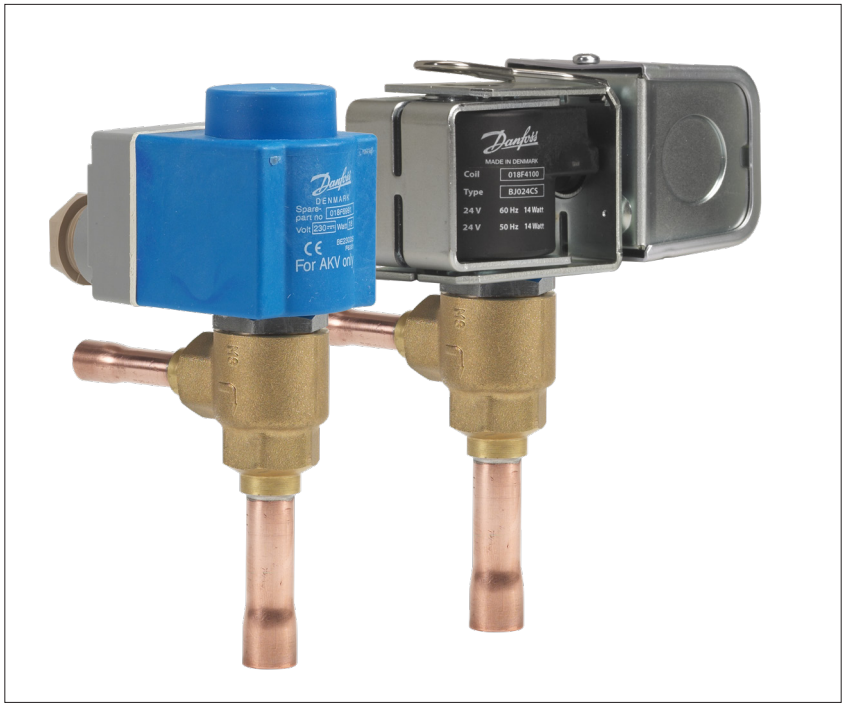
ENGINEERING TOMORROW

Data sheet

Electric expansion valve

Type AKV 10P, AKV 10PS



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

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 assembly is 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 coils AC/DC coils with various cable length

Valve construction
- Internal and external corrosion resistant

Protecting the environment and climate
- Manufactured according to ISO/TS16949
- Second – to – none quality and reliability

Approvals (valves)

Pressure Equipment Directive (PED) 2014/68/EU

c UL us Listed (Refrigerant valve) 53RO

EAC 089

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, R507, R513A, R513B, R515A, R515B, R516A, R600, R600a, R744.

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.

Safety notes:

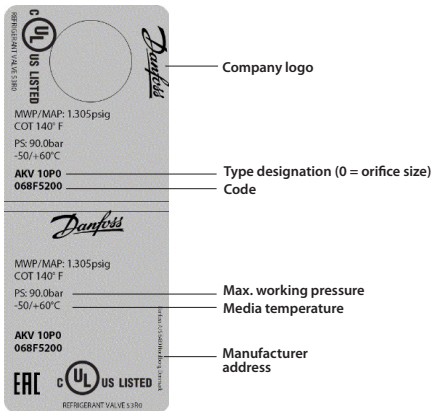
- The product can be applied on systems with R454C, R454A, R1234ze, R1270, R290, R32, R444B, R452B, R454B, R600, R600a, R455A, R516A, R1234yf as the working fluid.
- For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third 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.

	Direct operated valve	Servo operated valve
Valve type	AKV 10P0 to AKV 10P7	AKV 10PS4 to AKV 10PS7
Working principle	PWM (Pulse-width modulation)	PWM (Pulse-width modulation)
Recommended period of cycle time	6 Seconds	6 Seconds
Regulation range (Capacity range)	10 – 100%	10 – 100%
Connection type	Solder	Solder
Evaporating temperature (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)	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

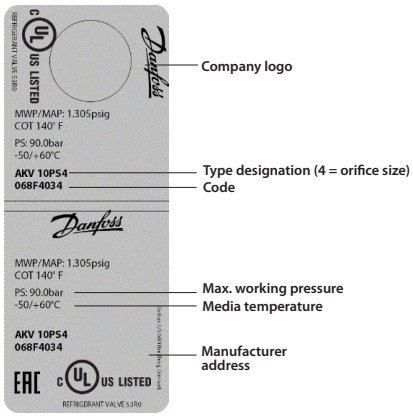
Note: It is recommended to selected Servo operated AKV 10PS valves for those application where higher MOPD (with low coil power) and high dampening is required.

