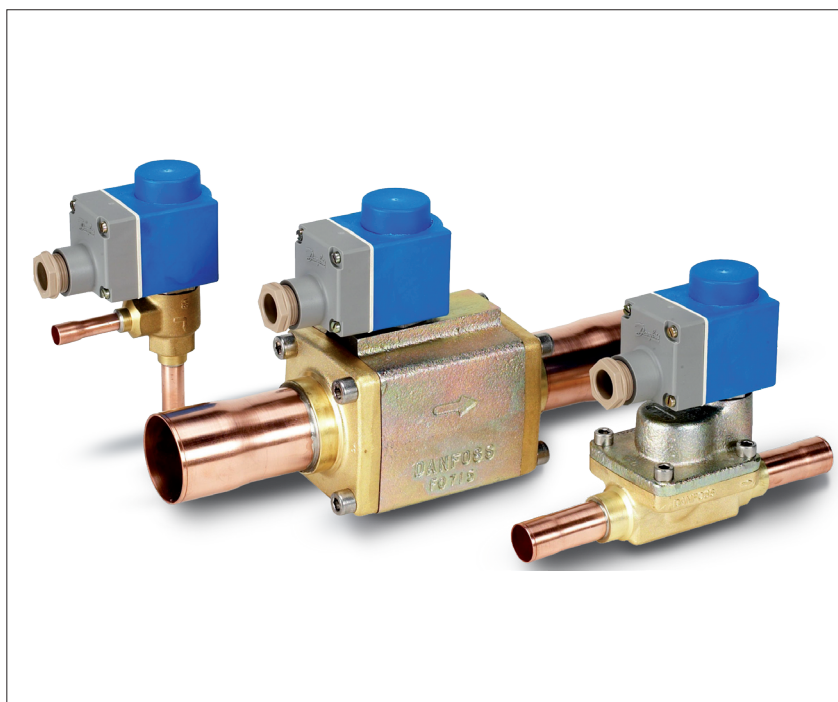


Data sheet

# Electric expansion valves

## Types AKV 10, AKV 15 and AKV 20



AKV are electrically operated expansion valves designed for refrigerating plants.

The AKV valves are normally controlled by a controller from Danfoss' range of ADAP- KOOL® controllers.

The AKV valves are supplied as a component programme, as follows:

- Separate valve
- Separate coil with terminal box or cable
- Spare parts in the form upper part, orifice and filter

Valve capacity is indicated with a number forming part of the type designation. The number represents the size of the orifice of the valve in question. A valve with orifice 3 will for example be designated AKV 10-3. The orifice assembly is replaceable.

### Features

- Refrigerants: R744, R22/R407C, R404A/R507, R410A, R134a, R407A, R23, R407F, R422B, R422D, R448A, R449A, R449B, R450A, R452A, R513A.  
For a complete list of approved refrigerants, visit [www.products.danfoss.com](http://www.products.danfoss.com) and search for individual code numbers, where refrigerants are listed as part of technical data.
- The valve requires no adjustment
- Wide regulation range
- Replaceable orifice assembly
- Both expansion valve and solenoid valve
- Wide range of AC and DC coils

**Data sheet | Electric expansion valves, types AKV 10, AKV 15 and AKV 20**

**Approvals**

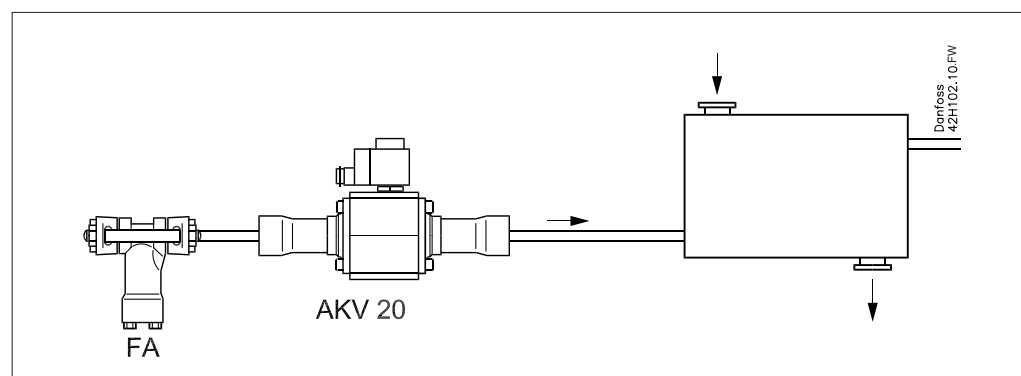
DEMKO, Denmark  
SETI, Finland  
SEV, Switzerland

UL listed (separate code nos)  
CSA certified (separate code nos)  
Low Voltage Directive (LVD) 2006/95/EC

**Technical data**

| Valve type                                   | AKV 10                       | AKV 15                   | AKV 20                   |
|----------------------------------------------|------------------------------|--------------------------|--------------------------|
| Tolerance of coil voltage                    | 10 / - 15%                   | 10 / - 15%               | 10 / - 15%               |
| Enclosure to IEC 529                         | Max. IP67                    | Max. IP67                | Max. IP67                |
| Working principle                            | Pulse Width Modulation (PWM) |                          |                          |
| Recommended period of time                   | 6 s.                         | 6 s.                     | 6 s.                     |
| Capacity (R404A/R507)                        | 0.6 – 14 kW                  | 14 – 85 kW               | 56 – 530 kW              |
| Regulation range<br>(Capacity range)         | 10 – 100%                    | 10 – 100%                | 10 – 100%                |
| Connection                                   | Solder                       | Solder                   | Solder or weld           |
| Evaporating temperature                      | - 50 – 60 °C                 | - 50 – 60 °C             | - 40 – 60 °C             |
| Ambient temperature                          | - 50 – 50 °C                 | - 40 – 50 °C             | - 40 – 50 °C             |
| MOPD<br>(Max. Opening Pressure Differential) | 18 bar                       | 22 bar                   | 18 bar                   |
| Filter, replaceable                          | Internal 100 µm              | External 100 µm          | External 100 µm          |
| Max. working pressure                        | AKV 10-1 – 10-6: 52 barg     | AKV 15-1 – 15-4: 46 barg | AKV 20-1 – 20-5: 28 barg |
|                                              | AKV 10-7: 42 barg            |                          |                          |

**Filter**



On plants using AKV 15 or AKV 20 a filter must be mounted in front of AKV 15 and AKV 20.

AKV 10 has built-in filter and external filter is not necessary.

