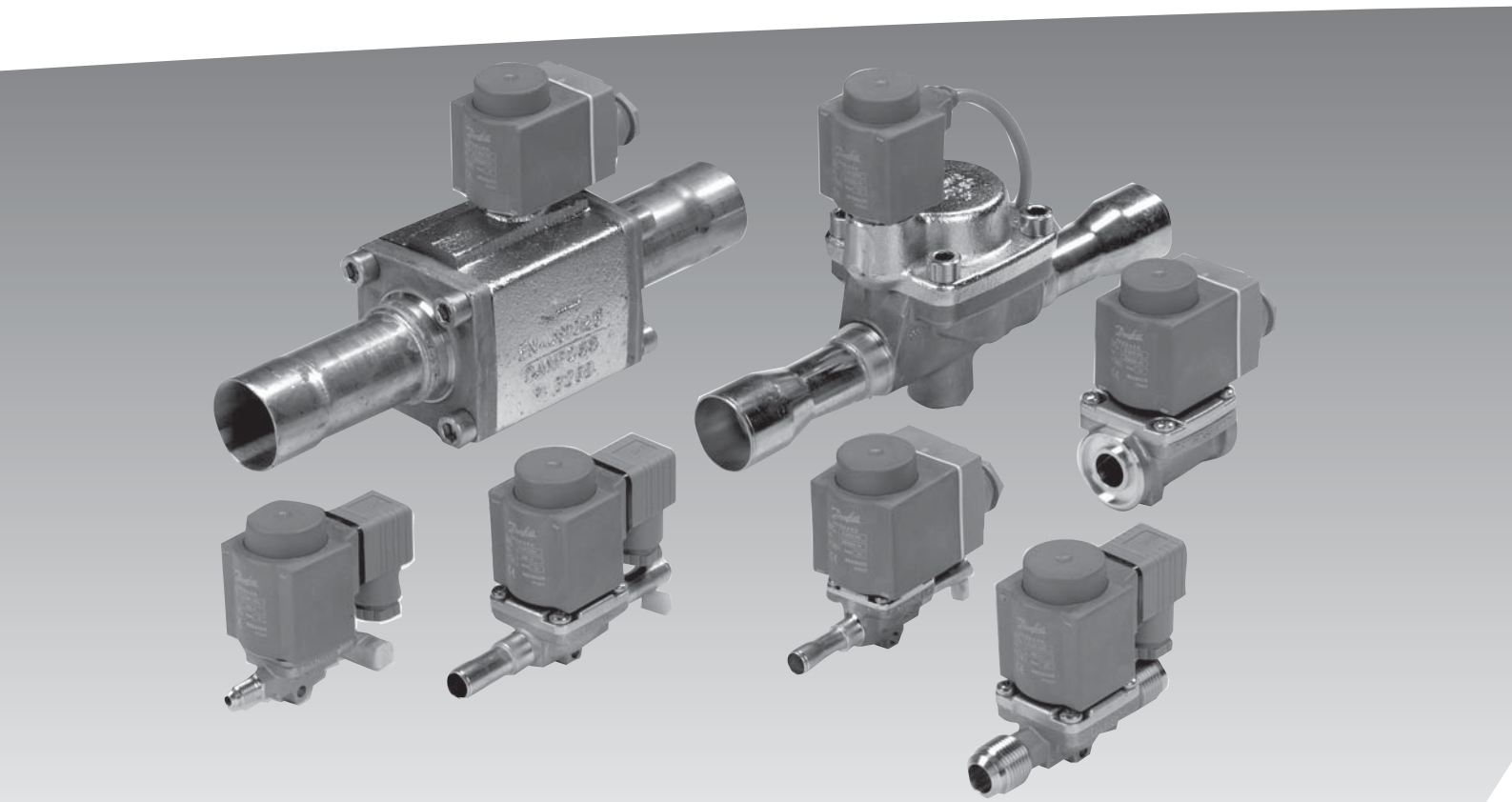


Solenoid valves
Type EVR 2 → 40 NC/ NO

REFRIGERATION AND
AIR CONDITIONING

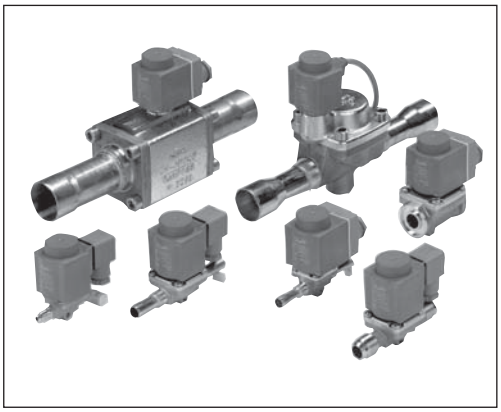
Technical leaflet

Contents

Introduction

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 both 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
- 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 for soldering make installation easy
  It is not necessary to dismantle the valve when soldering in.
- EVR are also available with flange connections

Approvals

DnV, Det norske Veritas, Norge

Pressure Equipment Directive (PED) 97/23/EC

The Low Voltage Directive (LVD) 73/23/EC with amendments EN 60730-2-8

Polski Rejestr Statków, Polen

MRS, Maritime Register of Shipping, Russia

Versions with UL approval can be supplied to order.

Technical data

Refrigerants
CFC, HCFC, HFC

Temperature of medium
−40 → +105°C with 10 W or 12 W coil.
Max. 130°C during defrosting.

