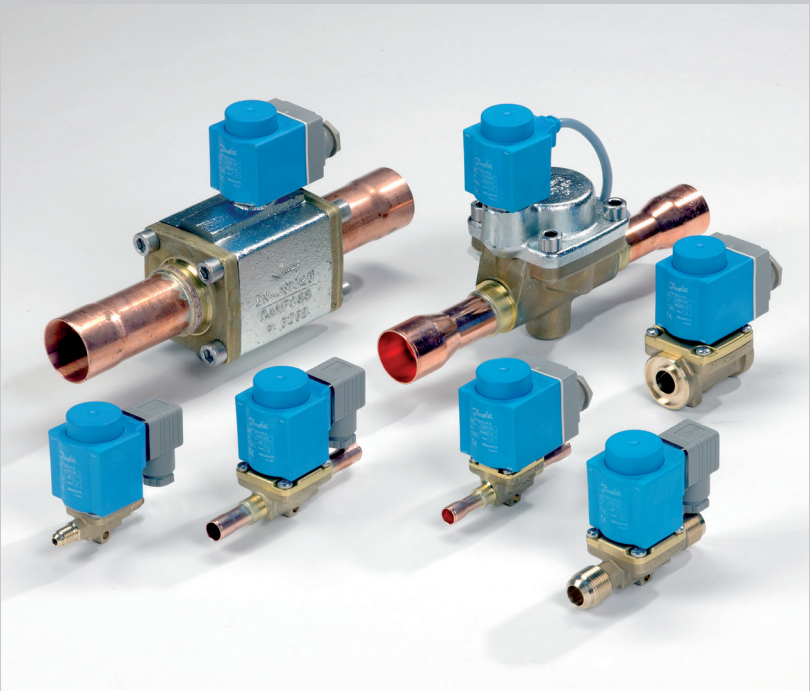
Data sheet

Solenoid valve
Types EVR 2 – EVR 40 NC/NO



EVR is a direct or servo operated solenoid valve for liquid, suction, and hot gas lines with fluorinated refrigerants.

EVR valves are supplied complete or as separate components, i.e. valve body, coil and flanges, if required, can be ordered separately.

Features

- Complete range of solenoid valves for refrigeration, freezing and air conditioning plant
- Supplied in versions normally closed (NC) and normally open (NO) with de-energized coil
- Wide choice of coils for a.c. and d.c.
- Suitable for all fluorinated refrigerants, including flammable refrigerants
- Designed for media temperatures up to 105 °C
- MOPD up to 25 bar with 12 W coil
- Flare connections up to $^{5}/_{8}$ in.
- Solder connections up to 2 $^{1}/_{8}$ in.
- Extended ends on solder versions make the installation easy. It is not necessary to dismantle the valve when soldering in.
- Available in flare, solder and flange conection versions

Approvals

Det norske Veritas, DNV

Pressure Equipment Directive (PED) 97/23/EC

Low Voltage Directive (LVD) 2006/95/EC

Polski Rejestr Statków, Polen

Maritime Register of Shipping, MRS

Versions with UL approval can be supplied to order.

Technical data

Refrigerants
R22/R407C, R134a and R404A/R507.

For other refrigerants, please contact Danfoss.

Temperature of medium
-40 – 105 °C with 10 W or 12 W coil.
Max. 130 °C during defrosting.

Type	Opening differential pressure with standard coil Δp [bar]				Temperature of medium [°C]
	Min.	Max. (= MOPD) liquid [2]			
		10 W a. c.	12 W a. c.	20 W d. c.	
EVR 2	0.00	25	—	18	-40 – 105
EVR 3	0.00	21	25	18	-40 – 105
EVR 6	0.05	21	25	18	-40 – 105
EVR 6 NO	0.05	21	21	21	-40 – 105
EVR 10	0.05	21	25	18	-40 – 105
EVR 10 NO	0.05	21	21	21	-40 – 105
EVR 15	0.05	21	25	18	-40 – 105
EVR 15 NO	0.05	21	21	21	-40 – 105
EVR 20 with a.c. coil	0.05	21	25	13	-40 – 105
EVR 20 with d.c. coil	0.05	—	—	16	-40 – 105
EVR 20 NO	0.05	19	19	19	-40 – 105
EVR 22	0.05	21	25	13	-40 – 105
EVR 22 NO	0.05	19	19	19	-40 – 105
EVR 25 [3]	0.20	21	25	18	-40 – 105
EVR 32 [3]	0.20	21	25	18	-40 – 105
EVR 40 [3]	0.20	21	25	18	-40 – 105

[1] The k_v value is the water flow in [m^3/h] at a pressure drop across valve of 1 bar, ρ = 1000 kg/m^3.

[2] MOPD (Max. Opening Pressure Differential) for media in gas form is approx. 1 bar greater.

[3] Min. diff. pressure 0.07 bar is needed to stay open.

Rated capacity [kW]

	Liquid		
	R22/R407C	R134a	R404A/R507
EVR 2	3.20	2.90	2.20
EVR 3	5.40	5.00	3.80
EVR 6	16.10	14.80	11.20
EVR 10	38.20	35.30	26.70
EVR 15	52.30	48.30	36.50
EVR 20	101.00	92.80	70.30
EVR 22	121.00	111.00	84.30
EVR 25	201.00	186.00	141.00
EVR 32	322.00	297.00	225.00
EVR 40	503.00	464.00	351.00

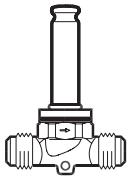
	Suction vapour		
	R22/R407C	R134a	R404A/R507
EVR 2	—	—	—
EVR 3	—	—	—
EVR 6	1.80	1.30	1.60
EVR 10	4.30	3.10	3.90
EVR 15	5.90	4.20	5.30
EVR 20	11.40	8.10	10.20
EVR 22	13.70	9.70	12.20
EVR 25	22.80	16.30	20.40
EVR 32	36.50	26.10	32.60
EVR 40	57.00	40.80	51.00

	Hot gas		
	R22/R407C	R134a	R404A/R507
EVR 2	1.50	1.20	1.20
EVR 3	2.50	2.00	2.00
EVR 6	7.40	5.90	6.00
EVR 10	17.50	13.90	14.30
EVR 15	24.00	19.00	19.60
EVR 20	46.20	36.60	37.70
EVR 22	55.40	43.90	45.20
EVR 25	92.30	73.20	75.30
EVR 32	148.00	117.00	120.00
EVR 40	231.00	183.00	188.00

Rated liquid and suction vapour capacity is based on evaporating temperature t_e = -10 °C, liquid temperature ahead of valve t_l = 25 °C, pressure drop in valve Δp = 0.15 bar.

Rated hot gas capacity is based on condensing temperature t_c = 40 °C, pressure drop across valve Δp = 0.8 bar, hot gas temperature t_h = 65 °C, and subcooling of refrigerant Δtsub = 4 K.

Ordering



EVR flare connections, Normally Closed (NC) - separate valve bodies

Type	Coil type	Connection size [in.]	Connection size [mm]	Manual operation	Max. working pressure [bar]	k_v value [m^3/h]	Code no.
EVR 2	a.c.	1/4	6	No	45.2	0.16	**032F8056**
EVR 3	a.c. / d.c.	1/4	6	No	45.2	0.27	**032F8107**
	a.c. / d.c.	3/8	10	No	45.2	0.27	**032F8116**
EVR 6	a.c. / d.c.	3/8	10	No	45.2	0.80	**032F8072**
	a.c. / d.c.	1/2	12	No	45.2	0.80	**032F8079**
EVR 10	a.c. / d.c.	1/2	12	No	35	1.9	**032F8095**
	a.c. / d.c.	5/8	16	No	35	1.9	**032F8098**
EVR 15	a.c. / d.c.	5/8	16	No	32	2.6	**032F8101**
	a.c. / d.c.	5/8	16	Yes	32	2.6	**032F8100**

EVR flare connections, Normally Open (NO) - separate valve bodies

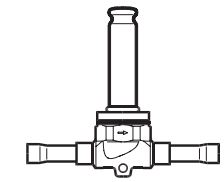
Type	Coil type	Connection size [in.]	Connection size [mm]	Manual operation	Max. working pressure [bar]	k_v value [m^3/h]	Code no.
EVR 6	a.c. / d.c.	3/8	10	No	45.2	0.80	**032F8085**
EVR 10	a.c. / d.c.	1/2	12	No	35	1.9	**032F8090**

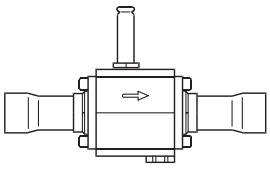
Valve bodies are supplied without flare nuts.
Separate flare nuts:
– 1/4 in. or 6 mm, code no. **011L1101**
– 3/8 in. or 10 mm, code no. **011L1135**
– 1/2 in. or 12 mm, code no. **011L1103**
– 5/8 in. or 16 mm, code no. **011L1167**

See separate data sheet for coils.

The normal range of coils can be used for the NO valves, with the exception of the double frequency versions of 110 V, 50/60 Hz and 220 V, 50/60 Hz.

Ordering
(continued)

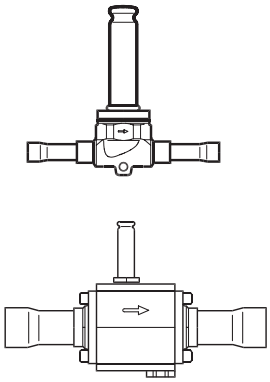




EVR solder connections, Normally Closed (NC) - separate valve bodies

Type	Coil type	Connection size [in.]	Connection size [mm]	Manual operation	Max. working pressure [bar]	k_v value [m^3/h]	Code no.
EVR 2	a.c.	1/4	—	No	45.2	0.16	032F1201
	a.c.	—	6	No	45.2	0.16	032F1202
EVR 3	a.c. / d.c.	1/4	—	No	45.2	0.27	032F1206
	a.c. / d.c.	3/8	—	No	45.2	0.27	032F1204
	a.c. / d.c.	—	6	No	45.2	0.27	032F1207
	a.c. / d.c.	—	10	No	45.2	0.27	032F1208
EVR 6	a.c. / d.c.	1/2	—	No	45.2	0.80	032F1209
	a.c. / d.c.	3/8	—	No	45.2	0.80	032F1212
	a.c. / d.c.	—	10	No	45.2	0.80	032F1213
	a.c. / d.c.	—	12	No	45.2	0.80	032F1236
EVR 10	a.c. / d.c.	1/2	—	No	35	1.9	032F1217
	a.c. / d.c.	—	12	No	35	1.9	032F1218
	a.c. / d.c.	5/8	16	No	35	1.9	032F1214
EVR 15	a.c. / d.c.	7/8	22	No	32	2.6	032F1225
	a.c. / d.c.	—	16	Yes	32	2.6	032F1227
	a.c. / d.c.	5/8	16	No	32	2.6	032F1228
EVR 20	a.c.	7/8	22	No	32	5.0	032F1240
	a.c.	7/8	—	Yes	32	5.0	032F1254
	a.c.	1 1/8	—	No	32	5.0	032F1244
	a.c.	—	28	No	32	5.0	032F1245
	d.c.	7/8	22	No	32	5.0	032F1264
	d.c.	7/8	—	Yes	32	5.0	032F1274
EVR 22	a.c.	1 3/8	35	No	32	6.0	032F3267
EVR 25	a.c. / d.c.	1 1/8	—	Yes	32	10.0	032F2200
	a.c. / d.c.	1 1/8	—	No	32	10.0	032F2201
	a.c. / d.c.	—	28	Yes	32	10.0	032F2205
	a.c. / d.c.	—	28	No	32	10.0	032F2206
	a.c. / d.c.	1 3/8	—	Yes	32	10.0	032F2207
	a.c. / d.c.	1 3/8	—	No	32	10.0	032F2208
EVR 32	a.c. / d.c.	1 5/8	—	Yes	32	16.0	042H1103
	a.c. / d.c.	1 5/8	—	No	32	16.0	042H1104
	a.c. / d.c.	—	35	Yes	32	16.0	042H1105
	a.c. / d.c.	—	35	No	32	16.0	042H1106
	a.c. / d.c.	—	42	Yes	32	16.0	042H1107
	a.c. / d.c.	—	42	No	32	16.0	042H1108
EVR 40	a.c. / d.c.	1 5/8	—	Yes	32	25.0	042H1109
	a.c. / d.c.	1 5/8	—	No	32	25.0	042H1110
	a.c. / d.c.	2 1/8	—	Yes	32	25.0	042H1111
	a.c. / d.c.	2 1/8	—	No	32	25.0	042H1112
	a.c. / d.c.	—	42	Yes	32	25.0	042H1113
	a.c. / d.c.	—	42	No	32	25.0	042H1114

