SOMAS®

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Mi-503 EN

Service and operating instruction
Pneumatic actuators

Type A - DA	Double acting actuator
Type A - SC	Single acting actuator (spring to close)
Type A - SO	Single acting actuator (spring to open)

Introduction

This operating manual is intended for the operating, maintenance and supervisory personnel.

This operating manual also describes components, equipment and ancillary units which are not or only partially included in the scope of supply.

The scope of supply applies always to the supply specification acc. to Page 42, Chapter 7 Product key.

The operating personnel must have read, understood and must comply with this operating manual.

We keep the right to do any technical changes which are necessary to improve the product without prior notice.

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Valve supplier

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1 Preliminary remarks

To enable you to find information quickly and reliably in the operation manual, this chapter familiarises you with the structure of the operating manual.

This manual uses symbols and special characters which make it easier for you to find information. Please read the explanations of the symbols given in the section below.

Ensure that you read all the safety instructions in this operating manual very carefully.

You will find safety instructions in section 2, in the foreword to the sections and before any working instructions.

1.1 Explanation of warnings, symbols and signs

Warnings are used in this operating manual to warn against injury and material damage. Always read and observe these warnings! Warnings are identified by the following symbols:

In this manual are used diverse types of safety and warning notices:

Danger!	
Type of danger. Advise for imminent danger. Not attention of the advices could be mortal or cause severe injuries as a consequence. Explanation of the countermeasures.	International Safety symbol

Warning!	
Type of danger. Advise for imminent danger. Not attention of the advices could cause severe injuries or property damage as a consequence. Explanation of the countermeasures.	International Safety symbol

Attention!	
Type of danger. Advise for possible danger. Not attention of the advices could cause property damage as a consequence. Explanation of the countermeasures.	International Safety symbol

Note

Advices and give tips for better understanding of the manual or a better handling of the valve.

1.1.2 Symbols and signs

Symbols and signs are used in this operating manual to provide fast access to information.

1.1.2.1 Symbols and signs in the text

Symbol	Denotation	Explanation
⇨	Operating instructions	This means there is an action to be carried out.
1. 2.	Operating instructions, multi-step	Work instructions must be carried out in the sequence shown. Deviations from the sequence shown may result in damages to the valve and accidents.
• –	Lists, two-stage	No activities are linked with lists.
➔	Cross-reference	References to images, tables, other sections or other instructions.

Tab.1-1 Symbols in the text

2 Safety

2.1 Safety instructions

2.1.1 General dangers

Sources of danger resulting in general hazards:

- Mechanical hazards
- Electrical hazards

2.1.2 Hazards due to electrical equipment

Due to the permanent dampness, electrically-operated machine parts represent a potential source of danger.
Comply with all regulations on electrical equipment in damp areas!

2.1.3 Additional hazards

2.1.3.1 Entanglement, crushing and cut/sever hazards

- by moving actuator parts left exposed, by removing covers for inspection, sampling, etc.
- by automatic operated valves

2.1.3.2 Burning or scalding hazards

- by opening or leaving open function-check and/or sampling openings on systems operating at high temperatures (above 40°C)
- by operating temperature >= 70°C. Short contacts (approx. 1s) of the skin with the surface of the valve may cause burns (pr EN 563)
- by operating temperature = 65°C. Longer contacts (approx. 3s) of the skin with the surface of the valve may cause burns (pr EN 563)
- by operating temperature 55°C…65°C. Longer contacts (approx. 10 ... 3s) of the skin with the surface of the valve may cause burns (pr EN 563)

2.1.3.3 Explosion hazards

A high surface temperature on a valve and actuator, constitutes (a risk for burn injuries, and) a risk of ignition of explosive atmospheres in ATEX applications.

The surface temperature of the equipment is not dependent on the equipment itself, but on the ambient conditions and the process conditions. The protection from the surface temperature is the responsibility of the end user, and must be effectuated before the equipment is put into service.

2.1.4 State of the art

This product has been built by Somas Instrument AB in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, its use may constitute a risk to life and limb of the user or of third parties, or cause damage to the valve and to other material property, if:

- the product is not used as designated
- the product is operated or repaired by untrained personnel
- the product is modified or converted improperly and/or
- the safety instructions are not observed

Therefore, every person involved in erecting, operating, inspecting, maintaining, servicing and repairing the valve must read, understand and observe the complete operating instructions, particularly the safety instructions.

2.1.5 Preconditions for using the actuator

The actuator only has to be used:

- in perfect technical condition
- as designated
- according to the instructions in the operating manual, and only by safety-conscious persons who are fully aware of the risks involved in operating the actuator
- if all protective devices are installed and operative

Rectify immediately any functional disorders, especially those affecting the safety of the actuator!

2.2 Designated use of the actuator

2.2.1 Use

Pneumatic actuators type A are suitable to be assembled on the industrial shut-off or control valves from Somas.

If you want to use the actuator with another shut off and control valve please contact Somas Instrument AB.
The specified operating and limit values as well as the ambient temperature must be complied.

Particular data to the operation and limit values are specified on the data sheet „Si-503EN“.

The operating values, limit values and setting data must not deviate from the values specified in the operating manual and corresponding information sheet

without consulting the manufacturer! The manufacturer cannot be held liable for any damages resulting from non-observance of the operating manual.

2.2.2 Liability for non-designated use.

Using the actuators for other purposes than those mentioned previously is considered contrary to its designated use. For resulting damages of this, Somas Instrument AB is not liable! The user take the risk.

2.3 Organizational measures

2.3.1 Availability of operating manual

The operating manual has to be stored and be readily available!

2.3.2 Additional regulations

In addition to the operating manual, it have to be observed all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection! Direct the personnel to comply with them!

2.3.3 Checks

Periodically check that the personnel carry out the work in compliance with the operating manual and that they pay attention to risks and safety factors.

2.3.4 Protective equipment

Use when necessary protective equipment.

2.3.5 Rebuilds or modifications at the actuator

Do not make any rebuilds or modifications at the actuator yourself, which can affect the security of the actuator.

2.3.6 Replacing damaged parts

Actuator parts that are not in perfect condition must be replaced immediately with original spare parts! Use only original spare and wear parts from Somas Instrument AB.

On unauthorized parts is not guarantee that they have been designed and manufactured according to the application.

2.4 Selection and qualification of personnel

Operation, maintenance and repairing works require special knowledge and may only be carried out by trained technical specialists or qualified personnel authorized by the user.

2.5 Pneumatic actuators type A, ATEX

Actuators type A, with additional type indication -E, is in compliance with the ATEX-directive 2014/34/EU.

The actuator has the following Ex-marking:  **II 2 GD Ex c X**

II Equipment group II (not mines)

2 Equipment category 2, for use in zone 1 and 2 (gas atmospheres) and zone 21 and 22 (dust atmospheres)

G Permitted to use in gas atmospheres

D Permitted to use in dust atmospheres

Ex c Ignition protection according to the standard for mechanical products “constructional safety”

X Special conditions for SAFE use is available in the ATEX-instruction and in the “declaration of conformity”

Use stainless steel tubing to connect the actuator to the positioner or the solenoid valve.

Make sure there is electrical contact between the actuator, the valve and all associated equipment, as well as between all components in the actuator during repair or assembly (resistance max. 1 MΩ).

Brackets of unpainted stainless steel or the Somas mounting block are to be used for mounting of associated equipment on top of the actuator.
Brackets of unpainted stainless steel are to be used for mounting of actuators on valves.
The valve must be connected/earthed to the pipeline.

To avoid charging and electrostatic discharges: Do not clean the Somas logotype stickers and the red warning stickers with dry fabrics.

2.5.1 Special conditions

For actuators including spring packages, the spring packages shall be replaced by new ones every fifth (5) year or two (2) million operating cycles, whatever comes first.

As an alternative the spring package replacements can be avoided by connecting both air connections, CLOSE and OPEN, on each actuator cylinder, to the valve positioner or the solenoid valve. The function of the valve positioner and the solenoid valve must be double-acting type. As an alternative to double-acting positioners and solenoid valves, other equipment can be used, with such function to permanently ensure instrument air only, on both sides of the pistons in the actuator cylinders. The supply air must be clean and dry instrument air and have a constant pressure within the range of 4-8 bar (0,4-0,8 MPa).

2.6 Safety instructions for pneumatic actuators

Operation of the actuator is always subject to the local safety and accident prevention regulations.

Danger!

Risk of injury!
Do not place hands and fingers in the area of moving parts of the valve or of the actuator when the actuator is connected to the compressed air supply.
Single action actuators may move to “open” or “closed” position without being connected to the air system.

Warning!

Before carrying out maintenance or repair work on the valve with actuator or installation and removal of the valve from the pipeline, always disconnect the compressed air supply to the actuator. Single action actuators may move to “open” or “closed” position without being connected to the air system.

Warning!

Ensure that personnel who work with, install or repair the actuator are appropriately trained. This prevents unnecessary damage and accidents or injury to personnel.

The maintenace and assembly personnel must be familiar with the process of installing and disassembling the actuator in a process line, the special and possible risks of the process and the most important safety regulations.

The repair and assembly personnel must be familiar with the risks when handling pressurised equipment, hot and cold surfaces, dangerous substances and substances which represent a hazard to health.

Warning!

Before carrying out maintenance or repair work, installation and removal of an actuator from a valve in the pipeline, always depressurise the valve in the pipeline, isolate the valve and remove the medium.
The pressurised medium may lead to injuries to personnel.

Warning!

Protect yourself against noise - use the relevant safety equipment.

Warning!

Beware of very cold or hot surfaces!
The actuator and/or actuator parts may become very cold or very hot during operation. Protect yourself against frostbite and burns.

Danger!

Risk of injury!
Always release the spring tension before unscrewing the end cover of the cylinder.

Warning!

When transporting and handling the actuator, observe the weight of the actuator or of the whole unit. Never lift the valve by its positioner, limit switch, solenoid valve or piping. Place the hoisting ropes securely according to lift instruction.
The actuator may injure persons if dropped.
Do not walk under suspended loads.

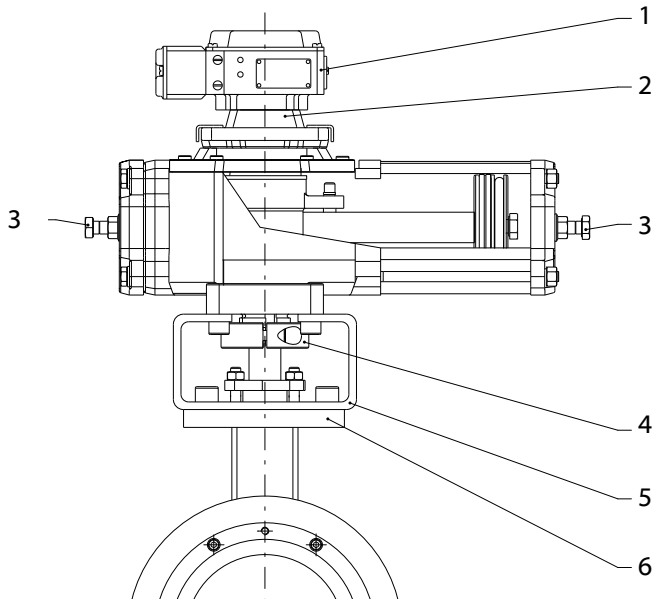
3 Description

3.1 General information

Somas pneumatic actuators type A are available in two designs:

- double acting - type DA
- single acting - type SC (spring to close) or SO (spring to open)

The actuator offers a patented backlash-free transmission coupling and a special friction coupling which eliminate the play between the actuator and the valve. (Valid for valves with a shaft diameter ≤ 50 mm).

