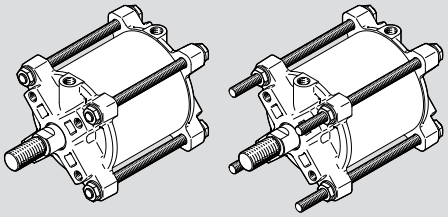
DFPC
Linear drive



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Operating instructions

8165883
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[8165885]

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Translation of the original instructions

1 Applicable Documents

All available documents for the product ➔ www.festo.com/sp.

2 Safety

2.1 Safety instructions

- Take into account the ambient conditions at the location of use.
- Only use the product in its original condition without unauthorised modifications.
- Observe the identifications on the product.
- Before switching off the compressed air supply: secure the load on the piston rod.
- Prior to assembly, installation and maintenance work: switch off the compressed air supply and secure it against being switched back on.
- Keep the travel path of the piston rod clear.

2.2 Intended use

The intended use of the product is to implement linear movements in a compressed air machine in an industrial environment.

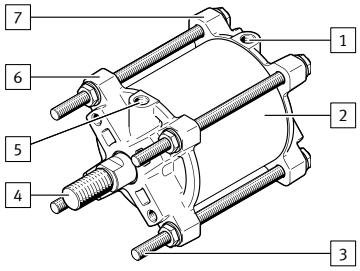
2.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers. The qualified personnel have skills and experience in dealing with pneumatic (open-loop) control technology.

3 Additional information

Contact the regional Festo contact if you have technical problems ➔ www.festo.com.

4 Product design



1 Pneumatic port 2
2 Cylinder barrel
3 Extended tie rod (only for DFPC-...-LB2)
4 Piston rod
5 Pneumatic port 1
6 Bearing cap
7 End cap

Fig. 1: Product design

5 Function

Pressurising and exhausting the cylinder chambers causes the piston rod connected to the piston to move back and forth.

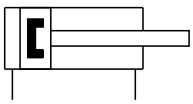


Fig. 2: Function

6 Transport and storage

Store the product in a cool, dry environment protected from UV and corrosion. Keep storage times short.

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Do not use the tie rods as a transport aid.

7 Assembly

- Fasten the linear drive to one of the mounting interfaces.
  Potential mounting interfaces:
  - Mounting thread on the bearing cap
  - Extended tie rods (only for DFPC-...-LB2)

8 Pneumatic Installation

1. Remove the plugs at the pneumatic connections.
2. To set the travel speed, use one-way flow control valves.
3. Screw the fittings into the pneumatic connections 1 and 2.

9 Commissioning

Requirements

- The linear drive is fully mounted and connected.
- The permissible impact energy at the end stop must not be exceeded ➔ 14 Technical data.
- The piston rod or the piston rod bearing must not be subjected to transverse loads. The dead weight of the piston rod must be absorbed.
- Take the permissible buckling load into account ➔ 14.1 Permissible buckling load.

Permissible impact energy at end stop

The permissible impact energy at the end stop is dependent on the impact velocity and the mass of the moving payload.

Impact velocity and mass of the moving payload	
Permissible impact velocity	$v_{perm} = \sqrt{\frac{2 \cdot E_{perm}}{m_{own} + m_{load}}}$
Permissible mass of the moving payload	$m_{load} = \frac{2 \cdot E_{perm}}{v^2} - m_{own}$

E_{perm}	Max. impact energy
$m_{Intrinsic}$	Moving mass (drive) ➔ 14 Technical data $m_{Intrinsic}$ = moving mass with 0 mm stroke + added moving mass per 10 mm stroke
m_{Load}	Permissible mass of the moving payload
v	Operating velocity
v_{perm}	Permissible impact velocity

Tab. 1: Impact velocity and mass of the moving payload

Commissioning the linear drive

1. Pressurise the product slowly. A soft start valve is used for the gradual start-up pressurisation .
2. Screw the one-way flow control valves all the way in on both sides, then loosen by one turn.
3. Exhaust the cylinder on one side.
   ↳ The piston rod moves to an end position.
4. Start a test run.
5. During the test run, check the velocity of the moving mass and the end stop.

10 Operation

⚠ WARNING

Risk of injury due to unexpected movement of components.
Body parts in the movement range of the piston rod can be crushed or severed.
- Protect the positioning range from unwanted intervention.
- Keep foreign objects out of the positioning range.

- Observe the operating conditions.
- Observe the permissible limit values.

11 Maintenance

If used as intended, the product is maintenance-free.

12 Fault clearance

Fault description	Cause	Remedy
Piston rod does not move in the desired direction	Tubing lines reversed at the ports	Correct the tubing lines at the ports.
Uneven movement of the piston	Input pressure too low	Keep tubing lines short. Select suitable cross sections.
		Select correct pressure.
	Transverse loads are applied to the piston rod	Avoid transverse loads on the piston rod.
	Piston seal or piston rod seal faulty	Replace product.
Piston does not move to end position	Cylinder barrel damaged	Replace product.
	Piston rod damaged	
	Foreign matter in the product	Replace product.
		Filter compressed air.

