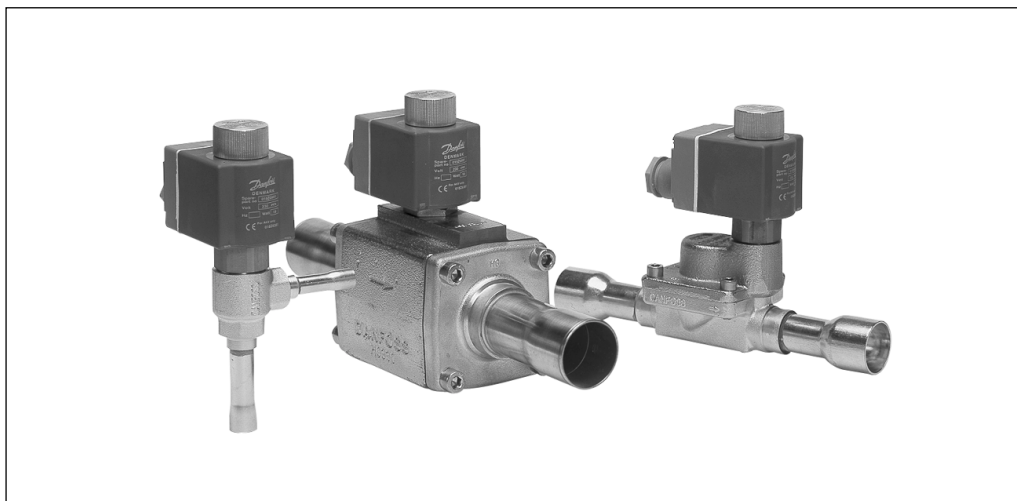


Introduction



AKV are electrically operated expansion valves designed for refrigerating plant. The AKV valves can be used for CFC, HCFC and HFC refrigerants.

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

The individual capacities are 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.

The AKV 10 valves covers a capacity range from 1 kW to 16 kW (R 22) and are divided up into 7 capacity ranges.

AKV 15 valves are in a cast iron (GGG40.3) design complying with the coming European safety standards.

The valve covers a capacity range from 25 kW to 100 kW (R 22) and are divided up into 4 capacity ranges.

AKV 15 valves can be used for cold rooms.

The AKV 20 valves cover a capacity range from 100 kW to 630 kW (R 22) and are divided up into 5 capacity ranges.

The AKV 20 can be used for water chiller units.

Features

- For CFC, HCFC, HFC refrigerants
- The valve requires no adjustment
- Wide regulation range
- Replaceable orifice assembly
- Both expansion valve and solenoid valve.
- Wide range of coils for d.c. and a.c.

Approvals

DEMKO, Denmark
SETI, Finland
SEV, Switzerland

UL listed (separate code. nos.)
CSA certified (separate code. nos.)

Technical data

Valve type	AKV 10	AKV 15	AKV 20
Supply voltage Supplied from the controller	See next page.	See next page.	See next page.
Tolerance of coil voltage	+10 / -15%	+10 / -15%	+10 / -15%
Enclosure to IEC 529	Max. IP 67	Max. IP 67	Max. IP 67
Working principle (Pulse-width modulation)	PWM	PWM	PWM
Recommend period of time	6 seconds	6 seconds	6 seconds
Capacity	1 to 16 kW	25 to 100 kW	100 to 630 kW
Regulation range (Capacity range)	10 - 100%	10 - 100%	10 - 100%
Connection	Flare or solder	Solder	Solder or weld
Media temperature	- 50 to 60°C	- 40 to 60°C	- 40 to 60°C
Ambient temperature	- 50 to 50 °C	- 40 to 50 °C	- 40 to 50 °C
Leak of valve seat	< 0.02% of k_v -value	< 0.02% of k_v -value	< 0.02% of k_v -value
MOPD	18 bar	22 bar	18 bar
Filter, replaceable	100µm	Non	Non
Max. working pressure	PB = 28 bar	PB = 28 bar	PB = 28 bar
Test pressure	p' = 36 bar	p' = 36 bar	p' = 31 bar

