

General Product Guide 2017

For Refrigeration, Air Conditioning and Heat Pumps





Copeland™
brand products

Alco Controls™

Copeland Scroll™

Copeland Scroll™

Digital

Copeland Scroll™

Heating

Copeland Scroll™

Variable Speed

DWM COPELAND

Copeland™
EazyCool™

Note:

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Pioneering Technologies For Best-In-Class Products

Emerson Climate Technologies is the world's leading provider of heating, ventilation, air conditioning and refrigeration solutions for residential, commercial and industrial applications. We create reliable, energy-efficient climate systems that improve human comfort, safeguard food, and protect the environment.

For more than 80 years we have been introducing innovative technology to the market, from the first semi-hermetic and hermetic compressors in the 1940s and 1950s, over the high efficiency Discus, air conditioning and heating scroll compressors in the 1980s and 1990s, to the new Stream semi-hermetic compressors, the digital scroll compressor and the variable speed scroll with drive technology of today.

Based on this, we have developed an unequalled range of solutions for the refrigeration and air conditioning markets. In recent years, we have become a major solutions provider to the heat pump industry. Our range of Copeland™ brand compressors is engineered for higher efficiency, lower sound levels, superior durability and unsurpassed reliability. They allow the integration of new and environmentally-friendly refrigerants into your systems, while seamlessly improving efficiency and performance levels. Alco Controls™ is the leading provider of precision mechanical controls for the refrigeration and air conditioning markets, and together with the range of electronic controls from Emerson Climate Technologies we continue to pioneer the control of refrigerant flow with innovative design, keeping system performance optimization central to our product development.

More than 1,250 employees develop and deliver Emerson's high-class technology and manufacture our products in four European plants: Belgium, Northern Ireland and the Czech Republic (two plants). R&D centers in Welkenraedt (Belgium) and Mikulov (Czech Republic) enable new developments not only to meet our customers' requirements, but also to redefine the limits of technology.

With sales offices in Germany, France, Spain, Italy, the United Kingdom, Scandinavia, Benelux, Poland, as well as in Eastern Europe and Russia, Emerson Climate Technologies supports its European customers in a lean and efficient manner, supporting the industry with advanced technology, technical support and training services.

Our 2017 product catalogue gives a comprehensive overview of Emerson Climate Technologies', Copeland brand and Alco Controls products. Take a look and discover our broad product ranges including these innovations:

- Next generation of 20 and 25hp ZP*KCE R410A compact scrolls for efficient and reliable large chillers
- New commercial variable speed models with their matched inverter drive for superior performance when designing reversible chillers, heat pumps, precision cooling systems or rooftops
- New variable speed scrolls and their matched drives for residential applications
- The ZS*KAScroll compressor range for medium-temperature covering small size displacement range of 4 m³/h to 5 m³/h.
- The extended range of 4-cylinder Stream compressors for R744 transcritical and subcritical applications
- The CS3 series of safety pressure switches with fixed switch-point settings for CO₂ applications,
- The EXD-SH1/2 superheat controller controller, specifically designed for Emerson EX and CX electrical control valves in high-pressure CO₂ / high MOPD applications.

More in-depth technical data is available through our user-friendly Copeland and Alco selection software tools accessible via our web page www.emersonclimate.eu. For individual consultancy and service please contact your European sales office.



Copeland Scroll™ Compressors

With the launch of scroll technology in the mid 1980s, Emerson revolutionized the market setting new standards in the air conditioning industry. Since then, Copeland Scroll has become the reference not only in air conditioning but in refrigeration and heating applications too. Thousands of customers trust our proprietary technology: today, over 100 million Copeland Scrolls are installed worldwide, more than any other scroll compressor brand. Copeland Scroll compressors range from 1.5 to 60 hp and are designed to work with all the main refrigerants, including CO₂. With compressors built in both vertical and horizontal versions and capable of digital modulation, Emerson Climate Technologies has expanded the capability of scroll technology to new heights.

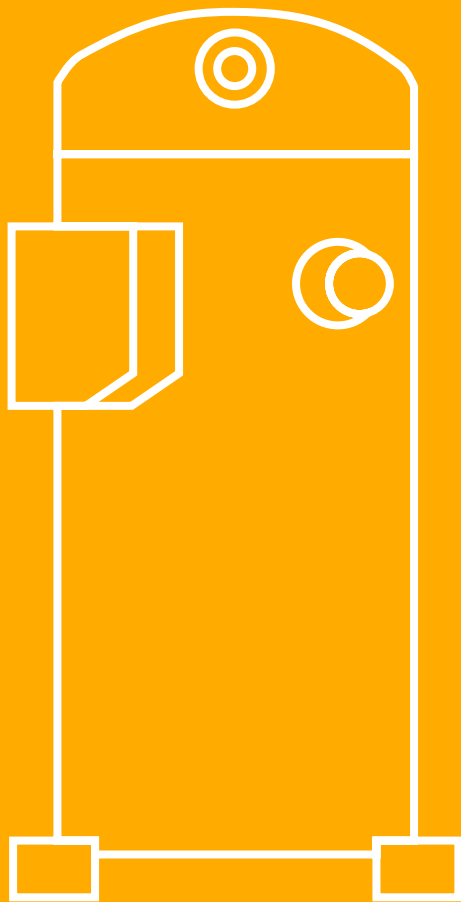
Additional innovations such as Enhanced Vapor Injection, the new Variable Speed scroll with drive technology for heat pump compressors or the design of the Emerson Climate Technologies sound shell give manufacturers, installers and end users the right tools to reduce the carbon footprint of their installations, optimize system design, efficiency, sound and reliability, while ensuring long equipment lifetime and minimizing capital and operating costs.

Applications for scroll compressors continue to grow thanks to innovation and adaptation. Industry as a whole has embraced its responsibility to put the environment first in its list of priorities, and this has led to strategic imperatives such as the need to introduce larger capacity scrolls with improved seasonal performance, modulated systems and product designed for use with “green” refrigerants such as CO₂. Emerson Climate Technologies is staying abreast of these challenges by successfully further developing its technologies in each of these areas.



Today we offer the broadest scroll product line-up in the market

Comfort Applications



Comfort Applications

For decades, Emerson Climate Technologies has driven advancement in the air conditioning and heat pump industry, leading the field with engineering products and systems that maximize the comfort of office and living spaces – while minimizing costs and inefficiencies.

Copeland Scroll™ compressors are designed to deliver the highest performance in residential and commercial applications. Thanks to the widest selection of scroll compressors optimized for air conditioning and heating, it has never been easier to match all desired applications with the highest efficiency and reliability. The capacity of our single scrolls ranges from 1.5 to 60hp and they can reach an overall capacity of 180 hp per circuit when combined in even and uneven tandems and trios. Whether your need is a cooling optimized, heating optimized or reversible unit, you will find the most advanced technology within our range.

One of the most important recent innovations for comfort applications has been the introduction of Variable Speed technology.

It was first introduced with the ZHW compressors (featuring Enhanced Vapor Injection), as a solution for residential heat pump applications. Now we also offer the XHV range for cost-competitive heating systems. In addition to the ZHW and XHV ranges for residential applications, a wide range of models for reversible and low temperature commercial applications are available, from 20 to 96 cm³: XPV and ZPV Variable Speed scroll compressors allow system manufacturers and building owners to achieve superior performance when designing reversible chillers, heat pumps, precision cooling systems or rooftops.

Emerson Climate Technologies is introducing the next generation of 20 and 25hp ZP* KCE compact scrolls for R410A with advanced monitoring features and optimized seasonal performance.

ZR Copeland Scroll™ Compressor Range for R407C and R134a

ZR Copeland Scroll compressors, for R407C and R134a, for comfort and process/precision cooling applications.

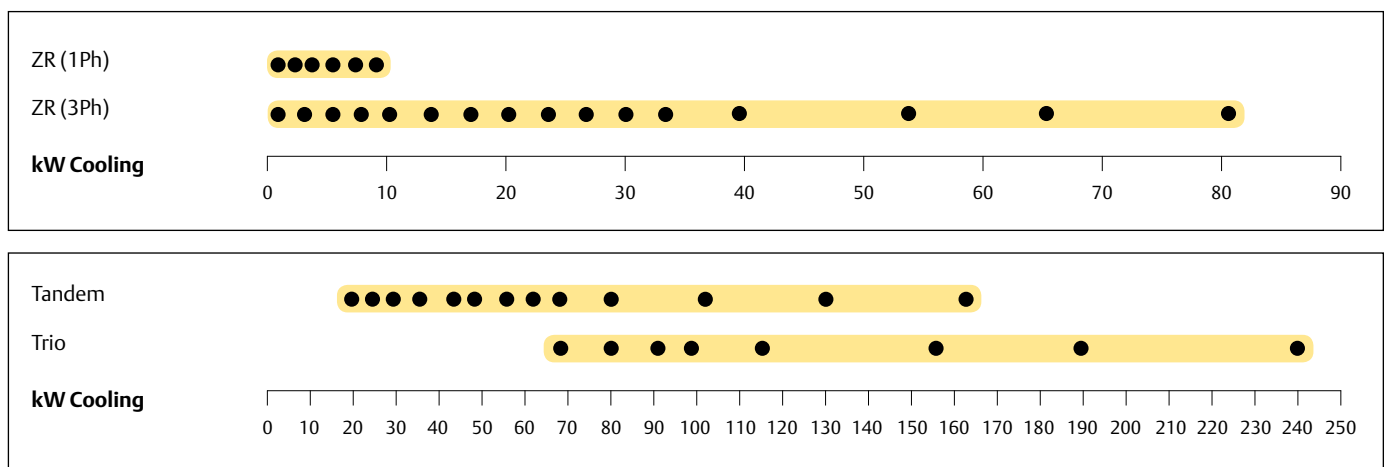
Applied in the air conditioning and comfort industry for water chillers, rooftops and close control unit applications, scroll compressors are now the most used compression technology replacing reciprocating and screw compressors due to its undeniable superiority. Several, fully Copeland™ qualified, multiple compressor assemblies (tandem and trio) are available to allow the use of Copeland Scroll compressors into large capacity systems (ex. up to 500kW air cooled chillers) able to deliver optimal comfort, low operating cost with higher seasonal efficiency (ESEER).

The range of products goes from the ZR18 (1.5hp) to the ZR380 (30hp)



ZR Scroll Compressor

ZR Scroll Compressor Line-up R407C



Conditions EN12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

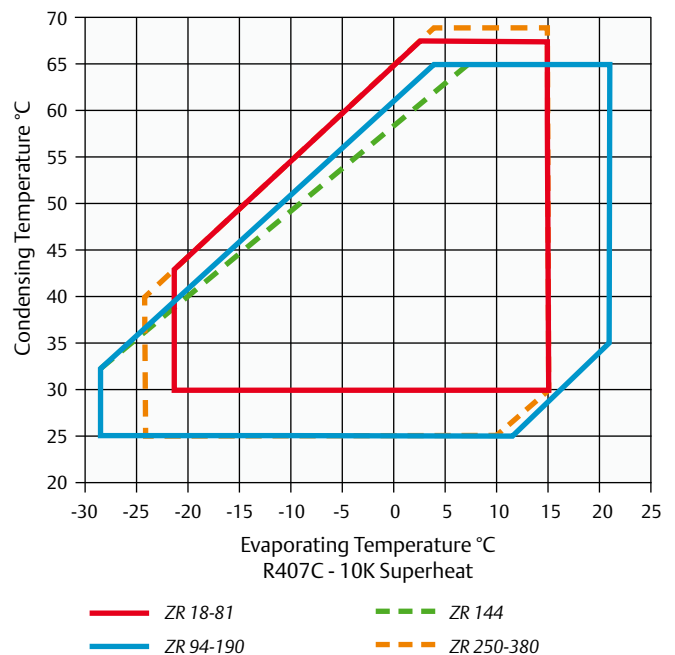
Features and Benefits

- Copeland Scroll axial and radial compliance for superior reliability and efficiency
- Wide scroll line-up for R407C and R134a
- Low TEWI (Total Equivalent Warming Impact)
- Low sound and vibration level
- Low oil circulation rate
- Copeland qualified tandem and trio configurations for superior seasonal efficiency (ESEER)

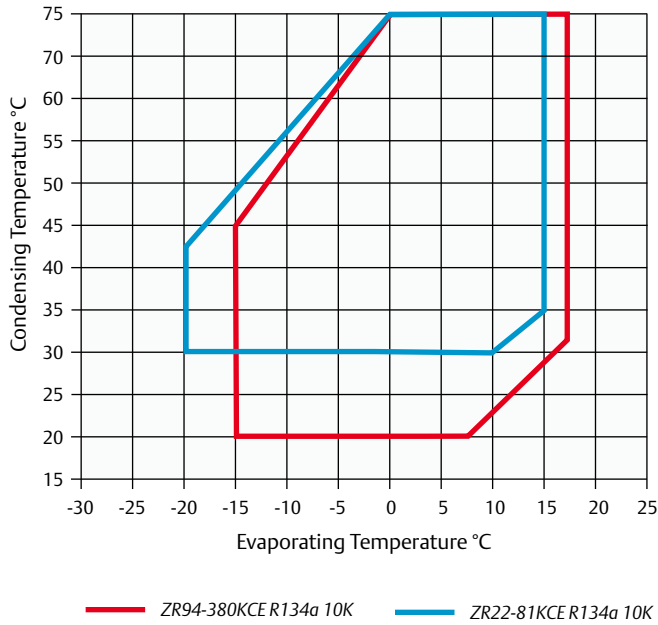
Maximum Allowable Pressure (PS)

- ZR18 to ZR81:
Low Side PS 20 bar(g) / High Side PS 29.5 bar(g)
- ZR94 to ZR380:
Low Side PS 20 bar(g) / High Side PS 32 bar(g)

Operating Envelope R407C



Operating Envelope R134a



Technical Overview

| Models | Nominal hp | R407C Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m - dB(A) *** |
|----------|------------|---------------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|---------------------------------|
| | | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| ZR18K5E | 1.5 | 3.7 | 3.0 | 4.4 | ¾ | ½ | 0.74 | 242/242/383 | 20 | PFJ | | 10 | | 35 | | 54 |
| ZR22K3E | 2.0 | 4.5 | 2.9 | 5.3 | ¾ | ½ | 1.00 | 242/242/363 | 22 | PFJ | TFD | 11 | 4 | 47 | 24 | 54 |
| ZR28K3E | 2.5 | 5.9 | 2.9 | 6.8 | ¾ | ½ | 1.00 | 242/242/363 | 25 | PFJ | TFD | 15 | 5 | 61 | 32 | 54 |
| ZR34K3E | 2.8 | 7.0 | 3.0 | 8.0 | ¾ | ½ | 1.10 | 242/242/386 | 26 | PFJ | TFD | 17 | 6 | 76 | 40 | 57 |
| ZR40K3E | 3.5 | 8.2 | 3.0 | 9.4 | ¾ | ½ | 1.10 | 242/242/400 | 27 | PFJ | TFD | 23 | 7 | 100 | 46 | 57 |
| ZR48K3E | 4.0 | 10.1 | 3.1 | 11.4 | ¾ | ½ | 1.36 | 242/242/417 | 31 | PFJ | TFD | 23 | 10 | 114 | 50 | 57 |
| ZR61KCE | 5.0 | 12.5 | 3.1 | 14.4 | ¾ | ½ | 1.66 | 241/247/438 | 43 | PFJ | TFD | 30 | 11 | 150 | 65 | 60 |
| ZR61K5E | 5.0 | 12.8 | 3.2 | 14.4 | ¾ | ½ | 1.42 | 242/242/430 | 30 | PFZ | TFM | | 11 | | 59 | 61 |
| ZR72KCE | 6.0 | 14.8 | 3.2 | 17.1 | ¾ | ½ | 1.77 | 242/242/438 | 39 | | TFD | | 13 | | 74 | 61 |
| ZR81KCE | 6.8 | 16.7 | 3.2 | 18.7 | ¾ | ¾ | 1.77 | 242/242/443 | 39 | | TFD | | 15 | | 101 | 61 |
| ZR94KCE | 8.0 | 20.6 | 3.3 | 22.1 | 1 ¼ | ¾ | 2.65 | 264/285/476 | 57 | | TFD | | 16 | | 95 | 63 |
| ZR108KCE | 9.0 | 23.0 | 3.4 | 24.9 | 1 ¾ | ¾ | 3.38 | 264/285/533 | 60 | | TFD | | 17 | | 111 | 63 |
| ZR125KCE | 10.0 | 27.0 | 3.4 | 29.1 | 1 ¾ | ¾ | 3.38 | 264/285/533 | 61 | | TFD | | 19 | | 118 | 63 |
| ZR144KCE | 12.0 | 30.9 | 3.4 | 33.2 | 1 ¾ | ¾ | 3.38 | 264/285/533 | 61 | | TFD | | 22 | | 118 | 64 |
| ZR160KCE | 13.0 | 33.4 | 3.2 | 36.4 | 1 ¾ | ¾ | 3.38 | 264/285/552 | 65 | | TFD | | 28 | | 140 | 67 |
| ZR190KCE | 15.0 | 39.3 | 3.2 | 43.3 | 1 ¾ | ¾ | 3.38 | 264/285/552 | 66 | | TFD | | 34 | | 174 | 69 |
| ZR250KCE | 20.0 | 52.2 | 3.2 | 56.6 | 1 ¾ | 1 ¾ | 4.70 | 432/376/717 | 140 | | TWD | | 41 | | 225 | 72 |
| ZR310KCE | 25.0 | 65.0 | 3.2 | 71.4 | 1 ¾ | 1 ¾ | 6.80 | 448/392/715 | 160 | | TWD | | 52 | | 272 | 74 |
| ZR380KCE | 30.0 | 81.7 | 3.4 | 87.4 | 1 ¾ | 1 ¾ | 6.30 | 447/427/715 | 177 | | TWD | | 62 | | 310 | 76 |

Conditions EN12900 : Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

* 1 Ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature +40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|------|------|------|------|------|----------|------------------------------|------|------|------|------|------|------|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 |
| ZR22K3E | 1.4 | 1.8 | 2.3 | 2.9 | 3.6 | 4.4 | 5.3 | ZR22K3E | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 |
| ZR28K3E | 1.8 | 2.3 | 3.0 | 3.8 | 4.7 | 5.7 | 6.9 | ZR28K3E | 1.1 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| ZR34K3E | 2.2 | 2.9 | 3.6 | 4.5 | 5.5 | 6.7 | 8.1 | ZR34K3E | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 |
| ZR40K3E | 2.5 | 3.3 | 4.2 | 5.2 | 6.4 | 7.8 | 9.3 | ZR40K3E | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| ZR48K3E | 3.1 | 4.0 | 5.1 | 6.3 | 7.8 | 9.5 | 11.5 | ZR48K3E | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| ZR61KCE | 4.0 | 5.2 | 6.5 | 8.1 | 9.9 | 12.1 | 14.6 | ZR61KCE | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 |
| ZR72KCE | 4.8 | 6.2 | 7.8 | 9.7 | 11.9 | 14.5 | 17.4 | ZR72KCE | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.7 |
| ZR81KCE | 5.5 | 7.0 | 8.8 | 10.8 | 13.2 | 16.0 | 19.2 | ZR81KCE | 2.8 | 2.9 | 2.9 | 2.9 | 2.9 | 3.0 | 3.0 |
| ZR94KCE | 5.3 | 7.5 | 10.5 | 13.0 | 15.9 | 19.2 | 23.0 | ZR94KCE | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.5 |
| ZR108KCE | 7.3 | 9.3 | 11.7 | 14.3 | 17.5 | 21.3 | 25.7 | ZR108KCE | 3.7 | 3.8 | 3.8 | 3.8 | 3.8 | 3.9 | 3.9 |
| ZR125KCE | 8.3 | 10.7 | 13.5 | 16.7 | 20.5 | 24.9 | 30.1 | ZR125KCE | 4.3 | 4.4 | 4.4 | 4.4 | 4.4 | 4.5 | 4.5 |
| ZR144KCE | 10.4 | 13.3 | 16.5 | 20.0 | 23.7 | 27.8 | 32.4 | ZR144KCE | 4.7 | 4.9 | 4.9 | 5.0 | 5.0 | 5.2 | 5.5 |
| ZR160KCE | 10.1 | 13.3 | 16.9 | 21.0 | 25.7 | 31.2 | 37.5 | ZR160KCE | 5.5 | 5.5 | 5.5 | 5.6 | 5.7 | 5.8 | 5.9 |
| ZR190KCE | 12.3 | 16.0 | 20.2 | 25.0 | 30.7 | 37.2 | 44.7 | ZR190KCE | 6.8 | 6.9 | 6.9 | 7.0 | 7.0 | 7.1 | 7.3 |
| ZR250KCE | 16.1 | 20.5 | 25.6 | 31.8 | 39.0 | 47.4 | 57.2 | ZR250KCE | 8.6 | 8.7 | 8.9 | 9.0 | 9.1 | 9.2 | 9.4 |
| ZR310KCE | 20.0 | 25.6 | 32.1 | 39.7 | 48.6 | 59.0 | 71.1 | ZR310KCE | 10.6 | 10.8 | 10.9 | 10.0 | 11.2 | 11.5 | 11.7 |
| ZR380KCE | 25.5 | 32.2 | 40.1 | 49.4 | 60.3 | 73.0 | 87.8 | ZR380KCE | 12.6 | 12.9 | 13.1 | 13.4 | 13.6 | 14.0 | 14.4 |

Conditions: Suction Superheat 10K / Subcooling 0K

| Condensing Temperature +40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|------|------|------|-------|-------|----------|------------------------------|------|------|------|------|------|------|
| R407C | Cooling Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 |
| ZR18K5E | 1.8 | 2.3 | 2.8 | 3.5 | 4.2 | 5.1 | 6.1 | ZR18K5E | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| ZR22K3E | 2.1 | 2.7 | 3.4 | 4.2 | 5.2 | 6.3 | 7.5 | ZR22K3E | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 |
| ZR28K3E | 2.7 | 3.5 | 4.4 | 5.5 | 6.7 | 8.1 | 9.6 | ZR28K3E | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 |
| ZR34K3E | 3.2 | 4.1 | 5.2 | 6.5 | 7.9 | 9.6 | 11.5 | ZR34K3E | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 |
| ZR40K3E | 3.8 | 4.9 | 6.1 | 7.6 | 9.4 | 11.3 | 13.5 | ZR40K3E | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 |
| ZR48K3E | 4.8 | 6.1 | 7.6 | 9.4 | 11.5 | 13.8 | 16.6 | ZR48K3E | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 |
| ZR61KSE | 6.5 | 8.1 | 9.9 | 11.9 | 14.4 | 17.2 | 20.6 | ZR61KsE | 3.0 | 3.0 | 3.1 | 3.2 | 3.2 | 3.1 | 2.9 |
| ZR72KCE | 7.0 | 9.0 | 11.3 | 13.9 | 16.9 | 20.3 | 24.2 | ZR72KCE | 3.6 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.8 |
| ZR81KCE | 7.8 | 10.1 | 12.7 | 15.6 | 19.1 | 23.0 | 27.7 | ZR81KCE | 4.1 | 4.1 | 4.1 | 4.1 | 4.2 | 4.2 | 4.3 |
| ZR94KCE | 9.8 | 12.6 | 15.8 | 19.3 | 23.3 | 27.9 | 33.1 | ZR94KCE | 4.9 | 5.0 | 5.0 | 5.0 | 5.0 | 4.9 | 4.9 |
| ZR108KCE | 11.3 | 14.2 | 17.6 | 21.5 | 26.2 | 31.5 | 37.6 | ZR108KCE | 5.4 | 5.4 | 5.5 | 5.5 | 5.5 | 5.6 | 5.7 |
| ZR125KCE | 13.1 | 16.6 | 20.5 | 25.2 | 30.5 | 36.7 | 43.7 | ZR125KCE | 6.3 | 6.3 | 6.4 | 6.4 | 6.4 | 6.5 | 6.6 |
| ZR144KCE | 14.5 | 18.7 | 23.4 | 28.9 | 35.0 | 42.0 | 50.1 | ZR144KCE | 7.1 | 7.1 | 7.2 | 7.2 | 7.3 | 7.3 | 7.4 |
| ZR160KCE | 14.9 | 19.5 | 24.9 | 31.3 | 38.7 | 47.3 | 57.1 | ZR160KCE | 8.0 | 8.1 | 8.2 | 8.2 | 8.3 | 8.4 | 8.5 |
| ZR190KCE | 18.5 | 23.8 | 29.8 | 36.7 | 44.7 | 53.8 | 64.2 | ZR190KCE | 9.7 | 9.7 | 9.8 | 9.8 | 9.9 | 10.1 | 10.4 |
| ZR250KCE | 25.7 | 32.2 | 39.9 | 48.9 | 59.3 | 71.3 | 85.0 | ZR250KCE | 12.5 | 12.6 | 12.7 | 12.9 | 13.0 | 13.0 | 13.0 |
| ZR310KCE | 31.2 | 39.7 | 49.7 | 61.4 | 75.0 | 90.7 | 108.5 | ZR310KCE | 15.6 | 15.7 | 15.9 | 16.1 | 16.3 | 16.6 | 17.0 |
| ZR380KCE | 38.1 | 49.1 | 61.7 | 76.2 | 93.1 | 113.0 | 136.5 | ZR380KCE | 18.6 | 18.8 | 19.0 | 19.2 | 19.4 | 19.8 | 20.3 |

Conditions: Suction Superheat 10K / Subcooling 0K

Tandem and Trio Model Overview

| Model | Nominal hp | Cooling Capacity R407C (kW) | Cooling Capacity R134a (kW) | Even Tandem | Uneven Tandem | Trio |
|--|------------|-----------------------------|-----------------------------|-------------|---------------|------|
| Tandem ZRT - Tandem Uneven ZRU - Trio ZRY | | | | | | |
| ZRT 96 K3E | 2 x 4 | 20 | 14 | • | | |
| ZRT 122 K3E | 2 x 5 | 25 | 18 | • | | |
| ZRT 144 K3E | 2 x 6 | 30 | 21 | • | | |
| ZRT 162 K3E | 2 x 6.5 | 33 | 24 | • | | |
| ZRT 188 K3E | 2 x 8 | 41 | 28 | • | | |
| ZRT 216 K3E | 2 x 9 | 46 | 31 | • | | |
| ZRT 250 K3E | 2 x 10 | 52 | 37 | • | | |
| ZRT 288 K3E | 2 x 12 | 59 | 42 | • | | |
| ZRU 315 KCE* | 10 + 15 | 66 | 45 | | • | |
| ZRT 320 K3E | 2 x 13 | 67 | 46 | • | | |
| ZRU 350 KCE* | 13 + 15 | 73 | 50 | | • | |
| ZRT 380 K3E | 2 x 15 | 78 | 54 | • | | |
| ZRU 440 KCE* | 15 + 20 | 92 | 63 | | • | |
| ZRY 480 KCE* | 3 x 13 | 99 | 67 | | | • |
| ZRT 500 K3E* | 2 x 20 | 104 | 71 | • | | |
| ZRU 500 KCE* | 15 + 25 | 104 | 71 | | • | |
| ZRU 560 KCE* | 20 + 25 | 117 | 79 | | • | |
| ZRY 570 KCE* | 3 x 15 | 116 | 80 | | | • |
| ZRT 620 K3E* | 2 x 25 | 130 | 88 | • | | |
| ZRU 690 KCE* | 25 + 30 | 147 | 99 | | • | |
| ZRY 750 KCE* | 3 x 20 | 154 | 105 | | | • |
| ZRT 760 K3E* | 2 x 30 | 163 | 111 | • | | |
| ZRY 930 KCE* | 3 x 25 | 192 | 129 | | | • |
| ZRY 114 KCE* | 3 x 30 | 241 | 164 | | | • |

Conditions EN 12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

* Tandem / Trio assemblies by system manufacturers. Emerson Climate Technologies can provide full technical support.

ZP Copeland Scroll™ Compressor Range for R410A

ZP Copeland Scroll compressors, for R410A, for comfort and process/precision cooling applications. Emerson Climate Technologies has been the pioneer in launching the first complete line-up of R410A commercial scroll compressors.

ZP Copeland Scroll compressors are perfectly suitable for air-cooled chiller systems up to 900kW (1100 kW if water-cooled) featuring high comfort and superior seasonal efficiency (ESEER). Whether used in stand-alone, tandem or trio configurations, the broad ZP Copeland Scroll line-up meets today's market requirements with unmatched flexibility, efficiency and proven reliability.

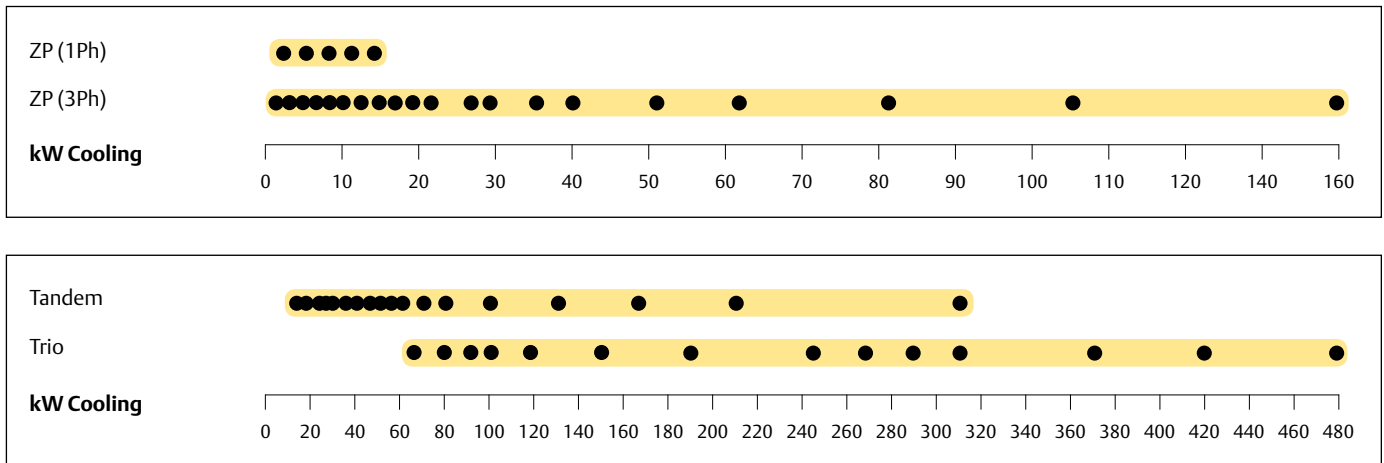
The new ZP232 and ZP292KCE for large chillers feature advanced monitoring capabilities, improved part load information and optimized seasonal performance.

ZP104, ZP122 and ZP143KCE compressors for light commercial systems have a reduced footprint and weight for more compact systems. Their high efficiency helps to reduce operating costs.



ZP Scroll Compressor

ZP Scroll Compressor Line-up



Conditions EN12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

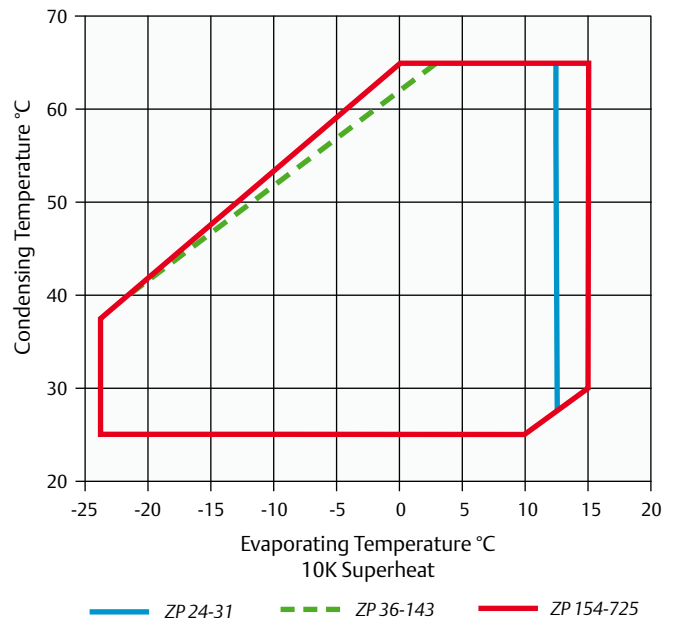
Features and Benefits

- Copeland qualified tandem and trio (now also uneven) configurations for superior seasonal efficiency (ESEER and EN14825: SEER and SCOP)
- Copeland Scroll axial and radial compliance for superior reliability and efficiency
- Extended 5K operating envelope suitable for heat pump applications
- Low TEWI (Total Equivalent Warming Impact)
- Wide scroll line-up for R410A
- Low sound and vibration level
- Low oil circulation rate

Maximum Allowable Pressure (PS)

- ZP24 to ZP91:
Low Side PS 28 bar(g) / High Side PS 43 bar(g)
- ZP104 to ZP725:
Low Side PS 29.5 bar(g) / High Side PS 45 bar(g)

Operating Envelope R410A



Technical Overview

| Models | Nominal hp | Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m - dB(A)**** |
|----------|------------|---------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|---------------------------------|
| | | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| ZP24K5E | 1.9 | 5.1 | 2.8 | 3.9 | ¾ | ½ | 0.74 | 242/242/387 | 22 | PFJ | TFD | 13 | 5 | 60 | 28 | 55 |
| ZP29K5E | 2.2 | 6.1 | 2.9 | 4.8 | ¾ | ½ | 0.74 | 242/242/387 | 23 | PFJ | TFD | 16 | 6 | 67 | 38 | 55 |
| ZP31K5E | 3.0 | 6.5 | 2.8 | 5.0 | ¾ | ½ | 0.74 | 242/242/388 | 23 | PFJ | TFD | 17 | 6 | 67 | 38 | 55 |
| ZP36K5E | 2.6 | 7.9 | 3.0 | 6.0 | ¾ | ½ | 1.25 | 242/242/418 | 30 | PFJ | TFD | 22 | 7 | 98 | 46 | 57 |
| ZP42K5E | 3.4 | 9.0 | 2.9 | 6.9 | ¾ | ½ | 1.25 | 242/242/418 | 31 | PFJ | TFD | 26 | 8 | 128 | 43 | 57 |
| ZP54K5E | 4.6 | 11.6 | 3.0 | 8.9 | ¾ | ½ | 1.24 | 242/242/418 | 34 | PFJ | TFD | 31 | 10 | 115 | 51 | 59 |
| ZP61K5E | 5.0 | 13.3 | 3.0 | 10.0 | ¾ | ½ | 1.24 | 246/246/443 | 35 | | TFD | | 12 | | 64 | 60 |
| ZP72K5E | 6.0 | 15.3 | 3.0 | 11.7 | ¾ | ½ | 1.77 | 246/246/443 | 40 | | TFD | | 15 | | 75 | 64 |
| ZP83K5E | 6.5 | 17.7 | 3.1 | 13.4 | ¾ | ½ | 1.77 | 246/246/443 | 40 | | TFD | | 15 | | 101 | 61 |
| ZP91K5E | 7.5 | 19.3 | 3.1 | 14.7 | ¾ | ¾ | 1.77 | 246/248/446 | 41 | | TFD | | 16 | | 101 | 61 |
| ZP104K5E | 9.0 | 22.7 | 3.2 | 16.8 | 1 ¼ | ¾ | 2.51 | 264/284/476 | 48 | | TFD | | 18 | | 128 | 63 |
| ZP122K5E | 10.0 | 26.5 | 3.2 | 19.5 | 1 ¼ | ¾ | 2.51 | 293/258/559 | 49 | | TFD | | 22 | | 139 | 63 |
| ZP143K5E | 12.0 | 31.6 | 3.2 | 23.1 | 1 1/8 | ¾ | 2.75 | 297/262/559 | 49 | | TFD | | 25 | | 145 | 64 |
| ZP154K5E | 13.0 | 33.5 | 3.2 | 24.8 | 1 ¾ | ¾ | 3.38 | 329/298/552 | 65 | | TFD | | 31 | | 140 | 65 |
| ZP182K5E | 15.0 | 39.6 | 3.2 | 29.1 | 1 ¾ | ¾ | 3.38 | 264/284/552 | 66 | | TFD | | 34 | | 174 | 66 |
| ZP232K5E | 20.0 | 50.6 | 3.3 | 37.8 | 1 ¾ | 1 ¼ | 4.60 | 344/292/661 | 91 | | TED | | 40 | | 225 | 72 |
| ZP235K5E | 20.0 | 50.6 | 3.2 | 37.8 | 1 ¾ | 1 ¼ | 4.70 | 427/376/717 | 140 | | TWD | | 40 | | 225 | 71 |
| ZP292K5E | 25.0 | 63.0 | 3.3 | 45.7 | 1 ¾ | 1 ¼ | 4.60 | 344/292/661 | 91 | | TED | | 48 | | 272 | 73 |
| ZP295K5E | 25.0 | 63.5 | 3.2 | 46.7 | 1 ¾ | 1 ¾ | 6.80 | 448/392/715 | 160 | | TWD | | 48 | | 272 | 74 |
| ZP385K5E | 30.0 | 82.4 | 3.2 | 60.8 | 1 ¾ | 1 ¾ | 6.30 | 448/392/715 | 178 | | TWD | | 65 | | 310 | 74 |
| ZP485K5E | 40.0 | 105.0 | 3.2 | 77.3 | 1 ¾ | 1 ¾ | 6.30 | 391/447/746 | 190 | | TWD | | 82 | | 408 | 78 |
| ZP725K5E | 60.0 | 160.0 | 3.2 | 115 | 2 ¼ | 1 ¾ | 6.30 | 459/483/863 | 250 | | FED | | 124 | | 567 | 78 |

Conditions EN12900 : Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

* 1 Ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Preliminary data

Capacity Data

| Condensing Temperature +40°C | | | | | | | | | | | | | | | | | |
|------------------------------|--|------------------------------|-------|-------|-------|-------|-------|-------|----------|------------------------------|------|------|------|------|------|------|------|
| R410A | | Cooling Capacity (kW) | | | | | | R410A | | Power Input (kW) | | | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 |
| ZP24K5E | | 2.2 | 3.0 | 3.9 | 4.9 | 5.9 | 7.1 | | ZP24K5E | | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | |
| ZP29K5E | | 2.9 | 3.9 | 4.9 | 6.0 | 7.3 | 8.6 | | ZP29K5E | | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | |
| ZP31K5E | | 3.2 | 4.1 | 5.2 | 6.3 | 7.6 | 9.1 | | ZP31K5E | | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | |
| ZP36K5E | | 4.1 | 5.1 | 6.3 | 7.7 | 9.2 | 11.0 | | ZP36K5E | | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | |
| ZP42K5E | | 4.4 | 5.7 | 7.1 | 8.7 | 10.5 | 12.5 | | ZP42K5E | | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | |
| ZP54K5E | | 6.0 | 7.5 | 9.3 | 11.3 | 13.5 | 16.0 | | ZP54K5E | | 3.1 | 3.1 | 3.0 | 3.0 | 2.9 | 2.9 | |
| ZP61K5E | | 6.9 | 8.6 | 10.6 | 12.9 | 15.5 | 18.4 | 21.4 | ZP61K5E | | 3.5 | 3.5 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| ZP72KCE | | 8.2 | 10.1 | 12.3 | 14.8 | 17.7 | 20.9 | | ZP72KCE | | 4.0 | 4.0 | 4.0 | 4.0 | 4.1 | 4.1 | |
| ZP83KCE | | 9.4 | 11.6 | 14.2 | 17.1 | 20.4 | 24.2 | | ZP83KCE | | 4.5 | 4.5 | 4.5 | 4.6 | 4.6 | 4.7 | |
| ZP91KCE | | 10.2 | 12.6 | 15.4 | 18.6 | 22.2 | 26.3 | 31.0 | ZP91KCE | | 4.9 | 4.9 | 4.9 | 5.0 | 5.0 | 5.0 | 5.3 |
| ZP104KCE | | 12.0 | 14.9 | 18.1 | 21.9 | 26.1 | 31.0 | 36.5 | ZP104KCE | | 5.7 | 5.7 | 5.7 | 5.7 | 5.8 | 5.8 | 5.9 |
| ZP122KCE | | 14.1 | 17.4 | 21.2 | 25.5 | 30.4 | 36.1 | 42.4 | ZP122KCE | | 6.6 | 6.6 | 6.7 | 6.7 | 6.7 | 6.8 | 6.9 |
| ZP143KCE | | 15.9 | 20.3 | 25.2 | 30.5 | 36.1 | 41.9 | 47.8 | ZP143KCE | | 7.5 | 7.7 | 7.8 | 7.9 | 8.1 | 8.4 | 8.8 |
| ZP154KCE | | 18.2 | 22.3 | 27.1 | 32.6 | 38.9 | 46.1 | 54.3 | ZP154KCE | | 8.1 | 8.2 | 8.2 | 8.3 | 8.3 | 8.5 | 8.8 |
| ZP182KCE | | 21.4 | 26.3 | 32.0 | 38.4 | 45.6 | 53.9 | 63.3 | ZP182KCE | | 9.5 | 9.7 | 9.9 | 10.0 | 10.1 | 10.1 | 10.0 |
| ZP232KCE | | 26.5 | 32.9 | 40.3 | 48.8 | 58.6 | 69.7 | 82.3 | ZP232KCE | | 12.4 | 15.5 | 12.7 | 12.8 | 13.0 | 13.2 | 13.4 |
| ZP235KCE | | 26.5 | 32.9 | 40.3 | 48.8 | 58.6 | 69.7 | 82.3 | ZP235KCE | | 12.5 | 12.6 | 12.7 | 12.8 | 13.0 | 13.2 | 13.5 |
| ZP292KCE | | 34.5 | 42.0 | 50.6 | 60.6 | 71.9 | 84.9 | 99.7 | ZP292KCE | | 15.2 | 15.4 | 15.5 | 15.6 | 15.6 | 15.6 | 15.6 |
| ZP295KCE | | 34.2 | 41.9 | 50.9 | 61.3 | 73.3 | 86.9 | 102.5 | ZP295KCE | | 15.8 | 16.0 | 16.1 | 16.2 | 16.4 | 16.6 | 16.8 |
| ZP385KCE | | 43.7 | 53.9 | 65.8 | 79.5 | 95.2 | 113.0 | 133.5 | ZP385KCE | | 20.3 | 20.4 | 20.5 | 20.7 | 20.9 | 21.3 | 21.7 |
| ZP485KCE | | 57.5 | 70.0 | 84.7 | 101.6 | 121.0 | 143.0 | 168.0 | ZP485KCE | | 24.9 | 25.3 | 25.8 | 26.3 | 27.0 | 27.8 | 28.8 |
| ZP725KCE | | 88.0 | 107.0 | 129.0 | 154.0 | 182.0 | 215.0 | 252.0 | ZP725KCE | | 39.0 | 39.6 | 40.0 | 40.0 | 40.7 | 41.3 | 41.1 |

Conditions: Suction Superheat 10K / Subcooling 0K

Preliminary data

Tandem and Trio Model Overview

| Model | Nominal hp | Cooling Capacity (kW) | Even Tandem | Uneven Tandem | Even Trio | Uneven Trio |
|--|--------------|-----------------------|-------------|---------------|-----------|-------------|
| Tandem ZPT - Tandem Uneven ZPU - Trio ZPY - Uneven Trio ZPM | | | | | | |
| ZPT 72 K5E* | 2 x 3 | 16 | • | | | |
| ZPT 84 K5E* | 2 x 3.5 | 18 | • | | | |
| ZPT 108 K5E* | 2 x 4 | 23 | • | | | |
| ZPT 122 K5E* | 2 x 5 | 26 | • | | | |
| ZPT 144 KCE* | 2 x 6 | 31 | • | | | |
| ZPT 166 KCE* | 2 x 6.5 | 35 | • | | | |
| ZPT 182 KCE* | 2 x 8 | 39 | • | | | |
| ZPT 208 KCE* | 2 x 9 | 45 | • | | | |
| ZPT 244 KCE* | 2 x 10 | 53 | • | | | |
| ZPT286KCE | 2 x 12 | 63 | • | | | |
| ZPT 308KCE* | 2 x 13 | 67 | • | | | |
| ZPU 336 KCE* | 13 + 15 | 73 | | • | | |
| ZPT 364 KCE* | 2 x 15 | 79 | • | | | |
| ZPU 417 KCE* | 15 + 20 | 90 | | • | | |
| ZPU418KCE* | 20 + 15 | 90 | | • | | |
| ZPY 462 KCE* | 3 x 13 | 99 | | | • | |
| ZPT 470 KCE* | 2 x 20 | 101 | • | | | |
| ZPT472KCE* | 2 x 20 | 101 | • | | | |
| ZPU 532KCE* | 20 + 25 | 101 | • | | | |
| ZPU 477 KCE* | 15 + 25 | 103 | | • | | |
| ZPU 530 KCE* | 20 + 25 | 114 | | • | | |
| ZPY 546 KCE* | 3 x 15 | 117 | | | • | |
| ZPT 592KCE* | 2 x 25 | 125 | • | | | |
| ZPT 590 KCE* | 2 x 25 | 127 | • | | | |
| ZPU 681KCE* | 30 + 25 | 144 | | • | | |
| ZPU 680 KCE* | 25 + 30 | 146 | | • | | |
| ZPY 705 KCE* | 3 x 20 | 150 | | | • | |
| ZPY 708KCE* | 3 x 20 | 150 | | | • | |
| ZPT 770 KCE* | 2 x 30 | 165 | • | | | |
| ZPU 870 KCE* | 30 + 40 | 187 | | • | | |
| ZPY 885 KCE* | 3 x 25 | 188 | | | • | |
| ZPT 970 KCE* | 2 x 40 | 209 | • | | | |
| ZPU 111 MCE* | 30 + 60 | 240 | | • | | |
| ZPY 115 MCE* | 3 x 30 | 243 | | | • | |
| ZPU 121 MCE* | 40 + 60 | 262 | | • | | |
| ZPM 125 MCE* | 30 + 30 + 40 | 265 | | | | • |
| ZPM 135 MCE* | 30 + 40 + 40 | 287 | | | | • |
| ZPY 145 MCE* | 40 + 40 + 40 | 309 | | | • | |
| ZPT 145 MCE* | 60 + 60 | 317 | • | | | |
| ZPM 169 MCE* | 40 + 40 + 60 | 362 | | | | • |
| ZPM 194 MCE* | 40 + 60 + 60 | 416 | | | | • |
| ZPY 218 MCE* | 60 + 60 + 60 | 470 | | | • | |

Conditions EN 12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

* Tandem / Trio assemblies by system manufacturers. Emerson Climate Technologies can provide full technical support.

ZPD & ZRD Copeland Scroll Digital™ Compressor Range for R410A and R407C

Stepless capacity modulation in air conditioning applications:
Flexible solution for R407C and R410A.

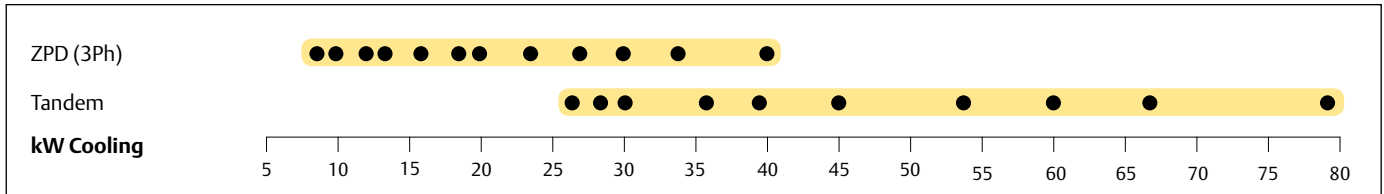
In many cooling and heating systems, the load and the operating conditions vary over a wide range thus requiring the use of capacity modulation. Digital Scroll assures stepless modulation down to 10% of the nominal capacity, enabling precise temperature control, superior comfort and energy saving.

Digital Scroll compressors are the preferred choice for process cooling, refrigeration racks, refrigeration units, VRF, rooftop and air handling unit systems.

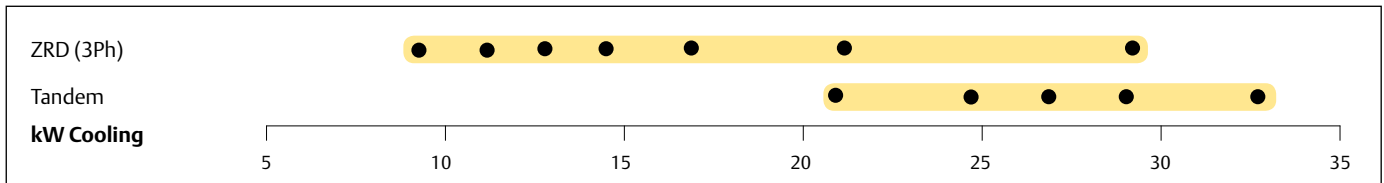


ZPD & ZRD Copeland Scroll Digital Compressor

ZPD & ZRD Digital Scroll Compressor Line-up R410A



ZPD & ZRD Digital Scroll Compressor Line-up R407C



Conditions EN12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

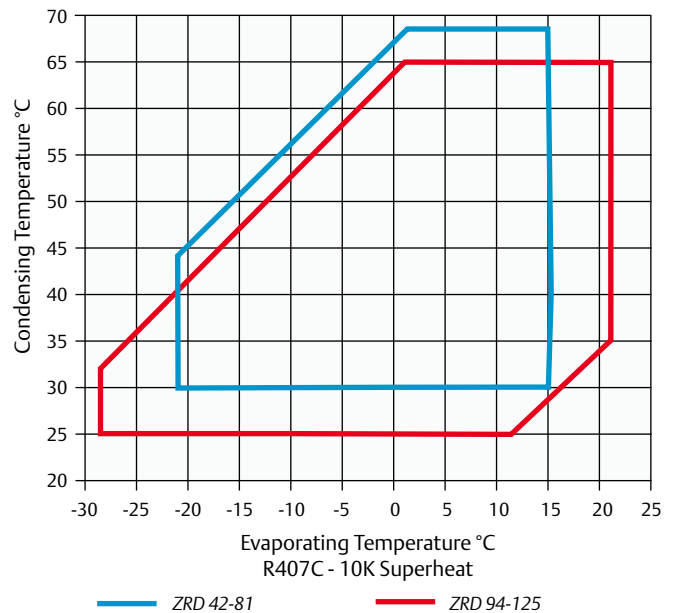
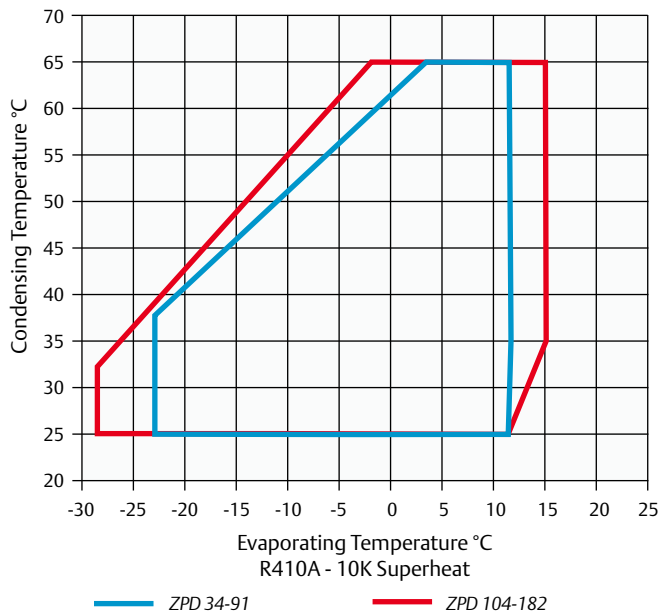
Features and Benefits

- Wide modulation range from 10% to 100% for immediate load adjustment, close temperature comfort, optimal comfort
- No complex electronics, a quasi-drop-in solution for fast time to market, no EMI/EMC problems, easy installation and maintenance
- No impact on system mechanical balance: no vibration and resonance phenomenon, no frame / piping redesign necessary

Maximum Allowable Pressure (PS)

- Digital ZRD42 to ZRD81:
Low Side PS 20bar(g) / High Side PS 29.5 bar(g)
- Digital ZRD94 to ZRD125:
Low Side PS 20bar(g) / High Side PS 32 bar(g)
- Digital ZPD34 to ZPD91:
Low Side PS 28 bar(g) / High Side PS 43 bar(g)
- Digital ZPD103 to ZPD182:
Low Side PS 29.5 bar(g) / High Side PS 45 bar(g)

Operating Envelope R410A/R407C



Technical Overview

| Models | Nominal hp | Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @1 m - dB(A)** |
|-----------|------------|---------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------|-------------------------------|--------------------------|-------------------------------|
| | | | | | | | | | | 3 Ph* | 3 Ph* | 3 Ph* | |
| ZPD34KCE | 3.0 | 7.3 | 2.8 | 5.7 | ¾ | ½ | 1.24 | 243/243/448 | 31 | TFM | 12 | 64 | 66 |
| ZPD42KCE | 3.5 | 9.1 | 3.0 | 6.9 | ¾ | ½ | 1.24 | 243/243/464 | 31 | TFM | 8 | 52 | 66 |
| ZPD54KCE | 4.5 | 11.5 | 3.0 | 8.9 | ¾ | ½ | 1.24 | 236/236/479 | 35 | TFM | 10 | 62 | 67 |
| ZPD61KCE | 5.0 | 13.2 | 2.9 | 10.1 | ¾ | ½ | 1.89 | 241/246/484 | 41 | TFD | 12 | 64 | 63 |
| ZPD72KCE | 5.0 | 15.2 | 2.9 | 11.6 | ¾ | ½ | 1.89 | 241/246/484 | 40 | TFD | 15 | 75 | 67 |
| ZPD83KCE | 6.0 | 17.7 | 3.0 | 13.4 | ¾ | ½ | 1.77 | 246/253/481 | 40 | TFD | 16 | 101 | 64 |
| ZPD91KCE | 7.5 | 19.2 | 3.1 | 14.7 | ¾ | ¾ | 1.80 | 246/253/481 | 40 | TFD | 16 | 101 | 69 |
| ZPD104KCE | 9.0 | 22.7 | 3.1 | 16.7 | 1 ½ | ¾ | 3.25 | 270/262/605 | 61 | TFD | 18 | 128 | 63 |
| ZPD122KCE | 10.0 | 26.3 | 3.1 | 19.7 | 1 ½ | ¾ | 3.25 | 270/262/605 | 62 | TFD | 21 | 139 | 63 |
| ZPD137KCE | 12.0 | 29.5 | 3.1 | 22.1 | 1 ¾ | ¾ | 3.25 | 293/285/533 | 62 | TFD | 25 | 118 | 63 |
| ZPD154KCE | 13.0 | 33.1 | 3.1 | 24.8 | 1 ¾ | ¾ | 3.25 | 314/285/552 | 65 | TFD | 27 | 140 | 66 |
| ZPD182KCE | 15.0 | 39.0 | 3.1 | 29.0 | 1 ¾ | ¾ | 3.25 | 314/285/552 | 67 | TFD | 34 | 173 | 68 |

Conditions EN12900 R410A: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

* 3 Ph: 380-420V/ 50Hz

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

| Models | Nominal hp | Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @1 m - dB(A)** |
|-----------|------------|---------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------|-------------------------------|--------------------------|-------------------------------|
| | | | | | | | | | | 3 Ph* | 3 Ph* | 3 Ph* | |
| ZRD42KCE | 3.5 | 8.9 | 2.9 | 9.9 | ¾ | ½ | 1.24 | 241/241/462 | 31 | TFD | 7 | 46 | 60 |
| ZRD48KCE | 4.0 | 10.5 | 3.0 | 11.4 | ¾ | ½ | 1.36 | 241/241/465 | 32 | TFD | 10 | 48 | 64 |
| ZRD61KCE | 5.0 | 12.5 | 3.0 | 14.3 | ¾ | ½ | 1.89 | 241/246/481 | 38 | TFD | 9.6 | 64 | 65 |
| ZRD72KCE | 6.0 | 14.3 | 2.9 | 17.0 | ¾ | ¾ | 1.89 | 241/246/481 | 40 | TFD | 13 | 74 | 63 |
| ZRD81KCE | 6.0 | 17.0 | 3.1 | 18.7 | ¾ | ¾ | 1.89 | 241/246/481 | 41 | TFD | 15 | 100 | 67 |
| ZRD94KCE | 7.5 | 21.0 | 3.3 | 22.1 | 1 ½ | ¾ | 2.51 | 293/285/476 | 58 | TFD | 16 | 95 | 64 |
| ZRD125KCE | 10.0 | 27.7 | 3.3 | 28.8 | 1 ¾ | ¾ | 3.25 | 293/285/533 | 61 | TFD | 20 | 118 | 64 |

Conditions EN12900 R407C: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

* 3 Ph: 380-420V/ 50Hz

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature +40°C | | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|------|------|------|------|------|-----------|------------------------------|-----|------|------|------|------|------|--|
| R410A | Cooling Capacity (kW) | | | | | | | R410A | Power Input (kW) | | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 | |
| ZPD34KSE | 3.9 | 5.0 | 6.2 | 7.6 | 9.2 | 11.0 | | ZPD34KSE | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | | |
| ZPD42KSE | 4.8 | 5.9 | 7.3 | 8.8 | 10.6 | 12.6 | | ZPD42KSE | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.3 | | |
| ZPD54KSE | 6.5 | 7.9 | 9.5 | 11.4 | 13.5 | 16.0 | | ZPD54KSE | 3.1 | 3.1 | 3.1 | 3.0 | 3.0 | 3.0 | | |
| ZPD61KCE | 6.9 | 8.6 | 10.5 | 12.7 | 15.3 | 18.2 | | ZPD61KCE | 3.3 | 3.4 | 3.5 | 3.5 | 3.6 | 3.6 | | |
| ZPD72KCE | 8.2 | 10.1 | 12.3 | 14.8 | 17.6 | 20.9 | | ZPD72KCE | 3.9 | 4.0 | 4.1 | 4.1 | 4.2 | 4.2 | | |
| ZPD83KCE | 9.7 | 11.9 | 14.4 | 17.2 | 20.5 | 24.1 | | ZPD83KCE | 4.5 | 4.6 | 4.7 | 4.7 | 4.8 | 4.9 | | |
| ZPD91KCE | 10.1 | 12.6 | 15.3 | 18.5 | 22.1 | 26.2 | 30.9 | ZPD91KCE | 4.9 | 5.0 | 5.0 | 5.0 | 5.1 | 5.0 | 5.0 | |
| ZPD104KCE | 12.3 | 15.1 | 18.3 | 21.9 | 26.1 | 30.8 | 36.2 | ZPD104KCE | 5.6 | 5.7 | 5.7 | 5.9 | 6.0 | 6.1 | 6.2 | |
| ZPD122KCE | 14.2 | 17.5 | 21.2 | 25.4 | 30.3 | 35.8 | 42.0 | ZPD122KCE | 6.4 | 6.5 | 6.6 | 6.7 | 6.8 | 6.9 | 7.0 | |
| ZPD137KCE | 15.5 | 19.4 | 23.7 | 28.7 | 34.2 | 40.3 | 47.2 | ZPD137KCE | 7.5 | 7.5 | 7.5 | 7.4 | 7.4 | 7.5 | 7.6 | |
| ZPD154KCE | 17.8 | 22.0 | 26.6 | 31.9 | 38.0 | 45.0 | 53.0 | ZPD154KCE | 8.2 | 8.3 | 8.4 | 8.5 | 8.6 | 8.7 | 8.9 | |
| ZPD182KCE | 22.3 | 26.8 | 32.0 | 37.9 | 44.6 | 52.5 | 61.6 | ZPD182KCE | 9.8 | 9.9 | 10.0 | 10.1 | 10.2 | 10.4 | 10.5 | |

Conditions: Suction Superheat 10K / Subcooling 0K

| Condensing Temperature +40°C | | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|------|------|------|------|------|-----------|------------------------------|-----|-----|-----|-----|-----|-----|--|
| R407C | Cooling Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | -15 | -10 | -5 | 0 | +5 | +10 | +15 | |
| ZRD42KCE | 4.3 | 5.4 | 6.7 | 8.3 | 10.1 | 12.2 | 14.6 | ZRD42KCE | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | |
| ZRD48KCE | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 | 15.0 | 18.1 | ZRD48KCE | 2.5 | 2.6 | 2.6 | 2.7 | 2.7 | 2.8 | 2.9 | |
| ZRD61KCE | 6.1 | 7.7 | 9.5 | 11.7 | 14.2 | 17.3 | 21.0 | ZRD61KCE | 3.0 | 3.1 | 3.2 | 3.4 | 3.4 | 3.4 | 3.3 | |
| ZRD72KCE | 3.5 | 6.0 | 8.9 | 12.3 | 16.2 | 20.6 | 25.6 | ZRD72KCE | 3.5 | 3.6 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | |
| ZRD81KCE | 8.0 | 10.2 | 12.8 | 15.8 | 19.2 | 23.2 | 27.7 | ZRD81KCE | 4.3 | 4.4 | 4.4 | 4.5 | 4.6 | 4.7 | 4.8 | |
| ZRD94KCE | 10.0 | 12.7 | 16.0 | 19.8 | 24.1 | 28.9 | 34.5 | ZRD94KCE | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.2 | 5.3 | |
| ZRD125KCE | 13.2 | 16.9 | 21.3 | 26.3 | 31.7 | 37.6 | 43.7 | ZRD125KCE | 6.5 | 6.6 | 6.6 | 6.7 | 6.8 | 6.9 | 7.1 | |

Conditions: Suction Superheat 10K / Subcooling 0K



XPV and ZPV Copeland Scroll™ Variable Speed Compressor Range for R410A with inverter drive

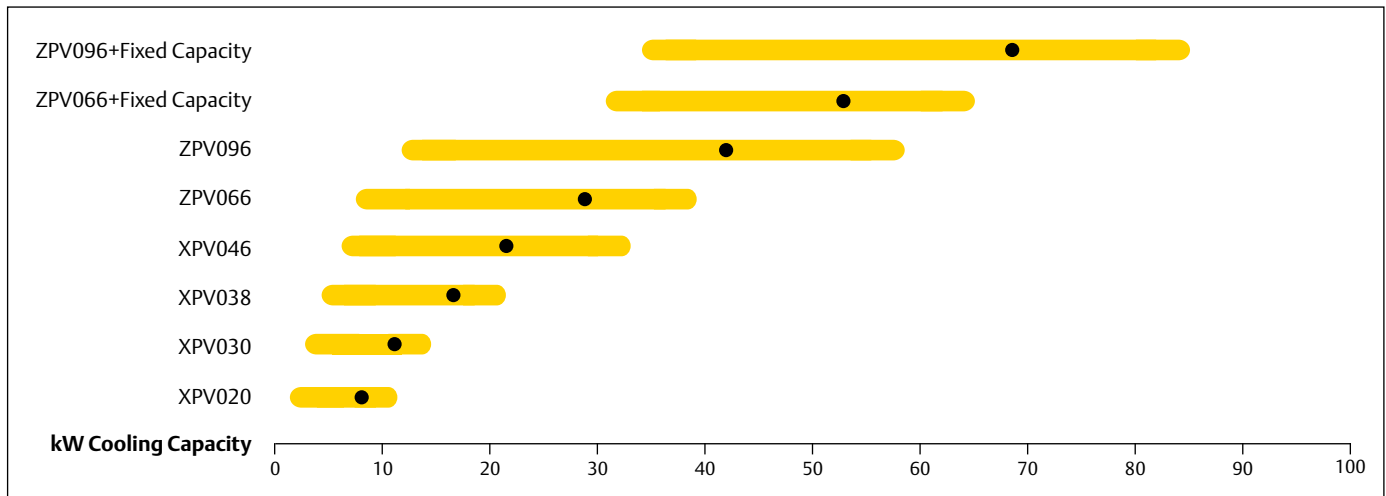
Copeland Scroll™ XPV and ZPV Variable Speed compressors are designed to deliver maximum cooling and heating efficiency when you need it most. Equipped with the latest variable speed technology, they allow system manufacturers and building owners to achieve superior performance when designing reversible chillers, heat pumps, precision cooling systems or rooftops.

In addition to Copeland market-proven robustness, the new XPV and ZPV ranges with their qualified inverter drive meet and exceed the level of reliability expected for these applications.



Copeland Scroll™ ZPV066 Variable Speed compressor and drive

XPV and ZPV Variable Speed Scroll Compressor Line-up



Conditions EN12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

Features and Benefits Operating Envelope R410A

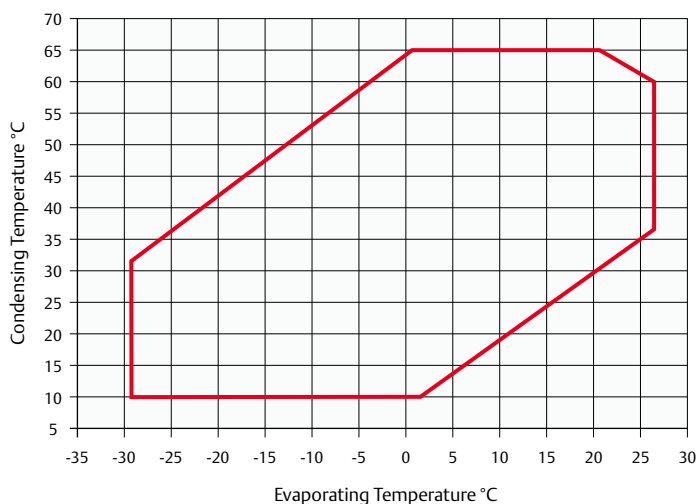
- Highest part load efficiency in its class enabling significant energy savings and standards compliance
- Wide speed range for enhanced part load efficiency and dehumidification: 1,000-7,200 RPM (17-120Hz)
- Capability to be tandemized with fixed speed compressors for maximum flexibility in system design
- Both compressor and drive are Copeland™ approved for reduced design time, cost and speed to market

- BPM motor technology for highest efficiency
- Sound reduction technology for reversible chiller transition and defrost

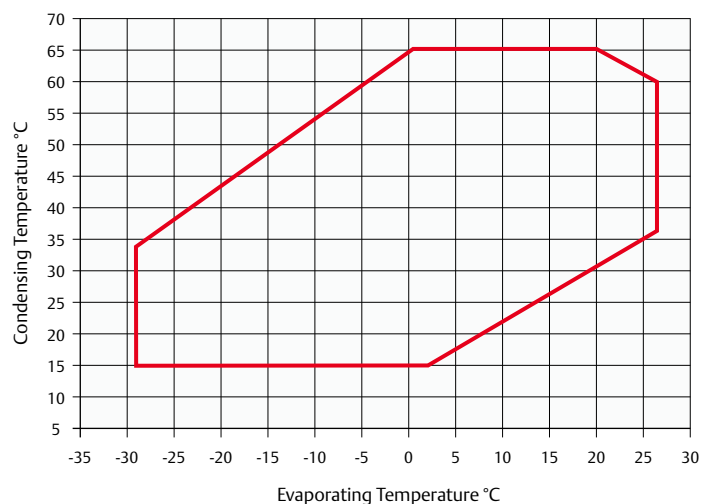
Maximum Allowable Pressure (PS)

- XPV020-046
Low Side PS 28 bar(g) / High Side PS 45 bar(g)
- ZPV066 - 096
Low Side PS 29.5 bar(g) / High Side PS 45 bar(g)

ZPV Operating Envelope R410A



XPV Operating Envelope R410A



Technical Overview

| Compressor | | | | | | | | | | |
|------------|-----------------------|------|------|---------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|-------------------------------|
| R410A | Cooling Capacity (kW) | | EER* | Displacement (cm ³) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Sound Pressure @1 m - dB(A)** |
| | Min | Max | | | | | | | | |
| XPV0202E | 1.4 | 8.7 | 2.9 | 20.0 | ¾ | ½ | 0.74 | 229/198/388 | 14 | n.a. |
| XPV0302E | 2.2 | 19.2 | 3.1 | 30.0 | ¾ | ½ | 1.2 | 229/198/388 | 20 | n.a. |
| XPV0382E | 2.9 | 25.1 | 3.2 | 38.0 | ¾ | ½ | 1.2 | 229/198/388 | 21 | n.a. |
| XPV0462E | 3.8 | 33.0 | 3.2 | 46.0 | ¾ | ½ | 1.2 | 229/198/388 | 22 | n.a. |
| ZPV0662E | 9.0 | 36.7 | 3.0 | 63.0 | 1 ½ | ¾ | 2.5 | 293/246/559 | 40 | 73 |
| ZPV0962E | 13.7 | 56.7 | 3.1 | 96.0 | 1 ½ | ¾ | 2.5 | 293/246/559 | 45 | 75 |

Conditions EN12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

*@ Nominal Speed (90hz)

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Preliminary data

| Inverter Drive | | | | | | | | | | | | |
|----------------|----------------------|---------------|----------|---------|----------------|---------|-----------------|----------|----------|----------|-------|--------------------------|
| Model | Matched Compressor** | Capacity (kW) | Amps (A) | Cooling | Frequency (hz) | | Net Weight (kg) | 3Ph 400V | 3Ph 230V | 3Ph 575V | Comm. | Depth/Width/Height (mm)* |
| | | | | | Nominal | Nominal | | | | | | |
| ED3015B | | 5.0 | 15 | | 15 | 120 | 3.6 | √ | | | | |
| ED3020B | | 8.0 | 20 | | 15 | 120 | 5.1 | √ | | | | |
| ED3027B | | 11.0 | 27 | | 15 | 120 | | √ | | | | |
| EVC1150 | ZPV066 | 15.0 | | Air | 17 | 120 | 7.4 | √ | √ | √ | | 202/143/391 |
| EVC1185 | ZPV096 | 18.5 | | | 20 | 120 | 14.0 | √ | √ | √ | | 227/210/391 |

Conditions: Suction Superheat 5K, Subcooling 4K

*Air cooled version including fins

** Matching with XPV ongoing

Capacity Data

| Condensing Temperature +50°C | | | | | | | | | | | | | | | | | |
|------------------------------|-----|------------------------------|------|------|------|------|------|-------|----------|------------------------------|------|------|------|------|------|------|------|
| R410A | | Cooling Capacity (kW) | | | | | | R410A | | Power Input (kW) | | | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 |
| XPV0202E | Max | 5.3 | 6.5 | 8.0 | 9.7 | 11.7 | 14.0 | 16.5 | XPV0202E | Max | 3.7 | 3.8 | 3.9 | 3.9 | 4.0 | 4.1 | 4.1 |
| | Min | 1.2 | 1.4 | 1.0 | 1.2 | 1.4 | 1.6 | 2.2 | | Min | 1.2 | 1.0 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 |
| XPV0302E | Max | 8.9 | 10.7 | 12.9 | 15.6 | 18.8 | 22.5 | 26.7 | XPV0302E | Max | 5.5 | 5.6 | 5.7 | 5.8 | 5.9 | 6.0 | 6.0 |
| | Min | 2.2 | 2.5 | 1.5 | 1.9 | 2.3 | 2.7 | 3.7 | | Min | 1.8 | 1.6 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| XPV0382E | Max | 11.3 | 13.6 | 16.4 | 19.8 | 23.8 | 28.5 | 33.8 | XPV0382E | Max | 7.0 | 7.1 | 7.3 | 7.4 | 7.5 | 7.5 | 7.6 |
| | Min | 2.8 | 3.2 | 1.9 | 2.4 | 2.9 | 3.4 | 4.6 | | Min | 2.2 | 2.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.3 |
| XPV0462E | Max | 13.6 | 16.4 | 19.8 | 23.9 | 28.8 | 34.4 | 40.8 | XPV0462E | Max | 8.1 | 8.3 | 8.4 | 8.6 | 8.7 | 8.7 | 8.7 |
| | Min | 3.6 | 4.5 | 2.2 | 2.8 | 3.3 | 4.0 | 5.1 | | Min | 2.7 | 2.6 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| ZPV0662E | Max | 19.1 | 23.3 | 28.2 | 34.0 | 40.6 | 48.2 | 56.8 | ZPV0662E | Max | 13.2 | 13.5 | 13.8 | 14.1 | 14.3 | 14.5 | 14.7 |
| | Min | 6.2 | 4.9 | 6.0 | 7.1 | 8.3 | 9.8 | 11.5 | | Min | 4.2 | 3.0 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 |
| ZPV0962E | Max | 28.0 | 34.3 | 41.7 | 50.4 | 60.4 | 71.8 | 84.6 | ZPV0962E | Max | 18.2 | 18.7 | 19.2 | 19.6 | 20.0 | 20.4 | 20.8 |
| | Min | 9.1 | 7.5 | 9.0 | 10.8 | 12.8 | 15.2 | 18.0 | | Min | 5.7 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.0 |

Condition: Suction Superheat 5K, Subcooling 4K

Preliminary data

ZH Copeland Scroll™ Fixed Speed Compressor Range for R410A and R407C

ZH Copeland Scroll Compressor Range

The ZH compressor range is optimized for reversible and heat pump applications. In addition to the existing R407C range, a complete new range optimized for R410A has been developed. Both ranges are based on three platform sizes and cover a capacity of 4kW to 38kW.

ZH heating compressors have been optimized for reversible heating systems, they deliver higher capacity and efficiency at low evaporating (heat source) temperatures and are therefore better adapted to heating requirements than standard air conditioning compressors. Due to their larger operating map they also require less additional heating (electrical or gas) to cover the full heating demand on the coldest days and therefore further improve the system seasonal efficiency.

ZH Scroll Compressors with Enhanced Vapor Injection

ZH heating compressors with Enhanced Vapor Injection have been further optimized to ensure best-in-class performances in dedicated heating applications. This technology allows replacement of traditional boilers in new building and retrofit applications, without the need of substituting existing heating elements in the building.

ZH Copeland Scroll heating compressors with Enhanced Vapor Injection have an additional port to inject vapor within the compression process. This improves system performances by increasing the heating capacity for a given compressor displacement. Additional benefits are the reduction of the gas discharge temperature and the extension of the operating envelope which enable the production of high temperature water at all working conditions.

ZHI heating compressors reach the same high standards of durability and reliability as other Copeland Scroll compressors. This includes the ability to handle relatively large amounts of liquid, which is known to damage or cause compressor failures. Fewer moving parts, robust running gear and low vibration due to balanced compression mechanism make the ZH range of Copeland Scroll compressors the most reliable solution available in the heat pump market.



ZH Scroll Compressor

ZH Nomenclature Guidelines

ZH**K4E

Qualified for **R407C/R134a**

Without Enhanced Vapor Injection - ** capacity in Btu/h

ZH**KVE

Qualified for **R407C** only

Enhanced Vapor Injection - ** capacity in kW

ZH**K1P

Qualified for **R410A** only

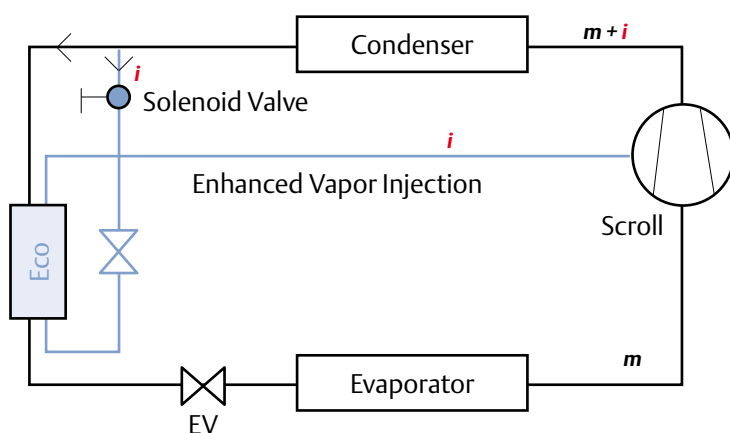
Without Enhanced Vapor Injection - ** capacity in kW

ZHI**K1P

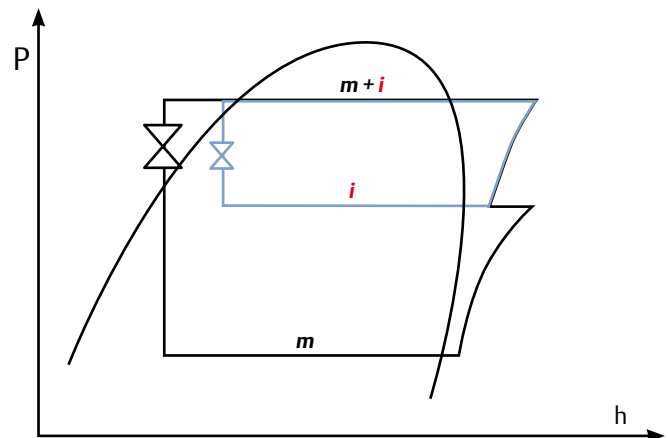
Qualified for **R410A** only

Enhanced Vapor Injection - ** capacity in kW

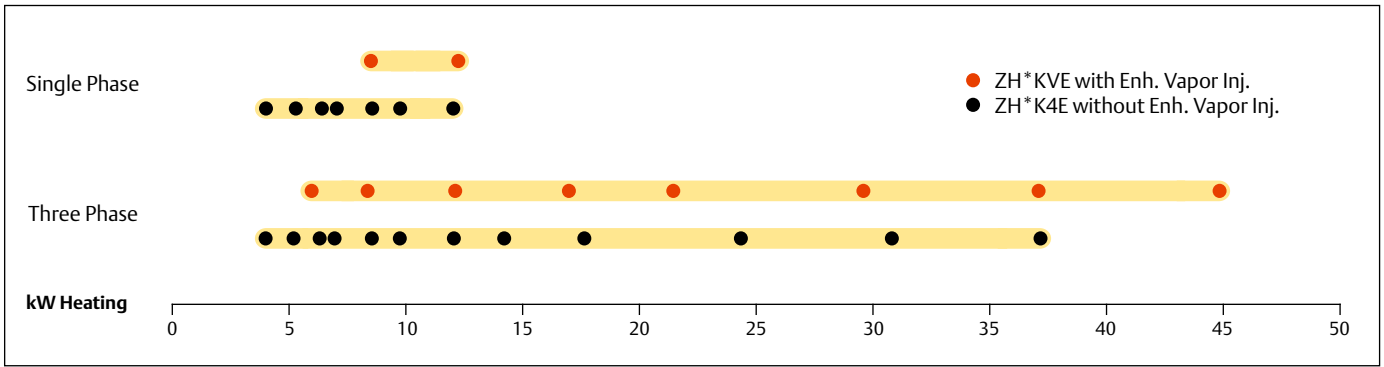
Enhanced Vapor Injection: System Design



Enhanced Vapor Injection: Enthalpy Diagram

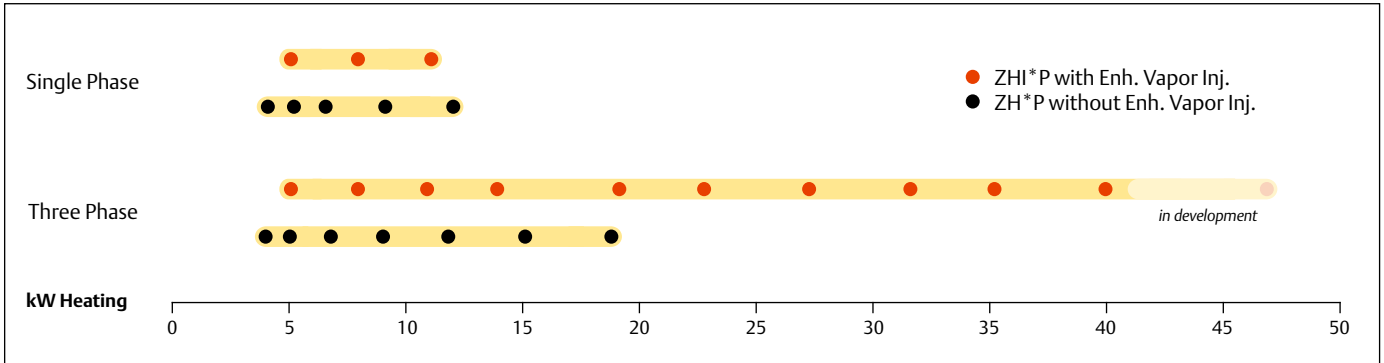


ZH*K4E / ZH*KVE Scroll Compressor Line-up R407C



Conditions: Evaporating -7°C, Condensing 50°C, 4K Subcooling, 5K Superheat

ZH*P / ZHI*P Scroll Compressor Line-up R410A



Conditions: Evaporating -7°C, Condensing 50°C, 4K Subcooling, 5K Superheat

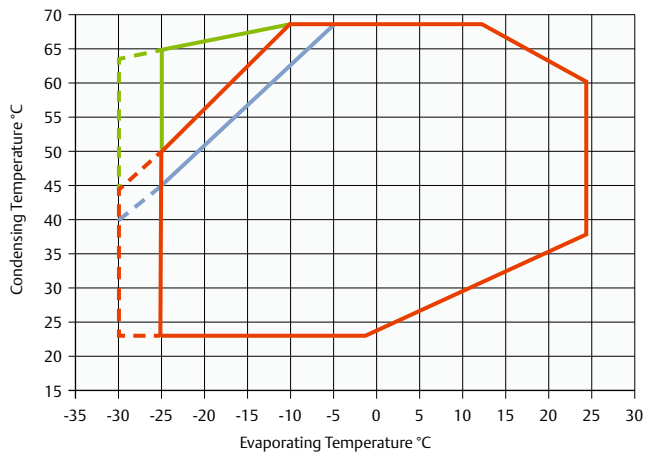
Features and Benefits

- Copeland Scroll axial and radial compliance for high reliability
- High efficiency and increased heating capacity
- High water temperature for all applications
- Low sound and low vibration level
- Tandem combination for superior seasonal efficiency
- Enhanced Vapor Injection technology for best seasonal efficiency

Maximum Allowable Pressure (PS)

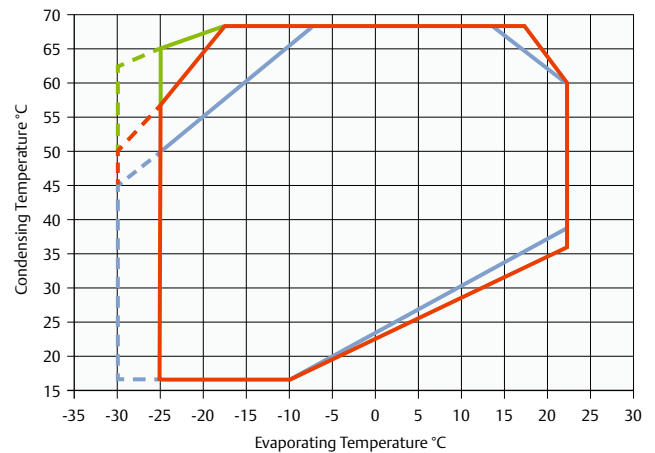
- ZH(I)04K1P to ZH(I)23K1P:
Low Side PS 28 bar(g) / High Side PS 45 bar(g)
- ZHI27K1P to ZHI46K1P:
Low Side PS 29.5 bar(g) / High Side PS 53 bar(g)
- ZH12K4E to ZH45K4E:
Low Side PS 20 bar(g) / High Side PS 32 bar(g)
- ZH56K4E to ZH11M4E:
Low Side PS 22.6 bar(g) / High Side PS 32 bar(g)
- ZH09KVE to ZH18KVE:
Low Side PS 20 bar(g) / High Side PS 32 bar(g)
- ZH24KVE to ZH48KVE:
Low Side PS 22.6 bar(g) / High Side PS 32 bar(g)

Operating Envelope R410A Heating



- ZH*P without Enh. Vapor Inj.
- - - ZH*P 2000 hours max.
- ZHI*P with Enh. Vapor Inj.
- - - ZHI*P 2000 hours max.
- Wet Injection

Operating Envelope R407C Heating



- ZH without Enh. Vapor Inj.
- - - ZH 2000 hours max.
- ZH*KVE with Enh. Vapor Inj.
- - - ZH*KVE 2000 hours max.
- Wet Injection

Refer to Emerson's Select selection software for individual model operating envelopes and other refrigerants.

Technical Overview

| R410A | Nominal hp | Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m - dB(A) *** |
|-----------|------------|---------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|---------------------------------|
| | | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| ZH04 K1P | 1.8 | 4.2 | 2.8 | 3.4 | ¾ | ½ | 0.7 | 229/198/388 | 22 | PFZ | TFM | 9 | 5 | 50 | 28 | 62 |
| ZH05 K1P | 2.0 | 5.0 | 2.8 | 4.0 | ¾ | ½ | 0.7 | 229/198/388 | 22 | PFZ | TFM | 13 | 5 | 60 | 28 | 62 |
| ZH06 K1P | 2.7 | 6.6 | 2.9 | 5.1 | ¾ | ½ | 1.2 | 242/242/418 | 31 | PFZ | TFM | 17 | 6 | 83 | 44 | 62 |
| ZH09 K1P | 3.5 | 9.0 | 3.1 | 6.9 | ¾ | ½ | 1.2 | 242/242/418 | 33 | PFZ | TFM | 23 | 7 | 108 | 52 | 62 |
| ZH12 K1P | 4.5 | 11.4 | 3.0 | 8.9 | ¾ | ½ | 1.2 | 242/242/418 | 35 | PFZ | TFM | 28 | 10 | 130 | 62 | 65 |
| ZH15 K1P | 5.0 | 15.1 | 3.1 | 11.7 | ¾ | ½ | 1.9 | 245/249/442 | 39 | | TFM | | 13 | | 75 | 67 |
| ZH19 K1P | 6.5 | 18.7 | 3.2 | 14.8 | ¾ | ¾ | 1.9 | 239/244/443 | 39 | | TFM | | 17 | | | 67 |
| ZHI05 K1P | 1.9 | 5.2 | 3.0 | 3.4 | ¾ | ½ | 0.7 | 229/198/388 | 22 | PFZ | TFM | 14 | 4 | 60 | 28 | 63 |
| ZHI08 K1P | 2.8 | 8.2 | 3.1 | 5.1 | ¾ | ½ | 1.2 | 242/242/418 | 31 | PFZ | TFM | 19 | 6 | 108 | 43 | 63 |
| ZHI11 K1P | 3.6 | 10.8 | 3.2 | 6.9 | ¾ | ½ | 1.2 | 242/242/418 | 31 | PFZ | TFM | 25 | 9 | 130 | 52 | 65 |
| ZHI14 K1P | 4.6 | 13.9 | 3.3 | 8.9 | ¾ | ½ | 1.2 | 242/242/418 | 34 | | TFM | | 11 | | 70 | 65 |
| ZHI18 K1P | 5.0 | 17.9 | 3.4 | 11.7 | ¾ | ½ | 1.9 | 249/245/443 | 41 | | TFM | | 15 | | | 67 |
| ZHI23 K1P | 6.5 | 22.8 | 3.4 | 14.8 | ¾ | ¾ | 1.9 | 239/244/443 | 41 | | TFM | | 19 | | | 67 |
| ZHI27 K1P | 9.0 | 27.0 | 3.3 | 16.8 | 1 ¾ | ¾ | 3.3 | 280/280/533 | 63 | | TFD | | | | 118 | 77 |
| ZHI32 K1P | 10.0 | 31.7 | 3.2 | 19.8 | 1 ¾ | ¾ | 3.3 | 280/280/533 | 63 | | TFD | | | | 140 | 75 |
| ZHI35 K1P | 12.0 | 35.6 | 3.2 | 22.1 | 1 ¾ | ¾ | 3.3 | 280/284/568 | 63 | | TFD | | | | 174 | 76 |
| ZHI40 K1P | 13.0 | 39.7 | 3.3 | 24.9 | 1 ¾ | ¾ | 3.3 | 284/280/568 | 64 | | TFD | | | | 174 | 76 |
| ZHI46 K1P | 15.0 | 46.5 | 3.3 | 29.1 | 1 ¾ | ¾ | 3.4 | 395/395/568 | 64 | | TWD | | | | 168 | 76 |

Conditions: Evaporating -7°C, Condensing 50°C, Superheat 5K, Subcooling 4K

* 1 Ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Preliminary data

| R407C | Nominal hp | Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m - dB(A) *** |
|---------|------------|---------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|---------------------------------|
| | | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| ZH12K4E | 1.7 | 3.7 | 3.0 | 4.7 | ¾ | ½ | 0.7 | 229/198/388 | 21 | PFZ | | 10 | | 44 | | 53 |
| ZH15K4E | 2.0 | 4.6 | 3 | 5.8 | ¾ | ½ | 1.3 | 243/242/364 | 23 | PFJ | TFD | 11.6 | 4.3 | 61 | 26 | 60 |
| ZH21K4E | 3.0 | 6.5 | 3.1 | 8.0 | ¾ | ½ | 1.5 | 243/242/387 | 27 | PFJ | TFD | 16 | 5 | 76 | 32 | 59 |
| ZH26K4E | 3.5 | 8.2 | 3.1 | 10.0 | ¾ | ½ | 3.1 | 243/242/400 | 28 | PFJ | TFD | 20 | 7 | 97 | 46 | 63 |
| ZH30K4E | 4.0 | 9.5 | 3.1 | 11.7 | ¾ | ½ | 1.9 | 247/241/438 | 38 | PFJ | TFD | 25 | 8 | 108 | 52 | 62 |
| ZH38K4E | 5.0 | 11.7 | 3.2 | 14.4 | ¾ | ½ | 1.9 | 247/241/438 | 38 | PFZ | TFD | 31 | 10 | 150 | 64 | 63 |
| ZH45K4E | 6.0 | 14.0 | 3.2 | 17.1 | ¾ | ½ | 1.9 | 250/246/438 | 36 | | TFD | | 12 | | 74 | 64 |
| ZH56K4E | 7.5 | 17.4 | 3.1 | 20.9 | 1 ¾ | ¾ | 4.0 | 357/321/497 | 93 | | TWD | | 17 | | 99 | 69 |
| ZH75K4E | 10.0 | 24.2 | 3.2 | 28.8 | 1 ¾ | ¾ | 4.0 | 357/321/497 | 93 | | TWD | | 21 | | 127 | 70 |
| ZH92K4E | 13.0 | 30.7 | 3.3 | 35.6 | 1 ¾ | ¾ | 4.1 | 356/320/505 | 95 | | TWD | | 25 | | 167 | 72 |
| ZH11M4E | 15.0 | 37.0 | 3.3 | 42.8 | 1 ¾ | ¾ | 4.1 | 357/321/579 | 112 | | TWD | | 32 | | 198 | 72 |
| ZH06KVE | 2.5 | 6.2 | 3.3 | 5.8 | ¾ | ½ | 1.3 | 243/243/364 | 27.5 | | TFM | | 4.4 | | 26 | 62 |
| ZH09KVE | 3.0 | 8.2 | 3.3 | 8.0 | ¾ | ½ | 1.5 | 243/243/386 | 30 | PFZ | TFD | 21 | 7 | 97 | 40 | 62 |
| ZH13KVE | 4.0 | 11.8 | 3.4 | 11.7 | ¾ | ½ | 1.9 | 244/241/438 | 38 | PFZ | TFD | 30 | 10 | 160 | 64 | 65 |
| ZH18KVE | 6.0 | 16.7 | 3.4 | 17.1 | ¾ | ½ | 1.9 | 244/241/438 | 41 | | TFD | | 14 | | 101 | 67 |
| ZH24KVE | 7.5 | 21.3 | 3.3 | 20.9 | 1 ¾ | ¾ | 4.0 | 368/321/525 | 93 | | TWD | | 18 | | 99 | 73 |
| ZH33KVE | 10.0 | 29.5 | 3.4 | 29.0 | 1 ¾ | ¾ | 4.0 | 368/321/525 | 93 | | TWD | | 24 | | 127 | 73 |
| ZH40KVE | 13.0 | 37.0 | 3.4 | 35.5 | 1 ¾ | ¾ | 4.1 | 368/321/532 | 103 | | TWD | | 30 | | 167 | 73 |
| ZH48KVE | 15.0 | 44.7 | 3.4 | 42.8 | 1 ¾ | ¾ | 4.1 | 368/323/579 | 112 | | TWD | | 36 | | 198 | 76 |

Conditions: Evaporating -7°C, Condensing 50°C, Superheat 5K, Subcooling 4K

* 1 Ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature +50°C | | | | | | | | | | | | | | | |
|--------------------------------------|------------------------------|------|------|------|------|------|------|-----------|------------------------------|------|------|------|------|------|------|
| R410A | Heating Capacity (kW) | | | | | | | R410A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -30 | -15 | -10 | -5 | 0 | +5 | +15 | Model | -30 | -15 | -10 | -5 | 0 | +5 | +15 |
| ZH04 K1P | n.a. | 3.3 | 3.9 | 4.5 | 5.2 | 6.0 | 7.6 | ZH04 K1P | n.a. | 1.4 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| ZH09 K1P | n.a. | 7.1 | 8.2 | 9.5 | 10.9 | 12.5 | 16.4 | ZH09 K1P | n.a. | 2.8 | 2.9 | 3.0 | 3.0 | 3.0 | 3.0 |
| ZH12 K1P | n.a. | 9.2 | 10.5 | 12.1 | 13.9 | 15.9 | 21.0 | ZH12 K1P | n.a. | 3.7 | 3.7 | 3.8 | 3.8 | 3.8 | 3.8 |
| ZH15 K1P | n.a. | 12.0 | 13.8 | 15.9 | 18.4 | 21.1 | 27.7 | ZH15 K1P | n.a. | 4.7 | 4.9 | 5.0 | 5.1 | 5.2 | 5.2 |
| ZH19 K1P | n.a. | 15.2 | 17.5 | 20.2 | 23.2 | 26.7 | 35.1 | ZH19 K1P | n.a. | 6.0 | 6.2 | 6.3 | 6.4 | 6.5 | 6.5 |
| Models with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| Model | -30 | -15 | -10 | -5 | 0 | +5 | +15 | Model | -30 | -15 | -10 | -5 | 0 | +5 | +15 |
| ZHI05 K1P | 2.6 | 4.2 | 4.8 | 5.4 | 6.1 | 6.9 | 8.6 | ZHI05 K1P | 1.7 | 1.7 | 1.7 | 1.8 | 1.8 | 1.8 | 1.7 |
| ZHI08 K1P | 5.0 | 6.7 | 7.6 | 8.4 | 9.4 | 10.5 | 13.1 | ZHI08 K1P | 2.5 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.4 |
| ZHI11 K1P | 6.4 | 9.0 | 10.1 | 11.3 | 12.6 | 14.0 | 17.2 | ZHI11 K1P | 3.2 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.1 |
| ZHI14 K1P | 8.5 | 11.6 | 13.0 | 14.5 | 16.2 | 18.1 | 22.3 | ZHI14 K1P | 3.9 | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 | 4.0 |
| ZHI18 K1P | 10.8 | 14.9 | 16.7 | 18.7 | 20.9 | 23.2 | 28.7 | ZHI18 K1P | 5.1 | 5.3 | 5.4 | 5.4 | 5.4 | 5.3 | 5.2 |
| ZHI23 K1P | 13.8 | 19.0 | 21.3 | 23.9 | 26.6 | 29.7 | 36.7 | ZHI23 K1P | 6.6 | 6.8 | 6.9 | 6.9 | 6.9 | 6.8 | 6.6 |
| ZHI27 K1P | 14.2 | 22.1 | 25.1 | 28.4 | 31.8 | 35.5 | 43.8 | ZHI27 K1P | 7.9 | 8.2 | 8.2 | 8.1 | 8.1 | 7.9 | 7.5 |
| ZHI32 K1P | 16.4 | 26.1 | 29.5 | 33.2 | 37.1 | 41.4 | 51.1 | ZHI32 K1P | 8.7 | 9.7 | 9.8 | 9.8 | 9.7 | 9.6 | 9.4 |
| ZHI35 K1P | 19.5 | 29.2 | 33.1 | 37.3 | 41.9 | 46.7 | 57.4 | ZHI35 K1P | 11.0 | 10.8 | 10.9 | 11.0 | 11.1 | 11.2 | 11.1 |
| ZHI40 K1P | 21.7 | 32.5 | 36.9 | 41.7 | 47.0 | 52.7 | 65.6 | ZHI40 K1P | 12.0 | 12.0 | 12.1 | 12.1 | 12.2 | 12.2 | 12.3 |
| ZHI46 K1P | 26.1 | 38.7 | 43.5 | 48.7 | 54.3 | 60.4 | 74.0 | ZHI46 K1P | 13.2 | 14.0 | 14.1 | 14.1 | 14.1 | 14.1 | 14.0 |

Conditions: Suction Superheat 5K / Subcooling 4K

| Condensing Temperature +50°C | | | | | | | | | | | | | | | |
|--------------------------------------|------------------------------|------|------|------|------|------|------|---------|------------------------------|------|------|------|------|------|------|
| R407C | Heating Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | |
| | Evaporating temperature (°C) | | | | | | | | Evaporating temperature (°C) | | | | | | |
| Model | -30 | -15 | -10 | -5 | 0 | +5 | +15 | Model | -30 | -15 | -10 | -5 | 0 | +5 | +15 |
| ZH12K4E | n.a. | 2.8 | 3.3 | 3.9 | 4.6 | 5.4 | 7.5 | ZH12K4E | n.a. | 1.2 | 1.2 | 1.3 | 1.3 | 1.3 | 1.4 |
| ZH15K4E | n.a. | 3.6 | 4.3 | 5.0 | 5.8 | 6.8 | 9.2 | ZH15K4E | n.a. | 1.5 | 1.5 | 1.6 | 1.6 | 1.6 | 1.9 |
| ZH21K4E | n.a. | 5.1 | 5.9 | 6.9 | 8.1 | 9.6 | 13.2 | ZH21K4E | n.a. | 2.0 | 2.1 | 2.1 | 2.2 | 2.3 | 2.4 |
| ZH26K4E | n.a. | 6.3 | 7.4 | 8.7 | 10.3 | 12.1 | 16.5 | ZH26K4E | n.a. | 2.5 | 2.6 | 2.7 | 2.7 | 2.8 | 3.0 |
| ZH30K4E | n.a. | 7.3 | 8.6 | 10.1 | 11.9 | 14.0 | 19.2 | ZH30K4E | n.a. | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 | 3.4 |
| ZH38K4E | n.a. | 9.0 | 10.6 | 12.5 | 14.6 | 17.2 | 23.4 | ZH38K4E | n.a. | 3.5 | 3.6 | 3.8 | 3.9 | 4.0 | 4.2 |
| ZH45K4E | n.a. | 10.8 | 12.7 | 14.9 | 17.4 | 20.3 | 27.2 | ZH45K4E | n.a. | 4.2 | 4.3 | 4.5 | 4.6 | 4.7 | 5.1 |
| ZH56K4E | n.a. | 13.4 | 15.8 | 18.6 | 21.8 | 25.5 | 34.1 | ZH56K4E | n.a. | 5.3 | 5.5 | 5.7 | 6.0 | 6.2 | 6.8 |
| ZH75K4E | n.a. | 18.5 | 21.9 | 25.8 | 30.3 | 35.5 | 47.6 | ZH75K4E | n.a. | 7.0 | 7.4 | 7.7 | 8.0 | 8.2 | 8.5 |
| ZH92K4E | n.a. | 23.4 | 27.8 | 32.8 | 38.5 | 45.1 | 60.3 | ZH92K4E | n.a. | 8.5 | 9.0 | 9.5 | 10.0 | 10.4 | 11.2 |
| ZH11M4E | n.a. | 28.4 | 33.6 | 39.5 | 46.3 | 54.3 | 72.7 | ZH11M4E | n.a. | 10.3 | 10.9 | 11.5 | 11.9 | 12.5 | 13.4 |
| Models with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| | -30 | -15 | -10 | -5 | 0 | +5 | +15 | | -30 | -15 | -10 | -5 | 0 | +5 | +15 |
| ZH06KVE | 3.3 | 4.9 | 5.7 | 6.5 | 7.4 | 8.4 | 10.8 | ZH06KVE | 1.7 | 1.8 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 |
| ZH09KVE | 4.1 | 6.6 | 7.6 | 8.7 | 9.9 | 11.2 | 14.3 | ZH09KVE | 2.1 | 2.4 | 2.4 | 2.5 | 2.6 | 2.6 | 2.6 |
| ZH13KVE | 5.7 | 9.5 | 10.9 | 12.5 | 14.3 | 16.2 | 20.7 | ZH13KVE | 3.0 | 3.4 | 3.5 | 3.5 | 3.6 | 3.6 | 3.7 |
| ZH18KVE | 8.0 | 13.5 | 15.4 | 17.6 | 20.0 | 22.6 | 28.7 | ZH18KVE | 4.2 | 4.8 | 4.9 | 5.0 | 5.1 | 5.1 | 5.2 |
| ZH24KVE | 9.7 | 17.0 | 19.6 | 22.5 | 25.5 | 28.9 | 36.7 | ZH24KVE | 5.2 | 6.2 | 6.4 | 6.6 | 6.7 | 6.8 | 7.0 |
| ZH33KVE | 14.3 | 23.7 | 27.2 | 31.1 | 35.3 | 40.0 | 50.7 | ZH33KVE | 7.0 | 8.2 | 8.5 | 8.8 | 9.1 | 9.3 | 9.6 |
| ZH40KVE | 18.1 | 29.6 | 34.1 | 39.1 | 44.7 | 50.9 | 65.5 | ZH40KVE | 8.9 | 10.2 | 10.6 | 11.0 | 11.3 | 11.7 | 12.4 |
| ZH48KVE | 21.1 | 35.6 | 41.1 | 47.2 | 54.1 | 61.8 | 80.4 | ZH48KVE | 10.0 | 12.2 | 12.7 | 13.2 | 13.5 | 14.0 | 15.1 |

Conditions: Suction Superheat 5K / Subcooling 4K

XHV & ZHW Copeland Scroll™ Variable Speed Compressor Range for R410A with inverter drive

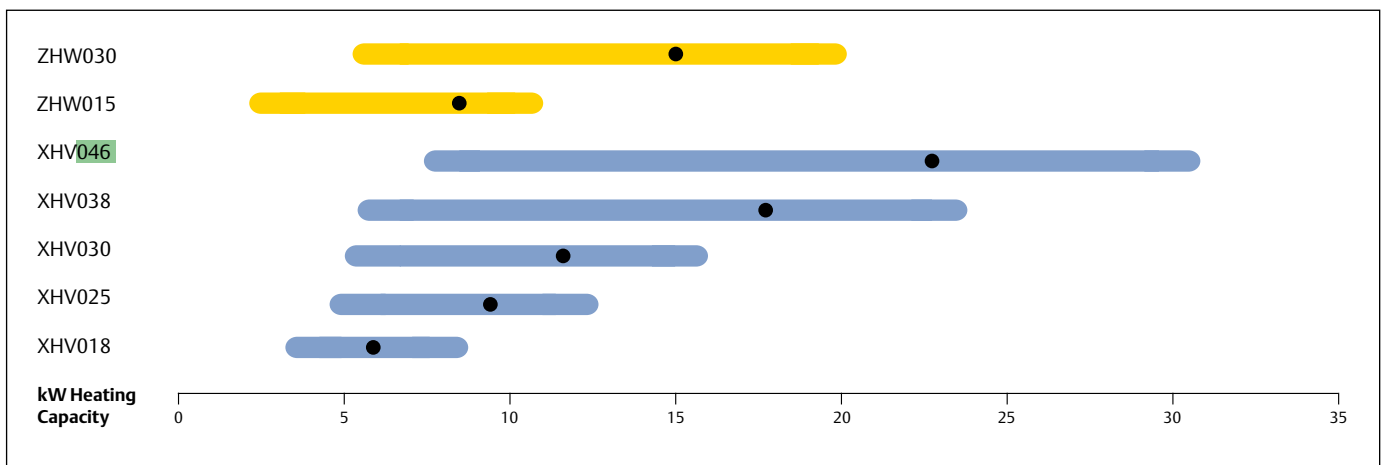
XHV and ZHW Variable Speed scroll compressors for R410A, for outstanding performance for cooling and heating applications.

The new Emerson Climate Technologies solution for variable speed applications with capacity modulated compressors. XHV and ZHW compressors deliver outstanding performances, both in new building and retrofit applications. Variable Speed Copeland Scroll compressors feature a state-of-the-art brushless permanent magnet motor matched with a highly efficient drive and vapor injection technology (ZHW only). In addition to Copeland market-proven robustness, XHV and ZHW compressors with the qualified inverter drive meet and exceed the level of reliability expected for these demanding applications.



ZHW Copeland Scroll Variable Speed Compressor and Emerson Climate Inverter Drive

XHV & ZHW Variable Speed Scroll Compressor Line-up

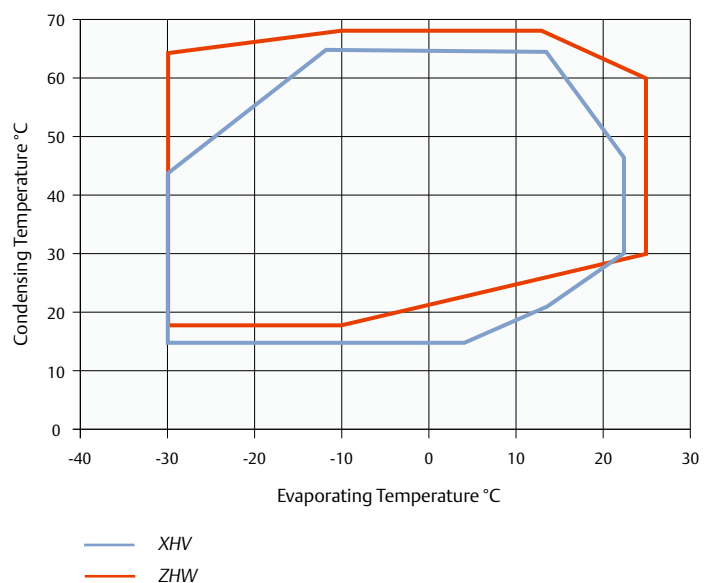


Conditions: Cooling kW Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K
Heating kW Evaporating -7°C, Condensing 50°C, 4K Subcooling, 5K Superheat

Features and Benefits

- Highest efficiency throughout the operating envelope and speed range
- Envelope and speed management information for the system controller (real-time communication via Modbus RS485)
- Enhanced Vapor Injection technology for best seasonal efficiency (ZHW)
- High water temperature for all applications
- Compliance with electromagnetic-compatibility (EMC) and electromagnetic-interference (EMI) requirements for residential applications
- VDE certification for ZHW compressor matched with Emerson Climate inverter drive
- Wide speed range 15-120Hz
- Mutually optimized and qualified scroll and drive

Operating Envelope R410A



Maximum Allowable Pressure (PS)

- ZHW:
Low Side PS 28 bar(g) / High Side PS 45 bar(g)
- XHV:
Low Side PS 28 bar(g) / High Side PS 45 bar(g)

Technical Overview

| Compressor | | | | | | | | | | |
|------------|-----------------------|------|------|---------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------------------|
| R410A | Heating Capacity (kW) | | COP* | Displacement (cm ³) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Sound Pressure @ 1 m - dB(A)** |
| | Min | Max | | | | | | | | |
| ZHW0152P | 2.7 | 10.4 | 2.9 | 15.0 | 3/4 | 1/2 | 1.7 | 229/198/394 | 21 | 68 |
| ZHW0302P | 5.5 | 19.8 | 3.2 | 30.0 | 3/4 | 1/2 | 1.7 | 229/198/394 | 22 | 68 |
| XHV0181P | 2.9 | 8.2 | 2.9 | 18.0 | 3/4 | 1/2 | 0.7 | 229/198/388 | 14 | n.a. |
| XHV0251P | 3.9 | 12.4 | 2.9 | 25.0 | 3/4 | 1/2 | 0.7 | 229/198/388 | 15 | n.a. |
| XHV0301P | 4.3 | 4.3 | 3.0 | 30.0 | 3/4 | 1/2 | 1.2 | 229/198/388 | 20 | n.a. |
| XHV0381P | 5.5 | 22.9 | 3.1 | 38.0 | 3/4 | 1/2 | 1.2 | 229/198/388 | 21 | n.a. |
| XHV0501P | 8.0 | 33.1 | 3.1 | 50.0 | 3/4 | 1/2 | 1.2 | 229/198/388 | 22 | n.a. |

Conditions: Heating kW (-7/50)

*@ Nominal Speed (90Hz)

Preliminary data

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

| Inverter Drive | | | | | | | | | | | | | |
|----------------|--------------------|------------------|---------|----------|-----|--------------|----------------|-----|-----------------|----------|----------|--------|---------------------------|
| Model | Matched Compressor | Power input (kW) | | Amps (A) | | Cooling | Frequency (Hz) | | Net Weight (kg) | 1Ph 230V | 3Ph 400V | Comm. | Length/Width/Height (mm)* |
| | | Nominal | Nominal | Min | Max | | | | | | | | |
| EV2033M | ZHW015 | 3.3 | | | | Air / Liquid | 15 | 120 | 3.6 | √ | n.a. | Modbus | 228/260/156 |
| EV2037M | ZHW015 | 3.7 | | | | | 15 | 120 | 3.6 | √ | n.a. | | 228/260/119 |
| EV2055M | ZHW015-30 | 5.5 | | | | | 15 | 120 | 3.6 | √ | v | | 228/260/156 |
| EV2080M | ZHW030 | 8.0 | | | | | 15 | 120 | 5.1 | √ | √ | | |
| ED3011A | XHV018 | 2.6 | 11 | | | | 15 | 120 | 2.8 | √ | n.a. | | |
| ED3015A | XHV018-25-30 | 3.8 | 15 | | | | 15 | 120 | 3.6 | √ | n.a. | | |
| ED3018A | XHV025-30-38 | 5.0 | 18 | | | | 15 | 120 | 3.6 | √ | n.a. | | |
| ED3011B | XHV025-30-38 | 3.8 | 11 | | | | 15 | 120 | 3.6 | n.a. | √ | | |
| ED3015B | XHV025-30-38 | 5.0 | 15 | | | | 15 | 120 | 3.6 | n.a. | √ | | |
| ED3020B | XHV038-050 | 8.0 | 20 | | | | 15 | 120 | 5.1 | n.a. | √ | | |

Conditions: Suction Superheat 5K, Subcooling 4K

*Air cooled version including fins

Preliminary data

Capacity Data

| Condensing Temperature +50°C | | | | | | | | | | | | | | | | | |
|------------------------------|-----|------------------------------|------|------|------|------|------|------|----------|-----|------------------------------|-----|-----|-----|-----|-----|-----|
| R410A | | Heating Capacity (kW) | | | | | | | R410A | | Power Input (kW) | | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | | -30 | -15 | -10 | -5 | 0 | 5 | 15 | Model | | -30 | -15 | -10 | -5 | 0 | 5 | 15 |
| ZHW0152P | Max | 6.0 | 8.6 | 9.7 | 11.0 | 12.0 | 12.0 | 12.4 | ZHW0152P | Max | 3.1 | 3.3 | 3.3 | 3.4 | 3.2 | 2.9 | 2.4 |
| | Min | 2.0 | 2.6 | 2.8 | 2.9 | 3.1 | 3.1 | 3.8 | | Min | 1.3 | 1.1 | 1.1 | 1.0 | 0.9 | 0.9 | 0.9 |
| ZHW0302P | Max | 11.3 | 16.3 | 18.5 | 20.8 | 22.6 | 22.6 | 23.7 | ZHW0302P | Max | 5.7 | 6.0 | 6.1 | 6.1 | 5.7 | 5.4 | 4.4 |
| | Min | 4.2 | 5.2 | 5.8 | 5.9 | 6.6 | 6.6 | 8.1 | | Min | 2.4 | 2.0 | 2.0 | 1.9 | 1.7 | 1.7 | 1.7 |

Condition: Suction Superheat 10K, Subcooling 4K

| Condensing Temperature +50°C | | | | | | | | | | | | | | | | | |
|------------------------------|-----|------------------------------|------|------|------|------|------|------|----------|-----|------------------------------|-----|-----|-----|-----|-----|-----|
| R410A | | Heating Capacity (kW) | | | | | | | R410A | | Power Input (kW) | | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | | -20 | -15 | -10 | -5 | 0 | 5 | 15 | Model | | -20 | -15 | -10 | -5 | 0 | 5 | 15 |
| XHV0181P | Max | 5.6 | 6.3 | 7.3 | 8.3 | 9.5 | 10.9 | 11.7 | XHV0181P | Max | 2.7 | 2.7 | 2.7 | 2.8 | 2.8 | 2.9 | 2.8 |
| | Min | 1.9 | 2.0 | 2.3 | 1.2 | 1.3 | 1.3 | 1.7 | | Min | 1.2 | 1.1 | 0.9 | 0.5 | 0.4 | 0.4 | 0.5 |
| XHV0251P | Max | 9.3 | 10.5 | 12.0 | 13.8 | 15.8 | 18.1 | 19.6 | XHV0251P | Max | 4.3 | 4.4 | 4.4 | 4.5 | 4.6 | 4.6 | 4.6 |
| | Min | 3.0 | 3.3 | 3.8 | 1.9 | 2.1 | 2.2 | 2.9 | | Min | 1.8 | 1.6 | 1.5 | 0.7 | 0.7 | 0.7 | 0.7 |
| XHV0301P | Max | 12.3 | 13.9 | 15.8 | 18.1 | 20.8 | 23.9 | 26.0 | XHV0301P | Max | 5.6 | 5.7 | 5.8 | 5.9 | 6.0 | 6.0 | 6.0 |
| | Min | 3.8 | 4.3 | 5.0 | 2.4 | 2.7 | 2.9 | 3.8 | | Min | 2.2 | 2.1 | 2.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| XHV0381P | Max | 16.0 | 17.9 | 20.4 | 23.3 | 26.8 | 30.8 | 34.0 | XHV0381P | Max | 6.8 | 7.0 | 7.1 | 7.3 | 7.4 | 7.5 | 7.5 |
| | Min | 4.6 | 5.5 | 6.5 | 2.8 | 3.3 | 3.7 | 4.9 | | Min | 2.5 | 2.4 | 2.4 | 1.1 | 1.1 | 1.1 | 1.1 |
| XHV0501P | Max | 21.0 | 23.6 | 26.8 | 30.7 | 35.3 | 40.6 | 44.7 | XHV0501P | Max | 9.0 | 9.2 | 9.4 | 9.6 | 9.7 | 9.9 | 9.9 |
| | Min | 6.0 | 7.2 | 8.5 | 3.7 | 4.3 | 4.9 | 6.4 | | Min | 3.3 | 3.2 | 3.2 | 1.5 | 1.5 | 1.5 | 1.5 |

Condition: Suction Superheat 5K, Subcooling 4K

Preliminary data

ZH Copeland Scroll™ For Heat Recovery and High Refrigeration Applications for R134a

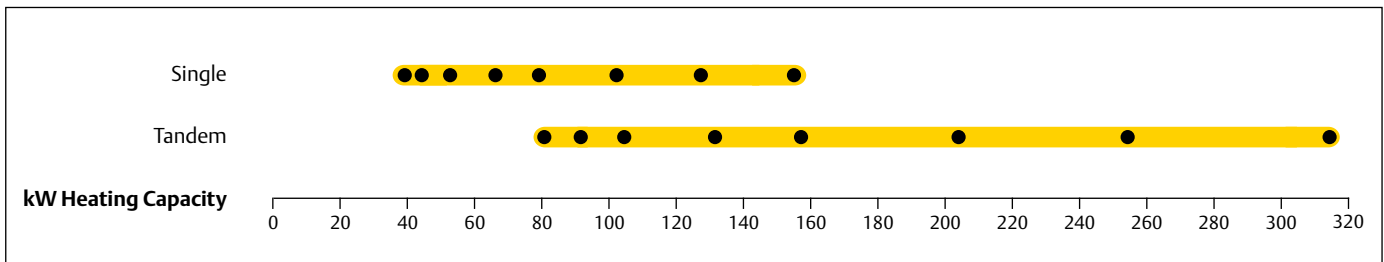
ZH*KCE R134a Copeland Scroll compressors were developed for the recovery and reuse of available heat. For example, the heat generated by processes or machining cooling equipment can be recovered and not wasted. This contributes to reducing the total energy cost of installations. On a water-cooled chiller, heat recovery on the condensing water loop can be used to produce high temperature water for sanitary or premise heating. With a typical evaporating temperature between 20°C and 40°C and condensing up to 85°C, ZH*KCE scrolls offer many opportunities of heat recovery.

The range of products goes from the ZH40KCE (7.5hp) to the ZH150 (30hp) which can be tandemized.



ZH*KCE Scroll Compressor For Heat Recovery

ZH*KCE Scroll Compressor Line-up R134a



Conditions: Evaporating 40°C, Condensing 85°C, Superheat 10K, Subcooling 5K

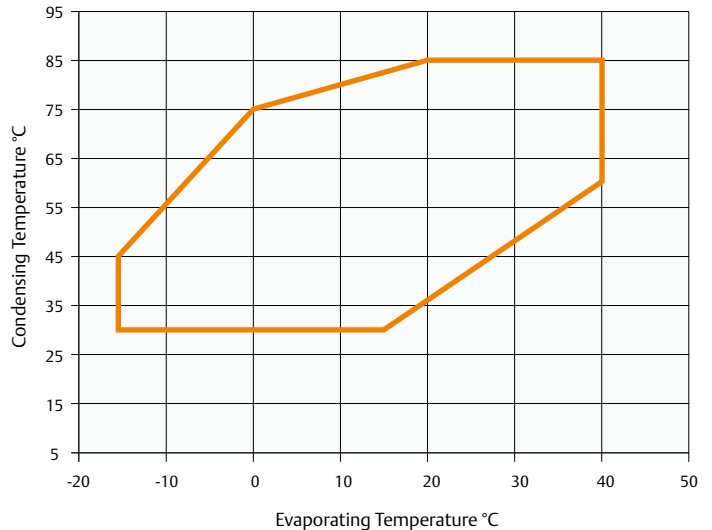
Features and Benefits

- Copeland Scroll axial and radial compliance for superior reliability and efficiency
- Wide scroll line-up R134a with 8 models and tandem
- Low sound and vibration level
- Low oil circulation rate
- Copeland qualified tandem

Typical Applications

- Heat recovery on the dry cooler water circuit of a water-cooled chiller to produce sanitary water or other heating
- Re-inject energy to district heating network and avoid wasting it
- Process industry where the water returning from the machinery comes back between 20 and 40°C
- Food industry where one areas needs cooling and another heating at the same time
- Air-to-water heat pump, even during the warm season
- Exhaust air heat recovery system
- Heat recovery on Fluegas

Operating Envelope R134a



Maximum Allowable Pressure (PS)

Low Side PS 20 bar(g) / High Side PS 32 bar(g)

Technical Overview

| Models | Nominal hp | Heating Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version / Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @1m - dB(A)** |
|----------|------------|-----------------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|----------------------|-------------------------------|--------------------------|------------------------------|
| | | | | | | | | | | 3 Ph* | 3 Ph* | 3 Ph* | |
| ZH40KCE | 7.5 | 39.0 | 4.3 | 22.1 | 1 1/8 | 7/8 | 2.7 | 264 / 285 / 476 | 57 | TFD | 19.2 | 95 | 63 |
| ZH45KCE | 9.0 | 44.0 | 4.6 | 24.9 | 1 3/8 | 7/8 | 3.4 | 264 / 285 / 533 | 60 | TFD | 21.1 | 111 | 63 |
| ZH50KCE | 10.0 | 50.9 | 4.5 | 29.1 | 1 3/8 | 7/8 | 3.4 | 264 / 285 / 533 | 61 | TFD | 23.6 | 118 | 63 |
| ZH64KCE | 13.0 | 63.7 | 4.3 | 36.4 | 1 3/8 | 7/8 | 3.4 | 264 / 285 / 552 | 65 | TFD | 27.1 | 140 | 68 |
| ZH75KCE | 15.0 | 76.0 | 4.2 | 43.4 | 1 3/8 | 7/8 | 3.4 | 264 / 285 / 552 | 66 | TFD | 35.3 | 174 | 71 |
| ZH100KCE | 20.0 | 96.1 | 4.0 | 56.6 | 1 5/8 | 1 3/8 | 4.7 | 432 / 376 / 694 | 140 | TWD | 42.7 | 225 | 72 |
| ZH125KCE | 25.0 | 120.0 | 4.1 | 71.4 | 1 5/8 | 1 3/8 | 6.8 | 447 / 392 / 717 | 160 | TWD | 53.4 | 272 | 74 |
| ZH150KCE | 30.0 | 148.8 | 4.2 | 87.5 | 1 5/8 | 1 3/8 | 6.3 | 447 / 427 / 717 | 177 | TWD | 67.6 | 310 | 76 |

Conditions Evaporating 40°C - Condensing 85°C - Superheat 5K - Subcooling 4K

* 3 Ph: 380-420V/ 50Hz

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature +80°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|------|-------|-------|-------|-------|----------|------------------------------|------|------|------|------|------|------|
| R134a | Heating Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Models | +10 | +15 | +20 | +25 | +30 | +35 | +40 | Models | +10 | +15 | +20 | +25 | +30 | +35 | +40 |
| ZH40KCE | 16.9 | 19.7 | 22.9 | 26.5 | 30.7 | 35.6 | 41.1 | ZH40KCE | 8.3 | 8.3 | 8.2 | 8.1 | 8.1 | 8.1 | 8.1 |
| ZH45KCE | 20.2 | 23.2 | 26.5 | 30.5 | 35.0 | 40.3 | 46.5 | ZH45KCE | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 |
| ZH50KCE | 23.1 | 26.6 | 30.6 | 35.2 | 40.5 | 46.7 | 53.8 | ZH50KCE | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 |
| ZH64KCE | 28.7 | 33.1 | 38.1 | 43.9 | 50.7 | 58.4 | 67.3 | ZH64KCE | 13.5 | 13.5 | 13.4 | 13.4 | 13.5 | 13.5 | 13.6 |
| ZH75KCE | 34.8 | 39.9 | 45.8 | 52.6 | 60.5 | 69.7 | 80.3 | ZH75KCE | 16.2 | 16.2 | 16.2 | 16.2 | 16.3 | 16.4 | 16.7 |
| ZH100KCE | 46.4 | 52.6 | 59.9 | 68.3 | 77.9 | 88.9 | 101.5 | ZH100KCE | 21.1 | 21.3 | 21.4 | 21.5 | 21.5 | 21.5 | 21.6 |
| ZH125KCE | 57.6 | 65.4 | 74.4 | 84.8 | 96.9 | 111.0 | 127.0 | ZH125KCE | 27.6 | 26.6 | 26.6 | 26.5 | 26.4 | 26.3 | 26.3 |
| ZH150KCE | 71.0 | 80.7 | 91.9 | 105.0 | 120.0 | 137.0 | 157.0 | ZH150KCE | 30.7 | 31.2 | 31.5 | 31.8 | 32.0 | 32.3 | 32.5 |

Conditions: Suction Superheat 5K / Subcooling 4K

ZRH & ZRHV Copeland Scroll™ Horizontal Compressor Range

for R407C and R134a, for the specific needs of transport air conditioning

Air conditioning for passenger comfort is a pre-requisite in today's public transport vehicles. At the same time, maximization of passenger space and streamlining of high speed trains increasingly impose limitations on height.

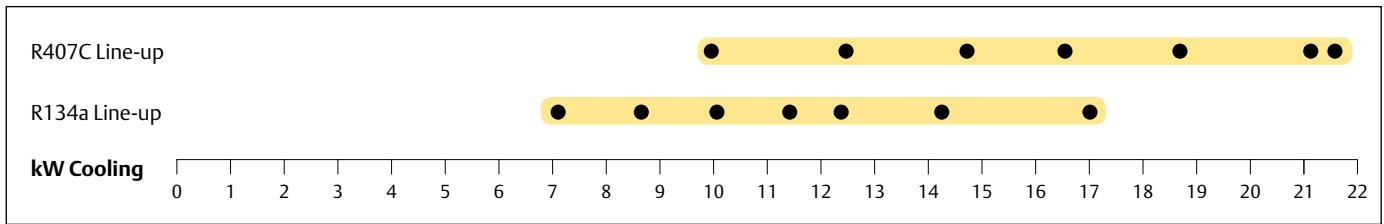
ZRH compressors are based on the unique Copeland Scroll design and provide the same reliability as a standard Copeland Scroll. The addition of an oil pump covers the specific needs of transport air conditioning and of horizontal compressor arrangement in general.

The low profile design and modulation capabilities of the ZRH compressor range are the ideal response to these market needs.



Horizontal Scroll Compressor

ZRH Scroll Compressors Line-up R407C and R134a



Conditions: EN12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

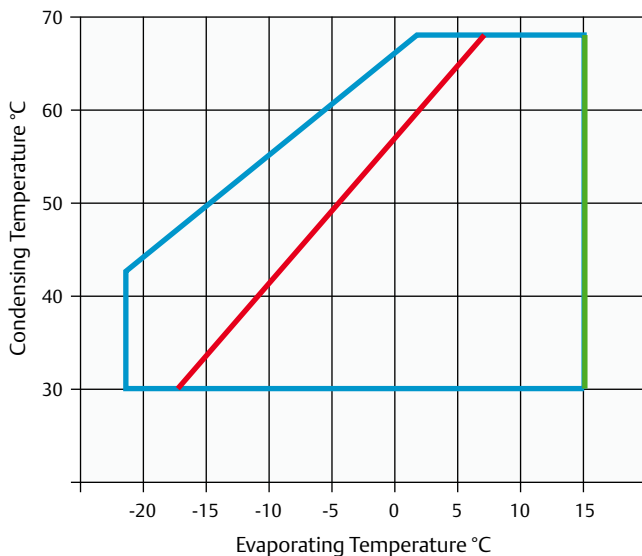
Features and Benefits

- Compactness and low weight
- Horizontal design with less than 250mm height
- Copeland Scroll compliance for superior reliability and efficiency
- Additional oil-pump
- Reduction of potential risk of refrigerant leakage through the drive shaft sealing
- Capacity modulation from 70% to 150% for Quest models ZRHV

Maximum Allowable Pressure (PS)

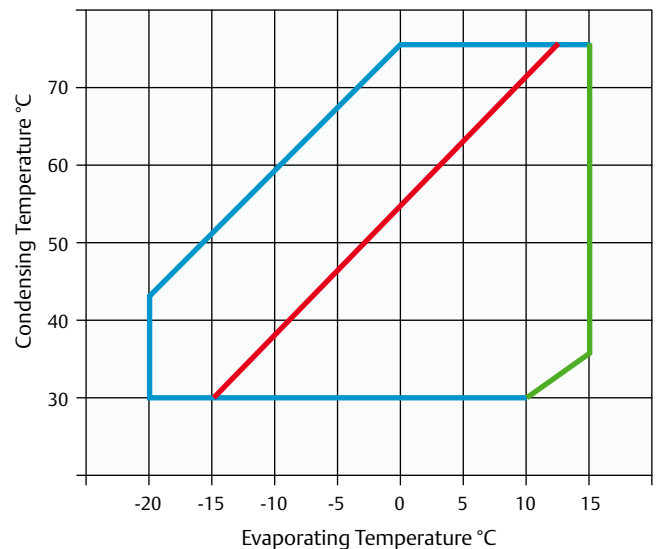
Low Side PS 21 bar(g) / High Side PS 28.8 bar(g)

Operating Envelope R407C



— 10K Suction Superheat — Maximum Evaporating Temperature
— 25°C Suction Gas Return

Operating Envelope R134a



— 10K Suction Superheat — Maximum Evaporating Temperature
— 25°C Suction Gas Return

Technical Overview - Fixed speed Models

| Models | Nominal hp | Capacity (kW) | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @ 1 m - dB(A)** |
|-----------|------------|---------------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|---------------------|-------------------------------|--------------------------|--------------------------------|
| | | | | | | | | | | 3 Ph* | 3 Ph* | 3 Ph* | |
| ZRH49KJE | 4.0 | 10.4 | 2.9 | 11.8 | 7/8 | 1/2 | 1.8 | 487/290/231 | 52 | TFD | 9 | 52 | 66 |
| ZRH61KJE | 5.0 | 13.2 | 3.1 | 14.5 | 7/8 | 1/2 | 1.8 | 487/290/231 | 53 | TFD | 12 | 64 | 67 |
| ZRH72KJE | 6.0 | 15.2 | 3.1 | 17.1 | 7/8 | 1/2 | 1.8 | 487/290/231 | 54 | TFD | 12 | 74 | 68 |
| ZRH78KTE | 7.0 | 16.7 | 3.0 | 19.8 | 1 3/8 | 7/8 | 1.6 | 585/313/250 | 60 | TFD | 14 | 100 | 74 |
| ZRH87KTE | 7.5 | 18.8 | 3.0 | 22.1 | 1 3/8 | 7/8 | 1.6 | 585/313/250 | 60 | TFD | 16 | 95 | 74 |
| ZRH100KTE | 9.0 | 21.5 | 3.1 | 24.9 | 1 3/8 | 7/8 | 1.6 | 585/313/250 | 63 | TFD | 18 | 111 | 74 |
| ZRH116KTE | 10.0 | 25.1 | 3.1 | 29.1 | 1 3/8 | 7/8 | 1.6 | 585/313/250 | 64 | TFD | 20 | 118 | 74 |

Conditions: EN12900 R407C - HT: Evaporating +5°C, Condensing +50°C, Suction Superheat 10K, Subcooling 0K

*TFD: 3Ph 380-420V/50Hz - 460/60Hz; TF5 200-220V/50Hz, 200-230V/60Hz

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Technical Overview - Variable Speed Models

| Models | Capacity (kW) | | COP | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @ 1 m - dB(A)** |
|-----------|---------------|------|-----|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|---------------------|-------------------------------|--------------------------|--------------------------------|
| | Min | Max | | | | | | | | 3 Ph* | 3 Ph* | 3 Ph* | |
| ZRHV72KJE | 13.3 | 22.0 | 2.8 | 17.1 | 7/8 | 1/2 | 1.8 | 487/290/231 | 53 | TFD | 15 | 100 | 66 |
| ZRHV94KJE | 18.6 | 32.9 | 2.8 | 23.9 | 1 3/8 | 7/8 | 1.6 | 584/305/230 | 60 | TFD | 21 | 140 | 73 |

Conditions: EN12900 R407C - HT: Evaporating +5°C, Condensing +50°C, Suction Superheat 10K, Subcooling 0K

*TFD: 3Ph 380-420V/50Hz - 460/60Hz; TF5 200-220V/50Hz, 200-230V/60Hz

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data - Fixed speed Models

| Condensing Temperature +50°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|------|------|------|------|------|-----------|------------------------------|-------|-----|-----|-----|-----|-----|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | Model | -15 | -10 | -5 | 0 | +5 | +10 | | +15 | Model | -15 | -10 | -5 | 0 | +5 |
| ZRH49KJE | 2.8 | 3.7 | 4.7 | 5.9 | 7.3 | 8.9 | 10.7 | ZRH49KJE | 2.0 | 1.1 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 |
| ZRH61KJE | 3.6 | 4.6 | 5.9 | 7.3 | 8.9 | 10.9 | 13.1 | ZRH61KJE | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 3.1 |
| ZRH72KJE | 4.3 | 5.6 | 7.0 | 8.6 | 10.5 | 12.6 | 15.0 | ZRH72KJE | 2.6 | 2.8 | 3.0 | 3.1 | 3.0 | 3.4 | 3.5 |
| ZRH78KTE | 4.2 | 5.5 | 7.1 | 9.0 | 11.3 | 13.9 | 17.0 | ZRH78KTE | 3.5 | 3.6 | 3.7 | 3.8 | 3.8 | 3.9 | 4.0 |
| ZRH87KTE | 4.3 | 5.8 | 7.6 | 9.8 | 13.3 | 15.2 | 18.7 | ZRH87KTE | 3.9 | 4.0 | 4.0 | 4.1 | 4.1 | 4.1 | 4.0 |
| ZRH100KTE | 4.8 | 6.6 | 8.7 | 11.2 | 14.2 | 17.6 | 21.7 | ZRH100KTE | 4.2 | 4.4 | 4.4 | 4.5 | 4.4 | 4.5 | 4.5 |
| ZRH116KTE | 6.4 | 8.4 | 10.8 | 13.6 | 16.9 | 10.8 | 25.3 | ZRH116KTE | 5.5 | 5.6 | 5.6 | 5.6 | 5.5 | 5.5 | 5.5 |

Conditions: Suction Superheat 10K / Subcooling 0K

Preliminary data

| Condensing Temperature +50°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|------|------|------|------|------|-----------|------------------------------|-------|-----|-----|-----|-----|-----|
| R407C | Cooling Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | Model | -15 | -10 | -5 | 0 | +5 | +10 | | +15 | Model | -15 | -10 | -5 | 0 | +5 |
| ZRH49KJE | | 5.6 | 6.9 | 8.5 | 10.4 | 12.6 | 15.0 | ZRH49KJE | | 3.1 | 3.3 | 3.4 | 3.5 | 3.6 | 3.8 |
| ZRH61KJE | | 7.2 | 8.8 | 10.8 | 13.2 | 15.9 | 19.0 | ZRH61KJE | | 3.8 | 4.0 | 4.2 | 4.3 | 4.5 | 4.6 |
| ZRH72KJE | | 8.1 | 10.1 | 12.4 | 15.2 | 18.4 | 22.2 | ZRH72KJE | | 4.3 | 4.5 | 4.7 | 4.9 | 5.0 | 5.1 |
| ZRH78KTE | | | 10.3 | 13.4 | 16.7 | 20.5 | | ZRH78KTE | | | 5.4 | 5.5 | 5.5 | 5.5 | |
| ZRH87KTE | | | 15.6 | 14.8 | 18.8 | 23.5 | | ZRH87KTE | | | 6.1 | 6.2 | 6.2 | 6.2 | |
| ZRH100KTE | | | 13.8 | 17.4 | 21.5 | 26.3 | | ZRH100KTE | | | 6.7 | 6.8 | 6.9 | 6.9 | |
| ZRH116KTE | | | 16.1 | 20.2 | 25.1 | 30.8 | | ZRH116KTE | | | 7.9 | 8.0 | 8.0 | 8.1 | |

Conditions: Suction Superheat 10K / Subcooling 0K

Capacity Data - Variable Speed Models

| Condensing Temperature +50°C | | | | | | | | | | | | | | | | | | |
|------------------------------|-----|------------------------------|-----|------|------|------|------|------|----------|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|
| R134a | | Cooling Capacity (kW) | | | | | | | R134a | | Power Input (kW) | | | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 | |
| ZRHV72KJE | Max | | 8.5 | 10.6 | 13.0 | 15.8 | 18.9 | 22.3 | ZRH49KJE | Max | | 4.8 | 5.1 | 5.4 | 5.7 | 6.0 | 6.3 | |
| | Min | | 5.1 | 6.3 | 7.8 | 9.5 | 11.3 | 13.4 | | Min | | | 2.9 | 3.1 | 3.2 | 3.4 | 3.6 | 3.8 |
| ZRHV94KJE | Max | | | 12.4 | 15.2 | 18.5 | 22.2 | 26.2 | ZRH61KJE | Max | | | 0.0 | 6.0 | 6.3 | 6.7 | 7.0 | |
| | Min | | | 8.9 | 10.9 | 13.3 | 15.9 | 18.7 | | Min | | | 0.0 | 4.3 | 4.5 | 4.8 | 5.0 | |

Conditions: Suction Superheat 10K / Subcooling 0K

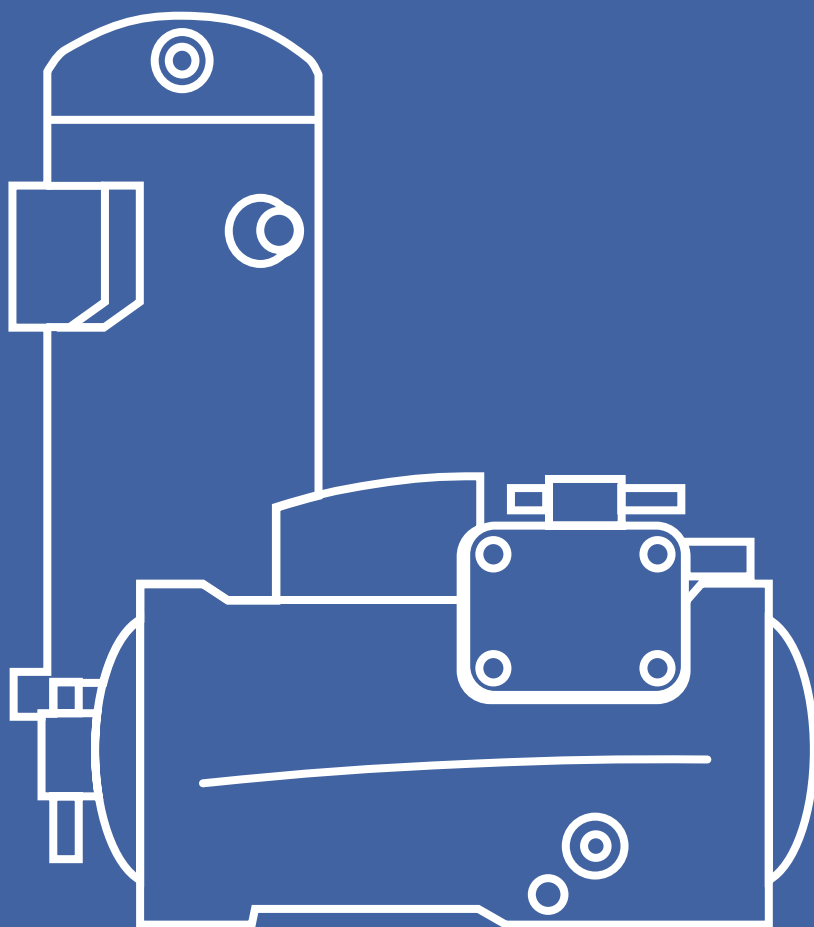
Preliminary data

| Condensing Temperature +50°C | | | | | | | | | | | | | | | | | |
|------------------------------|-----|------------------------------|------|------|------|------|------|------|----------|-----|------------------------------|-----|-----|-----|-----|-----|------|
| R407C | | Cooling Capacity (kW) | | | | | | | R407C | | Power Input (kW) | | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 | Model | | -15 | -10 | -5 | 0 | +5 | +10 | +15 |
| ZRHV72KJE | Max | | 11.8 | 14.8 | 18.2 | 22.1 | 26.5 | 31.2 | ZRH49KJE | Max | | 6.8 | 7.2 | 7.5 | 7.9 | 8.4 | 8.9 |
| | Min | | 7.1 | 8.9 | 10.9 | 13.3 | 15.9 | 18.7 | | Min | | | 4.1 | 4.3 | 4.5 | 4.8 | 5.0 |
| ZRHV94KJE | Max | | | 17.3 | 21.3 | 25.9 | 31.0 | 36.7 | ZRH61KJE | Max | | | 8.4 | 8.8 | 9.3 | 9.8 | 10.4 |
| | Min | | | 12.4 | 15.3 | 18.6 | 22.2 | 26.2 | | Min | | | 6.0 | 6.3 | 6.7 | 7.0 | 7.5 |

Conditions: Suction Superheat 10K / Subcooling 0K



Refrigeration Applications



Refrigeration Applications

Emerson Climate Technologies offers a wide range of solutions for commercial refrigeration applications. With its long-lasting expertise in semi-hermetic reciprocating compressor technology as well as in scroll technology, we can meet the requirements for most applications - at the small end just like at the large end of commercial refrigeration.

Completed by the various offerings in the segment of refrigeration units, Emerson Climate Technologies is able to offer the best solution and performance, whether you are looking for applications in foodservice or processing, supermarkets, hypermarkets, petrol stations or refrigerated warehousing.

Emerson Climate Technologies' prime focus for its semi-hermetic reciprocating technology is at the large end of commercial refrigeration. Here aspects such as reliability, serviceability and capacity modulation are of importance and they are perfectly provided by Emerson Climate Technologies' semi-hermetic reciprocating compressors. Innovations like the Discus™ and Stream technologies, digital modulation and CoreSense™ Diagnostics for advanced protection and preventive maintenance keep semi-hermetic at the forefront of compressor technology.

Especially when compact equipment, energy efficiency and reliability are musts, the scroll technology is the preferred choice for refrigeration applications. With developments such as vapor injection and digital modulation, scroll has become the leading technology and is widely recognized in the refrigeration market.

CoreSense™ Diagnostics is now also available as an option for the new scroll Summit series for medium and low temperature applications.

Whatever the chosen technology and product solution, Emerson Climate Technologies' range meets the specific refrigeration needs covering the entire spectrum of medium and low temperature applications whether using standard HFCs, low GWP or natural refrigerants.

ZS*KA Copeland Scroll™ Compressor Range for Medium Temperature Refrigeration Applications

As an extension to the existing ZB*KCE scroll range the new Copeland scroll ZS*KA compressor range represents the latest innovation in scroll technology for refrigeration equipment covering a small size displacement range of 4m³/h to 5 m³/h. As with the other existing scrolls, ZS*KA scrolls also feature a scroll compliance mechanism which makes them particularly robust and reliable under severe conditions including liquid slugging.

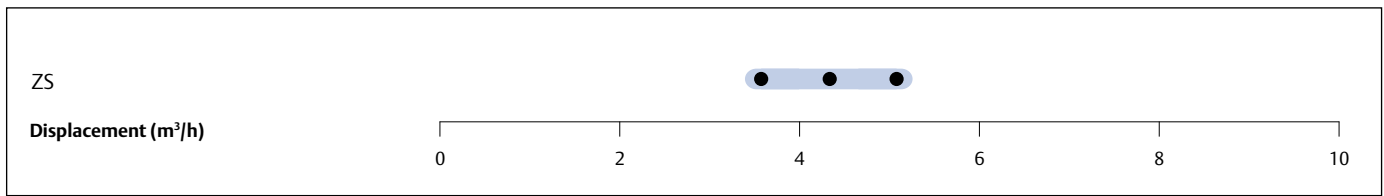
The ZS*KA models are intended for medium temperature refrigeration type systems and are ideally suited for applications such as walk-ins, reach-ins, cold rooms, display cases, and milk tank units. These models are multi-refrigerant capable and feature low sound and low vibration particularly important in the retail and food service sector and recommended for supermarket, restaurant, convenience store, and milk cooling operations.

The ZS*KA range from 1.3hp to 1.8 hp is designed to provide seasonal efficiencies up to 28% higher than the equivalent hermetic reciprocating compressors. These compressors are qualified for today's HFC as well as new low GWP refrigerants and HFO blends.