**Rated capacity and ordering**

| Valve type | Rated capacity <sup>1)</sup> |      |       |      |       |      |                |      |       |      |       |      |      |      | k <sub>v</sub><br>value<br>[m³/h] | Connections Solder ODF               |                        |                       |
|------------|------------------------------|------|-------|------|-------|------|----------------|------|-------|------|-------|------|------|------|-----------------------------------|--------------------------------------|------------------------|-----------------------|
|            | R22                          |      | R134a |      | R407C |      | R404A/<br>R507 |      | R407A |      | R410A |      | R744 |      |                                   | Inlet × outlet<br>[in]               | Inlet × outlet<br>[mm] | Multipack<br>Code no. |
|            | [kW]                         | [TR] | [kW]  | [TR] | [kW]  | [TR] | [kW]           | [TR] | [kW]  | [TR] | [kW]  | [TR] | [kW] | [TR] |                                   |                                      |                        |                       |
| AKV 10     |                              |      |       |      |       |      |                |      |       |      |       |      |      |      |                                   |                                      |                        |                       |
| AKV 10-1   | 1.03                         | 0.29 | 0.8   | 0.23 | 1.09  | 0.31 | 0.72           | 0.21 | 1.02  | 0.29 | 1.20  | 0.34 | 1.31 | 0.37 | 0.010                             | -                                    | 10 × 12                | 068F1162              |
|            | 1.03                         | 0.29 | 0.8   | 0.23 | 1.09  | 0.31 | 0.72           | 0.21 | 1.02  | 0.29 | 1.20  | 0.34 | 1.31 | 0.37 | 0.010                             | $\frac{3}{8} \times \frac{1}{2}$     | -                      | 068F1161              |
| AKV 10-2   | 1.75                         | 0.50 | 1.35  | 0.38 | 1.85  | 0.52 | 1.23           | 0.35 | 1.73  | 0.49 | 2.05  | 0.58 | 2.23 | 0.63 | 0.017                             | -                                    | 10 × 12                | 068F1165              |
|            | 1.75                         | 0.50 | 1.35  | 0.38 | 1.85  | 0.52 | 1.23           | 0.35 | 1.73  | 0.49 | 2.05  | 0.58 | 2.23 | 0.63 | 0.017                             | $\frac{3}{8} \times \frac{1}{2}$     | -                      | 068F1164              |
| AKV 10-3   | 2.57                         | 0.73 | 1.99  | 0.57 | 2.71  | 0.77 | 1.81           | 0.51 | 2.54  | 0.72 | 3.01  | 0.86 | 3.27 | 0.93 | 0.025                             | -                                    | 10 × 12                | 068F1168              |
|            | 2.57                         | 0.73 | 1.99  | 0.57 | 2.71  | 0.77 | 1.81           | 0.51 | 2.54  | 0.72 | 3.01  | 0.86 | 3.27 | 0.93 | 0.025                             | $\frac{3}{8} \times \frac{1}{2}$     | -                      | 068F1167              |
| AKV 10-4   | 4.73                         | 1.34 | 3.66  | 1.04 | 4.99  | 1.42 | 3.33           | 0.95 | 4.67  | 1.33 | 5.54  | 1.57 | 6.02 | 1.71 | 0.046                             | -                                    | 10 × 12                | 068F1171              |
|            | 4.73                         | 1.34 | 3.66  | 1.04 | 4.99  | 1.42 | 3.33           | 0.95 | 4.67  | 1.33 | 5.54  | 1.57 | 6.02 | 1.71 | 0.046                             | $\frac{3}{8} \times \frac{1}{2}$     | -                      | 068F1170              |
| AKV 10-5   | 6.58                         | 1.87 | 5.10  | 1.45 | 6.95  | 1.98 | 4.63           | 1.32 | 6.50  | 1.85 | 7.70  | 2.19 | 8.38 | 2.38 | 0.064                             | -                                    | 10 × 12                | 068F1174              |
|            | 6.58                         | 1.87 | 5.10  | 1.45 | 6.95  | 1.98 | 4.63           | 1.32 | 6.50  | 1.85 | 7.70  | 2.19 | 8.38 | 2.38 | 0.064                             | $\frac{3}{8} \times \frac{1}{2}$     | -                      | 068F1173              |
| AKV 10-6   | 11.7                         | 3.33 | 9.07  | 2.58 | 12.4  | 3.52 | 8.25           | 2.35 | 11.6  | 3.29 | 13.7  | 3.90 | 14.9 | 4.24 | 0.114                             | -                                    | 10 × 12                | 068F1177              |
|            | 11.7                         | 3.33 | 9.07  | 2.58 | 12.4  | 3.52 | 8.25           | 2.35 | 11.6  | 3.29 | 13.7  | 3.90 | 14.9 | 4.24 | 0.114                             | $\frac{3}{8} \times \frac{1}{2}$     | -                      | 068F1176              |
| AKV 10-7   | 16.7                         | 4.73 | 12.9  | 3.66 | 17.6  | 5.00 | 11.7           | 3.34 | 16.5  | 4.68 | 19.5  | 5.55 | 21.2 | 6.03 | 0.209                             | -                                    | 12 × 16                | 068F1180              |
|            | 16.7                         | 4.73 | 12.9  | 3.66 | 17.6  | 5.00 | 11.7           | 3.34 | 16.5  | 4.68 | 19.5  | 5.55 | 21.2 | 6.03 | 0.209                             | $\frac{1}{2} \times \frac{5}{8}$     | -                      | 068F1179              |
| AKV 15     |                              |      |       |      |       |      |                |      |       |      |       |      |      |      |                                   |                                      |                        |                       |
| AKV 15-1   | 25.7                         | 7.30 | 19.9  | 5.66 | 27.1  | 7.72 | 18.1           | 5.14 | 25.4  | 7.23 | 30.1  | 8.56 | 32.7 | 9.30 | 0.250                             | $\frac{3}{4} \times \frac{3}{4}$     | -                      | 068F5000              |
|            | 25.7                         | 7.30 | 19.9  | 5.66 | 27.1  | 7.72 | 18.1           | 5.14 | 25.4  | 7.23 | 30.1  | 8.56 | 32.7 | 9.30 | 0.250                             | -                                    | 18 × 18                | 068F5001              |
|            | 25.7                         | 7.30 | 19.9  | 5.66 | 27.1  | 7.72 | 18.1           | 5.14 | 25.4  | 7.23 | 30.1  | 8.56 | 32.7 | 9.30 | 0.250                             | $\frac{3}{4} \times \frac{3}{4}$     | -                      | 068F5035              |
| AKV 15-2   | 41.1                         | 11.7 | 31.8  | 9.03 | 43.3  | 12.3 | 28.9           | 8.23 | 40.6  | 11.6 | 48.1  | 13.7 | 52.4 | 14.9 | 0.400                             | $\frac{3}{4} \times \frac{3}{4}$     | -                      | 068F5005              |
|            | 41.1                         | 11.7 | 31.8  | 9.03 | 43.3  | 12.3 | 28.9           | 8.23 | 40.6  | 11.6 | 48.1  | 13.7 | 52.4 | 14.9 | 0.400                             | -                                    | 18 × 18                | 068F5006              |
|            | 41.1                         | 11.7 | 31.8  | 9.03 | 43.3  | 12.3 | 28.9           | 8.23 | 40.6  | 11.6 | 48.1  | 13.7 | 52.4 | 14.9 | 0.400                             | $\frac{3}{4} \times \frac{3}{4}$     | -                      | 068F5036              |
| AKV 15-3   | 64.5                         | 18.3 | 49.9  | 14.1 | 68.1  | 19.4 | 45.4           | 12.9 | 63.8  | 18.1 | 75.7  | 21.5 | 82.6 | 23.5 | 0.630                             | $\frac{7}{8} \times \frac{7}{8}$     | -                      | 068F5010              |
|            | 64.5                         | 18.3 | 49.9  | 14.1 | 68.1  | 19.4 | 45.4           | 12.9 | 63.8  | 18.1 | 75.7  | 21.5 | 82.6 | 23.5 | 0.630                             | $\frac{7}{8} \times \frac{7}{8}$     | -                      | 068F5037              |
| AKV 15-4   | 102                          | 29.0 | 78.6  | 22.3 | 107   | 30.5 | 71.9           | 20.5 | 101   | 28.6 | 120   | 34.1 | 131  | 37.2 | 1.000                             | $1 \frac{1}{8} \times 1 \frac{1}{8}$ | -                      | 068F5015              |
|            | 102                          | 29.0 | 78.6  | 22.3 | 107   | 30.5 | 71.9           | 20.5 | 101   | 28.6 | 120   | 34.1 | 131  | 37.2 | 1.000                             | -                                    | 28 × 28                | 068F5016              |
|            | 102                          | 29.0 | 78.6  | 22.3 | 107   | 30.5 | 71.9           | 20.5 | 101   | 28.6 | 120   | 34.1 | 131  | 37.2 | 1.000                             | $1 \frac{1}{8} \times 1 \frac{1}{8}$ | -                      | 068F5038              |

| Valve type | Rated capacity <sup>1)</sup> |      |       |      |      |      |                |      |       |      |       |      |      |      | k <sub>v</sub> value<br>[m³/h] | Connections               |                           |                           |          |
|------------|------------------------------|------|-------|------|------|------|----------------|------|-------|------|-------|------|------|------|--------------------------------|---------------------------|---------------------------|---------------------------|----------|
|            | R22                          |      | R134a |      | 407C |      | R404A/<br>R507 |      | R407A |      | R410A |      | R744 |      |                                | Solder ODF                |                           | Weld                      |          |
|            | [kW]                         | [TR] | [kW]  | [TR] | [kW] | [TR] | [kW]           | [TR] | [kW]  | [TR] | [kW]  | [TR] | [kW] | [TR] |                                | Inlet ×<br>outlet<br>[in] | Inlet ×<br>outlet<br>[mm] | Inlet ×<br>outlet<br>[in] | Code no. |
| AKV 20     |                              |      |       |      |      |      |                |      |       |      |       |      |      |      |                                |                           |                           |                           |          |
| AKV 20-1   | 103                          | 29.2 | 79.5  | 22.6 | 108  | 30.8 | 72             | 20.6 | 102   | 28.9 | 120   | 34.2 | 131  | 37.2 | 1.0                            | 1 ⅜ × 1 ⅜                 | 35 × 35                   | -                         | 042H2020 |
|            | 103                          | 29.2 | 79.5  | 22.6 | 108  | 30.8 | 72             | 20.6 | 102   | 28.9 | 120   | 34.2 | 131  | 37.2 | 1.0                            | -                         | -                         | 1 ¼ × 1 ¼                 | 042H2021 |
| AKV 20-2   | 164                          | 46.6 | 127   | 36.0 | 173  | 49.2 | 115            | 32.9 | 162   | 46.1 | 192   | 54.7 | 210  | 59.7 | 1.6                            | 1 ⅜ × 1 ⅜                 | 35 × 35                   | -                         | 042H2022 |
|            | 164                          | 46.6 | 127   | 36.0 | 173  | 49.2 | 115            | 32.9 | 162   | 46.1 | 192   | 54.7 | 210  | 59.7 | 1.6                            | -                         | -                         | 1 ¼ × 1 ¼                 | 042H2023 |
| AKV 20-3   | 255                          | 72.6 | 197   | 55.9 | 269  | 76.5 | 180            | 51.2 | 252   | 71.7 | 300   | 85.3 | 328  | 93.3 | 2.5                            | -                         | 42 × 42                   | -                         | 042H2025 |
|            | 255                          | 72.6 | 197   | 55.9 | 269  | 76.5 | 180            | 51.2 | 252   | 71.7 | 300   | 85.3 | 328  | 93.3 | 2.5                            | 1 ⅝ × 1 ⅝                 | -                         | -                         | 042H2024 |
|            | 255                          | 72.6 | 197   | 55.9 | 269  | 76.5 | 180            | 51.2 | 252   | 71.7 | 300   | 85.3 | 328  | 93.3 | 2.5                            | -                         | -                         | 1 ¼ × 1 ¼                 | 042H2026 |
| AKV 20-4   | 405                          | 115  | 311   | 88.3 | 426  | 121  | 286            | 81.4 | 400   | 114  | 477   | 136  | 526  | 150  | 4.0                            | 2 ⅞ × 2 ⅞                 | 54 × 54                   | -                         | 042H2027 |
|            | 405                          | 115  | 311   | 88.3 | 426  | 121  | 286            | 81.4 | 400   | 114  | 477   | 136  | 526  | 150  | 4.0                            | -                         | -                         | 1 ½ × 1 ½                 | 042H2028 |
| AKV 20-5   | 631                          | 179  | 478   | 136  | 660  | 188  | 446            | 127  | 620   | 176  | 746   | 212  | 835  | 237  | 6.3                            | 2 ⅞ × 2 ⅞                 | 54 × 54                   | -                         | 042H2029 |
|            | 631                          | 179  | 478   | 136  | 660  | 188  | 446            | 127  | 620   | 176  | 746   | 212  | 835  | 237  | 6.3                            | -                         | -                         | 2 × 2                     | 042H2030 |