Ambient temperature and enclosure for coil
See "Coils for solenoid valves", RD.3J.E2.02

Technical data
(continued)

Type	Opening differential pressure with standard coil Δp bar				Temperature of medium	Max. working pressure PB	k_v value [1]
		Max. (= MOPD) liquid [2]					
	Min.	10 W a. c.	12 W a. c.	20 W d. c.	°C	bar	m³/h
EVR 2	0.0	25		18	−40 → 105	45.2	0.16
EVR 3	0.0	21	25	18	−40 → 105	45.2	0.27
EVR 6	0.05	21	25	18	−40 → 105	35	0.8
EVR 6 NO	0.05	21	21	21	−40 →105	35	0.8
EVR 10	0.05	21	25	18	−40 → 105	35	1.9
EVR 10 NO	0.05	21	21	21	−40 → 105	35	1.9
EVR 15	0.05	21	25	18	−40 → 105	32	2.6
EVR 15 NO	0.05	21	21	21	−40 → 105	32	2.6
EVR 20 (a.c.)	0.05	21	25	13	−40 → 105	32	5.0
EVR 20 (d.c.)	0.05			16	−40 → 105	32	5.0
EVR 20 NO	0.05	19	19	19	−40 → 105	32	5.0
EVR 22	0.05	21	25	13	−40 → 105	32	6.0
EVR 22 NO	0.05	19	19	19	−40 → 105	32	6.0
EVR 25 [3]	0.20	21	25	18	−40 → 105	32	10.0
EVR 32 [3]	0.20	21	25	18	−40 → 105	32	16.0
EVR 40 [3]	0.20	21	25	18	−40 → 105	32	25.0

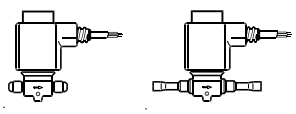
[1] The k_v value is the water flow in m³/h at a pressure drop across valve of 1 bar, ρ = 1000 kg/m³.
[2] MOPD for media in gas form is approx. 1 bar greater.
[3] Min. diff. pressure 0.07 bar is needed to stay open.

Type	Rated capacity kW											
	Liquid				Suction vapour				Hot gas			
	R22	R134a	R404A/R507	R407C	R22	R134a	R404A/R 507	R407C	R22	R134a	R404A/R507	R407C
EVR 2	3.20	2.90	2.20	3.01					1.50	1.20	1.20	1.46
EVR 3	5.40	5.00	3.80	5.08					2.50	2.00	2.00	2.43
EVR 6	16.10	14.80	11.20	15.13	1.80	1.30	1.60	1.66	7.40	5.90	6.00	7.18
EVR 10	38.20	35.30	26.70	35.91	4.30	3.10	3.90	3.96	17.50	13.90	14.30	16.98
EVR 15	52.30	48.30	36.50	49.16	5.90	4.20	5.30	5.43	24.00	19.00	19.60	23.28
EVR 20	101.00	92.80	70.30	94.94	11.40	8.10	10.20	10.49	46.20	36.60	37.70	44.81
EVR 22	121.00	111.00	84.30	113.74	13.70	9.70	12.20	12.60	55.40	43.90	45.20	53.74
EVR 25	201.00	186.00	141.00	188.94	22.80	16.30	20.40	20.98	92.30	73.20	75.30	89.53
EVR 32	322.00	297.00	225.00	302.68	36.50	26.10	32.60	33.58	148.00	117.00	120.00	143.56
EVR 40	503.00	464.00	351.00	472.82	57.00	40.80	51.00	52.44	231.00	183.00	188.00	224.07

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.

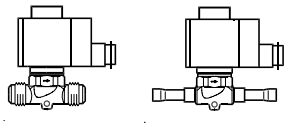
Rated hot gas capacity is based on
condensing temperature t_c = +40°C,
pressure drop across valve Δp = 0.8 bar,
hot gas temperature t_h = +65°C,
and subcooling of refrigerant Δt_{sub} = 4 K.

Ordering
Complete valves



Normally closed (NC) with a.c. coil [1])

Type	Connection		Code no. Valve body + 10 W a. c. coil with 1 m cable		
			Flare [2])	Solder ODF	
	in.	mm	in./mm	in.	mm
EVR 3	1/4	6	**032F8109**	**032F2042**	**032F2052**
EVR 6	3/8	10	**032F8073**	**032F2082**	**032F2092**
EVR 10	1/2	12	**032F8091**	**032F2122**	**032F2132**
EVR 15	5/8	16	**032F8102**	**032F2192**	**032F2192**



Type	Connection		Code no. Valve body + 10 W a. c. coil with terminal box		
			Flare [2])	Solder ODF	
	in.	mm	in./mm	in.	mm
EVR 3	1/4	6	**032F8110**	**032F2043**	**032F2053**
EVR 6	3/8	10	**032F8074**	**032F2083**	**032F2093**
EVR 10	1/2	12	**032F8092**	**032F2123**	**032F2133**
EVR 15	5/8	16	**032F8103**	**032F2193**	**032F2193**
EVR 20	7/8	22		**032F2243**	**032F2243**

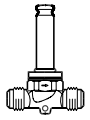
[1]) Please specify code no., voltage and frequency. Voltage and frequency can also be given in the form of an appendix number, see table "Appendix numbers".
[2]) Supplied without flare nuts.
Separate flare nuts:
1/4 in. or 6 mm, code no. **011L1101**
3/8 in. or 10 mm, code no. **011L1135**
1/2 in. or 12 mm, code no. **011L1103**
5/8 in. or 16 mm, code no. **011L1167**
[3]) Can only be used with DIN plug

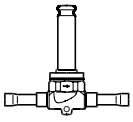
Appendix numbers

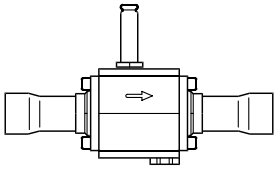
Voltage V	Frequency Hz	Energy consumpt. W	Appendix no.
12	50	10	15
24	50	10	16
42	50	10	17
48	50	10	18
115	50	10	22
220-230	50	10	31
240	50	10	33
380-400	50	10	37
420	50	10	38
24	60	10	14
115	60	10	20
220	60	10	29
240	60	10	30
110	50/60	10	21
220-230	50/60	10	32

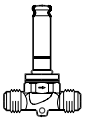
Ordering *(conmtinued)*

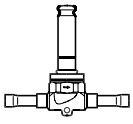
Components
Flare and solder connections











Separate valve bodies, normally closed (NC)

