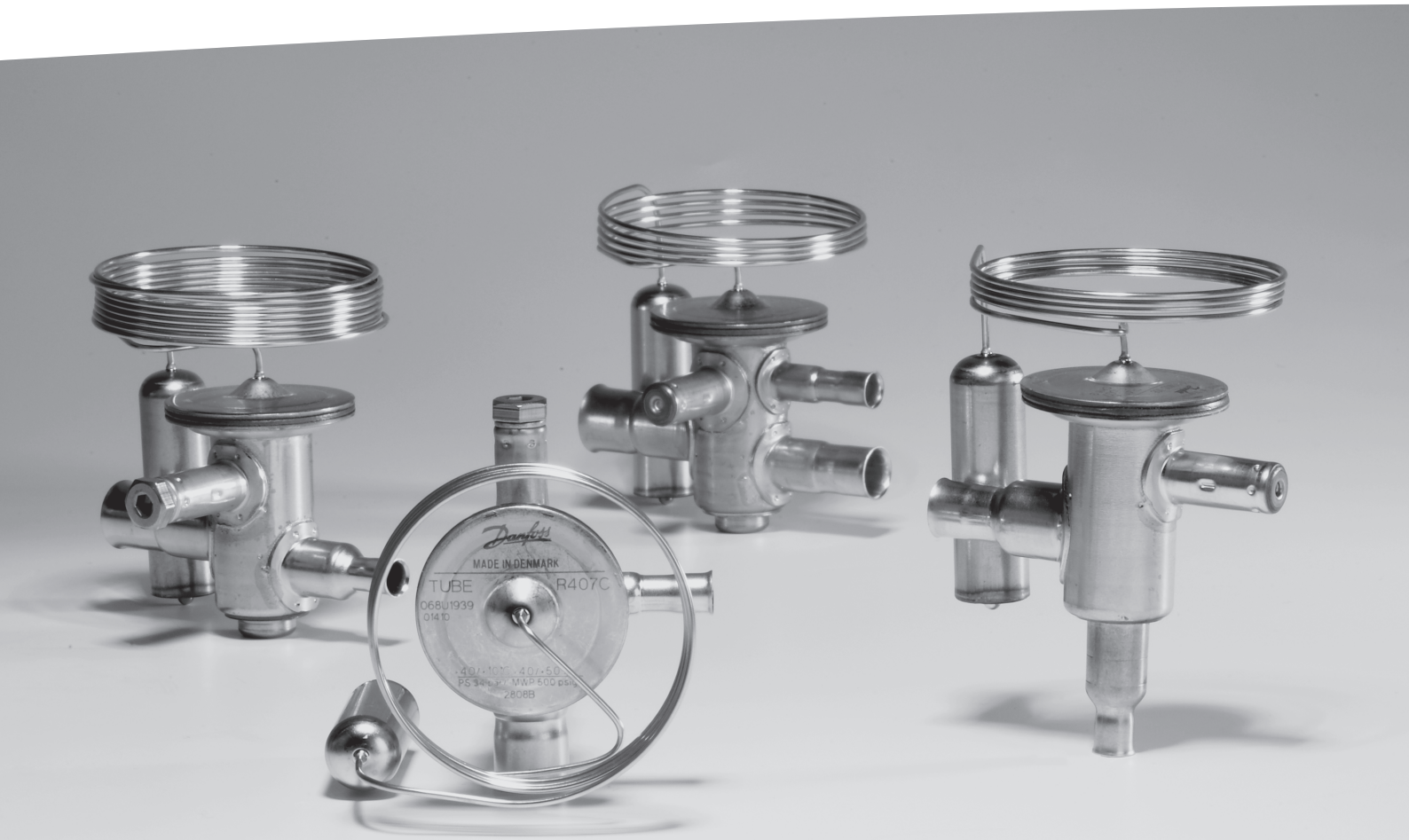
MAKING MODERN LIVING POSSIBLE

Technical brochure

# Thermostatic expansion valves
# TUB/TUBE and TUC/TUCE

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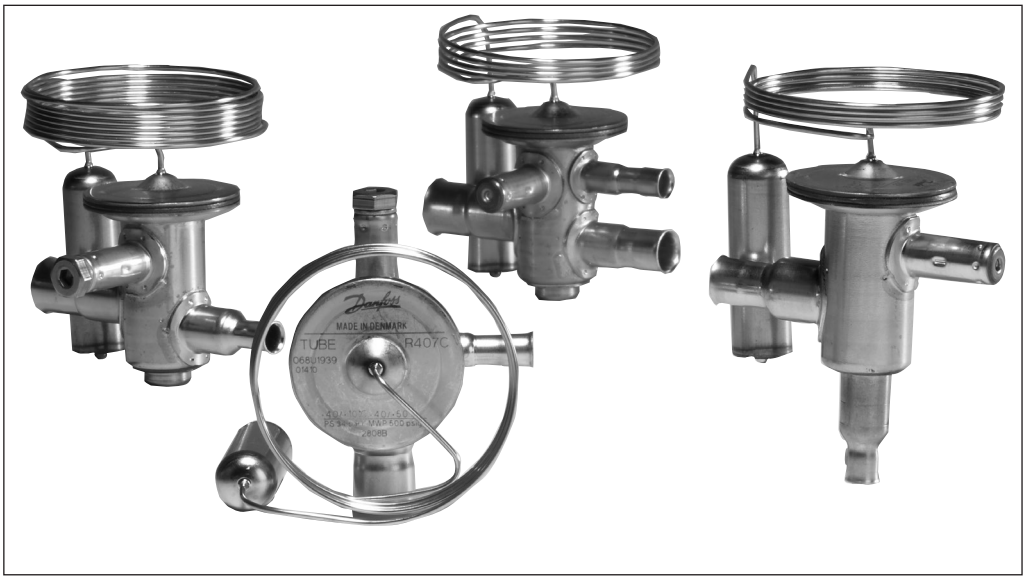
## Introduction




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/TUCE 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
  R22, R134a, R404A, R507, R407C, R410A and future refrigerants
- Capacities from 0.6 to 16 kW (0.17 to 4.5 TR) for R22
  - large capacity range in small steps
- Stable regulation
- Biflow function (orifice 1 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 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):*
R22, R134a, R404A, R407C, R410A = 5 K
R507 = 6.4 K

*Capillary tube length:* 0.8 m

*Connections:*

| | | |
|---|---|---|
| Inlet | Orifice 0 → 6 | ¼ in./6 mm |
| | Orifice 7 → 9 | ⅜ in./10 mm |
| Outlet | | ½ 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 |

Valves to special temperature ranges can be supplied.

*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 | ⅜ in./10 mm |
| | Orifice 7 → 9 | ¼ in./6 mm |
| | Straightway only | ½ in./12 mm |
| Outlet | | ⅜ in./10 mm |
| | Straightway only | ⅝ in./16 mm |

*Capacity, orifice variants:*