ZS*KA Copeland Scroll™ Compressor Range for Medium Temperature Refrigeration Applications

ZS*KA Compressor Line-up



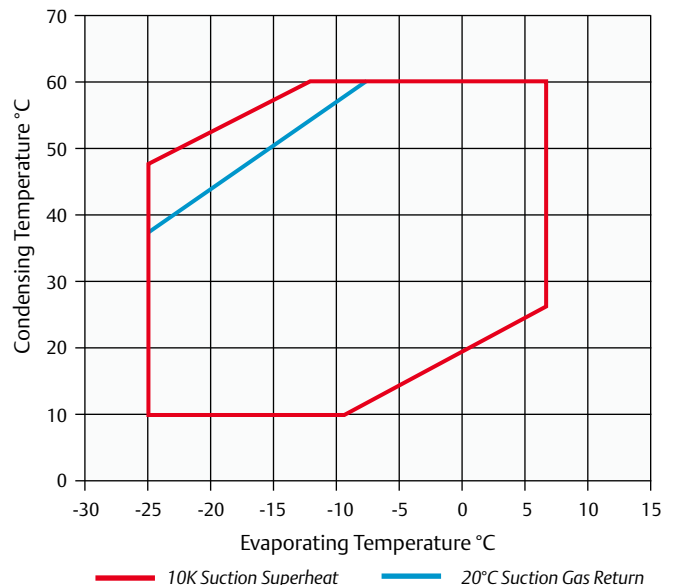
Features and Benefits

- Copeland Scroll axial and radial compliance for superior reliability and efficiency
- High seasonal efficiencies as scrolls are designed at the condition where equipment runs most of the time
- Up to 15% efficiency advantage over hermetic reciprocating compressors at rating conditions, and up to 28% improvement at lower condensing temperatures
- Availability of optional sound shell on all models providing up to 10 dBA additional sound attenuation for silent operation
- Wide operating range from -25°C to 10°C covering a minimum condensing limit of 10°C
- Qualified for R407A/F/C, R448A, R449A, R404A and R134a refrigerants

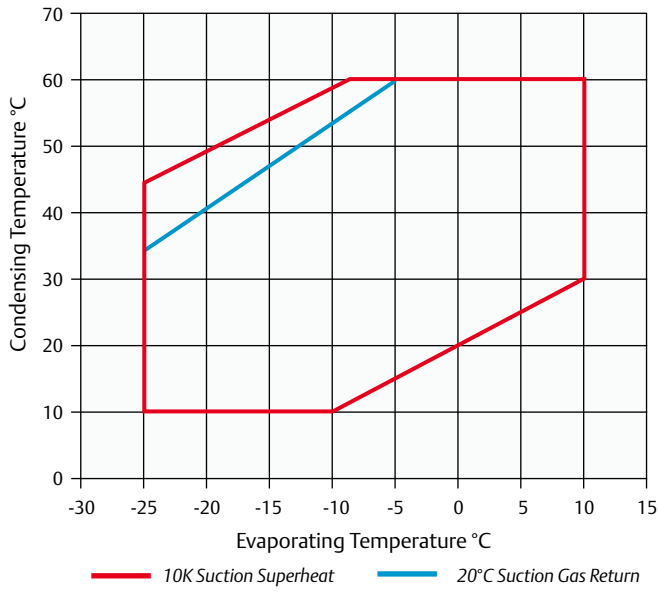
Maximum Allowable Pressure (PS)

- ZS09 to ZS13KA:
Low Side PS 21.6 bar(g) / High Side PS 31.9 bar(g)

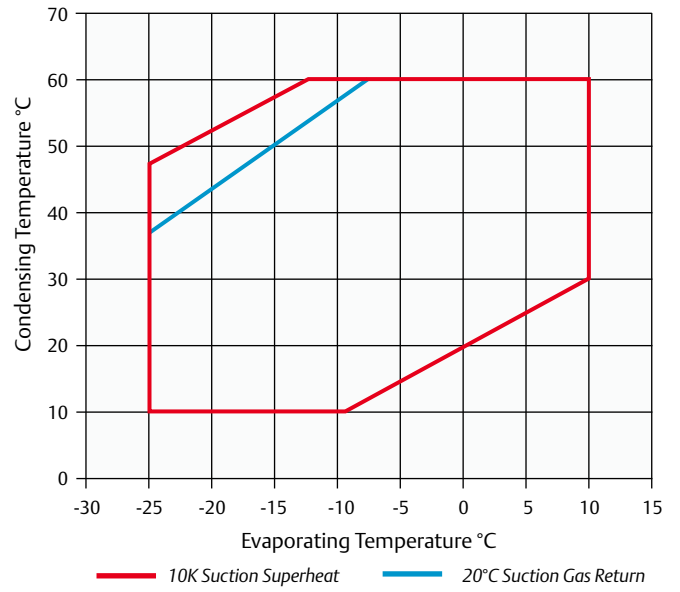
Operating Envelope R407A



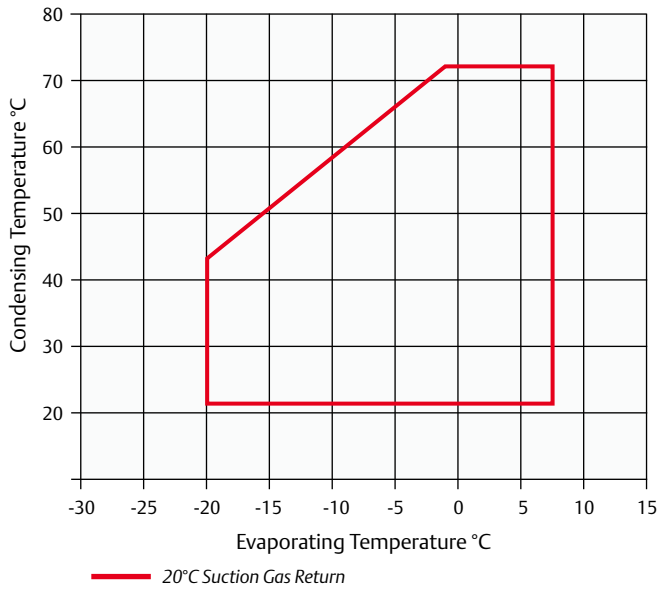
Operating Envelope R407F



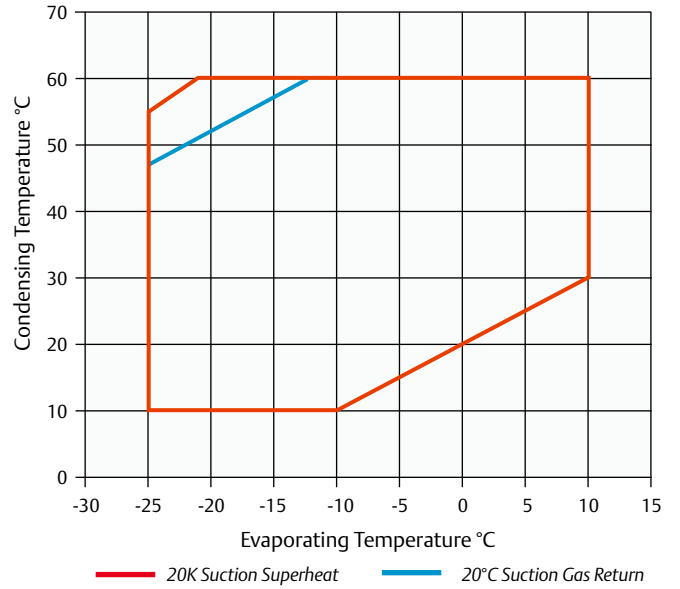
Operating Envelope R448A/R449A



Operating Envelope R134a



Operating Envelope R404A



Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Rotolock Suction (inch) | Rotolock Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m - dB(A) |
|---------|------------|----------------------------------|-------------------------|---------------------------|------------------|--------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|-----------------------------|
| | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| ZS09KAE | 1.3 | 3.7 | ¾ | ½ | 0.7 | 246/246/387 | 22.2 | PFJ | TFD | 7.2 | 3.0 | 45.0 | 27.0 | 59.0 |
| ZS11KAE | 1.5 | 4.4 | ¾ | ½ | 0.7 | 246/246/387 | 22.4 | PFJ | TFD | 8.7 | 3.3 | 45.0 | 27.0 | 59.0 |
| ZS13KAE | 1.8 | 5.0 | ¾ | ½ | 0.7 | 246/246/387 | 21.4 | PFJ | TFD | 9.9 | 4.0 | 54.0 | 29.0 | 59.0 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|------|-----|-----|-----|-----|---------|------------------------------|-----|------|-----|-----|-----|-----|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZS09KAE | | | 1.1* | 1.5 | 1.8 | 2.2 | 2.6 | ZS09KAE | | | 0.8* | 0.8 | 0.8 | 0.8 | 0.9 |
| ZS11KAE | | | 1.3* | 1.7 | 2.1 | 2.6 | 3.1 | ZS11KAE | | | 0.9* | 1.0 | 1.0 | 1.0 | 1.1 |
| ZS13KAE | | | 1.5* | 2.0 | 2.4 | 2.9 | 3.6 | ZS13KAE | | | 1.1* | 1.1 | 1.1 | 1.2 | 1.2 |

Conditions: Suction Gas Return 20°C / Subcooling 0K

* Conditions: Suction Superheat 10K, Subcooling 0K

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|------|-----|-----|-----|-----|---------|------------------------------|-----|------|-----|-----|-----|-----|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZS09KAE | | | 1.2* | 1.5 | 1.9 | 2.3 | 2.7 | ZS09KAE | | | 0.8* | 0.8 | 0.9 | 0.9 | 0.9 |
| ZS11KAE | | | 1.4* | 1.8 | 2.2 | 2.7 | 3.3 | ZS11KAE | | | 1.0* | 1.0 | 1.1 | 1.1 | 1.1 |
| ZS13KAE | | | 1.6* | 2.1 | 2.6 | 3.1 | 3.7 | ZS13KAE | | | 1.1* | 1.2 | 1.2 | 1.2 | 1.3 |

Conditions: Suction Gas Return 20°C / Subcooling 0K

* Conditions: Suction Superheat 10K, Subcooling 0K

Preliminary data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|------|-----|-----|-----|-----|-----------------|------------------------------|-----|------|-----|-----|-----|-----|
| R448A/ R449A | Cooling Capacity (kW) | | | | | | | R448A/ R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZS09KAE | | | 1.0* | 1.4 | 1.7 | 2.1 | 2.5 | ZS09KAE | | | 0.8* | 0.8 | 0.9 | 0.9 | 0.9 |
| ZS11KAE | | | 1.2* | 1.7 | 2.1 | 2.5 | 3.0 | ZS11KAE | | | 0.9* | 1.0 | 1.0 | 1.0 | 1.0 |
| ZS13KAE | | | 1.4* | 1.9 | 2.4 | 2.9 | 3.5 | ZS13KAE | | | 1.1* | 1.1 | 1.1 | 1.2 | 1.2 |

Conditions: Suction Gas Return 20°C / Subcooling 0K

* Conditions: Suction Superheat 10K, Subcooling 0K

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|------|-----|-----|-----|-----|---------|------------------------------|-----|------|-----|-----|-----|-----|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZS09KAE | | | 1.1* | 1.5 | 1.9 | 2.3 | 2.8 | ZS09KAE | | | 0.9* | 0.9 | 1.0 | 1.0 | 1.0 |
| ZS11KAE | | | 1.3* | 1.9 | 2.3 | 2.8 | 3.3 | ZS11KAE | | | 1.0* | 1.1 | 1.1 | 1.2 | 1.2 |
| ZS13KAE | | | 1.5* | 2.1 | 2.6 | 3.1 | 3.8 | ZS13KAE | | | 1.2* | 1.3 | 1.3 | 1.4 | 1.4 |

Conditions: Suction Gas Return 20°C / Subcooling 0K

*Conditions: Suction Superheat 10K, Subcooling 0K

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|-----|-----|-----|-----|-----|---------|------------------------------|-----|-----|-----|-----|-----|-----|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZS09KAE | | | | 0.9 | 1.1 | 1.4 | 1.7 | ZS09KAE | | | | 0.5 | 0.6 | 0.6 | 0.6 |
| ZS11KAE | | | | 1.1 | 1.3 | 1.7 | 2.0 | ZS11KAE | | | | 0.6 | 0.7 | 0.7 | 0.7 |
| ZS13KAE | | | | 1.2 | 1.5 | 1.9 | 2.3 | ZS13KAE | | | | 0.7 | 0.8 | 0.8 | 0.8 |

Conditions: Suction Gas Return 20°C / Subcooling 0K

ZB Copeland Scroll™ Compressor Range for Medium Temperature Refrigeration

using R407A/F/C, R448A/R449A, R404A, R134a, R450A and R513A

Emerson Climate Technologies offers ZB compressors with a wide displacement range from 5.9 m³/h to 87.5 m³/h. It includes digital compressor models that offers continuous capacity modulation technology.

Copeland Scroll compressors have 3 times less moving parts than reciprocating compressors and feature a scroll compliance mechanism which makes them particularly robust and reliable under severe conditions including liquid slugging.

They have the advantage of light weight and compactness, making them ideal for the usage in refrigeration units, compact refrigeration systems or special process units.

The Summit Series from 7 to 15 hp is designed to provide seasonal efficiencies 15% higher than traditional semi-hermetic compressors. These compressors are extremely quiet and can be fitted with an external sound shell for an additional 10 dBA sound reduction, which makes them best choice for refrigeration applications in urban and domestic areas.

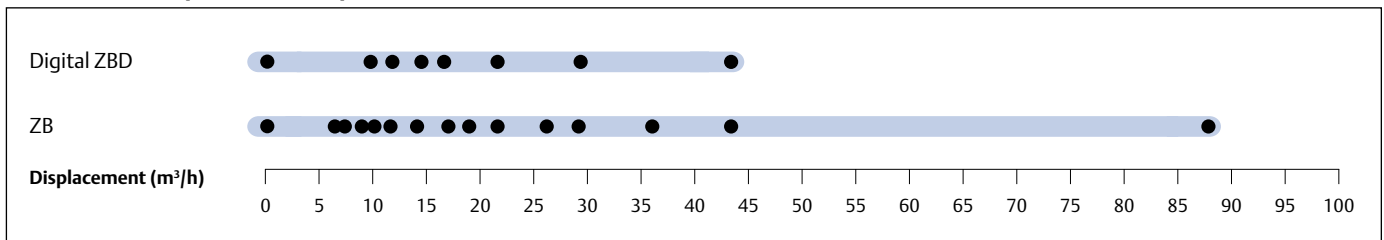
The ZB range also features ZB220 (30hp), the largest refrigeration scroll available on the market. These compressors are qualified for R407A/F/C, R448A, R449A, R404A and R134a. CoreSense™ Diagnostics is now available as an option for the ZB Scroll Summit series (ZB66K5E, ZB76K5E, ZB95K5E and ZB114K5E) as well as for Summit Digital ZBD*K5E Series.



ZB Compressor for Medium Temperature Refrigeration with and without Sound Shell

For more details on Digital models please refer to page 56 in the catalogue.

ZB and ZBD Compressor Line-up



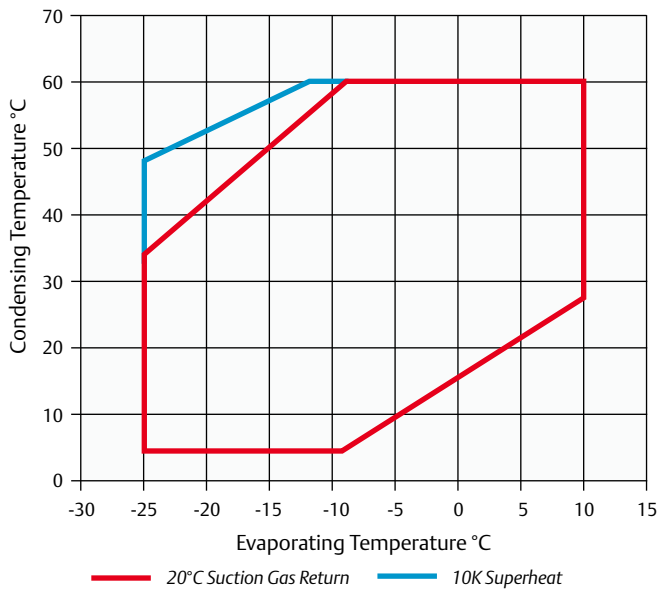
Features and Benefits

- Copeland Scroll axial and radial compliance for superior reliability and efficiency
- Wide operating envelope with 10°C condensing limit and fast pull-down capabilities
- High seasonal efficiencies as scrolls are designed at the condition where equipment runs most of the time
- Light weight and compactness, up to half the weight of equivalent semi-hermetic compressors
- Availability of optional sound shell on all models providing an additional 10 dBA sound attenuation for silent operation
- Includes 12 Digital Scroll compressor models for simple, stepless 10 to 100% capacity modulation
- One model for multiple refrigerants R407A/F/C, R448A/R449A, R404A, R134a, R450A and R513A

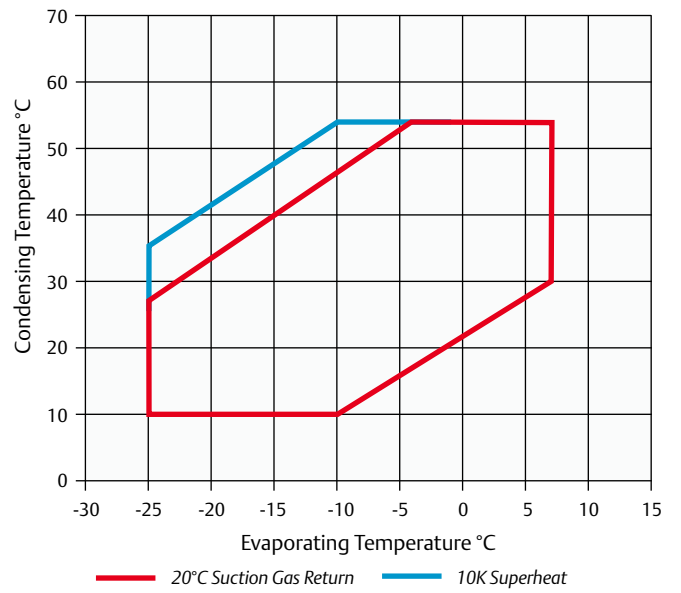
Maximum Allowable Pressure (PS)

- ZB15 to ZB45:
Low Side PS 21 bar(g) / High Side PS 32 bar(g)
- ZB50 to ZB220:
Low Side PS 22.6 bar(g) / High Side PS 32 bar(g)
- Digital ZBD:
Low Side PS 21 bar(g) / High Side PS 28.8 bar(g)
- Summit ZBD:
Low Side PS 22.6 bar(g) / High Side PS 32 bar(g)

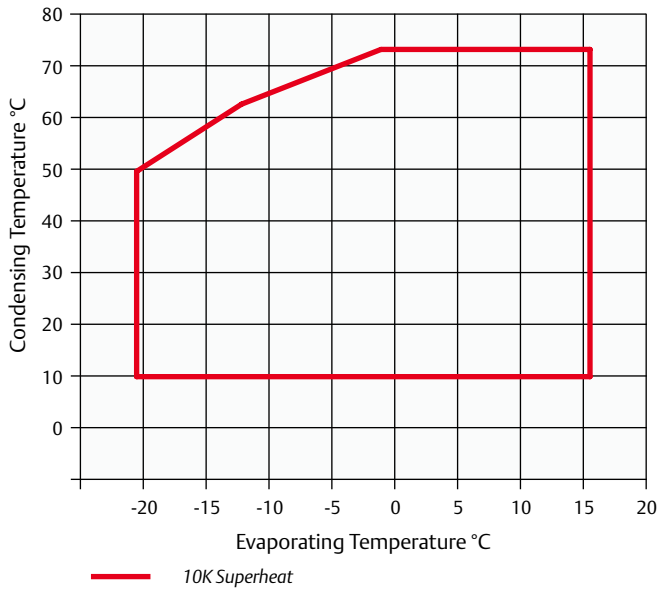
Operating Envelope R448A/R449A



Operating Envelope R407A



Operating Envelope R134a - For ZBD Digital Models



For individual model details please refer to Select software.

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Rotolock Suction (inch) | Rotolock Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m - dB(A)*** |
|-------------------------|------------|----------------------------------|-------------------------|---------------------------|------------------|--------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|--------------------------------|
| | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| ZB15KCE | 2.0 | 5.9 | 1 ¼ | 1 | 1.3 | 241/241/369 | 25.4 | PFJ | TFD | 12.8 | 4.9 | 58.0 | 26.0 | 55.0 |
| ZB19KCE | 2.5 | 6.8 | 1 ¼ | 1 | 1.5 | 242/242/369 | 27.2 | PFJ | TFD | 12.8 | 6.5 | 61.0 | 32.0 | 55.0 |
| ZB21KCE | 3.0 | 8.6 | 1 ¼ | 1 | 1.2 | 243/244/391 | 29.0 | PFJ | TFD | 16.4 | 7.2 | 82.0 | 40.0 | 58.0 |
| ZB26KCE | 3.5 | 10.0 | 1 ¼ | 1 | 1.5 | 243/244/405 | 28.0 | PFJ | TFD | 18.0 | 8.9 | 97.0 | 46.0 | 60.0 |
| ZB29KCE | 4.0 | 11.4 | 1 ¼ | 1 | 1.5 | 246/246/423 | 28.6 | | TFD | | 10.0 | | 50.0 | 58.0 |
| ZB38KCE | 5.0 | 14.4 | 1 ¼ | 1 | 1.9 | 242/242/438 | 37.4 | PFJ | TFD | 32.3 | 12.8 | 142.0 | 65.5 | 61.0 |
| ZB42KCE | 5.5 | 16.2 | 1 ¼ | 1 | 1.9 | 251/246/438 | 43.0 | PFJ | | 35.7 | | 150.0 | | 62.0 |
| ZB45KCE | 6.0 | 17.1 | 1 ¼ | 1 | 1.9 | 242/242/438 | 39.5 | | TFD | | 13.1 | | 74.0 | 61.0 |
| ZB48KCE | 6.5 | 18.8 | 1 ¼ | 1 ¼ | 1.8 | 246/250/442 | 39.0 | | TFD | | 14.0 | | 101.0 | 62.0 |
| ZB57KCE | | 21.4 | 1 ¼ | 1 ¼ | 1.9 | 246/256/442 | 39.5 | | TFD | | 15.9 | | 102.0 | 68.0 |
| ZB220KCE | 30.0 | 87.5 | 2 ¾ | 1 ¾ | 6.3 | 448/392/715 | 176.0 | | TWM | | 69.0 | | 310.0 | 78.0 |
| ZB Summit Models | | | | | | | | | | | | | | |
| ZB66K5E | 10.0 | 25.7 | 1 ¾ | 1 ¼ | 3.4 | 280/280/534 | 59.9 | | TFD | | 17.5 | | 111.0 | 66.0 |
| ZB76K5E | 12.0 | 28.8 | 1 ¾ | 1 ¼ | 3.4 | 280/280/534 | 61.2 | | TFD | | 20.4 | | 118.0 | 67.0 |
| ZB95K5E | 13.0 | 36.4 | 1 ¾ | 1 ¼ | 3.4 | 280/280/552 | 64.9 | | TFD | | 28.2 | | 140.0 | 69.0 |
| ZB114K5E | 15.0 | 43.4 | 1 ¾ | 1 ¼ | 3.4 | 280/280/552 | 66.2 | | TFD | | 33.5 | | 174.0 | 72.0 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|-----|-------|------|------|------|-----------|------------------------------|-----|-----|-------|------|------|------|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZB15KCE | | | | 2.1* | 2.8 | 3.5 | 4.2 | ZB15KCE | | | | 1.5* | 1.5 | 1.5 | 1.5 |
| ZB19KCE | | | | 2.6* | 3.4 | 4.2 | 5.2 | ZB19KCE | | | | 1.7* | 1.8 | 1.8 | 1.8 |
| ZB21KCE | | | | 3.0* | 4.0 | 5.1 | 6.3 | ZB21KCE | | | | 2.0* | 2.0 | 2.0 | 2.1 |
| ZB26KCE | | | | 3.6* | 4.7 | 5.8 | 7.1 | ZB26KCE | | | | 2.3* | 2.3 | 2.3 | 2.4 |
| ZB29KCE | | | | 4.2* | 5.6 | 7.0 | 8.6 | ZB29KCE | | | | 2.6* | 2.6 | 2.6 | 2.6 |
| ZB38KCE | | | | 5.4* | 7.2 | 8.9 | 11.0 | ZB38KCE | | | | 3.2* | 3.3 | 3.3 | 3.4 |
| ZB42KCE** | | | | 6.1* | 7.9 | 9.8 | 12.0 | ZB42KCE** | | | | 3.9* | 3.9 | 3.9 | 3.9 |
| ZB45KCE | | | | 6.3* | 8.2 | 10.2 | 12.4 | ZB45KCE | | | | 3.9* | 4.0 | 4.0 | 4.0 |
| ZB48KCE | | | | 7.3* | 9.5 | 11.7 | 14.3 | ZB48KCE | | | | 4.5* | 4.5 | 4.6 | 4.5 |
| ZB57KCE | | | | 8.4* | 11.1 | 13.8 | 17.0 | ZB57KCE | | | | 5.2* | 5.2 | 5.3 | 5.3 |
| ZB Summit Models | | | | | | | | | | | | | | | |
| ZB66K5E | | | | 9.2* | 12.4 | 15.6 | 19.3 | ZB66K5E | | | | 5.5* | 5.5 | 5.7 | 5.8 |
| ZB76K5E | | | | 10.6* | 14.2 | 18.1 | 22.4 | ZB76K5E | | | | 6.5* | 6.5 | 6.7 | 6.9 |
| ZB95K5E | | | | 12.9* | 17.7 | 22.5 | 27.8 | ZB95K5E | | | | 8.3* | 8.3 | 8.5 | 8.7 |
| ZB114K5E | | | | 14.8* | 20.5 | 26.3 | 32.8 | ZB114K5E | | | | 10.2* | 10.2 | 10.3 | 10.5 |

Suction Gas Return 20°C / Subcooling 0K

* Suction Superheat 10K

** Single Phase only

Preliminary data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|-----|-----|-------|-------|------|---------|------------------------------|-----|-----|-----|-------|-------|------|------|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | |
| ZB15KCE | | | | | 2.6* | 3.4 | 4.2 | ZB15KCE | | | | | 1.6* | 1.6 | 1.6 | |
| ZB19KCE | | | | | 3.2* | 4.2 | 5.1 | ZB19KCE | | | | | 1.9* | 1.9 | 1.9 | |
| ZB21KCE | | | | | 3.9* | 5.0 | 6.2 | ZB21KCE | | | | | 2.2* | 2.2 | 2.3 | |
| ZB26KCE | | | | | 4.5* | 5.8 | 7.2 | ZB26KCE | | | | | 2.6* | 2.6 | 2.6 | |
| ZB29KCE | | | | | 5.4* | 7.0 | 8.7 | ZB29KCE | | | | | 2.8* | 2.9 | 2.8 | |
| ZB38KCE | | | | | 5.2* | 6.9* | 8.9 | 11.0 | ZB38KCE | | | | 3.7* | 3.7* | 3.7 | 3.7 |
| ZB42KCE** | | | | | 5.9* | 7.8* | 10.1 | 12.5 | ZB42KCE** | | | | 4.0* | 4.0* | 4.0 | 4.0 |
| ZB45KCE | | | | | 6.0* | 8.1* | 10.5 | 13.0 | ZB45KCE | | | | 4.1* | 4.2* | 4.3 | 4.2 |
| ZB48KCE | | | | | 7.0* | 9.3* | 12.1 | 15.0 | ZB48KCE | | | | 4.7* | 4.8* | 4.9 | 4.9 |
| ZB57KCE | | | | | 7.9* | 10.6* | 13.7 | 16.8 | ZB57KCE | | | | 4.7* | 5.0* | 5.3 | 5.5 |
| ZB Summit Models | | | | | | | | | | | | | | | | |
| ZB66K5E | | | | | 9.5* | 13.0* | 16.9 | 20.9 | ZB66K5E | | | | 5.8* | 5.8* | 5.9 | 6.1 |
| ZB76K5E | | | | | 10.9* | 15.0* | 19.6 | 24.2 | ZB76K5E | | | | 6.9* | 6.8* | 7.0 | 7.2 |
| ZB95K5E | | | | | 13.3* | 18.6* | 24.4 | 30.1 | ZB95K5E | | | | 8.8* | 8.8* | 8.9 | 9.1 |
| ZB114K5E | | | | | 15.3* | 21.5* | 28.5 | 35.4 | ZB114K5E | | | | 10.7* | 10.7* | 10.8 | 11.0 |

Suction Gas Return 20°C / Subcooling 0K

* Suction Superheat 10K

** Single Phase only

Preliminary data

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|-------|-------|------|------|------|-----------------|------------------------------|-----|-------|-------|------|------|------|
| R448A/ R449A | Cooling Capacity (kW) | | | | | | | R448A/ R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZB15KCE | | | 1.5* | 2.2 | 2.8 | 3.5 | 4.3 | ZB15KCE | | | 1.6* | 1.5 | 1.5 | 1.4 | 1.4 |
| ZB19KCE | | | 1.9* | 2.6 | 3.2 | 4.0 | 4.9 | ZB19KCE | | | 1.7* | 1.7 | 1.7 | 1.7 | 1.7 |
| ZB21KCE | | | 2.5* | 3.3 | 4.2 | 5.2 | 6.4 | ZB21KCE | | | 2.0* | 2.0 | 2.0 | 2.0 | 2.0 |
| ZB26KCE | | | 2.9* | 3.9 | 4.9 | 6.0 | 7.4 | ZB26KCE | | | 2.3* | 2.4 | 2.4 | 2.4 | 2.4 |
| ZB29KCE | | | 3.3* | 4.4 | 5.5 | 6.8 | 8.2 | ZB29KCE | | | 2.6* | 2.6 | 2.6 | 2.7 | 2.7 |
| ZB38KCE | | | 3.9* | 5.7 | 7.2 | 8.9 | 10.9 | ZB38KCE | | | 3.4* | 3.4 | 3.4 | 3.4 | 3.4 |
| ZB42KCE** | | | 4.4* | 6.4 | 8.1 | 10.1 | 12.3 | ZB42KCE** | | | 3.9* | 3.9 | 3.9 | 3.9 | 3.9 |
| ZB45KCE | | | 4.5* | 6.6 | 8.4 | 10.5 | 12.8 | ZB45KCE | | | 3.9* | 3.9 | 3.9 | 3.9 | 3.9 |
| ZB48KCE | | | 5.3* | 7.6 | 9.7 | 12.1 | 14.7 | ZB48KCE | | | 4.5* | 4.5 | 4.5 | 4.5 | 4.5 |
| ZB57KCE | | | 6.0* | 8.7 | 11.0 | 13.6 | 16.5 | ZB57KCE | | | 4.3* | 4.5 | 4.7 | 4.9 | 5.1 |
| ZB220KCE | | | | 32.4* | 43.1 | 53.7 | 65.7 | ZB220KCE | | | | 20.3* | 20.3 | 20.4 | 20.6 |
| ZB Summit Models | | | | | | | | | | | | | | | |
| ZB66K5E | | | 6.8* | 9.4* | 12.7 | 15.8 | 19.3 | ZB66K5E | | | 5.8* | 5.8* | 5.8 | 5.8 | 5.8 |
| ZB76K5E | | | 8.0* | 11.1* | 14.9 | 18.6 | 22.7 | ZB76K5E | | | 6.5* | 6.6* | 6.6 | 6.6 | 6.7 |
| ZB95K5E | | | 8.8* | 13.2* | 18.2 | 22.8 | 27.8 | ZB95K5E | | | 8.7* | 8.6* | 8.6 | 8.6 | 8.7 |
| ZB114K5E | | | 10.6* | 15.6* | 21.5 | 27.3 | 33.7 | ZB114K5E | | | 10.5* | 10.3* | 10.3 | 10.3 | 10.4 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|-------|------|------|------|------|-----------|------------------------------|-----|-------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZB15KCE | | | 1.9 | 2.4 | 3.0 | 3.7 | 4.5 | ZB15KCE | | | 1.7 | 1.7 | 1.6 | 1.6 | 1.5 |
| ZB19KCE | | | 2.3 | 2.9 | 3.5 | 4.2 | 5.1 | ZB19KCE | | | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| ZB21KCE | | | 3.0 | 3.7 | 4.5 | 5.5 | 6.6 | ZB21KCE | | | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| ZB26KCE | | | 3.5 | 4.3 | 5.3 | 6.4 | 7.6 | ZB26KCE | | | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 |
| ZB29KCE | | | 4.0 | 4.9 | 6.0 | 7.2 | 8.6 | ZB29KCE | | | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| ZB38KCE | | | 5.1 | 6.3 | 7.7 | 9.3 | 11.2 | ZB38KCE | | | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| ZB42KCE** | | | 5.7 | 7.1 | 8.7 | 10.6 | 12.7 | ZB42KCE** | | | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| ZB45KCE | | | 6.0 | 7.4 | 9.1 | 11.0 | 13.2 | ZB45KCE | | | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| ZB48KCE | | | 6.9 | 8.6 | 10.5 | 12.7 | 15.2 | ZB48KCE | | | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| ZB57KCE | | | 7.9 | 9.7 | 11.9 | 14.3 | 17.1 | ZB57KCE | | | 4.7 | 4.9 | 5.2 | 5.4 | 5.5 |
| ZB220KCE | | | 28.5* | 39.2 | 47.7 | 57.5 | 68.9 | ZB220KCE | | | 21.4* | 21.8 | 22.0 | 22.2 | 22.4 |
| ZB Summit Models | | | | | | | | | | | | | | | |
| ZB66K5E | | | 9.1 | 11.4 | 13.9 | 16.8 | 20.1 | ZB66K5E | | | 6.2 | 6.2 | 6.2 | 6.3 | 6.4 |
| ZB76K5E | | | 10.5 | 13.1 | 16.2 | 19.7 | 23.6 | ZB76K5E | | | 7.2 | 7.2 | 7.3 | 7.4 | 7.5 |
| ZB95K5E | | | 10.7* | 16.0 | 20.1 | 24.5 | 29.3 | ZB95K5E | | | 9.3* | 9.2 | 9.3 | 9.3 | 9.4 |
| ZB114K5E | | | 12.5* | 18.7 | 23.4 | 28.7 | 34.7 | ZB114K5E | | | 11.3* | 11.3 | 11.3 | 11.4 | 11.4 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|-----|-----|------|------|------|-----------|------------------------------|-----|-----|-----|------|------|------|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZB15KCE | | | | 1.4 | 1.7 | 2.2 | 2.7 | ZB15KCE | | | | 0.9 | 0.9 | 0.9 | 0.9 |
| ZB19KCE | | | | 1.6 | 2.0 | 2.5 | 3.1 | ZB19KCE | | | | 1.1 | 1.1 | 1.1 | 1.1 |
| ZB21KCE | | | | 2.0 | 2.5 | 3.2 | 4.0 | ZB21KCE | | | | 1.3 | 1.3 | 1.3 | 1.3 |
| ZB26KCE | | | | 2.3 | 2.9 | 3.7 | 4.6 | ZB26KCE | | | | 1.5 | 1.5 | 1.5 | 1.5 |
| ZB29KCE | | | | 2.5 | 3.2 | 4.0 | 5.0 | ZB29KCE | | | | 1.7 | 1.7 | 1.7 | 1.7 |
| ZB38KCE | | | | 3.2 | 4.2 | 5.4 | 6.7 | ZB38KCE | | | | 2.1 | 2.1 | 2.1 | 2.2 |
| ZB42KCE** | | | | 3.8 | 4.8 | 6.0 | 7.5 | ZB42KCE** | | | | 2.5 | 2.5 | 2.5 | 2.4 |
| ZB45KCE | | | | 4.0 | 5.1 | 6.4 | 8.0 | ZB45KCE | | | | 2.4 | 2.4 | 2.5 | 2.5 |
| ZB48KCE | | | | 4.8 | 6.0 | 7.5 | 9.1 | ZB48KCE | | | | 2.8 | 2.8 | 2.9 | 2.9 |
| ZB57KCE | | | | 5.0 | 6.4 | 8.1 | 10.1 | ZB57KCE | | | | 3.4 | 3.4 | 3.4 | 3.5 |
| ZB220KCE | | | | | 27.3 | 34.1 | 42.1 | ZB220KCE | | | | | 13.0 | 13.2 | 13.5 |
| ZB Summit Models | | | | | | | | | | | | | | | |
| ZB66K5E | | | | 6.0 | 7.5 | 9.5 | 11.8 | ZB66K5E | | | | 3.8 | 3.7 | 3.8 | 3.8 |
| ZB76K5E | | | | 6.9 | 8.6 | 10.8 | 13.5 | ZB76K5E | | | | 4.4 | 4.4 | 4.4 | 4.5 |
| ZB95K5E | | | | 8.2 | 10.8 | 13.8 | 17.1 | ZB95K5E | | | | 5.4 | 5.5 | 5.5 | 5.6 |
| ZB114K5E | | | | 9.6 | 12.7 | 16.3 | 20.4 | ZB114K5E | | | | 6.6 | 6.6 | 6.7 | 6.7 |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

ZF Copeland Scroll™ Compressor Range for Low Temperature Refrigeration

using R407A/F, R448A/R449A and R404A

Emerson Climate Technologies developed the ZF range to provide the best performance in low temperature. The range has a wide application envelope as it can operate from -40°C evaporating temperature to +7°C. They have been optimized in their design to perfectly fit frozen food application requirements. Thanks to their scroll compliance mechanism, these scroll compressors feature particularly high tolerance to liquid slugging.

The range consists of:

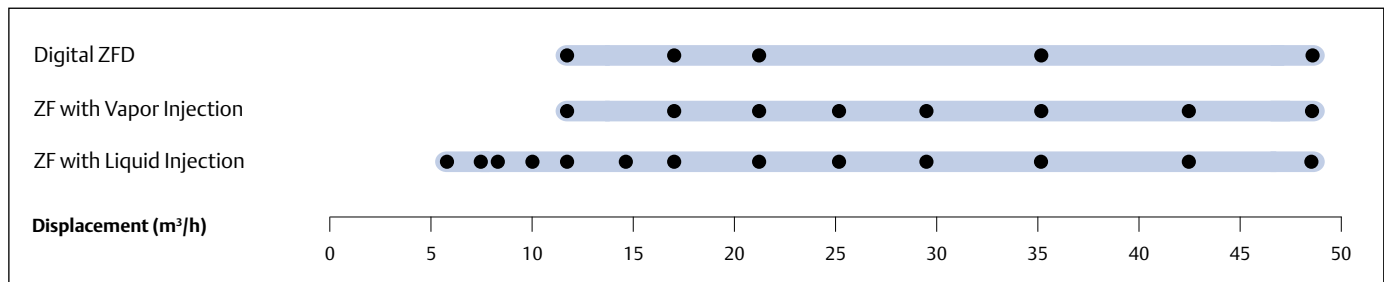
- The ZF* K4E models that operate with liquid injection in order to control discharge temperature and increase the operating envelope.
- The ZF* KVE models that are optimized for vapor injection with use of a sub-cooler. This boosts refrigeration system's cooling capacity and efficiency.
- The Summit ZF* K5E models that operate both with liquid injection or vapor injection.

These compressors are qualified for R407A/F, R448A/R449A, R404A and R134a for certain models. For more details on Digital Scroll models please refer to page 56 in the catalogue. CoreSense™ Diagnostics is now available as an option for the ZF Scroll Summit series (ZF34K5E-ZF54K5E) as well as for Summit Digital ZFD41K5E and ZFD54K5E.



ZF Compressor for Low Temperature Refrigeration with and without Sound Shell

ZF and ZFD Compressor Line-up



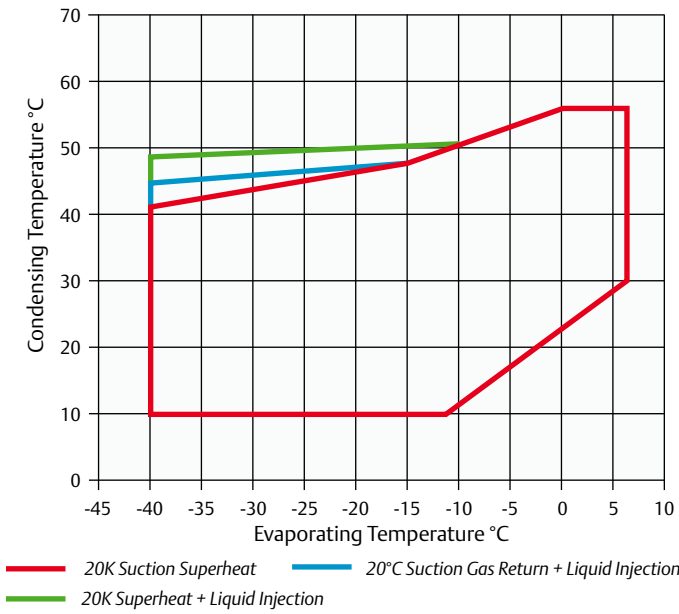
Features and Benefits

- Wide operating envelope with 10°C low condensing temperature to minimize energy consumption
- One model for multiple refrigerants
- Light weight and compactness, up to half the weight of equivalent semi-hermetic compressor
- Optional Sound Shell allowing up to 10 dBA sound attenuation
- ZF models with liquid injection
 - Easy, efficient and reliable injection via Discharge Temperature Control Valve (DTC)
- ZF models with Enhanced Vapor Injection
 - Seasonal efficiencies compared to Emerson's best semi-hermetic compressors
 - Improved system capacity and efficiency by 40% and 25% respectively, making them the most efficient compressors on the market.
 - Possibility to reduce the equipment and component sizes by using smaller compressors

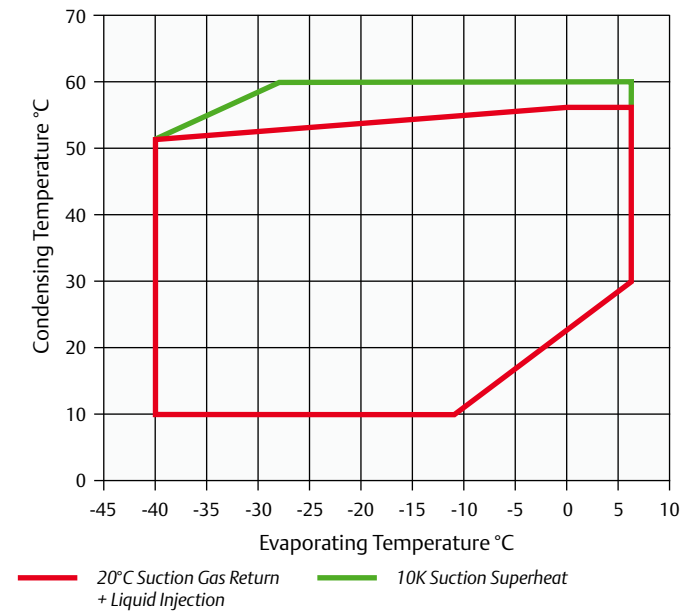
Maximum Allowable Pressure (PS)

- ZF06 to ZF18 (K4E/KVE):
Low Side PS 21 bar(g) / High Side PS 32 bar(g)
- ZF25 to ZF54 (K5E):
Low Side PS 22.6 bar(g) / High Side PS 32 bar(g)
- Digital ZFD:
Low Side PS 21 bar(g) / High Side PS 28.8 bar(g)

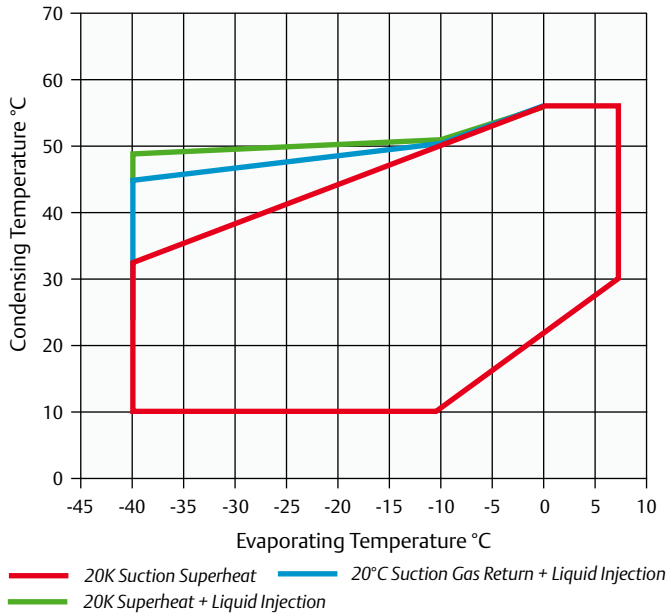
Operating Envelope R407A - For Vapor Injection



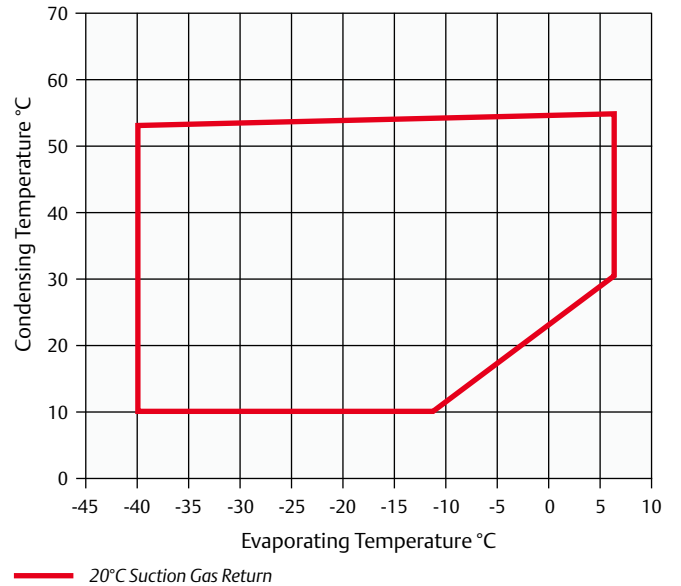
For Liquid Injection



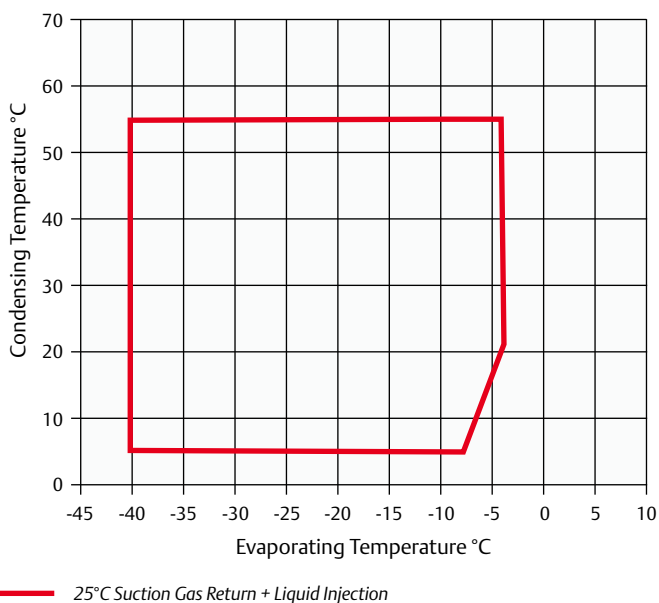
Operating Envelope R407F - For Vapor Injection



For Liquid Injection



Operating Envelope R448A/R449A - For Liquid Injection



For individual model details please refer to Select Software.

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Rotolock Suction (inch) | Rotolock Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @ 1 m - dB(A)*** |
|---|------------|----------------------------------|-------------------------|---------------------------|------------------|--------------------------|-----------------|---------------------|-------------------------------|--------------------------|---------------------------------|
| | | | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| Models with Liquid Injection | | | | | | | | | | | |
| ZF06K4E | 2.0 | 5.9 | 1 ¼ | 1 | 1.3 | 243/245/369 | 25.4 | TFD | 5.0 | 26.0 | 57.0 |
| ZF08K4E | 2.5 | 7.3 | 1 ¼ | 1 | 1.5 | 243/245/391 | 27.2 | TFD | 6.0 | 32.0 | 59.0 |
| ZF09K4E | 2.8 | 8.0 | 1 ¼ | 1 | 1.5 | 243/244/391 | 27.0 | TFD | 6.0 | 40.0 | 62.0 |
| ZF11K4E | 3.5 | 9.9 | 1 ¼ | 1 | 1.5 | 243/244/405 | 28.0 | TFD | 7.1 | 46.0 | 63.0 |
| ZF13K4E | 4.0 | 11.8 | 1 ¼ | 1 | 1.9 | 246/251/442 | 38.0 | TFD | 8.0 | 51.5 | 65.0 |
| ZF15K4E | 5.0 | 14.5 | 1 ¼ | 1 | 1.9 | 246/251/442 | 39.0 | TFD | 10.0 | 64.0 | 65.0 |
| ZF18K4E | 6.0 | 17.1 | 1 ¼ | 1 | 1.9 | 246/251/442 | 41.0 | TFD | 12.5 | 74.0 | 67.0 |
| ZF Summit Models with Liquid Injection | | | | | | | | | | | |
| ZF25K5E | 7.5 | 21.4 | 1 ¼ | 1 ¼ | 1.9 | 246/257/452 | 39.5 | TFD | 16.0 | 102.0 | 70.0 |
| ZF34K5E | 10.0 | 29.1 | 1 ¾ | 1 ¼ | 3.4 | 280/280/534 | 63.1 | TFD | 25.0 | 100.0 | 68.0 |
| ZF41K5E | 13.0 | 35.3 | 1 ¾ | 1 ¼ | 3.4 | 280/280/534 | 63.1 | TFD | 29.0 | 118.0 | 69.0 |
| ZF49K5E | 15.0 | 42.4 | 1 ¾ | 1 ¼ | 3.4 | 280/280/552 | 66.2 | TFD | 30.0 | 139.0 | 72.0 |
| ZF54K5E | 17.0 | 48.3 | 1 ¾ | 1 ¼ | 3.4 | 363/312/552 | 66.2 | TFD | 31.0 | 168.0 | 78.0 |
| Models with Enhanced Vapor Injection | | | | | | | | | | | |
| ZF13KVE EVI | 4.0 | 11.7 | 1 ¼ | 1 | 1.9 | 246/251/442 | 38.0 | TFD | 9.0 | 64.0 | 63.0 |
| ZF18KVE EVI | 6.0 | 17.1 | 1 ¼ | 1 | 1.9 | 246/251/442 | 39.5 | TFD | 13.7 | 74.0 | 67.0 |
| ZF54K5E EVI | 17.0 | 48.3 | 1 ¾ | 1 ¼ | 3.4 | 363/312/552 | 66.2 | TFD | 31.0 | 168.0 | 78.0 |

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|--|------------------------------|------|------|------|------|------|------|-------------|------------------------------|------|------|------|------|------|------|
| Models with Liquid Injection | | | | | | | | | | | | | | | |
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZF06K4E | 1.2 | 1.5 | 1.9 | 2.3 | 2.8 | 3.5 | 4.2 | ZF06K4E | 1.2 | 1.2 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| ZF08K4E | 1.4 | 1.9 | 2.4 | 3.0 | 3.6 | 4.4 | 5.3 | ZF08K4E | 1.4 | 1.4 | 1.5 | 1.6 | 1.6 | 1.7 | 1.8 |
| ZF09K4E | 1.6 | 2.0 | 2.6 | 3.2 | 3.9 | 4.8 | 5.9 | ZF09K4E | 1.5 | 1.5 | 1.6 | 1.6 | 1.7 | 1.8 | 1.9 |
| ZF11K4E | 2.0 | 2.6 | 3.2 | 4.0 | 4.9 | 6.0 | 7.3 | ZF11K4E | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.2 | 2.3 |
| ZF13K4E | 2.2 | 2.9 | 3.6 | 4.5 | 5.6 | 6.8 | 8.3 | ZF13K4E | 2.3 | 2.3 | 2.4 | 2.5 | 2.5 | 2.6 | 2.8 |
| ZF15K4E | 2.7 | 3.5 | 4.4 | 5.5 | 6.8 | 8.4 | 10.2 | ZF15K4E | 2.7 | 2.8 | 2.9 | 3.1 | 3.2 | 3.4 | 3.6 |
| ZF18K4E | 3.3 | 4.3 | 5.4 | 6.7 | 8.3 | 10.2 | 12.4 | ZF18K4E | 3.3 | 3.4 | 3.5 | 3.6 | 3.8 | 3.9 | 4.1 |
| Models with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF13KVE EVI | 3.1 | 4.0 | 4.9 | 6.0 | 7.3 | 8.7 | 10.4 | ZF13KVE EVI | 2.3 | 2.3 | 2.4 | 2.5 | 2.6 | 2.7 | 2.7 |
| ZF18KVE EVI | 4.9 | 6.0 | 7.3 | 8.8 | 10.8 | 13.3 | 16.4 | ZF18KVE EVI | 3.4 | 3.5 | 3.6 | 3.7 | 3.9 | 4.1 | 4.4 |
| ZF Summit Models - with Liquid Injection | | | | | | | | | | | | | | | |
| ZF25K5E | 4.3 | 5.5 | 6.9 | 8.6 | 10.7 | 13.2 | 16.0 | ZF25K5E | 4.0 | 4.2 | 4.5 | 4.7 | 4.9 | 5.2 | 5.4 |
| ZF34K5E | 5.9 | 7.6 | 9.6 | 12.1 | 15.0 | 18.3 | 22.3 | ZF34K5E | 5.1 | 5.5 | 5.9 | 6.2 | 6.6 | 6.9 | 7.3 |
| ZF41K5E | 7.3 | 9.3 | 11.7 | 14.5 | 17.9 | 21.8 | 26.4 | ZF41K5E | 6.2 | 6.7 | 7.1 | 7.6 | 8.0 | 8.4 | 8.9 |
| ZF49K5E | 8.6 | 11.2 | 14.1 | 17.7 | 21.9 | 26.8 | 32.5 | ZF49K5E | 7.6 | 8.2 | 8.7 | 9.2 | 9.7 | 10.2 | 10.7 |
| ZF54K5E | 9.4 | 12.0 | 15.0 | 18.6 | 22.7 | | | ZF54K5E | 7.3 | 7.9 | 8.4 | 9.0 | 9.6 | | |
| ZF Summit Models - with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF25K5E EVI | 6.1 | 7.7 | 9.4 | 11.4 | 13.5 | 15.8 | 18.2 | ZF25K5E EVI | 4.3 | 4.4 | 4.6 | 4.8 | 5.0 | 5.3 | 5.5 |
| ZF34K5E EVI | 8.0 | 9.9 | 12.1 | 14.6 | 17.4 | 20.7 | 24.2 | ZF34K5E EVI | 5.3 | 5.5 | 5.7 | 5.9 | 6.1 | 6.3 | 6.4 |
| ZF41K5E EVI | 10.1 | 12.6 | 15.5 | 18.7 | 22.1 | 25.8 | 29.7 | ZF41K5E EVI | 6.7 | 6.9 | 7.2 | 7.4 | 7.6 | 7.8 | 8.0 |
| ZF49K5E EVI | 12.1 | 15.1 | 18.4 | 22.3 | 26.8 | | | ZF49K5E EVI | 8.0 | 8.3 | 8.5 | 8.8 | 9.1 | | |
| ZF54K5E EVI | 14.5 | 17.8 | 21.6 | 26.1 | 31.4 | | | ZF54K5E EVI | 9.7 | 10.0 | 10.4 | 10.7 | 11.0 | | |

Suction Gas Return 20°C / Subcooling 0K
 Preliminary data

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|--|------------------------------|------|------|------|------|------|------|-------------|------------------------------|------|------|-----|------|------|------|
| Models with Liquid Injection | | | | | | | | | | | | | | | |
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZF06K4E | 1.2 | 1.6 | 2.0 | 2.4 | 3.0 | 3.6 | 4.4 | ZF06K4E | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.5 | 1.6 |
| ZF08K4E | 1.5 | 2.0 | 2.5 | 3.1 | 3.8 | 4.6 | 5.5 | ZF08K4E | 1.5 | 1.5 | 1.6 | 1.6 | 1.7 | 1.8 | 1.9 |
| ZF09K4E | 1.7 | 2.1 | 2.7 | 3.4 | 4.2 | 5.1 | 6.2 | ZF09K4E | 1.6 | 1.6 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 |
| ZF11K4E | 2.1 | 2.7 | 3.4 | 4.2 | 5.2 | 6.3 | 7.7 | ZF11K4E | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.3 | 2.4 |
| ZF13K4E | 2.4 | 3.0 | 3.8 | 4.7 | 5.9 | 7.2 | 8.7 | ZF13K4E | 2.4 | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 |
| ZF15K4E | 2.9 | 3.7 | 4.7 | 5.8 | 7.2 | 8.8 | 10.8 | ZF15K4E | 2.8 | 3.0 | 3.1 | 3.2 | 3.4 | 3.5 | 3.8 |
| ZF18K4E | 3.5 | 4.5 | 5.7 | 7.0 | 8.7 | 10.7 | 13.0 | ZF18K4E | 3.5 | 3.6 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 |
| Models with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF13KVE EVI | 3.3 | 4.3 | 5.4 | 6.7 | 8.1 | 9.7 | 11.5 | ZF13KVE EVI | 2.8 | 2.9 | 3.0 | 3.0 | 3.1 | 3.2 | 3.3 |
| ZF18KVE EVI | 4.9 | 6.1 | 7.6 | 9.3 | 11.3 | 13.5 | 16.0 | ZF18KVE EVI | 3.8 | 4.0 | 4.1 | 4.2 | 4.4 | 4.5 | 4.7 |
| ZF Summit Models - with Liquid Injection | | | | | | | | | | | | | | | |
| ZF25K5E | 4.5 | 5.8 | 7.3 | 9.1 | 11.3 | 13.8 | 16.8 | ZF25K5E | 4.2 | 4.4 | 4.7 | 4.9 | 5.2 | 5.4 | 5.7 |
| ZF34K5E | 6.2 | 8.0 | 10.1 | 12.7 | 15.7 | 19.3 | 23.4 | ZF34K5E | 5.4 | 5.8 | 6.1 | 6.5 | 6.9 | 7.3 | 7.6 |
| ZF41K5E | 7.6 | 9.7 | 12.3 | 15.2 | 18.8 | 22.9 | 27.7 | ZF41K5E | 6.5 | 7.0 | 7.5 | 8.0 | 8.4 | 8.9 | 9.3 |
| ZF49K5E | 9.1 | 11.7 | 14.8 | 18.6 | 23.0 | 28.1 | 34.2 | ZF49K5E | 8.0 | 8.6 | 9.1 | 9.6 | 10.2 | 10.7 | 11.2 |
| ZF54K5E | 9.9 | 12.6 | 15.8 | 19.5 | 23.9 | | | ZF54K5E | 7.7 | 8.2 | 8.8 | 9.4 | 10.1 | | |
| ZF Summit Models - with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF25K5E EVI | 6.4 | 8.0 | 9.9 | 11.9 | 14.2 | 16.6 | 19.1 | ZF25K5E EVI | 4.5 | 4.7 | 4.9 | 5.1 | 5.3 | 5.5 | 5.8 |
| ZF34K5E EVI | 8.3 | 10.4 | 12.7 | 15.4 | 18.4 | 21.7 | 25.4 | ZF34K5E EVI | 5.6 | 5.8 | 6.0 | 6.2 | 6.4 | 6.6 | 6.8 |
| ZF41K5E EVI | 10.6 | 13.3 | 16.3 | 19.6 | 23.2 | 27.1 | 31.2 | ZF41K5E EVI | 7.0 | 7.3 | 7.5 | 7.7 | 8.0 | 8.2 | 8.4 |
| ZF49K5E EVI | 12.7 | 15.8 | 19.4 | 23.5 | 28.1 | | | ZF49K5E EVI | 8.4 | 8.7 | 9.0 | 9.3 | 9.5 | | |
| ZF54K5E EVI | 15.2 | 18.6 | 22.7 | 27.4 | 33.0 | | | ZF54K5E EVI | 10.2 | 10.5 | 10.9 | 1.2 | 11.6 | | |

Suction Gas Return 20°C / Subcooling 0K

Preliminary data

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|--|------------------------------|------|------|------|------|------|------|-----------------|------------------------------|------|------|------|------|-----|------|
| Models with Liquid Injection | | | | | | | | | | | | | | | |
| R448A/ R449A | Cooling Capacity (kW) | | | | | | | R448A/ R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZF06K4E | 1.3 | 1.6 | 2.0 | 2.5 | 3.0 | 3.6 | 4.4 | ZF06K4E | 1.4 | 1.4 | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 |
| ZF08K4E | 1.6 | 2.0 | 2.6 | 3.2 | 3.9 | 4.7 | 5.5 | ZF08K4E | 1.6 | 1.6 | 1.7 | 1.7 | 1.8 | 1.9 | 2.0 |
| ZF09K4E | 1.8 | 2.2 | 2.8 | 3.4 | 4.2 | 5.1 | 6.1 | ZF09K4E | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 |
| ZF11K4E | 2.2 | 2.8 | 3.5 | 4.3 | 5.2 | 6.3 | 7.6 | ZF11K4E | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 |
| ZF13K4E | 2.5 | 3.2 | 4.0 | 5.0 | 6.1 | 7.4 | 8.9 | ZF13K4E | 2.3 | 2.3 | 2.4 | 2.4 | 2.5 | 2.6 | 2.7 |
| ZF15K4E | 3.1 | 3.9 | 4.9 | 6.1 | 7.5 | 9.1 | 10.9 | ZF15K4E | 3.0 | 3.1 | 3.1 | 3.2 | 3.4 | 3.5 | 3.7 |
| ZF18K4E | 3.6 | 4.7 | 5.9 | 7.2 | 8.8 | 10.7 | 12.9 | ZF18K4E | 3.6 | 3.6 | 3.6 | 3.6 | 3.7 | 3.9 | 4.0 |
| Models with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF13KVE EVI | 3.2 | 4.0 | 5.0 | 6.2 | 7.5 | 9.0 | 10.7 | ZF13KVE EVI | 2.5 | 2.6 | 2.7 | 2.8 | 2.8 | 2.9 | 3.0 |
| ZF18KVE EVI | 4.5 | 5.7 | 7.0 | 8.4 | 10.1 | 12.1 | 14.2 | ZF18KVE EVI | 3.1 | 3.3 | 3.6 | 3.8 | 4.0 | 4.2 | 4.3 |
| ZF Summit Models - with Liquid Injection | | | | | | | | | | | | | | | |
| ZF25K5E | 4.9 | 6.1 | 7.6 | 9.4 | 11.4 | 13.8 | 16.6 | ZF25K5E | 3.8 | 3.9 | 4.1 | 4.3 | 4.5 | 4.8 | 5.0 |
| ZF34K5E | 6.1 | 7.8 | 9.8 | 12.1 | 14.9 | 18.1 | 21.7 | ZF34K5E | 5.1 | 5.3 | 5.4 | 5.7 | 6.0 | 6.3 | 6.7 |
| ZF41K5E | 7.6 | 9.7 | 12.1 | 15.0 | 18.4 | 22.5 | 27.1 | ZF41K5E | 6.4 | 6.6 | 6.9 | 7.2 | 7.6 | 8.0 | 8.4 |
| ZF49K5E | 9.1 | 11.6 | 14.6 | 18.1 | 22.2 | 27.0 | 32.5 | ZF49K5E | 7.7 | 7.8 | 8.0 | 8.4 | 8.9 | 9.4 | 10.0 |
| ZF54K5E | 15.2 | 18.6 | 22.7 | 27.4 | 33.0 | | | ZF54K5E | 10.2 | 10.5 | 10.9 | 1.2 | 11.6 | | |
| ZF Summit Models - with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF25K5E EVI | 6.2 | 7.7 | 9.5 | 11.4 | 13.5 | 15.7 | 18.1 | ZF25K5E EVI | 3.9 | 4.2 | 4.5 | 4.8 | 5.1 | 5.3 | 5.5 |
| ZF34K5E EVI | 8.1 | 10.3 | 12.8 | 15.6 | 18.8 | 22.2 | 26.2 | ZF34K5E EVI | 5.6 | 6.0 | 6.4 | 6.8 | 7.3 | 7.9 | 8.5 |
| ZF41K5E EVI | 9.9 | 12.6 | 15.6 | 19.0 | 22.8 | 27.1 | 31.9 | ZF41K5E EVI | 6.8 | 7.3 | 7.8 | 8.4 | 9.0 | 9.7 | 10.4 |
| ZF49K5E EVI | 11.9 | 14.9 | 18.3 | 22.2 | 26.8 | | | ZF49K5E EVI | 8.4 | 8.9 | 9.4 | 10.0 | 10.6 | | |
| ZF54K5E EVI | 14.1 | 14.5 | 21.4 | 25.9 | 31.2 | | | ZF54K5E EVI | 10.5 | 11.1 | 11.7 | 12.4 | 13.2 | | |

Suction Gas Return 20°C / Subcooling 0K

Preliminary data

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|--|------------------------------|------|------|------|------|------|------|-------------|------------------------------|------|------|------|------|------|------|
| Models with Liquid Injection | | | | | | | | | | | | | | | |
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| ZF06K4E | 1.4 | 1.8 | 2.2 | 2.6 | 3.1 | 3.8 | 4.5 | ZF06K4E | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 | 1.7 | 1.8 |
| ZF08K4E | 1.8 | 2.2 | 2.8 | 3.4 | 4.0 | 4.8 | 5.7 | ZF08K4E | 1.6 | 1.7 | 1.8 | 1.9 | 1.9 | 2.1 | 2.2 |
| ZF09K4E | 1.9 | 2.4 | 3.0 | 3.6 | 4.4 | 5.2 | 6.3 | ZF09K4E | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 | 2.1 | 2.2 |
| ZF11K4E | 2.5 | 3.0 | 3.7 | 4.5 | 5.4 | 6.5 | 7.8 | ZF11K4E | 2.2 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 | 2.7 |
| ZF13K4E | 2.8 | 3.5 | 4.3 | 5.3 | 6.4 | 7.7 | 9.1 | ZF13K4E | 2.3 | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 3.0 |
| ZF15K4E | 3.4 | 4.3 | 5.3 | 6.4 | 7.8 | 9.4 | 11.2 | ZF15K4E | 3.0 | 3.2 | 3.3 | 3.5 | 3.6 | 3.8 | 4.1 |
| ZF18K4E | 4.0 | 5.1 | 6.3 | 7.6 | 9.2 | 11.1 | 13.2 | ZF18K4E | 3.6 | 3.7 | 3.8 | 3.9 | 4.0 | 4.2 | 4.4 |
| Models with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF13KVE EVI | 4.0 | 4.9 | 6.0 | 7.2 | 8.5 | 10.0 | 11.7 | ZF13KVE EVI | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 | 3.4 | 3.5 |
| ZF18KVE EVI | 6.1 | 7.3 | 8.7 | 10.4 | 12.3 | 14.4 | 16.9 | ZF18KVE EVI | 4.0 | 4.3 | 4.5 | 4.6 | 4.8 | 5.0 | 5.1 |
| ZF Summit Models - with Liquid Injection | | | | | | | | | | | | | | | |
| ZF25K5E | 5.1 | 6.4 | 7.9 | 9.6 | 11.7 | 14.1 | 16.8 | ZF25K5E | 3.8 | 4.1 | 4.4 | 4.6 | 4.9 | 5.2 | 5.5 |
| ZF34K5E | 6.8 | 8.5 | 10.5 | 12.8 | 15.5 | 18.6 | 22.2 | ZF34K5E | 5.1 | 5.4 | 5.8 | 6.1 | 6.5 | 6.8 | 7.2 |
| ZF41K5E | 8.4 | 10.5 | 13.0 | 15.8 | 19.2 | 23.1 | 27.7 | ZF41K5E | 6.4 | 6.8 | 7.3 | 7.7 | 8.2 | 8.7 | 9.1 |
| ZF49K5E | 10.1 | 12.7 | 15.6 | 19.1 | 23.1 | 27.8 | 33.2 | ZF49K5E | 7.7 | 8.1 | 8.5 | 9.0 | 9.6 | 10.2 | 10.9 |
| ZF54K5E | 11.2 | 13.9 | 17.1 | 20.8 | 25.2 | | | ZF54K5E | 8.7 | 9.1 | 9.7 | 10.2 | 10.9 | | |
| ZF Summit Models - with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZF25K5E EVI | 7.7 | 9.3 | 11.2 | 13.2 | 15.3 | 17.5 | 19.7 | ZF25K5E EVI | 4.8 | 5.1 | 5.4 | 5.7 | 6.0 | 6.3 | 6.6 |
| ZF34K5E EVI | 10.4 | 12.5 | 14.9 | 17.7 | 20.8 | 24.4 | 28.4 | ZF34K5E EVI | 6.4 | 6.8 | 7.2 | 7.6 | 7.9 | 8.3 | 8.7 |
| ZF41K5E EVI | 12.5 | 15.1 | 18.1 | 21.5 | 25.5 | 30.0 | 35.2 | ZF41K5E EVI | 7.9 | 8.3 | 8.8 | 9.2 | 9.7 | 10.1 | 10.6 |
| ZF49K5E EVI | 14.1 | 17.1 | 20.5 | 24.5 | 28.9 | | | ZF49K5E EVI | 9.1 | 9.7 | 10.3 | 10.8 | 11.3 | | |
| ZF54K5E EVI | 16.8 | 20.2 | 24.3 | 29.0 | 34.2 | | | ZF54K5E EVI | 10.8 | 11.5 | 12.2 | 12.8 | 13.3 | | |

Suction Gas Return 20°C / Subcooling 0K
Preliminary data

For capacity data of ZF28K5E please refer to Select software.

ZFD & ZBD Copeland Scroll Digital™ Range for Medium and Low Temperature Refrigeration

Copeland Scroll Digital ZBD and ZFD compressors provide step-less continuous capacity modulation in medium and low temperature refrigeration applications.

Based on the unique Copeland Compliant Scroll™ design, the Digital modulation operates on a simple mechanism. Capacity control is achieved by separating the scroll sets axially over a small period of time. It is a simple mechanical solution allowing precise temperature control and system efficiency.

Digital Scroll technology is a simple modulation solution that can easily and quickly be implemented into any existing system design as no other components are required.

Digital Scroll technology provides continuous, stepless modulation from 10% to 100% with no operating envelope restriction. As a result, system pressures and temperatures are tightly controlled. These compressors provide optimum performance for refrigeration units, refrigeration packs, process and agricultural units.

The Digital Scroll range consists of:

- ZBD models dedicated to medium temperature applications
- ZFD models with vapor injection for low temperature applications
- ZOD model designed for use in R744 (CO₂) - see page 64

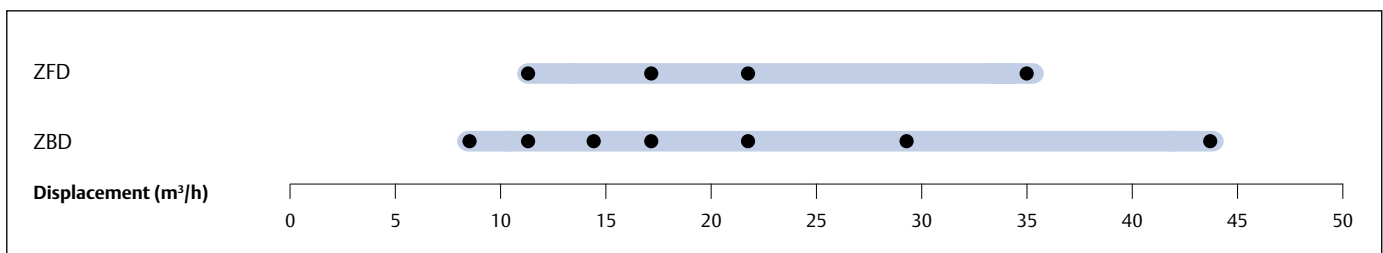


Copeland Scroll Digital for Low and Medium Temperature Refrigeration with and without Sound Shell

CoreSense™ Diagnostics is now available as an option for the ZBD Scroll Summit series (ZBD76K5E and ZBD114K5E) as well as for ZFD41K5E and ZFD54K5E Summit Digital.

These compressors are qualified for R407A/F/C, R448A/R449A and R404A for all digital models and R134a, R450A and R513 for ZBD only.

Digital Scroll Compressor Line-up



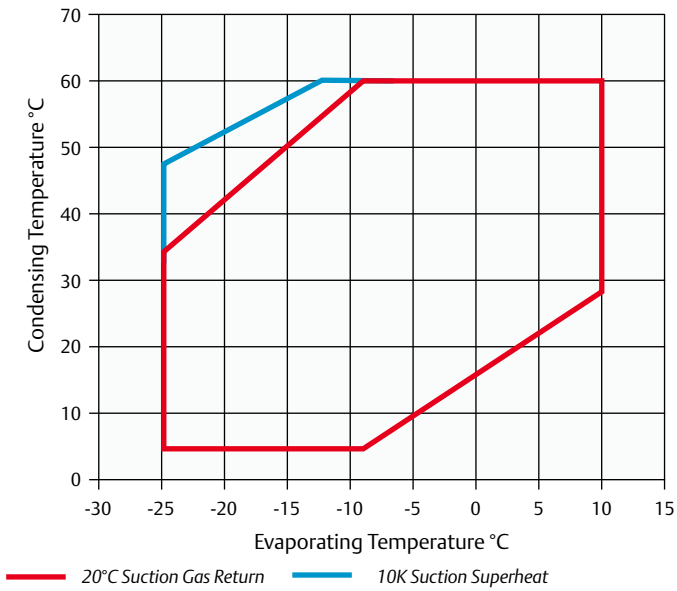
Features and Benefits

- Continuous modulation from 10% to 100% ensuring a perfect match of capacity and power to the desired load
- An economical and reliable alternative to variable speed drive
- Precise suction pressure control with associated energy savings
- Food quality is maintained by stable evaporating temperatures in the refrigerated areas
- Longer lasting refrigeration equipment due to fewer compressor cycling
- Quick and easy integration into refrigeration equipment, similar to any other scroll compressor
- Availability of optional sound shell on all models providing up to 10 dBA additional sound attenuation for silent operation
- Availability of Emerson's series of controllers that operate the Digital Scroll compressor
- Possibility of digital and liquid injection control via optional CoreSense technology

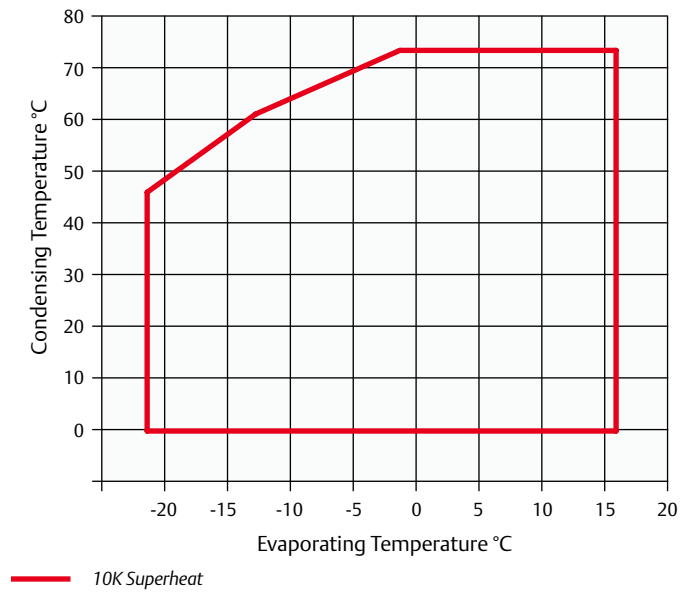
Maximum Allowable Pressure (PS)

- Digital ZBD:
Low Side PS 22.6 bar(g) / High Side PS 32 bar(g)
- Digital ZFD:
Low Side PS 19 bar(g) / High Side PS 28 bar(g)

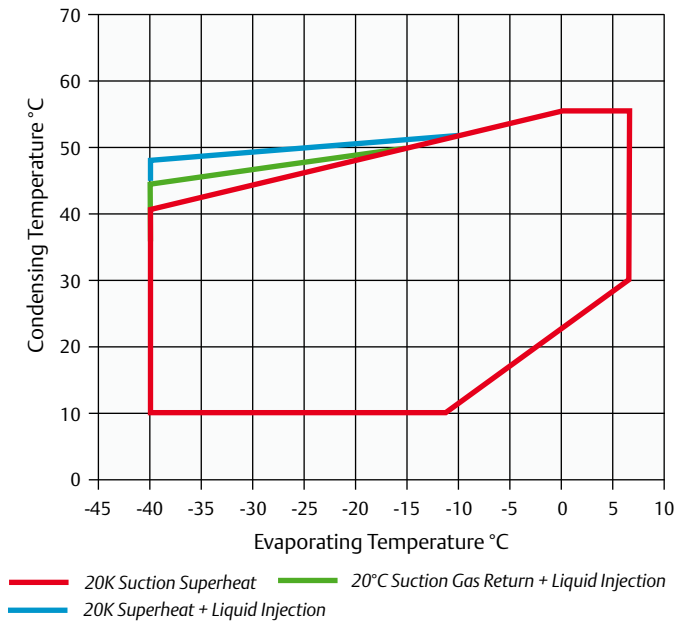
Operating Envelope R448A/R449A - For ZBD Digital Models



Operating Envelope R134a - For ZBD Digital Models



Operating Envelope R448A/R449A - For ZFD Digital Models



For individual model details please refer to Select software.

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Rotolock Suction (inch) | Rotolock Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @ 1 m - dB(A)*** |
|---------------------------|------------|----------------------------------|-------------------------|---------------------------|------------------|--------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|---------------------------------|
| | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| Medium Temperature | | | | | | | | | | | | | | |
| ZBD21KCE | 3.0 | 8.3 | 1 ¼ | 1 | 1.2 | 243/243/432 | 30.2 | PFJ | TFD | 16.5 | 6.7 | 97.0 | 40.0 | 62.0 |
| ZBD29KCE | 4.0 | 11.4 | 1 ¼ | 1 | 1.4 | 245/243/463 | 32.7 | | TFD | | 7.9 | | 48.0 | 58.0 |
| ZBD38KCE | 5.0 | 14.4 | 1 ¼ | 1 | 1.9 | 246/250/481 | 38.1 | | TFD | | 11.3 | | 64.0 | 67.0 |
| ZBD45KCE | 6.0 | 17.1 | 1 ¼ | 1 | 1.9 | 241/246/481 | 39.9 | | TFD | | 12.3 | | 74.0 | 61.0 |
| ZBD57KCE | 7.5 | 21.4 | 1 ¼ | 1 ¼ | 1.9 | 246/257/481 | 43.1 | | TFD | | 15.9 | | 102.0 | 68.0 |
| ZBD76K5E | 10.0 | 28.8 | 1 ¾ | 1 ¼ | 3.4 | 299/280/534 | 61.2 | TFD | 24 | | 24.0 | | 118.0 | 66.0 |
| ZBD114K5E | 15.0 | 43.3 | 1 ¾ | 1 ¼ | 3.4 | 299/280/552 | 68.9 | TFD | 33.3 | | 33.0 | | 174.0 | 71.0 |
| Low Temperature | | | | | | | | | | | | | | |
| ZFD13KVE EVI | 4.0 | 11.7 | 1 ¼ | 1 | 1.9 | 246/250/481 | 38.6 | | TFD | | 9.0 | | 64.0 | 65.0 |
| ZFD18KVE EVI | 6.0 | 17.1 | 1 ¼ | 1 | 1.9 | 300/299/481 | 43.1 | | TFD | | 13.8 | | 74.0 | 67.0 |
| ZFD25KVE EVI | 7.5 | 21.4 | 1 ¼ | 1 ¼ | 1.9 | 246/250/481 | 43.1 | | TFD | | 16.0 | | 102.0 | 70.0 |
| ZFD41K5E | 10.0 | 35.3 | 1 ¾ | 1 ¼ | 3.4 | 310/280/534 | 66.2 | | TFD | | 20.4 | | 118.0 | 73.0 |
| ZFD41K5E EVI | 13.0 | 35.3 | 1 ¼ | 1 ¾ | 3.4 | 310/280/534 | 66.2 | | TFD | | 20.4 | | 118.0 | 72.0 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

For capacity data of ZFD54K5E please refer to Select software.

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|---|------------------------------|------|-------|------|------|------|------|--------------|------------------------------|-----|-------|------|------|------|------|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| Medium Temperature | | | | | | | | | | | | | | | |
| ZBD21KCE | | | | 3.4* | 4.3 | 5.2 | 6.3 | ZBD21KCE | | | | 1.8* | 1.9 | 1.9 | 2.0 |
| ZBD29KCE | | | | 4.2* | 5.5 | 6.8 | 8.4 | ZBD29KCE | | | | 2.6* | 2.6 | 2.6 | 2.6 |
| ZBD38KCE | | | | 5.5* | 7.3 | 9.1 | 11.2 | ZBD38KCE | | | | 3.4* | 3.4 | 3.4 | 3.5 |
| ZBD45KCE | | | | 6.1* | 8.1 | 10.1 | 12.5 | ZBD45KCE | | | | 3.8* | 3.8 | 3.8 | 3.9 |
| ZBD57KCE | | | | 8.4* | 11.1 | 13.8 | 17.0 | ZBD57KCE | | | | 5.2* | 5.2 | 5.3 | 5.3 |
| ZBD76K5E | | | 8.2* | 11.3 | 14.5 | 18.4 | 22.8 | ZBD76K5E | | | 7.5* | 7.1 | 7.1 | 7.3 | 7.5 |
| ZBD114K5E | | | 10.8* | 15.6 | 20.5 | 26.3 | 32.8 | ZBD114K5E | | | 10.3* | 10.2 | 10.2 | 10.3 | 10.5 |
| Low Temperature with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZFD13KVE EVI | 3.1 | 4.1 | 5.2 | 6.4 | 7.7 | 9.2 | 10.9 | ZFD13KVE EVI | 2.7 | 2.8 | 2.8 | 2.9 | 2.9 | 3.0 | 3.1 |
| ZFD18KVE EVI | 4.9 | 6.0 | 7.3 | 8.8 | 10.8 | 13.3 | 16.4 | ZFD18KVE EVI | 3.4 | 3.5 | 3.6 | 3.7 | 3.9 | 4.1 | 4.4 |
| ZFD25KVE EVI | 6.1 | 7.7 | 9.4 | 11.4 | 13.5 | 15.8 | 18.2 | ZFD25KVE EVI | 4.3 | 4.4 | 4.6 | 4.8 | 5.0 | 5.3 | 5.5 |
| ZFD41K5E | 7.3 | 9.3 | 11.8 | 14.6 | | | | ZFD41K5E | 6.2 | 6.7 | 7.2 | 7.5 | | | |
| ZFD41K5E EVI | 10.1 | 12.6 | 15.5 | 18.7 | 22.1 | 25.8 | 23.7 | ZFD41K5E EVI | 6.7 | 6.9 | 7.2 | 7.4 | 7.6 | 7.8 | 8.0 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

Preliminary data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|---|------------------------------|------|------|-------|-------|------|------|--------------|------------------------------|-----|-----|-------|------|------|------|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| Medium Temperature | | | | | | | | | | | | | | | |
| ZBD21KCE | | | | | | 5.1 | 6.3 | ZBD21KCE | | | | | | 2.0 | 2.0 |
| ZBD29KCE | | | | | 5.8* | 7.3 | 8.9 | ZBD29KCE | | | | | 2.9* | 2.9 | 2.9 |
| ZBD38KCE | | | | 5.7* | 7.1* | 8.9 | 10.8 | ZBD38KCE | | | | 3.0* | 3.3* | 3.5 | 3.6 |
| ZBD45KCE | | | | 6.4* | 8.4* | 10.8 | 13.2 | ZBD45KCE | | | | 3.7* | 3.9* | 4.1 | 4.3 |
| ZBD57KCE | | | | 8.5* | 10.8* | 13.8 | 17.0 | ZBD57KCE | | | | 5.2* | 5.2* | 5.3 | 5.3 |
| ZBD76K5E | | | | 11.5* | 15.2 | 19.3 | 23.9 | ZBD76K5E | | | | 7.5* | 7.4 | 7.6 | 7.9 |
| ZBD114K5E | | | | 15.8* | 21.5 | 27.6 | 34.4 | ZBD114K5E | | | | 10.7* | 10.7 | 10.8 | 11.0 |
| Low Temperature with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZFD13KVE EVI | 3.3 | 4.3 | 5.4 | 6.7 | 8.1 | 9.7 | 11.4 | ZFD13KVE EVI | 2.8 | 2.9 | 3.0 | 3.0 | 3.1 | 3.1 | 3.2 |
| ZFD18KVE EVI | 4.9 | 6.1 | 7.6 | 9.3 | 11.3 | 13.5 | 16.0 | ZFD18KVE EVI | 3.8 | 4.0 | 4.1 | 4.2 | 4.4 | 4.5 | 4.7 |
| ZFD25KVE EVI | 6.4 | 8.0 | 9.9 | 11.9 | 14.2 | 16.6 | 19.1 | ZFD25KVE EVI | 4.5 | 4.7 | 4.9 | 5.1 | 5.3 | 5.5 | 5.8 |
| ZFD41K5E | 7.3 | 9.3 | 11.8 | 14.6 | | | | ZFD41K5E | 6.2 | 6.7 | 7.2 | 7.5 | | | |
| ZFD41K5E EVI | 23.5 | 29.8 | 37.2 | 45.9 | | | | ZFD41K5E KVE | 6.4 | 6.6 | 6.8 | 7.1 | | | |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

Preliminary data

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|------|-----------------|------------------------------|-----|------|-----|------|------|------|
| R448A/ R449A | Cooling Capacity (kW) | | | | | | | R448A/ R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| Medium Temperature | | | | | | | | | | | | | | | |
| ZBD21KCE | | | 2.5* | 3.3 | 4.2 | 5.2 | 6.4 | ZBD21KCE | | | 2.0* | 2.0 | 2.0 | 2.0 | 2.0 |
| ZBD38KCE | | | 3.9* | 5.7 | 7.2 | 8.9 | 10.9 | ZBD38KCE | | | 3.4* | 3.4 | 3.4 | 3.4 | 3.4 |
| ZBD45KCE | | | 4.5* | 6.6 | 8.4 | 10.5 | 12.8 | ZBD45KCE | | | 3.9* | 3.9 | 3.9 | 3.9 | 3.9 |
| ZBD57KCE | | | 6.0* | 8.7 | 11.0 | 13.6 | 16.5 | ZBD57KCE | | | 4.3* | 4.5 | 4.7 | 4.9 | 5.1 |
| ZBD76K5E | | | | | 15.1 | 18.8 | 23.0 | ZBD76K5E | | | | | 6.9 | 6.9 | 7.0 |
| ZBD114K5E | | | | | 21.8 | 27.7 | 34.2 | ZBD114K5E | | | | | 10.7 | 10.8 | 10.9 |
| Low Temperature with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZFD13KVE EVI | 3.3 | 4.2 | 5.2 | 6.3 | 7.6 | 9.0 | 10.6 | ZFD13KVE EVI | 2.3 | 2.3 | 2.4 | 2.5 | 2.7 | 2.8 | 2.8 |
| ZFD18KVE EVI | 4.8 | 6.0 | 7.4 | 9.0 | 10.8 | 12.9 | 15.2 | ZFD18KVE EVI | 3.4 | 3.6 | 3.8 | 4.0 | 4.3 | 4.5 | 4.7 |
| ZFD25KVE EVI | 6.2 | 7.7 | 9.5 | 11.4 | 13.5 | 15.7 | 18.1 | ZFD25KVE EVI | 3.9 | 4.2 | 4.5 | 4.8 | 5.1 | 5.3 | 5.5 |
| ZFD41K5E | 7.4 | 9.4 | 11.8 | 14.6 | 17.9 | 21.7 | 26.2 | ZFD41K5E | 5.4 | 5.8 | 6.2 | 6.8 | 7.4 | 8.1 | 8.9 |
| ZFD41K5E EVI | 9.9 | 12.5 | 15.6 | 19.0 | 22.8 | 27.9 | 31.9 | ZFD41K5E EVI | 6.8 | 7.3 | 7.8 | 8.4 | 9.0 | 9.7 | 10.4 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

Preliminary data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|------|--------------|------------------------------|-----|------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| Medium Temperature | | | | | | | | | | | | | | | |
| ZBD21KCE | | | 3.0 | 3.7 | 4.5 | 5.5 | 6.6 | ZBD21KCE | | | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 |
| ZBD29KCE | | | 4.1 | 5.1 | 6.2 | 7.4 | 8.9 | ZBD29KCE | | | 2.5 | 2.6 | 2.7 | 2.8 | 2.8 |
| ZBD38KCE | | | 5.2 | 6.3 | 7.7 | 9.3 | 11.1 | ZBD38KCE | | | 3.1 | 3.2 | 3.4 | 3.5 | 3.6 |
| ZBD45KCE | | | 6.1 | 7.5 | 9.2 | 11.2 | 13.4 | ZBD45KCE | | | 3.7 | 3.8 | 4.0 | 4.2 | 4.4 |
| ZBD57KCE | | | 7.9 | 9.7 | 11.9 | 14.3 | 17.1 | ZBD57KCE | | | 4.7 | 4.9 | 5.2 | 5.4 | 5.5 |
| ZBD76K5E | | | 10.6 | 13.3 | 16.4 | 20.0 | 23.9 | ZBD76K5E | | | 7.5 | 7.5 | 7.6 | 7.7 | 7.8 |
| ZBD114K5E | | | 14.2 | 18.6 | 23.4 | 28.7 | 34.7 | ZBD114K5E | | | 11.3 | 11.3 | 11.3 | 11.4 | 11.4 |
| Low Temperature with Enhanced Vapor Injection | | | | | | | | | | | | | | | |
| ZFD13KVE EVI | 4.0 | 4.9 | 6.0 | 7.2 | 8.5 | 10.0 | 11.7 | ZFD13KVE EVI | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 | 3.4 | 3.5 |
| ZFD18KVE EVI | 6.1 | 7.3 | 8.7 | 10.4 | 12.3 | 14.4 | 16.9 | ZFD18KVE EVI | 4.0 | 4.3 | 4.5 | 4.6 | 4.8 | 5.0 | 5.1 |
| ZFD25KVE EVI | 7.7 | 9.3 | 11.2 | 13.2 | 15.3 | 17.5 | 19.7 | ZFD25KVE EVI | 4.8 | 5.1 | 5.4 | 5.7 | 6.0 | 6.3 | 6.6 |
| ZFD41K5E EVI | 12.5 | 15.0 | 18.1 | 21.5 | 25.4 | 29.5 | 33.9 | ZFD41K5E EVI | 7.9 | 8.4 | 8.8 | 9.3 | 9.7 | 10.1 | 10.6 |
| ZFD41K5E | 8.6 | 10.6 | 13.0 | 15.7 | 18.9 | 22.6 | 27.0 | ZFD41K5E | 6.3 | 6.7 | 7.1 | 7.5 | 7.9 | 8.4 | 8.8 |

Suction Gas Return 20°C / Subcooling 0K

Preliminary data

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | | | |
|-----------------------------|--|------------------------------|-----|------|------|------|------|-------|-----------|------------------------------|-----|-----|------|-----|-----|-----|----|
| R134a | | Cooling Capacity (kW) | | | | | | R134a | | Power Input (kW) | | | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| Model | | -35 | -30 | -25 | -20 | -15 | -10 | -5 | Model | | -35 | -30 | -25 | -20 | -15 | -10 | -5 |
| Medium Temperature | | | | | | | | | | | | | | | | | |
| ZBD21KCE | | | | 2.0* | 2.7 | 3.3 | 4.0 | | ZBD21KCE | | | | 1.2* | 1.3 | 1.4 | 1.4 | |
| ZBD29KCE | | | | 2.5* | 3.3 | 4.2 | 5.2 | | ZBD29KCE | | | | 1.7* | 1.7 | 1.7 | 1.7 | |
| ZBD38KCE | | | | 3.2* | 4.4 | 5.5 | 6.8 | | ZBD38KCE | | | | 1.9* | 2.1 | 2.2 | 2.3 | |
| ZBD45KCE | | | | 3.8* | 5.1 | 6.4 | 7.9 | | ZBD45KCE | | | | 2.3* | 2.4 | 2.5 | 2.6 | |
| ZBD57KCE | | | | 4.7* | 6.4 | 8.1 | 10.1 | | ZBD57KCE | | | | 3.4* | 3.4 | 3.4 | 3.5 | |
| ZBD76K5E* | | | | 6.2 | 7.9 | 10.0 | 12.6 | | ZBD76K5E | | | | 5.3 | 5.3 | 5.4 | 5.4 | |
| ZBD114K5E* | | | | 8.1 | 11.1 | 14.6 | 18.7 | | ZBD114K5E | | | | 7.4 | 7.4 | 7.4 | 7.5 | |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

Preliminary data

Emerson Coresense™ Diagnostics for Refrigeration Scrolls

The CoreSense Diagnostics module is a breakthrough innovation for troubleshooting refrigeration system faults and is installed in the electrical box of all 8 - 15hp Copeland Scroll K5 refrigeration compressors. By monitoring and analyzing data from the compressors (via module power, discharge line thermistor and the current transducer), the CoreSense module accurately detects the cause of electrical and system related issues and guides the service technician more quickly and accurately to the root cause of a problem via flashing LED indicators visible on the CoreSense box. Supermarket operators hence benefit from increased system uptime as well as reduced food losses and maintenance costs.

Technical Specification

- Power supply 110-230V AC
- Front end: multi-color LEDs
- Communication protocol: Modbus®RTU
- Bus to system controller: RS485, 3-wire, (+,GND)
- Discharge temperature sensor
- Current sensor
- EEPROM memory
- Alarm reset button



Coresense™ Diagnostics for Refrigeration Scrolls



Benefits

- Facilitate predictive maintenance & advanced diagnostics
- Reduce applied system costs
- Manage on-site compressor data
- Reduce maintenance costs
- Increase system uptime / reduce food loss
- Digital and Liquid injection control through CoreSense
- Remote trouble shooting

Functions

- Current sensing based diagnostics
- Discharge temperature protection
- Phase monitor protection
- Liquid injection control
- Scroll Digital control
- Open circuit identification
- System trip protection
- Low voltage protection
- Locked rotor protection
- Alarm and operating history
- Asset information
- LED visual indication of alerts
- Modbus communication

ZO & ZOD Copeland Scroll™ Compressor Range for CO₂-Subcritical Refrigeration

ZO Copeland Scroll Compressors have been designed for use in R744 (CO₂) low temperature refrigeration systems. These compressors are suitable for usage in CO₂-subcritical cascade and booster systems.

Increasing environmental concerns about potential direct emissions from HFC-based refrigeration systems into the atmosphere have led to the revival of R744 in the European refrigeration market. Regionally, this trend is reinforced by legislation and taxation schemes which favor the usage of refrigerant R744.

In comparison with HFC refrigerants, the specific properties of R744 require changes in the design of the refrigeration system. The ZO range of Copeland Scroll compressors has been particularly designed to exploit the characteristics of the R744 refrigeration system. Efficiency, reliability and liquid handling advantages of the Copeland Scroll technology equally apply.

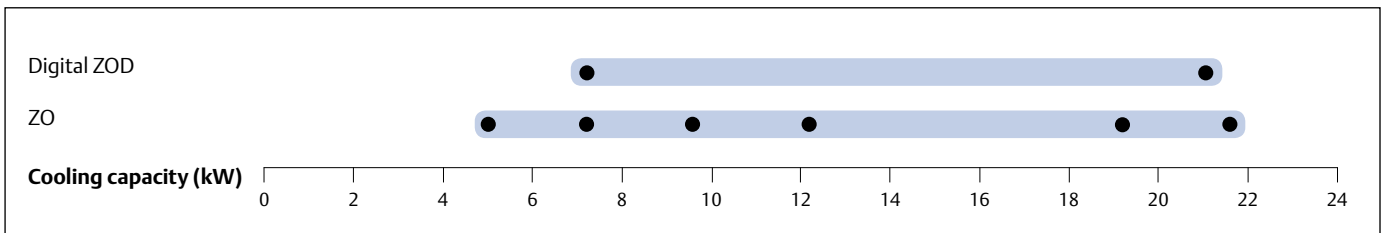
The optimized design of ZO compressors effectively address the challenges of R744 systems i.e., high pressure levels, higher mass flow for a given displacement while securing proper lubrication.

The range consists of 6 models including 2 digital models for 10 to 100% continuous cooling capacity modulation.



ZO Compressor for Low Temperature Refrigeration

ZO and ZOD Compressor Line-up



Conditions EN12900 R744: Evaporating -35°C, Refrigeration -5°C, Suction Superheat 10K, Subcooling 0K

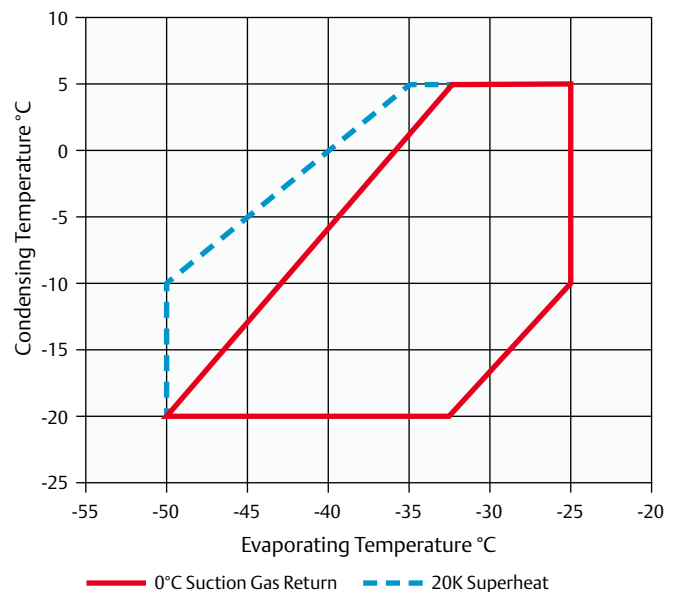
Features and Benefits

- Optimized for high efficiency in CO₂-subcritical cascade and booster systems
- High condensing temperature limit allowing for optimized overall system design
- Compact design minimizing required machine room space
- Half the weight of equivalent semi-hermetic compressors
- Optional Sound Shell allowing 10 dBA sound attenuation
- High bearing reliability and lubrication of all critical parts under all conditions including liquid slugging
- Availability of a digital model offering simple, stepless 10 to 100% capacity modulation

Maximum Allowable Pressure (PS)

- ZO:
Low Side PS 30 bar(g) / High Side PS 52 bar(g)
- Digital ZOD:
Low Side PS 30 bar(g) / High Side PS 45 bar(g)

Operating Envelope R744



For individual model details please refer to Select Software.

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Stub Suction (inch) | Stub Discharge (inch) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @1 m - dB(A)** |
|-----------------------|------------|----------------------------------|---------------------|-----------------------|------------------|--------------------------|-----------------|--------------------|-------------------------------|--------------------------|-------------------------------|
| | | | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| ZO21K5E | 1.5 | 2.6 | 1 ¼ | 1 | 1.0 | 228/228/388 | 22.2 | TFD | 3.6 | 27 | 52 |
| ZO34K3E | 2 | 4.1 | 1 ¼ | 1 | 1.4 | 242/242/381 | 30 | TFD | 5.5 | 26 | 54 |
| ZO45K3E | 2.5 | 5.4 | 1 ¼ | 1 | 1.4 | 242/242/403 | 31 | TFD | 6.2 | 35 | 56 |
| ZO58K3E | 3.5 | 6.9 | 1 ¼ | 1 | 1.4 | 242/242/417 | 32.5 | TFD | 8 | 48 | 56 |
| ZO88KCE | 5 | 10.1 | 1 ¼ | 1 | 1.9 | 245/249/440 | 40.3 | TFD | 11.8 | 64 | 60 |
| ZO104KCE | 6 | 11.7 | 1 ¼ | 1 | 1.9 | 242/242/461 | 40 | TFD | 15 | 74 | 61 |
| Digital Models | | | | | | | | | | | |
| ZOD34K3E | 2 | 4.07 | 1 ¼ | 1 | 1.4 | 242/242/377 | 30 | TFD | 5.5 | 26 | 55 |
| ZOD104KCE | 6 | 11.7 | 1 ¼ | 1 | 1.9 | 241/246/484 | 41 | TFD | 15 | 75 | 67 |

Capacity Data

| Condensing Temperature: -10°C | | | | | | | | | |
|-------------------------------|------------------------------|------|------|------|-----------|------------------------------|-----|-----|-----|
| R744 | Cooling Capacity (kW) | | | | R744 | Power Input (kW) | | | |
| | Evaporating Temperature (°C) | | | | | Evaporating Temperature (°C) | | | |
| Model | -45 | -40 | -35 | -30 | Model | -45 | -40 | -35 | -30 |
| ZO21K5E | 3.2 | 4.1 | 5.1 | 6.2 | ZO21K5E | 1.2 | 1.2 | 1.2 | 1.1 |
| ZO34K3E | 4.8 | 6.2 | 7.8 | 9.7 | ZO34K3E | 1.8 | 1.8 | 1.8 | 1.7 |
| ZO45K3E | 7.0 | 8.8 | 10.9 | 13.3 | ZO45K3E | 2.3 | 2.3 | 2.3 | 2.2 |
| ZO58K3E | 8.9 | 11.2 | 13.9 | 17.0 | ZO58K3E | 3.0 | 3.0 | 2.9 | 2.8 |
| ZO88KCE | 13.3 | 17.0 | 21.0 | 25.4 | ZO88KCE | 4.5 | 4.5 | 4.4 | 4.2 |
| ZO104KCE | 15.9 | 19.7 | 24.1 | 29.2 | ZO104KCE | 4.9 | 5.0 | 5.1 | 5.2 |
| Digital Models | | | | | | | | | |
| ZOD34K3E | 5.1 | 6.4 | 7.9 | 9.7 | ZOD34K3E | 1.8 | 1.8 | 1.8 | 1.7 |
| ZOD104KCE | 15.6 | 19.1 | 23.2 | 27.9 | ZOD104KCE | 5.0 | 5.0 | 5.1 | 5.3 |

10 K Superheat
Preliminary data

Sound Shell for Copeland Scroll™ Compressors

Quiet Operation in Sound Critical Environment

Environmental noise has become a serious problem that can lead to potential contentious situations. It is particularly true for refrigeration applications where kitchen equipment or compressor packs are often source of disturbing noise in domestic areas. Emerson Climate Technologies put sound minimisation at the centre of any of its new compressor development along reliability, seasonal efficiency, size and weight reduction.

A large portion of equipment acoustic emissions come from condensers and compressors and in some critical sound sensitive applications the refrigeration installations need to be acoustically insulated. Simple solutions are now available to contain sound emissions. Emerson Climate Technologies has developed a dedicated Sound Shell for all Copeland Scroll compressors from 2–15 hp. It completely encapsulates the compressor, minimizing sound leaks while cooling performance remains uncompromised.

Groundbreaking design techniques and materials, derived from the automotive industry, were utilized to design the Sound Shell. The use of low pressure reaction injection moulded parts (top cap cover, terminal box cover and compressor base plate) allows a 10–12 dBA sound attenuation.

It is a significant improvement over conventional sound jackets available from other suppliers that reduce sound by 3–6 dBA depending on the application. Particular attention was also paid in the design stage to ensure ease of mounting in retrofit, service and new installation situations.

Sound Shell for Copeland Scroll



2 to 4 hp scroll



4 to 6 hp scroll



4 to 6 hp scroll
ZF with DTC



4 to 6 hp
Digital Scroll



Summit Series
7 to 15 hp scroll



Summit Series
Digital Scroll

Technical Overview

| | Small Scroll | Summit Scroll | | | Summit Digital Scroll | |
|---------------------------|---|---------------|-------------|------------|-----------------------|-------------|
| | All sizes | Small size | Medium size | Large size | Small size | Medium size |
| Technical Data | | | | | | |
| Sound attenuation | 10 - 12 dBA | | | | | |
| Total Weight (kg) | 3.4 | 4.8 | 4.9 | 5.1 | 5.3 | 5.6 |
| Mantle Thickness | 25mm | | | | | |
| Flammability | Conforms to IEC 60335-1 §30 | | | | | |
| Material | | | | | | |
| Mantle | Green felt layer (cotton + binder 1.2 kg/m ²) | | | | | |
| | Heavy layer (PVC 4.5 kg/m ²) | | | | | |
| | Closure by use of Velcro fastening - High frequency welded on PVC layer | | | | | |
| Base Plate | PU SRIM - Low pressure reaction injection moulding technology | | | | | |
| Top Cap Cover | PU SRIM - Low pressure reaction injection moulding technology | | | | | |
| | Inside insulation green felt and aluminium film | | | | | |
| | High temperature insulation ring | | | | | |
| Terminal Box Cover | PU SRIM - Low pressure reaction injection moulding technology | | | | | |

Semi-Hermetic Reciprocating Compressors

Emerson Climate Technologies offers different ranges of semi-hermetic reciprocating compressors with distinct levels of performance and technical characteristics depending on the application requirements.

The Stream Series:

Emerson Climate Technologies has introduced Stream, a line of semi-hermetic 4 and 6 cylinder compressors. The series provides best in class performance for today's HFC-based and uprising natural and low GWP refrigerants, significantly reducing cost of operation and environmental impact compared to competing products.

The range consists of 4 and 6 cylinder models, available with both inverter and continuous capacity modulation options. The compressors can be fitted with a dedicated sound shell for sound sensitive applications.

The new Emerson Climate Technologies line-up of 4 cylinder compressors for CO₂-transcritical applications is the ideal solution for R744 medium temperature cascade and booster systems. It is characterised by a design pressure of 135 bar. Refrigerant flow and heat transfer have been optimized for best performance. In combination with the CO₂-subcritical scroll for the low temperature refrigeration side, Emerson Climate Technologies offers the most energy efficient package available on the market today.

With advanced protection and diagnostics features for system reliability, reduced service costs and increased equipment uptime, the Stream series is built to last in today's modern and changing world.



Stream 4 Cylinder



Stream 6 Cylinder



Stream Digital 4 Cylinder



Stream Digital 6 Cylinder



Stream 4 Cylinder for R744



Sound Shell for Stream

The S-Series:

Its design is based on traditional "reed" valve plates similar to what is used in reciprocating compressors offered by other manufacturers. The performance of such compressors meets basic market requirements but cannot compete with Discus compressors in terms of efficiency. The S-Series ranges from 1.5 to 70 hp and is composed of K and L presented in this catalogue.



S-Series

The Discus Range:

It is broadly recognized as the most efficient compressor whatever the running condition. This range is mainly used in medium and low temperature refrigeration applications where system efficiency is a priority for the end-user. The key difference between Discus and other reciprocating compressors lies in its valve plate design. Traditional "reed" valves are replaced by "puck" type valves that are integrated in the valve plate. This special design eliminates the dead volume at the end of the compression and allows for the highest compressor efficiency. To date, no other reciprocating compressor is able to match Discus in terms of performance. Available from 4 to 60 hp, they are referred to as 2D, 3D and 8D in this catalogue.



Discus 2 Cylinder

Emerson CoreSense™ Diagnostics for Copeland™ Stream Refrigeration Compressors

Emerson CoreSense Diagnostics is an innovative technology for Copeland Stream refrigeration compressors. It goes beyond compressor protection by assisting in system diagnosis and optimization. Providing service engineers with detailed information at the right time, system-related problems can be diagnosed faster or even before they occur. Supermarket operators benefit from increased system uptime, reduction in food loss and reduced maintenance costs.

Technical Specification

- Power supply 120/240V AC, 24V AC
- Front end: 2 x LED, green/red, yellow
- Communication protocol (Modbus®RTU)
- Bus to system controller: RS 485, 3-wire, (+, GND, -)
- Discharge temperature sensor
- Current sensor and sensor module
- Flash memory
- Alarm reset button
- IP 54

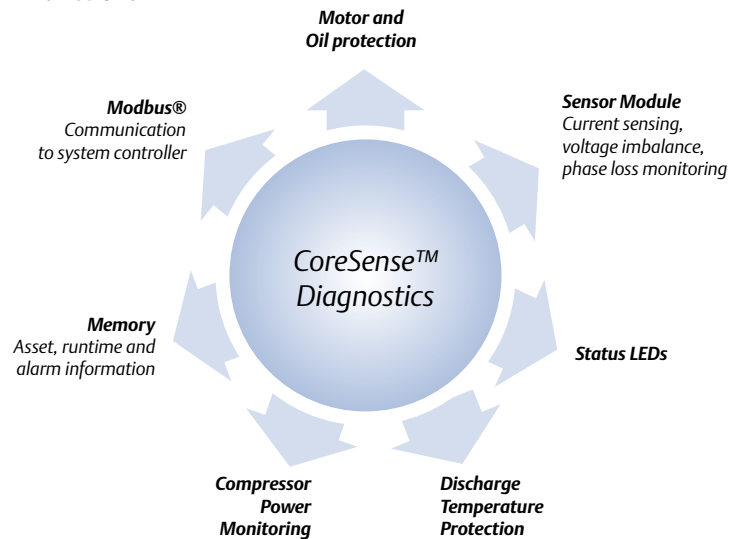
Benefits

- Reduce applied system costs
- Manage on-site compressor data
- Facilitate predictive maintenance & advanced diagnostics
- Reduce maintenance costs
- Increase system uptime / reduce food loss
- Power consumption monitoring

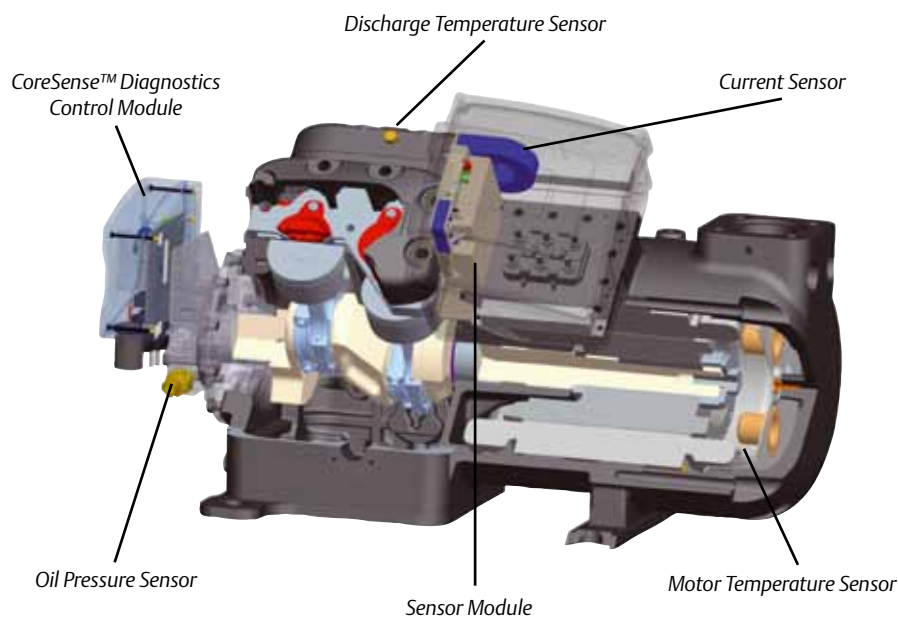


Emerson CoreSense Diagnostics for Copeland™ Stream refrigeration compressors. Ensuring Best Performance over Full Lifetime.

Functions



Scope of Supply



K and L Reciprocating Compressor Range

Small 2-cylinder semi-hermetic reciprocating compressors for medium and low temperature refrigeration applications and transport refrigeration.

Designed on the principle of standard reed valve type technology, these compressors feature an internal oil pump that guarantees optimum reliability in all operating conditions.

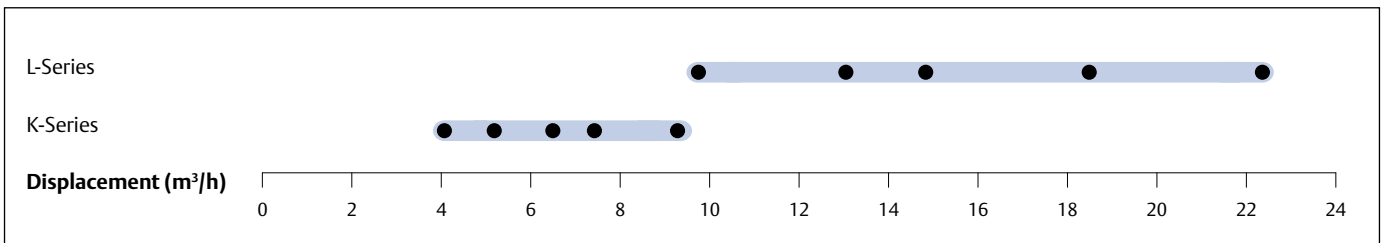
The K-series ranges from 0.5 to 2 hp and the L-series from 2 to 5 hp with a displacement of 4 to 22.5 m³/h.

These compressors are qualified for R407A/F/C, R448A/R449A, R404A and R134a.



K-Series Compressor

K & L Compressor Line-up



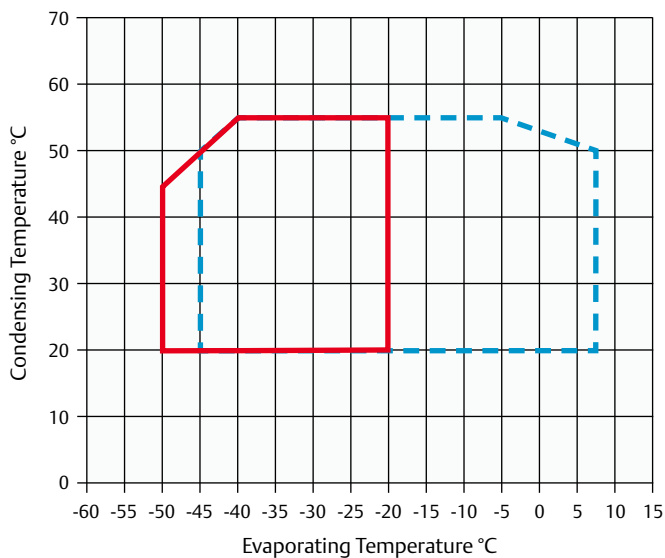
Features and Benefits

- Large operating envelope from 5°C to -45°C evaporating and up to 55°C condensing
- Two motor sizes per displacement, optimized for different applications
- Compact and light compressors
- Ideal for refrigeration unit or transport applications
- Integrated oil pump for maximum reliability

Maximum Allowable Pressure (PS)

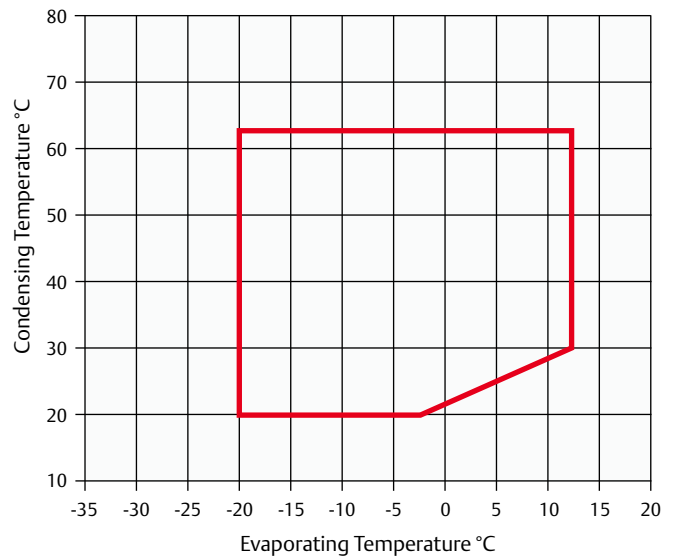
- Low Side PS 22.5 bar (g)/ High Side PS 28 bar (g)

Operating Envelope R404A



— Small Motor - - - Large Motor

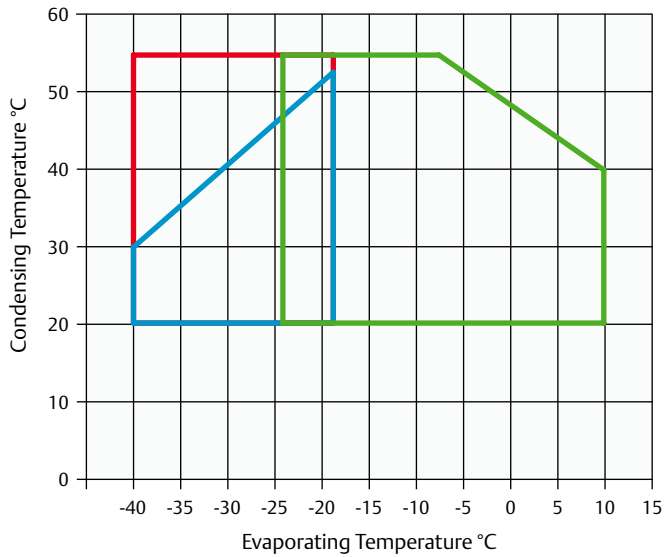
Operating Envelope R134a



— 20°C Suction Gas Return

For individual model details please refer to Select Software.

Operating Envelope R448A/R449A



- Small Motor 0°C Suction Gas Return + Fan
- Large Motor 20°C Suction Gas Return + Fan
- Small Motor 20°C Suction Gas Return + Fan

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m ^{**} dB(A) |
|----------------|------------|----------------------------------|------------------|--------------------------|-----------------|---------------------|--------|-------------------------------|--------|--------------------------|--------|---|
| | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| KM-5X | 0.5 | 4.0 | 0.7 | 365/235/280 | 39.0 | CAG | EWL | 4.8 | 1.8 | 24.0 | 12.2 | 45.0 |
| KM-7X | 0.8 | 4.0 | 0.7 | 365/235/280 | 39.0 | CAG | EWL | 6.0 | 2.4 | 34.5 | 12.2 | 45.0 |
| KJ-7X | 0.8 | 5.1 | 0.7 | 365/235/280 | 39.0 | CAG | EWL | 5.8 | 2.3 | 34.5 | 12.2 | 45.0 |
| KJ-10X | 1.0 | 5.1 | 0.7 | 365/235/280 | 39.0 | CAG | EWL | 7.1 | 3.2 | 32.4 | 15.5 | 45.0 |
| KSJ-10X | 1.0 | 6.3 | 0.7 | 365/235/280 | 40.0 | CAG | EWL | 6.7 | 2.7 | 32.4 | 15.5 | 50.0 |
| KSJ-15X | 1.5 | 6.3 | 0.7 | 365/235/280 | 40.0 | CAG | EWL | 9.0 | 3.4 | 43.0 | 19.1 | 53.0 |
| KL-15X | 1.5 | 7.4 | 0.7 | 365/235/280 | 39.0 | CAG | EWL | 8.4 | 3.4 | 43.0 | 19.1 | 47.0 |
| KL-20X | 2.0 | 7.4 | 0.7 | 365/235/280 | 39.0 | | EWL | | 3.8 | | 20.4 | |
| KSL-20X | 2.0 | 9.1 | 0.7 | 365/235/280 | 40.0 | | EWL | | 4.7 | | 20.4 | |
| LE-20X | 2.0 | 9.9 | 2.0 | 470/330/385 | 78.0 | | EWL | | 5.7 | | 37.6 | 51.0 |
| LF-20X | 2.0 | 12.9 | 2.0 | 470/330/385 | 80.0 | | EWL | | 5.5 | | 37.6 | 51.0 |
| LF-30X | 3.0 | 12.9 | 2.0 | 470/330/385 | 80.0 | | EWL | | 7.2 | | 53.0 | 51.0 |
| LJ-20X | 2.0 | 14.5 | 2.0 | 470/330/385 | 78.0 | | EWL | | 5.6 | | 37.6 | 52.0 |
| LJ-30X | 3.0 | 14.5 | 2.0 | 470/330/385 | 83.0 | | EWL | | 8.1 | | 53.0 | 52.0 |
| LL-30X | 3.0 | 18.2 | 2.0 | 470/330/385 | 85.0 | | EWL | | 7.3 | | 50.6 | 52.0 |
| LL-40X | 4.0 | 18.2 | 2.0 | 470/330/385 | 87.0 | | EWL | | 9.5 | | 58.9 | 63.0 |
| LSG-40X | 4.0 | 22.5 | 2.0 | 470/330/385 | 77.0 | | EWL | | 8.9 | | 58.9 | 63.0 |

* 1 Ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|------|------|-------|-------|-------|---------|------------------------------|------|------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| KM-5X | 0.2° | 0.6° | 0.8° | 1.3° | | | | KM-5X | 0.3° | 0.5° | 0.6° | 0.7° | | | |
| KM-7X | 0.2° | 0.5° | 0.8° | 1.3° | 2.0° | 2.5° | 3.6° | KM-7X | 0.3° | 0.5° | 0.6° | 0.8° | 0.9° | 1.0° | 1.0° |
| KJ-7X | 0.4° | 0.8° | 1.1° | 1.8° | | | | KJ-7X | 0.5° | 0.7° | 0.8° | 1.0° | | | |
| KJ-10X | 0.3° | 0.8° | 1.0° | 1.8° | 2.8° | 3.4° | 4.9° | KJ-10X | 0.4° | 0.7° | 0.8° | 1.0° | 1.2° | 1.3° | 1.4° |
| KSJ-10X | 0.5° | 1.0° | 1.4° | 2.3° | | | | KSJ-10X | 0.7° | 0.9° | 1.1° | 1.3° | | | |
| KSJ-15X | 0.5° | 1.0° | 1.4° | 2.3° | 3.5° | 4.2° | 6.1° | KSJ-15X | 0.6° | 0.9° | 1.0° | 1.3° | 1.6° | 1.7° | 1.8° |
| KL-15X | 0.6° | 1.2° | 1.6° | 2.6° | | | | KL-15X | 0.8° | 1.0° | 1.2° | 1.5° | | | |
| KL-20X | 0.5° | 1.1° | 1.5° | 2.6° | 4.1° | 5.0° | | KL-20X | 0.6° | 0.9° | 1.1° | 1.4° | 1.7° | 1.8° | |
| KSL-20X | 0.8° | 1.5° | 2.0° | 3.3° | 5.1° | 6.1° | | KSL-20X | 0.8° | 1.2° | 1.4° | 1.9° | 2.3° | 2.5° | |
| LE-20X | | 1.1° | 1.7° | 3.2° | 5.1° | 6.4° | 9.4° | LE-20X | | 1.0° | 1.2° | 1.6° | 2.0° | 2.2° | 2.5° |
| LF-20X | | 1.8° | 2.3° | 4.0° | | | | LF-20X | | 1.4° | 1.7° | 2.2° | | | |
| LF-30X | 0.7° | 1.9° | 2.6° | 4.6° | 7.2° | 8.8° | 12.8° | LF-30X | 1.0° | 1.6° | 1.9° | 2.4° | 2.9° | 3.1° | 3.4° |
| LJ-20X | | 1.9° | 2.8° | 5.0° | | | | LJ-20X | | 1.6° | 1.9° | 2.6° | | | |
| LJ-30X | 0.8° | 2.1° | 2.9° | 5.1° | 8.0° | 9.8° | 14.2° | LJ-30X | 1.1° | 1.8° | 2.1° | 2.8° | 3.3° | 3.6° | 3.9° |
| LL-30X | 0.9° | 2.6° | 3.7° | 6.5° | | | | LL-30X | 1.1° | 2.0° | 2.4° | 3.3° | | | |
| LL-40X | 1.1° | 2.7° | 3.7° | 6.4° | 10.2° | 12.6° | 18.4° | LL-40X | 1.4° | 2.2° | 2.6° | 3.3° | 4.0° | 4.3° | 4.9° |
| LSG-40X | 1.4° | 3.5° | 4.8° | 8.2° | | | | LSG-40X | 1.6° | 2.6° | 3.1° | 4.1° | | | |

Suction Gas Return 20°C / Subcooling OK

° High Discharge Temp - Additional Cooling Required

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|-----|------|------|------|-------|---------|------------------------------|-----|-----|------|------|------|------|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| KM-5X | | | | 0.7° | 1.2° | 1.5° | 2.3° | KM-5X | | | | 0.5° | 0.6° | 0.6° | 0.7° |
| KJ-7X | | | | 0.9° | 1.6° | 2.0° | 3.0° | KJ-7X | | | | 0.6° | 0.7° | 0.8° | 0.8° |
| KSJ-10X | | | | 1.2° | 2.0° | 2.5° | 3.8° | KSJ-10X | | | | 0.7° | 0.8° | 0.9° | 1.0° |
| KL-15X | | | | 1.4° | 2.2° | 2.8° | 4.3° | KL-15X | | | | 0.8° | 1.0° | 1.1° | 1.3° |
| KSL-15X | | | | 1.7° | 2.8° | 3.5° | 5.3° | KSL-15X | | | | 1.0° | 1.3° | 1.4° | 1.6° |
| KSL-20X | | | | 1.7° | 2.9° | 3.7° | 5.6° | KSL-20X | | | | 1.0° | 1.2° | 1.4° | 1.6° |
| LE-20X | | | | 1.5° | 2.8° | 3.6° | 5.6° | LE-20X | | | | 1.0° | 1.3° | 1.4° | 1.5° |
| LF-20X | | | | 2.2° | 3.8° | 4.9° | 7.5° | LF-20X | | | | 1.2° | 1.6° | 1.7° | 1.9° |
| LJ-20X | | | | 2.6° | 4.3° | 5.4° | 8.3° | LJ-20X | | | | 1.6° | 1.9° | 2.1° | 2.4° |
| LL-30X | | | | 3.2° | 5.5° | 7.0° | 10.9° | LL-30X | | | | 1.9° | 2.4° | 2.6° | 3.0° |
| LSG-40X | | | | 4.3° | 7.2° | 9.0° | 13.7° | LSG-40X | | | | 2.3° | 2.9° | 3.2° | 3.7° |

Suction Gas Return 20°C / Subcooling OK

° High Discharge Temp - Additional Cooling Required

For more details about other refrigerants please refer to Select software.

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|------|-------|-------|-------|-------|-----|---------|------------------------------|------|------|------|------|------|-----|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -30 | -20 | -10 | -5 | +5 | +10 | +15 | Model | -30 | -20 | -10 | -5 | +5 | +10 | +15 |
| KM-5X | 0.5° | 1.1° | 1.8° | 2.3° | | | | KM-5X | 0.5° | 0.7° | 0.8° | 0.9° | | | |
| KM-7X | | 1.0° | 1.7° | 2.2° | 3.5° | 4.2° | | KM-7X | | 0.7° | 0.8° | 0.9° | 1.0° | 1.0° | |
| KJ-7X | 0.8° | 1.5° | 2.4° | 3.0° | | | | KJ-7X | 0.7° | 0.9° | 1.1° | 1.2° | | | |
| KJ-10X | | 1.5° | 2.5° | 3.2° | 4.8° | 5.8° | | KJ-10X | | 0.9° | 1.1° | 1.2° | 1.4° | 1.4° | |
| KSJ-10X | 1.1° | 1.9° | 3.1° | 3.8° | | | | KSJ-10X | 0.9° | 1.1° | 1.4° | 1.5° | | | |
| KSJ-15X | | 1.9° | 3.2° | 4.0° | 6.0° | 7.2° | | KSJ-15X | | 1.2° | 1.5° | 1.6° | 1.8° | 1.8° | |
| KL-15X | 1.2° | 2.2° | 3.6° | 4.5° | | | | KL-15X | 0.9° | 1.2° | 1.6° | 1.7° | | | |
| KL-20X | | 2.5° | 3.9° | 4.8° | 7.0° | 8.4° | | KL-20X | | 1.3° | 1.6° | 1.7° | 1.9° | 2.0° | |
| KSL-20X | | 2.9° | 4.5° | 5.6° | 8.3° | 10.1° | | KSL-20X | | 1.6° | 1.9° | 2.1° | 2.4° | 2.4° | |
| LE-20X | 1.5° | 2.8° | 4.8° | 6.0° | 9.0° | 10.9° | | LE-20X | 1.2° | 1.6° | 2.1° | 2.3° | 2.6° | 2.7° | |
| LF-20X | 2.1° | 3.9° | 6.4° | 8.0° | | | | LF-20X | 1.6° | 2.2° | 2.7° | 2.9° | | | |
| LF-30X | | 4.2° | 6.7° | 8.2° | 12.2° | 14.7° | | LF-30X | | 2.3° | 2.8° | 3.0° | 3.5° | 3.6° | |
| LJ-20X | 2.5° | 4.7° | 7.7° | 9.6° | | | | LJ-20X | 1.9° | 2.5° | 3.1° | 3.4° | | | |
| LJ-30X | | 5.0° | 7.8° | 9.5° | 13.9° | 16.6° | | LJ-30X | | 2.6° | 3.1° | 3.4° | 3.8° | 4.0° | |
| LL-30X | 2.9° | 5.5° | 9.1° | 11.4° | | | | LL-30X | 2.1° | 2.9° | 3.6° | 4.0° | | | |
| LL-40X | | 5.5° | 9.1° | 11.4° | 16.9° | 20.4° | | LL-40X | | 2.8° | 3.5° | 3.8° | 4.4° | 4.6° | |
| LSG-40X | 3.9° | 7.0° | 11.3° | 14.0° | | | | LSG-40X | 2.7° | 3.7° | 4.7° | 5.2° | | | |

Conditions: Suction Gas Return 20°C / Subcooling 0K

Preliminary data

° High Discharge Temp - Additional Cooling Required

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|------|-------|-------|-------|-------|-----|---------|------------------------------|------|------|------|------|------|-----|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -30 | -20 | -10 | -5 | +5 | +10 | +15 | Model | -30 | -20 | -10 | -5 | +5 | +10 | +15 |
| KM-5X | 0.6° | 1.1° | 1.9° | | | | | KM-5X | 0.5° | 0.7° | 0.9° | | | | |
| KM-7X | | 1.1° | 1.9° | 2.4° | 3.8° | 4.6° | | KM-7X | | 0.7° | 0.9v | 0.9° | 1.1° | 1.1° | |
| KJ-7X | 0.9° | 1.6° | 2.6° | 3.2° | | | | KJ-7X | 0.7° | 0.9° | 1.2° | 1.3° | | | |
| KJ-10X | | 1.6° | 2.7° | 3.4° | 5.1° | 6.2° | | KJ-10X | | 1.0° | 1.2° | 1.3° | 1.5° | 1.5° | |
| KSJ-10X | 1.2° | 2.1° | 3.3° | 4.1° | | | | KSJ-10X | 0.9° | 1.2° | 1.5° | 1.6° | | | |
| KSJ-15X | | 2.0° | 3.4° | 4.2° | 6.3° | 7.5° | | KSJ-15X | | 1.2° | 1.5° | 1.7° | 1.9° | 1.9° | |
| KL-15X | 1.3° | 2.4° | 3.9° | 4.9° | | | | KL-15X | 1.0° | 1.3° | 1.7° | 1.8° | | | |
| KL-20X | | 2.6° | 4.1° | 5.1° | 7.5° | 8.9° | | KL-20X | | 1.4° | 1.7° | 1.8° | 2.0° | 2.1° | |
| KSL-20X | | 3.1° | 4.9° | 6.0° | 8.9° | 10.7° | | KSL-20X | | 1.7° | 2.1° | 2.2° | 2.5° | 2.6° | |
| LE-20X | 1.6° | 3.1° | 5.2° | 6.4° | 9.6° | 11.6° | | LE-20X | 1.3° | 1.8° | 2.2° | 2.4° | 2.7° | 2.9° | |
| LF-20X | 2.3° | 4.2° | 6.9° | 8.6° | | | | LF-20X | 1.7° | 2.3° | 2.8° | 3.1° | | | |
| LF-30X | | 4.6° | 7.2° | 8.9° | 13.0° | 15.6° | | LF-30X | | 2.4° | 2.9° | 3.1° | 3.5° | 3.7° | |
| LJ-20X | 2.7° | 5.1° | 8.3° | 10.4° | | | | LJ-20X | 2.0° | 2.7° | 3.3° | 3.6° | | | |
| LJ-30X | | 5.3° | 8.3° | 10.2° | 14.8° | 17.7° | | LJ-30X | | 2.8° | 3.4° | 3.6° | 4.1° | 4.3° | |
| LL-30X | 3.2° | 5.8° | 9.5° | 11.9° | | | | LL-30X | 2.3° | 3.1° | 4.0° | 4.4° | | | |
| LL-40X | | 5.9° | 9.7° | 12.1° | 18.0° | 21.7° | | LL-40X | | 3.0° | 3.7° | 4.1° | 4.7° | 4.9° | |
| LSG-40X | 4.3° | 7.6° | 12.2° | | | | | LSG-40X | 2.9° | 4.0° | 5.0° | | | | |

Conditions: Suction Gas Return 20°C / Subcooling 0K

Preliminary data

° High Discharge Temp - Additional Cooling Required

Capacity Data

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|------|------|-------|-------|-------|-----|----------------|------------------------------|------|------|------|------|------|-----|
| R448A/ R449 | Cooling Capacity (kW) | | | | | | | R448A/ R449 | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -30 | -20 | -10 | -5 | +5 | +10 | +15 | Model | -30 | -20 | -10 | -5 | +5 | +10 | +15 |
| KM-5X | 0.7° | 1.2° | | | | | | KM-5X | 0.5° | 0.6° | | | | | |
| KM-7X | | 1.2° | 1.9° | 2.4° | 3.5° | 4.3° | | KM-7X | | 0.7° | 0.8° | 0.9° | 1.0° | 1.0° | |
| KJ-7X | 0.9° | 1.6° | | | | | | KJ-7X | 0.7° | 0.9° | | | | | |
| KJ-10X | | 1.6° | 2.6° | 3.2° | 4.8° | 5.7° | | KJ-10X | | 1.0° | 1.1° | 1.2° | 1.3° | 1.4° | |
| KSJ-10X | 1.3° | 2.1° | | | | | | KSJ-10X | 1.0° | 1.2° | | | | | |
| KSJ-15X | | 2.1° | 3.3° | 4.1° | 6.0° | 7.1° | | KSJ-15X | | 1.2° | 1.5° | 1.6° | 1.7° | 1.7° | |
| KL-15X | 1.5° | 2.4° | | | | | | KL-15X | 1.0° | 1.3° | | | | | |
| LE-20X | | 3.0° | 5.0° | 6.2° | 5.3° | 11.3° | | LE-20X | | 1.5° | 1.9° | 2.0° | 2.3° | 2.4° | |
| LF-30X | | 4.4° | 6.9° | 8.4° | 12.4° | 14.8° | | LF-30X | | 2.4° | 2.9° | 3.1° | 3.5° | 3.6° | |
| LF-20X | 2.1° | 3.8° | | | | | | LF-20X | 1.5° | 2.0° | | | | | |
| LJ-20X | 2.6° | 4.7° | | | | | | LJ-20X | 1.7° | 2.3° | | | | | |
| LJ-30X | | 4.7° | 7.6° | 9.4° | 13.9° | 16.6° | | LJ-30X | | 2.5° | 3.1° | 3.3° | 3.6° | 3.7° | |
| LL-30X | | 6.1° | | | | | | LL-30X | 2.1° | 3.0° | | | | | |
| LL-40X | | 5.9° | 9.7° | 12.0° | 18.0° | 21.7° | | LL-40X | | 3.0° | 3.6° | 4.0° | 4.5° | 4.8° | |
| LSG-40X | 4.4° | 7.6° | | | | | | LSG-40X | 2.7° | 3.7° | | | | | |

Conditions: Suction Gas Return 20°C / Subcooling 0K

Preliminary data

° High Discharge Temp - Additional Cooling Required

Discus™ Reciprocating Compressor Range

From 2, 3 and 8 cylinder semi-hermetic reciprocating compressors for medium/low temperature refrigeration and high temperature applications like process cooling or air-conditioning.

The key difference between Discus and traditional reciprocating technologies lies in the valve plate design. The Discus valve plate allows gas to flow into the cylinders with a minimum heat gain, while suction cavities are designed to smoothly route the gas to minimize losses. These effects lead to:

- Superior cooling capacity due to no re-expansion volume
- Up to 10% higher efficiency compared to conventional “cost-effective” reed type compressors
- Lower operating costs for the end-user

The Discus ranges from 5 to 60 hp with a displacement of 16.8 to 181. These compressors are qualified for R407A/F/C, R448A/R449A, R404A, R134a, R450A and R513A. All Discus compressors are designed to deliver maximum performance and reliability:

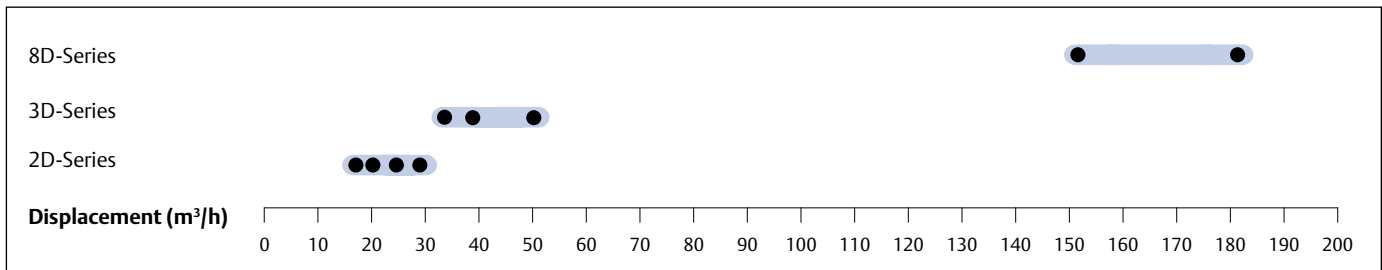
- Discus “puck” valve integrated into the valve plate for highest performance whatever the operating condition
- Positive displacement high flow oil pump guarantees high oil feeding pressure for good lubrication and bearings’ cooling



Discus Compressor

- PTFE-coated bearings for especially low friction and good protection at start-up
- Electronic motor protection module
- Availability of two motor sizes per displacement. The small motor covers all refrigeration applications while the large motor can be used in comfort, process cooling or inverter applications

Discus Compressor Line-up



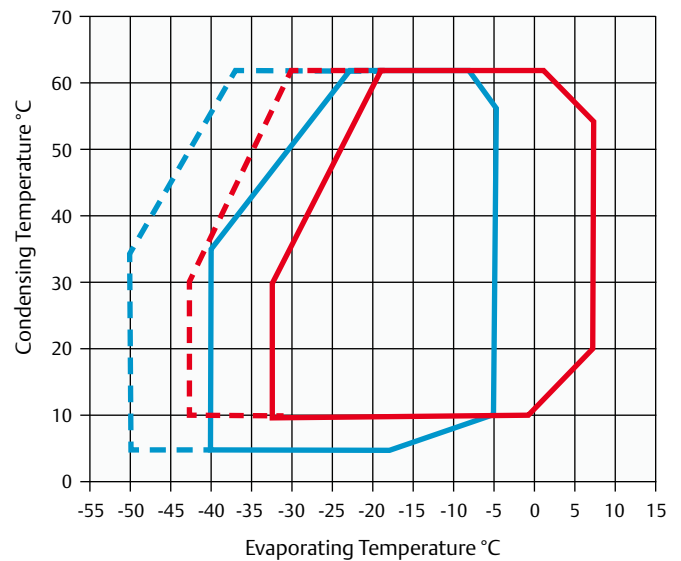
Features and Benefits

- Highest level of efficiency available on the market, whatever the refrigerant and operating condition
- Integrated oil pump and Electronic Oil Pressure Switch OPS2 for maximum reliability
- Two motor sizes per displacement, optimized for different applications
- Large operating envelope that allows medium and low temperature applications to be covered by one single model with condensing limit as low as 5°C
- Provide cooling capacity modulation either by cylinder head blocked suction or with use of frequency inverters from 25 to 60Hz
- Multi-refrigerant compressor range – one model to cover all standard refrigerants
- Option to use 2 and 3 cylinder models with additional Demand Cooling function in order to achieve extended low temperature operating envelope without any superheat restriction for new refrigerants R407A/F, R448A and R449A

Maximum Allowable Pressure (PS)

- Low Side PS 22.5 bar (g)/ High Side PS 28 bar (g)

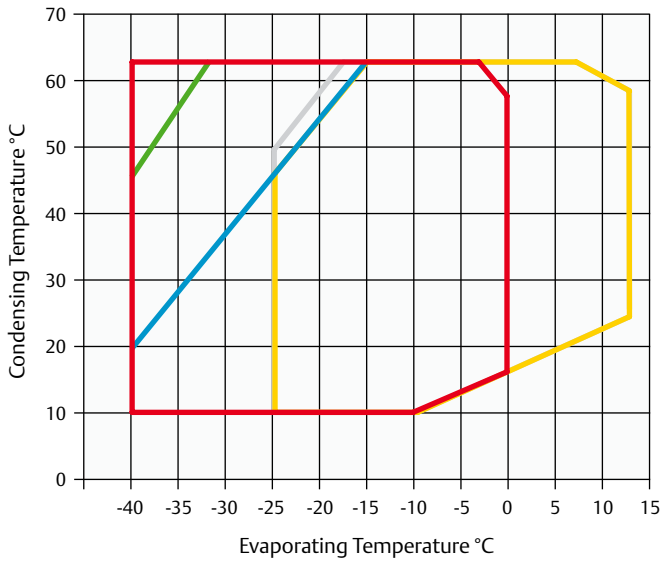
Operating Envelope R404A



- Large Motor 20°C SGRT
- - - Large Motor 20°C SGRT + Fan
- Small Motor 20°C SGRT
- - - Small Motor 0°C SGRT + Fan

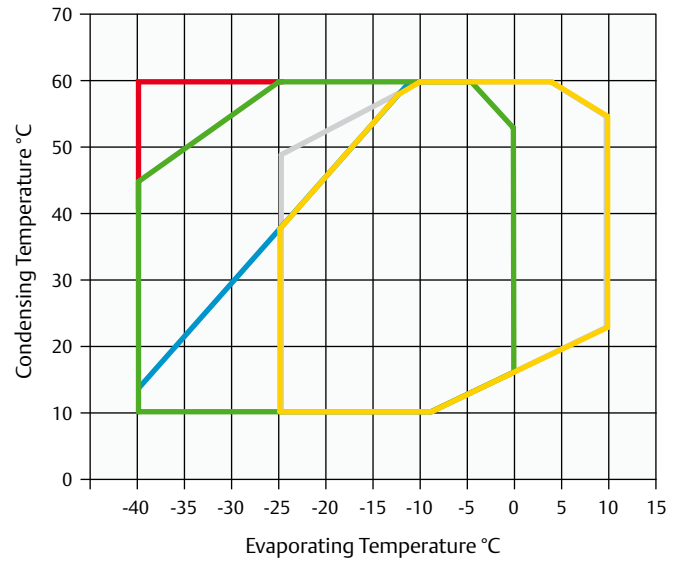
For individual model details please refer to Select Software.

