Bellows cylinders EB/EBS

FESTO

- 1 - Type discontinued EBS
Available up until 2011

Bellows cylinders EB/EBS

Key features, product range overview and type code

FESTO

Key features

Bellows cylinders function both as driving and pneumatic spring components. Bellows cylinders function as a driving component by providing pressurising and exhaust functions. As the stroke increases, the force generated is reduced in relation the contractional force of the bellows. When bellows cylinders are supplied with permanent pressure, they function as a cushioning component. The simple design consists of two metal plates with a ribbed rubber bellows. There are no sealing components and no moving mechanical parts. Bellows cylinders are single-acting drives that do not require spring returns, as the reset is performed through the application of external force. Rolling bellows have a different stroke/force characteristic to conventional bellows and can cover a wider stroke range in relation to installation height.
With rolling bellows cylinders, the reduction in force only begins due to the contractional force of the bellows after approximately 50% of the stroke travelled.

Product range overview

Function	Variant	Type	Size	Stroke [mm]	→ Page/Internet
Single-acting	**Bellows**				
		**EB** Single-bellows cylinder	145	60	3
			165	65	
			215	80	
			250	85	
			325	95	
			385	115	
		**EB** Double-bellows cylinder	145	100	3
			165	125	
			215	155	
			250	185	
			325	215	
			385	230	
	Rolling bellows				
		**EBS** Rolling bellows	80	110	12
			100	105	

Type codes

EB – 250 – 85

Type	
Single-acting	
EB	Bellows
EBS	Rolling bellows

Size

Stroke [mm]

Bellows cylinders EB

Technical data

FESTO

Function

- Ø - Diameter
  145 ... 385 mm
- I - Stroke length
  60 ... 230 mm

General technical data							
Size		145	165	215	250	325	385
Pneumatic connection		G⅛	G¼	G¾	G¾	G¼	G¼
Mode of operation		Single-acting					
Design		Bellows					
Type of mounting		With female thread					
Mounting position		Any					

Operating and environmental conditions		
Operating medium		Filtered compressed air, lubricated or unlubricated
Operating pressure	[bar]	0 ... 8
Ambient temperature	[°C]	–40 ... +70
Corrosion resistance class CRC[1)]		2

1) Corrosion resistance class 2 to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

Forces [N]							
Size		145	165	215	250	325	385
Single-bellows cylinder							
Force/stroke curve		→ 4		→ 5			
Resetting force		200				300	
Double-bellows cylinder							
Force/stroke curve		→ 6		→ 7			
Resetting force		200				300	

Note

- Bellows cylinders may only be driven against a workpiece, or they must be equipped with stroke limiting stops at the stroke ends, because the bellows would otherwise be overloaded
- A resetting force is required in order to press the bellows cylinder together to its minimum height. As a rule, this is achieved through the applied load
- The entire bearing surfaces of the upper and lower plates must be utilised in order to absorb forces
- Bellows cylinders must be exhausted before disassembly
- The rubber bellows must not come into contact with other parts during operation

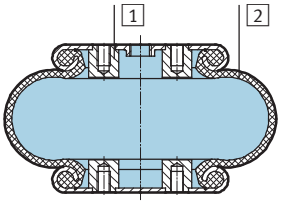
Bellows cylinders EB

Technical data

Weights [g]						
Size	145	165	215	250	325	385
Single-bellows cylinder	900	1,200	2,000	2,300	4,100	5,800
Double-bellows cylinder	1,100	1,500	2,300	3,000	4,800	6,900

Materials

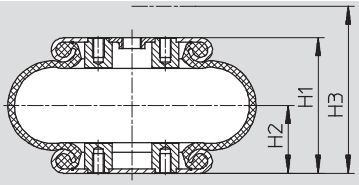
Sectional view



Bellows cylinder		
1	Housing	Galvanised steel
2	Bellows	Rubber
–	Note on materials	Free of copper, PTFE and silicone
		Conforms to RoHS

Thrust F and bellows volume V as a function of the minimum installation height H2 + stroke length

