

Data sheet

Temperature controller for heating (PN 25)

AVT / VG - external thread

AVT / VGF - flange

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)

It can be used in mixing loops and room heating systems as well.

Controller closes on rising temperature.

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.

Main data:

- DN 15-50
- k_{vs} 0,4-25 m³/h
- PN 25
- Setting ranges:
-10 ... 40°C/20 ... 70°C/40 ... 90°C/60 ... 110°C and
10 ... 45°C/35 ... 70°C/60 ... 100°C/85 ... 125°C
- Temperature:
- Circ. water/glycolic water up to 30%:
2 ... 150 °C
- Connections:
- Ext. thread (weld-on, thread and flange tailpieces)
- Flange
- Flow and return mounting.

Ordering

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:

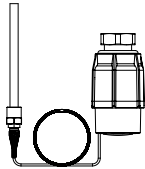
- 1× Weld-on tailpieces
Code No: **003H6908**

VG, VGF valve

Picture	DN (mm)	k_{vs} (m ³ /h)	Connection	Code No.
	15	0,4	Cylindrical external thread acc. to ISO 228 / 1	065B0770
		1,0		065B0771
		1,6		065B0772
		2,5		065B0773
		4,0		065B0774
	20	6,3		065B0775
	25	8,0		065B0776
	32	12,5		065B0777
	40	16		065B0778
	50	20		065B0779
	15	4,0	Flanges PN 25, acc. to EN 1092-2	065B0780
	20	6,3		065B0781
	25	8,0		065B0782
	32	12,5		065B0783
	40	20		065B0784
	50	25		065B0785

Ordering (continuous)

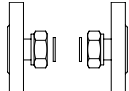
AVT thermostatic actuator

Picture	For valves	Setting range (°C)	Temperature sensor with brass immersion pocket, length, connection	Code No.
	DN 15-25	-10 ... +40	170 mm, R ½ ¹⁾	065-0596
		20 ... 70		065-0597
		40 ... 90		065-0598
		60 ... 110		065-0599
	DN 32-50	-10 ... +40	210 mm, R ¾ ¹⁾	065-0600
		20 ... 70		065-0601
		40 ... 90		065-0602
		60 ... 110		065-0603
	DN 15-50	10 ... 45	255 mm, R ¾ ^{1) 2)}	065-0604
		35 ... 70		065-0605
		60 ... 100		065-0606
		85 ... 125		065-0607

¹⁾ conic male thread EN 10226

²⁾ without immersion pocket

Accessories for valves

Picture	Type designation	DN	Connection	Code No.
	Weld-on tailpieces	15	-	003H6908
		20		003H6909
		25		003H6910
		32		003H6911
		40		003H6912
		50		003H6913
	External thread tailpieces	15	Conical ext. thread acc. to EN 10226-1	R ½ 003H6902
		20		R ¾ 003H6903
		25		R 1 003H6904
		32		R 1¼ 003H6905
		40		R 1½ 065F6061
		50		R 2 065F6062
	Flange tailpieces	15	Flanges PN 25, acc. to EN 1092-2	003H6915
		20		003H6916
		25		003H6917

Accessories for thermostats

Accessories for thermostats					
Picture	Type designation	PN	For valves	Material	Code No.
	Immersion pocket	25	DN 15-25	Brass	065-4414 ¹⁾
				Stainless steel, mat. No. 1.4571	065-4415 ¹⁾
			DN 32-50	Brass	065-4416 ¹⁾
				Stainless steel, mat. No. 1.4435	065-4417 ¹⁾
	Combination piece K2				003H6855
	Combination piece K3				003H6856

¹⁾ Not for AVT thermostatic actuator code numbers: 065-0604, 065-0605, 065-0606, 065-0607

Service kits

Picture	Type designation	DN (mm)	k _{VS} (m³/h)	Code No.
	Valve insert	15	0,4	003H6869
			1,0	003H6870
			1,6	003H6871
			2,5	003H6872
			4,0	003H6873
		20	6,3	003H6874
		25	8,0	003H6875
	Housing of sensor stuffing box	32/40/50	125/16/20/25	003H6876
		for sensors		Code No.
		AVT R ½		065-4420
		AVT R ¾		065-4421

