

## Data Sheet

# Thermostatic expansion valve Type **TU** and **TC**

Thermostatic expansion valves maintain a constant superheat level at the evaporator outlet



The thermostatic expansion valves TUA/TUAE, TCAE with exchangeable orifice, TUB/TUBE/TCBE with fixed orifice and TUC/TUCE/TCCE with fixed orifice and fixed superheat setting, are made of stainless steel and therefore especially well suited to refrigeration systems in the food industry and where aggressive environments exist. These thermostatic expansion valves have been developed and designed especially for easy and quick soldering into hermetic refrigeration systems.

The valves are offered in the following rated capacities

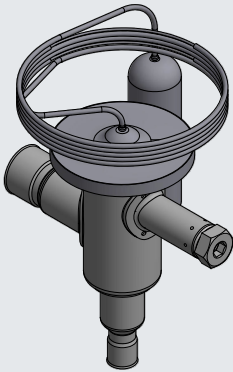
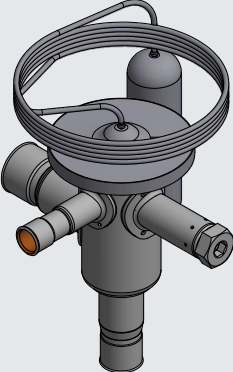
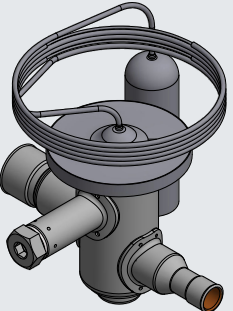
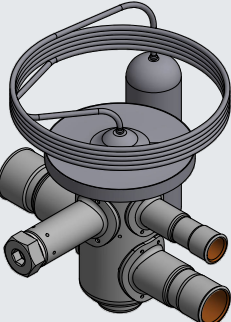
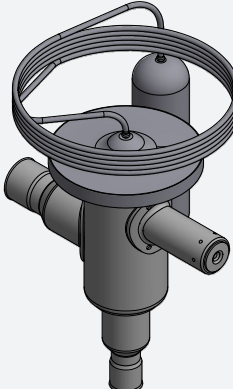
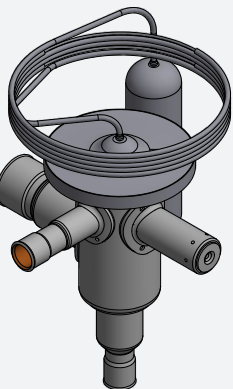
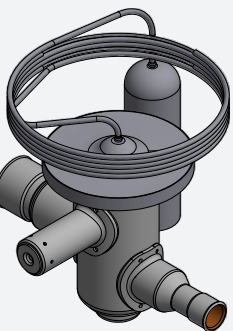
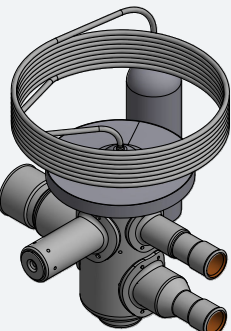
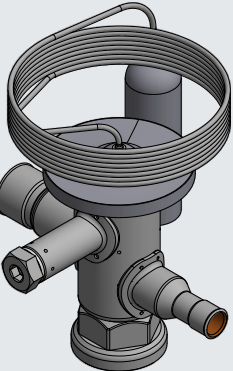
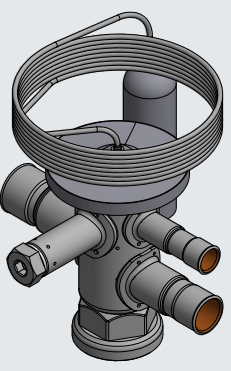
1. From 0.5 kW / 0.14 TR, up to 17.0 kW / 4.8 TR R407C (TU)
2. From 19.0 kW / 5.4 TR up to 28.5 kW / 8.1 TR R407C (TC)

## Features

- **Bi-metal connections**
  1. Fast and easy brazing process – no wet wrap needed.
  2. Braze alloys with as little as 5% Ag can be used.
- **Compact, lightweight design**
  1. Flexible and easy integration in any system.
- **Stainless steel**
  1. High body strength.
  2. High corrosion resistance.
  3. High vibration resistance
- **Laser-welded power element**
  1. Ensures diaphragm's structural integrity and lengthens life.
- **Stainless steel capillary tube**
  1. Flexible lightweight capillary tube, tolerates more bending for trouble-free installation and longer life.
  2. Greater resistance to vibration during operation because of low weight.
- **Laser engraving**
  1. Durable positive valve identification; no label that peels off over time.
  2. Customer-specific engraving available on request.
- **Fully hermetic brazed and laser-welded design**
  1. Hermetic valve in accordance with EU F-gas Regulation EU 517/2014.
  2. No external leakage which saves costs on maintenance and refrigerant loss.
  3. Protecting the environment and climate
- **Manufactured according to IATF16949**
  1. Quality and reliability that are second to none.

## Portfolio overview

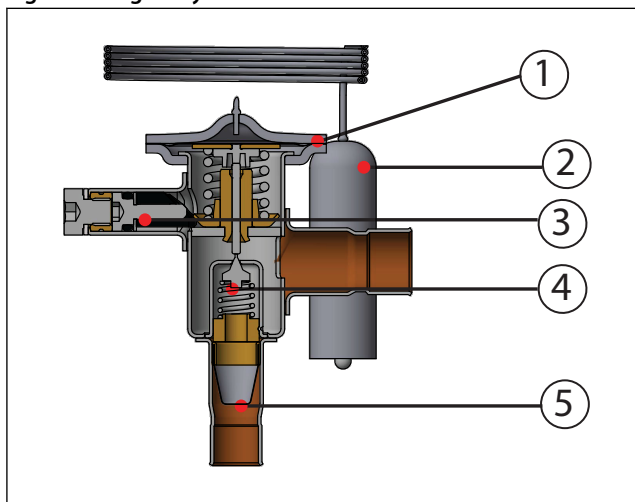
Table 1: Overview of available versions

| Type                                                           | Angleway                                                                           |                                                                                    | Straightway                                                                          |                                                                                       |
|----------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                | Internal pressure equalization                                                     | External pressure equalization                                                     | Internal pressure equalization                                                       | External pressure equalization                                                        |
| TUB/TUBE/TCBE<br>Adjustable superheat                          |   |   |    |    |
| TUC/TUCE/TCCE<br>Non-adjustable superheat                      |  |  |   |   |
| TUA/TUAE/TCAE<br>Adjustable superheat and exchangeable orifice |                                                                                    |                                                                                    |  |  |

## Functions

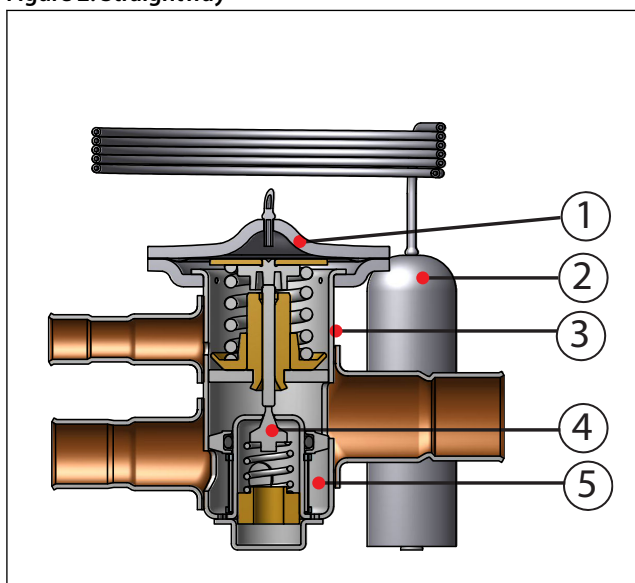
Thermostatic expansion valves maintain a constant superheat level at the evaporator outlet. It does this by controlling the amount of refrigerant that is injected into the evaporator, taking both the evaporator load and ambient temperatures into consideration. This both optimizes the efficiency of the refrigeration system and prevents liquid refrigerant from entering the suction line, possibly causing damage to the compressor. Particularly when compared to systems that use capillary tubes, the thermostatic expansion valve will offer a significant energy saving.

Figure 1: Angleyway



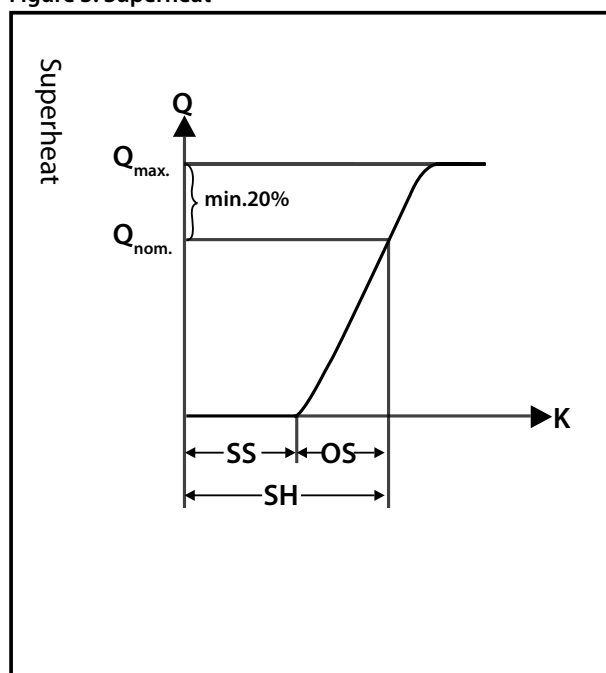
|   |                                                       |
|---|-------------------------------------------------------|
| 1 | Thermostatic element with diaphragm                   |
| 2 | Bulb with capillary tube                              |
| 3 | Setting spindle for adjustment of static superheat SS |
| 4 | Orifice assembly                                      |
| 5 | Filter                                                |

Figure 2: Straightway



|   |                                                                                   |
|---|-----------------------------------------------------------------------------------|
| 1 | Thermostatic element with diaphragm                                               |
| 2 | Bulb with capillary tube                                                          |
| 3 | Setting spindle for adjustment of static superheat SS (behind valve, not visible) |
| 4 | Orifice assembly                                                                  |
| 5 | Filter                                                                            |

Figure 3: Superheat



|              |                   |
|--------------|-------------------|
| SS           | Static superheat  |
| OS           | Opening superheat |
| SH = SS + OS | Total superheat   |
| Qnom         | Rated capacity    |
| Qmax         | Maximum capacity  |

Static superheat (SS) can be adjusted by turning the setting spindle (3), (TUB/TUBE/TCBE) Static Superheat cannot be adjusted on TUC/TUCE/TCCE.

The superheat setting is 4K for all standard valves. The opening superheat is 4K, measured from when the valve begins to open to when the valve gives its rated capacity (Qnom).

Table 2: Example

| Features          | Value           |
|-------------------|-----------------|
| Static superheat  | SS = 4K         |
| Opening Superheat | OS = 4K         |
| Total superheat   | SH = 4 + 4 = 8K |

## Operation

### Superheat

Superheat is the controlling parameter of a TXV. Superheat, measured at the evaporator outlet, is defined as the number of degrees the refrigerant vapor is heated above its saturation temperature (boiling point), at a specific pressure. Liquid entering the compressor causes serious damage. To prevent this, the TXV will maintain a certain minimum superheat. When discussing superheat in relation to TXV valve operation, the following terms are used:

#### Static superheat

Static superheat, SS is the superheat above which the valve will begin to open.

#### Opening superheat

Opening superheat, OS, is the amount of superheat above static superheat, SS, required to produce a given valve capacity.

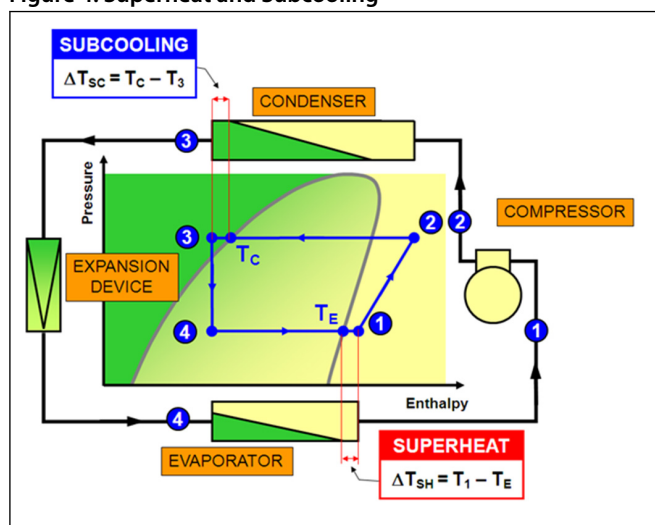
#### Total superheat

Total superheat is static superheat plus opening superheat, and is what is measured at the evaporator outlet.

### Subcooling

Subcooling, measured at the condenser outlet, is defined as the number of degrees a liquid refrigerant is cooled below its saturation temperature (boiling point), at a specific pressure. Subcooling is necessary to prevent flash gas forming in the liquid line. Depending on system design, various levels of subcooling may be needed. In most cases, 2 to 5K of subcooling is adequate. If flash gas forms in the liquid line, the capacity of the TXV will be greatly reduced.

Figure 4: Superheat and Subcooling



## TU stainless steel technology

Figure 5: Type TU and TC



### Benefits of stainless steel

The fact that the TU is an all-stainless steel expansion valve offers a number of benefits:

- Stainless steel is far more corrosion-resistant than traditional valve materials.
- Stainless steel valves require no surface treatment.
- Stainless steel capillary tubes are three times stronger and twenty times more resistant to vibration than copper capillary tubes.
- Stainless steel has a greater strength-to-weight ratio, making TU valves lighter and more compact.
- Stainless steel diaphragms have greater strength and corrosion resistance for a longer life.

