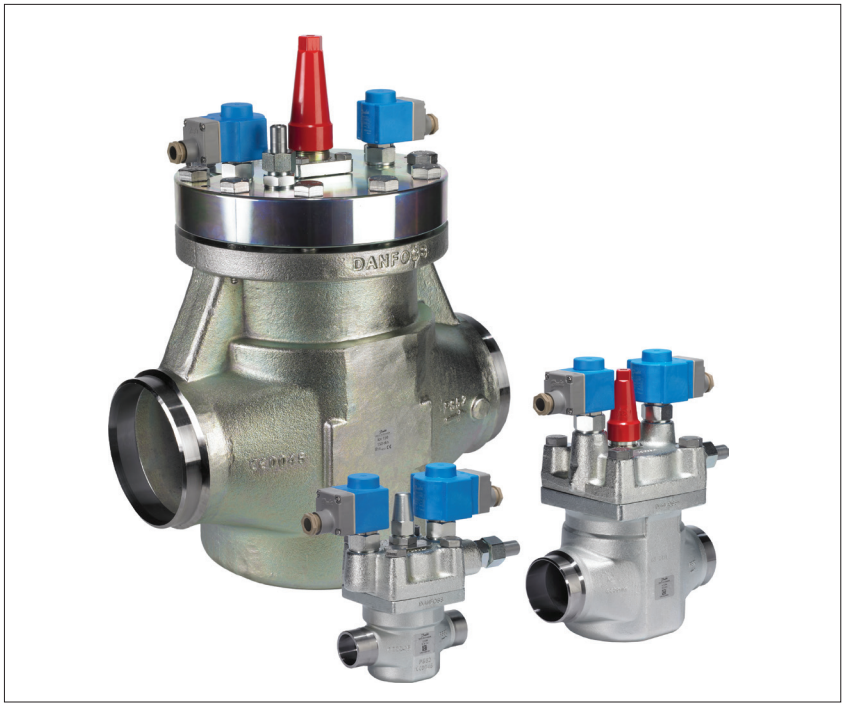
ENGINEERING TOMORROW

Data sheet

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.

Contents **Page**

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

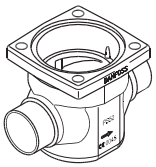
The ICLX Concept

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.

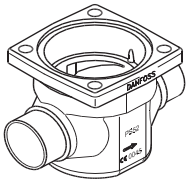
- There are seven valve bodies available.

ICV 32

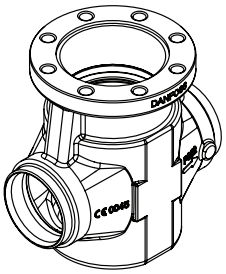
ICV 40



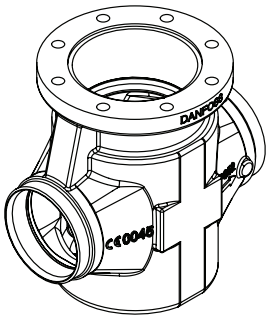
ICV 50



ICV 65



ICV 100



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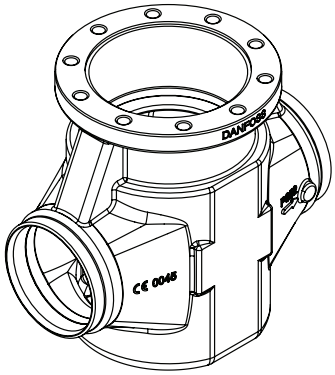
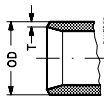
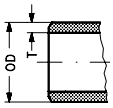
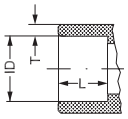
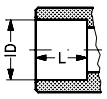
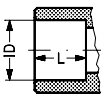


ICV 150

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

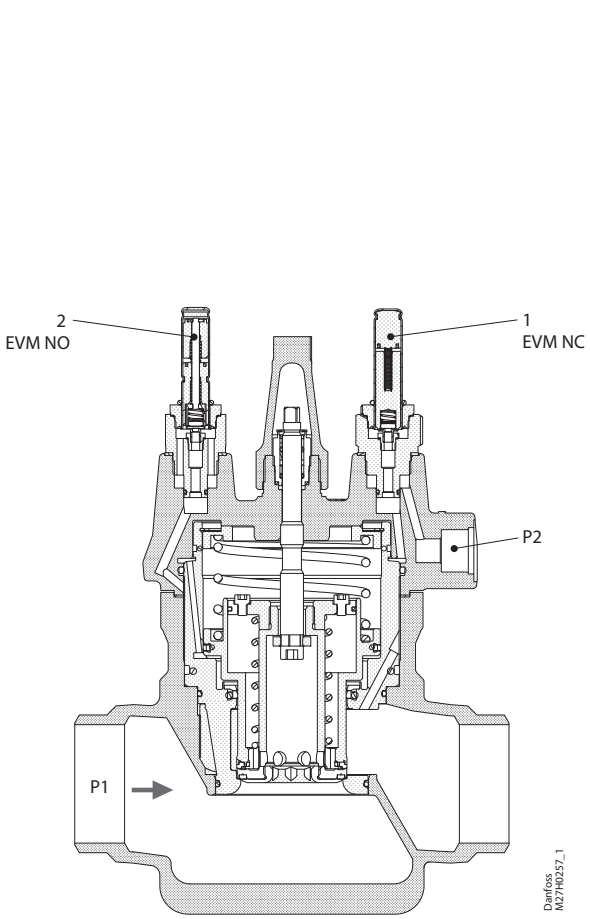
Technical data

- *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.