Rated capacity and Ordering

AKV 10 and AKV 15

Valve type	Rated capacity in kW ¹⁾				k_v -value m ³ /h	Connections					
						Flare		Solder ODF			
	R 22	R 134a	R 404A/R 507	R 407C		Inlet x outlet in.	Code no.	Inlet x outlet in.	Code no.	Inlet x outlet mm	Code no.
AKV 10-1	1.0	0.9	0.8	1.1	0.010	$\frac{3}{8} \times \frac{1}{2}$	068F1160	$\frac{3}{8} \times \frac{1}{2}$	068F1161	10 × 12	068F1162
AKV 10-2	1.6	1.4	1.3	1.7	0.017	$\frac{3}{8} \times \frac{1}{2}$	068F1163	$\frac{3}{8} \times \frac{1}{2}$	068F1164	10 × 12	068F1165
AKV 10-3	2.6	2.1	2.0	2.5	0.025	$\frac{3}{8} \times \frac{1}{2}$	068F1166	$\frac{3}{8} \times \frac{1}{2}$	068F1167	10 × 12	068F1168
AKV 10-4	4.1	3.4	3.1	4.0	0.046	$\frac{3}{8} \times \frac{1}{2}$	068F1169	$\frac{3}{8} \times \frac{1}{2}$	068F1170	10 × 12	068F1171
AKV 10-5	6.4	5.3	4.9	6.4	0.064	$\frac{3}{8} \times \frac{1}{2}$	068F1172	$\frac{3}{8} \times \frac{1}{2}$	068F1173	10 × 12	068F1174
AKV 10-6	10.2	8.5	7.8	10.1	0.114	$\frac{3}{8} \times \frac{1}{2}$	068F1175	$\frac{3}{8} \times \frac{1}{2}$	068F1176	10 × 12	068F1177
AKV 10-7	16.3	13.5	12.5	17.0	0.209	$\frac{1}{2} \times \frac{5}{8}$	068F1178	$\frac{1}{2} \times \frac{5}{8}$	068F1179	12 × 16	068F1180
AKV 15-1	25.5	21.2	19.6	25.2	0.25			$\frac{3}{4} \times \frac{3}{4}$	068F5000	18 × 18	068F5001
AKV 15-2	40.8	33.8	31.4	40.4	0.40			$\frac{3}{4} \times \frac{3}{4}$	068F5005	18 × 18	068F5006
AKV 15-3	64.3	53.3	49.4	63.7	0.63			$\frac{7}{8} \times \frac{7}{8}$	068F5010	22 × 22	068F5010
AKV 15-4	102	84.6	78.3	101	1.0			$1\frac{1}{8} \times 1\frac{1}{8}$	068F5015	28 × 28	068F5016

AKV 20

Valve type	Rated capacity in kW ¹⁾				k_v -value m ³ /h	Connections					
						Solder ODF				Weld	
	R 22	R 134a	R 404A/R 507	R 407C		Inlet x outlet in.	Code no.	Inlet x outlet mm	Code no.	Inlet x outlet in.	Code no.
AKV 20-1	102	84.6	78.3	101	1.0	$1\frac{3}{8} \times 1\frac{3}{8}$	042H2020	35 × 35	042H2020	$1\frac{1}{4} \times 1\frac{1}{4}$	042H2021
AKV 20-2	163	135	125	170	1.6	$1\frac{3}{8} \times 1\frac{3}{8}$	042H2022	35 × 35	042H2022	$1\frac{1}{4} \times 1\frac{1}{4}$	042H2023
AKV 20-3	255	212	196	252	2.5	$1\frac{5}{8} \times 1\frac{5}{8}$	042H2024	42 × 42	042H2025	$1\frac{1}{4} \times 1\frac{1}{4}$	042H2026
AKV 20-4	408	338	314	404	4.0	$2\frac{1}{8} \times 2\frac{1}{8}$	042H2027	54 × 54	042H2027	$1\frac{1}{2} \times 1\frac{1}{2}$	042H2028
AKV 20-5	643	533	494	637	6.3	$2\frac{1}{8} \times 2\frac{1}{8}$	042H2029	54 × 54	042H2029	2 × 2	042H2030

¹⁾ Rated capacities are based on
Condensing temperature $t_c = 32^\circ\text{C}$
Liquid temperature $t_l = 28^\circ\text{C}$
Evaporating temperature $t_e = 5^\circ\text{C}$

Spare parts

AKV 10



Orifice

Orifice no.	Code no.	Contents
1	068F0506	1 pc. orifice 1 pc. Al. gasket 1 pc. cap for coil
2	068F0507	
3	068F0508	
4	068F0509	
5	068F0510	
6	068F0511	
7	068F0512	



