Data sheet

Thermostatic expansion valve

TR 6

Designed and developed with special features for different applications

Description

The TR 6 series is a hermetic design which is developed with features especially for use in applications such as:
• Residential air conditioning systems
• Split systems
• Roof top units
• Heat pumps
• Chillers
• Light commercial air conditioning systems
The TR 6 design incorporates a forged brass body with the entire power element, including the capillary tube and bulb, fabricated from stainless steel. All valves are designed with balanced port which reduces the influence from varying condensing pressures. The valves can be delivered with special connections and fittings both at the inlet, outlet, and the equalizer connection.

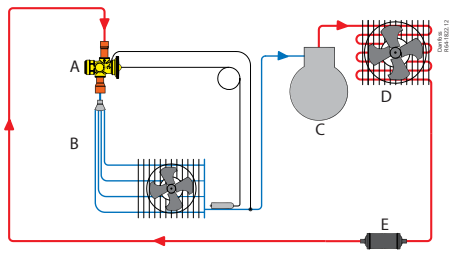
Features & benefits

- Compact size - hermetic design, straightway configuration with external equalization
- Refrigerants & rated capacities ranging up to: R22 / R407C – 23.9 kW (6.8 TR); R410A – 24.6 kW (7 TR); R454B – 26.7 kW (7.6 TR); R32 – 36.2 kW (10.3 TR)
- Laser-welded power element with longer diaphragm life and high corrosion resistance
- Stainless steel capillary tube that tolerates more bending for easier installation and longer life, with high strength and vibration resistance
- Stainless steel bulb with self-aligning design
- Connectors: Solder, chatleff, and aeroquip; external equalization; UL listed, file SA7200, anti-hunt bulb charge
- Balance port design
- A complete program with and without internal check valve
- Internal check valve design with low pressure drop in reverse flow
- Adjustable or non-adjustable superheat, for customer specific factory setting and bleed function available

Applications

Traditional air conditioning system, cooling only

Figure: Traditional air conditioning system, cooling only

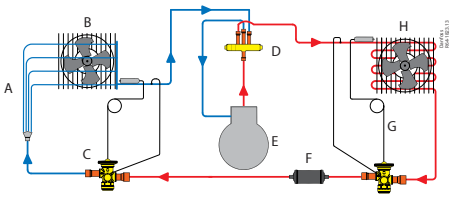


A	TR 6 with / without internal check valve
B	RD Distributor
C	Compressor
D	Outdoor coil
E	DCL/DML

Illustrates the diagram of a traditional air conditioning system where the TR 6 is controlling liquid injection in one direction only.

Traditional air conditioning / heat pump system

Figure: Traditional air conditioning / heat pump system

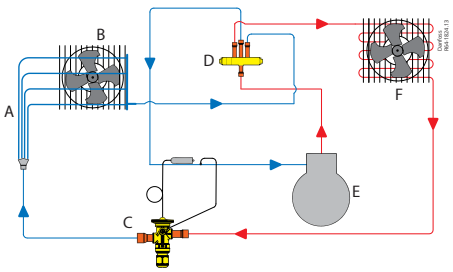


A	RD Distributor
B	Indoor coil
C	TR 6 with internal check valve
D	4-way valve
E	Compressor
F	DCB/DMB
G	TR 6 with internal check valve
H	Outdoor coil

Illustrates a split air conditioning / heat pump system with two thermostatic expansion valves, one for cooling mode and one for heating mode. The thermostatic expansion valves each has a built-in check valve, which has the function of preventing flow in one direction and allowing the flow in the opposite direction. It means that one thermostatic expansion valve is controlling liquid injection into the indoor coil while the other thermostatic expansion valve is bypassing the metering device with the open check valve.

Simplified air conditioning / heat pump system (bi-flow)

Figure: Simplified air conditioning / heat pump system (bi-flow)



A	RD Distributor
B	Indoor coil
C	TR 6 without check valve
D	4-way valve
E	Compressor
F	Outdoor coil

Illustrates a packaged air conditioning / heat pump system with a short distance between the indoor and outdoor heat-exchangers. The two TR 6 valves from fig 6 can be replace by one TR 6 valve without internal check valve, making use of the bi-flow feature of this thermostatic expansion valve. The single valve is controlling the liquid injection in both directions. The normal flow direction marked with an arrow on the valve body should be used for the primary function, i.e. cooling or heating.