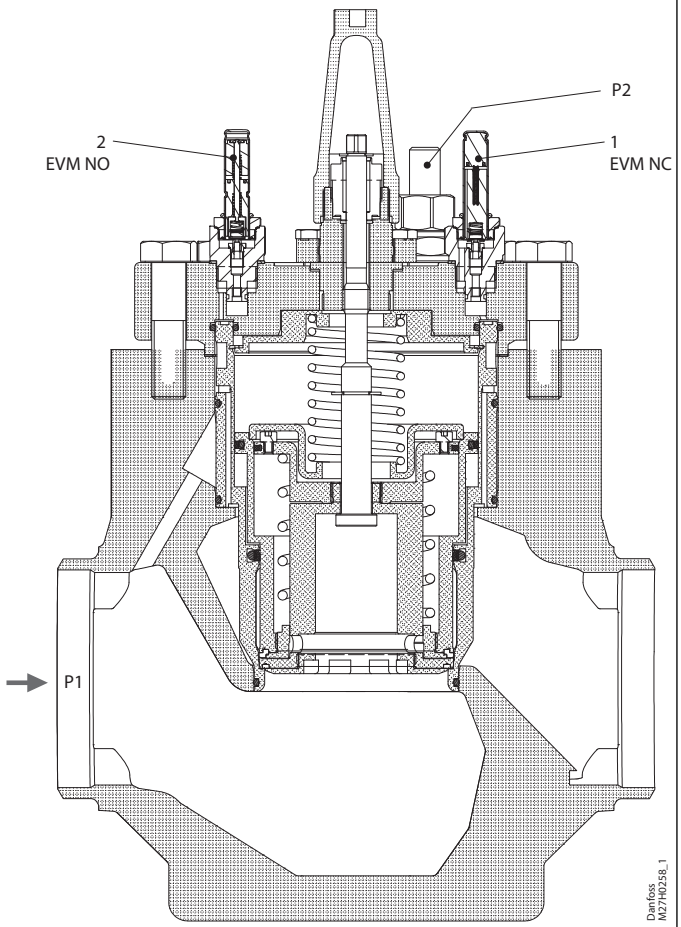
ICLX 32-150
40 bar / 580 psi @ external pressure 2 bar (30 psi) higher than inlet pressure of the valve.

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.

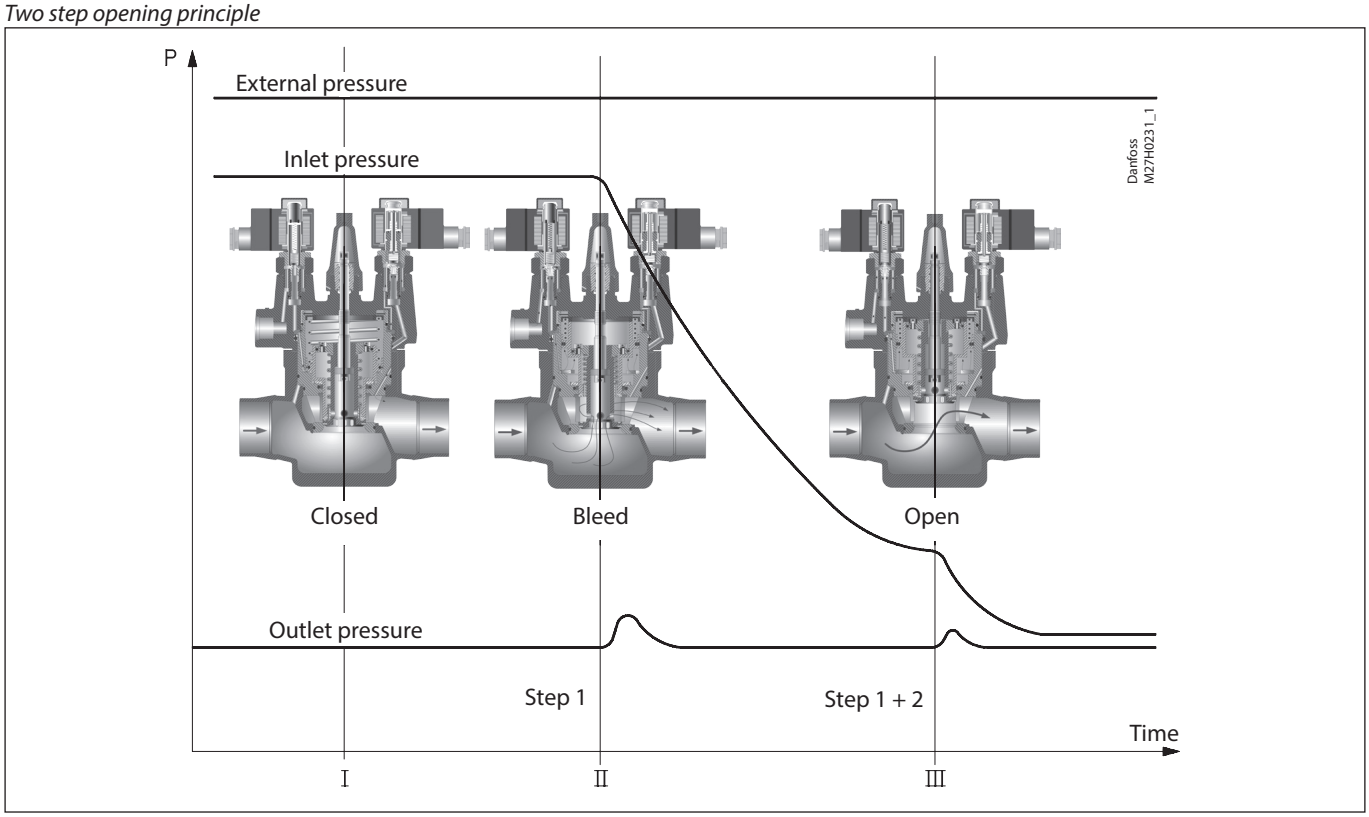
The ICLX is closing and kept closed when the coils on EVM pilot solenoid valves pos. 1 and pos. 2 are de-energised.

