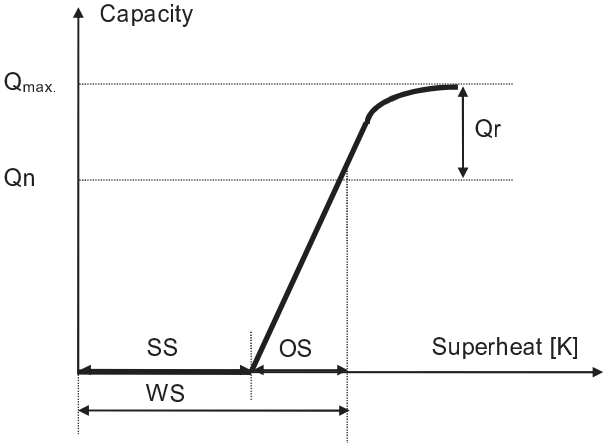
Introduction

Superheat

The factory setting of a TI is made with the valve pin just starting to move away from the seat. The superheat increment necessary to get the pin ready to move is called static superheat (SS). An increase of superheat over and beyond the static superheat (factory setting) is necessary for the valve pin to open to its rated capacity. This additional superheat is known as gradient or opening superheat (OS).
The working superheat (WS), which can be measured in the field, is the sum of static superheat and opening superheat.
The opening superheat of TXV varies if the selected valve operates at higher or lower capacities than the rated capacity. It is highly recommended to select the valve according to the rated capacity. Using reserve capacity leads to larger opening superheat and longer pull down time during start-up or after defrost.
Selecting a larger valve than required in a system may lead to smaller opening superheat and/or hunting of TXV.
EMERSON Thermo™-Expansion Valves are factory pre-set for optimum superheat settings. This setting should be modified only if absolutely necessary. The readjustment should be at the **lowest** expected evaporating temperature.

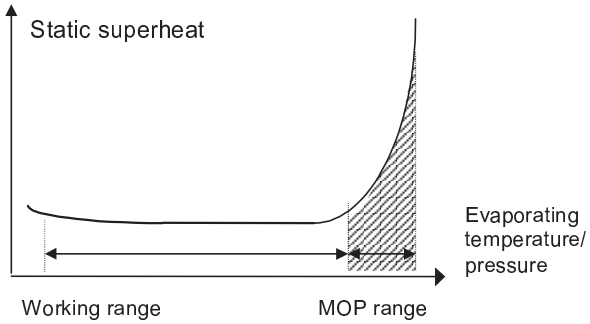


Qr = 0 for TIO-00X and TIO-000
Qr ≈ 15% of Qn for all other orifices
SS: Static superheat
OS: Opening superheat
WS: Working superheat

MOP (Maximum Operating Pressure)

MOP functionality is somewhat similar to the application of a crankcase pressure regulator. Evaporator pressures are limited to a maximum value to protect the compressor from overload conditions.
MOP selection should be within maximum allowed suction pressure rating of the compressor and at approximately 3 K above maximum evaporating temperature.

Performance of TXV with MOP function with gas charge



Valve operates as superheat control in normal working range and operates as pressure regulator within MOP range.

Cross ambient

The cross ambient effect occurs on TXV with a gas charge when the temperature at the bulb is higher than temperature at the valve head. The construction of TXV with interchangeable orifice from liquid inlet connection leads that the warmer liquid enters into the bottom of valve and cold refrigerant leaves the valve near the valve head. Therefore the valve head becomes cold.
The chance of cross ambient effect is very great if the total superheat is/becomes large. In many applications gas charges are not suitable for the valve with interchangeable orifice construction unless the valve head is wrapped by an electric strip heater. The adsorption charge with similar MOP function is another solution.

Subcooling

Subcooling generally increases the capacity of a refrigeration system and may be accounted for when dimensioning an expansion valve by applying the correction factor K_t. The capacity corrections for evaporating temperature, condensing temperature and subcooling are all incorporated in K_t. These are in particular the liquid density upstream from the expansion valve, the different enthalpies of liquid and vapor phase refrigerants as well as certain part of flash gas after expansion. The percentage of flash gas differs with various refrigerants and depends on system conditions.

Heavy subcooling results in very small flash gas amounts and therefore **increases expansion valve capacities.** These conditions are not covered. Likewise, small flash gas amounts lead to reduced evaporator capacities and may result in substantial discrepancies between the capacities of the Thermo™-Expansion Valve and the evaporator. These effects must be considered during component selection when designing refrigeration circuits.
Quick selection tables are for very small amount of subcooling. For larger subcooling than 5K, please use Controls navigator selection program.

TI Series - Thermo™-Expansion Valves

EMERSON TI series of Thermo™-Expansion Valves with interchangeable orifices are designed for refrigeration applications such as display cases in supermarkets, walk-in/reach-in coolers, freezers, soft ice cream/ice maker machines, milk tank coolers, transport refrigeration as well as for air conditioning and heat pump systems. TI provides flexibility in selection of capacity and is ideal for those applications requiring compact size with stable and accurate control over wide load and evaporating range.