Filter: **Code no. 068F0540**
Contents: 10 pcs. filters
10 pcs. Al. gaskets



Upper part: **Code no. 068F0541**
Contents: 1pc. armature ass.
1pc. armature tube
1pc. Al. gasket



Gasket for upper part: **Code no. 068F0549**
Contents: 25 pcs. Cu/Tn gaskets

AKV 15



Piston

Type	Code no.	Contents
AKV 15-1	068F5265	1 pc. piston assembly 1 pc. gasket 1 pc. O-ring 2 pcs. labels
AKV 15-2	068F5266	
AKV 15-3	068F5267	
AKV 15-4	068F5268	

Gasket set: **Code no. 068F5263**

Contents: 3 pcs. O-rings
1 pc. Cu. gasket
1 pc. gasket



Filter: **Code no. 068F0540**
Contents: 10 pcs. filters
10 pcs. Al. gaskets



Upper part: **Code no. 068F0545**
Contents: 1pc. armature ass.
1pc. armature tube
1pc. Al. gasket



Gasket for upper part: **Code no. 068F0549**
Contents: 25 pcs. Cu/Tn gaskets

AKV 20



Piston

Type	Code no.	Contents
AKV 20-0.6	042H2039	1 pc.piston assembly 3 pcs.O-rings
AKV 20-1	042H2040	
AKV 20-2	042H2041	
AKV 20-3	042H2042	
AKV 20-4	042H2043	
AKV 20-5	042H2044	

Gasket set: **Code no. 042H0160**
Contents: 3 pcs. O-rings
2 pcs. Al. gaskets
3 pcs. gaskets



Upper part: **Code no. 068F5045**
Contents: 1pc. armature ass.
1pc. armature tube
1pc. Al. gasket



Gasket for upper part: **Code no. 068F0549**
Contents: 25 pcs. Cu/Tn gaskets



Orifice set

Type	Code no.	Contents
AKV 20-0.6	068F5270	Main orifice, dia. 8 mm Pilot orifice, dia. 1.2mm 2 pcs. Al. gaskets O-ring
AKV 20-1	068F5270	
AKV 20-2	068F5270	
AKV 20-3	068F5270	
AKV 20-4	068F5271	Main orifice, dia. 14 mm Pilot orifice, dia. 2.4 mm 2 pcs. Al. gaskets O-ring
AKV 20-5	068F5271	

Ordering

Coils for AKV valves

AKV 10-1 10-2 10-3 10-4 10-5	AKV 10-6	AKV 10-7	AKV 15-1 15-2 15-3 15-4	AKV 20-1 20-2 20-3	AKV 20-4 20-5
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D.C. coils	Code no.						
220 V d.c. 20 W, standard with terminal box	018Z6851	+	+	+	+	+	+
100 V d.c. 18 W, special with terminal box with DIN socket	018Z6780 018Z6990	+	+	+	+	+	+
230 V d.c. 18 W, special with terminal box with DIN socket	018Z6781¹⁾ 018Z6991¹⁾	+	+	+	+	+	+
230 V d.c. 18 W, special with 2.5 m cable with 4.0 m cable with 8.0 m cable	018Z6288¹⁾ 018Z6278¹⁾ 018Z6279¹⁾	+	+	+	+	+	+

