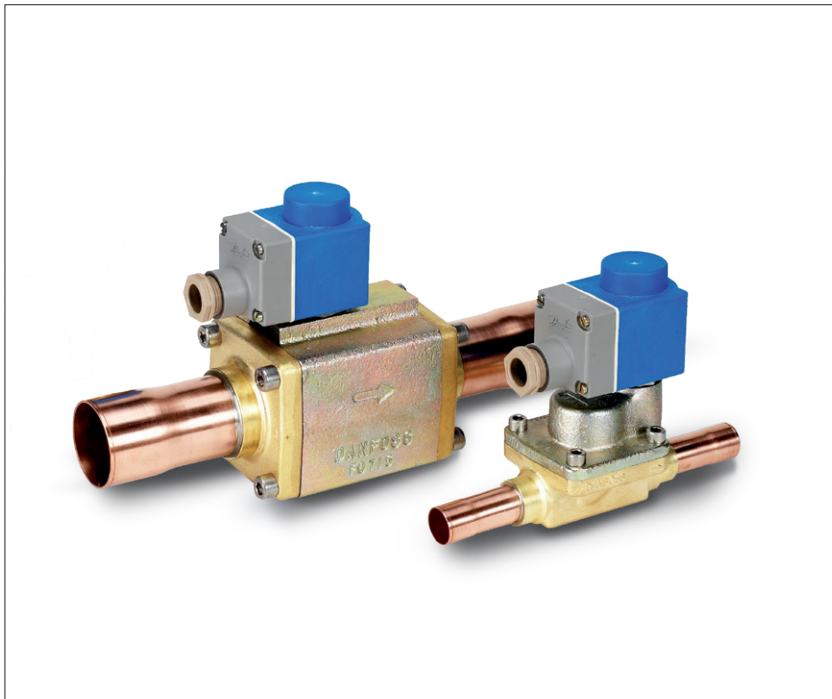


Data sheet

# Electric expansion valves

## Types AKV 15 and AKV 20



AKV are electrically operated expansion valves designed for refrigerating plants.

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

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

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

Valve capacity is indicated with a number forming part of the type designation. The number represents the size of the orifice of the valve in question. A valve with orifice 3 will for example be designated AKV 15-3. The orifice assembly is replaceable.

### Features

- Refrigerants: R134a, R22, R23, R404A, R407A, R407C, R407F, R407H, R410A, R422B, R422D, R438A, R448A, R449A, R449B, R450A, R452A, R463A, R507, R513A, R513B, R515A, R515B, R744.
- For a complete list of approved refrigerants, visit <https://store.danfoss.com/> and search for individual code numbers, where refrigerants are listed as part of technical data.
- The valve requires no adjustment
- Wide regulation range Replaceable orifice assembly
- Both expansion valve and solenoid valve
- Wide range of AC and DC coils

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

**Approvals**

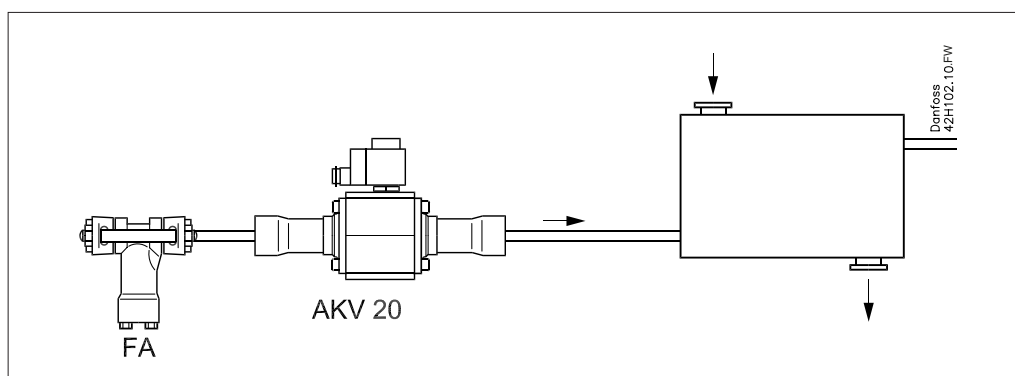
DEMKO, Denmark  
SETI, Finland  
SEV, Switzerland