Type	Required coil type	Connection		Code no. Valve body without coil				
				Flare [1]	Solder ODF With manual			
		in.	mm	in./mm	in.	mm	With manual operation	Without manual operation
EVR 2	a.c.	1/4	6	**032F8056**	**032F1201**	**032F1202**		
EVR 3	a.c./d.c.	1/4	6	**032F8107**	**032F1206**	**032F1207**		
		3/8	10	**032F8116**	**032F1204**	**032F1208**		
EVR 6		3/8	10	**032F8072**	**032F1212**	**032F1213**		
		1/2	12	**032F8079**	**032F1209**	**032F1236**		
EVR 10		1/2	12	**032F8095**	**032F1217**	**032F1218**		
		5/8	16	**032F8098**	**032F1214**	**032F1214**		
EVR 15		5/8	16	**032F8101**	**032F1228**	**032F1228**		
		5/8	16	**032F8100 [2]**			**032F1227**	
		7/8	22		**032F1225**	**032F1225**		
EVR 20	a.c.	7/8	22		**032F1240**	**032F1240**		
		7/8	22				**032F1254**	
		1 1/8	28		**032F1244**	**032F1245**		
	d.c.	7/8	22		**032F1264**	**032F1264**		
		7/8	22				**032F1274**	
EVR 22	a.c.	1 3/8	35		**032F3267**	**032F3267**		
EVR 25	a.c./d.c.	1 1/8					**032F2200**	**032F2201**
			28				**032F2205**	**032F2206**
		1 3/8	35				**032F2207**	**032F2208**
EVR 32		1 3/8	35				**042H1105**	**042H1106**
		1 5/8					**042H1103**	**042H1104**
			42				**042H1107**	**042H1108**
EVR 40		1 5/8					**042H1109**	**042H1110**
			42				**042H1113**	**042H1114**
		2 1/8	54				**042H1111**	**042H1112**

Separate valve bodies, normally open (NO) [3]

Type	Required coil type	Connection		Code no. Valve body without coil [3]			
				Flare [1]		Solder ODF	
		in.	mm	in.	mm	in.	mm
EVR 6	a.c./d.c.	3/8	10	**032F8085**	**032F8085**	**032F1290**	**032F1295**
EVR 10		1/2	12	**032F8091**	**032F8091**	**032F1291**	**032F1296**
EVR 15		5/8	16	**032F8099**	**032F8099**	**032F1299**	**032F1299**
		7/8	22			**032F3270**	**032F3270**
EVR 20		7/8	22			**032F1260**	**032F1260**
		1 1/8	28			**032F1269**	**032F1279**
EVR 22	a.c.	1 3/8	35			**032F3268**	**032F3268**

[1] 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**

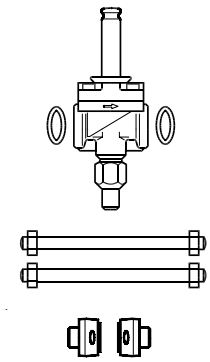
[2] With manual operation.

[3] 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.

Coils
See "Coils for solenoid valves", RD.3J.E2.02.

Ordering *(continued)*

Components
Flare and solder connections



Separate valve bodies, normally closed (NC)

Type	Require coil type	Connection	**Code no.** Valve body + gaskets +bolts; without coil and flanges	
			Without manual operation	Without manual operation
EVR 15	a.c./d.c.	Flanges	**032F1234**	**032F1224**
EVR 20	a.c.		**032F1253**	**032F1243**
	d.c.		**032F1273**	**032F1263**

Coils
See "Coils for solenoid valves", RD.3J.E2.02.

Flange sets

Valve type	Connection		**Code no.**		
			Solder		Weid
	in.	mm	in.	mm	in.
EVR 15	1/2				**027N1115**
	5/8	16	**027L1117**	**027L1116**	
	3/4				**027N1120**
	7/8	22	**027L1123**	**027L1122**	
EVR 20	3/4				**027N1220**
	7/8	22	**027L1223**	**027L1222**	
	1				**027N1225**
	1 1/8	28	**027L1229**	**027L1228**	

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

+ 1/2 in. weld flange set,
code no. **027N1115**

+ coil with termfnal box, 220 V, 50 Hz,
code no. **018F6701**
(See "Coils for solenoid valves",
RD.3J.E2.02.).

Accessories

Description	**Code no.**
Mounting bracket for EVR 2, 3, 6 and 10	**032F0197**
Strainer FA for direct mounting	See "FA"

Capacity

Liquid capacity Q_e kW

R22

Type	Liquid capacity Q_e kW at pressure drop across valve Δp bar				
	0.1	0.2	0.3	0.4	0.5
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

Liquid capacity Q_e kW

R134a

Type	Liquid capacity Q_e kW at pressure drop across valve Δp bar				
	0.1	0.2	0.3	0.4	0.5
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

Liquid capacity Q_e kW

R404A/R507

Type	Liquid capacity Q_e kW at pressure drop across valve Δp bar				
	0.1	0.2	0.3	0.4	0.5
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 for liquid temperature t_l

t_l°C	–10	0	10	15	20	25	30	35	40	45	50
R22	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
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)

Liquid capacity Q_e kW

R407C

Type	Liquid capacity Q_e kW at pressure drop across valve Δp bar				
	0.1	0.2	0.3	0.4	0.5
EVR 2	2.4	3.4	4.3	5.0	5.3
EVR 3	4.2	5.9	7.2	8.4	9.3
EVR 6	12.3	17.5	21.4	24.7	27.6
EVR 10	29.5	41.5	50.9	58.7	65.7
EVR 15	40.1	56.7	69.7	80.4	90.0
EVR 20	77.0	109.0	134.0	155.0	172.0
EVR 22	93.1	130.0	161.0	185.2	207.0
EVR 25	155.0	218.0	268.0	309.0	346.0
EVR 32	247.0	350.0	428.0	494.0	553.0
EVR 40	386.0	546.0	669.0	773.0	864.0

Capacities are based on liquid temperature t_l = +25°C ahead of valve, evaporating temperature t_e = –10°C, and 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
R407C	0.71	0.78	0.85	0.89	0.94	1.0	1.06	1.14	1.23	1.33	1.46