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.

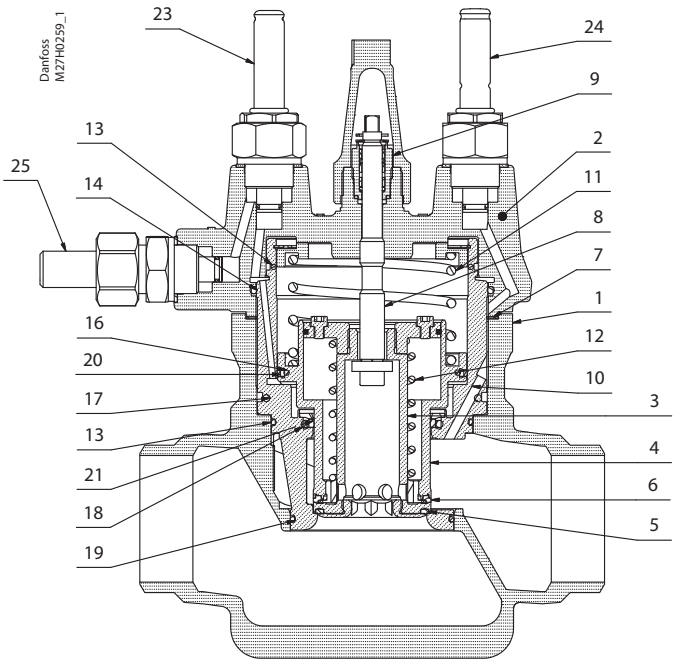
The exact time taken from when the pilot valves change position to complete closing of the ICLX will depend on temperature, pressure, refrigerant and size of valve. Thus an exact closing time for the valves cannot be given but, in general, lower temperatures give longer closing times.

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

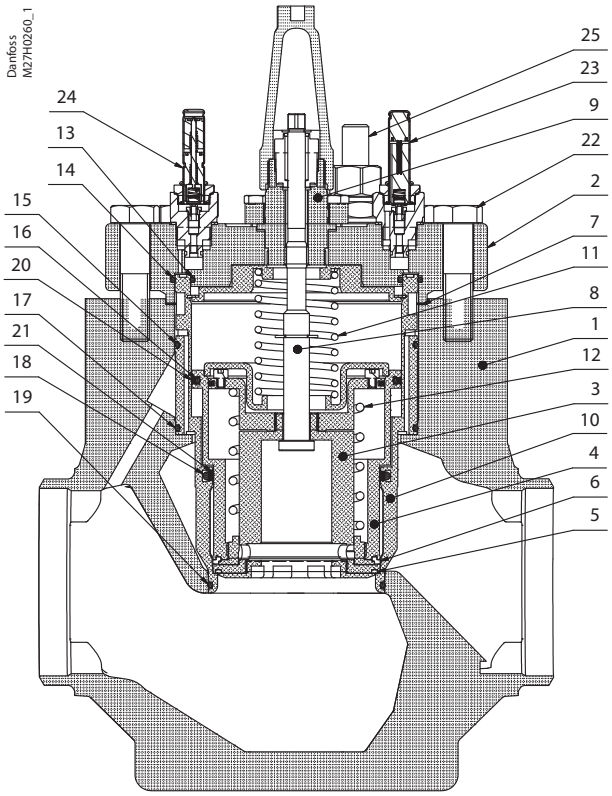
Steps must be taken to ensure that the hot gas supply valve is not opened before the ICLX in the suction line is completely closed. If the hot gas supply valve is opened before the ICLX in the suction line is closed, considerable energy will be lost and potentially dangerous situations might arise because 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