Technical data

Valves

Nominal diameter		DN	15						20	25	32	40	50
k _{vs} value		m³/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		5						10		
Control ratio			> 1:50										
Control characteristic			linear										
Cavitation factor z			≥ 0,6						≥ 0,55		≥ 0,5		
Leakage acc. to standard IEC 534	% of k _{vs}		≤ 0,02							≤ 0,05			
Nominal pressure	PN		25										
Max. differential pressure	bar		20							16			
Medium			Circulation water / glycolic water up to 30%										
Medium pH			Min. 7, max. 10										
Medium temperature		°C	2 ... 150										
Connections	valve		External thread										
		-	Flange										
	tailpieces		Weld-on and external thread										
			Flange								-		
Materials													
Valve body	thread		Red bronze CuSn5ZnPb (Rg5)							Ductile iron EN-GJS-400-18-LT (GGG 40.3)			
	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										

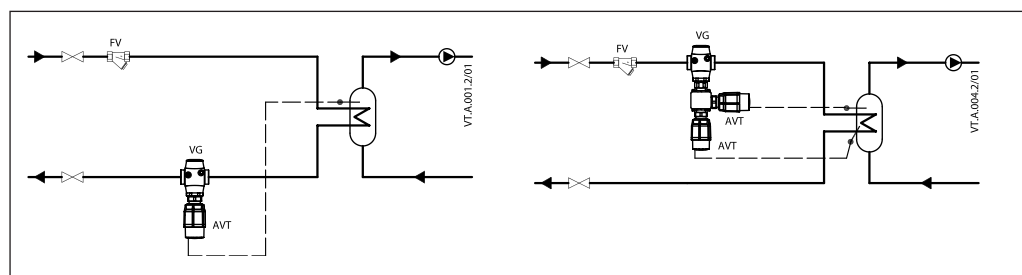
¹⁾ Flange valve body

Thermostatic actuator

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		
Capillary tube length		5 m (170 mm, 210 mm), 4 m (255 mm)
Materials		
Temperature sensor		Cooper
Immersion pocket ¹⁾	Ms design	Brass, nickel-plated
	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

Application principles



Combinations

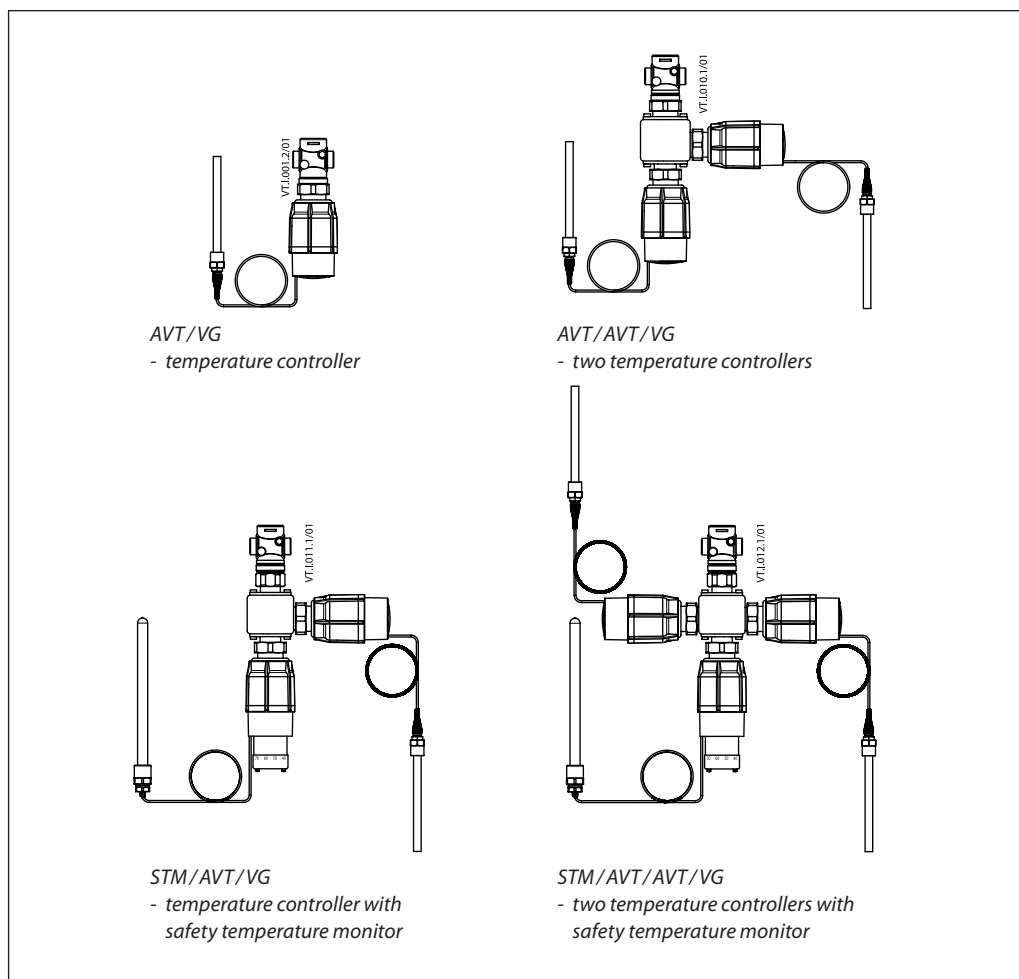
Example:
 Temperature controller with safety
 temperature monitor, DN 15; k_{VS} 1,6;
 PN 25; setting range 40 ... 90 °C;
 T_{max} 150 °C; ext. thread