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

**Technical data**

Valve type	AKV 15	AKV 20
Tolerance of coil voltage (coil dependent)	10 / - 15%	10 / - 15%
Enclosure to IEC 529	Max. IP67	Max. IP67
Working principle	Pulse Width Modulation (PWM)	
Recommended period of time	6 sec.	6 sec.
Capacity (R404A/R507)	14 – 85 kW / 3.98 – 24.17 ton	56 – 530 kW / 15.92 – 150.70 ton
Regulation range (Capacity range)	10 – 100%	10 – 100%
Connection	Solder	Solder or weld
Evaporating temperature	-50 – 60 °C / -58 – 140 °F	-40 – 60 °C / -104 – 140 °F
Ambient temperature (coil dependent)	-40 – 50 °C / -104 – 122 °F	-40 – 50 °C / -104 – 122 °F
MOPD (Max. Opening Pressure Differential)	22 bar / 319 psig	18 bar / 261 psig
Filter, replaceable	External 100 µm	External 100 µm
Max. working pressure	AKV 15-1 – 15-4: 46 barg / 667 psig	AKV 20-1 – 20-5: 28 barg / 406 psig

**Filter**



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

**Rated capacity and ordering**

Valve type	Rated capacity <sup>1)</sup>														k <sub>v</sub> value [m <sup>3</sup> /h]	Connections Solder ODF		
	R22		R134a		R407C		R404A/R507		R407A		R410A		R744			Inlet × outlet [in]	Inlet × outlet [mm]	Multipack Code no.
	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]				
<b>AKV 15</b>																		
AKV 15-1	25.7	7.30	19.9	5.66	27.1	7.72	18.1	5.14	25.4	7.23	30.1	8.56	32.7	9.30	0.250	¾ × ¾	-	068F5000
	25.7	7.30	19.9	5.66	27.1	7.72	18.1	5.14	25.4	7.23	30.1	8.56	32.7	9.30	0.250	-	18 × 18	068F5001
	25.7	7.30	19.9	5.66	27.1	7.72	18.1	5.14	25.4	7.23	30.1	8.56	32.7	9.30	0.250	¾ × ¾	-	068F5035*)
AKV 15-2	41.1	11.7	31.8	9.03	43.3	12.3	28.9	8.23	40.6	11.6	48.1	13.7	52.4	14.9	0.400	¾ × ¾	-	068F5005
	41.1	11.7	31.8	9.03	43.3	12.3	28.9	8.23	40.6	11.6	48.1	13.7	52.4	14.9	0.400	-	18 × 18	068F5006
	41.1	11.7	31.8	9.03	43.3	12.3	28.9	8.23	40.6	11.6	48.1	13.7	52.4	14.9	0.400	¾ × ¾	-	068F5036*)
AKV 15-3	64.5	18.3	49.9	14.1	68.1	19.4	45.4	12.9	63.8	18.1	75.7	21.5	82.6	23.5	0.630	7/8 × 7/8	-	068F5010
	64.5	18.3	49.9	14.1	68.1	19.4	45.4	12.9	63.8	18.1	75.7	21.5	82.6	23.5	0.630	7/8 × 7/8	-	068F5037*)
AKV 15-4	102	29.0	78.6	22.3	107	30.5	71.9	20.5	101	28.6	120	34.1	131	37.2	1.000	1 1/8 × 1 1/8	-	068F5015
	102	29.0	78.6	22.3	107	30.5	71.9	20.5	101	28.6	120	34.1	131	37.2	1.000	-	28 × 28	068F5016
	102	29.0	78.6	22.3	107	30.5	71.9	20.5	101	28.6	120	34.1	131	37.2	1.000	1 1/8 × 1 1/8	-	068F5038*)

