
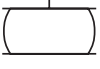

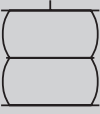


Overview

System	Fig.	Symbol	Series	Page
Bellows Cylinder single convolution type			SP-1B..	128-132
Bellows Cylinder double convolution type			SP-2B..	128 133-136

Bellows Cylinders

Series SP...

Single convolution

Double convolution

Bellows cylinders are single acting. They are made of neoprene rubber reinforced by 2 layers of nylon cord.

The external diameter of the bellows is largest when the cylinder is compressed. When air is introduced, they cylinder extends and the bellows diameter decreases. The longer the stroke, the more the force decreases.

There are two basic types:

Single and double convolution.

Single convolution: maximum stroke length 110 mm.

Double convolution: maximum stroke length 240 mm.

Standard delivery includes fitted end plates for the particular type.

Technical Notes

Force

The force available depends on the stroke length: see the force diagrams in the data sheets.

Maximum permissible length

Depends on the operating pressure and is shown in the force diagrams: it must not be exceeded, to avoid damage to the cylinder. The stroke must therefore be limited by an external stop.

Maximum permissible pitch

The pitch of the end plates must not exceed 30°.

Minimum permissible length (E_{min}) and maximum permissible length (E_{max}), must be observed.

Minimum permissible length

Is shown in the dimension tables and must be observed: be sure to provide an external limit stop.

Medium

Air, Water (with glycol additives) and brake fluid. (No hydraulic fluids)

Oil resistance

The amount of oil necessary for lubricating pneumatic systems and moderate external oil contamination are harmless.

Operating pressure range

Is 2-8 bar for the standard 2 ply cylinder.

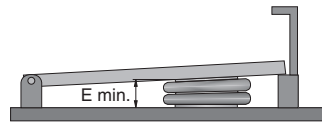
Temperature range

-40 to +70°C

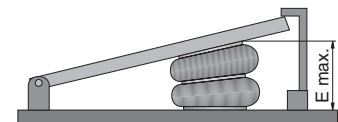
Special versions

Are available on request, e.g. larger diameters, higher temperature ranges, open ended with mounting rings, etc..



Position at minimum permissible length



Position at maximum permissible length



Installation Size

Series	Port size	Type	Force
	G1/4	SP-1B04	See force diagrams
	G1/4	SP-1B05	
	G1/4	SP-1B07	
	G3/4	SP-1B12	
	G3/4	SP-1B22	
	G3/4	SP-1B34	
	G1/4	SP-2B04	
	G1/4	SP-2B05	
	G1/4	SP-2B05A	
	G1/4	SP-2B07	
	G3/4	SP-2B12	
	G3/4	SP-2B22	
	G3/4	SP-2B34	

Bellows Cylinder

*Series SP-1B..
Single convolution*

Characteristics

Characteristics	Symbol	Unit	Description
System			Single acting
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	- 40 higher temperature ranges on request +70
Installation			Max. pitch of end plates 30°, max. deviation of axes to one another must be less than 10 mm. Both limits of stroke have to be limited by external stops. Return has to be effected by external force.
Medium			Filtered and unlubricated compressed air
Material			End plates of steel, galvanized and chromium anodized; Mounting rings of aluminium. Bellows-neoprene with nylon cord lining.
Operating pressure range	p_{max}	bar	8 (for cushioning duty = 7 bar)