TISE

TIE

TILE

Features

- Eight interchangeable orifice assemblies provide a capacity range from 0.5…19.4 kW based on R448A
- 45 bar maximum working pressure allows the use of high pressure refrigerants
- Three styles of connections:
  - TILE: Stainless steel brazed fittings eliminate the need of wet rags during brazing
  - TIS(E): Copper brazed fittings (valve requires wet rag during brazing)
  - TI(E): Flare
- Cleanable / exchangeable inlet strainer in orifice assembly
- Constant superheat across a wide application range
- Large diaphragm eliminates disturbances to the valve and provides smoother and consistent valve control
- Laser welded stainless steel power element
- Internal or external equalizer
- Inlet brazing adapter
- Adjustable static superheat
- Special setting upon request an minimum 100 pieces order quantity

Selection table: Orifice assembly (with strainer)

Orifice type	Part No.	Nominal capacity [kW]				
		R448A	R449A	R450A	R513A	R1234ze
TIO-00X	**800532**	0.50	0.49	0.20	0.21	0.23
TIO-000	**800533**	1.30	1.27	0.55	0.56	0.63
TIO-001	**800534**	3.19	3.12	1.30	1.33	1.49
TIO-002	**800535**	5.28	5.16	2.11	2.16	2.42
TIO-003	**800536**	8.48	8.28	3.41	3.49	3.91
TIO-004	**800537**	13.86	13.54	5.66	5.79	6.49
TIO-005	**800538**	16.85	16.46	6.89	7.05	7.90
TIO-006	**800539**	19.44	19.00	7.98	8.17	9.15

***Note:** Products are classified based on fluid group 2 (non-flammable) according European pressure equipment directive.*

For selection of other operating condition, please use TI quick selection tables in the next pages or Controls Navigator selection program.

The nominal capacity is based on the following conditions:

Refrigerant	Evaporating temperature [°C]	Condensing temperature [°C]	Subcooling
R513A, R1234ze	+4°C dew point	+38°C bubble/ +38°C dew point	1K
R450A		+38°C bubble/ +38.6°C dew point	
R448A, R449A		+38°C bubble/ +42.6°C dew point	

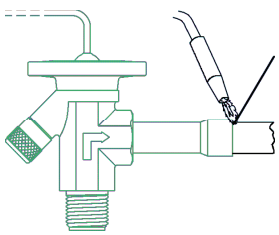
Selection table: Valve bodies without orifice and nuts in single packaging

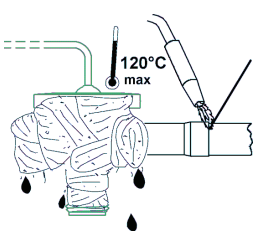
Refrigerant	Connection	Valves with factory setting and/or new charges					Valve for field setting	
		Type	Part No.	Equalizer	Charge	MOP	Type	Part No.
R448A/ R449A	Brazing stainless steel fittings *	TILE-BW (12 mm)		External	Liquid	No	TILE-SW (12 mm)	**802465**
		TILE-BW (1/2")			Liquid	No	TILE-SW (1/2")	**802466**
	Brazing copper fittings **	TISE-BW (12 mm)			Liquid	No	TISE-SW (12 mm)	**802462**
		TISE-BW (1/2")			Liquid	No	TISE-SW (1/2")	**802464**
		TISE-BW30 (1/2")			Vapor	Yes		**-**
		TISE-BW70 (1/2")			Vapor	Yes	TISE-SW75 (1/2")	**802472**
		TIS-BW (12 mm)		Internal	Liquid	No	TIS-SW (12 mm)	**802461**
		TIS-BW (1/2")			Liquid	No	TIS-SW (1/2")	**802463**
	Flare fittings	TIE-BW		External	Liquid	No	TIE-SW	**802460**
		TIE-BW70			Vapor	Yes	TIE-SW75	**802470**
		TI-BW		Internal	Liquid	No	TI-SW	**802459**
R450A	Brazing stainless steel fittings *	TILE-DW (12 mm)		External	Liquid	No	TILE-MW (12 mm)	**802451**
		TILE-DW (1/2")			Liquid	No	TILE-MW (1/2")	**802452**
	Brazing copper fittings **	TISE-DW (12 mm)			Liquid	No	TISE-MW (12 mm)	**802448**
		TISE-DW (1/2")			Liquid	No	TISE-MW (1/2")	**802450**
		TISE-DW55 (12 mm)			Vapor	Yes	TISE-MW55 (12 mm)	**802457**
		TISE-DW55 (1/2")			Vapor	Yes	TISE-MW55 (1/2")	**802458**
		TIS-DW (12 mm)		Internal	Liquid	No	TIS-MW (12 mm)	**802447**
		TIS-DW (1/2")			Liquid	No	TIS-MW (1/2")	**802449**
	Flare fittings	TIE-DW		External	Liquid	No	TIE-MW	**802446**
		TI-DW		Internal	Liquid	No	TI-MW	**802445**
R513A	Brazing stainless steel fittings *	TILE-CW (12 mm)		External	Liquid	No	TILE-MW (12 mm)	**802451**
		TILE-CW (1/2")			Liquid	No	TILE-MW (1/2")	**802452**
	Brazing copper fittings **	TISE-CW (12 mm)			Liquid	No	TISE-MW (12 mm)	**802448**
		TISE-CW (1/2")			Liquid	No	TISE-MW (1/2")	**802450**
		TISE-CW55 (12 mm)			Vapor	Yes	TISE-MW55 (12 mm)	**802457**
		TISE-CW55 (1/2")			Vapor	Yes	TISE-MW55 (1/2")	**802458**
		TIS-CW (12 mm)		Internal	Liquid	No	TIS-MW (12 mm)	**802447**
		TIS-CW (1/2")			Liquid	No	TIS-MW (1/2")	**802449**
	Flare fittings	TIE-CW		External	Liquid	No	TIE-MW	**802446**
		TI-CW		Internal	Liquid	No	TI-MW	**802445**
R1234ze	Brazing copper fittings **	TISE-EW (12 mm)		External	Liquid	No	TISE-MW (12 mm)	**802448**
		TISE-EW (1/2")			Liquid	No	TISE-MW (1/2")	**802450**
		TISE-EW55 (12 mm)			Vapor	Yes	TISE-MW55 (12 mm)	**802457**
		TISE-EW55 (1/2")			Vapor	Yes	TISE-MW55 (1/2")	**802458**
		TIS-EW (12 mm)			Liquid	No	TIS-MW (12 mm)	**802447**
		TIS-EW (1/2")			Liquid	No	TIS-MW (1/2")	**802449**
	Flare fittings	TIE-EW			Liquid	No	TIE-MW	**802446**
		TI-EW		Internal	Liquid	No	TI-MW	**802445**

