



Hot gas bypass regulator

TUH / TCHE / TGHE

Capacity regulator

Description

TUH, TCHE and TGHE capacity regulators adapt compressor capacity to actual evaporator load in applications operating at an evaporating temperature of around 0 °C. TUH, TCHE and TGHE valves are typically used in applications such as:

- Air driers
- Water chillers

Fitted in a bypass between the high and low pressure sides of the air-drier system, TUH, TCHE and TGHE maintain compressor suction pressure by injecting hot gas/ cool gas from the high-pressure side.

TUH has internal pressure equalisation and opens when pressure drops at the valve outlet. TCHE and TGHE have external pressure equalisation and open directly when compressor suction pressure drops.

For all types, the bulb only serves as a reservoir for the charge. However, it is recommended that the bulb be mounted in a location where temperature variation during operation is limited.

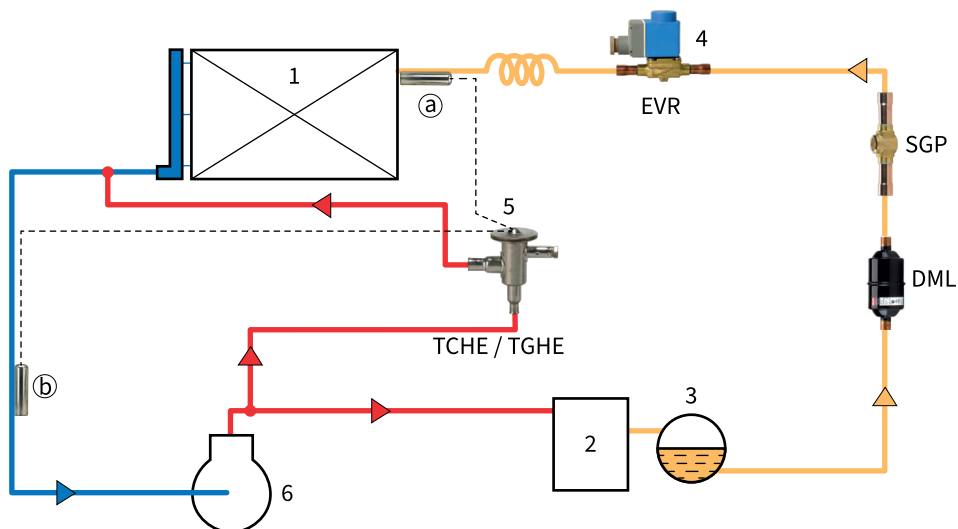
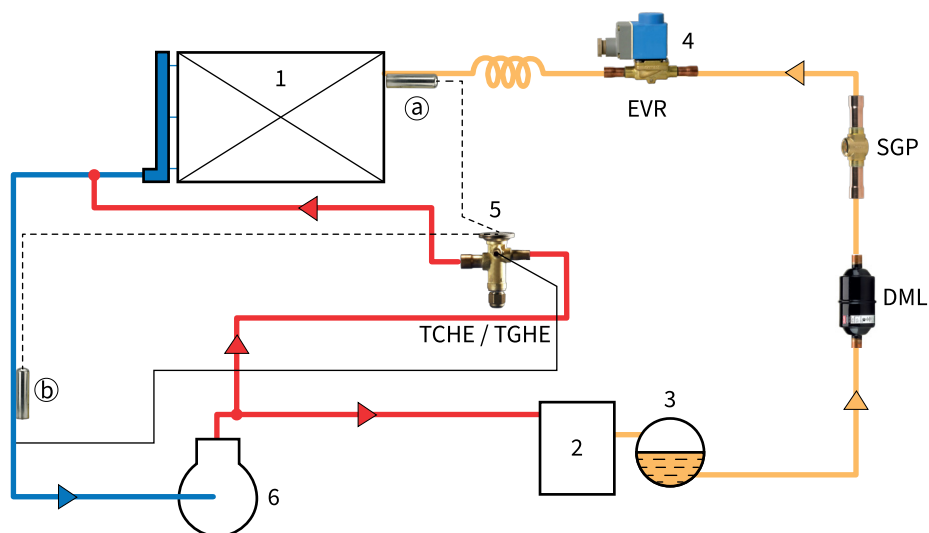
Features & benefits

- Bimetal connections for TUH and TCHE
 - Straight forward and fast soldering (no wet cloth or refrigeration pliers required)
- Replacement capacities up to 28.9 kW (8.3 TR) for R410A
- Stable regulation
- Tight across the seat
- Compact design
 - Small dimensions and low weight
- Hermetically tight design
- Stainless steel, hermetically tight solder version
 - High connection strength
 - High corrosion resistance
 - Capillary tube joints of high strength and vibration resistance
- Laser-welded, stainless steel diaphragm element
 - Optimum function
 - Long diaphragm life
 - High pressure resistance
- Adjustable setting
 - Accurate setting
 - Fine tuning possible
- Low p-band and low hysteresis

Applications

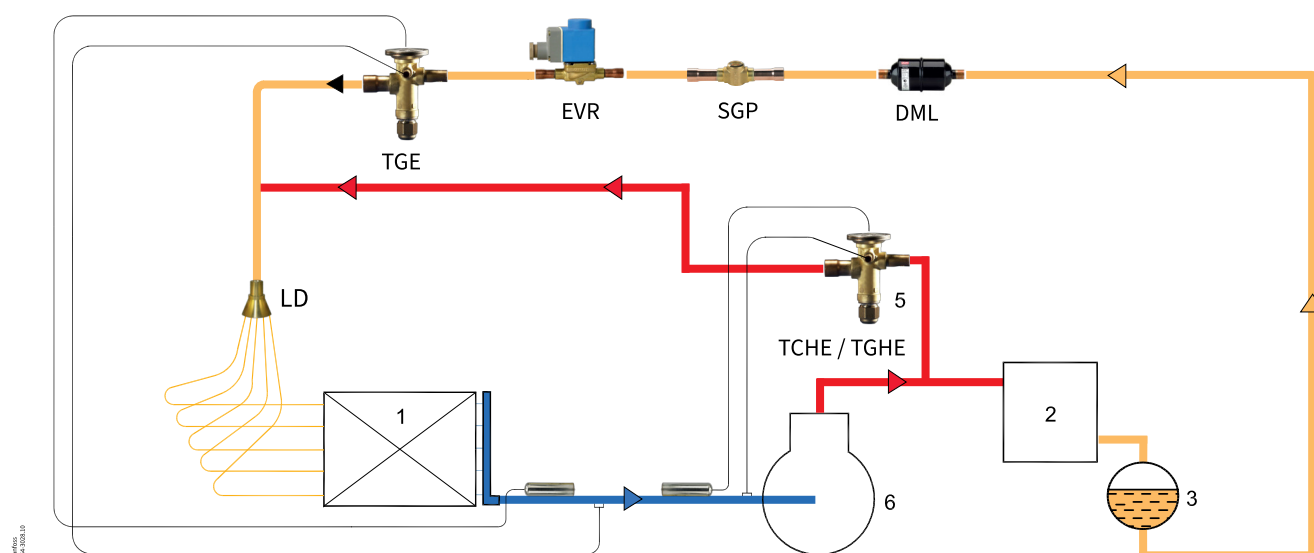
NOTE:

The bulb serves only as a reservoir for the charge, however, it is recommended to mount it in a position where the temperature variation during running conditions is limited (see **a** and **b** in the drawings below).

