

Data Sheet

Electric expansion valve Type **AKV 10P** and **AKV 10PS**

For liquid injection into evaporators



AKV 10P and AKV10PS are electric operated expansion valves designed for refrigeration plants.

The AKV 10P and AKV 10PS valves are normally controlled by a controller from Danfoss range of ADAP- KOOL® controllers, that ensures a precise liquid injection into evaporators.

The AKV 10P and AKV 10PS valves are supplied as a part program, as follows:

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

The orifice and piston assemblies are replaceable. The AKV 10P and AKV 10PS valves cover a wide capacity range.

Features

Precise control of liquid injection

- Optimum utilization of the evaporator
- Increased energy efficiency and COP
- Improved overall system performance
- Enables energy saving minimum stable superheat and adaptive defrost algorithms due to turbulent flow
- Provides excellent distribution and oil return
- Repetitive operation of the valve at all conditions

Superior valve technology

- Soft pulse operation makes possible to have a low noise valve that guarantees precise flow control and increased energy efficiency of the system

Fully Serviceable valve

- Fast troubleshooting during system diagnostics
- Replaceable filter and orifice assembly
- Special Service coil available for installation and servicing

Fast opening/closing within sec.

- Quick reaction to the operating condition.
- Minimizes the risk of liquid refrigerant flowing into the compressor at shut down and low pressure cut out at start up
- Normally closed Solenoid tight shut-off valve
- Prevents migration of the refrigerant during stand-still
- Reduced complexity by reducing number of components in the system

Supports variety of refrigerants with wider regulation range

- Wide application scope

Compact, lightweight design

- Flexible and easy integration in any system

Wider selection range

- Wider range of AC and DC voltage coils
- Coils with various cable lengths

Valve construction

- Internal and external corrosion resistant





Protecting the environment and climate

- Manufactured according to ISO/TS16949
- Second – to – none quality and reliability

Portfolio overview





Related products

Table 1: Related products

| AK-CC55 case controller | AK-CC 750 case controller | EKC 315A superheat controller | DML/DMSC Eliminator® hermetic filter drier |
|---|---|--|---|
|  |  |  |  |


Standard coil for AKV 10P/ AKV 10PS

Table 2: Standard coil for AKV 10P/ AKV 10PS

| Solenoid coil with terminal box | Solenoid coil with DIN spade and protection cap | Solenoid coil with cable | Solenoid coil with DIN spade |
|--|--|---|--|
|  |  |  |  |

UL coil for AKV 10P / AKV 10PS

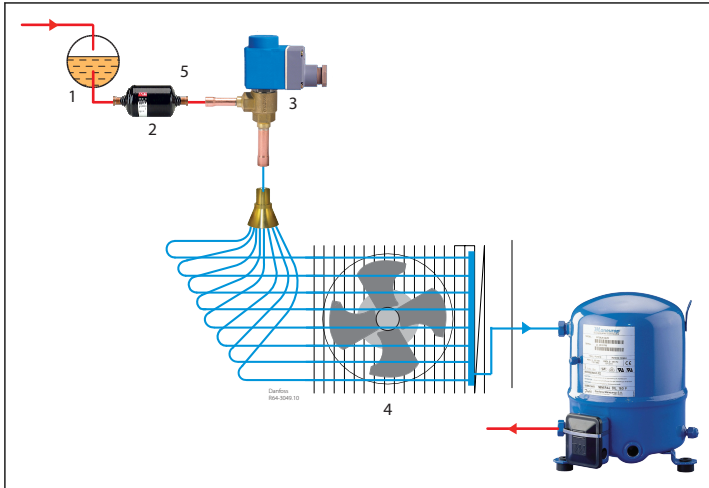
Table 3: UL coil for AKV 10P / AKV 10PS

| Junction box NEMA 2 | Conduit boss NEMA 4 |
|---|---|
|  |  |

Applications

Typical Application

Figure 1: Application



| | |
|---|--------------------|
| 1 | Receiver |
| 2 | Filter |
| 3 | AKV 10P / AKV 10PS |
| 4 | Evaporator |
| 5 | Max. 1 m/s |

⚠ WARNING:

Filter < 40 micron micro is required for AKV 10 PS recommended filter drier, type DML / DMSC

Product specification

Technical data

Refrigerant

R1233zd, R1234yf, R1234ze, R1270, R134a, R22, R23, R290, R32, R404A, R407A, R407C, R407F, R407H, R410A, R422B, R422D, R438A, R444B, R448A, R449A, R449B, R450A, R452A, R452B, R454A, R454B, R454C, R455A, R463A, R469A, R507, R513A, R513B, R515A, R515B, R516A, R600, R600a, R744.

⚠ WARNING:

Safety notes for flammable refrigerants (R454C, R454A, R1234ze, R1270, R290, R32, R444B, R452B, R454B, R600, R600a, R455A, R516A, R1234yf):

- This product is validated in accordance to ATEX, EN 378, ISO 5149, ASHRAE 15, IEC 60335-2-x or equivalent standards.
- Ignition risk is evaluated in accordance to ISO 5149 and IEC 60335.
- See safety note below.

⚠ WARNING:

Safety notes:

- The product can be applied on systems with R454C, R454A, R1234ze, R1270, R290, R32, R444B, R452B, R454B, R600, R600a, R455A, R516A, R1234yf as the working fluid.
- For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third party approval of the system containing flammable refrigerant.
- Note, please follow specific selection criteria stated in the datasheet for these particular refrigerants.
- The valve must only be used in closed circuit refrigeration system, where no oxygen is present acc. EN 378, ISO 5149 ASHRAE 15 or IEC 60335-2-x or equivalent standards.

| Features | Direct operated valve | Servo operated valve |
|---|--|--|
| Valve type | AKV 10P0 to AKV 10P8 | AKV 10PS4 to AKV 10PS8 |
| Working principle | PWM (Pulse-width modulation) | PWM (Pulse-width modulation) |
| Recommended period of cycle time | 6 Seconds | 6 Seconds |
| Regulation range (Capacity range) | 10 – 100% | 10 – 100% |
| Connection type | Solder | Solder |
| Evaporating temperature (on outlet side of valve) | -60 – 60 °C / -76 – 140 °F | -60 – 60 °C / -76 – 140 °F |
| Ambient temperature (coil dependent) | -50 – 80 °C / -58 – 176 °F | -50 – 80 °C / -58 – 176 °F |
| Max. OPD | 35 bar / 508 psig (AKV 10P0 to AKV 10P6) | 35 bar / 508 psig |
| Max. OPD | 18 bar / 261 psi (AKV 10P7 to AKV 10P8) | N/A |
| Min. OPD | 0 bar / 0 psi | 0.1 bar / 1.45 psi |
| Filter, replaceable | Internal 100 µm | Internal 53 µm |
| Max. working pressure | 90 barg / 1305 psig | 90 barg / 1305 psig |
| MAP (Max. Abnormal Pressure) 1305 psig | 1305 psig | 1305 psig |
| COT (Continuous Operation Temperature) | 140 °F | 140 °F |
| Recommended Danfoss filter | N/A | ELIMINATOR® Hermetic filter drier, type DML / DMSC |

⚠ WARNING:

