

Data sheet

Thermostatic water valve AVTB

Application



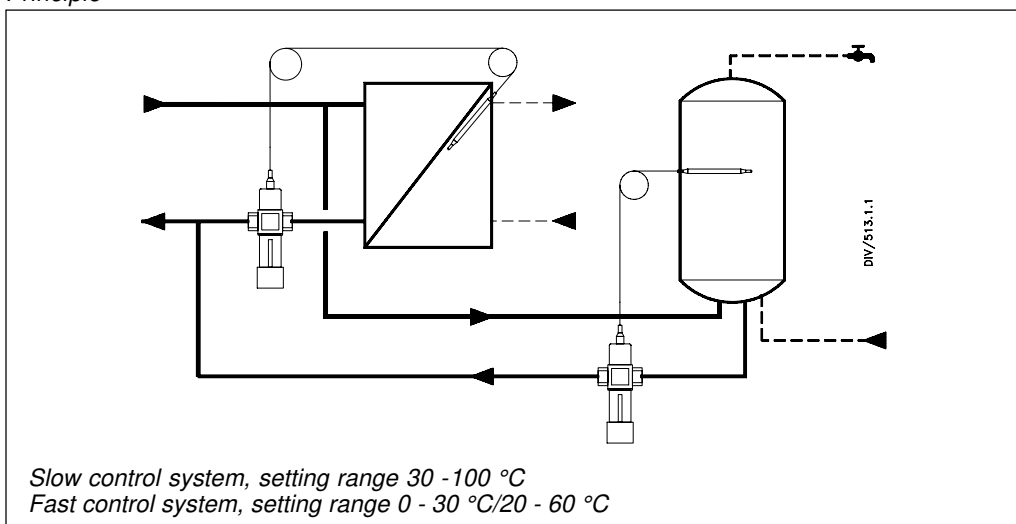
Description

- Self-acting
- Closes on rising temperature
- Can be fitted in the flow or return depending on sensor type
- Pressure range PN 16, max. 130 °C

The complete AVTB valve has a setting knob, a valve body, a bellows element with capillary tube and a sensor pocket.

The valve is used to control the water temperature in hot water tanks, heat exchangers, oil preheaters, etc.

Principle



Ordering

Product

Type	Setting range °C	Capacity (k _{vs}) m ³ /h	Max. sensor temp. °C	Internal thread		External thread	
				Connection ISO 7/1	Code no. ¹⁾	Connection ISO 228/1	Code no. ¹⁾
AVTB 15	0 - 30	1.9	55	R _p 1/2	003N2232 ⁴⁾	G 3/4 A	003N5101 ⁴⁾
	20 - 60		90		003N8229 ²⁾		003N5114 ²⁾
	30 - 100		130		003N8141 ³⁾		003N5141 ³⁾
AVTB 20	0 - 30	3.4	55	R _p 3/4	003N3232 ⁴⁾	G 1 A	003N5102 ⁴⁾
	20 - 60		90		003N8230 ²⁾		003N5115 ²⁾
	30 - 100		130		003N8142 ³⁾		003N5142 ³⁾
AVTB 25	0 - 30	5.5	55	R _p 1	003N4232 ⁴⁾	G 1 1/4 A	003N5103 ⁴⁾
	20 - 60		90		003N8253 ²⁾		003N5116 ²⁾
	30 - 100		130		003N8143 ³⁾		003N5143 ³⁾

¹⁾ Complete control including capillary tube gland. The sensor pocket is an accessory.

²⁾ Including small sensor Ø 9,5 x 180. The sensor is to be mounted where the system temperature is warmer than the temperature in the valve housing.

³⁾ Including small sensor Ø 9,5 x 150. Capillary tube length 2.3 m.

⁴⁾ Delivered on order.

Capillary tube length: 2 m.

Ordering

Spare parts

Type	Spare part	Capillary tube length	Code No.
AVTB 15	<i>Repair set</i> Two diaphragms, two O-rings, one rubber cone, one tube of grease and eight valve cover screws	-	003N4006
AVTB 20		-	003N4007
AVTB 25		-	003N4008
AVTB	Thermostatic element 0 - 30 °C	2 m	003N0075
	Thermostatic element 20 - 60 °C, sensor: Ø 9,5 x 180	2 m	003N0130
	Thermostatic element 30 - 100 °C, sensor: Ø 9,5 x 150	2,3 m	003N0131
AVTB	House for capillary tube gland R ¹ / ₂ / M 14x1	-	013U8090