Ordering
(continued)

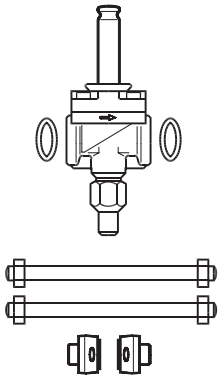


EVR solder connections, Normally Open (NO) - separate valve bodies

Type	Coil type	Connection size [in.]	Connection size [mm]	Manual operation	Max. Working Pressure [bar]	k_v value [m^3/h]	Code no.
EVR 6	a.c. / d.c.	3/8	—	No	45.2	0.80	**032F1290**
	a.c. / d.c.	—	10	No	45.2	0.80	**032F1295**
EVR 10	a.c. / d.c.	1/2	—	No	35	1.9	**032F1291**
	a.c. / d.c.	—	12	No	35	1.9	**032F1296**
EVR 15	a.c. / d.c.	5/8	16	No	32	2.6	**032F1299**
	a.c. / d.c.	7/8	22	No	32	2.6	**032F3270**
EVR 20	a.c. / d.c.	7/8	22	No	32	5.0	**032F1260**
	a.c. / d.c.	1 1/8	—	No	32	5.0	**032F1269**
	a.c. / d.c.	—	28	No	32	5.0	**032F1279**
EVR 22	a.c.	1 3/8	35	No	32	6.0	**032F3268**

The normal range of coils can be used for the NO valves, with the exception of the double frequency versions of 110 V, 50/60 Hz and 220 V, 50/60 Hz.

Ordering
(continued)



Separate valve bodies, normally closed (NC)

Type	Option coil type	Connection	Manual operation	Code no. Valve body + gaskets + bolts; without coil and flanges
EVR 15	a.c. / d.c.	Flanges	yes	032F1234
	a.c. / d.c.	Flanges	no	032F1224
EVR 20	a.c.	Flanges	yes	032F1253
	a.c.	Flanges	no	032F1243
	d.c.	Flanges	yes	032F1273

See separate data sheet for coils.

Flange sets

Type	Connection size		Connection type			Code no.
	[in.]	[mm]	Solder [in.]	Solder [mm]	Weld [in.]	
EVR 15	1/2	—	—	—	yes	027N1115
	5/8	—	yes	—	—	027L1117
	—	16	—	yes	—	027L1116
	3/4	—	—	—	yes	027N1120
	7/8	—	yes	—	—	027L1123
	—	22	—	yes	—	027L1122
EVR 20	3/4	—	—	—	yes	027N1220
	7/8	—	yes	—	—	027L1223
	—	22	—	yes	—	027L1222
	1	—	—	—	yes	027N1225
	11/8	—	yes	—	—	027L1229
	—	28	—	yes	—	027L1228

Example
EVR 15 without manual operation,
code no. **032F1224**

½ in. weld flange set,
code no. **027N1115**

+ coil with terminal box, 220 V, 50 Hz,
code no. **018F6701**

See separate data sheet for coils.

Accessories

Description	Code no.
Strainer FA for direct mounting	See "FA"

Capacity

Type	Liquid capacity Q_e [kW] at pressure drop across valve Δp [bar]				
	0.1	0.2	0.3	0.4	0.5
R22/R407C					
EVR 2	2.6	3.7	4.6	5.3	5.9
EVR 3	4.5	6.3	7.7	8.9	9.9
EVR 6	13.1	18.6	22.8	26.3	29.4
EVR 10	31.4	44.1	54.2	62.5	69.9
EVR 15	42.7	60.3	74.1	85.5	95.7
EVR 20	82.2	116.0	143.0	165.0	184.0
EVR 22	99.0	139.0	171.0	197.0	220.0
EVR 25	165.0	232.0	285.0	329.0	368.0
EVR 32	263.0	372.0	455.0	526.0	588.0
EVR 40	411.0	581.0	712.0	822.0	919.0
R134a					
EVR 2	2.4	3.4	4.2	4.9	5.4
EVR 3	4.1	5.8	7.1	8.2	9.1
EVR 6	12.1	17.2	21.0	24.3	27.1
EVR 10	28.8	40.7	49.9	57.6	64.4
EVR 15	39.4	55.7	68.3	78.8	88.1
EVR 20	75.8	107.0	131.0	152.0	170.0
EVR 22	90.9	129.0	158.0	182.0	203.0
EVR 25	152.0	214.0	263.0	303.0	339.0
EVR 32	243.0	343.0	420.0	485.0	542.0
EVR 40	379.0	536.0	656.0	758.0	847.0

Capacities are based on:
– liquid temperature
t_l = 25 °C ahead of valve,
– evaporating temperature
t_e = -10 °C, superheat 0 K.

Correction factors
When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature t_l ahead of valve/evaporator.

When the corrected capacity is known, the selection can be made from the table.

Correction factors based on liquid temperature t_l

t_l [°C]	-10	0	10	15	20	25	30	35	40	45	50
R22/R407C	0.76	0.82	0.88	0.92	0.96	1.0	1.05	1.10	1.16	1.22	1.30
R134a	0.73	0.79	0.86	0.90	0.95	1.0	1.06	1.12	1.19	1.27	1.37

Capacity
(continued)

Type	Liquid capacity Q_e [kW] at pressure drop across valve Δp [bar]				
	0.1	0.2	0.3	0.4	0.5
					R404A/R507
EVR 2	1.8	2.6	3.2	3.7	4.1
EVR 3	3.1	4.4	5.4	6.2	6.9
EVR 6	9.2	13.0	15.9	18.4	20.5
EVR 10	21.8	30.8	37.8	43.6	48.8
EVR 15	29.8	42.2	51.7	59.6	66.8
EVR 20	57.4	81.1	99.4	115.0	128.0
EVR 22	68.9	97.4	119.0	138.0	169.0
EVR 25	115.0	162.0	199.0	230.0	257.0
EVR 32	184.0	260.0	318.0	367.0	411.0
EVR 40	287.0	406.0	497.0	574.0	642.0

Capacities are based on:
– liquid temperature
t_l = 25 °C ahead of valve,
– evaporating temperature
t_e = -10 °C, superheat 0 K.

Correction factors
When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature t_l ahead of valve/evaporator.

When the corrected capacity is known, the selection can be made from the table.

Correction factors based on liquid temperature t_l

t_l [°C]	-10	0	10	15	20	25	30	35	40	45	50
R404A/R507	0.65	0.72	0.81	0.86	0.93	1.0	1.09	1.20	1.33	1.51	1.74

Capacity
(continued)

Type	Pressure drop Δp [bar]	Suction vapour capacity Q_e [kW] at evaporating temperature t_e [°C]					
		-40	-30	-20	-10	0	10
							R22/R407C
EVR 6	0.10	0.73	0.94	1.2	1.5	1.8	2.1
	0.15	0.87	1.1	1.4	1.8	2.2	2.6
	0.20	0.98	1.3	1.6	2.0	2.5	3.0
EVR 10	0.10	1.7	2.2	2.9	3.5	4.3	5.1
	0.15	2.1	2.7	3.4	4.3	5.2	6.2
	0.20	2.3	3.1	3.9	4.8	6.0	7.1
EVR 15	0.10	2.3	3.1	4.0	4.8	5.8	6.9
	0.15	2.8	3.7	4.7	5.9	7.1	8.5
	0.20	3.2	4.2	5.3	6.6	8.2	9.8
EVR 20	0.10	4.6	5.9	7.6	9.3	11.2	13.3
	0.15	5.4	7.1	9.1	11.4	13.9	16.7
	0.20	6.1	8.1	10.3	12.7	15.9	18.8
EVR 22	0.10	5.5	7.1	9.1	11.2	13.4	16.0
	0.15	6.5	8.5	10.7	13.7	16.4	20.0
	0.20	7.3	9.7	12.3	15.2	19.0	22.6
EVR 25	0.10	9.1	11.8	15.2	18.6	22.4	26.6
	0.15	10.9	14.2	17.9	22.8	27.4	32.6
	0.20	12.2	16.1	20.4	25.3	31.7	37.6
EVR 32	0.10	14.6	18.9	24.3	29.8	35.8	42.6
	0.15	17.4	22.7	28.8	36.5	43.8	52.2
	0.20	19.6	25.7	32.6	40.5	50.7	60.2
EVR 40	0.10	22.8	29.5	38.1	46.5	56.0	66.5
	0.15	27.2	35.4	45.0	57.0	68.6	81.5
	0.20	30.5	40.2	51.0	63.3	79.2	94.0

Capacities are based on liquid temperature t_l = 25 °C ahead of evaporator.

The table values refer to the evaporator capacity and are given as a function of evaporating temperature t_e and pressure drop Δp across valve.

Capacities are based on dry, saturated vapour ahead of valve.

During operation with superheated vapour ahead of valve, the capacities are reduced by 4% for each 10 K superheat.

Correction factors
When sizing valves, the evaporator capacity must be multiplied by a correction factor depending on liquid temperature t_l ahead of expansion valve.

When the corrected capacity is known, the selection can be made from the table.

t_l [°C]	-10	0	10	15	20	25	30	35	40	45	50
R22/R407C	0.76	0.82	0.88	0.92	0.96	1.0	1.05	1.10	1.16	1.22	1.30

Capacity
(continued)

Capacities are based on liquid temperature t_l = 25 °C ahead of evaporator.

The table values refer to the evaporator capacity and are given as a function of evaporating temperature t_e and pressure drop Δp across valve.

Capacities are based on dry, saturated vapour ahead of valve.

During operation with superheated vapour ahead of valve, the capacities are reduced by 4% for each 10 K superheat.

Type	Pressure drop Δp [bar]	Suction vapour capacity Q_e [kW] at evaporating temperature t_e [°C]					
		-40	-30	-20	-10	0	10
							R134a
EVR 6	0.1	0.46	0.73	0.84	1.1	1.4	1.7
	0.15	0.53	0.87	1.0	1.3	1.7	2.0
	0.2	0.58	0.98	1.1	1.5	1.9	2.4
EVR 10	0.1	1.1	1.7	2.0	2.6	3.3	4.0
	0.15	1.3	2.1	2.4	3.1	4.0	4.9
	0.2	1.4	2.3	2.7	3.5	4.5	5.7
EVR 15	0.1	1.5	2.3	2.7	3.6	4.5	5.5
	0.15	1.7	2.8	3.3	4.2	5.5	6.7
	0.2	1.9	3.2	3.7	4.8	6.1	7.8
EVR 20	0.1	2.9	4.6	5.3	7.0	8.6	10.6
	0.15	3.3	5.4	6.3	8.1	10.6	13.0
	0.2	3.7	6.1	7.1	9.3	11.7	15.0
EVR 22	0.1	3.4	5.5	6.3	8.3	10.3	12.7
	0.15	4.0	6.5	7.5	9.7	12.7	15.5
	0.2	4.4	7.3	8.5	11.1	14.0	17.9
EVR 25	0.1	5.8	9.1	10.5	13.9	17.2	21.1
	0.15	6.6	10.9	12.5	16.3	21.1	25.9
	0.2	7.3	12.2	14.1	18.5	23.4	29.9
EVR 32	0.1	9.3	14.6	16.8	22.2	27.7	33.8
	0.15	10.6	17.4	20.0	26.1	33.8	41.4
	0.2	11.7	19.6	22.6	29.6	37.4	47.4
EVR 40	0.1	14.5	22.8	26.3	34.8	43.3	52.8
	0.15	16.5	27.2	31.3	40.8	52.8	64.8
	0.2	18.3	30.5	35.3	46.3	58.5	74.8

Correction factors
When sizing valves, the evaporator capacity must be multiplied by a correction factor depending on liquid temperature t_l ahead of expansion valve.