Valve identification (Examples of labels)

Direct operated valve AKV 10P0 - AKV 10P7



Servo operated valve AKV 10PS4 - AKV 10PS7



Capacity and ordering

Direct operated valve AKV 10P - Rated capacity

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					[m³/h]	[gpm]	[in]	[mm]		
	[kW]	[kW]	[TR]	[TR]	[kW]	[TR]	[kW]	[TR]						
AKV 10P0	0.44	0.69	0.13	0.20	0.34	0.10	0.21	0.06	0.003	0.0035	3/8 × 1/2	–	068F5210	068F5230
AKV 10P0	0.44	0.69	0.13	0.20	0.34	0.10	0.21	0.06	0.003	0.0035	–	10 × 12	068F5200	068F5220
AKV 10P1	1.17	1.84	0.33	0.53	0.90	0.26	0.8	0.23	0.09	0.104	3/8 × 1/2	–	068F5211	068F5231
AKV 10P1	1.17	1.84	0.33	0.53	0.90	0.26	0.8	0.23	0.09	0.104	–	10 × 12	068F5201	068F5221
AKV 10P2	2.06	3.25	0.59	0.93	1.59	0.45	1.3	0.37	0.016	0.021	3/8 × 1/2	–	068F5212	068F5232
AKV 10P2	2.06	3.25	0.59	0.93	1.59	0.45	1.3	0.37	0.016	0.021	–	10 × 12	068F5202	068F5222
AKV 10P3	3.14	4.97	0.90	1.41	2.43	0.69	2.0	0.57	0.024	0.028	3/8 × 1/2	–	068F5213	068F5233
AKV 10P3	3.14	4.97	0.90	1.41	2.43	0.69	2.0	0.67	0.024	0.028	–	10 × 12	068F5203	068F5223
AKV 10P4	6.10	9.64	1.74	2.75	4.71	1.34	3.1	0.88	0.046	0.053	3/8 × 1/2	–	068F5214	068F5234
AKV 10P4	6.10	9.64	1.74	2.75	4.71	1.34	3.1	0.88	0.046	0.053	–	10 × 12	068F5204	068F5224
AKV 10P5	8.49	13.4	2.42	3.82	6.55	1.87	4.9	1.39	0.064	0.074	3/8 × 1/2	–	068F5215	068F5235
AKV 10P5	8.49	13.4	2.42	3.82	6.55	1.87	4.9	1.39	0.064	0.074	–	10 × 12	068F5205	068F5225
AKV 10P6	15.1	23.9	4.31	6.81	11.7	3.32	7.8	2.22	0.114	0.132	3/8 × 1/2	–	068F5216	068F5236
AKV 10P6	15.1	23.9	4.31	6.81	11.7	3.32	7.8	2.22	0.114	0.132	–	10 × 12	068F5206	068F5226
AKV 10P7	24.6	39.3	7.00	11.1	18.9	5.39	12.5	3.55	0.185	0.214	1/2 × 5/8	–	068F5217	–
AKV 10P7	24.6	39.3	7.00	11.1	18.9	5.39	12.5	3.55	0.185	0.214	–	12 x 16	068F5207	–

[1] Rated capacities are based on:
Condensing temperature t_c = 38 °C / 100 °F
Liquid temperature t_l = 37 °C / 98 °F
Evaporating temperature t_e = 4 °C / 39 °F

[2] Rated capacities are based on:
Condensing temperature t_c = 0 °C / 32 °F
Evaporating temperature Refrig. t_e = -10 °C / 14 °F
Evaporating temperature Freezing. t_e = -30 °C / -22 °F
Subcooling = 1°C / 1.8 °F

