

Data sheet

Temperature controller for heating (PN 25)

AVT / VG - external thread

AVT / VGF - flange

Description



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.

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)

Ordering

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

- 1x VG DN 15 valve
Code No: **065B0772**
- 1x AVT thermostatic actuator,
40 ... 90 °C
Code No: **065-0598**

Option:
- 1x 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		G 1 A	065B0775
	25	8.0		G 1¼ A	065B0776
	32	12.5		G 1¾ A	065B0777
	40	16		G 2 A	065B0778
	50	20		G 2½ A	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 1/2 ¹⁾	065-0596
		20 ... 70		065-0597
		40 ... 90		065-0598
		60 ... 110		065-0599
	DN 32-50	-10 ... +40	210 mm, R 3/4 ¹⁾	065-0600
		20 ... 70		065-0601
		40 ... 90		065-0602
		60 ... 110		065-0603
	DN 15-50	10 ... 45	255 mm, R 3/4 ^{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		065B2006
		50		065B2007
	External thread tailpieces	15	Conical ext. thread acc. to EN 10226-1	R 1/2 003H6902
		20		R 3/4 003H6903
		25		R 1 003H6904
		32		R 1 1/4 003H6905
		40		R 1 1/2 065B2004
		50		R 2 065B2005
	Flange tailpieces	15	Flanges PN 25, acc. to EN 1092-2	003H6915
		20		003H6916
		25		003H6917

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} (m ³ /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
		32/40/50	125/16/20/25	003H6876
	Housing of sensor stuffing box	for sensors		Code No.
		AVT 170 R 1/2		065-4420
		AVT 210, 255 R 3/4		065-4421

Technical data

Valves

Nominal diameter	DN	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			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										
	tailpieces	-					Flange					
		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										

