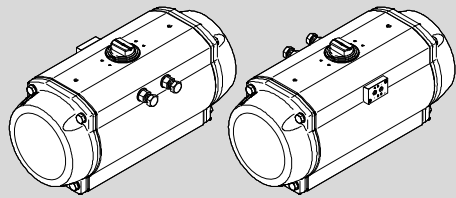


# Quarter-turn actuator DFPD-700 ... 2300



**FESTO**

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Operating instructions  
(Translation of the original instructions)

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## Quarter turn actuator DFPD-700 ... 2300 ..... English

### 1 About this document

This document describes the use of the above-mentioned product.

#### 1.1 Further applicable documents

- Certification documents
- Operating conditions EX



For all available product documentation → [www.festo.com/pk](http://www.festo.com/pk)

#### 1.2 Target group

The document is targeted towards persons who mount and operate the product. It is additionally targeted towards individuals who are entrusted with the planning and application of the product in a safety-related system.

### 2 Safety

#### General safety information

- The product may only be used in its original status without unauthorized modifications.
- Only use the product if it is in perfect technical condition.
- Take the ambient conditions into consideration at the location of use. Corrosive environments reduce the service life of the product.
- Observe product labelling.
- Prior to all work, switch off compressed air supply and secure it against accidental restarting.
- Exhaust actuator prior to mounting, installation and dismantling.

#### Operating medium

- Only use compressed air in accordance with the specifications → Technical data.
- Use only unlubricated compressed air under normal conditions. Once the product has been used with lubricated compressed air, it must continue to be operated with compressed air only.
- Protect the device from pressure fluctuations. Use overpressure valves and pressure regulators.

#### Return to Festo

Hazardous substances can endanger the health and safety of personnel and cause damage to the environment. To prevent hazards, the product should only be returned upon explicit request by Festo.

- Consult your regional Festo contact.
- Complete the declaration of contamination and attach it to the outside of the packaging.
- Comply with all legal requirements for handling hazardous substances and conveying dangerous goods.

### 3 Intended use

The DFPD quarter turn actuator is intended to actuate process valves, such as ball valves and butterfly valves with a rotation angle from 0° (valve closed) to 180° (depending on design).



#### Note

The operating torque of the actuator must not be higher than the maximum permissible torque listed in ISO 5211 related to the size of the mounting flange and coupling.

### 4 Additional information

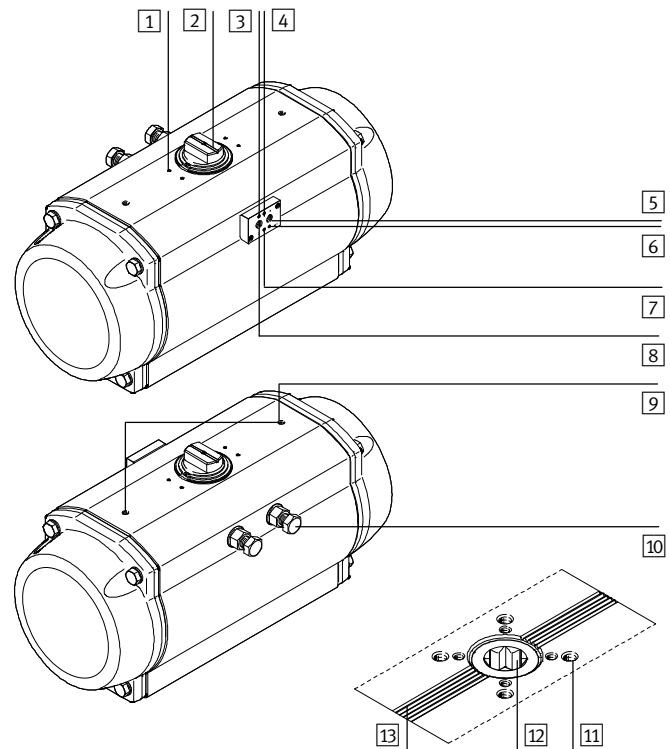
- Accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue)
- Spare parts → [www.festo.com/spareparts](http://www.festo.com/spareparts)
- Documents and literature → [www.festo.com/sp](http://www.festo.com/sp)

### 5 Service

- Consult your regional Festo contact if you have technical questions → [www.festo.com](http://www.festo.com).