Operating Envelope R407A



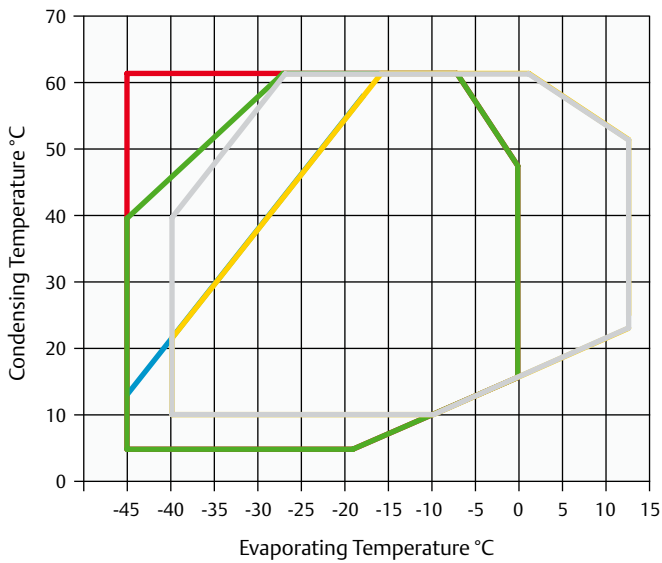
- Large Motor 0°C SGRT
- Large Motor 20°C SGRT
- Small Motor 20K Suction Superheat
- Small Motor 20°C SGRT
- 20°C Demand Cooling

Operating Envelope R407F



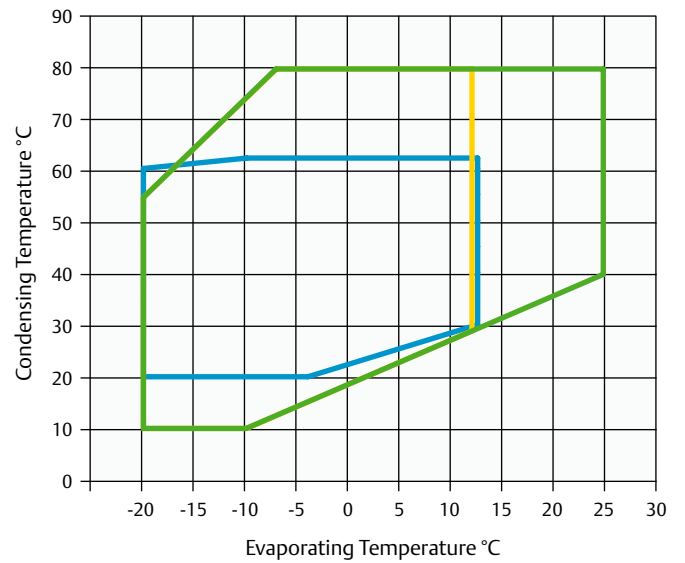
- Large Motor 0°C SGRT
- Large Motor 20°C SGRT
- Small Motor 20K Suction Superheat
- Small Motor 20°C SGRT
- 20°C Demand Cooling

Operating Envelope R448A/R449A



- Large Motor 20K Superheat
- Large Motor 20°C SGRT
- Small Motor 20K Suction Superheat
- Small Motor 20°C SGRT
- 20°C Demand Cooling

Operating Envelope R134a



- Small Motor 25°C SGRT
- Large Motor 20K Superheat
- Large Motor 20°C SGRT

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @1 m - dB(A)*** |
|----------|------------|----------------------------------|------------------|--------------------------|-----------------|--------------------|-------------------------------|--------------------------|--------------------------------|
| | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| 2DC-50X | 5 | 16.8 | 2.3 | 590/330/470 | 132 | AWM | 9 | 55 | 65 |
| 2DD-50X | 5 | 19.3 | 2.3 | 590/330/470 | 132 | AWM | 10.3 | 55 | 65 |
| 2DL-40X | 4 | 23.7 | 2.3 | 590/330/470 | 131 | AWM | 11.1 | 55 | 64 |
| 2DL-75X | 7.5 | 23.7 | 2.3 | 590/330/470 | 136 | AWM | 13.8 | 70 | 66 |
| 2DB-50X | 5 | 28 | 2.3 | 590/330/470 | 131 | AWM | 13.4 | 55 | 64 |
| 2DB-75X | 7.5 | 28 | 2.3 | 590/330/470 | 136 | AWM | 16.1 | 70 | 66 |
| 3DA-50X | 5 | 32.2 | 3.7 | 655/370/480 | 146 | AWM | 15.9 | 55 | 69 |
| 3DA-75X | 7.5 | 32.2 | 3.7 | 680/370/480 | 152 | AWM | 17.5 | 106 | 69 |
| 3DC-75X | 7.5 | 38 | 3.7 | 655/370/480 | 150 | AWM | 18.3 | 70 | 71 |
| 3DC-100X | 10 | 38 | 3.7 | 680/370/480 | 164 | AWM | 20.5 | 121 | 70 |
| 3DS-100X | 10 | 49.9 | 3.7 | 680/370/480 | 162 | AWM | 24.4 | 121 | 70 |
| 3DS-150X | 15 | 49.9 | 3.7 | 710/370/490 | 166 | AWM | 29 | 125.7 | 70 |
| 8DH-500X | 50 | 151 | 7.6 | 835/475/610 | 330 | AWM | 88.2 | 458 | 79 |
| 8DL-370X | 37 | 151 | 7.6 | 835/475/610 | 323 | AWM | 74.3 | 349 | 76 |
| 8DJ-600X | 60 | 181 | 7.6 | 835/475/610 | 331 | AWM | 108 | 476 | 79 |
| 8DT-450X | 45 | 181 | 7.6 | 835/475/610 | 335 | AWM | 90.7 | 441 | 78 |

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-------|-------|------|------|-------|-------|----------|------------------------------|-------|-------|------|------|------|------|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 2DC-50X | | 1.7 | 2.4 | 4.5 | 7.8 | 10.0 | 15.5 | 2DC-50X | | 1.4 | 1.7 | 2.3 | 2.9 | 3.2 | 3.6 |
| 2DD-50X | | 2.1 | 3.1 | 5.8 | 9.5 | 12.0 | 18.1 | 2DD-50X | | 1.7 | 2.1 | 2.7 | 3.4 | 3.7 | 4.1 |
| 2DL-40X | | 2.5* | 3.7* | 7.4 | 11.9 | 14.8 | | 2DL-40X | | 2.3* | 2.7* | 3.5 | 4.3 | 4.6 | |
| 2DL-75X | | | | 7.2 | 11.9 | 14.8 | 22.1 | 2DL-75X | | | | 3.5 | 4.2 | 4.5 | 4.8 |
| 2DB-50X | | 3.3* | 4.6* | 9.0 | 14.4 | 17.8 | | 2DB-50X | | 2.8* | 3.3* | 4.3 | 5.2 | 5.6 | |
| 2DB-75X | | | | 9.0 | 14.3 | 17.7 | 26.1 | 2DB-75X | | | | 4.4 | 5.3 | 5.7 | 6.1 |
| 3DA-50X | | 3.8* | 5.4* | 10.4 | 16.4 | 20.2 | | 3DA-50X | | 3.2* | 3.8* | 5.0 | 6.1 | 6.5 | |
| 3DA-75X | | | | 10.3 | 16.7 | 20.7 | 30.8 | 3DA-75X | | | | 5.0 | 6.0 | 6.4 | 6.9 |
| 3DC-75X | | 4.7* | 6.5* | 12.4 | 19.6 | 24.2 | | 3DC-75X | | 3.9* | 4.6* | 6.0 | 7.2 | 7.8 | |
| 3DC-100X | | | | 12.6 | 20.3 | 25.1 | 37.0 | 3DC-100X | | | | 5.8 | 7.1 | 7.6 | 8.1 |
| 3DS-100X | | 6.4* | 9.1* | 16.9 | 26.3 | 32.1 | | 3DS-100X | | 5.2* | 6.1* | 7.9 | 9.6 | 10.3 | |
| 3DS-150X | | | | 16.8 | 26.6 | 32.7 | 48.0 | 3DS-150X | | | | 7.9 | 9.6 | 10.2 | 11.1 |
| 8DH-500X | | | | 49.1 | 78.8 | 97.7 | 146.0 | 8DH-500X | | | | 24.1 | 28.8 | 31.0 | 33.9 |
| 8DL-370X | | 20.7* | 28.8* | 53.6 | 85.3 | 105.5 | | 8DL-370X | | 17.4* | 19.8* | 25.2 | 30.5 | 33.0 | |
| 8DJ-600X | | | | 60.3 | 95.5 | 118.0 | 174.5 | 8DJ-600X | | | | 28.9 | 35.1 | 37.9 | 42.2 |
| 8DT-450X | | 24.0* | 32.6* | 59.6 | 93.3 | 114.5 | | 8DT-450X | | 20.1* | 23.2* | 29.5 | 35.8 | 38.6 | |

Suction Gas Return 20°C / Subcooling 0K

* 10K border

Capacity Data

| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
|----------|------------------------------|-------|-------|------|-------|-------|-------|----------|------------------------------|-------|-------|------|------|------|------|
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 2DC-50X | | 1.1* | 1.9* | 4.7 | 8.0 | 10.1 | 15.4 | 2DC-50X | | 1.4* | 1.7* | 2.4 | 3.1 | 3.3 | 3.6 |
| 2DD-50X | | 1.6* | 2.6* | 5.9 | 9.7 | 12.1 | 18.1 | 2DD-50X | | 1.7* | 2.1* | 2.9 | 3.6 | 3.8 | 4.1 |
| 2DL-40X | | 2.6* | 3.9* | 7.7 | 12.4 | 15.3 | | 2DL-40X | | 2.4* | 2.8* | 3.7 | 4.5 | 4.9 | |
| 2DL-75X | | | | 7.6 | 12.5 | 15.6 | 23.4 | 2DL-75X | | | | 3.7 | 4.4 | 4.6 | 5.0 |
| 2DB-50X | | 3.9* | 5.4* | 9.8 | 15.3 | 18.8 | | 2DB-50X | | 2.9* | 3.4* | 4.5 | 5.4 | 5.8 | |
| 2DB-75X | | | | 9.6 | 15.3 | 18.9 | 27.9 | 2DB-75X | | | | 4.6 | 5.6 | 6.0 | 6.3 |
| 3DA-50X | | 4.3* | 6.1* | 11.3 | 17.9 | 22.1 | | 3DA-50X | | 3.4* | 4.0* | 5.2 | 6.4 | 6.8 | |
| 3DA-75X | | | | 11.4 | 18.4 | 22.8 | 33.8 | 3DA-75X | | | | 5.2 | 6.3 | 6.8 | 7.2 |
| 3DC-75X | | 5.4* | 7.5* | 13.8 | 21.6 | 26.6 | | 3DC-75X | | 4.2* | 4.8* | 6.2 | 7.5 | 8.1 | |
| 3DC-100X | | | | 14.0 | 22.1 | 27.3 | 40.2 | 3DC-100X | | | | 6.1 | 7.4 | 7.9 | 8.5 |
| 3DS-100X | | 7.3* | 10.2* | 18.4 | 28.8 | 35.3 | | 3DS-100X | | 5.5* | 6.4* | 8.3 | 10.0 | 10.8 | |
| 3DS-150X | | | | 18.8 | 29.7 | 36.4 | 53.2 | 3DS-150X | | | | 8.2 | 10.1 | 10.8 | 11.8 |
| 8DL-370X | | 20.8* | 28.9* | 53.6 | 85.3 | 105.5 | | 8DL-370X | | 17.4* | 19.8* | 25.2 | 30.5 | 33.0 | |
| 8DH-500X | | | | 53.0 | 84.6 | 105.0 | 156.5 | 8DH-500X | | | | 25.8 | 30.5 | 32.2 | 34.9 |
| 8DJ-600X | | | | 63.7 | 101.0 | 125.0 | 187.5 | 8DJ-600X | | | | 30.6 | 36.9 | 39.8 | 43.9 |
| 8DT-450X | | 26.8* | 35.9* | 64.1 | 100.5 | 123.5 | | 8DT-450X | | 21.8* | 24.7* | 31.2 | 37.7 | 40.7 | |

Suction Gas Return 20°C / Subcooling 0K
* 10K border

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-------|-------|------|------|-------|-------|----------------|------------------------------|-------|-------|------|------|------|------|
| R448A/ R449 | Cooling Capacity (kW) | | | | | | | R448A/ R449 | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 2DC-50X | | 1.4* | 2.4* | 5.1 | 8.4 | 10.6 | 15.9 | 2DC-50X | | 1.4* | 1.7* | 2.4 | 3.0 | 3.3 | 3.5 |
| 2DD-50X | | 1.7* | 2.7* | 5.8 | 9.7 | 12.1 | 18.2 | 2DD-50X | | 1.6* | 2.0* | 2.8 | 3.5 | 3.8 | 4.1 |
| 2DL-40X | 1.0* | 2.7* | 3.9* | 7.5 | 12.2 | 15.2 | | 2DL-40X | 1.5* | 2.3* | 2.7* | 3.5 | 4.4 | 4.9 | |
| 2DL-75X | | 2.5* | 3.7* | 7.3 | 12.1 | 15.2 | 23.2 | 2DL-75X | | 2.3* | 2.7* | 3.5 | 4.3 | 4.6 | 5.1 |
| 2DB-50X | 1.4* | 3.6* | 5.0* | 9.2 | 14.7 | 18.2 | | 2DB-50X | 2.0* | 2.8* | 3.3* | 4.4 | 5.4 | 5.8 | |
| 2DB-75X | | 3.8* | 5.2* | 9.4 | 15.0 | 18.6 | 27.6 | 2DB-75X | | 3.0* | 3.5* | 4.4 | 5.3 | 5.7 | 6.2 |
| 3DA-50X | 1.9* | 4.1* | 5.6* | 10.2 | 16.1 | 19.8 | | 3DA-50X | 2.3* | 3.3* | 3.9* | 5.0 | 6.2 | 6.6 | |
| 3DA-75X | | 3.9* | 5.8* | 11.0 | 17.6 | 21.8 | 32.3 | 3DA-75X | | 3.3* | 4.0* | 5.2 | 6.1 | 6.5 | 6.8 |
| 3DC-75X | 2.7* | 5.1* | 6.9* | 12.4 | 19.4 | 23.8 | | 3DC-75X | 2.9* | 4.0* | 4.6* | 6.0 | 7.3 | 7.8 | |
| 3DC-100X | | 4.4* | 6.9* | 13.3 | 21.1 | 25.9 | 37.7 | 3DC-100X | | 3.6* | 4.4* | 6.0 | 7.2 | 7.6 | 8.1 |
| 3DC-75X DC | 2.6 | 5.4 | 7.3 | 12.4 | 19.5 | 23.9 | | 3DC-75X DC | 2.9 | 4.0 | 4.6 | 6.0 | 7.3 | 7.8 | |
| 3DS-100X | 3.8* | 7.1* | 9.5* | 16.9 | 26.5 | 32.5 | | 3DS-100X | 4.0* | 5.4* | 6.2* | 8.1 | 9.8 | 10.6 | |
| 3DS-150X | | 7.5* | 10.2* | 17.8 | 27.6 | 33.7 | 49.1 | 3DS-150X | | 5.6* | 6.4* | 8.2 | 9.8 | 10.5 | 11.5 |
| 8DH-500X | | 18.7* | 27.4* | 51.0 | 80.6 | 99.2 | 145.0 | 8DH-500X | | 15.9* | 18.8* | 24.4 | 29.3 | 31.3 | 34.0 |
| 8DL-370X | 7.4* | 18.4* | 26.2* | 49.3 | 79.0 | 97.6 | | 8DL-370X | 11.5* | 16.6* | 19.3* | 24.6 | 29.3 | 31.4 | |
| 8DJ-600X | | 24.2* | 34.0* | 61.7 | 96.9 | 119.0 | 174.5 | 8DJ-600X | | 19.3* | 22.5* | 29.2 | 35.6 | 38.4 | 42.9 |
| 8DT-450X | 12.2* | 25.4* | 34.7* | 62.0 | 97.7 | 120.0 | | 8DT-450X | 14.9* | 20.1* | 23.2* | 29.6 | 36.0 | 38.8 | |

Conditions: Suction Gas Return 20°C / Subcooling 0K
* Conditions: Suction Superheat 10K, Subcooling 0K
Preliminary data

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-------|-------|------|-------|-------|-------|----------|------------------------------|-------|-------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 2DC-50X | | 2.1° | 3.0° | 5.4 | 8.8 | 11.0 | 16.5 | 2DC-50X | | 1.7° | 2.1° | 2.7 | 3.3 | 3.6 | 3.8 |
| 2DD-50X | | 2.8° | 3.9° | 6.8 | 10.8 | 13.2 | 19.3 | 2DD-50X | | 2.2° | 2.5° | 3.3 | 3.9 | 4.1 | 4.3 |
| 2DL-40X | 1.2* | 3.8 | 5.1 | 8.5 | 13.2 | 16.2 | | 2DL-40X | 1.8* | 2.7 | 3.2 | 4.1 | 4.9 | 5.3 | |
| 2DL-75X | | 3.6° | 4.9° | 8.4 | 13.4 | 16.5 | 24.1 | 2DL-75X | | 2.7° | 3.1° | 4.0 | 4.8 | 5.1 | 5.5 |
| 2DB-50X | 1.7* | 4.6 | 6.2 | 10.4 | 16.0 | 19.4 | | 2DB-50X | 2.2* | 3.2 | 3.8 | 4.9 | 5.9 | 6.3 | |
| 2DB-75X | | 4.9° | 6.4° | 10.5 | 16.2 | 19.8 | 28.6 | 2DB-75X | | 3.5° | 4.0° | 5.1 | 6.1 | 6.5 | 7.0 |
| 3DA-50X | 2.0* | 5.7 | 7.4 | 11.9 | 17.9 | 21.7 | | 3DA-50X | 2.7* | 4.0 | 4.7 | 5.9 | 6.9 | 7.3 | |
| 3DA-75X | | 5.2° | 7.2° | 12.2 | 18.9 | 23.1 | 33.4 | 3DA-75X | | 3.9° | 4.6° | 5.9 | 6.9 | 7.3 | 7.6 |
| 3DC-75X | 2.8* | 7.0 | 9.1 | 14.4 | 21.6 | 26.1 | | 3DC-75X | 3.4* | 4.9 | 5.6 | 7.0 | 8.2 | 8.7 | |
| 3DC-100X | | 6.6° | 8.9° | 14.9 | 22.7 | 27.5 | 39.3 | 3DC-100X | | 4.6° | 5.4° | 6.9 | 8.1 | 8.5 | 8.9 |
| 3DS-100X | 4.0* | 9.6 | 12.5 | 19.8 | 29.5 | 35.5 | | 3DS-100X | 4.7* | 6.5 | 7.5 | 9.4 | 11.1 | 11.7 | |
| 3DS-150X | | 9.1° | 12.2° | 19.9 | 30.2 | 36.5 | 51.9 | 3DS-150X | | 6.3° | 7.4° | 9.4 | 11.1 | 11.6 | 12.0 |
| 8DH-500X | | 26.3° | 35.7° | 58.8 | 89.3 | 108.0 | 153.5 | 8DH-500X | | 19.1° | 22.1° | 27.9 | 32.8 | 34.7 | 37.3 |
| 8DL-370X | 10.8* | 28.0 | 36.9 | 59.3 | 88.8 | 106.5 | | 8DL-370X | 13.2* | 19.5 | 22.4 | 27.9 | 32.7 | 34.7 | |
| 8DJ-600X | | 32.7° | 44.0° | 71.3 | 107.0 | 128.5 | 181.0 | 8DJ-600X | | 23.0° | 26.8° | 33.7 | 39.5 | 41.9 | 45.5 |
| 8DT-450X | 14.2* | 34.7 | 44.9 | 70.6 | 105.0 | 125.5 | | 8DT-450X | 16.9* | 23.7 | 27.2 | 34.0 | 40.2 | 42.8 | |

Suction Gas Return 20°C / Subcooling 0K

° High Discharge Temp - Additional Cooling Required

* 10K border

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|-----|-------|-------|-------|-------|----------|------------------------------|-----|-----|-------|-------|-------|------|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 2DC-50X | | | | 2.4* | 4.7* | 6.3* | 10.3 | 2DC-50X | | | | 1.5* | 2.0* | 2.1* | 2.3 |
| 2DD-50X | | | | 3.1* | 5.8* | 7.6* | 12.2 | 2DD-50X | | | | 1.9* | 2.3* | 2.5* | 2.7 |
| 2DL-40X | | | | 4.0 | 7.2 | 9.2 | 14.4 | 2DL-40X | | | | 2.3 | 2.8 | 3.1 | 3.4 |
| 2DL-75X | | | | 3.6* | 6.8* | 8.9* | 14.3 | 2DL-75X | | | | 2.1* | 2.7* | 3.0* | 3.3 |
| 2DB-50X | | | | 5.2 | 9.1 | 11.6 | 17.9 | 2DB-50X | | | | 2.6 | 3.3 | 3.6 | 4.0 |
| 2DB-75X | | | | 4.5* | 8.2* | 10.6* | 17.0 | 2DB-75X | | | | 2.6* | 3.3* | 3.5* | 3.9 |
| 3DA-50X | | | | 6.0 | 10.2 | 12.9 | 19.8 | 3DA-50X | | | | 3.0 | 3.7 | 4.0 | 4.4 |
| 3DA-75X | | | | 5.1* | 9.6* | 12.5* | 20.1 | 3DA-75X | | | | 3.1* | 3.8* | 4.1* | 4.5 |
| 3DC-75X | | | | 7.4 | 12.5 | 15.7 | 23.9 | 3DC-75X | | | | 3.6 | 4.5 | 4.8 | 5.3 |
| 3DC-100X | | | | 6.8* | 12.0* | 15.3* | 24.2 | 3DC-100X | | | | 3.7* | 4.5* | 4.8* | 5.2 |
| 3DS-100X | | | | 9.7 | 16.2 | 20.4 | 31.0 | 3DS-100X | | | | 4.7 | 5.9 | 6.4 | 7.2 |
| 3DS-150X | | | | 9.7* | 16.3* | 20.6* | 31.7 | 3DS-150X | | | | 5.0 | 6.2* | 6.6* | 7.3 |
| 8DH-500X | | | | 28.6* | 47.9* | 60.9* | 95.6 | 8DH-500X | | | | 15.5* | 18.8* | 20.2* | 22.2 |
| 8DJ-600X | | | | 34.4* | 57.5* | 72.9* | 114.0 | 8DJ-600X | | | | 18.1* | 22.2* | 24.0* | 26.8 |
| 8DL-370X | | | | 31.4 | 51.6 | 64.5 | 97.3 | 8DL-370X | | | | 15.1 | 18.5 | 19.9 | 22.2 |
| 8DT-450X | | | | 38.7 | 62.1 | 77.1 | 115.0 | 8DT-450X | | | | 18.4 | 22.5 | 24.4 | 27.5 |

Suction Gas Return 20°C / Subcooling 0K

* 10K border

Discus™ Digital (3Cylinder) Reciprocating Compressor

With Continuous Capacity Modulation

Discus Digital series with 3 cylinder compressors provide an alternative means of continuous modulation to inverter. Digital modulation is the most simple and precise method of capacity control and helps to contain applied costs associated with modulation.

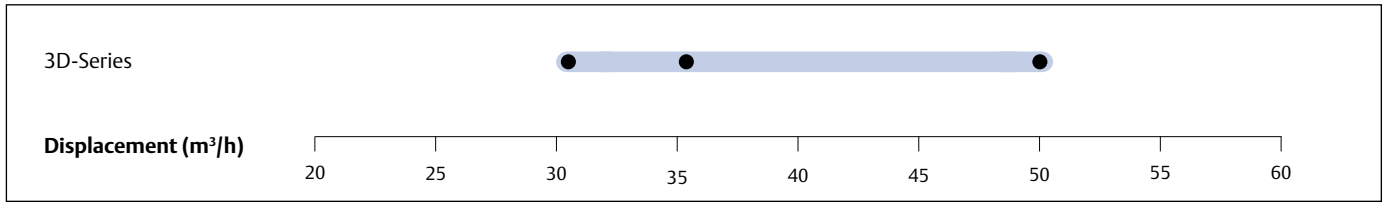
Digital technology is based on controlling a high-cycle solenoid valve fitted on one of the cylinder heads based on cycle time. The valve actuates a piston that controls the flow of gas into the suction area of the Discus valve plate.

The compressor always run at constant speed which resolves the challenges related to oil return, mechanical and electrical stress on the system.



Discus Digital 3 Cylinder Compressor

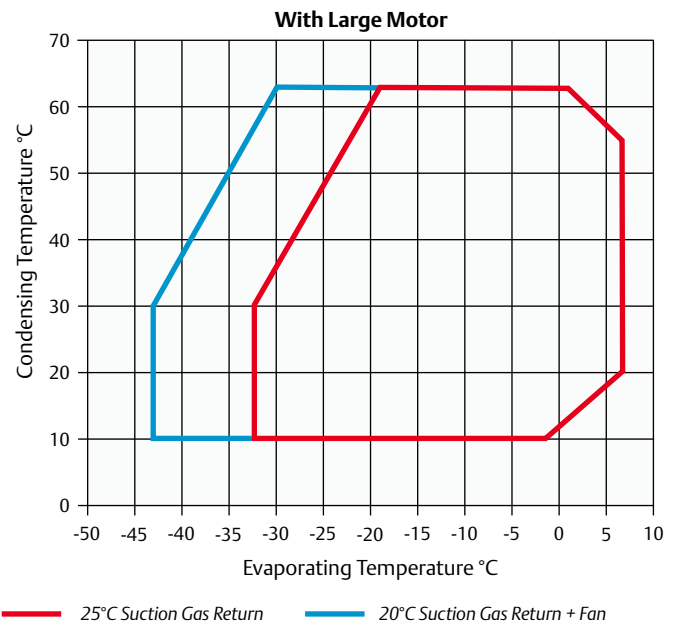
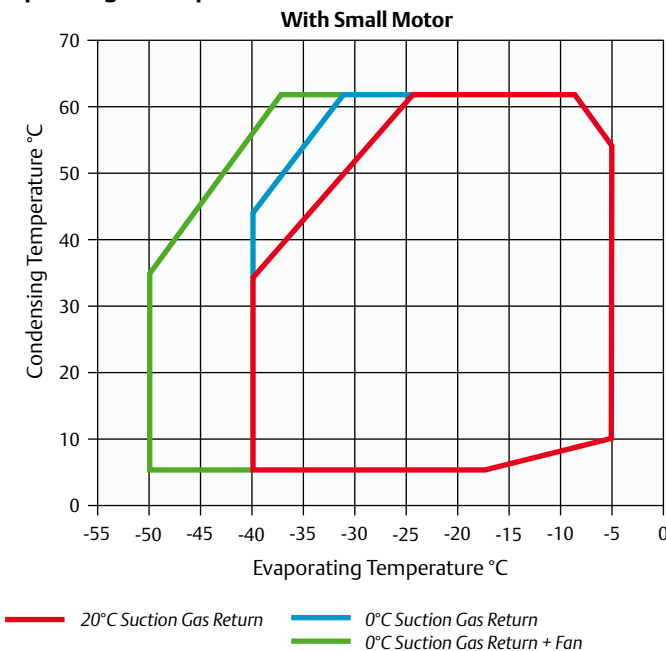
Discus Digital Compressor Line-up



Features and Benefits

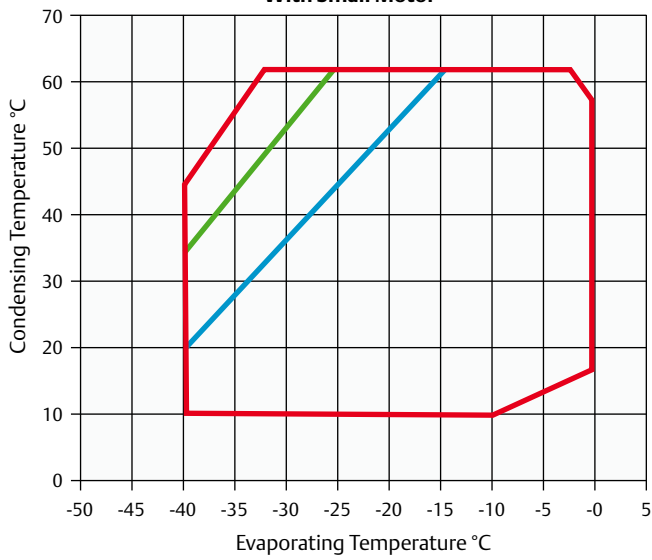
- Range of 6 models from 32 to 50 m³/h
- Compatible with R407A/F/C, R448A/ R449A, R404A, R134a, R450A and R513A.
- Continuous modulation from 10–100% ensuring a perfect match of capacity and power to refrigeration load
- Economical and reliable alternative to frequency inverters
- Precise suction pressure control with associated energy savings and stable evaporating temperatures
- Quick and easy integration into refrigeration equipment, similar to any other standard compressor
- Possibility to easily retrofit existing installations with digital cylinder head kit
- No vibrations or mechanical stress on system piping and compressor parts
- Reduced compressor cycling for longer contactor and compressor life

Operating Envelope R404A



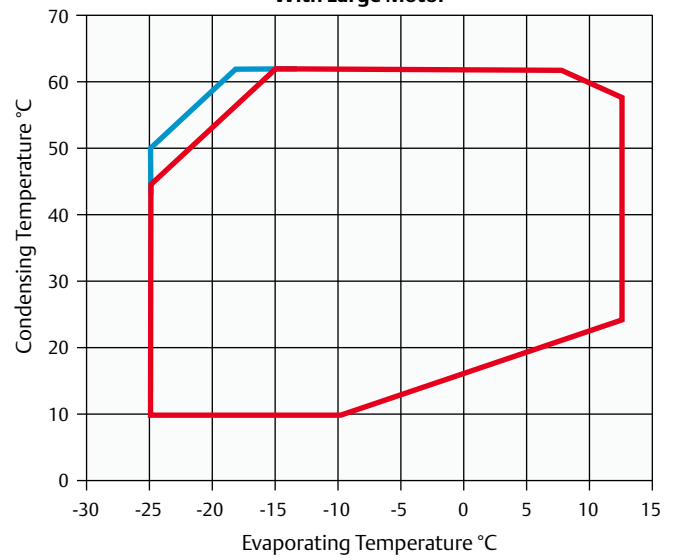
Operating Envelope R407A

With Small Motor



— 20K Suction Superheat — 20°C Suction Gas Return
 — 0°C Suction Gas Return

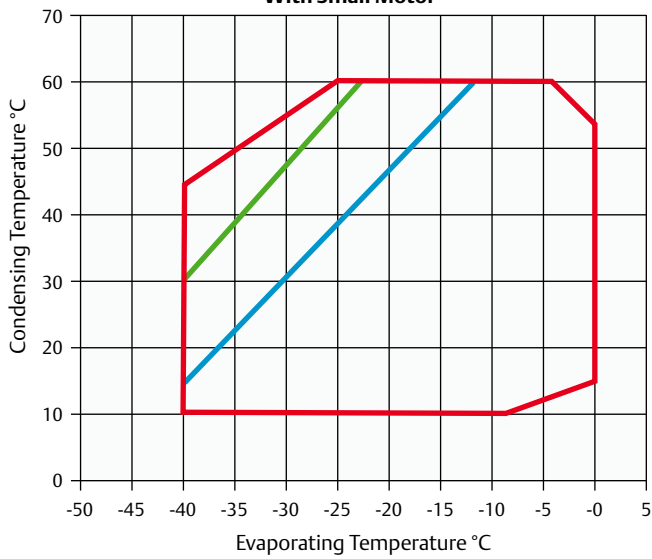
With Large Motor



— 20°C Suction Gas Return — 0°C Suction Gas Return

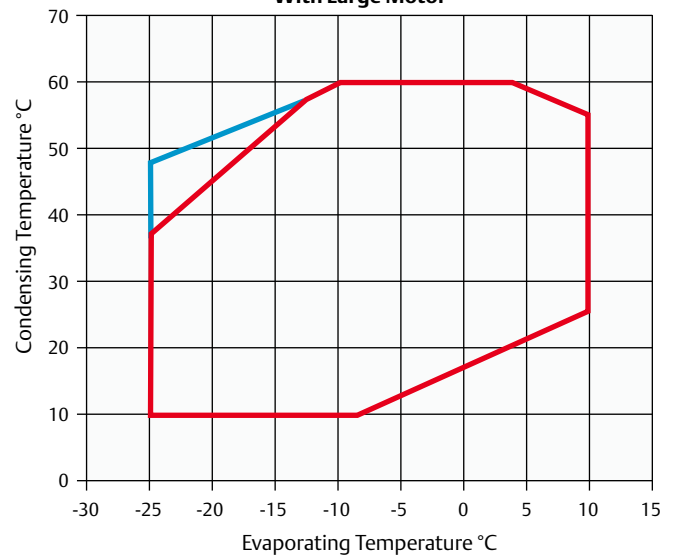
Operating Envelope R407F

With Small Motor



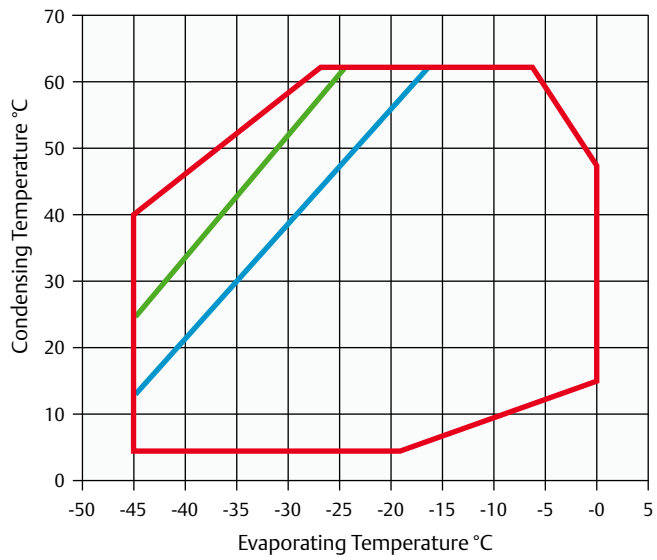
— 20K Suction Superheat — 20°C Suction Gas Return
 — 0°C Suction Gas Return

With Large Motor

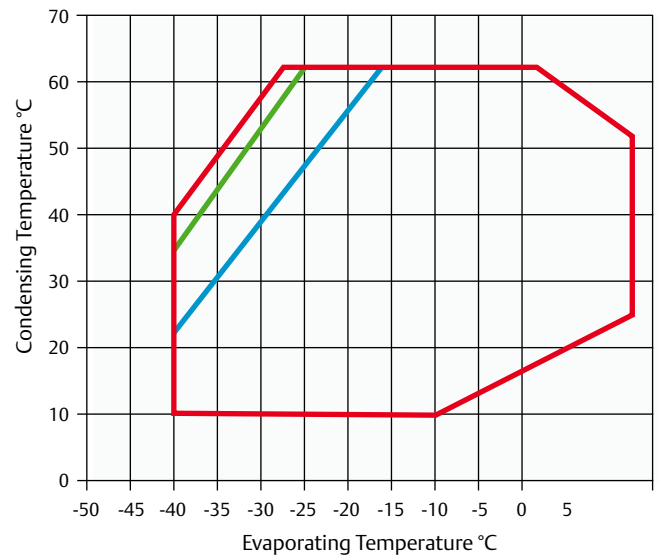


— 20°C Suction Gas Return — 0°C Suction Gas Return

Operating Envelope R448A/R449A



— 20K Suction Superheat
 — 20°C Suction Gas Return
— 0°C Suction Gas Return



— 20K Suction Superheat
 — 20°C Suction Gas Return
— 0°C Suction Gas Return

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @1 m - dB(A)*** |
|------------------|------------|----------------------------------|------------------|--------------------------|-----------------|--------------------|-------------------------------|--------------------------|--------------------------------|
| | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| 3DAD-50X | 5.0 | 32.2 | 3.7 | 655/370/480 | 146.0 | AWM | 15.7 | 55.0 | 65.0 |
| 3DAD-75X | 7.5 | 32.2 | 3.7 | 680/370/480 | 152.0 | AWM | 18.6 | 106.0 | 67.0 |
| 3DCD-75X | 7.5 | 38.0 | 3.7 | 655/370/480 | 150.0 | AWM | 18.5 | 70.0 | 67.0 |
| 3DCD-100X | 10.0 | 38.0 | 3.7 | 680/370/480 | 164.0 | AWM | 21.6 | 121.0 | 68.0 |
| 3DSD-100X | 10.0 | 49.9 | 3.7 | 680/370/480 | 162.0 | AWM | 24.4 | 121.0 | 69.0 |
| 3DSD-150X | 15.0 | 49.9 | 3.7 | 710/370/490 | 166.0 | AWM | 29.7 | 129.0 | 69.0 |

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
|------------------|------------------------------|------|------|------|------|------|----|------------------|------------------------------|-----|-----|------|------|------|----|
| | Condensing Temperature 40°C | | | | | | | | Condensing Temperature 40°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 | Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 |
| 3DAD-50X | 5.3* | 10.3 | 16.2 | 19.9 | | | | 3DAD-50X | 3.8* | 5.0 | 6.1 | 6.5 | | | |
| 3DAD-75X | | 10.2 | 16.4 | 20.4 | 30.4 | 36.5 | | 3DAD-75X | | 5.0 | 6.0 | 6.4 | 6.9 | 6.9 | |
| 3DCD-100X | | 12.4 | 20.0 | 24.7 | 36.6 | 43.9 | | 3DCD-100X | | 5.8 | 7.1 | 7.6 | 8.3 | 8.3 | |
| 3DCD-75X | 6.4* | 12.3 | 19.4 | 23.8 | | | | 3DCD-75X | 4.6* | 6.0 | 7.2 | 7.8 | | | |
| 3DSD-100X | 8.9* | 16.7 | 25.9 | 31.6 | | | | 3DSD-100X | 6.1* | 7.9 | 9.6 | 10.3 | | | |
| 3DSD-150X | | 16.5 | 26.2 | 32.2 | 47.6 | 57.0 | | 3DSD-150X | | 7.8 | 9.6 | 10.3 | 11.2 | 11.3 | |

Suction Gas Return 20°C / Subcooling 0K, 100% loaded

*Suction Superheat 10K, Subcooling 0K

| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
|------------------|------------------------------|------|------|------|------|------|----|------------------|------------------------------|-----|------|------|------|------|----|
| | Condensing Temperature 40°C | | | | | | | | Condensing Temperature 40°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 | Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 |
| 3DAD-50X | 6.0* | 11.2 | 17.8 | 21.9 | | | | 3DAD-50X | 4.0* | 5.2 | 6.4 | 6.8 | | | |
| 3DAD-75X | | 11.3 | 18.2 | 22.6 | 33.6 | 40.4 | | 3DAD-75X | | 5.2 | 6.3 | 6.8 | 7.2 | 7.2 | |
| 3DCD-75X | 7.4* | 13.7 | 21.5 | 26.4 | | | | 3DCD-75X | 4.8* | 6.2 | 7.5 | 8.1 | | | |
| 3DCD-100X | | 13.9 | 21.9 | 27.0 | 39.8 | 47.8 | | 3DCD-100X | | 6.0 | 7.3 | 7.9 | 8.6 | 8.6 | |
| 3DSD-100X | 10.0* | 18.2 | 28.5 | 35.0 | | | | 3DSD-100X | 6.3* | 8.3 | 10.1 | 10.8 | | | |
| 3DSD-150X | | 18.4 | 29.2 | 36.0 | 53.0 | 63.4 | | 3DSD-150X | | 8.2 | 10.1 | 10.9 | 11.9 | 12.0 | |

Suction Gas Return 20°C / Subcooling 0K, 100% loaded

*Suction Superheat 10K, Subcooling 0K

Capacity Data

| R448A/ R449A | | Cooling Capacity (kW) | | | | | | R448A/ R449A | | Power Input (kW) | | | | | |
|-----------------|-------|------------------------------|------|------|------|------|----|-----------------|------|------------------------------|-----|------|------|------|----|
| | | Condensing Temperature 40°C | | | | | | | | Condensing Temperature 40°C | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 | Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 |
| 3DAD-50X | 5.6* | 10.2 | 16.1 | 19.8 | | | | 3DAD-50X | 3.9* | 5.0 | 6.2 | 6.6 | | | |
| 3DAD-75X | 6.7* | 11.9 | 18.3 | 22.2 | 31.8 | 37.6 | | 3DAD-75X | 4.4* | 5.7 | 6.8 | 7.2 | 7.5 | 7.4 | |
| 3DCD-75X | 6.9* | 12.4 | 19.4 | 23.8 | | | | 3DCD-75X | 4.6* | 6.0 | 7.3 | 7.8 | | | |
| 3DCD-100X | 7.3* | 13.4 | 21.1 | 26.0 | 38.0 | 45.4 | | 3DCD-100X | 4.7* | 6.1 | 7.2 | 7.6 | 8.0 | 7.9 | |
| 3DSD-150X | 10.2* | 17.8 | 27.6 | 33.7 | 49.1 | 58.4 | | 3DSD-150X | 6.4* | 8.2 | 9.8 | 10.5 | 11.5 | 11.8 | |
| 3DSD-100X | 9.5* | 16.9 | 26.5 | 32.5 | | | | 3DSD-100X | 6.2* | 8.1 | 9.8 | 10.6 | | | |

Suction Gas Return 20°C / Subcooling 0K, 100% loaded

*Suction Superheat 10K, Subcooling 0K

Preliminary data

| R404A | | Cooling Capacity (kW) | | | | | | R404A | | Power Input (kW) | | | | | |
|-----------|------|------------------------------|------|------|------|----|----|-----------|-----|------------------------------|------|------|------|----|----|
| | | Condensing Temperature 40°C | | | | | | | | Condensing Temperature 40°C | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 | Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 |
| 3DAD-75X | 7.1 | 11.9 | 18.3 | 22.2 | 31.8 | | | 3DAD-75X | 4.4 | 5.7 | 6.8 | 7.2 | 7.5 | | |
| 3DAD-50X | 7.3 | 11.8 | 17.8 | 21.5 | | | | 3DAD-50X | 4.6 | 5.9 | 6.9 | 7.3 | | | |
| 3DCD-75X | 8.8 | 14.1 | 21.2 | 25.6 | | | | 3DCD-75X | 5.5 | 7.0 | 8.2 | 8.6 | | | |
| 3DCD-100X | 8.6 | 14.3 | 21.8 | 26.5 | 37.9 | | | 3DCD-100X | 5.3 | 6.8 | 8.0 | 8.4 | 8.9 | | |
| 3DSD-150X | 12.1 | 19.1 | 28.6 | 34.6 | 49.3 | | | 3DSD-150X | 7.3 | 9.2 | 11.0 | 11.6 | 12.3 | | |
| 3DSD-100X | 11.9 | 18.9 | 28.3 | 34.1 | | | | 3DSD-100X | 7.4 | 9.3 | 10.9 | 11.6 | | | |

Suction Gas Return 20°C / Subcooling 0K, 100% loaded

High Discharge Temp - Additional Cooling Required

| R134a | | Cooling Capacity (kW) | | | | | | R134a | | Power Input (kW) | | | | | |
|-----------|-----|------------------------------|-------|-------|------|------|------|-----------|-----|------------------------------|------|------|-----|-----|-----|
| | | Condensing Temperature 40°C | | | | | | | | Condensing Temperature 40°C | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 | Model | -30 | -20 | -10 | -5 | 5 | 10 | 15 |
| 3DAD-50X | | 6.3 | 10.4 | 13.0 | 19.8 | 24.1 | | 3DAD-50X | | 3.0 | 3.8 | 4.1 | 4.5 | 4.6 | |
| 3DAD-75X | | 5.5* | 9.8* | 12.6* | 20.0 | 24.5 | 29.6 | 3DAD-75X | | 3.1* | 3.8* | 4.1* | 4.5 | 4.5 | 4.5 |
| 3DCD-75X | | 7.5 | 12.4 | 15.6 | 23.5 | 28.5 | | 3DCD-75X | | 3.6 | 4.5 | 4.9 | 5.4 | 5.5 | |
| 3DCD-100X | | 6.8* | 11.9* | 15.2* | 23.8 | 29.0 | 34.9 | 3DCD-100X | | 3.7* | 4.5* | 4.8* | 5.2 | 5.3 | 5.3 |
| 3DSD-100X | | 10.2 | 16.6 | 20.6 | 31.0 | 37.5 | | 3DSD-100X | | 4.8 | 6.0 | 6.4 | 7.1 | 7.3 | |
| 3DSD-150X | | 9.1* | 15.7* | 19.9* | 31.0 | 37.5 | 44.9 | 3DSD-150X | | 4.8* | 6.0* | 6.6* | 7.3 | 7.4 | 7.3 |

Suction Gas Return 20°C / Subcooling 0K, 100% loaded

*Suction Superheat 10K, Subcooling 0K

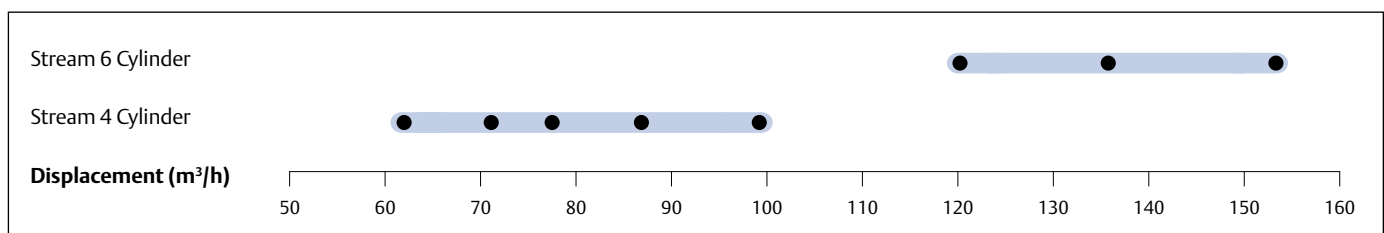
Copeland™ Stream With CoreSense™ Diagnostics, Semi-Hermetic Reciprocating Compressors For HFC / HFO blends

Stream series 4 and 6 cylinder compressors provide best-in-class performance, thereby significantly reducing cost of operation and environmental impact compared to competing products. With advanced protection and diagnostics features for system reliability, reduced service costs and increased equipment uptime, Stream series is built to last in today's modern changing world.



Copeland Stream Compressor
Designed to Deliver Best-in-Class Performance

Stream Compressor Line-up



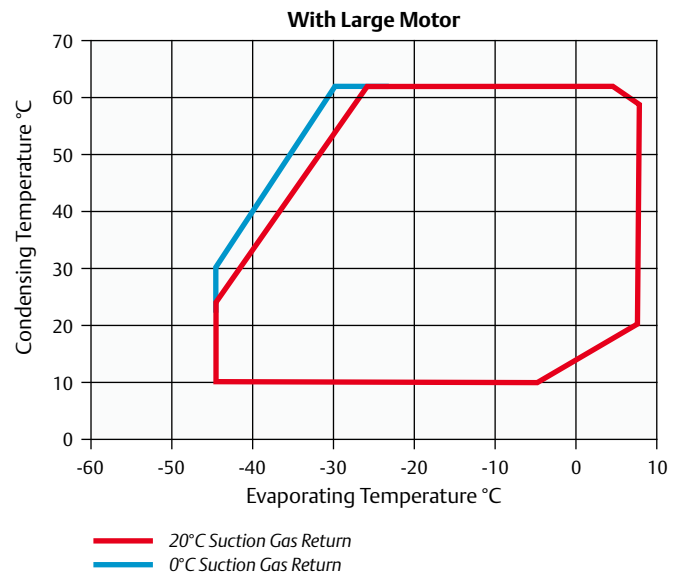
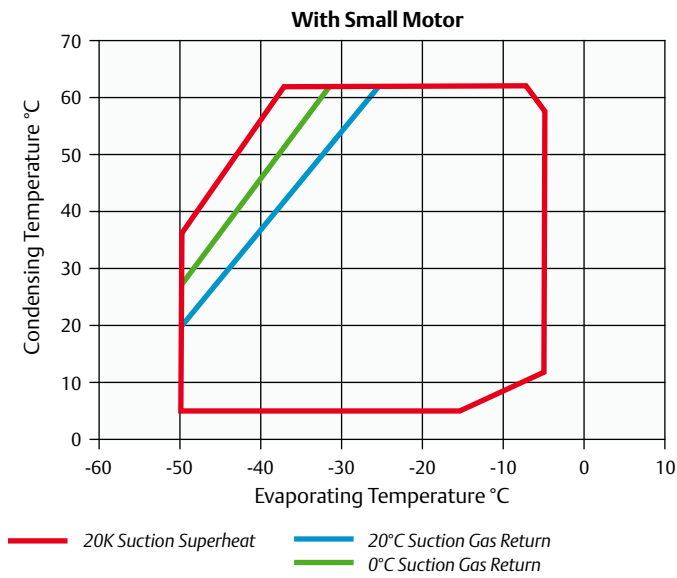
Features and Benefits

- Range of 16 models from 62 to 153m³/h
- Best-in-class seasonal efficiencies, up to 15% higher than market standard
- Multi-refrigerant compressor as it is compatible with R407A/F/C, R448A/ R449A, R404A, R134a, R450A and R513A
- Stepless capacity modulation by means of inverter or Digital modulation
- Wide Operating Envelope covering low- and medium-temperature refrigeration without cooling fan
- Reduced sound level, dimensions and weight by up to 45 kg
- CoreSense Protection available as option
- Option to use compressors with additional Demand Cooling function in order to achieve extended low temperature operating envelope without any superheat restriction for new refrigerants R407A/F, R448A and R449A

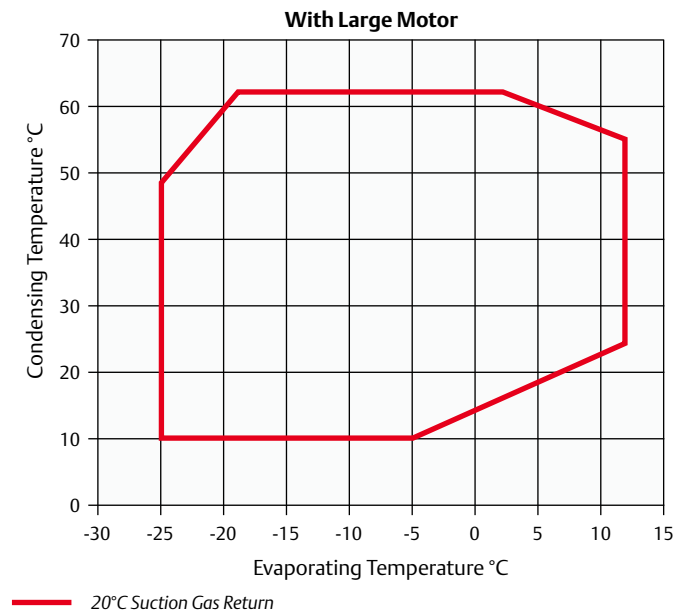
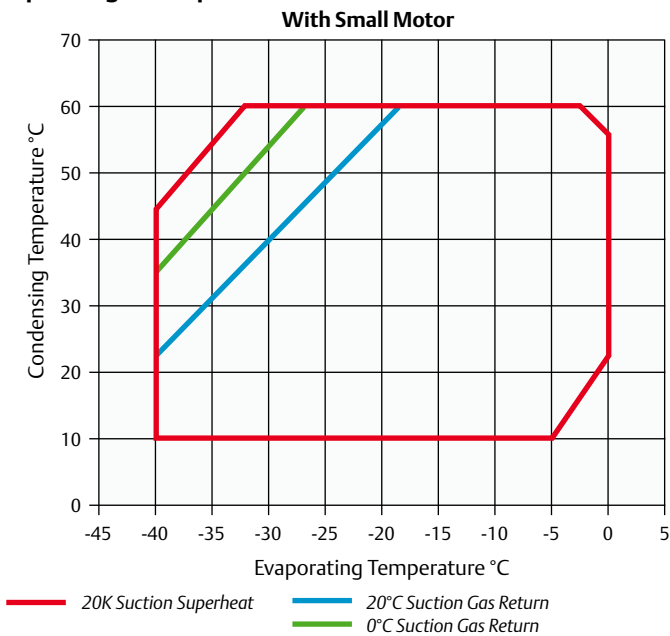
CoreSense Diagnostics Features

- Motor and oil protection
- Storage of compressor asset and advanced runtime information
- Runtime/alarm signalling using multi-colour LED flash-codes
- Communication to system controller via Modbus®
- Individual compressor power monitoring

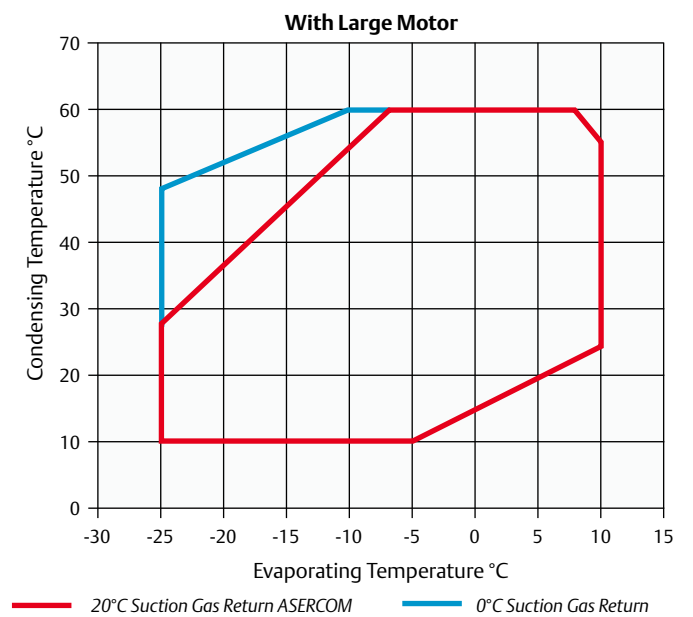
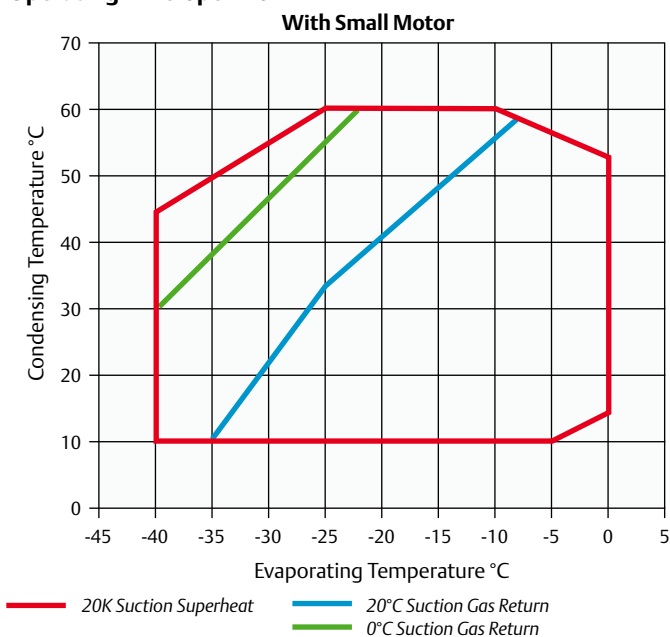
Operating Envelope R404A



Operating Envelope R407A

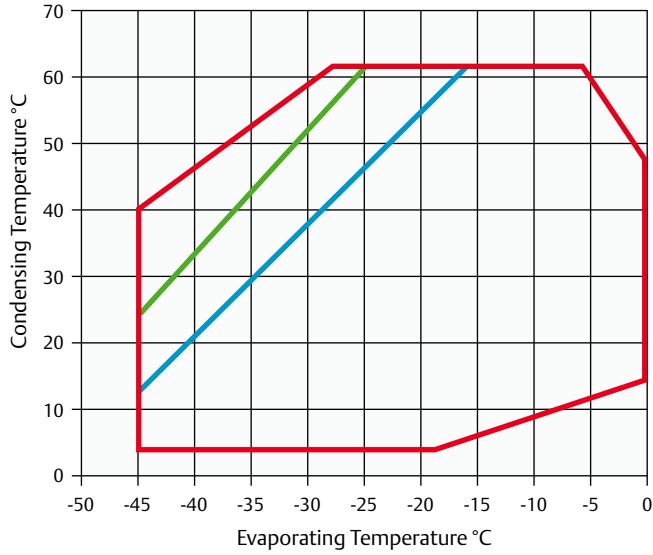


Operating Envelope R407F



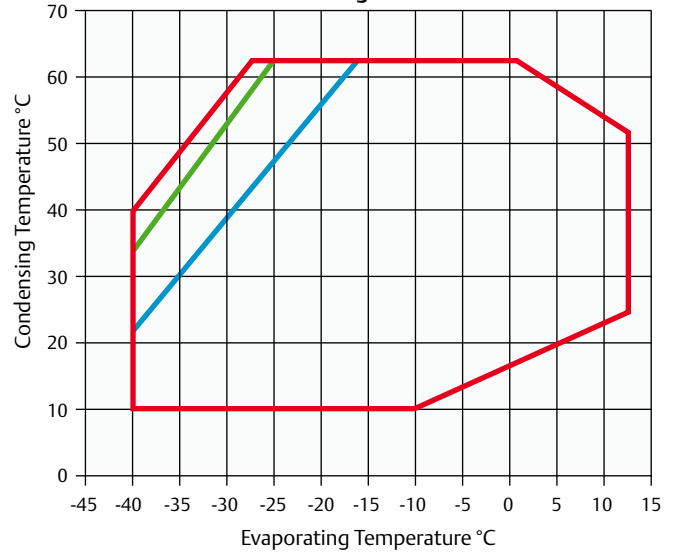
Operating Envelope R448A/R449A

With Small Motor



— 20K Suction Superheat — 20°C Suction Gas Return
 — 0°C Suction Gas Return

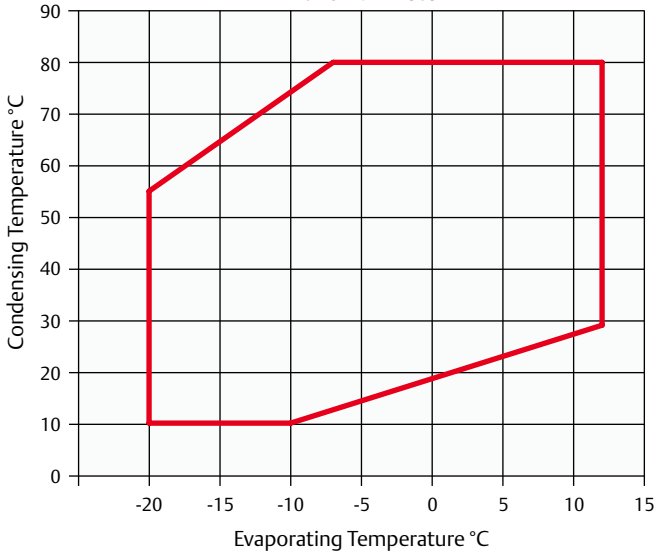
With Large Motor



— 20K Suction Superheat — 20°C Suction Gas Return
 — 0°C Suction Gas Return

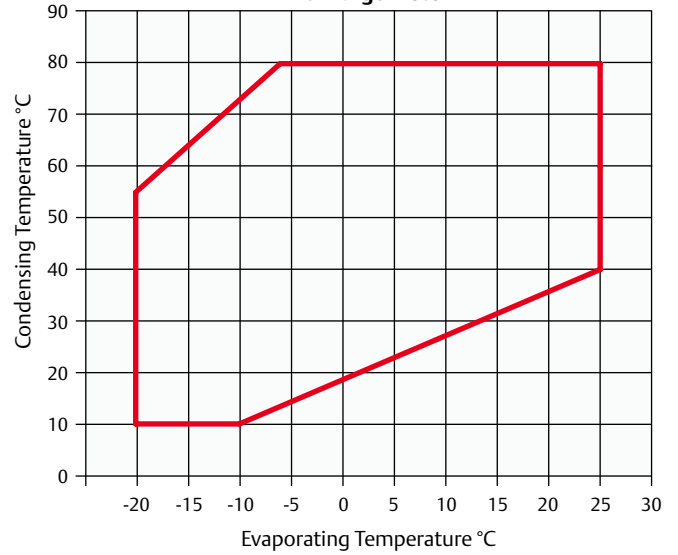
Operating Envelope R134a

With Small Motor



— 20°C Suction Gas Return

With Large Motor



— 20K Suction Superheat

For individual model details please refer to Select Software.

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @ 1 m - dB(A) *** |
|---------|------------|----------------------------------|------------------|--------------------------|-----------------|---------------------|-------------------------------|--------------------------|----------------------------------|
| | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| 4MF-13X | 13 | 61.7 | 3.3 | 638/501/452 | 177 | AWM | 30.8 | 105 | 70 |
| 4MA-22X | 22 | 61.7 | 3.3 | 638/501/452 | 177 | AWM | 36.3 | 175 | 75 |
| 4ML-15X | 15 | 71.4 | 3.3 | 638/501/452 | 180 | AWM | 35.4 | 156 | 71 |
| 4MH-25X | 25 | 71.4 | 3.3 | 657/501/452 | 187 | AWM | 41.6 | 199 | 75 |
| 4MM-20X | 17 | 78.2 | 3.3 | 657/501/452 | 182 | AWM | 39 | 175 | 71 |
| 4MI-30X | 27 | 78.2 | 3.3 | 657/501/452 | 188 | AWM | 46.6 | 221 | 75 |
| 4MT-22X | 22 | 87.7 | 3.3 | 657/501/452 | 183 | AWM | 44.5 | 175 | 73 |
| 4MJ-33X | 33 | 87.7 | 3.3 | 657/501/452 | 190 | AWM | 52.9 | 221 | 74 |
| 4MU-25X | 25 | 99.4 | 3.3 | 657/501/452 | 186 | AWM | 51.9 | 199 | 72 |
| 4MK-35X | 32 | 99.4 | 3.3 | 688/501/452 | 202 | AWM | 61.1 | 255 | 74 |
| 6MM-30X | 27 | 120.5 | 3.3 | 695/547/450 | 215 | AWM | 59.7 | 255 | 78 |
| 6MI-40X | 35 | 120.5 | 3.3 | 695/547/450 | 219 | AWM | 71.4 | 304 | 78 |
| 6MT-35X | 32 | 135 | 3.3 | 725/547/450 | 221 | AWM | 67.3 | 255 | 77 |
| 6MJ-45X | 40 | 135 | 3.3 | 725/547/450 | 223 | AWM | 81.5 | 304 | 79 |
| 6MU-40X | 40 | 153 | 3.3 | 757/547/450 | 225 | AWM | 75.8 | 306 | 78 |
| 6MK-50X | 50 | 153 | 3.3 | 773/547/450 | 230 | AWM | 92.9 | 393 | 80 |

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-------|-------|------|------|------|-------|---------|------------------------------|-------|-------|------|------|------|------|----|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| | Model | -45 | -35 | -30 | -20 | -10 | -5 | | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 |
| 4MF-13X | | 7.1* | 10.3* | 19.9 | 31.2 | 38.3 | | 4MF-13X | | 6.1* | 7.3* | 9.7 | 11.8 | 12.7 | | |
| 4MA-22X | | | | 20.3 | 32.6 | 40.3 | 59.9 | 4MA-22X | | | | 9.5 | 11.7 | 12.6 | 14 | |
| 4ML-15X | | 9.2* | 13.0* | 24.3 | 38 | 46.6 | | 4ML-15X | | 7.4* | 8.8* | 11.4 | 13.8 | 14.9 | | |
| 4MH-25X | | | | 23.8 | 37.8 | 46.7 | 69.2 | 4MH-25X | | | | 11.4 | 13.7 | 14.6 | 15.9 | |
| 4MM-20X | | 10.4* | 14.5* | 26.7 | 41.6 | 51 | | 4MM-20X | | 8.3* | 9.7* | 12.7 | 15.3 | 16.5 | | |
| 4MI-30X | | | | 26.7 | 42.1 | 51.9 | 76.5 | 4MI-30X | | | | 12.6 | 15 | 16.1 | 17.8 | |
| 4MT-22X | | 11.2* | 15.5* | 28.7 | 44.7 | 54.8 | | 4MT-22X | | 9.4* | 11.1* | 14.5 | 17.5 | 18.9 | | |
| 4MJ-33X | | | | 29.7 | 46.8 | 57.7 | 85.1 | 4MJ-33X | | | | 14.2 | 17 | 18.2 | 20.1 | |
| 4MU-25X | | 12.3* | 17.3* | 32.6 | 50.9 | 62.4 | | 4MU-25X | | 10.6* | 12.4* | 16.2 | 19.9 | 21.6 | | |
| 4MK-35X | | | | 33.5 | 52.6 | 64.7 | 95.1 | 4MK-35X | | | | 16.2 | 19.5 | 20.9 | 23.4 | |
| 6MM-30X | | 15.1* | 21.2* | 39.7 | 61.9 | 75.8 | | 6MM-30X | | 12.6* | 14.9* | 19.4 | 23.6 | 25.5 | | |
| 6MI-40X | | | | 40.8 | 64.2 | 79 | 116.5 | 6MI-40X | | | | 19.3 | 23.3 | 25 | 27.6 | |
| 6MT-35X | | 18.4* | 25.1* | 45.7 | 71 | 86.9 | | 6MT-35X | | 14.5* | 16.8* | 21.9 | 26.9 | 29.1 | | |
| 6MJ-45X | | | | 45.4 | 71.4 | 87.9 | 129.5 | 6MJ-45X | | | | 21.5 | 26.1 | 28 | 31 | |
| 6MU-40X | | 20.9* | 27.8* | 50.3 | 78.7 | 96.7 | | 6MU-40X | | 16.6* | 19.0* | 24.4 | 30.1 | 32.8 | | |
| 6MK-50X | | | | 50.6 | 79.4 | 97.6 | 143.5 | 6MK-50X | | | | 24.4 | 29.8 | 32.3 | 36.4 | |

Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K, Subcooling 0K

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-------|-------|-------|------|-------|-------|---------|------------------------------|-------|-------|-------|------|------|------|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 4MF-13X | | 7.8* | 11.1* | 19.7* | 32.5 | 39.9 | | 4MF-13X | | 6.5* | 7.7* | 10.2* | 12.4 | 13.3 | |
| 4MA-22X | | | | 20.7* | 34.8 | 43 | 63.8 | 4MA-22X | | | | 10.2* | 12.4 | 13.2 | 14.4 |
| 4MH-25X | | | | 24.2* | 40.4 | 49.9 | 73.8 | 4MH-25X | | | | 11.9* | 14.4 | 15.4 | 16.8 |
| 4ML-15X | | 9.9* | 13.8* | 24.2* | 39.8 | 48.9 | | 4ML-15X | | 7.8* | 9.2* | 12.0* | 14.6 | 15.7 | |
| 4MM-20X | | 11.0* | 15.3* | 26.6* | 43.5 | 53.4 | | 4MM-20X | | 8.7* | 10.3* | 13.3* | 16.0 | 17.2 | |
| 4MI-30X | | | | 26.9* | 44.4 | 54.8 | 80.7 | 4MI-30X | | | | 13.1* | 15.8 | 17.0 | 18.6 |
| 4MT-22X | | 12.7* | 17.4* | 29.9* | 48.5 | 59.5 | | 4MT-22X | | 10.0* | 11.7* | 15.1* | 18.3 | 19.7 | |
| 4MJ-33X | | | | 30.2* | 49.5 | 60.9 | 89.8 | 4MJ-33X | | | | 14.8* | 17.8 | 19.2 | 21.1 |
| 4MU-25X | | 14.0* | 19.3* | 33.3* | 54.6 | 66.9 | | 4MU-25X | | 11.2* | 13.2* | 17.2* | 21.0 | 22.8 | |
| 4MK-35X | | | | 33.7* | 55.3 | 68.3 | 101 | 4MK-35X | | | | 16.8* | 20.4 | 22.1 | 24.4 |
| 6MM-30X | | 17.2* | 23.7* | 40.7* | 66 | 80.7 | | 6MM-30X | | 13.6* | 15.8* | 20.4* | 24.8 | 26.7 | |
| 6MI-40X | | | | 41.2* | 67.9 | 83.5 | 122.5 | 6MI-40X | | | | 20.2* | 24.4 | 26.2 | 28.9 |
| 6MT-35X | | 19.8* | 27.0* | 45.8* | 74.1 | 90.4 | | 6MT-35X | | 15.3* | 18.0* | 23.1* | 28.0 | 30.3 | |
| 6MJ-45X | | | | 45.8* | 75.2 | 92.6 | 136 | 6MJ-45X | | | | 22.9* | 27.6 | 29.7 | 32.8 |
| 6MU-40X | | 20.1* | 27.7* | 48.5* | 82.7 | 101.5 | | 6MU-40X | | 16.9* | 19.8* | 25.9* | 31.7 | 34.4 | |
| 6MK-50X | | | | 51.3* | 84.5 | 104 | 153.5 | 6MK-50X | | | | 25.8* | 31.3 | 33.7 | 37.5 |

Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K, Subcooling 0K

| Condensing Temperature 40°C | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------|-------|-------|------|------|-------|-------|-----------------|------------------------------|-------|-------|------|------|------|------|
| R448A/ R449A | Cooling Capacity (kW) | | | | | | | R448A/ R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | 5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | 5 |
| 4MA-22X | | 7.8* | 11.3* | 21.2 | 34.3 | 42.7 | 63.5 | 4MA-22X | | 6.2* | 7.4* | 9.8 | 11.8 | 12.6 | 13.7 |
| 4MF-13X | 3.8* | 8.2* | 11.1* | 19.6 | 30.4 | 37.3 | | 4MF-13X | 4.5* | 6.3* | 7.4* | 9.8 | 12.2 | 13.1 | |
| 4MH-25X | | 9.4* | 13.5* | 24.7 | 39.1 | 48.0 | 70.3 | 4MH-25X | | 7.6* | 8.9* | 11.6 | 14.1 | 15.1 | 16.7 |
| 4ML-15X | 4.3* | 10.5* | 14.3* | 25.2 | 38.7 | 47.1 | | 4ML-15X | 5.2* | 7.6* | 8.9* | 11.6 | 14.2 | 15.4 | |
| 4MI-30X | | 10.8* | 15.4* | 28.1 | 44.1 | 54.0 | 78.6 | 4MI-30X | | 8.2* | 9.8* | 13.0 | 15.6 | 16.7 | 18.2 |
| 4MM-20X | 4.9* | 11.8* | 16.0* | 27.8 | 42.5 | 51.5 | | 4MM-20X | 5.8* | 8.5* | 9.9* | 12.9 | 15.6 | 16.9 | |
| 4MJ-33X | | 12.1* | 17.0* | 30.9 | 48.7 | 59.8 | 87.6 | 4MJ-33X | | 9.2* | 11.0* | 14.5 | 17.6 | 18.9 | 20.6 |
| 4MT-22X | 5.9* | 13.5* | 18.2* | 31.3 | 47.7 | 57.8 | | 4MT-22X | 6.6* | 9.7* | 11.3* | 14.6 | 17.8 | 19.2 | |
| 4MK-35X | | 13.7* | 19.2* | 34.7 | 54.8 | 67.5 | 98.9 | 4MK-35X | | 10.7* | 12.7* | 16.7 | 20.4 | 22.0 | 24.4 |
| 4MU-25X | 6.5* | 14.3* | 19.5* | 34.2 | 53.2 | 65.1 | | 4MU-25X | 7.4* | 10.8* | 12.7* | 16.6 | 20.5 | 22.4 | |
| 6MI-40X | | 17.1* | 23.9* | 42.8 | 66.6 | 81.4 | 118.0 | 6MI-40X | | 13.0* | 15.3* | 19.6 | 23.5 | 25.2 | 28.0 |
| 6MM-30X | 6.6* | 17.6* | 24.1* | 41.8 | 63.2 | 76.3 | | 6MM-30X | 8.8* | 13.1* | 15.4* | 19.9 | 23.9 | 25.6 | |
| 6MT-35X | 7.5* | 19.8* | 26.9* | 46.5 | 70.0 | 84.3 | | 6MT-35X | 9.7* | 14.6* | 17.2* | 22.2 | 26.9 | 29.0 | |
| 6MJ-45X | | 19.5* | 27.2* | 48.1 | 74.5 | 91.0 | 132.0 | 6MJ-45X | | 14.3* | 17.0* | 22.2 | 26.9 | 28.8 | 31.7 |
| 6MK-50X | | 21.1* | 29.4* | 52.7 | 82.2 | 101.0 | 147.0 | 6MK-50X | | 16.4* | 19.2* | 25.0 | 30.3 | 32.7 | 36.7 |
| 6MU-40X | 8.3* | 22.2* | 30.5* | 53.4 | 81.8 | 99.4 | | 6MU-40X | 10.9* | 16.3* | 19.1* | 24.6 | 29.8 | 32.1 | |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

Preliminary data

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|------|------|------|-------|-------|---------|------------------------------|------|------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 4MA-22X | | 10.5 | 14.3 | 23.6 | 36.0 | 43.5 | 62.0 | 4MA-22X | | 7.3 | 8.6 | 11.0 | 13.0 | 13.7 | 14.7 |
| 4MF-13X | 3.6* | 10.7 | 14.0 | 22.8 | 34.8 | 42.2 | | 4MF-13X | 5.0* | 7.4 | 8.7 | 11.0 | 13.0 | 13.9 | |
| 4MH-25X | | 12.4 | 16.7 | 27.5 | 42.2 | 51.3 | 73.6 | 4MH-25X | | 8.6 | 10.1 | 13.0 | 15.4 | 16.3 | 17.5 |
| 4ML-15X | 4.8* | 13.3 | 17.4 | 27.9 | 42.0 | 50.8 | | 4ML-15X | 6.3* | 9.0 | 10.5 | 13.3 | 15.8 | 16.7 | |
| 4MI-30X | | 14.4 | 19.4 | 31.2 | 46.8 | 56.3 | 79.5 | 4MI-30X | | 9.8 | 11.5 | 14.5 | 17.0 | 18 | 19.5 |
| 4MM-20X | 5.7* | 15.1 | 19.6 | 30.9 | 46.1 | 55.4 | | 4MM-20X | 7.1* | 10.1 | 11.6 | 14.6 | 17.0 | 18.2 | |
| 4MJ-33X | | 16.2 | 21.4 | 34.6 | 52.4 | 63.4 | 90.4 | 4MJ-33X | | 10.9 | 12.6 | 16.0 | 19.0 | 20.2 | 21.8 |
| 4MT-22X | 6.7* | 17.0 | 21.9 | 34.7 | 52.0 | 62.7 | | 4MT-22X | 8.0* | 11.5 | 13.2 | 16.6 | 19.5 | 20.7 | |
| 4MK-35X | | 18.3 | 24.0 | 38.8 | 58.9 | 71.3 | 102.0 | 4MK-35X | | 12.6 | 14.6 | 18.5 | 22.0 | 23.5 | 25.7 |
| 4MU-25X | 7.2* | 18.6 | 24.1 | 38.5 | 58.1 | 70.2 | | 4MU-25X | 9.0* | 12.9 | 14.9 | 18.8 | 22.3 | 23.7 | |
| 6MI-40X | | 21.9 | 28.9 | 46.7 | 70.8 | 85.8 | 122.5 | 6MI-40X | | 15.2 | 17.6 | 22.2 | 26.1 | 27.7 | 30.1 |
| 6MM-30X | 8.9* | 22.7 | 29.3 | 46.5 | 70.2 | 85.1 | | 6MM-30X | 11.0* | 15.7 | 18.0 | 22.5 | 26.3 | 27.8 | |
| 6MJ-45X | | 24.3 | 32.3 | 52.5 | 79.5 | 96.1 | 136.5 | 6MJ-45X | | 16.8 | 19.6 | 24.9 | 29.5 | 31.4 | 33.9 |
| 6MT-35X | 10.3* | 25.6 | 33 | 52.5 | 79.3 | 95.9 | | 6MT-35X | 12.3* | 17.5 | 20.1 | 25.3 | 29.7 | 31.5 | |
| 6MK-50X | | 27.3 | 36.3 | 58.7 | 88.6 | 107.0 | 152.0 | 6MK-50X | | 19.4 | 22.5 | 28.3 | 33.5 | 35.9 | 39.9 |
| 6MU-40X | 11.0* | 28.4 | 36.8 | 58.7 | 89.0 | 108.0 | | 6MU-40X | 13.8* | 19.7 | 22.7 | 28.5 | 33.6 | 35.8 | |

Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K, Subcooling 0K

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|-----|------|------|------|------|---------|------------------------------|-----|-----|------|------|------|------|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Models | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Models | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 4MA-22X | | | | 13.1 | 21.3 | 26.6 | 40.1 | 4MA-22X | | | | 5.9 | 7.3 | 7.9 | 8.7 |
| 4MF-13X | | | | 12.2 | 20.4 | 25.6 | 38.9 | 4MF-13X | | | | 5.8 | 7.2 | 7.8 | 8.7 |
| 4MH-25X | | | | 15.0 | 24.6 | 30.7 | 46.4 | 4MH-25X | | | | 7.0 | 8.7 | 9.4 | 10.4 |
| 4ML-15X | | | | 15.0 | 24.5 | 30.5 | 46.0 | 4ML-15X | | | | 6.9 | 8.5 | 9.3 | 10.4 |
| 4MI-30X | | | | 16.8 | 27.1 | 33.7 | 50.7 | 4MI-30X | | | | 7.6 | 9.4 | 10.3 | 11.4 |
| 4MM-20X | | | | 16.6 | 27.0 | 33.6 | 50.3 | 4MM-20X | | | | 7.7 | 9.4 | 10.2 | 11.4 |
| 4MJ-33X | | | | 18.9 | 30.3 | 37.6 | 56.4 | 4MJ-33X | | | | 8.7 | 10.7 | 11.5 | 12.8 |
| 4MT-22X | | | | 19.0 | 30.6 | 38.1 | 57.2 | 4MT-22X | | | | 8.7 | 10.8 | 11.7 | 13.0 |
| 4MK-35X | | | | 21.0 | 34.0 | 42.2 | 63.3 | 4MK-35X | | | | 9.7 | 12.2 | 13.3 | 14.9 |
| 4MU-25X | | | | 20.7 | 33.9 | 42.3 | 63.8 | 4MU-25X | | | | 9.8 | 12.2 | 13.3 | 15.0 |
| 6MI-40X | | | | 24.8 | 40.2 | 50.2 | 76.0 | 6MI-40X | | | | 12.0 | 14.6 | 15.8 | 17.8 |
| 6MM-30X | | | | 25.2 | 40.7 | 50.7 | 76.1 | 6MM-30X | | | | 11.7 | 14.6 | 15.8 | 17.7 |
| 6MJ-45X | | | | 28.5 | 45.6 | 56.7 | 85.3 | 6MJ-45X | | | | 13.0 | 16.2 | 17.8 | 20.3 |
| 6MT-35X | | | | 28.5 | 46.0 | 57.1 | 85.2 | 6MT-35X | | | | 13.3 | 16.5 | 17.9 | 20.0 |
| 6MK-50X | | | | 29.8 | 49.1 | 61.7 | 94.3 | 6MK-50X | | | | 15.2 | 18.8 | 20.5 | 23.3 |
| 6MU-40X | | | | 31.5 | 50.6 | 62.9 | 94.5 | 6MU-40X | | | | 14.6 | 18.4 | 20.1 | 23.0 |

Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K, Subcooling 0K

Copeland™ Stream Digital with CoreSense™ Diagnostics for Continuous Capacity Modulation

Stream Digital series 4 and 6 cylinder compressors provide an alternative means of continuous modulation to inverter. Digital modulation is the most simple and precise method of capacity control and helps to contain applied costs associated with modulation.

Digital technology is based on controlling a high-cycle solenoid valve fitted on one of the cylinder heads based on cycle time. The valve actuates a piston that controls the flow of gas into the suction area of the Stream valve plate.

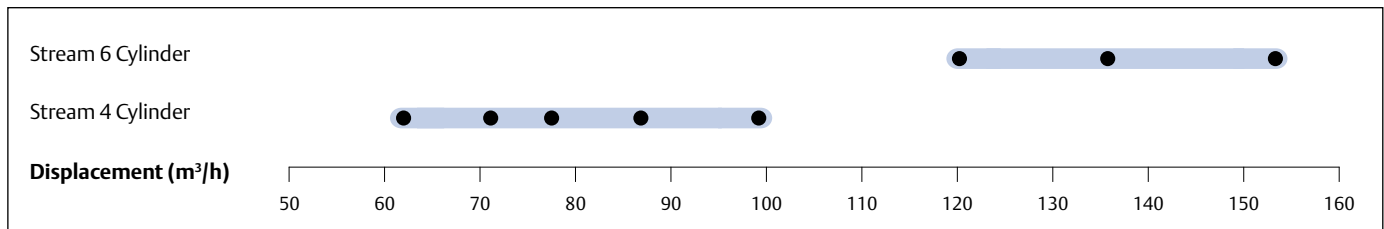
The compressor always runs at constant speed which resolves the challenges related to oil return, mechanical and electrical stress on the system.

All compressors are equipped with CoreSense technology and offer the possibility to diagnose system-related problems faster or even before they occur.



Copeland Stream Digital Compressor

Stream Digital Line-up

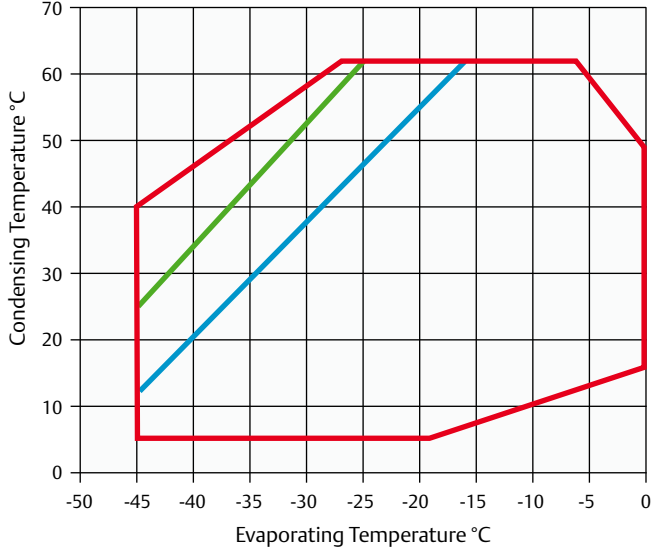


Features and Benefits

- Range of 16 Models from 62 to 153 m³/h
- Multi-refrigerant compressor as it is compatible with R407A/F/C, R448A/ R449A, R404A, R134a, R450A and R513A
- Continuous modulation from 50–100% (4-cylinder) and 33–100% (6-cylinder) ensuring a perfect match of capacity and power to refrigeration load
- Economical and reliable alternative to frequency inverters
- Precise suction pressure control with associated energy savings and stable evaporating temperatures
- Quick and easy integration into refrigeration equipment, similar to any other standard compressor
- Possibility to easily retrofit existing installations with digital cylinder head kit
- No vibrations or mechanical stress on system piping and compressor parts
- Reduced compressor cycling for longer contactor and compressor life
- Emerson CoreSense Diagnostics technology providing advanced protection, diagnostics and preventive maintenance
- CoreSense Protection available as option

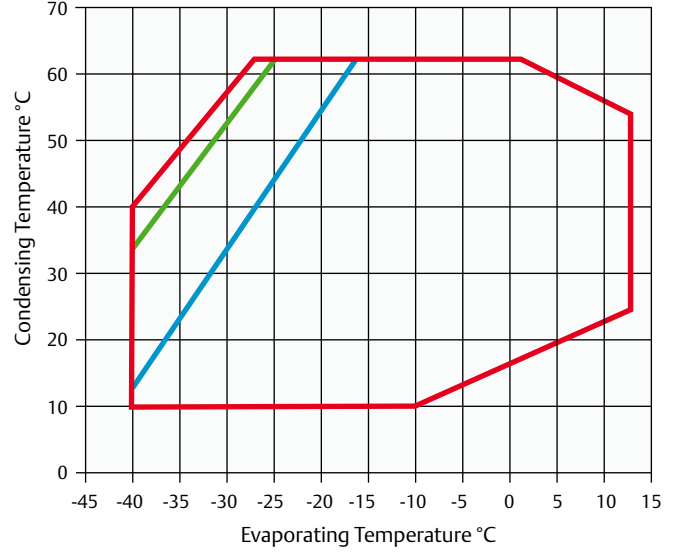
Operating Envelope R448A/R449A

With 4 Cylinder Small Motor - 100% Modulation



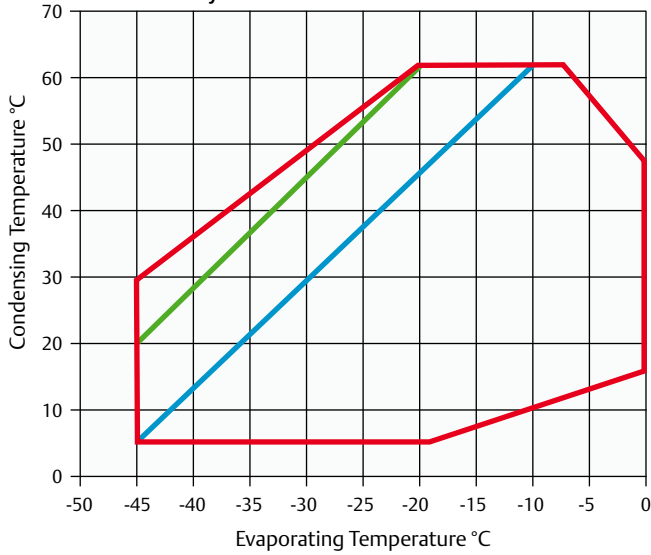
— 20K Suction Superheat — 0°C Suction Gas Return
— 20°C Suction Gas Return

With 6 Cylinder Large Motor - 100% Modulation



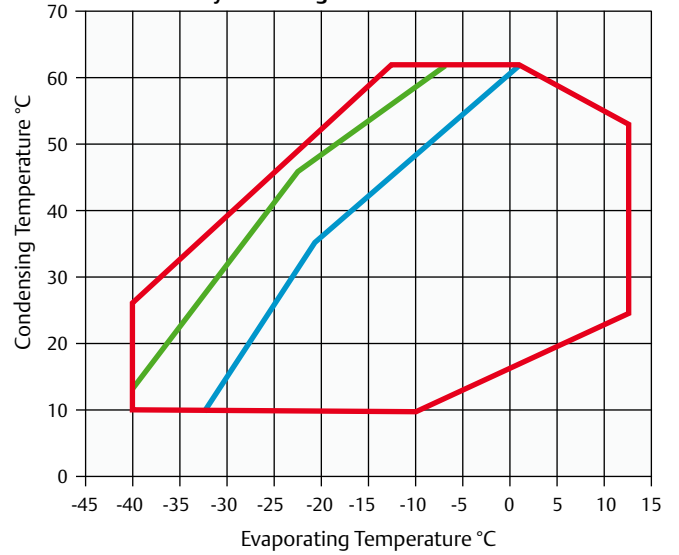
— 20K Suction Superheat — 0°C Suction Gas Return
— 20°C Suction Gas Return

With 4 Cylinder Small Motor - 50% Modulation



— 20K Suction Superheat — 0°C Suction Gas Return
— 20°C Suction Gas Return

With 6 Cylinder Large Motor - 33% Modulation



— 20K Suction Superheat — 0°C Suction Gas Return
— 20°C Suction Gas Return

All other refrigerant envelopes are available as 'Dynamic Envelopes' and can be accessed through Select software.

Technical Overview

| Models | Nominal hp | Displacement (m ³ /h) | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @ 1 m - dB(A) *** |
|----------|------------|----------------------------------|------------------|--------------------------|-----------------|---------------------|-------------------------------|--------------------------|----------------------------------|
| | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| 4MFD-13X | 13 | 61.7 | 3.3 | 638/501/452 | 183 | AWM | 30.8 | 105 | 70 |
| 4MAD-22X | 22 | 61.7 | 3.3 | 638/501/452 | 183 | AWM | 36.3 | 175 | 75 |
| 4MLD-15X | 15 | 71.4 | 3.3 | 638/501/452 | 186 | AWM | 35.4 | 156 | 71 |
| 4MHD-25X | 25 | 71.4 | 3.3 | 657/501/452 | 193 | AWM | 41.6 | 199 | 75 |
| 4MMD-20X | 17 | 78.2 | 3.3 | 657/501/452 | 188 | AWM | 39.0 | 175 | 71 |
| 4MID-30X | 27 | 78.2 | 3.3 | 657/501/452 | 194 | AWM | 46.6 | 221 | 75 |
| 4MTD-22X | 22 | 87.7 | 3.3 | 657/501/452 | 189 | AWM | 44.5 | 175 | 73 |
| 4MJD-33X | 33 | 87.7 | 3.3 | 657/501/452 | 196 | AWM | 52.9 | 221 | 74 |
| 4MUD-25X | 25 | 99.4 | 3.3 | 657/501/452 | 192 | AWM | 51.9 | 199 | 72 |
| 4MKD-35X | 32 | 99.4 | 3.3 | 688/501/452 | 202 | AWM | 61.1 | 255 | 74 |
| 6MMD-30X | 27 | 120.5 | 3.3 | 695/547/450 | 221 | AWM | 59.7 | 255 | 78 |
| 6MID-40X | 35 | 120.5 | 3.3 | 695/547/450 | 225 | AWM | 71.4 | 304 | 78 |
| 6MTD-35X | 32 | 135.0 | 3.3 | 725/547/450 | 227 | AWM | 67.3 | 255 | 77 |
| 6MJD-45X | 40 | 135.0 | 3.3 | 725/547/450 | 229 | AWM | 81.5 | 304 | 79 |
| 6MUD-40X | 40 | 153.0 | 3.3 | 757/547/450 | 231 | AWM | 75.8 | 304 | 78 |
| 6MKD-50X | 50 | 153.0 | 3.3 | 773/547/450 | 236 | AWM | 92.9 | 393 | 80 |

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|-------|-------|------|------|-------|----------|------------------------------|-------|-------|-------|------|------|------|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | Model | -45 | -35 | -30 | -20 | -10 | -5 | | +5 | Model | -45 | -35 | -30 | -20 | -10 |
| 4MFD-13X | | | | 18.3* | 30.9 | 37.9 | | 4MFD-13X | | | | 9.7* | 11.8 | 12.7 | |
| 4MAD-22X | | | | | 32.2 | 39.9 | 59.3 | 4MAD-22X | | | | | 11.7 | 12.6 | 14.0 |
| 4MLD-15X | | | | 22.7* | 37.7 | 46.1 | | 4MLD-15X | | | | 11.4* | 13.8 | 14.9 | |
| 4MHD-25X | | | | | 37.4 | 46.2 | 68.5 | 4MHD-25X | | | | | 13.7 | 14.6 | 15.9 |
| 4MMD-20X | | | | 24.9* | 41.2 | 50.5 | | 4MMD-20X | | | | 12.7* | 15.3 | 16.5 | |
| 4MID-30X | | | | 21.6* | 37.4 | 46.2 | 68.5 | 4MID-30X | | | | 11.4* | 13.7 | 14.6 | 15.9 |
| 4MTD-22X | | | | 26.5* | 44.2 | 54.2 | | 4MTD-22X | | | | 14.5* | 17.5 | 18.9 | |
| 4MJD-33X | | | | | 41.7 | 51.4 | 75.7 | 4MJD-33X | | | | | 15.1 | 16.1 | 17.8 |
| 4MUD-25X | | | | 30.1* | 50.4 | 61.8 | | 4MUD-25X | | | | 16.2* | 19.9 | 21.6 | |
| 4MKD-35X | | | | | 52.1 | 64.1 | 94.2 | 4MKD-35X | | | | | 19.5 | 20.9 | 23.4 |
| 6MMD-30X | | | 20.9* | 39.3 | 61.3 | 75.0 | | 6MMD-30X | | | 14.9* | 19.4 | 23.6 | 25.5 | |
| 6MID-40X | | | | 40.4 | 63.6 | 78.3 | 115.5 | 6MID-40X | | | | 19.3 | 23.3 | 25.0 | 27.6 |
| 6MTD-35X | | | 24.8* | 45.3 | 70.3 | 86.0 | | 6MTD-35X | | | 16.8* | 21.9 | 26.9 | 29.1 | |
| 6MJD-45X | | | | 45.0 | 70.7 | 87.0 | 128.0 | 6MJD-45X | | | | 21.5 | 26.1 | 28.0 | 31.0 |
| 6MUD-40X | | | | 50.4 | 78.7 | 96.7 | | 6MUD-40X | | | | 24.4 | 30.1 | 32.8 | |
| 6MKD-50X | | | | 50.1 | 78.6 | 96.6 | 142.0 | 6MKD-50X | | | | 24.4 | 29.8 | 32.3 | 36.4 |

Suction Gas Return 20°C, Subcooling 0K, 100% loaded

* Suction Superheat 10K, Subcooling 0K

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|-----|-------|------|-------|-------|----------|------------------------------|--------|-----|-------|------|------|------|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | Model | -45 | -35 | -30 | -20 | -10 | -5 | | +5 | Models | -45 | -35 | -30 | -20 | -10 |
| 4MAD-22X | | | | 20.5* | 34.4 | 42.6 | 63.1 | 4MAD-22X | | | | 10.2* | 12.4 | 13.2 | 14.4 |
| 4MFD-13X | | | | 19.5* | 32.2 | 39.5 | | 4MFD-13X | | | | 10.2* | 12.4 | 13.3 | |
| 4MHD-25X | | | | 23.9* | 40.0 | 49.4 | 73.1 | 4MHD-25X | | | | 11.9* | 14.4 | 15.4 | 16.8 |
| 4MLD-15X | | | | 23.9* | 39.4 | 48.4 | | 4MLD-15X | | | | 12.0* | 14.6 | 15.7 | |
| 4MID-30X | | | | 26.6* | 44.0 | 54.2 | 79.9 | 4MID-30X | | | | 13.1* | 15.8 | 17.0 | 18.6 |
| 4MMD-20X | | | | 26.3* | 43.0 | 52.9 | | 4MMD-20X | | | | 13.3* | 16.0 | 17.2 | |
| 4MJD-33X | | | | 29.8* | 49.0 | 60.3 | 88.9 | 4MJD-33X | | | | 14.8* | 17.8 | 19.2 | 21.1 |
| 4MTD-22X | | | | 29.5* | 48.0 | 58.9 | | 4MTD-22X | | | | 15.1* | 18.3 | 19.7 | |
| 4MKD-35X | | | | 33.3* | 54.8 | 67.6 | 100.0 | 4MKD-35X | | | | 16.8* | 20.4 | 22.0 | 24.4 |
| 4MUD-25X | | | | 32.9* | 54.0 | 66.3 | | 4MUD-25X | | | | 17.1* | 21.0 | 22.8 | |
| 6MID-40X | | | | 40.7* | 67.2 | 82.6 | 121.5 | 6MID-40X | | | | 20.2* | 24.4 | 26.2 | 28.9 |
| 6MMD-30X | | | | 40.2* | 65.4 | 79.9 | | 6MMD-30X | | | | 20.4* | 24.8 | 26.7 | |
| 6MJD-45X | | | | 45.3* | 74.5 | 91.6 | 135.0 | 6MJD-45X | | | | 22.9* | 27.6 | 29.7 | 32.8 |
| 6MTD-35X | | | | 45.3* | 73.3 | 89.5 | | 6MTD-35X | | | | 23.1* | 28.0 | 30.3 | |
| 6MKD-50X | | | | 50.7* | 83.7 | 103.0 | 151.5 | 6MKD-50X | | | | 25.8* | 31.3 | 33.7 | 37.5 |
| 6MUD-40X | | | | 47.9* | 81.9 | 100.5 | | 6MUD-40X | | | | 25.9* | 31.7 | 34.4 | |

Suction Gas Return 20°C, Subcooling 0K, 100% loaded

* Suction Superheat 10K, Subcooling 0K

Preliminary data

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-------|-------|------|------|-------|-------|-----------|------------------------------|-------|-------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 4MAD-22X | | 8.1* | 11.7* | 23.4 | 35.6 | 43.1 | 61.3 | 4MAD-22X | | 7.3* | 8.6* | 11.0 | 13.0 | 13.7 | 14.7 |
| 4MFD-13X | | 8.3* | 11.5* | 22.6 | 34.5 | 41.8 | | 4MFD-13X | | 7.4* | 8.7* | 11.0 | 13.1 | 13.9 | |
| 4MHD-25X | | 9.6* | 13.7* | 27.2 | 41.7 | 50.7 | 72.9 | 4MHD-25X | | 8.6* | 10.1* | 13.0 | 15.4 | 16.3 | 17.5 |
| 4MLD-15X | | 10.6* | 14.5* | 27.6 | 41.6 | 50.2 | | 4MLD-15X | | 9.0* | 10.5* | 13.3 | 15.8 | 16.7 | |
| 4MID-30X | | 11.4* | 16.2* | 30.9 | 46.3 | 55.7 | 78.7 | 4MID-30X | | 9.8* | 11.5* | 14.5 | 17.0 | 18.0 | 19.5 |
| 4MMD-20X | | 12.2* | 16.4* | 30.6 | 45.6 | 54.8 | | 4MMD-20X | | 10.1* | 11.6* | 14.6 | 17.1 | 18.2 | |
| 4MJJD-33X | | 12.9* | 17.8* | 34.2 | 51.9 | 62.7 | 89.5 | 4MJJD-33X | | 10.9* | 12.6* | 16.1 | 19.0 | 20.2 | 21.8 |
| 4MTD-22X | | 13.7* | 18.4* | 34.3 | 51.5 | 62.1 | | 4MTD-22X | | 11.5* | 13.2* | 16.6 | 19.5 | 20.7 | |
| 4MKD-35X | | 14.5* | 20.0* | 38.4 | 58.3 | 70.6 | 101.0 | 4MKD-35X | | 12.6* | 14.6* | 18.5 | 22.0 | 23.5 | 25.7 |
| 4MUD-25X | | 14.9* | 20.1* | 38.1 | 57.5 | 69.5 | | 4MUD-25X | | 12.9* | 14.9* | 18.8 | 22.3 | 23.7 | |
| 6MID-40X | | 17.3* | 28.6° | 46.2 | 70.1 | 84.9 | 121.5 | 6MID-40X | | 15.2* | 17.6° | 22.2 | 26.1 | 27.7 | 30.1 |
| 6MMD-30X | | 18.2* | 29.0° | 46.0 | 69.5 | 84.3 | | 6MMD-30X | | 15.7* | 18.1° | 22.5 | 26.3 | 27.8 | |
| 6MJJD-45X | | 19.2* | 32.0° | 51.9 | 78.7 | 95.1 | 135.0 | 6MJJD-45X | | 16.8* | 19.6° | 24.9 | 29.5 | 31.4 | 33.9 |
| 6MTD-35X | | 20.5* | 32.7° | 52.0 | 78.5 | 94.9 | | 6MTD-35X | | 17.5* | 20.1° | 25.3 | 29.7 | 31.5 | |
| 6MKD-50X | | 21.4* | 36.0° | 58.1 | 87.7 | 106.0 | 150.5 | 6MKD-50X | | 19.4* | 22.5° | 28.3 | 33.5 | 35.9 | 39.9 |
| 6MUD-40X | | 22.6* | 36.5° | 58.1 | 88.1 | 107.0 | | 6MUD-40X | | 19.7* | 22.7° | 28.5 | 33.6 | 35.8 | |

Suction Gas Return 20°C, Subcooling 0K, 100% loaded

* Suction Superheat 10K, Subcooling 0K

° Additional Cooling Required

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|------|-------|-------|-------|-------|------|-----------|------------------------------|------|------|-------|-------|-------|------|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 4MAD-22X | | 4.0* | 6.2* | 11.8* | 20.0* | 25.4* | 39.7 | 4MAD-22X | | 3.7* | 4.4* | 5.9* | 7.3* | 7.9* | 8.7 |
| 4MFD-13X | | | | 12.1 | 20.2 | 25.4 | 38.5 | 4MFD-13X | | | | 5.8 | 7.2 | 7.8 | 8.7 |
| 4MHD-25X | | 4.4* | 6.9* | 13.5* | 23.1* | 29.3* | 45.9 | 4MHD-25X | | 4.7* | 5.4* | 7.1* | 8.7* | 9.4* | 10.4 |
| 4MLD-15X | | | | 14.8 | 24.2 | 30.2 | 45.5 | 4MLD-15X | | | | 6.9 | 8.5 | 9.3 | 10.4 |
| 4MID-30X | | 5.2* | 8.0* | 15.1* | 25.4* | 32.2* | 50.2 | 4MID-30X | | 4.9* | 5.8* | 7.6* | 9.4* | 10.3* | 11.4 |
| 4MMD-20X | | | | 16.5 | 26.7 | 33.3 | 49.8 | 4MMD-20X | | | | 7.7 | 9.4 | 10.2 | 11.4 |
| 4MJJD-33X | | 6.0* | 9.1* | 17.0* | 28.5* | 35.9* | 55.9 | 4MJJD-33X | | 5.6* | 6.6* | 8.7* | 10.7* | 11.5* | 12.8 |
| 4MTD-22X | | | | 18.9 | 30.3 | 37.7 | 56.7 | 4MTD-22X | | | | 8.7 | 10.8 | 11.7 | 13.1 |
| 4MKD-35X | | 7.0* | 10.4* | 19.1* | 31.9* | 40.3* | 62.7 | 4MKD-35X | | 7.1* | 7.7* | 9.7* | 12.2* | 13.3* | 14.9 |
| 4MUD-25X | | | | 20.5 | 33.5 | 41.9 | 63.2 | 4MUD-25X | | | | 9.8 | 12.2 | 13.3 | 15.1 |
| 6MID-40X | | | | 22.2* | 37.6* | 47.8* | 75.3 | 6MID-40X | | | | 12.0* | 14.6* | 15.8* | 17.8 |
| 6MMD-30X | | | | 24.9 | 40.3 | 50.2 | 75.3 | 6MMD-30X | | | | 11.7 | 14.6 | 15.8 | 17.7 |
| 6MJJD-45X | | | | 25.6* | 42.7* | 54.0* | 84.5 | 6MJJD-45X | | | | 13.0* | 16.2* | 17.8* | 20.3 |
| 6MTD-35X | | | | 28.2 | 45.5 | 56.5 | 84.4 | 6MTD-35X | | | | 13.3 | 16.5 | 17.9 | 20.0 |
| 6MKD-50X | | | | 26.2* | 45.7* | 58.6* | 93.4 | 6MKD-50X | | | | 15.2* | 18.8* | 20.5* | 23.3 |
| 6MUD-40X | | | | 31.2 | 50.1 | 62.3 | 93.6 | 6MUD-40X | | | | 14.6 | 18.4 | 20.1 | 23.0 |

Suction Gas Return 20°C, Subcooling 0K, 100% loaded

* Suction Superheat 10K, Subcooling 0K

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-------|-------|------|------|------|-------|------------------|------------------------------|-------|-------|------|------|------|------|
| R448A / R449A | Cooling Capacity (kW) | | | | | | | R448A / R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| 4MAD-22X | | 7.7* | 11.1* | 21.0 | 34.0 | 42.2 | 62.9 | 4MAD-22X | | 6.2* | 7.4* | 9.8 | 11.8 | 12.6 | 13.7 |
| 4MFD-13X | 3.7* | 8.1* | 10.9* | 19.4 | 30.1 | 36.9 | | 4MFD-13X | 4.5* | 6.3* | 7.4* | 9.8 | 12.2 | 13.1 | |
| 4MLD-15X | 4.2* | 10.3* | 14.2* | 24.9 | 38.3 | 46.6 | | 4MLD-15X | 5.2* | 7.6* | 8.9* | 11.6 | 14.2 | 15.4 | |
| 4MHD-25X | | 9.3* | 13.3* | 24.5 | 38.7 | 47.6 | 69.6 | 4MHD-25X | | 7.6* | 8.9* | 11.6 | 14.1 | 15.1 | 16.7 |
| 4MMD-20X | 4.9* | 11.6* | 15.8* | 27.5 | 42.0 | 51.0 | | 4MMD-20X | 5.8* | 8.5* | 9.9* | 12.9 | 15.6 | 16.9 | |
| 4MID-30X | | 10.6* | 15.3* | 27.8 | 43.6 | 53.5 | 77.8 | 4MID-30X | | 8.2* | 9.8* | 13.0 | 15.6 | 16.7 | 18.2 |
| 4MJD-33X | | 11.9* | 16.8* | 30.6 | 48.2 | 59.2 | 86.7 | 4MJD-33X | | 9.2* | 11.0* | 14.5 | 17.6 | 18.9 | 20.6 |
| 4MTD-22X | 5.8* | 13.3* | 17.9* | 31.0 | 47.2 | 57.2 | | 4MTD-22X | 6.6* | 9.7* | 11.3* | 14.6 | 17.8 | 19.2 | |
| 4MKD-35X | | 13.6* | 19.0* | 34.4 | 54.3 | 66.8 | 97.9 | 4MKD-35X | | 10.7* | 12.7* | 16.7 | 20.4 | 22.0 | 24.4 |
| 4MUD-25X | 6.4* | 14.2* | 19.2* | 33.9 | 52.7 | 64.4 | | 4MUD-25X | 7.4* | 10.8* | 12.7* | 16.6 | 20.5 | 22.4 | |
| 6MID-40X | | 16.9* | 23.7* | 42.4 | 65.9 | 80.6 | 116.5 | 6MID-40X | | 13.0* | 15.3* | 19.6 | 23.5 | 25.2 | 28.0 |
| 6MMD-30X | 6.5* | 17.4* | 23.8* | 41.4 | 62.6 | 75.5 | | 6MMD-30X | 8.8* | 13.1* | 15.4* | 19.9 | 23.9 | 25.6 | |
| 6MTD-35X | 7.4* | 19.5* | 26.6* | 46.0 | 69.3 | 83.5 | | 6MTD-35X | 9.7* | 14.6* | 17.2* | 22.2 | 26.9 | 29.0 | |
| 6MJD-45X | | 19.3* | 26.9* | 47.6 | 73.7 | 90.1 | 131.0 | 6MJD-45X | | 14.3* | 17.0* | 22.2 | 26.9 | 28.8 | 31.7 |
| 6MKD-50X | | 20.8* | 29.1* | 52.2 | 81.4 | 99.8 | 145.5 | 6MKD-50X | | 16.4* | 19.2* | 25.0 | 30.3 | 32.7 | 36.7 |
| 6MUD-40X | 8.2* | 21.9* | 30.2* | 52.9 | 81.0 | 98.4 | | 6MUD-40X | 10.9* | 16.3* | 19.1* | 24.6 | 29.8 | 32.1 | |

Conditions: Suction Gas Return 20°C / Subcooling 0K, 100% loaded

* Conditions: Suction Superheat 10K, Subcooling 0K

Preliminary data

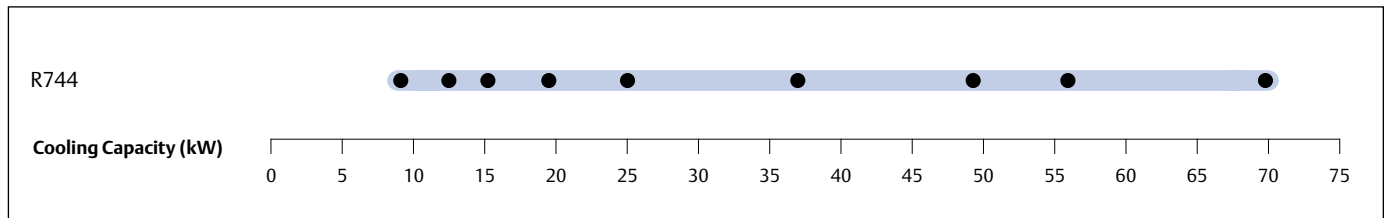
Copeland™ Stream Compressors with CoreSense™ Diagnostics for R744-Transcritical Applications

Stream series of 4 cylinder CO₂ compressors is the ideal solution for R744 booster systems. It is characterized by a design pressure of 135 bar. Refrigerant flow and heat transfer have been optimized for best performance. All compressors are equipped with CoreSense technology and offer the possibility to diagnose system-related problems faster or even before they occur.



*Copeland Stream Compressors for R744 Refrigeration
Designed for Durability and Best-in-Class
Performance in R744-Transcritical Applications*

Stream Compressor Line-up



Conditions: EN12900 R744: Evaporating -10°C, Gas cooler exit: 35°C/ 90 bar, Superheat: 10K

Features and Benefits

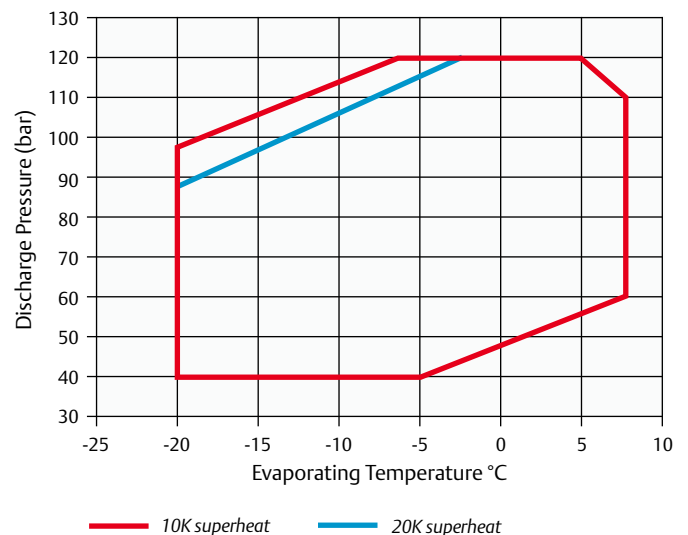
Stream provides for flexibility in pack design and operation:

- Compact dimensions
- Integrated low pressure relief valve
- Discharge temperature protection
- Service valve 360° rotation for ease of piping design
- 2 sight glasses for mounting of oil management control and visual inspection
- One oil port for oil equalization in parallel system
- Oil splasher system ensuring lubrication at constant and variable speed

Designed for durability and performance in R744 applications:

- Low sound, low vibration and large discharge chamber to eliminate pulsation
- High design pressures of 135 bar (high side) and 90 bar (low side)
- Burst pressures in excess of safety factor 3
- Cylinder head and discharge plenum design minimizing heat transfer to suction side
- Stepless capacity modulation via inverter from 25 to 70Hz
- CoreSense™ Diagnostics
- Individual compressor power consumption monitoring
- CoreSense Protection available as option

Operating Envelope R744



Technical Overview

| Model | Nominal hp | Displacement (m ³ /h) | Capacity (kw) | COP | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @ 1 m - dB(A)*** |
|-----------------|------------|----------------------------------|---------------|------|------------------|--------------------------|-----------------|---------------------|-------------------------------|--------------------------|---------------------------------|
| | | | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| 4MTL-05X | 5.0 | 4.6 | 9.3 | 1.6 | 1.5 | 630/425/410 | 123.0 | EWL | 13.3 | 80.5 | 59.0 |
| 4MTL-07X | 7.0 | 6.2 | 12.5 | 1.6 | 1.5 | 630/425/410 | 124.0 | EWL | 17.5 | 81.2 | 62.0 |
| 4MTL-09X | 9.0 | 7.4 | 15.3 | 1.6 | 1.5 | 630/425/410 | 123.0 | EWL | 21.0 | 93.5 | 63.0 |
| 4MTL-12X | 12.0 | 9.5 | 19.2 | 1.7 | 1.8 | 697/444/423 | 170.0 | AWM | 26.5 | 145.0 | 67.4 |
| 4MTL-15X | 15.0 | 12.5 | 25.2 | 1.8 | 1.8 | 697/445/422 | 170.0 | AWM | 34.8 | 156.0 | 71.3 |
| 4MTL-30X | 30.0 | 18.0 | 37.0 | 1.8 | 1.8 | 697/445/422 | 175.0 | AWM | 50.0 | 221.0 | 75.1 |
| 4MTL-35X | 35.0 | 22.7 | 49.0 | 1.79 | 2.5 | 842/468/467 | 257.9 | AWM | 67.1 | 304 | 75.1 |
| 4MTL-40X | 40.0 | 26.6 | 56.0 | 1.84 | 2.5 | 842/468/467 | 264.0 | AWM | 72.6 | 306 | 75.1 |
| 4MTL-50X | 50.0 | 32.0 | 70.0 | 1.81 | 2.5 | 842/468/467 | 269.4 | AWM | 90.3 | 393 | 75.1 |

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| | | | Cooling Capacity (kW) | | | | | Power Input (kW) | | | | | |
|----------|------------------|----------------|---------------------------------------|------|------|------|------|---------------------------------------|------|------|------|------|------|
| Model | Temperature (°C) | Pressure (bar) | Evaporating Temperature (°C) | | | | | Evaporating Temperature (°C) | | | | | |
| | | | -20 | -15 | -10 | -5 | 0 | -20 | -15 | -10 | -5 | 0 | |
| | | | Equivalent evaporation pressure (bar) | | | | | Equivalent evaporation pressure (bar) | | | | | |
| | | | 19.7 | 22.9 | 26.5 | 30.5 | 34.9 | 19.7 | 22.9 | 26.5 | 30.5 | 34.9 | |
| 4MTL-05X | Condensing | 10 | 45 | 10.9 | 13.4 | 16.3 | 19.5 | | 3.1 | 3.0 | 2.8 | 2.5 | |
| | | 15 | 50 | 9.8 | 12.1 | 14.8 | 17.8 | 21.2 | 3.4 | 3.4 | 3.2 | 3.0 | 2.6 |
| | | 20 | 57 | 8.8 | 10.8 | 13.2 | 16.0 | 19.1 | 3.8 | 3.8 | 3.7 | 3.5 | 3.2 |
| | | 25 | 64 | 7.6 | 9.4 | 11.5 | 14.0 | 16.7 | 4.1 | 4.2 | 4.2 | 4.0 | 3.8 |
| | | 30 | 75 | 6.0 | 7.4 | 9.2 | 11.2 | 13.4 | 4.5 | 4.6 | 4.6 | 4.6 | 4.4 |
| | Cool gas | 35 | 90 | | 7.0 | 8.7 | 10.7 | 12.9 | | 5.4 | 5.6 | 5.7 | 5.7 |
| | | 40 | 100 | | | 7.5 | 9.3 | 11.3 | | | 6.0 | 6.2 | 6.3 |
| | | 40 | 110 | | | | 9.6 | 11.7 | | | | 6.6 | 6.8 |
| 4MTL-07X | Condensing | 10 | 45 | 14.9 | 18.2 | 22.1 | 26.5 | | 3.9 | 3.7 | 3.4 | 3.0 | |
| | | 15 | 50 | 13.5 | 16.5 | 20.1 | 24.1 | 28.7 | 4.3 | 4.3 | 4.0 | 3.7 | 3.2 |
| | | 20 | 57 | 12.0 | 14.7 | 17.9 | 21.7 | 25.8 | 4.8 | 4.8 | 4.7 | 4.4 | 4.0 |
| | | 25 | 64 | 10.4 | 12.8 | 15.6 | 18.9 | 22.5 | 5.3 | 5.4 | 5.3 | 5.2 | 4.9 |
| | | 30 | 75 | 8.2 | 10.2 | 12.5 | 15.1 | 18.1 | 5.8 | 6.0 | 6.0 | 5.9 | 5.7 |
| | Cool gas | 35 | 90 | | 9.5 | 11.8 | 14.5 | 17.4 | | 7.0 | 7.3 | 7.4 | 7.5 |
| | | 40 | 100 | | | 10.2 | 12.5 | 15.1 | | | 7.9 | 8.2 | 8.3 |
| | | 40 | 110 | | | | 12.9 | 15.6 | | | | 8.8 | 9.0 |
| 4MTL-09X | Condensing | 10 | 45 | 18.3 | 22.3 | 27.0 | 32.4 | | 4.6 | 4.5 | 4.1 | 3.6 | |
| | | 15 | 50 | 16.6 | 20.3 | 24.6 | 29.5 | 35.0 | 5.2 | 5.1 | 4.9 | 4.5 | 3.9 |
| | | 20 | 57 | 14.8 | 18.2 | 22.1 | 26.5 | 31.5 | 5.8 | 5.8 | 5.6 | 5.3 | 4.9 |
| | | 25 | 64 | 12.9 | 15.8 | 19.3 | 23.2 | 27.6 | 6.4 | 6.5 | 6.4 | 6.2 | 5.9 |
| | | 30 | 75 | 10.3 | 12.6 | 15.4 | 18.6 | 22.1 | 6.9 | 7.1 | 7.2 | 7.1 | 6.9 |
| | Cool gas | 35 | 90 | | 11.9 | 14.7 | 17.8 | 21.4 | | 8.5 | 8.8 | 9.0 | 9.0 |
| | | 40 | 100 | | | 12.7 | 15.5 | 18.6 | | | 9.5 | 9.8 | 10.0 |
| | | 40 | 110 | | | | 16.0 | 19.3 | | | | 10.6 | 10.9 |
| 4MTL-12X | Condensing | 10 | 45 | 24.1 | 29.1 | 35.0 | 41.7 | | 6.1 | 5.9 | 5.5 | 4.9 | |
| | | 15 | 50 | 21.8 | 26.4 | 31.9 | 38.1 | 45.0 | 6.8 | 6.8 | 6.5 | 6.0 | 5.3 |
| | | 20 | 57 | 19.5 | 23.7 | 28.6 | 34.3 | 40.6 | 7.6 | 7.6 | 7.4 | 7.0 | 6.5 |
| | | 25 | 64 | 16.9 | 20.6 | 25.0 | 30.0 | 35.6 | 8.3 | 8.4 | 8.4 | 8.2 | 7.7 |
| | | 30 | 75 | 13.5 | 16.4 | 20.0 | 24.1 | 28.6 | 9.0 | 9.3 | 9.4 | 9.3 | 9.0 |
| | Cool gas | 35 | 90 | 12.8 | 15.7 | 19.3 | 23.3 | 27.9 | 10.2 | 10.9 | 11.3 | 11.6 | 11.6 |
| | | 40 | 100 | | 13.6 | 16.8 | 20.4 | 24.4 | | 11.5 | 12.2 | 12.6 | 12.8 |
| | | 40 | 110 | | | 17.4 | 21.2 | 25.5 | | | 12.8 | 13.5 | 13.9 |
| 4MTL-15X | Condensing | 10 | 45 | 31.2 | 37.9 | 45.6 | 54.4 | | 7.9 | 7.6 | 7.1 | 6.3 | |
| | | 15 | 50 | 28.3 | 34.5 | 41.6 | 49.7 | 58.7 | 8.8 | 8.7 | 8.4 | 7.8 | 6.9 |
| | | 20 | 57 | 25.3 | 30.9 | 37.4 | 44.8 | 53.0 | 9.7 | 9.7 | 9.6 | 9.2 | 8.6 |
| | | 25 | 64 | 22.0 | 26.9 | 32.7 | 39.3 | 46.6 | 10.5 | 10.8 | 10.8 | 10.7 | 10.2 |
| | | 30 | 75 | 17.5 | 21.5 | 26.2 | 31.6 | 37.5 | 11.4 | 11.8 | 12.0 | 12.1 | 11.8 |
| | Cool gas | 35 | 90 | 16.5 | 20.5 | 25.2 | 30.5 | 36.5 | 13.1 | 13.8 | 14.4 | 14.8 | 15.0 |
| | | 40 | 100 | | 17.7 | 21.8 | 26.6 | 31.8 | | 14.8 | 15.5 | 16.1 | 16.4 |
| | | 40 | 110 | | | 22.5 | 27.5 | 33.1 | | | 16.6 | 17.3 | 17.9 |
| 4MTL-30X | Condensing | 10 | 45 | 45.6 | 54.9 | 65.9 | 78.3 | | 11.4 | 11.0 | 10.4 | 9.3 | |
| | | 15 | 50 | 41.5 | 50.2 | 60.3 | 71.7 | 84.4 | 12.6 | 12.5 | 12.1 | 11.4 | 10.2 |
| | | 20 | 57 | 37.2 | 45.1 | 54.3 | 64.7 | 76.3 | 13.9 | 14.0 | 13.9 | 13.4 | 12.5 |
| | | 25 | 64 | 32.4 | 39.4 | 47.6 | 56.9 | 67.2 | 15.2 | 15.5 | 15.6 | 15.4 | 14.8 |
| | | 30 | 75 | 25.9 | 31.6 | 38.3 | 45.8 | 54.2 | 16.4 | 16.9 | 17.3 | 17.4 | 17.1 |
| | Cool gas | 35 | 90 | 24.7 | 30.3 | 37.0 | 44.6 | 53.1 | 18.8 | 19.8 | 20.6 | 21.2 | 21.5 |
| | | 40 | 100 | | 26.3 | 32.2 | 39.0 | 46.5 | | 21.2 | 22.2 | 23.0 | 23.6 |
| | | 40 | 110 | | | 33.4 | 40.5 | 48.5 | | | 23.8 | 24.8 | 25.6 |

Suction Superheat 10K / Subcooling 0K
Preliminary data

Capacity Data

| | | | Cooling Capacity (kW) | | | | | Power Input (kW) | | | | | |
|----------|------------------|----------------|---------------------------------------|------|------|-------|-------|---------------------------------------|------|------|------|------|------|
| Model | Temperature (°C) | Pressure (bar) | Evaporating Temperature (°C) | | | | | Evaporating Temperature (°C) | | | | | |
| | | | -20 | -15 | -10 | -5 | 0 | -20 | -15 | -10 | -5 | 0 | |
| | | | Equivalent evaporation pressure (bar) | | | | | Equivalent evaporation pressure (bar) | | | | | |
| | | | 19.7 | 22.9 | 26.5 | 30.5 | 34.9 | 19.7 | 22.9 | 26.5 | 30.5 | 34.9 | |
| 4MTL-35X | Condensing | 10 | 45 | 57.9 | 69.9 | 84.2 | 100.5 | | 14.3 | 13.7 | 12.6 | 11.2 | |
| | | 15 | 50 | 52.6 | 63.7 | 76.8 | 91.9 | 109.0 | 15.9 | 15.6 | 14.8 | 13.6 | 12.0 |
| | | 20 | 57 | 47.1 | 57.1 | 69.1 | 82.8 | 98.2 | 17.6 | 17.6 | 17.1 | 16.2 | 14.9 |
| | | 25 | 64 | 41.1 | 49.9 | 60.5 | 72.6 | 86.2 | 19.3 | 19.6 | 19.4 | 18.8 | 17.8 |
| | | 30 | 75 | 32.8 | 40.0 | 48.5 | 58.4 | 69.4 | 20.9 | 21.5 | 21.7 | 21.5 | 20.8 |
| | Cool gas | 35 | 90 | 31.5 | 38.4 | 46.9 | 56.7 | 67.7 | 23.6 | 25.1 | 26.1 | 26.7 | 26.9 |
| | | 40 | 100 | | 33.5 | 40.9 | 49.5 | 59.3 | | 26.5 | 28.0 | 29.1 | 29.7 |
| | | 40 | 110 | | | 42.5 | 51.6 | 61.9 | | | 29.5 | 31.1 | 32.1 |
| 4MTL-40X | Condensing | 10 | 45 | 69.0 | 83.1 | 99.7 | 118.5 | | 16.5 | 15.9 | 14.7 | 13.0 | |
| | | 15 | 50 | 62.8 | 75.8 | 91.1 | 108.5 | 128.0 | 18.5 | 18.2 | 17.4 | 16.1 | 14.1 |
| | | 20 | 57 | 56.4 | 68.1 | 81.9 | 97.9 | 115.5 | 20.4 | 20.4 | 20.0 | 19.1 | 17.6 |
| | | 25 | 64 | 49.3 | 59.6 | 71.8 | 85.9 | 101.5 | 22.4 | 22.7 | 22.6 | 22.1 | 21.1 |
| | | 30 | 75 | 39.5 | 47.8 | 57.7 | 69.1 | 81.9 | 24.3 | 25.0 | 25.3 | 25.2 | 24.6 |
| | Cool gas | 35 | 90 | 38.1 | 46.2 | 55.9 | 67.2 | 79.9 | 28.2 | 29.4 | 30.4 | 31.1 | 31.4 |
| | | 40 | 100 | | 40.3 | 48.8 | 58.8 | 70.0 | | 31.8 | 33.0 | 34.1 | 34.8 |
| | | 40 | 110 | | | 50.8 | 61.2 | 73.1 | | | 35.6 | 36.9 | 37.9 |
| 4MTL-50X | Condensing | 10 | 45 | 82.8 | 99.7 | 119.5 | 142.0 | | 20.2 | 19.6 | 18.4 | 16.7 | |
| | | 15 | 50 | 75.6 | 91.1 | 109.5 | 130.5 | 153.5 | 22.6 | 22.3 | 21.5 | 20.0 | 18.0 |
| | | 20 | 57 | 67.9 | 82.0 | 98.6 | 117.5 | 139.0 | 24.9 | 25.1 | 24.6 | 23.5 | 21.9 |
| | | 25 | 64 | 59.5 | 71.9 | 86.5 | 103.5 | 122.0 | 27.3 | 27.8 | 27.8 | 27.2 | 25.9 |
| | | 30 | 75 | 47.7 | 57.8 | 69.7 | 83.4 | 98.6 | 29.6 | 30.6 | 31.1 | 30.9 | 30.1 |
| | Cool gas | 35 | 90 | 46.2 | 56.0 | 67.8 | 81.4 | 96.7 | 33.9 | 35.9 | 37.4 | 38.3 | 38.6 |
| | | 40 | 100 | | 49.0 | 59.3 | 71.3 | 84.8 | | 38.2 | 40.3 | 41.8 | 42.6 |
| | | 40 | 110 | | | 61.9 | 74.5 | 88.8 | | | 42.6 | 44.7 | 46.2 |

Copeland™ Stream Compressors with CoreSense™ Diagnostics for R744-Subcritical Applications Requiring High Standstill Pressures (90Bar)

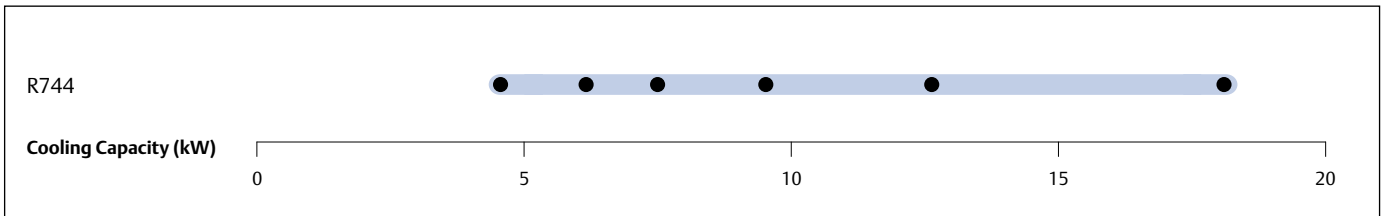
Stream series of 4 cylinder CO₂ compressors is the ideal solution for R744 low temperature cascade and booster systems requiring high standstill pressure of up to 90 bar suction. The use of transcritical compressors in medium / transcritical side as well as on the low temperature / subcritical side ensures that in case of power outage, the refrigeration system features full resilience and no operation disruption.

Stream is characterized by a design pressure of 135 bar. Refrigerant flow and heat transfer have been optimized for best performance. All compressors are equipped with CoreSense technology and offer the possibility to diagnose system-related problems faster or even before they occur.



Copeland Stream Compressors for Low Temperature Applications with R744 Designed for Durability and Best-in-class Performance in R744 Subcritical Applications

Stream Compressor Line-up



Conditions: EN12900 R744: Evaporating -35°C, Condensing -5°C, Superheat 10K, Subcooling 0K

Features and Benefits

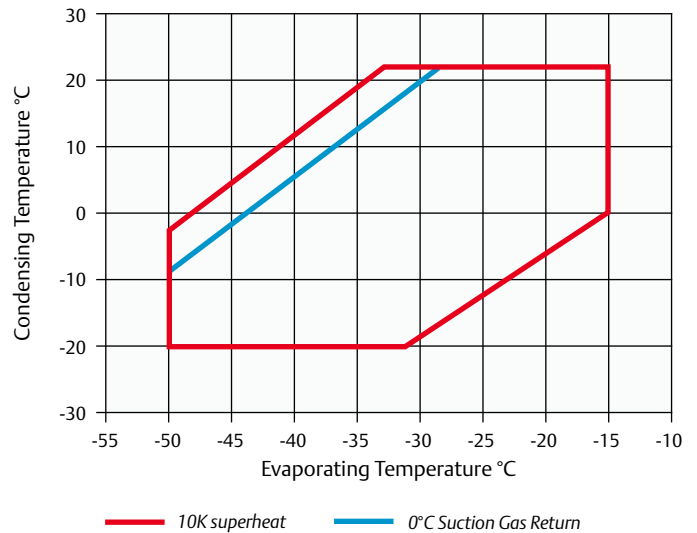
Stream provides for flexibility in pack design and operation:

- Compressor Max. Pressures (Suction/Discharge): 90 bar / 135 bar
- Compact dimensions
- Integrated low pressure relief valve
- Discharge temperature protection
- Service valve 360° rotation for ease of piping design
- 2 sight glasses for mounting of oil management control and visual inspection
- One oil port for oil equalization in parallel system
- Oil splasher system ensuring lubrication at constant and variable speed

Designed for durability and performance in R744 applications:

- Low sound, low vibration and large discharge chamber to eliminate pulsation
- Optimized motor selection for low temperature running conditions
- Burst pressures in excess of safety factor 3
- Cylinder head and discharge plenum design minimizing heat transfer to suction side
- Stepless capacity modulation via inverter from 25 to 70Hz
- CoreSense Diagnostics for advanced protection, diagnostics, communication
- Individual compressor power consumption monitoring
- CoreSense Protection available as option

Operating Envelope R744



Technical Overview

| R744 | Nominal hp | Displacement (m ³ /h) | Capacity (kw) | COP | Oil Quantity (l) | Length/Width/Height (mm) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @1 m - dB(A)*** |
|----------|------------|----------------------------------|---------------|-----|------------------|--------------------------|-----------------|---------------------|-------------------------------|--------------------------|--------------------------------|
| | | | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| 4MSL-03X | 3.0 | 4.6 | 7.2 | 3.2 | 1.5 | 697/444/423 | | EWL | | | 76.0 |
| 4MSL-04X | 4.0 | 6.2 | 9.9 | 3.6 | 1.5 | 697/444/423 | | EWL | | | 76.0 |
| 4MSL-06X | 5.0 | 7.4 | 12.4 | 3.7 | 1.5 | 697/444/423 | | EWL | | | 76.0 |
| 4MSL-08X | 8.0 | 9.5 | 15.9 | 3.6 | 1.8 | 697/444/423 | 170.0 | AWM | 13.9 | 87.4 | 76.0 |
| 4MSL-12X | 12.0 | 12.5 | 21.0 | 3.7 | 1.8 | 697/445/422 | 170.0 | AWM | 18.7 | 145.0 | 76.0 |
| 4MSL-15X | 15.0 | 17.9 | 31.0 | 3.8 | 1.8 | 697/445/422 | 170.0 | AWM | 25.7 | 156.0 | 76.0 |

** 3 Ph: 380-420V/ 50Hz

*** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

| R744 | Cooling Capacity (kW) | | | | R744 | Power Input (kW) | | | |
|----------|------------------------------|-------|-------|-------|----------|------------------------------|------|------|------|
| | Condensing Temperature -10°C | | | | | Condensing Temperature -10°C | | | |
| | Evaporating Temperature (°C) | | | | | Evaporating Temperature (°C) | | | |
| Model | -45 | -40 | -35 | -30 | Model | -45 | -40 | -35 | -30 |
| 4MSL-03X | 4.8* | 6.3* | 8.2* | 10.5* | 4MSL-03X | 1.9* | 2.0* | 2.0* | 1.9* |
| 4MSL-04X | 6.7* | 8.8* | 11.3* | 14.2* | 4MSL-04X | 2.5* | 2.6* | 2.5* | 2.4* |
| 4MSL-06X | 8.0* | 10.5* | 13.5* | 16.9* | 4MSL-06X | 2.9* | 3.0* | 2.9* | 2.7* |
| 4MSL-08X | 10.3* | 13.5* | 17.2* | 21.5* | 4MSL-08X | 3.8* | 4.0* | 3.9* | 3.7* |
| 4MSL-12X | 13.8* | 17.9* | 22.7* | 28.4* | 4MSL-12X | 4.9* | 5.0* | 5.0* | 4.8* |
| 4MSL-15X | 20.3* | 26.3* | 33.4* | 41.5* | 4MSL-15X | 7.0* | 7.2* | 7.2* | 7.0* |

Conditions: Suction Gas Return 20°C / Subcooling 0K

* Conditions: Suction Superheat 10K, Subcooling 0K

Preliminary data

Service Compressors for 4 and 6 cylinder S-Series and Discus Reciprocating Compressors

With the successful launch of Stream with CoreSense™ Diagnostics 4M and 6M compressors, Emerson has decided to consolidate product families to allow our customers to reduce product proliferation and cost of operation. As a result, Emerson will in the future only produce the most efficient semi-hermetic reciprocating compressor platforms out of its current portfolio.

With a large number of 4 and 6 cylinder S-Series and Discus compressors operating in applications around the world, Emerson Climate Technologies recognizes the importance of providing worry-free drop-in replacement models. The range of service compressors offers easy replacement (“like for like”) without the need of system adaptations.

More detailed information is available with our “Guidelines for replacement of S-Series and Discus compressors” available from your Emerson Climate sales office or as download under www.emersonclimate.eu

For your product selection in case of replacement needs, please refer to the cross-reference table below. In addition, our local Application Engineering and Sales team is ready to support you.



*Service Compressor**

Discus Replacements

| | | |
|-----------|---|-----------|
| D4DF-100X | → | 4MFS1-13X |
| D4DA-100X | → | 4MFS1-13X |
| D4DA-200X | → | 4MAS1-22X |
| D4DL-150X | → | 4MLS1-15X |
| D4DH-150X | → | 4MLS1-15X |
| D4DH-250X | → | 4MHS1-25X |
| D4DT-220X | → | 4MMS1-20X |
| D4DJ-200X | → | 4MMS1-20X |
| D4DJ-300X | → | 4MIS1-30X |
| D6DL-270X | → | 6MLS1-27X |
| D6DH-200X | → | 6MLS1-27X |
| D6DH-350X | → | 6MHS1-35X |
| D6DT-320X | → | 6MMS1-30X |
| D6DJ-300X | → | 6MMS1-30X |
| D6DJ-400X | → | 6MIS1-40X |

*Valves are available as optional accessories.

Refrigeration Units

Refrigeration Units

Emerson Climate Technologies offers the broadest and most reliable refrigeration unit product line-up. Leveraging the latest compressor technology, each platform provides you the option to select the refrigerant, capacity and application temperature combinations that meet your requirements. A huge variety of Copeland™ indoor and outdoor refrigeration units offer the right solution for applications in food retail and food service, commercial and industrial refrigeration.

Copeland EazyCool™ Scroll Outdoor Refrigeration Units are designed and fully equipped for a quick and easy installation and ideal to integrate into urban environments. The latest scroll technology is combined with high-quality Alco components and covered by a weatherproof housing in a unique design.

The Copeland EazyCool Refrigeration Unit ZX Series offers the highest energy efficiency available in a standard unit to lower operators' utility bills. Ranging in size from 2 to 7.5 hp, the ZX units are perfectly suited for typical food service and retail applications. The key benefits of compactness, silence and efficiency in the standard models will be enhanced by the capability of continuous capacity modulation of the ZX Digital models. This makes ZX Digital refrigeration units the perfect fit for applications with wide load variations.

Copeland Scroll™ indoor refrigeration units are equipped with the latest refrigeration scroll compressors and constitute the widest range of their kind. The modular line concept offers base units which can be adapted to the target application by various options including weather housings and fan speed controls.

Copeland Scroll Digital Receiver Units HLR are an innovative offering for food service and retail businesses. Their compact design and the power of Digital Scroll continuous capacity modulation enable optimized environmental integration with highest system efficiency.

Semi-hermetic refrigeration units: robust, reliable and efficient air-cooled refrigeration unit platforms featuring semi-hermetic reciprocating compressor technology are for use in high-, medium- and low-temperature applications. Emerson Climate Technologies has expanded its semi-hermetic product range by the innovative Stream Indoor Refrigeration Units. Therewith we can offer a product range from 0.8 - 40 hp with dedicated refrigerant approvals for R407A/F, R448A/ R449A, R404A, R134a, R450A and R513A.

Copeland EazyCool™ Outdoor Refrigeration Units with Scroll Compressors

Copeland™ air-cooled outdoor refrigeration units for medium-temperature and low-temperature applications.

Emerson Climate Technologies has developed this series of refrigeration units especially for outdoor use. The latest Scroll technology is combined with high-quality components and covered by an absolutely weather-resistant synthetic resin housing in a unique design.