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1	Evaporator
2	Condenser
3	Receiver

4	Solenoid valve
5	Discharge bypass valve with adjustable setting
6	Compressor



1	Evaporator
2	Condenser
3	Receiver

4	Solenoid valve
5	Discharge bypass valve with adjustable setting
6	Compressor

Ordering

Product code numbers

Table: Standard range (supplied with bulb strap)

Type	Refrigerant	Orifice	Capacity ⁽¹⁾		Adjustment range for start opening		Connection					
							Inlet × Outlet					
			kW	TR	°C	°F	[in]	Code no.		[mm]	Code no.	
								IP	MP		IP	MP
TUH	R134a	9	1.8	0.5	-1 – 10	30 – 50	3/8 × 1/2	068U2953	068U3748	10 × 12	068U2950	068U3746
		9			-1 – 10	30 – 50	–	–	–	6 × 10	068U2961	068U3751
		9			-6 – 5	21 – 41	–	–	–	10 × 12	068U2966	–
	R404A / R507	9	4.5	1.5	-1 – 12	30 – 54	3/8 × 1/2	068U2954	–	10 × 12	068U2951	068U3747
		9			-42 – -32	-44 – -26	–	–	–	10 × 12	–	068U2962
	R22 / R407C	9	3.0	0.9	-4 – -8	25 – 46	3/8 × 1/2	068U2959	068U3749	–	–	–
	R410A	9	7.3	2.1	-1 – 10	30 – 50	3/8 × 1/2	068U2960	068U3750	10 × 12	068U2958	–
TCHE	R134a	3	2.6	0.75	-1 – 12	30 – 54	3/8 × 1/2	–	–	10 × 12	068U4530	068U4578
		4	3.4	1.0	-1 – 12	30 – 54	3/8 × 1/2	068U4537	068U4583	10 × 12	068U4534	068U4580
		4			-5 – 5	23 – 41	3/8 × 1/2	–	–	10 × 12	068U4560	–
	R404A / R507	3	5.9	1.7	0 – 6	32 – 43	3/8 × 1/2	068U4541	–	10 × 12	068U4531	068U4579
		4	7.6	2.2	0 – 6	32 – 43	–	–	–	10 × 12	068U4535	068U4581
	R407C	3	4.0	1.2	-1 – 8	30 – 46	–	–	–	10 × 12	068U4532	–
		4	5.3	1.5	-1 – 8	30 – 46	–	–	–	10 × 12	068U4536	068U4582
	R22 / R407C	3	4.1	1.2	0 – 8	32 – 46	3/8 × 1/2	068U4546	068U4584	–	–	–
		4	5.3	1.5	0 – 8	32 – 46	3/8 × 1/2	068U4547	–	–	–	–
	R410A	3	10.0	2.9	-1 – 9	30 – 48	3/8 × 1/2	068U4548	068U4585	10 × 12	068U4528	068U4576
		3			-5 – 5	23 – 41	3/8 × 1/2	068U4559	–	–	–	–
		4	13.0	3.8	-1 – 9	30 – 48	3/8 × 1/2	068U4549	068U4586	10 × 12	068U4529	068U4577
		4			-5 – 5	23 – 41	3/8 × 1/2	068U4558	068U4587	–	–	–
TGHE 10	R407C	11	3.8	1.1	-1 – 10	30 – 50	5/8 × 5/8	–	067N8313	16 × 16	–	–
	R22 / R407C	11	5	1.4	-1 – 10	30 – 50	5/8 × 5/8	–	067N8314	16 × 16	–	–
	R410A	11	8.4	2.4	-1 – 12	30 – 54	5/8 × 5/8	–	067N8315	16 × 16	–	–
TGHE 20	R134a	20	5.6	1.6	-1 – 13	30 – 55	5/8 × 5/8	–	067N8301	16 × 16	–	–
	R404A / R507	20	7.5	2.1	-1 – 7	30 – 45	5/8 × 5/8	–	067N8302	16 × 16	–	–
	R407C	20	6.5	1.9	-1 – 7	30 – 45	5/8 × 5/8	–	067N8303	16 × 16	–	–
	R22 / R407C	20	8.8	2.5	-1 – 7	30 – 45	5/8 × 5/8	–	067N8304	16 × 16	–	–
	R410A	20	14.5	4.1	-1 – 7	30 – 45	5/8 × 5/8	067N8345	067N8305	16 × 16	–	–
TGHE 40	R134a	40	10.7	3.1	-1 – 16	30 – 61	7/8 × 7/8	067N8322	067N8306	22 × 22	–	–
	R404A / R507	40	15	4.3	-1 – 8	30 – 46	7/8 × 7/8	–	067N8308	22 × 22	–	–
	R407C	40	13	3.7	-1 – 10	30 – 50	7/8 × 7/8	–	067N8309	22 × 22	–	–
	R410A	40	28.9	8.3	-1 – 8	30 – 46	7/8 × 7/8	067N8321	067N8311	22 × 22	–	–

⁽¹⁾ The nominal replacement capacity is the regulator capacity at
 evaporating temperature $t_e = -2\text{ °C} / 28\text{ °F}$,
 condensing temperature $t_c = 40\text{ °C} / 104\text{ °F}$,
 reduction of suction temperature / suction pressure $\Delta t_s = 4\text{ K} / 7\text{ °F}$.