[3] C_v value is calculated from K_v value in above table

Servo operated valve AKV 10PS - Rated capacity

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					[m³/h]	[gpm]	[in]	[mm]		
	[kW]	[kW]	[TR]	[TR]	[kW]	[TR]	[kW]	[TR]						
AKV 10PS4	6.10	9.64	1.74	2.75	4.71	1.34	3.1	0.88	0.046	0.053	3/8 × 1/2	–	068F4044	068F5184
AKV 10PS4	6.10	9.64	1.74	2.75	4.71	1.34	3.1	0.88	0.046	0.053	–	10 × 12	068F4034	068F5174
AKV 10PS5	8.49	13.4	2.42	3.82	6.55	1.87	4.9	1.39	0.064	0.074	3/8 × 1/2	–	068F4045	068F5185
AKV 10PS5	8.49	13.4	2.42	3.82	6.55	1.87	4.9	1.39	0.064	0.074	–	10 × 12	068F4035	068F5175
AKV 10PS6	15.1	23.9	4.31	6.81	11.7	3.32	7.8	2.22	0.114	0.132	3/8 × 1/2	–	068F4046	068F5186
AKV 10PS6	15.1	23.9	4.31	6.81	11.7	3.32	7.8	2.22	0.114	0.132	–	10 × 12	068F4036	068F5176
AKV 10PS7	24.6	39.3	7.00	11.1	18.9	5.39	12.5	3.55	0.185	0.214	1/2 × 5/8	–	068F4047	–
AKV 10PS7	24.6	39.3	7.00	11.1	18.9	5.39	12.5	3.55	0.185	0.214	–	10 × 16	068F4037	–

[1] Rated capacities are based on:
Condensing temperature t_c = 38 °C / 100 °F
Liquid temperature t_l = 37 °C / 98 °F
Evaporating temperature t_e = 4 °C / 39 °F

[2] Rated capacities are based on:
Condensing temperature t_c = 0 °C / 32 °F
Evaporating temperature Refrig. t_e = -10 °C / 14 °F
Evaporating temperature Freezing. t_e = -30 °C / -22 °F
Subcooling = 1°C / 1.8 °F

[3] C_v value is calculated from K_v value in above table

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 exeed 1m/s (3ft/s).

You can download it from http://coolselector.danfoss.com

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

Approvals (coils)

Low Voltage Directive (LVD) 2014/35/EU

CE

Technical data

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%

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)

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

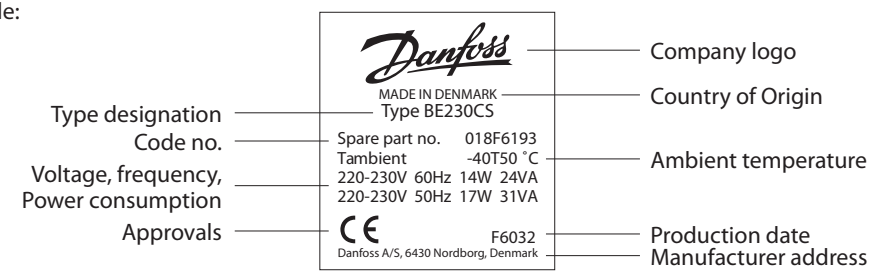
1. The products (only refer to IP65/67 coils) are validated in accordance to ISO 5149, IEC 60335 (ref. IEC/EN 60079-15). Ignition risk is evaluated in accordance to ISO 5149 and IEC 60335 (ref. IEC/EN 60079-15). See safety note below.
2. Please make sure that there is no spark, arc during the application, 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.

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.

Coil identification

Example:



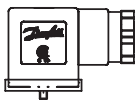
Ordering global coils

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)					
						AKV 10P					AKV 10PS
						Orifice size					Orifice size
	Code no.	Pcs. per pack				0 to 3	4	5	6	7	PS4 to PS7
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

NOTE:
1. N/A: Coil is not suitble 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)

Acessories (Standard coils)



Plug for DIN spade connection

Type	Voltage [V]	Frequency [Hz]	Quantity [Pcs]	Code no. Multi pack
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)

UL coil for AKV 10P / AKV 10PS

Junction box NEMA 2

Conduit boss NEMA 4

Approvals (coils)

c UL us Listed

Technical data

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

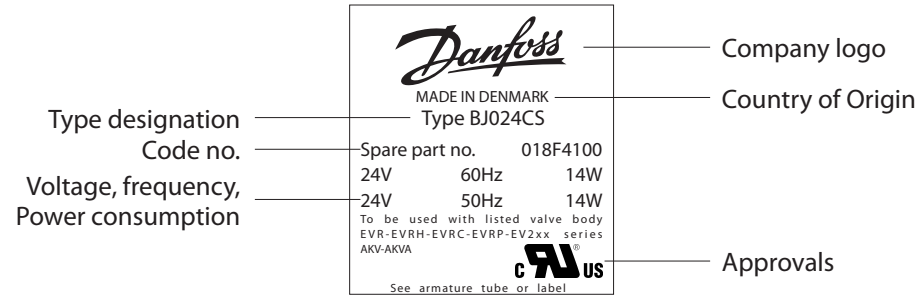
Connection
Junction box or Conduit boss

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

Coil Identification

Example:



Ordering
BJ and BX Coils

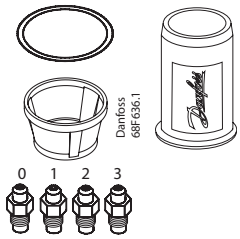
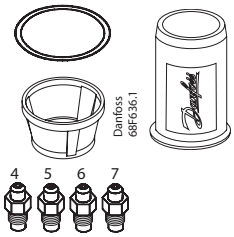
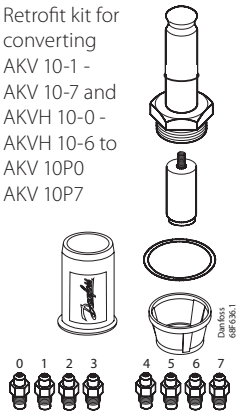
UL coils

Multi-pack code no.	Supply voltage/ power/frequency	Wire length		MOPD of individual coil (bar)					
				AKV 10P					AKV 10PS
		(in)	(cm)	Orifice size					Orifice size
				0 to 3	4	5	6	7	PS4 to PS7
AC coils - Junction box NEMA 2 (type BJ)									
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
AC coils - Conduit boss NEMA 4 (type BX)									
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

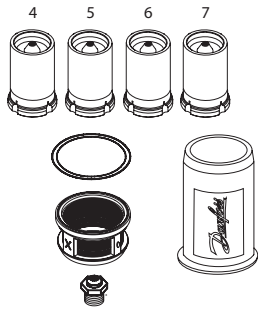
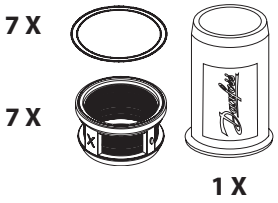
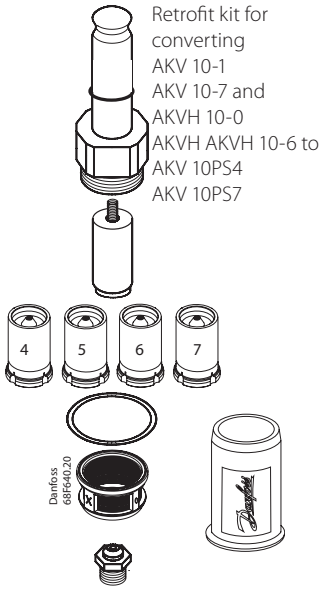
NOTE:
1. N/A: Coil is not suitble due to too low MOPD.
2. Multi-pack coil code nos. can be ordered as single parts.
3. MOPD table is based on:
   - Nominal voltage
   - Max media temperature 60 °C (140 °F)
   - Max ambient temperature 50 °C (122 °F)

Ordering spareparts

For Direct operated AKV 10P

AKV 10P0 – AKV 10P3 Orifice kit 1	AKV 10P4 – AKV 10P7 Orifice kit 2	AKV 10P0– AKV 10P7 Armature kit 3	AKV 10P0 - AKV 10P7 Filter kit 4
Code no. 068F5151	**Code no. 068F5152**	**Code no. 068F5153**	**Code no. 068F5154**
			

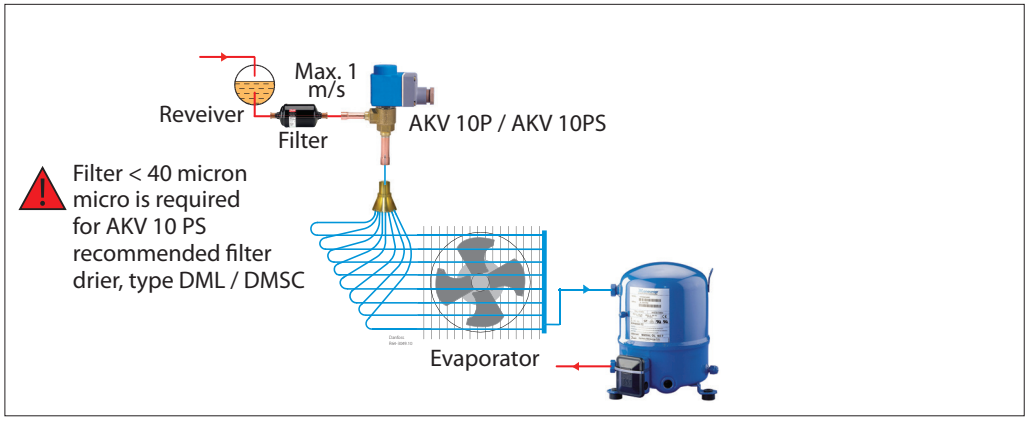
For servo operated AKV 10PS

AKV 10PS4 - AKV 10PS7 Orifice kit 5	AKV 10PS4 - AKV 10PS7 Filter Kit 6	AKV 10PS4 - AKV 10PS7 Armature kit 7
Code no. 068F5155	**Code no. 068F5156**	**Code no. 068F5161**
		