\*) : UL Listed

Valve type	Rated capacity <sup>1)</sup>														k <sub>v</sub> value [m <sup>3</sup> /h]	Connections			
	R22		R134a		407C		R404A/R507		R407A		R410A		R744			Solder ODF		Weld	Code no.
	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]		Inlet × outlet [in]	Inlet × outlet [mm]	Inlet × outlet [in]	
<b>AKV 20</b>																			
AKV 20-1	103	29.2	79.5	22.6	108	30.8	72	20.6	102	28.9	120	34.2	131	37.2	1.0	1 3/8 × 1 3/8	35 × 35	-	042H2020
	103	29.2	79.5	22.6	108	30.8	72	20.6	102	28.9	120	34.2	131	37.2	1.0	-	-	1 1/4 × 1 1/4	042H2021
AKV 20-2	164	46.6	127	36.0	173	49.2	115	32.9	162	46.1	192	54.7	210	59.7	1.6	1 3/8 × 1 3/8	35 × 35	-	042H2022
	164	46.6	127	36.0	173	49.2	115	32.9	162	46.1	192	54.7	210	59.7	1.6	-	-	1 1/4 × 1 1/4	042H2023
AKV 20-3	255	72.6	197	55.9	269	76.5	180	51.2	252	71.7	300	85.3	328	93.3	2.5	-	42 × 42	-	042H2025
	255	72.6	197	55.9	269	76.5	180	51.2	252	71.7	300	85.3	328	93.3	2.5	1 5/8 × 1 5/8	-	-	042H2024
	255	72.6	197	55.9	269	76.5	180	51.2	252	71.7	300	85.3	328	93.3	2.5	-	-	1 1/4 × 1 1/4	042H2026
AKV 20-4	405	115	311	88.3	426	121	286	81.4	400	114	477	136	526	150	4.0	2 1/8 × 2 1/8	54 × 54	-	042H2027
	405	115	311	88.3	426	121	286	81.4	400	114	477	136	526	150	4.0	-	-	1 1/2 × 1 1/2	042H2028
AKV 20-5	631	179	478	136	660	188	446	127	620	176	746	212	835	237	6.3	2 1/8 × 2 1/8	54 × 54	-	042H2029
	631	179	478	136	660	188	446	127	620	176	746	212	835	237	6.3	-	-	2 × 2	042H2030

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

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

**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).

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

**Ordering**
*Coils for AKV valves*

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

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

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

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

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

**Approval (coils)**



**Technical data**

*Design*  
In accordance with UL 429

*Insulation of coil wire*  
Class H according to IEC 85

*Power supply*  
Alternating current (AC)

*Connection*  
Junction box or Conduit boss

*Permissible voltage variation*  
Alternating current (AC):  
50 Hz and 60 Hz: -10% – 15%  
50/60 Hz: ± 10%

*Enclosure, IEC 60529*  
Junction box NEMA 2 ~ IP 12–32  
Conduit boss NEMA 4 ~ IP 54

*Power consumption*  
Alternating current (AC): Inrush: 49 VA;  
Holding: 28 VA, 16 W

*Ambient temperature*  
-40 °F – 122 °F

**Ordering**

BJ and BX Coils

**AC coils for AKV**

Valve type	Coil type	Wire length		Voltage [V AC]	Frequency [Hz]	Power consumption [W]	Code no.
		[in]	[cm]				

**Junction box NEMA 2 for AKV**

AKV 15, 20	BJ024CS	7	18	24	50 / 60	14	018F4100
	BJ120CS	7	18	110	50 / 60	16	018F4110
		7	18	120	60	15	
	BJ240CS	7	18	208 – 240	60	14	018F4120
7		18	230	50	17		

**Conduit boss NEMA 4 for AKV**

AKV 15, 20	BX024CS	18	46	24	50 / 60	14	018F4102
	BX024CS	71	180	24	50 / 60	14	018F4103
	BX024CS	98	250	24	50 / 60	14	018F4104
	BX120CS	18	46	110	50 / 60	16	018F4112
		18	46	120	60	15	
	BX120CS	36	91	110	50 / 60	16	018F4113
	BX120CS	36	91	120	60	15	
	BX120CS	71	180	110	50 / 60	16	018F4114
	BX120CS	71	180	120	60	15	
	BX120CS	98	250	110	50 / 60	16	018F4115
	BX120CS	98	250	120	60	15	
	BX240CS	18	46	208 – 240	60	14	018F4122
		98	250	230	50	17	
	BX240CS	18	46	208 – 240	60	14	018F4123
98		250	230	50	17		