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

Technical data - Standard coils for AKV 10P / AKV 10PS

Table 4: Technical data

| features | values |
|-------------------------------|---|
| Design | In accordance with IEC 60335 |
| Power supply | Alternating current (AC) and direct current (DC) |
| Permissible voltage variation | Alternating current (AC): 50 Hz and 60 Hz: -10% – 15% 50/60 Hz: ± 10% Direct current (DC): +/- 10% |

Electric expansion valve, type AKV 10P and AKV 10PS

| features | values |
|-------------------------|---|
| Insulation of coil wire | Class H according to IEC 85 |
| Connection | Terminal box, DIN spade or cable |
| Enclosure, IEC 60529 | IP20, IP65 or IP67 |
| Ambient temperature | -40 °C – 80 °C / -40 °F – 176 °F (coil dependent) |

⚠ WARNING:

Safety notes for flammable refrigerants (R454C, R454A, R1234ze, R1270, R290, R32, R444B, R452B, R454B, R600, R600a, R455A, R516A, R1234yf):

1. The products (only refer to IP65/67 coils) are validated in accordance to ISO 5149, IEC 60335 (ref. IEC/EN 60079-15). Ignition risk is evaluated in accordance to ISO 5149 and IEC 60335 (ref. IEC/EN 60079-15). See safety note below.
2. Please make sure that there is no spark, arc during the application, especially the connection of coils.
3. Follow the instruction to mount the coil correctly and apply the O-ring for sealing, to prevent the moisture penetrate inside the coils.
4. Always install a fuse ahead of the coil to avoid short circuit (fuse size should be around 2 times of rated current, and time lag: medium);
5. The coil used in an area of not more than pollution degree 2.

⚠ WARNING:

Safety notes:

1. The product (only refer to IP65/67 coils) can be applied on systems with R454C, R454A, R1234ze, R1270, R290, R32, R444B, R452B, R454B, R600, R600a, R455A, R516A, R1234yf as the working fluid.
2. For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third party approval of the system containing flammable refrigerant.
3. Note, please follow specific selection criteria stated in the datasheet for these particular refrigerants.
4. Note that the product (only refer to IP65/67 coils) has NOT been verified ATEX or IECEx or IEC 60079 series zone 2 compliant. This product is only validated for systems in compliance with ISO5149, IEC 60335 (ref. IEC/EN 60079-15). It is the responsibility of the user to verify such compliance. Improper use can cause explosion, fire, leakage potentially causing death, personal injury, or damage to property.

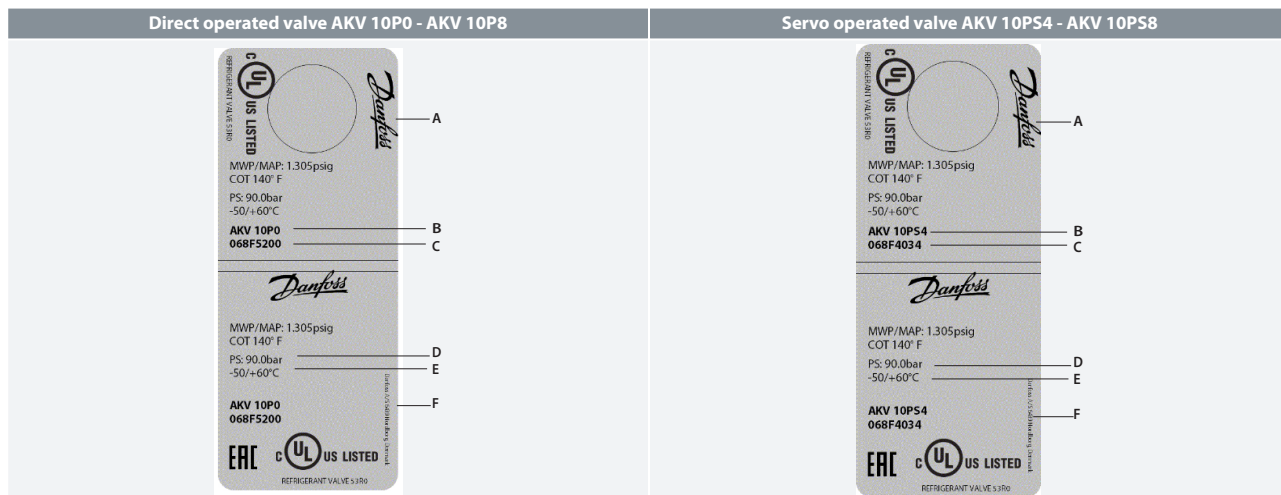
Technical data - UL coil for AKV 10P/AKV 10PS

Table 5: Technical data

| features | values |
|-------------------------------|---|
| Design | In accordance with UL 429 |
| Power supply | Alternating current (AC) |
| Permissible voltage variation | Alternating current (AC): 50 Hz and 60 Hz: -10% – 15% 50/60 Hz: ± 10% |
| Insulation of coil wire | Class H according to IEC 85 |
| Connection | Junction box or Conduit boss |
| Enclosure, IEC 60529 | Junction box NEMA 2 ~ IP 12-32 Conduit boss NEMA 4 ~ IP 54 |
| Ambient temperature | -40 °C – 50 °C / -40 °F – 122 °F |

Valve identification (Examples of labels)

Table 6: Valve identification



| | |
|---|-------------------------------------|
| A | Company logo |
| B | Type designation (0 = orifice size) |
| C | Code |
| D | Max. working pressure |
| E | Media temperature |
| F | Manufacturer address |