<sup>1)</sup> Rated capacities are based on:  
Condensing temperature    t<sub>c</sub> = 38 °C / 100 °F  
Liquid temperature         t<sub>l</sub> = 37 °C / 98 °F  
Evaporating temperature    t<sub>e</sub> = 4.4 °C / 40 °F



**Note!** AKV 20 are not suitable for R744 applications with media temperatures constantly below 0 °C.  
For other media temperatures, please contact Danfoss.

**Ordering**
**Coils for AKV valves**

| DC coils                |                   | Code no.               | AKV                                  | AKV  | AKV  | AKV                          | AKV                  | AKV          |
|-------------------------|-------------------|------------------------|--------------------------------------|------|------|------------------------------|----------------------|--------------|
|                         |                   |                        | 10-1<br>10-2<br>10-3<br>10-4<br>10-5 | 10-6 | 10-7 | 15-1<br>15-2<br>15-3<br>15-4 | 20-1<br>20-2<br>20-3 | 20-4<br>20-5 |
| 220 V DC 20 W, standard | with terminal box | 018F6851               | +                                    | +    | +    | +                            | +                    | +            |
| 100 V DC 18 W, special  | with terminal box | 018F6780               | +                                    | +    | +    | +                            | +                    | +            |
|                         | with DIN plugs    | —                      |                                      |      |      |                              |                      |              |
| 230 V DC 18 W, special  | with terminal box | 018F6781 <sup>1)</sup> | +                                    | +    | +    | +                            | +                    | +            |
|                         | with DIN plugs    | 018F6991 <sup>1)</sup> |                                      |      |      |                              |                      |              |
| 230 V DC 18 W, special  | with 2.5 m cable  | 018F6288 <sup>1)</sup> | +                                    | +    | +    | +                            | +                    | +            |
|                         | with 4.0 m cable  | 018F6278 <sup>1)</sup> |                                      |      |      |                              |                      |              |
|                         | with 8.0 m cable  | 018F6279 <sup>1)</sup> |                                      |      |      |                              |                      |              |

<sup>1)</sup> Recommended for commercial refrigeration plant.

| AC coils                |                   | Code no.               | AKV | AKV | AKV | AKV | AKV | AKV |
|-------------------------|-------------------|------------------------|-----|-----|-----|-----|-----|-----|
| 240 V AC 10 W, 50 Hz    | with terminal box | 018F6702               | +   | +   | —   | +   | —   | —   |
|                         | with DIN plugs    | 018F6177               |     |     |     |     |     |     |
| 240 V AC 10 W, 60 Hz    | with terminal box | 018F6713               | +   | +   | —   | +   | —   | —   |
|                         | with DIN plugs    | —                      |     |     |     |     |     |     |
| 240 V AC 12 W, 50 Hz    | with terminal box | 018F6802               | +   | +   | +   | +   | +   | —   |
| 230 V AC 10 W, 50 Hz    | with terminal box | 018F6701               | +   | +   | —   | +   | —   | —   |
|                         | with DIN-plugs    | 018F6176               |     |     |     |     |     |     |
| 230 V AC 10 W, 60 Hz    | with terminal box | 018F6714               | +   | +   | —   | +   | —   | —   |
|                         | with DIN-plugs    | 018F6189               |     |     |     |     |     |     |
| 230 V AC 10 W, 50/60 Hz | with terminal box | 018F6732               | +   | +   | —   | +   | —   | —   |
|                         | with DIN-plugs    | 018F6193               |     |     |     |     |     |     |
| 230 V AC 12 W, 50 Hz    | with terminal box | 018F6801               | +   | +   | —   | +   | +   | —   |
| 230 V AC 12 W, 60 Hz    | with terminal box | 018F6814               | +   | +   | —   | +   | +   | —   |
| 230 V AC 20 W, 50 Hz    | with terminal box | 018F6905 <sup>2)</sup> | +   | +   | +   | +   | +   | +   |
| 115 V AC 10 W, 50 Hz    | with terminal box | 018F6711               | +   | +   | —   | +   | —   | —   |
|                         | with DIN-plugs    | —                      |     |     |     |     |     |     |
| 115 V AC 10 W, 60 Hz    | with terminal box | 018F6710               | +   | +   | —   | +   | —   | —   |
|                         | with DIN-plugs    | 018F6185               |     |     |     |     |     |     |
| 110 V AC 12 W, 50 Hz    | with terminal box | 018F6811               | +   | +   | —   | +   | +   | —   |
| 110 V AC 12 W, 60 Hz    | with terminal box | 018F6813               | +   | +   | —   | +   | +   | —   |
| 110 V AC 20 W, 50 Hz    | with terminal box | 018Z6904               | +   | +   | +   | +   | +   | +   |
| 24 V AC 10 W, 50 Hz     | with terminal box | 018F6707               | +   | —   | —   | +   | —   | —   |
|                         | with DIN-plugs    | 018F6182               |     |     |     |     |     |     |
| 24 V AC 10 W, 60 Hz     | with terminal box | 018F6715               | —   | —   | —   | +   | —   | —   |
|                         | with DIN-plugs    | —                      |     |     |     |     |     |     |
| 24 V AC 12 W, 50 Hz     | with terminal box | 018F6807               | +   | —   | —   | +   | +   | +   |
| 24 V AC 12 W, 60 Hz     | with terminal box | 018F6815               | +   | —   | —   | +   | +   | +   |
| 24 V AC 20 W, 50 Hz     | with terminal box | 018F6904 <sup>2)</sup> | +   | +   | +   | +   | +   | +   |
| 24 V AC 20 W, 60 Hz     | with terminal box | 018F6902 <sup>2)</sup> | +   | +   | +   | +   | +   | +   |

<sup>2)</sup> 20 W coils can not be connected to AKC 24P2 and AKC 24W2.

**Capacity**

| Valve type | Capacity in [kW]<br>at pressure drop across valve $\Delta p$ [bar] |   |   |   |    |    |    |    |
|------------|--------------------------------------------------------------------|---|---|---|----|----|----|----|
|            | 2                                                                  | 4 | 6 | 8 | 10 | 12 | 14 | 18 |

**R22/R407C**

|          |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AKV 10-1 | 0.7   | 0.9   | 1.0   | 1.1   | 1.2   | 1.2   | 1.2   | 1.2   | 1.2   |
| AKV 10-2 | 1.1   | 1.4   | 1.6   | 1.8   | 1.8   | 1.9   | 1.9   | 2.0   | 1.9   |
| AKV 10-3 | 1.8   | 2.3   | 2.6   | 2.8   | 2.9   | 3.0   | 3.0   | 3.0   | 3.1   |
| AKV 10-4 | 2.8   | 3.6   | 4.1   | 4.4   | 4.6   | 4.7   | 4.8   | 4.9   | 4.9   |
| AKV 10-5 | 4.4   | 5.7   | 6.4   | 6.9   | 7.2   | 7.5   | 7.6   | 7.7   | 7.7   |
| AKV 10-6 | 7.0   | 9.0   | 10.2  | 11.0  | 11.5  | 11.8  | 12.1  | 12.2  | 12.3  |
| AKV 10-7 | 11.2  | 14.4  | 16.3  | 17.6  | 18.4  | 18.9  | 19.3  | 19.5  | 19.3  |
| AKV 15-1 | 17.5  | 22.5  | 25.5  | 27.5  | 28.7  | 29.6  | 30.1  | 30.4  | 30.6  |
| AKV 15-2 | 28.0  | 36.0  | 40.8  | 44.0  | 45.9  | 47.4  | 48.2  | 48.7  | 49.0  |
| AKV 15-3 | 44.0  | 56.6  | 64.3  | 69.2  | 72.3  | 74.6  | 75.9  | 76.7  | 77.2  |
| AKV 15-4 | 69.9  | 89.9  | 102.0 | 110.0 | 115.0 | 118.0 | 121.0 | 122.0 | 123.0 |
| AKV 20-1 | 69.9  | 89.9  | 102.0 | 110.0 | 115.0 | 118.0 | 121.0 | 122.0 | 123.0 |
| AKV 20-2 | 112.0 | 144.0 | 163.0 | 176.0 | 184.0 | 189.0 | 193.0 | 195.0 | 193.0 |
| AKV 20-3 | 175.0 | 225.0 | 255.0 | 275.0 | 287.0 | 296.0 | 301.0 | 304.0 | 306.0 |
| AKV 20-4 | 280.0 | 360.0 | 408.0 | 440.0 | 459.0 | 474.0 | 482.0 | 487.0 | 490.0 |
| AKV 20-5 | 440.0 | 566.0 | 643.0 | 692.0 | 723.0 | 746.0 | 759.0 | 767.0 | 772.0 |

