



**Applications:**



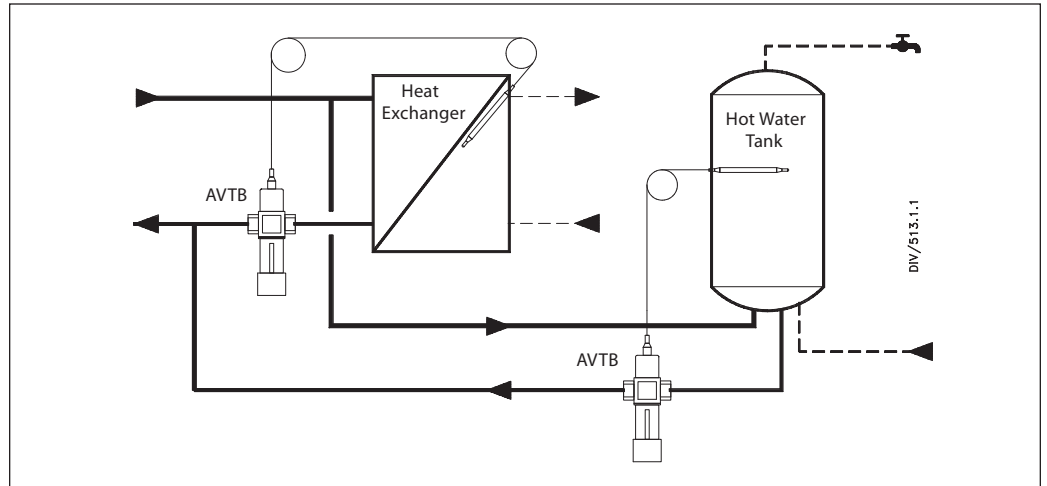
AVTB is a direct acting thermostatic temperature controller used to regulate the water temperature in hot water tanks, heat exchangers, oil preheaters, etc. The non-electric thermostatic controller closes on rising temperature.

The thermostatic controller is a three part assembly consisting of the valve body, the thermostatic element and an adjustment assembly.

**Features:**

- For water
- Self-acting
- Closes on rising temperature
- Can be fitted in the supply or return
- Pressure range PN 16 (232 psi/16 bar)

**Typical Application:**



**Ordering Information:**

| Code No. | Model   | Connection (FNPT) | Capillary Tube Length | Max. Sensor Temperature °F (°C) | C <sub>v</sub> | Temperature Range °F (°C) |
|----------|---------|-------------------|-----------------------|---------------------------------|----------------|---------------------------|
| 003N6032 | AVTB 15 | 1/2"              | 6' 6"<br>(2.0 m)      | 130 (55)                        | 2.2            | 32-86 (0-30)              |
| 003N6252 |         |                   |                       | 190 (90)                        |                | 70-140 (20-60)            |
| 003N6272 |         |                   |                       | 255 (125)                       |                | 125-190 (50-90)           |
| 003N7032 | AVTB 20 | 3/4"              |                       | 130 (55)                        | 4.0            | 32-86 (0-30)              |
| 003N7252 |         |                   |                       | 190 (90)                        |                | 70-140 (20-60)            |
| 003N7272 |         |                   |                       | 255 (125)                       |                | 125-190 (50-90)           |
| 003N8032 | AVTB 25 | 1"                |                       | 130 (55)                        | 6.4            | 32-86 (0-30)              |
| 003N8252 |         |                   |                       | 190 (90)                        |                | 70-140 (20-60)            |
| 003N8272 |         |                   |                       | 255 (125)                       |                | 125-190 (50-90)           |

**Ordering  
Information  
(Cont.):**

*Accessories*

| Code No.        | Components                               |
|-----------------|--|
| <b>003N0056</b> | Capillary tube gland                     |
| <b>003N0418</b> | Gasket for capillary tube gland          |
| <b>AVTBWELL</b> | Sensor pocket, 3/4" NPT, brass           |
| <b>003N0053</b> | Sensor pocket, 3/4" NPT, stainless steel |