Ordering

Product code numbers

R22 / R407C, R410A, R454B and R32

Figure: Adjustable setting

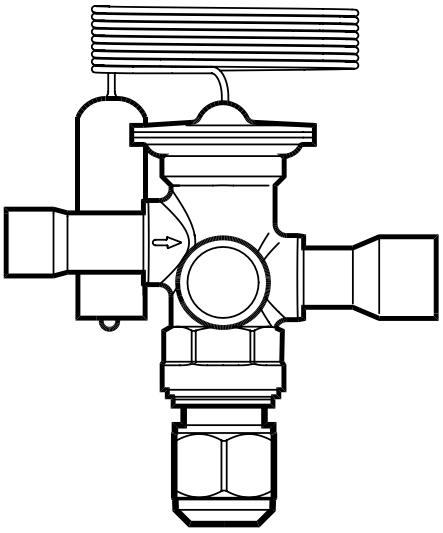


Table: TR 6 - Aftermarket kits

Valve type	Orifice no.	Connections solder ODF	Capillary tube with flare nut 24.3 in	TXV kit code number[1]				
		Inlet x Outlet [in]	Equalization size [in]	R410A	R22/R407C	R454B	R32	Multi refrigerants [2]
TR 6	2	⅜ x ⅜	¼	067L5963	–	067L5975	067L5969	067L6005
TR 6	3	⅜ x ⅜	¼	067L5955	067L5855	–	067L5970	067L6006
TR 6	4	⅜ x ⅜	¼	067L5956	067L5856	067L5977	067L5971	067L6007
TR 6	5	⅜ x ⅜	¼	067L5957	067L5857	–	–	067L6008
TR 6	6	⅜ x ⅜	¼	067L5958	067L5858	067L5979	067L5973	067L6009
TR 6	7	⅜ x ⅜	¼	067L5959	067L5859	067L5980	067L5974	067L6010

[1] Kit part numbers consist of a valve, bulb strap, insulation tape, installation guide, and the following connectors:

1 Chatleff female ¾ in. connector

1 Aeroquip female ⅝ in. connector

1 Flare ⅜ in. connector.

[2] Multi-refrigerants: R410A, R454B, R32

Table: TR 6 - General market

Valve type	Orifice no.	Connections solder ODF	Capillary tube with flare nut 24.3 in	TXV code number[3]			
		Inlet x Outlet [in]	Equalization size [in]	R410A	R22/R407C	R454B	R32
TR 6	2	⅜ x ⅜	¼	067L5987	Not available	067L5999	067L5993
TR 6	3	⅜ x ⅜	¼	067L5988	Not available	067L6000	067L5994
TR 6	4	⅜ x ⅜	¼	067L5989	Not available	067L6001	067L5995
TR 6	5	⅜ x ⅜	¼	067L5990	Not available	067L6002	067L5996
TR 6	6	⅜ x ⅜	¼	067L5991	Not available	067L6003	067L5997
TR 6	7	⅜ x ⅜	¼	067L5992	Not available	067L6004	067L5998

[3] General Market TR6 valves are provided in industrial packaging with bulb strap, installation guide only (No kit).

Table: Capacities for R22 / R407C, R410A, R454B and R32

Valve type	Orifice no.	Rated capacity									
		R410A[4]		R407C		R22		R454B[4]		R32	
		[KW]	[TR]	[KW]	[TR]	[KW]	[TR]	[KW]	[TR]	[KW]	[TR]
TR 6	2	9.5	2.7	–	–	–	–	10.5	3	14.4	4.1
TR 6	3	11.2	3.2	9.8	2.8	10.9	3.1	12.6	3.6	17.2	4.9
TR 6	4	15.8	4.5	13.7	3.9	15.4	4.4	17.6	5	24.2	6.9
TR 6	5	19	5.4	16.5	4.7	18.3	5.2	21.1	6	28.4	8.1
TR 6	6	20.4	5.8	17.2	4.9	19.7	5.6	22.5	6.4	30.5	8.7
TR 6	7	24.6	7	21.1	6	23.9	6.8	26.7	7.6	36.2	10.3