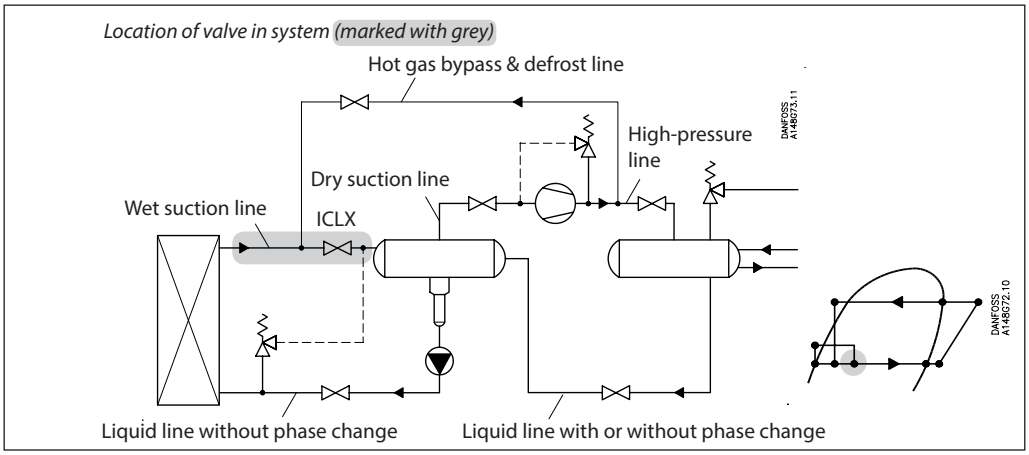


ICLX 100-150

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 × 0.77 × 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 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	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 m³/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 ($f_{\Delta P}$)

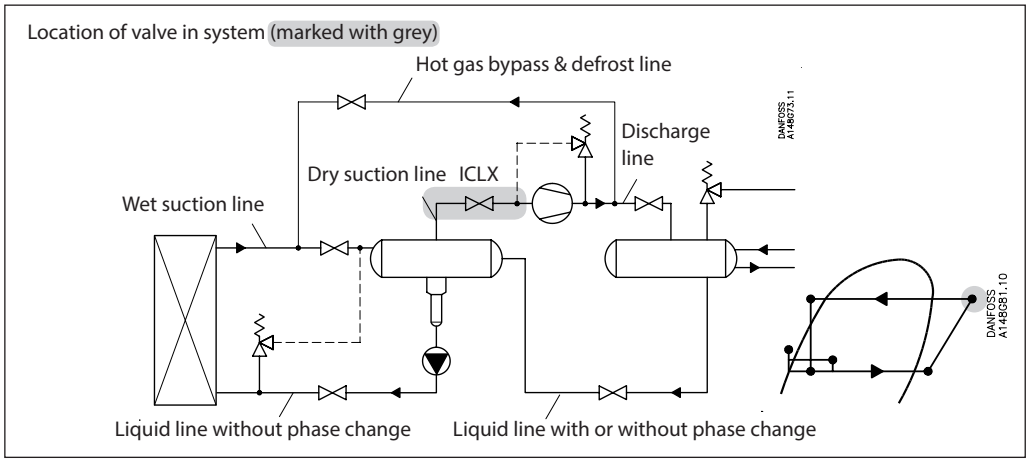
ΔP (psi)	Correction factor
0.15	2.24
0.45	1.29
0.75	**1**
1.25	0.77
1.75	0.65
2.25	0.58

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 (°C)	Correction factor
-20	0.82
-10	0.86
0	0.88
10	0.92
20	0.96
30	**1**
40	1.04
50	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 (°F)	Correction factor
-10	0.82
10	0.85
30	0.88
50	0.92
70	0.96
90	**1**
110	1.04
130	1.09

Nominal capacities

Dry suction line

R 744

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 10 °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
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 (°C)	Correction factor
-20	0.75
-10	0.81
0	0.89
10	1
15	1.08

R 744

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 50 °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
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 (°F)	Correction factor
-10	0.73
10	0.80
30	0.89
50	1
60	1.08

Nominal capacities

Dry suction line

R 134a

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						
		–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 (°C)	Correction factor
–20	0.66
–10	0.70
0	0.76
10	0.82
20	0.90
30	**1**
40	1.13
50	1.29

R 134a

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						
		–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 (°F)	Correction factor
–10	0.64
10	0.68
30	0.74
50	0.81
70	0.89
90	**1**
110	1.15
130	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 (°C)	Correction factor
–20	0.55
–10	0.60
0	0.66
10	0.74
20	0.85
30	**1**
40	1.23
50	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})

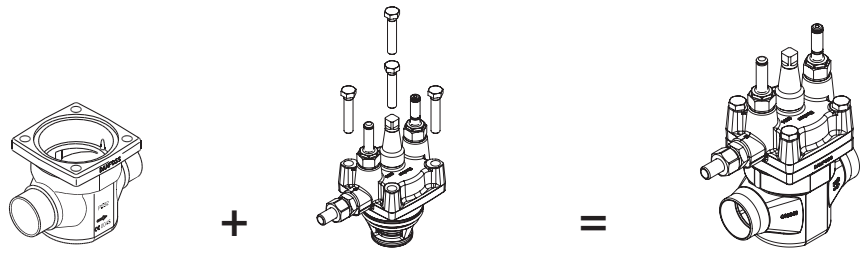
Liquid temperature (°F)	Correction factor
–10	0.52
10	0.57
30	0.63
50	0.72
70	0.83
90	**1**
110	1.29
130	1.92

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.

