

Data Sheet

Desuperheating valve Type **TEAT**

Used to inject refrigerant into the suction line of the refrigeration system



Refrigerant injection into the suction line

TEAT valves are used to inject refrigerant into the suction line of the refrigeration system to reduce the high discharge temperatures that can occur when the system operates with highly superheated suction vapour.

This applies when, for example:

- A compressor runs either with low suction pressure or with high condensing temperature
- A compressor runs with both low suction pressure and high condensing temperature. This applies especially to systems with R 22
- A compressor receives highly superheated suction vapour
- A compressor runs with capacity regulation by hot gas bypass

Two-stage refrigeration plant

TEAT valves are also used in two-stage refrigeration plant to control liquid injection into the intercooler. The bulb is installed on the discharge line from the highpressure compressor. The theoretically obtainable discharge temperature for given operating conditions can be found in the h, log p diagram for the refrigerant concerned.

Temperature regulation of the medium

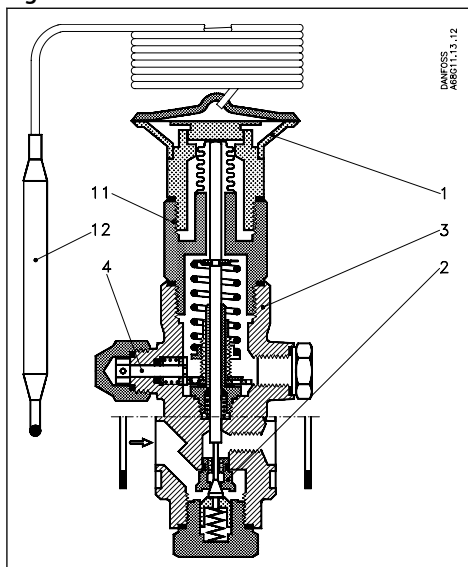
TEAT valves have a further application: the temperature regulation of the medium, e.g. the temperature of the oil in a screw compressor.

Features

- Refrigerants Applicable to HCFC, non flammable HFC and R717 (Ammonia)
- Regulation ranges: See ordering table
- Classification: DNV, CRN, BV, EAC etc. To get an updated list of certification on the products please contact your local Danfoss Sales Company

Functions

Figure 1: TEAT



Temperature variations in the discharge pipe where the bulb is placed act on the thermal charge in the bulb (12). This changes the pressure in the thermostatic element (1) and thus gives modulating liquid injection.

If leakage in the thermostatic element does occur, it will not result in refrigerant loss.

The thermostatic element is screwed to the intermediate section (11) of the valve. A bellow on the intermediate section means that the suction pressure cannot influence the valve setting.

The movement of the setting spindle (4) is transferred through a gearwheel mechanism.

The orifice assembly (2) is identical to that of TEA thermostatic expansion valves.

NOTE:

The TEAT is not able to close completely tight, so a solenoid valve is needed to shut off liquid supply, when the system stops.

Media

Refrigerants

Applicable to HCFC, non flammable HFC and R717 (Ammonia).

New refrigerants

Danfoss products are continually evaluated for use with new refrigerants depending on market requirements.

When a refrigerant is approved for use by Danfoss, it is added to the relevant portfolio, and the R number of the refrigerant (e.g. R513A) will be added to the technical data of the code number. Therefore, products for specific refrigerants are best checked at store.danfoss.com/en/, or by contacting your local Danfoss representative.

Product specification

Pressure and temperature data

Table 1: Pressure and temperature data

| Description | Values |
|-----------------------|-------------|
| P band | 20 °C |
| Capillary tube length | 5 m |
| Max. bulb temperature | 150 °C |
| Max. working pressure | PS = 20 bar |
| Max. test pressure | p' = 30 bar |

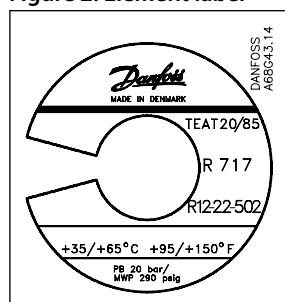
Design

Materials

- Valve housing made of GGG40.3
- Gaskets are non asbestos

Identification

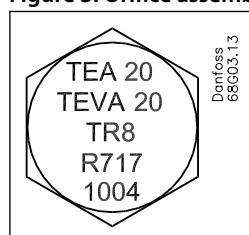
Figure 2: Element label



The thermostatic element

Has a label giving valve type, temperature range and max. test pressure.