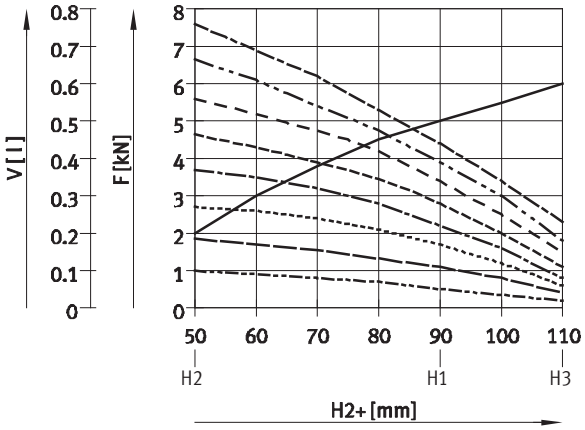
The diagram illustrates the change in thrust F with various working pressures and differing bellows volumes V in relation to stroke length. The minimum installation height H2 must be observed in order to fully reach the indicated forces.



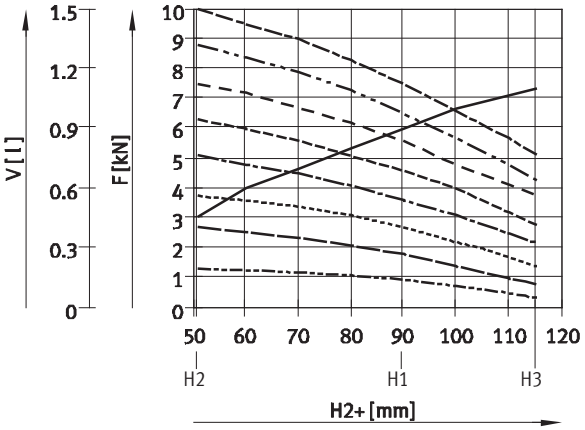
H1 Recommended operating height for cushioning applications at 6 bar
H2 Minimum installation height
H3 Maximum extended end position

Single-bellows cylinder

EB-145-60



EB-165-65

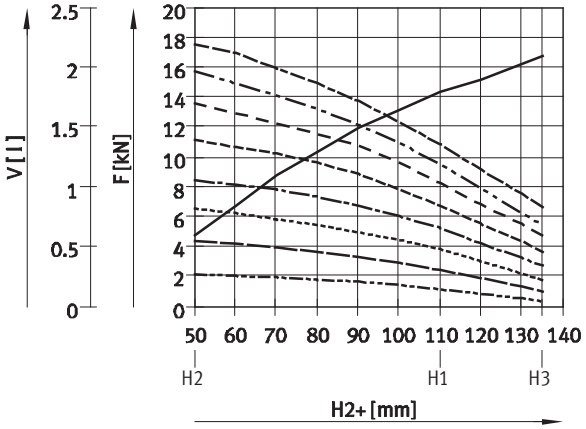


\+ plus stroke length

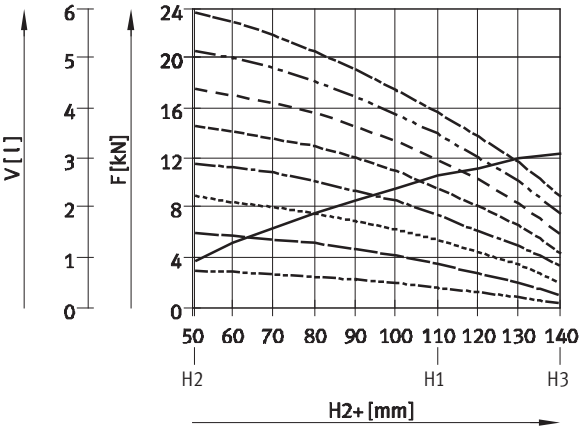
Volume
1 bar
2 bar
3 bar
4 bar
5 bar
6 bar
7 bar
8 bar

