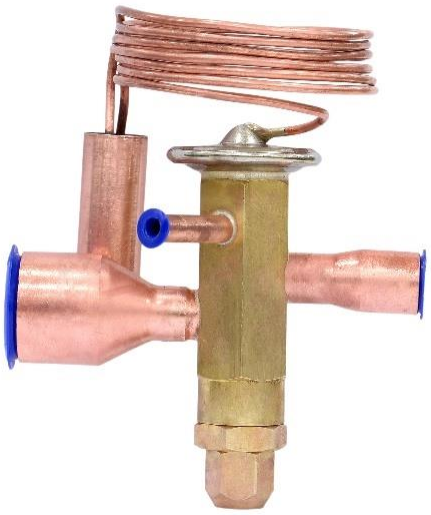
# TRAE Stretch (8~18Tons)

## Flow Controls

# D A T A S H E E T

TRAE Stretch series of Thermal Expansion Valves are designed predominantly for AC, heat pumps, close control, industrial process cooling applications, and transportation AC with HP demand.

The new TRAE stretches down to 8-18 Ton range and introduces a very compact design, consequently it is ideal for those applications requiring hermetic/compact size combined with stable and accurate control over wide load and evaporating temperature ranges.



Key features:

- Hermetic valve with brazing connections
- Compact size design
- Compatible with R410A / R407C / R22
- Maximum working pressure: 46.9 bar
- Bi-Flow application
  - Balanced port in normal and reverse flow directions eliminates disturbance forces resulting from condensing pressure
  - Optimum static superheat in normal and reverse flow
  - Capacities performance in normal and reverse flow correlates to capacity of heat pumps in cooling and heating mode
- Desired reverse superheat setting is much suitable for Heat Pump application in heating model.
- Stainless steel power element with special diaphragms design provides life expectancy against high pressure during reversed flow via external equalizer.
- Special factory setting upon request.

**Technical Data**

| | |
|---|---|
| Maximum Working Gauge Pressure (bar) | 46.9 |
| Burst Gauge Pressure (bar) | 234.5 |
| Compatibility | R410A, R407C, R22 |

| | |
|---|---|
| Connections | Copper |
| Capillary Tube Length (m) | 1.5 (5Ft) |
| Power Element | Stainless Steel |
| Gross Weight | Approx. 0.50 ~ 0.53 kg (Depend on valve size) |

| Charge Code | System Refrigerant | Maximum Bulb Temperature (°C) | Evaporating Temperature Range (˚C) |
|---|---|---|---|
| HCA | R22 | 120 | -29 ~ 10 |
| HW100 | R22 | 120 | -46 ~ 10 |
| NW100 | R407C | 120 | -46 ~ 10 |
| ZAA | R410A | 120 | -46 ~ 10 |

**R410A Selection table**

| Model | PCN | Capacity, R410A [Ton]① | Capacity, R410A [KW]② | Connection | |
|---|---|---|---|---|---|
| | | | | Inlet × Outlet | Equalizer |
| TRAE 8 ZAA | 066797 | 8 | 32 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 10 ZAA | 066798 | 10 | 40 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 12 ZAA | 066799 | 12 | 48 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 15 ZAA | 066800 | 15 | 60 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 15 ZAA | 066801 | 15 | 60 | 5/8 × 1-1/8 ODF | 1/4 ODF |
| TRAE 18 ZAA | 066802 | 18 | 72 | 5/8 × 1-1/8 ODF | 1/4 ODF |

① Nominal capacity is rated at 37.8°C liquid inlet and 4.4°C evap temperature; with 160 Psi pressure drop across TXV per ARI-750.

②The nominal capacities are based +4°C dew point evaporating temperature, +38°C bubble point condensing temperature and 1K subcooling per Asercom standard.

*See extended capacity tables for ratings at a wide range of conditions per Asercom standard.

**R407C Selection table**

| Model | PCN | Capacity, R407C [Ton]① | Capacity, R407C [KW]② | Connection | |
|---|---|---|---|---|---|
| | | | | Inlet × Outlet | Equalizer |
| TRAE 8 NW100 | 066790 | 8 | 36 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 10 NW100 | 066791 | 10 | 46 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 12 NW100 | 066792 | 12 | 55 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 12 NW100 | 066793 | 12 | 55 | 5/8 × 1-1/8 ODF | 1/4 ODF |
| TRAE 15 NW100 | 066794 | 15 | 68 | 5/8 × 1-1/8 ODF | 1/4 ODF |

① Nominal capacity is rated at 37.8°C liquid inlet and 4.4°C evap temperature; with 100 Psi pressure drop across TXV per ARI-750.