Junction box NEMA 2

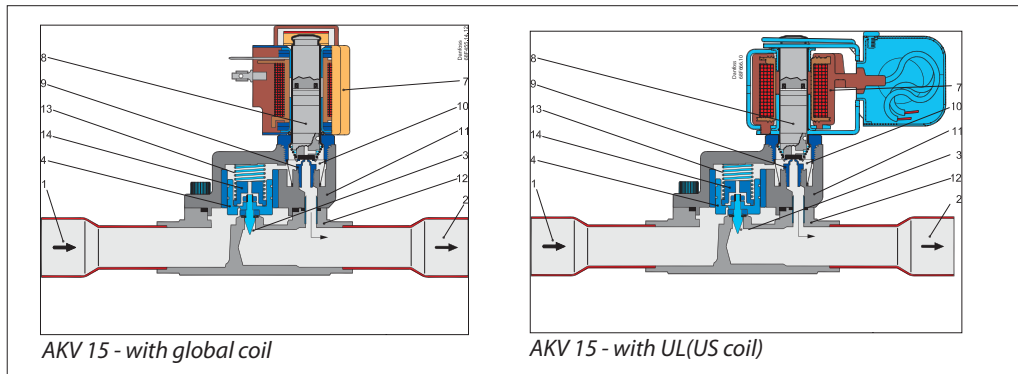


Conduit boss NEMA 4

**Design**

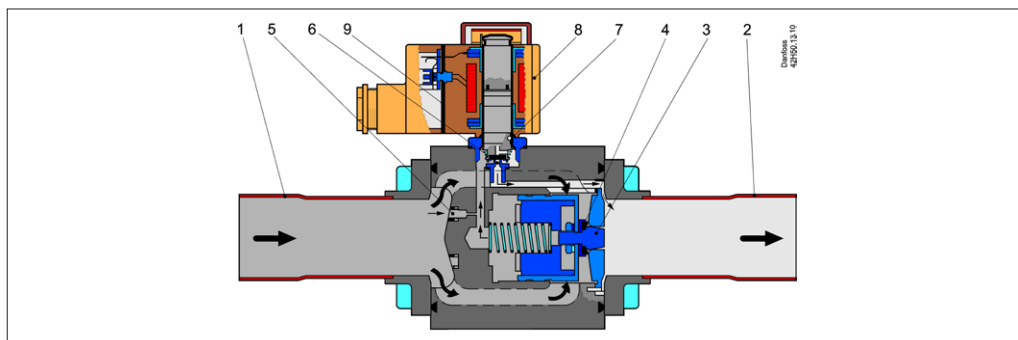
1. Inlet
2. Outlet
3. Orifice
4. Piston assembly
7. Coil
8. Armature
9. Pilot orifice
10. Filter
11. Cover
12. Valve body
13. Spring
14. Orifice assembly

AKV 15



AKV 20

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

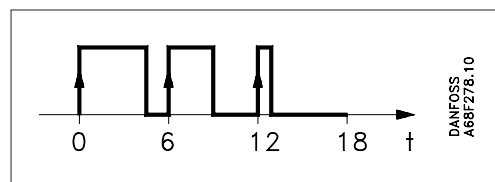


**Function**

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

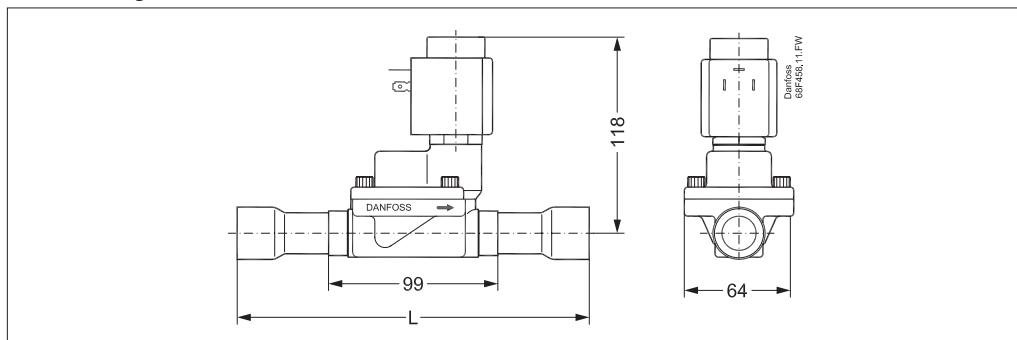
The relation between this opening and closing time indicates the actual capacity. If there is an intense need for refrigeration, the valve will remain open for almost all six seconds of the period. If the required amount of refrigeration is modest, the valve will only stay open during a fraction of the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

