

Operating instructions

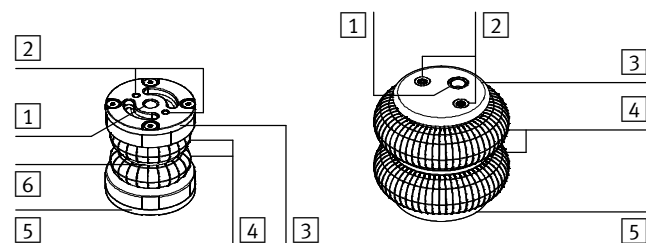
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Bellows actuator EB English

**Note**

Installation and commissioning is to be carried out only by qualified personnel.

1 Applicable documentsFor all available product documentation → www.festo.com/pk**2 Control sections and connections**

- | | |
|--------------------|------------------------|
| 1 Pneumatic port | 4 Bellows |
| 2 Mounting thread | 5 Sub-base, underneath |
| 3 Sub-base, on top | 6 Belt ring |

Fig. 1

3 Function and application

The bellows actuator is intended to be used as a drive or cushioning component.

- Bellows actuators function as a driving component through pressurization and exhaust.

As the stroke increases, the force generated is reduced – possibly dependent on the constriction of the bellows. Resetting takes place through external application of force.

- Through permanent pressurization, the bellows actuator works as a cushioning component.

The bellows actuator consists of the sub-bases 3 and 5 with an integrated bellows 4. There are no sealing components and no moving mechanical parts.

4 Transport and storage

- Take into account the weight of the EB.
Depending on the design, the EB weighs up to 6.9 kg.
- When storing the product, avoid
 - direct sunlight
 - temperatures below 15 °C or above 25 °C
 - air humidity above 70 %
 - climatic influences, e.g. through draughts
 - nearby ozone-generating equipment, such as electric motors, welding systems or photocopiers
- Store the product free of tension and without deformation – preferably upright.
- In addition, observe the general requirements for storage of the product to ISO 2230 “Rubber Products – Guidelines for Storage”.

5 Requirements for product use**Note**

Incorrect handling can result in malfunctions.

- Make sure that the specifications contained in this chapter are adhered to at all times. This is the only way to ensure correct and safe product behaviour.

- Take into consideration the legal regulations applicable for the destination as well as:
 - regulations and standards
 - regulations of the testing organizations and insurers
 - national specifications.
- Remove all transport packaging, such as plastic sheets, caps and cartons (except for any covers in the pneumatic ports).
The packaging is intended for recycling.
- Use the product in its original status, without any unauthorised product modifications.
- Take into consideration the ambient conditions at the location of use.
The bellows actuator is not permanently resistant to solvent, hydraulic fluids based on mineral oil and phosphate esters, lubricating oils, lubricating greases, metal chips and hot metal.
Corrosive environments (e.g. ozone) will reduce the service life of the product.
- Compare the limit values specified in these operating instructions with your actual application (e.g. pressures, forces, torques, temperatures, loads).
Operation of the product in compliance with the relevant safety regulations is contingent on adherence to the load limits.
- Make sure the compressed air is properly prepared (without aggressive media → 11 Technical data).
- Maintain the selected medium for the total service life of the product. Example: Always use non-lubricated compressed air.
- Slowly pressurize the system as a whole.
There will then be no uncontrolled movements.

6 Installation

- Inspect the bellows actuator for damage prior to installation.
- Inspect the environment of the installation location.
- Make sure that the entire bearing surface of the bellows actuator is used for reception of the dynamic and static forces. The opposite surface must be smooth and flat.

6.1 Installation, mechanical

Through an appropriate installation environment (e.g. stroke limiters, spacers), the stroke of the bellows actuator is limited.

**Warning**

Danger of injury due to separating sub-bases.

- Make sure that the bellows actuator does not exceed the maximum height h_{max} . Example Fig. 2.

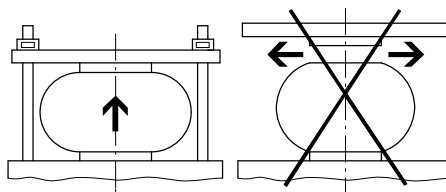


Fig. 2

**Note**

Damage through jamming of the bellows actuator.

- Make sure that the bellows actuator does not drop below the minimum height h_{min} . Example Fig. 3.

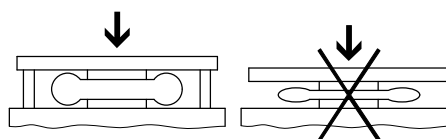


Fig. 3

Space required

The bellows actuator must not come into contact with other machine parts at any time.

- Make sure that, at the installation location, there is sufficient space for expansion of the bellows actuator across the entire stroke range → 11 Technical data.

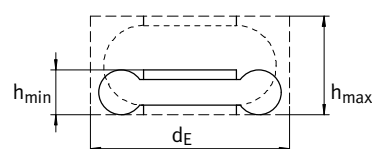


Fig. 4

Lateral offset

Lateral offset increases the required installation space.

- Make sure that the max. lateral offset is not exceeded
→ 11 Technical data.