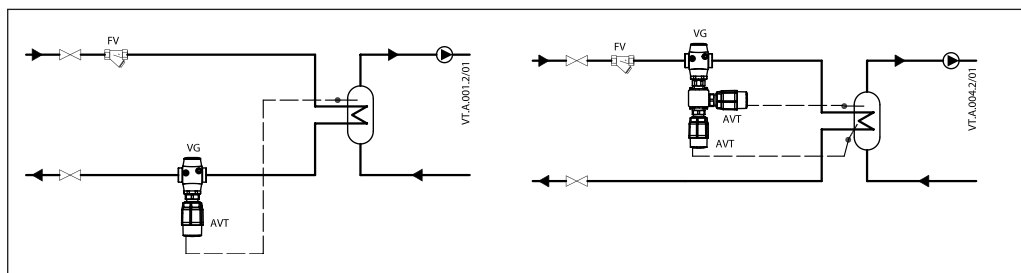
¹⁾ Flange valve body

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



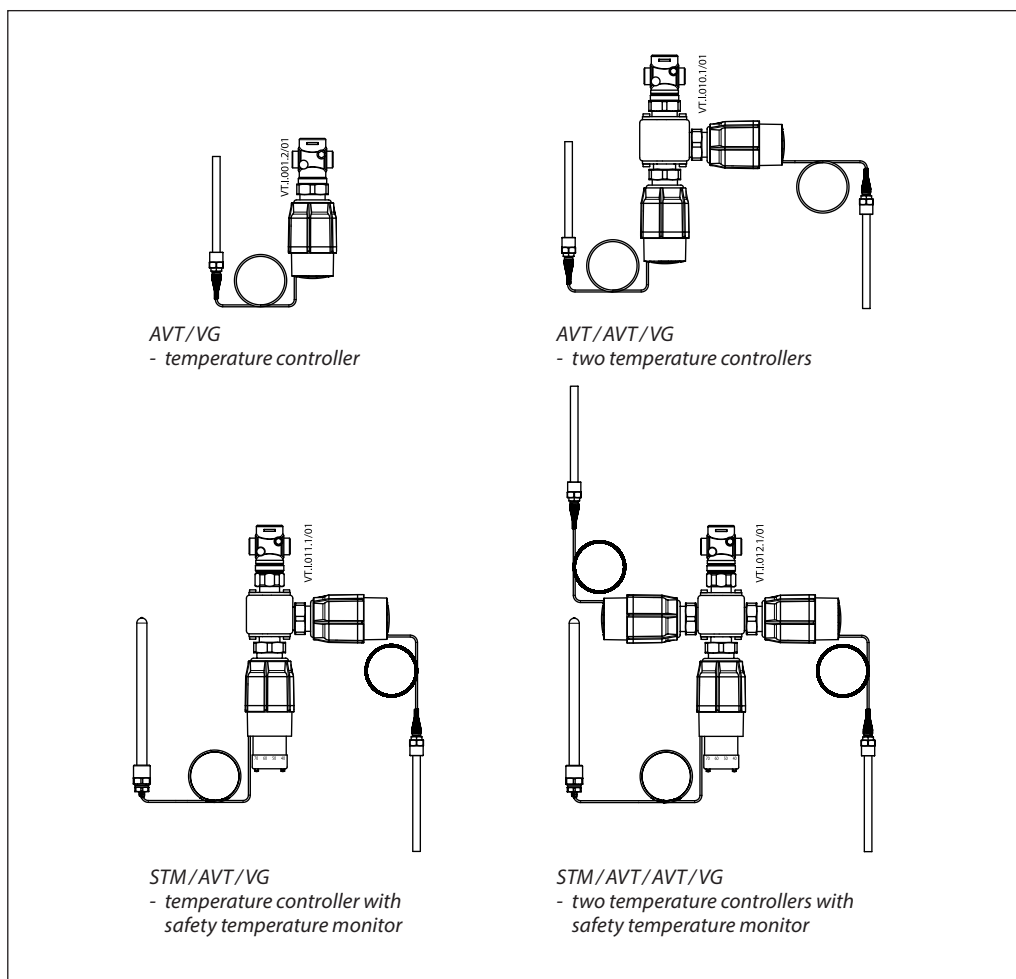
Combinations

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

- 1x VG DN 15 valve
Code No: **065B0772**
- 1x AVT thermostatic actuator,
40 ... 90 °C
Code No: **065-0598**
- 1x STM thermostat, 30 ... 110 °C
Code No: **065-0608**
- 1x K2 combination piece
Code No: **003H6855**

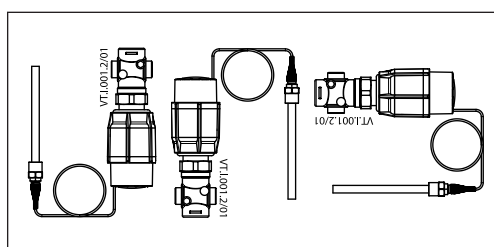
Products will be delivered separately

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

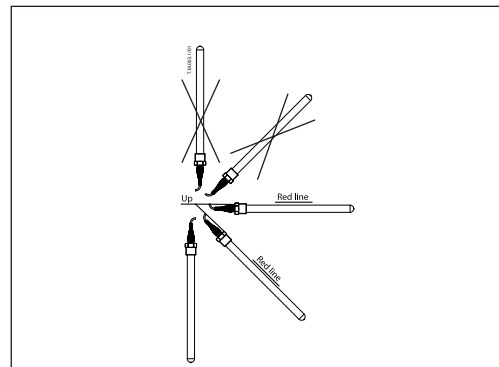
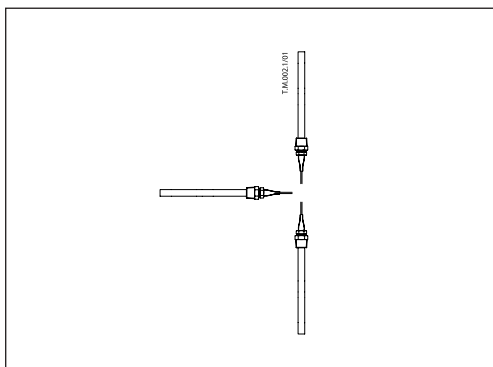
The place of installation must be chosen in a way that the temperature of the medium is directly taken without any delay. Avoid overheating of temperature sensor. The temperature sensor must be immersed into the medium in its full length.