In addition to the standard range, valves with orifice 0 are available for R134a, R404A and R507.

*For further information, please contact Danfoss.*

## Technical data

| | |
|---|---|
| *Max. bulb temperature* | 100°C |
| *Max. valve body temperature* | 120°C, |
| *short-lived peak* | 150°C |
| *Perm. working press. (excl. R410A)* | PS = 34 bar |
| *Max. working pressure, R410A* | PS = 45.5 bar |
| *Max. test pressure (excl. R410A)* | p' = 37.5 bar |
| *Max. test pressure, R410A* | p' = 50 bar |

*Biflow operation*
With flow in the opposite direction, the rated capacity is reduced by up to 15%.
TUBE with orifice 0 and 9, all 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 |
| R22 | $p_e$ = 100 psig/6.9 bar | $p_e$ = 60 psig/4.0 bar | $p_e$ = 20 psig/1.5 bar |
| R134a | $p_e$ = 55 psig/3.9 bar | $p_e$ = 30 psig/1.9 bar | |
| R404A / R507 | $p_e$ = 120 psig/8.4 bar | $p_e$ = 75 psig/5.0 bar | $p_e$ = 30 psig/2.0 bar |
| R407C | $p_e$ = 95 psig/6.6 bar | $p_e$ = 50 psig/3.6 bar | $p_e$ = 15 psig/1.1 bar |
| R410A | $p_e$ = 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) |
| **068U2167** | = Code number |
| R22/R407C | = 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 |
| PS 34 bar/ MWP 500 psig | = Max. working pressure |
| 1802B | = Date marking (week **18**, year 20**02**, weekday **B** = Tuesday) |

