

Catalogue

# Check valves for Industrial Refrigeration

## Contents

## Page

|                                                                                                              |    |
|--------------------------------------------------------------------------------------------------------------|----|
| Check & stop valves, type SCA-X - Check valve, type CHV-X, 52 bar (754 psi) .....                            | 3  |
| Check & stop valves, type SCA-X - Check valve, type CHV-X, 65 bar (943 psi) .....                            | 19 |
| Check & stop valves in stainless steel, type SCA-X SS - Check valves in stainless steel, type CHV-X SS ..... | 33 |
| Check valves, type NRVA.....                                                                                 | 41 |
| Check valves, type NRVS.....                                                                                 | 77 |



# Check & stop valve, SCA-X, 52 bar (754 psi) Check valve, CHV-X, 52 bar (754 psi)

## Contents

|                                               | Page |
|-----------------------------------------------|------|
| Features .....                                | 5    |
| Design .....                                  | 6    |
| Application .....                             | 6    |
| Technical data .....                          | 7    |
| Computation and selection .....               | 7    |
| Material specification .....                  | 9    |
| Connections .....                             | 11   |
| Dimensions and weights .....                  | 12   |
| Ordering complete valves .....                | 15   |
| Ordering SVA-X from the parts programme ..... | 17   |
| Ordering CHV-X from the parts programme ..... | 18   |



## Check & stop valve, SCA-X, 52 bar (754 psi) Check valve, CHV-X, 52 bar (754 psi)



SCA-X are check valves with a built-in shut-off valve function. SCA-X valves are available in angleway versions.

CHV-X are check valves only. CHV-X are available in both angleway and straightway versions.

The valves are designed to open at very low differential pressures, allow favourable flow conditions and are easy to disassemble for inspection and service.

The SCA-X is equipped with vented cap and has internal backseating enabling the spindle seal to be replaced whilst the valve still under pressure.

Laser cut V-ports provide excellent opening characteristics (SCA-X/CHV-X 50-125).

The valve cone has a built-in flexibility to ensure a precise and tight closing towards the valve seat.

A well balanced dampening effect between the piston and the cylinder gives an optimal protection during low loads and against pulsations.

### Features

- Applicable to HCFC, HFC, R717 (Ammonia), R744 (CO<sub>2</sub>), Propane, Butane, Iso-Butane and Ethane.  
R717 Heat Pump and Propylene applications with replaced O-ring.
- Modular Concept:
  - Each valve housing is available with several different connection types and sizes.
  - Possible to convert SCA-X or CHV-X to any other product in the Flexline™ SVL family (Hand operated regulating valve, shut-off valve or strainer) just by replacing the complete top part.
- Fast and easy valve overhaul service. It is easy to replace the top part and no welding is needed.
- Designed to open at a very low differential pressure of 0.04 bar / 0.58 psig.
- Designed with a built-in damping chamber preventing valve flutter in case of low refrigerant velocity and/or low density.
- Each valve is clearly marked with type, size and performance range.  
Additional ID ring to be installed when preparing for Ammonia Heat Pump or Propylene application.
- Easy to disassemble for inspection and service.
- Internal backseating enables replacement of the spindle seal whilst the valve is active, i.e. under pressure.
- Optimal flow characteristics ensuring quick opening to the fully open position.
- Protection against pulsation by built-in damping facility.
- Housing and bonnet material is low temperature steel according to requirements of the Pressure Equipment Directive and other international classification authorities.
- Equipped with Stainless steel bolts.
- Max. working pressure:  
52 bar g / 754 psi g
- Temperature range:  
-60 – 150 °C / -76 – 302 °F
- Classification: DNV, CRN, BV, EAC etc.  
To get an updated list of certification on the products please contact your local Danfoss Sales Company.

## Design

### Connections

Available with the following connections:

- Butt-weld DIN (EN 10220)  
DN 15 - 125 (½ - 5 in.)
- Butt-weld ANSI (B 36.10 Schedule 80),  
DN 15 - 40 (½ - 1½ in.)
- Butt-weld ANSI (B 36.10 Schedule 40),  
DN 50 - 125 (2 - 5 in.)
- Butt-weld GOST, (8734-75 and 8732-78)  
DN 15 - 125 (½ - 5 in.)
- Socket-weld ANSI (B 16.11),  
DN 50 (2 in.)

### Housing

The housing is made from special, cold resistant steel.

### Valve cone

Valve cone with built in metallic stop - prevents damage to teflon ring in case of overtightening.

### Damping chamber

The chamber is filled with refrigerants (gas or liquid), which provides a damping effect when the valve opens and closes.

### Spindle (SCA-X)

Made of polished stainless steel, which is ideal for O-ring sealing.

### Packing Gland (SCA-X)

The "full temperature range" packing gland is the standard for the entire SVL platform.

This ensures perfect tightness throughout the whole temperature range:  
-60/+150°C (-76/+302°F).

### Pressure Equipment Directive (PED)

The SCA-X/CHV-X valves are approved according to the European standard specified in the Pressure Equipment Directive and are CE marked.

For further details / restrictions - see the product instruction.

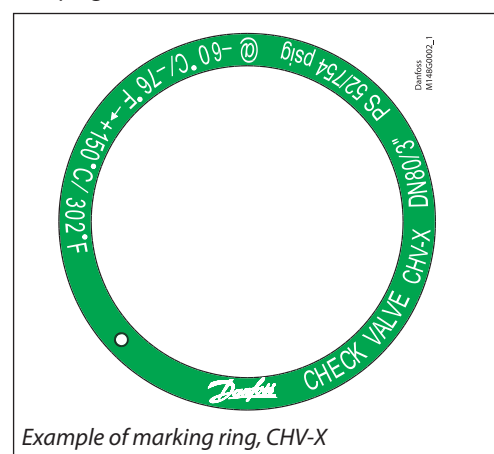
### Installation

The valve must be mounted vertically with the cone downwards.

The valve is designed to resist very high internal pressure. However, the piping system in general should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion.

For further information refer to installation instructions for SCA-X/CHV-X.

If cold refrigeration oil having low viscosity enters and settles in the damping chamber, problems with the check valve may arise. Consequently, it may be necessary to modify the valve for more viscous liquids by enlarging the hole to the damping chamber.



| SCA-X/CHV-X valves |                        |                         |                            |
|--------------------|------------------------|-------------------------|----------------------------|
| Nominal bore       | DN = < 25 mm (1 in.)   | DN32-80 mm (1¼ - 3 in.) | DN100 - 125 mm (4 - 5 in.) |
| Classified for     | Fluid group I          |                         |                            |
| Category           | Article 3, paragraph 3 | II                      | III                        |

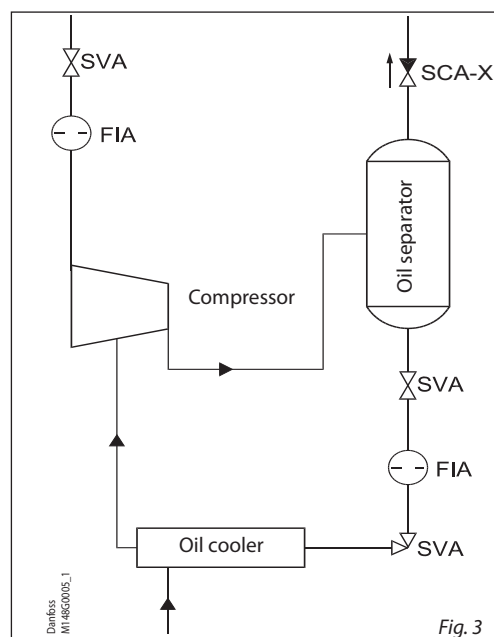
## Application

Figure 3 shows the check & stop valve SCA-X in the discharge line of a screw compressor unit. The SCA-X valve in the discharge line prevents "back condensation" in the oil separator as well as pressure equalising through the compressor.

Compared to an ordinary shut-off and check valve arrangement the combined check & stop valve solution, as shown, is easier to install and has lower flow resistance.

Installation of the SCA-X/CHV-X in the economizer line is **not** recommended.

For horizontal installation of the function module; please contact Danfoss.



## Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

### Technical data

- **Refrigerants**  
Applicable to HCFC, HFC, R717 (Ammonia), R744 (CO<sub>2</sub>), Propane, Butane, Iso-Butane and Ethane.  
R717 Heat Pump and Propylene applications with replaced O-ring.
- **Temperature range**  
-60 – 150 °C / -76 – 302 °F.
- **Max. working pressure**  
52 bar g / 754 psig.

### Computation and selection

#### Introduction

When dimensioning SCA-X/CHV-X, it is important to select a valve that is best suited to all operating conditions. Therefore, it is necessary to consider both the nominal and part load working conditions.

The SCA-X/CHV-X valve can be calculated in two ways:

- Using the tables below.
- Using Coolselector®2

### Example

#### SI-Units

Assumed working conditions:  
Maximum flow  $\dot{V} = 1000 \text{ m}^3/\text{h}$   
Density  $\rho = 3.0 \text{ kg/m}^3$   
Minimum part load = 33%

Used expressions:

Recommended velocity -  $C_{rec}$  [m/s]  
Minimum recommended velocity -  $C_{min, rec}$  [m/s]  
Maximum velocity -  $C_{max}$  [m/s]  
Part load velocity -  $C_{part}$  [m/s]

We know the density  $\rho \approx 3.0 \text{ kg/m}^3$ , consequently  $C_{rec}$  as well as  $C_{min, rec}$  can be found in the figure below (standard valve).

$C_{rec} \approx 14 \text{ m/s}$   
 $C_{min, rec} \approx 3 \text{ m/s}$

#### US-Units

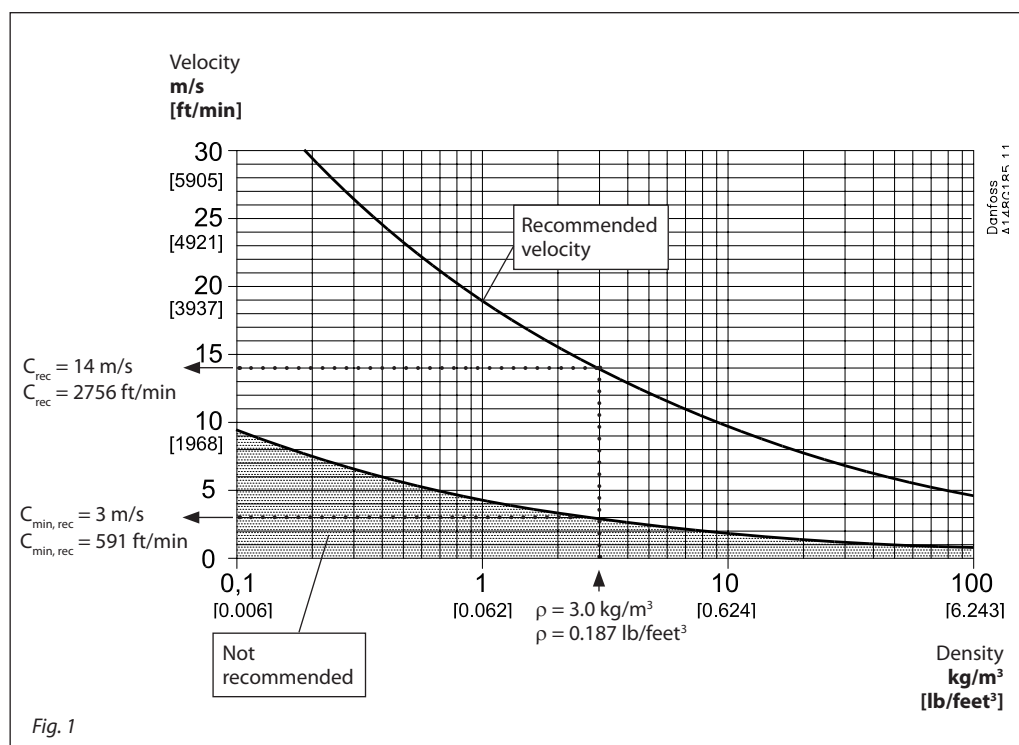
Assumed working conditions:  
Maximum flow  $\dot{V} = 1160 \text{ gpm}$   
Density  $\rho = 0.187 \text{ lb/ft}^3$   
Minimum part load = 33%

Used expressions:

Recommended velocity -  $C_{rec}$  [ft/min]  
Minimum recommended velocity -  $C_{min, rec}$  [ft/min]  
Maximum velocity -  $C_{max}$  [ft/min]  
Part load velocity -  $C_{part}$  [ft/min]

We know the density  $\rho \approx 0.187 \text{ lb/ft}^3$ , consequently  $C_{rec}$  as well as  $C_{min, rec}$  can be found in the figure (standard valve).

$C_{rec} \approx 2756 \text{ ft/min}$   
 $C_{min, rec} \approx 591 \text{ ft/min}$



Selection example continued on following page.

Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

**Computation and selection**  
(continued)

Knowing that  $\dot{V} = 1000 \text{ m}^3/\text{h}$  (1160 gpm) fig. 2 gives the following choices:

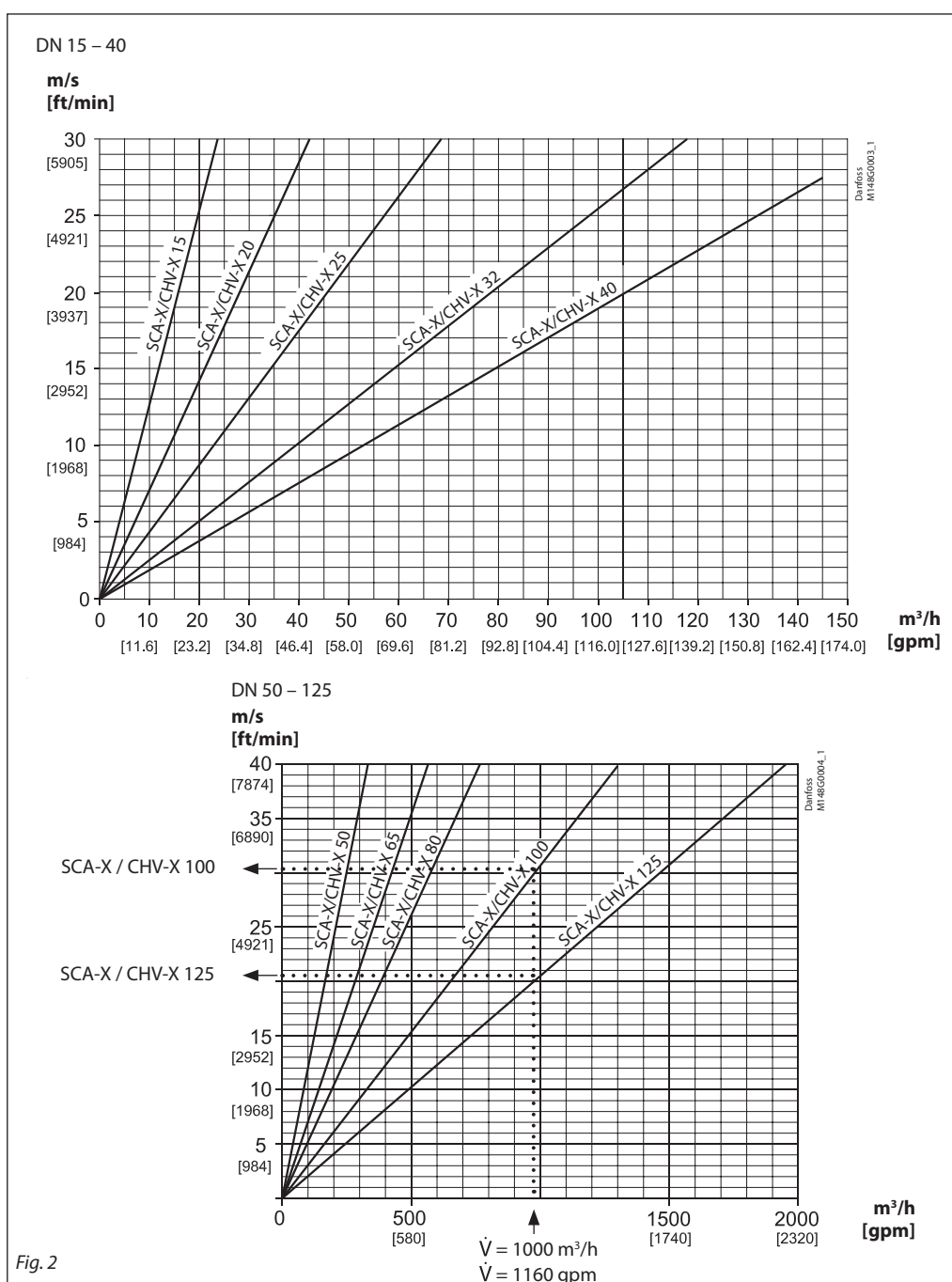
For SCA-X / CHV-X in size DN 100 the maximum velocity  $C_{\max} \approx 31 \text{ m/s}$  (6100 ft/min)

For SCA-X / CHV-X in size DN 125 the maximum velocity  $C_{\max} \approx 20 \text{ m/s}$  (3900 ft/min)

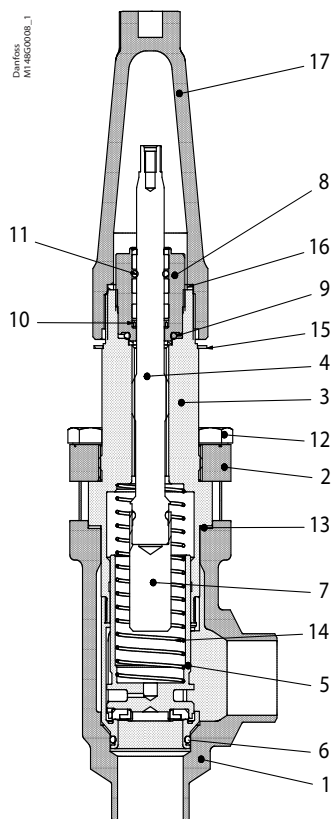
In conclusion SCA-X in size DN 125 is selected because  $C_{\max} \approx 20 \text{ m/s}$  (3900 ft/min) comes nearest to the recommended velocity  $C_{\text{rec}} \approx 14 \text{ m/s}$  (2756 ft/min) and at the same time part load conditions fulfil the requirements, as described:

If the valve in question (for instance under part load conditions) provides a velocity less than  $C_{\text{min, rec}}$  the valve might start hammering and become noisy. As a result the valve may wear prematurely.

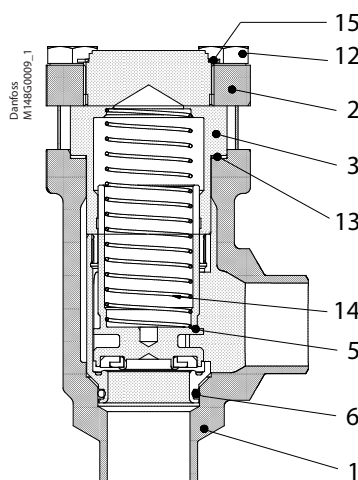
We know that  $C_{\max} \approx 20 \text{ m/s}$  (3900 ft/min) and that minimum part load is 33%. It follows that  $C_{\text{part}} \approx 6.5 \text{ m/s}$  (1290 ft/min). Thus,  $C_{\text{part}}$  (6.5 m/s) >  $C_{\text{min, rec}}$  (3.0 m/s) and the selected SCA-X model DN125 is the perfect choice.



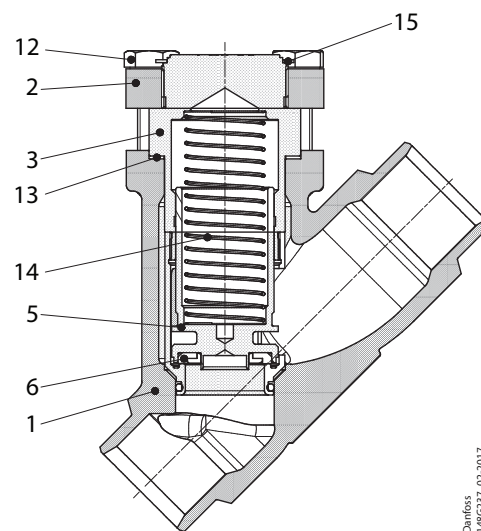
## Material specification



SCA-X 15 - 40



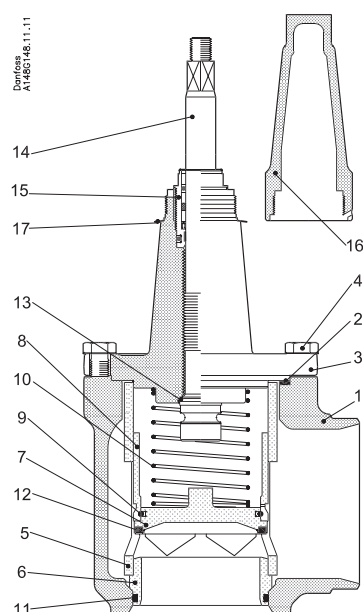
CHV-X 15 - 40



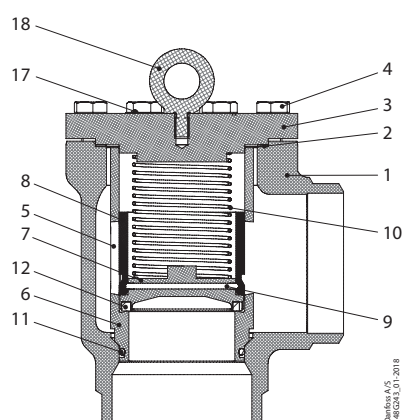
CHV-X 15 - 40

| No. | Part                     | Material                       | DIN/EN               | ISO            | ASTM             |
|-----|--------------------------|--------------------------------|----------------------|----------------|------------------|
| 1   | Housing                  | Steel                          | P285QH<br>EN10222-4  |                | LF2A350          |
| 2   | Bonnet, Flange           | Steel                          | P275NL1<br>EN10028-3 |                |                  |
| 3   | Bonnet, Insert           | Steel                          |                      |                |                  |
| 4   | Spindle                  | Stainless steel                | X 10CrNiS18-9        | Type 17, 17440 | AISI 303, 683/13 |
| 5   | Cone                     | Steel<br>Teflon (PTFE)         |                      |                |                  |
| 6   | O-ring                   | Cloroprene (Neoprene)          |                      |                |                  |
| 7   | Spindle extension        | Steel                          |                      |                |                  |
| 8   | Packing gland<br>O-rings | Steel<br>Cloroprene (Neoprene) |                      |                |                  |
| 9   | Packing washer           | Aluminium                      |                      |                |                  |
| 10  | Spring loaded seal       | Teflon (PTFE)                  |                      |                |                  |
| 11  | O-ring                   | Cloroprene (Neoprene)          |                      |                |                  |
| 12  | Bolts                    | Stainless steel                | A2-70                | A2-70          | Type 308         |
| 13  | Gasket                   | Fiber, non-asbestos            |                      |                |                  |
| 14  | Spring                   | Steel                          |                      |                |                  |
| 15  | Identification ring      | Stainless steel                |                      |                |                  |
| 16  | Seal cap gasket          | Nylon                          |                      |                |                  |
| 17  | Spindle seal cap         | Aluminium                      |                      |                |                  |

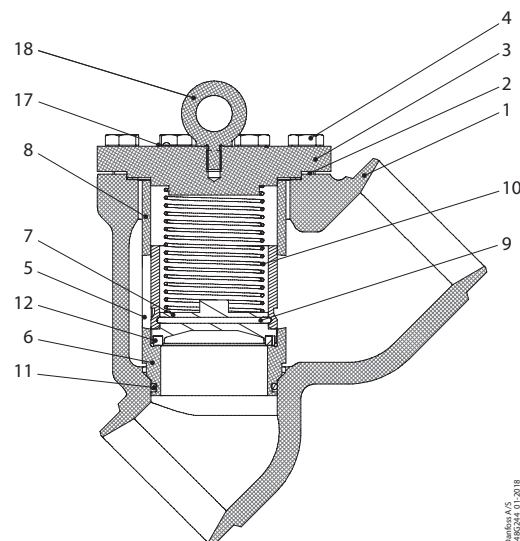
## Material specification



SCA-X 50 - 125



CHV-X 50 - 125



CHV-X 50 - 125

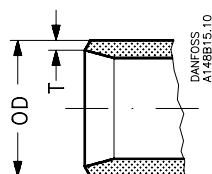
| No. | Part                                    | Material              | DIN/EN                | ISO                 | ASTM              |
|-----|-----------------------------------------|-----------------------|-----------------------|---------------------|-------------------|
| 1   | Housing DN 50-65                        | Steel                 | P285 QH<br>EN 10222-4 |                     | LF2A350           |
|     | Housing DN 80-125                       | Steel                 | G20Mn5 QT<br>SEW 685  |                     | LCC, A352         |
| 2   | Gasket                                  | Fiber, Non-asbestos   |                       |                     |                   |
| 3   | SCA-X: Valve bonnet<br>CHV-X: End cover | Steel                 | P285 QH<br>EN 10222-4 |                     | LF2A350           |
| 4   | Bolts                                   | Stainless steel       | A2-70                 | A2-70               | A-276             |
| 5   | Tube                                    | Steel                 |                       |                     |                   |
| 6   | Seat                                    | Steel                 |                       |                     |                   |
| 7   | Valve plate                             | Steel                 |                       |                     |                   |
| 8   | Guide sleeve                            | Steel                 |                       |                     |                   |
| 9   | Spring ring                             | Steel                 |                       |                     |                   |
| 10  | Spring                                  | Steel                 |                       |                     |                   |
| 11  | O-ring                                  | Cloroprene (Neoprene) |                       |                     |                   |
| 12  | Teflon ring                             | Teflon (PTFE)         |                       |                     |                   |
| 13  | Soft back seal                          | Teflon (PTFE)         |                       |                     |                   |
| 14  | Spindle DN 50-65                        | Stainless steel       | X8CrNiS18-9<br>17440  | Type 17<br>R 683/13 | AISI 303          |
|     | Spindle DN 80-125                       | Stainless steel       | X5CrNi1810<br>17440   | Type 11<br>683/13   | AISI 304<br>A-276 |
| 15  | Packing gland                           | Steel                 | 9Mn28, 1651           | Type 2, R 683/9     | 1213, SAE J403    |
| 16  | Spindle seal cap and gasket             | Aluminium             |                       |                     |                   |
| 17  | Marking label                           | Stainless steel       |                       |                     |                   |
| 18  | Eye bolt DIN 580                        | Steel                 |                       |                     |                   |

# Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

## Connections

| Size<br>mm | Size<br>in. | OD<br>mm | T<br>mm | OD<br>in. | T<br>in. |  |  | k <sub>v</sub><br>Angleway<br>m <sup>3</sup> /h | C <sub>v</sub><br>Angleway<br>USgal/min | K <sub>v</sub><br>Straightway<br>m <sup>3</sup> /h | C <sub>v</sub><br>Straightway<br>USgal/min |
|------------|-------------|----------|---------|-----------|----------|--|--|-------------------------------------------------|-----------------------------------------|----------------------------------------------------|--------------------------------------------|
|------------|-------------|----------|---------|-----------|----------|--|--|-------------------------------------------------|-----------------------------------------|----------------------------------------------------|--------------------------------------------|

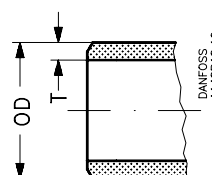
## DIN



### Butt-weld DIN (EN 10220)

|     |    |       |     |       |       |  |  |     |      |     |      |
|-----|----|-------|-----|-------|-------|--|--|-----|------|-----|------|
| 15  | ½  | 21.3  | 2.3 | 0.839 | 0.091 |  |  | 8   | 9.3  | 4   | 4.6  |
| 20  | ¾  | 26.9  | 2.3 | 1.059 | 0.091 |  |  | 10  | 11.6 | 7   | 8.1  |
| 25  | 1  | 33.7  | 2.6 | 1.327 | 0.102 |  |  | 24  | 27.8 | 16  | 18.6 |
| 32  | 1¼ | 42.4  | 2.6 | 1.669 | 0.102 |  |  | 30  | 34.8 | 21  | 24.4 |
| 40  | 1½ | 48.3  | 2.6 | 1.902 | 0.102 |  |  | 30  | 34.8 | 21  | 24.4 |
| 50  | 2  | 60.3  | 2.9 | 2.37  | 0.11  |  |  | 45  | 53   | 28  | 34   |
| 65  | 2½ | 76.1  | 2.9 | 3.00  | 0.11  |  |  | 72  | 85   | 41  | 48   |
| 80  | 3  | 88.9  | 3.2 | 3.50  | 0.13  |  |  | 103 | 129  | 81  | 94   |
| 100 | 4  | 114.3 | 3.6 | 4.50  | 0.14  |  |  | 196 | 232  | 157 | 182  |
| 125 | 5  | 139.7 | 4.0 | 5.50  | 0.16  |  |  | 301 | 356  | 250 | 290  |

## ANSI



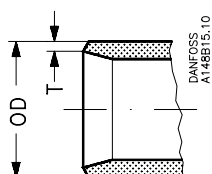
### Butt-weld ANSI (B 36.10 Schedule 80)

|    |    |      |     |       |       |  |  |    |      |    |      |
|----|----|------|-----|-------|-------|--|--|----|------|----|------|
| 15 | ½  | 21.3 | 3.7 | 0.839 | 0.146 |  |  | 8  | 9.3  | 4  | 4.6  |
| 20 | ¾  | 26.9 | 4.0 | 1.059 | 0.158 |  |  | 10 | 11.6 | 7  | 8.1  |
| 25 | 1  | 33.7 | 4.6 | 1.327 | 0.181 |  |  | 24 | 27.8 | 16 | 18.6 |
| 32 | 1¼ | 42.4 | 4.9 | 1.669 | 0.193 |  |  | 30 | 34.8 | 21 | 24.4 |
| 40 | 1½ | 48.3 | 5.1 | 1.902 | 0.201 |  |  | 30 | 34.8 | 21 | 24.4 |

### Butt-weld ANSI (B 36.10 Schedule 40)

|     |    |       |     |      |      |  |  |     |     |     |     |
|-----|----|-------|-----|------|------|--|--|-----|-----|-----|-----|
| 50  | 2  | 60.3  | 3.9 | 2.37 | 0.15 |  |  | 45  | 53  | 28  | 34  |
| 65  | 2½ | 73.0  | 5.2 | 2.87 | 0.20 |  |  | 72  | 85  | 41  | 48  |
| 80  | 3  | 88.9  | 5.5 | 3.50 | 0.22 |  |  | 103 | 129 | 81  | 94  |
| 100 | 4  | 114.3 | 6.0 | 4.50 | 0.24 |  |  | 196 | 232 | 157 | 182 |
| 125 | 5  | 141.3 | 6.6 | 5.56 | 0.26 |  |  | 301 | 356 | 250 | 290 |

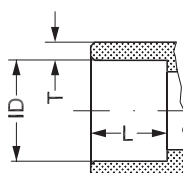
## GOST



### Butt-weld GOST (8734-75 and 8732-78)

|     |    |      |     |       |       |  |  |     |      |     |      |
|-----|----|------|-----|-------|-------|--|--|-----|------|-----|------|
| 15  | ½  | 18   | 2   | 0.709 | 0.079 |  |  | 8   | 9.3  | 4   | 4.6  |
| 20  | ¾  | 25   | 2.5 | 0.984 | 0.098 |  |  | 10  | 11.6 | 7   | 8.1  |
| 25  | 1  | 32   | 3   | 1.260 | 0.118 |  |  | 24  | 28.8 | 16  | 18.6 |
| 32  | 1¼ | 38   | 3   | 1.496 | 0.118 |  |  | 30  | 49.4 | 21  | 24.4 |
| 40  | 1½ | 45   | 3   | 1.772 | 0.118 |  |  | 30  | 52.4 | 21  | 24.4 |
| 50  | 2  | 57   | 3.5 | 2.244 | 0.138 |  |  | 45  | 53   | 28  | 34   |
| 65  | 2½ | 76.1 | 2.9 | 3     | 0.11  |  |  | 72  | 85   | 41  | 48   |
| 80  | 3  | 88.9 | 3.2 | 3.50  | 0.13  |  |  | 103 | 129  | 81  | 94   |
| 100 | 4  | 108  | 4   | 4.252 | 0.157 |  |  | 196 | 232  | 157 | 182  |
| 125 | 5  | 133  | 4   | 5.236 | 0.157 |  |  | 301 | 356  | 250 | 290  |

## SOC



| Size<br>mm | Size<br>in. | ID<br>mm | T<br>mm | ID<br>in. | T<br>in. | L<br>mm | L<br>in. |  |  |  |  |
|------------|-------------|----------|---------|-----------|----------|---------|----------|--|--|--|--|
|------------|-------------|----------|---------|-----------|----------|---------|----------|--|--|--|--|