Suction vapour capacity Q_e

R22

Type	Pressure drop Δp bar	Suction vapour capacity Q_e kW at evaporating temperature t_e °C					
		–40	–30	–20	–10	0	+10
EVR 6	0.1	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
	0.2	0.98	1.3	1.6	2.0	2.5	3.0
EVR 10	0.1	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
	0.2	2.3	3.1	3.9	4.8	6.0	7.1
EVR 15	0.1	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
	0.2	3.2	4.2	5.3	6.6	8.2	9.8
EVR 20	0.1	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
	0.2	6.1	8.1	10.3	12.7	15.9	18.8
EVR 22	0.1	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
	0.2	7.3	9.7	12.3	15.2	19.0	22.6
EVR 25	0.1	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
	0.2	12.2	16.1	20.4	25.3	31.7	37.6
EVR 32	0.1	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
	0.2	19.6	25.7	32.6	40.5	50.7	60.2
EVR 40	0.1	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
	0.2	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 divided 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 for liquid temperature t_l

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

Capacity
(continued)

Suction vapour capacity Q_e

R134a

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

Suction vapour capacity Q_e kW

R404A/R507

Type	Pressure drop across valve Δp bar	Suction vapour capacity Q_e kW at evaporating temperature t_e °C					
		–40	–30	–20	–10	0	+10
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 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
R134a	0.73	0.79	0.86	0.90	0.95	1.0	1.06	1.12	1.19	1.27	1.37
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)

R407C

Type	Pressure drop across valve Δp bar	Suction vapour capacity Q_e kW at evaporating temperature t_e °C					
		–40	–30	–20	–10	0	+10
EVR 6	0.1	0.61	0.81	1.1	1.4	1.7	2.0
	0.15	0.72	0.95	1.3	1.7	2.1	2.5
	0.2	0.81	1.1	1.4	1.8	2.4	2.9
EVR 10	0.1	1.4	1.9	2.6	3.2	4.0	4.9
	0.15	1.7	2.3	3.0	4.0	4.9	6.0
	0.2	1.9	2.7	3.5	4.4	5.6	6.9
EVR 15	0.1	1.9	2.7	3.6	4.4	5.5	6.7
	0.15	2.3	3.2	4.2	5.4	6.7	8.2
	0.2	2.7	3.6	4.7	6.1	7.7	9.5
EVR 20	0.1	3.8	5.1	6.8	8.6	10.5	12.9
	0.15	4.5	6.1	8.1	10.5	13.1	16.2
	0.2	5.1	7.0	9.2	11.7	14.9	18.2
EVR 22	0.1	4.6	6.1	8.1	10.3	12.6	15.5
	0.15	5.4	7.3	9.5	12.6	15.4	19.4
	0.2	6.1	8.3	11.0	14.0	17.9	21.9
EVR 25	0.1	7.6	10.2	13.5	17.1	21.1	25.8
	0.15	9.1	12.2	15.9	21.0	25.8	31.6
	0.2	10.1	13.9	18.2	23.3	29.8	36.5
EVR 32	0.1	12.1	16.3	21.6	27.4	33.7	41.3
	0.15	14.4	19.5	25.6	33.6	41.2	50.6
	0.2	16.3	22.1	29.0	37.3	47.7	58.4
EVR 40	0.1	18.9	25.4	33.9	42.8	52.6	64.5
	0.15	22.6	30.4	40.1	52.4	64.5	79.1
	0.2	25.3	34.6	45.4	58.2	74.4	91.2

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
R407C	0.71	0.78	0.85	0.89	0.94	1.0	1.06	1.14	1.23	1.33	1.46

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
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 22 with t_c = + 40°C gives the 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 apprx. 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)

R22

Hot gas capacity Q_h kW

Type	Pressure drop across valve Δp bar	Hot gas capacity Q_h 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 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
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 temperatur t_e

t_e °C	–40	–30	–20	–10	0	+10
R22	0.90	0.94	0.97	1.0	1.03	1.05

Capacity
(continued)

Hot gas capacity Q_h kW

R134a

Type	Pressure drop across valve Δp bar	Hot gas capacity Q_h kW				
		Evaporating temp. t_e=-10°C. Hot gas temp. t_h=t_c +25°C. Subcooling Δt_{sub} =4 Kv				
		Condensing temperature t_c °C				
		+20	+30	+40	+50	+60
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	2.86
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
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 temperatur 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)

Hot gas capacity Q_h kW

R404A/R507

Type	Pressure drop across valve Δp bar	Hot gas capacity Q_h 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 2	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
EVR 3	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
EVR 6	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
EVR 10	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
EVR 15	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
EVR 20	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
EVR 22	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
EVR 25	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
EVR 32	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
EVR 40	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 temperatur t_e

t_e °C	–40	–30	–20	–10	0	+10
R440A/R507	0.86	0.88	0.93	1.0	1.03	1.07

Capacity
(continued)

