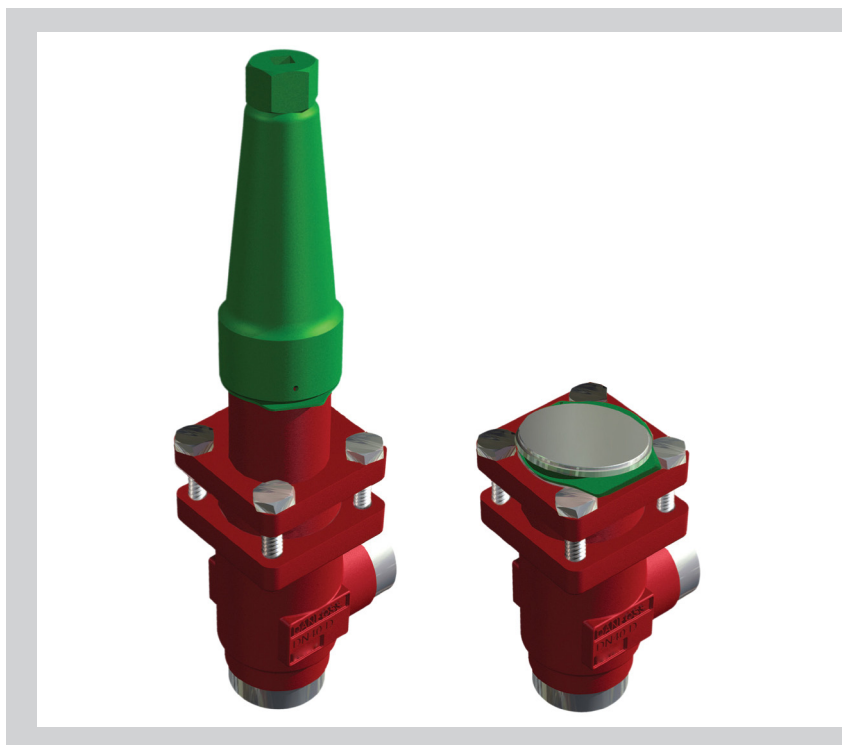


Technical brochure

Stop check valves, SCA-X

Check valves, CHV-X



SCA-X are check valves with a built-in stop valve function. CHV-X are check valves only. SCA-X/CHV-X are available in angleway versions.

The valves are designed to open at very low differential pressures, allow favourable flow conditions and are easy to disassemble for inspection and service.

The SCA-X is equipped with vented cap and has internal backseating enabling the spindle seal to be replaced whilst the valve still under pressure.

Laser cut V-ports provide excellent opening characteristics (SCA-X/CHV-X 50-125).

The valve cone has a built-in flexibility to ensure a precise and tight closing towards the valve seat.

A well balanced dampening effect between the piston and the cylinder gives an optimal protection during low loads and against pulsations.

Features

- Applicable to all common non-flammable refrigerants and all non-corrosive gases/liquids.
Can be used in chemical and petro-chemical applications.
- Housing is Standard SVL angleway housing allowing other inserts from the SVL platform to be installed.
- Designed to open at a very low differential pressure of 0.04 bar (0.58 psig).
- Designed with a built-in damping chamber preventing valve flutter in case of low refrigerant velocity and/or low density.
- Each valve is clearly marked with type, size and performance range.
- Easy to disassemble for inspection and service.
- Internal backseating enables replacement of the spindle seal whilst the valve is active, i.e. under pressure.
- Optimal flow characteristics ensuring quick opening to the fully open position.
- Protection against pulsation by built-in damping facility.
- Housing and bonnet material is low temperature steel according to requirements of the Pressure Equipment Directive and other international classification authorities.
- Equipped with Stainless steel bolts.
- Max. working pressure: 52 bar g (754 psi g)
- Temperature range: $-60^{\circ}\text{C}/+150^{\circ}$ ($-76^{\circ}\text{F}/+302^{\circ}\text{F}$)
- Classification:
To get an updated list of certification on the products please contact your local Danfoss Sales Company.

Stop check valves type SCA-X - Check valves type CHV-X

Design

Connections

Available with the following connections:

- Butt-weld DIN (EN 10220)
- DN 15 - 125 (½ - 5 in.)
- Butt-weld ANSI (B 36.10 Schedule 80),
- DN 15 - 40 (½ - 1½ in.)
- Butt-weld ANSI (B 36.10 Schedule 40),
- DN 50 - 125 (2 - 5 in.)
- Socket-weld ANSI (B 16.11),
- DN 50 (2 in.)

Housing

The housing is made from special, cold resistant steel.

Valve cone

Valve cone with built in metallic stop - prevents damage to teflon ring in case of overtightening.

Damping chamber

The chamber is filled with refrigerants (gas or liquid), which provides a damping effect when the valve opens and closes.

Spindle (SCA-X)

Made of polished stainless steel, which is ideal for O-ring sealing.

Packing Gland (SCA-X)

The "full temperature range" packing gland is the standard for the entire SVL platform.

This ensures perfect tightness throughout the whole temperature range:
-60/+150°C (-76/+302°F).

Pressure Equipment Directive (PED)

The SCA-X/CHV-X valves are approved according to the European standard specified in the Pressure Equipment Directive and are CE marked.

For further details / restrictions - see the product instruction.

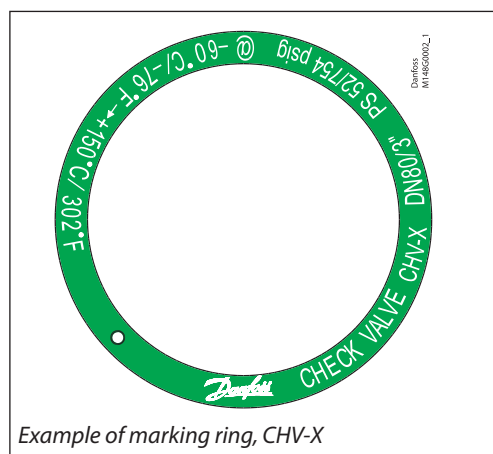
Installation

The valve must be mounted vertically with the cone downwards.

