

## **Stop check valves**

type SCA 15-125, SCA-SS 15-40

## **Check valves**

type CHV 15-125, CHV-SS 15-40

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Introduction



SCA are check valves with a built-in stop valve function. CHV are check valves only.

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

SCA are equipped with vented cap and have internal backseating enabling the spindle seal to be replaced whilst the valve still under pressure.

Laser cut V-ports provide excellent opening characteristics (SCA/CHV 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 including R717 and non corrosive gases/liquids dependent on sealing material compatibility
- 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, due to 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 (SCA-SS and CHV-SS are in stainless steel) according to requirements of the Pressure Equipment Directive and other international classification authorities
- Stainless steel bolts
- Pressure range  
SCA/CHV: 40 bar g (580 psig)  
SCA-SS/CHV-SS: 52 bar g (754 psi g)
- Temperature range  
-60°C/+150° (-76°F/+302°F)
- Classification: To get an updated list of certification on the products please contact your local Danfoss Sales Company.

**Design**

*Connections*

Available with the following connections:

- Welding DIN (EN 10220)
- Butt-weld ANSI (B 36.10 Schedule 80),  
- DN 15 - 40 (½ - 1½ in.)
- Butt-weld ANSI (B 36.10 Schedule 40),  
- DN 50 - 200 (2 - 8 in.)
- Socket-weld ANSI (B 16.11),  
- DN 50 (2 in.)

*Housing*

Made from special, cold resistant steel (SCA-SS and CHV-SS are made from stainless steel) approved for low temperature operations.

*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)*

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

*Packing Gland (SCA)*

The "full temperature range" packing gland consists of a double O-ring sealing arrangement combined with permanent lubrication from a grease reservoir. This ensures perfect tightness throughout the whole temperature range: -60/+150°C (-76/+302°F).

*Pressure Equipment Directive (PED)*

The SCA / CHV valves are approved and CE marked in accordance with Pressure Equipment Directive - 97/23/EC.

For further details / restrictions - see Installation Instruction.

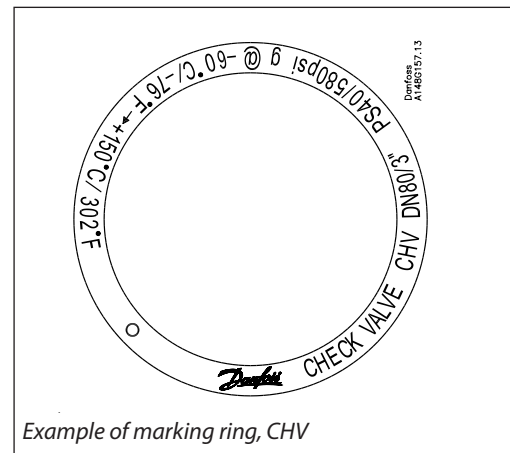
*Installation*

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/CHV.

If cold refrigeration oil having low viscosities 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



SCA / CHV valves			
Nominal bore	Standard application	DN 50-80 mm (2-3 in.)	DN 100-125 mm (4-5 in.)
	High pressure application	DN 50-65 mm (2-2½ in.)	DN 80-125 mm (3-5 in.)
Classified for	Fluid group I		
Category	II		III

**Technical data**

- *Refrigerants*  
Applicable to all common non flammable refrigerants including R717 and non corrosive gases/liquids dependent on sealing materials compatibility.  
For further information refer to installation instruction for SCA/CHV.  
Flammable hydrocarbons are not recommended. For further information please contact your local Danfoss Sales company.

- *Temperature range*  
-60/+150°C (-76/+302°F).
- *Pressure range*  
Max. working pressure:  
SCA/CHV 40 bar g (580 psig).  
SCA-SS/CHV-SS 52 bar g (754 psi g)

Valves for higher working pressure are available on request.

Computation and selection

Introduction

When dimensioning SCA/CHV, 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/CHV 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  $V = 1000 \text{ m}^3/\text{h}$   
 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 (standard valve).