Temperature sensors 170 mm R 1/2 and 210 mm R 3/4

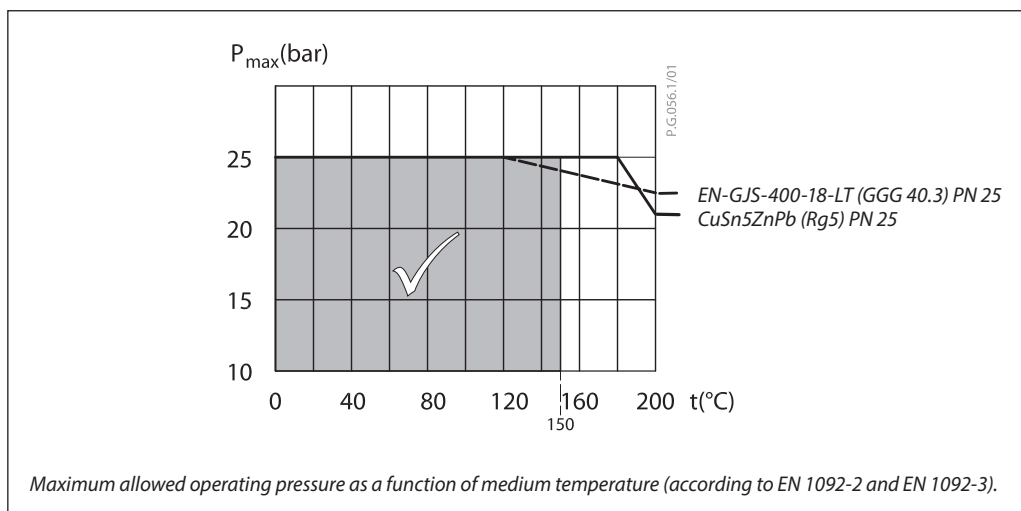
- The temperature sensor may be installed in any position.

Temperature sensor 255 mm R 3/4

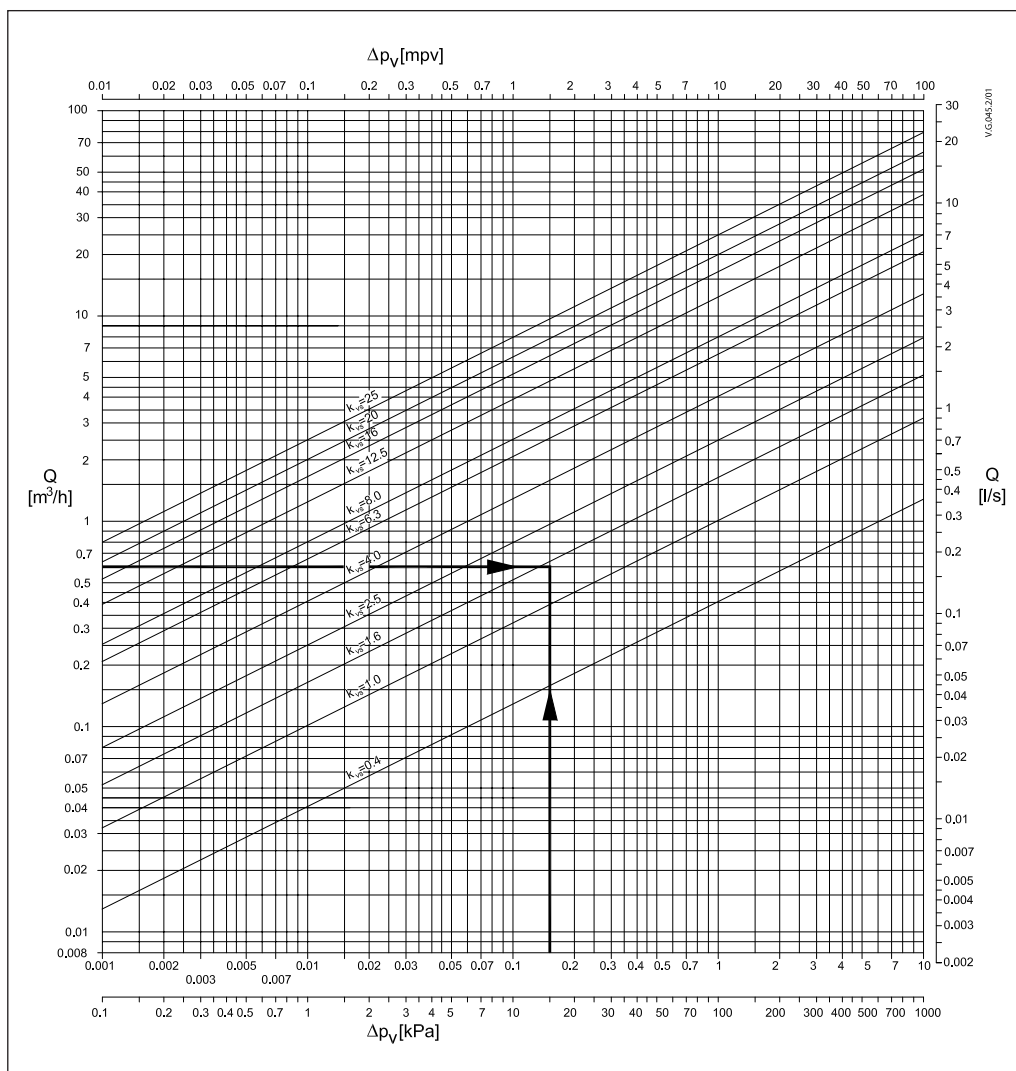
- The temperature sensor must be installed as shown on the picture.