Hot gas capacity Q_h kW

R407C

Type	Pressure drop across valve Δp bar	Hot gas capacity Q_h 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 2	0.1	0.53	0.55	0.57	0.56	0.54
	0.2	0.75	0.78	0.80	0.80	0.76
	0.4	1.08	1.12	1.14	1.14	1.09
	0.8	1.48	1.51	1.58	1.63	1.56
	1.6	2.09	2.19	2.23	2.25	2.15
EVR 3	0.1	0.9	0.94	0.95	0.96	0.91
	0.2	1.28	1.32	1.35	1.35	1.29
	0.4	1.83	1.89	1.93	1.92	1.83
	0.8	2.50	2.54	2.66	2.76	2.63
	1.6	3.53	3.69	3.77	3.79	3.62
EVR 6	0.1	2.7	2.8	2.8	2.8	2.7
	0.2	3.8	4.0	4.0	3.5	3.8
	0.4	5.4	5.6	5.7	5.7	5.5
	0.8	7.4	7.5	7.9	8.2	7.7
	1.6	10.4	10.9	11.1	11.2	10.7
EVR 10	0.1	6.3	6.6	6.7	6.8	6.4
	0.2	9.0	9.4	9.5	9.6	9.1
	0.4	12.8	13.3	13.6	13.5	12.9
	0.8	17.6	17.8	18.7	19.4	18.5
	1.6	24.9	26.0	26.5	26.6	25.5
EVR 15	0.1	8.6	9.0	9.2	9.2	8.7
	0.2	12.3	12.8	12.9	13	12.4
	0.4	17.6	18.3	18.5	18.5	17.6
	0.8	24.1	24.4	25.7	26.5	25.4
	1.6	33.9	35.5	36.3	36.4	34.8
EVR 20	0.1	16.6	17.3	17.7	17.7	16.9
	0.2	23.6	24.5	25.0	25.1	23.9
	0.4	33.6	35.1	35.6	35.7	34.0
	0.8	46.3	47	49.4	51.1	48.6
	1.6	65.3	68.3	69.8	70.1	67.0
EVR 22	0.1	19.9	20.7	21.1	21.2	20.2
	0.2	28.3	29.5	30.0	30.1	28.7
	0.4	40.4	42.1	42.8	42.8	40.8
	0.8	55.4	56.3	59.3	61.3	58.3
	1.6	78.4	82.0	83.7	84	80.4
EVR 25	0.1	33.2	34.5	35.2	35.4	33.7
	0.2	47.2	49.1	50.0	50.1	47.8
	0.4	67.4	70.2	71.3	71.3	68.0
	0.8	92.4	96.7	98.8	102.1	97.2
	1.6	131.0	136.4	139.1	140.4	134.3
EVR 32	0.1	53.1	55.2	56.3	56.6	53.9
	0.2	75.5	78.5	79.9	80.2	76.5
	0.4	107.9	112.2	114.5	114.4	108.8
	0.8	147.8	154.0	158.4	163.3	155.8
	1.6	209.4	218.9	223.6	224.6	214.6
EVR 40	0.1	82.9	86.4	88.1	88.4	84.3
	0.2	117.6	123.2	125.2	125.8	119.6
	0.4	169.1	174.9	178.7	178.9	170.5
	0.8	230.7	244.2	247.2	255.8	243.0
	1.6	325.9	341.0	348.8	350.5	335.2

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 temperatur t_e

t_e °C	–40	–30	–20	–10	0	+10
R407C	0.90	0.94	0.97	1.0	1.03	1.05

Capacity
(continued)

Hot gas capacity G_h kg/s

R 22

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

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				
		+35	0.006	0.008	0.01	0.011	0.012	0.012	0.012		
		+45	0.007	0.009	0.012	0.014	0.015	0.015	0.015	0.015	0.015
EVR 3		+25	0.008	0.011	0.011	0.014	0.014				
		+35	0.009	0.013	0.016	0.018	0.018	0.018	0.018		
		+45	0.01	0.016	0.02	0.023	0.025	0.025	0.025	0.025	0.025
EVR 6		+25	0.024	0.032	0.04	0.041	0.041				
		+35	0.028	0.038	0.049	0.055	0.056	0.056	0.056		
		+45	0.032	0.045	0.059	0.068	0.072	0.073	0.073	0.073	0.073
EVR 10		+25	0.057	0.075	0.094	0.098	0.098				
		+35	0.066	0.09	0.117	0.13	0.132	0.132	0.132		
		+45	0.076	0.107	0.141	0.161	0.17	0.172	0.172	0.172	0.172
EVR 15		+25	0.074	0.1	0.124	0.129	0.129				
		+35	0.087	0.119	0.154	0.171	0.167	0.167	0.167		
		+45	0.1	0.14	0.185	0.212	0.223	0.225	0.225	0.225	0.225
EVR 20		+25	0.149	0.199	0.247	0.258	0.258				
		+35	0.174	0.238	0.307	0.341	0.347	0.347	0.347		
		+45	0.2	0.28	0.37	0.423	0.447	0.452	0.452	0.452	0.452
EVR 22		+25	0.179	0.239	0.296	0.31	0.31				
		+35	0.209	0.286	0.368	0.409	0.416	0.416	0.416		
		+45	0.24	0.336	0.444	0.508	0.536	0.542	0.542	0.542	0.542
EVR 25		+25	0.292	0.391	0.486	0.506	0.506				
		+35	0.341	0.467	0.602	0.668	0.679	0.679	0.679		
		+45	0.393	0.549	0.725	0.83	0.876	0.885	0.885	0.885	0.885
EVR 32		+25	0.478	0.638	0.793	0.826	0.826				
		+35	0.556	0.763	0.994	1.091	1.108	1.108	1.108		
		+45	0.641	0.897	1.197	1.354	1.432	1.446	1.446	1.446	1.446
EVR 40		+25	0.747	0.998	1.24	1.291	1.291				
		+35	0.87	1.192	1.553	1.704	1.731	1.731	1.731		
		+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)

Hot gas capacity G_h kg/s

R404A/R507

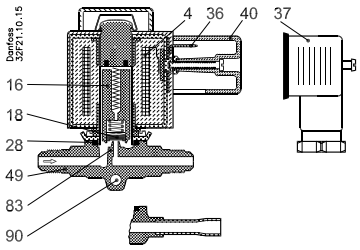
Type	Hot gas temperature t_h °C	Condensing temperature t_c °C	Hot gas capacity G_h kg/s at pressure drop across valve Δp bar								
			0.5	1	2	3	4	5	6	7	8
EVR 2	+60	+25	0.007	0.009	0.012	0.014	0.016	0.016	0.016	0.016	0.016
		+35	0.008	0.011	0.014	0.017	0.019	0.02	0.02	0.02	0.02
		+45	0.009	0.012	0.016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