Single-bellows cylinder

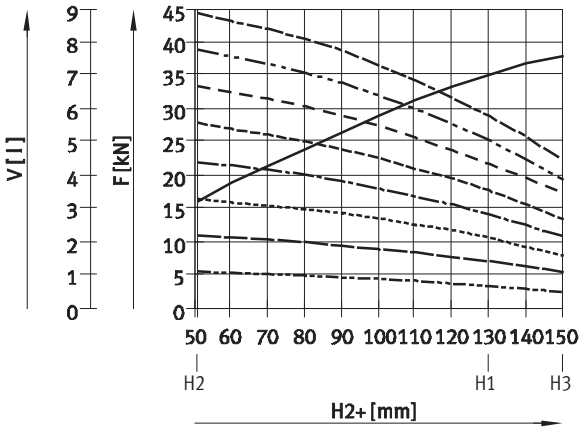
EB-215-80



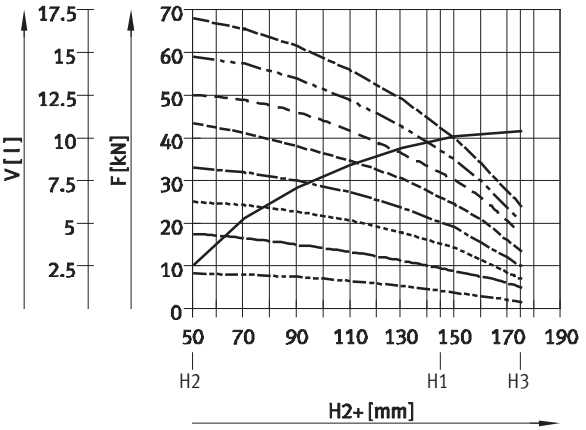
EB-250-85



EB-325-95



EB-385-115

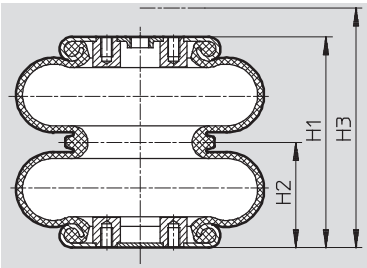


\+ plus stroke length

Volume
1 bar
2 bar
3 bar
4 bar
5 bar
6 bar
7 bar
8 bar

Thrust F and bellows volume V as a function of the minimum installation height H2 + stroke length

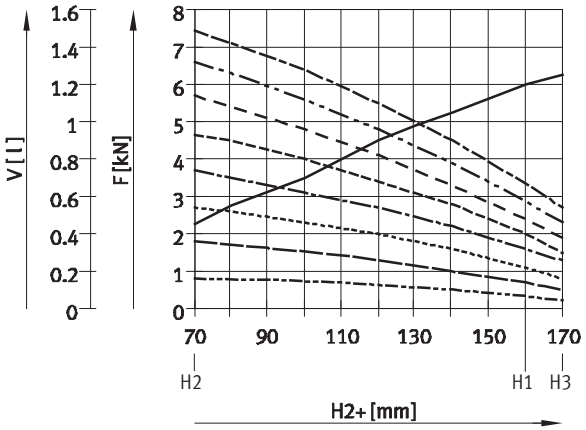
The diagram illustrates the change in thrust F with various working pressures and differing bellows volumes V in relation to stroke length. The minimum installation height H2 must be observed in order to fully reach the indicated forces.



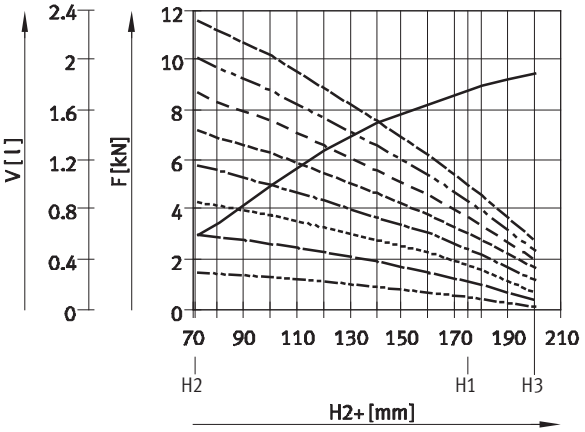
H1 Recommended operating height for cushioning applications at 6 bar
H2 Minimum installation height
H3 Maximum extended end position