¹⁾ Recommended for commercial refrigeration plant

A.C. coils	Code no.						
240 V a.c. 10 W, 50 Hz with terminal box with DIN plugs	018Z6702 018Z6177	+	+	—	+	—	—
240 V a.c. 10 W, 60 Hz with terminal box with DIN plugs	018Z6713 018Z6188	+	+	—	+	—	—
240 V a.c. 12 W, 50 Hz with terminal box	018Z6802	+	+	+	+	+	—
220 V a.c. 10 W, 50 Hz with terminal box with DIN plugs	018Z6701 018Z6176	+	+	—	+	—	—
220 V a.c. 10 W, 60 Hz with terminal box with DIN plugs	018Z6714 018Z6189	+	+	—	+	—	—
220 V a.c. 12 W, 50 Hz with terminal box	018Z6801	+	+	—	+	+	—
220 V a.c. 12 W, 60 Hz with terminal box	018Z6814	+	+	—	+	+	—
115 V a.c. 10 W, 50 Hz with terminal box with DIN plugs	018Z6711 018Z6186	+	+	—	+	—	—
115 V a.c. 10 W, 60 Hz with terminal box with DIN plugs	018Z6710 018Z6185	+	+	—	+	—	—
110 V a.c. 12 W, 50 Hz with terminal box	018Z6811	+	+	—	+	+	—
110 V a.c. 12 W, 60 Hz with terminal box	018Z6813	+	+	—	+	+	—
110 V a.c. 20 W, 50 Hz with terminal box	018Z6904	+	+	+	+	+	+
24 V a.c. 10 W, 50 Hz with terminal box with DIN plugs	018Z6707 018Z6182	+	—	—	+	—	—
24 V a.c. 10 W, 60 Hz with terminal box with DIN plugs	018Z6715 018Z6190	—	—	—	+	—	—
24 V a.c. 12 W, 50 Hz with terminal box	018Z6807	+	—	—	+	—	—
24 V a.c. 12 W, 60 Hz with terminal box	018Z6815	+	—	—	+	—	—
24 V a.c. 20 W, 50 Hz with terminal box	018Z6901²⁾	+	+	+	+	+	+
24 V a.c. 20 W, 60 Hz with terminal box	018Z6902²⁾	+	+	+	+	+	+

²⁾ Recommended for industrial refrigeration plant

Capacity

R 22

Valve type	Capacity in kW at pressure drop across valve Δp bar								
	2	4	6	8	10	12	14	16	18
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	110	115	118	121	122	123
AKV 20 - 1	69.9	89.9	102	110	115	118	121	122	123
AKV 20 - 2	112	144	163	176	184	189	193	195	193
AKV 20 - 3	175	225	255	275	287	296	301	304	306
AKV 20 - 4	280	360	408	440	459	474	482	487	490
AKV 20 - 5	440	566	643	692	723	746	759	767	772

R 134a

Valve type	Capacity in kW at pressure drop across valve Δp bar								
	2	4	6	8	10	12	14	16	18
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	135	144	149	150	150	149	144
AKV 20 - 3	148	189	212	225	232	235	235	232	225
AKV 20 - 4	236	303	338	360	371	376	376	371	360
AKV 20 - 5	372	477	533	566	585	592	592	585	566

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 Δt_{sub}

Correction factor	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 22	1.00	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.72	0.69
R 134a	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)

R 404A/R 507

Valve type	Capacity in kW at pressure drop across valve Δp bar								
	2	4	6	8	10	12	14	16	18
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

R 407C

Valve type	Capacity in kW at pressure drop across valve Δp bar								
	2	4	6	8	10	12	14	16	18
AKV 10 - 1	0.7	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.2
AKV 10 - 2	1.2	1.5	1.7	1.7	1.9	1.9	2.0	2.0	1.9
AKV 10 - 3	1.8	2.4	2.5	2.8	2.9	3.0	3.0	3.0	3.0
AKV 10 - 4	3.0	3.8	4.0	4.5	4.7	4.8	4.9	4.9	4.9
AKV 10 - 5	4.7	5.9	6.4	7.1	7.4	7.5	7.7	7.7	7.6
AKV 10 - 6	7.4	9.4	10.1	11.3	11.7	12.0	12.2	12.2	12.1
AKV 10 - 7	11.9	15.1	17.0	17.4	18.8	19.1	19.5	19.5	19.1
AKV 15 - 1	18.1	23.6	25.2	28.3	29.3	29.9	30.4	30.4	30.3
AKV 15 - 2	29.7	37.8	40.4	45.3	46.8	47.9	48.7	48.7	48.5
AKV 15 - 3	46.6	59.4	63.7	71.3	73.7	75.3	76.7	76.7	76.4
AKV 15 - 4	74.1	94.4	101	113	117	120	122	122	121
AKV 20 - 1	74.1	94.4	101	113	117	120	122	122	121
AKV 20 - 2	119	151	170	174	188	191	195	195	191
AKV 20 - 3	181	236	252	283	293	299	304	304	303
AKV 20 - 4	297	378	404	453	468	479	487	487	485
AKV 20 - 5	466	594	637	713	737	753	767	767	764

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 Δt_{sub}

Correction factor	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 404A / R 507	1.00	0.91	0.83	0.78	0.73	0.68	0.65	0.61	0.59	0.56
R 407C	1.00	0.93	0.88	0.83	0.79	0.75	0.72	0.69	0.66	0.64

Corrected capacity = evaporator capacity x correction factor.

