



Service and Operating Instructions Mi-503 EN

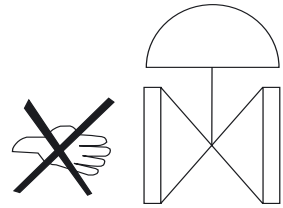
Actuator Types A-DA and A-SC/SO

Edition: 2007-11

Safety Information

To avoid injury, disconnect the actuator from its power source before servicing the valve or actuator.

DO NOT place fingers, hands or arms either inside the valve or at the sealing surface when the power source is connected to the actuator.



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Important

NOTE! The supply air must be clean and dry instrument air and have a constant pressure within the range of 4–8 bar (60–120 psi). ALWAYS follow the instructions carefully.

The driver may ONLY be used for operation of the device during assembly. It must not be used for emergency operation.

Single-acting devices include a heavily pre-tensioned spring package. The air connections must be disconnected before removing the actuator from the valve. Always release the spring tension before unscrewing the end cover.

Function and design

SOMAS pneumatic actuator type A has been primarily developed and matched to SOMAS range of valves, but can also be used with other types of valves that require 90 degree travel.

The actuator is available in double-acting, (DA) and single-acting, spring to close (SC) or spring to open (SO) types.

In addition to the keyway joint, a friction coupling eliminates play between the device and valve. (Applies to valves with a valve shaft diameter ≤ 50 mm).

Storage, handling and lifting

Check that the device has not been damaged during transport. The device should not be stored directly on the ground and should be protected from contamination during storage and installation.

Consideration must be given to accessories such as pipes, positioners, etc., when lifting the actuator.

If the actuator is fitted on a valve, secure lifting straps around the valve or mounting bracket – never around the actuator – before lifting the assembly (see Fig. 2).

Air connection markings

Air connections on the device are marked as follows:

4 / CLOSE = increased pressure will close the valve.

2 / OPEN = increased pressure will open the valve.

Mounting the clamp ring

The clamp ring on the friction coupling is supplied pre-mounted for the actuator mounting position A or C. The clamp ring should be turned 90 degrees for actuator position B or D. See page 3.

Accessories

Actuator type A can be equipped with a variety of accessories, such as a positioner, limit switches and solenoid valve.

For information on mounting accessories, refer to the accessory manufacturers' instructions.

For actuators in option -E (ATEX), see also service- and mounting instruction Mi-503-E.

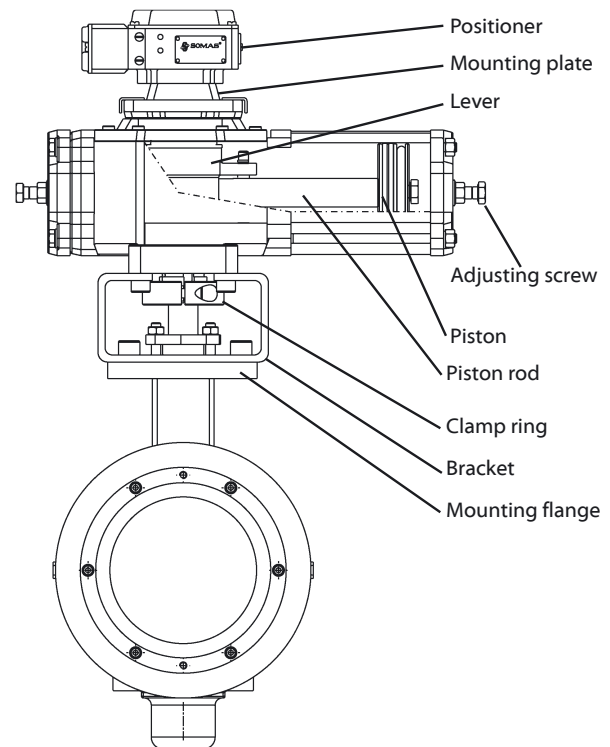


Fig. 1a

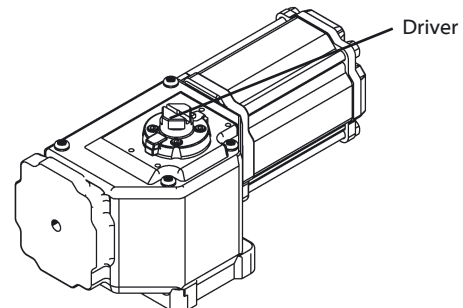


Fig. 1b

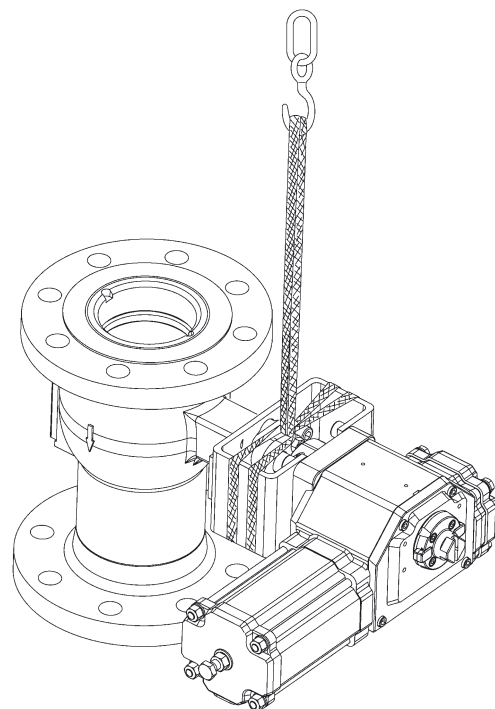


Fig. 2



Adjusting the end position

The actuator's travel is limited in the closed and open positions by adjustment screws. In closed position, the adjustment screw allows for adjustment of $\pm 5^\circ$. In open position, the adjustment screw is used to limit the stroke of the valve. The degree of limitation in open position depends on the valve type (see. Fig. 5a and 5b).