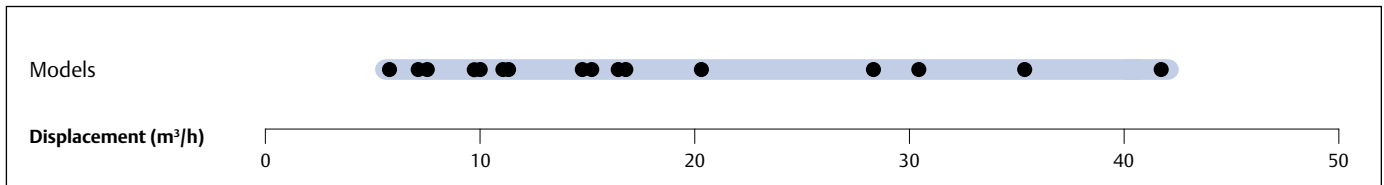
The EazyCool line-up offers state-of-the-art technology and models featuring stepless capacity control, vapor injection and fan speed control. This makes it the first choice for target applications in food retail and food service:

- Proximity and convenience stores
- Mini markets and supermarkets
- Bars, restaurants and kitchens
- Beer cellars and beverage coolers

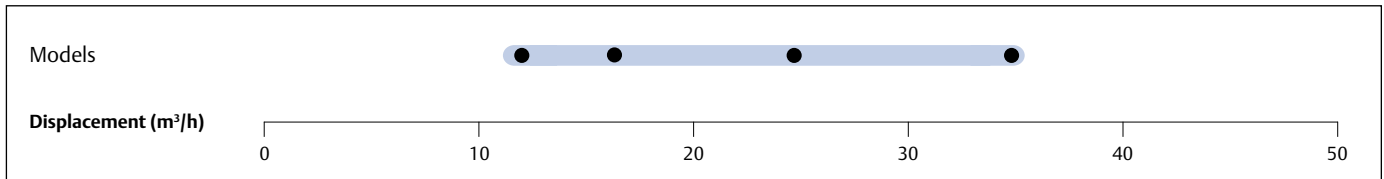


Copeland EazyCool Outdoor Refrigeration Units with Scroll Compressors

EazyCool OLQ/OMQ Line-up



EazyCool Digital Line-up



Features and Benefits

- Standard equipment: Scroll compressor(s), crankcase heater(s), condenser with thermally protected fan(s), fan speed control, HP and LP switch, liquid receiver, filter drier & sight glass, weather-resistant housing
- Suitable for multiple refrigerants: R407A/F, R448A/ R449A, R404A, R134a, R450A and R513A.
- Wide range of quality accessories
- Excellent efficiency
- Filter drier, liquid sight glass and solenoid valve in liquid line

Maximum Allowable Pressure (PS)

- Low Side PS 22.5 bar (g)
- High Side PS 28 bar (g)

Technical Overview

| Models | Displacement (m ³ /h) | Receiver Capacity (l) | Number of fans | Total Fan Motor Power (W) | Suction Line Diameter (inch) | Liquid Line Diameter (inch) | Width/Depth/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @10m - dB(A)*** |
|--|----------------------------------|-----------------------|----------------|---------------------------|------------------------------|-----------------------------|-------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|--------------------------------|
| | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-56 | 11.5 | 17.7 | 2 | 290 | 1 3/8 | 5/8 | 2100/670/950 | 224.0 | | TWD | | 15 | | 99 | 44.0 |
| OMTQ-60 | 13.1 | 17.7 | 2 | 290 | 1 3/8 | 5/8 | 2100/670/950 | 209.0 | | TFD | | 2x10 | | 2x49 | 42.0 |
| OMTQ-76 | 15.1 | 17.7 | 2 | 290 | 1 3/8 | 5/8 | 2100/670/950 | 211.0 | | TFD | | 2x13 | | 2x66 | 43.0 |
| OMQ-75 | 15.3 | 17.7 | 2 | 290 | 1 3/8 | 5/8 | 2100/670/950 | 224.0 | | TWD | | 22 | | 127 | 44.0 |
| OMTQ-90 | 19.9 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 225.0 | | TFD | | 2x13 | | 2x74 | 45.0 |
| OMQ-92 | 20.5 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 246.0 | | TWD | | 25 | | 167 | 46.0 |
| OMQ-110 | 23.7 | 17.7 | 2 | 550 | 1 5/8 | 5/8 | 2100/670/950 | 255.0 | | TWD | | 29 | | 198 | 47.0 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | 6.2 | 8.1 | 1 | 145 | 7/8 | 1/2 | 1050/630/720 | 98.0 | | TFD | | 8 | | 52 | 36.0 |
| OMQ-45D | 9.4 | 8.1 | 1 | 145 | 7/8 | 1/2 | 1250/642/720 | 118.0 | | TFD | | 12 | | 74 | 39.0 |
| OMTQ-60D | 13.2 | 17.7 | 2 | 290 | 1 3/8 | 5/8 | 2100/670/950 | 209.0 | | TFD | | 8+10 | | | 42.0 |
| OMTQ-90D | 20.0 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 225.0 | | TFD | | 12+13 | | | 45.0 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| OLQ-24V | 7.2 | 17.7 | 2 | 290 | 1 3/8 | 5/8 | 2100/670/950 | 228.0 | | TWD | | 16 | | 99 | 44.0 |
| OLTQ-26V | 8.2 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 221.0 | | TFD | | 2x9 | | 2x52 | 42.0 |
| OLQ-33V | 9.8 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 228.0 | | TWD | | 21 | | 127 | 44.0 |
| OLQ-40V | 11.8 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 238.0 | | TWD | | 27 | | 167 | 46.0 |
| OLTQ-36V | 12.1 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 235.0 | | TFD | | 2x14 | | 2x74 | 45.0 |
| OLQ-48V | 14.7 | 17.7 | 2 | 550 | 1 5/8 | 5/8 | 2100/670/950 | 259.0 | | TWD | | 31 | | 198 | 47.0 |
| Digital Low Temperature Models | | | | | | | | | | | | | | | |
| OLQ-18DV | 6.1 | 17.7 | 2 | 290 | 7/8 | 5/8 | 2100/670/950 | 200.0 | | TFD | | 14 | | 74 | 39.0 |
| OLTQ-36DV | 12.1 | 17.7 | 2 | 550 | 1 3/8 | 5/8 | 2100/670/950 | 235.0 | | TFD | | 14+14 | | 2x74 | 45.0 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 10m: sound pressure level at 10m distance from the compressor, free field condition

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-------|-------|-------|-------|-------|------|-----------|------------------------------|------|------|-------|-------|-------|------|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-56 | | | | 7.2* | 11.1 | 13.2 | 17.8 | OMQ-56 | | | | 5.5* | 6.1 | 6.4 | 7.0 |
| OMQ-75 | | | | 10.1* | 14.6* | 17.6 | 23.2 | OMQ-75 | | | | 7.2* | 8.3* | 9.1 | 10.3 |
| OMQ-92 | | | | 13.1* | 19.8 | 23.3 | 31.3 | OMQ-92 | | | | 9.0* | 10.3 | 10.9 | 12.3 |
| OMQ-110 | | | | 15.2* | 22.3* | 27.0 | 36.1 | OMQ-110 | | | | 11.2* | 12.8* | 13.8 | 15.6 |
| OMTQ-60 | | | | 8.3* | 13.0 | 15.5 | 21.0 | OMTQ-60 | | | | 6.1* | 6.8 | 7.2 | 8.2 |
| OMTQ-76 | | | | 9.8* | 15.2 | 17.9 | | OMTQ-76 | | | | 7.8* | 8.8 | 9.4 | |
| OMTQ-90 | | | | 12.4* | 19.0 | 22.5 | 30.6 | OMTQ-90 | | | | 8.0* | 9.3 | 9.9 | 11.1 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| OLQ-24V | | 5.8 | 7.2 | 10.4 | 14.3 | 16.4 | 21.0 | OLQ-24V | | 4.9 | 5.3 | 6.3 | 8.0 | 9.2 | 13.0 |
| OLQ-33V | | 7.7 | 9.8 | 14.5 | 18.7 | 20.1 | 20.4 | OLQ-33V | | 6.4 | 6.8 | 7.8 | 9.3 | 10.5 | 13.9 |
| OLQ-40V | | 10.2 | 12.6 | 18.3 | 24.7 | 28.0 | 34.5 | OLQ-40V | | 7.6 | 8.2 | 9.8 | 12.2 | 13.8 | 18.1 |
| OLTQ-36V | | 10.2* | 12.2* | 17.4* | 25.2* | 30.6* | | OLTQ-36V | | 8.0* | 8.3* | 9.1* | 10.7* | 12.2* | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | | 5.9* | 7.0* | | OMQ-30D | | | | | 3.8* | 4.1* | |
| OMQ-45D | | | | | 8.6* | 10.6 | | OMQ-45D | | | | | 4.8* | 5.2 | |
| OMTQ-60D | | | | 8.3* | 13.0 | 15.5 | 20.9 | OMTQ-60D | | | | 6.2* | 6.9 | 7.3 | 8.3 |
| OMTQ-90D | | | | 12.6 | 18.7 | 22.3 | 30.5 | OMTQ-90D | | | | 8.7 | 9.5 | 10.0 | 11.0 |
| Digital Low Temperature Models | | | | | | | | | | | | | | | |
| OLTQ-36DV | | 10.0* | 12.1* | 17.3* | 25.4* | 30.8* | | OLTQ-36DV | | 7.8* | 8.1* | 9.0* | 10.8* | 12.3* | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|-----|-------|-------|-------|------|----------|------------------------------|-----|-----|------|-------|-------|------|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| OMTQ-60 | | | | | 12.4* | 15.2 | | OMTQ-60 | | | | | 7.3* | 7.7 | |
| OMTQ-76 | | | | | 14.3* | 17.2* | | OMTQ-76 | | | | | 9.7* | 10.3* | |
| OMTQ-90 | | | | 11.7* | 18.6* | 22.9 | 31.8 | OMTQ-90 | | | | 9.1* | 10.3* | 10.9 | 12.2 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | | 6.1* | 7.2* | | OMQ-30D | | | | | 3.5* | 3.9* | |
| OMQ-45D | | | | | 9.1* | 11.1 | | OMQ-45D | | | | | 5.0* | 5.5 | |
| OMTQ-60D | | | | | 12.6* | 15.4 | | OMTQ-60D | | | | | 7.0* | 7.5 | |
| OMTQ-90D | | | | 11.8* | 18.9* | 23.2 | 31.7 | OMTQ-90D | | | | 8.6* | 10.0* | 10.8 | 12.4 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|------|-------|-------|-------|-------|------|---------|------------------------------|------|------|-------|-------|-------|-----|
| R448A | Cooling Capacity (kW) | | | | | | | R448A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| OLQ-24V | | 5.7* | 7.1* | 10.5* | 14.8* | 17.3* | | OLQ-24V | | 4.8* | 5.2* | 5.9* | 6.6* | 7.0* | |
| OLQ-33V | | 7.9* | 9.8* | 14.6* | 20.6* | 24.1* | 32.3 | OLQ-33V | | 6.4* | 6.9* | 7.7* | 8.6* | 9.0* | 9.9 |
| OLQ-40V | | 9.5* | 12.4* | 18.6* | 25.7* | 29.7* | | OLQ-40V | | 7.6* | 8.7* | 10.6* | 11.9* | 12.6* | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | 4.1* | 6.2 | 7.3 | | OMQ-30D | | | | 2.9* | 3.5 | 3.9 | |
| OMQ-45D | | | | 6.1* | 9.5 | 11.2 | 14.9 | OMQ-45D | | | | 3.8* | 4.7 | 5.2 | 6.2 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|------|-------|-------|-------|-------|------|---------|------------------------------|------|------|-------|-------|-------|-----|
| R449A | Cooling Capacity (kW) | | | | | | | R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| OLQ-24V | | 5.7* | 7.1* | 10.5* | 14.8* | 17.3* | | OLQ-24V | | 4.8* | 5.2* | 5.9* | 6.7* | 7.0* | |
| OLQ-33V | | 7.9* | 9.8* | 14.6* | 20.6* | 24.1* | 32.3 | OLQ-33V | | 6.4* | 6.9* | 7.8* | 8.6* | 9.0* | 9.9 |
| OLQ-40V | | 9.5* | 12.4* | 18.6* | 25.7* | 29.6* | | OLQ-40V | | 7.6* | 8.7* | 10.6* | 12.0* | 12.6* | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | 4.1* | 6.2 | 7.3 | | OMQ-30D | | | | 2.9* | 3.5 | 3.9 | |
| OMQ-45D | | | | 6.1* | 9.5 | 11.2 | 14.9 | OMQ-45D | | | | 3.8* | 4.7 | 5.2 | 6.2 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|------|------|------|------|------|------|-----------|------------------------------|------|------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-56 | | | | 8.3 | 11.5 | 13.4 | 17.4 | OMQ-56 | | | | 6.2 | 6.7 | 6.9 | 7.5 |
| OMQ-75 | | | | 11.3 | 15.3 | 17.4 | 22.1 | OMQ-75 | | | | 8.2 | 9.3 | 9.8 | 10.9 |
| OMQ-92 | | | | 14.9 | 20.5 | 23.7 | 30.7 | OMQ-92 | | | | 10.2 | 11.2 | 11.8 | 13.1 |
| OMQ-110 | | | | 17.3 | 23.7 | 27.3 | 35.1 | OMQ-110 | | | | 12.7 | 14.1 | 14.8 | 16.4 |
| OMTQ-60 | | | | 9.4 | 13.1 | 15.1 | 19.6 | OMTQ-60 | | | | 7.0 | 7.5 | 7.8 | 8.4 |
| OMTQ-76 | | | | 11.1 | 15.1 | 17.3 | | OMTQ-76 | | | | 9.3 | 10.1 | 10.6 | |
| OMTQ-90 | | | | 14.2 | 19.9 | 23.1 | 30.2 | OMTQ-90 | | | | 9.6 | 10.3 | 10.7 | 11.5 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| OLQ-18V | | 6.0 | 7.1 | 9.7 | 13.1 | 15.0 | | OLQ-18V | | 4.6 | 5.0 | 6.0 | 7.1 | 7.8 | |
| OLQ-24V | | 7.2 | 8.7 | 12.3 | 16.4 | 18.6 | 23.3 | OLQ-24V | | 5.6 | 6.0 | 6.8 | 7.9 | 8.5 | 10.1 |
| OLQ-33V | | 9.8 | 11.9 | 16.8 | 22.8 | 26.1 | 33.7 | OLQ-33V | | 7.4 | 7.9 | 8.8 | 10.0 | 10.7 | 12.2 |
| OLQ-40V | | 11.8 | 14.9 | 21.4 | 28.4 | 32.0 | 39.3 | OLQ-40V | | 8.7 | 9.8 | 12.0 | 14.0 | 15.1 | 17.4 |
| OLQ-48V | | 14.7 | 17.6 | 24.0 | 30.9 | 34.3 | | OLQ-48V | | 11.1 | 12.2 | 14.7 | 18.1 | 20.2 | |
| OLTQ-26V | | 8.2 | 9.9 | 14.3 | 19.8 | 23.1 | 31.1 | OLTQ-26V | | 6.4 | 6.7 | 7.4 | 8.2 | 8.7 | 9.6 |
| OLTQ-36V | | 12.1 | 14.4 | 20.0 | 27.1 | 31.4 | | OLTQ-36V | | 8.9 | 9.6 | 11.1 | 12.8 | 13.8 | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | 4.6 | 6.2 | 7.0 | 8.8 | OMQ-30D | | | | 3.2 | 3.7 | 3.9 | 4.5 |
| OMQ-45D | | | | 6.9 | 9.4 | 10.8 | 13.7 | OMQ-45D | | | | 4.4 | 5.2 | 5.6 | 6.4 |
| OMTQ-60D | | | | 9.5 | 13.2 | 15.2 | 19.7 | OMTQ-60D | | | | 6.5 | 7.2 | 7.5 | 8.3 |
| OMTQ-90D | | | | 13.9 | 20.0 | 23.5 | 31.5 | OMTQ-90D | | | | 9.6 | 10.4 | 10.9 | 12.1 |
| Digital Low Temperature Models | | | | | | | | | | | | | | | |
| OLQ-18DV | | 6.1 | 7.3 | 10.2 | 13.9 | 16.1 | 21.3 | OLQ-18DV | | 4.3 | 4.7 | 5.3 | 6.0 | 6.5 | 7.4 |
| OLTQ-36DV | | 12.1 | 14.4 | 20.0 | 27.1 | 31.4 | | OLTQ-36DV | | 8.9 | 9.6 | 11.1 | 12.8 | 13.8 | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|------------------------------|-----|-----|-------|-------|-------|------|---------|------------------------------|-----|-----|-------|-------|------|------|
| R407C | Cooling Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-56 | | | | 6.9* | 10.4* | 12.7 | 17.4 | OMQ-56 | | | | 5.3* | 5.8* | 6.1 | 6.6 |
| OMQ-75 | | | | 9.3* | 13.7* | 16.2* | 22.2 | OMQ-75 | | | | 6.7* | 7.7* | 8.2* | 9.4 |
| OMQ-92 | | | | 12.0* | 17.8* | 21.7 | 29.6 | OMQ-92 | | | | 8.4* | 9.4* | 10.0 | 11.1 |
| OMQ-110 | | | | 14.2* | 21.1* | 25.6 | 34.7 | OMQ-110 | | | | 10.6* | 12.0* | 12.8 | 14.4 |
| OMTQ-60 | | | | 7.2* | 11.3* | 13.9 | 19.3 | OMTQ-60 | | | | 5.6* | 6.2* | 6.6 | 7.4 |
| OMTQ-76 | | | | 8.1* | 12.9* | 15.7* | 22.3 | OMTQ-76 | | | | 6.8* | 7.8* | 8.4* | 9.8 |
| OMTQ-90 | | | | 10.6* | 17.0* | 21.0 | 29.3 | OMTQ-90 | | | | 7.8* | 8.6* | 9.1 | 10.1 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|------|-------|------|------|----------|------------------------------|-----|-----|------|------|-----|-----|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-56 | | | | 4.6* | 7.3* | 9.1 | 13.0 | OMQ-56 | | | | 3.3* | 3.6* | 3.7 | 4.0 |
| OMQ-75 | | | | 6.4* | 9.8* | 12.3 | 17.2 | OMQ-75 | | | | 4.0* | 4.6* | 4.9 | 5.6 |
| OMQ-92 | | | | 8.1* | 12.6* | 15.7 | 22.2 | OMQ-92 | | | | 5.4* | 5.9* | 6.2 | 6.8 |
| OMTQ-60 | | | | 5.1* | 8.3* | 10.5 | 15.1 | OMTQ-60 | | | | 3.8* | 4.0* | 4.2 | 4.5 |
| OMTQ-76 | | | | 6.1* | 10.0* | 12.6 | 18.0 | OMTQ-76 | | | | 4.4* | 4.9* | 5.1 | 5.7 |
| OMTQ-90 | | | | 7.7* | 12.3* | 15.6 | 22.5 | OMTQ-90 | | | | 5.5* | 5.7* | 5.9 | 6.4 |
| OMQ-110 | | | | 9.9* | 15.2* | 19.0 | 26.6 | OMQ-110 | | | | 6.6* | 7.3* | 7.8 | 8.6 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | | 4.3 | 5.1 | 7.1 | OMQ-30D | | | | | 2.0 | 2.2 | 2.5 |
| OMQ-45D | | | | | 6.2 | 7.6 | 10.7 | OMQ-45D | | | | | 2.8 | 3.0 | 3.4 |
| OMTQ-60D | | | | 5.3* | 8.7 | 10.5 | 14.9 | OMTQ-60D | | | | 3.5* | 3.9 | 4.1 | 4.6 |
| OMTQ-90D | | | | 8.3 | 12.8 | 15.6 | 22.4 | OMTQ-90D | | | | 5.1 | 5.6 | 5.9 | 6.5 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|------|-----|-----|------|---------|------------------------------|-----|-----|------|-----|-----|-----|
| R450A | Cooling Capacity (kW) | | | | | | | R450A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | 2.3* | 3.8 | 4.6 | 6.6 | OMQ-30D | | | | 1.5* | 1.7 | 1.8 | 2.0 |
| OMQ-45D | | | | 3.6 | 5.7 | 6.9 | 10.0 | OMQ-45D | | | | 2.1 | 2.4 | 2.5 | 2.9 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|------|-----|-----|------|---------|------------------------------|-----|-----|------|-----|-----|-----|
| R513A | Cooling Capacity (kW) | | | | | | | R513A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| OMQ-30D | | | | 2.7* | 4.4 | 5.3 | 7.4 | OMQ-30D | | | | 1.8* | 2.0 | 2.1 | 2.4 |
| OMQ-45D | | | | 4.0* | 6.6 | 8.0 | 11.2 | OMQ-45D | | | | 2.5* | 2.8 | 3.0 | 3.5 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

Copeland EazyCool™ Outdoor Refrigeration Units for Refrigeration Networks

Copeland™ outdoor refrigeration unit networks for medium-temperature and low-temperature applications.

Emerson Climate Technologies has developed this version of outdoor scroll refrigeration units with interconnectivity in order to create medium and large refrigeration network systems.

The EazyCool refrigeration unit networks perfectly fit in applications where larger cooling capacities and capacity modulation are required.

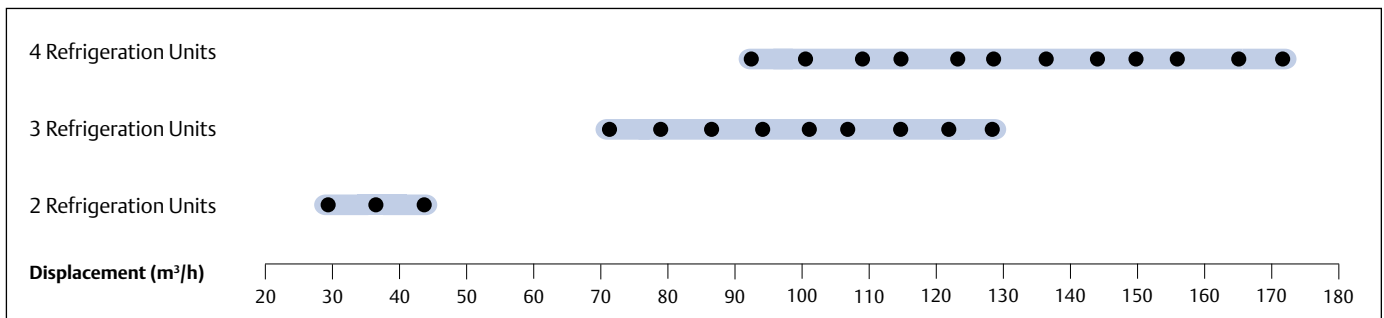
Typical applications are:

- Cold and freeze stores
- Discount and convenience stores
- Supermarkets and mini-markets
- Petrol station forecourts



Copeland EazyCool Outdoor Refrigeration Units for Refrigeration Networks

Copeland EazyCool Network Line-up



Conditions EN13215 R404A: Evaporating Temperature MT -10°C/LT -35°C, Ambient Temperature 32°C, Suction Gas Return 20°C

Features and Benefits

- Standard equipment: Copeland Scroll™ compressor(s), crankcase heater(s), condenser with thermally protected low speed fan(s), fan speed controller, oil separator, suction and liquid equalization lines, HP and LP switch, oil reservoir, EC2 Electronic controller, weather-resistant housing
- Oil control system with oil separator, TRAX OIL on each compressor, oil distribution lines and additional liquid receiver unit for large networks
- LON Master/Slave communication
- Capacity modulation with up to 8 compressors or stepless with Digital Scroll
- Perfect capacity adjustment by a wide range of combination opportunities

Maximum Allowable Pressures (PS)

- Low Side PS 22.5 bar(g)
- High Side PS 28 bar(g)

Capacity Data - OMQ

| R404A | | Medium Temperature (-10/+32°C) | | | | | | |
|--------------------------------------|---------------------|--------------------------------------|---|-----------|---|----------|---|----------|
| Displacement (m³/h) | Motor Capacity (kW) | Model Configuration | | | | | | |
| | | 2 Refrigeration Units Network | | | | | | |
| 28.8 | 14.8 | OMQ75 NLO | + | OMQ56 NL | | | | |
| 28.8 | 17.1 | OMQ75 NLO | + | OMQ75 NL | | | | |
| 35.6 | 19.7 | OMQ92 NLO | + | OMQ75 NL | | | | |
| 35.6 | 22.2 | OMQ92 NLO | + | OMQ92 NL | | | | |
| 42.8 | 25.1 | OMQ110 NLO | + | OMQ 92 NL | | | | |
| 42.8 | 28.0 | OMQ110 NLO | + | OMQ110 NL | | | | |
| 3 Refrigeration Units Network | | | | | | | | |
| 70.6 | 21.0 | OMQ75 NO | + | OMQ56 N | + | OMQ56 N | | |
| 78.5 | 23.3 | OMQ75 NO | + | OMQ75 N | + | OMQ56 N | | |
| 86.4 | 25.7 | OMQ75 NO | + | OMQ75 N | + | OMQ75 N | | |
| 93.2 | 28.2 | OMQ92 NO | + | OMQ75 N | + | OMQ75 N | | |
| 100.0 | 30.8 | OMQ92 NO | + | OMQ92 N | + | OMQ75 N | | |
| 106.8 | 33.3 | OMQ92 NO | + | OMQ92 N | + | OMQ92 N | | |
| 114.0 | 36.2 | OMQ110 NO | + | OMQ92 N | + | OMQ92 N | | |
| 121.2 | 39.1 | OMQ110 NO | + | OMQ110 N | + | OMQ92 N | | |
| 128.4 | 42.0 | OMQ110 NO | + | OMQ110 N | + | OMQ110 N | | |
| 4 Refrigeration Units Network | | | | | | | | |
| 91.5 | 27.2 | OMQ75 NO | + | OMQ56 N | + | OMQ56 N | + | OMQ56 N |
| 99.4 | 29.5 | OMQ75 NO | + | OMQ75 N | + | OMQ56 N | + | OMQ56 N |
| 107.3 | 31.9 | OMQ75 NO | + | OMQ75 N | + | OMQ75 N | + | OMQ56 N |
| 115.2 | 34.2 | OMQ75 NO | + | OMQ75 N | + | OMQ75 N | + | OMQ75 N |
| 122.0 | 36.8 | OMQ92 NO | + | OMQ75 N | + | OMQ75 N | + | OMQ75 N |
| 128.8 | 39.3 | OMQ92 NO | + | OMQ92 N | + | OMQ75 N | + | OMQ75 N |
| 135.6 | 41.9 | OMQ92 NO | + | OMQ92 N | + | OMQ92 N | + | OMQ75 N |
| 142.4 | 44.4 | OMQ92 NO | + | OMQ92 N | + | OMQ92 N | + | OMQ92 N |
| 149.6 | 47.3 | OMQ110 NO | + | OMQ92 N | + | OMQ92 N | + | OMQ92 N |
| 156.8 | 50.2 | OMQ110 NO | + | OMQ110 N | + | OMQ92 N | + | OMQ92 N |
| 164.0 | 53.1 | OMQ110 NO | + | OMQ110 N | + | OMQ110 N | + | OMQ92 N |
| 171.2 | 56.0 | OMQ110 NO | + | OMQ110 N | + | OMQ110 N | + | OMQ110 N |

Capacity Data - OLQ

| R404A | | Low Temperature (-35/+32°C) | | | | | | |
|--------------------------------------|---------------------|-----------------------------|---|-----------|---|----------|---|----------|
| Cooling Capacity (kW) | Motor Capacity (kW) | Model Configuration | | | | | | |
| 2 Refrigeration Units Network | | | | | | | | |
| 16.4 | 13.9 | OLQ33V NLO | + | OLQ24V NL | | | | |
| 18.7 | 16.4 | OLQ33V NLO | + | OLQ33V NL | | | | |
| 20.9 | 17.0 | OLQ40V NLO | + | OLQ33V NL | | | | |
| 23.0 | 17.6 | OLQ40V NLO | + | OLQ40V NL | | | | |
| 25.4 | 20.6 | OLQ48V NLO | + | OLQ40V NL | | | | |
| 27.8 | 23.6 | OLQ48V NLO | + | OLQ48V NL | | | | |
| 3 Refrigeration Units Network | | | | | | | | |
| 23.4 | 19.6 | OLQ33V NO | + | OLQ24V N | + | OLQ24V N | | |
| 25.7 | 22.1 | OLQ33V NO | + | OLQ33V N | + | OLQ24V N | | |
| 28.1 | 24.6 | OLQ33V NO | + | OLQ33V N | + | OLQ33V N | | |
| 30.2 | 25.2 | OLQ40V NO | + | OLQ33V N | + | OLQ33V N | | |
| 32.4 | 25.8 | OLQ40V NO | + | OLQ40V N | + | OLQ33V N | | |
| 34.5 | 26.4 | OLQ40V NO | + | OLQ40V N | + | OLQ40V N | | |
| 36.9 | 29.4 | OLQ48V NO | + | OLQ40V N | + | OLQ40V N | | |
| 39.3 | 32.4 | OLQ48V NO | + | OLQ48V N | + | OLQ40V N | | |
| 41.7 | 35.4 | OLQ48V NO | + | OLQ48V N | + | OLQ48V N | | |
| 4 Refrigeration Units Network | | | | | | | | |
| 30.4 | 25.3 | OLQ33V NO | + | OLQ24V N | + | OLQ24V N | + | OLQ24V N |
| 32.7 | 27.8 | OLQ33V NO | + | OLQ33V N | + | OLQ24V N | + | OLQ24V N |
| 35.1 | 30.3 | OLQ33V NO | + | OLQ33V N | + | OLQ33V N | + | OLQ24V N |
| 37.4 | 32.8 | OLQ33V NO | + | OLQ33V N | + | OLQ33V N | + | OLQ33V N |
| 39.6 | 33.4 | OLQ40V NO | + | OLQ33V N | + | OLQ33V N | + | OLQ33V N |
| 41.7 | 34.0 | OLQ40V NO | + | OLQ40V N | + | OLQ33V N | + | OLQ33V N |
| 43.9 | 34.6 | OLQ40V NO | + | OLQ40V N | + | OLQ40V N | + | OLQ33V N |
| 46.0 | 35.2 | OLQ40V NO | + | OLQ40V N | + | OLQ40V N | + | OLQ40V N |
| 48.4 | 38.2 | OLQ48V NO | + | OLQ40V N | + | OLQ40V N | + | OLQ40V N |
| 50.8 | 41.2 | OLQ48V NO | + | OLQ48V N | + | OLQ40V N | + | OLQ40V N |
| 53.2 | 44.2 | OLQ48V NO | + | OLQ48V N | + | OLQ48V N | + | OLQ40V N |
| 55.6 | 47.2 | OLQ48V NO | + | OLQ48V N | + | OLQ48V N | + | OLQ48V N |

Conditions: EN13215: Suction Gas Return 20°C, Suction Superheat 10K

Copeland EazyCool™ ZX Outdoor Refrigeration Units with Scroll Compressors

Copeland™ compact outdoor refrigeration units are for medium-temperature and low-temperature applications.

With this new range of outdoor refrigeration units, Emerson Climate Technologies offers a solution for refrigeration applications with space and noise constraints which responds to the increasing demand for energy-efficient refrigeration solutions units.

Copeland EazyCool ZX outdoor refrigeration units feature the most complete and unique equipment. Their advanced electronic controller enables precise parameter control and displays the system status. Vapor injection and liquid injection technology significantly increase system efficiency and operation map. Electronic protection functions, oil separator and suction accumulator guarantee optimum system safety.

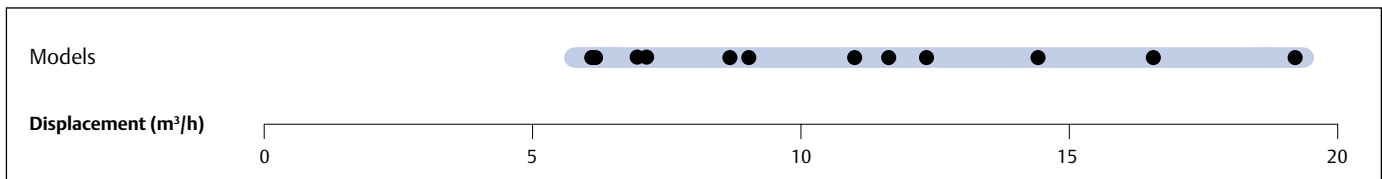
Lowest life cycle costs and comprehensive safety features make Copeland EazyCool ZX a cost efficient and reliable choice for:

- Convenience stores
- Cold rooms
- Fast food stores, bars and restaurants
- Beverage coolers

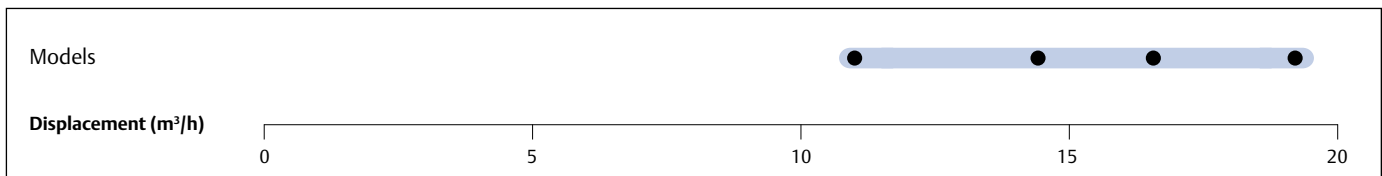


Copeland EazyCool ZX Outdoor Refrigeration Units with Scroll Compressors

Copeland EazyCool ZX Line-up



Copeland EazyCool ZX Digital Line-up



Features and Benefits

- Standard equipment: Copeland Scroll™ compressor, crankcase heater, electronic controller, fan(s) with speed control, liquid receiver, safety switches, filter drier and sight glass, oil separator and suction accumulator (LT models only)
- Copeland EazyCool ZX Digital models allow for 10% to 100% continuous capacity modulation
- Diagnostic capabilities protect the unit from over-current, phase loss and phase imbalance
- LED display shows real time system status
- Precise electronic suction pressure control
- Energy and operation cost saving due to excellent energy efficiency
- Noise attenuation due to low speed fan motors with sickle blades, fan speed control and sound jacket
- High capacity vapor injection technology for LT models
- Space saving due to compact dimensions
- Easy and quick installation
- Multiple refrigerant approvals incl. R407A/F, R448A/R449A, R404A, R134a, R450A and R513A

Maximum Allowable Pressures (PS)

- Low Side PS 22.5 bar (g)
- High Side PS 28.8 bar (g)

Technical Overview

| Model | Displacement (m ³ /h) | Receiver Capacity (l) | Number of fans | Total Fan Motor Power (W) | Suction Line Diameter (inch) | Liquid Line Diameter (inch) | Width/Depth/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @10m - dB(A)*** |
|--|----------------------------------|-----------------------|----------------|---------------------------|------------------------------|-----------------------------|-------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|--------------------------------|
| | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | 5.9 | 4.4 | 1 | 116 | ¾ | ½ | 1029/424/840 | 76.0 | PFJ | TFD | 13 | 5 | 58 | 26 | 39.0 |
| ZXME025E | 6.8 | 4.4 | 1 | 116 | ¾ | ½ | 1029/424/840 | 79.0 | PFJ | TFD | 12 | 5 | 61 | 38 | 40.0 |
| ZXME030E | 8.6 | 4.4 | 1 | 116 | ¾ | ½ | 1029/424/840 | 79.0 | PFJ | TFD | 16 | 7 | 82 | 40 | 40.0 |
| ZXME040E | 11.7 | 4.4 | 1 | 116 | ⅞ | ½ | 1029/424/840 | 91.0 | PFJ | TFD | 24 | 10 | 114 | 49 | 40.0 |
| ZXME040E | 14.4 | 4.4 | 1 | 116 | ⅞ | ½ | 1029/424/840 | 91.0 | | TFD | | 10 | | 49 | 40.0 |
| ZXME050E | 17.1 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 108.0 | | TFD | | 13 | | 66 | 41.0 |
| ZXME060E | 18.8 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 112.0 | | TFD | | 13 | | 74 | 41.0 |
| ZXME075E | 11.9 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 118.0 | | TFD | | 14 | | 101 | 42.0 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | 11.4 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 104.0 | | TFD | | 8 | | 48 | 40.0 |
| ZXDE-050E | 14.4 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 108.0 | | TFD | | 11 | | 64 | 41.0 |
| ZXDE-060E | 17.1 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 112.0 | | TFD | | 11 | | 74 | 41.0 |
| ZXDE-075E | 18.8 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 118.0 | | TFD | | 14 | | 100 | 42.0 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| ZXLE020E | 6.1 | 4.4 | 1 | 116 | ¾ | ½ | 1029/424/840 | 79.0 | PFJ | TFD | 14 | 6 | 57 | 39 | 39.0 |
| ZXLE025E | 7.1 | 4.4 | 1 | 116 | ¾ | ½ | 1029/424/840 | 79.0 | PFJ | TFD | 16 | 6 | 74 | 39 | 39.0 |
| ZXLE030E | 8.0 | 4.4 | 1 | 116 | ¾ | ½ | 1029/424/840 | 81.0 | PFJ | TFD | 18 | 7 | 82 | 36 | 40.0 |
| ZXLE040E | 12.7 | 4.4 | 1 | 116 | ⅞ | ½ | 1029/424/840 | 93.0 | | TFD | | 9 | | 52 | 40.0 |
| ZXLE050E | 14.4 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 106.0 | | TFD | | 12 | | 52 | 41.0 |
| ZXLE060E | 17.1 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 116.0 | | TFD | | 14 | | 74 | 41.0 |
| ZXLE075E | 18.8 | 6.3 | 2 | 246 | ⅞ | ½ | 1029/424/1242 | 121.0 | | TFD | | 15 | | 101 | 41.0 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 10m: sound pressure level at 10m distance from the compressor, free field condition

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|-----|------|------|------|------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | | 3.5 | 4.1 | 5.6 | ZXME020E | | | | | 1.7 | 1.7 | 1.7 |
| ZXME025E** | | | | | 3.9 | 4.7 | 6.6 | ZXME025E** | | | | | 1.7 | 1.8 | 1.9 |
| ZXME030E | | | | | 4.9 | 5.9 | 8.3 | ZXME030E | | | | | 2.3 | 2.4 | 2.6 |
| ZXME040E** | | | | | 6.0 | 7.1 | 9.9 | ZXME040E** | | | | | 3.0 | 3.1 | 3.5 |
| ZXME040E | | | | | 6.3 | 7.5 | 10.3 | ZXME040E | | | | | 3.2 | 3.4 | 3.8 |
| ZXME050E | | | | | 8.7 | 10.4 | 14.4 | ZXME050E | | | | | 3.7 | 3.9 | 4.3 |
| ZXME060E | | | | | 9.8 | 11.8 | 16.4 | ZXME060E | | | | | 4.3 | 4.5 | 5.0 |
| ZXME075E | | | | | 11.3 | 13.6 | 18.9 | ZXME075E | | | | | 4.9 | 5.1 | 5.6 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| ZXLE020E | | 1.5 | 1.9 | 3.0 | 4.3 | 5.1 | 6.7 | ZXLE020E | | 1.4 | 1.5 | 1.6 | 1.8 | 1.8 | 2.0 |
| ZXLE025E | | 1.8 | 2.2 | 3.4 | 5.0 | 5.9 | 7.9 | ZXLE025E | | 1.6 | 1.7 | 1.8 | 2.0 | 2.0 | 2.3 |
| ZXLE030E | | 2.0 | 2.5 | 3.9 | 5.6 | 6.6 | 8.7 | ZXLE030E | | 1.8 | 1.9 | 2.0 | 2.2 | 2.3 | 2.5 |
| ZXLE040E | | 3.1 | 3.9 | 5.9 | 8.3 | 9.6 | | ZXLE040E | | 2.7 | 2.9 | 3.4 | 4.0 | 4.4 | |
| ZXLE050E | | 3.6 | 4.5 | 6.8 | 9.7 | 11.4 | 14.8 | ZXLE050E | | 3.1 | 3.2 | 3.7 | 4.3 | 4.7 | 5.4 |
| ZXLE060E | | 4.2 | 5.3 | 7.9 | 11.3 | 13.1 | | ZXLE060E | | 3.7 | 3.9 | 4.5 | 5.3 | 5.8 | |
| ZXLE075E | | 4.8 | 5.9 | 9.0 | 13.0 | 15.2 | 19.9 | ZXLE075E | | 3.9 | 4.1 | 4.6 | 5.4 | 5.8 | 6.7 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 4.7 | 7.3 | 8.8 | 12.5 | ZXDE-040E | | | | 2.7 | 2.8 | 2.9 | 3.1 |
| ZXDE-050E | | | | 5.8 | 8.7 | 10.4 | 14.4 | ZXDE-050E | | | | 3.5 | 3.7 | 3.9 | 4.3 |
| ZXDE-060E | | | | 6.4 | 9.8 | 11.8 | 16.4 | ZXDE-060E | | | | 4.0 | 4.3 | 4.5 | 5.0 |
| ZXDE-075E | | | | 7.4 | 11.3 | 13.6 | 18.9 | ZXDE-075E | | | | 4.5 | 4.9 | 5.1 | 5.6 |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|------|------|-------|------|------------|------------------------------|-----|-----|------|------|------|-----|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | | 3.4 | 4.0 | 5.7 | ZXME020E | | | | | 1.6 | 1.6 | 1.7 |
| ZXME025E** | | | | 3.3 | 5.0 | 6.0 | 8.4 | ZXME025E** | | | | 2.1 | 2.3 | 2.5 | 2.7 |
| ZXME030E | | | | | 4.9 | 5.9 | 8.3 | ZXME030E | | | | | 2.3 | 2.4 | 2.6 |
| ZXME040E** | | | | 4.0 | 6.0 | 7.1 | 9.9 | ZXME040E** | | | | 2.8 | 3.0 | 3.1 | 3.5 |
| ZXME040E | | | | | 6.5* | 8.0 | 10.9 | ZXME040E | | | | | 3.3* | 3.5 | 4.0 |
| ZXME050E | | | | 5.7* | 8.6 | 10.4 | 14.4 | ZXME050E | | | | 3.5* | 3.7 | 3.9 | 4.3 |
| ZXME060E | | | | 6.2* | 9.7 | 11.8 | 16.4 | ZXME060E | | | | 4.0* | 4.3 | 4.5 | 5.0 |
| ZXME075E | | | | 7.1* | 11.2 | 13.6 | 18.9 | ZXME075E | | | | 4.5* | 4.9 | 5.1 | 5.6 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| ZXLE020E | | 1.6 | 2.0 | 3.1 | 4.5 | 5.3 | 7.0 | ZXLE020E | | 1.5 | 1.6 | 1.7 | 1.9 | 1.9 | 2.2 |
| ZXLE025E | | 1.8 | 2.3 | 3.6 | 5.3 | 6.2 | 8.2 | ZXLE025E | | 1.7 | 1.8 | 1.9 | 2.1 | 2.2 | 2.4 |
| ZXLE030E | | 2.1 | 2.6 | 4.0 | 5.9 | 6.9 | 9.1 | ZXLE030E | | 1.9 | 2.0 | 2.1 | 2.3 | 2.4 | 2.7 |
| ZXLE040E | | 3.3 | 4.1 | 6.1 | 8.6* | 10.0* | | ZXLE040E | | 2.9 | 3.1 | 3.6 | 4.3* | 4.7* | |
| ZXLE050E | | 3.8 | 4.7 | 7.1 | 10.2 | 11.9 | 15.4 | ZXLE050E | | 3.2 | 3.4 | 3.9 | 4.6 | 5.0 | 5.8 |
| ZXLE060E | | 4.4 | 5.5 | 8.3 | 11.8 | 13.7 | | ZXLE060E | | 3.9 | 4.1 | 4.8 | 5.7 | 6.2 | |
| ZXLE075E | | 5.0 | 6.2 | 9.4 | 13.6 | 15.9 | 20.8 | ZXLE075E | | 4.1 | 4.3 | 4.9 | 5.7 | 6.2 | 7.2 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 4.7 | 7.2 | 8.8 | 12.4 | ZXDE-040E | | | | 2.8 | 2.9 | 3.0 | 3.2 |
| ZXDE-050E | | | | 5.7 | 8.6 | 10.5 | 14.6 | ZXDE-050E | | | | 3.6 | 3.9 | 4.1 | 4.5 |
| ZXDE-060E | | | | 5.9 | 9.0 | 10.9 | 15.1 | ZXDE-060E | | | | 3.9 | 4.2 | 4.4 | 4.8 |
| ZXDE-075E | | | | 6.7 | 10.2 | 12.3 | 17.2 | ZXDE-075E | | | | 4.3 | 4.6 | 4.8 | 5.2 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|-----|-----|------|------|------|------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R448A | Cooling Capacity (kW) | | | | | | | R448A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | 2.2 | 3.4 | 4.1 | 5.8 | ZXME020E | | | | 1.6 | 1.6 | 1.6 | 1.8 |
| ZXME025E** | | | | 2.6 | 4.0 | 4.8 | 6.8 | ZXME025E** | | | | 1.7 | 1.8 | 1.9 | 2.0 |
| ZXME030E | | | | 3.4 | 5.0 | 6.1 | 8.4 | ZXME030E | | | | 2.1 | 2.3 | 2.4 | 2.6 |
| ZXME040E | | | | 4.3 | 6.6 | 7.8 | 10.7 | ZXME040E | | | | 3.0 | 3.3 | 3.5 | 3.9 |
| ZXME050E | | | | 5.8 | 8.8 | 10.5 | 14.6 | ZXME050E | | | | 3.6 | 3.8 | 3.9 | 4.3 |
| ZXME060E | | | | 6.6 | 10.1 | 12.0 | 16.7 | ZXME060E | | | | 4.1 | 4.4 | 4.6 | 5.0 |
| ZXME075E | | | | 7.6 | 11.6 | 13.9 | 19.2 | ZXME075E | | | | 4.7 | 5.1 | 5.3 | 5.8 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| ZXLE020E | | 1.6 | 2.0 | 3.1 | 4.4 | 5.2 | 7.0 | ZXLE020E | | 1.4 | 1.5 | 1.7 | 1.8 | 1.8 | 1.9 |
| ZXLE025E | | 1.8 | 2.3 | 3.6 | 5.2 | 6.2 | 8.3 | ZXLE025E | | 1.6 | 1.7 | 1.9 | 2.0 | 2.0 | 2.1 |
| ZXLE030E | | 2.1 | 2.6 | 4.0 | 5.7 | 6.8 | 9.3 | ZXLE030E | | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 |
| ZXLE040E | | 3.2 | 4.0 | 6.0 | 8.3 | 9.7 | | ZXLE040E | | 2.6 | 2.9 | 3.3 | 3.7 | 3.9 | |
| ZXLE050E | | 4.0 | 5.0 | 7.3 | 10.4 | 12.1 | 16.3 | ZXLE050E | | 3.1 | 3.4 | 3.9 | 4.3 | 4.5 | 4.9 |
| ZXLE060E | | 4.7 | 5.8 | 8.5 | 12.0 | 14.0 | | ZXLE060E | | 3.7 | 4.1 | 4.7 | 5.3 | 5.6 | |
| ZXLE075E | | 5.2 | 6.5 | 9.7 | 13.7 | 16.2 | 21.8 | ZXLE075E | | 3.9 | 4.2 | 4.8 | 5.3 | 5.6 | 6.1 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 4.8 | 7.2 | 8.7 | 12.3 | ZXDE-040E | | | | 2.5 | 2.7 | 2.8 | 3.1 |
| ZXDE-050E | | | | 5.8 | 8.7 | 10.4 | 14.4 | ZXDE-050E | | | | 3.2 | 3.7 | 3.9 | 4.4 |
| ZXDE-060E | | | | 6.8 | 10.1 | 12.0 | 16.6 | ZXDE-060E | | | | 3.9 | 4.5 | 4.8 | 5.5 |
| ZXDE-075E | | | | 7.7 | 11.4 | 13.6 | 18.8 | ZXDE-075E | | | | 4.2 | 4.8 | 5.1 | 5.8 |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|-----|-----|------|------|------|------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R449A | Cooling Capacity (kW) | | | | | | | R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | 2.2 | 3.4 | 4.1 | 5.8 | ZXME020E | | | | 1.6 | 1.6 | 1.6 | 1.8 |
| ZXME025E** | | | | 2.6 | 4.0 | 4.8 | 6.8 | ZXME025E** | | | | 1.7 | 1.8 | 1.9 | 2.0 |
| ZXME030E | | | | 3.4 | 5.0 | 6.1 | 8.4 | ZXME030E | | | | 2.1 | 2.3 | 2.4 | 2.6 |
| ZXME040E | | | | 4.3 | 6.6 | 7.8 | 10.7 | ZXME040E | | | | 3.0 | 3.3 | 3.5 | 3.9 |
| ZXME050E | | | | 5.8 | 8.8 | 10.5 | 14.6 | ZXME050E | | | | 3.6 | 3.8 | 3.9 | 4.3 |
| ZXME060E | | | | 6.6 | 10.1 | 12.0 | 16.7 | ZXME060E | | | | 4.1 | 4.4 | 4.6 | 5.0 |
| ZXME075E | | | | 7.6 | 11.6 | 13.9 | 19.2 | ZXME075E | | | | 4.7 | 5.1 | 5.3 | 5.8 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| ZXLE020E | | 1.6 | 2.0 | 3.1 | 4.4 | 5.2 | 7.0 | ZXLE020E | | 1.4 | 1.5 | 1.7 | 1.8 | 1.8 | 1.9 |
| ZXLE025E | | 1.8 | 2.3 | 3.6 | 5.2 | 6.2 | 8.3 | ZXLE025E | | 1.6 | 1.7 | 1.9 | 2.0 | 2.0 | 2.1 |
| ZXLE030E | | 2.1 | 2.6 | 4.0 | 5.7 | 6.8 | 9.3 | ZXLE030E | | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 |
| ZXLE040E | | 3.2 | 4.0 | 6.0 | 8.3 | 9.7 | | ZXLE040E | | 2.6 | 2.9 | 3.3 | 3.7 | 3.9 | |
| ZXLE050E | | 4.0 | 5.0 | 7.3 | 10.4 | 12.1 | 16.3 | ZXLE050E | | 3.1 | 3.4 | 3.9 | 4.3 | 4.5 | 4.9 |
| ZXLE060E | | 4.7 | 5.8 | 8.5 | 12.0 | 14.0 | | ZXLE060E | | 3.7 | 4.1 | 4.7 | 5.3 | 5.6 | |
| ZXLE075E | | 5.2 | 6.5 | 9.7 | 13.7 | 16.2 | 21.8 | ZXLE075E | | 3.9 | 4.2 | 4.8 | 5.3 | 5.6 | 6.1 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 4.8 | 7.2 | 8.7 | 12.3 | ZXDE-040E | | | | 2.5 | 2.7 | 2.8 | 3.1 |
| ZXDE-050E | | | | 5.8 | 8.7 | 10.4 | 14.4 | ZXDE-050E | | | | 3.2 | 3.7 | 3.9 | 4.4 |
| ZXDE-060E | | | | 6.8 | 10.1 | 12.0 | 16.6 | ZXDE-060E | | | | 3.9 | 4.5 | 4.8 | 5.5 |
| ZXDE-075E | | | | 7.7 | 11.4 | 13.6 | 18.8 | ZXDE-075E | | | | 4.2 | 4.8 | 5.1 | 5.8 |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|------|------|------|------|------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | 2.4 | 3.6 | 4.2 | 5.7 | ZXME020E | | | | 1.8 | 1.8 | 1.8 | 1.8 |
| ZXME025E** | | | | 3.0 | 4.3 | 5.1 | 6.9 | ZXME025E** | | | | 1.9 | 2.0 | 2.0 | 2.1 |
| ZXME030E | | | | 3.7 | 5.2 | 6.2 | 8.2 | ZXME030E | | | | 2.4 | 2.5 | 2.6 | 2.7 |
| ZXME040E** | | | | 4.7 | 6.8 | 8.0 | 10.6 | ZXME040E** | | | | 3.2 | 3.4 | 3.5 | 3.8 |
| ZXME040E | | | | 4.9 | 7.0 | 8.2 | 10.8 | ZXME040E | | | | 3.2 | 3.4 | 3.5 | 3.8 |
| ZXME050E | | | | 6.4 | 9.1 | 10.7 | 14.4 | ZXME050E | | | | 4.0 | 4.2 | 4.3 | 4.5 |
| ZXME060E | | | | 7.3 | 10.4 | 12.2 | 16.2 | ZXME060E | | | | 4.6 | 4.8 | 5.0 | 5.3 |
| ZXME075E | | | | 8.4 | 11.9 | 13.9 | 18.5 | ZXME075E | | | | 5.1 | 5.4 | 5.5 | 5.9 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| ZXLE020E | | 1.9 | 2.4 | 3.5 | 4.9 | 5.7 | | ZXLE020E | | 1.6 | 1.7 | 1.9 | 2.1 | 2.1 | |
| ZXLE025E | | 2.2 | 2.8 | 4.1 | 5.8 | 6.7 | | ZXLE025E | | 1.9 | 2.0 | 2.2 | 2.4 | 2.5 | |
| ZXLE030E | | 2.6 | 3.2 | 4.6 | 6.4 | 7.4 | | ZXLE030E | | 2.1 | 2.2 | 2.4 | 2.6 | 2.6 | |
| ZXLE040E | | 4.0 | 4.9 | 7.0 | 9.6 | 11.0 | | ZXLE040E | | 3.0 | 3.2 | 3.6 | 4.1 | 4.4 | |
| ZXLE050E | | 5.0 | 6.0 | 8.5 | 11.5 | 13.2 | | ZXLE050E | | 3.6 | 3.9 | 4.4 | 5.0 | 5.4 | |
| ZXLE060E | | 5.8 | 7.0 | 9.8 | 13.2 | 15.0 | 18.9 | ZXLE060E | | 4.4 | 4.7 | 5.5 | 6.3 | 6.7 | 7.7 |
| ZXLE075E | | 6.5 | 7.9 | 11.2 | 15.3 | 17.6 | | ZXLE075E | | 4.6 | 4.9 | 5.5 | 6.2 | 6.6 | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 5.3 | 7.6 | 8.9 | 12.2 | ZXDE-040E | | | | 2.7 | 3.0 | 3.1 | 3.3 |
| ZXDE-050E | | | | 6.4 | 9.0 | 10.6 | 14.1 | ZXDE-050E | | | | 3.6 | 4.0 | 4.3 | 4.7 |
| ZXDE-060E | | | | 7.4 | 10.5 | 12.2 | 16.1 | ZXDE-060E | | | | 4.3 | 4.9 | 5.2 | 5.8 |
| ZXDE-075E | | | | 8.4 | 11.9 | 13.8 | 18.3 | ZXDE-075E | | | | 4.7 | 5.3 | 5.6 | 6.3 |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|-----|-----|------|------|------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | 1.4 | 2.3 | 2.8 | 4.0 | ZXME020E | | | | 1.0 | 1.0 | 1.0 | 1.1 |
| ZXME025E** | | | | 1.5 | 2.6 | 3.2 | 4.7 | ZXME025E** | | | | 1.2 | 1.3 | 1.3 | 1.4 |
| ZXME030E | | | | 2.1 | 3.2 | 4.0 | 5.8 | ZXME030E | | | | 1.3 | 1.4 | 1.4 | 1.5 |
| ZXME040E** | | | | 2.6 | 4.3 | 5.3 | 7.8 | ZXME040E** | | | | 2.0 | 2.1 | 2.2 | 2.4 |
| ZXME040E | | | | 2.8 | 4.4 | 5.4 | 7.8 | ZXME040E | | | | 1.7 | 1.8 | 1.9 | 2.0 |
| ZXME050E | | | | 3.4 | 5.5 | 6.8 | 9.9 | ZXME050E | | | | 2.1 | 2.3 | 2.4 | 2.5 |
| ZXME060E | | | | 4.2 | 6.5 | 8.0 | 11.7 | ZXME060E | | | | 2.5 | 2.6 | 2.7 | 3.0 |
| ZXME075E | | | | 4.8 | 7.5 | 9.1 | 13.2 | ZXME075E | | | | 3.1 | 3.2 | 3.3 | 3.6 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 4.3 | 5.3 | 8.0 | | ZXDE-040E | | | | 1.8 | 1.9 | 1.9 | |
| ZXDE-050E | | | | 5.3 | 6.5 | 9.7 | | ZXDE-050E | | | | 2.3 | 2.4 | 2.5 | |
| ZXDE-060E | | | | 6.3 | 7.9 | 11.7 | | ZXDE-060E | | | | 2.7 | 2.8 | 3.0 | |
| ZXDE-075E | | | | 7.2 | 8.8 | 12.7 | | ZXDE-075E | | | | 3.0 | 3.0 | 3.3 | |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|-----|-----|-----|------|------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R450A | Cooling Capacity (kW) | | | | | | | R450A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | 1.2 | 2.0 | 2.5 | 3.6 | ZXME020E | | | | 0.9 | 0.9 | 0.9 | 0.9 |
| ZXME025E** | | | | 1.4 | 2.3 | 2.8 | 4.2 | ZXME025E** | | | | 1.0 | 1.0 | 1.0 | 1.1 |
| ZXME030E | | | | 1.8 | 2.9 | 3.6 | 5.3 | ZXME030E | | | | 1.2 | 1.2 | 1.2 | 1.3 |
| ZXME040E | | | | 2.5 | 3.9 | 4.9 | 7.1 | ZXME040E | | | | 1.6 | 1.6 | 1.6 | 1.7 |
| ZXME050E | | | | 3.1 | 5.0 | 6.1 | 9.1 | ZXME050E | | | | 2.0 | 2.1 | 2.1 | 2.2 |
| ZXME060E | | | | 3.6 | 5.8 | 7.1 | 10.5 | ZXME060E | | | | 2.3 | 2.4 | 2.4 | 2.5 |
| ZXME075E | | | | 4.0 | 6.5 | 8.0 | 11.8 | ZXME075E | | | | 2.6 | 2.7 | 2.7 | 2.9 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 2.5 | 3.9 | 4.9 | 7.1 | ZXDE-040E | | | | 1.6 | 1.6 | 1.6 | 1.7 |
| ZXDE-050E | | | | 3.1 | 5.0 | 6.1 | 9.1 | ZXDE-050E | | | | 2.0 | 2.1 | 2.1 | 2.2 |
| ZXDE-060E | | | | 3.6 | 5.8 | 7.1 | 10.5 | ZXDE-060E | | | | 2.3 | 2.4 | 2.4 | 2.5 |
| ZXDE-075E | | | | 4.0 | 6.5 | 8.0 | 11.8 | ZXDE-075E | | | | 2.6 | 2.7 | 2.7 | 2.9 |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

Preliminary data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|-----|-----|-----|------|------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R513A | Cooling Capacity (kW) | | | | | | | R513A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXME020E | | | | 1.5 | 2.3 | 2.9 | 4.2 | ZXME020E | | | | 1.0 | 1.0 | 1.0 | 1.1 |
| ZXME025E** | | | | 1.7 | 2.7 | 3.3 | 4.9 | ZXME025E** | | | | 1.2 | 1.2 | 1.2 | 1.3 |
| ZXME030E | | | | 2.2 | 3.4 | 4.2 | 6.0 | ZXME030E | | | | 1.4 | 1.4 | 1.5 | 1.6 |
| ZXME040E | | | | 3.0 | 4.6 | 5.7 | 8.2 | ZXME040E | | | | 1.9 | 1.9 | 2.0 | 2.1 |
| ZXME050E | | | | 3.8 | 5.9 | 7.2 | 10.5 | ZXME050E | | | | 2.4 | 2.5 | 2.5 | 2.6 |
| ZXME060E | | | | 4.4 | 6.8 | 8.4 | 12.1 | ZXME060E | | | | 2.8 | 2.8 | 2.9 | 3.0 |
| ZXME075E | | | | 4.9 | 7.7 | 9.4 | 13.5 | ZXME075E | | | | 3.1 | 3.2 | 3.2 | 3.4 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| ZXDE-040E | | | | 3.0 | 4.6 | 5.7 | 8.2 | ZXDE-040E | | | | 1.9 | 1.9 | 2.0 | 2.1 |
| ZXDE-050E | | | | 3.8 | 5.9 | 7.2 | 10.5 | ZXDE-050E | | | | 2.4 | 2.5 | 2.5 | 2.6 |
| ZXDE-060E | | | | 4.4 | 6.8 | 8.4 | 12.1 | ZXDE-060E | | | | 2.8 | 2.8 | 2.9 | 3.0 |
| ZXDE-075E | | | | 4.9 | 7.7 | 9.4 | 13.5 | ZXDE-075E | | | | 3.1 | 3.2 | 3.2 | 3.4 |

Suction Gas Return 20°C / Subcooling 0K

** Single Phase only

Preliminary data

Copeland™ Outdoor Refrigeration Units for R744-Transcritical Applications

With this range of outdoor refrigeration units, Emerson Climate Technologies offers a solution which responds responding to the increasing demand for future proof refrigeration technology.

These models are designed for operation with the natural refrigerant CO₂ which has a very low gobal warming potential (GWP) of only 1.

The range features the latest technology like Stream series compressors which are characterized by their silent and reliable operation. The integrated frequency inverter controls the compressor speed exactly to the capacity demand of the application. EC-fans remove the heat from the gas cooler in the most efficient and silent way.

The state of the art electronic contoller allows for precise adjustment and control of all relevant parameters and comprises numerous electronic protection functions for highly reliable operation.

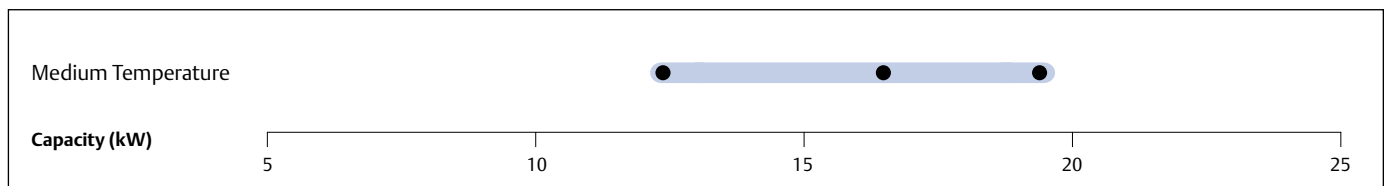
The refrigeration units are future-proof choice for various target applications:

- Convenience stores
- Forecourt sites
- Cold rooms
- Fast food stores, bars and restaurants



*Copeland™ Outdoor Refrigeration Unit
for R744-Transcritical Applications*

Refrigeration unit Line-up



EN 13215 - R744: Te = -10 °C, Ta = 32 °C, 10 K Superheat, 70 Hz

Features and Benefits

- Future-proof solution with natural GWP 1 refrigerant, not impacted by F-Gas legislation
- Low carbon footprint
- Silent operation due to special attenuation on panels and sound optimized EC fans
- High energy efficiency through inverter controlled compressor and EC fans
- Space saving design
- Time saving comissioning by pre-set parameters
- High reliability with electronic protection against incorrect voltage, phase, current and discharge temperature
- State of the art controller for precise system control
- Modbus communication and monitoring functionality
- LCD Display to show the operation status
- OilWatch maintains correct system oil level
- Controller prepared for heat recovery
- Easy access for time saving service
- Built and tested in advanced industrial processes
- Individual compressor power consumption monitoring

Design pressure:

- 90 bar in receiver and liquid line
- 120 bar on high-pressure side

Copeland Scroll™ Indoor Refrigeration Units for Refrigeration

Copeland™ air-cooled refrigeration units for medium temperature and low temperature applications.

Copeland Scroll refrigeration units are equipped with the latest refrigeration scroll compressors and build the widest range of its kind. The modular line concept offers base units which can be adapted to the target application by various options including weather housings and fan speed controls.

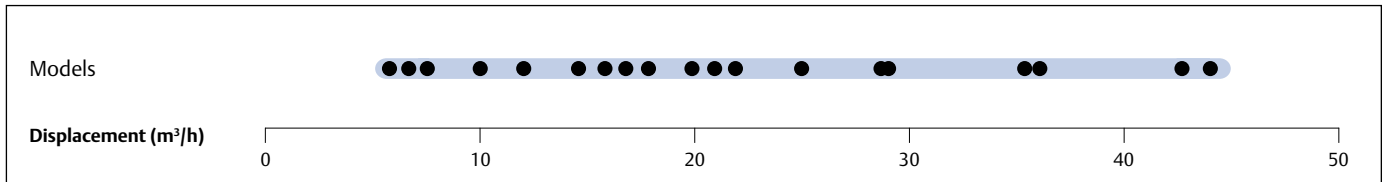
Copeland Scroll refrigeration units are available with normal or high capacity condensers to ensure optimum performance even under extreme conditions. They are equipped with dedicated medium or low temperature compressors which makes them suitable for all general refrigeration applications, such as:

- Mini markets and supermarkets
- Bars, restaurants and kitchens
- Beer cellars and beverage coolers
- Cold rooms
- Milk cooling tank

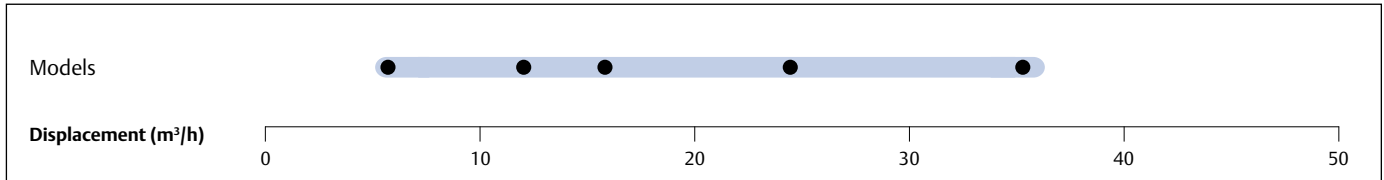


*Copeland Scroll
Indoor Refrigeration Unit*

Copeland Scroll Refrigeration Units Line-up



Copeland Scroll Digital Refrigeration Units Line-up



Features and Benefits

- Standard equipment: base plate, scroll compressor, crank case heater, condenser with 1ph fan(s), HP and LP switch, liquid receiver with rotalock-valve, suction- and discharge shut-off valves
- Suitable for multiple refrigerants: R407A/F, R448A/R449A, R404A, R134a, R450A and R513A
- Wide range of quality accessories
- Excellent efficiency and reliability

Maximum Allowable Pressures (PS)

- Low Side PS 22.5 bar (g)
- High Side PS = 28 bar (g)

Technical Overview

| Model | Displacement (m ³ /h) | Receiver Capacity (l) | Number of fans | Total Fan Motor Power (W) | Suction Line Diameter (inch) | Liquid Line Diameter (inch) | Width/Depth/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @10m - dB(A)*** |
|--|----------------------------------|-----------------------|----------------|---------------------------|------------------------------|-----------------------------|-------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|--------------------------------|
| | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZB15KE | 5.9 | 3.9 | 1 | 110 | 3/4 | 1/2 | 560/570/446 | 48.0 | PFJ | TFD | 13 | 5 | 58 | 26 | 45.8 |
| MC-H8-ZB15KE | 5.9 | 7.9 | 1 | 235 | 3/4 | 1/2 | 735/680/533 | 57.0 | PFJ | TFD | 13 | 5 | 58 | 26 | 48.6 |
| MC-D8-ZB19KE | 6.8 | 3.9 | 1 | 110 | 3/4 | 1/2 | 560/570/446 | 49.0 | PFJ | TFD | 13 | 7 | 61 | 32 | 45.9 |
| MC-K9-ZB19KE | 6.8 | 7.9 | 2 | 220 | 3/4 | 1/2 | 950/640/454 | 66.5 | PFJ | TFD | 13 | 7 | 61 | 32 | 47.5 |
| MC-H8-ZB19KE | 6.8 | 7.9 | 1 | 235 | 3/4 | 1/2 | 735/680/533 | 61.0 | PFJ | TFD | 13 | 7 | 61 | 32 | 48.7 |
| MC-D8-ZB21KE | 8.6 | 3.9 | 1 | 110 | 7/8 | 1/2 | 560/570/446 | 50.0 | PFJ | TFD | 16 | 7 | 82 | 40 | 46.4 |
| MC-H8-ZB21KE | 8.6 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 61.0 | PFJ | TFD | 16 | 7 | 82 | 40 | 48.9 |
| MC-K9-ZB21KE | 8.6 | 7.9 | 2 | 220 | 7/8 | 1/2 | 950/640/454 | 67.5 | PFJ | TFD | 16 | 7 | 82 | 40 | 47.8 |
| MC-K9-ZB26KE | 10.0 | 7.9 | 2 | 220 | 7/8 | 1/2 | 950/640/454 | 68.0 | PFJ | TFD | 18 | 9 | 97 | 46 | 47.8 |
| MC-H8-ZB26KE | 10.0 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 62.0 | PFJ | TFD | 18 | 9 | 97 | 46 | 48.9 |
| MC-H8-ZB30KE | 11.7 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 74.0 | PFJ | TFD | 26 | 10 | 142 | 49 | 49.1 |
| MC-M8-ZB30KE | 11.7 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/730/708 | 86.5 | PFJ | TFD | 26 | 10 | 142 | 49 | 48.6 |
| MC-P8-ZB30KE | 11.7 | 7.9 | 2 | 220 | 7/8 | 1/2 | 950/640/633 | 86.5 | | TFD | | 10 | | 49 | 48.5 |
| MC-H8-ZB38KE | 14.4 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 77.0 | PFJ | TFD | 32 | 13 | 142 | 66 | 49.2 |
| MC-M8-ZB38KE | 14.4 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/730/708 | 89.0 | PFJ | TFD | 32 | 13 | 142 | 66 | 48.8 |
| MC-P8-ZB38KE | 14.4 | 7.9 | 2 | 220 | 7/8 | 1/2 | 950/640/633 | 89.0 | PFJ | TFD | 32 | 13 | 142 | 66 | 48.7 |
| MC-M8-ZB42KE | 16.2 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/730/708 | 91.0 | PFJ | | 36 | | 150 | | 49.4 |
| MC-R7-ZB42KE | 16.2 | 7.9 | 2 | 470 | 7/8 | 1/2 | 1130/680/633 | 101.0 | PFJ | | 36 | | 150 | | 52.7 |
| MC-M8-ZB45KE | 17.1 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/730/708 | 91.0 | | TFD | | 13 | | 74 | 49.4 |
| MC-M9-ZB45KE | 17.1 | 7.9 | 1 | 400 | 7/8 | 1/2 | 735/730/708 | 95.5 | | TFD | | 13 | | 74 | 49.4 |
| MC-R7-ZB45KE | 17.1 | 7.9 | 2 | 470 | 7/8 | 1/2 | 1130/680/633 | 101.0 | | TFD | | 13 | | 74 | 49.5 |
| MC-R7-ZB50KE | 19.8 | 7.9 | 2 | 470 | 1 3/8 | 1/2 | 1130/820/621 | 110.0 | | TFD | | 15 | | 100 | 49.3 |
| MC-S9-ZB50KE | 22.1 | 11.7 | 2 | 470 | 1 3/8 | 5/8 | 1130/820/703 | 113.0 | | TFD | | 15 | | 100 | 49.7 |
| MC-R7-ZB58KE | 22.1 | 7.9 | 2 | 470 | 1 3/8 | 1/2 | 1130/820/621 | 110.0 | | TFD | | 16 | | 95 | |
| MC-S9-ZB58KE | 22.1 | 11.7 | 2 | 470 | 1 3/8 | 5/8 | 1130/820/703 | 113.0 | | TFD | | 16 | | 95 | |
| MC-S9-ZB66KE | 24.9 | 11.7 | 2 | 470 | 1 3/8 | 5/8 | 1130/820/707 | 116.0 | | TFD | | 18 | | 111 | 50.3 |
| MC-V9-ZB66KE | 24.9 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1330/820/821 | 150.0 | | TFD | | 18 | | 111 | 50.2 |
| MC-V9-ZB76KE | 29.1 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1330/820/835 | 151.0 | | TFD | | 20 | | 118 | 50.2 |
| MC-V6-ZB76KE | 29.1 | 15.8 | 2 | 800 | 1 3/8 | 3/4 | 1330/820/835 | 168.0 | | TFD | | 20 | | 118 | 54.7 |
| MC-V9-ZB95KE | 36.4 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1330/820/835 | 155.0 | | TFD | | 28 | | 140 | 50.7 |
| MC-V6-ZB95KE | 36.4 | 15.8 | 2 | 800 | 1 3/8 | 3/4 | 1330/820/835 | 172.0 | | TFD | | 28 | | 140 | 54.7 |
| MC-V6-ZB114KE | 43.3 | 15.8 | 2 | 800 | 1 3/8 | 3/4 | 1330/820/835 | 174.0 | | TFD | | 33 | | 174 | 54.7 |
| MC-W9-ZB114KE | 43.3 | 15.8 | 2 | 800 | 1 3/8 | 3/4 | 1640/820/864 | 174.0 | | TFD | | 33 | | 174 | 54.7 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | 11.7 | 11.7 | 1 | 235 | 7/8 | 5/8 | 735/730/708 | 86.5 | | TFD | | 8 | | 52 | 48.6 |
| MC-M9-ZBD45 | 17.1 | 11.7 | 1 | 400 | 7/8 | 5/8 | 735/730/708 | 95.5 | | TFD | | 12 | | 74 | 49.4 |
| MC-V6-ZBDT60 | 23.4 | 18.9 | 2 | 800 | 1 3/8 | 3/4 | 1330/820/835 | 207.0 | | TFD | | 8+10 | | | 57.4 |
| MC-V6-ZBDT90 | 34.1 | 18.9 | 2 | 800 | 1 3/8 | 3/4 | 1330/820/835 | 218.0 | | TFD | | 12+13 | | | 57.4 |
| MC-S9-ZF48KE | 11.7 | 11.7 | 2 | 470 | 1 3/8 | 5/8 | 1130/820/708 | 189.0 | | TWD | | 29 | | 198 | 54.7 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 10m: sound pressure level at 10m distance from the compressor, free field condition

Technical Overview

| Models | Displacement (m ³ /h) | Receiver Capacity (l) | Number of fans | Total Fan Motor Power (W) | Suction Line Diameter (inch) | Liquid Line Diameter (inch) | Width/Depth/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @10m - dB(A)*** |
|-------------------------------|----------------------------------|-----------------------|----------------|---------------------------|------------------------------|-----------------------------|-------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|--------------------------------|
| | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| Low Temperature Models | | | | | | | | | | | | | | | |
| MC-B8-ZF06KE | 3.3 | 3.3 | 1 | 85 | 7/8 | 1/2 | 560/570/396 | 64.0 | | TFD | | 5 | | 26 | 46.7 |
| MC-D8-ZF09KE | 3.9 | 3.9 | 1 | 110 | 7/8 | 1/2 | 560/570/446 | 64.0 | | TFD | | 6 | | 40 | 46.7 |
| MC-H8-ZF09KE | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 66.0 | | TFD | | 6 | | 40 | 49.1 |
| MC-H8-ZF11KE | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 67.0 | | TFD | | 7 | | 46 | 49.4 |
| MC-H8-ZF13KE | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 77.0 | | TFD | | 8 | | 52 | 49.5 |
| MC-M8-ZF13KE | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/730/708 | 85.0 | | TFD | | 8 | | 52 | 49.0 |
| MC-M9-ZF13KE | 7.9 | 7.9 | 1 | 400 | 7/8 | 1/2 | 735/730/708 | 95.5 | | TFD | | 8 | | 52 | |
| MC-H8-ZF15KE | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 83.0 | | TFD | | 10 | | 64 | 50.0 |
| MC-M8-ZF15KE | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/730/708 | 86.0 | | TFD | | 10 | | 64 | 49.6 |
| MC-R7-ZF15KE | 7.9 | 7.9 | 2 | 470 | 1 3/8 | 1/2 | 1130/680/708 | 105.0 | | TFD | | 10 | | 64 | 52.0 |
| MC-M8-ZF18KE | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/730/708 | 88.0 | | TFD | | 13 | | 74 | 49.9 |
| MC-M9-ZF18KE | 7.9 | 7.9 | 1 | 400 | 7/8 | 1/2 | 735/730/708 | 95.5 | | TFD | | 13 | | 74 | 50.0 |
| MC-S9-ZF18KE | 7.9 | 7.9 | 2 | 470 | 1 3/8 | 1/2 | 1130/680/708 | 168.0 | | TFD | | 13 | | 74 | |
| MC-S9-ZF25K5 | 11.7 | 11.7 | 2 | 470 | 1 1/8 | 5/8 | 1130/680/703 | 117.0 | | TFD | | 16 | | 102 | 54.7 |
| MC-S9-ZF34K5 | 11.7 | 11.7 | 2 | 470 | 1 3/8 | 5/8 | 1130/680/703 | 141.0 | | TFD | | 25 | | 100 | 54.7 |
| MC-V6-ZF41K5 | 11.7 | 11.7 | 2 | 800 | 1 3/8 | 3/4 | 1330/820/830 | 168.0 | | TFD | | 29 | | 118 | 57.4 |
| MC-V6-ZF49K5 | 11.7 | 11.7 | 2 | 800 | 1 3/8 | 3/4 | 1330/820/830 | 185.0 | | TFD | | 30 | | 139 | 57.4 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 10m: sound pressure level at 10m distance from the compressor, free field condition

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | | |
|----------------------------------|------------------------------|-----|-----|------|-------|------|------|----------------|------------------------------|-----|-----|------|------|-------|------|------|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 | |
| Medium Temperature Models | | | | | | | | | | | | | | | | |
| MC-H8-ZB15KE | | | | | 3.5 | 4.2 | 5.9 | MC-H8-ZB15KE | | | | | | 1.7 | 1.8 | 1.9 |
| MC-D8-ZB15KE | | | | | 3.2 | 3.8 | 5.3 | MC-D8-ZB15KE | | | | | | 1.8 | 1.9 | 2.1 |
| MC-D8-ZB19KE | | | | | 3.7* | 4.5 | 6.1 | MC-D8-ZB19KE | | | | | | 2.2* | 2.3 | 2.5 |
| MC-K9-ZB19KE | | | | | 4.1 | 4.9 | 6.8 | MC-K9-ZB19KE | | | | | | 2.1 | 2.1 | 2.3 |
| MC-H8-ZB19KE | | | | | 4.1 | 4.9 | 6.9 | MC-H8-ZB19KE | | | | | | 2.1 | 2.2 | 2.3 |
| MC-K9-ZB21KE | | | | | 4.8 | 5.8 | 8.0 | MC-K9-ZB21KE | | | | | | 2.5 | 2.6 | 2.8 |
| MC-H8-ZB21KE | | | | | 4.8 | 5.8 | 8.0 | MC-H8-ZB21KE | | | | | | 2.5 | 2.6 | 2.8 |
| MC-D8-ZB21KE | | | | | 4.2* | 5.1 | | MC-D8-ZB21KE | | | | | | 2.7* | 3.0 | |
| MC-K9-ZB26KE | | | | | 5.4 | 6.4 | 8.8 | MC-K9-ZB26KE | | | | | | 2.9 | 3.0 | 3.4 |
| MC-H8-ZB26KE | | | | | 5.4 | 6.4 | 8.9 | MC-H8-ZB26KE | | | | | | 2.9 | 3.0 | 3.4 |
| MC-M8-ZB30KE | | | | | 6.4 | 7.8 | 10.8 | MC-M8-ZB30KE | | | | | | 3.3 | 3.4 | 3.7 |
| MC-P8-ZB30KE | | | | | 6.5 | 7.8 | 10.9 | MC-P8-ZB30KE | | | | | | 3.2 | 3.4 | 3.7 |
| MC-H8-ZB30KE | | | | | 5.9* | 7.3 | | MC-H8-ZB30KE | | | | | | 3.5* | 3.7 | |
| MC-H8-ZB38KE | | | | | 7.2* | 8.6* | | MC-H8-ZB38KE | | | | | | 4.5* | 4.9* | |
| MC-P8-ZB38KE | | | | | 7.8* | 9.6 | 13.0 | MC-P8-ZB38KE | | | | | | 4.1* | 4.4 | 5.0 |
| MC-M8-ZB38KE | | | | | 7.7* | 9.5 | | MC-M8-ZB38KE | | | | | | 4.2* | 4.5 | |
| MC-R7-ZB42KE** | | | | 6.0* | 9.3 | 11.1 | 15.3 | MC-R7-ZB42KE** | | | | 4.4* | 4.8 | 5.0 | 5.3 | |
| MC-M8-ZB42KE** | | | | 5.6* | 8.2* | 10.0 | 13.4 | MC-M8-ZB42KE** | | | | 4.6* | 5.1* | 5.5 | 6.0 | |
| MC-M8-ZB45KE | | | | | 8.5* | 10.3 | | MC-M8-ZB45KE | | | | | | 5.2* | 5.6 | |
| MC-R7-ZB45KE | | | | | 9.6 | 11.5 | 15.7 | MC-R7-ZB45KE | | | | | | 4.9 | 5.1 | 5.5 |
| MC-M9-ZB45KE | | | | | 9.3 | 11.0 | 14.9 | MC-M9-ZB45KE | | | | | | 5.1 | 5.3 | 5.8 |
| MC-R7-ZB50KE | | | | | 11.0 | 13.2 | 18.0 | MC-R7-ZB50KE | | | | | | 6.0 | 6.3 | 6.9 |
| MC-S9-ZB50KE | | | | | 11.4 | 13.7 | 19.0 | MC-S9-ZB50KE | | | | | | 5.7 | 5.9 | 6.4 |
| MC-R7-ZB58KE | | | | | 11.1* | 13.8 | | MC-R7-ZB58KE | | | | | | 6.6* | 7.1 | |
| MC-S9-ZB58KE | | | | | 11.9 | 14.5 | 20.4 | MC-S9-ZB58KE | | | | | | 6.3 | 6.7 | 7.4 |
| MC-V9-ZB66KE | | | | | 13.8 | 16.7 | 23.2 | MC-V9-ZB66KE | | | | | | 6.9 | 7.3 | 8.1 |
| MC-S9-ZB66KE | | | | | 13.2 | 15.9 | 21.9 | MC-S9-ZB66KE | | | | | | 7.3 | 7.7 | 8.7 |
| MC-V9-ZB76KE | | | | | 15.8 | 19.0 | 26.3 | MC-V9-ZB76KE | | | | | | 8.2 | 8.7 | 9.8 |
| MC-V6-ZB76KE | | | | | 16.7 | 20.2 | 28.4 | MC-V6-ZB76KE | | | | | | 8.0 | 8.4 | 9.2 |
| MC-V6-ZB95KE | | | | | 19.5 | 23.5 | 32.6 | MC-V6-ZB95KE | | | | | | 10.7 | 11.3 | 12.6 |
| MC-V9-ZB95KE | | | | | 17.4* | 21.5 | | MC-V9-ZB95KE | | | | | | 11.3* | 12.1 | |
| MC-V6-ZB114KE | | | | | 21.4* | 26.8 | | MC-V6-ZB114KE | | | | | | 13.0* | 13.9 | |
| MC-W9-ZB114KE | | | | | 22.5 | 27.4 | 38.4 | MC-W9-ZB114KE | | | | | | 12.9 | 13.6 | 15.4 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|------|------|------|------|-------|--------------|------------------------------|-----|-----|------|------|------|------|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| MC-H8-ZF09KE | | 1.7 | 2.1 | 3.2 | 4.7 | 5.5 | 7.6 | MC-H8-ZF09KE | | 1.7 | 1.7 | 1.8 | 2.1 | 2.3 | 2.7 |
| MC-D8-ZF09KE | | 1.6 | 2.0 | 3.0 | 4.3 | 5.0 | 6.6* | MC-D8-ZF09KE | | 1.7 | 1.7 | 1.9 | 2.1 | 2.3 | 2.8* |
| MC-M9-ZF13KE | | 2.3 | 2.9 | 4.5 | 6.7 | 8.0 | 11.1 | MC-M9-ZF13KE | | 2.5 | 2.6 | 2.8 | 3.2 | 3.4 | 4.1 |
| MC-H8-ZF13KE | | 2.3 | 2.8 | 4.3 | 6.3 | 7.4 | 10.0 | MC-H8-ZF13KE | | 2.5 | 2.6 | 2.9 | 3.4 | 3.7 | 4.6 |
| MC-M8-ZF13KE | | 2.3 | 2.9 | 4.4 | 6.5 | 7.7 | 10.6 | MC-M8-ZF13KE | | 2.4 | 2.5 | 2.8 | 3.2 | 3.4 | 4.2 |
| MC-M8-ZF15KE | | 2.8 | 3.5 | 5.3 | 7.6 | 9.0 | 12.2 | MC-M8-ZF15KE | | 2.9 | 3.1 | 3.6 | 4.2 | 4.7 | 5.8 |
| MC-R7-ZF15KE | | 2.9 | 3.6 | 5.6 | 8.2 | 9.7 | 13.5 | MC-R7-ZF15KE | | 3.0 | 3.1 | 3.5 | 4.0 | 4.4 | 5.3 |
| MC-H8-ZF15KE | | 2.7 | 3.4 | 5.1 | 7.2 | 8.5 | | MC-H8-ZF15KE | | 3.0 | 3.3 | 3.8 | 4.6 | 5.1 | |
| MC-S9-ZF18KE | | 3.5 | 4.4 | 6.7 | 9.9 | 11.8 | 16.3 | MC-S9-ZF18KE | | 3.5 | 3.7 | 4.1 | 4.6 | 4.9 | 5.8 |
| MC-M8-ZF18KE | | 3.3 | 4.2 | 6.2 | 8.9 | 10.4 | 13.7* | MC-M8-ZF18KE | | 3.6 | 3.8 | 4.4 | 5.1 | 5.6 | 6.8* |
| MC-M9-ZF18KE | | 3.4 | 4.3 | 6.5 | 9.3 | 11.1 | 14.9 | MC-M9-ZF18KE | | 3.6 | 3.8 | 4.3 | 4.9 | 5.3 | 6.4 |
| MC-S9-ZF25K5 | | 4.4 | 5.5 | 8.5 | 12.4 | 14.8 | | MC-S9-ZF25K5 | | 4.3 | 4.6 | 5.3 | 6.2 | 6.7 | |
| MC-S9-ZF34K5 | | 5.9 | 7.5 | 11.4 | 16.4 | 19.4 | | MC-S9-ZF34K5 | | 5.6 | 6.2 | 7.4 | 9.0 | 9.9 | |
| MC-V6-ZF41K5 | | 7.4 | 9.4 | 14.2 | 20.6 | 24.4 | | MC-V6-ZF41K5 | | 6.8 | 7.4 | 8.7 | 10.2 | 11.1 | |
| MC-V6-ZF49K5 | | 8.7 | 11.1 | 16.9 | 24.5 | 29.1 | | MC-V6-ZF49K5 | | 8.3 | 9.1 | 10.8 | 12.8 | 13.9 | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | | 6.8 | 8.1 | 11.1 | MC-M8-ZBD30 | | | | | 3.4 | 3.6 | 4.0 |
| MC-M9-ZBD45 | | | | | 9.2 | 11.0 | 15.0 | MC-M9-ZBD45 | | | | | 4.9 | 5.2 | 5.8 |
| MC-V6-ZBDT60 | | | | 9.4 | 14.4 | 17.4 | 24.3 | MC-V6-ZBDT60 | | | | 6.0 | 6.4 | 6.7 | 7.3 |
| MC-V6-ZBDT90 | | | | 12.7 | 19.1 | 22.8 | 31.4 | MC-V6-ZBDT90 | | | | 8.8 | 9.5 | 9.9 | 10.9 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|-----|-----|-------|-------|-------|------|---------------|------------------------------|-----|-------|-------|-------|------|------|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-H8-ZB15KE | | | | | 3.4 | 4.1 | 5.7 | MC-H8-ZB15KE | | | | | 1.8 | 1.9 | 1.9 |
| MC-D8-ZB15KE | | | | | 3.0 | 3.7 | 5.0 | MC-D8-ZB15KE | | | | | 2.0 | 2.0 | 2.2 |
| MC-H8-ZB19KE | | | | | 4.0 | 4.8 | 6.7 | MC-H8-ZB19KE | | | | | 2.2 | 2.3 | 2.5 |
| MC-K9-ZB19KE | | | | | 4.0 | 4.8 | 6.7 | MC-K9-ZB19KE | | | | | 2.2 | 2.3 | 2.5 |
| MC-D8-ZB19KE | | | | | 3.5* | 4.3 | 5.9 | MC-D8-ZB19KE | | | | | 2.4* | 2.5 | 2.8 |
| MC-K9-ZB21KE | | | | | 4.7 | 5.6 | 7.7 | MC-K9-ZB21KE | | | | | 2.7 | 2.9 | 3.1 |
| MC-H8-ZB21KE | | | | | 3.9* | 4.7* | | MC-H8-ZB21KE | | | | | 3.0* | 3.2* | |
| MC-H8-ZB26KE | | | | | 5.1* | 6.3 | 8.6 | MC-H8-ZB26KE | | | | | 3.3* | 3.5 | 3.9 |
| MC-K9-ZB26KE | | | | | 5.1* | 6.3 | 8.6 | MC-K9-ZB26KE | | | | | 3.3* | 3.5 | 3.9 |
| MC-M8-ZB30KE | | | | 4.1* | 6.6 | 8.0 | 11.2 | MC-M8-ZB30KE | | | 3.3* | 3.5 | 3.7 | 4.1 | |
| MC-P8-ZB30KE | | | | 4.1* | 6.6 | 8.0 | 11.3 | MC-P8-ZB30KE | | | 3.2* | 3.5 | 3.6 | 4.0 | |
| MC-H8-ZB30KE | | | | | 6.1* | 7.5 | | MC-H8-ZB30KE | | | | | 3.8* | 4.0 | |
| MC-M8-ZB38KE | | | | | 7.6* | 9.3 | | MC-M8-ZB38KE | | | | | 4.7* | 4.9 | |
| MC-P8-ZB38KE | | | | | 7.7* | 9.4 | | MC-P8-ZB38KE | | | | | 4.6* | 4.9 | |
| MC-H8-ZB38KE | | | | | 7.0* | 8.4* | | MC-H8-ZB38KE | | | | | 5.0* | 5.3* | |
| MC-R7-ZB45KE | | | | 5.9* | 9.7 | 11.8 | 16.4 | MC-R7-ZB45KE | | | 4.7* | 5.2 | 5.5 | 6.0 | |
| MC-M9-ZB45KE | | | | | 9.1* | 11.2 | 15.5 | MC-M9-ZB45KE | | | | | 5.4* | 5.7 | 6.4 |
| MC-M8-ZB45KE | | | | | 8.4* | 10.2* | | MC-M8-ZB45KE | | | | | 5.6* | 6.0* | |
| MC-R7-ZB58KE | | | | | 11.7* | 14.6 | | MC-R7-ZB58KE | | | | | 7.1* | 7.6 | |
| MC-S9-ZB58KE | | | | 7.1* | 12.4* | 15.4 | 21.5 | MC-S9-ZB58KE | | | | 6.0* | 6.7* | 7.2 | 8.1 |
| MC-V9-ZB66KE | | | | 8.7* | 14.6 | 17.7 | 24.6 | MC-V9-ZB66KE | | | | 6.6* | 7.4 | 7.8 | 8.7 |
| MC-S9-ZB66KE | | | | | 13.6* | 16.8 | | MC-S9-ZB66KE | | | | | 7.7* | 8.3 | |
| MC-V9-ZB76KE | | | | 9.8* | 16.3* | 20.1 | 27.8 | MC-V9-ZB76KE | | | | 7.6* | 8.7* | 9.4 | 10.7 |
| MC-V6-ZB76KE | | | | 10.6* | 17.8 | 21.6 | 30.2 | MC-V6-ZB76KE | | | | 7.6* | 8.5 | 8.9 | 9.9 |
| MC-W9-ZB114KE | | | | 13.3* | 23.2* | 29.0 | | MC-W9-ZB114KE | | | 12.1* | 13.7* | 14.7 | | |
| MC-V6-ZB114KE | | | | | 22.6* | 28.2 | | MC-V6-ZB114KE | | | | | 14.0* | 15.1 | |
| Low Temperature Models | | | | | | | | | | | | | | | |
| MC-B8-ZF06KE | | 1.2 | 1.4 | 2.1 | | | | MC-B8-ZF06KE | | 1.5 | 1.6 | 1.8 | | | |
| MC-H8-ZF09KE | | 1.7 | 2.2 | 3.3 | 4.9 | 5.8 | 7.9 | MC-H8-ZF09KE | | 1.8 | 1.8 | 1.9 | 2.2 | 2.4 | 2.8 |
| MC-D8-ZF09KE | | 1.7 | 2.1 | 3.1 | 4.4 | 5.2 | | MC-D8-ZF09KE | | 1.8 | 1.8 | 2.0 | 2.3 | 2.5 | |
| MC-H8-ZF11KE | | 2.2 | 2.7 | 4.1 | 5.9 | 6.9 | 9.3 | MC-H8-ZF11KE | | 2.1 | 2.2 | 2.4 | 2.7 | 3.0 | 3.5 |
| MC-M9-ZF13KE | | 2.4 | 3.1 | 4.7 | 7.0 | 8.3 | 11.6 | MC-M9-ZF13KE | | 2.6 | 2.7 | 3.0 | 3.3 | 3.6 | 4.3 |
| MC-M8-ZF13KE | | 2.4 | 3.0 | 4.6 | 6.8 | 8.1 | 11.0 | MC-M8-ZF13KE | | 2.5 | 2.6 | 2.9 | 3.4 | 3.7 | 4.5 |
| MC-H8-ZF13KE | | 2.4 | 3.0 | 4.5 | 6.5 | 7.7 | | MC-H8-ZF13KE | | 2.6 | 2.8 | 3.1 | 3.6 | 4.0 | |
| MC-H8-ZF15KE | | 2.8 | 3.6 | 5.3 | 7.5 | | | MC-H8-ZF15KE | | 3.2 | 3.5 | 4.1 | 5.0 | | |
| MC-R7-ZF15KE | | 3.0 | 3.8 | 5.8 | 8.5 | 10.2 | 14.0 | MC-R7-ZF15KE | | 3.1 | 3.3 | 3.7 | 4.2 | 4.6 | 5.6 |
| MC-M8-ZF15KE | | 2.9 | 3.7 | 5.5 | 8.0 | 9.4 | | MC-M8-ZF15KE | | 3.0 | 3.3 | 3.8 | 4.5 | 5.0 | |
| MC-M8-ZF18KE | | 3.5 | 4.3 | 6.5 | 9.2 | 10.8 | | MC-M8-ZF18KE | | 3.8 | 4.1 | 4.7 | 5.5 | 6.0 | |
| MC-M9-ZF18KE | | 3.5 | 4.5 | 6.8 | 9.7 | 11.5 | | MC-M9-ZF18KE | | 3.8 | 4.0 | 4.6 | 5.2 | 5.7 | |
| MC-S9-ZF18KE | | 3.6 | 4.6 | 7.1 | 10.4 | 12.3 | 17.0 | MC-S9-ZF18KE | | 3.7 | 3.9 | 4.3 | 4.9 | 5.2 | 6.1 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | 4.6* | 6.8 | 8.1 | 10.9 | MC-M8-ZBD30 | | | | 2.8* | 3.3 | 3.6 | 4.1 |
| MC-M9-ZBD45 | | | | | 9.4* | 11.6 | 15.5 | MC-M9-ZBD45 | | | | | 5.1* | 5.5 | 6.6 |
| MC-V6-ZBDT60 | | | | 9.1* | 14.3 | 17.2 | 24.0 | MC-V6-ZBDT60 | | | | 6.1* | 6.7 | 6.9 | 7.6 |
| MC-V6-ZBDT90 | | | | 12.1* | 19.7 | 23.7 | 32.6 | MC-V6-ZBDT90 | | | | 8.7* | 10.1 | 10.7 | 12.2 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|-----|-------|------|------|------|----------------|------------------------------|-----|-----|-------|------|------|------|
| R448A | Cooling Capacity (kW) | | | | | | | R448A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZB15KE | | | | 2.1 | 3.2 | 3.8 | 5.3 | MC-D8-ZB15KE | | | | 1.7 | 1.8 | 1.8 | 2.0 |
| MC-H8-ZB15KE | | | | 2.2 | 3.5 | 4.2 | 5.9 | MC-H8-ZB15KE | | | | 1.7 | 1.7 | 1.7 | 1.8 |
| MC-D8-ZB19KE | | | | 2.3* | 3.7 | 4.4 | 6.0 | MC-D8-ZB19KE | | | | 2.0* | 2.1 | 2.2 | 2.5 |
| MC-H8-ZB19KE | | | | 2.6 | 4.0 | 4.8 | 6.6 | MC-H8-ZB19KE | | | | 1.9 | 2.0 | 2.1 | 2.3 |
| MC-K9-ZB19KE | | | | 2.6 | 3.9 | 4.7 | 6.6 | MC-K9-ZB19KE | | | | 1.9 | 2.0 | 2.0 | 2.3 |
| MC-D8-ZB21KE | | | | 2.9* | 4.5 | 5.3 | 7.0 | MC-D8-ZB21KE | | | | 2.4* | 2.8 | 3.0 | 3.4 |
| MC-H8-ZB21KE | | | | 3.3 | 4.9 | 5.9 | 8.1 | MC-H8-ZB21KE | | | | 2.3 | 2.5 | 2.6 | 2.8 |
| MC-K9-ZB21KE | | | | 3.3 | 4.9 | 5.9 | 8.1 | MC-K9-ZB21KE | | | | 2.3 | 2.5 | 2.6 | 2.9 |
| MC-H8-ZB26KE | | | | 3.8 | 5.6 | 6.7 | 9.2 | MC-H8-ZB26KE | | | | 2.8 | 3.0 | 3.1 | 3.5 |
| MC-K9-ZB26KE | | | | 3.7 | 5.6 | 6.6 | 9.1 | MC-K9-ZB26KE | | | | 2.8 | 3.0 | 3.2 | 3.5 |
| MC-H8-ZB30KE | | | | 4.0* | 6.4 | 7.5 | 10.3 | MC-H8-ZB30KE | | | | 3.2* | 3.6 | 3.8 | 4.2 |
| MC-P8-ZB30KE | | | | 4.4 | 6.7 | 8.0 | 11.0 | MC-P8-ZB30KE | | | | 3.1 | 3.3 | 3.4 | 3.8 |
| MC-M8-ZB30KE | | | | 4.4 | 6.7 | 8.0 | 10.9 | MC-M8-ZB30KE | | | | 3.1 | 3.3 | 3.5 | 3.9 |
| MC-H9-ZB38KE | | | | 4.7* | 7.5 | 8.8 | | MC-H9-ZB38KE | | | | 4.3* | 4.8 | 5.1 | |
| MC-P8-ZB38KE | | | | 5.1* | 8.0 | 9.5 | 13.0 | MC-P8-ZB38KE | | | | 3.9* | 4.3 | 4.5 | 5.1 |
| MC-M8-ZB38KE | | | | 5.0* | 8.0 | 9.4 | 12.8 | MC-M8-ZB38KE | | | | 4.0* | 4.4 | 4.6 | 5.2 |
| MC-M8-ZB42KE** | | | | 5.5* | 8.7 | 10.3 | 13.9 | MC-M8-ZB42KE** | | | | 4.6* | 5.2 | 5.5 | 6.2 |
| MC-R7-ZB42KE** | | | | 6.3 | 9.5 | 11.4 | 15.7 | MC-R7-ZB42KE** | | | | 4.4 | 4.7 | 4.9 | 5.4 |
| MC-M8-ZB45KE | | | | 5.7* | 9.0 | 10.6 | 14.3 | MC-M8-ZB45KE | | | | 4.7* | 5.2 | 5.5 | 6.3 |
| MC-R7-ZB45KE | | | | 6.5 | 9.8 | 11.8 | 16.1 | MC-R7-ZB45KE | | | | 4.5 | 4.8 | 5.0 | 5.5 |
| MC-M9-ZB45KE | | | | 6.3 | 9.5 | 11.3 | 15.4 | MC-M9-ZB45KE | | | | 4.6 | 5.0 | 5.2 | 5.9 |
| MC-R7-ZB58KE | | | | 7.1* | 12.0 | 14.4 | 19.7 | MC-R7-ZB58KE | | | | 6.1* | 6.8 | 7.2 | 8.1 |
| MC-S9-ZB58KE | | | | 7.5* | 12.5 | 15.1 | 20.8 | MC-S9-ZB58KE | | | | 5.9* | 6.4 | 6.7 | 7.5 |
| MC-S9-ZB66KE | | | | 8.6* | 13.9 | 16.5 | 22.4 | MC-S9-ZB66KE | | | | 6.7* | 7.4 | 7.8 | 8.7 |
| MC-V9-ZB66KE | | | | 9.0* | 14.5 | 17.3 | 23.7 | MC-V9-ZB66KE | | | | 6.5* | 7.0 | 7.3 | 8.1 |
| MC-V6-ZB76KE | | | | 10.9* | 17.4 | 21.0 | 29.0 | MC-V6-ZB76KE | | | | 7.4* | 8.0 | 8.4 | 9.3 |
| MC-V9-ZB76KE | | | | 10.3* | 16.6 | 19.8 | 26.9 | MC-V9-ZB76KE | | | | 7.5* | 8.3 | 8.8 | 10.0 |
| MC-V9-ZB95KE | | | | 11.2* | 18.8 | 22.5 | 30.2 | MC-V9-ZB95KE | | | | 10.2* | 11.5 | 12.3 | 14.2 |
| MC-W9-ZB114KE | | | | 14.1* | 23.6 | 28.5 | 39.3 | MC-W9-ZB114KE | | | | 11.9* | 13.1 | 13.8 | 15.6 |
| MC-V6-ZB114KE | | | | 13.8* | 23.1 | 27.9 | 38.3 | MC-V6-ZB114KE | | | | 12.2* | 13.4 | 14.1 | 16.1 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZF09KE | | 1.7 | 2.2 | 3.2 | 4.5 | 5.2 | | MC-D8-ZF09KE | | 2.0 | 2.0 | 2.2 | 2.5 | 2.7 | |
| MC-H8-ZF09KE | | 1.8 | 2.3 | 3.4 | 4.9 | 5.7 | | MC-H8-ZF09KE | | 1.9 | 1.9 | 2.0 | 2.3 | 2.5 | |
| MC-H8-ZF13KE | | 2.5 | 3.1 | 4.7 | 6.7 | 7.8 | | MC-H8-ZF13KE | | 2.6 | 2.6 | 2.9 | 3.4 | 3.7 | |
| MC-M8-ZF13KE | | 2.6 | 3.2 | 4.9 | 7.0 | 8.2 | | MC-M8-ZF13KE | | 2.5 | 2.5 | 2.8 | 3.1 | 3.4 | |
| MC-M9-ZF13KE | | 2.6 | 3.3 | 5.0 | 7.2 | 8.5 | | MC-M9-ZF13KE | | 2.6 | 2.6 | 2.8 | 3.1 | 3.4 | |
| MC-H8-ZF15KE | | 3.0 | 3.8 | 5.5 | 7.6 | | | MC-H8-ZF15KE | | 3.4 | 3.6 | 4.2 | 5.0 | | |
| MC-M8-ZF15KE | | 3.1 | 3.9 | 5.8 | 8.1 | 9.4 | | MC-M8-ZF15KE | | 3.3 | 3.4 | 3.9 | 4.5 | 5.0 | |
| MC-R7-ZF15KE | | 3.2 | 4.0 | 6.1 | 8.7 | 10.3 | | MC-R7-ZF15KE | | 3.3 | 3.4 | 3.7 | 4.3 | 4.6 | |
| MC-M8-ZF18KE | | 3.6 | 4.5 | 6.7 | 9.3 | 10.8 | | MC-M8-ZF18KE | | 4.1 | 4.2 | 4.6 | 5.4 | 5.9 | |
| MC-M9-ZF18KE | | 3.7 | 4.6 | 6.9 | 9.8 | 11.5 | | MC-M9-ZF18KE | | 4.0 | 4.0 | 4.4 | 5.0 | 5.4 | |
| MC-S9-ZF18KE | | 3.8 | 4.8 | 7.2 | 10.4 | 12.3 | | MC-S9-ZF18KE | | 3.8 | 3.8 | 4.1 | 4.6 | 4.9 | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | 4.5 | 6.8 | 8.1 | 11.1 | MC-M8-ZBD30 | | | | 2.7 | 3.2 | 3.5 | 4.1 |
| MC-M9-ZBD45 | | | | 6.5 | 9.7 | 11.6 | 15.6 | MC-M9-ZBD45 | | | | 4.0 | 4.8 | 5.2 | 6.1 |
| MC-V6-ZBDT60 | | | | 9.4 | 14.3 | 17.1 | 23.8 | MC-V6-ZBDT60 | | | | 5.8 | 6.3 | 6.6 | 7.4 |
| MC-V6-ZBDT90 | | | | 13.2 | 19.9 | 23.6 | 32.4 | MC-V6-ZBDT90 | | | | 8.3 | 9.3 | 9.9 | 11.3 |

Suction Gas Return 20°C / Subcooling OK

*Suction Superheat 10K, Subcooling OK

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|-----|-------|------|------|------|----------------|------------------------------|-----|-----|-------|------|------|------|
| R449A | Cooling Capacity (kW) | | | | | | | R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZB15KE | | | | 2.1 | 3.2 | 3.8 | 5.3 | MC-D8-ZB15KE | | | | 1.7 | 1.8 | 1.8 | 2.0 |
| MC-H8-ZB15KE | | | | 2.2 | 3.5 | 4.2 | 5.9 | MC-H8-ZB15KE | | | | 1.7 | 1.7 | 1.7 | 1.8 |
| MC-D8-ZB19KE | | | | 2.3* | 3.7 | 4.4 | 6.0 | MC-D8-ZB19KE | | | | 2.0* | 2.1 | 2.2 | 2.5 |
| MC-H8-ZB19KE | | | | 2.6 | 4.0 | 4.8 | 6.6 | MC-H8-ZB19KE | | | | 1.9 | 2.0 | 2.1 | 2.3 |
| MC-K9-ZB19KE | | | | 2.6 | 3.9 | 4.7 | 6.6 | MC-K9-ZB19KE | | | | 1.9 | 2.0 | 2.0 | 2.3 |
| MC-D8-ZB21KE | | | | 2.9* | 4.5 | 5.3 | 7.0 | MC-D8-ZB21KE | | | | 2.4* | 2.8 | 3.0 | 3.4 |
| MC-H8-ZB21KE | | | | 3.3 | 4.9 | 5.9 | 8.1 | MC-H8-ZB21KE | | | | 2.3 | 2.5 | 2.6 | 2.8 |
| MC-K9-ZB21KE | | | | 3.3 | 4.9 | 5.9 | 8.1 | MC-K9-ZB21KE | | | | 2.3 | 2.5 | 2.6 | 2.9 |
| MC-H8-ZB26KE | | | | 3.8 | 5.6 | 6.7 | 9.2 | MC-H8-ZB26KE | | | | 2.8 | 3.0 | 3.1 | 3.5 |
| MC-K9-ZB26KE | | | | 3.7 | 5.6 | 6.6 | 9.1 | MC-K9-ZB26KE | | | | 2.8 | 3.0 | 3.2 | 3.5 |
| MC-H8-ZB30KE | | | | 4.0* | 6.4 | 7.5 | 10.3 | MC-H8-ZB30KE | | | | 3.2* | 3.6 | 3.8 | 4.2 |
| MC-P8-ZB30KE | | | | 4.4 | 6.7 | 8.0 | 11.0 | MC-P8-ZB30KE | | | | 3.1 | 3.3 | 3.4 | 3.8 |
| MC-M8-ZB30KE | | | | 4.4 | 6.7 | 8.0 | 10.9 | MC-M8-ZB30KE | | | | 3.1 | 3.3 | 3.5 | 3.9 |
| MC-P8-ZB38KE | | | | 5.1* | 8.0 | 9.5 | 13.0 | MC-P8-ZB38KE | | | | 3.9* | 4.3 | 4.5 | 5.1 |
| MC-M8-ZB38KE | | | | 5.0* | 8.0 | 9.4 | 12.8 | MC-M8-ZB38KE | | | | 4.0* | 4.4 | 4.6 | 5.2 |
| MC-H8-ZB38KE | | | | 4.7* | 7.5 | 8.8 | | MC-H8-ZB38KE | | | | 4.3* | 4.8 | 5.1 | |
| MC-M8-ZB42KE** | | | | 5.5* | 8.7 | 10.3 | 13.9 | MC-M8-ZB42KE** | | | | 4.6* | 5.2 | 5.5 | 6.2 |
| MC-R7-ZB42KE** | | | | 6.3 | 9.5 | 11.4 | 15.7 | MC-R7-ZB42KE** | | | | 4.4 | 4.7 | 4.9 | 5.4 |
| MC-M8-ZB45KE | | | | 5.7* | 9.0 | 10.6 | 14.3 | MC-M8-ZB45KE | | | | 4.7* | 5.2 | 5.5 | 6.3 |
| MC-R7-ZB45KE | | | | 6.5 | 9.8 | 11.8 | 16.1 | MC-R7-ZB45KE | | | | 4.5 | 4.8 | 5.0 | 5.5 |
| MC-M9-ZB45KE | | | | 6.3 | 9.5 | 11.3 | 15.4 | MC-M9-ZB45KE | | | | 4.6 | 5.0 | 5.2 | 5.9 |
| MC-R7-ZB58KE | | | | 7.1* | 12.0 | 14.4 | 19.7 | MC-R7-ZB58KE | | | | 6.1* | 6.8 | 7.2 | 8.1 |
| MC-S9-ZB58KE | | | | 7.5* | 12.5 | 15.1 | 20.8 | MC-S9-ZB58KE | | | | 5.9* | 6.4 | 6.7 | 7.5 |
| MC-S9-ZB66KE | | | | 8.6* | 13.9 | 16.5 | 22.4 | MC-S9-ZB66KE | | | | 6.7* | 7.4 | 7.8 | 8.7 |
| MC-V9-ZB66KE | | | | 9.0* | 14.5 | 17.3 | 23.7 | MC-V9-ZB66KE | | | | 6.4* | 7.0 | 7.3 | 8.1 |
| MC-V6-ZB76KE | | | | 10.9* | 17.4 | 21.0 | 29.0 | MC-V6-ZB76KE | | | | 7.4* | 8.0 | 8.4 | 9.3 |
| MC-V9-ZB76KE | | | | 10.3* | 16.6 | 19.8 | 26.9 | MC-V9-ZB76KE | | | | 7.5* | 8.3 | 8.8 | 10.0 |
| MC-V6-ZB95KE | | | | 12.3* | 20.5 | 24.5 | 33.4 | MC-V6-ZB95KE | | | | 9.9* | 10.8 | 11.4 | 12.8 |
| MC-V9-ZB95KE | | | | 11.2* | 18.8 | 22.5 | 30.2 | MC-V9-ZB95KE | | | | 10.2* | 11.5 | 12.3 | 14.2 |
| MC-V6-ZB114KE | | | | 13.7* | 23.1 | 27.9 | 38.3 | MC-V6-ZB114KE | | | | 12.2* | 13.4 | 14.1 | 16.1 |
| MC-W9-ZB114KE | | | | 14.1* | 23.6 | 28.5 | 39.3 | MC-W9-ZB114KE | | | | 11.9* | 13.1 | 13.8 | 15.6 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZF09KE | | 1.7 | 2.2 | 3.2 | 4.5 | 5.2 | | MC-D8-ZF09KE | | 2.0 | 2.0 | 2.2 | 2.5 | 2.7 | |
| MC-H8-ZF09KE | | 1.8 | 2.3 | 3.4 | 4.9 | 5.7 | | MC-H8-ZF09KE | | 1.9 | 1.9 | 2.0 | 2.3 | 2.5 | |
| MC-H8-ZF13KE | | 2.5 | 3.1 | 4.7 | 6.7 | 7.8 | | MC-H8-ZF13KE | | 2.6 | 2.6 | 2.9 | 3.4 | 3.7 | |
| MC-M8-ZF13KE | | 2.6 | 3.2 | 4.9 | 7.0 | 8.2 | | MC-M8-ZF13KE | | 2.5 | 2.5 | 2.8 | 3.1 | 3.4 | |
| MC-M9-ZF13KE | | 2.6 | 3.3 | 5.0 | 7.2 | 8.5 | | MC-M9-ZF13KE | | 2.6 | 2.6 | 2.8 | 3.1 | 3.4 | |
| MC-H8-ZF15KE | | 3.0 | 3.8 | 5.5 | 7.6 | | | MC-H8-ZF15KE | | 3.4 | 3.6 | 4.2 | 5.0 | | |
| MC-M8-ZF15KE | | 3.1 | 3.9 | 5.8 | 8.1 | 9.4 | | MC-M8-ZF15KE | | 3.3 | 3.4 | 3.9 | 4.5 | 5.0 | |
| MC-R7-ZF15KE | | 3.2 | 4.0 | 6.1 | 8.7 | 10.3 | | MC-R7-ZF15KE | | 3.3 | 3.4 | 3.7 | 4.3 | 4.6 | |
| MC-M8-ZF18KE | | 3.6 | 4.5 | 6.7 | 9.3 | 10.8 | | MC-M8-ZF18KE | | 4.1 | 4.2 | 4.6 | 5.4 | 5.9 | |
| MC-M9-ZF18KE | | 3.7 | 4.6 | 6.9 | 9.8 | 11.5 | | MC-M9-ZF18KE | | 4.0 | 4.0 | 4.4 | 5.0 | 5.4 | |
| MC-S9-ZF18KE | | 3.8 | 4.8 | 7.2 | 10.4 | 12.3 | | MC-S9-ZF18KE | | 3.8 | 3.8 | 4.1 | 4.6 | 4.9 | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | 4.5 | 6.8 | 8.1 | 11.1 | MC-M8-ZBD30 | | | | 2.7 | 3.2 | 3.5 | 4.1 |
| MC-M9-ZBD45 | | | | 6.5 | 9.7 | 11.6 | 15.6 | MC-M9-ZBD45 | | | | 4.0 | 4.8 | 5.2 | 6.1 |
| MC-V6-ZBDT60 | | | | 9.4 | 14.3 | 17.1 | 23.8 | MC-V6-ZBDT60 | | | | 5.8 | 6.3 | 6.6 | 7.4 |
| MC-V6-ZBDT90 | | | | 13.2 | 19.9 | 23.6 | 32.4 | MC-V6-ZBDT90 | | | | 8.3 | 9.3 | 9.9 | 11.3 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|------------------------------|-----|-----|-------|------|------|------|----------------|------------------------------|-----|-----|-------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-H8-ZB15KE | | | | 2.5 | 3.6 | 4.3 | 5.8 | MC-H8-ZB15KE | | | | 1.9 | 1.9 | 1.9 | 1.9 |
| MC-D8-ZB15KE | | | | 2.2 | 3.3 | 3.8 | 5.0 | MC-D8-ZB15KE | | | | 1.9 | 2.0 | 2.0 | 2.1 |
| MC-K9-ZB19KE | | | | 2.9 | 4.1 | 4.8 | 6.5 | MC-K9-ZB19KE | | | | 2.1 | 2.2 | 2.2 | 2.4 |
| MC-H8-ZB19KE | | | | 2.9 | 4.1 | 4.8 | 6.5 | MC-H8-ZB19KE | | | | 2.1 | 2.2 | 2.3 | 2.4 |
| MC-D8-ZB19KE | | | | 2.6 | 3.7 | 4.3 | 5.6 | MC-D8-ZB19KE | | | | 2.2 | 2.4 | 2.5 | 2.6 |
| MC-H8-ZB21KE | | | | 3.6 | 5.1 | 5.9 | 7.8 | MC-H8-ZB21KE | | | | 2.6 | 2.7 | 2.8 | 3.0 |
| MC-K9-ZB21KE | | | | 3.6 | 5.1 | 5.9 | 7.8 | MC-K9-ZB21KE | | | | 2.6 | 2.7 | 2.8 | 3.0 |
| MC-D8-ZB21KE | | | | 3.2 | 4.4 | 5.0 | 6.4 | MC-D8-ZB21KE | | | | 2.8 | 3.1 | 3.2 | 3.5 |
| MC-K9-ZB26KE | | | | 4.1 | 5.7 | 6.6 | 8.7 | MC-K9-ZB26KE | | | | 3.1 | 3.3 | 3.4 | 3.6 |
| MC-H8-ZB26KE | | | | 4.1 | 5.7 | 6.6 | 8.6 | MC-H8-ZB26KE | | | | 3.1 | 3.3 | 3.4 | 3.7 |
| MC-H8-ZB30KE | | | | 4.6 | 6.4 | 7.4 | 9.6 | MC-H8-ZB30KE | | | | 3.7 | 3.9 | 4.1 | 4.4 |
| MC-P8-ZB30KE | | | | 5.0 | 7.1 | 8.3 | 11.1 | MC-P8-ZB30KE | | | | 3.3 | 3.5 | 3.5 | 3.8 |
| MC-M8-ZB30KE | | | | 4.8 | 6.8 | 7.9 | 10.5 | MC-M8-ZB30KE | | | | 3.4 | 3.6 | 3.7 | 4.0 |
| MC-H8-ZB38KE | | | | 5.3 | 7.3 | 8.4 | 10.7 | MC-H8-ZB38KE | | | | 4.8 | 5.2 | 5.4 | 6.0 |
| MC-P8-ZB38KE | | | | 6.0 | 8.4 | 9.7 | 12.9 | MC-P8-ZB38KE | | | | 4.2 | 4.5 | 4.7 | 5.1 |
| MC-M8-ZB38KE | | | | 5.7 | 8.0 | 9.2 | 12.0 | MC-M8-ZB38KE | | | | 4.4 | 4.8 | 5.0 | 5.4 |
| MC-R7-ZB42KE** | | | | 6.9 | 9.8 | 11.4 | 15.1 | MC-R7-ZB42KE** | | | | 4.8 | 5.1 | 5.2 | 5.6 |
| MC-M8-ZB42KE** | | | | 6.3 | 8.7 | 10.0 | 12.8 | MC-M8-ZB42KE** | | | | 5.1 | 5.6 | 5.8 | 6.3 |
| MC-R7-ZB45KE | | | | 7.1 | 10.1 | 11.8 | 15.6 | MC-R7-ZB45KE | | | | 5.0 | 5.3 | 5.4 | 5.8 |
| MC-M8-ZB45KE | | | | 6.5 | 8.9 | 10.3 | 13.2 | MC-M8-ZB45KE | | | | 5.3 | 5.7 | 6.0 | 6.5 |
| MC-M9-ZB45KE | | | | 6.9 | 9.6 | 11.1 | 14.5 | MC-M9-ZB45KE | | | | 5.1 | 5.5 | 5.7 | 6.1 |
| MC-S9-ZB50KE | | | | 7.9 | 12.0 | 14.2 | 18.9 | MC-S9-ZB50KE | | | | 5.8 | 6.1 | 6.3 | 6.7 |
| MC-R7-ZB50KE | | | | 7.5 | 11.4 | 13.4 | 17.7 | MC-R7-ZB50KE | | | | 6.0 | 6.5 | 6.7 | 7.2 |
| MC-R7-ZB58KE | | | | 8.5 | 12.4 | 14.5 | 18.8 | MC-R7-ZB58KE | | | | 6.7 | 7.3 | 7.6 | 8.3 |
| MC-S9-ZB58KE | | | | 8.9 | 13.1 | 15.4 | 20.3 | MC-S9-ZB58KE | | | | 6.4 | 6.9 | 7.1 | 7.7 |
| MC-S9-ZB66KE | | | | 10.3 | 14.5 | 16.8 | 21.7 | MC-S9-ZB66KE | | | | 7.4 | 7.9 | 8.2 | 8.9 |
| MC-V9-ZB66KE | | | | 10.7 | 15.1 | 17.6 | 23.0 | MC-V9-ZB66KE | | | | 7.1 | 7.6 | 7.8 | 8.5 |
| MC-V6-ZB76KE | | | | 12.9 | 18.5 | 21.6 | 28.7 | MC-V6-ZB76KE | | | | 8.0 | 8.6 | 8.9 | 9.6 |
| MC-V9-ZB76KE | | | | 12.2 | 17.2 | 19.9 | 25.8 | MC-V9-ZB76KE | | | | 8.3 | 9.0 | 9.4 | 10.3 |
| MC-V6-ZB95KE | | | | 14.9 | 21.5 | 25.2 | 33.1 | MC-V6-ZB95KE | | | | 10.7 | 11.4 | 11.9 | 13.0 |
| MC-V9-ZB95KE | | | | 12.2* | 19.3 | 22.4 | 28.7 | MC-V9-ZB95KE | | | | 11.2* | 12.4 | 13.0 | 14.3 |
| MC-W9-ZB114KE | | | | 16.8 | 24.6 | 28.8 | 38.0 | MC-W9-ZB114KE | | | | 13.2 | 14.1 | 14.6 | 16.0 |
| MC-V6-ZB114KE | | | | 15.1* | 24.3 | 28.4 | 37.3 | MC-V6-ZB114KE | | | | 13.1* | 14.3 | 14.8 | 16.2 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|------|------|------|------|------|------|--------------|------------------------------|-----|-----|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Low Temperature Models | | | | | | | | | | | | | | | |
| MC-B8-ZF06KE | | 1.3 | 1.6 | 2.2 | 2.9 | 3.2 | | MC-B8-ZF06KE | | 1.7 | 1.8 | 2.1 | 2.4 | 2.6 | |
| MC-D8-ZF09KE | | 1.9 | 2.3 | 3.3 | 4.4 | 5.0 | 6.3 | MC-D8-ZF09KE | | 2.0 | 2.1 | 2.3 | 2.6 | 2.8 | 3.2 |
| MC-H8-ZF09KE | | 2.0 | 2.5 | 3.6 | 4.9 | 5.7 | 7.5 | MC-H8-ZF09KE | | 2.0 | 2.0 | 2.2 | 2.5 | 2.6 | 3.0 |
| MC-H8-ZF11KE | | 2.5 | 3.0 | 4.3 | 5.8 | 6.7 | 8.7 | MC-H8-ZF11KE | | 2.4 | 2.5 | 2.7 | 3.1 | 3.3 | 3.8 |
| MC-M9-ZF13KE | | 2.9 | 3.6 | 5.3 | 7.3 | 8.5 | 11.2 | MC-M9-ZF13KE | | 2.6 | 2.7 | 3.0 | 3.4 | 3.6 | 4.1 |
| MC-H8-ZF13KE | | 2.8 | 3.4 | 4.9 | 6.6 | 7.6 | 9.7 | MC-H8-ZF13KE | | 2.6 | 2.7 | 3.1 | 3.5 | 3.8 | 4.3 |
| MC-M8-ZF13KE | | 2.8 | 3.5 | 5.1 | 7.0 | 8.1 | 10.6 | MC-M8-ZF13KE | | 2.5 | 2.6 | 2.9 | 3.3 | 3.6 | 4.1 |
| MC-R7-ZF15KE | | 3.5 | 4.4 | 6.4 | 8.9 | 10.4 | 13.6 | MC-R7-ZF15KE | | 3.4 | 3.6 | 4.0 | 4.5 | 4.9 | 5.7 |
| MC-M8-ZF15KE | | 3.4 | 4.2 | 5.9 | 8.1 | 9.2 | 11.7 | MC-M8-ZF15KE | | 3.3 | 3.5 | 4.0 | 4.7 | 5.1 | 6.0 |
| MC-H8-ZF15KE | | 3.3 | 4.0 | 5.6 | 7.4 | 8.4 | | MC-H8-ZF15KE | | 3.4 | 3.7 | 4.3 | 5.0 | 5.5 | |
| MC-M8-ZF18KE | | 3.9 | 4.8 | 6.8 | 9.2 | 10.5 | 13.3 | MC-M8-ZF18KE | | 4.0 | 4.3 | 4.8 | 5.5 | 5.9 | 6.8 |
| MC-M9-ZF18KE | | 4.0 | 5.0 | 7.2 | 9.8 | 11.3 | 14.6 | MC-M9-ZF18KE | | 4.0 | 4.2 | 4.6 | 5.2 | 5.6 | 6.4 |
| MC-S9-ZF18KE | | 4.2 | 5.2 | 7.6 | 10.6 | 12.4 | 16.5 | MC-S9-ZF18KE | | 3.8 | 4.0 | 4.4 | 4.9 | 5.2 | 5.9 |
| MC-S9-ZF25K5 | | 5.3 | 6.5 | 9.3 | 13.0 | 15.1 | 19.8 | MC-S9-ZF25K5 | | 4.2 | 4.5 | 5.2 | 6.1 | 6.5 | 7.5 |
| MC-S9-ZF34K5 | | 6.7 | 8.3 | 11.9 | 16.1 | 18.5 | | MC-S9-ZF34K5 | | 5.6 | 6.0 | 7.1 | 8.3 | 9.1 | |
| MC-V6-ZF41K5 | | 8.6 | 10.6 | 15.4 | 21.4 | 24.8 | 32.6 | MC-V6-ZF41K5 | | 7.0 | 7.5 | 8.7 | 10.1 | 10.8 | 12.4 |
| MC-V6-ZF49K5 | | 10.2 | 12.5 | 18.1 | 24.8 | 28.7 | | MC-V6-ZF49K5 | | 8.4 | 8.9 | 10.3 | 12.1 | 13.1 | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | 5.0 | 6.9 | 8.0 | 10.5 | MC-M8-ZBD30 | | | | 3.0 | 3.4 | 3.6 | 4.0 |
| MC-M9-ZBD45 | | | | 7.1 | 9.8 | 11.4 | 14.6 | MC-M9-ZBD45 | | | | 4.5 | 5.2 | 5.6 | 6.4 |
| MC-V6-ZBDT60 | | | | 10.4 | 14.9 | 17.6 | 23.6 | MC-V6-ZBDT60 | | | | 6.3 | 6.7 | 7.0 | 7.5 |
| MC-V6-ZBDT90 | | | | 14.1 | 20.4 | 24.1 | 32.5 | MC-V6-ZBDT90 | | | | 9.6 | 10.4 | 10.8 | 11.9 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|------------------------------|-----|-----|-------|------|------|------|----------------|------------------------------|-----|-----|-------|------|------|------|
| R407C | Cooling Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZB15KE | | | | 1.8* | 3.0 | 3.6 | 5.1 | MC-D8-ZB15KE | | | | 1.6* | 1.6 | 1.7 | 1.8 |
| MC-H8-ZB15KE | | | | 1.9* | 3.2 | 3.9 | 5.6 | MC-H8-ZB15KE | | | | 1.6* | 1.6 | 1.6 | 1.7 |
| MC-H8-ZB19KE | | | | 2.2* | 3.5 | 4.3 | 6.3 | MC-H8-ZB19KE | | | | 1.7* | 1.8 | 1.9 | 2.0 |
| MC-D8-ZB19KE | | | | 2.0* | 3.2* | 4.0 | 5.7 | MC-D8-ZB19KE | | | | 1.7* | 1.9* | 2.0 | 2.2 |
| MC-K9-ZB19KE | | | | 2.2* | 3.5 | 4.3 | 6.3 | MC-K9-ZB19KE | | | | 1.7* | 1.8 | 1.9 | 2.0 |
| MC-H8-ZB21KE | | | | 2.9* | 4.6 | 5.5 | 7.8 | MC-H8-ZB21KE | | | | 2.1* | 2.3 | 2.4 | 2.6 |
| MC-K9-ZB21KE | | | | 2.8* | 4.6 | 5.5 | 7.7 | MC-K9-ZB21KE | | | | 2.1* | 2.3 | 2.4 | 2.6 |
| MC-D8-ZB21KE | | | | 2.6* | 4.0* | 4.9* | 6.8 | MC-D8-ZB21KE | | | | 2.2* | 2.5* | 2.6* | 3.0 |
| MC-H8-ZB26KE | | | | 3.3* | 5.1* | 6.3 | 8.8 | MC-H8-ZB26KE | | | | 2.5* | 2.7* | 2.9 | 3.2 |
| MC-K9-ZB26KE | | | | 3.3* | 5.1* | 6.2 | 8.7 | MC-K9-ZB26KE | | | | 2.5* | 2.7* | 2.9 | 3.2 |
| MC-M8-ZB30KE | | | | 4.2* | 6.2* | 7.5 | 10.4 | MC-M8-ZB30KE | | | | 2.8* | 3.2* | 3.3 | 3.7 |
| MC-H8-ZB30KE | | | | 4.0* | 5.9* | 7.1 | 9.7 | MC-H8-ZB30KE | | | | 3.0* | 3.4* | 3.6 | 4.0 |
| MC-P8-ZB30KE | | | | 4.2* | 6.3 | 7.5 | 10.5 | MC-P8-ZB30KE | | | | 2.8* | 3.1 | 3.3 | 3.6 |
| MC-M8-ZB38KE | | | | 4.9* | 7.5* | 9.1 | 12.3 | MC-M8-ZB38KE | | | | 3.6* | 3.9* | 4.2 | 4.7 |
| MC-H8-ZB38KE | | | | | 7.0* | 8.4* | 11.4 | MC-H8-ZB38KE | | | | | 4.3* | 4.5* | 5.3 |
| MC-P8-ZB38KE | | | | 4.9* | 7.5* | 9.1 | 12.5 | MC-P8-ZB38KE | | | | 3.6* | 3.9* | 4.1 | 4.6 |
| MC-R7-ZB42KE** | | | | 5.7* | 8.8 | 10.5 | 14.7 | MC-R7-ZB42KE** | | | | 4.3* | 4.6 | 4.7 | 4.8 |
| MC-M8-ZB42KE** | | | | 5.3* | 7.9* | 9.4* | 13.0 | MC-M8-ZB42KE** | | | | 4.5* | 4.9* | 5.1* | 5.6 |
| MC-R7-ZB45KE | | | | 5.8* | 9.1 | 11.1 | 15.5 | MC-R7-ZB45KE | | | | 4.1* | 4.5 | 4.7 | 5.1 |
| MC-M8-ZB45KE | | | | 5.4* | 8.2* | 9.8* | 13.8 | MC-M8-ZB45KE | | | | 4.3* | 4.8* | 5.1* | 5.9 |
| MC-M9-ZB45KE | | | | 5.6* | 8.7* | 10.7 | 14.8 | MC-M9-ZB45KE | | | | 4.2* | 4.6* | 4.9 | 5.5 |
| MC-S9-ZB50KE | | | | 6.3* | 10.5 | 12.8 | 17.8 | MC-S9-ZB50KE | | | | 4.9* | 5.2 | 5.4 | 6.0 |
| MC-R7-ZB50KE | | | | 5.9* | 10.0 | 12.3 | 17.1 | MC-R7-ZB50KE | | | | 5.1* | 5.5 | 5.7 | 6.3 |
| MC-V9-ZB66KE | | | | 9.0* | 13.8 | 16.5 | 23.0 | MC-V9-ZB66KE | | | | 5.8* | 6.4 | 6.7 | 7.3 |
| MC-S9-ZB66KE | | | | | 13.3 | 15.9 | 22.0 | MC-S9-ZB66KE | | | | | 6.7 | 7.1 | 7.9 |
| MC-V6-ZB76KE | | | | 10.4* | 16.3 | 19.7 | 27.6 | MC-V6-ZB76KE | | | | 6.9* | 7.5 | 7.7 | 8.5 |
| MC-V9-ZB76KE | | | | 10.0* | 15.6 | 18.7 | 26.0 | MC-V9-ZB76KE | | | | 6.9* | 7.7 | 8.1 | 9.1 |
| MC-W9-ZB114KE | | | | 13.6* | 22.2 | 26.9 | 37.7 | MC-W9-ZB114KE | | | | 10.7* | 11.9 | 12.5 | 14.0 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|-----|------|------|------|------|----------------|------------------------------|-----|-----|------|-----|-----|-----|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZB15KE | | | | 1.4 | 2.2 | 2.7 | 3.9 | MC-D8-ZB15KE | | | | 1.0 | 1.0 | 1.1 | 1.2 |
| MC-H8-ZB15KE | | | | 1.4 | 2.3 | 2.8 | 4.1 | MC-H8-ZB15KE | | | | 1.1 | 1.1 | 1.1 | 1.2 |
| MC-H8-ZB19KE | | | | 1.6 | 2.6 | 3.2 | 4.7 | MC-H8-ZB19KE | | | | 1.2 | 1.3 | 1.3 | 1.4 |
| MC-K9-ZB19KE | | | | 1.6 | 2.6 | 3.2 | 4.7 | MC-K9-ZB19KE | | | | 1.2 | 1.2 | 1.3 | 1.3 |
| MC-D8-ZB19KE | | | | 1.6 | 2.5 | 3.1 | 4.4 | MC-D8-ZB19KE | | | | 1.1 | 1.2 | 1.3 | 1.4 |
| MC-H8-ZB21KE | | | | 2.1 | 3.2 | 4.0 | 5.7 | MC-H8-ZB21KE | | | | 1.5 | 1.5 | 1.6 | 1.7 |
| MC-K9-ZB21KE | | | | 2.1 | 3.2 | 4.0 | 5.8 | MC-K9-ZB21KE | | | | 1.4 | 1.5 | 1.6 | 1.7 |
| MC-D8-ZB21KE | | | | 1.9* | 3.1 | 3.7 | 5.3 | MC-D8-ZB21KE | | | | 1.4* | 1.5 | 1.6 | 1.8 |
| MC-H8-ZB26KE | | | | 2.3 | 3.7 | 4.5 | 6.5 | MC-H8-ZB26KE | | | | 1.7 | 1.8 | 1.8 | 2.0 |
| MC-K9-ZB26KE | | | | 2.4 | 3.7 | 4.5 | 6.5 | MC-K9-ZB26KE | | | | 1.6 | 1.7 | 1.8 | 1.9 |
| MC-M8-ZB30KE | | | | 2.8 | 4.4 | 5.3 | 7.7 | MC-M8-ZB30KE | | | | 1.9 | 2.0 | 2.0 | 2.2 |
| MC-P8-ZB30KE | | | | 2.8 | 4.4 | 5.4 | 7.8 | MC-P8-ZB30KE | | | | 1.8 | 1.9 | 2.0 | 2.1 |
| MC-H8-ZB30KE | | | | 2.7 | 4.2 | 5.2 | 7.4 | MC-H8-ZB30KE | | | | 1.9 | 2.0 | 2.1 | 2.3 |
| MC-P8-ZB38KE | | | | 3.3 | 5.4 | 6.6 | 9.5 | MC-P8-ZB38KE | | | | 2.2 | 2.4 | 2.5 | 2.7 |
| MC-M8-ZB38KE | | | | 3.3 | 5.3 | 6.5 | 9.3 | MC-M8-ZB38KE | | | | 2.2 | 2.4 | 2.5 | 2.8 |
| MC-H8-ZB38KE | | | | 3.0* | 5.1 | 6.3 | 8.9 | MC-H8-ZB38KE | | | | 2.3* | 2.6 | 2.7 | 3.0 |
| MC-R7-ZB42KE** | | | | 3.9 | 6.1 | 7.5 | 10.8 | MC-R7-ZB42KE** | | | | 2.8 | 2.9 | 2.9 | 2.9 |
| MC-M8-ZB42KE** | | | | 3.8 | 5.9 | 7.1 | 10.1 | MC-M8-ZB42KE** | | | | 2.8 | 2.9 | 3.0 | 3.1 |
| MC-M8-ZB45KE | | | | 4.0 | 6.2 | 7.6 | 10.9 | MC-M8-ZB45KE | | | | 2.7 | 2.9 | 3.0 | 3.3 |
| MC-M9-ZB45KE | | | | 4.1 | 6.4 | 7.8 | 11.3 | MC-M9-ZB45KE | | | | 2.7 | 2.9 | 3.0 | 3.3 |
| MC-R7-ZB45KE | | | | 4.2 | 6.5 | 8.0 | 11.6 | MC-R7-ZB45KE | | | | 2.8 | 2.9 | 3.0 | 3.2 |
| MC-R7-ZB50KE | | | | 4.7 | 7.3 | 8.9 | 12.8 | MC-R7-ZB50KE | | | | 3.4 | 3.5 | 3.7 | 4.0 |
| MC-S9-ZB50KE | | | | 4.8 | 7.5 | 9.1 | 13.1 | MC-S9-ZB50KE | | | | 3.3 | 3.4 | 3.5 | 3.8 |
| MC-S9-ZB58KE | | | | 5.3 | 8.3 | 10.2 | 14.6 | MC-S9-ZB58KE | | | | 3.7 | 3.8 | 4.0 | 4.3 |
| MC-R7-ZB58KE | | | | 5.2 | 8.1 | 9.9 | 14.1 | MC-R7-ZB58KE | | | | 3.8 | 4.0 | 4.1 | 4.5 |
| MC-S9-ZB66KE | | | | 6.1 | 9.4 | 11.4 | 16.4 | MC-S9-ZB66KE | | | | 4.1 | 4.3 | 4.5 | 4.9 |
| MC-V9-ZB66KE | | | | 6.2 | 9.5 | 11.6 | 16.7 | MC-V9-ZB66KE | | | | 4.0 | 4.2 | 4.4 | 4.7 |
| MC-V9-ZB76KE | | | | 7.0 | 10.8 | 13.1 | 18.8 | MC-V9-ZB76KE | | | | 4.7 | 4.9 | 5.2 | 5.6 |
| MC-V6-ZB76KE | | | | 7.1 | 11.1 | 13.6 | 19.6 | MC-V6-ZB76KE | | | | 4.9 | 5.0 | 5.2 | 5.6 |
| MC-V9-ZB95KE | | | | 8.3 | 13.3 | 16.2 | 22.9 | MC-V9-ZB95KE | | | | 5.9 | 6.4 | 6.7 | 7.4 |
| MC-V6-ZB95KE | | | | 8.6 | 13.8 | 16.9 | 24.2 | MC-V6-ZB95KE | | | | 5.9 | 6.3 | 6.5 | 7.1 |
| MC-V6-ZB114KE | | | | 9.9 | 16.1 | 19.8 | 28.4 | MC-V6-ZB114KE | | | | 7.2 | 7.6 | 8.0 | 8.7 |
| MC-W9-ZB114KE | | | | 9.9 | 16.2 | 20.0 | 28.7 | MC-W9-ZB114KE | | | | 7.1 | 7.6 | 7.9 | 8.6 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | 2.9 | 4.5 | 5.4 | 7.6 | MC-M8-ZBD30 | | | | 1.8 | 2.0 | 2.1 | 2.4 |
| MC-M9-ZBD45 | | | | 3.9* | 6.4 | 7.7 | 11.0 | MC-M9-ZBD45 | | | | 2.6* | 3.0 | 3.1 | 3.5 |
| MC-V6-ZBDT60 | | | | 5.8 | 9.1 | 11.1 | 16.0 | MC-V6-ZBDT60 | | | | 3.9 | 4.1 | 4.3 | 4.6 |
| MC-V6-ZBDT90 | | | | 8.4 | 13.0 | 15.9 | 22.9 | MC-V6-ZBDT90 | | | | 5.2 | 5.7 | 6.0 | 6.6 |

Suction Gas Return 20°C / Subcooling 0K

*Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|-----|------|------|------|------|----------------|------------------------------|-----|-----|------|-----|-----|-----|
| R450A | Cooling Capacity (kW) | | | | | | | R450A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZB15KE | | | | 1.2 | 1.9 | 2.4 | 3.5 | MC-D8-ZB15KE | | | | 0.9 | 0.9 | 0.9 | 0.9 |
| MC-H8-ZB15KE | | | | 1.2 | 2.0 | 2.5 | 3.7 | MC-H8-ZB15KE | | | | 1.0 | 1.0 | 1.0 | 1.0 |
| MC-D8-ZB19KE | | | | 1.4 | 2.2 | 2.7 | 4.0 | MC-D8-ZB19KE | | | | 1.1 | 1.1 | 1.1 | 1.2 |
| MC-H8-ZB19KE | | | | 1.4 | 2.3 | 2.8 | 4.2 | MC-H8-ZB19KE | | | | 1.1 | 1.1 | 1.1 | 1.2 |
| MC-K9-ZB19KE | | | | 1.4 | 2.3 | 2.8 | 4.2 | MC-K9-ZB19KE | | | | 1.1 | 1.1 | 1.1 | 1.2 |
| MC-D8-ZB21KE | | | | 1.6* | 2.8 | 3.4 | 4.9 | MC-D8-ZB21KE | | | | 1.3* | 1.3 | 1.4 | 1.5 |
| MC-H8-ZB21KE | | | | 1.8 | 2.9 | 3.6 | 5.3 | MC-H8-ZB21KE | | | | 1.3 | 1.4 | 1.4 | 1.4 |
| MC-K9-ZB21KE | | | | 1.8 | 2.9 | 3.6 | 5.3 | MC-K9-ZB21KE | | | | 1.3 | 1.3 | 1.3 | 1.4 |
| MC-H8-ZB26KE | | | | 2.1 | 3.3 | 4.1 | 6.0 | MC-H8-ZB26KE | | | | 1.5 | 1.6 | 1.6 | 1.7 |
| MC-K9-ZB26KE | | | | 2.1 | 3.3 | 4.1 | 6.0 | MC-K9-ZB26KE | | | | 1.5 | 1.5 | 1.6 | 1.7 |
| MC-H8-ZB30KE | | | | 2.4 | 3.8 | 4.7 | 6.9 | MC-H8-ZB30KE | | | | 1.8 | 1.8 | 1.8 | 1.9 |
| MC-M8-ZB30KE | | | | 2.4 | 3.9 | 4.9 | 7.1 | MC-M8-ZB30KE | | | | 1.7 | 1.7 | 1.8 | 1.8 |
| MC-P8-ZB30KE | | | | 2.5 | 4.0 | 4.9 | 7.2 | MC-P8-ZB30KE | | | | 1.7 | 1.7 | 1.7 | 1.8 |
| MC-H9-ZB38KE | | | | 2.7* | 4.6 | 5.7 | 8.2 | MC-H9-ZB38KE | | | | 2.2* | 2.3 | 2.4 | 2.6 |
| MC-M8-ZB38KE | | | | 3.0 | 4.8 | 5.9 | 8.6 | MC-M8-ZB38KE | | | | 2.1 | 2.2 | 2.2 | 2.4 |
| MC-P8-ZB38KE | | | | 3.0 | 4.8 | 6.0 | 8.7 | MC-P8-ZB38KE | | | | 2.1 | 2.1 | 2.2 | 2.3 |
| MC-M8-ZB42KE** | | | | 3.3 | 5.3 | 6.5 | 9.4 | MC-M8-ZB42KE** | | | | 2.4 | 2.5 | 2.5 | 2.7 |
| MC-R7-ZB42KE** | | | | 3.4 | 5.5 | 6.8 | 10.0 | MC-R7-ZB42KE** | | | | 2.5 | 2.5 | 2.6 | 2.7 |
| MC-M8-ZB45KE | | | | 3.5 | 5.5 | 6.8 | 9.8 | MC-M8-ZB45KE | | | | 2.5 | 2.5 | 2.6 | 2.8 |
| MC-M9-ZB45KE | | | | 3.5 | 5.7 | 7.0 | 10.2 | MC-M9-ZB45KE | | | | 2.6 | 2.6 | 2.7 | 2.8 |
| MC-R7-ZB45KE | | | | 3.6 | 5.8 | 7.1 | 10.5 | MC-R7-ZB45KE | | | | 2.6 | 2.6 | 2.7 | 2.8 |
| MC-R7-ZB58KE | | | | 4.5 | 7.2 | 8.8 | 12.7 | MC-R7-ZB58KE | | | | 3.3 | 3.6 | 3.8 | 4.1 |
| MC-S9-ZB58KE | | | | 4.6 | 7.3 | 8.9 | 13.0 | MC-S9-ZB58KE | | | | 3.3 | 3.5 | 3.7 | 4.0 |
| MC-S9-ZB66KE | | | | 5.1 | 8.1 | 9.9 | 14.4 | MC-S9-ZB66KE | | | | 3.6 | 3.9 | 4.1 | 4.5 |
| MC-V9-ZB66KE | | | | 5.2 | 8.2 | 10.1 | 14.6 | MC-V9-ZB66KE | | | | 3.6 | 3.9 | 4.0 | 4.4 |
| MC-V6-ZB76KE | | | | 6.0 | 9.7 | 11.9 | 17.4 | MC-V6-ZB76KE | | | | 4.4 | 4.7 | 4.9 | 5.2 |
| MC-V9-ZB76KE | | | | 5.9 | 9.4 | 11.6 | 16.9 | MC-V9-ZB76KE | | | | 4.1 | 4.5 | 4.7 | 5.2 |
| MC-V6-ZB95KE | | | | 7.3 | 11.8 | 14.5 | 21.3 | MC-V6-ZB95KE | | | | 5.4 | 5.7 | 6.0 | 6.7 |
| MC-V9-ZB95KE | | | | 7.1 | 11.3 | 14.0 | 20.3 | MC-V9-ZB95KE | | | | 5.3 | 5.7 | 6.0 | 6.8 |
| MC-V6-ZB114KE | | | | 8.4 | 13.8 | 17.0 | 24.8 | MC-V6-ZB114KE | | | | 6.5 | 7.0 | 7.3 | 8.1 |
| MC-W9-ZB114KE | | | | 8.5 | 13.8 | 17.1 | 25.0 | MC-W9-ZB114KE | | | | 6.5 | 7.0 | 7.3 | 8.0 |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | 2.5 | 4.0 | 4.9 | 7.1 | MC-M8-ZBD30 | | | | 1.5 | 1.7 | 1.8 | 2.0 |
| MC-M9-ZBD45 | | | | 3.6 | 5.8 | 7.1 | 10.2 | MC-M9-ZBD45 | | | | 2.3 | 2.6 | 2.7 | 3.0 |
| MC-V6-ZBDT60 | | | | 5.0 | 8.1 | 10.1 | 14.8 | MC-V6-ZBDT60 | | | | 3.5 | 3.6 | 3.7 | 4.0 |
| MC-V6-ZBDT90 | | | | 7.3 | 11.6 | 14.3 | 21.0 | MC-V6-ZBDT90 | | | | 4.8 | 5.1 | 5.2 | 5.7 |

Suction Gas Return 20°C / Subcooling 0K

* Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|--|------------------------------|-----|------|------|------|------|------|----------------|------------------------------|-----|-----|------|-----|-----|-----|
| R513A | Cooling Capacity (kW) | | | | | | | R513A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| | -45 | -35 | -30 | -20 | -10 | -5 | +5 | | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-D8-ZB15KE | | | | 1.4 | 2.3 | 2.8 | 4.0 | MC-D8-ZB15KE | | | | 1.1 | 1.1 | 1.1 | 1.1 |
| MC-H8-ZB15KE | | | | 1.5 | 2.4 | 2.9 | 4.2 | MC-H8-ZB15KE | | | | 1.1 | 1.1 | 1.1 | 1.1 |
| MC-D8-ZB19KE | | | | 1.6* | 2.6 | 3.2 | 4.4 | MC-D8-ZB19KE | | | | 1.2* | 1.3 | 1.3 | 1.4 |
| MC-H8-ZB19KE | | | | 1.8 | 2.8 | 3.3 | 4.8 | MC-H8-ZB19KE | | | | 1.3 | 1.3 | 1.3 | 1.4 |
| MC-K9-ZB19KE | | | | 1.8 | 2.8 | 3.4 | 4.8 | MC-K9-ZB19KE | | | | 1.3 | 1.3 | 1.3 | 1.4 |
| MC-D8-ZB21KE | | | | 2.0* | 3.3 | 3.9 | 5.3 | MC-D8-ZB21KE | | | | 1.5* | 1.6 | 1.7 | 1.8 |
| MC-H8-ZB21KE | | | | 2.3 | 3.5 | 4.2 | 5.9 | MC-H8-ZB21KE | | | | 1.5 | 1.6 | 1.6 | 1.7 |
| MC-K9-ZB21KE | | | | 2.3 | 3.5 | 4.2 | 5.9 | MC-K9-ZB21KE | | | | 1.5 | 1.6 | 1.6 | 1.7 |
| MC-H8-ZB26KE | | | | 2.5 | 3.9 | 4.7 | 6.8 | MC-H8-ZB26KE | | | | 1.8 | 1.9 | 1.9 | 2.0 |
| MC-K9-ZB26KE | | | | 2.5 | 3.9 | 4.8 | 6.8 | MC-K9-ZB26KE | | | | 1.8 | 1.8 | 1.9 | 2.0 |
| MC-H8-ZB30KE | | | | 2.7* | 4.5 | 5.5 | 7.8 | MC-H8-ZB30KE | | | | 2.0* | 2.1 | 2.2 | 2.4 |
| MC-M8-ZB30KE | | | | 3.0 | 4.6 | 5.7 | 8.2 | MC-M8-ZB30KE | | | | 2.0 | 2.0 | 2.1 | 2.2 |
| MC-P8-ZB30KE | | | | 3.0 | 4.7 | 5.8 | 8.3 | MC-P8-ZB30KE | | | | 1.9 | 2.0 | 2.0 | 2.1 |
| MC-H9-ZB38KE | | | | 3.2* | 5.4 | 6.5 | 9.2 | MC-H9-ZB38KE | | | | 2.6* | 2.8 | 2.9 | 3.1 |
| MC-M8-ZB38KE | | | | 3.4* | 5.6 | 6.8 | 9.7 | MC-M8-ZB38KE | | | | 2.5* | 2.6 | 2.7 | 2.9 |
| MC-P8-ZB38KE | | | | 3.7 | 5.7 | 7.0 | 10.0 | MC-P8-ZB38KE | | | | 2.5 | 2.6 | 2.6 | 2.8 |
| MC-M8-ZB42KE** | | | | 3.7* | 6.2 | 7.6 | 10.7 | MC-M8-ZB42KE** | | | | 2.8* | 3.0 | 3.1 | 3.3 |
| MC-R7-ZB42KE** | | | | 4.2 | 6.6 | 8.0 | 11.5 | MC-R7-ZB42KE** | | | | 2.9 | 3.0 | 3.0 | 3.2 |
| MC-M8-ZB45KE | | | | 3.9* | 6.5 | 7.8 | 11.1 | MC-M8-ZB45KE | | | | 2.9* | 3.1 | 3.2 | 3.4 |
| MC-M9-ZB45KE | | | | 4.3 | 6.7 | 8.1 | 11.6 | MC-M9-ZB45KE | | | | 3.0 | 3.1 | 3.2 | 3.4 |
| MC-R7-ZB45KE | | | | 4.4 | 6.8 | 8.3 | 12.0 | MC-R7-ZB45KE | | | | 3.0 | 3.1 | 3.1 | 3.3 |
| MC-R7-ZB58KE | | | | 5.5 | 8.4 | 10.2 | 14.4 | MC-R7-ZB58KE | | | | 3.9 | 4.1 | 4.3 | 4.7 |
| MC-S9-ZB58KE | | | | 5.5 | 8.6 | 10.5 | 14.9 | MC-S9-ZB58KE | | | | 3.9 | 4.0 | 4.1 | 4.5 |
| MC-S9-ZB66KE | | | | 6.2 | 9.6 | 11.6 | 16.4 | MC-S9-ZB66KE | | | | 4.3 | 4.5 | 4.7 | 5.1 |
| MC-V9-ZB66KE | | | | 6.3 | 9.7 | 11.8 | 16.8 | MC-V9-ZB66KE | | | | 4.3 | 4.4 | 4.5 | 4.9 |
| MC-V6-ZB76KE | | | | 7.4 | 11.5 | 14.0 | 20.2 | MC-V6-ZB76KE | | | | 5.1 | 5.3 | 5.5 | 5.8 |
| MC-V9-ZB76KE | | | | 7.2 | 11.2 | 13.6 | 19.3 | MC-V9-ZB76KE | | | | 4.9 | 5.2 | 5.4 | 5.9 |
| MC-V6-ZB95KE | | | | 8.9 | 14.0 | 17.1 | 24.3 | MC-V6-ZB95KE | | | | 6.4 | 6.7 | 6.9 | 7.4 |
| MC-V9-ZB95KE | | | | 8.6 | 13.4 | 16.2 | 22.8 | MC-V9-ZB95KE | | | | 6.3 | 6.8 | 7.1 | 7.8 |
| MC-V6-ZB114KE | | | | 10.1 | 16.3 | 19.9 | 28.1 | MC-V6-ZB114KE | | | | 7.8 | 8.2 | 8.5 | 9.1 |
| MC-W9-ZB114KE | | | | 10.2 | 16.4 | 20.0 | 28.3 | MC-W9-ZB114KE | | | | 7.7 | 8.2 | 8.4 | 9.0 |
| MC-V6-ZB114KE | | | 10.2 | | | | | MC-V6-ZB114KE | | | | | | | |
| Digital Medium Temperature Models | | | | | | | | | | | | | | | |
| MC-M8-ZBD30 | | | | 3.0 | 4.7 | 5.7 | 8.1 | MC-M8-ZBD30 | | | | 1.8 | 2.0 | 2.1 | 2.3 |
| MC-M9-ZBD45 | | | | 4.4 | 6.8 | 8.2 | 11.6 | MC-M9-ZBD45 | | | | 2.7 | 3.0 | 3.2 | 3.6 |
| MC-V6-ZBDT60 | | | | 6.2 | 9.6 | 11.9 | 17.2 | MC-V6-ZBDT60 | | | | 4.0 | 4.2 | 4.3 | 4.6 |
| MC-V6-ZBDT90 | | | | 8.8 | 13.7 | 16.8 | 24.0 | MC-V6-ZBDT90 | | | | 5.6 | 6.0 | 6.2 | 6.7 |

Suction Gas Return 20°C / Subcooling 0K

* Suction Superheat 10K, Subcooling 0K

** Single Phase only

Preliminary data

Copeland Scroll Digital™ Receiver Unit HLR

Copeland Scroll Digital Receiver Units are the perfect choice for remote condenser systems.