*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 |

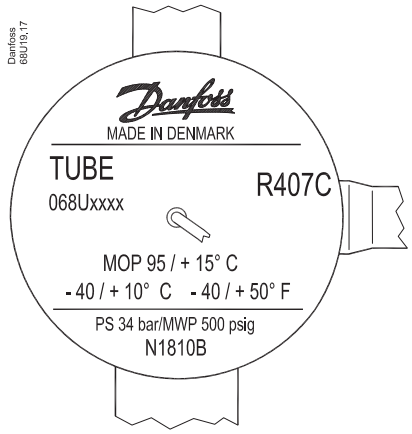



*Fig. 1*

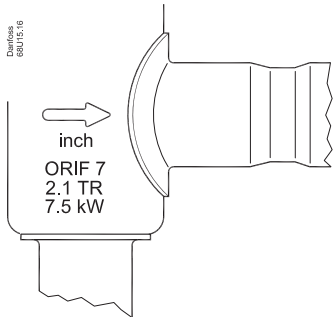
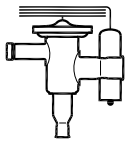



*Fig. 2*

## Ordering
### Angleway
*Supplied with bulb strap*
*Standard valve range*



# R22, R407C, R410A, R134a

*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 in. | Code no. | Connection Inlet × Outlet mm | Code no. |
|---|---|---|---|---|---|---|---|---|---|
| R22/ R407C [3] | TUB | 0.9 | 0.25 | 1 | int. | 1/4 × 1/2 | **068U2057** | | |
| | TUB | 1.3 | 0.36 | 2 | int. | 1/4 × 1/2 | **068U2058** | | |
| | TUB | 1.8 | 0.50 | 3 | int. | 1/4 × 1/2 | **068U2059** | | |
| | TUB | 2.6 | 0.75 | 4 | int. | 1/4 × 1/2 | **068U2060** | | |
| | TUB | 3.5 | 1.00 | 5 | int. | 1/4 × 1/2 | **068U2061** | | |
| | TUB | 5.3 | 1.50 | 6 | int. | 1/4 × 1/2 | **068U2062** | | |
| | TUB | 7.0 | 2.00 | 7 | int. | 3/8 × 1/2 | **068U2063** | | |
| | TUB | 11.0 | 3.00 | 8 | int. | 3/8 × 1/2 | **068U2064** | | |
| | TUBE | 3.5 | 1.00 | 5 | ext. | 1/4 × 1/2 | **068U2071** | | |
| | TUBE | 5.3 | 1.50 | 6 | ext. | 1/4 × 1/2 | **068U2072** | | |
| | TUBE | 7.0 | 2.00 | 7 | ext. | 3/8 × 1/2 | **068U2073** | | |
| | TUBE | 11.0 | 3.00 | 8 | ext. | 3/8 × 1/2 | **068U2074** | | |
| | TUBE | 16.0 | 4.50 | 9 | ext. | 3/8 × 1/2 | **068U2075** | | |
| R407C | TUB | 0.92 | 0.26 | 1 | int. | | | 6 × 12 | **068U1901** |
| | TUB | 1.4 | 0.38 | 2 | int. | | | 6 × 12 | **068U1902** |
| | TUB | 1.9 | 0.53 | 3 | int. | | | 6 × 12 | **068U1903** |
| | TUB | 2.8 | 0.80 | 4 | int. | | | 6 × 12 | **068U1904** |
| | TUB | 3.8 | 1.10 | 5 | int. | | | 6 × 12 | **068U1905** |
| | TUB | 5.7 | 1.60 | 6 | int. | | | 6 × 12 | **068U1906** |
| | TUB | 7.5 | 2.10 | 7 | int. | | | 10 × 12 | **068U1907** |
| | TUB | 11.0 | 3.20 | 8 | int. | | | 10 × 12 | **068U1908** |
| | TUB | 17.0 | 4.80 | 9 | int. | | | 10 × 12 | **068U1909** |
| | TUBE | 0.92 | 0.26 | 1 | ext. | | | 6 × 12 | **068U1911** |
| | TUBE | 1.4 | 0.38 | 2 | ext. | | | 6 × 12 | **068U1912** |
| | TUBE | 1.9 | 0.53 | 3 | ext. | | | 6 × 12 | **068U1913** |
| | TUBE | 2.8 | 0.80 | 4 | ext. | | | 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** |
| R410A | TUB | 1.3 | 0.4 | 1 | int. | 1/4 × 1/2 | **068U1958** | | |
| | TUB | 2.1 | 0.6 | 2 | int. | 1/4 × 1/2 | **068U1959** | | |
| | TUB | 2.9 | 0.8 | 3 | int. | 1/4 × 1/2 | **068U1960** | | |
| | TUB | 4.5 | 1.3 | 4 | int. | 1/4 × 1/2 | **068U1961** | | |
| | TUB | 5.9 | 1.7 | 5 | int. | 1/4 × 1/2 | **068U1962** | | |
| | TUB | 9.0 | 2.5 | 6 | int. | 1/4 × 1/2 | **068U1963** | | |
| | TUBE | 12.0 | 3.4 | 7 | ext. | 3/8 × 1/2 | **068U1973** | | |
| | TUBE | 18.0 | 5.0 | 8 | ext. | 3/8 × 1/2 | **068U1974** | | |
| | TUBE | 26.0 | 7.5 | 9 | ext. | 3/8 × 1/2 | **068U1975** | | |
| R134a | TUB | 0.47 | 0.13 | 0 | int. | 1/4 × 1/2 | **068U2660** | | |
| | 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** |
| | TUBE | 0.7 | 0.19 | 1 | ext. | | | 6 × 12 | **068U2009** |