Dimensioning

To obtain an expansion valve that will function correctly under different load conditions it is necessary to consider the following points when the valve has to be dimensioned: These points must be dealt with in the following sequence:

- 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.

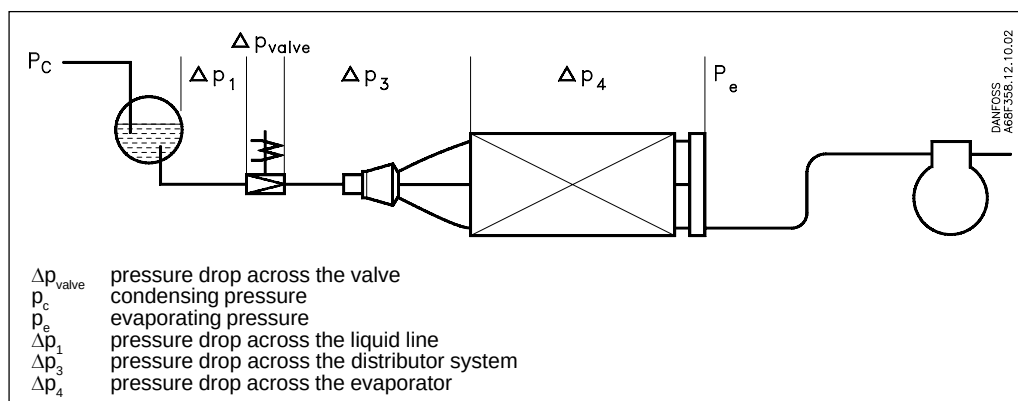
2) Pressure drop across the valve

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 sundry other pressure drops in the liquid line, distributor, evaporator, etc.

It is indicated in the following formula:

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



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

Example of calculation of pressure drop across a valve:

Refrigerant: R22
 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 you 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".

Dimensioning (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 Δt_{sub}

Correction factor	4 K	10 K	15 K	20 K	25 K	30 K	35 K	40 K	45 K	50 K
R 22	1.00	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.72	0.69
R 134a	1.00	0.93	0.88	0.84	0.80	0.76	0.73	0.70	0.68	0.65
R 404A / R 507	1.00	0.91	0.83	0.78	0.73	0.68	0.65	0.61	0.59	0.56
R 407C	1.00	0.93	0.88	0.83	0.79	0.75	0.72	0.69	0.66	0.64

Corrected capacity = evaporator capacity x correction factor.

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

Note: Too little subcooling may cause flash gas.

Example of correction:

Refrigerant: R 22

Evaporator capacity Q_e : 5 kW

Subcooling: 10 K

Correction factor according to the table = 0.94

Corrected capacity = 5 x 0.94 = 4.7 kW.

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

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 you 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:

$\Delta p_{valve} = 8.3$ bar

$Q_{e, corrected} = 4.7$ 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 x 4.7 kW = 5.88 kW.

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

With the given values $\Delta p_{valve} = 8.3$ 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.

Dimensioning (continued)