The valve is designed to resist very high internal pressure. However, the piping system in general should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion.

For further information refer to installation instructions for SCA-X/CHV-X.

If cold refrigeration oil having low viscosity enters and settles in the damping chamber, problems with the check valve may arise. Consequently, it may be necessary to modify the valve for more viscous liquids by enlarging the hole to the damping chamber.



Example of marking ring, CHV-X



SCA-X/CHV-X valves			
Nominal bore	DN = < 25 mm (1 in.)	DN32-80 mm (1¼ - 3 in.)	DN100 - 125 mm (4 - 5 in.)
Classified for	Fluid group I		
Category	Article 3, paragraph 3	II	III

Technical data

- **Refrigerants**
Applicable to all common non-flammable refrigerants and all non-corrosive gases/liquids.
For further information refer to the product instruction for SCA-X/CHV-X.
- **Temperature range**
-60/+150°C (-76/+302°F).
- **Max. working pressure**
52 bar g (754 psig).

Stop check valves type SCA-X - Check valves type CHV-X

Computation and selection

Introduction

When dimensioning SCA-X/CHV-X, it is important to select a valve that is best suited to all operating conditions. Therefore, it is necessary to consider both the nominal and part load working conditions.

The SCA-X/CHV-X valve can be calculated in two ways:

- Using the tables below.
- Using DIRcalc version 1.14 or higher.

Example

SI-Units

Assumed working conditions:
 Maximum flow $\dot{V} = 1000 \text{ m}^3/\text{h}$
 Density $\rho = 3.0 \text{ kg/m}^3$
 Minimum part load = 33%

Used expressions:

Recommended velocity - C_{rec} [m/s]
 Minimum recommended velocity - $C_{min, rec}$ [m/s]
 Maximum velocity - C_{max} [m/s]
 Part load velocity - C_{part} [m/s]

We know the density $\rho \approx 3.0 \text{ kg/m}^3$, consequently C_{rec} as well as $C_{min, rec}$ can be found in the figure below (standard valve).

$$C_{rec} \approx 14 \text{ m/s}$$

$$C_{min, rec} \approx 3 \text{ m/s}$$

US-Units

Assumed working conditions:
 Maximum flow $\dot{V} = 1160 \text{ gpm}$
 Density $\rho = 0.187 \text{ lb/ft}^3$
 Minimum part load = 33%

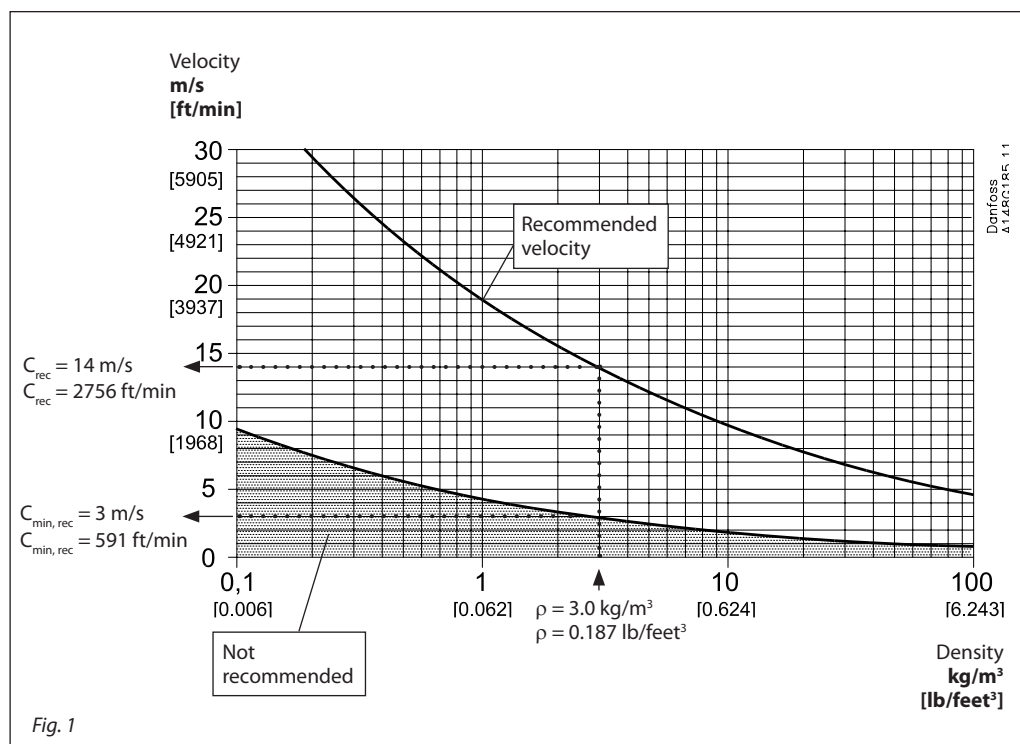
Used expressions:

Recommended velocity - C_{rec} [ft/min]
 Minimum recommended velocity - $C_{min, rec}$ [ft/min]
 Maximum velocity - C_{max} [ft/min]
 Part load velocity - C_{part} [ft/min]

We know the density $\rho \approx 0.187 \text{ lb/ft}^3$, consequently C_{rec} as well as $C_{min, rec}$ can be found in the figure (standard valve).

$$C_{rec} \approx 2756 \text{ ft/min}$$

$$C_{min, rec} \approx 591 \text{ ft/min}$$



Selection example continued on following page.