When the corrected capacity is known, the selection can be made from the table.

Correction factors based on liquid temperature t_l

t_l [°C]	-10	0	10	15	20	25	30	35	40	45	50
R134a	0.73	0.79	0.86	0.90	0.95	1.0	1.06	1.12	1.19	1.27	1.37

Capacity
(continued)

Type	Pressure drop Δp [bar]	Suction vapour capacity Q_e [kW] at evaporating temperature t_e [°C]					
		-40	-30	-20	-10	0	10
							R404A/R507
EVR 6	0.1	0.62	0.8	1.1	1.3	1.6	2.0
	0.15	0.73	0.97	1.3	1.6	2.0	2.4
	0.2	0.82	1.1	1.4	1.8	2.3	2.8
EVR 10	0.1	1.5	1.9	2.5	3.2	3.9	4.7
	0.15	1.7	2.3	3.0	3.9	4.8	5.8
	0.2	2.0	2.6	3.4	4.3	5.5	6.7
EVR 15	0.1	2.0	2.6	3.5	4.3	5.3	6.4
	0.15	2.4	3.2	4.1	5.3	6.5	7.9
	0.2	2.7	3.6	4.7	5.9	7.5	9.1
EVR 20	0.1	3.9	5.0	6.7	8.3	10.2	12.3
	0.15	4.6	6.1	7.9	10.2	12.5	15.2
	0.2	5.2	6.9	9.0	11.4	14.4	17.5
EVR 22	0.1	4.6	6.0	8.0	10.0	12.2	14.8
	0.15	5.5	7.3	9.5	12.2	15.0	18.2
	0.2	6.2	8.3	10.8	13.6	17.3	21.0
EVR 25	0.1	7.7	10.1	13.3	16.6	20.4	24.6
	0.15	9.1	12.1	15.8	20.4	25.0	30.3
	0.2	10.3	13.8	18.0	22.7	28.8	35.0
EVR 32	0.1	12.3	16.2	21.3	26.6	32.6	39.4
	0.15	14.6	19.4	25.3	32.6	40.0	48.5
	0.2	16.5	22.0	28.8	36.3	46.1	56.0
EVR 40	0.1	19.3	25.3	33.3	41.5	51.0	61.5
	0.15	22.8	30.3	39.5	51.0	62.5	75.6
	0.2	25.8	34.5	45.0	56.8	72.1	87.5

Capacities are based on liquid temperature t_l = 25 °C ahead of evaporator.

The table values refer to the evaporator capacity and are given as a function of evaporating temperature t_e and pressure drop Δp across valve.

Capacities are based on dry, saturated vapour ahead of valve.

During operation with superheated vapour ahead of valve, the capacities are reduced by 4% for each 10 K superheat.

Correction factors
When sizing valves, the evaporator capacity must be multiplied by a correction factor depending on liquid temperature t_l ahead of expansion valve.

When the corrected capacity is known, the selection can be made from the table.

Correction factors based on liquid temperature t_l

t_l [°C]	-10	0	10	15	20	25	30	35	40	45	50
R404A/R507	0.65	0.72	0.81	0.86	0.93	1.0	1.09	1.20	1.33	1.51	1.74

Capacity
(continued)

Hot gas defrosting
With hot gas defrosting it is not normally possible to select a valve from condensing temperature t_c and evaporating temperature t_e.

This is because the pressure in the evaporator as a rule quickly rises to a value near that of the condensing pressure. It remains at this value until the defrosting is finished.

In most cases therefore, the valve will be selected from condensing temperature t_c and pressure drop Δp across the valve, as shown in the example for heat recovery.

Heat recovery
The following is given:

- Refrigerant = R22/R407C
- Evaporating temperature t_e = -30 °C
- Condensing temperature t_c = 40 °C
- Hot gas temperature ahead of valve t_h = 85 °C
- Heat recovery condenser yield Q_h = 8 kW

The capacity table for R22/R407C with t_c = 40 °C gives the capacity for an EVR 10 as 8.9 kW, when pressure drop Δp is 0.2 bar.

The correction factor for t_e = -30 °C is given in the table as 0.94.

The correction for hot gas temperature t_h = 85 °C has been calculated as 4% which corresponds to a factor of 1.04.

Q_h must be corrected with factors found:
With Δp = 0.2 bar
is Q_h = 8.9 x 0.94 x 1.04 = 8.7 kW.

With Δp = 0.1 bar, Q_h becomes only 6.3 x 0.94 x 1.04 = 6.2 kW.

An EVR 6 would also be able to give the required capacity, but with Δp at approx. 1 bar.
The EVR 6 is therefore too small.

The EVR is so large that it is doubtful whether the necessary Δp of approx. 0.1 bar could be obtained.
An EVR 15 would therefore be too large.

Result: An EVR 10 is the correct valve for the given conditions.

Capacity
(continued)

Type	Pressure drop across valve Δp [bar]	Hot gas capacity Qh [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. t_h = t_c 25 °C. Subcooling Δt_{sub} =4 K				
		Condensing temperature t_c [°C]				
		20	30	40	50	60
						R22/R407C
EVR 2	0.1	0.47	0.50	0.53	0.54	0.55
	0.2	0.67	0.71	0.75	0.77	0.78
	0.4	0.96	1.02	1.07	1.10	1.11
	0.8	1.32	1.37	1.48	1.57	1.59
	1.6	1.87	1.99	2.08	2.16	2.19
EVR 3	0.1	0.80	0.85	0.89	0.92	0.93
	0.2	1.14	1.20	1.26	1.30	1.32
	0.4	1.63	1.72	1.80	1.85	1.87
	0.8	2.23	2.31	2.49	2.65	2.68
	1.6	3.15	3.35	3.52	3.64	3.69
EVR 6	0.1	2.4	2.5	2.6	2.7	2.8
	0.2	3.4	3.6	3.7	3.4	3.9
	0.4	4.8	5.1	5.3	5.5	5.6
	0.8	6.6	6.8	7.4	7.9	7.9
	1.6	9.3	9.9	10.4	10.8	10.9
EVR 10	0.1	5.6	6.0	6.3	6.5	6.5
	0.2	8.0	8.5	8.9	9.2	9.3
	0.4	11.4	12.1	12.7	13.0	13.2
	0.8	15.7	16.2	17.5	18.7	18.9
	1.6	22.2	23.6	24.8	25.6	26.0
EVR 15	0.1	7.7	8.2	8.6	8.8	8.9
	0.2	11.0	11.6	12.1	12.5	12.7
	0.4	15.7	16.6	17.3	17.8	18.0
	0.8	21.5	22.2	24.0	25.5	25.9
	1.6	30.3	32.3	33.9	35.0	35.5

An increase in hot gas temperature t_h of 10 K, based on t_h = t_c 25 °C, reduces valve capacity approx. 2% and vice versa.

A change in evaporating temperature t_e changes valve capacity; see correction factor table below.

Correction factors
When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t_e.

Correction factors for evaporating temperature t_e

t_e [°C]	-40	-30	-20	-10	0	10
R22/R407C	0.90	0.94	0.97	1.0	1.03	1.05

Capacity
(continued)

R22/R407C *(continued)*

Type	Pressure drop across valve Δp [bar]	Hot gas capacity Qh [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. t_h = t_c 25 °C. Subcooling Δt_{sub} = 4 K Condensing temperature t_c [°C]				
		20	30	40	50	60
EVR 20	0.1	14.8	15.7	16.5	17.0	17.2
	0.2	21.1	22.3	23.4	24.1	24.4
	0.4	30.0	31.9	33.3	34.3	34.7
	0.8	41.3	42.7	46.2	49.1	49.6
	1.6	58.3	62.1	65.2	67.4	68.4
EVR 22	0.1	17.8	18.8	19.7	20.4	20.6
	0.2	25.3	26.8	28.0	28.9	29.3
	0.4	36.1	38.3	40.0	41.2	41.6
	0.8	49.5	51.2	55.4	58.9	59.5
	1.6	70.0	74.5	78.2	80.8	82.0
EVR 25	0.1	29.6	31.4	32.9	34.0	34.4
	0.2	42.1	44.6	46.7	48.2	48.8
	0.4	60.2	63.8	66.6	68.6	69.4
	0.8	82.5	87.9	92.3	98.2	99.2
	1.6	117.0	124.0	130.0	135.0	137.0
EVR 32	0.1	47.4	50.2	52.6	54.4	55.0
	0.2	67.4	71.4	74.7	77.1	78.1
	0.4	96.3	102.0	107.0	110.0	111.0
	0.8	132.0	140.0	148.0	157.0	159.0
	1.6	187.0	199.0	209.0	216.0	219.0
EVR 40	0.1	74.0	78.5	82.3	85.0	86.0
	0.2	105.0	112.0	117.0	121.0	122.0
	0.4	151.0	159.0	167.0	172.0	174.0
	0.8	206.0	222.0	231.0	246.0	248.0
	1.6	291.0	310.0	326.0	337.0	342.0

An increase in hot gas temperature t_h of 10 K, based on t_h = t_c 25 °C, reduces valve capacity approx. 2% and vice versa.

A change in evaporating temperature t_e changes valve capacity; see correction factor table below.

Correction factors
When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t_e.

Correction factors for evaporating temperature t_e

t_e [°C]	-40	-30	-20	-10	0	10
R22/R407C	0.90	0.94	0.97	1.0	1.03	1.05

Capacity
(continued)

Type	Pressure drop across valve Δp [bar]	Hot gas capacity Qh [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. t_h = t_c 25 °C. Subcooling Δt_{sub} =4 K				
		Condensing temperature t_c [°C]				
		20	30	40	50	60
						R134a
EVR 2	0.1	0.38	0.40	0.41	0.42	0.42
	0.2	0.54	0.57	0.59	0.60	0.59
	0.4	0.74	0.82	0.84	0.86	0.85
	0.8	1.06	1.13	1.17	1.23	1.22
	1.6	1.50	1.61	1.67	1.70	1.69
EVR 3	0.1	0.64	0.67	0.70	0.71	0.71
	0.2	0.91	0.96	0.99	1.01	1.00
	0.4	1.26	1.38	1.42	1.44	1.43
	0.8	1.79	1.90	1.98	2.08	2.05
	1.6	2.57	2.72	2.82	2.88	2.8t6
EVR 6	0.1	1.88	1.99	2.07	2.11	2.09
	0.2	2.69	2.84	2.95	3.00	2.97
	0.4	3.73	4.08	4.22	4.28	4.23
	0.8	5.29	5.62	5.86	6.16	6.08
	1.6	7.61	8.05	8.37	8.52	8.46
EVR 10	0.1	4.5	4.7	4.9	5.0	5.0
	0.2	6.4	6.8	7.0	7.1	7.1
	0.4	8.9	9.7	10.0	10.2	10.1
	0.8	12.6	13.3	13.9	14.6	14.4
	1.6	18.1	19.1	19.9	20.2	20.1
EVR 15	0.1	6.1	6.5	6.7	6.7	6.8
	0.2	8.7	9.2	9.6	9.7	9.7
	0.4	12.1	13.3	13.7	13.9	13.8
	0.8	17.2	18.3	19.0	20.0	19.8
	1.6	24.8	26.2	27.2	27.7	27.5

An increase in hot gas temperature t_h of 10 K, based on t_h = t_c 25 °C, reduces valve capacity approx. 2% and vice versa.

