

ENGINEERING  
TOMORROW

*Danfoss*

Quick Selection Guide  
Australia & New Zealand Second Edition

# Products and technologies for all your application needs, today and **tomorrow**

REFRIGERATION & AIR CONDITIONING

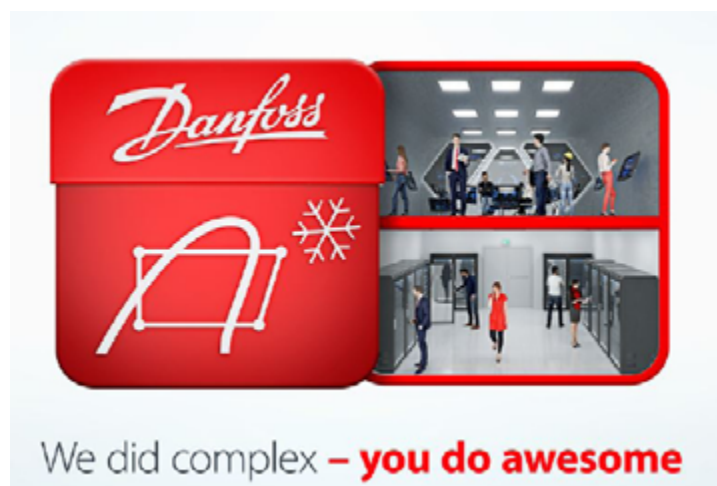
Flow Controls | Electronic Controllers | Compressors | IR Products

## Easy

selection of future-  
proof solutions and  
components.

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# Coolselector®



## Coolselector2 - Cool romm.cspj

File Options Tools Help About | Selections Report Bill of Materials

**VALVES AND LINE COMPONENTS**

**COMPONENTS IN SERIES**

**COMPRESSORS AND CONDENSING UNITS**

**ELECTRONIC CONTROLS**

**INDUSTRIAL APPLICATIONS**

**COMMERCIAL APPLICATIONS**

**SENSORS AND SWITCHES**

|  |                               |  |                                   |  |                          |
|--|-------------------------------|--|-----------------------------------|--|--------------------------|
|  | Control and regulating valves |  | Electronic expansion valve        |  | Filters and strainers    |
|  | Solenoid valves               |  | Thermostatic expansion valve      |  | Filter driers            |
|  | Check valves                  |  | Manual expansion valve            |  | Burnout filters          |
|  | Stop and shut off valves      |  | Float expansion valve             |  | Sight glasses            |
|  | ICF valve station             |  | Transcritical high pressure valve |  | Piping                   |
|  | Safety relief valves          |  | Transcritical gas bypass valve    |  | Internal heat exchangers |
|  | Water valves                  |  | Multi ejectors                    |  |                          |

## Coolselector® – Select the right component the coolest way

As the world gets more complicated we all need support to make the right choices.

Danfoss helps you make the right selections also for the other components that you will need in your professional daily life. Coolselector® calculates for you the performance of the component at your conditions, not just according to the standards.

### Select the right component the coolest way

Do you pick your solenoid valve for your cold room by connection size alone?

Maybe you could actually go for a size smaller, or maybe the cold room would have done better if you had optimized the selection of that particular valve to the flow. Most professionals know that selecting a thermostatic expansion valve can turn out to be a tricky task if the conditions are not exactly standard conditions. You will need to take superheat, sub cooling and pressure drop into consideration to find the optimal valve with the right orifice. But also other components require consideration before selecting the best valve for the purpose. Even the solenoid valve should be checked for the specific performance under the conditions you intend to expose it to.

Coolselector® helps you optimize the choice of component and even tells you how the component behaves at the conditions given.

With the new version of Coolselector® you have all the components required to control a commercial refrigeration plant. Danfoss have now included the well-known compressor and condensing unit selection program RS+3 in Coolselector® which means that you no longer have to open several programs to calculate a compressor, a solenoid valve and an expansion valve. You can now do this in just one program.

The new section with compressors and condensing units also includes compressors for heat pumps which mean that you easily can select the best suited compressor for heat pump applications. Danfoss have on purpose kept the familiar and user friendly interface from RS+3 and just extended the content in accordance with the additional compressors. Coolselector® will continue development and enhancement and offers you automatic-updates also in future.

Please do not hesitate and go to the web address: **coolselector.danfoss.com** to down-load the program.

Quick Selection Notes:

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# T2 / TE2, Thermostatic expansion valves

T2 / TE2 thermostatic expansion valves are used for liquid injection into evaporators on both refrigeration and air conditioning systems using fluorinated refrigerants e.g. R407C / R22, R134a, R404A / R507, R407C, R407F and R407A.

T2 / TE2 valves are supplied as a parts programme, with separate thermostatic element/valve body and orifice assembly. Available as angleway valves with flare x flare or flare x solder connection, with internal and external equalisation.

## Features T2 / TE2



### Laser-welded power element in stainless steel

- long diaphragm life
- high pressure tolerance and working pressure
- high corrosion resistance

### Stainless steel capillary tube and bulb:

- high corrosion resistance
- high strength and vibration resistance

Flare or solder outlet

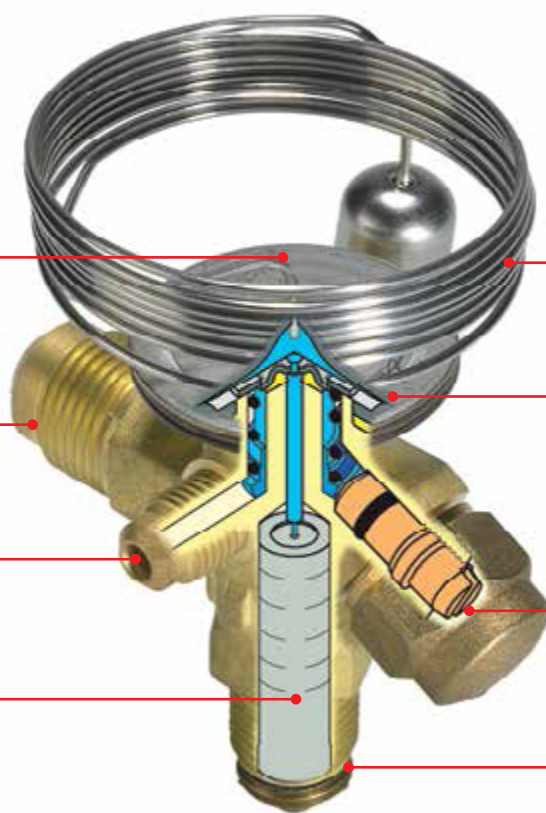
Laser-engraved label

Flare or solder pressure equalization

Easy adjustment of superheat setting

Interchangeable orifice assembly with dirt protection strainer

Flare inlet  
Solder adaptor available as an option



## Facts

### Applications:

- Traditional refrigeration
- Heat pump systems
- Air conditioning units
- Liquid coolers
- Transport refrigeration

### Maximum working temperature:

- -60 to 10 °C / -76 to 50°F

### Refrigerants:

- R22/R407C
- R23
- R236fa
- R404A/R507
- R407C
- R407F
- R134a/R513A
- R407A
- R448A
- R449A
- R452A

### Capacity range:

- 0.18 – 6.51 TR / 0.64 – 22.9 kW

### Benefit:

- Interchangeable orifice assembly
- Easy stocking
- Easy capacity matching
- Better service
- Can be supplied with MOP(Max. Operating Pressure)
- Protects the compressor motor against excessive evaporating pressure during normal operation

# Technical data and ordering

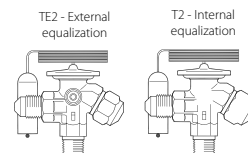


Thermostatic element + Orifice

## T2 / TE2

Thermostatic element with: bulb strap, without: orifice, strainer cone and nuts

Flare × flare connection

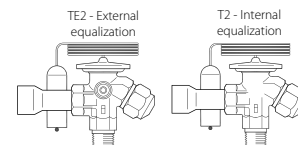


| Refrigerant   | Valve type | Pressure equalization Flare | Capillary Tube (m) | Connection Inlet × outlet        |         | Code no.     |           |              |              |
|---------------|------------|-----------------------------|--------------------|----------------------------------|---------|--------------|-----------|--------------|--------------|
|               |            |                             |                    |                                  |         | Range N      |           | Range NL     | Range B      |
|               |            |                             |                    |                                  |         | -40 to +10°C |           | -40 to -15°C | -60 to -25°C |
|               |            |                             |                    | in. × in.                        | mm × mm | Without MOP  | MOP +15°C | MOP -10°C    | MOP -20°C    |
| R22           | T 2        | Int.                        | 1.5                | $\frac{3}{8} \times \frac{1}{2}$ | 10 × 12 | 068Z3206     | 068Z3208  | -            | -            |
|               | TE 2       | Ext.                        |                    |                                  |         | 068Z3209     | 068Z3211  | 068Z3227     | 068Z3229     |
| R134a         | T 2        | Int.                        |                    |                                  |         | 068Z3346     | 068Z3347  | -            | -            |
|               | TE 2       | Ext.                        |                    |                                  |         | 068Z3348     | 068Z3349  | -            | -            |
| R404A / R507  | T 2        | Int.                        |                    |                                  |         | 068Z3400     | 068Z3402  | 068Z3408     | 068Z3410     |
|               | TE 2       | Ext.                        |                    |                                  |         | 068Z3403     | 068Z3405  | 068Z3409     | -            |
| R448A / R449A | T2         | Int.                        |                    |                                  |         | 068Z3727     | -         | -            | -            |
|               | T2         | Ext.                        |                    |                                  |         | 068Z3728     | -         | -            | -            |

## T2 / TE2

Thermostatic element with: bulb strap, without: orifice,

Flare × solder connection

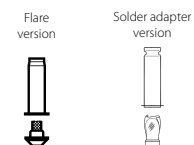


| Refrigerant   | Valve type | Pressure equalization Solder | Capillary Tube (m) | Connection        |                   | Code no.     |           |              |              |
|---------------|------------|------------------------------|--------------------|-------------------|-------------------|--------------|-----------|--------------|--------------|
|               |            |                              |                    |                   |                   | Range N      |           | Range NL     | Range B      |
|               |            |                              |                    |                   |                   | -40 to +10°C |           | -40 to -15°C | -60 to -25°C |
|               |            |                              |                    | Inlet Flare       | Outlet ODFsolder  | Without MOP  | MOP +15°C | MOP -10°C    | MOP -20°C    |
| R22           | T 2        | -                            | 1.5                | $\frac{3}{8}$ in. | $\frac{1}{2}$ in. | 068Z3281     | -         | -            | -            |
|               | TE 2       | $\frac{1}{4}$ in.            |                    |                   |                   | 068Z3284     | -         | -            | -            |
| R134a         | T 2        | -                            |                    |                   |                   | 068Z3383     | 068Z3387  | -            | -            |
|               | TE 2       | $\frac{1}{4}$ in.            |                    |                   |                   | 068Z3385     | 068Z3389  | -            | -            |
| R404A / R507  | T 2        | -                            |                    |                   |                   | 068Z3414     | 068Z3416  | -            | 068Z3420     |
|               | TE 2       | $\frac{1}{4}$ in.            |                    |                   |                   | 068Z3415     | 068Z3417  | 068Z3430     | -            |
| R448A / R449A | T 2        | -                            |                    |                   |                   | 068Z3729     | -         | -            | -            |
|               | TE 2       | $\frac{1}{4}$ in.            |                    |                   |                   | 068Z3730     | -         | -            | -            |

# Technical data and ordering

## T2 / TE2

### Orifice assembly (Flare version)



| Orifice no. | Rated capacity in kW |      |       |       |       |      |            |      |       |      |       |      |       |      |       |      | Code no.              |                        |
|-------------|----------------------|------|-------|-------|-------|------|------------|------|-------|------|-------|------|-------|------|-------|------|-----------------------|------------------------|
|             | R22                  |      | R407C |       | R134a |      | R404A/R507 |      | R513A |      | R452F |      | R448A |      | R449A |      | Flare X Flare version | Solder adaptor version |
|             | MT                   | LT   | MT    | LT    | MT    | LT   | MT         | LT   | MT    | LT   | MT    | LT   | MT    | LT   | MT    | LT   |                       |                        |
| 0X          | 0.95                 | 0.88 | 0.93  | 0.83  | 0.69  | 0.58 | 0.64       | 0.56 | 0.57  | 0.46 | 0.68  | 0.6  | 0.91  | 0.83 | 0.89  | 0.81 | 068-2002              | -                      |
| 0           | 1.78                 | 1.35 | 1.72  | 1.28  | 1.12  | 0.76 | 1.24       | 0.88 | 0.93  | 0.6  | 1.2   | 0.97 | 1.71  | 1.32 | 1.66  | 1.29 | 068-2003              | 068-2090               |
| 1           | 3.21                 | 2.05 | 3.11  | 1.971 | 1.8   | 1.08 | 2.37       | 1.4  | 1.5   | 0.85 | 2.44  | 1.57 | 3.14  | 2.05 | 3.05  | 2.03 | 068-2010              | 068-2091               |
| 2           | 4.09                 | 2.43 | 3.94  | 2.28  | 2.14  | 1.22 | 3.14       | 1.65 | 1.77  | 0.97 | 3.18  | 1.86 | 4.02  | 2.4  | 3.9   | 2.37 | 068-2015              | 068-2092               |
| 3           | 6.95                 | 4.07 | 6.7   | 3.84  | 3.6   | 2.05 | 5.37       | 2.79 | 2.99  | 1.63 | 5.4   | 3.14 | 6.83  | 4.05 | 6.64  | 4.01 | 068-2006              | 068-2093               |
| 4           | 10.47                | 6.01 | 9.91  | 5.65  | 5.31  | 3.04 | 8.25       | 4.11 | 4.39  | 2.43 | 8.26  | 4.63 | 10.21 | 5.95 | 9.94  | 5.91 | 068-2007              | 068-2094               |
| 5           | 14.14                | 7.85 | 13.13 | 7.39  | 7     | 4    | 10.89      | 5.4  | 5.62  | 3.08 | 10.53 | 5.9  | 13.35 | 7.78 | 13.01 | 7.74 | 068-2008              | 068-2095               |
| 6           | 16.49                | 9.16 | 15.7  | 8.71  | 8.34  | 4.74 | 13.01      | 6.3  | 6.94  | 3.77 | 13.15 | 7.25 | 16.17 | 9.24 | 15.74 | 9.19 | 068-2009              | -                      |

Rated capacity at:

MT rated condition: Evaporating Temp.  $t_e = -5^\circ\text{C}$ , Condensing Temp.  $t_c = +43^\circ\text{C}$ , superheat=8K, Subcooling=2K

LT rated condition: Evaporating Temp.  $t_e = -25^\circ\text{C}$ , Condensing Temp.  $t_c = +43^\circ\text{C}$ , superheat=8K, Subcooling=2K

Out of the box, factory settings:

On systems charged with R134a; SSH =  $5.0^\circ\text{C}$  ( $9.0^\circ\text{F}$ )

On systems charged with R513A; SSH =  $6.1^\circ\text{C}$  ( $11^\circ\text{F}$ )

Note: For capacity of other refrigerant please refer datasheet of the valve or Coolselector.

### Solder adaptor without orifice assembly



| Connection - ODF solder | Code no. |
|-------------------------|----------|
| 1/4 in                  | 068-2062 |
| 3/8 in                  | 068-2060 |

<sup>1)</sup> Including filter.

### Filter as accessories



| Filter type          | Code no. |
|----------------------|----------|
| For flare connection | 068-0003 |
| For solder adaptor   | 068-0015 |

The solder adaptor is for use with thermostatic expansion valves T2 and TE2.

When the solder adaptor is fitted correctly it meets the sealing requirements of DIN 8964. The flare orifice in T2 and TE2 can be used with a solder adaptor when the orifice filter is replaced with a specific filter intended for solder adaptors. Only in this way the sealing requirements of DIN 8964 can be fulfilled.

Solder adaptors for filter driers (FSA) must not be used on the T2 inlet.

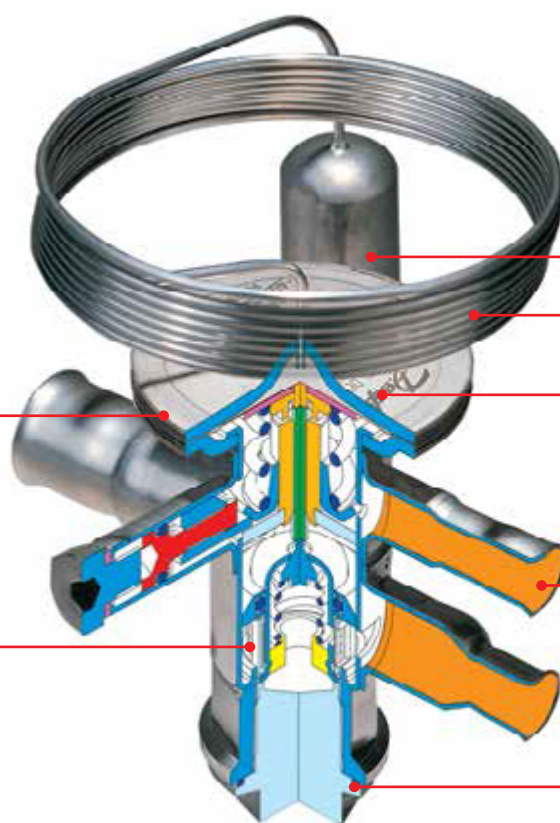


# TUA / TUAE, Thermostatic expansion valves

TUA / TUAE stainless steel thermostatic expansion valves are used for liquid injection into evaporators on both refrigeration and air conditioning systems using fluorinated refrigerants e.g. R134a, R404A, R407C, R22, R507 and R410A. TUA / TUAE valves are compact in design, light weight and have steel / copper bi-metal connections for fast soldering.

TUA / TUAE valves are supplied as parts programme, with separate thermostatic element / valve body, and orifice assembly. TUA has internal equalization, TUAE external equalization. TUA / TUAE are straightway valves, and have adjustable superheat setting.

## Features TUA / TUAE



Laser welded stainless steel thermostatic element for unsurpassed joint strength and operational lifetime

Separate strainer, mounted on the orifice assembly for easy maintenance and cleaning

### Stainless steel capillary tube and bulb:

- high corrosion resistance
- high strength and vibration resistance

Laser-engraved label

Bi-metal connections  
Stainless steel with rolled on copper cladding for safe, fast and convenient copper-to-copper soldering

Orifice assembly with an unmatched hermetic seal

## Facts

### Applications:

- Traditional refrigeration
- Heat pump systems
- Air conditioning units
- Liquid coolers
- Ice cube machines
- Transport refrigeration

### Maximum working temperature:

- -40 to 10 °C / -40 to 50 °F

### Refrigerants:

- R22/R407C
- R23
- R32
- R404A/R507
- R407C
- R407F
- R410A
- R508b
- R134a/R513A
- R407A
- R448A
- R449A

### Capacity range:

- 0.11 – 6.56 TR / 0.42 – 23.1 kW

### Benefit:

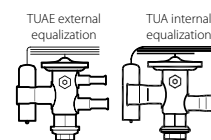
- The use of stainless steel makes the valves light and strong
- Bi-metal connections for safe, fast and convenient soldering
- Bi-flow function (TUA: only orifice 1 – 8)



# Technical data and ordering

## TUA / TUAE

Thermostatic element, without orifice or strainer, with bulb strap



| Refrigerant | Type | Pressure equalization | Capillary Tube (m) | Connections Inlet x outlet | Code no.     |           |          |
|-------------|------|-----------------------|--------------------|----------------------------|--------------|-----------|----------|
|             |      |                       |                    |                            | Range N      |           | Range    |
|             |      |                       |                    | in.                        | -40 to +10°C |           | -40 to   |
|             |      |                       |                    |                            | Without MOP  | MOP +15°C | MOP 0°C  |
| R22         | TUA  | Int.                  | 1.5                | 3/8 x 1/2                  | 068U2235     | -         | -        |
|             | TUAE | Ext.                  |                    |                            | 068U2237     | -         | -        |
| R134A/R513A | TUA  | Int.                  |                    |                            | 068U2205     | -         | -        |
|             | TUAE | Ext.                  |                    |                            | 068U2207     | -         | -        |
| R404/R507   | TUA  | Int.                  |                    |                            | 068U2285     | -         | -        |
|             | TUAE | Ext.                  |                    |                            | 068U2287     | 068U2295  | 068U2303 |
| R407C       | TUA  | Int.                  |                    |                            | 068U2325     | -         | -        |
|             | TUAE | Ext.                  |                    |                            | 068U2327     | -         | -        |
| R410A       | TUAE | Ext. 1/4 in.          |                    |                            | 068U1714     | -         | -        |
|             |      |                       |                    |                            |              |           |          |

## TUA / TUAE

Orifice assembly with filter and gasket



| Valve type/<br>Orifice | R134A |      | R404A/R507 |      | R407C |      | R22   |      | R410A |       | Code no. |
|------------------------|-------|------|------------|------|-------|------|-------|------|-------|-------|----------|
|                        | MT    | LT   | MT         | LT   | MT    | LT   | MT    | LT   | MT    | LT    |          |
| TU Orif. 0             | 0.35  | 0.16 | 0.41       | 0.19 | 0.56  | 0.34 | 0.56  | 0.35 | 0.91  | 0.58  | 068U1030 |
| TU Orif. 1             | 0.52  | 0.2  | 0.61       | 0.24 | 0.8   | 0.49 | 0.83  | 0.52 | 1.21  | 0.78  | 068U1031 |
| TU Orif. 2             | 0.6   | 0.3  | 0.72       | 0.35 | 0.93  | 0.55 | 0.97  | 0.59 | 1.48  | 0.89  | 068U1032 |
| TU Orif. 3             | 0.8   | 0.46 | 0.94       | 0.53 | 1.23  | 0.75 | 1.28  | 0.8  | 1.9   | 1.2   | 068U1033 |
| TU Orif. 4             | 1.32  | 0.73 | 1.61       | 0.86 | 2.069 | 1.22 | 2.16  | 1.28 | 3.4   | 1.95  | 068U1034 |
| TU Orif. 5             | 1.77  | 0.99 | 2.16       | 1.15 | 2.77  | 1.6  | 2.89  | 1.72 | 4.54  | 2.61  | 068U1035 |
| TU Orif. 6             | 2.75  | 1.54 | 3.37       | 1.79 | 4.3   | 2.49 | 4.5   | 2.68 | 7.12  | 4.05  | 068U1036 |
| TU Orif. 7             | 3.63  | 2.03 | 4.45       | 2.36 | 5.68  | 3.29 | 5.95  | 3.53 | 9.39  | 5.34  | 068U1037 |
| TU Orif. 8             | 5.38  | 3.01 | 6.52       | 3.4  | 8.34  | 4.83 | 8.73  | 5.2  | 13.56 | 7.84  | 068U1038 |
| TU Orif. 9*            | 7.36  | 4.21 | 8.62       | 4.65 | 11.23 | 6.46 | 11.84 | 7    | 18.69 | 10.42 | 068U1039 |

Rated capacity at:

MT rated condition: Evaporating Temp. te = -5 °C, Condensing Temp. tc = +43 °C, superheat=8K, Subcooling=2K

LT rated condition: Evaporating Temp. te = -25 °C, Condensing Temp. tc = +43 °C, superheat=8K, Subcooling=2K

\*TUAE with orifice no. 9 can't be used for Biflow operation.

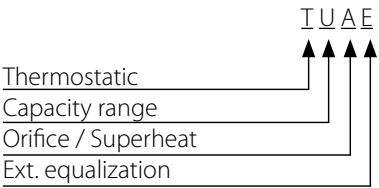
Out of the box, factory settings:

On systems charged with R134a; SSH = 5.0 °C (9.0 °F)

On systems charged with R513A; SSH = 6.1 °C (11 °F)

Note: For capacity of other refrigerant please refer datasheet of the valve or Coolselector.

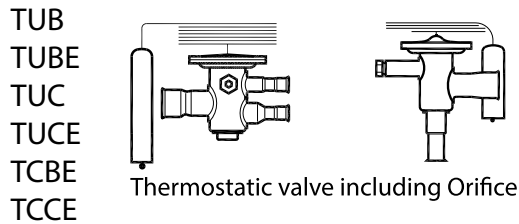
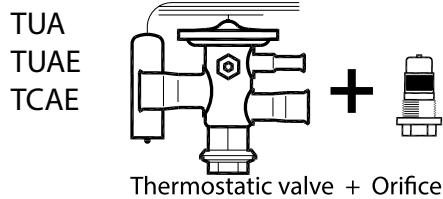
# Technical data



## Orifice / Superheat

|   | Interchangeable | Adjustable |
|---|-----------------|------------|
| A | YES             | YES        |
| B | NO              | YES        |
| C | NO              | NO         |

*N* = -40 °C – 10 °C / -40 – 50 °F  
*NM* = -40 °C – -5 °C MOP 0 °C / -40 – 25 °F MOP 32 °F  
*NL* = -40 °C – -15 °C with MOP - 10 °C / -40 – 5 °F MOP 14 °F  
*B* = -60 °C – -25 °C / -75 – -15 °F



Valve types **TUB / TUBE / TUC / TUCE** and **TCBE / TCCE** can be replaced by **TUA / TUAE** and **TCAE** types



# TE 5 - TE 55, Thermostatic expansion valves

TE 5 - TE 55 thermostatic expansion valves regulate the injection of refrigerant liquid into evaporators for medium sized plants. Injection is controlled by the refrigerant superheat. Therefore the valves are especially suitable for liquid injection in "dry" evaporators where the superheat at the evaporator outlet should always be kept constant.

TE 5 - TE 55 valves are supplied as parts programme, built up of three main components - thermostatic element, orifice assembly, and valve body with connections, and have external pressure equalization. Refrigerants: R22, R134a, R404A, R507, R407A, R407F and R407C.

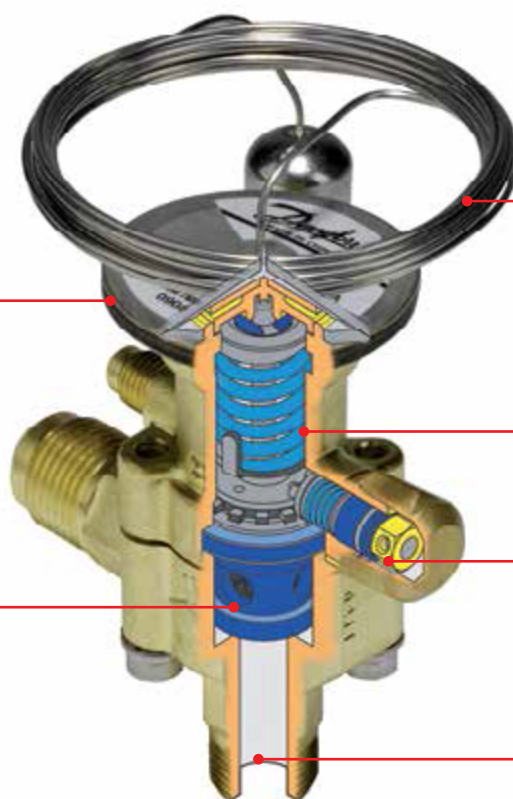
## Features TE 5 - TE 55



### Laser-welded power element in stainless steel

- longer diaphragm life
- high pressure tolerance and working pressure
- high corrosion resistance

To ensure long operating life, the valve cone and seat are made of a special alloy with particularly good wear qualities



### Stainless steel capillary tube and bulb

- high corrosion resistance
- high strength and vibration resistance

Large parts programme ensures minimal stocks

Easy adjustment of superheat setting

### More connection possibilities

- solder x solder
- flare x flare
- flanges
- straightway or angleway

## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units
- Water chillers

### Maximum working pressure:

- 46 bar / 667 psig

### Refrigerants:

- R1234yf
- R23
- R134a
- R404A/R507
- R407C
- R22
- R407A
- R407F
- R448A
- R449A
- R449B
- R454C
- R455A
- R452A
- R513A

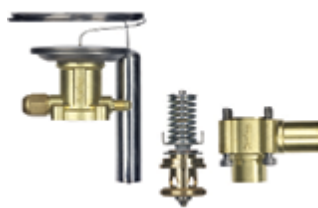
### Capacity range:

- 2.3 – 71 TR / 8.17 – 250 kW

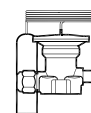
### Benefit:

- Balance port design
- Biflow with expansion in both directions
- Cylindrical bulb and patented bulb strap design

# Technical data and ordering



Thermostatic element + Orifice + Valve body



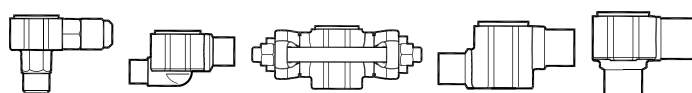
## TE5 - TE 55

Thermostatic element - including bulb strap, Capillary Tube - 3M

| Valve type | Refrigerant  | Code no.                         |
|------------|--------------|----------------------------------|
|            |              | Range N -40 to +10°C Without MOP |
| TE 5       | R407C        | 067B3278                         |
| TE 12      |              | 067B3366                         |
| TE 55      |              | 067G3240                         |
| TE 5       | R134a        | 067B3297                         |
| TE 12      |              | 067B3232                         |
| TE 5       | R404A / R507 | 067B3342                         |
| TE 12      |              | 067B3347                         |
| TE 20      |              | 067B3352                         |
| TE 55      |              | 067G3302                         |
| TE 5       | R22          | 067B3250                         |
| TE 12      |              | 067B3210                         |
| TE 20      |              | 067B3274                         |
| TE 55      |              | 067G3205                         |
| TE 5       | R448 / R449  | 067B3252                         |
| TE 12      |              | 067B2512                         |
| TE 20      |              | 067B3294                         |
| TE 55      |              | 067G3219                         |

## TE5 - TE 55

Body selection



| Type  | Connection Inlet x Outlet            |                | Code no.               |                        |
|-------|--------------------------------------|----------------|------------------------|------------------------|
|       | in.                                  | Flare angleway | Solder angleway        | Solder straightway     |
| TE 5  | $\frac{1}{2} \times \frac{5}{8}$     | 067B4013       | 067B4009 <sup>1)</sup> | 067B4007 <sup>1)</sup> |
|       | $\frac{1}{2} \times \frac{7}{8}$     | -              | 067B4010 <sup>1)</sup> | 067B4008 <sup>1)</sup> |
|       | $\frac{5}{8} \times \frac{7}{8}$     | -              | 067B4011 <sup>1)</sup> | -                      |
|       | $\frac{7}{8} \times 1 \frac{1}{8}$   | -              | 067B4034 <sup>2)</sup> | -                      |
| TE 12 | $\frac{7}{8} \times 1 \frac{1}{8}$   | -              | 067B4023 <sup>2)</sup> | 067B4021 <sup>2)</sup> |
| TE 20 | $\frac{7}{8} \times 1 \frac{1}{8}$   | -              | 067B4023 <sup>2)</sup> | -                      |
| TE 55 | $1 \frac{1}{8} \times 1 \frac{3}{8}$ | -              | 067G4004 <sup>3)</sup> | 067G4003 <sup>3)</sup> |

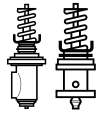
1) ODF X ODF, 2) ODF x ODM, 3) ODM X ODM

ODF = Internal Diameter, ODM - External Diameter

# Technical data and ordering

## TE5 - TE 55

### Orifice assembly



| Valve type | Orifice no. | (kW)          |       |              |      |       |       |       |      |       |       | Code no. |
|------------|-------------|---------------|-------|--------------|------|-------|-------|-------|------|-------|-------|----------|
|            |             | R448A / R449A |       | R404A / R507 |      | R22   |       | R134a |      | R407C |       |          |
|            |             | MT            | LT    | MT           | LT   | MT    | LT    | MT    | LT   | MT    | LT    |          |
| TE 5       | 0.5         | 9.3           | 6     | 7.4          | 4.8  | 9.8   | 6.6   | 6     | 3.8  | 9.5   | 6.2   | 067B2788 |
|            | 1           | 17.2          | 11.1  | 13.7         | 8.8  | 18    | 12.3  | 11.1  | 7.1  | 17.6  | 11.5  | 067B2789 |
|            | 2           | 24.1          | 15.7  | 19           | 12.4 | 25.2  | 17.3  | 15.5  | 10   | 24.7  | 16.2  | 067B2790 |
|            | 3           | 30.2          | 19.6  | 24.1         | 15.5 | 31.9  | 21.6  | 19.8  | 12.7 | 31.1  | 20.2  | 067B2791 |
|            | 4           | 41.4          | 26.2  | 32.95        | 20.9 | 43.5  | 29.1  | 27    | 17   | 42.4  | 27    | 067B2792 |
| TE 12      | 5           | 46.7          | 29.7  | 43.6         | 26.1 | 51.5  | 34.1  | 33.4  | 21.5 | 46.8  | 28.5  | 067B2708 |
|            | 6           | 61.4          | 37.8  | 54.6         | 31.8 | 68.1  | 43.9  | 43.9  | 27.6 | 61.1  | 36.2  | 067B2709 |
|            | 7           | 75.1          | 46.7  | 66           | 37.8 | 84.5  | 54.9  | 56.6  | 36   | 75.4  | 44.6  | 067B2710 |
| TE 20      | 8           | 107.4         | 66.8  | 76.8         | 46   | 117.8 | 77.2  | 69    | 43.4 | 101.6 | 63.9  | 067B2771 |
|            | 9           | 117.2         | 69.7  | 85.5         | 49.8 | 132   | 82.4  | 79.22 | 48.5 | 112.5 | 68.2  | 067B2773 |
| TE 55      | 10          | 129.3         | 75.1  | 106.5        | 59.6 | 148.1 | 91.1  | 94.3  | 55.7 | 133.6 | 79.9  | 067G2701 |
|            | 11          | 140.3         | 81.6  | 115          | 64.6 | 161.1 | 99.3  | 103.6 | 61.3 | 145.1 | 87    | 067G2704 |
|            | 12          | 150.7         | 86.5  | 124          | 68.6 | 174.4 | 106.1 | 112.7 | 65.9 | 156.1 | 92.5  | 067G2707 |
|            | 13          | 181           | 102.7 | 148.3        | 81.3 | 210.9 | 127.1 | 138.5 | 80.4 | 187.7 | 110.2 | 067G2710 |

Rated capacity at:

MT rated condition: Evaporating Temp.  $t_e = -5\text{ }^{\circ}\text{C}$ , Condensing Temp.  $t_c = +43\text{ }^{\circ}\text{C}$ , superheat=8K, Subcooling=4K

LT rated condition: Evaporating Temp.  $t_e = -25\text{ }^{\circ}\text{C}$ , Condensing Temp.  $t_c = +43\text{ }^{\circ}\text{C}$ , superheat=8K, Subcooling=4K

Note: For capacity of other refrigerant please refer datasheet of the valve or Coolselector.

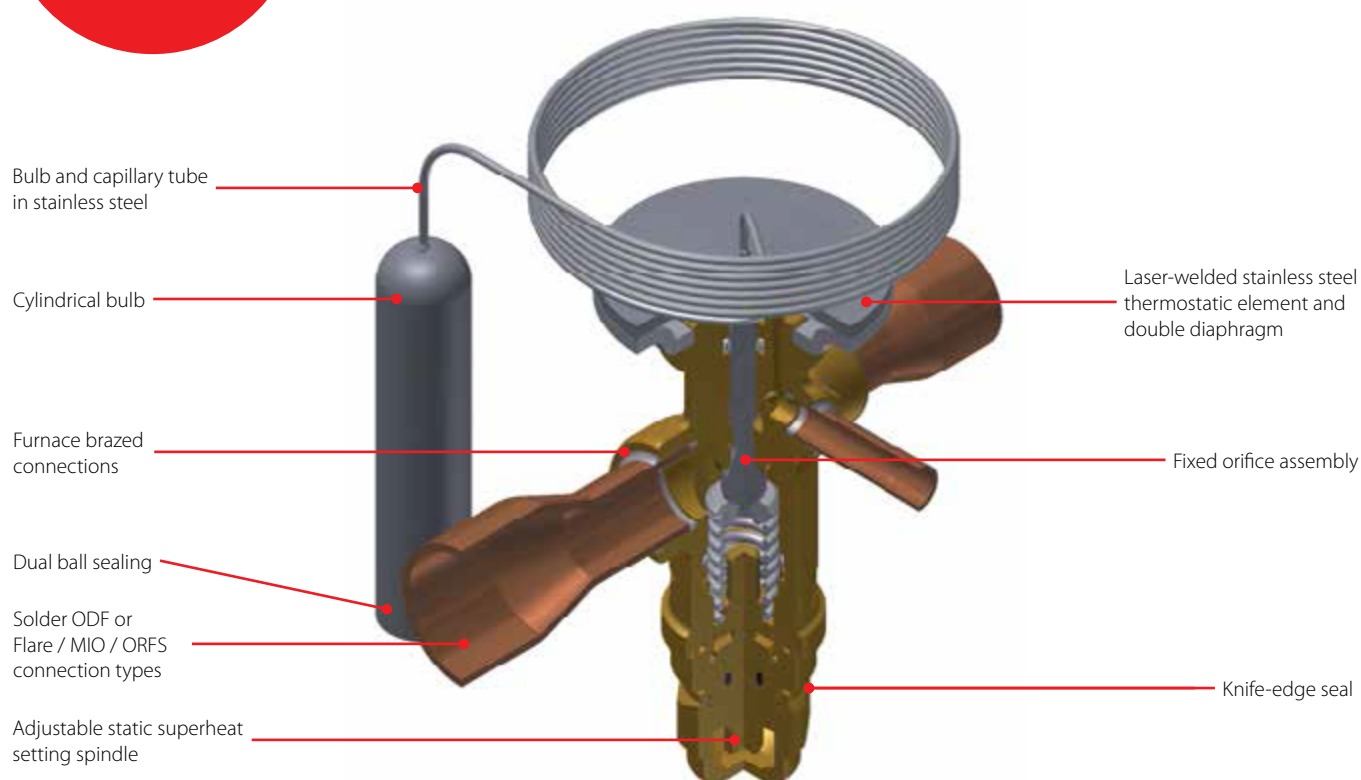


# TGE, Thermostatic expansion valve

TGE is an innovatively designed series of thermostatic expansion valves for fluorinated refrigerants. TGE has copper connections upgraded for high-pressure applications with tight soldering, and is available with a wide variety of

connection types such as solder, flare, MIO, and ORFS, and a wide variety of connection sizes.

## Features TGE



## Facts

### Applications:

- Water chillers
- Bus A/C
- Rooftop units
- Heat pumps
- Refrigerated containers and others A/C and other refrigeration system

### Maximum working pressure:

- 46 bar / 667 psig

### Refrigerants:

- R410A,
- R32,
- R452B,
- R22,
- R134a,
- R1234ze,
- R407F,
- R407A,
- R404A,
- R507,
- R407C
- R290
- R454B
- R452B

### Capacity range:

- 2.2 – 52 TR / 8 – 182 kW

### Benefit:

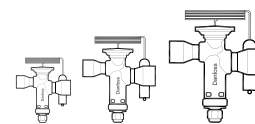
- Balance port design
- Biflow with expansion in both directions
- Cylindrical bulb and patented bulb strap design



# Technical data and ordering

## TGE

Thermostatic Expansion Valve with fixed Orifice



| Refrigerant | Valve type | Orifice no. | Nominal capacity<br>Q nom. |       | Inch version                            |          |
|-------------|------------|-------------|----------------------------|-------|-----------------------------------------|----------|
|             |            |             | MT                         | LT    | Connection Solder<br>ODF × ODF<br>(in.) | Code no. |
| R407C       | TGE 10     | 6           | 17.11                      | 11.06 | $\frac{5}{8} \times \frac{7}{8}$        | 067N4155 |
|             | TGE 10     | 8           | 22.86                      | 14.82 | $\frac{5}{8} \times \frac{7}{8}$        | 067N4156 |
|             | TGE 10     | 11          | 34.39                      | 22.37 | $\frac{5}{8} \times \frac{7}{8}$        | 067N4157 |
|             | TGE 20     | 12.5        | 36.98                      | 22.64 | $\frac{5}{8} \times \frac{7}{8}$        | 067N4159 |
|             | TGE 20     | 16          | 46.14                      | 27.98 | $\frac{7}{8} \times 1 \frac{3}{8}$      | 067N4162 |
|             | TGE 20     | 20          | 55.13                      | 34.13 | $\frac{7}{8} \times 1 \frac{3}{8}$      | 067N4163 |
|             | TGE 40     | 26          | 73.56                      | 44.98 | $\frac{7}{8} \times 1 \frac{3}{8}$      | 067N4165 |
|             | TGE 40     | 40          | 103.2                      | 60.68 | $\frac{7}{8} \times 1 \frac{3}{8}$      | 067N4169 |
| R22         | TGE 10     | 3           | 9.6                        | 6.57  | $\frac{3}{8} \times \frac{5}{8}$        | 067N2150 |
|             | TGE 10     | 4           | 13.1                       | 8.8   | $\frac{1}{2} \times \frac{7}{8}$        | 067N2152 |
|             | TGE 10     | 6           | 19.15                      | 12.85 | $\frac{1}{2} \times \frac{5}{8}$        | 067N2153 |
|             | TGE 10     | 6           | 19.15                      | 12.85 | $\frac{1}{2} \times \frac{7}{8}$        | 067N2154 |
|             | TGE 10     | 6           | 19.15                      | 12.85 | $\frac{5}{8} \times \frac{7}{8}$        | 067N2155 |
|             | TGE 10     | 8           | 25.5                       | 17.2  | $\frac{5}{8} \times \frac{7}{8}$        | 067N2156 |
|             | TGE 10     | 11          | 37.78                      | 26.13 | $\frac{5}{8} \times \frac{7}{8}$        | 067N2157 |
|             | TGE 20     | 12.5        | 38.68                      | 24.39 | $\frac{5}{8} \times \frac{7}{8}$        | 067N2159 |
|             | TGE 20     | 16          | 48.54                      | 30.13 | $\frac{7}{8} \times 1 \frac{1}{8}$      | 067N2162 |
|             | TGE 20     | 20          | 57.83                      | 36.95 | $\frac{7}{8} \times 1 \frac{1}{8}$      | 067N2163 |
|             | TGE 40     | 26          | 81.63                      | 49.81 | $\frac{7}{8} \times 1 \frac{3}{8}$      | 067N2165 |
|             | TGE 40     | 40          | 110.6                      | 68.25 | $\frac{7}{8} \times 1 \frac{3}{8}$      | 067N2168 |
| R410A       | TGE 10     | 4           | 15.44                      | 10.46 | $\frac{1}{2} \times \frac{7}{8}$        | 067N3152 |
|             | TGE 10     | 6           | 22.51                      | 15.2  | $\frac{1}{2} \times \frac{7}{8}$        | 067N3154 |
|             | TGE 10     | 6           | 22.51                      | 15.2  | $\frac{5}{8} \times \frac{7}{8}$        | 067N3155 |
|             | TGE 10     | 8           | 29.92                      | 20.32 | $\frac{5}{8} \times \frac{7}{8}$        | 067N3156 |
|             | TGE 10     | 11          | 44.52                      | 30.92 | $\frac{5}{8} \times \frac{7}{8}$        | 067N3157 |
|             | TGE 20     | 20          | 72.55                      | 46.89 | $\frac{7}{8} \times 1 \frac{1}{8}$      | 067N3163 |
|             | TGE 40     | 30          | 110.6                      | 68.25 | $\frac{7}{8} \times 1 \frac{3}{8}$      | 067N3168 |
| R134A       | TGE 10     | 4           | 7.48                       | 4.8   | $\frac{1}{2} \times \frac{7}{8}$        | 067N5152 |
|             | TGE 10     | 6           | 11.13                      | 7.15  | $\frac{1}{2} \times \frac{5}{8}$        | 067N5153 |
|             | TGE 10     | 8           | 15.11                      | 9.75  | $\frac{5}{8} \times \frac{7}{8}$        | 067N5156 |
|             | TGE 10     | 11          | 22.39                      | 14.45 | $\frac{5}{8} \times \frac{7}{8}$        | 067N5157 |
| R404/R507   | TGE 10     | 6           | 12.75                      | 8.186 | $\frac{1}{2} \times \frac{7}{8}$        | 067N6151 |
|             | TGE 10     | 8           | 17.03                      | 10.99 | $\frac{5}{8} \times \frac{7}{8}$        | 067N6150 |
|             | TGE 10     | 11          | 25.17                      | 16.56 | $\frac{5}{8} \times \frac{7}{8}$        | 067N6154 |
|             | TGE 20     | 12.5        | 27.86                      | 16.96 | $\frac{5}{8} \times \frac{7}{8}$        | 067N6158 |
|             | TGE 20     | 16          | 34.92                      | 21.08 | $\frac{5}{8} \times 1 \frac{1}{8}$      | 067N6155 |

Range N = -40 → +10°C OS = 4 K

# Technical data and ordering

## TGE cross reference

### TRE Series

| TGE Valves (fixed Orifice) „New Replacement Series" |             |        |              |                |          | TDE & TRE Valves (fixed Orifice) "Obsolete Range" |             |             |      |           |         |          |          |
|-----------------------------------------------------|-------------|--------|--------------|----------------|----------|---------------------------------------------------|-------------|-------------|------|-----------|---------|----------|----------|
| TGE Single Pack                                     | Description | Body   | Intel-Outlet | OEM Pack (Qty) | Old Code | Description2                                      | Refrigement | Range       | Orif | KW        | SH      | Inlet    | Outlet   |
| 067N4156                                            | TGEZ 7      | TGE 10 | 5/8 X 7/8    | <              | 067L1100 | TRE 10-BZ                                         | R407C       | -40 - 10 °C | 8    | 25,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N4157                                            | TGEZ 10     | TGE 10 | 5/8 X 7/8    | <              | 067L1101 | TRE10-10Z                                         | R407C       | -40 - 10 °C | 11   | 36,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N4159                                            | TGEZ 12     | TGE 20 | 5/8 X 7/8    | <              | 067L1102 | TRE20-12Z                                         | R407C       | -40 - 10 °C | 12.5 | 42,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N5156                                            | TGEN 4.5    | TGE 10 | 5/8 X 7/8    | <              | 067L1103 | TRE10-5N                                          | R134a       | -40 - 10 °C | 8    | 17,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N4157                                            | TGEZ 10     | TGE 10 | 5/8 X 7/8    | <              | 067L1104 | TRE20-10Z                                         | R407C       | -40 - 10 °C | 11   | 36,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N5157                                            | TGEN 7      | TGE 10 | 5/8 X 7/8    | <              | 067L1106 | TRE10-7N                                          | R134a       | -40 - 10 °C | 11   | 24,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N4156                                            | TGEZ7       | TGE 10 | 5/8 X 7/8    | <              | 067L1112 | TRE10-8Z                                          | R407C       | -40 - 10 °C | 8    | 25,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8 X 7/8    | <              | 067L1121 | TRE10-8X                                          | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2157                                            | TGEX 11     | TGE 10 | 5/8 X 7/8    | <              | 067L1124 | TRE10-10X                                         | R22         | -40 - 10 °C | 11   | 38,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N3155                                            | TGEL 6.5    | TGE 10 | 5/8 X 7/8    | <              | 067L1129 | TREL10-8                                          | R410A       | -40 - 10 °C | 6    | 24,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N3156                                            | TGEL 9      | TGE 10 | 5/8 X 7/8    | <              | 067L1131 | TREL10-10                                         | R410A       | -40 - 10 °C | 8    | 32,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N3157                                            | TGEL 13     | TGE 10 | 5/8 X 7/8    | <              | 067L1135 | TREL10-12.5                                       | R410A       | -40 - 10 °C | 11   | 45,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N3232                                            | TGEL 15     | TGE 20 | 7/8 X 11/8   | <              | 067L1139 | TREL10-15                                         | R410A       | -40 - 10 °C | 12.5 | 54,00 kW  | 4,00 °C | 7/8in    | 1 1/8 in |
| 067N5157                                            | TGEN 7      | TGE 10 | 5/8 X 7/8    | <              | 067L1141 | TRE20-7N                                          | R134a       | -40 - 10 °C | 11   | 24,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N5162                                            | TGEN 10     | TGE 20 | 7/8 X 11/8   | <              | 067L1150 | TRE20-11N                                         | R134a       | -40 - 10 °C | 16   | 37,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N5163                                            | TGEN 12     | TGE 20 | 7/8 X 11/8   | <              | 067L1153 | TRE20-14N                                         | R134a       | -40 - 10 °C | 20   | 44,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N4162                                            | TGEN 15     | TGE 20 | 7/8 X 11/8   | <              | 067L1167 | TRE20-15Z                                         | R407C       | -40 - 10 °C | 16   | 53,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N4163                                            | TGEZ 18     | TGE 20 | 7/8 X 11/8   | <              | 067L1170 | TRE20-20Z                                         | R407C       | -40 - 10 °C | 20   | 62,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N2157                                            | TGEX 11     | TGE 10 | 5/8 X 7/8    | <              | 067L1175 | TRE20-10X                                         | R22         | -40 - 10 °C | 11   | 38,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2159                                            | TGEX 12     | TGE 20 | 5/8 X 7/8    | <              | 067L1179 | TRE20-12.5X                                       | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2162                                            | TGEX 15     | TGE 20 | 7/8 X 11/8   | <              | 067L1184 | TRE20-15X                                         | R22         | -40 - 10 °C | 16   | 54,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8 X 11/8   | <              | 067L1187 | TRE20-20X                                         | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N2164                                            | TGEX 18     | TGE 20 | 7/8 X 13/8   | <              | 067L1188 | TRE20-20X                                         | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in    | 1 3/8in  |
| 067N3162                                            | TGEL 19     | TGE 20 | 7/8 X 11/8   | <              | 067L1194 | TREL20-20                                         | R410A       | -40 - 10 °C | 16   | 68,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N3163                                            | TGEL 23     | TGE 20 | 7/8 X 11/8   | <              | 067L1197 | TREL20-25                                         | R410A       | -40 - 10 °C | 20   | 79,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8 X 7/8    | 067N2176 (12)  | 067L2121 | TRE10-8X                                          | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2157                                            | TGEX 11     | TGE 10 | 5/8 X 7/8    | 067N2177 (12)  | 067L2124 | TRE10-10X                                         | R22         | -40 - 10 °C | 11   | 38,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N3155                                            | TGEL 6.5    | TGE 10 | 5/8 X 7/8    | 067N3175 (12)  | 067L2129 | TREL10-8                                          | R410A       | -40 - 10 °C | 6    | 24,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N3248                                            | TGEL 10     | TGE 10 | 5/8 X 7/8    | <              | 067L2130 | TREL10-10                                         | R410A       | -40 - 10 °C | 8    | 32,00 kW  | 4,00 °C | 5/8in    | 5/8in    |
| 067N3156                                            | TGEL 9      | TGE 10 | 5/8 X 7/8    | 067N3176 (12)  | 067L2131 | TREL10-10                                         | R410A       | -40 - 10 °C | 8    | 32,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N3249                                            | TGEL 10     | TGE 10 | 5/8 X 7/8    | <              | 067L2134 | TREL10-12.5                                       | R410A       | -40 - 10 °C | 11   | 45,00 kW  | 4,00 °C | 5/8in    | 5/8in    |
| 067N3157                                            | TGEL 13     | TGE 10 | 5/8 X 7/8    | 067N3177 (12)  | 067L2135 | TREL10-12.5                                       | R410A       | -40 - 10 °C | 11   | 45,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N4159                                            | TGEZ 12     | TGE 20 | 5/8 X 7/8    | 067N4179 (8)   | 067L2162 | TRE20-12.5Z                                       | R407C       | -40 - 10 °C | 12.5 | 42,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2157                                            | TGEX 11     | TGE 10 | 5/8 X 7/8    | 067N2177 (12)  | 067L2175 | TRE20-10X                                         | R22         | -40 - 10 °C | 11   | 38,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2159                                            | TGEX 12     | TGE 20 | 5/8 X 7/8    | 067N2179 (8)   | 067L2179 | TRE20-12.5X                                       | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in    | 7/8in    |
| 067N2162                                            | TGEX 15     | TGE 20 | 7/8 X 11/8   | 067N2182 (8)   | 067L2184 | TRE20-15X                                         | R22         | -40 - 10 °C | 16   | 54,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8 X 11/8   | 067N2183 (8)   | 067L2187 | TRE20-20X                                         | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N2165                                            | TGEX 26     | TGE 40 | 7/8 X 13/8   | <              | 067L3105 | TRE40-25X                                         | R22         | -40 - 10 °C | 26   | 92,00 kW  | 4,00 °C | 7/8in    | 1 3/8in  |
| 067N2168                                            | TGEX 30     | TGE 40 | 11/8 X 13/8  | <              | 067L3109 | TRE40-30X                                         | R22         | -40 - 10 °C | 30   | 104,00 kW | 4,00 °C | 1 1/8 in | 1 3/8 in |
| 067N2169                                            | TGEX 38     | TGE 40 | 11/8 X 13/8  | <              | 067L3112 | TRE40-40X                                         | R22         | -40 - 10 °C | 40   | 134,00 kW | 4,00 °C | 1 1/8 in | 1 3/8 in |
| 067N3166                                            | TGEL 31     | TGE 40 | 11/8 X 13/8  | <              | 067L3120 | TRE40-30L                                         | R410A       | -40 - 10 °C | 26   | 110,00 kW | 4,00 °C | 1 1/8 in | 1 3/8 in |
| 067N3168                                            | TGEL 35     | TGE 40 | 11/8 X 13/8  | <              | 067L3124 | TRE40-40L                                         | R410A       | -40 - 10 °C | 30   | 125,00 kW | 4,00 °C | 1 1/8 in | 1 3/8 in |
| 067N3169                                            | TGEL 46     | TGE 40 | 11/8 X 13/8  | <              | 067L3128 | TRE40-55L                                         | R410A       | -40 - 10 °C | 40   | 161,00 kW | 4,00 °C | 1 1/8 in | 1 3/8 in |
| 067N4163                                            | TGEZ 18     | TGE 20 | 7/8 X 11/8   | <              | 067L3130 | TRE40-20Z                                         | R407C       | -40 - 10 °C | 20   | 62,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N4165                                            | TGEZ 24     | TGE 40 | 7/8 X 13/8   | <              | 067L3134 | TRE40-25Z                                         | R407C       | -40 - 10 °C | 26   | 84,00 kW  | 4,00 °C | 7/8in    | 1 3/8in  |
| 067N4167                                            | TGEZ 27     | TGE 40 | 7/8 X 13/8   | <              | 067L3138 | TRE40-30Z                                         | R407C       | -40 - 10 °C | 30   | 309,00 kW | 4,00 °C | 7/8in    | 1 3/8in  |
| 067N4169                                            | TGEZ 34     | TGE 40 | 11/8 X 13/8  | <              | 067L3140 | TRE40-40Z                                         | R407C       | -40 - 10 °C | 40   | 121,00 kW | 4,00 °C | 1 1/8in  | 1 3/8in  |
| 067N5163                                            | TGEN 12     | TGE 20 | 7/8 X 11/8   | <              | 067L3143 | TRE40-14N                                         | R134a       | -40 - 10 °C | 20   | 44,00 kW  | 4,00 °C | 7/8in    | 1 1/8in  |
| 067N5165                                            | TGEN 17     | TGE 40 | 7/8 X 13/8   | <              | 067L3147 | TRE40-16N                                         | R134a       | -40 - 10 °C | 26   | 61,00 kW  | 4,00 °C | 7/8in    | 1 3/8in  |
| 067N5169                                            | TGEN 25     | TGE 40 | 11/8 X 13/8  | <              | 067L3154 | TRE40-25N                                         | R134a       | -40 - 10 °C | 40   | 87,00 kW  | 4,00 °C | 1 1/8in  | 1 3/8in  |

# Technical data and ordering

## TGE cross reference

### TRE Series

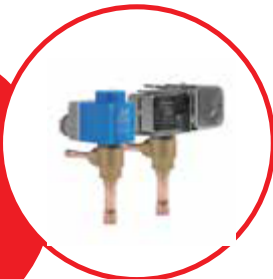
| TGE Valves (fixed Orifice) „New Replacement Series" |             |        |              |                |          | TDE & TRE Valves (fixed Orifice) "Obsolete Range" |             |             |      |           |         |         |         |
|-----------------------------------------------------|-------------|--------|--------------|----------------|----------|---------------------------------------------------|-------------|-------------|------|-----------|---------|---------|---------|
| TGE Single Pack                                     | Description | Body   | Intel-Outlet | OEM Pack (Qty) | Old Code | Description2                                      | Refrigement | Range       | Orif | KW        | SH      | Inlet   | Outlet  |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8 X 7/8    | 067N2176(12)   | 068H5101 | TDEX7.5                                           | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2159                                            | TGEX 12     | TGE 20 | 5/8 X 7/8    | 067N2179(8)    | 068H5121 | TDEX12.5                                          | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8X11/8     | 067N2183(8)    | 068H5124 | TDEX19                                            | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N2162                                            | TGEX 15     | TGE 20 | 7/8X11/8     | 067N2182(8)    | 068H5127 | TDEX16                                            | R22         | -40 - 10 °C | 16   | 54,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8X7/8      | 067N2176(12)   | 068H5128 | TDEX8                                             | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4150                                            | TGEZ 2.5    | TGE 10 | 3/8X5/8      | <              | 068H7000 | TDEZ3                                             | R407C       | -40 - 10 °C | 3    | 9,00 kW   | 4,00 °C | 3/8in   | 5/8in   |
| 067N4151                                            | TGEZ 2.5    | TGE 10 | 1/2X5/8      | <              | 068H7002 | TDEZ3                                             | R407C       | -40 - 10 °C | 3    | 9,00 kW   | 4,00 °C | 1/2in   | 5/8in   |
| 067N4152                                            | TGEZ 3.5    | TGE 10 | 1/2X7/8      | <              | 068H7004 | TDEZ4                                             | R407C       | -40 - 10 °C | 4    | 13,00 kW  | 4,00 °C | 1/2in   | 7/8in   |
| 067N4153                                            | TGEZ 5      | TGE 10 | 1/2X5/8      | <              | 068H7006 | TDEZ6                                             | R407C       | -40 - 10 °C | 6    | 19,00 kW  | 4,00 °C | 1/2in   | 5/8in   |
| 067N4155                                            | TGEZ 5      | TGE 10 | 5/8X7/8      | <              | 068H7010 | TDEZ6                                             | R407C       | -40 - 10 °C | 6    | 19,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4156                                            | TGEZ 7      | TGE 10 | 5/8X7/8      | <              | 068H7012 | TDEZ7.5                                           | R407C       | -40 - 10 °C | 8    | 25,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4156                                            | TGEZ 7      | TGE 10 | 5/8X7/8      | <              | 068H7014 | TDEZ8                                             | R407C       | -40 - 10 °C | 8    | 25,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4163                                            | TGEZ 18     | TGE 20 | 7/8X11/8     | <              | 068H7026 | TDEZ16                                            | R407C       | -40 - 10 °C | 20   | 62,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N4163                                            | TGEZ 18     | TGE 20 | 7/8X11/8     | <              | 068H7030 | TDEBZ20                                           | R407C       | -40 - 10 °C | 20   | 62,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N4165                                            | TGEZ 24     | TGE 40 | 7/8X13/8     | <              | 068H7032 | TDEBZ26                                           | R407C       | -40 - 10 °C | 26   | 84,00 kW  | 4,00 °C | 7/8in   | 1 3/8in |
| 067N4169                                            | TGEZ 34     | TGE 40 | 11/8X13/8    | <              | 068H7036 | TDEBZ30                                           | R407C       | -40 - 10 °C | 40   | 121,00 kW | 4,00 °C | 1 1/8in | 1 3/8in |
| 067N4169                                            | TGEZ 34     | TGE 40 | 11/8X13/8    | <              | 068H7038 | TDEBZ40                                           | R407C       | -40 - 10 °C | 40   | 121,00 kW | 4,00 °C | 1 1/8in | 1 3/8in |
| 067N2150                                            | TGEX 3      | TGE 10 | 3/8X5/8      | <              | 068H7050 | TDEX3                                             | R22         | -40 - 10 °C | 3    | 10,00 kW  | 4,00 °C | 3/8in   | 5/8in   |
| 067N2152                                            | TGEX 4      | TGE 10 | 1/2X7/8      | <              | 068H7054 | TDEX4                                             | R22         | -40 - 10 °C | 4    | 14,00 kW  | 4,00 °C | 1/2in   | 7/8in   |
| 067N2153                                            | TGEX 6      | TGE 10 | 1/2X5/8      | <              | 068H7056 | TDEX6                                             | R22         | -40 - 10 °C | 6    | 20,00 kW  | 4,00 °C | 1/2in   | 5/8in   |
| 067N2154                                            | TGEX 6      | TGE 10 | 1/2X7/8      | <              | 068H7058 | TDEX6                                             | R22         | -40 - 10 °C | 6    | 20,00 kW  | 4,00 °C | 1/2in   | 7/8in   |
| 067N2155                                            | TGEX 6      | TGE 10 | 5/8X7/8      | <              | 068H7060 | TDEX6                                             | R22         | -40 - 10 °C | 6    | 20,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8X7/8      | <              | 068H7062 | TDEX7.5                                           | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8X7/8      | <              | 068H7064 | TDEX8                                             | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2159                                            | TGEX 12     | TGE 20 | 5/8X7/8      | <              | 068H7066 | TDEX11                                            | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2159                                            | TGEX 12     | TGE 20 | 5/8X7/8      | <              | 068H7070 | TDEX12.5                                          | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8X11/8     | <              | 068H7076 | TDEX16                                            | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in1  | 1/8in   |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8X11/8     | <              | 068H7080 | TDEBX20                                           | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in1  | 1/8in   |
| 067N2165                                            | TGEX 26     | TGE 40 | 7/8X13/8     | <              | 068H7082 | TDEBX26                                           | R22         | -40 - 10 °C | 26   | 92,00 kW  | 4,00 °C | 7/8in1  | 3/8in   |
| 067N2169                                            | TGEX 38     | TGE 40 | 11/8X13/8    | <              | 068H7086 | TDEBX30                                           | R22         | -40 - 10 °C | 40   | 134,00 kW | 4,00 °C | 1 1/8in | 1 3/8in |
| 067N2169                                            | TGEX 38     | TGE 40 | 11/8X13/8    | <              | 068H7088 | TDEBX40                                           | R22         | -40 - 10 °C | 40   | 134,00 kW | 4,00 °C | 1 1/8in | 1 3/8in |
| 067N2155                                            | TGEX 6      | TGE 10 | 5/8X7/8      | 067N2175(12)   | 068H8062 | TDEX7.5                                           | R22         | -40 - 10 °C | 6    | 20,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2157                                            | TGEX 11     | TGE 10 | 5/8X7/8      | 067N2177(12)   | 068H8068 | TDEX11                                            | R22         | -40 - 10 °C | 11   | 38,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8X7/8      | 067N2176(12)   | 068H8082 | TDEX8                                             | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2159                                            | TGEX 12     | TGE 20 | 5/8X7/8      | 067N2179(8)    | 068H8084 | TDEX11                                            | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2159                                            | TGEX 12     | TGE 20 | 5/8X7/8      | 067N2179(8)    | 068H8088 | TDEX12.5                                          | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8X11/8     | 067N2183(8)    | 068H8094 | TDEX16                                            | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8X11/8     | 067N2183(8)    | 068H8098 | TDEBX20                                           | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N2156                                            | TGEX 7.5    | TGE 10 | 5/8X7/8      | <              | 068H8106 | TDEX8                                             | R22         | -40 - 10 °C | 8    | 27,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2157                                            | TGEX 11     | TGE 10 | 5/8X7/8      | <              | 068H8108 | TDEX11                                            | R22         | -40 - 10 °C | 11   | 38,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2159                                            | TGEX 12     | TGE 20 | 5.8X7/8      | <              | 068H8112 | TDEX12.5                                          | R22         | -40 - 10 °C | 12.5 | 43,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N2162                                            | TGEX 15     | TGE 20 | 7/8X11/8     | <              | 068H8118 | TDEX16                                            | R22         | -40 - 10 °C | 18   | 54,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N2163                                            | TGEX 18     | TGE 20 | 7/8X11/8     | <              | 068H8120 | TDEX19                                            | R22         | -40 - 10 °C | 20   | 63,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N4155                                            | TGEZ 5      | TGE 10 | 5/8X7/8      | 067N4175(12)   | 068H8214 | TDEZ6                                             | R407C       | -40 - 10 °C | 6    | 19,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4159                                            | TGEZ 12     | TGE 20 | 5/8X7/8      | 067N4179(8)    | 068H8224 | TDEZ12.5                                          | R407C       | -40 - 10 °C | 12.5 | 42,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4159                                            | TGEZ 12     | TGE 20 | 5/8X7/8      | 067N4179(8)    | 068H8236 | TDEZ11                                            | R407C       | -40 - 10 °C | 12.5 | 42,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4159                                            | TGEZ 12     | TGE 20 | 5/8X7/8      | 067N4179(8)    | 068H8240 | TDEZ12.5                                          | R407C       | -40 - 10 °C | 12.5 | 42,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4156                                            | TGEZ 7      | TGE 10 | 5/8X7/8      | <              | 068H8260 | TDEZ8                                             | R407C       | -40 - 10 °C | 8    | 25,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N4158                                            | TGEZ 10     | TGE 10 | 5/8X11/8     | <              | 068H8264 | TDEZ11                                            | R407C       | -40 - 10 °C | 11   | 36,00 kW  | 4,00 °C | 5/8in   | 1 1/8in |
| 067N4162                                            | TGEZ 15     | TGE 20 | 7/8X11/8     | <              | 068H8272 | TDEZ16                                            | R407C       | -40 - 10 °C | 16   | 53,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N4163                                            | TGEZ 18     | TGE 20 | 7/8X11/8     | <              | 068H8274 | TDEZ19                                            | R407C       | -40 - 10 °C | 20   | 62,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N5150                                            | TGEN 1.5    | TGE 10 | 3/8X5/8      | <              | 068H8408 | TDEN2.3                                           | R134a       | -40 - 10 °C | 3    | 6,00 kW   | 4,00 °C | 3/8in   | 5/8in   |
| 067N5151                                            | TGEN 1.5    | TGE 10 | 1/2X5/8      | <              | 068H8410 | TDEN2.3                                           | R134a       | -40 - 10 °C | 3    | 6,00 kW   | 4,00 °C | 1/2in   | 5/8in   |
| 067N5152                                            | TGEN 2.5    | TGE 10 | 1/2X7/8      | <              | 068H8412 | TDEN3.1                                           | R134a       | -40 - 10 °C | 4    | 8,00 kW   | 4,00 °C | 1/2in   | 7/8in   |
| 067N5153                                            | TGEN 3.5    | TGE 10 | 1/2X5/8      | <              | 068H8414 | TDEN4.6                                           | R134a       | -40 - 10 °C | 6    | 12,00 kW  | 4,00 °C | 1/2in   | 5/8in   |
| 067N5154                                            | TGEN 3.5    | TGE 10 | 1/2X7/8      | <              | 068H8416 | TDEN4.6                                           | R134a       | -40 - 10 °C | 6    | 12,00 kW  | 4,00 °C | 1/2in   | 7/8in   |
| 067N5156                                            | TGEN 4.5    | TGE 10 | 5/5X7/8      | <              | 068H8420 | TDEN5.8                                           | R134a       | -40 - 10 °C | 8    | 17,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N5156                                            | TGEN 4.5    | TGE 10 | 5/5X7/8      | <              | 068H8436 | TDEN6.2                                           | R134a       | -40 - 10 °C | 8    | 17,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N5157                                            | TGEN 7      | TGE 10 | 5/8X7/8      | <              | 068H8438 | TDEN8.5                                           | R134a       | -40 - 10 °C | 11   | 24,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N5160                                            | TGEN 8      | TGE 20 | 5/8X11/8     | <              | 068H8444 | TDEN9.6                                           | R134a       | -40 - 10 °C | 12.5 | 29,00 kW  | 4,00 °C | 5/8in   | 1 1/8in |
| 067N5162                                            | TGEN 10     | TGE 20 | 7/8X11/8     | <              | 068H8448 | TDEN12.3                                          | R134a       | -40 - 10 °C | 16   | 37,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N5163                                            | TGEN 12     | TGE 20 | 7/8X11/8     | <              | 068H8450 | TDEN14.6                                          | R134a       | -40 - 10 °C | 20   | 44,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N5156                                            | TGEN 4.5    | TGE 10 | 5/8X7/8      | <              | 068H8468 | TDEN5.8                                           | R134a       | -40 - 10 °C | 8    | 17,00 kW  | 4,00 °C | 5/8in   | 7/8in   |
| 067N5162                                            | TGEN 10     | TGE 20 | 7/8X11/8     | <              | 068H8480 | TDEN12.3                                          | R134a       | -40 - 10 °C | 16   | 37,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N5163                                            | TGEN 12     | TGE 20 | 7/8X11/8     | <              | 068H8482 | TDEN14.6                                          | R134a       | -40 - 10 °C | 20   | 44,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N5163                                            | TGEN 12     | TGE 20 | 7/8X11/8     | <              | 068H8500 | TDEN15.4                                          | R134a       | -40 - 10 °C | 20   | 44,00 kW  | 4,00 °C | 7/8in   | 1 1/8in |
| 067N5165                                            | TGEN 17     | TGE 40 | 7/8X13/8     | <              | 068H8502 | TDEBN20                                           | R134a       | -40 - 10 °C | 26   | 61,00 kW  | 4,00 °C | 7/8in   | 1 3/8in |
| 067N5169                                            | TGEN 25     | TGE 40 | 11/8X13/8    | <              | 068H8506 | TDEBN23.1                                         | R134a       | -40 - 10 °C | 40   | 87,00 kW  | 4,00 °C | 1 1/8in | 1 3/8in |
| 067N5169                                            | TGEN 25     | TGE 40 | 11/8X13/8    | <              | 068H8508 | TDEBN30.8                                         | R134a</     |             |      |           |         |         |         |

# AKV 10P / AKV 10PS, Electric expansion valves

AKV 10P and AKV10PS are electric operated expansion valves designed for refrigerating plants. The AKV 10P and AKV 10PS valves are normally controlled by a controller from Danfoss range of ADAP- KOOL® controllers, that ensures a precise liquid injection into evaporators.