Accessories

Type	Accessory	Code No.
AVTB	Sensor pocket, R _p 1/2, brass, without gland	013U0290
	Sensor pocket, R _p 1/2, stainless steel, with gland	003N0196
	Sensor pocket, R _p 3/4, brass, with gland	003N0050
	Sensor pocket, R _p 3/4, stainless steel, with gland	003N0192
AVTB 30-100	Insulating disk	003N4022

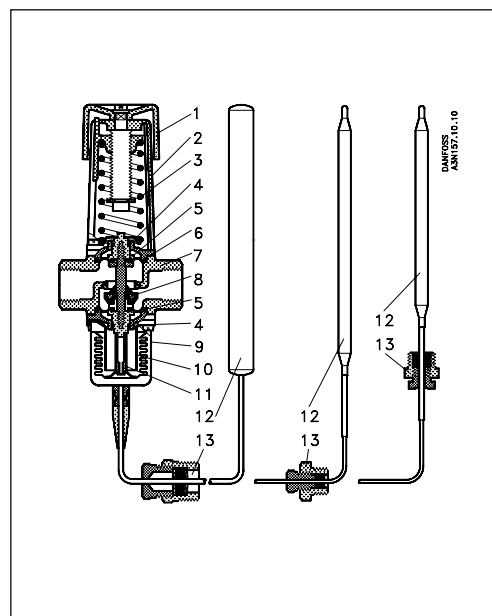
Tail pieces

Weld-on fittings	DN	Code no.
1 set (including 2 union nuts, 2 nipples and 2 seals)	15	003N5090
	20	003N5091
	25	003N5092

Tail pieces

External thread	DN	Code No.
1 set (including 2 union nuts, 2 nipples and 2 seals)	15	003N5070
	20	003N5071
	25	003N5072

Design



Materials, parts in contact with water

- Diaphragms in valve body: EPDM-rubber
- Spindle: Dezincing-free brass BS 2872/CZ132
- Valve seat: Cr Ni steel, DIN 17440, w.no. 1.4301
- Valve cone: NBR-rubber
- O-rings: EPDM-rubber

Valve bodies with internal thread

- Valve body: MS 58, hot-pressed, DIN 17660, w.no. 2.0402, CuZn40Pb2

Valve body with external thread

- Valve body: Dezincing-free brass, BS 2872/CZ132

- Other metal parts: Dezincing-free brass, BS 2874/CZ132

- Sensor: Copper

Sensor charge:

- 0 - 30 °C: R 152 A, C₂H₄F₂
- 20 - 60 °C: Butane R600, C₄H₁₀
- 30 - 100 °C: Carbon dioxide, CO₂

1. Setting knob
2. Spring housing
3. Setting spring
4. O-ring
5. Diaphragm
6. Spindle
7. Valve body
8. Valve cone
9. Bellows unit
10. Bellows stop
11. Pressure stem
12. Sensor
13. Capillary tube gland

Data

Flow temperature - 25 - + 130 °C
 Max. working pressure 16 bar
 Max. differential pressure 10 bar
 Max. test pressure 25 bar

Sizing

Example

Hot water temperature control in hot water tanks.

Primary medium: Water.

Given Load: 31 kW
 (26500 kcal/h)