### Danfoss precision port design

The TU thermostatic expansion valve introduces precision port design, incorporating four features that ensure superior repeatable performance over an extended valve life.

- Laser welding of the power element preserves the structural uniformity of the diaphragm, assuring consistent operation.
- A precision-machined pushrod and bushing make a practically frictionless seal with no need for a packing gland.
- The free-floating pushrod is self-aligning and eliminates binding.
- The precision-machined cone and orifice accurately meter refrigerant under all operating conditions.

### High quality

The TU is manufactured on fully automated, process-monitored production lines. Cellularized computer-monitored technology ensures uniform high quality and that, when delivered, every valve meets Danfoss quality standards and customer specifications. Cellularized production also makes possible simultaneous production of large and small quantities of standard and custom version valves.

### Advanced technology - fast and easy installation

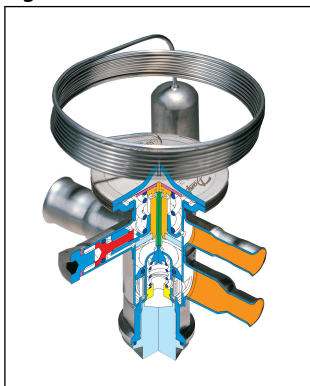
The TU stainless steel thermostatic expansion valve has significant installation advantages because it is a valve

## Thermostatic expansion valve, Type TU and TC

---

designed specifically for soldering. The TU can be installed in less than half the time required for traditional brass-bodied valves. The valve connections are made of copper and stainless steel bi-metal which makes installation easy, reliable, and fast.

Figure 6: TUAE



### No need for a wet cloth

Bi-metal has a very low thermal conductivity, actually only 10% that of copper, so heat applied during soldering remains largely in the copper layer of the connection tube, instead of being conducted to the valve body. External cooling is unnecessary. The result is less energy consumption and better solder quality. At the same time, the diaphragm's structural integrity is preserved.

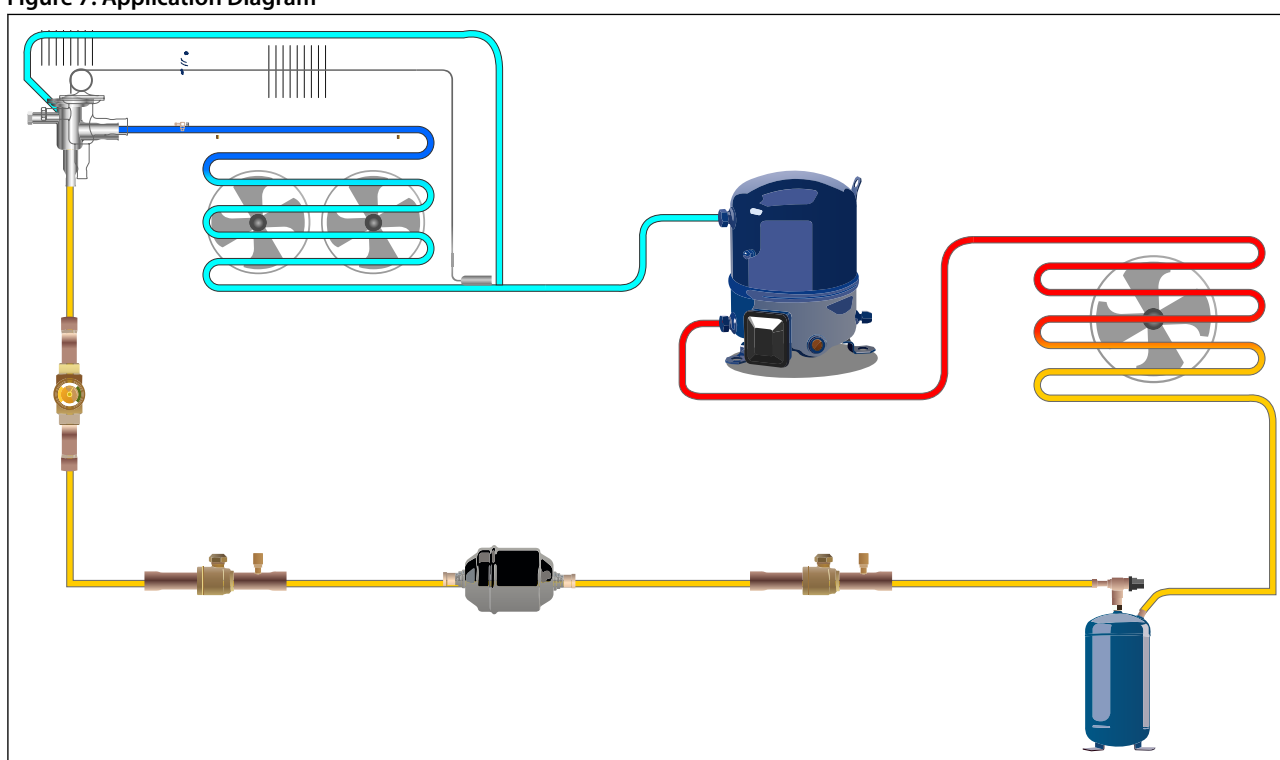
## Applications

Thermostatic expansion valves regulate the amount of refrigerant that is injected into the evaporator. It does this to keep a constant superheat level at the outlet of the evaporator, thereby preventing liquid refrigerant from entering the suction line and possibly causing damage to the compressor.

### Typical applications for TU and TC valves are:

- Conventional refrigeration systems
- Heat pump systems
- Air conditioning systems
- Specialty refrigeration appliances
- Liquid chillers
- Ice machines
- Transport refrigeration

Figure 7: Application Diagram



### Available charges

#### Universal charge

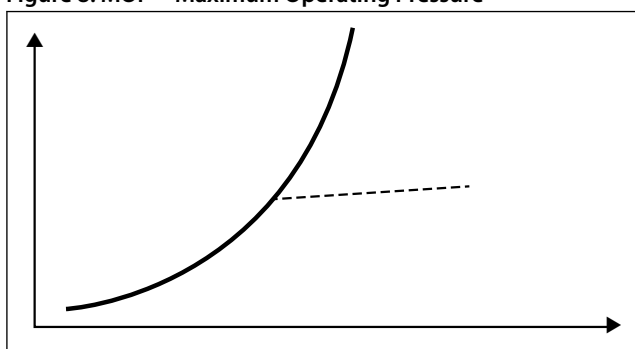
This is the standard charge, used in most applications. It is characterized by a very large operational evaporating temperature range, with only small variations in static superheat across the temperature range. It is available in two temperature ranges. One for normal (-40°C to +10°C / -40°F to 50°F) and one for low (-60 to -25°C / -76°F to -13°F) temperature applications.

#### MOP charge (MOP = Maximum Operating Pressure)

The MOP charge is used to protect the compressor motor against overload during start-up. A valve with MOP charge will throttle liquid injection into the evaporator and thus prevent the evaporating pressure from rising above the specified MOP point. Above the MOP point, any increase in sensor temperature results in only minimal additional opening of the expansion valve. A number of different MOP points are available



Figure 8: MOP = Maximum Operating Pressure



### NOTE:

The MOP point will change if the factory superheat setting of the expansion valve is changed. If the setting is reduced, the MOP point will go up and vice versa.

### MAH charge

The Danfoss Marinite Anti-Hunt (MAH) charge can be used in dynamic systems, often A/C systems. Here it reduces valve hunting during evaporator load changes, thereby helping to maintain stable system superheat and improve system performance.

### F-charge

The F-charge is designed for refrigeration systems where low total superheat is required. Valves with this charge are delivered with an optimized low static superheat setting which allows for installation with no or minimal field adjustment. The F-charge also includes the Danfoss MAH function, as described above.

### Ice charge

The ice charge is designed with an optimized static superheat characteristic, which allows for optimal function, particularly in Ice cubers, where low superheat is required in order to fully utilize the entire evaporator coil.

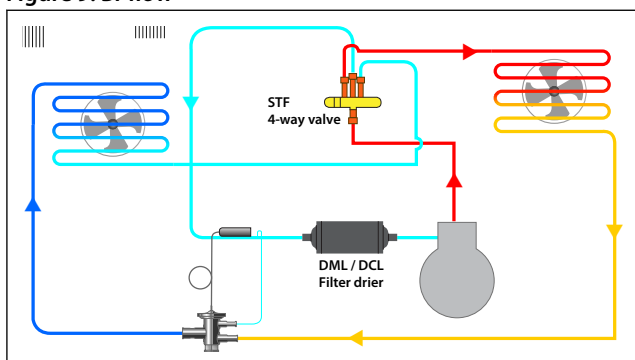
### Milk charge

The milk charge is designed for use in milk cooling tanks where a limitation of the suction pressure is required, but where an MOP valve would suffer from charge migration.

### Bi-flow

Bi-flow function is sometimes used in systems with 4-way reversing valves where hot gas defrosts, or heating cycles are required. Only externally equalized TU valves with orifices X to 8 and externally equalized TC valves with orifices 1 and 2 – without MOP charges, can be used in bi-flow mode. When used in reverse direction, the rated valve capacity will be reduced by up to 15%. Valves for bi-flow operation should be installed so that the normal refrigerant flow is towards the main evaporator

Figure 9: Bi-flow



### Sizing example

How to select a TU or TC thermostatic expansion valve.

Example: Refrigerant: R134a

Cooling capacity: 3KW

Evaporating temperature: -10 °C

## Thermostatic expansion valve, Type TU and TC

Condensing temperature: 35 °C

Total (useful) superheat: 8K

Subcooling: 6K

This guide will help select a thermostatic expansion valve based on the above system parameters using the Coolselector tool.

### Step 1

Open the Coolselector tool and select thermostatic expansion valve. Coolselector can be downloaded from <https://www.danfoss.com/en/service-and-support/downloads/dcs/coolselector-2/> or used online on <http://coolselectoronline.danfoss.com>

### Step 2

Select TU/TC from product families and the refrigerant. For this example: R134a.

### Step 3

Fill in the operating conditions at the top as per the system parameters stated in the example.

Figure 10: Operating conditions

### Step 4

Now select the appropriate orifice size from the list provided by the tool. For this example, the tool suggests TU-7, which is the valve size closest to 100% load.

Figure 11: Coolselector2 Selection TU

Liquid line (Dry expansion system. R134a. TXV).

Selection: TU - 7 No code numbers selected

| Selected                         | Type   | NS   | Range | Nominal capacity [kW] | Min. capacity [kW] | Load [%] | DP [bar] | Velocity, in [m/s] | Result |
|----------------------------------|--------|------|-------|-----------------------|--------------------|----------|----------|--------------------|--------|
| <input type="radio"/>            | TU - 5 | 9,53 | N     | 1,576                 | 0,394              | 190      | 6,862    | 0,33               | ⚠      |
| <input type="radio"/>            | TU - 6 | 9,53 | N     | 2,445                 | 0,611              | 123      | 6,862    | 0,33               | ⚠      |
| <input checked="" type="radio"/> | TU - 7 | 9,53 | N     | 3,239                 | 0,810              | 93       | 6,862    | 0,33               | ✓      |
| <input type="radio"/>            | TU - 8 | 9,53 | N     | 4,813                 | 1,203              | 62       | 6,862    | 0,33               | ✓      |
| <input type="radio"/>            | TU - 9 | 9,53 | N     | 6,587                 | 1,647              | 46       | 6,862    | 0,33               | ✓      |

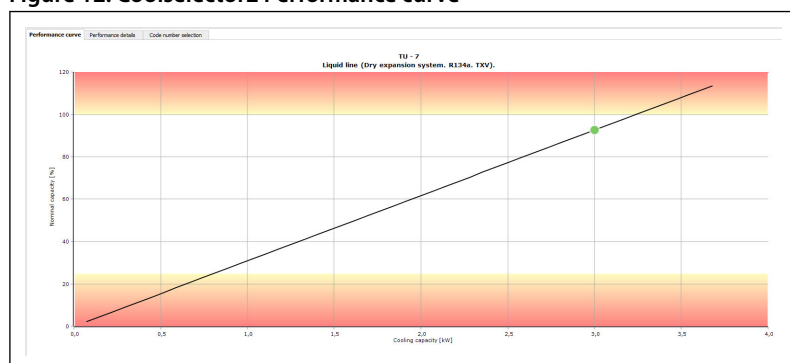
: 1. Always remember to include sub cooling in the selection parameters. It is important for TXV selection. When all other parameters remain constant, an increase in sub cooling will increase the capacity of the thermostatic expansion valve. Insufficient sub cooling can create flash gas before the valve and high sub cooling can create lesser flash gas after the valve.

: 2. Coolselector determines pressure drop across the valve based on the condensing and evaporating temperatures. If the system is using a distributor, has valves in the liquid line or height variations between evaporator and condenser, the pressure drops from these components must be summarized, and given as input to the tool, using the "Distributor pressure drop" field. The capacity of the thermostatic expansion valve is influenced by these pressure drops.

### Step 5

The code number for the valve can be selected based on additional parameters like specific charge, equalization, connector type, connection size etc. at the code number selection tab. The performance details will also be shown in detail under the Performance details tab.

**Figure 12: Coolselector2 Performance curve**



### Step 6

For list of code numbers, click the "Code number selection" tab.