| | TUBE | 1.0 | 0.28 | 2 | ext. | | | 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** |

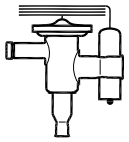
Valves with inch connections have 1/4 in. pressure equalisation.
Valves with mm connections have 6 mm pressure equalisation.

[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 0 and 9 and all TUB (internal pressure equalisation) cannot be used for biflow operation.

[3] For R407C plants, please select valves from the dedicated R407C program

## Ordering
## Angleway
*Supplied with bulb strap*
*Standard valve range*



# R404A/R507

*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 in. | Code no. | Connection Inlet × Outlet mm | Code no. |
|---|---|---|---|---|---|---|---|---|---|
| R404A R507 | 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** | | |
| | 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 ¼ 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 0 and 9 and all TUB (internal pressure equalisation) cannot be used for biflow operation.

## Capacity

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

**R22**

| 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** | | | | | | | |
| 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 $\Delta t_{sub}$*

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 $\Delta t_{sub}$*

| $\Delta t_{sub}$ | 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 |

*Selection example*

Refrigerant = R22
Evaporating temperature $t_e$ = –10°C
Pressure drop in valve Δp = 10 bar
Subcooling $\Delta t_{sub}$ = 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)*

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

**R22**

| 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** | | | | | | | |
| 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 $\Delta t_{sub}$*

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 $\Delta t_{sub}$*

| $\Delta t_{sub}$ | 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** *(continued)*

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

**R134a**

| 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** | | | | | | | |
| 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 $\Delta t_{sub}$*
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 $\Delta t_{sub}$*

| $\Delta t_{sub}$ | 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** *(continued)*

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

# R404A/R507

| 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** | | | | | | | |
| 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 $\Delta t_{sub}$*
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 $\Delta t_{sub}$*

| $\Delta t_{sub}$ | 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 |

**Capacity** *(continued)*

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

# R404A/R507

| 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** | | | | | | | |
| 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 $\Delta t_{sub}$*