Stroke, Weight, Frequency

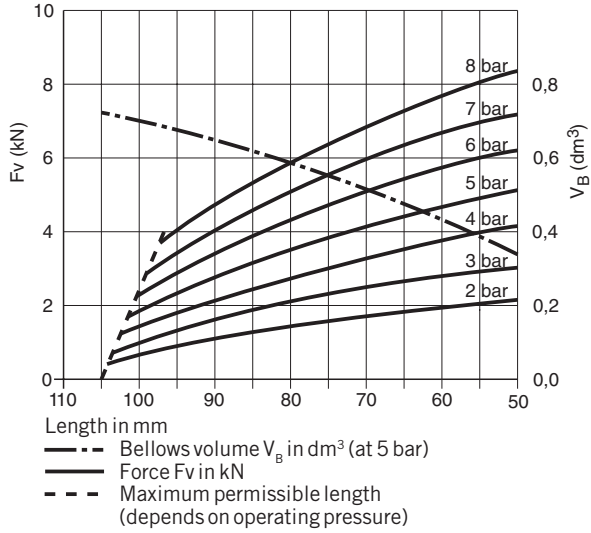
Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency ¹⁾ (Hz)
SP-1B04	55	0.85	3 (when E = 80)
SP-1B05	45	1.0	4 (when E = 75)
SP-1B07	90	2.1	2.8 (when E = 90)
SP-1B12	100	2.7	2.4 (when E = 100)
SP-1B22	110	4.5	2.1 (when E = 120)
SP-1B34	110	5.5	2.1 (when E = 120)

¹⁾ Nominal values at p_{max}

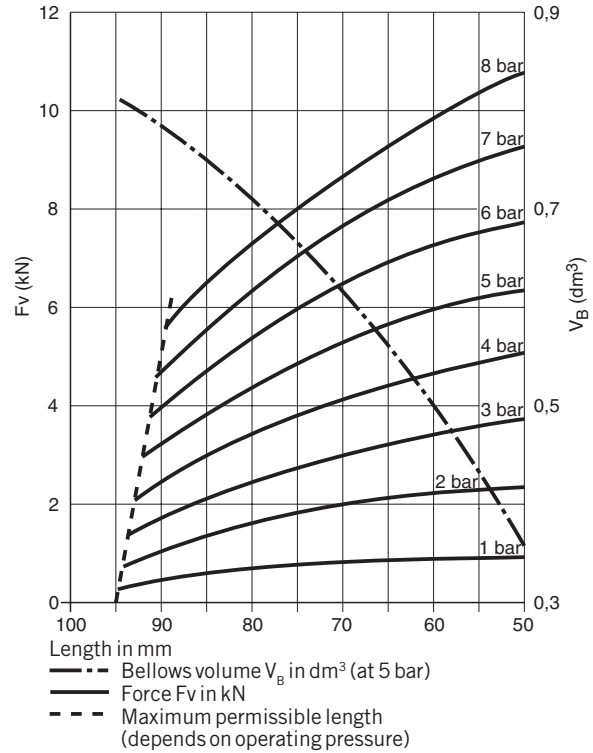


Force Diagrams – Series SP-1B..

