M&S Armaturen GmbH

PARTNER NOT JUST SUPPLIER.

Operation Manual

-Translation of the original-

Pneumatic actuator PAMS NC/NO/DA

Sizes 0, 1, and 2

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1 Table of Contents

2 Safety advice

2.1 Marking of safety instructions in operating instructions

Danger warnings
Danger warnings are denoted by the danger symbol which appears on the left and are framed.

Information
Descriptions to which particular attention must be paid are denoted by this symbol which appears on the left and are also framed.

2.2 Intended use

The pneumatic actuators M&S PAMS are only intended for use as described. Any use beyond that is considered to be improper use. M&S is not liable for any resulting damage, the risk is solely with the operator. Requirement for perfect safe operation of the actuators are proper transport and storage as well as professional set-up and assembly. Proper use also includes adherence to the requirements for operation, maintenance and repair. Unauthorised changes and modifications that impair the safety of the actuators are not permitted. Only use original spare parts and accessories approved by the manufacturer.

2.3 Personnel

Operating and maintenance personnel must be qualified for the respective tasks. They must have had special instructions about any occurring hazards and must know and observe the safety advices mentioned in the operating instructions.

2.4 General instructions

The used is obliged to operate the valve in perfect condition only. Apart from the operating instructions, the following apply

- pertinent regulations on the prevention of accidents
- generally accepted safety-related rules
- internal work and safety regulations

3 Use and operating principle

- The pneumatic actuator type "PAMS" enables automatic actuation of butterfly valves.
- A piston runs in a housing, its stroke movement is transmitted to a rotary movements of the drive shaft.
- The stroke of the piston is limited in such a way that the drive shaft does a 90° rotation per stroke. This matches exactly the required rotational angle to open or close the butterfly valve disc in the butterfly valve connected via a flange (figure 1).
- With the actuator NC/NO, the compressed air is supplied via a drilled hole G 1/8" in the lid. The compressed air flows in above the piston and causes the piston to move down, the butterfly valve disc rotates. The installed springs provides the return movement of the piston. With the actuator DA, an additional drilled hole G1/8“ is located at the side in the lower area of the actuator. The return movement of the piston is done by compressed air flowing in. Pneumatic connections are not part of the delivery.

NC[1]/NO[2]	The actuator is charged with compressed air above the piston. On the other side, air escapes through a venting hole. Reset movement is done by spring force.
DA[3]	The actuator is charged with compressed air either above or below the piston.

Changes in construction and design due to technical advance reserved.

[1] normally closed (air-opened/spring-closed) (single-acting)

[2] normally open (spring-opened/air-closed) (single-acting)

[3] air-opened/air-closed (double acting)