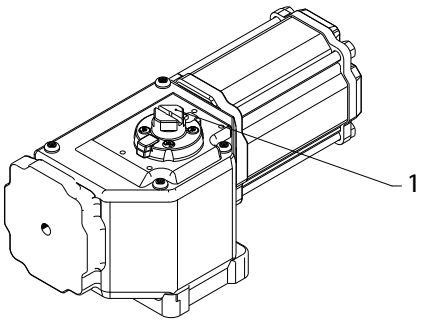


1	Valve positioner	3	End position bolt	5	Bracket
2	Mounting plate	4	Clamping ring	6	Mounting flange

Fig.3-1 Controlling valve with integrated actuator type A and a electropneumatic valve positioner

3.2 Important advice

The driver may only be used to operate the actuator during installation. Do never use the driver for a emergency operation.



1 Driver

Fig.3-2 Driver

3.3 Air connections codes

The air connections of the actuator are identified as follows:

4 CLOSE	Rising pressure has a rotary motion clockwise as a consequence - Somas valve closes
2 OPEN	Rising pressure has a rotary motion counterclockwise as a consequence - Somas valve opens

Type A size A11, A21 and so on has one cylinder.

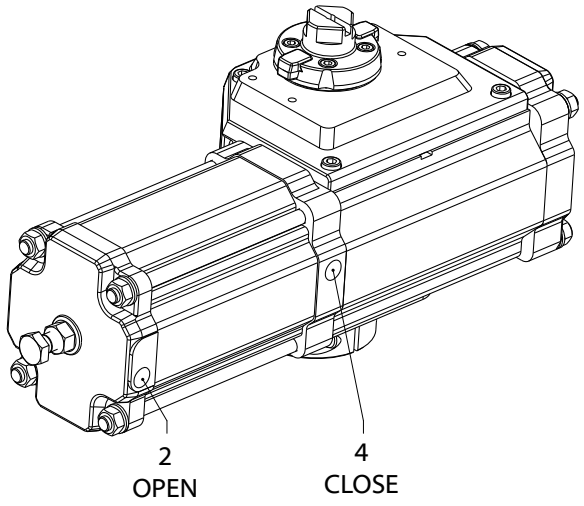


Fig.3-3 Air connections on type A size A11, 21... with one cylinder

Type A size A22, A32 and so on has two cylinders.

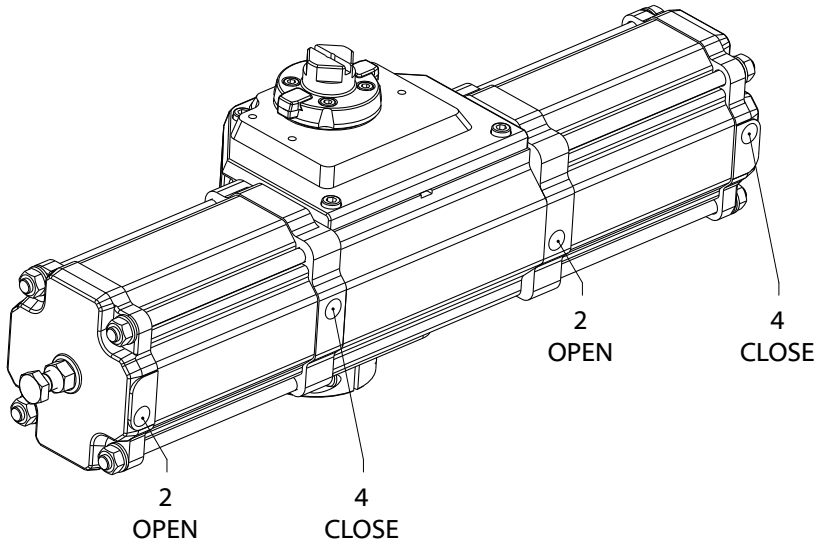


Fig.3-4 Air connections on type A size A22, 32... with two cylinders

3.4 Air pipes connection

The following connection descriptions refer to the following function: Connection pressurisation “CLOSE” has a rotary motion clockwise as a consequence.

Attention!

The air supply shall be dry and clean instrument air acc. to ISO 8573-1. The pressure must be constant at 4 - 8 bar (0.4 - 0.8 MPa).
The maximum supply air pressure shall not exceed the stated maximum value of the positioner.

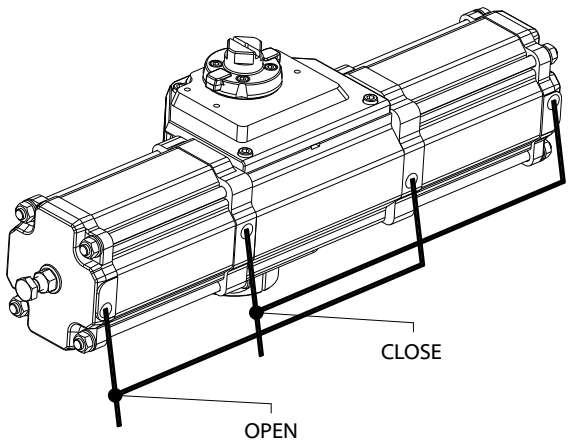


Fig.3-5 Pneumatic actuator type A with two cylinders and schematic drawing of the to-connect air pipes (double acting - A-DA)

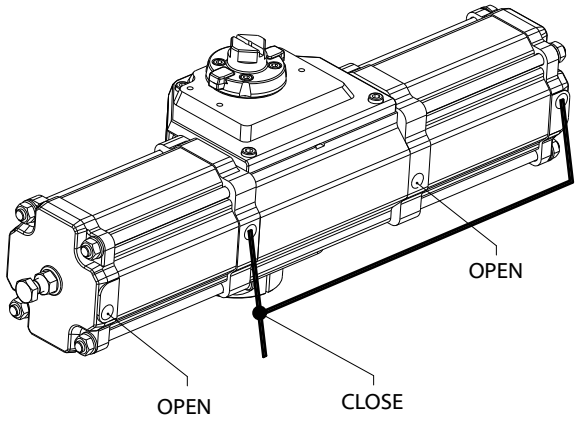


Fig.3-6 Pneumatic actuator type A with two cylinders and schematic drawing of the to-connect air pipes (single acting - spring to open A-SO). The ports "2 / open" are equipped with silencers

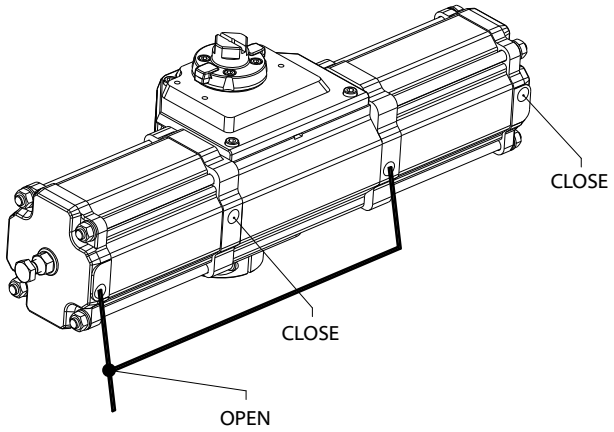


Fig.3-7 Pneumatic actuator type A with two cylinders and schematic drawing of the to-connect air pipes (single acting - spring to close A-SC)
The ports "4 / close" are equipped with silencers

3.5 Accessories

Actuator type A can be equipped with diverse accessories, e.g. valve positioners, position limit switches and solenoid valves. Please observe the assembly instructions for each component.

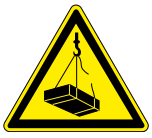
4 Assembly

4.1 Unpacking, storage and transportation

Inspect the actuator for transport damage when unpacking. The protective caps on the connections must only be removed immediately before assembly. The actuator must be stored on an suitable base on a dry, cold and clean place and be protected against dirt until installed, see also Technical Information sheet, Ti-935 that is available at www.somas.se.

Warning!

When transporting and handling the actuator, observe the weight of the actuator or of the whole unit. Never lift the valve by its positioner, limit switch, solenoid valve or piping. Place the hoisting ropes securely according to lift instruction.
The actuator may injure persons if dropped.
Do not walk under suspended loads.



- Transportation must be carried out with suitable hoisting equipment
- Use lifting straps to lift the actuator, when this is installed on the valve (➔ Fig.4-1). The picture shows a standard situation. Please note that all possible situations that can occur cannot be covered in this lift instruction

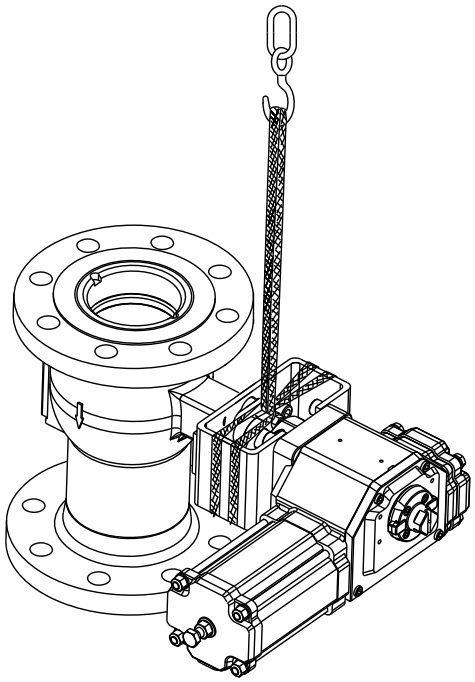


Fig.4-1 Lifting

4.2 Assembly of the pneumatic actuator

Warning!