②The nominal capacities are based +4°C dew point evaporating temperature, +38°C bubble point (+43°C dew point) condensing temperature and 1K subcooling per Asercom standard.

*See extended capacity tables for ratings at a wide range of conditions per Asercom standard.

**R22 Selection table**

| Model | PCN | Capacity, R22 [Ton]① | Capacity, R22 [KW]② | Connection | |
|---|---|---|---|---|---|
| | | | | Inlet × Outlet | Equalizer |
| TRAE 8 HCA | 066780 | 8 | 32 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 10 HCA | 066781 | 10 | 40 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 12 HCA | 066782 | 12 | 48 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 12 HCA | 066783 | 12 | 48 | 5/8 × 1-1/8 ODF | 1/4 ODF |
| TRAE 15 HCA | 066784 | 15 | 61 | 5/8 × 1-1/8 ODF | 1/4 ODF |
| TRAE 8 HW100 | 066785 | 8 | 32 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 10 HW100 | 066786 | 10 | 40 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 12 HW100 | 066787 | 12 | 48 | 5/8 × 7/8 ODF | 1/4 ODF |
| TRAE 12 HW100 | 066788 | 12 | 48 | 5/8 × 1-1/8 ODF | 1/4 ODF |
| TRAE 15 HW100 | 066789 | 15 | 61 | 5/8 × 1-1/8 ODF | 1/4 ODF |

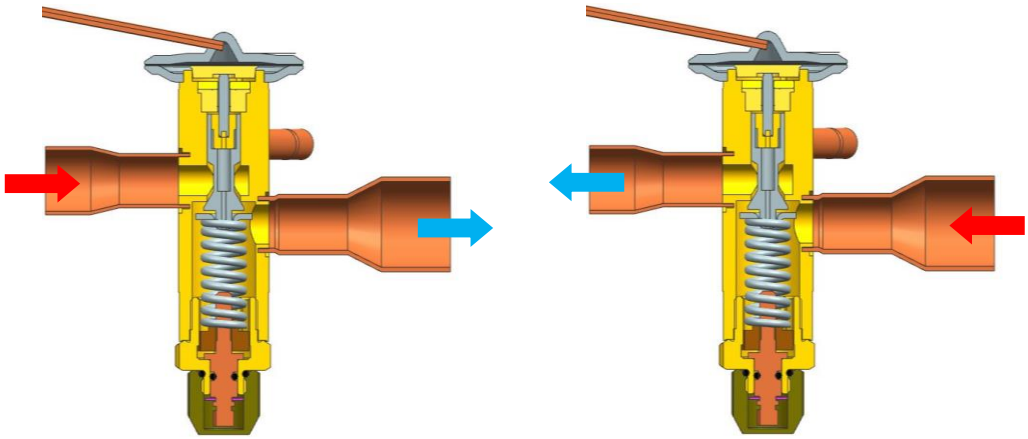
① Nominal capacity is rated at 37.8°C liquid inlet and 4.4°C evap temperature; with 100 Psi pressure drop across TXV per ARI-750.

②The nominal capacities are based +4°C dew point evaporating temperature, +38°C bubble point condensing temperature and 1K subcooling per Asercom standard.

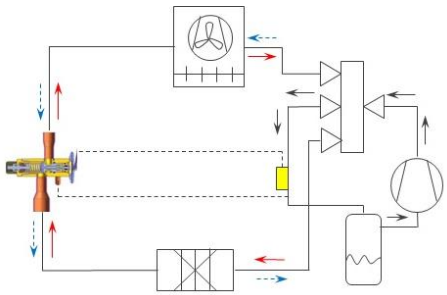
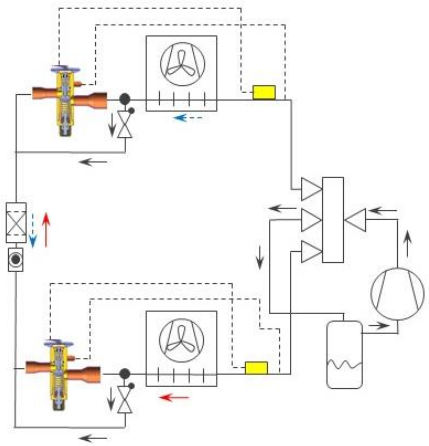
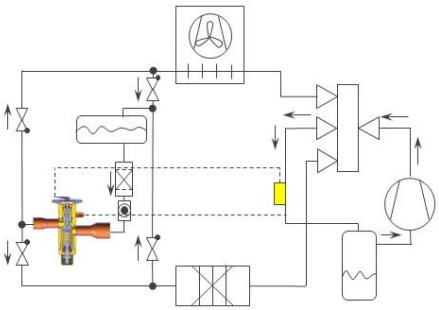
*See extended capacity tables for ratings at a wide range of conditions per Asercom standard.