Primary temperature drop Δt : 20 K

Differential pressure Δp across the valve: 1.7 bar

Max. hot water temperature: 55 °C

Water volume Q: $\frac{31 \times 0.86}{20} = 1.3 \text{ m}^3/\text{h}$

Required

The correct valve size
 Temperature range and P-band

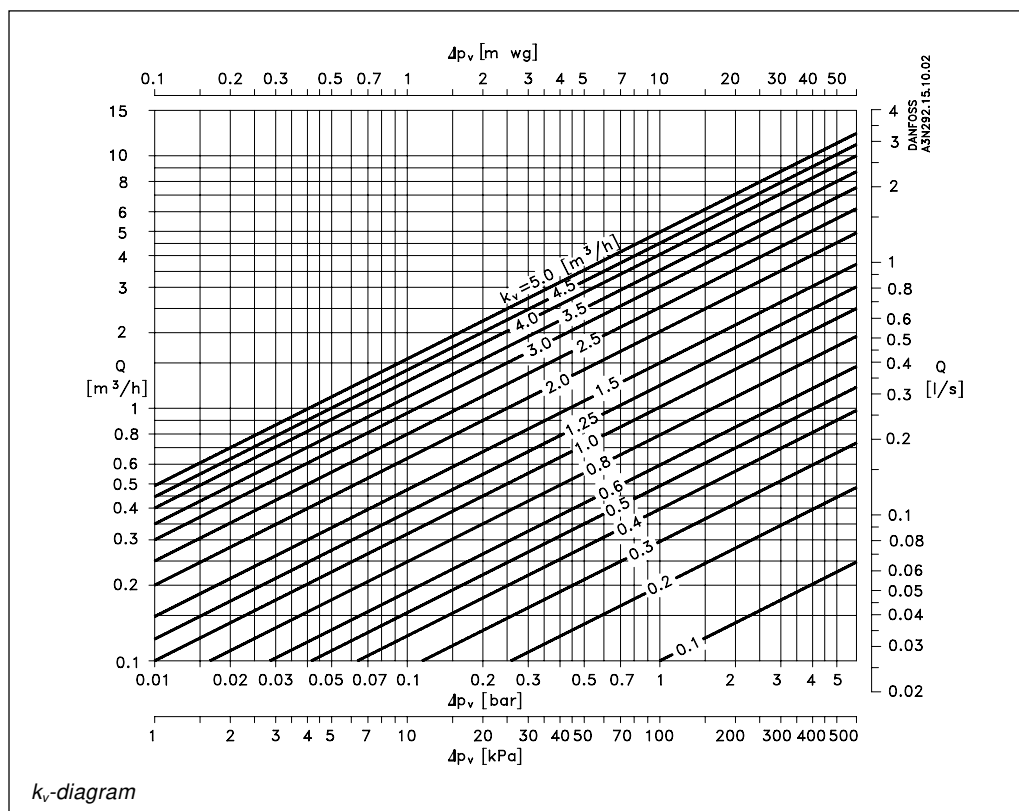
Method

Using Q and Δp , the necessary k_v value can be read from the k_v diagram, in this example k_v -value = 1. From this value on the k_v scale in the AVTB diagram, take a line horizontally to intersect the columns for recommended sizing range. Select the smallest possible valve, here an AVTB 15. A temperature range of 30 -100 °C can be assumed as suitable for this example.

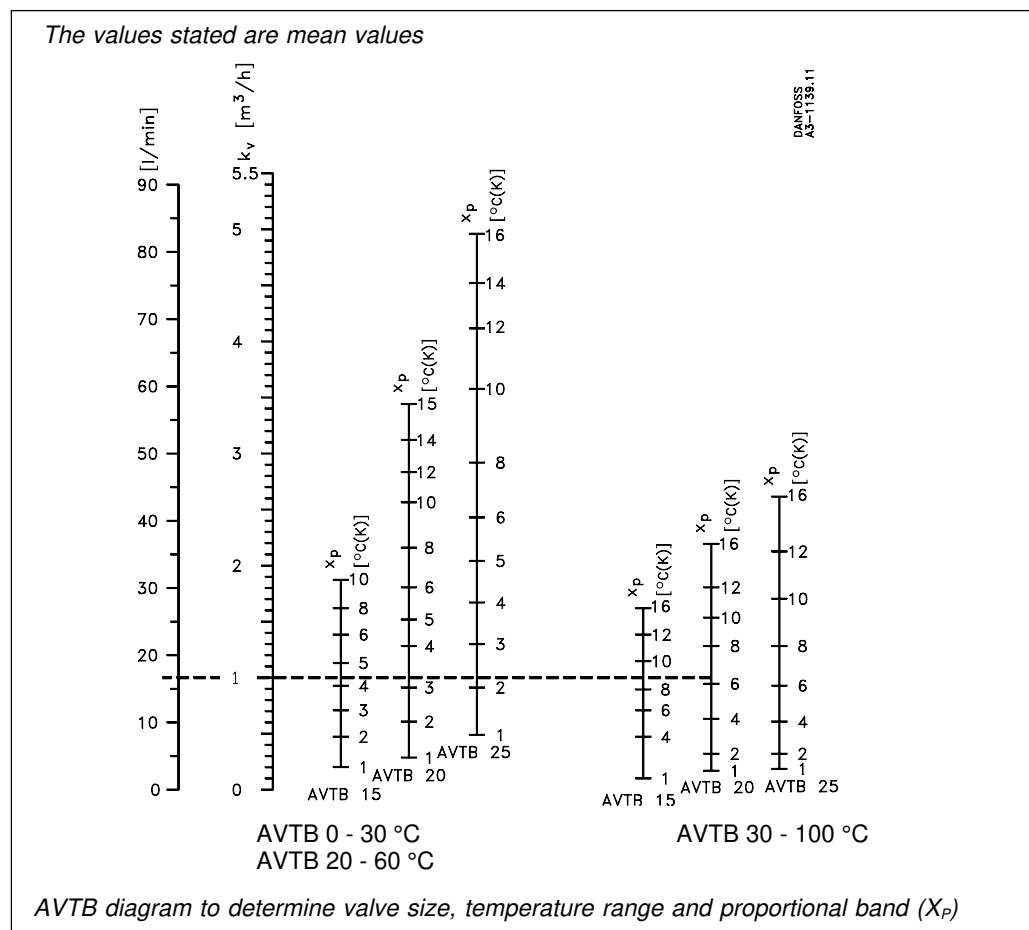
The P-band (X_p) and final temperature range can also be read from the AVTB diagram. The required closing temperature can be read from the scale for the valve selected. However, there are two temperature ranges that meet the requirement for a closing temperature of 55 °C.