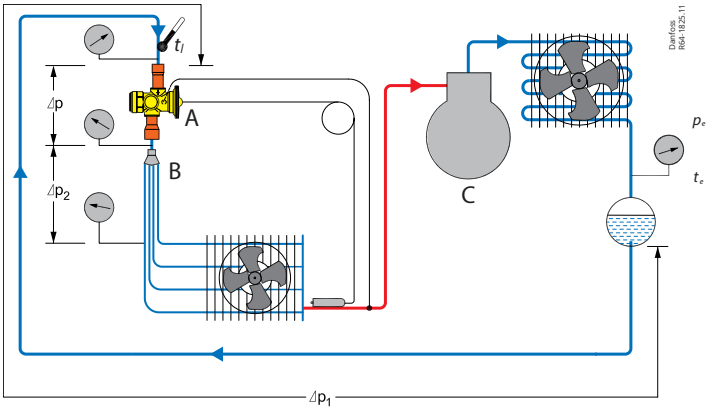
[4] The rated capacity is based on:

- Evaporating temperature t_e : 4.4 °C / 40 °F
- Condensing temperature t_c : 38 °C / 100 °F
- Refrigerant temperature ahead of valve t_l : 37 °C / 98 °F

Temperature range = -10 – 15 °C / 15 – 60 °F
TR6 with fixed superheat setting are available upon request. Single pack = 1 valve kit in a box
Industrial pack = 18 pieces in one box (adjustable) or 24 pieces in one box (fixed)

Sizing

Figure: Sizing



A	TR 6
B	RD Distributor
C	Compressor

Example:
Refrigerant = R410A
Evaporating temperature = (t_e = 45 °F; p_e = 131 psig)

Condensing temperature = (t_c=110 °F; p_c = 368 psi
Liquid line t_l = 100 °F
pressure drop in liquid line, drier and distributor system Dp2 + Dp1 = 35 psi

Pressure drop in valve D_p = 368 - 131 - 35 = 202 psi
Subcooling $\Delta t_{sub} = t_c - t_l$=10 °F
Evaporator capacity = 4.0 TR
Correction factor from table = 1.02

The corrected evaporator capacity then becomes 4.0 × 1.02 = 4.08 TR
As the selected valve must be equal to or slightly larger than the corrected evaporator capacity of 4.08 TR, the TR 6 with orifice 4 would be a suitable choice. Reference table below for rated capacities.

Table: Capacity in TR for MAH 14 – 59 °F at 7.2 °F static super heat SS

		Pressure drop across valve Δpsi								Pressure drop across valve Δpsi							
		50	75	100	125	150	175	200	225	50	75	100	125	150	175	200	225
Evaporating temperature 0 °F										Evaporating temperature 20 °F							
TR 6	3	1.48	1.67	1.79	1.86	1.90	1.93	1.94	1.94	1.87	2.13	2.30	2.40	2.46	2.50	2.51	2.51
	4	2.20	2.47	2.63	2.72	2.78	2.81	2.81	2.80	2.74	3.12	3.36	3.49	3.56	3.60	3.61	3.59
	5	2.71	3.05	3.23	3.34	3.41	3.43	3.43	3.41	3.36	3.82	4.10	4.25	4.33	4.37	4.37	4.35
	6	2.91	3.25	3.45	3.56	3.62	3.65	3.64	3.61	3.59	4.08	4.37	4.53	4.61	4.65	4.64	4.61
	7	3.58	3.99	4.22	4.34	4.40	4.41	4.39	4.34	4.42	5.00	5.34	5.52	5.61	5.64	5.62	5.56
Evaporating temperature 40 °F										Evaporating temperature 50 °F							
TR 6	3	2.30	2.63	2.86	3.01	3.09	3.14	3.15	3.15	2.53	2.90	3.15	3.32	3.43	3.48	3.49	3.48
	4	3.33	3.80	4.11	4.31	4.41	4.46	4.47	4.44	3.63	4.15	4.49	4.71	4.85	4.90	4.90	4.87
	5	4.03	4.59	4.96	5.20	5.31	5.36	5.36	5.32	4.36	4.97	5.37	5.63	5.79	5.84	5.84	5.80
	6	4.31	4.90	5.29	5.54	5.65	5.70	5.69	5.65	4.66	5.31	5.73	6.00	6.16	6.21	6.21	6.16
	7	5.29	6.01	6.47	6.77	6.89	6.93	6.91	6.85	5.73	6.51	7.02	7.34	7.53	7.57	7.55	7.48