**True Bi-flow Design**

The valve pin is balanced against inlet pressure changes in both flow directions. The inlet pressure impact negatively performance of Thermo™- Expansion valves.

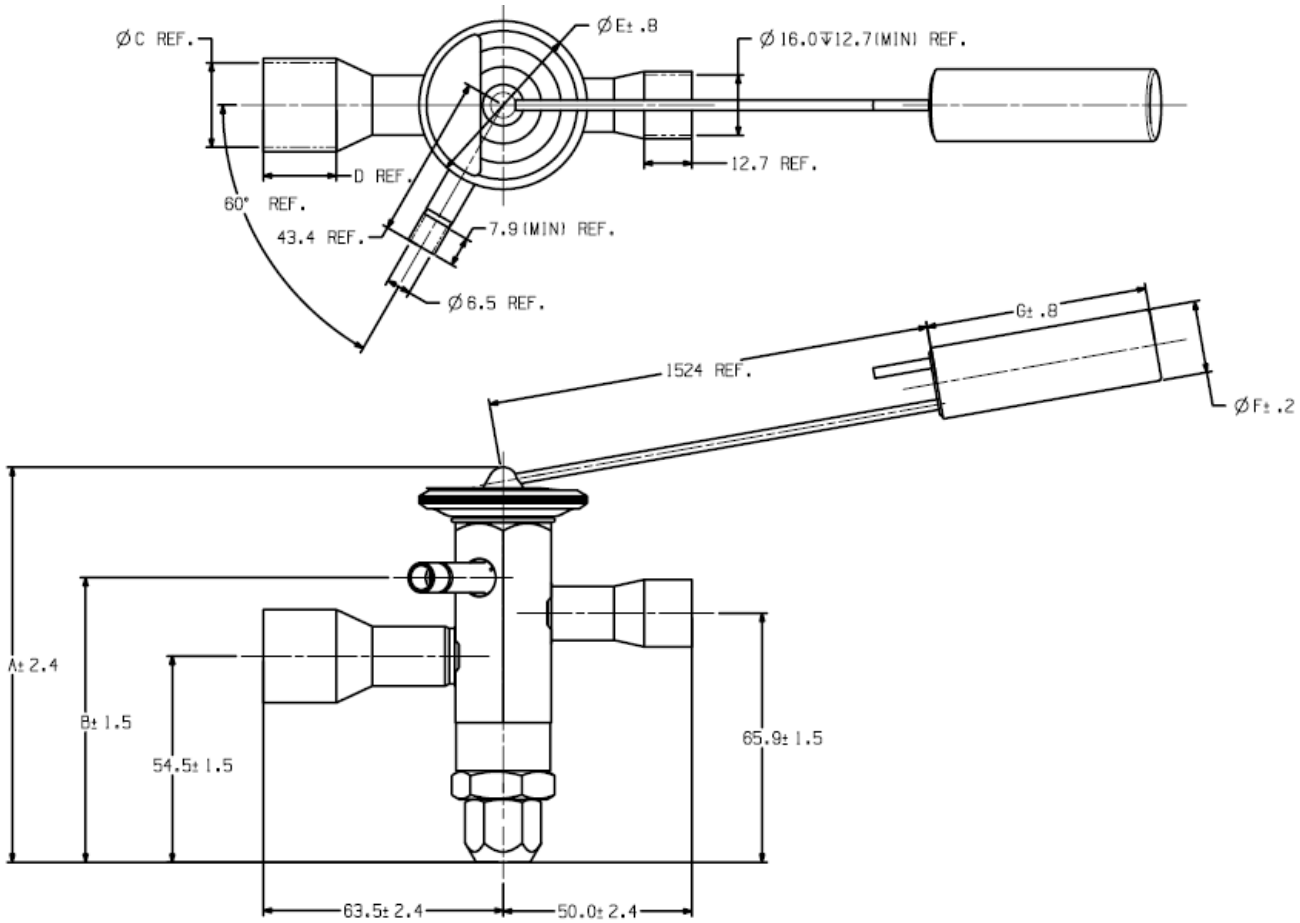


**Typical applications in Reversible chillers and heat pumps**

| Single Bi-Flow (package unit) | Two valves (package or split unit) | Single valve (package unit) |
|---|---|---|
|  |  |  |

Note: : Flow direction in cooling mode
: Flow direction in heating mode
: Flow direction independent from heating and cooling mode