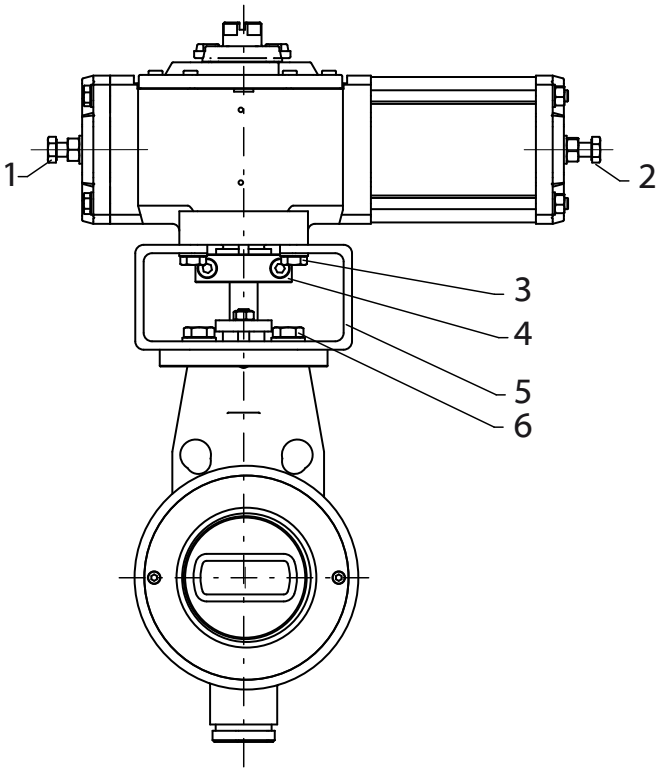
Before carrying out maintenance or repair work, installation and removal of an actuator from a valve in the pipeline, always depressurise the valve in the pipeline, isolate the valve and remove the medium.
The pressurised medium may lead to injuries to personnel.

Warning!

Before carrying out maintenance or repair work on the valve with actuator or installation and removal of the valve from the pipeline, always disconnect the compressed air supply to the actuator. Single action actuators may move to “open” or “closed” position without being connected to the air system.

Danger!

Risk of injury!
Do not place hands and fingers in the area of moving parts of the valve or of the actuator when the actuator is connected to the compressed air supply.
Single action actuators may move to “open” or “closed” position without being connected to the air system.



1	End stop bolt	3	Bolt	5	Bracket
2	End stop bolt	4	Clamping ring	6	Bolt

Fig.4-2 Assembly of the actuator (schematic diagram)

4.2.1 Installing position of the Actuator and the Positioner

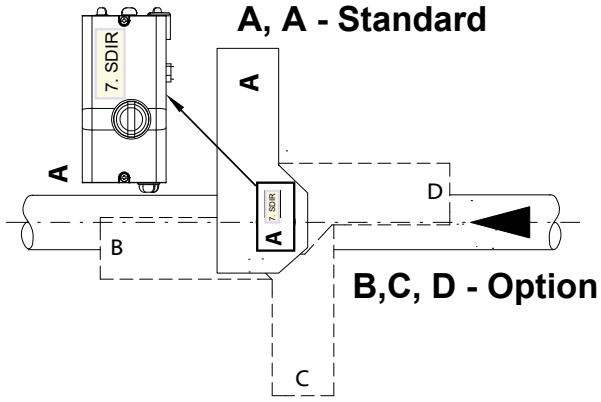


Fig.4-3a Mounting positions of the Actuator

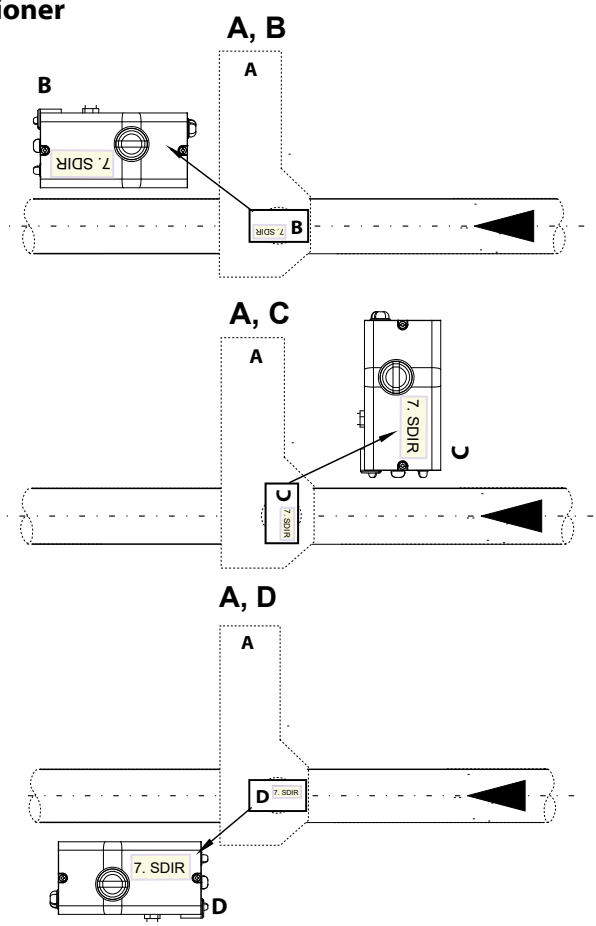


Fig.4-3ab Mounting positions of the Positioner

Installation position A, A (→ Fig. 4-3a) - perpendicular to the pipeline is the standard mounting for both Actuators and Positioners. Mounting positions B, C, D for Actuator (→ Fig. 4-3a) and the Positioner → Fig. 4-3ab) can be selected depending on the installation option.
The Valve and Actuators mounting position relative the horizontal line. A mounting position with the Valve shaft pointing upwards (vertical) is often considered to be standard. If the media contains sticky or other difficult impurities, that tend to collect at the bottom of the pipe, it is advised to mount the valve with an angle of vertical.
In this way it is avoided that the impurities collect and eventually clog and glue the bottom bearing of the valve shaft.

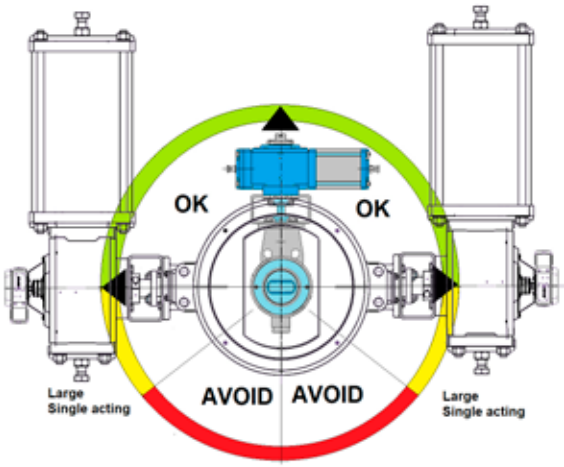


Fig.4-3b Mounting position

When large actuators (both single - and double acting) are used in vertical pipes, install them with the cylinder in the pipe direction. This will result in less wear and easier maintenance. (→ Fig.4-3b).

Note

To prevent damage, do not fit the actuator with force.
When large actuators (both single - and double acting) are used in vertical pipes, install them with the cylinder in the pipe direction. This will result in less wear and easier maintenance.

Procedure

1. When using double acting and spring-closed actuators, ensure that the valve is in “closed” position.
2. When using spring opened actuators, ensure that the valve is in “open” position.
3. Lubricate the shaft and the key.
4. Fix the bracket (➔ Fig.4-2/5) to the actuator with the aid of the bolts (➔ Fig.4-2/3).
5. Place the actuator with the bracket (➔ Fig.4-2/5) in the required position (A, B, C or D) (➔ Fig.4-3a). on the shaft of the valve and fix the unit with the aid of the bolts. (➔ Fig.4-2/6).
6. Connect the clamping ring to shaft end of the valve and the actuator (➔ Fig.4-2/4). The clamping ring is to be mounted in such a way that its yellow markings indicate the position of the ball segment/ball/disc. When the valve is closed, the markings must then be offset to the direction of flow by 90°.

Clamping ring / backlash-free transmission coupling are pre-assembled on the actuator in mounting positions A or C at delivery (➔ Fig.4-3). For the mounting positions B or D the clamping ring has to be turned through 90°.

1 Clamping ring 2 Allen bolt

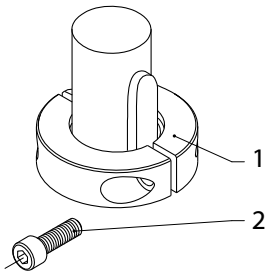


Fig.4-4 Mounting clamping ring

7. Tighten the bolts (➔ Fig.4-4/2) on the clamping ring (➔ Fig.4-4/1).
8. Then set the end positions (➔ Chap.4.4).

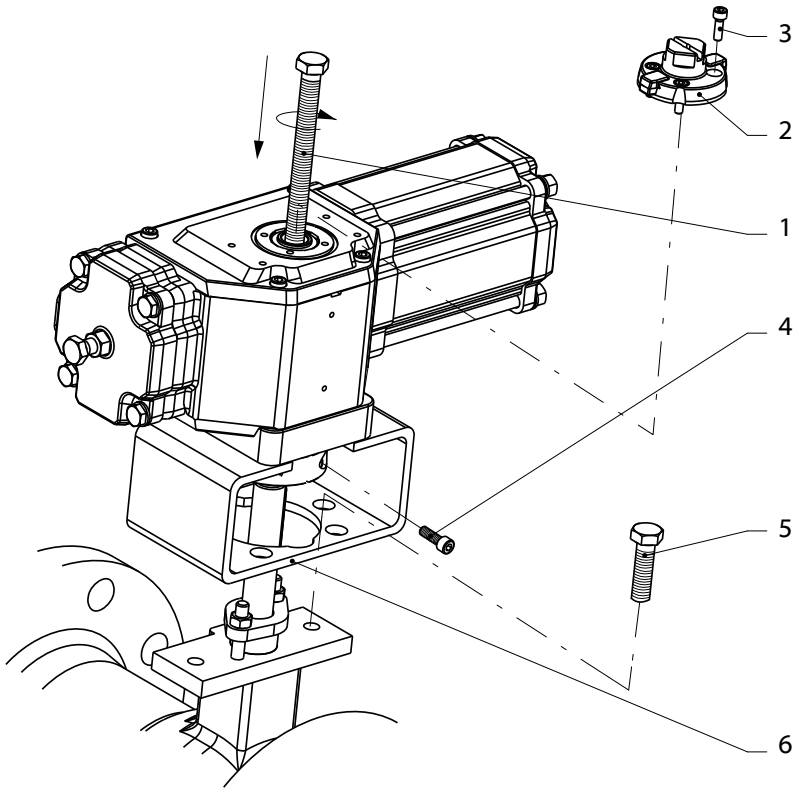
4.3 Disassembly of the pneumatic actuator

Warning!

Before carrying out maintenance or repair work, installation and removal of an actuator from a valve in the pipeline, always depressurise the valve in the pipeline, isolate the valve and remove the medium.
The pressurised medium may lead to injuries to personnel.

Warning!

Before carrying out maintenance or repair work on the valve with actuator or installation and removal of the valve from the pipeline, always disconnect the compressed air supply to the actuator. Single action actuators may move to “open” or “closed” position without being connected to the air system.



1	Puller	3	Screw	5	Bolt
2	Driver	4	Clamping ring bolts	6	Bracket

Fig.4-5 Disassembly of the actuator (schematic diagram)

Use a puller to remove the actuator from the valve. This prevents damage to the seat and the ball segment/ball/disc of the valve.