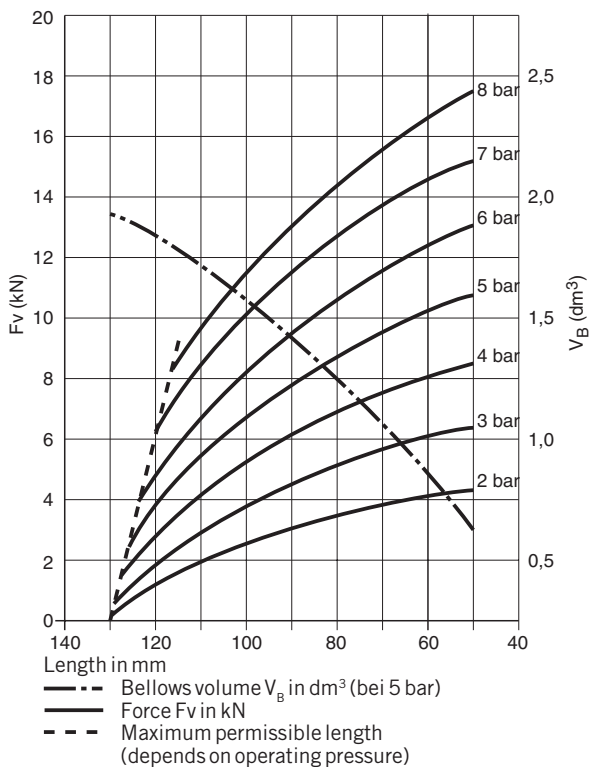
Type: SP-1B04, Stroke: max. 55 mm



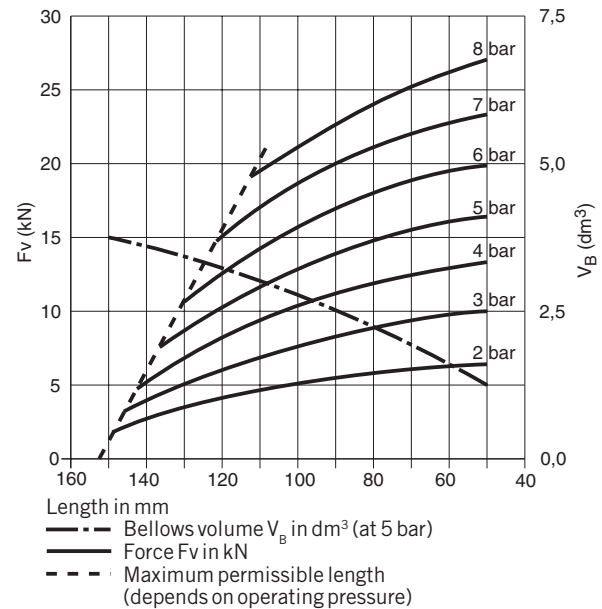
Type: SP-1B05, Stroke: max. 45 mm



Type: SP-1B07, Stroke: max. 90 mm

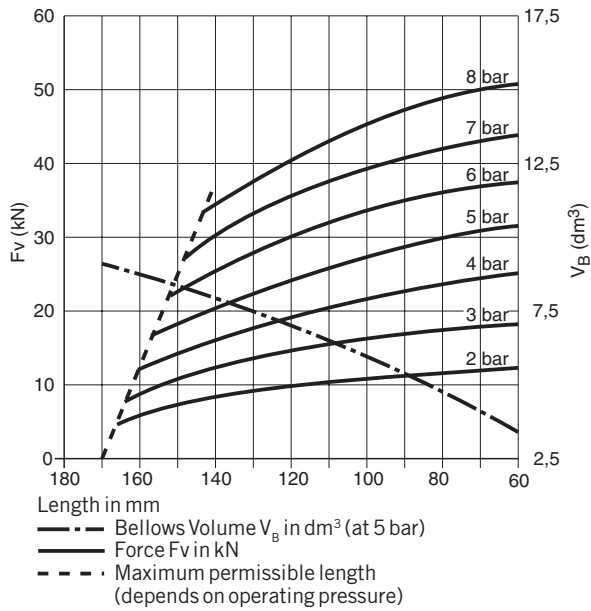


Type: SP-1B12, Stroke: max. 100 mm

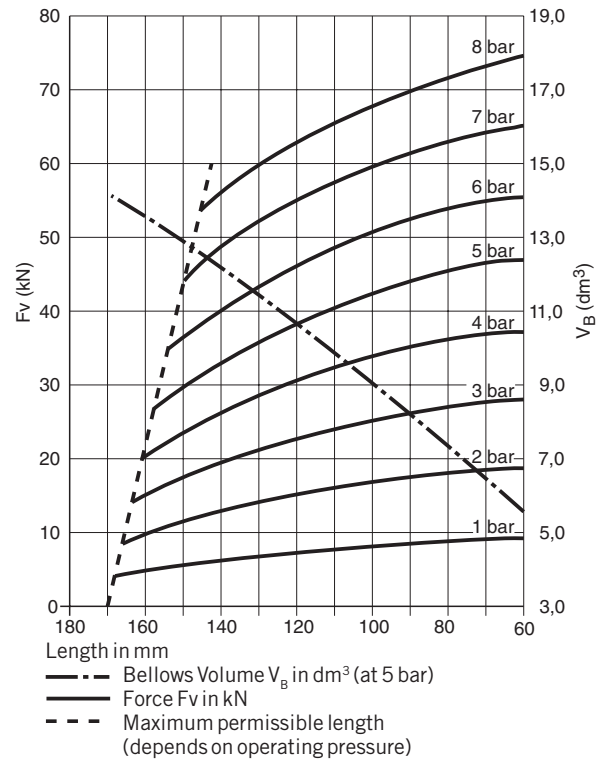


Force Diagrams – Series SP-1B..