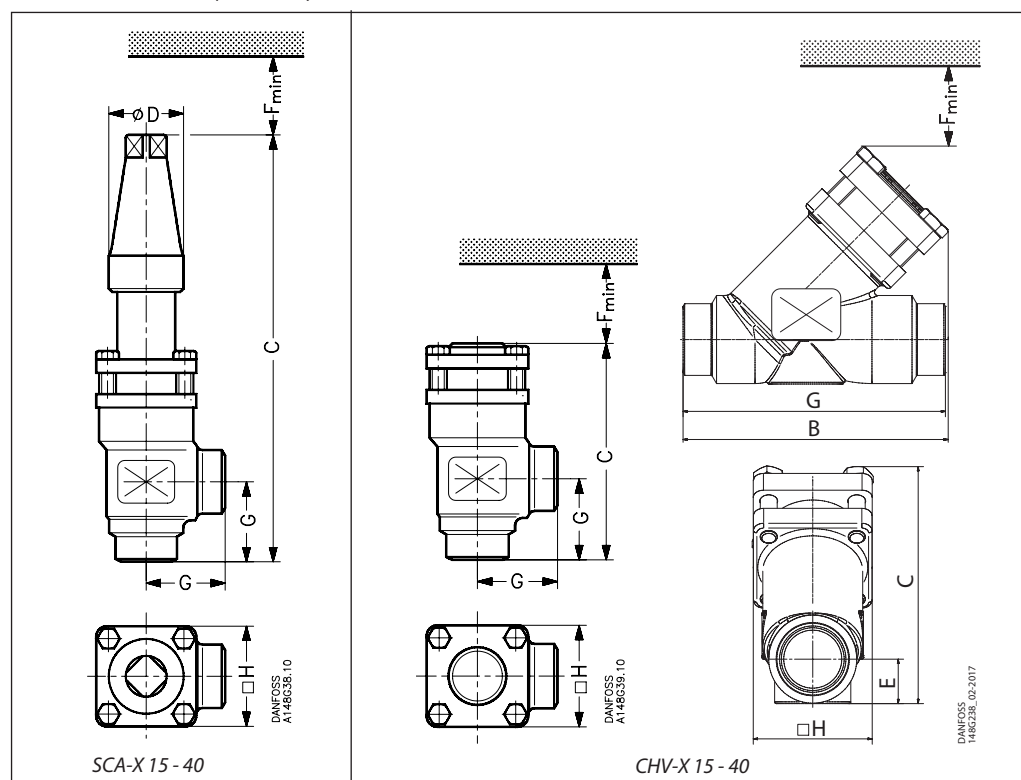
### Socket welding ANSI (B 16.11)

|    |    |      |     |       |       |    |      |  |  |  |  |
|----|----|------|-----|-------|-------|----|------|--|--|--|--|
| 15 | ½  | 21.8 | 6   | 0.858 | 0.235 | 10 | 0.39 |  |  |  |  |
| 20 | ¾  | 27.2 | 4.6 | 1.071 | 0.181 | 13 | 0.51 |  |  |  |  |
| 25 | 1  | 33.9 | 7.2 | 1.335 | 0.284 | 13 | 0.51 |  |  |  |  |
| 32 | 1¼ | 42.7 | 6.1 | 1.743 | 0.240 | 13 | 0.51 |  |  |  |  |
| 40 | 1½ | 48.8 | 6.6 | 1.921 | 0.260 | 13 | 0.51 |  |  |  |  |
| 50 | 2  | 61.2 | 6.2 | 2.41  | 0.24  | 16 | 0.63 |  |  |  |  |

# Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

## Dimensions and weights

### SCA-X/CHV-X 15 - 40 (½- 1½ in.)



| Valve size |  | C |  | G |  | ØD |  | F <sub>min</sub> |  | □H | Weight |
|------------|--|---|--|---|--|----|--|------------------|--|----|--------|
|------------|--|---|--|---|--|----|--|------------------|--|----|--------|

#### SCA-X 15 - 40

| Valve size        |     | C     |  | G    |  | ØD   |  | F <sub>min</sub> |  | □H   | Weight  |
|-------------------|-----|-------|--|------|--|------|--|------------------|--|------|---------|
| SCA-X 15 (½ in.)  | mm  | 212   |  | 45   |  | 38   |  | 60               |  | 60   | 1.6 kg  |
|                   | in. | 8.35  |  | 1.77 |  | 1.50 |  | 2.36             |  | 2.36 | 3.53 lb |
| SCA-X 20 (¾ in.)  | mm  | 212   |  | 45   |  | 38   |  | 60               |  | 60   | 1.6 kg  |
|                   | in. | 8.35  |  | 1.77 |  | 1.50 |  | 2.36             |  | 2.36 | 3.53 lb |
| SCA-X 25 (1 in.)  | mm  | 295   |  | 55   |  | 50   |  | 85               |  | 70   | 3.2 kg  |
|                   | in. | 11.61 |  | 2.17 |  | 1.97 |  | 3.35             |  | 2.76 | 7.05 lb |
| SCA-X 32 (1¼ in.) | mm  | 295   |  | 55   |  | 50   |  | 85               |  | 70   | 3.2 kg  |
|                   | in. | 11.61 |  | 2.17 |  | 1.97 |  | 3.35             |  | 2.76 | 7.05 lb |
| SCA-X 40 (1½ in.) | mm  | 295   |  | 55   |  | 50   |  | 85               |  | 70   | 3.2 kg  |
|                   | in. | 11.61 |  | 2.17 |  | 1.97 |  | 3.35             |  | 2.76 | 7.05 lb |

#### CHV-X 15 - 40 Angleway

| Valve size        |     | C    |  | G    |  | F <sub>min</sub> |  | □H   | Weight  |
|-------------------|-----|------|--|------|--|------------------|--|------|---------|
| CHV-X 15 (½ in.)  | mm  | 103  |  | 45   |  | 60               |  | 60   | 1.2 kg  |
|                   | in. | 4.06 |  | 1.77 |  | 2.36             |  | 2.36 | 2.65 lb |
| CHV-X 20 (¾ in.)  | mm  | 103  |  | 45   |  | 60               |  | 60   | 1.2 kg  |
|                   | in. | 4.06 |  | 1.77 |  | 2.36             |  | 2.36 | 2.65 lb |
| CHV-X 25 (1 in.)  | mm  | 143  |  | 55   |  | 85               |  | 70   | 2.3 kg  |
|                   | in. | 5.63 |  | 2.17 |  | 3.35             |  | 2.76 | 5.07 lb |
| CHV-X 32 (1¼ in.) | mm  | 143  |  | 55   |  | 85               |  | 70   | 2.3 kg  |
|                   | in. | 5.63 |  | 2.17 |  | 3.35             |  | 2.76 | 5.07 lb |
| CHV-X 40 (1½ in.) | mm  | 143  |  | 55   |  | 85               |  | 70   | 2.3 kg  |
|                   | in. | 5.63 |  | 2.17 |  | 3.35             |  | 2.76 | 5.07 lb |

| Valve size |  | C | B | E |  | G |  | F <sub>min</sub> |  | □H | Weight |
|------------|--|---|---|---|--|---|--|------------------|--|----|--------|
|------------|--|---|---|---|--|---|--|------------------|--|----|--------|

#### CHV-X 15 - 40 Straightway

| Valve size        |     | C    | B    | E    |  | G    |  | F <sub>min</sub> |  | □H   | Weight |
|-------------------|-----|------|------|------|--|------|--|------------------|--|------|--------|
| CHV-X 15 (½ in.)  | mm  | 99   | 114  | 19   |  | 120  |  | 60               |  | 60   | 1.3kg  |
|                   | in. | 3.90 | 4.49 | 0.75 |  | 4.72 |  | 2.36             |  | 2.36 | 2.87lb |
| CHV-X 20 (¾ in.)  | mm  | 99   | 114  | 19   |  | 120  |  | 60               |  | 60   | 1.3kg  |
|                   | in. | 3.90 | 4.49 | 0.75 |  | 4.72 |  | 2.36             |  | 2.36 | 2.87lb |
| CHV-X 25 (1 in.)  | mm  | 141  | 157  | 26   |  | 155  |  | 85               |  | 70   | 2.6kg  |
|                   | in. | 5.55 | 6.18 | 1.02 |  | 6.10 |  | 3.35             |  | 2.76 | 5.73lb |
| CHV-X 32 (1¼ in.) | mm  | 141  | 157  | 26   |  | 155  |  | 85               |  | 70   | 2.6kg  |
|                   | in. | 5.55 | 6.18 | 1.02 |  | 6.10 |  | 3.35             |  | 2.76 | 5.73lb |
| CHV-X 40 (1½ in.) | mm  | 141  | 157  | 26   |  | 155  |  | 85               |  | 70   | 2.6kg  |
|                   | in. | 5.55 | 6.18 | 1.02 |  | 6.10 |  | 3.35             |  | 2.76 | 5.73lb |

#### CHV-X 32-40 Straightway, Socket weld

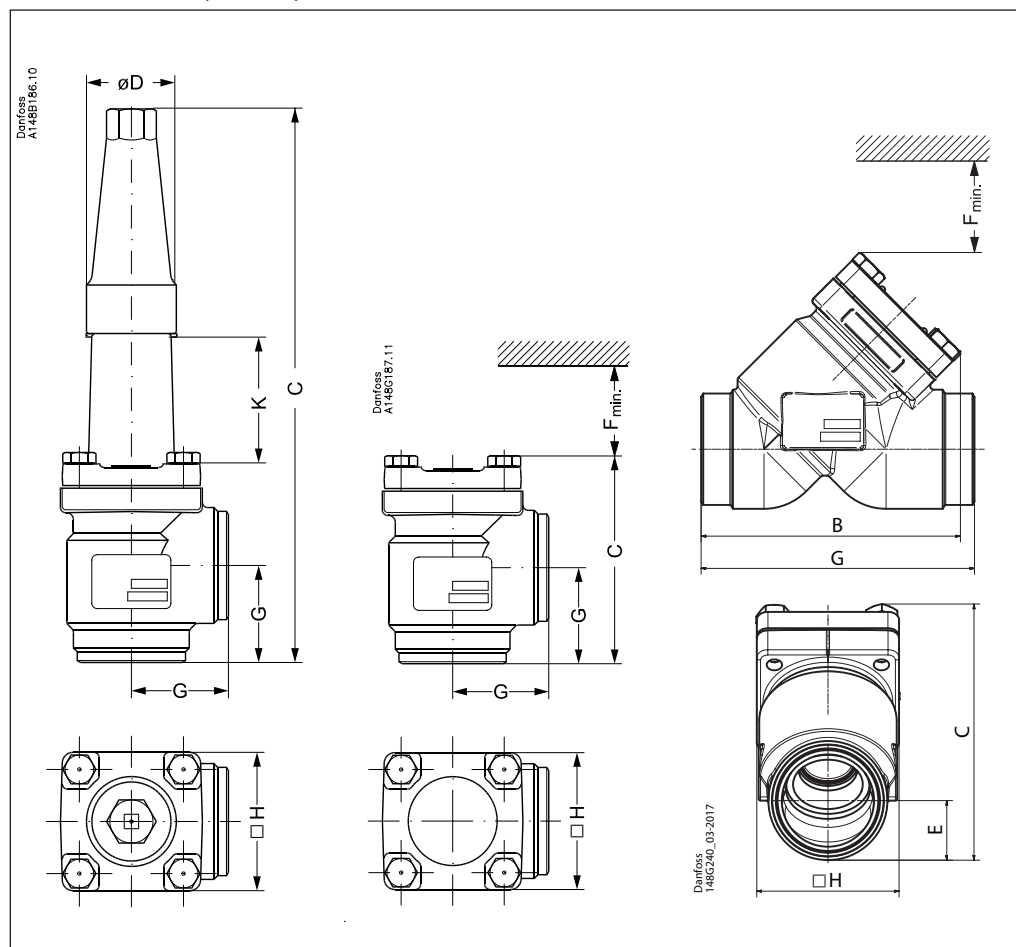
| Valve size                |     | C    | B    | E    |  | G    |  | F <sub>min</sub> |  | □H   | Weight |
|---------------------------|-----|------|------|------|--|------|--|------------------|--|------|--------|
| CHV-X 32-40 (1¼ - 1½ in.) | mm  | 132  | 156  | 26   |  | 155  |  | 85               |  | 70   | 2.8kg  |
|                           | in. | 5.20 | 6.14 | 1.02 |  | 6.10 |  | 3.35             |  | 2.76 | 6.11lb |

Specified weights are approximate values only.

# Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

## Dimensions and weights

SCA-X/CHV-X 50 - 65 (2 - 2½ in.)



| Valve size | K |  |  | C |  |  | G | ØD | □H |  | Weight |
|------------|---|--|--|---|--|--|---|----|----|--|--------|
|------------|---|--|--|---|--|--|---|----|----|--|--------|

### SCA-X

|            |     |      |  |       |  |  |      |      |      |  |          |
|------------|-----|------|--|-------|--|--|------|------|------|--|----------|
| SCA-X 50   | mm  | 70   |  | 315   |  |  | 60   | 50   | 77   |  | 3.8 kg   |
| SCA-X (2)  | in. | 2.76 |  | 12.40 |  |  | 2.36 | 1.97 | 3.03 |  | 8.40 lb  |
| SCA-X 65   | mm  | 70   |  | 335   |  |  | 70   | 50   | 90   |  | 5.5 kg   |
| SCA-X (2½) | in. | 2.76 |  | 13.19 |  |  | 2.76 | 1.97 | 3.54 |  | 12.16 lb |

| Valve size |  |  |  | C |  |  | G | F <sub>min.</sub> | □H |  | Weight |
|------------|--|--|--|---|--|--|---|-------------------|----|--|--------|
|------------|--|--|--|---|--|--|---|-------------------|----|--|--------|

### CHV-X Angleway

|            |     |  |  |      |  |  |      |      |      |  |         |
|------------|-----|--|--|------|--|--|------|------|------|--|---------|
| CHV-X 50   | mm  |  |  | 132  |  |  | 60   | 92   | 77   |  | 3.2 kg  |
| CHV-X (2)  | in. |  |  | 5.20 |  |  | 2.36 | 3.62 | 3.03 |  | 7.10 lb |
| CHV-X 65   | mm  |  |  | 152  |  |  | 70   | 107  | 90   |  | 4.5 kg  |
| CHV-X (2½) | in. |  |  | 5.98 |  |  | 2.76 | 4.21 | 3.54 |  | 9.95 lb |

| Valve size |  |  |  | C | B | E | G | F <sub>min.</sub> | □H |  | Weight |
|------------|--|--|--|---|---|---|---|-------------------|----|--|--------|
|------------|--|--|--|---|---|---|---|-------------------|----|--|--------|

### CHV-X Straightway

|            |     |  |  |      |      |      |      |      |      |  |         |
|------------|-----|--|--|------|------|------|------|------|------|--|---------|
| CHV-X 50   | mm  |  |  | 139  | 140  | 32   | 148  | 92   | 77   |  | 3 kg    |
| CHV-X (2)  | in. |  |  | 5.47 | 5.51 | 1.26 | 5.83 | 3.62 | 3.03 |  | 6.72 lb |
| CHV-X 65   | mm  |  |  | 163  | 164  | 40   | 176  | 107  | 90   |  | 4.3 kg  |
| CHV-X (2½) | in. |  |  | 6.4  | 6.4  | 1.6  | 6.9  | 4.21 | 3.54 |  | 9.44 lb |

### CHV-X Straightway, Socket weld

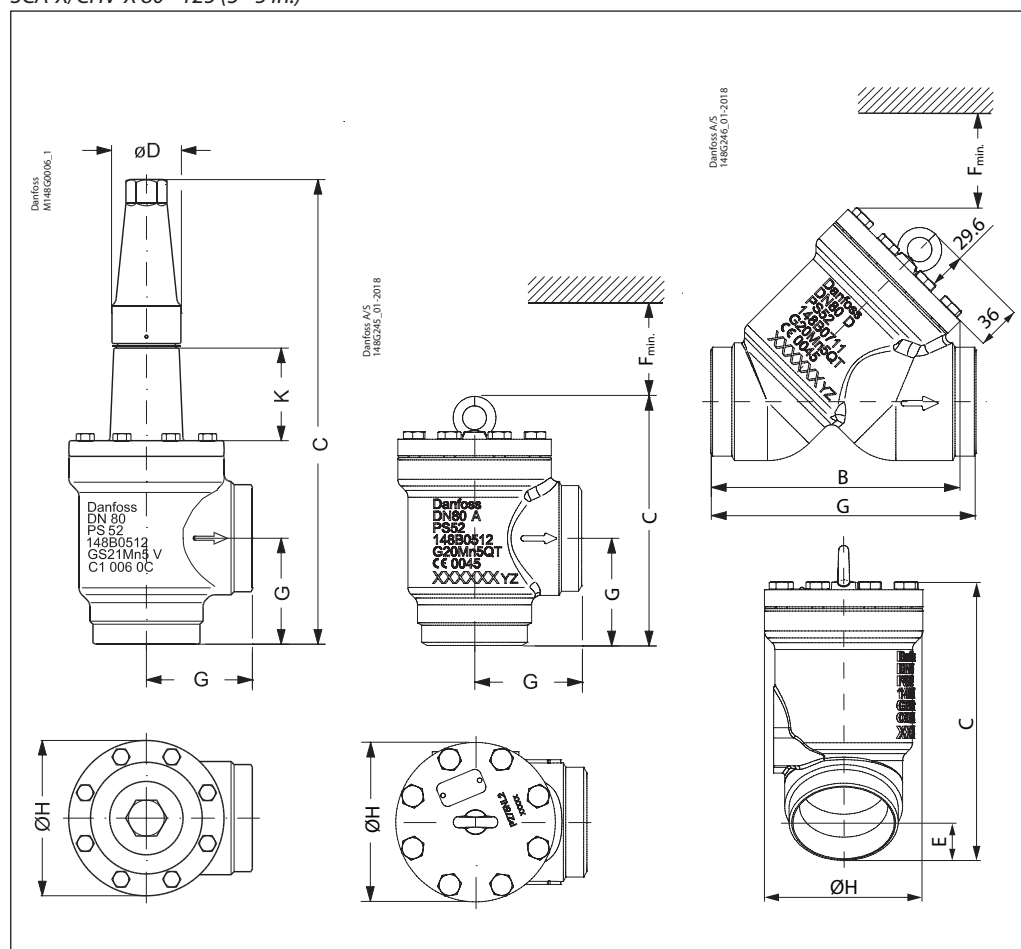
|           |     |  |  |      |      |      |      |      |      |  |         |
|-----------|-----|--|--|------|------|------|------|------|------|--|---------|
| CHV-X 50  | mm  |  |  | 142  | 147  | 37   | 162  | 92   | 77   |  | 3.8 kg  |
| CHV-X (2) | in. |  |  | 5.59 | 5.79 | 1.46 | 6.38 | 3.62 | 3.03 |  | 8.33 lb |

Specified weights are approximate values only.

Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

Dimensions and weights

SCA-X/CHV-X 80 - 125 (3 - 5 in.)



| Valve size | K |  |  | C |  |  | G | ØD |  | ØH | Weight |
|------------|---|--|--|---|--|--|---|----|--|----|--------|
|------------|---|--|--|---|--|--|---|----|--|----|--------|

SCA-X

|           |     |      |  |       |  |  |      |      |  |      |         |
|-----------|-----|------|--|-------|--|--|------|------|--|------|---------|
| SCA-X 80  | mm  | 76   |  | 388   |  |  | 90   | 58   |  | 129  | 9.7 kg  |
| SCA-X (3) | in. | 3.00 |  | 15.28 |  |  | 3.54 | 2.28 |  | 5.08 | 21.4 lb |
| SCA-X 100 | mm  | 90   |  | 437   |  |  | 106  | 58   |  | 156  | 15.3 kg |
| SCA-X (4) | in. | 3.54 |  | 17.20 |  |  | 4.17 | 2.28 |  | 6.14 | 33.7 lb |
| SCA-X 125 | mm  | 90   |  | 533   |  |  | 128  | 74   |  | 193  | 28.1 kg |
| SCA-X (5) | in. | 3.54 |  | 20.98 |  |  | 5.04 | 2.91 |  | 7.60 | 61.9 lb |

| Valve size |  |  |  | C |  |  | G |  | F <sub>min.</sub> | ØH | Weight |
|------------|--|--|--|---|--|--|---|--|-------------------|----|--------|
|------------|--|--|--|---|--|--|---|--|-------------------|----|--------|

CHV-X Angleway

|           |     |  |  |       |  |  |      |  |       |      |          |
|-----------|-----|--|--|-------|--|--|------|--|-------|------|----------|
| CHV-X 80  | mm  |  |  | 218.6 |  |  | 90   |  | 103.4 | 129  | 8.7 kg   |
| CHV-X (3) | in. |  |  | 8.61  |  |  | 3.54 |  | 4.07  | 5.08 | 19.23 lb |
| CHV-X 100 | mm  |  |  | 252.6 |  |  | 106  |  | 133.4 | 156  | 14.3 kg  |
| CHV-X (4) | in. |  |  | 9.94  |  |  | 4.17 |  | 5.25  | 6.14 | 31.60 lb |
| CHV-X 125 | mm  |  |  | 297.6 |  |  | 128  |  | 160.4 | 193  | 25.6 kg  |
| CHV-X (5) | in. |  |  | 11.72 |  |  | 5.04 |  | 6.31  | 7.60 | 56.58 lb |

| Valve size |  |  |  | C | B | E | G |  | F <sub>min.</sub> | ØH | Weight |
|------------|--|--|--|---|---|---|---|--|-------------------|----|--------|
|------------|--|--|--|---|---|---|---|--|-------------------|----|--------|

CHV-X Straightway

|           |     |  |  |       |       |      |       |  |      |      |          |
|-----------|-----|--|--|-------|-------|------|-------|--|------|------|----------|
| CHV-X 80  | mm  |  |  | 206   | 204   | 48   | 216   |  | 133  | 129  | 9.3 kg   |
| CHV-X (3) | in. |  |  | 8.11  | 8.03  | 1.89 | 8.50  |  | 5.24 | 5.08 | 20.4 lb  |
| CHV-X 100 | mm  |  |  | 256   | 248   | 62   | 264   |  | 163  | 156  | 14.6 kg  |
| CHV-X (4) | in. |  |  | 10.08 | 9.76  | 2.44 | 10.39 |  | 6.43 | 6.14 | 32.29 lb |
| CHV-X 125 | mm  |  |  | 314   | 302   | 74   | 322   |  | 190  | 193  | 32.5 kg  |
| CHV-X (5) | in. |  |  | 12.36 | 11.89 | 2.91 | 12.68 |  | 7.48 | 7.60 | 71.65 lb |

Specified weights are approximate values only.

## Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

### Ordering complete valves

#### How to order

The table below is used to identify the valve required.

For further information please contact your local Danfoss Sales Company.

Please note that the type codes only serve to identify the valves, some of which may not form part of the standard product range.

| Valve type                                       | SCA-X<br>CHV-X                                                                                                                   | Check & stop valve<br>Check Valve                                                                                                                                                                                                                     |                                                                                                                                                                |                                                                                                                      |                                                                                                                      |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| (valve size measured on the connection diameter) | <b>15</b><br><b>20</b><br><b>25</b><br><b>32</b><br><b>40</b><br><b>50</b><br><b>65</b><br><b>80</b><br><b>100</b><br><b>125</b> | <b>A</b><br><b>D</b><br><b>G</b><br><b>SOC</b>                                                                                                                                                                                                        | <b>DN 15</b><br><b>DN 20</b><br><b>DN 25</b><br><b>DN 32</b><br><b>DN 40</b><br><b>DN 50</b><br><b>DN 65</b><br><b>DN 80</b><br><b>DN 100</b><br><b>DN 125</b> | <b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b> | <b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b><br><b>x</b> |
| Connections                                      | <b>A</b><br><b>D</b><br><b>G</b><br><b>SOC</b>                                                                                   | Welding branches: ANSI B 31.5 schedule 80 DN 15 - 40 (½ - 1½ in.)<br>Welding branches: ANSI B 31.5 schedule 40 DN 50 - 125 (2 - 5 in.)<br>Welding branches: EN 10220<br>Butt-weld connection: GOST (8734-75 and 8732-78)<br>Socket weld: ANSI B 16.11 |                                                                                                                                                                |                                                                                                                      |                                                                                                                      |
| Valve housing                                    | <b>ANG</b>                                                                                                                       | Angle flow                                                                                                                                                                                                                                            |                                                                                                                                                                |                                                                                                                      |                                                                                                                      |
|                                                  | <b>STR</b>                                                                                                                       | Straight flow                                                                                                                                                                                                                                         |                                                                                                                                                                |                                                                                                                      |                                                                                                                      |

### Important!

Where products need to be certified according to specific certification societies the relevant information should be included at the time of order.

### Angleway

#### SCA-X Butt-weld DIN (EN 10220)

| Size |     | Type            | Code No.        |
|------|-----|-----------------|-----------------|
| mm   | in. |                 |                 |
| 15   | ½   | SCA-X 15 D ANG  | <b>148B5208</b> |
| 20   | ¾   | SCA-X 20 D ANG  | <b>148B5308</b> |
| 25   | 1   | SCA-X 25 D ANG  | <b>148B5408</b> |
| 32   | 1¼  | SCA-X 32 D ANG  | <b>148B5508</b> |
| 40   | 1½  | SCA-X 40 D ANG  | <b>148B5608</b> |
| 50   | 2   | SCA-X 50 D ANG  | <b>148B5702</b> |
| 65   | 2½  | SCA-X 65 D ANG  | <b>148B5803</b> |
| 80   | 3   | SCA-X 80 D ANG  | <b>148B5902</b> |
| 100  | 4   | SCA-X 100 D ANG | <b>148B6002</b> |
| 125  | 5   | SCA-X 125 D ANG | <b>148B6102</b> |

#### SCA-X Butt-weld ANSI (B 36.10 Schedule 80)

| Size |     | Type           | Code No.        |
|------|-----|----------------|-----------------|
| mm   | in. |                |                 |
| 15   | ½   | SCA-X 15 A ANG | <b>148B5209</b> |
| 20   | ¾   | SCA-X 20 A ANG | <b>148B5309</b> |
| 25   | 1   | SCA-X 25 A ANG | <b>148B5409</b> |
| 32   | 1¼  | SCA-X 32 A ANG | <b>148B5509</b> |
| 40   | 1½  | SCA-X 40 A ANG | <b>148B5609</b> |

#### SCA-X Butt-weld ANSI (B 36.10 Schedule 40)

| Size |     | Type            | Code No.        |
|------|-----|-----------------|-----------------|
| mm   | in. |                 |                 |
| 50   | 2   | SCA-X 50 A ANG  | <b>148B5703</b> |
| 65   | 2½  | SCA-X 65 A ANG  | <b>148B5802</b> |
| 80   | 3   | SCA-X 80 A ANG  | <b>148B5903</b> |
| 100  | 4   | SCA-X 100 A ANG | <b>148B6004</b> |
| 125  | 5   | SCA-X 125 A ANG | <b>148B6103</b> |

#### SCA-X Socket welding ANSI (B 16.11)

| Size |     | Type             | Code No.        |
|------|-----|------------------|-----------------|
| mm   | in. |                  |                 |
| 50   | 2   | SCA-X 50 SOC ANG | <b>148B5704</b> |

### Angleway

#### CHV-X Butt-weld DIN (EN 10220)

| Size |     | Type            | Code No.        |
|------|-----|-----------------|-----------------|
| mm   | in. |                 |                 |
| 15   | ½   | CHV-X 15 D ANG  | <b>148B5236</b> |
| 20   | ¾   | CHV-X 20 D ANG  | <b>148B5336</b> |
| 25   | 1   | CHV-X 25 D ANG  | <b>148B5436</b> |
| 32   | 1¼  | CHV-X 32 D ANG  | <b>148B5536</b> |
| 40   | 1½  | CHV-X 40 D ANG  | <b>148B5636</b> |
| 50   | 2   | CHV-X 50 D ANG  | <b>148B5736</b> |
| 65   | 2½  | CHV-X 65 D ANG  | <b>148B5838</b> |
| 80   | 3   | CHV-X 80 D ANG  | <b>148B5936</b> |
| 100  | 4   | CHV-X 100 D ANG | <b>148B6036</b> |
| 125  | 5   | CHV-X 125 D ANG | <b>148B6136</b> |

#### CHV-X Butt-weld ANSI (B 36.10 Schedule 80)

| Size |     | Type           | Code No.        |
|------|-----|----------------|-----------------|
| mm   | in. |                |                 |
| 15   | ½   | CHV-X 15 A ANG | <b>148B5237</b> |
| 20   | ¾   | CHV-X 20 A ANG | <b>148B5337</b> |
| 25   | 1   | CHV-X 25 A ANG | <b>148B5437</b> |
| 32   | 1¼  | CHV-X 32 A ANG | <b>148B5537</b> |
| 40   | 1½  | CHV-X 40 A ANG | <b>148B5637</b> |

#### CHV-X Butt-weld ANSI (B 36.10 Schedule 40)

| Size |     | Type            | Code No.        |
|------|-----|-----------------|-----------------|
| mm   | in. |                 |                 |
| 50   | 2   | CHV-X 50 A ANG  | <b>148B5737</b> |
| 65   | 2½  | CHV-X 65 A ANG  | <b>148B5837</b> |
| 80   | 3   | CHV-X 80 A ANG  | <b>148B5937</b> |
| 100  | 4   | CHV-X 100 A ANG | <b>148B6037</b> |
| 125  | 5   | CHV-X 125 A ANG | <b>148B6137</b> |

#### CHV-X Socket welding ANSI (B 16.11)

| Size |     | Type           | Code No.        |
|------|-----|----------------|-----------------|
| mm   | in. |                |                 |
| 32   | 1¼  | CHV 32 SOC ANG | <b>148B5539</b> |
| 50   | 2   | CHV 50 SOC ANG | <b>148B5740</b> |

ANG = Angleway

## Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

### Ordering complete valves (continued)

#### Straightway

##### CHV-X Butt-weld DIN (EN 10220)

| Size |     | Type            | Code No.        |
|------|-----|-----------------|-----------------|
| mm   | in. |                 |                 |
| 15   | ½   | CHV-X 15 D STR  | <b>148B6581</b> |
| 20   | ¾   | CHV-X 20 D STR  | <b>148B6583</b> |
| 25   | 1   | CHV-X 25 D STR  | <b>148B6585</b> |
| 32   | 1¼  | CHV-X 32 D STR  | <b>148B6587</b> |
| 40   | 1½  | CHV-X 40 D STR  | <b>148B6589</b> |
| 50   | 2   | CHV-X 50 D STR  | <b>148B6591</b> |
| 65   | 2½  | CHV-X 65 D STR  | <b>148B6593</b> |
| 80   | 3   | CHV-X 80 D STR  | <b>148B6595</b> |
| 100  | 4   | CHV-X 100 D STR | <b>148B6597</b> |
| 125  | 5   | CHV-X 125 D STR | <b>148B6599</b> |

##### CHV-X Butt-weld ANSI (B 36.10 Schedule 80)

| Size |     | Type           | Code No.        |
|------|-----|----------------|-----------------|
| mm   | in. |                |                 |
| 15   | ½   | CHV-X 15 A STR | <b>148B6582</b> |
| 20   | ¾   | CHV-X 20 A STR | <b>148B6584</b> |
| 25   | 1   | CHV-X 25 A STR | <b>148B6586</b> |
| 32   | 1¼  | CHV-X 32 A STR | <b>148B6588</b> |
| 40   | 1½  | CHV-X 40 A STR | <b>148B6590</b> |

##### CHV-X Butt-weld ANSI (B 36.10 Schedule 40)

| Size |     | Type            | Code No.        |
|------|-----|-----------------|-----------------|
| mm   | in. |                 |                 |
| 50   | 2   | CHV-X 50 A STR  | <b>148B6592</b> |
| 65   | 2½  | CHV-X 65 A STR  | <b>148B6594</b> |
| 80   | 3   | CHV-X 80 A STR  | <b>148B6596</b> |
| 100  | 4   | CHV-X 100 A STR | <b>148B6598</b> |
| 125  | 5   | CHV-X 125 A STR | <b>148B6600</b> |

##### CHV-X Socket welding ANSI (B 16.11)

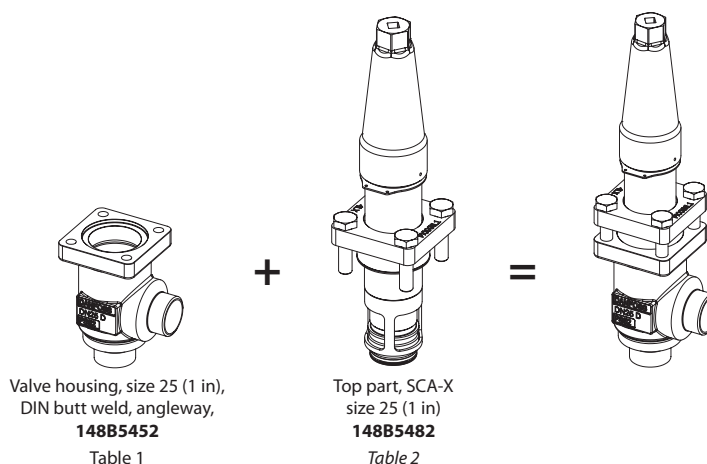
| Size |     | Type             | Code No.        |
|------|-----|------------------|-----------------|
| mm   | in. |                  |                 |
| 15   | ½   | CHV-X 15 SOC STR | <b>148B6601</b> |
| 20   | ¾   | CHV-X 20 SOC STR | <b>148B6602</b> |
| 25   | 1   | CHV-X 25 SOC STR | <b>148B6603</b> |
| 32   | 1¼  | CHV-X 32 SOC STR | <b>148B6604</b> |
| 40   | 1½  | CHV-X 40 SOC STR | <b>148B6605</b> |
| 50   | 2   | CHV-X 50 SOC STR | <b>148B6606</b> |

STR = Straightway

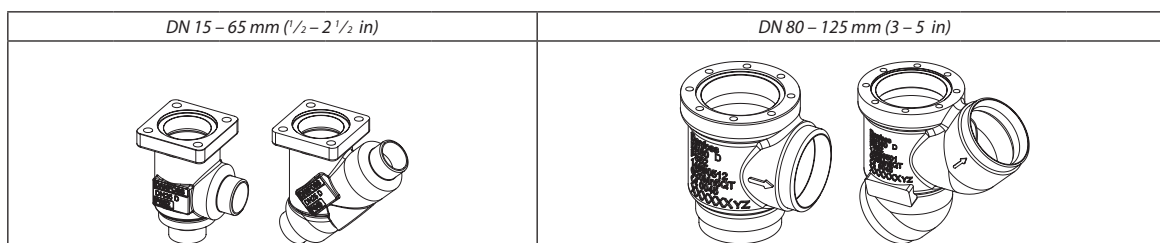
# Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