- 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

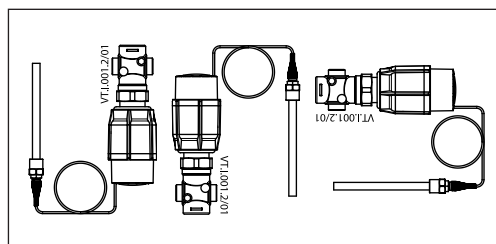
Note:

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



Installation positions

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



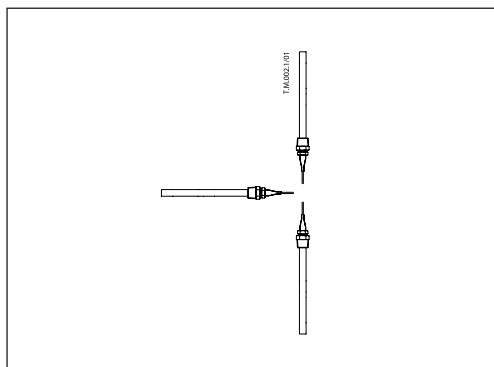
Installation positions
(continuous)

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.

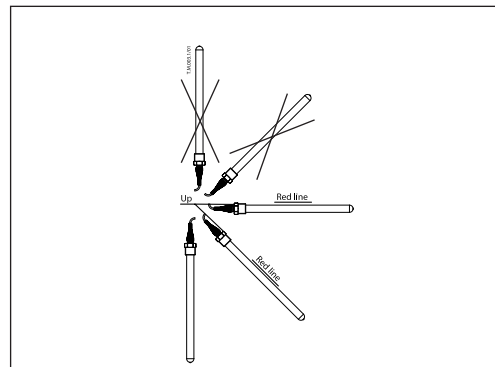
Temperature sensors 170 mm R ½ and 210 mm R ¾

- The temperature sensor may be installed in any position.

