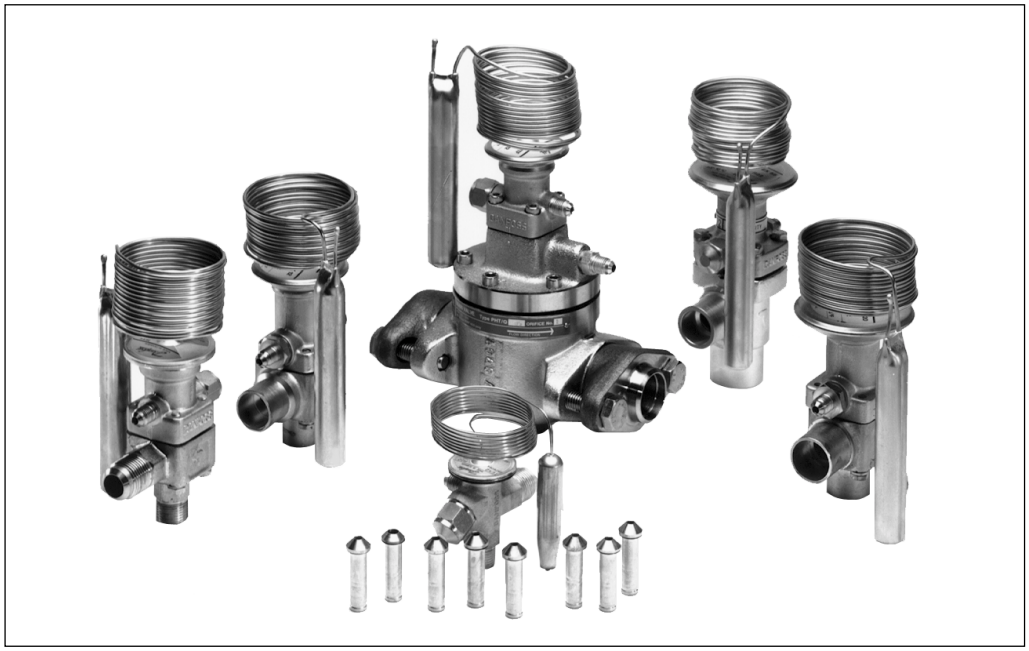
Data sheet

Thermostatic expansion valves type T, TE and PHT

Introduction



Thermostatic expansion valves regulate the injection of refrigerant liquid into evaporators. Injection is controlled by the refrigerant superheat.

Therefore the valves are especially suitable for liquid injection in ”dry“ evaporators where the superheat at the evaporator outlet is proportional to the evaporator load.

Features

- *Large temperature range:*
  –60 to +50°C
  Equally applicable to freezing, refrigeration and air conditioning plant.
- *Interchangeable orifice assembly*
  – easier stocking
  – easy capacity matching
  – better service.
- *Rated capacities from 0.5 to 1890 kW*
  (0.15 to 540 TR) for R 22
- *Can be supplied with MOP*
  (Max. Operating Pressure)
  Protects the compressor motor against excessive evaporating pressure.
- *Patented double contact bulb*
  Fast and easy to install.
  Good temperature transfer from pipe to bulb.

Technical data

Max. temperature
Bulb, when valve is installed: 100°C
Complete valve not installed: 60°C

Min. temperature
– T 2 → TE 55: –60°C
– PHT: –50°C

Max. test pressure
T 2, TE 2: p' = 36 bar
TE 5, TE 12, TE 20, TE 55, PHT: p' = 28 bar

Permissible working pressure
T 2, TE 2: PB = 28 bar
TE 5 → TE 55 and PHT: PB = 22 bar

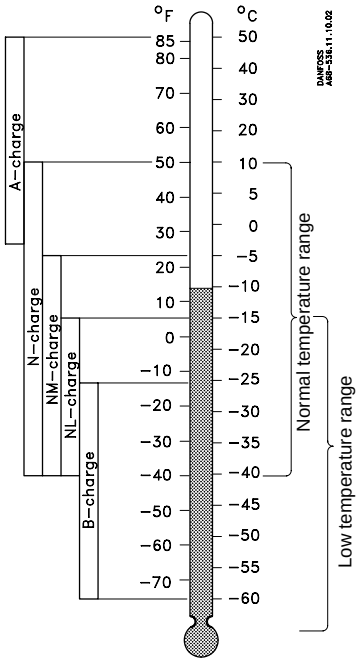
MOP-points

Refrigerant	Range N –40 → +10°C	Range NM –40 → –5°C	Range NL –40 → –15°C	Range B –60 → –25°C
	MOP-point in evaporating temperature t_e and evaporating pressure p_e			
	+15°C/+60°F	0°C/+32°F	–10°C/+15°F	–20°C/–4°F
R 22	100 psig/6.9 bar	60 psig/4.0 bar	35 psig/3.5 bar	20 psig/1.5 bar
R 134a	55 psig/5 bar	30 psig/3.1 bar	15 psig/2.1 bar	
R 404A/R 507	120 psig/9.3 bar	75 psig/6.2 bar	50 psig/4.4 bar	30 psig/3.1 bar
R 407C	95 psig/6.6 bar	50 psig/3.6		15 psig/1.1 bar

MOP = Max. Operating Pressure

MOP is the evaporating pressure at which the expansion valve will shut off liquid injection in the evaporator and thus prevent the evaporating pressure from rising.
Rising bulb temperature will not open the expansion valve when MOP is reached.

If the superheat factory setting of the expansion valve is changed, the MOP point changes.
If the superheat setting increases, the MOP point is reduced and vice versa, if the MOP point increases, the superheat setting is reduced.



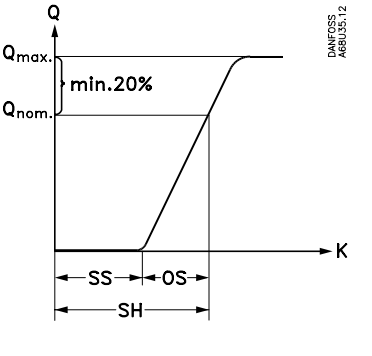
Operating range for thermostatic expansion valves

Superheat

SS = static superheat
OS = opening superheat
SH = SS + OS = total superheat
Q_{nom} = rated capacity
Q_{max} = maximum capacity

Static superheat SS can be adjusted with setting spindle.
The standard superheat setting SS is 5 K for valves without MOP and 4 K for valves with MOP.
The opening superheat OS is 6 K from when opening begins to where the valve gives its rated capacity Q_{nom}.

Example
Static superheat SS = 5 K
Opening superheat OS = 6 K
Total superheat SH = 5 + 6 = 11 K



Sizing

Sizing the thermostatic expansion valve is dependent on:
- max. evaporator load
- evaporating temperature,
- condensing temperature
- liquid subcooling

The pressure drop across the expansion valve is the difference between the compressor condensing and evaporating pressures minus the pressure drop in piping and through distributors.

The following example illustrates the conditions that must be taken into consideration.

Example
Refrigerant = R 22
Required valve connection = solder, angelway
Evaporator capacity Q_e = 9 kW
Evaporating temperature
t_e = –10°C (~p_e = 3.6 bar)
Condensing temperature
t_c +36°C (~p_c = 13.9 bar)

Evaporator with six sections.
Size and length of liquid line,
dia. 1⁄2 in., l = 25 m
Since the evaporator is placed 6 m higher than the receiver, h = 6 m.
A suitable expansion valve and liquid distributor is required.

A. Determination of pressure drop

The evaporating pressure p_e is subtracted from the condensing pressure p_c. Values p_e and p_c are determined by the values given for t_e and t_c. These can be obtained from a refrigerant table or a Danfoss calculator.
$p_c - p_e$ = 13.9 bar - 3.6 bar
$p_c - p_e$ = 10.3 bar

To obtain the actual pressure drop across the expansion valve, not only is it necessary to subtract p_e from p_c, but a series of other pressure drops must also be subtracted

1. Pressure drop Δp_1 in the liquid line.
   For example: $\Delta p_1 \approx 0.1$ bar

2. The assumed pressure drop, p_2, in filter drier, sight glass, manual shut-off valve and pipe bends:
   $\Delta p_2 \approx 0.2$ bar.

3. Pressure drop Δp_3 in the vertical liquid line (because of the height difference, h = 6 m). This is given in the table below:
   Δp_3 = 0.7 bar

Refrigerant	Static pressure drop, Δp_3 bar at height difference h between evaporator and receiver				
	6 m	12 m	18 m	24 m	30 m
R 22	0.7	1.4	2.1	2.8	3.5
R 134a	0.7	1.4	2.1	2.8	3.6
R 404A	0.6	1.3	1.9	2.5	3.2
R 507	0.6	1.3	1.9	2.5	3.2

4. Pressure drop Δp_4 in the liquid distributor:
   $\Delta p_4 \approx 0.5$ bar

5. Pressure drop Δp_5 in the distributor tubes:
   $\Delta p_5 \approx 0.5$ bar

Total pressure drop across expansion valve:
$\Delta p = (p_c - p_e) - (\Delta p_1 + \Delta p_2 + \Delta p_3 + \Delta p_4 + \Delta p_5)$
$\Delta p \approx 10.3 - (0.1 + 0.2 + 0.7 + 0.5 + 0.5)$
$\Delta p \approx 8.3$ bar

B. Determination of capacity Q_e

Valve type	Orifice no.	Pressure drop across valve Δp bar							
		2	4	6	**8**	**10**	12	14	16
Evaporating temperature –10°C									
TX 2/TEX 2-0.15	0X	0.37	0.47	0.53	0.57	0.60	0.63	0.64	0.64
TX 2/TEX 2-0.3	00	0.79	0.96	1.1	1.2	1.2	1.3	1.3	1.3
TX 2/TEX 2-0.7	01	1.6	2.0	2.3	2.5	2.6	2.7	2.8	2.8
TX 2/TEX 2-1.0	02	2.2	2.9	3.3	3.6	3.8	4.0	4.1	4.1
TX 2/TEX 2-1.5	03	3.9	5.1	5.9	6.4	6.8	7.1	7.3	7.3
TX 2/TEX 2-2.3	04	5.8	7.6	8.7	**9.5**	**10.1**	10.5	10.8	10.9
TX 2/TEX 2-3.0	05	7.4	9.6	11.0	12.0	12.8	13.3	13.6	13.8
TX 2/TEX 2-4.5	06	9.1	11.8	13.5	14.7	15.6	16.2	16.6	16.8

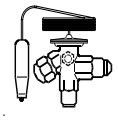
From the table for t_e = –10°C and Δp = 8.3 bar by interpolation:

$$Q_e = 9.5 + \frac{8.3 - 8}{10 - 8} \quad (10.1 - 9.5)$$

Q_e = 9.6 kW

The table indicates that a TEX 2-2.3 with orifice 04 should be used.
The table capacities are based on 4 K subcooling ahead of valve.

Generally, the maximum capacity of a valve is approx. 20% higher than the figure given in the table.



Ordering, components with flare × flare connection

Thermostatic element, without orifice, filter cone, nuts, with sensor band

Refrigerant	Valve type	Pressure equalization [1]	Capillary tube	Connection Inlet × Outlet		Code no.					
						Range N –40 to +10°C		Range NM –40 to –5°C	Range NL –40 to –15°C	Range B –60 to –25°C	
			m	in. × in.	mm × mm	Without MOP	With MOP	With MOP	With MOP	Without MOP	With MOP
R 22	TX 2	Int.	1.5	⅜ × ½	10 × 12	**068Z3206**	**068Z3208**	**068Z3224**	**068Z3226**	**068Z3207**	**068Z3228**
	TEX 2	Ext.	1.5	⅜ × ½	10 × 12	**068Z3209**	**068Z3211**	**068Z3225**	**068Z3227**	**068Z3210**	**068Z3229**
R 134a	TN 2	Int.	1.5	⅜ × ½	10 × 12	**068Z3346**	**068Z3347**	**068Z3393**	**068Z3369**		
	TEN 2	Ext.	1.5	⅜ × ½	10 × 12	**068Z3348**	**068Z3349**	**068Z3392**	**068Z3370**		
R 404A/ R 507	TS 2	Int.	1.5	⅜ × ½	10 × 12	**068Z3400**	**068Z3402**	**068Z3406**	**068Z3408**	**068Z3401**	**068Z3410**
	TES 2	Ext.	1.5	⅜ × ½	10 × 12	**068Z3403**	**068Z3405**	**068Z3407**	**068Z3409**	**068Z3404**	**068Z3411**

[1]) Valves with inch connections have ¼ inch pressure equalization.

