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Catalogue

Solenoid valves for Industrial Refrigeration

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2-step solenoid valve
Type ICLX 32-150

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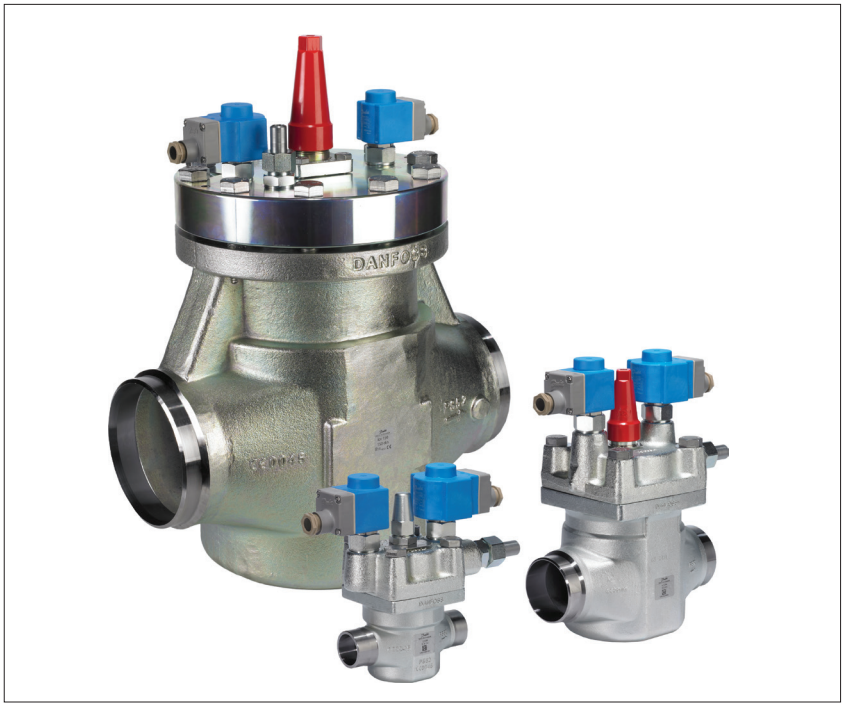
2-step solenoid valve
Type ICLX 32-150



ICLX 2-step solenoid valves belong to the ICV family.

ICLX are used in suction lines for the opening against high differential pressure, e.g. after hot gas defrost in large industrial refrigeration systems with ammonia, fluorinated refrigerants or CO_2.

The ICLX valve is factory configured to open in 2 steps.

By following a simple procedure the valve can be configured to open in 1 step only.

In 2-step configuration, step 1 opens to approx. 10% of the capacity after the pilot solenoid valves are energized.

Step 2 opens automatically when the pressure differential across the valve has decreased to approx. 1.25 bar (18 psig).

The ICLX valve comprises five main components: Valve body, top cover, function module and 2 pilot solenoid valves. On ICLX 32-150 the top cover and function module are factory-assembled.

Features

- Designed for Industrial Refrigeration applications for a maximum working pressure of 52 bar g / 754 psig
- Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO_2)
- Can be used in chemical and petro-chemical applications
- Direct welded connections
- Connection types include butt weld, socket weld and solder connections
- Low temperature steel body
- Low weight and compact design
- Only one signal required for both pilot solenoid valves
- The ICLX main valve top cover can be oriented in any direction without the function of pilot valves being affected
- Especially suitable for systems where low pressure drop is required
- Stabilizes working conditions and eliminates pressure pulsations during opening after defrosting
- Provides safety against pressure "shocks" as the valve can only open fully when $\Delta p < 1.25$ bar (18 psig)
- Cavitation resistant valve seat
- Manual opening possible
- PTFE seat provides excellent valve tightness.
- Service friendly design
- Classification: DNV, CRN, BV, EAC etc.
  To get an updated list of certification on the products please contact your local Danfoss Sales Company

Approvals
The ICV valve concept is designed to fulfil global refrigeration requirements.

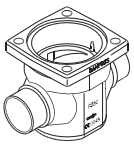
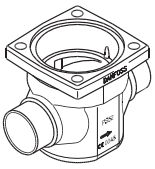
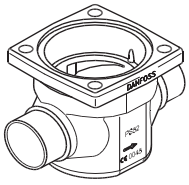
The Factory assembled ICLX is CE and UL approved. For specific approval information, please contact Danfoss.

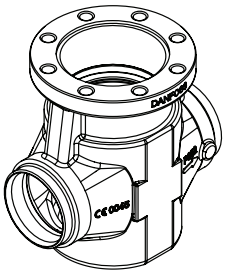
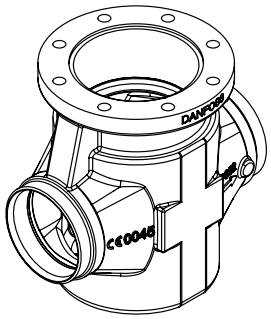
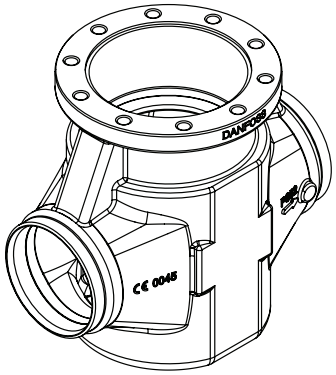
ICLX valves			
Nominal bore	DN≤ 25 (1 in)	DN 32 – 65 (1 ¼ – 2 ½ in)	DN 80-150 (3 – 6 in)
Classified for	Fluid group I		
Category	Article 3, paragraph 3	II	III

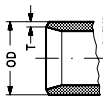
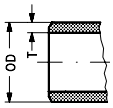
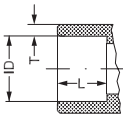
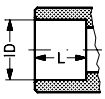
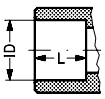
The ICLX Concept

The ICLX concept is developed to highest flexibility of direct welded connections. For valve sizes ICV 32 – ICV 65 a wide range of connection sizes and types is available. ICV 100 – ICV 150 are available in butt-weld DIN and butt-weld ANSI nominal sizes. The direct welded (non-flanged) connections secures low risk of leakage.

- There are seven valve bodies available.

			
ICV 32	ICV 40	ICV 50	ICV 65

		
ICV 100	ICV 125	ICV 150

D	A	SOC	SD	SA
				
Butt-weld DIN	Butt-weld ANSI	Socket weld ANSI	Solder DIN	Solder ANSI

Design (valve)

Connections
There is a very wide range of connection types available with ICLX valves:

- D: Butt weld, EN 10220
- A: Butt weld, ANSI (B 36.10)
- SOC: Socket weld, ANSI (B 16.11)
- SD: Solder connection, EN 1254-1
- SA: Solder connection, ANSI (B 16.22)

The ICLX valves are approved in accordance with the European standard specified in the Pressure Equipment Directive and are CE marked.
For further details / restrictions - see Installation Instruction.

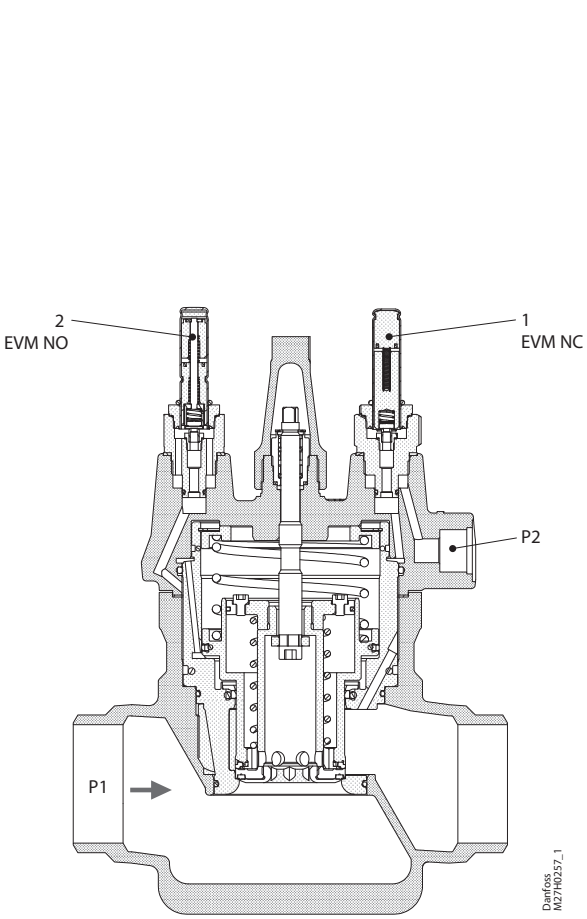
Valve body and top cover material
Low temperature steel

Technical data

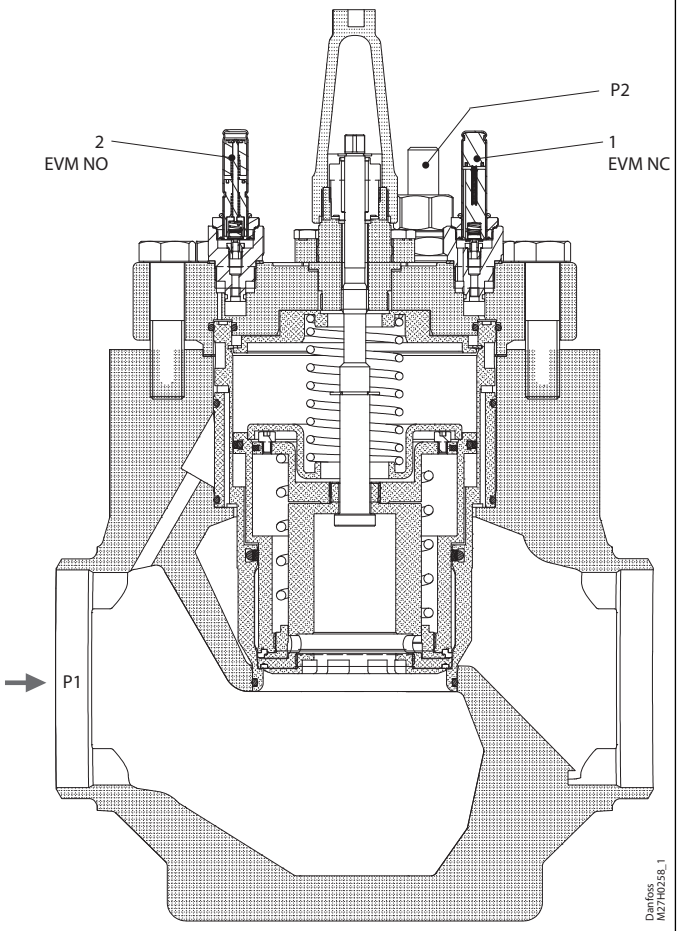
- *Refrigerants*
  Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO_2).
  Temperature range:
  Media: -60 – 120 °C / -76 – 248 °F.
- *Pressure*
  The valve is designed for a max. working pressure of 52 bar g / 754 psi g
- *Surface protection*
  The ICLX external surface is zinc-chromated to provide good corrosion protection.
- *Max. opening pressure differential (MOPD):*
  ICLX 32-150
  21 bar (305 psi) @ external pressure 1.5 bar (22 psi) higher than inlet pressure of the valve.
  ICLX 32-150
  40 bar (580 psi) @ external pressure 2 bar (30 psi) higher than inlet pressure of the valve.

Coil requirements:
Both coils to be IP67.
EVM NC:
10W ac (or higher) for MOPD up to 21 bar
EVM NC:
20W AC for MOPD 21 – 40 bar
EVM NO:
10W ac (or higher)

	ICLX 32	ICLX 40	ICLX 50	ICLX 65	ICLX 100	ICLX 125	ICLX 150
K_v [m^3/h]	22	29	47	82	151	225	390
C_v [USgal/min]	25.5	33.6	54.5	95	175	261	452



ICLX 32-65



ICLX 100-150

Function

The ICLX valve is used as a shut-off valve in suction lines to open after hot gas defrost.

The valve is a pilot controlled valve operated by an external pilot pressure source. This means that the valve can operate with no internal pressure differential (P_d) at all.

Low P_d is the key objective and makes the ICLX valve ideal for applications that are sensitive to differential pressure.

Though P_d is kept low, it can still be quantified, and must be considered when choosing valve size. See section - Selection of ICLX valve - for the impact.

The main valve is provided with two pilot solenoid valves, as well as a nipple for connection to external pilot pressure.

The external pilot pressure line must be connected to a system pressure (p2) which is at least 1.5 bar (20 psi) higher than the inlet pressure (p1) of the valve. The difference between the external pilot pressure and the inlet pressure of the valve defines the maximum opening differential pressure (MOPD) of the ICLX.

The ICLX is kept open when power is applied to the coils placed on the EVM pilot solenoid valves pos. 1 and pos. 2.

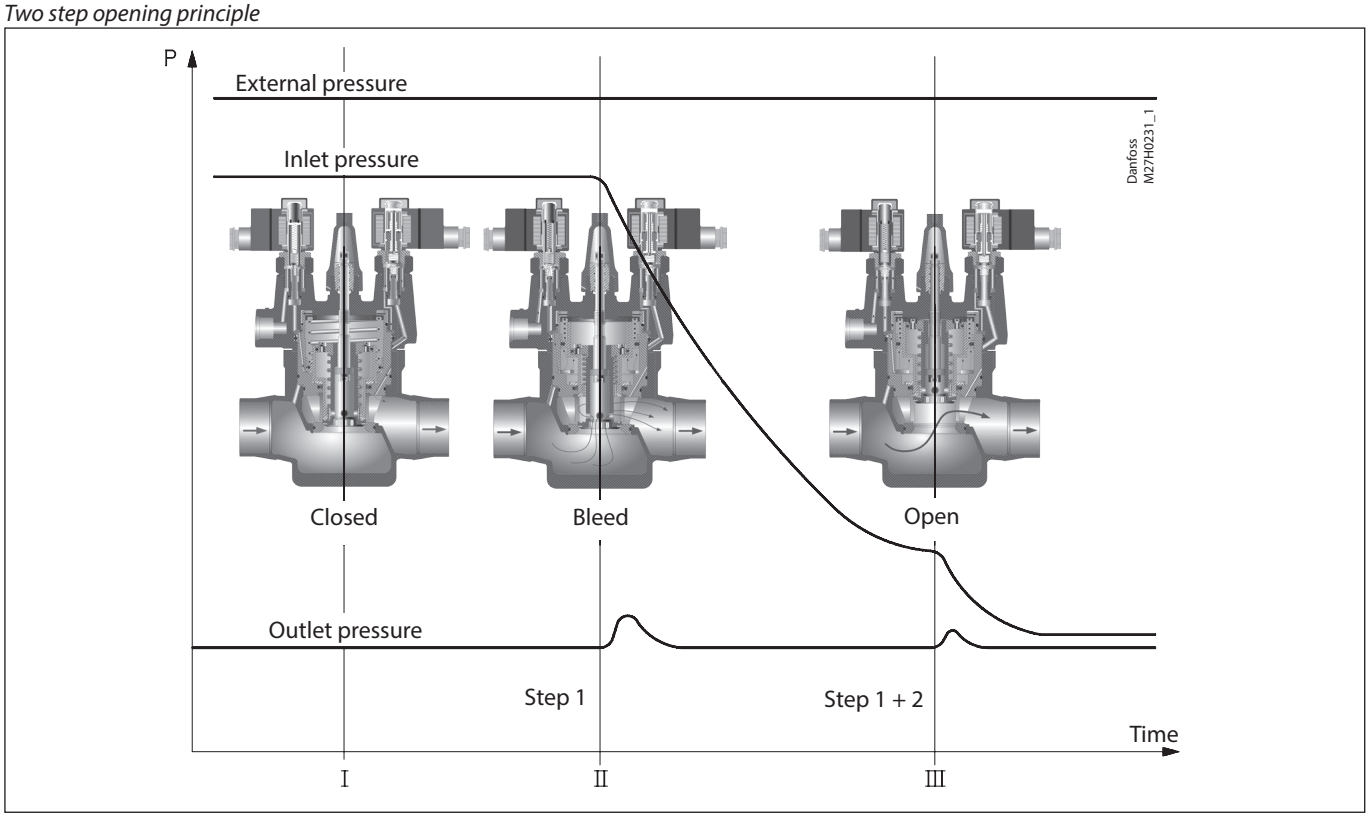
The ICLX is closing and kept closed when the coils on EVM pilot solenoid valves pos. 1 and pos. 2 are de-energised.

The pilot solenoid valve (pos.1) allows external pilot pressure (p_2) to the bottom of the servo piston and thus opens the first step corresponding to approx. 10% of the valve capacity. At the same time the bleed spring will be compressed. This will start a pressure equalization of the inlet pressure (p_1) to the outlet pressure. When the differential pressure across the valve has fallen to approx. 1.25 bar (18 psig) the spring will be strong enough to open the second step and open the valve for full capacity. This way high-pressure pulsations, which would occur when opening for full capacity in one step, can be avoided.

ICLX must not be used in pipe systems where the differential pressure across the main valve in open position can exceed 1 bar (15 psig), otherwise the step two on the valve will close.

Function
(continued)

Two step opening principle



Important note for ICLX valves:
The ICLX valve is kept in its open position by hot gas. The hot gas condenses in the cold valve and creates liquid under the servo piston. When the pilot valves change status to close the ICLX, the pressure on the servo piston equalises with the suction pressure through the pilot valve (pos. 2). This equalisation takes time because condensed liquid is present in the valve.

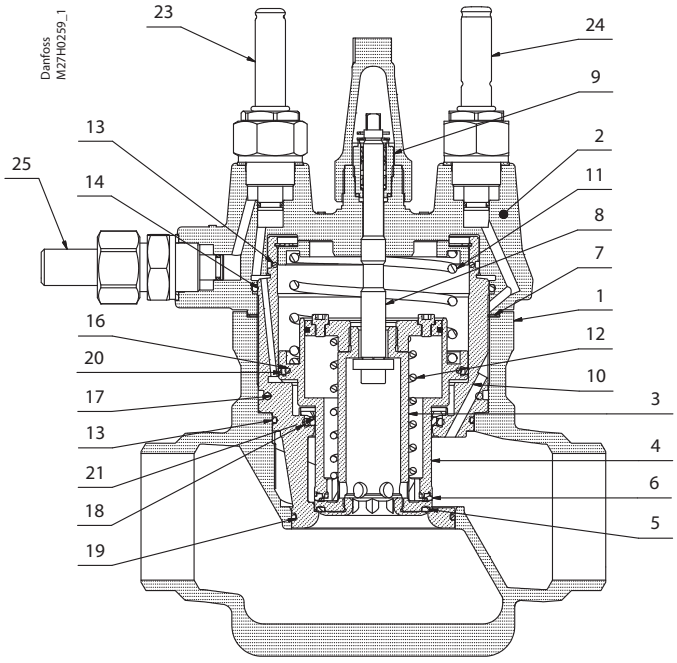
The exact time taken from when the pilot valves change position to complete closing of the ICLX will depend on temperature, pressure, refrigerant and size of valve. Thus an exact closing time for the valves cannot be given but, in general, lower temperatures give longer closing times.

It is very important to take the closing times into consideration when hot gas defrost is performed on evaporators.

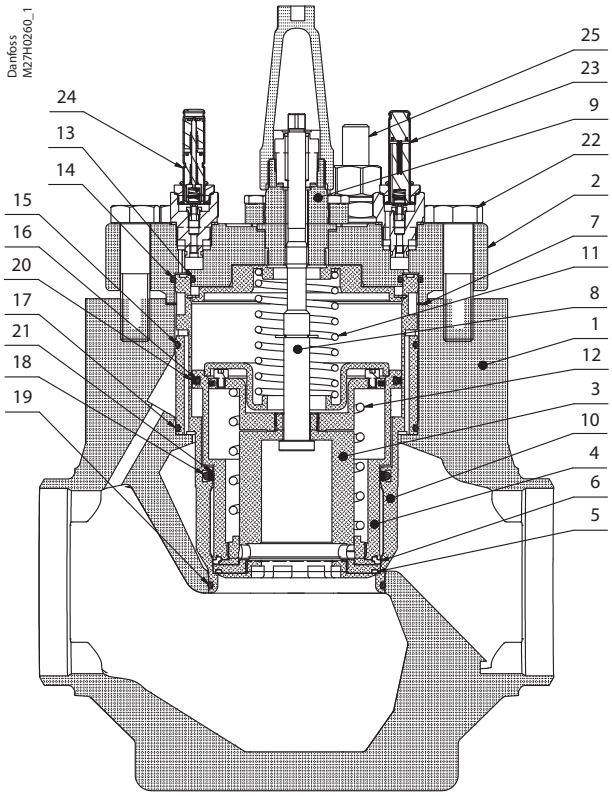
Steps must be taken to ensure that the hot gas supply valve is not opened before the ICLX in the suction line is completely closed. If the hot gas supply valve is opened before the ICLX in the suction line is closed, considerable energy will be lost and potentially dangerous situations might arise because of "liquid hammer". In ICLX valves, the spring-loaded second stage might be induced to hammer by gas and liquid being forced through the valve at $\Delta p > 1.5$ bar across the ICLX. The final result could be severe damage to the valve.