NOTE:
Insufficient subcooling can produce flash gas.
Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K / 7.2 °F.
The corrected capacity can be obtained by multiplying the evaporator capacity by the correction factor given below.

Table: Correction factor for subcooling Δt_{sub}

Correction factor	4K	10K	15K	20K	25K	30K	35K	40K
	7.2 °F	18 °F	27 °F	36 °F	45 °F	55 °F	63 °F	72 °F
R410A	1.00	1.08	1.14	1.20	1.26	1.31	1.37	1.43

Functions

Operation

Valve program

Standard versions

Refrigerants: R22 / R407C, R410A, R454B and R32
Operating range: -10 – 15 °C / 15 – 60 °F

Settings

- Fixed setting:
  - Static superheat in accordance with customers' specifications
- Adjustable setting:
  R22 / R407C
  Factory static superheat of 4 K / 7.2 °F
  R410A, R454B and R32
  Factory static superheat of 3 K / 5.4 °F

Product details

General data

Packing
Single or Multipack
Industrial pack for OEM specific valves only

Versions:
All valves are in straightway versions with or without internal check valve

Standard connections:
Inlet solder ⅜ in. ODF x Outlet solder ⅜ in. ODF
Equalizer capillary tube ¼ in. flare; 24.3 in. length

Capillary tube length: 800 mm / 31.5 in.

Options on request

Capillary tube lengths(approx.):
450 mm / 17.7 in.
975 mm / 38.4 in.

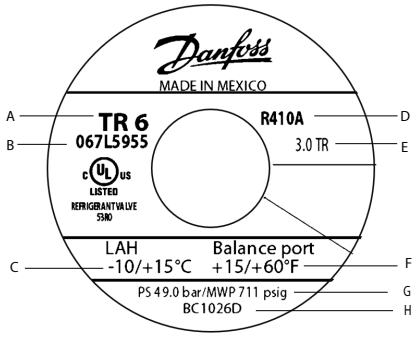
Options for Connections:
Inlet/Outlet:
Inlet: Solder ODM ⅜ in., solder ODF ⅜ in., solder ODF ½ in., Chatleff male ⅝ in. and aeroquip male ⅝ in.
Outlet: Solder ODF ⅜ in., solder ODF ½ in., solder ODF ⅝ in., chatleff female ¾ in., short and long tail, aeroquip female ⅝ in., short and long tail.

Equalizer:
Copper capillary tube size (approx.): Ø⅛ in.

Available configurations:
Solder ODM ⅛ in., lengths 9.5 in., 16.9 in., 24.3 in., 31.7 in.
Solder ODF ¼ in., lengths 31.7 in. and 39.1 in.
Flare nut ¼ in., lengths 9.5 in., 16.9 in., 24.3 in., 31.7 in.