AKV 10P and AKV10PS valves are fully serviceable valves and are supplied as a parts programme with separate valve body and coil (with terminal box, cable or DIN plug).

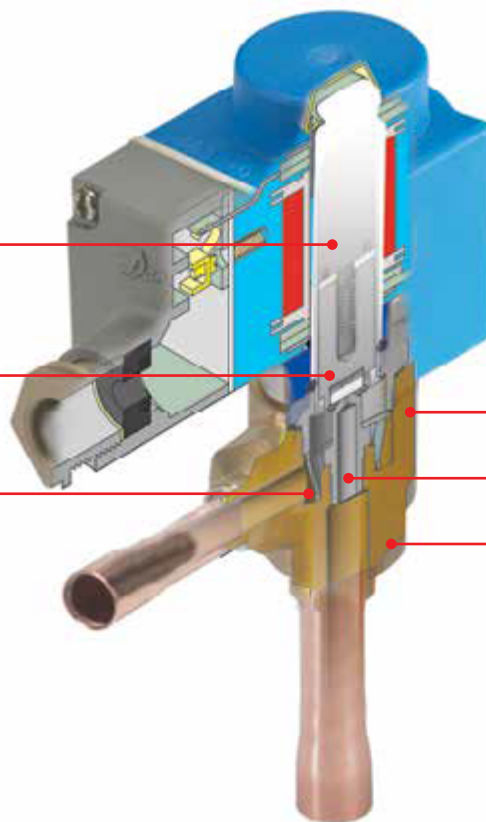
## Features AKV 10P/ AKVP 10PS



Normally closed  
Solenoid tight shut-off valve

Superior valve technology  
that provides soft pulse  
operation

Fully serviceable valve



Internal and external  
corrosion resistant

Replaceable filter  
and orifice assembly

Both expansion valve  
and solenoid valve

## Facts

### Applications:

- Traditional refrigeration
- Cold rooms
- Water chillers

### Refrigerants:

- |           |         |         |         |
|-----------|---------|---------|---------|
| • R1233zd | • R407F | • R452B | • R516A |
| • R1234yf | • R407H | • R134a | • R600  |
| • R1234ze | • R410A | • R513A | • R600a |
| • R1270   | • R422B | • R454B | • R744  |
| • R134a   | • R422D | • R454C |         |
| • R22     | • R438A | • R455A |         |
| • R23     | • R444B | • R463A |         |
| • R290    | • R448A | • R507  |         |
| • R32     | • R449A | • R513A |         |
| • R404A   | • R449B | • R513B |         |
| • R407A   | • R450A | • R515A |         |
| • R407C   | • R452A | • R515B |         |

### Benefit:

- Precise control of liquid injection
- The AKV 10P/10PS valves cover a capacity range from 0.2 - 12.5 kW / 0.06 - 3.55 TR (404A / R507) and are divided into 8 capacity ranges
- Supports variety of refrigerants
- Solenoid tight shut-off
- Fully serviceable valve
- Superior valve technology that provides soft pulse operation
- The AKV 10P/10PS valve are supplied as a parts programme, as follows:
  - Separate valve incl. exchangeable orifice
  - Separate coil

# Technical data and ordering

## AKV 10P / AKV 10PS

### Direct operated Valve

|                                        | Direct operated Valve        | Servo operated Valve         |
|----------------------------------------|------------------------------|------------------------------|
| Valve type                             | AKV 10P0 to AKV 10P7         | AKV 10PS4 to AKV 10PS7       |
| Working principle                      | PWM (Pulse-width modulation) | PWM (Pulse-width modulation) |
| Recommended period of cycle time       | 6 Seconds                    | 6 Seconds                    |
| Regulation range (Capacity range)      | 10 - 100%                    | 10 - 100%                    |
| Connection type                        | Solder                       | Solder                       |
| Evaporating temperature                | -60 - 60°C                   | -60 - 60°C                   |
| Ambient temperature                    | -50 - 50°C                   | -50 - 50°C                   |
| MOPD, AKV 10P0 to AKV 10P6             | 35 bar / 508 psig            | 35 bar / 508 psig            |
| MOPD, AKV 10P7                         | 18 bar / 261 psi             | 18 bar / 261 psi             |
| Min. OPD, AKV 10P0 to AKV 10P7         | 0 bar / 0 psi                | 0.1 bar / 1.45 psi           |
| Filter, replaceable                    | Internal 100 µm              | Internal 53 µm               |
| Max. working pressure                  | 90 barg / 1305 psig          | 90 barg / 1305 psig          |
| MAP (Max. Abnormal Pressure)           | 1305 psig                    | 1305 psig                    |
| COT (Continuous Operation Temperature) | 60°C                         | 60°C                         |

**Note:**

1) It is recommended to selected Servo operated AKV 10PS valves for those application where higher MOPD (with low coil power) and high dampening is required.

2) Recommended Danfoss Filter ELIMINATOR® Hermetic filter drier, type DML / DMSC

# Technical data and ordering

## AKV 10P / AKV 10PS

### AKV 10P - Rated capacity

| Valve type / orifice no. | R744 <sup>2)</sup> |          | R404A / R507 <sup>1)</sup> | R448A | R449A | R452A | K <sub>v</sub> Value | Connection size<br>Solder ODF / ODF | Code no.<br>Single pack |
|--------------------------|--------------------|----------|----------------------------|-------|-------|-------|----------------------|-------------------------------------|-------------------------|
|                          | Refrig.            | Freezing |                            |       |       |       |                      |                                     |                         |
|                          | [kW]               | [kW]     |                            |       |       |       |                      |                                     |                         |
| AKV 10P0                 | 0.44               | 0.69     | 0.21                       | 0.32  | 0.31  | 0.25  | 0.003                | 3/8 × 1/2                           | 068F5210                |
| AKV 10P1                 | 1.17               | 1.84     | 0.8                        | 0.95  | 0.93  | 0.73  | 0.09                 | 3/8 × 1/2                           | 068F5211                |
| AKV 10P2                 | 2.06               | 3.25     | 1.3                        | 1.68  | 1.64  | 1.29  | 0.016                | 3/8 × 1/2                           | 068F5212                |
| AKV 10P3                 | 3.14               | 4.97     | 2.0                        | 2.57  | 2.51  | 1.98  | 0.024                | 3/8 × 1/2                           | 068F5213                |
| AKV 10P4                 | 6.10               | 9.64     | 3.1                        | 4.99  | 4.88  | 3.84  | 0.046                | 3/8 × 1/2                           | 068F5214                |
| AKV 10P5                 | 8.49               | 13.4     | 4.9                        | 6.95  | 6.79  | 5.35  | 0.064                | 3/8 × 1/2                           | 068F5215                |
| AKV 10P6                 | 15.1               | 23.9     | 7.8                        | 12.38 | 12.1  | 9.54  | 0.114                | 3/8 × 1/2                           | 068F5216                |
| AKV 10P7                 | 24.6               | 39.3     | 12.5                       | 20.07 | 19.63 | 15.47 | 0.185                | 1/2 × 5/8                           | 068F5217                |

Note: It is recommended to selected Servo operated AKV 10PS valves for those application where higher MOPD (with low coil power) and high dampening is required.

### AKV 10PS - Rated capacity

| Valve type / orifice no. | R744 <sup>2)</sup> |          | R404A / R507 <sup>1)</sup> | R448A | R449A | R452A | K <sub>v</sub> Value | Connection size<br>Solder ODF / ODF | Code no.<br>Single pack |
|--------------------------|--------------------|----------|----------------------------|-------|-------|-------|----------------------|-------------------------------------|-------------------------|
|                          | Refrig.            | Freezing |                            |       |       |       |                      |                                     |                         |
|                          | [kW]               | [kW]     |                            |       |       |       |                      |                                     |                         |
| AKV 10PS4                | 6.10               | 9.64     | 3.1                        | 4.997 | 4.88  | 3.84  | 0.046                | 3/8 × 1/2                           | 068F4044                |
| AKV 10PS5                | 8.49               | 13.4     | 4.9                        | 6.95  | 6.79  | 5.35  | 0.064                | 3/8 × 1/2                           | 068F4045                |
| AKV 10PS6                | 15.1               | 23.9     | 7.8                        | 12.38 | 12.1  | 9.54  | 0.114                | 3/8 × 1/2                           | 068F4046                |
| AKV 10PS7                | 24.6               | 39.3     | 12.5                       | 20.07 | 19.63 | 15.47 | 0.185                | 1/2 × 5/8                           | 068F4047                |

<sup>1)</sup> Rated capacities are based on:

Condensing temperature t<sub>c</sub> = 38°C / 100°F

Liquid temperature t<sub>l</sub> = 37°C / 98°F

Evaporating temperature t<sub>e</sub> = 4°C / 39°F

<sup>2)</sup> Rated capacities are based on:

Condensing temperature t<sub>c</sub> = 0°C / 32°F

Evaporating temperature Refrig. t<sub>e</sub> = -10°C / 14°F

Evaporating temperature Freezing. t<sub>e</sub> = -30°C / -22°F

Subcooling = 1°C / 1.8°F

C<sub>v</sub> value is calculated from K<sub>v</sub> value in above table

### Spare part ordering - Single pack

| Description                             | Code no. |
|-----------------------------------------|----------|
| Orifice kit direct operated AKV 10P0-3  | 068F5151 |
| Orifice kit direct operated AKV 10P4-7  | 068F5152 |
| Orifice kit servo operated AKV 10PS4-7  | 068F5155 |
| Filter kit direct operated AKV 10P      | 068F5154 |
| Filter kit servo operated AKV 10PS      | 068F5156 |
| Armature kit direct operated AKV 10P0-7 | 068F5153 |
| Armature kit servo operated AKV 10PS4-7 | 068F5157 |

Note: Old AKV 10/AKVH 10 body can be converted to AKV 10P/ AKV 10PS by using the respective armature kit.

# Technical data and ordering

## AKV 10P / AKV 10PS

### AKV 10P - Rated capacity

| Coil type | Voltage | Frequency | Power consumption | Electrical connection | SKU / Code number | Picture                                                                             | Application Comments    |
|-----------|---------|-----------|-------------------|-----------------------|-------------------|-------------------------------------------------------------------------------------|-------------------------|
| BE230CS   | 230     | 50        | 17                | Term. box             | 018F6732          |  | All range               |
| BE230AS   | 230     | 50        | 12                | Term. box             | 018F6701          |  | AKV10P0-3<br>AKV10PS4-7 |
| BG230AS   | 230     | 50        | 15                | Term. box             | 018F6801          |  | AKV10P0-3<br>AKV10PS4-7 |

### AKV10 and AKVH 10 cross reference to AKV 10P and AKV 10PS

| AKV Danfoss codes | Product Description           | New AKV 10P (direct) code | Description                    | New AKV 10PS (servo) code | Description                     |
|-------------------|-------------------------------|---------------------------|--------------------------------|---------------------------|---------------------------------|
| 068F1161          | AKV10-1 Valve ODF-ODF 3/8-1/2 | 068F5211                  | AKV 10P1 Valve ODF-ODF 3/8-1/2 | NA                        | NA                              |
| 068F1164          | AKV10-2 Valve ODF-ODF 3/8-1/2 | 068F5212                  | AKV 10P2 Valve ODF-ODF 3/8-1/2 | NA                        | NA                              |
| 068F1167          | AKV10-3 Valve ODF-ODF 3/8-1/2 | 068F5213                  | AKV 10P3 Valve ODF-ODF 3/8-1/2 | NA                        | NA                              |
| 068F1170          | AKV10-4 Valve ODF-ODF 3/8-1/2 | 068F5214                  | AKV 10P4 Valve ODF-ODF 3/8-1/2 | 068F4044                  | AKV 10PS4 Valve ODF-ODF 3/8-1/2 |
| 068F1173          | AKV10-5 Valve ODF-ODF 3/8-1/2 | 068F5215                  | AKV 10P5 Valve ODF-ODF 3/8-1/2 | 068F4045                  | AKV 10PS5 Valve ODF-ODF 3/8-1/2 |
| 068F1176          | AKV10-6 Valve ODF-ODF 3/8-1/2 | 068F5216                  | AKV 10P6 Valve ODF-ODF 3/8-1/2 | 068F4046                  | AKV 10PS6 Valve ODF-ODF 3/8-1/2 |
| 068F1179          | AKV10-7 Valve ODF-ODF 1/2-5/8 | 068F5217                  | AKV 10P7 Valve ODF-ODF 1/2-5/8 | 068F4047                  | AKV 10PS7 Valve ODF-ODF 3/8-1/2 |
| 068F4078          | AKVH10-0 VALVE ODF 3/8-1/2    | 068F5210                  | AKV 10P0 Valve ODF-ODF 3/8-1/2 | NA                        | NA                              |
| 068F4079          | AKVH10-1 VALVE ODF 3/8-1/2    | 068F5211                  | AKV 10P1 Valve ODF-ODF 3/8-1/2 | NA                        | NA                              |
| 068F4080          | AKVH10-2 VALVE ODF 3/8-1/2    | 068F5212                  | AKV 10P2 Valve ODF-ODF 3/8-1/2 | NA                        | NA                              |
| 068F4081          | AKVH10-3 VALVE ODF 3/8-1/2    | 068F5213                  | AKV 10P3 Valve ODF-ODF 3/8-1/2 | NA                        | NA                              |
| 068F4082          | AKVH10-4 VALVE ODF 3/8-1/2    | 068F5214                  | AKV 10P4 Valve ODF-ODF 3/8-1/2 | 068F4044                  | AKV 10PS4 Valve ODF-ODF 3/8-1/2 |
| 068F4083          | AKVH10-5 VALVE ODF 3/8-1/2    | 068F5215                  | AKV 10P5 Valve ODF-ODF 3/8-1/2 | 068F4045                  | AKV 10PS5 Valve ODF-ODF 3/8-1/2 |
| 068F4084          | AKVH10-5 VALVE ODF 3/8-1/2    | 068F5216                  | AKV 10P6 Valve ODF-ODF 3/8-1/2 | 068F4046                  | AKV 10PS6 Valve ODF-ODF 3/8-1/2 |

### Benefits of AKVP

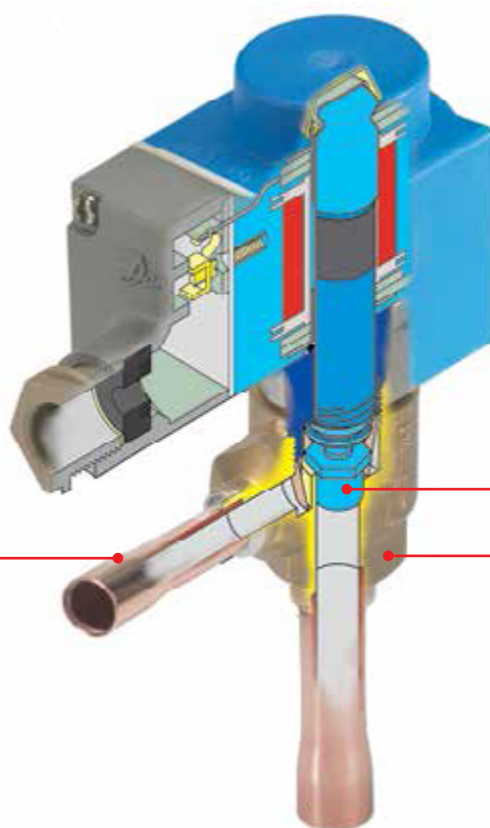


# AKV, Electric expansion valves

AKV are electrically operated expansion valves designed for refrigeration plants.  
The AKV valves are designed for use with a controller from Danfoss' range of ADAP-KOOL® controllers.

The AKV valves are supplied as a parts programme with separate valve body and coil (with terminal box, cable or DIN plug).  
AKV has an exchangeable orifice. Refrigerants: R744, R22 / R407C, R404A / R507, R410A, R134a, R407A, R23.

## Features AKV



Available with ODF solder connections (AKV 15 and AKV 20 – straightway,

The orifice assembly is replaceable

Both expansion valve and solenoid valve

## Facts

### Applications:

- Traditional refrigeration
- Cold rooms
- water chiller

### Maximum working pressure:

- AKV 10–1–6 PS / MWP = 52 bar / 754 psig
- AKV 10–7 PS / MWP = 42 bar / 610 psig
- AKV 15–1,2,3 PS / MWP = 42 bar / 610 psig
- AKV 15–4 PS / MWP = 28 bar / 400 psig
- AKV 20 PS / MWP = 28 bar / 400 psig

### Refrigerants:

- |         |         |
|---------|---------|
| • R407F | • R515B |
| • R422B | • R134a |
| • R422D | • R22   |
| • R448A | • R23   |
| • R449A | • R404A |
| • R449B | • R407A |
| • R450A | • R407C |
| • R452A | • R410A |
| • R513A | • R507  |
| • R407H | • R744  |
| • R438A |         |
| • R463A |         |
| • R513B |         |
| • R515A |         |

### Capacity range:

- 0.2 – 114 TR / 0.8 – 404 kW

### Benefit:

- The AKV valves are supplied as a parts programme, as follows:
- Separate valve incl. exchangeable orifice
- Separate coil
- The valve requires no adjustment



# Technical data and ordering

## AKV

### Valve excluded coil

| Valve type | Rated capacity kW |       |             |       | kv value          | Connections          |          |
|------------|-------------------|-------|-------------|-------|-------------------|----------------------|----------|
|            |                   |       |             |       |                   | Solder ODF           |          |
|            | R22/ R407C        | R134a | R404A/ R507 | R407C | m <sup>3</sup> /h | Inlet × outlet (in.) | Code no. |
| AKV 15-1   | 25.5              | 21.2  | 19.6        | 25.2  | 0.25              | 3/4 × 3/4            | 068F5000 |
| AKV 15-2   | 40.8              | 33.8  | 31.4        | 40.4  | 0.4               | 3/4 × 3/4            | 068F5005 |
| AKV 15-3   | 64.3              | 53.3  | 49.4        | 63.7  | 0.63              | 7/8 × 7/8            | 068F5010 |
| AKV 15-4   | 102               | 84.6  | 78.3        | 101   | 1                 | 1 1/8 × 1 1/8        | 068F5015 |
| AKV 20-1   | 102               | 84.6  | 78.3        | 101   | 1                 | 1 3/8 × 1 3/8        | 042H2020 |
| AKV 20-2   | 163               | 135   | 125         | 170   | 1.6               | 1 3/8 × 1 3/8        | 042H2022 |
| AKV 20-3   | 255               | 212   | 196         | 252   | 2.5               | 1 5/8 × 1 5/8        | 042H2024 |

Rated capacities are based on:

Condensing temperature  $t_c = 32^\circ\text{C}$

Liquid temperature  $t_l = 28^\circ\text{C}$

Evaporating temperature  $t_e = 5^\circ\text{C}$

## AKV

### Coil



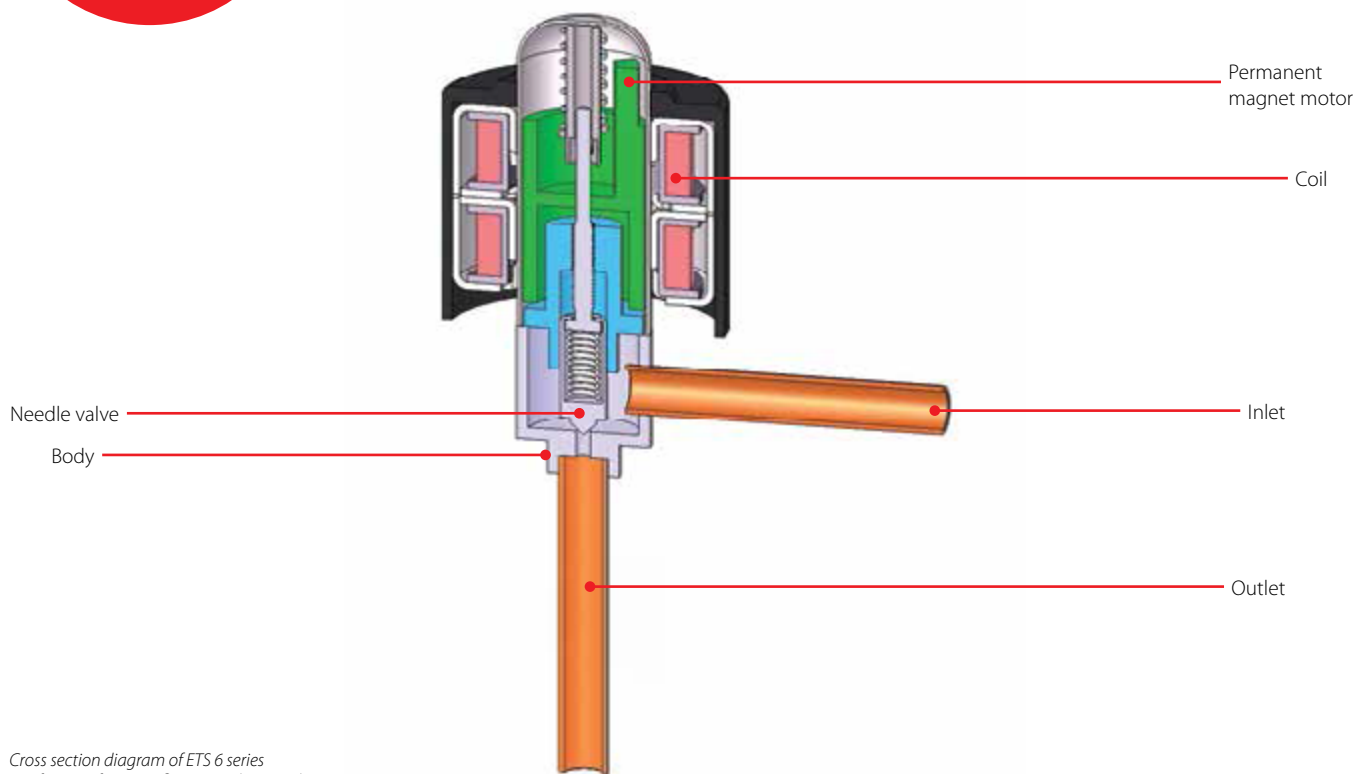
| Type | Description                              | Code no. |
|------|------------------------------------------|----------|
| Coil | 240 V a.c. 12 W, 50 Hz with Terminal Box | 018F6802 |
|      | 230 V a.c. 10 W, 50 Hz with Terminal Box | 018F6701 |
|      | 230V a.c. 20W, 50Hz with Terminal Box    | 018F6905 |
|      | 24 V a.c. 10 W, 50 Hz with Terminal Box  | 018F6707 |

# ETS 6, Electric expansion valve

ETS 6 are compact and lightweight electric expansion valves. Bi-flow operation is possible for heat pump systems. The valve operation is by means of a unipolar motor, which can be controlled by a number of controllers from Danfoss or third party vendors.

With a Danfoss EKE 1A, EKE 1B, EKE 1C and EIM 336 (current drivers) and an AKS sensor, an accuracy better than  $\pm 0.5$  K can be obtained.

## Features ETS 6



Cross section diagram of ETS 6 series  
\* Refers to refrigerant flow in cooling mode

## Facts

### Applications:

- Heat pumps
- Modular air-cooled chillers
- VRF
- Multi split
- Inverter mini split
- Bus air conditioning
- IT cooling

### Maximum working pressure:

- 47 bar / 681 psig

### Refrigerants:

- R134a
- R22/R407C
- R404A/R507
- R410A
- R290
- R32
- R448A
- R449A
- R452A
- R1234yf
- R407H
- R449B
- R452B
- R454A
- R454B
- R454C
- R455A
- R463A
- R513A

### Capacity range:

- 0.11 – 6.56 TR / 0.42 – 23.1 kW

### Benefit:

- Compact and lightweight hermetic design with removable coil
- Bi-flow operation for reversible systems
- Power saving design that enables energy efficiency with precision flow control

# Technical data and ordering

## ETS 6

Valve excl. coil



| Type     | Rated capacity (kW) |       |      |       |             | Connection (ODF X ODF) |             | Code no.      |
|----------|---------------------|-------|------|-------|-------------|------------------------|-------------|---------------|
|          | R410A               | R407C | R22  | R134a | R404A/ R507 | in.                    | mm          | Straight away |
| ETS 6-10 | 3.1                 | 2.7   | 2.6  | 2     | 1.8         | -                      | 7.94 X 7.94 | 034G5005      |
| ETS 6-14 | 6.8                 | 5.9   | 5.8  | 4.5   | 4.1         | -                      | 7.94 X 7.94 | 034G5015      |
| ETS 6-18 | 12.1                | 10.6  | 10.3 | 8.1   | 7.3         | -                      | 6.35 X 6.35 | 034G5026      |
| ETS 6-25 | 23                  | 20.1  | 19.6 | 15.3  | 13.8        | -                      | 7.94 X 7.94 | 034G5035      |
| ETS 6-32 | 33.9                | 29.6  | 28.8 | 22.5  | 20.3        | -                      | 7.94 X 7.94 | 034G5055      |
| ETS 6-40 | 46                  | 40.2  | 39.1 | 30.6  | 27.9        | -                      | 7.94 X 7.94 | 034G5065      |

ETS 6 rated capacity on:

Evaporating temperature  $t_e$ : 5°C (40°F), Condensing temperature  $t_c$ : 38°C (90°F), Subcooling= 0°C, superheat= 0°C

## ETS 6

Coil



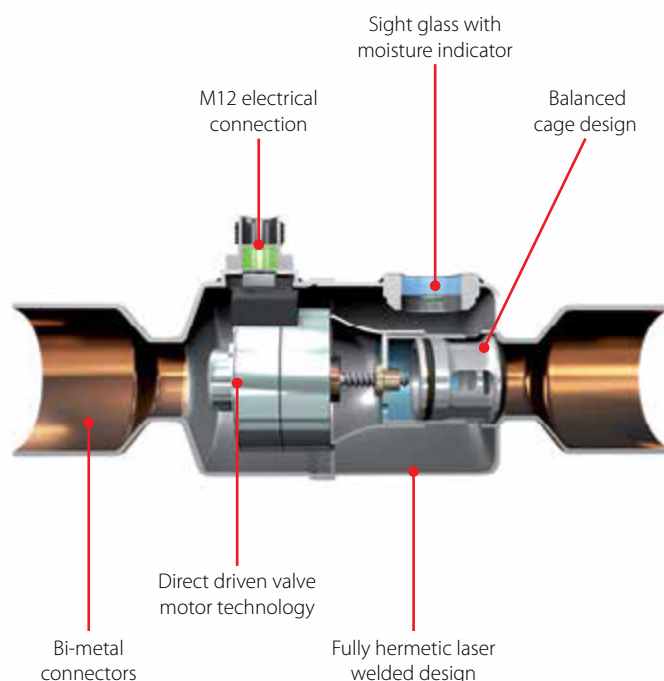
| Type | Description                                     | Code no. |
|------|-------------------------------------------------|----------|
| Coil | 12 VDC (0.26A / phase) with JST XHP-6 connector | 034G5105 |
|      | 12 VDC (0.26A / phase) with JST XHP-5 connector | 034G5115 |

# ETS 12C / ETS 24C / ETS 25C / ETS 50C / ETS 100C, Electric expansion valves

ETS Colibri® is an electric stepper motor valve. The valve has been designed for precise liquid injection into evaporators for air conditioning and refrigeration applications. The valves are compact, lightweight and in-line design. The valves are compact, lightweight and in-line design includes a balanced cage and slider assembly operated by the direct driven motor technology.

This ensures solenoid tight shut-off in both flow directions, thus providing smooth operation of the system. The valve incorporates a powerful bi-polar motor which precisely controls flow regulation. ETS Colibri® valves are compatible with electronic control solutions from Danfoss and other manufacturers.

## Features ETS 12C, ETS 24C, ETS 25C, ETS 50C, ETS 100C



## Facts

### Applications:

- Air Conditioning
- Chillers, heat pumps
- Roof top and ducted split systems
- VRF and other split systems
- Close control cooling
- Refrigeration
- Cold Rooms, Food retail and Transport

### Refrigerants:

- |           |         |              |          |
|-----------|---------|--------------|----------|
| • R1234yf | • R422D | • R227       | • R502   |
| • R1234ze | • R427A | • R1233zd(E) | • R512A  |
| • R1270   | • R438A | • R22        | • R513B  |
| • R134a   | • R444B | • R407B      | • R515A  |
| • R23     | • R448A | • R407H      | • R515B  |
| • R290    | • R449A | • R413A      | • R516A  |
| • R32     | • R450A | • R422B      | • R245fa |
| • R404A   | • R452A | • R442A      | • R412A  |
| • R407A   | • R452B | • R447A      | • R500   |
| • R407C   | • R454B | • R449B      |          |
| • R407F   | • R507  | • R454A      |          |
| • R410A   | • R513A | • R454C      |          |
| • R417A   | • R600  | • R455A      |          |
| • R422A   | • R600a | • R463A      |          |

### Benefit:

- Precise control of liquid injection
- Linear Flow characteristic
- Higher MOPD and MWP
- Supports variety of refrigerants, approved for oil free applications
- Fast opening / closing time of 4 sec
- Solenoid tight shut-off
- Sight glass / moisture indicator
- Bi-metal connectors allows fast and improved brazing process
- Internal and external corrosion resistant

# Technical data and ordering

## ETS Colibri®

### Technical data

|                                                                    |                                                                         |
|--------------------------------------------------------------------|-------------------------------------------------------------------------|
| Refrigerant oil                                                    | POE, PVE, All mineral oils, ester oils and supports oil free            |
| Complies with PED                                                  | Yes, Fluid group 1*) and group 2.                                       |
| MOPD                                                               | 40 bar / 580 psi                                                        |
| Max. working pressure PS/MWP                                       | 50 bar(g) / 725 psi(g)                                                  |
| Refrigerant temperature range (measured at the inlet of the valve) | -40 – 70 °C / -40 – 158 °F                                              |
| Ambient temperature                                                | -40 – 70 °C / -40 – 158 °F                                              |
| Capacity control range                                             | 10% - 100% of total opening degree                                      |
| Initial opening                                                    | 5% = 30 full steps                                                      |
| Environmental transport / storage temperature and humidity         | Max. +75 °C / 167 °F, Humidity: <100% RH                                |
| Material of construction                                           | Body: Stainless Steel / Connector: Bimetal (stainless steel and copper) |
| Sightglass / moisture indicator                                    | Type N moisture indicator                                               |

\*) Variants with connector size 1-1/8 in. and smaller.

### Electrical data

|                                 |                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motor enclosure                 | IP67                                                                                                                                                                                                                                                                            |
| Stepper motor type              | Bi-polar - permanent magnet                                                                                                                                                                                                                                                     |
| Step mode                       | Microstepping (recommended), 2 phase full step or half step                                                                                                                                                                                                                     |
| Phase current                   | 800 mA peak / 600 mA RMS                                                                                                                                                                                                                                                        |
| Holding current                 | No permanent holding current needed. Max. 20% permanent holding current allowed with refrigerant flow through valve. For optimal performance, driver should keep 100% current on coils 10ms after last step                                                                     |
| Phase resistance                | 10 Ω ±10% at 20 °C / 68 °F                                                                                                                                                                                                                                                      |
| Inductance                      | 14 mH ±25%                                                                                                                                                                                                                                                                      |
| Duty cycle                      | 100% possible, requiring refrigerant flow through valve. Less than 50% over 120 sec period recommended                                                                                                                                                                          |
| Nominal Power consumption       | 7.44 W RMS at 20 °C (total, both coils)                                                                                                                                                                                                                                         |
| Total number of full steps      | 600                                                                                                                                                                                                                                                                             |
| Step rate                       | Current control driver:<br>a. Step type: Microstep (1/4th or higher): 160 full steps/sec. recommended<br>b. Step type: Full step or Half steps: 50 full steps/sec. recommended Emergency close : 250 full steps/sec.<br>OEMs with 3rd party controller, please contact Danfoss. |
| Step translation                | 0.0167 mm / step                                                                                                                                                                                                                                                                |
| Full travel time                | 3.75 at 160 steps/sec                                                                                                                                                                                                                                                           |
| Opening stroke                  | 10 mm / 0.4 in.                                                                                                                                                                                                                                                                 |
| Reference position              | Overdriving against the full close position                                                                                                                                                                                                                                     |
| Overdriving performance         | 1% (6 full steps) Overdrive is recommended for optimum performance 628 steps in closing direction recommended for initialisation Overdriving in open position not recommended                                                                                                   |
| Electrical connection           | According to EN 61076-2-101                                                                                                                                                                                                                                                     |
| Compatible controllers / driver | Danfoss EKE 1A, EKE 1B, EKE 1C, MCX061V, MCX152V<br>Certain third party controllers / drivers. Contact Danfoss for details                                                                                                                                                      |

### Installation and troubleshooting of ETS Colibri



# Technical data and ordering

**ETS Colibri®**

Ordering - Without sight glass



| Type    | K <sub>v</sub><br>value | C <sub>v</sub><br>value | Rated capacity ) |      |       |      |         |      |       |      |      |      | Connection        |         | Code no.<br>single pack |
|---------|-------------------------|-------------------------|------------------|------|-------|------|---------|------|-------|------|------|------|-------------------|---------|-------------------------|
|         | [m³/h]                  | [gpm]                   | R410A            |      | R407C |      | R1234ze |      | R134a |      | R290 |      | ODF × ODF (A × B) |         |                         |
|         |                         |                         | [kW]             | [TR] | [kW]  | [TR] | [kW]    | [TR] | [kW]  | [TR] | [kW] | [TR] | [in]              | [mm]    |                         |
| ETS 12C | 0.60                    | 0.69                    | 105              | 29.8 | 95.1  | 27.0 | 53.6    | 15.2 | 68.0  | 19.0 | 91.0 | 26.0 | ½ × ½             | –       | 034G7500                |
|         | 0.60                    | 0.69                    | 105              | 29.8 | 95.1  | 27.0 | 53.6    | 15.2 | 68.0  | 19.0 | 91.0 | 26.0 | ⅝ × ⅝             | 16 × 16 | 034G7501                |
|         | 0.60                    | 0.69                    | 105              | 29.8 | 95.1  | 27.0 | 53.6    | 15.2 | 68.0  | 19.0 | 91.0 | 26.0 | ⅞ × ⅞             | 22 × 22 | 034G7502                |
| ETS 24C | 1.20                    | 1.39                    | 170              | 48.5 | 155   | 44.0 | 87.3    | 24.8 | 111   | 31.5 | 149  | 42.0 | ½ × ½             | –       | 034G7900                |
|         | 1.20                    | 1.39                    | 170              | 48.5 | 155   | 44.0 | 87.3    | 24.8 | 111   | 31.5 | 149  | 42.0 | ⅝ × ⅝             | 16 × 16 | 034G7901                |
|         | 1.20                    | 1.39                    | 170              | 48.5 | 155   | 44.0 | 87.3    | 24.8 | 111   | 31.5 | 149  | 42.0 | ⅞ × ⅞             | 22 × 22 | 034G7902                |

Ordering - With sight glass



| Type     | K <sub>v</sub><br>value | C <sub>v</sub><br>value | Rated capacity <sup>1)</sup> |      |       |      |         |      |       |      |      |      | Connection        |         | Code no.<br>single pack |
|----------|-------------------------|-------------------------|------------------------------|------|-------|------|---------|------|-------|------|------|------|-------------------|---------|-------------------------|
|          | [m³/h]                  | [gpm]                   | R410A                        |      | R407C |      | R1234ze |      | R134a |      | R290 |      | ODF × ODF (A × B) |         |                         |
|          |                         |                         | [kW]                         | [TR] | [kW]  | [TR] | [kW]    | [TR] | [kW]  | [TR] | [kW] | [TR] | [in]              | [mm]    |                         |
| ETS 25C  | 1.20                    | 1.39                    | 170                          | 48.5 | 155   | 44.0 | 87.3    | 24.8 | 111   | 31.5 | 149  | 42.0 | 7/8 × 7/8         | 22 × 22 | 034G7602                |
| ETS 50C  | 2.50                    | 2.89                    | 323                          | 92.0 | 294   | 83.5 | 166     | 47.1 | 210   | 59.7 | 282  | 80.0 | 7/8 × 7/8         | 22 × 22 | 034G7700                |
|          | 2.50                    | 2.89                    | 323                          | 92.0 | 294   | 83.5 | 166     | 47.1 | 210   | 59.7 | 282  | 80.0 | 7/8 × 1 1/8       | 22 × 28 | 034G7701                |
|          | 2.50                    | 2.89                    | 323                          | 92.0 | 294   | 83.5 | 166     | 47.1 | 210   | 59.7 | 282  | 80.0 | 1 1/8 × 1 1/8     | 28 × 28 | 034G7702                |
|          | 2.50                    | 2.89                    | 323                          | 92.0 | 294   | 83.5 | 166     | 47.1 | 210   | 59.7 | 282  | 80.0 | 1 1/8 × 1 3/8     | 28 × 35 | 034G7703                |
| ETS 100C | 5.00                    | 5.78                    | 635                          | 181  | 577   | 164  | 325     | 92.5 | 413   | 117  | 554  | 157  | 1 1/8 × 1 1/8     | 28 × 28 | 034G7800                |
|          | 5.00                    | 5.78                    | 635                          | 181  | 577   | 164  | 325     | 92.5 | 413   | 117  | 554  | 157  | 1 1/8 × 1 3/8     | 28 × 35 | 034G7801                |
|          | 5.00                    | 5.78                    | 635                          | 181  | 577   | 164  | 325     | 92.5 | 413   | 117  | 554  | 157  | 1 3/8 × 1 3/8     | 35 × 35 | 034G7802                |
|          | 5.00                    | 5.78                    | 635                          | 181  | 577   | 164  | 325     | 92.5 | 413   | 117  | 554  | 157  | 1 5/8 × 1 5/8     | —       | 034G7803                |

<sup>1)</sup> The above estimated capacities, are based on the following conditions:

Evaporating temperature t<sub>e</sub>: 5 °C / 40 °F

Liquid temperature t<sub>l</sub>: 28 °C / 82 °F

Condensing temperature t<sub>c</sub>: 32 °C / 90 °F

Full stroke opening in normal flow direction.

Capacity is ± 10% in full open state in reverse flow direction.

Note: for fast and precise selection of valve, use Danfoss' CoolSelector2® software. You can download it from <http://coolselector.danfoss.com>

Ordering



| Cable       | Cable length (L) | Insulation | Packing format | Code no. |
|-------------|------------------|------------|----------------|----------|
| PVC - Black | 2 m / 6.6 ft     | SR-PVC     | Single pack    | 034G7073 |
|             | 8 m / 26.2 ft    | SR-PVC     | Single pack    | 034G7074 |

Caution: M12 angle cable is not approved for flammable applications.

Cross reference for ETS to ETS Colibri

| Code     | Description                       | Connection size (inches) | Replacement |          |
|----------|-----------------------------------|--------------------------|-------------|----------|
|          |                                   |                          | Description | Code     |
| 034G4209 | ETS 12.5 Electric exp. valve      | 1/2 × 1/2                | ETS 12C     | 034G7500 |
| 034G4210 | ETS 12.5 Electric exp. valve      | 5/8 × 5/8                | ETS 12C     | 034G7501 |
| 034G4214 | ETS 12.5 Electric exp. valve      | 5/8 × 5/8 (angle)        | ETS 12C     | 034G7501 |
| 034G4211 | ETS 12.5 Electric exp. valve      | 7/8 × 7/8                | ETS 12C     | 034G7502 |
| 034G4215 | ETS 12.5 Electric exp. valve      | 7/8 × 7/8 (angle)        | ETS 12C     | 034G7502 |
| 034G4202 | ETS 25 Electric exp. valve        | 5/8 × 5/8                | ETS 24C     | 034G7902 |
| 034G4203 | ETS 25 Electric exp. valve        | 7/8 × 7/8                | ETS 25C     | 034G7602 |
| 034G1721 | ETS 25B Electric exp. valve w. SG | 7/8 × 7/8                | ETS 25C     | 034G7602 |
| 034G1708 | ETS 50 Electric exp. valve w. SG  | 7/8 × 7/8                | ETS 50C     | 034G7700 |
| 034G1705 | ETS 50 Electric exp. valve w. SG  | 7/8 × 1 1/8              | ETS 50C     | 034G7701 |
| 034G1706 | ETS 50 Electric exp. valve w. SG  | 1 1/8 × 1 1/8            | ETS 50C     | 034G7702 |
| 034G1704 | ETS 50 Electric exp. valve w. SG  | 1 1/8 × 1 3/8            | ETS 50C     | 034G7703 |
| 034G0507 | ETS 100 Electric exp. valve w. SG | 1 1/8 × 1 1/8            | ETS 100C    | 034G7801 |
| 034G0508 | ETS 100 Electric exp. valve w. SG | 1 3/8 × 1 3/8            | ETS 100C    | 034G7802 |
| 034G0505 | ETS 100 Electric exp. valve w. SG | 1 5/8 × 1 5/8            | ETS 100C    | 034G7803 |

Compatible: Danfoss EKE 1A, EKE 1B, EKE 1C, MCX061V, MCX152V



# EVR version 2, Solenoid valves

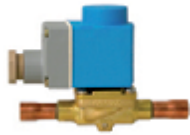
EVR solenoid valves are direct or servo operated solenoid valves for liquid, suction and hot gas lines with most refrigerants, including flammable refrigerants. They are suitable for condensing units and power packs in all refrigeration, freezing and air conditioning applications and are compatible with fluorinated refrigerants R22/ R407C, R134a, R404A/R507, R410A, R407A, R32, R290, R600, R600a, R1234yf, R1234ze, R404A, R407F, R152A, R448A, R449A, R452A and R450A.

EVR 2 - EVR 22 with solder connections and without manual stem are suitable for the flammable refrigerants R152A, R32, R290, R600, R600a, R1234yf and R1234ze.

The valves can be delivered as normally open or normally closed valves and with or without manual operation.

EVR valves are available with flare, solder or flange connections.

## Features EVR version 2



"Clip on" coil system for quick and easy mounting

Coil with terminal box, 1 m cable or DIN plug

Stainless steel armature

Extended ends for soldering make installation easy

Drawn stainless steel tube with internal armature top for maximum external tightness

Spring damping to increase the lifetime of the seat plate

Forged brass body for maximum external tightness

Teflon seat plate with cardan effect to secure maximum internal tightness

## Facts

### Applications:

- Traditional refrigeration
- Heat pump systems
- Air conditioning units
- Liquid coolers
- Transport refrigeration

### Maximum working pressure:

- EVR solder and flare connections  
45.2 bar / 655 psi

### Refrigerants:

- |         |         |         |
|---------|---------|---------|
| • R125  | • R413A | • R22   |
| • R134a | • R422A | • R407C |
| • R404A | • R422B | • R455A |
| • R407A | • R422D |         |
| • R407F | • R438A |         |
| • R410A | • R447A |         |
| • R417A | • R449B |         |
| • R448A | • R463A |         |
| • R449A | • R513B |         |
| • R450A | • R515A |         |
| • R452A | • R515B |         |
| • R507  | • R442A |         |
| • R513A | • R447B |         |
| • R407H | • R512A |         |

### Temperature range:

- -40 – 105 °C / -40 – 221 °F

### Benefit:

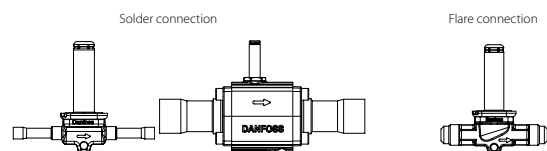
- High reliability and durability due to maximum internal and external tightness.
- MOPD up to 38 bar / 550 psi



# Technical data and ordering

## EVR version 2

Normally Closed (NC) - separate valve bodies



| Type   | Coil voltage | Connection size (in.) | Code no.                   | Manual operation Solder | Kv value (m³/h) | Code no.                  |
|--------|--------------|-----------------------|----------------------------|-------------------------|-----------------|---------------------------|
|        |              |                       | Solder Normally Close (NC) |                         |                 | Flare Normally Close (NC) |
| EVR 2  | AC / DC      | 1/4                   | 032F1201                   | No                      | 0.15            | 032F8056                  |
| EVR 3  | AC / DC      | 1/4                   | 032F1206                   | No                      | 0.26            | 032F8107                  |
|        | AC / DC      | 3/8                   | 032F1204                   | No                      | 0.26            | 032F8116                  |
| EVR 6  | AC / DC      | 3/8                   | 032L1212                   | No                      | 1               | 032L8072                  |
|        | AC / DC      | —                     | 032L1213                   | No                      | 1               | -                         |
|        | AC / DC      | —                     | 032L1236                   | No                      | 1               | -                         |
|        | AC / DC      | 1/2                   | 032L1209                   | No                      | 1               | 032L8079                  |
| EVR 10 | AC / DC      | —                     | 032L1218                   | No                      | 2.2             | -                         |
|        | AC / DC      | 1/2                   | 032L1217                   | No                      | 2.2             | 032L8095                  |
|        | AC / DC      | 5/8                   | 032L1214                   | No                      | 2.2             | 032L8098                  |
| EVR 15 | AC / DC      | 5/8                   | 032L1228                   | No                      | 3.3             | -                         |
|        | AC / DC      | 5/8                   | 032L1227                   | Yes                     | 3.3             | 032L8101                  |
|        | AC / DC      | 7/8                   | 032L1225                   | No                      | 3.3             | -                         |
| EVR 20 | AC / DC      | 7/8                   | 032L1240                   | No                      | 6               | -                         |
|        | AC / DC      | 7/8                   | 032L1254                   | Yes                     | 6               | -                         |
|        | AC / DC      | 1 1/8                 | 032L1244                   | No                      | 6               | -                         |
| EVR 22 | AC / DC      | 1 1/8                 | 032L7145                   | No                      | 6               | -                         |
|        | AC / DC      | 1 3/8                 | 032L3267                   | No                      | 6               | -                         |
| EVR 25 | AC / DC      | 1 1/8                 | 032L2200                   | Yes                     | 9.8             | -                         |
|        | AC / DC      | 1 1/8                 | 032L2201                   | No                      | 9.8             | -                         |
|        | AC / DC      | 1 3/8                 | 032L2207                   | Yes                     | 9.8             | -                         |
|        | AC / DC      | 1 3/8                 | 032L2208                   | No                      | 9.8             | -                         |
| EVR 32 | AC / DC      | 1 3/8                 | 032L1105                   | Yes                     | 16.7            | -                         |
|        | AC / DC      | 1 3/8                 | 032L1106                   | No                      | 16.7            | -                         |
|        | AC / DC      | 1 5/8                 | 032L1103                   | Yes                     | 16.7            | -                         |
|        | AC / DC      | 1 5/8                 | 032L1104                   | No                      | 16.7            | -                         |
| EVR 40 | AC / DC      | 1 5/8                 | 032L1109                   | Yes                     | 24.2            | -                         |
|        | AC / DC      | 1 5/8                 | 032L1110                   | No                      | 24.2            | -                         |
|        | AC / DC      | 2 1/8                 | 032L1111                   | Yes                     | 24.2            | -                         |
|        | AC / DC      | 2 1/8                 | 032L1112                   | No                      | 24.2            | -                         |

# Technical data and ordering

## Solenoid coils

BE solenoid coil with terminal box IP67



| Type    | Valve type                                                                                           | Tambient<br>(°C) | Supply<br>voltage<br>(V) | Voltage<br>variation<br>(%) | Frequency<br>(Hz) | Power consumption |    | Code no. |
|---------|------------------------------------------------------------------------------------------------------|------------------|--------------------------|-----------------------------|-------------------|-------------------|----|----------|
|         |                                                                                                      |                  |                          |                             |                   | W                 | VA |          |
| BE012AS | EVR 2 – EVR 40 (NC)<br>EVR 6 – EVR 22 (NO)<br>EVRH 10 – EVRH 40<br>EVR<br>EVRAT<br>EVRST<br>EVM (NC) | -40T80           | 12                       | -15, +10                    | 50                | 10                | 18 | 018F6706 |
| BE024AS |                                                                                                      | -40T80           | 24                       | -15, +10                    | 50                | 12                | 21 | 018F6707 |
| BE115AS |                                                                                                      | -40T80           | 115                      | -15, +10                    | 50                | 11                | 19 | 018F6711 |
| BE230AS |                                                                                                      | -40T80           | 230                      | -15, +10                    | 50                | 12                | 22 | 018F6701 |
| BE230AS |                                                                                                      | -40T80           | 220                      | -15, +10                    | 50                | 11                | 19 | 018F6701 |
| BE240AS |                                                                                                      | -40T80           | 240                      | -15, +10                    | 50                | 11                | 19 | 018F6702 |
| BE440CS |                                                                                                      | -40T80           | 380 - 400                | -15, +10                    | 50                | 13                | 23 | 018F6703 |



# Overview of Fluid controls

|                 |                                |   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
|-----------------|--------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Type            |                                | EV310A<br>3/2-way                                                                   | EV210A<br>2/2-way                                                                   | EV220A<br>2/2-way                                                                   | EV310B<br>3/2-way                                                                     | EV210B<br>2/2-way                                                                     | EV220B 6-22<br>2/2-way                                                                |
| Media           | Water                          |    |    |    |    |    |    |
|                 | Air and neutral gasses         |    |    |    |    |    |    |
|                 | Oil                            |    |    |    |    |    |    |
|                 | Steam                          |                                                                                     |                                                                                     |                                                                                     |                                                                                       |    |                                                                                       |
| Characteristics | Dirty media                    |                                                                                     |                                                                                     |                                                                                     | ✓                                                                                     | ✓                                                                                     | ✓                                                                                     |
|                 | Long lifetime                  |                                                                                     |                                                                                     |                                                                                     | ✓                                                                                     | ✓                                                                                     | ✓                                                                                     |
|                 | Soft closing (Low waterhammer) |                                                                                     |                                                                                     | ✓                                                                                   |                                                                                       |                                                                                       | ✓                                                                                     |
|                 | System suitability             |  |  |  |  |  |  |
|                 | Connection                     | G 1/8 – G 1/4,<br>flange 32 mm                                                      | G 1/8 – G 1/4,<br>flange 32 mm                                                      | G 1/4 – G 2                                                                         | G 1/8 – G 3/8,<br>flange 32 mm                                                        | G 1/8 – G 1                                                                           | G 1/4 – G 1                                                                           |
|                 | Function                       | NC or NO                                                                            | NC or NO                                                                            | NC or NO                                                                            | NC or NO                                                                              | NC or NO                                                                              | NC or NO                                                                              |
|                 | Orifice size mm                | 1.2 – 2                                                                             | 1.2 – 3.5                                                                           | 6 – 50                                                                              | 1.5 – 3.5                                                                             | 1.5 – 25                                                                              | 6 – 22                                                                                |
|                 | Pressure range, bar            | 0 – 20                                                                              | 0 – 30                                                                              | 0.2 – 16                                                                            | 0 – 20                                                                                | 0 – 30                                                                                | 0.1 – 30                                                                              |
|                 | Medium temperature max.        | 100 °C                                                                              | 120 °C                                                                              | 100 °C                                                                              | 100 °C                                                                                | 140 °C                                                                                | 100 °C                                                                                |
|                 | Kv value m³/h                  | 0.04 – 0.08                                                                         | 0.04 – 0.26                                                                         | 1 – 32                                                                              | 0.08 – 0.4                                                                            | 0.08 – 8                                                                              | 0.7 – 6                                                                               |
|                 | Special features               | Manual override option                                                              |                                                                                     |                                                                                     | Manual override option                                                                | Isolating diaphragm                                                                   |                                                                                       |
|                 | Approvals*                     | WRAS                                                                                |                                                                                     | WRAS                                                                                | GL                                                                                    | GL, WRAS and DNV                                                                      | WRAS and DNV                                                                          |
| Material        | Valve body                     | Brass or stainless steel                                                            | Brass or stainless steel                                                            | Brass                                                                               | Brass or stainless steel                                                              | Brass or stainless steel                                                              | Brass or DZR brass                                                                    |
|                 | Internal                       | Stainless steel                                                                     | Stainless steel                                                                     | Stainless steel                                                                     | Stainless steel                                                                       | Stainless steel                                                                       | Stainless steel                                                                       |
|                 | Seal material                  | FKM                                                                                 | EPDM or FKM                                                                         | EPDM, NBR or FKM                                                                    | FKM                                                                                   | EPDM or FKM                                                                           | EPDM or FKM                                                                           |

\* Only EPDM versions in Normally Closed (NC) valves are WRAS approved. GL = Germanischer Lloyd. WRAS = Water Regulations Advisory Scheme. VA = Water supply and drainage of ETA Denmark. DNV = Det Norske Veritas. SVGW = Schweizerischer Verein des Gas- und Wasserfaches.

|  |                                    |                   |                   |                   |                              |                            |                                      |                                             |
|------------------------------------------------------------------------------------|------------------------------------|-------------------|-------------------|-------------------|------------------------------|----------------------------|--------------------------------------|---------------------------------------------|
| EV220B 15-50<br>2/2-way                                                            | EV220B 65-100<br>2/2-way           | EV250B<br>2/2-way | EV224B<br>2/2-way | EV225B<br>2/2-way | EV260B 2-way<br>proportional | AVTA 2-way<br>proportional | BVTS 2-way<br>proportional           | AV210                                       |
|                                                                                    |                                    |                   |                   |                   |                              |                            |                                      |                                             |
|                                                                                    |                                    |                   |                   |                   |                              |                            |                                      |                                             |
|                                                                                    |                                    |                   |                   |                   |                              |                            |                                      |                                             |
|                                                                                    |                                    |                   |                   |                   |                              |                            |                                      |                                             |
| ✓                                                                                  | ✓                                  | ✓                 | ✓                 |                   | ✓                            | ✓                          | ✓                                    | ✓                                           |
| ✓                                                                                  | ✓                                  | ✓                 | ✓                 | ✓                 | ✓                            | ✓                          | ✓                                    | ✓                                           |
| ✓                                                                                  | ✓                                  | ✓                 | ✓                 |                   | ✓                            |                            |                                      |                                             |
|                                                                                    |                                    |                   |                   |                   |                              |                            | Back-burning and overheat protection |                                             |
| G ½ – G 2                                                                          | Flange connections:<br>2, 3 and 4" | G ¾ – G 1         | G ½ – G 1         | G ¼ – G 1         | G 1/4 – G ¾                  | G ¾ – G 1                  | G ¾                                  | G ¾ – G 2                                   |
| NC or NO                                                                           | NC                                 | NC or NO          | NC or NO          | NC                | NC                           | Thermostatic               | Thermostatic                         | NC or NO                                    |
| 15 – 50                                                                            | 65 – 100                           | 10 – 22           | 15 – 25           | 6 – 25            | 6 – 20                       | 10 – 25                    | 18                                   | 15 – 50                                     |
| 0.3 – 16                                                                           | 0.25 – 10                          | 0 – 10            | 0.3 – 40          | 0.2 – 10          | 0.5 – 10                     | 0 – 10                     | 0 – 10                               | 0 – 16                                      |
| 140 °C                                                                             | 90 °C                              | 140 °C            | 60 °C             | 185 °C            | 80 °C                        | 130 °C                     | 110 °C                               | 180 °C                                      |
| 4 – 40                                                                             | 50 – 130                           | 2.5 – 7           | 4 – 11            | 0.9 – 6           | 0.8 – 5                      | 1.4 – 5.5                  | 2.6                                  | 4.5 – 74                                    |
|                                                                                    |                                    |                   | High pressure     | IP65              |                              |                            | Test function                        | Options: Manual override position indicator |
| GL, WRAS and DNV                                                                   |                                    | WRAS              | GL                |                   |                              |                            | TÜV                                  |                                             |
| Brass, DZR Brass or stainless steel                                                | Cast iron                          | DZR Brass         | Brass             | DZR Brass         | Brass                        | Brass or stainless steel   | DZR brass                            | Gun metal or stainless steel                |
| Stainless steel                                                                    | Stainless steel                    | Stainless steel   | Stainless steel   | Stainless steel   | Stainless steel              | Brass or stainless steel   | Stainless steel                      | Stainless steel                             |
| EPDM, FKM or NBR                                                                   | EPDM or NBR                        | EPDM or FKM       | NBR               | PTFE and AFLAS    | FKM and PTFE                 | EPDM or NBR                | EPDM or NBR                          | PTFE                                        |

# Media list for Danfoss Industrial Valves

| Medium                                                    | Temperature/<br>Concentration |       | Brass | DZR-brass<br>Bronze<br>RG5 |
|-----------------------------------------------------------|-------------------------------|-------|-------|----------------------------|
|                                                           |                               |       |       |                            |
| Ammonia                                                   |                               |       | -     | -                          |
| Brine (Potassium formate; without oxygen, closed systems) | -20 °C                        |       | ✓     | ✓✓                         |
| Butane                                                    | 20 °C                         |       | ✓✓    | ✓✓                         |
| Chloric acid HCl                                          |                               |       | -     | -                          |
| Citric acid                                               |                               |       | -     | -                          |
| CO <sub>2</sub>                                           |                               |       | ✓✓    | ✓✓                         |
| Compressed air                                            |                               |       | ✓✓    | ✓✓                         |
| De-ionized water                                          | 80 °C                         |       | -     | ✓✓                         |
| Fresh Water                                               | 100 °C                        |       | ✓✓    | ✓✓                         |
| Glycol                                                    | 80 °C                         | 100 % | ✓     | ✓✓                         |
| Methane                                                   | 20 °C                         |       | ✓✓    | ✓✓                         |
| NaOH                                                      | 50 °C                         | 40 %  | -     | ✓                          |
| Natural Gas (dry)                                         | 40 °C                         |       | ✓✓    | ✓✓                         |
| Nitrogen (Air)                                            |                               |       | ✓✓    | ✓✓                         |
| Oil; Animal                                               |                               |       | ✓✓    | ✓✓                         |
| Oil; Mineral                                              |                               |       | ✓✓    | ✓✓                         |
| Oil; Vegetable                                            |                               |       | ✓✓    | ✓✓                         |
| Oxygen                                                    |                               |       | ✓     | ✓✓                         |
| Ozone                                                     |                               |       | ✓     | ✓✓                         |
| Propane                                                   | 20 °C                         |       | ✓✓    | ✓✓                         |
| Salt water (sea water)                                    | 20 °C                         | 2 %   | -     | ✓                          |
| Steam                                                     | 185 °C                        |       | -     | ✓✓                         |
| Sulphuric acid H <sub>2</sub> SO <sub>4</sub>             |                               |       | -     | -                          |
| Water electrical conduction < 20 µ-siemens                | 60 °C                         |       | -     | ✓                          |
| Water electrical conduction > 500 µ-siemens               | 60 °C                         |       | ✓✓    | ✓✓                         |
| Water electrical conduction between 20 and 500 µ-siemens  | 60 °C                         |       | ✓     | ✓✓                         |

|    |   |                        |
|----|---|------------------------|
| ✓✓ | = | Suitable               |
| ✓  | = | Suitable in most cases |
| -  | = | Not recommendable      |

| Body material                              |                                                                                |           | Seal material |     |     |      |
|--------------------------------------------|--------------------------------------------------------------------------------|-----------|---------------|-----|-----|------|
| Stainless Steel<br>AISI 316 /<br>EN 1.44xx | Stainless Steel<br>AISI 430 /<br>EN 1.41xx<br>armature/spring<br>steel quality | Cast Iron | EPDM          | NBR | FKM | PTFE |
| ✓✓                                         | ✓✓                                                                             | -         | ✓✓            | ✓   | -   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | ✓✓            | ✓   | -   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | -             | ✓✓  | ✓✓  | ✓✓   |
| -                                          | -                                                                              | -         | -             | -   | ✓   | ✓✓   |
| ✓                                          | -                                                                              | -         | ✓✓            | ✓✓  | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | ✓✓            | ✓✓  | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | -             | ✓✓  | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | -         | ✓✓            | ✓✓  | ✓   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | ✓✓            | ✓   | ✓   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | ✓✓            | ✓   | -   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | -             | ✓✓  | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | -         | ✓✓            | -   | -   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | -             | ✓   | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | ✓✓            | ✓✓  | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | -             | ✓   | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | -             | ✓   | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | ✓✓            | ✓   | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | ✓✓            | -   | ✓   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | ✓✓            | -   | -   | ✓    |
| ✓✓                                         | ✓✓                                                                             | ✓✓        | -             | ✓✓  | ✓✓  | ✓✓   |
| ✓                                          | -                                                                              | -         | ✓✓            | ✓✓  | ✓   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | -         | -             | -   | -   | ✓✓   |
| -                                          | -                                                                              | -         | ✓             | -   | ✓   | ✓✓   |
| ✓✓                                         | ✓                                                                              | -         | ✓✓            | ✓✓  | ✓   | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | ✓         | ✓✓            | ✓✓  | ✓✓  | ✓✓   |
| ✓✓                                         | ✓✓                                                                             | -         | ✓✓            | ✓✓  | ✓   | ✓✓   |

# EV220B, Solenoid valves

EV220B 15 – EV220B 50 is a universal indirect servo-operated 2/2-way solenoid valve program. Valve body in brass, dezincification resistant brass and stainless steel ensures that a broad variety of application can be covered.

Built-in pilot filter as standard, adjustable closing time and enclosures up to IP67 ensures optimal performance even under critical working conditions.

## Features EV220B



Wide coil range up to IP67

High capacity across the entire pressure range

Broad temperature and material range

Effective against water hammer

High capacity across the entire pressure range

Insensitive to dirt

## Facts

### Benefit:

- 2/2-way
- Servo-operated
- DN 15 – DN 50
- Valve body available in brass, DZR brass, gun metal or stainless steel
- NC and NO versions
- ISO 228/1 or NPT thread connection (EVSI and EVSI-U)
- Built in filter for protection of pilot system
- Water hammer damped
- Adjustable closing time available
- Nominal pressure PN 16
- Wetted parts: brass, stainless steel, copper, tin, EPDM, FKM or NBR rubber



# Technical data and ordering

## EV220B

### Servo-operated 2/2-way solenoid valves

| Connection ISO228/1 | Seal material | Orifice size | Kv - value (m <sup>3</sup> /h) | Differential pressure | Media temperature | Code no. |
|---------------------|---------------|--------------|--------------------------------|-----------------------|-------------------|----------|
| G ½                 | EPDM          | 10           | 1.5                            | 0.1 - 20              | -30 - 100         | 032U1251 |
|                     | EPDM          | 12           | 2.5                            | 0.3 - 10              | -30 - 100         | 032U1256 |
|                     | EPDM          | 15           | 4                              | 0.3 - 16              | -30 - 120         | 032U7115 |
|                     | NBR           | 15           | 4                              | 0.3 - 16              | -10 - 90          | 032U7170 |
| G ¾                 | EPDM          | 20           | 8                              | 0.3 - 16              | -30 - 120         | 032U7120 |
|                     | NBR           | 20           | 7.5                            | 0.3 - 16              | -10 - 90          | 032U7171 |
| G 1                 | EPDM          | 25           | 11                             | 0.3 - 16              | -30 - 120         | 032U7125 |
| G 1 ¼               | EPDM          | 32           | 18                             | 0.3 - 16              | -30 - 120         | 032U7132 |
| G 1 ½               | EPDM          | 40           | 24                             | 0.3 - 16              | -30 - 120         | 032U7140 |
| G 2                 | EPDM          | 50           | 40                             | 0.3 - 16              | -30 - 120         | 032U7150 |

EPDM is recommended for water.

NBR is suitable for oil, water and air.

## EV220B

### Coils & accessories

| Type       | Description          | Code no. |
|------------|----------------------|----------|
| Coil       | BA024A 24V 50HZ      | 042N7508 |
|            | BB024D 24V DC        | 042N7457 |
|            | BB230CS 230V 50/60HZ | 018F7363 |
|            | BA024D 24V DC        | 042N7551 |
|            | BA240A 240V 50HZ     | 042N7502 |
| Cable Plug | PG11                 | 042N0156 |

## EV220B

### Spares

| Type      | Seal Material | Code no. |
|-----------|---------------|----------|
| EV220B 15 | EPDM          | 032U1071 |
| EV220B 15 | FKM           | 032U1072 |
| EV220B 25 | EPDM          | 032U1075 |

Contents for Kit:

Locking button and nut for the coil

Armature with valve plate and spring

O-ring for the armature tube

2 O-rings for the equalizing orifice

Spring and diaphragm

2 O-rings for the pilot system

# Overview of Industrial switches

| Pressure switches |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                          |
|-------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|
| Type              |  |  |  |   |  |  |                                          |
| Segments          | Marine and railway equipment                                                      |  |  |  |                                                                                     |                                                                                     |                                          |
|                   | Industrial boilers and boiler room equipment                                      |  |  |                                                                                     |  |                                                                                     |                                          |
|                   | Autoclaves and sterilisers                                                        |  |  |                                                                                     |  |                                                                                     |                                          |
|                   | Water pumps and air compressors                                                   |  |                                                                                   |                                                                                     |  |  |                                          |
|                   | Hydraulic equipment                                                               |  |  |  |  |                                                                                     |                                          |
|                   | Windmills                                                                         |                                                                                   |  |  |                                                                                     |                                                                                     |                                          |
| Characteristics   | Setting range                                                                     | -1 – 30 bar                                                                       | 0.03 – 40 bar                                                                     | 0 – 60 bar                                                                          | 0 – 60 bar                                                                          | -0.2 – 28 bar                                                                       | 2 – 20 bar                               |
|                   | Contact system                                                                    | SPDT                                                                              | SPDT                                                                              | SPDT                                                                                | SPDT                                                                                | SPDT                                                                                | TPST and SPST                            |
|                   | Electrical rating AC-3<br>Electrical rating AC-15                                 | 4 A, 400 V<br>3 A, 400 V                                                          | 3 A, 250 V<br>2 A, 250 V                                                          | 6 A, 400 V<br>4 A, 400 V                                                            | -<br>0.1 A, 220 V                                                                   | 16/ 6 A, 400 V<br>10/4 A, 400 V                                                     | 12 A, 400 V<br><i>industrial engines</i> |
|                   | Electrical connection                                                             | Screw terminals                                                                   | DIN plug                                                                          | Screw terminals                                                                     | Screw terminals                                                                     | Screw terminals                                                                     | Screw terminals                          |
|                   | Contact material                                                                  | Silver or Gold                                                                    | Silver or Gold                                                                    | Gold                                                                                | Silver                                                                              | Silver or Gold                                                                      | Silver                                   |
|                   | Differential                                                                      | Adjustable                                                                        | Adjustable                                                                        | Adjustable                                                                          | Fixed                                                                               | Adjustable                                                                          | Adjustable                               |
|                   | Special approvals                                                                 | Marine, TÜV                                                                       | TÜV                                                                               | Marine, UL                                                                          | Marine                                                                              | Marine                                                                              |                                          |
|                   | Degree of enclosure                                                               | IP66 or IP54                                                                      | IP65                                                                              | IP67                                                                                | IP67                                                                                | IP30, IP44 or IP55                                                                  | IP43 or IP55                             |
|                   | Design                                                                            | Box industrial                                                                    | Box industrial                                                                    | Box heavy duty                                                                      | Box heavy duty                                                                      | Box                                                                                 | Box                                      |
|                   | Adjustable neutral zone                                                           | Yes                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                          |

 *Railways and marine*  
 *Electric power and wind turbines*

 *Industrial hydraulics, air compressors and water pumps*  
 *Boiler and boiler room equipment, sterilisers and autoclaves*

| Differential pressure switches                                                     |                                                                                   |                                                                                   |                                                                                    | Temperature switches                                                                 |                                                                                    |                                                                                      |                                                                                      |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|   |  |  |   |     |  |   |   |
| MBC                                                                                | RT                                                                                | CAS                                                                               | MBC                                                                                | RT                                                                                   | KPS                                                                                | KP                                                                                   | MBC                                                                                  |
|   |  |  |   |   |                                                                                    |   |                                                                                      |
|   |                                                                                   |                                                                                   |                                                                                    |     |                                                                                    |   |                                                                                      |
|   |                                                                                   |                                                                                   |                                                                                    |     |                                                                                    |   |                                                                                      |
|   |                                                                                   |  |   |     |                                                                                    |   |   |
|   |                                                                                   |                                                                                   |   |                                                                                      |                                                                                    |   |   |
|  |                                                                                   |                                                                                   |  |  |                                                                                    |  |  |
| -0.2 – 400 bar                                                                     | 0 – 11 bar                                                                        | 0.2 – 2.5 bar                                                                     | 0.3 – 5 bar                                                                        | -60 – 300 °C                                                                         | -10 – 200 °C                                                                       | 0 – 150 °C                                                                           | -10 – 200 °C                                                                         |
| SPDT                                                                               | SPDT                                                                              | SPDT                                                                              | SPDT                                                                               | SPDT                                                                                 | SPDT                                                                               | SPDT                                                                                 | SPDT                                                                                 |
| 3 A, 250 V<br>0.5 A, 250 V                                                         | 4 A, 400 V<br>3 A, 400 V                                                          | -<br>0.1 A, 220 V                                                                 | 3 A, 250 V<br>0.5 A, 250 V                                                         | 4 A, 400 V<br>3 A, 400 V                                                             | 6 A, 400 V<br>4 A, 400 V                                                           | 16 A, 400 V<br>10 A, 400 V                                                           | 3 A, 250 V<br>0.5 A, 250 V                                                           |
| DIN plug                                                                           | Screw terminals                                                                   | Screw terminals                                                                   | DIN plug                                                                           | Screw terminals                                                                      | Screw terminals                                                                    | Screw terminals                                                                      | DIN plug                                                                             |
| Silver                                                                             | Silver or Gold                                                                    | Silver                                                                            | Silver                                                                             | Silver or Gold                                                                       | Gold                                                                               | Silver                                                                               | Silver                                                                               |
| Fixed                                                                              | Fixed                                                                             | Fixed                                                                             | Fixed                                                                              | Adjustable                                                                           | Adjustable                                                                         | Adjustable                                                                           | Fixed                                                                                |
| Marine                                                                             | Marine                                                                            | Marine                                                                            | Marine                                                                             | Marine                                                                               | Marine, UL                                                                         | Marine, UL                                                                           | Marine                                                                               |
| IP65                                                                               | IP66                                                                              | IP67                                                                              | IP65                                                                               | IP66 or IP54                                                                         | IP67                                                                               | IP30, IP44 or IP55                                                                   | IP65                                                                                 |
| Compact                                                                            | Box industrial                                                                    | Box heavy duty                                                                    | Compact                                                                            | Box industrial                                                                       | Box heavy duty                                                                     | Box                                                                                  | Compact                                                                              |
| Yes                                                                                |                                                                                   |                                                                                   |                                                                                    | Yes                                                                                  |                                                                                    |                                                                                      |                                                                                      |

# KP, Pressure switch

KP pressure switches are designed to protect refrigeration systems from excessively high discharge pressures, excessively low suction pressures, to start / stop compressors or to operate fans of aircooled condensers.

