Data sheet

Thermostatic expansion valve
Type TUB/TUBE and TUC/TUCE

Introduction

The TU series of thermostatic expansion valves has been developed for soldering into hermetic refrigeration systems.
TU valves are made of stainless steel and are therefore very suitable for use in the food industry.
TU valves can be used in many forms of refrigeration systems, in particular:
- Traditional refrigeration systems
- Heat pump systems
- Air conditioning units
- Refrigeration appliances
- Liquid coolers
- Ice cube machines
- Mobile refrigeration systems

All variants are available in both single packs and industrial packs as required by the customer.

TUB/TUBE have adjustable superheat and are available in angleway versions as standard.

TUC/TUCE have fixed superheat, but are otherwise identical to TUB.

TUB/TUBE and TUC/TUCE can be delivered in straightway versions.

All straightway versions and TUC valves are produced to order and therefore this catalogue contains no description of a standard range or code numbers.

TU valves are also available in a number of variants that give countless combination possibilities.
Contact Danfoss for further information.

Features

- *Bimetal connections*
  - straightforward and fast soldering (no wet cloth or refrigeration pliers required).
- *Refrigerants*
  R 22, R 134a, R 404A, R 507, R 407C, R 410A and future refrigerants
- *Capacities from 0.6 to 16 kW (0.17 to 4.5 TR) for R 22*
  - large capacity range in small steps
- *Stable regulation*
- *Biflow function (orifice 0 to 8)*
- *Compact design*
  - small dimensions and low weight
- *Stainless steel, hermetically tight solder version*
  - high connection strength
  - high corrosion resistance
  - capillary tube joints of high strength and vibration resistance
- *Laser-welded, stainless steel thermostatic diaphragm element*
  - optimum function
  - long diaphragm life
  - high pressure resistance
- *Stainless steel double contact bulb*
  - straightforward and fast installation
  - good heat transfer from bulb to pipe
- *Adjustable superheat type (TUB/TUBE)*
  -accurate setting
  -adjustable in operation
- *Fixed superheat type (TUC/TUCE)*
- *Filter with high dirt retention capacity*
- *Available with self-cleaning bleed*
- *Available with MOP (Max. Operating Pressure)*

Standard range

Versions available in the standard range:

Range N : −40 to +10°C without MOP

Static superheat (SS):
R 22, R 134a, R 404A, R 407C, R 410A = 5 K
R 507 = 6.4 K

Capillary tube length: 0.8 m

Connections:

Inlet	Orifice 0 → 6	1/4 in./6 mm
	Orifice 7 → 9	3/8 in./10 mm
Outlet		1/2 in./12 mm

Variant range

In addition to the standard range, TUB/TUBE and TUC/TUCE valves are also available in these variants and variant combinations:

Straightway versions

Range N	−40 → +10°C	MOP +15°C
Range NM	−40 → −5°C	MOP 0°C
Range B	−60 → −25°C	
Range B	−60 → −25°C	MOP −20°C

Static superheat (SS):
2 K, 3 K, 4 K, or 6 K (applies to TUB/TUBE and TUC/TUCE – see fig. 5)

Capillary tube length: 1.5 m

Bleed: 15%

Connections:

Inlet	Orifice 0 → 6	3/8 in./10 mm
	Orifice 7 → 9	1/4 in./6 mm
	Straightway only	1/2 in./12 mm
Outlet		3/8 in./10 mm
	Straightway only	5/8 in./16 mm

Capacity, orifice variants:
In addition to the standard range, valves with orifice 0 are available for R 134a, R 404A and R 507.

For further information, please contact Danfoss.

Technical data

Max. bulb temperature	100°C
Max. valve body temperature	120°C,
short-lived peak	150°C
Permissible working pressure (excl. R 410A)	PB = 28 bar
Max. working pressure, R 410A	PB = 42.5 bar
Max. test pressure (excl. R 410A)	p' = 36 bar
Max. test pressure, R 410A	p' = 47 bar

Biflow operation
With flow in the opposite direction, the rated capacity is reduced by up to 15%.
TUBE with orifice 9, TUB and valves with MOP charges cannot be used for biflow operation.

MOP valves

To avoid charge migration when MOP valves are used, the bulb temperature must be lower than the thermostatic element temperature.

MOP-points

Refrigerant	Range N −40 → +10°C	Range NM −40 → −5°C	Range B −60 → −25°C
	MOP point for evaporating temperature t_e and evaporating pressure p_e [1])		
	t_e = +15°C/+60°F	t_e = 0°C/+32°F	t_e = −20°C/−4°F
R 22	p_e = 100 psig/6.9 bar	p_e = 60 psig/4.0 bar	p_e = 20 psig/1.5 bar
R 134a	p_e = 55 psig/3.9 bar	p_e = 30 psig/1.9 bar	
R 404A / R 507	p_e = 120 psig/8.4 bar	p_e = 75 psig/5.0 bar	p_e = 30 psig/2.0 bar
R 407C	p_e = 95 psig/6.6 bar	p_e = 50 psig/3.6 bar	p_e = 15 psig/1.1 bar
R 410A	p_e = 165 psig/11.5 bar	p_e = 100 psig/7.0 bar	p_e = 45 psig/3.0 bar

[1]) p_e in bar gauge

Identification

Main valve data is given on the element (fig. 1) and on the valve body (fig. 2).

Valves with bleed are marked on the element: BP 15 (= 15% bleed of nominal capacity).

For valves with fixed superheat setting (type TUC/TUCE) the superheat is printed on the element (e.g. SS 5°C / 9°F)

Main valve data example, fig. 1

TUBE	= Type (E = external pressure equalisation)
68U2167	= Code number
R 22	= Refrigerant
MOP 100 / +15°C	= MOP-point in psig / °C
–40 / +10°C	= Evaporating temperature range in °C
–40 / +50°F	= Evaporating temperature range in °F
PB 28 bar/ MWP 400 psig	= Max. working pressure
425A	= Date marking (week 42, year 1995, weekday A = Monday)

Main valve data example, fig. 2

⇒	= Normal flow direction
IN	= Connection in inches (MM = millimetres)
ORIF7	= Orifice number 7
2.00 TR	= Rated capacity $Q_{nom.}$ in Tons of Refrigeration
7.0 kW	= Rated capacity $Q_{nom.}$ in kW

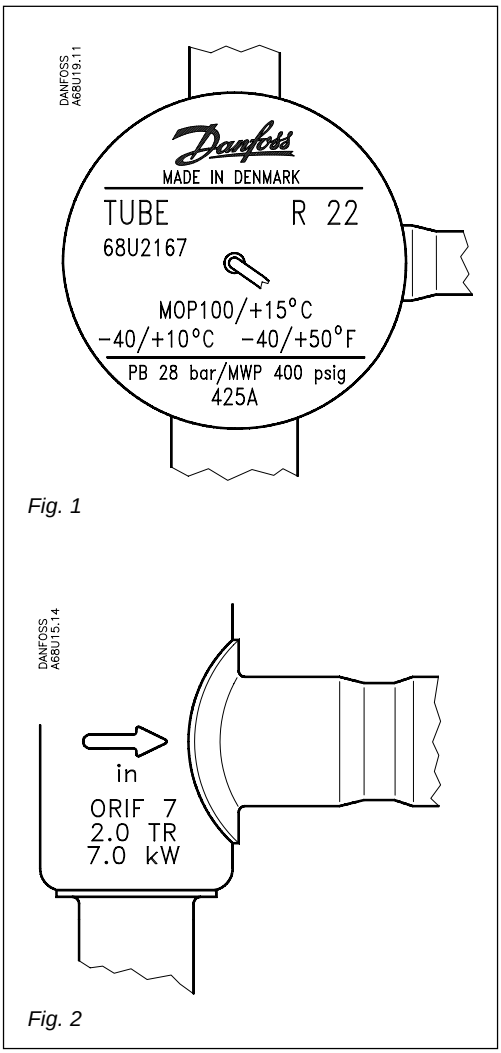
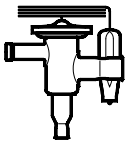