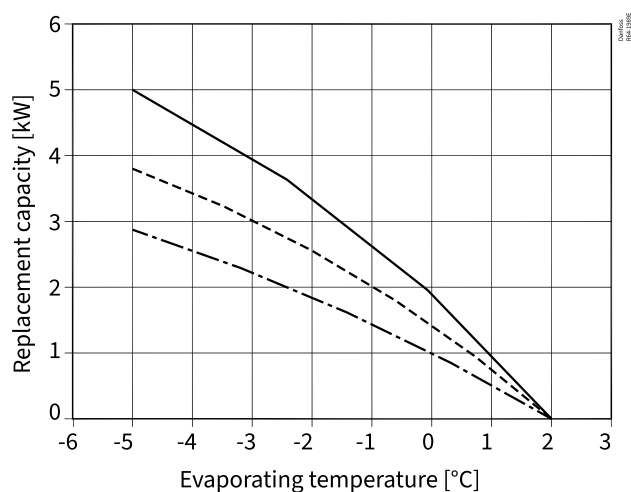
Overview

Product portfolio

Replacement capacity and Mass flow

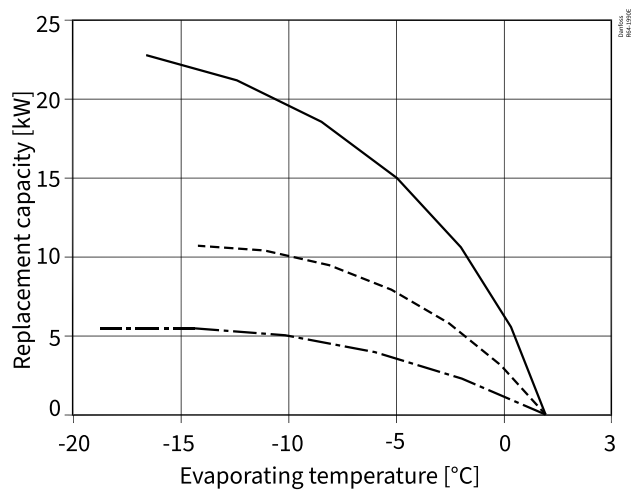
Replacement capacity – R134a

Figure: TUH & TCHE – R134a



	TCHE 4
	TCHE 3
	TUH 9

Figure: TGHE – R134a



	TGHE 40
	TGHE 20
	TGHE 10

Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R134a	0.8	1.0	1.2

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



Mass flow – R134a

Figure: TUH & TCHE – R134a

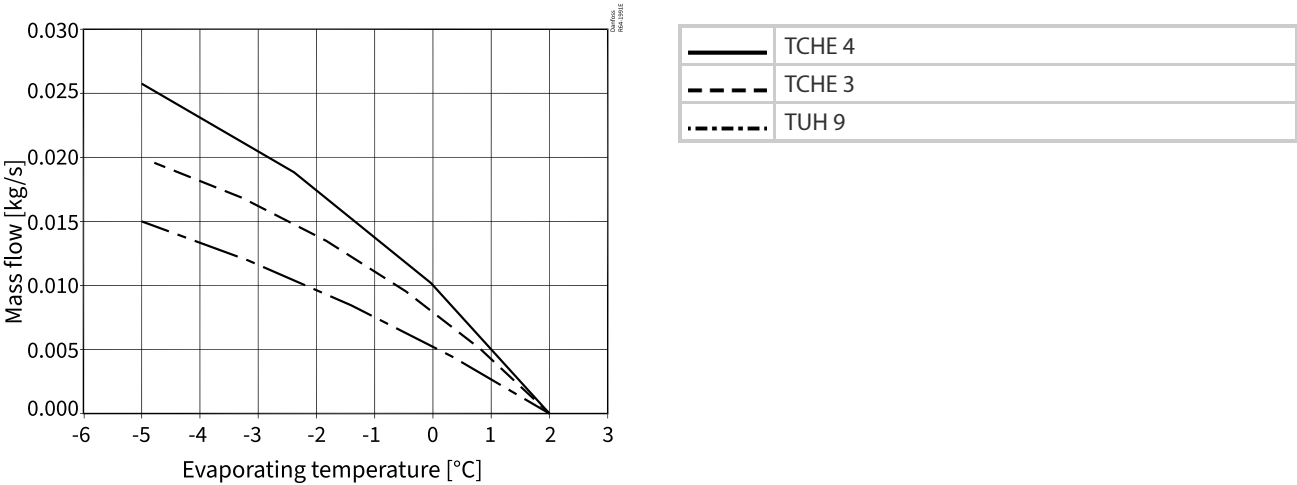
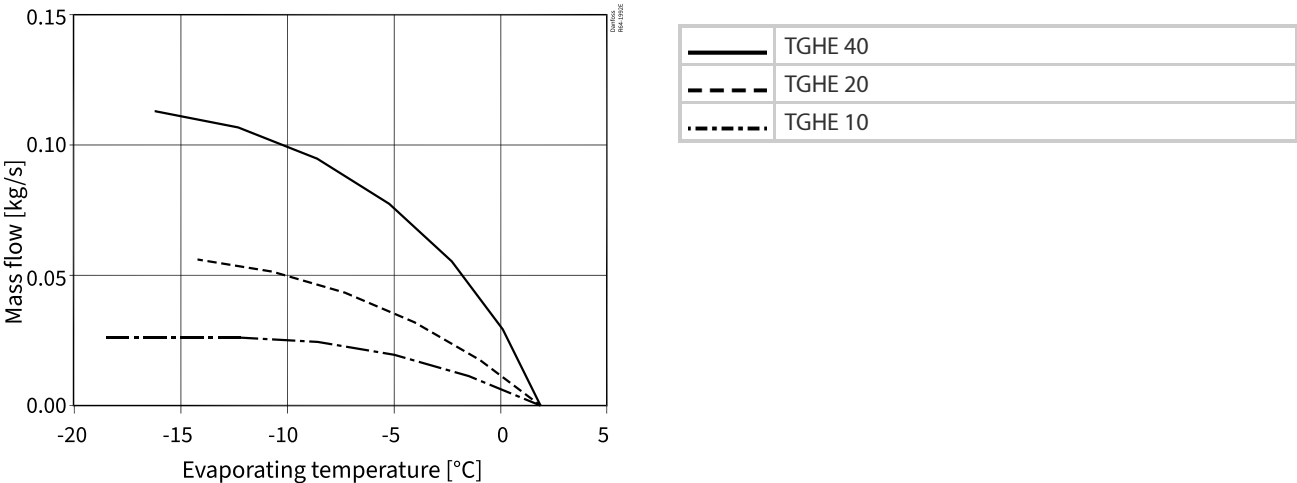


Figure: TGHE – R134a



Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

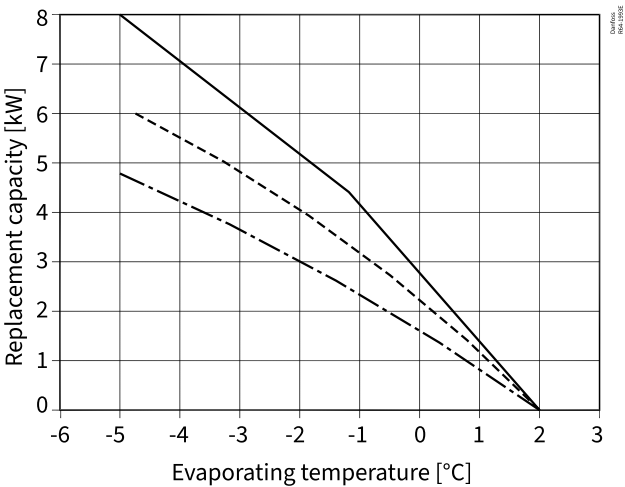
Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R134a	0.8	1.0	1.2

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



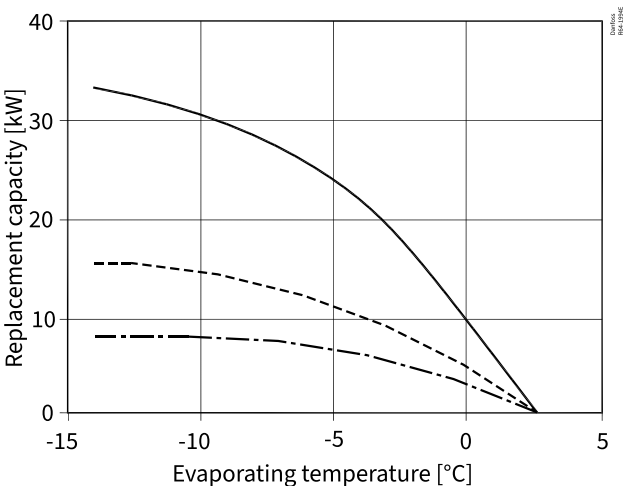
Replacement capacity – R22

Figure: TUH & TCHE – R22



	TCHE 4
	TCHE 3
	TUH 9

Figure: TGHE – R22



	TGHE 40
	TGHE 20
	TGHE 10

Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

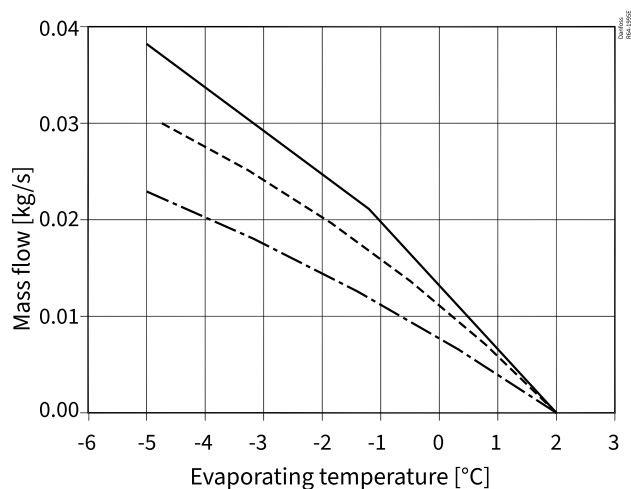
Table: Correction factor for condensing temperature

Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R22	0.8	1.0	1.2

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.

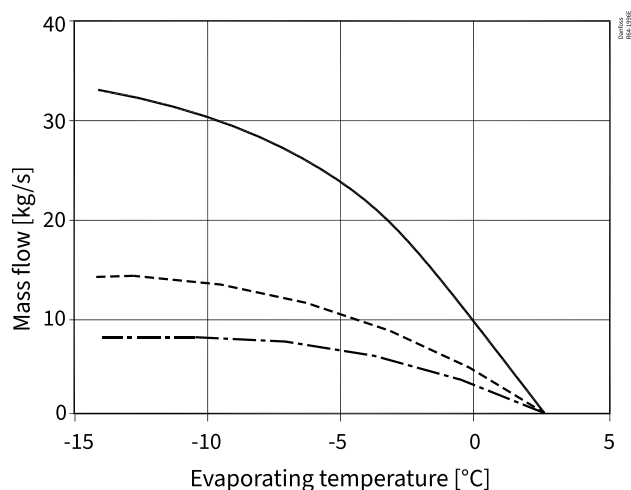
Mass flow – R22

Figure: TUH & TCHE – R22



	TCHE 4
	TCHE 3
	TUH 9

Figure: TGHE – R22



	TGHE 40
	TGHE 20
	TGHE 10

Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

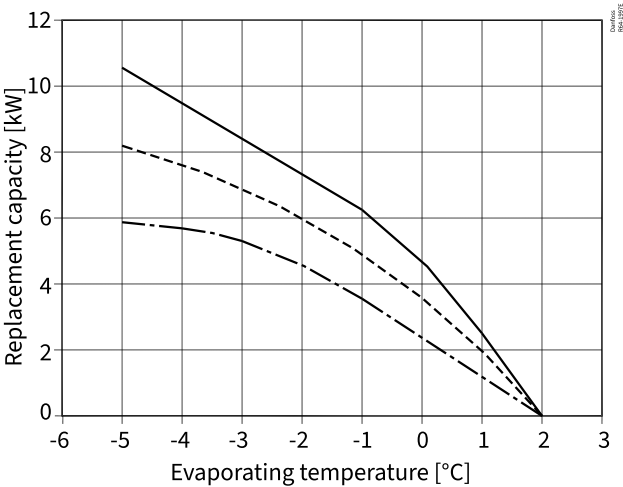
Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R22	0.8	1.0	1.2