Double-bellows cylinder

EB-145-100



EB-165-125

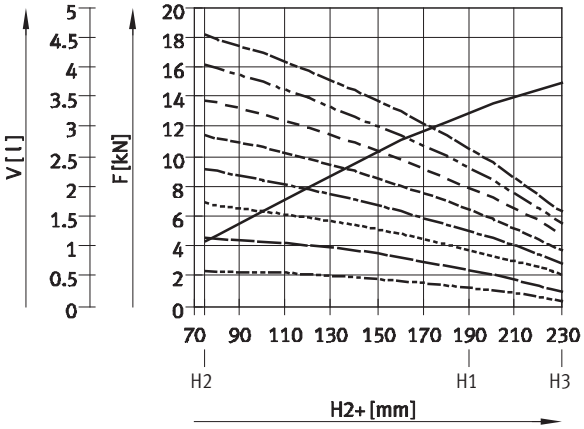


\+ plus stroke length

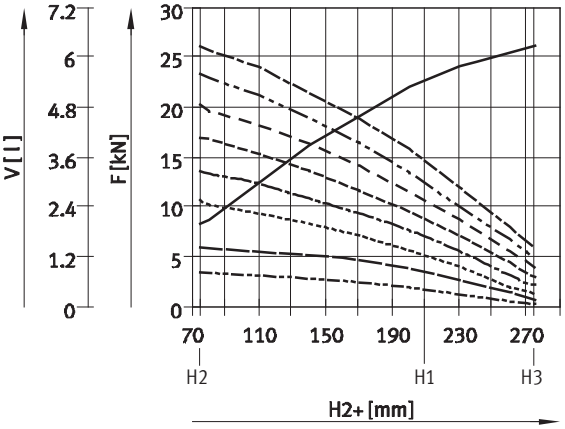
Volume
1 bar
2 bar
3 bar
4 bar
5 bar
6 bar
7 bar
8 bar