## Ordering SVA-X from the parts programme

**Example**  
(select from  
table 1 and 2)

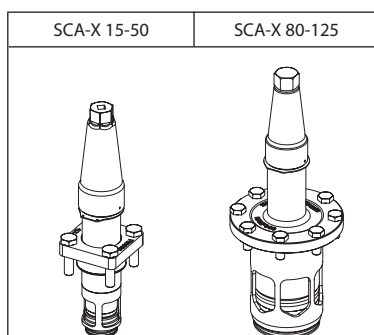


**Table 1**  
SVL valve housings  
w/different  
connections



| Sizes [DN] |       | Valve Housing SVL |          |                |          |                |          |          |          |          |          |     |
|------------|-------|-------------------|----------|----------------|----------|----------------|----------|----------|----------|----------|----------|-----|
| [mm]       | [in]  | DIN-Butt weld     |          | ANSI-Butt weld |          | GOST-Butt-weld |          | SOC      |          | FPT      |          | T   |
|            |       | ANG               | STR      | ANG            | STR      | ANG            | STR      | ANG      | STR      | ANG      | STR      | ANG |
| 15         | 1/2   | 148B5252          | 148B5253 | 148B5254       | 148B5255 | 148B5391       | 148B5392 | 148B5256 | 148B5257 | 148B5258 | 148B5259 |     |
| 20         | 3/4   | 148B5352          | 148B5353 | 148B5354       | 148B5355 | 148B5393       | 148B5394 | 148B5356 | 148B5357 | 148B5358 | 148B5359 |     |
| 25         | 1     | 148B5452          | 148B5453 | 148B5454       | 148B5455 | 148B5498       | 148B5499 | 148B5456 | 148B5457 | 148B5458 | 148B5459 |     |
| 32         | 1 1/4 | 148B5576          | 148B5577 | 148B5578       | 148B5579 | 148B5593       | 148B5594 | 148B5580 | 148B5581 | 148B5582 | 148B5583 |     |
| 40         | 1 1/2 | 148B5652          | 148B5653 | 148B5654       | 148B5655 | 148B5681       | 148B5682 | 148B5656 | 148B5657 |          |          |     |
| 50         | 2     | 148B5741          | 148B5742 | 148B5743       | 148B5744 | 148B5759       | 148B5760 | 148B5745 | 148B5746 |          |          |     |
| 65         | 2 1/2 | 148B5816          | 148B5817 | 148B5818       | 148B5819 | 148B5816       | 148B5817 |          |          |          |          |     |
| 80         | 3     | 148B5912          | 148B5913 | 148B5914       | 148B5915 | 148B5912       | 148B5913 |          |          |          |          |     |
| 100        | 4     | 148B6014          | 148B6015 | 148B6016       | 148B6017 | 148B6033       | 148B6034 |          |          |          |          |     |
| 125        | 5     | 148B6112          | 148B6113 | 148B6114       | 148B6115 | 148B6133       | 148B6134 |          |          |          |          |     |

**Table 2**  
SCA-X complete top part  
including gaskets and  
bolts



| Sizes [DN] |       | Complete top part |
|------------|-------|-------------------|
| [mm]       | [in]  | SCA-X             |
| 15         | 1/2   | 148B5282          |
| 20         | 3/4   |                   |
| 25         | 1     |                   |
| 32         | 1 1/4 |                   |
| 40         | 1 1/2 | 148B5482          |
| 50         | 2     |                   |
| 65         | 2 1/2 | 148B5825          |
| 80         | 3     | 148B5918          |
| 100        | 4     | 148B6019          |
| 125        | 5     | 148B6118          |

Replacement kit (O-ring replacement) for R717 Ammonia Heat Pump\* and Propylene applications (including ID tag)

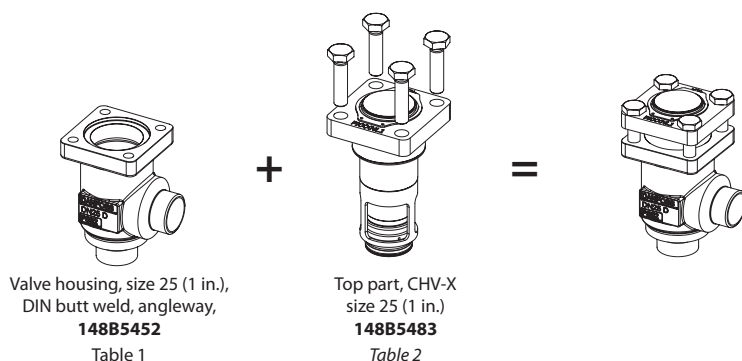
| Size (DN) |       | O-ring kit for |                 |
|-----------|-------|----------------|-----------------|
| mm        | in.   | R717 Heat pump | R1270 Propylene |
| 15        | 1/2   | 148B6070       | 148B6077        |
| 20        | 3/4   |                |                 |
| 25        | 1     | 148B6071       | 148B6078        |
| 32        | 1 1/4 |                |                 |
| 40        | 1 1/2 | 148B6072       | 148B6079        |
| 50        | 2     |                |                 |
| 65        | 2 1/2 | 148B6073       | 148B6080        |
| 80        | 3     | 148B6074       | 148B6081        |
| 100       | 4     | 148B6075       | 148B6082        |
| 125       | 5     | 148B6076       | 148B6083        |

\* Replacement kits for R717 Ammonia Heat Pump is applicable for continuous operating temperature between +100°C to 150°C (212°F to 302°F)

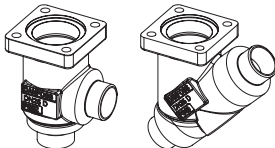
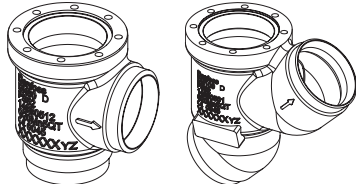
# Check & stop valve, type SCA-X, 52 bar (754 psi) - Check valve, type CHV-X, 52 bar (754 psi)

## Ordering CHV-X from the parts programme

**Example**  
(select from  
table 1 and 2)



**Table 1**  
SVL valve housings  
w/different  
connections

| Table 1<br>SVL valve housings<br>w/different<br>connections |     | DN 15-65 mm (½ - 2½ in.)                                                           |          |                |          |                |          | DN 80-125 mm (3 - 5 in.)                                                            |          |          |          |     |  |
|-------------------------------------------------------------|-----|------------------------------------------------------------------------------------|----------|----------------|----------|----------------|----------|-------------------------------------------------------------------------------------|----------|----------|----------|-----|--|
|                                                             |     |  |          |                |          |                |          |  |          |          |          |     |  |
| Sizes [DN]                                                  |     | Valve Housing SVL                                                                  |          |                |          |                |          |                                                                                     |          |          |          |     |  |
|                                                             |     | DIN-Butt weld                                                                      |          | ANSI-Butt weld |          | GOST-Butt-weld |          | SOC                                                                                 |          | FPT      |          | T   |  |
| mm                                                          | in. | ANG                                                                                | STR      | ANG            | STR      | ANG            | STR      | ANG                                                                                 | STR      | ANG      | STR      | ANG |  |
| 15                                                          | ½   | 148B5252                                                                           | 148B5253 | 148B5254       | 148B5255 | 148B5391       | 148B5392 | 148B5256                                                                            | 148B5257 | 148B5258 | 148B5259 |     |  |
| 20                                                          | ¾   | 148B5352                                                                           | 148B5353 | 148B5354       | 148B5355 | 148B5393       | 148B5394 | 148B5356                                                                            | 148B5357 | 148B5358 | 148B5359 |     |  |
| 25                                                          | 1   | 148B5452                                                                           | 148B5453 | 148B5454       | 148B5455 | 148B5498       | 148B5499 | 148B5456                                                                            | 148B5457 | 148B5458 | 148B5459 |     |  |
| 32                                                          | 1¼  | 148B5576                                                                           | 148B5577 | 148B5578       | 148B5579 | 148B5593       | 148B5594 | 148B5580                                                                            | 148B5581 | 148B5582 | 148B5583 |     |  |
| 40                                                          | 1½  | 148B5652                                                                           | 148B5653 | 148B5654       | 148B5655 | 148B5681       | 148B5682 | 148B5656                                                                            | 148B5657 |          |          |     |  |
| 50                                                          | 2   | 148B5741                                                                           | 148B5742 | 148B5743       | 148B5744 | 148B5759       | 148B5760 | 148B5745                                                                            | 148B5746 |          |          |     |  |
| 65                                                          | 2½  | 148B5816                                                                           | 148B5817 | 148B5818       | 148B5819 | 148B5816       | 148B5817 |                                                                                     |          |          |          |     |  |
| 80                                                          | 3   | 148B5912                                                                           | 148B5913 | 148B5914       | 148B5915 | 148B5912       | 148B5913 |                                                                                     |          |          |          |     |  |
| 100                                                         | 4   | 148B6014                                                                           | 148B6015 | 148B6016       | 148B6017 | 148B6033       | 148B6034 |                                                                                     |          |          |          |     |  |
| 125                                                         | 5   | 148B6112                                                                           | 148B6113 | 148B6114       | 148B6115 | 148B6133       | 148B6134 |                                                                                     |          |          |          |     |  |

**Table 2**  
CHV-X complete top part  
including gaskets and  
bolts

|            |     | CHV-X 15-50       | CHV-X 80-125 |
|------------|-----|-------------------|--------------|
|            |     |                   |              |
| Sizes [DN] |     | Complete top part |              |
| mm         | in. | CHV-X             |              |
| 15         | ½   | 148B5283          |              |
| 20         | ¾   |                   |              |
| 25         | 1   |                   |              |
| 32         | 1¼  | 148B5483          |              |
| 40         | 1½  |                   |              |
| 50         | 2   |                   |              |
| 65         | 2½  | 148B5747          |              |
| 80         | 3   | 148B5827          |              |
| 100        | 4   | 148B5919          |              |
| 125        | 5   | 148B6022          |              |
|            |     | 148B6119          |              |

Replacement kit (O-ring replacement) for R717 Ammonia Heat Pump\* and Propylene applications (including ID tag)

| Size (DN) |     | O-ring kit for |                 |
|-----------|-----|----------------|-----------------|
| mm        | in. | R717 Heat pump | R1270 Propylene |
| 15        | ½   | 148B6070       | 148B6077        |
| 20        | ¾   |                |                 |
| 25        | 1   |                |                 |
| 32        | 1¼  | 148B6071       | 148B6078        |
| 40        | 1½  |                |                 |
| 50        | 2   | 148B6072       | 148B6079        |
| 65        | 2½  | 148B6073       | 148B6080        |
| 80        | 3   | 148B6074       | 148B6081        |
| 100       | 4   | 148B6075       | 148B6082        |
| 125       | 5   | 148B6076       | 148B6083        |

\* Replacement kits for R717 Ammonia Heat Pump is applicable for continuous operating temperature between +100°C to 150°C (212°F to 302°F)

# Check & stop valve, SCA-X, 65 bar (943 psi) Check valve, CHV-X, 65 bar (943 psi)

## Contents

|                                 | Page |
|---------------------------------|------|
| Features .....                  | 21   |
| Technical data .....            | 22   |
| Design .....                    | 22   |
| Computation and selection ..... | 23   |
| Material specification .....    | 25   |
| Application .....               | 27   |
| Dimensions and weights .....    | 28   |
| Connections .....               | 31   |
| Ordering .....                  | 31   |



## Check & stop valve, SCA-X, 65 bar (943 psi) Check valve, CHV-X, 65 bar (943 psi)



SCA-X are check valves with a built-in stop valve function. CHV-X are check valves only. SCA-X/CHV-X are available in angleway and straightway versions.

The valves are designed to open at very low differential pressures, allow favourable flow conditions and are easy to disassemble for inspection and service.

The SCA-X is equipped with vented cap and has internal backseating enabling the spindle seal to be replaced whilst the valve still under pressure.

Laser cut V-ports provide excellent opening characteristics (SCA-X/CHV-X 50-125).

The valve cone has a built-in flexibility to ensure a precise and tight closing towards the valve seat.

A well balanced dampening effect between the piston and the cylinder gives an optimal protection during low loads and against pulsations.

### Features

- Modular Concept:
  - Each valve housing is available with DIN and ANSI butt weld connection and in several different sizes.
  - Possible to convert SCA-X or CHV-X to any other product in the Flexline™ SVL family (regulating valve, shut-off valve or strainer) just by replacing the complete top part.
- Fast and easy valve overhaul service. It is easy to replace the top part and no welding is needed.
- Designed to open at a very low differential pressure of 0.04 bar (0.58 psig).
- Designed with a built-in damping chamber preventing valve flutter in case of low refrigerant velocity and/or low density.
- Each valve is clearly marked with type, size and performance range.  
At replacement of the O-ring for special application, an additional ID ring is fixed to the valve.
- Easy to disassemble for inspection and service.
- Internal backseating enables replacement of the spindle seal whilst the valve is active, i.e. under pressure.
- Optimal flow characteristics ensuring quick opening to the fully open position.
- Protection against pulsation by built-in damping facility.
- Housing and bonnet material is low temperature steel according to requirements of the Pressure Equipment Directive and other international classification authorities.
- Equipped with 42 CrMo5 bolts to withstand high pressure.
- Classification: DNV, CRN, BV, EAC etc.  
To get an updated list of certification on the products please contact your local Danfoss Sales Company.
- Service kits with replacement O-rings for R717 Heat Pump and R1270 Propylene include separate ID-ring for ID of application.

## Check & stop valve, type SCA-X, 65 bar (943 psi) - Check valve, type CHV-X, 65 bar (943 psi)

### Technical data

- **Refrigerants**  
Applicable to HCFC, HFC, R717 (Ammonia), R744 (CO<sub>2</sub>) and flammable refrigerants.  
For further information please see the installation guide for SCA-X/CHV-X.
- **Temperature range**  
-60/+150°C (-76/+302°F).
- **Max. working pressure**  
65 bar (943 psig)  
*With O-ring replaced (Service kit):*  
Heat pump configuration: R717 - 65 bar (943 psi) @ +100°C to +150°C (+212°F to +302°F) continuous.  
Propylene configuration: R1270 - 65 bar (943 psi) @ -60°C to 150°C (-76°F to 302°F)

### Design

#### Housing

The housing is made from special, cold resistant steel.

#### Valve cone

Valve cone with built in metallic stop - prevents damage to teflon ring in case of overtightening.

Teflon ring made of reinforced teflon

#### Damping chamber

The chamber is filled with refrigerants (gas or liquid), which provides a damping effect when the valve opens and closes.

#### Spindle (SCA-X)

Made of polished stainless steel, which is ideal for O-ring sealing.

#### Packing Gland (SCA-X)

The "full temperature range" packing gland is the standard for the entire SVL platform.

This ensures perfect tightness throughout the whole temperature range:  
-60/+150°C (-76/+302°F).

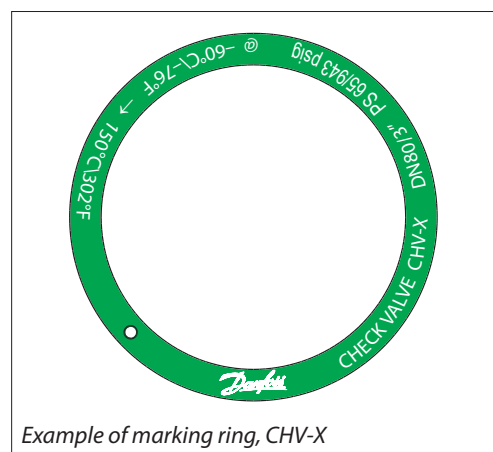
#### Installation

The valve must be mounted vertically with the cone downwards.

The valve is designed to resist very high internal pressure. However, the piping system in general should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion.

For further information refer to installation guide for SCA-X/CHV-X.

If cold refrigeration oil having low viscosity enters and settles in the damping chamber, problems with the check valve may arise. Consequently, it may be necessary to modify the valve for more viscous liquids by enlarging the hole to the damping chamber.

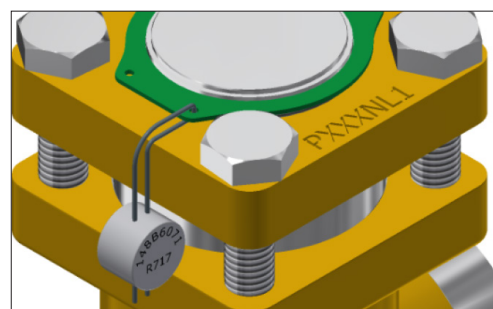


Example of marking ring, CHV-X

#### ID ring for special application

After converting a SCA or CHV valve for Heat Pump/Propylene applications (replacing O-ring) the color marked ID tag included in the service kit must be fixed to the valve as shown in figure to the right.

The ID tag indicates the special application and identifies the installed O-ring.



Check & stop valve, type SCA-X, 65 bar (943 psi) - Check valve, type CHV-X, 65 bar (943 psi)



Pressure Equipment Directive (PED)

SVL valves are approved according to the European standard specified in the Pressure Equipment Directive and are CE marked.

For further details / restrictions - see Installation guide.

| SVL                   |                        |                         |                          |
|-----------------------|------------------------|-------------------------|--------------------------|
| <b>Nominal bore</b>   | DN ≤ 25 mm (1 in.)     | DN32-80 mm (1¼ - 3 in.) | DN100 - 200 mm (4-8 in.) |
| <b>Classified for</b> | Fluid group I          |                         |                          |
| <b>Category</b>       | Article 3, paragraph 3 | II                      | III                      |

Computation and selection

Introduction

When dimensioning SCA-X/CHV-X, it is important to select a valve that is best suited to all operating conditions. Therefore, it is necessary to consider both the nominal and part load working conditions.

The SCA-X/CHV-X valve can be calculated in two ways:

- Using the tables below.
- Using Coolselector™

Example

SI-Units

Assumed working conditions:  
Maximum flow  $\dot{V} = 1000 \text{ m}^3/\text{h}$   
Density  $\rho = 3.0 \text{ kg/m}^3$   
Minimum part load = 33%

Used expressions:

Recommended velocity -  $C_{\text{rec}}$  [m/s]  
Minimum recommended velocity -  $C_{\text{min, rec}}$  [m/s]  
Maximum velocity -  $C_{\text{max}}$  [m/s]  
Part load velocity -  $C_{\text{part}}$  [m/s]

We know the density  $\rho \approx 3.0 \text{ kg/m}^3$ , consequently  $C_{\text{rec}}$  as well as  $C_{\text{min, rec}}$  can be found in the figure below (standard valve).

$C_{\text{rec}} \approx 14 \text{ m/s}$   
 $C_{\text{min, rec}} \approx 3 \text{ m/s}$

US-Units

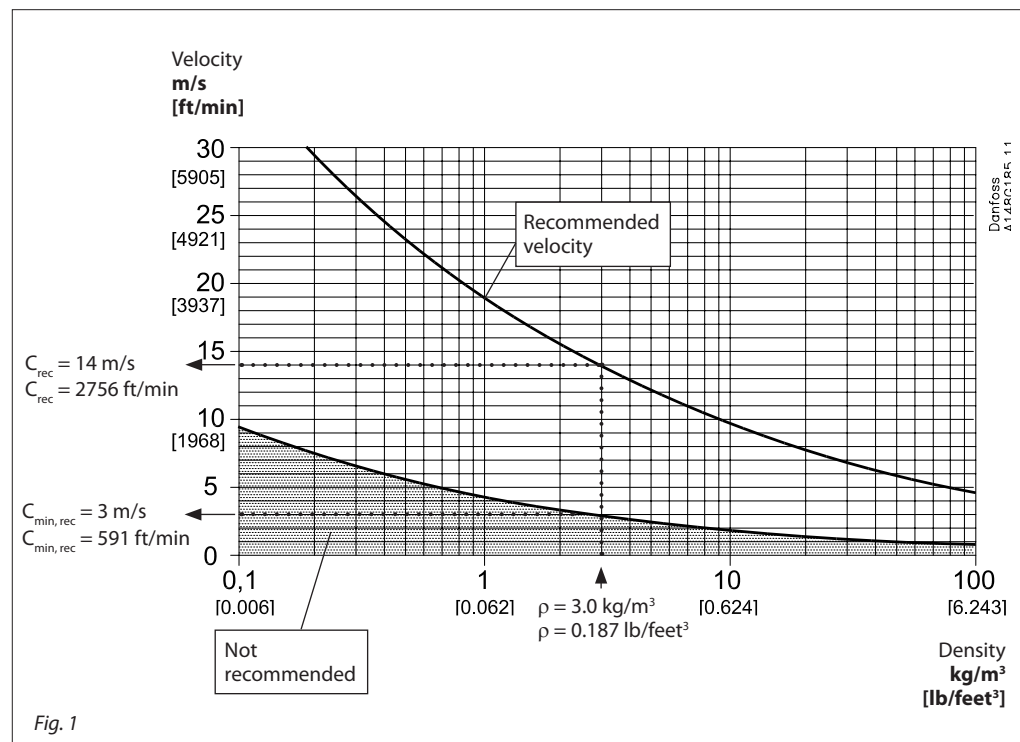
Assumed working conditions:  
Maximum flow  $\dot{V} = 1160 \text{ gpm}$   
Density  $\rho = 0.187 \text{ lb/ft}^3$   
Minimum part load = 33%

Used expressions:

Recommended velocity -  $C_{\text{rec}}$  [ft/min]  
Minimum recommended velocity -  $C_{\text{min, rec}}$  [ft/min]  
Maximum velocity -  $C_{\text{max}}$  [ft/min]  
Part load velocity -  $C_{\text{part}}$  [ft/min]

We know the density  $\rho \approx 0.187 \text{ lb/ft}^3$ , consequently  $C_{\text{rec}}$  as well as  $C_{\text{min, rec}}$  can be found in the figure (standard valve).

$C_{\text{rec}} \approx 2756 \text{ ft/min}$   
 $C_{\text{min, rec}} \approx 591 \text{ ft/min}$



Selection example continued on following page.

Check & stop valve, type SCA-X, 65 bar (943 psi) - Check valve, type CHV-X, 65 bar (943 psi)

**Computation and selection**  
(continued)

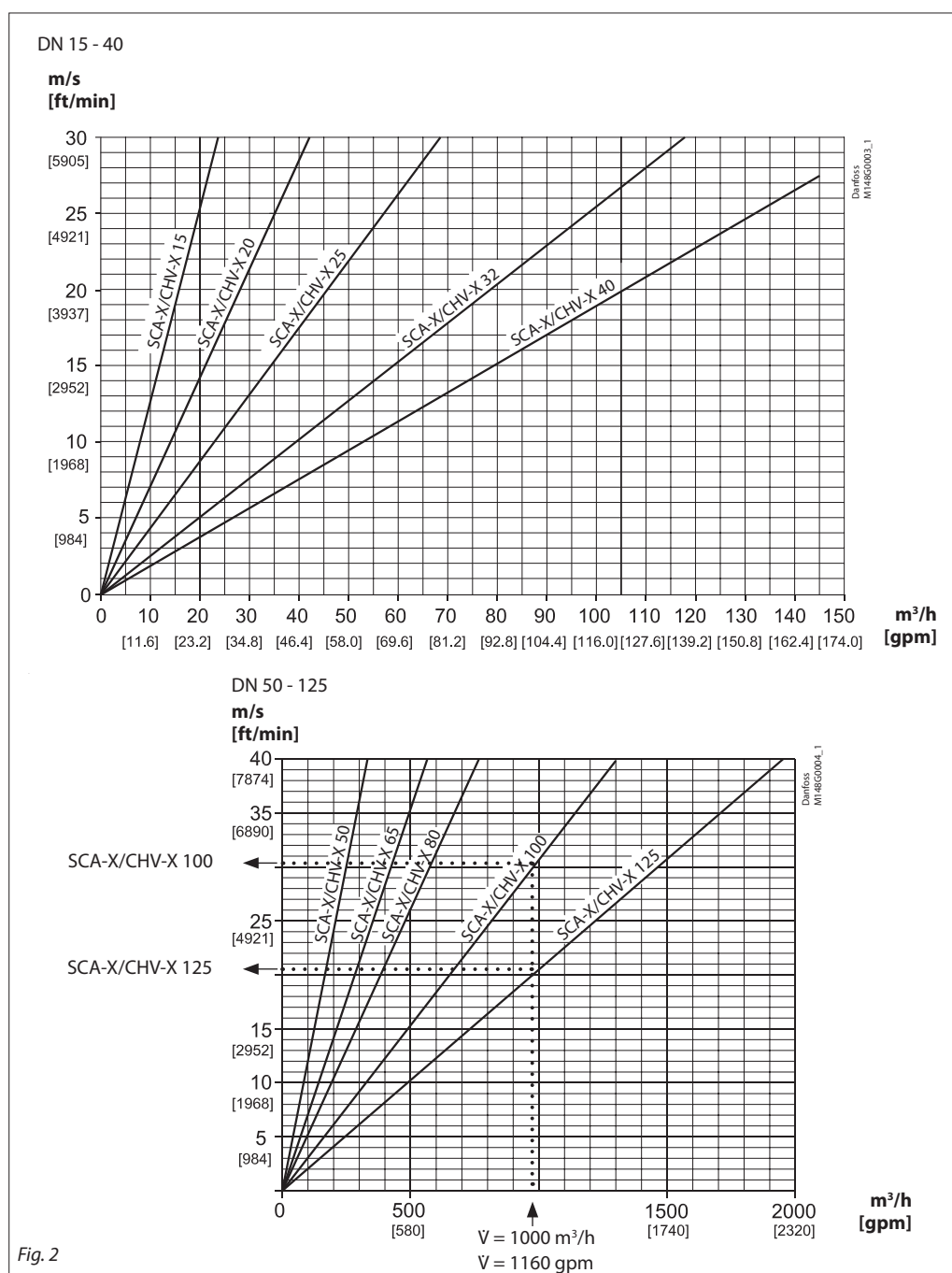
Knowing that  $\dot{V} = 1000 \text{ m}^3/\text{h}$  (1160 gpm) fig. 2 gives the following choices:

For SCA-X/CHV-X in size DN 100 the maximum velocity  $C_{\max} \approx 31 \text{ m/s}$  (6100 ft/min)  
For SCA-X/CHV-X in size DN 125 the maximum velocity  $C_{\max} \approx 20 \text{ m/s}$  (3900 ft/min)

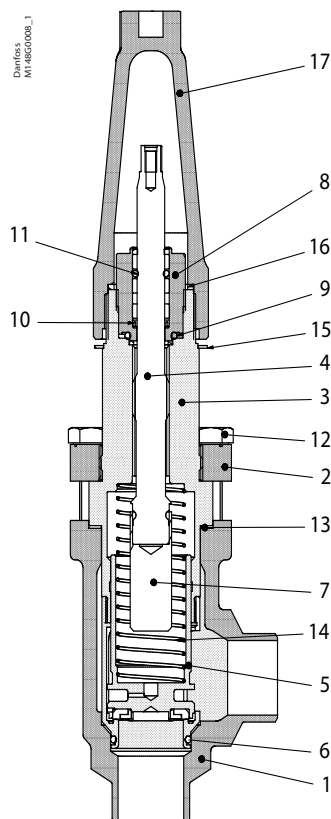
In conclusion SCA-X in size DN 125 is selected because  $C_{\max} \approx 20 \text{ m/s}$  (3900 ft/min) comes nearest to the recommended velocity  $C_{\text{rec}} \approx 14 \text{ m/s}$  (2756 ft/min) and at the same time part load conditions fulfil the requirements, as described:

If the valve in question (for instance under part load conditions) provides a velocity less than  $C_{\min, \text{rec}}$  the valve might start hammering and become noisy. As a result the valve may wear prematurely.

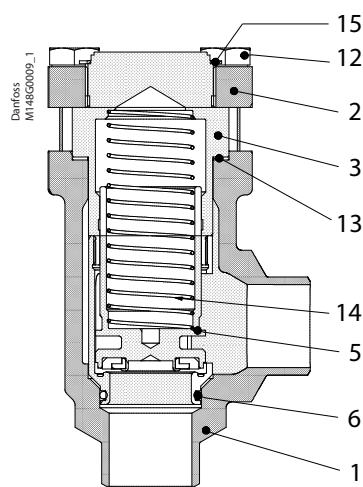
We know that  $C_{\max} \approx 20 \text{ m/s}$  (3900 ft/min) and that minimum part load is 33%. It follows that  $C_{\text{part}} \approx 6.5 \text{ m/s}$  (1290 ft/min). Thus,  $C_{\text{part}}$  (6.5 m/s) >  $C_{\min, \text{rec}}$  (3.0 m/s) and the selected SCA-X model DN125 is the perfect choice.



## Material specification



SCA-X 15 - 40

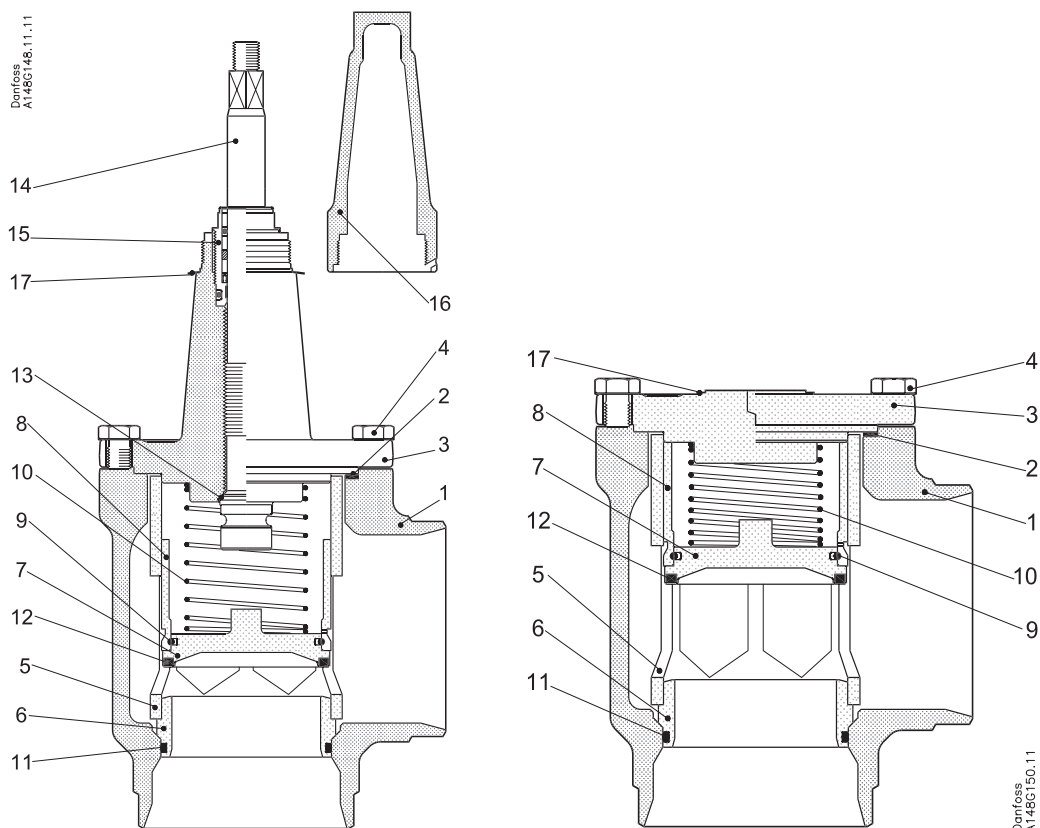


CHV-X 15 - 40

| No. | Part                     | Material                                 | DIN/EN                                  | ISO               | ASTM                   |
|-----|--------------------------|------------------------------------------|-----------------------------------------|-------------------|------------------------|
| 1   | Housing                  | Steel                                    | G20Mn5QT, 10213-3<br>P285QH+QT, 10222-4 |                   | LCC, A352<br>LF2, A350 |
| 2   | Bonnet, Flange           | Steel                                    | P275NL1<br>EN10028-3                    |                   | LF2, A350              |
| 3   | Bonnet, Insert           | Steel                                    | 11SMn30<br>10087                        | Type 2<br>R 683/9 | AISI 1213              |
| 4   | Spindle                  | Stainless steel                          | X8CrNiS18-9,<br>EN 10088-3              | Type 17<br>683/13 | AISI 303               |
| 5   | Cone                     | Steel<br>Teflon (PTFE)                   |                                         |                   |                        |
| 6   | O-ring                   | Cloroprene (Neoprene)*                   |                                         |                   |                        |
| 7   | Spindle extension        | Steel                                    |                                         |                   |                        |
| 8   | Packing gland<br>O-rings | Stainless steel<br>Cloroprene (Neoprene) | X8CrNiS18-9<br>10088                    | Type 17<br>683/13 | AISI 303               |
| 9   | Packing washer           | Aluminium                                |                                         |                   |                        |
| 10  | Spring loaded seal       | Teflon (PTFE)                            |                                         |                   |                        |
| 11  | O-ring                   | Cloroprene (Neoprene)                    |                                         |                   |                        |
| 12  | Bolts                    | High temperature steel                   | 42CrMo5<br>10269                        |                   | A193                   |
| 13  | Gasket                   | Fiber, non-asbestos                      |                                         |                   |                        |
| 14  | Spring                   | Steel                                    |                                         |                   |                        |
| 15  | Identification ring      | Stainless steel                          |                                         |                   |                        |
| 16  | Seal cap gasket          | Nylon                                    |                                         |                   |                        |
| 17  | Spindle seal cap         | Aluminium                                |                                         |                   |                        |

\*To be replaced in R717 Heat Pump and R1270 Propylene applications.