R407C

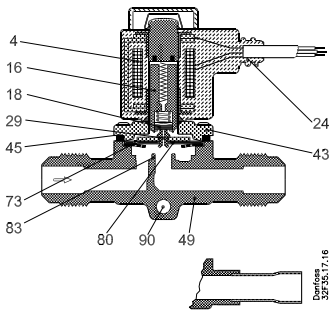
Type	Hot gas temperature t_h °C	Condensing temperature t_c °C	Hot gas capacity G_h kg/s at pressure drop across valve Δp bar								
			0.5	1	2	3	4	5	6	7	8
EVR 2	+90	+25	0.0054	0.0076	0.0108	0.0118	0.0130	0.0132	0.0132	0.0132	0.0132
		+35	0.0065	0.0097	0.0118	0.0140	0.0151	0.0165	0.0165	0.0165	0.0165
		+45	0.0076	0.0108	0.0140	0.0173	0.0184	0.0198	0.0209	0.0209	0.022
EVR 3		+25	0.010	0.013	0.017	0.021	0.022	0.022	0.022	0.022	0.022
		+35	0.011	0.015	0.021	0.024	0.026	0.028	0.029	0.029	0.029
		+45	0.013	0.017	0.024	0.028	0.032	0.034	0.036	0.037	0.037
EVR 6		+25	0.029	0.040	0.053	0.06	0.063	0.065	0.065	0.065	0.065
		+35	0.033	0.046	0.062	0.073	0.078	0.083	0.085	0.085	0.085
		+45	0.038	0.053	0.071	0.085	0.094	0.101	0.105	0.108	0.109
EVR 10		+25	0.069	0.095	0.125	0.143	0.152	0.154	0.155	0.155	0.155
		+35	0.08	0.11	0.148	0.172	0.187	0.197	0.202	0.202	0.202
		+45	0.091	0.125	0.171	0.202	0.223	0.24	0.252	0.256	0.258
EVR 15		+25	0.091	0.125	0.165	0.189	0.198	0.202	0.204	0.204	0.204
		+35	0.105	0.145	0.194	0.227	0.246	0.26	0.265	0.265	0.265
		+45	0.119	0.165	0.225	0.266	0.293	0.316	0.331	0.337	0.339
EVR 20		+25	0.183	0.249	0.329	0.377	0.398	0.405	0.408	0.408	0.408
		+35	0.21	0.288	0.388	0.453	0.493	0.519	0.531	0.531	0.531
		+45	0.238	0.329	0.448	0.532	0.588	0.631	0.663	0.675	0.678
EVR 22		+25	0.219	0.299	0.395	0.452	0.477	0.486	0.491	0.491	0.491
		+35	0.301	0.346	0.465	0.544	0.591	0.623	0.637	0.637	0.637
		+45	0.285	0.395	0.538	0.639	0.705	0.758	0.795	0.801	0.814
EVR 25		+25	0.357	0.489	0.647	0.738	0.779	0.794	0.801	0.801	0.801
		+35	0.41	0.566	0.76	0.889	0.966	1.018	1.041	1.041	1.041
		+45	0.465	0.646	0.879	1.042	1.151	1.238	1.298	1.323	1.329
EVR 32		+25	0.582	0.798	1.054	1.206	1.273	1.297			
		+35	0.669	0.924	1.242	1.451	1.576	1.66	1.699		
		+45	0.76	1.056	1.435	1.703	1.878	2.021	2.119	2.161	2.17
EVR 40		+25	0.91	1.247	1.647	1.884	1.989	2.027			
		+35	1.045	1.445	1.942	2.267	2.463	2.594	2.656		
		+45	1.188	1.65	2.244	2.66	2.935	3.157	3.311	3.378	3.391

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

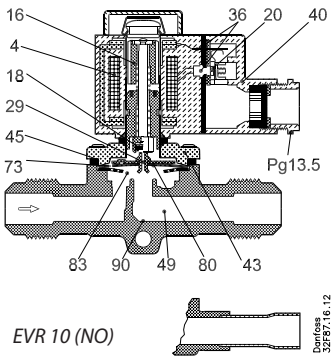
Design / Function



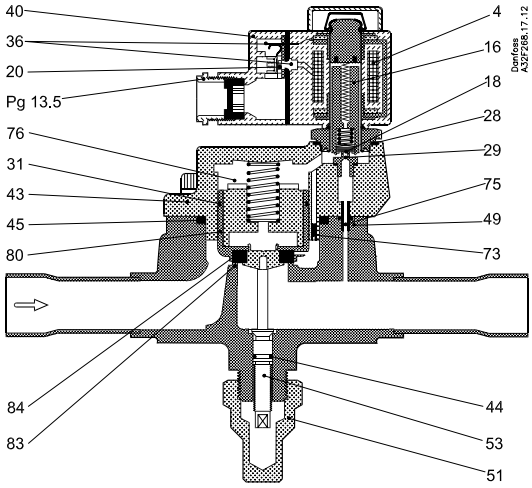
EVR 2 (NC)



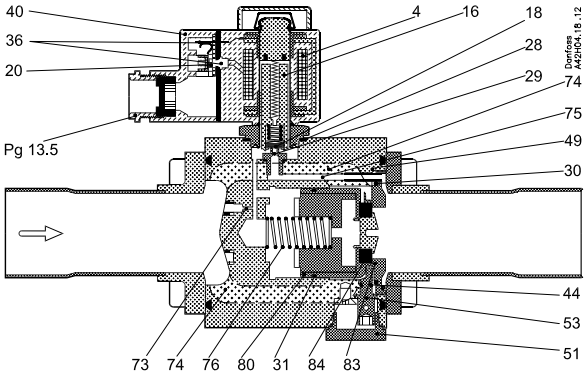
EVR 10 (NC)



EVR 10 (NO)



EVR 25 (NC)



EVR 32 and 40 (NC)

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
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
50. Gasket
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
90. Mounting hole

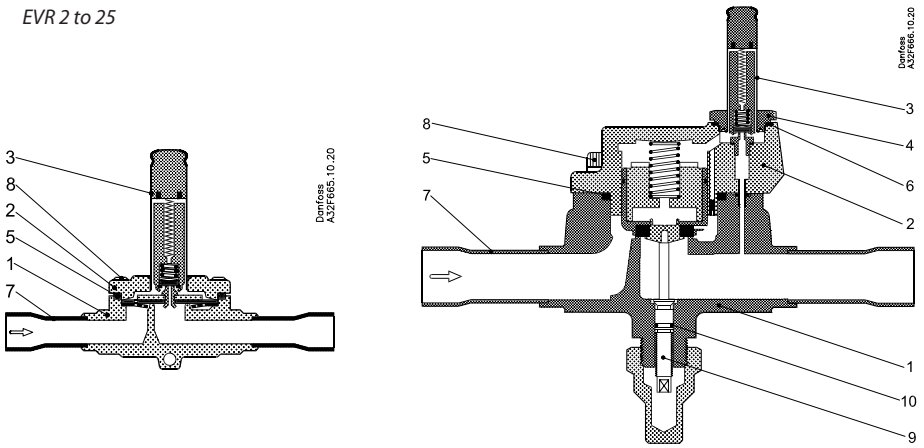
EVR solenoid valves are designed on two different principles:
1. Direct operation
2. Servo operation

1. Direct operation
EVR 2 and 3 are direct operated. The valves open direct 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 teflon valve plate (18) is fitted direct on the armature (16).
Inlet pressure acts from above on the armature and the valve plate. Thus, inlet pressure, spring force and the weight of the armature 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 teflon pilot valve plate (18) is fitted direct 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 weight of the armature, 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, 32 and 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, the force of the compression spring (76) and possibly the piston weight. 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.

