

Semi-rotary drive DFPX-...-RP-...-CS



Operating instructions

8197225
2023.06



Warning

In order to guarantee safe operation of this device and to be able to make sure of all the function, please read these instructions thoroughly!

- Installation and maintenance must be carried out only by authorized qualified personnel in accordance with the operating instructions.
- The supply of electrical power, pilot air pressure and air pump must be shut off before any kind of maintenance.
- Only the spare parts from Festo or distributor authorized by Festo can be used when some parts of actuator need to be replaced.
- Observe the specified maximum values (e.g. for pressures, temperature).
- Do not operate the actuator by using inflammable, oxidative and corrosive, explosive or instable gases.
- Operating the actuator beyond its stated maximum operating limits of pointed out temperature, pressure or recommend operating media, can cause personal safety risks involving death or injury, and or damage internal components as well as cause damage to actuator housing.
- Please comply with national and local safety laws and regulations.

1. Technical Specifications

Designation	Specification
Type of mounting	Via thread hole
Mounting position	Via ISO 5211 interface
Operating medium	Compressed air accordance with ISO 8573-1:2010[7:4:4] Light hydraulic oil Inert and non-corrosive gas (to consult)
Operating pressure [MPa]	0.25...0.8
Max. operating pressure [MPa]	1.0
Ambient temperature [°C]	-20...+80
Mode of operation	Double-acting/Single acting
Lubrication	The actuator is supplied ready-lubricated, no further lubrication is required.
Other information	Shape size, model code, Order data etc.. refer to catalog

1.1 Achievable safety classification

The product is suitable for use as an element in a safety-oriented system in accordance with IEC 61511.

- in Low Demand Mode up to SIL 2
- in High Demand Mode up to SIL 1

Considering the necessary minimum hardware fault tolerance of HFT = 1, the product can also be used up to SIL 3 in a redundant execution of the entire system.

Safety manual see 8195965

2. PRINCIPLE OF OPERATION

2.1 Double acting actuator (see Fig. 1)

Standard rotation:

Air to port A forces the pistons outwards, causing the drive shaft to turn counterclockwise while the air is being exhausted from port B.
Air to port B forces the pistons inwards, causing the drive shaft to turn clockwise

while the air is being exhausted from port A.

Reverse rotation:

Air to port A forces the pistons outwards, causing the drive shaft to turn clockwise while the air is being exhausted from port B.
Air to port B forces the pistons inwards, causing the drive shaft to turn counterclockwise while the air is being exhausted from port A.

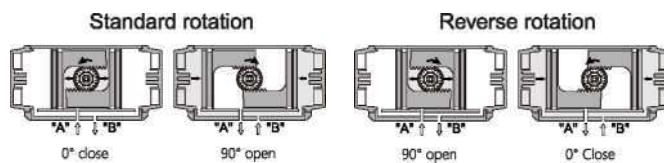


Fig. 1

2.2 Spring return actuator (see Fig. 2)

Standard rotation:

Air to port A forces the pistons outwards, causing the springs to compress, the drive shaft turns counterclockwise while air is being exhausted from port B.
Loss of air pressure on port A, the stored energy in the springs forces the pistons inwards. The drive shaft turns clockwise while air is being exhausted from port A.

Reverse rotation:

to port A forces the pistons outwards, causing the springs to compress, the drive shaft turns clockwise while air is being exhausted from port B.
Loss of air pressure on port A, the stored energy in the springs forces the pistons inwards. The drive shaft turns counterclockwise while air is being exhausted from port A.

Assembling the actuator and reversing the position of the pistons can easily reverse the standard rotation.

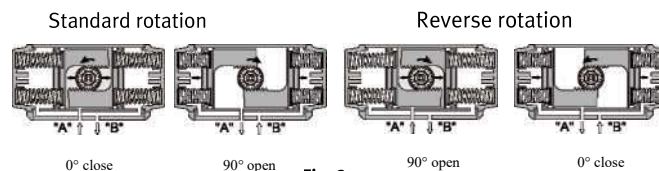


Fig. 2

3. ASSEMBLY OF VALVE (see Fig. 3)

Pneumatic actuators are fitted with a double square "star" pattern drive shaft and a mounting bolt pattern conforming to ISO Standards. This allows the actuator to be fitted to valves in increments of 90°, allowing mounting alignment either inline or across the line of the pipe work, enabling the most efficient use of space without the position affecting the actuators basic operation.