### 6 Product overview

#### 6.1 Configuration



- |   |  |    |   |
|---|--|----|---|
| 1 | Mounting thread for limit switch or position sensor                              | 7  | Mounting thread for coding pin                |
| 2 | Transmission shaft (shaft groove shows the process valve position – here closed) | 8  | Compressed air supply port (2)                |
| 3 | Mounting thread for pneumatic NAMUR switching valve                              | 9  | Threaded hole for transport lugs (DFPD-2300)  |
| 4 | Mounting thread for coding pin   | 10 | End-position adjustment on both sides         |
| 5 | Compressed air supply port (4)   | 11 | Mounting thread for process valve to ISO 5211 |
| 6 | Mounting thread for pneumatic NAMUR switching valve                              | 12 | Coupling for process valve                    |
|   |  | 13 | Leakage slot                                  |

Fig. 1

A shaft is guided outward on both sides through the housing. Through this, the reaction torque is transmitted to a process valve (→ Fig. 1, [12]) and, if applicable, a limit switch or position sensor (→ Fig. 1, [2]).

The end stops can be adjusted in the range ± 5° through the end-position adjustment on both sides (→ Fig. 1, [9]).

## 6.2 Product variants and type code

**i** Fig. 2 explains selected product characteristics that are necessary to understand the instructions.  
Description of the complete type code: → [www.festo.com/catalogue](http://www.festo.com/catalogue).

Characteristic	Value	Description
Type code	DFPD	Quarter turn actuator
System of units	– N	Metric Imperial
Size	700, 900, 1200, 2300	
Swivel angle	90, 180	Swivel angle specification in [°]
Closing direction	L R	Closes to the left Closes to the right
Mode of operation	D S	Double-acting Single-acting
Spring configuration	–, 20, 25, 30, 35, 40, 45, 50, 55, 60	Not for double-acting drive, for connection pressure with single-acting drive
Flange hole pattern 1	F10, F12, F14	Flange hole pattern according to ISO 5211
Flange hole pattern 2	F12, F16	Flange hole pattern according to ISO 5211
Temperature range	T4, T5, T6	→ Technical data

Fig. 2

## 7 Function

The piston movement of the DFPD is converted through a rack & pinion kinematics (rack and pinion principle) into a swivel motion of the transmission shaft.

– Single-acting quarter turn actuators: Return is through spring force.

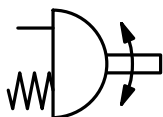


Fig. 3

– Double-acting quarter turn actuators: Through pressurising and exhausting of the cylinder chambers, the shaft turns back and forth.

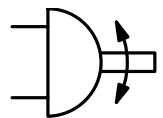


Fig. 4

## Symbol on the rating plate

Type code	Mode of operation	Symbol
DFPD-...-RD-...	Double-acting	
DFPD-...-LD-...	Closes to the right / left	
DFPD-...-RS-...	Single-acting (spring return) Closes to the right	
DFPD-...-LS-...	Single-acting (spring return) Closes to the left	

Fig. 5

## 8 Conveying and storage



### Warning

**Danger of crushing! Danger of shearing!**

The product without accessories weighs up to 80 kg, depending on the product version.

Body parts can be crushed or severed if the product falls.

- Use appropriate load handling equipment.
- For DFPD-2300: Use additional threaded holes (→ Fig. 1, [9]) for transport lugs.

- When dispatching used products: Comply with all legal requirements for handling hazardous substances and conveying dangerous goods.  
For return to Festo → Chapter 2.
- Remove all attachments.
- Store the product in a cool, dry, UV-protected and corrosion-protected environment. Ensure that storage times are kept to a minimum.

## 9 Mounting and installation



### Note

Mounting and installation should only be carried out by qualified personnel.

### 9.1 Mounting without adapter bridge

1. Prepare process valve.
  - Adjust the switching shaft of the process valve so that the desired operating method for opening and closing is implemented.
2. Place the quarter turn actuator on the switching shaft of the process valve. The square of the process valve must sit in the coupling of the quarter turn actuator (→ Fig. 1, [12]) without tilting.
3. Fasten the quarter turn actuator to the connecting flange of the process valve with 4 corrosion-resistant screws and retaining rings (material: CI).
4. Tighten the screws crosswise.
  - Tightening torque → Fig. 8