Stop check valves type SCA-X - Check valves type CHV-X

Computation and selection (continued)

Knowing that $\dot{V} = 1000 \text{ m}^3/\text{h}$ (1160 gpm) fig. 2 gives the following choices:

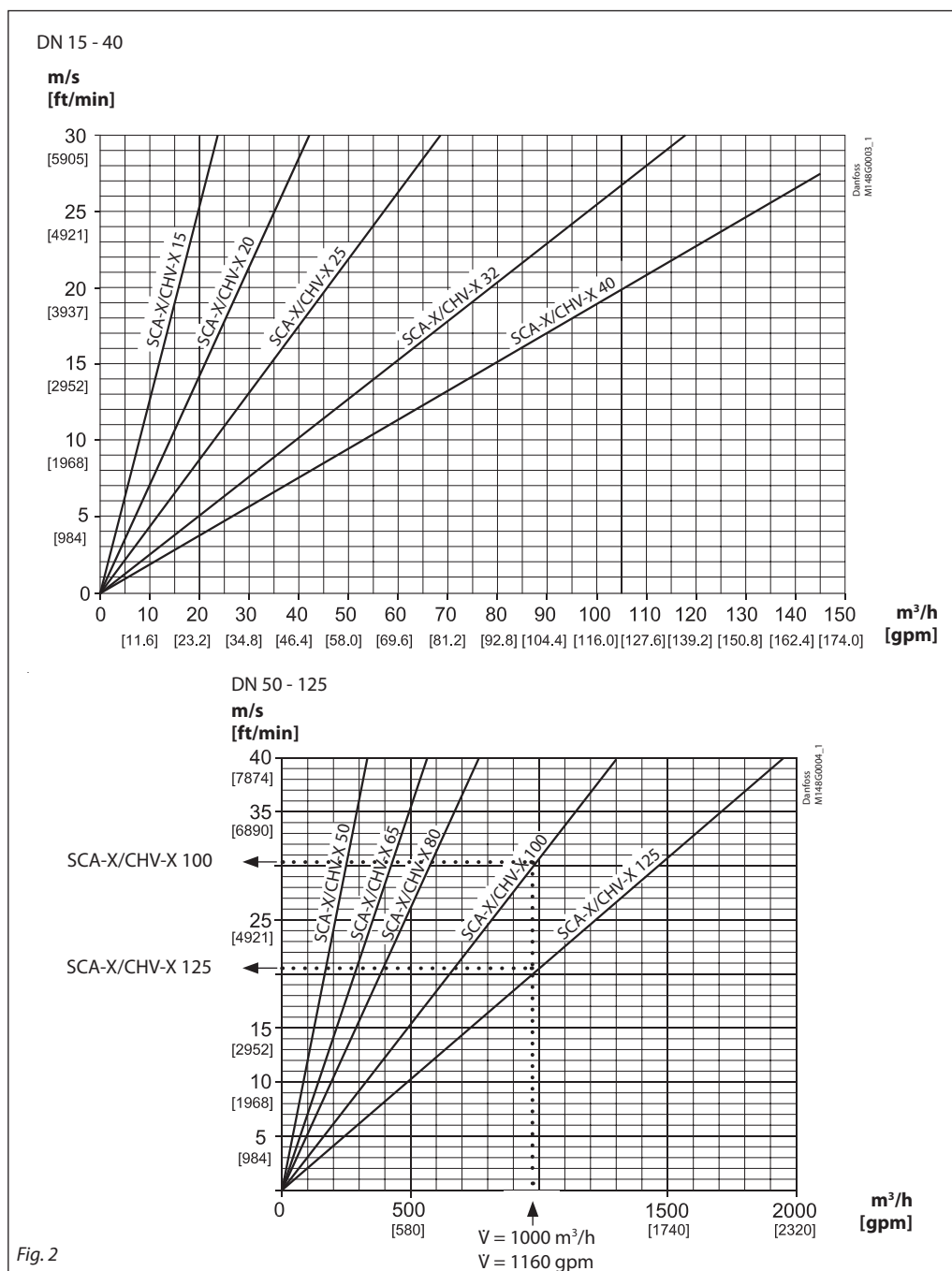
For SCA-X/CHV-X in size DN 100 the maximum velocity $C_{\text{max}} \approx 31 \text{ m/s}$ (6100 ft/min)

For SCA-X/CHV-X in size DN 125 the maximum velocity $C_{\text{max}} \approx 20 \text{ m/s}$ (3900 ft/min)

In conclusion SCA-X in size DN 125 is selected because $C_{\text{max}} \approx 20 \text{ m/s}$ (3900 ft/min) comes nearest to the recommended velocity $C_{\text{rec}} \approx 14 \text{ m/s}$ (2756 ft/min) and at the same time part load conditions fulfil the requirements, as described:

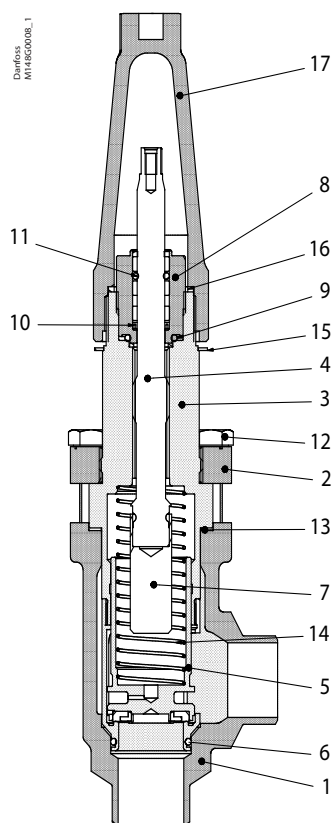
If the valve in question (for instance under part load conditions) provides a velocity less than $C_{\text{min,rec}}$ the valve might start hammering and become noisy. As a result the valve may wear prematurely.