Orifice assembly with filter

The rated capacity is based on:
Evaporating temperature t_e = +5°C for range N and t_e = –30°C for range B
Condensing temperature t_c = +32°C
Refrigerant temperature ahead of valve t_l = +28°C

Range N: – 40 to +10°C

Orifice no.	Rated capacity in tons (TR)			Rated capacity in kW			Code no.
	R 22	R 134a	R 404A R 507	R 22	R 134a	R 404A R 507	
0X	0.15	0.11	0.11	0.5	0.4	0.38	**068-2002**
00	0.3	0.25	0.21	1.0	0.9	0.7	**068-2003**
01	0.7	0.5	0.45	2.5	1.8	1.6	**068-2010**
02	1.0	0.8	0.6	3.5	2.6	2.1	**068-2015**
03	1.5	1.3	1.2	5.2	4.6	4.2	**068-2006**
04	2.3	1.9	1.7	8.0	6.7	6.0	**068-2007**
05	3.0	2.5	2.2	10.5	8.6	7.7	**068-2008**
06	4.5	3.0	2.6	15.5	10.5	9.1	**068-2009**

Range B: – 60 to – 25°C

0X	0.15		0.11	0.5		0.38	**068-2002**
00	0.2		0.21	0.7		0.7	**068-2003**
01	0.3		0.45	1.0		1.6	**068-2010**
02	0.6		0.6	2.1		2.1	**068-2015**
03	0.8		1.0	2.8		3.5	**068-2006**
04	1.2		1.4	4.2		4.9	**068-2007**
05	1.5		1.7	5.2		6.0	**068-2008**
06	2.0		1.9	7.0		6.6	**068-2009**

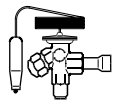
Flare connections

Connection for copper tubing with outside diameter		Reducer for copper tubing with outside diameter		Code no.
in.	mm	in.	mm	
¼	6			**011L1101**
⅜	10			**011L1135**
½	12			**011L1103**
		¼	6	**011L1107**

Example
A TE 2 thermostatic expansion valve consists of two elements + flare nuts if required:
– 1 thermostatic element
– 1 orifice assembly and flare nuts

When ordering one thermostatic expansion valve, TEX 2 with orifice 01, five code numbers are required:
– 1-off thermostatic element, **068Z3209**
– 1-off orifice assembly 01, **068-2010**
– 1-off ⅜ in. flare nut, **011L1135**
– 1-off ½ in. flare nut, **011L1103**
– 1-off ¼ in. flare nut, **011L1101**

Ordering, components with flare × solder connection



Thermostatic element, without orifice, filter cone, nuts, with sensor band

Refrigerant	Valve type	Pressure equaliz-ation [1]	Capillary tube	Connection			Code no.				
				Inlet Flare	Outlet ODF solder		Range N −40 to +10°C		Range NL −40 to −15°C	Range B −60 to −25°C	
			m	in.	in.	mm	Without MOP	With MOP	With MOP	Without MOP	With MOP
R 22	TX 2	Int.	1.5	3/8	1/2		**068Z3281**	**068Z3287**		**068Z3357**	**068Z3319**
	TX 2	Int.	1.5	3/8		12	**068Z3302**	**068Z3308**	**068Z3366**	**068Z3361**	**068Z3276**
	TEX 2	Ext.	1.5	3/8	1/2		**068Z3284**	**068Z3290**		**068Z3359**	**068Z3320**
	TEX 2	Ext.	1.5	3/8		12	**068Z3305**	**068Z3311**	**068Z3367**	**068Z3363**	**068Z3277**
R 134a	TN 2	Int.	1.5	3/8	1/2		**068Z3383**	**068Z3387**			
	TN 2	Int.	1.5	3/8		12	**068Z3384**	**068Z3388**			
	TEN 2	Ext.	1.5	3/8	1/2		**068Z3385**	**068Z3389**			
	TEN 2	Ext.	1.5	3/8		12	**068Z3386**	**068Z3390**			
R 404A/ R 507	TS 2	Int.	1.5	3/8	1/2		**068Z3414**	**068Z3416**	**068Z3429**	**068Z3418**	**068Z3420**
	TS 2	Int.	1.5	3/8		12	**068Z3435**	**068Z3423**	**068Z3436**	**068Z3425**	**068Z3427**
	TES 2	Ext.	1.5	3/8	1/2		**068Z3415**	**068Z3417**	**068Z3430**	**068Z3419**	**068Z3421**
	TES 2	Ext.	1.5	3/8		12	**068Z3422**	**068Z3424**	**068Z3437**	**068Z3426**	**068Z3428**

[1]) Valves with inch connections have 1/4 inch pressure equalization. Valves with mm connections have 6 mm pressure equalization.

Orifice assembly with filter

The rated capacity is based on:
Evaporating temperature t_e = +5°C for range N and
t_e = –30°C for range B
Condensing temperature t_c = +32°C
Refrigerant temperature ahead of valve t_l = +28°C

Range N: – 40 to +10°C

Orifice no.	Rated capacity in tons (TR)			Rated capacity in kW			Code no.
	R 22	R 134a	R 404A R 507	R 22	R 134a	R 404A R507	
0X	0.15	0.11	0.11	0.5	0.4	0.38	**068-2002**
00	0.3	0.25	0.21	1.0	0.9	0.7	**068-2003**
01	0.7	0.5	0.45	2.5	1.8	1.6	**068-2010**
02	1.0	0.8	0.6	3.5	2.6	2.1	**068-2015**
03	1.5	1.3	1.2	5.2	4.6	4.2	**068-2006**
04	2.3	1.9	1.7	8.0	6.7	6.0	**068-2007**
05	3.0	2.5	2.2	10.5	8.6	7.7	**068-2008**
06	4.5	3.0	2.6	15.5	10.5	9.1	**068-2009**

Range B: – 60 to – 25°C

0X	0.15		0.11	0.5		0.38	**068-2002**
00	0.2		0.21	0.7		0.7	**068-2003**
01	0.3		0.45	1.0		1.6	**068-2010**
02	0.6		0.6	2.1		2.1	**068-2015**
03	0.8		1.0	2.8		3.5	**068-2006**
04	1.2		1.4	4.2		4.9	**068-2007**
05	1.5		1.7	5.2		6.0	**068-2008**
06	2.0		1.9	7.0		6.6	**068-2009**

Solder adaptor

The adaptor is for use with thermostatic expansion valves T 2 and TE 2 with flare × solder connections. When the adaptor is fitted correctly it meets the sealing requirements of DIN 8964.

The adaptor offers the following advantages:
- The orifice assembly can be replaced.
- The filter can be cleaned or replaced.

The standard orifice in T 2 and TE 2 can be used with the solder adaptor when the expansion valve filter is replaced with a separately ordered filter.
Only in this way can the sealing requirements of DIN 8964 be fulfilled.
A solder adaptor is also available for filter driers.

Solder adaptor without orifice assembly and filter

Connection ODF solder	Code no.
1/4 in.	**068-2062**
6 mm	**068-2063**
3/8 in.	**068-2060**
10 mm	**068-2061**

Filter for solder adaptor

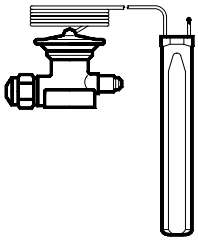
Description	Code no.
Filter excl. orifice assembly	**068-0015**

Orifice assembly with filter for solder adaptor

Orifice no.	Code no.
0X	**068-2089**
00	**068-2090**
01	**068-2091**
02	**068-2092**
03	**068-2093**
04	**068-2094**
05	**068-2095**
06	**068-2096**

Flare connections
See previous page.

Ordering
(continued)

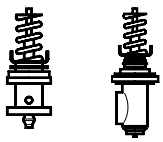


Thermostatic element

R 22

Valve type	Pressure equalization	Capillary tube	Code no.					
			Range N –40 to +10°C		Range NM –40 to –5°C	Range NL –40 to –15°C	Range B –60 to –25°C	
	¼ in. / 6 mm	m	Without MOP	With MOP	With MOP	With MOP	Without MOP	With MOP
TEX 5	Ext. [1])	3	**067B3250**	**067B3267**	**067B3249**	**067B3253**	**067B3263**	**067B3251**
TEX 12	Ext. [2])	3	**067B3210**	**067B3227**	**067B3207**	**067B3213**		**067B3211**
TEX 12	Ext. [2])	5	**067B3209**					**067B3212**
TEX 20	Ext. [2])	3	**067B3274**	**067B3286**	**067B3273**	**067B3275**		**067B3276**
TEX 20	Ext. [2])	5	**067B3290**					**067B3287**
TEX 55	Ext. [2])	3	**067G3205**	**067G3220**	**067G3206**			**067G3207**
TEX 55	Ext. [2])	5	**067G3209**					**067G3217**

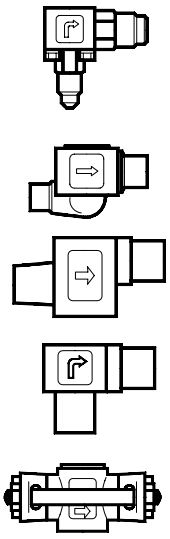
[1]) Pressure equalization with solder connector can be supplied on contacting Danfoss.
[2]) Available as accessory: solder adapter for TE 12, TE 20 and TE 55. **Code no. 068B0170.**



Orifice assembly

Valve type	Rated capacity Range N: –40 to 10°C kW	Rated capacity Range B: –60/55 to –25°C kW	Orifice no.	**Code no.**
TEX 5-3	19.7	11.9	01	**067B2089**
TEX 5-4.5	26.9	16.7	02	**067B2090**
TEX 5-7.5	38.8	24.8	03	**067B2091**
TEX 5-12	55.3	35.4	04	**067B2092**
TEX 12-4.5	26.8	17.2	01	**067B2005**
TEX 12-7.5	43.4	28.2	02	**067B2006**
TEX 12-12	64.0	41.4	03	**067B2007**
TEX 12-18	84.4	55.9	04	**067B2008**
TEX 20-30	108.0	70.0	01	**067B2172**
TEX 55-50	239.0	148.0	01	**067G2005**
TEX 55-85	356.0	228.0	02	**067G2006**

The rated capacity is based on:
Evaporating temperature t_e = +5°C for range N and t_e = –30°C for range B
Condensing temperature t_c = +32°C
Refrigerant temperature ahead of valve t_l = +28°C

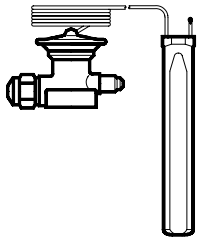


Valve body

Type	Orifice no.	Connection Inlet × Outlet		Code no.			
		in.	mm	Flare angleway	Solder angleway	Solder straightway	Solder flanges
TE 5	01 - 03 03 04	½ × ⅝ ½ × ⅞ ⅝ × ⅞		**068B4013**	**068B4009** **068B4010** **068B4011**	**068B4007** **068B4008**	
TE 5	01- 03 03 04		12 × 16 12 × 22 16 × 22	**068B4013**	**068B4004** **068B4005** **068B4012**	**068B4002** **068B4003**	
TE 12	01 - 02 03 - 04 03 - 04	⅝ × ⅞ ⅞ × 1 ⅞ × 1⅛			**068B4022** [1]) **068B4023** [2])	**068B4020** [1]) **068B4021** [2])	**068B4025** [1]) **068B4026** [1])
TE 12	01 - 02 03 - 04 03 - 04		16 × 22 22 × 25 22 × 28		 **068B4017** [2])	**068B4018** [1]) **068B4016** [2])	**068B4027** [1]) **068B4015** [1])
TE 20	01 01	⅞ × 1⅛	 22 × 28		**068B4023** [2]) **068B4017** [2])	**068B4021** [2]) **068B4016** [2])	
TE 55	01- 02 01- 02	1⅛ × 1⅜	 28 × 35		**068G4004** [3]) **068G4002** [3])	**068G4003** [3]) **068G4001** [3])	

[1]) ODF × ODF
[2]) ODF × ODM
[3]) ODM × ODM
ODF = Internal diameter
ODM = External diameter

Ordering
(continued)



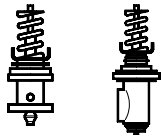
Thermostatic element

R 134a

Valve type	Pressure equalization	Capillary tube	Code no.		
			Range N –40 to +10°C		Range NM –40 to –5°C
	¼ in. / 6 mm	m	Without MOP	With MOP	With MOP
TEN 5	Ext. [1])	3	**067B3297**	**067B3298**	**067B3360**
TEN 12	Ext. [2])	3	**067B3232**	**067B3233**	
TEN 12	Ext. [2])	5	**067B3363**		
TEN 20	Ext. [2])	3	**067B3292**	**067B3293**	
TEN 20	Ext. [2])	5	**067B3370**		
TEN 55	Ext. [2])	3	**067G3222**	**067G3223**	
TEN 55	Ext. [2])	5	**067G3230**		

[1])Pressure equalization with solder connector can be supplied on contacting Danfoss.

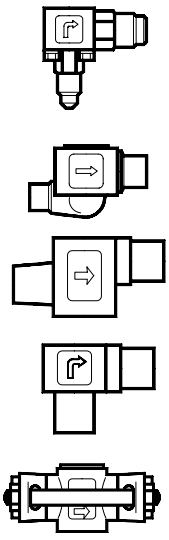
[2]) Available as accessory: solder adapter for TE 12, TE 20 and TE 55. **Code no. 068B0170.**



Orifice assembly

Valve type	Rated capacity kW	Orifice no.	**Code no.**
TEN 5-3.7	12.9	01	**067B2089**
TEN 5-5.4	19.1	02	**067B2090**
TEN 5-8.3	29.1	03	**067B2091**
TEN 5-11.2	39.6	04	**067B2092**
TEN 12-4.7	16.7	01	**067B2005**
TEN 12-7.7	27.2	02	**067B2006**
TEN 12-11.4	40.0	03	**067B2007**
TEN 12-15	53.0	04	**067B2008**
TEN 20-18	65.0	01	**067B2170**
TEN 55-41	145.0	01	**067G2001**
TEN 55-62	220.0	02	**067G2002**

The rated capacity is based on:
Evaporating temperature t_e = +5°C
Condensing temperature t_c = +32°C
Refrigerant temperature ahead of valve t_l = +28°C



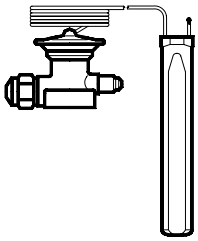
Valve body

Type	Orifice no.	Connection Inlet × Outlet		Code no.			
		in.	mm	Flare angleway	Solder angleway	Solder straightway	Solder flanges
TE 5	01 - 03 03 04	½ × ⅝ ½ × ⅞ ⅝ × ⅞		**068B4013**	**068B4009** **068B4010** **068B4011**	**068B4007** **068B4008**	
TE 5	01- 03 03 04		12 × 16 12 × 22 16 × 22	**068B4013**	**068B4004** **068B4005** **068B4012**	**068B4002** **068B4003**	
TE 12	01 - 02 03 - 04 03 - 04	⅝ × ⅞ ⅞ × 1 ⅞ × 1⅛			**068B4022** [1]) **068B4023** [2])	**068B4020** [1]) **068B4021** [2])	**068B4025** [1]) **068B4026** [1])
TE 12	01 - 02 03 - 04 03 - 04		16 × 22 22 × 25 22 × 28		 **068B4017** [2])	**068B4018** [1]) **068B4016** [2])	**068B4027** [1]) **068B4015** [1])
TE 20	01 01	⅞ × 1⅛	 22 × 28		**068B4023** [2]) **068B4017** [2])	**068B4021** [2]) **068B4016** [2])	
TE 55	01- 02 01- 02	1⅛ × 1⅜	 28 × 35		**068G4004** [3]) **068G4002** [3])	**068G4003** [3]) **068G4001** [3])	

[1]) ODF × ODF
[2]) ODF × ODM
[3]) ODM × ODM
ODF = Internal diameter
ODM = External diameter

Ordering
(continued)

R 404A/R 507

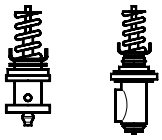


Thermostatic element

Valve type	Pressure equalization	Capillary tube	Code no.					
			Range N –40 to +10°C		Range NM –40 to –5°C	Range NL –40 to –15°C	Range B –60 to –25°C	
	¼ in. / 6 mm	m	Without MOP	With MOP	With MOP	With MOP	Without MOP	With MOP
TES 5	Ext. [1])	3	**067B3342**		**067B3357**	**067B3358**	**067B3344**	**067B3343**
TES 12	Ext. [2])	3	**067B3347**		**067B3345**	**067B3348**		**067B3349**
TES 12	Ext. [2])	5	**067B3346**					**067B3350**
TES 20	Ext. [2])	3	**067B3352**		**067B3351**	**067B3353**		**067B3354**
TES 20	Ext. [2])	5	**067B3356**					**067B3355**
TES 55	Ext. [2])	3	**067G3302**		**067G3303**	**067G3304**		**067G3305**
TES 55	Ext. [2])	5	**067G3301**					**067G3306**

[1])Pressure equalization with solder connector can be supplied on contacting Danfoss.