1. Fit the square of the valve directly into the square of the actuator.
2. Bolt together through the valve ISO pad.

Following should be noted prior to assembly to valves:

- Determine the desired operation of the assembly, Normally closed valve NC, or Normally open NO.
- Check the valve and actuator are in the same position (open or closed).
- Check the correct positioning (alignment) of all the elements of the group, valve, connection piece, bracket and actuator.
- Assemble ensuring the mounting screws correctly distribute the effort in proportionally.
- Ensure all position indicators are correctly adjusted and show the correct position.

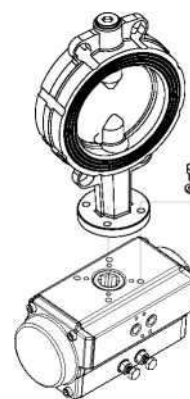


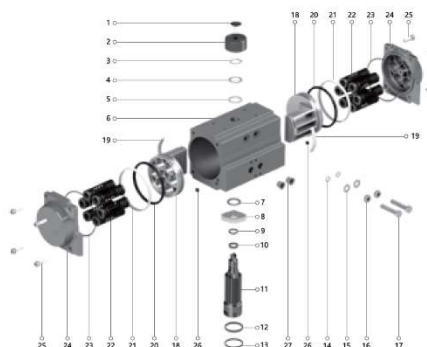
Fig. 3



Warning

- When using a spring return actuator for reversing operation, ensure that an air or electrical fault occurs in the correct direction for rotation

4. DISASSEMBLY OF THE ACTUATOR



No.	Description	Qty.	Material
1	Indicator screw	1	Plastic
2	Indicator	1	Plastic
3	Spring clip	1	Stainless steel
4	Thrust washer	1	Stainless steel
5	Outside washer	1	Engineering plastics
6	Body	1	Extruded aluminum alloy
7	Inside washer	1	Engineering plastics
8	Cam	1	Alloy steel
9	O-ring (Shaft top)	1	NBR
10	Bearing (Shaft top)	1	Engineering plastics
11	Drive Shaft	1	Alloy steel
12	Bearing (Shaft bottom)	1	Engineering plastics
13	O-ring (Shaft bottom)	1	NBR
14	O-ring (Adjust screw)	2	NBR
15	Gasket (Adjust screw)	2	Stainless steel
16	Nut (Adjust screw)	2	Stainless steel
17	Adjust screw	2	Stainless steel
18	Piston	2	Cast aluminum
19	Guide (Piston)	2	Engineering plastics
20	O-ring (Piston)	2	NBR
21	Bearing (Piston)	2	Engineering plastics
22	Spring	n	Spring steel
23	O-ring (End cap)	2	NBR
24	End cap	2	Cast aluminum
25	Cap screw	8	Stainless steel
26	Plug	2	NBR
27	Dustproof plug	2	Plastic

1. safety disconnect all electric power and supply lines connected to the actuator or accessories.
2. Disassemble all the accessories of the actuator (solenoid, limit switch box, etc)
3. Disassemble the actuator off the valve.
4. Remove indicator screw (1) if fit, Lift position indicator (2) off shaft, it may be necessary to pry gently with a screwdriver.
5. Unscrew the end cap screws (25)
6. Remove adjust screw (17) together with nut (16), gasket (15) and O-rings (14)
7. Remove the end caps (24)
8. To rotate the drive shaft (11) counterclockwise so that the pistons (18) will exit the body (6)
9. Remove the Spring clip (3) and the thrust washer (4) and outside washer (5)
10. Remove the drive shaft (11) cam (8), O-ring (9) and bearing (10) from the body of the actuator, with downward force to the top of drive shaft
11. Clean the components of the actuator perfectly

Warning

- Air pressure should not be used to remove the pistons from body.

5. INDICATOR ASSEMBLY (see Fig.4)

Actuator in the open position, 90 degrees position when you can adjust its stroke, screw in and out the adjusting bolt until the shaft is fitted with the indicator just in the position required.

Re-install the indicator screw.

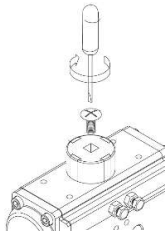


Fig. 4

Notice

- The indicator to be installed in the initial products

6. INSPECTION AND MAINTENANCE

Inspect the components of the actuator for wear or damage and replace what is necessary Replace

- On the drive shaft: Spring clip (3), O-ring (9) and (13), outside washer (5), drive shaft bearing (10) and (12)
 - On the end caps : End cap O-ring (23)
 - On the pistons : O-ring (20) guides(19) bearing (21)
- All springs should be replaced during periodic maintenance.