# Material specification



SCA-X 50 - 125

CHV-X 50 - 125

| No. | Part                                    | Material               | DIN/EN                                       | ISO                 | ASTM                   |
|-----|-----------------------------------------|------------------------|----------------------------------------------|---------------------|------------------------|
| 1   | Housing DN 50-65                        | Steel                  | G20Mn5QT, 10213-3<br>P285QH+QT, 10222-4      |                     | LCC, A352<br>LF2, A350 |
|     | Housing DN 80-125                       | Steel                  | G20Mn5 QT<br>SEW 685                         |                     | LCC, A352              |
| 2   | Gasket                                  | Fiber, Non-asbestos    |                                              |                     |                        |
| 3   | SCA-X: Valve bonnet<br>CHV-X: End cover | Steel                  | P285 QH EN 10222-4<br>P275NL1 or 2 EN10028-3 |                     | LF2, A350<br>A, A662   |
| 4   | Bolts                                   | High temperature steel | 42CrMo5<br>10269                             |                     | A193                   |
| 5   | Tube                                    | Steel                  |                                              |                     |                        |
| 6   | Seat                                    | Steel                  |                                              |                     |                        |
| 7   | Valve plate                             | Steel                  |                                              |                     |                        |
| 8   | Guide sleeve                            | Steel                  |                                              |                     |                        |
| 9   | Spring ring                             | Steel                  |                                              |                     |                        |
| 10  | Spring                                  | Steel                  |                                              |                     |                        |
| 11  | O-ring                                  | Cloroprene (Neoprene)* |                                              |                     |                        |
| 12  | Teflon ring                             | Teflon (PTFE)          |                                              |                     |                        |
| 13  | Soft back seal                          | Teflon (PTFE)          |                                              |                     |                        |
| 14  | Spindle DN 50-65                        | Stainless steel        | X8CrNiS18-9<br>17440                         | Type 17<br>R 683/13 | AISI 303               |
|     | Spindle DN 80-125                       | Stainless steel        | X5CrNi1810<br>17440                          | Type 11<br>683/13   | AISI 304<br>A-276      |
| 15  | Packing gland                           | Stainless steel        | X8CrNiS18-9, EN 10088-3,                     | Type 17<br>R 683/13 | AISI 303               |
| 16  | Spindle seal cap and gasket             | Aluminium              |                                              |                     |                        |
| 17  | Marking label                           | Stainless steel        |                                              |                     |                        |

\*To be replaced in R717 Heat Pump and R1270 Propylene applications.

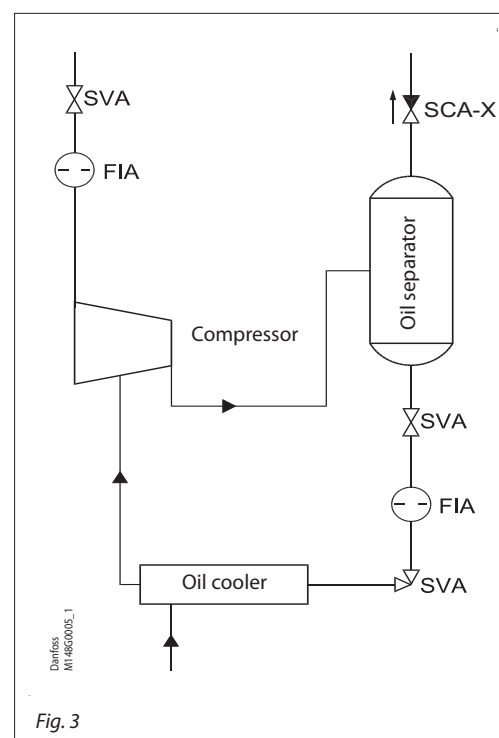
## Application

Figure 3 shows the check & stop valve SCA-X in the discharge line of a screw compressor unit. The SCA-X valve in the discharge line prevents "back condensation" in the oil separator as well as pressure equalising through the compressor.

Compared to an ordinary stop and check valve arrangement the combined stop/check valve solution, as shown, is easier to install and has lower flow resistance.

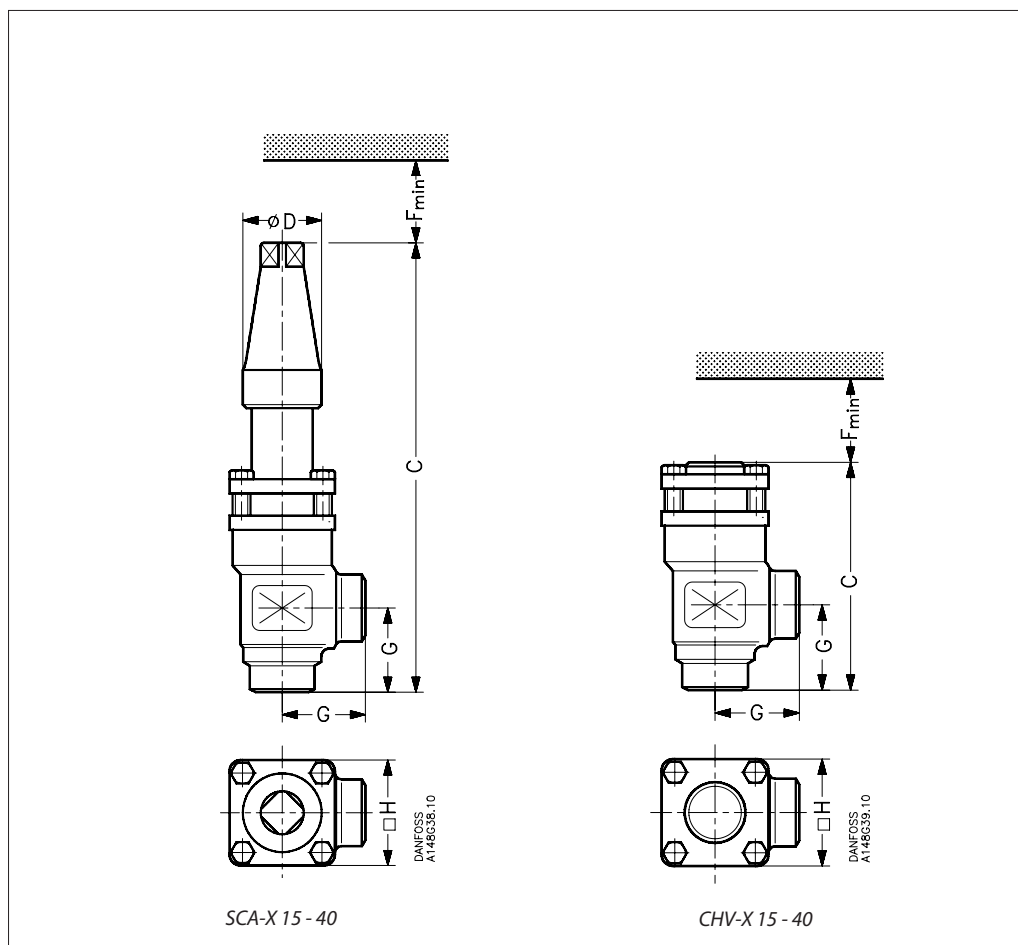
Installation of the SCA-X/CHV-X in the economizer line is **not** recommended.

For horizontal installation of the function module; please contact Danfoss.



## Dimensions and weights

SCA-X/CHV-X 15 - 40 (½- 1½ in.)



| Valve size |  | C |  | G |  | ØD |  | F <sub>min</sub> |  | □H | Weight |
|------------|--|---|--|---|--|----|--|------------------|--|----|--------|
|------------|--|---|--|---|--|----|--|------------------|--|----|--------|

### SCA-X 15 - 40

|                   |           |              |  |            |  |            |  |            |  |            |                   |
|-------------------|-----------|--------------|--|------------|--|------------|--|------------|--|------------|-------------------|
| SCA-X 15 (½ in.)  | mm<br>in. | 212<br>8.35  |  | 45<br>1.77 |  | 38<br>1.50 |  | 60<br>2.36 |  | 60<br>2.36 | 1.6 kg<br>3.53 lb |
| SCA-X 20 (¾ in.)  | mm<br>in. | 212<br>8.35  |  | 45<br>1.77 |  | 38<br>1.50 |  | 60<br>2.36 |  | 60<br>2.36 | 1.6 kg<br>3.53 lb |
| SCA-X 25 (1 in.)  | mm<br>in. | 295<br>11.61 |  | 55<br>2.17 |  | 50<br>1.97 |  | 85<br>3.35 |  | 70<br>2.76 | 3.2 kg<br>7.05 lb |
| SCA-X 32 (1¼ in.) | mm<br>in. | 295<br>11.61 |  | 55<br>2.17 |  | 50<br>1.97 |  | 85<br>3.35 |  | 70<br>2.76 | 3.2 kg<br>7.05 lb |
| SCA-X 40 (1½ in.) | mm<br>in. | 295<br>11.61 |  | 55<br>2.17 |  | 50<br>1.97 |  | 85<br>3.35 |  | 70<br>2.76 | 3.2 kg<br>7.05 lb |

| Valve size |  | C |  | G |  |  |  | F <sub>min</sub> |  | □H | Weight |
|------------|--|---|--|---|--|--|--|------------------|--|----|--------|
|------------|--|---|--|---|--|--|--|------------------|--|----|--------|

### CHV-X 15 - 40

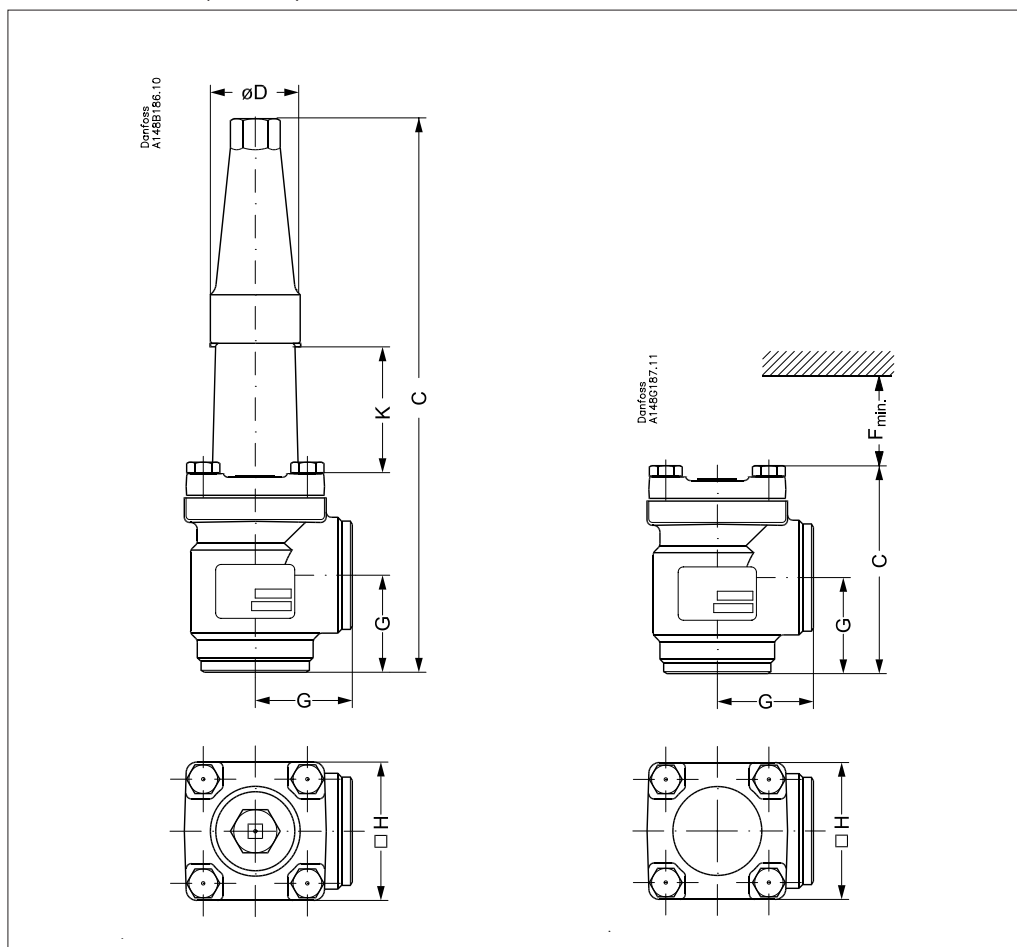
|                   |           |             |  |            |  |  |  |            |  |            |                   |
|-------------------|-----------|-------------|--|------------|--|--|--|------------|--|------------|-------------------|
| CHV-X 15 (½ in.)  | mm<br>in. | 103<br>4.06 |  | 45<br>1.77 |  |  |  | 60<br>2.36 |  | 60<br>2.36 | 1.2 kg<br>2.65 lb |
| CHV-X 20 (¾ in.)  | mm<br>in. | 103<br>4.06 |  | 45<br>1.77 |  |  |  | 60<br>2.36 |  | 60<br>2.36 | 1.2 kg<br>2.65 lb |
| CHV-X 25 (1 in.)  | mm<br>in. | 143<br>5.63 |  | 55<br>2.17 |  |  |  | 85<br>3.35 |  | 70<br>2.76 | 2.3 kg<br>5.07 lb |
| CHV-X 32 (1¼ in.) | mm<br>in. | 143<br>5.63 |  | 55<br>2.17 |  |  |  | 85<br>3.35 |  | 70<br>2.76 | 2.3 kg<br>5.07 lb |
| CHV-X 40 (1½ in.) | mm<br>in. | 143<br>5.63 |  | 55<br>2.17 |  |  |  | 85<br>3.35 |  | 70<br>2.76 | 2.3 kg<br>5.07 lb |

Specified weights are approximate values only.

Check & stop valve, type SCA-X, 65 bar (943 psi) - Check valve, type CHV-X, 65 bar (943 psi)

Dimensions and weights

SCA-X/CHV-X 50 - 65 (2 - 2½ in.)



| Valve size | K |  | C | G | ØD | □H | Weight |
|------------|---|--|---|---|----|----|--------|
|------------|---|--|---|---|----|----|--------|

SCA-X

|            |     |      |       |       |      |      |      |          |
|------------|-----|------|-------|-------|------|------|------|----------|
| SCA-X 50   | mm  | 70   |       | 315   | 60   | 50   | 77   | 3.8 kg   |
| SCA-X (2)  | in. | 2.76 |       | 12.40 | 2.36 | 1.97 | 3.03 | 8.40 lb  |
| SCA-X 65   | mm  | 70   | 12.20 | 335   | 70   | 50   | 90   | 5.5 kg   |
| SCA-X (2½) | in. | 2.76 |       | 13.19 | 2.76 | 1.97 | 3.54 | 12.16 lb |

| Valve size |  | C | G | F min. | □H | Weight |
|------------|--|---|---|--------|----|--------|
|------------|--|---|---|--------|----|--------|

CHV-X

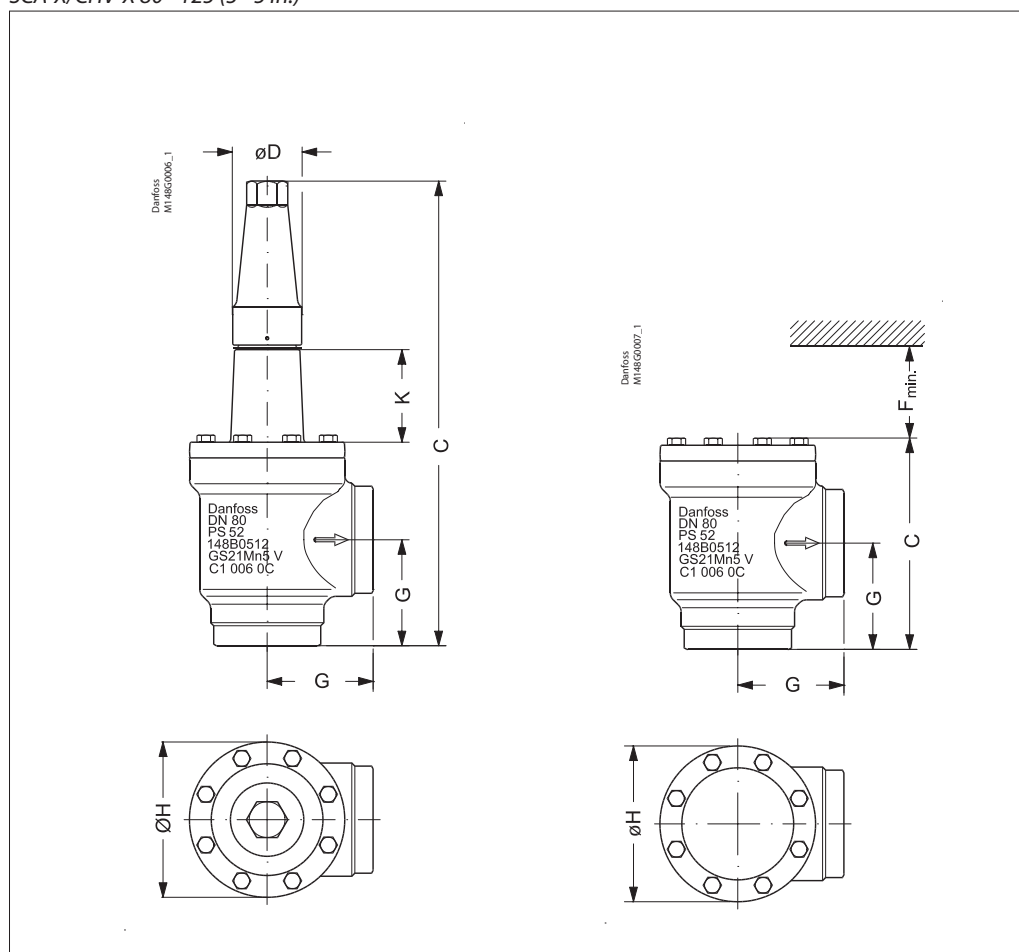
|            |     |  |      |      |      |      |         |
|------------|-----|--|------|------|------|------|---------|
| CHV-X 50   | mm  |  | 132  | 60   | 92   | 77   | 3.2 kg  |
| CHV-X (2)  | in. |  | 5.20 | 2.36 | 3.62 | 3.03 | 7.10 lb |
| CHV-X 65   | mm  |  | 152  | 70   | 107  | 90   | 4.5 kg  |
| CHV-X (2½) | in. |  | 5.98 | 2.76 | 4.21 | 3.54 | 9.95 lb |

Specified weights are approximate values only.

Check & stop valve, type SCA-X, 65 bar (943 psi) - Check valve, type CHV-X, 65 bar (943 psi)

Dimensions and weights

SCA-X/CHV-X 80 - 125 (3 - 5 in.)



| Valve size | K |  | C | G | ØD | ØH | Weight |
|------------|---|--|---|---|----|----|--------|
|------------|---|--|---|---|----|----|--------|

SCA-X

|           |     |      |  |       |      |      |      |         |
|-----------|-----|------|--|-------|------|------|------|---------|
| SCA-X 80  | mm  | 76   |  | 388   | 90   | 58   | 129  | 9.7 kg  |
| SCA-X (3) | in. | 3.00 |  | 15.28 | 3.54 | 2.28 | 5.08 | 21.4 lb |
| SCA-X 100 | mm  | 90   |  | 437   | 106  | 58   | 156  | 15.3 kg |
| SCA-X (4) | in. | 3.54 |  | 17.20 | 4.17 | 2.28 | 6.14 | 33.7 lb |
| SCA-X 125 | mm  | 90   |  | 533   | 128  | 74   | 193  | 28.1 kg |
| SCA-X (5) | in. | 3.54 |  | 20.98 | 5.04 | 2.91 | 7.60 | 61.9 lb |

| Valve size |  |  | C | G |  | F min. | ØH | Weight |
|------------|--|--|---|---|--|--------|----|--------|
|------------|--|--|---|---|--|--------|----|--------|

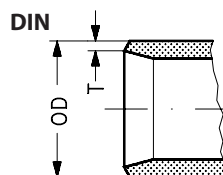
CHV-X

|           |     |  |  |       |      |      |      |          |
|-----------|-----|--|--|-------|------|------|------|----------|
| CHV-X 80  | mm  |  |  | 189   | 90   | 133  | 129  | 8.7 kg   |
| CHV-X (3) | in. |  |  | 7.44  | 3.54 | 5.24 | 5.08 | 19.23 lb |
| CHV-X 100 | mm  |  |  | 223   | 106  | 163  | 156  | 14.3 kg  |
| CHV-X (4) | in. |  |  | 8.78  | 4.17 | 6.43 | 6.14 | 31.60 lb |
| CHV-X 125 | mm  |  |  | 268   | 128  | 190  | 193  | 25.6 kg  |
| CHV-X (5) | in. |  |  | 10.55 | 5.04 | 7.48 | 7.60 | 56.58 lb |

Specified weights are approximate values only.

## Check & stop valve, type SCA-X, 65 bar (943 psi) - Check valve, type CHV-X, 65 bar (943 psi)

### Connections



| Size<br>mm | Size<br>in. | OD<br>mm | T<br>mm | OD<br>in. | T<br>in. |  |  | k <sub>v</sub> -angle<br>m³/h | k <sub>v</sub> -straight<br>m³/h | C <sub>v</sub> -angle<br>USgal/min | C <sub>v</sub> -straight<br>USgal/min |
|------------|-------------|----------|---------|-----------|----------|--|--|-------------------------------|----------------------------------|------------------------------------|---------------------------------------|
|------------|-------------|----------|---------|-----------|----------|--|--|-------------------------------|----------------------------------|------------------------------------|---------------------------------------|

#### Butt-weld DIN (EN 10220)

|     |    |       |     |       |       |  |  |      |      |      |      |
|-----|----|-------|-----|-------|-------|--|--|------|------|------|------|
| 15  | ½  | 21.3  | 2.3 | 0.839 | 0.091 |  |  | 7.0  | 4.9  | 8.1  | 5.7  |
| 20  | ¾  | 26.9  | 2.3 | 1.059 | 0.091 |  |  | 14.6 | 10.2 | 16.9 | 11.8 |
| 25  | 1  | 33.7  | 2.6 | 1.327 | 0.103 |  |  | 24.8 | 17.4 | 28.8 | 20.2 |
| 32  | 1¼ | 42.4  | 2.6 | 1.669 | 0.102 |  |  | 42.6 | 29.8 | 49.4 | 34.6 |
| 40  | 1½ | 48.3  | 2.6 | 1.902 | 0.103 |  |  | 45.2 | 31.6 | 52.4 | 36.7 |
| 50  | 2  | 60.3  | 2.9 | 2.37  | 0.11  |  |  | 80   | 65   | 93   | 76   |
| 65  | 2½ | 76.1  | 2.9 | 3     | 0.11  |  |  | 120  | 97   | 140  | 113  |
| 80  | 3  | 88.9  | 3.2 | 3.50  | 0.13  |  |  | 182  | 152  | 211  | 176  |
| 100 | 4  | 114.3 | 3.6 | 4.50  | 0.14  |  |  | 313  | 278  | 363  | 323  |
| 125 | 5  | 139.7 | 4.0 | 5.50  | 0.16  |  |  | 514  | 470  | 596  | 545  |

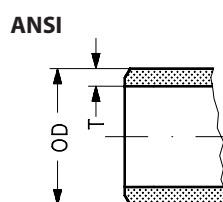
| Size<br>mm | Size<br>in. | OD<br>mm | T<br>mm | OD<br>in. | T<br>in. |  |  | k <sub>v</sub> -angle<br>m³/h | k <sub>v</sub> -straight<br>m³/h | C <sub>v</sub> -angle<br>USgal/min | C <sub>v</sub> -straight<br>USgal/min |
|------------|-------------|----------|---------|-----------|----------|--|--|-------------------------------|----------------------------------|------------------------------------|---------------------------------------|
|------------|-------------|----------|---------|-----------|----------|--|--|-------------------------------|----------------------------------|------------------------------------|---------------------------------------|

#### Butt-weld ANSI (B 36.10 Schedule 80)

|    |    |      |     |       |       |  |  |      |      |      |      |
|----|----|------|-----|-------|-------|--|--|------|------|------|------|
| 15 | ½  | 21.3 | 3.7 | 0.839 | 0.146 |  |  | 7.0  | 4.9  | 8.1  | 5.7  |
| 20 | ¾  | 26.9 | 4.0 | 1.059 | 0.158 |  |  | 14.6 | 10.2 | 16.9 | 11.8 |
| 25 | 1  | 33.7 | 4.6 | 1.327 | 0.181 |  |  | 24.8 | 17.4 | 28.8 | 20.2 |
| 32 | 1¼ | 42.4 | 4.9 | 1.669 | 0.193 |  |  | 42.6 | 29.8 | 49.4 | 34.6 |
| 40 | 1½ | 48.3 | 5.1 | 1.902 | 0.201 |  |  | 45.2 | 31.6 | 52.4 | 36.7 |

#### Butt-weld ANSI (B 36.10 Schedule 40)

|     |    |       |     |      |      |  |  |     |     |     |     |
|-----|----|-------|-----|------|------|--|--|-----|-----|-----|-----|
| 50  | 2  | 60.3  | 3.9 | 2.37 | 0.15 |  |  | 80  | 65  | 93  | 76  |
| 65  | 2½ | 73.0  | 5.2 | 2.87 | 0.20 |  |  | 120 | 97  | 140 | 113 |
| 80  | 3  | 88.9  | 5.5 | 3.50 | 0.22 |  |  | 182 | 152 | 211 | 176 |
| 100 | 4  | 114.3 | 6.0 | 4.50 | 0.24 |  |  | 313 | 278 | 363 | 323 |
| 125 | 5  | 141.3 | 6.6 | 5.56 | 0.26 |  |  | 514 | 470 | 596 | 545 |



### Ordering

| Size<br>[DN] | Parts Program |          |          |          |              |          |
|--------------|---------------|----------|----------|----------|--------------|----------|
|              | Housing       |          |          |          | Top complete |          |
|              | ANG           |          | STR      |          | SCA-X        | CHV-X    |
|              | DIN           | ANSI     | DIN      | ANSI     |              |          |
| 6            |               |          |          |          |              |          |
| 10           |               |          |          |          |              |          |
| 15           | 148B6622      | 148B6612 | 148B6642 | 148B6632 | 148B5769     | 148B5776 |
| 20           | 148B6623      | 148B6613 | 148B6643 | 148B6633 | 148B5769     | 148B5776 |
| 25           | 148B6624      | 148B6614 | 148B6644 | 148B6634 | 148B5770     | 148B5777 |
| 32           | 148B6625      | 148B6615 | 148B6645 | 148B6635 | 148B5770     | 148B5777 |
| 40           | 148B6626      | 148B6616 | 148B6646 | 148B6636 | 148B5770     | 148B5777 |
| 50           | 148B6627      | 148B6617 | 148B6647 | 148B6637 | 148B5771     | 148B5778 |
| 65           | 148B6628      | 148B6618 | 148B6648 | 148B6638 | 148B5772     | 148B5779 |
| 80           | 148B6629      | 148B6619 | 148B6649 | 148B6639 | 148B5773     | 148B5780 |
| 100          | 148B6630      | 148B6620 | 148B6650 | 148B6640 | 148B5774     | 148B5781 |
| 125          | 148B6631      | 148B6621 | 148B6651 | 148B6641 | 148B5775     | 148B5782 |
| 150          |               |          |          |          |              |          |
| 200          |               |          |          |          |              |          |

| Size<br>[DN] | Service kit*      |                    |
|--------------|-------------------|--------------------|
|              | O-ring kit for    |                    |
|              | R717<br>Heat Pump | R1270<br>Propylene |
| 6            |                   |                    |
| 10           |                   |                    |
| 15           | 148B6070          | 148B6077           |
| 20           | 148B6070          | 148B6077           |
| 25           | 148B6071          | 148B6078           |
| 32           | 148B6071          | 148B6078           |
| 40           | 148B6071          | 148B6078           |
| 50           | 148B6072          | 148B6079           |
| 65           | 148B6073          | 148B6080           |
| 80           | 148B6074          | 148B6081           |
| 100          | 148B6075          | 148B6082           |
| 125          | 148B6076          | 148B6083           |
| 150          |                   |                    |
| 200          |                   |                    |



# Check & stop valves, type SCA-X SS

## Check valves, type CHV-X SS

### Contents

|                                      | Page |
|--------------------------------------|------|
| Features .....                       | 35   |
| Pressure and temperature range ..... | 35   |
| Design .....                         | 36   |
| Technical data .....                 | 36   |
| Connections .....                    | 37   |
| Material specification .....         | 38   |
| Dimensions and weights .....         | 39   |
| Ordering complete valves .....       | 40   |
| Important! .....                     | 40   |



## Check & stop valves, type SCA-X SS

### Check valves, type CHV-X SS



In certain specific areas such as outdoor applications and corrosive atmospheres, such as coastal installations, there is a need for high surface protection to prevent failure due to corrosion.

Today's food safety standards often call for daily treatment with detergents to protect against bacteria growth, again producing a need for high surface protection.

SCA-X SS are check valves with a built-in stop valve function. CHV-X SS are check valves only.

The valves are designed to open at very low differential pressures, allow favourable flow conditions and are easy to disassemble for inspection and service.

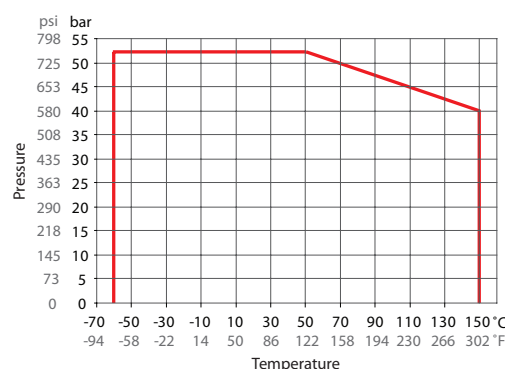
The valve cone has a built-in flexibility to ensure a precise and tight closing towards the valve seat.

A well balanced dampening effect between the piston and the cylinder gives an optimal protection during low loads and against pulsations.

#### Features

- Applicable to HCFC, HFC, R717 (Ammonia), R744 (CO<sub>2</sub>), Propane, Butane, Iso-Butane and Ethane.  
R717 Heat Pump and Propylene applications with replaced O-ring.
- Designed to give favourable flow conditions.
- Internal backseating enables replacement of the spindle seal whilst the valve is active, i.e. under pressure (SCA-SS)
- Housing is made of special cold resistant stainless steel approved for low temperature operations.
- Easy to disassemble for inspection and service.
- Butt-weld DIN and ANSI connections.
- Max. operating pressure:  
52 bar g (754 psig)
- Temperature range:  
-60/+150°C (-76 +302°F).
- Compact and light valves for easy handling and installation.
- Classification: DNV, CRN, BV, EAC etc.  
To get an updated list of certification on the products please contact your local Danfoss Sales Company.

#### Pressure and temperature range



— SCA-X SS/CHV-X SS DN15-DN40

## Connections

Available with the following connections:

- Butt-weld DIN (EN 10220)  
DN 15 - 40 (½ - 1½ in.)
- Butt-weld ANSI (B 36.19M)  
DN 20 - 40 (¾ - 1½ in.)

## Housing

Made of stainless steel approved for low temperature operations.

Valve cone

Valve cone with built in metallic stop - prevents damage to teflon ring in case of overtightening.

*Damping chamber*

**Damping chamber:**  
The chamber is filled with refrigerants (gas or liquid), which provides a damping effect when the valve opens and closes.

Spindle (SCA-X SS)

Made of polished stainless steel, which is ideal for O-ring sealing.

### Packing Gland (SCA-X SS)

The "full temperature range" packing gland is the standard for the entire SVL platform.

This ensures perfect tightness throughout the whole temperature range:

–60/+150°C (–76/+302°F).

### Pressure Equipment Directive (PED)

The SCA-X SS/CHV-X SS valves are approved according to the European standard specified in the Pressure Equipment Directive and are CE marked.

For further details / restrictions - see the product instruction.

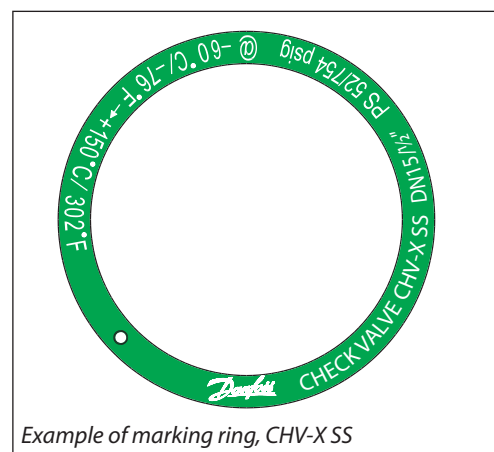
## Installation

The valve must be mounted vertically with the cone downwards.

The valve is designed to resist very high internal pressure. However, the piping system in general should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion.

For further information refer to installation instructions for SCA-X SS/CHV-X SS.

If cold refrigeration oil having low viscosity enters and settles in the damping chamber, problems with the check valve may arise. Consequently, it may be necessary to modify the valve for more viscous liquids by enlarging the hole to the damping chamber.



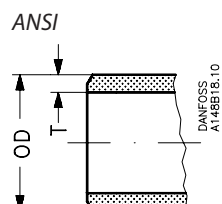
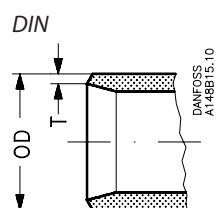
| SCA-X SS/CHV-X SS valves |                        |                          |
|--------------------------|------------------------|--------------------------|
| Nominal bore             | DN = < 25 mm (1 in.)   | DN32-40 mm (1¼ - 1½ in.) |
| Classified for           | Fluid group I          |                          |
| Category                 | Article 3, paragraph 3 | II                       |

## Technical data

- *Refrigerants*  
Applicable to HCFC, HFC, R717 (Ammonia), R744 (CO<sub>2</sub>), Propane, Butane, Iso-Butane and Ethane.  
R717 Heat Pump and Propylene applications with replaced O-ring.  
For further information refer to the installation guide for SCA-X SS/CHV-X SS.
- *Temperature range*  
-60/+150°C (-76/+302°F).
- *Max. working pressure*  
52 bar g (754 psig).