$C_{rec} \approx 14 \text{ m/s}$   
 $C_{min, rec} \approx 3 \text{ m/s}$

US-Units

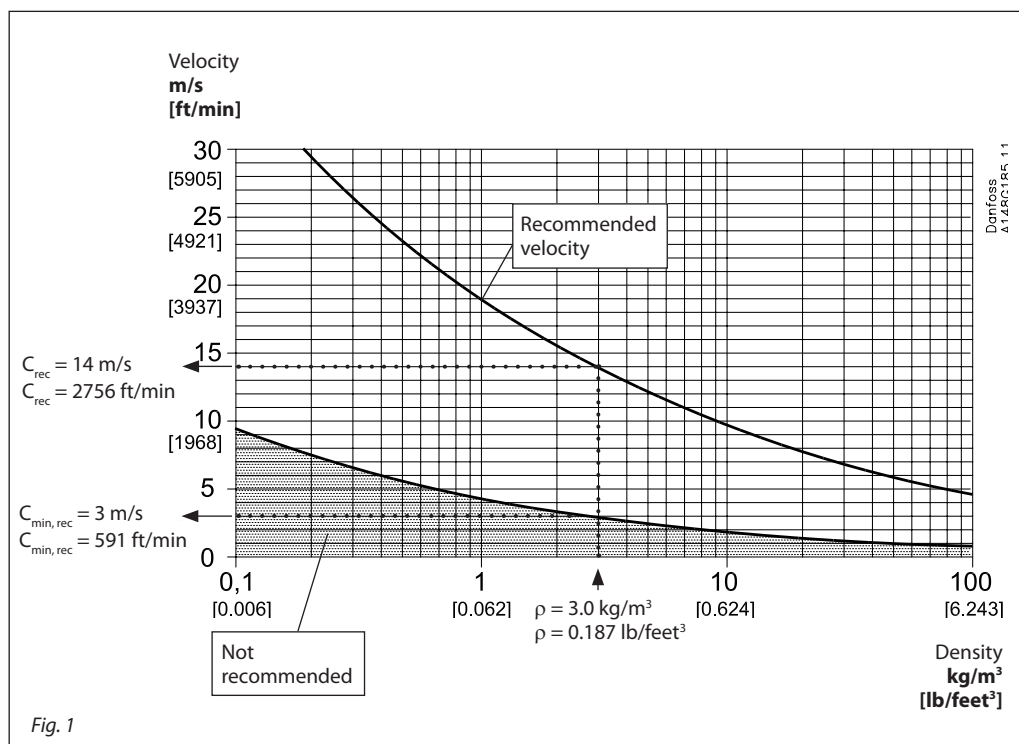
Assumed working conditions:  
 Maximum flow  $V = 1160 \text{ gpm}$   
 Density  $\rho = 0.187 \text{ lb/feet}^3$   
 Minimum part load = 33%

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  $\rho \approx 0.187 \text{ lb/feet}^3$ , 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.

**Computation and selection**  
(continued)

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

- For SCA/CHV in size DN 100 the maximum velocity  $C_{\text{max}} \approx 31 \text{ m/s}$  (6100 ft/min)
- For SCA/CHV in size DN 125 the maximum velocity  $C_{\text{max}} \approx 20 \text{ m/s}$  (3900 ft/min)

In conclusion SCA 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,  $C_{\text{part}} (6.5 \text{ m/s}) > C_{\text{min,rec}} (3.0 \text{ m/s})$  and the selected SCA model DN125 is the perfect choice.