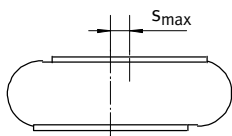


Fig. 5

Tilted installation

The bellows walls may not rub against each other at any time.

- Make sure that the max. tilt angle is not exceeded
→ 11 Technical data.

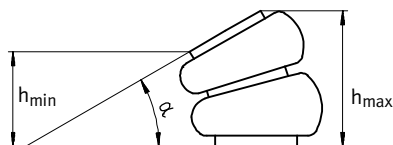


Fig. 6

Combined installation

The direction stability of connected bellows actuators is not guaranteed.

- In case of combined installation of two or more bellows actuators, make sure that the resistance to bending is secured through suitable design measures.

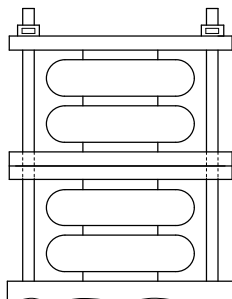


Fig. 7

To attach the bellows actuator:

- Tighten the connectors alternately and, if necessary, diagonally opposite with a torque spanner (tightening torque → 11 Technical data).

6.2 Installation, pneumatic

1. Connect the bellows actuator EB via the pneumatic port 1.

To set the stroke speed:

- Screw a one-way flow control valve into the compressed air supply port.

7 Commissioning



Warning

Damage to the bellows actuator.

- Place the bellows actuator under pressure only with height stop.
- Make sure that the maximum operating pressure of 8 bar is not exceeded.

7.1 Preparation for commissioning



Warning

Injury to people, damage to the machine and system.

- Make sure that, in the travel range,
 - nobody can reach into the path of the movable components (e.g. by providing a protective guard)
 - there are no foreign objects.

It should not be possible to grasp the EB until the mass has come to a complete rest.

7.2 Commissioning the complete system

- Slowly pressurize the system as a whole.
In this way you will prevent sudden uncontrolled movements.

8 Maintenance and care

- Check the bellows actuator regularly for cracks, bubbles, brittleness or other external damage. Replace the bellows actuator, if necessary.

8.1 Cleaning

- When necessary, clean the bellows actuator with a soft cloth and one of the following cleansers:
 - commercially available alkaline cleaners
 - diluted caustic soda
 - water with ammonia.
- Then rinse the cleanser away with clear water.



Note

- Avoid the use of cleansers based on aliphatic or aromatic hydrocarbons, such as kerosene, cleaning benzine, benzole, cellulose thinner, etc.

- Alternatively, use a steam jet or high-pressure cleaner.
 - maximum pressure: 90 bar
 - minimum distance: 20 cm

9 Repair

Repair of the bellows actuator is not possible.

10 Fault clearance

Malfunction	Possible cause	Remedy
Bellows actuator does not move	No drive medium available	Inspect connection
Cracks or abrasion up to the reinforcement	Mechanical or age-related wear or corrosive environment	Replacement of the bellows actuator
Advanced bellows actuator does not retract	Resetting force too low	Increase resetting force

Fig. 8

11 Technical data

Size	80	145	165	215	250	325	385
Mode of operation	– as drive: Single-acting – as cushioning component: Double-acting						
Mounting position	any						
Mounting thread at							
sub-base, on top [3]	2x M6	1x M8	2x M8				4xM8
sub-base, underneath[5]	2x M6	2x M8		4xM8			
Max. tightening torque for mounting thread [2]	[Nm]	5	25				
Operating medium		Compressed air to ISO 8573-1:2010 [–:–:4]					
Operating pressure [bar]		0 ... 8					
Pneumatic port		G1/4	G1/8	G1/4	G3/4		G1/4
Max. tightening torque for pneumatic port [1]		[Nm]	15	25		50	25
Ambient temperature [°C]		–40 ... +70					
Environmental restrictions		Not permanently resistant to: – solvent – hydraulic fluids based on mineral oil and phosphate ester – lubricating oils – lubricating greases – metal chips – hot metal					
Storage conditions							
Temperature [°C]		+15 ... +25 - no direct sunlight					
Max. air humidity [%]		70					
Materials							
Sub-bases		Die-cast alu-min-ium	Galvanised steel, CR VI-free				
Bellows		CR	NR/BR				

Fig. 9

Single-bellows actuator EB-	80 -20	145 -60	165 -65	215 -80	250 -85	325- 95	385 -115
Max. resetting force F _R [N]	400	120	200			300	
Mounting							
Min. installation diameter d _E [mm]	95	160	180	230	265	340	400
Min. height h _{min} [mm]	50		51	50	51		
Max. height h _{max} [mm]	70	110	115	135	140	150	175
Max. lateral offset S _{vmax} [mm]	5	10					
Max. tilt angle α [°]	10	20				15	

Fig. 10

Double-bellows actuator EB-	80 -45	145 -100	165 -125	215 -155	250 -185	325 -215	385 -230
Max. resetting force F _R [N]	200					300	400
Mounting							
Min. installation diameter d _E [mm]	95	160	180	230	265	340	400
Min. height h _{min} [mm]	65	70	72	75			77
Max. height h _{max} [mm]	110	170	200	230	275	305	310
Max. lateral offset S _{vmax} [mm]	10	20					
Max. tilt angle α [°]	15	30			25	20	

Fig. 11