# Check & stop valves in stainless steel, type SCA-X SS - Check valves in stainless steel, type CHV-X SS

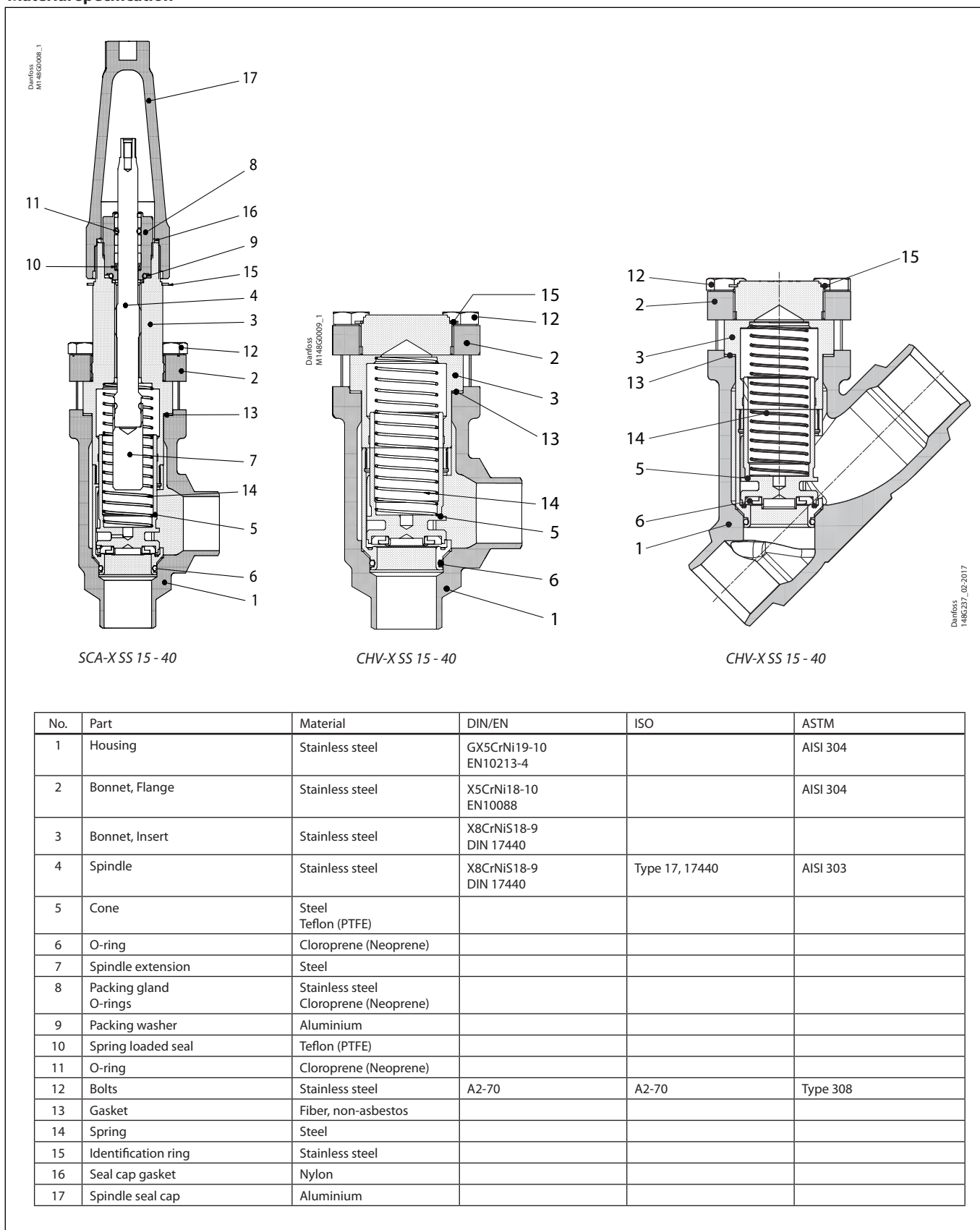
## Connections



| Size                            |     | OD    | T     |
|---------------------------------|-----|-------|-------|
| <b>Butt-weld DIN (EN 10220)</b> |     |       |       |
| 15                              | mm  | 21.3  | 2.3   |
| 1/2                             | in. | 0.839 | 0.091 |
| 20                              | mm  | 26.9  | 2.3   |
| 3/4                             | in. | 1.059 | 0.091 |
| 25                              | mm  | 33.7  | 2.6   |
| 1                               | in. | 1.327 | 0.103 |
| 32                              | mm  | 42.4  | 2.6   |
| 1 1/4                           | in. | 1.669 | 0.102 |
| 40                              | mm  | 48.3  | 2.6   |
| 1 1/2                           | in. | 1.902 | 0.103 |

| Size                                          |     | OD   | T    |
|-----------------------------------------------|-----|------|------|
| <b>Butt-weld ANSI (B 36.19M, SCHEDULE 40)</b> |     |      |      |
| 20                                            | mm  | 26.9 | 2.9  |
| 3/4                                           | in. | 1.06 | 0.11 |
| 25                                            | mm  | 33.7 | 3.5  |
| 1                                             | in. | 1.33 | 0.14 |
| 32                                            | mm  | 42.4 | 3.6  |
| 1 1/4                                         | in. | 1.67 | 0.14 |
| 40                                            | mm  | 48.3 | 3.7  |
| 1 1/2                                         | in. | 1.9  | 0.15 |

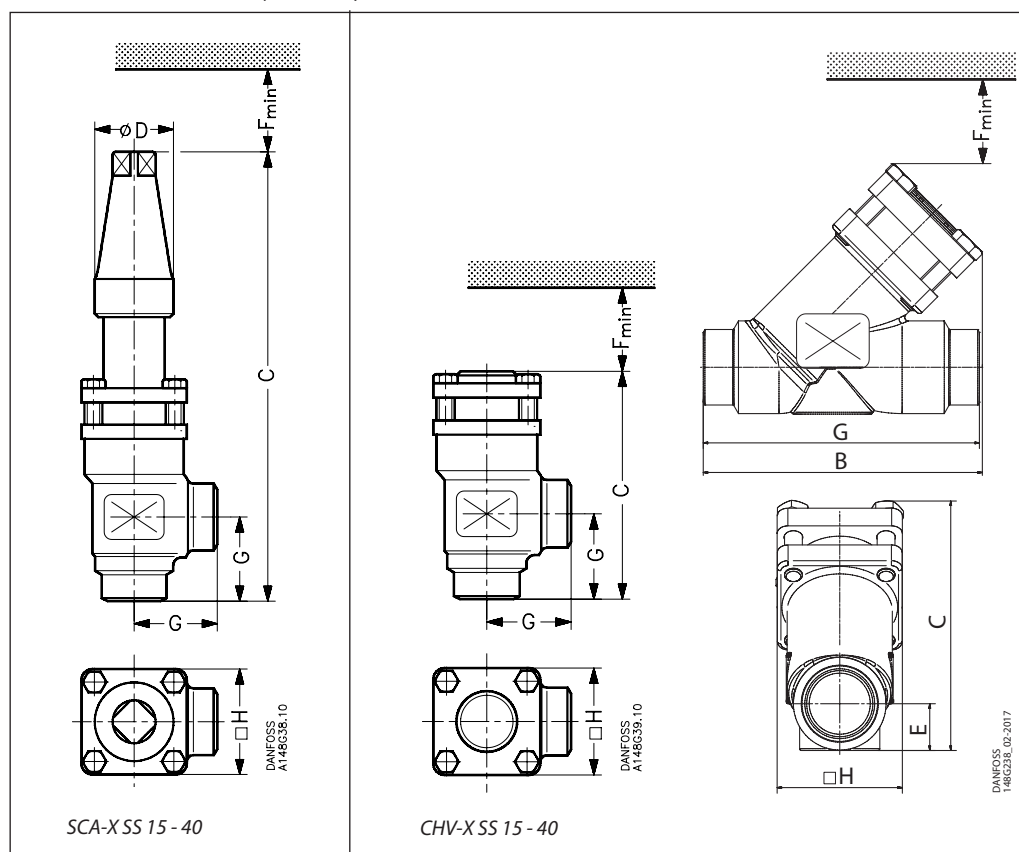
## Material specification



# Check & stop valves in stainless steel, type SCA-X SS - Check valves in stainless steel, type CHV-X SS

## Dimensions and weights

SCA-X SS/CHV-X SS 15 - 40 (½ - 1½ in.)



| Valve size |  | C |  | G |  | ØD |  | F <sub>min</sub> |  | H | Weight |
|------------|--|---|--|---|--|----|--|------------------|--|---|--------|
|------------|--|---|--|---|--|----|--|------------------|--|---|--------|

### SCA-X SS 15 - 40

|                      |           |              |  |            |  |            |  |            |  |            |                   |
|----------------------|-----------|--------------|--|------------|--|------------|--|------------|--|------------|-------------------|
| SCA-X SS 15 (½ in.)  | mm<br>in. | 212<br>8.35  |  | 45<br>1.77 |  | 38<br>1.50 |  | 60<br>2.36 |  | 60<br>2.36 | 1.6 kg<br>3.53 lb |
| SCA-X SS 20 (¾ in.)  | mm<br>in. | 212<br>8.35  |  | 45<br>1.77 |  | 38<br>1.50 |  | 60<br>2.36 |  | 60<br>2.36 | 1.6 kg<br>3.53 lb |
| SCA-X SS 25 (1 in.)  | mm<br>in. | 295<br>11.61 |  | 55<br>2.17 |  | 50<br>1.97 |  | 85<br>3.35 |  | 70<br>2.76 | 3.2 kg<br>7.05 lb |
| SCA-X SS 32 (1¼ in.) | mm<br>in. | 295<br>11.61 |  | 55<br>2.17 |  | 50<br>1.97 |  | 85<br>3.35 |  | 70<br>2.76 | 3.2 kg<br>7.05 lb |
| SCA-X SS 40 (1½ in.) | mm<br>in. | 295<br>11.61 |  | 55<br>2.17 |  | 50<br>1.97 |  | 85<br>3.35 |  | 70<br>2.76 | 3.2 kg<br>7.05 lb |

### CHV-X SS 15 - 40 Angleway

|                      |           |             |  |            |  |  |  |            |  |            |                   |
|----------------------|-----------|-------------|--|------------|--|--|--|------------|--|------------|-------------------|
| CHV-X SS 15 (½ in.)  | mm<br>in. | 103<br>4.06 |  | 45<br>1.77 |  |  |  | 60<br>2.36 |  | 60<br>2.36 | 1.2 kg<br>2.65 lb |
| CHV-X SS 20 (¾ in.)  | mm<br>in. | 103<br>4.06 |  | 45<br>1.77 |  |  |  | 60<br>2.36 |  | 60<br>2.36 | 1.2 kg<br>2.65 lb |
| CHV-X SS 25 (1 in.)  | mm<br>in. | 143<br>5.63 |  | 55<br>2.17 |  |  |  | 85<br>3.35 |  | 70<br>2.76 | 2.3 kg<br>5.07 lb |
| CHV-X SS 32 (1¼ in.) | mm<br>in. | 143<br>5.63 |  | 55<br>2.17 |  |  |  | 85<br>3.35 |  | 70<br>2.76 | 2.3 kg<br>5.07 lb |
| CHV-X SS 40 (1½ in.) | mm<br>in. | 143<br>5.63 |  | 55<br>2.17 |  |  |  | 85<br>3.35 |  | 70<br>2.76 | 2.3 kg<br>5.07 lb |

| Valve size |  | C | B | E |  | G |  | F <sub>min</sub> |  | H | Weight |
|------------|--|---|---|---|--|---|--|------------------|--|---|--------|
|------------|--|---|---|---|--|---|--|------------------|--|---|--------|

### CHV-X SS 15 - 40 Straightway

|                      |           |             |             |            |  |             |  |            |  |            |                   |
|----------------------|-----------|-------------|-------------|------------|--|-------------|--|------------|--|------------|-------------------|
| CHV-X SS 15 (½ in.)  | mm<br>in. | 99<br>3.90  | 114<br>4.49 | 19<br>0.75 |  | 120<br>4.72 |  | 60<br>2.36 |  | 60<br>2.36 | 1.3 kg<br>2.87 lb |
| CHV-X SS 20 (¾ in.)  | mm<br>in. | 99<br>3.90  | 114<br>4.49 | 19<br>0.75 |  | 120<br>4.72 |  | 60<br>2.36 |  | 60<br>2.36 | 1.3 kg<br>2.87 lb |
| CHV-X SS 25 (1 in.)  | mm<br>in. | 141<br>5.55 | 157<br>6.18 | 26<br>1.02 |  | 155<br>6.10 |  | 85<br>3.35 |  | 70<br>2.76 | 2.6 kg<br>5.73 lb |
| CHV-X SS 32 (1¼ in.) | mm<br>in. | 141<br>5.55 | 157<br>6.18 | 26<br>1.02 |  | 155<br>6.10 |  | 85<br>3.35 |  | 70<br>2.76 | 2.6 kg<br>5.73 lb |
| CHV-X SS 40 (1½ in.) | mm<br>in. | 141<br>5.55 | 157<br>6.18 | 26<br>1.02 |  | 155<br>6.10 |  | 85<br>3.35 |  | 70<br>2.76 | 2.6 kg<br>5.73 lb |

Specified weights are approximate values only.

## Check & stop valves in stainless steel, type SCA-X SS - Check valves in stainless steel, type CHV-X SS

### Ordering complete valves

#### How to order

The table below is used to identify the valve required.

Please note that the type codes only serve to identify the valves, some of which may not form part of the standard product range.

For further information please contact your local Danfoss Sales Company.

| Valve type                                       | SCA-X SS<br>CHV-X SS                                          | Stop Check Valve<br>Check Valve                                                     |
|--------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|
| (valve size measured on the connection diameter) | <b>15</b><br><b>20</b><br><b>25</b><br><b>32</b><br><b>40</b> | <b>D</b><br><b>A</b><br>DN 15 x<br>DN 20 x x<br>DN 25 x x<br>DN 32 x x<br>DN 40 x x |
| Connections                                      | <b>D</b><br><b>A</b>                                          | Butt-weld connection: DIN EN 10220<br>Butt-weld connection: ANSI B 36.19M           |
| Valve housing                                    | <b>ANG</b><br><b>STR</b>                                      | Angle flow<br>Straight flow                                                         |

#### Important!

Where products need to be certified according to specific certification societies the relevant information should be included at the time of order.

### SCA-X SS Angleway

#### Butt-weld DIN (EN 10220)

| Size |     | Type              | Code No. |
|------|-----|-------------------|----------|
| mm   | in. |                   |          |
| 15   | ½   | SCA-X SS 15 D ANG | 148B5293 |
| 20   | ¾   | SCA-X SS 20 D ANG | 148B5381 |
| 25   | 1   | SCA-X SS 25 D ANG | 148B5490 |
| 32   | 1¼  | SCA-X SS 32 D ANG | 148B5585 |
| 40   | 1½  | SCA-X SS 40 D ANG | 148B5664 |

#### Butt-weld ANSI (B 36.19M SCHEDULE 40)

| Size |     | Type                | Code No. |
|------|-----|---------------------|----------|
| mm   | in. |                     |          |
| 20   | ¾   | SCA-X SS 20 A40 ANG | 148B6489 |
| 25   | 1   | SCA-X SS 25 A40 ANG | 148B6480 |
| 32   | 1¼  | SCA-X SS 32 A40 ANG | 148B6490 |
| 40   | 1½  | SCA-X SS 40 A40 ANG | 148B5687 |

### CHV-X SS Angleway

#### Butt-weld DIN (EN 10220)

| Size |     | Type              | Code No. |
|------|-----|-------------------|----------|
| mm   | in. |                   |          |
| 15   | ½   | CHV-X SS 15 D ANG | 148B5294 |
| 20   | ¾   | CHV-X SS 20 D ANG | 148B5382 |
| 25   | 1   | CHV-X SS 25 D ANG | 148B5491 |
| 32   | 1¼  | CHV-X SS 32 D ANG | 148B5586 |
| 40   | 1½  | CHV-X SS 40 D ANG | 148B5665 |

#### Butt-weld ANSI (B 36.19M SCHEDULE 40)

| Size |     | Type                | Code No. |
|------|-----|---------------------|----------|
| mm   | in. |                     |          |
| 20   | ¾   | CHV-X SS 20 A40 ANG | 148B6491 |
| 25   | 1   | CHV-X SS 25 A40 ANG | 148B6481 |
| 32   | 1¼  | CHV-X SS 32 A40 ANG | 148B6492 |
| 40   | 1½  | CHV-X SS 40 A40 ANG | 148B5688 |

### CHV-X SS Straightway

#### Butt-weld DIN (EN 10220)

| Size |     | Type              | Code No. |
|------|-----|-------------------|----------|
| mm   | in. |                   |          |
| 15   | ½   | CHV-X SS 15 D STR | 148B5678 |
| 20   | ¾   | CHV-X SS 20 D STR | 148B5679 |
| 25   | 1   | CHV-X SS 25 D STR | 148B5680 |
| 32   | 1¼  | CHV-X SS 32 D STR | 148B5644 |
| 40   | 1½  | CHV-X SS 40 D STR | 148B5666 |

#### Butt-weld ANSI (B 36.19M SCHEDULE 40)

| Size |     | Type                | Code No. |
|------|-----|---------------------|----------|
| mm   | in. |                     |          |
| 20   | ¾   | CHV-X SS 20 A40 STR | 148B6608 |
| 25   | 1   | CHV-X SS 25 A40 STR | 148B6609 |
| 32   | 1¼  | CHV-X SS 32 A40 STR | 148B6610 |
| 40   | 1½  | CHV-X SS 40 A40 STR | 148B6611 |

ANG = Angleway  
STR = Straightway

Replacement kit (O-ring replacement) for R717 Ammonia Heat Pump\* and Propylene applications (including ID tag)

| Size |     | O-ring kit for |                 |
|------|-----|----------------|-----------------|
| mm   | in. | R717 Heat pump | R1270 Propylene |
| 15   | ½   | 148B6070       | 148B6077        |
| 20   | ¾   |                |                 |
| 25   | 1   | 148B6071       | 148B6078        |
| 32   | 1¼  |                |                 |
| 40   | 1½  |                |                 |

\* Replacement kits for R717 Ammonia Heat Pump is applicable for continuous operating temperature between +100°C to 150°C (212°F to 302°F)

# Check valves

## Type NRVA

### Contents

|                              | Page |
|------------------------------|------|
| Features.....                | 43   |
| Design .....                 | 43   |
| Technical data .....         | 44   |
| Material specification ..... | 44   |
| Ordering .....               | 44   |
| Flange connections.....      | 45   |
| Dimensions and weights.....  | 46   |
| Nominal capacities .....     | 47   |



# Check valves

## Type NRVA



Check valve type NRVA can be used in liquid, suction and hot gas lines in refrigeration and air conditioning plant with ammonia.

NRVA can also be used in refrigerating systems with fluorinated refrigerants.

When the NRVA is used in liquid lines where cold, thick oil or impurities may be present, it is recommended that the standard spring be replaced by a special spring. See ordering table.

### Features

- Ensures correct direction of flow.
- Valve housing made of steel.
- Available for 40 bar g / 580 psig working pressure.
- Large range of flanges with connection dimensions in accordance with standards: DIN, ANSI, SOC, SA and FPT.
- Fitted with damping piston that makes the valves suitable for installation in lines where pulsation can occur, e.g. in the discharge line from the compressor.
- Classification: DNV, CRN, BV, EAC etc.  
To get an updated list of certification on the products please contact your local Danfoss Sales Company.

### Design

#### Connections

There is a very wide range of connection possibilities with NRVA check valves:

- Welding, DIN (2448)
- Welding, ANSI (B 36.10)
- Welding socket, ANSI (B 16.11)
- Solder connection, DIN (2856)
- Solder connection, ANSI (B 16.22)
- FPT internal thread, NPT (ANSI/ASME B 1.20.1)

#### Gaskets:

Do not contain asbestos.

#### Valve cone:

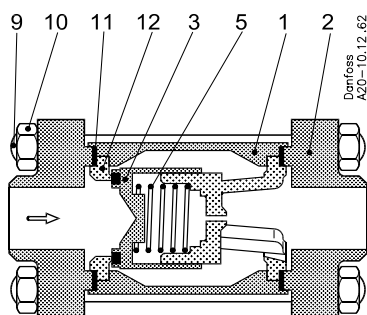
The valve cone has a teflon tightening ring. Teflon tightening ring renders perfect sealing at a minimum closing force.

## Check valves, type NRVA

### Technical data

- **Refrigerants**  
Applicable to HCFC, HFC and R717 (Ammonia).  
For further information please see installation instruction for NRVA.  
Use with flammable hydrocarbons cannot be recommended; please contact Danfoss.
- **Temperature range**  
-50 – 140 °C / -58 – 284 °F.
- **Pressure range**  
The valve is designed for:  
Max. working pressure: 40 bar g / 580 psig.

### Material specification

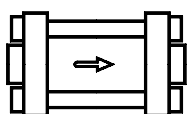


#### Material specification for NRVA check valves

| No. | Part       | Material                  | DIN                      | ISO          | ASTM           |
|-----|------------|---------------------------|--------------------------|--------------|----------------|
| 1   | Housing    | Steel                     | G20Mn5QT *)<br>EN10213-3 |              | LCC, A352      |
|     |            |                           | P285QH<br>EN10222-4      |              | LF2, A350      |
| 2   | Flanges    | Steel                     | RSt. 37-2, 10025         | Fe360 B, 630 | Grade C, A 283 |
| 3   | Valve cone | Stainless steel<br>Teflon |                          |              |                |
| 5   | Spring     | Steel                     |                          |              |                |
| 9   | Bolts      | Stainless steel           | A2-70                    |              |                |
| 10  | Nut        | Stainless steel           |                          |              |                |
| 11  | Gasket     | Non asbestos              |                          |              |                |
| 12  | Valve seat | Steel                     |                          |              |                |

\*) NRVA 40 / NRVA 50 housing material is TTSt 35N until January 2006

### Ordering



#### Complete valves incl. DIN 2448 flange:

| Type    | Weld flange connection | Code no. |                            | Δp <sup>2)</sup>     |        |                                 |        | k <sub>v</sub> value <sup>3)</sup> | C <sub>v</sub> value <sup>4)</sup> |
|---------|------------------------|----------|----------------------------|----------------------|--------|---------------------------------|--------|------------------------------------|------------------------------------|
|         |                        | Valve    | Spec. spring <sup>1)</sup> | With standard spring |        | With spec. spring <sup>1)</sup> |        |                                    |                                    |
|         | [in]                   |          |                            | [bar]                | [psig] | [bar]                           | [psig] | [m³/h]                             | [gal/min]                          |
| NRVA 15 | 1/2                    | 020-2000 | 020-2307                   | 0.12                 | 1.7    | 0.3                             | 4.4    | 5                                  | 6                                  |
| NRVA 20 | 3/4                    | 020-2001 | 020-2307                   | 0.12                 | 1.7    | 0.3                             | 4.4    | 6                                  | 7                                  |
| NRVA 25 | 1                      | 020-2002 | 020-2317                   | 0.12                 | 1.7    | 0.3                             | 4.4    | 19                                 | 22                                 |
| NRVA 32 | 1 1/4                  | 020-2003 | 020-2317                   | 0.12                 | 1.7    | 0.3                             | 4.4    | 20                                 | 23                                 |
| NRVA 40 | 1 1/2                  | 020-2004 | 020-2327                   | 0.07                 | 1.0    | 0.4                             | 5.8    | 44                                 | 51                                 |
| NRVA 50 | 2                      | 020-2005 | 020-2327                   | 0.07                 | 1.0    | 0.4                             | 5.8    | 44                                 | 51                                 |
| NRVA 65 | 2 1/2                  | 020-2006 | 020-2337                   | 0.07                 | 1.0    | 0.4                             | 5.8    | 75                                 | 87                                 |

<sup>1)</sup> A special type spring can be supplied to replace the standard valve spring.

<sup>2)</sup>  $\Delta p$  = the minimum pressure differential at which the valve is completely open.

<sup>3)</sup> The  $k_v$  value is the flow of water in m³/h at a pressure drop across valve of 1 bar,  $\rho = 1000 \text{ kg/m}^3$ .

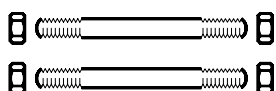
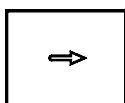
<sup>4)</sup> The  $C_v$  value is the flow of water in gal/min at a pressure drop across valve of 1 psig,  $\rho = 10 \text{ lbs/gal}$ .

#### Valve body without flanges:

| Type    | Code no.        |
|---------|-----------------|
| NRVA 15 | <b>020-2020</b> |
| NRVA 20 | <b>020-2020</b> |
| NRVA 25 | <b>020-2022</b> |
| NRVA 32 | <b>020-2022</b> |
| NRVA 40 | <b>020-2024</b> |
| NRVA 50 | <b>020-2024</b> |
| NRVA 65 | <b>020-2026</b> |

#### Staybolts and gaskets

| Type         | Dimensions    | Code no.        |
|--------------|---------------|-----------------|
| NRVA 15 / 20 | M 12 × 115 mm | <b>006-1107</b> |
| NRVA 25 / 32 | M 12 × 148 mm | <b>006-1135</b> |
| NRVA 40 / 50 | M 12 × 167 mm | <b>006-1137</b> |
| NRVA 65      | M 16 × 200 mm | <b>006-1138</b> |



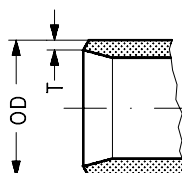
## Check valves, type NRVA

### Flange connections

Danfoss flange sets excluding gaskets, bolts and nuts, are specially made for the Danfoss product range and must only be used for the purpose described.

Select the valve based on capacity and then select the size of flanges most suitable for the application, which can be mounted on the valve.

#### DIN

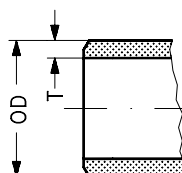


| Size [mm] | Size [in] | OD [mm] | T [mm] | OD [in] | T [in] | Flange type | For use with valve housing size | Code no. |
|-----------|-----------|---------|--------|---------|--------|-------------|---------------------------------|----------|
|-----------|-----------|---------|--------|---------|--------|-------------|---------------------------------|----------|

#### Butt welding DIN (2448)

|    |       |      |     |       |       |     |            |          |
|----|-------|------|-----|-------|-------|-----|------------|----------|
| 10 | 3/8   | 18   | 2   | 0.710 | 0.079 | 1.3 | NRVA 15/20 | 027N1112 |
| 15 | 1/2   | 22   | 2.5 | 0.866 | 0.098 | 1.3 | NRVA 15/20 | 027N1115 |
| 20 | 3/4   | 26.9 | 2.3 | 1.059 | 0.091 | 1.3 | NRVA 15/20 | 027N1120 |
| 25 | 1     | 33.7 | 2.6 | 1.327 | 0.103 | 4   | NRVA 25/32 | 027N1026 |
| 32 | 1 1/4 | 42.4 | 2.6 | 1.669 | 0.102 | 4   | NRVA 25/32 | 027N1033 |
| 40 | 1 1/2 | 48.3 | 2.6 | 1.902 | 0.103 | 6   | NRVA 40/50 | 027N1042 |
| 50 | 2     | 60.3 | 2.9 | 2.370 | 0.110 | 6   | NRVA 40/50 | 027N1051 |
| 65 | 2 1/2 | 76.1 | 2.9 | 3.000 | 0.110 | 8   | NRVA 65    | 027N1055 |

#### ANSI

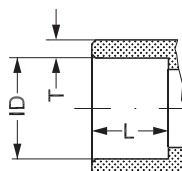


| Size [mm] | Size [in] | OD [mm] | T [mm] | OD [in] | T [in] | Flange type | For use with valve housing size | Code no. |
|-----------|-----------|---------|--------|---------|--------|-------------|---------------------------------|----------|
|-----------|-----------|---------|--------|---------|--------|-------------|---------------------------------|----------|

#### Butt welding ANSI B 36.10

|    |       |      |     |       |       |     |            |          |
|----|-------|------|-----|-------|-------|-----|------------|----------|
| 10 | 3/8   | 17.2 | 3.2 | 0.677 | 0.126 | 1.3 | NRVA 15/20 | 027N2020 |
| 15 | 1/2   | 21.3 | 3.7 | 0.839 | 0.146 | 1.3 | NRVA 15/20 | 027N2021 |
| 20 | 3/4   | 26.9 | 4.0 | 1.059 | 0.158 | 1.3 | NRVA 15/20 | 027N2022 |
| 25 | 1     | 33.7 | 4.6 | 1.327 | 0.181 | 4   | NRVA 25/32 | 027N2023 |
| 32 | 1 1/4 | 42.4 | 4.9 | 1.669 | 0.193 | 4   | NRVA 25/32 | 027N2024 |
| 40 | 1 1/2 | 48.3 | 5.1 | 1.902 | 0.201 | 6   | NRVA 40/50 | 027N2025 |
| 50 | 2     | 60.3 | 3.9 | 2.370 | 0.150 | 6   | NRVA 40/50 | 027N2026 |
| 65 | 2 1/2 | 73.0 | 5.2 | 3.000 | 0.200 | 8   | NRVA 65    | 027N2027 |

#### SOC

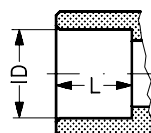


| Size [mm] | Size [in] | ID [mm] | T [mm] | ID [in] | T [in] | L [mm] | L [in] | Flange type | For use with valve housing size | Code no. |
|-----------|-----------|---------|--------|---------|--------|--------|--------|-------------|---------------------------------|----------|
|-----------|-----------|---------|--------|---------|--------|--------|--------|-------------|---------------------------------|----------|

#### Socket welding ANSI (B 16.11)

|    |       |      |     |       |       |    |       |     |            |          |
|----|-------|------|-----|-------|-------|----|-------|-----|------------|----------|
| 10 | 3/8   | 17.8 | 4.1 | 0.701 | 0.161 | 10 | 0.394 | 1.3 | NRVA 15/20 | 027N2010 |
| 15 | 1/2   | 22   | 4.8 | 0.866 | 0.189 | 10 | 0.394 | 1.3 | NRVA 15/20 | 027N2011 |
| 20 | 3/4   | 27.4 | 5.0 | 1.079 | 0.197 | 13 | 0.512 | 4   | NRVA 25/32 | 027N2012 |
| 25 | 1     | 34.1 | 5.8 | 1.343 | 0.228 | 13 | 0.512 | 4   | NRVA 25/32 | 027N2013 |
| 32 | 1 1/4 | 42.9 | 6.0 | 1.689 | 0.236 | 13 | 0.512 | 4   | NRVA 25/32 | 027N2016 |
| 40 | 1 1/2 | 49.0 | 6.5 | 1.929 | 0.254 | 13 | 0.512 | 6   | NRVA 40/50 | 027N2015 |

#### SA



| Size [mm] | Size [in] | ID [mm] | ID [in] | L [mm] | L [in] | Flange type | For use with valve housing size | Code no. |
|-----------|-----------|---------|---------|--------|--------|-------------|---------------------------------|----------|
|-----------|-----------|---------|---------|--------|--------|-------------|---------------------------------|----------|

#### Soldering DIN (2856)

|    |  |       |  |  |  |    |  |     |            |          |
|----|--|-------|--|--|--|----|--|-----|------------|----------|
| 16 |  | 16.07 |  |  |  | 15 |  | 1.3 | NRVA 15/20 | 027L1116 |
| 22 |  | 22.08 |  |  |  | 22 |  | 1.3 | NRVA 15/20 | 027L1122 |
| 35 |  | 35.07 |  |  |  | 25 |  | 4   | NRVA 25/32 | 027L2335 |
| 54 |  | 54.09 |  |  |  | 33 |  | 4   | NRVA 40/50 | 027L2554 |

#### Soldering (ANSI B 16.22)

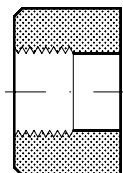
|  |       |  |  |       |  |  |       |     |            |          |
|--|-------|--|--|-------|--|--|-------|-----|------------|----------|
|  | 5/8   |  |  | 0.628 |  |  | 0.807 | 1.3 | NRVA 15/20 | 027L1117 |
|  | 7/8   |  |  | 0.878 |  |  | 0.866 | 1.3 | NRVA 15/20 | 027L1123 |
|  | 1 3/8 |  |  | 1.375 |  |  | 0.984 | 4   | NRVA 25/32 | 027L2335 |
|  | 2 1/8 |  |  | 2.125 |  |  | 1.300 | 4   | NRVA 40/50 | 027L2554 |

To be continued next page.

## Check valves, type NRVA

### Flange connections (Continued)

FPT



| Size<br>[mm] | Size<br>[in] | Inside pipe thread | Flange<br>type | For use with valve<br>housing size | Code no. |
|--------------|--------------|--------------------|----------------|------------------------------------|----------|
|--------------|--------------|--------------------|----------------|------------------------------------|----------|

*FPT inside pipe thread, NPT (ANSI/ASME B 1.20.1)*

|    |     |                |     |            |                 |
|----|-----|----------------|-----|------------|-----------------|
| 10 | 3/8 | (3/8 × 18 NPT) | 1.3 | NRVA 15/20 | <b>027G1005</b> |
| 15 | 1/2 | (1/2 × 14 NPT) | 1.3 | NRVA 15/20 | <b>027G1006</b> |
| 20 | 3/4 | (3/4 × 14 NPT) | 4   | NRVA 25/32 | <b>027G1007</b> |

#### Example

NRVA 32 with 1 1/4" flanges for ANSI butt welding:

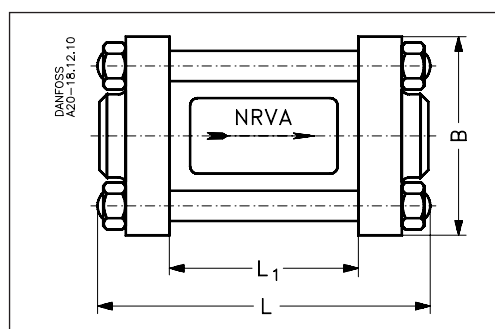
NRVA 32 + bolts + flanges (set) =  
020-2022 + 006-1135 + 027N2024



#### NOTE:

The flanges sets are exclusive gaskets, bolts and nuts.