**Figure 13: Coolselector2 code number selection**

[illegible]

## Product specification

### Technical data

Table 3: Technical data

| Types                                                    | Description                                                                                                                                                                                                                                                   |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Charges available for following refrigerants             | R290, R134a, R513A, R404A, R407A, R407C, R407F, R448A, R449A, R507, R410A, R452A, R600a, R454C, R455A, R1234yf, R1234ze(E), R454A TU and TC valves are continually evaluated for use with newer refrigerants. For further information please contact Danfoss. |
| Ignition assessment                                      | Positive. Zone 2 (Category 3, IIA) TUA/TUAE and TCAE only approved for A1 refrigerants                                                                                                                                                                        |
| Complies with PED                                        | Yes, fluid group 2, Article 4 paragraph 3, DN < 25 (inner bore)                                                                                                                                                                                               |
| Standard charge ranges with MOP                          | -40 – +10 °C / -40 – +50 °F MOP +15 °C / + 60 °F<br>-40 – -5 °C / -40 – +25 °F MOP 0 °C / +32 °F<br>-60 – -25 °C / -75 – -15 °F MOP -20 °C / -4 °F (not for R134a and R513A)<br>For other ranges, please contact Danfoss.                                     |
| Max. working pressure PS/MWP                             | TU (non R410A): 34 bar(g) / 500 psi(g)<br>TU (R410A): 45.5 bar(g) / 660 psi(g)<br>TC (all): 45.5 bar(g) / 660 psi(g)                                                                                                                                          |
| Connection type                                          | Solder, ODF                                                                                                                                                                                                                                                   |
| Connection sizes, Angleway                               | Inlet: 1/4 in, 3/8 in, 6 mm, 10 mm Outlet: 3/8 in, 1/2 in, 5/8 in, 10 mm, 12 mm, 16 mm                                                                                                                                                                        |
| Connection sizes, Straightway                            | Inlet: 1/4 in, 3/8 in, 1/2 in, 6 mm, 10 mm, 12 mm Outlet: 3/8 in, 1/2 in, 5/8 in, 10 mm, 12 mm, 16 mm                                                                                                                                                         |
| Connection sizes, [External equalization]                | 1/4 in, 6 mm                                                                                                                                                                                                                                                  |
| Orifices, TUB(E), TUC(E)                                 | X, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9                                                                                                                                                                                                                               |
| Orifices TUA(E)                                          | 1, 2, 3, 4, 5, 6, 7, 8, 9                                                                                                                                                                                                                                     |
| Orifices TCAE, TCBE, TCCE                                | 1, 2, 3                                                                                                                                                                                                                                                       |
| Bleed                                                    | 15% (of nominal capacity) available. For 30%, contact Danfoss.                                                                                                                                                                                                |
| Biflow operation                                         | With flow in the opposite direction, the rated capacity is reduced by up to 15%.                                                                                                                                                                              |
| Biflow not recommended in                                | TU with orifice 9<br>TC with orifice 3<br>All valves with MOP charges                                                                                                                                                                                         |
| Biflow not possible in                                   | All valves with internal equalization                                                                                                                                                                                                                         |
| Environmental transport/storage temperature and humidity | Max. +65 °C / +150 °F, Humidity: <100% RH                                                                                                                                                                                                                     |
| Max. body temperature (mounting/operation)               | +120°C / +250°F (short lived peak: +150°C / +300°F)                                                                                                                                                                                                           |
| Min. body temperature                                    | See Evaporating temperature range low end.                                                                                                                                                                                                                    |
| Max. bulb temperature (operation)                        | Standard valves: +100°C / +212°F<br>Valves with MOP charges: +150°C / +300°F                                                                                                                                                                                  |
| Static superheat (SS)                                    | Standard 4K / 7.2°F<br>Customer-specific settings and non-adjustable valves are available.<br>Please contact Danfoss.                                                                                                                                         |
| Material of product                                      | Body: Stainless steel<br>Capillary tube: Stainless steel<br>Connector: Bimetal (stainless steel and copper)                                                                                                                                                   |
| Standard capillary tube lengths                          | TU: 0.8 m / 31.5 in<br>TC: 0.9 m / 35 in                                                                                                                                                                                                                      |
| Special capillary tube lengths available                 | 0.3 m / 11.8 in, 0.45 m / 18.0 in and 1.5 m / 59 in                                                                                                                                                                                                           |
| Inlet strainer                                           | TU orifice X - 4 = 100 mesh / All other TU and TC = 50 mesh / TU and TC angle = 80 mesh                                                                                                                                                                       |
| Serviceable                                              | No                                                                                                                                                                                                                                                            |
| Corrosion                                                | Passed salt spray test (EN ISO 9227 NSS) and ASTM prohesion (ASTM G85) test.<br>Both 2000 hours                                                                                                                                                               |

### Capacity tables

Table 4: Type TU and TC

| Type | Orifice | R410 |      | R134 |      | R407 |      | R404A/R507 |      | R290 |      | R22  |      |
|------|---------|------|------|------|------|------|------|------------|------|------|------|------|------|
|      |         | [kw] | [TR] | [kw] | [TR] | [kw] | [TR] | [kw]       | [TR] | [kw] | [TR] | [kw] | [TR] |
| TU   | X       | 0.74 | 0.21 | 0.32 | 0.09 | 0.5  | 0.15 | 0.37       | 0.11 | 0.49 | 0.14 | 0.48 | 0.13 |
| TU   | 0       | 0.99 | 0.28 | 0.42 | 0.12 | 0.66 | 0.19 | 0.49       | 0.14 | 0.64 | 0.18 | 0.63 | 0.18 |
| TU   | 1       | 1.3  | 0.38 | 0.61 | 0.17 | 0.94 | 0.27 | 0.71       | 0.21 | 0.94 | 0.27 | 0.92 | 0.26 |
| TU   | 1       | 1.7  | 0.49 | 0.72 | 0.2  | 1.1  | 0.33 | 0.87       | 0.26 | 1.1  | 0.32 | 1.1  | 0.31 |
| TU   | 3       | 2.1  | 0.61 | 0.95 | 0.27 | 1.5  | 0.42 | 1.1        | 0.33 | 1.5  | 0.41 | 1.4  | 0.4  |

## Thermostatic expansion valve, Type TU and TC

| Type | Orifice | R410 |      | R134 |      | R407 |      | R404A/R507 |      | R290 |      | R22  |      |
|------|---------|------|------|------|------|------|------|------------|------|------|------|------|------|
|      |         | [kw] | [TR] | [kw] | [TR] | [kw] | [TR] | [kw]       | [TR] | [kw] | [TR] | [kw] | [TR] |
| TU   | 4       | 4.1  | 1.2  | 1.6  | 0.45 | 2.5  | 0.74 | 2          | 0.59 | 2.6  | 0.72 | 2.5  | 0.7  |
| TU   | 5       | 5.3  | 1.5  | 2.1  | 0.6  | 3.4  | 0.98 | 2.7        | 0.79 | 3.4  | 0.96 | 3.4  | 0.93 |
| TU   | 6       | 8.5  | 2.4  | 3.4  | 0.94 | 5.3  | 1.5  | 4.2        | 1.2  | 5.3  | 1.5  | 5.3  | 1.5  |
| TU   | 7       | 11.2 | 3.2  | 4.4  | 1.3  | 7    | 2    | 5.6        | 1.6  | 7    | 2    | 7    | 1.9  |
| TU   | 8       | 15.8 | 4.5  | 6.5  | 1.8  | 10.2 | 3    | 8          | 2.4  | 10.2 | 2.9  | 10.1 | 2.8  |
| TU   | 9       | 23.1 | 6.6  | 9    | 2.5  | 14   | 4.1  | 11.3       | 3.4  | 14.3 | 4.1  | 14.1 | 4    |
| TC   | 1       | 21.2 | 6.1  | 13   | 3.7  | 17.8 | 5.1  | 13         | 3.8  | 19.1 | 5.4  | 18.3 | 5.1  |
| TC   | 2       | 24.5 | 7    | 14.9 | 4.2  | 20.4 | 5.9  | 15.1       | 4.4  | 22.2 | 6.3  | 21.2 | 5.9  |
| TC   | 3       | 30.6 | 8.9  | 18.6 | 5.2  | 25.2 | 7.3  | 18.9       | 5.6  | 27.9 | 7.9  | 26.7 | 7.4  |

The rated capacity is based on:

Evaporating temperature  $t_e = 4.4\text{ °C} / 40\text{ °F}$

Liquid teperature  $t_l = 37\text{ °C} / 98\text{ °F}$

Condensing temperature  $t_c = 38\text{ °C} / 100\text{ °F}$

**Table 5: Type TU and TC**

| Type | Orifice | R407F |      | R407A |      | R448A |      | R449A |      | R513A |      | R452A |      |
|------|---------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
|      |         | [kw]  | [TR] | [kw]  | [TR] | [kw]  | [TR] | [kw]  | [TR] | [kw]  | [TR] | [kw]  | [TR] |
| TU   | X       | 0.58  | 0.17 | 0.49  | 0.14 | 0.48  | 0.14 | 0.47  | 0.14 | 0.28  | 0.08 | 0.28  | 0.08 |
| TU   | 0       | 0.76  | 0.22 | 0.65  | 0.19 | 0.63  | 0.18 | 0.61  | 0.18 | 0.36  | 0.1  | 0.31  | 0.09 |
| TU   | 1       | 1.1   | 0.32 | 0.94  | 0.28 | 0.93  | 0.27 | 0.9   | 0.26 | 0.53  | 0.15 | 0.46  | 0.13 |
| TU   | 1       | 1.4   | 0.39 | 1.1   | 0.33 | 1.1   | 0.33 | 1.1   | 0.31 | 0.62  | 0.18 | 0.55  | 0.16 |
| TU   | 3       | 1.7   | 0.5  | 1.5   | 0.43 | 1.4   | 0.42 | 1.4   | 0.41 | 0.82  | 0.23 | 0.72  | 0.2  |
| TU   | 4       | 3.1   | 0.91 | 2.6   | 0.77 | 2.5   | 0.74 | 2.4   | 0.71 | 1.4   | 0.4  | 1.3   | 0.36 |
| TU   | 5       | 4.2   | 1.2  | 3.5   | 1    | 3.4   | 1    | 3.2   | 1    | 1.8   | 0.53 | 1.7   | 0.48 |
| TU   | 6       | 6.5   | 1.9  | 5.5   | 1.6  | 5.3   | 1.5  | 5.1   | 1.5  | 2.9   | 0.83 | 2.7   | 0.75 |
| TU   | 7       | 8.6   | 2.5  | 7.2   | 2.1  | 7     | 2    | 6.7   | 2    | 3.8   | 1.1  | 3.5   | 0.99 |
| TU   | 8       | 12.4  | 3.6  | 10.5  | 3.1  | 10.1  | 3    | 9.8   | 2.9  | 5.6   | 1.6  | 5.1   | 1.4  |
| TU   | 9       | 17.1  | 5    | 14.4  | 4.2  | 13.9  | 4.1  | 13.6  | 4    | 7.7   | 2.2  | 7.2   | 2.1  |
| TC   | 1       | 20.6  | 5.9  | 17.6  | 5.1  | 17.6  | 5.1  | 16.9  | 4.9  | 11.5  | 3.3  | 12.6  | 3.6  |
| TC   | 2       | 24    | 6.9  | 20.3  | 5.9  | 20.3  | 5.9  | 19.3  | 5.6  | 13.2  | 3.8  | 14.5  | 4.1  |
| TC   | 3       | 30.1  | 8.7  | 25.2  | 7.4  | 25.1  | 7.4  | 23.9  | 7    | 16.5  | 4.7  | 18.1  | 5.2  |

The rated capacity is based on:

Evaporating temperature  $t_e = 4.4\text{ °C} / 40\text{ °F}$

Liquid teperature  $t_l = 37\text{ °C} / 98\text{ °F}$

Condensing temperature  $t_c = 38\text{ °C} / 100\text{ °F}$

**Table 6: Type TU and TC**

| Type | Orifice | R454A |      | R454C |      | R455A |      | R1234yf |      | R1234ze(E) |      |
|------|---------|-------|------|-------|------|-------|------|---------|------|------------|------|
|      |         | [kW]  | [TR] | [kW]  | [TR] | [kW]  | [TR] | [kW]    | [TR] | [kW]       | [TR] |
| TU   | X       | 0.59  | 0.17 | 0.46  | 0.13 | 0.52  | 0.15 | 0.27    | 0.08 | 0.20       | 0.06 |
| TU   | 0       | 0.65  | 0.19 | 0.50  | 0.14 | 0.57  | 0.16 | 0.30    | 0.08 | 0.21       | 0.06 |
| TU   | 1       | 0.99  | 0.28 | 0.76  | 0.22 | 0.87  | 0.25 | 0.45    | 0.13 | 0.32       | 0.09 |
| TU   | 2       | 1.2   | 0.34 | 0.91  | 0.26 | 1.0   | 0.30 | 0.53    | 0.15 | 0.37       | 0.10 |
| TU   | 3       | 1.6   | 0.44 | 1.2   | 0.34 | 1.4   | 0.38 | 0.69    | 0.20 | 0.49       | 0.14 |
| TU   | 4       | 2.8   | 0.79 | 2.0   | 0.58 | 2.4   | 0.67 | 1.2     | 0.34 | 0.80       | 0.23 |
| TU   | 5       | 3.7   | 1.1  | 2.7   | 0.78 | 3.2   | 0.90 | 1.6     | 0.45 | 1.1        | 0.30 |
| TU   | 6       | 5.9   | 1.7  | 4.3   | 1.2  | 4.9   | 1.4  | 2.5     | 0.70 | 1.7        | 0.47 |
| TU   | 7       | 7.8   | 2.2  | 5.6   | 1.6  | 6.5   | 1.9  | 3.3     | 0.92 | 2.2        | 0.62 |
| TU   | 8       | 11.1  | 3.2  | 8.2   | 2.3  | 9.5   | 2.7  | 4.8     | 1.4  | 3.3        | 0.93 |
| TU   | 9       | 15.7  | 4.5  | 11.2  | 3.2  | 12.9  | 3.7  | 6.6     | 1.9  | 4.4        | 1.2  |

The rated capacity is based on:

Evaporating temperature  $t_e = 4.4\text{ °C} / 40\text{ °F}$

Liquid teperature  $t_l = 37\text{ °C} / 98\text{ °F}$

Condensing temperature  $t_c = 38\text{ °C} / 100\text{ °F}$

## Design

TU and TC valves are basically identical, except for the larger diaphragm on the TC. The larger diaphragm allows for more travel of the orifice cone, which gives the TC valve more capacity than the TU valve.