Double-bellows cylinder

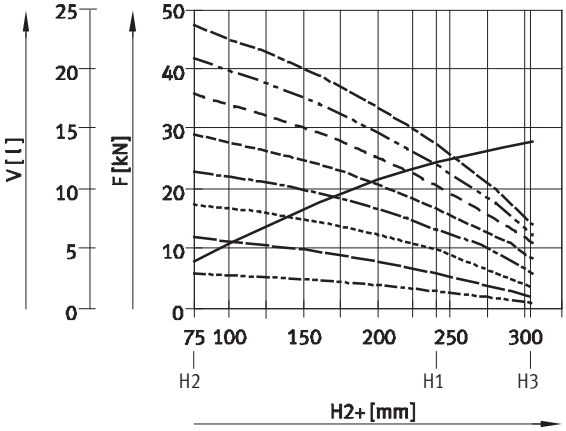
EB-215-155



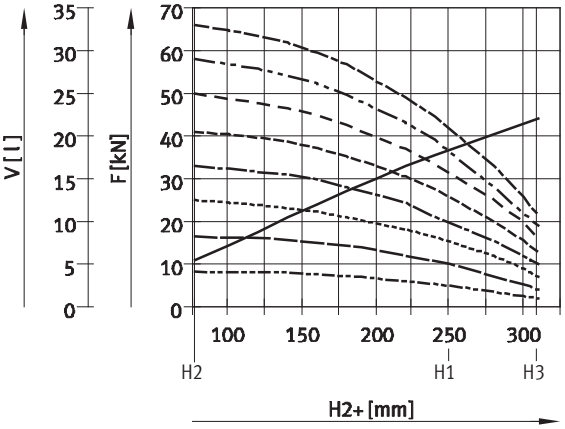
EB-250-185



EB-325-215



EB-385-230



\+ plus stroke length

Volume
1 bar
2 bar
3 bar
4 bar
5 bar
6 bar
7 bar
8 bar

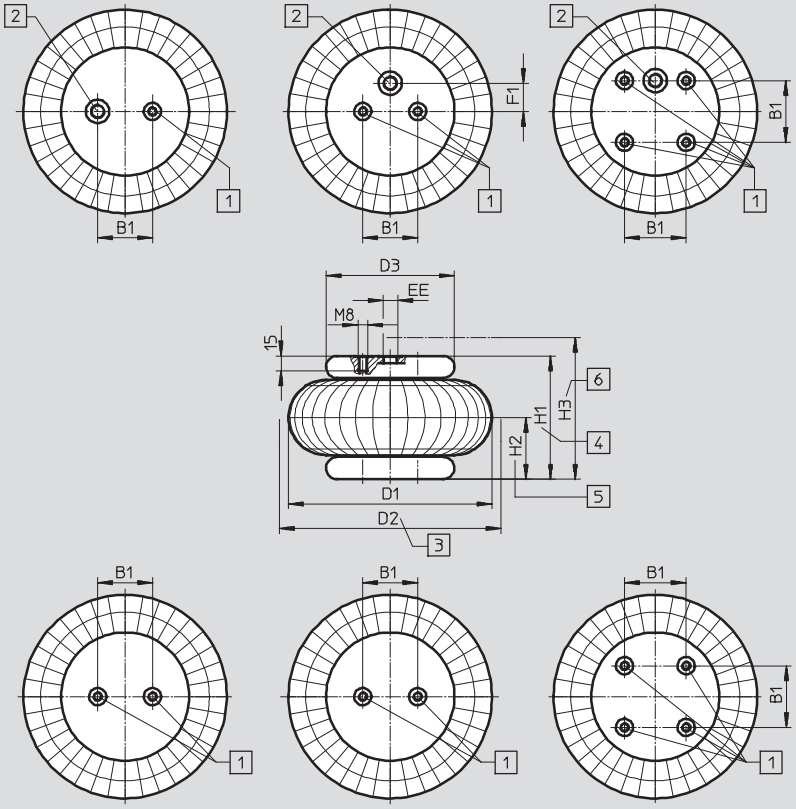
Dimensions – Single-bellows cylinder

Download CAD Data ➔ **www.festo.com/us/cad**

EB-385

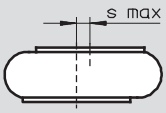
EB-165
EB-215
EB-250
EB-325

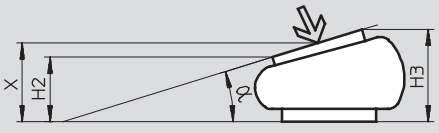
EB-145



1 Mounting thread
2 Compressed air connection
3 Required fitting space
4 Status upon delivery
5 Minimum installation height
6 Maximum extended end position

Maximum offset between the mounting surfaces





Note

The stroke of the bellows cylinder can be made to describe a circular arc, in which case the indicated tilt angle α must not be exceeded. During setup it must be observed that the minimum height H2 is not fallen short of, and that the maximum height H3 is not exceeded at any given point. The height at the centre of the plate X is the decisive factor in the calculation of the thrust.

Bellows cylinders EB

Technical data

Type	B1 ±0.2	D1 ∅ max.	D2 ∅	D3 ∅	EE	F1 ±0.2	H1	H2 min.	H3 max.	s_{max}	Tilt angle α max.
EB-145-60	20	145	160	90	G1⁄8	–	90	50	110	10	20°
EB-165-65	44.5	165	180	108	G1⁄4	0	90	51	115	10	20°
EB-215-80	70	215	230	141	G3⁄4	0	110	50	135	10	20°
EB-250-85	89	250	265	161	G3⁄4	38.1	110	51	140	10	20°
EB-325-95	157.5	325	340	228	G1⁄4	73	130	51	150	10	15°
EB-385-115	158.8	385	400	287	G1⁄4	79.4	145	51	175	10	15°