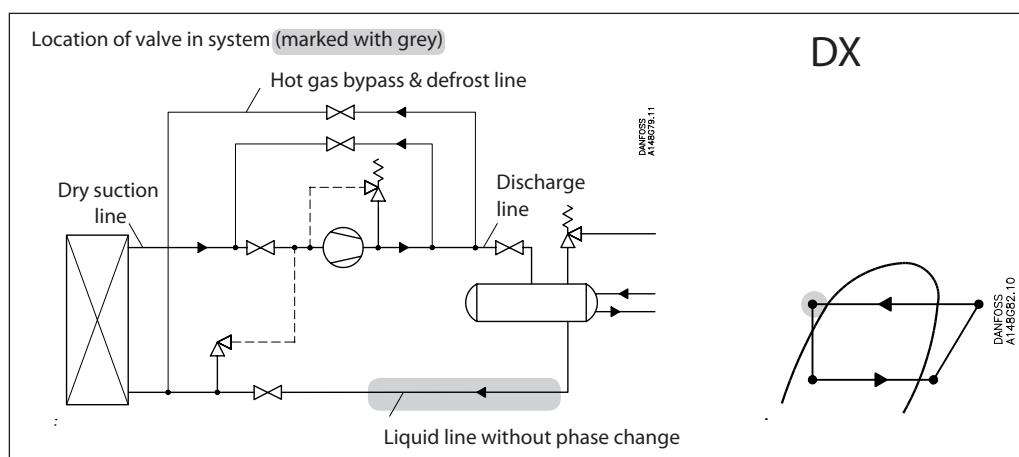
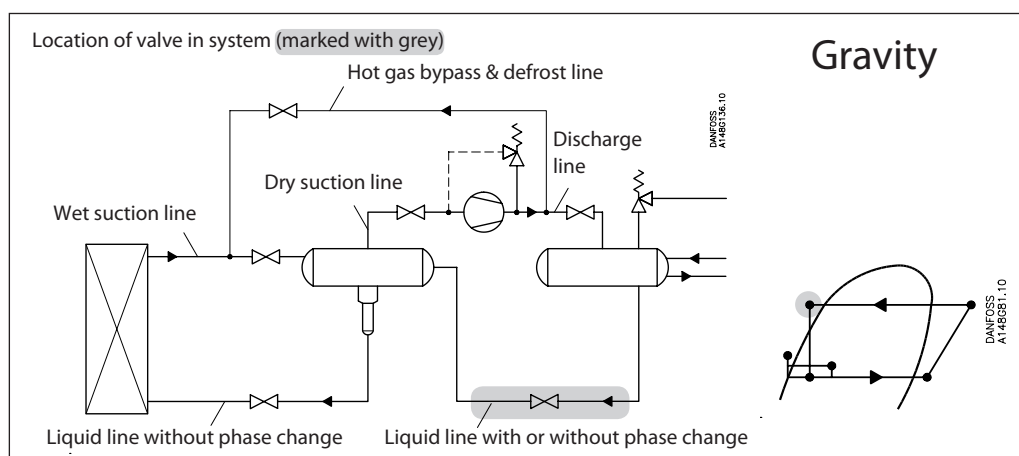
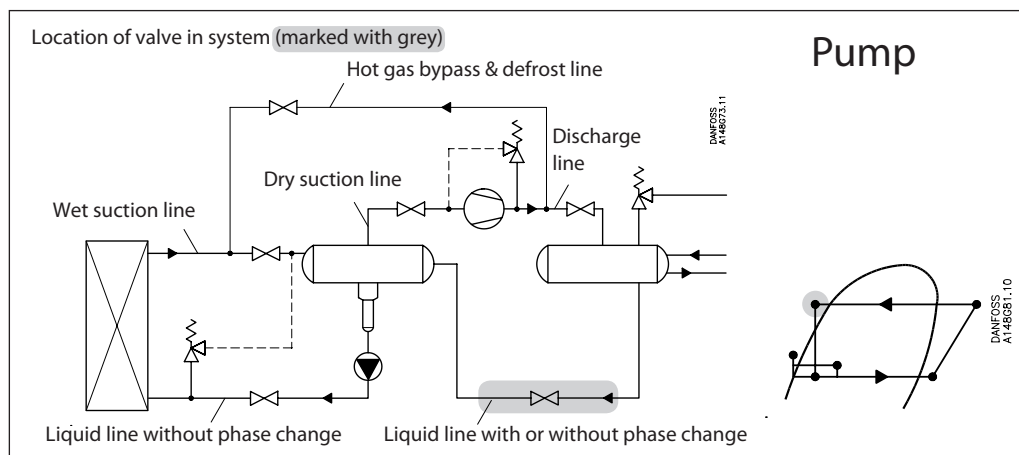
### Dimensions and weights



| Type         |      | L    | L <sub>1</sub> <sup>1)</sup> | B      | Weight   |
|--------------|------|------|------------------------------|--------|----------|
| NRVA 15 – 20 | [mm] | 115  | 50                           | 80     | 1.4 kg   |
|              | [in] | 4.53 | 1.97                         | 3.15   | 3.09 lb  |
| NRVA 25 – 32 | [mm] | 138  | 74                           | Ø 83   | 3.0 kg   |
|              | [in] | 5.43 | 2.91                         | Ø 3.27 | 6.61 lb  |
| NRVA 40 – 50 | [mm] | 172  | 94.5                         | Ø 103  | 5.0 kg   |
|              | [in] | 6.77 | 3.72                         | Ø 4.05 | 11.02 lb |
| NRVA 65      | [mm] | 226  | 124                          | Ø 185  | 13.0 kg  |
|              | [in] | 8.90 | 4.88                         | Ø 7.28 | 28.66 lb |

<sup>1)</sup> Without flanges

## Liquid line with/without phase change



## Nominal capacities

## Liquid line with / without phase change

### SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °C}$   
 $Q_o = 300\text{ kW}$   
 $T_{liq} = 10\text{ °C}$   
 Max.  $\Delta P = 0.3\text{ bar}$

The capacity table is based on nominal conditions ( $\Delta P = 0.2\text{ bar}$ ,  $T_{liq} = 30\text{ °C}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 0.3\text{ bar}$   $f_{\Delta P} = 0.82$ .

Correction factor for liquid temperature  $f_{Tliq} = 0.82$ .

$$Q_n = Q_o \times f_{\Delta P} \times f_{Tliq} = 300 \times 0.82 \times 0.82 = 202\text{ kW.}$$

From the capacity table a NRVA 25 with  $Q_n = 370\text{ kW}$  is the correct selection for the application.

### US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °F}$   
 $Q_o = 130\text{ TR}$   
 $T_{liq} = 50\text{ °F}$   
 Max.  $\Delta P = 5\text{ psi}$

The capacity table is based on nominal conditions ( $\Delta P = 3\text{ psi}$ ,  $T_{liq} = 90\text{ °F}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 5\text{ psi}$ ,  $f_{\Delta P} = 0.79$

Correction factor for liquid temperature  $f_{Tliq} = 0.81$ .

$$Q_n = Q_o \times f_{\Delta P} \times f_{Tliq} = 130 \times 0.79 \times 0.81 = 83.2\text{ TR}$$

From the capacity table a NRVA 25 with  $Q_n = 100\text{ TR}$  is the correct selection for the application.

## Check valves, type NRVA

### Nominal capacities

### Liquid line with/without phase change

#### SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

#### R 717

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 504                           | 512    | 519    | 526    | 532    | 537  | 542   | 546   |
| NRVA 20 | 6               | 605                           | 614    | 623    | 631    | 638    | 645  | 651   | 655   |
| NRVA 25 | 19              | 1916                          | 1945   | 1973   | 1998   | 2022   | 2042 | 2060  | 2075  |
| NRVA 32 | 20              | 2016                          | 2048   | 2077   | 2104   | 2128   | 2150 | 2169  | 2185  |
| NRVA 40 | 44              | 4436                          | 4505   | 4569   | 4628   | 4682   | 4730 | 4771  | 4806  |
| NRVA 50 | 44              | 4436                          | 4505   | 4569   | 4628   | 4682   | 4730 | 4771  | 4806  |
| NRVA 65 | 75              | 7562                          | 7678   | 7787   | 7889   | 7981   | 8062 | 8133  | 8192  |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.82              |
| -10 °C             | 0.86              |
| 0 °C               | 0.88              |
| 10 °C              | 0.92              |
| 20 °C              | 0.96              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.04              |
| 50 °C              | 1.09              |

#### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

#### R 717

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |       |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|-------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F  | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 143.9                         | 145.9  | 147.7  | 149.2 | 150.6 | 151.7 | 152.5 | 153.0 |
| NRVA 20 | 7                    | 173                           | 175    | 177    | 179   | 181   | 182   | 183   | 184   |
| NRVA 25 | 22                   | 547                           | 554    | 561    | 567   | 572   | 576   | 580   | 581   |
| NRVA 32 | 23                   | 576                           | 583    | 591    | 597   | 602   | 607   | 610   | 612   |
| NRVA 40 | 51                   | 1266                          | 1284   | 1300   | 1313  | 1325  | 1335  | 1342  | 1347  |
| NRVA 50 | 51                   | 1266                          | 1284   | 1300   | 1313  | 1325  | 1335  | 1342  | 1347  |
| NRVA 65 | 87                   | 2158                          | 2188   | 2215   | 2239  | 2259  | 2276  | 2288  | 2295  |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.82              |
| 10 °F              | 0.85              |
| 30 °F              | 0.88              |
| 50 °F              | 0.92              |
| 70 °F              | 0.96              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.04              |
| 130 °F             | 1.09              |

## Check valves, type NRVA

### Nominal capacities

### SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

## Liquid line with / without phase change

### R 22

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 99                            | 102    | 105    | 108    | 111    | 114  | 116   | 118   |
| NRVA 20 | 6               | 119                           | 123    | 126    | 130    | 133    | 136  | 139   | 142   |
| NRVA 25 | 19              | 376                           | 389    | 400    | 411    | 422    | 431  | 440   | 448   |
| NRVA 32 | 20              | 396                           | 409    | 421    | 433    | 444    | 454  | 463   | 472   |
| NRVA 40 | 44              | 872                           | 900    | 927    | 952    | 977    | 999  | 1020  | 1038  |
| NRVA 50 | 44              | 872                           | 900    | 927    | 952    | 977    | 999  | 1020  | 1038  |
| NRVA 65 | 75              | 1486                          | 1534   | 1580   | 1623   | 1665   | 1703 | 1738  | 1769  |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.71              |
| -10 °C             | 0.75              |
| 0 °C               | 0.80              |
| 10 °C              | 0.86              |
| 20 °C              | 0.92              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.09              |
| 50 °C              | 1.22              |

### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

### R 22

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 28                            | 29     | 30     | 31   | 32    | 32    | 33    | 34    |
| NRVA 20 | 7                    | 34                            | 35     | 36     | 37   | 38    | 39    | 40    | 41    |
| NRVA 25 | 22                   | 106                           | 110    | 114    | 117  | 120   | 123   | 126   | 129   |
| NRVA 32 | 23                   | 112                           | 116    | 120    | 123  | 127   | 130   | 133   | 135   |
| NRVA 40 | 51                   | 246                           | 255    | 263    | 271  | 279   | 286   | 292   | 298   |
| NRVA 50 | 51                   | 246                           | 255    | 263    | 271  | 279   | 286   | 292   | 298   |
| NRVA 65 | 87                   | 419                           | 434    | 449    | 462  | 475   | 487   | 498   | 507   |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.73              |
| 10 °F              | 0.77              |
| 30 °F              | 0.82              |
| 50 °F              | 0.87              |
| 70 °F              | 0.93              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.09              |
| 130 °F             | 1.20              |

## Check valves, type NRVA

### Nominal capacities

### Liquid line with/without phase change

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

### R 134a

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 89                            | 93     | 97     | 101    | 105    | 109  | 113   | 36    |
| NRVA 20 | 6               | 107                           | 112    | 117    | 122    | 127    | 131  | 136   | 68    |
| NRVA 25 | 19              | 338                           | 354    | 370    | 385    | 401    | 415  | 429   | 90    |
| NRVA 32 | 20              | 356                           | 373    | 390    | 406    | 422    | 437  | 452   | 158   |
| NRVA 40 | 44              | 783                           | 820    | 857    | 893    | 928    | 962  | 994   | 260   |
| NRVA 50 | 44              | 783                           | 820    | 857    | 893    | 928    | 962  | 994   | 389   |
| NRVA 65 | 75              | 1335                          | 1398   | 1461   | 1522   | 1582   | 1639 | 1695  | 678   |

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.66              |
| -10 °C             | 0.70              |
| 0 °C               | 0.76              |
| 10 °C              | 0.82              |
| 20 °C              | 0.90              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.13              |
| 50 °C              | 1.29              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

### R 134a

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 25                            | 26     | 28     | 29   | 30    | 32    | 33    | 10    |
| NRVA 20 | 7                    | 30                            | 32     | 33     | 35   | 36    | 38    | 39    | 20    |
| NRVA 25 | 22                   | 95                            | 100    | 105    | 110  | 115   | 120   | 124   | 26    |
| NRVA 32 | 23                   | 100                           | 106    | 111    | 116  | 121   | 126   | 131   | 46    |
| NRVA 40 | 51                   | 220                           | 232    | 244    | 255  | 266   | 278   | 288   | 75    |
| NRVA 50 | 51                   | 220                           | 232    | 244    | 255  | 266   | 278   | 288   | 112   |
| NRVA 65 | 87                   | 376                           | 396    | 416    | 435  | 454   | 473   | 490   | 196   |

\* 2 °F below min. operating temperature.

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.64              |
| 10 °F              | 0.68              |
| 30 °F              | 0.74              |
| 50 °F              | 0.81              |
| 70 °F              | 0.89              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.15              |
| 130 °F             | 1.35              |

## Check valves, type NRVA

### Nominal capacities

### Liquid line with/without phase change

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

### R 404A

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |        |        |        |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|--------|--------|--------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C   | 10 °C  | 20 °C  |
| NRVA 15 | 5               | 57.2                          | 61.3   | 65.3   | 69.2   | 73.0   | 76.6   | 79.9   | 82.8   |
| NRVA 20 | 6               | 68.7                          | 73.6   | 78.4   | 83.1   | 87.6   | 91.9   | 95.8   | 99.4   |
| NRVA 25 | 19              | 217.5                         | 232.9  | 248.2  | 263.1  | 277.4  | 290.9  | 303.5  | 314.7  |
| NRVA 32 | 20              | 228.9                         | 245.2  | 261.3  | 276.9  | 292.0  | 306.3  | 319.5  | 331.2  |
| NRVA 40 | 44              | 503.6                         | 539.4  | 574.8  | 609.2  | 642.4  | 673.8  | 702.8  | 728.7  |
| NRVA 50 | 44              | 503.6                         | 539.4  | 574.8  | 609.2  | 642.4  | 673.8  | 702.8  | 728.7  |
| NRVA 65 | 75              | 858.5                         | 919.4  | 979.7  | 1038.4 | 1094.9 | 1148.5 | 1198.0 | 1242.1 |

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.55              |
| -10 °C             | 0.60              |
| 0 °C               | 0.66              |
| 10 °C              | 0.74              |
| 20 °C              | 0.85              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.23              |
| 50 °C              | 1.68              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

### R 404A

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |       |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|-------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F  | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 15.7                          | 17.0   | 18.2   | 19.5  | 20.7  | 21.8  | 22.8  | 23.7  |
| NRVA 20 | 7                    | 18.8                          | 20.4   | 21.9   | 23.4  | 24.8  | 26.1  | 27.4  | 28.4  |
| NRVA 25 | 22                   | 59.6                          | 64.5   | 69.3   | 74.0  | 78.5  | 82.7  | 86.8  | 89.9  |
| NRVA 32 | 23                   | 62.8                          | 67.9   | 73.0   | 77.9  | 82.6  | 87.0  | 91.3  | 94.7  |
| NRVA 40 | 51                   | 138.1                         | 149.4  | 160.6  | 171.4 | 181.7 | 191.4 | 200.9 | 208.2 |
| NRVA 50 | 51                   | 138.1                         | 149.4  | 160.6  | 171.4 | 181.7 | 191.4 | 200.9 | 208.2 |
| NRVA 65 | 87                   | 235.4                         | 254.7  | 273.7  | 292.2 | 309.8 | 326.3 | 342.5 | 355.0 |

\* 2 °F below min. operating temperature.

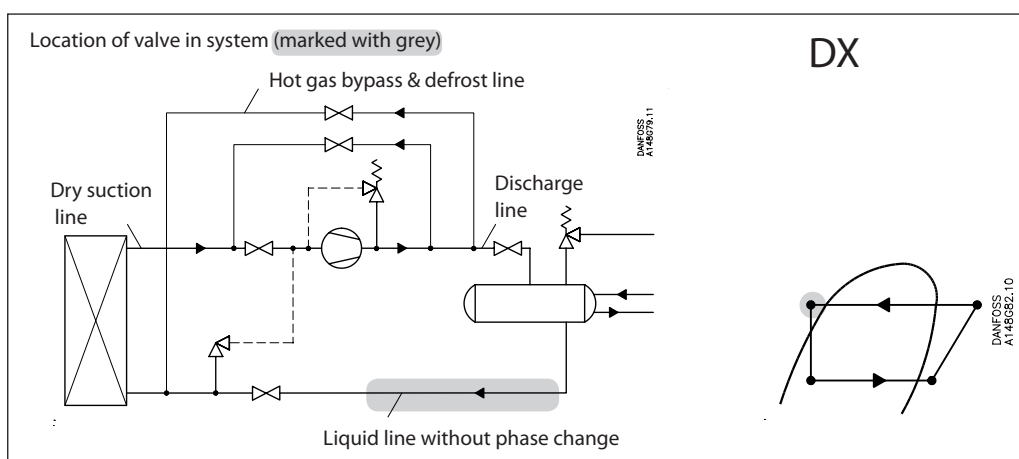
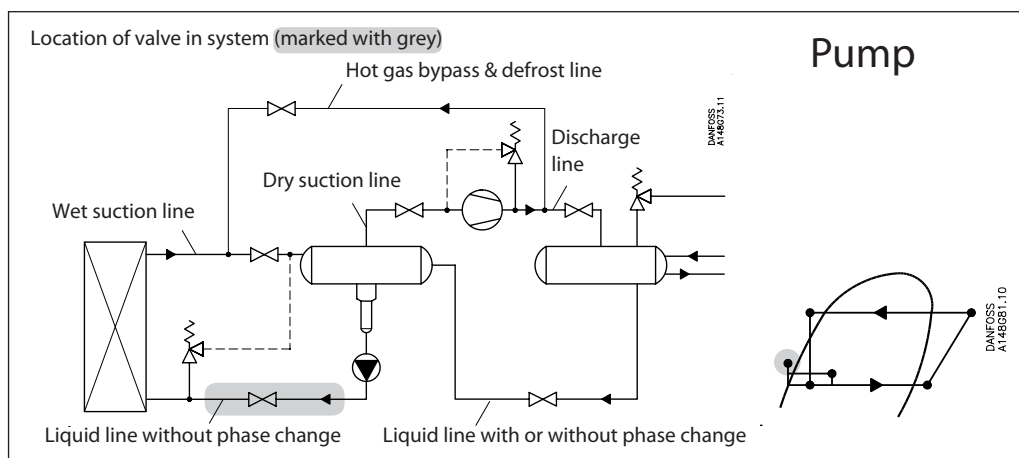
### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.52              |
| 10 °F              | 0.57              |
| 30 °F              | 0.63              |
| 50 °F              | 0.72              |
| 70 °F              | 0.83              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.29              |
| 130 °F             | 1.92              |

## Liquid line without phase change



## Nominal capacities

## Liquid line without phase change

### SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °C}$   
 $Q_0 = 300\text{ kW}$   
 circulation rate = 3  
 Max.  $\Delta P = 0.3\text{ bar}$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 0.2\text{ bar}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 0.3\text{ bar}$   $f_{\Delta P} = 0.82$

Correction factor for circulation rate  $f_{rec} = 0.75$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{rec} = 300 \times 0.82 \times 0.75 = 184.5\text{ kW}$$

From the capacity table a NRVA 40 with  $Q_n = 336\text{ kW}$  is the correct selection for the application.

### US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °F}$   
 $Q_0 = 130\text{ TR}$   
 Circulation rate = 3  
 Max.  $\Delta P = 5\text{ psi}$

The capacity table is based on nominal conditions (pressure drop  $\Delta p = 3\text{ psi}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 5\text{ psi}$   $f_{\Delta p} = 0.79$

Correction factor for circulation rate  $f_{rec} = 0.75$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{circ} = 130 \times 0.79 \times 0.75 = 77.0\text{ TR}$$

From the capacity table a NRVA 40 with  $Q_n = 101\text{ TR}$  is the correct selection for the application.

## Check valves, type NRVA

### Nominal capacities

### Liquid line without phase change

#### SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

#### R 717

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |       |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|-------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C  | 10 °C | 20 °C |
| NRVA 15 | 5                            | 182.5                         | 177.1  | 171.9  | 166.4  | 160.7  | 154.9 | 148.8 | 142.5 |
| NRVA 20 | 6                            | 219                           | 213    | 206    | 200    | 193    | 186   | 179   | 171   |
| NRVA 25 | 19                           | 693                           | 673    | 653    | 632    | 611    | 589   | 566   | 541   |
| NRVA 32 | 20                           | 730                           | 708    | 687    | 665    | 643    | 620   | 595   | 570   |
| NRVA 40 | 44                           | 1606                          | 1559   | 1512   | 1464   | 1414   | 1363  | 1310  | 1254  |
| NRVA 50 | 44                           | 1606                          | 1559   | 1512   | 1464   | 1414   | 1363  | 1310  | 1254  |
| NRVA 65 | 75                           | 2737                          | 2657   | 2578   | 2495   | 2411   | 2324  | 2232  | 2137  |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |

#### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

#### R 717

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |       |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|-------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F  | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 52.8                          | 51.1   | 49.5   | 47.8  | 45.9  | 44.0  | 41.9  | 39.8  |
| NRVA 20 | 7                    | 63.3                          | 61.4   | 59.4   | 57.4  | 55.1  | 52.8  | 50.3  | 47.8  |
| NRVA 25 | 22                   | 200.5                         | 194.4  | 188.2  | 181.7 | 174.5 | 167.3 | 159.2 | 151.4 |
| NRVA 32 | 23                   | 211                           | 205    | 198    | 191   | 184   | 176   | 168   | 159   |
| NRVA 40 | 51                   | 464                           | 450    | 436    | 421   | 404   | 387   | 369   | 351   |
| NRVA 50 | 51                   | 464                           | 450    | 436    | 421   | 404   | 387   | 369   | 351   |
| NRVA 65 | 87                   | 792                           | 767    | 743    | 717   | 689   | 660   | 628   | 598   |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |

## Check valves, type NRVA

### Nominal capacities

### SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

### R 22

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5                            | 45                            | 43     | 41     | 40     | 38     | 36   | 34    | 32    |
| NRVA 20 | 6                            | 53                            | 52     | 50     | 48     | 46     | 43   | 41    | 39    |
| NRVA 25 | 19                           | 169                           | 163    | 157    | 151    | 144    | 137  | 130   | 122   |
| NRVA 32 | 20                           | 178                           | 172    | 166    | 159    | 152    | 145  | 137   | 128   |
| NRVA 40 | 44                           | 392                           | 378    | 364    | 350    | 334    | 318  | 301   | 283   |
| NRVA 50 | 44                           | 392                           | 378    | 364    | 350    | 334    | 318  | 301   | 283   |
| NRVA 65 | 75                           | 668                           | 645    | 621    | 596    | 570    | 542  | 513   | 482   |

### Liquid line without phase change

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |

### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

### R 22

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 12.9                          | 12.4   | 11.9   | 11.4 | 10.8  | 10.2  | 9.5   | 8.8   |
| NRVA 20 | 7                    | 15                            | 15     | 14     | 14   | 13    | 12    | 11    | 11    |
| NRVA 25 | 22                   | 49                            | 47     | 45     | 43   | 41    | 39    | 36    | 34    |
| NRVA 32 | 23                   | 52                            | 50     | 48     | 46   | 43    | 41    | 38    | 35    |
| NRVA 40 | 51                   | 114                           | 109    | 105    | 100  | 95    | 90    | 84    | 78    |
| NRVA 50 | 51                   | 114                           | 109    | 105    | 100  | 95    | 90    | 84    | 78    |
| NRVA 65 | 87                   | 193                           | 186    | 179    | 171  | 162   | 153   | 143   | 133   |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |

## Check valves, type NRVA

### Nominal capacities

### Liquid line without phase change

#### R 134a

### SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
circulation rate = 4,  
 $\Delta P = 0.2$  bar

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5                            | 41.2                          | 39.7   | 38.2   | 36.6   | 34.8   | 33.0 | 31.1  | 32    |
| NRVA 20 | 6                            | 49                            | 48     | 46     | 44     | 42     | 40   | 37.4  | 39    |
| NRVA 25 | 19                           | 157                           | 151    | 145    | 139    | 132    | 126  | 118   | 122   |
| NRVA 32 | 20                           | 165                           | 159    | 153    | 146    | 139    | 132  | 125   | 128   |
| NRVA 40 | 44                           | 363                           | 350    | 336    | 322    | 307    | 291  | 274   | 283   |
| NRVA 50 | 44                           | 363                           | 350    | 336    | 322    | 307    | 291  | 274   | 283   |
| NRVA 65 | 75                           | 618                           | 596    | 573    | 549    | 523    | 496  | 467   | 482   |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |

#### R 134a

### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
circulation rate = 4,  
 $\Delta P = 3$  psi

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 11.9                          | 11.4   | 10.9   | 10.4 | 9.9   | 9.2   | 8.6   | 8.8   |
| NRVA 20 | 7                    | 14.3                          | 13.7   | 13.1   | 12.5 | 11.8  | 11.1  | 10.3  | 11    |
| NRVA 25 | 22                   | 45                            | 43     | 42     | 40   | 37    | 35    | 33    | 34    |
| NRVA 32 | 23                   | 48                            | 46     | 44     | 42   | 39    | 37    | 34    | 35    |
| NRVA 40 | 51                   | 105                           | 101    | 96     | 92   | 87    | 81    | 76    | 78    |
| NRVA 50 | 51                   | 105                           | 101    | 96     | 92   | 87    | 81    | 76    | 78    |
| NRVA 65 | 87                   | 179                           | 172    | 164    | 156  | 148   | 138   | 129   | 133   |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |

## Check valves, type NRVA

### Nominal capacities

### SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

### R 404A

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 36                            | 35     | 33     | 31     | 30     | 28   | 26    | 23    |
| NRVA 20 | 6               | 43                            | 42     | 39     | 38     | 35     | 33   | 31    | 28    |
| NRVA 25 | 19              | 138                           | 132    | 125    | 119    | 112    | 105  | 97    | 89    |
| NRVA 32 | 20              | 145                           | 139    | 131    | 125    | 118    | 111  | 102   | 93    |
| NRVA 40 | 44              | 319                           | 306    | 289    | 276    | 260    | 244  | 225   | 205   |
| NRVA 50 | 44              | 319                           | 306    | 289    | 276    | 260    | 244  | 225   | 205   |
| NRVA 65 | 75              | 543                           | 521    | 492    | 470    | 444    | 415  | 384   | 350   |

### Liquid line without phase change

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |

### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

### R 404A

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 10.5                          | 10.0   | 9.5    | 9.0  | 8.4   | 7.8   | 7.0   | 6.2   |
| NRVA 20 | 7                    | 13                            | 12     | 11     | 11   | 10    | 9     | 8     | 7     |
| NRVA 25 | 22                   | 40                            | 38     | 36     | 34   | 32    | 30    | 27    | 24    |
| NRVA 32 | 23                   | 42                            | 40     | 38     | 36   | 34    | 31    | 28    | 25    |
| NRVA 40 | 51                   | 92                            | 88     | 83     | 79   | 74    | 68    | 62    | 55    |
| NRVA 50 | 51                   | 92                            | 88     | 83     | 79   | 74    | 68    | 62    | 55    |
| NRVA 65 | 87                   | 158                           | 151    | 142    | 134  | 126   | 117   | 105   | 93    |

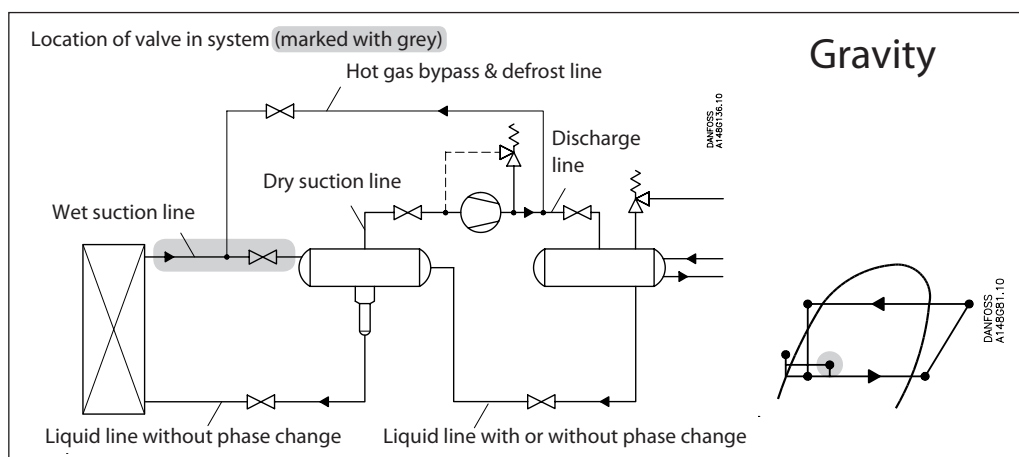
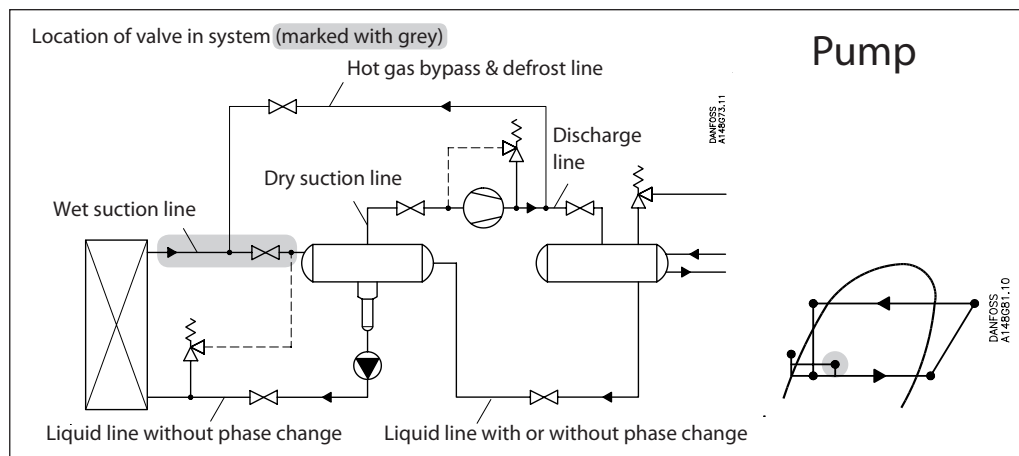
\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.5               |
| 3                | 0.75              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.5               |
| 8                | 2                 |
| 10               | 2.5               |



## Nominal capacities

## Wet suction line

### SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °C}$   
 $Q_0 = 100\text{ kW}$   
 Circulation rate = 3  
 Max.  $\Delta P = 0.3\text{ bar}$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 0.2\text{ bar}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 0.3\text{ bar}$   $f_{\Delta P} = 0.82$

Correction factor for circulation rate  $f_{rec} = 0.9$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{rec} = 100 \times 0.82 \times 0.9 = 73,8\text{ kW.}$$

From the capacity table a NRVA 40 with  $Q_n = 157\text{ kW}$  is the correct selection for the application.

Choosing NRVA 32 would give a slightly higher pressure drop than 0.3. Accepting this requires a plant evaluation.

### US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °F}$   
 $Q_0 = 10\text{ TR}$   
 Circulation rate = 3  
 Max.  $\Delta P = 5\text{ psi}$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 3\text{ psi}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 5\text{ psi}$   $f_{\Delta P} = 0.79$

Correction factor for circulation rate  $f_{rec} = 0.9$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{circ} = 10 \times 0.79 \times 0.9 = 7.1\text{ TR}$$

From the capacity table a NRVA 25 with  $Q_n = 16.5\text{ TR}$  is the correct selection for the application.