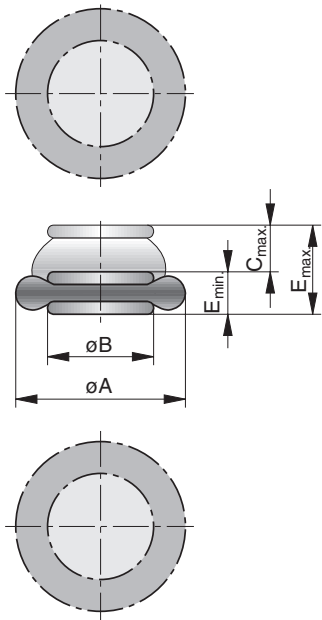
Type: SP-1B22, Stroke: max. 110 mm



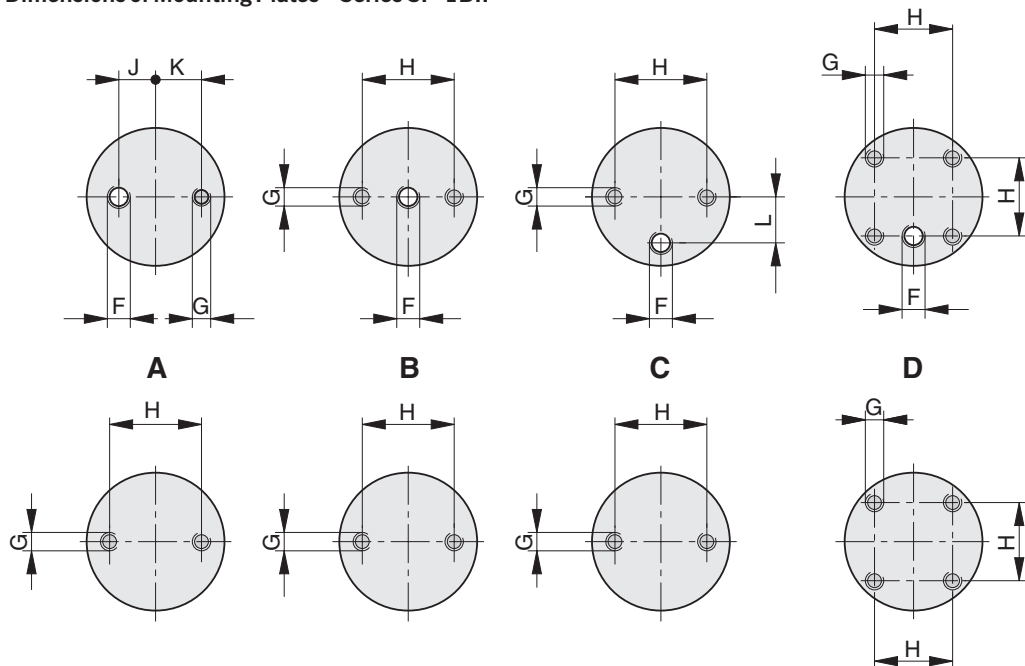
Type: SP-1B34, Stroke: max. 110 mm



Dimensions
Series SP-1B..



Dimensions of Mounting Plates – Series SP-1B..