Capacity

Direct operated valve AKV 10P - Rated capacity

Table 7: Direct operated valve AKV 10P

| Valve type / orifice no. | R744 ⁽²⁾ | | | | R407A / R507 ⁽¹⁾ | | R404A ⁽¹⁾ | | k_v value | C_v value ⁽³⁾ | Connection size Solder ODF/ODF | | Code no. Single pack | Code no. Industrial pack 16 pcs. pr. Pack |
|--------------------------|---------------------|----------|---------|----------|-----------------------------|------|----------------------|------|-------------|----------------------------|--------------------------------|---------|----------------------|---|
| | Refrig. | Freezing | Refrig. | Freezing | [kW] | [TR] | [kW] | [TR] | | | [in] | [mm] | | |
| | [kW] | [kW] | [TR] | [TR] | | | | | | | | | | |
| AKV 10P0 | 0.40 | 0.63 | 0.11 | 0.18 | 0.31 | 0.09 | 0.22 | 0.06 | 0.003 | 0.0035 | 3/8 x 1/2 | - | 068F5210 | 068F5230 |
| AKV 10P0 | 0.40 | 0.63 | 0.11 | 0.18 | 0.31 | 0.09 | 0.22 | 0.06 | 0.003 | 0.0035 | - | 10 x 12 | 068F5200 | 068F5220 |
| AKV 10P1 | 1.17 | 1.84 | 0.33 | 0.52 | 0.9 | 0.26 | 0.64 | 0.18 | 0.009 | 0.0104 | 3/8 x 1/2 | - | 068F5211 | 068F5231 |
| AKV 10P1 | 1.17 | 1.84 | 0.33 | 0.52 | 0.9 | 0.26 | 0.64 | 0.18 | 0.009 | 0.0104 | - | 10 x 12 | 068F5201 | 068F5221 |
| AKV 10P2 | 2.06 | 3.25 | 0.58 | 0.92 | 1.58 | 0.45 | 1.12 | 0.32 | 0.016 | 0.021 | 3/8 x 1/2 | - | 068F5212 | 068F5232 |
| AKV 10P2 | 2.06 | 3.25 | 0.58 | 0.92 | 1.58 | 0.45 | 1.12 | 0.32 | 0.016 | 0.021 | - | 10 x 12 | 068F5202 | 068F5222 |
| AKV 10P3 | 3.14 | 4.97 | 0.89 | 1.41 | 2.41 | 0.69 | 1.72 | 0.49 | 0.024 | 0.028 | 3/8 x 1/2 | - | 068F5213 | 068F5233 |
| AKV 10P3 | 3.14 | 4.97 | 0.89 | 1.41 | 2.41 | 0.69 | 1.72 | 0.49 | 0.024 | 0.028 | - | 10 x 12 | 068F5203 | 068F5223 |
| AKV 10P4 | 6.10 | 9.64 | 1.74 | 2.74 | 4.68 | 1.33 | 3.33 | 0.95 | 0.046 | 0.053 | 3/8 x 1/2 | - | 068F5214 | 068F5234 |
| AKV 10P4 | 6.10 | 9.64 | 1.74 | 2.74 | 4.68 | 1.33 | 3.33 | 0.95 | 0.046 | 0.053 | - | 10 x 12 | 068F5204 | 068F5224 |
| AKV 10P5 | 8.49 | 13.41 | 2.41 | 3.81 | 6.52 | 1.86 | 4.64 | 1.32 | 0.064 | 0.074 | 3/8 x 1/2 | - | 068F5215 | 068F5235 |
| AKV 10P5 | 8.49 | 13.41 | 2.41 | 3.81 | 6.52 | 1.86 | 4.64 | 1.32 | 0.064 | 0.074 | - | 10 x 12 | 068F5205 | 068F5225 |
| AKV 10P6 | 15.14 | 23.90 | 4.30 | 6.80 | 11.60 | 3.30 | 8.27 | 2.35 | 0.114 | 0.132 | 3/8 x 1/2 | - | 068F5216 | 068F5236 |
| AKV 10P6 | 15.14 | 23.90 | 4.30 | 6.80 | 11.60 | 3.30 | 8.27 | 2.35 | 0.114 | 0.132 | - | 10 x 12 | 068F5206 | 068F5226 |
| AKV 10P7 | 24.58 | 38.80 | 6.99 | 11.03 | 18.81 | 5.35 | 13.40 | 3.82 | 0.185 | 0.214 | 1/2 x 5/8 | - | 068F5217 | - |
| AKV 10P7 | 24.58 | 38.80 | 6.99 | 11.03 | 18.81 | 5.35 | 13.40 | 3.82 | 0.185 | 0.214 | - | 12 x 16 | 068F5207 | - |
| AKV 10P8 | 33.26 | 52.43 | 9.46 | 14.91 | 25.40 | 7.23 | 18.10 | 5.16 | 0.250 | 0.289 | 1/2 x 5/8 | - | 068F5218 | - |
| AKV 10P8 | 33.26 | 52.43 | 9.46 | 14.91 | 25.40 | 7.23 | 18.10 | 5.16 | 0.250 | 0.289 | - | 12 x 16 | 068F5208 | - |

Electric expansion valve, type AKV 10P and AKV 10PS

- ⁽¹⁾ Rated capacities are based on:
 Condensing temperature $t_c = 38\text{ °C} / 100\text{ °F}$
 Liquid temperature $t_l = 37\text{ °C} / 98\text{ °F}$
 Evaporating temperature $t_e = 4\text{ °C} / 39\text{ °F}$
- ⁽²⁾ Rated capacities are based on:
 Condensing temperature $t_c = 0\text{ °C} / 32\text{ °F}$
 Evaporating temperature Refrig. $t_e = -10\text{ °C} / 14\text{ °F}$
 Evaporating temperature Freezing. $t_e = -30\text{ °C} / -22\text{ °F}$
 Subcooling = $1\text{ °C} / 1.8\text{ °F}$
- ⁽³⁾ Cv value is calculated from Kv value in above table

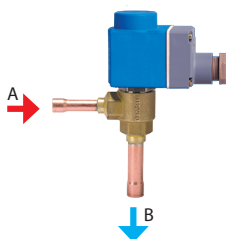
Servo operated valve AKV 10PS - Rated capacity

Table 8: Servo operated valve AKV 10PS

| Valve type / orifice no. | R744 ⁽²⁾ | | | | R407A ⁽¹⁾ | | R404A/ R507 ⁽¹⁾ | | k _v value | C _v value ⁽³⁾ | Connection size Solder ODF/ODF | | Code no. Single pack | Code no. Industrial pack 16 pcs. pr. Pack |
|--------------------------|---------------------|----------|---------|----------|----------------------|------|----------------------------|------|----------------------|-------------------------------------|--------------------------------|---------|----------------------|---|
| | Refrig. | Freezing | Refrig. | Freezing | | | | | | | [in] | [mm] | | |
| | [kW] | [kW] | [TR] | [TR] | [kW] | [TR] | [kW] | [TR] | [m ³ /h] | [gpm] | | | | |
| AKV 10PS4 | 6.10 | 9.64 | 1.74 | 2.74 | 4.68 | 1.33 | 3.33 | 0.95 | 0.046 | 0.053 | 3/8 × 1/2 | – | 068F4044 | 068F5184 |
| AKV 10PS4 | 6.10 | 9.64 | 1.74 | 2.74 | 4.68 | 1.34 | 3.33 | 0.88 | 0.046 | 0.053 | – | 10 × 12 | 068F4034 | 068F5174 |
| AKV 10PS5 | 8.49 | 13.41 | 2.41 | 3.81 | 6.52 | 1.86 | 4.64 | 1.32 | 0.064 | 0.074 | 3/8 × 1/2 | – | 068F4045 | 068F5185 |
| AKV 10PS5 | 8.49 | 13.41 | 2.41 | 3.81 | 6.52 | 1.86 | 4.64 | 1.32 | 0.064 | 0.074 | – | 10 × 12 | 068F4035 | 068F5175 |
| AKV 10PS6 | 15.14 | 23.90 | 4.30 | 6.80 | 11.60 | 3.30 | 8.27 | 2.35 | 0.114 | 0.132 | 3/8 × 1/2 | – | 068F4046 | 068F5186 |
| AKV 10PS6 | 15.14 | 23.90 | 4.30 | 6.80 | 11.60 | 3.30 | 8.27 | 2.35 | 0.114 | 0.132 | – | 10 × 12 | 068F4036 | 068F5176 |
| AKV 10PS7 | 24.58 | 38.80 | 6.99 | 11.03 | 18.81 | 5.35 | 13.40 | 3.82 | 0.185 | 0.214 | 1/2 × 5/8 | – | 068F4047 | – |
| AKV 10PS7 | 24.58 | 38.80 | 6.99 | 11.03 | 18.81 | 5.35 | 13.40 | 3.82 | 0.185 | 0.214 | – | 12 × 16 | 068F4037 | – |
| AKV 10PS8 | 33.26 | 52.43 | 9.46 | 14.91 | 25.40 | 7.23 | 18.10 | 5.16 | 0.250 | 0.289 | 1/2 × 5/8 | – | 068F4048 | – |
| AKV 10PS8 | 33.26 | 52.43 | 9.46 | 14.91 | 25.40 | 7.23 | 18.10 | 5.16 | 0.250 | 0.289 | – | 12 × 16 | 068F4039 | – |