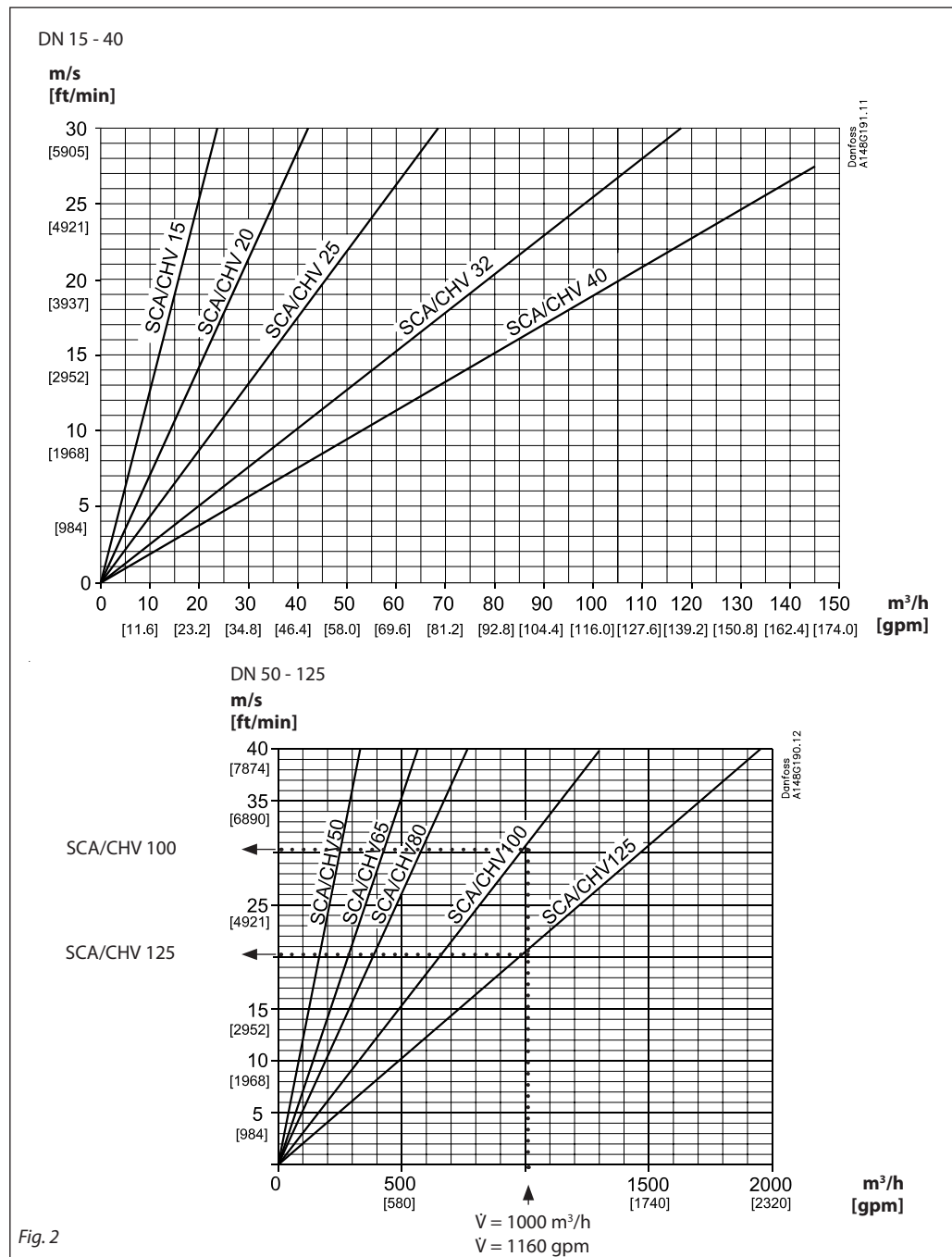
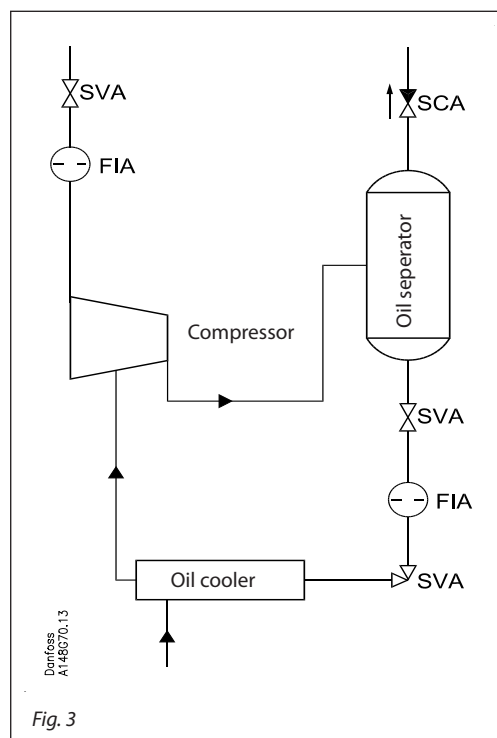


Fig. 2

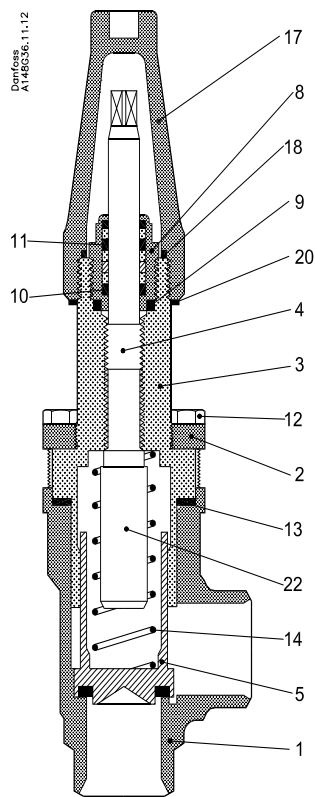
**Application**

Figure 3 shows the stop/check valve SCA in the discharge line of a screw compressor unit. The SCA 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.

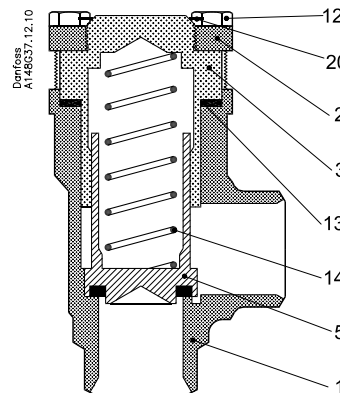
Installation of the SCA/CHV in the economizer line is **not** recommended.