We know that $C_{\text{max}} \approx 20 \text{ m/s}$ (3900 ft/min) and that minimum part load is 33%. It follows that $C_{\text{part}} \approx 6.5 \text{ m/s}$ (1290 ft/min). Thus, C_{part} (6.5 m/s) > $C_{\text{min,rec}}$ (3.0 m/s) and the selected SCA-X model DN125 is the perfect choice.

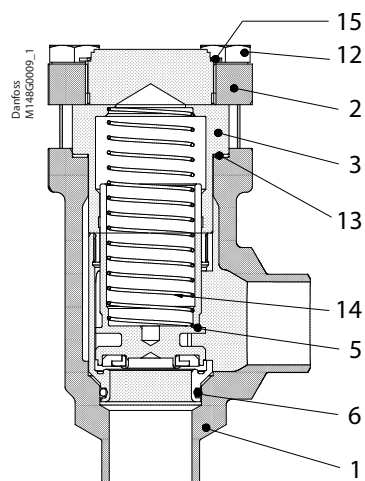


Stop check valves type SCA-X - Check valves type CHV-X

Material specification



SCA-X 15 - 40

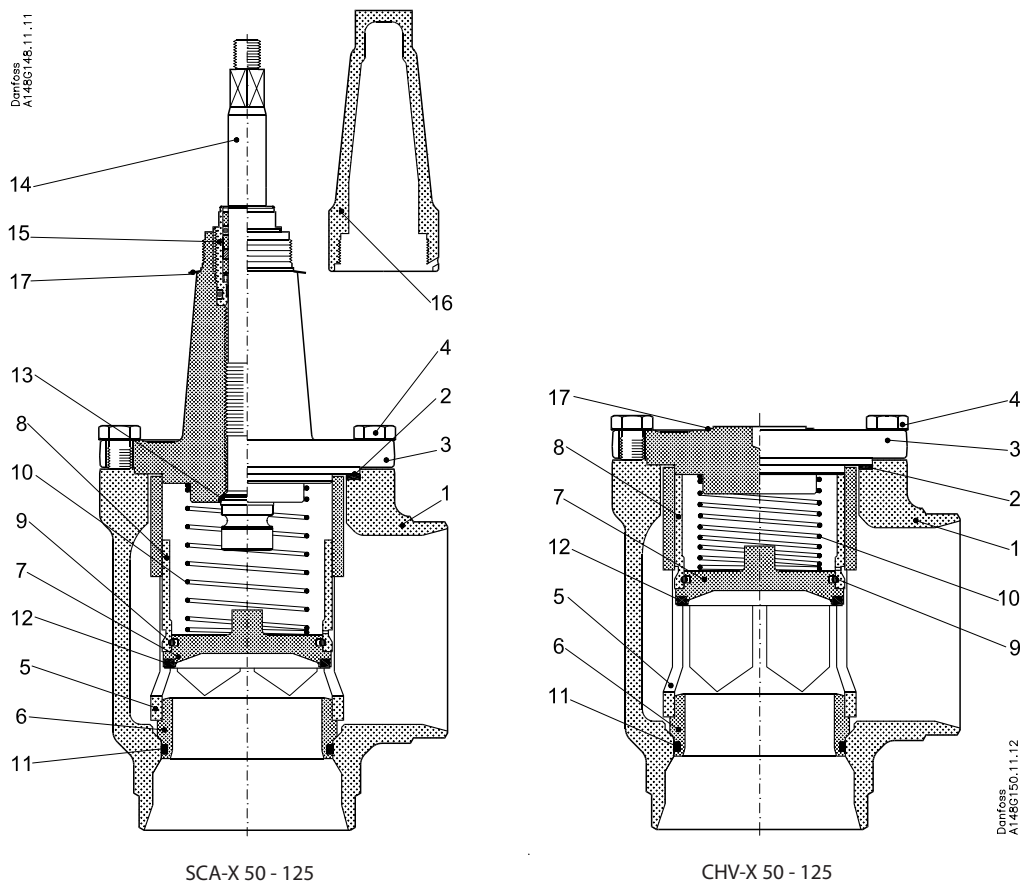


CHV-X 15 - 40

No.	Part	Material	DIN/EN	ISO	ASTM
1	Housing	Steel	P285QH EN10222-4		LF2A350
2	Bonnet, Flange	Steel	P275NL1 EN10028-3		
3	Bonnet, Insert	Steel			
4	Spindle	Stainless steel	X 10CrNiS18-9	Type 17, 17440	AISI 303, 683/13
5	Cone	Steel Teflon (PTFE)			
6	O-ring	Cloroprene (Neoprene)			
7	Spindle extension	Steel			
8	Packing gland O-rings	Steel Cloroprene (Neoprene)			
9	Packing washer	Aluminium			
10	Spring loaded seal	Teflon (PTFE)			
11	O-ring	Cloroprene (Neoprene)			
12	Bolts	Stainless steel	A2-70	A2-70	Type 308
13	Gasket	Fiber, non-asbestos			
14	Spring	Steel			
15	Identification ring	Stainless steel			
16	Seal cap gasket	Nylon			
17	Spindle seal cap	Aluminium			