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



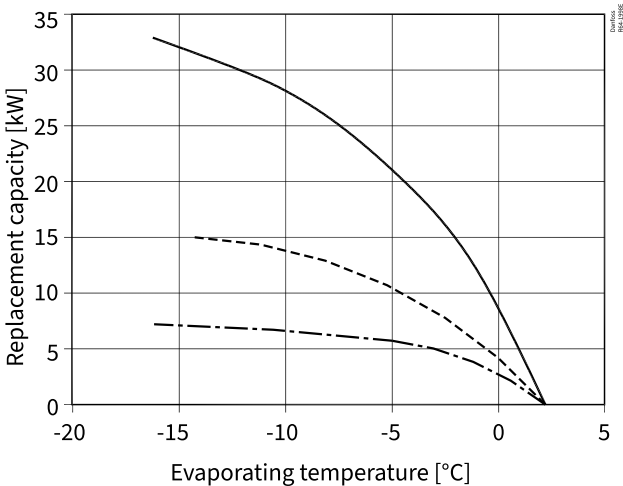
Replacement capacity – R404A / R507

Figure: TUH & TCHE – R404A / R507



	TCHE 4
	TCHE 3
	TUH 9

Figure: TGHE – R404A / R507



	TGHE 40
	TGHE 20
	TGHE 10

Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

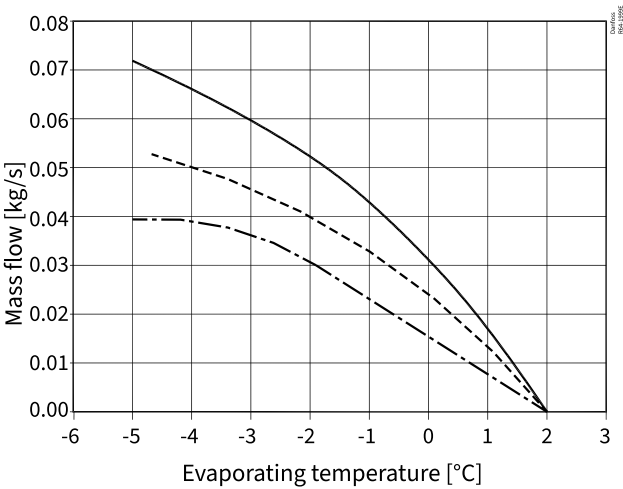
Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R404A / R507	0.8	1.0	1.2

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



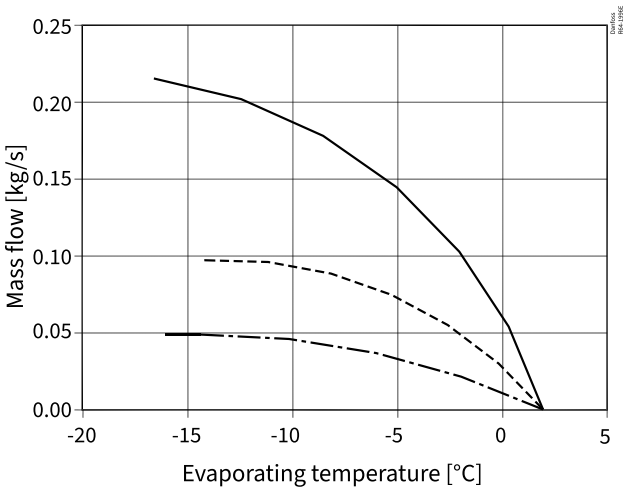
Mass flow – R404A / R507

Figure: TUH & TCHE – R404A / R507



	TCHE 4
	TCHE 3
	TUH 9

Figure: TGHE – R404A / R507



	TGHE 40
	TGHE 20
	TGHE 10

Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

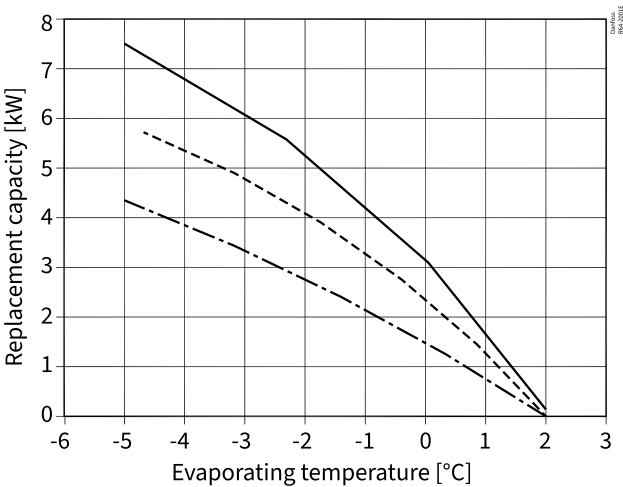
Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R404A / R507	0.8	1.0	1.2