Material specification



SCA 15 - 40

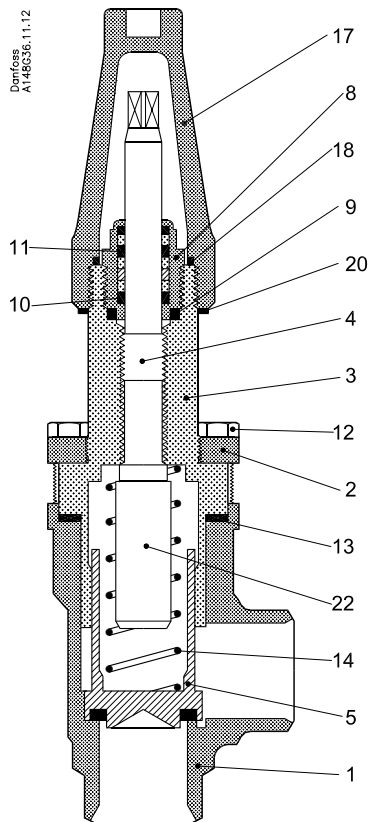


CHV 15 - 40

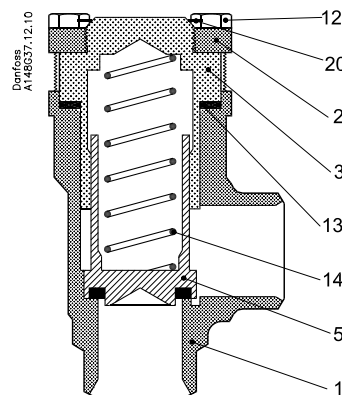
No.	Part	Material	DIN/EN	ISO	ASTM
1	Housing	Steel	P285QH EN10222-4		LF2A350
2	Bonnet, Flange	Steel	P275NL1 EN10028-3		
3	Bonnet, Insert	Steel			
4	Spindle	Stainless steel	X 10CrNiS18-9	Type 17, 17440	AISI 303, 683/13
5	Cone	Steel Teflon (PTFE)			
8	Packing gland O-rings	Steel Cloroprene (Neoprene)		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



Material specification



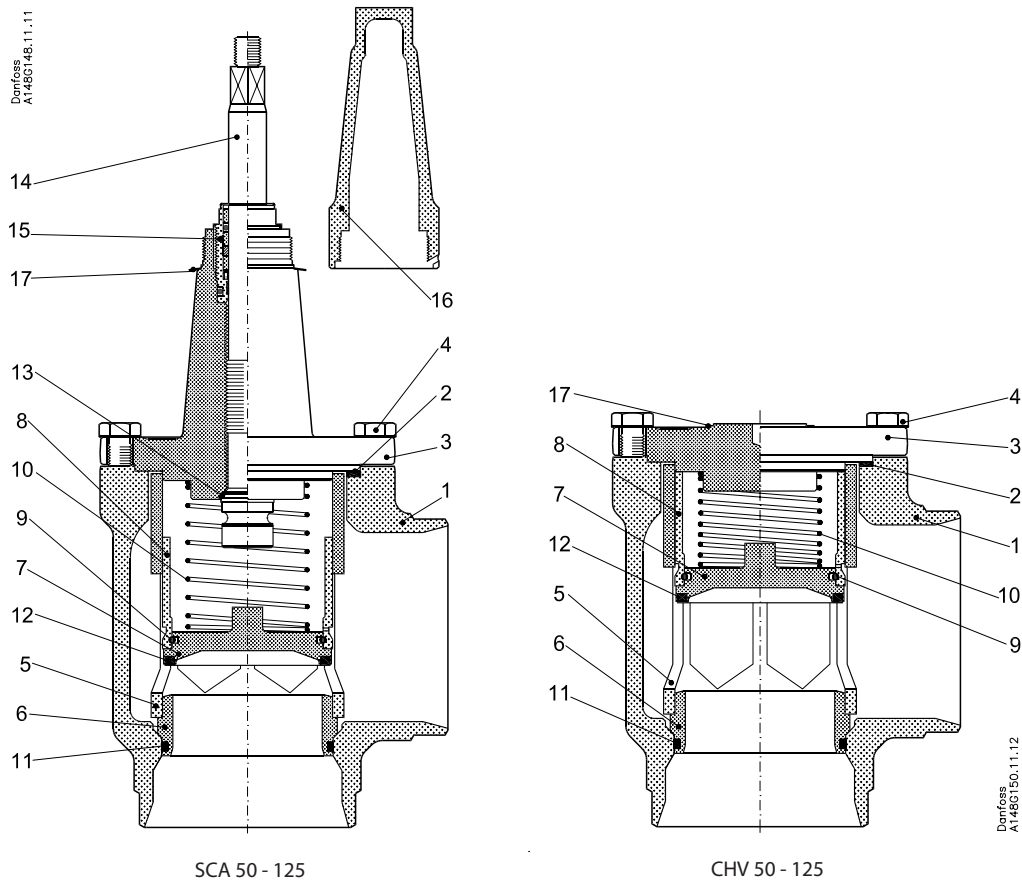
SCA-SS 15 - 40 (1/2" - 1 1/2")



CHV-SS 15 - 40 (1/2" - 1 1/2")