4 Illustration of pneumatic actuator PAMS

4.1 Illustration of pneumatic actuator PAMS with butterfly valve type SV04

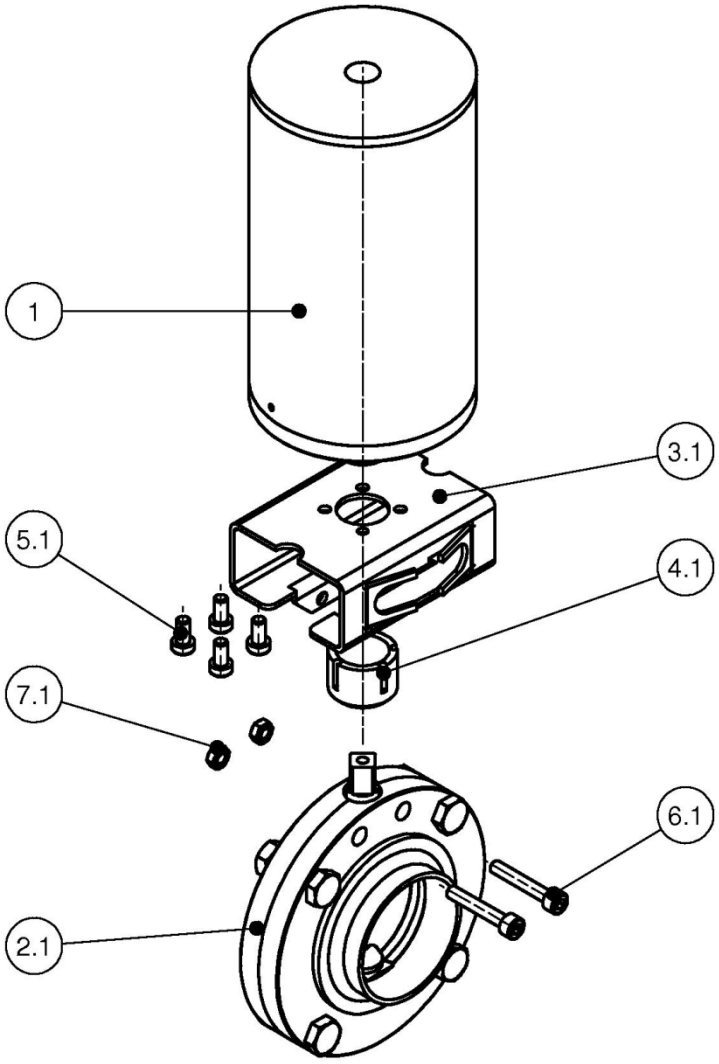

Figure 1: Pneumatic actuator PAMS with butterfly valve type SV04

Figure 1: Bill of material pneumatic actuator PAMS with butterfly valve type SV04

Item	Quantity	Designation
1	1	Pneumatic actuator PAMS size 0/1/2
2.1	1	Butterfly valve type SV04
3.1	1	Bracket SV04
4.1	1	SV switch cam
5.1	4	Hexagon socket head cap screw DIN 7984
6.1	2	Hexagon socket head cap screw DIN 912
7.1	2	Hexagon nut DIN 934

4.2 Illustration of pneumatic actuator PAMS with butterfly valve type Classic

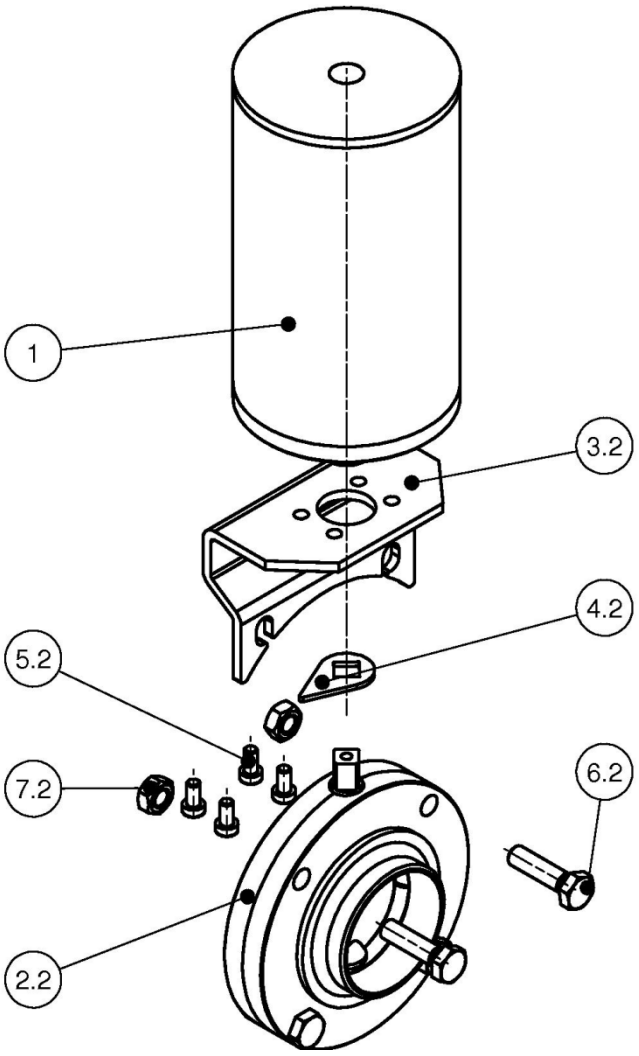

Figure 2: Pneumatic actuator PAMS with butterfly valve type Classic

Figure 2: Bill of material pneumatic actuator PAMS with butterfly valve type Classic