A change in evaporating temperature t_e changes valve capacity; see correction factor table below.

Correction factors
When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t_e.

Correction factors for evaporating temperature t_e

t_e [°C]	-40	-30	-20	-10	0	10
R134a	0.88	0.92	0.98	1.0	1.04	1.08

Capacity
(continued)

R134a *(continued)*

Type	Pressure drop across valve Δp [bar]	Hot gas capacity Qh [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. t_h = t_c 25 °C. Subcooling Δt_{sub} = 4 K Condensing temperature t_c [°C]				
		20	30	40	50	60
EVR 20	0.1	11.8	12.5	13.0	13.2	13,1
	0.2	16.8	17.8	18.4	18.7	18,6
	0.4	23.4	25.5	26.4	26.7	26,5
	0.8	33.1	35.1	36.6	38.5	38,0
	1.6	47.6	50.3	52.3	53.3	52,9
EVR 22	0.1	14.1	15.0	15.5	15.8	15,7
	0.2	20.2	21.3	22.1	22.6	22,3
	0.4	28.0	30.6	31.6	32.1	31,7
	0.8	39.7	42.2	43.9	46.2	45,6
	1.6	57.1	60.4	62.8	63.9	63,5
EVR 25	0.1	23.6	24.9	25.9	26.4	26,2
	0.2	33.6	35.5	36.8	37.4	37,1
	0.4	46.6	51.0	52.7	53.4	52,9
	0.8	66.2	70.2	73.2	77.0	76,0
	1.6	95.2	101.0	105.0	107.0	106,0
EVR 32	0.1	37.6	39.8	41.4	42.1	41,8
	0.2	53.8	56.8	58.9	59.8	59,4
	0.4	74.7	81.6	84.3	85.4	84,6
	0.8	106.0	112.0	117.0	123.0	122,0
	1.6	152.0	161.0	167.0	170.0	169,0
EVR 40	0.1	58.8	62.3	64.7	65.8	65,3
	0.2	84.1	88.8	92.1	93.5	92,8
	0.4	117.0	127.0	132.0	134.0	132,0
	0.8	166.0	176.0	183.0	192.0	190,0
	1.6	238.0	252.0	262.0	266.0	265,0

An increase in hot gas temperature t_h of 10 K, based on t_h = t_c 25 °C, reduces valve capacity approx. 2% and vice versa.

A change in evaporating temperature t_e changes valve capacity; see correction factor table below.

Correction factors
When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t_e.

Correction factors for evaporating temperature t_e

t_e [°C]	-40	-30	-20	-10	0	10
R134A	0.88	0.92	0.98	1.0	1.04	1.08

Capacity
(continued)

Type	Pressure drop across valve Δp bar	Hot gas capacity Qh [kW] Evaporating temp. t_e=-10 °C. Hot gas temp. t_h=t_c 25 °C. Subcooling Δt_{sub} =4 K				
		Condensing temperature t_c [°C]				
		20	30	40	50	60
						R404A/R507
EVR2	0.1	0.43	0.44	0.43	0.40	0.37
	0.2	0.61	0.62	0.61	0.58	0.53
	0.4	0.87	0.87	0.87	0.82	0.75
	0.8	1.19	1.21	1.21	1.19	1.07
	1.6	1.68	1.70	1.69	1.62	1.48
EVR3	0.1	0.73	0.74	0.73	0.69	0.63
	0.2	1.03	1.04	1.03	0.98	0.89
	0.4	1.46	1.48	1.47	1.39	1.27
	0.8	2.01	2.04	2.03	2.00	1.81
	1.6	2.83	2.87	2.84	2.74	2.50
EVR6	0.1	2.16	2.18	2.15	2.05	1.86
	0.2	3.03	3.08	3.05	2.90	2.64
	0.4	4.34	4.38	4.35	4.13	3.76
	0.8	5.94	6.05	6.02	5.92	5.37
	1.6	8.37	8.52	8.43	8.10	7.40
EVR10	0.1	5.1	5.2	5.1	4.9	4.4
	0.2	7.2	7.3	7.3	6.9	6.3
	0.4	10.3	10.4	10.3	9.8	8.9
	0.8	14.1	14.4	14.3	14.1	12.8
	1.6	19.9	20.3	20.0	19.2	17.6
EVR15	0.1	7.0	7.1	7.0	6.7	6.1
	0.2	9.9	10.0	9.9	9.4	8.6
	0.4	14.1	14.3	14.2	13.4	12.2
	0.8	19.3	19.7	19.6	19.2	17.5
	1.6	27.2	27.7	27.6	26.3	24.1

An increase in hot gas temperature t_h of 10 K, based on t_h = t_c 25 °C, reduces valve capacity approx. 2% and vice versa.

A change in evaporating temperature t_e changes valve capacity; see correction factor table below.

Correction factors
When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t_e.

Correction factors for evaporating temperature t_e

t_e [°C]	-40	-30	-20	-10	0	10
R404A/R507	0.86	0.88	0.93	1.0	1.03	1.07

Capacity
(continued)

R404A/R507 *(continued)*

Type	Pressure drop across valve Δp bar	Hot gas capacity Qh [kW] Evaporating temp. t_e=-10 °C. Hot gas temp. t_h=t_c 25 °C. Subcooling Δt_{sub} =4 K Condensing temperature t_c [°C]				
		20	30	40	50	60
EVR20	0.1	13.4	13.7	13.5	12.8	11.6
	0.2	18.9	19.2	19.1	18.2	16.5
	0.4	27.1	27.4	27.2	25.8	23.5
	0.8	37.1	37.8	37.7	37.0	33.6
	1.6	52.4	53.3	52.6	50.6	46.2
EVR22	0.1	16.1	16.4	16.1	15.4	14.0
	0.2	22.7	23.1	22.9	21.8	19.8
	0.4	32.5	32.9	32.7	31.0	28.2
	0.8	44.5	45.4	45.2	44.4	40.3
	1.6	62.8	64.0	63.2	60.8	55.5
EVR25	0.1	26.8	27.4	26.9	25.6	23.3
	0.2	37.9	38.4	38.2	36.3	33.0
	0.4	54.2	54.9	54.5	51.7	47.0
	0.8	74.2	75.6	75.3	74.0	67.2
	1.6	105.0	107.0	105.0	101.0	92.5
EVR32	0.1	43.0	43.8	43.0	40.9	37.3
	0.2	60.6	61.4	61.1	58.1	52.8
	0.4	86.7	87.8	87.2	82.7	75.2
	0.8	119.0	121.0	120.0	118.0	107.0
	1.6	167.0	171.0	168.0	162.0	148.0
EVR40	0.1	67.0	68.5	67.3	64.0	58.3
	0.2	94.8	96.0	95.5	90.8	82.5
	0.4	136.0	137.0	136.0	129.0	117.0
	0.8	186.0	189.0	188.0	185.0	168.0
	1.6	262.0	266.0	263.0	253.0	231.0

An increase in hot gas temperature t_h of 10 K, based on t_h = t_c 25 °C, reduces valve capacity approx. 2% and vice versa.

A change in evaporating temperature t_e changes valve capacity; see correction factor table below.

Correction factors
When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t_e.

Correction factors for evaporating temperature t_e

t_e [°C]	-40	-30	-20	-10	0	10
R404A/R507	0.86	0.88	0.93	1.0	1.03	1.07

Capacity
(continued)

Type	Hot gas temperature t_h [°C]	Condensing temperature t_c [°C]	Hot gas capacity G_h [kg/s] at pressure drop across valve Δp [bar]								
			0.5	1	2	3	4	5	6	7	8
R22/R407C											
EVR 2	90	25	0.005	0.007	0.01	0.011	0.012	0.012	0.012	0.012	0.012
	90	35	0.006	0.009	0.011	0.013	0.014	0.015	0.015	0.015	0.015
	90	45	0.007	0.01	0.013	0.016	0.017	0.018	0.019	0.019	0.02
EVR 3	90	25	0.009	0.012	0.016	0.019	0.02	0.02	0.02	0.02	0.02
	90	35	0.01	0.014	0.019	0.022	0.024	0.025	0.026	0.026	0.026
	90	45	0.012	0.016	0.022	0.026	0.029	0.031	0.032	0.033	0.033
EVR 6	90	25	0.027	0.037	0.049	0.055	0.058	0.059	0.059	0.059	0.059
	90	35	0.031	0.043	0.057	0.067	0.072	0.075	0.077	0.077	0.077
	90	45	0.035	0.049	0.066	0.078	0.086	0.092	0.095	0.097	0.098
EVR 10	90	25	0.064	0.088	0.116	0.131	0.139	0.14	0.14	0.14	0.14
	90	35	0.074	0.102	0.137	0.158	0.172	0.179	0.182	0.182	0.182
	90	45	0.084	0.116	0.158	0.185	0.205	0.218	0.227	0.231	0.232
EVR 15	90	25	0.084	0.116	0.153	0.173	0.182	0.184	0.184	0.184	0.184
	90	35	0.097	0.134	0.18	0.208	0.226	0.236	0.239	0.239	0.239
	90	45	0.11	0.153	0.208	0.244	0.269	0.287	0.298	0.304	0.305
EVR 20	90	25	0.169	0.231	0.305	0.346	0.365	0.368	0.368	0.368	0.368
	90	35	0.194	0.267	0.359	0.416	0.452	0.472	0.478	0.478	0.478
	90	45	0.22	0.305	0.415	0.488	0.539	0.574	0.597	0.608	0.611
EVR 22	90	25	0.203	0.277	0.366	0.415	0.438	0.442	0.442	0.442	0.442
	90	35	0.279	0.32	0.431	0.499	0.542	0.566	0.574	0.574	0.574
	90	45	0.264	0.366	0.498	0.586	0.647	0.689	0.716	0.722	0.733
EVR 25	90	25	0.331	0.453	0.599	0.677	0.715	0.722	0.722	0.722	0.722
	90	35	0.38	0.524	0.704	0.816	0.886	0.925	0.938	0.938	0.938
	90	45	0.431	0.598	0.814	0.956	1.056	1.125	1.169	1.192	1.197
EVR 32	90	25	0.539	0.739	0.976	1.106	1.168	1.179	—	—	—
	90	35	0.619	0.856	1.15	1.331	1.446	1.509	1.531	—	—
	90	45	0.704	0.978	1.329	1.562	1.723	1.837	1.909	1.947	1.955
EVR 40	90	25	0.843	1.155	1.525	1.728	1.825	1.843	—	—	—
	90	35	0.968	1.338	1.798	2.08	2.26	2.358	2.393	—	—
	90	45	1.1	1.528	2.078	2.44	2.693	2.87	2.983	3.043	3.055

An increase in hot gas temperature t_h of 10 K reduces valve capacity approx. 2% and vice versa.