**R134a**

|          |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AKV 10-1 | 0.6   | 0.8   | 0.9   | 0.9   | 0.9   | 0.9   | 0.9   | 0.9   | 0.9   |
| AKV 10-2 | 0.9   | 1.2   | 1.4   | 1.4   | 1.5   | 1.5   | 1.5   | 1.5   | 1.4   |
| AKV 10-3 | 1.5   | 1.9   | 2.1   | 2.3   | 2.3   | 2.4   | 2.4   | 2.3   | 2.3   |
| AKV 10-4 | 2.4   | 3.0   | 3.4   | 3.6   | 3.7   | 3.8   | 3.8   | 3.7   | 3.6   |
| AKV 10-5 | 3.7   | 4.8   | 5.3   | 5.7   | 5.9   | 5.9   | 5.9   | 5.9   | 5.7   |
| AKV 10-6 | 5.9   | 7.6   | 8.5   | 9.0   | 9.3   | 9.4   | 9.4   | 9.3   | 9.0   |
| AKV 10-7 | 9.4   | 12.1  | 13.5  | 14.4  | 14.8  | 15.0  | 15.0  | 14.8  | 14.4  |
| AKV 15-1 | 14.8  | 18.9  | 21.2  | 22.5  | 23.2  | 23.5  | 23.5  | 23.2  | 23.5  |
| AKV 15-2 | 23.6  | 30.3  | 33.8  | 36.0  | 37.1  | 37.6  | 37.6  | 37.1  | 36.0  |
| AKV 15-3 | 37.2  | 47.7  | 53.3  | 56.6  | 58.5  | 59.2  | 59.2  | 58.5  | 56.6  |
| AKV 15-4 | 59.0  | 75.7  | 84.6  | 89.9  | 92.8  | 94.0  | 94.0  | 92.8  | 89.9  |
| AKV 20-1 | 59.0  | 75.7  | 84.6  | 89.9  | 92.8  | 94.0  | 94.0  | 92.8  | 89.9  |
| AKV 20-2 | 94.9  | 121.0 | 135.0 | 144.0 | 149.0 | 150.0 | 150.0 | 149.0 | 144.0 |
| AKV 20-3 | 148.0 | 189.0 | 212.0 | 225.0 | 232.0 | 235.0 | 235.0 | 232.0 | 225.0 |
| AKV 20-4 | 236.0 | 303.0 | 338.0 | 360.0 | 371.0 | 376.0 | 376.0 | 371.0 | 360.0 |
| AKV 20-5 | 372.0 | 477.0 | 533.0 | 566.0 | 585.0 | 592.0 | 592.0 | 585.0 | 566.0 |

**Correction for subcooling**

The evaporator capacity used must be corrected, if the subcooling deviates from 4 K. Use the actual correction factor indicated in the table.

Multiply the evaporator capacity by the correction factor to obtain the corrected capacity.

**Correction factors for subcooling  $\Delta t_{sub}$** 

| Correction factor | 4 K  | 10 K | 15 K | 20 K | 25 K | 30 K | 35 K | 40 K | 45 K | 50 K |
|-------------------|------|------|------|------|------|------|------|------|------|------|
| R22/R407C         | 1.00 | 0.94 | 0.90 | 0.87 | 0.83 | 0.80 | 0.77 | 0.74 | 0.72 | 0.69 |
| R134a             | 1.00 | 0.93 | 0.88 | 0.84 | 0.80 | 0.76 | 0.73 | 0.70 | 0.68 | 0.65 |

Corrected capacity = evaporator capacity x correction factor.

**Capacity**  
(continued)

| Valve type | Capacity in [kW]<br>at pressure drop across valve $\Delta p$ [bar] |   |   |   |    |    |    |    |
|------------|--------------------------------------------------------------------|---|---|---|----|----|----|----|
|            | 2                                                                  | 4 | 6 | 8 | 10 | 12 | 14 | 18 |

**R404A/R507**

|          |      |      |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|------|------|
| AKV 10-1 | 0.6  | 0.7  | 0.8  | 0.8  | 0.9  | 0.8  | 0.8  | 0.8  | 0.8  |
| AKV 10-2 | 0.9  | 1.1  | 1.3  | 1.3  | 1.4  | 1.4  | 1.3  | 1.3  | 1.2  |
| AKV 10-3 | 1.4  | 1.8  | 2.0  | 2.1  | 2.1  | 2.1  | 2.1  | 2.0  | 1.9  |
| AKV 10-4 | 2.3  | 2.9  | 3.1  | 3.3  | 3.4  | 3.4  | 3.3  | 3.3  | 3.1  |
| AKV 10-5 | 3.6  | 4.5  | 4.9  | 5.2  | 5.3  | 5.3  | 5.3  | 5.1  | 4.9  |
| AKV 10-6 | 5.6  | 7.1  | 7.8  | 8.2  | 8.4  | 8.5  | 8.4  | 8.2  | 7.7  |
| AKV 10-7 | 9.0  | 11.4 | 12.5 | 13.2 | 13.5 | 13.5 | 13.4 | 13.1 | 12.4 |
| AKV 15-1 | 14.1 | 17.8 | 19.6 | 20.6 | 21.0 | 21.1 | 20.9 | 20.4 | 19.4 |
| AKV 15-2 | 22.6 | 28.5 | 31.4 | 33.0 | 33.7 | 33.9 | 33.4 | 32.6 | 30.8 |
| AKV 15-3 | 35.5 | 44.9 | 49.4 | 51.9 | 53.0 | 53.2 | 52.7 | 51.4 | 48.7 |
| AKV 15-4 | 56.4 | 71.2 | 78.3 | 82.4 | 84.2 | 84.6 | 83.7 | 81.5 | 77.3 |
| AKV 20-1 | 56.4 | 71.2 | 78.3 | 82.4 | 84.2 | 84.6 | 83.7 | 81.5 | 77.3 |
| AKV 20-2 | 90.3 | 114  | 125  | 132  | 135  | 135  | 134  | 131  | 124  |
| AKV 20-3 | 141  | 178  | 196  | 206  | 210  | 211  | 209  | 204  | 194  |
| AKV 20-4 | 226  | 285  | 314  | 330  | 337  | 339  | 334  | 326  | 308  |
| AKV 20-5 | 355  | 449  | 494  | 519  | 530  | 532  | 527  | 514  | 487  |

**Correction for subcooling**

The evaporator capacity used must be corrected, if the subcooling deviates from 4 K. Use the actual correction factor indicated in the table.

Multiply the evaporator capacity by the correction factor to obtain the corrected capacity.

**Correction factors for subcooling  $\Delta t_{sub}$** 

| Correction factor | 4 K  | 10 K | 15 K | 20 K | 25 K | 30 K | 35 K | 40 K | 45 K | 50 K |
|-------------------|------|------|------|------|------|------|------|------|------|------|
| R404A/R507        | 1.00 | 0.91 | 0.83 | 0.78 | 0.73 | 0.68 | 0.65 | 0.61 | 0.59 | 0.56 |

Corrected capacity = evaporator capacity x correction factor.

