

Thermostatic expansion valves, type T 2 and TE 2

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*
Equally applicable to freezing, refrigeration and air conditioning applications.
- *Interchangeable orifice assembly*
– easier stocking
– easy capacity matching
– better service.
- *Rated capacities from 0.5 to 15.5 kW*
(0.15 to 4.5 TR) for R 22
- *Can be supplied with MOP*
(Max. Operating Pressure)
Protects the compressor motor against excessive evaporating pressure during normal operation.
- *Patented double contact bulb*
Fast and easy to install.
Good temperature transfer from pipe to bulb.
- *Valves for special temperature ranges can be supplied.*

Technical data

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

Max. test pressure
PT = 36 bar

Min. temperature
T 2 → TE 2: -60°C

Max. working pressure
PS/MWP = 28 bar

MOP-points

Refrigerant	Range N	Range NM	Range NL	Range B
	-40 → +10°C	-40 → -5°C	-40 → -15°C	-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 407C	95 psig/6.6 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

Superheat

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

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} .

Static superheat SS can be adjusted with setting spindle.
The standard superheat setting SS is 5 K for

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

Thermostatic expansion valves, type T 2 and TE 2

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.

Solder adaptor without orifice assembly and filter

Connection ODF solder	Code no.
¼ in.	068-2062
6 mm	068-2063
⅜ in.	068-2060
10 mm	068-2061

Filter for solder adaptor

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

Flare connections
See previous page.

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.

Solder adaptor for filter drier (FSA) may not be used in the T 2 inlet.

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

For capacities see the tables above.

Orifice assembly with filter



The rated capacity is based on:
Evaporating temperature $t_e = +5^\circ\text{C}$
for range N and
 $t_e = -30^\circ\text{C}$ for range B
Condensing temperature $t_c = +32^\circ\text{C}$
Refrigerant temperature ahead
of valve $t_1 = +28^\circ\text{C}$

Range N: - 40 to +10°C

Orifice no.	Rated capacity in tons (TR)				Rated capacity in kW				Code no.
	R22	R 407C	R 134a	R404A R507	R22	R 407C	R 134a	R404A R507	
0X	0.15	0.16	0.11	0.11	0.5	0.5	0.4	0.38	068-2002
00	0.3	0.3	0.25	0.21	1.0	1.1	0.9	0.7	068-2003
01	0.7	0.8	0.5	0.45	2.5	2.7	1.8	1.6	068-2010
02	1.0	1.1	0.8	0.6	3.5	3.8	2.6	2.1	068-2015
03	1.5	1.6	1.3	1.2	5.2	5.6	4.6	4.2	068-2006
04	2.3	2.5	1.9	1.7	8.0	8.6	6.7	6.0	068-2007
05	3.0	3.2	2.5	2.2	10.5	11.3	8.6	7.7	068-2008
06	4.5	4.9	3.0	2.6	15.5	16.7	10.5	9.1	068-2009

Range B: - 60 to - 25°C

Orifice no.	Rated capacity in tons (TR)		Rated capacity in kW		Code no.
	R22	R404A R507	R22	R404A R507	
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

Thermostatic expansion valves, type T 2 and TE 2

Capacity

R 404A / R 507

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

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
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
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			0.67	0.70	0.70	0.70	0.69	0.67			0.60	0.61	0.62	0.61	0.60	0.59
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

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

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	0.69	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
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	0.61	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	0.77	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	1.31	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	2.36	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	3.48	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	4.43	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	5.47	5.33	5.19		3.69	4.04	4.20	4.22	4.18	4.12	4.00
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								

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

Thermostatic expansion valves, type T 2 and TE 2

Design Function

General

T 2 and TE 2 valves have an interchangeable orifice assembly.

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.

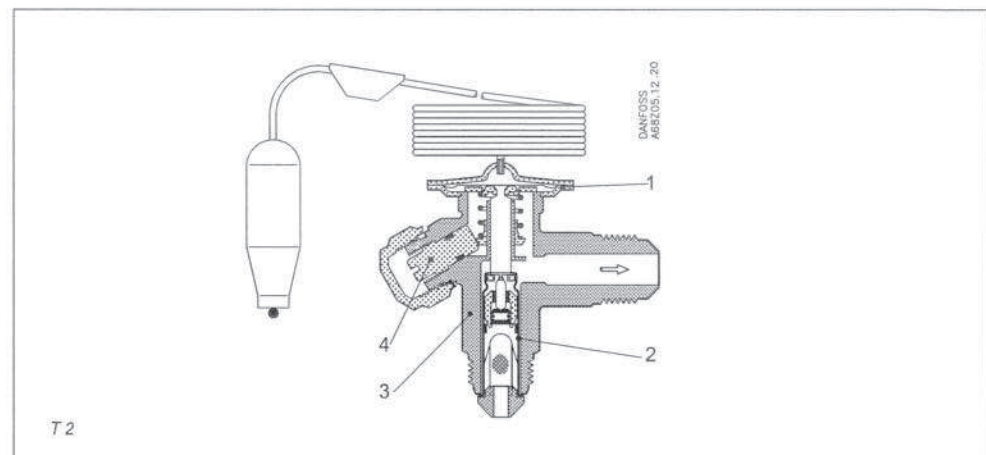
The valves can be equipped with internal (T 2) or external (TE 2) pressure equalization.

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.



1. Thermostatic element (diaphragm)
2. Interchangeable orifice assembly
3. Valve body
4. Superheat setting spindle (see instructions)

Thermostatic expansion valves, type T 2 and TE 2

Identification

The thermostatic element is fitted with a laser engraving on top of the diaphragm.

This engraving gives valve type (with code number), evaporating temperature range, MOP point, refrigerant, and max. working pressure, PB/MWP.

The code refers to the refrigerant for which the valve is designed:

- X = R 22
- Z = R 407C
- N = R 134a
- S = R 404A/R 507

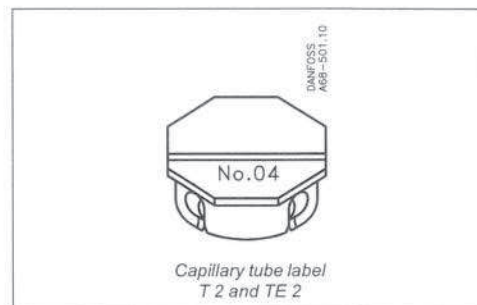
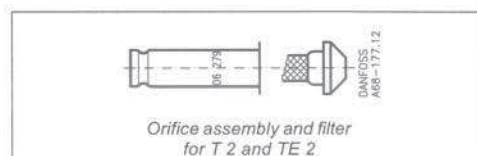
Orifice assembly for T 2 and TE 2

The orifice assembly is marked with the orifice size (e.g. 06) and week stamp + last number in the year (e.g. 279).

The orifice assembly number is also given on the lid of its plastic container.

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.



Dimensions and weights

T 2 and TE 2

Flare x flare

Flare x solder

Solder adaptor

Weight: 0.05 kg
0.11 lb

	Outlet A	Equalization B	Weight kg / lb
Flare x flare	1/2" flare	1/4" flare	0.3 / 0.7
Flare x solder	1/2" solder 12 mm solder	1/4" solder 6 mm solder	0.3 / 0.7

ODF	
in	mm
1/4	6
3/8	10