Fig. 1

Fig. 2

R 22, R 134a, R 404A/R 507

Ordering
Angleway
Supplied with bulb strap
Standard valve range



Range N = –40 → +10 °C

Refrigerant	Type	Rated capacity $Q_{nom.}$ [1]) kW	Rated capacity $Q_{nom.}$ [1]) TR	Orifice no.[2])	Pressure equalisation	Connection Inlet × Outlet inch	Code no.	mm	Code no.
R 22	TUB	0.6	0.17	0	int.	1/4 × 1/2	068U2056	6 × 12	068U2036
	TUB	0.9	0.25	1	int.	1/4 × 1/2	068U2057	6 × 12	068U2037
	TUB	1.3	0.36	2	int.	1/4 × 1/2	068U2058	6 × 12	068U2038
	TUB	1.8	0.50	3	int.	1/4 × 1/2	068U2059	6 × 12	068U2039
	TUB	2.6	0.75	4	int.	1/4 × 1/2	068U2060	6 × 12	068U2040
	TUB	3.5	1.00	5	int.	1/4 × 1/2	068U2061	6 × 12	068U2041
	TUB	5.3	1.50	6	int.	1/4 × 1/2	068U2062	6 × 12	068U2042
	TUB	7.0	2.00	7	int.	3/8 × 1/2	068U2063	10 × 12	068U2043
	TUB	11.0	3.00	8	int.	3/8 × 1/2	068U2064	10 × 12	068U2044
	TUB	16.0	4.50	9	int.	3/8 × 1/2	068U2065	10 × 12	068U2045
	TUBE	0.6	0.17	0	ext.	1/4 × 1/2	068U2066	6 × 12	068U2046
	TUBE	0.9	0.25	1	ext.	1/4 × 1/2	068U2067	6 × 12	068U2047
	TUBE	1.3	0.36	2	ext.	1/4 × 1/2	068U2068	6 × 12	068U2048
	TUBE	1.8	0.50	3	ext.	1/4 × 1/2	068U2069	6 × 12	068U2049
	TUBE	2.6	0.75	4	ext.	1/4 × 1/2	068U2070	6 × 12	068U2050
	TUBE	3.5	1.00	5	ext.	1/4 × 1/2	068U2071	6 × 12	068U2051
	TUBE	5.3	1.50	6	ext.	1/4 × 1/2	068U2072	6 × 12	068U2052
	TUBE	7.0	2.00	7	ext.	3/8 × 1/2	068U2073	10 × 12	068U2053
	TUBE	11.0	3.00	8	ext.	3/8 × 1/2	068U2074	10 × 12	068U2054
	TUBE	16.0	4.50	9	ext.	3/8 × 1/2	068U2075	10 × 12	068U2055
R 134a	TUB	0.7	0.19	1	int.	1/4 × 1/2	068U2027	6 × 12	068U2000
	TUB	1.0	0.28	2	int.	1/4 × 1/2	068U2028	6 × 12	068U2001
	TUB	1.4	0.39	3	int.	1/4 × 1/2	068U2029	6 × 12	068U2002
	TUB	2.1	0.59	4	int.	1/4 × 1/2	068U2030	6 × 12	068U2003
	TUB	2.7	0.78	5	int.	1/4 × 1/2	068U2031	6 × 12	068U2004
	TUB	4.1	1.20	6	int.	1/4 × 1/2	068U2032	6 × 12	068U2005
	TUB	5.5	1.60	7	int.	3/8 × 1/2	068U2033	10 × 12	068U2006
	TUB	8.2	2.30	8	int.	3/8 × 1/2	068U2034	10 × 12	068U2007
	TUB	12.0	3.50	9	int.	3/8 × 1/2	068U2035	10 × 12	068U2008
	TUBE	0.7	0.19	1	ext.	1/4 × 1/2	068U2018	6 × 12	068U2009
	TUBE	1.0	0.28	2	ext.	1/4 × 1/2	068U2019	6 × 12	068U2010
	TUBE	1.4	0.39	3	ext.	1/4 × 1/2	068U2020	6 × 12	068U2011
	TUBE	2.1	0.59	4	ext.	1/4 × 1/2	068U2021	6 × 12	068U2012
	TUBE	2.7	0.78	5	ext.	1/4 × 1/2	068U2022	6 × 12	068U2013
	TUBE	4.1	1.20	6	ext.	1/4 × 1/2	068U2023	6 × 12	068U2014
	TUBE	5.5	1.60	7	ext.	3/8 × 1/2	068U2024	10 × 12	068U2015
	TUBE	8.2	2.30	8	ext.	3/8 × 1/2	068U2025	10 × 12	068U2016
	TUBE	12.0	3.50	9	ext.	3/8 × 1/2	068U2026	10 × 12	068U2017
R 404A R 507	TUB	0.7	0.19	1	int.	1/4 × 1/2	068U2094	6 × 12	068U2076
	TUB	1.0	0.28	2	int.	1/4 × 1/2	068U2095	6 × 12	068U2077
	TUB	1.4	0.39	3	int.	1/4 × 1/2	068U2096	6 × 12	068U2078
	TUB	2.1	0.60	4	int.	1/4 × 1/2	068U2097	6 × 12	068U2079
	TUB	2.8	0.79	5	int.	1/4 × 1/2	068U2098	6 × 12	068U2080
	TUB	4.2	1.20	6	int.	1/4 × 1/2	068U2099	6 × 12	068U2081
	TUB	5.6	1.60	7	int.	3/8 × 1/2	068U2100	10 × 12	068U2082
	TUB	8.4	2.40	8	int.	3/8 × 1/2	068U2101	10 × 12	068U2083
	TUB	12.0	3.50	9	int.	3/8 × 1/2	068U2102	10 × 12	068U2084
	TUBE	0.7	0.19	1	ext.	1/4 × 1/2	068U2103	6 × 12	068U2085
	TUBE	1.0	0.28	2	ext.	1/4 × 1/2	068U2104	6 × 12	068U2086
	TUBE	1.4	0.39	3	ext.	1/4 × 1/2	068U2105	6 × 12	068U2087
	TUBE	2.1	0.60	4	ext.	1/4 × 1/2	068U2106	6 × 12	068U2088
	TUBE	2.8	0.79	5	ext.	1/4 × 1/2	068U2107	6 × 12	068U2089
	TUBE	4.2	1.20	6	ext.	1/4 × 1/2	068U2108	6 × 12	068U2090
	TUBE	5.6	1.60	7	ext.	3/8 × 1/2	068U2109	10 × 12	068U2091
	TUBE	8.4	2.40	8	ext.	3/8 × 1/2	068U2110	10 × 12	068U2092
	TUBE	12.0	3.50	9	ext.	3/8 × 1/2	068U2111	10 × 12	068U2093

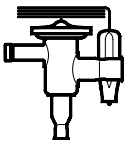
Valves with inch connections have 1/4 in. pressure equalisation.
Valves with mm connections have 6 mm pressure equalisation.

[1]) Rated capacity $Q_{nom.}$ is based on:
Evaporating temperature
t_e = +5°C
Condensing temperature
t_c = +32°C
Refrigerant liquid temperature
t_l = +28°C
Opening superheat
OS = 4 K

[2]) TUBE with orifice 9 and TUB (internal pressure equalisation) cannot be used for biflow operation.

Ordering

Angleway
Supplied with bulb strap
Standard valve range



1) Rated capacity $Q_{nom.}$ is based on:
Evaporating temperature
t_e = +5°C
Condensing temperature
t_c = +32°C
Refrigerant liquid temperature
t_l = +28°C
Opening superheat
OS = 4 K

2) TUBE with orifice 9 and TUB (internal pressure equalisation) cannot be used for biflow operation.

