

Data sheet

Temperature controller (NC) (PN 25)

AVT / VGU - external thread

AVT / VGUF - flange

Description



Geprüft TR(TW)700



The AVT / VGU(F) is a self-acting proportional temperature controller developed primarily for cooling applications.

Controller opens on rising temperature.

The controller has a control valve VGU(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.

Main data:

- DN 15-50
- k_{vs} 4.0 -25 m³/h
- PN 25
- Setting ranges:
-10 ... 40 °C / 20 ... 70 °C / 40 ... 90 °C / 60 ... 110 °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:

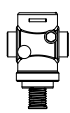
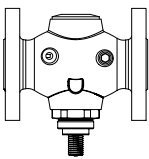
Temperature controller for cooling,
DN 15; k_{vs} 4.0; PN 25; setting range
-10 ... 40 °C; T_{max} 150 °C; ext. thread

- 1x VGU DN 15 valve
Code No: **065B0791**
- 1x AVT thermostatic actuator,
-10 ... 40 °C
Code No: **065-0596**

Option:

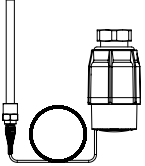
- 1x Weld-on tailpieces
Code No: **003H6908**

VGU, VGUF valve

Picture	DN (mm)	k_{vs} (m ³ /h)	Connection	Code No.
	15	4.0	Cylindrical external thread acc. to ISO 228/1	G 3/4 A 065B0791
	20	6.3		G 1 A 065B0792
	25	8.0		G 1 1/4 A 065B0793
	32	12.5		G 1 3/4 A 065B0794
	40	16		G 2 A 065B0795
	50	20		G 2 1/2 A 065B0796
	32	12.5	Flanges PN 25, acc. to EN 1092-2	065B0797
	40	20		065B0798
	50	25		065B0799

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) 3)}	065-0604
		35 ... 70		065-0605
		60 ... 100		065-0606
		85 ... 125		065-0607

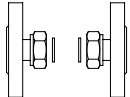
¹⁾ conic male thread EN 10226

²⁾ without immersion pocket

³⁾ setting range is for approx. 5-10 °C higher as stated (see Adjustment diagram section)

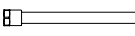
Accessories for valves

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 ½003H6902
		20		R ¾003H6903
		25		R 1003H6904
		32		R 1¼003H6905
		40		R 1½065B2004
		50		R 2065B2005
	Flange tailpieces	15	Flanges PN 25, acc. to EN 1092-2	003H6915
		20		003H6916
		25		003H6917
	Adapter ¹⁾	M45 × 1.5 mm / M30 × 1.5 mm		003H6928

¹⁾ Adapter for VGU(F) combinations with electrical actuators type AMV(E) 20, 23, 30, 33.

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⁾

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

Service kits

Picture	Type designation	for sensors	Code No.
	Housing of sensor stuffing box	AVT R ½	065-4420
		AVT R ¾	065-4421

Technical data

Valves

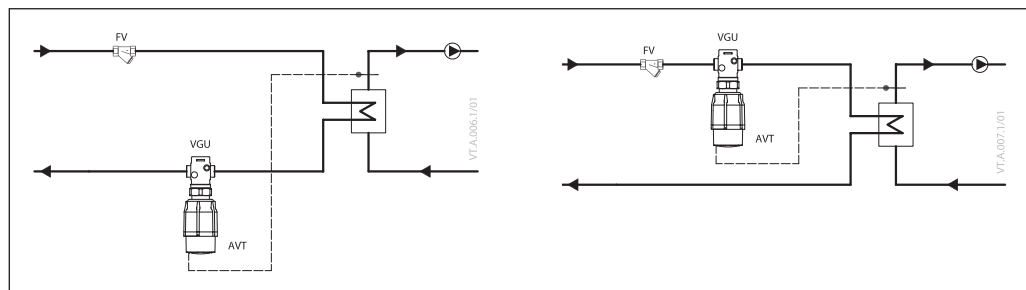
Nominal diameter	DN	15	20	25	32	40	50
k _{vs} value	m³/h	4.0	6.3	8.0	12.5	20	25
Stroke	mm	5					
Control ratio		>1:50					
Control characteristic		linear					
Cavitation factor z		≥ 0.6		≥ 0.55		≥ 0.5	
Leakage acc. to standard IEC 534	% of k _{vs}	≤ 0.02			≤ 0.05		
Nominal pressure	PN	25					
Max. differential 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			External thread and flange		
	tailpieces	Weld-on and external thread					
		Flange			-		
Materials							
Valve body		Red bronze CuSn5ZnPb (Rg5)			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					