Pressure temperature diagram



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} (m³/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 m³/h) and Δp_v scale (0.15 bar) to intersect k_v -scale at 1.5 m³/h

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

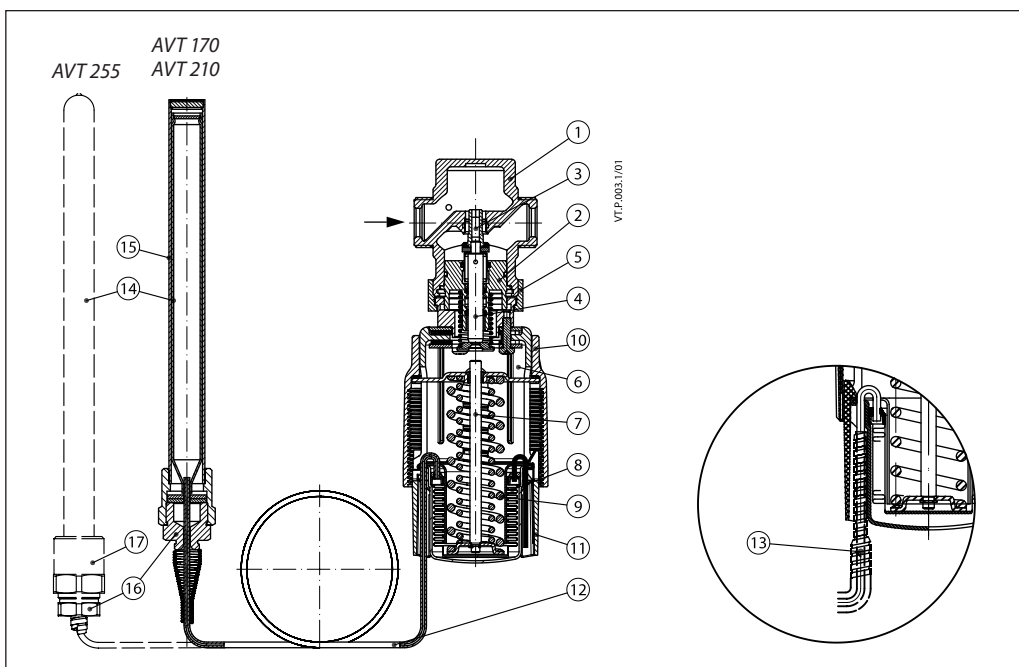
Solution:

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

Dimensions

The technical drawings show the AVT, VG, and VGF temperature controllers. The AVT drawing includes a side view with dimensions L, H₂, and H, and a top view with dimensions L₁, H₃, and H₁. A detail of the sensor is shown with a height of 150 mm and a diameter of Ø 76 mm. The VG and VGF drawings show side and top views with dimensions L, H₁, H₂, and H.