Range N = –40 → +10 °C

R 407C, R 410A

Refri-gerant	Type	Rated capacity $Q_{nom.}$ 1)		Orifice no.2)	Pres-sure equali-sation	Connection Inlet × Outlet			
		kW	TR			inch	**Code no.**	mm	**Code no.**
R 407C	TUB	0.63	0.18	0	int.	1/4 × 1/2	**068U1920**	6 × 12	**068U1900**
	TUB	0.92	0.26	1	int.	1/4 × 1/2	**068U1921**	6 × 12	**068U1901**
	TUB	1.4	0.38	2	int.	1/4 × 1/2	**068U1922**	6 × 12	**068U1902**
	TUB	1.9	0.53	3	int.	1/4 × 1/2	**068U1923**	6 × 12	**068U1903**
	TUB	2.8	0.80	4	int.	1/4 × 1/2	**068U1924**	6 × 12	**068U1904**
	TUB	3.8	1.10	5	int.	1/4 × 1/2	**068U1925**	6 × 12	**068U1905**
	TUB	5.7	1.60	6	int.	1/4 × 1/2	**068U1926**	6 × 12	**068U1906**
	TUB	7.5	2.10	7	int.	3/8 × 1/2	**068U1927**	10 × 12	**068U1907**
	TUB	11.0	3.20	8	int.	3/8 × 1/2	**068U1928**	10 × 12	**068U1908**
	TUB	17.0	4.80	9	int.	3/8 × 1/2	**068U1929**	10 × 12	**068U1909**
	TUBE	0.63	0.18	0	ext.	1/4 × 1/2	**068U1930**	6 × 12	**068U1910**
	TUBE	0.92	0.26	1	ext.	1/4 × 1/2	**068U1931**	6 × 12	**068U1911**
	TUBE	1.4	0.38	2	ext.	1/4 × 1/2	**068U1932**	6 × 12	**068U1912**
	TUBE	1.9	0.53	3	ext.	1/4 × 1/2	**068U1933**	6 × 12	**068U1913**
	TUBE	2.8	0.80	4	ext.	1/4 × 1/2	**068U1934**	6 × 12	**068U1914**
	TUBE	3.8	1.10	5	ext.	1/4 × 1/2	**068U1935**	6 × 12	**068U1915**
	TUBE	5.7	1.60	6	ext.	1/4 × 1/2	**068U1936**	6 × 12	**068U1916**
	TUBE	7.5	2.10	7	ext.	3/8 × 1/2	**068U1937**	10 × 12	**068U1917**
	TUBE	11.0	3.20	8	ext.	3/8 × 1/2	**068U1938**	10 × 12	**068U1918**
	TUBE	17.0	4.80	9	ext.	3/8 × 1/2	**068U1939**	10 × 12	**068U1919**
R 410A	TUB	0.82	0.23	0	int.	1/4 × 1/2	**068U1798**	6 × 12	**068U1796**
	TUB	1.3	0.4	1	int.	1/4 × 1/2	**068U1958**	6 × 12	**068U1940**
	TUB	2.1	0.6	2	int.	1/4 × 1/2	**068U1959**	6 × 12	**068U1941**
	TUB	2.9	0.8	3	int.	1/4 × 1/2	**068U1960**	6 × 12	**068U1942**
	TUB	4.5	1.3	4	int.	1/4 × 1/2	**068U1961**	6 × 12	**068U1943**
	TUB	5.9	1.7	5	int.	1/4 × 1/2	**068U1962**	6 × 12	**068U1944**
	TUB	9.0	2.5	6	int.	1/4 × 1/2	**068U1963**	6 × 12	**068U1945**
	TUB	12.0	3.4	7	int.	3/8 × 1/2	**068U1964**	10 × 12	**068U1946**
	TUB	18.0	5.0	8	int.	3/8 × 1/2	**068U1965**	10 × 12	**068U1947**
	TUB	26.0	7.5	9	int.	3/8 × 1/2	**068U1966**	10 × 12	**068U1948**
	TUBE	0.82	0.23	0	ext.	1/4 × 1/2	**068U1799**	6 × 12	**068U1797**
	TUBE	1.3	0.4	1	ext.	1/4 × 1/2	**068U1967**	6 × 12	**068U1949**
	TUBE	2.1	0.6	2	ext.	1/4 × 1/2	**068U1968**	6 × 12	**068U1950**
	TUBE	2.9	0.8	3	ext.	1/4 × 1/2	**068U1969**	6 × 12	**068U1951**
	TUBE	4.5	1.3	4	ext.	1/4 × 1/2	**068U1970**	6 × 12	**068U1952**
	TUBE	5.9	1.7	5	ext.	1/4 × 1/2	**068U1971**	6 × 12	**068U1953**
	TUBE	9.0	2.5	6	ext.	1/4 × 1/2	**068U1972**	6 × 12	**068U1954**
	TUBE	12.0	3.4	7	ext.	3/8 × 1/2	**068U1973**	10 × 12	**068U1955**
	TUBE	18.0	5.0	8	ext.	3/8 × 1/2	**068U1974**	10 × 12	**068U1956**
	TUBE	26.0	7.5	9	ext.	3/8 × 1/2	**068U1975**	10 × 12	**068U1957**

Valves with inch connections have 1/4 in. pressure equalisation.
Valves with mm connections have 6 mm pressure equalisation.

Capacity

R 22

Capacity in kW for range N = –40 → +10°C and opening superheat OS = 4 K

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**							
TU	0	0.42	0.53	0.60	0.65	0.68	0.70	0.71	0.72	0.40	0.50	0.56	0.60	0.63	0.65	0.67	0.67
	1	0.61	0.79	0.89	1.0	1.0	1.0	1.1	1.1	0.55	0.71	0.80	0.86	0.91	0.93	0.95	0.96
	2	0.9	1.2	1.3	1.5	1.6	1.6	1.7	1.7	0.73	1.0	1.1	1.2	1.3	1.3	1.4	1.4
	3	1.2	1.6	1.8	2.0	2.1	2.2	2.3	2.3	1.0	1.3	1.5	1.7	1.8	1.8	1.9	1.9
	4	1.8	2.4	2.8	3.1	3.2	3.4	3.5	3.5	1.5	2.0	2.3	2.5	2.7	2.8	2.8	2.8
	5	2.4	3.2	3.7	4.1	4.3	4.5	4.6	4.7	2.0	2.7	3.1	3.4	3.5	3.7	3.8	3.8
	6	3.7	4.9	5.6	6.1	6.5	6.7	6.9	7.1	3.1	4.0	4.6	5.0	5.3	5.5	5.7	5.8
	7	4.9	6.5	7.5	8.2	8.6	9.0	9.2	9.4	4.1	5.4	6.2	6.7	7.1	7.4	7.6	7.7
	8	7.3	9.6	11.2	12.2	12.9	13.4	13.7	13.9	6.1	8.0	9.2	10.1	10.6	11.0	11.3	11.5
	9	10.9	14.5	16.7	18.2	19.3	20.0	20.5	20.9	9.1	12.1	13.8	15.0	15.9	16.4	16.8	17.1
		Evaporating temperature –10°C								**Evaporating temperature –20°C**							
TU	0	0.36	0.46	0.51	0.55	0.57	0.59	0.60	0.61		0.40	0.45	0.48	0.50	0.52	0.53	0.53
	1	0.47	0.62	0.70	0.75	0.79	0.81	0.82	0.83		0.51	0.57	0.62	0.65	0.67	0.68	0.69
	2	0.60	0.78	0.89	1.0	1.0	1.1	1.1	1.1		0.61	0.70	0.76	0.79	0.82	0.84	0.85
	3	0.8	1.1	1.3	1.4	1.4	1.5	1.5	1.5		0.9	1.0	1.1	1.1	1.2	1.2	1.2
	4	1.2	1.6	1.9	2.0	2.1	2.2	2.2	2.3		1.3	1.5	1.6	1.6	1.7	1.7	1.8
	5	1.7	2.2	2.5	2.7	2.8	2.9	3.0	3.0		1.7	1.9	2.1	2.2	2.3	2.3	2.3
	6	2.5	3.2	3.7	4.0	4.3	4.4	4.5	4.6		2.5	2.9	3.1	3.3	3.4	3.5	3.5
	7	3.3	4.3	5.0	5.4	5.7	5.9	6.0	6.1		3.4	3.9	4.2	4.4	4.5	4.6	4.7
	8	5.0	6.5	7.5	8.1	8.5	8.8	9.0	9.1		5.1	5.8	6.3	6.6	6.8	7.0	7.1
	9	7.4	9.7	11.1	12.0	12.6	13.1	13.3	13.5		7.6	8.6	9.3	9.7	10.1	10.3	10.4
		Evaporating temperature –30°C								**Evaporating temperature –40°C**							
TU	0		0.34	0.38	0.40	0.42	0.44	0.44	0.45			0.31	0.33	0.34	0.35	0.36	0.36
	1		0.39	0.45	0.48	0.51	0.52	0.53	0.54			0.33	0.36	0.38	0.39	0.39	0.40
	2		0.47	0.53	0.57	0.60	0.62	0.63	0.63			0.39	0.42	0.44	0.45	0.46	0.46
	3		0.66	0.74	0.80	0.84	0.87	0.88	0.89			0.55	0.59	0.61	0.63	0.64	0.65
	4		1.0	1.1	1.2	1.2	1.3	1.3	1.3			0.80	0.86	0.90	0.92	0.94	0.95
	5		1.3	1.5	1.6	1.7	1.7	1.7	1.8			1.1	1.2	1.2	1.2	1.3	1.3
	6		1.9	2.2	2.4	2.5	2.5	2.6	2.6			1.6	1.7	1.8	1.8	1.9	1.9
	7		2.6	2.9	3.2	3.3	3.4	3.5	3.5			2.1	2.3	2.4	2.5	2.5	2.5
	8		3.9	4.4	4.8	5.0	5.1	5.2	5.3			3.2	3.5	3.6	3.7	3.8	3.8
	9		5.7	6.5	7.0	7.3	7.5	7.7	7.7			4.7	5.1	5.3	5.5	5.5	5.6