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



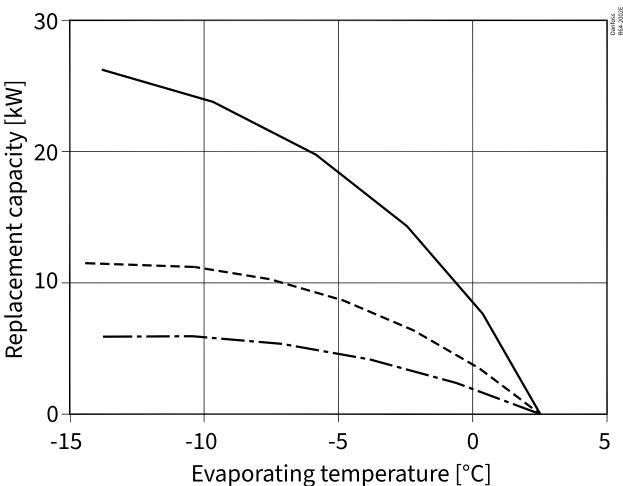
Replacement capacity – R407C

Figure: TUH & TCHE – R407C



	TCHE 4
	TCHE 3
	TUH 9

Figure: TGHE – R407C



	TGHE 40
	TGHE 20
	TGHE 10

Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R407C	0.7	1.0	1.4

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



Mass flow – R407C

Figure: TUH & TCHE – R407C

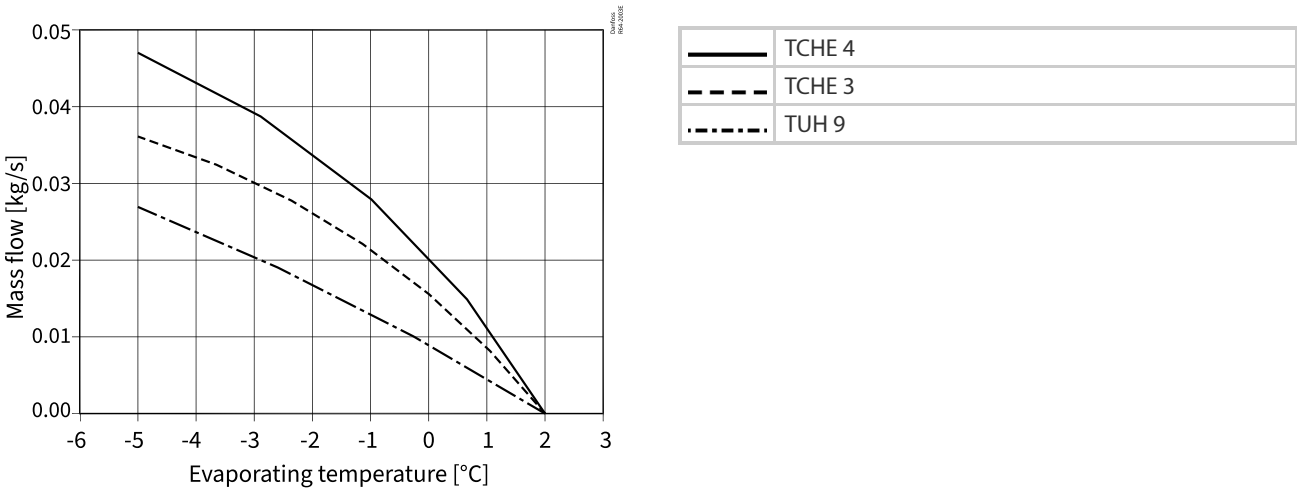
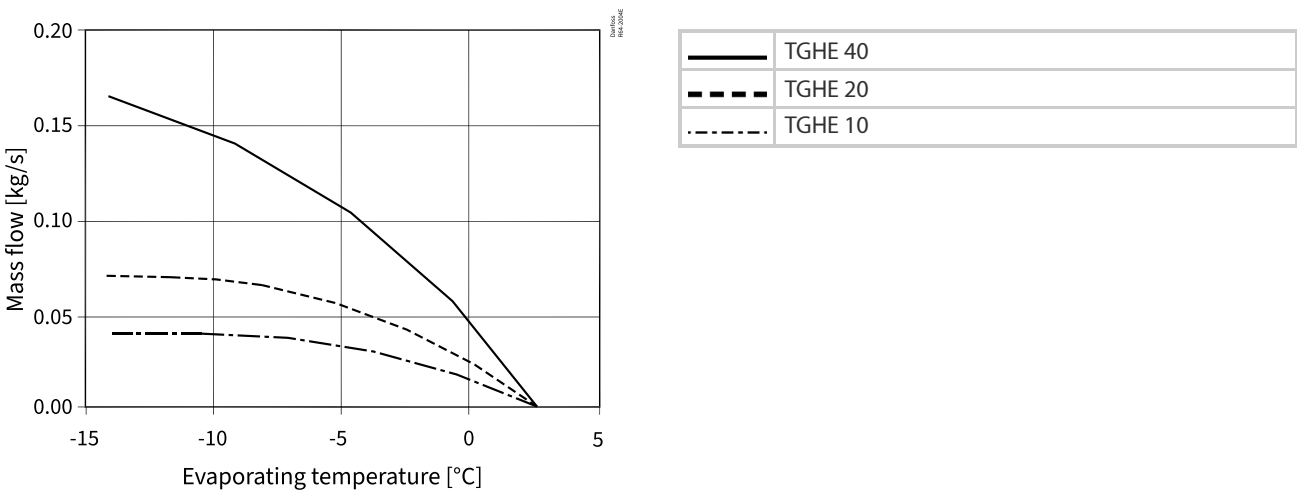


Figure: TGHE – R407C



Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R407C	0.7	1.0	1.4

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



Replacement capacity – R410A

Figure: TUH & TCHE – R410A

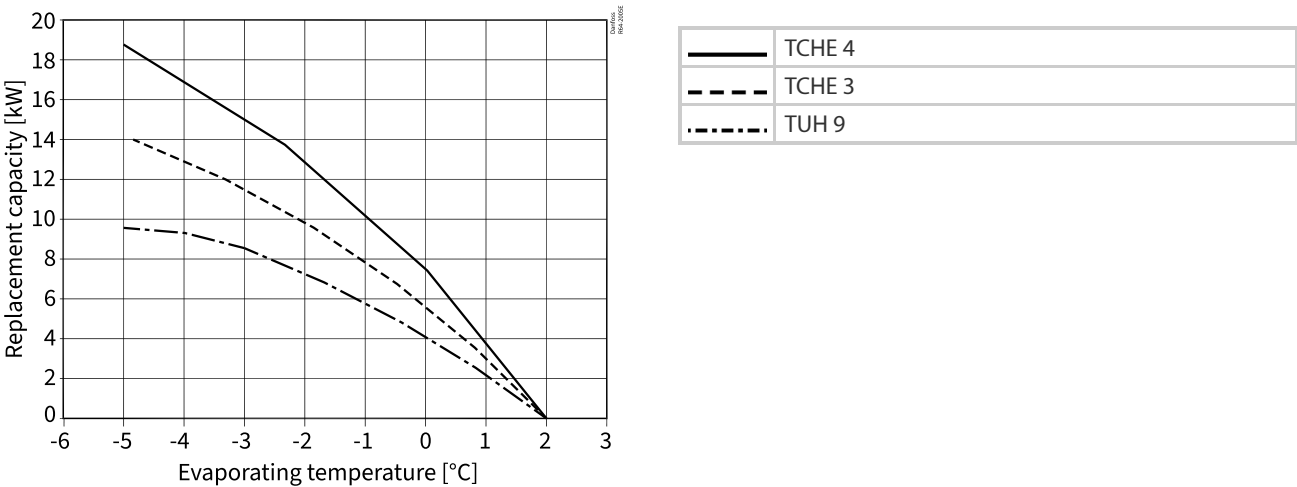
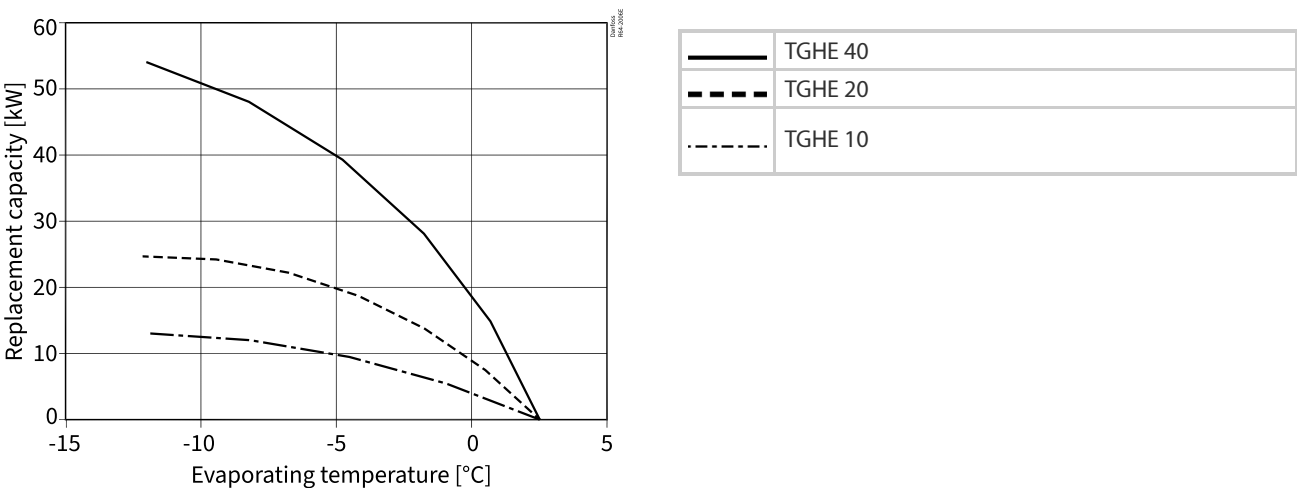


Figure: TGHE – R410A



Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Table: Correction factor for condensing temperature