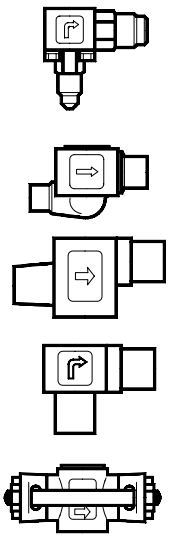
[2]) Available as accessory: solder adapter for TE 12, TE 20 and TE 55. **Code no. 068B0170.**



Orifice assembly

Valve type	Rated capacity range N: –40 to 10°C kW	Rated capacity range B: –60/55 to –25°C kW	Orifice no.	**Code no.**
TES 5-3.7	13.0	8.0	01	**067B2089**
TES 5-5.0	17.6	11.2	02	**067B2090**
TES 5-7.2	25.3	16.6	03	**067B2091**
TES 5-10.3	36.2	23.7	04	**067B2092**
TES12-4.2	14.8	11.6	01	**067B2005**
TES 12-6.8	23.9	18.9	02	**067B2006**
TES 12-10.0	35.2	27.7	03	**067B2007**
TES 12-13.4	47.1	37.5	04	**067B2008**
TES 20-16.5	59.0	41.0	01	**067B2175**
TES 55-37.0	130.0	95.0	01	**067G2011**
TES 55-56.0	197.0	144.0	02	**067G2012**

The rated capacity is based on:
Evaporating temperature t_e = +5°C for range N and t_e = –30°C for range B
Condensing temperature t_c = +32°C
Refrigerant temperature ahead of valve t_l = +28°C



Valve body

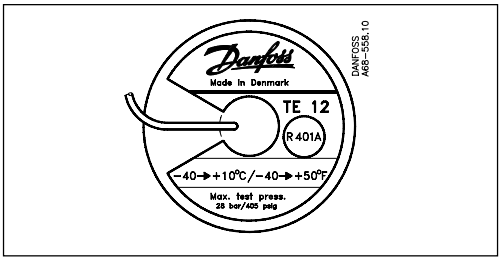
Type	Orifice no.	Connection Inlet × Outlet		Code no.			
		in.	mm	Flare angleway	Solder angleway	Solder straightway	Solder flanges
TE 5	01 - 03 03 04	½ × ⅝ ½ × ⅞ ⅝ × ⅞		**068B4013**	**068B4009** **068B4010** **068B4011**	**068B4007** **068B4008**	
TE 5	01- 03 03 04		12 × 16 12 × 22 16 × 22	**068B4013**	**068B4004** **068B4005** **068B4012**	**068B4002** **068B4003**	
TE 12	01 - 02 03 - 04 03 - 04	⅝ × ⅞ ⅞ × 1 ⅞ × 1⅛			**068B4022** [1]) **068B4023** [2])	**068B4020** [1]) **068B4021** [2])	**068B4025** [1]) **068B4026** [1])
TE 12	01 - 02 03 - 04 03 - 04		16 × 22 22 × 25 22 × 28		 **068B4017** [2])	**068B4018** [1]) **068B4016** [2])	**068B4027** [1]) **068B4015** [1])
TE 20	01 01	⅞ × 1⅛	 22 × 28		**068B4023** [2]) **068B4017** [2])	**068B4021** [2]) **068B4016** [2])	
TE 55	01- 02 01- 02	1⅛ × 1⅜	 28 × 35		**068G4004** [3]) **068G4002** [3])	**068G4003** [3]) **068G4001** [3])	

[1]) ODF × ODF
[2]) ODF × ODM
[3]) ODM × ODM
ODF = Internal diameter
ODM = External diameter

Introduction

As a help for the refrigeration installer, Danfoss offers thermostatic elements as service elements aand service kits for applications where refrigerants R 12 and R 502 are replaced by one of the many substitute refrigerants offered to the refrigeration trade.
The service kit contains an instruction for resetting of the thermostatic expansion valve to a substitute refrigerant.
Additionally, the service kit contains a series of self-adhesive labels. e.g. to stick on the label of the expansion valve in order to identify expansion valve and substitute refrigerant.
Service elements and service kit are for thermostatic expansion valve T 2/ TE 2, TE 5 and TE 12, range N and B without MOP for R 12 and R 502.

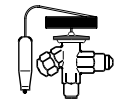
Identification labels

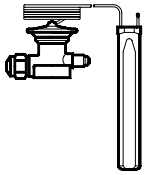


Note:
On service elements used in retro-fit elements the character for refrigerant has been removed from the type designation.

Ordering

Service elementes incl. service kit





Type	Capillary tube	**Code no.**
R 12, range N –40/ +10°C		
TF 2	1.5 m	**068-3460**
TEF 2	1.5 m	**068-3461**
TEF 5	3 m	**068B3320**
TEF 12	3 m	**068B3321**
R 502, range N –40/ +10°C		
TY 2	1.5 m	**068-3462**
TEY 2	1.5 m	**068-3463**
TEY 5	3 m	**068B3322**
TEY 12	3 m	**068B3323**
R 502, range B –60/ –25°C		
TY 2	1.5 m	**068-3464**
TEY 2	1.5 m	**068-3465**
TEY 5	3 m	**068B3325**

Service kit, **code no. 068-0144**

Capacity

Recommended correction factors based on R 12 and R 502

Refrigerant		Correction factor
R 12 for:	R 401A	1.39
	R 401B	1.43
	R 401C	--
	R 405A	1.16
	R 409A	1.37
	R 409B	1.40
R 502 for:	R 402A	1.13
	R 402B	1.24
	R 403A	1.22
	R 403B	1.04
	R 407B	1.22
	R 408A	1.28

The stated correction factors are to be multiplied with the valve capacities for R 12/ R 134A and R 502/ R 404A respectively.
All service refrigerants give higher valve capacity than their basic refrigerants.

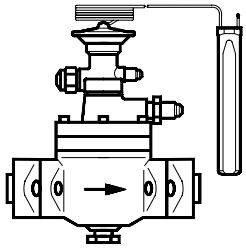
Recommended correction factors based on R 134a and R 404A

Refrigerant		Correction factor
R 134a for:	R 401A	1.06
	R 401B	1.09
	R 401C	--
	R 405A	0.88
	R 409A	1.05
	R 409B	1.07
R 404A for:	R 402A	1.04
	R 402B	1.15
	R 403A	1.13
	R 403B	0.96
	R 407B	1.15
	R 408A	1.19

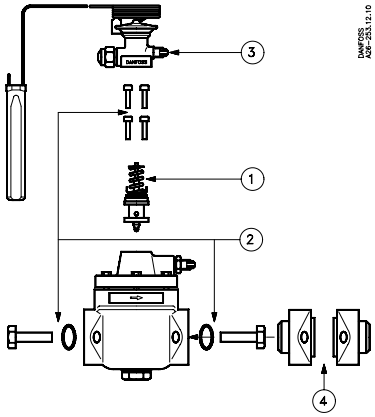
In some cases it might therefore be necessary to change to a lower valve capacity, either by changing the orifice or by replacing the complete valve with a smaller valve.

Ordering (continued)

Components



PHT 85
Solder or weld flanges

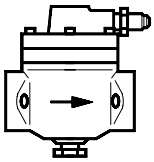


1. Orifice assembly for pilot valve
2. Valve body, flange gaskets, flange bolts and screws
3. Thermostatic element (incl. accessory bag with screws)
4. Flange set

1. Pilot orifice assembly

Type	**Code no.**
PHT	**068B2089**

2. Valve body, flange gaskets, flange bolts and screws

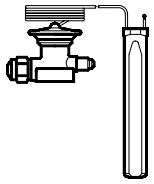


Type	Orifice no.	Rated capacity [1]) R 22		Rated capacity [1]) 134a				**Code no.**
		Range N: –40 to +10°C		Range N: –40 to +10°C		Range A: +10 to +50°C		
		TR	kW	TR	kW	TR	kW	
PHT 85	1	30	105	16	55	20	69	**026H0160**
PHT 85	2	50	175	26	92	33	114	**026H0161**
PHT 85	3	80	280	39	138	52	182	**026H0162**
PHT 85	4	130	455	59	208	72	273	**026H0163**
PHT 125	1	225	790	125	438	156	545	**026H0164**
PHT 300	1	325	1140	178	622	221	773	**026H0165**
PHT 300	2	540	1890	309	1083	351	1227	**026H0166**

[1]) The rated capacity for range N is based on evaporating temperature t_e = +5°C, condensing temperature t_c = +32°C, and refrigerant liquid temperature ahead of valve t_l = +28°C.
The rated capacity for range A is based on evaporating temperature t_e = +5°C, condensing temperature t_c = +42°C, and refrigerant liquid temperature ahead of valve t_l = +38°C.

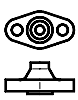
See following pages for extended capacity tables.

3. Thermostatic element (incl. accessory bag with screws)



Range	Refrigerant	**Code no.**	
		3 m capillary tube	5 m capillary tube
–40 til +10°C	R 22	**068B3303**	**068B3304**
	R 22, MOP 100 psig	**068B3300**	**068B3306**
	R 134a	**068B3310**	**068B3315**
	R 134a, MOP 55 psig	**068B3316**	**068B3317**
	R 404A / R 507		**068B3319**
	R 407C	**068B3314**	**068B3341**
	R 407C, MOP 95 psig	**068B3311**	
+10 til +50°C	R 134a		**068B3318**

4. Flange set



Valve flange	Flange type	Weld flanges		Solder flanges			
		in.	**Code no.**	in.	**Code no.**	mm	**Code no.**
PHT 85	2	1	**027N1025**				
PHT 85	2			1⅛	**027L1029**	28	**027L1028**
PHT 85	2			1⅜	**027L1035**	35	**027L1035**
PHT 125	3 A	1¼	**027N1032**				
PHT 300	4 A	1½	**027N1040**				
PHT 300	4 A	2	**027N1050**				

Capacity in KW for Range N: □–40°C to +10°C

R 22

Valve type	Orifice no.	Pressure drop across valve Δp bar								Pressure drop across valve Δp bar							
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
		Evaporating temperature +10°C								**Evaporating temperature 0°C**							
TX 2/TEX 2-0.15	0X	0.37	0.48	0.55	0.60	0.63	0.65	0.65	0.67	0.37	0.48	0.55	0.59	0.63	0.65	0.66	0.66
TX2/TEX 2-0.3	00	0.87	1.1	1.2	1.3	1.4	1.4	1.4	1.5	0.84	1.0	1.2	1.3	1.3	1.4	1.4	1.4
TX2/TEX 2-0.7	01	2.2	2.8	3.2	3.4	3.6	3.7	3.8	3.8	1.9	2.4	2.7	3.0	3.1	3.2	3.3	3.3
TX2/TEX 2-1.0	02	3.0	4.0	4.7	5.1	5.4	5.6	5.8	5.8	2.6	3.4	4.0	4.3	4.6	4.8	4.9	5.0
TX2/TEX 2-1.5	03	5.4	7.2	8.3	9.1	9.7	10.0	10.2	10.3	4.6	6.1	7.1	7.8	8.2	8.5	8.7	8.8
TX2/TEX 2-2.3	04	8.1	10.8	12.5	13.8	14.5	15.0	15.4	15.5	6.9	9.1	10.5	11.5	12.2	12.7	13.0	13.2
TX2/TEX 2-3.0	05	10.2	13.6	15.7	17.2	18.3	18.9	19.3	19.5	8.8	11.6	13.3	14.6	15.5	16.1	16.4	16.6
TX2/TEX 2-4.5	06	12.6	16.7	19.3	21.0	22.3	23.1	23.5	23.7	10.8	14.2	16.3	17.8	18.9	19.6	20.0	20.2
TEX 5-3	01	12.4	16.3	18.8	20.5	21.7	22.4	22.8	23.0	12.8	16.7	19.1	20.8	22.0	22.7	23.2	23.3
TEX 5-4.5	02	17.2	22.5	25.9	28.1	29.7	30.6	31.1	31.3	17.7	22.9	26.1	28.3	29.9	30.9	31.5	31.7
TEX 5-7.5	03	25.3	32.8	37.4	40.6	42.6	43.9	44.5	44.7	25.9	33.0	37.5	40.6	42.8	44.2	45.0	45.3
TEX 5-12	04	35.8	46.6	53.3	57.8	60.8	62.6	63.6	63.9	36.6	47.0	53.5	58.0	61.2	63.2	64.3	64.7
TEX 12-4.5	01	16.8	22.5	26.1	28.6	30.3	31.4	32.1	32.3	16.1	21.2	24.5	26.8	28.5	29.6	30.3	30.6
TEX 12-7.5	02	27.3	36.4	42.1	46.1	48.8	50.7	51.6	52.0	26.2	34.5	39.8	43.5	46.1	47.8	48.9	49.3
TEX 12-12	03	40.2	53.3	61.6	67.2	71.1	73.5	74.9	75.5	38.7	50.8	58.5	63.9	67.7	70.3	71.9	72.6
TEX 12-18	04	53.2	70.2	80.9	88.1	93.0	96.1	97.8	98.5	51.7	67.6	77.8	85.0	90.2	93.7	95.8	96.9
TEX 20-30	01	72.0	94.4	108	118	124	129	131	132	66.3	86.0	98.5	107	113	118	120	121
TEX 55-50	01	158	209	241	263	278	287	293	295	145	190	218	237	251	260	265	267
TEX 55-85	02	239	313	360	391	412	425	432	434	221	286	326	355	375	388	395	397
PHTX 85	1	67.3	95.0	112	124	133	139	142	144	56.7	76.6	93.4	103	111	115	119	121
PHTX 85	2	109	151	178	196	209	217	222	224	94.4	131	153	169	180	188	194	196
PHTX 85	3	174	244	287	316	336	349	356	360	147	206	241	265	283	295	303	306
PHTX 85	4	299	422	493	542	572	594	606	611	230	331	391	432	460	480	495	500
PHTX 125	1	518	605	695	803	876	927	957	982	454	573	698	763	813	840	863	870
PHTX 300	1	786	1048	1211	1317	1387	1432	1455	1476	671	887	1022	1110	1182	1216	1250	1271
PHTX 300	2	1290	1688	1935	2096	2202	2269	2302	2327	1133	1471	1685	1827	1941	1997	2048	2077