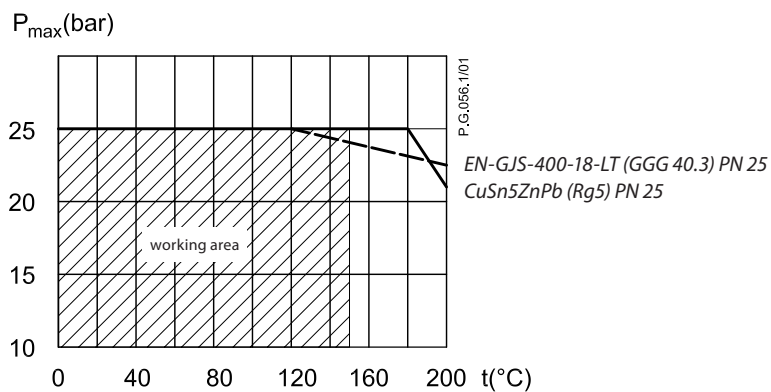


Temperature sensor 255 mm R ¾

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

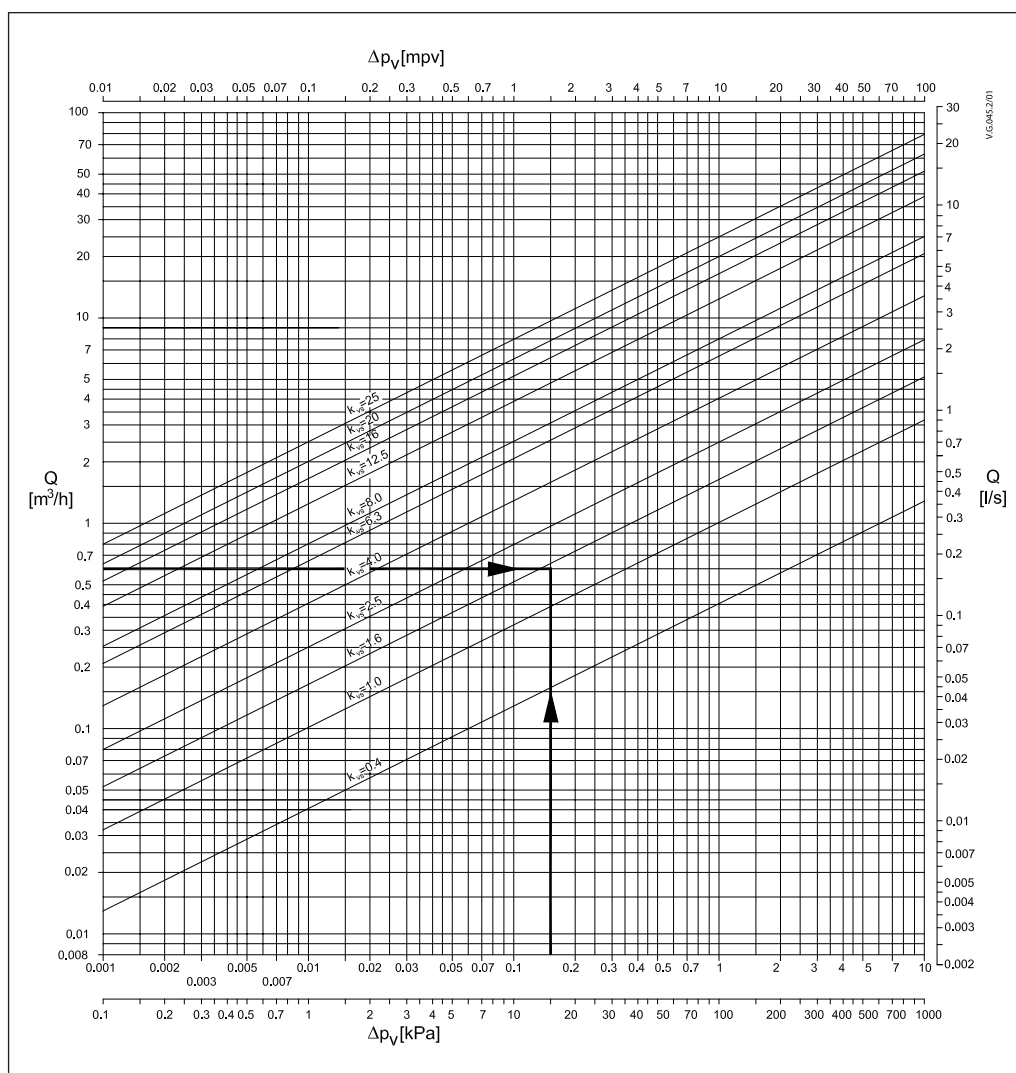


Pressure temperature diagram



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

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