Pullers

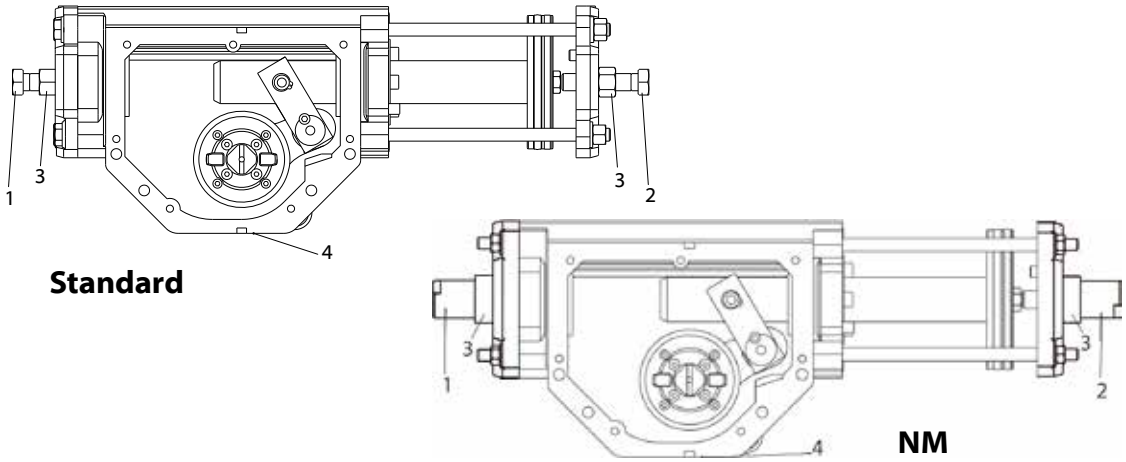
Actuator size	A11	A13	A21	A22	A23	A24	A31	A32
Article no.	34786	34786	34786	34786	34786	34786	34787	34787
Actuator size	**A33**	**A34**	**A41**	**A42**	**A43**	**A44**	**A51**	**A52**
Article no.	34787	34787	34788	34788	34788	34788	34788	34788

1. Undo the clamping ring bolts (➔ Fig.4-5/4).
2. Remove the accessory parts such as positioners and end position limit switches.
3. Remove the screws (➔ Fig.4-5/3), to remove the driver (➔ Fig.4-5/2).
4. Remove the bracket (➔ Fig.4-5/6) from the valve by removing the bolts (➔ Fig.4-5/5).
5. Press the actuator off the valve with the puller (➔ Fig.4-5/1). Turn the puller in until the actuator can be removed from the valve shaft.
6. Lift the actuator off and turn the puller out again.

4.4 Adjustment of the end positions

Danger!

Risk of injury! Do not place hands and fingers in the area of moving parts of the valve or of the actuator when the actuator is connected to the compressed air supply. Single action actuators may move to “open” or “closed” position without being connected to the air system.



1 End position bolt “open” position 2 End position bolt “closed” position 3 Locking nut 4 Type plate

Fig.4-6 End position bolts on pneumatic actuator

Types A-DA A11, A21 and s.o. has one cylinder.
Types A-DA A22, A32 and s.o. has two cylinders.

The movement of the actuator is limited through end position bolts. The final position for the open or closed setting can be adjusted with the end position bolts.

In closed position, the adjustment screw allows for adjustment of ± 5 degree.

The end position bolt on the open position, functions as a limit of the valve stroke of the piston. The stroke of the piston depends on the function of the valve.

Attention!

Damage to PTFE seats!
While adjusting butterfly valves equipped with PTFE seats keep attention not to close the valve to firm. This causes damage to the seat!

4.4.1 Tightening torque, tie-rods and nuts

The table below shows the maximum permitted tightening torques for tightening tie-rods and nuts when the actuator has been dismantled (➔ Tab.4-1).

Thread	Max. torque (Nm)
M8	10
M12	30
M16	50
M24	75

Tab.4-1 Tightening torque, tie-rods and nuts

5 Maintenance

5.1 Maintenance

Warning!

Before carrying out maintenance or repair work on the valve with actuator or installation and removal of the valve from the pipeline, always disconnect the compressed air supply to the actuator. Single action actuators may move to “open” or “closed” position without being connected to the air system.

Warning!

When transporting and handling the actuator, observe the weight of the actuator or of the whole unit. Never lift the valve by its positioner, limit switch, solenoid valve or piping. Place the hoisting ropes securely according to lift instruction.
The actuator may injure persons if dropped.
Do not walk under suspended loads.

Regular maintenance is not necessary for the actuator type A. Assumed that the service air is dry, oil free and its available with the required pressure.

Overhauling and repair work at the actuator may only be executed by Somas Instrument AB or another service center who is authorised by Somas Instrument AB. Repair work at the actuator may only be carried out by qualified personnel.

For the realisation of repairing work the instructions on the “additional instructions for repair work” must be observed. Additional instructions as well as corresponding repairing sets are available on request.

Note

Note down the details of the type plate before contacting the contact partners given in the order confirmation in case of technical request.

5.2 Sealing and repair kits

Double-acting actuator, type A-DA standard and option -E (ATEX)

Actuator size	A11-DA	A13-DA	A21-DA	A22-DA	A23-DA	A24-DA	A31-DA	A32-DA
Sealing kit	35584	35585	35586	35587	35588	35589	35590	35591
Repair kit for standard	35607	35608	35609	35610	35611	35612	35613	35614
Repair kit for ATEX	42000	42001	42002	42003	42004	42005	42006	42007
Actuator size	**A33-DA**	**A34-DA**	**A41-DA**	**A42-DA**	**A43-DA**	**A44-DA**	**A51-DA**	**A52-DA**
Sealing kit	35592	35593	35594	35595	35596	35597	35598	35599
Repair kit for standard	35615	35616	35617	35618	35619	35620	35621	35622
Repair kit for ATEX	42008	42009	42010	42011	42012	42013	42014	42015

Tab.5-1 Double-acting actuator, type A-DA standard and option -E (ATEX)

Double-acting actuator, type A-DA, High-temperature design standard and option -E (ATEX)

Actuator size	A11-DA	A13-DA	A21-DA	A22-DA	A23-DA	A24-DA	A31-DA	A32-DA
Sealing kit	35630	35631	35632	35633	35634	35635	35636	35637
Repair kit for standard	35653	35654	35655	35656	35657	35658	35659	35660
Repair kit for ATEX	42016	42017	42018	42019	42020	42021	42022	42023
Actuator size	**A33-DA**	**A34-DA**	**A41-DA**	**A42-DA**	**A43-DA**	**A44-DA**	**A51-DA**	**A52-DA**
Sealing kit	35638	35639	35640	35641	35642	35643	35644	35645
Repair kit for standard	35661	35662	35663	35664	35665	35666	35667	35668
Repair kit for ATEX	42024	42025	42026	42027	42028	42029	42030	42031

Tab.5-2 Double-acting actuator, type A-DA, High-temperature design standard and option -E (ATEX

Single-acting actuator, type A-SC/SO standard and option -E (ATEX)

Actuator size	A13-SC/SO	A23-SC/SO	A24-SC/SO	A33-SC/SO	A34-SC/SO	A43-SC/SO	A44-SC/SO
Sealing kit	35600	35601	35602	35603	35604	35605	35606
Repair kit for standard	35623	35624	35625	35626	35627	35628	35629
Repair kit for ATEX	42032	42033	42034	42035	42036	42037	42038

Tab.5-3 Single-acting actuator, type A-SC/SO standard and option -E (ATEX)

Single-acting actuator, type A-SC/SO, High-temperature design standard and option -E (ATEX)

Actuator size	A13-SC/SO	A23-SC/SO	A24-SC/SO	A33-SC/SO	A34-SC/SO	A43-SC/SO	A44-SC/SO
Sealing kit	35646	35647	35648	35649	35650	35651	35652
Repair kit for standard	35669	35670	35671	35672	35673	35674	35675
Repair kit for ATEX	42039	42040	42041	42042	42043	42044	42045

Tab.5-4 Single-acting actuator, type A-SC/SO, High-temperature design standard and option -E (ATEX)

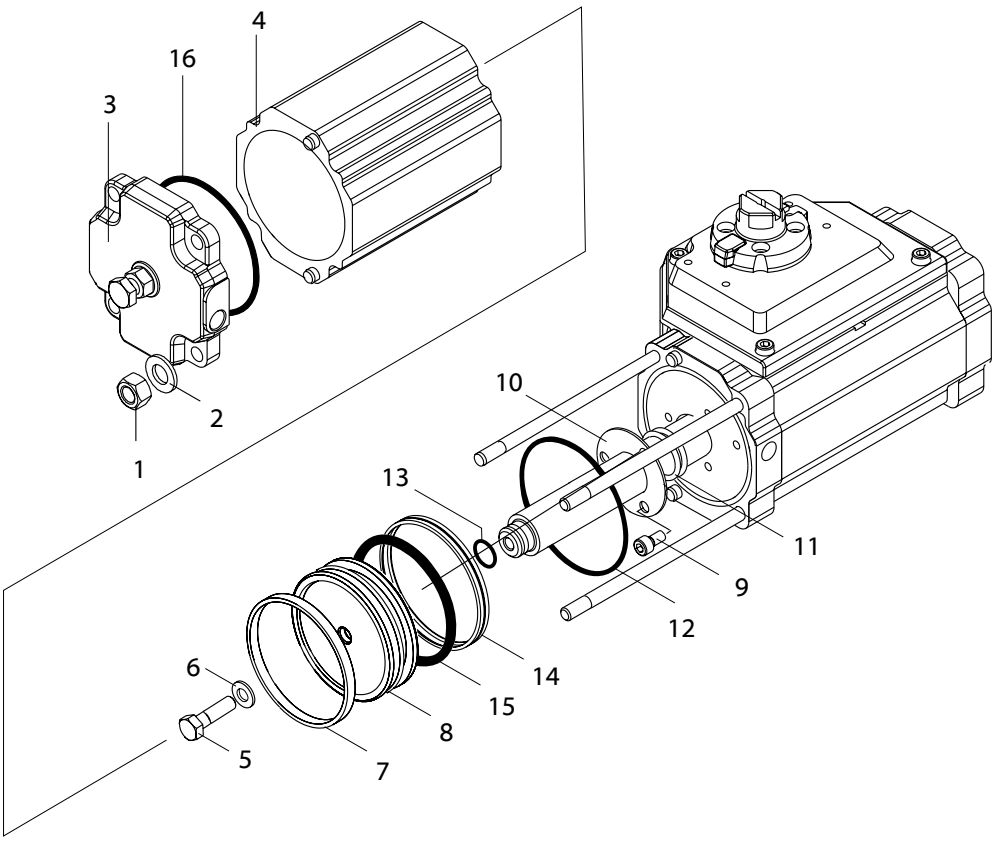
5.3 Replacing the sealing kit

⇨ For actuators in option -E (ATEX) (➔ Chap.2.5).

Danger!

Risk of injury!
Always release the spring tension before unscrewing the end cover of the cylinder.