**Dimensions (mm)**




| PCN | Model | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|---|
| 066780 | TRAE 8 HCA | 103.7 | 75.3 | 22.3 | 19.3 | 44.4 | 19.1 | 58.7 |
| 066781 | TRAE 10 HCA | 103.7 | 75.3 | 22.3 | 19.3 | 44.4 | 19.1 | 58.7 |
| 066782 | TRAE 12 HCA | 107.9 | 79.5 | 22.3 | 19.3 | 44.4 | 19.1 | 58.7 |
| 066783 | TRAE 12 HCA | 107.9 | 79.5 | 28.7 | 23.1 | 44.4 | 19.1 | 58.7 |
| 066784 | TRAE 15 HCA | 107.9 | 79.5 | 28.7 | 23.1 | 44.4 | 19.1 | 58.7 |
| 066785 | TRAE 8 HW100 | 103.7 | 75.3 | 22.3 | 19.3 | 44.4 | 19.1 | 58.7 |
| 066786 | TRAE 10 HW100 | 103.7 | 75.3 | 22.3 | 19.3 | 44.4 | 19.1 | 58.7 |
| 066787 | TRAE 12 HW100 | 107.9 | 79.5 | 22.3 | 19.3 | 44.4 | 19.1 | 58.7 |
| 066788 | TRAE 12 HW100 | 107.9 | 79.5 | 28.7 | 23.1 | 44.4 | 19.1 | 58.7 |
| 066789 | TRAE 15 HW100 | 107.9 | 79.5 | 28.7 | 23.1 | 44.4 | 19.1 | 58.7 |
| 066790 | TRAE 8 NW100 | 103.7 | 75.3 | 22.3 | 19.3 | 44.4 | 12.6 | 53.2 |
| 066791 | TRAE 10 NW100 | 103.7 | 75.3 | 22.3 | 19.3 | 44.4 | 12.6 | 53.2 |
| 066792 | TRAE 12 NW100 | 107.9 | 79.5 | 22.3 | 19.3 | 44.4 | 12.6 | 53.2 |
| 066793 | TRAE 12 NW100 | 107.9 | 79.5 | 28.7 | 23.1 | 44.4 | 12.6 | 53.2 |
| 066794 | TRAE 15 NW100 | 107.9 | 79.5 | 28.7 | 23.1 | 44.4 | 12.6 | 53.2 |
| 066797 | TRAE 8 ZAA | 104.5 | 75.3 | 22.3 | 19.3 | 44.5 | 19.1 | 58.7 |
| 066798 | TRAE 10 ZAA | 104.5 | 75.3 | 22.3 | 19.3 | 44.5 | 19.1 | 58.7 |
| 066799 | TRAE 12 ZAA | 104.5 | 75.3 | 22.3 | 19.3 | 44.5 | 19.1 | 58.7 |
| 066800 | TRAE 15 ZAA | 108.7 | 79.5 | 22.3 | 19.3 | 44.5 | 19.1 | 58.7 |
| 066801 | TRAE 15 ZAA | 108.7 | 79.5 | 28.7 | 23.1 | 44.5 | 19.1 | 58.7 |
| 066802 | TRAE 18 ZAA | 108.7 | 79.5 | 28.7 | 23.1 | 44.5 | 19.1 | 58.7 |