Ordering data – Single-bellows cylinder

Size	Stroke [mm]	Part No.	Type
145	60	**36 486**	**EB-145-60**
165	65	**36 487**	**EB-165-65**
215	80	**36 488**	**EB-215-80**
250	85	**36 489**	**EB-250-85**
325	95	**193 788**	**EB-325-95**
385	115	**193 789**	**EB-385-115**

Dimensions – Double-bellows cylinder

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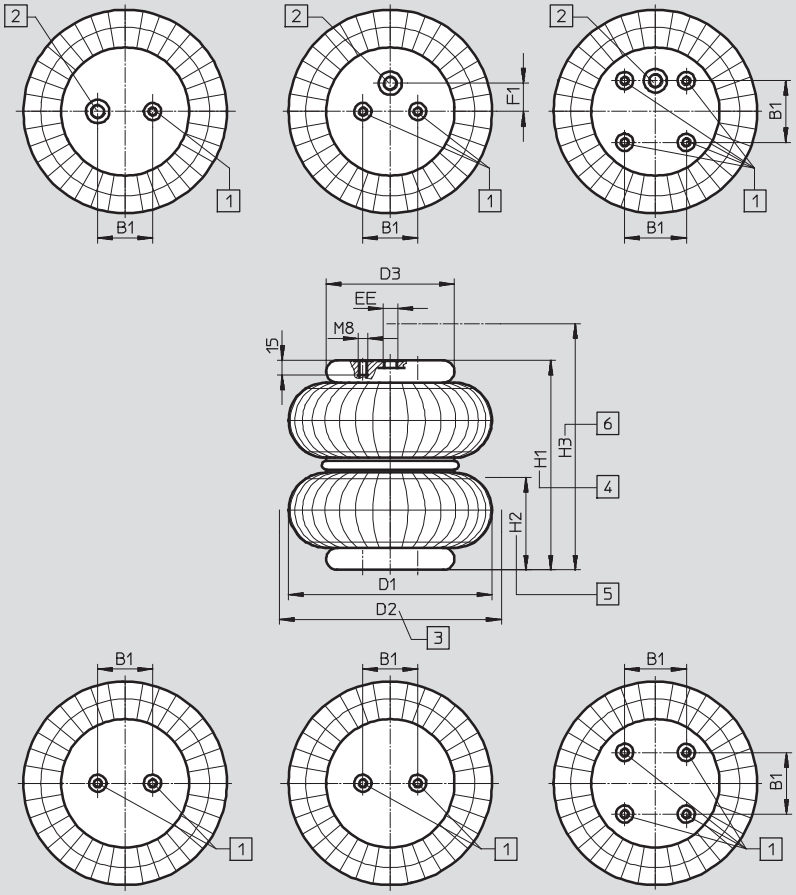
EB-385

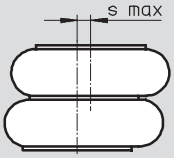
EB-165
EB-215
EB-250
EB-325

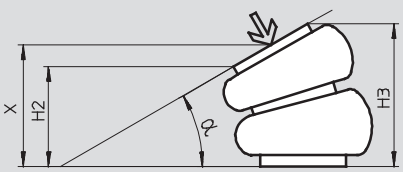
EB-145



1 Mounting thread
2 Compressed air connection
3 Required fitting space
4 Status upon delivery
5 Minimum installation height
6 Maximum extended end position

Maximum offset between the mounting surfaces





Note

The stroke of the bellows cylinder can be made to describe a circular arc, in which case the indicated tilt angle α must not be exceeded. During setup it must be observed that the minimum height H2 is not fallen short of, and that the maximum height H3 is not exceeded at any given point. The height at the centre of the plate X is the decisive factor in the calculation of the thrust.