Stop check valves type SCA-X - Check valves type CHV-X

Material specification



SCA-X 50 - 125

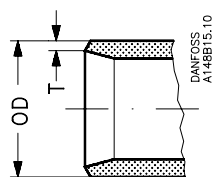
CHV-X 50 - 125

No.	Part	Material	DIN/EN	ISO	ASTM
1	Housing DN 50-65	Steel	P285 QH EN 10222-4		LF2A350
	Housing DN 80-125	Steel	G20Mn5 QT SEW 685		LCC, A352
2	Gasket	Fiber, Non-asbestos			
3	SCA-X: Valve bonnet CHV-X: End cover	Steel	P285 QH EN 10222-4		LF2A350
4	Bolts	Stainless steel	A2-70	A2-70	A-276
5	Tube	Steel			
6	Seat	Steel			
7	Valve plate	Steel			
8	Guide sleeve	Steel			
9	Spring ring	Steel			
10	Spring	Steel			
11	O-ring	Cloroprene (Neoprene)			
12	Teflon ring	Teflon (PTFE)			
13	Soft back seal	Teflon (PTFE)			
14	Spindle DN 50-65	Stainless steel	X8CrNiS18-9 17440	Type 17 R 683/13	AISI 303
	Spindle DN 80-125	Stainless steel	X5CrNi1810 17440	Type 11 683/13	AISI 304 A-276
15	Packing gland	Steel	9Mn28, 1651	Type 2, R 683/9	1213, SAE J403
16	Spindle seal cap and gasket	Aluminium			
17	Marking label	Stainless steel			

Stop check valves type SCA-X - Check valves type CHV-X

Connections

DIN



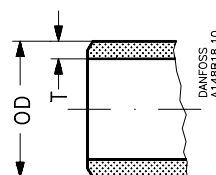
Size mm	Size in.	OD mm	T mm	OD in.	T in.			k_v -angle m ³ /h		C_v -angle USgal/min	
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Welding DIN (EN 10220)

15	1/2	21.3	2.3	0.839	0.091			8.0		9.3	
20	3/4	26.9	2.3	1.059	0.091			10.0		11.6	
25	1	33.7	2.6	1.327	0.102			24.0		27.8	
32	1 1/4	42.4	2.6	1.669	0.102			30.0		34.8	
40	1 1/2	48.3	2.6	1.902	0.102			30.0		34.8	

50	2	60.3	2.9	2.37	0.11			45		53	
65	2 1/2	76.1	2.9	3.00	0.11			72		85	
80	3	88.9	3.2	3.50	0.13			103		129	
100	4	114.3	3.6	4.50	0.14			196		232	
125	5	139.7	4.0	5.50	0.16			301		356	

ANSI



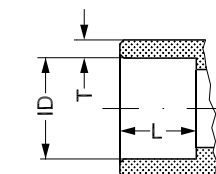
Welding ANSI (B 36.10 Schedule 80)

15	1/2	21.3	3.7	0.839	0.146			8.0		9.3	
20	3/4	26.9	4.0	1.059	0.158			10.0		11.6	
25	1	33.7	4.6	1.327	0.181			24.0		27.8	
32	1 1/4	42.4	4.9	1.669	0.193			30.0		34.8	
40	1 1/2	48.3	5.1	1.902	0.201			30.0		34.8	

Welding ANSI (B 36.10 Schedule 40)

50	2	60.3	3.9	2.37	0.15			45		53	
65	2 1/2	73.0	5.2	2.87	0.20			72		85	
80	3	88.9	5.5	3.50	0.22			103		129	
100	4	114.3	6.0	4.50	0.24			196		232	
125	5	141.3	6.6	5.56	0.26			301		356	

SOC



Size mm	Size in.	ID mm	T mm	ID in.	T in.	L mm	L in.	k_v -angle m ³ /h		C_v -angle USgal/min	
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Socket welding ANSI (B 16.11)

50	2	61.2	6.2	2.41	0.24	16	0.63	45		53	
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Application

Figure 3 shows the stop/check valve SCA-X in the discharge line of a screw compressor unit. The SCA-X valve in the discharge line prevents "back condensation" in the oil separator as well as pressure equalising through the compressor.

Compared to an ordinary stop and check valve arrangement the combined stop/check valve solution, as shown, is easier to install and has lower flow resistance.

Installation of the SCA-X/CHV-X in the economizer line is **not** recommended.