The enhanced contact system for 16 A makes it possible to operate electrical motors up to 2 kW directly, without the use of contactors. KP pressure switches are available in IP30 and IP44 enclosures. Versions of KP are available for applications with HCFC and non-flammable HFC refrigerants, ammonia or hydrocarbons.

## Features KP



Range and differential easily adjustable with screwdriver

Manual trip function

Bellows without any welding points. Fail safe bellows versions available

Various pressure connections

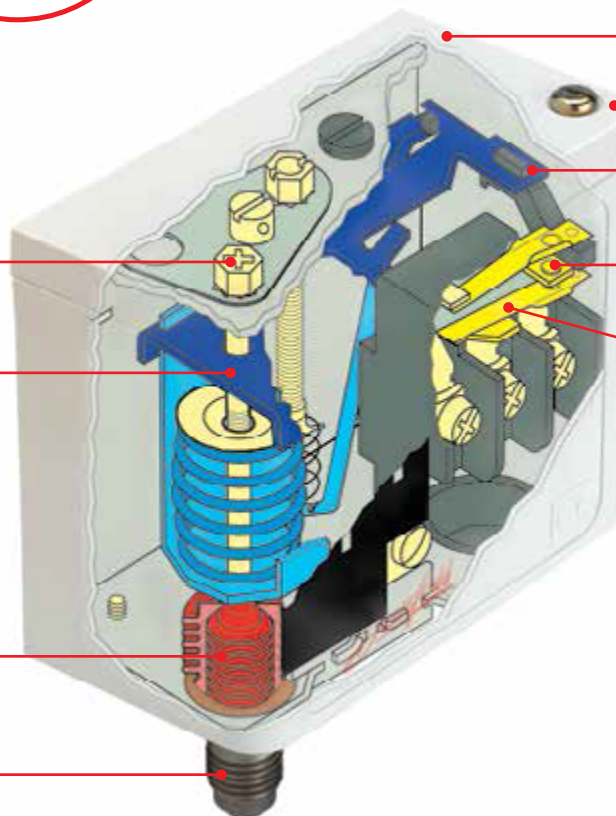
Available with manual and automatic reset

Compact design

Vibration proof

High contact rating:  
AC-1 / AC-3: 16 A @ 400 V  
AC-15: 10 A @ 400 V

Reliable and fully visible SPDT contact system



## Facts

### Applications:

- Food Retail
- Heavy Commercial Refrigeration
- Light Commercial Refrigeration
- Commercial Air Conditioning
- Food Processing
- Storage

### Refrigerants:

- R All HCFC and non-flammable HFC refrigerants

### Working range:

- -0.9 – 46.5 bar / -1.3 – 674 psi

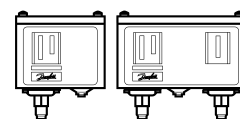
### Benefit:

- High reliability both electrically and mechanically-a KP switch can be connected directly to a single-phase AC motor of up to approximately 2 kW or installed in the control circuit of DC motors and large AC motors
- Versions with IP30 enclosure rating can be updated to IP44 or IP55 enclosure rating using top plate (IP44) or IP55 enclosure (IP55), available as accessories

# Technical data and ordering

## KP

### Pressure Control for Fluorinated refrigerants



| Pressure | Type  | Low pressure (LP)      |                               | High pressure (HP)     |                               | Reset             |                    | Contact system | Code no.           |
|----------|-------|------------------------|-------------------------------|------------------------|-------------------------------|-------------------|--------------------|----------------|--------------------|
|          |       | Regulating range (bar) | Differential $\Delta p$ (bar) | Regulating range (bar) | Differential $\Delta p$ (bar) | Low pressure (LP) | High pressure (HP) |                | 1/4 in. 6 mm Flare |
| Low      | KP 1  | -0.2 - 7.5             | 0.7 - 4                       | -                      | -                             | Aut.              | -                  | SPDT           | 060-110191         |
| Low      | KP 1  | -0.9 - 7               | 0.7                           | -                      | -                             | Man.              | -                  | SPDT           | 060-110391         |
| High     | KP 5  | -                      | -                             | 8 - 32                 | 1.8 - 6.0                     | -                 | Aut.               | SPDT           | 060-117191         |
| High     | KP 5  | -                      | -                             | 8 - 32                 | 3                             | -                 | Man.               | SPDT           | 060-117391         |
| Dual     | KP 15 | -0.2 - 7.5             | 0.7 - 4                       | 8 - 32                 | 4                             | Aut.              | Aut.               | SPDT + LP      | 060-124191         |
| Dual     | KP 15 | -0.2 - 7.5             | 0.7 - 4                       | 8 - 32                 | 4                             | Aut.              | Man.               | SPDT + LP      | 060-124391         |
| Dual     | KP 15 | -0.2 - 7.5             | 0.7 - 4                       | 8 - 32                 | 4                             | Aut.              | Man.               | SPDT + LP+HP   | 060-126491         |
| Dual     | KP 15 | -0.2 - 7.5             | 0.7 - 4                       | 8 - 32                 | 4                             | Conv.             | Conv.              | SPDT + LP+HP   | 060-115491         |

## KP

### Parts & accessories

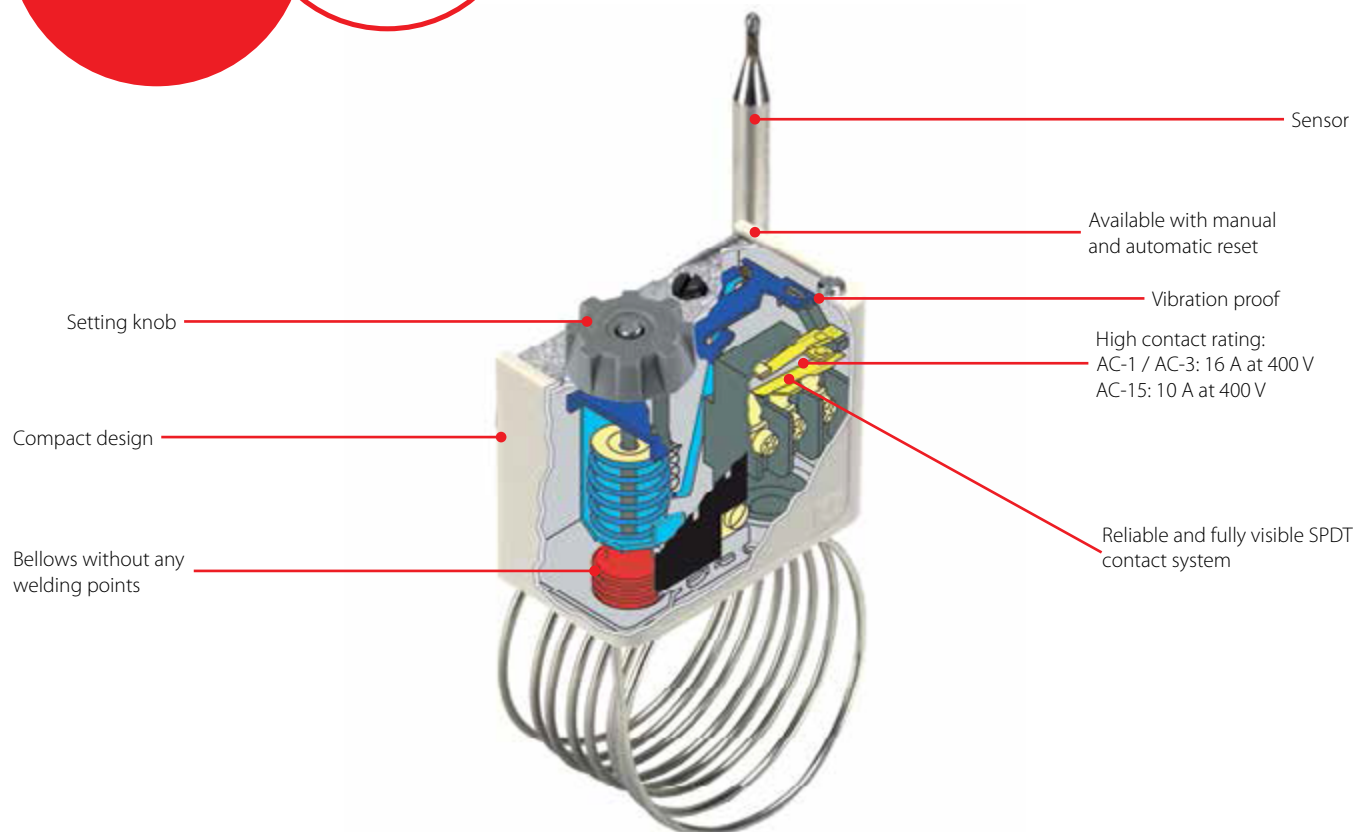
| Type                                              | Description                                   | Code no.   |
|---------------------------------------------------|-----------------------------------------------|------------|
| Mounting Brackets                                 | Wall Bracket Flat                             | 060-105566 |
|                                                   | Angle Bracket                                 | 060-105666 |
| Capillary (inc 1/4" flare nuts)                   | 1 metre capillary with flare nuts             | 060-019166 |
| IP55 Enclosure                                    | Single for KP1, KP5, KPR5                     | 060-033066 |
|                                                   | Double for KP15, KP17                         | 060-035066 |
| OEM KP Controls (including capillary and bracket) | KP1 Auto incl. capillary and angle bracket    | 060-110566 |
|                                                   | KP15 A/Auto incl. capillary and angle bracket | 060-000766 |
| KPR5 HP Control (condensor fan control)           | KPR5 Auto 1/4 flare                           | 060-117466 |
| KP6W 8- 42 bar range (CO2 & R410A)                | KP6W Auto 1/4 flare 8 – 42 bar, IP44          | 060-519091 |
|                                                   | KP6B Manual 1/4 flare 8 – 42 bar, IP30        | 060-519191 |

# KP, Thermostat

KP thermostats are single-pole, double-throw (SPDT) temperature-operated electric switches. KP thermostats can be connected directly to a single-phase AC motor of up to approximately 2 kW or installed in the control circuit of DC motors and large AC motors.

KP thermostats are used primarily for regulation, but also for safety monitoring systems, and are available with vapour charge or with adsorption charge. With vapour charge the differential is very small. KP thermostats with adsorption charge are widely used to give frost protection.

## Features KP



## Facts

### Applications:

- Frost protection
- Defrost control
- Case and Room control

### Benefit:

- Available with capillary sensor, air sensor or cylindrical pocket sensor
- Different sensing elements - As experts in charging technologies Danfoss offers temperature switches that operate in a wide temperature range
- Available with vapour charge or with adsorption charge

# Technical data and ordering

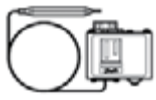
## KP

### Temperature Control - Thermostats

| Charge     | Type  | Sensor type | Setting range (°C) | Differential Δt   |                    | Reset | Max. Sensor temp. HP | Capillary tube length | Code no.   |
|------------|-------|-------------|--------------------|-------------------|--------------------|-------|----------------------|-----------------------|------------|
|            |       |             |                    | Lowest temp. (°C) | Highest temp. (°C) |       | (°C)                 | (m)                   |            |
| Vapour     | KP 61 | A           | -30 – 15           | 5.5 – 23          | 1.5 – 7            | Aut.  | 120                  | 2                     | 060L110066 |
|            | KP 68 | C 1         | -5 – 35            | 4.5 – 25          | 1.8 – 7            | Aut.  | 120                  | -                     | 060L111166 |
|            | KP 69 | B           | -5 – 35            | 4.5 – 25          | 1.8 – 7            | Aut.  | 120                  | 2                     | 060L111266 |
| Absorbtion | KP 71 | E 2         | -5 – 20            | 3 – 10            | 2.2 – 9            | Aut.  | 80                   | 2                     | 060L111366 |
|            | KP 73 | E 1         | -25 – 15           | 12 – 70           | 8 – 25             | Aut.  | 80                   | 2                     | 060L111766 |
|            | KP 73 | D 1         | -25 – 15           | 3.5 – 20          | 3.25 – 18          | Aut.  | 80                   | 2                     | 060L114366 |
|            | KP 77 | E 3         | 20 – 60            | 3.5 – 10          | 3.5 – 10           | Aut.  | 130                  | 2                     | 060L112166 |

## KP

### Thermostat sensor types

| A                                                                                  | B                                                                                  | C                                                                                  | D                                                                                                                                      | E                                                                                                   | F                                                                                    |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |  |                                                      |                 |  |
| Straight capillary tube                                                            | ø9.5 x 70 mm remote air coil                                                       | C1: ø40 x 30 mm air coil<br>C2: ø25 x 67 mm air coil<br>(integral with thermostat) | D1: ø10 x 85 mm double contact remote sensor<br>D2: ø16 x 170 mm double contact remote sensor<br>Note! Cannot be used in sensor pocket | E1: ø6.4 x 95 mm remote sensor<br>E2: ø9.5 x 115 mm remote sensor<br>E3: ø9.5 x 85 mm remote sensor | ø25x125 mm remote duct coil                                                          |

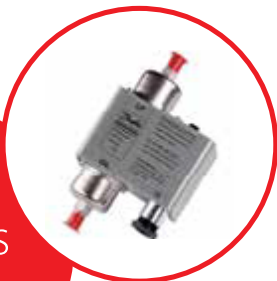
# MP, Differential pressure switch

MP 54 and MP 55 oil differential pressure switches are used as safety switches to protect refrigeration compressors against low lubricating oil pressure. If the oil pressure fails, the oil differential pressure switch stops the compressor after a certain time period.

MP 54 has a fixed differential pressure setting. It also incorporates a thermal time relay with a fixed release time setting.

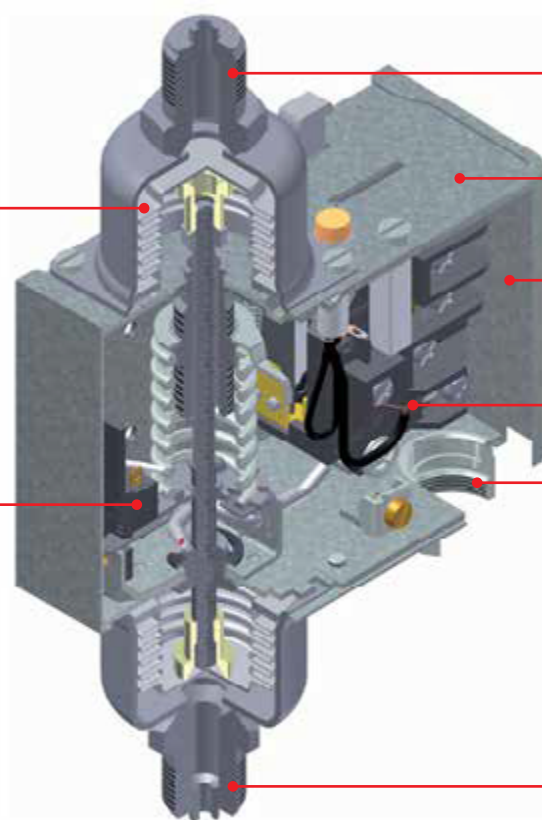
MP 55 and MP 55A have adjustable differential pressure and are available both with and without thermal time relay.

## Features MP



Dedicated for wide range of refrigerants

Models with different relay release time



Connection to suction side of refrigeration plant, LP

Versions with adjustable or fixed differential

Electrical connection at the front of the unit

Suitable for both alternating and direct current (AC and DC)

Pg 13.5 screwed cable entry

Connection to pressure side of lubrication system, OIL

## Facts

### Application:

- Food Retail
- Heavy Commercial Refrigeration
- Light Commercial Refrigeration
- Commercial Air Conditioning
- Food Processing and Storage

- Suitable for both alternating and direct current (AC and DC)
- Small contact differential
- Bellows without any welding points, which makes them stress free and completely tight
- Wide regulating range

- Screwed cable entry for cables: 6 – 14 mm diameter
- Electrical connection at the front of the unit
- Wide range of approvals - Danfoss offers a wide range of approvals suited for specific applications and geographical markets



# Technical data and ordering

## MP differential pressure switches for R22, R134a, R404A, R407A, R407C, R407F, R422B, R422D, R448A, R449A, R450A, R452A, R507A, R513A



### Ordering

| Type  | Differential Δp [bar] | Operation range, LP side [bar] | Relay release time [s] | Connection type | Code no.   |
|-------|-----------------------|--------------------------------|------------------------|-----------------|------------|
| MP 54 | 0.65                  | -1 – 12                        | 45                     | 1/4 in Flare    | 060B016691 |
|       | 0.65                  | -1 – 12                        | 90                     | 1/4 in Flare    | 060B016891 |
| MP 55 | 0.3 – 4.5             | -1 – 12                        | 45                     | 1/4 in Flare    | 060B017091 |
|       | 0.3 – 4.5             | -1 – 12                        | 60                     | 1/4 in Flare    | 060B017191 |
|       | 0.3 – 4.5             | -1 – 12                        | 90                     | 1/4 in Flare    | 060B017291 |
|       | 0.3 – 4.5             | -1 – 12                        | 120                    | 1/4 in Flare    | 060B017391 |
|       | 0.3 – 4.5             | -1 – 12                        | 0 <sup>2)</sup>        | 1/4 in Flare    | 060B029991 |

<sup>1)</sup> With glow lamp that remains on during normal operation.

Note: If the operational light goes out, the compressor should not run longer than the release time.

<sup>2)</sup> MP without time relay.

Versions without time relay are for applications where an external time relay is required - perhaps with a different release time than the one specified.

## MP differential pressure switches for R717, R22, R134a, R404A, R407A, R407C, R407F, R422B, R422D, R448A, R449A, R450A, R452A, R507A, R513A



### Ordering

| Type   | Differential Δp [bar] | Operation range, LP side [bar] | Relay release time [s] | Connection type                                | Code no.                 |
|--------|-----------------------|--------------------------------|------------------------|------------------------------------------------|--------------------------|
| MP 55A | 0.3 – 4.5             | -1 – 12                        | 45                     | G 3/8 A supplied with ø6.5 / 10 mm weld nipple | 060B017491               |
|        | 0.3 – 4.5             | -1 – 12                        | 60                     | G 3/8 A supplied with ø6.5 / 10 mm weld nipple | 060B017591               |
|        | 0.3 – 4.5             | -1 – 12                        | 90                     | G 3/8 A supplied with ø6.5 / 10 mm weld nipple | 060B017691               |
|        | 0.3 – 4.5             | -1 – 12                        | 0 <sup>2)</sup>        | G 3/8 A supplied with ø6.5 / 10 mm weld nipple | 060B029891 <sup>2)</sup> |

<sup>1)</sup> With glow lamp that remains on during normal operation.

Note: If the operational light goes out, the compressor should not run longer than the release time.

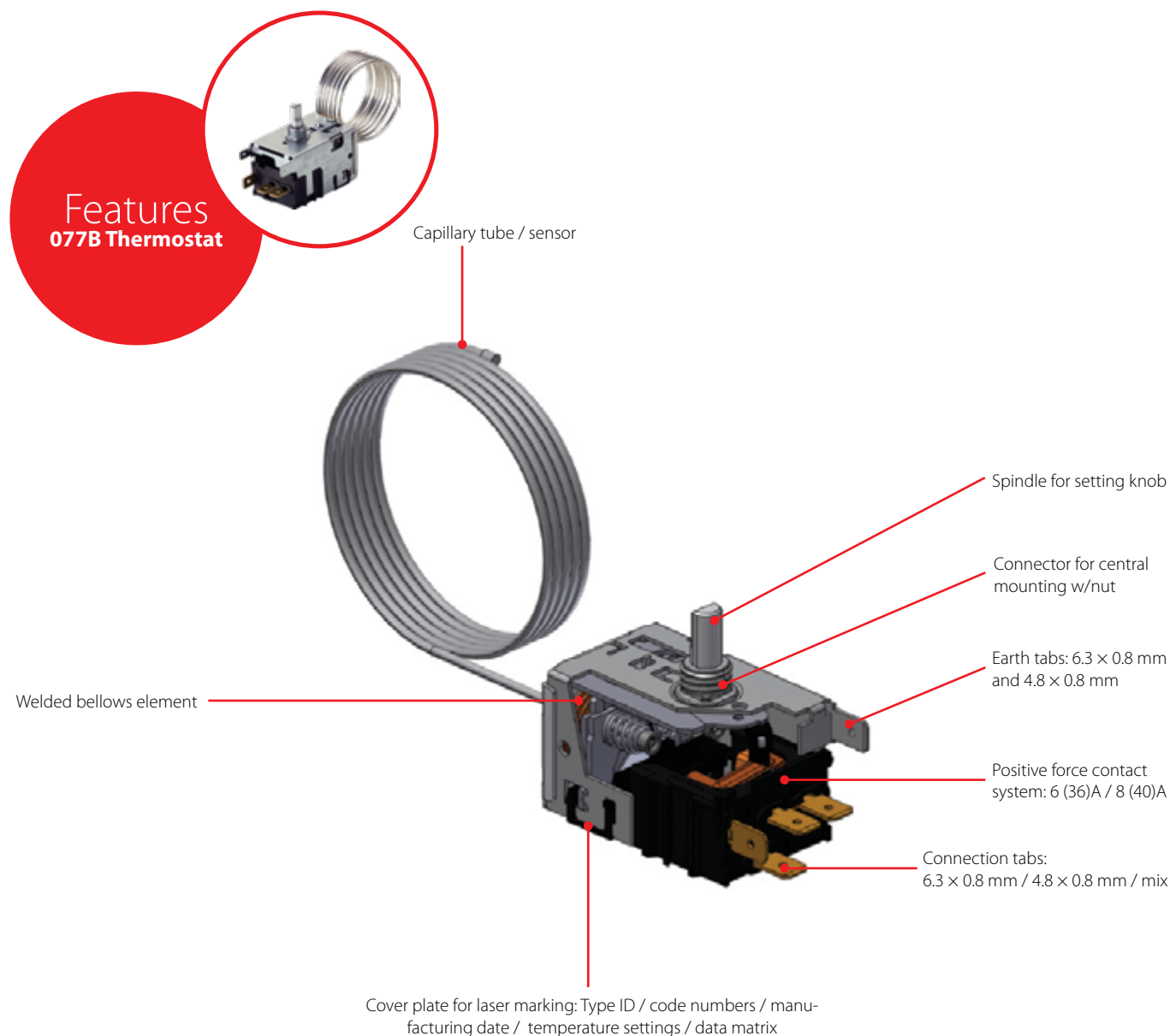
<sup>2)</sup> MP without time relay.

Versions without time relay are for applications where an external time relay is required - perhaps with a different release time than the one specified.

# 077B, Thermostat

077B thermostats have NC (Normally Closed) main contacts; i.e. they cut out the compressor current circuit on decreasing temperature. 077B thermostats are designed to operate at least 300,000 cycles at full load (6/36A and 8/40A respectively); internal quality audits

reinforced product performance by metering over 1,000,000 cycles. 077B thermostats are designed for temperature control in refrigerators and freezers and can be used as an evaporator or a room thermostat.



## Facts

### Application:

- Refrigerators
- Upright and chest freezers
- Liquid and bottle coolers
- Small commercial refrigeration

- World class quality with high CpK values that ensures a long and trouble-free lifetime
- Available with Enclosed Brake Device (EBD) for use in household appliances charged with hydrocarbon gases such as R600a or R290
- Available with a wide range of standard functions, various extra functions and accessories
- Available with 6.3 × 0.8 mm, 4.8 × 0.8 mm terminals or a combination
- Approved by recognized authorities for

specific applications and geographical markets

- Danfoss Appliance Controls are certified by Bureau Veritas in ISO14001, ISO9001 and OHSAS18001

# Technical data and ordering

## 077B

### Service thermostats

| Application                                    | No. | Temperatures (°C)          |                            |        |            | Accessories |            |             |                  |          |             | Capillary tube length (m) | Remarks               | Code no.               |
|------------------------------------------------|-----|----------------------------|----------------------------|--------|------------|-------------|------------|-------------|------------------|----------|-------------|---------------------------|-----------------------|------------------------|
|                                                |     | Warm pos. cut-in / cut out | Cold pos. cut-in / cut out | Signal | Defrosting | Washer      | Small knob | Push-button | Mounting bracket | Seal cap | Small parts |                           |                       |                        |
| Refrigerators                                  | 1   | 2 / -5.5                   | -13.5 / -25 *)             | –      | –          | x           | x          | –           | x                | –        | x           | 1.3                       | –                     | 077B7001 <sup>1)</sup> |
| Refrigerators with pushbutton defrost          | 2   | 0 / -7.5 *)                | -11 / -21                  | –      | 6          | x           | x          | x           | x                | –        | x           | 1.3                       | –                     | 077B7002               |
| Refrigerators with automatic defrost           | 3   | 3.5 / -11                  | 3.5 / -27.5 *)             | –      | –          | x           | x          | –           | x                | –        | x           | 1.6                       | With auxillary switch | 077B7003 <sup>1)</sup> |
| Absorption refrigerators                       | 4   | 3.5 / -1 *)                | -5 / -11                   | –      | –          | x           | x          | –           | x                | –        | x           | 1.5                       | With auxillary switch | 077B7004 <sup>1)</sup> |
| Ice-cream cabinets and freezers without signal | 5   | -7.5 / -15                 | -21 / -32.5 *)             | –      | –          | –           | x          | –           | x                | x        | x           | 2.3                       | –                     | 077B7005 <sup>1)</sup> |
| Freezers with active signal                    | 6   | -10 / -17 *)               | -24 / -34.5                | -6 *)  | –          | –           | x          | –           | x                | x        | x           | 2.3                       | With active signal    | 077B7006 <sup>1)</sup> |
| Freezers with passive signal                   | 7   | -10 / -17 *)               | -24 / -34.5                | -6 *)  | –          | –           | x          | –           | x                | x        | x           | 2.3                       | With passive signal   | 077B7007               |
| Bottle and liquid coolers                      | 8   | 11.5 / 6 *)                | -1 / -8.5                  | –      | –          | x           | x          | –           | x                | x        | x           | 2.0                       | –                     | 077B7008 <sup>1)</sup> |

\*) Adjustment position

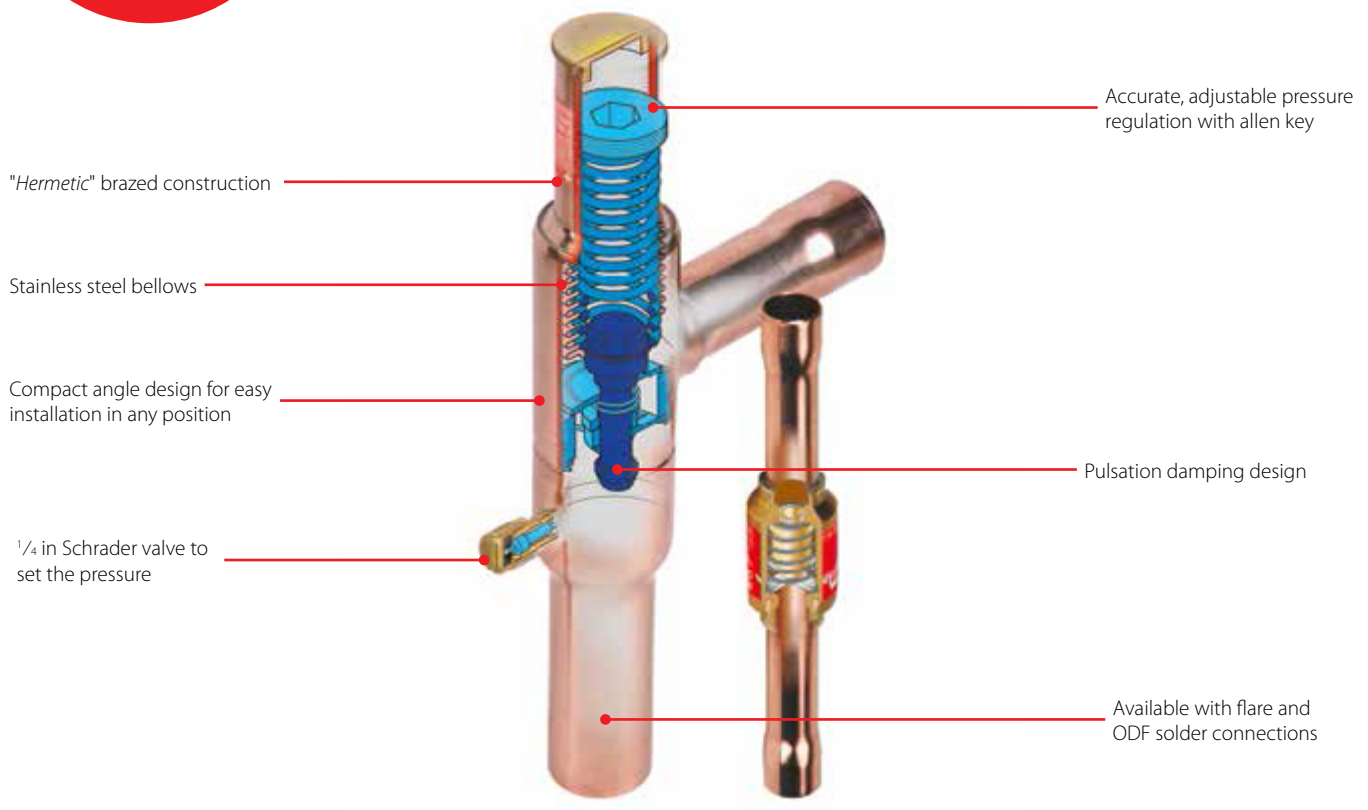
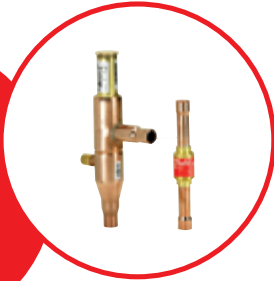
<sup>1)</sup> With EBD (from January 2017)

# KVR / NRD, Condensing pressure regulator / Differential pressure valve

KVR condensing pressure regulator valves can be mounted on either the gas or liquid side of the condenser in refrigeration and air conditioning systems.

They are used to maintain a constant and sufficiently high condensing pressure with systems using air-cooled condensers. KVR condensing pressure regulators can also be used with valve types NRD or KVD to assure that adequate pressure is maintained on the receiver.

## Features KVR / NRD



## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units
- transport refrigeration

### Maximum working pressure:

- KVR: PS / MWP = 28 bar / 406 psig
- NRD: PS / MWP = 46 bar / 667 psig

### Refrigerants:

- |         |           |           |
|---------|-----------|-----------|
| • R1270 | • R448A   | • R449B   |
| • R134a | • R449A   | • R454C   |
| • R22   | • R450A   | • R455A   |
| • R290  | • R452A   | • R515B   |
| • R404A | • R507A   | • R516A   |
| • R407A | • R513A   | • R1234yf |
| • R407C | • R600    | • R454A   |
| • R407F | • R600a   |           |
| • R422B | • R1234ze |           |
| • R422D | • R407H   |           |

### Capacity range:

- 3.4 – 40 TR / 12 - 140 kW based on liquid or hot gas

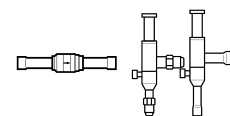
### Benefit:

- The regulators are the most compact on the market
- Reliable design and very easy to adjust
- KVR can be installed either in discharge line or liquid line

# Technical data and ordering

## KVR / NRD

Condensing pressure regulator / Differential pressure valve



| Type   | Evaporator capacity                       |       |                 |       |                                            |       |                 |       | Solder,<br>ODF connection <sup>3)</sup> |    | Code no. |
|--------|-------------------------------------------|-------|-----------------|-------|--------------------------------------------|-------|-----------------|-------|-----------------------------------------|----|----------|
|        | Rated liquid capacity in kW <sup>1)</sup> |       |                 |       | Rated hot gas capacity in kW <sup>1)</sup> |       |                 |       |                                         |    |          |
|        | R22                                       | R134a | R404A /<br>R507 | R407C | R22                                        | R134a | R404A /<br>R507 | R407C | in.                                     | mm |          |
| KVR 12 | 50.4                                      | 47.3  | 36.6            | 54.4  | 13.2                                       | 11.6  | 12              | 14.3  | 1/2                                     | -  | 034L0093 |
| KVR 15 | 50.4                                      | 47.3  | 36.6            | 54.4  | 13.2                                       | 11.6  | 12              | 14.3  | 5/8                                     | 16 | 034L0097 |
| KVR 22 | 50.4                                      | 47.3  | 36.6            | 54.4  | 13.2                                       | 11.6  | 12              | 14.3  | 7/8                                     | 22 | 034L0094 |
| KVR 28 | 129                                       | 121   | 93.7            | 139.3 | 34.9                                       | 30.6  | 34.9            | 37.7  | 1 1/8                                   | -  | 034L0095 |
| KVR 35 | 129                                       | 121   | 93.7            | 139.3 | 34.9                                       | 30.6  | 34.9            | 37.7  | 1 3/8                                   | 35 | 034L0100 |
| NRD    | -                                         | -     | -               | -     | -                                          | -     | -               | -     | 1/2                                     | -  | 020B1132 |

1) Rated capacity is based on:

– evaporating temperature  $t_e = -10\text{ °C} / 14\text{ °F}$

– condensing temperature  $t_c = 30\text{ °C} / 110\text{ °F}$

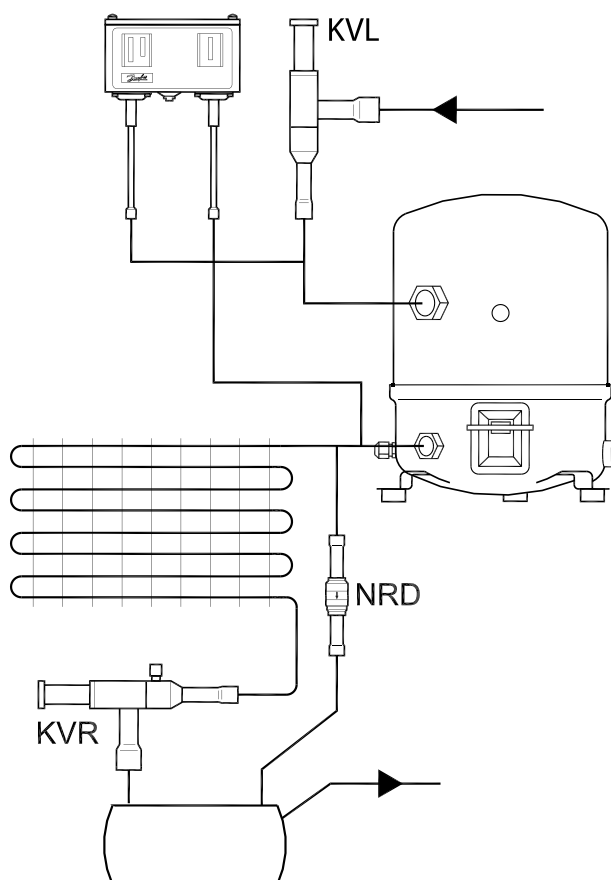
– pressure drop across the valve  $\Delta p = 0.2\text{ bar} / 3\text{ psi}$  for liquid capacity;  $\Delta p = 0.4\text{ bar} / 6\text{ psi}$  for hot gas capacity, offset =  $3\text{ bar} / 45\text{ psi}$

2) KVR are delivered without flare nuts. Separate flare nuts can be supplied: 1/2 in / 12 mm – code no. 011L1103, 3/8 in / 16 mm – code no. 011L1167. 3

3) The connection dimensions chosen must not be too small, as gas velocities in excess of 130 ft/s at the inlet of the regulator can give flow noise.

To select the product for other conditions or refrigerants, use Danfoss Coolselector®2.

## Application example

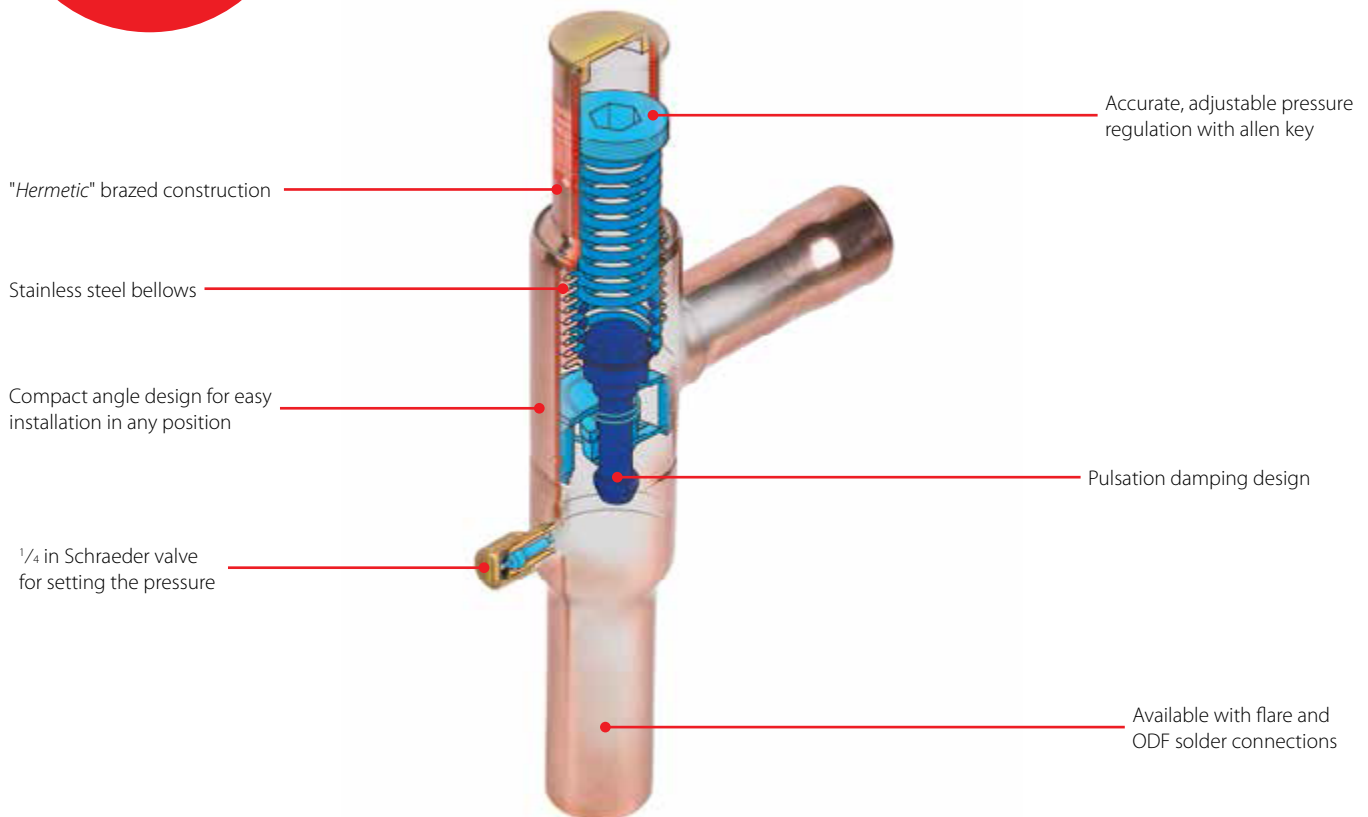


# KVP, Evaporator pressure regulator

KVP evaporating pressure regulators are mounted in the suction line of refrigeration and air conditioning systems. They are used to maintain a constant pressure corresponding to a constant temperature on the evaporator.

They also protect against too low an evaporating pressure by throttling down when the pressure falls below the set value.

## Features KVP



## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units
- Cold rooms
- Display cabinets

### Maximum working pressure:

- 18 bar / 260 psig

### Refrigerants:

- |         |           |           |
|---------|-----------|-----------|
| • R1270 | • R449A   | • R455A   |
| • R134a | • R450A   | • R515B   |
| • R22   | • R452A   | • R516A   |
| • R290  | • R507A   | • R1234yf |
| • R404A | • R513A   | • R454A   |
| • R407A | • R600    |           |
| • R407C | • R600a   |           |
| • R407F | • R1234ze |           |
| • R422B | • R407H   |           |
| • R422D | • R449B   |           |
| • R448A | • R454C   |           |

### Capacity range:

- 0.9 – 2.6 TR / 2.8 – 7.9 kW

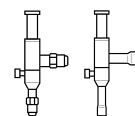
### Benefit:

- Wide capacity and operating range.
- Protection against a too low evaporating pressure: the regulator closes when the pressure in the evaporator falls below the set value
- The KVP can be used to differentiate the evaporating pressures in two or more evaporators in systems with one compressor

# Technical data and ordering

## KVP

### Evaporator pressure regulator



| Type   | Rated capacity in kW <sup>1)</sup> |       |            |       | Rated hot gas capacity in kW <sup>1)</sup> |    | Code no. | Solder, ODF connection |    | Code no. |
|--------|------------------------------------|-------|------------|-------|--------------------------------------------|----|----------|------------------------|----|----------|
|        | R22                                | R134a | R404A/R507 | R407C | in.                                        | mm |          | in.                    | mm |          |
| KVP 12 | 4                                  | 2.8   | 3.6        | 3.7   | 1/2                                        | 12 | 034L0021 | 1/2                    | -  | 034L0023 |
| KVP 15 | 4                                  | 2.8   | 3.6        | 3.7   | 5/8                                        | 16 | 034L0022 | 5/8                    | 16 | 034L0029 |
| KVP 22 | 4                                  | 2.8   | 3.6        | 3.7   | -                                          | -  | -        | 7/8                    | 22 | 034L0025 |
| KVP 28 | 8.6                                | 6.1   | 7.7        | 7.9   | -                                          | -  | -        | 1 1/8                  | -  | 034L0026 |
| KVP 35 | 8.6                                | 6.1   | 7.7        | 7.9   | -                                          | -  | -        | 1 3/8                  | 35 | 034L0032 |

1) Rated capacity is the capacity of the regulator at

– Evaporating temperature  $t_e = -10\text{ }^{\circ}\text{C}$ ,

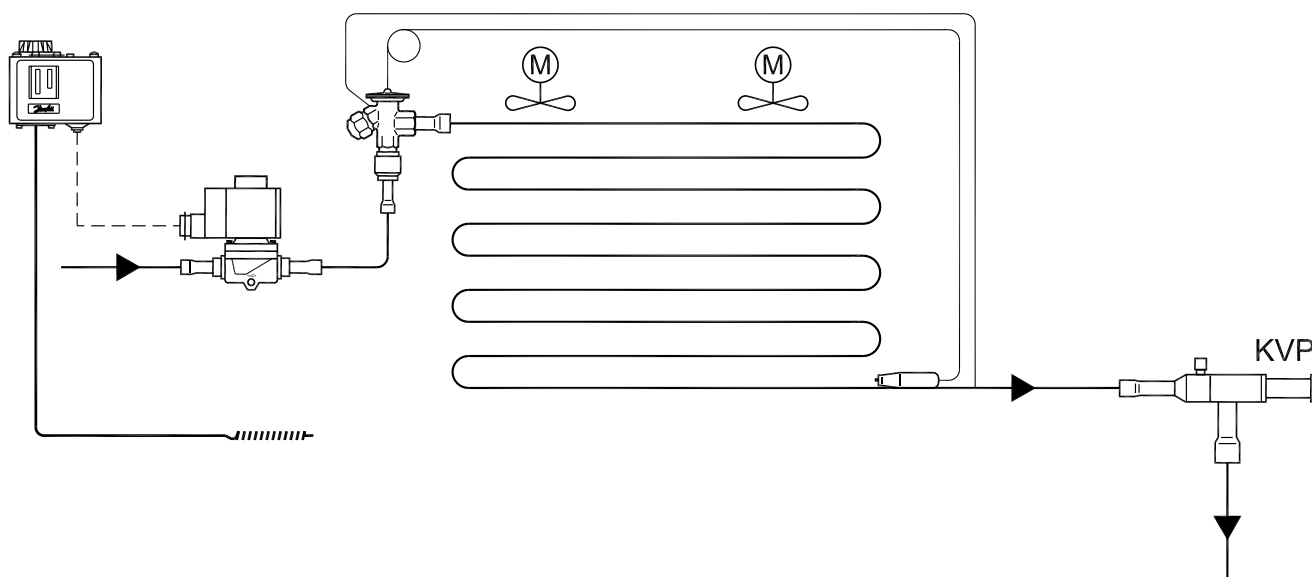
– Condensing temperature  $t_c = +25\text{ }^{\circ}\text{C}$

– Pressure drop in regulator  $\Delta p = 0.2\text{ bar}$ , offset = 0.6 bar

2) Supplied without flare nuts. Separate flare nuts can be supplied:

1/2 in./12 mm, code no. 011L1103, 5/8 in./16 mm, code no. 011L1167.

### Application example

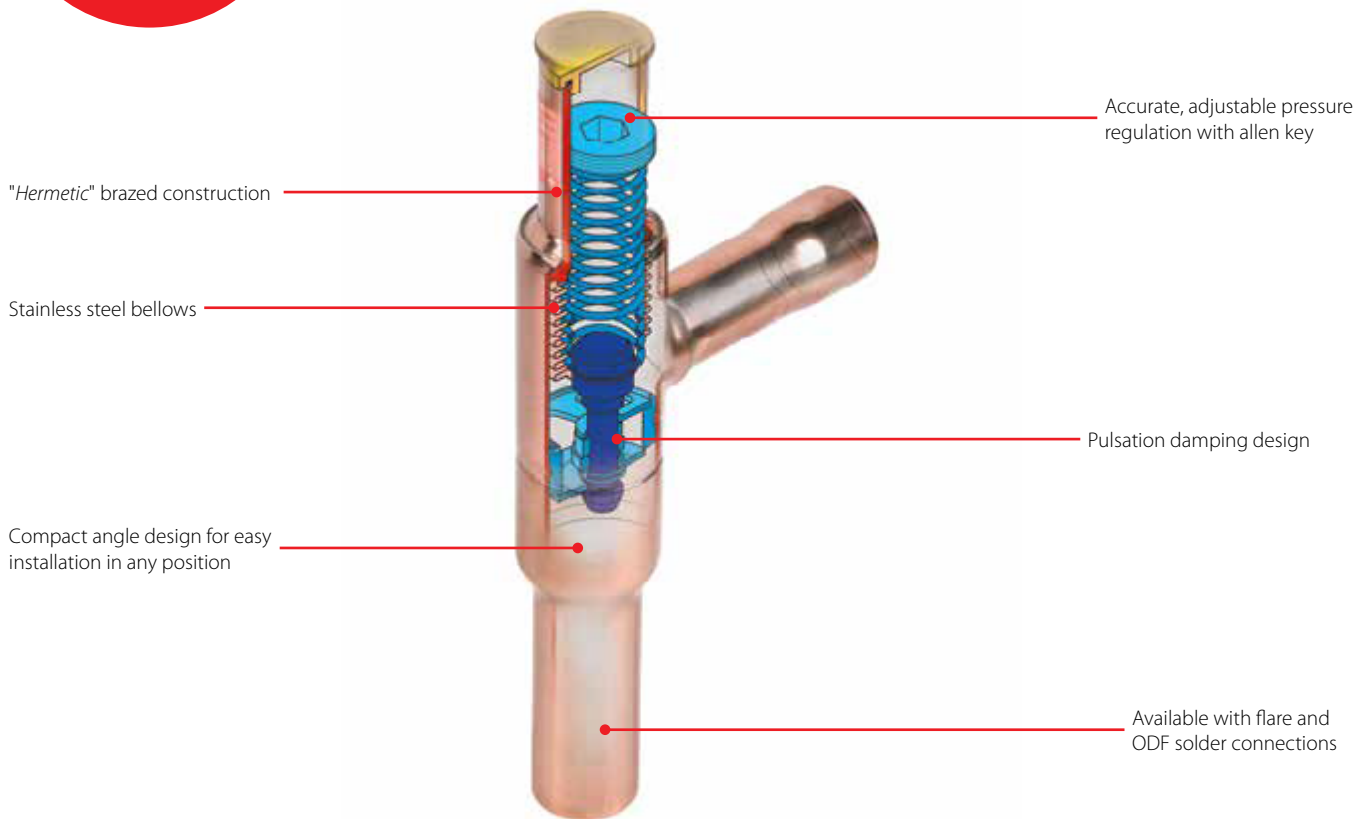


# KVL, Crankcase pressure regulator

KVL crankcase pressure regulators valves are installed in the suction line ahead of the compressor.

KVL protects the compressor motor against overload during start-up after long standstill periods or after defrost periods (high pressure in evaporator).

## Features KVL



## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units
- Transport refrigeration

### Maximum working pressure:

- 18 bar / 260 psig

### Refrigerants:

- |         |           |
|---------|-----------|
| • R1270 | • R507A   |
| • R134a | • R513A   |
| • R22   | • R600    |
| • R290  | • R600a   |
| • R404A | • R1234ze |
| • R407A | • R407H   |
| • R407C | • R449B   |
| • R407F | • R454C   |
| • R422B | • R455A   |
| • R422D | • R515B   |
| • R448A | • R516A   |
| • R449A | • R1234yf |
| • R450A | • R454A   |
| • R452A |           |

### Capacity range:

- 5.3 – 16.4 kW

### Benefit:

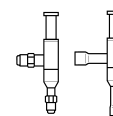
- Wide capacity and operating range
- Protects the compressor against electrical motor overloading



# Technical data and ordering

## KVL

### Crankcase pressure regulator



| Type   | Rated capacity in kW <sup>1)</sup> |       |            |       | Flare connection <sup>2)</sup> | Code no. | Solder, ODF connection | Code no. |
|--------|------------------------------------|-------|------------|-------|--------------------------------|----------|------------------------|----------|
|        | R22                                | R134a | R404A/R507 | R407C | in.                            |          | in.                    |          |
| KVL 12 | 7.1                                | 5.3   | 6.3        | 6.4   | 1/2                            | 034L0041 | 1/2                    | 034L0043 |
| KVL 15 | 7.1                                | 5.3   | 6.3        | 6.5   | 5/8                            | 034L0042 | 5/8                    | 034L0049 |
| KVL 22 | 7.1                                | 5.3   | 6.3        | 6.5   | -                              | -        | 7/8                    | 034L0045 |
| KVL 28 | 17.8                               | 13.2  | 15.9       | 16.4  | -                              | -        | 1 1/8                  | 034L0046 |
| KVL 35 | 17.8                               | 13.2  | 15.9       | 16.4  | -                              | -        | 1 3/8                  | 034L0052 |

1) Rated capacity is the capacity of the regulator at

– Evaporating temperature  $t_e = -10^\circ\text{C}$ ,

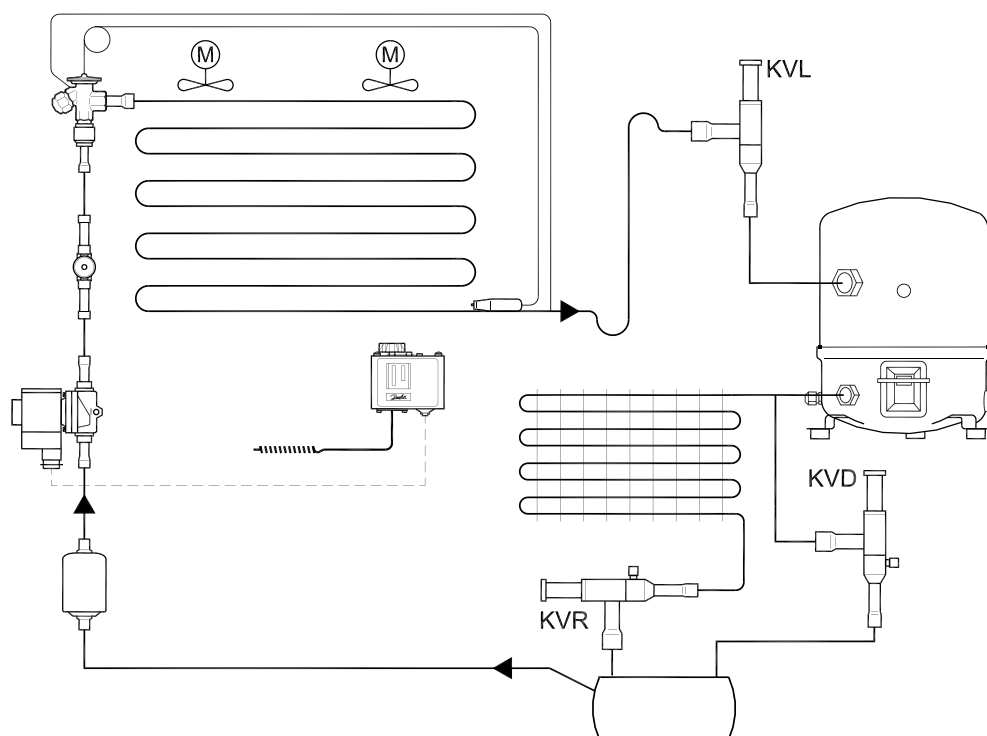
– Condensing temperature  $t_c = +25^\circ\text{C}$

– Pressure drop in regulator  $\Delta p = 0.2$  bar, offset = 0.6 bar

2) Supplied without flare nuts. Separate flare nuts can be supplied:

1/2 in./12 mm, code no. 011L1103, 5/8 in./16 mm, code no. 011L1167.

### Application example

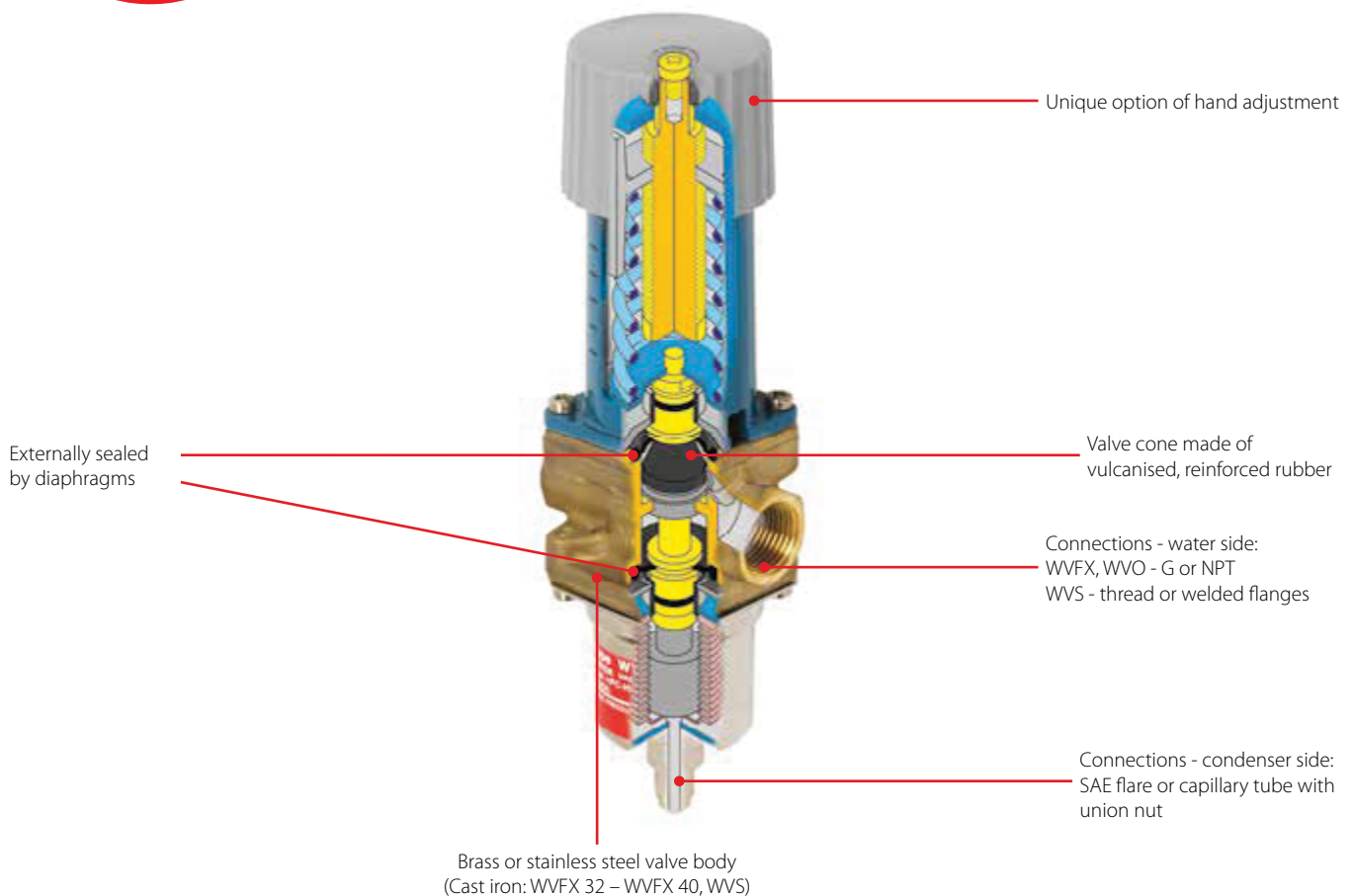


# WVFX / WVO / WVS, Pressure operated water valves

WVFX, WVO and WVS pressure operated water valves are used to regulate the flow of water in refrigeration plant with water-cooled condensers in order to ensure constant proportional regulation of condensing pressure. The water valve modulates the water flow to maintain the condensing pressure at a constant level during operation.

When the refrigeration plant is stopped, the cooling water flow is shut off automatically. Media: fresh water and neutral brine. For use with aggressive media such as sea water, WVFX 15, WVFX 20 and WVFX 25 are available in stainless steel versions.

## Features WVFX / WVO / WVS



## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units
- Other applications with water-cooled condenser
- Ice making machines
- Ice cream machines
- IT cooling
- Water chillers
- WVFX 10 – WVFX 25 can be supplied in stainless steel housing for sea water applications

- Exact pressure control - high accuracy of WVO valves up to 0.2 bar
- Reliable design - factory setting is maintained during whole life cycle
- Insensitive to dirt - fit and forget solution
- High permissible water pressure (PS) = 16 bar - can be used with water towers
- Low flow version - 0.63 m<sup>3</sup>/h (available on request)
- WVFX 10 – WVFX 40 are direct actuated valves
- WVS 32 – WVS 100 are servo-operated valves

- Very wide media temperature range: -25 – 130 °C
- Versions with capillary tube available on request
- Applicable to R22, R1270, R134a, R290, R404A, R407A, R407C, R407F, R410A <sup>1)</sup>, R448A, R449A, R450A, R452A, R507A, R513A, R600, R600a, R717 <sup>2)</sup>
- <sup>1)</sup> High pressure refrigerants version (45.2 MWP) only
- <sup>2)</sup> WVS, WVFX 10 – 25 and WVO with flare connection only; versions with capillary tube or with solder connections are not compatible with R717. WVFX 32 and WVFX 40 are not compatible with R717
- May be used in the following EX range: Category 3 (Zone 2)

# Technical data and ordering



## WVS - Pressure operated water valve parts programme

| Type   | Code no.   |                          |                                                                |                                                          |
|--------|------------|--------------------------|----------------------------------------------------------------|----------------------------------------------------------|
|        | Valve body | Pilot unit <sup>2)</sup> | Pilot unit for R410A and R744 (CO <sub>2</sub> ) <sup>2)</sup> | Servo spring for differential pressure range: 1 - 10 bar |
| WVS 32 | 016D5032   | 016D1017                 | 016D1018                                                       | 016D1327                                                 |
| WVS 40 | 016D5040   | 016D1017                 | 016D1018                                                       | 016D0575                                                 |
| WVS 50 | 016D5050   | 016D1017                 | 016D1018                                                       | 016D0576                                                 |
| WVS 65 | 016D5065   | 016D1017                 | 016D1018                                                       | 016D0577                                                 |

<sup>1)</sup> Code numbers cover valve body, flange gaskets, flange bolts and screws for pilot valve.

<sup>2)</sup> Code numbers cover control element and spring housing.

<sup>3)</sup> Code numbers cover an inlet and an outlet flange.

## WVFX - Pressure operated water valves, commercial applications

### Ordering



| Type    | Connection           |                |         | Range (refrigerant)<br>[bar] | Code no. |
|---------|----------------------|----------------|---------|------------------------------|----------|
|         | Water side ISO 228-1 | Condenser side |         |                              |          |
|         |                      | [in]           | [mm]    |                              |          |
| WVFX 10 | G 3⁄8                | 1⁄4            | 6 flare | 3.5 – 16                     | 003N1100 |
|         | G 3⁄8                | 1⁄4            | 6 flare | 4.0 – 23                     | 003N1105 |
| WVFX 15 | G 1⁄2                | 1⁄4            | 6 flare | 3.5 – 16                     | 003N2100 |
|         | G 1⁄2                | 1⁄4            | 6 flare | 4.0 – 23                     | 003N2105 |
| WVFX 20 | G 3⁄4                | 1⁄4            | 6 flare | 3.5 – 16                     | 003N3100 |
|         | G 3⁄4                | 1⁄4            | 6 flare | 4.0 – 23                     | 003N3105 |
|         | G 3⁄4                | 1⁄4            | 6 flare | 15.0 – 29.0                  | 003N3410 |
| WVFX 25 | G 1                  | 1⁄4            | 6 flare | 3.5 – 16                     | 003N4100 |
|         | G 1                  | 1⁄4            | 6 flare | 4.0 – 23                     | 003N4105 |
|         | G 1                  | 1⁄4            | 6 flare | 15.0 – 29.0                  | 003N4410 |
| WVFX 32 | G 1 1⁄4              | 1⁄4            | 6 flare | 4.0 – 17                     | 003F1232 |
| WVFX 40 | G 1 1⁄2              | 1⁄4            | 6 flare | 4.0 – 17                     | 003F1240 |

## WVFX - Pressure operated water valves, with stainless steel housing

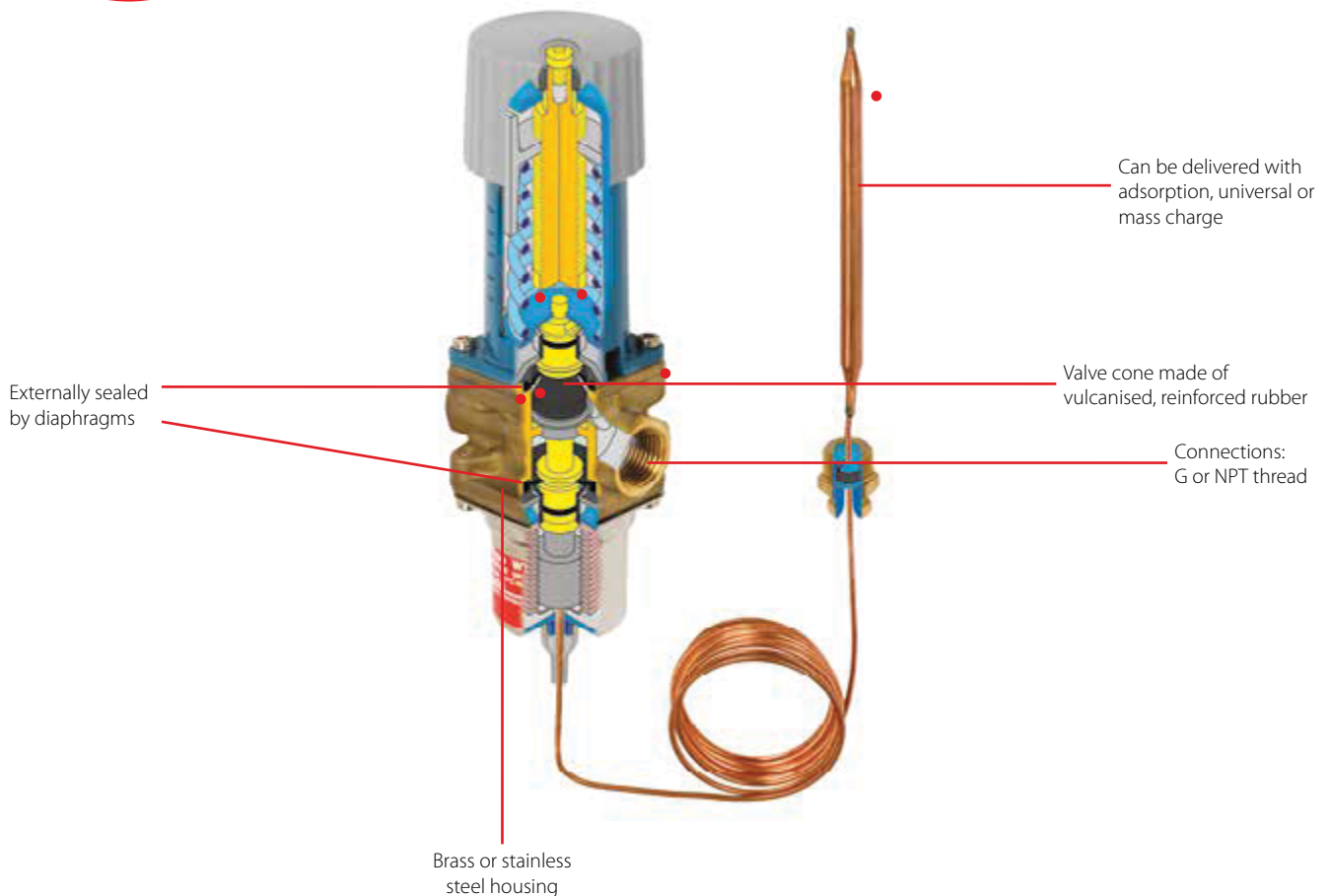
|         |       |     |         |          |          |
|---------|-------|-----|---------|----------|----------|
| WVFX 15 | G 1/2 | 1/4 | 6 flare | 4.0 – 23 | 003N2104 |
| WVFX 25 | G 1   | 1/4 | 6 flare | 3.5 – 16 | 003N4101 |

# AVTA, Thermostatic operated water valve

AVTA thermostatic operated water valves are used for proportional regulation of water flow quantity in refrigeration plant with water-cooled condensers for condensing pressure regulation purposes. AVTA valves give modulating regulation of the condensing temperature and so maintain it constant during operation.

When the refrigeration plant is stopped, the cooling water flow is shut off automatically. Media: Fresh water or neutral brine. For use with aggressive media such as sea water, special versions in stainless steel are available. AVTA opens on rising bulb temperatures.

## Features AVTA

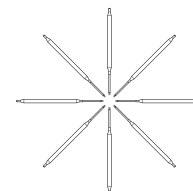


## Facts

### Applications:

- Traditional refrigeration with water cooled condenser
- Cooling of industrial processes
- Insensitive to dirt – fit and forget solution
- Insensitive to pressure variations
- Needs no power supply - self acting
- The valve can be placed in any position
- Operates from zero differential pressure
- Unique option of hand regulation
- Differential pressure: 0 – 10 bar
- Max. working pressure PS = 16 bar
- Max. pressure on sensor: 25 bar
- Opens on rising sensor temperature
- The regulation range is defined for the point at which the valve begins to open
- AVTA are direct actuated valves

# Technical data and ordering

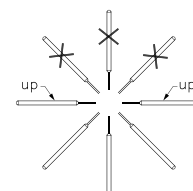


## AVTA with adsorption charge (sensor $\varnothing 9.5 \times 150$ mm)

### Ordering

| Type    | Connection<br>ISO 228-1 | Regulating range<br>[°C] | Max. temperature<br>sensor<br>[°C] | K <sub>v</sub> value at $\Delta p = 1$ bar<br>[m³/h] | Capillary tube length<br>[m] | Code no. <sup>1)</sup> |
|---------|-------------------------|--------------------------|------------------------------------|------------------------------------------------------|------------------------------|------------------------|
| AVTA 10 | G 3/8                   | 10 – 80                  | 130                                | 1.4                                                  | 2.3                          | 003N1144               |
| AVTA 15 | G 1/2                   | 10 – 80                  | 130                                | 1.9                                                  | 2.3                          | 003N0107               |
| AVTA 20 | G 3/4                   | 10 – 80                  | 130                                | 3.4                                                  | 2.3                          | 003N0108               |
| AVTA 25 | G 1                     | 10 – 80                  | 130                                | 5.5                                                  | 2.3                          | 003N0109               |

<sup>1)</sup> Code no. covers complete valve including capillary tube gland.

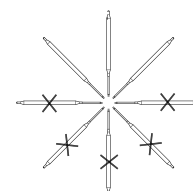


## AVTA with universal charge (sensor $\varnothing 18 \times 210$ mm)

### Ordering

| Type    | Connection<br>ISO 228-1 | Regulating range<br>[°C] | Max. temperature<br>sensor<br>[°C] | K <sub>v</sub> value at $\Delta p = 1$ bar<br>[m³/h] | Capillary tube length<br>[m] | Code no. <sup>1)</sup> |
|---------|-------------------------|--------------------------|------------------------------------|------------------------------------------------------|------------------------------|------------------------|
| AVTA 10 | G 3/8                   | 0 – 30                   | 57                                 | 1.4                                                  | 2.0                          | 003N1132               |
| AVTA 15 | G 1/2                   | 0 – 30                   | 57                                 | 1.9                                                  | 2.0                          | 003N2132               |
| AVTA 20 | G 3/4                   | 0 – 30                   | 57                                 | 3.4                                                  | 2.0                          | 003N3132               |
| AVTA 25 | G 1                     | 0 – 30                   | 57                                 | 5.5                                                  | 2.0                          | 003N4132               |
| AVTA 10 | G 3/8                   | 25 – 65                  | 90                                 | 1.4                                                  | 2.0                          | 003N1162               |
| AVTA 15 | G 1/2                   | 25 – 65                  | 90                                 | 1.9                                                  | 2.0                          | 003N2162               |
| AVTA 20 | G 3/4                   | 25 – 65                  | 90                                 | 3.4                                                  | 2.0                          | 003N3162               |
| AVTA 25 | G 1                     | 25 – 65                  | 90                                 | 5.5                                                  | 2.0                          | 003N4162               |
|         | G 1                     | 25 – 65                  | 90                                 | 5.5                                                  | 5.0                          | 003N4165               |
| AVTA 15 | G 1/2                   | 50 – 90                  | 125                                | 1.9                                                  | 2.0                          | 003N2182               |
| AVTA 20 | G 3/4                   | 50 – 90                  | 125                                | 3.4                                                  | 2.0                          | 003N3182               |
| AVTA 25 | G 1                     | 50 – 90                  | 125                                | 5.5                                                  | 2.0                          | 003N4182               |

<sup>1)</sup> Code no. covers complete valve including capillary tube gland.