As a rule of thumb a closing time of 2 minutes can be used as a starting point.
The optimum closing time for each individual system must be determined at initial start-up of the plant at intended operational conditions.
It is recommended to check if the closing time needs to be changed when conditions changes (suction pressure, ambient temp. etc.) and closing time should be checked at service of the valve.
Once the optimum closing time has been identified it is recommended to add a safety margin of 30 sec. to the optimum closing time.

Material specification



ICLX 32-65

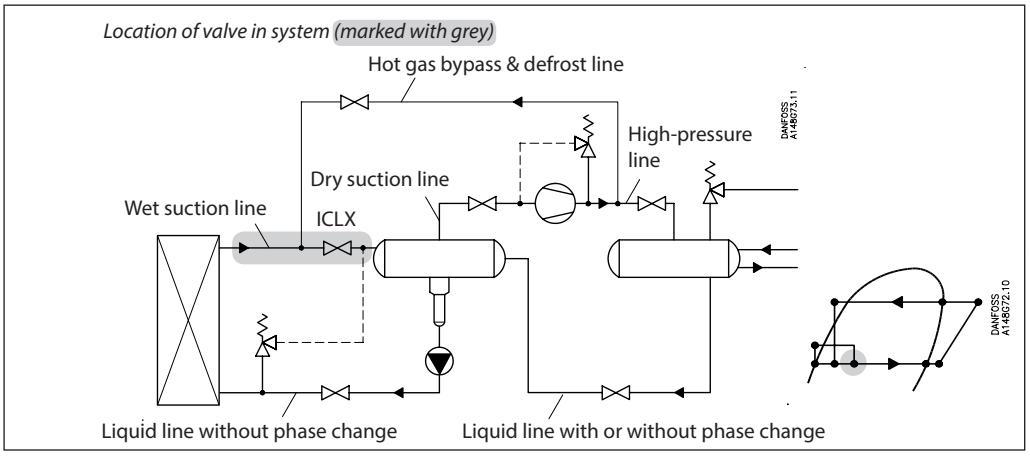


ICLX 100-150

No.	Part	Material	EN	ASTM
1	Valve body	Low temperature steel	G20Mn5QT, EN 10213-3	LCC, A352
2	Top cover	ICLX 32-65: Low temperature steel ICLX 100-150: Low temperature steel	P285QH, EN 10222-4 P275NL2, EN 10028	LF2, A350
3	Main piston	Steel		
4	Bleed piston	Steel		
5	Seat plate main	PTFE		
6	Seat plate bleed	PTFE		
7	Gasket	Fibre, non-asbestos		
8	Spindle manual opener	Stainless steel		
9	Packing gland	Steel		
10	Insert	Steel		
11	Spring - main	Stainless steel		
12	Spring - bleed	Stainless steel		
13	O-ring	Chloroprene (neoprene)		
14	O-ring	Chloroprene (neoprene)		
15	O-ring	ICLX 100-150 only, Chloroprene (neoprene)		
16	O-ring	Chloroprene (neoprene)		
17	O-ring	Chloroprene (neoprene)		
18	O-ring	Chloroprene (neoprene)		
19	O-ring	Chloroprene (neoprene)		
20	Seal	PTFE		
21	Seal	PTFE		
22	Bolt	Stainless steel	A2-70 EN 1515-1	A2-70, B1054
23	EVM pilot NC			
24	EVM pilot NO			
25	External pressure inlet			

Selection of ICLX valve

Wet suction line



Nominal capacities

Wet suction line

SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = –20 °C
Q_0 = 100 kW
Circulation ratio = 3
Max. ΔP = 0.1 bar

The capacity table is based on nominal conditions (pressure drop ΔP = 0.05 bar, circulation ratio = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP = 0.1 bar, $f_{\Delta P}$ = 0.71
Correction factor for circulation ratio, f_{circ} = 0.9

$Q_n = Q_0 \times f_{\Delta P} \times f_{circ}$ = 100 x 0.71 x 0.9 = 63.9 kW.

From the capacity table a ICLX 50 with Q_n = 84 kW is selected.

US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = – 20 °F
Q_0 = 10 TR
Circulation ratio = 3
Max. ΔP = 1.25 psi

The capacity table is based on nominal conditions (pressure drop ΔP = 0.75 psi, circulation ratio = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP = 1.25 psi, $f_{\Delta p}$ = 0.77
Correction factor for circulation ratio, f_{circ} = 0.9

$Q_n = Q_0 \times f_{\Delta P} \times f_{circ} = 10 \times 0.77 \times 0.9 = 6.9$ TR

From the capacity table a ICLX 32 with Q_n = 9.4 TR is selected.

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
circulation ratio = 4,
ΔP = 0.05 bar

R 717

Type	k_v [m^3/h]	Evaporating temperature T_e							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
ICLX 32	22	20	26	32	39	47	55	63	72
ICLX 40	29	27	34	43	52	62	72	83	95
ICLX 50	47	43	56	69	84	100	117	135	153
ICLX 65	83	76	99	122	148	177	207	238	271
ICLX 100	151	138	179	222	270	322	377	433	493
ICLX 125	225	206	267	331	402	480	561	645	734
ICLX 150	390	357	463	574	697	831	973	1118	1273

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	1
0.08	0.79
0.10	0.71
0.14	0.60

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	1
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
circulation ratio = 4,
ΔP = 0.75 psi

R 717

Type	C_v [USgal/min]	Evaporating temperature T_e							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
ICLX 32	26	5.5	7.4	9.4	12	14	17	19	22
ICLX 40	34	7.3	9.8	12	15	19	22	25	29
ICLX 50	55	12	16	20	25	30	36	41	48
ICLX 65	96	21	28	35	44	53	63	73	84
ICLX 100	175	38	51	65	80	97	114	132	153
ICLX 125	261	57	76	96	119	144	170	197	228
ICLX 150	452	98	132	167	206	250	295	342	396

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
circulation ratio = 4,
ΔP = 0.05 bar

R 744

Type	k_v [m^3/h]	Evaporating temperature T_e						
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C
ICLX 32	22	34	38	43	48	51	54	54
ICLX 40	29	44	50	57	63	68	71	71
ICLX 50	47	72	82	93	102	110	115	115
ICLX 65	83	126	145	164	180	193	202	203
ICLX 100	151	230	263	298	328	352	368	370
ICLX 125	225	343	392	443	488	524	548	552
ICLX 150	390	594	679	768	846	909	951	956

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	**1**
0.08	0.79
0.10	0.71
0.14	0.60

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
circulation ratio = 4,
ΔP = 0.75 psi

R 744

Type	C_v [USgal/min]	Evaporating temperature T_e						
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F
ICLX 32	26	9.4	10.9	12.5	14	15	15	15
ICLX 40	34	12.4	14.4	16	18	20	20	20
ICLX 50	55	20	23	27	30	32	33	32
ICLX 65	96	35	41	47	52	56	58	56
ICLX 100	175	65	75	86	95	102	106	102
ICLX 125	261	96	111	128	141	152	157	153
ICLX 150	452	167	193	221	245	263	273	264

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
circulation ratio = 4,
ΔP = 0.05 bar

R 134a

Type	k_v [m^3/h]	Evaporating temperature T_e						
		-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
ICLX 32	22	9	11	13	15	18	20	22
ICLX 40	29	11	14	17	20	23	26	30
ICLX 50	47	18	23	27	32	38	43	48
ICLX 65	83	33	40	49	57	66	75	84
ICLX 100	151	59	73	88	104	121	137	154
ICLX 125	225	88	109	132	155	180	204	229
ICLX 150	390	153	189	228	269	311	354	397

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	**1**
0.08	0.79
0.10	0.71
0.14	0.60

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
circulation ratio = 4,
ΔP = 0.75 psi

R 134a

Type	C_v [USgal/min]	Evaporating temperature T_e						
		-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
ICLX 32	26	2.5	3.1	4	5	5	6	7
ICLX 40	34	3.2	4	5	6	7	8	9
ICLX 50	55	5	7	8	10	11	13	15
ICLX 65	96	9	12	14	17	20	23	26
ICLX 100	175	17	21	26	31	36	42	47
ICLX 125	261	25	32	39	46	54	62	70
ICLX 150	452	44	55	67	80	94	107	121

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
circulation ratio = 4,
ΔP = 0.05 bar

R 404A

Type	k_v [m³/h]	Evaporating temperature T_e							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
ICLX 32	22	10	12	14	17	19	22	24	26
ICLX 40	29	13	16	19	22	25	29	31	34
ICLX 50	47	22	26	31	36	41	46	51	55
ICLX 65	83	38	46	55	64	73	82	90	98
ICLX 100	151	70	84	99	116	132	149	164	178
ICLX 125	225	104	125	148	172	197	221	244	265
ICLX 150	390	180	217	257	299	342	384	424	460

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	**1**
0.08	0.79
0.10	0.71
0.14	0.60

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
circulation ratio = 4,
ΔP = 0.75 psi

R 404A

Type	C_v [USgal/min]	Evaporating temperature T_e							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
ICLX 32	26	2.8	3.5	4.2	5	6	6	7	8
ICLX 40	34	3.7	4.6	6	7	8	8	9	10
ICLX 50	55	6	7	9	11	12	14	15	17
ICLX 65	96	11	13	16	19	22	24	27	29
ICLX 100	175	19	24	29	34	39	44	49	53
ICLX 125	261	29	36	43	51	58	66	73	79
ICLX 150	452	50	62	74	88	101	114	126	137

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

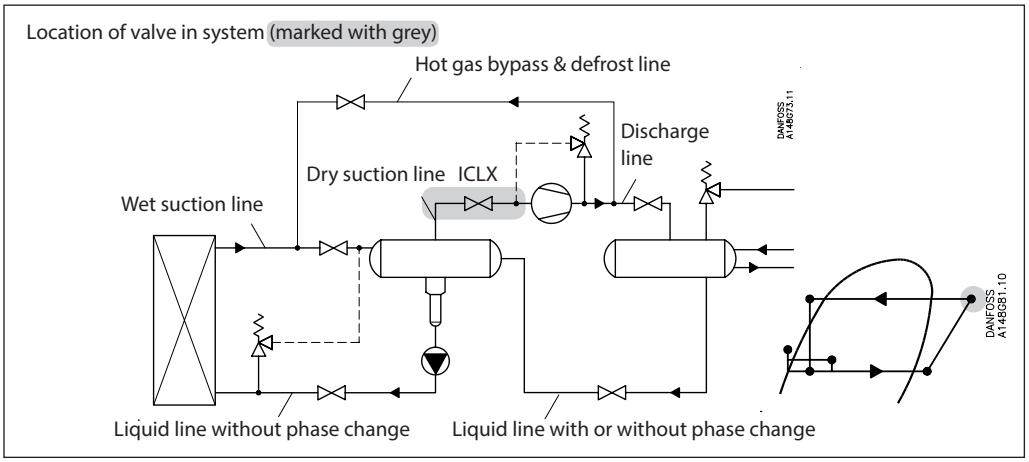
ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for circulation ratio (f_{circ})

Circulation ratio	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

Nominal capacities

Dry suction line



Nominal capacities

Dry suction line

SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = -20 °C
Q_0 = 100 kW
T_{liq} = 10 °C
Max. ΔP = 0.1 bar

The capacity table is based on nominal conditions (pressure drop ΔP = 0.05 bar, T_{liq} = 30 °C).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP = 0.1 bar, $f_{\Delta P}$ = 0.71
Correction factor for liquid temperature, f_{Tliq} = 0.92

Correction factor for superheat (T_s) = 1.0
$Q_n = Q_0 \times f_{\Delta P} \times f_{Tliq} \times f_{Ts}$
$= 100 \times 0.71 \times 0.92 \times 1.0 = 65.3$ kW

From the capacity table a ICLX 40 with Q_n = 79 kW is selected.

US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = 0 °F
Q_0 = 30 TR
T_{liq} = 50 °F
Max. ΔP = 1.25 psi

The capacity table is based on nominal conditions (pressure drop ΔP = 0.75 psi, T_{liq} = 90 °F)

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP = 1.25 psi, $f_{\Delta p}$ = 0.77
Correction factor for liquid temperature, f_{Tliq} = 0.92

Correction factor for superheat (T_s) = 1.0
$Q_n = Q_0 \times f_{\Delta P} \times f_{Tliq} \times f_{Ts}$
$= 30 \times 0.77 \times 0.92 \times 1.0 = 21.25$ TR

From the capacity table a ICLX 40 with Q_n = 24 TR is selected.

Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30 °C,
ΔP = 0.05 bar
Superheat = 8K

R 717

Type	k_v [m³/h]	Evaporating temperature T_e							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
ICLX 32	22	28	37	48	60	74	90	108	127
ICLX 40	29	37	49	63	79	98	119	142	168
ICLX 50	47	61	80	103	129	159	193	230	272
ICLX 65	83	107	141	181	227	280	340	407	481
ICLX 100	151	195	257	330	414	510	619	740	875
ICLX 125	225	290	383	491	616	760	922	1103	1304
ICLX 150	390	503	663	851	1069	1317	1598	1912	2259

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	**1**
0.08	0.79
0.10	0.71
0.14	0.60

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
-20 °C	0.82
-10 °C	0.86
0 °C	0.88
10 °C	0.92
20 °C	0.96
30 °C	**1**
40 °C	1.04
50 °C	1.09

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90 °F,
ΔP = 0.75 psi
Superheat = 12 °F

R 717

Type	C_v [USgal/min]	Evaporating temperature T_e							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
ICLX 32	26	7.8	10.6	14.0	18	23	28	34	40
ICLX 40	34	10.3	14.0	18	24	30	37	44	53
ICLX 50	55	17	23	30	38	48	59	72	86
ICLX 65	96	30	40	53	68	85	105	127	152
ICLX 100	175	54	73	96	123	155	191	231	276
ICLX 125	261	80	109	143	184	231	284	345	412
ICLX 150	452	139	189	248	319	400	493	598	713

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10 °F	0.82
10 °F	0.85
30 °F	0.88
50 °F	0.92
70 °F	0.96
90 °F	**1**
110 °F	1.04
130 °F	1.09

Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 10 °C,
ΔP = 0.05 bar
Superheat = 8K

R 744

Type	k_v [m^3/h]	Evaporating temperature T_e						
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C
ICLX 32	22	38	47	56	67	78	89	102
ICLX 40	29	50	62	74	88	103	118	134
ICLX 50	47	82	101	120	142	166	191	217
ICLX 65	83	144	178	213	251	293	337	383
ICLX 100	151	263	324	387	457	534	614	697
ICLX 125	225	391	482	577	681	795	915	1039
ICLX 150	390	678	836	1000	1181	1379	1585	1801

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	**1**
0.08	0.79
0.1	0.71
0.14	0.6

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
-20 °C	0.75
-10 °C	0.81
0 °C	0.89
10 °C	1
15 °C	1.08

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 50 °F,
ΔP = 0.75 psi
Superheat = 12 °F

R 744

Type	C_v [USgal/min]	Evaporating temperature T_e						
		–60 °F*	–40 °F	–20 °F	0 °F	20 °F	40 °F	60 °F
ICLX 32	26	10.6	13.4	16.3	20	23	27	31
ICLX 40	34	13.9	17.7	22	26	31	36	41
ICLX 50	55	23	29	35	42	50	58	66
ICLX 65	96	40	51	62	74	87	102	117
ICLX 100	175	73	92	112	135	159	185	213
ICLX 125	261	108	137	167	201	237	276	317
ICLX 150	452	188	238	290	348	411	478	549

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
-10 °F	0.73
10 °F	0.80
30 °F	0.89
50 °F	1
60 °F	1.08

Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30 °C,
ΔP = 0.05 bar
Superheat = 8K

R 134a

Type	k_v [m³/h]	Evaporating temperature T_e						
		-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
ICLX 32	22	10	13	16	21	26	31	38
ICLX 40	29	13	17	21	27	34	41	50
ICLX 50	47	20	27	35	44	55	67	82
ICLX 65	83	36	47	61	78	97	119	144
ICLX 100	151	65	86	112	141	176	216	262
ICLX 125	225	98	129	167	211	262	322	390
ICLX 150	390	169	223	289	365	454	558	676

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	**1**
0.08	0.79
0.10	0.71
0.14	0.60

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
-20 °C	0.66
-10 °C	0.70
0 °C	0.76
10 °C	0.82
20 °C	0.90
30 °C	**1**
40 °C	1.13
50 °C	1.29

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90 °F,
ΔP = 0.75 psi
Superheat = 12 °F

R 134a

Type	C_v [USgal/min]	Evaporating temperature T_e						
		-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
ICLX 32	26	2.7	3.7	5	6	8	10	12
ICLX 40	34	3.6	5	6	8	11	13	16
ICLX 50	55	6	8	10	13	17	21	26
ICLX 65	96	10	14	18	24	30	38	46
ICLX 100	175	19	25	34	43	55	69	84
ICLX 125	261	28	38	50	64	82	102	125
ICLX 150	452	48	65	87	112	141	177	216

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
-10 °F	0.64
10 °F	0.68
30 °F	0.74
50 °F	0.81
70 °F	0.89
90 °F	**1**
110 °F	1.15
130 °F	1.35

Nominal capacities

Dry suction line

R 404A

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30 °C,
ΔP = 0.05 bar
Superheat = 8K

Type	k_v [m³/h]	Evaporating temperature T_e							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
ICLX 32	22	8	11	15	19	24	29	35	43
ICLX 40	29	11	15	19	25	31	38	47	56
ICLX 50	47	18	24	31	40	50	62	76	91
ICLX 65	83	32	42	56	71	89	109	133	161
ICLX 100	151	58	77	101	129	162	199	243	293
ICLX 125	225	86	115	151	192	241	297	362	436
ICLX 150	390	149	199	261	333	417	515	627	756

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.01	2.24
0.03	1.29
0.05	**1**
0.08	0.79
0.10	0.71
0.14	0.60

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20 °C	0.55
–10 °C	0.60
0 °C	0.66
10 °C	0.74
20 °C	0.85
30 °C	**1**
40 °C	1.23
50 °C	1.68

R 404A

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90 °F,
ΔP = 0.75 psi
Superheat = 12 °F

Type	C_v [USgal/min]	Evaporating temperature T_e							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
ICLX 32	26	2.3	3.2	4.3	6	7	9	11	14
ICLX 40	34	3.1	4.2	6	7	9	12	15	18
ICLX 50	55	5	7	9	12	15	19	24	29
ICLX 65	96	9	12	16	21	27	34	42	51
ICLX 100	175	16	22	30	39	49	62	77	94
ICLX 125	261	24	33	44	58	73	92	114	139
ICLX 150	452	41	57	76	100	127	160	198	242

* 2 °F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

Correction factor for liquid temperature (T_{liq})

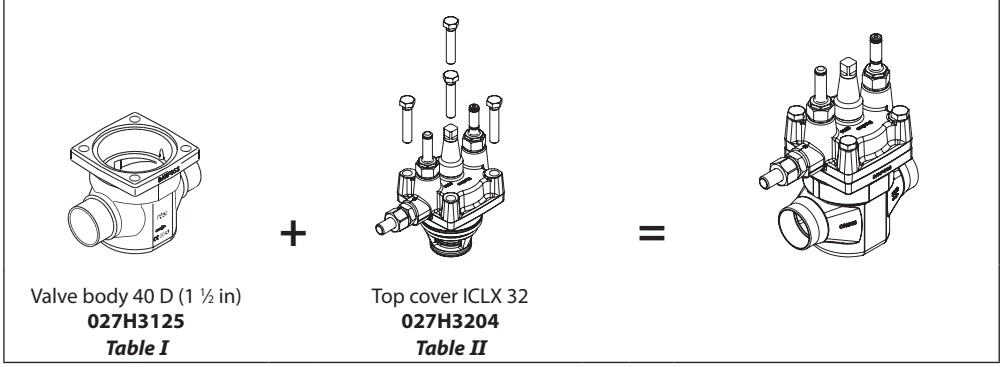
Liquid temperature	Correction factor
-10 °F	0.52
10 °F	0.57
30 °F	0.63
50 °F	0.72
70 °F	0.83
90 °F	**1**
110 °F	1.29
130 °F	1.92

ICLX 32

Ordering from the parts programme

Please note:
The ICLX function modules can only be used in housings produced in or after week 49 2012; thus the week code on the housing must be 4912 or higher.