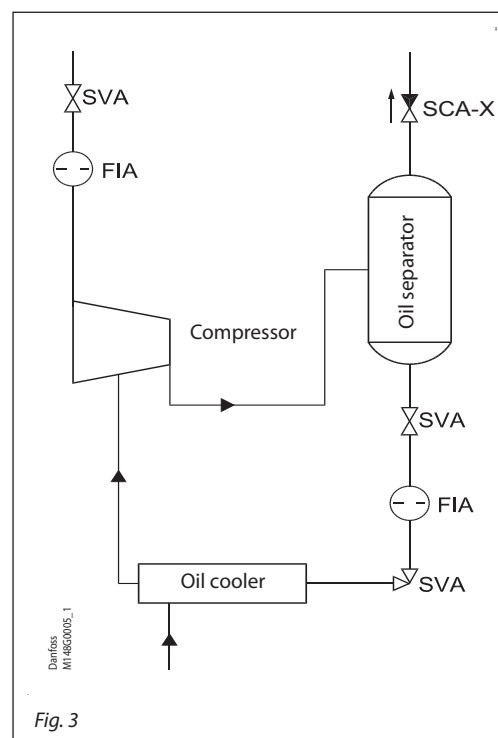
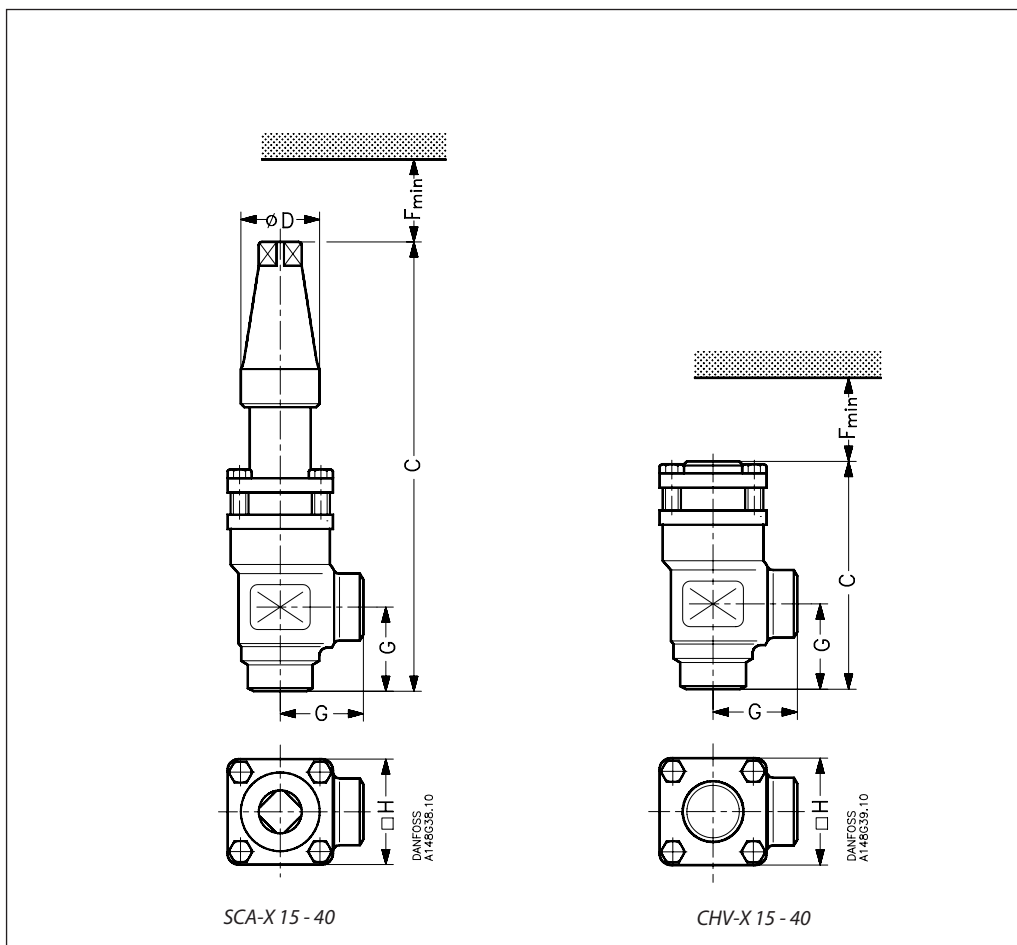


Fig. 3

Stop check valves type SCA-X - Check valves type CHV-X

Dimensions and weights

SCA-X/CHV-X 15 - 40 (1/2- 1 1/2 in.)



Valve size	C	G	$\varnothing D$	F_{min}	H	Weight
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SCA-X 15 - 40

Valve size	mm in.	C	G	$\varnothing D$	F_{min}	H	Weight
SCA-X 15 (1/2 in.)	212 8.35	45 1.77	38 1.50	60 2.36	60 2.36	1.6 kg 3.53 lb	
SCA-X 20 (3/4 in.)	212 8.35	45 1.77	38 1.50	60 2.36	60 2.36	1.6 kg 3.53 lb	
SCA-X 25 (1 in.)	295 11.61	55 2.17	50 1.97	85 3.35	70 2.76	3.2 kg 7.05 lb	
SCA-X 32 (1 1/4 in.)	295 11.61	55 2.17	50 1.97	85 3.35	70 2.76	3.2 kg 7.05 lb	
SCA-X 40 (1 1/2 in.)	295 11.61	55 2.17	50 1.97	85 3.35	70 2.76	3.2 kg 7.05 lb	

Valve size	C	G	$\varnothing D$	F_{min}	H	Weight
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CHV-X 15 - 40

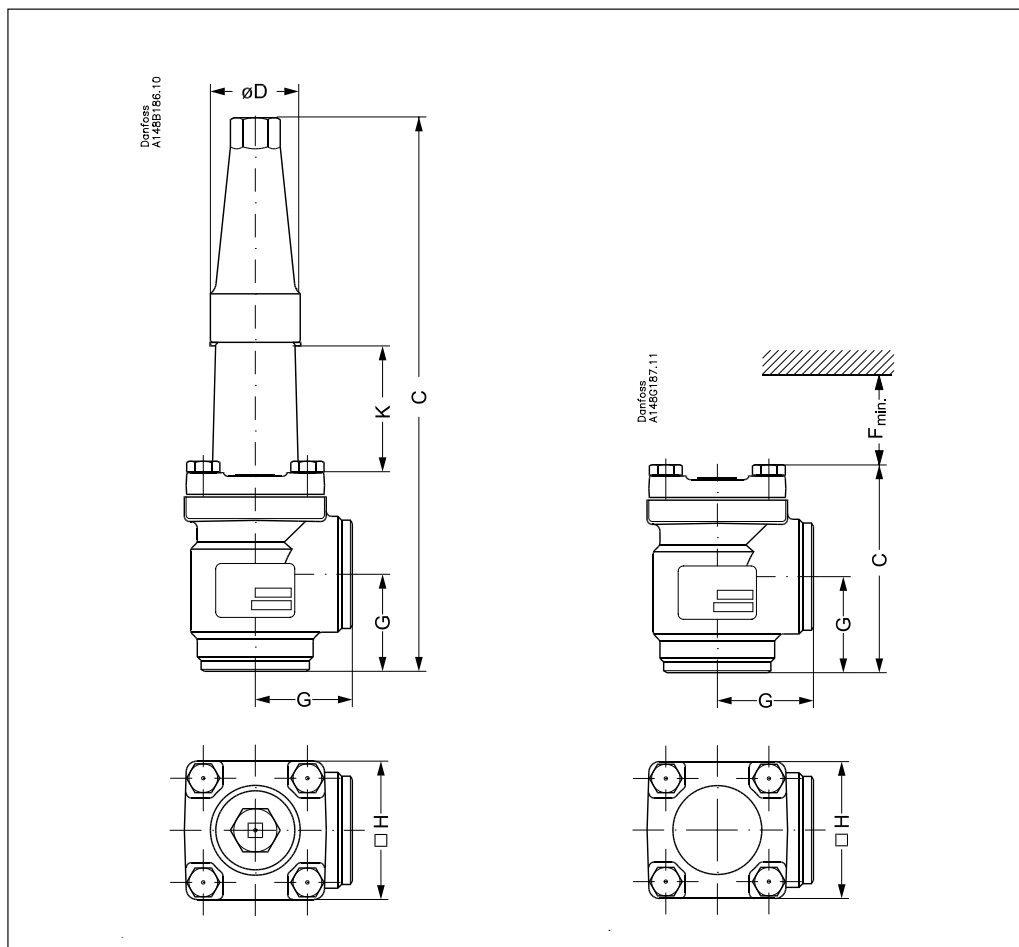
Valve size	mm in.	C	G	$\varnothing D$	F_{min}	H	Weight
CHV-X 15 (1/2 in.)	103 4.06	45 1.77		60 2.36	60 2.36	1.2 kg 2.65 lb	
CHV-X 20 (3/4 in.)	103 4.06	45 1.77		60 2.36	60 2.36	1.2 kg 2.65 lb	
CHV-X 25 (1 in.)	143 5.63	55 2.17		85 3.35	70 2.76	2.3 kg 5.07 lb	
CHV-X 32 (1 1/4 in.)	143 5.63	55 2.17		85 3.35	70 2.76	2.3 kg 5.07 lb	
CHV-X 40 (1 1/2 in.)	143 5.63	55 2.17		85 3.35	70 2.76	2.3 kg 5.07 lb	