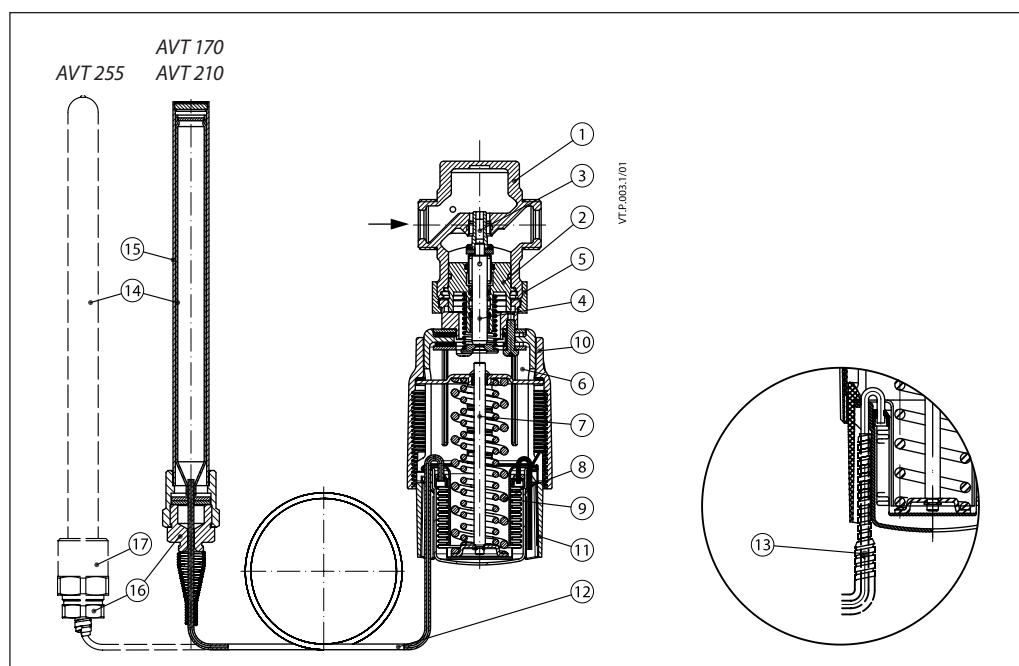
Solution:

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



Function

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

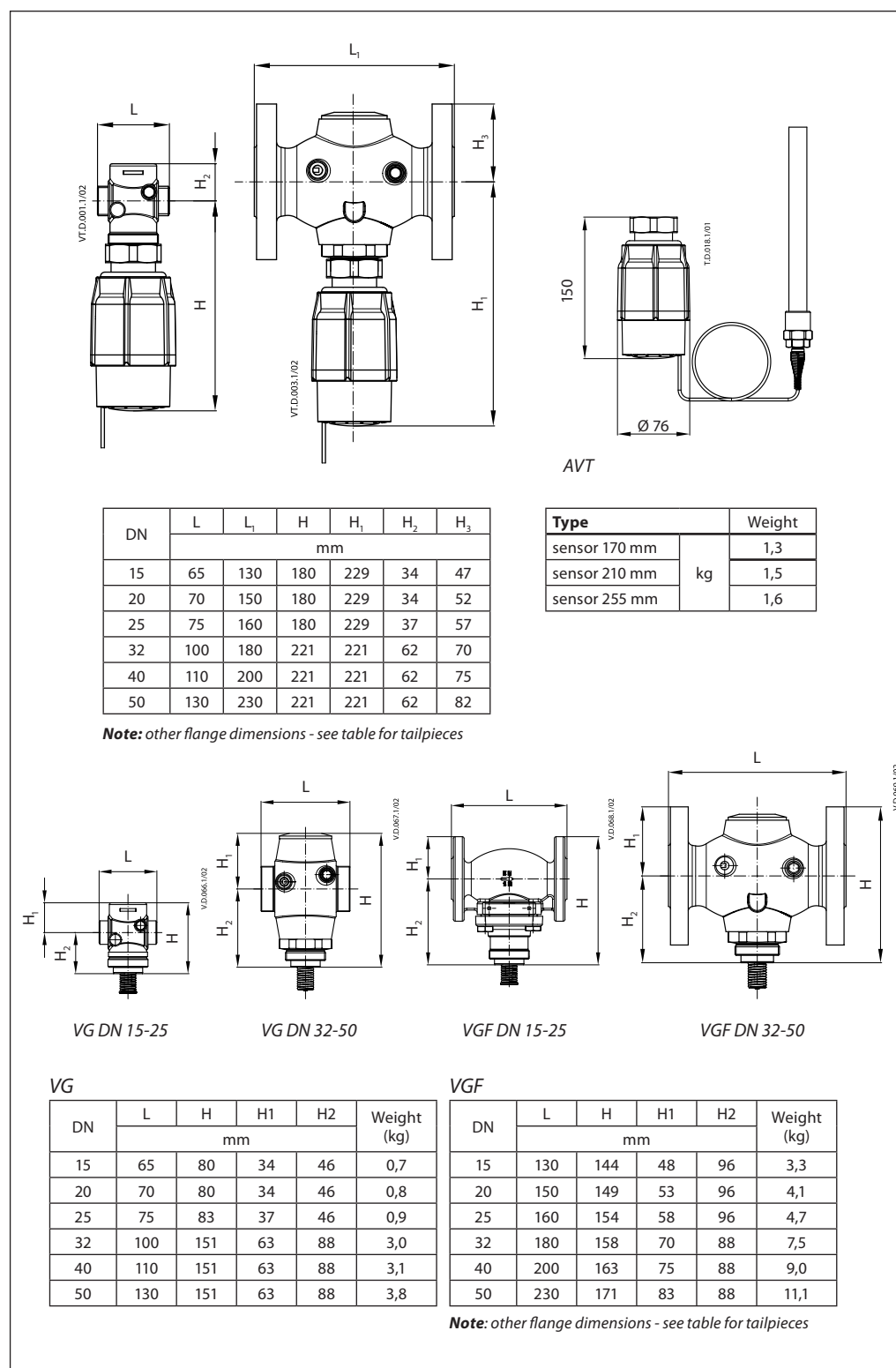
Relation between scale numbers 1-5 and closing temperature.