TU and TC valves are available in both Straightway and Angleway versions. TUA(E) and TCAE only as straight flow.

Figure 14: Angle flow  
(fixed orifice)

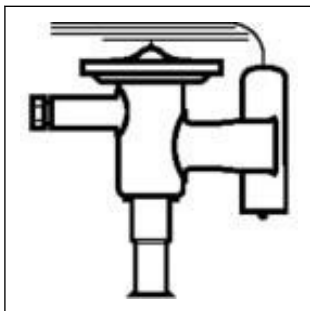


Figure 15: Straight flow  
(fixed orifice)

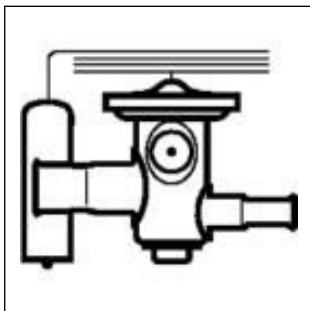


Figure 16: Straight flow  
(exchangeable orifice)

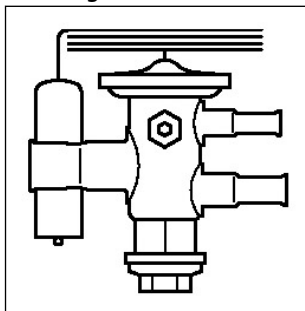


Figure 17: TU Angleway

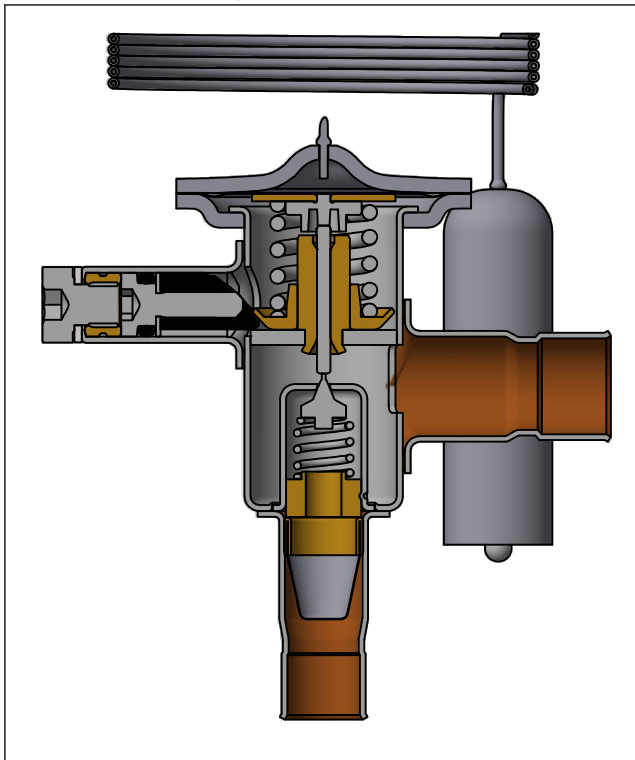


Figure 18: TU Straightway

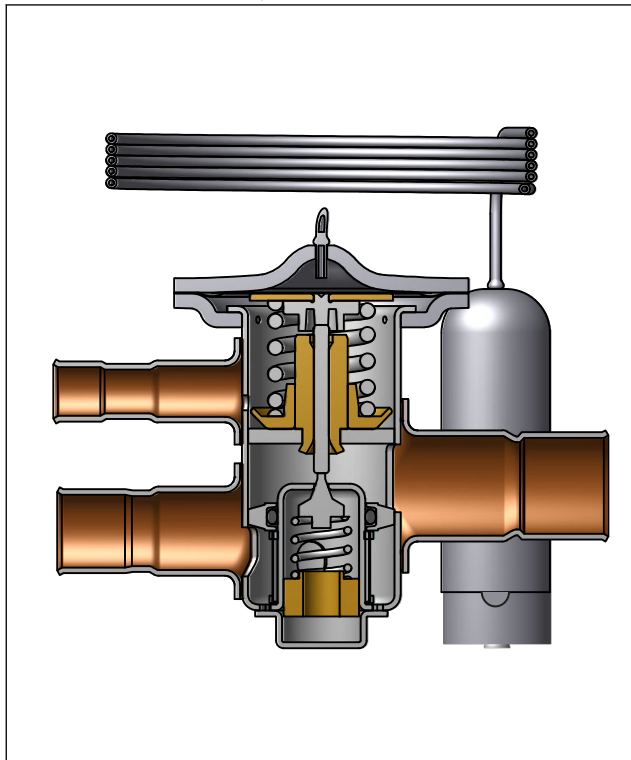


Figure 19: TUA / TUAE (incl. orifice)

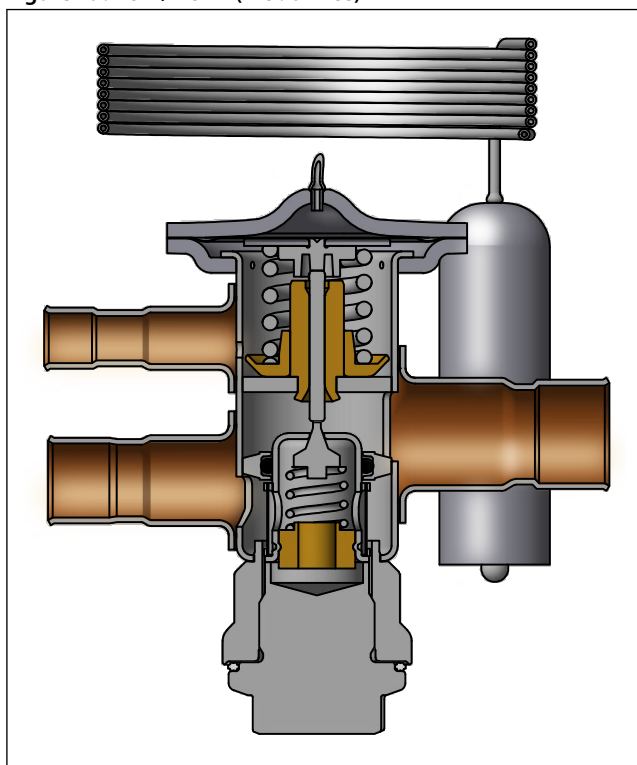


Figure 20: TC Angleway

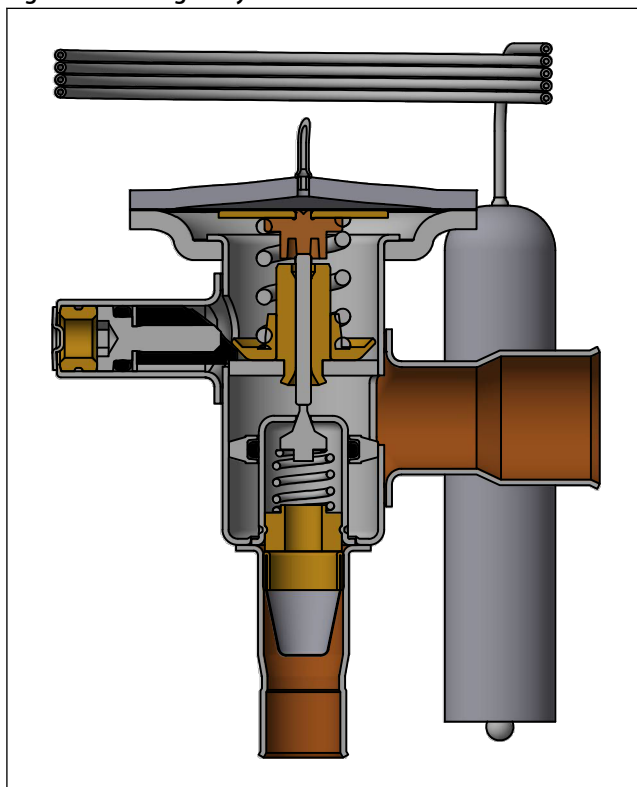


Figure 21: TC Straightway

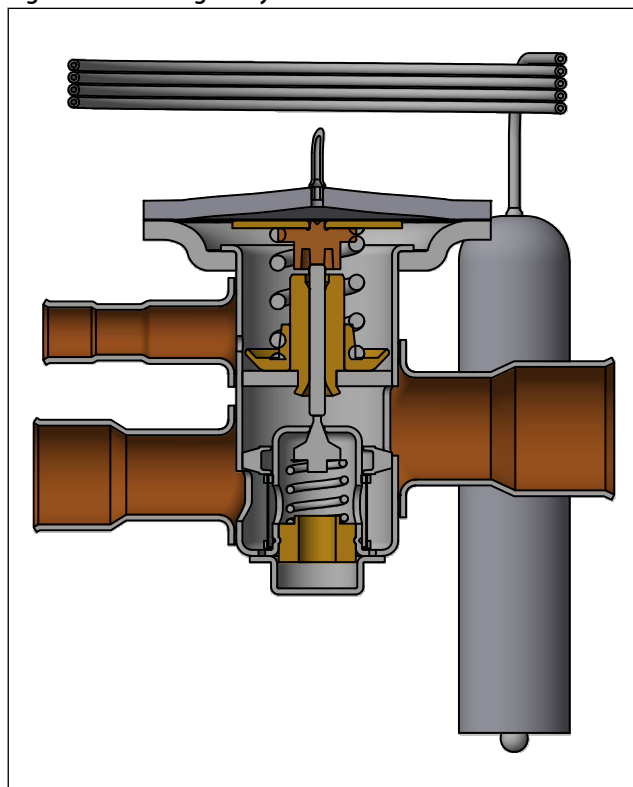
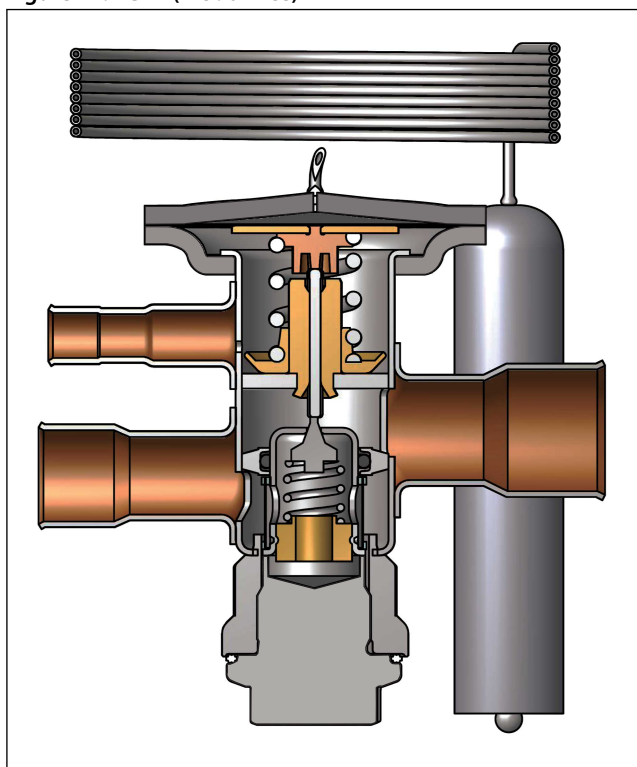


Figure 22: TCAE (incl. orifice)