No.	Part	Material	DIN/EN	ISO	ASTM
1	Housing	Stainless steel	X5CrNi18-10 EN10088		AISI 304
2	Bonnet, Flange	Stainless steel	X5CrNi18-10 EN10088		AISI 304
3	Bonnet, Insert	Stainless steel			
4	Spindle	Stainless steel	X8CrNiS18-9	Type 17, 17440	AISI 303, 683/13
5	Cone	Steel Teflon (PTFE)			
8	Packing gland O-rings	Stainless steel Cloroprene (Neoprene)			
9	Packing washer	Aluminium			
12	Bolts	Stainless steel	A2-70	A2-70	Type 308
13	Gasket	Fiber, non-asbestos			
14	Spring	Steel			
17	Spindle seal cap	Aluminium			
18	Seal cap gasket	Nylon			
20	Identification ring	Stainless steel			
22	Spindle extension	Steel			

Material specification



SCA 50 - 125

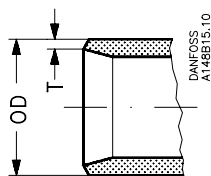
CHV 50 - 125

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: Valve bonnet CHV: 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			

Connections

Size mm	Size in.	OD mm	T mm	OD in.	T in.			k <sub>v</sub> -angle m <sup>3</sup> /h		C <sub>v</sub> -angle USgal/min	
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DIN

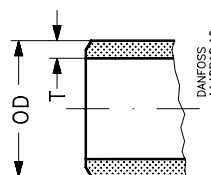


Welding DIN (EN 10220)

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



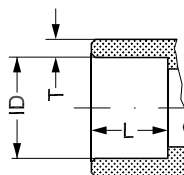
Welding ANSI (B 36.10 Schedule 80)

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



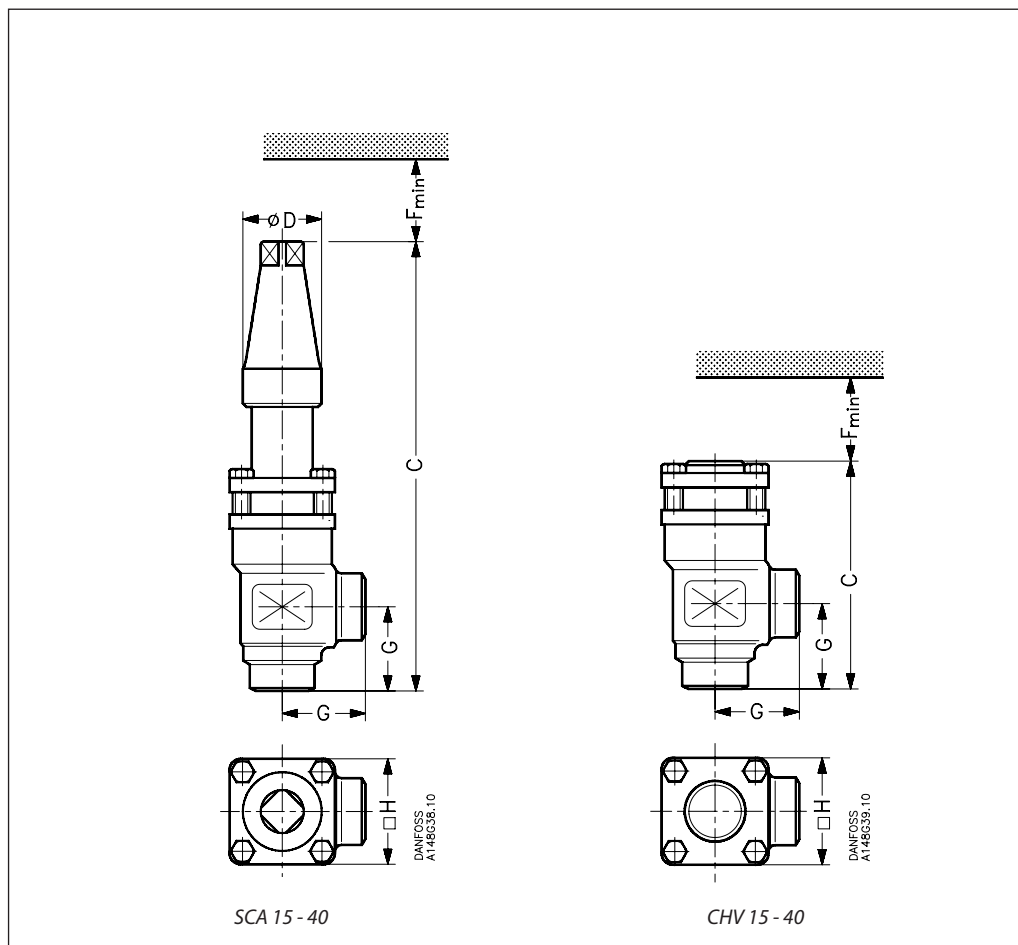
Size mm	Size in.	ID mm	T mm	ID in.	T in.	L mm	L in.	k <sub>v</sub> -angle m <sup>3</sup> /h		C <sub>v</sub> -angle USgal/min	
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Socket welding ANSI (B 16.11)

50	2	61.2	6.2	2.41	0.24	16	0.63	80		93	
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Dimensions and weights

SCA/CHV 15 - 40 (½- 1½ in.)