Dimension Table (mm) and Order Instructions

Type	Order-No.	Mounting plate	$\varnothing A$ at 8 bar	$\varnothing B$	C_{max}^{**}	E_{max}^{**}	E_{min}	F	G*	H	J	K	L
SP-1B04	KY9500	A	150	88	55	105	50	G1/4	M8	22	9	11	-
SP-1B05	KY8401	B	165	110	45	95	50	G1/4	M8	44.5	-	-	-
SP-1B07	KY9501	C	205	135	80	130	50	G1/4	M8	54	-	-	27
SP-1B12	KY9502	C	250	160	100	150	50	G3/4	M8	89	-	-	38
SP-1B22	KY9590	C	350	229	110	170	60	G3/4	M12	157.5	-	-	73
SP-1B34	KY8010	D	420	288	110	170	60	G3/4	M8	158.8	-	-	-

* 15 deep

**These dimensions depend on the operating pressure: see force diagrams

Bellows Cylinder

*Series SP-2B..
Double convolution*

Characteristics

Characteristics	Symbol	Unit	Description
System			Single acting
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	- 40 higher temperature ranges on request +70
Installation			Max. pitch of end plates 30°, max. deviation of axes to one another must be less than 10 mm. Both limits of stroke have to be limited by external stops. Return has to be effected by external force.
Medium			Filtered and unlubricated compressed air
Material			End plates of steel, galvanized and chromium anodized; Mounting rings of aluminium. Bellows - neoprene with nylon cord lining
Operating pressure range	p_{max}	bar	8 (for cushioning duty = 7 bar)

Stroke, Weight, Frequency

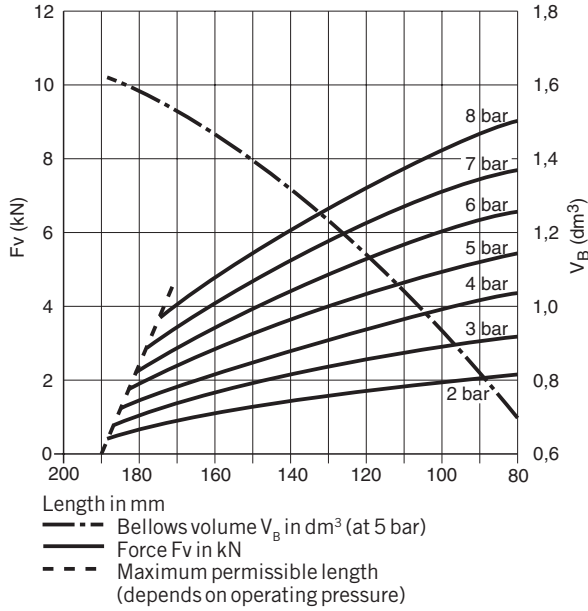
Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency ¹⁾ (Hz)
SP-2B04	110	1.1	2.3 (when E = 80)
SP-2B05	80	1.2	2.5 (when E = 120)
SP-2B05A	105	1.25	2.3 (when E = 140)
SP-2B07	125	2.6	1.9 (when E = 160)
SP-2B12	150	3.5	1.8 (when E = 180)
SP-2B22	170	4.9	1.7 (when E = 190)
SP-2B34	170	6.8	1.7 (when E = 190)