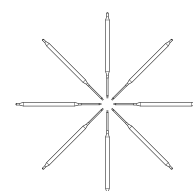


## AVTA with mass charge (sensor $\varnothing 9.5 \times 180$ mm)

### Ordering

| Type    | Connection<br>ISO 228-1 | Regulating range<br>[°C] | Max. temperature<br>sensor<br>[°C] | K <sub>v</sub> value at $\Delta p = 1$ bar<br>[m³/h] | Capillary tube length<br>[m] | Code no. <sup>1)</sup> |
|---------|-------------------------|--------------------------|------------------------------------|------------------------------------------------------|------------------------------|------------------------|
| AVTA 15 | G 1/2                   | 25 – 65                  | 90                                 | 1.9                                                  | 2.0                          | 003N0045               |
|         | G 1/2                   | 25 – 65                  | 90                                 | 1.9                                                  | 2.0 (armoured)               | 003N0299               |

<sup>1)</sup> Code no. covers complete valve including capillary tube gland.



## AVTA in stainless steel with adsorption charge (sensor $\varnothing 9.5 \times 150$ mm)

### Ordering

| Type    | Connection<br>ISO 228-1 | Regulating range<br>[°C] | Max. temperature<br>sensor<br>[°C] | K <sub>v</sub> value at $\Delta p = 1$ bar<br>[m³/h] | Capillary tube length<br>[m] | Code no. <sup>1)</sup> |
|---------|-------------------------|--------------------------|------------------------------------|------------------------------------------------------|------------------------------|------------------------|
| AVTA 15 | G 1/2                   | 10 – 80                  | 130                                | 1.9                                                  | 2.3                          | 003N2150               |
| AVTA 20 | G 3/4                   | 10 – 80                  | 130                                | 3.4                                                  | 2.3                          | 003N3150               |
| AVTA 25 | G 1                     | 10 – 80                  | 130                                | 5.5                                                  | 2.3                          | 003N4150               |

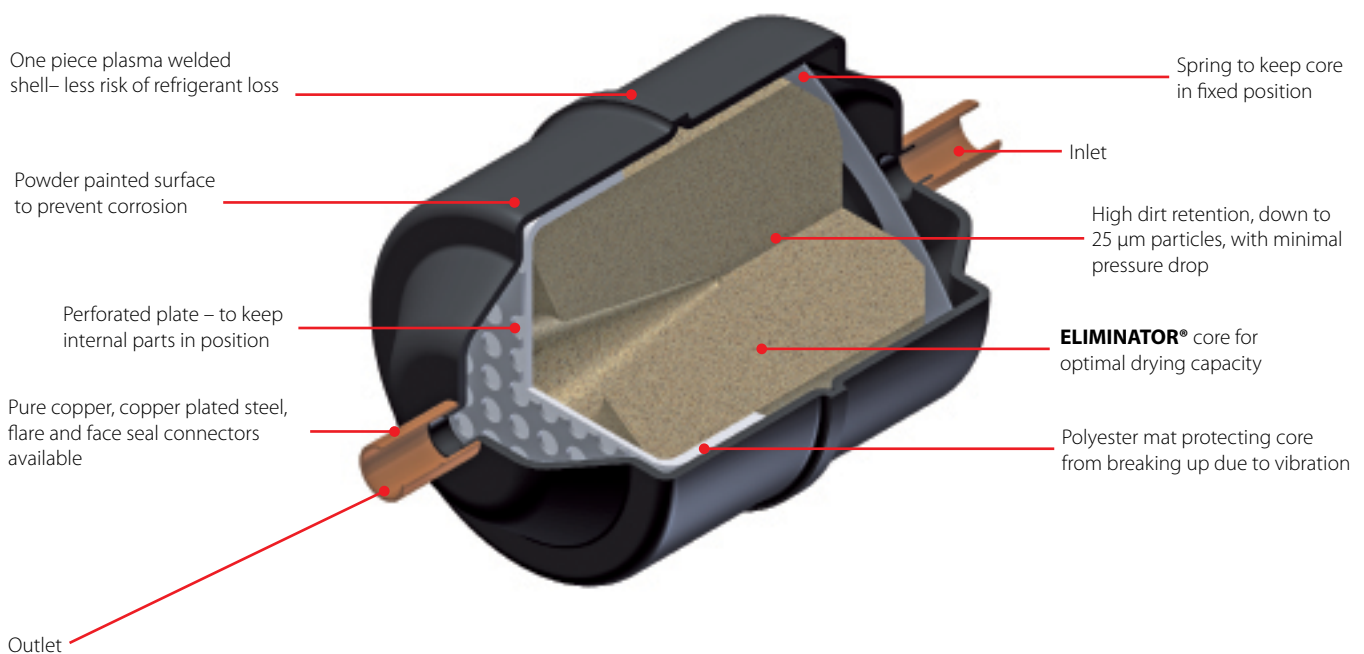
<sup>1)</sup> Code no. covers complete valve including capillary tube gland.

# DML, Hermetic filter drier (Liquid line filter)

DML hermetic filter driers are optimised for refrigerants with mineral or benzene oils. The filter driers are hermetic and approved for up to 46 bar, depending on type.

The filter driers are delivered with flare or copper / copper plated steel connections.

## Features DML



## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units

### Maximum working pressure:

- Up to 46 bar / 667 psig

### Size:

- Wide range from 1.5 - 75 cubic inches

### Refrigerants:

- |             |         |         |
|-------------|---------|---------|
| • R1234yf   | • R422B | • R507A |
| • R1234ze   | • R422D | • R513A |
| • R125      | • R438A | • R600  |
| • R134a     | • R444B |         |
| • R22/R407C | • R448A |         |
| • R23       | • R449A |         |
| • R290      | • R449B |         |
| • R32       | • R450A |         |
| • R404A     | • R452A |         |
| • R407A     | • R452B |         |
| • R407F     | • R454B |         |
| • R410A     | • R455A |         |

### Connections:

- Available in flare, solder

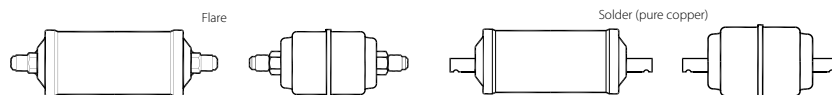
### Benefit:

- Corrosion resistant powder-painted finish

# Technical data and ordering

## DML

Hermetic filter drier



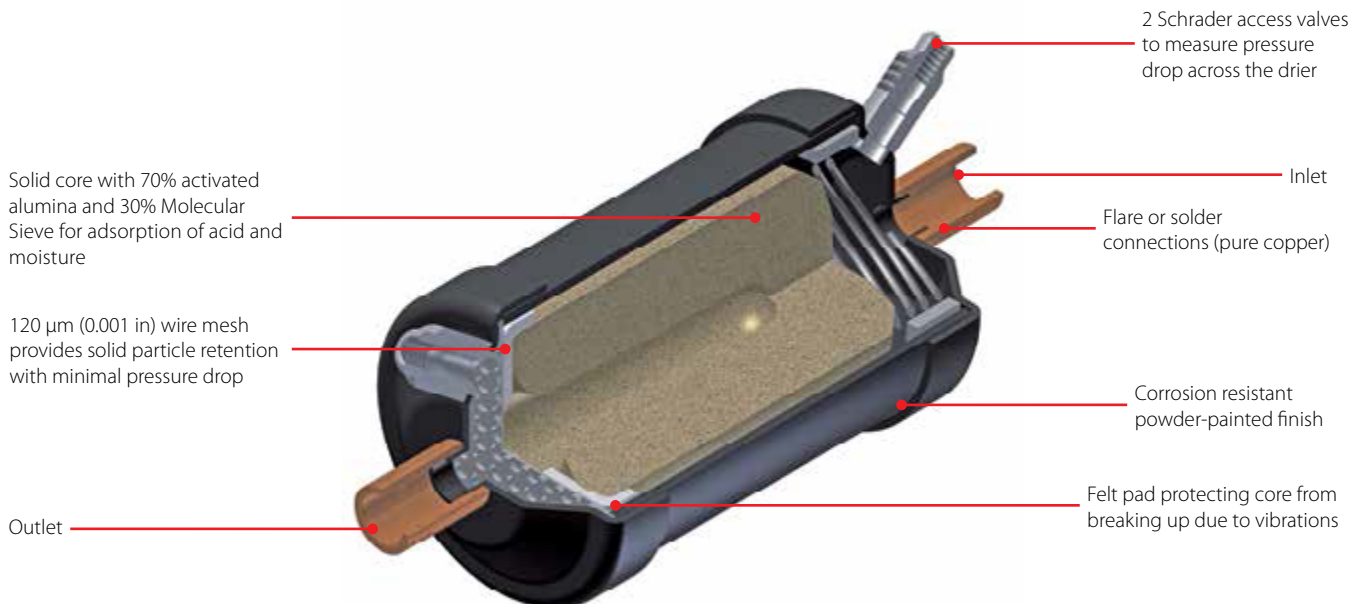
| Type         | Size (in.) | Size (mm) | Liquid capacity (kW) |       |       |       |       |       |       | Code no.   |            |
|--------------|------------|-----------|----------------------|-------|-------|-------|-------|-------|-------|------------|------------|
|              |            |           | R134a                | R404A | R507  | R22   | R407C | R410A | R32   | Flare      | Solder     |
| DML 032/032s | 1/4        | 6         | 6.7                  | 5.01  | 4.86  | 7.45  | 7.09  | 7.43  | 10.86 | 023Z503591 | 023Z504891 |
| DML 033/033s | 3/8        | 10        | 12.85                | 9.86  | 9.57  | 14.46 | 13.84 | 14.67 | 21.4  | 023Z503691 | 023Z505091 |
| DML 052/052s | 1/4        | 6         | 7.67                 | 5.62  | 5.45  | 8.45  | 8.02  | 8.32  | 12.18 | 023Z503791 | 023Z505391 |
| DML 053/053s | 3/8        | 10        | 12.87                | 9.81  | 9.52  | 14.44 | 13.8  | 14.58 | 21.28 | 023Z503891 | 023Z505491 |
| DML 082/082s | 1/4        | 6         | 7.68                 | 5.44  | 5.27  | 8.32  | 7.85  | 8.02  | 11.77 | 023Z503991 | 023Z505791 |
| DML 083/083s | 3/8        | 10        | 14.19                | 10.98 | 10.66 | 16.03 | 15.37 | 16.35 | 23.85 | 023Z504091 | 023Z505891 |
| DML 084/084s | 1/2        | 12        | 28.61                | 21.33 | 20.68 | 31.76 | 30.24 | 31.63 | 46.24 | 023Z504191 | 023Z506191 |
| DML 085/085s | 5/8        | 16        | 43.81                | 35.32 | 34.33 | 50.47 | 48.71 | 52.83 | 76.81 | 023Z507391 | 023Z507291 |
| DML 162/162s | 1/4        | 6         | 7.68                 | 5.43  | 5.26  | 8.31  | 7.85  | 8.01  | 11.75 | 023Z504291 | 023Z506391 |
| DML 163/163s | 3/8        | 10        | 16.33                | 11.18 | 10.82 | 17.41 | 16.33 | 16.43 | 24.16 | 023Z504391 | 023Z506491 |
| DML 164/164s | 1/2        | 12        | 32.19                | 23.54 | 22.81 | 35.4  | 33.6  | 34.83 | 50.99 | 023Z504491 | 023Z506791 |
| DML 165/165s | 5/8        | 16        | 44.64                | 36.59 | 35.59 | 51.82 | 50.16 | 54.83 | 79.63 | 023Z504591 | 023Z506891 |
| DML 166/166s | 3/4        | 19        | 45.53                | 37.37 | 36.35 | 52.89 | 51.2  | 56.01 | 81.33 | 023Z504691 | 023Z507191 |
| DML 303/303s | 3/8        | 10        | 15.7                 | 10.56 | 10.2  | 16.59 | 15.52 | 15.48 | 22.79 | 023Z0049   | 023Z0067   |
| DML 304/304s | 1/2        | 12        | 32.51                | 25    | 24.26 | 36.63 | 35.06 | 37.19 | 54.26 | 023Z0050   | 023Z0068   |
| DML 305/305s | 5/8        | 16        | 45.71                | 36.96 | 35.93 | 52.72 | 50.91 | 55.29 | 80.38 | 023Z0051   | 023Z0069   |
| DML 306/306s | 3/4        | 19        | 43.73                | 39.89 | 38.95 | 53.22 | 52.49 | 60.57 | 87.22 | 023Z0193   | 023Z0070   |
| DML 414/414s | 1/2        | 12        | 33.39                | 26.45 | 25.7  | 38.15 | 36.7  | 39.48 | 57.48 | 023Z0109   | 023Z0111   |
| DML 415/415s | 5/8        | 16        | 55.48                | 41.84 | 40.58 | 61.92 | 59.08 | 62.11 | 90.74 | 023Z0110   | 023Z0112   |

# DAS, Hermetic burn-out filter drier

DAS **ELIMINATOR**® hermetic burn-out filter driers are used in the suction line to clean up refrigeration and air conditioning systems with fluorinated refrigerants after a compressor motor burn-out.

The solid core, which is composed of 70% activated alumina and 30% Molecular Sieve, adsorbs harmful acids as well as moisture, in order to protect the new compressor against failure.

## Features DAS



## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units

### Maximum working pressure:

- Up to 35 bar / 500 psig

### Size:

- Wide range from 8 - 60 cubic inches

### Refrigerants:

- |             |         |         |
|-------------|---------|---------|
| • R1234yf   | • R422B | • R507A |
| • R1234ze   | • R422D | • R513A |
| • R125      | • R438A | • R600  |
| • R134a     | • R444B |         |
| • R22/R407C | • R448A |         |
| • R23       | • R449A |         |
| • R290      | • R449B |         |
| • R32       | • R450A |         |
| • R404A     | • R452A |         |
| • R407A     | • R452B |         |
| • R407F     | • R454B |         |
| • R410A     | • R455A |         |

### Connections:

- Available in flare, solder

### Benefit:

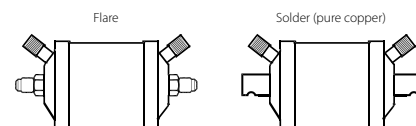
- Corrosion resistant powder-painted finish



# Technical data and ordering

**DAS**

Hermetic burn-out filter drier



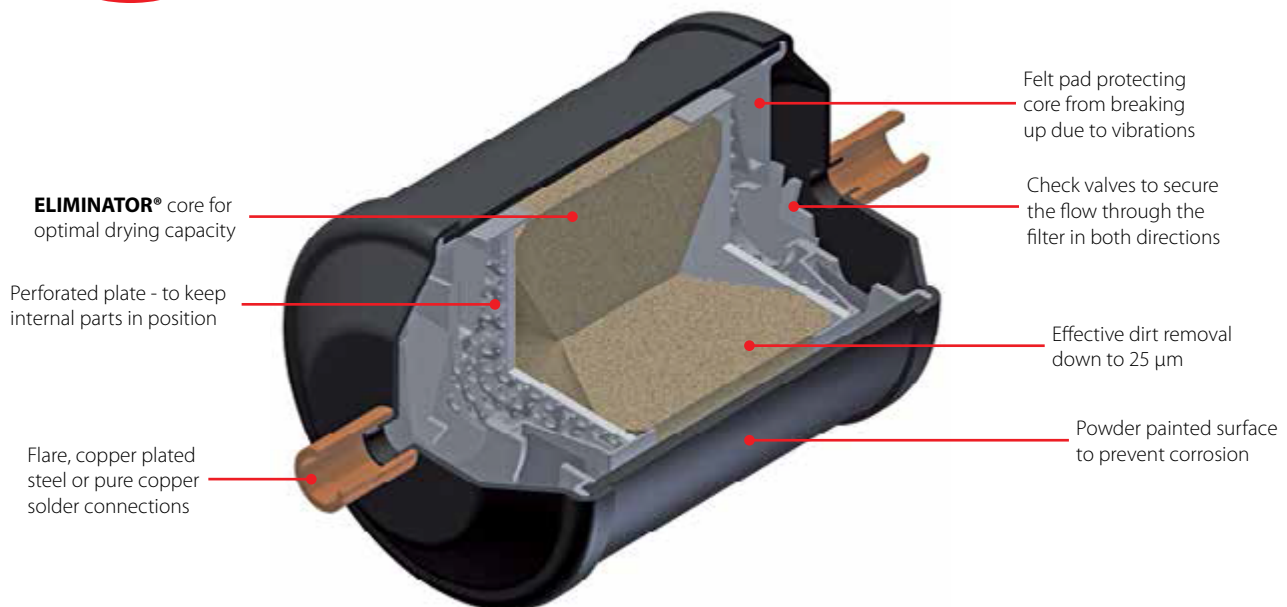
| Type    | Size<br>(in.) | Rated capacity  |       |              | Acid<br>capacity | Max<br>Working<br>Pressure PS | Code no. |          |
|---------|---------------|-----------------|-------|--------------|------------------|-------------------------------|----------|----------|
|         |               | R22/R407C/R410A | R134a | R404A / R507 |                  |                               | Flare    | Solder   |
|         |               | (kW)            |       |              | (g)              | (bar)                         |          |          |
| DAS 083 | 3/8           | 6               | 3.5   | 4.5          | 3.8              | 35                            | 023Z1001 | 023Z1003 |
| DAS 084 | 1/2           | 10              | 5.5   | 8            | 3.8              | 35                            | 023Z1002 | 023Z1004 |
| DAS 085 | 5/8           | 14.5            | 9     | 12.5         | 3.8              | 35                            | -        | 023Z1005 |
| DAS 086 | 3/4           | 19              | 11.5  | 16.5         | 3.8              | 35                            | -        | 023Z1006 |
| DAS 164 | 1/2           | 10.5            | 6     | 8.5          | 8.6              | 35                            | 023Z1007 | 023Z1009 |
| DAS 165 | 5/8           | 15              | 9.5   | 13           | 8.6              | 35                            | 023Z1008 | 023Z1010 |
| DAS 166 | 3/4           | 20              | 12    | 17           | 8.6              | 35                            | -        | 023Z1011 |
| DAS 167 | 7/8           | 22              | 13.5  | 19           | 8.6              | 35                            | -        | 023Z1012 |
| DAS 305 | 5/8           | 18              | 11    | 15           | 18.2             | 35                            | -        | 023Z1013 |
| DAS 306 | 3/4           | 22              | 14    | 19           | 18.2             | 35                            | -        | 023Z1014 |
| DAS 307 | 7/8           | 26              | 16    | 22           | 18.2             | 35                            | -        | 023Z1015 |
| DAS 309 | 1 1/8         | 31              | 20    | 27           | 18.2             | 35                            | -        | 023Z1016 |
| DAS 417 | 7/8           | 30              | 18    | 25           | 24.3             | 35                            | -        | 023Z1017 |
| DAS 419 | 1 1/8         | 35              | 22    | 30           | 24.3             | 35                            | -        | 023Z1018 |
| DAS 607 | 7/8           | 20              | 12    | 17           | 36.5             | 35                            | -        | 023Z1019 |
| DAS 609 | 1 1/8         | -               | -     | -            | -                | 35                            | -        | 023Z1020 |

# DMB, Hermetic bi-flow filter drier

DMB **ELIMINATOR**® hermetic bi-flow filter drier series are for use in liquid lines on heat pumps, and have built-in check valves to ensure that refrigerant liquid flows through the filter drier from the outer side of the filter core towards the center. They ensure fast and effective adsorption of moisture as well as organic and inorganic acids, and all dirt particles are retained irrespective of flow direction.

DMB hermetic bi-flow filter driers contain a solid core consisting of 100% 3 Å Molecular Sieve, and are especially suitable for heat pumps with HFC refrigerants and polyolester oil with additives.

## Features DMB



## Facts

### Applications:

- Traditional refrigeration
- Heat pumps
- Air conditioning units

### Maximum working pressure:

- 46bar

### Capacity range:

- 0.7 – 13.3 TR / 2.8 – 47 kW

### Refrigerants:

- |             |         |
|-------------|---------|
| • R1234yf   | • R438A |
| • R1234ze   | • R444B |
| • R125      | • R448A |
| • R134a     | • R449A |
| • R22/R407C | • R449B |
| • R23       | • R450A |
| • R32       | • R452A |
| • R404A     | • R452B |
| • R407A     | • R454B |
| • R407F     | • R455A |
| • R410A     | • R507A |
| • R422B     | • R513A |

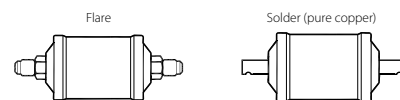
### Benefit:

- No dirt released by reversing the flow direction
- The check valves are not sensitive to dirt and give minimum restriction, irrespective of flow direction
- Use of hermetic bi-flow filter driers can save up to ten solder connections in heat pump systems. This reduces production costs and the number of potential leakage points

# Technical data and ordering

## DMB

Hermetic bi-flow filter drier



| Type           | Size |    | Liquid capacity (kW) |       |      |     |       |       | Code no. |          |
|----------------|------|----|----------------------|-------|------|-----|-------|-------|----------|----------|
|                | in.  | mm | R134a                | R404A | R507 | R22 | R407C | R410A | Flare    | Solder   |
| DMB 082 / 82s  | 1/4  | 6  | 3.9                  | 2.8   | 2.8  | 4.3 | 4.3   | 4.3   | 023Z1412 | 023Z1443 |
| DMB 083 / 83s  | 3/8  | 10 | 7.4                  | 5.3   | 5.3  | 8.2 | 8.2   | 8.2   | 023Z1411 | 023Z1442 |
| DMB 084 / 84s  | 1/2  | 12 | 8.3                  | 6     | 6    | 9.2 | 9.2   | 9.2   | 023Z1410 | 023Z1441 |
| DMB 163 / 163s | 3/8  | 10 | 18                   | 13    | 13   | 20  | 20    | 20    | 023Z1415 | 023Z1446 |
| DMB 164 / 164s | 1/2  | 12 | 28                   | 20    | 20   | 32  | 32    | 32    | 023Z1414 | 023Z1445 |
| DMB 165 / 165s | 5/8  | 16 | 37                   | 29    | 29   | 40  | 40    | 40    | 023Z1413 | 023Z1444 |
| DMB 304 / 304s | 1/2  | 12 | 28                   | 20    | 20   | 31  | 31    | 31    | -        | 023Z1449 |
| DMB 305 / 305s | 5/8  | 16 | 38                   | 28    | 28   | 42  | 42    | 42    | 023Z1417 | 023Z1448 |
| DMB 307s       | 7/8  | -  | 43                   | 32    | 32   | 47  | 47    | 47    | -        | 023Z1447 |

# DCR, Filter drier with replaceable solid core

DCR **ELIMINATOR**® filter driers with replaceable solid core protect refrigeration, freezing and air conditioning systems from moisture, acids and solid particles.

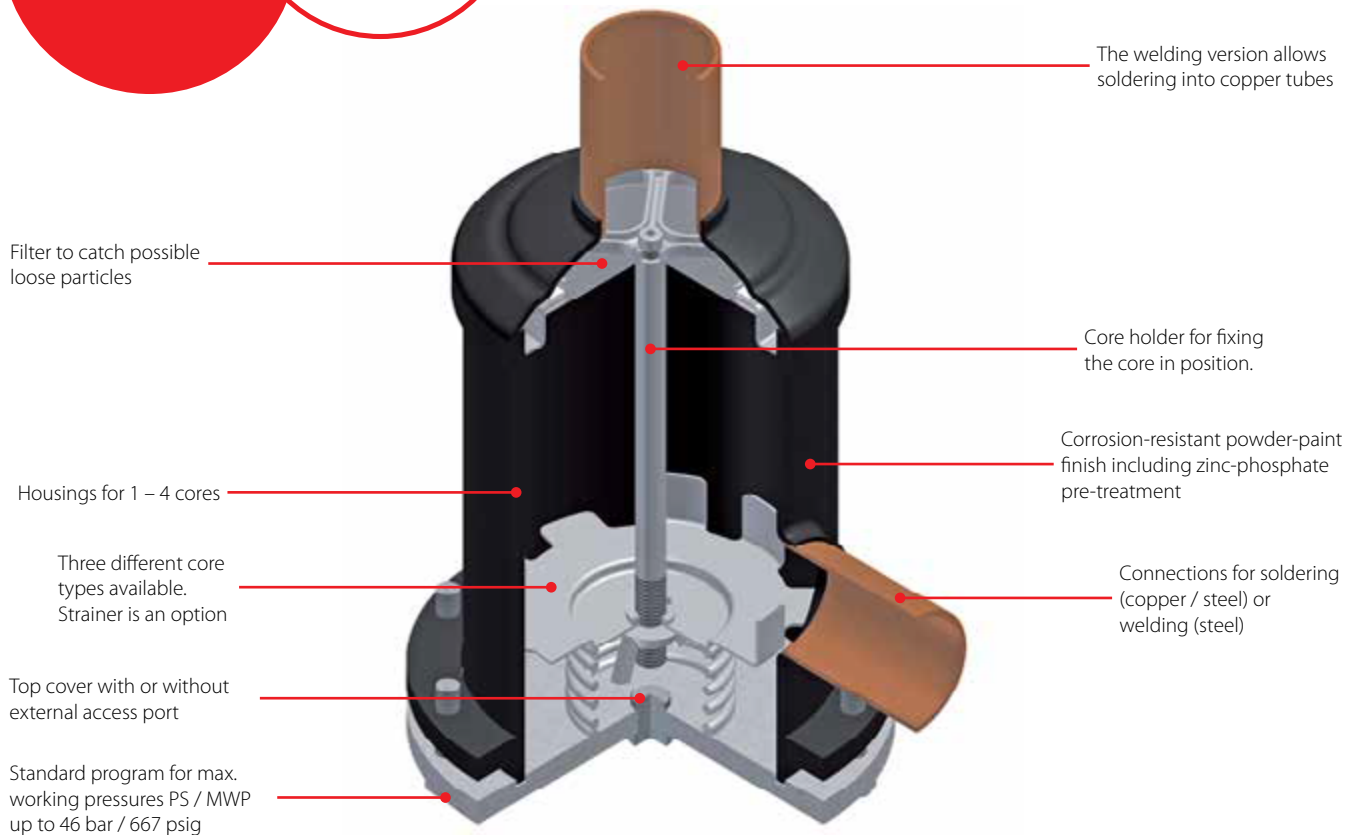
Besides being able to meet the demanding requirements of high working pressure levels when operating with R410A thanks to replaceable solid cores the DCR programme offers flexibility with respect to different applications.

Core types:

- 48-DC for HFC, HCFC systems and mineral or AB oils
- 48-DM for HFC, HCFC systems and POE or PAG oils
- 48 DA for acid adsorption after burnout
- 48-F strainer for retaining dirt

Cores / inserts are ordered separately.

## Features DCR



## Facts

### Applications:

- Traditional refrigeration
- Air conditioning units

### Maximum working pressure:

- 35 / 46 bar (receiver / drier application)

### Refrigerants:

- R1234ze
- R125
- R134a
- R22/R407C
- R23
- R404A
- R407A
- R407F
- R410A
- R438A
- R448A
- R449A
- R449B
- R450A
- R452A
- R507A
- R513A

### Connections:

- Solder

### Benefit:

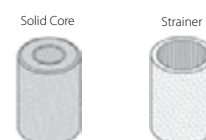
- Highly efficient dirt retaining capabilities on both the suction and the liquid line

# Technical data and ordering

## DCR

Filter drier with replaceable solid core

| Type      | Number of core | Size  |    | Max. working pressure<br>PS (bar) | Code no. |
|-----------|----------------|-------|----|-----------------------------------|----------|
|           |                | in.   | mm |                                   | Solder   |
| DCR 0487  | 1              | 7/8   | 22 | 46                                | 023U7251 |
| DCR 0489  | 1              | 7/8   | 22 | 46                                | 023U7253 |
| DCR 04811 | 1              | –     | 28 | 46                                | 023U7254 |
| DCR 04813 | 1              | 1 1/8 | –  | 46                                | 023U7255 |
| DCR 04821 | 1              | 1 3/8 | 35 | 46                                | 023U7276 |
| DCR 0969  | 2              | –     | 42 | 46                                | 023U7459 |
| DCR 09611 | 2              | –     | 42 | 46                                | 023U7461 |
| DCR 09617 | 2              | 2 5/8 | –  | 46                                | 023U7464 |
| DCR 1449  | 3              | 7/8   | 22 | 35 / 46                           | 023U7066 |



## DCR

Inserts with gasket

| Type             | Material / Description           | Code no. |
|------------------|----------------------------------|----------|
| 48-DM solid core | 100% molecular sieve             | 023U1392 |
| 48-DC solid core | 80% molecular sieve & 20% Al3 O2 | 023U4381 |
| 48-DA solid core | 30% molecular sieve & 70% Al3 O2 | 023U5381 |
| 48-F strainer    | Felt-gasket, 15 µm               | 023U1921 |

# SGP, Sight glass (high pressure)

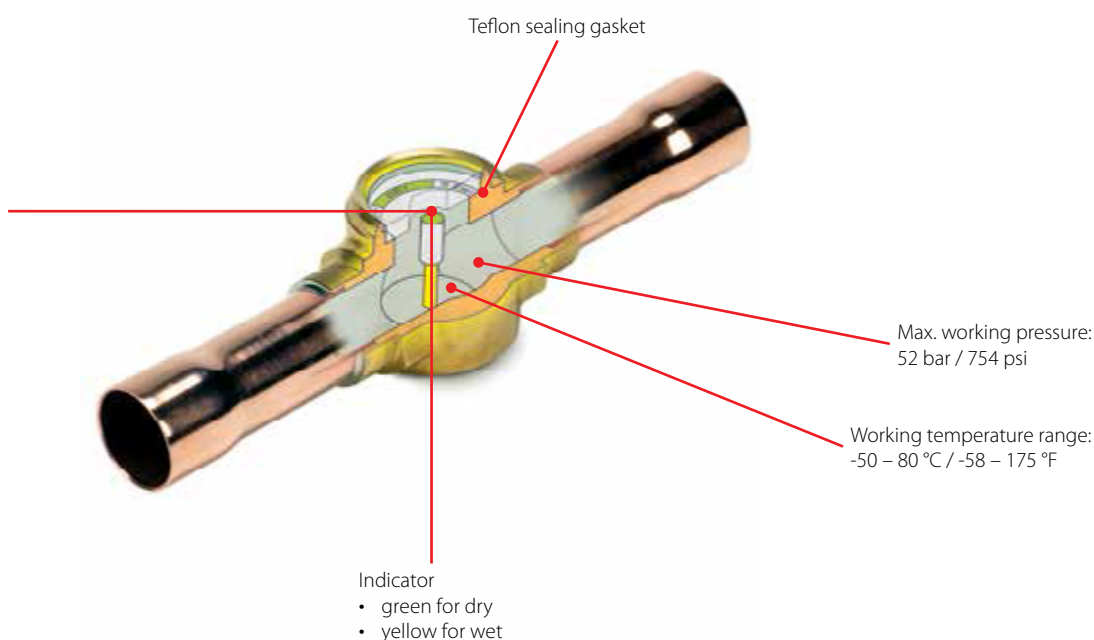
SGP are sight glasses for high pressure applications (Max Working Pressure PS / MWP: 52 bar / 754 psi). SGP is available with flare, solder and socket connections, and with and without moisture indicators.

SGP N equipped with sensitive indicators that reflects a changes colour, depending on the moisture content in the refrigerant.

## Features SGP



Reliable due to minimal dependancy on temperature



## Facts

### Applications:

- Traditional refrigeration
- Heat pump systems
- Air conditioning units
- Liquid coolers
- Transport refrigeration

### Refrigerants:

- |         |              |
|---------|--------------|
| • R1270 | • R452B      |
| • R134a | • R454B      |
| • R22   | • R513A      |
| • R32   | • R744       |
| • R404A | • R1233zd(E) |
| • R407A | • R1234ze(E) |
| • R407C | • R407H      |
| • R407F | • R454C      |
| • R410A | • R455A      |
| • R448A | • R515B      |
| • R449A | • R463A      |
| • R450A | • R1234yf    |
| • R452A | • R507A      |

### Benefits:

- Indicates too high moisture content in the refrigeration system
- Indicates lack of subcooling
- Indicates refrigerant deficiency

### Connection:

- Solder ODF x ODF
- Solder ODF x ODM
- Flare ext. x ext.
- Flare int. x ext.

### Connection size:

- From 6 to 22 mm or 1/4 to 7/8 in.

# Technical data and ordering

## SGP N

Sight glass (high pressure)



| Type      | Connection type   | Connection (in.) | Connection (mm) | Code no. |
|-----------|-------------------|------------------|-----------------|----------|
| SGP 6 N   | Flare ext. x ext. | 1/4 x 1/4        | 6 x 6           | 014L0161 |
| SGP 10 N  | Flare ext. x ext. | 3/8 x 3/8        | 10 x 10         | 014L0162 |
| SGP 12 N  | Flare ext. x ext. | 1/2 x 1/2        | 12 x 12         | 014L0163 |
| SGP 16 N  | Flare ext. x ext. | 5/8 x 5/8        | 16 x 16         | 014L0165 |
| SGP 19 N  | Flare ext. x ext. | 3/4 x 3/4        | 19 x 19         | 014L0166 |
| SGP 6 N   | Flare int. x ext. | 1/4 x 1/4        | 6 x 6           | 014L0171 |
| SGP 10 N  | Flare int. x ext. | 3/8 x 3/8        | 10 x 10         | 014L0172 |
| SGP 12 N  | Flare int. x ext. | 1/2 x 1/2        | 12 x 12         | 014L0173 |
| SGP 16 N  | Flare int. x ext. | 5/8 x 5/8        | 16 x 16         | 014L0174 |
| SGP 19 N  | Flare int. x ext. | 3/4 x 3/4        | 19 x 19         | 014L0175 |
| SGP 6s N  | ODF x ODF solder  | 1/4 x 1/4        | –               | 014L0181 |
| SGP 10s N | ODF x ODF solder  | 3/8 x 3/8        | –               | 014L0182 |
| SGP 12s N | ODF x ODF solder  | 1/2 x 1/2        | –               | 014L0183 |
| SGP 16s N | ODF x ODF solder  | 5/8 x 5/8        | 16 x 16         | 014L0184 |
| SGP 19s N | ODF x ODF solder  | 3/4 x 3/4        | 19 x 19         | 014L0185 |
| SGP 22s N | ODF x ODF solder  | 7/8 x 7/8        | 22 x 22         | 014L0186 |
| SGP 22s N | ODF x ODF solder  | 1 1/8 x 1 1/8    | –               | 014L0187 |
| SGP 6s N  | ODF x ODM solder  | 1/4 x 1/4        | –               | 014L0201 |
| SGP 10s N | ODF x ODM solder  | 3/8 x 3/8        | –               | 014L0202 |
| SGP 16s N | ODF x ODM solder  | 5/8 x 5/8        | 16 x 16         | 014L0204 |
| SGP 22s N | ODF x ODM solder  | 7/8 x 7/8        | 22 x 22         | 014L0206 |



### Note

Only solder versions are allowed for flammable refrigerants.

# GBC version 2, Shut-off ball valve

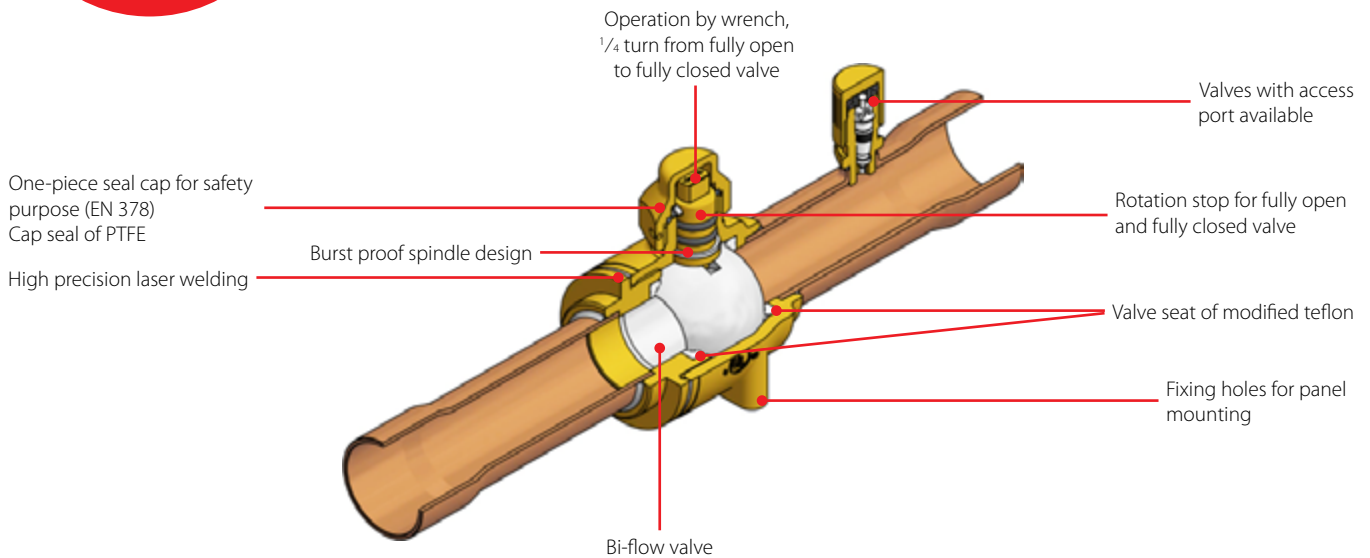
GBC v2 shut-off ball valves are manually operated valves suitable for bi-directed flow.

Shut-off ball valves are used in liquid, suction and hot gas lines in refrigeration, freezing and air conditioning systems.

The GBC v2 bi-directed shut-off ball valves can be delivered with or without external access port.

The valves have one-piece wire seal cap to prevent unintentional cap removal or tampering between services.

## Features GBC version 2



## Facts

### Applications:

- Liquid, suction and hot gas lines in all refrigeration and air-conditioning systems with fluorinated refrigerants

### Refrigerants:

- |              |              |
|--------------|--------------|
| • R134a      | • R449B      |
| • R22/R407C  | • R454C      |
| • R404A/R507 | • R455A      |
| • R407A      | • R515B      |
| • R407F      | • R516A      |
| • R410A      | • R1234ze(E) |
| • R448A      | • R290       |
| • R449A      | • R452B      |
| • R450A      | • R454B      |
| • R452A      | • R454A      |
| • R513A      |              |
| • R1234yf    |              |
| • R407H      |              |

### Benefits:

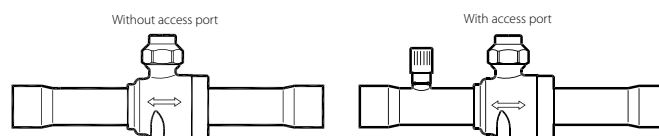
- Full flow with minimum pressure drop
- Bi-directional flow
- 1/4 turn from fully open to fully closed
- Burst proof spindle design
- Selected Teflon and O-ring material to secure the best tightness and long lifetime
- Versions with access port helps in reducing cost if service of the system is necessary
- One-piece seal cap for safety purpose  
Complies with European Safety Directive EN 378
- Ball status indicator on spindle top indicating open or closed position
- Laser welded construction
- Drilled and tapped for panel mounting
- Double O-ring stem seal design
- Customized brass material ensures consistent performance under aggressive environment



# Technical data and ordering

## GBC version 2

### Shut-off ball valve



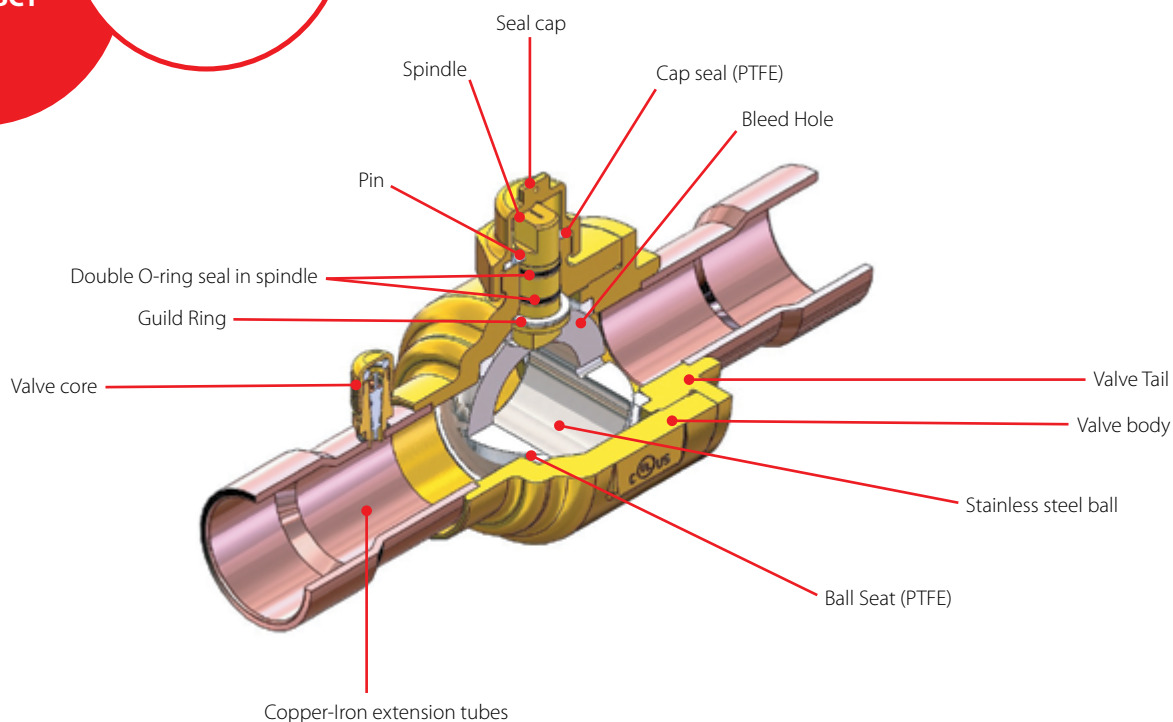
| Type       | Size  |    | Kv Value (m³/h) | Code no.            |                  |
|------------|-------|----|-----------------|---------------------|------------------|
|            | in.   | mm |                 | Without Access Port | With Access Port |
| GBC 6s     | 1/4   | 6  | 1.96            | 009L7020            | 009L7050         |
| GBC 10s    | 3/8   | 10 | 5.68            | 009L7021            | 009L7051         |
| GBC 12s    | 1/2   | 12 | 10.58           | 009L7022            | 009L7052         |
| GBC 16s    | 5/8   | 16 | 14.11           | 009L7023            | 009L7053         |
| GBC 18s    | 3/4   | 18 | 20.42           | 009L7024            | 009L7054         |
| GBC 22s    | 7/8   | 22 | 28.17           | 009L7025            | 009L7055         |
| GBC 28s    | 1 1/8 | 28 | 51.95           | 009L7026            | 009L7056         |
| GBC 35s    | 1 3/8 | 35 | 80.89           | 009L7027            | 009L7057         |
| GBC 42s    | 1 5/8 | 42 | 121.07          | 009L7028            | 009L7058         |
| GBC 54s    | 2 1/8 | 54 | 224.96          | 009L7029            | 009L7059         |
| GBC 67s RP | 2 5/8 | 67 | 310             | 009L7036            | 009L7066         |

# Type GBCT, Shut-off ball valve for R744 (CO<sub>2</sub>) high pressure

Danfoss shut-off ball valves, type GBCT for R744 (CO<sub>2</sub>) high pressure are manually operated shut-off valves for transcritical CO<sub>2</sub> refrigeration systems, in order to open and to shut off inner flow path by operating the valve spindle.

The valve structure and materials are designed and tested specifically for use with CO<sub>2</sub> refrigerant. The valves are approved for use in transcritical CO<sub>2</sub> refrigeration systems.

## Features Type GBCT



## Facts

### Features:

- Designed for transcritical CO<sub>2</sub> systems
- Maximum working pressure (PS): 140 bar / 2031 psig
- Temperature range (TS): -40 °C - 149 °C / -40 °F - 300 °F
- UL/cUL Listed, complies with Pressure Equipment Directive 2014/68/ EU
- Full port construction to match line size
- Rupture proof, internally-loaded spindle design ensures safe operation under extreme pressures
- Specially-selected sealing material for CO<sub>2</sub> refrigerant
- Reinforced copper-iron tube extensions permit trouble-free valve installation with traditional torch-brazing methods
- Bleed hole design avoids liquid entrapment when valve is closed

# Technical data and ordering

## Type GBCT

Shut-off ball valve for R744 (CO<sub>2</sub>) high pressure

|                                                        |                                   |
|--------------------------------------------------------|-----------------------------------|
| Refrigerants                                           | R 744 (CO <sub>2</sub> )          |
| Oils:                                                  | POE, PAG                          |
| Continuous operating temperature (COT)                 | -40 °C - 149 °C / -40 °F - 300 °F |
| Design Pressure (DP) / Maximum abnormal pressure (MAP) | 140 bar / 2031 psig               |
| Flow direction                                         | bi-flow                           |

HIGH PRESSURE SIDE "HP" LOW PRESSURE SIDE "LP"



## Ordering

GBCT without access port

| Type     | Size   | Kv Value            | Multi Pack      | Code no. |
|----------|--------|---------------------|-----------------|----------|
|          | (inch) | (m <sup>3</sup> /h) | (Pcs. Per pack) |          |
| GBCT 6s  | 1/4    | 0.9                 | 30              | 009L6415 |
| GBCT 10s | 3/8    | 3.7                 | 30              | 009L6416 |
| GBCT 12s | 1/2    | 5.4                 | 30              | 009L6417 |
| GBCT 16s | 5/8    | 10.4                | 30              | 009L6418 |
| GBCT 18s | 3/4    | 16.4                | 16              | 009L6419 |
| GBCT 22s | 7/8    | 23.7                | 16              | 009L6420 |
| GBCT 28s | 1 1/8  | 42.3                | 4               | 009L6406 |
| GBCT 35s | 1 3/8  | 67.1                | 4               | 009L6410 |
| GBCT 42s | 1 5/8  | 83.1                | 4               | 009L6411 |
| GBCT 54s | 2 1/8  | 171.3               | 2               | 009L6412 |

## Ordering

GBCT with access port

| Type     | Size   | Kv Value            | Multi Pack      | Code no. |
|----------|--------|---------------------|-----------------|----------|
|          | (inch) | (m <sup>3</sup> /h) | (Pcs. Per pack) |          |
| GBCT 6s  | 1/4    | 0.9                 | 30              | 009L6581 |
| GBCT 10s | 3/8    | 3.7                 | 30              | 009L6582 |
| GBCT 12s | 1/2    | 5.4                 | 30              | 009L6585 |
| GBCT 16s | 5/8    | 10.4                | 30              | 009L6586 |
| GBCT 18s | 3/4    | 16.4                | 16              | 009L6588 |
| GBCT 22s | 7/8    | 23.7                | 16              | 009L6589 |
| GBCT 28s | 1 1/8  | 42.3                | 4               | 009L6451 |
| GBCT 35s | 1 3/8  | 67.1                | 4               | 009L6453 |
| GBCT 42s | 1 5/8  | 83.1                | 4               | 009L6454 |
| GBCT 54s | 2 1/8  | 171.3               | 2               | 009L6456 |

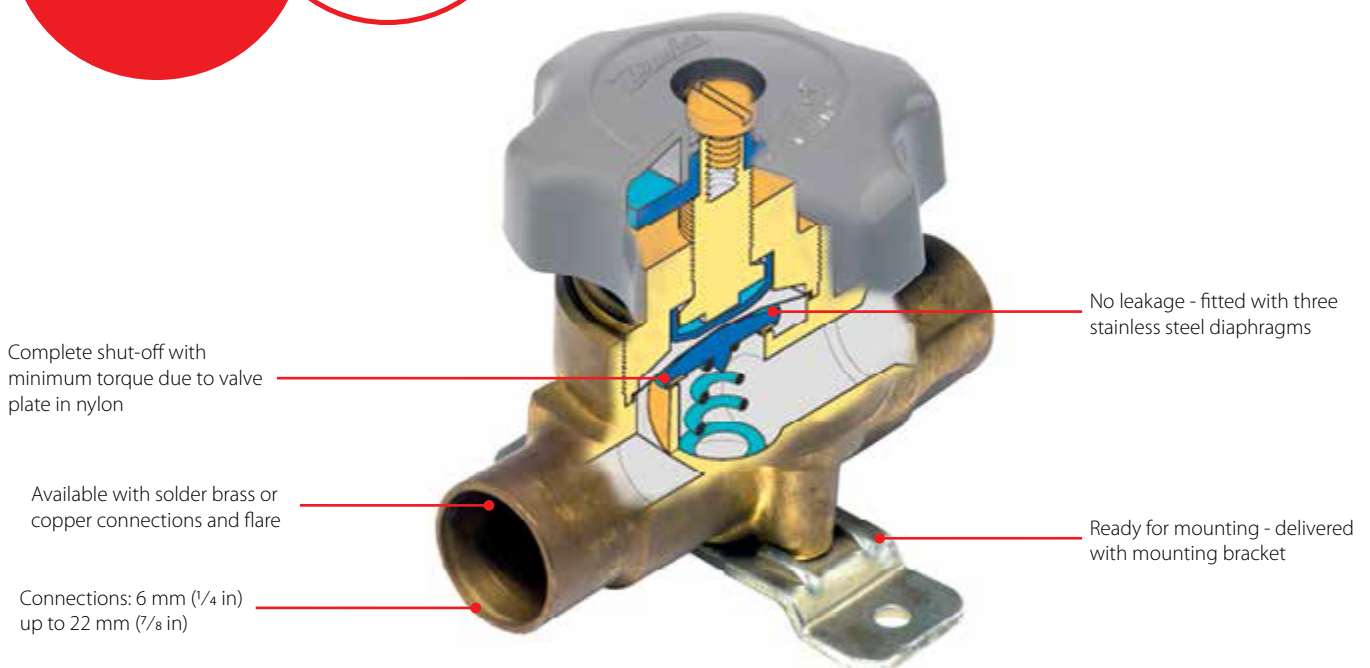
# BML, Shut-off diaphragm valves

BML are manual shut-off diaphragm valves designed for installation in the liquid, suction and hot gas lines of refrigeration plants. BML valves can be delivered with flare, ODF solder or ODF solder with extended ends.

In the same product category, BMT 6 is a three-way manual shut-off valve with similar characteristics.

BML valve can be used for HCFC, HFC and HC refrigerants.

## Features BML



## Facts

### Applications:

- Traditional refrigeration

### Temperature range:

- -55 – 100 °C / -67 – 212 °F

### Maximum working pressure:

- 28 bar / 406 psig

### Working range:

- -1 – 21 bar / -14 – 304 psig

### Refrigerants:

- R1234yf
- R1234ze
- R1270
- R134a
- R22/R407C
- R290
- R404A/R507
- R450A
- R513A
- R600
- R600a
- R407H
- R449B
- R515B
- R516A

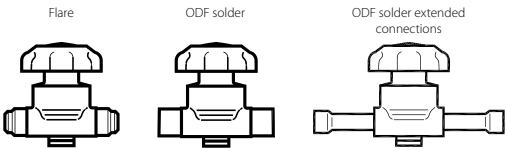
### Benefits:

- Fitted with three stainless steel diaphragms which ensure long operating life
- Valve plate of polyamide nylon to give complete shut-off with minimum torque
- Valve cover with counter-seat to prevent the ingress of moisture in fully open position

# Technical data and ordering

## BML

Shut-off diaphragm valves, with hand wheel



| Type   | Connection (in.) | kv-value (m³/h) | Code no. |            |                   |
|--------|------------------|-----------------|----------|------------|-------------------|
|        |                  |                 | Flare    | ODF solder | ODF extended ends |
| BML 6  | 1/4              | 0.3             | 009G0101 | -          | 009G0202          |
| BML 10 | 3/8              | 0.84            | 009G0127 | 009G0122   | 009G0222          |
| BML 12 | 1/2              | 1.5             | 009G0141 | -          | 009G0242          |
| BML 15 | 5/8              | 2.2             | 009G0168 | -          | -                 |

# NRV / NRVH, Check valves

NRV and NRVH check valves can be used in liquid, suction and hot gas lines in refrigeration and air conditioning plants with HCFC, HFC and HC flammable refrigerants. Special versions, with a max. working pressure of 90 bar / 1305 psig are available for CO<sub>2</sub> applications.

The valves ensure the correct flow direction and prevent back-condensation from a warm part of the system to the cold evaporator. A built-in damping piston makes the valves suitable for installation in lines where pulsation can occur, e. g. in the discharge line from the compressor.

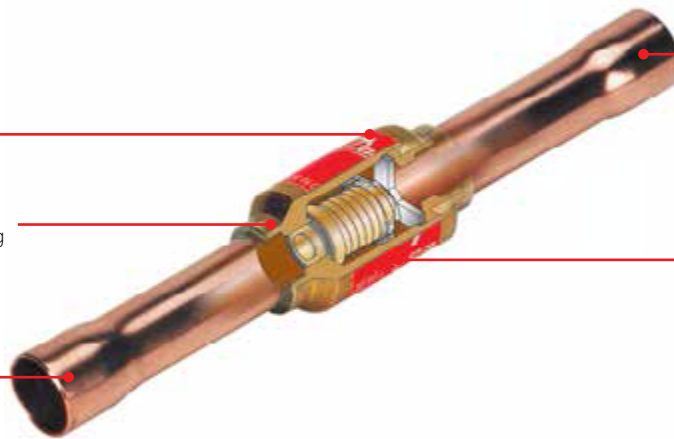
## Features NRV / NRVH



Min. pressure drop  
NRV 0.04 – 0.07 bar / 0.58 – 1.01 psig  
NRVH 0.3 bar / 4.35 psig

Max. working pressure  
PS / MWP 46 bar / 667 psig

Flare and solder version  
NRV 6 – 19  
NRV 6s – 35s  
NRVH 6s – 35s



Standard or oversize  
solder connections

Built-in damping  
piston

## Facts

### Applications:

- Traditional refrigeration
- Heat pump systems
- Air conditioning units
- Liquid coolers
- Transport refrigeration

### Refrigerants:

- |              |         |
|--------------|---------|
| • R1233zd(E) | • R449A |
| • R1234yf    | • R449B |
| • R1234ze(E) | • R450A |
| • R1270      | • R452A |
| • R134a      | • R452B |
| • R22/R407C  | • R454B |
| • R290       | • R454C |
| • R32        | • R455A |
| • R404A/R507 | • R513A |
| • R407A      | • R515B |
| • R407F      | • R516A |
| • R407H      | • R600  |
| • R410A      | • R600a |
| • R448A      | • R454A |

### Benefits:

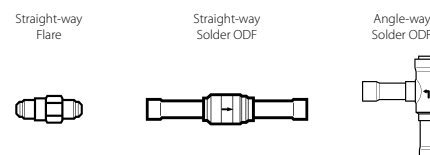
- Hermetic tight design for solder versions
- Built-in damping piston that makes the valves suitable for installation in lines where pulsation can occur, e.g. in the discharge line from the compressor
- Available in both straightway and angleway versions
- Solder versions are compliant with ATEX hazard zone 2
- NRVH type check valve is with stronger spring and it's recommended to use for compressors in parallel (i.e. power packs) where higher level of pulsation and vibration are expected

# Technical data and ordering

## NRV / NRVH - Check valves

### Technical data

| Type                            | Description                 |
|---------------------------------|-----------------------------|
| Temperature range               | -50 - 140 °C / -58 - 285 °F |
| Max. working pressure (PS/ MWP) | 46 bar / 667 psig           |
| Approvals                       | C UL US LISTED, EAC         |



## NRV / NRVH

### Check valves

| Type                   | Version        |            | Connection |          | Pressure drop across valve $\Delta p$ bar <sup>1)</sup> | kv-value <sup>2)</sup> m3/h |
|------------------------|----------------|------------|------------|----------|---------------------------------------------------------|-----------------------------|
|                        |                |            | Size       |          |                                                         |                             |
|                        |                |            | in.        | Code no. |                                                         |                             |
| NRV6                   | Straight - way | Flare      | 1/4        | 020-1040 | 0.07                                                    | 0.56                        |
| NRV 10                 | Straight - way | Flare      | 3/8        | 020-1041 | 0.07                                                    | 1.43                        |
| NRV 12                 | Straight - way | Flare      | 1/2        | 020-1042 | 0.05                                                    | 2.05                        |
| NRV 16                 | Straight - way | Flare      | 5/8        | 020-1043 | 0.05                                                    | 3.6                         |
| NRV 6s                 | Straight - way | Solder ODF | 1/4        | 020B1010 | 0.07                                                    | 0.56                        |
| NRV 6s <sup>3)</sup>   | Straight - way | Solder ODF | 3/8        | 020B1057 | 0.07                                                    | 0.56                        |
| NRVH 6s <sup>3)</sup>  | Straight - way | Solder ODF | 3/8        | 020B1069 | 0.3                                                     | 0.56                        |
| NRV 10s                | Straight - way | Solder ODF | 3/8        | 020B1011 | 0.07                                                    | 1.43                        |
| NRV 12s                | Straight - way | Solder ODF | 1/2        | 020B1012 | 0.05                                                    | 2.05                        |
| NRV 12s <sup>3)</sup>  | Straight - way | Solder ODF | 5/8        | 020B1052 | 0.05                                                    | 2.05                        |
| NRV 16s                | Straight - way | Solder ODF | 5/8        | 020B1018 | 0.05                                                    | 3.6                         |
| NRVH 16s               | Straight - way | Solder ODF | 5/8        | 020B1038 | 0.3                                                     | 3.6                         |
| NRVH 16s <sup>3)</sup> | Straight - way | Solder ODF | 3/4        | 020B1071 | 0.3                                                     | 3.6                         |
| NRV 19s                | Straight - way | Solder ODF | 3/4        | 020B1019 | 0.05                                                    | 5.5                         |
| NRVH 19s               | Straight - way | Solder ODF | 3/4        | 020B1023 | 0.3                                                     | 5.5                         |
| NRVH 19s <sup>3)</sup> | Straight - way | Solder ODF | 7/8        | 020B1066 | 0.3                                                     | 5.5                         |
| NRV 19s <sup>3)</sup>  | Straight - way | Solder ODF | 7/8        | 020B1054 | 0.05                                                    | 5.5                         |
| NRV 22s                | Angle - way    | Solder ODF | 7/8        | 020-1020 | 0.04                                                    | 8.5                         |
| NRVH 22s               | Angle - way    | Solder ODF | 7/8        | 020-1032 | 0.03                                                    | 8.5                         |
| NRV 22s <sup>3)</sup>  | Angle - way    | Solder ODF | 1 1/8      | 020-1060 | 0.04                                                    | 8.5                         |
| NRVH 22s <sup>3)</sup> | Angle - way    | Solder ODF | 1 1/8      | 020-1072 | 0.3                                                     | 8.5                         |
| NRV 28s                | Angle - way    | Solder ODF | 1 1/8      | 020-1021 | 0.04                                                    | 19                          |
| NRV 28s <sup>3)</sup>  | Angle - way    | Solder ODF | 1 3/8      | 020-1056 | 0.04                                                    | 19                          |
| NRV 35s                | Angle - way    | Solder ODF | 1 3/8      | 020-1026 | 0.04                                                    | 29                          |
| NRVH 35s               | Angle - way    | Solder ODF | 1 3/8      | 020-1034 | 0.3                                                     | 29                          |
| NRV 35s <sup>3)</sup>  | Angle - way    | Solder ODF | 1 5/8      | 020-1061 | 0.04                                                    | 29                          |

1)  $\Delta p$  = the minimum pressure at which the valve is completely open.

The NRVH with a stronger spring is used in the discharge line from compressors connected in parallel.

2) The Kv value is the flow of water in m<sup>3</sup>/h at a pressure drop across valve of 1 bar,  $\rho = 1000 \text{ kg/m}^3$ .

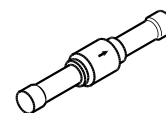
3) Oversize connections.

Max operating pressure is 90 bar.

# Technical data and ordering

## NRV 10s H - Check valve for R744 (CO<sub>2</sub>)

### Technical data



| Type                             | Description                 |
|----------------------------------|-----------------------------|
| Refrigerants                     | R744 (CO <sub>2</sub> )     |
| Oil                              | POE, PAG                    |
| Temperature range                | -50 - 140 °C / -58 - 285 °F |
| Max. working pressure (PS / MWP) | 90 bar / 1305 psig          |
| Approvals                        | C UL US LISTED, EAC         |

## NRV 10s H - Check valve, straight-way - solder ODF

### Ordering

| Type      | Connection type        | Connection size |      | Differential pressure to start opening the valve |                     | Pressure drop across valve $\Delta p$ |                     | Kv - value <sup>2)</sup> | Cv - value <sup>2)</sup> | Code no. |
|-----------|------------------------|-----------------|------|--------------------------------------------------|---------------------|---------------------------------------|---------------------|--------------------------|--------------------------|----------|
|           |                        | [in]            | [mm] | [bar] <sup>1)</sup>                              | [psi] <sup>1)</sup> | [bar] <sup>1)</sup>                   | [psi] <sup>1)</sup> | [m <sup>3</sup> /h]      | [gal/min]                |          |
| NRV 10s H | Straightway Solder ODF | 3/8             | -    | 0.4                                              | 5.8                 | 1.0                                   | 14.5                | 0.9                      | 1.04                     | 020-4000 |

1)  $\Delta p_1$  = the minimum pressure at which the valve start opening.

$\Delta p_2$  = the minimum pressure at which the valve is completely open.

2) The Kv / Cv value is the flow of water in [m<sup>3</sup>/h] / [gal/min] at a pressure drop across valve of 1 bar / 14.5 psig,  $p = 1000 \text{ kg/m}^3 / 2205 \text{ lbs/G}$ .





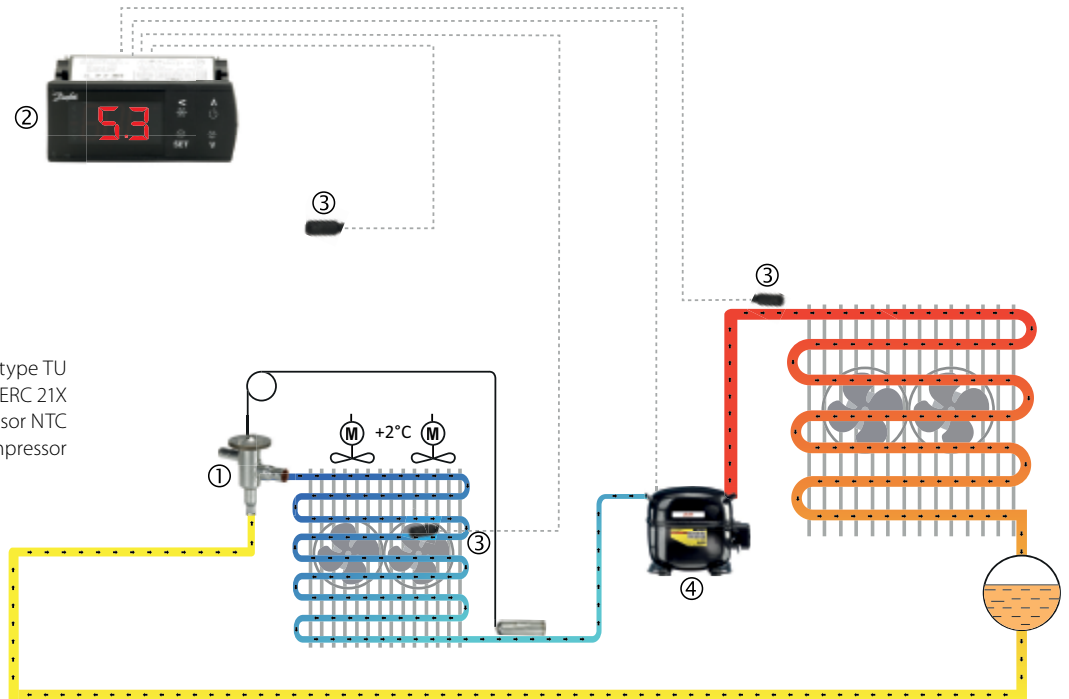
# ERC 211 / ERC 213 / ERC 214, Refrigeration controllers

ERC 21X is a smart multipurpose refrigeration controller with temperature and defrost management.

The controller has been designed to fulfill today's requirements of advanced commercial Refrigeration applications.

## Features ERC 211 / 213 / 214

1. Thermostatic expansion valve type TU
2. Temperature controller ERC 21X
3. Temperature sensor NTC
4. Compressor



## Facts

### Thermostat:

- ON / OFF thermostat
- Day / Night, continuous cycle, emergency mode
- Pre-installed applications
- Compatible with wide range of sensors (NTC 5 K and 10 K, Pt1000, PTC)

### Defrost:

- Natural, electrical and hot gas defrost
- Defrost on demand
- Start via push button, DI input or time interval
- Stop on time, temperature or push button

### Compressor:

- Voltage protection
- Anti-cycle timers for optimum compressor protection
- High-effect 16 A relays for connection of compressors

### Evaporator Fan:

- Fan delay function
- Smart evaporator fan management for energy saving
- Fan stop at high evaporator temperature

### Alarms:

- High and low temperature alarm
- Sensor failure alarm
- High and low voltage alarm
- Condenser cleaning alarm
- Door open alarm
- External alarm input

### Multi-purpose DI input:

- Two multipurpose DI input for defrost start, Day / night control, main switch, reference displacement and continuous cycle control

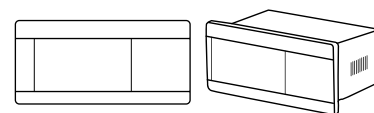
### Display & programming:

- Bigger and High efficient LED Display
- Display temperatures in °C / °F
- Parameter settings/readouts and alarm conditions can be read on the display

### Other functions:

- Zero cross switching in all relays
- Three levels password protection
- Door function with alarm monitoring
- Delay of outputs at power up
- Keypad lock and unlock feature
- Galvanic Isolation

# Technical data and ordering



## ERC 211 / ERC 213 / ERC 214

### Refrigeration controllers

| Type   | Description                                                         | Code no. |
|--------|---------------------------------------------------------------------|----------|
| ERC211 | KIT - ERC 211,RED LED,230V. Supplied with 1 NTC10K Temp. Probe 1.5m | 080G3263 |
| ERC213 | KIT - ERC 213,RED LED,230V. Supplied with 2 NTC10K Temp. Probe 1.5m | 080G3265 |
| ERC214 | ERC 214,Controller, RED LED, 230V. Temp Probe ordered separately    | 080G3295 |

Spares:

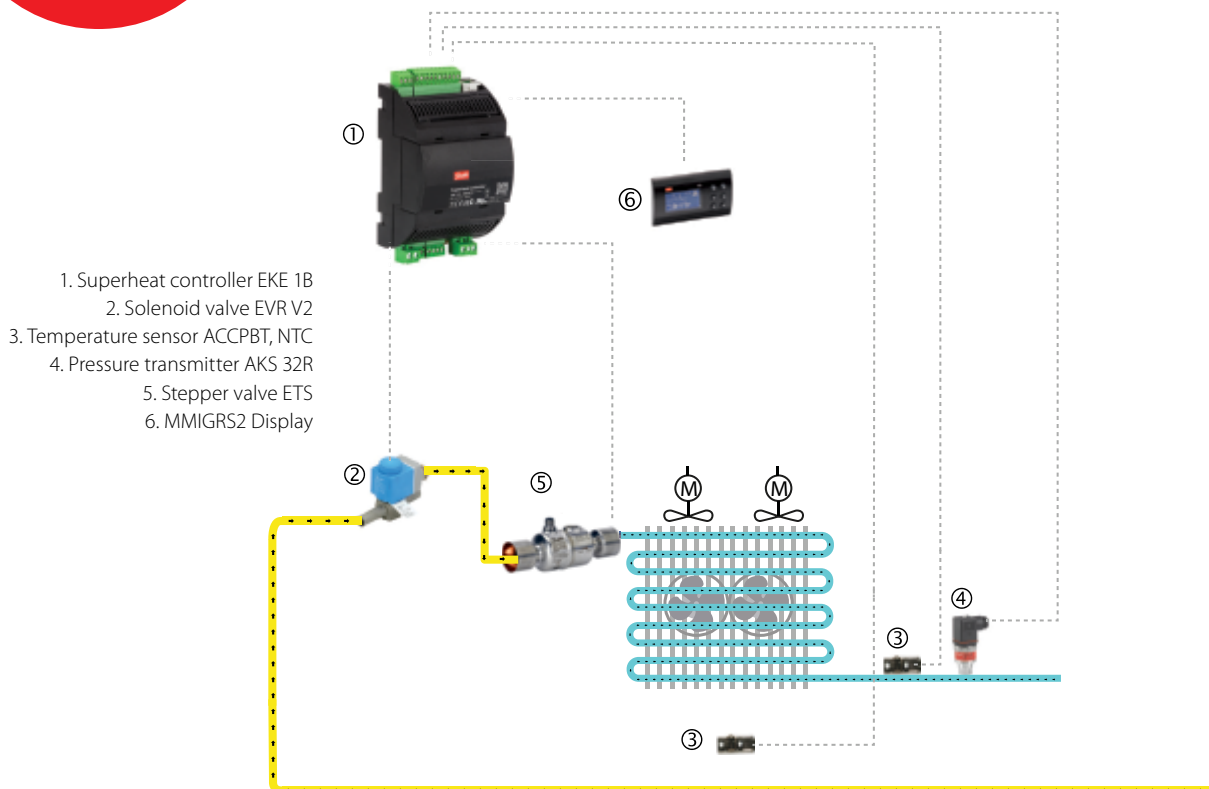
Elastomer Cap - 080G4025

NTC 10K probe 3m - 084N3210

# LP-ETS kit and ETS, Superheat controller

Superheat control in Cold stores, processing plants or A/C plants with Stepper Valve

## Features LP-ETS kit & ETS



## Facts

### Benefits:

- The evaporator is charged optimally even when there are great variations of load and suction pressure
- Energy savings
- The superheating is regulated to the lowest possible value at the same time as the media temperature is controlled by the thermostat function

### Functions:

- Regulation of superheat
- Temperature control
- MOP function
- ON/OFF input for start/stop of regulation
- Input signal that can displace the superheat reference or the temperature reference
- Alarm if the set alarm limits are exceeded
- Relay output for solenoid valve
- PID regulation

### Energy Saving:

- The adaptive regulation of the refrigerant injection ensures optimum utilization of the evaporator and hence a high suction pressure

# Technical data and ordering

## Ordering Code: LP-ETS-KIT

Kit Includes the following codes

| Description                                           | Code no.  | PSC |
|-------------------------------------------------------|-----------|-----|
| Superheat Controller, EKE 1B                          | 080G5350  | 1   |
| Pressure transmitter, AKS 32R (1/4" flare -1- 34 bar) | 060G0090  | 1   |
| ACCPBT, NTC Temperature probe, IP68 6X20, 3m Cable    | 080G0202  | 2   |
| Din Plug                                              | 060G0008  | 1   |
| 120 Ohm Resistors                                     | LP-RR0550 | 2   |
| Control Panel (MMGIRS2)                               | 080G0294  | 1   |
| ACCCBI Cable, Telephone U.I. 1.5m                     | 080G0075  | 1   |

Note:

-Please note, that the 240/24V transformer and stepper valve are not included in the kit.