Specified weights are approximate values only.

Stop check valves type SCA-X - Check valves type CHV-X

Dimensions and weights

SCA-X/CHV-X 50 - 65 (2 - 2½ in.)



Valve size	K		C		G		ØD	□H		Weight
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SCA-X

SCA-X 50	mm	70		315		60		50	77		3.8 kg
SCA-X (2)	in.	2.76		12.40		2.36		1.97	3.03		8.40 lb
SCA-X 65	mm	70	12.20	335		70	3.94	50	90		5.5 kg
SCA-X (2½)	in.	2.76		13.19		2.76		1.97	3.54		12.16 lb

Valve size			C		G		F _{min.}	□H		Weight
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CHV-X

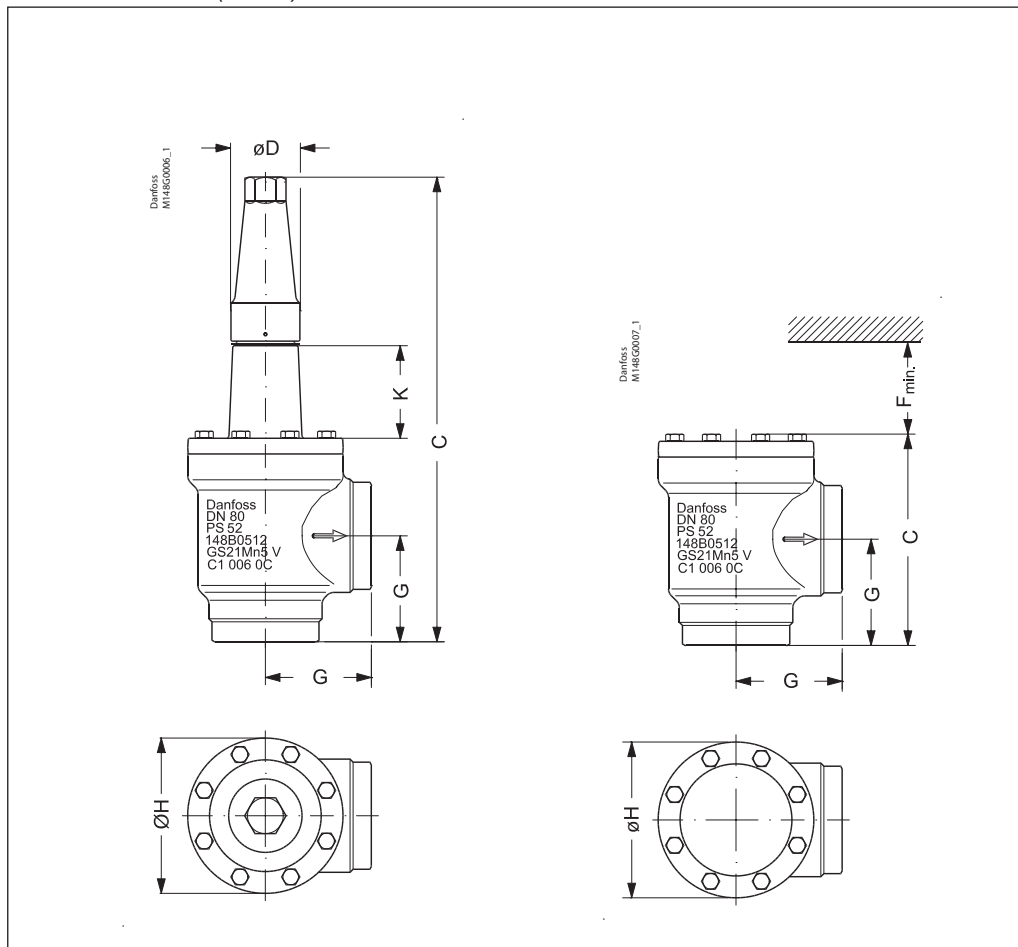
CHV-X 50	mm			132		60		92	77		3.2 kg
CHV-X (2)	in.			5.20		2.36		3.62	3.03		7.10 lb
CHV-X 65	mm			152		70		107	90		4.5 kg
CHV-X (2½)	in.			5.98		2.76		4.21	3.54		9.95 lb

Specified weights are approximate values only.