Note: Please see table on the next page for readjustment in order to be used with HFO/HFO blends.

*) **TILE** Brazing without wet rag

) **TISE Brazing with wet rag





Connections

Body	Inlet connection		Outlet	External equalizer *
	Brazing with adapter	Flare		
TI(E) Flare connections	-	5/8"-18UNF Flare suitable for 6 mm, 8 mm, 10 mm, 1/4", 5/16", 3/8" tubes	3/4"-16UNF Flare: for 12 mm, 1/2" tubes	7/16"-20UNF Flare: for 6 mm, 1/4" tubes
TIS(E) / TILE Braze connections	TIA-M06 (6 mm ODF) TIA-M10 (10 mm ODF)		12 mm ODF	6 mm ODF
	TIA-014 (1/4" ODF) TIA-038 (3/8" ODF)		1/2" ODF	1/4" ODF

Note: *) TI and TIS with internal equalizer

MOP value, gas charge

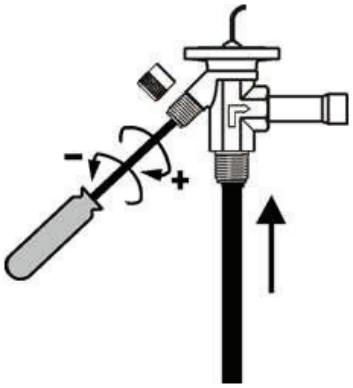
Code	MOP [bar]
MW55	3.8
SW75	5.2
BW30	1.6
BW70	4.3

Accessories

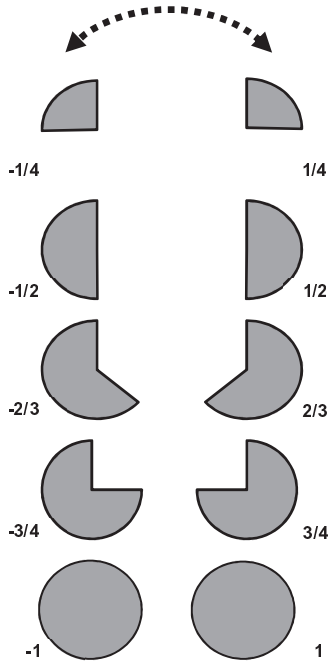
Description	Type	Part No.	Connection size
Brazing adapter	**TIA-M06**	**802500**	6 mm
	TIA-M10	**802501**	10 mm
	TIA-014	**802502**	1/4"
	TIA-038	**802503**	3/8"

The following table/graphic is a guideline for readjustment:

Evaporating temperature [°C]	Number of turn			
	TI...-MW...			TI...-SW...
	System refrigerant			
	R450A	R513A	R1234ze	R448A R449A
-40	1/3	-1/3	2/3	1-2/3
-35	1/2	-1/2	1	2
-30	2/3	-1/2	1	2-1/4
-25	3/4	-2/3	1-1/3	2-1/2
-20	1	-2/3	1-3/4	3
-15	1-1/4	-1	2-1/3	3-1/2
-10	1-1/2	-1	2-1/2	3-3/4
-5	1-2/3	-1-1/4	3-1/3	4-1/4
0	2	-1-1/3	3-1/2	4-3/4
5	2-1/3	-1,5	4-1/2	5
10	2-2/3	-1-2/3	5-1/4	5-2/3



Note: Number of turns in direction of clockwise as positive number and in direction of counter-clockwise as negative number.