6) Correctly dimensioned liquid line

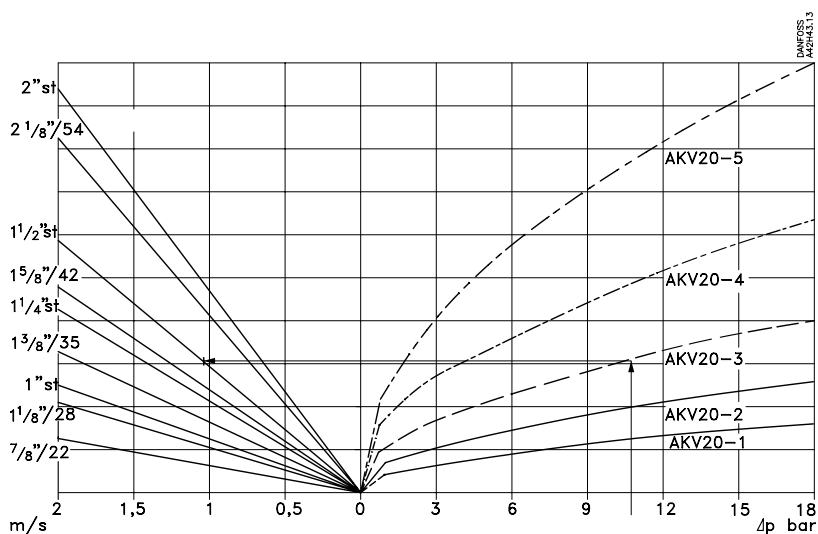
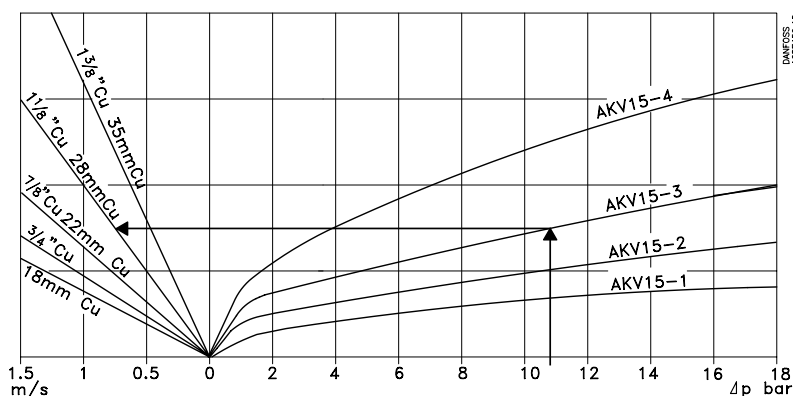
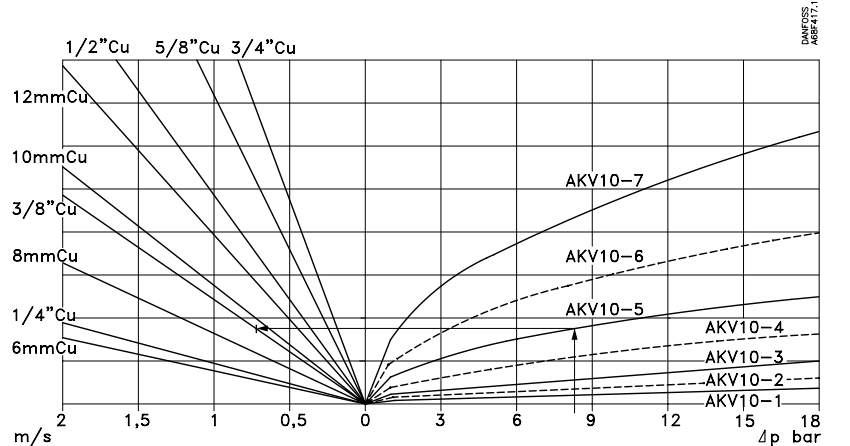
To obtain a correct supply of liquid to the AKV valve, the liquid line to the individual AKV valve must be correctly dimensioned.

The liquid flow rate should not exceed 1 m/sec. This must be observed on account of

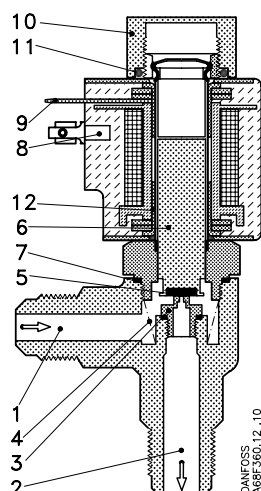
the pressure drop in the liquid line (lack of subcooling) and pulsations in the liquid line.

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.