		Evaporating temperature –10°C								**Evaporating temperature –20°C**							
TX 2/TEX 2-0.15	0X	0.37	0.47	0.53	0.57	0.60	0.63	0.64	0.64		0.44	0.50	0.54	0.57	0.59	0.61	0.61
TX 2/TEX 2-0.3	00	0.79	0.96	1.1	1.2	1.2	1.3	1.3	1.3		0.88	1.0	1.1	1.1	1.2	1.2	1.2
TX 2/TEX 2-0.7	01	1.6	2.0	2.3	2.5	2.6	2.7	2.8	2.8		1.7	1.9	2.0	2.2	2.3	2.3	2.3
TX 2/TEX 2-1.0	02	2.2	2.9	3.3	3.6	3.8	4.0	4.1	4.1		2.4	2.7	2.9	3.1	3.2	3.3	3.3
TX 2/TEX 2-1.5	03	3.9	5.1	5.9	6.4	6.8	7.1	7.3	7.3		4.2	4.8	5.2	5.5	5.8	5.9	6.0
TX 2/TEX 2-2.3	04	5.8	7.6	8.7	9.5	10.1	10.5	10.8	10.9		6.2	7.1	7.7	8.2	8.5	8.7	8.8
TX 2/TEX 2-3.0	05	7.4	9.6	11.0	12.0	12.8	13.3	13.6	13.8		7.9	9.0	9.8	10.3	10.8	11.0	11.2
TX 2/TEX 2-4.5	06	9.1	11.8	13.5	14.7	15.6	16.2	16.6	16.8		9.6	11.0	11.9	12.6	13.1	13.5	13.7
TEX 5-3	01	11.1	14.3	16.3	17.7	18.8	19.5	19.9	20.1		11.5	13.0	14.1	15.0	15.6	16.0	16.2
TEX 5-4.5	02	15.4	19.7	22.4	24.3	25.7	26.7	27.3	27.6		15.9	18.1	19.6	20.8	21.6	22.1	22.4
TEX 5-7.5	03	22.7	28.7	32.7	35.6	37.8	39.4	40.4	40.9		23.2	26.3	28.7	30.6	32.0	32.9	33.5
TEX 5-12	04	32.3	41.1	46.8	51.0	54.1	56.3	57.7	58.4		33.2	37.7	41.1	43.7	45.7	47.0	47.8
TEX 12-4.5	01		18.7	21.4	23.4	24.8	25.8	26.4	26.6		15.9	18.1	19.6	20.8	21.6	22.1	22.4
TEX 12-7.5	02		30.4	34.8	37.9	40.2	41.8	42.8	43.2		25.9	29.4	32.0	33.9	35.2	36.1	36.5
TEX 12-12	03		44.5	50.9	55.6	59.0	61.4	62.9	63.7		37.7	42.9	46.7	49.6	51.7	53.1	53.9
TEX 12-18	04		59.1	67.7	74.0	78.7	82.1	84.3	85.6		49.9	57.0	62.3	66.4	69.6	71.8	73.1
TEX 20-30	01		75.4	85.9	93.6	99.2	103	106	107		63.7	72.4	78.8	83.8	87.4	90.0	91.4
TEX 55-50	01		166	189	205	217	225	229	231		140	158	171	181	187	191	193
TEX 55-85	02		251	285	309	327	339	346	349		213	240	260	275	285	291	294
PHTX 85	1	46.0	64.0	74.9	82.9	88.4	92.9	94.5	97.4		49.6	57.8	63.3	68.2	71.5	73.1	75.3
PHTX 85	2	78.4	108	126	139	148	156	159	163		85.6	99.5	109	117	123	125	129
PHTX 85	3	119	166	195	215	228	239	245	248		129	151	166	178	186	192	195
PHTX 85	4	153	231	276	310	334	350	361	368		139	165	187	205	215	230	234
PHTX 125	1	381	505	582	637	677	707	727	730		403	465	511	541	567	585	591
PHTX 300	1	552	723	827	898	957	1002	1034	1040		570	648	711	751	789	821	818
PHTX 300	2	953	1228	1401	1522	1620	1695	1747	1757		990	1124	1233	1304	1370	1425	1422

Correction for subcooling Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor below. Selections can then be made from the tables above.

Note:
Insufficient subcooling can produce flash gas.

Δt_u	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
Correction factor	1.00	1.06	1.11	1.15	1.2	1.25	1.3	1.35	1.39	1.44

Example
Refrigerant = R 22
Evaporator capacity Q_e = 5 kW
Subcooling = 10 K

Correction factor from table = 1.06
Corrected capacity = 5 ÷ 1.06 = 4.72 kW

Capacity in KW for range N: –40°C to +10°C

R 22

Valve type	Orifice no.	Pressure drop across valve Δp bar								Pressure drop across valve Δp bar							
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
		Evaporating temperature –30°C								**Evaporating temperature –40°C**							
TX 2/TEX 2-0.15	0X		0.40	0.45	0.49	0.52	0.55	0.56	0.57			0.42	0.45	0.48	0.50	0.52	0.53
TX 2/TEX 2-0.3	00		0.79	0.90	0.96	1.0	1.1	1.1	1.1			0.80	0.86	0.92	0.95	0.98	0.99
TX 2/TEX 2-0.7	01		1.4	1.5	1.7	1.8	1.8	1.9	1.9			1.3	1.4	1.4	1.5	1.5	1.6
TX 2/TEX 2-1.0	02		1.9	2.2	2.7	2.5	2.6	2.6	2.7			1.7	1.9	2.0	2.0	2.1	2.1
TX 2/TEX 2-1.5	03		3.4	3.9	4.2	4.4	4.6	4.7	4.8			3.1	3.4	3.5	3.7	3.8	3.8
TX 2/TEX 2-2.3	04		5.0	5.7	6.2	6.5	6.8	7.0	7.1			4.6	4.9	5.2	5.4	5.6	5.7
TX 2/TEX 2-3.0	05		6.4	7.2	7.8	8.3	8.6	8.8	9.0			5.8	6.3	6.6	6.9	7.1	7.2
TX 2/TEX 2-4.5	06		7.8	8.8	9.6	10.1	10.5	10.8	11.0			7.1	7.7	8.1	8.4	8.7	8.8
TEX 5-3	01		9.0	10.2	11.1	11.7	12.2	12.5	12.7			7.9	8.5	9.0	9.4	9.7	9.8
TEX 5-4.5	02		12.6	14.3	15.4	16.4	17.0	17.5	17.8			11.1	12.0	12.7	13.3	13.7	13.9
TEX 5-7.5	03		18.3	20.8	22.7	24.2	25.4	26.2	26.8			16.2	17.7	19.0	19.9	20.7	21.2
TEX 5-12	04		26.3	29.8	32.5	34.6	36.3	37.5	38.2			23.2	25.3	27.1	28.5	29.5	30.2
TEX 12-4.5	01			14.8	16.0	16.9	17.6	18.0	18.3			11.9	12.8	13.5	14.0	14.4	14.6
TEX 12-7.5	02			24.2	26.2	27.7	28.8	29.5	29.9			19.4	21.0	22.2	23.1	23.7	24.1
TEX 12-12	03			35.1	38.1	40.5	42.4	43.7	44.5			28.1	30.6	32.6	34.1	35.3	36.1
TEX 12-18	04			46.6	51.0	54.6	57.4	59.6	61.0			37.4	41.1	44.2	46.8	48.8	50.3
TEX 20-30	01			59.2	64.5	68.8	72.0	74.4	75.8			47.5	51.8	55.4	58.2	60.4	61.9
TEX 55-50	01			129	139	146	151	155	156			102	110	116	120	122	123
TEX 55-85	02			197	212	224	232	237	240			158	170	178	185	189	191
PHTX 85	1		36.6	42.8	46.8	49.8	52.2	54.3	55.9			30.6	33.6	36.1	38.0	39.4	40.2
PHTX 85	2		64.1	74.7	81.7	86.9	91.1	94.6	97.4			54.0	59.2	63.7	66.9	69.4	70.4
PHTX 85	3		95.3	112	124	132	138	144	147			79.9	88.5	94.7	99.7	104	107
PHTX 85	4		100	120	134	145	153	158	161			84.7	95.5	103	111	115	119
PHTX 125	1		310	358	390	413	434	449	461			266	289	309	321	339	340
PHTX 300	1		429	487	536	570	598	621	627			364	399	430	454	467	474
PHTX 300	2		759	862	949	1011	1062	1104	1115			655	719	775	820	844	857

Correction for subcooling
Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor below. Selections can then be made from the tables above.

Note:
Insufficient subcooling can produce flash gas.

Δt_u	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
Correction factor	1.00	1.06	1.11	1.15	1.2	1.25	1.3	1.35	1.39	1.44

Example
Refrigerant = R 22
Evaporator capacity Q_e = 5 kW
Subcooling = 10 K

Correction factor from table = 1.06
Corrected capacity = 5 ÷ 1.06 = 4.72 kW

Capacity in kW for range B: –60°C to –25°C

R 22

Valve type	Orifice no.	Pressure drop across valve Δp bar								Pressure drop across valve Δp bar							
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
		Evaporating temperature –25°C								**Evaporating temperature –30°C**							
TX 2/TEX 2-0.2	00	0.69	0.83	0.94	1.0	1.1	1.1	1.1	1.2	0.66	0.79	0.89	0.96	1.0	1.1	1.1	1.1
TX 2/TEX 2-0.3	01	1.2	1.5	1.7	1.9	2.0	2.0	2.1	2.1	1.1	1.4	1.5	1.7	1.8	1.8	1.9	1.9
TX 2/TEX 2-0.6	02	1.7	2.1	2.4	2.6	2.8	2.9	2.9	3.0	1.5	1.9	2.2	2.3	2.5	2.6	2.6	2.7
TX 2/TEX 2-0.8	03	3.0	3.8	4.3	4.7	5.0	5.2	5.3	5.3	2.7	3.4	3.9	4.2	4.4	4.6	4.7	4.8
TX 2/TEX 2-1.2	04	4.4	5.6	6.4	6.9	7.3	7.6	7.8	7.9	3.9	5.0	5.7	6.2	6.5	6.8	7.0	7.1
TX 2/TEX 2-1.5	05	5.6	7.1	8.1	8.7	9.3	9.6	9.9	10.0	5.0	6.4	7.2	7.8	8.3	8.6	8.8	9.0
TX 2/TEX 2-2.0	06	6.8	8.7	9.8	10.7	11.3	11.8	12.1	12.3	6.1	7.8	8.8	9.6	10.1	10.5	10.8	11.0
TEX 5-3	01	8.1	10.2	11.6	12.5	13.3	13.8	14.2	14.4	7.2	9.0	10.2	11.1	11.7	12.2	12.5	12.7
TEX 5-4.5	02	11.3	14.2	16.1	17.4	18.5	19.2	19.7	20.0	10.1	12.6	14.3	15.4	16.4	17.0	17.5	17.8
TEX 5-7.5	03	16.4	20.7	23.5	25.6	27.3	28.6	29.5	30.0	14.6	18.3	20.8	22.7	24.2	25.4	26.2	26.8
TEX 5-12	04	23.5	29.6	33.6	36.6	39.0	40.8	42.1	42.8	20.9	26.3	29.8	32.5	34.6	36.3	37.5	38.2
TEX 12-4.5	01	11.3	14.5	16.4	17.8	18.8	19.6	20.0	20.3	10.2	13.1	14.8	16.0	16.9	17.6	18.0	18.3
TEX 12-7.5	02	18.5	23.6	26.8	29.0	30.7	31.9	32.7	33.2	16.8	21.4	24.2	26.2	27.7	28.8	29.5	29.9
TEX 12-12	03	26.8	34.2	38.9	42.3	45.0	46.9	48.3	49.1	24.3	30.9	35.1	38.1	40.5	42.4	43.7	44.5
TEX 12-18	04	35.4	45.3	51.7	56.6	60.4	63.4	65.6	67.0	32.0	40.8	46.6	51.0	54.6	57.4	59.6	61.0
TEX 20-20	01	46.0	58.0	66.0	72.0	76.0	80.0	82.0	83.0	41.0	52.0	59.0	65.0	69.0	72.0	74.0	76.0
TEX 55-35	01	100	127	143	155	163	169	173	174	91.0	115	129	139	146	151	155	156
TEX 55-60	02	154	194	218	236	249	258	264	267	140	175	197	212	224	232	237	240
		Evaporating temperature –40°C								**Evaporating temperature –50°C**							
TX 2/TEX 2-0.2	00	0.60	0.71	0.80	0.86	0.92	0.95	0.98	0.99	0.54	0.65	0.72	0.78	0.82	0.85	0.87	0.88
TX 2/TEX 2-0.3	01	0.90	1.1	1.3	1.4	1.4	1.5	1.5	1.6	0.74	0.92	1.0	1.1	1.2	1.2	1.3	1.3
TX 2/TEX 2-0.6	02	1.2	1.6	1.7	1.9	2.0	2.1	2.1	2.1	1.0	1.3	1.4	1.5	1.6	1.7	1.7	1.7
TX 2/TEX 2-0.8	03	2.2	2.8	3.1	3.4	3.5	3.7	3.8	3.8	1.8	2.3	2.6	2.7	2.9	3.0	3.1	3.1
TX 2/TEX 2-1.2	04	3.2	4.0	4.6	4.9	5.2	5.4	5.6	5.7	2.6	3.3	3.7	4.0	4.2	4.4	4.5	4.6
TX 2/TEX 2-1.5	05	4.1	5.1	5.8	6.3	6.6	6.9	7.1	7.2	3.4	4.2	4.7	5.1	5.4	5.6	5.8	5.9
TX 2/TEX 2-2.0	06	5.0	6.3	7.1	7.7	8.1	8.4	8.7	8.8	4.1	5.1	5.8	6.2	6.6	6.9	7.1	7.2
TEX 5-3	01	5.6	7.0	7.9	8.5	9.0	9.4	9.7	9.8		5.5	6.1	6.6	7.0	7.3	7.5	7.7
TEX 5-4.5	02	7.9	9.9	11.1	12.0	12.7	13.3	13.7	13.9		7.7	8.7	9.4	9.9	10.4	10.7	10.9
TEX 5-7.5	03	11.4	14.3	16.2	17.7	19.0	19.9	20.7	21.2		11.2	12.7	13.9	14.9	15.8	16.4	16.9
TEX 5-12	04	16.3	20.5	23.2	25.3	27.1	28.5	29.5	30.2		16.0	18.2	19.9	21.3	22.5	23.4	24.1
TEX 12-4.5	01	8.3	10.5	11.9	12.8	13.5	14.0	14.4	14.6		8.5	9.5	10.2	10.8	11.2	11.5	11.7
TEX 12-7.5	02	13.7	17.2	19.4	21.0	22.2	23.1	23.7	24.1		13.9	15.5	16.8	17.7	18.5	19.0	19.4
TEX 12-12	03	19.6	24.8	28.1	30.6	32.6	34.1	35.3	36.1		19.8	22.5	24.5	26.2	27.6	28.6	29.4
TEX 12-18	04	25.5	32.6	37.4	41.1	44.2	46.8	48.8	50.3		25.9	29.9	33.1	35.9	38.2	40.2	41.6
TEX 20-20	01	33.0	42.0	47.0	52.0	55.0	58.0	60.0	62.0		33.0	38.0	42.0	45.0	47.0	49.0	51.0
TEX 55-35	01	73.0	92.0	102	110	116	120	122	123		73.0	81.0	87.0	91.0	94.0	96.0	97.0
TEX 55-60	02	114	141	158	170	178	185	189	191		113	126	135	142	147	150	151
		Evaporating temperature –55°C								**Evaporating temperature –60°C**							
TX 2/TEX 2-0.2	00									0.50	0.60	0.66	0.71	0.75	0.77	0.79	0.80
TX 2/TEX 2-0.3	01									0.64	0.79	0.88	0.95	1.0	1.0	1.1	1.1
TX 2/TEX 2-0.6	02									0.9	1.1	1.2	1.3	1.4	1.4	1.4	1.4
TX 2/TEX 2-0.8	03									1.6	1.9	2.2	2.3	2.4	2.5	2.6	2.6
TX 2/TEX 2-1.2	04									2.2	2.8	3.1	3.4	3.6	3.7	3.8	3.9
TX 2/TEX 2-1.5	05									2.9	3.6	4.0	4.3	4.6	4.8	4.9	5.0
TX 2/TEX 2-2.0	06									3.5	4.4	4.9	5.3	5.6	5.8	6.0	6.1
TEX 5-3	01										4.4	4.9	5.3	5.6	5.9	6.1	6.2
TEX 5-4.5	02										6.2	7.0	7.6	8.0	8.4	8.6	8.8
TEX 5-7.5	03										9.0	10.3	11.3	12.1	12.9	13.5	13.9
TEX 5-12	04										12.9	14.7	16.1	17.3	18.3	19.2	19.8
TEX 12-4.5	01		7.6	8.5	9.2	9.7	10.1	10.4	10.5								
TEX 12-7.5	02		12.5	14.0	15.1	16.0	16.7	17.2	17.5								
TEX 12-12	03		17.8	20.3	22.1	23.7	25.0	26.0	26.7								
TEX 12-18	04		23.3	27.0	30.0	32.6	34.8	36.7	38.2								
TEX 20-20	01		30.0	34.0	37.0	40.0	43.0	45.0	46.0								
TEX 55-35	01		66.0	73.0	78.0	82.0	84.0	86.0	87.0								
TEX 55-60	02		102	113	121	127	131	134	135								