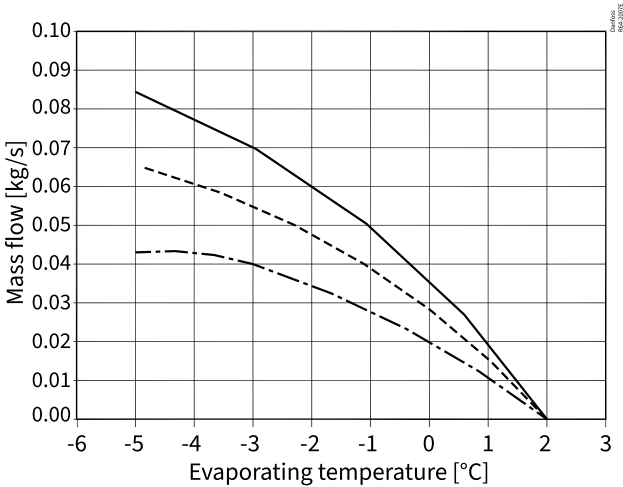
Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R410A	0.8	1.0	1.2

The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



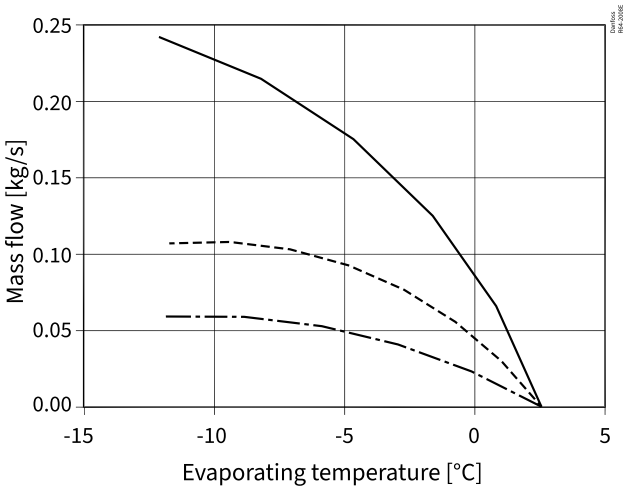
Mass flow – R410A

Figure: TUH & TCHE – R410A



	TCHE 4
	TCHE 3
	TUH 9

Figure: TGHE – R410A



	TGHE 40
	TGHE 20
	TGHE 10

Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

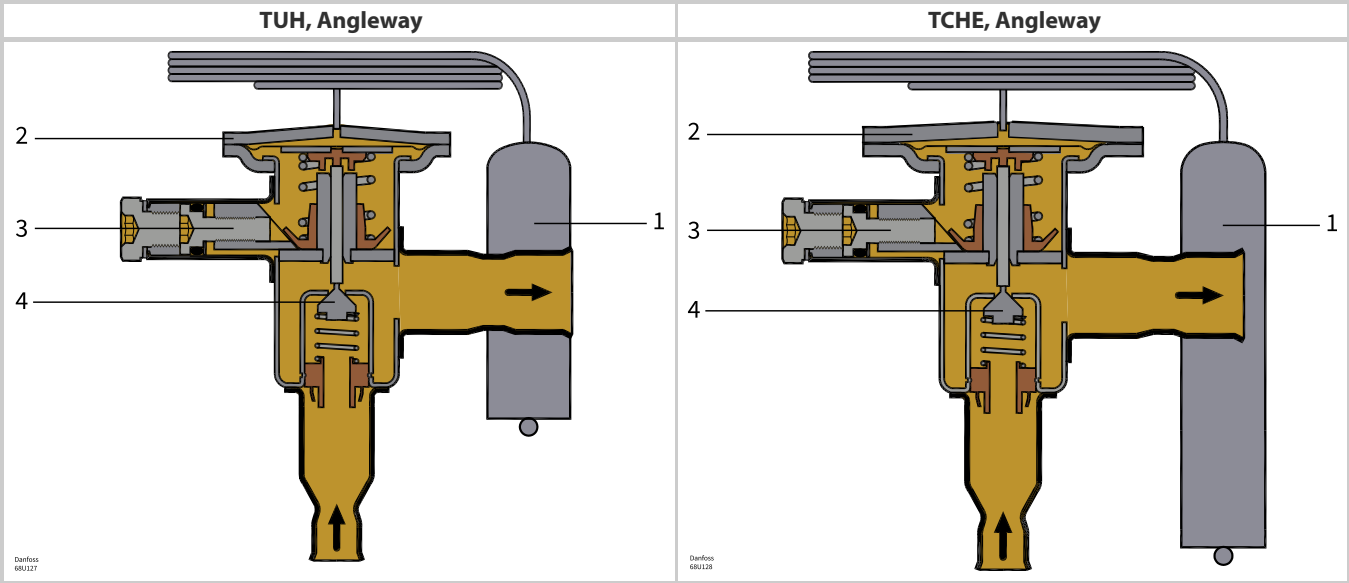
Table: Correction factor for condensing temperature

Refrigerant	Condensing temperature		
	30 °C	40 °C	50 °C
R410A	0.8	1.0	1.2

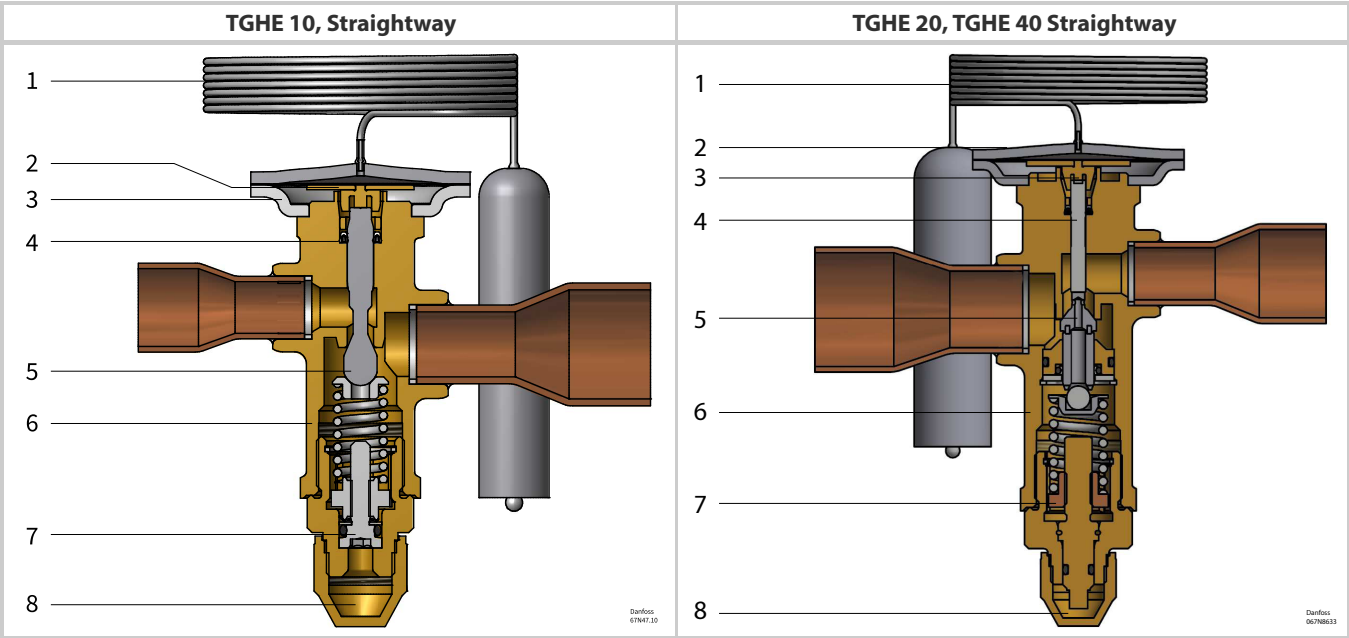
The correction factor can either be multiplied with the valve capacity, or the replacement capacity can be divided with the correction factor.



Functions



1	Bulb with capillary tube	3	Setting spindle for adjustment of opening point / minimum suction pressure
2	Diaphragm element	4	Fixed orifice



1	Bulb with capillary tube	5	Two-way balance port
2	Thrust pad	6	Valve body
3	Diaphragm element	7	Setting spindle
4	Push pin seal	8	Protective cap

The valve is set to start opening at an evaporating temperature of +2 °C / +36 °F. The setting can be changed by turning the setting spindle. The temperature at which the valve starts opening is increased by turning the spindle anti-clockwise and decreased by turning the spindle clockwise.