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

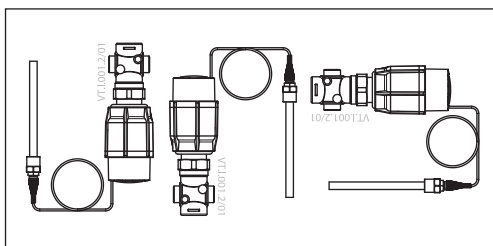
Application principles



Installation positions

Temperature controller

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

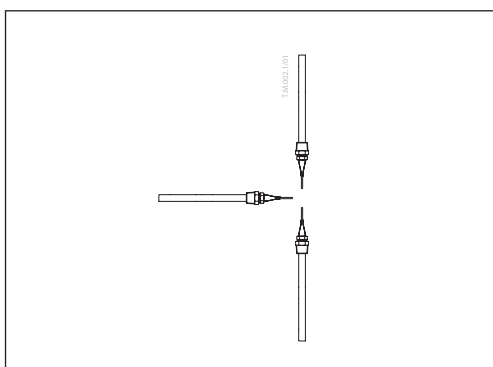


Temperature sensor

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.

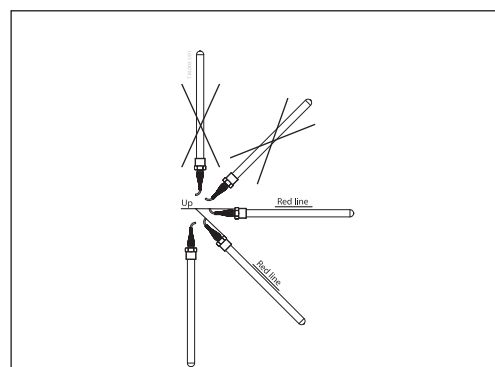
Temperature sensors 170 mm R 1/2 and 210 mm R 3/4

- The temperature sensor may be installed in any position.