These Scroll Digital Receiver Units are an innovative offering by Emerson Climate Technologies for food service and retail businesses. Their compact design and the power of Digital Scroll continuous capacity modulation allow for optimized environmental integration at highest system efficiency.

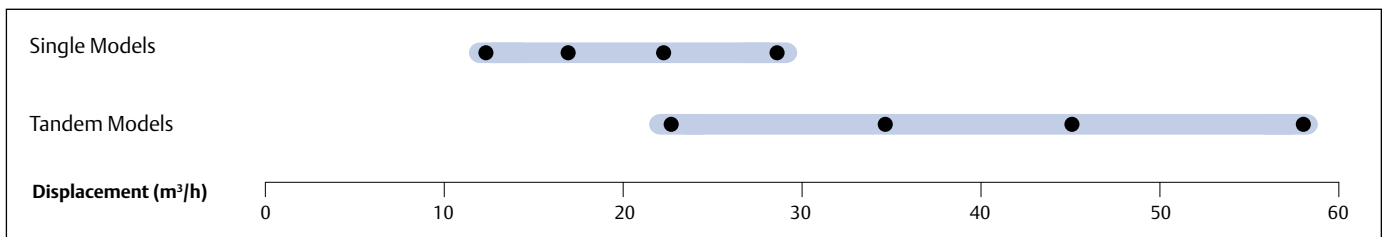
Eight models with single or tandem compressors cover the need of medium temperature refrigeration capacities in various applications. The continuous capacity modulation always provides the right performance, especially for systems with multiple evaporators and variable loads. The remote condenser concept allows for optimal building integration.



Digital Receiver Unit HLR



Digital Receiver Unit HLR Line-up



Features and Benefits

- Standard equipment: Digital Scroll compressor, liquid receiver, liquid line with filter drier and sight glass, HP/LP switch, complete electrical box including controller with overload protection and communication interface
- Continuous capacity modulation 10-100 % (Single) or 5-100 % (Tandem)
- Precise suction pressure control
- Maximum system flexibility by free choice of third party condensers
- Excellent energy efficiency
- High reliability
- Easy and quick installation
- Suitable for multiple refrigerants: R407A/F, R448A/R449A, R404A, R134a, R450A and R513A

Maximum Allowable Pressures (PS)

- Low Side PS 22.5 bar (g)
- High Side PS = 28/32 bar (g)

Technical Overview

| Models | Displacement (m ³ /h) | Receiver Capacity (l) | Suction Line Diameter (inch) | Liquid Line Diameter (inch) | Width/Depth/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @1 m - dB(A)*** | |
|--------------------------------------|----------------------------------|-----------------------|------------------------------|-----------------------------|-------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|--------------------------------|------------------|
| | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | with-out sound shell | with sound shell |
| Single Compressor Unit Models | | | | | | | | | | | | | | |
| HLR13-ZBD30KE | 11.7 | 13 | 7/8 | 5/8 | 690/400/710 | 72 | TFD | | 8 | | 52 | | 59 | 49 |
| HLR13-ZBD45KE | 17.1 | 13 | 7/8 | 5/8 | 690/400/710 | 75 | TFD | | 12 | | 74 | | 61 | 51 |
| HLR13-ZBD58KE | 22.1 | 13 | 1 1/8 | 3/4 | 725/400/710 | 84 | TFD | | 15 | | 95 | | 65 | 55 |
| HLR13-ZBD76KE | 28.8 | 13 | 1 3/8 | 3/4 | 725/400/710 | 90 | TFD | | 20 | | 118 | | 66 | 56 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | |
| HLR31-ZBDT60KE | 23.4 | 31 | 1 3/8 | 7/8 | 970/480/910 | 130 | TFD | | 8+8 | | 52 + 52 | | 62 | - |
| HLR31-ZBDT90KE | 34.1 | 31 | 1 3/8 | 7/8 | 970/480/910 | 138 | TFD | | 12 + 12 | | 74 + 74 | | 64 | - |
| HLR31-ZBDT116KE | 44.2 | 31 | 1 5/8 | 1 1/8 | 970/480/870 | 165 | TFD | | 15 + 15 | | 95 + 95 | | 68 | - |
| HLR31-ZBDT152KE | 58.2 | 31 | 1 5/8 | 1 3/8 | 970/480/870 | 175 | TFD | | 20 + 20 | | 118 + 118 | | 69 | - |

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|--------------------------------------|------------------------------|-----|-----|-------|------|------|------|-----------------|------------------------------|-----|-----|------|-----|-----|-----|
| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | | 4.0* | 6.8 | 8.4 | 12.4 | HLR13-ZBD30KCE | | | | 3.2* | 3.1 | 3.2 | 3.2 |
| HLR13-ZBD45KCE | | | | 5.5* | 9.4 | 11.7 | 17.2 | HLR13-ZBD45KCE | | | | 4.4* | 4.3 | 4.4 | 4.4 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | | 8.0* | 13.6 | 16.8 | 24.6 | HLR31-ZBDT60KCE | | | | 6.2* | 6.2 | 6.2 | 6.3 |
| HLR31-ZBDT90KCE | | | | 11.4* | 18.9 | 23.2 | 34.1 | HLR31-ZBDT90KCE | | | | 8.7* | 8.8 | 8.8 | 8.8 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K

Preliminary data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|------------------------------|------------------------------|-----|------|-------|------|------|------|-----------------|------------------------------|-----|------|------|-----|-----|-----|
| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| HLR13-ZBD30KCE | | | 2.8* | 4.8 | 7.3 | 8.8 | 12.8 | HLR13-ZBD30KCE | | | 2.0* | 2.5 | 2.8 | 2.9 | 3.1 |
| HLR13-ZBD45KCE | | | | 6.4* | 10.8 | 13.2 | 18.9 | HLR13-ZBD45KCE | | | | 3.7* | 4.1 | 4.3 | 4.6 |
| HLR31-ZBDT60KCE | | | | 8.9* | 14.5 | 17.7 | 25.7 | HLR31-ZBDT60KCE | | | | 5.4* | 5.7 | 5.8 | 6.0 |
| HLR31-ZBDT90KCE | | | | 12.4* | 21.2 | 26.1 | 37.9 | HLR31-ZBDT90KCE | | | | 7.8* | 8.4 | 8.5 | 8.8 |

Conditions: EN12900: Condensing Temperature 45°C, Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN12900: Condensing Temperature 45°C, Suction Superheat 10K

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|--------------------------------------|------------------------------|-----|-----|-------|------|-------|------|------------------|------------------------------|-----|-----|-------|------|-------|------|
| R448A | Cooling Capacity (kW) | | | | | | | R448A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | | 4.1* | 6.8 | 8.3 | 12.1 | HLR13-ZBD30KCE | | | | 2.7* | 3.0 | 3.1 | 3.4 |
| HLR13-ZBD45KCE | | | | 6.0* | 10.0 | 12.2 | 17.7 | HLR13-ZBD45KCE | | | | 3.8* | 4.2 | 4.4 | 4.8 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | | 8.2* | 13.5 | 16.6 | 24.2 | HLR31-ZBDT60KCE | | | | 5.4* | 5.9 | 6.2 | 6.8 |
| HLR31-ZBDT90KCE | | | | 12.0* | 20 | 24.4 | 35.4 | HLR31-ZBDT90KCE | | | | 7.6* | 8.4 | 8.8 | 9.6 |
| HLR31-ZBDT116KCE | | | | 13.7* | 25.5 | 31.7 | 46.2 | HLR31-ZBDT116KCE | | | | 11.9* | 11.8 | 11.9 | 12.1 |
| HLR31-ZBDT152KCE | | | | 19.8* | 34.9 | 43.10 | 62.5 | HLR31-ZBDT152KCE | | | | 15.8* | 16.0 | 16.10 | 16.5 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K

Preliminary data

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|-------------------------------|------------------------------|-----|-----|-------|------|-------|------|------------------|------------------------------|-----|-----|-------|------|-------|------|
| R449A | Cooling Capacity (kW) | | | | | | | R449A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | | 4.1* | 6.8 | 8.3 | 12.1 | HLR13-ZBD30KCE | | | | 2.7* | 3.0 | 3.1 | 3.4 |
| HLR13-ZBD45KCE | | | | 6.0* | 10.0 | 12.2 | 17.7 | HLR13-ZBD45KCE | | | | 3.8* | 4.2 | 4.4 | 4.8 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | | 8.2* | 13.5 | 16.6 | 24.2 | HLR31-ZBDT60KCE | | | | 5.4* | 5.9 | 6.2 | 6.8 |
| HLR31-ZBDT90KCE | | | | 11.9* | 20.0 | 24.4 | 35.4 | HLR31-ZBDT90KCE | | | | 7.6* | 8.4 | 8.8 | 9.6 |
| HLR31-ZBDT116KCE | | | | 13.7* | 25.5 | 31.7 | 46.2 | HLR31-ZBDT116KCE | | | | 11.9* | 11.8 | 11.9 | 12.1 |
| HLR31-ZBDT152KCE | | | | 19.7* | 34.9 | 43.10 | 62.5 | HLR31-ZBDT152KCE | | | | 15.8* | 16.0 | 16.10 | 16.5 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K

Preliminary data

| Condensing Temperature: 45°C | | | | | | | | | | | | | | | |
|-------------------------------|------------------------------|-----|------|------|------|------|------|-----------------|------------------------------|-----|-------|------|------|------|------|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | 2.7* | 4.8 | 7.0 | 8.4 | 11.8 | HLR13-ZBD30KCE | | | 2.4* | 2.9 | 3.1 | 3.2 | 3.5 |
| HLR13-ZBD45KCE | | | 3.4* | 6.6 | 10.2 | 12.5 | 18.0 | HLR13-ZBD45KCE | | | 4.4* | 4.6 | 4.8 | 4.9 | 5.2 |
| HLR13-ZBD58KCE | | | | 8.6 | 13.5 | 16.3 | 22.9 | HLR13-ZBD58KCE | | | | 6.4 | 6.4 | 6.4 | 6.4 |
| HLR13-ZBD76KCE | | | | 11.8 | 17.9 | 21.4 | 30.2 | HLR13-ZBD76KCE | | | | 8.1 | 8.3 | 8.3 | 8.4 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | 5.4* | 9.6 | 14.1 | 16.9 | 23.6 | HLR31-ZBDT60KCE | | | 4.9* | 5.8 | 6.3 | 6.5 | 6.9 |
| HLR31-ZBDT90KCE | | | 7.0* | 13.4 | 20.3 | 24.5 | 35.0 | HLR31-ZBDT90KCE | | | 9.2* | 9.4 | 9.6 | 9.7 | 9.9 |
| HLR31-ZBDT116KE | | | 6.4* | 17.0 | 26.7 | 32.4 | 45.8 | HLR31-ZBDT116KE | | | 13.1* | 12.7 | 12.7 | 12.7 | 12.8 |
| HLR31-ZBDT152KE | | | | 23.7 | 35.7 | 42.9 | 60.3 | HLR31-ZBDT152KE | | | | 16.2 | 16.4 | 16.5 | 16.8 |

Conditions: EN12900: Condensing Temperature 45°C, Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN12900: Condensing Temperature 45°C, Suction Superheat 10K

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|-------------------------------|------------------------------|-----|-----|-----|-------|------|------|-----------------|------------------------------|-----|-----|-----|------|-----|-----|
| R407C | Cooling Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | | | 6.2 | 7.6 | 11.1 | HLR13-ZBD30KCE | | | | | 3.0 | 3.0 | 3.0 |
| HLR13-ZBD45KCE | | | | | 8.9 | 11.1 | 16.5 | HLR13-ZBD45KCE | | | | | 4.1 | 4.1 | 4.2 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | | | 12.2* | 15.2 | 22.2 | HLR31-ZBDT60KCE | | | | | 6.0* | 6.0 | 6.1 |
| HLR31-ZBDT90KCE | | | | | 17.5* | 22.2 | 32.9 | HLR31-ZBDT90KCE | | | | | 8.3* | 8.3 | 8.4 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Suction Superheat 10K

Capacity Data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|-------------------------------|------------------------------|-----|-----|-----|------|------|------|------------------|------------------------------|-----|-----|-----|-----|-----|------|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | | | 4.3 | 5.2 | 7.5 | HLR13-ZBD30KCE | | | | | 1.9 | 2.0 | 2.2 |
| HLR13-ZBD45KCE | | | | | 6.0 | 7.5 | 11.2 | HLR13-ZBD45KCE | | | | | 2.7 | 2.9 | 3.1 |
| HLR13-ZBD58KCE | | | | | 7.8 | 9.7 | 14.4 | HLR13-ZBD58KCE | | | | | 3.8 | 3.8 | 3.9 |
| HLR31-ZBD76KCE | | | | | 10.2 | 12.7 | 18.9 | HLR31-ZBD76KCE | | | | | 4.9 | 5.0 | 5.1 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | | | 8.3 | 10.3 | 15.2 | HLR31-ZBDT60KCE | | | | | 3.9 | 4.0 | 4.2 |
| HLR31-ZBDT90KCE | | | | | 12.1 | 15.1 | 22.6 | HLR31-ZBDT90KCE | | | | | 5.5 | 5.6 | 5.9 |
| HLR31-ZBDT116KCE | | | | | 15.6 | 19.4 | 28.8 | HLR31-ZBDT116KCE | | | | | 7.5 | 7.6 | 7.8 |
| HLR31-ZBDT152KCE | | | | | 20.4 | 25.3 | 37.8 | HLR31-ZBDT152KCE | | | | | 9.8 | 9.9 | 10.2 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K
Preliminary data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|-------------------------------|------------------------------|-----|-----|------|------|------|------|-----------------|------------------------------|-----|-----|------|-----|-----|-----|
| R450A | Cooling Capacity (kW) | | | | | | | R450A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | | 2.0* | 3.6 | 4.6 | 6.9 | HLR13-ZBD30KCE | | | | 1.5* | 1.6 | 1.7 | 1.8 |
| HLR13-ZBD45KCE | | | | 3.0* | 5.4 | 6.7 | 10.2 | HLR13-ZBD45KCE | | | | 2.2* | 2.4 | 2.5 | 2.8 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | | 4.1* | 7.3 | 9.1 | 13.8 | HLR31-ZBDT60KCE | | | | 3.0* | 3.2 | 3.3 | 3.6 |
| HLR31-ZBDT90KCE | | | | 5.9* | 10.8 | 13.5 | 20.3 | HLR31-ZBDT90KCE | | | | 4.4* | 4.7 | 4.9 | 5.3 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K
Preliminary data

| Condensing Temperature: 40°C | | | | | | | | | | | | | | | |
|-------------------------------|------------------------------|-----|-----|------|------|------|------|-----------------|------------------------------|-----|-----|------|-----|-----|-----|
| R513A | Cooling Capacity (kW) | | | | | | | R513A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Single Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR13-ZBD30KCE | | | | 2.5* | 4.3 | 5.4 | 8.0 | HLR13-ZBD30KCE | | | | 1.8* | 1.9 | 2.0 | 2.1 |
| HLR13-ZBD45KCE | | | | 3.6* | 6.4 | 7.9 | 11.9 | HLR13-ZBD45KCE | | | | 2.6* | 2.8 | 2.9 | 3.1 |
| Tandem Compressor Unit Models | | | | | | | | | | | | | | | |
| HLR31-ZBDT60KCE | | | | 5.0* | 8.7 | 10.8 | 16.0 | HLR31-ZBDT60KCE | | | | 3.5* | 3.9 | 4.0 | 4.2 |
| HLR31-ZBDT90KCE | | | | 7.3* | 12.8 | 15.9 | 23.7 | HLR31-ZBDT90KCE | | | | 5.1* | 5.6 | 5.8 | 6.3 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K
Preliminary data

Semi-Hermetic Refrigeration Units K/L Compressors

Copeland™ air-cooled indoor refrigeration units for medium temperature and low temperature applications.

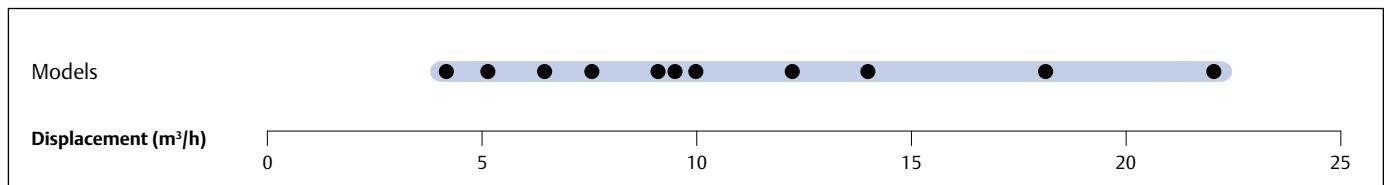
Long-term engineering and manufacturing experience has led to these refrigeration units with reed valve technology compressors. Their excellent quality and reliability is traditionally well known in the refrigeration industry.

This series of refrigeration units is equipped with single fan or twin fans which allows for very compact dimensions. The wide range of models offers solutions for most applications including operation in extreme conditions like high evaporation temperatures and high ambient temperatures.



Semi-Hermetic Refrigeration Unit K/L Compressors

Semi-Hermetic K & L Refrigeration Units Line-up



Features and Benefits

- Standard equipment: compressor, condenser with thermally protected fan(s), discharge line with flexible pipe loop or vibration absorber, liquid receiver with shut-off-valve, HP/LP switch with automatic reset
- Suitable for a broad range of refrigerants: R407A/F, R404A and R134a
- Wide range of quality accessories
- Proven reliability

Maximum Allowable Pressures (PS)

- Low Side PS 22.5 bar (g)
- High Side PS = 28 bar (g)

Technical Overview

| Models | Displacement (m ³ /h) | Receiver Capacity (l) | Number of fans | Total Fan Motor Power (W) | Suction Line Diameter (inch) | Liquid Line Diameter (inch) | Width/Depth/Height (mm) | Net Weight (kg) | Motor Version/Code | | Maximum Operating Current (A) | | Locked Rotor Current (A) | | Sound Pressure @ 10m - dB(A)*** |
|---------------------|----------------------------------|-----------------------|----------------|---------------------------|------------------------------|-----------------------------|-------------------------|-----------------|--------------------|--------|-------------------------------|--------|--------------------------|--------|---------------------------------|
| | | | | | | | | | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | 1 Ph* | 3 Ph** | |
| B8-KJ-10X-B | 3.3 | 3.3 | 1 | 85 | 5/8 | 1/2 | 560/570/396 | 57.5 | CAG | EWL | 7 | 3 | 32 | 16 | 39.0 |
| B8-KJ-7X-B | 3.3 | 3.3 | 1 | 85 | 5/8 | 1/2 | 560/570/396 | 57.5 | CAG | EWL | 6 | 2 | 35 | 12 | |
| B8-KL-15X-B | 3.3 | 3.3 | 1 | 85 | 5/8 | 1/2 | 560/570/396 | 57.5 | CAG | EWL | 8 | 3 | 43 | 19 | 39.5 |
| B8-KM-5X-B | 3.3 | 3.3 | 1 | 85 | 5/8 | 1/2 | 560/570/396 | 56.0 | CAG | EWL | 5 | 2 | 24 | 12 | 39.0 |
| B8-KM-7X-B | 3.3 | 3.3 | 1 | 85 | 1/2 | 1/2 | 560/570/396 | 57.5 | CAG | EWL | 6 | 2 | 35 | 12 | |
| B8-KSJ-10X-B | 3.3 | 3.3 | 1 | 85 | 5/8 | 1/2 | 560/570/396 | 58.5 | CAG | EWL | 7 | 3 | 32 | 16 | |
| D8-KSJ-15X-B | 3.9 | 3.9 | 1 | 110 | 7/8 | 1/2 | 560/570/446 | 62.0 | CAG | EWL | 9 | 3 | 43 | 19 | 45.6 |
| D8-KSL-20X-B | 3.9 | 3.9 | 1 | 110 | 5/8 | 1/2 | 560/570/446 | 60.0 | | EWL | | 5 | | 23 | |
| D8-LE-20X-B | 3.9 | 3.9 | 1 | 110 | 7/8 | 1/2 | 560/715/446 | 96.5 | | EWL | | 6 | | 38 | |
| D8-LF-20X-B | 3.9 | 3.9 | 1 | 110 | 7/8 | 1/2 | 560/715/446 | 98.5 | | EWL | | 6 | | 38 | |
| H8-KSL-20X-B | 7.9 | 7.9 | 1 | 235 | 5/8 | 1/2 | 735/680/533 | 60.0 | | EWL | | 5 | | 23 | |
| H8-LE-20X-B | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 108.0 | | EWL | | 6 | | 38 | |
| H8-LF-30X-B | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 108.0 | | EWL | | 7 | | 51 | 48.5 |
| H8-LJ-20X-B | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 103.0 | | EWL | | 6 | | 38 | |
| H8-LJ-30X-B | 7.9 | 7.9 | 1 | 235 | 7/8 | 1/2 | 735/680/533 | 108.0 | | EWL | | 7 | | 51 | 48.5 |
| H8-LL-30X-B | 7.9 | 7.9 | 1 | 235 | 1 1/8 | 1/2 | 735/680/533 | 110.0 | | EWL | | 7 | | 53 | 48.5 |
| H8-LL-40X-B | 7.9 | 7.9 | 1 | 235 | 1 1/8 | 1/2 | 735/680/533 | 112.0 | | EWL | | 10 | | 59 | 48.6 |
| H8-LSG-40X-B | 7.9 | 7.9 | 1 | 235 | 1 1/8 | 1/2 | 735/680/533 | 116.0 | | EWL | | 9 | | 69 | |
| K9-LL-30X-B | 7.9 | 7.9 | 2 | 220 | 1 1/8 | 1/2 | 950/640/454 | 134.0 | | EWL | | 7 | | 53 | 47.2 |
| K9-LSG-40X-B | 7.9 | 7.9 | 2 | 220 | 1 1/8 | 1/2 | 950/640/454 | 131.0 | | EWL | | 9 | | 69 | 50.9 |
| P8-LF-30X-B | 7.9 | 7.9 | 2 | 220 | 1 1/8 | 1/2 | 950/640/633 | 127.0 | | EWL | | 7 | | 51 | 47.8 |
| P8-LJ-30X-B | 7.9 | 7.9 | 2 | 220 | 7/8 | 1/2 | 950/640/633 | 127.0 | | EWL | | 7 | | 51 | 47.8 |
| P8-LL-40X-B | 7.9 | 7.9 | 2 | 220 | 1 1/8 | 1/2 | 950/640/633 | 128.0 | | EWL | | 10 | | 59 | 48.0 |

* 1ph: 230V/ 50Hz

** 3 Ph: 380-420V/ 50Hz

*** @ 10m: sound pressure level at 10m distance from the compressor, free field condition

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|-----|------------------------------|-----|-----|-----|------|------|--------------|-----|------------------------------|-----|-----|-----|-----|-----|
| R407A | | Cooling Capacity (kW) | | | | | | R407A | | Power Input (kW) | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| B8-KM-5X-B | | 0.5 | 0.7 | 1.2 | | | | B8-KM-5X-B | | 0.5 | 0.6 | 0.7 | | | |
| B8-KM-7X-B | | 0.5 | 0.7 | 1.2 | 1.8 | 2.2 | 3.0 | B8-KM-7X-B | | 0.6 | 0.6 | 0.8 | 0.9 | 1.0 | 1.2 |
| B8-KJ-7X-B | | 0.7 | 0.9 | 1.5 | | | | B8-KJ-7X-B | | 0.7 | 0.8 | 1.0 | | | |
| B8-KJ-10X-B | | 0.7 | 0.9 | 1.5 | 2.3 | 2.7 | | B8-KJ-10X-B | | 0.6 | 0.7 | 0.9 | 1.2 | 1.4 | |
| D8-KSJ-15X-B | | 0.9 | 1.2 | 2.0 | 3.0 | 3.6 | | D8-KSJ-15X-B | | 0.9 | 1.0 | 1.3 | 1.5 | 1.7 | |
| B8-KSJ-10X-B | | 0.9 | 1.2 | 1.9 | | | | B8-KSJ-10X-B | | 0.9 | 1.0 | 1.3 | | | |
| B8-KL-15X-B | | 1.0 | 1.3 | 2.1 | | | | B8-KL-15X-B | | 1.0 | 1.1 | 1.4 | | | |
| D8-LE-20X-B | | 0.9 | 1.4 | 2.6 | 4.1 | 5.0 | | D8-LE-20X-B | | 0.9 | 1.1 | 1.5 | 2.0 | 2.2 | |
| H8-LE-20X-B | | 0.9 | 1.5 | 2.8 | 4.6 | 5.6 | 7.9 | H8-LE-20X-B | | 1.0 | 1.2 | 1.6 | 2.1 | 2.3 | 2.7 |
| H8-LF-30X-B | | 1.3 | 2.0 | 3.7 | 5.9 | 7.1 | | H8-LF-30X-B | | 1.4 | 1.6 | 2.2 | 2.8 | 3.1 | |
| P8-LF-30X-B | | 1.4 | 2.1 | 3.9 | 6.2 | 7.5 | 10.6 | P8-LF-30X-B | | 1.3 | 1.6 | 2.2 | 2.7 | 3.0 | 3.6 |
| D8-LF-20X-B | | 1.3 | 1.8 | 3.2 | | | | D8-LF-20X-B | | 1.2 | 1.5 | 2.0 | | | |
| P8-LJ-30X-B | | 1.9 | 2.6 | 4.5 | 6.9 | 8.3 | | P8-LJ-30X-B | | 1.7 | 1.9 | 2.6 | 3.2 | 3.6 | |
| H8-LJ-20X-B | | 1.6 | 2.3 | 4.2 | | | | H8-LJ-20X-B | | 1.5 | 1.8 | 2.5 | | | |
| H8-LJ-30X-B | | 1.8 | 2.6 | 4.3 | 6.6 | 7.9 | | H8-LJ-30X-B | | 1.7 | 2.0 | 2.6 | 3.3 | 3.7 | |
| H8-LL-40X-B | | 2.1 | 3.1 | 5.3 | 8.0 | 9.5 | | H8-LL-40X-B | | 1.9 | 2.2 | 3.1 | 4.1 | 4.6 | |
| H8-LL-30X-B | | 2.1 | 3.0 | 5.2 | | | | H8-LL-30X-B | | 1.8 | 2.2 | 3.1 | | | |
| P8-LL-40X-B | | 2.2 | 3.2 | 5.6 | 8.6 | 10.4 | | P8-LL-40X-B | | 1.9 | 2.2 | 3.1 | 4.0 | 4.5 | |
| K9-LSG-40X-B | | 2.7 | 3.8 | 6.3 | | | | K9-LSG-40X-B | | 2.3 | 2.7 | 3.8 | | | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|------------------------------|-----|-----|-----|-----|------|------|--------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| B8-KM-7X-B | 0.3 | 0.6 | 0.8 | 1.3 | 1.9 | 2.2 | 3.0 | B8-KM-7X-B | 0.4 | 0.6 | 0.7 | 0.8 | 1.0 | 1.1 | 1.3 |
| B8-KM-5X-B | 0.3 | 0.6 | 0.8 | 1.3 | | | | B8-KM-5X-B | 0.5 | 0.6 | 0.6 | 0.8 | | | |
| B8-KJ-7X-B | 0.4 | 0.8 | 1.1 | 1.7 | | | | B8-KJ-7X-B | 0.6 | 0.8 | 0.9 | 1.1 | | | |
| B8-KJ-10X-B | 0.4 | 0.8 | 1.1 | 1.7 | 2.4 | 2.8 | 3.6 | B8-KJ-10X-B | 0.5 | 0.8 | 0.9 | 1.1 | 1.4 | 1.5 | 1.8 |
| D8-KSJ-15X-B | 0.6 | 1.1 | 1.4 | 2.2 | 3.2 | 3.8 | | D8-KSJ-15X-B | 0.7 | 1.0 | 1.1 | 1.4 | 1.8 | 1.9 | |
| B8-KSJ-10X-B | 0.6 | 1.1 | 1.3 | | | | | B8-KSJ-10X-B | 0.8 | 1.0 | 1.2 | | | | |
| B8-KL-15X-B | 0.7 | 1.2 | 1.5 | 2.3 | | | | B8-KL-15X-B | 0.9 | 1.1 | 1.3 | 1.6 | | | |
| H8-KSL-20X-B | 0.9 | 1.7 | 2.2 | 3.3 | 4.8 | 5.7 | | H8-KSL-20X-B | 1.1 | 1.5 | 1.7 | 2.1 | 2.6 | 2.8 | |
| D8-KSL-20X-B | 0.9 | 1.6 | 2.0 | 3.1 | 4.3 | | | D8-KSL-20X-B | 1.0 | 1.3 | 1.5 | 2.0 | 2.6 | | |
| H8-LE-20X-B | | 1.3 | 1.9 | 3.2 | 4.8 | 5.8 | 7.8 | H8-LE-20X-B | | 1.2 | 1.4 | 1.9 | 2.3 | 2.5 | 3.0 |
| D8-LE-20X-B | | 1.2 | 1.7 | 2.9 | 4.3 | 5.0 | | D8-LE-20X-B | | 1.1 | 1.3 | 1.7 | 2.2 | 2.5 | |
| H8-LF-30X-B | 0.9 | 2.1 | 2.7 | 4.4 | 6.3 | 7.4 | | H8-LF-30X-B | 1.3 | 1.9 | 2.1 | 2.7 | 3.3 | 3.6 | |
| P8-LF-30X-B | 1.0 | 2.1 | 2.9 | 4.7 | 6.9 | 8.2 | 11.1 | P8-LF-30X-B | 1.3 | 1.9 | 2.1 | 2.6 | 3.2 | 3.4 | 4.0 |
| D8-LF-20X-B | | 1.7 | 2.2 | 3.5 | | | | D8-LF-20X-B | | 1.5 | 1.8 | 2.4 | | | |
| H8-LJ-20X-B | | 2.1 | 2.9 | | | | | H8-LJ-20X-B | | 1.8 | 2.2 | | | | |
| P8-LJ-30X-B | 1.1 | 2.4 | 3.2 | 5.1 | 7.5 | 8.9 | 11.9 | P8-LJ-30X-B | 1.4 | 2.0 | 2.3 | 3.0 | 3.6 | 4.0 | 4.6 |
| H8-LJ-30X-B | 1.1 | 2.3 | 3.0 | 4.7 | 6.8 | 7.9 | | H8-LJ-30X-B | 1.4 | 2.0 | 2.4 | 3.0 | 3.8 | 4.2 | |
| H8-LL-40X-B | 1.4 | 2.8 | 3.6 | 5.7 | 8.1 | 9.4 | | H8-LL-40X-B | 1.7 | 2.4 | 2.8 | 3.7 | 4.7 | 5.3 | |
| H8-LL-30X-B | 1.2 | 2.7 | 3.6 | 5.7 | | | | H8-LL-30X-B | 1.5 | 2.2 | 2.7 | 3.6 | | | |
| P8-LL-40X-B | 1.4 | 2.9 | 3.9 | 6.2 | 9.1 | 10.8 | | P8-LL-40X-B | 1.7 | 2.4 | 2.8 | 3.6 | 4.5 | 5.0 | |
| K9-LL-30X-B | 1.2 | 2.7 | 3.6 | 5.7 | | | | K9-LL-30X-B | 1.5 | 2.2 | 2.6 | 3.6 | | | |
| H8-LSG-40X-B | 1.7 | 3.4 | 4.4 | 6.7 | | | | H8-LSG-40X-B | 1.9 | 2.8 | 3.3 | 4.5 | | | |
| K9-LSG-40X-B | 1.7 | 3.4 | 4.4 | 6.7 | | | | K9-LSG-40X-B | 1.9 | 2.8 | 3.3 | 4.5 | | | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|------------------------------|-----|-----|-----|-----|-----|------|--------------|------------------------------|-----|-----|-----|-----|-----|-----|
| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| B8-KM-5X-B | | | | 0.8 | 1.2 | 1.5 | 2.2 | B8-KM-5X-B | | | | 0.6 | 0.6 | 0.6 | 0.6 |
| B8-KJ-7X-B | | | | 1.0 | 1.6 | 1.9 | 2.8 | B8-KJ-7X-B | | | | 0.8 | 0.8 | 0.8 | 0.8 |
| B8-KSJ-10X-B | | | | 1.2 | 1.9 | 2.4 | 3.4 | B8-KSJ-10X-B | | | | 0.8 | 0.9 | 1.0 | 0.8 |
| B8-KL-15X-B | | | | 1.4 | 2.2 | 2.6 | 3.7 | B8-KL-15X-B | | | | 0.9 | 1.2 | 1.3 | 1.2 |
| D8-KSL-20X-B | | | | 1.8 | 2.9 | 3.5 | 5.0 | D8-KSL-20X-B | | | | 1.1 | 1.4 | 1.5 | 1.8 |
| H8-KSL-20X-B | | | | 1.9 | 3.0 | 3.7 | 5.4 | H8-KSL-20X-B | | | | 1.2 | 1.5 | 1.6 | 1.8 |
| D8-LE-20X-B | | | | 1.6 | 2.7 | 3.4 | 4.9 | D8-LE-20X-B | | | | 1.4 | 1.4 | 1.4 | 1.4 |
| H8-LE-20X-B | | | | 1.7 | 2.9 | 3.6 | 5.4 | H8-LE-20X-B | | | | 1.5 | 1.5 | 1.5 | 1.5 |
| D8-LF-20X-B | | | | 2.2 | 3.6 | 4.4 | 6.2 | D8-LF-20X-B | | | | 1.7 | 1.7 | 1.7 | 1.7 |
| H8-LJ-20X-B | | | | 2.7 | 4.3 | 5.2 | 7.5 | H8-LJ-20X-B | | | | 2.2 | 2.2 | 2.2 | 2.2 |
| H8-LL-30X-B | | | | 3.2 | 5.2 | 6.4 | 9.2 | H8-LL-30X-B | | | | 2.1 | 2.1 | 2.1 | 2.1 |
| K9-LL-30X-B | | | | 3.2 | 5.3 | 6.5 | 9.3 | K9-LL-30X-B | | | | 2.1 | 2.6 | 2.1 | 2.1 |
| H8-LSG-40X-B | | | | 4.2 | 6.5 | 7.9 | 11.0 | H8-LSG-40X-B | | | | 3.2 | 3.2 | 3.2 | 3.2 |
| K9-LSG-40X-B | | | | 4.2 | 6.6 | 8.0 | 11.1 | K9-LSG-40X-B | | | | 2.5 | 3.2 | 3.6 | 3.6 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

Refrigeration Units with Semi-Hermetic Discus™ Compressors

Copeland™ air-cooled indoor refrigeration units for medium temperature and low temperature applications.

In a further approach to improve compressor performance and reduce compression losses, Emerson Climate Technologies engineers developed the Discus valve technology.

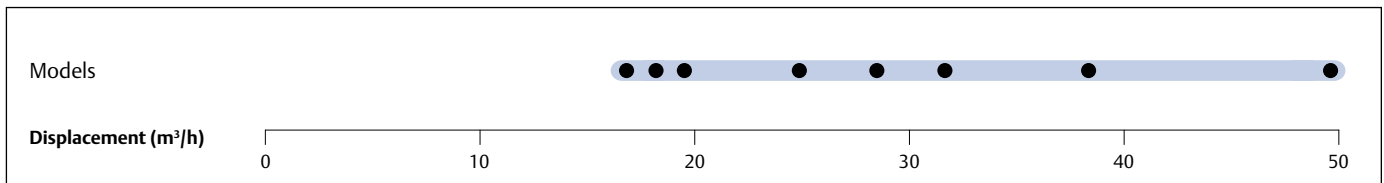
This series of refrigeration units is equipped with 2 or 3 cylinder semi-hermetic compressors with Discus valve technology. The models are specifically suitable for those applications where high efficiency and low energy consumption is required.

The wide range of compressor models combined with 2 or 4 fan high capacity condensers covers most application needs of low temperature and medium temperature applications.



Refrigeration Units with Semi-Hermetic Discus Compressors

Discus Refrigeration Units Line-up



Features and Benefits

- Standard equipment: Discus compressor, condenser with thermally protected fan(s), discharge line with flexible pipe loop or vibration absorber, liquid receiver with shut-off valve, HP/LP switch with automatic reset, oil pressure safety control OPS2
- Suitable for multiple refrigerants: R407A/F, R448A/R449A, R404A, R134a, R450A and R513A
- Wide range of quality accessories
- Excellent efficiency
- Proven reliability

Maximum Allowable Pressures (PS)

- Low Side PS 22.5 bar (g)
- High Side PS = 28 bar (g)

Technical Overview

| Model | Displacement (m ³ /h) | Receiver Capacity (l) | Number of fans | Total Fan Motor Power (W) | Suction Line Diameter (inch) | | Width/Depth/Height (mm) | Net Weight (kg) | Motor Version/Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @10m - dB(A)*** |
|----------------------|----------------------------------|-----------------------|----------------|---------------------------|------------------------------|--------|-------------------------|-----------------|--------------------|-------------------------------|--------------------------|--------------------------------|
| | | | | | 3 Ph** | 3 Ph** | | | 3 Ph** | | | |
| P8-2DC-50X-B | 17 | 11.7 | 2 | 220 | 1 3/8 | 5/8 | 950/740/633 | 186.0 | AWM | 9 | 55 | |
| R7-2DD-50X-B | 19 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1130/820/633 | 196.0 | AWM | 10 | 55 | |
| P8-2DL-75X-B | 24 | 11.7 | 2 | 220 | 1 3/8 | 5/8 | 950/740/633 | | AWM | 14 | 82 | 50.0 |
| R7-2DL-75X-B | 24 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1130/820/708 | 205.0 | AWM | 14 | 82 | |
| P8-2DB-50X-B | 28 | 11.7 | 2 | 220 | 1 3/8 | 5/8 | 950/740/633 | 186.0 | AWM | 13 | 55 | 49.6 |
| P8-2DB-75X-B | 28 | 11.7 | 2 | 220 | 1 3/8 | 5/8 | 950/740/633 | 191.0 | AWM | 16 | 82 | 52.0 |
| S9-2DB-75X-B | 28 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1130/820/708 | 212.0 | AWM | 16 | 82 | |
| P8-3DA-50X-B | 32 | 11.7 | 2 | 220 | 1 3/8 | 5/8 | 950/740/633 | 205.0 | AWM | 16 | 55 | 51.6 |
| P8-3DA-75X-B | 32 | 11.7 | 2 | 220 | 1 3/8 | 5/8 | 950/740/633 | 211.0 | AWM | 18 | 106 | 52.0 |
| S9-3DA-75X-B | 32 | 18.9 | 2 | 470 | 1 3/8 | 7/8 | 1330/820/835 | 259.0 | AWM | 18 | 106 | |
| R7-3DC-100X-B | 38 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1129/820/633 | 234.0 | AWM | 21 | 121 | 56.0 |
| R7-3DC-75X-B | 38 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1130/820/633 | 278.0 | AWM | 18 | 82 | 54.6 |
| S9-3DS-100X-B | 50 | 15.8 | 2 | 470 | 1 3/8 | 3/4 | 1130/820/708 | 239.0 | AWM | 24 | 121 | 54.0 |
| S9-3DS-150X-B | 50 | 15.8 | 2 | 470 | 1 5/8 | 3/4 | 1129/820/708 | 243.0 | AWM | 29 | 123 | 57.0 |

** 3 Ph: 380-420V/ 50Hz

*** @ 10m: sound pressure level at 10m distance from the compressor, free field condition

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|-----|------------------------------|------|------|------|------|------|---------------|-----|------------------------------|------|-----|------|------|------|
| R407A | | Cooling Capacity (kW) | | | | | | R407A | | Power Input (kW) | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| P8-2DC-50X-B | | 1.8 | 2.6 | 4.5 | 7.1 | 8.7 | 12.3 | P8-2DC-50X-B | | 1.6 | 1.9 | 2.5 | 3.2 | 3.6 | 4.5 |
| R7-2DD-50X-B | | 2.4 | 3.4 | 5.8 | 9.1 | 11.0 | 15.5 | R7-2DD-50X-B | | 2.2 | 2.5 | 3.2 | 4.0 | 4.4 | 5.2 |
| R7-2DL-75X-B | | | | 7.1 | 10.9 | 13.1 | 18.2 | R7-2DL-75X-B | | | | 4.0 | 5.0 | 5.5 | 6.6 |
| P8-2DB-75X-B | | | | 7.9 | 11.4 | 13.2 | | P8-2DB-75X-B | | | | 4.8 | 6.3 | 7.1 | |
| S9-2DB-75X-B | | | | 8.7 | 13.2 | 15.7 | 21.4 | S9-2DB-75X-B | | | | 4.9 | 6.1 | 6.8 | 8.1 |
| P8-2DB-50X-B | | 3.3* | 4.5* | 7.9 | 11.3 | 13.2 | | P8-2DB-50X-B | | 3.0* | 3.5* | 4.7 | 6.2 | 7.1 | |
| S9-3DA-75X-B | | | | 9.8 | 14.7 | 17.5 | 23.7 | S9-3DA-75X-B | | | | 5.6 | 7.0 | 7.8 | 9.4 |
| P8-3DA-50X-B | | 3.7* | 5.0* | 8.7 | 12.1 | 13.9 | | P8-3DA-50X-B | | 3.4* | 4.1* | 5.6 | 7.4 | 8.5 | |
| P8-3DA-75X-B | | | | 8.5 | 12.2 | 14.2 | | P8-3DA-75X-B | | | | 5.5 | 7.2 | 8.2 | |
| R7-3DC-75X-B | | 4.7* | 6.3* | 11.1 | 15.8 | 18.3 | | R7-3DC-75X-B | | 4.3* | 5.1* | 6.8 | 8.8 | 9.9 | |
| V6-3DC-100X-B | | | | 12.6 | 19.1 | 22.9 | 31.5 | V6-3DC-100X-B | | | | 6.6 | 8.2 | 9.0 | 10.6 |
| R7-3DC-100X-B | | | | 11.1 | 16.2 | 18.9 | | R7-3DC-100X-B | | | | 6.5 | 8.5 | 9.6 | |
| V6-3DS-150X-B | | | | 16.1 | 23.8 | 28.2 | 37.8 | V6-3DS-150X-B | | | | 8.9 | 11.2 | 12.4 | 15.0 |
| S9-3DS-100X-B | | 6.3* | 8.5* | 14.7 | 20.5 | 23.6 | | S9-3DS-100X-B | | 5.7* | 6.7* | 9.0 | 11.8 | 13.4 | |
| W9-3DS-150X-B | | | | 16.3 | 24.2 | 28.7 | 38.8 | W9-3DS-150X-B | | | | 8.8 | 11.1 | 12.3 | 14.7 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K
 * Conditions: EN13215: Suction Superheat 10K

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|-----|------------------------------|-------|------|------|------|------|-------------|-----|------------------------------|------|-----|------|------|------|
| R448A | | Cooling Capacity (kW) | | | | | | R448A | | Power Input (kW) | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| P8-2DC-50X | | 1.7* | 2.8 | 4.9 | 7.6 | 9.1 | 12.6 | P8-2DC-50X | | 1.6* | 2.0 | 2.7 | 3.4 | 3.8 | 4.6 |
| R7-2DD-50X | | 2.0* | 3.3 | 5.9 | 9.2 | 11.1 | 15.6 | R7-2DD-50X | | 2.1* | 2.5 | 3.3 | 4.1 | 4.5 | 5.3 |
| P8-2DL-75X | | 2.6* | 3.7* | 6.7 | 10.1 | 12.0 | | P8-2DL-75X | | 2.5* | 2.9* | 3.8 | 4.9 | 5.6 | |
| R7-2DL-75X | | 2.8* | 4.2 | 7.1 | 11.0 | 13.4 | 18.8 | R7-2DL-75X | | 2.8* | 3.1 | 4.0 | 5.0 | 5.5 | 6.8 |
| P8-2DB-50X | | 3.6* | 4.8* | 8.0 | 11.4 | 13.3 | | P8-2DB-50X | | 3.1* | 3.6* | 4.8 | 6.4 | 7.2 | |
| P8-2DB-75X | | 3.7* | 5.0* | 8.2 | 11.7 | 13.5 | | P8-2DB-75X | | 3.2* | 3.7* | 5.0 | 6.4 | 7.3 | |
| S9-2DB-75X | | 4.0* | 5.4* | 9.2 | 13.6 | 16.3 | 22.1 | S9-2DB-75X | | 3.4* | 3.9* | 5.0 | 6.2 | 6.8 | 8.3 |
| P8-3DA-50X | | 4.0* | 5.2* | 8.6 | 12.2 | | | P8-3DA-50X | | 3.5* | 4.1* | 5.6 | 7.4 | | |
| P8-3DA-75X | | 3.8* | 5.3* | 9.0 | 13.0 | 15.1 | | P8-3DA-75X | | 3.6* | 4.2* | 5.7 | 7.4 | 8.3 | |
| S9-3DA-75X | | 4.2* | 5.9* | 10.4 | 15.5 | 18.4 | 25.1 | S9-3DA-75X | | 3.8* | 4.4* | 5.8 | 7.1 | 7.9 | 9.4 |
| R7-3DC-100X | | 4.6* | 6.6* | 11.5 | 16.5 | 19.2 | | R7-3DC-100X | | 4.1* | 4.8* | 6.6 | 8.5 | 9.6 | |
| V6-3DC-100X | | 5.2* | 7.8 | 13.1 | 19.7 | 23.4 | 32.0 | V6-3DC-100X | | 4.4* | 5.2 | 6.7 | 8.2 | 9.1 | 10.8 |
| R7-3DC-75X | | 5.1* | 6.7* | 11.0 | 15.8 | 18.4 | | R7-3DC-75X | | 4.5* | 5.1* | 6.8 | 8.7 | 9.8 | |
| S9-3DS-100X | | 7.0* | 9.0* | 14.8 | 21.2 | | | S9-3DS-100X | | 5.8* | 6.8* | 9.1 | 11.9 | | |
| S9-3DS-150X | | 7.3* | 9.5* | 15.3 | 21.2 | 24.3 | | S9-3DS-150X | | 6.1* | 7.0* | 9.3 | 11.9 | 13.3 | |
| V6-3DS-150X | | 7.8* | 10.3* | 16.9 | 24.5 | 28.8 | 38.2 | V6-3DS-150X | | 6.3* | 7.2* | 9.2 | 11.4 | 12.6 | 15.2 |
| W9-3DS-150X | | 7.8* | 10.4* | 17.2 | 24.9 | 29.4 | 39.2 | W9-3DS-150X | | 6.3* | 7.2* | 9.1 | 11.3 | 12.5 | 15.0 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K
 * Conditions: EN13215: Suction Superheat 10K

Preliminary data

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|-----|------------------------------|-------|------|------|------|------|-------------|-----|------------------------------|------|-----|------|------|------|
| R449A | | Cooling Capacity (kW) | | | | | | R449A | | Power Input (kW) | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| P8-2DC-50X | | 1.7* | 2.8 | 4.9 | 7.6 | 9.1 | 12.6 | P8-2DC-50X | | 1.6* | 2.0 | 2.7 | 3.4 | 3.8 | 4.6 |
| R7-2DD-50X | | 2.0* | 3.3 | 5.9 | 9.2 | 11.1 | 15.6 | R7-2DD-50X | | 2.1* | 2.5 | 3.3 | 4.1 | 4.5 | 5.3 |
| P8-2DL-75X | | 2.6* | 3.7* | 6.7 | 10.1 | 12.0 | | P8-2DL-75X | | 2.5* | 2.9* | 3.8 | 4.9 | 5.6 | |
| R7-2DL-75X | | 2.8* | 4.2 | 7.1 | 11.0 | 13.4 | 18.8 | R7-2DL-75X | | 2.8* | 3.1 | 4.0 | 5.0 | 5.5 | 6.8 |
| P8-2DB-50X | | 3.6* | 4.8* | 8.0 | 11.4 | 13.3 | | P8-2DB-50X | | 3.1* | 3.6* | 4.8 | 6.4 | 7.2 | |
| P8-2DB-75X | | 3.7* | 4.9* | 8.2 | 11.7 | 13.5 | | P8-2DB-75X | | 3.2* | 3.7* | 5.0 | 6.4 | 7.3 | |
| S9-2DB-75X | | 4.0* | 5.4* | 9.2 | 13.6 | 16.3 | 22.1 | S9-2DB-75X | | 3.4* | 3.9* | 5.0 | 6.2 | 6.8 | 8.3 |
| P8-3DA-50X | | 4.0* | 5.2* | 8.6 | 12.2 | | | P8-3DA-50X | | 3.5* | 4.1* | 5.6 | 7.4 | | |
| P8-3DA-75X | | 3.8* | 5.2* | 9.0 | 13.0 | 15.1 | | P8-3DA-75X | | 3.6* | 4.2* | 5.7 | 7.4 | 8.3 | |
| S9-3DA-75X | | 4.2* | 5.9* | 10.4 | 15.5 | 18.4 | 25.1 | S9-3DA-75X | | 3.8* | 4.4* | 5.8 | 7.1 | 7.9 | 9.4 |
| R7-3DC-100X | | 4.6* | 6.6* | 11.5 | 16.5 | 19.2 | | R7-3DC-100X | | 4.1* | 4.8* | 6.6 | 8.5 | 9.6 | |
| V6-3DC-100X | | 5.2* | 7.8 | 13.1 | 19.7 | 23.4 | 32.0 | V6-3DC-100X | | 4.4* | 5.2 | 6.7 | 8.2 | 9.1 | 10.8 |
| R7-3DC-75X | | 5.1* | 6.6* | 11.0 | 15.8 | 18.4 | | R7-3DC-75X | | 4.5* | 5.1* | 6.8 | 8.7 | 9.8 | |
| S9-3DS-100X | | 6.9* | 9.0* | 14.8 | 21.2 | | | S9-3DS-100X | | 5.8* | 6.8* | 9.1 | 11.9 | | |
| S9-3DS-150X | | 7.3* | 9.5* | 15.3 | 21.2 | 24.3 | | S9-3DS-150X | | 6.1* | 7.0* | 9.3 | 11.9 | 13.3 | |
| V6-3DS-150X | | 7.8* | 10.3* | 16.9 | 24.5 | 28.8 | 38.2 | V6-3DS-150X | | 6.3* | 7.2* | 9.2 | 11.4 | 12.6 | 15.2 |
| W9-3DS-150X | | 7.8* | 10.4* | 17.2 | 24.9 | 29.4 | 39.2 | W9-3DS-150X | | 6.3* | 7.2* | 9.1 | 11.3 | 12.5 | 15.0 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|------|------------------------------|------|------|------|------|------|---------------|------|------------------------------|-----|------|------|------|------|
| R404A | | Cooling Capacity (kW) | | | | | | R404A | | Power Input (kW) | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| P8-2DC-50X-B | | 2.4 | 3.2 | 5.2 | 7.9 | 9.5 | 13.0 | P8-2DC-50X-B | | 2.0 | 2.3 | 3.0 | 3.7 | 4.0 | 4.7 |
| R7-2DD-50X-B | | 3.1 | 4.1 | 6.7 | 9.9 | 11.7 | 15.9 | R7-2DD-50X-B | | 2.6 | 3.0 | 3.8 | 4.5 | 4.9 | 5.6 |
| R7-2DL-75X-B | | 3.8 | 5.0 | 8.0 | 11.8 | 13.9 | 18.6 | R7-2DL-75X-B | | 3.2 | 3.6 | 4.5 | 5.6 | 6.1 | 7.3 |
| P8-2DB-75X-B | | 4.8 | 6.0 | 8.9 | 12.2 | 14.0 | | P8-2DB-75X-B | | 3.7 | 4.2 | 5.5 | 6.9 | 7.7 | |
| S9-2DB-75X-B | | 5.1 | 6.5 | 10.0 | 14.2 | 16.7 | 21.9 | S9-2DB-75X-B | | 3.9 | 4.4 | 5.6 | 6.9 | 7.6 | 8.9 |
| P8-2DB-50X-B | 2.0* | 4.6 | 5.9 | 8.9 | 12.3 | | | P8-2DB-50X-B | 2.5* | 3.4 | 4.0 | 5.4 | 7.0 | | |
| P8-3DA-50X-B | 2.3* | 5.4 | 6.7 | 9.6 | 12.9 | | | P8-3DA-50X-B | 2.9* | 4.2 | 5.0 | 6.5 | 8.3 | | |
| P8-3DA-75X-B | | 5.0 | 6.5 | 9.8 | 13.5 | 15.4 | | P8-3DA-75X-B | | 4.1 | 4.8 | 6.4 | 8.1 | 9.0 | |
| S9-3DA-75X-B | | 5.4 | 7.1 | 11.2 | 16.0 | 18.7 | 24.5 | S9-3DA-75X-B | | 4.4 | 5.1 | 6.5 | 8.0 | 8.7 | 10.3 |
| R7-3DC-75X-B | 3.1* | 6.7 | 8.4 | 12.1 | 16.2 | | | R7-3DC-75X-B | 3.9* | 5.4 | 6.2 | 7.9 | 9.9 | | |
| R7-3DC-100X-B | | 6.3 | 8.2 | 12.3 | 16.6 | 18.9 | | R7-3DC-100X-B | | 5.1 | 5.9 | 7.8 | 9.8 | 10.8 | |
| V6-3DC-100X-B | | 7.1 | 9.3 | 14.6 | 20.9 | 24.5 | 32.5 | V6-3DC-100X-B | | 5.4 | 6.2 | 7.8 | 9.3 | 10.1 | 11.5 |
| S9-3DS-100X-B | 4.2* | 9.0 | 11.3 | 16.2 | 21.5 | | | S9-3DS-100X-B | 5.1* | 7.1 | 8.2 | 10.7 | 13.5 | | |
| V6-3DS-150X-B | | 9.4 | 12.2 | 18.5 | 25.9 | 30.1 | 39.1 | V6-3DS-150X-B | | 7.1 | 8.2 | 10.6 | 12.9 | 14.1 | 16.3 |
| W9-3DS-150X-B | | 9.4 | 12.2 | 18.7 | 26.2 | 30.5 | 39.7 | W9-3DS-150X-B | | 7.1 | 8.2 | 10.5 | 12.9 | 14.0 | 16.2 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Capacity Data

| Ambient Temperature: 32°C | | | | | | | | | | | | | | | |
|---------------------------|-----|------------------------------|-----|-----|-----|-----|------|--------------|-----|------------------------------|-----|-----|-----|-----|-----|
| R134a | | Cooling Capacity (kW) | | | | | | R134a | | Power Input (kW) | | | | | |
| | | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| B8-KM-5X-B | | | | 0.8 | 1.2 | 1.5 | 2.2 | B8-KM-5X-B | | | | 0.6 | 0.6 | 0.6 | 0.6 |
| B8-KJ-7X-B | | | | 1.0 | 1.6 | 1.9 | 2.8 | B8-KJ-7X-B | | | | 0.8 | 0.8 | 0.8 | 0.8 |
| B8-KSJ-10X-B | | | | 1.2 | 1.9 | 2.4 | 3.4 | B8-KSJ-10X-B | | | | 0.8 | 0.9 | 1.0 | 0.8 |
| B8-KL-15X-B | | | | 1.4 | 2.2 | 2.6 | 3.7 | B8-KL-15X-B | | | | 0.9 | 1.2 | 1.3 | 1.2 |
| D8-KSL-20X-B | | | | 1.8 | 2.9 | 3.5 | 5.0 | D8-KSL-20X-B | | | | 1.1 | 1.4 | 1.5 | 1.8 |
| H8-KSL-20X-B | | | | 1.9 | 3.0 | 3.7 | 5.4 | H8-KSL-20X-B | | | | 1.2 | 1.5 | 1.6 | 1.8 |
| D8-LE-20X-B | | | | 1.6 | 2.7 | 3.4 | 4.9 | D8-LE-20X-B | | | | 1.4 | 1.4 | 1.4 | 1.4 |
| H8-LE-20X-B | | | | 1.7 | 2.9 | 3.6 | 5.4 | H8-LE-20X-B | | | | 1.5 | 1.5 | 1.5 | 1.5 |
| D8-LF-20X-B | | | | 2.2 | 3.6 | 4.4 | 6.2 | D8-LF-20X-B | | | | 1.7 | 1.7 | 1.7 | 1.7 |
| H8-LJ-20X-B | | | | 2.7 | 4.3 | 5.2 | 7.5 | H8-LJ-20X-B | | | | 2.2 | 2.2 | 2.2 | 2.2 |
| H8-LL-30X-B | | | | 3.2 | 5.2 | 6.4 | 9.2 | H8-LL-30X-B | | | | 2.1 | 2.1 | 2.1 | 2.1 |
| K9-LL-30X-B | | | | 3.2 | 5.3 | 6.5 | 9.3 | K9-LL-30X-B | | | | 2.1 | 2.6 | 2.1 | 2.1 |
| H8-LSG-40X-B | | | | 4.2 | 6.5 | 7.9 | 11.0 | H8-LSG-40X-B | | | | 3.2 | 3.2 | 3.2 | 3.2 |
| K9-LSG-40X-B | | | | 4.2 | 6.6 | 8.0 | 11.1 | K9-LSG-40X-B | | | | 2.5 | 3.2 | 3.6 | 3.6 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

Refer to Emerson's Select software for R450A and R513A capacity data.

Refrigeration Units with Semi-Hermetic Stream Compressors and CoreSense™ Diagnostics

Copeland air-cooled indoor refrigeration units for low, medium and high temperature applications.

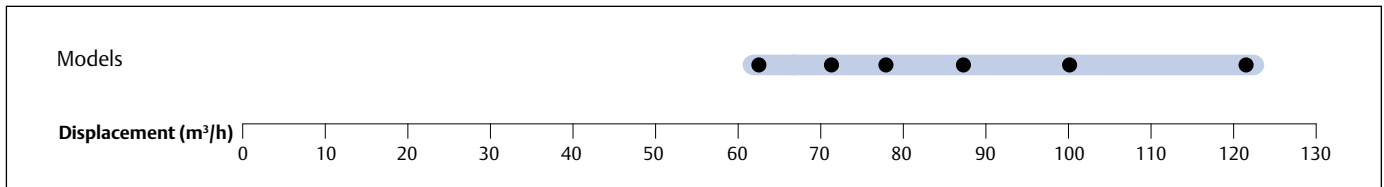
This series of refrigeration units is equipped with 4 or 6 cylinder high performance semi-hermetic Stream compressors. The advanced protection and diagnostic features reduce service costs and system downtime. These models are specifically suitable for those applications where high efficiency and reliability is required to achieve low lifecycle costs.

Multiple refrigerant approvals and wide range of accessories improve flexibility in system design.



Refrigeration Units with Semi-Hermetic Stream Compressors and CoreSense™ Diagnostics

Refrigeration Units with Stream Compressor Line-up



Features and Benefits

- Standard equipment: Stream compressor with CoreSense Diagnostics, condenser with thermally protected fan(s), discharge line with flexible pipe loop or vibration absorber, liquid receiver with shut-off-valve, HP/LP switch with automatic reset.
- Suitable for multiple refrigerants: R407A/F, R448A/R449A, R404A, R134a, R450A and R513A
- Wide range of quality accessories
- Excellent efficiency
- Proven reliability

Maximum Allowable Pressures (PS)

- Low pressure side = 22.5 bar
- High pressure side = 28 bar

CoreSense Diagnostics Features

- Motor and oil protection
- Storage of compressor asset and advanced runtime information
- Runtime and alarm signalling using multicoloured LED flash-codes
- System communication via Modbus
- Compressor power sensing

Technical Overview

| Model | Displacement (m ³ /h) | Receiver Capacity (l) | Number of fans | Total Fan Motor Power (W) | Suction Line Diameter (inch) | Liquid Line Diameter (inch) | Net Weight (kg) | Motor Version/ Code | Maximum Operating Current (A) | Locked Rotor Current (A) | Sound Pressure @10m - dB(A)*** |
|--------------------|----------------------------------|-----------------------|----------------|---------------------------|------------------------------|-----------------------------|-----------------|---------------------|-------------------------------|--------------------------|--------------------------------|
| | | | | | | | | 3 Ph** | 3 Ph** | 3 Ph** | |
| W99-6MI-40X | 121 | 47.9 | 4 | 1600 | 2 1/8 | 7/8 | 521.0 | AWM | 71 | 304 | 59.0 |
| Z9-4MA-22X | 62 | 18.9 | 4 | 1600 | 1 5/8 | 7/8 | 383.0 | AWM | 36 | 175 | 59.0 |
| V6-4ML-15X | 71 | 18.9 | 2 | 800 | 1 5/8 | 7/8 | 303.0 | AWM | 35 | 156 | 57.0 |
| V6-4MF-13X | 62 | 18.9 | 2 | 800 | 1 5/8 | 7/8 | 295.0 | AWM | 31 | 105 | 57.0 |
| Z9-4MH-25X | 71 | 18.9 | 4 | 1600 | 2 1/8 | 7/8 | 389.0 | AWM | 42 | 199 | 59.0 |
| Z9-4MM-20X | 71 | 18.9 | 4 | 1600 | 2 1/8 | 7/8 | 388.0 | AWM | 39 | 175 | |
| Z9-4MI-30X | 78 | 18.9 | 4 | 1600 | 2 1/8 | 7/8 | 416.0 | AWM | 47 | 221 | 59.0 |
| Z9-4MT-22X | 71 | 18.9 | 4 | 1600 | 2 1/8 | 7/8 | 389.0 | AWM | 45 | 175 | |
| Z9-4MJ-33X | 88 | 18.9 | 4 | 1600 | 2 1/8 | 7/8 | 416.0 | AWM | 53 | 221 | 59.0 |
| W9-4MT-22X | 88 | 18.9 | 2 | 800 | 2 1/8 | 7/8 | 358.0 | AWM | 45 | 175 | 59.0 |
| W9-4MM-20X | 78 | 18.9 | 2 | 800 | 2 1/8 | 7/8 | 358.0 | AWM | 39 | 175 | 57.0 |
| Z9-4MU-25X | 100 | 18.9 | 4 | 1600 | 2 1/8 | 7/8 | 392.0 | AWM | 52 | 199 | 59.0 |
| Z9-6MM-30X | 121 | 18.9 | 4 | 1600 | 2 1/8 | 7/8 | 410.0 | AWM | 60 | 255 | 59.0 |
| W99-4MK-35X | 121 | 47.9 | 4 | 1600 | 2 1/8 | 7/8 | 504.0 | AWM | 61 | 255 | 59.0 |
| Z9-4ML-15X | 71 | 18.9 | 4 | 1600 | 1 5/8 | 7/8 | 386.0 | AWM | 35 | 156 | |

** 3 Ph: 380-420V/ 50Hz

*** @ 10m: sound pressure level at 10m distance from the compressor, free field condition

Capacity Data

| R407A | Cooling Capacity (kW) | | | | | | | R407A | Power Input (kW) | | | | | | |
|-------------|------------------------------|-------|-------|------|------|------|------|-------------|------------------------------|-------|-------|------|------|------|------|
| | Ambient Temperature: 32°C | | | | | | | | Ambient Temperature: 32°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| V6-4MF-13X | | 7.5* | 10.3* | 18.4 | 26.5 | 31.0 | | V6-4MF-13X | | 6.9* | 8.1* | 10.9 | 14.0 | 15.8 | |
| Z9-4MA-22X | | | | 20.9 | 32.0 | 38.7 | 54.5 | Z9-4MA-22X | | | | 11.0 | 13.3 | 14.5 | 17.0 |
| Z9-4ML-15X | | 10.2* | 15.2 | 24.6 | 36.7 | 43.8 | | Z9-4ML-15X | | 8.9* | 10.2 | 12.9 | 15.8 | 17.4 | |
| Z9-4MH-25X | | | | 24.4 | 36.6 | 43.9 | 60.9 | Z9-4MH-25X | | | | 12.9 | 15.7 | 17.1 | 20.0 |
| V6-4ML-15X | | 9.3* | 12.6* | 21.7 | 30.9 | 35.9 | | V6-4ML-15X | | 8.2* | 9.6* | 12.9 | 16.7 | 18.9 | |
| Z9-4MI-30X | | | | 26.6 | 40.0 | 47.9 | 66.1 | Z9-4MI-30X | | | | 14.2 | 17.4 | 19.0 | 22.5 |
| Z9-4MM-20X | | 11.4* | 16.7 | 26.7 | 39.6 | 47.2 | | Z9-4MM-20X | | 9.7* | 11.2 | 14.3 | 17.6 | 19.3 | |
| W9-4MM-20X | | 10.5* | 14.0* | 23.8 | 33.8 | 39.2 | | W9-4MM-20X | | 9.0* | 10.6* | 14.3 | 18.5 | 20.9 | |
| Z9-4MJ-33X | | | | 29.3 | 43.6 | 52.0 | 71.2 | Z9-4MJ-33X | | | | 15.9 | 19.6 | 21.5 | 25.8 |
| W9-4MT-22X | | 11.1* | 14.7* | 25.1 | 35.2 | 40.6 | | W9-4MT-22X | | 10.3* | 12.1* | 16.4 | 21.4 | 24.3 | |
| Z9-4MT-22X | | 12.1* | 17.9 | 28.4 | 41.9 | 49.8 | | Z9-4MT-22X | | 10.9* | 12.6 | 16.2 | 20.1 | 22.2 | |
| W99-4MK-35X | | | | 32.4 | 47.9 | 56.8 | 76.6 | W99-4MK-35X | | | | 18.1 | 22.6 | 25.0 | 30.4 |
| Z9-4MU-25X | | 13.2* | 19.8 | 31.7 | 46.5 | 55.0 | | Z9-4MU-25X | | 12.1* | 14.0 | 18.1 | 22.8 | 25.5 | |
| Z9-6MM-30X | | 15.8* | 23.7 | 37.5 | 54.5 | 64.0 | | Z9-6MM-30X | | 14.2* | 16.5 | 21.7 | 27.6 | 30.9 | |
| W99-6MI-40X | | | | 38.4 | 56.2 | 66.1 | 87.7 | W99-6MI-40X | | | | 21.6 | 27.3 | 30.5 | 37.5 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

| R407F | Cooling Capacity (kW) | | | | | | | R407F | Power Input (kW) | | | | | | |
|-------------|------------------------------|-------|-------|-------|-------|------|------|-------------|------------------------------|-------|-------|-------|-------|------|------|
| | Ambient Temperature: 32°C | | | | | | | | Ambient Temperature: 32°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Z9-4MA-22X | | | | 21.3* | 34.0 | 41.1 | 57.5 | Z9-4MA-22X | | | | 11.7* | 14.2 | 15.5 | 18.0 |
| V6-4MF-13X | | 8.0* | 11.0* | 18.1* | 27.5 | 32.1 | | V6-4MF-13X | | 7.2* | 8.5* | 11.4* | 14.9 | 16.8 | |
| V6-4ML-15X | | 9.9* | 13.3* | 21.4* | 32.4 | | | V6-4ML-15X | | 8.6* | 10.1* | 13.6* | 17.9 | | |
| Z9-4MH-25X | | | | 24.4* | 38.7 | 46.5 | 64.6 | Z9-4MH-25X | | | | 13.5* | 16.6 | 18.1 | 21.3 |
| Z9-4MI-30X | | | | 26.9* | 42.0 | 50.2 | 68.8 | Z9-4MI-30X | | | | 14.7* | 18.2 | 20.0 | 23.9 |
| W9-4MM-20X | | 10.9* | 14.6* | 23.3* | 35.1 | | | W9-4MM-20X | | 9.6* | 11.2* | 15.0* | 19.6 | | |
| Z9-4MJ-33X | | | | 29.6* | 45.9 | 54.5 | 74.1 | Z9-4MJ-33X | | | | 16.6* | 20.6 | 22.9 | 27.7 |
| W9-4MT-22X | | 12.4* | 16.4* | 25.5* | 36.1* | | | W9-4MT-22X | | 10.9* | 12.7* | 17.2* | 22.8* | | |
| Z9-4MU-25X | | 14.8* | 19.8* | 32.2* | 49.5 | 58.5 | | Z9-4MU-25X | | 12.7* | 14.7* | 19.1* | 24.4 | 27.3 | |
| W99-4MK-35X | | | | 32.5* | 50.1 | 59.3 | 79.8 | W99-4MK-35X | | | | 18.8* | 23.6 | 26.4 | 32.7 |
| W99-6MI-40X | | | | 38.4* | 59.0 | 69.3 | 91.6 | W99-6MI-40X | | | | 22.6* | 28.9 | 32.4 | 40.2 |
| Z9-6MM-30X | | 17.7* | 23.7* | 38.1* | 58.0 | 68.1 | | Z9-6MM-30X | | 15.1* | 17.4* | 22.8* | 29.3 | 32.8 | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Capacity Data

| R448A | Cooling Capacity (kW) | | | | | | | R448A | Power Input (kW) | | | | | | |
|-------------|------------------------------|-------|-------|------|------|------|------|-------------|------------------------------|-------|-------|------|------|------|------|
| | Ambient Temperature: 32°C | | | | | | | | Ambient Temperature: 32°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Z9-4MA-22X | | 9.0* | 13.1 | 21.8 | 33.6 | 40.8 | 57.8 | Z9-4MA-22X | | 7.8* | 9.0 | 11.3 | 13.6 | 14.8 | 17.2 |
| V6-4MF-13X | | 8.4* | 11.0* | 18.2 | 25.8 | 30.1 | | V6-4MF-13X | | 7.0* | 8.2* | 11.1 | 14.4 | 16.3 | |
| Z9-4MH-25X | | 10.6* | 15.2 | 24.9 | 37.5 | 45.0 | 62.2 | Z9-4MH-25X | | 9.1* | 10.4 | 13.2 | 16.1 | 17.7 | 20.9 |
| V6-4ML-15X | | 10.5* | 13.8* | 22.4 | 31.6 | 36.6 | | V6-4ML-15X | | 8.4* | 9.8* | 13.2 | 17.3 | 19.7 | |
| Z9-4ML-15X | | 11.5* | 16.0 | 25.3 | 37.3 | 44.3 | | Z9-4ML-15X | | 9.1* | 10.4 | 13.2 | 16.3 | 17.9 | |
| Z9-4MI-30X | | 11.9* | 17.2 | 27.9 | 41.7 | 49.7 | 68.2 | Z9-4MI-30X | | 9.8* | 11.4 | 14.6 | 17.9 | 19.7 | 23.2 |
| W9-4MM-20X | | 11.7* | 15.3* | 24.5 | 34.1 | 39.2 | | W9-4MM-20X | | 9.3* | 10.9* | 14.6 | 19.3 | 22.0 | |
| Z9-4MM-20X | | 12.7* | 17.6 | 27.7 | 40.3 | 47.5 | | Z9-4MM-20X | | 10.0* | 11.4 | 14.5 | 18.0 | 20.0 | |
| Z9-4MJ-33X | | 13.2* | 18.8 | 30.3 | 45.0 | 53.6 | 73.3 | Z9-4MJ-33X | | 10.8* | 12.5 | 16.2 | 20.2 | 22.3 | 26.8 |
| W9-4MT-22X | | 13.1* | 16.9* | 27.0 | 37.2 | | | W9-4MT-22X | | 10.5* | 12.4* | 16.7 | 22.1 | | |
| Z9-4MT-22X | | 14.4* | 18.8* | 30.7 | 44.5 | 52.4 | | Z9-4MT-22X | | 11.2* | 12.8* | 16.4 | 20.5 | 22.8 | |
| W99-4MK-35X | | 14.7* | 19.8* | 33.4 | 49.3 | 58.5 | 79.3 | W99-4MK-35X | | 12.3* | 14.2* | 18.6 | 23.3 | 25.9 | 31.3 |
| Z9-4MU-25X | | 15.2* | 20.0* | 33.1 | 48.3 | 57.1 | | Z9-4MU-25X | | 12.3* | 14.2* | 18.5 | 23.6 | 26.5 | |
| W99-6MI-40X | | 17.8* | 23.9* | 40.0 | 57.7 | 67.5 | 88.5 | W99-6MI-40X | | 14.5* | 16.9* | 21.9 | 27.7 | 30.9 | 37.9 |
| Z9-6MM-30X | | 18.3* | 24.0* | 39.1 | 55.5 | 64.6 | | Z9-6MM-30X | | 14.6* | 16.9* | 22.2 | 28.1 | 31.4 | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

| R449A | Cooling Capacity (kW) | | | | | | | R449A | Power Input (kW) | | | | | | |
|-------------|------------------------------|-------|-------|------|------|------|------|-------------|------------------------------|-------|-------|------|------|------|------|
| | Ambient Temperature: 32°C | | | | | | | | Ambient Temperature: 32°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Z9-4MA-22X | | 9.0* | 13.1 | 21.8 | 33.6 | 40.8 | 57.8 | Z9-4MA-22X | | 7.8* | 9.0 | 11.3 | 13.6 | 14.8 | 17.2 |
| V6-4MF-13X | | 8.4* | 11.0* | 18.2 | 25.8 | 30.1 | | V6-4MF-13X | | 7.0* | 8.2* | 11.1 | 14.4 | 16.3 | |
| Z9-4MH-25X | | 10.5* | 15.2 | 24.9 | 37.5 | 45.0 | 62.2 | Z9-4MH-25X | | 9.1* | 10.4 | 13.2 | 16.1 | 17.7 | 20.9 |
| V6-4ML-15X | | 10.4* | 13.7* | 22.4 | 31.6 | 36.6 | | V6-4ML-15X | | 8.4* | 9.8* | 13.2 | 17.3 | 19.7 | |
| Z9-4ML-15X | | 11.4* | 16.0 | 25.3 | 37.3 | 44.3 | | Z9-4ML-15X | | 9.1* | 10.4 | 13.2 | 16.3 | 17.9 | |
| W9-4MM-20X | | 11.7* | 15.2* | 24.5 | 34.1 | 39.2 | | W9-4MM-20X | | 9.3* | 10.9* | 14.6 | 19.3 | 22.0 | |
| Z9-4MJ-33X | | 13.2* | 18.8 | 30.3 | 45.0 | 53.6 | 73.3 | Z9-4MJ-33X | | 10.8* | 12.5 | 16.2 | 20.2 | 22.3 | 26.8 |
| W9-4MT-22X | | 13.1* | 16.9* | 27.0 | 37.2 | | | W9-4MT-22X | | 10.5* | 12.4* | 16.7 | 22.1 | | |
| Z9-4MT-22X | | 14.3* | 18.8* | 30.7 | 44.5 | 52.4 | | Z9-4MT-22X | | 11.2* | 12.8* | 16.4 | 20.5 | 22.8 | |
| W99-4MK-35X | | 14.7* | 19.7* | 33.4 | 49.3 | 58.5 | 79.3 | W99-4MK-35X | | 12.3* | 14.2* | 18.6 | 23.3 | 25.9 | 31.3 |
| Z9-4MU-25X | | 15.1* | 19.9* | 33.1 | 48.3 | 57.1 | | Z9-4MU-25X | | 12.3* | 14.2* | 18.5 | 23.6 | 26.5 | |
| W99-6MI-40X | | 17.7* | 23.8* | 40.0 | 57.7 | 67.5 | 88.5 | W99-6MI-40X | | 14.5* | 16.9* | 21.9 | 27.7 | 30.9 | 37.9 |
| Z9-6MM-30X | | 18.2* | 24.0* | 39.1 | 55.5 | 64.6 | | Z9-6MM-30X | | 14.6* | 16.9* | 22.2 | 28.1 | 31.4 | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

Preliminary data

Capacity Data

| R404A | Cooling Capacity (kW) | | | | | | | R404A | Power Input (kW) | | | | | | |
|-------------|------------------------------|------|------|------|------|------|------|-------------|------------------------------|------|------|------|------|------|------|
| | Ambient Temperature: 32°C | | | | | | | | Ambient Temperature: 32°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Z9-4MA-22X | | 11.7 | 15.3 | 24.0 | 34.8 | 41.0 | 55.0 | Z9-4MA-22X | | 8.9 | 10.1 | 12.5 | 14.9 | 16.0 | 18.2 |
| V6-4MF-13X | 4.3* | 10.8 | 13.7 | 20.4 | 28.4 | 32.8 | | V6-4MF-13X | 5.8* | 8.2 | 9.5 | 12.3 | 15.3 | 16.9 | |
| V6-4ML-15X | 5.4* | 13.0 | 16.4 | 23.9 | 32.6 | 37.2 | | V6-4ML-15X | 7.1* | 9.9 | 11.5 | 14.9 | 18.7 | 20.6 | |
| Z9-4MH-25X | | 13.4 | 17.5 | 27.3 | 39.6 | 46.7 | 62.8 | Z9-4MH-25X | | 10.2 | 11.6 | 14.6 | 17.6 | 19.1 | 22.0 |
| Z9-4ML-15X | 5.9* | 14.2 | 18.1 | 27.7 | 39.5 | 46.3 | | Z9-4ML-15X | 7.9* | 10.5 | 12.0 | 15.0 | 18.0 | 19.4 | |
| Z9-4MM-20X | 6.8* | 15.9 | 20.1 | 30.2 | 42.5 | 49.4 | | Z9-4MM-20X | 8.7* | 11.6 | 13.1 | 16.3 | 19.7 | 21.3 | |
| W9-4MM-20X | 6.3* | 14.5 | 18.1 | 25.9 | 34.6 | 39.2 | | W9-4MM-20X | 7.9* | 11.0 | 12.7 | 16.5 | 20.7 | 23.0 | |
| Z9-4MI-30X | | 15.4 | 20.0 | 30.5 | 43.1 | 50.3 | 66.1 | Z9-4MI-30X | | 11.4 | 13.0 | 16.3 | 19.6 | 21.2 | 24.6 |
| Z9-4MJ-33X | | 17.0 | 21.8 | 33.2 | 46.9 | 54.6 | 71.6 | Z9-4MJ-33X | | 12.4 | 14.2 | 17.9 | 21.8 | 23.8 | 27.8 |
| W9-4MT-22X | 7.2* | 15.9 | 19.7 | 28.1 | 37.6 | | | W9-4MT-22X | 8.8* | 12.4 | 14.4 | 18.7 | 23.6 | | |
| Z9-4MT-22X | 7.9* | 17.7 | 22.2 | 33.3 | 46.9 | 54.6 | | Z9-4MT-22X | 9.6* | 13.0 | 14.7 | 18.5 | 22.4 | 24.4 | |
| W99-4MK-35X | | 18.9 | 24.1 | 36.5 | 51.3 | 59.6 | 77.8 | W99-4MK-35X | | 14.1 | 16.2 | 20.5 | 25.2 | 27.6 | 32.4 |
| Z9-4MU-25X | 8.4* | 19.2 | 24.2 | 36.1 | 50.7 | | | Z9-4MU-25X | 10.5* | 14.4 | 16.5 | 20.9 | 25.5 | | |
| W99-6MI-40X | | 22.1 | 28.2 | 42.3 | 58.8 | 67.9 | 87.3 | W99-6MI-40X | | 16.8 | 19.3 | 24.8 | 30.6 | 33.6 | 40.0 |
| Z9-6MM-30X | 10.1* | 22.8 | 28.4 | 41.8 | 58.1 | 67.2 | | Z9-6MM-30X | 12.8* | 17.5 | 20.0 | 25.3 | 31.2 | 34.3 | |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

* Conditions: EN13215: Suction Superheat 10K

| R407C | Cooling Capacity (kW) | | | | | | | R407C | Power Input (kW) | | | | | | |
|-------------|------------------------------|-----|-----|------|------|------|------|-------------|------------------------------|-----|-----|------|------|------|------|
| | Ambient Temperature: 32°C | | | | | | | | Ambient Temperature: 32°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Z9-4MA-22X | | | | 20.0 | 30.4 | 36.7 | 51.5 | Z9-4MA-22X | | | | 10.7 | 12.9 | 13.9 | 16.0 |
| Z9-4MH-25X | | | | 22.7 | 34.8 | 42.0 | 58.8 | Z9-4MH-25X | | | | 12.2 | 14.8 | 16.1 | 18.8 |
| Z9-4MI-30X | | | | 25.3 | 38.3 | 46.0 | 64.0 | Z9-4MI-30X | | | | 13.4 | 16.4 | 18.0 | 21.1 |
| Z9-4MJ-33X | | | | 27.8 | 42.0 | 50.4 | 69.6 | Z9-4MJ-33X | | | | 14.8 | 18.4 | 20.2 | 24.3 |
| W99-4MK-35X | | | | 31.9 | 47.7 | 56.9 | 77.5 | W99-4MK-35X | | | | 16.9 | 21.2 | 23.5 | 28.5 |
| W99-6MI-40X | | | | 36.2 | 53.5 | 63.3 | 84.5 | W99-6MI-40X | | | | 20.0 | 25.5 | 28.4 | 34.9 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

Preliminary data

Capacity Data

| R134a | Cooling Capacity (kW) | | | | | | | R134a | Power Input (kW) | | | | | | |
|-------------|------------------------------|-----|-----|------|------|------|------|-------------|------------------------------|-----|-----|------|------|------|------|
| | Ambient Temperature: 32°C | | | | | | | | Ambient Temperature: 32°C | | | | | | |
| | Evaporating Temperature (°C) | | | | | | | | Evaporating Temperature (°C) | | | | | | |
| Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 | Model | -45 | -35 | -30 | -20 | -10 | -5 | +5 |
| Z9-4MA-22X | | | | 14.0 | 21.9 | 26.9 | 39.1 | Z9-4MA-22X | | | | 7.4 | 8.8 | 9.4 | 10.6 |
| V6-4MF-13X | | | | 12.4 | 19.6 | 23.8 | 33.8 | V6-4MF-13X | | | | 6.6 | 8.2 | 9.1 | 10.9 |
| Z9-4ML-15X | | | | 15.7 | 24.8 | 30.5 | 44.0 | Z9-4ML-15X | | | | 8.3 | 10.0 | 10.9 | 12.5 |
| Z9-4MH-25X | | | | 15.8 | 24.9 | 30.6 | 44.4 | Z9-4MH-25X | | | | 8.5 | 10.2 | 11.1 | 12.6 |
| V6-4ML-15X | | | | 14.8 | 22.9 | 27.7 | 38.6 | V6-4ML-15X | | | | 7.7 | 9.8 | 10.9 | 13.2 |
| W9-4MM-20X | | | | 16.4 | 25.2 | 30.3 | 42.1 | W9-4MM-20X | | | | 8.5 | 10.8 | 12.0 | 14.6 |
| Z9-4MI-30X | | | | 17.5 | 27.2 | 33.3 | 47.9 | Z9-4MI-30X | | | | 9.1 | 11.0 | 12.0 | 13.8 |
| Z9-4MM-20X | | | | 17.3 | 27.1 | 33.2 | 47.6 | Z9-4MM-20X | | | | 9.1 | 11.0 | 12.0 | 13.8 |
| Z9-4MJ-33X | | | | 19.5 | 30.1 | 36.7 | 52.4 | Z9-4MJ-33X | | | | 10.2 | 12.3 | 13.4 | 15.5 |
| Z9-4MT-22X | | | | 19.6 | 30.4 | 37.1 | 52.9 | Z9-4MT-22X | | | | 10.2 | 12.4 | 13.6 | 15.9 |
| W9-4MT-22X | | | | 18.5 | 28.0 | 33.6 | 45.9 | W9-4MT-22X | | | | 9.7 | 12.3 | 13.7 | 16.9 |
| Z9-4MU-25X | | | | 21.2 | 33.3 | 40.6 | 57.9 | Z9-4MU-25X | | | | 11.3 | 14.0 | 15.4 | 18.3 |
| W99-4MK-35X | | | | 21.8 | 33.7 | 41.0 | 58.5 | W99-4MK-35X | | | | 11.2 | 13.8 | 15.2 | 18.0 |
| Z9-6MM-30X | | | | 25.3 | 39.1 | 47.4 | 66.7 | Z9-6MM-30X | | | | 13.3 | 16.7 | 18.4 | 22.1 |
| W99-6MI-40X | | | | 25.2 | 39.0 | 47.4 | 67.3 | W99-6MI-40X | | | | 13.5 | 16.5 | 18.2 | 21.7 |

Conditions: EN13215: Suction Gas Return 20°C, Subcooling 0K

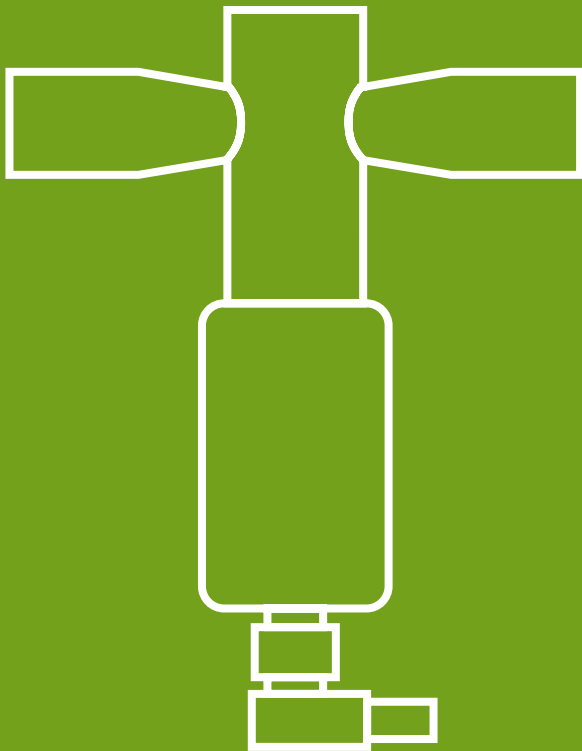
Refer to Emerson's Select software for R450A and R513A capacity data.

Compressors Motor Codes Table

| Semi-Hermetic | | | | | | |
|-------------------------------------|--------------|------------|--|-------------------|--------------|------------|
| Motor Codes | Voltage | Connection | | Motor Codes | Voltage | Connection |
| Standard Motor Version | | | | | | |
| CAG | 220-230/1/50 | - | | | | |
| EWL (DK, DL, D2S) | 220-240/3/50 | Δ | | EWN (DK, DL, D2S) | 250-280/3/60 | Δ |
| EWL (DK, DL, D2S) | 380-420/3/50 | Y | | EWN (DK, DL, D2S) | 440-480/3/60 | Y |
| AWM | 380-420/3/50 | YY/Y | | AWD | 440-480/3/60 | YY/Y |
| | | | | | | |
| | | | | | | |
| Special Motor Version | | | | | | |
| EWM | 380-420/3/50 | Δ/Y-Start | | EWD | 440-480/3/60 | Δ/Y-Start |
| AWR | 220-240/3/50 | YY/Y | | EWK (not D8) | 220-240/3/60 | Δ |
| AWY | 500-550/3/50 | YY/Y | | EWK (not D8) | 380-420/3/60 | Y |
| | | | | AWC | 208-230/3/60 | YY/Y |
| | | | | AWX | 380/3/60 | YY/Y |
| Hermetic & Scroll | | | | | | |
| Motor Codes | Voltage | Connection | | Motor Codes | Voltage | Connection |
| Standard Motor Version | | | | | | |
| PFJ | 220-240/1/50 | - | | PFJ | 265/1/60 | - |
| PFT | 220-240/1/50 | - | | | | |
| PFZ | 220-240/1/50 | - | | | | |
| TFD | 380-420/3/50 | Y | | TFD | 460/3/60 | Y |
| TFM | 380-420/3/50 | Y | | | | |
| TWD | 380-420/3/50 | Y | | TWD | 460/3/60 | Y |
| FWD | 380-420/3/50 | Δ/Δ | | | | |
| FWM | 380-420/3/50 | Δ/Δ | | | | |
| TWM | 380-420/3/50 | Y | | | | |
| Special Motor Version | | | | | | |
| TF5 | 200-220/3/50 | Y | | TF5 | 200-230/3/60 | Y |
| TWR | 220-240/3/50 | Y | | TW7 | 380/3/60 | Y |
| TWC | 200/3/50 | Y | | TWC | 208-230/3/60 | Y |
| TFE | 500/3/50 | Y | | TFE | 575/3/60 | Y |
| TWE | 500/3/50 | Y | | TWE | 575/3/60 | Y |
| | | | | TF7 | 380/3/60 | Y |
| TW5 | 200-220/3/50 | Y | | TW5 | 220-230/3/60 | Y |
| Variable Speed Motor Version | | | | | | |
| *E9 | BPM Motor | - | | | | |

YY/Y = part-winding-start
 Δ/Δ = part-winding-start

Controls Components



Controls Components

Alco Controls™ is the leading provider of precision mechanical controls for the refrigeration and air conditioning markets, and together with the range of electronic controls from Emerson Climate Technologies we continue to pioneer the control of refrigerant flow with innovative design, keeping system performance optimization central to our product development.

The wide range of Emerson controllers covers all major applications in commercial air conditioning and refrigeration, as well as heat pump systems. There are stand-alone controllers and controllers with a communication interface.

The controllers with TCP/IP Ethernet communication feature a full web server function and provide full data exchange with any user in the World Wide Web. This allows quick and inexpensive monitoring from any PC with a standard web browser.

Emerson offers stepper motor drivers and superheat controllers for the electrically driven control valves, as well as capacity controllers for Copeland Digital Scroll compressors. See section “Electronic Controllers and Sensors” for more details.

Display case and cold room controllers provide all functions needed to run commercial refrigeration, like superheat control with electrical control valve, thermostat, fan and defrost control, integrated timer and alarm functions.

The compressor soft starter allows keeping the starting current below the limit imposed in residential heat pump applications.

Electronic fan speed controllers help to maintain a minimum condensing pressure by reducing fan speed at low ambient temperature.

Make use of Alco Controls pressure transmitters, temperature sensors and other assorted accessories compatible with all of the above-mentioned controllers.

Oil management components feature active oil level monitoring and balancing for optimal compressor protection. The patented TraxOil™ 3-zone level control technology is unique and offers comfortable monitoring and proactively protects the compressor against low oil levels.

Emerson’s controls portfolio is completed by offering a variety of mechanical controls such as:

- Pressostats & Thermostats
- System Protectors
- Solenoid Valves
- Ball Valves
- Moisture Indicators
- Thermo™-Expansion Valves
- Oil Separators
- and Suction Accumulators

Electrical Control Valves

Electrical Control Valve Technology

Thermostatic expansion valves and mechanical regulator valves have been used in the refrigeration and air conditioning industry to control superheat and refrigerant mass flow since its very beginning. As today's systems require improved energy efficiency, tighter temperature control, a wider range of operating conditions and incorporate new features like remote monitoring and diagnostics, the application of electronically operated valves becomes mandatory. Only these offer the controls performance necessary to meet these needs. Electrical control valves are actuators only. For operation in a system they need sensors, valve drivers and controllers, see next chapter.

The **EXM/EXL** biflow valves for OEM use are equipped with an unipolar stepper motor drive. They are mainly used for heat pumps, air conditioning and close control.

The **EX2** is designed for pulse width modulation. It is applicable to all common HCFC and HFC refrigerants and for subcritical CO₂ applications and is used mainly for refrigeration applications such as display cases. The EX2 valve is a slide type solenoid valve with an orifice for expansion. It is either completely open or completely closed. One common valve body can be combined with 6 interchangeable orifices to cover 7 capacity ranges. The CX2 features the same technology and advantages as the EX2, however it is applicable to high-pressure CO₂ applications.

The **EX4/EX5/EX6/EX7/EX8** consist of two main internal assemblies, the valve and the stepper motor. The stepper motor is located next to the electrical plug and connected directly to the

slide and cage assembly of the valve. Similar to the technology used in compressors, the motor is exposed to refrigerant and lubricant and the materials used are identical to the ones in compressor motors. The housing of the motor and valve assembly is made from stainless steel and fully hermetic, utilising exclusively brazing and welding technologies and eliminating all gaskets. This design offers several technical advantages such as proportional linear mass flow and a wide capacity range. A common feature of all EX2, EX4-8 electrical control valves is the positive shut-off function, which eliminates the need for additional solenoid valves.

The **CX4/CX5/CX6/CX7** High Pressure Expansion Valves are stepper motor driven valves for precise control of R744 (CO₂) refrigerant mass flow in air conditioning, refrigeration and heat pump applications. The Control Valves also can be used for liquid injection duty and hot gas bypass.

Valve Selection

For the **EX2**, the published table quotes capacities at 100% duty cycle, i.e. valve open continuously. However, it is recommended to operate the valve at partial load (50-80%) to allow for system load fluctuations. For **EX4/EX5/EX6/EX7/EX8** and **EXM/EXL** valves, all published capacities are maximum and there are no reserve capacities. Each valve should be selected for the highest possible capacity of the system. A wide range regulation (10... 100%) with one slide orifice for each valve is achievable. To facilitate valve dimensioning for other than the standard conditions, Emerson Climate offers the program "Controls Navigator". This can be downloaded from www.emersonclimate.eu.

Selection Table for Electrical Control Valves and Applicable Controllers

| Valve type | Function | Capacity kW R407C | Feature | Main Application | Applicable Controller |
|--------------------|--|---|--------------------------------|---|--|
| EXM EXL | Expansion Valve | 5 .. 20.7 | Uni polar stepper motor driven | Heat pumps, Air Conditioning, Close Control | EXD-HP1/2 Superheat Controller (Modbus) |
| EX2 | Expansion Valve | 1.0 .. 18.7 | PWM | Refrigeration (Display cases) | EC2 |
| EX4-8 | Expansion valve, Hot gas bypass, Condensing pressure and liquid regulator, Head pressure control, Suction/Crankcase pressure regulator, Heat reclaim | 2 .. 925 (Capacity data as expansion valve) | Bi polar stepper motor driven | Refrigeration, Air Conditioning, Water Chillers, Heat pumps | EXD-U01 Driver Module EXD-SH1/2 Superheat Controller (Modbus) EC3-X Superheat Controller (TCP-IP) EC3-3 Coldroom Controller |
| EXN | Expansion Valve | 30 .. 38 | Uni polar stepper motor driven | Heat Pumps, Air Conditioning, Close Control | EXD-HP1/2 Superheat Controller (Modbus) |
| FX5-9 | Expansion Valve | 54 .. 2310 | Bi polar stepper motor driven | Air Conditioning, Heat Pumps, Close Control | EXD-SH1/2 Superheat Controller (Modbus) EC3-X Superheat Controller (TCP-IP) |

Selection Table for Electrical Control Valves and Applicable Controllers for CO₂ applications

| Valve type | Function | Capacity kW R744 | Feature | Main Application | Applicable Controller |
|--------------|---|--|-------------------------------|-------------------------------|---|
| CX2 | Expansion Valve | 1.5 .. 28.2 | PWM | Refrigeration (Display Cases) | EC2 |
| CX4-7 | High pressure gas valve for gas cooler control Expansion device Hot gas bypass Head pressure control Suction/Crankcase pressure regulator Heat reclaim | For capacity data for various applications (expansion, hot gas bypass etc.) please refer to the Controls Navigator | Bi polar stepper motor driven | Refrigeration | EXD-U01 Universal Driver Module EXD-SH1/2 Superheat/Temperature Controller |

Electrical Control Valves Series EXM/EXL for OEM use, stepper motor driven

Features

- Unipolar stepper motor
- Bi-flow (same performance in both flow directions in term of capacity)
- High MOPD: 40 bar in normal flow direction
- Removable coils in two versions: 12VDC/24VDC
- Continuous modulation of mass flow, no stress (liquid hammering) in the refrigeration circuit
- Linear flow
- Resolution: 500 pulses (half steps) or 250 full steps
- Hermetic design
- Reliability: 225 millions pulses at continuous 40 bar differential pressure



EXM/EXL with Coil

Note: The valve is not released for refrigeration applications such as cold rooms and refrigeration display cabinets.

Selection Chart

| Type | Part No. * | Description | Nominal Capacity kW | | | Connection size/style |
|---------|------------|-----------------|---------------------|-------|-------|-----------------------|
| | | | R410A | R407C | R134a | |
| EXM-B0A | 800 399M | Valve less coil | 1.8 | 1.6 | 1.2 | 1/4" ODM |
| EXM-B0B | 800 400M | Valve less coil | 5.5 | 5.0 | 3.7 | |
| EXM-B0D | 800 401M | Valve less coil | 11.6 | 10.5 | 7.7 | |
| EXM-B0E | 800 402M | Valve less coil | 13.7 | 12.4 | 9.1 | |
| EXM-125 | 800 403M | Coil 12VDC | - | - | - | |
| EXM-24U | 800 415M | Coil 24VDC | - | - | - | |
| EXL-B1F | 800 405M | Valve less coil | 17.0 | 15.4 | 11.3 | 1/4" ODF 8 mm ODM |
| EXL-B1G | 800 406M | Valve less coil | 23.0 | 20.7 | 15.2 | |
| EXL-125 | 800 407M | Coil 12VDC | - | - | - | |
| EXL-24U | 800 416M | Coil 24VDC | - | - | - | |

*Note: Only Bulk packing in boxes of 10 identical pieces

The nominal capacity is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|--------------|-------------------------|---|------------|
| R407C | +4°C (dew point) | +38°C bubble point / +43°C dew point | 1K |
| R134a, R410A | +4°C | +38°C | 1K |

Technical Data

| | |
|----------------------------|---|
| Max. allowable pressure PS | 45 bar |
| MOPD | 40 bar in normal flow direction |
| Temperature range TS | -30 to +70°C (liquid refrigerant) -30 to +60°C (ambient) |
| CE marking | Not required |
| Weight | Valve EXM: 65 g, EXL: 76 g Coil EXM: 124 g, EXL: 156 g |
| Package and delivery | Bulk pack with 10 pieces |

| | |
|------------------------|--|
| Stepper motor type | Uni-polar, constant voltage |
| Full travel time | 16.6 seconds at 30 pulse/sec. 5.5 seconds at 90 pulse/sec |
| Reference position | Mechanical stop at fully close position |
| Total number of pulses | 500 half step (250 full step) |
| Insulation class | EXM: A EXL: E |
| Cable length | 1m |

Electrical Control Valves Series EXN

For OEM use, stepper motor driven

Features

- Unipolar stepper motor
- Bi-flow with same capacity in normal and reverse flow direction
- MOPD: 36 bar in both flow directions
- Unipolar stepper motor with gear mechanism enabling Bi-flow performance at 36 bar differential pressure across the valve
- Removable coil: 12 VDC
- Continuous, linear modulation of mass flow
- High resolution: 2000 pulses (half steps) or 1000 full steps
- Hermetic design
- Available driver with specified Software Rev. No. (or higher):
 - EXD-HP1: 0x1115
 - EXD-HP2: 0x2115
 - EXD-TEVI: 0x311C



EXN with Coil

Note: The valve is not released for refrigeration applications such as cold room and refrigeration display cabinet.

Selection Chart

| Type | Part No. (Single Pack) | Description | Nominal capacity [kW] | | | | Connections Size / Style |
|---------|------------------------|---------------------|-----------------------|------|-------|-------|--------------------------|
| | | | R410A | R32 | R134a | R407C | |
| EXN-B2K | 800421 | Valve less coil | 34 | 50.6 | 22.2 | 30.7 | 1/2" ODF |
| EXN-B2L | 800422 | Valve less coil | 42 | 62.5 | 28.8 | 37.9 | 1/2" ODF |
| EXN-125 | 800420 | Coil 12VDC, 5 wires | - | - | - | - | - |

The nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|-------------------|-------------------------|--------------------------------|------------|
| R410A, R134a, R32 | +4°C | +38°C | 1K |
| R407C | +4°C dew point | +38°C bubble / +43°C dew point | 1K |

Technical Data

| | |
|--|---|
| Compatibility (not released for use with flammable refrigerants) | R410A, R32, R407C |
| MOPD (maximum operating pressure differential) | 36 bar in normal flow 36 bar in reverse flow |
| Max. working pressure PS: | 45 bar |
| Temperature range TS: liquid refrigerant Ambient | -30...+70°C -30...+60°C |
| CE marking | Not required |
| Weight | Valve EXN: 163 g Coil EXN: 158 g |

| | |
|-------------------------------------|--|
| Stepper motor type | Uni-polar, constant voltage, 5 wires |
| Supply voltage | 12 VDC coil: 12 V ± 10% |
| Total number of pulses | 2000 half step (1000 full step) |
| Pulsing rate frequency (pulse/sec.) | 100...200 Hz |
| Full travel time | 20 seconds at 100 Hz 10 seconds at 200 Hz |
| Coil insulation class | A |
| Cable length | 1 m |

Electronic Expansion Valves Series EX2

Pulse width modulated with exchangeable orifices

Can be used with EC2 display case controllers

Features

- Pulse width modulated
- Shut-off function eliminates the necessity of a separate solenoid valve
- Dampened plunger reduces noise effects of water hammer
- One valve body can be combined with 6 orifices to make 7 capacity ranges
- Applicable to all common refrigerants (HCFC, HFC, HFO/ HFO Blends) and for subcritical CO₂ applications
- Long lifetime, high reliability
- PS: 40bar, TS: -40 to +65°C



Selection Chart

| Type | Part No. | Description | Capacity Q _n at 100% open Valve (kW)* | | | | | | | | | | | |
|-----------|----------|--------------------------------|--|------|-------|------|-------|------|-------|-------|-------|-------|-------|---------|
| | | | R134a | R22 | R404A | R507 | R407C | R744 | R407F | R448A | R449A | R450A | R513A | R1234ze |
| EX2-M00 | 801 091 | 10 mm inlet / 12 mm outlet ODF | 13.3 | 17.2 | 12.1 | 12.1 | 18.7 | 35.0 | 19.2 | 17.2 | 16.8 | 11.7 | 12.0 | 10.4 |
| EX2-I00 | 801 090 | 3/8" inlet / 1/2" outlet ODF | | | | | | | | | | | | |
| EXO-004 | 801 089 | Orifice 4 | 8.5 | 10.9 | 7.7 | 7.7 | 11.8 | 22.2 | 12.2 | 10.9 | 10.6 | 7.4 | 7.6 | 6.6 |
| EXO-003 | 801 088 | Orifice 3 | 5.6 | 7.2 | 5.1 | 5.1 | 7.8 | 14.6 | 8.0 | 7.2 | 7.0 | 4.9 | 5.0 | 4.4 |
| EXO-002 | 801 087 | Orifice 2 | 3.3 | 4.3 | 3.0 | 3.0 | 4.7 | 8.7 | 4.8 | 4.3 | 4.2 | 2.9 | 3.0 | 2.6 |
| EXO-001 | 801 086 | Orifice 1 | 2.5 | 3.2 | 2.3 | 2.3 | 3.5 | 6.5 | 3.6 | 3.2 | 3.1 | 2.2 | 2.2 | 1.9 |
| EXO-000 | 801 085 | Orifice 0 | 1.2 | 1.6 | 1.1 | 1.1 | 1.7 | 3.3 | 1.8 | 1.6 | 1.6 | 1.1 | 1.1 | 1.0 |
| EXO-00X | 801 084 | Orifice X | 0.7 | 0.9 | 0.6 | 0.6 | 1.0 | 1.8 | 1.0 | 0.9 | 0.9 | 0.6 | 0.6 | 0.5 |
| ASC3 24V | 801 079 | Coil 24 VAC 50 Hz | | | | | | | | | | | | |
| ASC3-230V | 801 077 | Coil 230VAC 50Hz | | | | | | | | | | | | |

* Orifice should be selected at max. 80% of Q_n to allow covering the load fluctuation

WARNING: R1234ze classified as A2L. Use of product only for non-explosive environment, non ATEX zone.

| Description | Type | PCN (single packing) | PCN (bulk packing) |
|---------------------------------|---------|----------------------|--------------------|
| Plug and cable assembly (1.5 m) | ASC-N15 | 804570 | 804570M |
| Plug and cable assembly (3.0 m) | ASC-N30 | 804571 | 804571M |
| Plug and cable assembly (6.0 m) | ASC-N60 | 804572 | - |
| Plug PG9 | Plug | 801012 | - |
| Plug PG11 | Plug | 801013 | - |

The nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|-------------------------|-------------------------|--|------------|
| R407C, R407F | +4°C (dew point) | +38°C bubble point / +43°C dew point | 1K |
| R22, R134a, R404A, R507 | +4°C | +38°C | |
| R744 | -40°C | -10°C | |
| R448A, R449A | +4°C (dew point) | +38°C bubble point / +43°C dew point | |
| R450A | | +38°C bubble point / +38.6°C dew point | |
| R513A, R1234ze | | +38°C bubble point / +38°C dew point | |

For other operating conditions the selection tool "Controls Navigator" can be downloaded from www.emersonclimate.eu, or use correction factors with following formula:

$$Q_n = Q_o \times K_t \times K_{\Delta p}$$

Q_n: Nominal valve capacity
Q_o: Required cooling capacity

K_t: Correction factor for evaporating and liquid temperature
K_{Δp}: Correction factor for pressure drop at valve (See Datasheet for Correction Factor Tables.)

Electronic Expansion Valves Series CX2

Pulse width modulated with exchangeable orifices for high-pressure CO₂ applications

Can be used with EC2 display case controllers

Features

- Pulse width modulated
- Shut-off function eliminates the necessity of a separate solenoid valve
- Dampened plunger reduces noise effects of water hammer
- One valve body can be combined with 6 orifices to make 7 capacity ranges up to 28.2 kW (R744)
- Long lifetime, high reliability
- PS: 90bar
- MOPD: 65 bar



Selection Chart

| Valve | | Orifice | | Nominal Capacity kW (R744) |
|-----------|----------|-------------------|----------|----------------------------|
| Type | Part No. | Type | Part No. | |
| CX2-I00 | 801 095 | EX0-00X | 801 084 | 1.5 |
| CX2-I00 | 801 095 | EX0-000 | 801 085 | 2.6 |
| CX2-I00 | 801 095 | EX0-001 | 801 086 | 5.2 |
| CX2-I00 | 801 095 | EX0-002 | 801 087 | 7 |
| CX2-I00 | 801 095 | EX0-003 | 801 088 | 11.8 |
| CX2-I00 | 801 095 | EX0-004 | 801 089 | 17.9 |
| CX2-I00 | 801 095 | | | 28.2 |
| Coil | | | | |
| Type | Part No. | Description | | |
| ASC3 24V | 801 079 | Coil 24 VAC 50 Hz | | |
| ASC3-230V | 801 077 | Coil 230VAC 50Hz | | |

* Orifice should be selected at max. 80% of Q_n to allow covering the load fluctuation

| Description | Type | PCN (single packing) | PCN (bulk packing) |
|---------------------------------|---------|----------------------|--------------------|
| Plug and cable assembly (1.5 m) | ASC-N15 | 804570 | 804570M |
| Plug and cable assembly (3.0 m) | ASC-N30 | 804571 | 804571M |
| Plug and cable assembly (6.0 m) | ASC-N60 | 804572 | - |
| Plug PG9 | Plug | 801012 | - |
| Plug PG11 | Plug | 801013 | - |

For other operating conditions the selection tool “Controls Navigator” can be downloaded from www.emersonclimate.eu.

Electrical Control Valves Series EX4, EX5, EX6, EX7 & EX8

Features

- Multifunction as expansion valve, hot gas bypass, suction gas throttling, head pressure, liquid level actuator etc.
- Fully hermetic design (no thread joints between valve body and motor compartment)
- Applicable to all common refrigerants (HCFC, HFC, HFO/ HFO Blends) and for subcritical CO₂ applications
- Stepper motor driven
- Short opening and closing time
- Very fast full-stroke time
- High resolution and excellent repeatability
- Positive shut-off function to eliminate the need for additional solenoid valve
- Bi-flow versions for heat pump applications
- High linear flow capacity
- Extremely wide capacity range (10 ... 100%)
- Continuous modulation of mass flow, no stress (liquid hammering) in the refrigeration circuit
- Direct coupling of motor and valve for high reliability (no gear mechanism)
- Ceramic slide and port for highly accurate flow and minimal wear
- Europe patent No. 0743476, USA patent No. 5735501, Japan patent No. 28225789
- Balanced force design
- Corrosion resistant stainless steel body and stainless steel connections
- PS: EX4-EX7 60 bar, EX8 56 bar
- Liquid Inlet Temperature TS:
Uniflow: -50 to +100°C, Biflow: -40 to +80°C



Selection Chart (Capacities see following page)

| Type | Part No. | Flow Pattern | Capacity Range | Inlet Connection | Outlet Connection | Electrical Connection |
|---------|----------|------------------------|----------------|-------------------|-------------------|-----------------------|
| EX4-I21 | 800 615 | Uni-flow | 10 ... 100% | 3/8" ODF | 5/8" ODF | M12 Plug |
| EX4-M21 | 800 616 | | | 10mm ODF | 16mm ODF | |
| EX5-U21 | 800 618 | | | 5/8" (16mm) ODF | 7/8" (22mm) ODF | |
| EX6-I21 | 800 620 | | | 7/8" ODF | 1-1/8" ODF | |
| EX6-M21 | 800 621 | | | 22mm ODF | 28 mm ODF | |
| EX7-I21 | 800 624 | | | 1-1/8" ODF | 1-3/8" ODF | |
| EX7-M21 | 800 625 | | | 28mm ODF | 35mm ODF | |
| EX8-M21 | 800 629 | | | 42mm ODF | 42mm ODF | |
| EX8-U21 | 800 630 | | | 1-3/8" (35mm) ODF | 1-3/8" (35mm) ODF | |
| EX8-I21 | 800 631 | | | 1-5/8" ODF | 1-5/8" ODF | |
| EX4-U31 | 800 617 | Bi-flow (Heat Pump) | | 5/8" (16mm) ODF | 5/8" (16mm) ODF | |
| EX5-U31 | 800 619 | | | 7/8" (16mm) ODF | 7/8" (22mm) ODF | |
| EX6-I31 | 800 622 | | | 1-1/8" ODF | 1-1/8" ODF | |
| EX6-M31 | 800 623 | | | 28mm ODF | 28mm ODF | |
| EX7-U31 | 800 626 | | | 1-3/8" (35mm) ODF | 1-3/8" (35mm) ODF | |

Cable Connector Assemblies

| Type | Part No. | Temperature Range | Length | Connector type to valve | Connector type to driver or controller | Illustration |
|---------|----------|-------------------|--------|-------------------------|--|--------------|
| EXV-M15 | 804 663 | -50 ... +80°C | 1.5 m | M12, 4 pins | Loose wires | |
| EXV-M30 | 804 664 | | 3.0 m | | | |
| EXV-M60 | 804 665 | | 6.0 m | | | |

Capacity Data

Application Expansion Valve and Liquid Injection Valve Nominal Capacity kW (5% ... 100%)

| Valve Type | R407C | R22 | R134a | R404A | R410A | R23 * | R124 * | R744 | R407F | R448A | R449A | R450A | R513A | R1234ze |
|------------|-------|------|-------|-------|-------|-------|--------|------|-------|-------|-------|-------|-------|---------|
| EX4 | 17.4 | 16.5 | 12.8 | 11.5 | 19.3 | 17.8 | 9.2 | 33.5 | 18 | 16.5 | 16.1 | 11.3 | 11.5 | 10.0 |
| EX5 | 53 | 50 | 39 | 35 | 58 | 54 | 28 | 102 | 56 | 50 | 49 | 34 | 35 | 30 |
| EX6 | 126 | 120 | 93 | 84 | 140 | 130 | 67 | 244 | 134 | 120 | 117 | 82 | 84 | 73 |
| EX7 | 347 | 330 | 255 | 230 | 385 | - | - | 670 | 369 | 329 | 321 | 225 | 230 | 199 |
| EX8 | 925 | 880 | 680 | 613 | 1027 | - | - | 1789 | 984 | 877 | 857 | 600 | 614 | 532 |

WARNING: R1234ze classified as A2L. Use of product only for non-explosive environment, non ATEX zone.

* Biflow versions are not released for R124 and R23
Capacity for biflow versions identical in both flow directions.

The nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|--------------------------|-------------------------|--|------------|
| R407C, R407F | +4°C (dew point) | +38°C bubble point / +43°C dew point | 1K |
| R22, R134a, R404A, R410A | +4°C | +38°C | |
| R124 | +20°C | +80°C | |
| R23 | -60°C | -25°C | |
| R744 | -40°C | -10°C | |
| R513A, R1234ze | +4°C (dew point) | +38°C bubble point / +38°C dew point | |
| R450A | | +38°C bubble point / +38.6°C dew point | |
| R448A, R449A | | +38°C bubble point / +42.6°C dew point | |
| | | | |

Guideline for Selection of Electrical Control Valves as Expansion Valves

Controls Navigator

For easy and quick selection of Electrical Control Valves as Expansion Valves, the “Controls Navigator” selection tool can be downloaded from the Internet at www.emersonclimate.eu, or use the quick selection tables on the following pages.

The following guideline should be taken into consideration in order to obtain full advantages of the control valves:

- **Published capacities are maximum and there are no reserve capacities**
- Larger size of valve leads to shorter pull-down period and shorter travel time i.e., faster response. For example, the EX7 has a maximum travel time of 3.2 seconds. The valve has approximately 1.6 seconds travel time at 50% capacity operation.

For controllers, see chapter “Electronic Controllers and Sensors”.

Example:

System with R407C having two different operating conditions:

- 110 kW capacity at +4°C/+50°C with two stages compressor at 50% / 100% capacity
- 137 kW capacity at +4°C/+30°C with two stages compressor at 50% / 100% capacity

The EX6 with 126 kW covers condition A, however is not sufficient to cover condition B. It is recommended to select larger valve i. e. the EX7 with 337 kW at condition A and 293 kW at condition B.

Condition A:

Full load ratio = $110 / 337 = 33\%$

Partial load ratio = $(110/2) / 337 = 16\%$

Condition B:

Full load ratio = $137 / 293 = 47\%$

Partial load ratio = $(137/2) / 293 = 23\%$

The capacity ratios of system to valve are in all conditions higher than 10%. It is recommended to use the EX7 rather than the EX6.

Application Hot Gas Bypass - Nominal Capacities (kW)

| Valve Type | Kv. m ³ /h | R22 / R407C | R134a | R404A / R507 | R448A | R449A | R450A | R513A | R1234ze |
|------------|-----------------------|-------------|-------|--------------|-------|-------|-------|-------|---------|
| EX4 | 0.21 | 4.9 | 3.4 | 4.6 | 5.7 | 5.6 | 3 | 3.3 | 2.6 |
| EX5 | 0.68 | 16 | 11 | 15 | 18.6 | 18.3 | 9.7 | 10.8 | 8.3 |
| EX6 | 1.57 | 37 | 26 | 35 | 43.2 | 42.5 | 22.6 | 25.2 | 19.3 |
| EX7 | 5.58 | 131 | 92 | 126 | 153.5 | 151.2 | 80.2 | 89.4 | 68.7 |
| EX8 | 16.95 | 399 | 278 | 382 | 466.3 | 459.2 | 243.7 | 271.7 | 208.7 |

The nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | "Evaporating temperature [°C]" | "Condensing temperature [°C]" | Subcooling | "Pressure Drop (For suction duty)" | "Pressure drop (For liquid duty)" | "Pressure drop (For hot gas flow duty)" | "Isentropic efficiency (For hot gas flow duty)" |
|-------------------|--------------------------------|--------------------------------------|------------|------------------------------------|-----------------------------------|---|---|
| R407C | +4°C dew point | +38°C bubble point / +43°C dew point | 1K | 0.15 bar | 0.35 bar | 0.5 bar | 80% |
| R22, R134a, R404A | +4°C | +38°C | | | | | |
| R513A, R1234ze | +4°C dew point | "+38°C bubble / +38°C dew point" | | | | | |
| R450A | | "+38°C bubble / +38.6 °C dew point" | | | | | |
| R448A, R449A | | "+38°C bubble / +42.6°C dew point" | | | | | |

For other operating conditions use the "Controls Navigator" selection tool (download from www.emersonclimate.eu) or use the following quick selection tables.

Biflow versions are not released for hot gas bypass applications. EX4 .. EX8 must be installed with motor downward in hot gas line applications. This ensures the valve life expectancy. Install a check valve on main hot gas line just after branch to Control Valve.

Application Suction Pressure Regulation (Evaporating or Crankcase Pressure) - Nominal Capacities (kW)

| Valve Type | Kv. m ³ /h | R22 / R407C | R134a | R404A / R507 | R410A | R448A | R449A | R450A | R513A | R1234ze |
|------------|-----------------------|-------------|-------|--------------|-------|-------|-------|-------|-------|---------|
| EX6 | 1.57 | 8.6 | 7.1 | 7.6 | 10.4 | 3.9 | 3.8 | 2.8 | 3 | 2.5 |
| EX7 | 5.58 | 30.6 | 25.2 | 27 | 36.9 | 13.8 | 13.6 | 9.9 | 10.6 | 9 |
| EX8 | 16.95 | 92.4 | 76.8 | 82.1 | 112.5 | 42 | 41.4 | 30.1 | 32.2 | 27.4 |

The nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | "Evaporating temperature [°C]" | "Condensing temperature [°C]" | Subcooling | "Pressure Drop (For suction duty)" | "Pressure drop (For liquid duty)" | "Pressure drop (For hot gas flow duty)" | "Isentropic efficiency (For hot gas flow duty)" |
|-------------------|--------------------------------|--------------------------------------|------------|------------------------------------|-----------------------------------|---|---|
| R407C | +4°C dew point | +38°C bubble point / +43°C dew point | 1K | 0.15 bar | 0.35 bar | 0.5 bar | 80% |
| R22, R134a, R404A | +4°C | +38°C | | | | | |
| R513A, R1234ze | +4°C dew point | "+38°C bubble / +38°C dew point" | | | | | |
| R450A | | "+38°C bubble / +38.6°C dew point" | | | | | |
| R448A, R449A | | "+38°C bubble / +42.6°C dew point" | | | | | |

For other operating conditions use the "Controls Navigator" selection tool (download from www.emersonclimate.eu) or use the following quick selection tables.

Biflow versions are not released for hot gas bypass applications. EX4 .. EX8 must be installed with motor downward in hot gas line applications. This ensures the valve life expectancy. Install a check valve on main hot gas line just after branch to Control Valve.

Example:

The EX6 provides 3.5 kW at 0.15 bar pressure drop with R404A or $3.5 * 1.41 = 4.9$ kW at 0.3 bar pressure drop.

Multiply above nominal capacities by following factors to obtain capacities at different pressure drops:

| | | | | |
|-------------------|------|------|------|------|
| ΔP, bar | 0.10 | 0.15 | 0.20 | 0.30 |
| Correction factor | 0.82 | 1.00 | 1.15 | 1.41 |

Typical Order Package

- 1) Valve EX6, EX7 or EX8
Plug and cable assembly EXV-M60
- 2) Controller Kit EXD-U01 Part No. 804 750

Application Condensing Pressure Regulation and Liquid Duty - Nominal Capacities (kW)

| Valve Type | Kv. m ³ /h | R407C | R22 | R134a | R404A | R448A | R449A | R450A | R513A | R1234ze |
|------------|-----------------------|-------|-----|-------|-------|-------|-------|-------|-------|---------|
| EX4 | 0.21 | | | | | 5.4 | 5.2 | 5.3 | 5.1 | 5.1 |
| EX5 | 0.68 | 18 | 20 | 18 | 13 | 17.4 | 17 | 17.2 | 16.5 | 16.6 |
| EX6 | 1.57 | 43 | 46 | 42 | 30 | 40.4 | 39.6 | 40.1 | 38.3 | 38.7 |
| EX7 | 5.58 | 153 | 162 | 151 | 106 | 143 | 140 | 142 | 136 | 137 |
| EX8 | 16.95 | 463 | 491 | 458 | 323 | 430 | 422 | 428 | 408 | 413 |

The nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | “Evaporating temperature [°C]” | “Condensing temperature [°C]” | Subcooling | “Pressure Drop (For suction duty)” | “Pressure drop (For liquid duty)” | “Pressure drop (For hot gas flow duty)” | “Isentropic efficiency (For hot gas flow duty)” |
|-------------------|--------------------------------|--------------------------------------|------------|------------------------------------|-----------------------------------|---|---|
| R407C | +4°C dew point | +38°C bubble point / +43°C dew point | 1K | 0.15 bar | 0.35 bar | 0.5 bar | 80% |
| R22, R134a, R404A | +4°C | +38°C | | | | | |
| R513A, R1234ze | +4°C dew point | +38°C bubble / +38°C dew point | | | | | |
| R450A | | +38°C bubble / +38.6 °C dew point | | | | | |
| R448A, R449A | | +38°C bubble / +42.6°C dew point | | | | | |

For other operating conditions use the “Controls Navigator” selection tool (download from www.emersonclimate.eu) or use the following quick selection tables.

Biflow versions are not released for hot gas bypass applications. EX4 .. EX8 must be installed with motor downward in hot gas line applications. This ensures the valve life expectancy. Install a check valve on main hot gas line just after branch to Control Valve.

Multiply above nominal capacities by following factors to obtain capacities at different pressure drops:

| | | | |
|-------------------|------|------|------|
| ΔP , bar | 0.15 | 0.20 | 0.35 |
| Correction factor | 0.65 | 0.76 | 1.00 |

Example:

The EX6 provides 30kW at 0.35bar pressure drop with R404A or $30 \cdot 0.76 = 22.8$ kW at 0.2 bar pressure drop.

Application Hot Gas Flow such as Heat Reclaim Application - Nominal Capacities (kW)

| Valve Type | Kv. m ³ /h | R22 / R407C | R134a | R404A / R507 | R410A | R448A | R449A | R450A | R513A | R1234ze |
|------------|-----------------------|-------------|-------|--------------|-------|-------|-------|-------|-------|---------|
| EX6 | 1.57 | 8.6 | 7.1 | 7.6 | 10.4 | 9.9 | 11.8 | 11.6 | 8.5 | 8.8 |
| EX7 | 5.58 | 30.6 | 25.2 | 27 | 36.9 | 35.4 | 41.8 | 41.2 | 30.1 | 31.2 |
| EX8 | 16.95 | 92.4 | 76.8 | 82.1 | 112.5 | 106.7 | 126.9 | 125.2 | 91.4 | 94.9 |

The nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | “Evaporating temperature [°C]” | “Condensing temperature [°C]” | Subcooling | “Pressure Drop (For suction duty)” | “Pressure drop (For liquid duty)” | “Pressure drop (For hot gas flow duty)” | “Isentropic efficiency (For hot gas flow duty)” |
|-------------------|--------------------------------|--------------------------------------|------------|------------------------------------|-----------------------------------|---|---|
| R407C | +4°C dew point | +38°C bubble point / +43°C dew point | 1K | 0.15 bar | 0.35 bar | 0.5 bar | 80% |
| R22, R134a, R404A | +4°C | +38°C | | | | | |
| R513A, R1234ze | +4°C dew point | +38°C bubble / +38°C dew point | | | | | |
| R450A | | +38°C bubble / +38.6 °C dew point | | | | | |
| R448A, R449A | | +38°C bubble / +42.6°C dew point | | | | | |

Valves must be installed with motor downward in hot gas line applications. This ensures the valve life expectancy. Bi-flow versions are not released for hot gas flow applications.

Electrical Control Valves Series EX4, EX5, EX6, EX7, EX8

Technical Data

| | |
|--|---|
| Compatibility * | HCFCs, HFCs, HFO/HFO Blends CO ₂ Mineral and POE lubricants |
| MOPD (maximum operating pressure differential) | EX4/EX5/EX6: 40 bar EX7: 35 bar EX8: 30 bar |
| Max. allowable pressure, PS | EX4/EX5/EX6/EX7: 60 bar EX8: 56 bar |
| Medium temperature range: Uniflow version Biflow version | Liquid inlet temperature TS: -50 ... +100°C TS: -40 ... +80°C |
| Evaporating temperature range: | -100°C to +40°C (uniflow version) |
| Ambient temperature Storage temperature | -40 ... +55°C -40 ... +70°C |
| CE marking EX4/EX5 EX6/EX7/EX8 | not required required, Cat I, Module A |
| Salt spray test | non-corrosion stainless steel body |
| Humidity | 5 ... 95% R.H. |

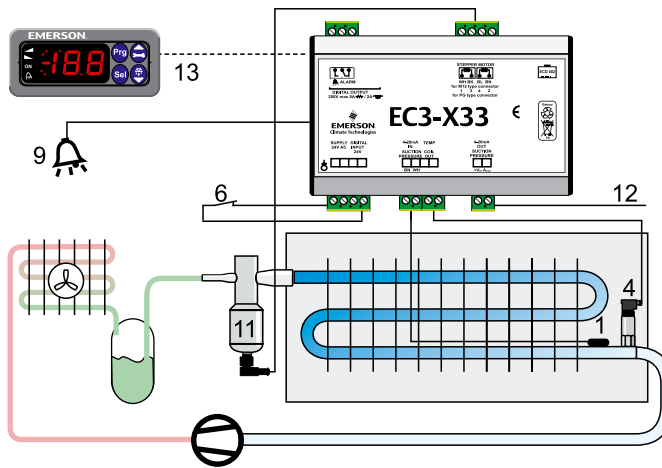
| | |
|--|---|
| Connections | ODF stainless steel fittings |
| Protection accordance to IEC 529, DIN 40050 | IP 67 with Alco supplied cable connector assembly |
| Vibration for non-connected and fastened valve | 4 g (0 .. 1000 Hz, 1 Oktave /min.) |
| Shock | 20g at 11 ms, 80g at 1 ms |
| Net weight | 0.5 kg (EX4), 0.52 kg (EX5), 0.6 kg (EX6), 1.1 kg (EX7), 1.5 kg (EX8) |
| Full travel time | EX4/EX5/EX6: 1.5 sec EX7: 3.2 sec., EX8: 5.2 sec |
| Seat leakage | Positive shut-off better than solenoid valve |
| External leakage | ≤ 3 g / Year |
| Package and delivery | Single pack, without electrical connector |

* Valves are not released for use with inflammable refrigerants.

Block Diagrams

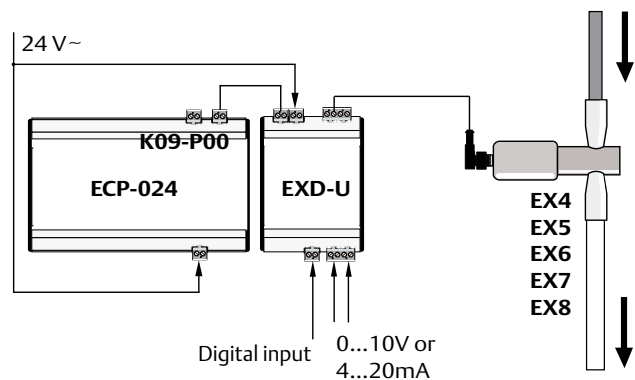
Superheat Control with EC3-X33

optional display unit ECD-002



- 1 ECN-N60 sensor
- 4 PT5 pressure transmitter
- 6 Supply / Digital Input
- 9 Alarm out
- 11 EX4 ... EX8 valve
- 12 Suction pressure 4...20mA out
- 13 ECD-002 Display unit

Refrigerant Mass Flow Control with EXD-U



Electronic Expansion Valves FX Series

Emerson FX are stepper motor driven electronic expansion valves for precise control of refrigerant mass flow in air conditioning, heat pumps, close control, and industrial process cooling applications.

Features

- Flexibility by configuration of outlet connection in 4 directions
- Stepper motor driven
- High resolution and excellent repeatability
- Linear flow capacity
- Extremely wide capacity range (10...100%)
- Continuous modulation of mass flow, no stress (liquid hammering) in the refrigeration circuit
- Direct coupling of motor and valve for high reliability (no gear mechanism)




FX7

Selection table

| Type | Part No. | Inlet Connection ODF | Outlet Connection ODF | Electric Connection |
|-----------|----------|----------------------|-----------------------|--|
| FX5-U07 | 801 336 | 3/8" | 3/8" | Suitable for M12 plug (order separately) |
| FX6-I09 | 801 337 | 1-1/8" | 1-1/8" | |
| FX6-M28 | 801 338 | 28 mm | 28 mm | |
| FX6.5-I09 | 801 339 | 1-1/8" | 1-1/8" | |
| FX6.5-M28 | 801 340 | 28 mm | 28 mm | |
| FX7-U11 | 801 341 | 1-3/8" | 1-3/8" | |
| FX7.5-U11 | | 1-3/8" | 1-3/8" | |
| FX8-I13 | | 1-5/8" | 1-5/8" | |
| FX8-M42 | | 42 mm | 42 mm | |
| FX9-U17 | 801 345 | 2-1/8" | 2-1/8" | |

Cable and connector assembly

| Type | Part No. | Temperature Range | Length | Connector type to valve | Connector type to driver board or controller | Illustration |
|---------|----------|-------------------|--------|-------------------------|--|---|
| EXV-M15 | 804 663 | -50 ... +80°C | 1.5 m | M12 | Loose wires |  |
| EXV-M30 | 804 664 | | 3.0 m | | | |
| EXV-M60 | 804 665 | | 6.0 m | | | |

Nominal capacities, kW

| Valve Type | R134a | R410A | R407C | R22 | R450A | R513A | R1234ze |
|------------|-------|-------|-------|------|-------|-------|---------|
| FX5 | 40 | 60 | 54 | 52 | 27.3 | 27.9 | 31.3 |
| FX6 | 90 | 136 | 123 | 116 | 65 | 66 | 74 |
| FX6.5 | 145 | 220 | 200 | 190 | 99 | 101 | 113 |
| FX7 | 300 | 450 | 400 | 390 | 211 | 216 | 242 |
| FX7.5 | 460 | 700 | 630 | 600 | 314 | 321 | 360 |
| FX8 | 730 | 1100 | 990 | 944 | 498 | 510 | 571 |
| FX9 | 1700 | - | 2310 | 2200 | 1159 | 1187 | 1329 |

Note: Nominal capacities of FX7.5/8/9 might be modified. Please contact sales office.

Warning: R1234ze classified as A2L. Use of product only for non-explosive environment, non ATEX zone.

The nominal capacity is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|--------------------|-------------------------|--|------------|
| R134a, R410A & R22 | +4°C | +38°C | 1K |
| R407C | +4°C (dew point) | +38°C bubble point / +43°C dew point | |
| R513A & R1234ze | +4°C | +38°C bubble point / +38°C dew point | |
| R450A | +4°C (dew point) | +38°C bubble point / +38.6°C dew point | |



Note: For other operating conditions use the quick selection in this document or the "Controls Navigator" selection tool (download from www.emersonclimate.eu).

Bi-flow application

FX valves are able to be operated in Bi-flow direction such as reversible heat pump with following consideration:

| Valve | Max. Operating differential, bar | | Capacity | |
|-------|----------------------------------|------------------------|---------------------------|------------------------|
| | Normal flow direction | Reverse flow direction | Normal flow direction | Reverse flow direction |
| FX5 | 40 | 30 | Normal capacity on page 1 | The same capacity |
| FX6 | 35 | 30 | | |
| FX6.5 | 35 | 30 | | |

Technical Data

| | |
|---|---|
|  marking FX5/6/6.5: FX7/7.5/8/9: | not required required, Cat I, Module A |
| Compatibility (not released for use with inflammable refrigerants) | HCFC, HFC, HFO, HFO-blends Mineral and POE lubricants |
| Max. working pressure PS | FX5-8: 46 bar FX9: 35 bar |
| Ambient temperature Storage temperature | -40...+55°C -40...+70°C |
| Medium inlet temperature | TS: -35...+75°C |
| Approval | UL (pending)  (pending) |

| | |
|---|---|
| Protection accordance to IEC 529, DIN 40050 | IP67 with EMERSON EXV-Mxx plug and cable assembly |
| Package and delivery (individual) | without electrical connector |
| Humidity | 5...95% r.H. |
| Connections | ODF Copper |
| Vibration resistance | 4g at 10...200Hz |
| Evaporating temperature | -35...+40°C |

Electrical Data

| | |
|-----------------------------|--|
| Stepper motor type | Bi-polar, phase current (constant current) |
| Electrical connection | 4 pin terminal via plug |
| Supply Voltage | 24 VDC (nominal) |
| Driver supply voltage range | 18...36 VDC |
| Phase current, operating | FX5-9: 800 mA |

| | |
|------------------------------|--|
| Total number of steps | FX5-7: 2400 full steps FX7.5: 2500 full steps FX8: 2600 full steps FX9: 3200 full steps |
| Step mode | Full step, half step or micro step |
| Stepping rate | 330 Hz |
| Winding resistance per phase | 3.4 Ohm ±10% |
| Reference position | Mechanical stop at fully close position |
| Full travel time | FX5-7: 7.3 seconds FX7.5: 7.6 seconds FX8: 7.9 seconds FX9: 9.7 seconds |

Electronic Controllers and Sensors

Electronic Controllers and Sensors

Selection Table Electronic Controllers

| Description | Network Communication | | |
|-------------|-----------------------|--------|--------|
| | Without | TCP/IP | Modbus |

Superheat Controllers And Stepper Motor Drivers

| | | | |
|---|---------|---------|-----------|
| Superheat controller for electrical control valves EX4 - 8 and FX5 - 9 | EC3-X33 | EC3-X32 | |
| Digital superheat controller for electrical control valves EX4 - 6 | EC3-D73 | EC3-D72 | |
| Universal stepper driver module for electrical control valves EX4 - 8 and CX4 - 7 | EXD-U01 | | |
| Superheat controller for electrical control valves EX4-8 and FX5-9 | | | EXD-SH1/2 |
| Superheat controller for electrical control valves EXM/L and EXN | | | EXD HP1/2 |

Economizer Controller for Tandem Compressors

| | | | |
|--|--|--|----------|
| Enhanced Wet Vapor Injection with EXM/L or EXN | | | EXD TEVI |
|--|--|--|----------|

Display Case And Cold Room Controllers For Electrical Control Valve

| | | | |
|--|--|---------|--|
| Temperature + superheat control of EX2 (pressure/temperature input) | | EC2-352 | |
| version for use with a compressor pack system | | EC2-372 | |
| Temperature + superheat control of EX2 (temperature/temperature input) | | EC2-312 | |
| version for use with a compressor pack system | | EC2-392 | |
| Temperature + superheat control of EX4 ... EX8 (stepper motor) | | EC3-332 | |

Condensing Unit Controllers

| | | | |
|--|--|---------|--|
| For 1 Copeland Scroll Digital™ and 1 single stage or 2 single stage compressors, fan speed control | | EC2-552 | |
|--|--|---------|--|

Drivers for DIGITAL-Copeland Compressors

| | | | |
|--|---------|--|--|
| Driver for Digital Scroll compressors and 3-cylinder digital semi hermetic compressors | EC3-D13 | | |
| Driver for 4- and 6-cylinder digital semi hermetic compressors | EC3-D23 | | |

Pressure Transmitter

| | | | |
|--------------------------|-----|--|--|
| Output signal 4 ... 20mA | PT5 | | |
|--------------------------|-----|--|--|

Temperature Sensors

| | | | |
|--------------|---------|--|--|
| NTC / PT1000 | ECN-... | | |
|--------------|---------|--|--|

Compressor Soft Starter

| | | | |
|---|-----|--|--|
| For single phase compressor motors with up to 32A | CSS | | |
|---|-----|--|--|

Electronic Fan Speed Controllers

| | | | |
|--|-----|--|--|
| Pressure actuated, current range 0.1 ... 4A | FSY | | |
| Fan Speed Control Modules for EC-type motors | FSE | | |

Electronic Superheat Controllers and Stepper Motor Drivers

Emerson Climate Technologies designs superheat controllers and valve drivers for stepper motor driven control valves for all commercial refrigeration and air conditioning applications.