## Dimensions

Figure 23: TUBE and TUCE

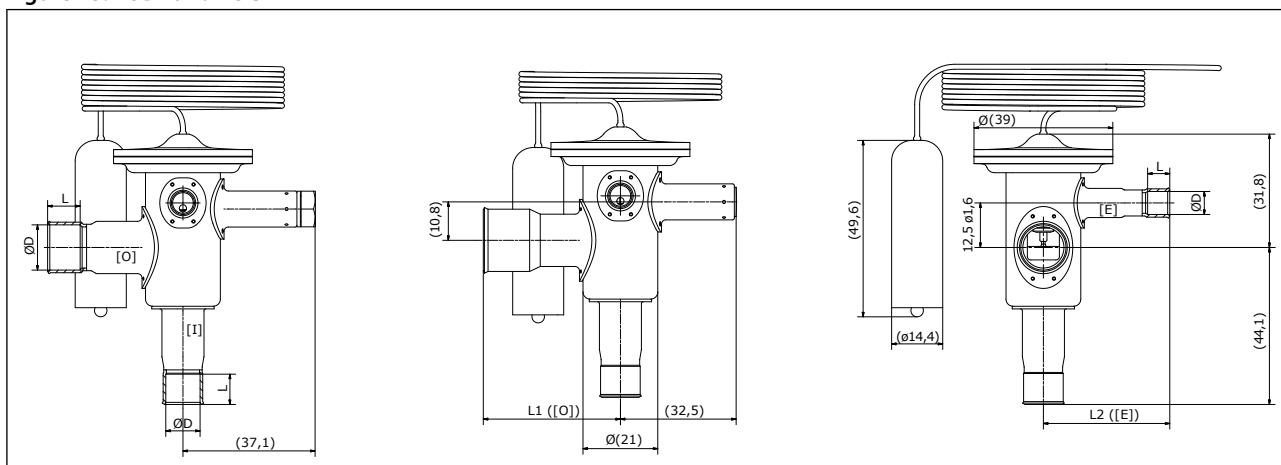


Table 7: Dimensions for TU and TC

| Con. / Dim.         | Size   | [ØD]  | [ØD] tolerance   | [L] | [L] tolerance | [L1] ([O]) | [L1] tolerance | [L2] ([E]; [I]) | [L2] tolerance |
|---------------------|--------|-------|------------------|-----|---------------|------------|----------------|-----------------|----------------|
| Equalization<br>[E] | 6 mm   | 6.00  | +0.155<br>+0.065 | 7   | ±1.2          | -          | -              | 35.5            | ±2             |
|                     | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
| Inlet [I]           | 6 mm   | 6.00  |                  | 7   | ±1.2          | -          | -              | -               | -              |
|                     | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              | -               | -              |
|                     | 3/8 in | 9.52  |                  | 8   | ±1.2          | -          | -              | -               | -              |
|                     | 10 mm  | 10.00 |                  | 9   | ±1.2          | -          | -              | -               | -              |
|                     | 1/2 in | 12.70 |                  | 10  | ±1.4          | -          | -              | -               | -              |
| Outlet [O]          | 3/8 in | 9.52  |                  | 8   | ±1.2          | 38.5       | ±2             | -               | -              |
|                     | 12 mm  | 12.00 |                  | 10  | ±1.4          |            |                | -               | -              |
|                     | 1/2 in | 12.70 |                  | 10  | ±1.4          | 41.5       | ±2             | -               | -              |
|                     | 5/8 in | 15.88 |                  | 12  | ±1.4          |            |                | -               | -              |



## Thermostatic expansion valve, Type TU and TC

Figure 24: TUBE and TUCE

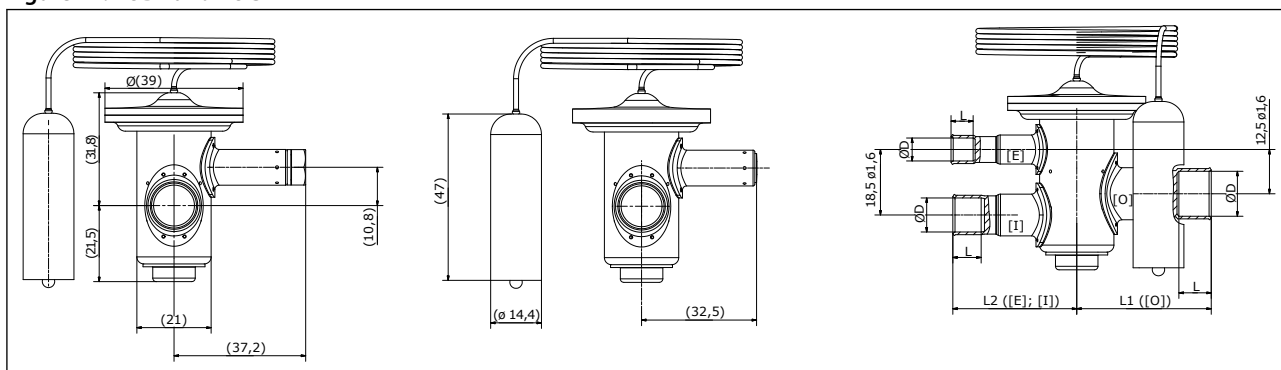


Table 8: Dimensions for TUBE and TUCE

| Con. / Dim.      | Size   | [ØD]  | [ØD] tolerance   | [L] | [L] tolerance | [L1] ([O]) | [L1] tolerance | [L2] ([E]; [I]) | [L2] tolerance |
|------------------|--------|-------|------------------|-----|---------------|------------|----------------|-----------------|----------------|
| Equalization [E] | 6 mm   | 6.00  | +0.155<br>+0.065 | 7   | ±1.2          | -          | -              | 35.5            | ±2             |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
| Inlet [I]        | 6 mm   | 6.00  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 3/8 in | 9.52  |                  | 8   | ±1.2          | -          | -              |                 |                |
|                  | 10 mm  | 10.00 |                  | 9   | ±1.2          | -          | -              |                 |                |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          | -          | -              | 38.5            | ±2             |
| Outlet [O]       | 3/8 in | 9.52  |                  | 8   | ±1.2          | 38.5       | ±2             | -               | -              |
|                  | 12 mm  | 12.00 |                  | 10  | ±1.4          |            |                | -               | -              |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          | 41.5       | ±2             | -               | -              |
|                  | 5/8 in | 15.88 |                  | 12  | ±1.4          |            |                | -               | -              |

Figure 25: TUAE

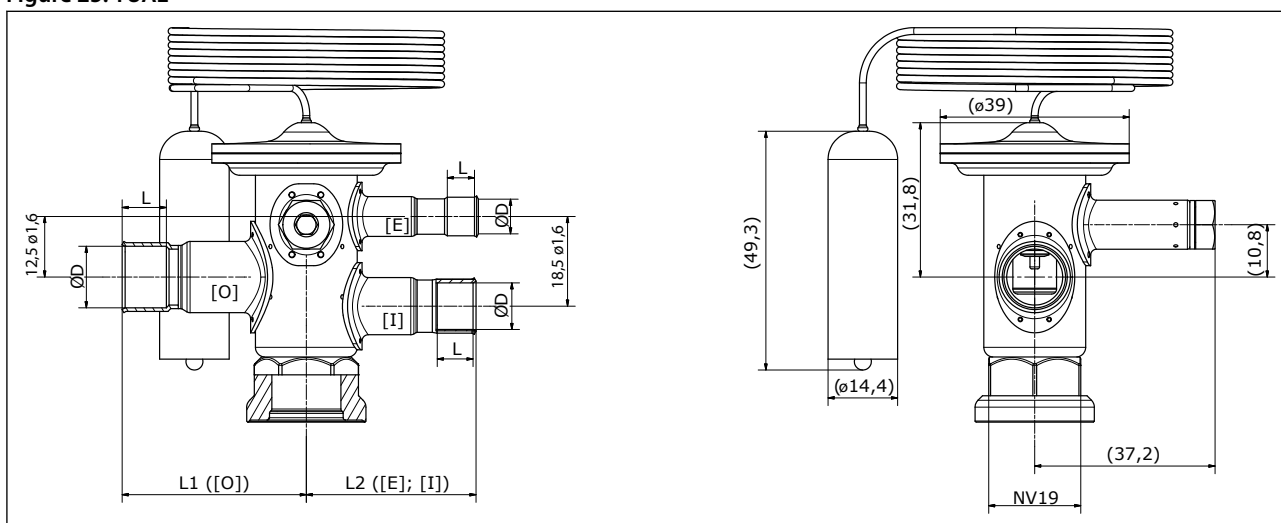


Table 9: Dimensions for TUAE

| Con. / Dim.      | Size   | [ØD]  | [ØD] tolerance   | [L] | [L] tolerance | [L1] ([O]) | [L1] tolerance | [L2] ([E]; [I]) | [L2] tolerance |
|------------------|--------|-------|------------------|-----|---------------|------------|----------------|-----------------|----------------|
| Equalization [E] | 6 mm   | 6.00  | +0.155<br>+0.065 | 7   | ±1.2          | -          | -              | 35.5            | ±2             |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
| Inlet [I]        | 6 mm   | 6.00  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 3/8 in | 9.52  |                  | 8   | ±1.2          | -          | -              |                 |                |
|                  | 10 mm  | 10.00 |                  | 9   | ±1.2          | -          | -              |                 |                |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          | -          | -              | 38.5            | ±2             |
| Outlet [O]       | 3/8 in | 9.52  |                  | 8   | ±1.2          | 38.5       | ±2             | -               | -              |
|                  | 12 mm  | 12.00 |                  | 10  | ±1.4          |            |                | -               | -              |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          | 41.5       | ±2             | -               | -              |
|                  | 5/8 in | 15.88 |                  | 12  | ±1.4          |            |                | -               | -              |

## Thermostatic expansion valve, Type TU and TC

Figure 26: TCBE and TCCE

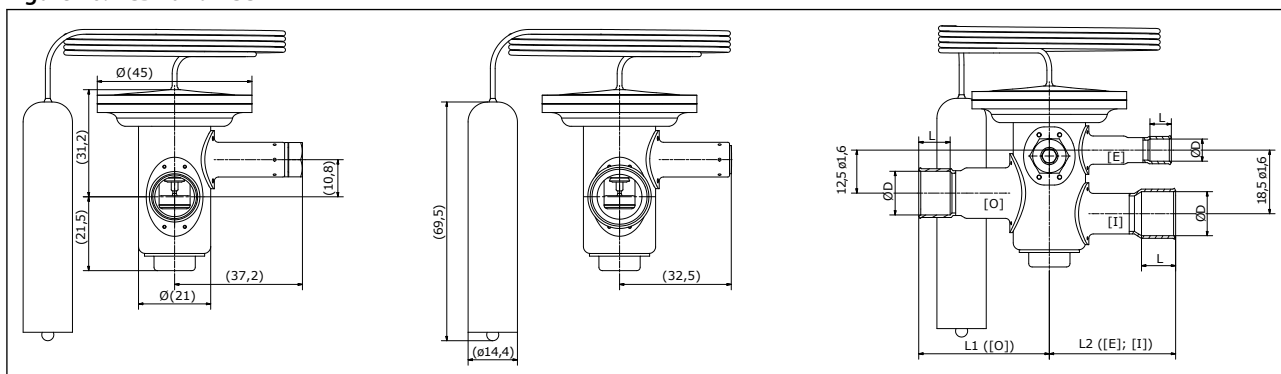
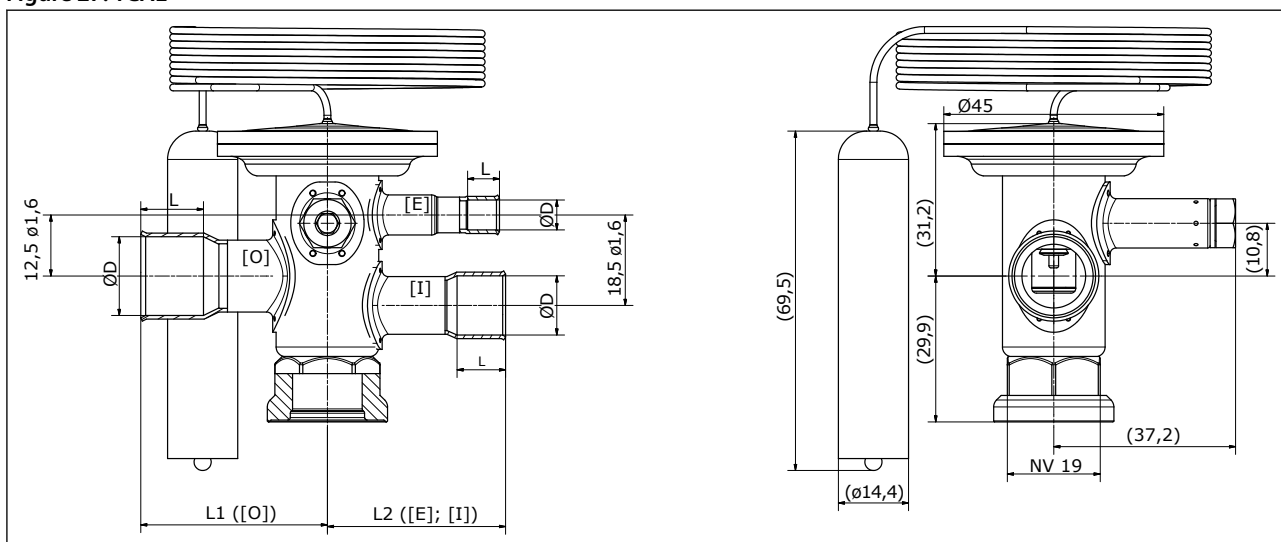


Table 10: Dimensions for TCBE and TCCE

| Con. / Dim.      | Size   | [ØD]  | [ØD] tolerance   | [L] | [L] tolerance | [L1] ((O)) | [L1] tolerance | [L2] ((E); (I)) | [L2] tolerance |
|------------------|--------|-------|------------------|-----|---------------|------------|----------------|-----------------|----------------|
| Equalization [E] | 6 mm   | 6.00  | +0.155<br>+0.065 | 7   | ±1.2          | -          | -              | 35.5            | ±2             |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
| Inlet [I]        | 6 mm   | 6.00  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 3/8 in | 9.52  |                  | 8   | ±1.2          | -          | -              |                 |                |
|                  | 10 mm  | 10.00 |                  | 9   | ±1.2          | -          | -              |                 |                |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          | -          | -              | 38.5            | ±2             |
| Outlet [O]       | 3/8 in | 9.52  |                  | 8   | ±1.2          | 38.5       | ±2             | -               | -              |
|                  | 12 mm  | 12.00 |                  | 10  | ±1.4          |            |                | -               | -              |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          |            |                | -               | -              |
|                  | 5/8 in | 15.88 |                  | 12  | ±1.4          | 41.5       | ±2             | -               | -              |

Figure 27: TCAE



## Thermostatic expansion valve, Type TU and TC

**Table 11: Dimensions for TCAE**

| Con. / Dim.      | Size   | [øD]  | [øD] tolerance   | [L] | [L] tolerance | [L1] ([O]) | [L1] tolerance | [L2] ([E]; [I]) | [L2] tolerance |
|------------------|--------|-------|------------------|-----|---------------|------------|----------------|-----------------|----------------|
| Equalization [E] | 6 mm   | 6.00  | +0.155<br>+0.065 | 7   | ±1.2          | -          | -              | 35.5            | ±2             |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
| Inlet [I]        | 6 mm   | 6.00  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 1/4 in | 6.35  |                  | 7   | ±1.2          | -          | -              |                 |                |
|                  | 3/8 in | 9.52  |                  | 8   | ±1.2          | -          | -              |                 |                |
|                  | 10 mm  | 10.00 |                  | 9   | ±1.2          | -          | -              |                 |                |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          | -          | -              | 38.5            | ±2             |
|                  | 3/8 in | 9.52  |                  | 8   | ±1.2          | 38.5       | ±2             | -               | -              |
| Outlet [O]       | 12 mm  | 12.00 |                  | 10  | ±1.4          |            |                | -               | -              |
|                  | 1/2 in | 12.70 |                  | 10  | ±1.4          |            |                | -               | -              |
|                  | 5/8 in | 15.88 |                  | 12  | ±1.4          | 41.5       | ±2             | -               | -              |

## Identification

Main valve data is given on the power element (Fig. 19 and 20), on the valve body (Fig. 21) and on the orifice assembly (Fig. 22).