X_p is 9 K for the range 30 -100 °C, which means that the control will yield the calculated capacity at a sensor temperature of 55 °C minus 9 K = 46 °C. For the range 20 -60 °C X_p = 4 K. This means that the control will yield the calculated capacity at 55 °C minus 4 K = 51 °C.

To ensure the most stable control an AVTB 15 with a range 30 -100 °C should be chosen. The water in the hot water tank will reach the closing temperature (55 °C) only when there has been no hot water demand for some time.



Sizing



Installation

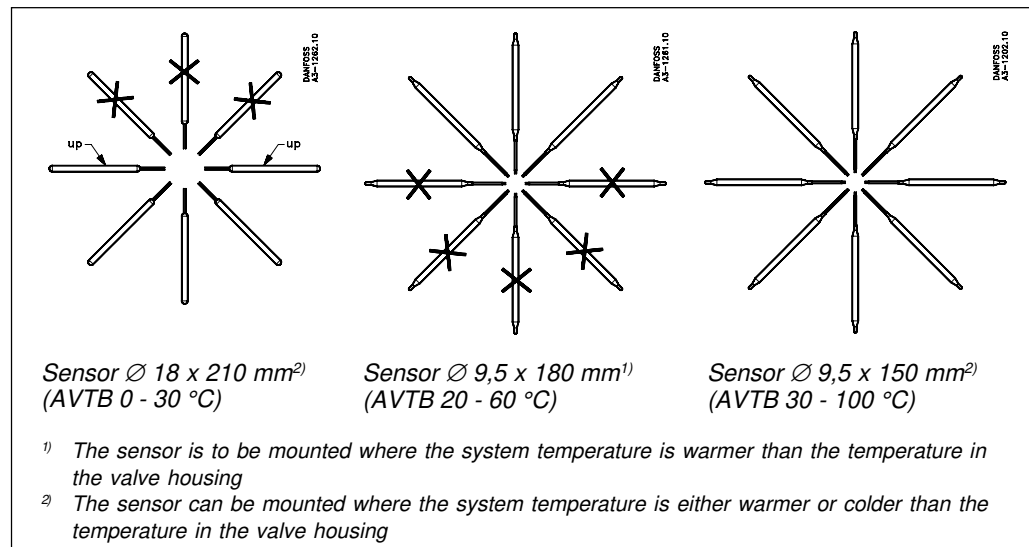
The valve can be installed in any position, with flow in the direction of the cast-in arrow.

AVTB 0 - 30 and 30 -100 can be installed in either the flow or return.

AVTB 20 - 60 must always be installed in the return flow (sensor warmer than valve).

With AVTB 30 -100, if temperature variations of more than 20 °C occur at the valve, insulation disk (003N4022) must be used between bellow element and valve body.

If AVTB 20 - 60 has been installed in the return flow from a service water heat exchanger (where for certain periods the return temperature approaches the sensor temperature) the installation of insulation disk is recommended (003N4022).



Setting

Relation between scale figures 1-5 and the closing temperature.

The values given are approximate.

Scale setting	1	2	3	4	5		
Closing temperature (0-30 °C)		0	3	15	23	30	°C
(20-60 °C)	20	35	50	60	70		
(30-100 °C)	30	35	55	75	95	120	

Dimensions

AVTB with internal thread

AVTB with external thread

Type	H ₁ m	H ₂ mm	L mm	L ₁ mm	a ISO 7/1
AVTB 15	217	133	72	14	R _p 1/2
AVTB 20	217	133	90	16	R _p 3/4
AVTB 25	227	138	95	19	R _p 1

Type	H ₁ m	H ₂ mm	L mm	L ₁ mm	L ₄ mm	b ISO 228/1
AVTB 15	217	133	72	14	75	G 3/4A
AVTB 20	217	133	90	16	80	G 1A
AVTB 25	227	138	95	19	83	G 1 1/4A

Sensor pocket

Capillary tube gland

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