- ⁽¹⁾ Rated capacities are based on:
 Condensing temperature $t_c = 38\text{ °C} / 100\text{ °F}$
 Liquid temperature $t_l = 37\text{ °C} / 98\text{ °F}$
 Evaporating temperature $t_e = 4\text{ °C} / 39\text{ °F}$
- ⁽²⁾ Rated capacities are based on:
 Condensing temperature $t_c = 0\text{ °C} / 32\text{ °F}$
 Evaporating temperature Refrig. $t_e = -10\text{ °C} / 14\text{ °F}$
 Evaporating temperature Freezing. $t_e = -30\text{ °C} / -22\text{ °F}$
 Subcooling = $1\text{ °C} / 1.8\text{ °F}$
- ⁽³⁾ Cv value is calculated from Kv value in above table

Flow direction



AKV 10P/10PS is designed for single flow direction and following pictures from A to B refers the normal flow.

Coolselector®2 - Valve sizing using calculation software

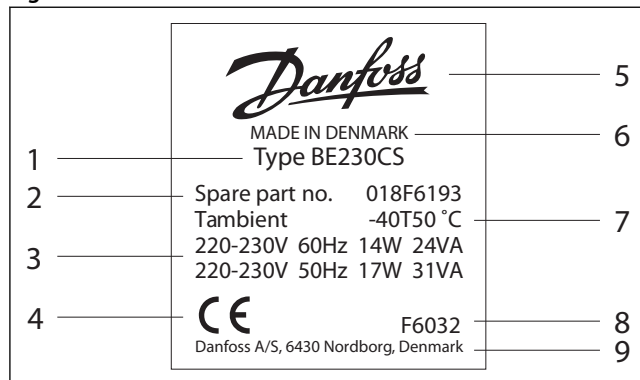


It is strongly recommended to use Coolselector®2 to find the correct valve for your application. The software can be downloaded from the Danfoss website. When using the calculation software it is recommended to choose a valve that is between 50% and 75% loaded at the nominal capacity. In addition, the liquid velocity in the line leading to the valve should not exceed 1m/s (3ft/s).

Download Coolselector®2 for free at coolselector.danfoss.com.

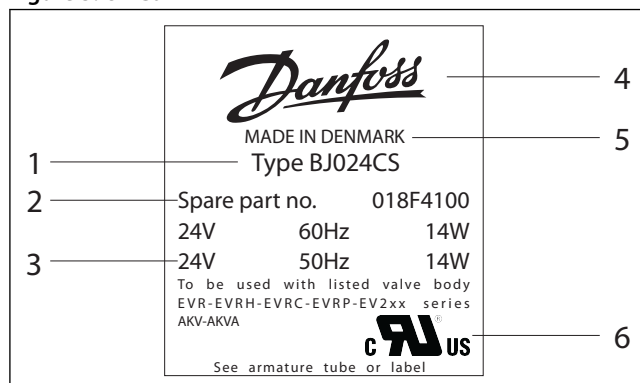
Coil Identification

Figure 2: Standard Coil



| | | | |
|---|---------------------------------------|---|----------------------|
| 1 | Type designation | 6 | Country of Origin |
| 2 | Code no. | 7 | Ambient temperature |
| 3 | Voltage, frequency, Power consumption | 8 | Production date |
| 4 | Approvals | 9 | Manufacturer address |
| 5 | Company logo | | |

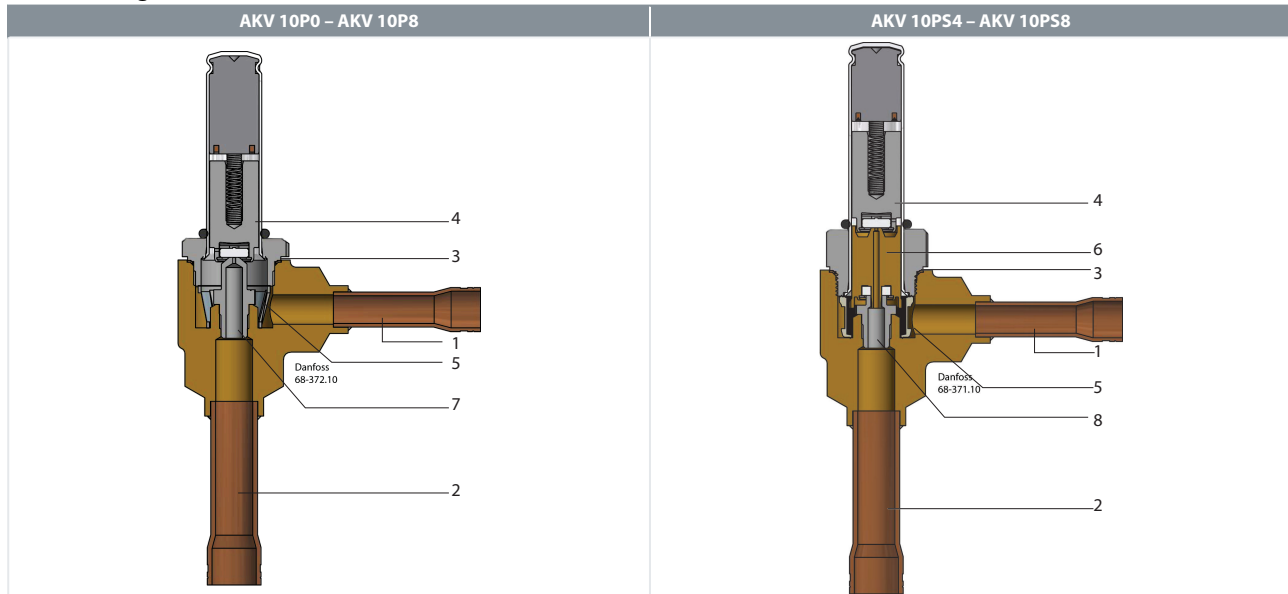
Figure 3: UL Coil



| | |
|---|---------------------------------------|
| 1 | Type designation |
| 2 | Code no. |
| 3 | Voltage, frequency, Power consumption |
| 4 | Company logo |
| 5 | Country of Origin |
| 6 | Approvals |

Design

Table 9: Design



| | | | |
|---|---|---|--------------------|
| 1 | Inlet (connection) | 6 | Piston |
| 2 | Outlet (connection) | 7 | Orifice (AKV 10P) |
| 3 | Copper gasket | 8 | Orifice (AKV 10PS) |
| 4 | Amature | | |
| 5 | Protection filter 100 micron (AKV 10P) and 53 micron (AKV 10PS) | | |

Material

1. Copper
2. Copper
3. Cu/Tn
4. Stainless steel
5. Nylon/stainless steel
6. Brass
7. Stainless steel
8. Stainless steel

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.