¹⁾Nominal values at p_{max}

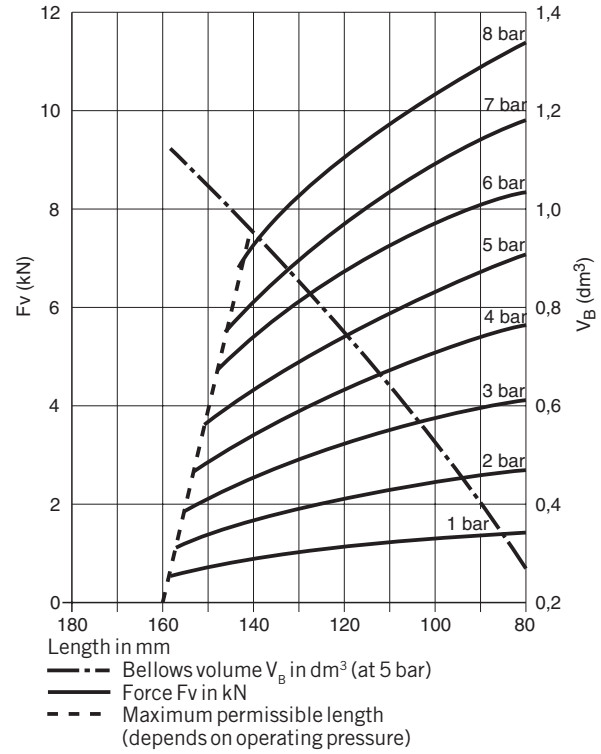


Force Diagrams – Series SP-2B..