**Capacity**  
(continued)

| Valve type | Capacity in [kW]<br>at pressure drop across valve Δp [bar] |   |   |   |    |    |    |    |
|------------|------------------------------------------------------------|---|---|---|----|----|----|----|
|            | 2                                                          | 4 | 6 | 8 | 10 | 12 | 14 | 16 |

**R410A**

|          |      |      |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|------|------|
| AKV 10-1 | 0.9  | 1.1  | 1.3  | 1.4  | 1.5  | 1.5  | 1.6  | 1.6  | 1.6  |
| AKV 10-2 | 1.4  | 1.8  | 2.0  | 2.2  | 2.3  | 2.4  | 2.5  | 2.5  | 2.5  |
| AKV 10-3 | 2.1  | 2.8  | 3.2  | 3.4  | 3.6  | 3.8  | 3.9  | 3.9  | 4.0  |
| AKV 10-4 | 3.4  | 4.4  | 5.1  | 5.5  | 5.8  | 6.0  | 6.2  | 6.3  | 6.4  |
| AKV 10-5 | 5.3  | 7.0  | 8.0  | 8.7  | 9.1  | 9.5  | 9.7  | 9.9  | 10.4 |
| AKV 10-6 | 8.5  | 11.1 | 12.7 | 13.7 | 14.5 | 15.0 | 15.4 | 15.7 | 15.9 |
| AKV 10-7 | 13.6 | 17.7 | 20.2 | 22.0 | 23.2 | 24.0 | 24.7 | 25.2 | 25.4 |
| AKV 15-1 | 21.2 | 27.7 | 31.6 | 34.4 | 36.2 | 37.6 | 38.5 | 39.2 | 39.8 |
| AKV 15-2 | 33.9 | 44.3 | 50.6 | 55.0 | 57.8 | 60.2 | 61.7 | 62.8 | 63.7 |
| AKV 15-3 | 53.2 | 69.6 | 79.7 | 86.5 | 91.1 | 94.7 | 97.2 | 98.9 | 100  |
| AKV 15-4 | 84.6 | 111  | 127  | 137  | 145  | 150  | 154  | 157  | 159  |
| AKV 20-1 | 84.6 | 111  | 127  | 137  | 145  | 150  | 154  | 157  | 159  |
| AKV 20-2 | 136  | 177  | 202  | 220  | 232  | 240  | 247  | 252  | 254  |
| AKV 20-3 | 212  | 277  | 316  | 344  | 362  | 376  | 385  | 392  | 398  |
| AKV 20-4 | 339  | 443  | 506  | 550  | 578  | 602  | 617  | 628  | 637  |
| AKV 20-5 | 532  | 696  | 797  | 865  | 911  | 947  | 972  | 989  | 1000 |

**R744**

|          |      |      |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|------|------|
| AKV 10-1 | 0.8  | 1.1  | 1.3  | 1.5  | 1.7  | 1.8  | 2.0  | 2.1  | 2.2  |
| AKV 10-2 | 1.2  | 1.7  | 2.1  | 2.4  | 2.7  | 2.9  | 3.2  | 3.4  | 3.6  |
| AKV 10-3 | 2.0  | 2.8  | 3.4  | 3.9  | 4.3  | 4.8  | 5.1  | 5.5  | 5.8  |
| AKV 10-4 | 3.1  | 4.3  | 5.3  | 6.2  | 6.8  | 7.5  | 8.1  | 8.7  | 9.1  |
| AKV 10-5 | 4.8  | 6.8  | 8.3  | 9.6  | 10.7 | 11.7 | 12.7 | 13.5 | 14.3 |
| AKV 10-6 | 7.7  | 10.8 | 13.2 | 15.3 | 17.0 | 18.7 | 20.2 | 21.5 | 22.7 |
| AKV 10-7 | 12.2 | 17.3 | 21.0 | 24.5 | 27.2 | 29.8 | 32.3 | 34.4 | 36.3 |
| AKV 15-1 | 19.1 | 27.0 | 32.9 | 38.3 | 42.6 | 46.7 | 50.5 | 53.8 | 56.9 |
| AKV 15-2 | 30.6 | 43.2 | 52.6 | 61.2 | 68.1 | 74.7 | 80.8 | 86.1 | 91.0 |
| AKV 15-3 | 48.2 | 68.2 | 82.9 | 96.5 | 107  | 118  | 127  | 136  | 143  |
| AKV 15-4 | 76.5 | 108  | 132  | 153  | 170  | 187  | 202  | 215  | 227  |
| AKV 20-1 | 76.5 | 108  | 132  | 153  | 170  | 187  | 202  | 215  | 227  |
| AKV 20-2 | 122  | 173  | 210  | 245  | 272  | 298  | 323  | 344  | 363  |
| AKV 20-3 | 191  | 270  | 329  | 383  | 426  | 467  | 505  | 538  | 569  |
| AKV 20-4 | 306  | 432  | 526  | 612  | 681  | 747  | 808  | 861  | 910  |
| AKV 20-5 | 482  | 682  | 829  | 965  | 1074 | 1177 | 1273 | 1357 | 1434 |

**Correction for subcooling**

The evaporator capacity used must be corrected, if the subcooling deviates from 4 K. Use the actual correction factor indicated in the table.

Multiply the evaporator capacity by the correction factor to obtain the corrected capacity.

**Correction factors for subcooling  $\Delta t_{sub}$** 

| Correction factor | 4 K  | 10 K | 15 K | 20 K | 25 K | 30 K | 35 K | 40 K | 45 K | 50 K |
|-------------------|------|------|------|------|------|------|------|------|------|------|
| R410A             | 1.00 | 0.95 | 0.90 | 0.85 | 0.81 | 0.77 | 0.73 | 0.70 | 0.67 | 0.64 |
| R744              | 1.00 | 0.91 | 0.86 | 0.81 | 0.77 | 0.73 | 0.69 | 0.66 | 0.63 | 0.60 |

Corrected capacity = evaporator capacity x correction factor.

**SI units R410A**

| Valve / Orifice | Cond. temp. [°C] | Evaporating [°C] |     |     |     |   |    |
|-----------------|------------------|------------------|-----|-----|-----|---|----|
|                 |                  | -40              | -30 | -20 | -10 | 0 | 10 |
|                 |                  | Capacity [kW]    |     |     |     |   |    |

**AKV 10**

|          |    |      |      |      |      |      |      |
|----------|----|------|------|------|------|------|------|
| AKV 10-1 | 25 | 1.37 | 1.36 | 1.33 | 1.26 | 1.14 | 0.95 |
| AKV 10-2 |    | 2.33 | 2.32 | 2.26 | 2.14 | 1.94 | 1.61 |
| AKV 10-3 |    | 3.42 | 3.41 | 3.32 | 3.15 | 2.85 | 2.36 |
| AKV 10-4 |    | 6.30 | 6.26 | 6.11 | 5.80 | 5.25 | 4.35 |
| AKV 10-5 |    | 8.75 | 8.71 | 8.50 | 8.07 | 7.31 | 6.05 |
| AKV 10-6 |    | 15.5 | 15.5 | 15.1 | 14.4 | 13.0 | 10.8 |
| AKV 10-7 |    | 22.1 | 22.0 | 21.5 | 20.4 | 18.5 | 15.3 |

**AKV 10**

|          |    |      |      |      |      |      |      |
|----------|----|------|------|------|------|------|------|
| AKV 15-1 | 25 | 34.1 | 34.0 | 33.2 | 31.5 | 28.5 | 23.6 |
| AKV 15-2 |    | 54.4 | 54.2 | 53.0 | 50.3 | 45.7 | 37.8 |
| AKV 15-3 |    | 84.9 | 84.9 | 83.1 | 79.1 | 71.8 | 59.6 |
| AKV 15-4 |    | 133  | 133  | 131  | 125  | 114  | 94   |

**AKV 20**

|          |    |     |     |     |     |     |      |
|----------|----|-----|-----|-----|-----|-----|------|
| AKV 20-1 | 25 | 136 | 136 | 133 | 126 | 114 | 94.5 |
| AKV 20-2 |    | 216 | 216 | 211 | 201 | 183 | 151  |
| AKV 20-3 |    | 333 | 334 | 328 | 313 | 285 | 237  |
| AKV 20-4 |    | 522 | 525 | 518 | 497 | 454 | 379  |
| AKV 20-5 |    | 802 | 808 | 801 | 773 | 713 | 599  |

2) The rated capacity is based on:  
 Evaporating temperature  $t_e$ : 4.4 °C / 40 °F  
 Condensing temperature  $t_c$ : 38 °C / 100 °F  
 Refrigerant temperature ahead of valve  $t_i$ : 37 °C / 98 °F

**SI units R410A**

| Valve / Orifice | Cond. temp. [°C] | Evaporating [°C] |     |     |     |   |    |
|-----------------|------------------|------------------|-----|-----|-----|---|----|
|                 |                  | -40              | -30 | -20 | -10 | 0 | 10 |
|                 |                  | Capacity [kW]    |     |     |     |   |    |

**AKV 10**

|          |    |      |      |      |      |      |      |
|----------|----|------|------|------|------|------|------|
| AKV 10-1 | 25 | 1.37 | 1.36 | 1.33 | 1.26 | 1.14 | 0.95 |
| AKV 10-2 |    | 2.33 | 2.32 | 2.26 | 2.14 | 1.94 | 1.61 |
| AKV 10-3 |    | 3.42 | 3.41 | 3.32 | 3.15 | 2.85 | 2.36 |
| AKV 10-4 |    | 6.30 | 6.26 | 6.11 | 5.80 | 5.25 | 4.35 |
| AKV 10-5 |    | 8.75 | 8.71 | 8.50 | 8.07 | 7.31 | 6.05 |
| AKV 10-6 |    | 15.5 | 15.5 | 15.1 | 14.4 | 13.0 | 10.8 |
| AKV 10-7 |    | 22.1 | 22.0 | 21.5 | 20.4 | 18.5 | 15.3 |

