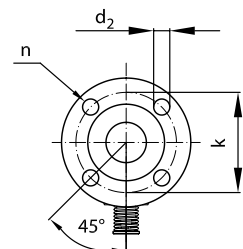
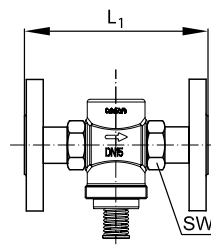
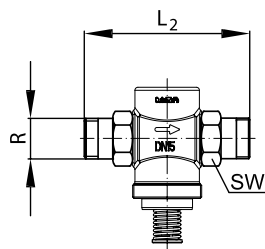
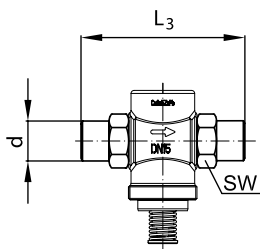
VG

DN	L (mm)	H (mm)	H ₁ (mm)	H ₂ (mm)	Weight (kg)
15	65	80	34	46	0.7
20	70	80	34	46	0.8
25	75	83	37	46	0.9
32	100	151	63	88	3.0
40	110	151	63	88	3.1
50	130	151	63	88	3.8

VGF

DN	L (mm)	H (mm)	H ₁ (mm)	H ₂ (mm)	Weight (kg)
15	130	144	48	96	3.3
20	150	149	53	96	4.1
25	160	154	58	96	4.7
32	180	158	70	88	7.5
40	200	163	75	88	9.0
50	230	171	83	88	11.1

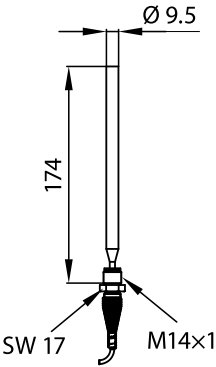
Note: other flange dimensions - see table for tailpieces.



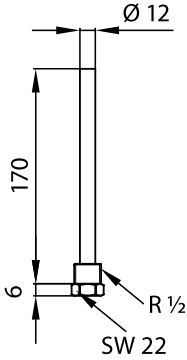
DN	R ¹⁾	SW (mm)	d (mm)	L ₁ (mm) ²⁾	L ₂ (mm)	L ₃ (mm)	k (mm)	d ₂ (mm)	n
15	½	32 (G ¾A)	21	130	131	139	65	14	4
20	¾	41 (G 1A)	26	150	144	154	75	14	4
25	1	50 (G 1 ¼A)	33	160	160	159	85	14	4
32	1 ¼	63 (G 1 ¾A)	42	-	177	184	100	18	4
40	1 ½	70 (G 2A)	47	-	195	204	110	18	4
50	2	82 (G 2 ½A)	60	-	252	234	125	18	4

¹⁾ Conical ext. thread acc. to EN 10226-1

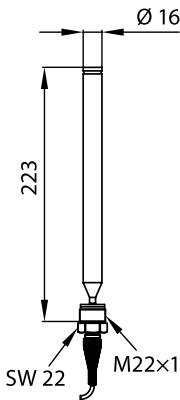
²⁾ Flanges PN 25, acc. to EN 1092-2



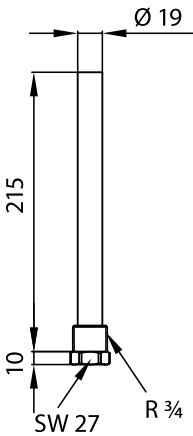
AVT 170



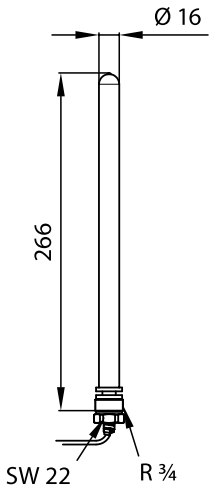
AVT 170
Immersion pocket



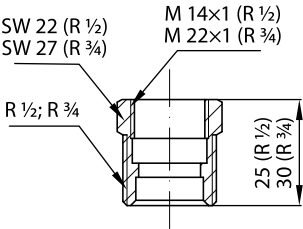
AVT 210



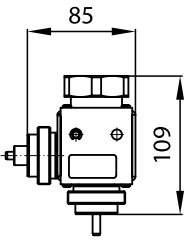
AVT 210
Immersion pocket



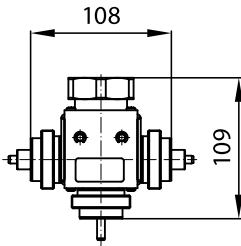
AVT 255



Housing of sensor stuffing box



Combination piece K2



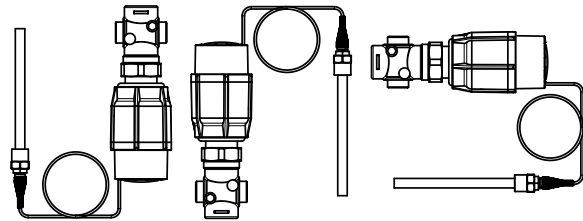
Combination piece K3

Installation

Installation positions

Temperature controller

Temperature controller AVT / VG(F) can be installed in any position.

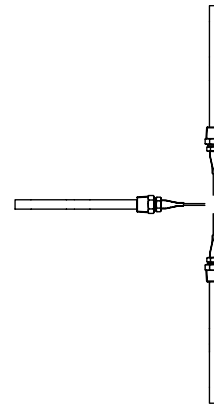


Temperature sensor

The place of installation must be chosen in a way that the temperature of the medium is directly taken without any delay. Avoid overheating of temperature sensor. The temperature sensor must be immersed into the medium in its full length.

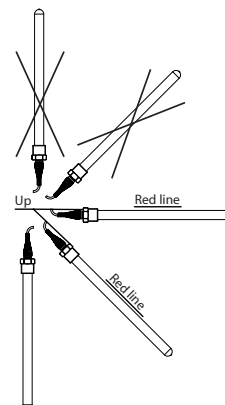
Temperature sensors 170 mm R ½ and 210 mm R ¾

- The temperature sensor may be installed in any position.



Temperature sensor 255 mm R ¾

- The temperature sensor must be installed as shown on the picture.



Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Issuer	Approval topic
EAC Declaration	EAC KZ 7100841.13.12.02339	EAC - Eurasian Customs Union	MD
UA Declaration	Danfoss UA 10.01.23 Heat Control Valves	Danfoss	
Electrical Safety Certificate	TR(TW)700	DIN CERTCO	
Export Control Declaration	Actuators pressure flow and temperature	Danfoss	
Pressure Safety Certificate	Certificate B (UA.TR.131.B.2655-26) Control valves	Academtest LLC	Pressure
Pressure Safety Certificate	Certificate D (UA.TR.131.B.2655-26) Control valves	Academtest LLC	Pressure
Pressure Safety Certificate	Declaration Control valves	Danfoss	Pressure
EU Declaration	PL08-28_230612EN0854103_EU declaration of conformity_rev6_Control Valves.docx.pdf	Danfoss	Pressure, PED
EU Declaration	Packaging EU Declaration of Conformity 260707EN0801	Danfoss	Packaging, PPWR

Contact details

Online support

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