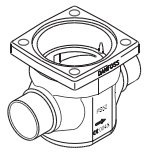
Example (select from table I and II)



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*

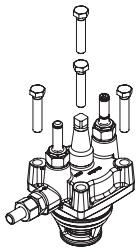


32 D (1 ¼ in.)	40 D (1 ½ in.)	42 SA (1 ⅝ in.)	42 SD (1⅝ in.)
027H3120	**027H3125**	**027H3127**	**027H3128**

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*

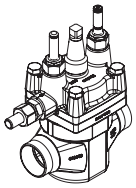


Description	Code Number
ICLX 32	**027H3204** *)

*) 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**	

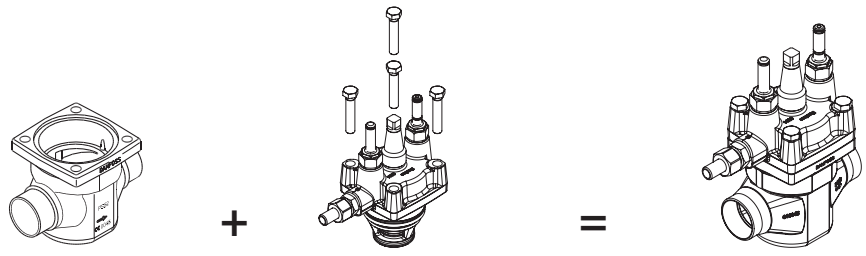
Select from parts programme

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.

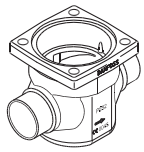
Example (select from table I and II)



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*

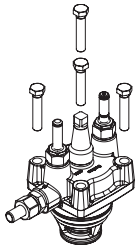


40 D (1 ½ in.)	50 D (2 in.)	42 SA (1 ⅝ in.)	42 SD (1 ⅝ in.)
027H4120	**027H4126**	**027H4124**	**027H4123**

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*

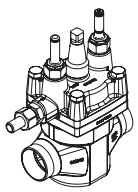


Description	Code Number
ICLX 40	**027H4204** *)

*) 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**	

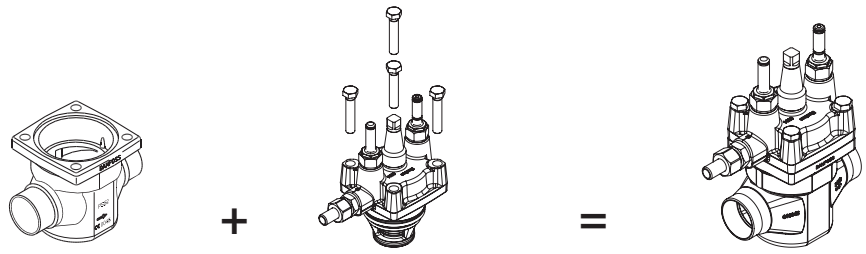
Select from parts programme

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.

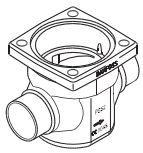
Example (select from table I and II)



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*

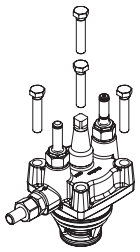


50 D (2 in.)	65 D (2 ½ in.)	54 SD (2 ⅛ in. SA)	50 A (2 in.)
027H5120	**027H5124**	**027H5123**	**027H5121**

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*

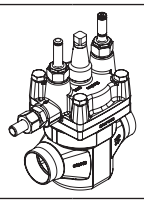


Description	Code Number
ICLX 50	**027H5204** *)

*) 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**	

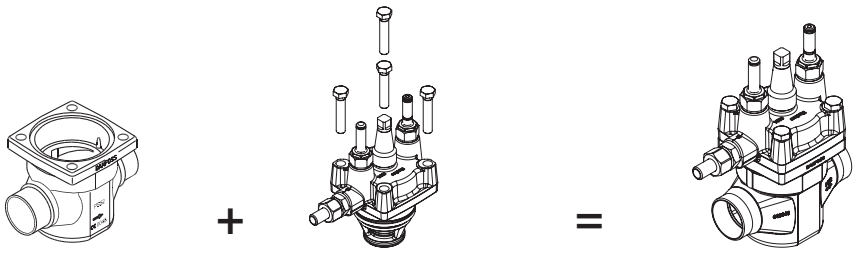
Select from parts programme

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.

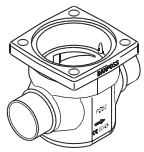
Example (select from table I and II)



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*

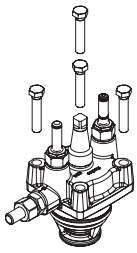


65 D (2 ½ in.)	65 A (2 ½ in.)	80 D (3 in.)	80 A (3 in.)
027H6120	**027H6121**	**027H6126**	**027H6127**

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*

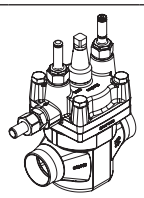


Description	Code Number
ICLX 65	**027H6204 *)**

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

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

Table A



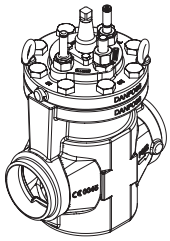
	Available connections						
	65 D (2 ½ in.)	65 A (2 ½ in.)	80 D (3 in.)	80 A (3 in.)	67 SA (2 ⅝ in.)	76 SD (3 in.)	65 SOC (2 ½ in.)
ICLX 65	**027H6040**	**027H6041**	**027H8040**	**027H8042**			**027H6042**