Stop check valves type SCA-X - Check valves type CHV-X

Dimensions and weights

SCA-X/CHV-X 80 - 125 (3 - 5 in.)



Valve size	K			C		G		ØD		ØH	Weight
------------	---	--	--	---	--	---	--	----	--	----	--------

SCA-X

SCA-X 80	mm	76		388		90		58		129	9.7 kg
SCA-X (3)	in.	3.00		15.28		3.54		2.28		5.08	21.4 lb
SCA-X 100	mm	90		437		106		58		156	15.3 kg
SCA-X (4)	in.	3.54		17.20		4.17		2.28		6.14	33.7 lb
SCA-X 125	mm	90		533		128		74		193	28.1 kg
SCA-X (5)	in.	3.54		20.98		5.04		2.91		7.60	61.9 lb

Valve size				C		G		F _{min.}	ØH	Weight
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CHV-X

CHV-X 80	mm			189		90		133	129	8.7 kg
CHV-X (3)	in.			7.44		3.54		5.24	5.08	19.23 lb
CHV-X 100	mm			223		106		163	156	14.3 kg
CHV-X (4)	in.			8.78		4.17		6.43	6.14	31.60 lb
CHV-X 125	mm			268		128		190	193	25.6 kg
CHV-X (5)	in.			10.55		5.04		7.48	7.60	56.58 lb

Specified weights are approximate values only.

Stop check valves type SCA-X - Check valves type CHV-X

Ordering

How to order

The table below is used to identify the valve required.

For further information please contact your local Danfoss Sales Company.

Please note that the type codes only serve to identify the valves, some of which may not form part of the standard product range.

Valve type	SCA-X CHV-X	Stop Check Valve Check Valve			
		ANSI	DIN	SOC	
(valve size measured on the connection diameter)	15	DN 15	x	x	
	20	DN 20	x	x	
	25	DN 25	x	x	
	32	DN 32	x	x	
	40	DN 40	x	x	
	50	DN 50	x	x	x
	65	DN 65	x	x	
	80	DN 80	x	x	
	100	DN 100	x	x	
	125	DN 125	x	x	
Connections	A	Welding branches: ANSI B 31.5 schedule 80 DN 15 - 40 (½ - 1½ in.)			
	D	Welding branches: ANSI B 31.5 schedule 40 DN 50 - 125 (2 - 5 in.)			
Valve housing	ANG	Angle flow			

Important!

Where products need to be certified according to specific certification societies, or where higher pressures are required, the relevant information should be included at the time of order.

SCA-X Butt-weld DIN (EN 10220)

Size		Type	Code No.
mm	in.		
15	½	SCA-X 15 D ANG	148B5208
20	¾	SCA-X 20 D ANG	148B5308
25	1	SCA-X 25 D ANG	148B5408
32	1¼	SCA-X 32 D ANG	148B5508
40	1½	SCA-X 40 D ANG	148B5608
50	2	SCA-X 50 D ANG	148B5702
65	2½	SCA-X 65 D ANG	148B5803
80	3	SCA-X 80 D ANG	148B5902
100	4	SCA-X 100 D ANG	148B6002
125	5	SCA-X 125 D ANG	148B6102

CHV-X Butt-weld DIN (EN 10220)

Size		Type	Code No.
mm	in.		
15	½	CHV-X 15 D ANG	148B5236
20	¾	CHV-X 20 D ANG	148B5336
25	1	CHV-X 25 D ANG	148B5436
32	1¼	CHV-X 32 D ANG	148B5536
40	1½	CHV-X 40 D ANG	148B5636
50	2	CHV-X 50 D ANG	148B5736
65	2½	CHV-X 65 D ANG	148B5838
80	3	CHV-X 80 D ANG	148B5936
100	4	CHV-X 100 D ANG	148B6036
125	5	CHV-X 125 D ANG	148B6136

SCA-X Butt-weld ANSI (B 36.10 Schedule 80)

Size		Type	Code No.
mm	in.		
15	½	SCA-X 15 A ANG	148B5209
20	¾	SCA-X 20 A ANG	148B5309
25	1	SCA-X 25 A ANG	148B5409
32	1¼	SCA-X 32 A ANG	148B5509
40	1½	SCA-X 40 A ANG	148B5609

CHV-X Butt-weld ANSI (B 36.10 Schedule 80)

Size		Type	Code No.
mm	in.		
15	½	CHV-X 15 A ANG	148B5237
20	¾	CHV-X 20 A ANG	148B5337
25	1	CHV-X 25 A ANG	148B5437
32	1¼	CHV-X 32 A ANG	148B5537
40	1½	CHV-X 40 A ANG	148B5637

SCA-X Butt-weld ANSI (B 36.10 Schedule 40)

Size		Type	Code No.
mm	in.		
50	2	SCA-X 50 A ANG	148B5703
65	2½	SCA-X 65 A ANG	148B5802
80	3	SCA-X 80 A ANG	148B5903
100	4	SCA-X 100 A ANG	148B6004
125	5	SCA-X 125 A ANG	148B6103

CHV-X Butt-weld ANSI (B 36.10 Schedule 40)

Size		Type	Code No.
mm	in.		
50	2	CHV-X 50 A ANG	148B5737
65	2½	CHV-X 65 A ANG	148B5837
80	3	CHV-X 80 A ANG	148B5937
100	4	CHV-X 100 A ANG	148B6037
125	5	CHV-X 125 A ANG	148B6137

SCA-X Socket welding ANSI (B 16.11)

Size		Type	Code No.
mm	in.		
50	2	SCA-X 50 SOC ANG	148B5704

CHV-X Socket welding ANSI (B 16.11)

Size		Type	Code No.
mm	in.		
32	1¼	CHV 32 SOC ANG	148B5539
50	2	CHV 50 SOC ANG	148B5740

ANG = Angleway