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 22	1.00	1.06	1.11	1.15	1.2	1.25	1.3	1.35	1.39	1.44

Selection example

Refrigerant = R 22
Evaporating temperature t_e = –10°C
Pressure drop in valve Δp = 10 bar
Subcooling Δt_{sub} = 15 K
Evaporator capacity = 3 kW
Correction value (table) = 1.11
The corrected evaporator capacity thus becomes 3 divided by 1.11 = 2.7 kW

Since the expansion valve capacity must be equal to or slightly more than the corrected evaporator capacity of 2.7 kW, a TUB/TUBE with orifice 5 and a table capacity of 2.8 kW would be a suitable choice.

Capacity *(continued)*

R 22

Capacity in kW for range B = –60 → –25°C and opening superheat OS = 4 K

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**							
TU	0	0.36	0.45	0.50	0.54	0.56	0.58	0.59	0.59	0.33	0.42	0.46	0.49	0.52	0.53	0.54	0.54
	1	0.48	0.62	0.69	0.74	0.77	0.79	0.81	0.81	0.42	0.54	0.61	0.66	0.68	0.70	0.71	0.72
	2	0.61	0.79	0.89	0.96	1.01	1.04	1.06	1.07	0.52	0.67	0.75	0.81	0.85	0.88	0.89	0.90
	3	0.85	1.10	1.25	1.34	1.41	1.45	1.48	1.50	0.73	0.93	1.1	1.1	1.2	1.2	1.3	1.3
	4	1.3	1.6	1.9	2.0	2.1	2.1	2.2	2.2	1.1	1.4	1.6	1.7	1.8	1.8	1.8	1.9
	5	1.7	2.2	2.5	2.7	2.8	2.9	2.9	3.0	1.4	1.9	2.1	2.2	2.4	2.4	2.5	2.5
	6	2.5	3.3	3.7	4.0	4.2	4.3	4.4	4.5	2.1	2.8	3.1	3.4	3.5	3.6	3.7	3.7
	7	3.4	4.4	5.0	5.4	5.6	5.8	5.9	6.0	2.9	3.7	4.2	4.5	4.7	4.9	4.9	5.0
	8	5.1	6.6	7.5	8.0	8.4	8.7	8.9	8.9	4.3	5.6	6.3	6.8	7.1	7.3	7.4	7.5
	9	7.6	9.7	11.0	11.9	12.4	12.8	13.1	13.2	6.4	8.2	9.3	10.0	10.4	10.7	10.9	11.0
		Evaporating temperature –40°C								**Evaporating temperature –50°C**							
TU	0	0.27	0.34	0.37	0.40	0.42	0.43	0.43	0.44	0.20	0.25	0.28	0.30	0.31	0.32	0.33	0.33
	1	0.31	0.39	0.44	0.47	0.50	0.51	0.52	0.52	0.21	0.27	0.30	0.32	0.34	0.35	0.35	0.35
	2	0.36	0.46	0.52	0.56	0.59	0.60	0.61	0.62	0.25	0.31	0.35	0.38	0.39	0.40	0.41	0.41
	3	0.51	0.65	0.73	0.79	0.82	0.85	0.86	0.87	0.35	0.44	0.50	0.53	0.55	0.57	0.58	0.58
	4	0.75	0.96	1.1	1.2	1.2	1.2	1.3	1.3	0.51	0.65	0.72	0.77	0.81	0.83	0.84	0.85
	5	1.0	1.3	1.4	1.6	1.6	1.7	1.7	1.7	0.68	0.87	0.97	1.0	1.1	1.1	1.1	1.1
	6	1.5	1.9	2.2	2.3	2.4	2.5	2.5	2.6	1.0	1.3	1.4	1.5	1.6	1.7	1.7	1.7
	7	2.0	2.6	2.9	3.1	3.2	3.3	3.4	3.4	1.4	1.7	1.9	2.1	2.2	2.2	2.3	2.3
	8	3.0	3.9	4.4	4.7	4.9	5.0	5.1	5.2	2.1	2.6	2.9	3.1	3.3	3.4	3.4	3.4
	9	4.5	5.7	6.4	6.8	7.1	7.3	7.5	7.5	3.0	3.8	4.3	4.6	4.8	4.9	5.0	5.0
		Evaporating temperature –60°C															
TU	0	0.14	0.17	0.19	0.21	0.21	0.22	0.22	0.22								
	1	0.14	0.18	0.20	0.22	0.22	0.23	0.23	0.23								
	2	0.16	0.21	0.23	0.25	0.26	0.26	0.27	0.27								
	3	0.23	0.29	0.33	0.35	0.36	0.37	0.38	0.38								
	4	0.34	0.43	0.48	0.51	0.53	0.54	0.55	0.55								
	5	0.45	0.57	0.64	0.68	0.71	0.73	0.74	0.74								
	6	0.67	0.85	0.95	1.01	1.05	1.08	1.09	1.10								
	7	0.91	1.1	1.3	1.4	1.4	1.5	1.5	1.5								
	8	1.4	1.7	1.9	2.1	2.1	2.2	2.2	2.2								
	9	2.0	2.5	2.8	3.0	3.1	3.2	3.2	3.2								

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 22	1.00	1.06	1.11	1.15	1.2	1.25	1.3	1.35	1.39	1.44