Valve size	C	G	ØD	F <sub>min</sub>	□H	Weight
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SCA 15 - 40

SCA 15 (½ in.)	mm in.	212 8.35	45 1.77	38 1.50	60 2.36	60 2.36	1.6 kg
SCA 20 (¾ in.)	mm in.	212 8.35	45 1.77	38 1.50	60 2.36	60 2.36	1.6 kg
SCA 25 (1 in.)	mm in.	295 11.61	55 2.17	50 1.97	85 3.35	70 2.76	3.2 kg
SCA 32 (1¼ in.)	mm in.	295 11.61	55 2.17	50 1.97	85 3.35	70 2.76	3.2 kg
SCA 40 (1½ in.)	mm in.	295 11.61	55 2.17	50 1.97	85 3.35	70 2.76	3.2 kg

Valve size	C	G	F <sub>min</sub>	□H	Weight
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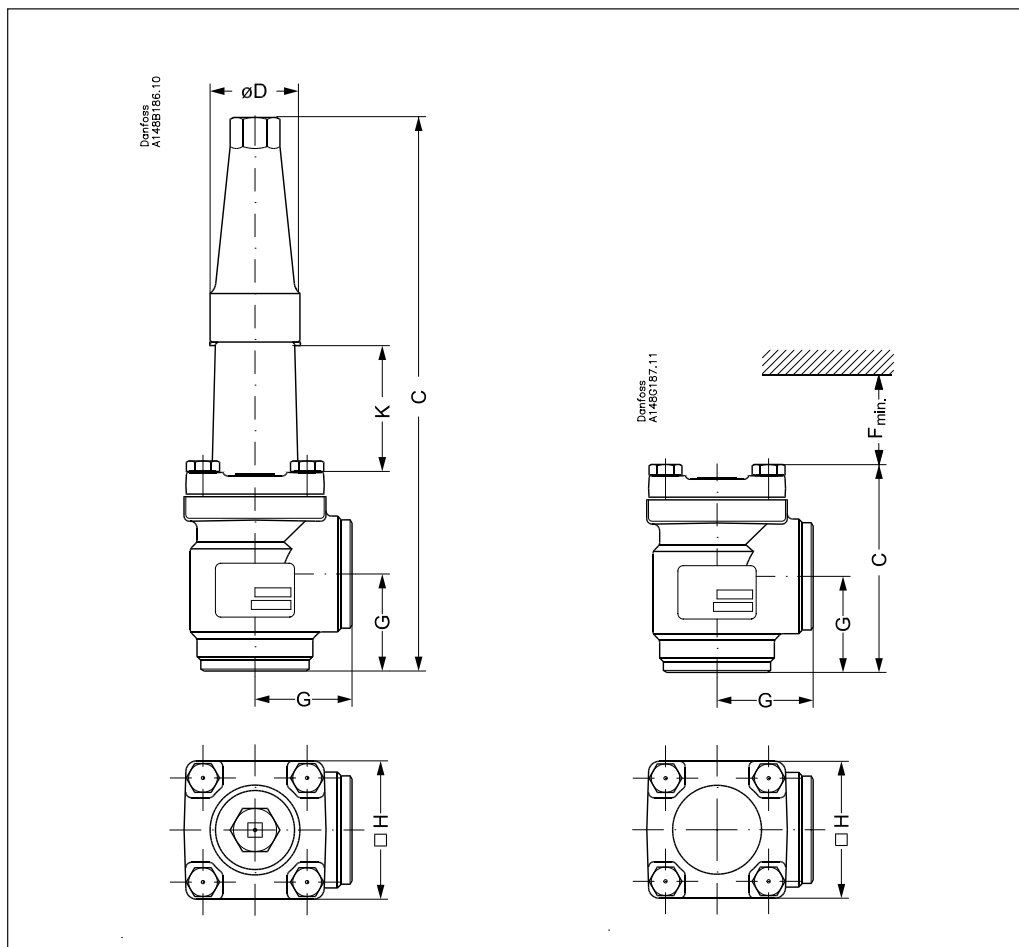
CHV 15 - 40

CHV 15 (½ in.)	mm in.	103 4.06	45 1.77	60 2.36	60 2.36	1.2 kg
CHV 20 (¾ in.)	mm in.	103 4.06	45 1.77	60 2.36	60 2.36	1.2 kg
CHV 25 (1 in.)	mm in.	143 5.63	55 2.17	85 3.35	70 2.76	2.3 kg
CHV 32 (1¼ in.)	mm in.	143 5.63	55 2.17	85 3.35	70 2.76	2.3 kg
CHV 40 (1½ in.)	mm in.	143 5.63	55 2.17	85 3.35	70 2.76	2.3 kg

Specified weights are approximate values only.