5.3.1 Double-acting actuator types A11, 21, 31, 41, 51 - DA



1	Nut	5	Screw	9	Screw	13	O-ring
2	Washer	6	Washer	10	Sealing bracket	14	Piston seal
3	End cover	7	Guide ring	11	Piston rod seal[1]	15	O-ring
4	Cylinder tube	8	Piston disc	12	O-ring	16	O-ring

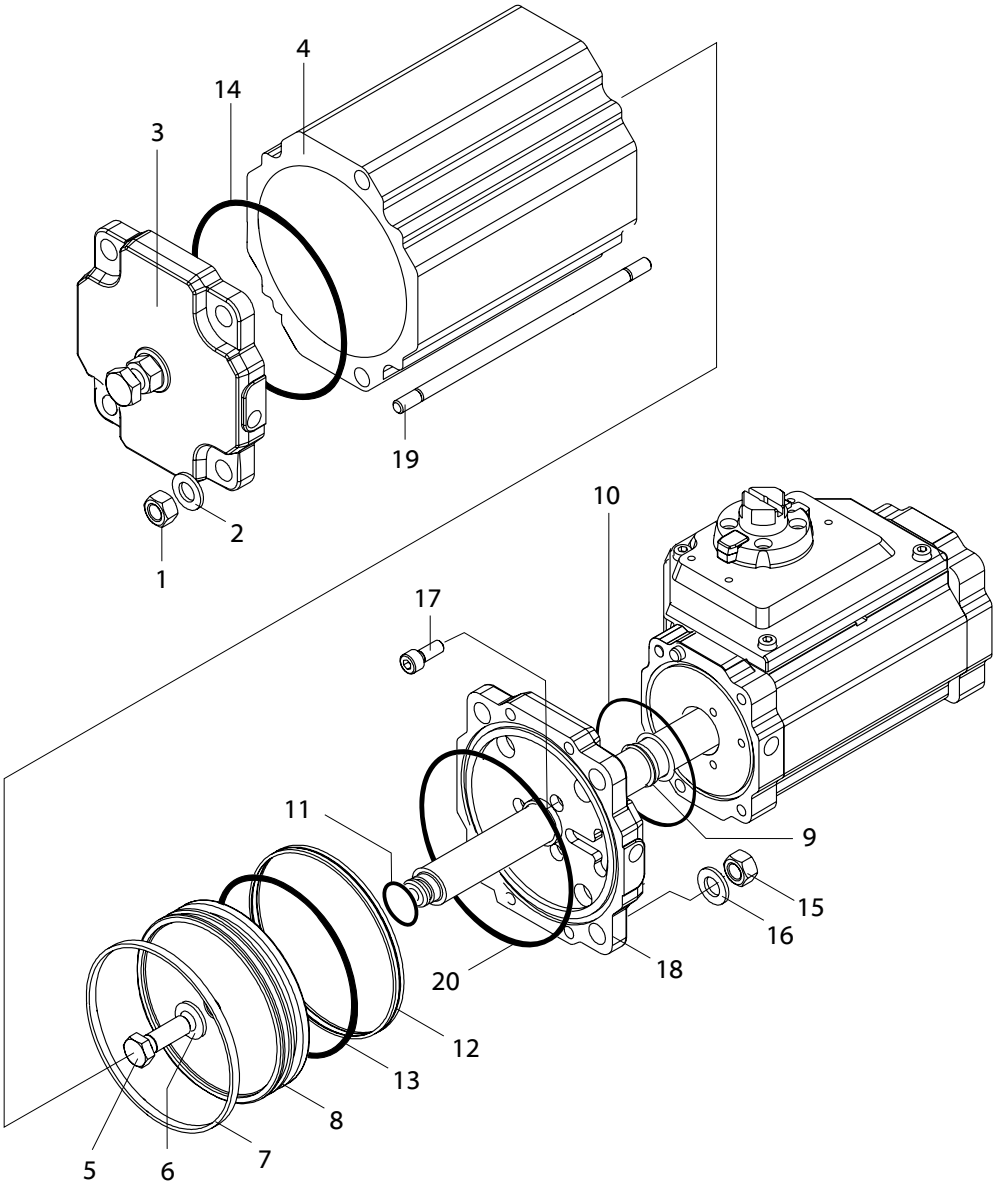
[1] O-ring + PTFE-ring

Fig.5-1 Replacing the sealing kit

Procedure

1. Disconnect internal air piping.
2. Unscrew the nuts (➔ Fig.5-1/1), remove the washers (➔ Fig.5-1/2) and the end cover (➔ Fig.5-1/3).
3. Dismantle the cylinder tube (➔ Fig.5-1/4).
4. Dismantle the screw (➔ Fig.5-1/5), washer (➔ Fig.5-1/6), guide ring (➔ Fig.5-1/7) and piston (➔ Fig.5-1/8).
5. Loosen the screws (➔ Fig.5-1/9) and dismantle the sealing bracket (➔ Fig.5-1/10).
6. Replace the piston rod seal (➔ Fig.5-1/11) and refit the sealing bracket.
7. Replace the O-ring (➔ Fig.5-1/12) in the housing end cover and the O-ring (➔ Fig.5-1/13) on the piston rod.
8. Fit a new piston seal (➔ Fig.5-1/14) and a new O-ring (➔ Fig.5-1/15) on the piston disc (➔ Fig.5-1/8). Screw together the complete package on the piston rod and fit a new guide ring (➔ Fig.5-1/7).
9. Replace the O-ring (➔ Fig.5-1/16) on the end cover. Refit the cylinder tube and end cover.

5.3.2 Double-acting actuator types A13, 23, 33, 43 - DA



1	Nut	6	Washer	11	O-ring	16	Washer[2]
2	Washer	7	Guide ring	12	Piston seal	17	Screw
3	End cover	8	Piston disc	13	O-ring[1]	18	Front end cover
4	Cylinder tube	9	Piston rod seal[1]	14	O-ring	19	Tie-rod
5	Screw	10	O-ring	15	Nut[2]	20	O-ring

[1] O-ring + PTFE-ring
[2] Not available for A13-DA

Fig.5-2 Replacing the sealing kit

Procedure

1. Disconnect internal air piping.
2. Unscrew the nuts (➔ Fig.5-2/1), remove the washers (➔ Fig.5-2/2) and the end cover (➔ Fig.5-2/3).
3. Loosen the nuts (➔ Fig.5-2/15), dismantle the washers (➔ Fig.5-2/16) the cylinder tube (➔ Fig.5-2/4) and the tie-rods (➔ Fig.5-2/19).
4. Unscrew the screw (➔ Fig.5-2/5), dismantle the washer (➔ Fig.5-2/6) and piston disc (➔ Fig.5-2/8).
5. Unscrew the screws (➔ Fig.5-2/17) and remove front end cover (➔ Fig.5-2/18).
6. Replace the piston rod seal (➔ Fig.5-2/9) and O-ring (➔ Fig.5-2/10).
7. Refit the front end cover.
8. Replace the O-ring (➔ Fig.5-2/20) in the front end cover and the O-ring (➔ Fig.5-2/11) on the piston rod.
9. Fit a new piston seal (➔ Fig.5-2/12) and new O-ring (➔ Fig.5-2/13) on the piston disc.
10. Screw together the complete package on the piston rod and fit a new guide ring (➔ Fig.5-2/7).
11. Replace the new O-ring (➔ Fig.5-2/14) in the end cover.
12. Refit the cylinder tube, tie-rods and end cover.

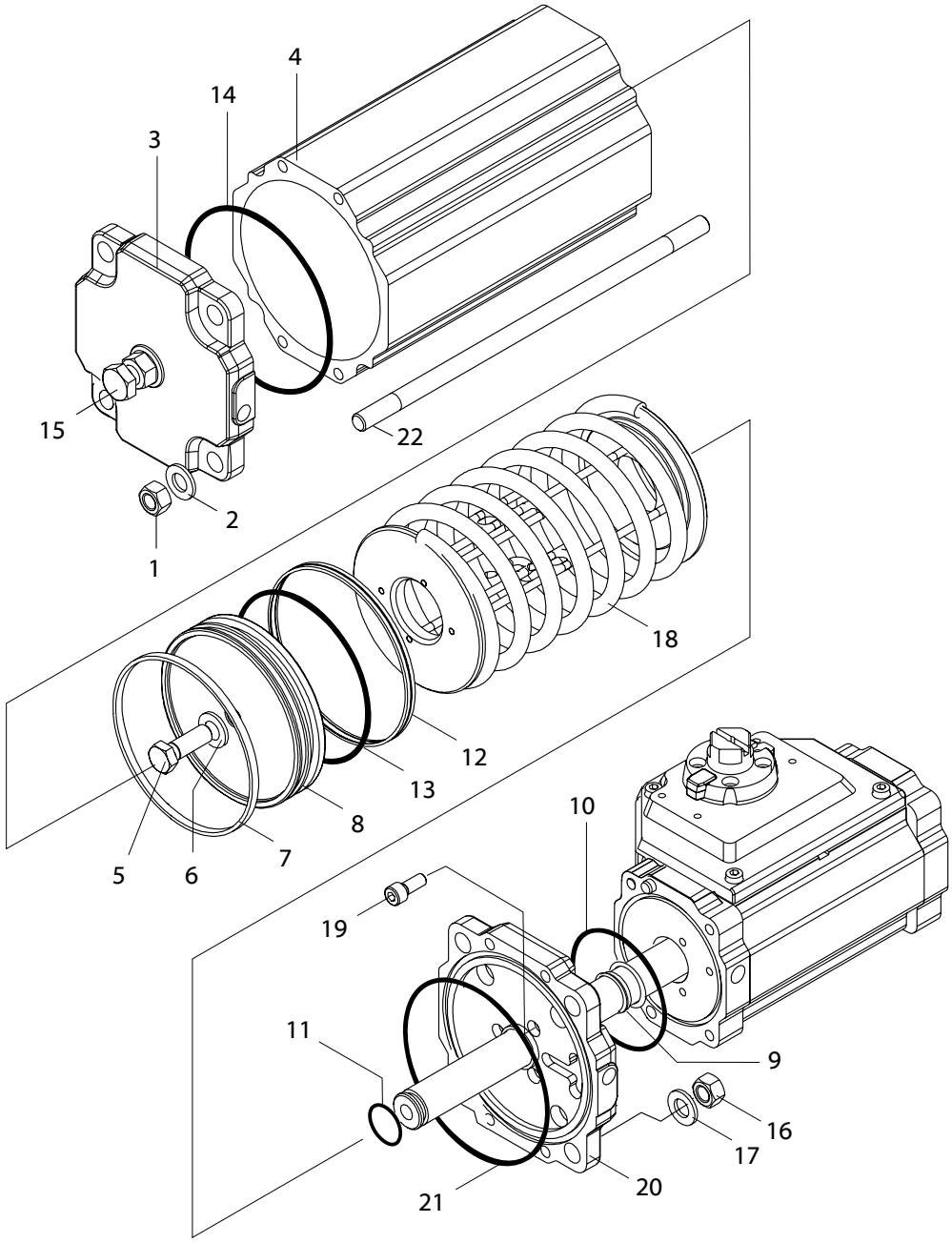
5.3.3 Double-acting actuator types A22, 32, 42, 52 - DA

See “Double-acting actuator types A11, 21, 31, 41, 51 - DA” (➔ Chap.5.3.1).