AKV 10P0 - AKV 10P8 is a direct operated valve which can operate at 0 bar/0 psi differential pressure.

AKV 10PS4 - AKV 10PS8 is a servo piston operated valve which needs a minimum differential pressure of 0.1 bar / 1.45 psi to open the valve and keep it open.

Dimensions and weight

Dimensions and weight AKV 10P valve

Table 10: AKV 10P0 - AKV 10P6 (Weight excluding coil: 0.30 kg / 0.66 lbs)

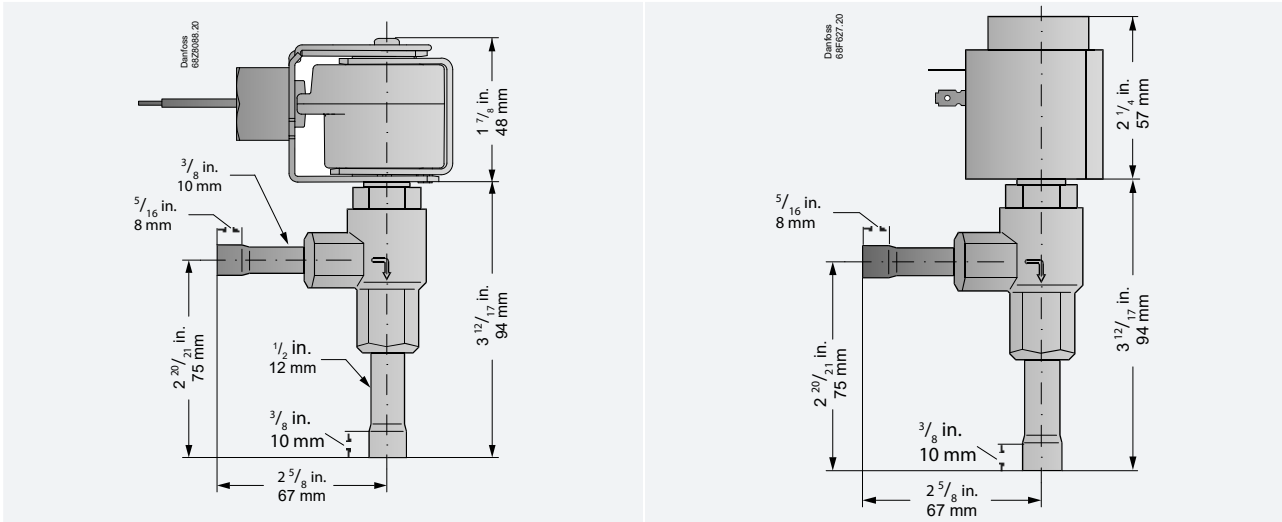
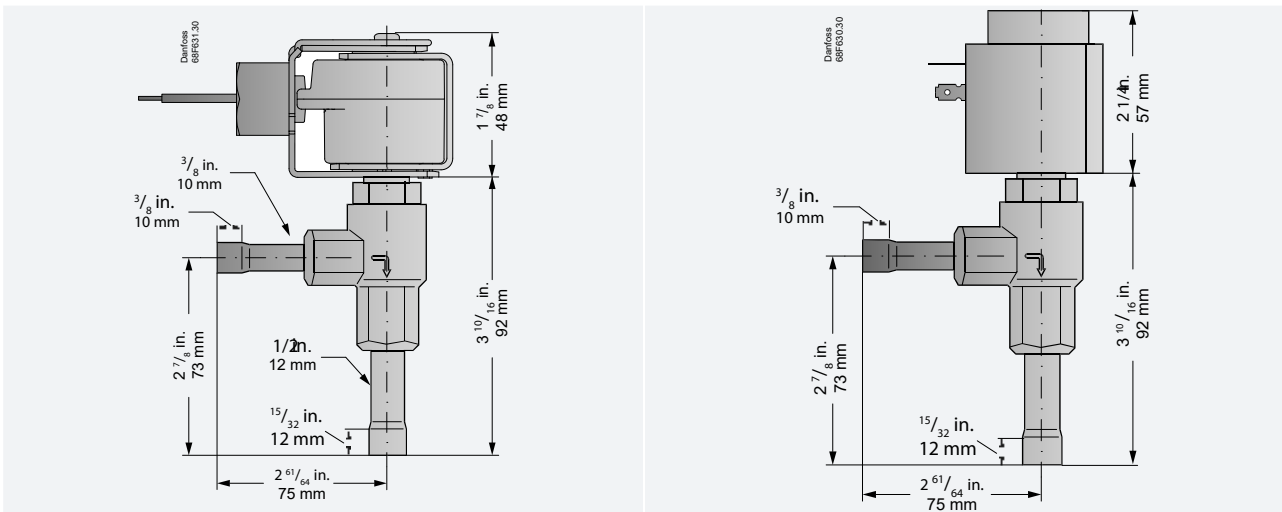


Table 11: AKV 10P7 - AKV 10P8 (Weight excluding coil: 0.343 Kg / 0.76 lbs)



Electric expansion valve, type AKV 10P and AKV 10PS

Dimensions and weight AKV 10PS valve

Table 12: AKV 10PS4 – AKV 10PS6 (Weight excluding coil: 0.335 Kg / 0.74 lbs)