Capacity *(continued)*

R 134a

Capacity in kW for range N = –40 → +10°C and opening superheat OS = 4 K

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**							
TU	0	0.38	0.46	0.50	0.53	0.54	0.54			0.35	0.42	0.46	0.48	0.49	0.49		
	1	0.57	0.69	0.76	0.79	0.81	0.81			0.50	0.61	0.66	0.69	0.70	0.71		
	2	0.82	1.1	1.2	1.2	1.3	1.3			0.66	0.84	0.93	0.98	1.0	1.0		
	3	1.1	1.4	1.6	1.7	1.8	1.8			0.92	1.2	1.3	1.4	1.4	1.4		
	4	1.7	2.2	2.5	2.6	2.7	2.7			1.4	1.8	1.9	2.0	2.1	2.1		
	5	2.3	2.9	3.3	3.5	3.6	3.6			1.8	2.3	2.6	2.7	2.8	2.8		
	6	3.4	4.4	4.9	5.2	5.4	5.5			2.8	3.5	3.9	4.1	4.2	4.3		
	7	4.6	5.9	6.6	7.0	7.2	7.2			3.7	4.7	5.2	5.5	5.6	5.7		
	8	6.8	8.7	9.8	10.3	10.6	10.8			5.5	7.0	7.8	8.2	8.4	8.5		
	9	10.2	13.1	14.6	15.5	15.9	16.0			8.3	10.4	11.5	12.2	12.4	12.5		
		Evaporating temperature –10°C								**Evaporating temperature –20°C**							
TU	0	0.31	0.37	0.40	0.42	0.43	0.43				0.31	0.34	0.35	0.35	0.35		
	1	0.41	0.51	0.55	0.58	0.58	0.58				0.39	0.43	0.44	0.45	0.45		
	2	0.51	0.64	0.70	0.74	0.75	0.76				0.47	0.51	0.53	0.54	0.54		
	3	0.71	0.89	0.98	1.0	1.1	1.1				0.65	0.72	0.75	0.76	0.76		
	4	1.1	1.3	1.5	1.5	1.6	1.6				0.96	1.05	1.10	1.12	1.1		
	5	1.4	1.8	2.0	2.1	2.1	2.1				1.3	1.4	1.5	1.5	1.5		
	6	2.1	2.7	2.9	3.1	3.1	3.2				1.9	2.1	2.2	2.2	2.2		
	7	2.8	3.5	3.9	4.1	4.2	4.2				2.6	2.8	3.0	3.0	3.0		
	8	4.3	5.3	5.9	6.2	6.3	6.3				3.9	4.3	4.4	4.5	4.5		
	9	6.3	7.9	8.7	9.1	9.3	9.3				5.7	6.2	6.5	6.6	6.6		
		Evaporating temperature –30°C								**Evaporating temperature –40°C**							
TU	0		0.25	0.27	0.28	0.28	0.28				0.18	0.19	0.20	0.20	0.20		
	1		0.28	0.30	0.32	0.32	0.32				0.19	0.21	0.21	0.21	0.21		
	2		0.32	0.35	0.37	0.37	0.37				0.22	0.24	0.25	0.25	0.25		
	3		0.46	0.50	0.52	0.53	0.52				0.31	0.34	0.35	0.35	0.35		
	4		0.67	0.73	0.76	0.77	0.76				0.45	0.49	0.50	0.51	0.51		
	5		0.90	0.98	1.02	1.03	1.0				0.61	0.66	0.68	0.68	0.68		
	6		1.3	1.5	1.5	1.5	1.5				0.90	0.97	1.0	1.0	1.0		
	7		1.8	2.0	2.0	2.1	2.1				1.2	1.3	1.4	1.4	1.4		
	8		2.7	3.0	3.1	3.1	3.1				1.8	2.0	2.1	2.1	2.1		
	9		4.0	4.3	4.5	4.5	4.5				2.7	2.9	3.0	3.0	3.0		

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 134a	1.00	1.08	1.13	1.19	1.25	1.31	1.37	1.42	1.48	1.54

Capacity *(continued)*

R 404A/R507

Capacity in kW for range N = –40 → +10°C and opening superheat OS = 4 K

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**							
TU	0	0.32	0.40	0.44	0.46	0.46	0.46	0.45	0.44	0.31	0.39	0.42	0.44	0.44	0.44	0.43	0.42
	1	0.47	0.60	0.68	0.69	0.70	0.70	0.68	0.66	0.44	0.56	0.61	0.64	0.64	0.64	0.63	0.61
	2	0.70	0.91	1.0	1.1	1.1	1.1	1.1	1.1	0.60	0.77	0.87	0.92	0.94	0.94	0.93	0.90
	3	0.96	1.2	1.4	1.5	1.5	1.5	1.5	1.5	0.83	1.1	1.2	1.3	1.3	1.5	1.3	1.3
	4	1.5	1.9	2.1	2.3	2.3	2.3	2.3	2.2	1.3	1.6	1.8	1.9	2.0	2.0	1.9	1.9
	5	2.0	2.5	2.8	3.0	3.1	3.1	3.1	3.0	1.7	2.2	2.4	2.6	2.6	2.6	2.6	2.5
	6	2.9	3.8	4.3	4.5	4.7	4.7	4.6	4.5	2.5	3.2	3.6	3.8	3.9	3.9	3.9	3.8
	7	3.9	5.1	5.7	6.0	6.2	6.2	6.1	6.0	3.4	4.3	4.8	5.1	5.2	5.3	5.2	5.0
	8	5.8	7.5	8.4	9.0	9.2	9.2	9.1	8.9	5.0	6.5	7.2	7.6	7.8	7.8	7.7	7.5
	9	8.8	11.3	12.7	13.5	13.8	13.9	13.7	13.39	7.5	9.6	10.8	11.4	11.7	11.7	11.5	11.2
		Evaporating temperature –10°C								**Evaporating temperature –20°C**							
TU	0	0.29	0.36	0.39	0.40	0.41	0.41	0.40	0.39		0.32	0.35	0.36	0.36	0.36	0.35	0.34
	1	0.39	0.50	0.54	0.57	0.57	0.57	0.56	0.54		0.41	0.46	0.48	0.48	0.48	0.47	0.45
	2	0.50	0.64	0.71	0.75	0.76	0.76	0.75	0.73		0.51	0.56	0.59	0.60	0.60	0.59	0.57
	3	0.70	0.89	0.99	1.0	1.1	1.1	1.1	1.0		0.71	0.79	0.83	0.84	0.84	0.82	0.80
	4	1.0	1.3	1.5	1.6	1.6	1.6	1.6	1.5		1.1	1.2	1.2	1.2	1.2	1.2	1.2
	5	1.4	1.8	2.0	2.1	2.1	2.1	2.1	2.0		1.4	1.6	1.6	1.7	1.7	1.6	1.6
	6	2.1	2.7	3.0	3.1	3.2	3.2	3.1	3.1		2.1	2.3	2.4	2.5	2.5	2.4	2.4
	7	2.8	3.6	4.0	4.2	4.3	4.3	4.2	4.1		2.8	3.1	3.3	3.3	3.3	3.3	3.2
	8	4.2	5.3	5.9	6.3	6.4	6.4	6.3	6.1		4.3	4.7	4.9	5.0	5.0	4.9	4.8
	9	6.2	7.9	8.8	9.3	9.5	9.5	9.3	9.0		6.3	6.9	7.3	7.4	7.4	7.2	7.0
		Evaporating temperature –30°C								**Evaporating temperature –40°C**							
TU	0			0.3	0.31	0.31	0.31	0.3	0.29			0.24	0.25	0.25	0.25	0.24	0.23
	1			0.36	0.38	0.38	0.38	0.37	0.36			0.27	0.28	0.28	0.28	0.27	0.26
	2			0.43	0.45	0.45	0.45	0.44	0.43			0.32	0.33	0.33	0.33	0.32	0.31
	3			0.60	0.63	0.64	0.63	0.62	0.60			0.45	0.46	0.47	0.46	0.45	0.43
	4			0.89	0.93	0.94	0.93	0.91	0.88			0.65	0.68	0.68	0.67	0.66	0.63
	5			1.2	1.2	1.3	1.2	1.2	1.2			0.88	0.91	0.91	0.90	0.88	0.85
	6			1.8	1.9	1.9	1.9	1.8	1.8			1.3	1.4	1.4	1.3	1.3	1.3
	7			2.4	2.5	2.5	2.5	2.4	2.4			1.8	1.8	1.8	1.8	1.8	1.7
	8			3.6	3.7	3.8	3.8	3.7	3.6			2.6	2.7	2.8	2.7	2.7	2.6
	9			5.3	5.5	5.5	5.5	5.4	5.2			3.9	4.0	4.0	4.0	3.9	3.7