5.3.4 Double-acting actuator types A24, 34, 44 - DA

See “Double-acting actuator types A11, 21, 31, 41, 51 - DA” (➔ Chap.5.3.1) and “Double-acting actuator types A13, 23, 33, 43 - DA” (➔ Chap.5.3.2).

5.3.5 Single-acting actuator types A13, 23, 33, 43 - SC



1	Nut	7	Guide ring	13	O-ring	19	Screw
2	Washer	8	Piston disc	14	O-ring	20	End cover
3	End cover	9	Piston rod seal[1]	15	Adjusting screw	21	O-ring
4	Cylinder tube	10	O-ring	16	Nut[2]	22	Tie-rod
5	Screw	11	O-ring	17	Washer[2]		
6	Washer	12	Piston seal	18	Spring kit		

[1] O-ring + PTFE-ring
[2] Not available for A13-SC

Fig.5-3 Replacing the sealing kit

Procedure

1. Disconnect internal air piping.
2. Unscrew the adjusting screw (➔ Fig.5-3/15) to its outermost position.
3. Loosen the nuts (➔ Fig.5-3/16), alternating crosswise.

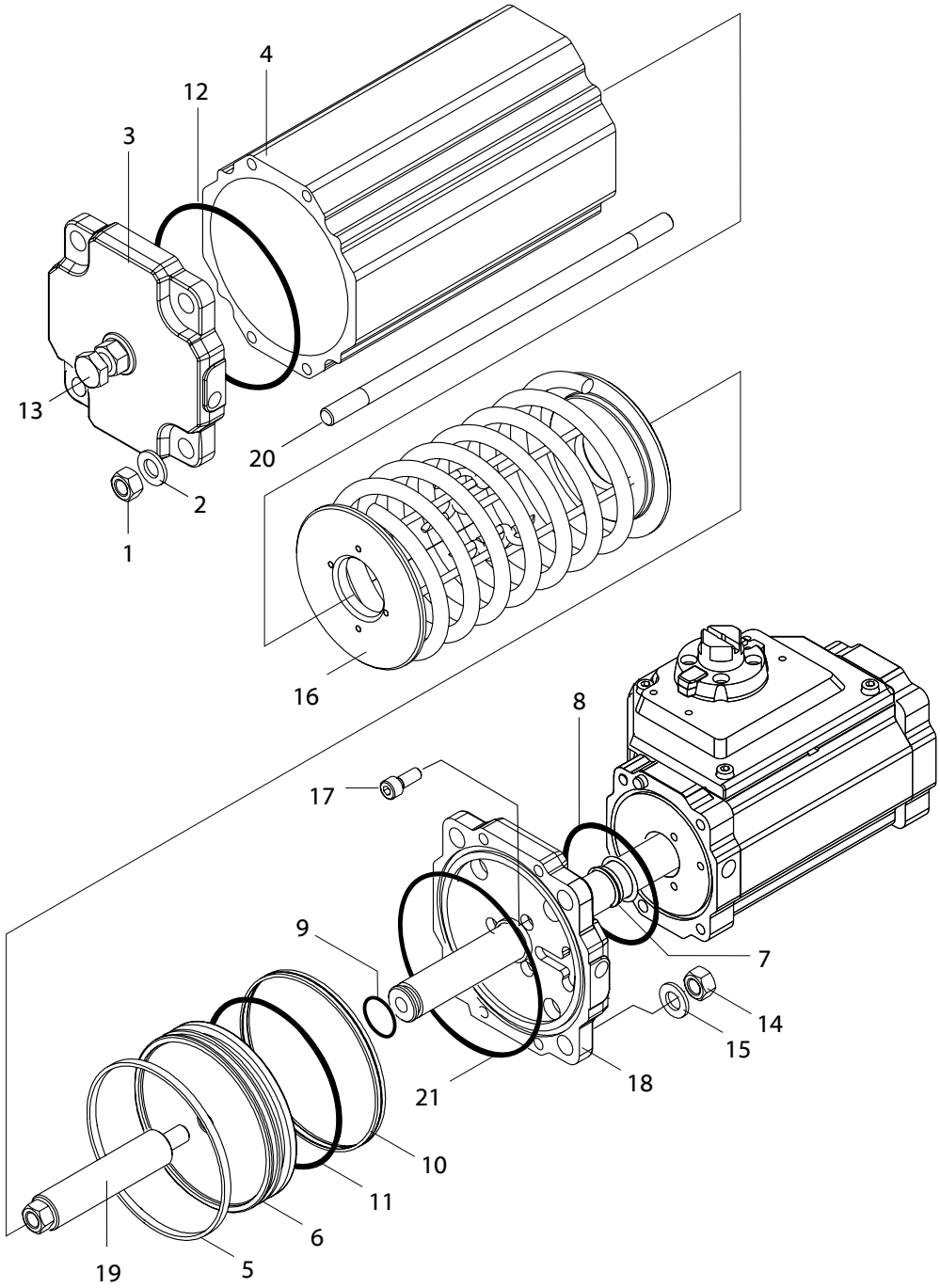
Note

Do not unscrew the nuts completely. Make sure that the spring force is released. The end cover has to be completely loose before removing the nuts and washers (➔ Fig.5-3/17) completely. Check with Somas if "tension" from the spring remains.

4. For actuator size A13-SC loosen the nuts (➔ Fig.5-3/1) in the same way.
5. Dismantle the end cover (➔ Fig.5-3/3), cylinder tube (➔ Fig.5-3/4) and tie-rods (➔ Fig.5-3/22).
6. Unscrew the screw (➔ Fig.5-3/5), dismantle the guide ring (➔ Fig.5-3/7), piston disc (➔ Fig.5-3/8) and spring kit (➔ Fig.5-3/18).
7. Unscrew the screws (➔ Fig.5-3/19). Remove the front end cover (➔ Fig.5-3/20). Replace the piston rod seal (➔ Fig.5-3/9) and O-ring (➔ Fig.5-3/10). Refit the front end cover.
8. Replace the O-ring (➔ Fig.5-3/21) in the front end cover and the O-ring (➔ Fig.5-3/11) on the piston rod.
9. Refit the spring kit.
10. Fit a new piston seal (➔ Fig.5-3/12) and O-ring (➔ Fig.5-3/13) on the piston disc. Screw together the complete package on the piston rod and fit a new guide ring (➔ Fig.5-3/7).
11. Replace the O-ring (➔ Fig.5-3/14) on the end cover.
12. Refit the cylinder tube, tie-rods and end cover.
13. Tighten the nuts (➔ Fig.5-3/16), alternating crosswise. Do not exceed maximum tightening torques for tightening (➔ Tab.4-1).

An end position adjustment should be made if the device is fitted on a valve (➔ Chap.4).

5.3.6 Single-acting actuator types A13, 23, 33, 43 - SO



1	Nut	7	Piston rod seal[1]	13	Adjusting screw	19	Spacer
2	Washer	8	O-ring	14	Nut[2]	20	Tie-rod
3	End cover	9	O-ring	15	Washer[2]	21	O-ring
4	Cylinder tube	10	Piston seal	16	Spring kit		
5	Guide ring	11	O-ring	17	Screw		
6	Piston disc	12	O-ring	18	End cover		

[1] O-ring + PTFE-ring
[2] Not available for A13-SO

Fig.5-4 Replacing the sealing kit

Procedure

1. Disconnect internal air piping.
2. Screw the adjusting screw (➔ Fig.5-4/13) to its outermost position.
3. Loosen the nuts (➔ Fig.5-4/14) alternating crosswise.

Note

Do not unscrew the nuts completely. Make sure that the spring force is released. The end cover has to be completely loose before removing the nuts and washers (➔ Fig.5-3/15) completely. Check with Somas if "tension" from the spring remains.

4. For actuator size A13-SO loosen the nuts (➔ Fig.5-4/1) in the same way.
5. Dismantle the end cover (➔ Fig.5-4/3), cylinder tube (➔ Fig.5-4/4), tie-rods (➔ Fig.5-4/20) and spring kit (➔ Fig.5-4/16).
6. Unscrew the spacer (➔ Fig.5-4/19) and dismantle the piston disc (➔ Fig.5-4/6).
7. Unscrew the screws (➔ Fig.5-4/17). Remove the front end cover (➔ Fig.5-4/18). Replace the piston rod seal (➔ Fig.5-4/7) and O-ring (➔ Fig.5-4/8). Refit the front end cover.
8. Replace the O-ring (➔ Fig.5-4/21) in the front end cover and the O-ring (➔ Fig.5-4/9) on the piston rod.
9. Fit a new piston seal (➔ Fig.5-4/10) and O-ring (➔ Fig.5-4/11) on the piston disc and screw the entire package on the piston rod.
10. Fit a new guide ring (➔ Fig.5-4/5) and refit the spacer.
11. Refit the spring kit and fit a new O-ring (➔ Fig.5-4/12) in the end cover.
12. Refit the cylinder tube, tie-rods and end cover.
13. Tighten the nuts (➔ Fig.5-4/14), alternating crosswise. Do not exceed maximum tightening torques for tightening (➔ Tab.4-1).

An end position adjustment should be made if the device is fitted on a valve (➔ Chap.4).