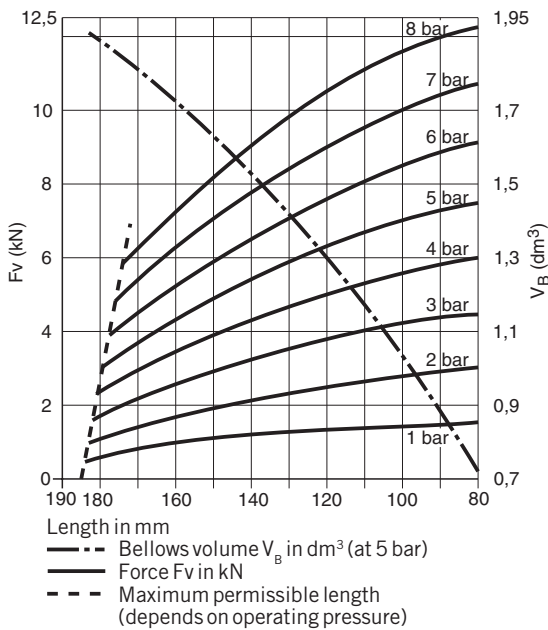
Type: SP-2B04, Stroke: max. 110 mm



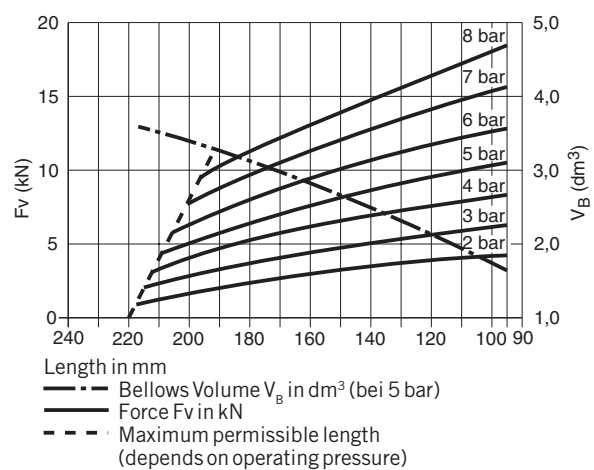
Type: SP-2B05, Stroke: max. 80 mm



Type: SP-2B05A, Stroke: max. 105 mm

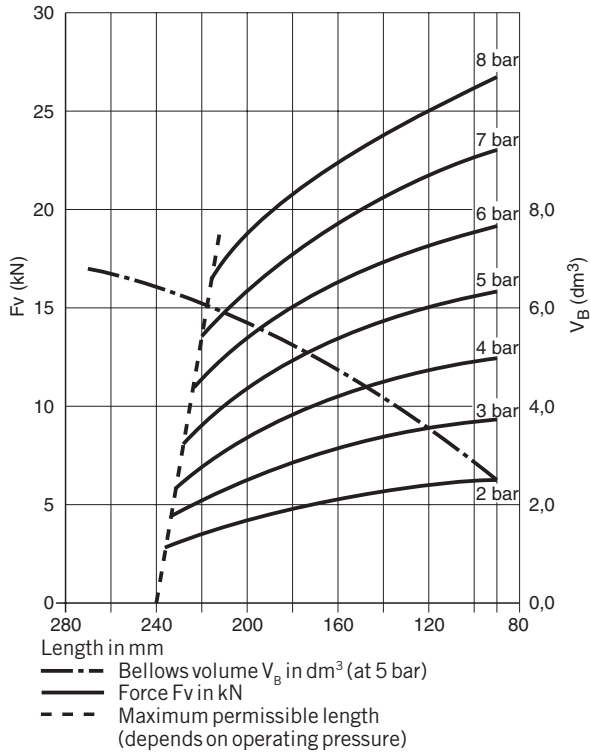


Type: SP-2B07, Stroke: max. 125 mm

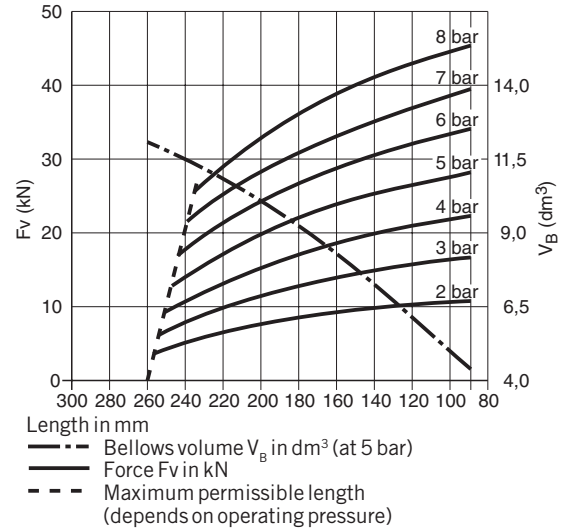


Force Diagrams – Series SP-2B..