Identification

Figure: Main valve data example:



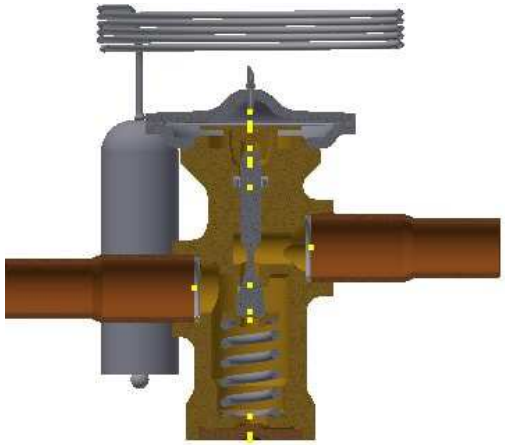
A	Valve type
B	Code number
C	Evaporating temperature range in °C
D	Refrigerant
E	Rated capacity Q_{nom} in Tons of refrigeration
F	Evaporating temperature range in °F
G	Max. working pressure in bar and psig
H	Date making (BC = Mexico, week 10, year 2026, weekday D = Thursday)

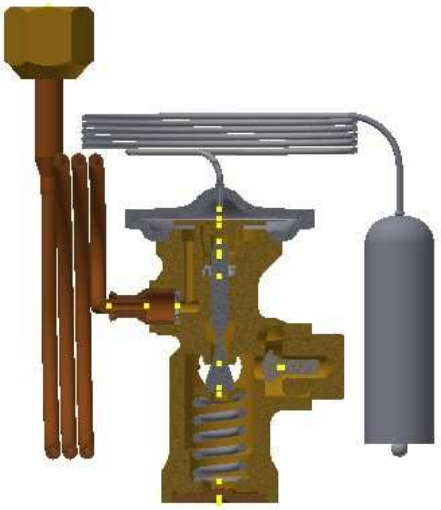
Essential valve data is given on the power element.

Design

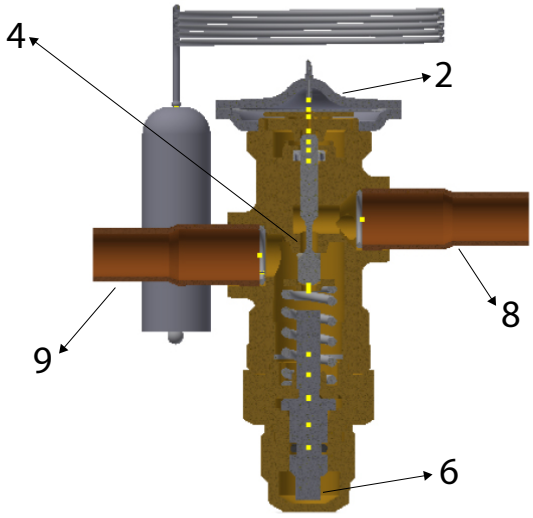
Table: Design and function

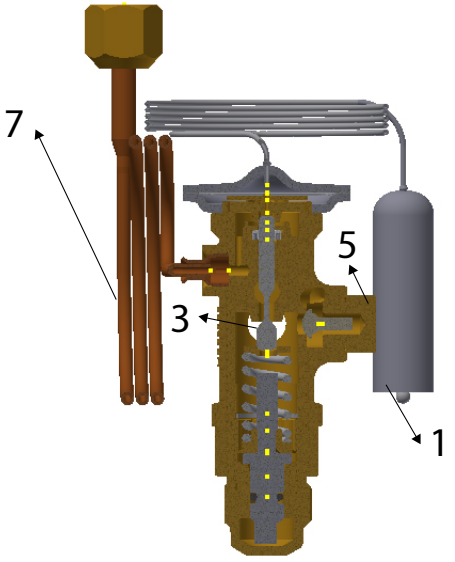
TR 6 with fixed setting





TR 6 with adjustable setting

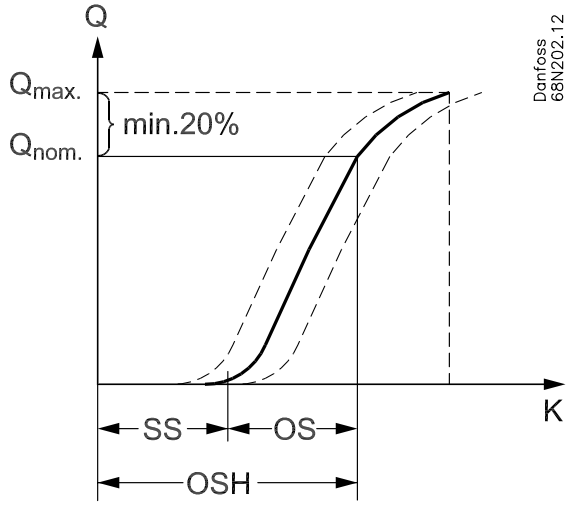




1	Bulb
2	Thermostatic element
3	Push pin seal
4	Balanced port
5	Check valve

6	Setting spindle for adjustment of static superheat (SS)
7	Equalizer
8	Inlet connection
9	Outlet connection

Figure: Static/opening superheat graph



SS	Static superheat
OS	Opening superheat at nominal / rated capacity
OS H	SS + OS = Operating superheat