**AKV 10**

|          |    |      |      |      |      |      |      |
|----------|----|------|------|------|------|------|------|
| AKV 15-1 | 25 | 34.1 | 34.0 | 33.2 | 31.5 | 28.5 | 23.6 |
| AKV 15-2 |    | 54.4 | 54.2 | 53.0 | 50.3 | 45.7 | 37.8 |
| AKV 15-3 |    | 84.9 | 84.9 | 83.1 | 79.1 | 71.8 | 59.6 |
| AKV 15-4 |    | 133  | 133  | 131  | 125  | 114  | 94   |

**AKV 20**

|          |    |     |     |     |     |     |      |
|----------|----|-----|-----|-----|-----|-----|------|
| AKV 20-1 | 25 | 136 | 136 | 133 | 126 | 114 | 94.5 |
| AKV 20-2 |    | 216 | 216 | 211 | 201 | 183 | 151  |
| AKV 20-3 |    | 333 | 334 | 328 | 313 | 285 | 237  |
| AKV 20-4 |    | 522 | 525 | 518 | 497 | 454 | 379  |
| AKV 20-5 |    | 802 | 808 | 801 | 773 | 713 | 599  |

2) The rated capacity is based on:  
 Evaporating temperature  $t_e$ : 4.4 °C / 40 °F  
 Condensing temperature  $t_c$ : 38 °C / 100 °F  
 Refrigerant temperature ahead of valve  $t_i$ : 37 °C / 98 °F

**Subcooling correction factor 'fsub'**

| Subcooling [K]    | 2    | 4    | 10   | 15   | 20   | 25   | 30   | 35   | 40   | 45   | 50   |
|-------------------|------|------|------|------|------|------|------|------|------|------|------|
| Correction factor | 0.98 | 1.00 | 1.07 | 1.13 | 1.19 | 1.25 | 1.31 | 1.36 | 1.42 | 1.48 | 1.53 |

**Distributor correction factor 'fp' \*)**

| Evaporating [°C]    |     | -40  | -30  | -20  | -10  | 0    | 10   |
|---------------------|-----|------|------|------|------|------|------|
| Pressure drop [bar] | 0   | 1    | 1    | 1    | 1    | 1    | 1    |
|                     | 1   | 0.97 | 0.97 | 0.97 | 0.96 | 0.96 | 0.94 |
|                     | 1.5 | 0.96 | 0.96 | 0.95 | 0.95 | 0.93 | 0.91 |
|                     | 2   | 0.94 | 0.94 | 0.93 | 0.93 | 0.91 | 0.88 |

\*) calculated at 32 °C condensing temperature.

**Valve sizing**

To obtain an expansion valve that will function correctly under different load conditions it is necessary to consider the following points in below sequence when sizing the valve:

1. Evaporator capacity
2. Pressure drop across the valve
3. Correction for subcooling
4. Correction for evaporating temperature
5. Determination of valve size
6. Correctly dimensioned liquid line

**1. Evaporator capacity**

The evaporator capacity is found in the specifications from the evaporator supplier.

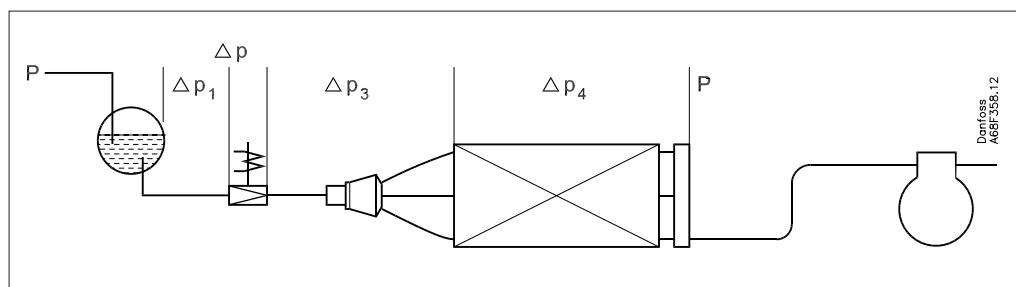
**2. Pressure drop across the valve**

The pressure drop across the valve directly determines the capacity and must therefore be considered.

The pressure drop across the valve is normally calculated as the condensing pressure less the

evaporating pressure and other sundry pressure drops in the liquid line, distributor, evaporator, etc. It is indicated in the following formula:

$$\Delta p_{\text{valve}} = p_c - (p_e + \Delta p_1 + \Delta p_3 + \Delta p_4)$$



|                           |                                             |
|---------------------------|---------------------------------------------|
| $\Delta p_{\text{valve}}$ | pressure drop across the valve              |
| $p_c$                     | condensing pressure                         |
| $p_e$                     | evaporating pressure                        |
| $\Delta p_1$              | pressure drop across the liquid line        |
| $\Delta p_3$              | pressure drop across the distributor system |
| $\Delta p_4$              | pressure drop across the evaporator         |

**⚠ Note:**

The pressure drop across the liquid line and the distributor system must be calculated on the basis of the max. capacity of the valve, as the valve operates with pulse-width modulation.

**Example  
of calculation of pressure drop across a valve:**

Refrigerant: R22/R407C  
 Condensing temperature: 35 °C ( $p_c = 13.5$  bar)  
 Evaporating temperature: 0 – 6 °C ( $p_e = 4.1$  bar)  
 $\Delta p_1 = 0.2$  bar  
 $\Delta p_3 = 0.8$  bar  
 $\Delta p_4 = 0.1$  bar

This will give the following equation:

$$\begin{aligned} \Delta p_{\text{valve}} &= p_c - (p_e + \Delta p_1 + \Delta p_3 + \Delta p_4) \\ &= 13.5 - (4.1 + 0.2 + 0.8 + 0.1) \\ &= 8.3 \text{ bar} \end{aligned}$$

The found value for “pressure drop across the valve” is used later in the section “Determination of valve size”.

## Valve sizing (continued)

### 3. Correction for subcooling

The evaporator capacity used must be corrected, if the subcooling deviates from 4 K. Use the actual correction factor indicated in the table.

Multiply the evaporator capacity by the correction factor to obtain the corrected capacity.

Correction factors for subcooling  $\Delta t_{sub}$

| Correction factor | 4 K  | 10 K | 15 K | 20 K | 25 K | 30 K | 35 K | 40 K | 45 K | 50 K |
|-------------------|------|------|------|------|------|------|------|------|------|------|
| R22/R407C         | 1.00 | 0.94 | 0.90 | 0.87 | 0.83 | 0.80 | 0.77 | 0.74 | 0.72 | 0.69 |
| R134a             | 1.00 | 0.93 | 0.88 | 0.84 | 0.80 | 0.76 | 0.73 | 0.70 | 0.68 | 0.65 |
| R404A/R507        | 1.00 | 0.91 | 0.83 | 0.78 | 0.73 | 0.68 | 0.65 | 0.61 | 0.59 | 0.56 |
| R410A             | 1.00 | 0.95 | 0.90 | 0.85 | 0.81 | 0.77 | 0.73 | 0.70 | 0.67 | 0.64 |
| R744              | 1.00 | 0.91 | 0.86 | 0.81 | 0.77 | 0.73 | 0.69 | 0.66 | 0.63 | 0.60 |

Corrected capacity = evaporator capacity x correction factor.

The corrected capacity is used in the section "Determination of valve size".

#### Example of correction:

Refrigerant: R22/R407C

Evaporator capacity  $Q_e$ : 5 kW

Subcooling: 10 K

Correction factor according to the table = 0.94

Corrected capacity =  $5 \times 0.94 = 4.7$  kW.

#### Note:

Too little subcooling may cause flash gas.

### 4. Correction for evaporating temperature ( $t_e$ )

To obtain a correctly dimensioned valve it is important that the application is considered. Depending on the application, the valve should have an overcapacity enabling it to cope with the extra amount of refrigeration needed during certain periods, e.g. during the defrost recovery process.

The valve's opening degree should therefore be between 50 and 75% when regulating. In this way it is ensured that the valve has a sufficiently wide regulation range, so that it can manage changed loads at or near the normal working point. Correction factors based on the evaporating temperature are indicated below:

Correction factors for evaporating temperature ( $t_e$ )

| Evaporating temperature $t_e$ [°C] | 5    | 0    | -10  | -15  | -20 | -30 | -40 |
|------------------------------------|------|------|------|------|-----|-----|-----|
| AKV 10                             | 1.25 | 1.25 | 1.25 | 1.25 | 1.6 | 1.6 | 1.6 |
| AKV 15                             | 1.0  | 1.0  | 1.0  | 1.0  | 1.2 | 1.3 | 1.4 |
| AKV 20                             | 1.0  | 1.0  | 1.0  | 1.0  | 1.2 | 1.3 | 1.4 |

## Valve sizing (continued)

### 5. Determination of valve size

When the valve size meeting the required capacity is selected it is important to note that the capacity indications are the valve's rated capacity, i.e. when the valve is 100% open.