Item	Quantity	Designation
1	1	Pneumatic actuator PAMS size 0/1/2
2.2	1	Butterfly valve type Classic
3.2	1	SV compact bracket
4.2	1	Butterfly valve cam switch
5.2	4	Hexagon socket head cap screw DIN 7984
6.2	2	Hexagon-head screw DIN 933
7.2	2	Hexagon nut DIN 934

5 Transport and storage

5.1 Checking the delivery

- When you receive the actuator, check the information on order and delivery papers to make sure they correspond.
- Check that the delivery is complete, and check its condition.

If there are visible signs of transit damage and/or packing units are missing, notify the forwarding agent immediately in the consignment note. You (the recipient) should take recourse against the forwarding agent immediately in writing, and M&S Armaturen GmbH must be informed of this action.

Complaints regarding transit damage that is not immediately evident must be made to the forwarding agent within 6 days. The recipient must bear the costs for claims made after this period.

5.2 Transport

- The packing units/actuators must only be transported using suitable lifting equipment and slinging gear.
- Pay attention to the graphic symbols on the packaging.
- Transport the actuator carefully to prevent damage from sudden impacts; exercise due care when loading/unloading.

6 Assembly/disassembly

- When carrying out the assembly, make absolutely sure that the butterfly valve disc is in the correct position!
- Mount the actuator in such a way that it cannot be damaged (e.g. by transport vehicles).
- Observe the relevant national guidelines and regulations.

6.1 Assembly of butterfly valve type SV04 (see figure 1)

- Put butterfly valve switch cam (4.1) onto the drive shaft of the pneumatic actuator (1).
- Attach bracket SVV04 (3.1) with the hexagon socket head cap screws (5.1) to the pneumatic actuator (1) applying a torque of 3Nm.
- Push the pneumatic actuator (1) with the mounted bracket SV04 (3.1) and the butterfly valve switch cam (4.1) over the butterfly valve (2.1) so that the outer square of the butterfly valve disc engages precisely into the inner square of the drive shaft of the pneumatic actuator (1). In doing so, pay attention to the disc position according to table 3.

Table 3: Position of butterfly valve disc

NC [normally closed]	NO [normally open]
Turn butterfly valve disc to closed position	Turn butterfly valve disc to open position
Assemble actuator with bracket	Assemble actuator with bracket

- Put hexagon socket head cap screws (6.1) into the side holes of the bracket SV04 (3.1) and the butterfly valve type SV04 (2.1).
- Screw on hexagon nut (7.1).
- Tighten screw connection with a torque of 6Nm (M6)[4].

6.2 Assembly of butterfly valve type Classic (see figure 2)

- Plug the butterfly valve cam switch (4.2) onto the outer square of the BV disc of the butterfly valve (2.2). Align the tip of the BV switch cam in a line with the notch on the BV disc.
- Attach compact bracket SV04 (3.2) with the hexagon socket head cap screws (5.2) to the pneumatic actuator (1) applying a torque of 3Nm.
- Undo the screw connection consisting of hexagon screw (6.2) and hexagon nut (7.2) and pull it out of the butterfly valve (2.2).
- Push the pneumatic actuator (1) with the mounted compact bracket SV04 (3.2) over the butterfly valve (2.2) so that the outer square of the butterfly valve disc engages precisely into the inner square of the drive shaft of the pneumatic actuator (1). In doing so, pay attention to the disc position according to table 3.
- Put the hexagon screws (6.2) through the BV compact bracket (3.2) and the butterfly valve (2.2).
- Screw on hexagon nut (7.2).
- Tighten the screw connection with a torque of 14Nm (M8[4]) or 30Nm (M10[4]), respectively.