TI: Quick selection (included 1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature [°C]	R448A/R449A Capacity [kW] Evaporating temperature [°C]													R448A/R449A Orifice type
	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	
60 bubble/ 63.4 dew point	0.46	0.46	0.46	0.46	0.46	0.45	0.40	0.34	0.28	0.23	0.18	0.15	0.12	TIO-00x
	1.18	1.20	1.20	1.20	1.19	1.18	1.04	0.88	0.72	0.59	0.47	0.38	0.31	TIO-000
	2.9	2.9	3.0	3.0	2.9	2.9	2.6	2.2	1.8	1.44	1.16	0.94	0.76	TIO-001
	4.8	4.9	4.9	4.9	4.9	4.8	4.3	3.6	3.0	2.4	1.9	1.6	1.3	TIO-002
	7.7	7.8	7.9	7.8	7.8	7.7	6.8	5.8	4.7	3.8	3.1	2.5	2.0	TIO-003
	12.7	12.8	12.8	12.8	12.8	12.6	11.2	9.4	7.7	6.3	5.0	4.1	3.3	TIO-004
	15.4	15.5	15.6	15.6	15.5	15.3	13.6	11.5	9.4	7.6	6.1	4.9	4.0	TIO-005
	17.8	17.9	18.0	18.0	17.9	17.7	15.7	13.2	10.9	8.8	7.1	5.7	4.6	TIO-006
50 bubble/ 54 dew point	0.46	0.47	0.48	0.49	0.49	0.49	0.43	0.37	0.31	0.25	0.20	0.16	0.13	TIO-00x
	1.20	1.23	1.25	1.27	1.27	1.27	1.13	0.96	0.80	0.65	0.53	0.43	0.35	TIO-000
	3.0	3.0	3.1	3.1	3.1	3.1	2.8	2.4	2.0	1.60	1.30	1.05	0.86	TIO-001
	4.9	5.0	5.1	5.2	5.2	5.2	4.6	3.9	3.2	2.6	2.1	1.7	1.4	TIO-002
	7.9	8.1	8.2	8.3	8.3	8.3	7.4	6.3	5.2	4.2	3.4	2.8	2.3	TIO-003
	12.9	13.2	13.4	13.5	13.6	13.6	12.1	10.3	8.5	6.9	5.6	4.6	3.7	TIO-004
	15.6	16.0	16.3	16.5	16.5	16.5	14.7	12.5	10.3	8.4	6.8	5.6	4.5	TIO-005
	18.0	18.5	18.8	19.0	19.1	19.0	17.0	14.4	11.9	9.7	7.9	6.4	5.2	TIO-006
40 bubble/ 44.5 dew point	0.43	0.45	0.47	0.48	0.49	0.49	0.44	0.38	0.32	0.26	0.21	0.17	0.14	TIO-00x
	1.12	1.18	1.22	1.25	1.27	1.28	1.15	0.99	0.82	0.67	0.55	0.45	0.37	TIO-000
	2.8	2.9	3.0	3.1	3.1	3.2	2.8	2.4	2.0	1.66	1.36	1.11	0.91	TIO-001
	4.6	4.8	5.0	5.1	5.2	5.2	4.7	4.0	3.4	2.7	2.2	1.8	1.5	TIO-002
	7.3	7.7	8.0	8.2	8.3	8.4	7.5	6.5	5.4	4.4	3.6	2.9	2.4	TIO-003