5.3.7 Single-acting actuator types A24, 34, 44 - SC

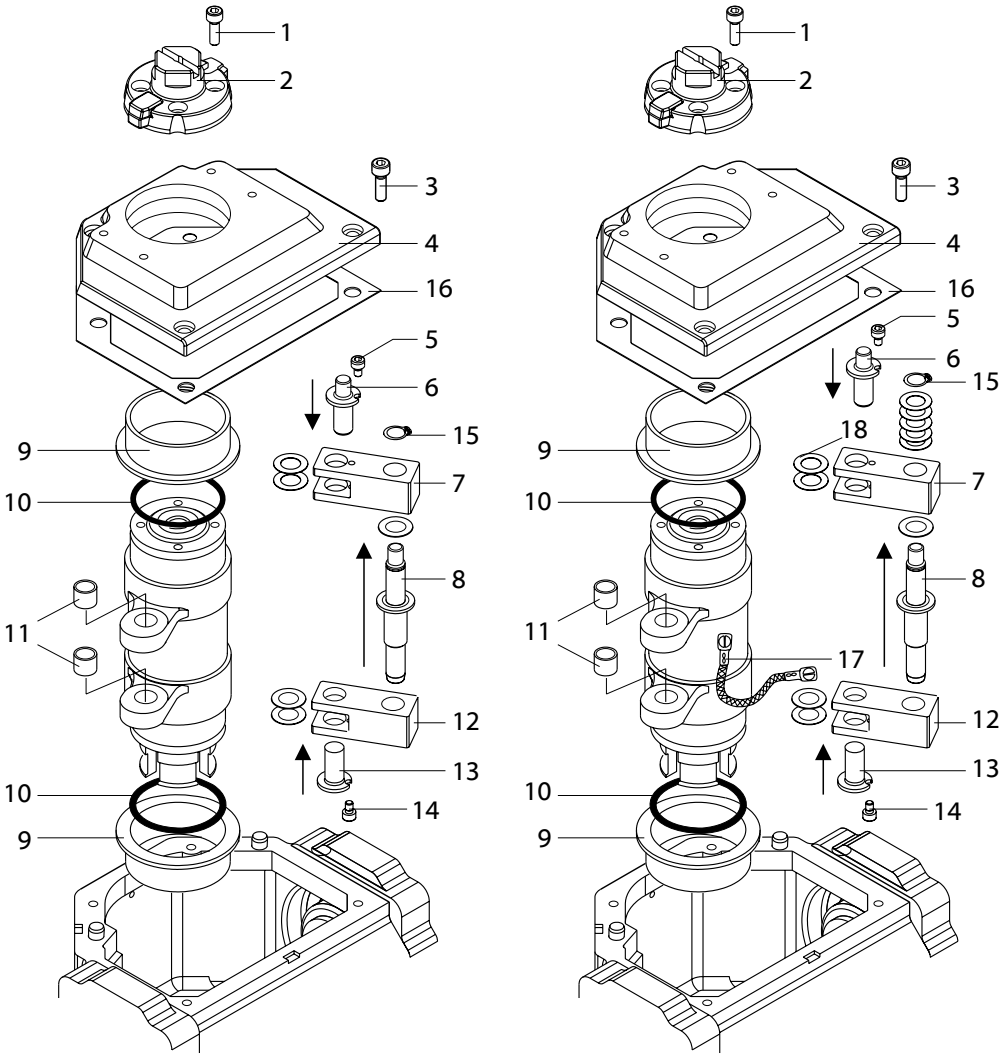
See "Single-acting actuator types A13, 23, 33, 43 - SC" (➔ Chap.5.3.5).

5.3.8 Single-acting actuator types A24, 34, 44 - SO

See "Single-acting actuator types A13, 23, 33, 43 - SO" (➔ Chap.5.3.6).

5.4 Replacing the repair kit

⇨ For actuators in option -E (ATEX), see also Service- and operating instruction Mi-503-E EN.



Standard **ATEX**

1	Screw	6	Pivot pin	11	Bushing	16	Gasket
2	Driver	7	Link arm	12	Link arm	17	Grounding cable
3	Screw	8	Swivel bolt	13	Pivot pin		
4	Cover	9	Bushing	14	Screw		
5	Screw	10	O-ring	15	Locking ring		

Fig.5-5 Replacing the repair kit

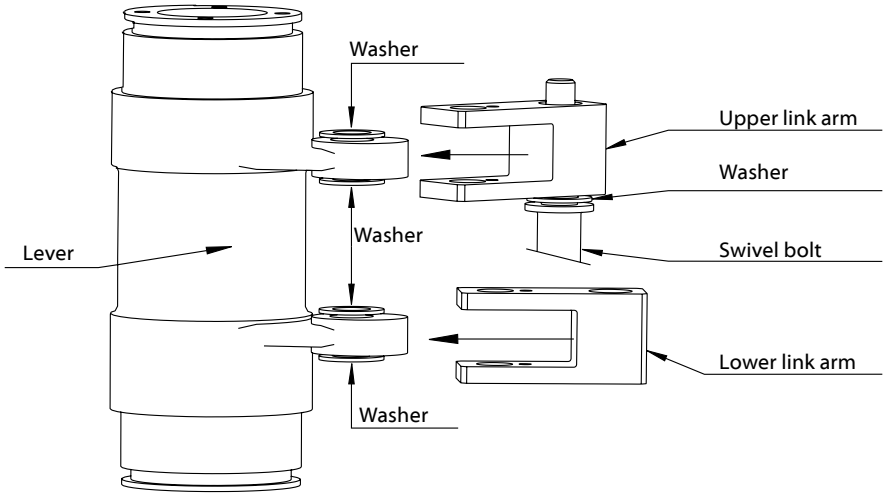


Fig.5-6 Standard

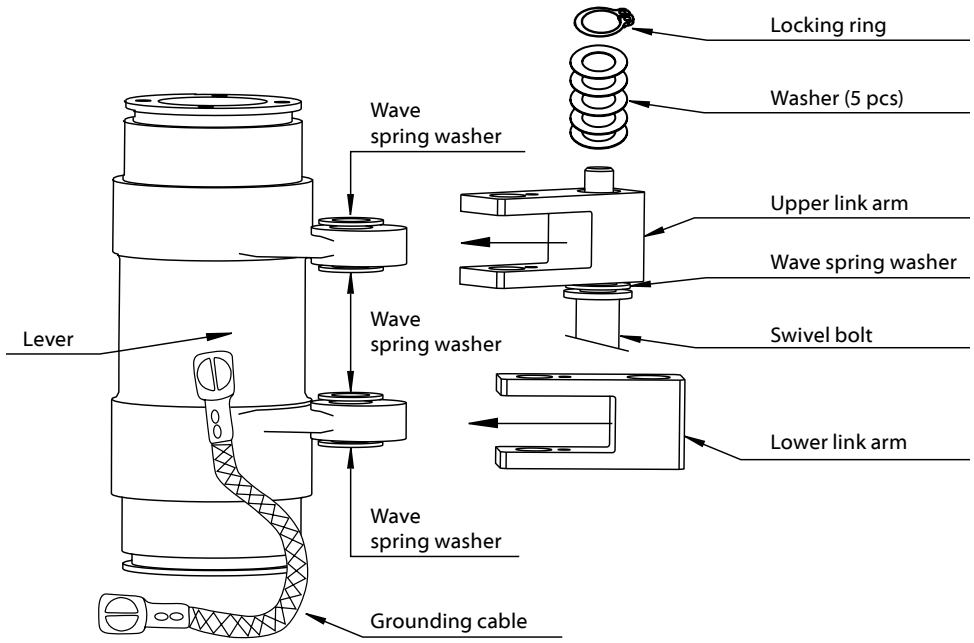


Fig.5-7 ATEX

1. Dismantle the actuator from the valve.
2. Dismantle the driver (➔ Fig.5-5/2) by loosening the screws (➔ Fig.5-5/1). If your actuator includes a positioner, dismantle the positioner/switch box and mounting block first.
3. Loosen the screws (➔ Fig.5-5/3) and dismantle the cover (➔ Fig.5-5/4).
4. Dismantle the screw (➔ Fig.5-5/5) and lift up the pivot pin (➔ Fig.5-5/6).
5. Twist the upper link arm (➔ Fig.5-5/7) off of the lever and pull it out from the piston rod together with the swivel bolt (➔ Fig.5-5/8).

6. Move the piston rod so that the whole lever can be lifted out of the housing and dismantle the lower link arm (➔ Fig.5-5/12) from the lever.
7. Fit new bushings (➔ Fig.5-5/9) in the cover (➔ Fig.5-5/4) respective bottom of the housing.
8. Fit new O-rings (➔ Fig.5-5/10) and new bushings (➔ Fig.5-5/11) on the lever.
9. Fit the new lower link arm (➔ Fig.5-5/12) with pivot pin (➔ Fig.5-5/13) on the lever. Lock with the screw (➔ Fig.5-5/14).

Note

Observe the position of the washers.

10. Fit the new pin bolt (➔ Fig.5-5/8) and washer on the new upper link arm (➔ Fig.5-5/7) and lock with locking ring (➔ Fig.5-5/15).
11. Refit the lever in the actuator housing. For ATEX connect the grounding cable (➔ Fig.5-5/17) in the actuator house.
12. Align the piston rod and lower link arm with each other and insert the pin bolt through the piston rod.
13. Secure the upper link arm on the lever by inserting the pivot pin (➔ Fig.5-5/6).

Note

The right position for the washers is demonstrated in the drawing (➔ Fig.5-6). Lock with screw (➔ Fig.5-5/5).

14. Fit a new gasket (➔ Fig.5-5/16) and refit the cover and the driver.

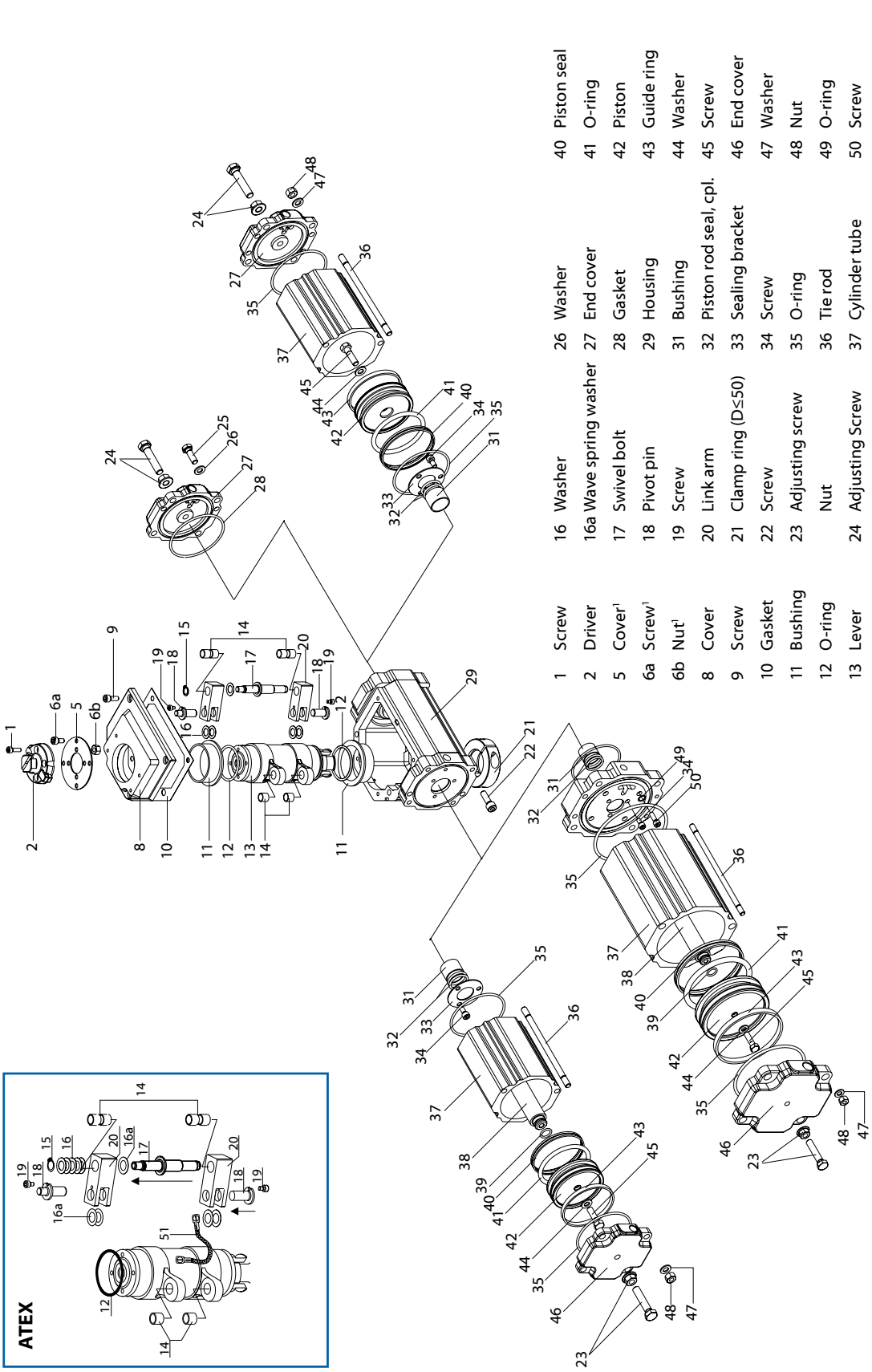
See “Replacing the sealing kit” (➔ Chap.5.3) to replace other parts in the repair kit.