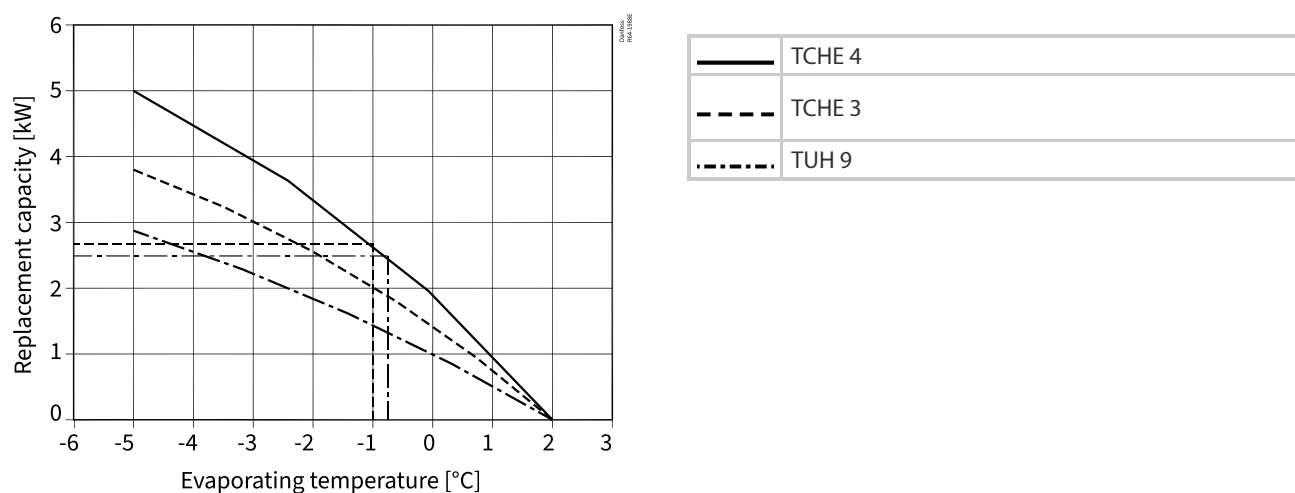
Specifically designed for hot gas applications.

All valves react only on to suction pressure variation.

Presettings

Sizing

Figure: Sizing example for R134a



Conditions used in calculation: $t_c = 40\text{ °C}$, start opening $t_e = 2\text{ °C}$

Correction for condensing temperature

The corrected replacement capacity can be obtained by dividing the replacement capacity with the correction factor given below.

Table: Correction factor for condensing temperature

Refrigerant	Condensing temperature		
	30 °C	40 °C	+50 °C
R134a	0.8	1.0	1.2

Example

Refrigerant: R134

Compressor capacity: 6 kW at 2 / 50 °C

Min. load 50%: 3 kW

Replacement capacity: $6 - 3 = 3\text{ kW}$

Min. evaporating temperature t_e : -1.0 °C

Condensing temperature t_c : 50 °C

Correction factor (table): 1.2

The corrected replacement capacity thus becomes 3 kW divided by 1.2 = 2.5 kW. The TCHE 4 gives 2.7 kW at -1.0 / 40 °C (....) and gives 2.5 kW at -0.8 / 40 °C (- -). Thus, the TCHE 4 would be a suitable choice.

Media

Refrigerants

Table: Refrigerants features

Features	Description		
Standard models	One standard range per refrigerant		
Refrigerants	R134a, R404A / R507, R407C, R22, R410A		
Max. valve body temperature	120 °C / 248 °F		
	Transient peak	150 °C / 302 °F	
Max. permissible working pressure (PS)	R134a, R22, R407C, R404A	34 bar / MWP = 500 psig	
	R410A	TCHE	45.5 bar / 660 psig
		TGHE	49 bar / 710 psig
Max. test pressure	R134a, R22, R407C, R404A	37.5 bar / 540 psig	
	R410A	TCHE	50 bar / 725 psig
		TGHE	54 bar / 755 psig
P-band max.	0.5 bar / 7.3 psig		

Performance

Table: Adjustment range for start opening

Valve type	Orifice sizes	Refrigerant	Adjustment range for start opening	
			[°C]	[°F]
TUH	9	R134a	-1 – 10	30 – 50
			-6 – 5	21 – 41
		R22 / R407C	-4 – 8	25 – 46
			-1 – 12	30 – 54
		R404A / R507	-42 – -32	-44 – -26
TCHE	3 and 4	R410A	-1 – 10	30 – 50
		R134a	-1 – 12	30 – 54
			-5 – 5	23 – 41
		R22 / R407C	0 – 8	32 – 46
		R407C	-1 – 8	30 – 46
		R404A / R507	0 – 6	32 – 43
			-1 – 9	30 – 48
TGHE 10	10	R410A	-5 – 5	23 – 41
		R134a	-1 – 12	30 – 54
		R22 / R407C	-1 – 10	30 – 50
		R407C	-1 – 10	30 – 50
		R404A / R507	-1 – 8	30 – 46
		R410A	-1 – 12	30 – 54
TGHE 20	20	R134a	-1 – 13	30 – 55
		R22 / R407C	-1 – 7	30 – 45
		R407C	-1 – 7	30 – 45
		R404A / R507	-1 – 7	30 – 45
		R410A	-1 – 7	30 – 45



TGHE 40	40	R134a	-1 – 16	30 – 61
		R407C	-1 – 10	30 – 50
		R404A / R507	-1 – 8	30 – 46
		R410A	-1 – 8	30 – 46

Product details

General data

Identification

Figure: TUH & TCHE label

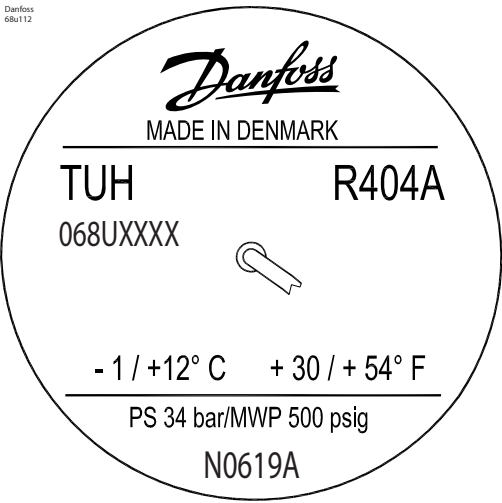


Table: TUH & TCHE label

Description	Features
Type	TUH
Code number	068UXXXX
Refrigerant	R404A
Adjusting range in °C	-1 – 12 °C
Adjusting range in °F	30 – 54 °F
Max. working pressure	PS 34 bar/ MWP 500 psig
Date marking (N = Nordborg, week 06, year 2019, weekday A = Monday)	N0619A



Figure: TUH & TCHE valve body

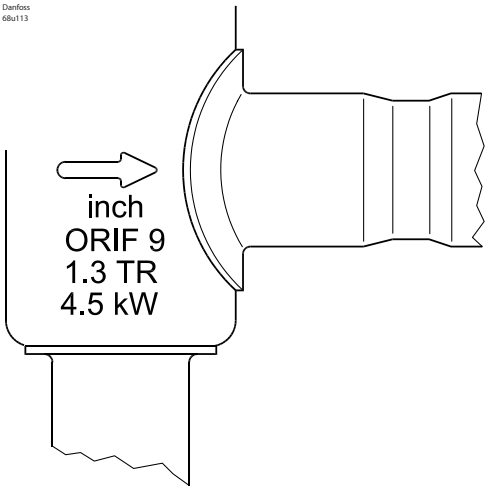


Table: Valve body data example

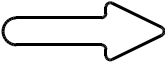
Description	Features
Normal flow direction	
Connection in inches (MM = millimetres)	inch
Orifice number 9	ORIF 9
Replacement capacity in tons of Refrigeration	1.3 TR
Replacement capacity in kW	4.5 kW