	12.0	12.6	13.1	13.4	13.6	13.7	12.3	10.6	8.8	7.2	5.9	4.8	4.0	TIO-004
	14.6	15.3	15.9	16.2	16.5	16.6	15.0	12.8	10.7	8.8	7.2	5.9	4.8	TIO-005
	16.9	17.7	18.3	18.7	19.0	19.2	17.3	14.8	12.3	10.1	8.3	6.8	5.5	TIO-006
30 bubble/ 34.5 dew point	0.36	0.40	0.42	0.45	0.46	0.47	0.43	0.37	0.31	0.26	0.21	0.17	0.14	TIO-00x
	0.94	1.03	1.10	1.16	1.20	1.22	1.11	0.96	0.81	0.67	0.55	0.45	0.37	TIO-000
	2.3	2.5	2.7	2.9	2.9	3.0	2.7	2.4	2.0	1.65	1.35	1.11	0.92	TIO-001
	3.8	4.2	4.5	4.7	4.9	5.0	4.5	3.9	3.3	2.7	2.2	1.8	1.5	TIO-002
	6.1	6.8	7.2	7.6	7.8	8.0	7.3	6.3	5.3	4.4	3.6	3.0	2.4	TIO-003
	10.0	11.0	11.8	12.4	12.8	13.1	11.9	10.3	8.7	7.2	5.9	4.8	4.0	TIO-004
	12.2	13.4	14.4	15.1	15.6	15.9	14.5	12.5	10.5	8.7	7.1	5.9	4.9	TIO-005
	14.0	15.5	16.6	17.4	18.0	18.4	16.7	14.5	12.1	10.0	8.2	6.8	5.6	TIO-006
20 bubble/ 25.3 dew point		0.29	0.34	0.38	0.40	0.42	0.39	0.35	0.29	0.24	0.20	0.17	0.14	TIO-00x
		0.76	0.89	0.98	1.05	1.10	1.02	0.90	0.76	0.64	0.53	0.44	0.36	TIO-000
		1.9	2.2	2.4	2.6	2.7	2.5	2.2	1.9	1.56	1.29	1.07	0.89	TIO-001
		3.1	3.6	4.0	4.3	4.5	4.2	3.7	3.1	2.6	2.1	1.8	1.5	TIO-002
		5.0	5.8	6.4	6.9	7.2	6.7	5.9	5.0	4.2	3.4	2.8	2.4	TIO-003
		8.1	9.5	10.5	11.2	11.8	10.9	9.6	8.1	6.8	5.6	4.7	3.9	TIO-004
		9.9	11.5	12.8	13.7	14.3	13.3	11.7	9.9	8.3	6.8	5.7	4.7	TIO-005
		11.4	13.3	14.7	15.8	16.5	15.3	13.5	11.4	9.5	7.9	6.5	5.4	TIO-006
10 bubble/ 15.5 dew point				0.26	0.31	0.35	0.33	0.30	0.26	0.22	0.18	0.15	0.13	TIO-00x
				0.68	0.81	0.90	0.87	0.78	0.68	0.57	0.48	0.40	0.34	TIO-000
				1.7	2.0	2.2	2.1	1.9	1.7	1.41	1.18	0.99	0.83	TIO-001
				2.8	3.3	3.7	3.5	3.2	2.8	2.3	2.0	1.6	1.4	TIO-002
				4.4	5.3	5.9	5.7	5.1	4.4	3.8	3.1	2.6	2.2	TIO-003
				7.3	8.7	9.6	9.3	8.4	7.3	6.1	5.1	4.3	3.6	TIO-004
				8.8	10.5	11.7	11.3	10.2	8.8	7.5	6.2	5.2	4.4	TIO-005
				10.2	12.1	13.5	13.0	11.7	10.2	8.6	7.2	6.0	5.0	TIO-006