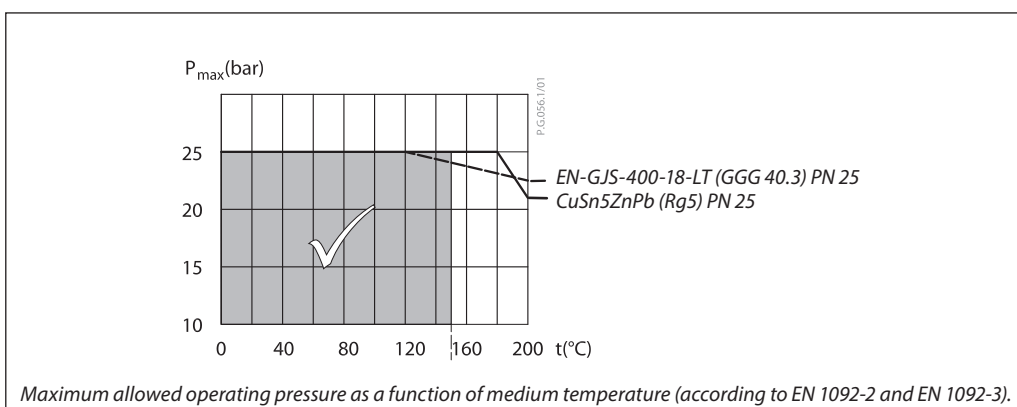


Temperature sensor 255 mm R 3/4

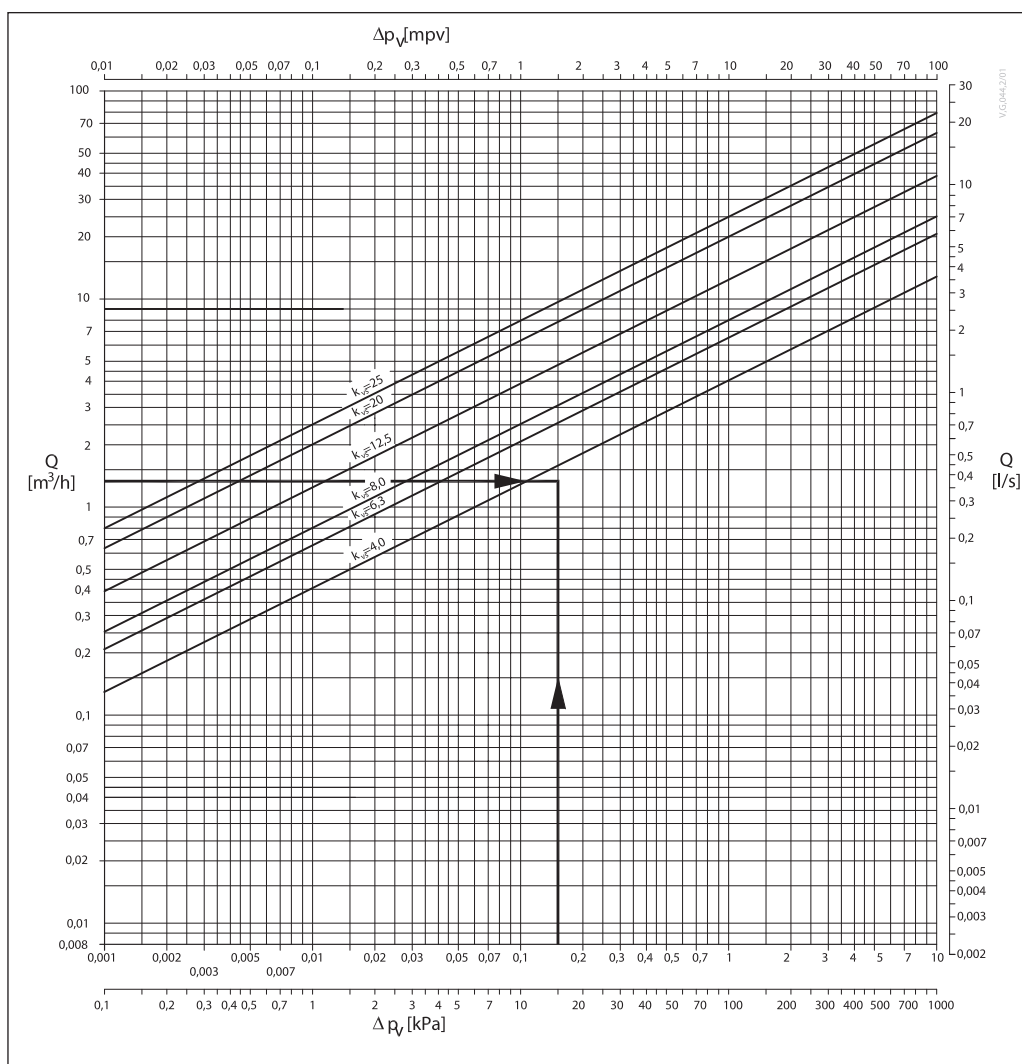
- The temperature sensor must be installed as shown on the picture.