Dimensions and weights

SCA/CHV 50 - 65 (2 - 2½ in.)



Valve size	K		C	G	ØD	□H	Weight
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SCA

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

Valve size		C	G	F <sub>min.</sub>	□H	Weight
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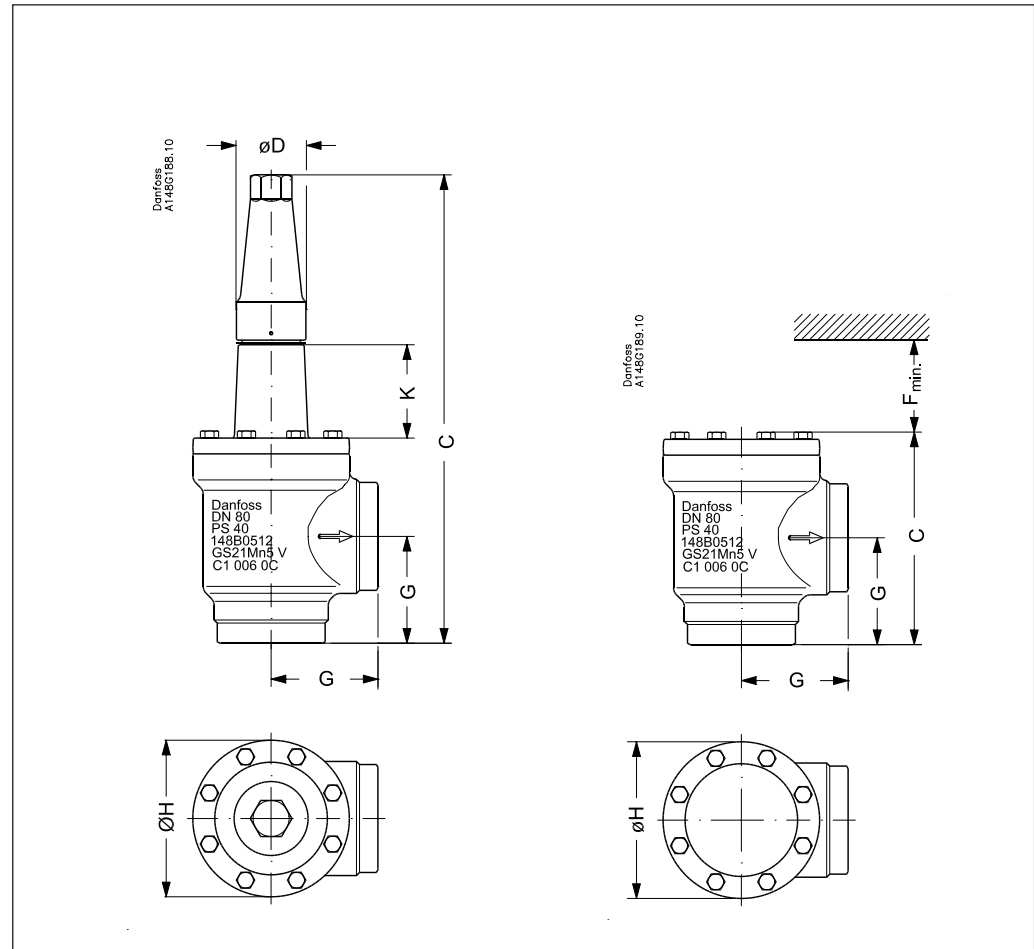
CHV

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

Specified weights are approximate values only.

Dimensions and weights

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



Valve size	K			C		G		ØD		ØH	Weight
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SCA

SCA 80	mm	76		388		90		58		129	9.7 kg
SCA (3)	in.	3.00		15.28		3.54		2.28		5.08	21.4 lb
SCA 100	mm	90		437		106		58		156	15.3 kg
SCA (4)	in.	3.54		17.20		4.17		2.28		6.14	33.7 lb
SCA125	mm	90		533		128		74		193	28.1 kg
SCA (5)	in.	3.54		20.98		5.04		2.91		7.60	61.9 lb

Valve size				C		G		F <sub>min.</sub>	ØH	Weight
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CHV

CHV 80	mm			189		90		133	129	8.7 kg
CHV (3)	in.			7.44		3.54		5.24	5.08	19.23 lb
CHV 100	mm			223		106		163	156	14.3 kg
CHV(4)	in.			8.78		4.17		6.43	6.14	31.60 lb
CHV125	mm			268		128		190	193	25.6 kg
CHV(5)	in.			10.55		5.04		7.48	7.60	56.58 lb

Specified weights are approximate values only.