R 22, R 134a, R 404A, R 407C and R 507

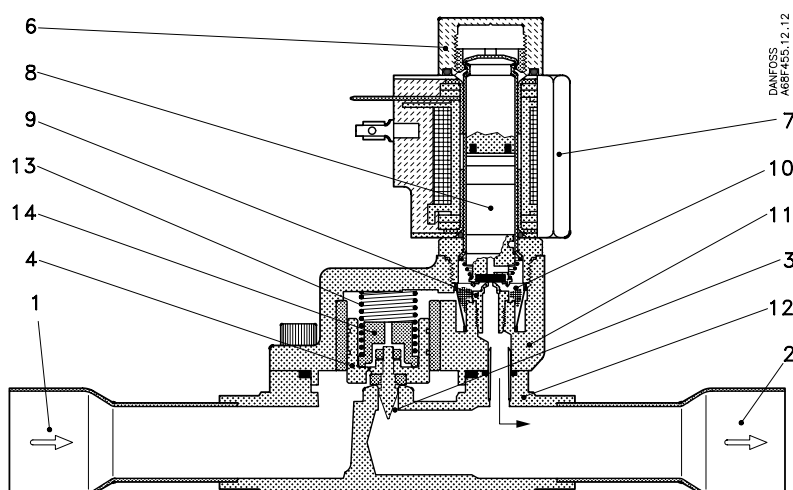


Design



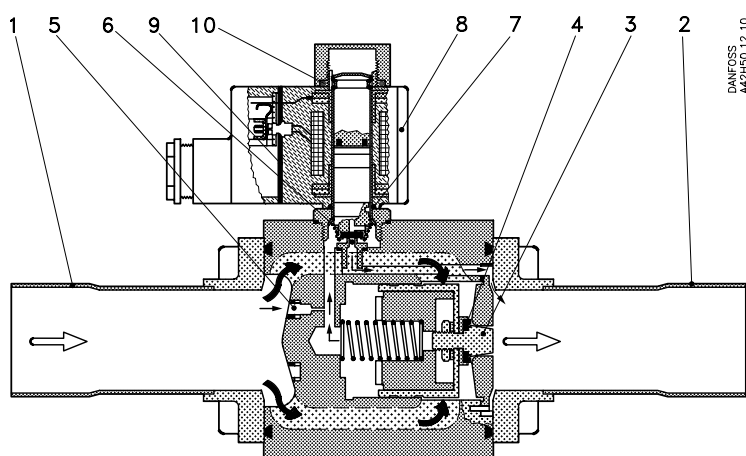
1. Inlet
2. Outlet
3. Orifice
4. Filter
5. Valve seat
6. Armature
7. Aluminium gasket
8. Coil
9. AMP plug
10. Cap
11. O ring
12. O ring

AKV 10



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

AKV 15

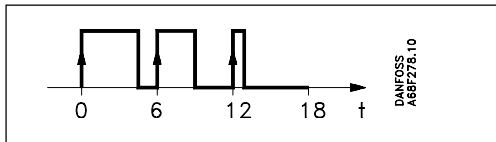


1. Inlet
2. Outlet
3. Orifice
4. Valve seat
5. Filter
6. Pilot orifice
7. Pilot valve
8. Coil
9. AMP plug
10. Cover

AKV 20

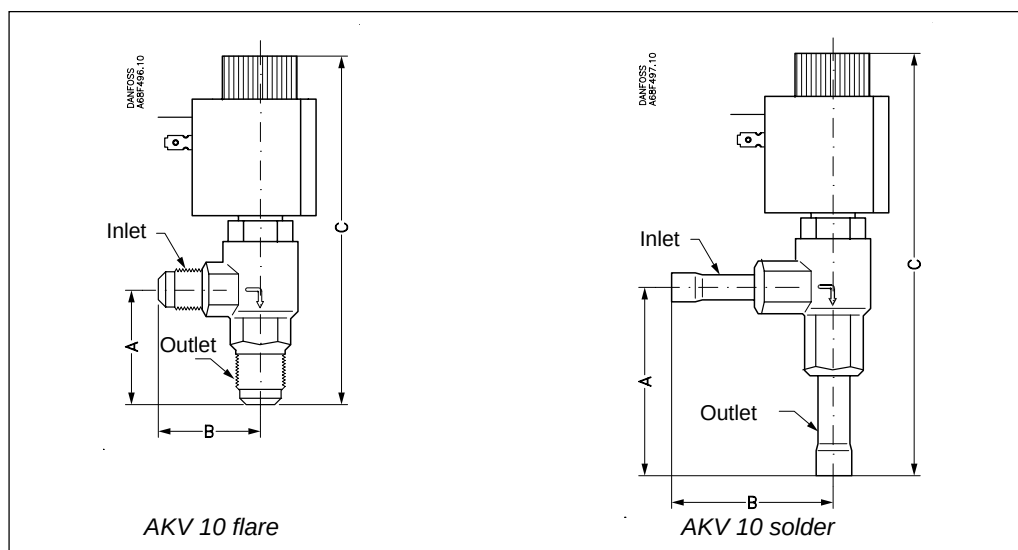
Function

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.