Figure 3: Orifice assembly marking



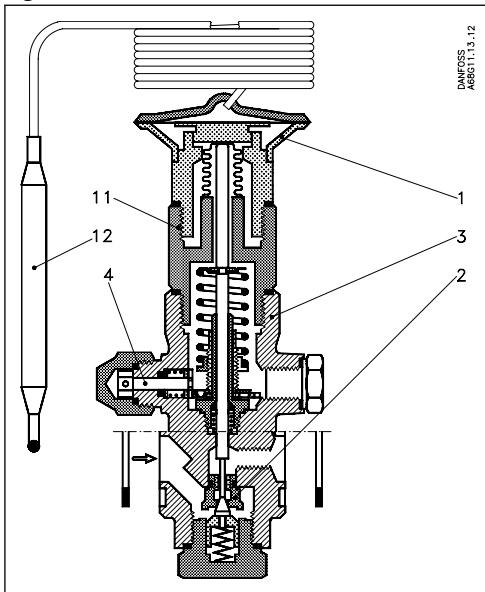
The orifice assembly

Is common to TEAT, TEA and TEVA. The rated capacity, e.g. 8 TR (= 28 kW) for the refrigerant ammonia is given on the orifice assembly.

The orifice assembly can be used for both ammonia and fluorinated refrigerants.

Material specification

Figure 4: TEAT



| | |
|----|----------------------------------|
| 1 | Thermostatic element (diaphragm) |
| 2 | Orifice assembly |
| 3 | Valve body |
| 4 | Setting spindle |
| 11 | Intermediate section |
| 12 | Bulb |

Rated capacity in kW

Table 2: Rated capacity in kW

| Type and rated capacity (TR) | Rated capacity in kW ⁽¹⁾ at $\Delta p = 8$ bar | | | | | |
|------------------------------|---|------|-------|-------|------|------|
| | R717 (NH ₃) | R22 | R134a | R404A | R12 | R502 |
| TEAT 20-1 | 3.3 | 0.8 | 0.7 | 0.6 | 0.5 | 0.6 |
| TEAT 20-2 | 6.4 | 1.5 | 1.2 | 1.1 | 0.9 | 1.1 |
| TEAT 20-3 | 9.7 | 2.3 | 1.7 | 1.6 | 1.3 | 1.6 |
| TEAT 20-5 | 16 | 3.6 | 3 | 2.9 | 2.3 | 2.7 |
| TEAT 20-8 | 25.6 | 6.2 | 4.6 | 4.4 | 3.5 | 4.4 |
| TEAT 20-12 | 38.4 | 9.2 | 6.9 | 6.7 | 5.3 | 6.5 |
| TEAT 20-20 | 64 | 15.4 | 13.1 | 12.6 | 10 | 10.8 |
| TEAT 85-33 | 106 | 26 | 19.5 | 18.8 | 14.9 | 18 |
| TEAT 85-55 | 173 | 42.4 | 31.8 | 30.6 | 24.3 | 27.4 |
| TEAT 85-85 | 274 | 66.3 | 50.3 | 48.4 | 38.4 | 46.5 |

⁽¹⁾ Rated capacity is valve capacity at +5 °C evaporating temperature, and 4K subcooling of the liquid in front of the valve.

NOTE:

Subcooling of the liquid in front of the valve is essential for the function of the valve. Lack of subcooling will lead to malfunction of the valve and increased wear on orifice.

Extended capacities in kW

Table 3: Extended capacities in kW R717

| Valve size | R717 ⁽¹⁾ | | | | |
|------------|---|------|------|------|------|
| | Pressure drop across valve Δp bar | | | | |
| | 4 | 6 | 8 | 11 | 15 |
| 20-1 | 2.3 | 2.8 | 3.3 | 3.6 | 4.7 |
| 20-2 | 4.8 | 5.7 | 6.4 | 7.2 | 7.9 |
| 20-3 | 7.2 | 8.5 | 9.7 | 10.8 | 11.7 |
| 20-5 | 12.1 | 14.2 | 16 | 18 | 19.8 |
| 20-8 | 18.6 | 22.1 | 25.6 | 28.5 | 31.4 |
| 20-12 | 29.1 | 33.7 | 38.4 | 43 | 47.1 |
| 20-20 | 47.7 | 57 | 64 | 72.1 | 79.1 |

Desuperheating valve, Type TEAT

| R717⁽¹⁾ | | | | | |
|---------------------------|---|-------|-------|-------|-------|
| Valve size | Pressure drop across valve Δp bar | | | | |
| | 4 | 6 | 8 | 11 | 15 |
| 85 - 33 | 80.2 | 94.2 | 106.4 | 118.6 | 130.3 |
| 85 - 55 | 136.1 | 157 | 176.8 | 197.7 | 215.2 |
| 85 - 85 | 203.5 | 239.6 | 274.5 | 302.4 | 334.9 |