Correction for subcooling Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor below. Selections can then be made from the tables above.

Note:
Insufficient subcooling can produce flash gas.

Δt_u	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
Correction factor	1.00	1.06	1.11	1.15	1.2	1.25	1.3	1.35	1.39	1.44

Capacity in kW

Range N: –40°C to +10°C

R 134a

Valve type	Orifice no.	Pressure drop across valve Δp bar					Pressure drop across valve Δp bar				
		2	4	6	8	10	2	4	6	8	10
		Evaporating temperature +10°C					**Evaporating temperature 0°C**				
TN 2/TEN 2 - 0.11	0X	0.34	0.43	0.47	0.50	0.51	0.33	0.42	0.46	0.47	0.49
TN 2/TEN 2 - 0.25	00	0.71	0.86	0.93	0.97	0.98	0.65	0.78	0.86	0.89	0.91
TN 2/TEN 2 - 0.5	01	1.50	1.86	2.05	2.15	2.19	1.25	1.55	1.71	1.80	1.83
TN 2/TEN 2 - 0.8	02	2.03	2.63	2.96	3.14	3.23	1.69	2.17	2.43	2.58	2.64
TN 2/TEN 2 - 1.3	03	3.64	4.71	5.29	5.61	5.77	3.04	3.89	4.36	4.61	4.73
TN 2/TEN 2 - 1.9	04	5.40	6.98	7.84	8.32	8.55	4.47	5.72	6.42	6.80	6.97
TN 2/TEN 2 - 2.5	05	6.86	8.85	9.93	10.8	10.9	5.69	7.27	8.14	8.62	8.83
TN 2/TEN 2 - 3.0	06	8.42	10.8	12.1	12.8	13.2	6.98	8.89	9.95	10.5	10.8
TEN 5 - 3.7	01	10.4	13.3	14.8	15.6	16.0	8.76	11.1	12.4	13.0	13.3
TEN 5 - 5.4	02	15.7	19.6	21.9	22.9	23.4	13.2	16.6	18.4	19.4	19.8
TEN 5 - 8.3	03	22.8	28.3	31.2	32.6	33.3	19.5	24.3	27.0	28.5	29.2
TEN 5 - 11.2	04	32.3	40.4	44.6	46.7	47.7	27.8	34.7	38.7	40.8	41.8
TEN 12 - 4.7	01	13.1	17.0	19.0	20.1	20.7	11.4	14.6	16.3	17.3	17.7
TEN 12 - 7.7	02	21.3	27.5	30.9	32.7	33.5	18.6	23.8	26.8	28.1	28.8
TEN 12 - 11.4	03	31.4	40.4	45.3	47.9	49.2	27.2	34.7	38.9	41.1	42.2
TEN 12 - 15	04	42.0	53.8	60.2	63.7	65.5	36.3	46.1	51.7	54.9	56.5
TEN 20 - 18	01	52.8	67.1	74.7	78.8	80.7	45.6	57.5	64.2	67.8	69.5
TEN 55 - 41	01	116.8	128.0	166.8	175.9	180.0	101.1	128.0	142.5	150.1	153.2
TEN 55 - 62	02	178.5	226.2	251.2	264.0	269.8	155.2	194.8	216.2	227.4	231.8
PHTN 85	1	45.0	62.0	71.0	76.0	79.0	36.0	49.0	56.0	60.0	62.0
PHTN 85	2	77.0	104	118	127	131	62	84	96	103	106
PHTN 85	3	118	161	183	196	201	93	128	146	157	161
PHTN 85	4	169	239	273	293	305	102	152	179	197	206
PHTN 125	1	372	486	545	576	591	304	399	448	477	488
PHTN 300	1	537	697	775	824	842	433	560	625	668	686
PHTN 300	2	927	1184	1303	1380	1407	762	974	1081	1149	1176
		Evaporating temperature –10°C					**Evaporating temperature –20°C**				
TN 2/TEN 2 - 0.11	0X	0.30	0.38	0.43	0.44	0.44	0.28	0.35	0.39	0.41	0.42
TN 2TEN 2 - 0.25	00	0.59	0.70	0.77	0.81	0.82	0.53	0.62	0.69	0.72	0.73
TN 2/TEN 2 - 0.5	01	1.01	1.25	1.39	1.46	1.49	0.81	1.00	1.11	1.17	1.19
TN 2/TEN 2 - 0.8	02	1.38	1.75	1.95	2.06	2.11	1.11	1.39	1.54	1.62	1.65
TN 2/TEN 2 - 1.3	03	2.48	3.13	3.49	3.69	3.77	2.00	2.48	2.75	2.90	2.96
TN 2/TEN 2 - 1.9	04	3.63	4.59	5.12	5.42	5.55	2.90	3.62	4.02	4.25	4.35
TN 2/TEN 2 - 2.5	05	4.62	5.83	6.51	6.88	7.05	3.70	4.60	5.11	5.40	5.53
TN 2/TEN 2 - 3.0	06	5.66	7.12	7.95	8.40	8.61	4.52	5.62	6.24	6.60	6.76
TEN 5 - 3.7	01	7.01	8.77	9.75	10.3	10.5	5.46	6.75	7.48	7.90	8.07
TEN 5 - 5.4	02	10.6	13.2	14.7	15.5	15.8	8.30	10.2	11.4	12.0	12.3
TEN 5 - 8.3	03	15.5	19.3	21.5	22.8	23.5	12.0	14.9	16.7	17.8	18.3
TEN 5 - 11.2	04	22.2	27.6	30.8	32.7	33.6	17.2	21.3	23.9	25.4	26.2
TEN 12 - 4.7	01	9.57	12.1	13.5	14.3	14.6	7.82	9.73	10.8	11.4	11.7
TEN 12 - 7.7	02	15.7	19.8	22.0	23.3	23.8	12.8	15.9	17.7	18.7	19.1
TEN 12 - 11.4	03	22.8	28.7	32.1	34.0	34.9	18.4	23.0	25.6	27.3	28.0
TEN 12 - 15	04	30.1	38.0	42.7	45.5	46.9	24.1	30.3	34.1	36.6	37.9
TEN 20 - 18	01	38.0	47.5	53.0	56.2	57.8	30.6	38.0	42.5	45.2	46.6
TEN 55 - 41	01	84.6	105.6	117.1	123.1	125.5	68.7	84.5	93.2	97.8	99.5
TEN 55 - 62	02	130.2	161.5	178.8	188.1	191.6	106.0	129.9	143.3	150.6	153.3
PHTN 85	1	27.0	36.0	41.0	44.0	46.0		25.0	29.0	31.0	32.0
PHTN 85	2	47.0	64.0	73.0	77.0	80.0		44.0	50.0	54.0	56.0
PHTN 85	3	69.0	95.0	109	117	120		64.0	75.0	81.0	83.0
PHTN 85	4	73.0	103	119	128	132		69.0	82.0	89.0	92.0
PHTN 125	1	232	306	345	367	375		216	246	264	268
PHTN 300	1	330	422	478	508	526		294	339	363	376
PHTN 300	2	591	748	846	895	925		531	612	655	678

Correction for subcooling
Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor below. Selections can then be made from the tables above.

Note:
Insufficient subcooling can produce flash gas.

Δt_u	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
Correction factor	1.00	1.08	1.13	1.19	1.25	1.31	1.37	1.42	1.48	1.54

Capacity in kW
(continued)

Range N: –40°C to +10°C

R 134a

Valve type	Orifice no.	Pressure drop across valve Δp bar					Pressure drop across valve Δp bar				
		2	4	6	8	10	2	4	6	8	10
		Evaporating temperature –30°C					**Evaporating temperature –40°C**				
TN 2/TEN 2 - 0.11	0X	0.25	0.32	0.35	0.37	0.38	0.23	0.28	0.32	0.33	0.34
TN 2/TEN 2 - 0.25	00	0.48	0.55	0.61	0.64	0.64	0.44	0.50	0.54	0.56	0.57
TN 2/TEN 2 - 0.5	01	0.66	0.80	0.88	0.93	0.95	0.54	0.65	0.72	0.76	0.77
TN 2/TEN 2 - 0.8	02	0.90	1.10	1.21	1.27	1.29	0.74	0.89	0.98	1.02	1.04
TN 2/TEN 2 - 1.3	03	1.60	1.97	2.17	2.28	2.32	1.32	1.60	1.75	1.84	1.86
TN 2/TEN 2 - 1.9	04	2.32	2.85	3.16	3.33	3.41	1.90	2.31	2.55	2.68	2.74
TN 2/TEN 2 - 2.5	05	2.95	3.63	4.02	4.24	4.34	2.42	2.94	3.24	3.42	3.49
TN 2/TEN 2 - 3.0	06	3.61	4.43	4.91	5.18	5.31	2.95	3.59	3.96	4.18	4.28
TEN 5 - 3.7	01	4.19	5.13	5.66	5.97	6.11	3.27	3.96	4.36	4.59	4.69
TEN 5 - 5.4	02	6.39	7.81	8.65	9.15	9.38	4.99	6.06	6.70	7.08	7.25
TEN 5 - 8.3	03	9.18	11.4	12.7	13.6	14.1	7.11	8.78	9.87	10.6	11.0
TEN 5 - 11.2	04	13.2	16.3	18.2	19.5	20.2	10.2	12.6	14.1	15.1	15.7
TEN 12 - 4.7	01	6.27	7.71	8.51	8.96	9.14	5.08	6.17	6.78	7.12	7.26
TEN 12 - 7.7	02	10.3	12.6	13.9	14.7	15.0	8.31	10.1	11.1	11.7	12.0
TEN 12 - 11.4	03	14.6	18.1	20.2	21.5	22.2	11.7	14.4	16.1	17.2	17.7
TEN 12 - 15	04	18.9	23.7	26.8	28.9	30.2	15.0	18.8	21.4	23.2	24.4
TEN 20 - 18	01	24.2	30.0	33.5	35.8	37.1	19.4	23.9	26.8	28.7	29.8
TEN 55 - 41	01	54.9	66.6	73.0	76.4	77.5	44.4	53.2	58.0	60.4	61.1
TEN 55 - 62	02	84.9	102.9	112.9	118.4	120.3	68.8	82.6	90.1	94.1	95.3
PHTN 85	1		15.0	18.0	19.0	21.0		9.0	10.0	12.0	12.0
PHTN 85	2		27.0	32.0	34.0	36.0		16.0	18.0	21.0	21.0
PHTN 85	3		40.0	47.0	51.0	53.0		23.0	27.0	30.0	31.0
PHTN 85	4		42.0	51.0	56.0	60.0		24.0	30.0	33.0	35.0
PHTN 125	1		141	161	171	180		87.0	99.0	108	112
PHTN 300	1		197	227	246	253		126	147	158	164
PHTN 300	2		362	416	450	465		234	273	292	304

Correction for subcooling
Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor below. Selections can then be made from the tables above.

Note:
Insufficient subcooling can produce flash gas.