Select from parts programme

Complete factory assembled valve

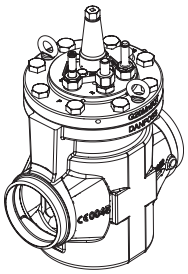
(body, function module / topcover and NC / NO pilot valves)

ICLX 100



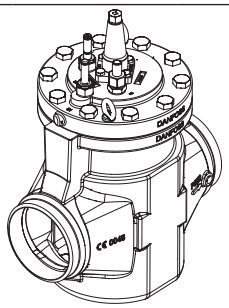
	Available connections	
	100 D (4 in.)	100 A (4 in.)
ICLX 100	**027H7147**	**027H7148**

ICLX 125



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

ICLX 150

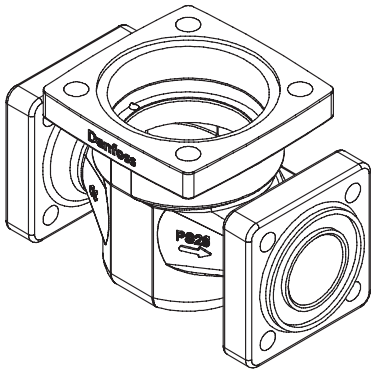


	Available connections	
	150 D (6 in.)	150 A (6 in.)
ICLX 150	**027H7167**	**027H7168**

Accessories

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

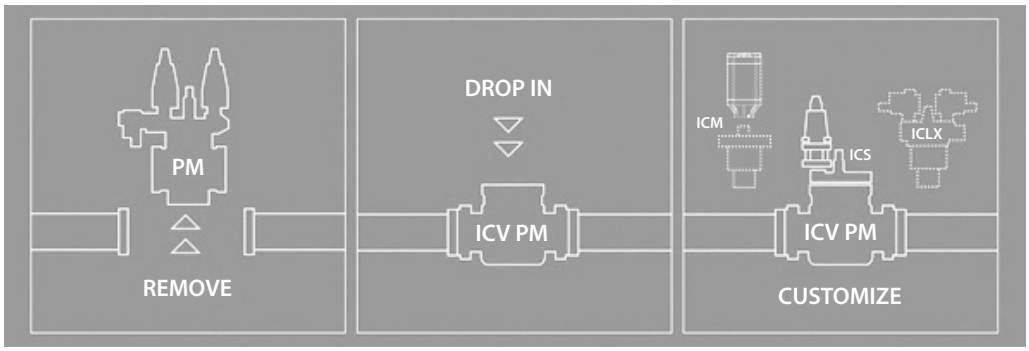
Pressure range
The ICV PM valve housing is designed for a max. working pressure of 28 bar g / 406 psig and therefore a suitable replacement for PM valves in the service market. They also offer the same drop-in dimensions as the PM valves.



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.

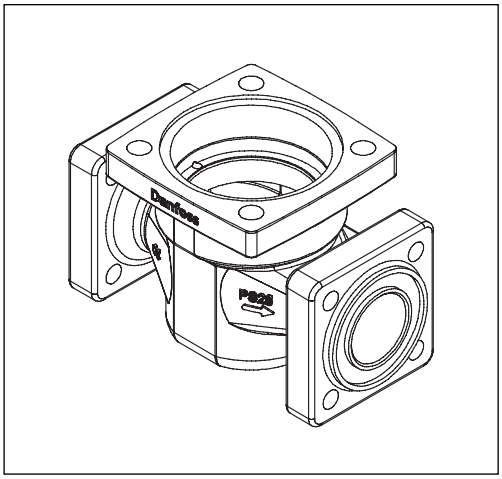
Function modules and top covers must be ordered separately (see the section "Ordering").



Accessories

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

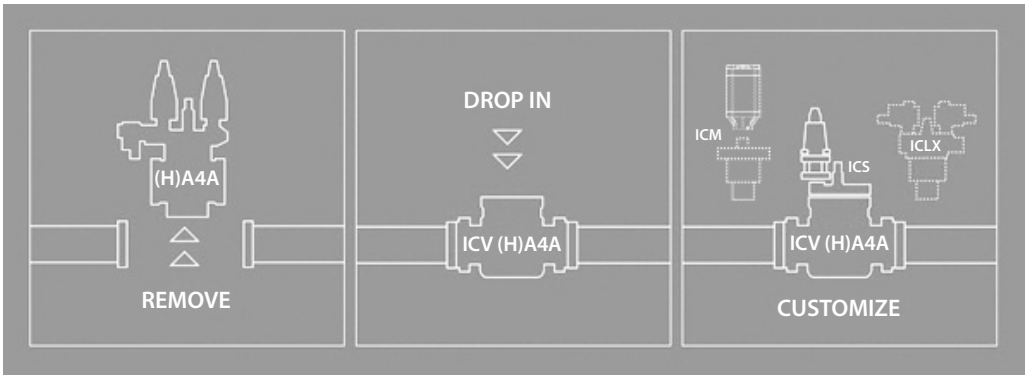
Pressure range
The ICV (H)A4A valve housing is designed for a max. working pressure of 28 bar g / 406 psig and therefore a suitable replacement for (H)A4A valves in the service market. They also offer the same drop-in dimensions as the (H)A4A valves.