Pressure temperature diagram



Valve sizing



Given data:

$$P_{\max} = 10 \text{ kW}$$

$$\Delta t = 6 \text{ K}$$

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

$P_{\max}$ - cooling 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:

$$Q_{\max} = \frac{P_{\max} \times 0.86}{\Delta t} = \frac{10 \times 0.86}{6}$$

$$Q_{\max} = 1.43 \text{ m}^3/\text{h}$$

k_v value is calculated according to formula:

$$k_v = \frac{Q_{\max}}{\sqrt{\Delta p_v}} = \frac{1.43}{\sqrt{0.15}}$$

$$k_v = 3.7 \text{ m}^3/\text{h}$$

Chosen $k_{v5} = 4.0 \text{ m}^3/\text{h}$

or

read from the sizing diagram by taking a line through Q scale ($1.43 \text{ m}^3/\text{h}$) and Δp_v scale (0.15 bar) to intersect k_v -scale at $3.7 \text{ m}^3/\text{h}$

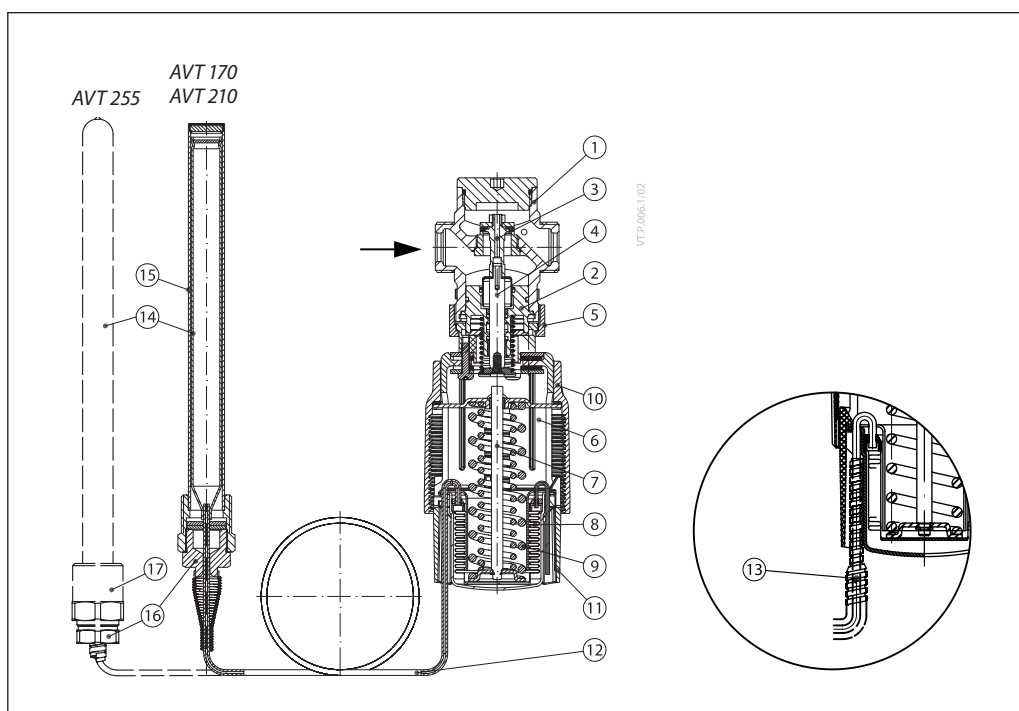
Chosen $k_{v5} = 4.0 \text{ m}^3/\text{h}$

Solution:

The example selects ext. thread valve VGU DN 15, k_{v5} value 4.0.

Design

1. Valve VGU(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 away the seat (valve opens by decreasing of medium temperature valve cone moves towards from the seat (valve closes).

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.