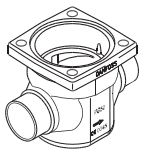
Example (select from table I and II)



Valve body 40 D (1 ½ in)
027H3125
Table I

Top cover ICLX 32
027H3204
Table II

ICV 32 valve body w/different connections *Table I*

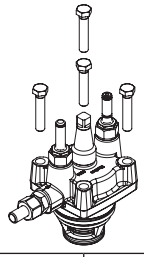


32 D (1 ¼ in)	40 D (1 ½ in)	42 SA (1 ⅝ in)	42 SD (1 ⅝ in)
027H3120	**027H3125**	**027H3127**	**027H3128**

35 SD (1 ⅜ in SA)	32 A (1 ¼ in)	32 SOC (1 ¼ in)	40 A (1 ½ in)
027H3123	**027H3121**	**027H3122**	**027H3126**

D = Butt-weld DIN ; A = Butt-weld ANSI ;
SOC = Socket weld ANSI ; SD = Solder DIN ; SA = Solder ANSI ;

ICLX 32 Function module / top cover *Table II*

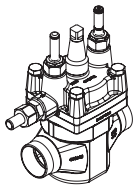


Description	Code Number
ICLX 32	**027H3204** *)

*) Including external pilot connection, NC/NO pilot valves, gasket and O-rings

Ordering complete factory assembled valve
(body, function module / top cover)

Table A



	Available connections							
	32 D (1 ¼ in)	40 D (1 ½ in)	42 SA (1 ⅝ in)	42 SD (1 ⅝ in)	35 SD (1 ⅜ in SA)	32 A (1 ¼ in)	32 SOC (1 ¼ in)	40 A (1 ½ in)
ICLX 32	**027H3040**					**027H3041**	**027H3042**	

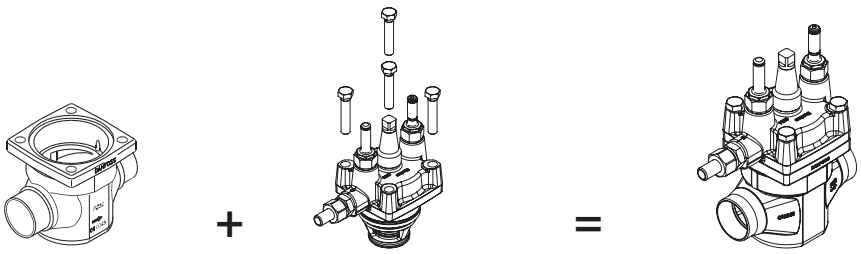
Select from parts programme

ICLX 40

Ordering from the parts programme

Please note:
The ICLX function modules can only be used in housings produced in or after week 49 2012; thus the week code on the housing must be 4912 or higher.

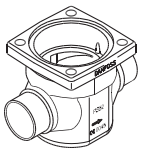
Example (select from table I and II)



Valve body A 40 (1 ½ in)
027H4121
Table I

Top cover ICLX 40
027H4204
Table II

ICV 40 valve body w/different connections *Table I*

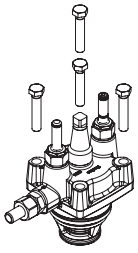


40 D (1 ½ in)	50 D (2 in)	42 SA (1 ⅝ in)	42 SD (1 ⅝ in)
027H4120	**027H4126**	**027H4124**	**027H4123**

40 A (1 ½ in)	40 SOC (1 ½ in)	50 A (2 in)	
027H4121	**027H4122**	**027H4127**	

D = Butt-weld DIN ; A = Butt-weld ANSI ;
SOC = Socket weld ANSI ; SD = Solder DIN ; SA = Solder ANSI ;

ICLX 40 Function module / top cover *Table II*

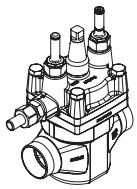


Description	Code Number
ICLX 40	**027H4204** *)

*) Including external pilot connection, NC/NO pilot valves, gasket and O-rings

Ordering complete factory assembled valve
(body, function module / top cover)

Table A



	Available connections						
	40 D (1 ½ in)	50 D (2 in)	42 SA (1 ⅝ in)	42 SD (1 ⅝ in)	40 A (1 ½ in)	40 SOC (1 ½ in)	50 A (2 in)
ICLX 40	**027H4040**				**027H4041**	**027H4042**	

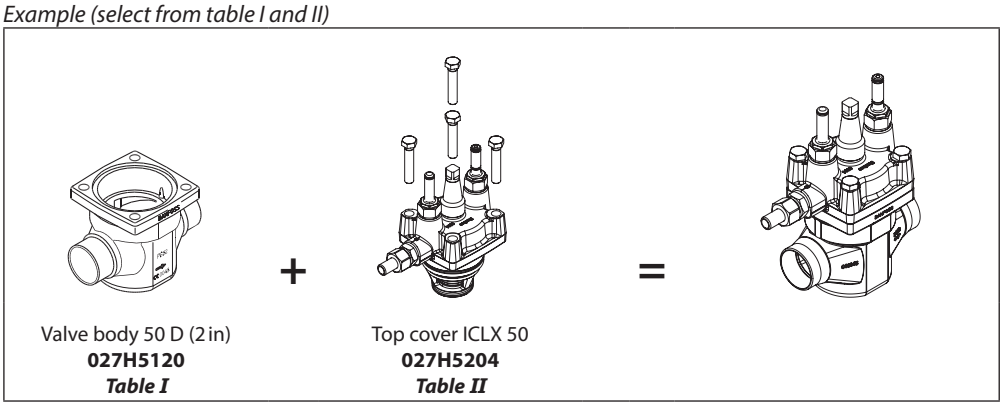
Select from parts programme

ICLX 50

Ordering from the parts programme

Please note:
The ICLX function modules can only be used in housings produced in or after week 49 2012; thus the week code on the housing must be 4912 or higher.

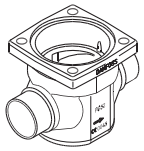
Example (select from table I and II)



Valve body 50 D (2 in)
027H5120
Table I

Top cover ICLX 50
027H5204
Table II

ICV 50 valve body w / different connections *Table I*

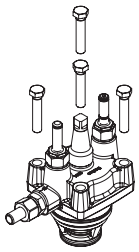


50 D (2 in)	65 D (2 ½ in)	54 SD (2 ⅛ in SA)	50 A (2 in)
027H5120	**027H5124**	**027H5123**	**027H5121**

50 SOC (2 in)	65 A (2 ½ in)		
027H5122	**027H5125**		

D = Butt-weld DIN ; A = Butt-weld ANSI ;
SOC = Socket weld ANSI ; SD = Solder DIN ; SA = Solder ANSI ;

ICLX 50 Function module / top cover *Table II*

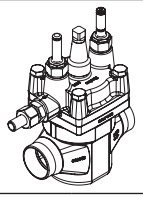


Description	Code Number
ICLX 50	**027H5204** *)

*) Including external pilot connection, NC / NO pilot valves, gasket and O-rings

Ordering complete factory assembled valve
(body, function module / top cover)

Table A



	Available connections					
	50 D (2 in)	65 D (2 ½ in)	54 SD (2 ⅛ in SA)	50 A (2 in)	50 SOC (2 in)	65 A (2 ½ in)
ICLX 50	**027H5040**			**027H5041**	**027H5042**	

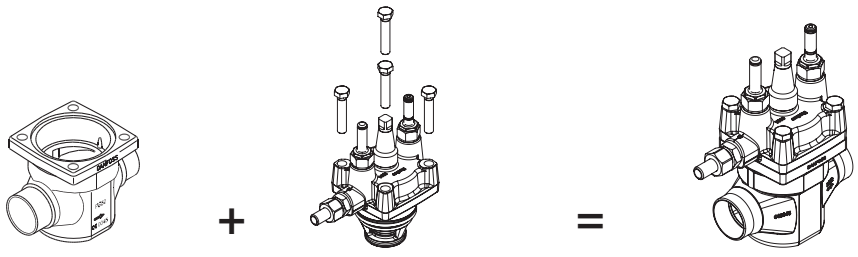
Select from parts programme

ICLX 65

Ordering from the parts programme

Please note:
The ICLX function modules can only be used in housings produced in or after week 49 2012; thus the week code on the housing must be 4912 or higher.

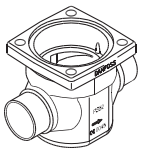
Example (select from table I and II)



Valve body 65 SOC (2 ½ in)
027H6123
Table I

Top cover ICLX 65
027H6204
Table II

ICV 65 valve body w/different connections *Table I*

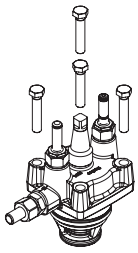


65 D (2 ½ in)	65 A (2 ½ in)	80 D (3 in)	80 A (3 in)
027H6120	**027H6121**	**027H6126**	**027H6127**

67 SA (2 ⅝ in)	76 SD (3 in)	65 SOC (2 ½ in)	
027H6125	**027H6124**	**027H6123**	

D = Butt-weld DIN ; A = Butt-weld ANSI ;
SOC = Socket weld ANSI ; SD = Solder DIN ; SA = Solder ANSI ;

ICLX 65 Function module / top cover *Table II*

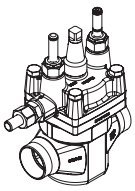


Description	Code Number
ICLX 65	**027H6204 *)**

*) Including external pilot connection, NC/NO pilot valves, gasket and O-rings

Ordering complete factory assembled valve
(body, function module/top cover)

Table A



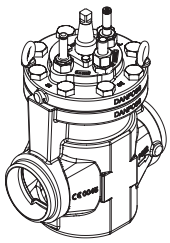
	Available connections						
	65 D (2 ½ in)	65 A (2 ½ in)	80 D (3 in)	80 A (3 in)	67 SA (2 ⅝ in)	76 SD (3 in)	65 SOC (2 ½ in)
ICLX 65	**027H6040**	**027H6041**	**027H8040**	**027H8042**			**027H6042**

Select from parts programme

Complete factory assembled valve

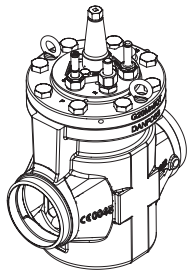
(body, function module/ topcover and NC/NO pilot valves)

ICLX 100



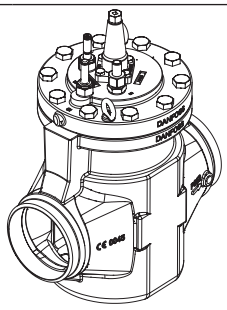
	Available connections	
	100 D (4 in.)	100 A (4 in.)
ICLX 100	**027H7147**	**027H7148**

ICLX 125



	Available connections	
	125 D (5 in.)	125 A (5 in.)
ICLX 125	**027H7157**	**027H7158**

ICLX 150

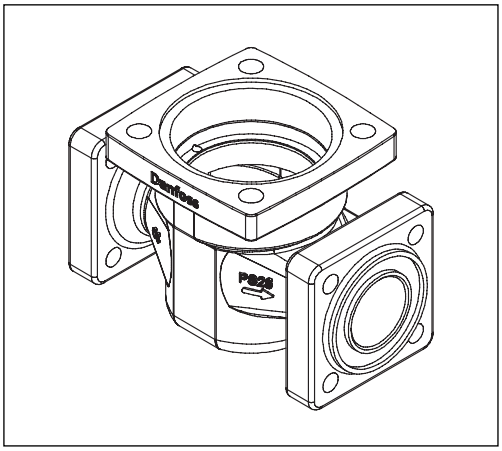


	Available connections	
	150 D (6 in.)	150 A (6 in.)
ICLX 150	**027H7167**	**027H7168**

Accessories

ICV PM flanged valve housings
ICV PM flanged valve housings can replace the PM valves on already installed refrigeration systems.

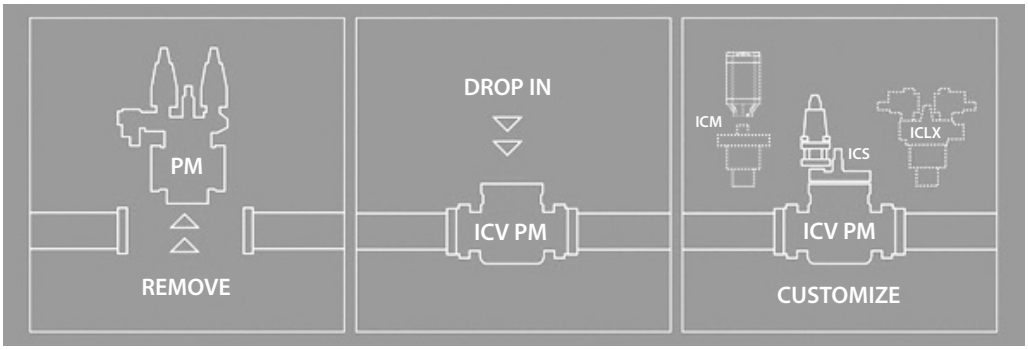
Pressure range
The ICV PM valve housing is designed for a max. working pressure of 28 bar g (406 psig) and therefore a suitable replacement for PM valves in the service market. They also offer the same drop-in dimensions as the PM valves.



Description	Code no.
ICV 25 PM Valve housing	**027H2119 *)**
ICV 32 PM Valve housing	**027H3129 *)**
ICV 40 PM Valve housing	**027H4128 *)**
ICV 50 PM Valve housing	**027H5127 **)**
ICV 65 PM Valve housing	**027H6128 **)**

*) Includes ICV PM valve housing, flange gaskets and flange bolts.
**) Includes ICV PM valve housing, flange gaskets, flange bolts and flange nuts.

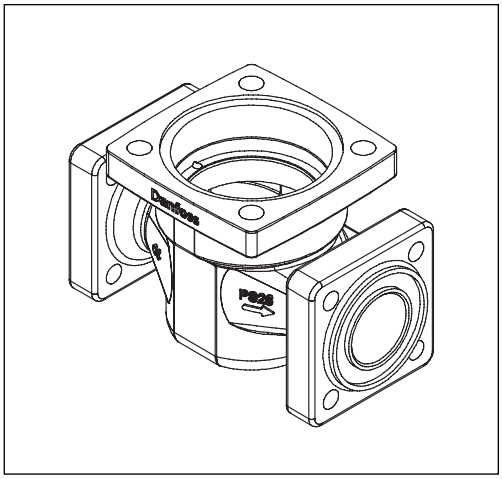
Function modules and top covers must be ordered separately (see the section "Ordering").



Accessories

ICV (H)A4A flanged valve housings
ICV (H)A4A flanged valve housings can replace the (H)A4A valves on already installed refrigeration systems.

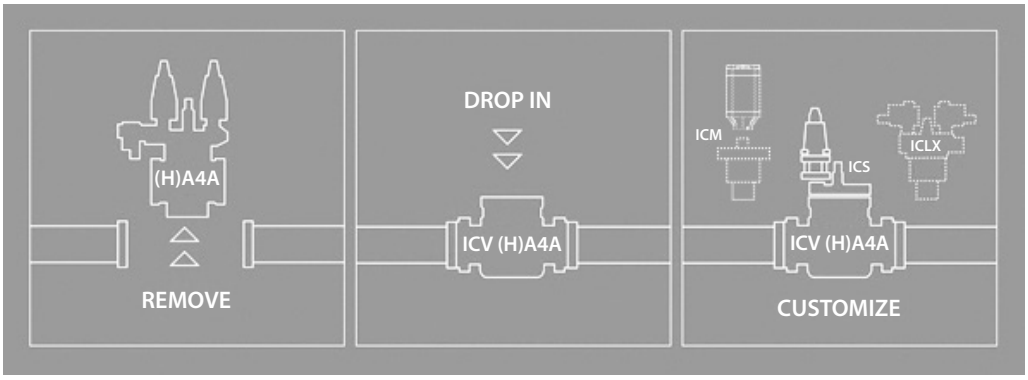
Pressure range
The ICV (H)A4A valve housing is designed for a max. working pressure of 28 bar g (406 psig) and therefore a suitable replacement for (H)A4A valves in the service market. They also offer the same drop-in dimensions as the (H)A4A valves.



Description	Code no.
ICV 25 (H)A4A Valve housing	**027H2304** *)
ICV 32 A4A Valve housing	**027H3130** *)
ICV 32 HA4A Valve housing	**027H3131** *)
ICV 40 (H)A4A Valve housing	**027H4129** *)
ICV 50 (H)A4A Valve housing	**027H5128** **)
ICV 65 (H)A4A Valve housing	**027H6129** **)

*) Includes ICV (H)A4A valve housing, flange gaskets and flange bolts.
**) Includes ICV (H)A4A valve housing, flange gaskets, flange bolts and flange nuts.

Function modules and top covers must be ordered separately (see the section "Ordering").

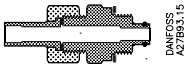


Accessories

Cap including gasket

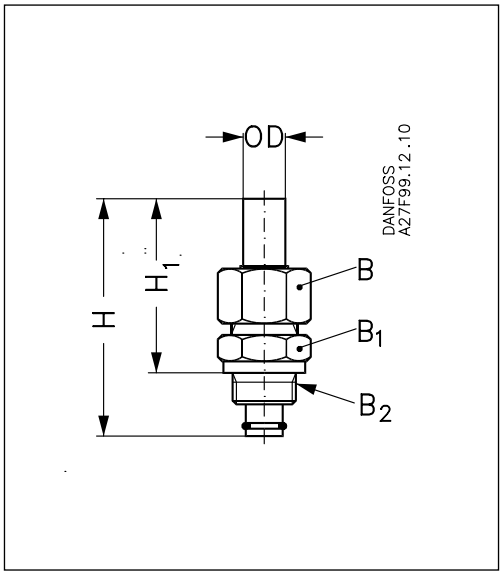
Valve size	Code number
ICLX 32-40	**148B3259**
ICLX 50-100	**148B4075**
ICLX 125-150	**148B4076**

External pilot connection



ICLX	Description	Code no.
32 – 80	External pilot connection (incl. damping orifice, D: 1.0 mm)	**027F1048**
32 – 80	External pilot connection (1/4" FPT) (incl. damping orifice, D: 1.0 mm)	**027B2065**
100 – 150	External polot connection (incl. damping orifice, D: 1.8 mm)	**027F1049**
100 – 150	External pilot connection (1/4" FPT) (incl. damping orifice, D: 1.8 mm)	**027B2066**
32 – 150	Accessory bag with seal and O-ring for pilot valve	**027F0666**

ICLX	Description	Code no.
32 – 80	Damping orifice for EVM. 10 pcs, (D: 1.0 mm)	**027F0664**
100 – 150	Damping orifice for EVM. 10 pcs, (D: 1.8 mm)	**027F0176**

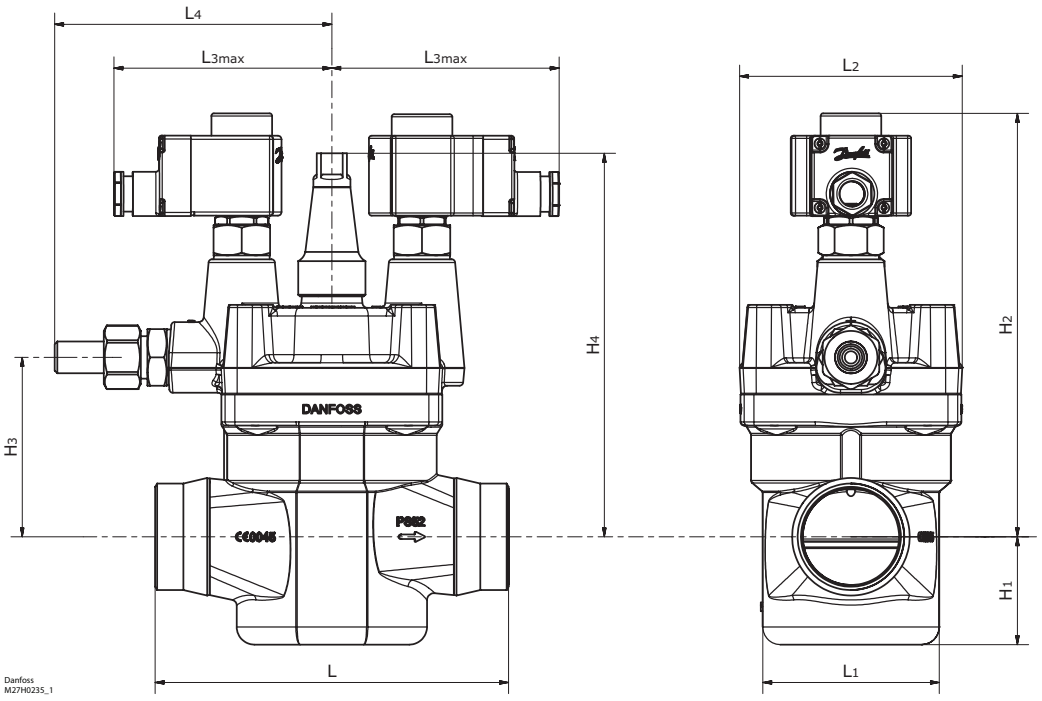


A damping orifice should be installed if the pressure difference between the low and the high pressure side is more than 6 bar.