In this section we tell you how the valve's size is determined.

*There are three factors that have an influence on the choice of the valve:*

- The pressure drop across the valve
- The corrected capacity (correction for subcooling)
- The corrected capacity for evaporating temperature

The three factors have been described earlier in this section on dimensioning.

*When these three factors have been established, the selection of the valve can be made:*

- First multiply the "corrected capacity" by a value stated in the table.
- Use the new value in the capacity table in combination with the pressure drop value.
- Now select the valve size.

#### *Example of selection of valve*

Use as starting point the two earlier mentioned examples, where the following two values have been obtained:

$\Delta p_{\text{valve}} = 8.3 \text{ bar}$

$Q_e \text{ corrected} = 4.7 \text{ kW}$

The valve should be used in a coldroom. Consequently, 1.25 should be selected as "correction factor for the evaporating temperature".

The dimensioned capacity will then be:  
 $1.25 \times 4.7 \text{ kW} = 5.88 \text{ kW}$ .

Now select a valve size from one of the capacity tables.

With the given values  $\Delta p_{\text{valve}} = 8.3 \text{ bar}$  and a capacity of 5.88 kW, select the valve size for AKV 10-5.  
This valve will have a capacity of approx. 7 kW.

### 6. Correctly dimensioned liquid line

To obtain a correct supply of liquid to the AKV valve, the liquid line to the individual AKV valve must be correctly dimensioned.

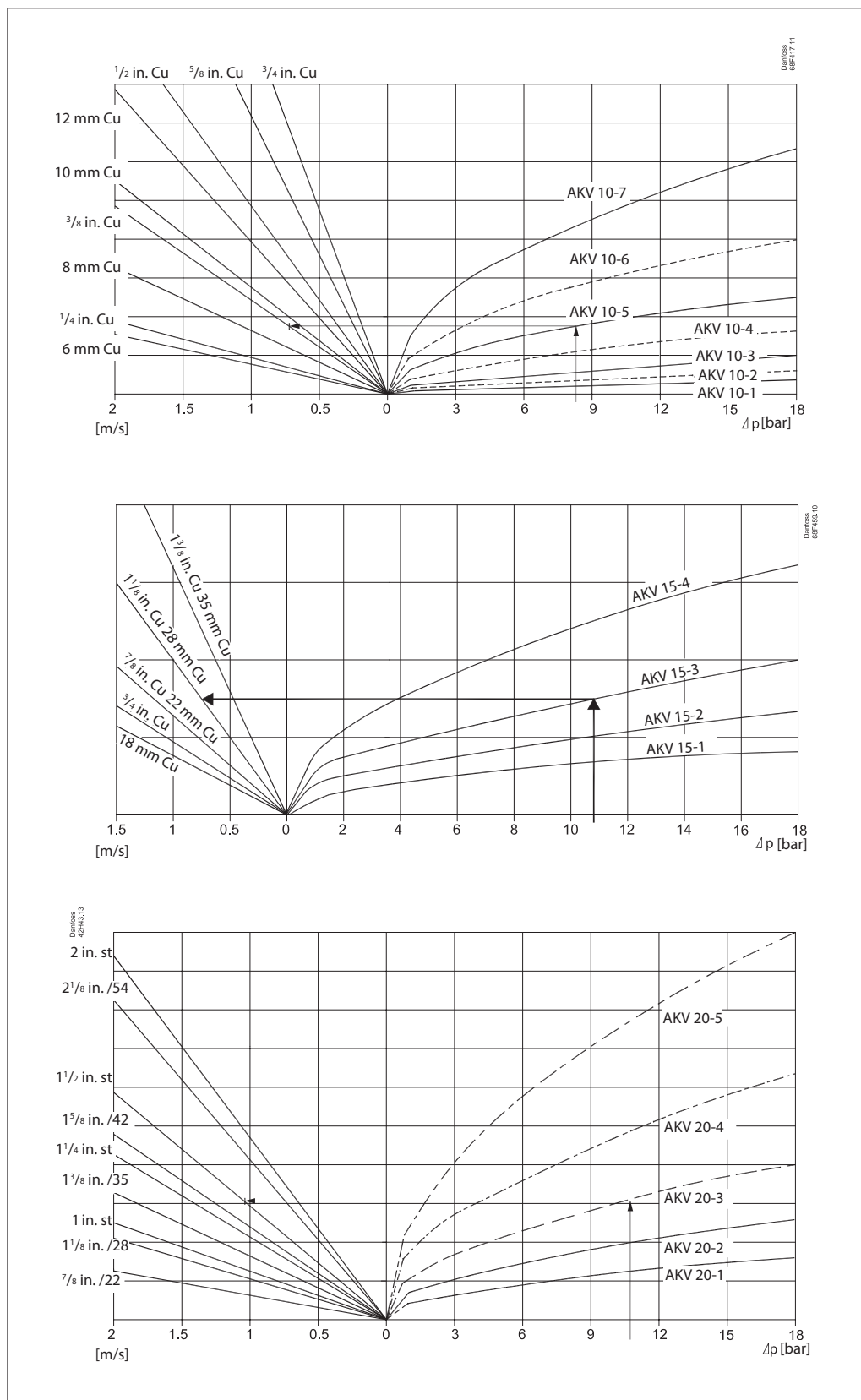
The liquid flow rate should not exceed 1 m/sec.

This must be observed on account of the pressure drop in the liquid line (lack of subcooling) and pulsations in the liquid line.

Dimensioning of the liquid line **must be based on the capacity of the valve at the pressure drop** with which it is operating (cf. capacity table), and not on the evaporator's capacity.

**Valve sizing**  
(continued)

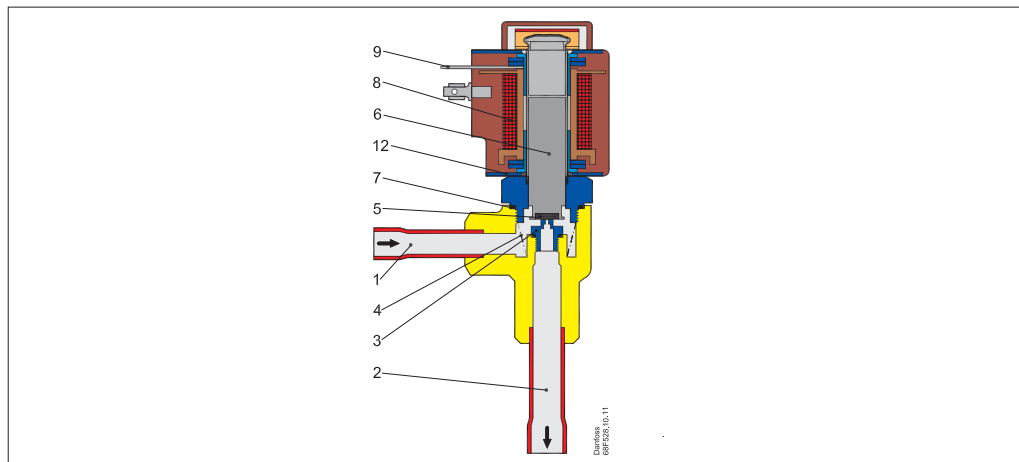
R22/R407C, R134a, R404A, R507



## Design

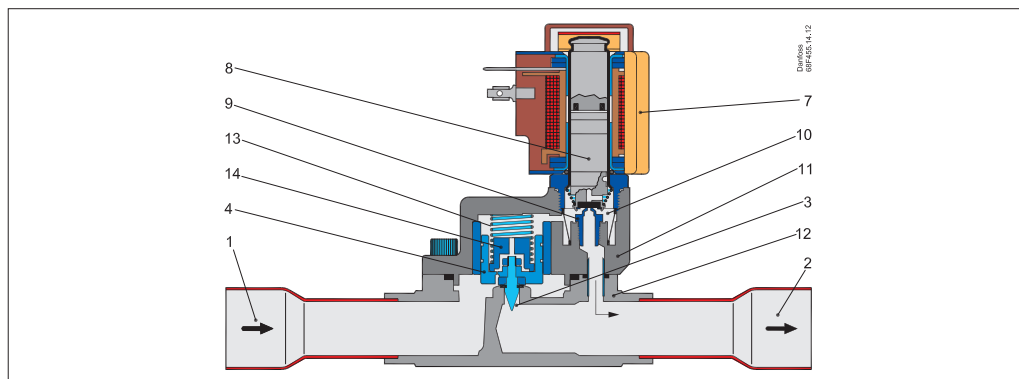
### AKV 10

1. Inlet
2. Outlet
3. Orifice
4. Filter
5. Valve seat
6. Armature
7. Copper gasket
8. Coil



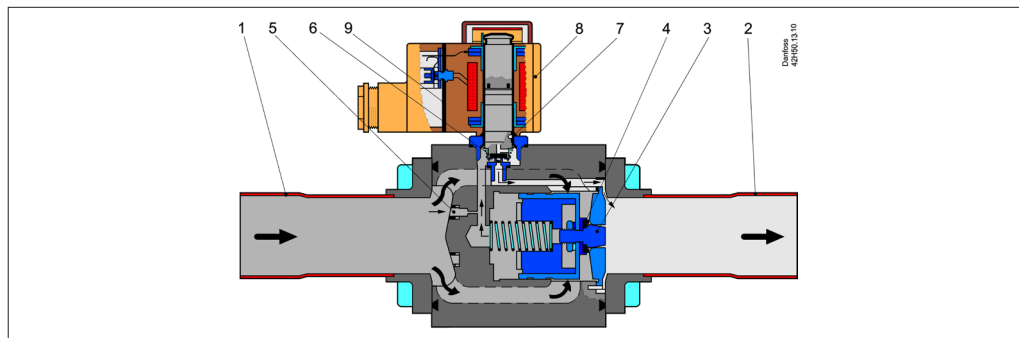
### AKV 15

1. Inlet
2. Outlet
3. Orifice
4. Piston assembly
7. Coil
8. Armature
9. Pilot orifice
10. Filter
11. Cover
12. Valve body
13. Spring
14. Orifice assembly