The **EC3-X33** is a universal superheat controller without network communication for air conditioning, refrigeration and industrial applications such as chillers, industrial process cooling, rooftops, heat pumps, package unit, close control, cold room, food process and air driers. The ECD-002 Display/Keypad Unit is necessary for setup but not for operation of the controllers. ECD-002 can be connected or disconnected to the EC3-X33 at any time.

In the event of a cooling request and compressor start-up, the EC3-X33 needs to be informed. This can be achieved by a digital input. The EC3-X33 will start to control the refrigerant mass flow stand-alone by precise positioning of the Control Valve under different operating conditions such as compressor start-up, start of a further compressor, high head pressure, low head pressure, high load, low load and partial load operation. EC3-X33 is capable for diagnostics and alarm. The alarm can be received via relay output as well as optical LED/alarm code on ECD-002.

The **EC3-X32** has the same function as EC3-X33 but with a TCP/IP Ethernet communication interface enabling the controller to be directly connected to a network or a PC via the standard Ethernet port. The EC3-X32 controller has embedded WebPages to enable the user to visualise the parameter list with a standard WebBrowser

Display Case and Coldroom Controllers

The compact **EC2** series is available with TCP/IP communication protocol covers applications where the display cases are connected to a multiple compressor application. In this case, the dedicated compressor relay on the controller is no longer required and is available as a spare relay to perhaps switch the display case lighting. The controllers therefore can be split into two groups; controller is required to switch the compressor directly; integral application and those connected to a multiple compressor (rack) system.

The **EC2-312** and **EC2-352** have the dedicated compressor relay.

The **EC2-392** and **EC2-372** are for use with the rack system.

The controllers are specifically designed for display cases for use **with EXVs** and perform the function of thermostat, defrost and fan management and are capable of operating a standalone condensing unit or being incorporated into a distributed system controlled by a rack.

All display case and cold room controllers feature many useful functions like temperature control, defrost and fan management, as well as alarm functions. An additional control circuit takes care for stable superheat control with EX2 type Pulse Width Modulated Expansion valves (EC2-3) and with EX4 ... EX8 Stepper Motor driven Electrical Control valves (EC3-3).

EC2-312 / EC2-392 (Temp / Temp): the superheat is controlled using two temperature sensors.

EC2-352 / EC2-372 (Pressure / Temp): the superheat is controlled using a pressure transmitter (PT5 series) in conjunction with a temperature sensor.

like Internet Explorer®. When suitably connected, the controller is able to automatically send alarms by email to a PC or mobile phone.

For use with **Copeland Scroll Digital™** technology two other models are available. **EC3-D73** is a stand-alone version for use with the ECD-002 Display / Keypad unit whilst the **EC3-D72** has a TCP/IP Ethernet interface. A 0-10V demand signal is required from a third party controller to control a tandem system with one fixed and one digital compressor. A patented algorithm synchronises the operation of the PWM digital compressor valve and the EX series electrical control valve.

EXD-U Universal Drivers are stepper motor drivers and enable the operation of Alco stepper motor driven valves EX4 ... EX8 as electronic expansion valve, capacity control by means of hot gas bypass or evaporating pressure regulator, crankcase pressure regulator, condenser pressure regulator, liquid level and liquid injection.

The EXD-U universal driver can be connected to any controller which can provide a 4-20mA or 0-10V analogue signal. The output is the opening/closing of EX4 ... EX8 and consequently the control of the refrigerant liquid or vapor mass flow in accordance with the analogue input.

EXD-SH1/2 and EXD-HP1/2 are superheat controllers and or economizer controllers with Modbus communication.

Whilst the products were developed for display cases, they may also be applied to control a simple coldroom.

In principle, the **EC3 series** utilize the same software technology of the EC2 series but provide additional inputs and outputs to satisfy the requirements of even the most demanding systems. Like the EC2, the EC3 series may be connected together to form larger systems combining the control of multiple compressors and fans.

The optional **ECD-001 Display/Keypad Unit** is available to display the system temperatures, indicate system status and to modify parameters.

The **EC3-332** series are specifically for use with stepper valve series (EX4, EX5, EX6, EX7, EX8). In case of power loss, the Electrical Control Valve needs to be closed to avoid flooding of the compressor, therefore each valve requires a battery backup. For this reason, the battery, together with its automatic charging circuit, has been incorporated into the controller housing, significantly saving installation time as well as space in the electrical enclosure.

Condensing Unit Controllers

Condensing Unit Controllers

The **EC2-552** controller is suitable for controlling the compressors and fans of a condensing unit. Digital inputs are available for individual compressor feedback loops from the safety chain, which typically consists of low and high pressure switches together with motor protection and oil management controls. A common feedback is also available for the fans.

Following models is available:

EC2-552: to control up to 2 single stage compressors or tandem compressor condensing units with a **Copeland Scroll Digital™** compressor. It features a 0...10V output to control fan motor speed with an inverter or to connect to ECM type fan motors directly.

PT5 series pressure transmitters are used to measure the suction and discharge pressures to modulate the compressor and fan capacities.

ECN Temperature sensors (NTC/PT1000) are used to measure the suction and discharge temperatures.

Network Communication and System Management

The Alco EC Series of drivers and controllers utilise the very latest in communication technology which sets new standards in the refrigeration industry. Energy saving algorithms are incorporated into many of the controllers, including adaptive superheat and thermostat modulation, defrost on demand & suction and discharge setpoint shift.

EC2 or **EC3** controllers are available with TCP/IP Ethernet communication protocol.

TCP/IP Ethernet:

The controllers are Ethernet based enabling them to be connected directly to any computer via the Ethernet port (RJ45 connector). The controllers act as web server enabling the engineer to pick up standard configuration pages directly from the controllers without the need of any additional hardware or software. The most convenient way to connect a controller to the PC is to use a router that will automatically assign a TCP/IP address. The engineer can access the monitoring and parameter configuration pages by entering the TCP/IP number into the address line of an Internet browser such as Mozilla or Microsoft Internet Explorer. User name and password protection is provided to protect the controller from unauthorized access.



The **TCP/IP based Controllers** offer a practical solution, particularly for smaller installations that require communication for monitoring purposes without the need for customized visualization. For many installations, an additional monitoring server is not required.

Other Functions:

- Monitoring of system temperatures and pressures as well as relay status information
- Read/write of EC2 & EC3 control parameters
- Real-time graphical visualization
- Log function of up to one month's data directly on the controller
- Log function of data to a PC *
- Storage and retrieval of system parameter

* Controller must be connected to the PC

EXD-HP1/2 Stand-alone Superheat/Economizer Controller

EXD-HP1/2 are stand-alone universal superheat and or economizer controllers for heat pumps, heating units, air conditioning and precision cooling such as telecom and shelter applications.

Features EXD-HP1/2

- Self adapting superheat/economizer control in conjunction with EMERSON stepper motor driven electronic expansion Valves EXM/EXL/EXN
- Discharge hot gas temperature control by liquid/vapor injection to compressor
- EXD-HP1: Controller with one EXV output
- EXD-HP2: Controller with two independent EXV outputs
- Controllers as slave with Modbus (RTU) communication capability. All data (read/write) accessible by any third party controller having modbus communication (RTU)
- Upload/download key (accessory) for transmission of parameter settings among controllers with the same setting
- Low pressure switch and freeze protection function
- Manual positioning of valve(s)
- Limitation of evaporating pressure (MOP)
- Low/high superheat alarm
- Monitoring of sensors and sensor wiring / detection of sensor and wiring failures
- Integrated display (3-digit LEDs) and keyboard
- Electrical connection via plug-in type screw terminals (included with controller)
- DIN rail mounting housing
- **OEM product: Box/order quantities: 20 pieces (Multi-pack)**



EXD-HP2

Selection Chart

| Description | Type | Part No. | |
|--|----------------|---------------------------|------------|
| | | M = Multipack (20 pieces) | Singlepack |
| Controller with one EXV output | EXD-HP1 | 807 836M | - |
| Controller with two EXV outputs | EXD-HP2 | 807 837M | - |
| Temperature sensor with 3 meter cable | ECP-P30 | - | 804 495 |
| Electronic expansion valves | Valve: EXM-B0B | 800 400M | - |
| | Valve: EXM-B0D | 800 401M | - |
| | Valve: EXM-B0E | 800 402M | - |
| | Coil: EXM-125 | 800 403M | - |
| | Valve: EXL-B1F | 800 405M | - |
| | Valve: EXL-B1G | 800 406M | - |
| | Coil: EXL-125 | 800 407M | - |
| | Valve: EXN-B2K | | 800 421 |
| | Valve: EXN-B2L | | 800 422 |
| | Coil: EXN-125 | | 800 420 |
| Pressure sensors (Suction pressure) see chapter Pressure Transmitters -0.8...7 bar (R22, R134a, R407C) 0.....18 bar (R410A, R32) | PT5-07M | 802 350M | 802 350 |
| | PT5-18M | 802 351M | 802 351 |
| | PT5-30M | 802 352M | 802 352 |
| Recommended for intermediate pressure (economizer control) | | | |
| | | | |
| Plug and cable assembly for pressure sensor 1.5m cable length 3.0m cable length | PT4-M15 | 804 803M | 804 803 |
| | PT4-M30 | 804 804M | 804 804 |
| Transformer 25VA | ECT-323 | - | 804 424 |

Remark: For further details of EXM/EXL and PT5: Please see separate datasheet.

EXD-SH1/2 Controller for EX/CX/FX

with ModBus communication capability

EXD-SH1/2 are stand-alone universal superheat and or temperature controllers for air conditioning units or refrigeration systems.

Features

- EXD-SH1: Control of one valve
- EXD-SH2: Control of two valves in two independent circuits
- Main function

| | Circuit 1 | Circuit 2 |
|---------|----------------------------------|-------------------|
| EXD-SH1 | Superheat or temperature control | |
| EXD-SH2 | Superheat or temperature control | Superheat Control |

- Other functions: Limitation of evaporating pressure (MOP), Low pressure switch, freeze protection and manual positioning of valve(s)
- Self-adapting superheat control function in conjunction with EMERSON EX5-8, FX5-9 and CX4-7 series
- For multiple refrigerants, including ultralow temperature refrigerant R23
- Modbus (RTU) communication
- Integrated keyboard with two lines display
- Monitoring of sensors and detection of sensor (ECN/PT5) stepper motor wiring failures
- Optional upload/download key (accessory) for transmission of parameter settings among controllers with the same setting
- Low/high superheat alarm as well as other function alarms
- Electrical connection via plug-in type screw terminals included with controller and Micro Molex EXD-M03 (must be ordered separately)
- DIN rail mounting housing



EXD-SH2



EXD-M03

Selection table

| Type | Description | Part No. | |
|---|---|------------------------------|--------------------|
| | | Multipack (20 pieces) | Single pack |
| Controllers | | Multipack (20 pieces) | Single pack |
| EXD-SH1 | Controller for single refrigeration circuit | - | 807 855 |
| EXD-SH2 | Controller for two independent refrigeration circuits | - | 807 856 |
| EXD-M03 | Molex terminal with 3 meter wires | - | 807 865 |
| ECN-N30 | Temperature sensor with 3 meter cable | - | 804 496 |
| ECN-N60 | Temperature sensor with 6 meter cable | - | 804 497 |
| ECN-Z60 | Ultralow Temperature sensor with 6 meter cable | - | 807 826 |
| Pressure transmitters: PT5 (7/16-20UNF connection) | | | |
| PT5-07M | Sensing pressure range -0.8 to 7 bar | 802 350M | 802 350 |
| PT5-18M | Sensing pressure range 0 to 18 bar | 802 351M | 802 351 |
| PT5-30M | Sensing pressure range 0 to 30 bar | 802 352M | 802 352 |
| PT5-50M | Sensing pressure range 0 to 50 bar | 802 353M | 802 353 |
| PT5-150D | Sensing pressure range 0 to 150 bar (1/4 NPTF) | 802 379M | 802 379 |
| Pressure transmitters: PT5 (Brazing connection) | | | |
| PT5-07T | Sensing pressure range -0.8 to 7 bar | 802 380M | 802 380 |
| PT5-18T | Sensing pressure range 0 to 18 bar | 802 381M | 802 381 |
| PT5-30T | Sensing pressure range 0 to 30 bar | 802 382M | 802 382 |
| PT5-50T | Sensing pressure range 0 to 50 bar | 802 383M | 802 383 |

Notice: Pressure range 18 bar for system with R410A, 30 bar for R410A economizer, 50/150 bar for CO₂

Accessories


| Type | Description | Part No. | |
|---|---|------------------------------|--------------------|
| M12 Plug and cable for pressure transmitters PT5 | | Multipack (20 pieces) | Single pack |
| PT4-M15 | 1.5 m | 804 803M | 804 803 |
| PT4-M30 | 3.0 m | 804 804M | 804 804 |
| PT4-M60 | 6.0 m | 804 805M | 804 805 |
| Uninterruptible Power supply | | | |
| ECP-024 | Backup battery with two outputs for two controllers | - | 804 558 |
| K09-P00 | Electrical Terminal Kit for ECP-024 | - | 804 560 |
| EXD-PM | Super cap for only EXD-SH1 (two pieces of EXD-PM required for one EXD-SH2) | - | 807 854 |

Available configuration options

| | | |
|-------------------------------|---|-------------------------|
| Refrigerants | R22, R23, R32*; R124, R134a, R404A, R407C, R407A, R407F, R507, R744 | R744 (CO ₂) |
| Main function | Superheat or and temperature control | Superheat control |
| Pressure transmitters | | |
| 3rd party ratio metric | | |
| 3rd party ratio metric | | |

*) R32 is for systems/regions which it does not consider R32 as potential explosive media (flammable or low flammable) and PED/CE marking is not required.
EXD-SH1/2 IS NOT ATEX APPROVED.

Technical Data: EXD-SH1/2

| | |
|--------------------|--|
| Supply voltage | 24VAC/DC ±10%, 50/60Hz |
| Power consumption | EXD-SH1: Max. 25VA EXD-SH2: Max. 50VA |
| Terminals 1 to 12 | Suitable for 12 poles molex plug |
| Terminals 13 to 36 | Suitable for removable screw version: wire size 0.14 ... 1.5mm ² Included in controller delivery |
| Protection class | IP 00 |
| Compliance | EMC, RoHS, |
| Marking |  |

| | |
|--|--|
| Mounting | DIN rail mounted |
| Temperatures storage operating/ surrounding | -25 ... +60°C 0 ... +60°C |
| Relative humidity | 20 ... 85% non condensing |
| Accessory (12 poles molex plug with 3 meter cable) | Type: EXD-M03 Part: No 807826 (to be ordered separately) |
| Housing | Self-extinguishing ABS |
| Weight | 320 g |

Note: EXD-SH1/2 are not released for flammable refrigerants

Input, Output EXD-SH1/2

| Description | Specification |
|---|--|
| Analogue input(s): NTC Temperature sensor Analogue input: PT1000 Temperature sensor | ECN-N... (-45° ... +50°C sensing range) ECN-Z60 (-80°C ... -40°C sensing range) |
| Analogue input(s): 4-20 mA pressure transmitters Analogue input(s): 0.5 to 4.5 V pressure transmitters | PT5 Third party ratio metric pressure transmitters (total error: ≤ 1%) |
| Digital input(s) | Dry contact, potential free |
| Digital output(s): Alarm relay(s) Contact is closed: During alarm condition Contact is open: During normal operation and supply power OFF | Resistive Load 24 V AC/DC, max. 1 A Inductive Load 24 V AC, max. 0.5 A |
| Communication | RS485 RTU Modbus, two wires |
| Stepper motor output | Valves: EX4-8, FX5-9 and CX4-7 |

EXD-TEVI Economizer Controller for Tandem Compressors

EXD-TEVI is a stand-alone controller for enhanced wet vapor injection for Copeland Scroll™ tandem compressors in heating applications.

Features EXD-TEVI

- Emerson solution for specified operating map of tandem scroll
- Two EXL valves can be driven in parallel for required wide injection capacity
- Input signals: Injection (intermediate) pressure and temperature sensor as well as two compressor discharge temperature sensors
- Two independent digital inputs for recognition of tandem compressors operation
- High discharge temperature alarm
- Monitoring of sensors and sensor wiring and detection of sensor wiring failures
- Controllers as slave with Modbus (RTU) communication capability
- Upload/download key (accessory) allows to copy parameter settings from one controller to others
- Integrated 3½ digit 7-segment display with 6 indicator LEDs
- Electrical connection via plug-in type screw terminals (included with controller)
- DIN rail mounting housing



EXD-TEVI

Selection table

| Description | Type | PCM | |
|---|-----------------------------------|-----------------------|----------------|
| | | Multipack (20 pieces) | Singlepack |
| Controller with connectors | EXD-TEVI | 807 838M | 807 838 |
| Injection line temperature sensor | ECN-N30 (3 meter cable) | - | 804 496 |
| | or ECN-N60 (6 meter cable) | - | 804 497 |
| Injection line pressure transmitter | PT5-30M (flare connection) | 802 352M | 802 352 |
| | or PT5-30T (brazed connection) | 802 382M | 802 382 |
| Plug and cable assembly for pressure transmitters | PT4-M15 (1.5 meter cable) | 804 803M | 804 803 |
| | or PT4-M30 (3 meter cable) | 804 804M | 804 804 |
| Electronic expansion valve body | EXL-B1F | 800405M | - |
| | EXL-B1G | 800406M | - |
| Electronic expansion valve coil | EXL-125 | 800407M | - |
| Valve | EXN-B2K | | 800 421 |
| Valve | EXN-B2L | | 800 422 |
| Coil | EXN-125 | | 800 420 |

Remark: Discharge temperature sensor (86 kΩ NTC) is part of compressor delivery.

Technical Data

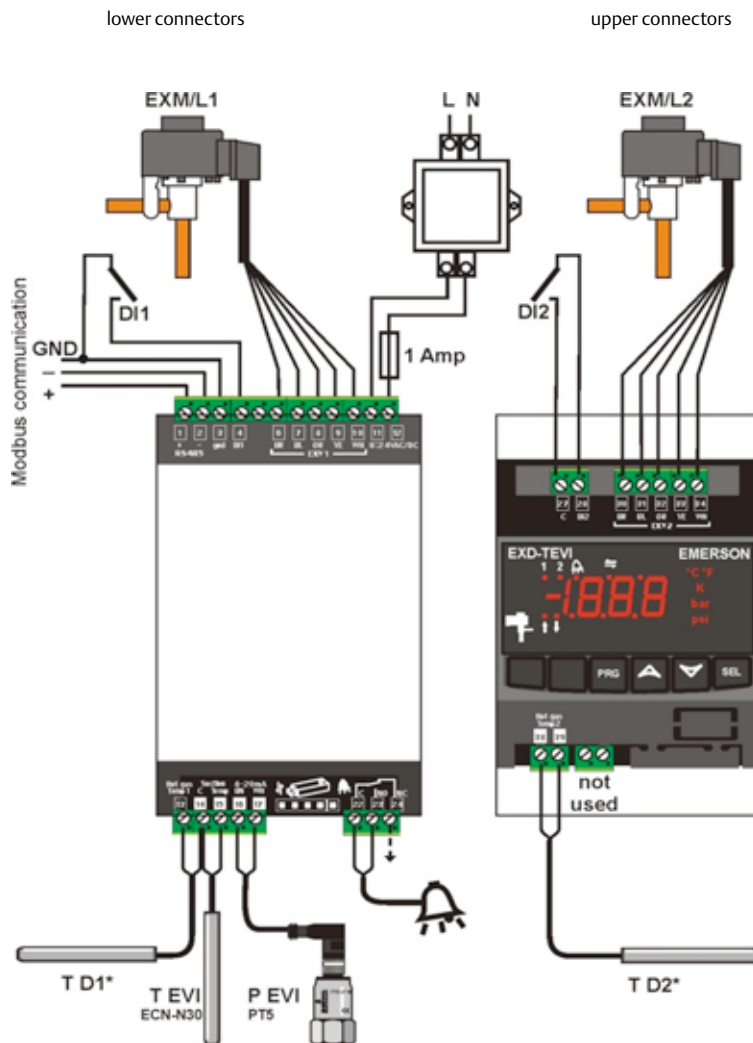
| | |
|------------------------|---|
| Supply voltage | 24VAC/DC \pm 10% |
| Power consumption | EXD-TEVI: Max. 20VA |
| Digital inputs | 2 (potential free) |
| Relay output (Alarm) | SPDT, with AgSnO contacts Inductive (AC15) 24V AC: 1A Resistive: 24 V AC/DC: 4A |
| Plug-in connector size | Removable screw version wire size 0.14 ... 1.5mm ² |
| Applied directive | LVD, EMC, RoHS |
| Compliance with | DIN EN 60335-1, DIN EN 55014-1 DIN EN 55014-2 |

| | |
|--------------------------------------|--------------------------------|
| Protection class | IP 20 |
| Housing | Self extinguishing ABS |
| Mounting | DIN rail mounted |
| Temperatures storage operating | -20 ... +65°C -10 ... +60°C |
| Relative humidity | 0 ... 85% RH non condensing |
| Weight | 175 g |
| Marking | CE |

Technical data: Sensors

| Description | Specification |
|--------------------------|---|
| Temperature sensors | 1 x 10k NTC for injection line temperature (ECN-N30 / ECN-N60) 2 x 86k NTC for discharge gas temperature (part of compressor delivery) |
| Pressure transmitter EVI | PT5-30M/T: 4-20 mA (Range: 0 to 30 bar) |

Wiring Diagram EXD-TEVI



Notes:

- Alarm relay, dry contact. Relay coil is not energized at alarm condition or power off and energized during normal operation
- Transformer shall be class 2
- *The discharge temperature sensors would be part of compressor delivery

Superheat Controllers Series EC3-X32 / EC3-X33

For stable superheat control with stepper motor driven electrical control valves Series EX4 - EX8 and Series FX5-9

Digital Superheat Controllers Series EC3-D72 / EC3-D73

For stable superheat control only with EX4...EX6 electrical control valves and automatic synchronisation of the PWM capacity control valve incorporated into the Copeland Scroll Digital™ compressor technology

Features

- Limitation of evaporating pressure (MOP)
- Feed-through of 4 ... 20mA signal of evaporating pressure transmitter to operate third party controllers with a common pressure transmitter
- Intelligent alarm management, superheat alarm
- Monitoring of sensors and sensor wiring, detection of sensor and wiring failures
- Integral rechargeable battery to close Electrical Control Valve in case of power loss
- Electrical connection via plug-in type screw terminals
- Aluminum housing for DIN rail mounting

Additional features EC3-X32 and EC3-D72 with TCP/IP

- WebServer functionality allows monitoring and configuration of controllers through a standard Web browser (e.g. Internet Explorer®)
- Internal data logging
- Multiple language support (www.emersonclimate.eu)



EC3-X33 with ECD-002

- Freeze protection
- Low and high superheat alarm
- Low pressure switch function/alarm

ECD-002 Display Unit

- Front panel mounted interface for parameter and status read-out and controller setup via keypad
- Indicator LEDs for valve opening/closing, external ON and alarm

Selection Chart

| Description | TCP/IP | | | Stand alone | | |
|-------------------------------|---------|----------------------|----------------|-------------|----------------------|----------------|
| | Type | Part No. single unit | Part No. Kit* | Type | Part No. single unit | Part No. Kit* |
| Superheat Controller | EC3-X32 | 807 782 | 808 037 | EC3-X33 | 807 783 | 808 036 |
| Terminal Kit for EC3-X32/-X33 | K03-X32 | 807 644 | | K03-X33 | 807 645 | |
| Digital Superheat Controller | EC3-D72 | 807 805 | 808 042 | EC3-D73 | 807 804 | 808 041 |
| Terminal Kit for EC3-D72/-D73 | K03-331 | 807 648 | | K03-331 | 807 648 | |

* Kits contain terminal kit, pressure transmitter PT5-07M with cable assembly, NTC sensor 6m, transformer 60VA (see chapter 'Accessories & Spare Parts')

Accessories

| Description | Type | Part No. | Note |
|--------------------------------------|---------|----------------|---|
| Display | ECD-002 | 807 657 | |
| Connection cable EC3 to ECD | ECC-N10 | 807 860 | 1m cable length |
| | ECC-N30 | 807 861 | 3m cable length |
| | ECC-N50 | 807 862 | 5m cable length |
| Pressure Transmitter | PT5-07M | 802 350 | for R134a, R22, R404A, R407C, R507C, R124 |
| | PT5-18M | 802 351 | for R410A only |
| | PT5-30M | 802 352 | for R744 |
| Cable Assembly for PT5 | PT4-M60 | 804 805 | other cable lengths see Pressure Transmitter Series PT5 |
| Temperature Sensor NTC | ECN-N30 | 804 496 | 3m cable length |
| | ECN-N60 | 804 497 | 6m cable length |
| | ECN-N99 | 804 499 | 12m cable length |
| Transformer 25VA 230V/24V AC 60VA | ECT-323 | 804 424 | for EX4 - 7 and FX5-9 |
| | ECT-623 | 804 421 | for EX8, DIN rail mounting |

Typical Ordering Package

System with 100 kW cooling capacity and refrigerant R22 requires the following parts:

| | | | |
|---------|------------------------------------|---------|------------------------------------|
| EX6 | Electronic Expansion Valve | ECN-N60 | NTC Temperature Sensor |
| EXV-M60 | Electrical Cable and Plug assembly | PT5-07M | Pressure Transmitter |
| EC3-X33 | Superheat Controller Stand-alone | PT4-M60 | Cable assembly PT5 6.0m |
| K03-X33 | Terminal Kit for EC3-X33 | ECD-002 | Display (optional) |
| ECT-323 | Transformer 25VA | ECC-N30 | Connection cable EC3 to ECD (opt.) |



Universal Driver Modules Series EXD-U01

Stepper motor valve driver specifically designed for the Emerson EX and CX Series of electrical control valves in applications such as:

- Capacity control by means of hot gas bypass
- Evaporating pressure regulator or crankcase pressure regulator
- Hot gas flow such as heat reclaim
- Condensing pressure regulation and liquid duty
- Refrigerant mass flow control in CO₂ transcritical systems

Features

- Plug and play, no parameter setting
- Valve opening proportional to 4-20mA or 0-10V analogue input signal
- Digital input can be used to force valve closing
- Dip-switches for selection of Electrical Control Valves, analog input
- Aluminum housing for DIN rail mounting
- Easy wiring
- Fully tested and ready for operation
- CE-marking for electromagnetic compatibility



EXD-U01

Options

- Uninterruptible Power Supply ECP-024 to automatically close valve after power down

Selection Chart

| Description | Type | Part No. single unit |
|-------------------------|---------|----------------------|
| Universal Driver Module | EXD-U01 | 804 750 |
| Electrical Terminal Kit | K09-U00 | 804 559 |

* Controller Kit contains terminal kit

Accessories

| Description | Type | Part No. | Note |
|------------------------------|---------|----------|----------------------------|
| Uninterruptible Power Supply | ECP-024 | 804 558 | for up to 2 driver modules |
| Electrical Terminal Kit | K09-P00 | 804 560 | for ECP-024 |
| Transformer | 25VA | ECT-323 | |
| 230V/24V AC | 60VA | ECT-623 | DIN-rail mounting |

Capacity Data

See “Electrical Control Valves EX4...EX8” data.

See Technical Bulletin “EXD-U01_TB” for detailed data and its application in CO₂ systems.



ECP-024



ECT-323

Display Case and Universal Controllers Series EC2

With Web Server functionality and TCP/IP Protocol

Features of all models:

- Superheat control for Pulse Width Modulated Valves (e.g. EX2-Series) see Selection Table
- Self-adapting controller, no user setup necessary
- Limitation of evaporating temperature (MOP)
- Air temperature control
- Defrost timer for natural, electric or hot-gas defrost with fan control
- Integrated timer and alarm functions
- All parameters and functions are programmable:
 - via standard Web browser (EC2-xx2 models)
 - with integral keypad
- Password protection to eliminate unauthorized use
- Multiple language support (www.emersonclimate.eu)
- Standard 29 x 71 mm cutout dimensions
- 2 ½ digit display in °C or °F
- CE marking



EC2 Controller

Communication TCP/IP Ethernet

- Web Server function provides monitoring and configuration through a standard web browser. Ethernet interface, as used in most office PCs
- Graphical visualisation via built-in Web pages
- Fixed or dynamic TCP/IP address with username and password
- Up to 30 days datalog








Example for Web page monitoring



Selection Table

| Functional Overview | TCP/IP | | |
|--|--------------------|----------------------------------|----------------------------------|
| | Type | Part No. single unit | Part No. Kit* |
| Display Case and Cold Room Controllers | | | |
| Temperature and Superheat Control of EX2 (Press. / Temp. input) Version for use with a compressor pack system | EC2-352 EC2-372 | 807 772 807 688 | 808 009 808 011 |
| * Kit contains terminal kit, pressure transmitter PT5-07M with cable assembly, transformer 25VA, 4 NTC sensors 6m fin, pipe and air version (EC2-35x only) | | | |
| Temperature and Superheat Control of EX2 (Temp. / Temp. input) Version for use with a compressor pack system | EC2-312 EC2-392 | 807 682 807 692 | 808 005 808 007 |
| * Kit contains terminal kit, transformer 25VA, 5 NTC sensors 6m fin, pipe and air version (EC2-31x only), see chapter "Accessories & Spare Parts". | | | |

Accessories

| | | Type | Part No. | |
|---|-------------------|---------|----------|---|
| Terminal kits, cables | | | |  |
| Terminal kit for EC2-31x, -35x, -37x, -39x | | K02-000 | 800 050 | |
| Ethernet Cable RJ45/4-pin-conn. | 6m cable length | ECX-N60 | 804 422 | |
| Sensors | | | | |
| Air-Sensors, single insulated (10 kΩ at 25°C) for EC2-21x, -31x, -35x | 1.5m cable length | ECN-S15 | 804 304 |  |
| | 3m cable length | ECN-S30 | 804 305 | |
| | 6m cable length | ECN-S60 | 804 284 | |
| Pipe and pocket sensors NTC (10 kΩ at 25°C) Air sensors for EC2-29x, EC2-3xx | 3m cable length | ECN-N30 | 804 496 |  |
| | 6m cable length | ECN-N60 | 804 497 | |
| | 12m cable length | ECN-N99 | 804 499 | |
| Defrost sensor (10 kΩ at 25°C) (including fin clip) | 6m cable length | ECN-F60 | 804 283 |  |
| Pressure transmitter | -0.8...7 bar | PT5-07M | 802 350 |  |
| | 0 ... 18 bar | PT5-18M | 802 351 | |
| | 0 ... 30 bar | PT5-30M | 802 352 | |
| Cable plug assembly for PT5 | 1.5m cable length | PT4-M15 | 804 803 |  |
| | 3m cable length | PT4-M30 | 804 804 | |
| | 6m cable length | PT4-M60 | 804 805 | |
| Transformer 230VAC Input, 24V output | | | | |
| | 25VA | ECT-323 | 804 424 |  |

Technical Data

| | |
|--|--|
| Supply voltage | 24V AC ±10% 50/60 Hz class II only |
| Power consumption | 20VA incl. EX2 valve (EC2-3xx) |
| Inputs | up to 5 Temperature sensors: Refrigerant inlet (saturated temp.) Refrigerant outlet (suction temp.) Air into / Air out of evaporator Defrost termination |
| Output contact rating cos φ = 0.5: (Voltage free contacts) | SPDT & SPST relays, 250V max / 8A resistive load EC2-3xx 2A inductive load all EC2 (defrost, compressor, fan) |
| Triac output to EX2 | 24VAC, 1 A max. |
| Communication | TCP/IP: Ethernet |

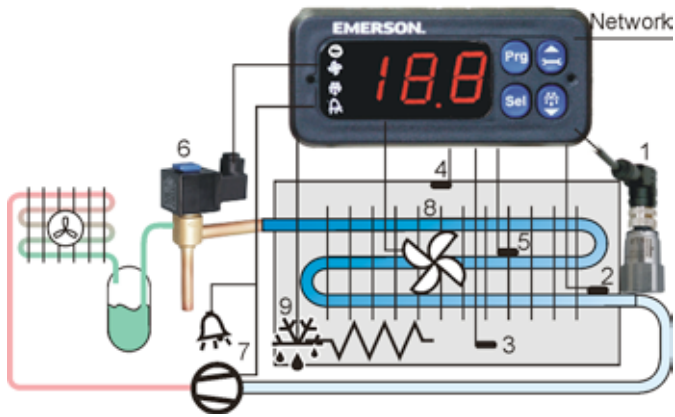
| | |
|-------------------------------------|--|
| Temperature storage | -10 ... +70°C |
| operation | 0 ... +50°C (housing) |
| operation | -50 ... +50°C (NTC sensor) |
| Display | 2 1/2 digits red LED Automatic decimal point between -19.9 & +19.9 Switchable between °C & °F |
| Indicator LEDs Varies upon model | Compressor, defrost, fan, alarm, service LED |
| Protection (EN 60529) | IP 65 (front protection with gasket) |
| Sensor type | NTC 10KΩ @ 25°C Order codes see above |
| Weight | ~ 150g |

Typical Order Package for a display case

| | | |
|--------------------------|----------|---------|
| Case Controller | EC2-312 | 807 682 |
| Terminal Kit | K02-000 | 800 050 |
| Electrical Control Valve | EX2-M00 | 801 091 |
| Orifice size 3 | EXO-003 | 801 088 |
| Coil 24VAC / 10W | ASC3 24V | 801 079 |
| Cable Assembly for ASC3 | ASC-N15 | 804 570 |
| 2 pipe sensors | ECN-N60 | 804 497 |
| 2 air sensors | ECN-S30 | 804 305 |
| Defrost sensor | ECN-F60 | 804 283 |
| Transformer 25VA | ECT-323 | 804 424 |
| Ethernet Cable 6m | ECX-N60 | 804 422 |

Block Diagrams

EC2-35x / -37x Case Controller (EX2, Press/Temp)



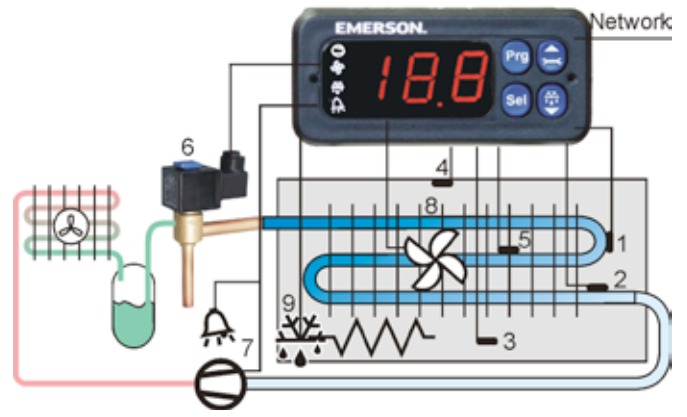
Inputs

- 1 = Suction pressure
- 2 = Coil out temperature
- 3 = Air in temperature
- 4 = Air out temperature
- 5 = Defrost temperature

Outputs

- 6 = EX2 Expansion valve
- 7 = Compressor (EC2-35x only)
Spare relay (EC2-37x only)
- 8 = Fan
- 9 = Defrost heater

EC2-31x / -39x Case Controller (EX2, Temp/Temp)



Inputs

- 1 = Coil in temperature
- 2 = Coil out temperature
- 3 = Air in temperature
- 4 = Air out temperature
- 5 = Defrost temperature

Outputs

- 6 = EX2 Expansion valve
- 7 = Compressor (EC2-31x only)
Spare relay (EC2-39x only)
- 8 = Fan
- 9 = Defrost heater

Condensing Unit Controllers Series EC2

With Web Server Function and TCP/IP Interface

Common Features

- Maintenance and alarm management
- Sensor failure handling
- Inputs for common low and common high pressure alarms
- Configuration data stored in non-volatile memory
- Electrical connection via plug-in type screw terminals
- with Web Server Function and TCP/IP Interface (see beginning of this chapter)
- Operation and commissioning via local or remote PC
- CE marking



EC2 Controller

Condensing Unit Controllers

- To control a combination of compressors and condenser fans based on suction and condensing pressure respectively
- Control of Copeland Scroll Digital™ Compressors



K02-211



ECT-323

Communication TCP/IP Ethernet

- Web Server Function provides monitoring and configuration through a standard Web browser. Ethernet interface, as used in most office PCs
- Graphical visualization via built-in Web pages
- Fixed or dynamic TCP/IP address with username and password
- Up to 30 days datalog
- Multiple language support (see www.emersonclimate.eu)



PT5

PT4-Mxx

Selection Table

| Description | TCP/IP | | |
|-------------|--------|----------------------|---------------|
| | Type | Part No. single unit | Part No. Kit* |

Condensing Unit Controllers

| | | | |
|--|---------|---------|---------|
| Condensing Unit Controller for 2 compressors or 1 Digital Scroll and 1 single stage compressor, variable fan speed control | EC2-552 | 807 738 | 808 019 |
|--|---------|---------|---------|

* EC2-552 Kits contains terminal kit, pressure transmitters PT5-07M and PT5-30M with cable assemblies, transformer 25VA (see "Pressure Transmitters Series PT5" for more information).

Accessories

| Description | Type | Part No. |
|----------------------------------|---------|----------|
| Terminal kits for EC2-552 series | K02-540 | 800 070 |

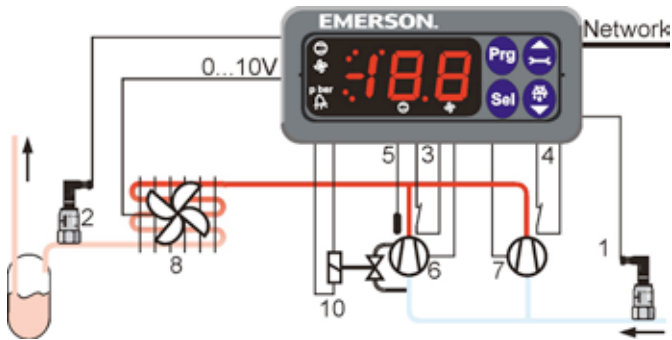
| | | | |
|--|------|---------|---------|
| NTC Sensor ECN single insulated for ambient temperature sensing -50 ... +50°C (10kΩ at 25°C) | 1.5m | ECN-S15 | 804 304 |
| | 3m | ECN-S30 | 804 305 |
| | 6m | ECN-S60 | 804 284 |

| Pressure transmitter PT5 for suction and condensing pressure sensing (details "Pressure Transmitters Series PT5") | | | |
|---|------|---------|---------|
| -0.8 ... 7 bar, 4 ... 20mA 0 ... 18 bar, 4 ... 20mA 0 ... 30 bar, 4 ... 20mA | | PT5-07M | 802 350 |
| | | PT5-18M | 802 351 |
| | | PT5-30M | 802 352 |
| Cable assembly | 1.5m | PT4-M15 | 804 803 |
| | 3.0m | PT4-M30 | 804 804 |
| | 6.0m | PT4-M60 | 804 805 |

| | | | |
|--------------------------------------|------|---------|---------|
| Transformer 230VAC Input, 24V output | 25VA | ECT-323 | 804 424 |
|--------------------------------------|------|---------|---------|

Block Diagrams

EC2-552 Condensing Unit Controller for 2 single stage compressors or 1 Digital Scroll and 1 single stage compressor



Inputs

- 1 = Suction pressure
- 2 = Condenser pressure
- 3 = Safety switch comp 1
- 4 = Safety switch comp 2
- 5 = Temperature input

Outputs

- 6 = Digital Scroll Compressor
- 7 = Single Stage Compressor
- 8 = Speed controlled fan with EC-motor
- 10 = PWM Digital Scroll Solenoid valve

Coldroom Controller Series EC3

Temperature and Superheat Control of EX4 ...EX8 (Stepper Motor)

Features

- Superheat control with self-adapting algorithm for Stepper Motor driven ECVs (EX4 ... EX8)
- Thermostat, fan & defrost control
- Limitation of evaporating temperature (MOP)
- Analog inputs: 3 NTC temperature sensors
- With integral backup battery to close Control Valve in case of power loss
- Analog input for suction pressure measurement using Alco PT5 Series pressure transmitters
- Digital inputs for compressor safety and coldroom door contact
- Relay outputs for compressor, defrost and alarm plus programmable relay
- All parameters and functions are programmable:
 - via TCP/IP Ethernet controller (EC3-332)
 - with keypad of optional display unit ECD-001
- Electrical connections via plug-in type screw terminals
- Lightweight aluminum enclosure for DIN rail mounting
- Multiple language support (see www.emersonclimate.eu)
- CE marking

Communication TCP/IP Ethernet

- Web Server Function provides monitoring and configuration through a standard Web browser. Ethernet interface, as used in most office PCs
- Graphical visualization via built-in Web pages
- Fixed or dynamic TCP/IP address with username and password
- Up to 30 days datalog
- Multiple language support (see www.emersonclimate.eu)

Typical Order Package

| | | |
|--|---------|---------|
| Coldroom Controller | EC3-332 | 807 632 |
| Terminal Kit | K03-331 | 807 648 |
| Display Unit (optional) | ECD-001 | 807 641 |
| Connection cable EC3 to ECD 1m | ECC-N10 | 807 860 |
| Transformer 25VA | ECT-323 | 804 424 |
| <i>Sensors: depending on application</i> | | |
| Ethernet Cable 5m | ECC-N50 | 807 862 |



EC3-332

ECD-001

Features of ECD-001 Display Unit

- For various system temperatures and valve opening readout
- Connection to EC3 Series via a RJ45 Western Digital plug. No further power cables required
- 2 ½ digit display
- Indicator LEDs for compressor, fan, heater and alarm
- 4 keys allow parameter modification
- Easy mounting in panels with 71 x 29 mm cutout
- IP65 if mounted in front panel

Selection table

| Description | TCP/IP | | |
|---|---------|----------------------|----------------|
| | Type | Part No. single unit | Part No. Kit* |
| Coldroom Controller ECV Stepper Motor Drive | EC3-332 | 807 632 | 808 013 |

*Kit contains terminal kit, pressure transmitter PT5-07M with cable assembly, transformer 25VA, NTC sensors 6m fin, pipe and single insulated version (see chapter "Accessories & Spare Parts")

Accessories

| Terminal Kits | | | |
|--|---------------------------|----------------|-------------------------|
| Description | Type | Part No. | |
| Terminal kit for EC3-332 | K03-331 | 807 648 | |
| ECD Series Display Units | | | |
| Display for EC3-332 | ECD-001 | 807 641 | |
| Connection cable EC3 to ECD | 1m cable length | ECC-N10 | 807 860 |
| | 3m cable length | ECC-N30 | 807 861 |
| | 5m cable length | ECC-N50 | 807 862 |
| NTC Sensors (Air type) (10 kΩ at 25°C) | 1.5m cable length | ECN-S15 | 804 304 |
| | 3m cable length | ECN-S30 | 804 305 |
| | 6m cable length | ECN-S60 | 804 284 |
| Pipe and pocket sensors NTC (10 kΩ at 25°C) | 3m cable length | ECN-N30 | 804 496 |
| | 6m cable length | ECN-N60 | 804 497 |
| | 12m cable length | ECN-N99 | 804 499 |
| NTC Sensors (Fin type) (10 kΩ at 25°C) | 6m cable length | ECN-F60 | 804 283 |
| Pressure transmitter | -0.8...7 bar | PT5-07M | 802 350 |
| Cable plug assembly | 1.5m length | PT4-M15 | 804 803 |
| Transformer, Class II | 230VAC Input / 24V output | 25VA | ECT-323 804 424 |
| | | 60VA | ECT-623* 804 421 |

* EX8 only



K03-331



PT5 PT4-Mxx



ECT-623



ECN-XX

Technical Data

Controller EC3-33x

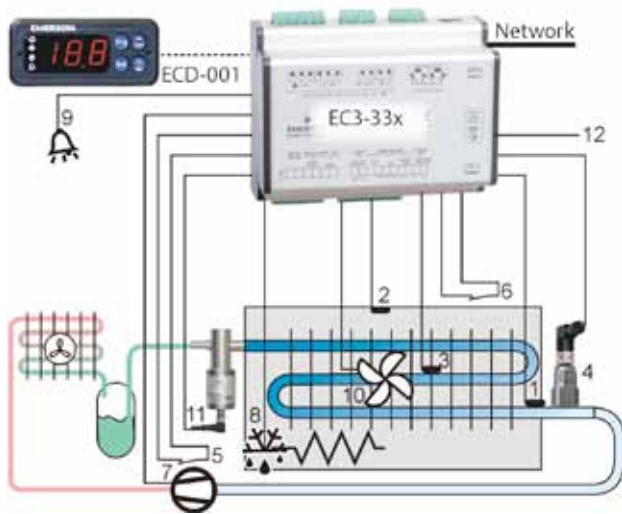
| | |
|-------------------------------|---|
| Supply voltage | 24 VAC ±10%, 50/60 Hz Class II |
| Power consumption | 25VA max. for EX4 .. EX7 28VA max. for EX8 |
| Plug-in connector size | Removable screw version wire size 0.14 ... 1.5 mm ² |
| Communication interface | TCP/IP Ethernet with Webserver (EC3-332) |
| Temperature storage operating | -20 ... +65°C 0 ... +60°C |
| Humidity | 0 ... 80% r.h. non condensing |
| Protection class | IP 20 (EN 60529) |
| Weight | ~ 800 g |
| Mounting | DIN rail mounted |

Display Unit ECD-001

| | |
|-------------------------------|--|
| Supply voltage | via ECC-N10 from EC3 controller |
| LED indicators | Compressor, fan, defrost, alarm outputs LON service pin |
| Display LED | Numeric segmental display, red, 2 1/2 digits with automatic dec. point betw. ±19.9; switchable between °C and °F |
| Operating Keys | 4 operating keys: Programming, select service/up, defrost/down |
| Temperature storage operating | -20 ... +65°C 0 ... +60°C |
| Humidity | 0 ... 80% r.h. non condensing |
| Protection class | IP 65 (front panel with gasket) |
| Weight | ~ 52 g |
| Mounting | Panel door (71 x 29mm cutout) |

Block Diagram

EC3-332 Coldroom Controller for stepper motor driven ECV



Inputs

- 1 = Coil out temperature
- 2 = Air temperature
- 3 = Defrost temperature
- 4 = Suction pressure
- 5 = Compressor safety
- 6 = Door contact

Outputs

- 7 = Compressor
- 8 = Defrost heater
- 9 = Alarm
- 10 = Fan
- 11 = Stepper motor ECV
- 12 = Output signal (4...20 mA)

Drivers for DIGITAL Copeland™ Compressors EC3-D13/EC3-D23

EC3-D13 driver for digital scroll compressors and 3 cylinder digital semi-hermetic compressors

EC3-D23 driver for 4 and 6 cylinder Stream digital semi-hermetic compressors

EC3-D13 /EC3-D23 drivers receive an input signal from an existing system controller (0...10V, 1...6V or 4...20mA) and activate digital solenoid valves for stepless capacity control of the digital scroll and digital semi-hermetic compressors .

For digital scroll compressors, an input allows monitoring of the discharge temperature or the compressor's DLT signal and to activate an alarm signal if the specified temperature is exceeded.

Features

- Valve opening PWM signal proportional to the analogue input signal
- Fully tested and ready for operation
- CE-marking for electromagnetic compatibility
- Electrical connections via plug-in type screw terminals



EC3-D13 with ECD-002

ECD-002 Display and key pad unit

- Display and interface for parameter setup and status read out
- For front panel mounting

Selection Chart Kits*

| Description | Type | Copeland Part Number |
|--|-------------|----------------------|
| Driver kit for digital scroll compressors | EC3-D13 kit | 8405187 |
| Driver kit for 4 and 6 cylinder Stream digital semi-hermetic compressors | EC3-D23 kit | 3187293 |

Kit contain EC3-D13/D23, ECD-002 keypad/Display unit, terminal kit K03-331, connection cable EC3 to ECD 13/23, Transformer ECT-323 (230V AC input / 24 VAC, 25VA)

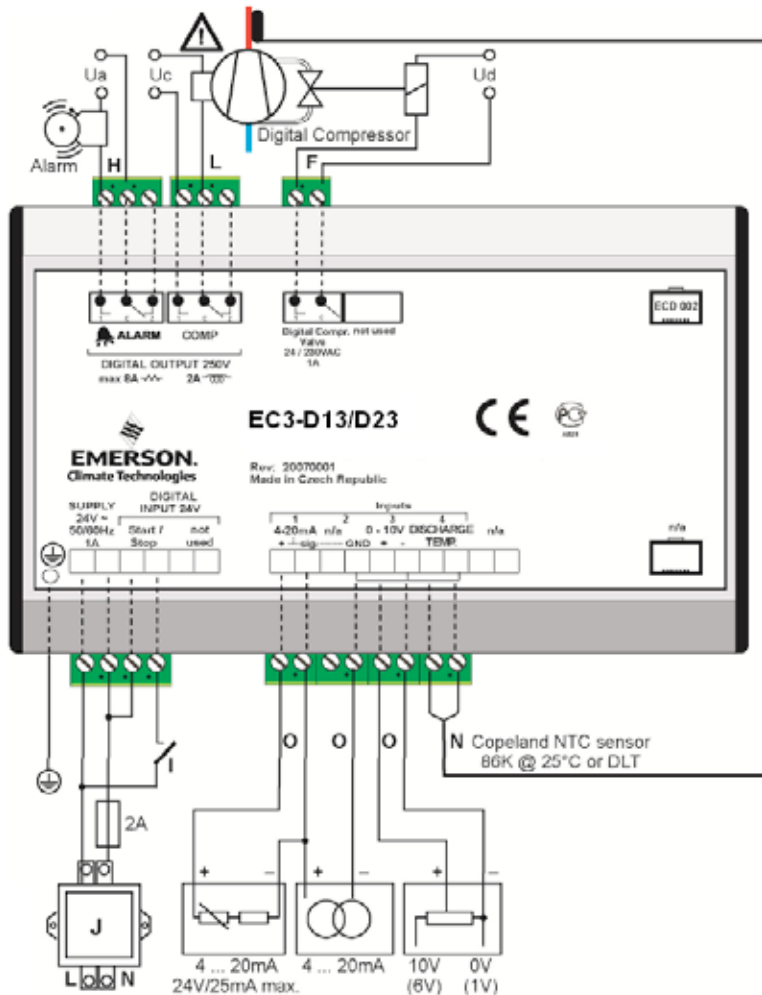
Selection Chart Individual Components

| Description | Type | Copeland Part Number |
|--|-------------------|----------------------|
| Driver for digital scroll compressors | EC3-D13 | 8404935 |
| Driver for digital scroll compressors with terminal kit | EC3-D13 & K03-331 | 3187306 |
| Driver for 4 and 6 cylinder Stream digital semi-hermetic compressors | EC3-D23 | 3187282 |
| Driver for 4 and 6 cylinder Stream digital semi-hermetic compressors with terminal kit | EC3-D23 & K03-331 | 3187317 |
| Display and key pad unit | ECD-002 | 8403318 |
| Terminal kit for Driver | K03-331 | 8405165 |
| Connection cable EC3-D13/23 to ECD-002, 1m | ECC-N10 | 8557782 |
| Transformer 230V AC input / 24 VAC, 25VA, DIN mount | ECT-323 | 804424 |

Technical Data

| | |
|-----------------------------|--|
| Power supply | 24VAC \pm 10%; 50/60Hz; 1A |
| Power consumption | 5VA max. |
| Plug-in connector | Removable screw terminals wire size 0.14 ... 1.5 mm ² |
| Grounding | 6.3 mm spade earth connector |
| Protection class (EN 60529) | IP20 |
| Connection to ECD-002 | ECC-Nxx or CAT5 cable with RJ45 connectors |
| Digital Input | I: 0/24VAC/DC for stop/start function |
| Analog Inputs | O: 4...20mA, 0...10V, 1...6V N: Copeland NTC temperature sensor (86K at 25°C) or Discharge Line Thermostat (DLT) |
| Digital Outputs (2): | H: Alarm L: Compressor relay for compressor contactor SPDT; I _{max} = 8A res (2A), V _{ACmax} = 250V Activated: During normal operation (no alarm condition) Deactivated: During alarm condition or power supply is OFF |
| Digital Scroll valve output | SPST contact, Solid State Relay (SSR) I _{max} = 1A res (1A), V _{ACmax} = 250V |
| Ambient temperature range | 0 ... 50°C |

Wiring



Compressor Soft Starter CSS-25U / CSS-32U

The Compressor Soft Starter CSS-25U / CSS-32U is used for switching, protecting and starting current limitation of single phase compressors in residential heat pump applications.

Features

- For motors with maximum operating current up to 25A/32A
- Limitation of starting current to less than 45 A (PCN 805209 less than 30 A)
- Self-adjusting for use in 50 Hz or 60 Hz supply
- Self-adjusting to motor current - no manual adjustment or calibration necessary
- Alarm relay output
- Start capacitor for improved motor acceleration is switched off after start
- Low voltage shutdown
- Locked rotor recognition and shutdown
- Delay function to limit number of motor starts per hour
- Thyristor protected contactor for long life
- No extra motor contactor needed
- Self-diagnostics
- Mounting clip for easy installation allows DIN rail mounting in two directions
- Easy connection by cage type screw terminals wire Ø 4mm



CSS-32W

CE Standards:

- LVD 2006/95/EC Low Voltage Directive
- EN 60947-1 Low voltage switchgear and controlgear
- EN 60947-4-2 Contactors and motor-starters - AC semiconductor motor controllers and starters
- **EN 60335-1, EN 60335-2-40: Safety of household and similar electrical appliances (PCN 805 204 and 805 205 only , confirmed and certified by independent test lab VDE.)**
- EMC 2004/108/EC
- ROHS 2002/95/EC

Selection Chart CSS

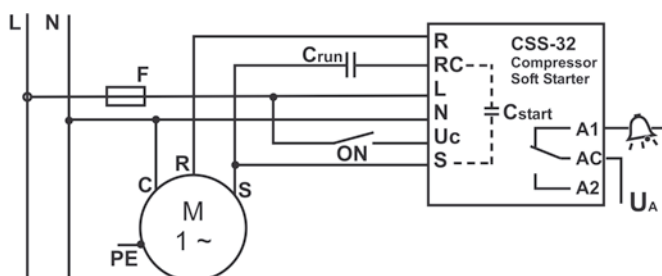
| Type | Part No. | Part No. (20 pieces) | Description | I max |
|---------|----------|----------------------|---|-------|
| CSS-32U | 805 204 | 805 204 M | Soft Starter incl. mounting clip, VDE released version | 32A |
| CSS-25U | 805 205 | 805 205M | Soft Starter incl. mounting clip, VDE released version | 25A |
| CSS-25U | 805 209 | 805 209M | Soft Starter incl. mounting clip (Limitation of starting current to less than 30 A) | 25A |
| K00-003 | 807 663 | - | 3-pol Screw connector to alarm output for wires up to 2.5mm ² ; bag with 50 pieces | |

Technical Data

| | |
|----------------------------|---|
| Operating voltage | 230 V 50/60 Hz nominal |
| Nominal compressor current | CSS-32U: 32A max. CSS-25U: 25A max. |
| Maximum start current | CSS-32U: 45A CSS-25U (805 205): 45A CSS-25U (805 209) 30A |
| Operating temperature | -20 ... +55°C non condensing |
| Storage temperature | -20 ... +65°C non condensing |
| Start capacitor | 200 ... 240 uF |
| Time delay after stop | 0.5 ... 5 Min |

| | |
|---|-------------------------|
| Alarm relay, AgNi (SPDT) | |
| Resistive (AC1) max. | 250V~ / 3A 30V= / 3A |
| Flexible cable cross section CSS-32U/-25U all terminals | 0.25 ... 4 mm |
| Flexible cable cross section alarm output connector K00-003 | 0.25 ... 2.5 mm |
| Max. vibration (at 10 ... 1000 Hz) | 4 g |
| Weight | 430 g |
| Protection acc. IEC 529 | IP 20 |

Wiring Diagram



CSS Contacts:

- R = Output motor run winding
- RC = Output run capacitor
- L = 230V / AC power input
- N = Neutral line
- Uc = Start input (ON if connected to 230V)
- S = Output start winding from start capacitor
- A1, AC, A2 = Alarm relay contact

Pressure Transmitter PT5

PT5 Pressure Transmitters convert a pressure into a linear electrical 4..20mA output signal suitable for controlling simple compressor and fan switching to the more sophisticated application of superheat modulation of Electronic Control Valves.

With competitive performance to price characteristics and an easy to install pre-fabricated M12 cable assembly, PT5 transmitters are the designers choice for all heat pump, refrigeration and air conditioning applications.

Features

- Piezo-resistive sensor with output signal 4 to 20 mA and 2-wire connection for the precise operation of superheat, compressor or fan control systems
- Specially calibrated pressure ranges with ±1% accuracy performance to fulfill demands of today's refrigeration and HVAC applications
- Fully hermetic
- PT5-xxM with 7/16" -20UNF pressure connection and Schrader valve opener
- PT5-xxT with 6mm x 40mm stainless steel tube and integrated brazing neck for easy mounting in applications requiring a fully hermetic system solution
- PT5-150D with pressure connection 1/4" NPT (M) suitable for subcritical and transcritical CO₂ systems
- Vibration, shock and pulsation resistant
- Protection class IP65 / IP67 (type-specific)
- UL (File No. E258370)



PT5-xxM
with PT4-Mxx Cable Assembly



PT5-150D



PT5-xxT

Selection Table

| Type | Part No. | | Pressure range for signal output (bar)* | Output signal | Medium Temp. Range at pressure connection (°C) | PS: Max. working pressure (bar)* | PT: Test pressure (bar)* | Burst pressure (bar)* | Pressure Connection |
|----------|-------------|--------------|---|---------------|--|----------------------------------|--------------------------|-----------------------|---|
| | Single pack | Multi-pack** | | | | | | | |
| PT5-07M | 802 350 | 802 350M | -0.8 .. 7 | 4 .. 20 mA | -40 .. +100 | 27 | 30 | 150 | 7/16" - 20 UNF (with Schrader valve opener) |
| PT5-18M | 802 351 | 802 351M | 0 .. 18 | | | 50 | 63 | 250 | |
| PT5-30M | 802 352 | 802 352M | 0 .. 30 | | | 60 | 100 | 400 | |
| PT5-50M | 802 353 | 802 353M | 0 .. 50 | | | 100 | 150 | 400 | |
| PT5-07T | 802 380 | 802 380M | -0.8 .. 7 | | -40 .. +135 | 27 | 30 | 150 | 6mm tube x 40mm long |
| PT5-18T | 802 381 | 802 381M | 0 .. 18 | | | 50 | 63 | 250 | |
| PT5-30T | 802 382 | 802 382M | 0 .. 30 | | | 60 | 100 | 400 | |
| PT5-50T | 802 383 | 802 383M | 0 .. 50 | | | 100 | 150 | 400 | |
| PT5-150D | 802 379 | - | 0 .. 150 | -40 .. +100 | 220 | 320 | 1000 | 1/4" NPT (M) | |

*) Sealed gauge pressure

**) PT5xxM: 20 pcs, PT5-xxT: 10 pcs

Selection Plug/Cable Assemblies: assembly fits all models

| Type | Part No. | | Cable Length | Weight (g/piece) | Temperature Range |
|---------|-------------|--------------------|--------------|------------------|--|
| | Single pack | Multipack** 20 pcs | | | |
| PT4-M15 | 804 803 | 804 803M | 1.5 m | 50 | -50 ... +80°C static application -25 ... +80°C mobile application |
| PT4-M30 | 804 804 | 804 804M | 3.0 m | 80 | |
| PT4-M60 | 804 805 | 804 805M | 6.0 m | 140 | |

Technical Data Pressure Transmitter

| | | | |
|---|--|--|---|
| Supply voltage (polarity protected) | Nominal: 24Vdc Range: 7.. 30Vdc PT5-150D: 7 .. 26.4Vdc | Sensor lifetime | 30 million load cycles with 1.3 times of nominal pressure |
| Permissible noise & ripple Influence of supply voltage | < 1 Vp-p < 0.02 %FS/V | Electrical connection PT4-Mxx Cable Assembly | M12 connection according to EN61076-2-101 Part 2 Prefabricated, various cable lengths |
| Operating current | Maximum \leq 24 mA 4 to 20 mA output | Medium compatibility | CFC, CHFC, HFC, HFO/HFO Blends CO ₂ Not released for use with caustic, flammable substances or ammonia! |
| Load resistance | $R_L \leq U_b - 7.0V$ 0.02A | Approvals/Marking | CE: 2004/108/EEC, EN 61326 Emission (Group 1; Class B) and immunity (industrial locations) UL, cRUus (UL File Nr. E258370) EAC for Russian markets |
| Response time | \leq 5 ms | Protection class (EN 60529) | PT5-07, -18: IP65 with plug PT5-30, -50, -150: IP67 with plug |
| Weight (without plug and cable ass.) | PT5-xxM, -150D: ~ 80 g PT5-xxT: ~ 60 g | Vibration at 10...2000Hz | 20 g according to IEC 60068-2-6 |
| Mounting position | Non position sensitive; details see operating instructions | Materials Housing, pressure connector and diaphragm with medium contact Electrical connector | Stainless steel 316L, 1.4534 1.4301 (PT5-xxT) Highly resistive, fiberglass-enforced plastic PBTGF30 |
| Temperatures Transport and storage Operating ambient housing Medium: PT5-xxM, -150D PT5-xxT | -25 .. +80 °C -40 .. +80 °C -40 .. +100 °C -40 .. +135 °C | | |

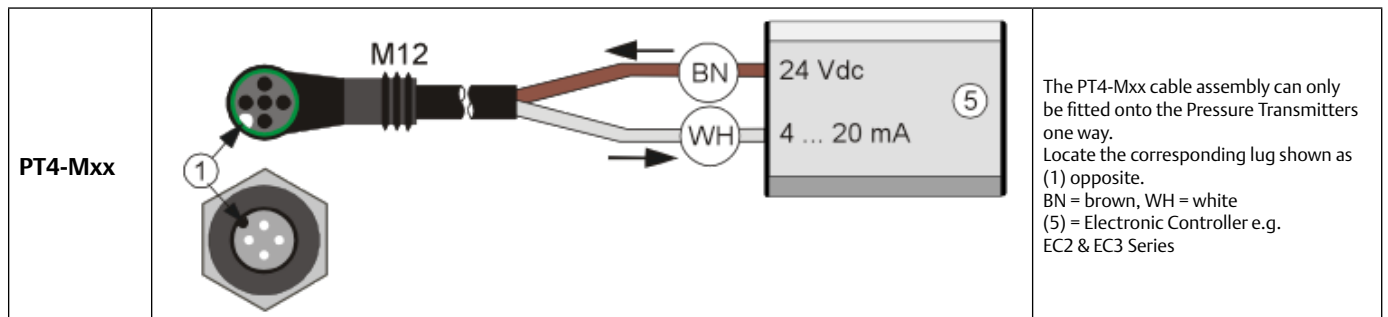
Accuracy Performance

| Type | Total error * | Temperature range |
|---------------|----------------------------|-----------------------------------|
| PT5-07 / 18 | \pm 1% FS | -40 ... +20 °C |
| PT5-30 / -50/ | \pm 1% FS \pm 2% FS | +10 ... +50 °C -10 ... +80 °C |
| PT5-150D | \pm 1% FS \pm 2% FS | +10 ... +50 °C -10 ... +100 °C |

*) Total error includes non-linearity, hysteresis, repeatability as well as offset and span drift due to the temperature changes.


Note: % FS is related to Percentage of Full sensor Scale.

Electrical connections



Electronic Fan Speed Controller Series FSY

Features

- Pressure actuated fan speed control
- Adjustable pressure for cut-off
- High Voltage Triac (800 Volts)
- Integrated protection circuit against voltage peaks
- Compact design
- Protection IP65
- Easy mounting and adjustment
- Easy retrofit in existing systems
- No additional gasket required (completely molded into plug)
- Multi-position plug with EMC filter incl. 1.5m (opt. 3 and 6m) cable for flexible installation
-  per EC 89/336/EC (together with FSF cable)
- UL file E183816
- Other pressure connection upon request (minimum order volume 100 pieces)




FSY-43S

Selection Table

| Type | Part No. | Operational Current A | Adjustment Range bar | Factory Setting bar | Max. Operating Pressure PS bar | Test Pressure PT bar | Pressure Connection |
|---------|------------------|-----------------------|----------------------|---------------------|--------------------------------|----------------------|-----------------------------------|
| FSY-41S | 0 715 533 | 0.1 ... 4 | 4.0 ... 12.5 | 8.0 | 27 | 30 | S: $\frac{7}{16}$ "-20 UNF female |
| FSY-42S | 0 715 534 | | 9.2 ... 21.2 | 15.0 | 32 | 36 | S: $\frac{7}{16}$ "-20 UNF female |
| FSY-43S | 0 715 537 | | 12.4 ... 28.4 | 21.8 | 45 | 50 | S: $\frac{7}{16}$ "-20 UNF female |

Cable Assemblies with Plug and EMC Filter

| Type | Part No. | Temperature range (°C) | Cable length (m) |  <p>FSF-N15</p> |
|---------|----------------|------------------------|------------------|--|
| FSF-N15 | 804 640 | -50 .. +80 | 1.5 | |
| FSF-N30 | 804 641 | | 3.0 | |
| FSF-N60 | 804 642 | | 6.0 | |

Technical Data

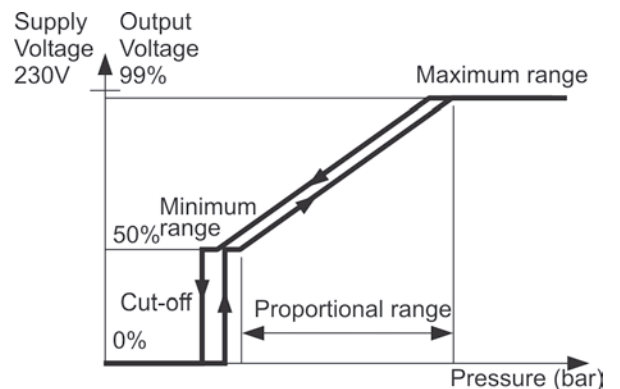
| Supply voltage | 230 AC, +15%, -20%, 50/60 Hz | | | | | | | | | | | | | | |
|--|--|--------------------------|-------------|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|
| Nominal current (see diagram below) | 0.1 ... 4 (3) A | | | | | | | | | | | | | | |
| Starting current | max. 8 Amps/5 sec. | | | | | | | | | | | | | | |
| Medium compatibility | HFC, HCFC, HFO/HFO Blends (not released for use with inflammable refrigerants) | | | | | | | | | | | | | | |
| Protection Class according to IEC529 /EN 60529 | IP 65 (with fitted connectors FSF-xxx) | | | | | | | | | | | | | | |
| Temperature ranges °C Ambient | -20 to +55°C (>40°C see diagramm) | | | | | | | | | | | | | | |
| Storage & transportation Medium | -30 to +70°C -20 to +70°C | | | | | | | | | | | | | | |
| <p style="text-align: center;">Max. Current vs Ambient Temperature</p> <table border="1"> <caption>Data for Max. Current vs Ambient Temperature</caption> <thead> <tr> <th>Ambient Temperature (°C)</th> <th>Current (A)</th> </tr> </thead> <tbody> <tr><td>30</td><td>4.0</td></tr> <tr><td>35</td><td>4.0</td></tr> <tr><td>40</td><td>4.0</td></tr> <tr><td>45</td><td>3.5</td></tr> <tr><td>50</td><td>3.0</td></tr> <tr><td>55</td><td>2.5</td></tr> </tbody> </table> | | Ambient Temperature (°C) | Current (A) | 30 | 4.0 | 35 | 4.0 | 40 | 4.0 | 45 | 3.5 | 50 | 3.0 | 55 | 2.5 |
| Ambient Temperature (°C) | Current (A) | | | | | | | | | | | | | | |
| 30 | 4.0 | | | | | | | | | | | | | | |
| 35 | 4.0 | | | | | | | | | | | | | | |
| 40 | 4.0 | | | | | | | | | | | | | | |
| 45 | 3.5 | | | | | | | | | | | | | | |
| 50 | 3.0 | | | | | | | | | | | | | | |
| 55 | 2.5 | | | | | | | | | | | | | | |

| | |
|---|---|
| Pressure change per turn of adjustment screw | FSY-41: 4.0 .. 12.5 bar clockwise ~ +1.2 bar counterclockwise ~ -1.2 bar |
| | FSY-42: 9.2 .. 21.2 bar clockwise ~ +2.5 bar counterclockwise ~ -2.5 bar |
| | FSY-43: 12.4 .. 28.4 bar clockwise ~ +3.3 bar counterclockwise ~ -3.3 bar |
| Proportional Range | FSY-41: 2.5 bar FSY-42: 3.8 bar FSY-43: 4.6 bar |
| Weight | approx. |
| FSY-41, -42 | 0.12 kg |
| FSY-43 | 0.15 kg |
| FSF-N15 | 0.14 kg |
| FSF-N30 | 0.20 kg |
| FSF-N60 | 0.22 kg |
| Housing material | PC and PA |

Function Diagram

The control behaviour can be easily described by looking at the function of output voltage versus input pressure: In the **maximum range** the FSY provides a constant output voltage of approximately 1% below the supply voltage. The fan is running at maximum speed. Along the **proportional range**, the output voltage varies between maximum and minimum voltage of approximately 50% of the supply voltage. This causes the fan to slow down from maximum to minimum speed.

Further decrease of pressure in the minimum range leads to cut-off of the fan motor. Reincrease of input pressure will start the motor with a hysteresis of approximately 0.7 bar to avoid cycling. The pressure from which motor cuts off is adjustable (see selection table - adjustment range).



FSE Fan Speed Control Module

Electronic Fan Speed Control Modules FSE generate a 0...10 V signal, which is used to control the speed of condenser fan motors in commercial refrigeration and air-conditioning systems. Ideal for use with high efficient EC-motors, but can be also used with phase cut controllers for induction motors.

Features

- Energy saving due to improved cooling efficiency
- Pressure for minimum speed adjustable
- Small proportional band and large hysteresis to minimize cycling at small pressure changes
- Reduced fan noise level during low ambient temp. conditions
- Improved overall performance of cooling system
- Easy installation with cables for power supply and motor connection factory wired
- IP 65 protection for outdoor mounting
- UL file nr.: E355325 (Released for 43 bar)



FSE Control Modules

Selection Chart Control Modules FSE

| Type | Part No. | Refrigerants | Adjustment Range P _{cut} (bar)* | Cut-off Pressure factory set (bar) | Max. operating pressure PS | Test Pressure | Pressure Connection |
|---------|----------|-------------------------|--|------------------------------------|----------------------------|---------------|----------------------|
| FSE-01S | 804 701 | R134a | 4 ... 12.5 | 7.8 | 27 bar | 30 bar | 1/16" -20 UNF female |
| FSE-02S | 804 706 | R22, R407C, R404A, R507 | 10 ... 21 | 15.5 | 32 bar | 36 bar | 1/16" -20 UNF female |
| FSE-03S | 804 711 | R410A | 12 ... 28 | 20.4 | 45 bar | 50 bar | 1/16" -20 UNF female |

Cable Assemblies for connection of FSE Control Module to controller

| Type | Part No. | No of leads | Diameter of leads | Temperature Range °C | Cable length mtr. |
|---------|----------|-------------|----------------------|----------------------|-------------------|
| PS3-N15 | 804 580 | 3 | 0.75 mm ² | -25/+80 | 1.5 |
| PS3-N30 | 804 581 | | | | 3.0 |
| PS3-N60 | 804 582 | | | | 6.0 |

Technical Data FSE

| | |
|--|---|
| Supply Voltage | 10V; supplied by controller |
| Operating current 0...10 VDC output | max. 1 mA |
| Medium compatibility | HFC, HCFC, HFO/HFO Blends, POE-, synthetic and mineral oils |
| Protection class (IEC529/EN 60529) | IP 65 with cable connector assemblies PS3-Nxx |

| | |
|--|---|
| Pressure connection FSE-01S and FSE-02S FSE-03S | Brass Stainless Steel |
| Weight (approx.) | FSE-01S: 0.125kg FSE-02S: 0.125kg FSE-03S: 0.15kg |
| Temperature Range Storage and transportation Operation | -30° ... +70°C -20° ... +65°C |
| Materials Housing cover | PA |

Thermo™-Expansion Valves

Thermo™-Expansion Valves

Basic Terms and Technical Information

Operating principles

Alco Thermo-Expansion valves control the superheat of refrigerant vapor at the outlet of the evaporator. They act as a throttle device between the high pressure and the low pressure sides of refrigeration systems and ensure that the rate of refrigerant flow into the evaporator exactly matches the rate of evaporation of liquid refrigerant in the evaporator. Thus the evaporator is fully utilized and no liquid refrigerant may reach the compressor.

Description of bulb charges

The application ranges of Thermo-Expansion valves are heavily influenced by the charge selected.

Liquid charges

The behaviour of Thermo-Expansion valves with liquid charges is exclusively determined by temperature changes at the bulb and not subject to any cross-ambient interference. They feature a fast response time and thus react quickly in the control circuit. Liquid charges cannot incorporate MOP functions. Maximum bulb temperatures shall not exceed 75°C.

Gas charges

The behaviour of Thermo-Expansion valves with gas charges will be determined by the lowest temperature at any part of the expansion valve (power assembly, capillary tube or bulb). If any parts other than the bulb are subject to the lowest temperature, malfunction of the expansion valve may occur (i.e., erratic low pressure or excessive superheat). Alco Thermo-Expansion valves with gas charges always feature MOP functions and include ballasted bulbs. Ballast in the bulb leads to slow opening and fast closure of the valve. Maximum bulb temperature is 120°C.

Adsorption charges

These charges feature control characteristics much like MOP charges but avoid the difficulties of cross-ambient interference. Response time is slow but perfectly suitable for common refrigeration systems. Maximum bulb temperature is 130°C.

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 compressor from overload conditions. MOP selection should be within maximum allowed low pressure rating of the compressor and should be at approximately 3K above evaporating temperatures.

Practical hint: Superheat adjustments influence the MOP:

Increase of superheat: Decrease of MOP
Decrease of superheat: Increase of MOP

Static superheat

Alco Thermo-Expansion valves are factory preset for optimum superheat settings. This setting should be modified only if absolutely necessary. The readjustment should be at the lowest expected evaporating temperature.

Subcooling

Subcooling generally increases the capacity of the refrigeration system and may be accounted for when dimensioning an expansion valve by applying the correction factor K_c . The capacity corrections for evaporating temperature, condensing temperature and subcooling are all incorporated in K_c . 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 parts 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 by K_c . 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. In cases when subcooling exceeds 15 K, sizing of components (K_c , $K\Delta p$) should be modified accordingly. The field practice indicates the following correction factors can be used to compensate the effect of the subcooling (liquid hammering) in addition to the use of correction factors K_c , and $K\Delta p$.

| Subcooling | 20K | 30K | 40K | 50K | 60K |
|-------------------|-----|-----|-----|-----|-----|
| Correction factor | 0.8 | 0.7 | 0.6 | 0.5 | 0.4 |

Emerson Climate Technologies will be happy to assist you. Please contact the application engineering department.

Dimensioning

To correctly select a Thermo-Expansion valve on a system, the following design conditions must be available:

- Cooling capacity Q_o
- Effective pressure differential across Thermo-Expansion valve Δp
- Evaporating temperature/pressure
- Lowest possible condensing temperature/pressure
- Liquid temperature
- Type of refrigerant

As opposed to single substances (e.g. R134a etc.) where the phase change takes place at a constant temperature/pressure, the evaporation and condensation of **zeotropic blend R407C** is in a gliding form (e.g., at a constant pressure the temperature varies within a certain range) through evaporators and condensers. The evaporating/condensing pressure must be determined at saturated temperatures (bubble/dew points) for dimensioning of Thermo-Expansion valves.

To facilitate valve dimensioning for other than standard conditions, Emerson Climate Technologies offers the "Controls Navigator" selection tool which can be downloaded from www.emersonclimate.eu See www.emersonclimate.eu for contact addresses, email, phone numbers or downloads.

Example

| | |
|--|----------|
| Cooling capacity of a system: | 18 kW |
| Refrigerant: | R407C |
| Condensing temperature (saturated liquid): | +35°C |
| (Condensing pressure will be 15.5 bar) | |
| Evaporating temperature (saturated vapor): | 0°C |
| (Evaporating pressure will be 4.61 bar) | |
| Subcooling: | 1 K |
| Pressure drops through liquid line: | 2.2 bar |
| Pressure drops through evaporator: | 0.3 bar |
| Required type of Thermo-Expansion valve: | T-series |

To calculate the nominal capacity the following formula has to be used:

$$\text{Cooling capacity} \times K_t \times K_{\Delta p} = \text{Nominal capacity}$$

1. Selected K_t -factor according to refrigerant, liquid and evaporating temperature from "Correction Tables for Thermo-Expansion Valves Series TI, TX3, TX6, T and L" in this chapter.

$$K_t = 0.98 \text{ (for this example)}$$

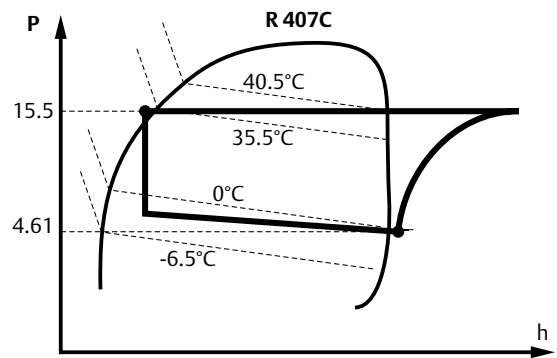
2. Determine pressure differential across the Thermo-Expansion valve using condensing pressure. subtract evaporating pressure and all other possible pressure losses (pressure drops in evaporator, drier, solenoid valve, liquid distribution...).

For this example:

$$\Delta p = 15.5 - (4.61 + 2.2 + 0.3) = 8.39 \text{ bar}$$

Select $K_{\Delta p}$ factor from "Correction Tables for Thermo-Expansion Valves Series TI, TX3, TX6, T and L" in this chapter:

$$K_{\Delta p} = 1.15 \text{ (for this example)}$$



3. Multiply cooling capacity with K_t and $K_{\Delta p}$. to find nominal capacity for Thermo-Expansion valve.

$$Q_n = 18 \times 0.98 \times 1.15 = 20.29 \text{ kW}$$

Select Thermo-Expansion Valve from table on page "Thermo-Expansion Valve Series T" : TCLE 550 NW (for this example).

Please note that all evaporating/condensing temperatures in this catalogue are based on saturated vapor/liquid temperatures.

Selection Guide for Expansion Valves

| Series | Selection Criteria | | | |
|--------|----------------------------|----------------------------|--------------------------------------|---|
| | Capacity Range kW (R 404A) | Evaporating Temp. Range °C | Main Application | Features |
| TI | 0.4 to 14.2 | +20 to -45 | Refrig./Air Cond. Heat Pumps | Exchangeable Orifices |
| TIH | 0.8 to 15.0 | +20 to -45 | Refrig./Air Cond. Heat Pumps | Hermetic, Superheat adjustable, optional with check valve |
| TX7 | 13.3 to 57.0 | +20 to -45 | Air-Cond. Heat Pumps | Hermetic, Superheat adjustable |
| T | 2 to 209 | +30 to -45 | Refrig./Air Cond. Heat Pumps | Exchangeable Orifices, Power-Assembly and Flange |
| ZZ | 1.9 to 81.2 | -45 to -120 | Low Temperature Application | Exchangeable Orifices, Power-Assembly and Flange |
| L | 2 to 154 | +30 to -50 | Liquid Injection Superheat Control | Exchangeable Orifices, Power-Assembly and Flange |
| 935 | 5.2 to 43.5 | +30 to -45 | Liquid Injection Temperature Control | Exchangeable Orifices, Power-Assembly and Flange |

Thermo™ -Expansion Valves Series TI

Exchangeable orifices

Features

- Laser-welded diaphragm with large diameter for high reliability and maximum lifetime
- Constant superheat across wide application ranges Easy and precise superheat setting by modified threads
- TIE with stainless steel fittings allow brazing without wet rags
- With capacities between 0.4 kW and 14.2 kW (R404A) ideally suited for service work
- Internal or external equaliser
- Brazing and flare connections available
- Capillary tube length 1.5 m
- PS: 45 bar. TS: -45 ... +75°C
- No CE marking according art. 3.3 PED 97/23 EC

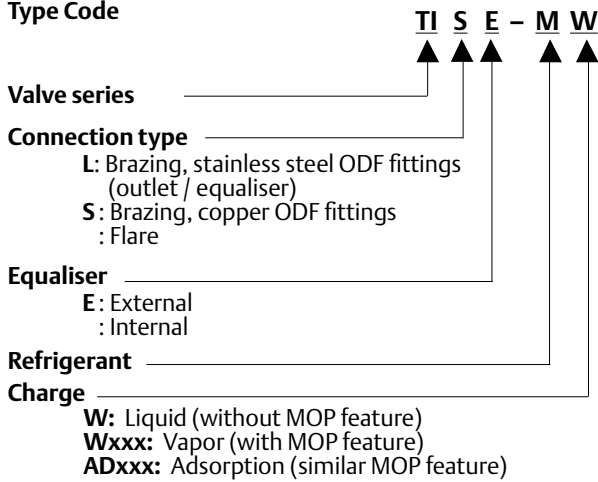


TIE



TLE

Type Code



Orifice Assembly with strainer for inlet connection

| Type | Nominal Capacity* (kW) | | | | | | | |
|--------------|------------------------|---------|---------|---------|---------|---------|---------|---------|
| | TIO-00X | TIO-000 | TIO-001 | TIO-002 | TIO-003 | TIO-004 | TIO-005 | TIO-006 |
| Part No. | 800 532 | 800 533 | 800 534 | 800 535 | 800 536 | 800 537 | 800 538 | 800 539 |
| R134a | 0.3 | 0.8 | 1.9 | 3.1 | 5.0 | 8.3 | 10.1 | 11.7 |
| R22 | 0.5 | 1.3 | 3.2 | 5.3 | 8.5 | 13.9 | 16.9 | 19.5 |
| R404A / R507 | 0.4 | 1.0 | 2.3 | 3.9 | 6.2 | 10.1 | 12.3 | 14.2 |
| R407C | 0.5 | 1.4 | 3.5 | 5.7 | 9.2 | 15.0 | 18.3 | 21.1 |
| R410A | 0.6 | 1.5 | 3.7 | 6.2 | 9.9 | 16.2 | 19.7 | 22.8 |
| R407A | 0.5 | 1.3 | 3.2 | 5.2 | 8.4 | 13.7 | 16.6 | 19.2 |
| R407F | 0.6 | 1.5 | 3.6 | 5.9 | 9.5 | 15.5 | 18.9 | 21.8 |
| R448A | 0.5 | 1.3 | 3.19 | 5.28 | 8.48 | 13.86 | 16.85 | 19.44 |
| R449A | 0.49 | 1.27 | 3.12 | 5.16 | 8.28 | 13.54 | 16.46 | 19 |
| R450A | 0.2 | 0.55 | 1.3 | 2.11 | 3.41 | 5.66 | 6.89 | 7.98 |
| R513A | 0.21 | 0.56 | 1.33 | 2.16 | 3.49 | 5.79 | 7.05 | 8.17 |
| R1234ze | 0.23 | 0.63 | 1.49 | 2.42 | 3.91 | 6.49 | 7.9 | 9.15 |

Brazing Adapter for TILE and TIS(E)

| Type | Part No. | Connection, ODF | |
|------------|----------------|-----------------|------|
| | | mm | inch |
| TIA-M06 | 802 500 | 6.0 | - |
| TIA-M10 | 802 501 | 10.0 | - |
| TIA-014 | 802 502 | - | ¼" |
| TIA-038 | 802 503 | - | ⅜" |
| Gasket Set | 803 780 | 100 pieces | |



*Nominal capacity is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Sub-cooling |
|---------------------------------------|-------------------------|------------------------------------|-------------|
| R407C, R407F | +4°C dew point | +38°C bubble p. +43°C dew point | 1K |
| R22, R134a, R404A, R410A, R507 | +4°C | +38°C | |
| R513A, R1234ze | +4°C dew point | +38°C bubble/ +38°C dew point | |
| R450A | | +38°C bubble/ +38.6°C dew point | |
| R448A, R449A | | +38°C bubble/ +42.6°C dew point | |

Valve selection for other operating conditions see "Correction Tables for Thermo-Expansion Valves Series TI, TX3, TX6, T and L", quick selection tables on next pages or the "Controls Navigator" selection tool which can be downloaded from www.emersonclimate.eu.

TI Valve Bodies without cage and nut

| Refrigerant | Outlet/Equalizer Connection | Type | Part No. | Type | Part No. | MOP °C | Evaporating temperature range °C | |
|-----------------|-----------------------------|--------------------------|----------------|--------------------|----------|-------------|----------------------------------|-------------|
| | | external Equalizer | | internal Equalizer | | | | |
| R404A / R507 | Brazeing stainless steel | TILE-SW (12mm) | 802465 | | | - | -45 ... +20 | |
| | | TILE-SW (½") | 802466 | | | - | -45 ... +20 | |
| | Brazeing copper | TISE-SW (12mm) | 802462 | TIS-SW (12mm) | 802461 | - | -45 ... +20 | |
| | | TISE-SW (½") | 802464 | TIS-SW (½") | 802463 | - | -45 ... +20 | |
| | | TISE-SAD10 (½") | 802479 | TIS-SAD10 (½") | 802478 | +10 | -45 ... 0 | |
| | | TISE-SW75 (12mm) | 802471 | | | 0 | -45 ... -3 | |
| | | TISE-SW75 (½") | 802472 | | | 0 | -45 ... -3 | |
| | | TISE-SAD-20 (12mm) | 802474 | | | -20 | -45 ... -27 | |
| | | TISE-SAD-20 (½") | 802475 | | | -20 | -45 ... -27 | |
| | Flare | TIE-SW | 802460 | TI-SW | 802459 | - | -45 ... +20 | |
| | | TIE-SAD10 | 802477 | TI-SAD10 | 802476 | +10 | -45 ... 0 | |
| | | TIE-SW75 | 802470 | TI-SW75 | 802469 | 0 | -45 ... -3 | |
| | | TIE-SAD-20 | 802473 | | | -20 | -45 ... -27 | |
| | R134a | Brazeing stainless steel | TILE-MW (12mm) | 802451 | | | - | -45 ... +20 |
| TILE-MW (½") | | | 802452 | | | - | -45 ... +20 | |
| Brazeing copper | | TISE-MW (12 mm) | 802448 | TIS-MW (12 mm) | 802447 | - | -45 ... +20 | |
| | | TISE-MW (½") | 802450 | TIS-MW (½") | 802449 | - | -45 ... +20 | |
| | | TISE-MW55 (12mm) | 802457 | | | +14 | -45 ... +11 | |
| Flare | | TISE-MW55 (½") | 802458 | | | +14 | -45 ... +11 | |
| | | TIE-MW | 802446 | TI-MW | 802445 | - | -45 ... +20 | |
| | | TIE-MW55 | 802456 | TI-MW55 | 802455 | +14 | -45 ... +11 | |
| R407C | Brazeing stainless steel | TILE-NW (12mm) | 802486 | | | - | -45 ... +20 | |
| | | TILE-NW (½") | 802485 | | | - | -45 ... +20 | |
| | Brazeing copper | TISE-NW (12mm) | 802438 | TIS-NW (12mm) | 802437 | - | -45 ... +20 | |
| | | TISE-NW (½") | 802440 | TIS-NW (½") | 802439 | - | -45 ... +20 | |
| | Flare | TIE-NW | 802436 | TI-NW | 802435 | - | -45 ... +20 | |
| | | | | | | | | |
| R407A/R407F | Brazeing stainless steel | TILE-NW (12mm) | 802486 | | | - | -45 ... 0 | |
| | | TILE-NW (½") | 802485 | | | - | -45 ... 0 | |
| | Brazeing copper | TISE-NW (12mm) | 802438 | TIS-NW (12mm) | 802437 | - | -45 ... 0 | |
| | | TISE-NW (½") | 802440 | TIS-NW (½") | 802439 | - | -45 ... 0 | |
| | Flare | TIE-NW | 802436 | TI-NW | 802435 | - | -45 ... 0 | |
| | | | | | | | | |
| | R22 | Brazeing stainless steel | TILE-HW (12mm) | 802426 | | | - | -45 ... +20 |
| | | | TILE-HW (½") | 802427 | | | - | -45 ... +20 |
| Brazeing copper | | TISE-HW (12mm) | 802423 | TIS-HW (12mm) | 802422 | - | -45 ... +20 | |
| | | TISE-HW (½") | 802425 | TIS-HW (½") | 802424 | - | -45 ... +20 | |
| Flare | TISE-HW100 (12mm) | 802431 | | | +15 | -45 ... +13 | | |
| | TISE-HW100 (½") | 802432 | | | +15 | -45 ... +13 | | |
| R410A | Brazeing stainless steel | TIE-HW | 802421 | TI-HW | 802420 | - | -45 ... +20 | |
| | | TILE-ZW (12mm) | 802488 | | | - | -35 ... +20 | |
| | | TILE-ZW (½") | 802489 | | | - | -35 ... +20 | |
| | | TILE-ZW175 (12mm) | 802490 | | | +16.4 | -35 ... +15 | |
| | | TILE-ZW175(½") | 802491 | | | +16.4 | -35 ... +15 | |

Inlet: Flare ⅜"-18UNF for 6mm, 8mm., 10mm, ¼", ⅝" and ¾" tubes
 Outlet: Flare ¾"-16UNF for 12mm and ½" tubes.
 Solder metric: ODF for 12mm tubes. Solder inch: ODF for ½" tubes
 Ext. Equalizer: Flare ⅝"-20UNF for 6mm and ¼" tubes.
 Solder metric: ODF for 6mm tubes. Solder inch: ODF for ¼" tubes

Note: See "Controls Navigator" for guideline on selection and adjustment

TI 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 | Braze stainless steel fittings * | TILE-BW (12mm) | | External | Liquid | No | TILE-SW (12 mm) | 802 465 | |
| | | TILE-BW (1/2") | | | Liquid | No | TILE-SW (1/2") | 802 466 | |
| | Braze copper fittings ** | TISE-BW (12 mm) | | | Liquid | No | TISE-SW (12 mm) | 802 462 | |
| | | TISE-BW (1/2") | | | Liquid | No | TISE-SW (1/2") | 802 464 | |
| | | TISE-BW30 (1/2") | | | Vapor | Yes | | - | |
| | | TISE-BW70 (1/2") | | | Vapor | Yes | TISE-SW75 (1/2") | 802 472 | |
| | | TIS-BW (12 mm) | | Internal | Liquid | No | TIS-SW (12 mm) | 802 461 | |
| | | TIS-BW (1/2") | | | Liquid | No | TIS-SW (1/2") | 802 463 | |
| | Flare fittings | TIE-BW | | External | Liquid | No | TIE-SW | 802 460 | |
| | | TIE-BW70 | | | Vapor | Yes | TIE-SW75 | 802 470 | |
| | | TI-BW | | Internal | Liquid | No | TI-SW | 802 459 | |
| | R450A | Braze stainless steel fittings * | TILE-DW (12 mm) | | External | Liquid | No | TILE-MW (12 mm) | 802 451 |
| TILE-DW (1/2") | | | | Liquid | | No | TILE-MW (1/2") | 802 452 | |
| Braze copper fittings ** | | TISE-DW (12 mm) | | Liquid | | No | TISE-MW (12 mm) | 802 448 | |
| | | TISE-DW (1/2") | | Liquid | | No | TISE-MW (1/2") | 802 450 | |
| | | TISE-DW55 (12 mm) | | Vapor | | Yes | TISE-MW55 (12 mm) | 802 457 | |
| | | TISE-DW55 (1/2") | | Vapor | | Yes | TISE-MW55 (1/2") | 802 458 | |
| | | TIS-DW (12 mm) | | Internal | Liquid | No | TIS-MW (12 mm) | 802 447 | |
| | | TIS-DW (1/2") | | | Liquid | No | TIS-MW (1/2") | 802 449 | |
| Flare fittings | | TIE-DW | | External | Liquid | No | TIE-MW | 802 446 | |
| | | TI-DW | | Internal | Liquid | No | TI-MW | 802 445 | |
| R513A | | Braze stainless steel fittings * | TILE-CW (12 mm) | | External | Liquid | No | TILE-MW (12 mm) | 802 451 |
| | | | TILE-CW (1/2") | | | Liquid | No | TILE-MW (1/2") | 802 452 |
| | Braze copper fittings ** | TISE-CW (12 mm) | | Liquid | | No | TISE-MW (12 mm) | 802 448 | |
| | | TISE-CW (1/2") | | Liquid | | No | TISE-MW (1/2") | 802 450 | |
| | | TISE-CW55 (12 mm) | | Vapor | | Yes | TISE-MW55 (12 mm) | 802 457 | |
| | | TISE-CW55 (1/2") | | Vapor | | Yes | TISE-MW55 (1/2") | 802 458 | |
| | | TIS-CW (12 mm) | | Internal | Liquid | No | TIS-MW (12 mm) | 802 447 | |
| | | TIS-CW (1/2") | | | Liquid | No | TIS-MW (1/2") | 802 449 | |
| | Flare fittings | TIE-CW | | External | Liquid | No | TIE-MW | 802 446 | |
| | | TI-CW | | Internal | Liquid | No | TI-MW | 802 445 | |
| | R1234ze | Braze copper fittings ** | TISE-EW (12 mm) | | External | Liquid | No | TISE-MW (12 mm) | 802 448 |
| | | | TISE-EW (1/2") | | | Liquid | No | TISE-MW (1/2") | 802 450 |
| TISE-EW55 (12 mm) | | | | Vapor | | Yes | TISE-MW55 (12 mm) | 802 457 | |
| TISE-EW55 (1/2") | | | | Vapor | | Yes | TISE-MW55 (1/2") | 802 458 | |
| TIS-EW (12 mm) | | | | Liquid | | No | TIS-MW (12 mm) | 802 447 | |
| TIS-EW (1/2") | | | | Liquid | | No | TIS-MW (1/2") | 802 449 | |
| Flare fittings | | TIE-EW | | Internal | Liquid | No | TIE-MW | 802 446 | |
| | | TI-EW | | | Liquid | No | TI-MW | 802 445 | |

Note: See "Controls Navigator" for guideline on selection and adjustment

Thermo™ -Expansion Valve Series TX3

For OEM use, hermetic design

Features

- Hermetic design with solder connections
- Internal or external equalizer
- External superheat adjustment
- Large diaphragm eliminates disturbances to the valve and provides smoother valve control
- Very compact size
- Version with internal check valve eliminates external check valve for heat pump applications
- Capillary tube length 1.5m
- PS: 45bar. TS: -45 ... +120°C
- Packaging units with 24 pieces, no single packs



MOP

| MOP (bar) | Upper limit of Evaporating Temperature Range | | | |
|-----------|--|-------|---------|-------|
| | R134a | R22 | R407C | R410A |
| 2.3 | | | | |
| 3.3 | +11°C | | | |
| 6.4 | | +13°C | +14.5°C | |
| 12.9 | | | | +17°C |

Pressures are given in gauge pressure.

Selection Charts

R134a

| Nominal Capacity | less MOP | | with Standard-MOP | | Equalizer | Inlet x Outlet Solder/ODF |
|------------------|----------|----------|-------------------|----------|-----------|---------------------------|
| | Type | Part No. | Type | Part No. | | |
| 1.8 | TX3-M02 | 801766M | TX3-M12 | 801778M | Internal | ¼" x ⅜" |
| 2.8 | TX3-M03 | 801767M | | | Internal | ¼" x ⅜" |
| 4.0 | TX3-M04 | 801768M | | | Internal | ⅜" x ½" |
| 2.8 | TX3-M23 | 801770M | TX3-M33 | 801782M | Ext. 1/4" | ¼" x ⅜" |
| 4.0 | TX3-M24 | 801771M | TX3-M34 | 801783M | Ext. 1/4" | ⅜" x ½" |
| 6.1 | TX3-M25 | 801772M | TX3-M35 | 801784M | Ext. 1/4" | ⅜" x ½" |
| 8.3 | TX3-M26 | 801773M | TX3-M36 | 801785M | Ext. 1/4" | ⅜" x ½" |
| 10.2 | TX3-M27 | 801774M | TX3-M37 | 801786M | Ext. 1/4" | ½" x ⅝" |
| 12.1 | TX3-M28 | 801775M | TX3-M38 | 801787M | Ext. 1/4" | ½" x ⅝" |
| 16.5 | TX3-M29 | 801776M | TX3-M39 | 801788M | Ext. 1/4" | ½" x ⅝" |

R22

| Nominal Capacity | less MOP | | with Standard-MOP | | Equalizer | Inlet x Outlet Solder/ODF |
|------------------|----------|----------|-------------------|----------|-----------|---------------------------|
| | Type | Part No. | Type | Part No. | | |
| 5.2 | TX3-H24 | 801741M | TX3-H34 | 801750M | Ext. 1/4" | ⅜" x ½" |
| 7.8 | TX3-H25 | 801742M | TX3-H35 | 801751M | Ext. 1/4" | ⅜" x ½" |
| 10.7 | TX3-H26 | 801743M | | | Ext. 1/4" | ⅜" x ½" |
| 15.6 | TX3-H28 | 801745M | | | Ext. 1/4" | ½" x ⅝" |
| 21.3 | TX3-H29 | 801746M | TX3-H39 | 801755M | Ext. 1/4" | ½" x ⅝" |

R410A

| Nominal Capacity | less MOP | | with Standard-MOP | | Equalizer | Inlet x Outlet Solder/ODF |
|------------------|----------|----------|-------------------|----------------|-----------|---------------------------|
| | Type | Part No. | Type | Part No. | | |
| 6.3 | | | TX3-Z34 | 801944M | Ext. ¼" | ¾" x ½" |
| 9.4 | | | TX3-Z35 | 801945M | Ext. ¼" | ¾" x ½" |
| 12.9 | | | TX3-Z36 | 801946M | Ext. ¼" | ¾" x ½" |
| 15.8 | | | TX3-Z37 | 801947M | Ext. ¼" | ½" x ⅝" |
| 18.8 | | | TX3-Z38 | 801948M | Ext. ¼" | ½" x ⅝" |

R407C

| Nominal Capacity | less MOP | | with Standard-MOP | | Equalizer | Inlet x Outlet Solder/ODF |
|------------------|----------|----------------|-------------------|----------------|-----------|---------------------------|
| | Type | Part No. | Type | Part No. | | |
| 0.9 | TX3-N01 | 801813M | | | Internal | ¼" x ⅜" |
| 3.9 | | | TX3-N13 | 801828M | Internal | ¼" x ⅜" |
| 2.5 | TX3-N22 | 801818M | | | Ext. ¼" | ¼" x ⅜" |
| 3.9 | TX3-N23 | 801819M | TX3-N33 | 801832M | Ext. ¼" | ¼" x ⅜" |
| 5.6 | TX3-N24 | 801820M | TX3-N34 | 801833M | Ext. ¼" | ¾" x ½" |
| 8.4 | TX3-N25 | 801821M | TX3-N35 | 801834M | Ext. ¼" | ¾" x ½" |
| 11.6 | TX3-N26 | 801822M | TX3-N36 | 801835M | Ext. ¼" | ¾" x ½" |
| 14.2 | TX3-N27 | 801823M | TX3-N37 | 801836M | Ext. ¼" | ½" x ⅝" |
| 16.9 | TX3-N28 | 801824M | TX3-N38 | 801837M | Ext. ¼" | ½" x ⅝" |
| 23.0 | | | TX3-N39 | 801838M | Ext. ¼" | ½" x ⅝" |

R407C for heat pump applications

| Nominal Capacity | less MOP | | Adjustable with internal check valve and special liquid charge for heat pump applications | Equalizer | Inlet x Outlet Solder/ODF |
|------------------|----------|----------------|---|-----------|---------------------------|
| | Type | Part No. | | | |
| 3.9 | TX3-N63 | 806801M | | Ext. ¼" | ¼" x ⅜" |
| 8.4 | TX3-N65 | 806803M | | Ext. ¼" | ¾" x ½" |
| 11.6 | TX3-N66 | 806804M | | Ext. ¼" | ¾" x ½" |
| 14.2 | TX3-N67 | 806805M | | Ext. ¼" | ½" x ⅝" |
| 16.9 | TX3-N68 | 806806M | | Ext. ¼" | ½" x ⅝" |
| 23.0 | TX3-N69 | 806807M | | Ext. ¼" | ½" x ⅝" |

Nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|-------------|-------------------------|------------------------------------|------------|
| R407C | +4°C dew point | +38°C bubble p. +43°C dew point | 1K |
| others | +4°C | +38°C | 1K |

Valve selection for other operating conditions see "Correction Tables for Thermo-Expansion Valves Series TI, TX3, TX6, T and L" or use the "Controls Navigator" selection tool (download from www.emersonclimate.eu).

Thermo™-Expansion Valves Series TX7

TX7 series of Thermo™-Expansion Valves are designed predominantly for AC, heat pumps, close control and industrial process cooling applications. The TX7 is ideal for those applications requiring hermetic / compact size combined with stable and accurate control over wide load and evaporating temperature ranges.

Features

- Monoblock, hermetic valve with brazing connections
- 7 sizes up to 180 kW (R410A) - Maximum working pressure: 46 bar
- Factory test pressure: 50.6 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
- Power Element with 65 mm diameter enables low partial load (20-25%) performance at stable superheat
- Applicable in systems with digital scroll, step less screw compressors and variable speed compressors
- Floating superheat in reverse flow (heating mode) supports evaporator efficiency during low ambient operating conditions in air cooled reversible chillers
- Laser welded stainless steel power element with a special diaphragm profile provides life expectancy against high pressure during reversed flow via external equalizer.
- Single diaphragm with negligible hysteresis withstands against higher pressure
- Fine tuning by external superheat adjusting mechanism
- Special factory setting upon request. Minimum order quantity 60 pieces



TX7-Z13

R410a / R32 Selection table

| Capacity, R410A [kW] | | Capacity, R32 [kW] | | | | Connection | |
|----------------------|--------------|--------------------|--------------|-----------|----------------|----------------|-----------|
| Normal flow | Reverse flow | Normal flow | Reverse flow | Type | Part No. | Inlet x Outlet | Equalizer |
| 32.1 | 31.7 | 47.7 | 46.9 | TX7-Z13 m | 806 811 | 12 mm x 16 mm | 6 mm |
| 32.1 | 31.7 | 47.7 | 46.9 | TX7-Z13 | 806 810 | ½" x ⅝" | ¼" |
| 39.9 | 39.1 | 59.3 | 57.8 | TX7-Z14 m | 806 813 | 16 mm x 22 mm | 6 mm |
| 39.9 | 39.1 | 59.3 | 57.8 | TX7-Z14 | 806 812 | ⅝" x ⅞" | ¼" |
| 48.9 | 47.4 | 72.7 | 70.1 | TX7-Z15 m | 806 815 | 16 mm x 22 mm | 6 mm |
| 48.9 | 47.4 | 72.7 | 70.1 | TX7-Z15 | 806 814 | ⅝" x ⅞" | ¼" |
| 80.7 | 67.7 | 120 | 100.2 | TX7-Z16 m | 806 817 | 22 mm x 28 mm | 6 mm |
| 80.7 | 67.7 | 120 | 100.2 | TX7-Z16 | 806 816 | ⅞" x 1-⅛" | ¼" |
| 99.4 | 81.5 | 147.9 | 120.5 | TX7-Z17 m | 806 819 | 22 mm x 28 mm | 6 mm |
| 99.4 | 81.5 | 147.9 | 120.5 | TX7-Z17 | 806 818 | ⅞" x 1-⅛" | ¼" |
| 130.9 | 113.9 | 194.7 | 168.4 | TX7-Z18 m | 806 821 | 22 mm x 28 mm | 6 mm |
| 130.9 | 113.9 | 194.7 | 168.4 | TX7-Z18 | 806 820 | ⅞" x 1-⅛" | ¼" |
| 183.4 | 165.1 | 272.9 | 244.1 | TX7-Z19 m | 806 823 | 22 mm x 28 mm | 6 mm |
| 183.4 | 165.1 | 272.9 | 244.1 | TX7-Z19 | 806 822 | ⅞" x 1-⅛" | ¼" |

Note: The nominal capacities are based +4°C evaporating temperature, +38°C condensing temperature and 1K subcooling. For other operating conditions use the quick selection in this document or the "Controls Navigator" selection tool (download from www.emersonclimate.eu).

R134a Selection table

| Capacity, R134a [kW] | | With MOP | | With MOP | | Connection | |
|----------------------|--------------|-----------|----------------|-----------|----------------|----------------|-----------|
| Normal flow | Reverse flow | Type | Part No. | Type | Part No. | Inlet x Outlet | Equalizer |
| 18.1 | 17.9 | TX7-M13 m | 806 839 | TX7-M03 m | 806 825 | 12 mm x 16 mm | 6 mm |
| 18.1 | 17.9 | TX7-M13 | 806 840 | TX7-M03 | 806 824 | ½" x ⅝" | ¼" |
| 22.5 | 22 | TX7-M14 m | 806 841 | TX7-M04 m | 806 827 | 16 mm x 22 mm | 6 mm |
| 22.5 | 22 | TX7-M14 | 806 842 | TX7-M04 | 806 826 | ⅝" x ⅞" | ¼" |
| 27.5 | 26.7 | TX7-M15 m | 806 843 | TX7-M05 m | 806 829 | 16 mm x 22 mm | 6 mm |
| 27.5 | 26.7 | TX7-M15 | 806 844 | TX7-M05 | 806 828 | ⅝" x ⅞" | ¼" |
| 45.4 | 38.2 | TX7-M16 m | 806 845 | TX7-M06 m | 806 831 | 22 mm x 28 mm | 6 mm |
| 45.4 | 38.2 | TX7-M16 | 806 846 | TX7-M06 | 806 830 | ⅞" x 1-⅛" | ¼" |
| 56.0 | 45.9 | TX7-M17 m | 806 847 | TX7-M07 m | 806 833 | 22 mm x 28 mm | 6 mm |
| 56.0 | 45.9 | TX7-M17 | 806 848 | TX7-M07 | 806 832 | ⅞" x 1-⅛" | ¼" |
| 73.7 | 64.1 | TX7-M18 m | 806 849 | TX7-M08 m | 806 835 | 22 mm x 28 mm | 6 mm |
| 73.7 | 64.1 | TX7-M18 | 806 850 | TX7-M08 | 806 834 | ⅞" x 1-⅛" | ¼" |
| 103.3 | 93 | TX7-M19 m | 806 851 | TX7-M09 m | 806 837 | 22 mm x 28 mm | 6 mm |
| 103.3 | 93 | TX7-M19 | 806 852 | TX7-M09 | 806 836 | ⅞" x 1-⅛" | ¼" |

Note: The nominal capacities are based +4°C evaporating temperature, +38°C condensing temperature and 1K subcooling. For other operating conditions use the quick selection in this document or the "Controls Navigator" selection tool (download from www.emersonclimate.eu).

R407C Selection table

| Capacity, R407C [kW] | | With MOP | | With MOP | | Connection | |
|----------------------|--------------|-----------|----------------|-----------|----------------|----------------|-----------|
| Normal flow | Reverse flow | Type | Part No. | Type | Part No. | Inlet x Outlet | Equalizer |
| 28.9 | 28.6 | TX7-N13 m | 806 868 | TX7-N03 m | 806 853 | 12 mm x 16 mm | 6 mm |
| 28.9 | 28.6 | TX7-N13 | 806 867 | TX7-N03 | 806 852 | ½" x ⅝" | ¼" |
| 36.0 | 35.2 | TX7-N14 m | 806 870 | TX7-N04 m | 806 855 | 16 mm x 22 mm | 6 mm |
| 36.0 | 35.2 | TX7-N14 | 806 869 | TX7-N04 | 806 854 | ⅝" x ⅞" | ¼" |
| 44.1 | 42.7 | TX7-N15 m | 806 872 | TX7-N05 m | 806 857 | 16 mm x 22 mm | 6 mm |
| 44.1 | 42.7 | TX7-N15 | 806 871 | TX7-N05 | 806 856 | ⅝" x ⅞" | ¼" |
| 72.7 | 61.1 | TX7-N16 m | 806 874 | TX7-N06 m | 806 859 | 22 mm x 28 mm | 6 mm |
| 72.7 | 61.1 | TX7-N16 | 806 873 | TX7-N06 | 806 858 | ⅞" x 1-⅛" | ¼" |
| 89.7 | 73.5 | TX7-N17 m | 806 876 | TX7-N07 m | 806 861 | 22 mm x 28 mm | 6 mm |
| 89.7 | 73.5 | TX7-N17 | 806 875 | TX7-N07 | 806 860 | ⅞" x 1-⅛" | ¼" |
| 118.1 | 102.7 | TX7-N18 m | 806 878 | TX7-N08 m | 806 863 | 22 mm x 28 mm | 6 mm |
| 118.1 | 102.7 | TX7-N18 | 806 877 | TX7-N08 | 806 862 | ⅞" x 1-⅛" | ¼" |
| 165.4 | 148.9 | TX7-N19 m | 806 880 | TX7-N09 m | 806 865 | 22 mm x 28 mm | 6 mm |
| 165.4 | 148.9 | TX7-N19 | 806 879 | TX7-N09 | 806 864 | ⅞" x 1-⅛" | ¼" |

Note: The nominal capacities are based +4°C evaporating temperature, +38°C condensing temperature and 1K subcooling. For other operating conditions use the quick selection in this document or the "Controls Navigator" selection tool (download from www.emersonclimate.eu).

R450A / R513A Selection table

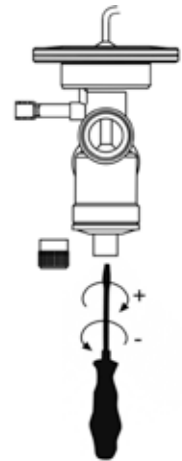
| Capacity, R450A [kW] | Capacity, R513A [kW] | With MOP | | With MOP | | Connection | |
|-------------------------|-------------------------|-----------|----------------|-----------|----------------|----------------|-----------|
| | | Type | Part No. | Type | Part No. | Inlet x Outlet | Equalizer |
| 15.9 | 16.3 | TX7-M13 m | 806 839 | TX7-M03 m | 806 825 | 12 mm x 16 mm | 6 mm |
| 15.9 | 16.3 | TX7-M13 | 806 840 | TX7-M03 | 806 824 | ½" x ⅝" | ¼" |
| 19.8 | 20.3 | TX7-M14 m | 806 841 | TX7-M04 m | 806 827 | 16 mm x 22 mm | 6 mm |
| 19.8 | 20.3 | TX7-M14 | 806 842 | TX7-M04 | 806 826 | ⅝" x ⅞" | ¼" |
| 24.3 | 24.8 | TX7-M15 m | 806 843 | TX7-M05 m | 806 829 | 16 mm x 22 mm | 6 mm |
| 24.3 | 24.8 | TX7-M15 | 806 844 | TX7-M05 | 806 828 | ⅝" x ⅞" | ¼" |
| 40.1 | 41.0 | TX7-M16 m | 806 845 | TX7-M06 m | 806 831 | 22 mm x 28 mm | 6 mm |
| 40.1 | 41.0 | TX7-M16 | 806 846 | TX7-M06 | 806 830 | ⅞" x 1-⅛" | ¼" |
| 49.4 | 50.6 | TX7-M17 m | 806 847 | TX7-M07 m | 806 833 | 22 mm x 28 mm | 6 mm |
| 49.4 | 50.6 | TX7-M17 | 806 848 | TX7-M07 | 806 832 | ⅞" x 1-⅛" | ¼" |
| 65.0 | 66.6 | TX7-M18 m | 806 849 | TX7-M08 m | 806 835 | 22 mm x 28 mm | 6 mm |
| 65.0 | 66.6 | TX7-M18 | 806 850 | TX7-M08 | 806 834 | ⅞" x 1-⅛" | ¼" |
| 91.1 | 93.3 | TX7-M19 m | 806 851 | TX7-M09 m | 806 837 | 22 mm x 28 mm | 6 mm |
| 91.1 | 93.3 | TX7-M19 | 806 852 | TX7-M09 | 806 836 | ⅞" x 1-⅛" | ¼" |

Note: The nominal capacities are based +4°C evaporating temperature, +38°C condensing temperature and 1K subcooling. For other operating conditions use the quick selection in this document or the "Controls Navigator" selection tool (download from www.emersonclimate.eu).

The TX7-xxx with standard charges can be used with systems having R450A, R513a, R32 and R22 considering the readjustment of factory setting. The readjusting depends to designed evaporating temperature. The graph below can be used as guideline:

| Refrigerant/ Type | Charge code | Evaporating temperature [°C] | | | |
|----------------------|-------------|------------------------------|------|-----|------|
| | | 5 | 0 | -10 | -20 |
| | | Number of turn | | | |
| R450A | M0/M1 | +4.5 | +4 | +3 | +2.5 |
| R513A | M0/M1 | -3 ① | -3 ② | -3 | -2 |
| R32 | Z1 | -1 | - | - | +2 |

Note: ①: This setting results to 4.4K static superheat due to the limit of adjusting mechanism.
②: This setting results to 4.8K static superheat due to the limit of adjusting mechanism.



R22 Selection table

Note: + means clockwise rotation / - means counterclockwise rotation

| Capacity, R22 [kW] | | With MOP | | With MOP | | Connection | |
|--------------------|--------------|-----------|----------------|-----------|----------------|----------------|-----------|
| Normal flow | Reverse flow | Type | Part No. | Type | Part No. | Inlet x Outlet | Equalizer |
| 27.5 | 27.2 | TX7-N13 m | 806 868 | TX7-N03 m | 806 853 | 12 mm x 16 mm | 6 mm |
| 27.5 | 27.2 | TX7-N13 | 806 867 | TX7-N03 | 806 852 | ½" x ⅝" | ¼" |
| 34.2 | 33.5 | TX7-N14 m | 806 870 | TX7-N04 m | 806 855 | 16 mm x 22 mm | 6 mm |
| 34.2 | 33.5 | TX7-N14 | 806 869 | TX7-N04 | 806 854 | ⅝" x ⅞" | ¼" |
| 41.9 | 40.6 | TX7-N15 m | 806 872 | TX7-N05 m | 806 857 | 16 mm x 22 mm | 6 mm |
| 41.9 | 40.6 | TX7-N15 | 806 871 | TX7-N05 | 806 856 | ⅝" x ⅞" | ¼" |
| 69.1 | 58.1 | TX7-N16 m | 806 874 | TX7-N06 m | 806 859 | 22 mm x 28 mm | 6 mm |
| 69.1 | 58.1 | TX7-N16 | 806 873 | TX7-N06 | 806 858 | ⅞" x 1-⅛" | ¼" |
| 85.2 | 69.9 | TX7-N17 m | 806 876 | TX7-N07 m | 806 861 | 22 mm x 28 mm | 6 mm |
| 85.2 | 69.9 | TX7-N17 | 806 875 | TX7-N07 | 806 860 | ⅞" x 1-⅛" | ¼" |
| 112.2 | 97.6 | TX7-N18 m | 806 878 | TX7-N08 m | 806 863 | 22 mm x 28 mm | 6 mm |
| 112.2 | 97.6 | TX7-N18 | 806 877 | TX7-N08 | 806 862 | ⅞" x 1-⅛" | ¼" |
| 157.2 | 141.5 | TX7-N19 m | 806 880 | TX7-N09 m | 806 865 | 22 mm x 28 mm | 6 mm |
| 157.2 | 141.5 | TX7-N19 | 806 879 | TX7-N09 | 806 864 | ⅞" x 1-⅛" | ¼" |

| Refrigerant/ Type | Charge code | Evaporating temperature [°C] | | | |
|----------------------|-------------|------------------------------|----|-----|------|
| | | 5 | 0 | -10 | -20 |
| | | Number of turn | | | |
| R22 | N0/N1 | -4 | -4 | -3 | -3.5 |

See "Controls Navigator" selection tool for more information

Technical Data

| | |
|-----------------------------|--|
| Maximum working pressure PS | 46 bar |
| Burst pressure | 230 bar |
| Factory test pressure PT | 50.6 bar |
| Medium temperature range TS | -25...+70°C |
| Storage temperature | -30...+70°C |
| Compatibility | R410A, R134a, R407C, R32, R450A, R513A |

| | |
|-----------------------|--|
| Connections | Copper ODF |
| Capillary tube length | 1.5 m |
| Power elements | Stainless steel, Laser welded |
| Label | Laser printing |
| Gross weight | Approx. 0.54...0.6 kg (depend on the valve size) |
| Marking | CE is not required, EAC & UL (pending) |

| Charge | Refrigerant | Recommended evaporating temperature range [°C] | Maximum bulb temperature [°C] |
|-----------------|-------------------|--|-------------------------------|
| M0 | R134a | -25...+30 | 88 |
| N0 | R407C | -25...+20 | 71 |
| M1 MOP 3.8 bar | R134a | -25...+10 | 120 |
| N1 MOP 6.9 bar | R407C | -25...+14 | 120 |
| Z1 MOP 12.1 bar | R410A/ R32 | -40...+14 | 120 |

Thermo™-Expansion Valve Series T

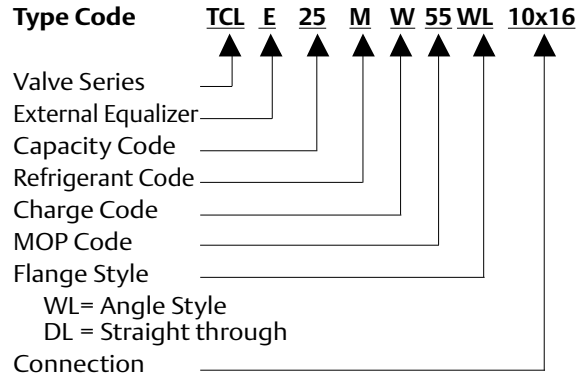
Exchangeable Power Assemblies and Orifices

Features

- Modular design for economical logistics and easy assembly and servicing
- Very good stability is attained because of the large forces generated by the large diaphragm diameter
- High-quality materials and processes for high reliability and long lifetime
- Superior partial load performance due to double seat orifice design (TJRE, TERE, TIRE & THRE)
- Biflow capability for applications in heat pumps
- Capillary tube length 1.5 m (TCLE, TJRE) and 3m (TERE, TIRE & THRE)
- PS: 46 / 31 bar with XB / XC power assembly.
- TS: -45 ... +65°C
- No CE marking according art. 3.3 PED 97/23 EC



TCLE



Selection Chart for Orifices

| Series | R134a | | R404A/ R507 | | R407C | | R407A/R407F | | | R410A | | R448A/ R449A | | R450A | | R513A | | R1234ze | | Orifice |
|--------|--------|------|----------------|------|---------|------|---------------------|----------------|----------------|---------|------|-----------------|------|--------|------|--------|------|---------|------|---------------|
| | Type | (kW) | Type | (kW) | Type | (kW) | Type | (kW) (407A) | (kW) (407F) | Type | (kW) | Type | (kW) | Type | (kW) | Type | (kW) | Type | (kW) | |
| TCLE | 25 MW | 1.5 | 25 SW | 1.3 | 50 NW | 2.1 | 50NW/ 25SW40 | 1.9 | 2.1 | 50 ZW | 2.2 | 25 BW | 1.9 | 20 DW | 1.3 | 20 CW | 1.3 | 20 EW | 1.1 | X 22440-B1B |
| | 75 MW | 2.9 | 75 SW | 2.6 | 100 NW | 4.0 | 100NW/ 75SW40 | 3.6 | 4.1 | 100 ZW | 4.3 | 100 BW | 3.7 | 50 DW | 2.5 | 50 CW | 2.6 | 50 EW | 2.2 | X 22440-B2B |
| | 150 MW | 6.1 | 150 SW | 5.6 | 200 NW | 8.5 | 200NW/ 150SW40 | 7.8 | 8.8 | 250 ZW | 9.2 | 200 BW | 7.9 | 100 DW | 5.4 | 100 CW | 5.5 | 120 EW | 4.8 | X 22440-B3B |
| | 200 MW | 9.3 | 200 SW | 8.4 | 300 NW | 12.9 | 300NW/ 200SW40 | 11.7 | 13.3 | 400 ZW | 13.9 | 250 BW | 11.9 | 150 DW | 8.1 | 150 CW | 8.3 | 150 EW | 7.2 | X 22440-B3.5B |
| | 250 MW | 13.5 | 250 SW | 12.2 | 400 NW | 18.7 | 400NW/ 250SW40 | 17 | 19.3 | 600 ZW | 20.2 | 300 BW | 17.3 | 200 DW | 11.8 | 200 CW | 12.1 | 200 EW | 10.5 | X 22440-B4B |
| | 350 MW | 17.3 | 400 SW | 15.7 | 550 NW | 24.0 | 550NW/ 400SW40 | 21.9 | 24.8 | 750 ZW | 25.9 | 500 BW | 22.1 | 250 DW | 15.1 | 250 CW | 15.5 | 300 EW | 13.4 | X 22440-B5B |
| | 550 MW | 23.6 | 600 SW | 21.5 | 750 NW | 32.9 | 750NW/ 600SW40 | 29.9 | 34 | 1000 ZW | 35.5 | 800 BW | 30.3 | 400 DW | 20.7 | 400 CW | 21.2 | 450 EW | 18.4 | X 22440-B6B |
| | 750 MW | 32.0 | 850 SW | 29.0 | 1000 NW | 44.4 | 1000NW/ 850SW40 | 40.5 | 45.9 | 1400 ZW | 48.0 | 1100 BW | 41.0 | 500 DW | 28.0 | 500 CW | 28.7 | 600 EW | 24.8 | X 22440-B7B |
| | 900 MW | 37.2 | 1000 SW | 33.8 | 1150 NW | 51.7 | 1150NW/ 1000SW40 | 47 | 53 | 1600 ZW | 55.8 | 1300 BW | 47.7 | 600 DW | 32.6 | 600 CW | 33.4 | 700 EW | 28.9 | X 22440-B8B |
| TJRE | 11 MW | 45 | 12 SW | 40 | 14 NW | 62 | 14NW/ 12SW40 | 57 | 65 | 19 ZW | 67.7 | 15 BW | 58 | 8 DW | 40 | 8 CW | 40 | 9 EW | 35 | X 11873-B4B |
| | 13 MW | 57 | 14 SW | 51 | 17 NW | 80 | 17NW/ 14SW40 | 73 | 83 | 25 ZW | 86.4 | 18 BW | 74 | 9 DW | 50 | 9 CW | 52 | 10 EW | 45 | X 11873-B5B |
| TERE | 16 MW | 71 | 18 SW | 63 | 21 NW | 99 | 21NW/ 18SW40 | 90 | 102 | - | - | 23 BW | 91 | 11 DW | 62 | 11 CW | 64 | 13 EW | 55 | X 9117-B6B |
| | 19 MW | 81 | 20 SW | 72 | 25 NW | 112 | 25NW/ 20SW40 | 102 | 116 | - | - | 26 BW | 104 | 13 DW | 71 | 13 CW | 73 | 15 EW | 63 | X 9117-B7B |
| | 25 MW | 112 | 27 SW | 99 | 33 NW | 155 | 33NW/ 27SW40 | 141 | 160 | - | - | 35 BW | 143 | 17 DW | 98 | 17 CW | 100 | 20 EW | 86 | X 9117-B8B |
| | 31 MW | 135 | 34 SW | 120 | 42 NW | 188 | 42NW/ 34SW40 | 171 | 194 | - | - | 44 BW | 174 | 22 DW | 119 | 22 CW | 121 | 24 EW | 105 | X 9117-B9B |
| TIRE | 45 MW | 174 | 47 SW | 154 | 52 NW | 241 | 52NW/ 47SW40 | 219 | 249 | - | - | 60 BW | 222 | 31 DW | 152 | 31 CW | 156 | 35 EW | 135 | X 9166-B10B |
| THRE | 55 MW | 197 | 61 SW | 174 | 71 NW | 273 | 71NW/ 61SW40 | 249 | 283 | - | - | 78 BW | 252 | 38 DW | 173 | 38 CW | 177 | 43 EW | 153 | X 9144-B11B |
| | 68 MW | 236 | 77 SW | 209 | 94 NW | 327 | 94NW/ 77SW40 | 297 | 338 | - | - | 98 BW | 301 | 47 DW | 206 | 47 CW | 211 | 53 EW | 183 | X 9144-B13B |

| MOP | | Evaporating Temperature Range °C | | | | |
|------|------|----------------------------------|------------|-----------|------------|-----------|
| Code | bar | R134a MW | R404A SW | R407C NW | R507 SW | R410 ZW |
| 35 | 2.4 | -45 .. 0 | | | | |
| 40 | 2.8 | | -45 .. -18 | | -45 .. -18 | |
| 55 | 3.8 | -45 .. 11 | -45 .. -10 | | -45 .. -10 | |
| 65 | 4.5 | | | | | |
| 75 | 5.2 | | -45 .. -2 | | -45 .. -2 | |
| 80 | 5.5 | | -45 .. 0 | | -45 .. 0 | |
| 100 | 6.9 | | | -45 .. 14 | | |
| 175 | 12.1 | | | | | -45 .. 16 |

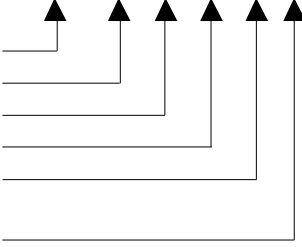
Available upon special request:

- Power assembly with solder connection for external pressure equalization
- Non-standard MOPs
- Non-standard charges
- Non-standard connection sizes. See last page of this chapter

Type Code

XB 1019 M W 55 - 1 B

Power Assembly
 Refrigerant Code
 Charge Code
 MOP Code
 Capillary Tube Length
 1=1.5m; 2=3m
 External Equalization



Nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|----------------|-------------------------|---------------------------------------|------------|
| R407C | +4°C dew point | +38°C bubble point +43°C dew point | 1K |
| R134a, R410A | +4°C | +38°C | |
| R448A, R449A | +4°C dew point | +38°C bubble / +43°C dew point | |
| R450A | | +38°C bubble / +38.6°C dew point | |
| R513A, R1234ze | | +38°C bubble / +38°C dew point | |

Valve selection for other operating conditions see “Correction Tables for Thermo-Expansion Valves Series TI, TX3, TX6, T and L” or use the “Controls Navigator” selection tool (download from www.emersonclimate.eu).

Selection Chart for Power Assemblies and Recommended Flanges

| Orifice | Connection Standard-Flange. Angle (see last page of this chapter) Solder/ODF | | Power Assembly |
|---------------|---|--|----------------|
| | mm | inch | |
| X 22440-B1B | C 501 - 5 mm 10 x 16 | C 501 - 5 $\frac{3}{8} \times \frac{5}{8}$ | XB1019...1B |
| X 22440-B2B | | | |
| X 22440-B3B | | | |
| X 22440-B3.5B | | | |
| X 22440-B4B | | | |
| X 22440-B5B | C 501 - 7 mm 12 x 16 | C 501 - 7 $\frac{1}{2} \times \frac{5}{8}$ | |
| X 22440-B6B | | | |
| X 22440-B7B | A 576 mm 16 x 22 (22 x 28 ODM) | $\frac{5}{8} \times \frac{7}{8}$ ($\frac{1}{8} \times 1 \frac{1}{8}$ ODM) | |
| X 22440-B8B | | | |
| X 11873-B4B | 10331 22 x 22 | $\frac{10331}{7/8 \times 7/8}$ ($1 \frac{1}{8} \times 1 \frac{1}{8}$ ODM) | |
| X 11873-B5B | | | |
| X 9117-B6B | 9153 mm 22 x 22 | $\frac{9153}{7/8 \times 7/8}$ ($1 \frac{1}{8} \times 1 \frac{1}{8}$ ODM) | XC726...2B |
| X 9117-B7B | | | |
| X 9117-B8B | | | |
| X 9117-B9B | | | |
| X 9166-B10B | | | |
| X 9144-B11B | 9149 22 x 22 | $\frac{9149}{7/8 \times 7/8}$ ($1 \frac{1}{8} \times 1 \frac{1}{8}$ ODM) | |
| X 9144-B13B | | | |

Spare Parts

| | Type | Part No. |
|--|----------------------------|----------------------------------|
| Gasket Set for T Series Valves | X 13455 -1 | 027 579 |
| Service Tool for T Series Valves | X 99999 | 800 005 |
| Steel screws for following flange types: C501, 9761, 6346, A576 9148, 9149, 9152, 9153, 10331, 10332 | Screw ST 32 Screw ST 48 | 803 573 803 574 |

Note: Please refer “Controls Navigator” for selection and adjustment guideline

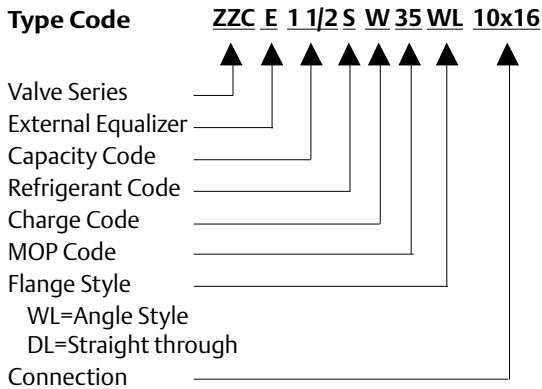
Thermo™ -Expansion Valve Series ZZ

for Low Evaporating Temperatures between -45 and -120°C

Features

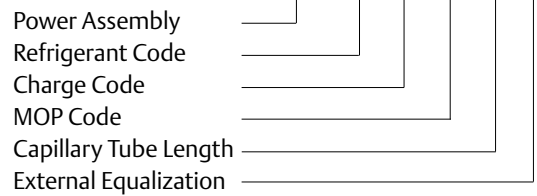
- Modular design for economical logistics and easy assembly and servicing
- Very good stability is attained because of the large forces generated by the large diaphragm diameter
- High-quality materials and processes for high reliability and long lifetime
- Capillary tube length 3 m
- PS: 31 bar. TS: -120 ... +65°C
- No CE marking according art. 3.3 PED 97/23 EC

Type Code



ZZCE

XC 726 S W 35 - 2 B



Available upon special request:

- Power assembly with solder connection for external pressure equalization
- Non-standard MOPs
- Non-standard charges
- Non-standard connection sizes (Selection see last page of this chapter)

| Series | R23 | | R404A / R507 | | R448A/ R449A | | Orifice | Connection Standard-Flange, Angle Solder/ODF | | Power Assembly |
|--------|------|-----------------------|--------------|-----------------------|--------------|-----------------------|----------|--|---|----------------|
| | Type | Nominal Capacity (kW) | Type | Nominal Capacity (kW) | Type | Nominal Capacity (kW) | | mm | inch | |
| | ZZCE | 2 BG | 1.9 | 2/4 SW | 1.2 | 1BW | | 1.7 | X 10-B01 | |
| 6 BG | | 4.0 | 1 1/2 SW | 2.6 | 2BW | 3.7 | X 10-B02 | | | |
| 8 BG | | 6.8 | 2 1/2 SW | 4.4 | 3BW | 6.2 | X 10-B03 | | | |
| 12 BG | | 10.8 | 3 1/2 SW | 7.0 | 5BW | 9.8 | X 10-B04 | C501 - 7mm 12 X 16 | C501 - 7 1/2" X 5/8" | |
| 17 BG | | 16.3 | 5 SW | 10.6 | 6BW | 14.8 | X 10-B05 | | | |
| 25 BG | | 21.7 | 8 SW | 14.1 | 10BW | 19.8 | X 10-B06 | A 576mm 16 X 22 (22 X 28 ODM) | A 576 5/8" X 1/8" (7/8" X 1 1/8" ODM) | |
| 31 BG | | 27.1 | 9 SW | 17.6 | 12BW | 24.7 | X 10-B07 | | | |

Attention: To withstand stress at extremely low temperatures, thermo expansion valves series ZZ feature bronze bolts.

| Preferred MOPs | | | | |
|----------------|-----|-------|----------------------------------|-------------|
| MOP Code | MOP | | Evaporating Temperature Range °C | |
| | bar | Tmax | R23 | R404A/R507 |
| 20 | 1.4 | -66°C | -100 ... -71 | |
| 35 | 2.4 | -11°C | | |
| 40 | 2.8 | -14°C | | -75 ... -18 |
| 55 | 3.8 | -7°C | | -75 ... -10 |
| 60 | 4.1 | -48°C | -100 ... -51 | |
| 125 | 8.6 | -32°C | -100 ... -35 | |

Nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | R22 | R23 | R404/R507 |
|------------------------------|-----|-----|-----------|
| Evaporating temperature (°C) | -40 | -60 | -40 |
| Condensing temperature (°C) | 25 | -25 | 25 |
| Subcooling (K) | 1 | 1 | 1 |

Valve selection at other operating conditions see "Correction Tables for Series ZZ"

Spare Parts

| | Type | Part No. |
|---|----------------------------|----------------------------------|
| Gasket Set for for ZZ Series Valves | X 13455 -1 | 027 579 |
| Service Tool for for ZZ Series Valves | X 99999 | 800 005 |
| Bronze screws for following flange types: C501, 9761, 6346, A576 9148, 9149, 9152, 9153, 10331, 10332 | Screw BZ 32 Screw BZ 48 | 803 575 803 576 |

Note: Please refer "Alco Navigator" for selection and adjustment guidelines

Liquid Injection Valve Series L

Exchangeable Power Assemblies and Orifices

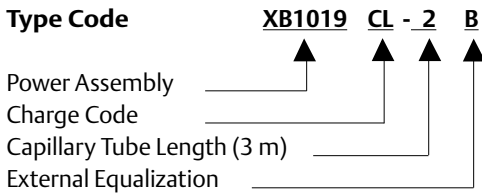
Features

- Applications for Series L valves include superheat control (desuperheating of suction gas i.e., in hotgas bypass systems and interstage cooling in multiple stage compressors)
- Modular design for economical logistics and easy assembly and servicing
- Very good stability is attained because of the large forces generated by the large diaphragm diameter
- High-quality materials and processes for high reliability and long lifetime
- Superior partial load performance due to seat orifice design (LJRE, LERE & LIRE)
- Capillary tube length 3 m
- PS: 46 / 31 bar with XB / XC power assembly
- TS: -45 ... +65°C
- No CE marking according art. 3.3 PED 97/23 EC

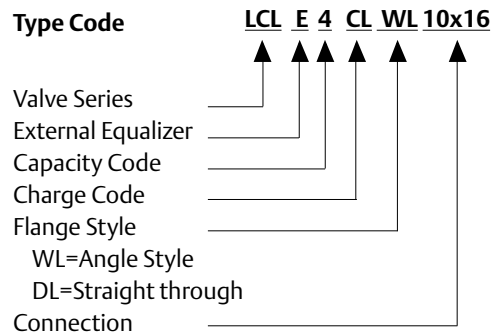


LCLE

Type Code



Type Code



| Series | Size code * | Nominal Capacity Q _n kW | | | | | | | Orifice | Connections Standard Flange. Angle Solder/ODF | | Power Assembly |
|--------|-------------|---------------------------------------|----------------|-------|-----------------|-------|-------|------------|---------------|---|---|-------------------|
| | | R134a | R404A/ R507 | R407C | R448A/ R449A | R450A | R513A | R1234ze | | mm | inch | |
| LCLE | 1 * | 1.5 | 1.3 | 2.1 | 1.9 | 1.3 | 1.3 | 1.1 | X 22440-B1B | C 501 – 5 mm 10 x 16 | XB1019...2B | |
| | 2 * | 2.9 | 2.6 | 4.0 | 3.7 | 2.5 | 2.6 | 2.2 | X 22440-B2B | | | |
| | 3 * | 6.1 | 5.6 | 8.5 | 7.9 | 5.4 | 5.5 | 4.8 | X 22440-B3B | | | |
| | 3.5 * | 9.3 | 8.4 | 12.9 | 11.9 | 8.1 | 8.3 | 7.2 | X 22440-B3.5B | | | |
| | 4 * | 13.5 | 12.2 | 18.7 | 17.3 | 11.8 | 12.1 | 10.5 | X 22440-B4B | C 501 – 7 mm 12 x 16 | | |
| | 6 * | 17.3 | 15.7 | 24.0 | 22.1 | 15.1 | 15.5 | 13.4 | X 22440-B5B | | | |
| | 7 * | 23.6 | 21.5 | 32.9 | 30.3 | 20.7 | 21.2 | 18.4 | X 22440-B6B | | | |
| | 9 * | 32.0 | 29.0 | 44.4 | 41.0 | 28.0 | 28.7 | 24.8 | X 22440-B7B | | | |
| LJRE | 10 * | 37.2 | 33.8 | 51.7 | 47.7 | 32.6 | 33.4 | 28.9 | X 22440-B8B | A 576 mm 16 x 22 (22 x 28 ODM) | A 576 5/8 x 3/8 (7/8 x 1 1/8 ODM) | |
| | 11 * | 45 | 40 | 62 | 58 | 40 | 40 | 35 | X 11873-B4B | 10331 22 x 22 | 10331 3/8 x 3/8 (1 1/8 x 1 1/8 ODM) | |
| LERE | 12 * | 57 | 51 | 80 | 74 | 50 | 52 | 45 | X 11873-B5B | | | |
| | 13 * | 71 | 63 | 99 | 91 | 62 | 64 | 55 | X 9117-B6B | 9153 mm 22 x 22 | 9153 3/8 x 3/8 (1 1/8 x 1 1/8 ODM) | |
| | 14 * | 81 | 72 | 112 | 104 | 71 | 73 | 63 | X 9117-B7B | | | |
| | 15 * | 112 | 99 | 155 | 143 | 98 | 100 | 86 | X 9117-B8B | | | |
| 16 * | 135 | 120 | 188 | 174 | 119 | 121 | 105 | X 9117-B9B | | | | |
| LIRE | 17 * | 174 | 154 | 241 | 222 | 152 | 156 | 135 | X 9166-B10B | | | XC726...2B |

Superheat selection

| * Charge Code | Refrigerant | | | | |
|---------------|-------------|------------|-------|-------|-------|
| | R134a | R404A/R507 | R407A | R407F | R407C |
| CL | | 22 K | 22 K | 22 K | 13 K |
| GL | 15 K | 35 K | 35 K | 35 K | 25 K |
| UL | 30 K | | | | 40 K |

* Please indicate designation character for desired superheat

Nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|--------------------|-------------------------|------------------------------------|------------|
| R407C | +4°C dew point | +38°C bubble point/+43°C dew point | 1K |
| R134a, R404A, R507 | +4°C | +38°C | |
| R448A, R449A | +4°C dew point | +38°C bubble / +43°C dew point | |
| R450A | | +38°C bubble / +38.6°C dew point | |
| R513A, R1234ze | | +38°C bubble / +38°C dew point | |

Valve selection for other operating conditions see “Correction Tables for Thermo-Expansion Valves Series TI, TX3, TX6, T and L”

Available upon special request

- Power assembly with solder connection for external pressure equalization
- Non-standard connection sizes see last page of this chapter

Spare Parts

| | Type | Part No. |
|--|----------------------------|--------------------|
| Gasket Set for L Series Valves | X 13455 -1 | 027 579 |
| Service Tool for L Series Valves | X 99999 | 800 005 |
| Steel screws for following flange types: C501, 9761, 6346, A576 9148, 9149, 9152, 9153, 10331, 10332 | Screw ST 32 Screw ST 48 | 803 573 803 574 |

Note: Please refer “Alco Navigator” for selection and adjustment guidelines

Liquid Injection Valves Series 935

Exchangeable Power Assemblies and Orifices

Applications

- Series 935 valves are applied as temperature controls.
- Applications include:
 - Desuperheating of discharge gas on compressors. In this case bulbs are mounted on the high pressure outlet of the compressor
 - Control of compressor oil temperatures
- Series 935 valves shall not be used to control superheat

Features

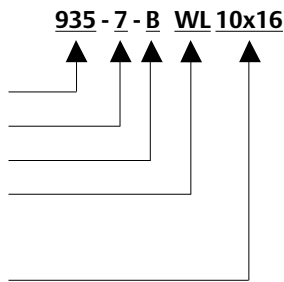
- Modular design for economical logistics and easy assembly and servicing
- Very good stability because of the large forces generated by the large diaphragm diameter
- High-quality materials and processes for high reliability and long lifetime
- Combinations of different charges with various orifice springs cover a very large application range
- PS: 46 bar
- TS: -45 ... +65°C
- No CE marking according art. 3.3 PED 97/23 EC
- Non-standard connection sizes see last page of this chapter



935

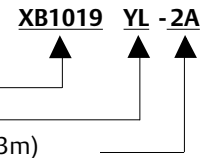
Type Code

Valve Series
 Temperature Code
 Capacity Code
 Flange Style
 WL=Angle Style
 DL=Straight through
 Connection Size



Type Code

Power Assembly
 Charge Code
 Capillary Tube Length (3m)



| Series | Nominal Capacity Q _n kW | | | | | | | | | | Orifice | Standard Flange. Angle Solder/ODF | | Power Assembly |
|--------|---------------------------------------|-------|----------------|-------|-------|-----------------|-------|-------|---------|------|---------|--------------------------------------|---------------------------------|-------------------|
| | R134a | R410A | R404A/ R507 | R407C | R407F | R448A/ R449A | R450A | R513A | R1234ze | mm | | inch | | |
| 935-* | A | 4.0 | 6.1 | 3.8 | 5.6 | 5.8 | 5.2 | 3.5 | 3.6 | 3.1 | X10-*01 | C 501 - 5 mm 10 x 16 | C 501 - 5 ¾ x ¾ | XB1019 - * - 2A |
| | B | 7.8 | 11.8 | 7.4 | 10.9 | 11.3 | 10.1 | 6.9 | 7.1 | 6.1 | X10-*02 | | | |
| | C | 11.1 | 16.6 | 10.3 | 15.4 | 15.9 | 14.2 | 9.7 | 9.9 | 8.6 | X10-*03 | | | |
| | D | 16.3 | 24.6 | 15.6 | 22.8 | 23.6 | 21.0 | 14.4 | 14.7 | 12.8 | X10-*04 | C 501 - 7 mm 12 x 16 | C 501 - 7 ½ x ¾ | |
| | E | 22.5 | 33.7 | 21.0 | 31.2 | 32.3 | 28.8 | 19.7 | 20.2 | 17.5 | X10-*05 | A 576 mm 16 x 22 (22 x 28 ODM) | A 576 ¾ x ¾ (¾ x 1-½ ODM) | |
| | G | 32.0 | 48.1 | 29.9 | 44.5 | 46.1 | 41.1 | 28.1 | 28.8 | 24.9 | X10-*06 | | | |
| | X | 46.6 | 70.0 | 43.5 | 64.9 | 67.1 | 59.8 | 40.9 | 41.9 | 36.3 | X10-*07 | | | |

| * = Temperature Code | Temperature Range °C | * = Spring Code | * = Charge Code |
|----------------------|----------------------|-----------------|-----------------|
| 3 | -1 / +17 | B | UL |
| 6 | +14 / +38 | C | KL |
| 105 | +44 / +70 | C | YL |
| 106 | +66 / +94 | C | JL |
| 100 | +94 / +121 | C | LL |

Nominal capacity (Q_n) is based on the following conditions:

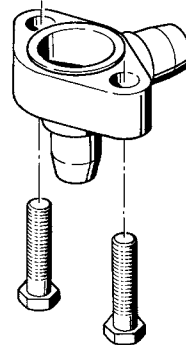
| Refrigerant | Evaporating temperature | Condensing temperature | Subcooling |
|---------------------------|-------------------------|------------------------------------|------------|
| R407C | +4°C dew point | +38°C bubble point/+43°C dew point | 1K |
| R134a, R404A, R507 | +4°C | +38°C | |
| R448A, R449A | +4°C dew point | +38°C bubble / +43°C dew point | |
| R450A | | +38°C bubble / +38.6°C dew point | |
| R513A, R1234ze | | +38°C bubble / +38°C dew point | |

Spare Parts

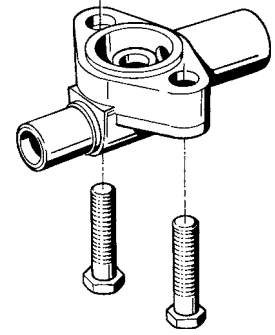
| Description | Type | Part No. |
|--|----------------------------|----------------------------------|
| Gasket Set for 935 Series Valves | X 13455 -1 | 027 579 |
| Service Tool for 935 Series Valves | X 99999 | 800 005 |
| Steel screws for following flange types: C501, 9761, 6346, A576 9148, 9149, 9152, 9153, 10331, 10332 | Screw ST 32 Screw ST 48 | 803 573 803 574 |

Note: See "Controls Navigator" for more information on selection and adjustment guidelines.