TI: Quick selection (included 1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature [°C]	R450A	Capacity [kW] Evaporating temperature [°C]									R450A	Orifice type
	20	15	10	5	0	-5	-10	-15	-20	-25	-30	
60	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,17	0,14	0,11	0,09	TIO-00x
	0,53	0,54	0,54	0,54	0,54	0,53	0,52	0,47	0,39	0,31	0,24	TIO-000
	1,26	1,28	1,29	1,29	1,28	1,27	1,25	1,11	0,92	0,73	0,57	TIO-001
	2,06	2,09	2,11	2,11	2,09	2,07	2,03	1,81	1,49	1,19	0,92	TIO-002
	3,33	3,38	3,40	3,40	3,37	3,33	3,28	2,91	2,41	1,91	1,49	TIO-003
	5,52	5,61	5,64	5,64	5,60	5,53	5,44	4,83	4,00	3,17	2,47	TIO-004
	6,72	6,82	6,87	6,86	6,81	6,73	6,62	5,88	4,87	3,86	3,01	TIO-005
	7,79	7,90	7,95	7,95	7,89	7,80	7,67	6,81	5,64	4,47	3,49	TIO-006
50	0,18	0,19	0,19	0,20	0,20	0,20	0,20	0,18	0,15	0,12	0,09	TIO-00x
	0,48	0,51	0,52	0,53	0,53	0,53	0,53	0,47	0,40	0,32	0,25	TIO-000
	1,15	1,20	1,23	1,25	1,26	1,26	1,26	1,13	0,94	0,75	0,59	TIO-001
	1,88	1,96	2,01	2,05	2,06	2,06	2,05	1,84	1,53	1,23	0,97	TIO-002
	3,03	3,16	3,25	3,30	3,32	3,32	3,30	2,96	2,47	1,98	1,56	TIO-003
	5,03	5,24	5,39	5,48	5,52	5,52	5,48	4,92	4,11	3,29	2,58	TIO-004
	6,12	6,38	6,56	6,66	6,71	6,71	6,67	5,98	5,00	4,00	3,15	TIO-005
	7,09	7,39	7,60	7,72	7,77	7,77	7,73	6,93	5,79	4,64	3,64	TIO-006
40	0,14	0,16	0,17	0,18	0,18	0,19	0,19	0,17	0,14	0,12	0,09	TIO-00x
	0,38	0,43	0,46	0,48	0,49	0,50	0,50	0,46	0,39	0,31	0,25	TIO-000
	0,91	1,01	1,08	1,13	1,17	1,19	1,20	1,09	0,92	0,74	0,59	TIO-001
	1,49	1,65	1,77	1,85	1,91	1,94	1,95	1,77	1,50	1,21	0,96	TIO-002
	2,40	2,67	2,85	2,99	3,07	3,13	3,15	2,86	2,41	1,95	1,55	TIO-003
	3,99	4,43	4,74	4,96	5,10	5,19	5,23	4,75	4,01	3,24	2,57	TIO-004
	4,85	5,39	5,77	6,03	6,21	6,32	6,37	5,78	4,88	3,94	3,12	TIO-005
	5,62	6,24	6,68	6,99	7,19	7,32	7,38	6,70	5,65	4,57	3,62	TIO-006
30		0,10	0,13	0,14	0,16	0,16	0,17	0,16	0,13	0,11	0,09	TIO-00x
		0,28	0,34	0,38	0,42	0,44	0,45	0,42	0,36	0,29	0,23	TIO-000
		0,65	0,81	0,91	0,99	1,04	1,07	0,99	0,85	0,69	0,55	TIO-001
		1,07	1,32	1,49	1,61	1,69	1,75	1,61	1,38	1,13	0,91	TIO-002
		1,72	2,13	2,40	2,60	2,73	2,82	2,60	2,23	1,82	1,46	TIO-003
		2,86	3,54	3,99	4,31	4,53	4,68	4,32	3,70	3,03	2,42	TIO-004
		3,48	4,30	4,86	5,24	5,51	5,69	5,26	4,50	3,68	2,95	TIO-005
		4,03	4,99	5,63	6,07	6,38	6,59	6,09	5,22	4,27	3,42	TIO-006
20				0,08	0,11	0,12	0,13	0,13	0,11	0,10	0,08	TIO-00x
				0,21	0,28	0,33	0,36	0,35	0,30	0,25	0,21	TIO-000
				0,49	0,67	0,78	0,85	0,82	0,72	0,60	0,49	TIO-001
				0,80	1,09	1,27	1,39	1,34	1,18	0,99	0,80	TIO-002
				1,29	1,76	2,05	2,25	2,16	1,90	1,59	1,29	TIO-003
				2,15	2,92	3,40	3,73	3,59	3,16	2,64	2,15	TIO-004
				2,61	3,55	4,14	4,54	4,37	3,84	3,21	2,61	TIO-005
				3,02	4,11	4,79	5,26	5,06	4,45	3,72	3,03	TIO-006
10								0,09	0,08	0,07	0,06	TIO-00x
								0,23	0,22	0,19	0,16	TIO-000
								0,54	0,52	0,46	0,39	TIO-001
								0,88	0,85	0,75	0,64	TIO-002
								1,42	1,38	1,22	1,03	TIO-003
								2,36	2,28	2,02	1,70	TIO-004
								2,87	2,78	2,45	2,07	TIO-005
								3,32	3,22	2,84	2,40	TIO-006