⁽¹⁾ The rated capacity is valve capacity at +5 °C evaporating temperature, +32 °C condensing temperature and 4K subcooling of the liquid in front of the valve

Table 4: Extended capacities in kW R22

| R22⁽²⁾ | | | | | |
|--------------------------|---|------|------|------|------|
| Valve size | Pressure drop across valve Δp bar | | | | |
| | 4 | 6 | 8 | 11 | 15 |
| 20 - 1 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
| 20 - 2 | 1.2 | 1.4 | 1.5 | 1.7 | 1.9 |
| 20 - 3 | 1.7 | 2 | 2.3 | 2.6 | 2.9 |
| 20 - 5 | 2.7 | 3.1 | 3.6 | 4 | 4.8 |
| 70 - 8 | 4.4 | 5.2 | 6.2 | 6.9 | 7.6 |
| 20 - 12 | 7 | 8.1 | 9.2 | 10.4 | 11.3 |
| 20 - 20 | 11.5 | 13.7 | 15.4 | 17.2 | 18.8 |
| 85 - 33 | 19.3 | 22.4 | 25.6 | 28.5 | 31.4 |
| 85 - 55 | 32.6 | 37.8 | 42.4 | 47.7 | 52.3 |
| 85 - 85 | 48.8 | 58.2 | 66.3 | 72.1 | 81.4 |

⁽²⁾ The rated capacity is valve capacity at +5 °C evaporating temperature, +32 °C condensing temperature and 4K subcooling of the liquid in front of the valve

Dimensions and weights

Figure 5: Dimensions and weights

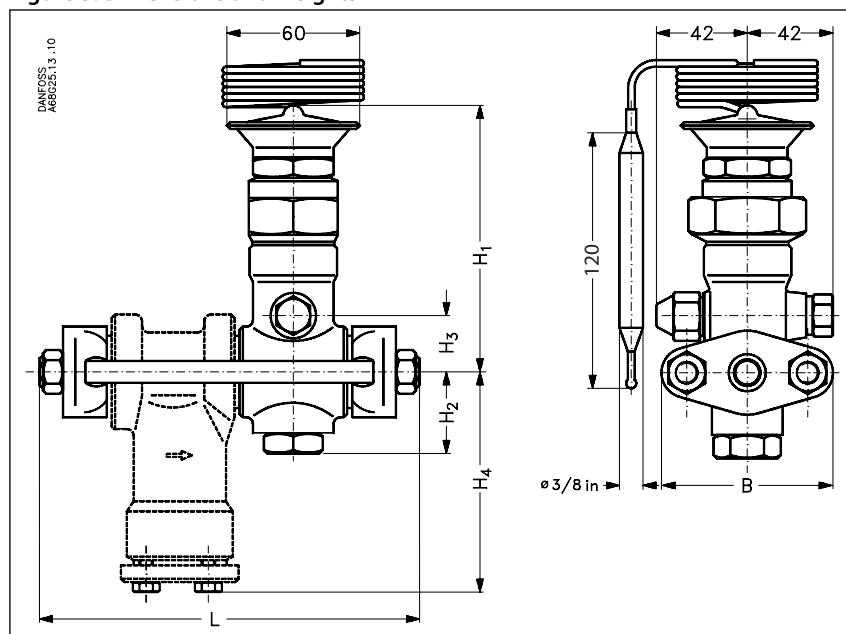


Table 5: Dimensions and weights

| Type | H_1 [mm] | H_2 [mm] | H_3 [mm] | H_4 [mm] | L | | B [mm] | Weight | |
|---------|------------|------------|------------|------------|---------------------|---------------------|--------|---------------------|---------------------|
| | | | | | Excl. strainer [mm] | Incl. strainer [mm] | | Excl. strainer [kg] | Incl. strainer [kg] |
| TEAT 20 | 121.5 | 37 | 25 | 96 | 110 | 164 | 80 | 2.1 | 3 |
| TEAT 85 | 131.5 | 37 | 35 | 106 | 125 | 199 | 95 | 3 | 4.5 |