## Check valves, type NRVA

### Nominal capacities

### Wet suction line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

### R 717

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5                            | 9.1                           | 11.8   | 14.7   | 17.9   | 21.3   | 24.9 | 28.7  | 32.6  |
| NRVA 20 | 6                            | 11.0                          | 14.2   | 17.6   | 21.4   | 25.5   | 29.9 | 34.5  | 39.2  |
| NRVA 25 | 19                           | 34.7                          | 45.0   | 55.9   | 67.9   | 80.9   | 94.7 | 109.1 | 124.0 |
| NRVA 32 | 20                           | 36.6                          | 47.3   | 58.8   | 71.5   | 85.1   | 99.7 | 115   | 131   |
| NRVA 40 | 44                           | 80.4                          | 104.1  | 129.4  | 157    | 187    | 219  | 253   | 287   |
| NRVA 50 | 44                           | 80.4                          | 104    | 129    | 157    | 187    | 219  | 253   | 287   |
| NRVA 65 | 75                           | 137                           | 178    | 221    | 268    | 319    | 374  | 431   | 490   |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

### R 717

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 2.5                           | 3.4    | 4.3    | 5.4  | 6.5   | 7.7   | 8.9   | 10.1  |
| NRVA 20 | 7                    | 3.1                           | 4.1    | 5.2    | 6.5  | 7.8   | 9.2   | 10.7  | 12.1  |
| NRVA 25 | 22                   | 9.7                           | 13.0   | 16.5   | 20.5 | 24.7  | 29.2  | 33.8  | 38.5  |
| NRVA 32 | 23                   | 10.2                          | 13.7   | 17.3   | 21.6 | 26.0  | 30.8  | 35.5  | 40.5  |
| NRVA 40 | 51                   | 22.4                          | 30.1   | 38.1   | 47.5 | 57.2  | 67.7  | 78.2  | 89.1  |
| NRVA 50 | 51                   | 22.4                          | 30.1   | 38.1   | 47.5 | 57.2  | 67.7  | 78.2  | 89.1  |
| NRVA 65 | 87                   | 38.2                          | 51.3   | 65.0   | 80.9 | 97.6  | 115   | 133   | 152   |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |

## Check valves, type NRVA

### Nominal capacities

### Wet suction line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

### R 22

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5                            | 4.5                           | 5.5    | 6.5    | 7.7    | 8.9    | 10.0 | 11.2  | 12.4  |
| NRVA 20 | 6                            | 5.3                           | 6.6    | 7.9    | 9.2    | 10.6   | 12.1 | 13.5  | 14.9  |
| NRVA 25 | 19                           | 16.9                          | 21     | 25     | 29     | 34     | 38   | 43    | 47    |
| NRVA 32 | 20                           | 17.8                          | 22     | 26     | 31     | 35     | 40   | 45    | 50    |
| NRVA 40 | 44                           | 39                            | 48     | 58     | 68     | 78     | 88   | 99    | 109   |
| NRVA 50 | 44                           | 39                            | 48     | 58     | 68     | 78     | 88   | 99    | 109   |
| NRVA 65 | 75                           | 67                            | 82     | 98     | 115    | 133    | 151  | 168   | 186   |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

### R 22

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 1.3                           | 1.6    | 1.9    | 2.3  | 2.7   | 3.0   | 3.4   | 3.8   |
| NRVA 20 | 7                    | 1.5                           | 1.9    | 2.3    | 2.7  | 3.2   | 3.6   | 4.1   | 4.6   |
| NRVA 25 | 22                   | 4.8                           | 6.0    | 7.3    | 8.7  | 10.1  | 11.5  | 13.1  | 14.4  |
| NRVA 32 | 23                   | 5.0                           | 6.3    | 7.7    | 9.2  | 10.6  | 12.2  | 13.8  | 15.2  |
| NRVA 40 | 51                   | 11.1                          | 13.9   | 16.9   | 20   | 23    | 27    | 30    | 33    |
| NRVA 50 | 51                   | 11.1                          | 13.9   | 16.9   | 20   | 23    | 27    | 30    | 33    |
| NRVA 65 | 87                   | 18.9                          | 24     | 29     | 34   | 40    | 46    | 52    | 57    |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |

## Check valves, type NRVA

### Nominal capacities

### Wet suction line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

### R 134a

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 3.3                           | 4.6    | 5.7    | 6.7    | 7.7    | 8.8  | 9.8   | 12.4  |
| NRVA 20 | 6               | 4.0                           | 5.5    | 6.8    | 8.0    | 9.3    | 10.5 | 11.8  | 14.9  |
| NRVA 25 | 19              | 12.6                          | 17.3   | 22     | 25     | 29     | 33   | 37    | 47    |
| NRVA 32 | 20              | 13.3                          | 18.2   | 23     | 27     | 31     | 35   | 39    | 50    |
| NRVA 40 | 44              | 29                            | 40.1   | 50     | 59     | 68     | 77   | 87    | 109   |
| NRVA 50 | 44              | 29                            | 40.1   | 50     | 59     | 68     | 77   | 87    | 109   |
| NRVA 65 | 75              | 50                            | 68.4   | 85     | 100    | 116    | 132  | 148   | 186   |

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

### R 134a

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 1.0                           | 1.3    | 1.7    | 2.0  | 2.4   | 2.7   | 3.1   | 3.8   |
| NRVA 20 | 7                    | 1.2                           | 1.6    | 2.0    | 2.4  | 2.8   | 3.3   | 3.7   | 4.6   |
| NRVA 25 | 22                   | 3.7                           | 5.1    | 6.4    | 7.7  | 9.0   | 10.3  | 11.6  | 14.4  |
| NRVA 32 | 23                   | 3.8                           | 5.4    | 6.8    | 8.1  | 9.4   | 10.9  | 12.2  | 15.2  |
| NRVA 40 | 51                   | 8.5                           | 11.8   | 14.9   | 17.8 | 21    | 24    | 27    | 33    |
| NRVA 50 | 51                   | 8.5                           | 11.8   | 14.9   | 17.8 | 21    | 24    | 27    | 33    |
| NRVA 65 | 87                   | 14.4                          | 20     | 25     | 30   | 35    | 41    | 46    | 57    |

\* 2 °F below min. operating temperature.

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |

## Check valves, type NRVA

### Nominal capacities

### Wet suction line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

### R 404A

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |       |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|-------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C  | 10 °C | 20 °C |
| NRVA 15 | 5               | 4.6                           | 5.5    | 6.5    | 7.6    | 8.7    | 9.8   | 10.8  | 11.7  |
| NRVA 20 | 6               | 5.5                           | 6.7    | 7.8    | 9.1    | 10.4   | 11.7  | 12.9  | 14.0  |
| NRVA 25 | 19              | 17.4                          | 21.1   | 24.7   | 28.9   | 33.0   | 37.1  | 40.9  | 44.4  |
| NRVA 32 | 20              | 18.3                          | 22.2   | 26.1   | 30.4   | 34.7   | 39.0  | 43.1  | 46.7  |
| NRVA 40 | 44              | 40.3                          | 48.8   | 57.3   | 66.9   | 76.4   | 85.8  | 94.8  | 102.8 |
| NRVA 50 | 44              | 40.3                          | 48.8   | 57.3   | 66.9   | 76.4   | 85.8  | 94.8  | 102.8 |
| NRVA 65 | 75              | 68.7                          | 83.2   | 97.7   | 114.0  | 130.3  | 146.3 | 161.6 | 175.3 |

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

### R 404A

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 1.3                           | 1.6    | 1.9    | 2.3  | 2.6   | 2.9   | 3.3   | 3.5   |
| NRVA 20 | 7                    | 1.6                           | 1.9    | 2.3    | 2.7  | 3.1   | 3.5   | 3.9   | 4.2   |
| NRVA 25 | 22                   | 4.9                           | 6.1    | 7.3    | 8.6  | 9.9   | 11.2  | 12.4  | 13.4  |
| NRVA 32 | 23                   | 5.2                           | 6.4    | 7.7    | 9.0  | 10.4  | 11.8  | 13.1  | 14.1  |
| NRVA 40 | 51                   | 11.4                          | 14.1   | 16.9   | 19.9 | 22.9  | 25.9  | 28.8  | 31.1  |
| NRVA 50 | 51                   | 11.4                          | 14.1   | 16.9   | 19.9 | 22.9  | 25.9  | 28.8  | 31.1  |
| NRVA 65 | 87                   | 19.4                          | 24.1   | 28.8   | 33.9 | 39.1  | 44.1  | 49.1  | 52.9  |

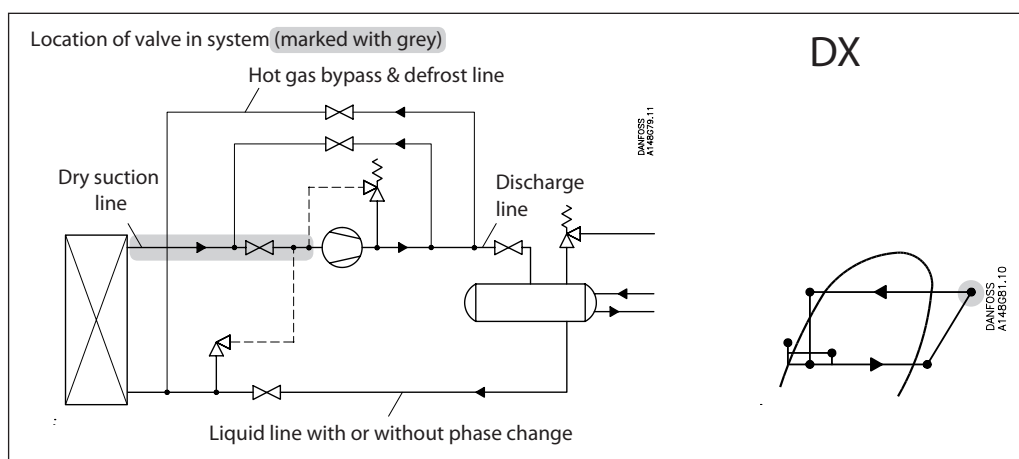
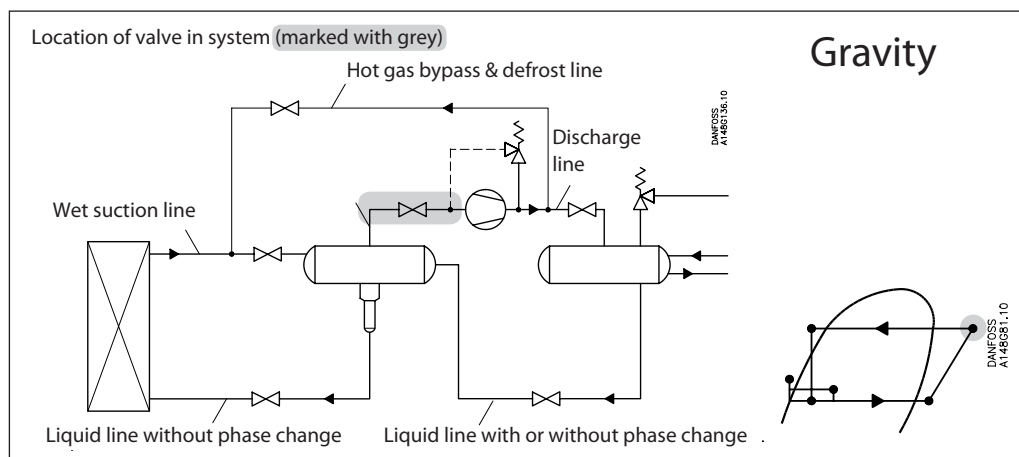
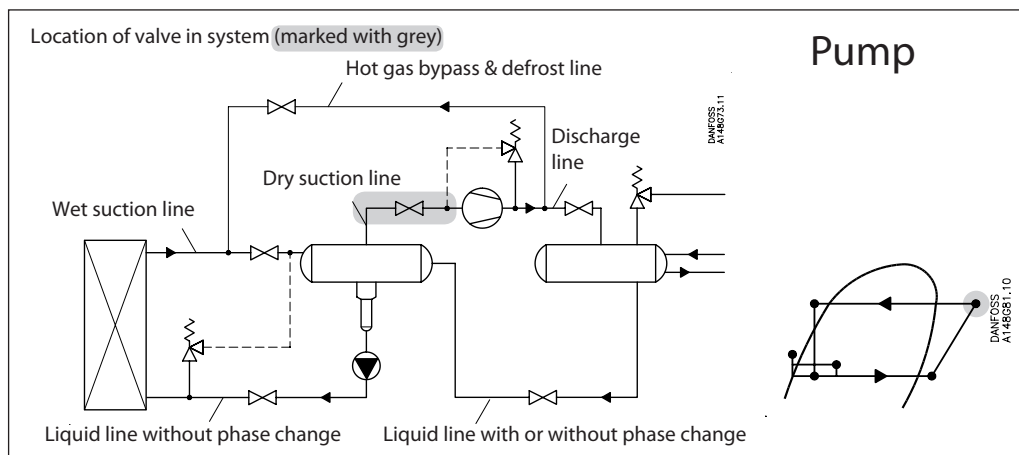
\* 2 °F below min. operating temperature.

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

### Correction factor for circulation rate ( $f_{rec}$ )

| Circulation rate | Correction factor |
|------------------|-------------------|
| 2                | 0.77              |
| 3                | 0.90              |
| <b>4</b>         | <b>1</b>          |
| 6                | 1.13              |
| 8                | 1.20              |
| 10               | 1.25              |



## Nominal capacities

## Dry suction line

### SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= -20\text{ }^{\circ}\text{C} \\ Q_0 &= 90\text{ kW} \\ T_{liq} &= 10\text{ }^{\circ}\text{C} \\ T_s &= 6\text{ }^{\circ}\text{C} \\ \text{Max. } \Delta P &= 0.3\text{ bar} \end{aligned}$$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 0.2\text{ bar}$ ,  $T_{liq} = 30\text{ }^{\circ}\text{C}$ ),  $T_s = 10\text{ }^{\circ}\text{C}$

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\text{ } 0.3\text{ bar}$   $f_{\Delta P} = 0.82$

Correction factor for liquid temperature  $f_{T_{liq}} = 0.82$

Correction factor for superheat ( $T_s$ ) = 1,0

$$\begin{aligned} Q_n &= Q_0 \times f_{\Delta P} \times f_{T_{liq}} \times f_{T_s} \\ &= 90 \times 0.82 \times 0.82 \times 1.0 = 60.5\text{ kW} \end{aligned}$$

From the capacity table a NRVA 40 or NRVA 50 with  $Q_n = 65\text{ kW}$  is the correct selection depending on connections for the application.

### US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= 0\text{ }^{\circ}\text{F} \\ Q_0 &= 23\text{ TR} \\ T_{liq} &= 50\text{ }^{\circ}\text{F} \\ T_s &= 10\text{ }^{\circ}\text{F} \\ \text{Max. } \Delta P &= 5\text{ psi} \end{aligned}$$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 3\text{ psi}$ ,  $T_{liq} = 90\text{ }^{\circ}\text{F}$ ),  $T_s = 14\text{ }^{\circ}\text{F}$

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\text{ } 5\text{ psi}$   $f_{\Delta P} = 0.79$

Correction factor for liquid temperature  $f_{T_{liq}} = 0.81$

Correction factor for superheat ( $T_s$ ) = 1,0

$$\begin{aligned} Q_n &= Q_0 \times f_{\Delta P} \times f_{T_{liq}} \times f_{T_s} = \\ &= 23 \times 0.79 \times 0.81 \times 1.0 = 14.7\text{ TR} \end{aligned}$$

From the capacity table a NRVA 40 or NRVA 50 with  $Q_n = 19.3\text{ TR}$  is the correct selection depending on connections for the application.

## Check valves, type NRVA

### Nominal capacities

### Dry suction line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

### R 717

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |       |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|-------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C  | 10 °C | 20 °C |
| NRVA 15 | 5               | 12.9                          | 17.0   | 21.8   | 27.5   | 33.7   | 41.0  | 49.0  | 57.9  |
| NRVA 20 | 6               | 15.5                          | 20.4   | 26.2   | 32.9   | 40.5   | 49.2  | 58.9  | 69.5  |
| NRVA 25 | 19              | 49.0                          | 64.7   | 82.8   | 104.3  | 128.2  | 155.7 | 186   | 220   |
| NRVA 32 | 20              | 51.6                          | 68.1   | 87.2   | 109.8  | 135    | 164   | 196   | 232   |
| NRVA 40 | 44              | 113.5                         | 149.7  | 192    | 242    | 297    | 361   | 432   | 510   |
| NRVA 50 | 44              | 113                           | 150    | 192    | 242    | 297    | 361   | 432   | 510   |
| NRVA 65 | 75              | 193                           | 255    | 327    | 412    | 506    | 615   | 736   | 869   |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for superheat ( $T_s$ )

| $T_s$ | Correction factor |
|-------|-------------------|
| 6 °C  | 1.00              |
| 8 °C  | 1.00              |
| 10 °C | 1.00              |
| 12 °C | 1.00              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.82              |
| -10 °C             | 0.86              |
| 0 °C               | 0.88              |
| 10 °C              | 0.92              |
| 20 °C              | 0.96              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.04              |
| 50 °C              | 1.09              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

### R 717

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 3.6                           | 4.9    | 6.4    | 8.2  | 10.4  | 12.8  | 15.4  | 18.3  |
| NRVA 20 | 7                    | 4.3                           | 5.9    | 7.7    | 9.8  | 12.4  | 15.4  | 18.5  | 22.0  |
| NRVA 25 | 22                   | 13.6                          | 18.7   | 24.4   | 31.2 | 39.4  | 48.6  | 58.5  | 69.7  |
| NRVA 32 | 23                   | 14.3                          | 19.7   | 25.7   | 32.8 | 41.4  | 51.2  | 61.5  | 73.3  |
| NRVA 40 | 51                   | 31.5                          | 43.2   | 56.5   | 72.2 | 91.2  | 112.6 | 135.4 | 161   |
| NRVA 50 | 51                   | 31.5                          | 43.2   | 56.5   | 72.2 | 91.2  | 113   | 135   | 161   |
| NRVA 65 | 87                   | 53.6                          | 73.7   | 96.3   | 123  | 155   | 192   | 231   | 275   |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for superheat ( $T_s$ )

| $T_s$ | Correction factor |
|-------|-------------------|
| 10 °F | 1.00              |
| 14 °F | 1.00              |
| 18 °F | 1.00              |
| 20 °F | 1.00              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.82              |
| 10 °F              | 0.85              |
| 30 °F              | 0.88              |
| 50 °F              | 0.92              |
| 70 °F              | 0.96              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.04              |
| 130 °F             | 1.09              |

## Check valves, type NRVA

### Nominal capacities

### Dry suction line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

### R 22

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 5.1                           | 6.6    | 8.3    | 10.4   | 12.7   | 15.3 | 18.2  | 21.4  |
| NRVA 20 | 6               | 6.1                           | 7.9    | 10.0   | 12.5   | 15.2   | 18.3 | 22    | 26    |
| NRVA 25 | 19              | 19.3                          | 25     | 32     | 40     | 48     | 58   | 69    | 81    |
| NRVA 32 | 20              | 20                            | 26     | 33     | 42     | 51     | 61   | 73    | 85    |
| NRVA 40 | 44              | 45                            | 58     | 73     | 92     | 112    | 134  | 160   | 188   |
| NRVA 50 | 44              | 45                            | 58     | 73     | 92     | 112    | 134  | 160   | 188   |
| NRVA 65 | 75              | 76                            | 99     | 125    | 156    | 190    | 229  | 272   | 320   |

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

### Correction factor for superheat ( $T_s$ )

| $T_s$ | Correction factor |
|-------|-------------------|
| 6 °C  | 1.00              |
| 8 °C  | 1.00              |
| 10 °C | 1.00              |
| 12 °C | 1.00              |

### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.71              |
| -10 °C             | 0.75              |
| 0 °C               | 0.80              |
| 10 °C              | 0.86              |
| 20 °C              | 0.92              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.09              |
| 50 °C              | 1.22              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

### R 22

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 1.4                           | 1.9    | 2.4    | 3.1  | 3.8   | 4.7   | 5.7   | 6.8   |
| NRVA 20 | 7                    | 1.7                           | 2.2    | 2.9    | 3.7  | 4.6   | 5.6   | 6.8   | 8.1   |
| NRVA 25 | 22                   | 5.3                           | 7.1    | 9.2    | 11.7 | 14.5  | 17.7  | 22    | 26    |
| NRVA 32 | 23                   | 5.6                           | 7.5    | 9.7    | 12.3 | 15.3  | 18.6  | 23    | 27    |
| NRVA 40 | 51                   | 12.3                          | 16.4   | 21     | 27   | 34    | 41    | 50    | 60    |
| NRVA 50 | 51                   | 12.3                          | 16.4   | 21     | 27   | 34    | 41    | 50    | 60    |
| NRVA 65 | 87                   | 21                            | 28     | 36     | 46   | 57    | 70    | 86    | 102   |

\* 2 °F below min. operating temperature.

### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

### Correction factor for superheat ( $T_s$ )

| $T_s$ | Correction factor |
|-------|-------------------|
| 10 °F | 1.00              |
| 14 °F | 1.00              |
| 18 °F | 1.00              |
| 20 °F | 1.00              |

### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.73              |
| 10 °F              | 0.77              |
| 30 °F              | 0.82              |
| 50 °F              | 0.87              |
| 70 °F              | 0.93              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.09              |
| 130 °F             | 1.20              |

## Check valves, type NRVA

### Nominal capacities

### Dry suction line

### SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

### R 134a

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5                            | 4.3                           | 5.7    | 7.4    | 9.4    | 11.7   | 14.3 | 17.3  | 21.4  |
| NRVA 20 | 6                            | 5.2                           | 6.9    | 8.9    | 11.2   | 14.0   | 17.2 | 21    | 26    |
| NRVA 25 | 19                           | 16.4                          | 22     | 28     | 36     | 44     | 54   | 66    | 81    |
| NRVA 32 | 20                           | 17.3                          | 23     | 30     | 37     | 47     | 57   | 69    | 85    |
| NRVA 40 | 44                           | 38                            | 50     | 65     | 82     | 103    | 126  | 153   | 188   |
| NRVA 50 | 44                           | 38                            | 50     | 65     | 82     | 103    | 126  | 153   | 188   |
| NRVA 65 | 75                           | 65                            | 86     | 111    | 140    | 175    | 215  | 260   | 320   |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for superheat ( $T_s$ )

| $T_s$ | Correction factor |
|-------|-------------------|
| 6 °C  | 1.00              |
| 8 °C  | 1.00              |
| 10 °C | 1.00              |
| 12 °C | 1.00              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.66              |
| -10 °C             | 0.70              |
| 0 °C               | 0.76              |
| 10 °C              | 0.82              |
| 20 °C              | 0.90              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.13              |
| 50 °C              | 1.29              |

### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

### R 134a

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 1.2                           | 1.7    | 2.2    | 2.8  | 3.6   | 4.6   | 5.6   | 6.8   |
| NRVA 20 | 7                    | 1.5                           | 2.0    | 2.6    | 3.4  | 4.3   | 5.5   | 6.7   | 8.1   |
| NRVA 25 | 22                   | 4.6                           | 6.3    | 8.3    | 10.8 | 13.7  | 17.3  | 21    | 26    |
| NRVA 32 | 23                   | 4.9                           | 6.6    | 8.8    | 11.4 | 14.4  | 18.3  | 22    | 27    |
| NRVA 40 | 51                   | 10.7                          | 14.6   | 19.3   | 25   | 32    | 40    | 49    | 60    |
| NRVA 50 | 51                   | 10.7                          | 14.6   | 19.3   | 25   | 32    | 40    | 49    | 60    |
| NRVA 65 | 87                   | 18.3                          | 25     | 33     | 43   | 54    | 68    | 84    | 102   |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for superheat ( $T_s$ )

| $T_s$ | Correction factor |
|-------|-------------------|
| 10 °F | 1.00              |
| 14 °F | 1.00              |
| 18 °F | 1.00              |
| 20 °F | 1.00              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.64              |
| 10 °F              | 0.68              |
| 30 °F              | 0.74              |
| 50 °F              | 0.81              |
| 70 °F              | 0.89              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.15              |
| 130 °F             | 1.35              |

## Check valves, type NRVA

### Nominal capacities

### Dry suction line

### SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

### R 404A

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                 | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 3.8                           | 5.1    | 6.7    | 8.6    | 10.7   | 13.2 | 16.1  | 19.4  |
| NRVA 20 | 6               | 4.6                           | 6.1    | 8.0    | 10.3   | 12.8   | 15.8 | 19.3  | 23.3  |
| NRVA 25 | 19              | 14.5                          | 19.4   | 25.3   | 32.5   | 40.6   | 50.2 | 61.2  | 73.7  |
| NRVA 32 | 20              | 15.3                          | 20.4   | 26.7   | 34.3   | 42.8   | 52.8 | 64.4  | 77.6  |
| NRVA 40 | 44              | 33.6                          | 44.9   | 58.7   | 75.4   | 94     | 116  | 142   | 171   |
| NRVA 50 | 44              | 33.6                          | 44.9   | 59     | 75     | 94     | 116  | 142   | 171   |
| NRVA 65 | 75              | 57.3                          | 77     | 100    | 128    | 160    | 198  | 241   | 291   |

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.25             | 0.89              |
| 0.3              | 0.82              |
| 0.4              | 0.71              |
| 0.5              | 0.63              |
| 0.6              | 0.58              |

#### Correction factor for superheat ( $T_s$ )

| $T_s$ | Correction factor |
|-------|-------------------|
| 6 °C  | 1.00              |
| 8 °C  | 1.00              |
| 10 °C | 1.00              |
| 12 °C | 1.00              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.55              |
| -10 °C             | 0.60              |
| 0 °C               | 0.66              |
| 10 °C              | 0.74              |
| 20 °C              | 0.85              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.23              |
| 50 °C              | 1.68              |

### US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

### R 404A

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 1.0                           | 1.4    | 1.9    | 2.5  | 3.2   | 4.0   | 5.1   | 6.2   |
| NRVA 20 | 7                    | 1.2                           | 1.7    | 2.3    | 3.0  | 3.8   | 4.8   | 6.1   | 7.4   |
| NRVA 25 | 22                   | 3.9                           | 5.4    | 7.3    | 9.5  | 12.2  | 15.3  | 19.3  | 23.5  |
| NRVA 32 | 23                   | 4.1                           | 5.7    | 7.6    | 10.0 | 12.8  | 16.1  | 20.3  | 24.7  |
| NRVA 40 | 51                   | 9.1                           | 12.5   | 16.8   | 22.0 | 28.2  | 35.4  | 44.6  | 54.4  |
| NRVA 50 | 51                   | 9.1                           | 12.5   | 16.8   | 22.0 | 28.2  | 35.4  | 44.6  | 54.4  |
| NRVA 65 | 87                   | 15.5                          | 21.4   | 28.7   | 37.5 | 48.0  | 60    | 76    | 93    |

\* 2 °F below min. operating temperature.

#### Correction factor for $\Delta P$ ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 4                | 0.87              |
| 5                | 0.79              |
| 6                | 0.72              |
| 7                | 0.66              |
| 8                | 0.62              |

#### Correction factor for superheat ( $T_s$ )

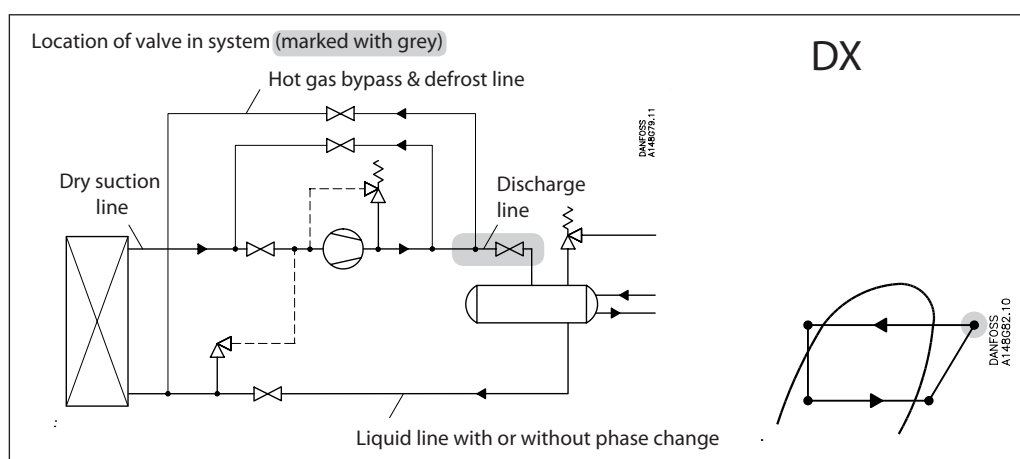
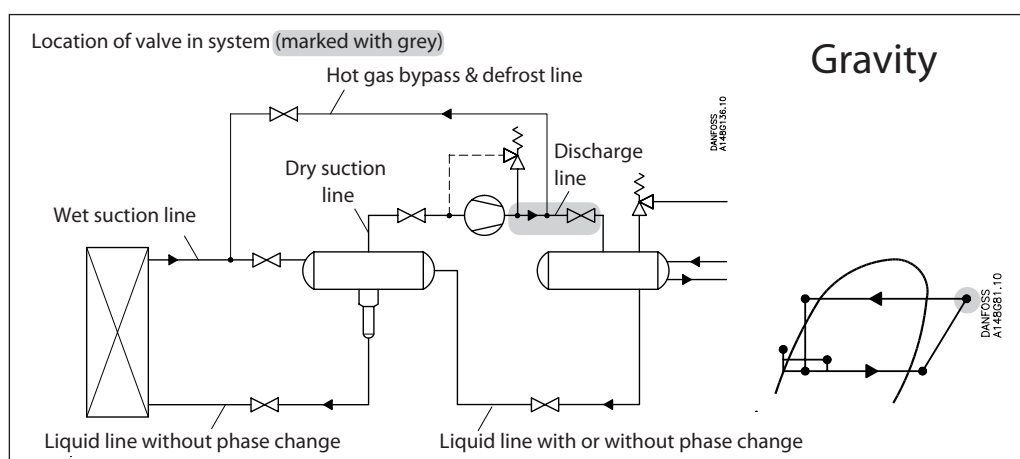
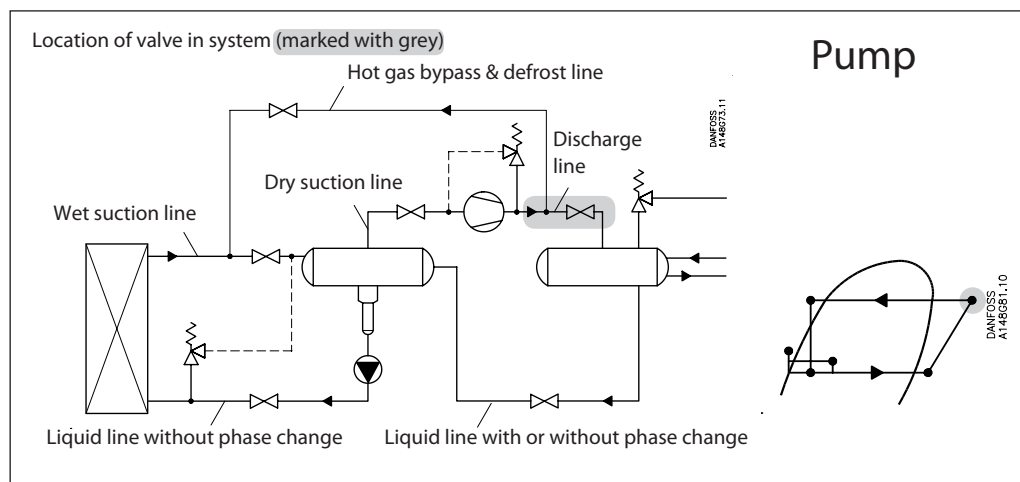
| $T_s$ | Correction factor |
|-------|-------------------|
| 10 °F | 1.00              |
| 14 °F | 1.00              |
| 18 °F | 1.00              |
| 20 °F | 1.00              |

#### Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.52              |
| 10 °F              | 0.57              |
| 30 °F              | 0.63              |
| 50 °F              | 0.72              |
| 70 °F              | 0.83              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.29              |
| 130 °F             | 1.92              |

Nominal capacities

Discharge line



## Nominal capacities

## Discharge line

### SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= -20\text{ °C} \\ Q_o &= 90\text{ kW} \\ T_{liq} &= 10\text{ °C} \\ \text{Max. } \Delta P &= 0.4\text{ bar} \\ T_{disch} &= 60\text{ °C} \end{aligned}$$

The capacity table is based on nominal conditions ( $\Delta P = 0.2\text{ bar}$ ,  $T_{liq} = 30\text{ °C}$ ,  $P_{disch} = 12\text{ bar}$ ,  $T_{disch} = 80\text{ °C}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P$  0.4 bar  $f_{\Delta P} = 0.72$ .

Correction factor for liquid temperature  $f_{Tliq} = 0.92$ .

Correction factor for  $T_{disch}$  60 °C,  $f_{disch} = 0.97$ .

Correction factor for  $P_{disch}$  12 bar,  $f_{pdisch} = 1.0$ .

$$\begin{aligned} Q_n &= Q_o \times f_{\Delta P} \times f_{Tliq} \times f_{Tdisch} \times f_{pdisch} \\ &= 90 \times 0.72 \times 0.92 \times 0.97 \times 1.0 = 58\text{ kW} \end{aligned}$$

From the capacity table a NRVA 20 with  $Q_n = 67.5\text{ kW}$  is the correct selection for the application.

### US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= 0\text{ °F} \\ Q_o &= 18\text{ TR} \\ T_{liq} &= 50\text{ °F} \\ \text{Max. } \Delta P &= 7\text{ psi} \\ T_{disch} &= 120\text{ °F} \end{aligned}$$

The capacity table is based on nominal conditions ( $\Delta P = 3\text{ psi}$ ,  $T_{liq} = 90\text{ °F}$ ,  $P_{disch} = 185\text{ psi}$ ,  $T_{disch} = 180\text{ °F}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P$  7 psi  $f_{\Delta P} = 0.67$ .

Correction factor for liquid temperature  $f_{Tliq} = 0.92$ .

Correction factor for  $T_{disch}$  120 °F,  $f_{disch} = 0.95$ .

Correction factor for  $P_{disch}$  185 psi,  $f_{pdisch} = 1.0$ .

$$\begin{aligned} Q_n &= Q_o \times f_{\Delta P} \times f_{Tliq} \times f_{Tdisch} \times f_{pdisch} \\ &= 18 \times 0.67 \times 0.92 \times 0.95 \times 1.0 = 10.5\text{ TR} \end{aligned}$$

From the capacity table a NRVA 15 with  $Q_n = 16.4\text{ TR}$  is the correct selection for the application.