DN	L	L ₁	H	H ₁	H ₂	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

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

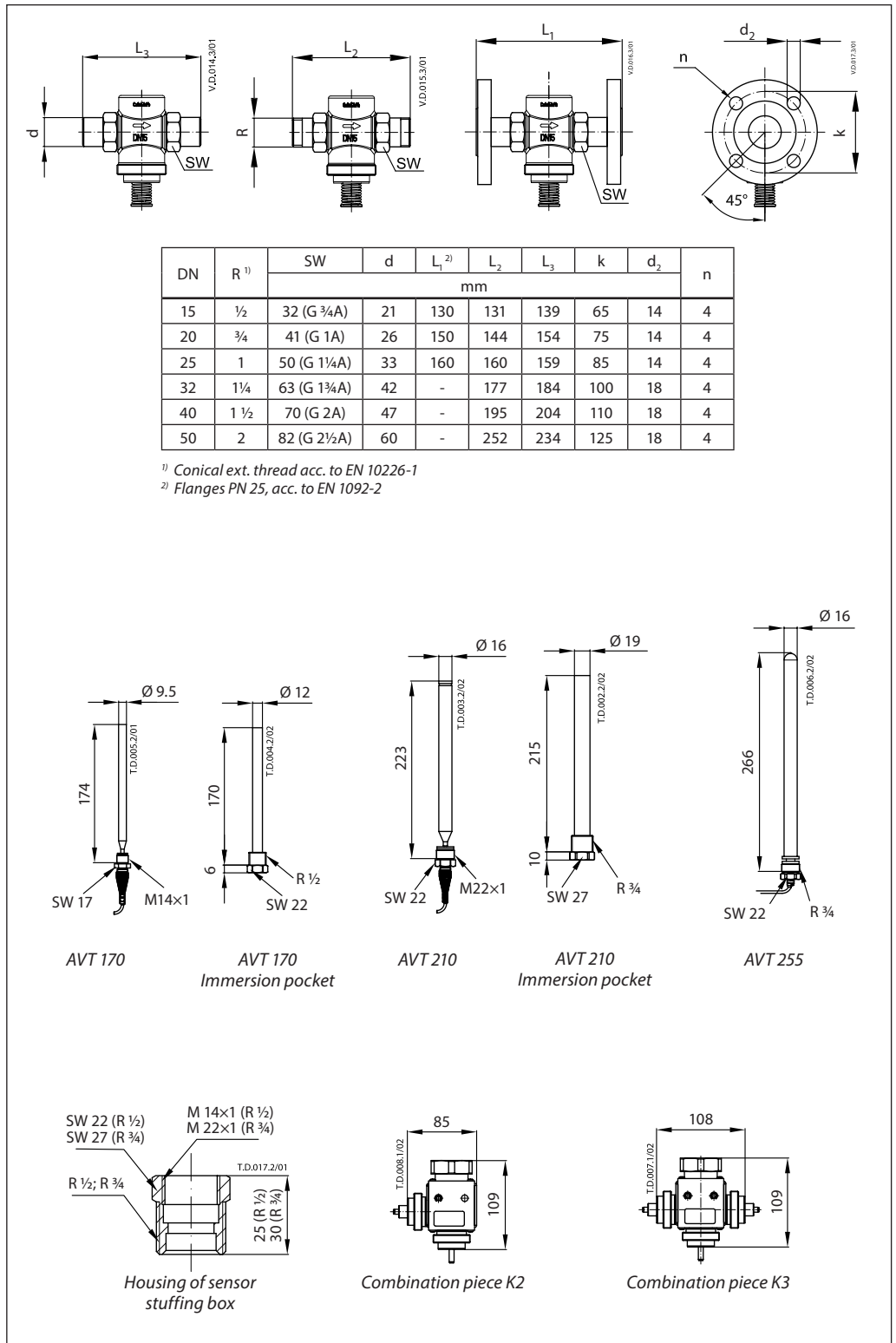
Note: other flange dimensions - see table for tailpieces

DN	L	H	H ₁	H ₂	Weight (kg)
	mm				
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

DN	L	H	H ₁	H ₂	Weight (kg)
	mm				
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

Dimensions (continuous)





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