6.3 Disassembly

- Dismount the actuator in such a way that it cannot be damaged (e.g. by transport vehicles).
- Observe the relevant national guidelines and regulations.

- Disassembly is done in reverse order as described above.

[4] The listed tightening torques are recommended values - see VDI 2230

7 Installation/Commissioning

- Pneumatic actuators may only be installed and brought into operation by specialist personnel who have received the necessary technical training, and are equipped with the experience and knowledge to carry out the tasks involved.

  Observe the following:

- The actuator must be securely connected to the bracket and butterfly valve.
- Lines, valves and drives in pressurised systems must not be detached.
- Appropriate measures must be taken to prevent unintentional operation or unauthorised interference.
- Only use clean, dry and oil-free compressed air (see also chapter 9.2).
- The pneumatic hoses must be cut at right angles using a hose cutter to ensure the necessary optimum fit in the plug connector.

8 Repairs/Maintenance

- The actuator must not be modified.
- The actuator must not be opened.
- Careful - tensioned spring!
- The actuator is maintenance free.
- Assembly/disassembly - see assembly instructions (the butterfly valve must be included in the potential equalisation).

- M&S Armaturen GmbH cannot accept liability for claims made as a result of nonobservance of these Operating Instructions or constructional changes to the actuator.
- Any other use or use outside the defined scope is considered to be improper use. M&S Armaturen GmbH will not accept liability for losses incurred as a result of improper use.

9 Technical Data

9.1 Torques, permissible operating pressures and air consumption

Table 4: Torques, permissible operating pressures and air consumption

Variant	Maximum closing moment [Nm]	Operating pressure [MPa]	Operating pressure [bar]	Air consumption [l/stroke]
NC/NO	35	0.48-0.80	4.8-8.0	0.8-1.2
NC/NO	65	0.48-0.80	4.8-8.0	1.2-2.0
NC/NO	100	0.48-0.80	4.8-8.0	3.0-5.0
DA size 0	50 (6bar)	0.30-0.80	3.0-8.0	0.5-1.2
DA size 1	80 (6bar)	0.30-0.80	3.0-8.0	0.8-2.0
DA size 2	130 (6bar)	0.30-0.80	3.0-8.0	1.9-5.0

9.2 Requirements control air

Table 5: Requirements control air

Requirement	Quality class	Standard
Solids content	6	acc. to ISO 8573-1
Water content	4	acc. to ISO 8573-1
Oil content	3	acc. to ISO 8573-1

9.3 Operating temperatures

Permitted operating temperatures from +1C° to max. +60C°.

The operating temperature depends on the fitting to be actuated.

10 Cleaning

Clean the pneumatic actuator with commercial cleaning agents.

11 Faults, possible causes, remedy

Table 6: Faults, possible causes, remedy

Fault	Possible causes	Remedy
Air leak at the connections	Pneumatic hoses not cut to fit at right angle	Cut the pneumatic hoses at right angles.
	Plug connection defective.	Replace plug connection.
	O-ring at plug connection missing.	Mount O-ring.
	Max. permitted operating pressure exceeded.	Reduce operating pressure.
Air leak at the piston gasket.	Piston gasket worn.	Replace actuator.
Butterfly valve does not open or close.	Air pressure too low.	Increase air pressure.
	Foreign body between butterfly valve and gasket	Dismount butterfly valve and remove foreign body
	Square at the disc twisted	Replace disc
	Piston gasket worn.	Replace actuator.
Disc does not remain is set position.	Air pressure too low.	Increase air pressure.
	Air leak at actuator and/or pneumatic connections.	Perform suitable measures depending on the leak.
Actuator gets loose from the bracket.	Special screws become undone.	Tighten screws with 3Nm.