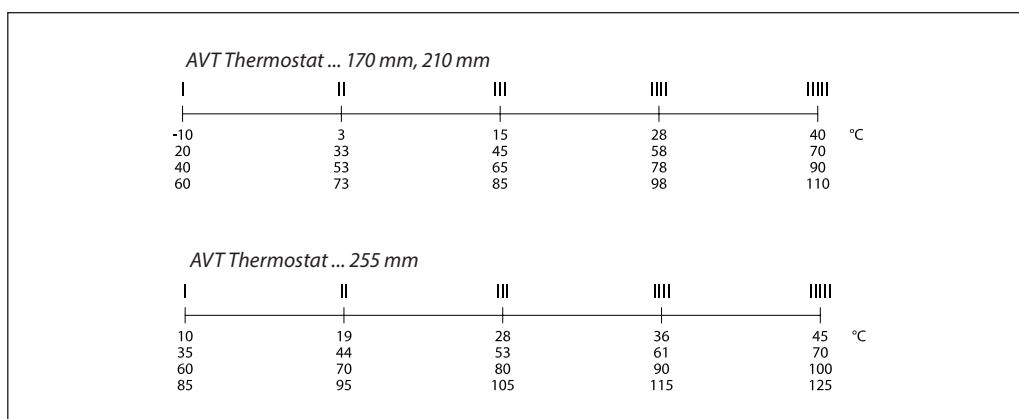
The adjustment can be done by means of handle for temperature setting and/or temperature indicators.

Adjustment diagram

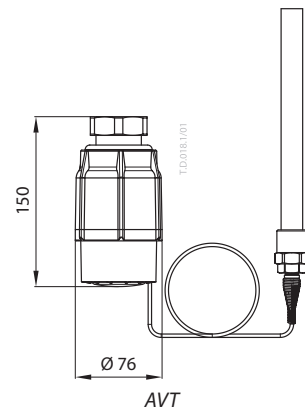
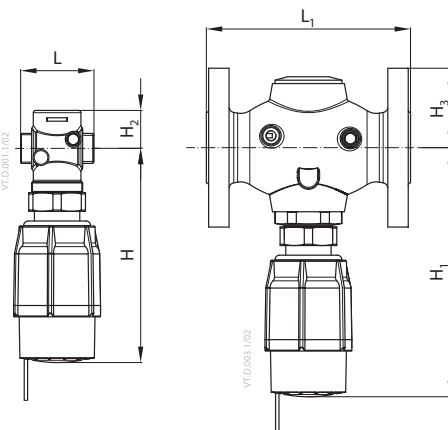
Temperature setting

Relation between scale numbers 1-5 and closing temperature.

Note: The values given are approximate



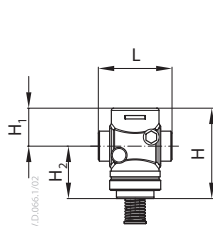
Dimensions



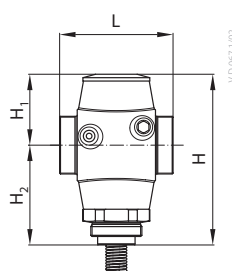
DN	L	L ₁	H	H ₁	H ₂	H ₃
mm						
15	65	-	180	-	34	-
20	70	-	180	-	34	-
25	75	-	180	-	37	-
32	100	180	221	221	63	70
40	110	200	221	221	63	75
50	130	230	221	221	63	82

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

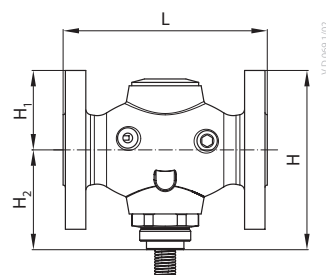
Note: other flange dimensions - see table for tailpieces



VGU DN 15-25



VGU DN 32-50



VGUF DN 32-50

VGU

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	154	63	91	3.2
40	110	154	63	91	3.3
50	130	154	63	91	4.1