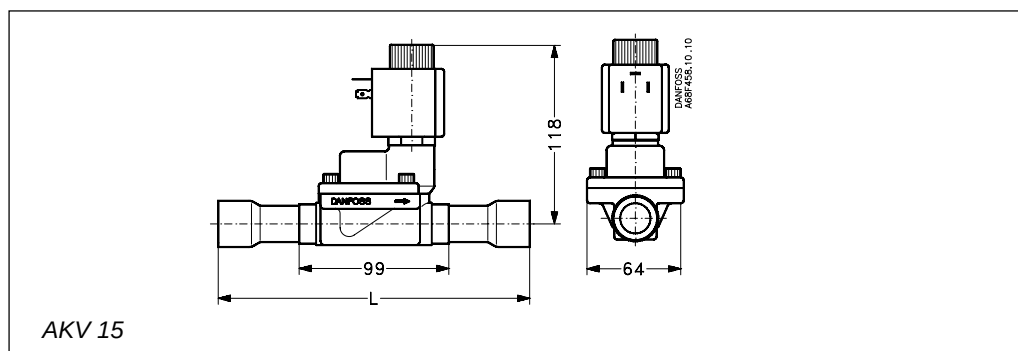


The relation between this opening and closing time indicates the actual capacity. If there is an intense need for refrigeration, the valve will remain open for almost all six seconds of the period. If the required amount of refrigeration is modest, the valve will only stay open during a fraction of the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

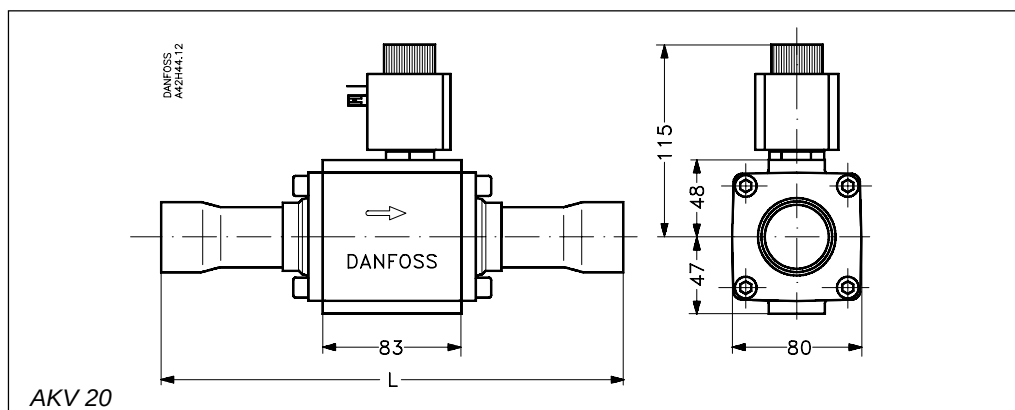


Valve type	Connection type	n	A mm	B mm	C mm	Inlet in.	Outlet in.	Inlet mm	Outlet mm	Weight without coil kg
AKV 10-n	Flare	1, 2, 3, 4, 5, 6	48	45	135	3/8	1/2			0.38
		7	48	45	135	1/2	5/8			0.38
AKV 10-n	Solder	1, 2, 3, 4, 5, 6	75	67	164	3/8	1/2	10	12	0.38
		7	73	75	162	1/2	5/8	12	16	0.38



Valve type	Inlet in.	Outlet in.	Inlet mm	Outlet mm	L mm	Weight without coil kg
AKV 15 -1	3/4	3/4	18	18	190	1.5
AKV 15 - 2	3/4	3/4	18	18	190	1.5
AKV 15 - 3	7/8	7/8	22	22	190	1.5
AKV 15 - 4	1 1/8	1 1/8	28	28	216	1.5

Dimensions and weights
(continued)



Valve type	Solder connections						Weld connections			
	Inlet in.	Outlet in.	Inlet mm	Outlet mm	L mm	Weight without coil kg	Inlet in.	Outlet in.	L mm	Weight without coil kg
AKV 20 - 1	1 3/8	1 3/8	35	35	281	4.3	1 1/4	1 1/4	180	4.1
AKV 20 - 2	1 5/8	1 5/8	42	42	281	4.3	1 1/2	1 1/2	200	4.1
AKV 20 - 3	2 1/8	2 1/8	54	54	281	4.3	2	2	230	4.1
AKV 20 - 4	2 1/8	2 1/8	54	54	281	4.3	2	2	230	4.1
AKV 20 - 5	2 1/8	2 1/8	54	54	281	4.3	2	2	230	4.1

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