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 $\Delta t_{sub}$*

| $\Delta t_{sub}$ | 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 |

**Capacity** *(continued)*

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

**R407C**

| 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** | | | | | | | |
| 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 $\Delta t_{sub}$*
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 $\Delta t_{sub}$*

| $\Delta t_{sub}$ | 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 | 1.14 | 1.21 | 1.27 | 1.33 | 1.39 | 1.45 | 1.51 | 1.57 |

**Capacity** *(continued)*

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

**R407C**

| 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** | | | | | | | |
| 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 $\Delta t_{sub}$*

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 $\Delta t_{sub}$*

| $\Delta t_{sub}$ | 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 | 1.14 | 1.21 | 1.27 | 1.33 | 1.39 | 1.45 | 1.51 | 1.57 |

**Capacity** *(continued)*

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

**R410A**

| Valve 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* $\Delta t_{sub}$
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* $\Delta t_{sub}$

| $\Delta t_{sub}$ | 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 | 1.15 | 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

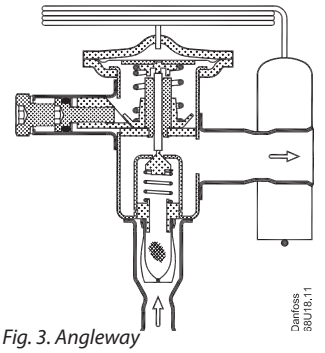



*Fig. 3. Angleway*

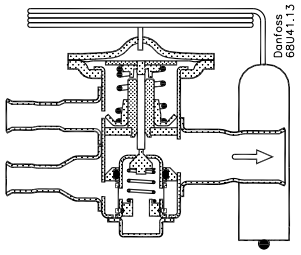



*Fig. 4. Straightway*

*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 |

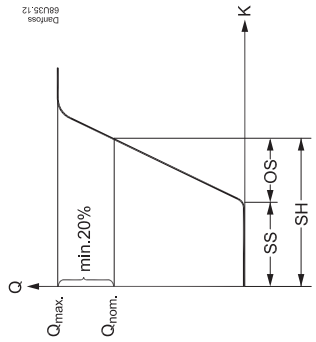
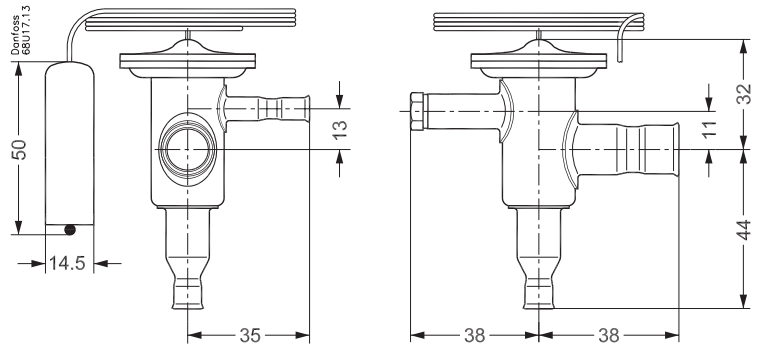


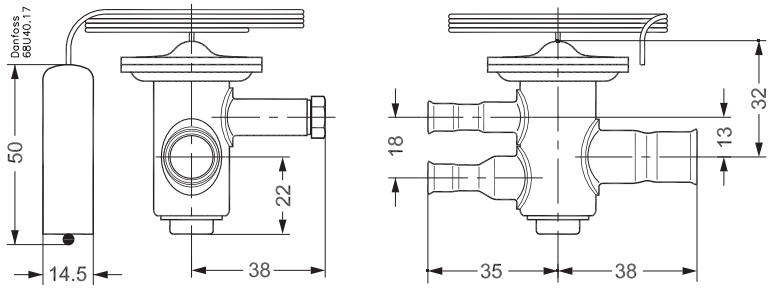

*Fig. 5. Superheat*

## 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*