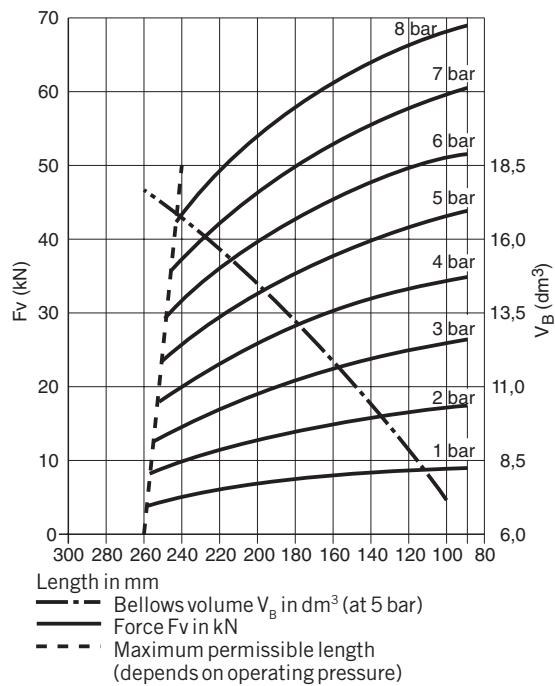
Type: SP-2B12, Stroke: max. 150 mm



Type: SP-2B22, Stroke: max. 170 mm

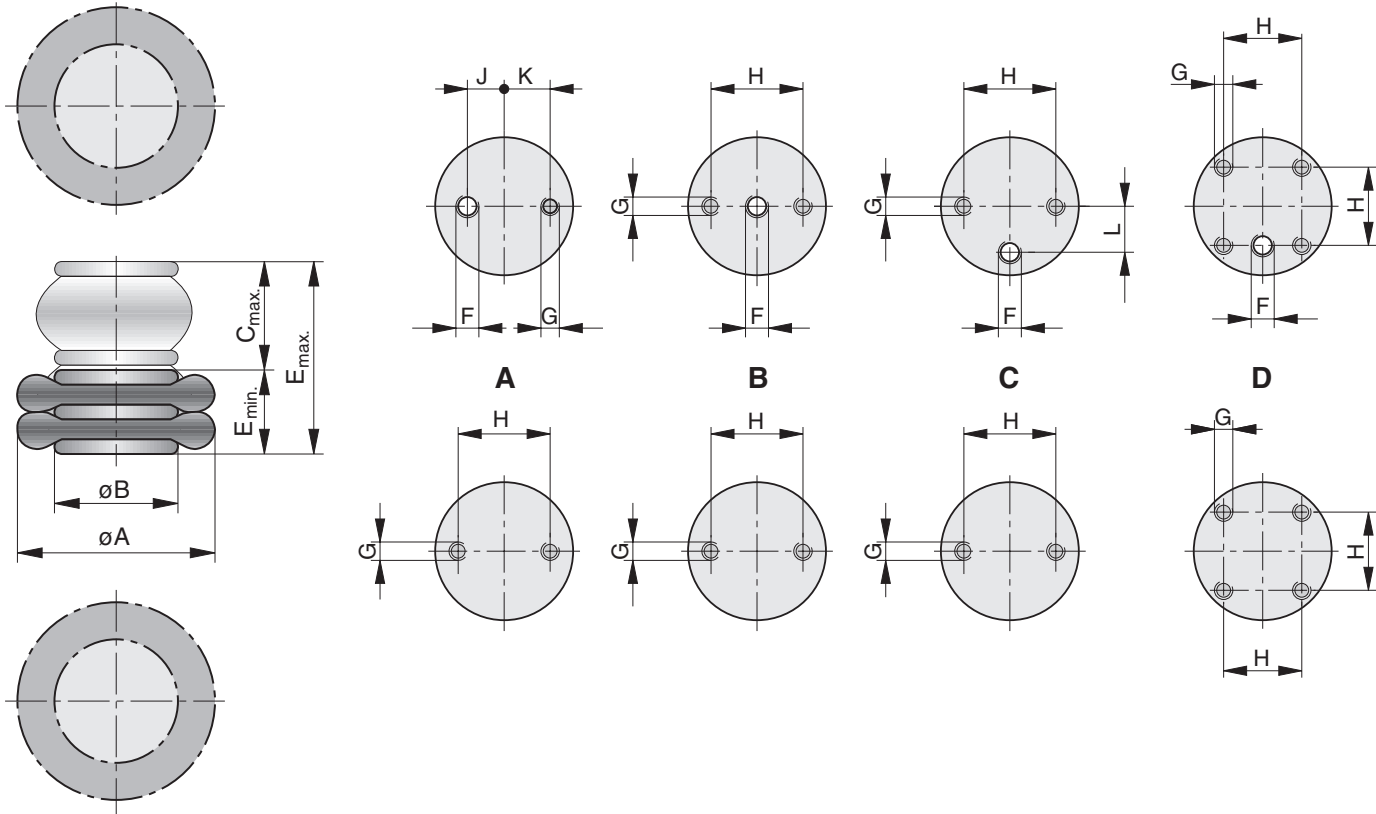


Type: SP-2B34, Stroke: max. 170 mm



Dimensions
Series SP-2B..

Dimensions of Mounting Plates – Series SP-2B..



Dimension Table (mm) and Order Instructions

Type	Order-No.	Mounting	ØA at 8 bar	ØB	C _{max} **	E _{max} **	E _{min}	F	G*	H	J	K	L
SP-2B04	KY9612	A	165	82	110	190	80	G1/4	M8	22	9	11	-
SP-2B05	KY8011	B	165	110	80	160	80	G1/4	M8	44.5	-	-	-
SP-2B05A	KY8012	B	170	110	105	185	80	G1/4	M8	44.5	-	-	-
SP-2B07	KY9589	C	215	135	125	220	95	G1/4	M8	54	-	-	27
SP-2B12	KY9611	C	250	160	150	240	90	G3/4	M8	89	-	-	38
SP-2B22	KY9591	C	320	229	170	260	90	G3/4	M12	157.5	-	-	73
SP-2B34	KY8007	D	390	288	170	260	90	G3/4	M8	158.8	-	-	-

*15 deep

**These dimensions depend on the operating pressure: see force diagrams