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** **)

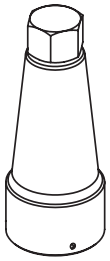
*) Includes ICV (H)A4A valve housing, flange gaskets and flange bolts.
**) Includes ICV (H)A4A valve housing, flange gaskets, flange bolts and flange nuts.

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



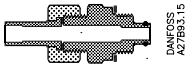
Accessories

Cap including gasket



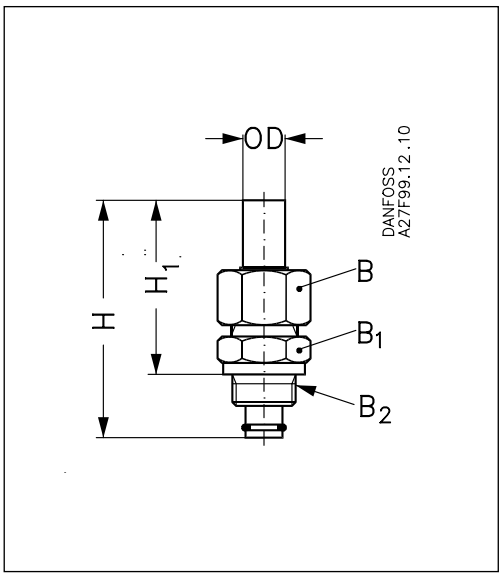
Valve size	Code number
ICLX 32 – 40	**148B3259**
ICLX 50 – 100	**148B4075**
ICLX 125 – 150	**148B4076**

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**

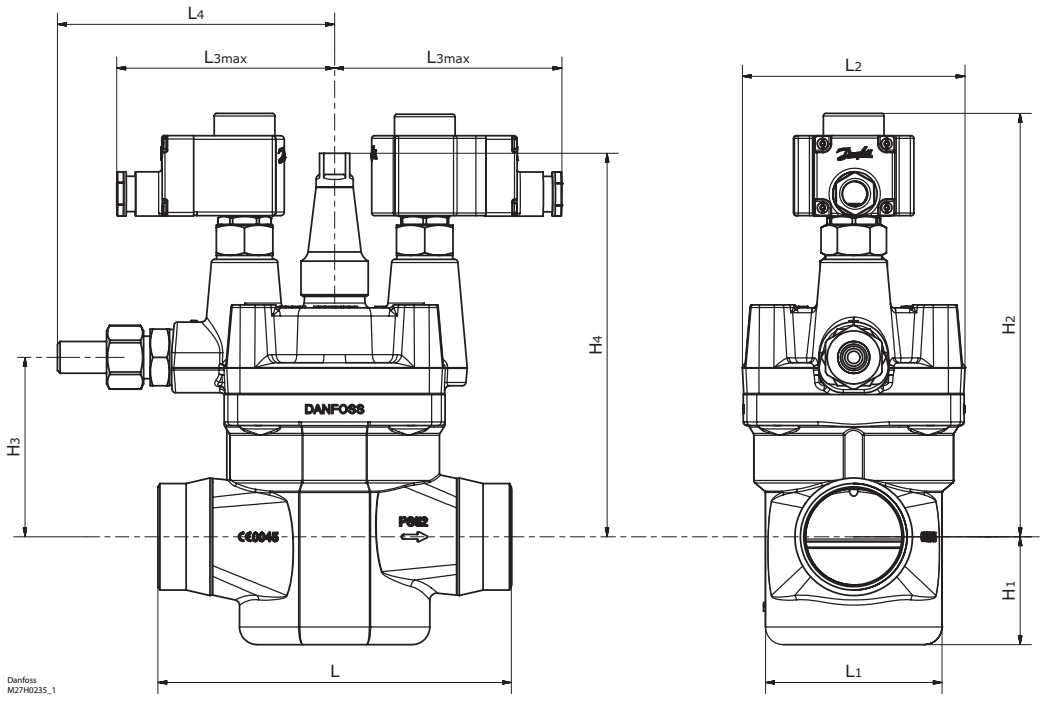


A damping orifice should be installed if the pressure difference between the low and the high pressure side is more than 6 bar.

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_3max		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_3max		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_3max		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