Capacity
(continued)

R134a

Type	Hot gas temperature t_h [°C]	Condensing temperature t_c [°C]	Hot gas capacity G_h [kg/s] at pressure drop across valve Δp [bar]								
			0.5	1	2	3	4	5	6	7	8
EVR 2	60	25	0.005	0.007	0.008	0.008	0.008	—	—	—	—
	60	35	0.006	0.008	0.01	0.011	0.012	0.012	0.012	—	—
	60	45	0.007	0.009	0.012	0.014	0.015	0.015	0.015	0.015	0.015
EVR 3	60	25	0.008	0.011	0.011	0.014	0.014	—	—	—	—
	60	35	0.009	0.013	0.016	0.018	0.018	0.018	0.018	—	—
	60	45	0.01	0.016	0.02	0.023	0.025	0.025	0.025	0.025	0.025
EVR 6	60	25	0.024	0.032	0.04	0.041	0.041	—	—	—	—
	60	35	0.028	0.038	0.049	0.055	0.056	0.056	0.056	—	—
	60	45	0.032	0.045	0.059	0.068	0.072	0.073	0.073	0.073	0.073
EVR 10	60	25	0.057	0.075	0.094	0.098	0.098	—	—	—	—
	60	35	0.066	0.09	0.117	0.13	0.132	0.132	0.132	—	—
	60	45	0.076	0.107	0.141	0.161	0.17	0.172	0.172	0.172	0.172
EVR 15	60	25	0.074	0.1	0.124	0.129	0.129	—	—	—	—
	60	35	0.087	0.119	0.154	0.171	0.167	0.167	0.167	—	—
	60	45	0.1	0.14	0.185	0.212	0.223	0.225	0.225	0.225	0.225
EVR 20	60	25	0.149	0.199	0.247	0.258	0.258	—	—	—	—
	60	35	0.174	0.238	0.307	0.341	0.347	0.347	0.347	—	—
	60	45	0.2	0.28	0.37	0.423	0.447	0.452	0.452	0.452	0.452
EVR 22	60	25	0.179	0.239	0.296	0.31	0.31	—	—	—	—
	60	35	0.209	0.286	0.368	0.409	0.416	0.416	0.416	—	—
	60	45	0.24	0.336	0.444	0.508	0.536	0.542	0.542	0.542	0.542
EVR 25	60	25	0.292	0.391	0.486	0.506	0.506	—	—	—	—
	60	35	0.341	0.467	0.602	0.668	0.679	0.679	0.679	—	—
	60	45	0.393	0.549	0.725	0.83	0.876	0.885	0.885	0.885	0.885
EVR 32	60	25	0.478	0.638	0.793	0.826	0.826	—	—	—	—
	60	35	0.556	0.763	0.994	1.091	1.108	1.108	1.108	—	—
	60	45	0.641	0.897	1.197	1.354	1.432	1.446	1.446	1.446	1.446
EVR 40	60	25	0.747	0.998	1.24	1.291	1.291	—	—	—	—
	60	35	0.87	1.192	1.553	1.704	1.731	1.731	1.731	—	—
	60	45	1.002	1.402	1.87	2.117	2.237	2.259	2.259	2.259	—

An increase in hot gas temperature t_h of 10 K reduces valve capacity approx. 2% and vice versa.

Capacity
(continued)

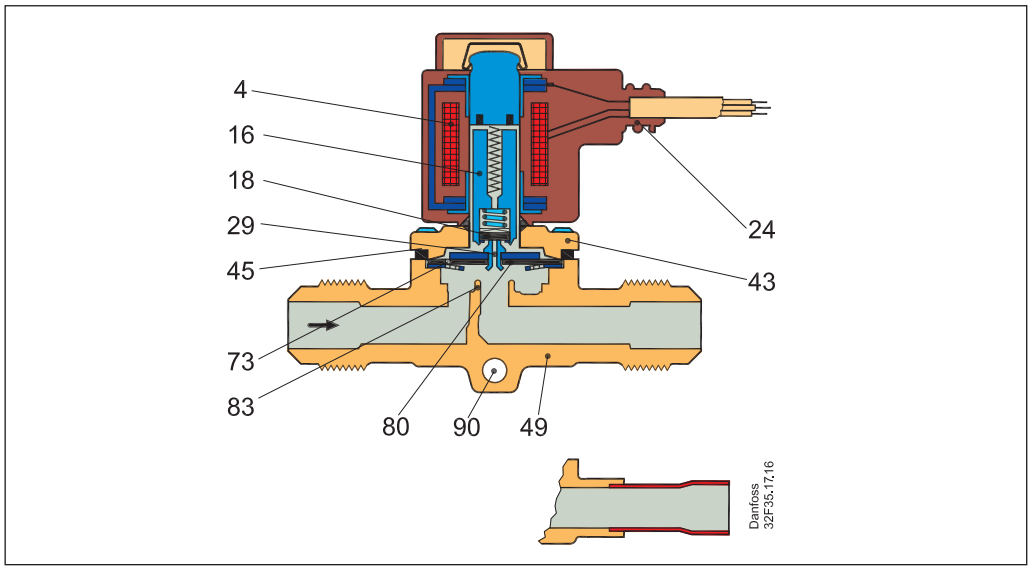
R404A/R507

Type	Hot gas temperature t_h [°C]	Condensing temperature t_c [°C]	Hot gas capacity G_h [kg/s] at pressure drop across valve Δp [bar]								
			0.5	1	2	3	4	5	6	7	8
EVR 2	60	25	0.007	0.009	0.012	0.014	0.016	0.016	0.016	0.016	0.016
	60	35	0.008	0.011	0.014	0.017	0.019	0.02	0.02	0.02	0.02
	60	45	0.009	0.012	0.016	0.019	0.021	0.024	0.025	0.025	0.025
EVR 3	60	25	0.011	0.016	0.021	0.024	0.026	0.026	0.027	0.027	0.027
	60	35	0.013	0.018	0.024	0.029	0.031	0.033	0.035	0.035	0.035
	60	45	0.015	0.02	0.028	0.032	0.037	0.039	0.041	0.043	0.043
EVR 6	60	25	0.034	0.047	0.062	0.072	0.077	0.079	0.08	0.08	0.08
	60	35	0.038	0.054	0.072	0.085	0.093	0.098	0.101	0.101	0.102
	60	45	0.043	0.061	0.082	0.097	0.108	0.116	0.122	0.126	0.128
EVR 10	60	25	0.08	0.11	0.148	0.17	0.183	0.188	0.19	0.19	0.19
	60	35	0.091	0.127	0.171	0.2	0.22	0.233	0.241	0.241	0.243
	60	45	0.102	0.143	0.194	0.23	0.257	0.277	0.288	0.3	0.303
EVR 15	60	25	0.105	0.146	0.195	0.224	0.24	0.247	0.249	0.249	0.249
	60	35	0.12	0.167	0.224	0.253	0.289	0.307	0.316	0.317	0.32
	60	45	0.135	0.189	0.225	0.303	0.339	0.365	0.38	0.393	0.399
EVR 20	60	25	0.21	0.29	0.39	0.448	0.48	0.495	0.5	0.5	0.5
	60	35	0.239	0.333	0.45	0.526	0.58	0.614	0.632	0.633	0.639
	60	45	0.27	0.375	0.51	0.606	0.677	0.729	0.76	0.785	0.799
EVR 22	60	25	0.252	0.348	0.468	0.538	0.576	0.594	0.6	0.6	0.6
	60	35	0.287	0.4	0.54	0.631	0.696	0.737	0.758	0.76	0.767
	60	45	0.324	0.45	0.612	0.727	0.812	0.875	0.912	0.942	0.959
EVR 25	60	25	0.411	0.57	0.763	0.878	0.942	0.969	0.978	0.978	0.978
	60	35	0.468	0.653	0.881	1.032	1.136	1.203	1.239	1.241	1.253
	60	45	0.529	0.734	1.0	1.188	1.326	1.43	1.49	1.539	1.566
EVR 32	60	25	0.672	0.931	1.245	1.432	1.539	1.581	1.581	1.581	1.581
	60	35	0.765	1.069	1.436	1.686	1.854	1.964	2.022	2.025	2.025
	60	45	0.862	1.198	1.632	1.939	2.16	2.34	2.433	2.513	2.557
EVR 40	60	25	1.05	1.454	1.946	2.238	2.406	2.471	2.471	2.471	2.471
	60	35	1.195	1.657	2.245	2.635	2.897	3.068	3.161	3.166	3.166
	60	45	1.348	1.873	2.55	3.03	3.384	3.65	3.801	3.926	3.995

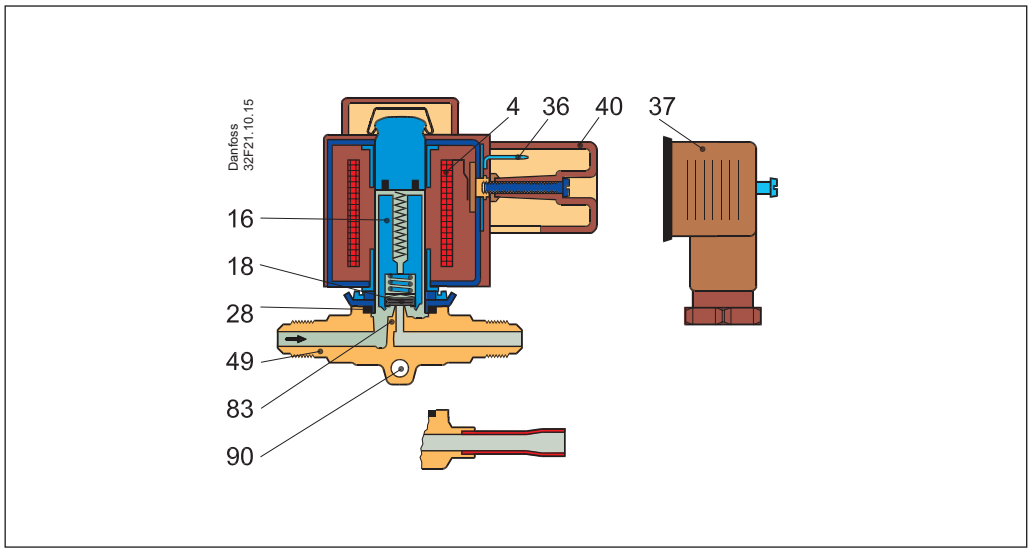
An increase in hot gas temperature t_h of 10 K reduces valve capacity approx. 2% and vice versa.