Flanges for Valves



Angle Style Flange
(WL)



Straight Through Flange
(DL)

| Flanges: T- / L-Series | | | | | | | |
|------------------------|-------------------------------------|---------------|---------------|------------------|----------------------------|-----------------------------|------------------------------------|
| Valve series | Orifice type | Angle style | | Straight through | | Connection (inlet x outlet) | |
| | | Type | Part No. | Type | Part No. | Metric | Imperial |
| TCLE / LCLE | X22440-B1B / B2B/ B3B / B3.5B / B4B | C501-5 | 803232 | 9761-3 | 803240 | - | 3/8"x5/8" ODF |
| | | C501-5mm | 803233 | 9761-3mm | 803241 | 10x16mm ODF | |
| | X22440-B5B / B6B | C501-7 | 803234 | 9761-4 | 803350 | | 1/2"x5/8" ODF |
| | | C501-7mm | 803235 | 9761-4mm | 803243 | 12x16mm ODF | - |
| | X22440-B7B / B8B | - | - | 6346-17 | 803330 | 16x22mm ODF | 5/8"x7/8" ODF |
| | | A576 | 803238 | - | - | - | 5/8"x7/8" ODF |
| A576-mm | | 803239 | - | - | 16x22mm ODF 22x28mm ODM | - | |
| TJRE / LJRE | X11873-B4B / B5B | 10331 | 803338 | 10332 | 803324 | 22x22mm ODF | 7/8"x7/8" ODF 1-1/8"x1-1/8" ODM |
| TERE/ TIRE | X9117-B6B / B7B / B8B / B9B / B10B | 9153 | 803244 | 9152 | 803286 | - | 7/8"x7/8" ODF 1-1/8"x1-1/8" ODM |
| LERE/ LIRE | | 9153-mm | 803245 | 9152-mm | 803287 | 22x22mm ODF 28x28mm ODM | |
| THRE | X9144-B11B / B13B | 9149 | 803284 | 9148 | 803283 | 22x22mm ODF | 7/8"x7/8" ODF 1-1/8"x1-1/8" ODM |

| Flanges: 935- / ZZ-Series | | | | | | | |
|---------------------------|---------------------|---------------|---------------|------------------|----------------------------|-----------------------------|---------------|
| Valve series | Orifice type | Angle style | | Straight through | | Connection (inlet x outlet) | |
| | | Type | Part No. | Type | Part No. | Metric | Imperial |
| 935 / ZZ | X10-*01 / *02 / *03 | C501-5 | 803232 | 9761-3 | 803240 | - | 3/8"x5/8" ODF |
| | | C501-5mm | 803233 | 9761-3mm | 803241 | 10x16mm ODF | |
| | X10-*04 / *05 | C501-7 | 803234 | 9761-4 | 803350 | | 1/2"x5/8" ODF |
| | | C501-7mm | 803235 | 9761-4mm | 803243 | 12x16mm ODF | - |
| | X10-*06 / *07 | - | - | 6346-17 | 803330 | 16x22mm ODF | 5/8"x7/8" ODF |
| | | A576 | 803238 | - | - | - | 5/8"x7/8" ODF |
| A576-mm | | 803239 | - | - | 16x22mm ODF 22x28mm ODM | - | |

Solenoid Valves

Solenoid Valves

Basic Terms and Technical Information

Operating principles

Directly actuated: The magnetic field of the solenoid coil forces a movement of the plunger and thus causes the opening of the valve seat.

Servo actuated: The magnetic field of the solenoid coil is only utilized for the opening of the pilot valve seat. The necessary energy to actuate the piston or diaphragm of the main valve seat is provided by the refrigerant flow and results in a certain pressure drop.

Minimum Pressure Drop

Directly actuated solenoid valves do not require a minimum pressure drop for proper operation.

Servo operated solenoid valves require a minimum pressure drop of approximately 0.05 bar to remain fully open. In case of insufficient refrigerant flow, this value will not be reached and the solenoid valve may close unintentionally. These closures may lead to malfunctions and oscillations in the refrigeration circuit. Improper sizing of solenoid valves (i.e., use of excessively large solenoid valves) is the main cause of this effect. This is particularly important in capacity controlled refrigeration circuits.

Therefore the decisive factor for proper solenoid valve sizing is the respective capacity of the valve and not its connection size.

Formula for calculating the actual pressure drop of a solenoid valve:

$$\Delta_{p1} = \Delta_{p2} \times (Q_{n1}/Q_{n2})^2$$

- Δ_{p1} : Actual pressure drop
- Δ_{p2} : Nominal pressure drop at Q_{n1}
- Q_{n1} : Calculated nominal capacity
- Q_{n2} : Nominal capacity of selected valve

Maximum Operating Pressure Differential (MOPD)

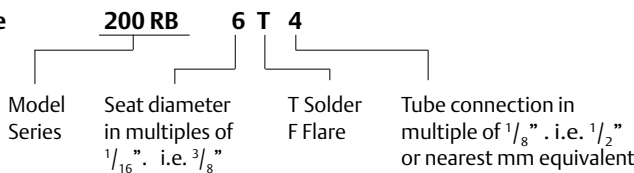
MOPD is the maximum pressure differential between inlet and outlet of the solenoid valve which permits proper opening of the valve. When used with Alco AC solenoid coils all Alco solenoid valves employ 25 bar MOPD.

Operation in conjunction with DC solenoid coils lead to reduced MOPD values depending on valve type and size. The **DS2 Chopper Plugs** allow the use of 24VAC coils with 24VDC by converting the DC in an AC voltage. Please contact Emerson Climate Technologies application engineering for additional details.

Selection Guide for Solenoid Valves

| Selection Criteria | Series | | | | | | |
|----------------------------------|------------|-----------------|-------------|------------|------------|------------|------------|
| | 110 RB | 200 RB / 200 RH | 240 RA | | 540 RA | | M36 |
| | | | 8/9/12/16T9 | 16T11/20 | 8/9/12/16 | 20 | |
| 2-Way | + | + | + | + | + | + | |
| 3-Way | | | | | | | + |
| Normally Closed (NC) | + | + | + | + | | | |
| Normally Open (NO) | | | | | + | + | |
| Min. Pressure Differential (bar) | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | |
| MWP (bar) | 31 | 31 / 60 | 31 | 31 | 31 | 28 | 35 |
| Media Temp. Range (°C) | -40 / +120 | -40 / +120 | -40 / +120 | -40 / +120 | -40 / +120 | -40 / +120 | -40 / +120 |
| Coil Type | ASC3 | ASC3 | ASC3 | ASC3 | ASC3 | ASC3 | ASC3 |

Type Code



Coils ASC3 and Cable Assemblies

Standards

- ASC3 Coils and cable assemblies conform to Low Voltage Directive



ASC3

| Type | Part No. | Voltage | Power Input | Electr. Connection | Protection |
|------------------------|--------------------------|---------|-------------|--------------------------------------|------------------------------------|
| ASC3 230V / 50 (60) Hz | 801 077 | AC | 8 W | without plug see cable assemblies | IP65 with plug / cable assembly |
| ASC3 120V / 50 (60) Hz | 801 078 | | | | |
| ASC3 24V / 50 (60) Hz | 801 079 | | | | |
| ASC3 24V DC | 801 076 | DC | 17 W | | |
| DS2-N15 + ASC3 24VAC | 804 620 + 801 079 | DC | 3 W | with plug and cable assembly | IP65 |

Note: Coils are delivered with retainer kit.
Please order cable assemblies separately.



ASC-N15

Cable Assemblies for ASC Coils

| Type | Part No. | Temperature Range | Cable length | Wire diameter | Connector Type |
|---------|----------------|---|--------------|--------------------------|----------------|
| ASC-N15 | 804 570 | -50 .. +80°C for stationary use only | 1.5m | 3 x 0.75 mm ² | loose wires |
| ASC-N30 | 804 571 | | 3.0m | | |
| ASC-N60 | 804 572 | | 6.0m | | |



DS2-N15 ASC 24V

Cable Assembly with 24V DC Chopper Plug

- Enables standard 24V AC Coil to be used for DC applications
- Low power assumption (3W only)
- No MOPD degradation

| Type | Part No. | Temperature Range | Cable length | Wire diameter | Connector Type |
|---------|----------------|-------------------|--------------|--------------------------|----------------|
| DS2-N15 | 804 620 | -25 .. +80°C | 1.5 m | 2 x 0.75 mm ² | loose wires |

Other Accessories for Solenoid Valves

| Type | Part No. | Description |
|-----------|----------------|--|
| X 11981-1 | 027 451 | Service tool for 110RB. 240RA. 540RA. 3031 |
| ASC3-K01 | 801 080 | Retainer kit (one cap + two O-rings) |
| PG9 Plug | 801 012 | Plug according to EN 175301 with cable gland PG 9 |
| PG11 Plug | 801 013 | Plug according to EN 175301 with cable gland PG 11 |

2-Way Solenoid Valves Series 110, 200, 240

Normally Closed

Features

- Compact size
- No disassembly necessary for soldering

Standards

- 240 RA 16T11 and 20 are CE marked per PED

Accessories:

- Actuation coil and cable assemblies available for various voltages, see 'Coils ASC3 and Cable Assemblies'



Capacity Data

| Type | Nominal Capacity Q _n (kW) | | | | | | | | | | Kv-value m ³ /h | Δp min bar |
|-----------|--------------------------------------|-------|---------------|-------|-------|-------|-------|---------|-------|-------|-------------------------------|---------------|
| | Liquid | | | | | | | | | | | |
| | R134a | R22 | R404A R507 | R407C | R407F | R450A | R513A | R1234ze | R448A | R449A | | |
| 110 RB 2 | 3.5 | 3.8 | 2.5 | 3.6 | 4.2 | 2.6 | 2.7 | 2.3 | 3.8 | 3.7 | 0.2 | 0.05 |
| 200 RB 3 | 6.6 | 7.1 | 4.6 | 6.8 | 7.9 | 4.8 | 5.0 | 4.3 | 7.1 | 6.9 | 0.4 | |
| 200 RB 4 | 15.5 | 16.8 | 10.9 | 16.1 | 18.8 | 11.5 | 11.7 | 10.2 | 16.8 | 16.4 | 0.9 | |
| 200 RB 6 | 27.3 | 29.5 | 18.9 | 28.0 | 33.0 | 20.1 | 20.6 | 17.8 | 29.4 | 28.7 | 1.6 | |
| 240 RA 8 | 36.3 | 39.3 | 25.2 | 37.3 | 43.9 | 26.8 | 27.4 | 23.8 | 39.2 | 38.3 | 2.3 | |
| 240 RA 9 | 76.2 | 82.5 | 52.9 | 78.4 | 92.2 | 56.3 | 57.6 | 49.9 | 82.3 | 80.4 | 4.8 | |
| 240 RA 12 | 85.7 | 92.8 | 59.5 | 88.1 | 103.7 | 63 | 65 | 56 | 93 | 90 | 5.4 | |
| 240 RA 16 | 139.1 | 150.5 | 96.5 | 142.9 | 168.2 | 103 | 105 | 91 | 150 | 147 | 8.8 | |
| 240 RA 20 | 202.6 | 219.3 | 140.7 | 208.3 | 245.2 | 150 | 153 | 133 | 219 | 214 | 12.8 | |

| Type | Nominal Capacity Q _n (kW) | | | | | | | | | | Kv-value m ³ /h | Δp min bar |
|-----------|--------------------------------------|-------|---------------|-------|-------|-------|---------|-------|-------|------|-------------------------------|---------------|
| | Hot Gas | | | | | | | | | | | |
| | R134a | R22 | R404A R507 | R407C | R450A | R513A | R1234ze | R448A | R449A | | | |
| 110 RB 2 | 1.6 | 2.0 | 1.7 | 2.1 | 1.4 | 1.5 | 1.3 | 2.0 | 2.0 | 0.2 | 0.05 | |
| 200 RB 3 | 3.0 | 3.7 | 3.2 | 3.9 | 2.9 | 3.0 | 2.6 | 4.0 | 4.0 | 0.4 | | |
| 200 RB 4 | 7.1 | 8.8 | 7.5 | 9.2 | 6.5 | 6.8 | 5.8 | 9.1 | 9.0 | 0.9 | | |
| 200 RB 6 | 12.5 | 15.4 | 13.1 | 16.1 | 11.6 | 12.1 | 10.4 | 16.2 | 15.9 | 1.6 | | |
| 240 RA 8 | 16.7 | 20.5 | 17.4 | 21.4 | 16.6 | 17.3 | 14.9 | 23.2 | 22.9 | 2.3 | | |
| 240 RA 9 | 35.1 | 43.1 | 36.5 | 44.9 | 34.7 | 36.2 | 31.1 | 48.5 | 47.8 | 4.8 | | |
| 240 RA 12 | 39.4 | 48.4 | 41.1 | 50.5 | 39.0 | 40.7 | 35.0 | 54.5 | 53.8 | 5.4 | | |
| 240 RA 16 | 64.0 | 78.5 | 66.6 | 81.9 | 63.5 | 66.3 | 57.0 | 88.9 | 87.6 | 8.8 | | |
| 240 RA 20 | 93.2 | 114.4 | 97.1 | 119.3 | 92.4 | 96.4 | 82.9 | 129.3 | 127.5 | 12.8 | | |

| Type | Nominal Capacity Q _n (kW) | | | | | | | | | | Kv-value m ³ /h | Δp min bar |
|-----------|--------------------------------------|------|---------------|-------|-------|-------|---------|-------|-------|------|-------------------------------|---------------|
| | Suction Gas | | | | | | | | | | | |
| | R134a | R22 | R404A R507 | R407C | R450A | R513A | R1234ze | R448A | R449A | | | |
| 240 RA 8 | 4.2 | 5.6 | 4.6 | 5.2 | 3.7 | 4.0 | 3.4 | 5.1 | 5.0 | 2.3 | 0.05 | |
| 240 RA 9 | 8.8 | 11.7 | 9.7 | 10.9 | 7.8 | 8.4 | 7.1 | 10.6 | 10.5 | 4.8 | | |
| 240 RA 12 | 9.9 | 13.1 | 10.9 | 12.3 | 8.8 | 9.4 | 8.0 | 11.9 | 11.8 | 5.4 | | |
| 240 RA 16 | 16.0 | 21.3 | 17.7 | 19.9 | 14.3 | 15.3 | 13.1 | 19.4 | 19.2 | 8.8 | | |
| 240 RA 20 | 33.0 | 31.0 | 25.7 | 29.0 | 20.8 | 22.3 | 19.0 | 28.3 | 27.9 | 12.8 | | |

Nominal capacities at +38°C condensing temperature, +4°C evaporating temperature, subcooling 1 K, superheat 0K. 0.15 bar pressure drop between valve inlet and outlet in liquid applications. 1 bar pressure drop for hot gas applications. +18 °C suction gas temperature. **Note:** See "Controls Navigator" for selection

Selection Guide

| Type | | Part No. | Connection Solder / ODF | |
|-----------|-------|----------|-------------------------|------|
| | | | mm | Inch |
| 110 RB 2 | T2 | 801 217 | 6 | |
| | T2 | 801 210 | | ¼ |
| | T3 | 801 209 | 10 | |
| 200 RB 3 | T3 | 801 239 | 10 | |
| 200 RB 4 | T3 | 801 176 | 10 | |
| | T3 | 801 190 | | ⅜ |
| | T4 | 801 178 | 12 | |
| | T4 | 801 179 | | ½ |
| 200 RB 6 | T4 | 801 182 | 12 | |
| | T4 | 801 183 | | ½ |
| | T5 | 801 186 | 16 | ⅝ |
| 240 RA 8 | T5 | 801 160 | | ⅝ |
| | T7 | 801 143 | 22 | ⅞ |
| 240 RA 9 | T5 | 801 161 | 16 | ⅝ |
| | T7 | 801 162 | 22 | ⅞ |
| | T9 | 801 142 | | 1-⅛ |
| 240 RA 12 | T7 | 801 163 | 22 | ⅞ |
| | T9 | 801 144 | | 1-⅛ |
| 240 RA 16 | T9 | 801 164 | | 1-⅛ |
| | T11 | 801 166 | 35 | 1-⅜ |
| 240 RA 20 | T11-M | 801 172 | 35 | 1-⅜ |
| | T13-M | 801 224 | 42 | |
| | T13-M | 801 173 | | 1-⅝ |
| | T17-M | 801 174 | 54 | 2-⅛ |

Special Versions:

- Manual stems standard on Series 240 RA 20.

Options:

- Actuation coils available for various voltages, see 'Coils ASC3 and Cable Assemblies'

2-Way Solenoid Valves Series 540

Normally Open

Features

- Compact size
- No disassembly necessary for soldering



540 RA

Accessories:

- Actuation coil and cable assemblies available for various voltages, see 'Coils ASC3 and Cable Assemblies'

Capacity Data

| Type | Nominal Capacity Q _n (kW) | | | | | | | | | | | | kv-value m ³ /h | Δp min bar |
|-----------|--------------------------------------|-------|---------------|-------|---------|-------|---------------|-------|-------------|------|------|-------|-------------------------------|---------------|
| | Liquid | | | | Hot Gas | | | | Suction Gas | | | | | |
| | R134a | R22 | R404A R507 | R407C | R134a | R22 | R404A R507 | R407C | R134a | R22 | R507 | R407C | | |
| 540 RA 8 | 36.3 | 39.3 | 25.2 | 37.3 | 16.7 | 20.5 | 17.4 | 21.4 | 4.2 | 5.6 | 4.6 | 5.2 | 2.3 | 0.05 |
| 540 RA 9 | 76.2 | 82.5 | 52.9 | 78.4 | 35.1 | 43.1 | 36.5 | 44.9 | 8.8 | 11.7 | 9.7 | 10.9 | 4.8 | 0.05 |
| 540 RA 12 | 85.7 | 92.8 | 59.5 | 88.1 | 39.4 | 48.4 | 41.1 | 50.5 | 9.9 | 13.1 | 10.9 | 12.3 | 5.4 | 0.05 |
| 540 RA 16 | 139.1 | 150.5 | 96.5 | 142.9 | 64.0 | 78.5 | 66.6 | 81.9 | 16.0 | 21.3 | 17.7 | 19.9 | 8.8 | 0.05 |
| 540 RA 20 | 202.6 | 219.3 | 140.7 | 208.3 | 93.2 | 114.4 | 97.1 | 119.3 | 23.3 | 31.0 | 25.7 | 29.0 | 12.8 | 0.05 |

Nominal capacities at +38°C condensing temperature, +4°C evaporating temperature, 0.15 bar pressure drop between valve inlet and outlet in liquid applications (for hot gas applications 1 bar pressure drop and +18 °C suction gas temperature); subcooling 1 K. Correction tables for other operating conditions see Correction Tables for 110 RB, 20 RB, 240 RA and 540 RA.

Note: See "Controls Navigator" for selection

Selection Guide

| Type | Part No. | Connection Solder / ODF | |
|-----------|----------|-------------------------|-------------|
| | | mm | Inch |
| 540 RA 8 | T5 | 046 265 | 5/8 |
| 540 RA 9 | T5 | 046 266 | 5/8 |
| | T7 | 046 268 | 22 7/8 |
| 540 RA 12 | T7 | 046 269 | 22 7/8 |
| 540 RA 16 | T9 | 046 270 | 1-1/8 |
| 540 RA 20 | T11 | 047 953 | 35 1-3/8 |

Options:

- Actuation coils available for various voltages, see 'Coils ASC3 and Cable Assemblies'

Accessories and spare parts for solenoid valves

Gasket kits

| Description | Type | Part No. |
|-------------|------------|----------------|
| 110RB | KS 30040-2 | 801 232 |
| 200RB | KS 30039-1 | 801 233 |
| 240RA8 | KS 30061-1 | 801 234 |
| 240RA9/12 | KS 30062-1 | 801 235 |
| 240RA16 | KS 30065-1 | 801 236 |
| 240RA20 | KS 30097-1 | 801 237 |

| Description | Type | Part No. |
|---|-------------|----------------|
| Service tool for 110 RB, 240 RA, 540 RA | X 11981 - 1 | 027 451 |

Repair Kits

| Description | Type | Part No. |
|-------------|-----------------------|----------------|
| 110RB | KS 30040-1 | 801 206 |
| 200RB | KS 30039/ KS 30109 | 801 205 |
| 240RA8 | KS 30061 | 801 262 |
| 240RA9 | KS 30062 | 801 263 |
| 240RA12 | KS 30063 | 801 264 |
| 240RA16 | KS 30065 | 801 200 |
| 240RA20 | KS 30097 | 801 216 |

2-Way Solenoid Valves Series 200 RH for high pressure applications

Normally Closed

Features

- Compact size
- Media Temperature Range -40 to +120 °C
- No disassembly necessary for soldering
- Extended copper tubes for easy installation
- No disassembly necessary for brazing
- IP 65 Solenoid coil and cable assembly
- One coil fits to all sizes and valve series
- PS: 60 bar

Accessories:

- Actuation coil and cable assemblies available for various voltages, see 'Coils ASC3 and Cable Assemblies'



Capacity Data

| Type | Nominal Capacity Q _n (kW) | | | |
|----------|--------------------------------------|------|---------|------|
| | Liquid | | Hot Gas | |
| | R410A | R744 | R410A | R744 |
| 200 RH 3 | 19.6 | 27.5 | 4.7 | 6.9 |
| 200 RH 4 | 34.4 | 48.3 | 10.5 | 15.5 |
| 200 RH 6 | 45.9 | 64.4 | 18.7 | 27.6 |

R410A: Nominal capacities at +38°C condensing temperature, +4°C evaporating temperature, subcooling 1 K
0.15 bar pressure drop between valve inlet and outlet in liquid applications.
1 bar pressure drop for hot gas applications

R744: Nominal capacities at +10°C condensing temperature, -10°C evaporating temperature, subcooling 1 K
0.15 bar pressure drop between valve inlet and outlet in liquid applications.
1 bar pressure drop for hot gas applications

Note: See "Controls Navigator" for selection

Selection Guide

| Type | Part No. | Connection Solder / ODF | |
|----------|------------|-------------------------|------|
| | | mm | inch |
| 200 RH 3 | T3 802 070 | 10 mm | 3/8" |
| 200 RH 4 | T3 802 071 | 10 mm | |
| | T3 802 072 | | 3/8" |
| | T4 802 073 | 12 mm | |
| | T4 802 074 | | 1/2" |
| 200 RH 6 | T4 802 075 | 12 mm | |
| | T4 802 076 | | 1/2" |
| | T5 802 077 | 16 mm | 5/8" |

Options:

- Actuation coils available for various voltages, see '2-Way Solenoid Valves coils ASC3'

3-Way Solenoid Valves Series M36

Features

- For heat reclaim application
- Pilot connection to suction line required. no minimum pressure drop
- Compact size
- No disassembly necessary for brazing
- Max. allowable pressure PS: 35 bar

Accessories:

- Actuation coil and cable assemblies available for various voltages, see 'Coils ASC3 and Cable Assemblies'



M36-118



M36-078 with ASC3 Coil
and DS2 Chopper Plug

Capacity Data

| Type | Part No. | Connection Solder/ODF | | Nominal Capacity Q_n (kW) | | | | kv-Value m ³ /h | Coil Type |
|---------|----------|-----------------------|-----------------|-----------------------------|------|--------------|-------|-------------------------------|-----------|
| | | mm | inch | R134a | R22 | R404A / R507 | R407C | | |
| M36-078 | 801 420 | 22 | $\frac{7}{8}$ | 28.9 | 35.1 | 31.3 | 38.5 | 6.7 | ASC3 |
| M36-118 | 801 421 | | $1-\frac{1}{8}$ | | | | | | |

Nominal capacities at +38°C condensing temperature. +4°C evaporating temperature (saturated pressures / dew point). 0.15 bar pressure drop between valve inlet and outlet.

Basic Terms and Technical Information

Capacity Regulators

Regulator series ACP and CPHE are hot gas bypass regulators and serve the purpose of compensating excess compressor capacity. Thus they prevent the generation of evaporator pressures below predetermined levels.

In case of hot gas injection into the suction line, a liquid injection valve in conjunction with a solenoid valve is required to desuperheat the excessively hot suction gas. The capacity should not be reduced below 60% of maximum in this application to avoid oil return problems.

With hot gas injection at the evaporator inlet, no liquid injection valve is necessary. The injection must be such that the incremental gas volume is taken into account. No problems with oil return should be expected even when regulating 100% of capacity.

Evaporator Pressure Regulators

Series PRE regulators serve the purpose of maintaining evaporator pressure above certain predetermined levels. The most important application is the use of several evaporators with different evaporating temperatures in conjunction with a common suction line.

The freezing of water in water chillers and air conditioning systems can be safely prevented if evaporating temperatures are kept above 0°C, even when loads are greatly reduced.

Crankcase Pressure Regulators

Series PRC regulators serve the purpose of preventing excessively high suction pressures to protect compressor motors from overloading.

Excessively high suction pressures can occur at start-up of a refrigeration circuit in case of high loads and after defrost. Crankcase regulators are adjusted to the maximum allowed suction pressure rating of the compressors as given by the compressor manufacturers.

Selection Guide for Pressure Regulators

| Selection Criteria | Series | | | |
|-------------------------------|--------|------|-----|-----|
| | ACP | CPHE | PRE | PRC |
| Capacity Regulator | + | + | | |
| Evaporator Pressure Regulator | | | + | |
| Crankcase Pressure Regulator | | | | + |

Hot Gas Bypass Regulators Series ACP

Features

- High-quality materials and processes for high reliability and long lifetime
- Internal equalization
- Compact size

Technical Data

| | |
|-----------------------------|-----------------|
| Adjustment Range | 0 ... 5 bar |
| Factory Setting | 2.7 bar |
| Max. allowable Pressure PS | 31 bar |
| Medium Temperature Range TS | -40°C ... 120°C |
| Ambient Temperature Range | -40 ... 50°C |
| Transport Temperature Range | -40 ... 70°C |



ACP

Capacity Data

| Type | Nominal Bypass Capacity Q_n kW | | | | | | | | | Orifice | Standard Flange Solder/ODF | | Power Assembly |
|-------------|-------------------------------------|-----|-------|-----------------|-------|-------|---------|-------|-------|-------------|---------------------------------------|---|-------------------|
| | R134a | R22 | R407C | R404A / R507 | R450A | R513A | R1234ze | R448A | R449A | | mm | inch | |
| CPHE - 1X | 3.5 | 5 | 5.8 | 4.5 | 3.4 | 2.6 | 5.9 | 5.8 | 3.1 | X 22440-B5B | C 501 - 7 mm 12 x 16 | C 501 - 7 ½ x ¾ | X7818 - 1 |
| CPHE - 2X | 6.4 | 9 | 10.4 | 8.1 | 6.2 | 4.8 | 10.6 | 10.5 | 5.6 | X 22440-B8B | A 576 mm 16 x 22 (22 x 280 ODM) | A 576 ¾ x 7/8 (7/8 x 1-1/8 ODM) | |
| CPHE - 3X | 12 | 17 | 20 | 15 | 12 | 9 | 20 | 20 | 10 | X 11873-B5B | 10331 22 x 22 | 10331 7/8 x 7/8 (1-1/8 x 1-1/8 ODM) | |
| CPHE - 3.5X | 13 | 19 | 22 | 17 | 13 | 10 | 22 | 22 | 12 | X 9117-B7B | 9153 mm 22 x 22 | 9153 7/8 x 7/8 | |
| CPHE - 4X | 16 | 23 | 27 | 21 | 16 | 12 | 27 | 26 | 14 | X 9117-B9B | | | |
| CPHE - 5X | 21 | 29 | 34 | 26 | 20 | 15 | 35 | 34 | 18 | X 9166-B10B | | | |
| CPHE - 6X | 35 | 50 | 58 | 45 | 34 | 26 | 59 | 58 | 31 | X 9144-B13B | 9149 22 x 22 | 9149 7/8 x 7/8 | |

Capacity Data

| Type | Part No. | Connection. Angle Solder/ODF inch | Nominal Bypass Capacity* Q_n | | | |
|-------|----------------|---|--------------------------------|------|-------|--------------|
| | | | R134a | R22 | R407C | R404A / R507 |
| ACP 1 | 047 680 | 1/4 x 3/8" | 0.21 | 0.35 | 0.41 | 0.30 |
| ACP 3 | 047 283 | 1/4 x 3/8" | 0.50 | 0.77 | 0.89 | 0.68 |
| ACP 5 | 053 374 | 3/8 x 3/8" | 1.18 | 1.83 | 2.12 | 1.59 |

* Nominal capacities at +38°C condensing temperature, +4°C evaporating temperature (saturated temperatures / dew point) and 1 K liquid subcooling at the inlet of the expansion valve.

Hot Gas Bypass Regulators Series CPHE

Features

- High-quality materials and processes for high reliability and long lifetime
- Superior partial load performance due to double seat orifice design (CPHE3 to CPHE6)
- Modular design for economical logistics and easy assembly and servicing
- External equalization

Specific connection sizes and flanges available on request. For selection see last page of “Thermo-Expansion Valves” chapter.

Technical Data

| | |
|-----------------------------|-----------------|
| Adjustment Range | -0.4 ... 5 bar |
| Factory Setting | 1.4 bar |
| Max. allowable Pressure PS | 35 bar |
| Medium Temperature Range TS | -40°C ... 120°C |
| Ambient Temperature Range | -40 ... 50°C |
| Transport Temperature Range | -40 ... 70°C |



Capacity Data CPHE

| Type | Nominal Bypass Capacity Q _n kW | | | | | | | | | Orifice | Standard Flange Solder/ODF | | Power Assembly |
|-------------|--|-----|-------|-----------------|-------|-------|---------|-------|-------|-------------|---------------------------------------|-----------------------------------|-------------------|
| | R134a | R22 | R407C | R404A / R507 | R450A | R513A | R1234ze | R448A | R449A | | mm | inch | |
| CPHE - 1X | 3.5 | 5 | 5.8 | 4.5 | 3.4 | 2.6 | 5.9 | 5.8 | 3.1 | X 22440-B5B | C 501 - 7 mm 12 x 16 | C 501 - 7 ½ x ¾ | X7818-1 |
| CPHE - 2X | 6.4 | 9 | 10.4 | 8.1 | 6.2 | 4.8 | 10.6 | 10.5 | 5.6 | X 22440-B8B | A 576 mm 16 x 22 (22 x 280 ODM) | A 576 ¾ x ¾ (¾ x 1-½ ODM) | |
| CPHE - 3X | 12 | 17 | 20 | 15 | 12 | 9 | 20 | 20 | 10 | X 11873-B5B | 10331 22 x 22 | 10331 ¾ x ¾ (1-½ x 1-½ ODM) | |
| CPHE - 3.5X | 13 | 19 | 22 | 17 | 13 | 10 | 22 | 22 | 12 | X 9117-B7B | 9153 mm 22 x 22 | 9153 ¾ x ¾ | |
| CPHE - 4X | 16 | 23 | 27 | 21 | 16 | 12 | 27 | 26 | 14 | X 9117-B9B | | | |
| CPHE - 5X | 21 | 29 | 34 | 26 | 20 | 15 | 35 | 34 | 18 | X 9166-B10B | | | |
| CPHE - 6X | 35 | 50 | 58 | 45 | 34 | 26 | 59 | 58 | 31 | X 9144-B13B | 9149 22 x 22 | 9149 ¾ x ¾ | |

Nominal capacities at +38°C condensing temperature, +4°C evaporating temperature (saturated temperatures / dew point) and 1 K liquid subcooling at the inlet of the expansion valve.

Specific connection sizes and flanges available on request. For selection, see last page of “Thermo-Expansion Valves” chapter.

Note: See “Controls Navigator” for selection

Evaporator and Crankcase Pressure Regulator Series PRE and PRC

Features

- Compact design permits minimal space requirements
- Schrader valve on inlet for ease of setting
- Direct operated regulator
- Balanced port design provides accurate pressure control
- Copper tubes for easy soldering



Technical Data

| | |
|---|---|
| Refrigerants | HFC, HCFC |
| Oil compatibility | Mineral, Alkyl Benzene and Polyol-Ester (POE) lubricants |
| Max. allowable pressure PS Max. test pressure PT | 25 bar 30 bar |
| Material, housing | CW509L (EN12420) |
| Temperature range | Storage -30°C to 80°C Medium TS -30°C to 80°C Ambient -30°C to 80°C |

| | |
|---|-------------------------|
| Pressure change per turn: Valve size 1 Valve size 2 | 0.6 bar 0.4 bar |
| Pressure range Factory setting | 0.5 to 6.9 bar 2 bar |
| Weight: PRC/PRE-1.. PRC/PRE-2.. | 0.6 kg 1.3 kg |

Evaporator Pressure Regulator Series PRE

Selection

| Type | Part No. | Tube Connection ODF | Nominal Capacity* Q _n (kW) | | | |
|-----------|----------------|-------------------------|---------------------------------------|--------------|-------|------|
| | | | R134a | R404A / R507 | R407C | R22 |
| PRE - 11A | 800 380 | 16 mm - $\frac{5}{8}$ " | 3.0 | 4.5 | 4.5 | 4.8 |
| PRE - 11B | 800 381 | 22 mm - $\frac{7}{8}$ " | | | | |
| PRE - 21C | 800 382 | 28 mm | 7.4 | 11.1 | 11.1 | 11.9 |
| PRE - 21D | 800 383 | 1 - $\frac{1}{8}$ " | | | | |

*Nominal capacities are based on evaporating Temperature +4°C, condensing temperature +38°C and a pressure drop of 1K.

Crankcase Pressure Regulator Series PRC

Selection

| Type | Part No. | Tube Connection ODF | Nominal Capacity* Q _n (kW) | | | |
|-----------|----------------|------------------------|---------------------------------------|--------------|-------|------|
| | | | R134a | R404A / R507 | R407C | R22 |
| PRC - 11A | 800 384 | 16 mm - 5/8" | 3.0 | 4.5 | 4.5 | 4.8 |
| PRC - 11B | 800 385 | 22 mm - 7/8" | | | | |
| PRC - 21C | 800 386 | 28 mm | 7.4 | 11.1 | 11.1 | 11.9 |
| PRC - 21D | 800 387 | 1 - 1/8" | | | | |
| PRC - 21E | 800 388 | 35 mm - 1-3/8" | | | | |

*Nominal capacities are based on evaporating temperature +4°C and condensing temperature +38°C and a pressure drop of 1 K.

Capacity Table

Selection for operating conditions other than +38°C / +4°C and 1 K liquid subcooling at the inlet of the valve: (capacities are based on a pressure drop of 0.07 bar).

| Refrigerant | Evaporating Temperature °C | Capacity (kW) Valve setting °C | | | | | | | | | | | | | |
|-----------------|----------------------------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----------------------|-----|------|------|------|------|------|
| | | Valve Size 1: PRC-11x | | | | | | | Valve Size 2: PRC-21x | | | | | | |
| | | -20 | -15 | -10 | -5 | 0 | +5 | +10 | -20 | -15 | -10 | -5 | 0 | +5 | +10 |
| R22 | -29 | 2.3 | 3.4 | 4.4 | 4.8 | 4.9 | | | 5.8 | 8.8 | 10.0 | 10.0 | 10.0 | | |
| | -21 | | 2.4 | 4.1 | 5.4 | 5.8 | | | | 6.5 | 12.1 | 12.1 | 12.1 | | |
| | -14 | | | 2.7 | 4.9 | 6.2 | | | | | 8.1 | 13.8 | 13.8 | | |
| | -8 | | | | 3.5 | 5.3 | | | | | | 9.0 | 15.4 | | |
| | -3 | | | | | 3.1 | | | | | | | 9.9 | | |
| R407 C | -6 | | | | 3.1 | 4.8 | | | | | | 7.9 | 13.9 | | |
| | -1 | | | | | 2.9 | | | | | | | 9.2 | | |
| R134 a | -6 | | | | | 2.1 | 3.9 | 5.3 | | | | | 5.2 | 10.3 | 12.9 |
| | 1 | | | | | | 2.4 | 4.7 | | | | | | 6.1 | 12.2 |
| | 7 | | | | | | | 3.3 | | | | | | | 8.1 |
| R404A / R507 | -27 | 1.6 | 2.9 | 3.7 | 3.9 | | | | 4.8 | 8.2 | 8.2 | 8.2 | | | |
| | -20 | | 1.9 | 3.5 | 4.5 | | | | | 5.7 | 9.8 | 9.8 | | | |
| | -14 | | | 2.2 | 4.5 | | | | | | 6.8 | 11.6 | | | |
| | -10 | | | | 3.1 | | | | | | | 8.1 | | | |

Pressure Controls and Thermostats

Pressure Controls

Basic Terms and Technical Information

Characteristics

Pressure controls serve various functions, which may be divided into control and protection functions. Examples for control functions are compressor cycling, pump-down or defrost control. Protection functions include pressure limiting and cut-out against excessive pressures, against loss of charge or for freeze protection. These functions are performed by operating a set of electrical contacts when exceeding a preset lower or upper pressure limit. Depending on whether they are type tested (TÜV approved) or not, they may be referred to by the following terms:

| | |
|-----------------------|---|
| without TÜV approval: | Pressure Control |
| with TÜV approval: | Pressure Limiter, Pressure Cut-Out or Safety Pressure Cut-Out |

Pressure controls with TÜV approval are tested according to EN 12263 as required by DIN 8901 and EN 378.

1. Pressure controls (without TÜV approval)

Pressure controls without type approval may either be of the automatic or manual reset type. Manual reset versions are available for decreasing (manual reset min.) or increasing pressure (manual reset max.).

2. Pressure limiters PSL/PSH

Pressure limiters are of the automatic reset type. Limiters for high pressure applications have a double bellows design to act as fail-safe controls.

3. Pressure cut-outs PZH/PZL

Pressure cut-outs are of the manual reset type where reset is possible from the outside of the control without the need for a tool (external reset). Cut-outs for high pressure applications have a double bellows design to act as fail-safe controls.

4. Safety pressure cut-outs PZHH/PZLL

Pressure cut-outs are of the manual reset type where the reset requires the use of a tool. Typically, the removal of a cover is required in order to press the reset button (internal reset). Cut-outs for high pressure applications have a double bellows design to act as fail-safe controls.

Adjustment of switching points

A pressure gauge should always be used for comparison when adjusting the switching points on pressure controls. The setting scale on the device is intended to serve for orientation, showing the setting range of the upper switching point p_{max} in bar/psig and the value of the pressure differential Δp as difference between upper switching point p_{max} and the lower switching point p_{min} . The upper switching point p_{max} has to be adjusted on the scale, whereas the lower switching point p_{min} is given by adjustment of the desired switching differential Δp .

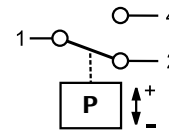
The formula is:

$$\text{Upper switching point} - \text{Differential} = \text{Lower switching point}$$

$$P_{max} - \Delta p = P_{min}$$

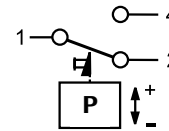
Function of contacts SPDT

On pressure rise above setting 1-2 opens and 1-4 closes. On pressure drop below setting 1-2 closes and 1-4 opens.



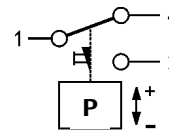
SPDT with manual reset max.

On pressure rise above setting 1-2 opens and 1-4 closes and latches. The device can be manually reset when the pressure has dropped below setting.



SPDT with manual reset min.

On pressure drop below setting 1-2 closes, 1-4 opens and latches. The device can be manually reset when the pressure has risen above setting.



Unit of pressure

All pressures are given in gauge pressure

$$P_{absolute} = P_{gauge} + 1 \text{ bar}$$

$$1 \text{ bar} = 100 \text{ kPa}$$

$$1 \text{ bar} = 14.5 \text{ psi}$$

Pulsation damping

All high pressure controls with connection ($7/16$ -20UNF. $1/4$ " SAE male) are equipped with a snubber to protect the pressure element from pulsations.

Standards and Regulations

| | |
|-----------------------------|---|
| BGV D4 (VBG20) | Accident prevention regulations for refrigeration plant. |
| DIN 8901 | Heat pumps with fluorocarbon refrigerants. Protection of soil, underground and surface water. |
| EN 60947-1/ EN 60947-5-1 | Specifications for low-voltage switchgear. |
| EN 378 | Refrigerating systems and heat pumps - Safety and environmental requirements. |
| EN 12263: | Refrigerating systems and heat pumps - Safety switching devices for limiting the pressure requirements and tests. |

Selection Guide for Pressure Controls

| Series | Selection Criteria | | | | | |
|--|--------------------------------|---------------------------|---|----------------------------------|---------------------------------------|-----------------|
| | Design | Number of Contacts (SPDT) | Adjustable | Protection DIN 40050 IEC 529 | Rated Operational Current at 230 V AC | |
| | | | | | Inductive Amp. AC 15 | Motor Rating UL |
| PS1 | Standard Model | 1 | yes | IP 44 | 10 A | 24 A |
| PS2 | Dual Pressure Switch | 1+1 | yes | IP 44 | 10 A | 24 A |
| PS3 and CS3 (for CO ₂ applications) | Pressure Switch Standard-Types | 1 | Factory set to fixed values | IP 30 / IP 65 | 3 A | 6 A |
| | Pressure Switch OEM-Types | 1 | Fixed values acc. to customer spec. depending on volume | IP 30 / IP 65 | 3 A | 6 A |
| PS4 | Pressure Switch OEM-Types | 1 | no | IP67 (cable) IP20 (terminals) | 6 A | 6 A |
| FD 113 | Differential Pressure Switch | 1 | yes pressure diff. + time delay | IP 30 | 3 A / 6 A | - |

Pressure Controls Series PS1 / PS2

Features

- Adjustable pressure setpoint
- Automatic and manual reset versions
- Flare and solder pressure connections
- Chatter-resistant (bounce-free) contacts
- High operational current, locked rotor max. 144 Amps (LRA)
- Standard SPDT with same operational current rating for both contacts
- Dual pressostat with two separate SPDT for high and low pressure side
- Including sealable blocking plate and mounting screws





Options (minimum lot size 100 pieces)

- Convertible reset to reduce stock
- Further pressure connections
- Factory set to customer specification

Technical Data PS1 / PS2

| | |
|---|---|
| Type of Contacts | 1 SPDT for PS1 2 separate SPDT for PS2 |
| Inductive Amp. (AC15) Inductive Amp. (DC13) | 10 A / 230V AC 0.1 A / 230V DC |
| Motor Rating, Full Load Amp. Motor Rating, Locked Rotor Amp. | 24 A / 120/240V AC 144 A / 120/240V AC |
| Medium compatibility | HFC, HCFC, HFO/HFO Blends |

Standards

-  per Low Voltage Directive
-  per PED Directive 97/23 EG. TÜV appr. versions only
- Manufactured and tested to  standards on our own responsibility
-  US LISTED Underwriter Laboratories (File Nr. E85974)
- German Lloyd for use on ships, when equipped with marine-type cable gland



| | |
|--|-------------------------|
| Protection acc. EN 60529 / IEC 529 | IP 44 |
| Ambient Temperature Range Max. Temperature at Pressure Connection | -50°C .. +70°C +70°C |
| Vibration Resistance (10 to 1000 Hz) | 4 g |
| Cable Entry | Grommet PG 16 |
| Locking Device | Blocking Plate |
| Mounting Screws | M4 / UNC 8-32 |

Single Pressure Controls PS1

| Type | Part No. | Adjustment Range | | Lowest Setpoint bar | Factory Setting bar | Leakage Test Pressure bar | Pressure Connection |
|-------------------------------|-----------|--------------------|---|---------------------|---------------------|---------------------------|---------------------|
| | | Upper Setpoint bar | Differential bar | | | | |
| Low Pressure Controls | | | | | | | |
| PS1-A3A | 4 370 700 | -0.5 ... 7 | 0.5 ... 5 | -0.9 | 3.5 / 4.5 | 24 | 7/16"-20 UNF |
| PS1-A3K | 4 370 600 | | | | | | capillary/nut |
| PS1-A3L | 4 714 945 | | | | | | cap./solder |
| PS1-A3U | 4 712 201 | | | | | | solder 6 mm |
| PS1-A3X | 4 713 430 | | | | | | solder 1/4" |
| PS1-R3A | 4 350 100 | -0.5 ... 7 | external reset approx. 1 bar above setpoint | -0.9 | 3.5 | 24 | 7/16"-20 UNF |
| PS1-R3K | 4 713 431 | | | | | | capillary nut |
| High Pressure Controls | | | | | | | |
| PS1-A5A | 4 350 500 | 6 ... 31 | 2 ... 15 | 3 | 16 / 20 | 35 | 7/16"-20 UNF |
| PS1-A5K | 4 370 400 | | | | | | capillary nut |
| PS1-A5L | 4 715 136 | | | | | | cap./solder |
| PS1-A5U | 4 713 325 | | | | | | solder 6 mm |
| PS1-A5X | 4 713 434 | | | | | | solder 1/4" |
| PS1-R5A | 4 350 700 | 6 ... 31 | ext. manual reset approx. 3 bar below setpoint | - | 20 | 35 | 7/16"-20 UNF |
| PS1-R5K | 4 370 300 | | | | | | capillary nut |

Single Pressure Controls Series PS1 TÜV / EN 12263

| Type | Part No. | Adjustment Range | | Lowest Setpoint bar | Factory Setting bar | Leakage Test Pressure bar | Pressure Connection |
|--|-----------|--------------------|---|---------------------|---------------------|---------------------------|---------------------|
| | | Upper Setpoint bar | Differential bar | | | | |
| Pressure Limiter for Low Pressure Protection PSL - Automatic Reset | | | | | | | |
| PS1-W3A | 4 368 300 | -0.5 ... 7 | 0.5 ... 5 | -0.9 | 3.5 / 4.5 | 24 | 7/16"-20 UNF |
| PS1-W3U | 4 713 437 | | | | | | solder 6 mm |
| Pressure Cut Out for Low Pressure Protection PZL - External Reset | | | | | | | |
| PS1-B3A | 4 470 400 | -0.5 ... 7 | external reset approx. 1 bar above setpoint | -0.9 | 3.5 | 24 | 7/16"-20 UNF |
| PS1-B3U | 4 715 141 | | | | | | solder 6 mm |
| Pressure Limiter for High Pressure Protection PSH - Automatic Reset | | | | | | | |
| PS1-W5A | 4 353 200 | 6 ... 31 | 2 ... 15 | 3 | 16 / 20 | 35 | 7/16"-20 UNF |
| PS1-W5K | 4 359 100 | | | | | | capillary/nut |
| PS1-W5U | 4 713 439 | | | | | | solder 6 mm |
| Pressure Cut Out for High Pressure Protection PZH - External Manual Reset | | | | | | | |
| PS1-B5A | 4 353 300 | 6 ... 31 | external reset approx. 3 bar below setpoint | - | 20 | 35 | 7/16"-20 UNF |
| PS1-B5U | 4 712 332 | | | | | | solder 6 mm |
| Safety Pressure Cut Out for High Pressure Protection PZHH - Internal Manual Reset | | | | | | | |
| PS1-S5A | 4 368 400 | 6 ... 31 | internal reset approx. 3 bar below setpoint | - | 21 | 35 | 7/16"-20 UNF |
| PS1-S5U | 4 711 591 | | | | | | solder 6 mm |

Dual Pressure Controls Series PS2



PS2

| Type | Part No. | Adjustment Range | | | | Factory Setting | | Leakage Test Pressure | | Pressure Connection |
|--|-----------|------------------|-----------|---|---|-----------------|-----------|-----------------------|-----------|---------------------|
| | | Upper Setpoint | | Differential | | | | left bar | right bar | |
| | | left bar | right bar | left bar | right bar | left bar | right bar | | | |
| Combined Low and High Pressure Controls | | | | | | | | | | |
| PS2-A7A | 4 353 400 | -0.5 ... 7 | 6 ... 31 | 0.5 ^a ... 5 | ca. 4 fix | 3.5 / 4.5 | 20 | 24 | 35 | 7/16"-20 UNF |
| PS2-A7K | 4 350 900 | | | | | | | | | capillary/nut |
| PS2-A7L | 4 713 565 | | | | | | | | | cap./solder |
| PS2-A7U | 4 713 415 | | | | | | | | | solder 6 mm |
| PS2-A7X | 4 713 416 | | | | | | | | | solder 1/4" |
| PS2-L7A | 4 351 100 | -0.5 ... 7 | 6 ... 31 | 0.5 ^a ... 5 | external reset approx. 4 bar under setpoint | 3.5 / 4.5 | 20 | 24 | 35 | 7/16"-20 UNF |
| PS2-L7K | 4 370 500 | | | | | | | | | capillary/nut |
| PS2-L7U | 4 713 417 | | | | | | | | | solder 6 mm |
| PS2-R7A | 4 351 300 | -0.5 ... 7 | 6 ... 31 | external reset approx. 1 bar above setpoint | external reset approx. 4 bar below setpoint | 3.5 | 20 | 24 | 35 | 7/16"-20 UNF |
| PS2-R7K | 4 713 421 | | | | | | | | | capillary/nut |
| PS2-R7U | 4 713 419 | | | | | | | | | solder 6 mm |

| Combined Low and High Pressure Controls. High Side Convertible From Automatic to Manual Reset | | | | | | | | | | |
|--|-----------|------------|----------|------------|---|-----------|----|----|----|--------------|
| PS2-M7A | 4 361 300 | -0.5 ... 7 | 6 ... 31 | 0.5a ... 5 | - | 3.5 / 4.5 | 21 | 24 | 35 | 7/16"-20 UNF |

Dual Pressure Controls Series PS2 TÜV / EN 12263

| Combined Pressure Limiter for Low Pressure / High Pressure Protection PSL / PSH - automatic / automatic | | | | | | | | | | |
|--|-----------|------------|----------|------------------------|-----------|-----------|----|----|----|--------------|
| PS2-W7A | 4 360 100 | -0.5 ... 7 | 6 ... 31 | 0.5 ^a ... 5 | ca. 4 fix | 3.5 / 4.5 | 20 | 24 | 35 | 7/16"-20 UNF |
| PS2-W7L | 4 450 300 | | | | | | | | | cap./solder |
| PS2-W7U | 4 712 436 | | | | | | | | | solder 6 mm |

| Combined Pressure Limiter / Pressure Cut-Out for Low Pressure / High Pressure Protection PSL / PZH - automatic / external manual reset | | | | | | | | | | |
|---|-----------|------------|----------|------------------------|---|-----------|----|----|----|--------------|
| PS2-C7A | 4 353 500 | -0.5 ... 7 | 6 ... 31 | 0.5 ^a ... 5 | external reset approx. 4 bar below setpoint | 3.5 / 4.5 | 20 | 24 | 35 | 7/16"-20 UNF |
| PS2-C7L | 4 715 131 | | | | | | | | | cap./solder |

| Combined Pressure Limiter Safety Pressure Cut Out for low pressure / high pressure protection EN 12263 PSL / PZH (automatic / automatic convertible to external manual reset) | | | | | | | | | | |
|--|-----------|------------|----------|------------|---|-----------|----|----|----|--------------|
| PS2-N7A | 4 715 756 | -0.5 ... 7 | 6 ... 31 | 0.5a ... 5 | - | 3.5 / 4.5 | 21 | 24 | 35 | 7/16"-20 UNF |

^a) lowest possible setpoint: -0.9 bar

Dual Pressure Controls PS2 TÜV / EN 12263

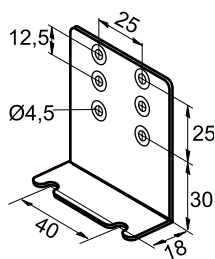
| Type | Part No. | Adjustment Range | | | | Factory Setting | | Leakage Test Pressure | | Pressure Connection |
|--|-----------|------------------|-----------|-------------------------|--|-----------------|-----------|-----------------------|-----------|---------------------|
| | | Upper Setpoint | | Differential | | | | left bar | right bar | |
| | | left bar | right bar | left bar | right bar | left bar | right bar | | | |
| Combined Pressure Limiter / Safety Pressure Cut-Out for Low Pressure / High Pressure Protection PSL / PZHH - automatic / internal manual reset | | | | | | | | | | |
| PS2-T7A | 4 368 500 | -0.5 ... 7 | 6 ... 31 | 0.5 ^{a)} ... 5 | internal reset approx. 4 bar below setpoint | 3.5 / 4.5 | 21 | 24 | 35 | 7/16"-20 UNF |
| PS2-T7U | 4 713 424 | | | | | | | | | solder 6 mm |

| | | | | | | | | | | |
|---|-----------|------------|----------|--|--|-----|----|----|----|---------------|
| Combined Pressure Cut-Out for Low Pressure / High Pressure Protection PZL / PZH external manual reset / external manual reset | | | | | | | | | | |
| PS2-B7A | 4 360 200 | -0.5 ... 7 | 6 ... 31 | external reset approx. 1 bar above setpoint | external reset approx. 4 bar below setpoint | 3.5 | 20 | 24 | 35 | 7/16"-20 UNF |
| PS2-B7K | 4 446 600 | | | | | | | | | capillary/nut |
| PS2-B7L | 4 446 700 | | | | | | | | | cap./solder |
| PS2-B7U | 4 449 400 | | | | | | | | | solder 6 mm |

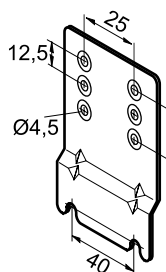
| | | | | | | | | | | |
|---|-----------|----------|----------|--|--|----|----|----|----|--------------|
| Combined Pressure Cut-Out / Safety Pressure Cut-Out for High Pressure Protection PZH / PZHH external manual reset / internal manual reset | | | | | | | | | | |
| PS2-G8A | 4 368 600 | 6 ... 31 | 6 ... 31 | external reset approx. 4 bar below setpoint | internal reset approx. 4 bar below setpoint | 20 | 21 | 35 | 35 | 7/16"-20 UNF |
| PS2-G8U | 4 713 427 | | | | | | | | | solder 6 mm |
| PS2-G8X | 4 713 428 | | | | | | | | | solder 1/4" |

^{a)} lowest possible setpoint: -0.9 bar

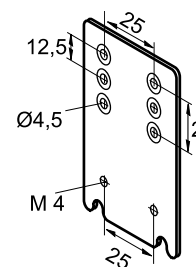
Accessories



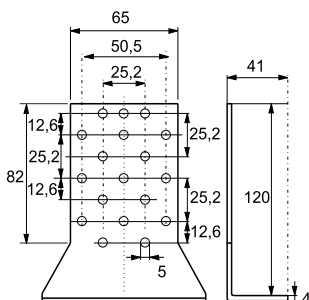
Mounting bracket angle
Part No.: 803 799



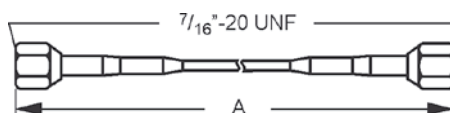
Mounting plate for units with hood
Part No.: 803 801



Extension bracket
Part No.: 803 800



Universal mounting bracket
Part No.: 803 798



Capillary Tube with two flare nuts 7/16"-20 UNF. R 1/4"
1.5m
Part No.: 803 804

Copper Gasket Set for R 1/4"
(7/16"-20 UNF. female)
100 pcs package
Part No.: 803 780

Pressure Controls Series PS3 / Standard types

Compact Pressure Switch with fixed switch-point settings





Features

- Maximum allowable pressure up to 45 bar / test pressure up to 50 bar
- High and low pressure switches
- High temperature version with snubber for direct compressor mounting (range 6)
- Direct mounting reduces the number of joints and thus avoiding potential leakage
- Precise setting and repeatability
- IP 65 protection if used with PS3-Nxx cables with plug (acc. EN 175301-803), no additional gasket required (molded into plug)
- Cables with plug to be ordered separately



PS3

Standards

-  per Low Voltage Directive
-  per PED Directive 97/23 EG, TÜV appr. versions only
- Manufactured and tested to  standards on our own responsibility
-  Underwriter Laboratories (File No. E85974) (Released for 43 bar)

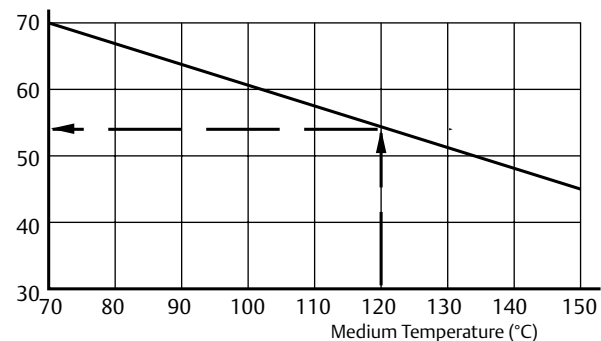
Technical Data

| | |
|--|---|
| Protection according to EN 60529 / IEC 529 | IP 00 IP 30 with terminal cover IP 65 with PS3-Nxx cables with plug or Plug DIN 43650 |
| Inductive Amp. (AC) | 3A / 230V AC |
| Inductive Amp. (DC) | 0.1A / 230V DC |
| Motor rating. full load Amp. | 6A / 120/240V AC |
| Motor rating. locked rotor Amp. | 36A / 120/240V AC |

| | |
|--|--|
| Temperature range TS * ambient. storage and transportation medium | -40 °C .. 70 °C -40 °C .. 70 °C (150°C range 6) |
| Pressure Range PS | - 0.6 .. 43 bar |
| Vibration resistance (10..950 Hz) | 4 g |
| Type of contacts | 1 SPDT |
| Medium compatibility | HFC, HCFC, HFO/HFO Blends |

*Note: For high temperature applications, i. e., medium temperatures between 70 °C and 150 °C, the maximum ambient temperature must be derated as per drawing. E.g.: on medium temperature 120 °C the ambient temperature of 55 °C around the switch housing should not be exceeded.

Maximum Ambient Temperature (°C)



Pressure Controls Series PS3 / Standard types

| Pressure Control Type | Part No. | Fixed setting | | Reset | Max. Temperature | | Leakage Test Pressure bar | Pressure Connection |
|---|-----------|---------------|-----------------------------|-----------------------|------------------|------------------------|---------------------------|--|
| | | Cut-out bar | Cut-in bar | | Ambient °C | Pressure Connection °C | | |
| High Pressure Controls | | | | | | | | |
| PS3-A6S | 0 715 603 | 16.0 | 11.0 | auto | +70 | +150 | 50 | 7/16"-20UNF female thread with Schrader opener |
| PS3-A6S | 0 715 604 | 19.0 | 15.0 | | | | | |
| PS3-A6S | 0 715 600 | 26.5 | 22.5 | | | | | |
| Low Pressure Controls / Pressure Limiter for low pressure protection PSL TÜV / EN 12263 | | | | | | | | |
| PS3-W1S | 0 714 760 | -0.3 | 1.2 | auto | +70 | +70 | 30 | 7/16"-20UNF female thread with Schrader opener |
| PS3-W1S | 0 714 761 | 0.3 | 1.8 | | | | | |
| PS3-W1S | 0 714 762 | 2.0 | 3.5 | | | | | |
| Pressure Limiter for high pressure protection PSH TÜV / EN 12263 | | | | | | | | |
| PS3-W6S | 0 715 831 | 14.0 | 10.0 | auto | +70 | +150 | 50 | 7/16"-20UNF female thread with Schrader opener and snubber |
| PS3-W6S | 0 715 556 | 21.0 | 16.0 | | | | | |
| PS3-W6S | 0 715 555 | 25.0 | 20.0 | | | | | |
| PS3-W6S | 0 715 567 | 29.0 | 23.0 | | | | | |
| PS3-W6S | 0 715 550 | 33.5 | 27.5 | | | | | |
| PS3-W6S | 0 715 553 | 40.0 | 33.0 | | | | | |
| Pressure Cut-Out for high pressure protection PZH with snubber for direct compressor mounting TÜV / EN 12263 | | | | | | | | |
| PS3-B6S | 0 715 568 | 19.2 | approx. 5 bar below cut-out | external manual reset | +70 | +150 | 50 | 7/16"-20UNF female thread with Schrader opener and snubber |
| PS3-B6S | 0 715 564 | 22.7 | | | | | | |
| PS3-B6S | 0 715 563 | 27.3 | | | | | | |
| PS3-B6S | 0 715 569 | 29.5 | | | | | | |
| PS3-B6S | 0 715 560 | 36.0 | | | | | | |

Selection Chart Cable Assemblies

| Temperature Range -50 to 80°C / no UL | | Length (mtr.) | Leads |
|--|----------|---------------|--------------------------|
| Type | Part No. | | |
| PS3-N15 | 804 580 | 1.5 | 3 x 0.75 mm ² |
| PS3-N30 | 804 581 | 3.0 | |
| PS3-N60 | 804 582 | 6.0 | |



| Plug according to EN 175301 | Part No. |
|-----------------------------|----------|
| PG9 | 801 012 |
| PG11 | 801 013 |

Pressure Controls Series PS3 / Special Types

For OEM use with settings according to customer's specification, minimum order quantity 100 pcs.

Features

- Maximum allowable pressure up to 45 bar / test pressure up to 50 bar
- For direct mounting on a pressure connection (free standing) or with a capillary tube
- Direct mounting reduces the number of joints and thus avoids potential leakage
- Direct mounting saves cost for flexible hose and additional fittings
- Precise setting and repeatability
- High temperature version with snubber, for direct compressor mounting (range 6)
- Micro switch for narrow pressure differentials
- Gold plated contacts for low voltage / current applications
- Worldwide approvals
- Easy mounting

Options

- Low pressure switch with automatic or manual reset
- High pressure switch with automatic or manual reset, standard or high temperature version
- Pressure limiter PSH - standard or high temperature version
- Pressure cut-out PZH - external reset, standard or high temperature version
- Safety pressure cut-out PZHH - internal reset, standard or high temperature version

Electrical connections (optional)

- Cables with plug in lengths of 1.5m, 3.0m and 6.0m available. No additional gasket required.
- Appliance socket DIN 43650

Type of contacts (optional)

- Standard (SPDT)
- Micro switch (SPDT)
- Gold plated contacts upon request

Technical Data

| | |
|--|---|
| Protection according to EN 60529 / IEC 529 | IP 00 IP 30 with terminal cover IP 65 with PS3-Nxx cables with plug or Plug DIN 43650 |
| Inductive Amp. (AC15) | 3 A / 230V AC 1.5 A with microswitch standard 0.1 A with gold plated contacts |
| Inductive Amp. (DC) | 0.1 A / 230V DC |
| Motor rating, full load Amp. | 6 A / 120/240V AC 2.5 A with microswitch |
| Motor rating, locked rotor Amp. | 36 A / 120/240V AC 15 A with microswitch |

For more information see datasheet PS3_e35003.



PS3

Standards

- per Low Voltage Directive
- per PED Directive 97/23 EG. TÜV appr. versions only
- Manufactured and tested to standards on our own responsibility
- Underwriter Laboratories (File No. E85974) (Released for 43 bar)

Pressure connections

- S: $\frac{7}{16}$ "-20UNF, female with Schrader opener and snubber (snubber only with high temperature diaphragm)
- A: $\frac{7}{16}$ "- 20UNF, $\frac{1}{4}$ " SAE male
- U: 6 mm solder. 80 mm length. ODF
- X: $\frac{1}{4}$ " solder. 80 mm length. ODF
- K: 1 m capillary tube with $\frac{1}{4}$ " SAE flare nut and Schrader opener
- L: 1 m capillary tube and $\frac{1}{4}$ " ODM solder connector

Installation

- Depending on pressure connection, free-standing or with console.

| | |
|-------------------------------------|--------------------------------|
| Temperature range TS | |
| Ambient. storage and transportation | -40°C ... 70°C |
| Medium | -40°C ... 70°C (150°C range 6) |
| Pressure Range PS | - 0.6 .. 43 bar |
| Vibration resistance (10..950 Hz) | 4 g |
| Type of contacts | 1 SPDT |
| Medium compatibility | HFC, HCFC, HFO/HFO Blends |
| Available approvals | TÜV, UL |
| Weight (approx.) | 0.1 kg |

Pressure Controls Series CS3

Safety pressure switch with fixed switch-point settings for R744 applications

Features

- Pressure range 8/Q
 - Versions with fixed factory cut-out setting available between 60 bar to 140 bar
 - Maximum Working Pressure of 140 bar
 - Factory Test Pressure of 154 bar
 - Narrow differential (approx. 6 bar) between cut-out and cut-in (in Microswitch version)
- Pressure range 7/P
 - Versions with fixed factory cut-out setting available between 40 bar to 70 bar
 - Maximum Working Pressure of 90 bar
 - Factory Test Pressure of 100 bar
 - Narrow differential (approx. 4 bar) between cut-out and cut-in (in Microswitch version)
- Manual reset versions available
- Precise switching and repeatability; Snap Action Contacts => Chatter Free (Bounce free) and Accurate Operation
- Contacts are designed as SPDT (Single pole double throw) for control function and alarm/status reporting
- Direct compressor mounting with adapter option
- 2 million cycles reliability (TUV EN 12263 approved)
- IP65 protection if used with PS3-Nxx with plug (acc. EN 175301-803), no additional gasket required (molded into plug)



CS3

Applied Standards

- per Low Voltage Directive
- per PED Directive 97/23/EC
- Manufactured and tested to VDE standards on our own responsibility

Selection table

1. Standard types

Pressure Range 8/Q

| Type | Part No. (Multi-pack 60pcs) | Part No. (Single Pack) | Fixed setting (bar) | | Reset | Electrical Switch | Pressure Connection |
|---------------------------------|-----------------------------|------------------------|---------------------|------------------------------|-----------------|-------------------|---|
| | | | Cut-out | Cut-in | | | |
| Pressure Limiter CS3-WQS | 0718008M | 0718008 | 106 bar | 100 bar | Automatic | Micro switch | 7/16"-20 UNF female thread with Schrader opener |
| Pressure Limiter CS3-W8S | 0718009M | 0718009 | 106 bar | 80 bar | | Standard switch | |
| Pressure Cut-out CS3-B8S | 0718001M | 0718001 | 108 bar | Approx. 25 bar below cut-out | External manual | Standard switch | |
| Safety Pressure Cut-out CS3-S8S | 0718002M | 0718002 | 108 bar | Approx. 25 bar below cut-out | Internal manual | Standard switch | |

Pressure Range 7/P

| Type | Part No. (Multi-pack 60pcs) | Part No. (Single Pack) | Fixed setting (bar) | | Reset | Electrical Switch | Pressure Connection |
|---------------------------------|-----------------------------|------------------------|---------------------|------------------------------|-----------------|-------------------|---|
| | | | Cut-out | Cut-in | | | |
| Pressure Limiter CS3-WPS | 0718007M | 0718007 | 54 bar | 50 bar | Automatic | Micro switch | 7/16"-20 UNF female thread with Schrader opener |
| Pressure Limiter CS3-W7S | 0718006M | 0718006 | 54 bar | 41 bar | | Standard switch | |
| Pressure Cut-out CS3-B7S | 0718004M | 0718004 | 54 bar | Approx. 13 bar below cut-out | External manual | Standard switch | |
| Safety Pressure Cut-out CS3-S7S | 0718005M | 0718005 | 54 bar | Approx. 13 bar below cut-out | Internal manual | Standard switch | |

Note: cables with plug must be ordered separately (see page 4).

2. Customer specific types (Minimum order quantity 60pcs)




Other settings upon request and within technical capabilities of the product

Pressure Range 8/Q: Versions with fixed factory cut-out settings available between 60 bar to 140 bar

Pressure Range 7/P: Versions with fixed factory cut-out settings available between 40 bar to 70 bar

Technical Data

| | |
|--|--|
| Protection class acc. to EN 60529 | IP 65 with PS3-Nxx IP00 without appliance socket |
| Max. working pressure PS | Pressure Range 8/Q: 140 bar Pressure Range 7/P: 90 bar |
| Factory Test pressure PT | Pressure Range 8/Q: 154 bar Pressure Range 7/P: 100 bar |
| Tolerances (As per EN 12263) - Only for Standard types (See page 1) Note: Tolerances are valid between -20...+55°C. | Pressure Range 8/Q Cut-out Tolerance: 0 to -6bar Cut-in Tolerance: +/-3bar Pressure Range 7/P Cut-out Tolerance: 0 to -3bar Cut-in Tolerance: +/-1.5bar |

| | |
|--|---|
| Vibration resistance | 4g (at 10...250 Hz) |
| Medium compatibility | R744 Note: CS3 are not released for use with flammable refrigerants! |
| Storage and transportation temperature | -40°C...+70°C |
| Ambient temperature (housing)* | -40°C...+70°C |
| Medium temperature* | -40°C...+150°C |
| Marking |  acc. Low voltage Directive  0035 acc. To PED 97/23/EC  |

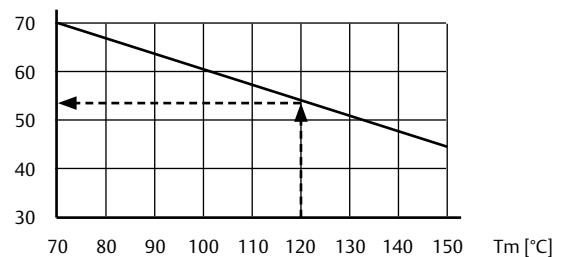
*) Note: For high temperature applications, i.e. medium temperatures between 70°C and 150°C, the maximum ambient temperature must be derated as per drawing.

E.g.: On medium temperature 120°C the ambient temperature of 55°C around the switch housing should not be exceeded.

T_m = Medium temperature

T_a = Ambient temperature

T_a [°C]



Electrical Data

| | Standard (SPDT) | Micro switch (SPDT) |
|-------------------------|--------------------|---------------------|
| Inductive load (AC15) | 3A / 230VAC | 1.5A / 230VAC |
| Inductive load (DC) | 0.1A / 230VDC | 0.1A / 230VDC |
| Motor rating amps (FLA) | 6A / 120 / 240VAC | 2.5A / 120 / 240VAC |
| Lock rotor amps (LRA) | 36A / 120 / 240VAC | 15A / 120 / 240VAC |

Accessories

Cables Assemblies

| Type | Part No. | No of leads | Diameter of leads | Temperature Range °C | Cable length [m] |
|---------|----------------|-------------|----------------------|----------------------|------------------|
| PS3-N15 | 804 580 | 3 | 0.75 mm ² | -50...+80 | 1.5 |
| PS3-N30 | 804 581 | | | | 3.0 |
| PS3-N60 | 804 582 | | | | 6.0 |

| Plug according to EN75301 | Part No. |
|---------------------------|----------------|
| PG9 | 801 012 |
| PG11 | 801 013 |

PS4 Pressure Switch

with fixed settings for OEM applications; minimum lot size 100 pieces

Features

- High- and low pressure switches
- Precise settings and repeatability
- Protection per EN 60529
IP67 (cable version);
IP20 (connector version QC)
- Direct mounting to the compressor possible
- Normally open/closed electrical contacts (under standard operating conditions)
- TUV approved versions
- Compatible with RoHS directive



PS4

Standards

- acc. Pressure Equipment Directive 97/23/EC
- Underwriter Laboratories file nr. E258370
- EN 60730-1, EN 60730-2-6, EN 60335-1

Low Pressure Switches With Automatic Reset; Open On Falling Pressure

| Type | PCN | Setting (bar) | | Connector (QC) Cable (m) | Test Pressure | EN 12263 | Contact function | Application | Pressure connection |
|--------|--------|---------------|--------|-----------------------------|------------------|----------|--------------------------------|-----------------|------------------------|
| | | Cut-out | Cut-in | | | | | | |
| PS4-W1 | 808269 | 0.3 | 1.5 | 3.0 | 30 bar | PSL | open on falling pressure | low pressure | 6mm |
| PS4-A3 | 808257 | 0.4 | 1.2 | QC | | none | | | 7/16-20UNF* |
| PS4-A1 | 808266 | 0.4 | 1.4 | 1.5 | | none | | | 1/4" |
| PS4-A1 | 808245 | 0.5 | 1.5 | 1.5 | | PSL | | | 7/16-20UNF* |
| PS4-W1 | 808208 | 0.6 | 1.8 | 1.5 | | | | | 6mm |
| PS4-W3 | 808235 | 0.6 | 1.8 | QC | | none | | | 7/16-20UNF* |
| PS4-W1 | 808251 | 0.6 | 1.8 | 3.0 | | | | | 6mm |
| PS4-W1 | 808209 | 0.7 | 2.1 | 1.5 | | PSL | | | 7/16-20UNF* |
| PS4-A1 | 808239 | 0.7 | 1.7 | 1.5 | | | | | 6mm |
| PS4-W1 | 808241 | 0.7 | 2.4 | 3.0 | | none | | | 1/4" |
| PS4-W1 | 808258 | 0.7 | 2.1 | 1.5 | | | | | 7/16-20UNF* |
| PS4-A1 | 808259 | 0.7 | 2 | 1.5 | | PSL | | | 6mm |
| PS4-A1 | 808247 | 1.5 | 2.5 | 2.5 | | | | | 7/16-20UNF* |
| PS4-A3 | 808252 | 1.5 | 2.5 | QC | | none | | | 6mm |
| PS4-W1 | 808210 | 1.7 | 3.4 | 1.5 | | | | | 7/16-20UNF* |
| PS4-W1 | 808249 | 1.7 | 3.4 | 1.5 | | PSL | | | 6mm |
| PS4-W3 | 808243 | 1.7 | 3.4 | QC | | | | | 7/16-20UNF* |
| PS4-W1 | 808271 | 1.8 | 3.2 | 1.5 | | none | | | 7/16-20UNF* |
| PS4-A1 | 808276 | 3.3 | 4.8 | 1.5 | | | | | |
| PS4-A1 | 808278 | 50/90 psig | | 1.5 | | none | | | 7/16-20UNF* |
| PS4-A3 | 808223 | 3.8 | 5.7 | QC | | | | | |

* 7/16-20UNF female with Schrader valve opener

High Pressure Switches With Automatic Reset; Open On Rising Pressure

| Type | PCN | Setting (bar) | | Connector (QC) Cable (m) | Test Pressure | EN 12263 | Contact function | Application | Pressure connection |
|--------|---------|---------------|--------|--------------------------|---------------|----------|-------------------------|--|---------------------|
| | | Cut-out | Cut-in | | | | | | |
| PS4-W1 | 808200 | 18 | 13 | 1.5 | 41 bar | PSH | open on rising pressure | high pressure | 7/16-20UNF* |
| PS4-W1 | 808265 | 18 | 13 | 3.0 | | | | | 6mm |
| PS4-W1 | 808201 | 26 | 20 | 1.5 | | PSH | | | 7/16-20UNF* |
| PS4-A3 | 808255 | 19.5 | 14.6 | QC | | none | | | 7/16-20UNF* |
| PS4-W1 | 808224 | 26 | 20 | 3.0 | | | | | 6mm |
| PS4-W1 | 808 282 | 24 | 18 | 5.0 | 55 bar | PSH | | | 6mm |
| PS4-W3 | 808236 | 26 | 20 | QC | | | | 7/16-20UNF* | |
| PS4-W3 | 808250 | 26 | 20 | QC | | | | 6mm | |
| PS4-A1 | 808260 | 26 | 20 | 1.5 | | none | | 1/4" | |
| PS4-W1 | 808203 | 28 | 21 | 1.5 | | PSH | | 7/16-20UNF* | |
| PS4-A1 | 808233 | 28 | 21 | 1.5 | | none | | 7/16-20UNF* | |
| PS4-A1 | 808244 | 28 | 21 | 1.5 | | | | 1/4" | |
| PS4-W3 | 808273 | 29 | 22.8 | QC | | PSH | | 7/16-20UNF Female with Schrader opener | |
| PS4-A1 | 808237 | 29.5 | 22.5 | 1.5 | | none | | | |
| PS4-A1 | 808246 | 30 | 24 | 2.5 | | | | | |
| PS4-W1 | 808214 | 31 | 24 | 1.5 | | PSH | | | |
| PS4-A1 | 808238 | 31 | 24 | 1.5 | | | | | |
| PS4-A3 | 808253 | 31 | 21 | QC | | none | | | |
| PS4-A1 | 808248 | 32 | 24 | 2.5 | | | | | |
| PS4-A3 | 808222 | 41.7 | 33.4 | QC | | | | | |
| PS4-W1 | 808205 | 42 | 33 | 1.5 | | PSH | | | |
| PS4-W3 | 808242 | 42 | 33 | QC | | | | | |
| PS4-A1 | 808277 | 500/650 psig | | 1.5 | | none | | | |
| PS4-W1 | 808261 | 45 | 35 | 1.5 | | PSH | | | 6mm |
| PS4-A1 | 808275 | 48 | 34 | 1.5 | none | | 7/16-20UNF* | | |

High Pressure Switches With Automatic Reset; Close On Rising Pressure

| Type | PCN | Setting (bar) | | Connector (QC) Cable (m) | Test Pressure | EN 12263 | Contact function | Application | Pressure connection |
|--------|--------|---------------|--------|--------------------------|---------------|----------|--------------------------|-------------|--|
| | | Cut-out | Cut-in | | | | | | |
| PS4-A2 | 808212 | 13 | 18 | 1.5 | 41 bar | PSH | close on rising pressure | fan control | 7/16-20UNF Female with Schrader opener |
| PS4-W2 | 808274 | 14.6 | 20 | 1.5 | | | | | |
| PS4-A2 | 808263 | 16 | 21.3 | 1.5 | | none | | | |
| PS4-A2 | 808264 | 17 | 22.6 | 1.5 | | | | | |
| PS4-A2 | 808213 | 18 | 24 | 1.5 | | | | | |
| PS4-W2 | 808227 | 22 | 28 | 1.5 | 55 bar | PSH | | | |

High Pressure Switches With Manual Reset; Open On Rising Pressure

| Type | PCN | Setting (bar) | | Connector (QC) Cable (m) | Test Pressure | EN 12263 | Contact function | Application | Pressure connection |
|--------|--------|---------------|--------|--------------------------|---------------|----------|-------------------------|----------------------|--|
| | | Cut-out | Cut-in | | | | | | |
| PS4-BL | 808202 | 26 | - | 1.5 | 41 bar | PZH | open on rising pressure | high pressure EN 378 | 7/16-20UNF Female with Schrader opener |
| PS4-BL | 808204 | 28 | - | 1.5 | 55 bar | | | | |
| PS4-BL | 808206 | 42 | - | 1.5 | 69 bar | | | | |

Technical Data

| Type | PS4-A | PS4-W | PS4-BL |
|--------------------------------------|---|----------|---------------|
| Electrical Data | | | |
| Inductive Load 230 VAC | | 0.1 – 6A | 0.1 – 6A |
| Inductive Load (DC <28V) | | 2A | 2A |
| Motor rating FLA 230 VAC | | 6A | 6A |
| Motor rating LRA 230 VAC | | 36A | 36A |
| Gold plated contacts (option) | | 25-100mA | 25-100mA |
| Electrical Connection | Cable or Terminal (QC) Version | | Cable Version |
| Life time | > 100.000 cycles | | |
| Protection class IEC 529 / DIN 40050 | IP67 (IP20 for Terminal Version) | | |
| Vibration resistance (10 ... 250 Hz) | 4 g | | |
| Temperature range: Medium Ambient | -50°C ... 135°C -30°C ... 80°C (UL version 65°C) | | |
| Compatibility * | HCFC, HFC, CO ₂ , Mineral-, Synthetic-, POE-Lubricants | | |
| Cable Version | 18 AWG 0.8 mm ² , 600 V (max. 125°C) | | |
| Cable Colour | LP: (0-8.5 bar: blue) HP: (>8.5 bar: black) | | |
| Weight | approx. 100g | | |




*) PS4-Pressure Switch are not released for flammable refrigerants

Differential Pressure Controls Series FD 113

Features

- Immediate reset (no cooling down period)
- Precise timing
- Adjustable time delay from 20 to 150 sec (ZU types)
- Separate output signals for operation and alarm
- Suitable for supply voltage 24 to 240 V AC / DC
- Pressure connection: Flare $\frac{7}{16}$ "-20 UNF, $\frac{1}{4}$ " SAE male

Standards

-  per Low Voltage Directive
- Manufactured and tested to  standards on our own responsibility
-  US LISTED File No. E85974



FD 113

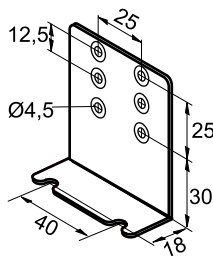
| Type | Part No. | Time Delay | | Cut out | | Cut in Fixed Setting | Max. Differential Pressure | Max. Proof Pressure |
|---|-----------|------------|-----------------|----------------------------|-----------------|----------------------|----------------------------|---------------------|
| | | Adjustable | Factory Setting | Adjusting Range Δp | Factory Setting | | | |
| | | Sec. | Sec. | bar | bar | | | |
| FD 113 | 0 710 173 | - | - | 0.3 ... 4.5 | 0.7 | 0.2 above cut-out | -0.8 ... 12 | 25 |
| FD 113 ZU | 3 465 300 | 20 ... 150 | 120 | | | | | |
| FD 113 ZU (A22-057) Copeland™ brand products | 0 711 195 | - | 115 fix | - | 0.63 fix | appr. 0.9 | | |

Technical Data

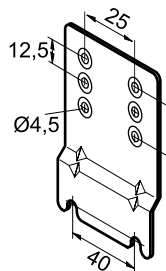
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|------------------------------|---------------------|
| Inductive Amp. (AC) | 3.0 A / 230 V AC |
| Inductive Amp. (DC) | 0.1 A / 230 V DC |
| Protection acc. to EN 60 529 | IP 30 |
| Nominal Voltage FD 113 ZU | 24 ... 240V AC / DC |

| | |
|---|----------------|
| Ambient Temperature Range | -20°C to +70°C |
| Max. Temperature at Pressure Connection | +70°C |
| Vibration resistance (10 to 1000 Hz) | 4 g |

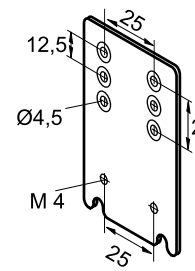
Accessories



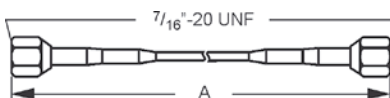
Mounting bracket angle
Part No.: 803 799



Mounting plate for units with hood
Part No.: 803 801



Extension bracket
Part No.: 803 800



Capillary Tube with two flare nuts $\frac{7}{16}$ "-20 UNF. R $\frac{1}{4}$ "
1.5m
Part No.: 803 804

Copper Gasket Set for R $\frac{1}{4}$ " ($\frac{7}{16}$ "-20 UNF. female)
100 pcs package
Part No.: 803 780

Thermostats

Basic Terms and Technical Information

Characteristics

Alco thermostats are electric circuit control devices which open or close an electric contact depending on temperature changes at the bulb.

Description of bulb charges

The application range of thermostats is mainly determined by the charge. Accordingly, various bulb shapes and sizes are necessary.

- **Vapor charge, bulb type A, E, P**

The thermosystem is filled with a medium in vapor phase. A thermostat with vapor charge operates in accordance with temperature changes at the bulb as long as the bulb is the coldest part in the whole system (bellows, capillary tube, bulb). Alco thermostats are equipped with a bellows heater (82 k Ohm, 230 V) to avoid such conditions. On applications with low current the bellows heater has to be removed. Max. bulb temperature is 150°C (70°C for bulb type E). Response time is very fast.

- **Adsorption charge, bulb type F**

This charge only reacts on temperature changes at the bulb. Max. bulb temperature is 100°C. Response time is slow but perfectly suitable for common refrigeration systems.

Adjustment of switching points

A thermometer should always be used for comparison when adjusting the switching points on temperature controls. The setting scale on the device is intended to serve for orientation, showing the setting range of the upper switching point t_{max} in °C and °F and the value of the temperature differential Δt in K as difference between the upper switching point t_{max} and the lower switching point t_{min} . The upper switching point t_{max} has to be adjusted on the scale, whereas the lower switching point t_{min} is given by adjustment of the desired switching differential Δt . The formula is:

$$\text{Upper switching point} - \text{Differential} = \text{Lower switching point}$$

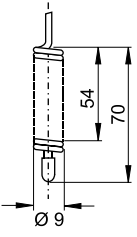
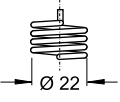
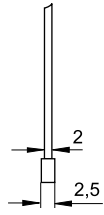
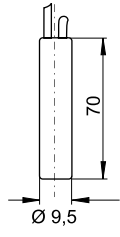
$$t_{max} - \Delta t = t_{min}$$

Important!

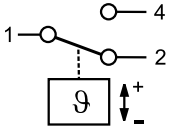
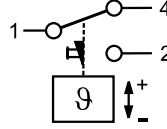
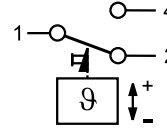
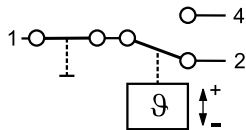
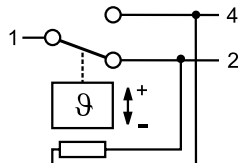
The differential Δt mentioned on the differential scale and in the technical data refers to the upper part of the setting range and the upper switching point.

In the lower part of the setting range an increase of the differential Δt can be expected. The lowest possible lower switching point t_{min} is mentioned in the selection tables and is helpful to select switching points with large differentials Δt in the lower temperature range.

Bulb Sizes

| A | E | P | F |
|---|---|--|---|
|  |  |  |  |
| Vapor 2m, capillary with bulb | Vapor coil, 0m | Vapor 2m, capillary with function C and D 6m | Adsorption 2m, capillary with bulb |

Function of Contacts

| | | |
|---|--|--|
|  <p>SPDT</p> <ul style="list-style-type: none"> - On temperature rise above setting 1-2 opens and 1-4 closes. - On temperature drop below setting 1-2 closes and 1-4 opens. |  <p>SPDT with manual reset min.</p> <ul style="list-style-type: none"> - On temperature drop below setting 1-2 closes. 1-4 opens and latches. - The device can be manually reset when the temperature has risen at least 2K above setting. |  <p>SPDT with manual reset max.</p> <ul style="list-style-type: none"> - On temperature rise above setting 1-2 opens and 1-4 closes and latches. - The device can be manually reset when the temperature has dropped 2K below setting. |
|  <p>SPDT with off switch AUTOmatic - STOP</p> | |  <p>SPDT with bellows heater includes a 82 k Ohm, 230 V AC/DC resistor</p> |

Standards and regulations

Important for the installation of thermostats:

- EN 60730-2-9 Specification for temperature controls and temperature cut-outs.
- EN 60947-1/
EN 60947-5-1 Specifications for low-voltage switchgear.
- EN 378 Refrigerating systems and heat pumps. Safety and environmental requirements.

Thermostats Series TS1

Features

- Adjustable temperatures and differentials
- Chatter resistant contacts (bounce-free)
- High operational current, locked rotor max. 144 Amps (LRA)
- Standard SPDT with same operational current rating for both contacts
- Captive terminal and cover screws
- Range and differential individually lockable

Technical Data

| | |
|---------------------------------------|---|
| Type of Contacts | 1 SPDT |
| Inductive Amp. (AC15) | 10 A / 230 V AC |
| Inductive Amp. (DC13) | 0.1 A / 230 V DC |
| Heating load (AC1) | 24 A / 230 V AC |
| Motor Rating, Full Load Amp. | 24 A / 120/240V AC |
| Motor Rating, Locked Rotor Amp. | 144 A / 120/240V AC |
| Ambient Temperature Range | -50°C to +70°C |
| Vibration Resistance (10 to 1000 Hz) | 4 g |
| Cable Entry | Grommet PG 16 |
| Protection acc. to EN 60529 / IEC 529 | IP 44 (IP 30 with Selector Switch) |
| Bellows Heater at Vapor Charge | 82 K Ohm. 230 V AC / DC (12 and 24 V DC upon request) |



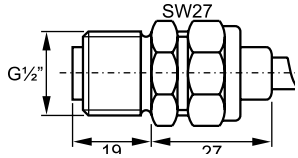
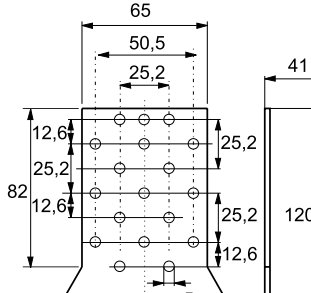
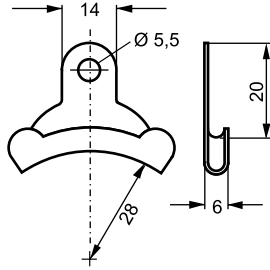
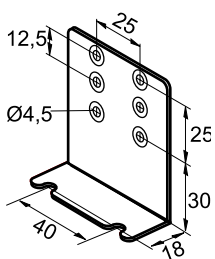
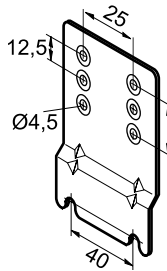
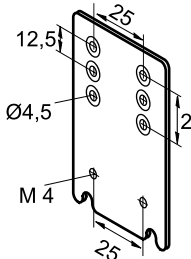
Standards

- per Low Voltage Directive
- Manufactured and tested to standards on our own responsibility
- Underwriter Laboratories File Nr: E85974

| Type | Part No. | Adjustment Range | | Lowest Setpoint | Factory Setting | Max. Bulb Temp. | Temperature Sensor | |
|--|-----------|------------------|----------------------------------|-----------------|-----------------|-----------------|--------------------|-----------------------|
| | | Upper Setpoint | Differential Setpoint ΔT | | | | Charge | Cap. tube length |
| | | °C | K | °C | °C | °C | | |
| Thermostats Top Operated | | | | | | | | |
| Thermostats without Off-Switch | | | | | | | | |
| TS1-A2P | 4 530 400 | -30 ... +15 | 1.5 ... 16 | -36 | -1 / -6 | +150 | Vapor | 2m capillary |
| TS1-A3P | 4 356 700 | -10 ... +35 | 1.5 ... 16 | -23 | +3 / -2 | | | |
| TS1-A1A | 4 351 500 | -45 ... -10 | 1.5 ... 16 | -55 | -18 / -20 | +150 | Vapor | 2m capillary and bulb |
| TS1-A2A | 4 351 600 | -30 ... +15 | 1.5 ... 16 | -36 | -1 / -6 | | | |
| TS1-A3A | 4 352 500 | -10 ... +35 | 1.5 ... 16 | -23 | +3 / -2 | | | |
| TS1-A4F Defrost- and Universal Thermostat | 4 351 800 | -30 ... +35 | 2.8 ... 20 | -35 | +5 / 0 | +100 | Adsorption | 2m capillary and bulb |
| TS1-A5F | 4 458 400 | +20 ... +60 | 3 ... 10 | +10 | +35 / +30 | | | |
| Thermostats with Off-Switch | | | | | | | | |
| TS1-B1A | 4 366 700 | -45 ... -10 | 1.5 ... 16 | -55 | -18 / -20 | +150 | Vapor | 2m capillary and bulb |
| TS1-B2A | 4 366 800 | -30 ... +15 | 1.5 ... 16 | -36 | -1 / -6 | | | |
| TS1-B3A | 4 366 900 | -10 ... +35 | 1.5 ... 16 | -23 | +3 / -2 | | | |
| TS1-B4F | 4 367 000 | -30 ... +35 | 2.8 ... 20 | -35 | +5 / 0 | +100 | Adsorption | |
| Frost Monitors Top Operated | | | | | | | | |
| Frost Monitors without Off-Switch | | | | | | | | |
| TS1-C0P | 4 352 100 | +4.5 ... +20 | 2.5 fix | +2 | 4,5 / +2 | +150 | Vapor | 6m capillary |
| TS1-D0P Low temp. cut out | 4 352 200 | +4.5 ... +20 | man. reset ca. 2.5 fix | +2 | +2 | | | |

| Type | Part No. | Adjustment Range | | Lowest Setpoint | Factory Setting | Max. Bulb Temp. | Temperature Sensor | |
|--|-----------|------------------|----------------------------------|-----------------|-----------------|-----------------|--------------------|-----------------------|
| | | Upper Setpoint | Differential Setpoint ΔT | | | | Charge | Cap. tube length |
| | | °C | K | | | | | |
| Room Thermostats Top Operated | | | | | | | | |
| Room Thermostats without Off-Switch, including insulation console | | | | | | | | |
| TS1-A3E | 4 355 300 | -10 ... +35 | 1.5 ... 16 | -23 | +20 / +18 | +70 | Vapor | 0m coil |
| Room Thermostats with Off-Switch, including insulation console | | | | | | | | |
| TS1-B3E | 4 344 500 | -10 ... +35 | 1.5 ... 16 | -23 | +20 / +18 | +70 | Vapor | 0m coil |
| Thermostats Front Operated | | | | | | | | |
| Thermostats without Off-Switch | | | | | | | | |
| TS1-E1A | 4 361 000 | -45 ... -10 | 2 ... 16 | -55 | -18 / -20 | +150 | Vapor | 2m capillary and bulb |
| TS1-E2A | 4 356 200 | -30 ... +10 | 1.5 ... 15 | -36 | +4 / +2 | | | |
| TS1-E3A | 4 365 200 | -10 ... +25 | 1.5 ... 15 | -23 | +3 / -2 | | | |
| TS1-E4F Defrost- and uni- versal thermostat | 4 367 500 | -25 ... +30 | 2.8 ... 20 | -30 | +5 / 0 | +100 | Adsorption | |
| TS1-E5F | 4 338 100 | +20 ... +60 | 3 ... 10 | +10 | +35 / +30 | | | |
| Thermostats with Off-Switch | | | | | | | | |
| TS1-F1A | 4 367 100 | -45 ... -10 | 2 ... 16 | -55 | -18 / -20 | +150 | Vapor | 2m capillary and bulb |
| TS1-F2A | 4 367 200 | -30 ... +10 | 1.5 ... 15 | -36 | -1 / -6 | | | |
| TS1-F3A | 4 367 400 | -10 ... +25 | 1.5 ... 15 | -23 | +3 / -2 | | | |
| Room Thermostats Front Operated | | | | | | | | |
| Room Thermostats without Off-Switch, including insulation console | | | | | | | | |
| TS1-E1E | 4 365 300 | -45 ... -10 | 2 ... 16 | -55 | -18 / -20 | +70 | Vapor | 0m coil |
| TS1-E2E | 4 356 800 | -30 ... +10 | 1.5 ... 15 | -36 | +4 / +2 | | | |
| Room Thermostats with Off-Switch, including insulation console | | | | | | | | |
| TS1-F1E | 4 368 000 | -45 ... -10 | 2 ... 16 | -55 | -18 / -20 | +70 | Vapor | 0m coil |
| TS1-F2E | 4 368 100 | -30 ... +10 | 1.5 ... 15 | -36 | +4 / +2 | | | |
| TS1-F3E | 4 368 200 | -10 ... +25 | 1.5 ... 15 | -23 | +20 / +18 | | | |
| Thermostats for Flush Mounting | | | | | | | | |
| Thermostats for Flush Mounting without Off-Switch | | | | | | | | |
| TS1-G2A | 4 355 400 | -30 ... +15 | 1.5 ... 15 | -36 | +4 / +2 | +150 | Vapor | 2m capillary and bulb |
| TS1-G4F Defrost- and uni- versal thermostat | 4 355 600 | -30 ... +35 | 2.8 ... 20 | -35 | +5 / 0 | +100 | Adsorption | |
| TS1-G7F Milk and beer cooler thermostat | 4 356 000 | 0 ... +10 | 2.5 fix | -2.5 | +5.5 / +3 | | | |
| Thermostats for Flush Mounting with Off-Switch | | | | | | | | |
| TS1-H2A | 4 355 500 | -30 ... +15 | 1.5 ... 15 | -36 | -1 / -6 | +150 | Vapor | 2m capillary and bulb |
| TS1-H3A | 4 367 900 | -10 ... +35 | 1.5 ... 15 | -23 | +3 / +2 | | | |

Accessories & Spare Parts

| | | |
|--|---|---|
|  |  |  |
| <p>Capillary Tube Gland. Brass for bulb style A / C Part No.: 803 807</p> | <p>Universal Mounting Bracket Part No.: 803 798</p> | <p>Capillary Tube Holder for frost monitors standard Part No.: 803 778</p> |
|  |  |  |
| <p>Mounting Bracket Angle Part No.: 803 799</p> | <p>Mounting Plate for units with hood Part No.: 803 801</p> | <p>Extension Bracket Part No.: 803 800</p> |

System Protectors and Moisture Indicators

Filter Driers

Basic Terminology and Technical Information

Function

The purpose of filter driers is to keep the refrigeration circuit clean of water, acid and solid contaminants. In case of contamination, corrosion and ice building can occur, as well as malfunction of the compressor.

Property of desiccants

Molecular sieves

This kind of desiccant has a very good drying effect independent of the oil content of the refrigerant. Molecular sieve is a fast acting desiccant and will remove moisture even when the water content of the refrigerant is low and when the temperature of the liquid refrigerant is high.

Activated alumina

Activated alumina incorporate an excellent acid capacity. By selecting a specific mixture of both desiccants, an optimum effect can be achieved to cover the requirements of all kinds of applications. Liquid filter driers are specially designed for a high water capacity, whereas suction line filter driers feature a high acid and filtration capacity.

Flow capacity

Flow capacity refers to ARI-Standard 710-86 and DIN 8949 and is based on a pressure drop of 0.07 bar, +30°C liquid temperature and -15°C evaporating temperature for common refrigerants.

The flow capacities are given at two levels of pressure drop: 0.07 and 0.14 bar.

For Filter drier selection under other operating conditions, use the correction factors given in tables at the end of liquid line filter driers BFK, ADK, FDB, ADKS, FDH, FDS

Water capacity

The water capacity for R22 refers to ARI 710-86 and DIN8948 is based on a liquid temperature of 24/52°C and an equilibrium point dryness (EPD) of 60 PPM water in refrigerant. The EPD for other refrigerants according to DIN 8949 is as follows:

| Refrigerant | EPD (PPM) |
|-------------|-----------|
| R134a | 50 |
| R407C | 50 |
| R404A | 50 |
| R507 | 50 |
| R410A | 50 |

Selection Guide for Filter and Filter Driers


| Selection criteria | Series | | | | | | | | | | |
|----------------------------|--------|--------|--------|--------------------|-----|------------------|-----|----------|-------|----------------|------|
| | BFK | ADK | FDB | ADKS/FDH with core | | FDS-24 with core | | ASF | ASD | BTAS with core | |
| | | | | H/S/W48 | F48 | S24 | F24 | | | AF | AF-D |
| Hermetic design | + | + | + | | | | | + | + | | |
| For exchangeable cores | | | | + | + | + | + | | | + | + |
| Quick cap flange | | | | | | + | + | | | | |
| Filter | | | | | + | | + | + | | + | |
| Filter drier | + | + | + | + | | + | | | + | | + |
| For liquid service | + | + | + | + | | + | | | | | |
| For suction service | | | | | + | + | + | + | + | + | + |
| For Heat Pumps (Bi-Flow) | + | | | | | | | | | | |
| Shell material | Steel | Steel | Steel | Steel | | Steel | | Steel | Steel | Brass | |
| Max. allowable pressure PS | 45 bar | 45 bar | 45 bar | 34.5*/46.0* bar | | 34.5* bar | | 27.5 bar | | 24 bar | |

*dependent on medium temperature

Bi-flow Filter Driers Series BFK

Hermetic Design for Liquid Refrigerants

Features

- Solid block style
- Integrated check valves ensure Bi-flow capability, eliminate the need for external check valves and reduce the external piping
- ODF Copper fittings for easy soldering
- Pattern flow for non-turbulent performance
- High water, acid adsorption capacity
- Filtration down to 40 microns
- Temperature range TS: -45°C to +65°C
- Max. allowable pressure PS: 45 bar
- No CE marking according art. 3.3 PED 97/23 EC
- HP marking according to German Pressurized Vessel Directive
-  US LISTED Underwriter Laboratories



BFK

| Type | Part No. | Connection size & type | Nominal Flow Capacity (KW) | | | | | | | | | |
|-----------------|----------------|------------------------|----------------------------|------|-------|---------------|-------|---------------------------|------|-------|---------------|-------|
| | | | at 0.07 bar pressure drop | | | | | at 0.14 bar pressure drop | | | | |
| | | | R134a | R22 | R407C | R404A R507 | R410A | R134a | R22 | R407C | R404A R507 | R410A |
| BFK-052 | 007 343 | 1/4"(6mm)SAE | 5.2 | 5.7 | 5.4 | 3.7 | 5.6 | 8.0 | 8.8 | 8.4 | 5.7 | 8.7 |
| BFK-052S | 007 344 | 1/4"ODF | 6.8 | 7.3 | 7.0 | 4.8 | 7.2 | 10.1 | 11.1 | 10.6 | 7.2 | 10.9 |
| BFK-083 | 007 345 | 3/8"(10mm)SAE | 10.6 | 11.5 | 11.0 | 7.5 | 11.4 | 16.9 | 18.4 | 17.6 | 12.0 | 18.2 |
| BFK-083S | 007 346 | 3/8"ODF | 12.0 | 13.1 | 12.5 | 8.5 | 12.9 | 20.6 | 22.5 | 21.5 | 14.7 | 22.2 |
| BFK-084 | 007 347 | 1/2"(12mm)SAE | 15.2 | 16.6 | 15.8 | 10.8 | 16.4 | 25.8 | 28.1 | 26.8 | 18.3 | 27.8 |
| BFK-084S | 007 348 | 1/2"ODF | 15.6 | 17.0 | 16.2 | 11.1 | 16.8 | 28.7 | 31.3 | 29.9 | 20.4 | 30.9 |
| BFK-163 | 007 349 | 3/8"(10mm)SAE | 13.6 | 14.9 | 14.2 | 9.7 | 14.7 | 21.0 | 22.9 | 21.8 | 14.9 | 22.6 |
| BFK-163S | 007 350 | 3/8"ODF | 15.5 | 16.9 | 16.1 | 11.0 | 16.7 | 23.8 | 26.0 | 24.8 | 17.0 | 25.7 |
| BFK-164 | 007 351 | 1/2"(12mm)SAE | 20.3 | 22.1 | 21.1 | 14.4 | 21.9 | 27.5 | 30.0 | 28.6 | 19.6 | 29.6 |
| BFK-164S | 007 352 | 1/2"ODF | 24.3 | 26.5 | 25.3 | 17.3 | 26.1 | 34.4 | 37.6 | 35.9 | 24.5 | 37.1 |
| BFK-165 | 007 353 | 5/8"(16mm)SAE | 25.1 | 27.4 | 26.2 | 17.9 | 27.1 | 35.3 | 38.5 | 36.8 | 25.1 | 38.0 |
| BFK-165S | 007 354 | 5/8"ODF | 25.6 | 28.0 | 26.7 | 18.3 | 27.6 | 37.0 | 40.4 | 38.5 | 26.3 | 39.9 |
| BFK-305S | 007 356 | 5/8"(16mm) ODF | 34.1 | 37.3 | 35.6 | 24.3 | 36.8 | 52.8 | 57.7 | 55.0 | 37.6 | 56.9 |
| BFK-307S | 007 357 | 7/8"(22mm) ODF | 40.6 | 44.3 | 42.3 | 28.9 | 43.7 | 65.7 | 71.7 | 68.4 | 46.8 | 70.8 |
| BFK-309S | 007 358 | 1 1/8"ODF | 47.0 | 51.3 | 49.0 | 33.5 | 50.7 | 79.9 | 87.2 | 83.2 | 56.9 | 86.1 |

The rated flow capacities are in accordance with ARI standard 710-86 and DIN 8949 at +30°C liquid temperature and -15°C evaporating temperature.

Selection method for other conditions:

1. Determine the correction factor given in tables at the end of liquid line filter driers BFK, ADK, FDB, ADKS, FDH, FDS based on type of refrigerant, liquid and evaporating temperature.
2. Multiply the correction factor by cooling capacity or heating capacity, whichever is greater
3. Select the filter drier according to determined capacity corresponding to flow capacity at 0.07 bar pressure drop.


Water and Acid Adsorption Capacity

| Type | Water adsorption capacity (gram) | | | | | | | | | | Acid Adsorption Capacity (g) |
|------------------|----------------------------------|------|------------|-------|-------|--------------------------|------|------------|-------|-------|------------------------------|
| | Liquid Temperature 24 °C | | | | | Liquid Temperature 52 °C | | | | | |
| | R134a | R22 | R404A/R507 | R407C | R410A | R134a | R22 | R404A/R507 | R407C | R410A | |
| BFK-05... | 4.4 | 4.1 | 4.5 | 3.4 | 2.8 | 4.1 | 3.8 | 4.3 | 2.8 | 2.2 | 0.3 |
| BFK-08... | 9.6 | 9.0 | 9.9 | 7.5 | 6.2 | 8.9 | 8.2 | 9.4 | 6.0 | 4.7 | 0.6 |
| BFK-16... | 18.9 | 17.7 | 19.5 | 14.8 | 12.2 | 17.5 | 16.2 | 18.5 | 11.9 | 9.3 | 1.2 |
| BFK-30... | 34.5 | 32.3 | 35.6 | 27.1 | 22.4 | 31.9 | 29.6 | 33.7 | 21.7 | 17.0 | 2.0 |

Filter Driers Series ADK

Hermetic Design for Liquid Refrigerants

Features

- Robust block with optimum blend of molecular sieve and activated alumina
- ODF Copper fittings for easy soldering
- High water and acid capacity
- Filtration down to 20 microns
- Temperature range TS: -45°C to +65°C
- Max. allowable pressure PS: 45 bar
- No CE marking according art. 3.3 PED 97/23 EC
- HP marking according to German Pressorized Vessel Directive
-  US LISTED Underwriter Laboratories



ADK

| Type | Part No. | Nominal Flow Capacity (kW) nom. Conditions see next page | | | | | | | | | | | |
|-------------|----------|--|-------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| | | at 0.07 bar pressure drop | | | | | | | | | | | |
| | | R22 | R134a | R404A R507 | R407C | R407F | R410A | R744 | R448A | R449A | R450A | R513A | R1234ze |
| ADK-032 | 003 595 | 7.3 | 6.7 | 4.8 | 7.0 | 7.0 | 7.2 | 10.6 | 6.1 | 5.9 | 5.9 | 6.4 | 6.2 |
| ADK-032S | 003 596 | 8.8 | 8.1 | 5.7 | 8.4 | 8.5 | 8.7 | 12.8 | 7.4 | 7.0 | 7.1 | 7.7 | 7.5 |
| ADK-036MMS | 003 597 | 8.0 | 7.3 | 5.2 | 7.6 | | 7.9 | 11.6 | 6.7 | 6.4 | 6.4 | 7.0 | 6.8 |
| ADK-052 | 003 598 | 7.6 | 6.9 | 4.9 | 7.2 | 7.3 | 7.5 | 11.0 | 6.4 | 6.1 | 6.1 | 6.6 | 6.5 |
| ADK-052S | 003 599 | 10.8 | 9.9 | 7.0 | 10.3 | 10.4 | 10.7 | 15.7 | 9.1 | 8.6 | 8.7 | 9.4 | 9.2 |
| ADK-056MMS | 003 600 | 10.0 | 9.2 | 6.5 | 9.5 | | 9.9 | 14.5 | 8.4 | 8.0 | 8.0 | 8.7 | 8.5 |
| ADK-053 | 003 601 | 14.2 | 13.0 | 9.2 | 13.5 | 13.6 | 14.0 | 20.6 | 11.9 | 11.3 | 11.4 | 12.3 | 12.1 |
| ADK-053S | 003 602 | 16.4 | 15.0 | 10.7 | 15.6 | 15.8 | 16.1 | 23.8 | 13.7 | 13.1 | 13.1 | 14.3 | 14.0 |
| ADK-0510MMS | 003 603 | 16.4 | 15.0 | 10.7 | 15.6 | | 16.1 | 23.8 | 13.7 | 13.1 | 13.1 | 14.3 | 14.0 |
| ADK-082 | 003 604 | 7.8 | 7.1 | 5.1 | 7.4 | 7.5 | 7.7 | 11.3 | 6.5 | 6.2 | 6.2 | 6.8 | 6.7 |
| ADK-082S | 003 605 | 11.9 | 10.9 | 7.8 | 11.4 | 11.5 | 11.8 | 17.4 | 10.0 | 9.6 | 9.6 | 10.4 | 10.2 |
| ADK-086MMS | 003 606 | 10.7 | 9.8 | 7.0 | 10.2 | | 10.5 | 15.5 | 9.0 | 8.5 | 8.6 | 9.3 | 9.1 |
| ADK-083 | 003 607 | 16.4 | 15.0 | 10.7 | 15.6 | 16.0 | 16.2 | 23.8 | 13.8 | 13.1 | 13.2 | 14.3 | 14.0 |
| ADK-083S | 003 608 | 16.4 | 15.0 | 10.7 | 15.7 | 15.8 | 16.2 | 23.9 | 13.8 | 13.1 | 13.2 | 14.3 | 14.0 |
| ADK-0810MMS | 003 609 | 16.4 | 15.0 | 10.7 | 15.6 | | 16.2 | 23.8 | 13.8 | 13.1 | 13.2 | 14.3 | 14.0 |
| ADK-084 | 003 610 | 25.7 | 23.5 | 16.7 | 24.5 | 24.7 | 25.3 | 37.3 | 21.5 | 20.5 | 20.6 | 22.4 | 21.9 |
| ADK-084S | 003 611 | 26.8 | 24.5 | 17.5 | 25.6 | 25.8 | 26.4 | 39.0 | 22.5 | 21.4 | 21.5 | 23.3 | 22.9 |
| ADK-0810MMS | 003 609 | 16.4 | 15.0 | 10.7 | 15.6 | | 16.2 | 23.8 | 22.1 | 21.1 | 21.1 | 22.9 | 22.5 |
| ADK-162 | 003 613 | 8.0 | 7.3 | 5.2 | 7.6 | 7.7 | 7.8 | 11.6 | 6.7 | 6.4 | 6.4 | 6.9 | 6.8 |
| ADK-163 | 003 614 | 16.8 | 15.4 | 10.9 | 16.0 | 16.2 | 16.5 | 24.4 | 14.1 | 13.4 | 13.4 | 14.6 | 14.3 |
| ADK-163S | 003 615 | 18.7 | 17.2 | 12.2 | 17.9 | 18.1 | 18.5 | 27.2 | 15.7 | 15.0 | 15.0 | 16.3 | 16.0 |
| ADK-1610MMS | 003 616 | 18.7 | 17.1 | 12.2 | 17.8 | | 18.5 | 27.2 | 15.7 | 15.0 | 15.0 | 16.3 | 16.0 |
| ADK-164 | 003 617 | 31.3 | 28.7 | 20.4 | 29.9 | 34.1 | 30.9 | 45.5 | 26.3 | 25.1 | 25.1 | 27.3 | 26.7 |
| ADK-164S | 003 618 | 36.0 | 33.0 | 23.5 | 34.3 | 35.1 | 35.5 | 52.3 | 30.2 | 28.8 | 28.9 | 31.4 | 30.7 |
| ADK-1612MMS | 003 619 | 32.3 | 29.6 | 21.1 | 30.8 | | 31.9 | 47.0 | 27.1 | 25.9 | 25.9 | 28.2 | 27.6 |
| ADK-165 | 003 620 | 44.8 | 41.1 | 29.2 | 42.8 | 43.2 | 44.3 | 65.2 | 37.7 | 35.9 | 36.0 | 39.1 | 38.3 |
| ADK-165S | 003 621 | 49.7 | 45.6 | 32.4 | 47.4 | 47.9 | 49.1 | 72.3 | 41.8 | 39.8 | 39.9 | 43.3 | 42.5 |
| ADK-303 | 003 622 | 17.7 | 16.2 | 11.5 | 16.9 | 17.1 | 17.5 | 25.7 | 14.9 | 14.2 | 14.2 | 15.4 | 15.1 |
| ADK-304 | 003 623 | 31.3 | 28.7 | 20.4 | 29.9 | 30.2 | 30.9 | 45.5 | 26.3 | 25.1 | 25.1 | 27.3 | 26.7 |
| ADK-304S | 003 624 | 36.0 | 33.0 | 23.5 | 34.4 | 34.7 | 35.6 | 52.4 | 30.3 | 28.8 | 28.9 | 31.4 | 30.8 |
| ADK-305 | 003 626 | 52.6 | 48.2 | 34.3 | 50.2 | 50.7 | 52.0 | 76.6 | 44.2 | 42.1 | 42.2 | 45.9 | 45.0 |
| ADK-305S | 003 627 | 52.8 | 48.4 | 34.4 | 50.4 | 46.4 | 52.1 | 76.8 | 44.3 | 42.2 | 42.4 | 46.0 | 45.1 |
| ADK-307S | 003 628 | 66.3 | 60.7 | 43.2 | 63.2 | 63.9 | 65.4 | 96.4 | 55.7 | 53.0 | 53.2 | 57.8 | 56.6 |
| ADK-414 | 003 629 | 36.8 | 33.7 | 24.0 | 35.1 | | 36.3 | 53.5 | 30.9 | 29.4 | 29.5 | 32.1 | 31.4 |
| ADK-415 | 003 632 | 58.6 | 53.7 | 38.2 | 55.9 | | 57.8 | 85.2 | 49.2 | 46.9 | 47.0 | 51.1 | 50.0 |
| ADK-415S | 003 633 | 63.0 | 57.7 | 41.1 | 60.1 | | 62.2 | 91.6 | 52.9 | 50.4 | 50.5 | 54.9 | 53.8 |
| ADK-417S | 003 634 | 77.9 | 71.4 | 50.8 | 74.3 | 80.0 | 76.9 | 113.3 | 65.4 | 62.4 | 62.5 | 67.9 | 66.6 |
| ADK-757S | 003 635 | 105.5 | 96.7 | 68.8 | 100.7 | 122.8 | 104.2 | 153.5 | 88.6 | 84.4 | 84.7 | 92.0 | 90.1 |
| ADK-759S | 003 636 | 117.2 | 107.4 | 76.4 | 111.8 | 133.9 | 115.7 | 170.4 | 98.4 | 93.8 | 94.0 | 102.1 | 100.1 |

| Type | Part No. | at 0.14 bar pressure drop | | | | | | |
|-------------|----------|---------------------------|---------|---------------|-------|-------|-------|-------|
| | | R22 | R134a | R404A R507 | R407C | R407F | R410A | R744 |
| | | ADK-032 | 003 595 | 10.6 | 9.7 | 6.9 | 10.1 | 10.2 |
| ADK-032S | 003 596 | 12.9 | 11.8 | 8.4 | 12.3 | 12.4 | 12.7 | 18.8 |
| ADK-036MMS | 003 597 | 12.0 | 11.0 | 7.8 | 11.4 | | 11.8 | 17.4 |
| ADK-052 | 003 598 | 11.0 | 10.1 | 7.2 | 10.5 | 10.6 | 10.9 | 16.0 |
| ADK-052S | 003 599 | 17.1 | 15.6 | 11.1 | 16.3 | 16.5 | 16.9 | 24.8 |
| ADK-056MMS | 003 600 | 15.0 | 13.7 | 9.8 | 14.3 | | 14.8 | 21.8 |
| ADK-053 | 003 601 | 21.3 | 19.5 | 13.9 | 20.3 | 20.5 | 21.0 | 31.0 |
| ADK-053S | 003 602 | 24.1 | 22.1 | 15.7 | 23.0 | 24.8 | 23.8 | 35.1 |
| ADK-0510MMS | 003 603 | 24.1 | 22.1 | 15.7 | 23.0 | | 23.8 | 35.1 |
| ADK-082 | 003 604 | 11.3 | 10.4 | 7.4 | 10.8 | 10.9 | 11.2 | 16.4 |
| ADK-082S | 003 605 | 17.3 | 15.9 | 11.3 | 16.5 | 16.7 | 17.1 | 25.2 |
| ADK-086MMS | 003 606 | 16.0 | 14.7 | 10.4 | 15.3 | | 15.8 | 23.3 |
| ADK-083 | 003 607 | 23.9 | 21.9 | 15.6 | 22.8 | 23.1 | 23.6 | 34.8 |
| ADK-083S | 003 608 | 24.1 | 22.1 | 15.7 | 23.0 | 23.3 | 23.8 | 35.1 |
| ADK-0810MMS | 003 609 | 24.1 | 22.1 | 15.7 | 23.0 | | 23.8 | 35.0 |
| ADK-084 | 003 610 | 39.1 | 35.8 | 25.5 | 37.3 | 37.7 | 38.6 | 56.9 |
| ADK-084S | 003 611 | 40.4 | 37.0 | 26.3 | 38.5 | 38.9 | 39.8 | 58.7 |
| ADK-0812MMS | 003 612 | 39.5 | 36.2 | 25.8 | 37.7 | | 39.0 | 57.4 |
| ADK-162 | 003 613 | 11.5 | 10.5 | 7.5 | 10.9 | 11.0 | 11.3 | 16.7 |
| ADK-163 | 003 614 | 24.1 | 22.1 | 15.7 | 23.0 | 23.3 | 23.8 | 35.1 |
| ADK-163S | 003 615 | 26.8 | 24.5 | 17.5 | 25.6 | 25.8 | 26.5 | 39.0 |
| ADK-1610MMS | 003 616 | 26.8 | 24.5 | 17.5 | 25.6 | | 26.5 | 39.0 |
| ADK-164 | 003 617 | 47.1 | 43.2 | 30.7 | 45.0 | 47.2 | 46.5 | 68.6 |
| ADK-164S | 003 618 | 49.9 | 45.7 | 32.6 | 47.6 | 48.1 | 49.3 | 72.6 |
| ADK-1612MMS | 003 619 | 48.5 | 44.4 | 31.6 | 46.3 | | 47.9 | 70.5 |
| ADK-165 | 003 620 | 66.5 | 60.9 | 43.4 | 63.5 | 64.1 | 65.7 | 96.7 |
| ADK-165S | 003 621 | 72.4 | 66.3 | 47.2 | 69.1 | 69.8 | 71.5 | 105.3 |
| ADK-303 | 003 622 | 25.4 | 23.2 | 16.5 | 24.2 | 24.5 | 25.0 | 36.9 |
| ADK-304 | 003 623 | 47.1 | 43.2 | 30.7 | 45.0 | 45.5 | 46.5 | 68.6 |
| ADK-304S | 003 624 | 51.6 | 47.2 | 33.6 | 49.2 | 49.7 | 50.9 | 75.0 |
| ADK-305 | 003 626 | 72.1 | 66.0 | 47.0 | 68.7 | 69.5 | 71.1 | 104.8 |
| ADK-305S | 003 627 | 72.9 | 66.8 | 47.6 | 69.6 | 70.3 | 72.0 | 106.1 |
| ADK-307S | 003 628 | 104.6 | 95.8 | 68.2 | 99.8 | 100.8 | 103.2 | 152.1 |
| ADK-414 | 003 629 | 55.2 | 50.6 | 36.0 | 52.7 | | 54.5 | 80.3 |
| ADK-415 | 003 632 | 87.9 | 80.5 | 57.3 | 83.9 | | 86.8 | 127.8 |
| ADK-415S | 003 633 | 94.5 | 86.6 | 61.6 | 90.2 | | 93.3 | 137.4 |
| ADK-417S | 003 634 | 116.9 | 107.1 | 76.2 | 111.5 | 121.7 | 115.4 | 170.0 |
| ADK-757S | 003 635 | 158.3 | 145.0 | 103.2 | 151.0 | 163.8 | 156.2 | 230.2 |
| ADK-759S | 003 636 | 175.8 | 161.0 | 114.6 | 167.7 | 173.2 | 173.5 | 255.6 |

Water and Acid Capacity

| Size | Water adsorption capacity (gram) | | | | | | | | | | Acid Adsorption Capacity (gram) |
|--------|----------------------------------|-------|------------|-------|-------|--------------------------|-------|------------|-------|-------|---------------------------------|
| | Liquid Temperature 24 °C | | | | | Liquid Temperature 52 °C | | | | | |
| | R134a | R22 | R404A/R507 | R407C | R410A | R134a | R22 | R404A/R507 | R407C | R410A | |
| ADK-03 | 4.9 | 4.5 | 4.9 | 3.4 | 2.8 | 4.4 | 4.0 | 4.6 | 2.9 | 2.4 | 0.8 |
| ADK-05 | 11.8 | 10.8 | 11.8 | 8.2 | 6.8 | 10.6 | 9.6 | 10.9 | 7.0 | 5.8 | 2.3 |
| ADK-08 | 17.9 | 16.4 | 18.0 | 12.4 | 10.3 | 16.2 | 14.6 | 16.6 | 10.7 | 8.8 | 3.3 |
| ADK-16 | 23.0 | 21.0 | 23.1 | 16.0 | 13.2 | 20.8 | 18.8 | 21.3 | 13.8 | 11.4 | 4.5 |
| ADK-30 | 51.8 | 48.6 | 53.5 | 36.9 | 30.6 | 47.4 | 43.3 | 49.3 | 31.8 | 26.3 | 11.3 |
| ADK-41 | 81.7 | 76.6 | 84.3 | 58.2 | 48.3 | 74.8 | 68.3 | 77.8 | 50.2 | 41.4 | 16.8 |
| ADK-75 | 143.5 | 134.5 | 148.1 | 102.1 | 84.8 | 131.4 | 120.0 | 136.6 | 88.1 | 72.8 | 29.9 |

The water capacities are according to ARI-Standard 710 for R22 and are based on a equilibrium point dryness (EPD) of 60 PPM water in refrigerant. The EPD for all other mentioned refrigerants according to DIN 8949 is 50 PPM.

Connections

| Type | Part No. | Connection | | | |
|-------------|----------|------------|-------|-----------|------|
| | | Solder/ODF | | Flare/SAE | |
| | | mm | inch | mm | inch |
| ADK-032 | 003 595 | | | 6 | 1/4 |
| ADK-036MMS | 003 597 | 6 | | | |
| ADK-032S | 003 596 | | 1/4 | | |
| ADK-052 | 003 598 | | | 6 | 1/4 |
| ADK-056MMS | 003 600 | 6 | | | |
| ADK-052S | 003 599 | | 1/4 | | |
| ADK-053 | 003 601 | | | 10 | 3/8 |
| ADK-0510MMS | 003 603 | 10 | | | |
| ADK-053S | 003 602 | | 3/8 | | |
| ADK-082 | 003 604 | | | 6 | 1/4 |
| ADK-086MMS | 003 606 | 6 | | | |
| ADK-082S | 003 605 | | 1/4 | | |
| ADK-083 | 003 607 | | | 10 | 3/8 |
| ADK-0810MMS | 003 609 | 10 | | | |
| ADK-083S | 003 608 | | 3/8 | | |
| ADK-084 | 003 610 | | | 12 | 1/2 |
| ADK-0812MMS | 003 612 | 12 | | | |
| ADK-084S | 003 611 | | 1/2 | | |
| ADK-162 | 003 613 | | | 6 | 1/4 |
| ADK-163 | 003 614 | | | 10 | 3/8 |
| ADK-1610MMS | 003 616 | 10 | | | |
| ADK-163S | 003 615 | | 3/8 | | |
| ADK-164 | 003 617 | | | 12 | 1/2 |
| ADK-1612MMS | 003 619 | 12 | | | |
| ADK-164S | 003 618 | | 1/2 | | |
| ADK-165 | 003 620 | | | 16 | 5/8 |
| ADK-165S | 003 621 | | 5/8 | | |
| ADK-303 | 003 622 | | | 10 | 3/8 |
| ADK-304 | 003 623 | | | 12 | 1/2 |
| ADK-304S | 003 624 | | 1/2 | | |
| ADK-305 | 003 626 | | | 16 | 5/8 |
| ADK-305S | 003 627 | | 5/8 | | |
| ADK-307S | 003 628 | 22 | 7/8 | | |
| ADK-414 | 003 629 | | | 12 | 1/2 |
| ADK-415 | 003 632 | | | 16 | 5/8 |
| ADK-415S | 003 633 | | 5/8 | | |
| ADK-417S | 003 634 | 22 | 7/8 | | |
| ADK-757S | 003 635 | 22 | 7/8 | | |
| ADK-759S | 003 636 | | 1-1/8 | | |

Nominal Operating Conditions

Nominal capacity is based on the following conditions:


| Refrigerant | Evaporating temperature | Liquid temperature |
|--|-------------------------|--------------------|
| R744 | -40°C | -10°C |
| R22, R134a, R404A, R407C, R407F R410A, R507 | -15°C | +30°C |
| R448A, R449A | | |
| R450A | | |
| R513A, R1234ze | | |

Correction factors for other than the nominal conditions use the correction factors given in tables at the end of liquid line filter driers BFK, ADK, FDB, ADKS, FDH, FDS

Filter Driers Series FDB

Hermetic Design, Bead Style for Liquid Refrigerants

Features

- Compacted bead style (spring loaded)
- Optimum blend of molecular sieve and activated alumina combined with high filtration capacity
- Final filtration 20 micron
- Filtration first for more effective use of surface area of desiccant
- High water and acid capacity
- Cushioned flow for non-turbulent performance
- ODF Copper fittings for easy soldering
- Rugged steel shells
- Corrosion-resistant epoxy paint
- Temperature range TS: -40°C to +65°C
- Max. allowable pressure PS: 45 bar
- No CE marking according art. 3.3 PED 97/23 EC
- HP marking according to German Pressurized Vessel Directive
-  Underwriter Laboratories



FDB

| Type | Part No. | Nominal Flow Capacity (kW) nom. Conditions see next page | | | | | | | | | | | |
|----------|----------|--|------|-------|----------------|-------|-------|-------|-------|-------|-------|-------|---------|
| | | at 0.07 bar pressure drop | | | | | | | | | | | |
| | | R134a | R22 | R407C | R404A/ R507 | R407A | R407F | R410A | R448A | R449A | R450A | R513A | R1234ze |
| FDB-032 | 059 305 | 6.3 | 6.9 | 6.6 | 4.5 | 6 | 6.7 | 6.8 | 6.0 | 5.9 | 5.8 | 5.5 | 5.5 |
| FDB-032S | 059 306 | 9.7 | 10.6 | 10.1 | 6.9 | 9.2 | 10.2 | 10.5 | 9.2 | 9.1 | 8.9 | 8.5 | 8.5 |
| FDB-052 | 059 307 | 6.5 | 7.1 | 6.8 | 4.6 | 6.1 | 6.8 | 7.0 | 6.2 | 6.1 | 6.0 | 5.7 | 5.7 |
| FDB-052S | 059 309 | 9.7 | 10.6 | 10.1 | 6.9 | 9.2 | 10.2 | 10.5 | 9.2 | 9.1 | 8.9 | 8.5 | 8.5 |
| FDB-053 | 059 308 | 15.5 | 16.9 | 16.1 | 11.0 | 14.6 | 16.3 | 16.7 | 14.7 | 14.4 | 14.2 | 13.5 | 13.6 |
| FDB-053S | 059 310 | 19.3 | 21.1 | 20.1 | 13.8 | 18.3 | 20.3 | 20.8 | 18.4 | 18.0 | 17.7 | 16.9 | 16.9 |
| FDB-082 | 059 311 | 6.8 | 7.4 | 7.1 | 4.8 | 6.4 | 7.1 | 7.3 | 6.4 | 6.3 | 6.2 | 5.9 | 5.9 |
| FDB-082S | 059 314 | 9.9 | 10.8 | 10.3 | 7.0 | 9.4 | 10.4 | 10.7 | 9.4 | 9.2 | 9.1 | 8.6 | 8.7 |
| FDB-083 | 059 312 | 15.8 | 17.2 | 16.4 | 11.2 | 14.9 | 16.6 | 17.0 | 15.0 | 14.7 | 14.4 | 13.8 | 13.8 |
| FDB-083S | 059 315 | 19.8 | 21.6 | 20.6 | 14.1 | 18.7 | 20.8 | 21.3 | 18.8 | 18.4 | 18.1 | 17.3 | 17.3 |
| FDB-084 | 059 313 | 26.4 | 28.8 | 27.5 | 18.8 | 24.9 | 27.8 | 28.4 | 25.1 | 24.6 | 24.2 | 23.0 | 23.1 |
| FDB-084S | 059 316 | 28.3 | 30.9 | 29.5 | 20.1 | 26.8 | 29.8 | 30.5 | 26.9 | 26.4 | 25.9 | 24.7 | 24.8 |
| FDB-162 | 059 317 | 6.8 | 7.4 | 7.1 | 4.8 | 6.4 | 7.1 | 7.3 | 6.4 | 6.3 | 6.2 | 5.9 | 5.9 |
| FDB-163 | 059 318 | 16.2 | 17.7 | 16.9 | 11.5 | 15.3 | 17.1 | 17.5 | 15.4 | 15.1 | 14.9 | 14.2 | 14.2 |
| FDB-163S | 059 321 | 23.0 | 25.1 | 23.9 | 16.4 | 21.7 | 24.2 | 24.8 | 21.9 | 21.4 | 21.1 | 20.1 | 20.1 |
| FDB-164 | 059 319 | 27.9 | 30.5 | 29.1 | 19.9 | 26.4 | 29.4 | 30.1 | 26.6 | 26.0 | 25.6 | 24.4 | 24.5 |
| FDB-164S | 059 322 | 36.0 | 39.3 | 37.5 | 25.6 | 34 | 37.9 | 38.8 | 34.2 | 33.6 | 33.0 | 31.4 | 31.5 |
| FDB-165 | 059 320 | 36.6 | 40.0 | 38.2 | 26.1 | 34.6 | 38.6 | 39.5 | 34.9 | 34.2 | 33.6 | 32.0 | 32.1 |
| FDB-165S | 059 323 | 48.8 | 53.3 | 50.8 | 34.8 | 46.2 | 51.4 | 52.6 | 46.4 | 45.5 | 44.7 | 42.6 | 42.8 |
| FDB-303 | 059 324 | 18.0 | 19.7 | 18.8 | 12.8 | 17.1 | 19 | 19.4 | 17.2 | 16.8 | 16.5 | 15.8 | 15.8 |
| FDB-304 | 059 325 | 31.8 | 34.7 | 33.1 | 22.6 | 30.1 | 33.5 | 34.2 | 30.2 | 29.6 | 29.1 | 27.8 | 27.8 |
| FDB-304S | 003 667 | 38.0 | 41.5 | 39.6 | 27.1 | 35.9 | 40 | 41.0 | 36.2 | 35.4 | 34.8 | 33.2 | 33.3 |
| FDB-305 | 059 326 | 40.3 | 44.0 | 42.0 | 28.7 | 38.1 | 42.4 | 43.4 | 38.3 | 37.6 | 36.9 | 35.2 | 35.3 |
| FDB-305S | 059 327 | 53.8 | 58.7 | 56.0 | 38.3 | 50.8 | 56.6 | 57.9 | 51.2 | 50.1 | 49.3 | 47.0 | 47.1 |
| FDB-307S | 059 328 | 60.5 | 66.1 | 63.1 | 43.1 | 57.2 | 63.7 | 65.2 | 47.3 | 46.4 | 45.6 | 43.4 | 43.6 |
| FDB-415 | 059 329 | 49.7 | 54.3 | 51.8 | 35.4 | 47 | 52.4 | 53.6 | 57.6 | 56.5 | 55.5 | 52.9 | 53.0 |
| FDB-417S | 059 330 | 77.2 | 84.3 | 80.4 | 55.0 | 73 | 81.3 | 83.2 | 73.5 | 72.0 | 70.8 | 67.5 | 67.6 |

| Type | Part No. | Nominal Flow Capacity (kW) nom. Conditions see next page | | | | | | |
|----------|----------|--|-------|-------|----------------|-------|-------|-------|
| | | at 0.14 bar pressure drop | | | | | | |
| | | R134a | R22 | R407C | R404A/ R507 | R407A | R407F | R410A |
| FDB-032 | 059 305 | 8.9 | 9.7 | 9.3 | 6.3 | 8.4 | 9.4 | 9.6 |
| FDB-032S | 059 306 | 13.7 | 15.0 | 14.3 | 9.8 | 13 | 14.5 | 14.8 |
| FDB-052 | 059 307 | 9.3 | 10.2 | 9.7 | 6.7 | 8.8 | 9.8 | 10.1 |
| FDB-052S | 059 309 | 13.7 | 15.0 | 14.3 | 9.8 | 13 | 14.5 | 14.8 |
| FDB-053 | 059 308 | 22.2 | 24.2 | 23.1 | 15.8 | 21 | 23.3 | 23.9 |
| FDB-053S | 059 310 | 27.6 | 30.1 | 28.7 | 19.6 | 26.1 | 29 | 29.7 |
| FDB-082 | 059 311 | 9.8 | 10.7 | 10.2 | 7.0 | 9.3 | 10.3 | 10.6 |
| FDB-082S | 059 314 | 14.2 | 15.5 | 14.8 | 10.1 | 13.4 | 14.9 | 15.3 |
| FDB-083 | 059 312 | 22.6 | 24.7 | 23.6 | 16.1 | 21.4 | 23.8 | 24.4 |
| FDB-083S | 059 315 | 28.4 | 31.0 | 29.6 | 20.2 | 26.8 | 29.9 | 30.6 |
| FDB-084 | 059 313 | 37.7 | 41.2 | 39.3 | 26.9 | 35.7 | 39.7 | 40.7 |
| FDB-084S | 059 316 | 40.4 | 44.1 | 42.1 | 28.8 | 38.2 | 42.5 | 43.5 |
| FDB-162 | 059 317 | 9.8 | 10.7 | 10.2 | 7.0 | 9.3 | 10.3 | 10.6 |
| FDB-163 | 059 318 | 23.1 | 25.2 | 24.0 | 16.4 | 21.8 | 24.3 | 24.9 |
| FDB-163S | 059 321 | 32.9 | 35.9 | 34.2 | 23.4 | 31.1 | 34.6 | 35.4 |
| FDB-164 | 059 319 | 39.9 | 43.6 | 41.6 | 28.4 | 37.8 | 42 | 43.0 |
| FDB-164S | 059 322 | 51.5 | 56.2 | 53.6 | 36.6 | 48.7 | 54.2 | 55.5 |
| FDB-165 | 059 320 | 52.4 | 57.2 | 54.6 | 37.3 | 49.5 | 55.2 | 56.5 |
| FDB-165S | 059 323 | 69.7 | 76.1 | 72.6 | 49.6 | 65.9 | 73.4 | 75.1 |
| FDB-303 | 059 324 | 25.7 | 28.1 | 26.8 | 18.3 | 24.3 | 27.1 | 27.7 |
| FDB-304 | 059 325 | 45.3 | 49.5 | 47.2 | 32.3 | 42.9 | 47.7 | 48.9 |
| FDB-304S | 003 667 | 54.2 | 59.2 | 56.5 | 38.6 | 51.3 | 57.1 | 58.4 |
| FDB-305 | 059 326 | 57.7 | 63.0 | 60.1 | 41.1 | 54.6 | 60.8 | 62.2 |
| FDB-305S | 059 327 | 76.9 | 83.9 | 80.0 | 54.7 | 72.7 | 80.9 | 82.8 |
| FDB-307S | 059 328 | 86.6 | 94.5 | 90.2 | 61.6 | 81.8 | 91.1 | 93.3 |
| FDB-415 | 059 329 | 71.1 | 77.6 | 74.0 | 50.6 | 67.2 | 74.8 | 76.6 |
| FDB-417S | 059 330 | 110.3 | 120.4 | 114.9 | 78.5 | 104.3 | 116.1 | 118.8 |

Water Adsorption Capacity

| Type | Unit Size | Water adsorption capacity (net) in grams | | | | | | | |
|-----------|-----------|--|------|-------|----------------|--------------------------|------|-------|----------------|
| | | 25 °C liquid refrigerant | | | | 52 °C liquid refrigerant | | | |
| | | R134a | R22 | R407C | R404A/ R507 | R134a | R22 | R407C | R404A/ R507 |
| FDB-03... | 3 | 1.9 | 2.0 | 1.7 | 1.9 | 1.8 | 1.7 | 1.6 | 1.9 |
| FDB-05... | 5 | 5.5 | 5.8 | 5.0 | 5.5 | 5.2 | 4.9 | 4.5 | 5.3 |
| FDB-08... | 8 | 8.8 | 9.3 | 8.0 | 8.8 | 8.4 | 7.9 | 7.2 | 8.5 |
| FDB-16... | 16 | 17.7 | 18.5 | 15.9 | 17.6 | 16.8 | 15.7 | 14.5 | 17.1 |
| FDB-30... | 30 | 31.7 | 33.0 | 28.5 | 31.6 | 30.1 | 28.2 | 26.0 | 30.5 |
| FDB-41... | 41 | 44.2 | 46.2 | 39.9 | 44.1 | 42.1 | 39.4 | 36.3 | 42.7 |

The water capacities are according to ARI-Standard 710 for R22 and are based on a equilibrium point dryness (EPD) of 60 PPM water in refrigerant. The EPD for all other mentioned refrigerants according to DIN 8949 is 50 PPM.

Connections

| Type | Part No. | Connection | |
|----------|----------|-------------------------|----------|
| | | Solder/ODF or Flare/SAE | |
| | | inch | mm |
| FDB-032 | 059 305 | 1/4"SAE | 6mm SAE |
| FDB-032S | 059 306 | 1/4"ODF | |
| FDB-052 | 059 307 | 1/4"SAE | 6mm SAE |
| FDB-052S | 059 309 | 1/4"ODF | |
| FDB-053 | 059 308 | 3/8"SAE | 10mm SAE |
| FDB-053S | 059 310 | 3/8"ODF | |
| FDB-082 | 059 311 | 1/4"SAE | 6mm SAE |
| FDB-082S | 059 314 | 1/4"ODF | |
| FDB-083 | 059 312 | 3/8"SAE | 10mm SAE |
| FDB-083S | 059 315 | 3/8"ODF | |
| FDB-084 | 059 313 | 1/2"SAE | 12mm SAE |
| FDB-084S | 059 316 | 1/2"ODF | |
| FDB-162 | 059 317 | 1/4"SAE | 6mm SAE |
| FDB-163 | 059 318 | 3/8"SAE | 10mm SAE |
| FDB-163S | 059 321 | 3/8"ODF | |
| FDB-164 | 059 319 | 1/2"SAE | 12mm SAE |
| FDB-164S | 059 322 | 1/2"ODF | |
| FDB-165 | 059 320 | 5/8"SAE | 16mm SAE |
| FDB-165S | 059 323 | 5/8"ODF | |
| FDB-303 | 059 324 | 3/8"SAE | 10mm SAE |
| FDB-304 | 059 325 | 1/2"SAE | 12mm SAE |
| FDB-304S | 003 667 | 1/2"ODF | |
| FDB-305 | 059 326 | 5/8"SAE | |
| FDB-305S | 059 327 | 5/8"ODF | 16mm SAE |
| FDB-307S | 059 328 | 7/8"ODF | |
| FDB-415 | 059 329 | 5/8"SAE | 16mm SAE |
| FDB-417S | 059 330 | 7/8"ODF | |

Nominal Operating Conditions

Nominal capacity is based on the following conditions:


| Refrigerant | Evaporating temperature | Liquid temperature |
|--|-------------------------|--------------------|
| R22, R134a, R404A, R407C, R410A, R507 | -15°C | +30°C |
| R448A, R449A | | |
| R450A | | |
| R513A, R1234ze | | |

Correction factors for other than the nominal conditions, see the correction factors given in tables at the end of liquid line filter driers BFK, ADK, FDB, ADKS, FDH, FDS in this chapter.