Ordering

Figure 6: TEAT

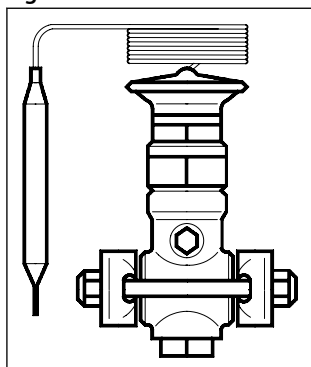


Table 6: Ordering

| Type and rated capacity (TR) | Regulating range °C | Flange connection | Code no. | | |
|------------------------------|---------------------|-------------------|-----------------|---------------------------|-------------------------------|
| | | | Assembled valve | Separate orifice assembly | Separate thermostatic element |
| TEAT 20-1 | 35 - 65 | ½ × ½ | (1) | 068G2050 | 068G3262 |
| | 55 - 95 | ½ × ½ | (1) | 068G2050 | 068G3260 |
| | 90 - 130 | ½ × ½ | (1) | 068G2050 | 068G3261 |
| TEAT 20-2 | 35 - 65 | ½ × ½ | 068G6125 | 068G2051 | 068G3262 |
| | 55 - 95 | ½ × ½ | 068G6062 | 068G2051 | 068G3260 |
| | 90 - 130 | ½ × ½ | 068G6065 | 068G2051 | 068G3261 |
| TEAT 20-3 | 35 - 65 | ½ × ½ | (1) | 068G2052 | 068G3262 |
| | 55 - 95 | ½ × ½ | (1) | 068G2052 | 068G3260 |
| | 90 - 130 | ½ × ½ | (1) | 068G2052 | 068G3261 |
| TEAT 20-5 | 35 - 65 | ½ × ½ | 068G6126 | 068G2053 | 068G3262 |
| | 55 - 95 | ½ × ½ | 068G6061 | 068G2053 | 068G3260 |
| | 90 - 130 | ½ × ½ | 068G6127 | 068G2053 | 068G3261 |
| TEAT 20-8 | 35 - 65 | ½ × ½ | 068G6128 | 068G2054 | 068G3262 |
| | 55 - 95 | ½ × ½ | 068G6063 | 068G2054 | 068G3260 |
| | 90 - 130 | ½ × ½ | 068G6066 | 068G2054 | 068G3261 |
| TEAT 20-12 | 35 - 65 | ½ × ½ | (1) | 068G2055 | 068G3262 |
| | 55 - 95 | ½ × ½ | (1) | 068G2055 | 068G3260 |
| | 90 - 130 | ½ × ½ | (1) | 068G2055 | 068G3261 |
| TEAT 20-20 | 35 - 65 | ½ × ½ | 068G6068 | 068G2056 | 068G3262 |
| | 55 - 95 | ½ × ½ | 068G6064 | 068G2056 | 068G3260 |
| | 90 - 130 | ½ × ½ | 068G6067 | 068G2056 | 068G3261 |
| TEAT 85-33 | 35 - 65 | ¾ × ¾ | 068G6129 | 068G2057 | 068G3262 |
| | 55 - 95 | ¾ × ¾ | 068G6070 | 068G2057 | 068G3260 |
| | 90 - 130 | ¾ × ¾ | 068G6072 | 068G2057 | 068G3261 |
| TEAT 85-55 | 35 - 65 | ¾ × ¾ | 068G6130 | 068G2058 | 068G3262 |
| | 55 - 95 | ¾ × ¾ | 068G6073 | 068G2058 | 068G3260 |
| | 90 - 130 | ¾ × ¾ | 068G6131 | 068G2058 | 068G3261 |
| TEAT 85-85 | 35 - 65 | ¾ × ¾ | 068G6069 | 068G2059 | 068G3262 |
| | 55 - 95 | ¾ × ¾ | 068G6071 | 068G2059 | 068G3260 |
| | 90 - 130 | ¾ × ¾ | 068G6132 | 068G2059 | 068G3261 |

(1) This valve size must be ordered as a complete valve + a separate orifice assembly in the required size.

Example: TEAT 20-3 must be ordered as **068G6125 + 068G2052**.

The orifice in the complete TEAT 20-2 valve must then be changed with the separate orifice assembly.

NOTE:

Separate filter with gaskets, staybolts and nuts

for TEAT 20, code no. **006-0042** for TEAT 85, code no. **006-0048**. Stainless steel bulb pocket, gasket, and union nut, code no. **993N3615**, for screwing into G ½ socket welded to tube or tank.

Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 7: Valid approvals

| Type | File name | Document type | Document topic | Approval authority |
|----------------|-------------------------------|-------------------------------|-----------------------|--------------------|
| TEAT | EAC RU Д-ДК.БЛ08.В.00191_18 | EAC Declaration | Machinery & Equipment | EAC RU |
| | MD 033F0691.AE | Manufacturers Declaration | RoHS | |
| | 033F0686.AG | Manufacturers Declaration | PED | |
| | RMRS 19.10034.262 | Marine - Safety Certificate | | RMRS |
| TEAT 20 | TSSA CRN.0C14029.523467890YTN | Pressure - Safety Certificate | CRN | TSSA |
| TEAT 85 | TSSA CRN.0C14029.523467890YTN | Pressure - Safety Certificate | CRN | TSSA |

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