Figure: TGHE label

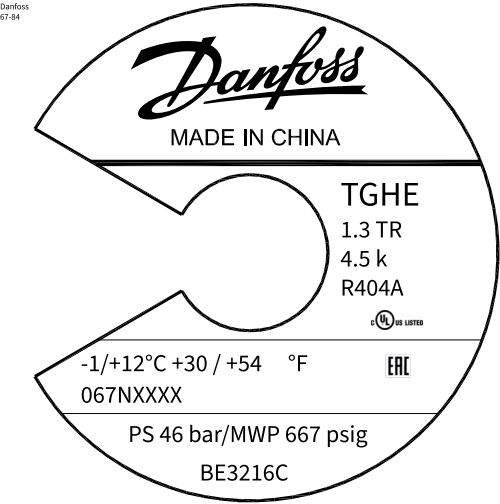
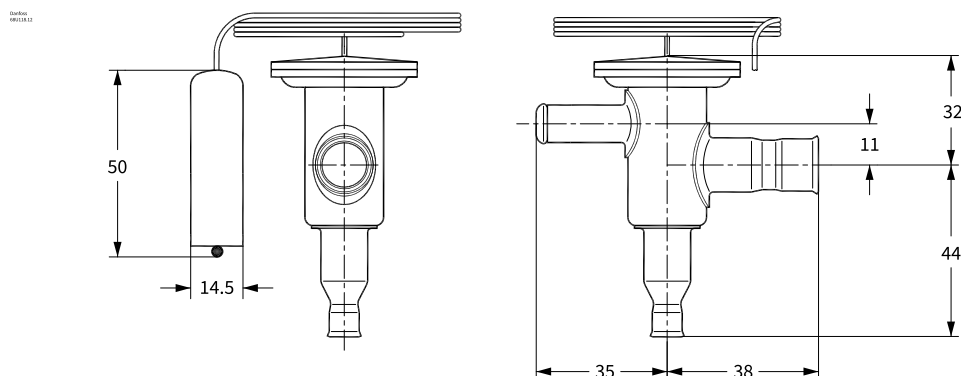


Table: TUH & TCHE label

Description	Features
Type	TGHE
Rated replacement capacity Q _{nom} in tons of refrigeration	1.3 TR
Rated replacement capacity Q _{nom} in kW	4.5 kW
Refrigerant	R404A
Code number	067NXXXX
Adjusting range in °C	-1 – 12 °C
Adjusting range in °F	30 – 54 °F
Max. working pressure	PS 46 bar / MWP 670 psig
Date marking (BE = China, week 32, year 2016, weekday C = Wednesday)	BE3216C

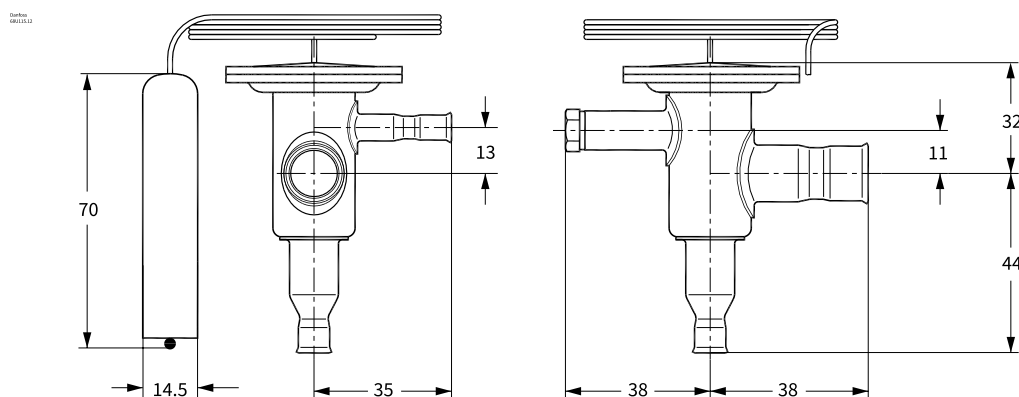
Dimensions

Figure: TUH Angleway



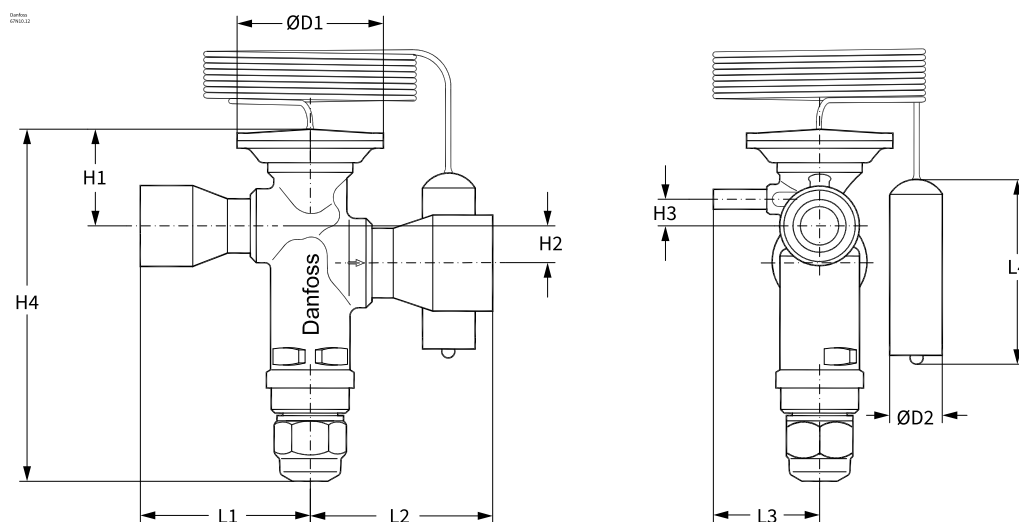
All dimensions in mm. TUH weight is 0.13 kg. For connection dimensions, see Ordering

Figure: TCHE Angleway



All dimensions in mm. TCHE weight is 0.15 kg. For connection dimensions, see Ordering

Figure: TGHE Straightway



For connection dimensions, see Ordering.

Table: Dimensions and weight for TGHE

Type	Connection (ODF solder)		H1	H2	H3	H4	L1	L2	L3	L4	øD1	øD2	Weight
	Inlet x outlet	Inlet x outlet											
	[in.]	[mm]											
TGEH 10	½ x ½	16 x 16	25.0	7.5	5.0	93.0	41.5	45.5	36.5	70.0	45.0	14.5	0.42
TGEH 20	¾ x ¾	16 x 16	28.5	9.0	8.0	117	48.0	62.0	40.0	70.0	53.0	14.5	0.65
TGHE 40	1 ½ x 1 ½	28 x 28	31.0	15.0	11.0	144	69.5	43.5	78.0	60.0	60.0	19.2	1.06

Table: Capillary tube length

Valve type	Capillary tube length	
	[m]	[ft]
TUH	0.8	2.6
TCHE	0.9	2.9
TGHE 10	1.5	5.0
TGHE 20	1.5	5.0
TGHE 40	3.0	10

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	Certification body	Approval topic
Export Control Declaration	Pressure and Temperature regulating valves	Danfoss	
Manufacturer's Declaration	Danfoss MD 067R1068.AG	Danfoss	PED, Pressure
Manufacturer's Declaration	Danfoss MD 033F4017.AF	Danfoss	
UA Declaration	Danfoss UA 2023-01-10 Valves PL01 PL40	Danfoss	PED, Pressure
Manufacturer's Declaration	Danfoss MD 033F4006 AC	Danfoss	China RoHS
EU Declaration	Danfoss EU 068U9903.01	Danfoss	EU RoHS
Export Control Declaration	TU/TC valves and orifice	Danfoss	
Manufacturer's Declaration	Danfoss MD 068U9616.03	Danfoss	China RoHS
Manufacturer's Declaration	Danfoss MD 068U9615.13	Danfoss	PED, Pressure, EU RoHS, ATEX, Explosive
Pressure Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1015.02-22	LLC CDC EURO TYSK - Ukraine	PED, Pressure

Contact details

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