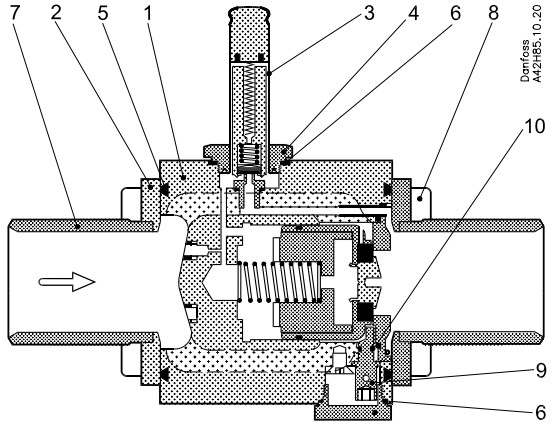
Material specifications

EVR 2 to 25



		Solenoid valves					Standard	
No.	Description	Type	Material	Analysis	Mat.no.	W.no.	DIN	EN
1	Valve body	EVR 2 to 25	Brass	CuZn40Pb2	CW617N	2.0402	17672-1	12165
2	Cover	EVR 2 to 3	Stainless steel	X5 CrNi18-10		1.4301		10088
		EVR 6 to 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 to 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 to 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 to 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				

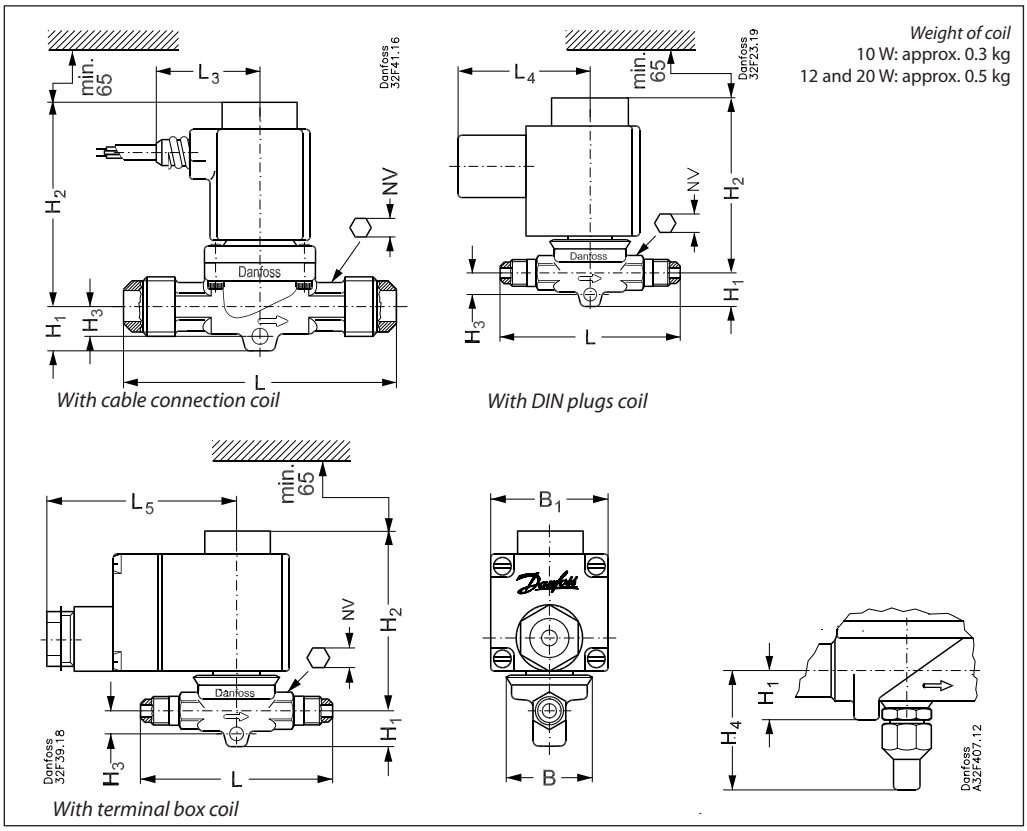
EVR 32 to 40



		Solenoid valves					Standard	
No.	Description	Type	Material	Analysis	Mat.no.	W.no.	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 and weights