TI: Quick selection (included 1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature [°C]	R513A	Capacity [kW] Evaporating temperature [°C]								R513A	Orifice type
	20	15	10	5	0	-5	-10	-15	-20	-25	-30	
60	0,19	0,20	0,20	0,20	0,19	0,19	0,19	0,17	0,14	0,11	0,09	TIO-00x
	0,52	0,52	0,52	0,52	0,52	0,51	0,50	0,44	0,37	0,29	0,23	TIO-000
	1,23	1,24	1,25	1,24	1,23	1,21	1,18	1,05	0,87	0,70	0,55	TIO-001
	2,00	2,03	2,03	2,02	2,00	1,97	1,93	1,72	1,43	1,14	0,89	TIO-002
	3,23	3,27	3,28	3,27	3,23	3,18	3,11	2,77	2,30	1,84	1,44	TIO-003
	5,36	5,43	5,44	5,42	5,36	5,27	5,16	4,59	3,82	3,05	2,39	TIO-004
	6,52	6,60	6,63	6,60	6,52	6,42	6,28	5,59	4,65	3,71	2,91	TIO-005
	7,56	7,65	7,67	7,64	7,56	7,43	7,27	6,47	5,39	4,30	3,37	TIO-006
50	0,18	0,19	0,19	0,20	0,20	0,20	0,20	0,18	0,15	0,12	0,09	TIO-00x
	0,48	0,50	0,52	0,52	0,53	0,53	0,52	0,47	0,39	0,32	0,25	TIO-000
	1,15	1,20	1,23	1,25	1,25	1,25	1,24	1,11	0,94	0,76	0,60	TIO-001
	1,88	1,96	2,00	2,03	2,04	2,04	2,02	1,82	1,53	1,23	0,98	TIO-002
	3,03	3,15	3,23	3,28	3,29	3,28	3,25	2,93	2,46	1,99	1,58	TIO-003
	5,03	5,24	5,37	5,44	5,46	5,45	5,40	4,86	4,09	3,31	2,62	TIO-004
	6,12	6,37	6,53	6,62	6,65	6,63	6,57	5,92	4,98	4,02	3,19	TIO-005
	7,09	7,38	7,57	7,67	7,70	7,68	7,61	6,85	5,77	4,66	3,69	TIO-006
40	0,15	0,16	0,18	0,18	0,19	0,19	0,19	0,17	0,15	0,12	0,10	TIO-00x
	0,40	0,44	0,47	0,49	0,50	0,51	0,51	0,47	0,40	0,32	0,26	TIO-000
	0,94	1,04	1,11	1,16	1,19	1,21	1,21	1,11	0,94	0,77	0,62	TIO-001
	1,53	1,69	1,81	1,89	1,94	1,97	1,98	1,80	1,54	1,25	1,00	TIO-002
	2,47	2,73	2,92	3,04	3,13	3,17	3,19	2,91	2,48	2,02	1,62	TIO-003
	4,10	4,54	4,84	5,05	5,19	5,27	5,30	4,83	4,11	3,36	2,69	TIO-004
	4,99	5,52	5,89	6,15	6,31	6,41	6,45	5,88	5,00	4,09	3,27	TIO-005
	5,78	6,40	6,83	7,12	7,32	7,43	7,47	6,81	5,80	4,73	3,79	TIO-006
30		0,11	0,14	0,15	0,16	0,17	0,18	0,16	0,14	0,12	0,09	TIO-00x
		0,30	0,36	0,40	0,43	0,45	0,47	0,43	0,38	0,31	0,25	TIO-000
		0,70	0,86	0,96	1,03	1,08	1,11	1,03	0,89	0,74	0,60	TIO-001
		1,15	1,40	1,56	1,68	1,76	1,81	1,68	1,45	1,20	0,97	TIO-002
		1,85	2,25	2,52	2,71	2,84	2,92	2,72	2,35	1,94	1,57	TIO-003
		3,08	3,74	4,19	4,50	4,71	4,85	4,51	3,89	3,22	2,61	TIO-004
		3,74	4,55	5,10	5,48	5,74	5,91	5,49	4,74	3,92	3,17	TIO-005
		4,34	5,27	5,91	6,34	6,64	6,84	6,36	5,49	4,54	3,67	TIO-006
20				0,09	0,12	0,13	0,15	0,14	0,12	0,10	0,09	TIO-00x
				0,24	0,31	0,36	0,39	0,37	0,33	0,28	0,23	TIO-000
				0,57	0,74	0,85	0,92	0,88	0,78	0,66	0,54	TIO-001
				0,93	1,20	1,38	1,50	1,44	1,28	1,08	0,89	TIO-002
				1,51	1,94	2,22	2,42	2,33	2,06	1,74	1,43	TIO-003
				2,50	3,22	3,69	4,01	3,86	3,43	2,89	2,37	TIO-004
				3,04	3,92	4,49	4,88	4,70	4,17	3,52	2,89	TIO-005
				3,53	4,55	5,21	5,66	5,45	4,83	4,07	3,35	TIO-006
10								0,10	0,10	0,08	0,07	TIO-00x
								0,27	0,25	0,22	0,19	TIO-000
								0,63	0,60	0,53	0,45	TIO-001
								1,03	0,99	0,87	0,74	TIO-002
								1,67	1,59	1,40	1,19	TIO-003
								2,77	2,64	2,33	1,98	TIO-004
								3,37	3,21	2,84	2,41	TIO-005
								3,90	3,72	3,29	2,79	TIO-006