Δt_u	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
Correction factor	1.00	1.08	1.13	1.19	1.25	1.31	1.37	1.42	1.48	1.54

Capacity in kW, range A: +10°C to +50°C

R 134a

Valve type	Orifice no.	Pressure drop across valve Δp bar					Pressure drop across valve Δp bar				
		2	4	6	8	10	2	4	6	8	10
		Evaporating temperature +50°C					**Evaporating temperature +40°C**				
PHTN 85	1	70.0	92.0	105	115	121	70.0	96.0	111	121	127
PHTN 85	2	105	138	159	172	183	107	145	166	181	190
PHTN 85	3	179	233	267	289	305	178	243	276	302	316
PHTN 85	4	324	417	472	508	535	316	426	483	524	551
PHTN 125	1	439	569	647	699	738	471	601	674	728	762
PHTN 300	1	723	790	936	1065	1160	778	989	1108	1196	1251
PHTN 300	2	1153	1477	1670	1799	1891	1234	1548	1724	1857	1943
		Evaporating temperature +30°C					**Evaporating temperature +20°C**				
PHTN 85	1	64.0	87.0	100	108	114	56	77.0	88.0	94.0	98.0
PHTN 85	2	102	137	156	168	178	93	125	142	152	158
PHTN 85	3	165	223	253	271	286	146	198	225	239	249
PHTN 85	4	286	387	435	462	489	240	272	330	372	394
PHTN 125	1	485	628	698	738	772	445	578	643	677	699
PHTN 300	1	737	950	1058	1121	1176	658	853	944	993	1029
PHTN 300	2	1201	1515	1672	1765	1852	1102	1400	1535	1608	1661
		Evaporating temperature +10°C					**Evaporating temperature 0°C**				
PHTN 85	1	47.0	65.0	74.0	80.0	82.0	38.0	53.0	60.0	65.0	67.0
PHTN 85	2	80.0	109	124	132	137	66	90	103	110	113
PHTN 85	3	123	169	192	205	211	100	137	158	169	173
PHTN 85	4	182	258	292	315	325	117	178	206	225	234
PHTN 125	1	387	507	564	597	609	324	423	475	506	515
PHTN 300	1	563	730	810	859	876	464	599	669	713	731
PHTN 300	2	963	1229	1353	1427	1453	808	1033	1147	1216	1243
		Evaporating temperature –10°C									
PHTN 85	1	30.0	42.0	48.0	51.0	52.0					
PHTN 85	2	52.0	72.0	82.0	88.0	90.0					
PHTN 85	3	77.0	107	124	132	136					
PHTN 85	4	83.0	118	136	146	150					
PHTN 125	1	262	340	385	406	418					
PHTN 300	1	372	475	533	568	583					
PHTN 300	2	657	832	934	991	1016					

Correction for subcooling Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor below. Selections can then be made from the tables above.

Δt_u	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
Correction factor	1.00	1.08	1.13	1.19	1.25	1.31	1.37	1.42	1.48	1.54

Note:
Insufficient subcooling can produce flash gas.

Capacity in kW for range N: –40°C to +10°C

R 404A/R 507

Valve type	Orifice no.	Pressure drop across valve Δp bar								Pressure drop across valve Δp bar							
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
		Evaporating temperature +10°C								**Evaporating temperature +0°C**							
TS2/TES 2 - 0.11	0X	0.28	0.35	0.40	0.42	0.43	0.43	0.42	0.41	0.30	0.37	0.41	0.42	0.43	0.43	0.43	0.41
TS 2/TES 2 - 0.21	00	0.67	0.82	0.90	0.94	0.96	0.96	0.93	0.90	0.68	0.80	0.87	0.90	0.92	0.93	0.91	0.87
TS 2/TES 2 - 0.45	01	1.70	2.10	2.30	2.42	2.48	2.46	2.41	2.34	1.53	1.86	2.04	2.13	2.18	2.18	2.15	2.08
TS 2/TES 2 - 0.6	02	2.32	3.00	3.39	3.61	3.73	3.74	3.68	3.59	2.06	2.64	2.95	3.13	3.22	3.25	3.21	3.11
TS 2/TES 2 - 1.2	03	4.15	5.36	6.03	6.43	6.63	6.66	6.55	6.39	3.68	4.72	5.27	5.59	5.75	5.80	5.73	5.55
TS 2/TES 2 - 1.7	04	6.24	8.06	9.06	9.66	9.95	9.98	9.81	9.57	5.49	7.05	7.86	8.33	8.58	8.64	8.53	8.27
TS 2/TES 2 - 2.2	05	7.91	10.17	11.43	12.16	12.53	12.56	12.34	12.03	6.97	8.92	9.95	10.52	10.83	10.90	10.76	10.43
TS 2/TES 2 - 2.6	06	9.71	12.47	13.98	14.86	15.29	15.31	15.05	14.66	8.57	10.93	12.16	12.85	13.21	13.30	13.12	12.72
TES 5 - 3.7	01	9.9	12.8	14.3	15.1	15.5	15.7	15.8	15.8	9.4	12.1	13.7	14.5	14.9	14.9	14.9	14.9
TES 5 - 5.0	02	13.6	17.4	19.4	20.5	21.0	21.2	21.4	21.3	13.0	16.6	18.6	19.6	20.1	20.2	20.2	20.2
TES 5 - 7.2	03	19.9	25.1	27.7	29.1	29.9	30.2	30.4	30.4	19.3	24.4	27.3	28.8	29.5	29.6	29.6	29.5
TES 5 - 10.3	04	28.2	35.8	39.7	41.7	42.8	43.2	43.5	43.5	27.4	34.9	39.1	41.4	42.4	42.4	42.4	42.3
TES 12 - 4.2	01	11.8	15.5	17.5	18.7	19.4	19.6	19.8	19.8	10.3	13.5	15.3	16.31	6.7	16.8	16.9	16.8
TES 12 - 6.8	02	19.2	25.2	28.5	30.3	31.3	31.7	31.9	32.0	16.9	22.0	24.8	26.4	27.2	27.4	27.4	27.3
TES 12 - 10.0	03	28.4	37.0	41.8	44.5	46.0	46.6	47.0	47.0	24.7	32.2	36.4	38.7	39.9	40.2	40.3	40.3
TES 12 - 13.4	04	38.0	49.4	55.7	59.2	61.2	62.1	62.7	63.0	33.0	42.8	48.5	51.7	53.4	53.9	54.2	54.4
TES 20 - 16.7	01	48.0	62.0	69.0	73.0	75.0	76.0	77.0	77.0	42.0	53.0	60.0	64.0	66.0	66.0	66.0	66.0
TES 55 - 37	01	106	137	154	164	169	170	171	171	92	119	134	142	145	146	145	145
TES 55 - 56.0	02	161	208	232	245	252	254	255	255	141	181	203	214	219	219	219	218
		Evaporating temperature –10°C								**Evaporating temperature –20°C**							
TS2/TES 2 - 0.11	0X	0.30	0.37	0.40	0.42	0.42	0.42	0.41	0.41		0.35	0.38	0.40	0.39	0.40	0.39	0.38
TS 2/TES 2 - 0.21	00	0.65	0.76	0.82	0.84	0.87	0.87	0.85	0.83		0.70	0.75	0.77	0.79	0.79	0.79	0.76
TS 2/TES 2 - 0.45	01	1.31	1.61	1.74	1.81	1.84	1.85	1.84	1.78		1.34	1.45	1.50	1.52	1.52	1.51	1.47
TS 2/TES 2 - 0.6	02	1.76	2.24	2.50	2.62	2.69	2.71	2.68	2.60		1.85	2.04	2.14	2.17	2.18	2.16	2.09
TS 2/TES 2 - 1.2	03	3.14	4.02	4.47	4.69	4.81	4.84	4.79	4.65		3.32	3.66	3.83	3.89	3.90	3.86	3.75
TS 2/TES 2 - 1.7	04	4.66	5.97	6.61	6.95	7.13	7.18	7.11	6.91		4.88	5.40	5.64	5.75	5.77	5.71	5.56
TS 2/TES 2 - 2.2	05	5.93	7.57	8.39	8.81	9.02	9.08	8.99	8.73		6.20	6.86	7.17	7.29	7.31	7.23	7.05
TS 2/TES 2 - 2.6	06	7.28	9.27	10.26	10.76	11.00	11.08	10.97	10.65		7.60	8.39	8.75	8.91	8.93	8.84	8.61
TES 5 - 3.7	01	7.9	10.1	11.3	12.0	12.4	12.4	12.3	12.2		7.9	8.9	9.6	9.8	9.9	9.8	9.7
TES 5 - 5.0	02	10.9	13.9	15.6	16.6	17.0	17.0	16.9	16.8		11.0	12.4	13.3	13.7	13.8	13.6	13.5
TES 5 - 7.2	03	16.0	20.4	23.0	24.5	25.1	25.2	25.2	25.2		16.1	18.3	19.8	20.5	20.7	20.6	20.6
TES 5 - 10.3	04	22.9	29.1	32.9	35.0	36.0	36.2	36.1	36.1		23.1	26.2	28.4	29.3	29.6	29.6	29.4
TES 12 - 4.2	01	9.0	11.7	13.2	14.1	14.5	14.5	14.4	14.3		6.2	10.9	11.7	12.0	12.0	11.9	11.7
TES 12 - 6.8	02	14.8	19.1	21.6	23.0	23.6	23.6	23.5	23.3		15.7	17.8	19.1	19.6	19.7	19.5	19.3
TES 12 - 10.0	03	21.6	27.8	31.5	33.6	34.7	34.8	34.7	34.6		22.8	25.9	28.0	28.8	29.2	29.1	28.9
TES 12 - 13.4	04	28.6	37.0	42.1	45.1	46.7	47.1	47.2	47.2		30.2	34.6	37.6	39.1	39.9	39.9	40.0
TES 20 - 16.7	01	36.0	46.0	52.0	56.0	57.0	58.0	58.0	57.0		38.0	43.0	47.0	48.0	49.0	49.0	48.0
TES 55 - 37.0	01	80.0	103	115	122	125	125	123	122		84.0	94.0	101	103	103	101	100
TES 55 - 56.0	02	124	157	176	186	190	190	188	186		129	145	155	158	158	156	153
		Evaporating temperature –30°C								**Evaporating temperature –40°C**							
TS 2/TES 2 - 0.11	0X			0.35	0.37	0.36	0.37	0.36	0.35			0.32	0.33	0.33	0.33	0.32	0.32
TS 2/TES 2 - 0.21	00			0.35	0.37	0.36	0.37	0.36	0.35			0.32	0.33	0.33	0.33	0.32	0.32
TS 2/TES 2 - 0.45	01			1.18	1.21	1.23	1.21	1.20	1.17			0.92	0.96	0.97	0.96	0.94	0.91
TS 2/TES 2 - 0.6	02			1.63	1.69	1.71	1.70	1.68	1.64			1.27	1.32	1.33	1.31	1.28	1.24
TS 2/TES 2 - 1.2	03			2.93	3.04	3.07	3.06	3.02	2.93			2.28	2.36	2.38	2.36	2.31	2.24
TS 2/TES 2 - 1.7	04			4.28	4.47	4.52	4.51	4.46	4.35			3.34	3.47	3.50	3.48	3.42	3.33
TS 2/TES 2 - 2.2	05			5.45	5.68	5.74	5.74	5.67	5.52			4.25	4.41	4.45	4.43	4.36	4.24
TS 2/TES 2 - 2.6	06			6.66	6.94	7.02	7.01	6.93	6.75			5.19	5.39	5.45	5.42	5.33	5.19
TES 5 - 3.7	01			6.9	7.3	7.6	7.6	7.5	7.5			5.1	5.5	5.7	5.7	5.6	5.5
TES 5 - 5.0	02			9.7	10.3	10.7	10.7	10.6	10.5			7.2	7.7	8.0	8.0	7.9	7.8
TES 5 - 7.2	03			14.3	15.4	16.2	16.4	16.3	16.2			10.7	11.6	12.3	12.5	12.5	12.4
TES 5 - 10.3	04			20.5	22.1	23.1	23.4	23.3	23.2			15.3	16.6	17.5	17.8	17.8	17.7
TES 12 - 4.2	01			8.7	9.3	9.6	9.6	9.5	9.3			6.7	7.2	7.4	7.4	7.3	7.2
TES 12 - 6.8	02			14.3	15.3	15.8	15.9	15.7	15.4			11.1	11.8	12.3	12.3	12.1	11.9
TES 12 - 10.0	03			20.8	22.4	23.4	23.7	23.5	23.4			16.1	17.4	18.3	18.6	18.5	18.4
TES 12 - 13.4	04			27.8	30.3	32.0	32.7	32.9	32.9			21.6	23.8	25.3	26.1	26.3	26.5
TES 20 -16.7	01			35.0	37.0	39.0	40.0	40.0	39.0			27.0	29.0	31.0	31.0	31.0	31.0
TES 55 -37.0	01			75.0	80.0	82.0	81.0	80.0	78.0			58.0	61.0	62.0	62.0	60.0	59.0
TES 55 - 56.0	02			116	123	127	126	124	121			90.0	95.0	97.0	97.0	94.0	92.0

Correction for subcooling Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor next page. Selections can then be made from the tables above.