Accessories

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

Typical Application

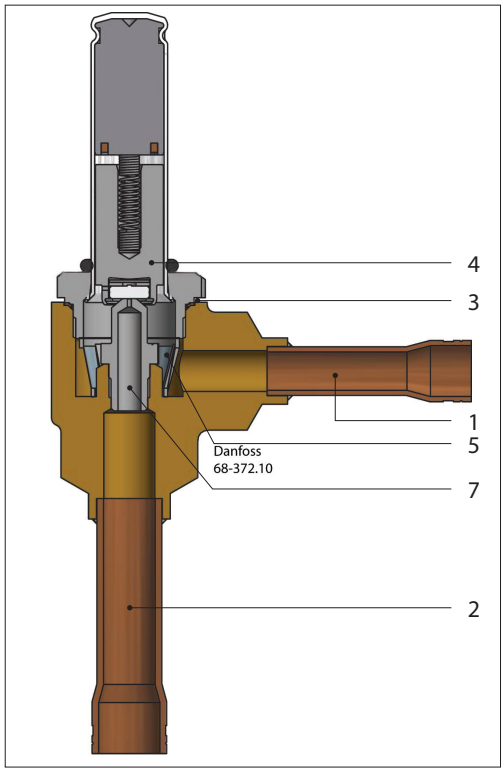


Design and function

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

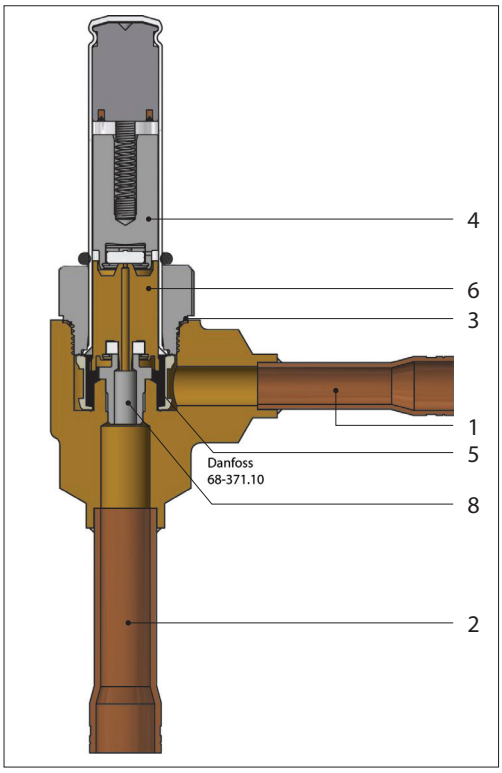
Material
1. *Copper*
2. *Copper*
3. *Cu/Tn*
4. *Stainless steel*
5. *Nylon/stainless steel*
6. *Brass*
7. *Stainless steel*
8. *Stainless steel*

AKV 10P0 – AKV 10P7



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.

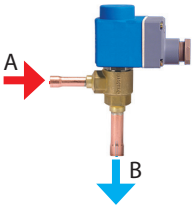
AKV 10PS4 – AKV 10PS7



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 10P7 is a direct operated valve which can operate at 0 bar/0 psi differential pressure.
AKV 10PS4 - AKV 10PS7 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.