7. MAINTENANCE IS RECOMMENDED TO BE CARRIED OUT COMPLETE CYCLES

- Low demand mode:
When used as intended, the product is maintenance-free
- High demand mode:
Grease the product again after 50,000switching cycles
- High demand mode:
For safety-oriented applications, replace consumable parts after max.50,000 switching cycles

8. ASSEMBLY OF THE ACTUATOR (see Fig. 5)

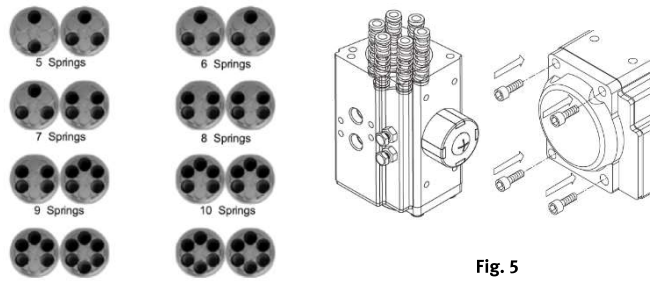


Fig. 5

Before beginning the assembly check all the O-rings and gaskets that is compatible with buna or nitrile rubbers are properly housed in their lodgings, and all the components are greased correctly using a standard commercial grease.

1. Fit the drive shaft (11) in the body of the actuator (6) ensuring the cam (8) is correctly fit during assembly. Ensure the drive shaft will rotate in counterclockwise when the adjust screws (17) are fitted.
2. Fit outside washer (5), (4) and Spring clip (3) to the top of drive shaft.
3. Fit the pistons (18) in the body (6) keeping in mind that both pistons should engage the gear of the drive shaft (11) at the same time.
4. For standard rotation assembly, Rotating the drive shaft (11) about 40-50° in a clockwise direction until the pistons are correctly retracted. Check that the pinion output end is square to the body and is in the correctly aligned.

Obtaining the correct gear tooth and piston alignment Could require more than one attempt.

5. Mount the end caps (24) to the body and tighten the screws (25) distributing the force evenly until the end cap is securely fixed. Caution should be taken not to "pinch" the O-rings during this assembly procedure. In spring return actuators, it will be necessary to insert the spring cartridges appropriately in their lodgings of the end caps according to the quantity of the springs you use (see detail).

ENDSTOP ADJUSTMENT - CLOCKWISE (Right Adjusting screw)

- Slacken the security nut (16) of the right-hand external stroke adjustment screw.
- Tighten or slacken the external adjust screw (17) until reaching the required position.
- Tighten the security nut (16) of the right-hand external stroke adjustment screw.

ENDSTOP ADJUSTMENT - COUNTERCLOCKWISE (Left Adjusting screw)

- Slacken the security nut (16) of the left-hand external stroke adjustment screw
- Tighten or slacken the external adjust screw (17) until reaching the required position.
- Tighten the security nut (16) of the left-hand external stroke adjustment screw.

PRESSURE TEST

-Pressure test the actuator with 6 bar (90 psi) compressed air and inspect for leaks using a soap and water solution sprayed on to all joints and rotating shafts.

STORAGE

To store the pneumatic actuators the following precautions are recommended:

- Ensure the actuator is completely dry and water free.
- Maintain the entrances of air passages by fitting the original or replacement plastic corks.
- Protect from dust, dirt and damage by packing in box or plastic bag.

ALL PNEUMATIC ACTUATORS HAVE BEEN 100% FACTORY TESTED IN OPERATION AND WATERTIGHTNESS AND THEY HAVE BEEN FITTED WITH INDIVIDUAL QUALITY CONTROL STAMPS.

Notice

- When the weight of the product exceeds 15 kg, it must be lifted by the eyebolt
- DFPX products over 20kg are already equipped with eye bolts
- For product 8161248,8161264,8161280 not include the eyebolts, a threaded hole can be used for the lifting ring connection

Warning

- Before carrying out any repair or maintenance on the actuator, make sure that the pressure supply lines and electrical connections have been safely isolated, removed or disconnected by authorized personnel.
The actuator must not be pressurized at any time during installation as injury maybe occurred.
- Never put any part of your body in the opening or port of the controlled valve or device.
- Special attention and precautions should be observed of the stored energy contained in the spring return pneumatic actuators. Do not disassemble individual spring cartridges. Personal injury maybe occurred when disassembly.
- Before installing onto a valve make sure that the rotation of the valve and the actuator are the same and that the position indicator orientation is also correct.
- Never forget that for the correct operation, a pneumatic actuator must be sized adequately and with sufficient safety margin of torque output for the correct operating conditions of the valve.
- *Only authorized and skilled personnel should perform maintenance of these actuators