Capacity in kW for range B: –60 to –25°C

R 404A/ R 507

Valve type	Orifice no.	Pressure drop across valve Δp bar								Pressure drop across valve Δp bar							
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
		Evaporating temperature –25°C								**Evaporating temperature –30°C**							
TS 2/TES 2 - 0.21	00	0.57	0.67	0.72	0.73	0.74	0.85	0.74	0.71	0.53	0.64	0.67	0.70	0.70	0.70	0.69	0.67
TS 2/TES 2 - 0.45	01	0.98	1.20	1.31	1.36	1.37	1.37	1.35	1.31	0.88	1.07	1.18	1.21	1.23	1.21	1.20	1.17
TS 2/TES 2 - 0.6	02	1.31	1.65	1.83	1.91	1.93	1.93	1.90	1.85	1.18	1.47	1.63	1.69	1.71	1.70	1.68	1.64
TS 2/TES 2 - 1.0	03	2.35	2.97	3.28	3.42	3.47	3.46	3.42	3.32	2.12	2.65	2.93	3.04	3.07	3.06	3.02	2.93
TS 2/TES 2 - 1.4	04	3.45	4.37	4.82	5.04	5.11	5.12	5.06	4.93	3.09	3.88	4.28	4.47	4.52	4.51	4.46	4.35
TS 2/TES 2 - 1.7	05	4.40	5.56	6.14	6.40	6.49	6.49	6.42	6.26	3.94	4.94	5.45	5.68	5.74	5.74	5.67	5.52
TS 2/TES 2 - 1.9	06	5.40	6.80	7.49	7.81	7.93	7.93	7.85	7.64	4.83	6.06	6.66	6.94	7.02	7.01	6.93	6.75
TES 5 - 3.7	01	8.1	8.5	8.6	9.1	9.2	9.4	9.5	9.5	7.7	8.1	8.3	8.6	8.9	9.1	9.1	9.2
TES 5 - 5.0	02	12.0	12.5	13.0	13.5	14.7	15.3	15.9	16.0	11.2	11.7	12.2	12.6	13.4	14.2	14.7	14.8
TES 5 - 7.2	03	19.8	20.5	21.3	22.3	24.4	25.1	25.8	26.2	18.0	18.2	18.8	19.6	20.8	21.8	22.9	23.4
TES 5 - 10.3	04	20.0	24.0	26.0	27.0	27.5	28.0	28.5	29.0	18.0	22.0	24.8	25.0	25.5	26.0	26.3	26.5
TES 12 - 4.2	01	9.8	12.8	13.6	14.6	15.1	15.4	15.5	15.9	9.4	11.1	12.3	13.0	13.3	13.5	13.6	14.1
TES 12 - 6.8	02	18.4	21.2	22.8	24.9	25.7	25.8	26.2	26.3	16.5	18.6	20.2	21.5	22.1	22.2	22.4	22.8
TES 12 - 10.0	03	30.5	35.3	37.4	41.7	42.4	43.0	43.2	43.6	27.7	30.7	33.8	35.8	36.5	37.1	37.4	37.9
TES 12 - 13.4	04	34.3	40.2	42.8	47.0	48.4	48.8	49.1	49.3	30.5	34.4	37.7	40.5	40.9	41.4	41.6	42.1
TES 20 - 11.7	01	34.0	41.0	46.0	50.0	51.0	52.0	53.0	53.0	30.0	37.0	40.0	43.0	45.0	45.0	46.0	47.0
TES 55 - 27.0	01	71.0	91.0	97.0	104	109	109	111	112	63.0	79.0	86.0	93.0	94.0	95.0	96.0	96.0
TES 55 - 41.0	02	111	140	147	161	170	171	174	175	99.0	124	132	143	145	146	147	149
		Evaporating temperature –40°C								**Evaporating temperature –50°C**							
TS 2/TES 2 - 0.21	00		0.56	0.60	0.61	0.62	0.61	0.60	0.59		0.49	0.53	0.54	0.54	0.53	0.52	0.50
TS 2/TES 2 - 0.45	01		0.65	0.72	0.75	0.77	0.77	0.77	0.75		0.51	0.57	0.60	0.60	0.60	0.60	0.59
TS 2/TES 2 - 0.6	02		1.17	1.27	1.32	1.33	1.31	1.28	1.24		0.91	0.99	1.02	1.02	1.01	0.98	0.95
TS 2/TES 2 - 1.0	03		2.09	2.28	2.36	2.38	2.36	2.31	2.24		1.63	1.78	1.84	1.84	1.81	1.78	1.72
TS 2/TES 2 - 1.4	04		3.03	3.34	3.47	3.50	3.48	3.42	3.33		2.36	2.60	2.69	2.71	2.68	2.63	2.56
TS 2/TES 2 - 1.7	05		3.87	4.25	4.41	4.45	4.43	4.36	4.24		3.02	3.30	3.43	3.45	3.42	3.35	3.26
TS 2/TES 2 - 1.9	06		4.73	5.19	5.39	5.45	5.47	5.33	5.19		3.69	4.04	4.20	4.22	4.18	4.12	4.00
TES 5 - 3.7	01		6.3	6.6	6.7	7.1	7.2	7.3	7.5		4.4	4.6	4.7	4.8	4.9	4.9	5.3
TES 5 - 5.0	02		10.0	10.1	10.3	10.5	11.0	11.3	11.4		7.8	7.9	8.2	8.3	8.3	8.4	8.6
TES 5 - 7.2	03		14.2	14.4	14.6	15.3	15.8	16.1	16.4		10.3	10.5	10.6	10.7	11.0	11.1	11.3
TES 5 - 10.3	04		17.5	19.5	20.0	20.5	21.0	21.0	21.2		13.5	15.0	15.5	16.0	16.0	16.0	15.5
TES 12 - 4.2	01		9.0	9.6	10.0	10.5	10.6	10.8	10.9		7.1	7.4	7.8	7.9	8.0	8.1	8.3
TES 12 - 6.8	02		14.8	15.8	16.2	16.7	17.0	17.1	17.5		11.4	11.8	12.4	12.9	13.1	13.3	13.4
TES 12 - 10.0	03		24.7	27.0	27.0	28.2	28.5	28.8	29.1		19.5	20.5	21.0	21.7	21.9	22.1	22.7
TES 12 - 13.4	04		27.7	29.4	30.5	31.9	32.1	32.3	32.6		21.9	23.1	23.9	24.4	24.9	25.1	25.4
TES 20 - 11.7	01		31.0	33.0	34.0	34.0	35.0	35.0	35.0		26.0	26.0	27.0	27.0	27.0	28.0	28.0
TES 55 - 27.0	01		63.0	67.0	70.0	73.0	74.0	75.0	76.0		46.0	48.0	50.0	51.0	52.0	53.0	54.0
TES 55 - 41.0	02		98.0	106	108	114	115	115	116		74.0	78.0	79.0	81.0	82.0	82.0	83.0
		Evaporating temperature –55°C								**Evaporating temperature –60°C**							
TS 2/TES 2 - 0.21	00											0.46	0.48	0.47	0.45	0.45	0.43
TS 2/TES 2 - 0.45	01											0.58	0.60	0.60	0.58	0.56	0.54
TS 2/TES 2 - 0.6	02											0.78	0.80	0.80	0.78	0.75	0.72
TS 2/TES 2 - 1.0	03											1.40	1.44	1.43	1.40	1.36	1.30
TS 2/TES 2 - 1.4	04											2.04	2.11	2.11	2.07	2.03	1.96
TS 2/TES 2 - 1.7	05											2.59	2.69	2.68	2.65	2.59	2.50
TS 2/TES 2 - 1.9	06											3.16	3.28	3.30	3.25	3.18	3.07
TES 5 - 3.7	01											3.0	3.3	3.4	3.4	3.4	3.5
TES 5 - 5.0	02											6.6	6.8	6.9	6.9	7.1	7.3
TES 5 - 7.2	03											7.8	7.9	8.0	8.1	8.2	8.2
TES 5 - 10.3	04											11.5	12.0	12.2	12.3	12.2	12.0
TES 12 - 4.2	01			6.3	6.9	7.0	7.1	7.3	7.8								
TES 12 - 6.8	02			10.7	10.9	11.2	11.3	11.4	11.5								
TES 12 - 10.0	03			17.9	18.5	18.9	19.2	19.5	19.7								
TES 12 - 13.4	04			20.2	20.5	20.9	21.3	21.6	22.0								
TES 20 -11.7	01			24.0	24.0	25.0	25.0	26.0	26.0								
TES 55 - 27.0	01			39.0	39.0	41.0	41.0	42.0	42.0								
TES 55 - 41.0	02			63.0	64.0	65.0	65.0	66.0	66.0								

Correction for subcooling Δt_{sub}

The evaporator capacities used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the required evaporator capacity by the correction factor below. Selections can then be made from the tables above.

Note:
Insufficient subcooling can produce flash gas.

Δt_u	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
Correction factor	1.00	1.1	1.2	1.29	1.37	1.46	1.54	1.63	1.7	1.78

Design
Function

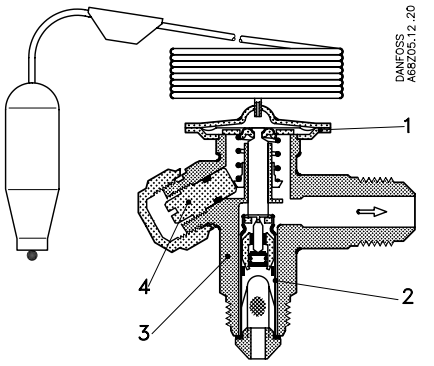
General
T, TE and PHT valves have an interchangeable orifice assembly.

T, TE and PHT valves are built up of three interchangeable main components:
I. Thermostatic element, 1
II. Orifice assembly, 2
Insert in PHT main valve, 7
III. Valve body with connections, 3

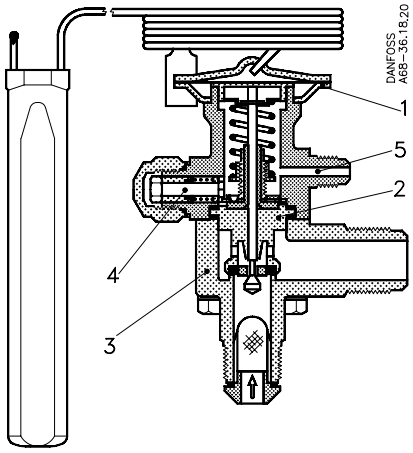
T/TE 2, TE 5, TE 12, PHT 85
For the same valve type and refrigerant, the associated orifice assembly is suitable for all versions of valve body and in all evaporating temperature ranges.

The charge in the thermostatic element depends on the evaporating temperature range.
The valves can be equipped with internal or external pressure equalization.
External pressure equalization should always be used on systems with liquid distributors.
The double contact bulb gives fast and precise reaction to temperature changes in the evaporator. It also makes fitting the bulb quick and easy.
The valves are able to withstand the effects that normally occur with hot gas defrosting.

To ensure long operating life, the valve cone and seat are made of a special alloy with particularly good wear qualities.



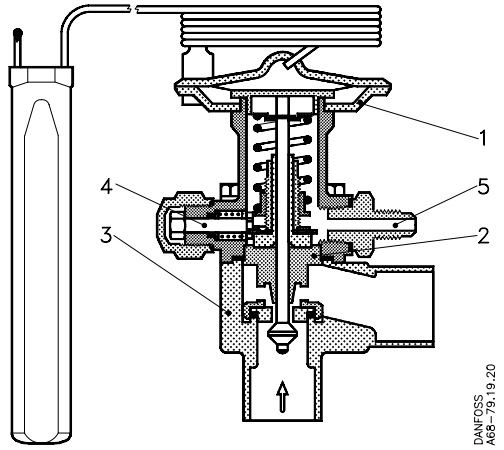
T 2



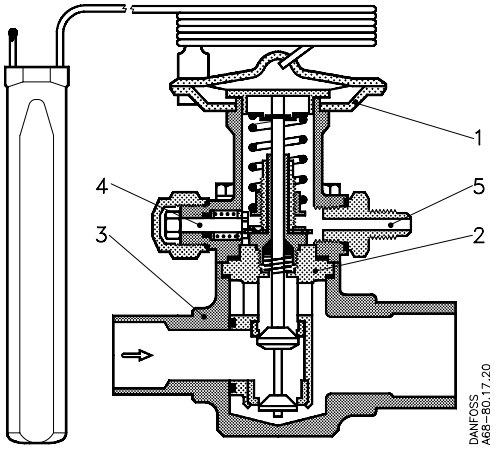
TE 5

1. Thermostatic element (diaphragm)
2. Interchangeable orifice assembly
3. Valve body
4. Superheat setting spindle (see instructions)
5. Ext. pressure equalizing connection with ¼ in./6 mm flare

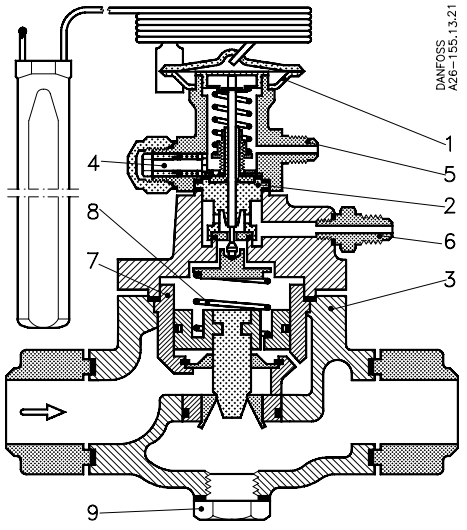
Design
Function
(Continued)



TE 12 / TE 20



TE 55



PHT 85

1. Thermostatic element (diaphragm)
2. Interchangeable orifice assembly
3. Valve body
4. Superheat setting spindle (see instructions)
5. Ext. pressure equalizing connection with 1⁄4 in./6 mm flare nut
6. Pilot connection
7. Insert in main valve
8. Main spring
9. Bottom plug

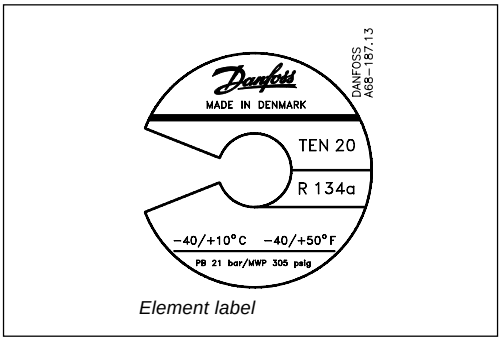
Identification

The thermostatic element is fitted with a label (on top of the diaphragm).The code refers to the refrigerant for which the valve is designed:

X = R 22
N = R 134a
S = R 404A/ R507

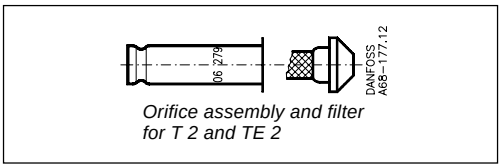
The label gives valve type, evaporating temperature range, MOP point, refrigerant, and max. test pressure, PB.

On T 2 and TE 2 with steel capillary tube this information is etched on with a laser.
With TE 20, TE 55 and PHT 85 the rated capacity is stamped on a band label fastened to the valve.



Element label

Orifice assembly for T 2 and TE 2
The orifice assembly is marked with the orifice size (06) and week stamp (404).
The orifice assembly number is also given on the lid of its plastic container.



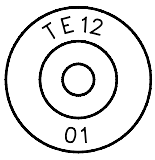
Orifice assembly and filter for T 2 and TE 2

Orifice assembly for TE 5, TE 12, 20 and 55
The orifice assembly is marked on top of the spring cup, e.g. as shown in the figure.
For a given size of valve, the same orifice assembly can be used for valves with ranges N and B.

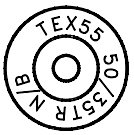
The thermostatic elements are different however:

- *On TE 5 and TE 12*
  the upper stamp (TE 12) indicates for which valve type the orifice can be used. The lower stamp (01) is the orifice size.