Bellows cylinders EB

Technical data

Type	B1 ±0.2	D1 ∅ max.	D2 ∅	D3 ∅	EE	F1 ±0.2	H1	H2 min.	H3 max.	s_{max}	Tilt angle α max.
EB-145-100	20	145	160	90	G⅛	–	160	70	170	20	30°
EB-165-125	44.5	165	180	108	G¼	0	175	72	200	20	30°
EB-215-155	70	215	230	141	G¾	0	190	75	230	20	30°
EB-250-185	89	250	265	161	G¾	38.1	210	75	275	20	25°
EB-325-215	157.5	325	340	228	G¼	73	240	75	305	20	20°
EB-385-230	158.8	385	400	287	G¼	79.4	250	77	310	20	20°

Ordering data – Double-bellows cylinder

Size	Stroke [mm]	Part No.	Type
145	100	**36 490**	**EB-145-100**
165	125	**36 491**	**EB-165-125**
215	155	**36 492**	**EB-215-155**
250	185	**36 493**	**EB-250-185**
325	215	**193 790**	**EB-325-215**
385	230	**193 791**	**EB-385-230**

Type discontinued
Available up until 2011

Bellows cylinders EBS

Technical data

FESTO

Function

- Diameter
  80 and 100 mm
- Stroke length
  105 and 110 mm

General technical data		
Size	80	100
Pneumatic connection	G3/8	
Mode of operation	Single-acting	
Design	Rolling bellows	
Type of mounting	With female thread	
Mounting position	Any	

Operating and environmental conditions		
Operating medium		Filtered compressed air, lubricated or unlubricated
Operating pressure	[bar]	0.9 ... 8.0
Ambient temperature	[°C]	–40 ... +70
Corrosion resistance class CRC[1)]		2

1) Corrosion resistance class 2 to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

Forces [N]		
Size	80	100
Force/stroke curve	→ 13	
Resetting force	350	450

Note

- Bellows cylinders may only be driven against a workpiece, or they must be equipped with stroke limiting stops at the stroke ends, because the bellows would otherwise be overloaded
- A resetting force is required in order to press the bellows cylinder together to its minimum height. As a rule, this is achieved through the applied load
- Rolling bellows require a minimum pressure of 0.9 bar in order to be able to roll on the piston. Consequently they must not be pushed back to their initial position when in the unpressurised state as this will damage the tube
- The entire bearing surfaces of the upper and lower plates must be utilised in order to absorb forces
- The rubber bellows must not come into contact with other parts during operation
- Bellows cylinders must be exhausted before disassembly

Bellows cylinders EBS

Technical data

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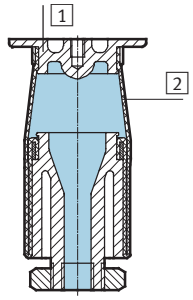
Weights [g]		
Size	80	100
Product weight	400	500

Materials

Sectional view

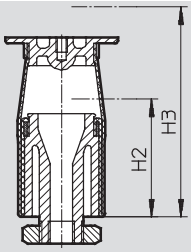


Bellows cylinder		
1	Housing	Polyamide, fibreglass reinforced
2	Bellows	Rubber
–	Note on materials	Free of copper, PTFE and silicone

Thrust F and bellows volume V as a function of the minimum installation height H2 + stroke length

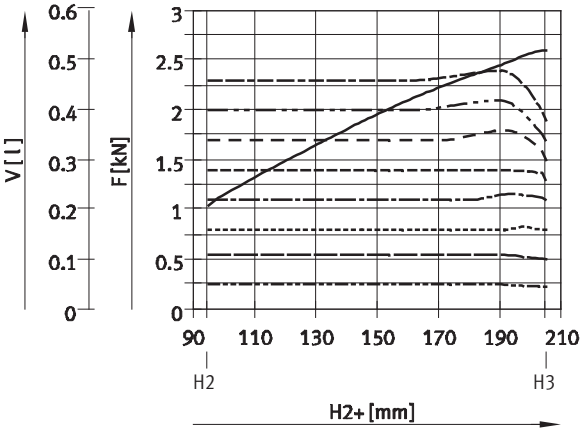
The diagrams illustrate the change in thrust F with various working pressures and differing bellows volumes V in relation to stroke length.

The minimum installation height H2 must be observed in order to fully reach the indicated forces.