**Quick Selection (Included 1.5 bar pressure drop for liquid line components and distributor)**

| Condensing temperature [°C] | R410A Capacity in normal flow direction [kW] Evaporating temperature [°C] | | | | | | | R410A | Model |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | |
| 65 | 25.8 | 26.1 | 26.3 | 26.3 | 26.2 | 26.0 | 25.7 | 25.4 | TRAE 8 ZAA |
| | 32.2 | 32.6 | 32.8 | 32.9 | 32.8 | 32.5 | 32.2 | 31.7 | TRAE 10 ZAA |
| | 38.6 | 39.1 | 39.4 | 39.4 | 39.3 | 39.0 | 38.6 | 38.1 | TRAE 12 ZAA |
| | 48.3 | 48.9 | 49.2 | 49.3 | 49.1 | 48.8 | 48.3 | 47.6 | TRAE 15 ZAA |
| | 58.0 | 58.7 | 59.1 | 59.1 | 59.0 | 58.5 | 57.9 | 57.1 | TRAE 18 ZAA |
| 60 | 28.3 | 28.8 | 29.1 | 29.3 | 29.4 | 29.3 | 29.1 | 28.8 | TRAE 8 ZAA |
| | 35.4 | 36.0 | 36.4 | 36.6 | 36.7 | 36.6 | 36.4 | 36.0 | TRAE 10 ZAA |
| | 42.5 | 43.2 | 43.7 | 44.0 | 44.0 | 43.9 | 43.6 | 43.2 | TRAE 12 ZAA |
| | 53.1 | 54.0 | 54.6 | 55.0 | 55.1 | 54.9 | 54.6 | 54.0 | TRAE 15 ZAA |
| | 63.7 | 64.8 | 65.6 | 66.0 | 66.1 | 65.9 | 65.5 | 64.8 | TRAE 18 ZAA |
| 55 | 29.6 | 30.3 | 30.8 | 31.1 | 31.3 | 31.3 | 31.2 | 31.0 | TRAE 8 ZAA |
| | 37.0 | 37.8 | 38.5 | 38.9 | 39.1 | 39.1 | 39.0 | 38.8 | TRAE 10 ZAA |
| | 44.3 | 45.4 | 46.2 | 46.6 | 46.9 | 47.0 | 46.8 | 46.5 | TRAE 12 ZAA |
| | 55.4 | 56.8 | 57.7 | 58.3 | 58.6 | 58.7 | 58.6 | 58.2 | TRAE 15 ZAA |
| | 66.5 | 68.1 | 69.2 | 70.0 | 70.4 | 70.5 | 70.3 | 69.8 | TRAE 18 ZAA |
| 50 | 29.9 | 30.9 | 31.6 | 32.1 | 32.4 | 32.6 | 32.6 | 32.5 | TRAE 8 ZAA |
| | 37.4 | 38.6 | 39.5 | 40.1 | 40.5 | 40.7 | 40.7 | 40.6 | TRAE 10 ZAA |
| | 44.9 | 46.3 | 47.4 | 48.1 | 48.6 | 48.8 | 48.9 | 48.7 | TRAE 12 ZAA |
| | 56.1 | 57.9 | 59.2 | 60.1 | 60.7 | 61.0 | 61.1 | 60.9 | TRAE 15 ZAA |
| | 67.4 | 69.5 | 71.1 | 72.2 | 72.9 | 73.3 | 73.3 | 73.1 | TRAE 18 ZAA |
| 45 | 29.6 | 30.8 | 31.7 | 32.4 | 32.9 | 33.2 | 33.3 | 33.4 | TRAE 8 ZAA |
| | 37.0 | 38.5 | 39.6 | 40.5 | 41.1 | 41.5 | 41.7 | 41.7 | TRAE 10 ZAA |
| | 44.4 | 46.2 | 47.6 | 48.6 | 49.3 | 49.8 | 50.0 | 50.0 | TRAE 12 ZAA |
| | 55.5 | 57.7 | 59.5 | 60.8 | 61.7 | 62.2 | 62.5 | 62.5 | TRAE 15 ZAA |
| | 66.6 | 69.3 | 71.4 | 72.9 | 74.0 | 74.7 | 75.0 | 75.0 | TRAE 18 ZAA |
| 40 | 28.6 | 30.1 | 31.3 | 32.2 | 32.8 | 33.3 | 33.6 | 33.7 | TRAE 8 ZAA |
| | 35.7 | 37.6 | 39.1 | 40.2 | 41.0 | 41.6 | 42.0 | 42.1 | TRAE 10 ZAA |
| | 42.8 | 45.1 | 46.9 | 48.2 | 49.3 | 49.9 | 50.4 | 50.6 | TRAE 12 ZAA |
| | 53.5 | 56.4 | 58.6 | 60.3 | 61.6 | 62.4 | 63.0 | 63.2 | TRAE 15 ZAA |
| | 64.2 | 67.7 | 70.3 | 72.4 | 73.9 | 74.9 | 75.6 | 75.9 | TRAE 18 ZAA |
| 35 | 26.8 | 28.7 | 30.2 | 31.4 | 32.3 | 32.9 | 33.4 | 33.6 | TRAE 8 ZAA |
| | 33.5 | 35.9 | 37.8 | 39.3 | 40.4 | 41.2 | 41.7 | 42.1 | TRAE 10 ZAA |
| | 40.2 | 43.1 | 45.4 | 47.1 | 48.4 | 49.4 | 50.1 | 50.5 | TRAE 12 ZAA |
| | 50.2 | 53.9 | 56.7 | 58.9 | 60.6 | 61.8 | 62.6 | 63.1 | TRAE 15 ZAA |
| | 60.3 | 64.6 | 68.0 | 70.7 | 72.7 | 74.1 | 75.1 | 75.7 | TRAE 18 ZAA |