Accessories			H	H_1	OD	B	B_1	B_2
External pilot connection								
	[mm] [in]		90 3.54	66 2.60	18 0.71	NV 32	NV 32	M 24 × 1.5

ICLX 32-65

Dimensions



ICLX 32	L							
	32 D	40 D	32 A	40 A	32 SOC	35 SD	42 SD	42 SA
[mm]	145	145	145	145	148	148	148	148
[in]	5.7	5.7	5.7	5.7	5.8	5.8	5.8	5.8

ICLX 32	L_1	L_2	L_3 max		L_4	H_1	H_2	H_3	H_4	Net weight
			10W	20W						
[mm]	75	104	125	135	159	43	193	82	168	9.9 kg
[in]	3.0	4.1	4.9	5.3	6.3	1.7	7.6	3.2	6.6	21.8 lb

ICLX 40	L						
	40 D	50 D	40 A	50 A	40 SOC	42 SD	42 SA
[mm]	160	180	160	180	180	180	180
[in]	6.3	7.1	6.3	7.1	7.1	7.1	7.1

ICLX 40	L_1	L_2	L_3 max		L_4	H_1	H_2	H_3	H_4	Net weight
			10W	20W						
[mm]	86	109	125	135	157	52	217	87	174	11.7 kg
[in]	3.4	4.3	4.9	5.3	6.2	2.0	8.5	3.4	6.9	25.8 lb

ICLX 50	L					
	50 D	65 D	50 A	65 A	50 SOC	54 SD
[mm]	200	210	200	210	216	216
[in]	7.9	8.3	7.9	8.3	8.5	8.5

ICLX 50	L_1	L_2	L_3 max		L_4	H_1	H_2	H_3	H_4	Net weight
			10W	20W						
[mm]	100	126	125	135	157	61	240	102	217	15.3 kg
[in]	3.9	5.0	4.9	5.3	6.2	2.4	9.4	4.0	8.5	33.7 lb

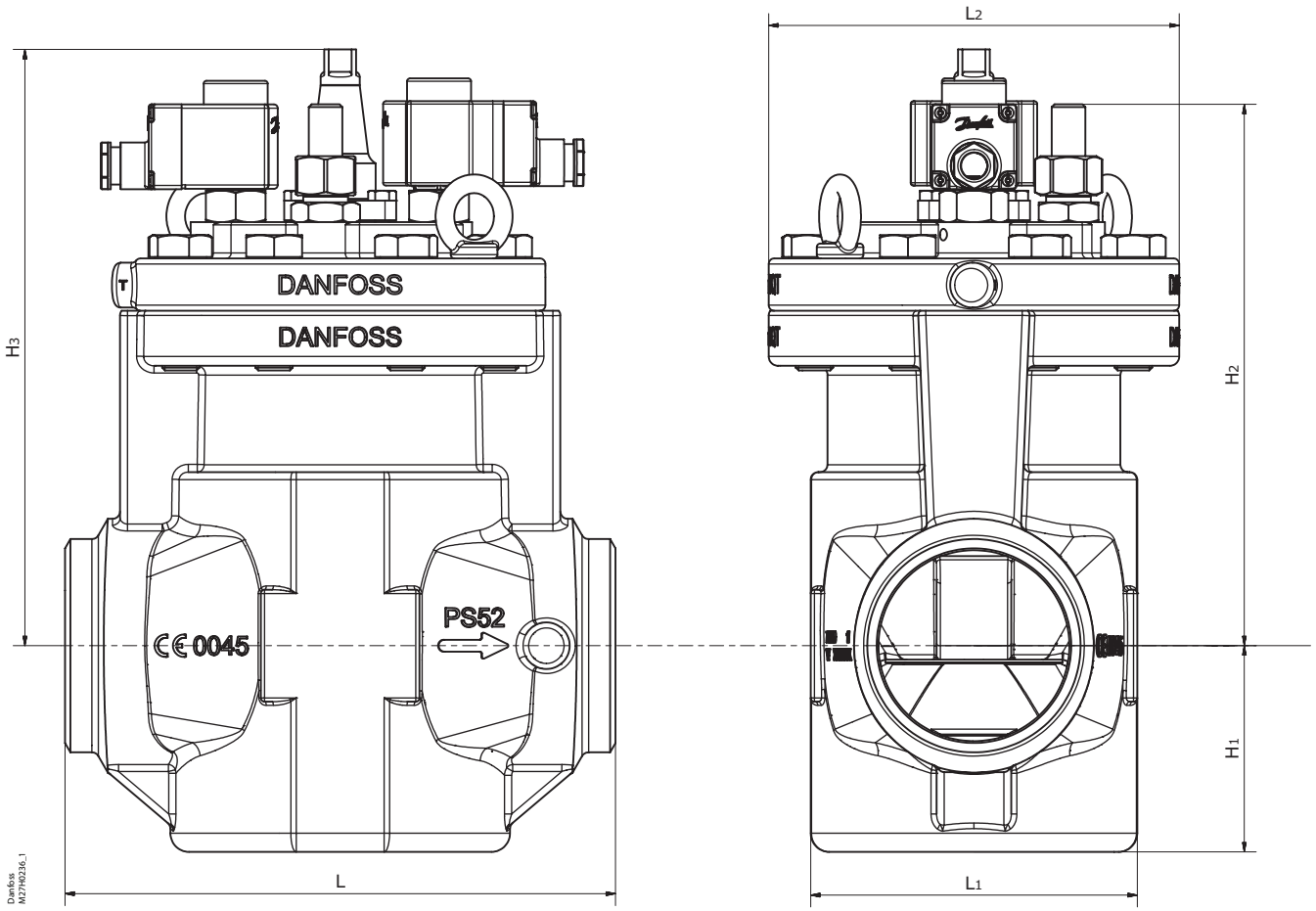
ICLX 65	L						
	65 D	80 D	65 A	80 A	65 SOC	76 SD	67 SA
[mm]	230	245	230	245	230	245	245
[in]	9.1	9.6	9.1	9.6	9.1	9.6	9.6

ICLX 65	L_1	L_2	L_3 max		L_4	H_1	H_2	H_3	H_4	Net weight
			10W	20W						
[mm]	130	141	125	135	163	69	257	123	234	20.3 kg
[in]	5.1	5.6	4.9	5.3	6.4	2.7	10.1	4.8	9.2	44.7 lb

D = Butt-weld DIN ; A = Butt-weld ANSI ; SOC = Socket weld ANSI ; SD = Solder DIN ; SA = Solder ANSI

ICLX 100-150

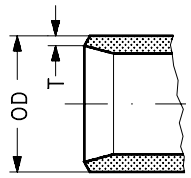
Dimensions



Type		L	L_1	L_2	H_1	H_2	H_3	Net weight
ICLX 100	[mm]	295	175	220	111	297	320	53.2 kg
	[in]	11.6	6.9	8.7	4.4	11.7	12.6	117.3 lb
ICLX 125	[mm]	350	215	260	142	305	376	80.8 kg
	[in]	13.8	8.5	10.2	5.6	12	14.8	178.1 lb
ICLX 150	[mm]	445	255	300	170	357	426	132.5 kg
	[in]	17.5	10.0	11.8	6.7	14.1	16.8	292.1 lb

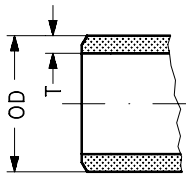
Connections

D: *Butt-weld (EN 10220)*



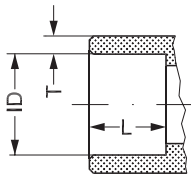
Size [mm]	Size [in]	OD [mm]	T [mm]	OD [in]	T [in]		
32	(1 ¼)	42.4	2.6	1.669	0.102		
40	(1 ½)	48.3	2.6	1.902	0.103		
50	(2)	60.3	2.9	2.37	0.11		
65	(2 ½)	76.1	2.9	3	0.11		
80	(3)	88.9	3.2	3.50	0.13		
100	(4)	114.3	6	4.5	0.24		
125	(5)	140.7	6.5	5.5	0.26		
150	(6)	168.3	7.1	6.6	0.28		

A: *Butt-weld ANSI (B 36.10)*



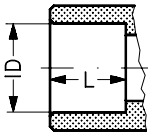
Size [mm]	Size [in]	OD [mm]	T [mm]	OD [in]	T [in]	Schedule	
(32)	1 ¼	42.4	4.9	1.669	0.193	80	
(40)	1 ½	48.3	5.1	1.902	0.201	80	
(50)	2	60.3	3.9	2.37	0.15	40	
(65)	2 ½	73.0	5.2	2.87	0.20	40	
(80)	3	88.9	5.5	3.50	0.22	40	
(100)	4	114.3	6	4.5	0.24		
(125)	5	140.7	6.5	5.5	0.26		
(150)	6	168.3	7.1	6.6	0.28		

SOC:
Socket welding ANSI (B 16.11)



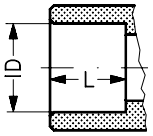
Size [mm]	Size [in]	ID [mm]	T [mm]	ID [in]	T [in]	L [mm]	L [in]
(32)	1 ¼	42.7	6.1	1.743	0.240	13	0.51
(40)	1 ½	48.8	6.6	1.921	0.260	13	0.51
(50)	2	61.2	6.2	2.41	0.24	16	0.63
(65)	2 ½	74	8.8	2.91	0.344	16	0.63

SD: *Soldering (EN 1254-1)*



Size [mm]	Size [in]	ID [mm]		ID [in]		L [mm]	L [in]
35		35.07				25	
42		42.07				28	
54		54.09				33	
76		76.1				33	

SA: Soldering (ANSI B 16.22)



	Size [in]			ID [in]			L [in]
	1 ⅜			1.375			0.984
	1 ⅝			1.625			1.102
	2 ⅛			2.125			1.300
	2 ½			2.625			1.300

ENGINEERING
TOMORROW

Solenoid valves
EVRA and EVRAT

Contents **Page**

DKRCI.PD.BM0.B6.02 | 2016.06

Solenoid valves
EVRA and EVRAT

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

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

EVRAT is an assisted lift, servo operated solenoid valve for liquid, suction and hot gas lines with ammonia and fluorinated refrigerants.

EVRAT is specially designed to open - and stay open - at a pressure drop of 0 bar. The EVRAT solenoid valve is thus suitable for use in all plant where the required opening differential pressure is 0 bar.

EVRAT is available as components, i.e. valve body, flanges and coil must be ordered separately.

EVRAT 10, 15 and 20 all have spindle for manual operation.

Technical data

- Refrigerants:
  Applicable to HCFC, HFC and R717 (Ammonia)
- Temperature of medium
  -40 – 105 °C
  Max. 130 °C during defrosting.
- Ambient temperature and enclosure for coil
  see "Coils for solenoid valves", DKRCC.PD.BS0.F.
- Classification: DNV, CRN, BV, EAC etc.
  To get an updated list of certification on the products please contact your local Danfoss Sales Company

Type	Opening differential pressure with standard coil (Δp bar)				Temperature of medium	Max. working pressure PB [bar]	k_V-value [1] [m³/h]
	Min.	Max. (= MOPD) liquid [2] 10 W AC	12 W AC	20 W DC	[°C]		
EVRA 3	0.00	21	25	14	-40 – 105	42	0.23
EVRA 10	0.05	21	25	18	-40 – 105	42	1.5
EVRAT 10	0.00	14	21	16	-40 – 105	42	1.5
EVRA 15	0.05	21	25	18	-40 – 105	42	2.7
EVRAT 15	0.00	14	21	16	-40 – 105	42	2.7
EVRA 20 with AC coil	0.05	21	25	13	-40 – 105	42	4.5
EVRA 20 with DC coil	0.05	19	21	16	-40 – 105	42	4.5
EVRAT 20	0.00	14	21	13	-40 – 105	42	4.5
EVRA 25	0.20	21	25	14	-40 – 105	42	10.0
EVRA 32	0.20	21	25	14	-40 – 105	42	16.0
EVRA 40	0.20	21	25	14	-40 – 105	42	25.0

1) The k_v value is the water flow in m^3/h at a pressure drop across valve of 1 bar, $\rho = 1000\ kg/m^3$.
2) MOPD for media in gas form is approx. 1 bar greater.

Ordering valve with coil

Type	Manual Stem	Inlet connection type	Orifice size [mm]	Max OPD 10W AC [bar]	Max OPD 20W DC [bar]	Coil type	Coil connection	Supply voltage [V] AC	Frequency [Hz]	Power consumption [W]	Singlepack/ Multipack (12 pcs.)	Code number
EVRA 3	No	Flange*	3	21	14	BF230AS	Cable (1 m/3.3 ft)	220 - 230	50	10	Multipack	032F310231
EVRA 3	No	Flange*	3	21	14	BE230AS	Connection Box	220 - 230	50	10	Multipack	032F310331
EVRA 3	No	Flange*	3	21	14	BE230CS	Connection Box	220 - 230	50/60	10	Multipack	032F310332
EVRA 10	No	Flange*	10	21	18	BE230AS	Connection Box	220 - 230	50	10	Multipack	032F620831
EVRA 10	Yes	Flange*	10	21	18	BF230AS	Cable (1 m/3.3 ft)	220 - 230	50	10	Singlepack	032F621231
EVRA 10	Yes	Flange*	10	21	18	BE230AS	Connection Box	220 - 230	50	10	Singlepack	032F621331
EVRA 10	Yes	Flange*	10	21	18	BE230CS	Connection Box	220 - 230	50/60	10	Singlepack	032F621332
EVRA 15	No	Flange*	15	21	18	BF230AS	Cable (1 m/3.3 ft)	220 - 230	50	10	Singlepack	032F621731
EVRA 15	No	Flange*	15	21	18	BF230CS	Cable (1 m/3.3 ft)	220 - 230	50/60	10	Singlepack	032F621732
EVRA 15	No	Flange*	15	21	18	BE230AS	Connection Box	220 - 230	50	10	Singlepack	032F621831
EVRA 15	No	Flange*	15	21	18	BE230CS	Connection Box	220 - 230	50/60	10	Singlepack	032F621832
EVRA 20	No	Flange*	20	21	13	BF230AS	Cable (1 m/3.3 ft)	220 - 230	50	10	Singlepack	032F622231
EVRA 20	No	Flange*	20	21	13	BE230AS	Connection Box	220 - 230	50	10	Singlepack	032F622331
EVRA 20	No	Flange*	20	21	13	BE230CS	Connection Box	220 - 230	50/60	10	Singlepack	032F622332
EVRA 25	Yes	Flange*	25	21	14	BE230CS	Connection Box	220 - 230	50/60	10	Singlepack	032F803432

Ordering valve without coil

Type	Manual Stem	Inlet connection type	Inlet size [in]	Orifice size [mm]	Max OPD 10W AC [bar]	Max OPD 12W AC [bar]	Max OPD 20W DC [bar]	Required coil type**	Singlepack/ Multipack (12 pcs.)	Code number
EVRA 3	No	Flange*		3	21	25	14	AC / DC	Multipack	032F3050
EVRA 10	Yes	Flange*		10	21	25	18	AC / DC	Singlepack	032F6210
EVRA 10	No	Flange*		10	21	25	18	AC / DC	Singlepack	032F6211
EVRAT 10	Yes	Flange*		10	14	21	16	AC / DC	Singlepack	032F6214
EVRA 15	Yes	Flange*		15	21	25	18	AC / DC	Singlepack	032F6215
EVRAT 15	Yes	Flange*		15	14	21	16	AC / DC	Singlepack	032F6216
EVRAT 20	Yes	Flange*		20	14	21	13	AC / DC	Singlepack	032F6219
EVRA 20	Yes	Flange*		20	21	25	13	AC	Singlepack	032F6220
EVRA 20	Yes	Flange*		20	19	21	16	AC / DC	Singlepack	032F6221
EVRA 25	Yes	Flange*		25	21	25	14	AC / DC	Singlepack	032F6225
EVRA 25	No	Flange*		25	21	25	14	AC / DC	Singlepack	032F6226
EVRA 32	Yes	Butt weld DIN	1 ¼	22.2	21	25	14	AC / DC	Singlepack	042H1126
EVRA 32	No	Butt weld DIN	1 ¼	22.2	21	25	14	AC / DC	Singlepack	042H1127
EVRA 40	Yes	Butt weld DIN	1 ½	25.4	21	25	14	AC / DC	Singlepack	042H1128
EVRA 40	No	Butt weld DIN	1 ½	25.4	21	25	14	AC / DC	Singlepack	042H1129
EVRA 32	Yes	Butt weld DIN	1 ½	22.2	21	25	14	AC / DC	Singlepack	042H1131
EVRA 40	Yes	Butt weld DIN	2	25.4	21	25	14	AC / DC	Singlepack	042H1132
EVRA 32	Yes	Butt weld ANSI 36.10	1 ¼	22.2	21	25	14	AC / DC	Singlepack	042H1140
EVRA 32	Yes	Butt weld ANSI 36.10	1 ½	22.2	21	25	14	AC / DC	Singlepack	042H1141
EVRA 40	Yes	Butt weld ANSI 36.10	1 ½	25.4	21	25	14	AC / DC	Singlepack	042H1142
EVRA 40	Yes	Butt weld ANSI 36.10	2	25.4	21	25	14	AC / DC	Singlepack	042H1143

* For ordering flanges; please downlad the data sheet DKRCI.PY.000.B from www.danfoss.com
** For ordering coils; please download the data sheet DKRCC.PD.BS0.F from www.danfoss.com

Rated capacity

Type	Rated capacity [1] [kW]											
	Liquid				Suction vapour				Hot gas			
	R717	R22	R134a	R404A	R717	R22	R134a	R404A	R717	R22	R134a	R404A
EVRA 3	21.8	4.6	4.3	3.2				6.5	2.1	1.7	1.7	
EVRA/T 10	142.0	30.2	27.8	21.1	9.0	3.4	2.5	3.1	42.6	13.9	11.0	11.3
EVRA/T 15	256.0	54.4	50.1	38.0	16.1	6.2	4.4	5.5	76.7	24.9	19.8	20.3
EVRA/T 20	426.0	90.6	83.5	63.3	26.9	10.3	7.3	9.2	128.0	41.5	32.9	33.9
EVRA 25	947.0	201.0	186.0	141.0	59.7	22.8	16.3	20.4	284.0	92.3	73.2	75.3
EVRA 32	1515.0	322.0	297.0	225.0	95.5	36.5	26.1	32.6	454.0	148.0	117.0	120.0
EVRA 40	2368.0	503.0	464.0	351.0	149.0	57.0	40.8	51.0	710.0	231.0	183.0	188.0

[1]) Rated liquid and suction vapour capacity is based on evaporating temperature t_e = -10 °C, liquid temperature ahead of valve t_l = +25 °C,
and pressure drop across 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.