12 Optional trigger and query systems

12.1 End position feedback

The bracket SV04 (3.1) and the SV compact bracket (3.2) are equipped with a feedback device. By the installation of inductive proximity switches M12x1 and a switch cam, the position "OPEN" and/or "CLOSED" can be queried, respectively.

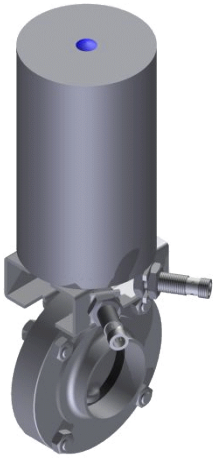

Figure 3: Butterfly valve type SV04 with pneumatic actuator and end position feedback

Figure 4: Butterfly valve type Classic with pneumatic actuator and end position feedback

12.2 Control and feedback head TOP09

The control and feedback head TOP09 is an extension module for the pneumatic actuator PAMS. The valve position detection is done by inductive proximity switches. The integrated pilot valve controls two single-acting actuators. In case of double-acting actuators, two pilot valves control the actuator.

The design of control head and pneumatic actuator allows for an internal control air flow without external hoses. Apart from the electric position feedback, the device status is displayed optically at the control head itself by a mechanic position indicator.

The control and feedback head can be adapted to any M&S standard element. A splashwater-protected housing contains both the proximity switches for position query and the pilot valves required for triggering.

Figure 5: Butterfly valve type SV04 with pneumatic actuator and control head TOP09

Figure 6: Butterfly valve type Classic with pneumatic actuator and control head TOP09

For further information please refer to the operating instructions "Control head TOP09, plastic version".

You can find this manual under the following link on the internet:

Link to the operating instructions Control and feedback head TOP09

12.3 Control head AS-i

The control head AS-i is an extension module for the pneumatic actuator PAMS with an AS-Interface field bus interface. A contact-free analogue sensor element detects the valve position after detecting the valve end positions automatically by means of the teach function during commissioning and storing them. The integrated pilot valve controls single- or double-acting actuators.

Figure 7: Butterfly valve type SV04 with pneumatic actuator and control head AS-i

Figure 8: Butterfly valve type Classic with pneumatic actuator and control head AS-i

For further information please refer to the operating instructions "Control head Type 8691".

You can find this manual under the following link on the internet:

Link to the operating instructions ASI control head Type 8691

12.4 Electro-pneumatic position controller (EPPC)

With the electro-pneumatic position controller (EPPC) for the pneumatic actuator PAMS, the actuator position or the valve disc position is controlled according to the set position value. The set value specification is done by an external standard signal 4 to 20 mA or via AS interface.

Figure 9: Butterfly valve type SV04 with pneumatic actuator and electro-pneumatic position controller (EPPC)

Figure 10: Butterfly valve type Classic with pneumatic actuator and electro-pneumatic position controller (EPPC)

For further information please refer to the operating instructions "Digital electro-pneumatic position controller type 8694".

You can find this manual under the following link on the internet:

Link to the operating instructions electro-pneumatic position controller type 8694

12.5 Electro-pneumatic process controller (EPPC/PR)

With an electro-pneumatic process controller (EPS/PR) for the pneumatic actuator PAMS, the actual value of the process factor is directly applied to the device as a 4-20 mA signal. The process controller calculates the set value for the position controller by a set/actual value comparison.

Figure 11: Butterfly valve type SV04 with pneumatic actuator and electro-pneumatic process controller (EPPC/PR)

Figure 12: Butterfly valve type Classic with pneumatic actuator and electro-pneumatic process controller (EPPC/PR)

For further information please refer to the operating instructions "Digital electro-pneumatic process controller Type 8693".

You can find this manual under the following link on the internet:

Link to the operating instructions electro-pneumatic process controller type 8693

Armaturen GmbH

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