TI: Quick selection (included 1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature [°C]	R1234ze	Capacity [kW] Evaporating temperature [°C]								R1234ze		Orifice type
	20	15	10	5	0	-5	-10	-15	-20	-25	-30	
60	0,23	0,23	0,23	0,23	0,23	0,23	0,22	0,20	0,16	0,13	0,10	TIO-00x
	0,61	0,62	0,62	0,62	0,62	0,61	0,59	0,53	0,44	0,34	0,27	TIO-000
	1,5	1,5	1,5	1,5	1,5	1,4	1,4	1,3	1,0	0,8	0,63	TIO-001
	2,4	2,4	2,4	2,4	2,4	2,4	2,3	2,0	1,7	1,3	1,0	TIO-002
	3,8	3,9	3,9	3,9	3,8	3,8	3,7	3,3	2,7	2,2	1,7	TIO-003
	6,3	6,4	6,5	6,4	6,4	6,3	6,2	5,5	4,5	3,6	2,8	TIO-004
	7,7	7,8	7,9	7,8	7,8	7,7	7,5	6,7	5,5	4,4	3,4	TIO-005
	8,9	9,1	9,1	9,1	9,0	8,9	8,7	7,7	6,4	5,0	3,9	TIO-006
50	0,20	0,21	0,22	0,22	0,23	0,22	0,22	0,20	0,17	0,13	0,10	TIO-00x
	0,55	0,57	0,59	0,60	0,60	0,60	0,60	0,53	0,45	0,36	0,28	TIO-000
	1,3	1,4	1,4	1,4	1,4	1,4	1,4	1,3	1,1	0,8	0,66	TIO-001
	2,1	2,2	2,3	2,3	2,3	2,3	2,3	2,1	1,7	1,4	1,1	TIO-002
	3,4	3,6	3,7	3,7	3,8	3,7	3,7	3,3	2,8	2,2	1,7	TIO-003
	5,7	5,9	6,1	6,2	6,2	6,2	6,2	5,5	4,6	3,7	2,9	TIO-004
	6,9	7,2	7,4	7,5	7,6	7,6	7,5	6,7	5,6	4,5	3,5	TIO-005
	8,0	8,4	8,6	8,7	8,8	8,8	8,7	7,8	6,5	5,2	4,1	TIO-006
40	0,16	0,18	0,19	0,20	0,21	0,21	0,21	0,19	0,16	0,13	0,10	TIO-00x
	0,41	0,47	0,51	0,53	0,55	0,56	0,56	0,51	0,43	0,35	0,27	TIO-000
	1,0	1,1	1,2	1,3	1,3	1,3	1,3	1,2	1,0	0,8	0,65	TIO-001
	1,6	1,8	2,0	2,1	2,1	2,2	2,2	2,0	1,7	1,3	1,1	TIO-002
	2,6	2,9	3,2	3,3	3,4	3,5	3,5	3,2	2,7	2,2	1,7	TIO-003
	4,3	4,9	5,2	5,5	5,7	5,8	5,8	5,3	4,5	3,6	2,8	TIO-004
	5,2	5,9	6,4	6,7	6,9	7,0	7,1	6,5	5,5	4,4	3,5	TIO-005
	6,1	6,9	7,4	7,8	8,0	8,2	8,2	7,5	6,3	5,1	4,0	TIO-006
30		0,10	0,13	0,15	0,17	0,18	0,19	0,17	0,15	0,12	0,10	TIO-00x
		0,26	0,35	0,41	0,45	0,48	0,49	0,46	0,39	0,32	0,26	TIO-000
		0,6	0,8	1,0	1,1	1,1	1,2	1,1	0,9	0,8	0,61	TIO-001
		1,0	1,4	1,6	1,7	1,8	1,9	1,8	1,5	1,2	1,0	TIO-002
		1,7	2,2	2,6	2,8	3,0	3,1	2,9	2,5	2,0	1,6	TIO-003
		2,7	3,7	4,3	4,7	4,9	5,1	4,8	4,1	3,3	2,7	TIO-004
		3,3	4,5	5,2	5,7	6,0	6,2	5,8	5,0	4,1	3,2	TIO-005
		3,9	5,2	6,0	6,6	7,0	7,2	6,7	5,8	4,7	3,7	TIO-006
20					0,10	0,12	0,14	0,14	0,12	0,10	0,08	TIO-00x
					0,27	0,33	0,38	0,37	0,33	0,27	0,22	TIO-000
					0,6	0,8	0,9	0,9	0,8	0,6	0,53	TIO-001
					1,0	1,3	1,5	1,4	1,3	1,1	0,9	TIO-002
					1,7	2,1	2,3	2,3	2,0	1,7	1,4	TIO-003
					2,8	3,5	3,9	3,8	3,4	2,8	2,3	TIO-004
					3,4	4,2	4,7	4,6	4,1	3,4	2,8	TIO-005
					3,9	4,9	5,5	5,4	4,8	4,0	3,2	TIO-006
10									0,08	0,07	0,06	TIO-00x
									0,21	0,19	0,17	TIO-000
									0,5	0,5	0,39	TIO-001
									0,8	0,8	0,6	TIO-002
									1,3	1,2	1,0	TIO-003
									2,2	2,0	1,7	TIO-004
									2,7	2,4	2,1	TIO-005
									3,1	2,8	2,4	TIO-006

***Note**: Products are classified based on fluid group 2 (non-flammable) according European pressure equipment directive.*