**Quick selection (Included 1.5 bar pressure drop for liquid line components and distributor)**

| Condensing temperature [°C] | R407C Capacity in normal flow direction [kW] Evaporating temperature [°C] | | | | | | | R407C | Model |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | |
| 55°C bubble point/ 59.2°C dew point | 34.8 | 35.2 | 35.3 | 35.3 | 35.1 | 34.8 | 34.4 | 33.9 | TRAE 8 NW100 |
| | 43.5 | 43.9 | 44.1 | 44.1 | 43.9 | 43.5 | 43.0 | 42.4 | TRAE 10 NW100 |
| | 52.2 | 52.7 | 53.0 | 52.9 | 52.7 | 52.2 | 51.6 | 50.8 | TRAE 12 NW100 |
| | 65.2 | 65.9 | 66.2 | 66.2 | 65.9 | 65.3 | 64.5 | 63.6 | TRAE 15 NW100 |
| 50°C bubble point/ 54.4°C dew point | 34.6 | 35.2 | 35.6 | 35.7 | 35.7 | 35.5 | 35.2 | 34.8 | TRAE 8 NW100 |
| | 43.3 | 44.0 | 44.5 | 44.7 | 44.6 | 44.4 | 44.0 | 43.5 | TRAE 10 NW100 |
| | 52.0 | 52.8 | 53.4 | 53.6 | 53.5 | 53.3 | 52.8 | 52.2 | TRAE 12 NW100 |
| | 65.0 | 66.1 | 66.7 | 67.0 | 66.9 | 66.6 | 66.0 | 65.3 | TRAE 15 NW100 |
| 45°C bubble point/ 49.6°C dew point | 34.0 | 34.8 | 35.4 | 35.7 | 35.8 | 35.8 | 35.6 | 35.3 | TRAE 8 NW100 |
| | 42.4 | 43.5 | 44.2 | 44.6 | 44.8 | 44.7 | 44.5 | 44.1 | TRAE 10 NW100 |
| | 50.9 | 52.2 | 53.0 | 53.5 | 53.7 | 53.6 | 53.4 | 52.9 | TRAE 12 NW100 |
| | 63.7 | 65.2 | 66.3 | 66.9 | 67.1 | 67.1 | 66.7 | 66.1 | TRAE 15 NW100 |
| 40°C bubble point/ 44.9°C dew point | 32.7 | 33.8 | 34.6 | 35.2 | 35.5 | 35.6 | 35.6 | 35.4 | TRAE 8 NW100 |
| | 40.9 | 42.3 | 43.3 | 44.0 | 44.4 | 44.5 | 44.4 | 44.2 | TRAE 10 NW100 |
| | 49.0 | 50.7 | 52.0 | 52.8 | 53.2 | 53.4 | 53.3 | 53.0 | TRAE 12 NW100 |
| | 61.3 | 63.4 | 65.0 | 66.0 | 66.5 | 66.8 | 66.7 | 66.3 | TRAE 15 NW100 |
| 35°C bubble point/ 40.1°C dew point | 30.9 | 32.4 | 33.5 | 34.2 | 34.7 | 35.0 | 35.1 | 35.1 | TRAE 8 NW100 |
| | 38.6 | 40.4 | 41.8 | 42.8 | 43.4 | 43.8 | 43.9 | 43.8 | TRAE 10 NW100 |
| | 46.3 | 48.5 | 50.2 | 51.3 | 52.1 | 52.5 | 52.7 | 52.6 | TRAE 12 NW100 |
| | 57.9 | 60.7 | 62.7 | 64.2 | 65.1 | 65.7 | 65.9 | 65.7 | TRAE 15 NW100 |
| 30°C bubble point/ 35.2°C dew point | 28.4 | 30.3 | 31.8 | 32.8 | 33.6 | 34.1 | 34.3 | 34.4 | TRAE 8 NW100 |
| | 35.5 | 37.9 | 39.7 | 41.1 | 42.0 | 42.6 | 42.9 | 43.0 | TRAE 10 NW100 |
| | 42.5 | 45.5 | 47.7 | 49.3 | 50.4 | 51.1 | 51.5 | 51.6 | TRAE 12 NW100 |
| | 53.2 | 56.9 | 59.6 | 61.6 | 63.0 | 63.9 | 64.4 | 64.5 | TRAE 15 NW100 |
| 25°C bubble point/ 30.4°C dew point | 25.1 | 27.7 | 29.6 | 31.0 | 32.0 | 32.7 | 33.2 | 33.4 | TRAE 8 NW100 |
| | 31.3 | 34.6 | 37.0 | 38.7 | 40.0 | 40.9 | 41.5 | 41.8 | TRAE 10 NW100 |
| | 37.6 | 41.5 | 44.3 | 46.5 | 48.0 | 49.1 | 49.7 | 50.1 | TRAE 12 NW100 |
| | 47.0 | 51.8 | 55.4 | 58.1 | 60.0 | 61.3 | 62.2 | 62.6 | TRAE 15 NW100 |