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



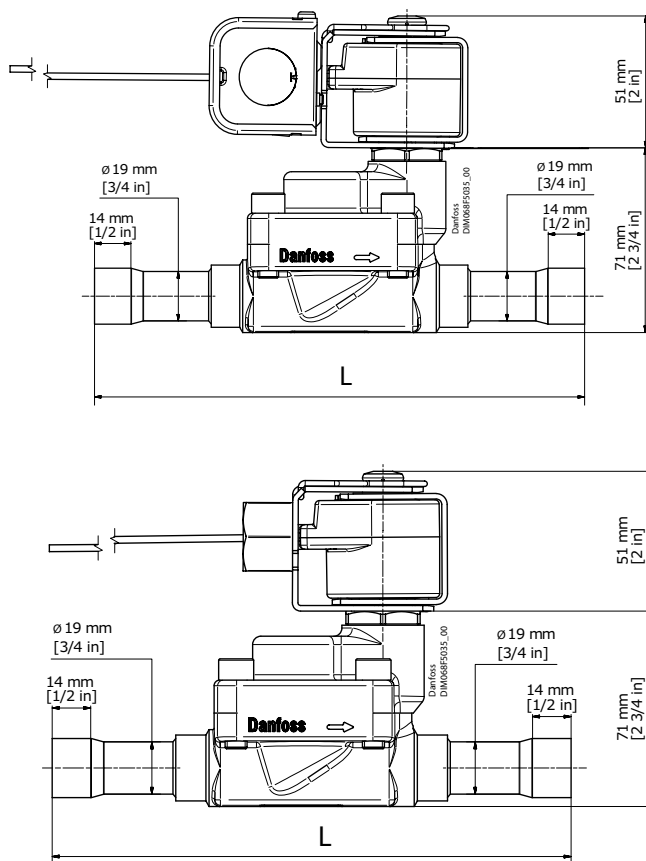
Dimensions and weights

AKV 15 - with global coil



Valve type	Inlet	Outlet	Inlet	Outlet	L	Net weight without coil
	[in.]	[in.]	[mm]	[mm]	[mm]	[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

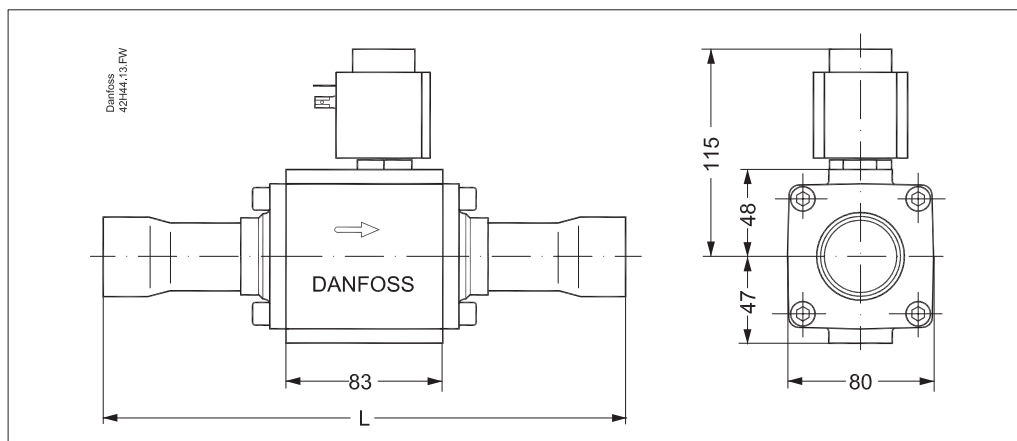
AKV 15 - with BJ/BX coil



Valve type	Inlet [inch]	Outlet [inch]	L [inch]	Net weight without coil [kg]
AKV 15-1	3/4	3/4	7.48	3.31
AKV 15-2	3/4	3/4	7.48	3.31
AKV 15-3	7/8	7/8	7.48	3.31
AKV 15-4	1 1/8	1 1/8	8.50	3.31

Dimensions and weights  
(continued)