Accessory, Power Supply- AK-PS 075- 080Z0053

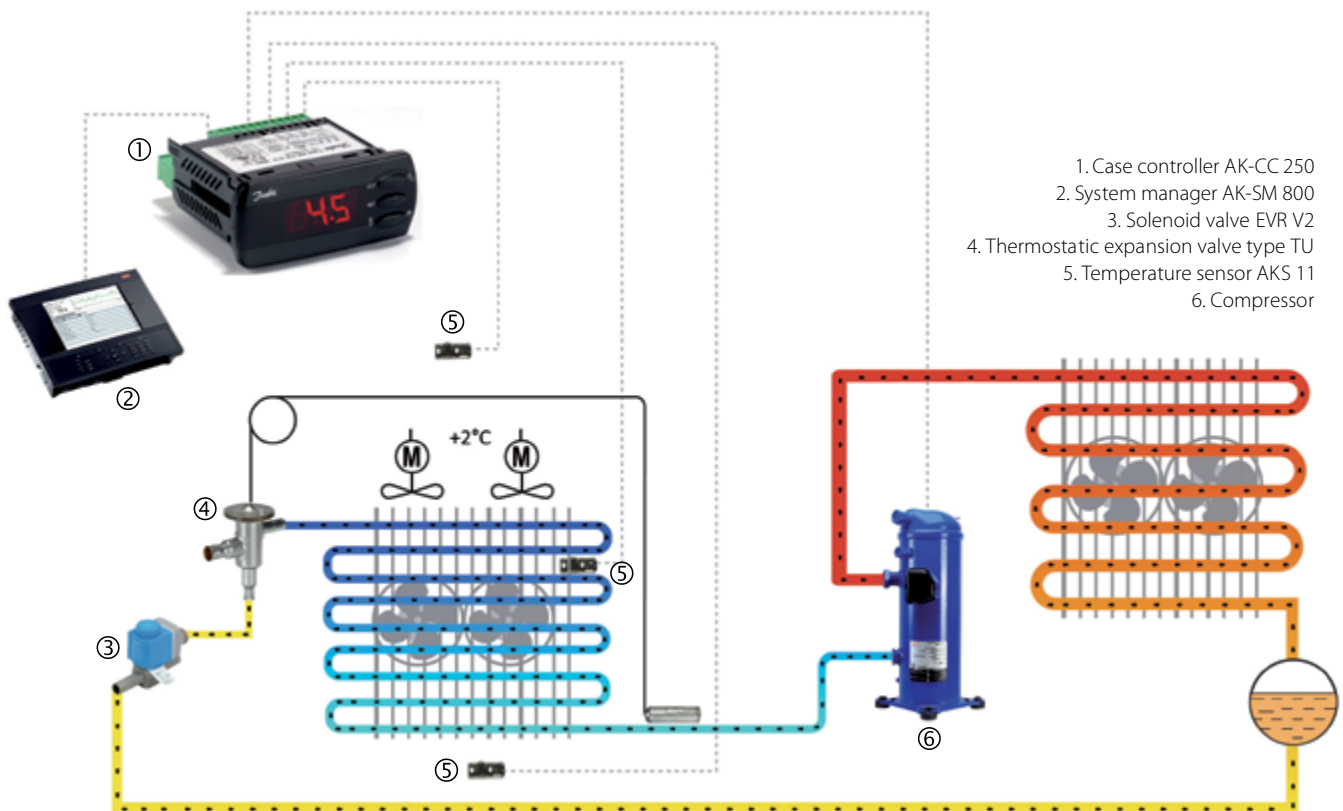
Backup power module, EKE 2U- 080G5555

# AK-CC 250A, Universal refrigeration controller

The controller is used for evaporator control refrigeration appliances in supermarkets. With many predefined applications one unit will

offer you many options. Flexibility has been planned both for new installations and for service in the refrigeration trade.

## Features AK-CC 250A



## Facts

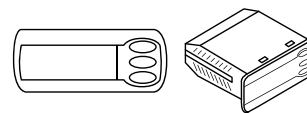
### Benefits:

- Many applications in the same unit
- The controller has integrated refrigeration-technical functions, so that it can replace a whole collection of thermostats and timers
- Buttons and seal imbedded in the front
- Can control two compressors
- Fixed MODBUS data communication
- Easy to remount data communication
- Quick setup
- Two temperature references
- HACCP (Hazard Analysis and Critical Control Points):
  - temperature monitoring and registration of period with too high temperature
  - factory calibration that will guarantee a better measuring accuracy than stated in the standard EN 441-13 without subsequent calibration (Pt 1000 ohm sensor)
- Digital inputs for various functions
- Clock function with backup

# Technical data and ordering

## AK-CC 250A

### Universal refrigeration controller



| Features                                 | Description                                                                                                                                                                 |                         |                                                                                       |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------|
| Supply voltage                           | 230 V AC 10 – 15% 2.5 V A                                                                                                                                                   |                         |                                                                                       |
| Sensors for AK-CC 250A, 3 pcs off either | Pt 1000 ohm (0 °C) PTC (1000 ohm / 25 °C)                                                                                                                                   |                         |                                                                                       |
|                                          | NTC-M2020 (5000 ohm / 25 °C)                                                                                                                                                |                         |                                                                                       |
|                                          | Measuring range: -60 – 99 °C                                                                                                                                                |                         |                                                                                       |
| Accuracy                                 | Controller: ± 1 K below -35 °C, ± 0.5 K between -35 – 25 °C, ± 1 K above +25 °C                                                                                             |                         |                                                                                       |
|                                          | Pt 1000 sensor: ± 0.3 K at 0 °C, ± 0.005 K per grad                                                                                                                         |                         |                                                                                       |
| External display                         | EKA 163 A (only in stand alone)                                                                                                                                             |                         |                                                                                       |
| Digital inputs                           | Signal from contact functions                                                                                                                                               |                         |                                                                                       |
|                                          | Requirements to contacts: Gold plating                                                                                                                                      |                         |                                                                                       |
|                                          | Cable length must be max. 15 m                                                                                                                                              |                         |                                                                                       |
| Electrical connection cable              | Use auxiliary relays when the cable is longer                                                                                                                               |                         |                                                                                       |
|                                          | Max. 1.5 mm <sup>2</sup> multi-core cable                                                                                                                                   |                         |                                                                                       |
| Relays *)                                | CE (250 V AC)                                                                                                                                                               |                         | UL *** (240 V AC)                                                                     |
|                                          | DO1. Refrigeration                                                                                                                                                          | 8 (6) A                 | 10 A Resistive<br>5 FLA, 30 LRA                                                       |
|                                          | DO2. Defrost                                                                                                                                                                | 8 (6) A                 | 10 A Resistive<br>5 FLA, 30 LRA                                                       |
|                                          | DO3. Fan                                                                                                                                                                    | 6 (3) A                 | 6 A Resistive<br>3 FLA, 18 LRA - 131 VA Pilot duty                                    |
|                                          | DO4. Alarm                                                                                                                                                                  | 4 (1) A Min. 100 mA **) | 4 A Resistive<br>131 VA Pilot duty                                                    |
| Environments                             | 0 – 55 °C, During operations                                                                                                                                                |                         |                                                                                       |
|                                          | -40 – 70 °C, During transport                                                                                                                                               |                         |                                                                                       |
|                                          | 20 – 80% Rh, not condensed                                                                                                                                                  |                         |                                                                                       |
| Enclosure                                | No shock influence / vibrations                                                                                                                                             |                         |                                                                                       |
|                                          | IP65 from front                                                                                                                                                             |                         |                                                                                       |
| Escapement reserve for the clock         | Buttons and packing are embedded in the front                                                                                                                               |                         |                                                                                       |
| Approvals                                | 4 hours                                                                                                                                                                     |                         |                                                                                       |
|                                          | EU Low Voltage Directive and EMC demands re CE-marking complied with<br>LVD tested acc. EN 60730-1 og EN 60730-2-9, A1, A2<br>EMC tested acc. EN50082-1 og EN 60730-2-9, A2 |                         |  |

\*) DO1 and DO2 are 16 A relays. DO3 and DO4 are 8 A relays. Max. load must be kept

\*\*) Gold plating ensures make function with small contact loads

\*\*) UL-approval based on 30000 couplings

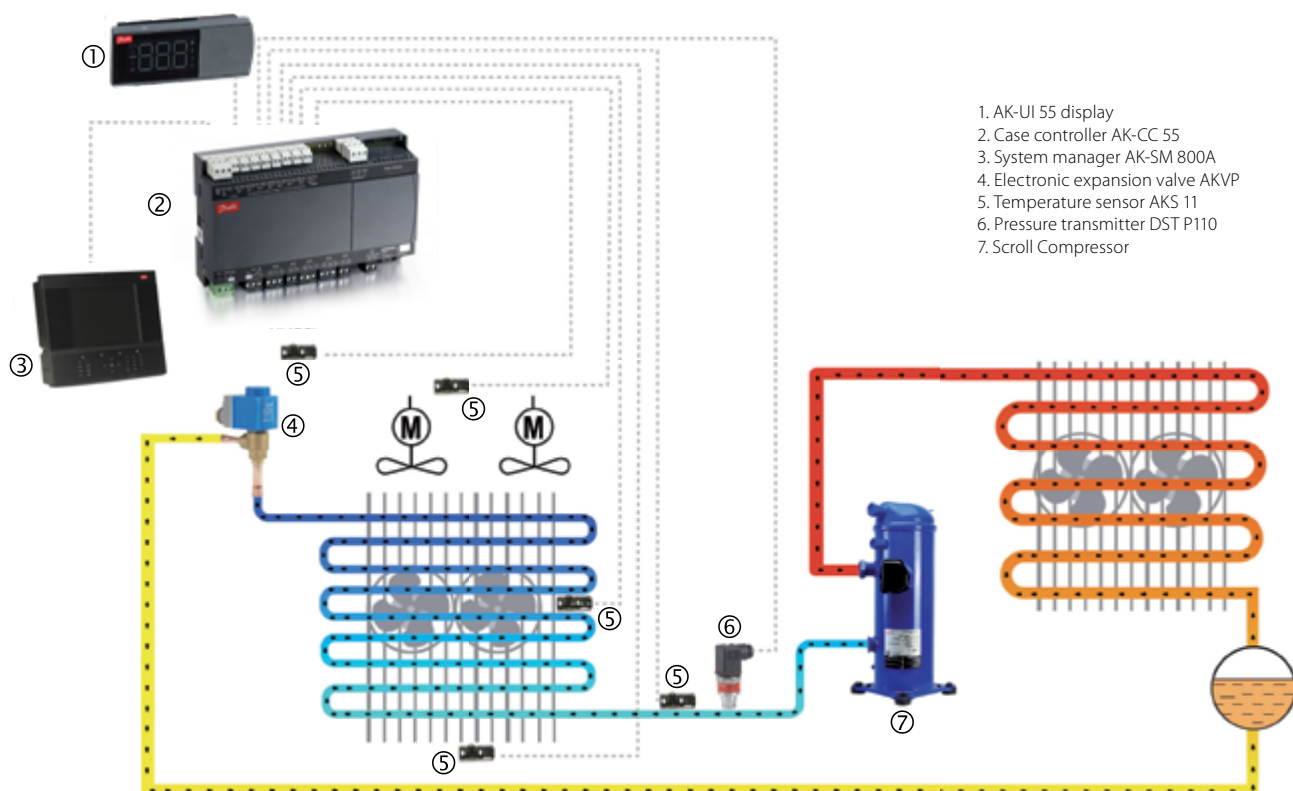
## Ordering

| Description                      | Code no.                          | PSC |
|----------------------------------|-----------------------------------|-----|
| Case Controller, AK-CC 250       | 084B8528                          | 1   |
| Sensor AKS 12 1.5m PT1000        | 084N0036                          | 2   |
| Thermostatic Expansion Valve, TU | Refer to data sheet for selection | 1   |
| Solenoid Valve, EVR              | Refer to data sheet for selection | 1   |
| Scroll Compressor                | Refer to data sheet for selection | 1   |
| EKA 183A Programming Key         | 084B8582                          | 1   |

# AK-CC 55 Room/ Case controller (Pulse valve)

AK-CC 55 is a complete refrigeration appliance control with great flexibility to adapt to all types of refrigeration appliances and cold storage rooms.

## Features AK-CC 55



1. AK-UI 55 display
2. Case controller AK-CC 55
3. System manager AK-SM 800A
4. Electronic expansion valve AKVP
5. Temperature sensor AKS 11
6. Pressure transmitter DST P110
7. Scroll Compressor

\* Pulsing valve may cause damage to weak joints in 1-1 system.

## Facts

### Benefits:

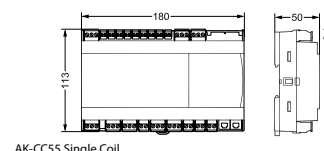
- Allows the suction pressure to be raised several degrees
- Energy optimization of the whole refrigeration appliance
- Adaptive Minimum Stable Superheat (MSS) control is performed with lowest possible superheat
- Adaptive Liquid Control (ALC) can be performed with superheat down to 0 degrees on transcritical CO<sub>2</sub> systems with liquid ejectors (ALC is available in selective AK-CC 55 models)
- One controller for several different refrigeration appliances
- Quick set-up with predefined settings
- Easy configuration and service using a mobile app with Bluetooth



# Technical data and ordering

## AK-CC 55

### Controller for appliance control



| Features                                              | Description                                                                                                                                                                                                      |                                                                                                                                                               |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supply voltage                                        | 115 / 230 V AC (85-265V). 5 V A, 50 / 60 Hz<br>Power: Green LED                                                                                                                                                  |                                                                                                                                                               |
| Sensor S2, S6                                         | Pt 1000                                                                                                                                                                                                          |                                                                                                                                                               |
| Sensor S3, S4, S5                                     | Pt 1000 or PTC 1000 or Ntc 5K or Ntc 10K<br>(All 3 must be of the same type)                                                                                                                                     |                                                                                                                                                               |
| Measuring of temperature                              | PT 1000: -60 – 120 °C, ± 0.5 K<br>PT 1000: -60 – 80 °C, ± 0.5 K<br>NTC 5K: -40 – 80 °C, ± 1.0 K<br>NTC 10K: -40 – 120 °C, ± 1.0 K                                                                                |                                                                                                                                                               |
|                                                       | Pt 1000 sensor                                                                                                                                                                                                   | ± 0.3K at 0 °C<br>± 0.005 K per degree                                                                                                                        |
| Measuring of Pe                                       | Ratiometric pressure transmitter                                                                                                                                                                                 | 10-90%                                                                                                                                                        |
| Measuring of RH                                       | 0-10 V                                                                                                                                                                                                           | Ri > 10K ohm<br>Accuracy +/- 0.3% FS                                                                                                                          |
| Display                                               | LED, 3-digits                                                                                                                                                                                                    |                                                                                                                                                               |
| External display                                      | 1 pc RJ12 output on compact versions and versions with integrated displays<br>2 pcs, RJ12 outputs on versions without displays<br>Max. 100m cable total                                                          |                                                                                                                                                               |
| Digital inputs DI1, D2                                | Signal from contact functions<br>Requirements to contacts: Gold plating<br>Cable length must be max. 15 m<br>Use auxiliary relays when the cable is longer<br>Open loop: 12 V<br>Contact 3.5 mA                  |                                                                                                                                                               |
| Digital inputs DI3                                    | 115 V / 230 V AC                                                                                                                                                                                                 |                                                                                                                                                               |
| Electrical cable dimensions                           | Max. 1.5 mm² multi-core cable                                                                                                                                                                                    |                                                                                                                                                               |
| Solid state output                                    | DO1 (for AKV coil)<br>(DO3 and DO7 in Multi Coil)                                                                                                                                                                | 115 V / 230 V AC<br>Max. 0.5 A<br>Max. 1 x 20 W AKV for 115 V AC<br>2 x 20 W AKV for 230 V AC                                                                 |
| Relays *                                              | DO2, DO3, DO4<br>DO5, DO6                                                                                                                                                                                        | 115 V / 230 V AC<br>Load max.: CE. 8 (6)A<br>UL 8A res. 3FLA 18LRA<br>Load min.: 1VA<br>Inrush: DO2 DO3 for Compact<br>DO5 DO6 for Single/Multi Coil TV-5 80A |
| Analogue output/ PWM                                  | AO1                                                                                                                                                                                                              | 0 / 10 V Pulse Width Modulated (PWM) max. 15mA.<br>0-10 V variable, max. 2mA                                                                                  |
| Environments                                          | 0 – 55 °C, During operations<br>-40 – 70 °C, During transport                                                                                                                                                    |                                                                                                                                                               |
|                                                       | 20 – 80% Rh, not condensed<br>No shock influence / vibrations                                                                                                                                                    |                                                                                                                                                               |
| Density                                               | IP20                                                                                                                                                                                                             |                                                                                                                                                               |
| Mounting                                              | DIN-rail                                                                                                                                                                                                         |                                                                                                                                                               |
| Weight                                                | 0.4 Kg                                                                                                                                                                                                           |                                                                                                                                                               |
| Data communication<br>Tx: Yellow LED<br>Rx: Green LED | Fixed                                                                                                                                                                                                            | MODBUS                                                                                                                                                        |
|                                                       | Extension options:<br>(Not for Compact version)                                                                                                                                                                  | LON RS485                                                                                                                                                     |
| Power reserve for the clock                           | 4 days                                                                                                                                                                                                           |                                                                                                                                                               |
| Approvals                                             | EU Low Voltage Directive and EMC demands re CE-marking complied with<br>LVD (2014/35/EU)<br>CB scheme acc. to IEC 60730-1 and 2-9 EMC (2014/35/EU)<br>EN 61000-6-2 and 6-3<br>Relays tested acc. to IEC 60079-15 |                                                                                                                                                               |

\* DO2 to DO6 are 16 A relays. Max. load must be observed. DO3 DO4 for Compact and DO5 DO6 for Single/ Multi Coil is recommended for EC Fan and LED light.  
All relays are sealed for use with flammable refrigerant like Propane R290.  
Compliance with EN 60 335-2-89: 2010 Annex BB.

# Technical data and ordering

## Ordering

| Description                                              | Code no. | PSC |
|----------------------------------------------------------|----------|-----|
| Controller with Modbus communication (single coil, 230V) | 084B4082 | 1   |
| AK-UI display                                            | 084B4076 | 1   |
| Display cable (RJ12 connector, 3m)                       | 084B4078 | 1   |
| Temperature probe AKS 11 (3.5 m cable, -50 to 100°C)     | 084N0003 | 3   |
| Pressure transmitter, AKS 32R (1/4" flare -1 to 12 bar)  | 060G1036 | 1   |
| Pressure transmitter plug (5m cable)                     | 060G1034 | 1   |

*Note: Other options of controller are available.*



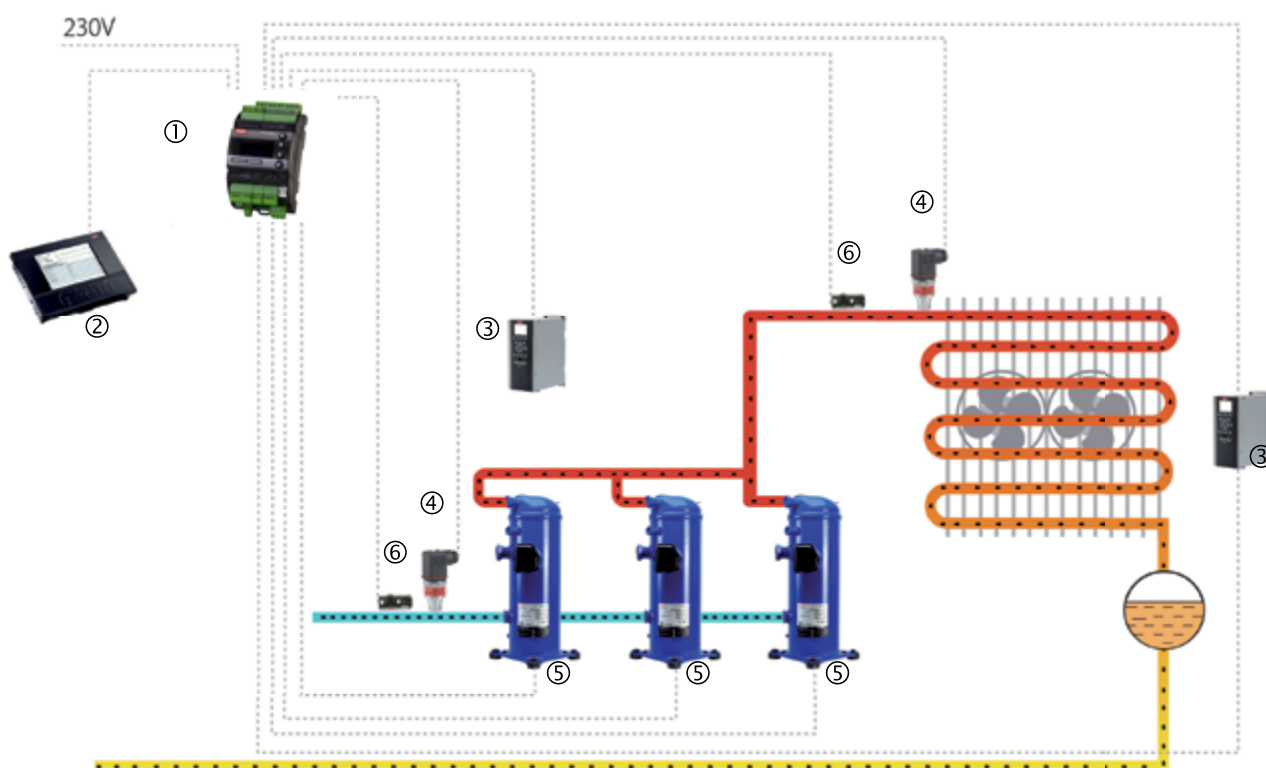
# AK-PC 351, Capacity controller

AK-PC 351 is used for capacity regulation of compressors and condensers in small refrigeration applications.  
A maximum of 4 compressors and one condenser can be regulated:

- One suction group + one condenser group, max. 6 steps
- One compressor group, max. 4 steps
- One condenser group, max. 4 steps

## Features AK-PC 351

1. AK-PC 351 Pack controller
2. System manager AK-SM 800
3. VLT® Frequency converter FC 103
4. Pressure transmitter AKS 32R
5. Scroll compressor
6. Temperature Sensor



## Facts

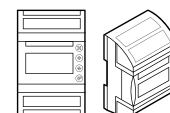
### Benefits:

- Energy savings via:
  - optimisation of suction pressure
  - night time increase
  - floating condensing pressure

# Technical data and ordering

## AK-PC 351

### Capacity controller



| Features                         | Description                                                                                                                                                                                                                                                            |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supply voltage                   | 24 V AC $\pm$ 15%, 50 / 60 Hz, 17 V A<br>24 V DC (20 – 60 V), 17 V A                                                                                                                                                                                                   |
| 4 analog Input                   | Pressure measuring:<br>Ratiometric pressure transmitter type AKS 32R<br>1 – 5 volt pressure transmitter type AKS 32<br>0 – 20 (4 – 20) mA pressure transmitter type AKS 33<br>Temperature measurement<br>Pt 1000 ohm / 0 °C<br>NTC - 86 K from digital scroll / stream |
| 8 digital input                  | From contact function<br>E.g. to:<br>Start / stop of regulation<br>Monitoring of safety circuits<br>General alarm function                                                                                                                                             |
| Relay output to capacity control | 5 pcs. SPST (5 A): AC-1: 5 A (ohmic)<br>5 pcs. SPST (5 A): AC-15: 2 (inductive)<br>1 pc. Solid State<br>PWM for scroll -unload<br>I <sub>max.</sub> = 0.5 A<br>I <sub>min.</sub> = 50 mA<br>Leak < 1.5 mA                                                              |
| 2 Voltage output                 | 0-10 V DC Ri = 1 kohm                                                                                                                                                                                                                                                  |
| Data communication               | Modbus for AK-SM 850                                                                                                                                                                                                                                                   |
| Environments                     | -20 – 60 °C, During operations<br>-40 – 70 °C, During transport<br>20 – 80% Rh, not condensed<br>No shock influence / vibrations                                                                                                                                       |
| Enclosure                        | IP40                                                                                                                                                                                                                                                                   |
| Weight                           | 0.2 kg                                                                                                                                                                                                                                                                 |
| Mounting                         | DIN-rail                                                                                                                                                                                                                                                               |
| Connection terminals             | max. 2.5 mm <sup>2</sup> multi core                                                                                                                                                                                                                                    |
| Approvals                        | EU Low Voltage Directive and EMC demands re<br>CE-marking complied with<br>LVD tested acc. EN 60730-1 and EN 60730-2-9<br>EMC-tested acc. EN61000-6-2 and 3                                                                                                            |

## Ordering

| Description                                                          | Code no.                                              | PSC |
|----------------------------------------------------------------------|-------------------------------------------------------|-----|
| Pack Controller AK-PC 351 (24 V)                                     | 080G0289                                              | 1   |
| Pressure transmitter AKS 32R for suction (1/4" flare -1 to 12 bar)   | 060G1036                                              | 1   |
| Pressure transmitter AKS 32R for discharge (1/4" flare -1 to 34 bar) | 060G0090                                              | 1   |
| Plug with 5 m cable                                                  | 060G1034                                              | 2   |
| Temperature sensor AKS 11 for suction (3.5 m cable, -50 to 100°C)    | 084N0003                                              | 1   |
| Temperature sensor AKS 21A for discharge (5 m cable, -70 to 180°C)   | 084N0008                                              | 1   |
| Speed drive FC-103 for lead compressor and condenser                 | consult FC-103 configuration tool(drives.danfoss.com) |     |
| Scroll Compressors, third party compressors                          |                                                       |     |

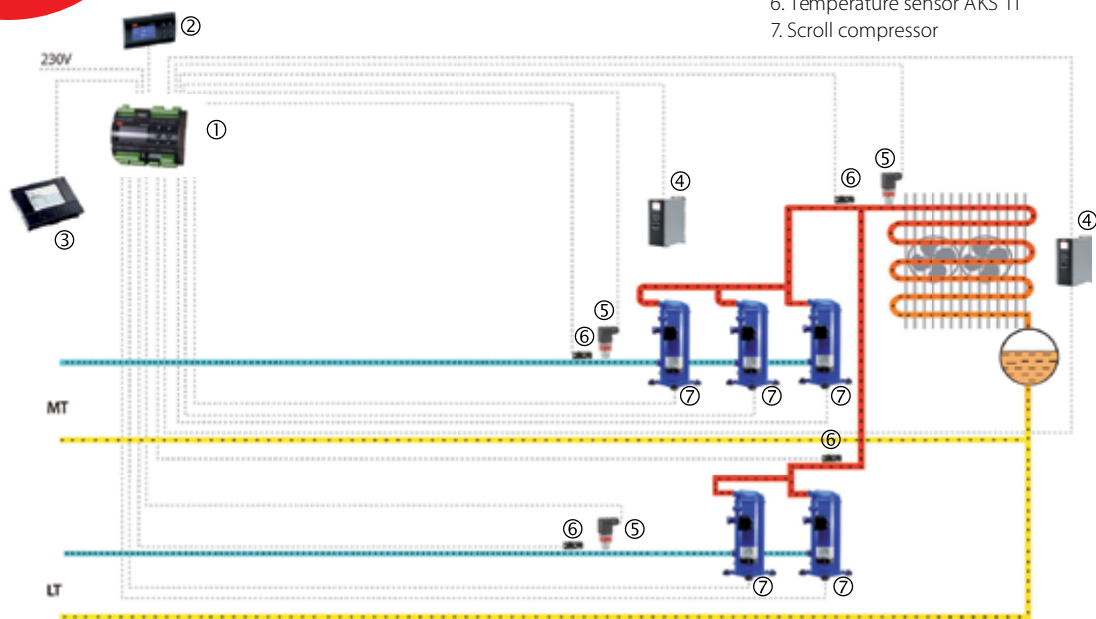
# AK-PC 551, Capacity controller

AK-PC 551 is used for capacity regulation of compressors and condensers in small refrigeration applications.  
A maximum of 8 compressors and one condenser can be regulated:

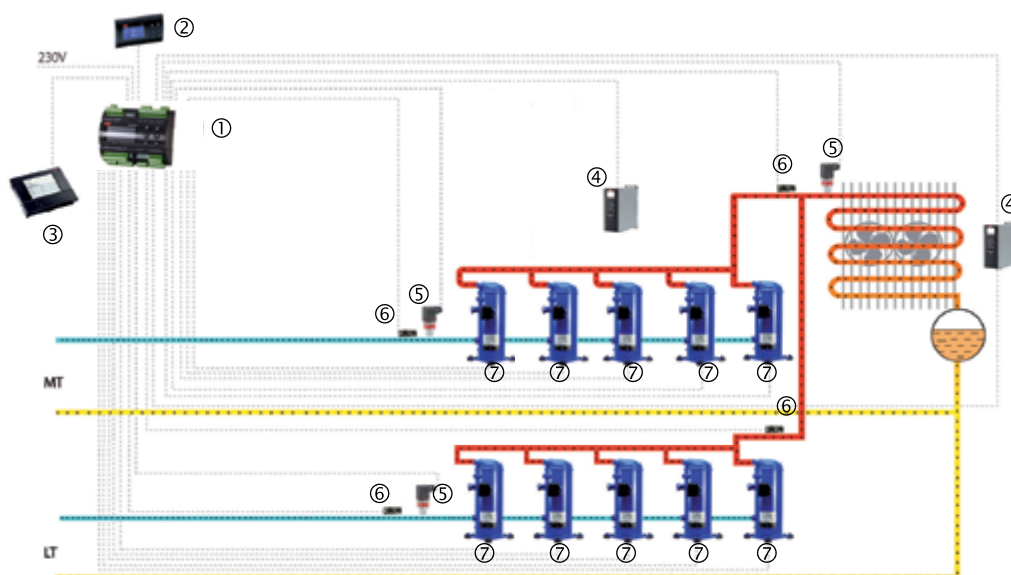
- One suction group + one condenser group
- Two suction groups + one shared condenser, max. 4 + 4 steps
- One compressor group, max. 8 steps
- One condenser group, max. 8 steps

## Features AK-PC 551

1. Pack controller AK-PC 551
2. Remote graphical display MMIGRS2
3. System Manager AK-SM 800
4. VLT® Frequency converter FC 103
5. Pressure transmitter AKS 32R
6. Temperature sensor AKS 11
7. Scroll compressor



One Suction



Two Suction

## Facts

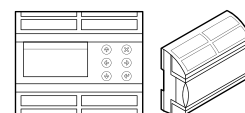
### Benefits:

- Energy savings via:
  - optimisation of suction pressure
  - night time increase
  - floating condensing pressure
  - load limitation

# Technical data and ordering

## AK-PC 551

### Capacity controller



| Features                         | Description                                                                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supply voltage                   | 24 V AC $\pm$ 15%, 50 / 60 Hz, 17 V A                                                                                                                                                              |
|                                  | 24 V DC (20 – 60 V), 17 V A                                                                                                                                                                        |
|                                  | 230 V AC (85 – 265 V) 50 / 60 Hz, 20 V A                                                                                                                                                           |
| 8 analog Input                   | Pressure measuring:<br>Ratiometric pressure transmitter type AKS 32R<br>1 – 5 volt pressure transmitter type AKS 32<br>0 – 20 (4 – 20) mA pressure transmitter type AKS 33                         |
|                                  | Temperature measurement<br>Pt 1000 ohm / 0 °C<br>NTC - 86 K from digital scroll / stream                                                                                                           |
|                                  | From contact function<br>E.g. to:<br>Start / stop of regulation<br>Monitoring of safety circuits<br>General alarm function                                                                         |
| 8 digital input                  |                                                                                                                                                                                                    |
| Relay output to capacity control | 4 pcs. SPDT (8 A): AC-1: 6 A (ohmic)                                                                                                                                                               |
|                                  | 4 pcs. SPDT (8 A): AC-15: 4 A (inductive)                                                                                                                                                          |
|                                  | 2 pcs. SPST (16 A): AC-1: 10 A (ohmic)                                                                                                                                                             |
|                                  | 2 pcs. SPST (16 A): AC-15: 3.5 A (inductive)                                                                                                                                                       |
|                                  | 2 pcs. Solid State.<br>PWM for scroll -unload                                                                                                                                                      |
| 2 Voltage output                 | 0-10 V DC Ri = 1 kohm, Separate 24 V supply required                                                                                                                                               |
| Display output                   | For type MMIGRS2                                                                                                                                                                                   |
| Data communication               | Modbus for AK-SM 850                                                                                                                                                                               |
| Environments                     | -20 – 60 °C, During operations                                                                                                                                                                     |
|                                  | -40 – 70 °C, During transport                                                                                                                                                                      |
|                                  | 20 – 80% Rh, not condensed                                                                                                                                                                         |
| Enclosure                        | No shock influence / vibrations                                                                                                                                                                    |
| Weight                           | IP20                                                                                                                                                                                               |
| Mounting                         | 0.4 kg                                                                                                                                                                                             |
| Connection terminals             | DIN-rail                                                                                                                                                                                           |
| Approvals                        | max. 2.5 mm <sup>2</sup> multi core<br>EU Low Voltage Directive and EMC demands re<br>CE-marking complied with<br>LVD tested acc. EN 60730-1 and EN 60730-2-9<br>EMC-tested acc. EN61000-6-2 and 3 |

## Ordering

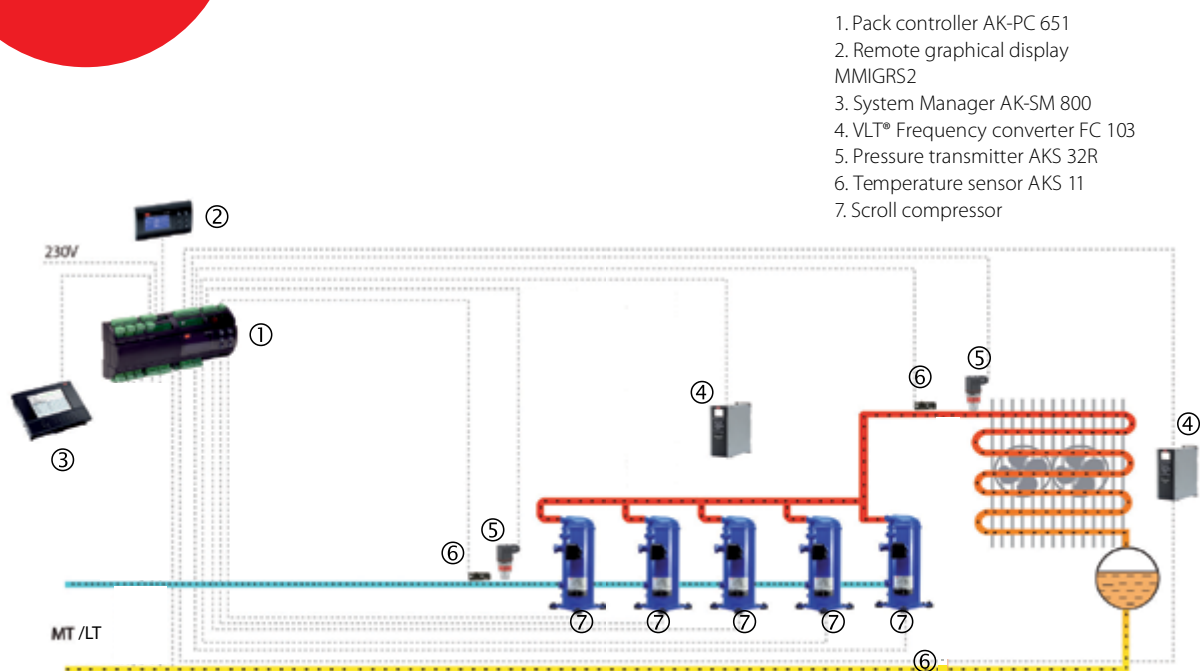
| Description                                                          | Code no.                                               | PSC |
|----------------------------------------------------------------------|--------------------------------------------------------|-----|
| Pack Controller AK-PC 551 with built-in display                      | 080G0281 (230 V) or 080G0283 (24 V)                    | 1   |
| Remote Display MMIGRS2                                               | 080G0294                                               | 1   |
| Wire for Display                                                     | 080G0076 (3 m)                                         | 1   |
| Pressure transmitter AKS 32R for suction (1/4" flare -1 to 12 bar)   | 060G1036                                               | 1   |
| Pressure transmitter AKS 32R for discharge (1/4" flare -1 to 34 bar) | 060G0090                                               | 1   |
| Plug with 5 m cable                                                  | 060G1034                                               | 2   |
| Temperature sensor AKS 11 for suction (3.5 m cable, -50 to 100°C)    | 084N0003                                               | 1   |
| Temperature sensor AKS 21A for discharge (5 m cable, -70 to 180°C)   | 084N0008                                               | 1   |
| Variable Speed drive FC-103 for lead compressor and condenser        | Consult FC-103 configuration tool (drives.danfoss.com) |     |
| Scroll Compressor                                                    |                                                        |     |

# AK-PC 651, Capacity controller

AK-PC 651 is used for capacity regulation of compressors and condensers in small refrigeration applications.  
A maximum of 10 compressors and one condenser can be regulated:

- One suction group + one condenser group
- One compressor group, max. 10 steps
- One condenser group, max. 8 steps

## Features AK-PC 651



## Facts

### Benefits:

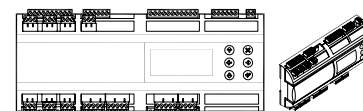
- Energy savings via:
  - optimisation of suction pressure
  - night time increase
  - floating condensing pressure
  - load limitation



# Technical data and ordering

## AK-PC 651

### Capacity controller



| Features                                                                     | Description                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supply voltage                                                               | 230 V AC (85 – 265 V) 50 / 60 Hz, 26 V A                                                                                                                                                                                                                               |
| 10 analog Input                                                              | Pressure measuring:<br>Ratiometric pressure transmitter type AKS 32R<br>1 – 5 volt pressure transmitter type AKS 32<br>0 – 20 (4 – 20) mA pressure transmitter type AKS 33<br>Temperature measurement<br>Pt 1000 ohm / 0 °C<br>NTC - 86 K from digital scroll / stream |
| 18 digital input<br>(14 for low voltage + 4 for high voltage or low voltage) | From contact function<br>E.g. to:<br>Start / stop of regulation<br>Monitoring of safety circuits<br>General alarm function                                                                                                                                             |
| Relay output to capacity control                                             | 7 pcs. SPST (8 A): AC-1: 6 A (ohmic), AC-15: 4 A (inductive)                                                                                                                                                                                                           |
|                                                                              | 4 pcs. SPDT (8 A): AC-1: 6 A (ohmic), AC-15: 4 A (inductive)                                                                                                                                                                                                           |
|                                                                              | 2 pcs. SPDT (16 A): AC-1: 7 A (ohmic), AC-15: 3.5 A (inductive)                                                                                                                                                                                                        |
|                                                                              | 2 pcs. Solid State.<br>PWM for scroll -unload                                                                                                                                                                                                                          |
| 4 Voltage output                                                             | 0-10 V DC Ri = 1 kohm, Separate 24 V supply required                                                                                                                                                                                                                   |
| Display output                                                               | For type MMIGRS2                                                                                                                                                                                                                                                       |
| Data communication                                                           | Modbus for AK-SM 850                                                                                                                                                                                                                                                   |
| Environments                                                                 | -20 – 60 °C, During operations                                                                                                                                                                                                                                         |
|                                                                              | -40 – 70 °C, During transport                                                                                                                                                                                                                                          |
|                                                                              | 20 – 80% Rh, not condensed                                                                                                                                                                                                                                             |
|                                                                              | No shock influence/vibrations                                                                                                                                                                                                                                          |
| Enclosure                                                                    | IP20                                                                                                                                                                                                                                                                   |
| Weight                                                                       | 0.8 kg                                                                                                                                                                                                                                                                 |
| Mounting                                                                     | DIN-rail                                                                                                                                                                                                                                                               |
| Connection terminals                                                         | max. 2.5 mm <sup>2</sup> multi core                                                                                                                                                                                                                                    |
| Approvals                                                                    | EU Low Voltage Directive and EMC demands re<br>CE-marking complied with<br>LVD tested acc. EN 60730-1 and EN 60730-2-9<br>EMC-tested acc. EN61000-6-2 and 3                                                                                                            |

## Ordering

| Description                                                          | Code no.                                               | PSC |
|----------------------------------------------------------------------|--------------------------------------------------------|-----|
| Pack Controller AK-PC 651 with built-in display                      | 080G0312                                               | 1   |
| Remote Display MMIGRS2                                               | 080G0294                                               | 1   |
| Wire for Display                                                     | 080G0076 (3 m)                                         | 1   |
| Pressure transmitter AKS 32R for suction (1/4" flare -1 to 12 bar)   | 060G1036                                               | 2   |
| Pressure transmitter AKS 32R for discharge (1/4" flare -1 to 34 bar) | 060G0090                                               | 1   |
| Plug with 5 m cable                                                  | 060G1034                                               | 3   |
| Temperature sensor AKS 11 for suction (3.5 m cable, -50 to 100°C)    | 084N0003                                               | 1   |
| Temperature sensor AKS 21A for discharge (5 m cable, -70 to 180°C)   | 084N0008                                               | 1   |
| Variable Speed drive FC-103 for lead compressor and condenser        | Consult FC-103 configuration tool (drives.danfoss.com) |     |
| Scroll Compressor                                                    |                                                        |     |

# AK-SM 800 series, System manager

The System Manager controller from Danfoss is the global control and supervisory solution for the food retail industry. The System Manager uses the latest technology to provide the maximum benefit to the end user, both in terms of energy saving optimization, control options and full web user access.

Designed specifically for the food retail and food processing / handling market, the System Manager provides comprehensive functionality and support tools to cover small to large stores.



## Facts

### Benefits:

- Direct support to EM-800 (AKM not supported / needed)
- Supports centralized and decentralized control strategy; compatible with Danfoss case and pack controllers and Danfoss I/O
- Open XML data transfer allowing remote access to key system parameters

### Design features:

- Active TFT SVGA color screen 800x600
- Front alarm status LED
- Removable keyboard panel (revealing connections)
- Easy access to USB flash drive
- Wall and panel mounting options
- Built in alarm relay output

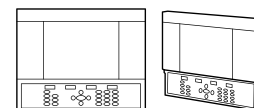
### Hardware capability features:

- Built in web server
- No back up battery required
- RS485 LonWorks®
- Ethernet
- EKC Modbus
- USB

# Technical data and ordering

## AK-SM 800 series

### System manager



| SM800 version comparison                                                                                    | AK-SM 810, SM820 - C-Store Version | SM850 - Refrig version     | SM880 - Full version       |
|-------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------|----------------------------|
| <b>Refrigeration Control</b>                                                                                |                                    |                            |                            |
| All SM800 variants come with Centralized I/O and Pack / Case control options.<br>EKC<br>AK2<br>SLV<br>FC103 | Max 32 generic device support      | Max 120 generic support    | Max 120 generic support    |
| <b>Lighting Control</b>                                                                                     |                                    |                            |                            |
| All SM800 variants come with built in lighting control via I/O modules.<br>The number of zones differ       | 10                                 | 30                         | 30                         |
| <b>HVAC</b>                                                                                                 |                                    |                            |                            |
| Only the SM820 and SM880 support built in HVAC control via I/O                                              | 10                                 | n/a                        | 45                         |
| <b>Alarms</b>                                                                                               |                                    |                            |                            |
| Capacity                                                                                                    | 250                                | 250                        | 250                        |
| <b>Miscellaneous points (via IO modules)</b>                                                                |                                    |                            |                            |
| Relay (R), Sensor (S), ON / OFF (O / F), Variable (V)                                                       | R=20, S=20, O / F=20, V=20         | R=70, S=80, O / F=70, V=70 | R=70, S=80, O / F=70, V=70 |
| <b>Master control</b>                                                                                       |                                    |                            |                            |
| Po Optimization, Master Schedules, AKC ON<br><i>Note: Adaptive Defrost not currently supported</i>          | X                                  | X                          | X                          |
| <b>Misc Calculations</b>                                                                                    |                                    |                            |                            |
| Boolean Logic statements                                                                                    | 96                                 | 96                         | 96                         |
| <b>History</b>                                                                                              |                                    |                            |                            |
| The SM800 has the ability to record datapoints for history and view                                         | 600 points                         | 600 points                 | 600 points                 |
| <b>Leak Detectors</b>                                                                                       |                                    |                            |                            |
| Refrigerant gas detectors (connected via AK I/O)                                                            | 10                                 | 50                         | 50                         |
| <b>Energy Meters</b>                                                                                        |                                    |                            |                            |
| Pulse Input (via I/O module), Carlo Garvazi, Wattnode, Wattnode Plus Modbus, Veris Modbus                   | 32                                 | 80                         | 80                         |
| <b>Service Tool Support</b>                                                                                 |                                    |                            |                            |
| Tunneling via front end (IP connection only)                                                                | X                                  | X                          | X                          |

Note:  
AK-SM 810 doesnt have screen

## Ordering

| Type        | Description                                                 | Options                                           | Code no. |
|-------------|-------------------------------------------------------------|---------------------------------------------------|----------|
| AK-SM 810   | C-Store Refrigeration/HVAC/Lightning,No display, No buttons | Convenience Store with 32 device capacity         | 080Z4006 |
| AK-SM 820   | C-Store (Refrigeration / HVAC / Lighting)                   | Convenience Store version with 32 device capacity | 080Z4004 |
| AK-SM 850   | Refrigeration (including lighting)                          | Refrigeration version with 120 device capacity    | 080Z4001 |
| AK-SM 880   | Full (Refrigeration / HVAC / Lighting)                      | Full store version with 120 device capacity       | 080Z4008 |
| AK-SM 800AL | Alarm logger                                                | AK-SM 8xx accessory                               | 080Z4014 |

## Smart store solution

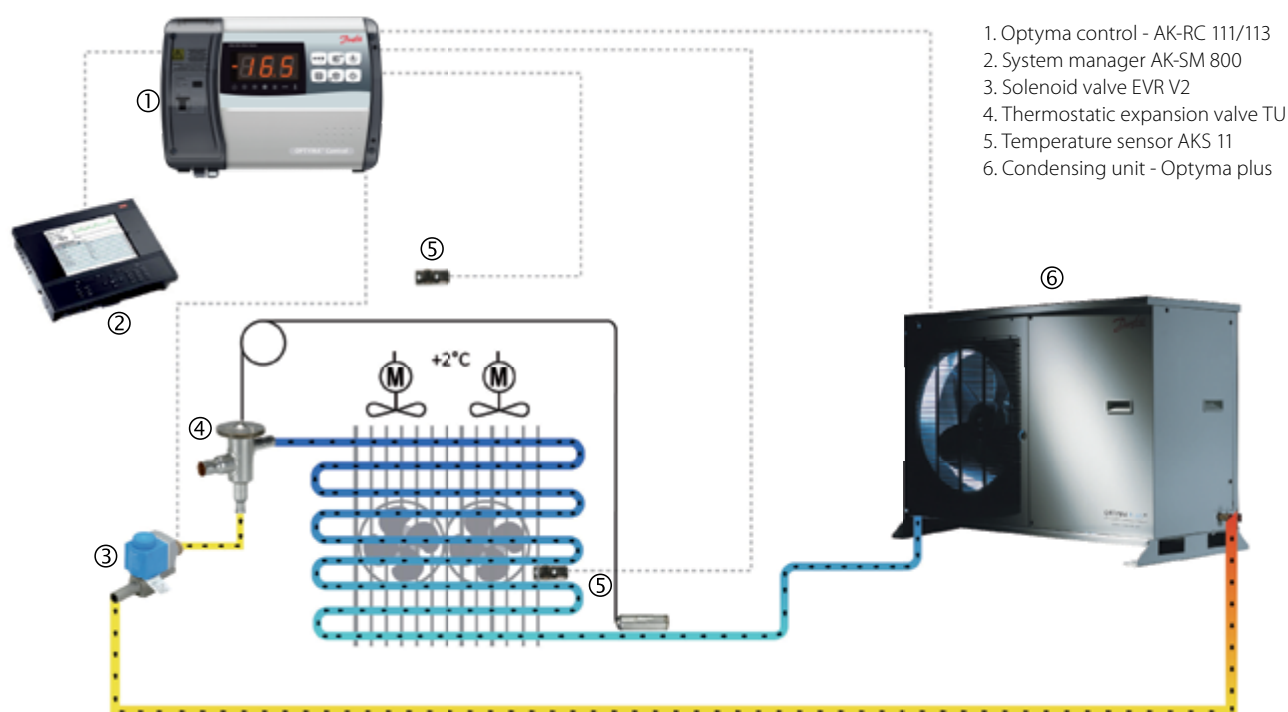


# Optyma™ Control, Single / Three-phase

The Optyma™ Control is particularly suitable for the Optyma™ and Optyma™ **Plus** condensing units from Danfoss but is also compatible with other condensing units on the market. The control features an attractive new design and simple flexible programming.

It offers both control and protection in a single unit, thanks to the unique built-in differential magnetothermal circuit breaker, which guarantees safety by cutting the general power supply.

## Features Optyma™



## Facts

### Benefits:

- Direct control of defrosting elements, evaporator fans, room light with outputs directly connectable to the various units
- Standard and ADAP-KOOL® compatible Modbus data communication

### Display & programming:

- LED indicators and large display show system status
- User-friendly keypad
- Display resolution to 0.1 °C

### Protection:

- Automatic fuse protect the refrigeration unit
- Stylish ABS housing with transparent cover for access to the automatic fuse, all with an IP65 protection rating so that panel can be used outside the room

# Technical data and ordering

## Optyma™ Control, Single phase

### Electronic controller

| Power supply                              |                 |                                                 |                                                                             |
|-------------------------------------------|-----------------|-------------------------------------------------|-----------------------------------------------------------------------------|
| Voltage                                   |                 | 230 V~ ± 10% 50/60 Hz                           |                                                                             |
| Max power (only electronics)              |                 | ~ 7 VA                                          |                                                                             |
| Rated current                             |                 | 16 A                                            |                                                                             |
| Climate conditions                        |                 |                                                 |                                                                             |
| Working temperature                       |                 | -5 – 50 °C                                      |                                                                             |
| Storage temperature                       |                 | -10 – 70 °C                                     |                                                                             |
| Relative ambient humidity                 |                 | Lower than 90% Hr                               |                                                                             |
| General characteristics                   |                 |                                                 |                                                                             |
| Type of sensors that can be connected     |                 | NTC 10K 1%                                      |                                                                             |
| Resolution                                |                 | 0.1 °C                                          |                                                                             |
| Sensor read precision                     |                 | ± 0.5 °C                                        |                                                                             |
| Read range                                |                 | -45 – 99 °C                                     |                                                                             |
| Output characteristics                    |                 |                                                 |                                                                             |
| Description                               | Installed relay | Card output characteristics                     | Note                                                                        |
| Compressor                                | (Relay 30A AC1) | 10 A 250 V~ (AC3) (2HP) (100000 cicli)          | The sum of contemporary absorptions of these outputs has not to exceed 16 A |
| Defrost                                   | (Relay 30A AC1) | 16A 250 V~ (AC1)                                |                                                                             |
| Fans                                      | (Relay 16A AC1) | 2.7 A 250 V~ (AC3)                              |                                                                             |
| Room light                                | (Relay 16A AC1) | 16 A 250 V~ (AC1)                               |                                                                             |
| Aux 1 (free voltage contact)              | (Relay 5A AC1)  | 5(3) A 250 V~                                   |                                                                             |
| Aux 2 (free voltage contact)              | (Relay 5A AC1)  | 5(3) A 250 V~                                   |                                                                             |
| General electrical protection             |                 | Differential magnetothermic circuit breaker 16A |                                                                             |
|                                           |                 | Id=300 mA                                       |                                                                             |
|                                           |                 | (Id=30 mA on request)                           |                                                                             |
|                                           |                 | Disconnecting power 4.5 kA                      |                                                                             |
| Dimension characteristics                 |                 |                                                 |                                                                             |
| Dimensions                                |                 | 18.0 cm x 9.6 cm x 26.3 cm (HxPxL)              |                                                                             |
| Insulation and mechanical characteristics |                 |                                                 |                                                                             |
| Box protection rating                     |                 | IP65                                            |                                                                             |
| Box material                              |                 | ABS self-extinguishing                          |                                                                             |
| Type of insulation                        |                 | Class II                                        |                                                                             |

# Technical data and ordering

## Optyma™ Control, three phase

### Technical Characteristics

| Technical characteristics             | OPTYMATM Control (4 HP)                                           | OPTYMATM Control (7.5 HP)                                         |           |  |
|---------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|-----------|--|
| Box dimensions                        | 400 x 300 x 135 mm                                                | 400 x 300 x 135 mm                                                |           |  |
| Weight                                | 9 kg                                                              | 10 kg                                                             |           |  |
| Protection rating                     | IP 65                                                             | IP 65                                                             |           |  |
| Power supply (3F+N+T)                 | 400 V AC ±10% 50/60Hz                                             | 400 V AC ±10% 50/60Hz                                             |           |  |
| Load type                             | 3-phase                                                           | 3-phase                                                           |           |  |
| Operating temperature                 | - 5 – 40 °C                                                       | - 5 – 40 °C                                                       |           |  |
| Storage temperature                   | -25 – 55 °C                                                       | -25 – 55 °C                                                       |           |  |
| Relative ambient humidity             | from 30% to 95% RH<br>w/out condensate                            | from 30% to 95% RH<br>w/out condensate                            |           |  |
| Altitude                              | < 1000 m                                                          | < 1000 m                                                          |           |  |
| Main switch / general protection      | 4 poles magnetothermic 16A "D"<br>Icn=6kA / Ics=8kA / Icu=15kA    | 4 poles magnetothermic 25A "D"<br>Icn=6kA / Ics=8kA / Icu=15kA    |           |  |
| Interruption power                    |                                                                   |                                                                   |           |  |
| Compressor protection                 | Adjustable motor circuit breaker                                  | Adjustable motor circuit breaker                                  |           |  |
| Defrosting                            | Electrical                                                        | Electrical                                                        |           |  |
| Status indicators                     | LED + display                                                     | LED + display                                                     |           |  |
| Alarm signals                         | LED + buzzer                                                      | LED + buzzer                                                      |           |  |
| Inputs                                |                                                                   |                                                                   |           |  |
| Ambient probe                         | NTC 10K 1%                                                        | NTC 10K 1%                                                        |           |  |
| Evaporator probe                      | NTC 10K 1%                                                        | NTC 10K 1%                                                        |           |  |
| Door switch                           | Present                                                           | Present                                                           |           |  |
| High/low pressure switch              | Present                                                           | Present                                                           |           |  |
| Kriwan® connection                    | Present                                                           | Present                                                           |           |  |
| Compressor functioning mode selection | Pump-down / thermostat                                            | Pump-down / thermostat                                            |           |  |
| Outputs                               |                                                                   |                                                                   |           |  |
| Compressor                            | See motor circuit breaker thermal range relative to panel ID code | See motor circuit breaker thermal range relative to panel ID code |           |  |
| Condenser fans output 1               | 800 W total                                                       | 800 W total                                                       | (1 phase) |  |
| Condenser fans output 2 (separated)   |                                                                   |                                                                   |           |  |
| Evaporator fans                       | 500 W (1 phase)                                                   | 2000 W (1phase / 3 phases)                                        |           |  |
| Defrosting heaters                    | 6000 W (AC1) eq. resistive load                                   | 9000 W (AC1) eq. resistive load                                   |           |  |
| Room light                            | 800 W (AC1) resistive load                                        | 800 W (AC1) resistive load                                        |           |  |
| Solenoid valve                        | Present                                                           | Present                                                           |           |  |
| Compressor oil heater                 | Present                                                           | Present                                                           |           |  |
| Aux1                                  | 100 W                                                             | 100 W                                                             |           |  |
| Aux2                                  | 100 W                                                             | 100 W                                                             |           |  |
| Supervision system                    | Modbus                                                            | Modbus                                                            |           |  |

## Ordering

| Type      | Description                                                          | Psc | Code no. |
|-----------|----------------------------------------------------------------------|-----|----------|
| AK-RC 111 | Optyma Control single-phase (2 HP) including two sensors             | 1   | 080Z3220 |
| AK-RC 113 | Optyma Control, three phase (4HP), including 2 sensors, 4,5 – 6,3 A  | 1   | 080Z3221 |
| AK-RC 113 | Optyma Control, three phase (4HP), including 2 sensors, 7 – 10 A     | 1   | 080Z3222 |
| AK-RC 113 | Optyma Control, three phase, (7,5HP), including 2 sensors, 11 – 16 A | 1   | 080Z3226 |
| AK-RC 113 | Optyma Control, three phase, (7,5HP), including 2 sensors, 14 – 20 A | 1   | 080Z3227 |

Note:

Sensor EKS 221 (spare part)- 084N3210



# Pressure transmitters overview

|                                                                                    |                                |                                                                                                                                                                                                                                                       |                                                                                                                                                                     |                                                                                                                      |                                                                                                                   |
|------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|  |                                |                                                                                                                                                                                                                                                       |                                                                                                                                                                     |                                                                                                                      |                                                                                                                   |
| Type                                                                               | Standard                       | MBS 3000                                                                                                                                                                                                                                              | MBS 3200                                                                                                                                                            | MBS 3100                                                                                                             | MBS 1900                                                                                                          |
|                                                                                    | Pulse-snubber                  | MBS 3050                                                                                                                                                                                                                                              | MBS 3250                                                                                                                                                            | MBS 3150                                                                                                             |                                                                                                                   |
| Industries                                                                         | Transportation                 |                                                                                                                                                                      |                                                                                    |                                   |                                                                                                                   |
|                                                                                    | Heating and sanitation         |                                                                                     |   |                                                                                                                      |                                                                                                                   |
|                                                                                    | Machine and equipment          |    |   |                                   |                                |
|                                                                                    | Energy                         |                                                                                                                                                                      |                                                                                    |                                                                                                                      |                                                                                                                   |
| Characteristics                                                                    | Sensor technology              | Piezo resistive                                                                                                                                                                                                                                       | Piezo resistive                                                                                                                                                     | Piezo resistive                                                                                                      | Piezo resistive                                                                                                   |
|                                                                                    | Accuracy FS (typ)              | ± 0.5%                                                                                                                                                                                                                                                | ± 0.5%                                                                                                                                                              | ± 0.5%                                                                                                               | ± 1%                                                                                                              |
|                                                                                    | Max. measuring range           | 600 bar<br>9,000 psi                                                                                                                                                                                                                                  | 600 bar<br>9,000 psi                                                                                                                                                | 600 bar<br>9,000 psi                                                                                                 | 25 bar<br>362 psi                                                                                                 |
|                                                                                    | Output signal                  | 4 – 20 mA<br>and absolute<br>voltage                                                                                                                                                                                                                  | 4 – 20 mA<br>and absolute<br>voltage                                                                                                                                | 4 – 20 mA                                                                                                            | 4 – 20 mA<br>Ratiometric                                                                                          |
|                                                                                    | Medium temperature             | -40 – 85 °C<br>-40 – 185 °F<br>                                                                                                                                    | -40 – 125 °C<br>-40 – 257 °F<br>                                                 | -40 – 85 °C<br>-40 – 185 °F<br> | 0 – 80 °C<br>32 – 176 °F<br> |
|                                                                                    | Enclosure IP                   | IP65<br>IP67                                                                                                                                                                                                                                          | IP65<br>IP67                                                                                                                                                        | IP65<br>IP67                                                                                                         | IP65                                                                                                              |
|                                                                                    | Wetted parts material          | AISI 316L                                                                                                                                                                                                                                             | AISI 316L                                                                                                                                                           | AISI 316L                                                                                                            | AISI 304/AISI 316                                                                                                 |
|                                                                                    | Housing material               | AISI 316L,<br>PA 6.6                                                                                                                                                                                                                                  | AISI 316L,<br>PA 6.6                                                                                                                                                | AISI 316L,<br>PA 6.6                                                                                                 | AISI 316L                                                                                                         |
|                                                                                    | Zero point and span adjustment |                                                                                                                                                                                                                                                       |                                                                                                                                                                     |                                                                                                                      |                                                                                                                   |
|                                                                                    | Marine approvals               |                                                                                                                                                                                                                                                       |                                                                                                                                                                     | •                                                                                                                    |                                                                                                                   |
|                                                                                    | ATEX approvals                 | Zone 2                                                                                                                                                                                                                                                | Zone 2                                                                                                                                                              | Zone 2                                                                                                               | UL                                                                                                                |
|                                                                                    | UL HazLoc                      | Class 1,<br>Div. 2                                                                                                                                                                                                                                    | Class 1,<br>Div. 2                                                                                                                                                  | Class 1,<br>Div. 2                                                                                                   |                                                                                                                   |



Railways and marine



Industrial hydraulics, air compressors, water pumps and industrial engines



Electric power and wind turbines



Boiler and boiler room equipment, sterilisers and autoclaves, mobile hydraulic





MBS1200

MBS1300

MBS 5100

MBS 4510

MBS 9200

MBS 9300

EMP 2

MBS1250

MBS1350

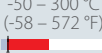
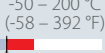
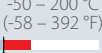
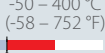
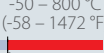
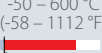
MBS 5150



| Thin film                           | Thin film                    | Piezo resistive             | Piezo resistive            | Piezo resistive                                | Piezo resistive                                | Piezo resistive              |
|-------------------------------------|------------------------------|-----------------------------|----------------------------|------------------------------------------------|------------------------------------------------|------------------------------|
| ± 0.5%                              | ± 0.5%                       | ± 0.3%                      | ± 0.5%                     | ± 0.5% – ± 2%<br>(depending on pressure range) | ± 0.5% – ± 2%<br>(depending on pressure range) | ± 0.3%                       |
| 2200 bar<br>32000 psi               | 2200 bar<br>32000 psi        | 600 bar<br>9,000 psi        | 25 bar<br>360 psi          | 250 mbar<br>3.62 psi                           | 250 mbar<br>3.62 psi                           | 400 bar<br>6,000 psi         |
| 4 – 20 mA<br>Voltage<br>Ratiometric |                              | 4 – 20 mA                   | 4 – 20 mA                  | 4 – 20 mA or<br>Ratiometric                    | 4 – 20 mA                                      | 4 – 20 mA                    |
| -40 – 125 °C<br>-40 – 257 °F        | -40 – 125 °C<br>-40 – 257 °F | -40 – 85 °C<br>-40 – 185 °F | -10 – 85 °C<br>14 – 185 °F | -40 – 85 °C<br>-40 – 185 °F                    | -40 – 85 °C<br>-40 – 185 °F                    | -40 – 100 °C<br>-40 – 212 °F |
| IP67                                | IP67                         | IP65<br>IP67                | IP65<br>IP67               | IP65                                           | IP65                                           | IP67                         |
| 17-4PH                              | 17-4PH                       | AISI 316L                   | AISI 316L                  | AISI 316L                                      | AISI 316L                                      | AISI316L                     |
| AISI 304 or plastic                 | AISI 304 or plastic          | AISI 316L,<br>PA 6.6        | AISI 316L,<br>PA 6.6       | AISI 316L,<br>PA 6.6                           | AISI 316L,<br>PA 6.6                           | Al                           |
|                                     |                              | •                           | •                          |                                                |                                                | •                            |
|                                     |                              | •                           |                            |                                                | •                                              | •                            |
|                                     |                              | Zone 2                      | Zone 2                     | Zone 2                                         | Zone 2                                         | Zone 2                       |
|                                     |                              | Class 1,<br>Div. 2          | Class 1,<br>Div. 2         |                                                |                                                |                              |

# Overview of temperature sensors



|                 | MBT3250                           | MBT 3270                                                                            | MBT 3560                                                                            | MBT 153                                                                             | MBT 5250                                                                            | MBT 5252                                                                             | MBT 5113                                                                              | MBT 5116                                                                              |                                                                                       |
|-----------------|-----------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Segments        | Transportation                    |    |    |    |                                                                                     |    |    |    |    |
|                 | Heating and sanitation            |                                                                                     |                                                                                     |                                                                                     |    |                                                                                      |    |                                                                                       |                                                                                       |
|                 | Machine and equipment             |    |    |    |                                                                                     |    |    |    |    |
|                 | Energy                            |    |                                                                                     |    |    |    |    |                                                                                       |                                                                                       |
| Characteristics | Pt 100/Pt 1000                    | ✓                                                                                   | ✓                                                                                   |                                                                                     | ✓                                                                                   | ✓                                                                                    | ✓                                                                                     |                                                                                       | ✓                                                                                     |
|                 | NTC/PTC                           | ✓                                                                                   | ✓                                                                                   |                                                                                     | ✓                                                                                   | ✓                                                                                    | ✓                                                                                     | ✓                                                                                     |                                                                                       |
|                 | Transmitter                       | mA/V d.c.                                                                           |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |                                                                                       |
|                 | Transmitter as option             |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      | mA                                                                                    | mA                                                                                    |                                                                                       |
|                 | Measuring insert                  | Changeable                                                                          | Fixed                                                                               | Fixed                                                                               | Fixed                                                                               | Changeable                                                                           | Changeable                                                                            | Changeable                                                                            | Changeable                                                                            |
|                 | Medium temperature                |  |  |  |  |  |  |  |  |
|                 | Enclosure                         | IP65<br>(NEMA 4)                                                                    | IP65<br>(NEMA 4)                                                                    | IP65/IP67<br>(NEMA 4/<br>NEMA 6)                                                    | IP67<br>(NEMA 6)                                                                    | IP65<br>(NEMA 4)                                                                     | IP65<br>(NEMA 4)                                                                      | IP65<br>(NEMA 4)                                                                      | IP65<br>(NEMA 4)                                                                      |
|                 | Material protection tube          | W.no. 1.4571<br>(AISI 316 Ti)                                                       | W.no. 1.4571<br>(AISI 316 Ti)                                                       | W.no. 1.4571<br>(AISI 316 Ti)                                                       | W.no. 1.4571<br>(AISI 316 Ti)                                                       | W.no. 1.4571<br>(AISI 316 Ti)                                                        | W.no. 1.4571<br>(AISI 316 Ti)                                                         | W.no. 1.4571<br>(AISI 316 Ti)                                                         | W.no. 1.4571<br>(AISI 316 Ti)                                                         |
|                 | Reaction time t0.5 in water (sec) | 9 s                                                                                 | 1.5 s                                                                               | 10 s                                                                                | 1 s                                                                                 | 9 s                                                                                  | 12 s                                                                                  | 30 s                                                                                  | 30 s                                                                                  |
|                 | Marine approvals                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     | ✓                                                                                    | ✓                                                                                     | ✓                                                                                     | ✓                                                                                     |



Marine and mobile hydraulics



Boiler and boiler room equipment, sterilisers and autoclaves



Electric power and wind turbines



Industrial hydraulics, air compressors, water pumps and industrial engines



# MBS 3000, Compact pressure transmitter

The compact pressure transmitter MBS 3000 is designed for use in almost all industrial applications, and offers a reliable pressure measurement, even under harsh environmental conditions. The flexible pressure transmitter programme covers a 4 – 20 mA output signal, absolute and gauge (relative) versions, measuring

ranges from 0 – 1 to 0 – 600 bar and a wide range of pressure and electrical connections.

Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent industrial requirements.

## Features MBS 3000



## Facts

### Benefits:

- 4 – 20 mA output signal
- Operating temperature: -40 – 85 °C
- Measuring range: 0 – 600 bar
- Standard pressure connection G 1/4 A
- For use in severe industrial environments such as pumps, compressors, pneumatics and water treatment
- Wetted parts: stainless steel (AISI 316)

# Technical data and ordering

## MBS 3000

### Compact pressure transmitter

| Measuring range<br>$P_e$ (bar) <sup>1)</sup> | Pressure connection |           | Output signal |         | Code no. |
|----------------------------------------------|---------------------|-----------|---------------|---------|----------|
|                                              | G 1/4 EN 837        | M20 x 1.5 | 4 – 20mA      | 0 – 10V |          |
| 0 – 1                                        | •                   |           | •             |         | 060G1113 |
| 0 – 2.5                                      | •                   |           | •             |         | 060G1122 |
| 0 – 4                                        | •                   |           | •             |         | 060G1123 |
| 0 – 6                                        | •                   |           | •             |         | 060G1124 |
| 0 – 10                                       | •                   |           | •             |         | 060G1125 |
| 0 – 10                                       | •                   |           |               | •       | 060G1650 |
| 0 – 16                                       | •                   |           | •             |         | 060G1133 |
| 0 – 25                                       | •                   |           | •             |         | 060G1430 |
| 0 – 40                                       | •                   |           | •             |         | 060G1105 |
| 0 – 100                                      | •                   |           | •             |         | 060G1107 |
| 0 – 160                                      | •                   |           | •             |         | 060G1112 |
| 0 – 250                                      | •                   |           | •             |         | 060G1111 |
| 0 – 400                                      | •                   |           | •             |         | 060G1109 |

1) Gauge/relative

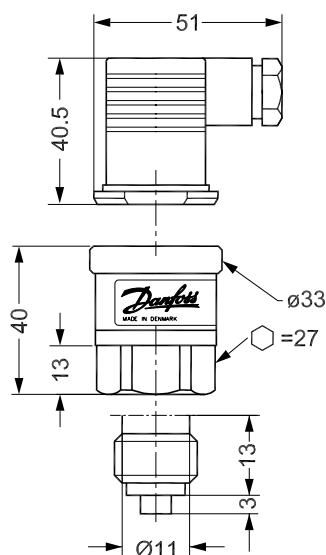
## MBS 3000

### Spare parts & accessories



| Type | Description                          | Code no. |
|------|--------------------------------------|----------|
| Plug | EN 175301-803-A, Pg 9 plug           | 060G0008 |
|      | EN 175301-803-A, plug with 5 m cable | 060G1034 |

### Dimensions & weight



Weight: 0.17 kg

All dimensions in millimetres

# MBS 3100, Compact pressure transmitter

The compact ship approved pressure transmitter MBS 3100 is designed for use in almost all marine applications, and offers a reliable pressure measurement, even under harsh environmental conditions.