- *On TE 20 and TE 55*
  the upper stamp (N/B 50/35 TR) indicates the rated capacity in the two evaporating temperature ranges N and B, and the refrigerant.
  (50/35 TR = 175 kW in range N and 123 kW in range B).
  The lower stamp (TEX 55) refers to the valve type for which the assembly can be used.



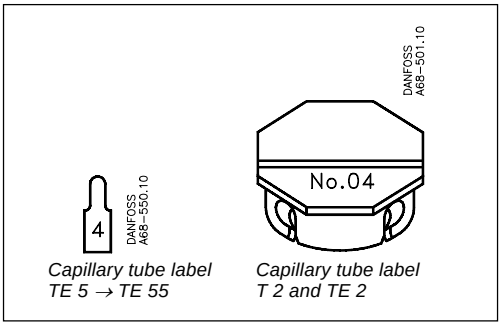
Orifice assembly marking for TE 5 and TE 12



Orifice assembly marking for TE 20 and TE 55

Capillary tube label for T 2 and TE 2
The label gives the orifice size (04) and consists of the lid of the orifice assembly plastic container. It can easily be fastened around the expansion valve capillary tube to clearly identify the valve size.

Capillary tube label for TE 5 to TE 55
The label gives the orifice size (04). A new label always accompanies a new orifice assembly.

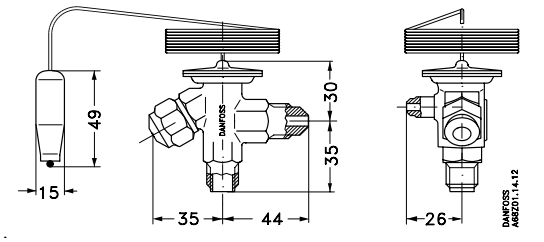


Capillary tube label TE 5 → TE 55

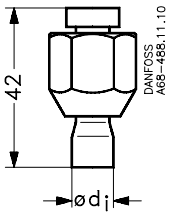
Capillary tube label T 2 and TE 2

Dimensions and weights

T 2 and TE 2

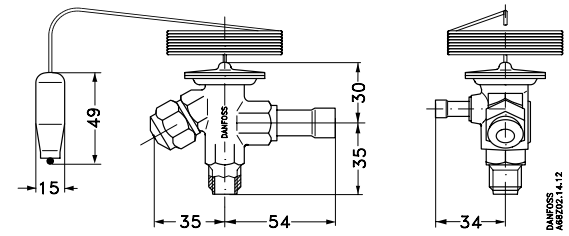


Flare × flare *Weight: 0.3 kg*



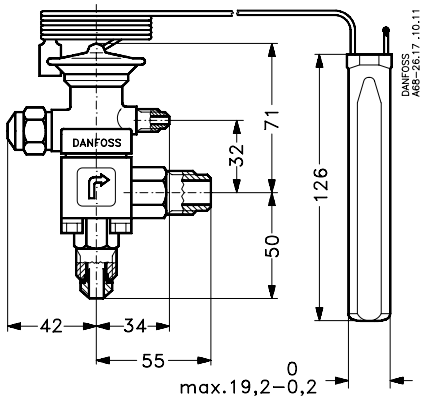
Solder adaptor *Weight: 0.05 kg*

Ød$_i$	
in.	mm
1/4	6
3/8	10

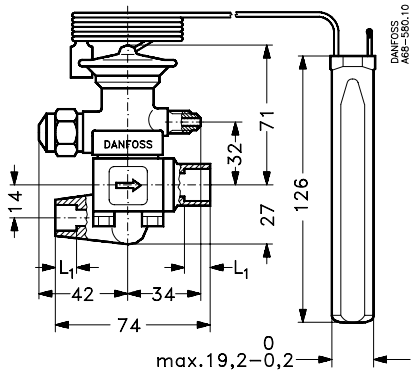


Flare × solder *Weight: 0.3 kg*

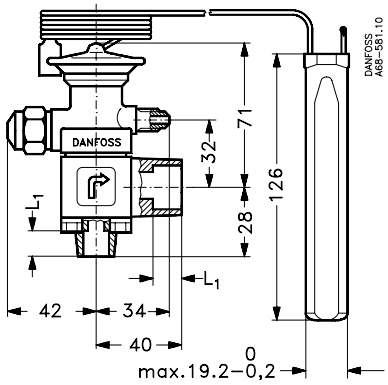
TE 5



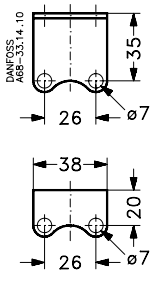
TE 5
Flare, angleway *Weight 1.1 kg*



TE 5
Solder, straightway *Weight 1 kg*



TE 5
Solder, angleway *Weight 1 kg*

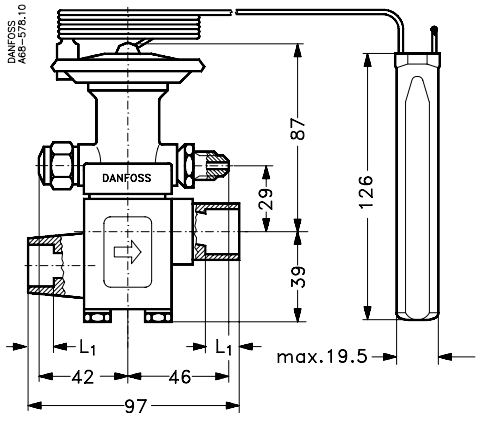


Bracket for TE 5

Inlet side ØD$_1$	L$_1$ mm
½ in./12 mm ODF	10
⅝ in./16 mm ODF	10

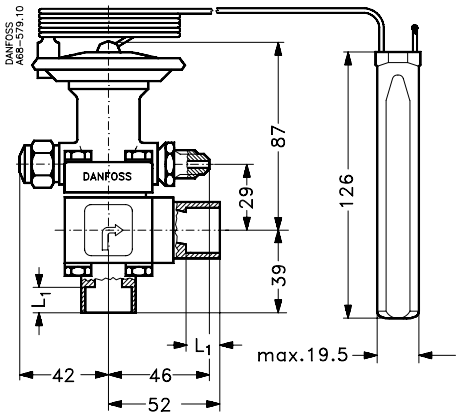
Outlet side ØD$_2$	L$_1$ mm
⅝ in./16 mm ODF	12
⅞ in./22 mm ODF	17

Dimensions and weights
(continued)



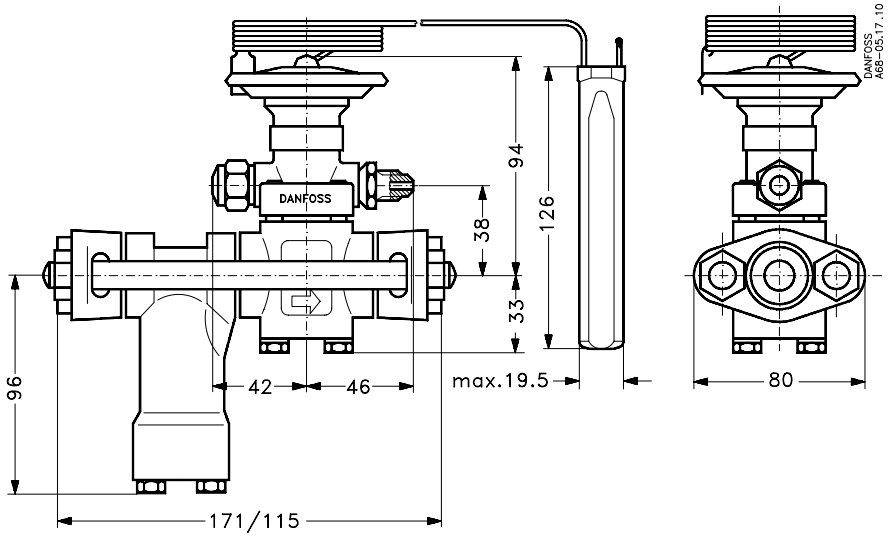
TE 12 and 20
Solder, straightway

Weight
TE 12: 1.5 kg
TE 20: 1.7 kg



TE 12 and 20
Solder, angleway

Weight
TE 12: 1.5 kg
TE 20: 1.6 kg



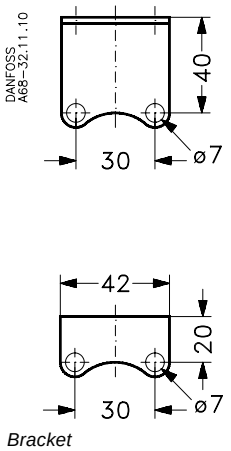
TE 12
Solder flanges, straightway

Weight
Without filter: 2.3 kg
With filter: 3.2 kg

Type TE 12 and TE 20

Inlet side $\varnothing D_1$	L_1 mm
5/8 in./16 mm ODF	12
7/8 in./22 mm ODF	17

Outlet side $\varnothing D_2$	L_1 mm
7/8 in./22 mm ODF	17
1 1/8 in./28 mm ODF	25



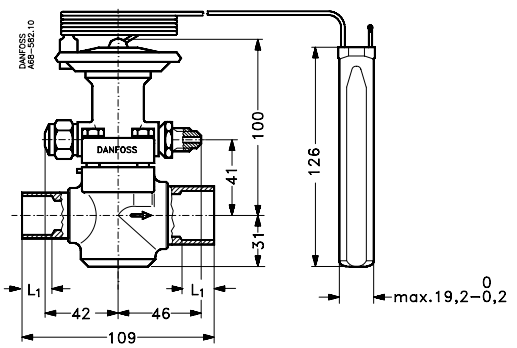
Bracket
for TE 12 and TE 20

Dimensions and weights
(continued)

Type TE 55

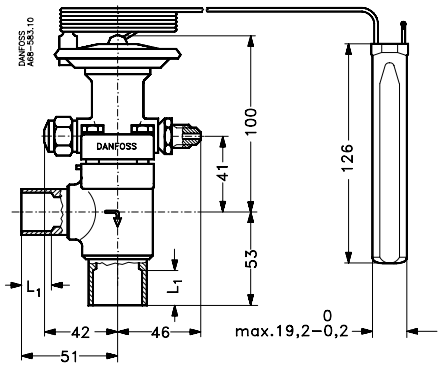
Inlet side $\varnothing D_1$	L_1 mm
7/8 in./22 mm ODF	17
1 1/8 in./28 mm ODM	25

Outlet side $\varnothing D_2$	L_1 mm
1 1/8 in./28 mm ODF	22
1 3/8 in./35 mm ODM	27



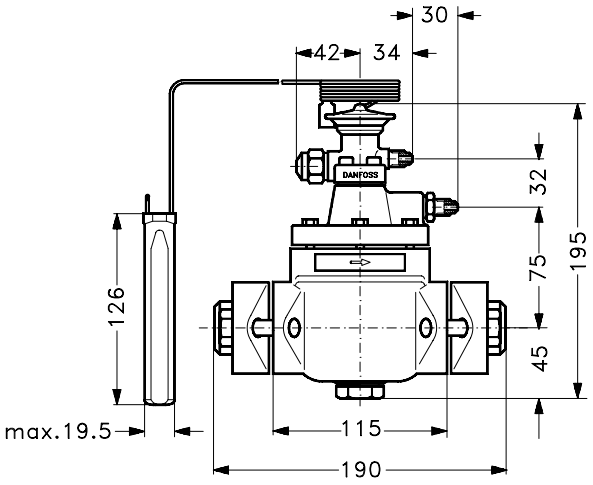
TE 55
Solder, straightway

Weight
1.7 kg

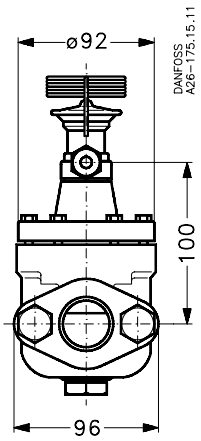


TE 55
Solder, straightway

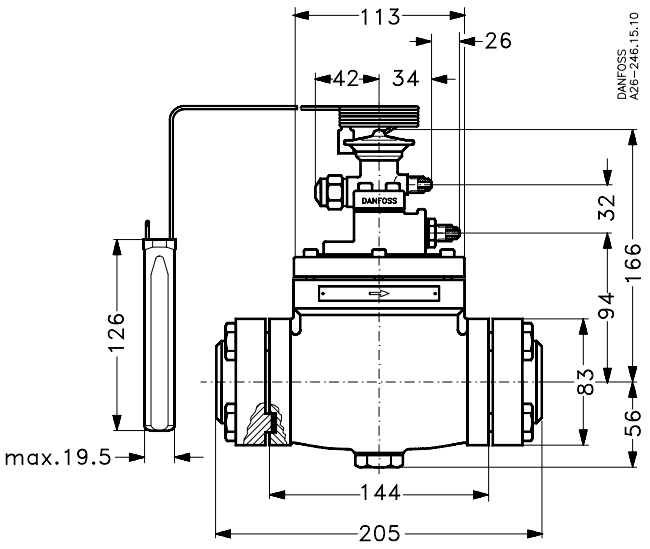
Weight
1.6 kg



PHT 85
Solder or weld flanges

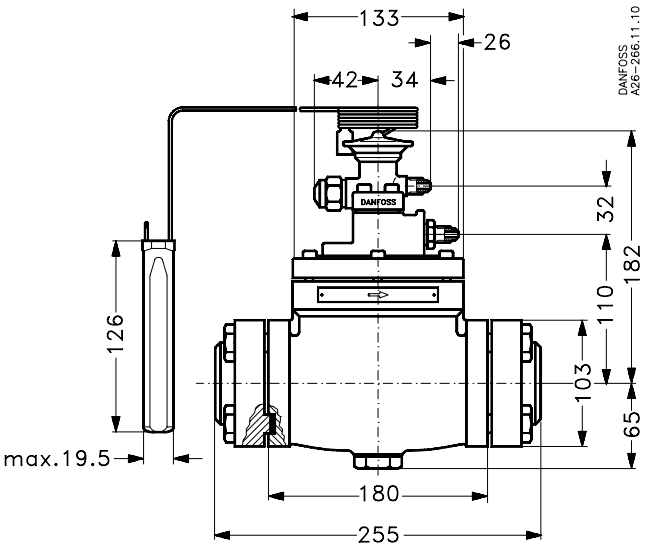


Weight
4.5 kg



PHT 125
Weld flanges

Weight
9.5 kg



PHT 200 and 300
Weld flanges

Weight
15.5 kg

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