### AKV 20

1. Inlet
2. Outlet
3. Orifice
4. Valve seat
5. Filter
6. Pilot orifice
7. O-ring
8. Coil
9. Terminal box

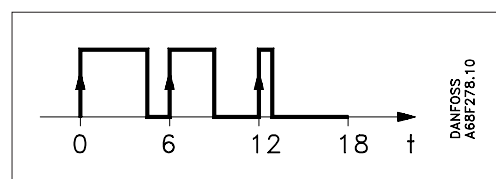


## Function

The valve capacity is regulated by means of pulse-width modulation. Within a period of six seconds a voltage signal from the controller will be transmitted to and removed from the valve coil. This makes the valve open and close for the flow of refrigerant.

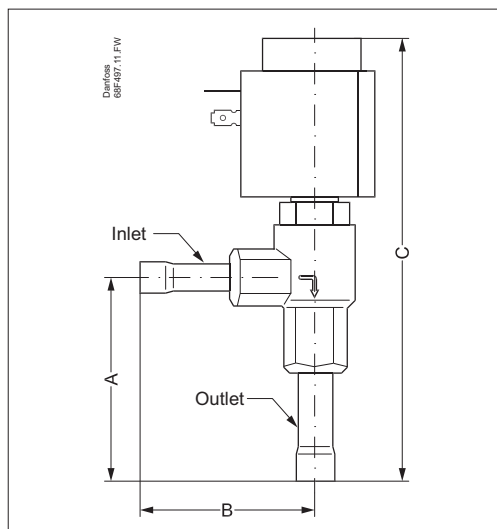
The relation between this opening and closing time indicates the actual capacity. If there is an intense need for refrigeration, the valve will remain open for almost all six seconds of the period. If the required amount of refrigeration is modest, the valve will only stay open during a fraction of the period.

The amount of refrigeration needed is determined by the controller. When no refrigeration is required, the valve will remain closed and thus function as a solenoid valve.



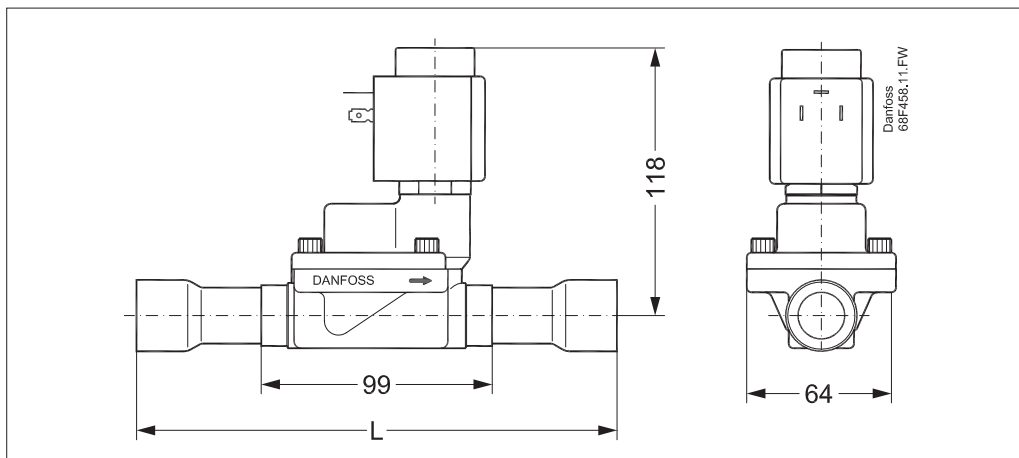
Dimensions and weights

AKV 10 solder



| Valve type | Connection type | n                | A    | B    | C    | Inlet         | Outlet        | Inlet | Outlet | Net weight without coil |
|------------|-----------------|------------------|------|------|------|---------------|---------------|-------|--------|-------------------------|
|            |                 |                  | [mm] | [mm] | [mm] | [in.]         | [in.]         | [mm]  | [mm]   |                         |
| AKV 10-n   | Solder          | 1, 2, 3, 4, 5, 6 | 75   | 67   | 154  | $\frac{3}{8}$ | $\frac{1}{2}$ | 10    | 12     | 0.38                    |
| AKV 10-n   | Solder          | 7                | 73   | 75   | 152  | $\frac{1}{2}$ | $\frac{5}{8}$ | 12    | 16     | 0.38                    |

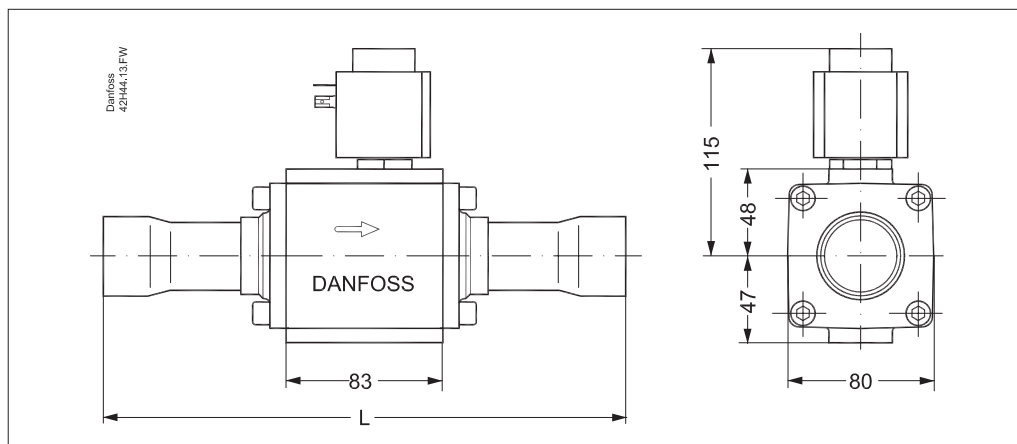
AKV 15



| Valve type | Inlet           | Outlet          | Inlet | Outlet | L    | Net weight without coil |
|------------|-----------------|-----------------|-------|--------|------|-------------------------|
|            | [in.]           | [in.]           | [mm]  | [mm]   | [mm] |                         |
| AKV 15-1   | $\frac{3}{4}$   | $\frac{3}{4}$   | 18    | 18     | 190  | 1.5                     |
| AKV 15-2   | $\frac{3}{4}$   | $\frac{3}{4}$   | 18    | 18     | 190  | 1.5                     |
| AKV 15-3   | $\frac{7}{8}$   | $\frac{7}{8}$   | 22    | 22     | 190  | 1.5                     |
| AKV 15-4   | $1 \frac{1}{8}$ | $1 \frac{1}{8}$ | 28    | 28     | 216  | 1.5                     |

## Dimensions and weights (continued)

### AKV 20



| Valve type | Solder connections |        |       |        |      |                         | Weld connections |        |      |                         |
|------------|--------------------|--------|-------|--------|------|-------------------------|------------------|--------|------|-------------------------|
|            | Inlet              | Outlet | Inlet | Outlet | L    | Net weight without coil | Inlet            | Outlet | L    | Net weight without coil |
|            | [in.]              | [in.]  | [mm]  | [mm]   | [mm] | [kg]                    | [in.]            | [in.]  | [mm] | [kg]                    |
| AKV 20-1   | 1 3/8              | 1 3/8  | 35    | 35     | 281  | 4.3                     | 1 1/4            | 1 1/4  | 176  | 4.1                     |
| AKV 20-2   | 1 3/8              | 1 3/8  | 35    | 35     | 281  | 4.3                     | 1 1/4            | 1 1/4  | 176  | 4.1                     |
| AKV 20-3   | 1 5/8              | 1 5/8  | 42    | 42     | 281  | 4.3                     | 1 1/4            | 1 1/4  | 176  | 4.1                     |
| AKV 20-4   | 2 1/8              | 2 1/8  | 54    | 54     | 281  | 4.3                     | 1 1/2            | 1 1/2  | 176  | 4.1                     |
| AKV 20-5   | 2 1/8              | 2 1/8  | 54    | 54     | 281  | 4.3                     | 2                | 2      | 176  | 4.1                     |