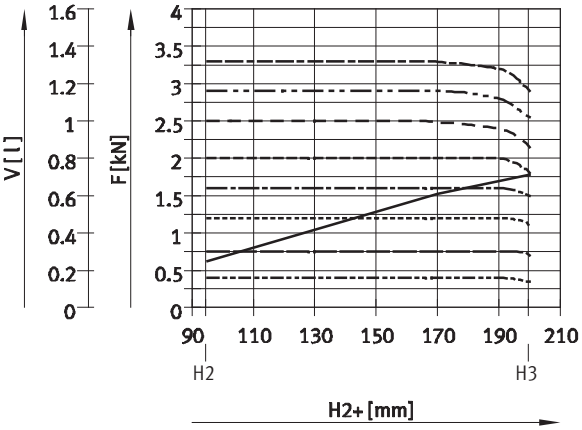


H2 Minimum installation height
H3 Maximum extended end position

EBS-80-110



EBS-100-105



\+ plus stroke length

Volume
1 bar
2 bar
3 bar
4 bar
5 bar
6 bar
7 bar
8 bar

- 1 - **Type discontinued**
Available up until 2011

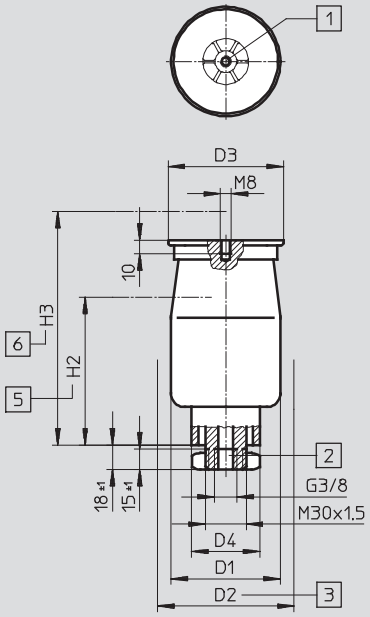
Bellows cylinders EBS

Technical data

FESTO

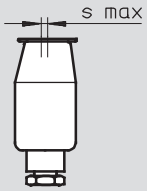
Dimensions – Rolling bellows

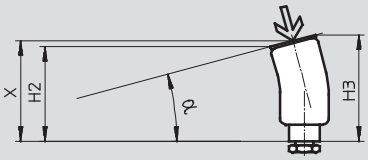
Download CAD Data ➔ **www.festo.com/us/cad**



1 Mounting thread
2 Compressed air connection
3 Required fitting space
5 Minimum installation height
6 Maximum extended end position

Maximum offset between the mounting surfaces





Note

The stroke of the bellows cylinder can be made to describe a circular arc, in which case the indicated tilt angle α must not be exceeded. During setup it must be observed that the minimum height H2 is not fallen short of, and that the maximum height H3 is not exceeded at any given point. The height at the centre of the plate X is the decisive factor in the calculation of the thrust.

Type	D1 ∅ max.	D2 ∅	D3 ∅ ±1	D4 ∅ ±0.5	H2 min.	H3 max.	s_{max}	Tilt angle α max.
EBS-80-110	80	100	76.5	50	95	205	10	15°
EBS-100-105	97	115	86.5	60.5	95	200	10	15°

Ordering data – Rolling bellows

Size	Stroke [mm]	Part No.	Type
80	110	**193 794**	**EBS-80-110**
100	105	**193 795**	**EBS-100-105**

Product Range and Company Overview

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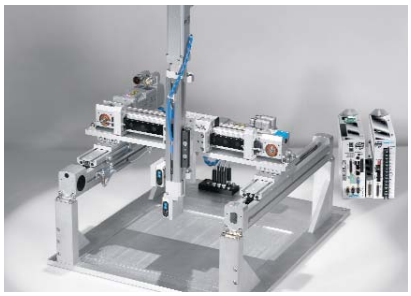

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PLCs and I/O Devices
PLC's, operator interfaces, sensors and I/O devices

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To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.

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