The flexible pressure transmitter programme covers a 4 – 20 mA output signal, absolute and gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar, plug and cable connections and a wide range of pressure connections.

Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent marine requirements. The compact ship approved pressure

transmitter MBS 3100 is designed for use in almost all marine applications, and offers a reliable pressure measurement, even under harsh environmental conditions.

The flexible pressure transmitter programme covers a 4 – 20 mA output signal, absolute and gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar, plug and cable connections and a wide range of pressure connections.

Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent marine requirements.

## Features MBS 3100



## Facts

### Benefits:

- 4 – 20 mA output signal
- Operating temperature: -40 – 85 °C
- Measuring range: 0 – 600 bar
- Standard pressure connection G 1/4 A EN 837, G 1/4 A, O-ring DIN 3852 G 1/2 A EN 837
- Available with all relevant marine approvals
- Suited for marine applications
- Wetted parts: stainless steel (AISI 316)

# Technical data and ordering

## MBS 3100

### Compact pressure transmitter

| Measuring range<br>$P_e$ (bar) <sup>1)</sup> | Pressure connection |                        |              | Code no. |
|----------------------------------------------|---------------------|------------------------|--------------|----------|
|                                              | G ¼ EN 837          | G ¼ A, O-ring DIN 3852 | G ½ A EN 837 |          |
| 0 – 4                                        | •                   |                        |              | 060G1367 |
| 0 – 6                                        | •                   |                        |              | 060G1368 |
| 0 – 10                                       | •                   |                        |              | 060G1369 |
| 0 – 40                                       | •                   |                        |              | 060G1372 |
| 0 – 4                                        |                     | •                      |              | 060G1463 |
| 0 – 6                                        |                     | •                      |              | 060G1464 |
| 0 – 10                                       |                     | •                      |              | 060G1465 |
| 0 – 40                                       |                     | •                      |              | 060G1468 |
| 0 – 10                                       |                     |                        | •            | 060G1471 |
| 0 – 16                                       |                     |                        | •            | 060G1472 |

1) Gauge / relative  
2) Sealed gauge

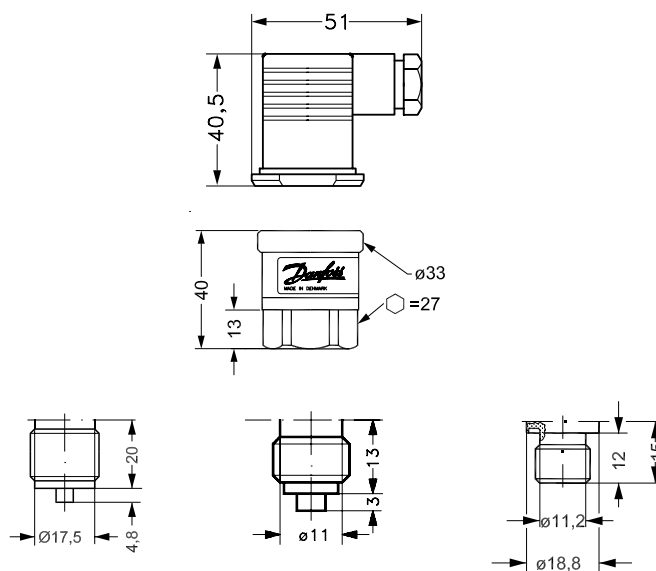
## MBS 3100

### Spare parts & accessories



| Type     | Description                          | Code no. |
|----------|--------------------------------------|----------|
| Plug     | EN 175301-803-A, Pg 9 plug           | 060G0008 |
|          | EN 175301-803-A, plug with 5 m cable | 060G1034 |
| Adapters | G ½ female – ¼ flare male            | 060G1024 |

### Dimensions & weight



Weight: 0.2 kg

All dimensions in millimetres

# MBS 5100, Pressure transmitter

The ship approved high accuracy pressure transmitter MBS 5100 is designed for use in almost all marine applications, and offers a reliable pressure measurement, even under harsh environmental conditions.

The pressure transmitter programme in block design covers a 4 – 20 mA output signal, absolute and gauge (relative) versions,

measuring ranges from 0 – 1 to 0 – 600 bar, zero point and span adjustment, plug connection and female/flange pressure connections.

Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent industrial requirements.

## Features MBS 5100



## Facts

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### Benefits:

- 4 – 20 mA output signal
- Operating temperature: -40 – 85 °C
- Measuring range: 0 – 600 bar
- Pressure connection G 1/4 female
- Available with all relevant marine approvals
- Designed to meet the strict demands in marine equipment
- Wetted parts: stainless steel (AISI 316)



# Technical data and ordering

## MBS 5100

### Pressure transmitter

| Measuring range<br>$P_e$ (bar) <sup>1)</sup> | Pressure connection | Code no. |
|----------------------------------------------|---------------------|----------|
|                                              | G 1/4 with flange   |          |
| 0 – 2.5                                      | •                   | 060N1033 |
| 0 – 4                                        | •                   | 060N1034 |
| 0 – 6                                        | •                   | 060N1035 |
| 0 – 10                                       | •                   | 060N1036 |
| 0 – 16                                       | •                   | 060N1037 |
| 0 – 25                                       | •                   | 060N1038 |
| 0 – 40                                       | •                   | 060N1039 |

1) Gauge / relative

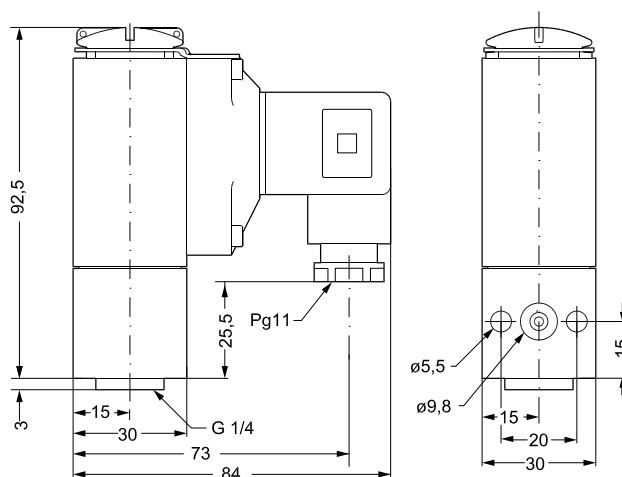
## MBS 5100

### Spare parts & accessories



| Type | Description                          | Code no. |
|------|--------------------------------------|----------|
| Plug | EN 175301-803-A, Pg 9 plug           | 060G0008 |
|      | EN 175301-803-A, plug with 5 m cable | 060G1034 |

### Dimensions & weight



Weight: 0.4 kg

All dimensions in millimetres

# AKS, Pressure transmitters

AKS pressure transmitters are used for commercial air-conditioning and for commercial and industrial refrigeration applications. They are made in stainless steel to be compatible with fluorinated and natural refrigerants and laser welding with no soft seals ensure hermetic tightness for decades.

AKS pressure transmitters utilize temperature calibrations methods and sensing technologies optimized for the refrigeration and air-conditioning segments.

## Features AKS

Dedicated temperature calibration to increase accuracy when used for suction or discharge pressure regulation

Compact AKS 32R; AKS 3000 with solder or female flare pressure ports



Parts in touch with refrigerants are all laserwelded, free of soft gaskets

## Facts

### Benefits:

- Designed for precise and energy optimized control
- Robust design optimized for
  - air-conditioning
  - refrigeration plant
  - supermarket installation
  - natural refrigerants like CO<sub>2</sub> and R717
- Pressure ranges up to 159 bar
- High test pressure,  $\geq 33$  bar
- Available with 4 – 20 mA, 1 – 5 V DC or 10 – 90% Vs ratiometric signals
- Available with a variety of pressure connection, incl.  $\frac{1}{4}$  inch female flare with valve depressor and  $\frac{3}{8}$  inch solder connection, ensuring a 100% hermetic installation

# Technical data and ordering

## AKS 32R and AKS 2050 - With 10 – 90% ratiometric output signal

### Pressure transmitters

| Type     | Pressure range (bar) | Max. overload pressure (bar) | Electrical connection        | Pressure connection                            | Code no.               |
|----------|----------------------|------------------------------|------------------------------|------------------------------------------------|------------------------|
| AKS 32R  | -1 – 12              | 33                           | EN 175301-803-A without plug | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G1036               |
|          | -1 – 34              | 55                           | EN 175301-803-A without plug | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G0090               |
| AKS 2050 | -1 – 59              | 100                          | EN 175301-803-A without plug | Thread ISO 228/1 – G $\frac{3}{8}$ A (BSP)     | 060G5750 <sup>1)</sup> |
|          | -1 – 99              | 150                          | EN 175301-803-A without plug | Thread ISO 228/1 – G $\frac{3}{8}$ A (BSP)     | 060G5751 <sup>1)</sup> |
|          | -1 – 159             | 250                          | EN 175301-803-A without plug | Thread ISO 228/1 – G $\frac{3}{8}$ A (BSP)     | 060G5752 <sup>1)</sup> |
|          | -1 – 59              | 100                          | EN 175301-803-A without plug | $\frac{1}{4}$ – 18 NPT                         | 060G6342               |
|          | -1 – 159             | 250                          | EN 175301-803-A without plug | $\frac{1}{4}$ – 18 NPT                         | 060G6344               |

1) With pulse-snubber

## AKS 32 and AKS 2050

### Accessory

| Type            | Electrical connection | Comments  | Code no. |
|-----------------|-----------------------|-----------|----------|
| Cable with plug | Plug 3 + E (female)   | 5 m cable | 060G1034 |
| Plug            | EN 175301-803-A       | Pg 9      | 060G0008 |

## AKS 32 with 1 – 5 V output signal

### Pressure transmitters

9 – 30 V DC supply voltage, accuracy 0.3% FS (typical), pressure reference gauge (relative)

| Type   | Pressure range (bar) | Max. overload pressure (bar) | Electrical connection   | Pressure connection                            | Code no. |
|--------|----------------------|------------------------------|-------------------------|------------------------------------------------|----------|
| AKS 32 | -1 – 12              | 33                           | EN175301-803-A Pg9 plug | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G2069 |
|        | -1 – 34              | 40                           | EN175301-803-A Pg9 plug | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G2071 |

## AKS 33 with 4 – 20 mA output signal

### Pressure transmitters

10 – 30 V DC supply voltage, accuracy 0.3% FS (typical), pressure reference gauge (relative)

| Type   | Pressure range (bar) | Max. overload pressure (bar) | Electrical connection    | Pressure connection                            | Code no. |
|--------|----------------------|------------------------------|--------------------------|------------------------------------------------|----------|
| AKS 33 | -1 – 12              | 33                           | EN175301-803-A Pg9 plug  | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G2049 |
|        | -1 – 12              | 33                           | EN175301-803-A Pg 9 plug | G $\frac{3}{8}$ EN 837                         | 060G2105 |
|        | -1 – 12              | 33                           | EN175301-803-A Pg9 plug  | $\frac{1}{4}$ – 18 NPT                         | 060G2101 |
|        | -1 – 20              | 40                           | EN175301-803-A Pg9 plug  | $\frac{1}{4}$ – 18 NPT                         | 060G2102 |
|        | 0 – 25               | 40                           | EN175301-803-A Pg9 plug  | $\frac{1}{4}$ – 18 NPT                         | 060G2115 |

## AKS 3000 with 4 – 20 mA output signal

### Pressure transmitters

10 – 30 V DC supply voltage, accuracy 1% FS (typical), pressure reference gauge (relative)

| Type     | Pressure range (bar) | Max. overload pressure (bar) | Electrical connection   | Pressure connection                            | Code no. |
|----------|----------------------|------------------------------|-------------------------|------------------------------------------------|----------|
| AKS 3000 | -1 – 12              | 33                           | EN175301-803-A Pg9 plug | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G1323 |
|          | 0 – 30               | 55                           | EN175301-803-A Pg9 plug | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G1327 |
|          | 0 – 40               | 100                          | EN175301-803-A Pg9 plug | $\frac{7}{16}$ – 20 UNF flare $\frac{1}{4}$ in | 060G1328 |
|          | 0 – 60               | 200                          | EN175301-803-A Pg9 plug | $\frac{1}{4}$ – 20 NPT flare $\frac{1}{4}$ in  | 060G1083 |

# EKS / AKS, Temperature sensors

AKS temperature sensors are used for exacting applications within air-conditioning as well as commercial and industrial refrigeration applications.

The Pt 1000 sensor element meets the DIN/EN 60751 class B requirements and ensures an accurate and reliable temperature signal applicable for regulation, safety and data logging.

EKS temperature sensors are a family of cost efficient temperature sensors based on thermistors with NTC or PTC characteristics which are used with Danfoss EKC controllers.

## Features EKS / AKS

EN441 certified  
AK-HS 1000  
HACCP sensors

AKS 11 temperature sensor for  
reliable super heat control to  
optimize accuracy and process  
efficiency

AKS21 sensor system for  
controlling extreme high and  
low temperatures

## Facts

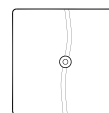
### Benefits:

- AKS 11 is designed for easy installation and optimized for demanding control functions like liquid injection control in evaporators where a reliable sensor is a must
- AKS 12 is the all-round cable temperature sensor to be used for plain temperature monitoring and control purposes
- AKS 21 is the ultimate sensor for -70 – 180 °C anywhere in the refrigeration plant and is available in various designs (cable and B-head) and with various accessories like sensor pockets
- AK-HS 1000 is the first choice for a temperature sensor for monitoring and HACCP data logging. The sensor design makes it simulate a refrigerated product what enable a realistic temperature signal is transmitted to a HACCP data logger
- EKS comes with PTC 1000 Ω (EKS 111), NTC 5000 Ω (EKS 211), or NTC 1000 Ω (EKS 221) with various cable lengths

# Technical data and ordering

## AK-HS - For monitoring and data logging in HACCP systems

### Temperature sensors



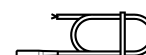
| Type       | Signal  | Temperature range (°C) | Measuring accuracy | Enclosure | Cable length (m) | Code no. |
|------------|---------|------------------------|--------------------|-----------|------------------|----------|
| AK-HS 1000 | Pt 1000 | -30 – 50               | EN 60751 Class B   | IP 54     | 5.5              | 084N1007 |

## EKS - For measuring air temperatures

### Temperature sensors

PTC characteristics matches controllers types EKC 101, EKC 201, EKC 301, CC and AK.

NTC characteristics matches controllers, types EKC and CC.



| Type    | Signal   | Temperature range (°C) | Sensor tube | Electrical connection | Cable length (m) | Code no. |
|---------|----------|------------------------|-------------|-----------------------|------------------|----------|
| EKS 111 | PTC 1000 | -55 – 100              | Round       | Cable with pins       | 1.5              | 084N1178 |
|         | PTC 1000 | -55 – 100              | Round       | Cable with pins       | 3.5              | 084N1179 |
|         | PTC 1000 | -55 – 150              | Round       | Cable with pins       | 8.5              | 084N1168 |
| EKS 211 | NTC 5000 | -40 – 80               | Round       | Cable                 | 3.5              | 084N1221 |

## EKS - For measuring temperatures

### Temperature sensors

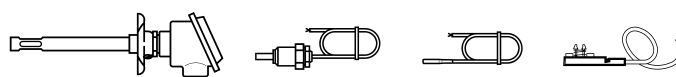
The sensor characteristics matches to OPTYMA room controllers and MCX unit controllers.

| Type    | Signal    | Temperature range (°C) | Sensor tube | Electrical connection | Cable length (m) | Code no. |
|---------|-----------|------------------------|-------------|-----------------------|------------------|----------|
| EKS 221 | NTC 10000 | -50 – 120              | Round       | Cable                 | 3.5              | 084N3210 |

## AKS - For measuring temperature

### Temperature sensors

Recommended for accurate temperature measurement in superheating, food safety logs and other important applications



| Type    | Signal  | Measure range [°C] | Sensor tube | Electrical connection | Cable length [m] | Code no. |
|---------|---------|--------------------|-------------|-----------------------|------------------|----------|
| AKS 12  | Pt 1000 | -40 – 80           | Round       | AMP plug              | 3.5              | 084N0039 |
|         | Pt 1000 | -50 – 100          | Concave     | Cable                 | 1.5              | 084N0036 |
| AKS 11  | Pt 1000 | -50 – 100          | Concave     | Cable                 | 8.5              | 084N0008 |
| AKS 21A | Pt 1000 | -70 – 180          | Round       | Cable                 | 3.5              | 084N2007 |
| AKS 21W | Pt 1000 | -70 – 180          | Sensor pipe | Cable                 | 2.5              | 084N2017 |

# Technical data and ordering

## PT 1000 resistance

AKS 11, AKS 12, AKS 21

| °C | ohm    | °C  | ohm    |
|----|--------|-----|--------|
| 0  | 1000.0 |     | 1000.0 |
| 1  | 1003.9 | -1  | 996.1  |
| 2  | 1007.8 | -2  | 992.2  |
| 3  | 1011.7 | -3  | 988.3  |
| 4  | 1015.6 | -4  | 984.4  |
| 5  | 1019.5 | -5  | 980.4  |
| 6  | 1023.4 | -6  | 976.5  |
| 7  | 1027.3 | -7  | 972.6  |
| 8  | 1031.2 | -8  | 968.7  |
| 9  | 1035.1 | -9  | 964.8  |
| 10 | 1039.0 | -10 | 960.9  |
| 11 | 1042.9 | -11 | 956.9  |
| 12 | 1046.8 | -12 | 953.0  |
| 13 | 1050.7 | -13 | 949.1  |
| 14 | 1054.6 | -14 | 945.2  |
| 15 | 1058.5 | -15 | 941.2  |
| 16 | 1062.4 | -16 | 937.3  |
| 17 | 1066.3 | -17 | 933.4  |
| 18 | 1070.2 | -18 | 929.5  |
| 19 | 1074.0 | -19 | 925.5  |
| 20 | 1077.9 | -20 | 921.6  |
| 21 | 1081.8 | -21 | 917.7  |
| 22 | 1085.7 | -22 | 913.7  |
| 23 | 1089.6 | -23 | 909.8  |
| 24 | 1093.5 | -24 | 905.9  |
| 25 | 1097.3 | -25 | 901.9  |
| 26 | 1101.2 | -26 | 898.0  |
| 27 | 1105.1 | -27 | 894.0  |
| 28 | 1109.0 | -28 | 890.1  |
| 29 | 1112.8 | -29 | 886.2  |
| 30 | 1116.7 | -30 | 882.2  |
| 31 | 1120.6 | -31 | 878.3  |
| 32 | 1124.5 | -32 | 874.3  |
| 33 | 1128.3 | -33 | 870.4  |
| 34 | 1132.2 | -34 | 866.4  |
| 35 | 1136.1 | -35 | 862.5  |
| 36 | 1139.9 | -36 | 858.5  |
| 37 | 1143.8 | -37 | 854.6  |
| 38 | 1147.7 | -38 | 850.6  |
| 39 | 1151.5 | -39 | 846.7  |
| 40 | 1155.4 | -40 | 842.7  |
| 41 | 1159.3 | -41 | 838.8  |
| 42 | 1163.1 | -42 | 835.0  |
| 43 | 1167.0 | -43 | 830.8  |
| 44 | 1170.8 | -44 | 826.9  |
| 45 | 1174.7 | -45 | 822.9  |
| 46 | 1178.5 | -46 | 818.9  |
| 47 | 1182.4 | -47 | 815.0  |
| 48 | 1186.3 | -48 | 811.0  |
| 49 | 1190.1 | -49 | 807.0  |
| 50 | 1194.0 | -50 | 803.1  |

approx. 3.9 ohm/K

The tolerance of a Pt 1000 sensor is less than  $\pm(0.3 + 0.005 T)$ .

This translates into a temperature error of less than 0.5 degree for refrigeration control.



# DGS, Gas sensor

DGS helps to comply to environmental F-Gas Regulations and / or Health and Safety requirements, on new or existing systems in:

- Supermarkets
- Process refrigeration plants
- Refrigerated storage and warehousing
- Special applications areas / zones

## Features DGS

**Utilizing**  
either Semi Conductor  
(SC) or Infrared (IR)  
technologies

**Can be used**  
in stand-alone or integrated  
systems, where continuous  
real-time, automatic  
monitoring with Danfoss  
ADAP-KOOL® Refrigeration  
Control and Monitoring System  
and / or Building Management  
Systems is applied



**RS485 Modbus**  
for data communication and  
integration into a complete  
ADAP-KOOL® system

**Gives**  
quick and immediate  
response in detecting a  
wide range of different  
gases typically applied  
in Refrigeration and Air  
Conditioning systems

## Facts

### Typical Refrigerant gas applications include:

- Halocarbons: HFC's, HCFC's, CFCs.
  - Carbon Dioxide (CO<sub>2</sub>/R744)
  - Hydrocarbons (e.g. R290)
  - Other special application gases to customer request
- Sensing technology varies to make the best detection for a given gas, in terms of performance and cost. DGS IR is based on Infra-Red sensor technology, DGS SC is based on Semi-Conductor and DGS-PE is based on Pellistor



# Technical data and ordering

## DGS

### Gas sensors

| Features                                                                             | Description                                                                                                                                                 |                     |                         |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|
| Supply voltage                                                                       | 24 V DC $\pm$ 20 % ; reverse polarity protected<br>24 V AC - 10 % / + 15 %                                                                                  |                     |                         |
| Power Consumption (24V DC)                                                           | Max. 250 mA (5 VA)                                                                                                                                          |                     |                         |
| Digital input<br>- Alarm acknowledge and test alarm<br>- Alarm relay /fault relay    | Potential-free contact<br>40 V AC/DC, 0.5 A, change-over contact (SPDT)<br>Critical relay: Normally Closed (SIL II compliant), Warning relay: Normally Open |                     |                         |
| Analog output signal                                                                 | Proportional, overload and short-circuit proof, load $\leq$ 500 Ohm<br>Measuring range: 0-10 V / 2-10V / 0-20mA / 4-20mA                                    |                     |                         |
| Modbus Physical                                                                      | 5 V DC, 250 mA max. overload, short-circuit and reverse-polarity protected                                                                                  |                     |                         |
| Enclosure rate                                                                       | IP 65                                                                                                                                                       |                     |                         |
| Humidity range                                                                       | 15 - 90 % RH not-condensing                                                                                                                                 |                     |                         |
| Burning behaviour                                                                    | UL 94 V2                                                                                                                                                    |                     |                         |
| Housing colour                                                                       | Black                                                                                                                                                       |                     |                         |
| Dimensions (W x H x D in mm)                                                         | 94 x 130 x 57                                                                                                                                               |                     |                         |
| Installation                                                                         | Wall mounting                                                                                                                                               |                     |                         |
| Cable entry                                                                          | 2 x M12 / 3 x M20                                                                                                                                           |                     |                         |
| Wire connection:<br>Power supply, Modbus Analog output,<br>Digital input Sensor head | Screw-type terminals 0.25 to 2.5 mm <sup>2</sup><br>Screw-type terminals 0.25 to 1.3 mm <sup>2</sup><br>3-pin plug connector                                |                     |                         |
| Sensor information                                                                   | <b>DGS-IR (CO<sub>2</sub>)</b>                                                                                                                              | <b>DGS-SC (HFC)</b> | <b>DGS-PE (Propane)</b> |
| Temperature range                                                                    | -35 to +40°C                                                                                                                                                | -30 to +50°C        | -30 to +50°C            |
| Response time T90                                                                    | <120s                                                                                                                                                       | <40s                | <10s                    |
| Recovery time, T0                                                                    | 90s                                                                                                                                                         | 180s                | 120s                    |
| Maximum calibration interval                                                         | 60 months                                                                                                                                                   | 12 months           | 6 months                |
| Measuring range                                                                      | 0 – 20,000ppm                                                                                                                                               | 20 – 2,000ppm       | 0 – 5,000ppm            |
| Default alarm threshold                                                              | 5,000ppm                                                                                                                                                    | 500ppm              | 800ppm                  |
| Compliance                                                                           |  IEC61010-1 ANSI/UL CAN/CSA-C22.2 No61010-1 RoHS                         |                     |                         |
| Light (LED)                                                                          | 20 – 80% Rh, not condensed                                                                                                                                  |                     |                         |
| Buzzer                                                                               | >85 dB (A) (0.1 distance ) 2300 Hz                                                                                                                          |                     |                         |

## Ordering

| Type        | Description                      | Code no. |
|-------------|----------------------------------|----------|
| DGS Sensors | DGS-SC HFC gr.1* + B&L           | 080Z2809 |
|             | DGS-SC HFC gr.2* + B&L           | 080Z2810 |
|             | DGS-SC HFC gr.3* + B&L           | 080Z2811 |
|             | DGS-PE Propane + B&L             | 080Z2812 |
|             | DGS-IR CO <sub>2</sub> + B&L     | 080Z2807 |
|             | DGS-IR-CO <sub>2</sub> 5 m + B&L | 080Z2808 |

\*HFC gr.1:: R1234ze, R454c, **R1234yf**, R454a, R452A, R454b, R513a

HFC gr.2: R407F, R416a, R417a, R407A, R422a, R427a, R449A, R437a, **R134A**, R438a, R422D

HFC gr.3: R448A, R125, R404A, R32, R507A, R434a, R410A, R452b, **R407C**, R143b

**Bold = calibration gas**

Accessories:

Hand Held Service Tool : 080Z2820

Power Supply AK-PS075: 080Z0053

Note:

Hand held service tool is needed for installation (setup using modbus), calibration.

# HGM, Multi-zone gas monitor

Multiple refrigerant gases and multiple area monitoring system for low level continuous monitoring of CFC, HCFC and HFC refrigerant gases used in most commercial refrigeration systems.

System design supports compliance to the refrigerant monitoring requirements of ANSI/BSR ASHRAE 15-2007 and ASHRAE safety code 34-2007.

## Features HGM-400



## Facts

### Benefits:

- Detects, measures, and displays the level of refrigerant gas in the area being monitored
- Automatically logs up to 200 gas readings that can be printed/plotted for analysis
- Eliminates false alarms with use of non-dispersive IR source and sample draw system
- Extensive self-diagnostics, providing both visual and audible indications when a fault occurs

### Design features:

- Optional models: LCD display, IP65 enclosure, EExd (Explosion
- Two digital outputs low level and high level alarm
- Manual or automatic alarm reset optional
- Battery powered, providing 8-12 hours of operation

### Application:

- Commercial refrigeration
- Cold Storage Facilities
- Supermarket/Hypermarket
- Distribution Centres
- Air Conditioning
- Chillers

# Technical data and ordering

## HGM-MZ

### Specification

| Specification         | Description                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product type          | Multiple refrigerant gases and multiple area monitoring system for low level continuous monitoring of CFC, HCFC and HFC refrigerant gases used in most commercial refrigeration systems. System design supports compliance to the refrigerant monitoring requirements of ANSI/ BSR ASHRAE 15-2007 and ASHRAE Safety Code 34-2007                                                                                            |
| Sensitivity           | All gases 1ppm                                                                                                                                                                                                                                                                                                                                                                                                              |
| Measuring range       | All gasses 0 to 10.000 ppm                                                                                                                                                                                                                                                                                                                                                                                                  |
| Accuracy <sup>1</sup> | ±1 ppm ±10% of reading from 0-1000ppm<br>(R11, R22, and R113 ±10ppm ±15% of reading 0-1000ppm)                                                                                                                                                                                                                                                                                                                              |
| Gas library           | CFC: HFP, R-11, R-12, R-113, R-114, R-502;<br>HFC: R125, R-134a, R236FA, R245Fa, R32, R-404a (HP62), R-407a, R-407c (AC9000), R-410a (AZ20), R422a, R422d, R427a, R-507 (AZ50), R-508b (SUVA95)<br>HCFC: R-123, R-124, R21, R-22, R227, R-23, R-401a (MP39), R-402a (HP80), R 402b (HP81), R-408a, R-409a, R-500, R-503;<br>Halon: H1211, H1301, H2402;<br>Other: FA188, FC72, H1234YF, N1230, R424A, R426A, R438A, CUSTOM. |

## General Multi-zone

### Specification

| Specification         | Description                                                                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Size (H x W x D)      | 12.23" x 13.7" x 4.96" (31.06cm x 34.80cm x 12.60cm)                                                                                                        |
| Weight                | 15lbs. (6.8kg)                                                                                                                                              |
| Sampling mode         | Automatic or manual (hold)                                                                                                                                  |
| Re-zero               | Auto or on zone change                                                                                                                                      |
| Response time         | 5 to 315 seconds - depending on air line length and number of zones                                                                                         |
| System noise          | Less than 40dB(A) @ 10ft (3m)                                                                                                                               |
| Monitoring distance   | 1.200ft (366m) maximum for combined length of sample + exhaust tubing (each zone)                                                                           |
| Conditioned signal    | Dual optional 4-20mA DC isolated outputs. Channel 1 = zone area, Channel 2 = PPM                                                                            |
| Alarms                | Four SPDT alarm contacts rated 2A at 250VAC (inductive) 5A at 250VAC (resistive).<br>Three are assigned to PPM level alarms, one assigned to system faults. |
| Communications        | Full two-way communications with Remote Display Module or Building Management System via RS 485 serial interface.<br>RS-232C communications port standard   |
| Power safety mode     | Fully automatic system reset. All programmed parameters retained                                                                                            |
| Operating temperature | 32 to 122°F (0 to 50°C)                                                                                                                                     |
| Ambient humidity      | 5 % to 90% RH (non-condensing)                                                                                                                              |
| AC power              | 100 to 240VAC, 50/60Hz, 20W                                                                                                                                 |

# Technical data and ordering

## DHGM

### Gas monitor

| DANFOSS HALOGEN GAS MONITOR (DHGM-8 zone) | 080Z2151 |
|-------------------------------------------|----------|
| Components included                       | Qty      |
| DHGM Unit                                 | 1        |
| Line End Dust filter                      | 8        |
| Purge/ Fresh Air Carbon Filter            | 1        |

Note: Tubing not supplied

## DHGM

### Components

| DHGM components (16 zone)        | LP-DHGMKIT |
|----------------------------------|------------|
| Components included              | Qty        |
| Line End Dust filter             | 3          |
| STRAIGHT ¼ X ¼ BSP"              | 2          |
| EQUAL CROSS ¼ PUSH IN            | 3          |
| Plastic Silencer ¾ BSPP "WHITE"  | 10         |
| Straight ¼" x ¾ BSP              | 10         |
| Socket ¾ - ¾                     | 2          |
| ¾ BSP F/F Elbow                  | 8          |
| Straight 6mm x ¼ BSP             | 2          |
| ¼ Mini filter                    | 2          |
| ¼ EQUAL TEE CONNECTOR            | 5          |
| Black 1" brackets                | 25         |
| PU tubing 6mm - 300 meters rolls | 2          |

Note: Individual Components not sold separately.  
080Z2154 - 4-20ma Output card required for all Danfoss frontend controllers

## DHGM

### Maintenance kit

| DHGM Maintenance kit                | LP-DHGM8M |
|-------------------------------------|-----------|
| Components included                 | Qty       |
| End of Line Filters                 | 23        |
| Hyperbolic Filter                   | 1         |
| Water Trap: Internal Filter Element | 2         |
| Purge/ Fresh Air Carbon Filter      | 1         |

## DHGM

### Spares

| Spares                           |             |
|----------------------------------|-------------|
| 4 port manifold                  | LP3015-5072 |
| 5 port manifold Block w/ Purge   | LP3015-5080 |
| HGM Sampling Pump with connector | LP3015-5176 |
| Rabbit Processor Board           | LP3015-5546 |
| Replacement Manifold fitting     | LP3015-5753 |
| Charcoal filter                  | C01680417   |



# PGM-IR, Portable gas monitor

The PGM-IR is designed to detect, measure, and display the concentration of refrigerant gas in the area being monitored. To ensure accurate gas measurements, the monitor self-zeroes every four minutes using an external supply of fresh air provided by activated carbon filtering.

During normal operation the Refrigerant Monitor displays both the current gas level and the peak gas level detected on its front LCD panel.

The monitor retains a log of previous readings that can be easily accessed at a later time for analysis.

## Features PGM-IR



## Facts

### Benefits:

- Detects, measures, and displays the level of refrigerant gas in the area being monitored
- PGM-Halogen gas monitor: Measures all gases up to 10,000 ppm with a sensitivity of 1 ppm-
- PGM-CO2 gas monitor: CO2 detection range of 20 to 100,000ppm, relative to ambient.
- Automatically logs up to 200 gas readings that can be printed/plotted for analysis

- Eliminates false alarms with use of non-dispersive IR source and sample draw system
- Visual and audible gas alarm indicators that are turned ON when the detected gas level exceeds a user defined trip-point
- Extensive self-diagnostics, providing both visual and audible indications when a fault occurs
- Battery powered, providing a minimum of 8 hours of operation

### Application:

- Commercial refrigeration
- Cold Storage Facilities
- Supermarket/Hypermarket
- Distribution Centres
- Air Conditioning
- Chillers

# Technical data and ordering

## PAGM Halogen

### Specification

| Specification          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gas Library            | <p>CFC: R-11, R-12, R-113, R-114, R-502, HFP</p> <p>HFC: R-404a (HP62), R-407a, R-407c (AC9000), R-134a, R-410a (AZ20), R-507 (AZ50), R-508b (SUVA95), R-236FA, R-125, R-245Fa, R-422a, R-422d, R-427a, R-424a, R-426a, R-438a, R-407F, R-32</p> <p>HCFC: R-22, R-123, R-124, R-500, R-503, R-401a (MP39), R-402a (HP80), R-402b (HP81), R-408a, R-409a, R-23, R-21, R-227</p> <p>HALON: H1301, H2402, H1211</p> <p>Other: FA188, FC72, N1230, H1234YF, H1234ZE, N7100, N7200, N7300, N7600</p> |
| Measuring Range        | All gases 0 to 10,000 ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Warm-Up Time           | 5 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Detector Type          | Infrared, Non-Dispersive                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Sensitivity            | 1 ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Accuracy               | <p>±1 ppm ±10% of reading from 0-1000 ppm</p> <p>R11, R22 and R113 are ±10 ppm ±15% of reading from 0-1000 ppm</p>                                                                                                                                                                                                                                                                                                                                                                              |
| Response Time          | 90% of response within 5 seconds; 100% in 7 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Temperature Drift      | 1.5 ppm per degree C between purge cycles                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| System Noise           | Less than 40 dB (A) at 10ft (3 m)                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Operating Temp         | 32 to 122°F (0 to 50°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Ambient Humidity       | 5 to 90% RH (non-condensing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Altitude Limit         | 6,562 ft (2,000 m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Power                  | DC power pack, provides a minimum of 8 hours of operation                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Power Consumption      | 15 Watts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Front panel            | <p>3 indicator lights:</p> <p>ON Green LED flashes during warm-up, then glows steady during normal operation.</p> <p>FAULT Yellow LED flashes when there is a system fault.</p> <p>ALARM Red LED flashes when the gas level is above its alarm setting</p>                                                                                                                                                                                                                                      |
| Audible Alarm          | Internal audible alarm programmable for any of the following conditions:<br>OFF, FAULT/ ALARM, ALARM                                                                                                                                                                                                                                                                                                                                                                                            |
| Dimensions (D x L x W) | 9.0 x 14.5 x 5.0 inches (229 x 368 x 127 mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Weight                 | Less than 9lbs (4 kg) including battery                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

# Technical data and ordering

## PAGM CO2

### Specification

| Specification          | Description                                                                                                                                                                                                                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gas Detected           | CO <sub>2</sub> (R744)                                                                                                                                                                                                                |
| Measuring Range        | 20 to 100,000 ppm (10% vol.)                                                                                                                                                                                                          |
| Warm-Up Time           | 5 minutes (300 seconds)                                                                                                                                                                                                               |
| Detector Type          | Infrared, Non-Dispersive                                                                                                                                                                                                              |
| Display Resolution     | 1 ppm                                                                                                                                                                                                                                 |
| Accuracy               | ±1 ppm ±10% of reading from 0-10,000 ppm                                                                                                                                                                                              |
| Response Time          | 90% of response within 5 minutes                                                                                                                                                                                                      |
| System Noise           | Less than 40dB (A) at 10ft (3 m)                                                                                                                                                                                                      |
| Operating Temperature  | 32 to 122°F (0 to 50°C)                                                                                                                                                                                                               |
| Ambient Humidity       | 5 to 90% RH (non-condensing)                                                                                                                                                                                                          |
| Altitude Limit         | 6,562 ft (2,000 m)                                                                                                                                                                                                                    |
| Power                  | DC power pack, provides a minimum of 8 hours of operation                                                                                                                                                                             |
| Power Consumption      | 15 Watts maximum                                                                                                                                                                                                                      |
| Front panel            | 3 indicator lights:<br>ON Green LED flashes during warm-up, then glows steady during normal operation<br>FAULT Yellow LED flashes when there is a system fault<br>ALARM Red LED flashes when the gas level is above its alarm setting |
| Audible Alarm          | Internal audible alarm programmable for any of the following conditions:<br>OFF, FAULT/ ALARM, ALARM                                                                                                                                  |
| Dimensions (D x L x W) | 9.0 x 14.5 x 5.0 inches (229 x 368 x 127 mm)                                                                                                                                                                                          |
| Weight                 | Less than 9lbs (4 kg) including battery                                                                                                                                                                                               |
| Warranty               | 2 years from date of shipment                                                                                                                                                                                                         |



# Technical data and ordering

## PGM-IR

### PAGM models

|                      |          |
|----------------------|----------|
| PAGM FOR CO2         | 080Z2148 |
| PAGM FOR HALOGEN GAS | 080Z2149 |

## PGM-IR

### Maintenece kit

|                                  |            |
|----------------------------------|------------|
| Maintenece kit                   | LP-DHGM-MM |
| Components included              | Qty        |
| Coalescing inline Filter Element | 1          |
| Purge/ Fresh Air Carbon Filter   | 1          |
| HYDROPHOBIC FILTERS              | 2          |

## PGM-IR

### Spare parts & accessories

| Spares      |                           |
|-------------|---------------------------|
| LP3015-5808 | Battery Charger only      |
| LP3015-5743 | PAGM Battery Pack         |
| LP3015-4239 | Replacement Pump          |
| LP3015-4721 | Replacement IR Sensor Kit |

# Secop reciprocating compressors produced for Danfoss - Direct current

BD range is the leading and widest AC / DC compressor range tailored for cooling on the move.

The excellent performance of the BD series safeguards food, medical and telecommunication.

## Features Reciprocating compressors



## Facts

### Applications:

- 12 / 24 V DC mobile refrigerators and freezers
- 12 V DC LBP / MBP van cooling boxes
- 12 / 24 V DC HBP telecommunication systems

### Refrigerants:

- R134a

### Capacity range:

- 32 - 274 W

### Segment usage:

- Refrigeration MT

### Benefit:

- Operation under extreme conditions
- Minimal energy consumption
- Portable beyond traditional limits
- Application possible at extreme voltage rate

# Technical data and ordering

## R134a

| Application | Compressors model | Kit ordering code         |                                | Cooling capacity (W) <sup>1)</sup> | Electrical equipment *             |                                   |
|-------------|-------------------|---------------------------|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|
|             |                   | with DC electronic module | with AC / DC electronic module |                                    | DC Electronic module (spare - EMI) | AC / DC electronic module (spare) |
| LBP / MBP   | BD35F             | 195B0722                  | 195B0744                       | 35.9                               | 101N0212                           | 101N0510                          |
|             | BD50F             | 195B0723                  | -                              | 52.5                               | 101N0212                           | 101N0510                          |
|             | BD80F             | 195B0742                  | -                              | 78                                 | 101N0390                           | -                                 |
|             | BD250GH           | 195B0748                  | -                              | 78                                 | 101N0390                           | -                                 |

AC plug for BD compressor - 105N9531

BD Remote kit with 75cm. Cable - 105N9100

\*- Electrical equipment are spares. Generally these are supplied along with compressors in kit ordering code.

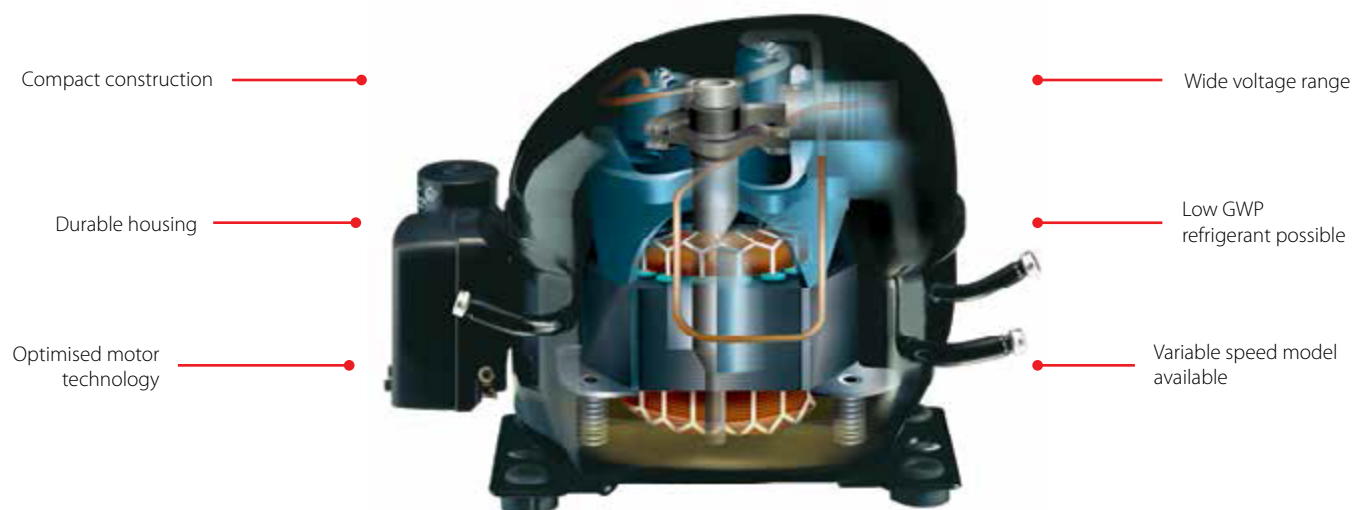
1) Condensing temperature : 55°C, Evaporating temp: -25°C, Suction gas temp: 32°C, Liquid temperature: 55°C

# Secop reciprocating compressors produced for Danfoss- Light commercial

Specially optimised for use in household and light commercial applications, hermetic reciprocating compressors from Secop for Danfoss provide high cooling capacity in an energy saving design.

Compressor models are available for R134a, R290, R404A / R507A and R600a, for cooling needs from 20W to 6kW.

## Features Reciprocating compressors



## Facts

### Applications:

- Laboratory and medical equipment
- Compressed air dryers
- Glass door merchandisers
- Display cabinets
- Fridges and freezers
- Ice cream cabinet
- Vending machines
- Drink dispensers
- Ice making machines
- Bottle coolers
- Heat pumps
- Milk cooling tanks

### Refrigerants:

- R134a
- R290
- R404A
- R507A
- R600a

### Capacity range:

- 20-6k W

### Segment usage:

- Household and light commercial application

### Benefit:

- Easy installation
- Low noise and high energy efficiency
- Robust in tough operating conditions
- Immune to unstable power supply
- Environmentally friendly solutions Portable beyond traditional limits
- Application possible at extreme voltage rate

# Technical data and ordering

## R134a

| Application                   | Compressors model | Compressor kit with HST equipment | Capacity (W) | Displacement (cm <sup>3</sup> ) | Electrical equipment * |                |                    |               |             |          |
|-------------------------------|-------------------|-----------------------------------|--------------|---------------------------------|------------------------|----------------|--------------------|---------------|-------------|----------|
|                               |                   |                                   |              |                                 | LST(RSIR)              | HST (CSIR)     |                    | HST (CSR)     | LST / HST   |          |
|                               |                   |                                   |              |                                 | PTC Starting device    | Starting relay | Starting capacitor | Starting unit | Cord relief | Cover    |
|                               |                   |                                   |              |                                 | spades                 | spades         |                    | spades        |             |          |
|                               |                   |                                   |              |                                 | 6.3 mm                 | 6.3 mm         | 6.3 mm             | 6.3 mm        |             |          |
| HBP / MBP / LBP <sup>1)</sup> | PL35G             | 195B0245                          | 28           | 2.00                            | 103N0011               | 117U6021       | 117U5014           | -             | 103N1010    | -        |
|                               | TL3G              | 195B0006                          | 41           | 3.13                            | 103N0011               | 117U6009       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | TL4G              | 195B0008                          | 58           | 3.86                            | 103N0011               | 117U6004       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | TL5G              | 195B0011                          | 79           | 5.08                            | 103N0011               | 117U6000       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | FR6G              | 195B0023                          | 83           | 6.23                            | 103N0011               | 117U6000       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | FR7.5G            | 195B0024                          | 99           | 6.93                            | 103N0011               | 117U6001       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | FR8.5G            | 195B0026                          | 123          | 7.95                            | 103N0011               | 117U6015       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | FR10G             | 195B0027                          | 136          | 9.05                            | 103N0011               | 117U6010       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | FR11G             | 195B0028                          | 170          | 11.15                           | 103N0011               | 117U6010       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | SC10G             | 195B0043                          | 113          | 10.29                           | -                      | 117U6002       | 117U5017           | -             | -           | -        |
|                               | SC12G             | 195B0050                          | 175          | 12.87                           | -                      | 117U6003       | 117U5017           | -             | -           | -        |
|                               | SC15G             | 195B0053                          | 164          | 15.28                           | -                      | 117U6005       | 117U5017           | -             | -           | -        |
|                               | SC18G             | 195B0059                          | 283          | 17.69                           | -                      | 117U6019       | 117U5017           | -             | -           | -        |
|                               | SC21G             | 195B0636                          | 333          | 20.95                           | -                      | -              | -                  | 117-7029      | -           | -        |
|                               | SC12/12G          | 195B0051                          | 350          | 2 × 12.87                       | -                      | 117U6003       | 117U5017           | -             | -           | -        |
| LBP <sup>2)</sup>             | PL50F             | 195B0001                          | 40           | 2.50                            | -                      | 117U6021       | 117U5014           | -             | 103N1010    | -        |
|                               | TL3FX             | 195B0005                          | 54           | 3.13                            | 103N0011               | 117U6007       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | TL5FX             | 195B0009                          | 82           | 5.08                            | 103N0011               | 117U6004       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | TL55FX            | 195B0010                          | 98           | 5.08                            | 103N0011               | 117U6004       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | TL56F             | 195B0012                          | 104          | 5.70                            | 103N0011               | 117U6004       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | TL57FX            | 195B0224                          | 120          | 6.49                            | 103N0011               | 117U6000       | 117U5014           | -             | 103N1010    | 103N2010 |
|                               | NL6FX             | 195B0165                          | 110          | 6.13                            | 103N0011               | 117U6004       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | NL7FX             | 195B0176                          | 136          | 7.27                            | 103N0011               | 117U6000       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | NL7FK             | 195B0091                          | 136          | 7.27                            | 103N0011               | 117U6000       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | NL9FK             | 195B0092                          | 155          | 8.35                            | 103N0011               | 117U6001       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | NL11FX            | 195B0093                          | 200          | 11.15                           | 103N0011               | 117U6002       | 117U5015           | -             | 103N1010    | 103N2010 |
|                               | SC15FX            | 195B0052                          | 230          | 15.28                           | -                      | 117U6003       | 117U5017           | -             | -           | -        |
|                               | SC18FX            | 195B0057                          | 280          | 17.69                           | -                      | 117U6005       | 117U5017           | -             | -           | -        |
|                               | SC21FX            | 195B0047                          | 335          | 20.95                           | -                      | 117U6019       | 117U5017           | -             | -           | -        |
| MBP <sup>3)</sup>             | NL7.3MF           | 195B0370                          | 304          | 7.27                            | 103N0011               | 117U6016       | 117U5015           | -             | 103N1010    | -        |
|                               | NL10MF            | 195B0275                          | 441          | 10.10                           | 103N0011               | 117U6022       | 117U5018           | -             | 103N1010    | -        |
|                               | GS26MFX           | 195B0433                          | 1266         | 26.30                           | -                      | -              | -                  | 117-7055      | -           | -        |
|                               | GS34MFX           | 195B0435                          | 1648         | 33.80                           | -                      | -              | -                  | 117-7056      | -           | -        |
| HBP <sup>4)</sup>             | FR7GH             | 195B0167                          | 525          | 6.93                            | -                      | 117U6016       | 117U5015           | -             | 103N1010    | -        |
|                               | SC10GH            | 195B0142                          | 762          | 10.29                           | -                      | 117U6005       | -                  | -             | -           | -        |
|                               | SC15GH            | 195B0144                          | 1139         | 15.28                           | -                      | 117U6011       | -                  | -             | -           | -        |
|                               | SC18GHX           | 195B0648                          | 1310         | 17.69                           | -                      | -              | -                  | -             | 103N9100    | 103N2008 |

Note: LST- Low starting torque= PTC relay only

HST- high starting torque= starting relay + capacitor.

\*- Electrical equipment are spares. Generally these are supplied along with compressors in kit ordering code.

1)- Condensing temperature : 55°C, Evaporating temp: -25°C, Suction gas temp: 32°C, Liquid temperature: 55°C

2)- Condensing temperature : 55°C, Evaporating temp: -25°C, Suction gas temp: 32°C, Liquid temperature: 55°C

3)- Condensing temperature : 55°C, Evaporating temp: -10°C, Suction gas temp: 32°C, Liquid temperature: 55°C

4)- Condensing temperature : 55°C, Evaporating temp: 5°C, Suction gas temp: 32°C, Liquid temperature: 55°C

# Technical data and ordering

## R404A & R507

| Application       | Compressors model | Compressor kit with HST equipment | Cooling capacity (W) | Displacement    | Electrical equipment * |                    |                 |             |          |
|-------------------|-------------------|-----------------------------------|----------------------|-----------------|------------------------|--------------------|-----------------|-------------|----------|
|                   |                   |                                   |                      |                 | HST (CSIR)             |                    | HST (CSR)       | LST / HST   |          |
|                   |                   |                                   |                      |                 | Starting relay         | Starting capacitor | Starting device | Cord relief | Cover    |
|                   |                   |                                   |                      | cm <sup>3</sup> | spades                 |                    | spades          |             |          |
|                   |                   |                                   |                      |                 | 6.3 mm                 | 6.3 mm             | 6.3 mm          |             |          |
| LBP <sup>1)</sup> | TL4CL             | 195B0021                          | 142                  | 3.86            | 117U6000               | 117U5014           | -               | 103N1010    | 103N2010 |
|                   | FR6CL             | 195B0031                          | 243                  | 6.23            | 117U6015               | 117U5015           | -               | 103N1010    | 103N2010 |
|                   | FR7.5CL           | 195B0398                          | 262                  | 6.93            | 117U6016               | 117U5015           | -               | 103N1010    | 103N2010 |
|                   | FR8.5CL           | 195B0038                          | 290                  | 7.95            | 117U6010               | 117U5015           | -               | 103N1010    | 103N2010 |
|                   | NL7CLX            | 195B0350                          | 340                  | 7.27            | 117U6002               | 117U5015           | -               | 103N1010    | 103N2010 |
|                   | SC10CLX           | 195B0074                          | 360                  | 10.29           | 117U6005               | 117U5017           | -               | 103N1004    | 103N2008 |
|                   | SC12CL            | 195B0076                          | 637                  | 12.87           | 117U6005               | 117U5017           | -               | 103N1004    | 103N2009 |
|                   | SC15CL            | 195B0088                          | 780                  | 12.87           | -                      | 117U5017           | -               | 103N1004    | 103N2008 |
|                   | SC18CL            | 195B0066                          | 995                  | 17.68           | 117U6013               | 117U5012           | -               | 103N1004    | 103N2009 |
|                   | SC21CLX           | 195B0640                          | 813                  | 20.95           | -                      | -                  | 117-7027        | 103N1004    | 103N2009 |
|                   | GS26CLX           | 195B0427                          | 1240                 | 26.3            | -                      | -                  | 117-7056        | -           | -        |
|                   | GS34CLX           | 195B0439                          | 1715                 | 33.8            | -                      | -                  | 117-7074        | -           | -        |
| MBP <sup>2)</sup> | SC15/15CL         | 195B0109                          | 1230                 | 2X15.28         | 117U6019               | 117U5017           | -               | 103N1004    | 103N2009 |
|                   | SC21/21CL         | 195B0644                          | 1636                 | 2X20.95         | -                      | -                  | 117-7027        | 103N1004    | 103N2009 |
|                   | NF7MLX            | 195B0443                          | 635                  | 7.27            | 117U4139               | 117U5018           | -               | 2x117U0349  | 117U1021 |
|                   | SC10MLX           | 195B0345                          | 855                  | 10.29           | 117U6011               | 117U5017           | -               | 103N1004    | 103N2008 |
|                   | SC12MLX           | 195B0323                          | 1038                 | 12.87           | 117U6011               | 117U5017           | -               | 103N1004    | 103N2008 |
|                   | SC15MLX           | 195B0391                          | 1285                 | 15.28           | 117U6013               | 117U5012           | -               | 103N1004    | 103N2009 |
|                   | SC18MLX           | 195B0652                          | 1497                 | 17.68           | -                      | -                  | 117-7027        | 103N1004    | 103N2009 |
|                   | SC18MLX.3         | 195B0653                          | 1557                 | 17.68           | -                      | -                  | 117-7027        | 103N1004    | 103N2009 |
|                   | GS21MLX           | 195B0436                          | 1748                 | 21.2            | -                      | -                  | 117-7070        | -           | -        |
| HBP <sup>3)</sup> | GS26MLX           | 195B0437                          | 2254                 | 26.3            | -                      | -                  | 117-7072        | -           | -        |
|                   | GS34MLX           | 195B0438                          | 2953                 | 33.8            | -                      | -                  | 117-7056        | -           | -        |
|                   | TL4DL             | 195B0166                          | 527                  | 3.86            | 117U6001               | 117U5014           | -               | 103N1010    | 103N2010 |
|                   | FR6DL             | 195B0032                          | 840                  | 6.23            | 117U6010               | 117U5015           | -               | 103N1010    | 103N2010 |
|                   | SC10DL            | 195B0075                          | 1450                 | 10.29           | 117U6005               | 117U5017           | -               | 103N1004    | 103N2009 |
|                   | SC12DL            | 195B0077                          | 1890                 | 12.87           | 117U6019               | 117U5017           | -               | 103N1004    | 103N2009 |
|                   | SC15DLX           | 195B0641                          | 2210                 | 15.28           | 117U6019               | 117U5017           | -               | 103N1004    | 103N2009 |
|                   | SC10/10DL         | 195B0111                          | 2900                 | 2X10.29         | 117U6005               | 117U5017           | -               | 103N1004    | 103N2009 |
|                   | SC12/12DL         | 195B0112                          | 3780                 | 2X12.87         | 117U6019               | 117U5017           | -               | 103N1004    | 103N2009 |

1)- Condensing temperature : 45°C, Evaporating temp: -25°C, Suction gas temp: 32°C, Liquid temperature: 45°C

2)- Condensing temperature : 45°C, Evaporating temp: -10°C, Suction gas temp: 32°C, Liquid temperature: 45°C

3)- Condensing temperature : 45°C, Evaporating temp: 5°C, Suction gas temp: 32°C, Liquid temperature: 45°C

\*- Electrical equipment are spares. Generally these are supplied along with compressors in kit ordering code.

# Technical data and ordering

## R600a

| Application | Compressors model | Compressor kit with HST (electrical equipments) | Capacity (W) <sup>1)</sup> | Displacement (cm <sup>3</sup> ) | Electrical Equipment |                                         |                                           |             |          |          |          |        |
|-------------|-------------------|-------------------------------------------------|----------------------------|---------------------------------|----------------------|-----------------------------------------|-------------------------------------------|-------------|----------|----------|----------|--------|
|             |                   |                                                 |                            |                                 | LST (RSIR) & (RSCR)  |                                         | Run capacitor                             | LST / HST   |          |          |          |        |
|             |                   |                                                 |                            |                                 | PTC Starting device  | PTC device with run capacitor connector | Optional or compulsory (refer data sheet) | Cord relief | Cover    |          |          |        |
|             |                   |                                                 |                            |                                 |                      |                                         |                                           |             |          | spades   |          |        |
|             |                   |                                                 |                            |                                 |                      |                                         |                                           |             |          | 6.3 mm   | 4.8 mm   | 6.3 mm |
| LBP / MBP   | TLES9KK.2         | 195B0228                                        | 110                        | 8.83                            | 103N0011             | 103N0021                                | 117-7117                                  |             |          | 103N1010 | 103N2010 |        |
| LBP         | NLX13KK.2         | 195B0456                                        | 167                        | 13.25                           | -                    | 103N0021                                | -                                         | 103N1010    | 103N2010 |          |          |        |
|             | NLX15KK.2         | 195B0506                                        | 192                        | 14.65                           | -                    | 103N0021                                | -                                         | 103N1010    | 103N2010 |          |          |        |
|             | NLE15KK.4         | 195B0374                                        | 190                        | 14.65                           | 103N0011             | 103N0021                                | 117-7117                                  | 103N1010    | 103N2010 |          |          |        |

1)- Condensing temperature : 45°C, Evaporating temp: -25°C, Suction gas temp: 32°C, Liquid temperature: 55°C

## R290

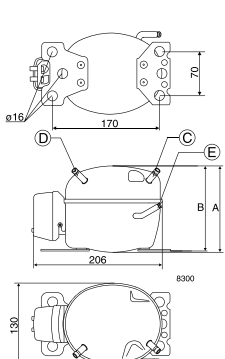
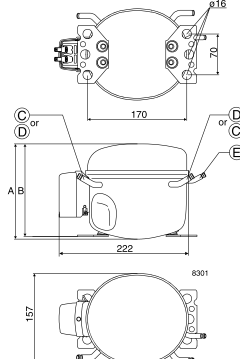
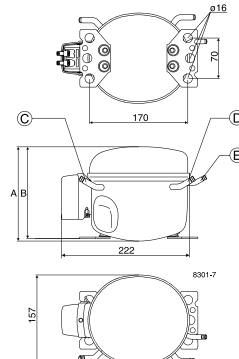
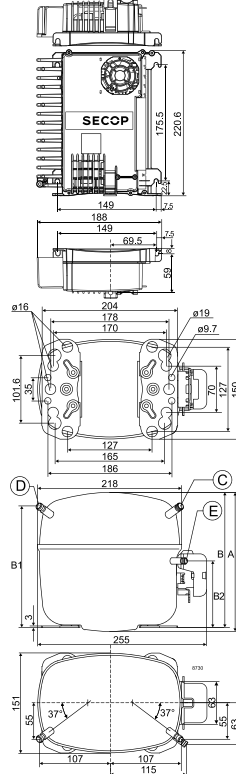
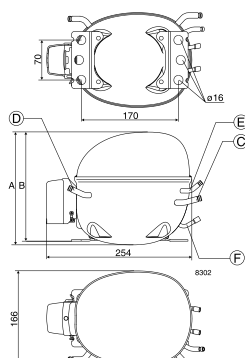
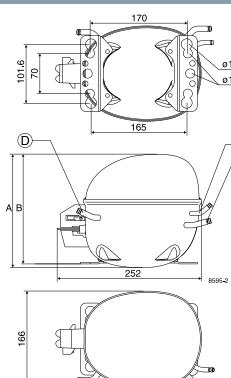
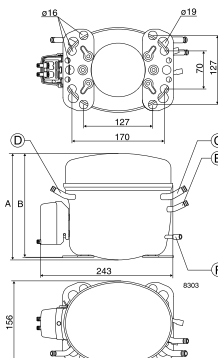
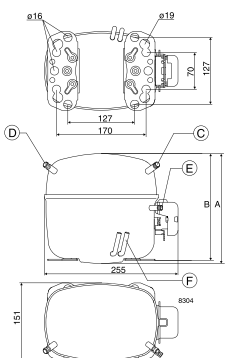
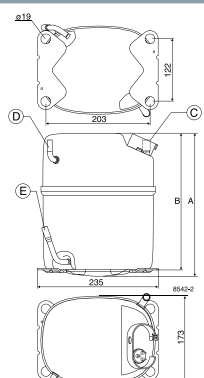
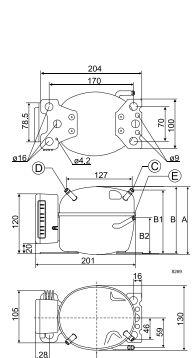
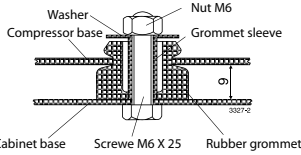
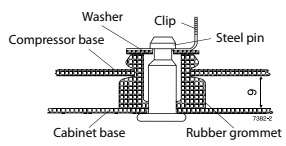
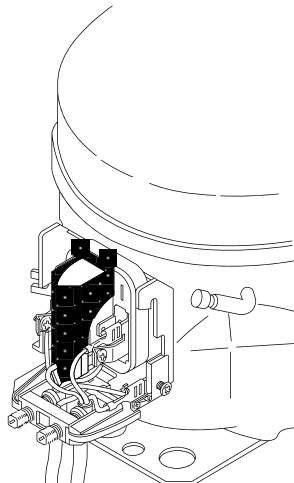
| Application | Compressors model | Compressor kit with HST (electrical equipments) | Capacity (W) <sup>1)</sup> | Displacement | Electrical Equipment                            |                                         |                            |                |                    |             |          |
|-------------|-------------------|-------------------------------------------------|----------------------------|--------------|-------------------------------------------------|-----------------------------------------|----------------------------|----------------|--------------------|-------------|----------|
|             |                   |                                                 |                            |              | LST (RSIR)                                      | LST(RSCR)                               | Run capacitor              | HST (CSIR)     |                    | LST / HST   |          |
|             |                   |                                                 |                            |              | PTC Starting device w/o run capacitor connector | PTC device with run capacitor connector | 1 optional<br>2 compulsory | Starting relay | Starting capacitor | Cord relief | Cover    |
|             |                   |                                                 |                            |              | cm³                                             |                                         |                            |                |                    |             |          |
|             |                   |                                                 |                            | cm³          | 6.3 mm                                          | 4.8 mm                                  | 6.3 mm                     | 6.3 mm         | 6.3 mm             |             |          |
| LBP / MBP   | DLE7.5CN          | 19580728                                        | 290                        | 0.27         | 103N0011                                        | 103N0021                                | 117-7117                   | 117U7002       | 117U5015           | 103N1010    | 103N2010 |
| LBP         | SC12CNX.2         | 19580458                                        | 45                         | 2.87         | -                                               | -                                       | -                          | -              | 117U5017           | -           | -        |
|             | SC18CNX.2         | 19580489                                        | 689                        | 7.69         | -                                               | -                                       | -                          | -              | 117U5017           | -           | -        |

1)- Condensing temperature : 45°C, Evaporating temp: -25°C, Suction gas temp: 32°C, Liquid temperature: 45°C

## Accessories

| Description                     | Code     |
|---------------------------------|----------|
| Bolt joint (M6 metric)          | 118-1917 |
| Snap on (Ø 7.3 mm)              | 118-1919 |
| Clip                            | 118-3585 |
| Steel Pin                       | 118-3586 |
| Washer Ø 21 x Ø 8.1 mm x 0.9 mm | 118-3588 |
| Rubber grommet 16 mm            | 118-3661 |
| Rubber grommet 19 mm            | 118-3666 |

# Wiring diagram of small compressors

| <p>PL / PLE</p>                                                                                                                                                                                                                                                                                                                                               | <p>TL</p>                                                                                                                                                                         | <p>TLS / tLES / tLX</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>SLV</p>  |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------|-----------------------|------------|----|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----|-----------------------------|----|-------------------------------|----|------------------------------|----|---------------------------------|----|---------------------------------|--|--|--|-------------------------------|--|--|--|--|--|-------------------------------|--|--|-----------------|--|--|--|--|--|----|----|-----|----|--|----|----|---|----|----|--|--|----|--|----|----|---|----|
| <p>NL / NLE / NLX</p>                                                                                                                                                                                                                                                                                                                                        | <p>NF</p>                                                                                                                                                                        | <p>FR</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                 |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| <p>SC</p>                                                                                                                                                                                                                                                                                                                                                   | <p>GS</p>                                                                                                                                                                       | <p>BD</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                 |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| <p>Mounting accessories</p>  <p><b>Bolt joint for</b><br/>one compressor: 118-1917<br/>in quantities: 118-1918</p> <p><b>Bolt joint for</b><br/>one GS compressor: 107B9150 (M8 x 40, base plate distance: 17 mm)</p>  <p><b>Snap-on</b><br/>in quantities: 118-1919</p> | <p>Protection Screen for PTC</p> <p><b>Note:</b><br/>to fulfil the requirements of EN 60355-2-34 the protection screen 103N0476 must be applied to the PTC starting device</p>  | <table><tr><th>Compressor design</th><th>Optimization level</th><th>Compressor size</th><th>Application range</th><th>Start characteristics</th><th>Generation</th></tr><tr><td>PL</td><td rowspan="6"><b>Blank</b><br/>Standard energy level<br/><br/><b>S</b><br/>Semi-direct intake<br/><br/><b>E</b><br/>Energy-optimized</td><td rowspan="6"><b>Nominal</b><br/>displacement in cm³<br/><br/><b>Exception:</b><br/>For PL compressors the capacity at rating point is stated</td><td><b>CL R404A / R507</b><br/>LBP</td><td rowspan="6"><b>Blank =&gt;</b><br/>first generation<br/><br/><b>Blank =&gt;</b><br/>universal (principal rule)<br/><br/><b>X = HST</b><br/>characteristics (expansion valve)<br/><br/><b>GH R134a</b><br/>Heat Pumps<br/><br/><b>GHH R134a</b><br/>Heat Pumps optimized</td><td rowspan="6"><b>.2 =&gt;</b><br/>second generation<br/><br/><b>.3 =&gt;</b><br/>third generation<br/><br/>etc.</td></tr><tr><td>TL</td><td><b>CN R290</b><br/>LBP (MBP)</td></tr><tr><td>NL</td><td><b>DL R404A / R507</b><br/>HBP</td></tr><tr><td>FR</td><td><b>FR134a</b><br/>LBP / (MBP)</td></tr><tr><td>SC</td><td><b>FT R134a</b><br/>LBP tropical</td></tr><tr><td>GS</td><td><b>G R134a</b><br/>LBP / MBP/hBP</td></tr><tr><td></td><td></td><td></td><td><b>GH R134a</b><br/>Heat Pumps</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td><b>ML R404A / R507</b><br/>MBP</td><td></td><td></td></tr><tr><td colspan="6"><b>Examples</b></td></tr><tr><td>TL</td><td>ES</td><td>5.7</td><td>FT</td><td></td><td>.3</td></tr><tr><td>NL</td><td>E</td><td>10</td><td>MF</td><td></td><td></td></tr><tr><td>SC</td><td></td><td>15</td><td>CN</td><td>X</td><td>.2</td></tr></table> | Compressor design                                                                               | Optimization level                                                                                                                                                                                                                             | Compressor size                                                                             | Application range | Start characteristics | Generation | PL | <b>Blank</b><br>Standard energy level<br><br><b>S</b><br>Semi-direct intake<br><br><b>E</b><br>Energy-optimized | <b>Nominal</b><br>displacement in cm³<br><br><b>Exception:</b><br>For PL compressors the capacity at rating point is stated | <b>CL R404A / R507</b><br>LBP | <b>Blank =&gt;</b><br>first generation<br><br><b>Blank =&gt;</b><br>universal (principal rule)<br><br><b>X = HST</b><br>characteristics (expansion valve)<br><br><b>GH R134a</b><br>Heat Pumps<br><br><b>GHH R134a</b><br>Heat Pumps optimized | <b>.2 =&gt;</b><br>second generation<br><br><b>.3 =&gt;</b><br>third generation<br><br>etc. | TL | <b>CN R290</b><br>LBP (MBP) | NL | <b>DL R404A / R507</b><br>HBP | FR | <b>FR134a</b><br>LBP / (MBP) | SC | <b>FT R134a</b><br>LBP tropical | GS | <b>G R134a</b><br>LBP / MBP/hBP |  |  |  | <b>GH R134a</b><br>Heat Pumps |  |  |  |  |  | <b>ML R404A / R507</b><br>MBP |  |  | <b>Examples</b> |  |  |  |  |  | TL | ES | 5.7 | FT |  | .3 | NL | E | 10 | MF |  |  | SC |  | 15 | CN | X | .2 |
| Compressor design                                                                                                                                                                                                                                                                                                                                                                                                                              | Optimization level                                                                                                                                                                                                                                                 | Compressor size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Application range                                                                               | Start characteristics                                                                                                                                                                                                                          | Generation                                                                                  |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| PL                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Blank</b><br>Standard energy level<br><br><b>S</b><br>Semi-direct intake<br><br><b>E</b><br>Energy-optimized                                                                                                                                                    | <b>Nominal</b><br>displacement in cm³<br><br><b>Exception:</b><br>For PL compressors the capacity at rating point is stated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>CL R404A / R507</b><br>LBP                                                                   | <b>Blank =&gt;</b><br>first generation<br><br><b>Blank =&gt;</b><br>universal (principal rule)<br><br><b>X = HST</b><br>characteristics (expansion valve)<br><br><b>GH R134a</b><br>Heat Pumps<br><br><b>GHH R134a</b><br>Heat Pumps optimized | <b>.2 =&gt;</b><br>second generation<br><br><b>.3 =&gt;</b><br>third generation<br><br>etc. |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| TL                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CN R290</b><br>LBP (MBP)                                                                     |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| NL                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>DL R404A / R507</b><br>HBP                                                                   |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| FR                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>FR134a</b><br>LBP / (MBP)                                                                    |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| SC                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>FT R134a</b><br>LBP tropical                                                                 |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| GS                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>G R134a</b><br>LBP / MBP/hBP                                                                 |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>GH R134a</b><br>Heat Pumps                                                                   |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>ML R404A / R507</b><br>MBP                                                                   |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                 |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| TL                                                                                                                                                                                                                                                                                                                                                                                                                                             | ES                                                                                                                                                                                                                                                                 | 5.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FT                                                                                              |                                                                                                                                                                                                                                                | .3                                                                                          |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| NL                                                                                                                                                                                                                                                                                                                                                                                                                                             | E                                                                                                                                                                                                                                                                  | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MF                                                                                              |                                                                                                                                                                                                                                                |                                                                                             |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |
| SC                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CN                                                                                              | X                                                                                                                                                                                                                                              | .2                                                                                          |                   |                       |            |    |                                                                                                                 |                                                                                                                             |                               |                                                                                                                                                                                                                                                |                                                                                             |    |                             |    |                               |    |                              |    |                                 |    |                                 |  |  |  |                               |  |  |  |  |  |                               |  |  |                 |  |  |  |  |  |    |    |     |    |  |    |    |   |    |    |  |  |    |  |    |    |   |    |



# Diagram and dimensions

| LST / RSIR - PL | LST / RSIR - TL-TLS-TLES-NL-NLE-FR | LST / RSIR - SC |
|-----------------|------------------------------------|-----------------|
|                 |                                    |                 |
| HST / CSIR - PL | HST / CSIR - TL-TLS-TLES-NL-NLE-FR | HST / CSIR - SC |
|                 |                                    |                 |
| HST / CSIR - NF | HST / CSR - SC                     | HST / CSR - GS  |
|                 |                                    |                 |
| Legend          |                                    |                 |

- a1) PTC starting device
- a2) Starting relay
- a3) Starting device
- b) Cover
- b1) Clamp (part of compressor)
- b2) Gasket (part of compressor)
- c) Starting capacitor
- d) Cord relief
- e) Run capacitor
- g) Protection screen for PTC

# Diagram and dimensions

| SC Twin             | Accessories for SC Twin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <p><b>SC10 / 10, SC12 / 12 and SC15 / 15:</b><br/>Service valve for 12 mm tube<br/>Solder connector for 12 mm tube<br/>118-7350<br/>104B0584</p> <p><b>SC18 / 18 and SC21 / 21:</b><br/>Service valve for 16 mm tube<br/>Solder connector for 16 mm tube<br/>118-7351<br/>118-7405</p> <p><b>SC10 / 10, SC12 / 12, SC15 / 15, SC18 / 18 and SC21 / 21:</b><br/>Seal ring for service valve and solder connector<br/>Time-delay relay<br/>Check valve (to be used with time-delay relay)<br/>118-3638<br/>117N0001<br/>020-1014</p> |
| HST / CSR - SC Twin | HST / CSIR - SC Twin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Applications

LBP: Low Back Pressure  
MBP: Medium Back Pressure  
HBP: High Back Pressure

## Motor types

RSIR: Resistant Start Induction Run  
RSCR: Resistant Start Capacitor Run  
CSIR: Capacitor Start Induction Run  
CSR: Capacitor Start Run

## Starting devices

LST: Low Starting Torque  
LST is used with capillary tube control and pressure equalizing. (Pressure equalizing may exceed 10 minutes)  
The PTC starting device requires 5 minutes cooling before each start  
HST: High Starting Torque  
HST consisting of relay and starting capacitor, is used for expansion valve control or for capillary tube control without pressure equalizing

## Test conditions EN 12900 (CECOMAF)

PL / tL / tLS / NL / FR / SC / BD

| Application                               | R134a | R404A / R507 |
|-------------------------------------------|-------|--------------|
| Condensing temperature                    | 55 °C | 45 °C        |
| Ambient temperature                       | 32 °C | 32 °C        |
| Suction gas temperature                   | 32 °C | 32 °C        |
| No subcooling                             |       |              |
| PL / TL / TLS / NL / FR / SC: 220 V 50 Hz |       |              |
| BD: 12 V, 24 V or 56 V DC                 |       |              |

## Test conditions ASHRAE

BD

| Application             | R600a   | R404A / R507 |
|-------------------------|---------|--------------|
| Condensing temperature  | 54.4 °C | 45 °C        |
| Ambient temperature     | 32 °C   | 32 °C        |
| Suction gas temperature | 32 °C   | 32 °C        |
| Liquid temperature      | 32 °C   | 32 °C        |
| 12 V, 24 V or 56 V DC   |         |              |

## Test conditions EN 12900

GS

| Application             | LBP           | MBP   | HBP   |
|-------------------------|---------------|-------|-------|
| Condensing temperature  | 40 °C         | 45 °C | 50 °C |
| Ambient temperature     | 32 °C         | 32 °C | 32 °C |
| Suction gas temperature | 20 °C         | 20 °C | 20 °C |
| Liquid temperature      | no subcooling |       |       |
| 220 V, 50 Hz            |               |       |       |

## Electrical equipment GS compressors

\*) Gasket / cover / clamp are parts of compressor

## Compressor cooling

S) Static cooling normally sufficient  
O) Oil cooling  
F<sub>1</sub>) Fan cooling 1.5 m/s  
(compressor compartment temperature equal to ambient temperature)  
F<sub>2</sub>) Fan cooling 3.0 m/s necessary  
\*\*) run capacitor 4 µF compulsory

## Voltages and frequencies

- 1) 198 – 254 V, 50 Hz
- 2) 187 – 254 V, 50 Hz, LBP
- 3) 198 – 254 V, 60 Hz, LBP
- 4) 198 – 254 V, 60 Hz, HBP
- 5) 198 – 254 V, 60 Hz, MBP
- 6) 207 – 254 V, 60 Hz, HBP
- 7) 187 – 254 V, 50 Hz, MBP
- 8) 187 – 254 V, 60 Hz, MBP
- 9) 187 – 254 V, 60 Hz, LBP

1 Watt = 0.86 kcal/h  
1 Watt = 3.41 Btu/h



# MTZ / NTZ Reciprocating compressors

Maneurop® MTZ series compressors are of the hermetic reciprocating type and are designed for medium and high evaporating temperature applications. NTZ are designed for low evaporating temperature applications.