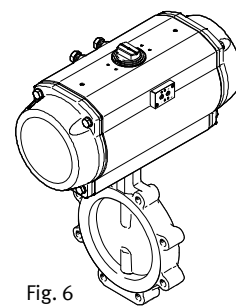


Fig. 6

### 9.2 Mounting with adapter bridge

1. Have suitable adapter bridge and shaft extension ready.
  - Accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue)
2. Mount the adapter bridge (→ Fig. 7, [1]) to the quarter turn actuator.
  - Align studs of the adapter bridge lengthwise to the actuator.
  - Align open side of the adapter bridge on the process valve.
  - Tighten screws, but not yet fully tight.
3. Prepare process valve.
  - Adjust the switching shaft of the process valve so that the desired operating method for opening and closing is implemented.
4. Insert shaft extension (→ Fig. 7, [2]). The square of the shaft extension must sit in the coupling of the quarter turn actuator (→ Fig. 1, [12]) without tilting.
5. Place the quarter turn actuator with adapter bridge and shaft extension onto the switching shaft of the process valve. The square of the process valve must sit in the coupling of the shaft extension without tilting.
6. Mount the adapter bridge to the connecting flange of the process valve with 4 corrosion-resistant screws and retaining rings (material: CI).
7. Tighten the screws at both the actuator and process valve crosswise.
  - Tightening torque → Fig. 8

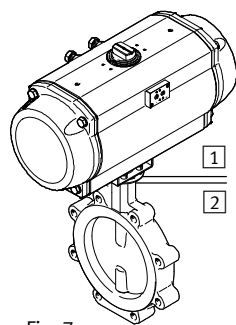


Fig. 7

Flange type	F10	F12	F14	F16
Tightening torque [Nm]	46 ... 50	80 ... 84	190 ... 200	370 ... 390

Fig. 8

### 9.3 Pneumatic port

#### Single-acting quarter turn actuators

Prevent corrosive atmosphere in spring space. In a corrosive atmosphere, use a rebreather block.

- Mount a filter element to the exhaust port 4 (A) to prevent ingress of dirt.

Type code	Compressed air supply port	Effect
DFPD-...-RS-...	2	Air supply; always connected
DFPD-...-LS-...	4	Pressurisation of spring space

Fig. 9

#### Double-acting quarter turn actuators

Type code	Compressed air supply port	Effect
DFPD-...-RD-...	2	Air supply direction of rotation anti-clockwise <sup>1)</sup>
	4	Air supply direction of rotation clockwise <sup>1)</sup>
DFPD-...-LD-...	2	Air supply direction of rotation clockwise <sup>1)</sup>
	4	Air supply direction of rotation anti-clockwise <sup>1)</sup>

1) Viewed from the connection point of the accessory

Fig. 10

### 10 Commissioning



#### Note

Commissioning should only be carried out by qualified personnel.

#### Prerequisites

- The actuator is fully mounted and connected.

#### Commissioning the actuator

1. Pressurise actuator slowly.
2. Check correct function at low travel speed.
  - Direction of rotation of actuator
  - Process valve position

### 11 Malfunctions



#### Note

Repairs to the product are not permissible. In the event of malfunctions or failure, replace the product and let Festo know about the failure. Return defective products to Festo.

Malfunction	Possible cause	Remedy
Actuator does not move in the desired direction	Compressed air supply ports connected incorrectly	<ul style="list-style-type: none"> <li>• Correct the tubing connection</li> </ul>

Fig. 11

### 12 Maintenance

With intended use, the product is maintenance-free.

### 13 Dismounting



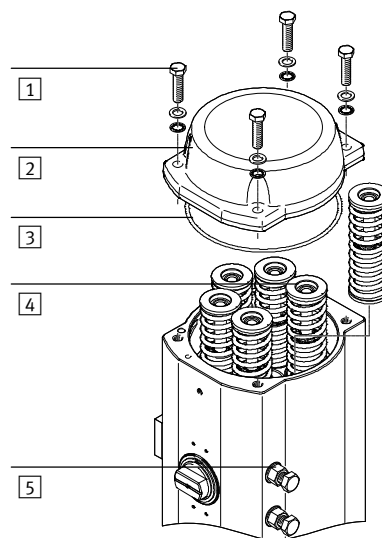
#### Note

Disassembly only by qualified personnel.

#### 13.1 Disassembly

1. Switch off the energy supply (compressed air, electricity)
2. Loosen the pneumatic connections.
3. Remove external attachments.
4. Loosen the mounting screws of the actuator at the process valve and remove the actuator.

#### 13.2 Replacement of spring package



- |   |        |   |                     |
|---|--------|---|---------------------|
| 1 | Screws | 4 | Springs             |
| 2 | Cover  | 5 | End position screws |
| 3 | Seal   |   |                     |

Fig. 12

#### Requirements

- Mounting position is vertical. Actuator is secured against tilting.
- Actuator is removed → Chapter 13.1.

1. Unscrew end position screws (→ Fig. 12, 5).
  - Actuator is in neutral position
2. Loosen screws (→ Fig. 12, 1) crosswise until the gap width is reached.
  - Cover (→ Fig. 12, 2) is no longer under spring force. The gap width between cover and actuator is 6 mm.