## Check valves, type NRVA

### Nominal capacities

### Discharge line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ °C}$ ,  
 $P_{disch} = 12\text{ bar}$ ,  
 $\Delta P = 0.2\text{ bar}$ ,  
 $T_{disch} = 80\text{ °C}$

## R 717

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5                            | 53.9                          | 54.8   | 55.5   | 56.3   | 56.9   | 57.5 | 58.0  | 58.4  |
| NRVA 20 | 6                            | 64.7                          | 65.7   | 66.6   | 67.5   | 68.3   | 69.0 | 69.6  | 70.1  |
| NRVA 25 | 19                           | 205                           | 208    | 211    | 214    | 216    | 218  | 220   | 222   |
| NRVA 32 | 20                           | 216                           | 219    | 222    | 225    | 228    | 230  | 232   | 234   |
| NRVA 40 | 44                           | 475                           | 482    | 489    | 495    | 501    | 506  | 510   | 514   |
| NRVA 50 | 44                           | 475                           | 482    | 489    | 495    | 501    | 506  | 510   | 514   |
| NRVA 65 | 75                           | 809                           | 821    | 833    | 844    | 854    | 862  | 870   | 876   |

Correction factor for discharge pressure ( $P_{disch}$ )

| $P_{disch}$ (bar) | Correction factor |
|-------------------|-------------------|
| <b>12</b>         | <b>1.00</b>       |
| 16                | 0.87              |
| 20                | 0.78              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.4              | 0.72              |
| 0.6              | 0.59              |
| 0.8              | 0.52              |
| 1                | 0.46              |
| 1.5              | 0.39              |
| 2                | 0.34              |
| 4                | 0.27              |

Correction factor for discharge temperature ( $T_{disch}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 50 °C                 | 0.96              |
| 60 °C                 | 0.97              |
| <b>80 °C</b>          | <b>1.00</b>       |
| 90 °C                 | 1.01              |
| 100 °C                | 1.03              |
| 110 °C                | 1.04              |
| 120 °C                | 1.06              |

Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.82              |
| -10 °C             | 0.86              |
| 0 °C               | 0.88              |
| 10 °C              | 0.92              |
| 20 °C              | 0.96              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.04              |
| 50 °C              | 1.09              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$ ,  
 $P_{disch} = 185\text{ psi}$ ,  
 $T_{disch} = 180\text{ °F}$

## R 717

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 15.8                          | 16.0   | 16.3   | 16.4 | 16.5  | 16.7  | 16.7  | 16.8  |
| NRVA 20 | 7                    | 19.0                          | 19.2   | 19.5   | 19.7 | 19.8  | 20.1  | 20.1  | 20.2  |
| NRVA 25 | 22                   | 60.1                          | 60.9   | 61.8   | 62.3 | 62.8  | 63.5  | 63.6  | 63.9  |
| NRVA 32 | 23                   | 63                            | 64     | 65     | 66   | 66    | 67    | 67    | 67    |
| NRVA 40 | 51                   | 139                           | 141    | 143    | 144  | 145   | 147   | 147   | 148   |
| NRVA 50 | 51                   | 139                           | 141    | 143    | 144  | 145   | 147   | 147   | 148   |
| NRVA 65 | 87                   | 237                           | 241    | 244    | 246  | 248   | 251   | 251   | 252   |

\* 2 °F below min. operating temperature.

Correction factor for discharge pressure ( $P_{disch}$ )

| $P_{disch}$ (psi) | Correction factor |
|-------------------|-------------------|
| <b>185</b>        | <b>1.00</b>       |
| 240               | 0.87              |
| 300               | 0.78              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 5                | 0.79              |
| 7                | 0.67              |
| 10               | 0.56              |
| 15               | 0.47              |
| 20               | 0.41              |
| 30               | 0.35              |
| 60               | 0.28              |

Correction factor for discharge temperature ( $T_{disch}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 120 °F                | 0.95              |
| 140 °F                | 0.97              |
| <b>180 °F</b>         | <b>1.00</b>       |
| 200 °F                | 1.02              |
| 210 °F                | 1.02              |
| 230 °F                | 1.04              |
| 250 °F                | 1.06              |

Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.82              |
| 10 °F              | 0.85              |
| 30 °F              | 0.88              |
| 50 °F              | 0.92              |
| 70 °F              | 0.96              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.04              |
| 130 °F             | 1.09              |

## Check valves, type NRVA

### Nominal capacities

### Discharge line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ °C}$ ,  
 $P_{disch} = 12\text{ bar}$ ,  
 $\Delta P = 0.2\text{ bar}$ ,  
 $T_{disch} = 80\text{ °C}$

### R 22

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |      |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5                            | 17.3                          | 17.9   | 18.4   | 18.9   | 19.4   | 19.8 | 20    | 21    |
| NRVA 20 | 6                            | 21                            | 21     | 22     | 23     | 23     | 24   | 24    | 25    |
| NRVA 25 | 19                           | 66                            | 68     | 70     | 72     | 74     | 75   | 77    | 78    |
| NRVA 32 | 20                           | 69                            | 71     | 74     | 76     | 78     | 79   | 81    | 82    |
| NRVA 40 | 44                           | 152                           | 157    | 162    | 166    | 171    | 175  | 178   | 181   |
| NRVA 50 | 44                           | 152                           | 157    | 162    | 166    | 171    | 175  | 178   | 181   |
| NRVA 65 | 75                           | 260                           | 268    | 276    | 284    | 291    | 297  | 304   | 309   |

Correction factor for discharge pressure ( $P_{disch}$ )

| $P_{disch}$ (bar) | Correction factor |
|-------------------|-------------------|
| <b>12</b>         | <b>1.00</b>       |
| 16                | 0.87              |
| 20                | 0.78              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.4              | 0.72              |
| 0.6              | 0.59              |
| 0.8              | 0.52              |
| 1                | 0.46              |
| 1.5              | 0.39              |
| 2                | 0.34              |
| 4                | 0.27              |

Correction factor for discharge temperature ( $T_{disch}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 50 °C                 | 0.96              |
| 60 °C                 | 0.97              |
| <b>80 °C</b>          | <b>1.00</b>       |
| 90 °C                 | 1.01              |
| 100 °C                | 1.03              |
| 110 °C                | 1.04              |
| 120 °C                | 1.06              |

Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.71              |
| -10 °C             | 0.75              |
| 0 °C               | 0.80              |
| 10 °C              | 0.86              |
| 20 °C              | 0.92              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.09              |
| 50 °C              | 1.22              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$ ,  
 $P_{disch} = 185\text{ psi}$ ,  
 $T_{disch} = 180\text{ °F}$

### R 22

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 5.0                           | 5.1    | 5.3    | 5.5  | 5.6   | 5.8   | 5.9   | 6.0   |
| NRVA 20 | 7                    | 5.9                           | 6.2    | 6.4    | 6.6  | 6.7   | 6.9   | 7.1   | 7.2   |
| NRVA 25 | 22                   | 18.8                          | 19.5   | 20     | 21   | 21    | 22    | 22    | 23    |
| NRVA 32 | 23                   | 19.8                          | 21     | 21     | 22   | 22    | 23    | 24    | 24    |
| NRVA 40 | 51                   | 44                            | 45     | 47     | 48   | 49    | 51    | 52    | 53    |
| NRVA 50 | 51                   | 44                            | 45     | 47     | 48   | 49    | 51    | 52    | 53    |
| NRVA 65 | 87                   | 74                            | 77     | 79     | 82   | 84    | 86    | 88    | 90    |

\* 2 °F below min. operating temperature.

Correction factor for discharge pressure ( $P_{disch}$ )

| $P_{disch}$ (psi) | Correction factor |
|-------------------|-------------------|
| <b>185</b>        | <b>1.00</b>       |
| 240               | 0.87              |
| 300               | 0.78              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 5                | 0.79              |
| 7                | 0.67              |
| 10               | 0.56              |
| 15               | 0.47              |
| 20               | 0.41              |
| 30               | 0.35              |
| 60               | 0.28              |

Correction factor for discharge temperature ( $T_{disch}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 120 °F                | 0.95              |
| 140 °F                | 0.97              |
| <b>180 °F</b>         | <b>1.00</b>       |
| 200 °F                | 1.02              |
| 210 °F                | 1.02              |
| 230 °F                | 1.04              |
| 250 °F                | 1.06              |

Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.73              |
| 10 °F              | 0.77              |
| 30 °F              | 0.82              |
| 50 °F              | 0.87              |
| 70 °F              | 0.93              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.09              |
| 130 °F             | 1.20              |

## Check valves, type NRVA

### Nominal capacities

### Discharge line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ °C}$ ,

$P_{disch.} = 12\text{ bar}$ ,

$\Delta P = 0.2\text{ bar}$ ,

$T_{disch.} = 80\text{ °C}$

### R 134a

| Type    | $k_v$<br>[m³/h] | Evaporating temperature $T_e$ |        |        |        |      |       |       |
|---------|-----------------|-------------------------------|--------|--------|--------|------|-------|-------|
|         |                 | -40 °C                        | -30 °C | -20 °C | -10 °C | 0 °C | 10 °C | 20 °C |
| NRVA 15 | 5               | 13.5                          | 14.2   | 14.8   | 15.4   | 16.0 | 16.6  | 17.2  |
| NRVA 20 | 6               | 16.2                          | 17.0   | 17.7   | 18.5   | 19.2 | 19.9  | 21    |
| NRVA 25 | 19              | 51                            | 54     | 56     | 59     | 61   | 63    | 65    |
| NRVA 32 | 20              | 54                            | 57     | 59     | 62     | 64   | 66    | 69    |
| NRVA 40 | 44              | 119                           | 125    | 130    | 136    | 141  | 146   | 151   |
| NRVA 50 | 44              | 119                           | 125    | 130    | 136    | 141  | 146   | 151   |
| NRVA 65 | 75              | 203                           | 212    | 222    | 231    | 240  | 249   | 257   |

Correction factor for discharge pressure ( $P_{disch}$ )

| $P_{disch}$ (bar) | Correction factor |
|-------------------|-------------------|
| <b>8</b>          | <b>1.00</b>       |
| 12                | 0.82              |
| 16                | 0.70              |
| 20                | 0.62              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| <b>0.2</b>       | <b>1.00</b>       |
| 0.4              | 0.72              |
| 0.6              | 0.59              |
| 0.8              | 0.52              |
| 1                | 0.46              |
| 1.5              | 0.39              |
| 2                | 0.34              |
| 4                | 0.27              |

Correction factor for discharge temperature ( $T_{disch}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 50 °C                 | 0.96              |
| 60 °C                 | 0.97              |
| <b>80 °C</b>          | <b>1.00</b>       |
| 90 °C                 | 1.01              |
| 100 °C                | 1.03              |
| 110 °C                | 1.04              |
| 120 °C                | 1.06              |

Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.66              |
| -10 °C             | 0.70              |
| 0 °C               | 0.76              |
| 10 °C              | 0.82              |
| 20 °C              | 0.90              |
| <b>30 °C</b>       | <b>1.00</b>       |
| 40 °C              | 1.13              |
| 50 °C              | 1.29              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ °F}$ ,

$\Delta P = 3\text{ psi}$ ,

$P_{disch.} = 185\text{ psi}$ ,

$T_{disch.} = 180\text{ °F}$

### R 134a

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|------|-------|-------|-------|-------|
|         |                      | -40 °F                        | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 3.9                           | 4.1    | 4.4  | 4.6   | 4.7   | 5.0   | 5.1   |
| NRVA 20 | 7                    | 4.7                           | 5.0    | 5.2  | 5.5   | 5.7   | 5.9   | 6.2   |
| NRVA 25 | 22                   | 14.9                          | 15.7   | 16.5 | 17.3  | 18.0  | 18.8  | 19.5  |
| NRVA 32 | 23                   | 15.7                          | 16.6   | 17.4 | 18.2  | 19.0  | 19.8  | 21    |
| NRVA 40 | 51                   | 35                            | 36     | 38   | 40    | 42    | 44    | 45    |
| NRVA 50 | 51                   | 35                            | 36     | 38   | 40    | 42    | 44    | 45    |
| NRVA 65 | 87                   | 59                            | 62     | 65   | 68    | 71    | 74    | 77    |

\* 2 °F below min. operating temperature.

Correction factor for discharge pressure ( $P_{disch}$ )

| $P_{disch}$ (psi) | Correction factor |
|-------------------|-------------------|
| <b>120</b>        | <b>1.00</b>       |
| 185               | 0.83              |
| 240               | 0.71              |
| 300               | 0.64              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| <b>3</b>         | <b>1.00</b>       |
| 5                | 0.79              |
| 7                | 0.67              |
| 10               | 0.56              |
| 15               | 0.47              |
| 20               | 0.41              |
| 30               | 0.35              |
| 60               | 0.28              |

Correction factor for discharge temperature ( $T_{disch}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 120 °F                | 0.95              |
| 140 °F                | 0.97              |
| <b>180 °F</b>         | <b>1.00</b>       |
| 200 °F                | 1.02              |
| 210 °F                | 1.02              |
| 230 °F                | 1.04              |
| 250 °F                | 1.05              |

Correction factor for liquid temperature ( $T_{liq}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.64              |
| 10 °F              | 0.68              |
| 30 °F              | 0.74              |
| 50 °F              | 0.81              |
| 70 °F              | 0.89              |
| <b>90 °F</b>       | <b>1.00</b>       |
| 110 °F             | 1.15              |
| 130 °F             | 1.35              |

## Check valves, type NRVA

### Nominal capacities

### Discharge line

## SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ °C}$ ,  
 $P_{disch.} = 12\text{ bar}$ ,  
 $\Delta P = 0.2\text{ bar}$ ,  
 $T_{disch.} = 80\text{ °C}$

### R 404A

| Type    | $k_v$<br>[m <sup>3</sup> /h] | Evaporating temperature $T_e$ |        |        |        |        |       |       |       |
|---------|------------------------------|-------------------------------|--------|--------|--------|--------|-------|-------|-------|
|         |                              | -50 °C                        | -40 °C | -30 °C | -20 °C | -10 °C | 0 °C  | 10 °C | 20 °C |
| NRVA 15 | 5                            | 12.6                          | 13.5   | 14.4   | 15.3   | 16.1   | 16.9  | 17.6  | 18.3  |
| NRVA 20 | 6                            | 15.2                          | 16.2   | 17.3   | 18.4   | 19.4   | 20.3  | 21.2  | 22.0  |
| NRVA 25 | 19                           | 48.0                          | 51.5   | 54.8   | 58.1   | 61.3   | 64.3  | 67.0  | 69.5  |
| NRVA 32 | 20                           | 50.6                          | 54.2   | 57.7   | 61.2   | 64.5   | 67.7  | 70.6  | 73.2  |
| NRVA 40 | 44                           | 111.3                         | 119.2  | 127.0  | 134.6  | 141.9  | 148.9 | 155.3 | 161.0 |
| NRVA 50 | 44                           | 111.3                         | 119.2  | 127.0  | 134.6  | 141.9  | 148.9 | 155.3 | 161.0 |
| NRVA 65 | 75                           | 189.7                         | 203.1  | 216.4  | 229.4  | 241.9  | 253.7 | 264.7 | 274.4 |

Correction factor for discharge pressure ( $P_{disch.}$ )

| $P_{disch.}$ (bar) | Correction factor |
|--------------------|-------------------|
| 12                 | 1                 |
| 16                 | 0.87              |
| 20                 | 0.78              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (bar) | Correction factor |
|------------------|-------------------|
| 0.2              | 1.00              |
| 0.4              | 0.72              |
| 0.6              | 0.59              |
| 0.8              | 0.52              |
| 1                | 0.46              |
| 1.5              | 0.39              |
| 2                | 0.34              |
| 4                | 0.27              |

Correction factor for discharge temperature ( $T_{disch.}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 50 °C                 | 0.96              |
| 60 °C                 | 0.97              |
| 80 °C                 | 1.00              |
| 90 °C                 | 1.01              |
| 100 °C                | 1.03              |
| 110 °C                | 1.04              |
| 120 °C                | 1.06              |

Correction factor for liquid temperature ( $T_{liq.}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -20 °C             | 0.55              |
| -10 °C             | 0.60              |
| 0 °C               | 0.66              |
| 10 °C              | 0.74              |
| 20 °C              | 0.85              |
| 30 °C              | 1.00              |
| 40 °C              | 1.23              |
| 50 °C              | 1.68              |

## US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$ ,  
 $P_{disch.} = 185\text{ psi}$ ,  
 $T_{disch.} = 180\text{ °F}$

### R 404A

| Type    | $C_v$<br>[USgal/min] | Evaporating temperature $T_e$ |        |        |      |       |       |       |       |
|---------|----------------------|-------------------------------|--------|--------|------|-------|-------|-------|-------|
|         |                      | -60 °F*                       | -40 °F | -20 °F | 0 °F | 20 °F | 40 °F | 60 °F | 80 °F |
| NRVA 15 | 6                    | 3.5                           | 3.8    | 4.0    | 4.3  | 4.6   | 4.8   | 5.1   | 5.3   |
| NRVA 20 | 7                    | 4.2                           | 4.5    | 4.9    | 5.2  | 5.5   | 5.8   | 6.1   | 6.3   |
| NRVA 25 | 22                   | 13.2                          | 14.3   | 15.4   | 16.4 | 17.4  | 18.3  | 19.3  | 20.0  |
| NRVA 32 | 23                   | 13.9                          | 15.1   | 16.2   | 17.3 | 18.3  | 19.3  | 20.3  | 21.0  |
| NRVA 40 | 51                   | 30.7                          | 33.2   | 35.6   | 38.0 | 40.3  | 42.5  | 44.6  | 46.2  |
| NRVA 50 | 51                   | 30.7                          | 33.2   | 35.6   | 38.0 | 40.3  | 42.5  | 44.6  | 46.2  |
| NRVA 65 | 87                   | 52.2                          | 56.5   | 60.7   | 64.8 | 68.7  | 72.4  | 76.0  | 78.8  |

\* 2 °F below min. operating temperature.

Correction factor for discharge pressure ( $P_{disch.}$ )

| $P_{disch.}$ (psi) | Correction factor |
|--------------------|-------------------|
| 185                | 1                 |
| 240                | 0.87              |
| 300                | 0.78              |

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

| $\Delta P$ (psi) | Correction factor |
|------------------|-------------------|
| 3                | 1.00              |
| 5                | 0.79              |
| 7                | 0.67              |
| 10               | 0.56              |
| 15               | 0.47              |
| 20               | 0.41              |
| 30               | 0.35              |
| 60               | 0.28              |

Correction factor for discharge temperature ( $T_{disch.}$ )

| Discharge temperature | Correction factor |
|-----------------------|-------------------|
| 120 °F                | 0.95              |
| 140 °F                | 0.97              |
| 180 °F                | 1.00              |
| 200 °F                | 1.02              |
| 210 °F                | 1.02              |
| 230 °F                | 1.04              |
| 250 °F                | 1.05              |

Correction factor for liquid temperature ( $T_{liq.}$ )

| Liquid temperature | Correction factor |
|--------------------|-------------------|
| -10 °F             | 0.52              |
| 10 °F              | 0.57              |
| 30 °F              | 0.63              |
| 50 °F              | 0.72              |
| 70 °F              | 0.83              |
| 90 °F              | 1.00              |
| 110 °F             | 1.29              |
| 130 °F             | 1.92              |

# Check valve

## Type NRVS

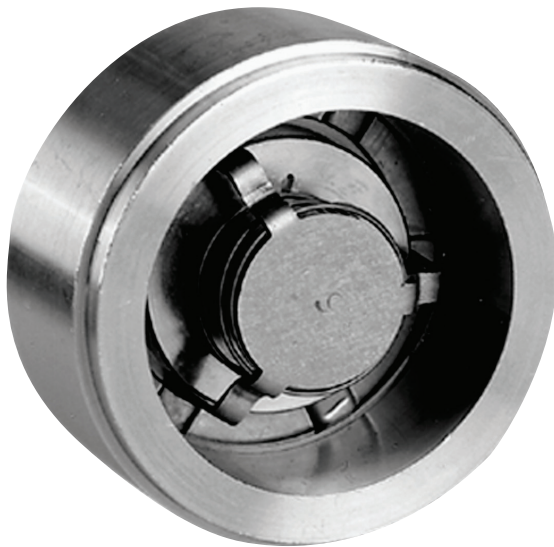
### Contents

|                              | Page |
|------------------------------|------|
| Features .....               | 79   |
| Technical data .....         | 79   |
| Materials .....              | 79   |
| Capacities .....             | 80   |
| Ordering .....               | 82   |
| Dimensions and weights ..... | 82   |



# Check valve

## Type NRVS



Check valve type NRVS has no damping feature and therefore can only be used for liquid line applications. NRVS is designed to be mounted directly to PM or solenoid valves EVRA / EVRAT.

### Features

- Ensures correct direction of flow
- Applicable to HCFC, HFC and R717 (Ammonia)
- Classification: DNV, CRN, BV, EAC etc.  
To get an updated list of certification on the products please contact your local Danfoss Sales Company

### Technical data

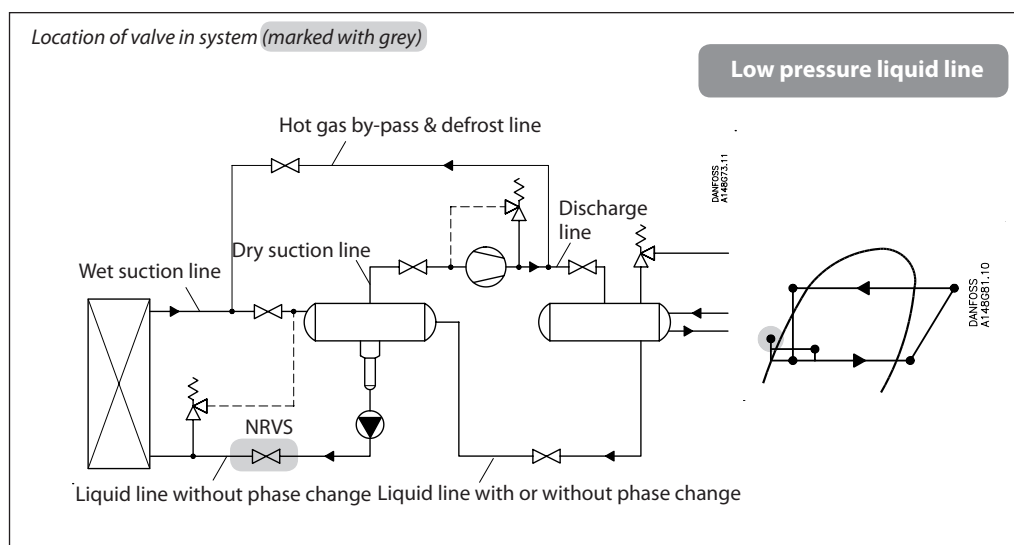
- Temperature of medium:  
-50 °C – 140 °C
- Maximum working pressure:  
PS = 28 bar / 406 psig

### Materials

- Valve housing made of Stainless Steel
- Gaskets are non-asbestos

## Check valve, type NRVS

### Capacities



| Valve combination | EVRA/EVRAT 10 + NRVS 15 | EVRA/EVRAT 15 + NRVS 15 | EVRA/EVRAT 20 + NRVS 25 | EVRA + NRVS 25 |
|-------------------|-------------------------|-------------------------|-------------------------|----------------|
| $k_v$ [m³/h]      | 1.4                     | 2.2                     | 4.1                     | 7.0            |

| Evaporating temperature $T_e$ | Pressure $\Delta p$ [bar] | Capacities (kW) $Q_0$ at circulation rate 1 R717 |     |     |      |
|-------------------------------|---------------------------|--------------------------------------------------|-----|-----|------|
| -40 °C                        | 0.15                      | 172                                              | 270 | 504 | 960  |
|                               | 0.25                      | 222                                              | 349 | 650 | 1110 |
|                               | 0.30                      | 243                                              | 382 | 713 | 1216 |
|                               | 0.40                      | 281                                              | 441 | 823 | 1405 |
|                               | 0.50                      | 314                                              | 493 | 920 | 1570 |
| -30 °C                        | 0.15                      | 167                                              | 262 | 489 | 835  |
|                               | 0.25                      | 215                                              | 338 | 631 | 1078 |
|                               | 0.30                      | 236                                              | 371 | 691 | 1180 |
|                               | 0.40                      | 273                                              | 428 | 798 | 1363 |
|                               | 0.50                      | 305                                              | 479 | 893 | 1524 |
| -20 °C                        | 0.15                      | 161                                              | 254 | 473 | 808  |
|                               | 0.25                      | 208                                              | 327 | 610 | 1042 |
|                               | 0.30                      | 228                                              | 359 | 669 | 1142 |
|                               | 0.40                      | 264                                              | 414 | 772 | 1319 |
|                               | 0.50                      | 295                                              | 463 | 863 | 1475 |
| -10 °C                        | 0.15                      | 156                                              | 245 | 456 | 780  |
|                               | 0.25                      | 201                                              | 316 | 589 | 1005 |
|                               | 0.30                      | 220                                              | 346 | 645 | 1102 |
|                               | 0.40                      | 254                                              | 399 | 745 | 1271 |
|                               | 0.50                      | 284                                              | 447 | 833 | 1422 |

Note: The capacities in the table must be divided by the actual circulation rate, or the evaporator capacities must be multiplied with the actual circulation rate.

Minimum opening differential pressure:

|                           |          |
|---------------------------|----------|
| EVRA/EVRAT 10 – 20 + NRVS | 0.07 bar |
| EVRA/EVRAT 25 + NRVS      | 0.11 bar |

**Solution**

$$290 \times 4 = 1160 \text{ kW}$$

EVRAT 25 + NRVS 25:  $Q_0 = 1180 \text{ kW}$ , at  $\Delta p = 0.3 \text{ bar}$  is chosen.

Precise valve capacities can be calculated for various refrigerants by using the "DIRcalc™" (Danfoss Industrial Refrigeration calculation programme).

**Example**

An application has the following operating conditions:

Refrigerant: ..... R717

Evaporating temperature: ..... -30 °C

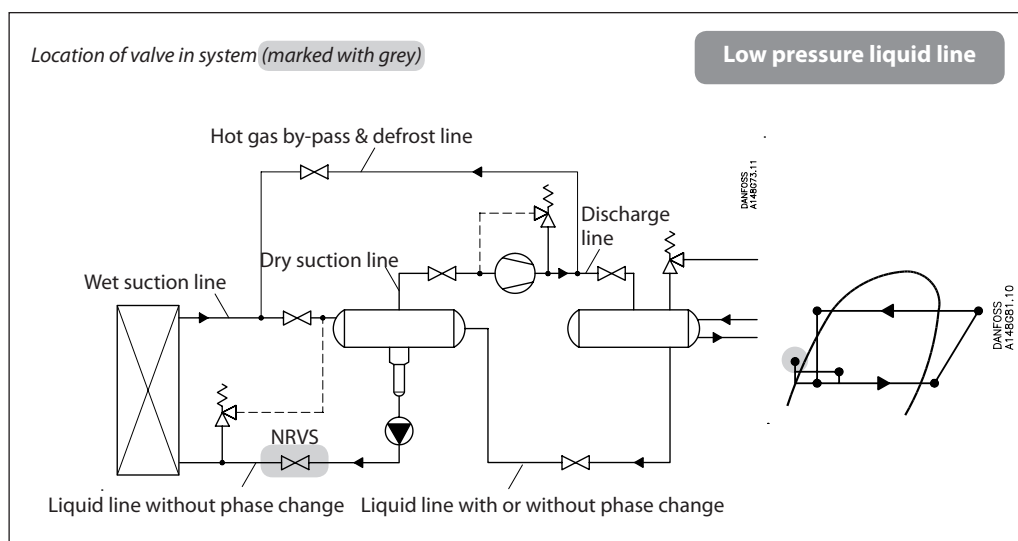
Evaporator capacity ( $Q_0$ ): ..... 290 kW

Circulation rate: ..... 4

$\Delta p \leq 0.3 \text{ bar}$

## Check valve, type NRVS

### Capacities (continued)



| Valve combination | PM 15   | PM 20   | PM 25   |
|-------------------|---------|---------|---------|
|                   | NRVS 25 | NRVS 25 | NRVS 25 |
| $k_v$ [m³/h]      | 4.0     | 6.0     | 7.5     |

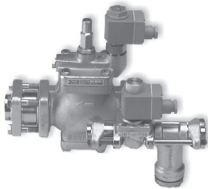
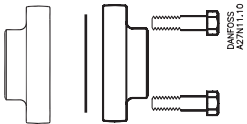
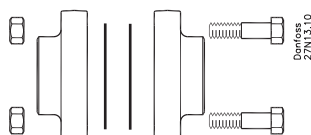
| Evaporating temperature<br>$T_e$ | Pressure<br>$\Delta p$ (bar) | Capacities (kW) $Q_0$ at circulation rate 1<br>R717 |      |      |
|----------------------------------|------------------------------|-----------------------------------------------------|------|------|
| -50 °C                           | 0.15                         | –                                                   | –    | –    |
|                                  | 0.25                         | 653                                                 | 979  | 1224 |
|                                  | 0.30                         | 715                                                 | 1072 | 1340 |
|                                  | 0.40                         | 825                                                 | 1238 | 1547 |
|                                  | 0.50                         | 923                                                 | 1384 | 1730 |
| -40 °C                           | 0.15                         | –                                                   | –    | –    |
|                                  | 0.25                         | 635                                                 | 951  | 1188 |
|                                  | 0.30                         | 695                                                 | 1043 | 1303 |
|                                  | 0.40                         | 803                                                 | 1204 | 1506 |
|                                  | 0.50                         | 897                                                 | 1346 | 1683 |
| -30 °C                           | 0.15                         | –                                                   | –    | –    |
|                                  | 0.25                         | 615                                                 | 922  | 1152 |
|                                  | 0.30                         | 675                                                 | 1011 | 1265 |
|                                  | 0.40                         | 779                                                 | 1169 | 1460 |
|                                  | 0.50                         | 871                                                 | 1306 | 1632 |
| -20 °C                           | 0.15                         | –                                                   | –    | –    |
|                                  | 0.25                         | 595                                                 | 894  | 1114 |
|                                  | 0.30                         | 653                                                 | 979  | 1224 |
|                                  | 0.40                         | 753                                                 | 1130 | 1412 |
|                                  | 0.50                         | 852                                                 | 1264 | 1580 |
| -10 °C                           | 0.15                         | –                                                   | –    | –    |
|                                  | 0.25                         | 575                                                 | 862  | 1075 |
|                                  | 0.30                         | 629                                                 | 944  | 1180 |
|                                  | 0.40                         | 727                                                 | 1090 | 1362 |
|                                  | 0.50                         | 812                                                 | 1219 | 1523 |

Note: The capacities in the table must be divided by the actual circulation rate, or the evaporator capacities must be multiplied with the actual circulation rate.

Minimum opening differential pressure:  
PM + NRVS will be fully open at  $\Delta p = 0.25$  bar.

Precise valve capacities can be calculated for various refrigerants by using the "DIRcalc™" (Danfoss Industrial Refrigeration calculation programme).

## Ordering

| Check valve                                                                       |                 |  |                 | Flanges, gasket and bolts <sup>1)</sup>                                             |                                      |                            |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|--------------------------------------|----------------------------|
|  |                 |                                                                                   |                 |  |                                      |                            |
| Valve type                                                                        | Code. no.       | For valve type                                                                    | Code no.        | Weight <sup>2)</sup><br>[kg]                                                        | Flange<br>type                       | Connection<br>size         |
| NRVS 15                                                                           | <b>020-2032</b> | EVRA / T 10, EVRA / T 15                                                          | <b>027N1255</b> | 0.7                                                                                 |                                      | 3/4 in                     |
| NRVS 25                                                                           | <b>020-2033</b> | EVRA / T 20, EVRA / T 25, PM 15, PM 20, PM 25                                     | <b>027N1254</b> | 1.1                                                                                 |                                      | 1 in                       |
|                                                                                   |                 |                                                                                   |                 | Flanges, gaskets and bolts for NRVS stand alone <sup>3)</sup>                       |                                      |                            |
|                                                                                   |                 |                                                                                   |                 |  |                                      |                            |
|                                                                                   |                 |                                                                                   |                 | <b>Code no.</b>                                                                     | <b>Weight <sup>2)</sup><br/>[kg]</b> | <b>Flange<br/>type</b>     |
|                                                                                   |                 |                                                                                   |                 | <b>027N1256</b>                                                                     | 0.256                                |                            |
|                                                                                   |                 |                                                                                   |                 | <b>027N1257</b>                                                                     | 0.443                                |                            |
|                                                                                   |                 |                                                                                   |                 |                                                                                     |                                      | <b>Connection<br/>size</b> |
|                                                                                   |                 |                                                                                   |                 |                                                                                     |                                      | 3/4 in                     |
|                                                                                   |                 |                                                                                   |                 |                                                                                     |                                      | 1 in                       |

<sup>1)</sup> Consists of one standard and one special flange, one gasket and 2 bolts.

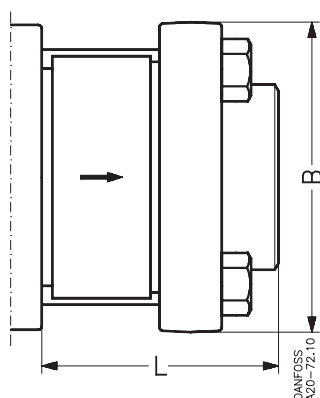
<sup>2)</sup> Flange and bolts only.

<sup>3)</sup> Consist of flanges, gaskets, bolts and nuts only.

One standard flange and one special flange, two gasket, 2 bolts and 2 nuts.

## Dimensions and weights

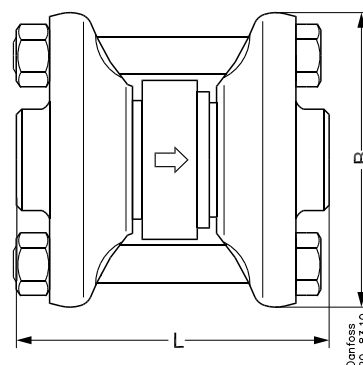
NRVS on valve



| Type    | L<br>[mm] | B<br>[mm] | Weight <sup>1)</sup><br>kg |
|---------|-----------|-----------|----------------------------|
| NRVS 15 | 47.5      | 78.0      | 0.1                        |
| NRVS 25 | 60.5      | 96.0      | 0.25                       |

<sup>1)</sup> NRVS without flanges and bolts

NRVS stand alone



| Type    | L<br>[mm] | B<br>[mm] | Weight <sup>1)</sup><br>kg |
|---------|-----------|-----------|----------------------------|
| NRVS 15 | 78        | 80        | 0.1                        |
| NRVS 25 | 98        | 96        | 0.25                       |

<sup>1)</sup> NRVS without flanges and bolts