The central push pin is sealed with a robust seal (pos. 3) that ensures maximum tightness and minimum friction through the lifetime of the valve.
The balanced port (pos. 4) ensures minimal superheat changes when condensing pressure varies. This feature makes the valve ideal for bi-flow operation.
Static superheat (SS) can be adjusted with the setting spindle (pos. 6).

Example
Static superheat
SS = 3K / 6.3 °F (factory setting)
or according to customer specification

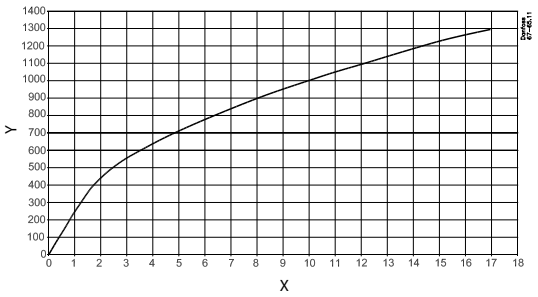
Opening superheat at nominal / rated capacity
- OS = 4 K / 7.2 °F for R22
- OS = 3.5K / 6.3 °F for R410A, R454B and R32

Opening superheat is defined as the required superheat to open the valve to nominal capacity

Capacity

Check valve capacity

Figure: Internal check valve for orifice bypass in reverse flow (flow rate as a function of pressure differential)



X	Dp (psi)
Y	Mass flow lb/h

T_C = 32 °C / 90 °F
T_I = 24 °C / 75 °F

Valve selection based on capacity calculation

As for extended capacity calculations and valve selection based on capacities and refrigerants, please refer to Coolselector®2. Rated and extended capacities are calculated with the Coolselector®2 calculation engine to ARI standards with the ASEREP equations based on laboratory measurements of selected valves.

Download Coolselector®2 for free at coolselector.danfoss.com.

Pressure and temperature data

Max. operating temperature

- Thermostatic bulb & top part / element:
  - R22 / R407C: max. 100 °C / 212 °F
  - R410A: max. 120 °C / 248 °F
  - R454B: max. 115 °C / 239 °F
  - R32: max. 120 °C / 320 °F
- Valve body:160 °C / 320 °F