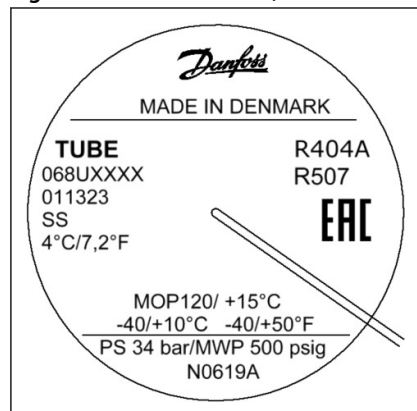
For valves and separate orifices with bleed (optional), the bleed size is marked on the valve body or orifice assembly respectively.

BP15 (= 15% bleed of nominal capacity).

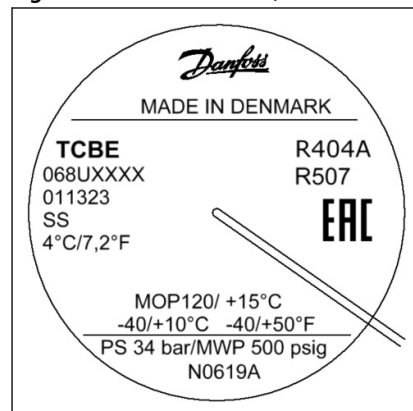
For valves with fixed superheat setting (types TUC, TUCE or TCCE), the static superheat is printed on the power element (e.g. SS 4°C/7.2°F).

All standard valves are marked with EAC, in case they need to be exported to Eurasia.

**Figure 28: Power element, TUBE**



**Figure 29: Power element, TCBE**



**Table 12: Power element, data example, Fig. 19 and 20:**

|                        |                                                                       |
|------------------------|-----------------------------------------------------------------------|
| TUBE                   | Type (E = external pressure equalization)                             |
| 068Uxxxx               | Code number                                                           |
| R404A/R507             | Refrigerant                                                           |
| MOP 55/+15°C           | MOP-point in psig and °C (optional)                                   |
| -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 in bar and psig                                 |
| N0619A                 | Date marking (N = Nordborg, week 06, year 2019, weekday A = Thursday) |

Figure 30: Valve body,  
TUBE and TCBE

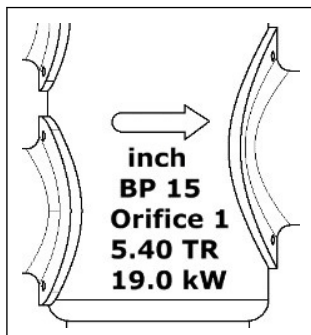


Table 13: Valve body, data example, Fig. 21:

|           |                                               |
|-----------|-----------------------------------------------|
| Arrow     | Normal flow direction                         |
| Inch      | Connection in Inches (MM = millimeters)       |
| BP15      | 15% bleed (optional)                          |
| Orifice 1 | Orifice number 1                              |
| 5.40 TR   | Rated capacity Qnom, in tons of refrigeration |
| 19.0 kW   | Rated capacity Qnom, in kW                    |

Figure 31: TUA / TCA  
orifice

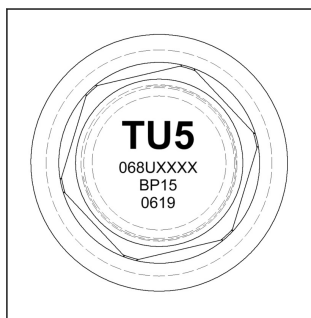


Table 14: Orifice assembly, data example (Fig. 22)

|          |                                             |
|----------|---------------------------------------------|
| TU       | Orifice for valve type (TUA or TCA)         |
| 5        | Orifice assembly number                     |
| 068Uxxxx | Code number, orifice with filter and gasket |
| 0619     | Date marking (week 06, year 19)             |

## Ordering

Figure 32: TUB

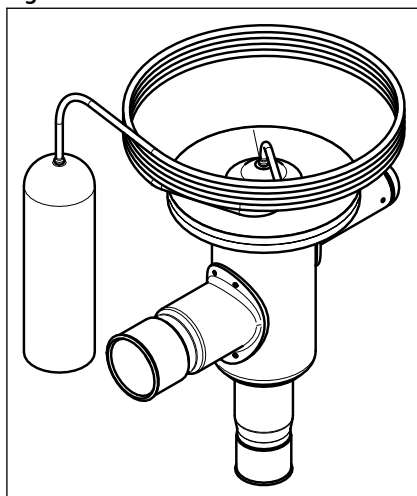


Figure 33: TUBE

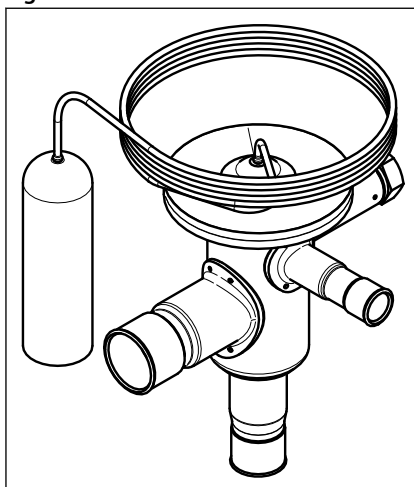


Table 15: Angle, TUB\_TUBE: Range N = -40 – +10 °C / -40 – +50 °F

| Refrigerant | Type | Orifice No. | Pressure eq. | Connection (in x out) |          |         |          |
|-------------|------|-------------|--------------|-----------------------|----------|---------|----------|
|             |      |             |              | inch                  | Code No. | mm      | Code No. |
| R407C       | TUB  | X           | Internal     | 1/4 x 1/2             | -        | 6 x 12  | -        |
|             |      | 00          |              |                       | -        |         | -        |
|             |      | 1           |              |                       | -        |         | 068U1901 |
|             |      | 2           |              |                       | -        |         | -        |
|             |      | 3           |              |                       | -        |         | 068U1903 |
|             |      | 4           |              |                       | -        |         | 068U1904 |
|             |      | 5           |              |                       | -        |         | 068U1905 |
|             |      | 6           |              | 3/8 x 1/2             | 068U1890 |         | 068U1906 |
|             | TUBE | 7           | External     | -                     | -        | 10 x 12 | 068U1907 |
|             |      | 5           |              | 3/8 x 1/2             | 068U1897 | 6 x 12  | 068U1915 |
|             |      | 6           |              | 1/4 x 1/2             | 068U1936 | 10 x 12 | 068U1916 |
|             |      | 7           |              | 3/8 x 1/2             | 068U1937 |         | 068U1917 |
|             |      | 8           |              |                       | 068U1938 |         | 068U1918 |
|             |      | 9           |              |                       | 068U1939 |         | -        |
|             |      | X           | Internal     | -                     | -        | -       | -        |
| R410A       | TUB  | 00          |              | -                     | -        |         | -        |
|             |      | 1           |              | 1/4 x 1/2             | 068U1958 |         | -        |
|             |      | 2           |              |                       | 068U1959 |         | -        |
|             |      | 3           |              |                       | 068U1960 |         | -        |
|             |      | 4           |              |                       | 068U1961 |         | -        |
|             |      | 5           |              |                       | 068U1962 |         | -        |
|             |      | 6           |              |                       | 068U1963 |         | -        |
|             |      | 7           |              | 3/8 x 1/2             | 068U1964 |         | -        |
|             | TUBE | 5           | External     | 1/4 x 1/2             | 068U1971 | 6 x 12  | 068U1953 |
|             |      | 6           |              | 3/8 x 1/2             | 068U1972 | 10 x 12 | 068U1954 |
|             |      | 7           |              |                       | 068U1973 |         | 068U1955 |
|             |      | 8           |              |                       | 068U1974 |         | 068U1956 |
|             |      | 9           |              |                       | 068U1975 |         | 068U1957 |

# Thermostatic expansion valve, Type TU and TC

| Refrigerant   | Type | Orifice No. | Pressure eq. | Connection (in x out) |          |         |          |
|---------------|------|-------------|--------------|-----------------------|----------|---------|----------|
|               |      |             |              | inch                  | Code No. | mm      | Code No. |
| R134a         | TUB  | X           | Internal     | -                     | -        | -       | -        |
|               |      | 00          |              | -                     | -        | -       | -        |
|               |      | 1           |              | 1/4 x 1/2             | 068U2027 | 6 x 12  | 068U2000 |
|               |      | 2           |              |                       | 068U2028 |         | 068U2001 |
|               |      | 3           |              |                       | 068U2029 |         | 068U2002 |
|               |      | 4           |              |                       | 068U2030 |         | 068U2003 |
|               |      | 5           |              |                       | 068U2031 |         | 068U2004 |
|               |      | 6           |              |                       | 068U2032 |         | 068U2005 |
|               |      | 7           |              | 3/8 x 1/2             | -        | 10 x 12 | 068U2006 |
|               | TUBE | 5           | External     | 1/4 x 1/2             | 068U2022 | 6 x 12  | 068U2013 |
|               |      | 6           |              |                       | 068U2023 |         | 068U2014 |
|               |      | 7           |              | 3/8 x 1/2             | 068U2024 | 10 x 12 | 068U2015 |
|               |      | 8           |              |                       | 068U2025 |         | 068U2016 |
|               |      | 9           |              |                       | 068U2026 |         | 068U2017 |
| R290          | TUB  | X           | Internal     | 1/4 x 1/2             | -        | 6 x 12  | -        |
|               |      | 00          |              |                       | -        |         | -        |
|               |      | 1           |              |                       | 068U3731 |         | -        |
|               |      | 2           |              |                       | 068U3732 |         | -        |
|               |      | 3           |              |                       | 068U3733 |         | -        |
|               |      | 4           |              |                       | 068U3735 |         | 068U3744 |
|               |      | 5           |              |                       | -        |         | 068U3831 |
|               |      | 6           |              |                       | -        |         | 068U3745 |
|               |      | 7           |              |                       | -        |         | -        |
|               | TUBE | 5           | External     | 1/4 x 3/8             | 068U3706 | 6 x 12  | 068U3717 |
|               |      | 6           |              |                       | 068U3707 |         | 068U3718 |
|               |      | 7           |              |                       | 068U3708 |         | 068U3719 |
|               |      | 8           |              | 3/8 x 1/2             | 068U3709 | 10 x 12 | 068U3720 |
|               |      | 9           |              |                       | 068U3710 |         | 068U3721 |
| R404A / R507A | TUB  | X           | Internal     | 1/4 x 1/2             | -        | 6 x 12  | -        |
|               |      | 00          |              |                       | -        |         | -        |
|               |      | 1           |              |                       | 068U2094 |         | 068U2076 |
|               |      | 2           |              |                       | 068U2095 |         | 068U2077 |
|               |      | 3           |              |                       | 068U2096 |         | 068U2078 |
|               |      | 4           |              |                       | 068U2097 |         | 068U2079 |
|               |      | 5           |              |                       | -        |         | 068U2080 |
|               |      | 6           |              |                       | 068U2099 |         | 068U2081 |
|               |      | 7           |              | 3/8 x 1/2             | 068U2100 | 10 x 12 | 068U2082 |
|               | TUBE | 5           | External     | 1/4 x 1/2             | 068U2107 | 6 x 12  | 068U2089 |
|               |      | 6           |              |                       | 068U2108 |         | 068U2090 |
|               |      | 7           |              | 3/8 x 1/2             | 068U2109 | 10 x 12 | 068U2091 |
|               |      | 8           |              |                       | 068U2110 |         | 068U2092 |
|               |      | 9           |              |                       | 068U2111 |         | 068U2093 |