AKV 20 - with global coil

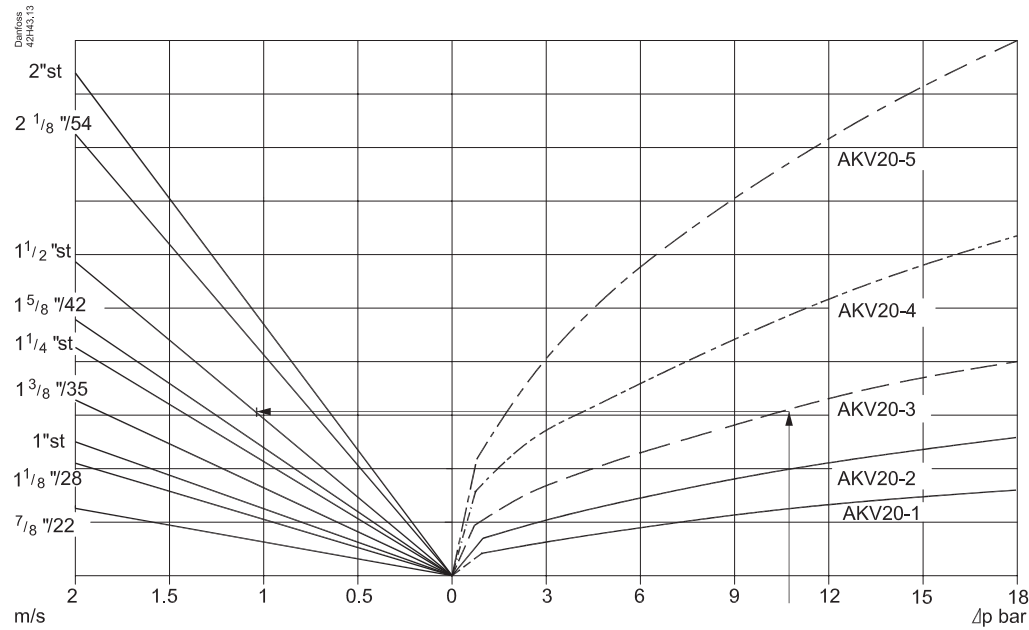
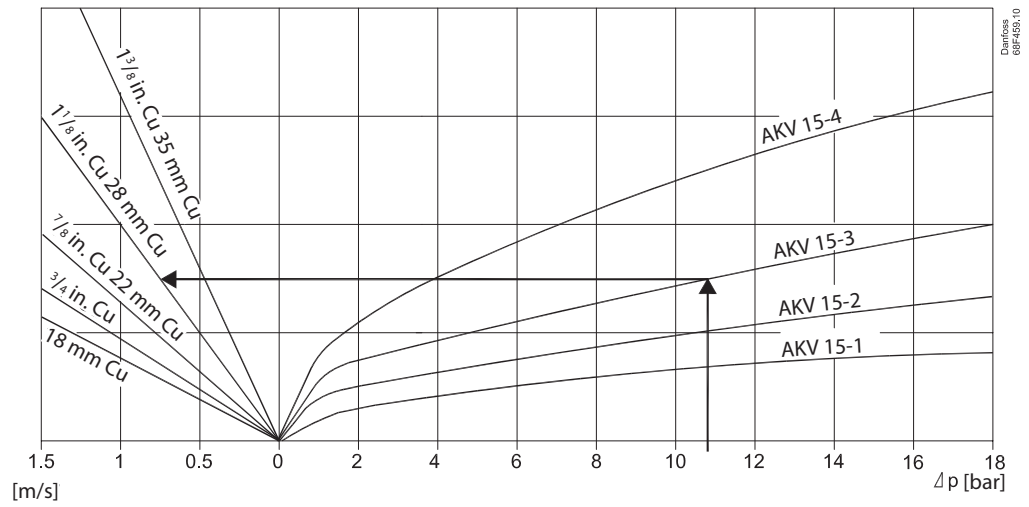


Valve type	Solder connections						Weld connections			
	Inlet	Outlet	Inlet	Outlet	L	Net weight without coil	Inlet	Outlet	L	Net weight without coil
	[in.]	[in.]	[mm]	[mm]	[mm]	[kg]	[in.]	[in.]	[mm]	[kg]
AKV 20-1	1 3/8	1 3/8	35	35	281	4.3	1 1/4	1 1/4	176	4.1
AKV 20-2	1 3/8	1 3/8	35	35	281	4.3	1 1/4	1 1/4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



**Appendix 1:**  
Dimensioning of the liquid line

R22/R407C, R134a, R404A, R507



**Related products**

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

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