#### Warning

Risk of injury due to unexpected movement of components. A defective spring package can result in the cover remaining under pressure while it is being dismantled. If the gap width exceeds the specified value, stop dismantling and dispose of the actuator → Chapter 14.

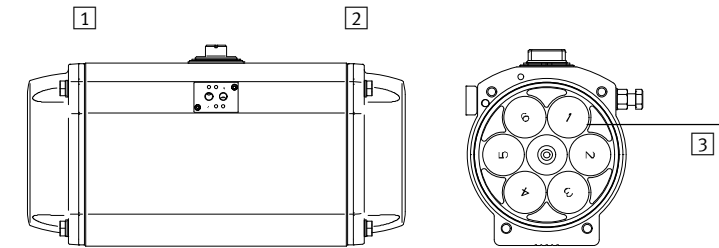
3. Unscrew screws completely.
4. Remove cover.
  - Spring package can now be replaced.
5. Remove springs.
6. Insert new springs in the desired configuration → Chapter 13.3.
7. Mount cover.
  - Observe correct position of the seal (→ Fig. 12, 3).
8. Insert screws and tighten them crosswise.
  - Tightening torque: → Fig. 13

Actuator	Diameter	Tightening torque [Nm]
DFPD-700	M10	40
DFPD-900	M12	65
DFPD-1200	M14	75
DFPD-2300	M16	120

Fig. 13

### 13.3 Configuration of spring package

Configuration of the spring package differs, depending on the size.



- 1 Left  
2 Right

3 Spring position

Fig. 1

Spring configuration	Spring position		Number of springs
	Left	Right	
[—]	—	—	0
[20]	2-5	2-5	4
[25]	2-5	2-4-6	5
[30]	2-4-6	2-4-6	6
[35]	2-4-6	1-3-4-6	7
[40]	1-3-4-6	1-3-4-6	8
[45]	1-3-4-6	1-3-4-5-6	9
[50]	1-3-4-5-6	1-3-4-5-6	10
[55]	1-3-4-5-6	1-2-3-4-5-6	11
[60]	1-2-3-4-5-6	1-2-3-4-5-6	12

Fig. 2

### 14 Disposal

- Observe the local regulations for environmentally friendly disposal.
- Dispose of the product in an environmentally friendly manner. When doing this, also take residual media into account (potential recycling of hazardous waste).

### 15 Technical data

DFPD-...	DFPD	DFPD-...-T4	DFPD-...-T6
Standard connection to the process valve	ISO 5211		
Cushioning	None		
Mounting position	Any		
Design	Rack and pinion principle		
Valve connection conforms to standard	VDI/VDE 3845 (NAMUR)		
Swivel angle			
DFPD-...-700	[°]	0...180	
DFPD-...-900	[°]	0...90	
DFPD-...-1200			
DFPD-...-2300			
End position adjustment range 0°	[°]	± 5	
End position adjustment range 90° / 180°	[°]	± 5	
Operating pressure	[bar]	2...8	3...8
Nominal operating pressure			
DFPD-...-RD, DFPD-...-LD	[bar]	5.5	
DFPD-...-...S-20	[bar]	2.0	
DFPD-...-...S-25	[bar]	2.5	
DFPD-...-...S-30	[bar]	3.0	
DFPD-...-...S-35	[bar]	3.5	
DFPD-...-...S-40	[bar]	4.0	
DFPD-...-...S-45	[bar]	4.5	
DFPD-...-...S-50	[bar]	5.0	
DFPD-...-...S-55	[bar]	5.5	
DFPD-...-...S-60	[bar]	6.0	
Operating medium	Compressed air according to ISO8573-1:2010 [7:4:4]		
Note on the operating medium	Pressure dew point at least 10 °C below outside temperature, lubricated operation possible (required in further operation)		
Ambient temperature	[°C]	-20 ... +80	0 ... +150
CE marking (declaration of conformity → <a href="http://www.festo.com/sp">www.festo.com/sp</a> )	In accordance with EU Explosion Protection Directive (ATEX) <sup>1)</sup>		
Material			
Housing	Anodised wrought aluminium alloy		
Cover	Coated die-cast aluminium		
Shaft	Steel, nickel-plated Stainless steel (only R3 variant)		
Screws	Stainless steel		
Seal	NBR	FPM	FVMQ

1) Take into account certification-specific documentation → [www.festo.com/sp](http://www.festo.com/sp)

Fig. 3