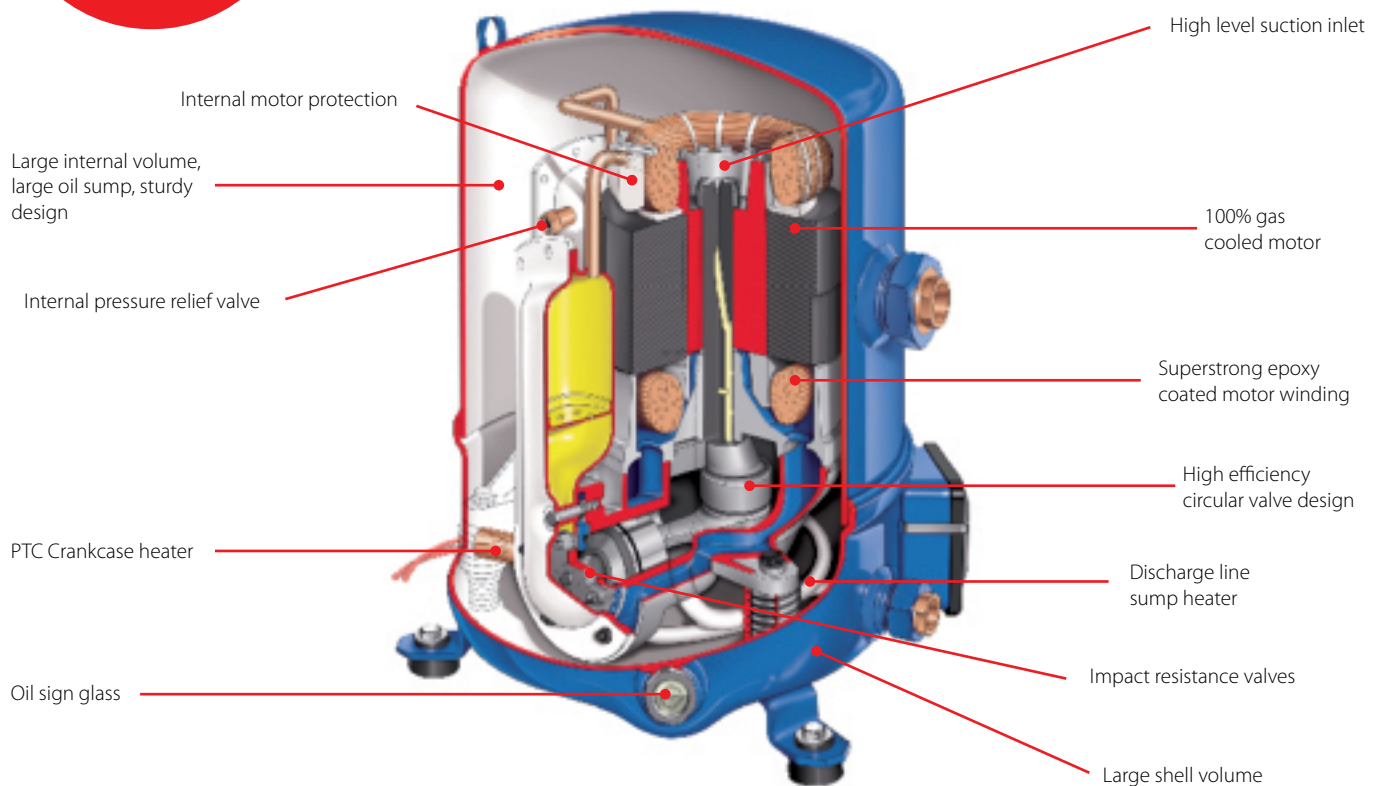
Available in a large variety of single and tandem models for refrigerants R404A, R134a, R407A/F, R407C, R448A, R449A, R452A and R513A\*, the compressors fit in lots of different applications.

## Features MTZ / NTZ



Built-in safeties

Safety by design



## Facts

### Applications:

- Walk-in freezers and cold rooms
- Frozen food processing and storage
- Ice cream machines
- Display cabinets
- Water chillers
- Large packaged air conditioners
- Process chillers
- Industrial air-con

### Segment usage:

- Airconditioning
- Refrigeration MT (NTZ)

### Refrigerants:

- R134a
- R407F
- R407A
- R404A
- R507A
- R407C
- R448A
- R449A
- R452A
- R513A

### Capacity range:

- 0.25 – 45 kW

### Benefit:

- Operation under extreme conditions
- Versatile
- No need for air circulation around the compressor
- Long lifetime expectancy and reliability

# Technical data and ordering

## MTZ

### Reciprocating compressors

| Compressor<br>model | Cooling capacity (W)        |       |                 |                         |       |       |       | Ordering code                         |                                       | No of cylinders | Oil<br>Charge<br>(dm³) | Displacemnt<br>(m³/h)<br>@2900 | Connection |           |          | Rotolock valve |           |
|---------------------|-----------------------------|-------|-----------------|-------------------------|-------|-------|-------|---------------------------------------|---------------------------------------|-----------------|------------------------|--------------------------------|------------|-----------|----------|----------------|-----------|
|                     | Refrigeration <sup>1)</sup> |       |                 | High temp <sup>2)</sup> |       |       |       |                                       |                                       |                 |                        |                                | Suction    | Discharge | Type     | Suction        | Discharge |
|                     | R404A/<br>R507              | R134a | R448A/<br>R449A | R513A                   | R513A | R407C | R134a | 400 / 3 / 50<br>Volts / Phase<br>/ Hz | 230 / 1 / 50<br>Volts / Phase<br>/ Hz |                 |                        |                                |            |           |          |                |           |
| MTZ018              | 2601                        | 1517  | 2501            | 1631                    | 2757  | 3470  | 2532  | MTZ18-4VI                             | MTZ18-5VI                             | 1               | 0.95                   | 5.3                            | 1          | 1         | Rotolock | V06            | V01       |
| MTZ022              | 3548                        | 2078  | 3393            | 2118                    | 3526  | 4550  | 3335  | MTZ22-4VI                             | MTZ22-5VI                             | 1               | 0.95                   | 6.6                            | 1          | 1         | Rotolock | V06            | V01       |
| MTZ028              | 4592                        | 2491  | 4189            | 2652                    | 4426  | 5890  | 4217  | MTZ28-4VI                             | MTZ28-5VI                             | 1               | 0.95                   | 8.4                            | 1          | 1         | Rotolock | V06            | V01       |
| MTZ032              | 5278                        | 2971  | 4809            | 3135                    | 5107  | 6650  | 4907  | MTZ32-4VI                             | MTZ32-5VI                             | 1               | 0.95                   | 9.4                            | 1 1/4      | 1         | Rotolock | V09            | V06       |
| MTZ036              | 6123                        | 3688  | 5587            | 3612                    | 6010  | 7510  | 6013  | MTZ36-4VI                             | MTZ36-5VI                             | 1               | 0.95                   | 10.5                           | 1 1/4      | 1         | Rotolock | V09            | V06       |
| MTZ040              | 6922                        | 4144  | 6422            | 4246                    | 6888  | 8660  | 6342  | MTZ40-4VI                             | –                                     | 1               | 0.95                   | 11.8                           | 1 1/4      | 1         | Rotolock | V09            | V06       |
| MTZ044              | 7139                        | 4027  | 6716            | 4405                    | 7380  | 9130  | 6836  | MTZ44-4VI                             | –                                     | 2               | 1.8                    | 13.3                           | 1 3/4      | 1 1/4     | Rotolock | V07            | V04       |
| MTZ050              | 8330                        | 4647  | 7657            | 4889                    | 8085  | 10420 | 7956  | MTZ50-4VI                             | –                                     | 2               | 1.8                    | 14.9                           | 1 3/4      | 1 1/4     | Rotolock | V07            | V04       |
| MTZ056              | 8978                        | 4896  | 8510            | 5269                    | 8894  | 11680 | 8621  | MTZ56-4VI                             | –                                     | 2               | 1.8                    | 16.7                           | 1 3/4      | 1 1/4     | Rotolock | V07            | V04       |
| MTZ064              | 10640                       | 5801  | 9756            | 6052                    | 10141 | 13360 | 10057 | MTZ64-4VI                             | –                                     | 2               | 1.8                    | 18.7                           | 1 3/4      | 1 1/4     | Rotolock | V07            | V04       |
| MTZ072              | 11820                       | 6678  | 11230           | 6839                    | 11436 | 15320 | 11543 | MTZ72-4VI                             | –                                     | 2               | 1.8                    | 21                             | 1 3/4      | 1 1/4     | Rotolock | V07            | V04       |
| MTZ080              | 13660                       | 7530  | 1309            | 7769                    | 12963 | 17380 | 13262 | MTZ80-4VI                             | –                                     | 2               | 1.8                    | 23.6                           | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |
| MTZ100              | 16210                       | 9095  | 15120           | 9464                    | 15950 | 20480 | 15452 | MTZ100-4VI                            | –                                     | 4               | 3.9                    | 29.8                           | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |
| MTZ125              | 20730                       | 11350 | 20340           | 12790                   | 21058 | 26880 | 18941 | MTZ125-4VI                            | –                                     | 4               | 3.9                    | 37.5                           | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |
| MTZ144              | 24140                       | 14410 | 22830           | 14680                   | 23855 | 29770 | 23536 | MTZ144-4VI                            | –                                     | 4               | 3.9                    | 42.1                           | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |
| MTZ160              | 26480                       | 16200 | 26180           | 16570                   | 26641 | 34090 | 25779 | MTZ160-4VI                            | –                                     | 4               | 3.9                    | 47.3                           | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |

1) Refrigeration  $T_e = -5^\circ\text{C}$ ,  $T_c = 45^\circ\text{C}$ ,  $SC = 2K$ ,  $SH = 10K$

2) High temp  $T_e = 5^\circ\text{C}$ ,  $T_c = 50^\circ\text{C}$ ,  $SC = 0K$ ,  $SH = 10K$

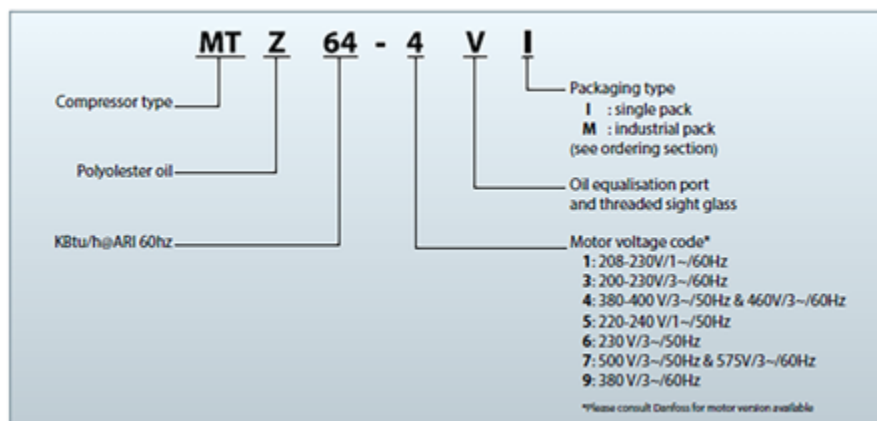
Rotolock connection of compressor can be changed to solder with solder sleeve

(Check the general spare part listing in this catalogue)

# Technical data and ordering

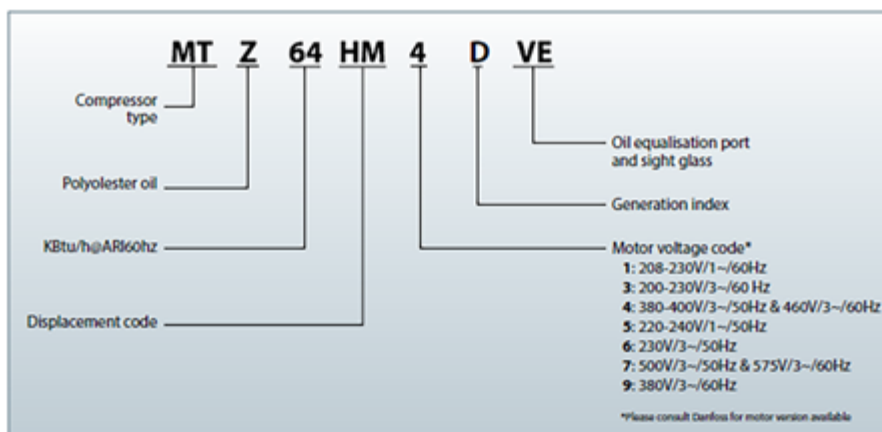
## MTZ

Code numbers (for ordering)



## MTZ

Compressor reference



# Technical data and ordering

## NTZ

### Reciprocating compressors

| Compressor model | Cooling capacity (W)        |       | Code no.                           |                                    | Oil Charge (dm³) | No of cylinders | Connection |           |          | Rotolock valve |           |
|------------------|-----------------------------|-------|------------------------------------|------------------------------------|------------------|-----------------|------------|-----------|----------|----------------|-----------|
|                  | Refrigeration <sup>1)</sup> |       | 400 / 3 / 50<br>Volts / Phase / Hz | 230 / 1 / 50<br>Volts / Phase / Hz |                  |                 | Suction    | Discharge | Type     | Suction        | Discharge |
|                  | R404A                       | R452A |                                    |                                    |                  |                 |            |           |          |                |           |
| NTZ048           | 1493                        | 1484  | 120F0226                           | 120F0228                           | 0.95             | 1               | 1 1/8      | 1         | Rotolock | V09            | V06       |
| NTZ068           | 2446                        | 2442  | 120F0230                           | 120F0232                           | 0.95             | 1               | 1 1/8      | 1         | Rotolock | V09            | V06       |
| NTZ096           | 2955                        | 3085  | 120F0234                           | –                                  | 1.8              | 2               | 1 3/4      | 1 1/4     | Rotolock | V07            | V04       |
| NTZ108           | 3583                        | 3761  | 120F0238                           | –                                  | 1.8              | 2               | 1 3/4      | 1 1/4     | Rotolock | V07            | V04       |
| NTZ136           | 4565                        | 4747  | 120F0236                           | –                                  | 1.8              | 2               | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |
| NTZ215           | 7046                        | 6942  | 120F0240                           | –                                  | 3.9              | 4               | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |
| NTZ271           | 9701                        | 9150  | 120F0242                           | –                                  | 3.9              | 4               | 1 3/4      | 1 1/4     | Rotolock | V02            | V04       |

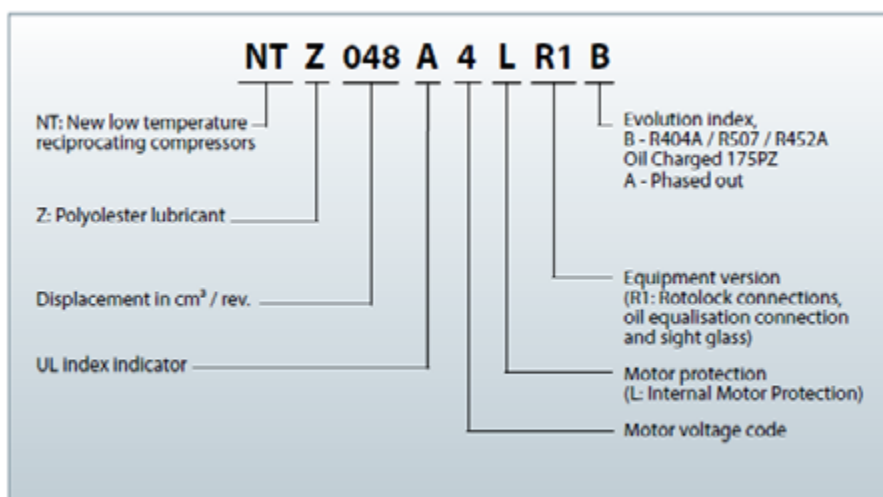
1) Refrigeration  $T_e = -25^\circ\text{C}$ ,  $T_c = 45^\circ\text{C}$ ,  $SC = 0\text{K}$ ,  $SH = 10\text{K}$

Rotolock connection of compressor can be changed to solder with solder sleeve

(Check the general spare part listing in this catalogue)

## NTZ

### Compressor reference



# MTZ and NTZ spares ordering



## Single Phase PSC starting kits

| Code n° | Description                             | Application                              | Packaging | Pack size |
|---------|-----------------------------------------|------------------------------------------|-----------|-----------|
| 7701026 | Permanent capacitors 440V, 20 µF, 10 µF | MT(Z)18-5, 22-5, 28-5 & NTZ 048-5, 068-5 | Multipack | 4         |



## Single phase CSR starting kits

| Code n° | Description                                          | Application                              | Packaging | Pack size |
|---------|------------------------------------------------------|------------------------------------------|-----------|-----------|
| 7701022 | Relay + Capacitors: run (20 + 10 µF), start (98 µF)  | MT(Z)18-5, 22-5, 28-5 & NTZ 048-5, 068-5 | Multipack | 4         |
| 7701023 | Relay + Capacitors: run (25 + 10 µF), start (140 µF) | MT(Z)32-5, 36-5                          | Multipack | 4         |



## 3 phase soft start equipment

| Code n° | Description                         | Application  | Packaging   | Pack size |
|---------|-------------------------------------|--------------|-------------|-----------|
| 7705006 | Electronic soft start kit, MCI 15 C | MT(Z)18-81   | Single pack | 1         |
| 7705007 | Electronic soft start kit, MCI 25 C | MT(Z)100-160 | Single pack | 1         |



## Relays and capacitors

| Code n° | Description                                | Application                             | Packaging   | Pack size |
|---------|--------------------------------------------|-----------------------------------------|-------------|-----------|
| 8173022 | Starting relay type RVA6AMKL               | All Single pack phase models (code 1&5) | Single pack | 1         |
| 8173001 | Starting capacitor 330V, 88-108 µF (98 µF) | CSR starting kits                       | Multipack   | 10        |



## Acoustic hoods

| Code n°  | Description                  | Application               | Packaging   | Pack size |
|----------|------------------------------|---------------------------|-------------|-----------|
| 120Z0575 | Slim acoustic hood for 1 cyl | MT(Z)18-40 & NTZ048-068   | Single pack | 1         |
| 120Z0576 | Slim acoustic hood for 2 cyl | MT(Z)44-81 & NTZ096-136   | Single pack | 1         |
| 120Z0577 | Slim acoustic hood for 2 cyl | MT(Z)100-160 & NTZ215-271 | Single pack | 1         |



## Mounting kits

| Code n° | Description                                                                                                        | Application                | Packaging   | Pack size |
|---------|--------------------------------------------------------------------------------------------------------------------|----------------------------|-------------|-----------|
| 8156001 | Mounting kit 1 & 2 cyl; Ebox: 80 x 96 mm; Sleeves 5/8" - 1/2"                                                      | MT/MTZ18-81 & NTZ048-136   | Single pack | 1         |
| 8156007 | Mounting kit for 4 cylinder compressor & M5, including 4 grommets, 4 bolts Ebox; 96 x 115 mm; Sleeves 1"1/8 - 3/4" | MT/MTZ100-160 & NTZ215-271 | Single pack | 1         |



## Terminal boxes, covers & T-block connectors

| Code n° | Description                                                          | Application                                                                                            | Packaging     | Pack size |
|---------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------|-----------|
| 8156134 | Cover 80 x 96 mm ; clamp                                             | MT/MTZ18-44(1), 18-73(3), 18-81(4), 18-50(5), 18-40(6), 32-56(7), 22-80(9) & NTZ048-136 (EXCEPT 136-1) | Multipack     | 10        |
| 8156135 | Service kit for terminal box 96 x 115 mm, including 1 cover, 1 clamp | MT/MTZ50-64(1), 80-160(3), 100-160(4), 44-160(6), 100-160(7), 100-160(9) & NTZ136-1, NTZ215-271        | Industry pack | 10        |





# MLZ / LLZ - Scroll compressors for refrigeration

MLZ and LLZ scroll compressors are dedicated to commercial and light commercial refrigeration applications with refrigerants R134a, R404A / R507A, R22, R407A. Both brazed and rotolock connections are available for most of the compressors.

MLZ: medium-temperature scroll compressors  
R404 / R507A, R407A / F, R134a, R448A, R449A, R452A  
LLZ: low-temperature scroll available with economizer line (R404A, R507A, R452A).

## Features MLZ / LLZ

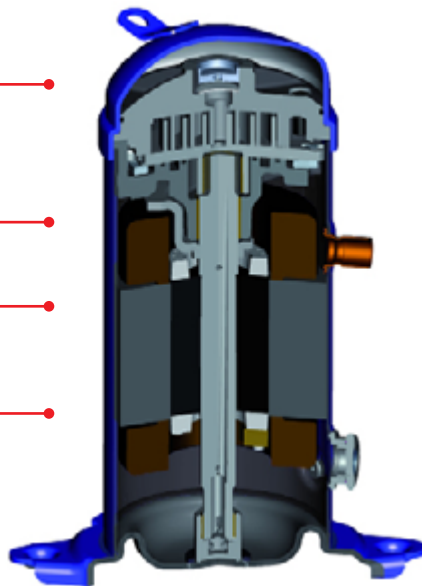


High efficiency motor

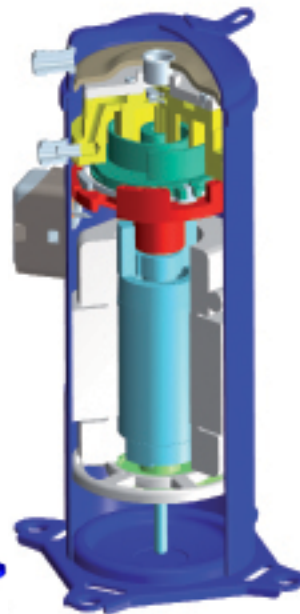
Optimised pressure ration for refrigeration applications

Optimized scroll design

HOOP overload protection  
Rotolock or braze connections



MLZ



LLZ

Optional sound jacket  
attenuates sound levels

Multi-refrigerant scrolls  
save on inventory

Suitable for transport of  
refrigerated goods

Vapor injection available  
with optional economizer kit  
increases LLZ efficiency and  
cooling capacity

## Facts

### Applications:

- Walk-in freezers and cold rooms
- Frozen food processing and storage
- Blast freezers
- Low temperature racks
- Ice cream machines
- Display cabinets
- Water chillers
- Large packaged air conditioners
- Process chillers etc

### Segment usage:

- Refrigeration MT & LT

### Refrigerants:

- R404A
- R507A
- R407A/F
- R448A
- R449A
- R452A
- R134A
- R513A

### Capacity range:

- 0.5 – 12.5 TR / 1.8 – 44 kW

### Benefit:

- Footprint up to 30% smaller than alternative reduces the logistics costs and frees up space in the system
- 30% fewer parts which improves the reliability of the compressor
- Optional vapor injection boosts the cooling capacity and efficiency by more than 20% on LLZ
- Better reliability with improved overload protection and oil injection

# Technical data and ordering

## MLZ

### Scroll compressors

| Compressors model | Cooling capacity (W) <sup>1)</sup> |       |       | Code no.                           |                                    | Connection |           |        |
|-------------------|------------------------------------|-------|-------|------------------------------------|------------------------------------|------------|-----------|--------|
|                   | R404A / R507A                      | R448A | R134a | 400 / 3 / 50<br>Volts / Phase / Hz | 230 / 1 / 50<br>Volts / Phase / Hz | Suction    | Discharge | Type   |
| MLZ015            | 3931                               | 3978  | 2540  | 121L8629                           | 121L8631                           | 3/4        | 1/2       | Brazed |
| MLZ019            | 5237                               | 5180  | 3272  | 121U8725                           | 121U8729                           | 3/4        | 1/2       | Brazed |
| MLZ021            | 5561                               | 5440  | 3476  | 121L8633                           | 121L8635                           | 3/4        | 1/2       | Brazed |
| MLZ026            | 6863                               | 6778  | 4298  | 121L8637                           | 121L8639                           | 3/4        | 1/2       | Brazed |
| MLZ030            | 8381                               | 8117  | 5177  | 121L8641                           | 121L8643                           | 7/8        | 1/2       | Brazed |
| MLZ038            | 9971                               | 9574  | 6094  | 121L8645                           | –                                  | 7/8        | 1/2       | Brazed |
| MLZ045            | 12160                              | 11920 | 7551  | 121L8649                           | –                                  | 7/8        | 1/2       | Brazed |
| MLZ048            | 13330                              | 12850 | 8009  | 121L8651                           | –                                  | 7/8        | 3/4       | Brazed |
| MLZ058            | 15460                              | 15040 | 9534  | 121L8653                           | –                                  | 1 1/8      | 7/8       | Brazed |
| MLZ066            | 17950                              | 17570 | 11070 | 121L8657                           | –                                  | 1 1/8      | 7/8       | Brazed |
| MLZ076            | 20280                              | 18970 | 12340 | 121L8655                           | –                                  | 1 1/8      | 7/8       | Brazed |

1)  $T_e = -5^\circ\text{C}$ ,  $T_c = 45^\circ\text{C}$ ,  $RGT = 20^\circ\text{C}$ ,  $SC = 0K$

Stub connection can be converted to rotolock using Solder sleeve adapter sets

(Check listings below)

## LLZ

### Scroll compressors

| Compressors model | Cooling capacity (W) <sup>1)</sup> |       |               |                                |                                    | Code no.                           | Connection |           |          |
|-------------------|------------------------------------|-------|---------------|--------------------------------|------------------------------------|------------------------------------|------------|-----------|----------|
|                   | Without economizer / no injection  |       |               | Liquid injection <sup>2)</sup> | With economizer / vapour injection |                                    | Suction    | Discharge | Type     |
|                   | R404A                              | R452A | R448A / R449A | R448A/R449A                    | R404A                              | 400 / 3 / 50<br>Volts / Phase / Hz |            |           |          |
| LLZ013            | 3536                               | 3295  | 3053          | 3053                           | 5662                               | 121L9535                           | 1 1/4      | 1         | Rotolock |
| LLZ015            | 4295                               | 3993  | 3910          | 3910                           | 6724                               | 121L9537                           | 1 1/4      | 1         | Rotolock |
| LLZ018            | 5050                               | 4745  | 4577          | 4577                           | 8010                               | 121L9539                           | 1 1/4      | 1         | Rotolock |
| LLZ024            | 6451                               | 5876  | 5549          | 5549                           | 10060                              | 121L9541                           | 1 3/4      | 1 1/4     | Rotolock |
| LLZ034            | 8695                               | 8615  | 7840          | 7840                           | 13340                              | 121L9543                           | 1 3/4      | 1 1/4     | Rotolock |

1)  $T_e = -25^\circ\text{C}$ ,  $T_c = 45^\circ\text{C}$ ,  $SH = 10K$ ,  $SC = 0K$

2) Liquid injection will have same capacity as no injection but will have extended operating envelope.

Rotolock connection of compressor can be changed to solder with solder sleeve

(Check the general spare part listing in this catalogue)

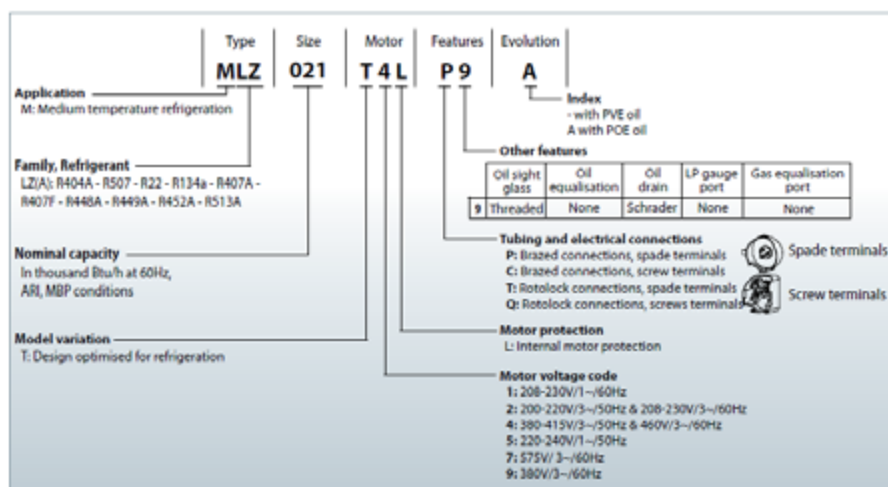
### Compressor checkup tips



# Technical data and ordering

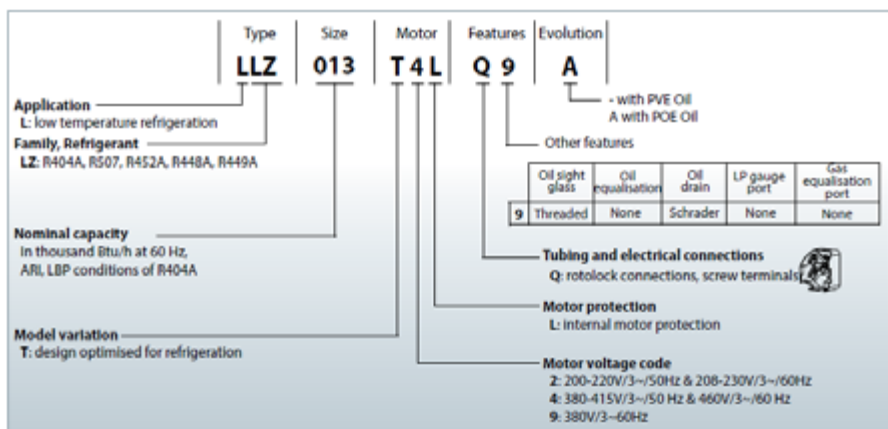
## MLZ

### Nomenclature



## LLZ

### Nomenclature



# MLZ & LLZ spares

## Solder sleeve adapter sets



| Code n°  | Description                                                                       | Application            | Packaging | Pack size |
|----------|-----------------------------------------------------------------------------------|------------------------|-----------|-----------|
| 120Z0126 | Solder sleeve adapter set (1" 1/4 Rotolock, 3/4" ODF),<br>(1" Rotolock, 1/2" ODF) | MLZ/MLM015.019.021.026 | Multipack | 6         |

## Run capacitors for PSC wiring



| Code n°  | Description               | Application        | Packaging | Pack size |
|----------|---------------------------|--------------------|-----------|-----------|
| 8173231  | Run capacitor 440V, 40 µF | MLZ/MLM015         | Multipack | 10        |
| 120Z0051 | Run capacitor 440V, 70 µF | MLZ/MLM019.021.026 | Multipack | 10        |
| 8173234  | Run capacitor 440V, 55 µF | MLZ/MLM038.042     | Multipack | 10        |

## Start capacitors for CSR wiring



| Code n°  | Description                             | Application            | Packaging | Pack size |
|----------|-----------------------------------------|------------------------|-----------|-----------|
| 120Z0399 | Start capacitor 250V, 145-175 µF        | MLZ/MLM015.019.021.026 | Multipack | 10        |
| 8173001  | Start capacitor 330V, 88-108 µF (98 µF) | MLZ/MLM038.042         | Multipack | 10        |

## Starting relays for CSR wiring



| Code n°  | Description            | Application            | Packaging | Pack size |
|----------|------------------------|------------------------|-----------|-----------|
| 120Z0393 | Starting relay RVA9CKL | MLZ/MLM015.019.021.026 | Multipack | 10        |
| 120Z0394 | Starting relay RVA3EKL | MLZ/MLM030             | Multipack | 10        |
| 120Z0395 | Starting relay RVA4GKL | MLZ/MLM038.042         | Multipack | 10        |

## IP54 upgrade kits



| Code n°  | Description                              | Application                                          | Packaging | Pack size |
|----------|------------------------------------------|------------------------------------------------------|-----------|-----------|
| 118U0056 | IP54 upgrade kit for round terminal box  | MLZ/MLM015.019.021.026                               | Multipack | 6         |
| 118U0057 | IP54 upgrade kit for square terminal box | MLZ/MLM030.038.042.045.058.066.076<br>All LLZ models | Multipack | 6         |

# MLZ & LLZ spares



## Mounting kits

| Code n°  | Description                                                                              | Application | Packaging   | Pack size |
|----------|------------------------------------------------------------------------------------------|-------------|-------------|-----------|
| 120Z5064 | Mounting kit for 1 scroll compressor including 4 grommets, 4 sleeves, 4 bolts, 4 washers | MLZ/MLM     | Single pack | 1         |
| 120Z0407 | Rigid grommets and washes for tandem / rack assembly. Set for 8 compressors              | MLZ/MLM     | Single pack | 1         |



## Terminal box and accessories

| Code n°  | Description                         | Application                        | Packaging | Pack size |
|----------|-------------------------------------|------------------------------------|-----------|-----------|
| 120Z5015 | Round terminal box (P & T version)  | MLZ/MLM015.019.021.026             | Multipack | 10        |
| 120Z5018 | Square terminal box (C & Q version) | MLZ/MLM030.038.042.045.058.066.076 | Multipack | 10        |



## Maifolding service kit

| Code n°  | Description                                                                                                                               | Application            | Packaging | Pack size |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|-----------|
| 120Z5073 | Oil equalisation kit including 2 oil sight glass adaptors, rotolock nuts, sleeves and gaskets, feel spacers and washers for 2 compressors | MLZ/MLM015.019.021.026 | Multipack | 6         |

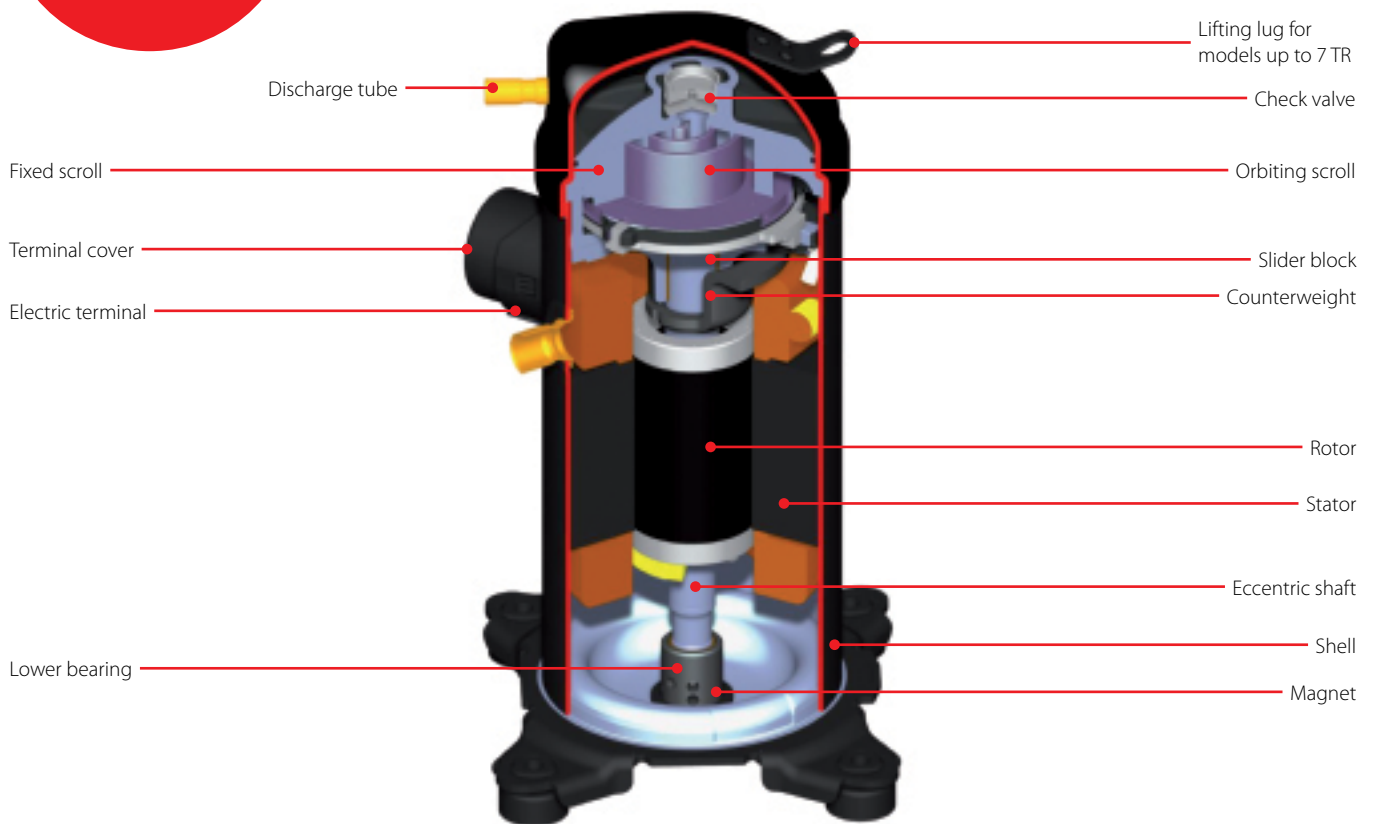


# H-Series, Scroll compressor

Danfoss scrolls are designed for excellence in performance, silence and endurance. They feature compressors that are among the quietest, most efficient, reliable and available on the market. Ranging from 2.5 – 10 TR, the universal dimension, footprint and connections of the H series make it the natural choice for greater comfort in existing or new residences.

Available in a large variety of single and tandem models for refrigerants R407C, R134a, R410A and R22, the compressors combine high energy efficiency with low sound and minimal vibration.

## Features H-Series



## Facts

### Applications:

- Small to medium packaged air conditioners for commercial purpose

### Segment usage:

- Airconditioning

### Refrigerants:

- R134a
- R407C
- R410A
- R22

### Capacity range:

- 0.25 – 20 TR / 1.07 – 34 kW

### Benefit:

- Excellent reliability due to Patented internal protection combined with HOOP (Hot Oil Over Protector) thermal valve
- Standard dimensions and tubing: ideal for both new installations and replacement markets
- No startup and shutdown noise



# Technical data and ordering

## H-Series

### Scroll compressors

| Compressors model | Cooling capacity (W) <sup>1)</sup> | Oil Charge (dm <sup>3</sup> ) | Net weight (kg) | Ordering code                      |                                    | Connection |           |        |
|-------------------|------------------------------------|-------------------------------|-----------------|------------------------------------|------------------------------------|------------|-----------|--------|
|                   | R407C                              |                               |                 | 400 / 3 / 50<br>Volts / Phase / Hz | 230 / 1 / 50<br>Volts / Phase / Hz | Suction    | Discharge | Type   |
| HRP025            | 5730                               | 1.06                          | 31              | 121L3088                           | -                                  | 3/4        | 1/2       | Brazed |
| HRP034            | 7 940                              | 1.06                          | 31              | 121L2024                           | 120U2019                           | 3/4        | 1/2       | Brazed |
| HRP038            | 8 840                              | 1.06                          | 31              | 121L1006                           | -                                  | 3/4        | 1/2       | Brazed |
| HRP040            | 9 110                              | 1.06                          | 31              | 121L1016                           | 121L1929                           | 3/4        | 1/2       | Brazed |
| HRP047            | 11 130                             | 1.33                          | 31              | 121L1046                           | 120U0986                           | 3/4        | 1/2       | Brazed |
| HRP058            | 13 470                             | 1.57                          | 37              | -                                  | 120U1596                           | 7/8        | 1/2       | Brazed |
| HRP060            | 13 860                             | 1.57                          | 37              | 121L1726                           | 121L1606                           | 7/8        | 1/2       | Brazed |
| HLP068            | 15 700                             | 1.57                          | 37              | 121L2014                           | 120U1621                           | 7/8        | 1/2       | Brazed |
| HLP072            | 16600                              | 1.57                          | 37              | 121L2072                           | -                                  | 7/8        | 1/2       | Brazed |
| HLP075            | 18000                              | 1.57                          | 37              | 121L1766                           | -                                  | 7/8        | 1/2       | Brazed |
| HLP081            | 19500                              | 1.57                          | 37              | 121L1781                           | -                                  | 7/8        | 1/2       | Brazed |
| HCP094            | 21600                              | 2.66                          | 44              | 121L0601                           | -                                  | 1 1/8      | 7/8       | Brazed |
| HCP109            | 26000                              | 2.66                          | 45              | 121L0376                           | -                                  | 1 1/8      | 7/8       | Brazed |
| HCP120            | 28100                              | 2.66                          | 45              | 121L0401                           | -                                  | 1 1/8      | 7/8       | Brazed |

1) Te= 7.2°C, Tc= 54.4 °C, SH= 11.1K, SC= 8.3K

## H-Series

### Scroll compressors

| Compressors model | Cooling capacity (W) <sup>1)</sup> | Oil Charge (dm <sup>3</sup> ) | Net weight (kg) | Code no.                           |                                    | Connection |           |        |
|-------------------|------------------------------------|-------------------------------|-----------------|------------------------------------|------------------------------------|------------|-----------|--------|
|                   | R410A                              |                               |                 | 460 / 3 / 50<br>Volts / Phase / Hz | 230 / 1 / 50<br>Volts / Phase / Hz | Suction    | Discharge | Type   |
| HRH029            | 7100                               | 1.06                          | 31              | 121L2287                           | -                                  | 3/4        | 1/2       | Brazed |
| HRH032            | 7700                               | 1.06                          | 31              | 121L1196                           | 121L1171                           | 3/4        | 1/2       | Brazed |
| HRH036            | 8800                               | 1.06                          | 31              | 121L1201                           | 121L1176                           | 3/4        | 1/2       | Brazed |
| HRH038            | 9300                               | 1.06                          | 32              | -                                  | 120U1181                           | 3/4        | 1/2       | Brazed |
| HRH040            | 10200                              | 1.33                          | 32              | -                                  | 121L1186                           | 3/4        | 1/2       | Brazed |
| HRH041            | 10000                              | 1.57                          | 37              | 121L1356                           | -                                  | 7/8        | 1/2       | Brazed |
| HRH044            | 10800                              | 1.57                          | 37              | 121L1361                           | -                                  | 7/8        | 1/2       | Brazed |
| HRH049            | 12100                              | 1.57                          | 37              | 121L1366                           | -                                  | 7/8        | 1/2       | Brazed |
| HRH051            | 12900                              | 1.57                          | 37              | 121L1371                           | 121L1326                           | 7/8        | 1/2       | Brazed |
| HRH054            | 13300                              | 1.57                          | 37              | -                                  | 121L1331                           | 7/8        | 1/2       | Brazed |
| HRH056            | 13800                              | 1.57                          | 37              | 121L1381                           | -                                  | 7/8        | 1/2       | Brazed |
| HLH061            | 14800                              | 1.57                          | 37              | 121L2052 (2)                       | 120U2047                           | 7/8        | 1/2       | Brazed |
| HLH068            | 16900                              | 1.57                          | 37              | 121L1391                           | 121L1341                           | 7/8        | 1/2       | Brazed |
| HLJ072            | 17800                              | 1.57                          | 37              | 121L1396                           | -                                  | 7/8        | 1/2       | Brazed |
| HLJ083            | 20400                              | 1.57                          | 37              | 121L1401                           | -                                  | 7/8        | 1/2       | Brazed |

1) Te= 7.2°C (44.96°F), Tc= 54.4 °C / 129.92°F, SH= 11.1K(51.98°F), SC= 8.3K

All compressors have brazed connections, spade terminals

2) Brazed connections, screw terminals

Stub connection can be converted to rotolock using Solder sleeve adapter sets or sol

(Check listings below)

# Technical data and ordering

## H-Series

### Nomenclature

| Type       | Size       | Motor      | Features  |
|------------|------------|------------|-----------|
| <b>HRH</b> | <b>036</b> | <b>U1L</b> | <b>P6</b> |

**Application:**  
H: high temperature / air conditioning

**Family:**  
C: commercial scroll  
R: residential scroll  
L: light commercial scroll

**Refrigerant & lubricant:**  
M: R22, alkylbenzene lubricant  
P: R407C, PVE lubricant  
H: R410A, PVE lubricant  
J: R410A, PVE lubricant

**Nominal capacity:**  
In thousand Btu/h at 60 Hz, ARI conditions

**Model variation:**  
T: design optimized for 7.2/54.4°C  
U: design optimized for 7.2/37.8°C

**Other features**

|   | Oil sight-glass | Oil equalization | Oil drain | LP gauge port | Gas equalization port |
|---|-----------------|------------------|-----------|---------------|-----------------------|
| 6 | None            | None             | None      | None          | None                  |
| 7 | Threaded        | None             | None      | None          | None                  |
| 8 | None            | Brazed           | None      | None          | Brazed                |
| T | None            | Screw            | Schrader  | None          | None                  |

**Tubing and electrical connections**  
P: brazed connections, spade terminals  
C: brazed connections, screw terminals

**Motor protection**  
L: internal motor protection

**Motor voltage code**  
1: 208-230V/1~/60 Hz  
2: 200-220V/3~/50Hz & 208-230V/3~/60 Hz  
4: 380-415V/3~/50 Hz & 460V/3~/60 Hz  
5: 220-240V/1~/50 Hz  
7: 575V/ 3~/60 Hz  
9: 380V/3~/60 Hz

Feature Version T compressors are built with a threaded oil equalization port to be used with Danfoss variable speed compressors range VZH series.

## Solder sleeve adapter sets



| Code n°  | Description                                                                    | Application                                            | Packaging | Pack size |
|----------|--------------------------------------------------------------------------------|--------------------------------------------------------|-----------|-----------|
| 120Z0126 | Solder sleeve adapter set (1" 1/4 Rotolock, 3/4" ODF), (1" Rotolock, 1/2" ODF) | HRM032-042, HRP034-042, HRH029-038, HHP015.019.021.026 | Multipack | 6         |

## Run capacitors



| Code n°  | Description               | Application                                                                                       | Packaging | Pack size |
|----------|---------------------------|---------------------------------------------------------------------------------------------------|-----------|-----------|
| 8173231  | Run capacitor 440V, 40 µF | HHP015                                                                                            | Multipack | 10        |
| 8173234  | Run capacitor 440V, 55 µF | HRM054-060, HLM068-081, HRP054-060, HLP068-081, HRH051-056, HLH068, HLJ072-083 all code 5, HHP038 | Multipack | 10        |
| 120Z0050 | Run capacitor 440V, 60 µF | HRM045-047, HRP045-047, HRH038-040 all code 5, HHP019-021                                         | Multipack | 10        |
| 120Z0051 | Run capacitor 440V, 70 µF | HRM032-042, HRP034-042, HRH029-036 all code 5, HHP026                                             | Multipack | 10        |

# Technical data and ordering

## Start capacitors for CSR wiring



| Code n°  | Description                             | Application                                                                                       | Packaging | Pack size |
|----------|-----------------------------------------|---------------------------------------------------------------------------------------------------|-----------|-----------|
| 120Z0399 | Start capacitor 250V, 145-175 µF        | HRM032-047, HRP034-047, HRH029-040 all code 5, HHP015.019.021.026                                 | Multipack | 10        |
| 8173001  | Start capacitor 330V, 88-108 µF (98 µF) | HRM058-060, HRP058-060, HLM068-081, HLP068-081, HRH051-056, HLH068, HLJ072-083 all code 5, HHP038 | Multipack | 10        |

## Starting relays for CSR wiring



| Code n°  | Description                 | Application                                                                                       | Packaging | Pack size |
|----------|-----------------------------|---------------------------------------------------------------------------------------------------|-----------|-----------|
| 120Z0393 | Starting relay type RVA9CKL | HRM032-047, HRP034-047, HRH031-040 all code 5, HHP015.019.021.026                                 | Multipack | 10        |
| 120Z0394 | Starting relay type RVA3EKL | HRM051-054, HRP051-054 all code 5, HHP030                                                         | Multipack | 10        |
| 120Z0395 | Starting relay type RVA4GKL | HRM058-060, HRP058-060, HLM068-081, HLP068-081, HRH051-056, HLH068, HLJ072-083 all code 5, HHP038 | Multipack | 10        |

## Mounting kits



| Code n°  | Description                                                                              | Application                                      | Packaging   | Pack size |
|----------|------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|-----------|
| 120Z5064 | Mounting kit for 1 scroll compressor including 4 grommets, 4 sleeves, 4 bolts, 4 washers | HRM, HLM, HCM, HRP, HLP, HCP, HRH, HLH, HLJ, HHP | Single pack | 1         |

## IP54 upgrade kit



| Code n°  | Description                              | Application                                                          | Packaging | Pack size |
|----------|------------------------------------------|----------------------------------------------------------------------|-----------|-----------|
| 118U0056 | IP54 upgrade kit for round terminal box  | HRM, HLM, HCM, HRP, HLP, HCP, HRH, HLH, HLJ, HHP, HHP015.019.021.026 | Multipack | 6         |
| 118U0057 | IP54 upgrade kit for square terminal box | HRM, HLM, HCM, HRP, HLP, HCP, HRH, HLH, HLJ, HHP, HHP030.038.045     | Multipack | 6         |

## Terminal box and accessories



| Code n°  | Description                         | Application                                      | Packaging | Pack size |
|----------|-------------------------------------|--------------------------------------------------|-----------|-----------|
| 120Z5015 | Round terminal box (P & T version)  | HRM, HLM, HCM, HRP, HLP, HCP, HRH, HLH, HHP      | Multipack | 10        |
| 120Z5018 | Square terminal box (C & Q version) | HRM, HLM, HCM, HRP, HLP, HCP, HRH, HLH, HLJ, HHP | Multipack | 10        |

# H series cross referencing

## Performer H Series

| Danfoss model R407c/R2 | HP/R | PH | KW   | Bristol     | Carlyle  | Old Danfoss model R22 |
|------------------------|------|----|------|-------------|----------|-----------------------|
| HRP034T5LP6            | 2.8  | 1  | 8.1  | H20C343ABKA | SCE340AC | HRM032U5LP6           |
| HRP038T5LP6            | 3.0  | 1  | 8.9  | H20C373ABKA | SCH370AC | HRM038U5LP6           |
| HRP040T5LP6            | 3.3  | 1  | 9.5  | H20C403ABKA | SCE400AC | HRM042U5LP6           |
| HRP045T5LP6            | 3.5  | 1  | 10.7 | H20R453ABKA | SRE450AC | HRM045U5LP6           |
| HRP058T5LP6            | 4.5  | 1  | 13.8 | H20R583ABKA | SRE580AC | HRM058U5LP6           |
| HRP060T5LP6            | 5.0  | 1  | 14.3 | H20R603ABKA | SRE600AC | HRM060U5LP6           |
| HRP068T5LP6            | 5.7  | 1  | 16.0 | -           | -        | HLM068U5LP6           |
| HRP038T4LP6            | 3.0  | 3  | 8.9  | H20C373DBEA | SCE370AC | HRM038U4LP6           |
| HRP040T4LP6            | 3.3  | 3  | 9.7  | H20C403DBEA | SCH402AC | HRM040U4LP6           |
| HRP045T4LP6            | 3.5  | 3  | 10.9 | H20R453DBEA | SRH452AC | HRM045U4LP6           |
| HRP047T4LP6            | 3.8  | 3  | 11.6 | H20R483DBEA | SRH482AC | HRM048U4LP6           |
| HRP058T4LP6            | 4.5  | 3  | 14.0 | H20R583DBEA | SRH582AC | HRM058U4LP6           |
| HRP060T4LP6            | 5.0  | 3  | 14.5 | H20R603DBEA | SRH600AC | HRM060U4LP6           |
| HLP068T4LC6            | 5.7  | 3  | 16.0 | -           | -        | HLM068U4LC6           |
| HLP072T4LC6            | 6.0  | 3  | 17.5 | H20R723DBEA | SRH722AE | HLM072T4LC6           |
| HLP075T4LC6            | 6.5  | 3  | 18.4 | H20R753DBEA | SRH752AE | HLM075T4LC6           |
| HLP081T4LC6            | 7.5  | 3  | 20.0 | H20R813DBEA | SRH812AC | HLM081T4LC6           |
| HCP094T4LC6            | 8.3  | 3  | 23.1 | H20R943DBEA | SRH942AE | HCM0943DBEA           |
| HCP109T4LC6            | 9.0  | 3  | 27.0 | -           | -        | -                     |
| HCP120T4LC6            | 10.0 | 3  | 29.0 | H20R124DBEA | SRH120AE | HCM120T4LC6           |

Nom ARI Conditions @ +7.2 S.S.T.

## Compass

Find the best Danfoss compressor alternative for the existing competitor products



## Compressor replacement tips





# SH / SM / SY / SZ - S-Series, Scroll compressors

By combining an in-depth understanding of customer needs with continuous investment in product technology Danfoss is able to offer you the S Series, which comprise a 7.5 - 40 TR industry-leading range of high efficiency scroll compressors optimized for rooftop and chiller applications.

Available in a large variety of single and manifold models for R410A, R407C, R134a and R22. The compressors combine high energy efficiency with low sound and minimal vibration.

## Features SH / SM / SY / SZ



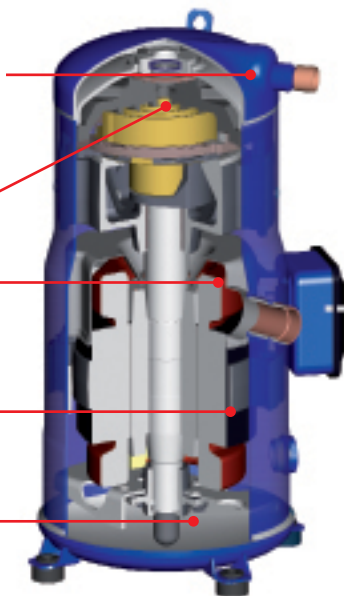
Heat shield that lowers the heat transfer between discharge and suction gas and the acoustic level

New PTFE spring seal for even lower leaks

Patented motor cap

Patented motor centring spacer

Improved lower bearing centring



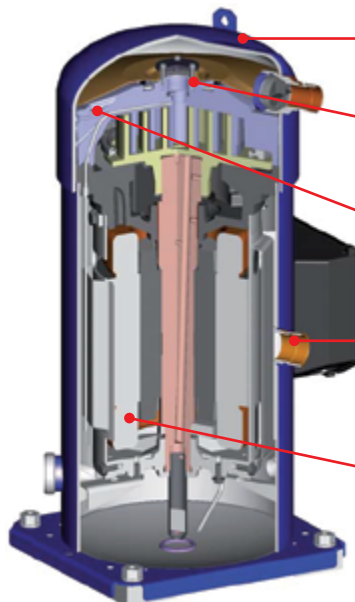
Heat shield that lowers the heat transfer between discharge and suction gas and the acoustic level

Intermediate discharge valves (SH485)

Integrated discharge gas temperature protection (SH485)

Liquid slug protection per suction fitting in upper position

Patented gas path flow (SH485)



## Facts

### Applications:

- Rooftop
- Process chiller
- Ducted split air-con
- IT cooling
- Chiller application

### Segment usage:

- Airconditioning & High temp.

### Refrigerants:

- R134a
- R410A
- R407C

### Capacity range:

- 7.5 – 40 TR / 26 – 140 kW

### Benefit:

- Greater reliability with the internal non-return valve, which avoids refrigerant migration from the high pressure side
- Highly efficient and reliable protection against overheating, overloading, phase loss and phase order with specific electronic module protection
- Quieter and more efficient operation with "no contact – no wear" scroll design for reduced friction

# Technical data and ordering

## SH

### Scroll compressors

| Type                | Nominal capacity<br>(W) <sup>1)</sup> R410A | Oil charge (dm <sup>3</sup> ) | Net weight (kg) | Ordering code                      | Displacement m <sup>3</sup> /h<br>@ 2900 | Connection |           |        |
|---------------------|---------------------------------------------|-------------------------------|-----------------|------------------------------------|------------------------------------------|------------|-----------|--------|
|                     |                                             |                               |                 | 400 / 3 / 50<br>Volts / Phase / Hz |                                          | Suction    | Discharge | Type   |
| SH090               | 22300                                       | 3                             | 58              | 120H0003                           | 15.404                                   | 1 1/8      | 7/8       | Brazed |
| SH105               | 26800                                       | 3.3                           | 64              | 120H0211                           | 18.09                                    | 1 3/8      | 7/8       | Brazed |
| SH120               | 30000                                       | 3.3                           | 64              | 120H0013                           | 20.3                                     | 1 3/8      | 7/8       | Brazed |
| SH140               | 34700                                       | 3.3                           | 67              | 120H0201                           | 23.1                                     | 1 3/8      | 7/8       | Brazed |
| SH161               | 38800                                       | 3.3                           | 69              | 120H0023                           | 26.39                                    | 1 3/8      | 7/8       | Brazed |
| SH184               | 44700                                       | 3.6                           | 71.5            | 120H0361                           | 29.59                                    | 1 3/8      | 7/8       | Brazed |
| SH180               | 44500                                       | 6.7                           | 108             | 120H0275 <sup>4)</sup>             | 29.59                                    | 1 5/8      | 1 1/8     | Brazed |
| SH240               | 59700                                       | 6.7                           | 108             | 120H0291 <sup>3)</sup>             | 39.58                                    | 1 5/8      | 1 1/8     | Brazed |
| SH295 <sup>2)</sup> | 73200                                       | 6.7                           | 111             | 120H0827 <sup>4)</sup>             | 48.11                                    | 1 5/8      | 1 1/8     | Brazed |
| SH300               | 75140                                       | 6.7                           | 153             | 120H0239 <sup>4)</sup>             | 49.67                                    | 1 5/8      | 1 1/8     | Brazed |
| SH380               | 90500                                       | 6.7                           | 159             | 120H0255 <sup>4)</sup>             | 60                                       | 1 5/8      | 1 1/8     | Brazed |

1) Te= 7.2°C, Tc= 54.4 °C, SH= 11.1K, SC= 8.3K

2) SH295 replaces SH300. SH300 (120H0239) model remains available for after-market

3) Module 24V AC (Electronic motor protection module located in terminal box)

4) Module 115 - 250V (Electronic motor protection module located in terminal box)

Stub connection can be converted to rotolock using Solder sleeve adapter sets (Check listings below)

## SM

### Scroll compressors

| Type  | Nominal capacity<br>(W) <sup>1)</sup> R22 | Oil charge (dm <sup>3</sup> ) | Net weight (kg) | Ordering code                      | Displacement m <sup>3</sup> /h<br>@ 2900 | Connection |           |          |
|-------|-------------------------------------------|-------------------------------|-----------------|------------------------------------|------------------------------------------|------------|-----------|----------|
|       |                                           |                               |                 | 400 / 3 / 50<br>Volts / Phase / Hz |                                          | Suction    | Discharge | Type     |
| SM084 | 20370                                     | 3.25                          | 64              | SM084-4VI                          | 19.9                                     | 1 1/8      | 3/4       | Brazed   |
| SM090 | 21790                                     | 3.25                          | 65              | SM090-4VI                          | 21                                       | 1 1/8      | 3/4       | Brazed   |
| SM100 | 23140                                     | 3.25                          | 65              | SM100-4VI                          | 22.1                                     | 1 1/8      | 3/4       | Brazed   |
| SM110 | 25940                                     | 3.25                          | 73              | SM110-4VI                          | 25.1                                     | 1 3/8      | 7/8       | Brazed   |
| SM115 | 28000                                     | 3.25                          | 73              | SM115-4RI                          | 26.97                                    | 1 3/4      | 1 1/4     | Rotolock |
| SM120 | 30110                                     | 3.25                          | 73              | SM120-4VI                          | 29                                       | 1 3/8      | 7/8       | Brazed   |
| SM125 | 30100                                     | 3.6                           | 73              | SM125-4RI                          | 28.9                                     | 1 3/4      | 1 1/8     | Rotolock |
| SM148 | 36080                                     | 3.6                           | 88              | SM148-4VAI                         | 34.6                                     | 1 3/8      | 7/8       | Brazed   |
| SM160 | 39100                                     | 3.6                           | 88              | SM160-4RAI                         | 37.6                                     | 1 5/8      | 1 1/8     | Rotolock |
| SM161 | 39020                                     | 3.6                           | 88              | SM161-4VAI                         | 37.7                                     | 1 3/8      | 7/8       | Brazed   |
| SM185 | 45500                                     | 6.2                           | 100             | SM185-4CAI                         | 43.5                                     | 1 5/8      | 1 1/8     | Brazed   |
| SM185 |                                           |                               |                 | SM185-4RI                          |                                          | 2 1/4      | 1 3/4     | Rotolock |

1) Te= 7.2°C, Tc= 54.4 °C, SH= 11.1K, SC= 8.3K

Stub connection can be converted to rotolock using Solder sleeve adapter sets (Check listings below)

# Technical data and ordering

## SY / SZ

### Scroll compressors

| Compressors model   | Nominal cooling capacity (W) <sup>1)</sup> |       | Oil charge (dm <sup>3</sup> ) | Net weight (kg) | Code no.                        | Displacement m <sup>3</sup> /h @ 2900 | Connection |           |          |
|---------------------|--------------------------------------------|-------|-------------------------------|-----------------|---------------------------------|---------------------------------------|------------|-----------|----------|
|                     | R407C                                      | R134a |                               |                 | 400 / 3 / 50 Volts / Phase / Hz |                                       | Suction    | Discharge | Type     |
| SZ084               | 19300                                      | 13630 | 3.25                          | 64              | SZ084-4VI                       | 19.9                                  | 1 1/8      | 3/4       | Brazed   |
| SZ090               | 20400                                      | 14520 | 3.25                          | 65              | SZ090-4VI                       | 21                                    | 1 1/8      | 3/4       | Brazed   |
| SZ100               | 21600                                      | 15500 | 3.25                          | 65              | SZ100-4VI                       | 22.1                                  | 1 1/8      | 3/4       | Brazed   |
| SZ110               | 24600                                      | 17550 | 3.25                          | 73              | SZ110-4VI                       | 25.1                                  | 1 3/8      | 7/8       | Brazed   |
| SZ120               | 28600                                      | 20260 | 3.25                          | 73              | SZ120-4VI                       | 29                                    | 1 3/8      | 7/8       | Brazed   |
| SZ148*              | 35100                                      | 24370 | 3.6                           | 88              | SZ148-4VAI                      | 34.6                                  | 1 3/8      | 7/8       | Brazed   |
| SZ161*              | 38000                                      | 26060 | 3.6                           | 88              | SZ161-4VAI                      | 37.7                                  | 1 3/8      | 7/8       | Brazed   |
| SZ185*              | 43100                                      | 30440 | 6.2                           | 100             | SZ185-4CAI                      | 43.5                                  | 1 5/8      | 1 1/8     | Brazed   |
|                     | 43100                                      | 30440 | 6.2                           | 100             | SZ185-4RI                       | 43.5                                  | 2 1/4      | 1 3/4     | Rotolock |
| SY240 <sup>2)</sup> | 59100                                      | 40450 | 8                             | 150             | SY240A4PBI <sup>4)</sup>        | 60.5                                  | 2 1/4      | 1 3/4     | Rotolock |
|                     | 59100                                      | 40450 | 8                             | 150             | SY240A4CBI <sup>4)</sup>        | 60.5                                  | 1 5/8      | 1 1/8     | Brazed   |
| SY300 <sup>2)</sup> | 72730                                      | 50410 | 8                             | 157             | SY300A4PBI <sup>4)</sup>        | 76.1                                  | 2 1/4      | 1 3/4     | Rotolock |
|                     | 72730                                      | 50410 | 8                             | 157             | SY300A4CBI <sup>4)</sup>        | 76.1                                  | 1 5/8      | 1 1/8     | Brazed   |
| SY380 <sup>2)</sup> | 89540                                      | 63260 | 8.4                           | 158             | SY380A4CAI <sup>3)</sup>        | 92.4                                  | 2 1/8      | 1 3/8     | Brazed   |
|                     | 89540                                      | 63260 | 8.4                           | 158             | SY380A4CBI <sup>4)</sup>        | 92.4                                  |            |           |          |

1) Te= 7.2°C, Tc= 54.4 °C, SH= 11.1K, SC= 8.3K

2) SY240-300-380 has replaced SZ240-300-380 compressors

3) Module 24V AC (Electronic motor protection module located in terminal box)

4) Module 110-240V (Electronic motor protection module located in terminal box)

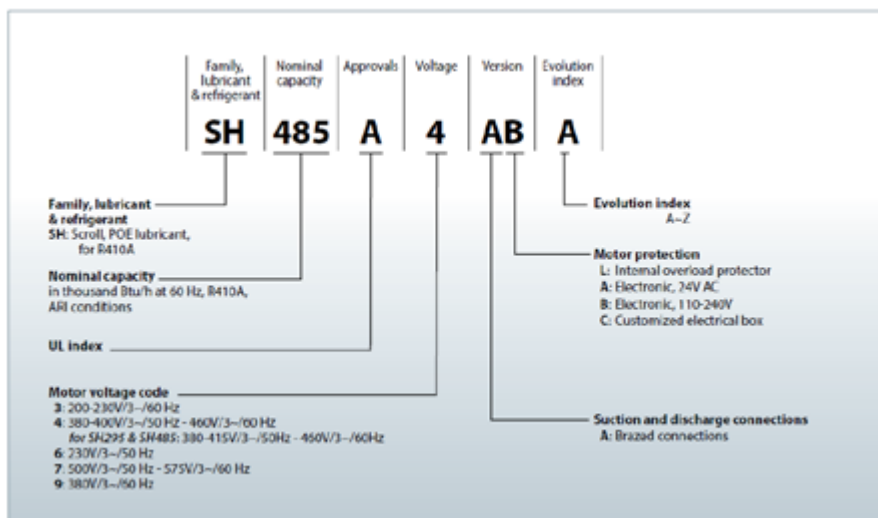
Stub connection can be converted to rotolock using Solder sleeve adapter sets (Check listings below)



# Technical data and ordering

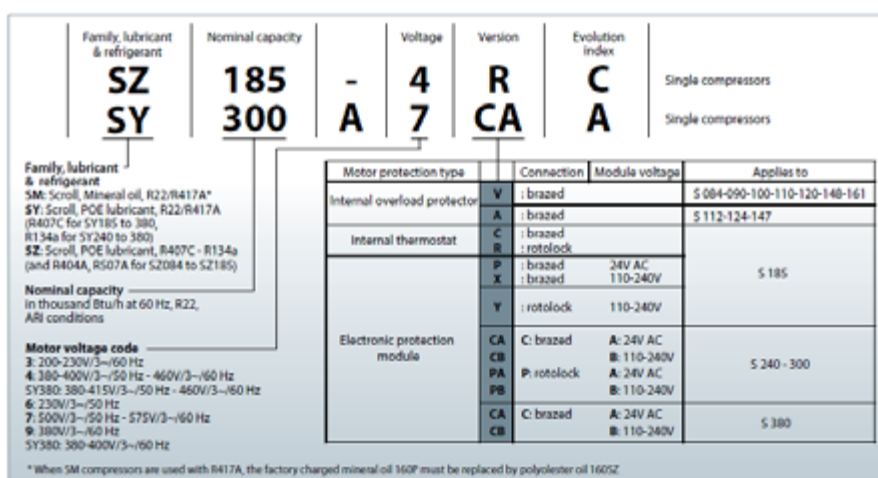
## SH

### Nomenclature



## SY / SZ

### Nomenclature



# SH / SM / SY / SZ series spares

## Solder sleeve adapter sets



| Code n°  | Description                                                                             | Application                                                               | Packaging | Pack size |
|----------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------|-----------|
| 7765005  | Solder sleeve adapter set (1" 3/4 Rotolock, 1" 1/8 ODF), (1" 1/4 Rotolock, 7/8" ODF)    | SM084.090.100 & SZ084.090.100                                             | Multipack | 6         |
| 7765006* | Solder sleeve adapter set (1" 3/4 Rotolock, 1" 3/8 ODF), (1" 1/4 Rotolock, 7/8" ODF)    | SM110.112.120.124.147.148.161 & SZ110.120.148.161 & SH105.120.140.161.184 | Multipack | 6         |
| 7765028  | Solder sleeve adapter set (2" 1/4 Rotolock, 1" 5/8 ODF), (1" 3/4 Rotolock, 1" 1/8" ODF) | SM/SY/SZ160.175.185.240.300 & SH180.240.295.300.380 & PSH051.064.077      | Multipack | 6         |

## 3 phase soft start equipment



| Code n°  | Description                          | Application                                                    | Packaging   | Pack size |
|----------|--------------------------------------|----------------------------------------------------------------|-------------|-----------|
| 7705006  | Electronic soft start kit, MCI 15C   | SM/SZ084-110 & SH090 & WSH090 & PSH019                         | Single pack | 1         |
| 7705007  | Electric soft start kit, MCI 25 C    | SM/SZ115-185 & SH105-184 & WSH105-184 & PSH023.026.030.034.039 | Single pack | 1         |
| 037N0401 | Electronic soft start kit, MCI 50 CM | SY/SZ240-380 & SH180-240 to 380 & PSH051.064.077               | Single pack | 1         |

## Terminal boxes and accessories



| Code n°  | Description                                                          | Application                                                                                                                           | Packaging   | Pack size |
|----------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|
| 8156135  | Service kit for terminal box 96 x 115 mm, including 1 cover, 1 clamp | SM084.090.100.110.112.120.124.147.148*.161*<br>SZ084.090.100.110.120.148*.161*<br>SH090.105.120.140*.161*<br>WSH090.105.120.140*.161* | Multipack   | 10        |
| 8156139  | Terminal box 186 x 198 mm, incl cover                                | SMSZ148-3.161-3.175.185                                                                                                               | Single pack | 1         |
| 120Z0458 | Terminal box 210 x 190 incl. cover                                   | SH180.240.295.300.380*.485*<br>SY/SZ240.300.380 - SY/SZ185 with module                                                                | Single pack | 1         |

## Motor protection modules and transformers



| Code n°  | Description                                     | Application             | Packaging   | Pack size |
|----------|-------------------------------------------------|-------------------------|-------------|-----------|
| 120Z0584 | Electronic motor protection module, 24V AC      | SM/SZ115-185 & SH180    | Single pack | 1         |
| 120Z0585 | Electronic motor protection module, 115/240V AC | SY/SZ24-380 & SH240-485 | Single pack | 1         |

# SH / SM / SY / SZ series spares



## Acoustic hoods

| Code n° | Description                         | Application    | Packaging   | Pack size |
|---------|-------------------------------------|----------------|-------------|-----------|
| 7755017 | Acoustic hood for scroll compressor | SM/SZ148*.161* | Single pack | 1         |
| 7755007 | Acoustic hood for scroll compressor | SM/SZ175.185   | Single pack | 1         |
| 7755016 | Acoustic hood for scroll compressor | SY/SZ240.300   | Single pack | 1         |



## Mounting kits

| Code n° | Description                                                                                                        | Application                                                                                       | Packaging   | Pack size |
|---------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------|-----------|
| 8156138 | Mounting kit for 1 scroll compressor. Grommets, sleeves, bolts, washers                                            | SM/SZ084-185 (excluding SM112.124.147) & SH180-240 to 485 & PSH051.064.077 in single installation | Single pack | 1         |
| 120Z066 | Mounting kit for 1 scroll compressor. Grommets, sleeves, bolts, washers                                            | SM112-124-147 & SH090-184 & PSH019.023.026.030.034.039                                            | Single pack | 1         |
| 8156147 | Mounting kit for 1 scroll compressor. Grommets, sleeves bolts, washers, rotolock nuts, solder sleeves, gaskets     | SM/SZ148-185                                                                                      |             |           |
| 8156007 | Mounting kit for 4 cylinder compressor & MS, including 4 grommets, 4 bolts Ebox: 96 x 115mm; Sleeves 1" 1/8 - 3/4" | MS/MSE/MSN115.125.175.185                                                                         | Single pack | 1         |

# DSH / SH Series, Scroll compressors

Danfoss Scrolls SH and DSH are industry leading ranges of high efficiency scrolls optimized for rooftop and chiller applications. They range from 7.5 to 40TR (SH range) and 50 TR (DSH range).