Design

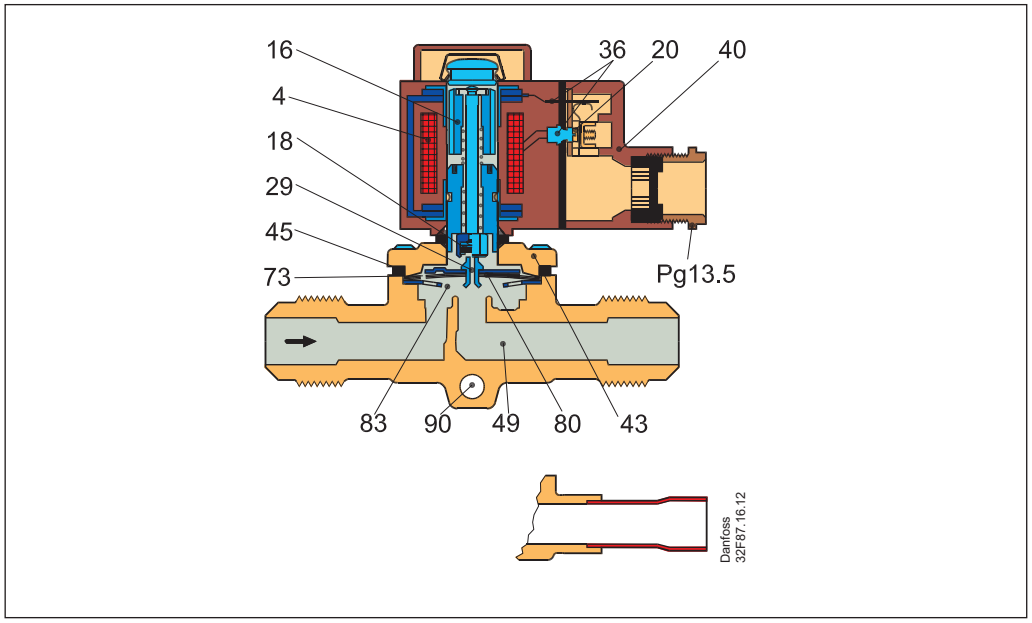
EVR 10 (NC)



EVR 2 (NC)



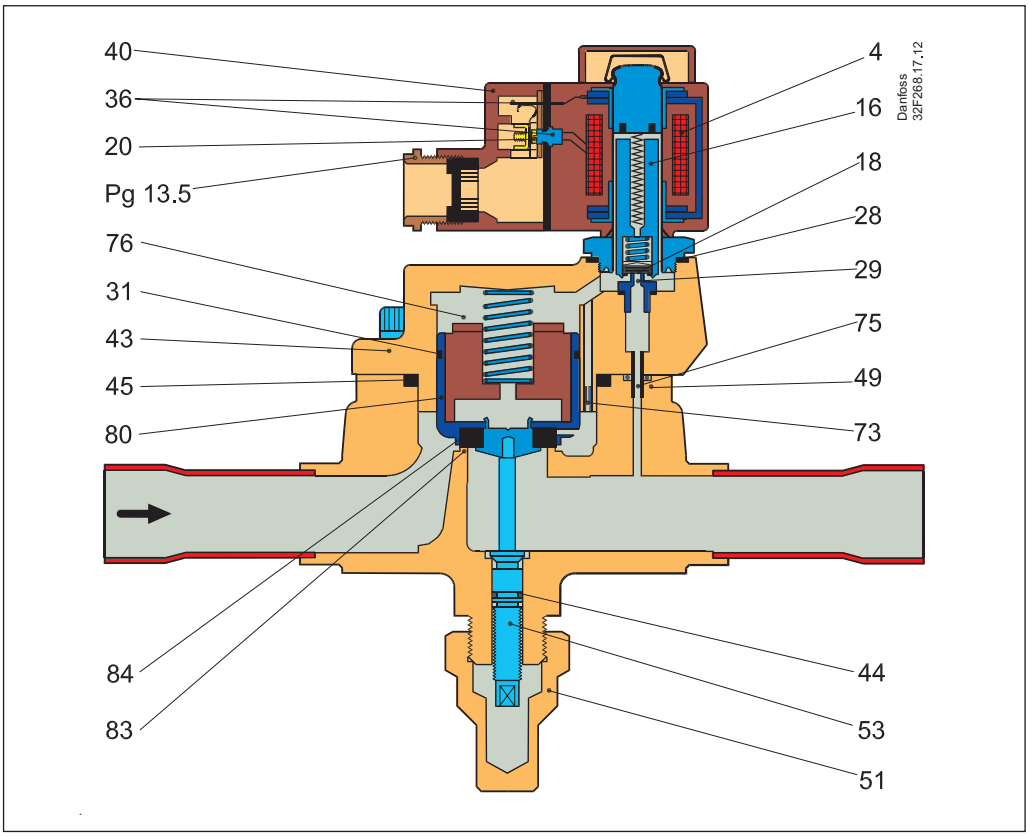
EVR 10 (NO)



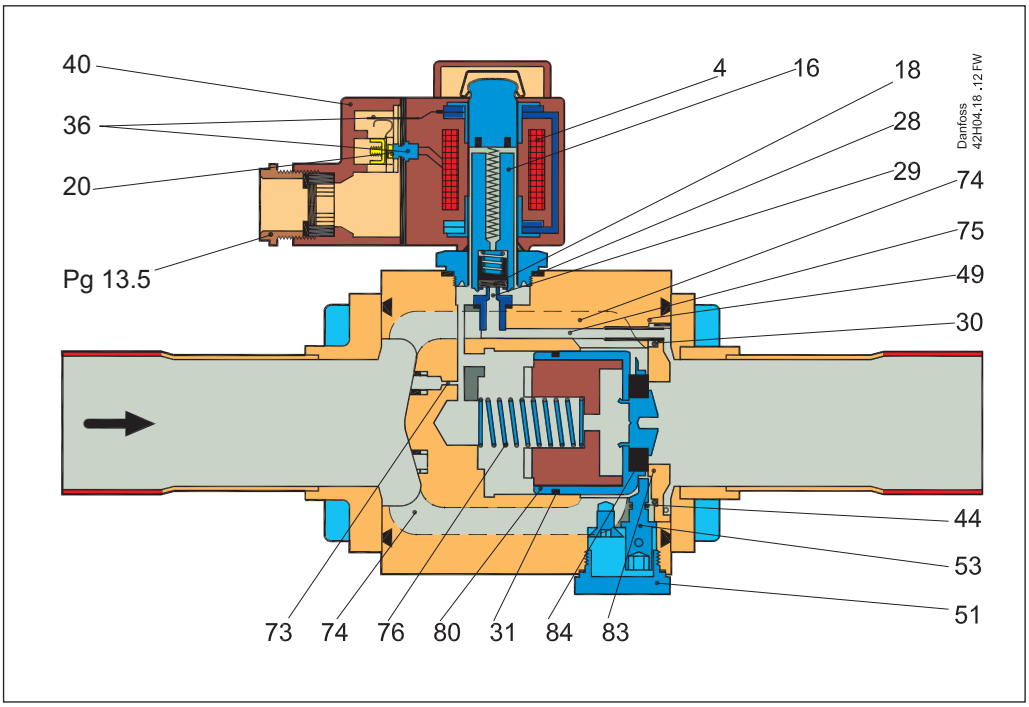
4. Coil
16. Armature
18. Valve plate/ Pilot valve plate
20. Earth terminal
24. Connection for flexible steel hose
28. Gasket
29. Pilot orifice
30. O-ring
36. DIN plug
37. DIN socket (to DIN 43650)
40. Protective cap/ Terminal box
43. Valve cover
44. O-ring
45. Valve cover gasket
49. Valve body
73. Equalization hole
80. Diaphragm/Servo piston
83. Valve seat
90. Mounting hole

Design
(continued)

EVR 25 (NC)



EVR 32 and EVR 40 (NC)



4. Coil
16. Armature
18. Valve plate / Pilot valve plate
20. Earth terminal
28. Gasket
29. Pilot orifice
30. O-ring
31. Piston ring
36. DIN plug
37. DIN socket (to DIN 43650)
40. Protective cap / Terminal box
43. Valve cover
44. O-ring
45. Valve cover gasket
49. Valve body
51. Threaded plug
53. Manual operation spindle
73. Equalization hole
74. Main channel
75. Pilot channel
76. Compression spring
80. Diaphragm / Servo piston
83. Valve seat
84. Main valve plate

Function

EVR solenoid valves are designed on two different principles:

1. Direct operation
2. Servo operation

1. Direct operation
EVR 2 – 3 are direct operated. The valves open directly for full flow when the armature (16) moves up into the magnetic field of the coil.

This means that the valves operate with a min. differential pressure of 0 bar.

The valve plate (18) is fitted directly on the armature (16).

Inlet pressure acts from above on the armature and the valve plate. Thus, inlet pressure and spring force act to close the valve when the coil is currentless.

2. Servo operation
EVR 6 – 22 are servo operated with a "floating" diaphragm (80). The pilot orifice (29) of stainless steel is placed in the centre of the diaphragm. The pilot valve plate (18) is fitted directly to the armature (16). When the coil is currentless, the main orifice and pilot orifice are closed. The pilot orifice and main orifice are held closed by the armature spring force and the differential pressure between inlet and outlet sides.

When current is applied to the coil the armature is drawn up into the magnetic field and opens the pilot orifice. This relieves the pressure above the diaphragm, i.e. the space above the diaphragm becomes connected to the outlet side of the valve.

The differential pressure between inlet and outlet sides then presses the diaphragm away from the main orifice and opens it for full flow. Therefore a certain minimum differential pressure is necessary to open the valve and keep it open. For EVR 6 – 22 valves this differential pressure is 0.05 bar.

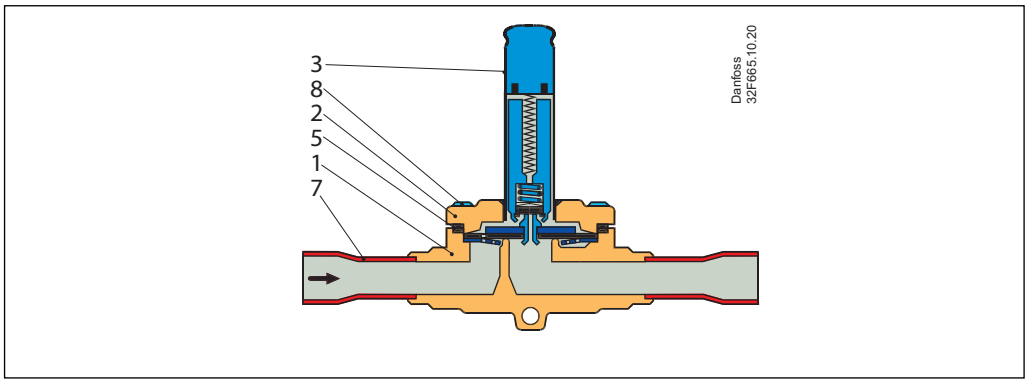
When current is switched off, the pilot orifice closes. Via the equalization holes (73) in the diaphragm, the pressure above the diaphragm then rises to the same value as the inlet pressure and the diaphragm closes the main orifice.

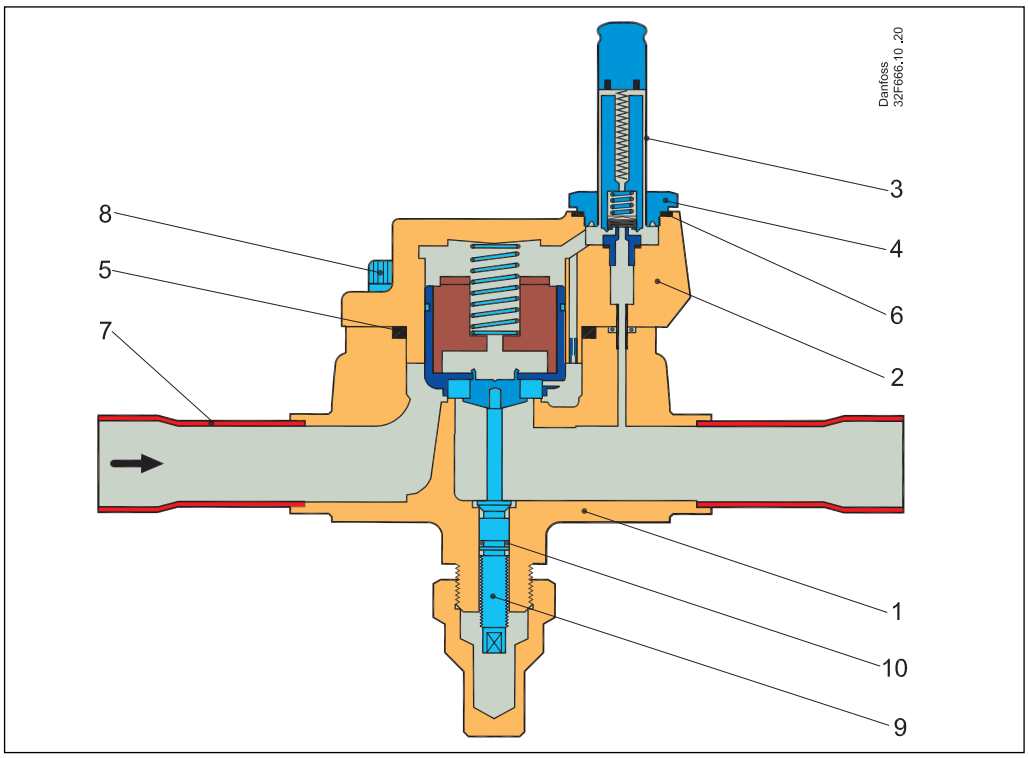
EVR 25, EVR 32 and EVR 40 are servo operated piston valves. The valves are closed with currentless coil. The servo piston (80) with main valve plate (84) closes against the valve seat (83) by means of the differential pressure between inlet and outlet side of the valve and the force of the compression spring (76). When current to the coil is switched on, the pilot orifice (29) opens. This relieves the pressure on the piston spring side of the valve. The differential pressure will then open the valve. The minimum differential pressure needed for full opening of the valves is 0.2 bar. EVR (NO) has the opposite function to EVR (NC), i.e. it is open with de-energised coil.