Note

When replacing the piston rod seal, the bushing in the housing end cover should be replaced. The bushing is included in the repair kit but not in the sealing kit.

5.6 Components

5.6.1 Actuator type A-DA



1	Screw	16	Washer	40	Piston seal
2	Driver	16a	Wave spring washer	41	O-ring
5	Cover[1]	17	Swivel bolt	42	Piston
6a	Screw[1]	18	Pivot pin	43	Guide ring
6b	Nut[1]	19	Screw	44	Washer
8	Cover	20	Link arm	45	Screw
9	Screw	21	Clamp ring (D≤50)	46	End cover
10	Gasket	22	Screw	47	Washer
11	Bushing	23	Adjusting screw	48	Nut
12	O-ring		Nut	49	O-ring
13	Lever	24	Adjusting Screw	50	Screw
14	Bushing		Nut	51	Grounding cable
15	Locking ring	25	Screw		

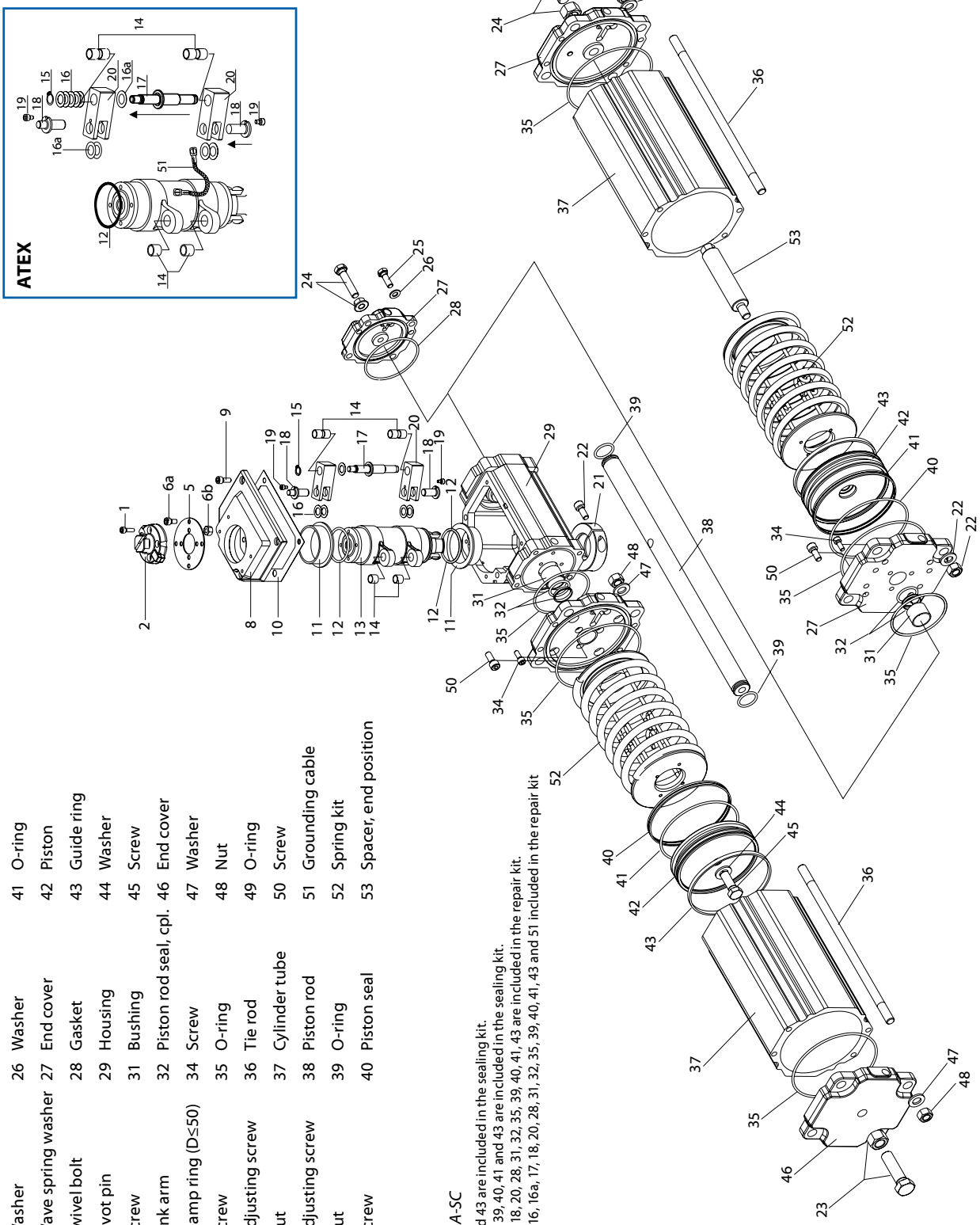
26	Washer	27	End cover
27	End cover	28	Gasket
28	Gasket	29	Housing
29	Housing	31	Bushing
31	Bushing	32	Piston rod seal, cpl.
32	Piston rod seal, cpl.	33	Sealing bracket
33	Sealing bracket	34	Screw
34	Screw	35	O-ring
35	O-ring	36	Tie rod
36	Tie rod	37	Cylinder tube
37	Cylinder tube	38	Piston rod
38	Piston rod	39	O-ring
39	O-ring		

[1] From actuator size 3

Fig.5-8 Actuator type A-DA

Pos.No. 28, 32, 35, 39, 40, 41 and 43 are included in the sealing kit.
ATEX: Pos.No. 10, 12, 28, 32, 35, 39, 40, 41 and 43 are included in the sealing kit.
Pos.No. 10, 11, 12, 14, 15, 16, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 are included in the repair kit.
ATEX: Pos.No. 10, 11, 12, 14, 15, 16, 16a, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 and 51 included in the repair kit

5.6.2 Actuator type A-SC



1	Screw	16	Washer	41	O-ring
2	Driver	16a	Wave spring washer	42	Piston
5	Cover[1]	17	Swivel bolt	43	Guide ring
6a	Screw[1]	18	Pivot pin	44	Washer
6b	Nut[1]	19	Screw	45	Screw
8	Cover	20	Link arm	46	End cover
9	Screw	21	Clamp ring (D≤50)	47	Washer
10	Gasket	22	Screw	48	Nut
11	Bushing	23	Adjusting screw	49	O-ring
12	O-ring		Nut	50	Screw
13	Lever	24	Adjusting screw	51	Grounding cable
14	Bushing		Nut	52	Spring kit
15	Locking ring	25	Screw	53	Spacer, end position

[1] From actuator size 3

Fig.5-9 Actuator type A-SC

Pos.No. 28, 32, 35, 39, 40, 41 and 43 are included in the sealing kit.
ATEX: Pos.No. 10, 12, 28, 32, 35, 39, 40, 41 and 43 are included in the sealing kit.
Pos.No. 10, 11, 12, 14, 15, 16, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 are included in the repair kit.
ATEX: Pos.No. 10, 11, 12, 14, 15, 16, 16a, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 and 51 included in the repair kit

1	Screw	16	Washer	26	Washer	41	O-ring
2	Driver	16a	Wave spring washer	27	End cover	42	Piston
5	Cover[1]	17	Swivel bolt	28	Gasket	43	Guide ring
6a	Screw[1]	18	Pivot pin	29	Housing	44	Washer
6b	Nut[1]	19	Screw	31	Bushing	45	Screw
8	Cover	20	Link arm	32	Piston rod seal, cpl.	46	End cover
9	Screw	21	Clamp ring (D≤50)	34	Screw	47	Washer
10	Gasket	22	Screw	35	O-ring	48	Nut
11	Bushing	23	Adjusting screw	36	Tie rod	49	O-ring
12	O-ring		Nut	37	Cylinder tube	50	Screw
13	Lever	24	Adjusting screw	38	Piston rod	51	Grounding cable
14	Bushing		Nut	39	O-ring	52	Spring kit
15	Locking ring	25	Screw	40	Piston seal	53	Spacer, end position

[1] From actuator size 3

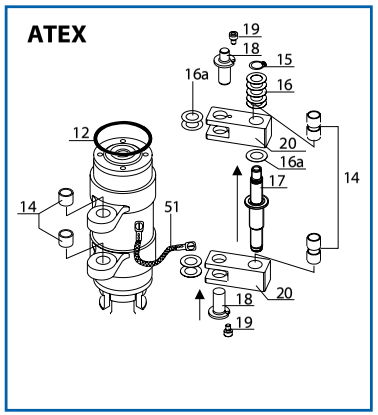


Fig.5-10 Actuator type A-SO

Pos.No. 28, 32, 35, 39, 40, 41 and 43 are included in the sealing kit.
ATEX: Pos.No. 10, 12, 28, 32, 35, 39, 40, 41 and 43 are included in the sealing kit.
Pos.No. 10, 11, 12, 14, 15, 16, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 are included in the repair kit.
ATEX: Pos.No. 10, 11, 12, 14, 15, 16, 16a, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 and 51 included in the repair kit

6 Material specification

Housing, cover, end cover:	Aluminium (painted)
Cylinder:	Aluminium (painted)
Tie rod:	EN 1.4305
Piston seal:	Carbon filled PTFE- + O-ring made of cold-resistant nitrile rubber
Screws/nuts:	Stainless steel
Connection[1]:	Plastic tubing (standard) Stainless steel tubing (option)

[1] Between actuator and accessories

7 Product key

A 32 - DA - H - D50 - F14
1 2 3 4 5 6

1 Type of actuator

2 Acuator size acc. to the selection table

3 Function

DA = Double-acting actuator
SC = Single-acting actuator (spring to close)
SO = Single-acting actuator (spring to open)
SCL = Single-acting actuator (spring to close)[1]
SOL = Single-acting actuator (spring to open)[1]

4 Option

E = ATEX design
H = High temperature design
NM = Emergency operation
LDC = Locking device (closed position)
V = Larger air connections
X = Special design
B = Bronze bushing in lever

5 Shaft diameter

6 Mounting pattern for valve attachment acc. to ISO 5211

[1] Low air supply design

Tab.7-1 Description product key

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E-mail: sales@somas.se
www.somas.se

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