Innovative design of the DSH range bring a new level of compressor robustness and system reliability. They are available in a large variety of single and manifold models for refrigerants R410A, R454B, R452B

## Features DSH / SH



Heat shield lowers the heat transfer between discharge and suction gas and the acoustic level

Lead free polymer bearings improve behavior under poor lubrication conditions

Patented motor cap for optimal motor cooling and higher resistance to liquid slugging

Organ pipe master oil circulation in manifold configuration (DSH)

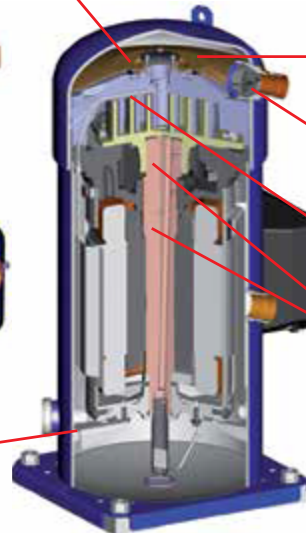
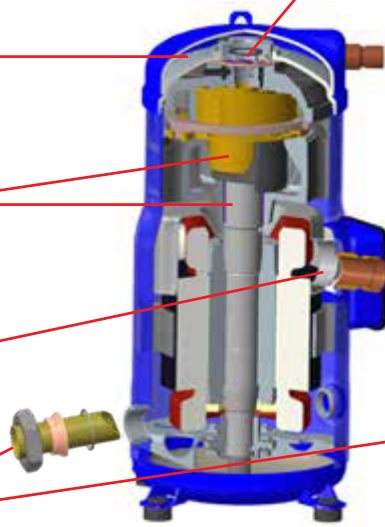
Intermediate discharge valves (IDVs) increase seasonal efficiency (DSH)

Heat shield lowers the heat transfer between discharge and suction gas and the acoustic level

Internal Non Return Valve (INRV) prevents excessive leak rate from high pressure side (DSH)

Integrated discharge gas temperature protection (DGT) (DSH)

Lead free polymer bearings improve behavior under poor lubrication conditions



DSH/SH090-105-120-140-161-184

DSH/SH240-295-381-485

## Facts

### Applications:

- Rooftop
- Process chiller
- Ducted split air-con
- IT cooling
- Chiller application

### Segment usage:

- Airconditioning & High temp.

### Refrigerants:

- R410A
- R454B
- R452B

### Capacity range:

- 6.2 - 40 TR / 22 - 144 kW

### Benefit:

- Greater reliability with the internal non-return valve, which avoids refrigerant migration from the high pressure side
- Intermediate Discharge Valves (IDVs)
  - IDV technology enhances system efficiency by 15% on average in Water-to-Water chillers and by 6% in rooftops and

### Air-to-Water chillers

- High efficient and reliable protection against overheating, overloading, phase loss and phase order with specific electronic module protection
- Reduce the load on mechanical parts at start up, provide safe operation at high condensing and evaporating temperatures and contribute to better liquid management

# Technical data and ordering

## DSH

### Scroll compressors

| Type   | Nominal capacity (W) <sup>1)</sup> | Oil charge (dm <sup>3</sup> ) | Net weight (kg) | Ordering code                   | Displacement m <sup>3</sup> /h @ 2900 | Replaces Old Danfoss compressor | Connection |           |        |
|--------|------------------------------------|-------------------------------|-----------------|---------------------------------|---------------------------------------|---------------------------------|------------|-----------|--------|
|        |                                    |                               |                 | 400 / 3 / 50 Volts / Phase / Hz |                                       |                                 | Suction    | Discharge | Type   |
| DSH090 | 22490                              | 3                             | 58              | 120H1182                        | 15.4                                  | SH090                           | 1 1/8      | 7/8       | Brazed |
| DSH105 | 26460                              | 3.3                           | 64              | 120H1190                        | 18                                    | SH105                           | 1 3/8      | 7/8       | Brazed |
| DSH120 | 30050                              | 3.3                           | 64              | 120H1198                        | 20.3                                  | SH120                           | 1 3/8      | 7/8       | Brazed |
| DSH140 | 34100                              | 3.3                           | 67              | 120H1206                        | 23.1                                  | SH140                           | 1 3/8      | 7/8       | Brazed |
| DSH161 | 39130                              | 3.3                           | 69              | 120H1214                        | 26.4                                  | SH161                           | 1 3/8      | 7/8       | Brazed |
| DSH184 | 43710                              | 3.6                           | 71.5            | 120H1222                        | 29.6                                  | SH184                           | 1 3/8      | 7/8       | Brazed |
| DSH240 | 59050                              | 6.1                           | 114             | 120H1376 <sup>2)</sup>          | 39.6                                  | SH240                           | 1 5/8      | 1 1/8     | Brazed |
| DSH295 | 72240                              | 6.1                           | 117             | 120H1370 <sup>3)</sup>          | 48.1                                  | SH295                           | 1 5/8      | 1 1/8     | Brazed |
| DSH381 | 91420                              | 6.1                           | 162             | 120H1366 <sup>3)</sup>          | 60                                    | SH381                           | 1 5/8      | 1 1/8     | Brazed |
| DSH485 | 117500                             | 6.1                           | 176             | 120H1362 <sup>3)</sup>          | 77                                    | SH485                           | 1 5/8      | 1 3/8     | Brazed |
| DSH600 | 144500                             | 6.1                           | 215             | 120H1378 <sup>3)</sup>          | 96.2                                  | -                               | 2 1/8      | 1 3/8     | Brazed |

Note:

1) Te= 7.2°C, Tc= 54.4 °C, SH= 11.1K, SC= 8.3K

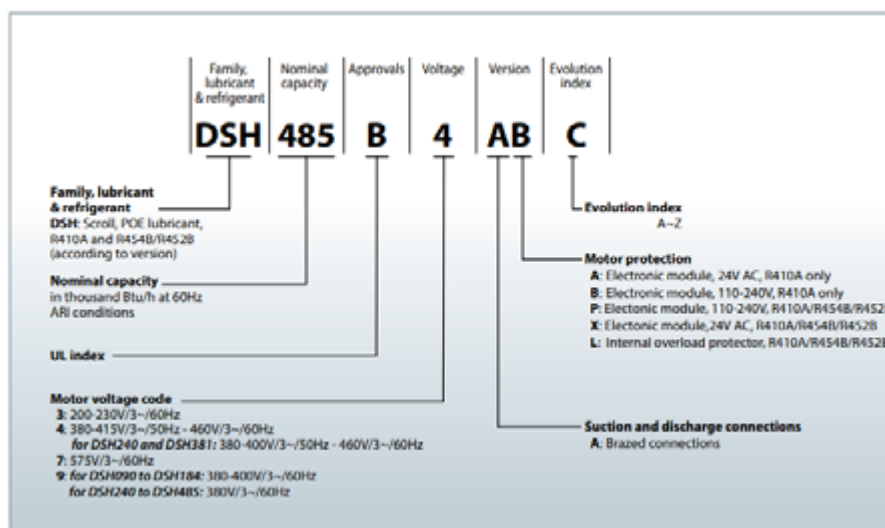
2) Module 24V AC (Electronic motor protection module located in terminal box)

3) Module 110 - 240V (Electronic motor protection module located in terminal box)

Please contact Danfoss Team for compressors with other protection modules

## DSH

### Nomenclature



# Spare parts and accessories



## Lubricants / oils

| Code n°  | Description                                | Application                                                               | Packaging   | Pack size |
|----------|--------------------------------------------|---------------------------------------------------------------------------|-------------|-----------|
| 7754001  | Mineral oil, 160P, 2 litre can             | SM, MT, MLM116                                                            | Multipack   | 8         |
| 7754002  | Mineral oil, 160P, 5 litre can             | SM, MT, MLM116                                                            | Multipack   | 4         |
| 7754019  | POE lubricant, 160PZ, 1 litre can          | MTZ, NTZ, VTZ                                                             | Multipack   | 12        |
| 120Z0573 | POE lubricant, 160PZ, 2.5 litre can        | MTZ, NTZ, VTZ                                                             | Multipack   | 4         |
| 7754023  | POE lubricant, 160SZ, 1 litre can          | SZ, SH, PSH, WSH, VZH088-117-170, VSH088-177-170                          | Multipack   | 12        |
| 120Z0571 | POE lubricant, 160SZ, 2.5 litre can        | SZ, SH, PSH, WSH, VZH088-117-170, VSH088-117-170                          | Multipack   | 4         |
| 7754121  | POE lubricant, 320SZ, 1 litre can          | SY                                                                        | Multipack   | 12        |
| 120Z0572 | POE lubricant, 320SZ, 2.5 litre can        | SY                                                                        | Multipack   | 4         |
| 120Z5034 | PVE lubricant, 320HV (FVC68D), 1 litre can | HRP, HLP, HCP, HRH, HLH, HLJ, HCJ, HHP, MLZ / MLM / LLZ<br>VZH028-035-044 | Single pack | 1         |



## Gaskets and gasket sets

| Code n° | Description                                               | Application                                                     | Packaging | Pack size |
|---------|-----------------------------------------------------------|-----------------------------------------------------------------|-----------|-----------|
| 8156131 | Gasket, G09, 1" 1/4                                       | Models with 1" 1/4 rotolock connection on all models            | Multipack | 10        |
| 8156132 | Gasket, G07, 1" 3/4                                       | Models with 1" 3/4 rotolock connection on all models            | Multipack | 10        |
| 8156133 | Gasket, G08, 2" 1/4                                       | Models with 2" 1/4 rotolock connection on Danfoss scroll models | Multipack | 10        |
| 8156009 | Gasket set, 1", 1" 1/4, 1" 3/4, OSG gaskets black & white | All 1-2-4 cylinder models                                       | Multipack | 10        |



## Crankcase heater

| Code n°  | Description                                         | Application                                                                                                                                                                                                 | Packaging | Pack size |
|----------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|
| 120Z0055 | Belt type crankcase heater, 40W, 230V, CE mark, UL  | HRM025-047, HRP025-047, HRH029-050<br>HHP015-019-021-026                                                                                                                                                    | Multipack | 6         |
| 120Z5038 | Belt type crankcase heater, 40W, 460V, CE mark, UL  | HRM025-047, HRP025-047, HRH029-050<br>HRM048-060, HLM068-081, HRP048-060, HLP68-081,<br>HRM041-056, HLH061-068, HLJ072-083, HH030-038-045<br>MLZ/MLM 015-019-021-026                                        | Multipack | 6         |
| 120Z0057 | Belt type crankcase heater, 50W, 230V, CE mark, UL  | LLZ all models<br>VZH028-035-044                                                                                                                                                                            | Multipack | 6         |
| 120Z0059 | Belt type crankcase heater, 65W, 230V, CE mark, UL  | HCM094-120, HCP094-120, HCJ090-120,<br>MLZ/MLM030.038.045.058.066.076<br>LLZ all models<br>HCM094-120, HCP094-120, HCK090-120<br>MLZ/MLM030.038.045.058.066.076<br>MLZ/MLM015-019-021-026<br>LLZ all models | Multipack | 6         |
| 7773106  | Belt type crankcase heater, 54W, 230V, CE mark, UL  | All recip 1 cyl                                                                                                                                                                                             | Multipack | 4         |
| 7773107  | Belt type crankcase heater, 65W, 230V, CE mark, UL  | SM/SZ084-161, VSH088.117 & VZH288.117,<br>All recip 2 cyl                                                                                                                                                   | Multipack | 6         |
| 7773117  | Belt type crankcase heater, 65W, 400V, CE mark, UL  |                                                                                                                                                                                                             | Multipack | 6         |
| 120Z0038 | Belt type crankcase heater, 65W, 230V, CE mark, UL  | VSH088.117 & VZH088.117                                                                                                                                                                                     | Multipack | 8         |
| 7773110  | Belt type crankcase heater, 75W, 110V, CE mark, UL  |                                                                                                                                                                                                             | Multipack | 6         |
| 7773108  | Belt type crankcase heater, 75W, 230V, CE mark, UL  | SM/SZ175-185 & SH180-240 TO 485<br>VSH170 & VZH170<br>All recip 4 cyl                                                                                                                                       | Multipack | 6         |
| 7773118  | Belt type crankcase heater, 75W, 400V, CE mark, UL  |                                                                                                                                                                                                             | Multipack | 6         |
| 7773121  | Belt type crankcase heater, 130W, 110V, CE mark, UL |                                                                                                                                                                                                             | Multipack | 4         |
| 7773122  | Belt type crankcase heater, 130W, 230V, CE mark, UL | SY/SZ240-380                                                                                                                                                                                                | Multipack | 4         |
| 7773123  | Belt type crankcase heater, 130W, 400V, CE mark, UL |                                                                                                                                                                                                             | Multipack | 4         |

# Spare parts and accessories

## Solder sleeves & Rotolock connector



| Code n° | Description                                       | Application                            | Packaging | Pack size |
|---------|---------------------------------------------------|----------------------------------------|-----------|-----------|
| 8153010 | Solder sleeve, P01, (1" Rotolock, 3/8" ODF)       | Models with 1" rotolock connection     | Multipack | 10        |
| 8153007 | Solder sleeve, P06, (1" Rotolock, 1/2" ODF)       | Models with 1" rotolock connection     | Multipack | 10        |
| 8153008 | Solder sleeve, P04, (1" 1/4 Rotolock, 3/4" ODF)   | Models with 1" 1/4 rotolock connection | Multipack | 10        |
| 8153004 | Solder sleeve, P02, (1" 3/4 Rotolock, 1" 1/8 ODF) | Models with 1" 3/4 rotolock connection | Multipack | 10        |
| 8153006 | Solder sleeve, P03, (2" 1/4 Rotolock, 1" 5/8 ODF) | Models with 2" 1/4 rotolock connection | Multipack | 10        |

## Rotolock nuts



| Code n° | Description          | Application                            | Packaging | Pack size |
|---------|----------------------|----------------------------------------|-----------|-----------|
| 8153124 | Rotolock nut, 1" 3/4 | Models with 1" 3/4 rotolock connection | Multipack | 10        |
| 8153126 | Rotolock nut, 2" 1/4 | Models with 2" 1/4 rotolock connection | Multipack | 10        |

## Rotolock service valves and valve sets (without gasket)



| Code n° | Description                                        | Application                            | Packaging | Pack size |
|---------|----------------------------------------------------|----------------------------------------|-----------|-----------|
| 8168027 | Rotolock valve, V01, (1" Rotolock, 3/8" ODF)       | Models with 1" rotolock connection     | Multipack | 6         |
| 8168031 | Rotolock valve, V06, (1" Rotolock, 1/2" ODF)       | Models with 1" rotolock connection     | Multipack | 6         |
| 8168029 | Rotolock valve, V04, (1" 1/4 Rotolock, 3/4" ODF)   | Models with 1" 1/4 rotolock connection | Multipack | 6         |
| 8168030 | Rotolock valve, V05, (1" 1/4 Rotolock, 7/8" ODF)   | Models with 1" 1/4 rotolock connection | Multipack | 6         |
| 8168033 | Rotolock valve, V09, (1" 1/4 Rotolock, 5/8" ODF)   | Models with 1" 1/4 rotolock connection | Multipack | 6         |
| 8168028 | Rotolock valve, V02, (1" 3/4 Rotolock, 1" 3/8 ODF) | Models with 1" 3/4 rotolock connection | Multipack | 6         |
| 8168032 | Rotolock valve, V07, (1" 3/4 Rotolock, 7/8" ODF)   | Models with 1" 3/4 rotolock connection | Multipack | 6         |
| 8168025 | Rotolock valve, V08, (2" 1/4 Rotolock, 1" 3/8 ODF) | Models with 2" 1/4 rotolock connection | Multipack | 6         |

## PTC heater



| Code n°  | Description    | Application               | Packaging | Pack size |
|----------|----------------|---------------------------|-----------|-----------|
| 120Z0459 | PTC heater 27W | All MTZ/MT/NTZ/VTZ models | Multipack | 10        |

## Discharge thermostat kit



| Code n° | Description              | Application | Packaging | Pack size |
|---------|--------------------------|-------------|-----------|-----------|
| 7750009 | Discharge thermostat kit | All models  | Multipack | 10        |

# Spare parts and accessories

## Surface sump heater



| Code n°  | Description                            | Application                                                                                     | Packaging | Pack size |
|----------|----------------------------------------|-------------------------------------------------------------------------------------------------|-----------|-----------|
| 120Z0389 | Surface sump heater, 80W, 230V, CE, UL | SM112.124.147 & SH090-184 & WSH090-184<br>PSH019.023.026.030.034.039<br>VSH088.117 & VZH088.117 | Multipack | 8         |

## Miscellaneous



| Code n° | Description                                    | Application                                                                     | Packaging   | Pack size |
|---------|------------------------------------------------|---------------------------------------------------------------------------------|-------------|-----------|
| 8154001 | Danfoss CC blue spray paint                    | SM, SY, SZ, SH<br>VSH088-117-170 & VZH088-117-170<br>All models                 | Single pack | 1         |
| 8156019 | Oil sight glass with gaskets (black & white)   | SM, SY, SZ, SH<br>VSH088-117-170 & VZH088-117-170<br>1-2-4 cylinder VE versions | Multipack   | 4         |
| 8156129 | Gasket for oil sight glass (white teflon)      | SM, SY, SZ, SH<br>VSH088-117-170 & VZH088-117-170<br>1-2-4 cylinder VE versions | Multipack   | 10        |
| 8156145 | Gasket for oil sight glass (black chloroprene) | Custom products<br>1-2-4 cyl models produced since 2002                         | Multipack   | 10        |





## Optyma™ - Condensing Units

Optyma™ is the widest range of hermetic condensing units on the market. Optyma™ condensing unit is available with reciprocating compressors to cover a large range of commercial refrigeration applications, reducing costs and complexity of the systems. All Optyma™ condensing units are extremely efficient and reliable.

That means less energy consumption and less running costs, less cost for service and maintenance. In addition to the wide Optyma™ range, we also offer local support and guidance if needed.

A network of partner wholesalers and local Danfoss teams can offer you help and will do their outmost to fulfil your needs. At Danfoss we simply believe it is important to offer an "Optimum service".

### Features Optyma™



Pre-mounted LP / HP tubes  
for easy connection of  
pressure switch

Easy accessible valves



Optimum airflow  
due to Danfoss designed  
fan cowl

Base rails designed  
for easy installation

## Facts

### Applications:

- Cold stores and freezer rooms
- Milk cooling
- Beer and wine cellars
- Small food retail and mini markets
- Garage forecourt shops
- Display cabinets
- Ice cream freezers
- Bottle coolers

### Segment usage:

- Medium temp and Low temp applications

### Refrigerants:

- R134a
- R404A
- R290
- For other refrigerants please contact Danfoss

### Capacity range:

- 50 - 20,000W

### Benefits:

- 100% factory tested for leakage and fully prewired
- Wide application range
- Powder coated steel parts

- High-efficiency condensers allowing an extended application envelope in high ambient conditions
- Reliable components for longer life and less warranty call out costs
- Base plate designed to allow easy mounting on wall brackets
- Flexible add-on design options including: fan speed control, oil separator, pressure switches or weather proof housing
- Easy access to all components for high serviceability and simplified maintenance
- Compact dimensions and minimum foot print for easy handling, shipping and installation

# Technical data and ordering

## Optyma™ - R290 MBP

| Model      | Code     | Version | Compressor | Electrical code (1) | Tamb [°C] | Cooling capacity Q [kW] (2) |       |       |       |       |       |       |       |
|------------|----------|---------|------------|---------------------|-----------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|
|            |          |         |            |                     |           | Te [°C]                     |       |       |       |       |       |       |       |
|            |          |         |            |                     |           | -25°C                       | -20°C | -15°C | -10°C | -5°C  | 0°C   | 5°C   | 10°C  |
| OP-MCNC004 | 114F1206 | A10     | NLY45RAb   | G                   | 27        | 0.203                       | 0.254 | 0.311 | 0.373 | 0.439 | 0.510 | 0.586 | 0.666 |
|            |          |         |            |                     | 32        | 0.186                       | 0.233 | 0.286 | 0.343 | 0.406 | 0.474 | 0.546 | 0.623 |
|            |          |         |            |                     | 38        | 0.166                       | 0.208 | 0.256 | 0.309 | 0.367 | 0.430 | 0.498 | –     |
|            |          |         |            |                     | 43        | 0.149                       | 0.187 | 0.231 | 0.280 | 0.334 | 0.394 | –     | –     |
| OP-MCNC006 | 114F1309 | A10     | NLY60RAb   | G                   | 27        | 0.274                       | 0.341 | 0.416 | 0.500 | 0.590 | 0.689 | 0.794 | 0.906 |
|            |          |         |            |                     | 32        | 0.254                       | 0.315 | 0.385 | 0.463 | 0.549 | 0.642 | 0.743 | 0.852 |
|            |          |         |            |                     | 38        | 0.230                       | 0.284 | 0.347 | 0.419 | 0.499 | 0.586 | 0.682 | –     |
|            |          |         |            |                     | 43        | 0.210                       | 0.258 | 0.316 | 0.382 | 0.457 | 0.540 | –     | –     |
| OP-MCNC008 | 114F1412 | A10     | NLY80RAb   | G                   | 27        | 0.354                       | 0.454 | 0.566 | 0.691 | 0.828 | 0.977 | 1.138 | 1.310 |
|            |          |         |            |                     | 32        | 0.328                       | 0.418 | 0.522 | 0.639 | 0.768 | 0.910 | 1.063 | 1.228 |
|            |          |         |            |                     | 38        | 0.296                       | 0.376 | 0.469 | 0.576 | 0.696 | 0.829 | 0.974 | –     |
|            |          |         |            |                     | 43        | 0.269                       | 0.341 | 0.426 | 0.524 | 0.636 | 0.761 | –     | –     |
| OP-MCNC009 | 114F1415 | A10     | NLY90RAb   | G                   | 27        | 0.408                       | 0.518 | 0.641 | 0.776 | 0.924 | 1.084 | 1.255 | 1.437 |
|            |          |         |            |                     | 32        | 0.378                       | 0.478 | 0.592 | 0.719 | 0.858 | 1.009 | 1.173 | 1.348 |
|            |          |         |            |                     | 38        | 0.342                       | 0.431 | 0.533 | 0.649 | 0.778 | 0.920 | 1.075 | –     |
|            |          |         |            |                     | 43        | 0.312                       | 0.391 | 0.485 | 0.592 | 0.712 | 0.846 | –     | –     |
| OP-MCNC011 | 114F1418 | A10     | NLY12RAb   | G                   | 27        | 0.474                       | 0.603 | 0.743 | 0.894 | 1.056 | 1.228 | 1.409 | 1.601 |
|            |          |         |            |                     | 32        | 0.442                       | 0.561 | 0.691 | 0.833 | 0.986 | 1.149 | 1.324 | 1.508 |
|            |          |         |            |                     | 38        | 0.404                       | 0.511 | 0.630 | 0.760 | 0.902 | 1.056 | 1.221 | –     |
|            |          |         |            |                     | 43        | 0.372                       | 0.469 | 0.578 | 0.699 | 0.833 | 0.978 | –     | –     |

Note:

A10 version: HP and LP Mini Pressure switch+ Wired Ebox+ Combo filter drier+ Schrader valve

(1) G- 230V- 1ph- 50Hz

(2) Nominal conditions (EN13215), evaporating temperatures at dew point, superheat 10K, Subcooling 0K

# Technical data and ordering

## Optyma™ - R404A/R507 MBP

| Model      | Code     | Version | Compressor | Electrical code (1) | Tamb [°C] | Cooling capacity Q [kW] (2) |       |       |       |       |       |
|------------|----------|---------|------------|---------------------|-----------|-----------------------------|-------|-------|-------|-------|-------|
|            |          |         |            |                     |           | Te [°C]                     |       |       |       |       |       |
|            |          |         |            |                     |           | -20°C                       | -15°C | -10°C | -5°C  | 0°C   | 5°C   |
| OP-MCHC006 | 114X2317 | A01     | FR6DL      | G                   | 27        | 0.376                       | 0.455 | 0.552 | 0.666 | 0.796 | 0.941 |
|            |          |         |            |                     | 32        | 0.337                       | 0.409 | 0.499 | 0.603 | 0.723 | 0.856 |
|            |          |         |            |                     | 38        | 0.293                       | 0.357 | 0.435 | 0.528 | 0.633 | 0.751 |
|            |          |         |            |                     | 43        | 0.259                       | 0.314 | 0.383 | 0.464 | 0.557 | -     |
| OP-MCHC010 | 114X0404 | A01     | SC10MLX    | G                   | 27        | 0.620                       | 0.767 | 0.938 | 1.132 | 1.348 | 1.583 |
|            |          |         |            |                     | 32        | 0.560                       | 0.696 | 0.853 | 1.031 | 1.229 | 1.445 |
|            |          |         |            |                     | 38        | 0.487                       | 0.609 | 0.749 | 0.908 | 1.085 | 1.279 |
|            |          |         |            |                     | 43        | 0.426                       | 0.535 | 0.661 | 0.804 | 0.963 | 1.138 |
| OP-MCHC013 | 114X0407 | A01     | SC12MLX    | G                   | 27        | 0.737                       | 0.905 | 1.098 | 1.316 | 1.555 | 1.813 |
|            |          |         |            |                     | 32        | 0.666                       | 0.820 | 0.997 | 1.196 | 1.416 | 1.653 |
|            |          |         |            |                     | 38        | 0.579                       | 0.717 | 0.875 | 1.052 | 1.247 | 1.458 |
|            |          |         |            |                     | 43        | 0.506                       | 0.630 | 0.771 | 0.930 | 1.104 | 1.294 |
| OP-MCHC015 | 114X2649 | A01     | SC15MLX    | G                   | 27        | 0.934                       | 1.148 | 1.396 | 1.677 | 1.991 | 2.337 |
|            |          |         |            |                     | 32        | 0.844                       | 1.043 | 1.273 | 1.534 | 1.826 | 2.150 |
|            |          |         |            |                     | 38        | 0.738                       | 0.916 | 1.124 | 1.360 | 1.625 | 1.919 |
|            |          |         |            |                     | 43        | 0.651                       | 0.811 | 0.998 | 1.212 | 1.453 | 1.722 |
| OP-MCHC018 | 114X0702 | A01     | SC18MLX    | G                   | 27        | 1.073                       | 1.315 | 1.594 | 1.909 | 2.259 | 2.642 |
|            |          |         |            |                     | 32        | 0.970                       | 1.195 | 1.453 | 1.745 | 2.070 | 2.428 |
|            |          |         |            |                     | 38        | 0.848                       | 1.050 | 1.282 | 1.545 | 1.840 | 2.164 |
|            |          |         |            |                     | 43        | 0.748                       | 0.929 | 1.139 | 1.377 | 1.644 | 1.939 |
| OP-MCHC021 | 114X2765 | A01     | GS21MLX    | G                   | 27        | 1.259                       | 1.557 | 1.898 | 2.278 | 2.694 | 3.141 |
|            |          |         |            |                     | 32        | 1.128                       | 1.402 | 1.715 | 2.064 | 2.446 | 2.859 |
|            |          |         |            |                     | 38        | 0.978                       | 1.222 | 1.500 | 1.811 | 2.152 | 2.523 |
|            |          |         |            |                     | 43        | 0.858                       | 1.076 | 1.325 | 1.603 | 1.910 | 2.244 |

Note:

A01 version: With receiver, 2 stop valves, brackets and copper pipes for KP

(1) G- 230V- 1ph- 50Hz

(2) Nominal conditions (EN13215), evaporating temperatures at dew point, superheat 10K, Subcooling 0K

# Technical data and ordering

## Optyma™ - R134a MBP

| Model      | Code     | Version | Compressor | Electrical code (1) | Tamb [°C] | Cooling capacity Q [kW] (2) |       |       |       |       |       |       |       |
|------------|----------|---------|------------|---------------------|-----------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|
|            |          |         |            |                     |           | Te [°C]                     |       |       |       |       |       |       |       |
|            |          |         |            |                     |           | -30°C                       | -25°C | -20°C | -15°C | -10°C | -5°C  | 0°C   | 5°C   |
| OP-MCGC003 | 114X0105 | A01     | TL3G       | G                   | 27        | 0.050                       | 0.066 | 0.086 | 0.110 | 0.137 | 0.167 | 0.200 | 0.236 |
|            |          |         |            |                     | 32        | 0.045                       | 0.060 | 0.079 | 0.101 | 0.126 | 0.154 | 0.184 | 0.217 |
|            |          |         |            |                     | 38        | 0.038                       | 0.052 | 0.070 | 0.090 | 0.112 | 0.138 | 0.165 | 0.194 |
|            |          |         |            |                     | 43        | 0.032                       | 0.045 | 0.061 | 0.080 | 0.101 | 0.123 | 0.148 | 0.175 |
| OP-MCGC005 | 114X0112 | A00     | TL5G       | G                   | 27        | 0.079                       | 0.102 | 0.130 | 0.162 | 0.198 | 0.238 | 0.281 | 0.328 |
|            |          |         |            |                     | 32        | 0.071                       | 0.094 | 0.120 | 0.150 | 0.184 | 0.222 | 0.263 | 0.306 |
|            |          |         |            |                     | 38        | 0.063                       | 0.084 | 0.108 | 0.136 | 0.168 | 0.203 | 0.241 | 0.281 |
|            |          |         |            |                     | 43        | 0.056                       | 0.076 | 0.099 | 0.125 | 0.155 | 0.187 | 0.222 | 0.260 |
| OP-MCGC006 | 114X0200 | A00     | FR6G       | G                   | 27        | 0.110                       | 0.146 | 0.188 | 0.238 | 0.296 | 0.364 | 0.441 | 0.527 |
|            |          |         |            |                     | 32        | 0.097                       | 0.131 | 0.172 | 0.219 | 0.275 | 0.340 | 0.413 | 0.496 |
|            |          |         |            |                     | 38        | 0.080                       | 0.113 | 0.152 | 0.197 | 0.250 | 0.311 | 0.380 | 0.458 |
|            |          |         |            |                     | 43        | 0.067                       | 0.099 | 0.136 | 0.179 | 0.229 | 0.287 | 0.352 | 0.426 |
| OP-MCGC007 | 114X0217 | A01     | FR7.5G     | G                   | 27        | 0.118                       | 0.156 | 0.202 | 0.256 | 0.319 | 0.392 | 0.474 | 0.567 |
|            |          |         |            |                     | 32        | 0.103                       | 0.140 | 0.184 | 0.236 | 0.296 | 0.366 | 0.444 | 0.532 |
|            |          |         |            |                     | 38        | 0.087                       | 0.122 | 0.164 | 0.213 | 0.269 | 0.335 | 0.408 | 0.491 |
|            |          |         |            |                     | 43        | 0.074                       | 0.108 | 0.148 | 0.194 | 0.248 | 0.309 | 0.379 | 0.457 |
| OP-MCGC008 | 114X0225 | A01     | FR8.5G     | G                   | 27        | 0.139                       | 0.184 | 0.239 | 0.302 | 0.376 | 0.458 | 0.551 | 0.653 |
|            |          |         |            |                     | 32        | 0.129                       | 0.171 | 0.222 | 0.281 | 0.350 | 0.428 | 0.516 | 0.613 |
|            |          |         |            |                     | 38        | 0.112                       | 0.151 | 0.198 | 0.253 | 0.317 | 0.389 | 0.472 | 0.564 |
|            |          |         |            |                     | 43        | 0.097                       | 0.133 | 0.177 | 0.229 | 0.289 | 0.358 | 0.436 | 0.525 |
| OP-MCGC008 | 114X0204 | A00     | NL8.4MF    | G                   | 27        | -                           | -     | 0.269 | 0.339 | 0.418 | 0.508 | 0.606 | 0.714 |
|            |          |         |            |                     | 32        | -                           | -     | 0.248 | 0.314 | 0.388 | 0.472 | 0.565 | 0.666 |
|            |          |         |            |                     | 38        | -                           | -     | 0.224 | 0.284 | 0.353 | 0.431 | 0.516 | 0.610 |
|            |          |         |            |                     | 43        | -                           | -     | 0.205 | 0.261 | 0.325 | 0.397 | 0.477 | 0.564 |
| OP-MCGC010 | 114X0223 | A04     | SC10G      | G                   | 27        | 0.163                       | 0.241 | 0.322 | 0.406 | 0.499 | 0.600 | 0.715 | 0.844 |
|            |          |         |            |                     | 32        | 0.153                       | 0.223 | 0.296 | 0.374 | 0.460 | 0.557 | 0.666 | 0.793 |
|            |          |         |            |                     | 38        | 0.136                       | 0.198 | 0.263 | 0.334 | 0.414 | 0.505 | 0.611 | 0.734 |
|            |          |         |            |                     | 43        | 0.121                       | 0.177 | 0.236 | 0.302 | 0.377 | 0.465 | 0.568 | 0.690 |
| OP-MCGC012 | 114X0340 | A00     | SC12G      | G                   | 27        | 0.213                       | 0.281 | 0.362 | 0.457 | 0.566 | 0.688 | 0.824 | 0.972 |
|            |          |         |            |                     | 32        | 0.185                       | 0.249 | 0.326 | 0.416 | 0.519 | 0.635 | 0.764 | 0.906 |
|            |          |         |            |                     | 38        | 0.153                       | 0.213 | 0.284 | 0.368 | 0.464 | 0.572 | 0.694 | 0.828 |
|            |          |         |            |                     | 43        | 0.129                       | 0.185 | 0.251 | 0.329 | 0.419 | 0.522 | 0.637 | 0.764 |
| OP-MCGC015 | 114X0448 | A00     | SC15G      | G                   | 27        | -                           | 0.323 | 0.427 | 0.552 | 0.694 | 0.854 | 1.029 | 1.218 |
|            |          |         |            |                     | 32        | -                           | 0.294 | 0.397 | 0.515 | 0.650 | 0.800 | 0.963 | 1.138 |
|            |          |         |            |                     | 38        | -                           | 0.252 | 0.353 | 0.466 | 0.592 | 0.730 | 0.879 | 1.039 |
|            |          |         |            |                     | 43        | -                           | 0.213 | 0.312 | 0.421 | 0.540 | 0.669 | 0.807 | 0.954 |
| OP-MCGC018 | 114X0556 | A00     | SC18G      | G                   | 27        | -                           | 0.400 | 0.515 | 0.649 | 0.803 | 0.978 | 1.173 | 1.389 |
|            |          |         |            |                     | 32        | -                           | 0.351 | 0.465 | 0.596 | 0.746 | 0.915 | 1.104 | 1.310 |
|            |          |         |            |                     | 38        | -                           | 0.307 | 0.417 | 0.543 | 0.685 | 0.844 | 1.019 | 1.211 |
|            |          |         |            |                     | 43        | -                           | 0.280 | 0.384 | 0.502 | 0.635 | 0.783 | 0.946 | 1.122 |
| OP-MCGC021 | 114X0564 | A00     | SC21G      | G                   | 27        | -                           | 0.463 | 0.601 | 0.758 | 0.933 | 1.125 | 1.331 | 1.551 |
|            |          |         |            |                     | 32        | -                           | 0.421 | 0.550 | 0.698 | 0.862 | 1.042 | 1.235 | 1.441 |
|            |          |         |            |                     | 38        | -                           | 0.375 | 0.491 | 0.624 | 0.773 | 0.936 | 1.112 | 1.300 |
|            |          |         |            |                     | 43        | -                           | 0.337 | 0.440 | 0.559 | 0.694 | 0.842 | 1.003 | 1.176 |
| OP-MCGC026 | 114X0773 | A01     | GS26MFX    | G                   | 27        | -                           | -     | 0.873 | 1.125 | 1.416 | 1.745 | 2.113 | 2.519 |
|            |          |         |            |                     | 32        | -                           | -     | 0.809 | 1.045 | 1.317 | 1.625 | 1.970 | 2.350 |
|            |          |         |            |                     | 38        | -                           | -     | 0.736 | 0.953 | 1.202 | 1.485 | 1.801 | 2.151 |
|            |          |         |            |                     | 43        | -                           | -     | 0.675 | 0.877 | 1.108 | 1.369 | 1.662 | 1.986 |
| OP-MCGC034 | 114X0781 | A01     | GS34MFX    | G                   | 27        | -                           | -     | 1.138 | 1.432 | 1.772 | 2.158 | 2.592 | 3.072 |
|            |          |         |            |                     | 32        | -                           | -     | 1.051 | 1.330 | 1.652 | 2.018 | 2.429 | 2.886 |
|            |          |         |            |                     | 38        | -                           | -     | 0.946 | 1.207 | 1.507 | 1.848 | 2.232 | 2.660 |
|            |          |         |            |                     | 43        | -                           | -     | 0.858 | 1.103 | 1.385 | 1.706 | 2.067 | 2.470 |

Note:

A00: Without valves and receiver for capillary tubes

A01: With receiver, 2 stop valves, brackets and copper pipes for KP

A04: A01 + KP17 WB + FSA-kit + power cord

(1) G- 230V- 1ph- 50Hz

(2) Nominal conditions (EN13215), evaporating temperatures at dew point, superheat 10K, Subcooling 0K

# Technical data and ordering

## Optyma™ - R290 LBP

| Model      | Code     | Version | Compressor | Electrical code (1) | Tamb [°C] | Cooling capacity Q [kW] (2) |       |       |       |       |       |       |
|------------|----------|---------|------------|---------------------|-----------|-----------------------------|-------|-------|-------|-------|-------|-------|
|            |          |         |            |                     |           | Te [°C]                     |       |       |       |       |       |       |
|            |          |         |            |                     |           | -40°C                       | -35°C | -30°C | -25°C | -20°C | -15°C | -10°C |
| OP-LCNC004 | 114F0203 | A10     | NLY45LAb   | G                   | 27        | 0.095                       | 0.128 | 0.166 | 0.209 | 0.256 | 0.307 | 0.363 |
|            |          |         |            |                     | 32        | 0.086                       | 0.116 | 0.152 | 0.192 | 0.236 | 0.284 | 0.337 |
|            |          |         |            |                     | 38        | 0.075                       | 0.103 | 0.134 | 0.171 | 0.212 | 0.257 | 0.307 |
|            |          |         |            |                     | 43        | 0.067                       | 0.091 | 0.120 | 0.154 | 0.192 | 0.235 | 0.282 |
| OP-LCNC006 | 114F0206 | A10     | NLY60LAb   | G                   | 27        | 0.120                       | 0.163 | 0.211 | 0.265 | 0.323 | 0.386 | 0.453 |
|            |          |         |            |                     | 32        | 0.110                       | 0.148 | 0.193 | 0.242 | 0.296 | 0.356 | 0.419 |
|            |          |         |            |                     | 38        | 0.097                       | 0.131 | 0.170 | 0.215 | 0.265 | 0.320 | 0.379 |
|            |          |         |            |                     | 43        | 0.087                       | 0.116 | 0.152 | 0.193 | 0.239 | 0.290 | 0.346 |
| OP-LCNC008 | 114F0309 | A10     | NLY80LAb   | G                   | 27        | 0.162                       | 0.219 | 0.284 | 0.356 | 0.436 | 0.523 | 0.616 |
|            |          |         |            |                     | 32        | 0.148                       | 0.199 | 0.258 | 0.325 | 0.400 | 0.482 | 0.571 |
|            |          |         |            |                     | 38        | 0.131                       | 0.175 | 0.228 | 0.289 | 0.357 | 0.433 | 0.517 |
|            |          |         |            |                     | 43        | 0.117                       | 0.156 | 0.203 | 0.259 | 0.322 | 0.393 | 0.472 |
| OP-LCNC011 | 114F0412 | A10     | NPY12LAb   | G                   | 27        | 0.258                       | 0.342 | 0.440 | 0.550 | 0.671 | 0.805 | 0.950 |
|            |          |         |            |                     | 32        | 0.235                       | 0.312 | 0.402 | 0.505 | 0.619 | 0.746 | 0.884 |
|            |          |         |            |                     | 38        | 0.208                       | 0.276 | 0.357 | 0.451 | 0.557 | 0.675 | 0.805 |
|            |          |         |            |                     | 43        | 0.185                       | 0.246 | 0.320 | 0.406 | 0.505 | 0.616 | 0.740 |

Note:

A10 version: HP and LP Mini Pressure switch+ Wired Ebox+ Combo filter drier+ Schrader valve

(1) G- 230V- 1ph- 50Hz

(2) Nominal conditions (EN13215), evaporating temperatures at dew point, superheat 10K, Subcooling 0K

## Technical data and ordering

### Optyma™ - R404A/R507 LBP

| Model      | Code     | Version | Compressor | Electrical code (1) | Tamb [°C] | Cooling capacity Q [kW] (2) |       |       |       |       |       |       |       |
|------------|----------|---------|------------|---------------------|-----------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|
|            |          |         |            |                     |           | Te [°C]                     |       |       |       |       |       |       |       |
|            |          |         |            |                     |           | -45°C                       | -40°C | -35°C | -30°C | -25°C | -20°C | -15°C | -10°C |
| OP-LCHC008 | 114X1301 | A01     | NL8.4CLX   | G                   | 27        | 0.121                       | 0.169 | 0.227 | 0.293 | 0.369 | 0.452 | 0.543 | 0.640 |
|            |          |         |            |                     | 32        | 0.121                       | 0.153 | 0.204 | 0.265 | 0.333 | 0.408 | 0.491 | 0.579 |
|            |          |         |            |                     | 38        | 0.094                       | 0.131 | 0.176 | 0.229 | 0.288 | 0.354 | 0.427 | 0.504 |
|            |          |         |            |                     | 43        | 0.079                       | 0.112 | 0.151 | 0.197 | 0.249 | 0.308 | 0.372 | 0.441 |
| OP-LCHC012 | 114X1441 | A01     | SC12CLX    | G                   | 27        | -                           | 0.243 | 0.333 | 0.439 | 0.563 | 0.704 | 0.862 | 1.037 |
|            |          |         |            |                     | 32        | -                           | 0.198 | 0.282 | 0.381 | 0.496 | 0.626 | 0.773 | 0.936 |
|            |          |         |            |                     | 38        | -                           | 0.146 | 0.221 | 0.311 | 0.414 | 0.533 | 0.666 | 0.814 |
|            |          |         |            |                     | 43        | -                           | -     | 0.172 | 0.253 | 0.347 | 0.454 | 0.576 | 0.711 |
| OP-LCHC015 | 114X1549 | A01     | SC15CL     | G                   | 27        | -                           | 0.285 | 0.389 | 0.507 | 0.639 | 0.788 | 0.951 | 1.130 |
|            |          |         |            |                     | 32        | -                           | 0.233 | 0.335 | 0.449 | 0.576 | 0.716 | 0.870 | 1.038 |
|            |          |         |            |                     | 38        | -                           | -     | -     | 0.375 | 0.496 | 0.627 | 0.771 | 0.926 |
|            |          |         |            |                     | 43        | -                           | -     | 0.151 | 0.311 | 0.426 | 0.551 | 0.686 | 0.832 |
| OP-LCHC018 | 114X1557 | A01     | SC18CLX    | G                   | 27        | 0.260                       | 0.362 | 0.486 | 0.632 | 0.801 | 0.991 | 1.203 | 1.435 |
|            |          |         |            |                     | 32        | 0.215                       | 0.310 | 0.423 | 0.557 | 0.712 | 0.886 | 1.082 | 1.296 |
|            |          |         |            |                     | 38        | -                           | 0.250 | 0.351 | 0.470 | 0.608 | 0.764 | 0.939 | 1.132 |
|            |          |         |            |                     | 43        | -                           | -     | 0.294 | 0.400 | 0.524 | 0.664 | 0.822 | 0.998 |

Note:

A01 version: With receiver, 2 stop valves, brackets and copper pipes for KP

(1) G- 230V- 1ph- 50Hz

(2) Nominal conditions (EN13215), evaporating temperatures at dew point, superheat 10K, Subcooling 0K

# One Supplier Covers your Industrial Refrigeration Needs

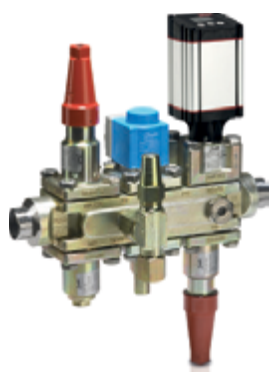
Danfoss has made a clear priority to be able to supply all types of components for industrial refrigeration. Having just one place to go for industrial refrigeration is a significant benefit. Danfoss' one-stop-shop concept makes constructing as well as servicing fast and easy and helps keep the part stock at a minimum.

Whether your industrial refrigeration plant is a manual system or a highly-automated system, you will be sure to find a Danfoss solution that exactly matches your project needs in our wide range for industrial refrigeration. With the support of our online tools and our dedicated, local staff, we continuously strive to make your selection of solutions safe and easy.

## The Flexline™ platform

The Flexline™ platform is synonymous with flexibility within industrial refrigeration. Based on a modular design concept, you will

experience that each product features a variety of benefits, including easy selection, installation and maintenance.



### ICF Flexline™ valve station

The Danfoss ICF Flexline™ multi-ported control solution offers you significant savings by substituting a string of valves with just one valve station. Consisting of a valve housing and a maximum of four or six function modules, the valve station is a true plug-and-play solution.



### ICFD Defrost Module

The liquid drain method is widely acknowledged as the most efficient hot gas defrost method within industrial refrigeration. The method ensures that liquid condensate is drained at lowest possible pressure resulting in a reduction of blow-by gas by up to 90%.



### SLV Flexline™ product platform

The SVL Flexline™ product platform is targeted to meet industrial refrigeration requirements worldwide. Using just two basic valve housings – a straightway and an angleway – the platform offers five different functions.



## ICV Flexline™ valves

The ICV product family consists of an ICS pilot operated control, ICM motor operated control and ICLX 2-step solenoid valve. All valve variants are based on one common valve body to offer outstanding flexibility.

The modular concept greatly facilitates the building of a valve that offers energy savings and reduction of down-time. All valves are designed for a maximum working pressure of 52 bar (754 psi) and efficiently handle CO<sub>2</sub> and other future high pressure refrigerants.



**ICLX 2-step solenoid valve**

The ICLX valves are 2-step servo-operated main valves with pilot solenoid valves offering safe, flexible and convenient installation, operation and service.



**ICM motor operated valve**

The ICM motor operated valves are very compact and easy to handle. The ICM motor valve is available as a complete valve and as parts programme.



**ICS pilot operated servo valve**

The ICS pilot operated servo valves are quick and simple to handle, install and service due to their low weight and compact design.



**ICSH, dual position solenoid valve**

The ICSH dual position solenoid valve is designed for gradual and safe opening of the hot gas flow to the evaporator, featuring an extra-safety-configuration to prevent hydraulic shocks in the system.



**New Danfoss Pilot Valve program for ICS control valves**

The new Danfoss Pilot Valve program for ICS control valves consist of just 4 fully backwards-compatible valves, which cover all regulation types and ranges needed in ammonia and CO<sub>2</sub> applications.

## Danfoss gas detection units for industrial refrigeration systems

The new Danfoss gas detectors are based on an intelligent platform and intuitive user-interface, Danfoss' complete line of fixed gas detectors range from basic to heavy duty models with sensor technology to match the specific refrigerant, application, and safety requirements of your system.

The Danfoss gas detection portfolio enables you to comply with regulations according to EN 378:2016, ISO 5149:2014, IIAR 2-2017, and ASHRAE 15:2016 while providing comprehensive safety and easy-to-use features



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## Evaporator control solution

The evaporator sub-system solution brings together Danfoss' efficient and reliable valves and controls to provide efficient and safe installation, operation & maintenance of the evaporator sub-system.

The evaporator control solution is prepared for smart defrosting which provide an optimized hot gas defrost process to better schedule, control, start and terminate

defrosting delivering improved energy efficiency and reduced defrost cycle duration time. The system features a controller dedicated for industrial refrigeration requirements and applications which manages the steps in the defrost cycle. The solution offers a safe defrost process that meets latest IIAR standards for hot gas defrost.



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## Air purger

The Danfoss Intelligent Purger System is a new, stand-alone air purger solution for multi purging. The automatic purging function, responds immediately to non-condensable gases in the refrigeration system improving system efficiency and safety. With a compact, plug & play design it provides fast and easy installation, saves space and reduces overall cost.



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## Semi-welded plate heat exchanger

Danfoss semi-welded plate heat exchangers are optimized for Ammonia industrial applications systems such as Condensers, flooded and pumped evaporators, Sub-coolers, Desuperheaters, Superheaters, Economizers and Oil coolers.



Coming Soon

**Complete industrial refrigeration solutions supplier for sensor, liquid level regulating valves, safety valves, and switches.**



**AKS 4100 Liquid Level Sensor**

Liquid Level Sensor with TDR Guided Radar technology fully adapted to the Industrial Refrigeration segment – reliable and with high accuracy.



**Liquid Level Control (AKS 38, HFI, SV, LLG)**

The Danfoss LLS 4000 Electronic Liquid Level Switch is a compact, cost-efficient, and reliable switch for liquid level measurements. With simple, one-point installation, smart commissioning via Bluetooth, and next-level reliability thanks to its SIL2 compliance, the LLS 4000 makes electronic liquid measuring smarter and more reliable than ever.



**Liquid Level Control (AKS 38, HFI, SV, LLG)**

Liquid level control is an important element in the designing of industrial refrigeration systems. It controls the liquid injection to maintain a constant liquid level. Danfoss offers Mechanical and electro-mechanical solution suited for meet varying plant requirements.



**Safety Relief Valves (SFA, SFV, DSV, BSV, POV)**

Danfoss Safety valves are designed to meet the strict quality demands and safety requirements for refrigeration installations, specified by the international classification societies.



**Switches and thermostats for Industrial Refrigeration**

Pressure controls and thermostats applicable for industrial refrigeration applications including ammonia as a refrigerant.



**Liquid Level Glasses**

LLG are liquid level glasses in ductile steel which meets the strictest requirements on industrial and marine refrigeration installations

**IR product information**



**IR products overview**



**IR tools**

If you need any further information, please email to [customer care.pac@danfoss.com](mailto:customer care.pac@danfoss.com)

# Danfoss Infogram

Danfoss has created various of information graphics for you to visualise quickly on how to troubleshoot problems, tips and tricks for selecting and installing products, working principal of products etc.



**Danfoss Learning Cooling Catalog**

Explore Cooling eLessons based on topics



**Solenoid Valves Troubleshooting**

Troubleshooting, tips and tricks



**360° Solenoid Valve**

Selection and installation tips etc



**Compressor Replacement**

What to remember when selecting a replacement compressor



**Thermostatic Expansion Valves Troubleshooting**

TXV troubleshooting, tips and tricks



**Pressure Regulators**

KV valves working principle



**TXV Troubleshooting**

Expansion troubleshooting, tips and tricks



**AKV Electronic Expansion Valves Troubleshooting**

Tips and tricks on pulse valve



**Condensing Units Selection**

Cold room overview



**Filter Driers and Sight Glasses**

Selection, troubleshooting, symptoms of filter driers and sight glasses

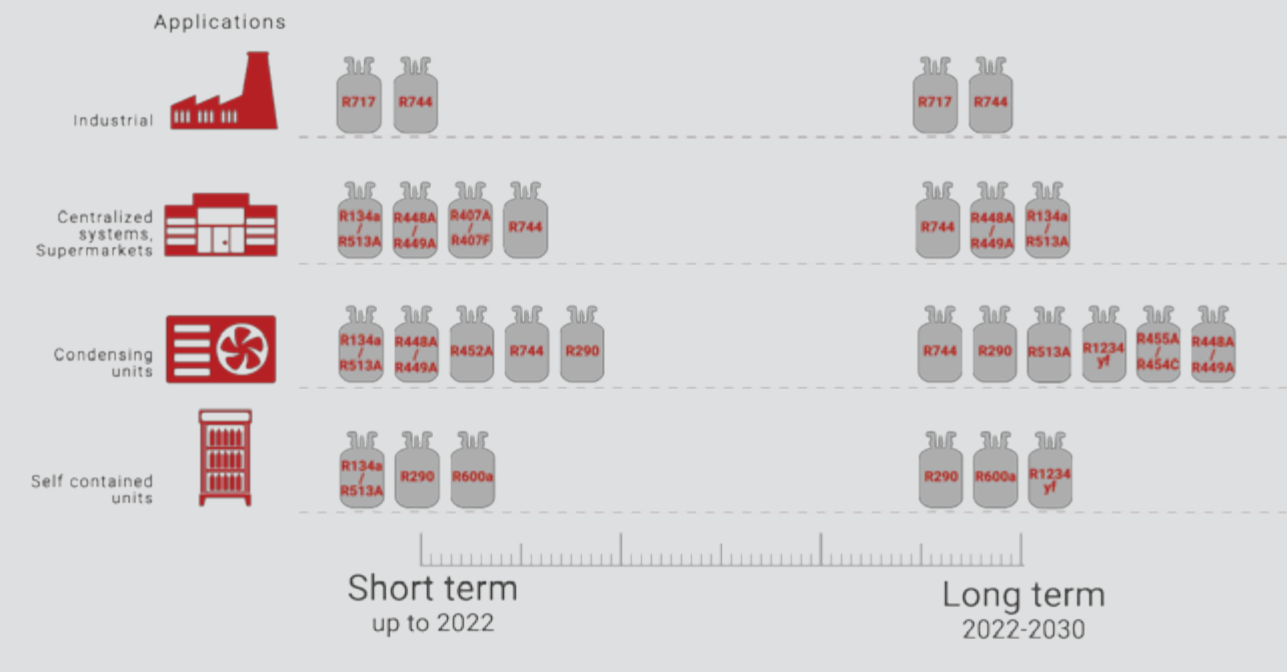


# Refrigerant Solutions for Refrigeration

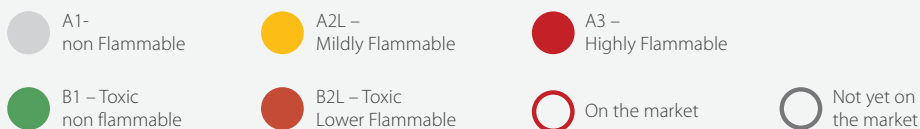
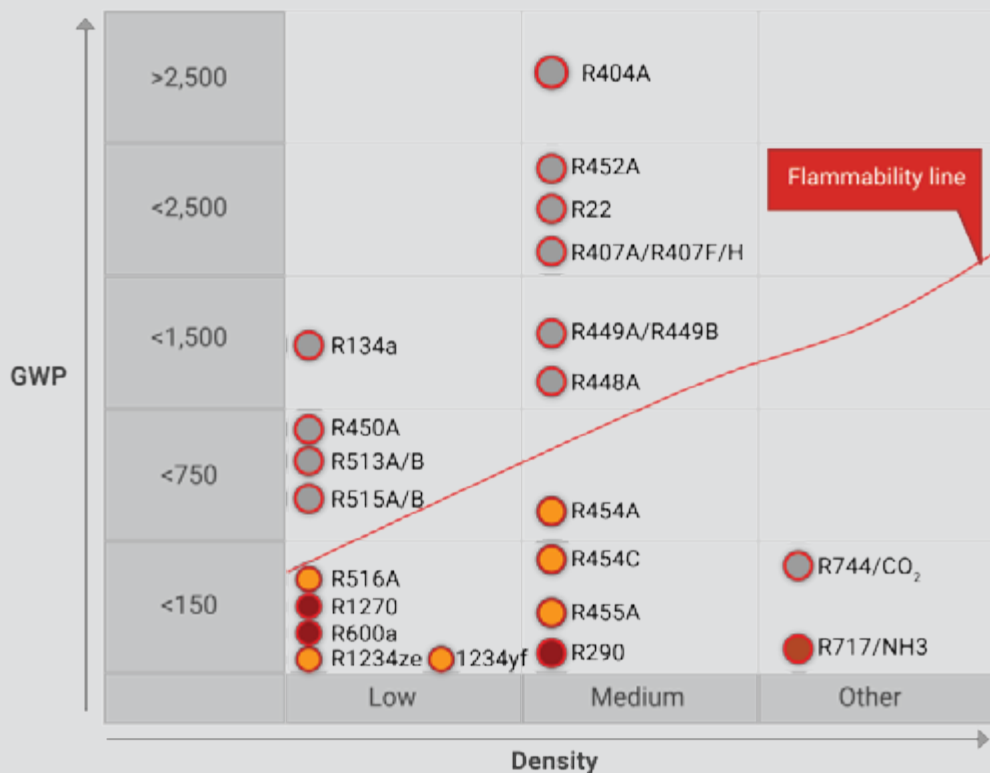
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Main alternative refrigerants in play



A picture in continuous evolution

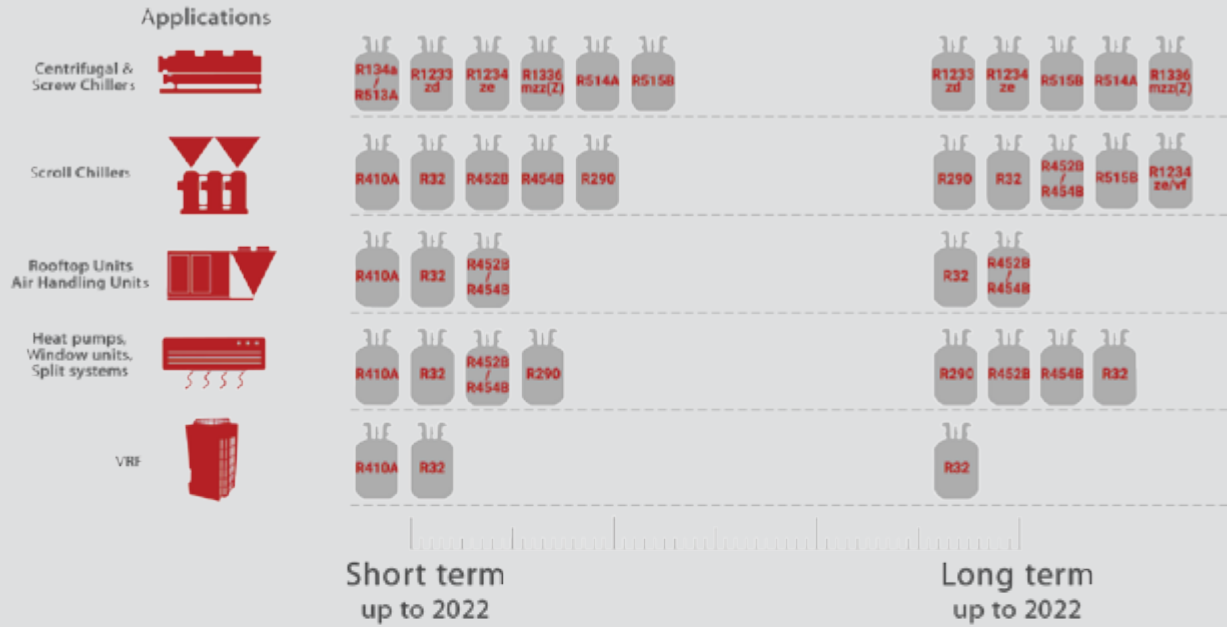


# Refrigerant Solutions for Air Conditioning and Heat Pumps

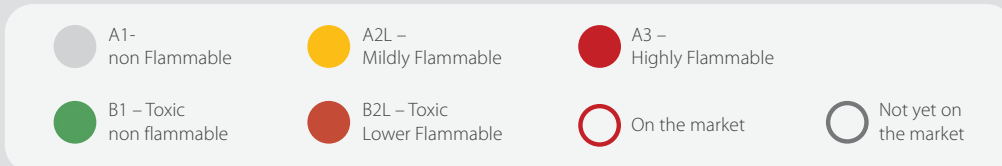
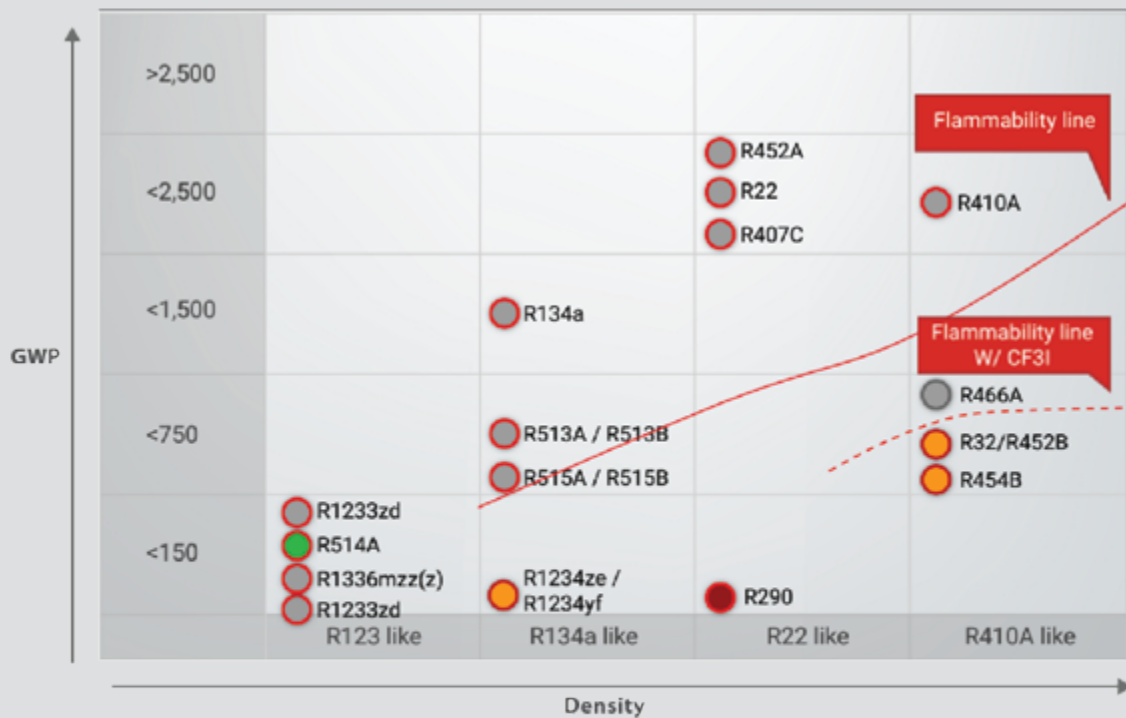
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Main alternative refrigerants in play



A picture in continuous evolution









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