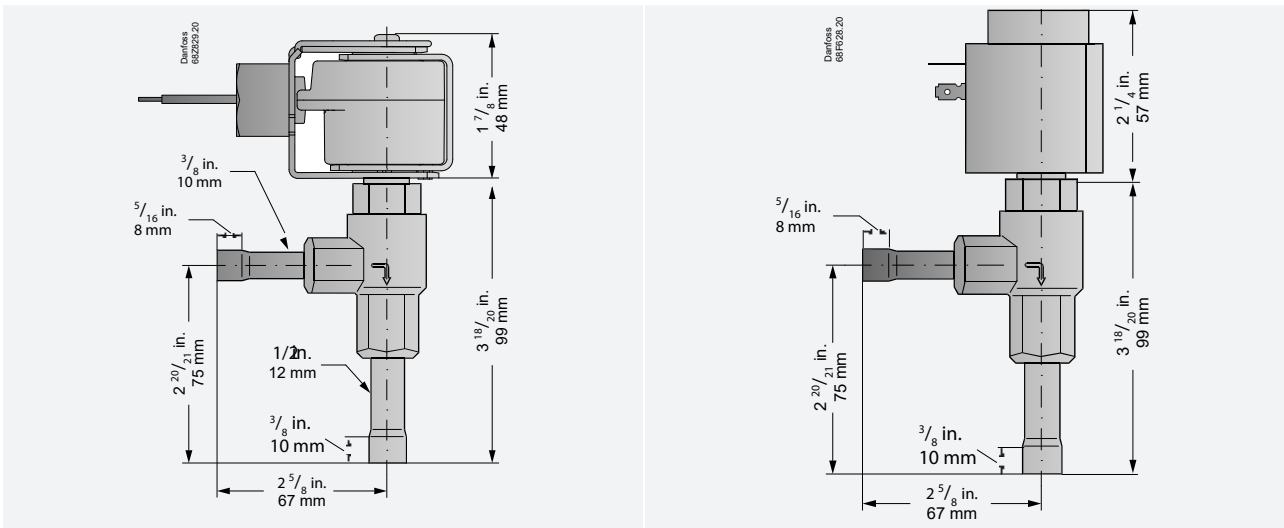
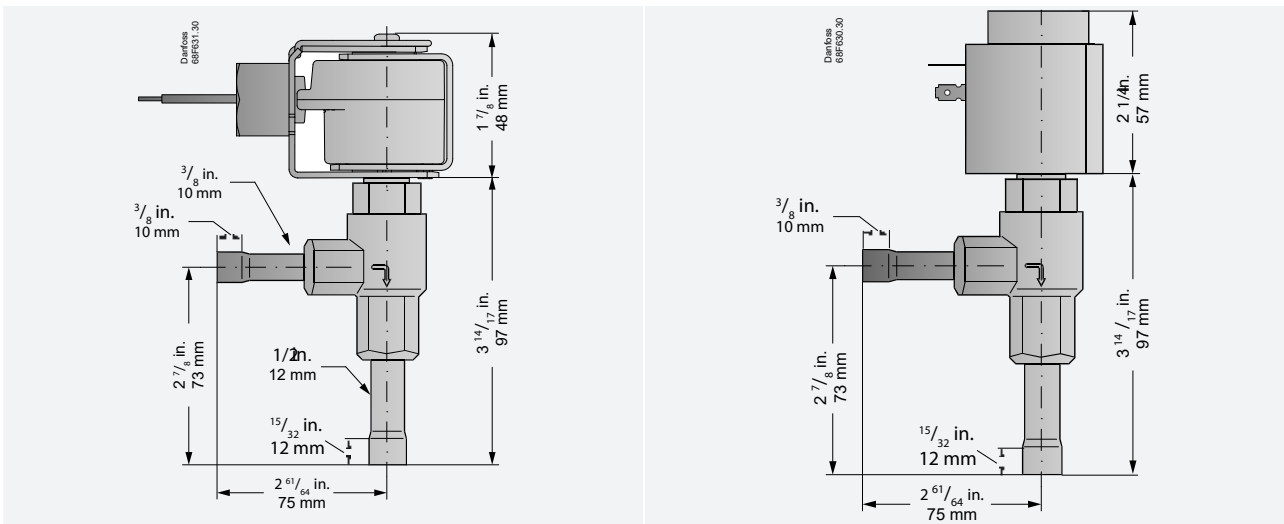


Table 13: AKV 10PS7 - AKV 10PS8 (Weight excluding coil: 0.343 Kg / 0.76 lbs)



Dimension and weight standard coils

Table 14: Dimension and weight standard coils

| Terminal box 10 W Weight 0.29 Kg / 0.6 lbs | Cable 10 W Weight 0.29 Kg / 0.6 lbs |
|---|--|
| | |
| DIN socket 10 W Weight 0.24 Kg / 0.5 lbs | Terminal box 12 - 20 W Weight 0.55 Kg / 1.2 lbs |
| | |

Dimensions and weight UL coils

Table 15: Dimensions and weight UL coils

| Junction box Weight 0.860 lbs / 0.39 kg | Conduit boss Weight 0.717 lbs / 0.33 kg |
|--|--|
| | |

Appendix: Dimensioning of the liquid line

Correctly dimensioned liquid line

To obtain a correct supply of liquid to the AKV 10P/PS valve, the liquid line to the individual AKV 10P/PS valve must be correctly dimensioned.

The liquid flow rate should not exceed 1 m/s (3 ft/s).

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

Electric expansion valve, type AKV 10P and AKV 10PS

Table 16: CO₂

| Type | Pipe dimension | |
|----------|----------------|----------------|
| | Refrigeration | Freezing |
| AKV 10P0 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P1 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P2 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P3 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P4 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P5 | 3/8 in / 10 mm | 1/2 in / 12 mm |
| AKV 10P6 | 1/2 in / 12 mm | 5/8 in / 15 mm |
| AKV 10P7 | 5/8 in / 15 mm | 3/4 in / 18 mm |
| AKV 10P8 | 5/8 in / 15 mm | 3/4 in / 18 mm |

Table 17: R407A

| Type | Pipe dimension | |
|----------|----------------|----------------|
| | Refrigeration | Freezing |
| AKV 10P0 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P1 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P2 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P3 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P4 | 3/8 in / 10 mm | 3/8 in / 10 mm |
| AKV 10P5 | 1/2 in / 12 mm | 1/2 in / 12 mm |
| AKV 10P6 | 1/2 in / 15 mm | 1/2 in / 15 mm |
| AKV 10P7 | 5/8 in / 16 mm | 5/8 in / 16 mm |

NOTE:

The conditions are the same as for the rated capacities.
 Evaporating temperature is -10 °C for refrigeration and -30 °C for freezing.
 The super heat is 8 K for both refrigeration and freezing.
 Pipes are according ANSI or DIN-EN.
 If conditions deviate from above, the pipe dimensions should be checked.

Troubleshooting

Table 18: Troubleshooting

| Symptom | Possible Cause | Remedy | |
|--|---|--|--|
| Valve does not open | Lack of proper electrical connection/Power | Check the connection between valve and a controller | |
| | Incorrect voltage/frequency | Check coil specification against measured operating voltage | |
| | Differential pressure too high/low | Check differential pressure of valve against technical specification | |
| | Impurities in the valve | Replace with suitable valve and or coil | |
| | Burnt out coil | | Check dirt inside valve and clean out impurities |
| | | | Never take the coil off the valve if voltage is applied. |
| | | | The coil can burn out |
| | Valve stuck open after being assembled | Check the wiring diagram and wiring itself | |
| | Valve does not open after orifice has been exchanged to a larger capacity due to high differential pressure | Check relay contacts, lead connections and fuses | |
| Internal leakage/ valve does not close or closes partially | Valve stuck open after being assembled | Check Instruction if all correct parts are used, and correctly assembled | |
| | Continuous voltage on coil | Replace with suitable valve and or coil | |
| | Impurities in the valve | Do not remove powered coil off the valve | |
| | Pulsation in discharge line Differential pressure too high in open position | | Check dirt inside valve and clean out impurities |
| | | | Check pressure and flow conditions |
| | | Check the supply voltage in the coil | |
| | | Replace with suitable valve | |

Electric expansion valve, type AKV 10P and AKV 10PS

| Symptom | Possible Cause | Remedy |
|---------------------------|---|---|
| Insufficient capacity | Valve capacity too small | Check refrigeration system capacity and compare with valve capacity Replace with larger valve if necessary - larger capacity orifice in AKV 10P - larger capacity piston in AKV 10PS |
| | Suction pressure too low Evaporator superheat too high | Check superheat performance, the settings SH min and SH max. in the super heat controller Check valve capacity Check coil excitation time Also check section "High Superheat" |
| | Valve blocked with foreign material | Valve strainer blocked, replace strainer with a new one |
| | Valve blocked with foreign material Also check "Insufficient capacity" | Replace valve strainer/filter De-ice evaporator |
| High superheat | Lack of sub-cooling | Check refrigerant Also refer to section Insufficient capacity |
| | Controller is not setup/tuned properly | Check the controller superheat settings and sensors connected to it Tune PID parameters in the controller |
| Flash gas | Lack of sub-cooling ahead of valve | Check refrigerant for flash gas ahead of valve/external subcooler If the valve is placed much higher than condenser outlet Check pressure difference |
| | Oversized valve selected | Limit max opening degree of the valve setting in controller Check refrigeration system capacity and compare with valve capacity Use proper valve size suitable for the system |
| Pulsations in liquid line | High flow velocity, max. 1 m/s | Check flow velocity, using coolselector2 Change to AKV 10PS for maximum dampening effect Use larger diameter pipes to reduce flow velocity |
| Overheating coil | Armature is not moving when coil is energized Too high voltage supply, dirt in valve, too high MOPD) | Check section valve does not open |