Filter Drier Shells Series ADKS-Plus

For Liquid- and Suction Applications with Replaceable Cores

Features

- Rustproof Aluminum flange cover with notch hole for ease of mounting
- ODF Copper fittings for easy soldering
- Rigid core holder from steel (no plastic)
- Service-friendly core holder and flange cover
- Optimum flow capacity at low pressure drop
- Temperature range TS: -45°C to +65°C
- Max. allowable pressure PS:
34.5 bar (-10°C to +65°C)
25.9 bar (-45°C to -10°C)
- CE marking according PED 97/23 EC
-  Underwriter Laboratories



ADKS-Plus

| Type ADKS-Plus | Part No. | Connection Solder/ODF | | Nominal Flow Capacity (kW) | | | | | | | | | | | | | Number of Blocks S48, H48 W48, F48 |
|---|----------|--------------------------|-------|---------------------------------------|------|-----|-------|------------|-------|-------|-------|-------|-----|-------|-------|-------|--|
| | | | | Pressure Drop 0.07 bar | | | | | | | | | | | | | |
| | | | | mm | inch | R22 | R134a | R404A/R507 | R407A | R407F | R407C | R410A | R22 | R448A | R449A | R450A | |
| Conformity assessment cat. I, procedure module A | | | | | | | | | | | | | | | | | |
| 485T | 883 551 | 16 | 5/8 | 78 | 72 | 51 | 68 | 75 | 75 | 77 | 100 | 68 | 67 | 66 | 63 | 63 | 1 |
| 487T | 883 552 | 22 | 7/8 | 145 | 133 | 95 | 126 | 140 | 138 | 143 | 182 | 126 | 124 | 122 | 116 | 116 | |
| 489T | 883 553 | | 1 1/8 | 204 | 187 | 133 | 177 | 197 | 195 | 202 | 262 | 178 | 174 | 172 | 163 | 164 | |
| 4811T | 883 554 | 35 | 1 3/8 | 285 | 261 | 186 | 247 | 275 | 272 | 281 | 355 | 248 | 243 | 239 | 228 | 228 | |
| 4813T MM | 883 836 | 42 | | 310 | 284 | 202 | 268 | 299 | 196 | 306 | 390 | 270 | 265 | 260 | 248 | 249 | |
| 4817 | 882 603 | 54 | 2 1/8 | Primary for suction line applications | | | | | | | | | | | | | |
| 967T | 883 555 | 22 | 7/8 | 159 | 146 | 104 | 138 | 153 | 152 | 157 | 199 | 139 | 136 | 134 | 127 | 128 | 2 |
| 969T | 883 556 | | 1 1/8 | 250 | 229 | 163 | 217 | 241 | 239 | 247 | 300 | 218 | 214 | 210 | 200 | 201 | |
| 9611T | 883 557 | 35 | 1 3/8 | 305 | 279 | 199 | 264 | 294 | 291 | 301 | 402 | 266 | 260 | 256 | 244 | 245 | |
| 9613T | 883 558 | | 1 1/8 | 350 | 321 | 228 | 303 | 337 | 334 | 345 | 470 | 305 | 299 | 294 | 280 | 281 | |
| 9613T MM | 883 559 | 42 | | 355 | 325 | 231 | 307 | 342 | 339 | 350 | 480 | 309 | 303 | 298 | 284 | 285 | |
| 9617 | 887 215 | 54 | | 350 | 321 | 228 | | | 334 | 345 | 470 | 305 | 299 | 294 | 280 | 281 | |
| 1449T | 883 560 | | 1 1/8 | 252 | 231 | 165 | 219 | 243 | 241 | 249 | 313 | 220 | 216 | 212 | 202 | 202 | 3 |
| 14411T | 883 561 | 35 | 1 3/8 | 351 | 322 | 229 | 304 | 339 | 335 | 347 | 438 | 306 | 300 | 295 | 281 | 282 | |
| 14413T | 883 562 | | 1 1/8 | 354 | 325 | 231 | 307 | 342 | 338 | 350 | 482 | 309 | 303 | 298 | 284 | 284 | |
| 14413T MM | 883 563 | 42 | | 360 | 330 | 235 | 312 | 347 | 343 | 355 | 490 | 314 | 307 | 302 | 288 | 289 | |
| 14417T | 883 564 | 54 | 2 1/8 | 420 | 385 | 274 | 364 | 405 | 401 | 415 | 560 | 366 | 359 | 353 | 336 | 337 | |
| Conformity assessment cat. II, procedure module D1 | | | | | | | | | | | | | | | | | |
| 19211T | 883 565 | 35 | 1 3/8 | 358 | 328 | 233 | 310 | 345 | 342 | 353 | 440 | 312 | 306 | 301 | 287 | 287 | 4 |
| 19213T | 883 566 | | 1 1/8 | 395 | 362 | 258 | 342 | 381 | 377 | 390 | 506 | 344 | 337 | 332 | 316 | 317 | |
| 19213T MM | 883 567 | 42 | | 400 | 366 | 261 | 346 | 386 | 382 | 395 | 510 | 349 | 342 | 336 | 320 | 321 | |
| 19217T | 883 568 | 54 | 2 1/8 | 430 | 394 | 281 | 373 | 415 | 411 | 425 | 567 | 375 | 368 | 361 | 344 | 345 | |

Correction factors for other than the nominal conditions use the correction factors given in tables at the end of liquid line filter driers BFK, ADK, FDB, ADKS, FDH, FDS Cores see next page.

| Type ADKS-Plus | Part No. | Connection Solder/ODF | | Nominal Flow Capacity (kW) | | | | | | Number of Blocks S48, H48 W48, F48 |
|---|----------|-----------------------|------|----------------------------|------------|-------|-------|-------|-------|--|
| | | | | Pressure Drop 0.14 bar | | | | | | |
| | | mm | inch | R134a | R404A/R507 | R407A | R407F | R407C | R410A | |
| Conformity assessment cat. I, procedure module A | | | | | | | | | | |
| 485T | 883 551 | 16 | ¾ | 92 | 65 | 87 | 96 | 95 | 99 | 1 |
| 487T | 883 552 | 22 | ¾ | 167 | 119 | 158 | 175 | 174 | 180 | |
| 489T | 883 553 | | 1 ¼ | 240 | 171 | 227 | 252 | 250 | 258 | |
| 4811T | 883 554 | 35 | 1 ¾ | 325 | 231 | 307 | 342 | 338 | 350 | |
| 4813T MM | 883 836 | 42 | | 357 | 254 | 338 | 376 | 372 | 385 | |
| 4817 | 882 603 | 54 | 2 ¼ | | | | | | | |
| 967T | 883 555 | 22 | ¾ | 182 | 129 | 172 | 191 | 189 | 196 | 2 |
| 969T | 883 556 | | 1 ¼ | 275 | 196 | 260 | 289 | 286 | 296 | |
| 9611T | 883 557 | 35 | 1 ¾ | 369 | 262 | 348 | 388 | 384 | 397 | |
| 9613T | 883 558 | | 1 ¼ | 431 | 306 | 407 | 453 | 448 | 464 | |
| 9613T MM | 883 559 | 42 | | 440 | 313 | 416 | 463 | 458 | 474 | |
| 9617 | 887 215 | 54 | | 431 | 306 | | | 448 | 464 | |
| 1449T | 883 560 | | 1 ¼ | 287 | 204 | 271 | 302 | 299 | 309 | 3 |
| 14411T | 883 561 | 35 | 1 ¾ | 401 | 285 | 379 | 422 | 417 | 432 | |
| 14413T | 883 562 | | 1 ¼ | 441 | 314 | 417 | 464 | 460 | 476 | |
| 14413T MM | 883 563 | 42 | | 449 | 319 | 424 | 472 | 467 | 484 | |
| 14417T | 883 564 | 54 | 2 ¼ | 513 | 365 | 485 | 540 | 534 | 553 | |
| Conformity assessment cat. II, procedure module D1 | | | | | | | | | | |
| 19211T | 883 565 | 35 | 1 ¾ | 403 | 287 | 381 | 424 | 419 | 434 | 4 |
| 19213T | 883 566 | | 1 ¼ | 464 | 330 | 438 | 488 | 483 | 500 | |
| 19213T MM | 883 567 | 42 | | 467 | 333 | 442 | 492 | 487 | 503 | |
| 19217T | 883 568 | 54 | 2 ¼ | 519 | 370 | 491 | 547 | 541 | 560 | |

Correction factors for other than the nominal conditions use the correction factors given in tables at the end of liquid line filter driers BFK, ADK, FDB, ADKS, FDH, FDS Cores see next page.

Nominal Operating Conditions

Nominal capacity (Q_n) is based on the following conditions:

| Refrigerant | Evaporating temperature | Liquid temperature |
|---|-------------------------|--------------------|
| R744 | -40°C | -10°C |
| R22, R134a, R404A, R407C, R410A, R507 | -15°C | +30°C |
| R448A, R449A | | |
| R450A | | |
| R513A, R1234ze | | |

Filter Drier Shells Series FDH

For Liquid- and Suction Applications with Replaceable Cores

Features

- Steel flange cover with notch hole for ease of mounting
- Plated steel ODF connections
- Rigid core holder from steel (no plastic)
- Service-friendly core holder and flange cover
- Optimum flow capacity at low pressure drop
- Temperature range TS: -45°C to +65°C
- Max. allowable pressure PS:
46 bar (-10°C to +65°C)
25.9 bar (-45°C to -10°C)
- CE marking according PED 97/23 EC



FDH

| Type | Part No. | Connection Solder/ODF | | Nominal Flow Capacity (kW) | | | | | | | | | | | | Number of Blocks |
|---|----------|-----------------------|--------|----------------------------|-------|---------------|-------|-------|------|------------------------|-------|--------------|-------|-------|------|------------------|
| | | mm | inch | Pressure Drop 0.07 bar | | | | | | Pressure Drop 0.14 bar | | | | | | |
| | | | | R22 | R134a | R404A R507 | R407C | R410A | R744 | R22 | R134a | R404 R507 | R407C | R410A | R744 | |
| Conformity assessment cat. I, procedure module A | | | | | | | | | | | | | | | | |
| FDH-485 | 880 300 | 16 | 5/8" | 78 | 72 | 51 | 75 | 77 | 114 | 100 | 92 | 65 | 95 | 99 | 146 | 1 |
| FDH-487 | 880 301 | 22 | 7/8" | 145 | 133 | 95 | 138 | 143 | 211 | 182 | 167 | 119 | 174 | 180 | 265 | |
| FDH-489 | 880 302 | | 1 1/8" | 204 | 187 | 133 | 195 | 202 | 297 | 262 | 240 | 171 | 250 | 258 | 380 | |
| FDH-969 | 880 306 | | 1 1/8" | 250 | 229 | 163 | 239 | 247 | 364 | 300 | 275 | 196 | 286 | 296 | 436 | 2 |
| FDH-9611 | 880 307 | 35 | 1 3/8" | 305 | 279 | 199 | 291 | 301 | 443 | 402 | 369 | 262 | 384 | 397 | 585 | |

Nominal conditions see previous page.

Correction factors for other than the nominal conditions see next pages.

Features

- Water capacities to suit specific system conditions
- Exceptional acid capacities for normal system protection, or to effectively clean-up following a compressor burnout (W48)



Core H48

Cores for ADKS-Plus and FDH have to be ordered separately

| Size | Part No. | Water Adsorption Capacity (gram) | | | | | | | | Acid Adsorption capacity (g) |
|---|----------|----------------------------------|------|---------------|-------|-------------------------|------|---------------|-------|------------------------------|
| | | Liquid Temperature 24°C | | | | Liquid Temperature 52°C | | | | |
| | | R134a | R22 | R404A R507 | R407C | R134a | R22 | R404A R507 | R407C | |
| S48 | 003 508 | 79.7 | 74.7 | 82.3 | 56.7 | 73.0 | 66.7 | 75.9 | 48.9 | 16.3 |
| H48 | 006 969 | 35.0 | 31.7 | 37.0 | 24.4 | 29.0 | 24.5 | 28.9 | 18.1 | 44.6 |
| W48 | 006 970 | 24.7 | 22.1 | 26.2 | 17.1 | 19.9 | 16.4 | 19.5 | 12.1 | 39.7 |
| F48 | 006 973 | Filter for suction line | | | | | | | | |
| H100 / W100 are for use with phased-out ADKS-300/-400 only | | | | | | | | | | |
| H100 | 006 971 | 59.9 | 53.3 | 63.8 | 41.2 | 47.4 | 38.3 | 46.0 | 28.5 | 105.1 |
| W100 | 006 972 | 52.7 | 47.1 | 56.0 | 36.4 | 42.4 | 34.7 | 41.4 | 25.7 | 85.5 |

Filter-Drier Shells With Quick-Cap Series FDS-24

For Liquid- and Suction Applications with Replaceable Cores

Features

- Quick-cap flange (one bolt) design makes replacing of cores in a matter of seconds
- Ideal for retrofit, reducing installation / material cost
- Ideal for refrigerant recovery / reclaim units with regular change of filter-drier
- Compatible with CFC, HCFC and HFC refrigerants
- Free volume as a receiver in FDS-24... (580 cm³)
- ODF Copper fittings for easy soldering
- Corrosion-resistant powder painting of shell body
- Temperature range TS: -45°C to +65°C
Max. allowable pressure PS:
34.5 bar (-10°C to +65°C)
25.9 bar (-45°C to -10°C)
- No CE marking according art.3.3 PED 97/23 EC
- HP marking according to German Pressurized Vessel Directive



FDS-24

Selection Chart Suction Application

| Type | Part No. | Connec-tion | | Nominal Flow Capacity (kW) | | | | | | | | | | | | |
|---------|----------|-------------|-------|----------------------------|------|-------|------------|-------|-------|-------|-------|---------|------------|------|-------|------------|
| | | mm | inch | Block Core S24 | | | | | | | | | Filter F24 | | | |
| | | | | R134a | R22 | R407C | R507 R404A | R448A | R449A | R450A | R513A | R1234ze | R134a | R22 | R407C | R507 R404A |
| FDS-245 | 003 573 | 16 | 5/8 | 22.3 | 30.6 | 28.5 | 26.0 | 65.1 | 63.8 | 62.7 | 59.8 | 59.9 | 24.7 | 33.9 | 31.5 | 28.8 |
| FDS-247 | 003 574 | 22 | 7/8 | 32.2 | 44.1 | 44.1 | 37.5 | 97.4 | 95.4 | 93.8 | 89.4 | 89.7 | 37.8 | 51.8 | 48.2 | 44.0 |
| FDS-249 | 003 575 | | 1 1/8 | 46.0 | 63.0 | 58.6 | 53.6 | 98.5 | 96.5 | 94.9 | 90.4 | 90.7 | 50.7 | 69.4 | 64.5 | 59.0 |
| FDS-249 | 003 576 | 28 | | 44.2 | 60.5 | 56.3 | 51.4 | 99.0 | 97.0 | 95.3 | 90.9 | 91.1 | 48.6 | 66.9 | 61.9 | 56.6 |

Selection Chart Liquid Application

| Type | Part No. | Connection Solder/ODF | | Nominal Flow Capacity (KW) | | | | | | | | | | | | | |
|---------|----------|-----------------------|-------|----------------------------|-------|-------------|-------|-------|-------|-------|------------------------|-------|-------------|-------|-------|-------|-------|
| | | mm | inch | Pressure Drop 0.07 bar | | | | | | | Pressure Drop 0.14 bar | | | | | | |
| | | | | R22 | R134a | R507/ R404A | R407A | R407F | R407C | R410A | R22 | R134a | R507/ R404A | R407A | R407F | R407C | R410A |
| FDS-245 | 003 573 | 16 | 5/8 | 75 | 68 | 49 | 65 | 72 | 71 | 74 | 98 | 90 | 64 | 85 | 94 | 93 | 97 |
| FDS-247 | 003 574 | 22 | 7/8 | 112 | 102 | 73 | 97 | 108 | 107 | 110 | 151 | 139 | 99 | 131 | 146 | 144 | 149 |
| FDS-249 | 003 575 | | 1-1/8 | 113 | 104 | 74 | 98 | 109 | 108 | 112 | 160 | 147 | 104 | 139 | 154 | 153 | 158 |
| FDS-249 | 003 576 | 28 | | 114 | 104 | 74 | 98 | 109 | 108 | 112 | 163 | 150 | 106 | 141 | 157 | 156 | 161 |

Correction factors for other than the nominal conditions see next page.

Selection Chart Cores

| Type | Part No. | Water Capacity in Grams at a Liquid Temperature of 24°C (52°C) | | | Application | Acid Adsorption capacity (g) |
|------|----------|--|-------------|-------------|------------------------------|------------------------------|
| | | R134a | R22 | R404A/R507 | | |
| S24 | 003 504 | 35.2 (32.3) | 34.8 (29.5) | 35.4 (32.1) | Liquid and suction line | 8.9 |
| W24 | 003 505 | 12.5 (9.2) | 12.3 (8.9) | 13.5 (10.4) | For motor burn-out (Suction) | 25.6 |
| F24 | 003 506 | - (-) | - (-) | - (-) | Filter for suction line | - |

Cores have to be ordered separately. 1 piece needed for FDS24 shell.

Spare Parts

| Description | Type | Part No. |
|--------------------------|-----------|----------------|
| ADKS, FDH | | |
| Gasket Set | X 99961 | 003 710 |
| Schrader Nipple 1/4" NPT | X 11562-2 | 803 251 |
| Core Holder | X 99963 | 003 712 |

| Description | Type | Part No. |
|---------------|---------|----------------|
| FDS 24 | | |
| Gasket Set | X 99967 | 003 716 |
| O-Ring Set | X 99968 | 003 717 |
| Core Holder | X 99969 | 003 718 |

Suction Line Filters and Filter Driers Series ASF and ASD

Hermetic Design

Features

- Minimum pressure drop due to internal construction and compacted bead style
- Service-friendly with 2 Schrader valves for pressure drop measurement
- ODF Copper fittings for easy soldering
- Filtration down to 40 microns
- Temperature range TS: -45°C to +50°C
- Max. allowable pressure PS: 27.5 bar
- No CE marking according art. 3.3 PED 97/23 EC
- HP marking according to German Pressurized Vessel Directive



ASF, ASD

Suction Line Filters

| Type | Part No. | Connection Solder/ODF | | Nominal Capacity Q _n kW | | | | | | | | |
|------------|----------|-----------------------|-------|------------------------------------|------|-------|-------|------|-------------|-------|-------|------|
| | | mm | inch | R134a | R22 | R404A | R407C | R507 | R448A R449A | R450A | R513A | R507 |
| ASF-28 S3 | 008 965 | | 3/8 | 6.0 | 8.4 | 7.7 | 7.8 | 7.7 | 8.3 | 3.7 | 3.4 | 3.2 |
| ASF-28 S4 | 008 941 | | 1/2 | 9.9 | 14.4 | 13.4 | 13.4 | 13.4 | 13.7 | 6.5 | 5.9 | 5.6 |
| ASF-35 S5 | 008 915 | 16 | 5/8 | 15.9 | 23.2 | 21.4 | 21.6 | 21.4 | 20.9 | 9.9 | 8.9 | 8.5 |
| ASF-45 S6 | 008 946 | | 3/4 | 23.3 | 34.5 | 32.0 | 32.1 | 32.0 | 25.2 | 13.3 | 12.0 | 11.4 |
| ASF-45 S7 | 008 904 | 22 | 7/8 | 32.5 | 42.5 | 34.5 | 39.5 | 34.5 | 33.1 | 17.3 | 15.7 | 14.9 |
| ASF-50 S9 | 008 908 | | 1 1/8 | 46.0 | 67.1 | 55.5 | 62.4 | 55.5 | 47.5 | 24.8 | 22.5 | 21.3 |
| ASF-75 S11 | 008 919 | 35 | 1 3/8 | 60.2 | 85.4 | 70.7 | 79.4 | 70.7 | 58.3 | 29.9 | 27.1 | 25.7 |
| ASF-75 S13 | 008 940 | | 1 3/8 | 65.4 | 87.5 | 73.1 | 81.4 | 73.1 | 62.2 | 31.6 | 28.7 | 27.2 |

Suction Line Filter Driers

| Type | Part No. | Connection Solder/ODF | | Nominal Capacity Q _n kW | | | | | | | | |
|------------|----------|-----------------------|-------|------------------------------------|------|-------|-------|------|-------------|-------|-------|------|
| | | mm | inch | R134a | R22 | R404A | R407C | R507 | R448A R449A | R450A | R513A | R507 |
| ASD-28 S3 | 008 909 | | 3/8 | 5.5 | 8.1 | 7.4 | 7.5 | 7.4 | 8.6 | 4.1 | 3.7 | 3.5 |
| ASD-28 S4 | 008 910 | | 1/2 | 9.1 | 13.4 | 12.7 | 12.5 | 12.7 | 14.8 | 6.8 | 6.2 | 5.8 |
| ASD-35 S5 | 008 899 | 16 | 5/8 | 14.3 | 20.4 | 19.0 | 19.0 | 19.0 | 23.7 | 11.2 | 10.2 | 9.6 |
| ASD-45 S6 | 008 925 | | 3/4 | 19.1 | 24.6 | 22.5 | 22.9 | 22.5 | 35.3 | 16.3 | 14.8 | 14.0 |
| ASD-45 S7 | 008 896 | 22 | 7/8 | 25.0 | 32.3 | 26.4 | 30.0 | 26.4 | 43.2 | 22.8 | 20.7 | 19.6 |
| ASD-50 S9 | 008 881 | | 1 1/8 | 35.3 | 46.4 | 38.3 | 43.2 | 38.3 | 68.4 | 32.3 | 29.3 | 27.8 |
| ASD-75 S11 | 008 891 | 35 | 1 3/8 | 42.9 | 56.9 | 47.8 | 52.9 | 47.8 | 57.6 | 40.8 | 37.0 | 35.1 |
| ASD-75 S13 | 008 953 | | 1 3/8 | 45.2 | 60.8 | 51.0 | 56.5 | 51.0 | 86.4 | 47.6 | 43.2 | 40.9 |

Nominal flow capacity at +4°C evaporating temperature (saturated condition/dew point) and a pressure drop of 0.21 bar between inlet and outlet of ASF/ASD. Correction factor for other evaporating temperatures than +4°C:

$$Q_n = Q_o \times K_s$$

- Q_n: Nominal capacity
 K_s: Correction factor for a pressure drop corresponding 1 K saturation temperature
 Q_o: Required cooling capacity

| Evaporating Temperature (°C) | +4 | 0 | -5 | -10 | -15 | -20 | -25 | -30 | -35 | -40 |
|----------------------------------|------|------|------|------|------|------|------|------|------|------|
| Correction Factor k _s | 1.00 | 1.12 | 1.35 | 1.75 | 2.00 | 2.50 | 3.00 | 3.75 | 5.00 | 6.60 |

Water and Acid Adsorption Capacity

| Type | Water Adsorption Capacity (gram) | | | | | | | | | | Acid Adsorption Capacity (g) |
|--------|----------------------------------|------|------------|-------|-------|-------------------------|-----|------------|-------|-------|------------------------------|
| | Liquid Temperature 24°C | | | | | Liquid Temperature 52°C | | | | | |
| | R134a | R22 | R404A R507 | R407C | R410A | R134a | R22 | R404A R507 | R407C | R410A | |
| ASD-28 | 11.8 | 5.7 | 12.2 | 9.1 | 8.0 | 10.0 | 3.6 | 9.7 | 6.7 | 5.6 | 3.0 |
| ASD-35 | 14.5 | 7.0 | 15.0 | 11.2 | 9.9 | 12.3 | 4.4 | 12.0 | 8.2 | 6.9 | 3.6 |
| ASD-45 | 18.0 | 8.8 | 18.6 | 13.9 | 12.3 | 15.3 | 5.5 | 14.9 | 10.2 | 8.6 | 4.5 |
| ASD-50 | 21.4 | 10.4 | 22.2 | 16.5 | 14.6 | 18.2 | 6.5 | 17.7 | 12.1 | 10.2 | 5.4 |
| ASD-75 | 31.5 | 15.4 | 32.6 | 24.3 | 21.5 | 26.7 | 9.6 | 26.0 | 17.8 | 15.0 | 7.9 |

Suction Line Filter and Filter Drier Shells Series BTAS

for replaceable Filters and Filter Drier Cores

Features

- Corrosion-free brass body ideal for suction line applications
- Extremely large filtration area for optimum flow capacity
- Low pressure drop
- Filtration down to 40 micron
- Temperature range TS: -45°C ... +50°C
- Max. allowable pressure PS: 24 bar
- UL/CUL file number: SA 3124



BTAS

Suction Line Shells with Filter Core (please order separately)

| Type | Part No. | Connection Solder/ODF | | Nominal Capacity Q _n kW | | | | | | | | | Filter Core | |
|--|----------|-----------------------|-------|------------------------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------------|----------|
| | | mm | inch | R134a | R22 | R404A | R407C | R507 | R448A R449A | R450A | R513A | R507 | Type | Part No. |
| No CE marking according to art. 3.3 PED 97/23. HP marking according to German pressurised vessel directive | | | | | | | | | | | | | | |
| BTAS 25 | 015 353 | | 5/8 | 12.5 | 17.1 | 13.9 | 15.9 | 13.9 | | | | | A2F | 009 907 |
| BTAS 27 | 015 354 | 22 | 7/8 | 22.3 | 29.6 | 24.3 | 27.5 | 24.3 | 31.7 | 16.3 | 14.8 | 14.6 | A3F | 009 909 |
| BTAS 39 | 015 355 | | 1 1/8 | 37.7 | 50.4 | 40.6 | 46.9 | 40.6 | 50.4 | 24.8 | 22.5 | 22.2 | | |
| BTAS 311 | 015 356 | 35 | 1 3/8 | 60.3 | 80.7 | 65.2 | 75.1 | 65.2 | 54.0 | 27.5 | 25.0 | 24.7 | | |
| BTAS 313 | 015 357 | | 1 5/8 | 73.4 | 97.5 | 81.1 | 90.7 | 81.1 | 86.4 | 44.2 | 40.1 | 39.6 | | |
| BTAS 342 | 015 358 | 42 | | 73.4 | 97.5 | 81.1 | 90.7 | 81.1 | 86.4 | 44.2 | 40.1 | 39.6 | A4F | 009 911 |
| BTAS 317 | 015 359 | 54 | 2 1/8 | 97.6 | 127.7 | 104.8 | 118.8 | 104.8 | 104.3 | 54.4 | 49.3 | 48.7 | | |
| BTAS 417 | 015 360 | 54 | 2 1/8 | 134.7 | 178.2 | 145.3 | 165.7 | 145.3 | 190.7 | 98.6 | 89.4 | 88.3 | | |
| CE marked, Conformity assessment cat. I, procedure module A | | | | | | | | | | | | | | |
| BTAS 521 | 015 361 | | 2 5/8 | 209.0 | 282.4 | 229.8 | 262.6 | 229.8 | 302.2 | 153.0 | 138.7 | 137.0 | A5F | 009 913 |
| BTAS 525 | 015 362 | | 3 1/8 | 260.1 | 346.1 | 283.9 | 321.9 | 283.9 | 370.6 | 190.4 | 172.6 | 170.4 | | |
| BTAS 580 | 015 363 | 80 | | 260.1 | 346.1 | 283.9 | 321.9 | 283.9 | 370.6 | 190.4 | 172.6 | 170.4 | | |

Filter Core has to be ordered separately.

Suction Line Shells with Filter Drier Core (please order separately)

| Type | Part No. | Connection Solder/ODF | | Nominal Capacity Q _n kW | | | | | | | | | Filter Drier Core | |
|--|----------|-----------------------|-------|------------------------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------------------|----------|
| | | mm | inch | R134a | R22 | R404A | R407C | R507 | R448A R449A | R450A | R513A | R507 | Type | Part No. |
| No CE marking according to art. 3.3 PED 97/23. HP marking according to German pressurised vessel directive | | | | | | | | | | | | | | |
| BTAS 25 | 015 353 | | 5/8 | 11.6 | 15.5 | 12.8 | 14.3 | 12.8 | 16.6 | 8.5 | 7.7 | 7.6 | A2F-D | 009 908 |
| BTAS 27 | 015 354 | 22 | 7/8 | 19.1 | 25.2 | 20.6 | 23.4 | 20.6 | 27.0 | 13.9 | 12.6 | 12.5 | | |
| BTAS 39 | 015 355 | | 1 1/8 | 34.4 | 45.7 | 37.5 | 42.5 | 37.5 | 36.0 | 18.0 | 16.3 | 16.1 | A3F-D | 009 910 |
| BTAS 311 | 015 356 | 35 | 1 3/8 | 49.2 | 65.5 | 53.7 | 60.9 | 53.7 | 50.4 | 25.2 | 22.8 | 22.5 | | |
| BTAS 313 | 015 357 | | 1 5/8 | 57.1 | 77.3 | 62.5 | 71.9 | 62.5 | 72.0 | 37.4 | 33.9 | 33.5 | | |
| BTAS 342 | 015 358 | 42 | | 57.1 | 77.3 | 62.5 | 71.9 | 62.5 | 72.0 | 37.4 | 33.9 | 33.5 | | |
| BTAS 317 | 015 359 | 54 | 2 1/8 | 77.1 | 94.1 | 77.7 | 87.5 | 77.7 | 82.8 | 40.8 | 37.0 | 36.5 | A4F-D | 009 912 |
| BTAS 417 | 015 360 | 54 | 2 1/8 | 106.8 | 144.5 | 118.3 | 134.4 | 118.3 | 154.7 | 78.2 | 70.9 | 70.0 | | |
| CE marked, Conformity assessment cat. I, procedure module A | | | | | | | | | | | | | | |
| BTAS 521 | 015 361 | | 2 5/8 | 153.3 | 205.1 | 169.0 | 190.7 | 169.0 | 219.5 | 112.2 | 101.7 | 100.4 | A5F-D | 009 914 |
| BTAS 525 | 015 362 | | 3 1/8 | 181.2 | 242.0 | 199.4 | 225.1 | 199.4 | 259.1 | 132.6 | 120.2 | 118.7 | | |
| BTAS 580 | 015 363 | 80 | | 181.2 | 242.0 | 199.4 | 225.1 | 199.4 | 259.1 | 132.6 | 120.2 | 118.7 | | |

Filter Drier Core has to be ordered separately.

Nominal capacity at +4°C evaporating temperature (saturated condition/ dew point) and a pressure drop of 0.21 bar between inlet and outlet of BTAS. Correction factor for other evaporating temperatures than +4°C:

$$Q_n = Q_o \times K_s$$

Q_n : Nominal capacity
 K_s : Correction factor for a pressure drop corresponding 1K saturation temperature
 Q_o : Required cooling capacity

| Evaporating Temperature (°C) | +4 | 0 | -5 | -10 | -15 | -20 | -25 | -30 | -35 | -40 |
|------------------------------|------|------|------|------|------|------|------|------|------|------|
| Correction Factor k_t | 1.00 | 1.12 | 1.35 | 1.75 | 2.00 | 2.50 | 3.00 | 3.75 | 5.00 | 6.60 |

BTAS - Water and Acid Adsorption Capacity

| Core | Water Adsorption Capacity (gram) | | | | | | | | Acid Adsorption capacity (g) |
|-------|----------------------------------|------|------------|-------|-------------------------|------|------------|-------|------------------------------|
| | Liquid Temperature 24°C | | | | Liquid Temperature 52°C | | | | |
| | R134a | R22 | R404A R507 | R407C | R134a | R22 | R404A R507 | R407C | |
| A2F-D | 2.8 | 2.5 | 2.9 | 4.8 | 2.3 | 1.9 | 2.3 | 5.0 | 3.7 |
| A3F-D | 7.6 | 6.8 | 8.0 | 13.3 | 6.3 | 5.3 | 6.2 | 13.8 | 10.3 |
| A4F-D | 14.8 | 13.3 | 15.7 | 25.9 | 12.2 | 10.3 | 12.2 | 26.9 | 20.1 |
| A5F-D | 21.8 | 19.6 | 23.1 | 38.2 | 18.0 | 15.1 | 17.9 | 39.7 | 29.6 |

Spare parts

| Repair Kits with cover, screws and gaskets | Type | Part No. |
|--|-------------------|----------------|
| Repair kit BTAS 2 | KD 30519-2 | 065 970 |
| Repair kit BTAS 3 | KD 30519-3 | 065 971 |
| Repair kit BTAS 4 | KD 30519-4 | 065 972 |
| Repair kit BTAS 5 | KD 30519-5 | 065 973 |

Moisture / Liquid Indicators Series MIA and CIA

Features

- MIA for HFC, HFO/HFO Blends & CO₂, max. allowable pressure 45 bar
- CIA for HFC & CO₂, max. allowable pressure 60 bar
- Fully hermetic
- Corrosion-resistant stainless steel body
- Crystal indicator element for long lifetime and reliability
- Indication of dryness according to ASERCOM recommendation
- Easy determination of moisture content
- Sensitive indicator with calibrated four colours
- Large clear viewing area
- Lightweight
- ODF extended tube configurations suitable for all commercial applications
- UL certified for Canada, see SA 4876 (MIA only, except MIA-078)



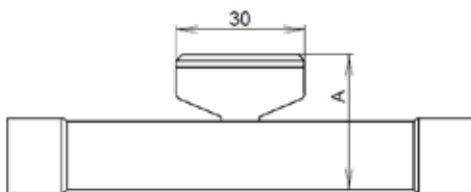
Selection Chart

| Type | Part No. | for Tube Outside Ø | Height A (mm) | Length B (mm) | Weight (g) |
|-------------------|----------|--------------------|---------------|---------------|------------|
| MIA 014 | 805 883 | ¼" | 25.7 | 98.0 | 60 |
| MIA 038 | 805 884 | ⅜" | 28.5 | 109.0 | 70 |
| MIA 012 | 805 885 | ½" | 31.8 | 113.0 | 75 |
| MIA 058 / MIA M16 | 805 886 | ⅝" / 16mm | 31.8 | 108.5 | 85 |
| MIA 078 | 805 887 | ⅞" | 37.8 | 122.5 | 150 |
| MIA 118 | 805 892 | 1 ⅛" | 43.5 | 122.5 | 190 |

| | | | | | |
|-----------------------|---------|-------|------|-------|-----|
| MIA M06 | 805 880 | 6 mm | 25.9 | 98.0 | 60 |
| MIA M10 | 805 881 | 10 mm | 28.5 | 109.0 | 70 |
| MIA M12 | 805 882 | 12 mm | 28.5 | 113.0 | 75 |
| MIA M28 | 805 891 | 28 mm | 43.5 | 122.5 | 190 |
| MIA M10 S Female/Male | 805 888 | 10 mm | 28.7 | 119.0 | 75 |
| MIA M12 S Female/Male | 805 889 | 12 mm | 28.5 | 113.0 | 75 |

| | | | | | |
|---------------|--------|--------------|------|-------|----|
| CIA 014 | 805910 | 1/4" | 25.7 | 98.0 | 60 |
| CIA 038 | 805911 | 3/8" | 28.5 | 109.0 | 70 |
| CIA 012 | 805912 | 1/2" | 31.8 | 113.0 | 75 |
| CIA 058 / M16 | 805913 | 5/8" or 16mm | 31.8 | 108.5 | 85 |

| | | | | | |
|---------|--------|------|------|-------|----|
| CIA M06 | 805914 | 6mm | 25.9 | 98.0 | 60 |
| CIA M10 | 805915 | 10mm | 28.5 | 109.0 | 70 |
| CIA M12 | 805916 | 12mm | 28.5 | 113.0 | 75 |



Water Contents* by Indicator Color

| Refrigerant | Liquid Temperature °C | blue: dry | purple | fushia: Caution | rose: Caution - wet |
|------------------|-----------------------|-----------|--------|-----------------|---------------------|
| R22 | +25 | 25 | 40 | 80 | 145 |
| | +38 | 35 | 65 | 130 | 105 |
| | +52 | 50 | 90 | 185 | 290 |
| R404/R507 | +25 | 15 | 33 | 60 | 120 |
| | +38 | 25 | 50 | 110 | 150 |
| | +52 | 45 | 60 | 140 | 180 |
| R134a | +25 | 20 | 35 | 90 | 130 |
| | +38 | 35 | 55 | 120 | 160 |
| | +52 | 50 | 85 | 150 | 190 |
| R407C | +25 | 26 | 42 | 94 | 151 |
| | +38 | 40 | 68 | 144 | 232 |
| | +52 | 64 | 109 | 230 | 371 |
| R410A | +25 | 30 | 50 | 110 | 165 |
| | +38 | 55 | 85 | 190 | 290 |
| | +52 | 75 | 120 | 270 | 420 |
| R744 | -40 | 3 | 5 | 10 | 16 |
| | -20 | 6 | 10 | 20 | 32 |
| | -10 | 8 | 14 | 29 | 46 |
| | 0 | 11 | 19 | 39 | 63 |
| | +5 | 13 | 22 | 46 | 75 |
| | +20 | 20 | 34 | 72 | 116 |

* Water content in mg Water per kg refrigerant (ppm)

Moisture / Liquid Indicators Series AMI

Features

- High accuracy of moisture indication according to ASERCOM recommendation
- Fused glass - no leakage
- Long lifetime of indicators by utilization of crystals
- Indicator with high resistance against acid and water
- Wide angle view for exact distinction of vapor and liquid
- Max. allowable pressure PS: 31 bar



AMI-1 SS



AMI-1 TT



AMI-3

Selection Chart

| Type | | Part No. | Connection | | Configuration |
|-------|---------|----------|------------|------|--|
| | | | mm | inch | |
| AMI-1 | SS 2 MM | 805 732 | 6 | | Female solder x female solder ODF x ODF |
| | SS 2 | 805 713 | | ¼ | |
| | SS 3 MM | 805 733 | 10 | | |
| | SS 3 | 805 714 | | ⅜ | |
| | SS 4 MM | 805 734 | 12 | | |
| | SS 4 | 805 715 | | ½ | |
| | SS 5 | 805 716 | 16 | ⅝ | |
| | SS 7 | 805 717 | 22 | ⅞ | |
| | SS 9 MM | 805 703 | 28 | | |
| | SS 9 | 805 705 | | 1 ⅛ | |
| | TT 2 MM | 805 697 | 6 | | Female solder x female solder ODF x ODF (with extended copper tubes) |
| | TT 2 | 805 655 | | ¼ | |
| | TT 3 MM | 805 698 | 10 | | |
| | TT 3 | 805 654 | | ⅜ | |
| | TT 4 MM | 805 699 | 12 | | |
| | TT 4 | 805 653 | | ½ | |
| | TT 5 | 805 652 | 16 | ⅝ | |
| | TT 7 | 805 656 | 22 | ⅞ | |
| | TT 9 MM | 805 700 | 28 | | |
| | TT 9 | 805 651 | | 1 ⅛ | |
| | MM 2 | 805 706 | 6 | ¼ | Male flare x male flare |
| | MM 3 | 805 707 | 10 | ⅜ | |
| | MM 4 | 805 708 | 12 | ½ | |
| | MM 5 | 805 709 | 16 | ⅝ | |
| | FM 2 | 805 710 | 6 | ¼ | |
| FM 3 | 805 711 | 10 | ⅜ | | |
| FM 4 | 805 712 | 12 | ½ | | |
| AMI-2 | S 11 | 805 704 | 35 | 1 ⅜ | Male solder ODM (for soldering into fittings) |
| | S 13 | 805 659 | 42 | 1 ⅝ | |
| | S 17 | 805 687 | 54 | 2 ⅛ | |
| AMI-3 | S 7 | 805 650 | 22 | ⅞ | Saddle type (for soldering onto the pipe) |
| | S 9 | 805 649 | 28 | 1 ⅛ | |
| | S 11 | 805 648 | 35 | 1 ⅜ | |

Water Contents* by Indicator Color

| Refrigerant | Liquid Temperature °C | blue: dry | purple | fushia: Caution | rose: Caution - wet |
|-------------|-----------------------|-----------|--------|-----------------|---------------------|
| R22 | 25 | 25 | 40 | 80 | 145 |
| | 38 | 35 | 65 | 130 | 205 |
| | 52 | 50 | 90 | 185 | 290 |
| R404/R507 | 25 | 15 | 33 | 60 | 120 |
| | 38 | 25 | 50 | 110 | 150 |
| | 52 | 45 | 60 | 140 | 180 |
| R134a | 25 | 20 | 35 | 90 | 130 |
| | 38 | 35 | 55 | 120 | 160 |
| | 52 | 50 | 85 | 150 | 190 |
| R407C | 25 | 26 | 42 | 94 | 151 |
| | 38 | 40 | 68 | 144 | 232 |
| | 52 | 64 | 109 | 230 | 371 |

* Water content in mg Water per kg refrigerant (ppm)

Accessories

| | Type | Part No. |
|-------------------|-----------|----------------|
| Lens assembly kit | X 12978-1 | 805 742 |
| O-Ring | x 99995 | 805 643 |

Oil Management Components

Oil Management Components

Technical Information

Refrigeration compressors are lubricated by refrigeration oil that circulates from the compressor crankcase or housing. As refrigerant gas is discharged by the compressor, it will leave a fine oil mist that will be circulated throughout the entire system. Small amounts of oil circulating through the system will not affect the system performance. Too much refrigeration oil circulating in the system will have adverse effects on the components in the system. Circulating oil reduces the ability of the system to effectively remove the heat. Condensers, evaporators and other heat exchangers lose efficiency when coated internally with an oil film.

Oil not returning to the compressor causes improper lubrication and eventual compressor failure. At low temperature application, oil thickness becomes difficult to move, causing oil to be trapped in the system.

Oil Separator Function

Refrigerant gas leaving the compressor through the discharge line contains refrigeration oil in a vaporous mist. As this mixture enters the oil separator, the velocity is reduced to allow oil separation to begin.

The refrigerant gas and oil mixture enters the oil separator and passes through an inlet screen, causing the fine particles to combine. Larger oil particles are formed and drop to the bottom of the oil separator.

The refrigerant gas then passes through an outlet screen to remove residual oil particles. The oil gathers in the bottom of the oil separator until a float operated needle valve opens to allow the return of oil to the compressor. Oil returns quickly to the compressor, because of the higher pressure in the oil separator than in the compressor crankcase. When the oil level has lowered, the needle valve retracts to prevent refrigerant gas from returning back to the compressor. The refrigerant gas leaves through the outlet of the oil separator and goes to the condenser.

Oil Level Management System Function

This system provides oil level balancing as well as oil level monitoring including alarm and compressor shut-down functions. The oil level is measured inside the compressor's crankcase. By operating an integrated solenoid valve, missing oil can be fed from the oil receiver or from the oil separator directly into the compressor sump. If the oil level drops to a dangerous level, the alarm contact changes into alarm state. The alarm contact may be used to shut down the compressor. The integrated electronics include delay times in order to avoid short-cycling and nuisance alarms.

This system applies to compressor pack applications with multiple parallel compressor arrangements, but also to stand-alone compressor applications for compressors without differential oil pressure monitoring.

OM3, OM4 and OM5 TraxOil Oil Management

The Emerson TraxOil oil management is a self-contained and reliable electronically controlled system with an integrated solenoid valve, which feeds missing oil directly into the compressor sump. The sight glass function remains fully available, status and level information is indicated by LED's. The integrated alarm function with compressor shut down completes the overall proven solution for compressor protection.

While OM3 is the well-proven solution for HFC refrigerants, OM4 can also be used for subcritical CO₂ systems. OM5 TraxOil has been specially developed for transcritical CO₂ applications, the new adapters are equipped with special types of O-rings to guarantee safe long-term and reliable operation.

Features

- OM3 for HFC, HFO/HFO Blends refrigerants
 - max. working pressure PS 46 bar
- OM4 for liquid R744 (CO₂) subcritical and HFC, HFO/HFO Blends
 - max. working pressure PS 60 bar
- OM5 for liquid R744 (CO₂) transcritical
 - max. working pressure PS 130 bar
 - max. operating pressure differential 100 bar
 - CO₂ optimized gasket material
 - Adapters with CO₂ optimized gasket material
 - High wattage ASC3-W coil to achieve high pressure differential MOPD of 100 bar
- Self-contained unit with oil level sensor and integral solenoid to manage oil level supply
- 3 Zone Level Control by using precise Hall-Sensor measurement, not prone to errors by foaming or light like optical sensors
- Alarm, status and level indication by LED's
- Supply 24VAC or 230VAC
- SPDT output contact for compressor shut down or alarming, rating 230VAC / 3A
- Easy installation by sight-glass replacement and front side mounting without nuts
- Adapters suitable for various types of compressors
- Recommended by leading compressor manufacturers
- CE marking under Low Voltage and EMC Directive, **EAC**



OM5 + ASC3 Coil 24V



OM4 + ASC3 Coil 230V + OM-230V

Product Selection OM3 and OM4 (select one item of each group)

1. Base Units (supplied without adapter and coil)

| Type | Part No. | Max. working pressure | Time delay alarm |
|---------|----------|-----------------------|------------------|
| OM3-020 | 805 133 | 46 bar | 20 sec |
| OM3-120 | 805 134 | | 120 sec |
| OM4-020 | 805135 | 60 bar | 20 sec |
| OM4-120 | 805136 | | 120 sec |



2. Adapter Flanges

| | | |
|---------|---------|-------------------------------|
| OM0-CUA | 805 037 | Flange adapter 3- / 4-hole |
| OM0-CBB | 805 038 | Screw adapter 1-1/8"-18 UNEF |
| OM0-CCA | 805 039 | Screw adapter 3/4"-14 NPTF |
| OM0-CCB | 805 040 | Screw adapter 1-1/8"-12 UNF |
| OM0-CCC | 805 041 | Flange adapter 3-hole |
| OM0-CCD | 805 042 | Rotalock adapter 1-3/4"-12UNF |
| OM0-CCE | 805 043 | Rotalock adapter 1-1/4"-12UNF |

3. Cables Alarm Relay

| | | |
|----------|---------|--------------------------|
| OM3-N30 | 805 141 | Connection to Relay 3 m |
| OM3-N60 | 805 142 | Connection to Relay 6 m |
| OM3-N100 | 805 146 | Connection to Relay 10 m |

Supply voltage 24V ± 10%

4. Solenoid Coil

| Type | Part No. | |
|------------|----------|----------------|
| ASC3-24VAC | 801 079 | 50/60 Hz, 17VA |

5. Cable Assembly Power Supply and Solenoid

| | | |
|----------|---------|-----------|
| OM3-P30 | 805 151 | 24V, 3 m |
| OM3-P60 | 805 152 | 24V, 6 m |
| OM3-P100 | 805 153 | 24V, 10 m |

Supply voltage 230V ± 10%

4. Solenoid Coil

| Type | Part No. | |
|--------------|----------|----------------|
| ASC3-230 VAC | 801 077 | 50/60 Hz, 17VA |

5. Cable Assembly with 230V module

| | | |
|-----------|---------|------------|
| OM-230V-3 | 805 163 | 230V, 3.0m |
| OM-230V-6 | 805 164 | 230V, 6.0m |

Oil Management Kits including adapter and 24V Coil: Cross Reference

| Kit inc. Adapter | Part No. |
|------------------|----------|
| OM3-CUA | 805 030 |
| OM3-CBB | 805 032 |
| OM3-CCA | 805 033 |
| OM3-CCB | 805 034 |
| OM3-CCC | 805 035 |
| OM3-CCD | 805 031 |
| OM3-CCE | 805 029 |



| Base Unit | Part No. | Adapter | Part No. | Coil | Part No. |
|-----------|----------|---------|----------|------------|----------|
| OM3-020 | 805133 | OM0-CUA | 805037 | ASC 24 VAC | 801 062 |
| | | OM0-CBB | 805038 | | |
| | | OM0-CCA | 805039 | | |
| | | OM0-CCB | 805040 | | |
| | | OM0-CCC | 805041 | | |
| | | OM0-CCD | 805042 | | |
| | | OM0-CCE | 805043 | | |

| | |
|---------|---------|
| OM4-CUA | 805 060 |
| OM4-CBB | 805 062 |
| OM4-CCA | 805 063 |
| OM4-CCB | 805 064 |
| OM4-CCC | 805 065 |
| OM4-CCD | 805 061 |
| OM4-CCE | 805 066 |

| Base Unit | Part No. | Adapter | Part No. | Coil | Part No. |
|-----------|----------|---------|----------|------------|----------|
| OM4-020 | 805 135 | OM0-CUA | 805 337 | ASC 24 VAC | 801062 |
| | | OM0-CBB | 805 338 | | |
| | | OM0-CCA | 805 339 | | |
| | | OM0-CCB | 805 340 | | |
| | | OM0-CCC | 805 341 | | |
| | | OM0-CCD | 805 342 | | |
| | | OM0-CCE | 805 343 | | |

Product Selection OM5 (select one item of each group)

1. Base Units (supplied without adapter and coil)

| Type | Part No. | Max. working pressure | Time delay alarm |
|---------|----------|-----------------------|------------------|
| OM5-020 | 805230 | 130 bar | 20 sec |
| OM5-120 | 805231 | | 120 sec |



2. Adapter Flanges

| | | |
|-------------|--------|-------------------------------|
| OM0-CUA CO2 | 805337 | Flange adapter 3- / 4-hole |
| OM0-CCC CO2 | 805341 | Flange adapter 3-hole |
| OM0-CUD CO2 | 805049 | Flange adapter 6- / 6-hole |
| OM0-CBB CO2 | 805338 | Screw adapter 1-1/8"-18 UNEF |
| OM0-CCA CO2 | 805339 | Screw adapter 3/4"-14 NPTF |
| OM0-CCB CO2 | 805340 | Screw adapter 1-1/8"-12 UNF |
| OM0-CCD CO2 | 805342 | Rotalock adapter 1-3/4"-12UNF |
| OM0-CCE CO2 | 805343 | Rotalock adapter 1-1/4"-12UNF |

3. Cables Alarm Relay

| | | |
|----------|---------|--------------------------|
| OM3-N30 | 805 141 | Connection to Relay 3 m |
| OM3-N60 | 805 142 | Connection to Relay 6 m |
| OM3-N100 | 805 146 | Connection to Relay 10 m |

Supply voltage 24V ±10%

4. Solenoid Coil

| Type | Part No. | |
|-------------|----------|-----------------|
| ASC3-W24VAC | 801074 | 50/60 Hz, 38 VA |

5. Cable Assembly Power Supply and Solenoid

| | | |
|----------|---------|-----------|
| OM3-P30 | 805 151 | 24V, 3 m |
| OM3-P60 | 805 152 | 24V, 6 m |
| OM3-P100 | 805 153 | 24V, 10 m |

Supply voltage 230V ±10%

4. Solenoid Coil

| Type | Part No. | |
|--------------|----------|-----------------|
| ASC3-W230VAC | 801075 | 50/60 Hz, 38 VA |

5. Cable Assembly with 230V module

| | | |
|-----------|---------|-----------|
| OM-230V-3 | 805 163 | 230V, 3 m |
| OM-230V-6 | 805 164 | 230V, 6 m |

Accessories and Spare Parts

| Type | Part No. | Description | Weight |
|------------|----------|--|---------|
| ECT-623 | 804 421 | Transformer 230 VAC / 24VAC, 60 VA (supply of 3 pieces Base unit) | 1.20 kg |
| ASC3-K01 | 801 080 | Retainer Kit ASC3 incl. O-rings | 0.10 kg |
| ODP-33A | 800 366 | Differential Oil Check Valve 3.5 bar, PS: 46 bar (Inlet 5/8"-UNF female, outlet 5/8"-UNF male) | 0.14 kg |
| OM3-K01 | 805 036 | Repair Kit OM3/OM4 (consists of sight glass with O-ring and screws, oil adapter with strainer, O-ring back side) | 0.26 kg |
| OM5-K01 | 805 067 | Repair Kit OM5 for CO ₂ (consists of sight glass with O-ring and screws, oil adapter with strainer, O-ring back side) | 0.26 kg |
| OM-HFC-K01 | 805 081 | Sealing Kit OM3/OM4 (consists of all O-rings for OM3/OM4 and for all types of adapters) | |
| OM-HFC-K02 | 805 083 | Enclosing tube for OM3/OM4 (including O-ring), only for replacement of new version with hexagonal nut! | |
| OM-CO2-K01 | 805 079 | Sealing Kit CO ₂ for OM5 (consists of all O-rings for OM5 and for all types of adapters) | |
| OM-CO2-K02 | 805 082 | Enclosing tube for OM5 (including O-ring), only for replacement of new version with hexagonal nut! | |

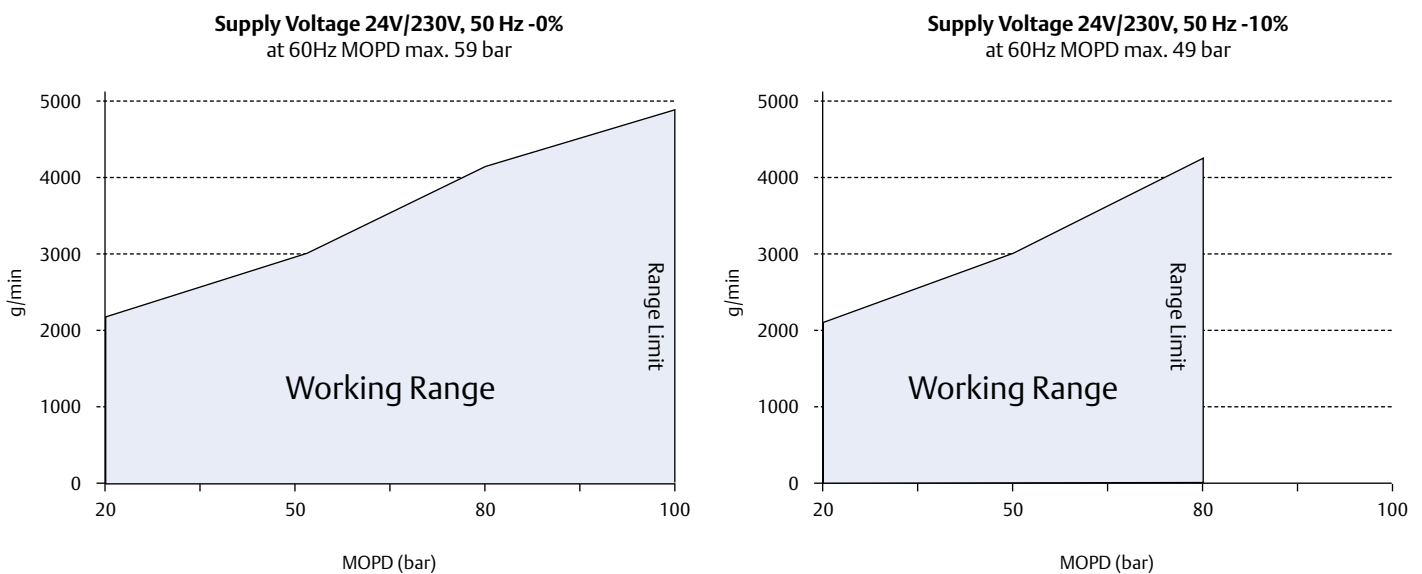
Technical Data

| | |
|--|--|
| Markings: | CE under: -Low Voltage Directive 2006/95/EC -EMC Directive 89/336/EC ERA |
| Applied Standards | EN 12284, EN 378, EN 61010, EN 50081-1, EN 50082-1 |
| Max. working pressure PS: | OM3: 46 bar OM4: 60 bar OM5: HP side (inlet): 130 bar LP side (outlet): 100 bar |
| Max. test pressure PT: | OM3: 51 bar OM4: 66 bar OM5: 143 bar (390 bar burst press) |
| Supply voltage / total power: | OM3/OM4: • with ASC3-24VAC coil: 24VAC, 50/60 Hz, ±10%, 17VA • with ASC3-230VAC coil and OM-230V-x module: 230VAC, 50/60 Hz, ±10%, 17VA OM5: • with ASC3-W24VAC coil: 24VAC, 50/60 Hz, ±10%, 38VA • with ASC3-W230VAC coil and OM-230V-x module: 230VAC, 50/60 Hz, ±10%, 38VA |
| Solenoid valve MOPD | OM3/OM4: 30 bar OM5: 100 bar (50Hz) see Fig. 1 59 bar (60Hz) |
| Vibration resistance (EN60068-2-6) | max. 4g, 10....250Hz |
| Medium temperature Ambient/Storage temperature | -20...+80°C -20...+50°C |
| Medium compatibility | OM3: HFC, HCFC, HFO/HFO Blends OM4: CO ₂ , HFC, HFO/HFO Blends OM5: CO ₂ only; All: mineral, synthetic and ester lubricants |

| | |
|---|---|
| Materials: Body and Adaptor Screws Sight Glass | aluminum (EN AW 6060) galvanized steel nickel-plated steel (ISO 2081) |
| Flow rate | OM3/OM4 at ΔP =3 bar: 340g/min. (22°C oil temperature, oil type HM46) OM5: see Fig. 1 |
| Orientation of base unit: | horizontal, +/- 1° |
| Level control: | 40% to 60% of sight glass height |
| Alarm contact: | max. 3A, 230VAC SPDT dry contact |
| Time Delay Alarm: | 20 sec.: OM3/4/5-020, all OM3/4 Kits 120 sec.: OM3/4/5-120 |
| Time Delay Filling: | 10 sec. |
| Protection class | IP 65 (IEC529/EN 60529) |
| Weight: 24V System 230V System | 750 ... 920g inc. adapter 1100 ... 1270g inc. adapter |
| Oil connection | 7/16"-20 UNF male, with strainer and O-ring (replaceable, see acc.) |
| Enclosing tube | Replaceable for cleaning, hexagon wrench size 18, see spare parts |

Fig. 1: OM5: Performance related to supply voltage: Flow Rate and Differential Pressure between inlet and outlet

(Oil type Reniso C85E, oil temperature 54°C)



Electronic Oil Level Monitoring TraxOil™ OW4 and OW5

OW4 and OW5 TraxOil are intended for systems which require oil level monitoring and alarming instead of active oil level balancing.

Features

- OW4 for CO₂ subcritical and HFC, HFO/HFO Blends refrigerants
max. working pressure PS: 60 bar
- OW5 for CO₂ transcritical
 - max. working pressure PS: 100 bar
 - CO₂ optimized gasket material, not released for HCFC and HFCs
 - Adapters with CO₂ optimized gasket material
- 3 Zone Level Control by using precise Hall-sensor measurement, not prone to errors by foaming or light like optical sensors
- Alarm, status and 3 zone indication by LED's
- SPDT output contact for compressor shut down or alarming, rating 230VAC / 3A
- Easy installation by sight-glass replacement and front side mounting without nuts
- Supply 24V AC, 50/60Hz
- Recommended by leading compressor manufacturers
- CE marking under Low Voltage and EMC Directive, EAC



OW4 TraxOil



OW5 TraxOil

Product Selection (select one item of each group)

1. Base Units (supplied without adapter)

| Type | Part No. | Max. working pressure | Time delay alarm |
|---------|----------|-----------------------|------------------|
| OW4-020 | 805 116 | 60 bar | 20 sec |

2. Adapter flanges

| | | |
|---------|---------|-------------------------------|
| OM0-CUA | 805 337 | Flange adapter 3-/4-hole |
| OM0-CCC | 805 341 | Flange adapter 3-hole |
| OM0-CBB | 805 338 | Screw adapter 1-1/8"-18 UNEF |
| OM0-CCA | 805 339 | Screw adapter 3/4"-14 NPTF |
| OM0-CCB | 805 340 | Screw adapter 1-1/8"-12 UNF |
| OM0-CCD | 805 342 | Rotalock adapter 1-3/4"-12UNF |
| OM0-CCE | 805 343 | Rotalock adapter 1-1/4"-12UNF |

Compressor models see OM3 series.

3. Relay Cables

| | | |
|----------|---------|---------------------------|
| OM3-N30 | 805 141 | Connection to Relay 3.0m |
| OM3-N60 | 805 142 | Connection to Relay 6.0m |
| OM3-N100 | 805 146 | Connection to Relay 10.0m |

4. Power Cable

| Type | Part No. | Description | Cable length |
|----------|----------|----------------------------------|--------------|
| OW-24V-3 | 804 672 | Connection to Power Supply 24VAC | 3.0m |

Warning: R1234ze classified as A2L. Use of product only for non-explosive environment, non ATEX zone.

Product Selection (select one item of each group)

1. Base Units (supplied without adapter)

| Type | Part No. | Max. working pressure | Time delay alarm |
|---------|----------------|-----------------------|------------------|
| OW5-120 | 805 241 | 100 bar | 120 sec |

2. Adapter flanges

| | | |
|-------------|----------------|-------------------------------|
| OM0-CUA CO2 | 805 337 | Flange adapter 3-/4-hole |
| OM0-CCC CO2 | 805 341 | Flange adapter 3-hole |
| OM0-CUD CO2 | 805 049 | Flange adapter 6-/6-hole |
| OM0-CBB CO2 | 805 338 | Screw adapter 1-1/8"-18 UNEF |
| OM0-CCA CO2 | 805 339 | Screw adapter 3/4"-14 NPTF |
| OM0-CCB CO2 | 805 340 | Screw adapter 1-1/8"-12 UNF |
| OM0-CCD CO2 | 805 342 | Rotalock adapter 1-3/4"-12UNF |
| OM0-CCE CO2 | 805 343 | Rotalock adapter 1-1/4"-12UNF |

Compressor models see OM3 series.

3. Relay Cables

| | | |
|----------|----------------|---------------------------|
| OM3-N30 | 805 141 | Connection to Relay 3.0m |
| OM3-N60 | 805 142 | Connection to Relay 6.0m |
| OM3-N100 | 805 146 | Connection to Relay 10.0m |



4. Power Cable

| Type | Part No. | Description | Cable length |
|----------|----------------|----------------------------------|--------------|
| OW-24V-3 | 804 672 | Connection to Power Supply 24VAC | 3.0m |

Accessories and Spare Parts

| Type | Part No. | Description | Weight |
|------------|----------------|---|---------|
| ECT-623 | 804 421 | Transformer 230 VAC / 24VAC, 60 VA (supply of 3 pieces Base unit) | 1.20 kg |
| OM-HFC-K01 | 805 081 | Sealing Kit OW4 (consists of all O-rings, incl. adapter gaskets) | |
| OM-CO2-K01 | 805 079 | Sealing Kit OW5 (consists of all O-rings, incl. adapter gaskets) | |

Technical Data

| | |
|--|--|
| Markings: |  under: -Low Voltage Directive 2006/95/EC -EMC Directive 89/336/EC  |
| Applied Standards | EN 12284, EN 378, EN 61010, EN 50081-1, EN 50082-1 |
| Max. working pressure PS: Max. test pressure PT: Burst Pressure: | OW4: 60 bar OW5: 100 bar OW4: 66 bar OW5: 110 bar OW4: 230 bar OW5: 390 bar |
| Supply voltage current | 24VAC, 50/60Hz, ±10%, 0.05A |
| Vibration resistance (EN60068-2-6) | max. 4g, 10....250Hz |
| Medium temperature Ambient/Storage temperature | -20 to 80°C -20 to 50°C |
| Medium compatibility | OW4: HFC, HCFC, HFO/HFO Blends, CO ₂ OW5: CO ₂ only mineral, synthetic and ester lubricants |

| | |
|--|---|
| Materials: Body and Adaptor Screws Sight Glass OW4 Sight Glass OW5 | aluminum (EN AW 6060) galvanized steel nickel-plated Steel (1.05.03 DIN EN10027) galvanized steel (ISO 2081) |
| Orientation of base unit: Level control: | horizontal, +/- 1° 40% to 60% sight glass height |
| Alarm contact: | max. 3A, 230VAC SPDT dry contact |
| Time Delay Alarm: | 20 sec or 120 sec |
| Protection class | IP 65 (DIN / EN 60529) |
| Weight | 850 ... 920g incl. adapter |

Level Watch LW4 and LW5 Liquid Level Control

LW4 and LW5 are self-contained units intended for liquid level monitoring and control at the sight glass connection of vessels, maintaining a permanent visibility of the liquid level versus other liquid level sensors.

Features

- LW4 for liquid CO₂, HFC, HFO/HFO Blends refrigerants and oil (MWP: 60 bar)
- LW5 for liquid CO₂ and oil (MWP: 130 bar)
 - CO₂ optimized gasket material, not released for HFCs
 - Adapters with CO₂ optimized gasket material
- Two Versions of each model:
 - LW4/5-H for high liquid level monitoring
 - LW4/5-L for low liquid level monitoring
- 3 Zone Level Control by using precise Hall-sensor measurement, not prone to errors by foaming or light like optical sensors
- Alarm, status and 3 zone indication by LED's
- Dual monitoring and protection:
- 24V output signal for critical liquid levels
- SPDT output contact for alarming, rating 230VAC / 3A
- Easy installation by sight-glass replacement and front side mounting without nuts
- Supply 24V AC, 50/60Hz
- CE marking under Low Voltage and EMC Directive



LW4



LW5

Product Selection (select one item of each group)

1. Base Unit (supplied without adapter)

| Type | Part No. | Max. working pressure | Medium |
|----------|----------------|-----------------------|----------------------------|
| LW4-H120 | 805 491 | 60 bar | HFC, CO ₂ , oil |
| LW4-L120 | 805 490 | 60 bar | CO ₂ , oil |

2. Adapter flanges

| | | |
|---------|----------------|-------------------------------|
| OM0-CUA | 805 037 | Flange adapter 3-/4-hole |
| OM0-CCC | 805 041 | Flange adapter 3-hole |
| OM0-CBB | 805 038 | Screw adapter 1-1/8"-18 UNEF |
| OM0-CCA | 805 039 | Screw adapter 3/4"-14 NPTF |
| OM0-CCB | 805 040 | Screw adapter 1-1/8"-12 UNF |
| OM0-CCD | 805 042 | Rotalock adapter 1-3/4"-12UNF |
| OM0-CCE | 805 043 | Rotalock adapter 1-1/4"-12UNF |

3. Cables Alarm Relay

| | | |
|----------|----------------|---------------------------|
| OM3-N30 | 805 141 | Connection to Relay 3.0m |
| OM3-N60 | 805 142 | Connection to Relay 6.0m |
| OM3-N100 | 805 146 | Connection to Relay 10.0m |

4. Cable Power Supply

| | | |
|-----------|----------------|---|
| LW-24V-3 | 805 500 | Connection to Power Supply 24V AC 3.0m |
| LW-24V-6 | 805 501 | Connection to Power Supply 24V AC 6.0m |
| LW-24V-10 | 805 502 | Connection to Power Supply 24V AC 10.0m |

Product Selection (select one item of each group)

1. Base Unit (supplied without adapter)

| Type | Part No. | Max. working pressure | Medium |
|----------|----------------|-----------------------|-----------------------|
| LW5-H120 | 805 481 | 130 bar | CO ₂ , oil |
| LW5-L120 | 805 480 | 130 bar | CO ₂ , oil |

2. Adapter flanges

| | | |
|-------------|----------------|----------------------------------|
| LW0-CCA CO2 | 805 254 | Screw adapter 3/4"-14 NPTF Steel |
|-------------|----------------|----------------------------------|

3. Cables Alarm Relay

| | | |
|----------|----------------|---------------------------|
| OM3-N30 | 805 141 | Connection to Relay 3.0m |
| OM3-N60 | 805 142 | Connection to Relay 6.0m |
| OM3-N100 | 805 146 | Connection to Relay 10.0m |

4. Cable Power Supply

| | | |
|-----------|----------------|---|
| LW-24V-3 | 805 500 | Connection to Power Supply 24V AC 3.0m |
| LW-24V-6 | 805 501 | Connection to Power Supply 24V AC 6.0m |
| LW-24V-10 | 805 502 | Connection to Power Supply 24V AC 10.0m |

Accessories and Spare Parts



| Type | Part No. | Description | Weight |
|------------|----------------|--|---------|
| ECT-623 | 804 421 | Transformer 230 VAC / 24VAC, 60 VA | 1.20 kg |
| OM-HFC-K01 | 805 081 | Sealing-Kit LW4 (contains all gaskets incl. adapter gaskets) | - |
| OM-CO2-K01 | 805 079 | Sealing-Kit LW5 for CO ₂ (contains all gaskets incl. adapter gaskets) | - |

Function

LW Liquid Level Monitoring Systems use a Hall-Sensor to measure the liquid levels. Unaffected from foaming oil or light a magnetic float changes its position according to the oil level. The hall sensor

converts these magnetic field changes into an equivalent signal, which is used by the integrated electronic controller to monitor the actual liquid level by LEDs.

Technical Data

| | |
|--|--|
| Marked: |  under: -Low Voltage Directive 2006/95/EC -EMC Directive 89/336/EC  |
| Applied Standards | EN 12284, EN 378, EN 61010, EN 50081-1, EN 50082-1 |
| Max. working pressure PS: Max. test pressure PT: Burst Pressure: | LW4: 60 bar LW5: 130 bar LW4: 66 bar LW5: 143 bar LW4: 230 bar LW5: 390 bar |
| Supply voltage current | 24VAC, 50/60Hz, ±10%, 0.05A |
| Vibration resistance (EN60068-2-6) | max. 4g, 10....250Hz |
| Medium temperature Ambient/Storage temperature | -20 to 80°C -20 to 50°C |
| Medium compatibility | LW4: HFC, HCFC, HFO/HFO Blends, CO ₂ LW5: CO ₂ only mineral, synthetic and ester lubricants |

| | |
|---|---|
| Orientation of base unit: Level control: | horizontal, +/- 1° 30% to 60% sight glass height |
| Alarm contact: | max. 3A, 230VAC SPDT dry contact |
| Output Signal | 24V AC Inductive load: 35VA |
| Time Delay Alarm: | 120 sec |
| Protection class | IP 65 (IEC529/EN 60529) |
| Weight | 850 ... 920g incl. adapter |

Oil Separator Series OS

Features

- Three different construction styles:
 - Hermetic
 - Top flange
 - Bottom flange with support bracket
- Stainless steel needle valve and floater
- Permanent magnet to catch iron particles out of the system
- Corrosion-resistant epoxy powder coating
- ODF Copper fittings for easy soldering
- Temperature range TS: -10°C ... +150°C
- Max. allowable pressure PS: 31 bar
- CE marking according PED 97/23 EC



OSH



OST



OSB

Type Code

Product line Oil Separators

Construction

- H: Hermetic
- T: Top flange
- B: Bottom flange with supporter

Nominal shell diameter

- 4: approx. 10 cm
- 6: approx. 15 cm

OS X-X XX

ODF connection

- 04: 1/2"
- 05: 5/8" (16mm)
- 07: 7/8" (22mm)
- 09: 1 1/8"
- 11: 1 3/8" (35mm)
- 13: 1 5/8"
- 17: 2 1/8"

Selection table

| Type | Part No. | Connection | | Conformity Assessment Category | Conformity Assessment Procedure | Nominal capacity (kW) | | | | | | | | | | Volume Lit. |
|---------|----------|------------|--------|--------------------------------|---------------------------------|-----------------------|-------|-------------|-------|-------|-------|-------|---------|------|------|-------------|
| | | mm | inch | | | R22/R407C | R134A | R404A/ R507 | R407A | R407F | R448A | 449A | R1234ze | 450A | 513A | |
| OSH-404 | 881 598 | | 1/2" | Cat. I | Module A* | 7.0 | 4.9 | 7.3 | 6.5 | 6.3 | 7.4 | 7.9 | 3.9 | 4.6 | 4.7 | 2.0 |
| OSH-405 | 881 599 | 16 | 5/8" | | | 18.7 | 13.1 | 19.4 | 17.4 | 16.8 | 18.8 | 20.1 | 9.9 | 11.7 | 12.1 | 2.4 |
| OSH-407 | 881 600 | 22 | 7/8" | | | 28.1 | 19.7 | 29.0 | 26.1 | 25.3 | 29.9 | 32.1 | 15.8 | 18.6 | 19.2 | 2.8 |
| OSH-409 | 881 792 | | 1 1/8" | | | 37.4 | 26.2 | 38.7 | 34.9 | 33.7 | 40.9 | 43.9 | 21.6 | 25.4 | 26.3 | 3.0 |
| OSH-411 | 881 794 | 35 | 1 3/8" | | | 46.8 | 32.8 | 48.4 | 43.6 | 42.1 | 49.3 | 52.9 | 26.0 | 30.7 | 31.7 | 3.6 |
| OSH-413 | 881 856 | | 1 5/8" | | | 65.5 | 45.9 | 67.8 | 61.0 | 59.0 | 68.7 | 73.6 | 36.2 | 42.7 | 44.1 | 3.6 |
| OSH-611 | 881 940 | 35 | 1 3/8" | Cat. II | Module D1 | 51.5 | 36.1 | 53.3 | 47.9 | 46.3 | 60.6 | 65.0 | 32.0 | 37.7 | 38.9 | 6.5 |
| OSH-613 | 881 953 | | 1 5/8" | | | 65.5 | 45.9 | 67.8 | 61.0 | 59.0 | 71.7 | 76.8 | 37.8 | 44.5 | 46.0 | 7.9 |
| OSH-642 | 889 022 | 42 | | | | 65.5 | 45.9 | 67.8 | 61.0 | 59.0 | - | - | - | - | - | 7.9 |
| OSH-617 | 881 970 | 54 | 2 1/8" | | | 105.3 | 73.8 | 108.9 | 98.0 | 94.8 | 108.7 | 116.5 | 57.4 | 67.5 | 69.8 | 7.9 |
| OST-404 | 881 860 | | 1/2" | Cat. I | Module A* | 7.0 | 4.9 | 7.3 | 6.5 | 6.3 | 7.4 | 7.9 | 3.9 | 4.6 | 4.7 | 1.8 |
| OST-405 | 881 861 | 16 | 5/8" | | | 18.7 | 13.1 | 19.4 | 17.4 | 16.8 | 18.8 | 20.1 | 9.9 | 11.7 | 12.1 | 2.6 |
| OST-407 | 881 862 | 22 | 7/8" | | | 28.1 | 19.7 | 29.0 | 26.1 | 25.3 | 29.9 | 32.1 | 15.8 | 18.6 | 19.2 | 3.2 |
| OST-409 | 881 863 | | 1 1/8" | | | 37.4 | 26.2 | 38.7 | 34.9 | 33.7 | 40.9 | 43.9 | 21.6 | 25.4 | 26.3 | 3.8 |
| OST-411 | 881 938 | 35 | 1 3/8" | | | 46.8 | 32.8 | 48.4 | 43.6 | 42.1 | 49.3 | 52.9 | 26.0 | 30.7 | 31.7 | 3.8 |
| OST-413 | 881 939 | | 1 5/8" | | | 65.5 | 45.9 | 67.8 | 61.0 | 59.0 | 68.7 | 73.6 | 36.2 | 42.7 | 44.1 | 3.8 |
| OSB-613 | 881 971 | | 1 5/8" | Cat. II | Module D1 | 65.5 | 45.9 | 67.8 | 61.0 | 59.0 | 71.7 | 76.8 | 37.8 | 44.5 | 46.0 | 7.8 |
| OSB-617 | 881 972 | 54 | 2 1/8" | | | 105.3 | 73.8 | 108.9 | 98.0 | 94.8 | 108.7 | 116.5 | 57.4 | 67.5 | 69.8 | 7.8 |

* applied higher module as required

Suction Accumulators, Ball Valves and Oil Test Kit

Suction Accumulators

Features

- Hermetic design
- ODF Copper fittings for easy soldering
- Corrosion-resistant epoxy powder coating
- Internal orifice with strainer for optimum oil return
- Temperature range TS: -45°C to +65°C
- Max. allowable pressure PS:
20.7 bar (-10°C to +65°C)
15.5 bar (-45°C to -10°C)
- CE marking for certain types according PED 97/23 EC
- HP marking for certain types according German pressurised vessels directive
- UL/CUL file number: SA 10225



A08

Selection table

| Type | Part No. | Conne- ction | | Nominal Capacity Q _n (KW) | | | | | | | | | | | | | | Conformity Assessment | | Volume Lit. | |
|---------|----------|-----------------|------|--------------------------------------|------|-------|------|----------------|------|-------|------|-------|------|---------|------|----------------|------|--|-----------|-------------|-------|
| | | | | R22/R407 | | R134a | | R404A/ R507 | | R450A | | R513A | | R1234ze | | R448A R449A | | Category | procedure | | |
| | | mm | inch | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | | | | |
| A08-304 | 001 973 | | ½ | 7.0 | 1.1 | 4.2 | 0.6 | 4.6 | 0.7 | 4.1 | 2.7 | 3.7 | 2.4 | 3.5 | 2.3 | 7.2 | 5.0 | HP Marking (CE Marking not required) | 0.73 | | |
| A10-305 | 001 977 | 16 | ¾ | 10.5 | 1.6 | 6.0 | 0.9 | 7.0 | 1.1 | 5.8 | 4.1 | 5.2 | 3.7 | 5.0 | 3.5 | 10.8 | 7.5 | | 0.93 | | |
| A12-305 | 001 978 | 16 | ¾ | 10.5 | 1.6 | 6.0 | 0.9 | 7.0 | 1.1 | 5.8 | 4.1 | 5.2 | 3.7 | 5.0 | 3.5 | 10.8 | 7.5 | | 1.16 | | |
| A12-306 | 001 979 | | ¾ | 14.0 | 2.1 | 8.1 | 1.2 | 9.1 | 1.4 | 7.8 | 5.4 | 7.1 | 4.9 | 6.7 | 4.6 | 14.4 | 10.0 | | 1.16 | | |
| A14-305 | 001 980 | 16 | ¾ | 10.5 | 1.6 | 6.0 | 0.9 | 7.0 | 1.1 | 5.8 | 4.1 | 5.2 | 3.7 | 5.0 | 3.5 | 10.8 | 7.5 | | 1.40 | | |
| A14-306 | 001 987 | | ¾ | 14.0 | 2.1 | 8.1 | 1.2 | 9.1 | 1.4 | 7.8 | 5.4 | 7.1 | 4.9 | 6.7 | 4.6 | 14.4 | 10.0 | | 1.40 | | |
| A06-405 | 001 989 | 16 | ¾ | 10.5 | 1.6 | 6.0 | 0.9 | 7.0 | 1.1 | 5.8 | 4.1 | 5.2 | 3.7 | 5.0 | 3.5 | 10.8 | 7.5 | | 0.93 | | |
| A10-405 | 001 990 | 16 | ¾ | 10.5 | 1.6 | 6.0 | 0.9 | 7.0 | 1.1 | 5.8 | 4.1 | 5.2 | 3.7 | 5.0 | 3.5 | 10.8 | 7.5 | | 1.75 | | |
| A10-406 | 001 994 | | ¾ | 14.0 | 2.1 | 8.1 | 1.2 | 9.1 | 1.4 | 7.8 | 5.4 | 7.1 | 4.9 | 6.7 | 4.6 | 14.4 | 10.0 | | 1.75 | | |
| A09-506 | 881 995 | | ¾ | 14.0 | 2.1 | 8.1 | 1.2 | 9.1 | 1.4 | 7.8 | 5.4 | 7.1 | 4.9 | 6.7 | 4.6 | 14.4 | 10.0 | Cat. I Mod. D1* | 2.33 | | |
| A09-507 | 882 455 | 22 | ¾ | 25.6 | 3.8 | 14.0 | 2.1 | 16.1 | 2.4 | 13.6 | 9.5 | 12.3 | 8.6 | 11.7 | 8.1 | 26.3 | 18.2 | | 2.73 | | |
| A12-506 | 881 996 | | ¾ | 14.0 | 2.1 | 8.1 | 1.2 | 9.1 | 1.4 | 7.8 | 5.4 | 7.1 | 4.9 | 6.7 | 4.6 | 14.4 | 10.0 | | 3.29 | | |
| A12-507 | 881 998 | 22 | ¾ | 25.6 | 3.8 | 14.0 | 2.1 | 16.1 | 2.4 | 13.6 | 9.5 | 12.3 | 8.6 | 11.7 | 8.1 | 26.3 | 18.2 | | 3.29 | | |
| A13-507 | 882 007 | 22 | ¾ | 25.6 | 3.8 | 14.0 | 2.1 | 16.1 | 2.4 | 13.6 | 9.5 | 12.3 | 8.6 | 11.7 | 8.1 | 26.3 | 18.2 | | 3.80 | | |
| A13-509 | 882 011 | | 1 ½ | 41.4 | 6.2 | 25.3 | 3.8 | 26.7 | 4.0 | 24.5 | 17.0 | 22.2 | 15.3 | 21.0 | 14.4 | 42.5 | 29.6 | | 3.80 | | |
| A17-509 | 882 012 | | 1 ½ | 41.4 | 6.2 | 25.3 | 3.8 | 26.7 | 4.0 | 24.5 | 17.0 | 22.2 | 15.3 | 21.0 | 14.4 | 42.5 | 29.6 | | 4.87 | | |
| A17-511 | 882 013 | 35 | 1 ¾ | 66.0 | 9.9 | 37.6 | 5.6 | 42.8 | 6.4 | 36.4 | 24.8 | 33.0 | 22.3 | 31.3 | 21.0 | 67.6 | 47.0 | | 4.87 | | |
| A11-607 | 882 014 | 22 | ¾ | 25.6 | 3.8 | 14.0 | 2.1 | 16.1 | 2.4 | 13.6 | 9.5 | 12.3 | 8.6 | 11.7 | 8.1 | 26.3 | 18.2 | | 4.30 | | |
| A13-607 | 882 015 | 22 | ¾ | 25.6 | 3.8 | 14.0 | 2.1 | 16.1 | 2.4 | 13.6 | 9.5 | 12.3 | 8.6 | 11.7 | 8.1 | 26.3 | 18.2 | | 4.98 | | |
| A13-609 | 882 019 | | 1 ½ | 41.4 | 6.2 | 25.3 | 3.8 | 26.7 | 4.0 | 24.5 | 17.0 | 22.2 | 15.3 | 21.0 | 14.4 | 42.5 | 29.6 | | 4.98 | | |
| A14-611 | 882 020 | 35 | 1 ¾ | 66.0 | 9.9 | 37.6 | 5.6 | 42.8 | 6.4 | 36.4 | 24.8 | 33.0 | 22.3 | 31.3 | 21.0 | 67.6 | 47.0 | | 5.48 | | |
| A17-613 | 882 022 | | 1 ½ | 100.0 | 15.0 | 59.7 | 9.0 | 63.9 | 9.6 | 57.8 | 39.8 | 52.4 | 35.8 | 49.7 | 33.7 | 102.5 | 71.2 | | 6.85 | | |
| A17-642 | 889 023 | 42 | | 100.0 | 15.0 | 59.7 | 9.0 | 63.9 | 9.6 | 57.8 | 39.8 | 52.4 | 35.8 | 49.7 | 33.7 | 102.5 | 71.2 | | 6.85 | | |
| A20-613 | 882 021 | | 1 ½ | 100.0 | 15.0 | 59.7 | 9.0 | 63.9 | 9.6 | 57.8 | 39.8 | 52.4 | 35.8 | 49.7 | 33.7 | 102.5 | 71.2 | | 8.21 | | |
| A25-613 | 882 023 | | 1 ½ | 100.0 | 15.0 | 59.7 | 9.0 | 63.9 | 9.6 | 57.8 | 39.8 | 52.4 | 35.8 | 49.7 | 33.7 | 102.5 | 71.2 | | Cat II | Mod. D1* | 10.23 |

* applied higher module as required

Q_o : Required cooling capacity

For easy selection and calculation refer to "Controls Navigator" selection tool.

Ball Valves Series BVE/BVS and CVE/CSV

Features

- BVE/S for HFC, Max. allowable pressure 45 bar
- CVE/S for CO₂, Max. allowable pressure 60 bar
- BVS/CSV version with Schrader valve
- Two threads at valve body for easy mounting
- Hermetic design
- Lightweight design – LASER welded brass body
- Bi-directional flow characteristics
- Valve cap retained by strap attached to main body
- Pressure relief port design
- UL approval (only for BVE/BVS models) and CE marking acc. PED 97/23 EC
- Applied Standards EN 12284, EN 378, EN12420, PED 97/23/EC, RoHS 2002/95/EC
- To protect valve from unauthorized use a special seal cap is available as accessory (see below)



BVE/BVS selection table (UL approved)

| Type BVE | Part No. | Type BVS | Part No. | Connection size ODF | |
|----------|----------|----------|----------|---------------------|--------|
| | | | | inch | metric |
| BVE-014 | 806 730 | BVS-014 | 806 750 | ¼" | |
| BVE-M06 | 806 731 | BVS-M06 | 806 751 | | 6mm |
| BVE-038 | 806 732 | BVS-038 | 806 752 | ⅜" | |
| BVE-M10 | 806 733 | BVS-M10 | 806 753 | | 10mm |
| BVE-012 | 806 734 | BVS-012 | 806 754 | ½" | |
| BVE-M12 | 806 735 | BVS-M12 | 806 755 | | 12mm |
| BVE-058 | 806 736 | BVS-058 | 806 756 | ⅝" | 16mm |
| BVE-034 | 806 737 | BVS-034 | 806 757 | ¾" | |
| BVE-078 | 806 738 | BVS-078 | 806 758 | ⅞" | 22mm |
| BVE-118 | 806 739 | BVS-118 | 806 759 | 1 ⅛" | |
| BVE-M28 | 806 740 | BVS-M28 | 806 760 | | 28mm |
| BVE-138 | 806 741 | BVS-138 | 806 761 | 1 ⅜" | 35mm |
| BVE-158 | 806 742 | BVS-158 | 806 762 | 1 ⅝" | |
| BVE-M42 | 806 743 | BVS-M42 | 806 763 | | 42mm |
| BVE-218 | 806 744 | BVS-218 | 806 764 | 2 ⅛" | 54mm |
| BVE-258 | 806 745 | BVS-258 | 806 765 | 2 ⅝" | |
| BVE-318 | 806746 | BVS-318 | 806766 | 3 ⅛" | |

Technical Data

| | |
|----------------------------|---|
| Max. allowable pressure PS | BVE/BVS 45 bar; CVE/CSV 60 bar |
| Test pressure PT | BVE/BVS 49.5 bar; CVE/CSV 66 bar |
| Medium temperature TS | -40 ... 120°C (150°C short term) |
| Medium compatibility | HFC, HCFC, CO ₂ , Mineral, Synthetic and Polyol-Ester (POE) lubricants |

Special Seal Caps to protect valve from unauthorized use

| BVE / BVS , CVE / CSV Valve Size | Part No. | Thread (3) | Quantity per pack |
|----------------------------------|----------------|------------|-------------------|
| ¼" ... ⅞" (6 ... 22mm) | 806 770 | M18x1 | 10 pcs |
| 1-⅛" ... 1 ⅜" (28 ... 35mm) | 806 771 | M27x1 | 10 pcs |
| 1-⅝" (42 mm) ... 3-⅛" | 806 772 | M36x1 | 10 pcs |

CVE/CSV selection table (Not UL approved)

| Type CVE | Part No. | Type CVS | Part No. | Connection size ODF | |
|----------|----------|----------|----------|---------------------|--------|
| | | | | inch | metric |
| CVE-014 | 808 130 | CVS-014 | 808 150 | ¼" | |
| CVE-M06 | 808 131 | CVS-M06 | 808 151 | | 6mm |
| CVE-038 | 808 132 | CVS-038 | 808 152 | ⅜" | |
| CVE-M10 | 808 133 | CVS-M10 | 808 153 | | 10mm |
| CVE-012 | 808 134 | CVS-012 | 808 154 | ½" | |
| CVE-M12 | 808 135 | CVS-M12 | 808 155 | | 12mm |
| CVE-058 | 808 136 | CVS-058 | 808 156 | ⅝" | 16mm |
| CVE-034 | 808 137 | CVS-034 | 808 157 | ¾" | |
| CVE-078 | 808 138 | CVS-078 | 808 158 | ⅞" | 22mm |

Acid Test Kit Series AOK

Features

- Quick & easy test kit
- Universal acid test kit for use with all oils: Mineral, POE, etc.
- By changing the percentage of oil sample taken, the acid number of the oil can be accurately determined
- Phase separation of the chemicals in the kit provide a positive colour change regardless of the colour and condition of the oil

| Type | Part No. |
|---------|----------|
| AOK-U01 | 804 166 |



AOK

Accessories & Spare Parts

Controller Kits Parts List

| Controller Kit | | PCN | Terminal Kits | | | | Sensors | | | Transformers | | | Pressure Transmitters | | | Cable Assembly PT5 | | | |
|-----------------------------------|---------|-----|---------------|---------|---------|---------|---------|---------|---------|--------------|---------|---------|-----------------------|---------|---------|--------------------|---------|---|---|
| | | | 807 644 | 807 645 | 804 559 | 800 050 | 800 070 | 807 648 | 804 283 | 804 497 | 804 284 | 804 424 | 804 421 | 802 350 | 802 351 | 802 352 | 804 805 | | |
| | | | K03-X32 | K03-X33 | K09-U00 | K02-000 | K02-540 | K03-331 | ECN-F60 | ECN-N60 | ECN-S60 | ECT-323 | ECT-623 | PT5-07M | PT5-18M | PT5-30M | PT4-M60 | | |
| Superheat | | | | | | | | | | | | | | | | | | | |
| EC3-D72 Ctr. Kit TCP/IP | 808 042 | | | | | | | 1 | | 1 | | | 1 | | | 1 | | 1 | |
| EC3-D73 Ctr. Kit R410A | 808 049 | | | | | | | 1 | | 1 | | | 1 | | 1 | | | 1 | |
| EC3-D73 Ctr. Kit | 808 041 | | | | | | | 1 | | 1 | | | 1 | | 1 | | | 1 | |
| EC3-X32 Ctr. Kit TCP/IP | 808 037 | 1 | | | | | | | | 1 | | | 1 | | 1 | | | 1 | |
| EC3-X33 Ctr. Kit | 808 036 | | 1 | | | | | | | 1 | | | 1 | | 1 | | | 1 | |
| EXD-U00 Ctr. Kit | 808 038 | | | 1 | | | | | | | | | | | | | | | |
| Display Case | | | | | | | | | | | | | | | | | | | |
| EC2-312 Ctr. Kit TCP/IP | 808 005 | | | | 1 | | | | 1 | 2 | 2 | | 1 | | | | | | |
| EC2-352 Ctr. Kit TCP/IP | 808 009 | | | | 1 | | | | 1 | 1 | 2 | | 1 | | | 1 | | 1 | |
| EC2-372 Ctr. Kit TCP/IP | 808 011 | | | | 1 | | | | 1 | 3 | | | 1 | | | 1 | | 1 | |
| EC2-392 Ctr. Kit TCP/IP | 808 007 | | | | 1 | | | | 1 | 4 | | | 1 | | | | | | |
| Cond. Unit & Condenser | | | | | | | | | | | | | | | | | | | |
| EC2-552 Ctr. Kit TCP/IP | 808 019 | | | | | 1 | | | | | | | 1 | | | 1 | | 1 | 2 |
| Cold Room | | | | | | | | | | | | | | | | | | | |
| EC3-332 Ctr. Kit TCP/IP | 808 013 | | | | | | 1 | | 1 | 1 | 1 | | 1 | | | 1 | | | 1 |

Accessories, Spare Parts & Appendix

Electronic controllers

| Description | Type | Part No. |
|-------------------------|------|----------|
| EC3 Replacement battery | | 807 790 |

Thermo™ - Expansion Valves

| | | |
|---|-------------|---------|
| Bulb clamp for XB1019 | XA 1728-4 | 803 260 |
| Bulb clamp for XC726 | XA 1728-5 | 803 261 |
| Service Tool for T Series | X 99999 | 800 005 |
| Gasket sets for T, ZZ, L, 935 and TG Series valves | X 13455-1 | 027 579 |
| Bronze Screws for following flange types: (mandatory for ZZ-Valves) C500, C501, 9761, X6346, X6669, A576 9148, 9149, 9152, 9153, 10331, 10332 | Screw BZ 32 | 803 575 |
| | Screw BZ 48 | 803 576 |
| Steel Screws for following flange types: C500, C501, 9761, X6346, X6669, A576 9148, 9149, 9152, 9153, 10331, 10332 | Screw ST 32 | 803 573 |
| | Screw ST 48 | 803 574 |

Solenoid Valves

| | | | |
|---|---|------------|---------|
| Retainer kit | | 801 080 | |
| Service tool for 110RB, 240RA, 540RA, M36 | X 11981-1 | 027 451 | |
| Plug acc. To EN 175301 cable gland PG9 | GDM 2009 / PG9 | 801 012 | |
| Plug acc. To EN 175301 cable gland PG11 | GDM 211 / PG11 | 801 013 | |
| Repair kits: | 110 RB | KS 30040-1 | 801 206 |
| | 200 RB | KS 30039/ | |
| | | KS 30109 | 801 205 |
| | 240RAB | KS 30061 | 801 262 |
| | 240RA9 | KS 30062 | 801 263 |
| | 240RA12 | KS 30063 | 801 264 |
| | 240RA16 | KS 30065 | 801 200 |
| | 240RA20 | KS 30097 | 801 216 |
| | M36-078 / M36-118 / 3031 (upper assembly inc. Gasket) | M36-UNF | 801 440 |
| Gasket kits: | 110 RB | KS 30040-2 | 801 232 |
| | 200 RB | KS 30039-1 | 801 233 |
| | 240RAB | KS 30061-1 | 801 234 |
| | 240RA9/12 | KS 30062-1 | 801 235 |
| | 240RA16 | KS 30065-1 | 801 236 |
| | 240RA20 | KS 30097-1 | 801 237 |
| | all 3031 | KS 30177-1 | 801 268 |

Pressure Controls

| | | |
|--|------------------|---------|
| Mounting bracket, angle, including screws Universal for PS1, PS2, FD113 | | 803 799 |
| Mounting bracket universal | | 803 798 |
| Extension bracket for PS1, PS2 | | 803 800 |
| Mounting plate for units with hood | | 803 801 |
| Plug acc. EN 175301 for PS3 | Cable gland PG9 | 801 012 |
| | Cable gland PG11 | 801 013 |
| Capillary tube with flare nuts 7/16" - 20UNF, 1/4" SAE, 1.5 m | | 803 804 |
| Copper gasket set (100 pcs) for R1/4" (7/16" - 20UNF, female) | | 803 780 |
| Locking plate for PS1, PS2, TS1 | | 803 783 |

| Description | Type | Part No. |
|-------------|------|----------|
|-------------|------|----------|

Thermostats

| | | |
|--|--|---------|
| Mounting bracket angle | | 803 799 |
| Universal mounting bracket | | 803 798 |
| Extension bracket for TS1 | | 803 800 |
| Capillary tube glands R 1/2" thread, for bulb style A/C | | 803 807 |
| Capillary tube holder (5 pcs) | | 803 778 |
| Capillary tube with flare nuts 3/16" - 20UNF, 1/4" SAE, 1.5m | | 803 804 |

Oil Management

| | | | |
|--|--|------------|---------|
| OM3 / OM4 OM5 / OW4-5/ LW4-5 | Transformer 230 VAC / 24VAC, 25VA | ECT-323 | 804 424 |
| | Transformer 230 VAC / 24VAC, 60VA | ECT-623 | 804 421 |
| | Differential oil check valve 3.5 bar, PS: 46 bar (inlet 3/8" - UNF female, outlet 3/8" - UNF male) | ODP-33A | 800 366 |
| | Repair kit OM3/OM4 Repair Kit OM3/OM4 (consists of sight glass with O-ring and screws, oil adapter with strainer, O-ring back side) | OM3-K01 | 805 036 |
| | Repair Kit Repair Kit OM5 (consists of sight glass with O-ring and screws, oil adapter with strainer, O-ring back side) | OM5-K01 | 805 067 |
| | Retainer Kit ASC3 incl. O-rings 0.10 kg | ASC3-K01 | 801 080 |
| | Sealing Kit OM3/OM4, OW4, LW4 (consists of all O-rings for OM3/OM4 and for all types of adapters) | OM-HFC-K01 | 805 081 |
| | Enclosing tube for OM3/OM4 (including O-ring), only for replacement of new version with hexagonal nut! | OM-HFC-K02 | 805 083 |
| | Sealing Kit CO ₂ for OM5, OW5, LW5 (consists of all O-rings for OM5 and for all types of adapters) | OM-CO2-K01 | 805 079 |
| Enclosing tube for OM5 (including O-ring), only for replacement of new version with hexagonal nut! | OM-CO2-K02 | 805082 | |
| OS | Gasket set for OSB / OST (50 pcs) | X 99956 | 007 591 |

Filter Driers

| | | | |
|---------------------|---|------------|---------|
| All ADKS, ADKS-Plus | | | |
| | Gasket set | X 99961 | 003 710 |
| | Schrader nipple 1/4" NPT | X 11562-2 | 803 251 |
| | Core holder | X 99963 | 003 712 |
| FDS 48 | | | |
| | O'Ring set | X 99962 | 003 711 |
| FDS 24 | | | |
| | Gasket set | X 99967 | 003 716 |
| | O'Ring set | X 99968 | 003 717 |
| | Core holder | X 99969 | 003 718 |
| BTAS | | | |
| | Repair kits with screws, gaskets, spring and brass cover: | | |
| | BTAS 2 | KD 30519-2 | 065 970 |
| | BTAS 3 | KD 30519-3 | 065 971 |
| | BTAS 4 | KD 30519-4 | 065 972 |
| | BTAS 5 | KD 30519-5 | 065 973 |

Indicators

| | | |
|-------------------------------|-----------|---------|
| AMI upper part with indicator | X 12978-1 | 805 742 |
| O'Rings 20 pcs | X 99995 | 805 643 |

Ball Valves

| | | | |
|--|---------------------------|--|---------|
| BVE/BVS special cap to protect valve from un-authorized use (10 pcs) | | | |
| | 1/4" - 3/8" (6-22mm) | | 806 770 |
| | 1 1/8" - 1 3/8" (28-35mm) | | 806 771 |
| | 1 3/8" - 3 1/8" (42-54mm) | | 806 772 |

Conversion Table

Power

| | |
|--------------------------------------|--------------------------------------|
| kW / h = Kcal / h : 860 | Kcal / h = kW / h x 860 |
| kW = US ton of refrigeration : 0.284 | US ton of refrigeration = kW x 0.284 |
| kW = BTU / h : 3413 | BTU / h = kW x 3413 |

Temperature

| | |
|----------------------|----------------------|
| °C = (°F - 32) : 1.8 | °F = (°C x 1.8) + 32 |
|----------------------|----------------------|

Pressure

| | |
|--|---|
| bar = PSI : 14.5 1 bar = 100 000 Pascal | PSI = bar x 14.5 100 Pascal = 1 mbar |
|--|---|

Connections

| Specification | | Connection Tube | | | Thread |
|---|---|--|--------|--------|---|
| | | SAE | inch | metric | |
| SAE | Flare | SAE ¼" | ¼" | 6mm | 7/16" - 20UNF |
| | | SAE 5/16" | 5/16" | 8mm | 9/16" - 18UNF |
| | | SAE 3/8" | 3/8" | 10mm | 5/8" - 18UNF |
| | | SAE ½" | ½" | 12mm | ¾" - 16UNF |
| | | SAE 5/8" | 5/8" | 16mm | 7/8" - 14UNF |
| | | SAE ¾" | ¾" | 18mm | 1 1/16" - 14UNF |
| | | SAE 7/8" | 7/8" | 22mm | 1 ¼" - 12UNF |
| | | SAE 1" | 1" | 25mm | 1 ½" - 12UNF |
| | | | 1 1/8" | | |
| | | | 1 3/8" | 35mm | |
| | | | 1 5/8" | | |
| | | | 2 1/8" | 54mm | |
| | | | 2 3/8" | | |
| | 3 1/8" | | | | |
| R or G same as BSP | Pipe thread female cylindrical | Male thread: R / NPT / BSP / G | | | Withworth- Pipe thread DIN 2999 / ISO 228 |
| R same as BSP | Pipe thread male tapering | Female thread: R / NPT / BSP / G | | | Withworth- Pipe thread DIN 2999 |
| G | Pipe thread male cylindar | Female thread: R / BSP / G | | | Withworth- Pipe thread ISO 228 |
| NPT | Pipe thread female tapering | Male thread: R / NPT / BSP | | | Standard taper Pipe thread ASA B 2.1 |
| | Pipe thread male tapering | Female thread: R / NPT / BSP / G | | | |
| ODF Outside Diameter Female | Solder female | Given dimension is outside tube diameter. Tube has to be pushed into ODF connection. | | | |
| ODM Outside Diameter Male | Solder male | Given dimension is outside tube diameter. Expanded tube can be pushed onto ODM connection or tube can be connected through a sleeve with the ODM connection. | | | |

Saturation Pressure Table for Refrigerants (bar, absolute)

| Temperature °C | R410A | R134a | R22 | R404A | | R507 | R407C | |
|-------------------|-------------|-------|-------|--------|-------|-------|--------|-------|
| | ALCO-Symbol | | | | | | | |
| | Z | M | H | S | | S | N | |
| | | | | Liquid | Vapor | | Liquid | Vapor |
| +85 | | 29.29 | 40.29 | | | | | |
| +80 | | 26.35 | 36.52 | | | | | |
| +75 | | 23.65 | 33.40 | | | | | |
| +70 | | 21.17 | 29.83 | 33.34 | 33.01 | | | |
| +65 | | 18.89 | 26.87 | 31.95 | 31.84 | 32.91 | | |
| +60 | 38.44 | 16.81 | 24.15 | 28.75 | 28.63 | 29.59 | | |
| +55 | 34.47 | 14.91 | 21.64 | 25.80 | 25.66 | 26.54 | 24.91 | 22.48 |
| +50 | 30.79 | 13.17 | 19.33 | 23.08 | 22.94 | 23.73 | 22.24 | 19.80 |
| +45 | 27.41 | 11.59 | 17.21 | 20.58 | 20.44 | 21.14 | 19.79 | 17.52 |
| +40 | 24.31 | 10.16 | 15.27 | 18.29 | 18.15 | 18.78 | 17.55 | 15.39 |
| +35 | 21.47 | 8.87 | 13.50 | 16.20 | 16.06 | 16.62 | 15.50 | 13.46 |
| +30 | 18.90 | 7.70 | 11.88 | 14.29 | 14.15 | 14.65 | 13.63 | 11.73 |
| +25 | 16.56 | 6.65 | 10.41 | 12.55 | 12.42 | 12.86 | 11.93 | 10.17 |
| +20 | 14.45 | 5.72 | 9.08 | 10.98 | 10.85 | 11.24 | 10.41 | 8.78 |
| +15 | 12.55 | 4.88 | 7.88 | 9.56 | 9.44 | 9.78 | 9.03 | 7.54 |
| +10 | 10.85 | 4.15 | 6.80 | 8.28 | 8.17 | 8.47 | 7.79 | 6.44 |
| +8 | 10.22 | 3.88 | 6.40 | 7.80 | 7.70 | 7.98 | 7.33 | 6.03 |
| +6 | 9.62 | 3.62 | 6.02 | 7.35 | 7.25 | 7.52 | 6.90 | 5.65 |
| +4 | 9.04 | 3.38 | 5.66 | 6.92 | 6.82 | 7.08 | 6.48 | 5.28 |
| +2 | 8.49 | 3.15 | 5.31 | 6.51 | 6.41 | 6.65 | 6.09 | 4.94 |
| 0 | 7.97 | 2.93 | 4.98 | 6.11 | 6.01 | 6.25 | 5.71 | 4.61 |
| -2 | 7.48 | 2.72 | 4.66 | 5.74 | 5.64 | 5.86 | 5.34 | 4.30 |
| -4 | 7.00 | 2.53 | 4.36 | 5.38 | 5.29 | 5.50 | 5.00 | 4.00 |
| -6 | 6.55 | 2.34 | 4.08 | 5.04 | 4.95 | 5.15 | 4.68 | 3.72 |
| -8 | 6.12 | 2.17 | 3.81 | 4.71 | 4.63 | 4.82 | 4.37 | 3.46 |
| -10 | 5.72 | 2.01 | 3.55 | 4.40 | 4.32 | 4.50 | 4.08 | 3.21 |
| -12 | 5.33 | 1.86 | 3.31 | 4.11 | 4.03 | 4.20 | 3.80 | 2.97 |
| -14 | 4.97 | 1.71 | 3.08 | 3.83 | 3.76 | 3.92 | 3.53 | 2.75 |
| -16 | 4.62 | 1.58 | 2.86 | 3.57 | 3.50 | 3.65 | 3.29 | 2.54 |
| -18 | 4.29 | 1.45 | 2.65 | 3.32 | 3.25 | 3.40 | 3.05 | 2.34 |
| -20 | 3.98 | 1.33 | 2.46 | 3.09 | 3.02 | 3.15 | 2.83 | 2.16 |
| -22 | 3.69 | 1.22 | 2.27 | 2.86 | 2.80 | 2.93 | 2.62 | 1.99 |
| -24 | 3.42 | 1.12 | 2.10 | 2.65 | 2.59 | 2.71 | 2.42 | 1.82 |
| -26 | 3.16 | 1.02 | 1.94 | 2.46 | 2.40 | 2.51 | 2.23 | 1.67 |
| -28 | 2.91 | 0.93 | 1.78 | 2.27 | 2.21 | 2.32 | 2.06 | 1.53 |
| -30 | 2.68 | 0.85 | 1.64 | 2.10 | 2.04 | 2.14 | 1.89 | 1.40 |
| -32 | 2.47 | 0.77 | 1.51 | 1.93 | 1.88 | 1.98 | 1.74 | 1.28 |
| -34 | 2.27 | 0.70 | 1.38 | 1.78 | 1.73 | 1.82 | 1.60 | 1.16 |
| -36 | 2.08 | 0.63 | 1.26 | 1.63 | 1.58 | 1.67 | 1.46 | 1.05 |
| -38 | 1.90 | 0.57 | 1.16 | 1.49 | 1.45 | 1.53 | 1.34 | 0.96 |
| -40 | 1.74 | 0.52 | 1.05 | 1.37 | 1.33 | 1.40 | 1.22 | 0.87 |
| -42 | 1.58 | 0.47 | 0.96 | 1.25 | 1.21 | 1.28 | 1.11 | 0.78 |
| -44 | 1.44 | 0.42 | 0.87 | 1.14 | 1.10 | 1.17 | 1.01 | 0.70 |
| -46 | 1.31 | 0.37 | 0.79 | 1.04 | 1.00 | 1.07 | 0.92 | 0.63 |
| -48 | 1.18 | 0.34 | 0.72 | 0.94 | 0.91 | 0.97 | 0.83 | 0.57 |
| -50 | 1.07 | 0.30 | 0.65 | 0.85 | 0.82 | 0.88 | 0.75 | 0.51 |
| -52 | 0.96 | 0.27 | 0.58 | 0.77 | 0.74 | 0.80 | 0.68 | 0.45 |
| -54 | 0.87 | 0.24 | 0.52 | 0.70 | 0.67 | 0.72 | 0.61 | 0.40 |
| -56 | 0.78 | 0.21 | 0.47 | 0.63 | 0.60 | 0.62 | 0.55 | 0.36 |
| -58 | 0.70 | 0.19 | 0.42 | 0.56 | 0.54 | 0.59 | 0.49 | 0.32 |
| -60 | 0.62 | 0.16 | 0.38 | 0.51 | 0.48 | 0.53 | 0.44 | 0.28 |

| Temperature °C | R23 |
|-------------------|-------------|
| | ALCO-Symbol |
| | B |
| 25 | 47.24 |
| 20 | 41.84 |
| 15 | 36.97 |
| 10 | 32.58 |
| 5 | 28.62 |
| 0 | 25.04 |
| -5 | 21.83 |
| -10 | 18.94 |
| -15 | 16.35 |
| -20 | 14.03 |
| -25 | 11.97 |
| -30 | 10.14 |
| -35 | 8.53 |
| -40 | 7.12 |
| -45 | 5.89 |
| -50 | 4.83 |
| -52 | 4.45 |
| -54 | 4.09 |
| -56 | 3.75 |
| -58 | 3.44 |
| -60 | 3.14 |
| -62 | 2.87 |
| -64 | 2.61 |
| -66 | 2.37 |
| -68 | 2.15 |
| -70 | 1.95 |
| -72 | 1.76 |
| -74 | 1.58 |
| -76 | 1.42 |
| -78 | 1.28 |
| -80 | 1.14 |
| -82 | 1.02 |
| -84 | 0.90 |
| -86 | 0.80 |
| -88 | 0.71 |
| -90 | 0.62 |
| -92 | 0.55 |
| -94 | 0.48 |
| -96 | 0.42 |
| -98 | 0.36 |
| -100 | 0.32 |
| -102 | 0.27 |
| -104 | 0.23 |
| -106 | 0.20 |
| -108 | 0.17 |
| -110 | 0.14 |
| -112 | 0.12 |
| -114 | 0.10 |
| -116 | 0.09 |
| -118 | 0.07 |
| -120 | 0.06 |

For component selection in R404A and R407C applications, use the values in the columns highlighted in green.

CE per Pressure Vessel Directive CE97/23/EC

Filter Driers

| Product | Fluid group | Volume (liter) | TS (°C) | PS (bar) | Hazard category | Conformity assessment module | Marking |
|---------------------------|-------------|----------------|------------------------------|----------------|-----------------|------------------------------|-------------|
| ADK-03 / 05 / 08 / 16... | II | 0.1 ... 0.38 | -40 ... +65 | 45 | SEP | - | HP & UL |
| ADK-30 / 41 / 75... | II | 0.4 ... 0.65 | | 45 | SEP | - | HP & UL |
| FDB-03 / 05 / 08 / 16... | II | 0.1 ... 0.38 | | 45 | SEP | - | HP & UL |
| FDB-30 / 41... | II | 0.45 ... 0.5 | | 45 | SEP | - | HP & UL |
| BFK-05 / 08 / 16... | II | 0.18 ... 0.32 | | 45 | SEP | - | HP & UL |
| BFK-30... | II | 0.4 | | 45 | SEP | - | HP & UL |
| FDS-24... | II | 1.0 | -10 ... +65 (-45 ... -10) | 34.5 (25.9) | SEP | - | HP & UL |
| ADKS-48... | II | 2.1 | | | I | A | CE & UL |
| ADKS-96... | II | 3.8 | | | I | A | CE & UL |
| ADKS-144... | II | 5.4 | | | I | A | CE & UL |
| ADKS-192... | II | 7.0 | | | I | D1 | CE0036 & UL |
| ASD/ASF-28.../35.../45... | II | <1.0 | -45 ... +50 | 27.5 | SEP | - | HP & UL |
| ASD/ASF50.../75... | II | <1.4 | | | SEP | - | HP & UL |
| BTAS-2... | II | 0.42 | -45 ... +50 | 24 | SEP | - | HP & UL |
| BTAS-3... | II | 1.1 | | | SEP | - | HP & UL |
| BTAS-4... | II | 1.97 | | | SEP | - | HP & UL |
| BTAS-5... | II | 3.19 | | | I | A | CE & UL |

Oil Management / Components

| | | | | | | | | | |
|-----------------------|----|--------|--------------|----|-------------|----|-------------|--|--|
| OSH-404 | II | 2.0 | -10 ... +150 | 31 | I | A | HP & UL | | |
| OSH-405 | II | 2.4 | | | I | A | HP & UL | | |
| OSH-407 | II | 2.8 | | | I | A | HP & UL | | |
| OSH-409 | II | 3.0 | | | I | A | HP & UL | | |
| OSH-411 / -413 | II | 3.6 | | | I | A | HP & UL | | |
| OST-404 | II | 1.8 | | | I | A | HP & UL | | |
| OST-405 | II | 2.6 | | | I | A | HP & UL | | |
| OSH-407 | II | 3.2 | | | I | A | CE & UL | | |
| OST-409 / -411 / -413 | II | 3.8 | | | I | A | CE & UL | | |
| OSH-611 | II | 6.5 | | | II | D1 | CE & UL | | |
| OSH-613 / -617 | II | 7.9 | | | II | D1 | CE0036 & UL | | |
| OSB-613 / -617 | II | 7.8 | | | II | D1 | HP & UL | | |
| OM3 | II | DN 6MM | | | -20 ... +80 | 35 | SEP | CE under Low Voltage and EMC Directive | |
| OM4 & OW4 | II | DN 6MM | | | -20 ... +80 | 60 | SEP | CE under Low Voltage and EMC Directive | |

Suction Accumulators

| | | | | | | | |
|----------------|----|-----|-----------------------------|----------------|-----|---|---------|
| A08-304 | II | 0.9 | -10 ... +65 (-45 ... 10) | 20.7 (15.5) | SEP | - | HP & UL |
| A10-305 | II | 1.1 | | | SEP | - | HP & UL |
| A12-305 / -306 | II | 1.3 | | | SEP | - | HP & UL |
| A14-305 / -306 | II | 1.6 | | | SEP | - | HP & UL |
| A06-404 / -405 | II | 1.2 | | | SEP | - | HP & UL |
| A10-405 / -406 | II | 2.1 | | | SEP | - | HP & UL |

Suction Accumulators (continued)

| Product | Fluid group | Volume (liter) | TS (°C) | PS (bar) | Hazard category | Conformity assessment module | Marking |
|----------------|-------------|----------------|------------------------------|----------------|-----------------|------------------------------|-------------|
| A09-506 / -507 | II | 2.7 | -10 ... +65 (-45 ... -10) | 20.7 (15.5) | I | A | CE & UL |
| A12-506 / -507 | II | 3.8 | | | I | A | CE & UL |
| A13-507 / -509 | II | 4.3 | | | I | A | CE & UL |
| A17-509 / -511 | II | 5.4 | | | I | A | CE & UL |
| A11-607 | II | 5.1 | | | I | A | CE & UL |
| A13-607 / -609 | II | 5.8 | | | I | A | CE & UL |
| A14-611 | II | 6.4 | | | I | A | CE & UL |
| A17-613 | II | 7.9 | | | I | A | CE & UL |
| A20-613 | II | 9.4 | | | I | A | CE & UL |
| A25-613 | II | 11.6 | | | II | D1 | CE0036 & UL |

Pressure Switches

| Product | Fluid group | DN (mm) | TS (°C) | PS (bar) | Hazard category | Conformity assessment module | Marking | |
|----------------------------------|-------------|------------------------------|-------------|------------------------------|------------------------------|------------------------------|-------------|-------------|
| PS1-B3..., PSA-B3... | | 6 | -50 ... +70 | 22 | IV | B, D | CE0035 & UL | |
| PS1-S3..., PSA-S3... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS1-W3..., PSA-W3... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS1-B5..., PSA-B5... | | 6 | | 32 | IV | B, D | CE0035 & UL | |
| PS1-S5..., PSA-S5... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS1-W5..., PSA-W5... | | 6 | | | IV | B, D | CE0035 & UL | |
| All other PS1 types | | 6 | | 22/32 | Under LVD, excluded from PED | | CE & UL | |
| PS2-B7..., PSB-B7... | | 6 | 50 ... +70 | 22 | IV | B, D | CE0035 & UL | |
| PS2-C7..., PSB-C7... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS2-T7..., PSB-T7... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS2-B7..., PSB-B7... | | 6 | | 32 | IV | B, D | CE0035 & UL | |
| PS2-C7..., PSB-C7... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS2-C8..., PSB-C8... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS2-G8..., PSB-G8... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS2-S8..., PSB-S8... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS2-T7..., PSB-T7... | | 6 | | | IV | B, D | CE0035 & UL | |
| PS2-W7..., PSB-W7... | | 6 | | IV | B, D | CE0035 & UL | | |
| All other PS2 types | | 6 | | 22/32 | Under LVD, excluded from PED | | CE | |
| PS3-B.1...,PS3-W.1... | | 6 | | -40 ... +70 | 27 | IV | B, D | CE0035 & UL |
| PS3-B.4...,PS3-S.4... | | 6 | | -40 ... +70 | 32 | IV | B, D | CE0035 & UL |
| PS3-B.5...,PS3-S.5... | | 6 | | | | IV | B, D | CE0035 & UL |
| PS3-W.4...,PS3-W.5... | 6 | IV | B, D | | | CE0035 & UL | | |
| PS3-C.4...,PS3-T.4...,PS3-X.4... | 6 | -40 ... +150 | | IV | B, D | CE0035 & UL | | |
| PS3-C.5...,PS3-T.5...,PS3-X.5... | 6 | | | IV | B, D | CE0035 & UL | | |
| PS3-B6...,PSC-B6... | 6 | -40 ... +150 | 43 | IV | B, D | CE0035 & UL | | |
| PS3-W6...,PSC-W6... | 6 | | | IV | B, D | CE0035 & UL | | |
| PS3-S6...,PSC-S6... | 6 | | | IV | B, D | CE0035 & UL | | |
| All other PS3 type | 6 | -40 ... +70 | 27/32 | Under LVD, excluded from PED | | CE | | |
| PS4-W..., PS4-BL... | 6 | -30 ... +80 | 25/41/55/69 | IV | B, D | CE | | |
| FD113... | 6 | Under LVD, excluded from PED | | | | CE & UL | | |

LVD = Low Voltage Directive

Fan Speed Controllers

| Product | Fluid group | DN (mm) | TS (°C) | PS (bar) | Hazard category | Conformity assessment module | Marking |
|-----------|-------------|---------|-------------|----------|---------------------------------|------------------------------|---------|
| FSY-41... | II | 6 | -20 ... +70 | 27 | under LVD, excluded from PED | | CE |
| FSY-42... | II | 6 | | 32 | | | CE |
| FSY-43... | II | 6 | | 43 | | | CE |

Transmitters

| | | | | | | | |
|-----------|----|---|---|-----|-----|---|----|
| PT5-07M/T | II | 6 | -40 ... +80 mobile applic.: -25 ... +80 | 27 | SEP | - | CE |
| PT5-18M/T | II | 6 | | 55 | SEP | - | CE |
| PT5-30M/T | II | 6 | | 60 | SEP | - | CE |
| PT5-50M/T | II | 6 | | 100 | SEP | - | CE |
| PT5-150D | II | 6 | -40 ... +80 | 150 | SEP | - | CE |

Thermo™ Expansion Valves and Electrical Control Valves

| | | | | | | | |
|---------------------------------------|----|---------|--------------|---------|-----|---|----|
| TI | II | max. 16 | -45 ... +65 | 45 | SEP | - | - |
| TX3 | II | max. 16 | | 45 | SEP | - | - |
| TX6-H/M/N/S.. | II | max. 22 | | 31 | SEP | - | - |
| TX6-Z.. | II | max. 22 | | 42 | SEP | - | - |
| T-series with XB / XC power element | II | max. 28 | | 46 / 31 | SEP | - | - |
| L-series with XB / XC power element | II | max. 28 | | 46 / 31 | SEP | - | - |
| 935-series with XB / XC power element | II | max. 28 | | 46 / 31 | SEP | - | - |
| ZZ-series | II | max. 28 | -120 ... +65 | 31 | SEP | - | - |
| EX2 | II | max. 12 | -40 ... +50 | 40 | SEP | - | - |
| EX4/EX5/EX6 | II | max. 22 | -50 ... +100 | 45 | SEP | - | - |
| EX7 | II | 35 | | 45 | I | A | CE |
| EX8 | II | 42 | | 45 | I | A | CE |

Solenoid Valves

| | | | | | | | |
|-----------------------|----|-----------|--------------|--------------|-----|-----|----|
| 110 RB 2... | II | 6...10 | -40 ... +120 | 31 | SEP | - | - |
| 200 RB 3/4/6... | II | 10 ... 16 | | 31 | SEP | - | - |
| 200 RH 3-6T4/6T5 | II | 10 ... 16 | | 60/50 | SEP | - | - |
| 240 RA 8/9/12... | II | 16 ... 28 | | 31 | SEP | - | - |
| 240 RA 16T9 | II | 28 | | 31 | SEP | - | - |
| 240 RA 16T11 | II | 35 | | 31 | I | A | CE |
| 240 RA 20T11/13/17... | II | 35 ... 54 | | 31 | I | A | CE |
| 540 RA 8/9/12/16... | II | 16 ... 28 | | 31 | SEP | - | - |
| 540 RA 20T11 | II | 35 ... 54 | | 28 | SEP | - | - |
| M36-078 | II | 28 | | -40 ... +120 | 35 | SEP | - |
| M36-118 | II | 28 | 35 | | SEP | - | - |

Regulators

| | | | | | | | |
|---------|----|-----------|--------------|----|-----|---|---|
| ACP | II | 6...10 | -40 ... +120 | 31 | SEP | - | - |
| CPHE... | II | 12 ... 28 | | 28 | SEP | - | - |
| PRE/PRC | II | 16 ... 35 | -30... +80 | 25 | SEP | - | - |

Ball valves

| | | | | | | | |
|-------------|----|------|--------------|----|-----|---|----|
| BVE/BVS... | II | ≤ 28 | -40 ... +120 | 45 | SEP | - | - |
| BVE/BVS.... | II | ≥ 35 | | 45 | I | A | CE |

Alco Keyword Register

| Series | Description | Page |
|----------------------|--|------|
| 110 RB | 2-Way Solenoid Valve | 240 |
| 200 RB | 2-Way Solenoid Valve | 240 |
| 200 RH | 2-Way Solenoid Valve | 243 |
| 240 RA | 2-Way Solenoid Valve | 240 |
| 540 RA | 2-Way Solenoid Valve | 242 |
| 935 | Liquid Injection Valve | 234 |
| A | Suction Accumulators | 306 |
| ACP | Hot Gas Bypass Regulator | 247 |
| ADK | Filter Drier | 276 |
| ADKS-Plus | Filter Drier Shell | 282 |
| AMI | Moisture/Liquid Indicator | 291 |
| AOK | Acid Test Kit | 308 |
| ASC3 | Coils | 175 |
| ASF | Suction Line Filter | 286 |
| ASD | Suction Line Filter Drier | 286 |
| B | | |
| BFK | Bi-Flow Filter Drier | 275 |
| BTAS | Suction Line Filter and Filter Drier Shell | 287 |
| BVE / BVS, CVE / CVS | Ball Valves | 307 |
| C | | |
| CPHE | Hot Gas Bypass Regulator | 248 |
| CSS | Compressor Soft Starter | 209 |
| CS3 | Pressure Controls (High Pressure) | 261 |
| CX2 | High Pressure Electrical Control Valves | 177 |
| E | | |
| EC2-3 | Display Case Controller | 199 |
| EC2-5 | Condenser and Condensing Unit Controller | 202 |
| EC3-3 | Coldroom Controller | 204 |
| EC3-D13/D23 | Driver for Digital Copeland™ compressors | 207 |
| EC3-D72/D73 | Digital Superheat Controllers | 197 |
| EC3-X32/X33 | Superheat Controllers | 197 |
| EX2 | Electrical Control Valves | 176 |
| EX4 .. EX8 | Electrical Control Valves | 178 |
| EXD-HP1/2 | Stand-alone Superheat/Economizer Controller | 191 |
| EXD-SH1/2 | Superheat Controller for EX/CX Valves | 193 |
| EXD-TEVI | Economizer Controller for Tandem Compressors | 195 |
| EXD-U | Universal Driver Modules | 198 |
| EXM/EXL | Electrical Control Valves | 174 |

Alco Keyword Register

| Series | Description | Page |
|-----------------|------------------------------------|------|
| F | | |
| FD 113 | Differential Pressure Controls | 266 |
| FDB | Filter Driers | 279 |
| FDH | Filter Drier Shell | 284 |
| FDS-24 | Filter-Drier Shells With Quick-Cap | 285 |
| FSE | Fan Speed Control Module | 214 |
| FSY | Electronic Fan Speed Controller | 212 |
| L | | |
| | Liquid Injection Valve | 232 |
| LW4/5 | Level Watch LW4 and LW5 | 301 |
| M | | |
| M36 | 3-Way Solenoid Valve | 244 |
| MIA / CIA | Moisture/Liquid Indicator | 289 |
| O | | |
| OM3 / OM4 / OM5 | Oil Level Management System | 295 |
| OW4 / OW5 | Electronic Oil Level Monitoring | 299 |
| OS | Oil Separator | 303 |
| P | | |
| PRC | Crankcase Pressure Regulator | 249 |
| PRE | Evaporator Pressure Regulator | 249 |
| PS1 | Pressure Controls | 254 |
| PS2 | Dual Pressure Controls | 256 |
| PS3 | Pressure Controls | 258 |
| PS4 | Pressure Switch | 263 |
| PT5 | Pressure Transmitter | 210 |
| T | | |
| | Thermo™-Expansion Valve | 228 |
| TI | Thermo Expansion Valve | 218 |
| TIH | Thermo Expansion Valve | 222 |
| TS1 | Thermostat | 269 |
| TX7 | Thermo Expansion Valve | 224 |
| Z | | |
| ZZ | Thermo -Expansion Valve | 230 |

1. DEFINITIONS:

In these Terms and Conditions of Sale, "Seller" means one of the three Emerson companies mentioned in the title; "Buyer" means the person, firm, company or corporation by whom the order is given; "Goods" means the goods (including any Software and Documentation, as defined in Clause 9) described in Seller's Acknowledgement of Order form; "Services" means the services described in Seller's Acknowledgement of Order Form; "Contract" means the written agreement (including these Terms and Conditions) made between Buyer and Seller for the supply of the Goods and/or provision of Services; "Contract Price" means the price payable to Seller by Buyer for the Goods and/or Services and "Seller Affiliate" means an Emerson Group company which is an affiliate within the meaning of Section 15 AktG (German Stock Corporation Act).

2. THE CONTRACT:

2.1 All orders must be in writing and are accepted subject to these Terms and Conditions of Sale. No terms or conditions put forward by Buyer and no representations, warranties, guarantees or other statements not contained in Seller's quotation or Acknowledgement of Order nor otherwise expressly agreed in writing by Seller shall be binding on Seller.
2.2 The Contract shall become effective only upon the date of acceptance of Buyer's order on Seller's Acknowledgement of Order form. If the details of the Goods or Services described in Seller's quotation differ from those set out in the Acknowledgement of Order Form the latter shall apply.

2.3 No alteration or variation to the Contract shall apply unless agreed in writing by both parties. However, Seller reserves the right to effect minor modifications and/or improvements to the Goods before delivery provided that the performance of the Goods is not adversely affected and that neither the Contract Price nor the delivery date is affected.

3. VALIDITY OF QUOTATION AND PRICES:

3.1 Unless previously withdrawn, Seller's quotation is open for acceptance within the period stated therein or, when no period is so stated, within thirty days after its date.

3.2 Prices are firm for delivery within the period stated in Seller's quotation and are exclusive of (a) Value Added Tax and (b) any similar and other taxes, duties, levies or other like charges arising outside Germany in connection with the performance of the Contract.

3.3 Prices (a) are for Goods delivered EXW (Ex works) Seller's shipping point, exclusive of freight, insurance and handling and (b) unless otherwise stated in the Seller's quotation, are exclusive of packing. If the Goods are to be packed, packing materials are non-returnable.

4. PAYMENT:

4.1 Payment shall be made: (a) in full without set-off, counterclaim or withholding of any kind (save where and to the extent that this cannot by law be excluded); and (b) in the currency of Seller's quotation within thirty days of receipt of invoice unless otherwise specified by Seller's Finance Department. Goods will be invoiced at any time after their readiness for dispatch has been notified by Buyer. Services will be invoiced monthly in arrears or, if earlier, upon completion. Without prejudice to Seller's other rights, Seller reserves the right to: (i) charge interest on any overdue sums at 8% above the base lending rate of Section 247 BGB (German Civil Code) during the period of delay; (ii) suspend performance of the Contract (including withholding shipment) in the event that Buyer fails or in Seller's reasonable opinion it appears that Buyer is likely to fail to make payment when due under the Contract or any other contract; and (iii) under the same conditions require reasonable security for payment.

4.2 Customer may set off counterclaims only if recognized or non-appealable. A right of retention may be exercised by Customer only if it concerns the same contractual relationship.

5. DELIVERY PERIOD:

5.1 Unless otherwise stated in Seller's quotation, all periods stated for delivery or completion run from the Effective Date and are to be treated as estimates only not involving any contractual obligations.

5.2 If Seller is delayed in or prevented from performing any of its obligations under the Contract due to the acts or omissions of Buyer or its agents (including but not limited to failure to provide specifications and/or fully dimensioned working drawings and/or such other information as Seller reasonably requires to proceed expeditiously with its obligations under the Contract), the delivery/completion period and the Contract Price shall both be adjusted accordingly.

5.3 If delivery is delayed due to any act or omission of Buyer, or if having been notified that the Goods are ready for dispatch, Buyer fails to take delivery or provide adequate shipping instructions, Seller shall be entitled to place the Goods into a suitable store at Buyer's expense. Upon placing the Goods into the store, delivery shall be deemed to be complete, risk in the Goods shall pass to Buyer and Buyer shall pay Seller accordingly.

6. FORCE MAJEURE:

6.1 The Contract (other than Buyer's obligation to pay all sums due to Seller in accordance with the Contract) shall be suspended, without liability, in the event and to the extent that its performance is prevented or delayed due to any circumstance beyond the reasonable control of the party affected, including but not limited to: Act of God, war, armed conflict or terrorist attack, riot, fire, explosion, accident, flood, sabotage; governmental decisions or actions (including but not limited to prohibition of exports or re-exports or the failure to grant or the revocation of applicable export licenses), or labor trouble, strike, lockout or injunction. Seller shall have no obligation to supply hardware, software or technology or to provide services in the absence of government permits or fulfillment of statutory conditions of exemption from such permits within the framework of import and export control (in particular, according to the regulations applicable in the United States, the European Union and the jurisdiction in which Seller has its registered office or from which components of the Goods are supplied) and the underlying circumstances could not be foreseen by Seller and are outside of Seller's sphere of influence. In the event of revocation of issued government permits or in the event of a change in the applicable statutory import and export control regulations such that Seller is prevented from fulfilling the contract, Seller is discharged from the contractual obligation without any liability of Seller.

6.2 If either party is delayed or prevented from performance of its obligations by reason of this Clause for more than 180 consecutive calendar days, either party may terminate the then unperformed portion of the Contract by notice in writing given to the other party, without liability provided that Buyer shall be obliged to pay the reasonable cost and expense of any work in progress and to pay for all Goods delivered and Services performed as at the date of termination.

7. INSPECTION, TESTING, AND CALIBRATION:

7.1 Goods will be inspected by Seller or manufacturer and, where practicable, submitted to Seller's or manufacturer's standard tests before dispatch. Any additional tests or inspection (including inspection by Buyer or its representative, or tests in the presence of Buyer or its representative and/or calibration) or the supply of test certificates and/or detailed test results shall be subject to Seller's prior written agreement and Seller reserves the right to charge therefor; if Buyer or its representative fails to attend such tests, inspection and/or calibration after seven days' notice that the Goods are ready therefor, the tests, inspection and/or calibration will proceed and shall be deemed to have been made in the presence of Buyer or its representative and the Seller's statement that the Goods have passed such testing and/or inspection and/or have been calibrated shall be conclusive.

7.2 Buyer's warranty rights are subject to Buyer's proper compliance with Buyer's inspection and complaint obligations set forth in Section 377 of the German Commercial Code (HGB).

8. DELIVERY, RISK & TITLE:

8.1 Unless otherwise expressly stated in the Contract, the Goods will be delivered Carriage Paid To (CPT) the destination named in the Contract; freight, packing and handling will be charged at Seller's standard rates. Risk of loss of or damage to the Goods shall pass to Buyer upon delivery as aforesaid and Buyer shall be responsible for insurance of the Goods after risk has so passed. Alternatively, if it is expressly stated in the Contract that Seller is responsible for the insurance of the Goods after their delivery to the carrier, such insurance will be charged at Seller's standard rates. "Ex-works"; "FCA"; "CPT" and any other delivery terms used in the Contract shall be defined in accordance with the latest version of Incoterms.

9. DOCUMENTATION AND SOFTWARE:

9.1 Title to and ownership of the copyrights in software and/or firmware incorporated into or provided for use with the Goods ("Software") and documentation supplied with the Goods ("Documentation") shall remain with the relevant Seller Affiliate (or such other party as may have supplied the Software and/or Documentation to Seller) and is not transferred hereby to Buyer.

9.2 Except as otherwise provided herein, Buyer is hereby granted a non-exclusive, royalty-free license to use the Software and Documentation in conjunction with the Goods, provided that and for so long as the Software and Documentation are not copied (unless expressly authorized by applicable law) and Buyer holds the Software and Documentation in strict confidence and does not disclose them to others, or permit others to have access to them (other than Seller's standard operating and maintenance manuals). Buyer may transfer the foregoing license to another party which purchases, rents or leases the Goods, provided the other party accepts and agrees in writing to be bound by the conditions of this Clause 9.

9.3 Notwithstanding Sub-clause 9.2, Buyer's use of certain Software, (as specified by Seller and including but not limited to control system and AMS Software) shall be governed exclusively by the applicable Seller Affiliate or third party license agreement.

9.4 Seller and Seller Affiliates shall retain ownership of all inventions, designs and processes made or evolved by them and save as set out in this Clause 9 no rights in intellectual property are hereby granted.

10. LIABILITY FOR DEFECTS OF QUALITY

10.1 Seller warrants that upon passing of the risk the Goods and Services will have the quality agreed upon. Unless otherwise agreed, the quality agreed upon shall meet Seller's specifications as valid and published at the time of the order confirmation.

10.2 If, upon passing of the risk, the Goods or Services do not have the quality agreed upon, Seller warrants to provide subsequent performance by either, at its option, repairing or replacing the concerned parts (subsequent rectification) or by replacing the Goods or Services by such Goods or Services which are free from defects (subsequent delivery).

10.3 Seller may rectify any defect several times and may decide at its discretion to change from rectification to subsequent delivery. Seller shall be responsible for all costs incurred in connection with its subsequent performance, especially the transport, shipping, labor and material cost, unless such costs are incurred as a result of the Goods being taken to a place other than the place of performance.

10.4 Buyer may set a reasonable period of at least four (4) weeks to Seller for him to provide subsequent performance and, if subsequent performance fails during such period, may demand reduction of the Contract Price after expiry of that period or, unless the defect is insignificant, may rescind the Contract. Damages may only be claimed in line with Clause 14.

10.5 Any claims and rights based on defects will become time-barred, except in the case of intent, after expiry of twelve (12) months since taking into operation of the Goods, however no later than eighteen (18) months since delivery. Claims to damages based on defects will become time-barred after expiry of the statutory period if they result from a violation of another's life, health or body, or from Seller's gross negligence.

10.6 Seller assumes no warranty for normal wear and tear, material provided by Buyer, processing of the Goods made by Buyer, damage due to improper storage, installation or operation or due to inadequate maintenance, or damage resulting from any modification or repair not approved beforehand by Seller in writing. Seller will not be liable where any non-authorized software or non-authorized spare or replacement parts are used. Any costs incurred by Seller for examining and removing such defects will be borne by Buyer upon demand. Buyer will always be responsible alone for the completeness and correctness of any information provided by it.

10.7 Regarding products or Services sourced by Seller from a third party (other than a Seller Affiliate) for resale to Buyer, Seller assigns to Buyer all warranty rights against such third party. In addition, Seller remains obliged to assume the guarantee set forth in the preceding clauses towards Buyer, however, only under the restriction that Buyer has beforehand unsuccessfully tried to execute the assigned warranty rights against the third party.

11. LIABILITY FOR PROPRIETARY RIGHTS INFRINGEMENTS

11.1 Seller warrants that upon passing of the risk no patents or other proprietary rights of third parties exist which may be claimed with respect to the Goods or Services if these are used as intended. Clauses 10.2 to 10.5 and 10.7 shall apply correspondingly.

11.2 Seller's liability shall be excluded where a third party patent or proprietary right is infringed because Seller has adhered to a design provided by Buyer or has complied with an instruction given by Buyer, or because the Goods are used in a manner, for a purpose, in a country, or in connection with other goods or services, without this having been communicated to Seller before execution of the Contract.

11.3 During the period of Seller's warranty, Buyer has the obligation to inform Seller in writing as promptly as possible in the event that a third party claims any patent or other proprietary right or asserts any claims in or out of court with respect to the Goods or Services. Before recognizing any claim advanced by a third party in or out of court, Buyer shall give Seller the opportunity to comment. At its request, Seller shall be given the authority to handle the negotiations or legal dispute with such third party at its own cost and responsibility. Buyer shall be liable to Seller for any damage sustained by it as a result of a culpable violation of said obligations.

11.4 Buyer warrants that the use of a design provided by it or compliance with an instruction given by it will not lead to Seller infringing any patents or other proprietary rights when performing its contractual obligations. Buyer agrees to indemnify and hold Seller harmless against any reasonable cost and damages incurred by Seller as a result of Buyer's breach of this warranty.

12. DAMAGES

12.1 Seller shall be liable to Buyer only for damage caused with intent or gross negligence. In the event of breach of material contractual obligations, Seller shall, however, be liable for each fault of its personnel (statutory representatives, executive employees and other persons employed in the performance of its obligations) causing damage.

12.2 Except in case of intentional causation of damage by personnel of Seller or causation of damage with gross negligence by statutory representatives or executive employees of Seller, Seller shall not be liable for compensation for indirect damage and, in particular, Seller shall not be liable for compensation for loss of profit, unless such damage is covered by the protective purpose of a warranty explicitly assumed.

12.3 Except in case of intentional causation of damage by personnel of Seller or causation of damage with gross negligence by statutory representatives or executive employees of Seller, the liability of Seller shall, in each case, be limited in terms of amount to the damage which is typically foreseeable in the time of conclusion of the contract.

12.4 Claims to damages which result from the violation of another's life, body or health, from the violation of a guaranty given by Seller expressly in writing as well as damage claims under the Product Liability Act shall remain unaffected.

13. STATUTORY AND OTHER REGULATIONS:

13.1 If Seller's obligations under the Contract shall be increased or reduced by reason of the making or amendment after the date of Seller's quotation of any law or order, regulation or by-law having the force of law that shall affect the performance of Seller's obligations under the Contract, the Contract Price and delivery period shall be adjusted accordingly and/or performance of the Contract suspended or terminated, as appropriate. A price adjustment shall not be implemented if the delivery is to be carried out within 4 months after the closing of the Contract.

13.2 Except to the extent otherwise required by applicable law, Seller shall have no responsibility for the collection, treatment, recovery or disposal of (i) the Goods or any part thereof when they are deemed by law to be "waste" or (ii) any items for which the Goods or any part thereof are replacements. If Seller is required by applicable law, including waste electrical and electronic equipment legislation, European Directive 2002/96/EC (WEEE) and related legislation in EU Member States, to dispose of "waste" Goods or any part thereof, Buyer shall, unless prohibited by applicable law, pay Seller, in addition to the Contract Price, either (i) Seller's standard charge for disposing of such Goods or (ii) if Seller does not have such a standard charge, Seller's costs (including all handling, transportation and disposal costs and a reasonable mark-up for overhead) incurred in disposing of such Goods.

13.3 Buyer's personnel shall, whilst on Seller's premises, comply with Seller's applicable site regulations and Seller's reasonable instructions, including but not limited to those relating to safety, security and electrostatic discharge.

14. COMPLIANCE WITH LAWS

Buyer agrees that all applicable import, export control and sanctions laws, regulations, orders and requirements, as they may be amended from time to time, including without limitation those of the United States, the European Union and the jurisdictions in which Seller and Buyer are established or from which items may be supplied, and the requirements of any licenses, authorizations, general licenses or license exceptions relating thereto will apply to its receipt and use of hardware, software, services and technology. In no event shall Buyer use, transfer, release, export or re-export any such hardware, software or technology in violation of such applicable laws, regulations, orders or requirements or the requirements of any licenses, authorizations or license exceptions relating thereto. Buyer agrees furthermore that it shall not engage in any activity that would expose the Seller or any of its affiliates to a risk of penalties under laws and regulations of any relevant jurisdiction prohibiting improper payments, including but not limited to bribes, to officials of any government or of any agency, instrumentality or political subdivision thereof, to political parties or political party officials or candidates for public office, or to any employee of any customer or supplier. Buyer agrees to comply with all appropriate legal, ethical and compliance requirements.

15. DEFAULT, INSOLVENCY AND CANCELLATION:

Seller shall be entitled, without prejudice to any other rights it may have, to cancel the Contract forthwith, wholly or partly, by notice in writing to Buyer, if Buyer is in default of any of its obligations under the Contract and fails, within 30 (thirty) days of the date of Seller's notification in writing of the existence of the default, either to rectify such default if it is reasonably capable of being rectified within such period or, if the default is not reasonably capable of being rectified within such period, to take action to remedy the default.

16. SUPPLEMENTARY TERMS AND CONDITIONS:

If the Goods comprise or include a control system, Seller's Supplementary Terms and Conditions Applicable to the Supply of Control Systems and Related Services shall apply to the control system and related services only. Such Supplementary Terms and Conditions shall take precedence over these Standard Terms and Conditions of Sale; copies are available from Seller upon request.

17. MISCELLANEOUS:

17.1 No waiver by either party with respect to any breach or default or of any right or remedy and no course of dealing, shall be deemed to constitute a continuing waiver of any other breach or default or of any other right or remedy, unless such waiver be expressed in writing and signed by the party to be bound.

17.2 If any clause, sub-clause or other provision of the Contract is invalid or unenforceable, this shall not affect the validity of the remainder of the Contract. Should one of the clauses be invalid or unenforceable, the parties obligate themselves to replace the invalid or unenforceable clause by such a clause which comes closest to the intended economic purpose of the invalid clause.

17.3 Buyer shall not be entitled to assign its rights or obligations hereunder without the prior written consent of Seller.

17.4 Seller enters into the Contract as principal. Buyer agrees to look only to Seller for due performance of the Contract.
17.5 GOODS AND SERVICES PROVIDED HEREUNDER ARE NOT SOLD OR INTENDED FOR USE IN ANY NUCLEAR OR NUCLEAR RELATED APPLICATIONS. Buyer (i) accepts Goods and Services in accordance with the foregoing restriction, (ii) agrees to communicate such restriction in writing to any and all subsequent purchasers or users and (iii) agrees to defend, indemnify and hold harmless Seller and Seller's Affiliates from and against all claims, losses, liabilities, suits, judgments and damages, including incidental and consequential damages, arising from use of Goods and Services in any nuclear or nuclear related applications, whether the cause of action be based in tort, contract or otherwise, including allegations that the Seller's liability is based on negligence or strict liability.

17.6 The Contract shall in all respects be construed in accordance with the laws of the Federal Republic of Germany excluding, however, any effect on such laws of the 1980 Vienna Convention on Contracts for the International Sale of Goods, and to the fullest extent permitted by law, shall be without regard to any conflict of laws or rules which might apply the laws of any other jurisdiction. All disputes arising out of the Contract shall be subject to the exclusive jurisdiction of the Berlin courts. However, Seller is entitled to sue Buyer in the court of Buyer's residence as well.

17.7 The headings to the Clauses and paragraphs of the Contract are for guidance only and shall not affect the interpretation thereof.

17.8 All notices and claims in connection with the Contract must be in writing.

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