Capacity

Liquid capacity Q_l kW

Type	Liquid capacity Q_e kW at pressure drop across valve Δp bar				
	0.1	0.2	0.3	0.4	0.5
R 717 (NH_3)					
EVRA 3	17.8	25.1	30.8	35.6	39.8
EVRA/T 10	116.0	164.0	201.0	232.0	259.0
EVRA/T 15	209.0	295.0	362.0	418.0	467.0
EVRA/T 20	348.0	492.0	603.0	696.0	778.0
EVRA 25	773.0	1093.0	1340.0	1547.0	1729.0
EVRA 32	1237.0	1749.0	2144.0	2475.0	2766.0
EVRA 40	1933.0	2734.0	3349.0	3867.0	4322.0
R 22					
EVRA 3	3.8	5.3	6.6	7.6	8.5
EVRA/T 10	24.7	34.9	42.7	49.3	55.1
EVRA/T 15	44.4	62.8	76.9	88.8	99.2
EVRA/T 20	73.9	105.0	128.0	148.0	165.0
EVRA 25	165.0	232.0	285.0	329.0	368.0
EVRA 32	263.0	372.0	455.0	526.0	588.0
EVRA 40	411.0	581.0	712.0	822.0	919.0
R 134a					
EVRA 3	3.5	4.9	6.0	7.0	7.8
EVRA/T 10	22.7	32.2	39.4	45.5	50.8
EVRA/T 15	40.9	57.9	70.9	81.8	91.5
EVRA/T 20	68.2	96.5	118.0	136.0	153.0
EVRA 25	152.0	214.0	263.0	303.0	339.0
EVRA 32	243.0	343.0	420.0	485.0	542.0
EVRA 40	379.0	536.0	656.0	758.0	847.0
R 404A					
EVRA 3	2.6	3.7	4.6	5.3	5.9
EVRA/T 10	17.2	24.3	29.8	34.4	38.5
EVRA/T 15	31.0	43.8	53.7	62.0	69.3
EVRA/T 20	51.7	73.0	89.5	103.0	116.0
EVRA 25	115.0	162.0	199.0	230.0	257.0
EVRA 32	184.0	260.0	318.0	367.0	411.0
EVRA 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, 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.

t_v °C	−10	0	+10	+20	+25	+30	+40	+50
R 717 (NH_3)	0.84	0.88	0.92	0.97	1.0	1.03	1.09	1.16
R 22, R 134a	0.76	0.81	0.88	0.96	1.0	1.05	1.16	1.31
R 404A	0.70	0.76	0.84	0.94	1.0	1.07	1.24	1.47

Capacity
(continued)

Suction vapour capacity Q_e kW

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
R 717 (NH_3)							
EVRA/T 10	0.1	3.4	4.5	5.9	7.3	8.9	10.6
	0.15	4.0	5.4	7.0	9.0	10.9	13.0
	0.2	4.5	6.1	7.9	10.0	12.6	15.0
EVRA/T 15	0.1	6.1	8.1	10.7	13.2	16.0	19.1
	0.15	7.2	9.7	12.5	16.1	19.6	23.4
	0.2	8.0	11.0	14.2	18.0	22.6	27.0
EVRA/T 20	0.1	10.2	13.5	17.8	21.9	26.6	31.9
	0.15	12.1	16.1	20.9	26.9	32.6	39.0
	0.2	13.4	18.3	23.7	29.9	37.7	45.1
EVRA 25	0.1	22.6	30.0	39.5	48.7	59.2	70.8
	0.15	26.7	35.9	46.3	59.7	72.5	86.7
	0.2	29.8	40.5	52.7	66.4	83.7	100.0
EVRA 32	0.1	36.2	47.8	63.2	77.9	94.7	113.0
	0.15	42.7	57.4	74.1	95.5	116.0	139.0
	0.2	47.7	64.8	84.3	106.0	134.0	160.0
EVRA 40	0.1	56.5	74.8	98.8	122.0	148.0	177.0
	0.15	66.8	89.8	116.0	149.0	181.0	217.0
	0.2	74.5	101.0	132.0	166.0	209.0	251.0
R 22							
EVRA/T 10	0.1	1.4	1.8	2.3	2.8	3.4	4.0
	0.15	1.6	2.1	2.7	3.4	4.1	4.9
	0.2	1.8	2.4	3.1	3.8	4.8	5.6
EVRA/T 15	0.1	2.5	3.2	4.1	5.0	6.1	7.2
	0.15	2.9	3.8	4.8	6.2	7.4	8.8
	0.2	3.3	4.3	5.5	6.8	8.6	10.2
EVRA/T 20	0.1	4.1	5.3	6.8	8.4	10.1	12.0
	0.15	4.9	6.4	8.1	10.3	12.3	14.7
	0.2	5.5	7.2	9.2	11.4	14.3	16.9
EVRA 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
EVRA 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
EVRA 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 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_v °C	-10	0	10	20	25	30	40	50
R 717 (NH_3)	0.84	0.88	0.92	0.97	1.0	1.03	1.09	1.16
R 22	0.76	0.81	0.88	0.96	1.0	1.05	1.16	1.31

Capacity
(continued)

Suction vapour capacity Q_e kW

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
R 134a							
EVRA/T 10	0.1	0.87	1.2	1.6	2.1	2.6	3.2
	0.15	0.99	1.4	1.9	2.4	3.2	3.9
	0.2	1.1	1.6	2.1	2.8	3.5	4.5
EVRA/T 15	0.1	1.6	2.1	2.8	3.8	4.7	5.7
	0.15	1.8	2.5	3.4	4.4	5.7	7.0
	0.2	2.0	2.8	3.8	5.0	6.3	8.1
EVRA/T 20	0.1	2.6	3.6	4.7	6.3	7.8	9.5
	0.15	3.0	4.2	5.6	7.3	9.5	11.7
	0.2	3.3	4.7	6.4	8.3	10.5	13.5
EVRA 25	0.1	5.8	7.9	10.5	13.9	17.2	21.1
	0.15	6.6	9.3	12.5	16.3	21.1	25.9
	0.2	7.3	10.4	14.1	18.5	23.4	29.9
EVRA 32	0.1	9.3	12.6	16.8	22.2	27.7	33.8
	0.15	10.6	14.9	20.0	26.1	33.8	41.4
	0.2	11.7	16.6	22.6	29.6	37.4	47.8
EVRA 40	0.1	14.5	19.8	26.3	34.8	43.3	52.8
	0.15	16.5	23.3	31.3	40.8	52.8	64.8
	0.2	18.3	26.0	35.3	46.3	58.5	74.8
R 404A							
EVRA/T 10	0.1	1.2	1.5	2.0	2.5	3.1	3.7
	0.15	1.4	1.8	2.4	3.1	3.8	4.6
	0.2	1.6	2.1	2.7	3.4	4.3	5.3
EVRA/T 15	0.1	2.1	2.7	3.6	4.5	5.5	6.6
	0.15	2.5	3.3	4.3	5.5	6.8	8.2
	0.2	2.8	3.7	4.9	6.1	7.8	9.5
EVRA/T 20	0.1	3.5	4.6	6.0	7.5	9.2	11.1
	0.15	4.1	5.5	7.1	9.2	11.3	13.6
	0.2	4.6	6.2	8.1	10.2	13.0	15.8
EVRA 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
EVRA 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
EVRA 40	0.1	19.3	25.3	33.3	41.5	51.0	61.5
	0.15	22.9	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.

t_v °C	-10	0	10	20	25	30	40	50
R 134a	0.76	0.81	0.88	0.96	1.0	1.05	1.16	1.31
R 404A	0.70	0.76	0.84	0.94	1.0	1.07	1.24	1.47

Capacity
(continued)

R 717 (NH_3)

Hot gas capacity Q_h kW

Type	Pressure drop across valve	Hot gas capacity Q_e kW				
		Evaporating temp.t_e =-10 °C. Hot gas temp. $t_h = t_c$ 25 °C.Subcooling Δt_{sub}=4K				
		Condensing temperature t_c °C				
	Δp bar	20	30	40	50	60
EVRA 3	0.1	1.8	2.1	2.3	2.5	2.6
	0.2	2.6	2.9	3.2	3.5	3.7
	0.4	3.8	4.2	4.6	4.9	5.3
	0.8	5.1	6.0	6.5	7.1	7.6
	1.6	7.4	8.3	9.1	9.9	10.9
EVRA/T 10	0.1	12.0	13.4	14.7	16.0	17.2
	0.2	17.1	19.0	20.9	22.7	24.4
	0.4	24.5	27.1	29.7	32.2	34.7
	0.8	34.0	39.0	42.6	46.1	49.5
	1.6	48.5	53.8	59.1	64.3	71.3
EVRA/T 15	0.1	21.7	24.1	26.4	28.8	31.0
	0.2	30.8	34.2	37.5	40.8	44.0
	0.4	44.1	48.8	53.5	58.0	62.4
	0.8	61.2	70.3	76.7	83.0	89.1
	1.6	87.4	96.9	106.0	116.0	128.0
EVRA/T 20	0.1	36.1	40.1	44.0	48.0	51.7
	0.2	51.4	57.0	62.6	68.0	73.2
	0.4	73.5	81.3	89.1	96.7	104.0
	0.8	102.0	117.0	128.0	138.0	148.0
	1.6	146.0	161.0	177.0	193.0	214.0
EVRA 25	0.1	80.2	89.1	98.0	107.0	115.0
	0.2	114.0	127.0	139.0	151.0	163.0
	0.4	163.0	181.0	198.0	215.0	231.0
	0.8	227.0	260.0	284.0	307.0	330.0
	1.6	324.0	358.0	394.0	429.0	475.0
EVRA 32	0.1	128.0	143.0	157.0	171.0	184.0
	0.2	183.0	203.0	223.0	242.0	260.0
	0.4	261.0	289.0	317.0	344.0	370.0
	0.8	362.0	416.0	455.0	492.0	528.0
	1.6	518.0	574.0	631.0	688.0	761.0
EVRA 40	0.1	201.0	223.0	244.0	267.0	287.0
	0.2	286.0	317.0	348.0	378.0	407.0
	0.4	408.0	452.0	495.0	537.0	578.0
	0.8	566.0	650.0	710.0	769.0	825.0
	1.6	809.0	897.0	986.0	1074.0	1188.0

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 factor

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

t_o °C	-40	-30	-20	-10	0	10
R 717 (NH_3)	0.89	0.91	0.96	1.0	1.06	1.10

Capacity
(continued)

R 22

Hot gas capacity Q_h kW

Type	Pressure drop across valve	Hot gas capacity Q_e kW				
		Evaporating temp.t_e =-10 °C. Hot gas temp. $t_h = t_c$ 25 °C.Subcooling Δt_{sub}=4K				
		Condensing temperature t_c °C				
	Δp bar	20	30	40	50	60
EVRA 3	0.1	0.68	0.72	0.76	0.78	0.79
	0.2	0.97	1.0	1.1	1.1	1.1
	0.4	1.4	1.5	1.5	1.6	1.6
	0.8	1.9	2.0	2.1	2.3	2.3
	1.6	2.7	2.9	3.0	3.1	3.2
EVRA/T 10	0.1	4.4	4.7	4.9	5.1	5.2
	0.2	6.3	6.7	7.0	7.2	7.3
	0.4	9.0	9.6	10.0	10.3	10.4
	0.8	12.4	13.2	13.9	14.7	14.9
	1.6	17.5	18.6	19.6	20.2	20.5
EVRA/T 15	0.1	8.0	8.5	8.9	9.2	9.3
	0.2	11.4	12.1	12.6	13.0	13.2
	0.4	16.3	17.2	18.0	18.5	18.7
	0.8	22.3	23.1	24.9	26.5	26.8
	1.6	31.5	33.5	35.2	36.4	36.9
EVRA/T 20	0.1	13.3	14.1	14.8	15.3	15.5
	0.2	19.0	20.1	21.0	21.7	22.0
	0.4	27.1	28.7	30.0	30.9	31.2
	0.8	37.1	38.4	41.5	44.2	44.6
	1.6	52.5	55.9	58.6	60.6	61.5
EVRA 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
EVRA 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
EVRA 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 factor

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

t_o °C	-40	-30	-20	-10	0	+10
R 22	0.90	0.94	0.97	1.0	1.03	1.05

Capacity
(continued)

R 134a

Hot gas capacity Q_h kW

Type	Pressure drop across valve	Hot gas capacity Q_e kW				
		Evaporating temp.t_e =-10 °C. Hot gas temp. $t_h = t_c$ 25 °C.Subcooling Δt_{sub}=4K				
		Condensing temperature t_c °C				
	Δp bar	20	30	40	50	60
EVRA 3	0.1	0.54	0.57	0.6	0.61	0.6
	0.2	0.77	0.82	0.85	0.86	0.85
	0.4	1.1	1.2	1.2	1.2	1.2
	0.8	1.5	1.6	1.7	1.8	1.8
	1.6	2.2	2.3	2.4	2.5	2.4
EVRA/T 10	0.1	3.5	3.7	3.9	4.0	3.9
	0.2	5.0	5.3	5.5	5.6	5.6
	0.4	7.0	7.7	7.9	8.0	7.9
	0.8	9.9	10.5	11.0	11.6	11.4
	1.6	14.3	15.1	15.7	16.0	15.9
EVRA/T 15	0.1	6.4	6.7	7.0	7.1	7.1
	0.2	9.1	9.6	10.0	10.1	10.0
	0.4	12.6	13.8	14.2	14.4	14.3
	0.8	17.9	19.0	19.8	20.8	20.5
	1.6	25.7	27.2	28.2	28.8	28.6
EVRA/T 20	0.1	10.6	11.2	11.7	11.8	11.8
	0.2	15.1	16.0	16.6	16.8	16.7
	0.4	21.0	22.9	23.7	24.0	23.8
	0.8	29.8	31.6	33.0	34.7	34.2
	1.6	42.8	45.3	47.1	47.9	47.6
EVRA 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
EVRA 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
EVRA 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 factor

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

t_o °C	-40	-30	-20	-10	0	10
R 134a	0.88	0.92	0.98	1.0	1.04	1.08

Capacity
(continued)

R 404A

Hot gas capacity Q_h kW

Type	Pressure drop across valve	Hot gas capacity Q_e kW Evaporating temp.t_e =-10 °C. Hot gas temp. $t_h = t_c + 25$ °C.Subcooling Δt_{sub}=4K Condensing temperature t_c °C				
	Δp bar	+20	+30	+40	+50	+60
EVRA 3	0.1	0.62	0.63	0.62	0.59	0.54
	0.2	0.87	0.89	0.88	0.83	0.76
	0.4	1.2	1.3	1.3	1.2	1.1
	0.8	1.7	1.7	1.7	1.7	1.5
	1.6	2.4	2.5	2.4	2.3	2.1
EVRA/T 10	0.1	4.0	4.1	4.0	3.8	3.5
	0.2	5.7	5.8	5.7	5.5	5.0
	0.4	8.1	8.2	8.2	7.8	7.0
	0.8	11.1	11.4	11.3	11.1	10.1
	1.6	15.7	16.0	15.8	15.2	13.9
EVRA/T 15	0.1	7.3	7.4	7.3	6.9	6.3
	0.2	10.2	10.4	10.3	9.8	8.9
	0.4	14.6	14.8	14.7	14.0	12.7
	0.8	20.1	20.4	20.3	20.0	18.1
	1.6	28.3	28.8	28.4	27.4	25.0
EVRA/T 20	0.1	12.1	12.3	12.1	11.5	10.5
	0.2	17.1	17.3	17.2	16.3	14.9
	0.4	24.4	24.7	24.5	23.3	21.1
	0.8	33.4	34.0	33.9	33.3	30.2
	1.6	47.1	48.0	47.4	45.6	41.6
EVRA 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
EVRA 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
EVRA 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 factor

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

t_o °C	-40	-30	-20	-10	0	10
R 404A	0.86	0.88	0.93	1.0	1.03	1.07

Capacity
(continued)

Hot gas capacity G_h kg/s

Type	Hot gas temperature t_h °C	Condensing temperature t_k °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
R 717 (NH_3)											
EVRA 3	90	25	0.003	0.005	0.006	0.007	0.007	0.007	0.007	0.007	0.007
		35	0.004	0.005	0.007	0.009	0.009	0.01	0.01	0.01	0.01
		45	0.005	0.006	0.009	0.01	0.011	0.012	0.013	0.013	0.013
EVRA/T 10		25	0.022	0.03	0.04	0.045	0.048	0.048	0.048	0.048	0.048
		35	0.026	0.036	0.048	0.056	0.061	0.064	0.065	0.065	0.065
		45	0.030	0.041	0.056	0.066	0.074	0.079	0.083	0.085	0.086
EVRA/T 15		25	0.040	0.054	0.072	0.081	0.086	0.087	0.087	0.087	0.087
		35	0.046	0.064	0.086	0.1	0.109	0.115	0.117	0.117	0.117
		45	0.053	0.074	0.101	0.12	0.133	0.142	0.149	0.153	0.155
EVRA/T 20		25	0.066	0.09	0.12	0.12	0.144	0.145	0.145	0.145	0.145
		35	0.077	0.107	0.144	0.167	0.182	0.191	0.195	0.195	0.195
		45	0.089	0.124	0.169	0.199	0.211	0.237	0.248	0.255	0.258
EVRA 25		25	0.143	0.197	0.26	0.296	0.313	0.316	0.316	0.316	0.316
		35	0.168	0.232	0.313	0.364	0.397	0.417	0.425	0.425	0.425
		45	0.194	0.269	0.368	0.434	0.482	0.516	1.54	0.555	0.561
EVRA 32		25	0.233	0.322	0.424	0.483	0.511	0.516			
		35	0.274	0.379	0.511	0.594	0.648	0.681	0.694		
		45	0.316	0.439	0.601	0.709	0.787	0.842	0.882	0.906	0.916
EVRA 40		25	0.362	0.503	0.663	0.755	0.798	0.806			
		35	0.429	0.592	0.798	0.929	1.013	1.064	1.084		
		45	0.495	0.686	0.939	1.107	1.23	1.316	1.378	1.416	1.431
R 22											
EVRA 3	90	25	0.008	0.011	0.014	0.016	0.017	0.017	0.017	0.017	0.017
		35	0.009	0.012	0.017	0.019	0.021	0.022	0.022	0.022	0.022
		45	0.010	0.014	0.019	0.022	0.025	0.026	0.027	0.028	0.028
EVRA/T 10		25	0.051	0.069	0.092	0.104	0.109	0.111	0.111	0.111	0.111
		35	0.058	0.08	0.108	0.125	0.136	0.142	0.144	0.144	0.144
		45	0.066	0.092	0.125	0.146	0.162	0.172	0.179	0.183	0.183
EVRA/T 15		25	0.091	0.125	0.165	0.187	0.197	0.199	0.199	0.199	0.199
		35	0.105	0.144	0.194	0.225	0.244	0.256	0.258	0.258	0.258
		45	0.119	0.165	0.224	0.263	0.291	0.31	0.322	0.329	0.330
EVRA/T 20		25	0.152	0.208	0.275	0.311	0.328	0.332	0.332	0.332	0.332
		35	0.174	0.241	0.323	0.375	0.407	0.425	0.431	0.431	0.431
		45	0.193	0.275	0.374	0.439	0.485	0.516	0.537	0.548	0.55
EVRA 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
EVRA 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
EVRA 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	2.383	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)

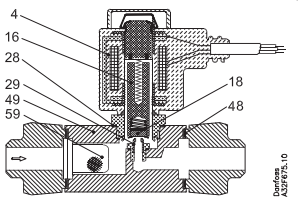
Hot gas capacity G_h kg/s

Type	Varmgas-temperatur t_h °C	Kondense-ringstemp. t_k °C	Varmgaskapacitet G_h kg/s ved trykfaldet i ventilen Δp bar								
			0.5	1	2	3	4	5	6	7	8
R 134a											
EVRA 3	60	25	0.007	0.009	0.011	0.012	0.012				
		35	0.009	0.011	0.014	0.016	0.016	0.016	0.016		
		45	0.01	0.012	0.018	0.02	0.021	0.021	0.021	0.021	0.021
EVRA/T 10		25	0.048	0.06	0.074	0.077	0.077				
		35	0.055	0.071	0.092	0.103	0.104	0.104			
		45	0.06	0.084	0.111	0.127	0.134	0.135	0.135	0.135	0.135
EVRA/T 15		25	0.081	0.108	0.134	0.14	0.14				
		35	0.094	0.129	0.166	0.192	0.187	0.187	0.187		
		45	0.108	0.151	0.2	0.228	0.241	0.244	0.244	0.244	0.244
EVRA/T 20		25	0.134	0.18	0.223	0.233	0.233				
		35	0.157	0.215	0.276	0.307	0.312	0.312	0.312		
		45	0.181	0.252	0.333	0.381	0.403	0.407	0.407	0.407	0.407
EVRA 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
EVRA 32		25	0.478	0.638	0.793	1.826	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
EVRA 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	
R 404A											
EVRA 3	60	25	0.01	0.013	0.018	0.021	0.022	0.023	0.023	0.023	0.023
		35	0.011	0.015	0.02	0.024	0.027	0.028	0.029	0.029	0.03
		45	0.012	0.017	0.023	0.028	0.032	0.034	0.035	0.036	0.037
EVRA/T 10		25	0.063	0.087	0.116	0.134	0.145	0.148	0.149	0.149	0.149
		35	0.072	0.1	0.134	0.158	0.174	0.184	0.19	0.19	0.192
		45	0.081	0.112	0.153	0.182	0.203	0.228	0.228	0.237	0.239
EVRA/T 15		25	0.113	0.157	0.21	0.242	0.26	0.267	0.269	0.269	0.269
		35	0.129	0.18	0.242	0.285	0.313	0.332	0.341	0.342	0.346
		45	0.146	0.202	0.275	0.327	0.365	0.393	0.411	0.424	0.431
EVRA/T 20		25	0.189	0.262	0.35	0.403	0.433	0.445	0.449	0.449	0.449
		35	0.215	0.3	0.404	0.474	0.521	0.552	0.569	0.57	0.576
		45	0.243	0.337	0.459	0.545	0.609	0.656	0.684	0.707	0.719
EVRA 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
EVRA 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	1.836	2.34	2.433	2.513	2.557
EVRA 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

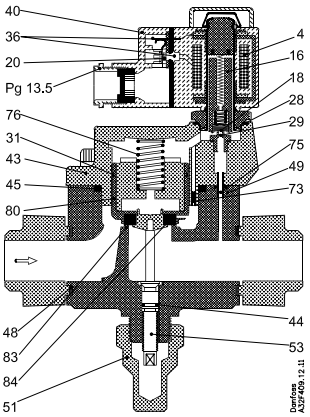
An increase in hot gas temperature t_h of 10 K reduces valve capacity approx. 2% and vice versa.

Design / function

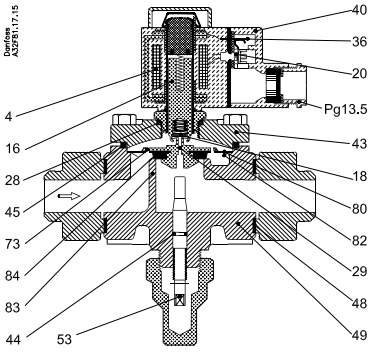
4. Coil
16. Armature
18. Valve plate / Pilot valve plate
20. Earth terminal
24. Connection for flexible steel hose
28. Gasket
29. Pilot orifice
30. O-ring
31. Piston ring
36. DIN plug
40. Terminal box
43. Valve cover
44. O-ring
45. Valve cover gasket
48. Flange gasket
49. Valve body
51. Cover / Threaded plug
53. Manual operation spindle
59. Strainer
73. Equalization hole
74. Main channel
75. Pilot channel
76. Compression spring
80. Diaphragm / Servo piston
82. Support washer
83. Valve seat
84. Main valve plate



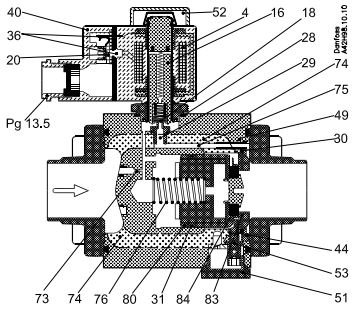
EVRA 3



EVRA 25



EVRA/T 10, 15 and 20



EVRA 32 and 40

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

1. Direct operation
EVRA 3 is direct operated. The valve opens direct for full flow when the armature (16) moves up into the magnetic field of the coil. This means that the valve operates 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.