VGUF

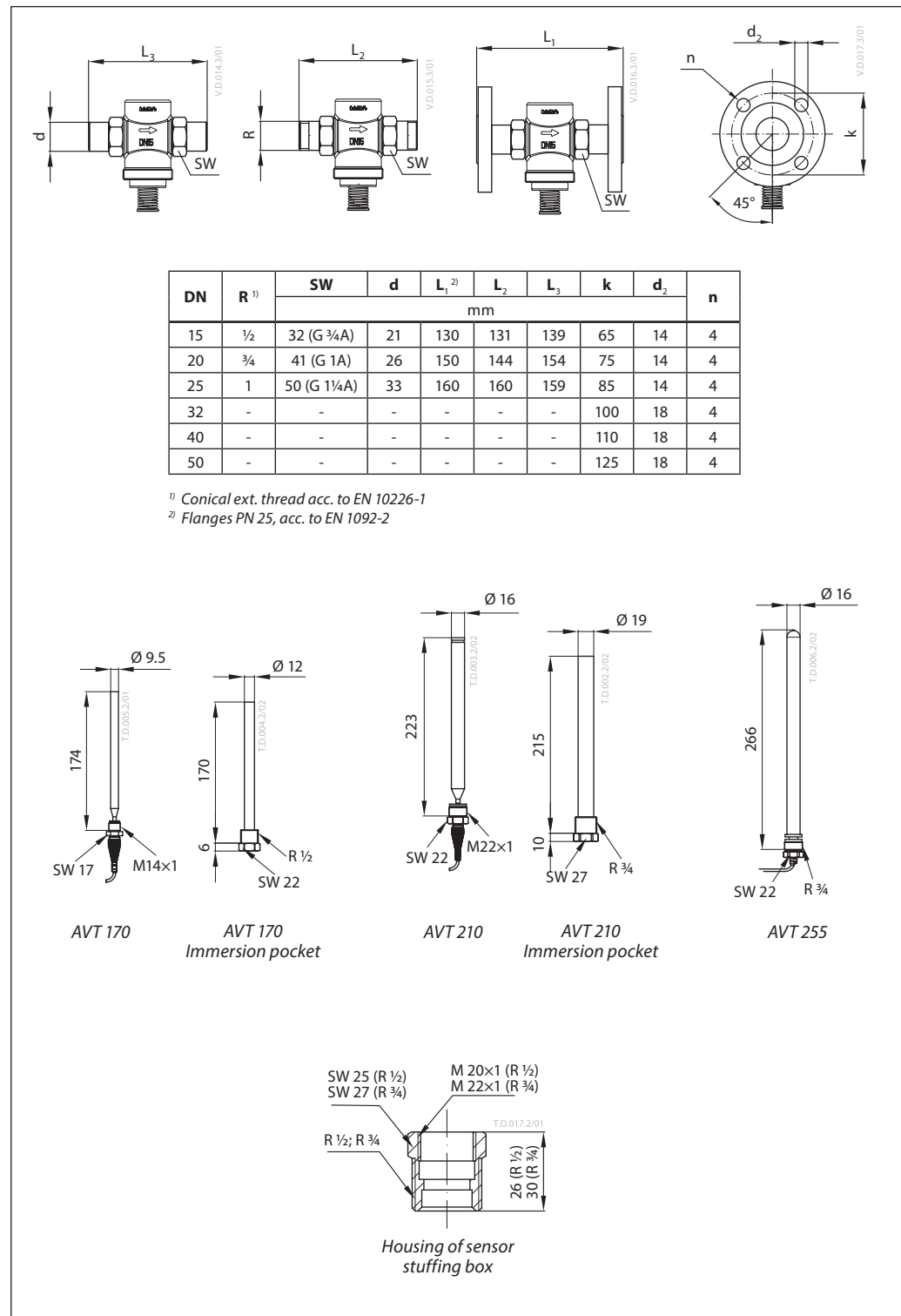
DN	L	H	H ₁	H ₂	Weight (kg)
mm					
32	180	158	70	88	7.5
40	200	163	75	88	9.0
50	230	171	83	88	11.1

Note: other flange dimensions - see table for tailpieces

Data sheet

Temperature controller AVT / VGU(F) (PN 25)

Dimensions (continuous)



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