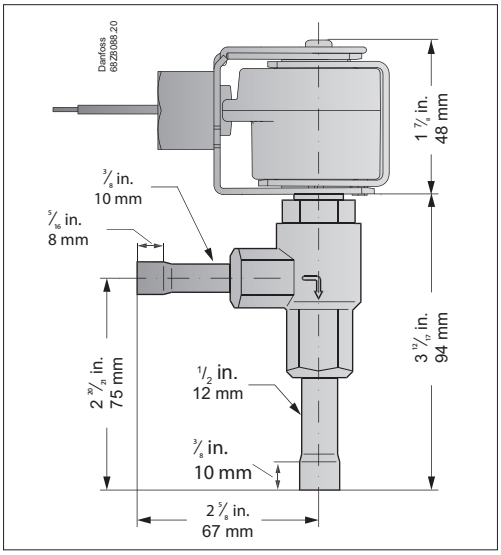
Flow direction

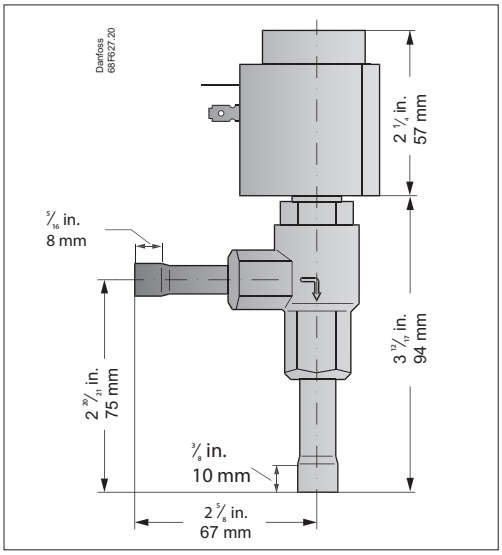
AKV 10P/10PS is designed for single flow direction and following pictures from A to B refers the normal flow.