Figure 34: TUB

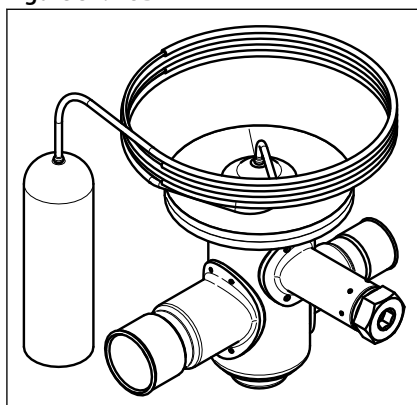
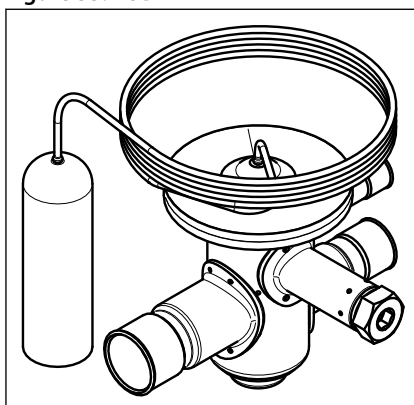


Figure 35: TUBE

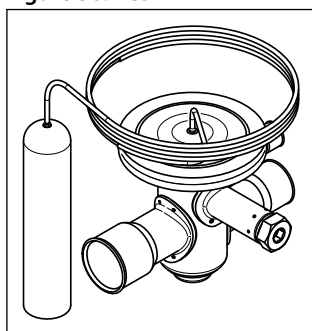


# Thermostatic expansion valve, Type TU and TC

**Table 16: Straight, TUB\_TUBE, Range N = -40 – +10 °C / -40 – +50 °F**

| Refrigerant   | Type | Orifice No. | Pressure eq. | Connection (in x out) |          |         |          |
|---------------|------|-------------|--------------|-----------------------|----------|---------|----------|
|               |      |             |              | inch                  | Code No. | mm      | Code No. |
| R407C         | TUB  | 7           | Internal     | 3/8 x 1/2             | 068U2647 | -       | -        |
|               | TUBE | 5           | External     | 1/4 x 1/2             | 068U2655 | 6 x 12  | -        |
|               |      | 6           |              |                       | -        |         | 068U2636 |
|               |      | 7           |              | 3/8 x 1/2             | 068U2657 | 10 x 12 | 068U2637 |
|               |      | 8           |              |                       | 068U2658 |         | 068U2638 |
|               |      | 9           |              |                       | 068U2659 |         | -        |
| R410A         | TUBE | 6           | External     | 1/4 x 1/2             | -        | -       | -        |
|               |      | 7           |              | 3/8 x 1/2             | -        |         | -        |
|               |      | 8           |              |                       | -        |         | -        |
|               |      | 9           |              |                       | 068U3316 |         | -        |
| R134a / R513A | TUB  | X           | Internal     | 1/4 x 3/8             | -        | 6 x 12  | -        |
|               |      | 00          |              |                       | -        |         | -        |
|               |      | 1           |              |                       | 068U3656 |         | 068U2540 |
|               |      | 2           |              |                       | -        |         | -        |
|               |      | 3           |              | 1/4 x 1/2             | -        |         | 068U2542 |
|               |      | 4           |              |                       | 068U2561 |         | 068U2543 |
|               |      | 5           |              |                       | -        |         | 068U2544 |
|               |      | 6           |              |                       | -        |         | -        |
|               | TUBE | 7           | External     | 3/8 x 1/2             | -        | 10 x 12 | -        |
|               |      | 5           |              | 3/8 x 1/2             | 068U3498 |         | -        |
|               |      | 6           |              |                       | 068U3818 |         | -        |
|               |      | 7           |              |                       | 068U2573 |         | 068U2555 |
|               |      | 8           |              |                       | 068U2574 |         | -        |
|               |      | 9           |              |                       | 068U2575 |         | -        |
| R290          | TUB  | X           | Internal     | 1/4 x 3/8             | 068U3700 | 6 x 12  | 068U3711 |
|               |      | 00          |              |                       | 068U3701 |         | 068U3712 |
| R404A / R507A | TUB  | X           | Internal     | 1/4 x 1/2             | -        | 6 x 12  | -        |
|               |      | 00          |              |                       | -        |         | -        |
|               |      | 1           |              |                       | 068U2594 |         | 068U3495 |
|               |      | 2           |              |                       | -        |         | -        |
|               |      | 3           |              |                       | -        |         | -        |
|               |      | 4           |              |                       | -        |         | 068U2579 |
|               |      | 5           |              |                       | -        |         | -        |
|               |      | 6           |              |                       | -        |         | -        |
|               | TUBE | 7           | External     | 3/8 x 1/2             | -        | 10 x 12 | -        |
|               |      | 5           |              | 1/4 x 1/2             | 068U2607 | -       | -        |
|               |      | 6           |              |                       | 068U2608 |         | -        |
|               |      | 7           |              | 3/8 x 1/2             | 068U2609 | -       | -        |
|               |      | 8           |              |                       | 068U2610 |         | -        |
|               |      | 9           |              |                       | 068U2611 |         | -        |

**Figure 36: TCBE**

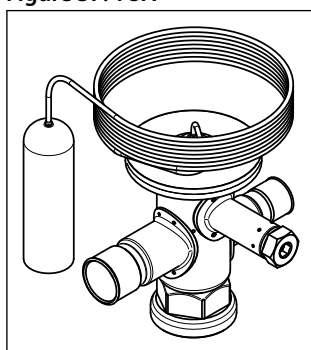


# Thermostatic expansion valve, Type TU and TC

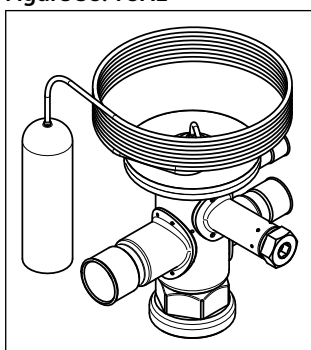
**Table 17: Straight, TCBE, Range N = -40 – +10 °C / -40 – +50 °F**

| Refrigerant                   | Type | Orifice No. | Pressure eq. | Connection (in x out) |          |         |          |
|-------------------------------|------|-------------|--------------|-----------------------|----------|---------|----------|
|                               |      |             |              | inch                  | Code No. | mm      | Code No. |
| R407C                         | TCBE | 1           | External     | 1/2 x 5/8             | 068U4257 | 12 x 16 | 068U4249 |
|                               |      | 2           |              |                       | 068U4258 |         | 068U4250 |
|                               |      | 3           |              |                       | 068U4251 |         | 068U4259 |
| R410A                         | TCBE | 1           | External     | 1/2 x 5/8             | 068U4265 | 12 x 16 | 068U4273 |
|                               |      | 2           |              |                       | 068U4266 |         | 068U4274 |
|                               |      | 3           |              |                       | 068U4267 |         | 068U4275 |
| R134a / R513A                 | TCBE | 1           | External     | 1/2 x 5/8             | 068U4217 | 12 x 16 | 068U4225 |
|                               |      | 2           |              |                       | 068U4218 |         | 068U4226 |
|                               |      | 3           |              |                       | 068U4219 |         | 068U4227 |
| R404A / R507A                 | TCBE | 1           | External     | 1/2 x 5/8             | -        | 12 x 16 | 068U4241 |
|                               |      | 2           |              |                       | 068U4234 |         | 068U4242 |
|                               |      | 3           |              |                       | 068U4235 |         | 068U4243 |
| R290                          | TCBE | 1           | External     | 3/8 x 5/8             | 068U4383 | 10 x 16 | 068U4386 |
|                               |      | 2           |              | 1/2 x 5/8             | 068U4384 | 12 x 16 | 068U4387 |
|                               |      | 3           |              |                       | 068U4385 |         | 068U4388 |
| Range N MOP 95 psig / +15 °C  |      |             |              |                       |          |         |          |
| R407C                         | TCBE | 1           | External     | 1/2 x 5/8             | 068U4253 | 12 x 16 | 068U4261 |
|                               |      | 2           |              |                       | 068U4254 |         | 068U4262 |
|                               |      | 3           |              |                       | -        |         | 068U4263 |
| Range N MOP 165 psig / +15 °C |      |             |              |                       |          |         |          |
| R410A                         | TCBE | 1           | External     | 1/2 x 5/8             | -        | 12 x 16 | -        |
|                               |      | 2           |              |                       | 068U4270 |         | -        |
|                               |      | 3           |              |                       | -        |         | 068U4279 |
| Range N MOP 55 psig / +15 °C  |      |             |              |                       |          |         |          |
| R134a/R513A                   | TCBE | 1           | External     | -                     | -        | 10 x 16 | 068U4228 |
|                               |      | 2           |              |                       | -        | 12 x 16 | 068U4230 |
|                               |      | 3           |              |                       | -        |         | 068U4231 |
| Range N MOP 120 psig / +15 °C |      |             |              |                       |          |         |          |
| R404A / R507A                 | TCBE | 1           | External     | -                     | -        | 10 x 16 | 068U4244 |
|                               |      | 2           |              |                       | -        | 12 x 16 | 068U4246 |
|                               |      | 3           |              |                       | -        |         | 068U4247 |

**Figure 37: TUA**



**Figure 38: TUAЕ**



**Table 18: Straight, TUA\_TUAЕ, Range N = -40 – +10 °C / -40 – +50 °F**

| Refrigerant | Type | Range | MOP              | Pressure eq. | Connection (in x out) |          |         |          |
|-------------|------|-------|------------------|--------------|-----------------------|----------|---------|----------|
|             |      |       |                  |              | inch                  | Code No. | mm      | Code No. |
| R407C       | TUA  | N     | -                | Internal     | 1/4 x 1/2             | 068U2324 | 06 x 12 | 068U2320 |
|             |      | N     | -                |              | 3/8 x 1/2             | 068U2325 | 10 x 12 | 068U2321 |
|             |      | N MOP | 95 psig / +15 °C |              | 1/4 x 1/2             | 068U2332 | -       | -        |
|             |      | N MOP | 95 psig / +15 °C |              | 3/8 x 1/2             | 068U2333 | -       | -        |
|             | TUAЕ | N     | -                | External     | 1/4 x 1/2             | 068U2326 | 06 x 12 | 068U2322 |
|             |      | N     | -                |              | 3/8 x 1/2             | 068U2327 | 10 x 12 | 068U2323 |
|             |      | N MOP | 95 psig / +15 °C |              | -                     | -        | 06 x 12 | 068U2330 |
|             |      | N MOP | 95 psig / +15 °C |              | 3/8 x 1/2             | 068U2335 | 10 x 12 | 068U2331 |