**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 CHV	Stop Check Valve Check Valve			
(valve size measured on the connection diameter)		ANSI	DIN	SOC	
	<b>15</b>	DN 15	x	x	
	<b>20</b>	DN 20	x	x	
	<b>25</b>	DN 25	x	x	
	<b>32</b>	DN 32	x	x	
	<b>40</b>	DN 40	x	x	
	<b>50</b>	DN 50	x	x	x
	<b>65</b>	DN 65	x	x	
	<b>80</b>	DN 80	x	x	
	<b>100</b>	DN 100	x	x	
	<b>125</b>	DN 125	x	x	
Connections	<b>A</b>	Welding branches: ANSI B 31.5 schedule 80 DN 15 - 40 (½ - 1½ in.)			
	<b>D</b>	Welding branches: ANSI B 31.5 schedule 40 DN 50 - 125 (2 - 5 in.)			
		Welding branches: DIN 2448			
Valve housing	<b>ANG</b>	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.

*CHV, butt-weld DIN*

Size		Type	Code No.
mm	in.		
15	½	CHV 15 D ANG	<b>148G3072</b>
15	½	CHV-SS 15 D ANG 52BAR	<b>148G3537</b>
20	¾	CHV 20 D ANG	<b>148G3074</b>
20	¾	CHV-SS 20 D ANG 52BAR	<b>148G3538</b>
25	1	CHV 25 D ANG	<b>148G3080</b>
25	1	CHV-SS 25 D ANG 52BAR	<b>148G3539</b>
32	1¼	CHV 32 D ANG	<b>148G3082</b>
32	1¼	CHV-SS 32 D ANG 52BAR	<b>148G3540</b>
40	1½	CHV 40 D ANG	<b>148G3084</b>
40	1½	CHV-SS 40 D ANG 52BAR	<b>148G3541</b>
50	2	CHV 50 D ANG	<b>148G3129</b>
65	2½	CHV 65 D ANG	<b>148G3130</b>
80	3	CHV 80 D ANG	<b>148G3131</b>
100	4	CHV 100 D ANG	<b>148G3132</b>
125	5	CHV 125 D ANG	<b>148G3133</b>

*SCA, butt-weld DIN*

Size		Type	Code No.
mm	in.		
15	½	SCA 15 D ANG	<b>148G3076</b>
15	½	SCA-SS 15 D ANG 52BAR	<b>148G3532</b>
20	¾	SCA 20 D ANG	<b>148G3078</b>
20	¾	SCA-SS 20 D ANG 52BAR	<b>148G3533</b>
25	1	SCA 25 D ANG	<b>148G3086</b>
25	1	SCA-SS 25 D ANG 52BAR	<b>148G3534</b>
32	1¼	SCA 32 D ANG	<b>148G3088</b>
32	1¼	SCA-SS 32 D ANG 52BAR	<b>148G3535</b>
40	1½	SCA 40 D ANG	<b>148G3090</b>
40	1½	SCA-SS 40 D ANG 52BAR	<b>148G3536</b>
50	2	SCA 50 D ANG	<b>148G3134</b>
65	2½	SCA 65 D ANG	<b>148G3135</b>
80	3	SCA 80 D ANG	<b>148G3136</b>
100	4	SCA 100 D ANG	<b>148G3137</b>
125	5	SCA 125 D ANG	<b>148G3138</b>

*CHV, butt-weld ANSI*

Size		Type	Code No.
mm	in.		
15	½	CHV 15 A ANG	<b>148G3073</b>
20	¾	CHV 20 A ANG	<b>148G3075</b>
25	1	CHV 25 A ANG	<b>148G3081</b>
32	1¼	CHV 32 A ANG	<b>148G3083</b>
40	1½	CHV 40 A ANG	<b>148G3085</b>
50	2	CHV 50 A ANG	<b>148G3139</b>
65	2½	CHV 65 A ANG	<b>148G3140</b>
80	3	CHV 80 A ANG	<b>148G3141</b>
100	4	CHV 100 A ANG	<b>148G3142</b>
125	5	CHV 125 A ANG	<b>148G3143</b>

*SCA, butt-weld ANSI*

Size		Type	Code No.
mm	in.		
15	½	SCA 15 A ANG	<b>148G3077</b>
20	¾	SCA 20 A ANG	<b>148G3079</b>
25	1	SCA 25 A ANG	<b>148G3087</b>
32	1¼	SCA 32 A ANG	<b>148G3089</b>
40	1½	SCA 40 A ANG	<b>148G3091</b>
50	2	SCA 50 A ANG	<b>148G3144</b>
65	2½	SCA 65 A ANG	<b>148G3145</b>
80	3	SCA 80 A ANG	<b>148G3146</b>
100	4	SCA 100 A ANG	<b>148G3147</b>
125	5	SCA 125 A ANG	<b>148G3148</b>

*CHV, socket weld SOC*

Size		Type	Code No.
mm	in.		
50	2	CHV 50 SOC ANG	<b>148G3149</b>

*SCA, socket weld SOC*

Size		Type	Code No.
mm	in.		
50	2	SCA 50 SOC ANG	<b>148G3150</b>