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 404A/R 507	1.00	1.1	1.2	1.29	1.37	1.46	1.54	1.63	1.7	1.78

Capacity *(continued)*

R 404A/R 507

Capacity in kW for range B = –60 → –25°C and opening superheat OS = 4 K

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**							
TU	0	0.30	0.36	0.39	0.40	0.40	0.40	0.39	0.38	0.28	0.33	0.36	0.37	0.37	0.37	0.36	0.35
	1	0.41	0.51	0.55	0.56	0.57	0.56	0.55	0.53	0.36	0.45	0.49	0.51	0.51	0.50	0.48	0.47
	2	0.53	0.66	0.73	0.76	0.77	0.77	0.75	0.73	0.45	0.57	0.62	0.65	0.65	0.65	0.64	0.61
	3	0.74	0.92	1.01	1.06	1.07	1.07	1.04	1.01	0.64	0.79	0.87	0.91	0.91	0.91	0.89	0.86
	4	1.1	1.4	1.5	1.6	1.6	1.6	1.6	1.5	1.0	1.2	1.3	1.3	1.4	1.3	1.3	1.3
	5	1.5	1.8	2.0	2.1	2.1	2.1	2.1	2.0	1.3	1.6	1.7	1.8	1.8	1.8	1.8	1.7
	6	2.2	2.8	3.0	3.2	3.2	3.2	3.1	3.0	1.9	2.4	2.6	2.7	2.7	2.7	2.6	2.6
	7	2.9	3.7	4.1	4.2	4.3	4.3	4.2	4.0	2.5	3.2	3.5	3.6	3.6	3.6	3.5	3.4
	8	4.4	5.5	6.1	6.3	6.4	6.4	6.3	6.1	3.8	4.7	5.2	5.4	5.5	5.4	5.3	5.1
	9	6.5	8.2	9.0	9.4	9.5	9.4	9.2	8.9	5.6	7.0	7.7	8.0	8.1	8.0	7.8	7.5
		Evaporating temperature -40°C								**Evaporating temperature -50°C**							
TU	0		0.28	0.30	0.30	0.31	0.30	0.29	0.28		0.22	0.23	0.24	0.24	0.23	0.22	0.21
	1		0.34	0.37	0.38	0.38	0.38	0.37	0.35		0.24	0.25	0.26	0.26	0.26	0.25	0.24
	2		0.40	0.44	0.45	0.46	0.45	0.44	0.42		0.27	0.30	0.31	0.31	0.30	0.29	0.28
	3		0.57	0.62	0.64	0.64	0.63	0.62	0.59		0.39	0.42	0.43	0.43	0.42	0.41	0.39
	4		0.83	0.91	0.94	0.94	0.93	0.91	0.87		0.57	0.61	0.63	0.63	0.62	0.60	0.57
	5		1.1	1.2	1.3	1.3	1.3	1.2	1.2		0.76	0.82	0.84	0.84	0.83	0.81	0.77
	6		1.7	1.8	1.9	1.9	1.9	1.8	1.8		1.1	1.2	1.3	1.3	1.2	1.2	1.2
	7		2.2	2.4	2.5	2.5	2.5	2.4	2.4		1.5	1.6	1.7	1.7	1.7	1.6	1.5
	8		3.4	3.7	3.8	3.8	3.8	3.7	3.5		2.3	2.5	2.6	2.6	2.5	2.4	2.3
	9		4.9	5.4	5.6	5.6	5.5	5.4	5.2		3.3	3.6	3.7	3.7	3.7	3.5	3.4
		Evaporating temperature -60°C															
TU	0			0.16	0.16	0.16	0.16	0.15	0.15								
	1			0.17	0.17	0.17	0.17	0.16	0.15								
	2			0.19	0.20	0.20	0.19	0.19	0.18								
	3			0.27	0.28	0.28	0.27	0.26	0.25								
	4			0.40	0.41	0.41	0.40	0.38	0.36								
	5			0.53	0.55	0.55	0.53	0.51	0.49								
	6			0.79	0.81	0.81	0.79	0.76	0.73								
	7			1.1	1.1	1.1	1.1	1.0	1.0								
	8			1.6	1.7	1.7	1.6	1.6	1.5								
	9			2.3	2.4	2.4	2.3	2.3	2.1								

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 404A/R 507	1.00	1.1	1.2	1.29	1.37	1.46	1.54	1.63	1.7	1.78

Capacity *(continued)*

R 407C

Capacity in kW for range N = –40 → +10°C and opening superheat OS = 4 K

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**							
TU	0	0.43	0.54	0.60	0.64	0.67	0.68	0.68	0.68	0.41	0.51	0.56	0.60	0.62	0.63	0.63	0.63
	1	0.63	0.81	0.90	0.96	0.99	1.01	1.02	1.01	0.56	0.73	0.81	0.86	0.89	0.90	0.91	0.90
	2	0.90	1.2	1.4	1.5	1.5	1.6	1.6	1.6	0.8	1.0	1.1	1.2	1.2	1.3	1.3	1.3
	3	1.2	1.6	1.9	2.0	2.1	2.2	2.2	2.2	1.0	1.4	1.5	1.7	1.7	1.8	1.8	1.8
	4	1.9	2.5	2.8	3.1	3.2	3.3	3.3	3.3	1.6	2.1	2.3	2.5	2.6	2.7	2.7	2.7
	5	2.5	3.3	3.8	4.1	4.2	4.4	4.4	4.4	2.1	2.7	3.1	3.3	3.5	3.5	3.6	3.6
	6	3.8	5.0	5.7	6.1	6.4	6.6	6.7	6.7	3.1	4.1	4.6	5.0	5.2	5.3	5.4	5.4
	7	5.0	6.6	7.6	8.2	8.6	8.8	8.9	8.9	4.2	5.4	6.2	6.7	6.9	7.1	7.2	7.2
	8	7.5	9.9	11.2	12.2	12.7	13.0	13.2	13.2	6.3	8.2	9.3	9.9	10.4	10.6	10.7	10.7
	9	11.3	14.8	16.9	18.2	19.0	19.5	19.7	19.7	9.3	12.2	13.8	14.8	15.4	15.8	15.9	15.9
		Evaporating temperature –10°C								**Evaporating temperature –20°C**							
TU	0	0.37	0.46	0.51	0.54	0.55	0.56	0.57	0.56	0.33	0.40	0.44	0.47	0.48	0.49	0.49	0.49
	1	0.48	0.62	0.70	0.74	0.76	0.77	0.77	0.77	0.39	0.50	0.56	0.60	0.62	0.63	0.63	0.63
	2	0.60	0.78	0.88	0.94	0.98	1.00	1.01	1.01	0.47	0.60	0.68	0.72	0.75	0.76	0.77	0.76
	3	0.84	1.1	1.2	1.3	1.4	1.4	1.4	1.4	0.66	0.84	0.95	1.0	1.1	1.1	1.1	1.1
	4	1.3	1.6	1.8	2.0	2.0	2.1	2.1	2.1	0.98	1.3	1.4	1.5	1.6	1.6	1.6	1.6
	5	1.7	2.2	2.4	2.6	2.7	2.8	2.8	2.8	1.3	1.7	1.9	2.0	2.1	2.1	2.1	2.1
	6	2.5	3.2	3.7	3.9	4.1	4.2	4.2	4.2	1.9	2.5	2.8	3.0	3.1	3.2	3.2	3.2
	7	3.4	4.3	4.9	5.2	5.5	5.6	5.6	5.6	2.6	3.3	3.7	4.0	4.1	4.2	4.2	4.2
	8	5.0	6.5	7.4	7.9	8.2	8.4	8.4	8.4	3.9	5.0	5.7	6.0	6.2	6.4	6.4	6.4
	9	7.5	9.6	10.9	11.6	12.1	12.3	12.4	12.4	5.8	7.4	8.3	8.9	9.2	9.3	9.4	9.3
		Evaporating temperature –30°C								**Evaporating temperature –40°C**							
TU	0		0.26	0.29	0.31	0.32	0.32	0.32	0.31			0.29	0.31	0.32	0.32	0.32	0.31
	1		0.38	0.43	0.45	0.47	0.48	0.48	0.47			0.31	0.33	0.34	0.34	0.35	0.34
	2		0.45	0.50	0.53	0.55	0.56	0.56	0.56			0.36	0.38	0.40	0.40	0.40	0.40
	3		0.63	0.71	0.75	0.78	0.79	0.79	0.79			0.51	0.54	0.56	0.56	0.56	0.56
	4		0.93	1.0	1.1	1.1	1.2	1.2	1.2			0.75	0.79	0.81	0.82	0.82	0.82
	5		1.3	1.4	1.5	1.5	1.6	1.6	1.5			1.0	1.1	1.1	1.1	1.1	1.1
	6		1.9	2.1	2.2	2.3	2.3	2.3	2.3			1.5	1.6	1.6	1.6	1.6	1.6
	7		2.5	2.8	3.0	3.1	3.1	3.1	3.1			2.0	2.1	2.2	2.2	2.2	2.2
	8		3.8	4.2	4.5	4.6	4.7	4.7	4.7			3.0	3.2	3.3	3.3	3.3	3.3
	9		5.5	6.2	6.5	6.7	6.8	6.9	6.8			4.4	4.7	4.8	4.9	4.9	4.8