# Thermostatic expansion valve, Type TU and TC

| Refrigerant   | Type | Range | MOP               | Pressure eq. | Connection (in x out) |          |         |          |
|---------------|------|-------|-------------------|--------------|-----------------------|----------|---------|----------|
|               |      |       |                   |              | inch                  | Code No. | mm      | Code No. |
| R410A         | TUA  | N     | -                 | Internal     | 3/8 x 1/2             | 068U2414 | -       | -        |
|               | TUAE | N     | -                 | External     | -                     | -        | 10 x 12 | 068U2780 |
|               |      | N MOP | 165 psig / +15 °C |              | 3/8 x 1/2             | 068U2939 | -       | -        |
|               |      | B MOP | 55 psig / -15 °C  |              | -                     | -        | 10 x 12 | 068U2450 |
| R134a         | TUA  | N     | -                 | Internal     | 1/4 x 1/2             | 068U2204 | 6 x 12  | 068U2200 |
|               |      | N     | -                 |              | 3/8 x 1/2             | 068U2205 | 10 X 12 | 068U2201 |
|               |      | N MOP | 55 psig / +15 °C  |              | 1/4 x 1/2             | 068U2212 | 6 x 12  | 068U2208 |
|               |      | N MOP | 55 psig / +15 °C  |              | 3/8 x 1/2             | 068U2213 | -       | -        |
|               | TUAE | F     | -                 | External     | 1/4 x 1/2             | 068U1256 | -       | -        |
|               |      | F     | -                 |              | 3/8 x 1/2             | 068U1257 | -       | -        |
|               |      | N     | -                 |              | 1/4 x 1/2             | 068U2206 | 6 x 12  | 068U2202 |
|               |      | N     | -                 |              | 3/8 x 1/2             | 068U2207 | 10 X 12 | 068U2203 |
|               |      | N MOP | 55 psig / +15 °C  |              | 1/4 x 1/2             | 068U2214 | -       | -        |
|               |      | N MOP | 55 psig / +15 °C  |              | 3/8 x 1/2             | 068U2215 | 10 X 12 | 068U2211 |
|               |      |       |                   |              |                       |          |         |          |
|               |      |       |                   |              |                       |          |         |          |
| R404A / R507A | TUA  | N     | -                 | Internal     | 1/4 x 1/2             | 068U2284 | 6 x 12  | 068U2280 |
|               |      | N     | -                 |              | 3/8 x 1/2             | 068U2285 | 10 x 12 | 068U2281 |
|               |      | N MOP | 120 psig / +15 °C |              | 1/4 X 1/2             | 068U2292 | -       | -        |
|               |      | N MOP | 120 psig / +15 °C |              | 3/8 x 1/2             | 068U2293 | -       | -        |
|               |      | NM    | 75 psig / 0°C     |              | 1/4 X 1/2             | 068U2300 | 6 x 12  | 068U2296 |
|               |      | B     | -                 |              | 1/4 x 1/2             | 068U2308 | -       | -        |
|               |      | B     | -v                |              | 3/8 x 1/2             | 068U2309 | -       | -        |
|               |      | B MOP | 30 psig / -20 °C  |              | 1/4 x 1/2             | 068U2316 | 6 x 12  | 068U2312 |
|               |      | B MOP | 30 psig / -20 °C  |              | 3/8 x 1/2             | 068U2317 | -       | -        |
|               | TUAE | F     | -                 | External     | 1/4 x 1/2             | 068U1252 | -       | -        |
|               |      | F     | -                 |              | 3/8 x 1/2             | 068U1253 | -       | -        |
|               |      | N     | -                 |              | 1/4 x 1/2             | 068U2286 | 6 x 12  | 068U2282 |
|               |      | N     | -                 |              | 3/8 x 1/2             | 068U2287 | 10 x 12 | 068U2283 |
|               |      | N MOP | 120 psig / +15 °C |              | 3/8 x 1/2             | 068U2295 | -       | -        |
|               |      | NL    | 50 psig / -10 °C  |              | 1/4 x 1/2             | 068U2931 | -       | -        |
|               |      | B MOP | 30 psig / -20 °C  |              | 1/4 x 1/2             | 068U2318 | -       | -        |
|               |      | B MOP | 30 psig / -20 °C  |              | 3/8 x 1/2             | 068U2319 | 10 x 12 | 068U2315 |
| R407A         | TUAE | F     | -                 | External     | 1/4 x 1/2             | 068U1258 | -       | -        |
|               |      | F     | -                 |              | 3/8 x 1/2             | 068U1259 | -       | -        |
| R407F         | TUAE | F     | -                 | External     | 1/4 x 1/2             | 068U1250 | -       | -        |
|               |      | F     | -                 |              | 3/8 x 1/2             | 068U1251 | -       | -        |
| R134a / R513A | TUAE | F     | -                 | External     | 1/4 x 1/2             | 068U1256 | -       | -        |
|               |      | F     | -                 |              | 3/8 x 1/2             | 068U1257 | -       | -        |
| R448A         | TUAE | F     | -                 | External     | 1/4 x 1/2             | 068U3772 | -       | -        |
|               |      | F     | -                 |              | 3/8 x 1/2             | 068U3773 | -       | -        |
| R449A         | TUAE | F     | -                 | External     | 1/4 x 1/2             | 068U3776 | -       | -        |
|               |      | F     | -                 |              | 3/8 x 1/2             | 068U3858 | -       | -        |
| R454C         | TUA  | -     | -                 | Internal     | 1/4 x 1/2             | 068U3948 | -       | -        |
|               | TUAE | -     | -                 | External     | -                     | -        | 6 x 12  | 068U3949 |
|               |      | -     | -                 |              | 1/4 x 1/2             | 068U3950 | -       | -        |
| R455A         | TUA  | -     | -                 | Internal     | -                     | -        | 6 x 12  | 068U3951 |
|               | TUAE | -     | -                 | External     | 1/4 x 1/2             | 068U3952 | -       | -        |
|               |      | -     | -                 |              | -                     | -        | 6 x 12  | 068U3953 |
|               |      | -     | -                 |              | 1/4 x 1/2             | 068U3954 | -       | -        |
| R1234yf       | TUA  | -     | -                 | Internal     | -                     | -        | 6 x 12  | 068U3955 |
|               | TUAE | -     | -                 | External     | 1/4 x 1/2             | 068U3956 | -       | -        |
|               |      | -     | -                 |              | -                     | -        | 6 x 12  | 068U3957 |
|               |      | -     | -                 |              | 1/4 x 1/2             | 068U3958 | -       | -        |
| R1234ze(E)    | TUA  | -     | -                 | Internal     | -                     | -        | 6 x 12  | 068U3959 |
|               | TUAE | -     | -                 | External     | 1/4 x 1/2             | 068U3960 | -       | -        |
|               |      | -     | -                 |              | -                     | -        | 6 x 12  | 068U3962 |
|               |      | -     | -                 |              | 1/4 x 1/2             | 068U3961 | -       | -        |
|               |      |       |                   |              | -                     | -        | 6 x 12  | 068U3964 |

## Thermostatic expansion valve, Type TU and TC

| Refrigerant | Type | Range | MOP | Pressure eq. | Connection (in x out) |          |        |          |
|-------------|------|-------|-----|--------------|-----------------------|----------|--------|----------|
|             |      |       |     |              | inch                  | Code No. | mm     | Code No. |
| R454A       | TUA  | -     | -   | Internal     | 1/4 x 1/2             | 068U3963 | -      | -        |
|             |      |       |     |              | -                     | -        | 6 x 12 | 068U3966 |
|             | TUAE | -     | -   | External     | 1/4 x 1/2             | 068U3965 | -      | -        |
|             |      |       |     |              | -                     | -        | 6 x 12 | 068U3970 |

Figure 39: TCAE

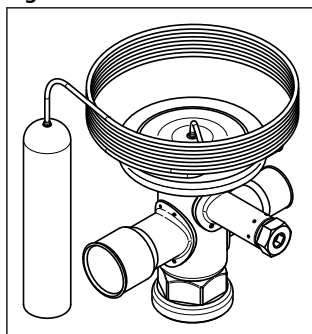


Table 19: Straight, TCAE, Range N = -40 – +10 °C / -40 – +50 °F

| Refrigerant   | Type | Range | MOP               | Pressure eq. | Connection (in x out) |          |         |          |
|---------------|------|-------|-------------------|--------------|-----------------------|----------|---------|----------|
|               |      |       |                   |              | inch                  | Code No. | mm      | Code No. |
| R407C         | TCAE | N     | -                 | External     | 3/8 x 5/8             | 068U4324 | 10 x 16 | 068U4328 |
|               |      | N     | -                 |              | 1/2 x 5/8             | 068U4325 | 12 x 16 | 068U4329 |
|               |      | N MOP | 95 psig / +15 °C  |              | 3/8 x 5/8             | 068U4326 | -       | -        |
|               |      | N MOP | 95 psig / +15 °C  |              | 1/2 x 5/8             | 068U4327 | 12 x 16 | 068U4331 |
| R410A         | TCAE | N     | -                 | External     | 3/8 x 5/8             | 068U4336 | -       | -        |
|               |      | N     | -                 |              | 1/2 x 5/8             | 068U4337 | 12 x 16 | 068U4341 |
|               |      | N MOP | 165 psig / +15 °C |              |                       | 068U4339 | 12 x 16 | 068U4343 |
| R134a/R513A   | TCAE | N     | -                 | External     | 3/8 x 5/8             | 068U4292 | 10 x 16 | 068U4296 |
|               |      | N     | -                 |              | 1/2 x 5/8             | 068U4293 | 12 x 16 | 068U4297 |
|               |      | N MOP | 55 psig / +15 °C  |              |                       | 068U4295 | 12 x 16 | 068U4299 |
| R404A / R507A | TCAE | N     | -                 | External     | 1/2 x 5/8             | 068U4304 | 10 x 16 | 068U4308 |
|               |      | N     | -                 |              |                       | 068U4305 | 12 x 16 | 068U4309 |
|               |      | N MOP | 120 psig / +15 °C |              |                       | 068U4307 | 10 x 16 | 068U4310 |
|               |      | B     | -                 |              |                       | 068U4317 | 12 x 16 | 068U4321 |
|               |      | B MOP | 30 psig / -20 °C  |              |                       | 068U4319 | 10 x 16 | 068U4322 |
| R448A         | TCAE | N     | -                 | External     | 1/2 x 5/8             | 068U4598 | -       | -        |
| R449A         |      | N     | -                 |              |                       | 068U4599 | -       | -        |

## Thermostatic expansion valve, Type TU and TC

Table 20: TUA / TUAE and TCAE, orifice assembly With inlet screen and gasket

| Type       | Orifice No. | Bleed | Code No. |
|------------|-------------|-------|----------|
| TUA / TUAE | 0           | -     | 068U1030 |
|            | 1           | -     | 068U1031 |
|            | 1           | 15%   | 068U1131 |
|            | 2           | -     | 068U1032 |
|            | 2           | 15%   | 068U1132 |
|            | 3           | -     | 068U1033 |
|            | 3           | 15%   | 068U1133 |
|            | 4           | -     | 068U1034 |
|            | 4           | 15%   | 068U1134 |
|            | 5           | -     | 068U1035 |
|            | 5           | 15%   | 068U1135 |
|            | 6           | -     | 068U1036 |
|            | 6           | 15%   | 068U1136 |
|            | 7           | -     | 068U1037 |
|            | 7           | 15%   | 068U1137 |
|            | 8           | -     | 068U1038 |
|            | 8           | 15%   | 068U1138 |
|            | 9           | -     | 068U1039 |
|            | 9           | 15%   | 068U1139 |
| TCAE       | 1           | -     | 068U4100 |
|            | 1           | 15%   | 068U4097 |
|            | 2           | -     | 068U4101 |
|            | 2           | 15%   | 068U4098 |
|            | 3           | -     | 068U4202 |
|            | 3           | 15%   | 068U4099 |

## Accessories and spare parts

Figure 40: Bulb strap

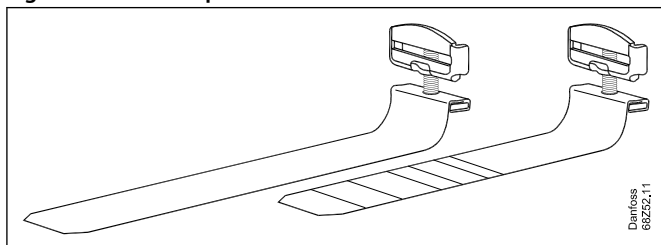


Table 21: Bulb strap for TU, TC, T2

| Code no. | Description                       | Pack mode | Quantity / pack |
|----------|-----------------------------------|-----------|-----------------|
| 068U3505 | Bulb strap 0.4 mm Max. 28 mm tube | I         | 45              |
| 068U3506 | Bulb strap 0.4 mm Max. 50 mm tube | I         | 45              |
| 068U3507 | Bulb strap 0.4 mm Max. 28 mm tube | M         | 25              |
| 068U3508 | Bulb strap 0.4 mm Max. 50 mm tube | M         | 25              |

Figure 41: OEM bulb strap

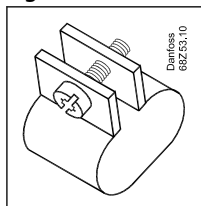


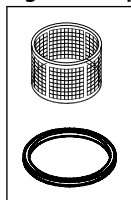
Table 22: Bulb strap for TU, TC, T2

| Code no. | Description                | Pack mode | Quantity / pack |
|----------|----------------------------|-----------|-----------------|
| 068U3509 | OEM bulb strap 3/8 in tube | I         | 45              |
| 068U3510 | OEM bulb strap 1/2 in tube | I         | 45              |
| 068U3511 | OEM bulb strap 5/8 in tube | I         | 45              |

## Thermostatic expansion valve, Type TU and TC

|          |                        |
|----------|------------------------|
| <b>I</b> | Industrial pack (OEM)  |
| <b>M</b> | Multipack (Wholesaler) |

**Figure 42: Spare parts TUA / TUAE and TCAE**



**Table 23: TUA / TUAE and TCAE**

| Code no. | Description                             | Pack mode          | Quantity pack |
|----------|-----------------------------------------|--------------------|---------------|
| 068U1706 | Inlet screen TUA/TUAE 0 - 4             | Industrial packing | 24            |
| 068U0016 | Inlet screen TUA/TUAE 5 - 9, TCAE 1 - 3 | Industrial packing | 24            |
| 068U0015 | Gasket                                  | Industrial packing | 24            |

**NOTE:**

To secure tightness, the orifice gasket must be changed each time the orifice is disassembled

## Certificates, declarations, and approvals

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

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

**Table 24: Certificates, declarations, and approvals**

| Document name           | Document type             | Document topic        | Approval authority |
|-------------------------|---------------------------|-----------------------|--------------------|
| RU Д-ДК.БЛ08.В.00191_18 | EAC Declaration           | Machinery & Equipment | EAC                |
| 068U9615.06             | Manufacturers Declaration | PED/RoHS              | Danfoss            |
| 068U9616.01             | Manufacturers Declaration | China RoHS            | Danfoss            |
| 068U9903.01             | EU Declaration            | RoHS                  | Danfoss            |

## Online support

Danfoss offers a wide range of support along with our products, including digital product information, software, mobile apps, and expert guidance. See the possibilities below.

### The Danfoss Product Store



The Danfoss Product Store is your one-stop shop for everything product related—no matter where you are in the world or what area of the cooling industry you work in. Get quick access to essential information like product specs, code numbers, technical documentation, certifications, accessories, and more.

Start browsing at [store.danfoss.com](https://store.danfoss.com).

### Find technical documentation



Find the technical documentation you need to get your project up and running. Get direct access to our official collection of data sheets, certificates and declarations, manuals and guides, 3D models and drawings, case stories, brochures, and much more.

Start searching now at [www.danfoss.com/en/service-and-support/documentation](https://www.danfoss.com/en/service-and-support/documentation).

### Danfoss Learning



Danfoss Learning is a free online learning platform. It features courses and materials specifically designed to help engineers, installers, service technicians, and wholesalers better understand the products, applications, industry topics, and trends that will help you do your job better.

Create your Danfoss Learning account for free at [www.danfoss.com/en/service-and-support/learning](https://www.danfoss.com/en/service-and-support/learning).

### Get local information and support



Local Danfoss websites are the main sources for help and information about our company and products. Find product availability, get the latest regional news, or connect with a nearby expert—all in your own language.

Find your local Danfoss website here: [www.danfoss.com/en/choose-region](https://www.danfoss.com/en/choose-region).

### Coolselector®2 - find the best components for you HVAC/R system



Coolselector®2 makes it easy for engineers, consultants, and designers to find and order the best components for refrigeration and air conditioning systems. Run calculations based on your operating conditions and then choose the best setup for your system design.

Download Coolselector®2 for free at [coolselector.danfoss.com](https://coolselector.danfoss.com).