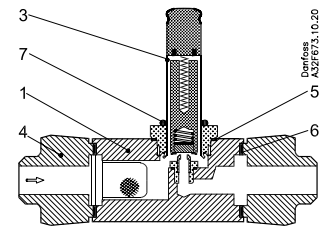
2. Servo operation
EVRA/T 10 – 20 are servo operated with a "floating" diaphragm (80). The pilot orifice (29) of stainless steel is placed in the centre of the diaphragm. The teflon pilot valve plate (18) is fitted direct to the armature (16).
When the coil is currentless, the main orifice and pilot 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 EVRA valve and keep it open. For diffential pressure 0 bar use EVRAT valves.
For EVRA 10 – 20 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.

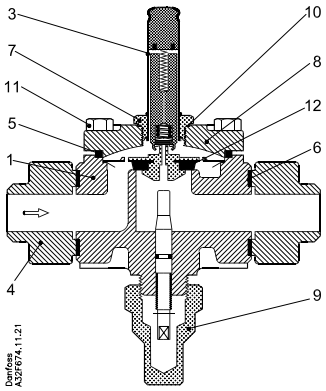
EVRA 25, 32 and 40 are servo operated piston valves. The valves are closed with currentless coil.
The servo piston (80) with main valve plate (84) closes against the valve seat (83) by means of the differential pressure between inlet and outlet side of the valve, the force of the compression spring (76) 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.

Material specification

EVRA 3

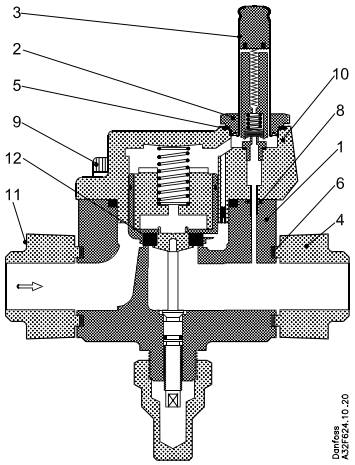


EVRA/T 10/15/20

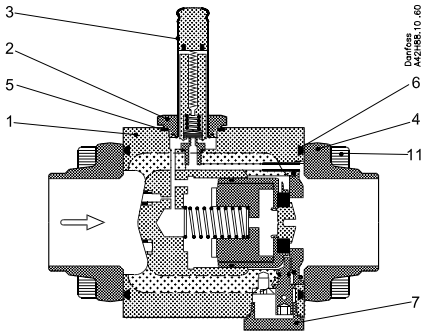


No.	Description	Solenoid valves	Material	Analysis	Mat.no.	W.no.	ISO	EN
1	Valve body	EVRA 3	Free-cutting steel	11MnPb30				10277-3
	Valve body	EVRA/T 10/15/20	Cast-iron	GJS-400-18-LT				1563
3	Armature tube	EVRA 3/10/15/20	Stainless steel	X2CrNi19-11				10088
4	Flange	EVRA/T 3/10/15/20	Steel	S235JRG2				10025
5	Gasket	EVRA 3	Aluminium	Al 99.5				10210
	Gasket	EVRA/T 10/15/20	Rubber	Cr				
6	Gasket	EVRA/T 3/10/15/20	asbestos-free					
7	Armature tube nut	EVRA/T 3/10/15/20	Stainless steel	X8CrNiS18-9				10088
8	Cover	EVRA/T 10/15/20	Cast-iron	GJS-400-18-LT				1563
9	Cover / thread plug	EVRA/T 10/15/20	Free-cutting steel	11SMnPb30				10277-3
10	Gasket	EVRA/T 10/15/20	Aluminium	Al 99.5				10210
11	Bolts	EVRA/T 10/15/20	Stainless steel	A2-70			3506	
12	Valve seat	EVRA/T 10/15/20	Teflon (PTFE)					

EVRA 25

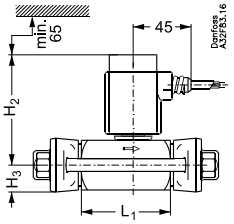


EVRA 32/40

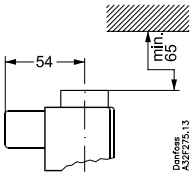


No.	Description	Solenoid valves	Material	Analysis	Mat.no.	W.no.	ISO	EN
1	Valve body	EVRA 25/32/40	Cast-iron	GJS-400-18-LT				1563
2	Armature tube nut	EVRA 25/32/40	Stainless steel	X8CrNiS 18-9				10088
3	Armature tube	EVRA 25/32/40	Stainless steel	X2CrNi19-11				10088
4	Flange	EVRA 25	Steel	S235JRG2				10025
	Flange	EVRA 32/40	Steel	P285QH				10222-4
5	Gasket	EVRA 25/32/40	Aluminium	Al 99.5				10210
6	Gasket	EVRA 25	asbestos-free					
	Gasket	EVRA 32/40	Rubber	Cr				
7	Cover / thread plug	EVRA 25	Free-cutting steel	11SMnPb30				10277-3
	Cover / thread plug	EVRA 32/40	Stainless steel	X5CrNi17-10				10088
8	Gasket	EVRA 25	Rubber	CR				
9	Bolts	EVRA 25	Stainless steel	A2-70			3506	
10	Cover	EVRA 25	Cast-iron	GJS-400-18-LT				1563
11	Bolts	EVRA 25/32/40	Stainless steel	A2-70			3506	
12	Valve seat	EVRA 25	Teflon (PTFE)					

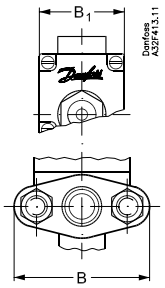
Dimensions and weight



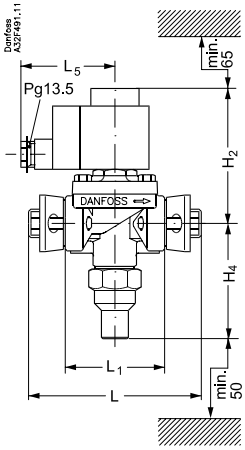
EVRA 3
Coil with cable



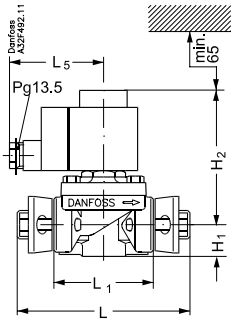
EVRA 3 → 20
Coil with DIN plugs



EVRA 3 → 20
Coil with terminal box



EVRA/T 10 – 20
Coil with terminal box



EVRA 10
Coil with terminal box

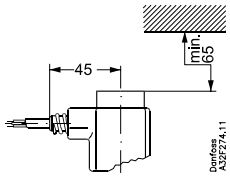
Weight of coil
10 W: approx. 0.3 kg
12 and 20 W: approx. 0.5 kg

Weight of flange set
For EVRA 3, 10 and 15: 0.6 kg
For EVRA 20: 0.9 kg

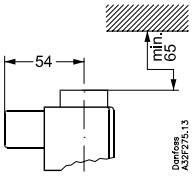
Type	H_1	H_2	H_3	H_4	L	L_1	L_5 max.		B	B_1 max.	Weight [1]
							10 W	12 W 20 W			
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
EVRA 3		84	19		124	65	75	85	80	68	1.2
EVRA/T 10	22	100		81	130	68			80	68	1.7
EVRA/T 15		100		81	130	68			80	68	1.8
EVRA/T 20		110		77	155	85			96	68	2.7

[1]) With coil, without flanges

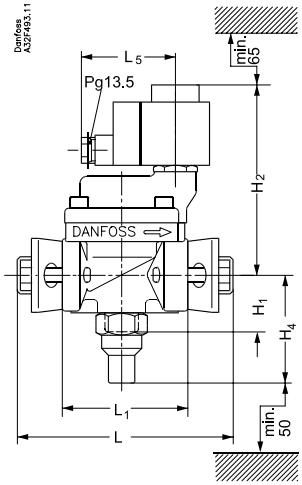
Dimensions and weight
(continued)



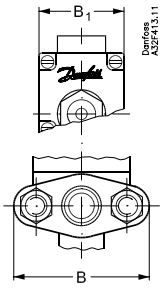
EVRA 25, 32 and 40
Coil with cable



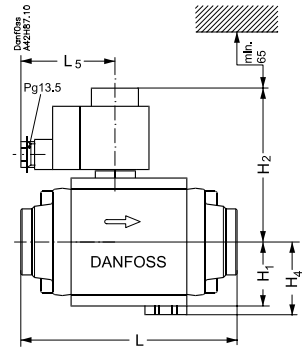
EVRA 25, 32 and 40
Coil with DIN plugs



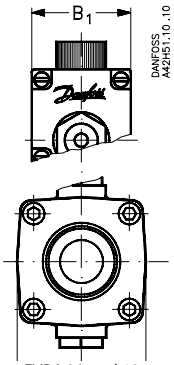
EVRA 25
Coil with terminal box



EVRA 25
Coil with terminal box



EVRA 32 and 40
Coil with terminal box



EVRA 32 and 40
Coil with terminal box

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

Weight of flange set
For EVRA 25: 0.9 kg

Type	H_1	H_2	H_3	H_4	L	L_1	L_5 max.		B	B_1 max.	Weight [1]
							10 W	12 W 20 W			
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
EVRA 25	46	141		78	162	92	75	85	95	68	3.0
EVRA 32	47	115		53	175				80	68	4.0
EVRA 40	47	115		53	175				80	68	4.0

[1]) With coil, without flanges

ENGINEERING
TOMORROW

Stainless steel solenoid valves
Type EVRS 3-20 and EVRST 10-20

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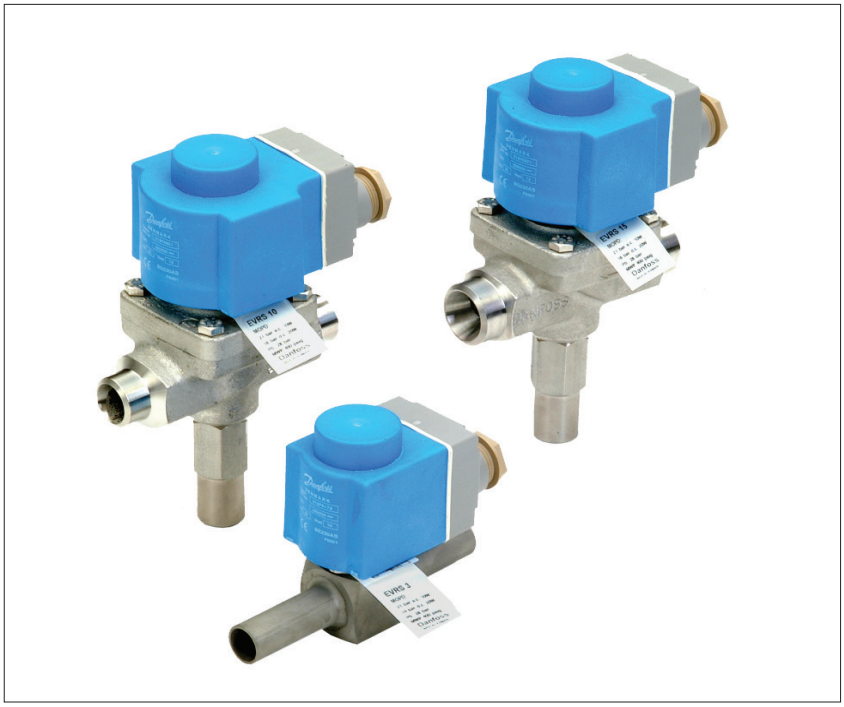
ENGINEERING
TOMORROW

Stainless steel solenoid valves
Type EVRS 3-20 and EVRST 10-20



EVRS and EVRST are valves made of stainless steel.

- EVRS 3 is direct operated.
- EVRS 10, 15 and 20 are servo operated.
- EVRST 10,15 and 20 are forced servo operated.

The valves are used in liquid, suction, hot gas and oil return lines with ammonia or fluorinated refrigerants.

EVRS 3 and EVRST are designed for keeping open at a pressure drop of 0 bar.

EVRS / EVRST 10, 15 and 20 are equipped with spindel for manual opening.

EVRS and EVRST are supplied as components, i.e. valve body and coil must be separately ordered.

Features

- Stainless steel valve body and connections
- Max. working pressure 50 barg
- Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO2).
- MOPD up to 38 bar with 20 watt AC coil
- Wide choice of AC and DC coils
- Designed for temperatures of media up to 105 °C
- Manual stem on EVRS and EVRST 10, EVRST 15 and EVRST 20
- Classification: DNV, CRN, BV, EAC etc. To get an updated list of certification on the products please contact your local Danfoss Sales Company.

Approvals

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

Technical data

Refrigerants
Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO_2).

Temperature of medium
-40 – 105 °C for 10 or 12 watt coil. Max. 130 °C during defrosting.
-40 – 80 °C for 20 watt coil.

Technical data
(Continued)

Ambient temperature and enclosure for coil: See "Coils for solenoid valves", lit.no. DKRCC.PD.BS0.A

Type	Opening differential pressure Δp bar					k_v value [2] [m³/h]	Max. working pressure Ps
	Min.	Max. (MOPD) liquid [1] 10 W AC	12 W AC	20 W AC	20 W DC		
EVRS 3	0.0	21	25	38	14	0.23	50 barg
EVRS 10	0.05	21	25	38	18	1.5	
EVRST 10	0.0	14	21	38	16	1.5	
EVRS 15	0.05	21	25	38	18	2.7	
EVRST 15	0.0	14	21	38	18	2.7	
EVRS 20	0.05	21	25	38	13	4.5	
EVRST 20	0.0	14	21	38	13	4.5	

[1]) MOPD for media in gas form is approx. 1 bar greater.
[2]) The k_v value is the water flow in m³/h at a pressure drop in the valve of 1 bar, ρ = 1000 kg/m³.

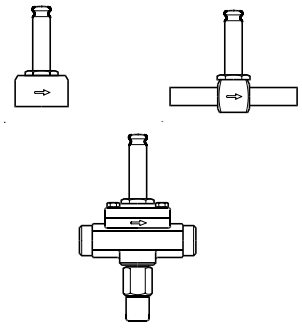
Type	Rated capacity[1] kW														
	Liquid					Suction vapour					Hot gas				
	R717	R22	R134a	R404A	R410A	R717	R22	R134a	R404A	R410A	R717	R22	R134a	R404A	R410A
EVRS 3	21.8	4.6	4.3	3.2	4.5						6.5	2.1	1.7	1.7	2.3
EVRS / EVRST 10	142.0	30.2	27.8	21.1	29.7	9.0	3.4	2.5	3.1	4.3	42.6	13.9	11.0	11.3	14.9
EVRS / EVRST 15	256.0	54.4	50.1	38.0	53.5	16.1	6.2	4.4	5.5	7.7	76.7	24.9	19.8	20.3	26.7
EVRS / EVRST 20	426.0	90.6	83.5	63.3	89.1	26.9	10.3	7.3	9.2	12.0	128.0	41.5	32.9	33.9	44.5

[1]) Rated liquid and suction vapour capacity is based on evaporating temperature t_e = -10 °C, liquid temperature ahead of valve t_l = 25 °C, and pressure drop across 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 = 60 °C, and subcooling of refrigerant Δt_{sub} = 4 K.

Type	R 744 Rated capacity kW [2]	
	Liquid	Suction
EVRS 3	6.65	-
EVRS / EVRST 10	43.3	6.9
EVRS / EVRST 15	78.0	12.4
EVRS / EVRST 20	130.0	20.7

[2]) Rated liquid and suction vapour capacity is based on evaporating temperature t_e = -40 °C, liquid temperature ahead of the vale t_l = -8 °C and pressure drop across the valve Δp = 0.15 bar
For other condition please refer to DIR-Calc or contact your local Danfoss office.

Ordering



Separate valve bodies

Type	Max. working pressure Ps [barg]	Connection		Code no.	
		Weld [in]	Pipe thread ISO 228/1	With manual stem	Without manual stem
EVRS 3	50	⅜			**032F3080**
EVRS 3	50		G ¼		**032F3081**
EVRS 10	50	½		**032F3082**	
EVRST 10	50	½		**032F3083**	
EVRS 15	50	¾		**032F3084**	
EVRST 15	50	¾		**032F3085**	
EVRS 20	50	1		**032F5437**	
EVRST 20	50	1		**032F5438**	

Coils See "Coils for solenoid valves", lit.no. *DKRCC.PD.BS0.A*

Capacity

Liquid capacity Q_l kW

Type	Liquid capacity Q_e kW at pressure drop across valve Δp bar				
	0.1	0.2	0.3	0.4	0.5
R717 (NH_3)					
EVRS 3	17.8	25.1	30.8	35.6	39.8
EVRS / EVRST 10	116.0	164.0	201.0	232.0	259.0
EVRS / EVRST 15	209.0	295.0	362.0	418.0	467.0
EVRS / EVRST 20	348.0	492.0	603.0	696.0	778.0
R22					
EVRS 3	3.8	5.3	6.6	7.6	8.5
EVRS / EVRST 10	24.7	34.9	42.7	49.3	55.1
EVRS / EVRST 15	44.4	62.8	76.9	88.8	99.2
EVRS / EVRST 20	73.9	105.0	128.0	148.0	165.0
R134a					
EVRS 3	3.5	4.9	6.0	7.0	7.8
EVRS / EVRST 10	22.7	32.2	39.4	45.5	50.8
EVRS / EVRST 15	40.9	57.9	70.9	81.8	91.5
EVRS / EVRST 20	68.2	96.5	118.0	136.0	153.0
R404A					
EVRS 3	2.6	3.7	4.6	5.3	5.9
EVRS / EVRST 10	17.2	24.3	29.8	34.4	38.5
EVRS / EVRST 15	31.0	43.8	53.7	62.0	69.3
EVRS / EVRST 20	51.7	73.0	89.5	103.0	116.0
R410A					
EVRS 3	3.7	5.3	6.4	7.5	8.3
EVRS / EVRST 10	24.3	34.4	42.0	48.6	54.3
EVRS / EVRST 15	43.7	61.8	75.6	87.5	97.7
EVRS / EVRST 20	72.9	103.0	126.0	146.0	163.0

Capacities are based on liquid temperature t_l = 5 °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.

t_v °C	-10	0	10	20	25	30	40	50
R717 (NH_3)	0.84	0.88	0.92	0.97	1.0	1.03	1.09	1.16
R22, R134a	0.76	0.81	0.88	0.96	1.0	1.05	1.16	1.31
R404A	0.70	0.76	0.84	0.94	1.0	1.07	1.24	1.47
R410A	0.73	0.79	0.86	0.95	1.0	1.06	1.23	1.47

Capacity
(continued)

Suction vapour capacity Q_e kW

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
R717 (NH_3)							
EVRS / EVRST 10	0.1	3.4	4.5	5.9	7.3	8.9	10.6
	0.15	4.0	5.4	7.0	9.0	10.9	13.0
	0.2	4.5	6.1	7.9	10.0	12.6	15.0
EVRS / EVRST 15	0.1	6.1	8.1	10.7	13.2	16.0	19.1
	0.15	7.2	9.7	12.5	16.1	19.6	23.4
	0.2	8.0	11.0	14.2	18.0	22.6	27.0
EVRS / EVRST 20	0.1	10.2	13.5	17.8	21.9	26.6	31.9
	0.15	12.1	16.1	20.9	26.9	32.6	39.0
	0.2	13.4	18.3	23.7	29.9	37.7	45.1
R22							
EVRS / EVRST 10	0.1	1.4	1.8	2.3	2.8	3.4	4.0
	0.15	1.6	2.1	2.7	3.4	4.1	4.9
	0.2	1.8	2.4	3.1	3.8	4.8	5.6
EVRS / EVRST 15	0.1	2.5	3.2	4.1	5.0	6.1	7.2
	0.15	2.9	3.8	4.8	6.2	7.4	8.8
	0.2	3.3	4.3	5.5	6.8	8.6	10.2
EVRS / EVRST 20	0.1	4.1	5.3	6.8	8.4	10.1	12.0
	0.15	4.9	6.4	8.1	10.3	12.3	14.7
	0.2	5.5	7.2	9.2	11.4	14.3	16.9
R134a							
EVRS / EVRST 10	0.1	0.87	1.2	1.6	2.1	2.6	3.2
	0.15	0.99	1.4	1.9	2.4	3.2	3.9
	0.2	1.1	1.6	2.1	2.8	3.5	4.5
EVRS / EVRST 15	0.1	1.6	2.1	2.8	3.8	4.7	5.7
	0.15	1.8	2.5	3.4	4.4	5.7	7.0
	0.2	2.0	2.8	3.8	5.0	6.3	8.1
EVRS / EVRST 20	0.1	2.6	3.6	4.7	6.3	7.8	9.6
	0.15	3.0	4.2	5.6	7.3	9.5	11.7
	0.2	3.3	4.7	6.4	8.3	10.5	13.5
R404A							
EVRS / EVRST 10	0.1	1.2	1.5	2.0	2.5	3.1	3.7
	0.15	1.4	1.8	2.4	3.1	3.8	4.6
	0.2	1.6	2.1	2.7	3.4	4.3	5.3
EVRS / EVRST 15	0.1	2.1	2.7	3.6	4.5	5.5	6.6
	0.15	2.5	3.3	4.3	5.5	6.8	8.2
	0.2	2.8	3.7	4.9	6.1	7.8	9.5
EVRS / EVRST 20	0.1	3.5	4.6	6.0	7.5	9.2	11.1
	0.15	4.1	5.5	7.1	9.2	11.3	13.6
	0.2	4.6	6.2	8.1	10.2	13.0	15.8
R410A							
EVRS / EVRST 10	0.1	1.9	2.3	2.9	3.5	4.2	5.0
	0.15	2.2	2.9	3.5	4.3	5.1	6.1
	0.2	2.6	3.3	4.0	5.0	5.9	7.0
EVRS / EVRST 15	0.1	3.3	4.2	5.2	6.3	7.6	9.0
	0.15	4.0	5.1	6.3	7.7	9.2	11.0
	0.2	4.7	5.9	7.3	8.9	10.7	12.7
EVRS / EVRST 20	0.1	5.6	7.0	8.6	10.5	12.6	15.0
	0.15	6.7	8.6	10.5	12.9	15.4	18.4
	0.2	7.8	9.9	12.2	14.9	17.8	21.2