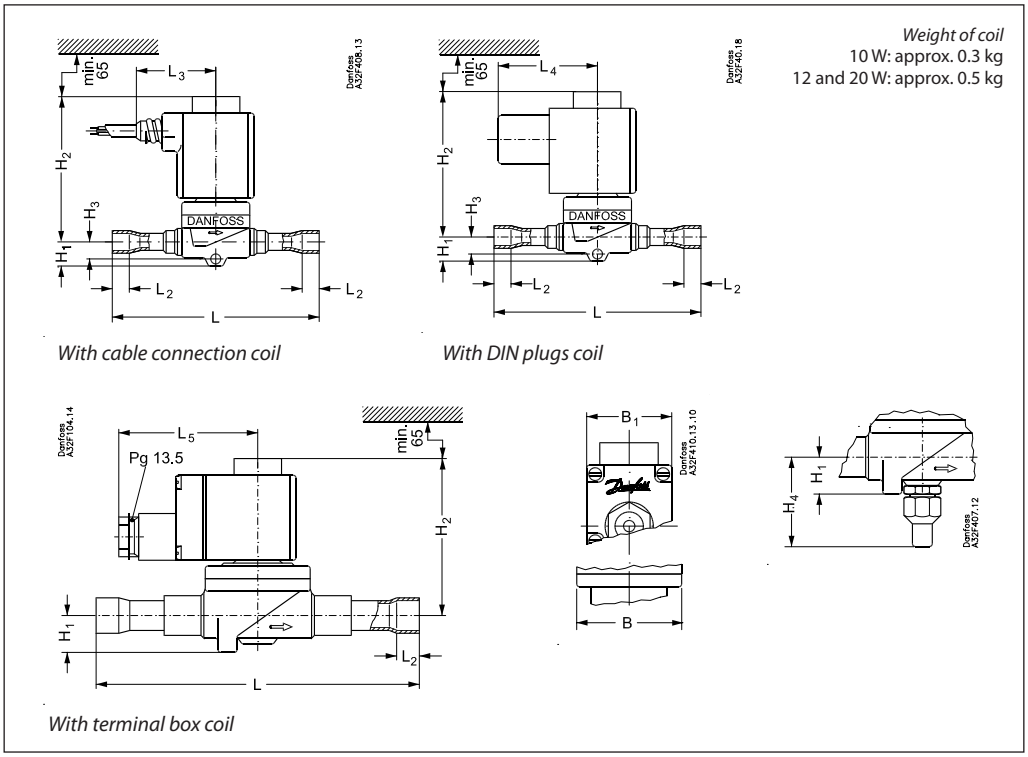
EVR (NC) 2 → 15 and EVR 6 → 15 (NO) , flare connection



Type	Connection Flare		H_1	H_2	H_3	H_4	L	L_2	L_3	L_4	NV	L_5 max.		B	B_1 max.	Weight with coil
												10 W	12/20 W			
	in.	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
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	36	68	0.6
	1/2	12	14	78	10		88		45	54	14	75	85	36	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

Dimensions and weights *(continued)*

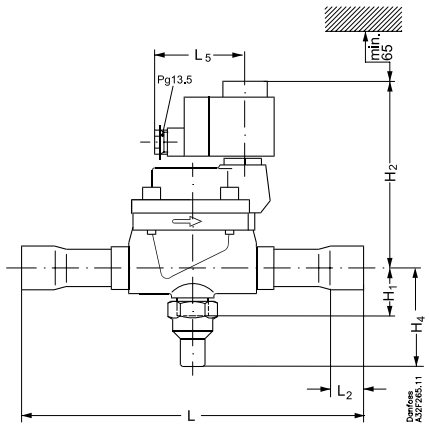
EVR (NC) 2 → 22 and EVR 6 → 22 (NO), solder connection



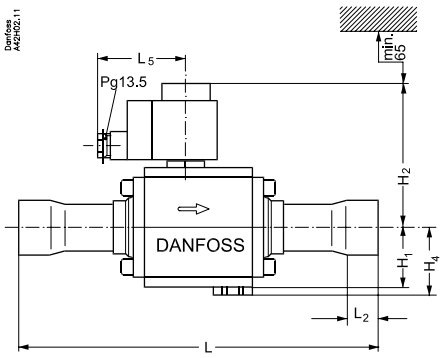
Type	Connection Solder		H_1	H_2	H_3	H_4	L	L_2	L_3	L_4	L_5 max.		B	B_1 max.	Weight with coil
											10 W	12/20 W			
	in.	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
EVR 2	1/4	6	14	73	9		102	7	45	54	75	85	33	68	0.5
EVR 3	1/4	6	14	73	9		102	7	45	54	75	85	33	68	0.6
	3/8	10	14	73	9		117	9	45	54	75	85	33	68	0.6
EVR 6	3/8	10	14	78	10		111	9	45	54	75	85	36	68	0.6
	1/2	12	14	78	10		127	10	45	54	75	85	36	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

Dimensions and weights *(continued)*

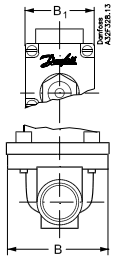
EVR (NC) 25, 32 og 40, solder connection



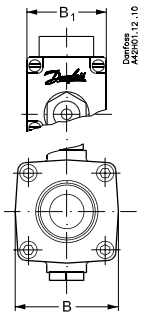
EVR 25 with terminal box coil



EVR 32 and 40 terminal box

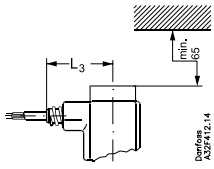


EVR 25

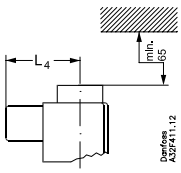


EVR 32 and 40

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



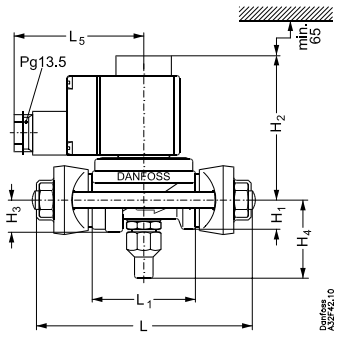
Coil with cable



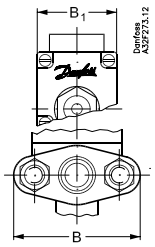
Coil with DIN plugs

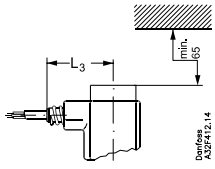
Type	Connection Solder		H_1	H_2	H_3	H_4	L	L_2	Coil with cable connection L_3	Coil with DIN connection L_4	Coil with terminal box L_5 max.		B	B_1 max.	Weight with coil
											10 W	12/20 W			
	in.	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
EVR 25	$1^1/_8$	28	38	138		72	256	22	45	54	75	85	95	68	3.0
	$1^3/_8$	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

EVR (NC) 15 and 20, flange connection

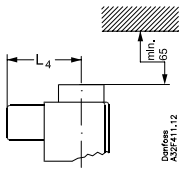


With terminal box coil





Coil with cable



Coil with DIN plugs

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

Type	H_1	H_2	H_3	H_4	L	L_1	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.	Weight with coil excl. flanges
										10 W	12/20 W			
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
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