**Quick selection (Included 1.5 bar pressure drop for liquid line components and distributor)**

| Condensing temperature [°C] | R22 Capacity in normal flow direction [kW] Evaporating temperature [°C] | | | | | | | | R22 Model |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | |
| 65 | 33.5 | 33.9 | 34.1 | 34.2 | 34.2 | 34.0 | 33.8 | 33.4 | TRAE 8 HCA |
| | 41.9 | 42.4 | 42.7 | 42.8 | 42.7 | 42.5 | 42.2 | 41.8 | TRAE 10 HCA |
| | 50.3 | 50.9 | 51.2 | 51.3 | 51.3 | 51.0 | 50.6 | 50.1 | TRAE 12 HCA |
| | 62.9 | 63.6 | 64.0 | 64.2 | 64.1 | 63.8 | 63.3 | 62.7 | TRAE 15 HCA |
| | 33.5 | 33.9 | 34.1 | 34.2 | 34.2 | 34.0 | 33.8 | 33.4 | TRAE 8 HW100 |
| | 41.9 | 42.4 | 42.7 | 42.8 | 42.7 | 42.5 | 42.2 | 41.8 | TRAE 10 HW100 |
| | 50.3 | 50.9 | 51.2 | 51.3 | 51.3 | 51.0 | 50.6 | 50.1 | TRAE 12 HW100 |
| | 62.9 | 63.6 | 64.0 | 64.2 | 64.1 | 63.8 | 63.3 | 62.7 | TRAE 15 HW100 |
| 60 | 33.4 | 33.9 | 34.3 | 34.5 | 34.6 | 34.5 | 34.3 | 34.1 | TRAE 8 HCA |
| | 41.7 | 42.4 | 42.8 | 43.1 | 43.2 | 43.1 | 42.9 | 42.6 | TRAE 10 HCA |
| | 50.0 | 50.9 | 51.4 | 51.7 | 51.8 | 51.7 | 51.5 | 51.1 | TRAE 12 HCA |
| | 62.5 | 63.6 | 64.3 | 64.7 | 64.8 | 64.7 | 64.4 | 63.9 | TRAE 15 HCA |
| | 33.4 | 33.9 | 34.3 | 34.5 | 34.6 | 34.5 | 34.3 | 34.1 | TRAE 8 HW100 |
| | 41.7 | 42.4 | 42.8 | 43.1 | 43.2 | 43.1 | 42.9 | 42.6 | TRAE 10 HW100 |
| | 50.0 | 50.9 | 51.4 | 51.7 | 51.8 | 51.7 | 51.5 | 51.1 | TRAE 12 HW100 |
| | 62.5 | 63.6 | 64.3 | 64.7 | 64.8 | 64.7 | 64.4 | 63.9 | TRAE 15 HW100 |
| 55 | 32.7 | 33.5 | 34.0 | 34.4 | 34.5 | 34.6 | 34.5 | 34.4 | TRAE 8 HCA |
| | 40.9 | 41.8 | 42.5 | 42.9 | 43.2 | 43.2 | 43.2 | 42.9 | TRAE 10 HCA |
| | 49.1 | 50.2 | 51.0 | 51.5 | 51.8 | 51.9 | 51.8 | 51.5 | TRAE 12 HCA |
| | 61.4 | 62.8 | 63.8 | 64.4 | 64.8 | 64.9 | 64.7 | 64.4 | TRAE 15 HCA |
| | 32.7 | 33.5 | 34.0 | 34.4 | 34.5 | 34.6 | 34.5 | 34.4 | TRAE 8 HW100 |
| | 40.9 | 41.8 | 42.5 | 42.9 | 43.2 | 43.2 | 43.2 | 42.9 | TRAE 10 HW100 |
| | 49.1 | 50.2 | 51.0 | 51.5 | 51.8 | 51.9 | 51.8 | 51.5 | TRAE 12 HW100 |
| | 61.4 | 62.8 | 63.8 | 64.4 | 64.8 | 64.9 | 64.7 | 64.4 | TRAE 15 HW100 |
| 50 | 31.7 | 32.6 | 33.3 | 33.9 | 34.2 | 34.4 | 34.4 | 34.3 | TRAE 8 HCA |
| | 39.6 | 40.8 | 41.7 | 42.3 | 42.7 | 42.9 | 43.0 | 42.9 | TRAE 10 HCA |