Tab. 2: Fault clearance

13 Disassembly

1. Secure the load to the piston rod.
2. Depressurise the product.
3. Disconnect the attachment from the piston rod.
4. Loosen the screws on the mounting interface.

14 Technical data

DFPC-...		80	100	125	160	200	250	320
Design		Piston, piston rod, tie rod, cylinder barrel						
Mode of operation		Double-acting						
Pneumatic Connection		G1/8			G1/4			
Stroke	[mm]	10 ... 1600						
Cushioning		Elastic cushioning rings at both end positions						
Type of mounting		DFPC-... (on flange in accordance with ISO 5210) DFPC-...-LB2 (based on ISO 15552 with spacer bolts on the bearing cap)						
Flange hole pattern ISO 5210		F07	F07	F10	F10	F10	F10/ F14	F10/ F14
Thread size Tie rod		M8	M8	M10	M12	M16	M20	M20
Thread length of tie rod DFPC-...-LB2	[mm]	10 ... 120[1]					10 ... 140[1]	
Mounting position		Any (transverse loads not permitted)						
Position sensing		Suitable for proximity switches						
Solenoid valve connection		Via accessories VDI/VDE 3845 adapter plate						
Max. impact energy at the end positions	[J]	1.4	0.94	1.1	3.3	4.8	6.0	12.6
Operating and ambient conditions								
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]						
Information on the operating medium		lubricated operation possible, in which case lubricated operation will always be required						
Operating pressure	[MPa]	0.06 ... 0.8						
	[bar]	0.6 ... 8						
	[psi]	9 ... 116						
Nominal operating pressure	[MPa]	0.6						
	[bar]	6						
	[psi]	87						
Ambient temperature	[°C]	–20 ... +80						
Vibration and shock resistance		Severity level 1 in accordance with IEC 60068[2]						
Materials								
Cylinder barrel		Wrought aluminium alloy, smooth anodised						
Cover		Gravity die-cast aluminium					Aluminium	
Tie rod		High-alloy stainless steel						
Piston rod		High-alloy stainless steel						
Piston		Wrought aluminium alloy			Gravity die-cast aluminium			
Wiper seal piston rod		TPE-U (PU)						
Static seals		NBR						
Forces and air consumption								
Theoretical force at 6 bar, advance	[N]	3016	4712	7363	12064	18850	29452	48255
Theoretical force at 6 bar, return	[N]	2827	4524	7069	11581	18096	28698	47077
Theoretical air consumption at 6 bar per 10 mm, advance	[l]	0.35	0.55	0.86	1.41	2.20	3.44	5.63
Theoretical air consumption at 6 bar per 10 mm, return	[l]	0.33	0.53	0.83	1.35	2.11	3.35	5.49

DFPC-...		80	100	125	160	200	250	320
Product weight with variable stroke[3]								
Basic weight at 0 mm stroke	[g]	1230	1667	2969	5949	10258	19297	33831
Added weight per 10 mm stroke	[g]	62	71	107	149	256	336	474
Moving mass at 0 mm stroke	[g]	451	617	1060	2102	3575	5600	9869
Added moving mass per 10 mm stroke	[g]	25	25	39	64	105	105	151

1) Variable value: thread length from bearing surface of bearing cap
2) The vibration and shock resistance is applicable up to a maximum stroke length of 400 mm.
3) For moving masses, added weights and basic weights: tolerance ± 15%

Tab. 3: Technical data

Type of severity level (SL)					
Vibration load					
Frequency range [Hz]		Acceleration [m/s²]		Deflection [mm]	
SL1	SL2	SL1	SG2	SL1	SL2
2 … 8	2 … 8	–	–	±3.5	±3.5
8 … 27	8 … 27	10	10	–	–
27 … 58	27 … 60	–	–	±0.15	±0.35
58 … 160	60 … 160	20	50	–	–
160 … 200	160 … 200	10	10	–	–
Shock load					
Acceleration [m/s²]		Duration [ms]		Shocks per direction	
SL1	SL2	SL1	SL2	SL1	SL2
±150	±300	11	11	5	5
Continuous shock load					
Acceleration [m/s²]		Duration [ms]		Shocks per direction	
±150		6		1000	

Tab. 4: Type of severity level (SL)

14.1 Permissible buckling load

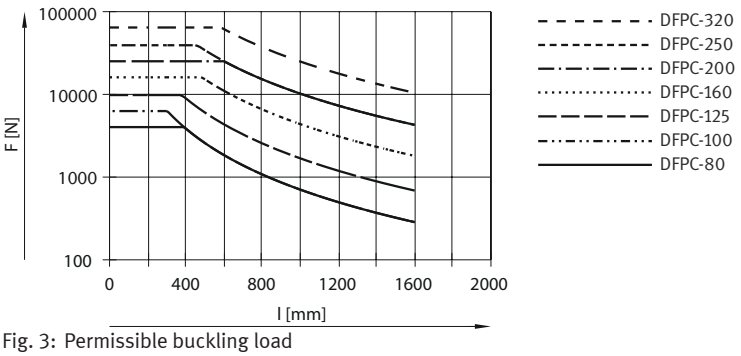

Fig. 3: Permissible buckling load

– F [N] = permissible buckling load
– l [mm] = stroke + piston rod extension E + piston rod thread extension L