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 in 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_v °C	-10	0	10	20	25	30	40	50
R717 (NH_3)	0.84	0.88	0.92	0.97	1.0	1.03	1.09	1.16
R22, R134a	0.76	0.81	0.88	0.96	1.0	1.05	1.16	1.31
R404A	0.70	0.76	0.84	0.94	1.0	1.07	1.24	1.47
R410A	0.76	0.80	0.89	0.96	1.0	1.05	1.18	1.37

Capacity
(continued)

Hot gas capacity Q_e 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
R717 (NH_3)						
EVRS 3	0.1	1.8	2.1	2.3	2.5	2.6
	0.2	2.6	2.9	3.2	3.5	3.7
	0.4	3.8	4.2	4.6	4.9	5.3
	0.8	5.1	6.0	6.5	7.1	7.6
	1.6	7.4	8.3	9.1	9.9	10.9
EVRS / EVRST 10	0.1	12.0	3.4	14.7	16.0	17.2
	0.2	17.1	19.0	20.9	22.7	24.4
	0.4	24.5	27.1	29.7	32.2	34.7
	0.8	34.0	39.0	42.6	46.1	49.5
	1.6	48.5	53.8	59.1	64.3	1.3
EVRS / EVRST 15	0.1	21.7	24.1	26.4	28.8	31.0
	0.2	30.8	34.2	37.5	40.8	44.0
	0.4	44.1	48.8	53.5	58.0	62.4
	0.8	61.2	70.3	76.7	83.0	89.1
	1.6	87.4	96.9	106.0	116.0	128.0
EVRS / EVRST 20	0.1	36.1	40.1	44.0	48.0	51.7
	0.2	51.4	57.0	62.6	68.0	73.2
	0.4	73.5	81.3	89.1	96.7	104.0
	0.8	102.0	117.0	128.0	138.0	148.0
	1.6	146.0	161.0	177.0	193.0	214.0
R22						
EVRS 3	0.1	0.68	0.72	0.76	0.78	0.79
	0.2		1.0	1.1	1.1	1.1
	0.4	0.97	1.5	1.5	1.6	1.6
	0.8	1.4	2.0	2.1	2.3	2.3
	1.6	1.9	2.9	3.0	3.1	3.2
		2.7				
EVRS / EVRST 10	0.1	4.4	4.7	4.9	5.1	5.2
	0.2	6.3	6.7	7.0	7.2	7.3
	0.4	9.0	9.6	10.0	10.3	10.4
	0.8	12.4	13.2	13.9	14.7	14.9
	1.6	17.5	18.6	19.6	20.2	20.5
EVRS / EVRST 15	0.1	8.0	8.5	8.9	9.2	9.3
	0.2	11.4	12.1	12.6	13.0	13.2
	0.4	16.3	17.2	18.0	18.5	18.7
	0.8	22.3	23.1	24.9	26.5	26.8
	1.6	31.5	33.5	35.2	36.4	36.9
EVRS / EVRST 20	0.1	13.3	14.1	14.8	15.3	15.5
	0.2	19.0	20.1	21.0	21.7	22.0
	0.4	27.1	28.7	30.0	30.9	31.2
	0.8	37.1	38.4	44.5	44.2	44.6
	1.6	52.5	55.9	58.6	60.6	61.5

An increase in hot gas temperature t_h of 10 K 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.

t_o °C	-40	-30	-20	-10	0	10
R717 (NH_3)	0.89	0.91	0.96	1.0	1.06	1.10
R22	0.90	0.94	0.97	1.0	1.03	1.05

Capacity
(continued)

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
R134a						
EVRS 3	0.1	0.54	0.57	0.6	0.61	0.6
	0.2	0.77	0.82	0.85	0.86	0.85
	0.4	1.1	1.2	1.2	1.2	1.2
	0.8	1.5	1.6	1.7	1.8	1.8
	1.6	2.2	2.3	2.4	2.5	2.4
EVRS / EVRST 10	0.1	3.5	3.7	3.9	4.0	3.9
	0.2	5.0	5.3	5.5	5.6	5.6
	0.4	7.0	7.7	7.9	8.0	7.9
	0.8	9.9	10.5	11.0	11.6	11.4
	1.6	14.3	15.1	15.7	16.0	15.9
EVRS / EVRST 15	0.1	6.4	6.7	7.0	7.1	7.1
	0.2	9.1	9.6	10.0	10.1	10.0
	0.4	12.6	13.8	14.2	14.4	14.3
	0.8	17.9	19.0	19.8	20.8	20.5
	1.6	25.7	27.2	28.2	28.8	28.6
EVRS / EVRST 20	0.1	10.6	11.2	11.7	11.8	11.8
	0.2	15.1	16.0	16.6	16.8	16.7
	0.4	21.0	22.9	23.7	24.0	23.8
	0.8	29.8	31.6	33.0	34.7	34.2
	1.6	42.8	45.3	47.1	47.9	47.6
R404A						
EVRS 3	0.1	0.62	0.63	0.62	0.59	0.54
	0.2	0.87	0.89	0.88	0.83	0.76
	0.4	1.2	1.3	1.3	1.2	1.1
	0.8	1.7	1.7	1.7	1.7	1.5
	1.6	2.4	2.5	2.4	2.3	2.1
EVRS / EVRST 10	0.1	4.0	4.1	4.0	3.8	3.5
	0.2	5.7	5.8	5.7	5.5	5.0
	0.4	8.1	8.2	8.2	7.8	7.0
	0.8	11.1	11.4	11.3	11.1	10.1
	1.6	15.7	16.0	15.8	15.2	13.9
EVRS / EVRST 15	0.1	7.3	7.4	7.3	6.9	6.3
	0.2	10.2	10.4	10.3	9.8	8.9
	0.4	14.6	14.8	14.7	14.0	12.7
	0.8	20.1	20.4	20.3	20.0	18.1
	1.6	28.3	28.8	28.4	27.4	25.0
EVRS / EVRST 20	0.1	12.1	12.3	12.1	11.5	10.5
	0.2	17.1	17.3	17.2	16.3	14.9
	0.4	24.4	24.7	24.5	23.3	21.1
	0.8	33.4	34.0	33.9	33.3	30.2
	1.6	47.1	48.0	47.4	45.6	41.6

An increase in hot gas temperature t_h of 10 K 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.

t_o °C	-40	-30	-20	-10	0	10
R404A	0.86	0.88	0.93	1.0	1.03	1.07
R134a	0.88	0.92	0.98	1.0	1.04	1.08

Capacity
(continued)

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
R410A						
EVRS 3	0.1	0.8	0.8	0.8	0.8	0.7
	0.2	1.1	1.1	1.1	1.1	1.0
	0.4	1.6	1.6	1.6	1.6	1.5
	0.8	2.2	2.7	2.2	2.2	2.1
	1.6	3.1	3.2	3.2	3.2	2.9
EVRS / EVRST 10	0.1	5.1	5.2	5.3	5.2	4.8
	0.2	7.2	7.4	7.4	7.3	6.8
	0.4	10.2	10.4	10.5	10.3	9.6
	0.8	14.4	14.8	14.9	14.5	13.7
	1.6	20.3	20.8	21.0	20.5	19.1
EVRS / EVRST 15	0.1	9.2	9.4	9.4	9.3	8.6
	0.2	13.0	13.3	13.3	13.1	12.2
	0.4	18.4	18.8	18.9	18.5	17.2
	0.8	25.9	26.6	26.7	26.1	24.6
	1.6	36.6	37.5	37.8	36.9	34.5
EVRS / EVRST 20	0.1	15.3	15.7	15.8	15.5	14.4
	0.2	21.6	22.1	22.2	21.8	20.3
	0.4	30.6	31.3	31.5	30.8	28.7
	0.8	43.2	44.3	44.6	43.5	41.0
	1.6	61.0	62.6	63.0	61.6	57.4

An increase in hot gas temperature t_h of 10 K 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.

t_o °C	-40	-30	-20	-10	0	10
R410A	0.92	0.95	0.98	1.0	1.02	1.03

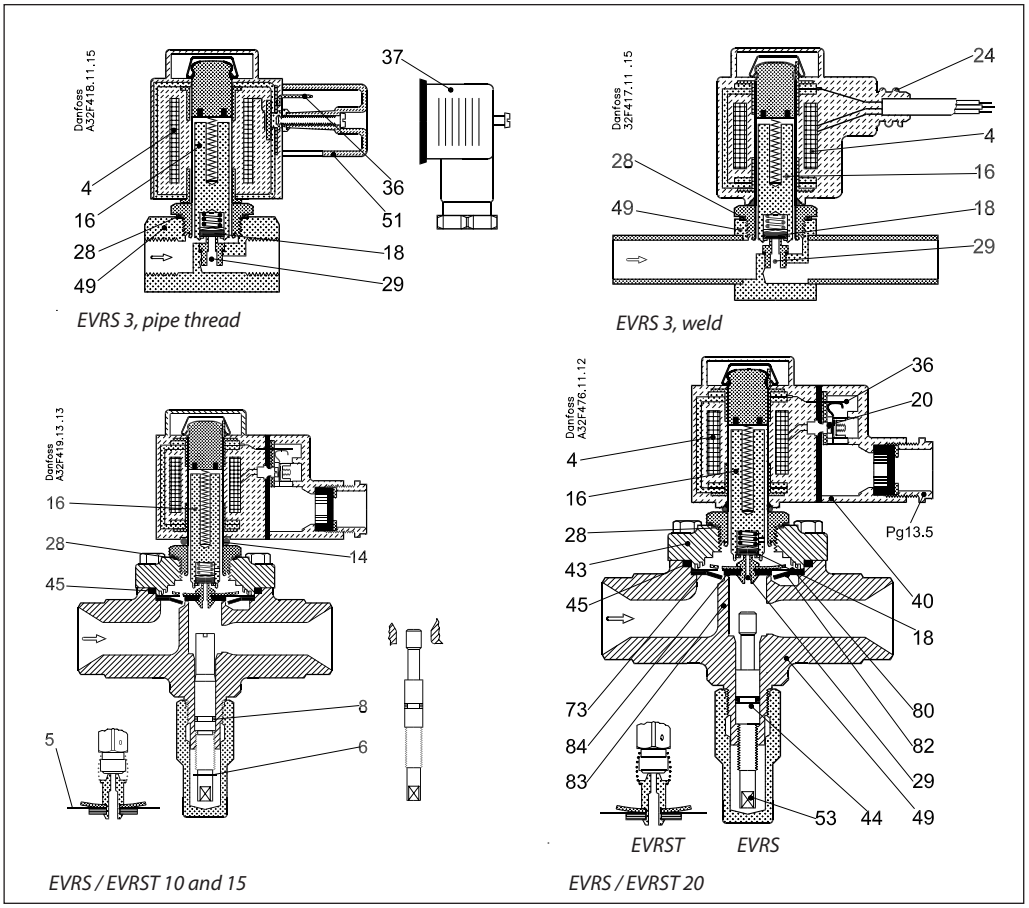
Capacity
(continued)

Hot gas capacity G_h kg/s

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
R717 (NH_3)											
EVRS 3	90	25	0.003	0.005	0.006	0.007	0.007	0.007	0.007	0.007	0.007
		35	0.004	0.005	0.007	0.009	0.009	0.01	0.01	0.01	0.01
		45	0.005	0.006	0.009	0.01	0.011	0.012	0.013	0.013	0.013
EVRS / EVRST 10		25	0.022	0.03	0.04	0.045	0.048	0.048	0.048	0.048	0.048
		35	0.026	0.036	0.048	0.056	0.061	0.064	0.065	0.065	0.065
		45	0.030	0.041	0.056	0.066	0.074	0.079	0.083	0.085	0.086
EVRS / EVRST 15		25	0.040	0.054	0.072	0.081	0.086	0.087	0.087	0.087	0.087
		35	0.046	0.064	0.086	0.100	0.109	0.115	0.117	0.117	0.117
		45	0.053	0.074	0.101	0.120	0.133	0.142	0.149	0.153	0.155
EVRS / EVRST 20		25	0.066	0.090	0.120	0.120	0.144	0.145	0.145	0.145	0.145
		35	0.077	0.107	0.144	0.167	0.182	0.191	0.195	0.195	0.195
		45	0.089	0.124	0.169	0.199	0.211	0.237	0.248	0.255	0.258
R22											
EVRS 3	90	25	0.008	0.011	0.014	0.016	0.017	0.017	0.017	0.017	0.017
		35	0.009	0.012	0.017	0.019	0.021	0.022	0.022	0.022	0.022
		45	0.010	0.014	0.019	0.022	0.025	0.026	0.027	0.028	0.028
EVRS / EVRST 10		25	0.051	0.069	0.092	0.104	0.109	0.111	0.111	0.111	0.111
		35	0.058	0.08	0.108	0.125	0.136	0.142	0.144	0.144	0.144
		45	0.066	0.092	0.125	0.146	0.162	0.172	0.179	0.183	0.183
EVRS / EVRST 15		25	0.091	0.125	0.165	0.187	0.197	0.199	0.199	0.199	0.199
		35	0.105	0.144	0.194	0.225	0.244	0.256	0.258	0.258	0.258
		45	0.119	0.165	0.224	0.263	0.291	0.31	0.322	0.329	0.330
EVRS / EVRST 20		25	0.152	0.208	0.275	0.311	0.328	0.332	0.332	0.332	0.332
		35	0.174	0.241	0.323	0.375	0.407	0.425	0.431	0.431	0.431
		45	0.193	0.275	0.374	0.439	0.485	0.516	0.537	0.548	0.550
R134a											
EVRS 3	60	25	0.007	0.009	0.011	0.012	0.012				
		35	0.009	0.011	0.014	0.016	0.016	0.016	0.016		
		45	0.01	0.012	0.018	0.02	0.021	0.021	0.021	0.021	0.021
EVRS / EVRST 10		25	0.048	0.06	0.074	0.077	0.077				
		35	0.055	0.071	0.092	0.103	0.104	0.104			
		45	0.06	0.084	0.111	0.127	0.134	0.135	0.135	0.135	0.135
EVRS / EVRST 15		25	0.081	0.108	0.134	0.14	0.14				
		35	0.094	0.129	0.166	0.192	0.187	0.187	0.187		
		45	0.108	0.151	0.2	0.228	0.241	0.244	0.244	0.244	0.244
EVRS / EVRST 20		25	0.134	0.180	0.223	0.233	0.233				
		35	0.157	0.215	0.276	0.307	0.312	0.312	0.312		
		45	0.181	0.252	0.333	0.381	0.403	0.407	0.407	0.407	0.407
R404A											
EVRS 3	60	25	0.01	0.013	0.018	0.021	0.022	0.023	0.023	0.023	0.023
		35	0.011	0.015	0.02	0.024	0.027	0.028	0.029	0.029	0.03
		45	0.012	0.017	0.023	0.028	0.032	0.034	0.035	0.036	0.037
EVRS/ EVRST 10		25	0.063	0.087	0.116	0.134	0.145	0.148	0.149	0.149	0.149
		35	0.072	0.1	0.134	0.158	0.174	0.184	0.19	0.19	0.192
		45	0.081	0.112	0.153	0.182	0.203	0.228	0.228	0.237	0.239
EVRS / EVRST 15		25	0.113	0.157	0.21	0.242	0.26	0.267	0.269	0.269	0.269
		35	0.129	0.18	0.242	0.285	0.313	0.332	0.341	0.342	0.346
		45	0.146	0.202	0.275	0.327	0.365	0.393	0.411	0.424	0.431
EVRS / EVRST 20		25	0.189	0.262	0.350	0.403	0.433	0.445	0.449	0.449	0.449
		35	0.215	0.300	0.404	0.474	0.521	0.552	0.569	0.570	0.576
		45	0.243	0.337	0.459	0.545	0.609	0.656	0.684	0.707	0.719
R410A											
EVRS 3	90	25	0.009	0.013	0.018	0.022	0.025	0.028	0.031	0.031	0.031
		35	0.010	0.014	0.020	0.025	0.029	0.032	0.035	0.038	0.038
		45	0.012	0.016	0.023	0.029	0.033	0.037	0.040	0.044	0.047
EVRS / EVRST 10		25	0.059	0.083	0.117	0.144	0.166	0.185	0.201	0.201	0.201
		35	0.067	0.094	0.133	0.163	0.189	0.211	0.231	0.249	0.249
		45	0.076	0.108	0.152	0.186	0.215	0.241	0.263	0.285	0.304
EVRS / EVRST 15		25	0.106	0.150	0.211	0.259	0.300	0.334	0.361	0.361	0.361
		35	0.120	0.170	0.240	0.294	0.340	0.380	0.416	0.449	0.449
		45	0.137	0.194	0.274	0.335	0.387	0.433	0.474	0.513	0.548
EVRS / EVRST 20		25	0.177	0.149	0.352	0.431	0.498	0.556	0.602	0.602	0.602
		35	0.200	0.283	0.400	0.490	0.566	0.633	0.693	0.748	0.748
		45	0.228	0.323	0.456	0.558	0.645	0.722	0.790	0.854	0.913

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

Design / function



4. Coil
16. Armature
18. Pilot valve plate
20. Earth terminal
24. Connection for flexible steel hose
28. Gasket
29. Pilot orifice
36. DIN plug
40. Terminal box
43. Valve cover
44. O-ring
45. Valve cover gasket
49. Valve body
51. Cover
53. Manual operating spindle
73. Equalization hole
80. Diaphragm
82. Support washer
83. Valve seat
84. Main valve plate

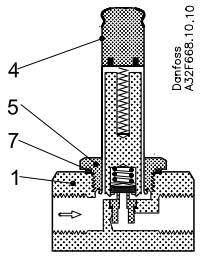
The solenoid valve design is based on three different principles:
1. Direct operation
2. Servo operation
3. Forced servo operation

1. Direct operation
EVRS 3 is directly operated. The valve opens direct for full flow when the armature (16) moves up into the magnetic field of the coil. This means that the valve operates with a min. differential pressure of 0 bar.
The valve plate (18) made of teflon and is fitted direct to the armature (16).
Inlet pressure acts from above on the armature and with it the valve plate. Thus, inlet pressure, spring force and the weight of the armature act to close the valve when the coil is currentless.

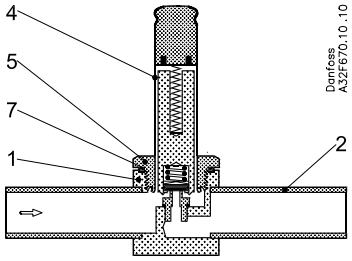
2. Servo operation
EVRS 10, 15 and 20 are servo operated with a "floating" diaphragm (80). The pilot orifice (29), which is of stainless steel, is placed in the centre of the diaphragm.
The teflon pilot valve plate (18) is fitted direct to the armature (16).
With the coil currentless, the main orifice 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 because 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 which opens to full flow.
Thus a certain minimum differential pressure is necessary to open the valve and keep it open. For EVRS 10, 15 and 20 valves this differential pressure is 0.05 bar.
When current is switched off, the pilot orifice closes. Then the pressure above the diaphragm rises, via the equalization holes (73) in the diaphragm, to the inlet pressure and causes the diaphragm to close the main orifice.

3. Forced servo operation
EVRST 10, 15 and 20 are forced servo operated solenoid valves.
Forced servo operation differs from servo operation in that in a forced servo operated valve the armature and the diaphragm are connected by a spring. Thus the armature helps to lift the diaphragm (80) and keep it lifted so that the pressure drop in the open valve is the least possible. These types of valves therefore require no differential pressure to keep them open.