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 407C	1.00	1.08	1.14	1.21	1.27	1.33	1.39	1.45	1.51	1.57

Capacity *(continued)*

R 407C

Capacity in kW for range B = –60 → –25°C and opening superheat OS = 4 K

Type	Orifice no.	Pressure drop across valve Δp bar								Pressure drop across valvel 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**							
TU	0	0.34	0.42	0.46	0.49	0.50	0.51	0.51	0.50	0.31	0.38	0.42	0.44	0.45	0.46	0.46	0.46
	1	0.43	0.54	0.61	0.65	0.66	0.67	0.67	0.67	0.37	0.47	0.52	0.56	0.57	0.58	0.59	0.58
	2	0.52	0.67	0.75	0.79	0.82	0.83	0.84	0.83	0.45	0.56	0.63	0.67	0.69	0.70	0.70	0.70
	3	0.73	0.93	1.0	1.1	1.2	1.2	1.2	1.2	0.62	0.79	0.88	0.94	0.97	0.98	0.98	0.98
	4	1.1	1.4	1.5	1.6	1.7	1.7	1.7	1.7	0.92	1.2	1.3	1.4	1.4	1.4	1.5	1.4
	5	1.5	1.8	2.1	2.2	2.3	2.3	2.3	2.3	1.2	1.6	1.7	1.8	1.9	1.9	1.9	1.9
	6	2.2	2.8	3.1	3.3	3.4	3.5	3.5	3.5	1.8	2.3	2.6	2.8	2.9	2.9	2.9	2.9
	7	2.9	3.7	4.1	4.4	4.5	4.6	4.6	4.6	2.5	3.1	3.5	3.7	3.8	3.9	3.9	3.9
	8	4.4	5.6	6.2	6.6	6.8	7.0	7.0	6.9	3.7	4.7	5.3	5.6	5.8	5.8	5.9	5.8
	9	6.5	8.2	9.2	9.7	10.1	10.2	10.3	10.2	5.5	6.9	7.7	8.2	8.4	8.6	8.6	8.5
		Evaporating temperature -40°C								**Evaporating temperature -50°C**							
TU	0	0.24	0.30	0.33	0.35	0.36	0.36	0.36	0.36	0.17	0.22	0.24	0.25	0.26	0.26	0.26	0.26
	1	0.27	0.34	0.37	0.39	0.41	0.41	0.41	0.41	0.18	0.23	0.25	0.27	0.27	0.28	0.28	0.27
	2	0.31	0.39	0.44	0.46	0.47	0.48	0.48	0.48	0.21	0.27	0.29	0.31	0.32	0.32	0.32	0.32
	3	0.44	0.55	0.61	0.65	0.67	0.68	0.68	0.67	0.30	0.37	0.41	0.44	0.45	0.45	0.45	0.45
	4	0.65	0.81	0.90	0.95	0.98	0.99	0.99	0.98	0.44	0.55	0.60	0.63	0.65	0.66	0.66	0.65
	5	0.86	1.1	1.2	1.3	1.3	1.3	1.3	1.3	0.59	0.73	0.81	0.85	0.88	0.88	0.88	0.87
	6	1.3	1.6	1.8	1.9	2.0	2.0	2.0	2.0	0.87	1.1	1.2	1.3	1.3	1.3	1.3	1.3
	7	1.7	2.2	2.4	2.5	2.6	2.7	2.7	2.6	1.2	1.5	1.6	1.7	1.7	1.8	1.8	1.7
	8	2.6	3.3	3.6	3.9	4.0	4.0	4.0	4.0	1.8	2.2	2.4	2.6	2.6	2.7	2.7	2.6
	9	3.8	4.8	5.3	5.6	5.8	5.8	5.8	5.8	2.6	3.2	3.5	3.7	3.8	3.9	3.9	3.8
		Evaporating temperature -60°C															
TU	0	0.12	0.15	0.16	0.18	0.17	0.17	0.17	0.17								
	1	0.12	0.15	0.17	0.18	0.18	0.18	0.18	0.18								
	2	0.14	0.17	0.19	0.20	0.21	0.21	0.21	0.20								
	3	0.20	0.25	0.27	0.29	0.29	0.29	0.29	0.29								
	4	0.29	0.36	0.39	0.41	0.42	0.43	0.42	0.42								
	5	0.39	0.48	0.53	0.56	0.57	0.57	0.57	0.56								
	6	0.58	0.71	0.79	0.83	0.85	0.85	0.85	0.83								
	7	0.78	0.96	1.1	1.1	1.1	1.1	1.1	1.1								
	8	1.2	1.5	1.6	1.7	1.7	1.7	1.7	1.7								
	9	1.7	2.1	2.3	2.4	2.5	2.5	2.5	2.5								

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 407C	1.00	1.08	1.14	1.21	1.27	1.33	1.39	1.45	1.51	1.57