Ordering

Standard global coils

Table 19: Standard global coils

| Multi-pack code no. | Identical Industrial pack code no. | | Identical spare part coil with DIN spade | Supply voltage/power/frequency | Connection type/ enclosure rating | MOPD of individual coil (bar) | | | | | |
|---|------------------------------------|---------------|--|--------------------------------|-----------------------------------|-------------------------------|-----|----|-----|--------|--------------|
| | Code no. | Pcs. per pack | | | | AKV 10P | | | | | AKV 10PS |
| | | | | | | Orifice size | | | | | Orifice size |
| | | | | | | 0 to 3 | 4 | 5 | 6 | 7 to 8 | |
| DC coils - with/without terminal box | | | | | | | | | | | |
| 018F6780 | - | - | - | 100 V DC 18 W | With terminal box, IP 67 | 33 | 22 | 35 | 35 | 18 | 29 |
| 018F6860 | - | - | - | 110V DC 16 W | With terminal box, IP 67 | 35 | 32 | 35 | 35 | 18 | 35 |
| 018F6851 | - | - | - | 220V DC 20 W | With terminal box, IP 67 | 35 | 34 | 35 | 35 | 18 | 35 |
| 018F6781 | 018F8781 | 25 | 018F6991 | 230 V DC 18 W | With terminal box, IP 67 | 26 | 16 | 35 | 35 | 18 | 22 |
| AC coils - with cable | | | | | | | | | | | |
| 018F4961 | 018F8291 | 6 | Not relevant | 230 V AC 16 W, 50 Hz | With 8 m cable, IP 67 | 35 | 25 | 25 | 25 | 14 | 35 |
| 018F6264 | - | - | Not relevant | 220 V AC 14 W, 60 Hz | With 1 m cable, IP 67 | 25 | N/A | 18 | N/A | N/A | 25 |
| 018F6282 | 018F8232 | 24 | Not relevant | 220-230 V AC 16 W, 50 Hz | With 1 m cable, IP 67 | 35 | 25 | 25 | 25 | 14 | 35 |
| - | 018F8290 | 12 | Not relevant | 220-230 V AC 17 W, 50 Hz | With 3 m cable, IP 67 | 35 | 25 | 25 | 25 | 14 | 35 |
| AC coils - with/without terminal box | | | | | | | | | | | |
| 018F6807 | - | - | - | 24 V AC 11 W, 50 Hz | With terminal box, IP 67 | 22 | 14 | 19 | 13 | 9 | 22 |
| 018F6904 | - | - | - | 24 V AC 24 W, 50 Hz | With terminal box, IP 67 | 35 | 35 | 35 | 30 | 18 | 35 |
| 018F6815 | - | - | - | 24 V AC 15 W, 60 Hz | With terminal box, IP 67 | 26 | 16 | 22 | 15 | 10 | 24 |
| 018F6906 | 018F8906 | 24 | - | 24 V AC 22 W, 60 Hz | With terminal box, IP 67 | 35 | 26 | 34 | 22 | 15 | 35 |
| 018F6813 | - | - | - | 110 V AC 16 W, 60 Hz | With terminal box, IP 67 | 35 | 18 | 30 | 18 | 14 | 35 |
| 018F6701 | 018F8701 | 50 | 018F6176 | 230 V AC 12 W, 50 Hz | With terminal box, IP 67 | 25 | N/A | 18 | N/A | N/A | 25 |
| 018F6801 | 018F8801 | 24 | - | 220 V AC 15 W, 50 Hz | With terminal box, IP 67 | 35 | 25 | 25 | N/A | N/A | 25 |
| 018F6732 | 018F8732 | 50 | 018F6193 | 230 V AC 17 W, 50 Hz | With terminal box, IP 67 | 35 | 25 | 25 | 25 | 14 | 35 |
| 018F6905 | - | - | - | 230 V AC 19 W, 50 Hz | With terminal box, IP 67 | 35 | 35 | 35 | 30 | 18 | 35 |
| 018F6713 | - | - | - | 240 V AC 15 W, 60 Hz | With terminal box, IP 67 | 25 | 18 | 25 | 18 | N/A | 30 |
| 018F6814 | - | - | - | 230 V AC 16 W, 60 Hz | With terminal box, IP 67 | 35 | 25 | 35 | 18 | 14 | 35 |

⚠ WARNING:

1. N/A: Coil is not suitable due to too low MOPD.
2. Multi-pack and spare part coil code nos. can be ordered as single parts.
3. MOPD table is based on:
 - Nominal voltage
 - Max media temperature 60 °C (140 °F)
 - Max ambient temperature 50 °C (122 °F)

BJ and BX Coils (UL coils)

Table 20: AC coils - Junction box NEMA 2 (type BJ)

| Multi-pack code no. | Supply voltage/ power/ frequency | Wire length | | MOPD of individual coil (bar) | | | | | |
|---------------------|----------------------------------|--------------|------|-------------------------------|----|----|--------------|--------|------------|
| | | | | AKV 10P | | | | | AKV 10PS |
| | | Orifice size | | | | | Orifice size | | |
| | | (in) | (cm) | 0 to 3 | 4 | 5 | 6 | 7 to 8 | PS4 to PS8 |
| 018F4100 | 24 V AC 14 W, 60 Hz | 7 | 18 | 25 | 18 | 25 | 14 | N/A | 25 |
| | 24 V AC 14 W, 50 Hz | 7 | 18 | 35 | 25 | 35 | 25 | 18 | 35 |
| 018F4110 | 110 V AC 16 W, 60 Hz | 7 | 18 | 25 | 18 | 25 | 18 | N/A | 30 |
| | 110 V AC 16 W, 50 Hz | 7 | 18 | 35 | 30 | 35 | 25 | 18 | 35 |
| | 120 V AC 15 W, 60 Hz | 7 | 18 | 35 | 18 | 35 | 18 | 14 | 35 |
| 018F4120 | 208 V AC 14 W, 60 Hz | 7 | 18 | 18 | 14 | 18 | 14 | N/A | 25 |
| | 240 V AC 14 W, 60 Hz | 7 | 18 | 35 | 25 | 35 | 18 | 14 | 35 |
| | 230 V AC 17 W, 50 Hz | 7 | 18 | 35 | 30 | 35 | 30 | 18 | 35 |
| 018F4130 | 120 V AC 16 W, 60 Hz | 7 | 18 | 35 | 30 | 35 | 25 | 14 | 35 |
| 018F4132 | 208 V AC 16 W, 60 Hz | 7 | 18 | 35 | 30 | 35 | 25 | 14 | 35 |
| 018F4134 | 240 V AC 16 W, 60 Hz | 7 | 18 | 35 | 30 | 35 | 25 | 14 | 35 |