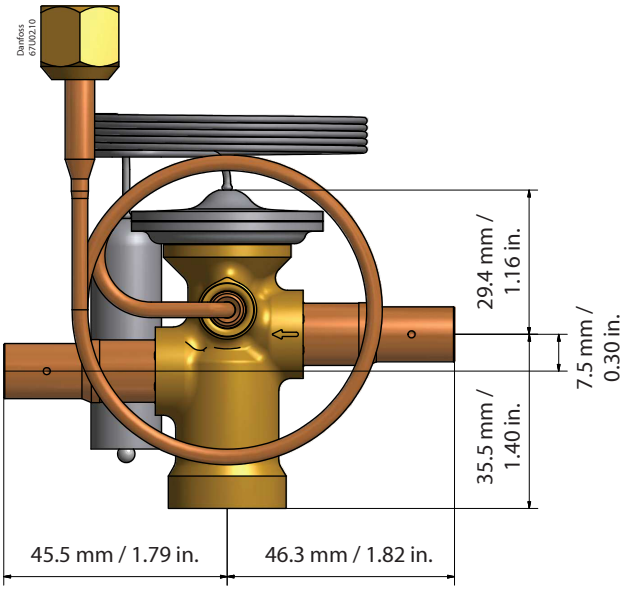
Max. working pressure PS / MWP

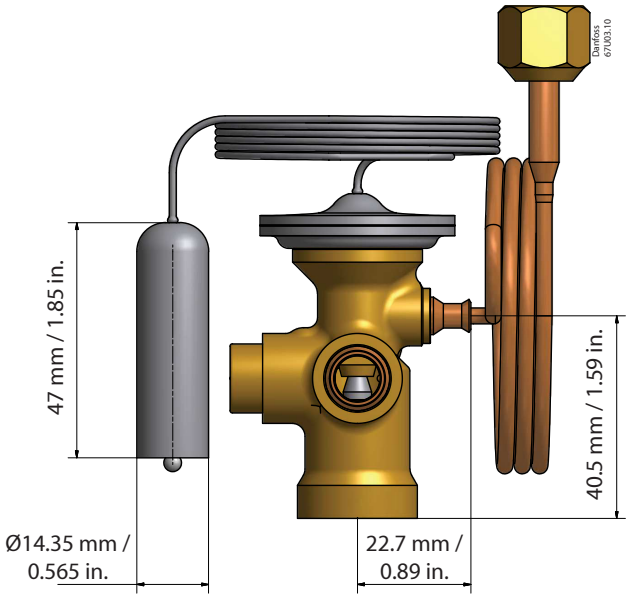
49 bar / 711 psig

Dimensions

Fixed setting

Table: Fixed setting

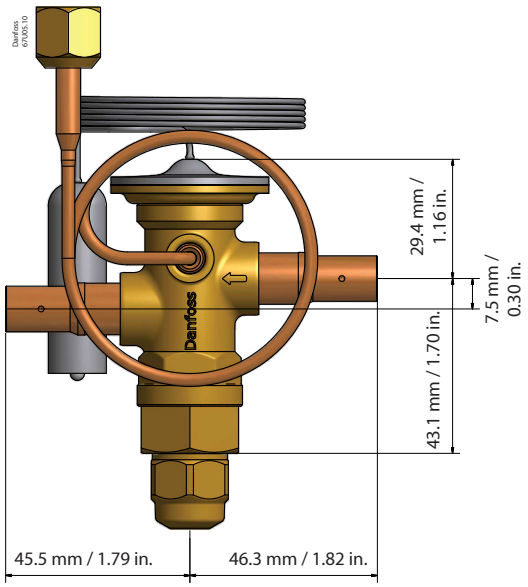


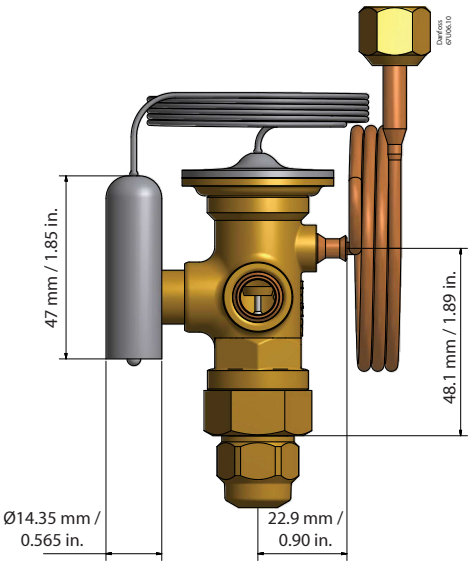


Weight 0.305 kg, 0.672 lbs

Adjustable setting

Table: Adjustable setting





Weight 0.361 kg; 0.795 lbs

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.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Issuer	Approval topic
Export Control Declaration	Thermostatic Expansion Valve	Danfoss	
UA Declaration	3) UA Declaration Module B (UA.TR.131.B.2656-26) Module D (UA.TR.131.1045-26).pdf	Academtest LLC	Pressure
Manufacturer's Declaration	Danfoss MD 067U9601.AD	Danfoss	Pressure
Mechanical Safety Certificate	Certificate of Compliance: SA7200 - Vol 8	UL - Underwriters Laboratories inc.	UL-CSA
EU Declaration	EU DOC PL01 Packaging	Danfoss	Packaging

Contact details

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