Dimensions and weight
AKV 10P valve

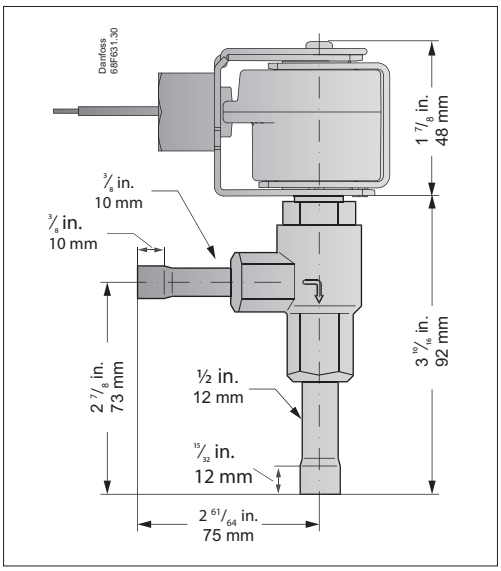
AKV 10P0 - AKV 10P6

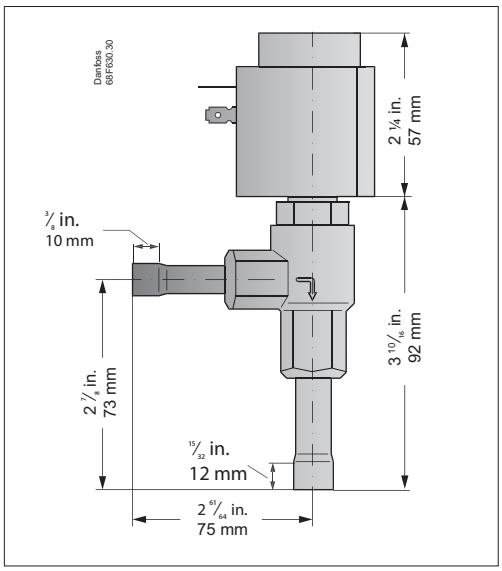




Weight excluding coil: 0.30 kg / 0.66 lbs

AKV 10P7

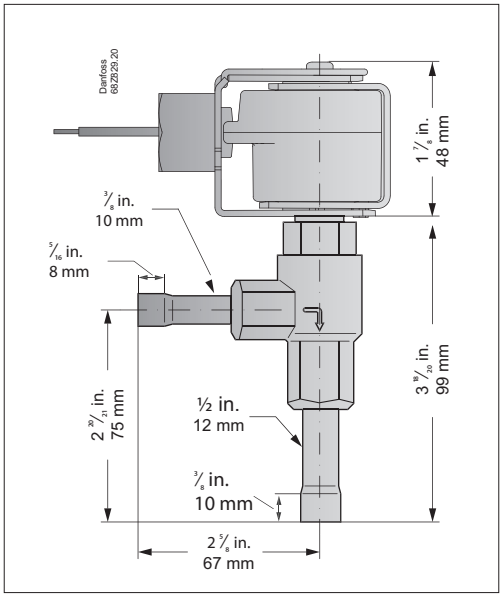


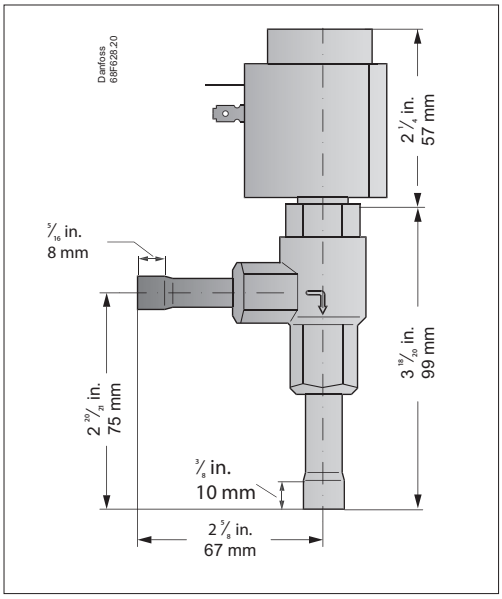


Weight excluding coil: 0.343 Kg / 0.76 lbs

Dimensions and weight
AKV 10PS valve

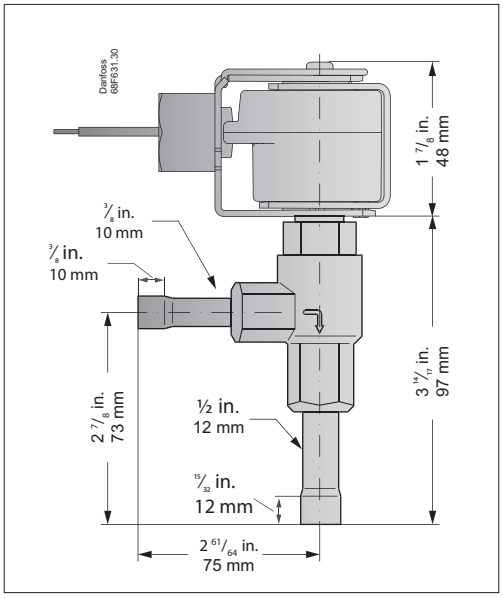
AKV 10PS4 – AKV 10PS6

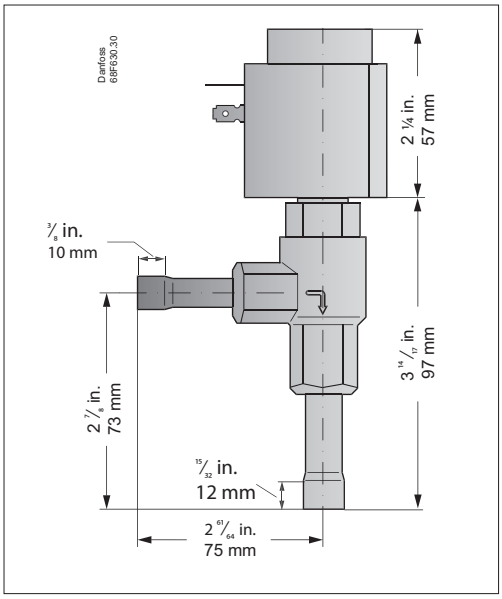




Weight excluding coil: 0.335 Kg / 0.74 lbs

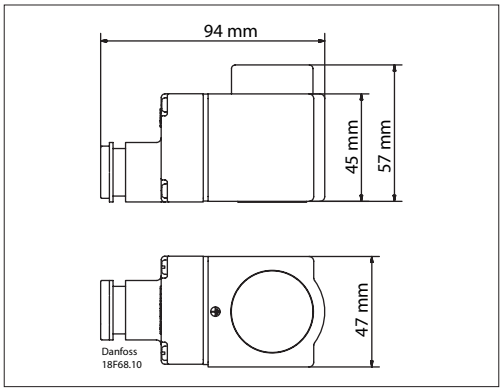
AKV 10PS7



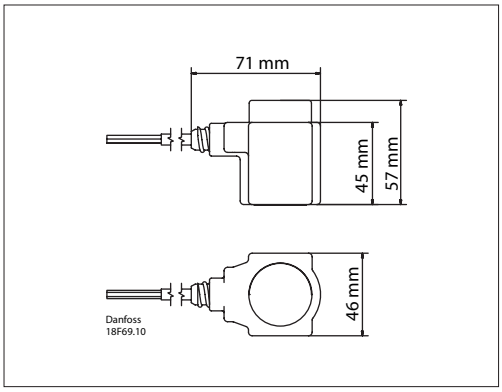


Weight excluding coil: 0.343 Kg / 0.76 lbs

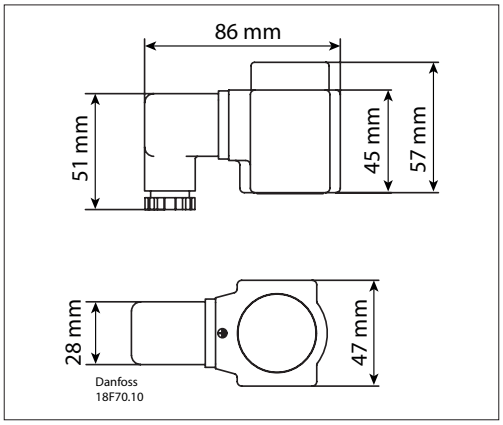
Dimension and weight standard coils



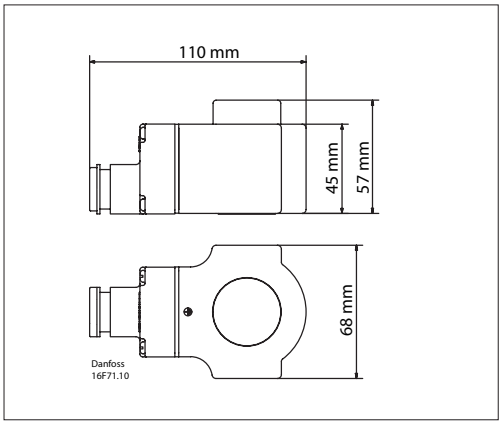
Terminal box 10 W
Weight 0.29 Kg / 0.6 lbs



Cable 10 W
Weight 0.29 Kg / 0.6 lbs

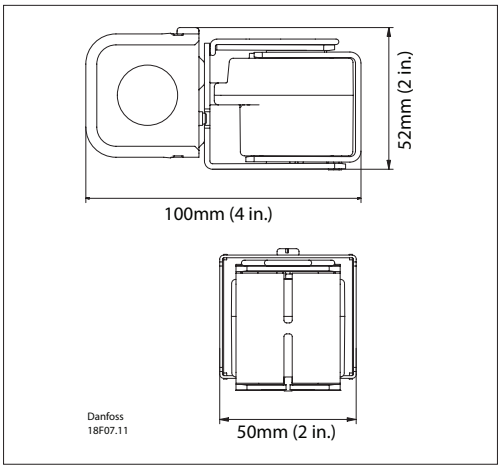


DIN socket 10 W
Weight 0.24 Kg / 0.5 lbs

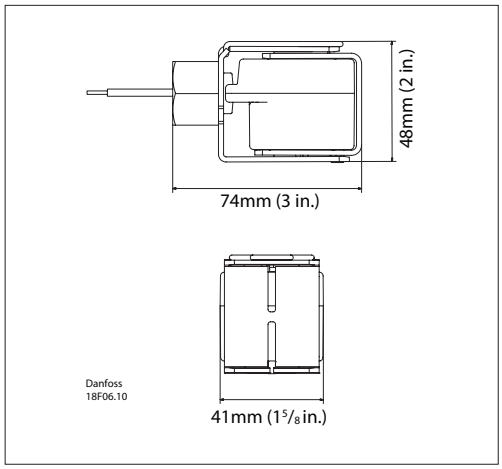


Terminal box 12 - 20 W
Weight 0.55 Kg / 1.2 lbs

Dimensions and weight UL coils



Junction box
Weight 0.860 lbs / 0.39 kg



Conduit boss
Weight 0.717 lbs / 0.33 kg

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 speciifcation •Replace with suitable valve and or coil
	-Impurities in the valve	•Check dirt inside valve and clean out impurities
	-Burnt out coil	•Never take the coil off the valve if voltage is applied. The coil can burn out •Check the wiring diagram and wiring itself •Check relay contacts, lead connections and fuses
	-Valve stuck open after being assembled	•Check Instruction if all correct parts are used, and correctly assembled
	-Valve does not open after orifice has been exchanged to a larger capacity due to high differential pressure	•Replace with suitable valve and or coil
Internal leakage/ valve does not close or closes partially	-Continuous voltage on coil	•Do not remove powered coil off the valve
	-Impurities in the valve	•Check dirt inside valve and clean out impurities
	-Pulsation in discharge line -Differential pressure too high in open position	•Check pressure and flow conditions •Check the supply voltage in the coil •Replace with suitable valve
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
Evaporator fully or partly iced up	-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

Appendix 1: 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 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.

CO_2

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

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.

Related products

AK-CC 550 case controller	AK-CC 750 case controller	EKC 315A superheat controller	DML/DMSC Eliminator® hermetic filter drier