EVR (NO) is available with servo operation only.

Material specifications

EVR 2 – 25

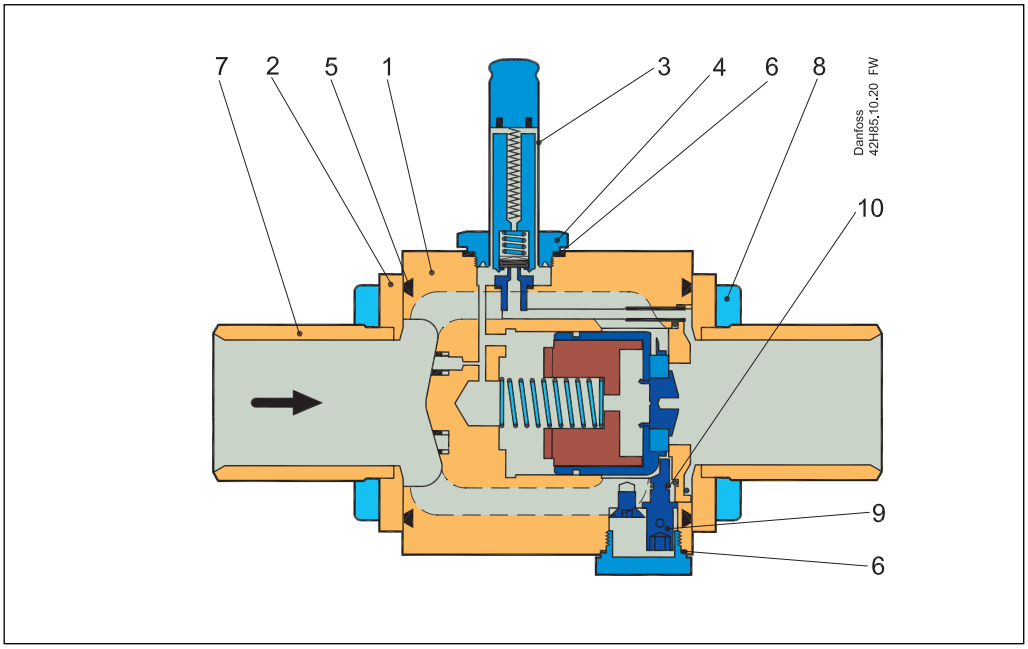




No.	Description	Solenoid valves type	Material	Analysis	Mat.no.	W.no.	Standard	
							DIN	EN
1	**Valve body**	**EVR 2 – 25**	Brass	CuZn40Pb2	CW617N	2.0402	17672-1	12165
2	**Cover**	**EVR 2 – 6**	Stainless steel	X5 CrNi18-10	—	1.4301	—	10088
		EVR 10 – 22	Brass	CuZn40Pb2	CW617N	2.0402	17672-1	12165
		EVR 25	Cast iron	EN-GJS-400-18-LT	EN-JS1025	—	—	1563
3	**Armature tube**	**EVR 2 – 25**	Stainless steel	X2 CrNi19-11	—	1.4306	—	10088
4	**Armature tube nut**	**EVR 25**	Stainless steel	X8 CrNiS 18-9	—	1.4305	—	10088
5	**Gasket**	**EVR 2 – 25**	Rubber	Cr	—	—	—	—
6	**Gasket**	**EVR 25**	Al. gasket	Al 99.5	—	3.0255	—	10210
7	**Solder tube**	**EVR 25**	Copper	SF-Cu	CW024A	2.0090	1787	12449
8	**Screws**	**EVR 2 – 25**	Stainless steel	A2-70	—	—	3506	—
9	**Spindle for man. operat.**	**EVR 25**	Stainless steel	X8 CrNiS 18-9	—	1.4305	—	10088
10	**Gasket**	**EVR 25**	Rubber	Cr	—	—	—	—

Material specifications
(continued)

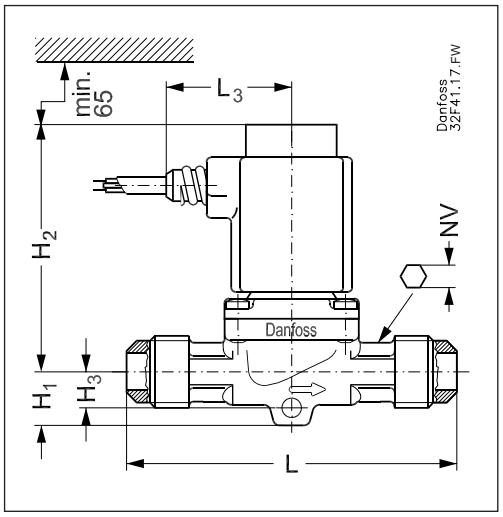
EVR 32 – 40



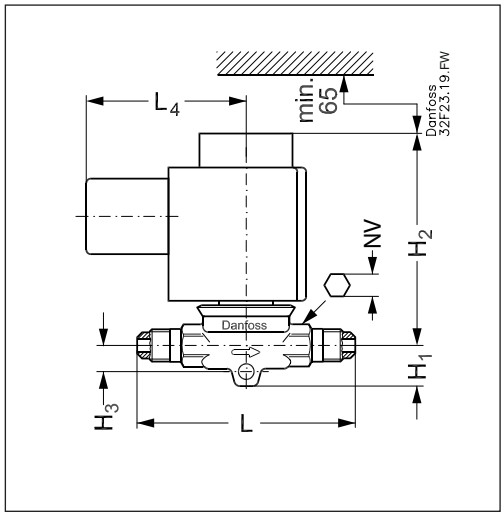
No.	Description	Solenoid valves type	Material	Analysis	Mat.no.	W.no.	Standard	
							DIN	EN
1	**Valve body**	**EVR 32/40**	Cast Iron	EN-GJS-400-18-LT	EN-JS1025	—	—	1563
2	**Cover**	**EVR 32/40**	Brass	CuZn40Pb2	CW617N	2.0402	—	12165
3	**Armature tube**	**EVR 32/40**	Stainless steel	X2 CrNi19-11	—	1.4306	—	10088
4	**Armature tube nut**	**EVR 32/40**	Stainless steel	X8 CrNiS 18-9	—	1.4305	—	10088
5	**Gasket**	**EVR 32/40**	Rubber	Cr	—	—	—	—
6	**Gasket**	**EVR 32/40**	Al. gasket	Al 99.5	—	3.0255	—	10210
7	**Solder tube**	**EVR 32/40**	Copper	SF.Cu	CW024A	2.0090	1787	12449
8	**Screws**	**EVR 32/40**	Stainless steel	A2-70	—	—	3506	—
9	**Spindle for. man. operation**	**EVR 32/40**	Stainless steel	X8 CrNiS 18-9	—	1.4305	—	10088

Dimensions [mm] and weights [kg]

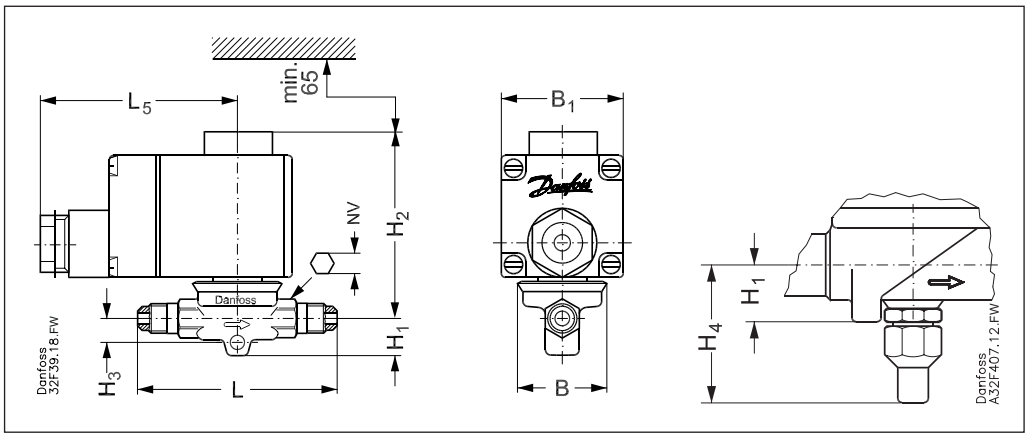
With cable connection coil



With DIN plugs coil



With terminal box coil



Net weight of coil
10 W: approx. 0.3 kg
12 and 20 W: approx. 0.5 kg

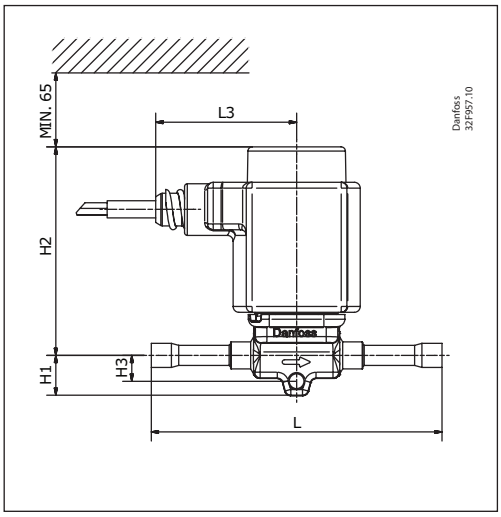
EVR (NC) 2 – 15, EVR 6 – 15 (NO) , flare connection

Type	Connection Flare [in.]	[mm]	H_1	H_2	H_3	H_4	L	L_3	L_4	NV	L_5 max. 10 W	L_5 max. 12/20 W	B	B_1 max.	Net weight with coil
EVR 2	1/4	6	14	73	9	—	75	45	54	13	75	85	33	68	0.5
EVR 3	1/4	6	14	73	9	—	75	45	54	13	75	85	33	68	0.5
	3/8	10	14	73	9	—	75	45	54	13	75	85	33	68	0.5
EVR 6	3/8	10	14	78	10	—	82	45	54	14	75	85	33	68	0.6
	1/2	12	14	78	10	—	88	45	54	14	75	85	33	68	0.6
EVR 10	1/2	12	16	79	11	—	103	45	54	16	75	85	46	68	0.8
	5/8	16	16	79	11	—	110	45	54	16	75	85	46	68	0.8
EVR 15	5/8	16	19	86	—	49	131	45	54	24	75	85	56	68	1.0