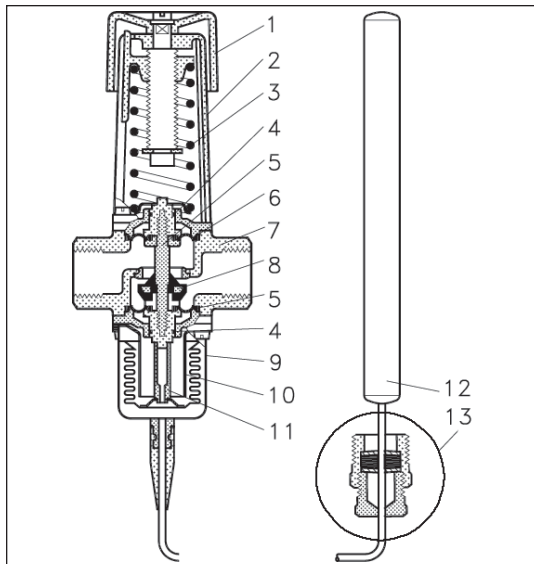
<sup>1</sup> Include gasket for capillary tube gland  
<sup>2</sup> Ø 0.4" (Ø 9.5 mm) sensor

*Spare Parts*

| Code No.                     | Components                                  | Cap. tube length ft. (m.)  |
|------------------------------|---|--|
| <b>003N0075</b> <sup>1</sup> | Thermostatic element<br>32-85°F (0-30°C)    | 6'6<br>(2)   |
| <b>003N0078</b> <sup>1</sup> | Thermostatic element<br>70-140°F (20-60°C)  |  |
| <b>003N0062</b> <sup>1</sup> | Thermostatic element<br>125-190°F (50-90°C) |  |
| <b>003N4006</b>              | AVTB 15                                     | <i>Repair set:</i> Two diaphragms,<br>two O-rings, one rubber cone,<br>one tube of grease and eight<br>valve cover crews |
| <b>003N4007</b>              | AVTB 20                                     |  |
| <b>003N4008</b>              | AVTB 25                                     |  |
| <b>003N6100</b>              | 1/2"  | Brass AVT body and<br>adjustment knob, less element  |
| <b>003N7100</b>              | 3/4"  |  |
| <b>003N8100</b>              | 1"  |  |
| <b>003N0520</b>              | AVT spare handle                            |  |

**Design:**

1. Handle for temperature setting
2. Spring housing
3. Setting spring
4. O-ring
5. Diaphragm
6. Spindle
7. Valve body
8. Valve cone
9. Bellows
10. Bellows stop
11. Pressure stem
12. Temperature sensor
13. Capillary tube gland



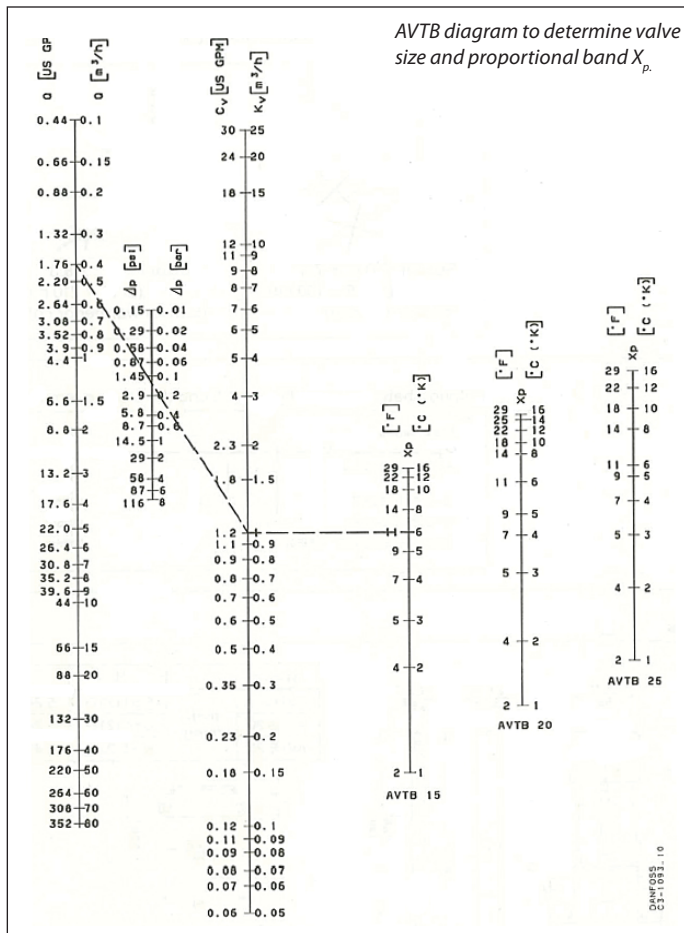
**Materials, parts in contact with water:**