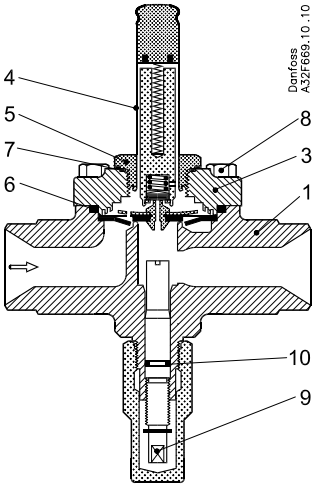
Material specification



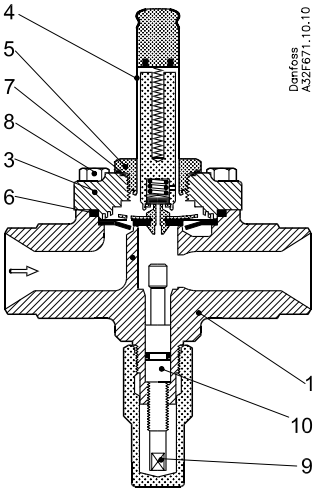
EVRS 3, Pipe thread



EVRS 3, welded



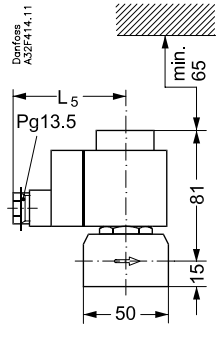
EVRS/ EVRST 10 and 15



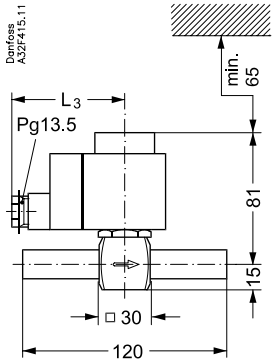
EVRS/ EVRST 20

		Solenoid valves					Standard	
No.	Description	Type	Material	Analysis	Mat.no.	W.no.	DIN	EN
1	Valve housing	EVRS 3	Stainless steel	X8 CrNiS 18-9		1.4305		10088
		EVRS (T) 10/15/20	Stainless steel	X6 CrNi 18-9		1.4308	17455	
2	Welding tube	EVRS 3	Stainless steel	X2 CrNiMo 17-12-2		1.4404	17455	
3	Cover	EVRS (T) 10(15/20	Stainless steel	X6 CrNi 18-9		1.4308	17455	
4	Armature tube	EVRS(T) 3/10/15/20	Stainless steel	X2 CrNi 19-11		1.4306		10088
5	Armature tube nut	EVRS(T) 3/10/15/20	Stainless steel	X8 CrNi 19-11		1.4305		10088
6	Gasket	EVRS(T) 3/10/15/20	Rubber	Cr				
7	Gasket armature tube	EVRS(T) 10/15/20	Al gasket	Al 99.5		3.0255		10210
8	Screws	EVRS(T) 10/15/20	Stainless steel	A2-70			3506	
9	Spindle for man. oper.	EVRS(T) 10/15/20	Stainless steel	X8 CrNiS 18-9		1.4305		10088
10	Gasket	EVRS(T) 10/15/20	Rubber	Cr				

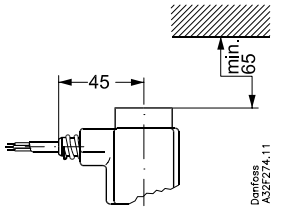
Dimensions and weights



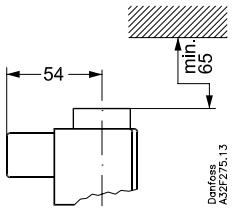
EVRS 3, pipe thread



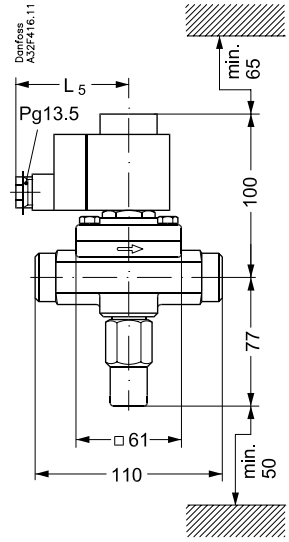
EVRS 3, weld



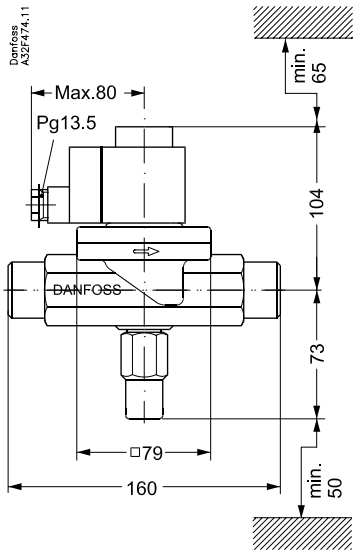
Coil with cable



Coil with DIN plugs



EVRS / EVRST 10 and 15
Coil with terminal box



EVRS / EVRST 20
Coil with terminal box

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

Type	L_5 max.		Weight with coil
	10 W	12 W 20 W	
	[mm]	[mm]	[kg]
EVRS 3, pipe thread	75	85	0.7
EVRS 3, weld	75	85	0.6
EVRS / EVRST 10	75	85	1.2
EVRS / EVRST 15	75	85	1.3
EVRS / EVRST 20	75	85	2.0

ENGINEERING
TOMORROW

Solenoid coil
Types BB, BE, BF, BG, and BN

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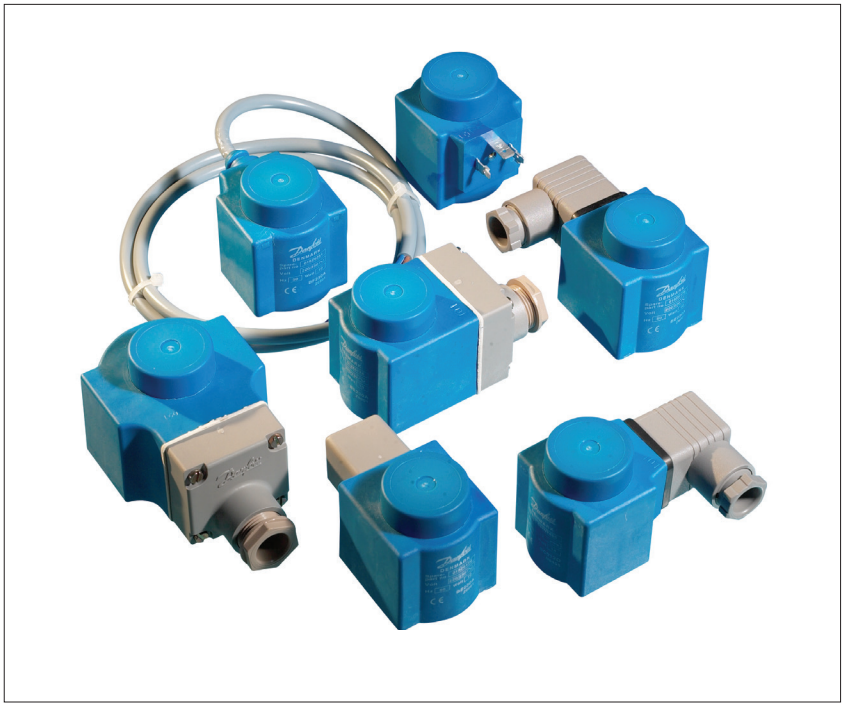
ENGINEERING
TOMORROW

Solenoid coil
Types BB, BE, BF, BG, and BN



The coils are specially designed to operate in the aggressive environment of high humidity and temperature fluctuations that you find in most refrigeration systems.

The Clip-on fastening system ensures a faultless installation and makes the coils easy to mount and dismount. A Danfoss Clip-on coil can be mounted without any tools at all, and it is simple to dismount the coil by means of a screwdriver.

The Clip-on coils are available for the entire range of Danfoss solenoid valves for refrigeration, freezing and air conditioning purposes.

Features

- Encapsulated coils with long operating life, even under extreme conditions
- Standard coils for AC or DC
- Standard coils available with 3-core cable, terminal box or DIN plugs
- Standard coils from 12 V to 420 V, 50, 60 or 50/60 Hz
- Standard coils dimensioned for max. opening differential pressure (MOPD) of up to 38 bar
- Coils can be fitted without the use of tools

Approvals

- Low Voltage Directive (LVD) 2006/95/EC
- EMC Directive 2004/108/EC

See further details under the required solenoid valve.

Technical data

Data	Solenoid coil type										
	1m 3-core cable	Terminal box			DIN spade and protection cap	DIN spade	1m 3-core cable	Terminal box	DIN spade and protection cap	DIN spade	Terminal box IP67
	 BF	 BE	 BG	 BG	 BE	 BB	 BF	 BE	 BE	 BB	 BN
Power consumption [W]	10	10	12	20	10	10	10	10	10	10	20
Frequency [Hz]	50 or 60	50 or 60	50 or 60	V DC	50 or 60	50 or 60	50 and 60	50 and 60	50 and 60	50 and 60	50 or 60
Enclosure	IP67	IP67	IP67	IP67	IP20	IP00	IP67	IP67	IP20	IP00	IP67
Polution degree	4	4	4	4	3	3	4	4	3	3	3
Conductor area [mm²]	0.75	0.75 – 1.5	0.75 – 1.5	0.75 – 1.5	0.75 – 1.5	0.75 – 1.5	0.75	0.75 – 1.5	0.75 – 1.5	0.75 – 1.5	0.75 – 1.5
Cable size [mm]	Ø6.6	Ø6.0 – Ø11	Ø6.0 – Ø11	Ø6.0 – Ø11	Ø6.0 – Ø11	Ø6.0 – Ø11	Ø6.6	Ø6.0 – Ø11	Ø6.0 – Ø11	Ø6.0 – Ø11	Ø6.0 – Ø11
Ambient temperature NC valve	-40 °C < t < 80 °C	-40 °C < t < 80 °C	-40 °C < t < 80 °C	-40 °C < t < 50 °C	-40 °C < t < 80 °C	-40 °C < t < 80 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C
Ambient temperature NO valve	-40 °C < t < 55 °C	-40 °C < t < 55 °C	-40 °C < t < 55 °C	-40 °C < t < 50 °C	-40 °C < t < 55 °C	-40 °C < t < 55 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C	-40 °C < t < 50 °C
Voltage variation	-15 – 10%	-15 – 10%	-15 – 10%	±10%	-15 – 10%	-15 – 10%	±10%	±10%	±10%	±10%	-15 – 10%
Rated impulse voltage [kV], if altitude < 4000 m	4	4	4	4	4	4	4	4	4	4	4
Humidity [R.H.]	0 – 100%	0 – 100%	0 – 100%	0 – 100%	0 – 97% non-condensation condition	0 – 97% non-condensation condition	0 – 100%	0 – 100%	0 – 97% non-condensation condition	0 – 97% non-condensation condition	0 – 100%
Type of control	1	1	1	1	1	1	1	1	1	1	1
Safety classification	Class I	Class I	Class I	Class I	Class I	Class I	Class I	Class I	Class I	Class I	Class I
Max. altitude above sea level [m]	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000

Note:
For DIN plug, impulse withstand voltage is 3.1 kV for 2000 m < Altitude < 4000 m

Approvals

See under the required solenoid valve.

Connection

3-core cable
The external thread in the screwed cable entry suits flexible steel hose or corresponding cable protection (3 x 0.75 mm²).

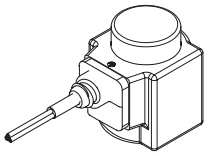
Terminal box
Leads are connected to terminal screws in the terminal box. The box is fitted with a Pg 13.5 screwed entry for 6 – 14 mm cable.
Max. lead cross section: 2.5 mm².

DIN plugs
The three pins on the coil can be fitted with spade tabs, 6.3 mm wide (to EN175301-803A).
The two current carrying pins can also be fitted with spade tabs, 4.8 mm wide.
Max. lead cross section: 1.5 mm².
Use of the protective cap supplied will prevent inadvertent contact with live parts.

DIN socket
(to EN175301-803A)
Leads are connected in the socket. The socket is fitted with a Pg 11 screwed entry for 6 – 12 mm.

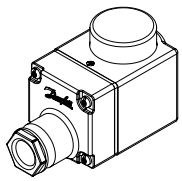
Ordering

Solenoid coil with 1m 3-core cable IP67

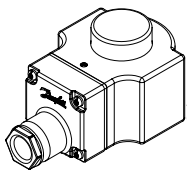


Coil type	Valve type	Power consumption	Frequency [Hz]	Voltage [V] AC	Voltage [V] DC	Code no.
BF	EVR 2 to 40 (NC) EVR 6 to 22 (NO) EVRH 10 to 40 EVRC EVRA EVRAT EVRS/EVRST EVM (NC)	Holding: 10 W/ 21 VA Inrush: 44 VA	50	24	–	018F6257
			50	220/230	–	018F6251
			50	240	–	018F6252
			50	380/400	–	018F6253
			60	24	–	018F6265
			60	115	–	018F6260
			60	220	–	018F6264
			50/60	110	–	018F6280
			50/60	220/230	–	018F6282

Solenoid coil with terminal box IP67



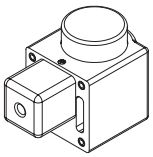
Coil type	Valve type	Power consumption	Frequency [Hz]	Voltage [V] AC	Voltage [V] DC	Code no.
BE	EVR 2 to 40 (NC) EVR 6 to 22 (NO) EVRH 10 to 40 EVRC EVRA EVRAT EVRS/EVRST EVM (NC)	Holding: 10 W/ 21 VA Inrush: 44 VA	50	12	–	018F6706
			50	24	–	018F6707
			50	42	–	018F6708
			50	48	–	018F6709
			50	115	–	018F6711
			50	220/230	–	018F6701
			50	240	–	018F6702
			50	380/400	–	018F6703
			50	420	–	018F6704
			60	24	–	018F6715
			60	115	–	018F6710
			60	220	–	018F6714
			60	240	–	018F6713
			50/60	110	–	018F6730
			50/60	220/230	–	018F6732
BG	EVR 3 to 40 EVRC EVRA EVRAT EVRS/EVRST EVM (NC/NO)	Holding: 12 W/ 26 VA Inrush: 64 VA	50	24	–	018F6807
			50	48	–	018F6809
			50	110	–	018F6811
			50	220/230	–	018F6801
			50	240	–	018F6802
			50	380/400	–	018F6803
			60	24	–	018F6815
			60	110	–	018F6813
			60	220	–	018F6814
	EVR 2 to 15 (NC) EVR 25 to 40 (NC/NO) EVR 6 to 15 (NO) EVRC 10 to 15 EVRA 3 to 15 (NC) EVRA 25 to 40 (NC) EVRAT 10 to 15 (NC) EVRS/EVRST 3 to 15 EVM (NC/NO)	20 W	–	–	12	018F6856
			–	–	24	018F6857
			–	–	48	018F6859
			–	–	110	018F6860
			–	–	115	018F6861
			–	–	220	018F6851
	EVR 20 to 22 (NC/NO) EVRC 20 EVRA 20 EVRAT 20 EVRST 20	20 W	–	–	12	018F6886
			–	–	24	018F6887
			–	–	48	018F6889
			–	–	110	018F6890
			–	–	220	018F6881



See "Opening differential pressure" under "Technical data" for the valve concerned.
When replacing a coil with terminal box, it is sufficient to change the coil unit itself. Therefore, order coil with DIN plugs and protective cap.

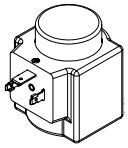
Ordering

Solenoid coil with DIN spade and protection cap IP20



Coil type	Valve type	Power consumption	Frequency [Hz]	Voltage [V] AC	Voltage [V] DC	Code no.
BE	EVR 2 to 40 (NC) EVR 6 to 22 (NO) EVRH 10 to 40 EVRC EVRA EVRAT EVRS/EVRST EVM (NC)	Holding: 10 W/ 21 VA Inrush: 44 VA	50	24	–	**018F6182**
			50	220/230	–	**018F6176**
			50	240	–	**018F6177**
			50	420	–	**018F6179**
			60	115	–	**018F6185**
			60	220	–	**018F6189**
			50/60	110	–	**018F6192**
			50/60	220/230	–	**018F6193**

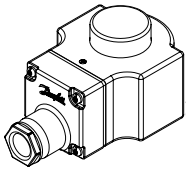
Solenoid coil with DIN spade*)



Coil type	Valve type	Power consumption	Frequency [Hz]	Voltage [V] AC	Voltage [V] DC	Code no.
BB	EVR 2 to 40 (NC) EVR 6 to 22 (NO) EVRH 10 to 40 EVRC EVRA EVRAT EVRS/EVRST EVM (NC)	Holding: 10 W/ 21 VA Inrush: 44 VA	50	24	–	**018F7358**
			50	115	–	**018F7361**
			50	220/230	–	**018F7351**
			50	240	–	**018F7352**
			50/60	110	–	**018F7360**
			50/60	220/230	–	**018F7363**

See "Opening differential pressure" under "Technical data" for the valve concerned.
When replacing a coil with terminal box, it is sufficient to change the coil unit itself. Therefore, order coil with DIN plugs and protective cap.
***)** Can only be used with DIN plug.*

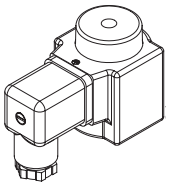
Special solenoid coil with terminal box IP67



Coil type	Valve type	Power consumption	Frequency [Hz]	Voltage [V] AC	Voltage [V] DC	Code no.
BN	EVR 2 to 40 (NC) EVR 6 to 22 (NO) EVRH 4 to 40 EVRC/EVRA/EVRAT/ EVRS/EVRST/EVM (NC)	Holding: 20 W/ 45 VA Inrush: 65 VA	50	24	–	**018F6901** [1]
			60	24	–	**018F6902** [1]
			50	230	–	**018F6905** [1]

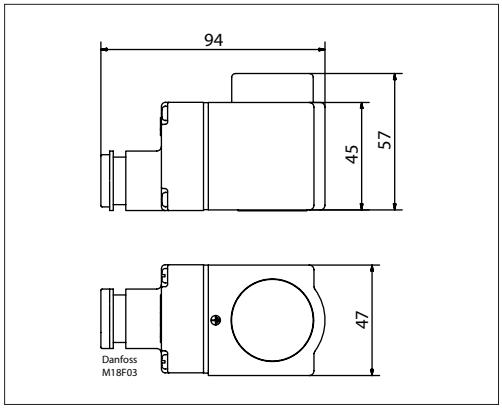
[1] *Recommended use for EVRH with high MOPD (38 bar).*

Coil with DIN plug

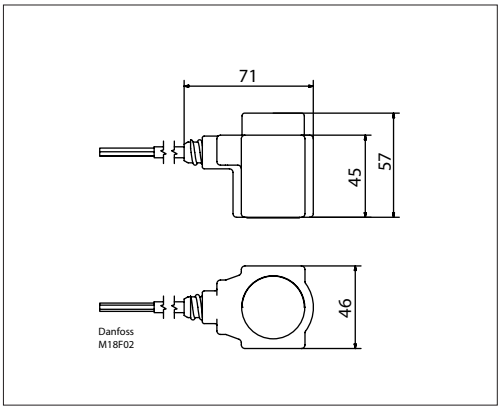


Terminal box	With built-in light emitting indicator diode for solenoid valves (only for AC)	**018Z0089**
DIN plug	Enclosure IP65, EN 175301-803A	**042N0156**

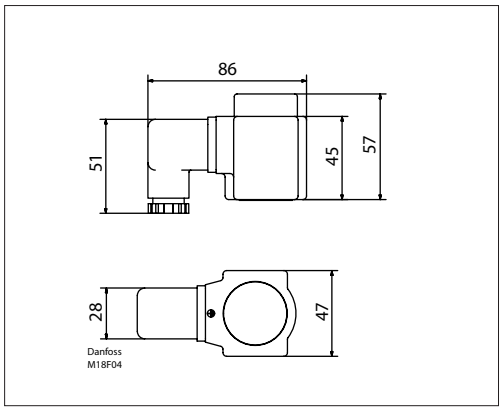
Dimension and weight



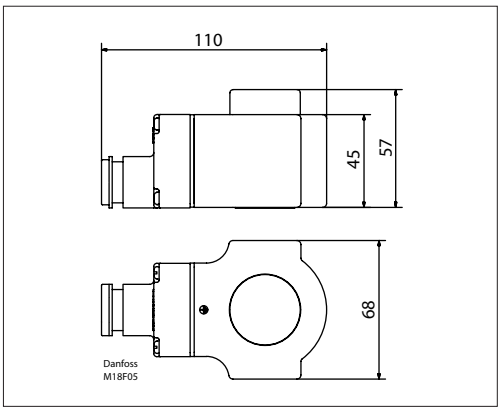
Terminal box 10 W
Weight 0.29 Kg



Cable 10 W
Weight 0.29 Kg



DIN socket 10 W
Weight 0.24 Kg



Terminal box 12 - 20 W
Weight 0.55 Kg