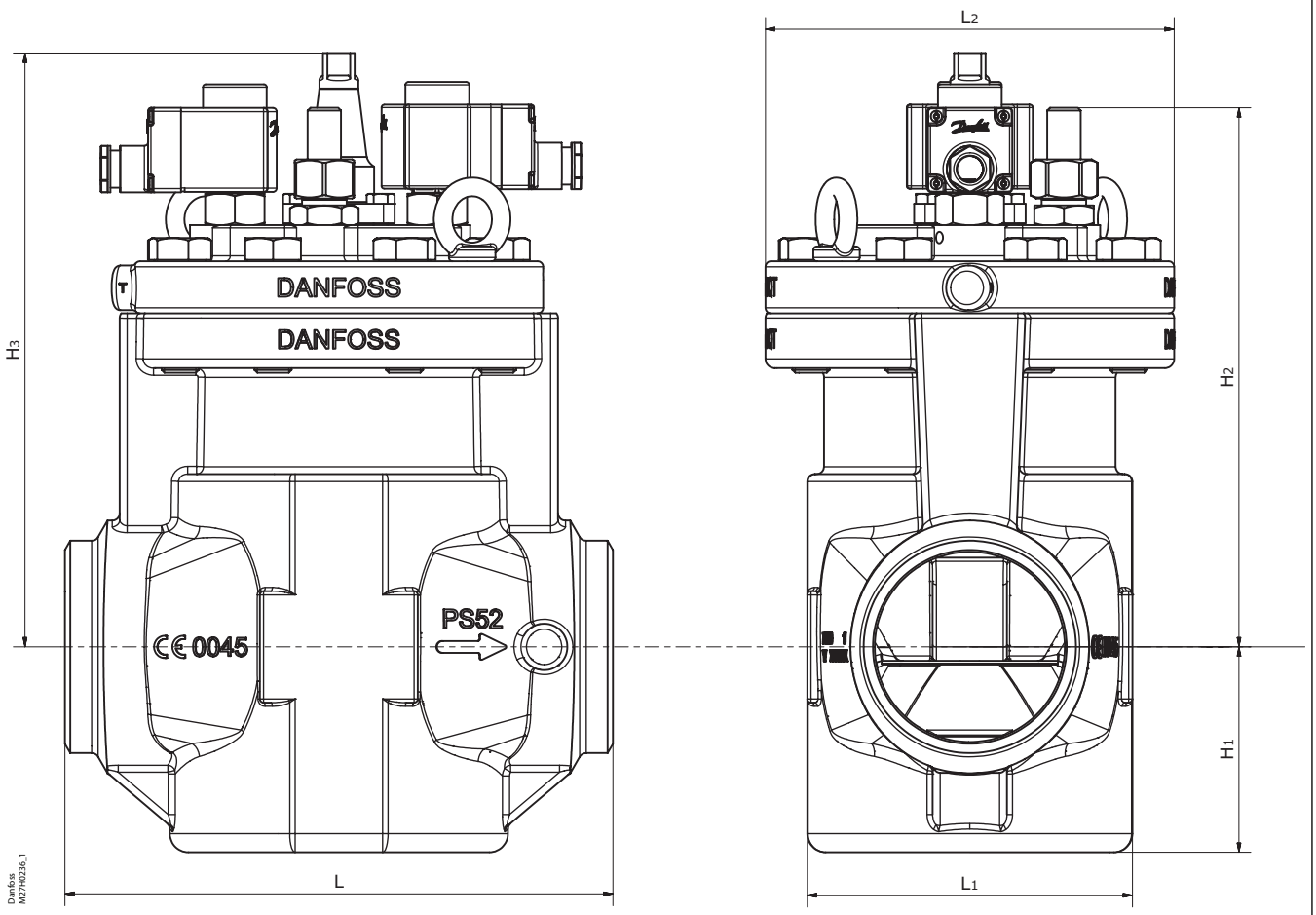
ICLX 65	L						
	65 D	80 D	65 A	80 A	65 SOC	76 SD	67 SA
mm	230	245	230	245	230	245	245
in.	9.1	9.6	9.1	9.6	9.1	9.6	9.6

ICLX 65	L_1	L_2	L_3max		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

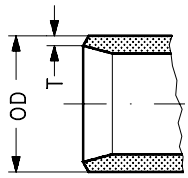
Dimensions



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

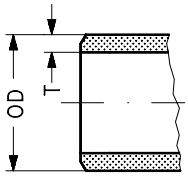
Connections

D: *Butt-weld (EN 10220)*



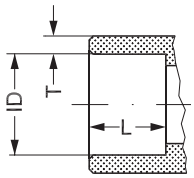
Size mm	Size in.	OD mm	T mm	OD in.	T in.		
32	(1 ¼)	42.4	2.6	1.669	0.102		
40	(1 ½)	48.3	2.6	1.902	0.103		
50	(2)	60.3	2.9	2.37	0.11		
65	(2 ½)	76.1	2.9	3	0.11		
80	(3)	88.9	3.2	3.50	0.13		
100	(4)	114.3	3.6	4.5	0.14		
125	(5)	140.7	4	5.5	0.16		
150	(6)	168.3	6.3	6.6	0.25		

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



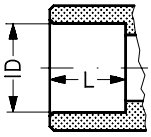
Size mm	Size in.	OD mm	T mm	OD in.	T in.	Schedule	
(32)	1 ¼	42.4	4.9	1.669	0.193	80	
(40)	1 ½	48.3	5.1	1.902	0.201	80	
(50)	2	60.3	3.9	2.37	0.15	40	
(65)	2 ½	73.0	5.2	2.87	0.20	40	
(80)	3	88.9	5.5	3.50	0.22	40	
(100)	4	114.3	6	4.5	0.24		
(125)	5	140.7	6.5	5.5	0.26		
(150)	6	168.3	7.1	6.6	0.28		

SOC:
Socket welding ANSI (B 16.11)



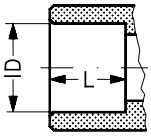
Size mm	Size in.	ID mm	T mm	ID in.	T in.	L mm	L in.
(32)	1 ¼	42.7	6.1	1.743	0.240	13	0.51
(40)	1 ½	48.8	6.6	1.921	0.260	13	0.51
(50)	2	61.2	6.2	2.41	0.24	16	0.63
(65)	2 ½	74	8.8	2.91	0.344	16	0.63

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