|                       |   |
|-----------------------|---|
| Valve body:           | Ms 58, hot-pressed                                |
| Other metal parts:    | Ms 58   |
| Diaphragms:           | EPDM rubber<br>(alt. NBR rubber for mineral oils) |
| Capillary tube gland: | NBR rubber  |
| Valve cone:           | NBR rubber  |
| Valve seat:           | CR Ni steel                                       |
| Sensor:               | Cu  |
| Sensor pocket:        | Ms 63   |

**Specifications:**

|                                |                                 |
|--------------------------------|---------------------------------|
| Supply temperature range:      | -13°F to 266°F (-25°C to 130°C) |
| Maximum working pressure:      | 232 psi (16 bar)                |
| Maximum differential pressure: | 100 psi (7 bar)                 |
| Maximum test pressure:         | 365 psi (25 bar)                |

**Sizing:**



**Example:**

Regulation of hot water temperature.  
Primary medium: water.

Given

Load:  
63,000 BTU/h (18.5 kW)

Primary temperature drop  $\Delta t$ :  
72°F (40°C[K])

Differential pressure  $\Delta p$  across valve:  
2.2psi (0.15 bar)

Maximum hot water temperature:  
130°F (55°C)

Volume:

$$Q = \frac{\text{load [BTU/h]}}{\Delta t [^\circ\text{F}] \times 500} = \frac{63,000}{72 \times 500} = 1.75 \text{ GPM} = (0.4 \text{ m}^3/\text{h})$$

Required

The correct valve size.  
Temperature range and P-band.

**Method**

Using the AVTB diagram, connect points  $Q = 1.75 \text{ GPM}$  ( $0.4 \text{ m}^3/\text{h}$ ) and  $\Delta p_v = 2.2 \text{ psi}$  ( $0.15 \text{ bar}$ ). Extend the line to intersect the  $C_v$ -scale ( $k_v$ -scale) and read the  $C_v$ -value ( $k_v$ -value); in this case  $1.2 \text{ GPM}$  ( $1.0 \text{ m}^3/\text{h}$ ). From this point, take a line horizontally to intersect the  $X_p$  columns. The selection is an AVTB 15 and the P-band of this temperature regulator at the selected capacity is approximately 11°F (6°C). If a smaller P-bands is required, an AVTB 20 can be chosen. The P-band is then approximately 7°F (4°C).

In this example a max. hot water temperature of 130°F (55°C) is required. According to page 1 an AVTB 15 (code no. 003N7032) with a temperature range 70-140°F (20-60°C) will be suitable for this application.

Note: To ensure the most stable regulation in connection with heat exchangers a P-band of 11-14°F (6-8°C) is recommended.

**Setting:**

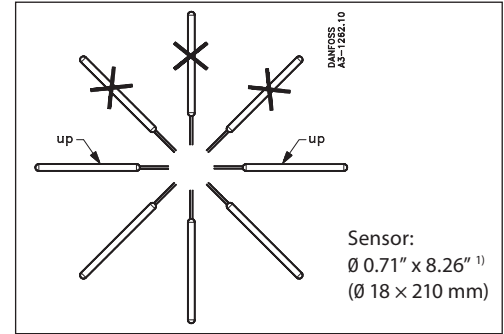
Relation between scale numbers 1-5 and the closing temperature. The values given are approximate.

| Scale setting                       | 1   | 2   | 3   | 4   | 5   |    |    |
|-------------------------------------|-----|-----|-----|-----|-----|----|----|
| Closing temperature<br>(0 ... 30°C) |     | 0   | 3   |     |     | °C |    |
| (20 ... 60°C)                       | 20  | 35  | 50  | 60  | 70  |    |    |
| (30 ... 100°C)30                    | 35  | 55  | 75  | 95  | 120 |    |    |
| (32...85°F)                         |     | 32  | 39  | 60  | 73  | 85 | °F |
| (77...150°F)                        | 77  | 95  | 122 | 140 | 158 |    |    |
| (125...190°F)                       | 125 | 150 | 176 | 194 | 210 |    |    |