Table 21: AC coils - Conduit boss NEMA 4 (type BX)

| Multi-pack code no. | Supply voltage/ power/ frequency | Wire length | | MOPD of individual coil (bar) | | | | | |
|---------------------|----------------------------------|--------------|------|-------------------------------|----|----|--------------|--------|------------|
| | | | | AKV 10P | | | | | AKV 10PS |
| | | Orifice size | | | | | Orifice size | | |
| | | (in) | (cm) | 0 to 3 | 4 | 5 | 6 | 7 to 8 | PS4 to PS7 |
| 018F4102 | 24 V AC 14 W, 60 Hz | 18 | 46 | 25 | 18 | 25 | 14 | N/A | 25 |
| | 24 V AC 14 W, 50 Hz | 18 | 46 | 35 | 25 | 35 | 25 | 18 | 35 |
| 018F4103 | 24 V AC 14 W, 60 Hz | 71 | 180 | 25 | 18 | 25 | 14 | N/A | 25 |
| | 24 V AC 14 W, 50 Hz | 71 | 180 | 35 | 25 | 35 | 25 | 18 | 35 |
| 018F4104 | 24 V AC 14 W, 60 Hz | 98 | 250 | 25 | 18 | 25 | 14 | N/A | 25 |
| | 24 V AC 14 W, 50 Hz | 98 | 250 | 35 | 25 | 35 | 25 | 18 | 35 |
| 018F4112 | 110 V AC 16 W, 60 Hz | 18 | 46 | 25 | 18 | 25 | 18 | N/A | 30 |
| | 110 V AC 16 W, 50 Hz | 18 | 46 | 35 | 30 | 35 | 25 | 18 | 35 |
| | 120 V AC 15 W, 60 Hz | 18 | 46 | 35 | 18 | 35 | 18 | 14 | 35 |
| 018F4113 | 110 V AC 16 W, 60 Hz | 36 | 91 | 25 | 18 | 25 | 18 | N/A | 30 |
| | 110 V AC 16 W, 50 Hz | 36 | 91 | 35 | 30 | 35 | 25 | 18 | 35 |
| | 120 V AC 15 W, 60 Hz | 36 | 91 | 35 | 18 | 35 | 18 | 14 | 35 |
| 018F4114 | 110 V AC 16 W, 60 Hz | 71 | 180 | 25 | 18 | 25 | 18 | N/A | 30 |
| | 110 V AC 16 W, 50 Hz | 71 | 180 | 35 | 30 | 35 | 25 | 18 | 35 |
| | 120 V AC 15 W, 60 Hz | 71 | 180 | 35 | 18 | 35 | 18 | 14 | 35 |
| 018F4115 | 110 V AC 16 W, 60 Hz | 98 | 250 | 25 | 18 | 25 | 18 | N/A | 30 |
| | 110 V AC 16 W, 50 Hz | 98 | 250 | 35 | 30 | 35 | 25 | 18 | 35 |
| | 120 V AC 15 W, 60 Hz | 98 | 250 | 35 | 18 | 35 | 18 | 14 | 35 |
| 018F4122 | 208 V AC 14 W, 60 Hz | 18 | 46 | 18 | 14 | 18 | 14 | N/A | 25 |
| | 240 V AC 14 W, 60 Hz | 18 | 46 | 35 | 25 | 35 | 18 | 14 | 35 |
| | 230 V AC 17 W, 50 Hz | 18 | 46 | 35 | 30 | 35 | 30 | 18 | 35 |
| 018F4123 | 208 V AC 14 W, 60 Hz | 98 | 250 | 18 | 14 | 18 | 14 | N/A | 25 |
| | 240 V AC 14 W, 60 Hz | 98 | 250 | 35 | 25 | 35 | 18 | 14 | 35 |
| | 230 V AC 17 W, 50 Hz | 98 | 250 | 35 | 30 | 35 | 30 | 18 | 35 |
| 018F4131 | 120 V AC 16 W, 60 Hz | 98 | 250 | 35 | 30 | 35 | 25 | 14 | 35 |
| 018F4133 | 208 V AC 16 W, 60 Hz | 98 | 250 | 35 | 30 | 35 | 25 | 14 | 35 |
| 018F4135 | 240 V AC 16 W, 60 Hz | 98 | 250 | 35 | 30 | 35 | 25 | 14 | 35 |

⚠ WARNING:

1. N/A: Coil is not suitable due to too low MOPD.
2. Multi-pack coil code nos. can be ordered as single parts.
3. MOPD table is based on:
 - Nominal voltage
 - Max media temperature 60 °C (140 °F)
 - Max ambient temperature 50 °C (122 °F)

Spareparts

For Direct operated AKV 10P

| AKV 10P0 – AKV 10P3 Orifice kit 1 | AKV 10P4 – AKV 10P8 Orifice kit 2 | AKV 10P0– AKV 10P8 Armature kit 3* | AKV 10P0 - AKV 10P8 Filter kit 4 |
|--------------------------------------|--------------------------------------|---------------------------------------|-------------------------------------|
| Code no. 068F5151 | Code no. 068F5152 | Code no. 068F5153 | Code no. 068F5154 |
| | | | |

*Retrofit kit for converting
AKV 10-1 - AKV 10-7, AKVH 10-0 - AKVH 10-6
and AKV 10PS4 - AKV 10PS8
to AKV 10P0 - AKV 10P8

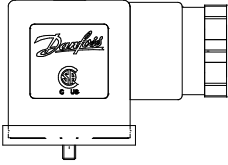
For servo operated AKV 10PS

| AKV 10PS4 - AKV 10PS8 Orifice kit 5 | AKV 10PS4 - AKV 10PS8 Filter Kit 6 | AKV 10PS4 - AKV 10PS8 Armature kit 7* |
|--|---------------------------------------|--|
| Code no. 068F5155 | Code no. 068F5156 | Code no. 068F5161 |
| | | |

*Retrofit kit for converting
AKV 10-1 -AKV 10-7, AKVH 10-0 - AKVH 10-6
and AKV 10P0 - AKV 10P8
to AKV 10PS4 - AKV 10PS8

Accessories

Figure 4: Plug for DIN spade connection



| Type | Voltage | Frequency | Quantity | Code no. Multi pack |
|----------|----------|-----------|----------|---------------------|
| | [V] | [Hz] | [Pcs] | |
| DIN plug | Max. 250 | 50 / 60 | 100 | 042N0156 |

Single pack = 1 product in a box with installation guide

Multi pack = box with x pieces single pack (can be split)

Industrial pack = x pieces in one box (cannot be split)



| Product | Description | Code no. |
|-----------------------|--|----------|
| Solenoid valve Tester | Permanent magnet for AKV 10P and AKV 10PS (for installation and testing purpose) | 018F0091 |

Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Valid approvals



(Refrigerant valve) 53RO

Low Voltage Directive (LVD) 2014/35/EU

Table 22: Approvals for AKV 10P and 10PS

| File name | Document type | Document topic | Approval authority |
|-------------|---------------------------|----------------|--------------------|
| 033F1035.AJ | Manufacturers Declaration | PED | Danfoss |

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