Note: The values given are approximate

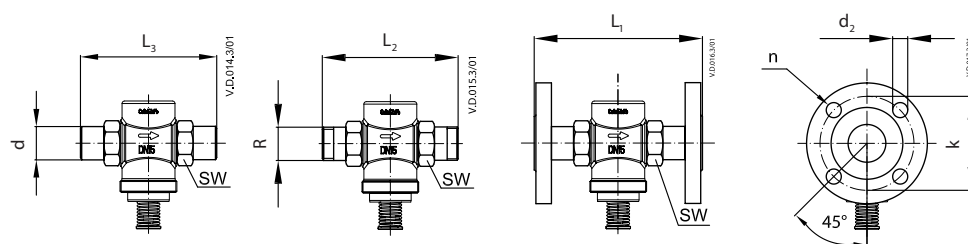
AVT Thermostat ... 170 mm, 210 mm					
I	II	III	III	IIII	°C
-10	3	15	28	40	
20	33	45	58	70	
40	53	65	78	90	
60	73	85	98	110	

AVT Thermostat ... 255 mm					
I	II	III	III	IIII	°C
10	19	28	36	45	
35	44	53	61	70	
60	70	80	90	100	
85	95	105	115	125	

Dimensions



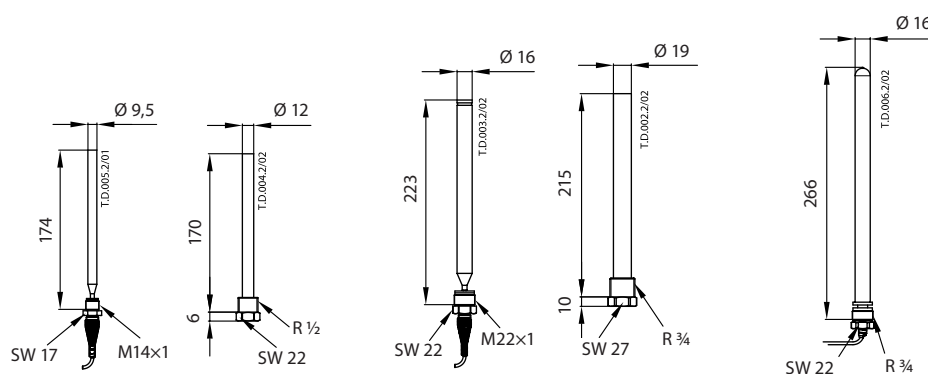
Dimensions (continuous)



DN	R ¹⁾	SW	d	L ₁ ²⁾	L ₂	L ₃	k	d ₂	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 1¼A)	33	160	160	159	85	14	4
32	1¼	63 (G 1¾A)	42	-	177	184	100	18	4
40	1 ½	70 (G 2A)	47	-	195	204	110	18	4
50	2	82 (G 2½A)	60	-	252	234	125	18	4

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

²⁾ Flanges PN 25, acc. to EN 1092-2



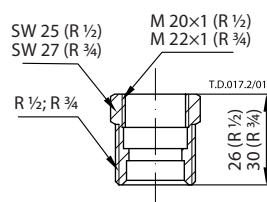
AVT 170

AVT 170
Immersion pocket

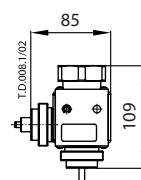
AVT 210

AVT 210
Immersion pocket

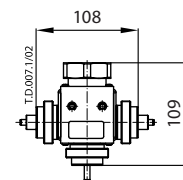
AVT 255



Housing of sensor
stuffing box



Combination piece K2



Combination piece K3