**Installation:**

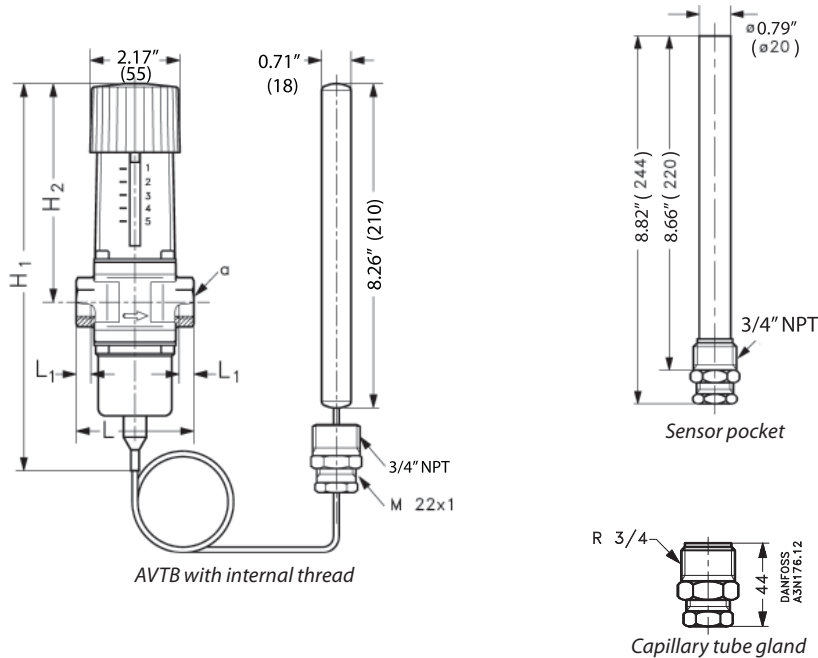
The valve can normally be fitted in the supply or return, in any position, provided the flow is always in the direction indicated by the arrow. Elements with a small sensor  $\varnothing 0.4''$  (9.5 mm) ("sensor warmer") must always have the valve housing fitted in the return.



<sup>1)</sup> The sensor can be mounted where the system temperature is either warmer or colder than the temperature in the valve body

**Dimensions:**

| Type    | H <sub>1</sub><br>in (mm) | H <sub>2</sub><br>in (mm) | L<br>in (mm) | L <sub>1</sub><br>in (mm) | L2<br>in (mm) | L3<br>in (mm) | L4<br>in (mm) | a<br>(int. thread) |
|---------|---------------------------|---------------------------|--------------|---------------------------|---------------|---------------|---------------|--------------------|
| AVTB 15 | 8.54 (217)                | 5.24 (133)                | 2.84 (72)    | 0.56 (14)                 | 5.6 (141)     | 5.87 (149)    | 2.95 (75)     | 1/2" NPT           |
| AVTB 20 | 8.54 (217)                | 5.24 (133)                | 3.55 (90)    | 0.63 (16)                 | 6.06 (154)    | 6.45 (164)    | 3.15 (80)     | 3/4" NPT           |
| AVTB 25 | 8.54 (227)                | 5.43 (138)                | 3.74 (95)    | 0.75 (19)                 | 6.61 (168)    | 6.57 (167)    | 3.27 (83)     | 1" NPT             |



Danfoss can accept no responsibility for possible errors in printed materials and reserves the right to alter its products without notice. All trademarks in this material are property of the respective companies. Danfoss and Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.



**Danfoss**  
Toronto, ON  
Toll Free: 866-375-HVAC (4822)  
Tel.: 905-285-2050, Fax: 905-285-2055  
www.na.heating.danfoss.com

**Danfoss**  
Baltimore, MD  
Toll Free: 866-375-HVAC (4822)  
Tel.: 443-512-0266, Fax: 443-512-0270  
www.na.heating.danfoss.com