| | 47.5 | 48.9 | 50.0 | 50.8 | 51.3 | 51.5 | 51.6 | 51.5 | TRAE 12 HCA |
| | 59.4 | 61.2 | 62.5 | 63.5 | 64.1 | 64.4 | 64.5 | 64.3 | TRAE 15 HCA |
| | 31.7 | 32.6 | 33.3 | 33.9 | 34.2 | 34.4 | 34.4 | 34.3 | TRAE 8 HW100 |
| | 39.6 | 40.8 | 41.7 | 42.3 | 42.7 | 42.9 | 43.0 | 42.9 | TRAE 10 HW100 |
| | 47.5 | 48.9 | 50.0 | 50.8 | 51.3 | 51.5 | 51.6 | 51.5 | TRAE 12 HW100 |
| | 59.4 | 61.2 | 62.5 | 63.5 | 64.1 | 64.4 | 64.5 | 64.3 | TRAE 15 HW100 |
| 45 | 30.1 | 31.4 | 32.3 | 33.0 | 33.5 | 33.8 | 33.9 | 34.0 | TRAE 8 HCA |
| | 37.7 | 39.2 | 40.4 | 41.2 | 41.8 | 42.2 | 42.4 | 42.5 | TRAE 10 HCA |
| | 45.2 | 47.0 | 48.4 | 49.5 | 50.2 | 50.7 | 50.9 | 50.9 | TRAE 12 HCA |
| | 56.5 | 58.8 | 60.6 | 61.9 | 62.8 | 63.3 | 63.6 | 63.7 | TRAE 15 HCA |
| | 30.1 | 31.4 | 32.3 | 33.0 | 33.5 | 33.8 | 33.9 | 34.0 | TRAE 8 HW100 |
| | 37.7 | 39.2 | 40.4 | 41.2 | 41.8 | 42.2 | 42.4 | 42.5 | TRAE 10 HW100 |
| | 45.2 | 47.0 | 48.4 | 49.5 | 50.2 | 50.7 | 50.9 | 50.9 | TRAE 12 HW100 |
| | 56.5 | 58.8 | 60.6 | 61.9 | 62.8 | 63.3 | 63.6 | 63.7 | TRAE 15 HW100 |
| 40 | 28.1 | 29.7 | 30.9 | 31.8 | 32.4 | 32.9 | 33.2 | 33.3 | TRAE 8 HCA |
| | 35.1 | 37.1 | 38.6 | 39.7 | 40.5 | 41.1 | 41.5 | 41.6 | TRAE 10 HCA |
| | 42.2 | 44.5 | 46.3 | 47.6 | 48.6 | 49.3 | 49.8 | 50.0 | TRAE 12 HCA |
| | 52.7 | 55.6 | 57.9 | 59.6 | 60.8 | 61.7 | 62.2 | 62.5 | TRAE 15 HCA |
| | 28.1 | 29.7 | 30.9 | 31.8 | 32.4 | 32.9 | 33.2 | 33.3 | TRAE 8 HW100 |
| | 35.1 | 37.1 | 38.6 | 39.7 | 40.5 | 41.1 | 41.5 | 41.6 | TRAE 10 HW100 |
| | 42.2 | 44.5 | 46.3 | 47.6 | 48.6 | 49.3 | 49.8 | 50.0 | TRAE 12 HW100 |
| | 52.7 | 55.6 | 57.9 | 59.6 | 60.8 | 61.7 | 62.2 | 62.5 | TRAE 15 HW100 |
| 35 | 25.5 | 27.5 | 29.0 | 30.2 | 31.1 | 31.7 | 32.1 | 32.4 | TRAE 8 HCA |
| | 31.9 | 34.4 | 36.3 | 37.7 | 38.8 | 39.6 | 40.2 | 40.5 | TRAE 10 HCA |
| | 38.3 | 41.2 | 43.5 | 45.3 | 46.6 | 47.5 | 48.2 | 48.6 | TRAE 12 HCA |
| | 47.8 | 51.5 | 54.4 | 56.6 | 58.2 | 59.4 | 60.2 | 60.7 | TRAE 15 HCA |
| | 25.5 | 27.5 | 29.0 | 30.2 | 31.1 | 31.7 | 32.1 | 32.4 | TRAE 8 HW100 |
| | 31.9 | 34.4 | 36.3 | 37.7 | 38.8 | 39.6 | 40.2 | 40.5 | TRAE 10 HW100 |
| | 38.3 | 41.2 | 43.5 | 45.3 | 46.6 | 47.5 | 48.2 | 48.6 | TRAE 12 HW100 |
| | 47.8 | 51.5 | 54.4 | 56.6 | 58.2 | 59.4 | 60.2 | 60.7 | TRAE 15 HW100 |