Capacity *(continued)*

R 410A

Capacity in kW for range N = –40 to +10°C and opening superheat OS = 4 K

Type	Orifice no.	Pressure drop across valve Δp bar								Pressure drop across valve Δp bar							
		3	6	9	12	15	18	21	24	3	6	9	12	15	18	21	24
		Evaporating temperature +10°C								**Evaporating temperature 0°C**							
TU	0	0.56	0.72	0.80	0.85	0.87	0.88	0.87	0.85	0.56	0.70	0.78	0.83	0.85	0.86	0.85	0.84
	1	0.89	1.13	1.26	1.30	1.37	1.38	1.36	1.33	0.84	1.06	1.18	1.24	1.29	1.30	1.29	1.27
	2	1.45	1.90	2.2	2.3	2.4	2.5	2.4	2.4	1.25	1.64	1.86	1.99	2.1	2.1	2.1	2.1
	3	1.98	2.6	3.0	3.2	3.3	3.3	3.3	3.3	1.72	2.3	2.6	2.7	2.9	2.9	2.9	2.9
	4	3.1	4.1	4.6	4.9	5.1	5.2	5.1	5.0	2.6	3.5	3.9	4.2	4.3	4.4	4.4	4.3
	5	4.1	5.3	6.1	6.5	6.7	6.8	6.8	6.7	3.5	4.6	5.2	5.6	5.8	5.9	5.8	5.8
	6	6.2	8.1	9.2	9.9	10.3	10.5	10.4	10.2	5.3	6.9	7.9	8.4	8.7	8.9	8.9	8.8
	7	8.2	10.7	12.7	13.1	13.6	13.8	13.8	13.5	7.0	9.2	10.4	11.1	11.6	11.8	11.8	11.6
	8	12.1	15.8	18.0	19.3	20.0	20.3	20.2	19.9	10.4	13.7	15.5	16.6	17.2	17.5	17.5	17.2
	9	18.3	24.0	27.2	29.1	30.2	30.6	30.5	29.9	15.7	20.5	23.3	24.9	25.8	26.2	26.2	25.7
		Evaporating temperature –10°C								**Evaporating temperature –20°C**							
TU	0	0.53	0.67	0.74	0.78	0.80	0.81	0.81	0.79		0.60	0.67	0.70	0.72	0.73	0.73	0.72
	1	0.76	0.96	1.07	1.13	1.16	1.17	1.17	1.15		0.83	0.92	0.97	1.00	1.01	1.00	0.99
	2	1.04	1.35	1.52	1.63	1.69	1.72	1.72	1.70		1.06	1.20	1.28	1.32	1.34	1.34	1.33
	3	1.44	1.86	2.1	2.3	2.3	2.4	2.4	2.4		1.48	1.67	1.78	1.84	1.87	1.87	1.85
	4	2.2	2.8	3.2	3.4	3.5	3.6	3.6	3.5		2.2	2.5	2.7	2.7	2.8	2.8	2.8
	5	2.9	3.7	4.2	4.5	4.7	4.8	4.8	4.8		3.0	3.3	3.5	3.7	3.7	3.7	3.7
	6	4.3	5.6	6.4	6.8	7.1	7.2	7.2	7.1		4.4	5.0	5.3	5.5	5.6	5.6	5.5
	7	5.8	7.5	8.5	9.1	9.4	9.6	9.6	9.5		5.9	6.6	7.1	7.4	7.5	7.5	7.4
	8	8.6	11.2	12.7	13.6	14.1	14.3	14.3	14.1		8.9	10.0	10.7	11.0	11.2	11.2	11.1
	9	12.9	16.8	19.0	20.3	21.0	21.3	21.3	21.0		13.2	14.8	15.8	16.4	16.6	16.6	16.4
		Evaporating temperature –30°C								**Evaporating temperature –40°C**							
TU	0		0.52	0.58	0.61	0.63	0.63	0.63	0.62			0.48	0.50	0.52	0.52	0.52	0.51
	1		0.66	0.74	0.79	0.82	0.82	0.82	0.81			0.56	0.59	0.61	0.62	0.62	0.61
	2		0.81	0.90	0.96	1.00	1.01	1.01	1.00			0.66	0.70	0.72	0.73	0.73	0.72
	3		1.13	1.27	1.35	1.40	1.41	1.41	1.40			0.93	0.98	1.02	1.03	1.03	1.01
	4		1.67	1.87	2.0	2.1	2.1	2.1	2.1			1.36	1.45	1.49	1.51	1.50	1.48
	5		2.2	2.5	2.7	2.8	2.8	2.8	2.8			1.82	1.9	2.0	2.0	2.0	2.0
	6		3.3	3.7	4.0	4.1	4.2	4.2	4.1			2.7	2.9	3.0	3.0	3.0	3.0
	7		4.5	5.0	5.4	5.5	5.6	5.6	5.5			3.6	3.9	4.0	4.0	4.0	4.0
	8		6.7	7.6	8.0	8.3	8.4	8.4	8.3			5.5	5.8	6.0	6.1	6.1	6.0
	9		9.9	11.1	11.8	12.2	12.4	12.4	12.2			8.1	8.6	8.8	8.9	8.9	8.8

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K. The corrected capacity can be obtained by dividing the evaporator capacity by the correction factor given below.

Note:
Insufficient subcooling can produce flash gas.

Correction factor for subcooling Δt_{sub}

	Δt_{sub}									
	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 410A	1.00	1.08	1.15	1.21	1.27	1.33	1.39	1.45	1.50	1.56

Design/ Function

1. Bulb with capillary tube
2. Thermostatic element with diaphragm
3. Setting spindle for adjustment of static superheat SS
4. Fixed orifice
5. Filter

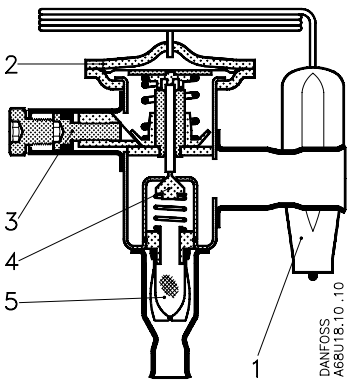


Fig. 3. Angleway

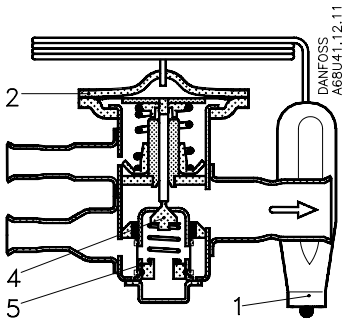


Fig. 4. Straightway

Superheat, TUB
See fig. 5
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 3, see fig. 3 (TUB). Static superheat cannot be adjusted on TUC.
The standard superheat setting SS is 5 K for valves without MOP and 4 K for valves with MOP.
The opening superheat OS is 4 K from when opening begins to when the valve gives its rated capacity $Q_{nom.}$.

Example

Static superheat	SS = 5 K
Opening superheat	OS = 4 K
Total superheat	SH = 5 + 4 = 9 K

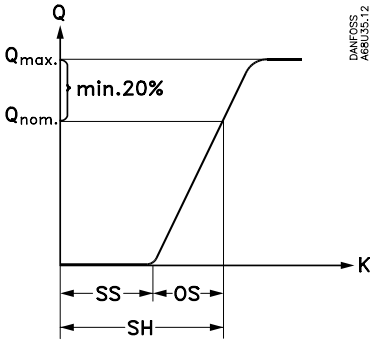
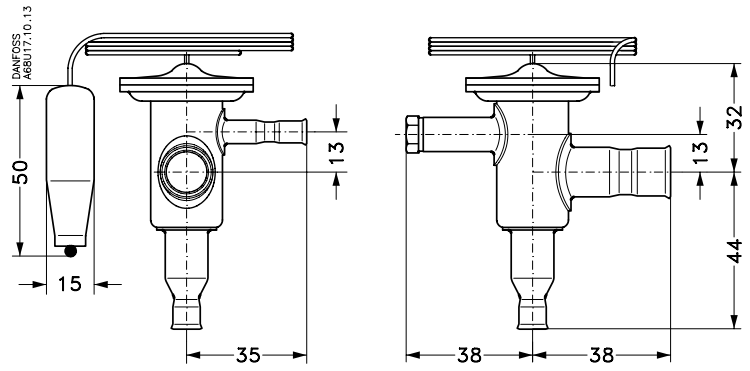


Fig. 5. Superheat

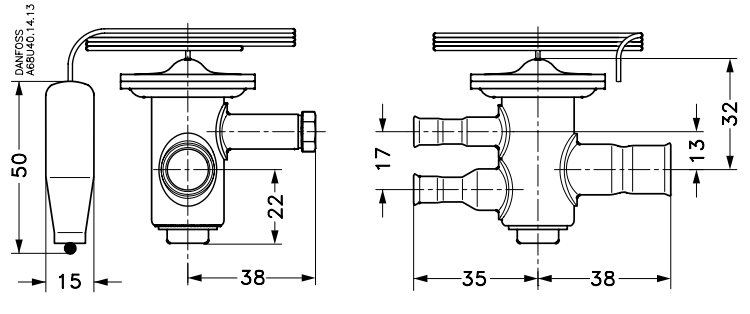
Dimensions and weight



Connection dimensions, see ordering tables.

Fig. 6. Angleway

Weight
0.13 kg



Connection dimensions, see ordering tables.

Fig. 6. Straightway

Weight
0.13 kg

DK-6430 Nordborg
Denmark