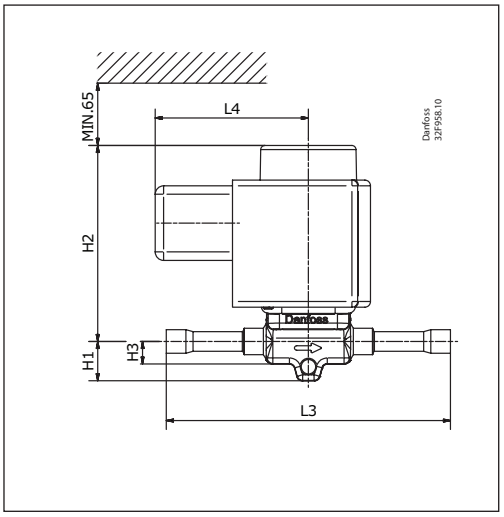
For 3D models, visit www.danfoss.com/products/categories/

Dimensions [mm] and weights [kg]
(continued)

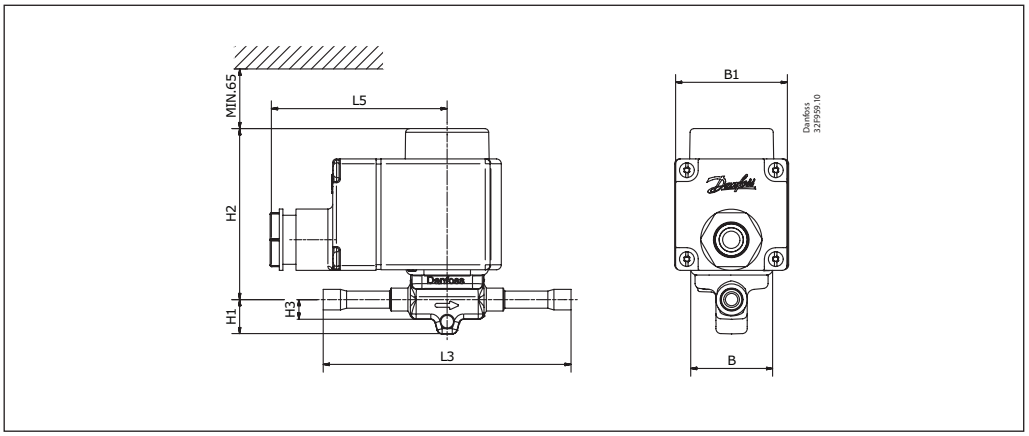
With cable connection coil



With DIN plugs coil



With terminal box coil



Net weight of coil
10 W: approx. 0.3 kg
12 and 20 W: approx. 0.5 kg

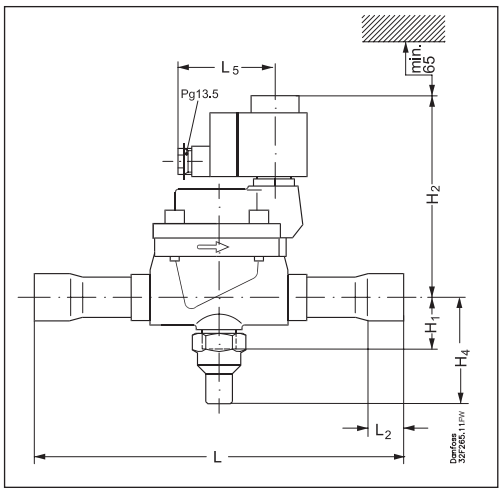
EVR (NC) 2 – 22, EVR 6 – 22 (NO), solder connection

Type	Connection Solder [in.]	[mm]	H_1	H_2	H_3	H_4	L	L_2	L_3	L_4	L_5 max. 10 W	L_5 max. 12/20 W	B	B_1 max.	Net weight with coil
EVR 2	1/4	6	14	73	9	—	102	7	45	54	75	85	33	68	0.5
EVR 3	1/4	6	14	73	9	—	102	7	45	54	75	85	33	68	0.6
	3/8	10	14	73	9	—	117	9	45	54	75	85	33	68	0.6
EVR 6	3/8	10	14	78	10	—	111	9	45	54	75	85	33	68	0.6
	1/2	12	14	78	10	—	127	10	45	54	75	85	33	68	0.6
EVR 10	1/2	12	16	79	11	—	127	10	45	54	75	85	46	68	0.7
	5/8	16	16	79	11	—	160	12	45	54	75	85	46	68	0.7
EVR 15	5/8	16	19	86	—	49	176	12	45	54	75	85	56	68	1.0
	7/8	22	19	86	—	—	176	17	45	54	75	85	56	68	1.0
EVR 20	7/8	22	20	90	—	53	191	17	45	54	75	85	72	68	1.5
	1 1/8	28	20	90	—	—	214	22	45	54	75	85	72	68	1.5
EVR 22	1 3/8	35	20	90	—	—	281	25	45	54	75	85	72	68	1.5

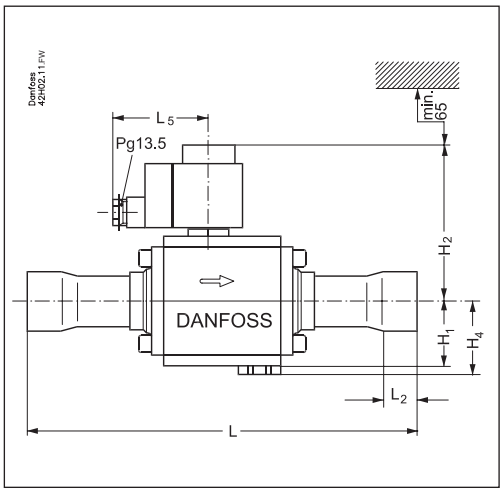
For 3D models, visit www.danfoss.com/products/categories/

Dimensions [mm] and weights [kg] *(continued)*

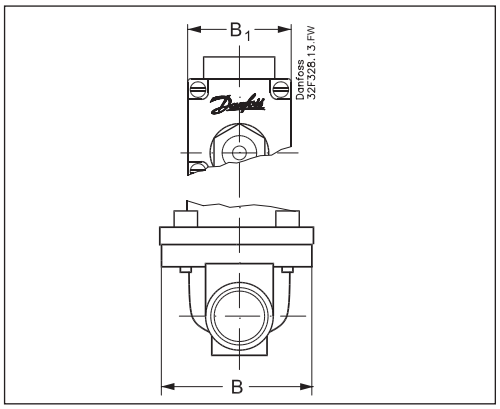
EVR 25 with terminal box coil



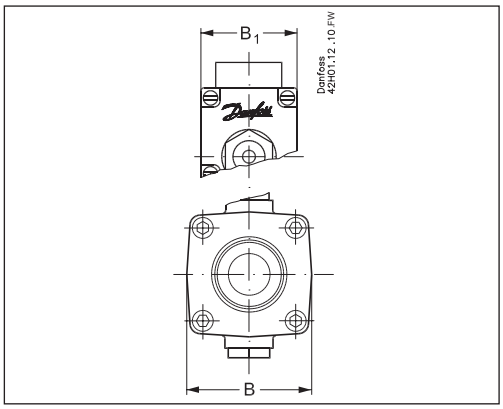
EVR 32 and EVR 40 *terminal box*



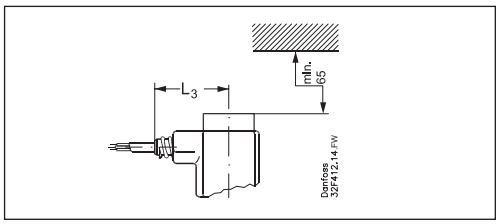
EVR 25



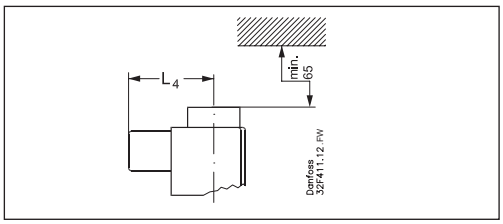
EVR 32 and EVR 40



Coil with cable



Coil with DIN plugs



Net weight of coil

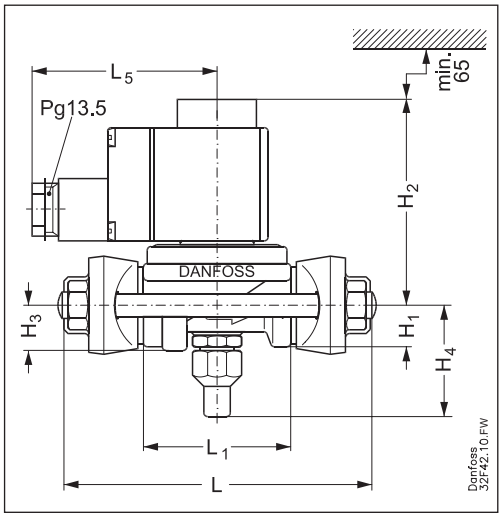
10 W: approx. 0.3 kg
12 and 20 W: approx. 0.5 kg

EVR (NC) 25, EVR 32 og EVR 40, solder connection

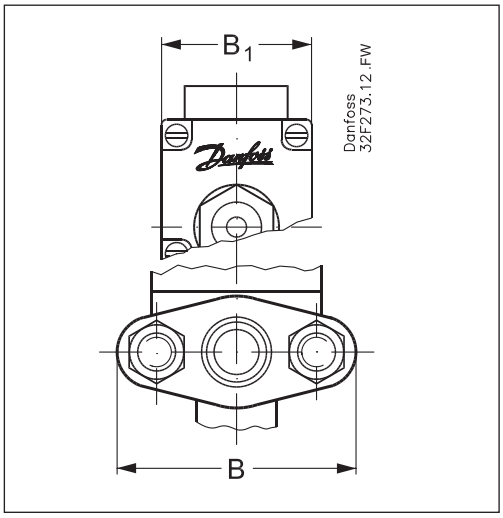
Type	Connection Solder		H_1	H_2	H_4	L	L_2	Coil with cable connection L_3	Coil with DIN connection L_4	Coil with terminal box L_5 max.		B	B_1 max.	Net weight with coil
	[in.]	[mm]								10 W	12/20 W			
EVR 25	1 1/8	28	38	138	72	256	22	45	54	75	85	95	68	3.0
	1 3/8	35	38	138	72	281	25	45	54	75	85	95	68	3.3
EVR 32	1 3/8	35	47	111	53	281	25	45	54	75	85	80	68	4.5
	1 5/8	42	47	111	53	281	29	45	54	75	85	80	68	4.6
EVR 40	1 5/8	42	47	111	53	281	29	45	54	75	85	80	68	4.6
	2 1/8	54	47	111	53	281	34	45	54	75	85	80	68	4.6

Dimensions [mm] and weights [kg] *(continued)*

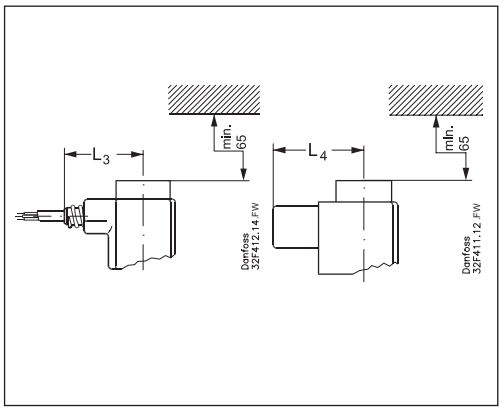
With terminal box coil



Coil with cable



Coil with DIN plugs



Net weight of coil
10 W: approx. 0.3 kg
12 and 20 W: approx. 0.5 kg

Weight of flange set
For EVR 15: 0.6 kg
For EVR 20: 0.9 kg

EVR (NC) 15 and EVR 20, flange connection

Type	H_1	H_2	H_3	H_4	L	L_1	Coil with cable connection L_3	Coil with DIN connection L_4	Coil with terminal box L_5 max.		B	B_1 max.	Net weight with coil excl. flanges
									10 W	12/20 W			
EVR 15	19	86	19	49	125	68	45	54	75	85	80	68	1.2
EVR 20	20	90	21	53	155	85	45	54	75	85	96	68	1.7