Closed position adjustment

For ball valves:

1. Loosen the locking nut and unscrew the closed position adjusting screw a few turns.
2. Ensure that the keyway connection on the valve shaft is turned 90° from the flow direction of the valve. If it is necessary to correct the closed position, use supply air pressure to turn the ball. The air connections are marked "4 / CLOSE" respectively "2 / OPEN" to indicate moving direction.
3. At correct position, screw in the adjusting screw, seal with sealing tape and lock with the nut.

For ball segment valves type KVT/KVTW/KVTF:

1. Loosen the locking nut and unscrew the closed position adjusting screw a few turns.
2. Make sure that the ball segment is centered on the seat by looking into the valve via the outlet flange. If it is necessary to correct the closed position, use supply air pressure to turn the segment. The air connections are marked "4 / CLOSE" respectively "2 / OPEN" to indicate moving direction.
3. At correct position, screw in the adjusting screw, seal with sealing tape and lock with the nut.

For ball segment valves type KVX/KVXW/KVXF and butterfly valves:

1. Loosen the locking nut and unscrew the closed position adjusting screw a few turns.
2. Fit a filter regulator on the air supply line and reduce the supply pressure to about 3 bars (2 bars for low-pressure actuators). Close the valve by using the reduced air pressure. Make sure that the segment or disc will reach the seat.
3. Screw in the adjusting screw, seal with thread sealing tape and lock with the nut.

For a butterfly valve, to check the tightness of the seal between the disc and seat, the valve should first be fitted between flanges or other pressure-testing equipment. A simple method to test the tightness of the seal between the disc and seat is to use a strip of normal writing paper approx. 2 to 3 cm wide. Insert the strip between the seat ring and the edge of the disc and close the valve. The adjusting screw is correctly adjusted when the surface pressure is so hard that the paper strip tends to break. For placement of the paper strip, see. Fig. 5c.

Open position adjustment

For ball segment valves:

In on/off applications the valve should be operated at 90° and in control applications the valve should be operated at between 75° and 90° .

1. Check the function of the valve and the opening angle.
2. Loosen the adjusting screw a few turns.
3. Open the valve.
4. Screw the adjusting screw gently against the stop.
5. Seal with thread sealing tape and lock with the nut.

For butterfly valves:

As an on/off valve the valve should open to 80° for maximum capacity. As a control valve the valve should open to between 60° and 80° .

1. Check the function of the valve and the opening angle.
2. Loosen the adjusting screw a few turns.
3. Open the valve to the required position.
4. Screw in the adjusting screw.
5. Seal with thread sealing tape and lock with the nut.

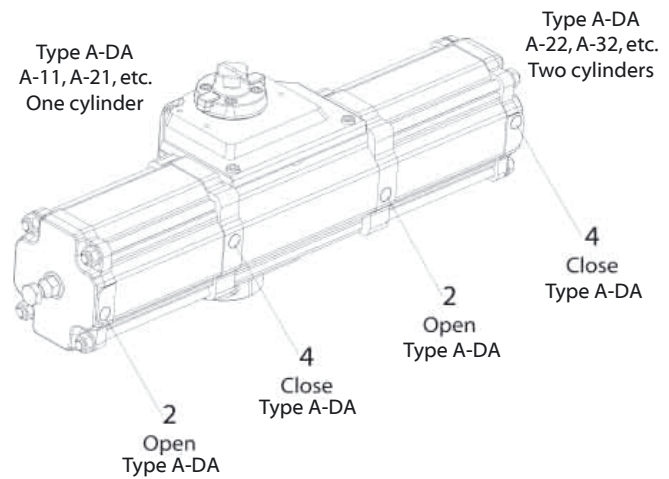


Fig. 5a

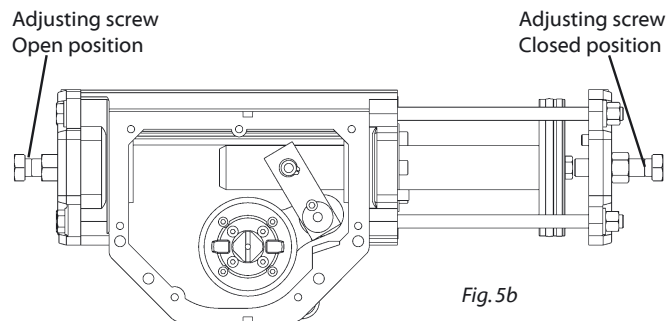


Fig. 5b

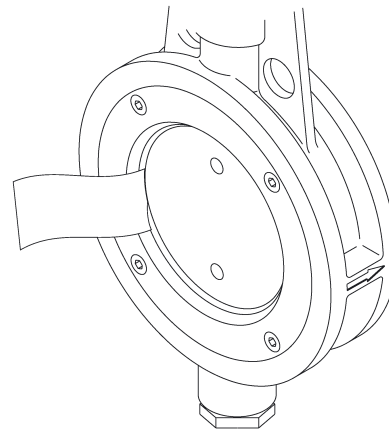


Fig. 6

For ball valves:

The valve should be operated at 90° in both on/off and control applications.

1. Check the function of the valve and the opening angle.
2. Loosen the adjusting screw a few turns.
3. Open the valve fully using a wrench or air pressure.
4. Screw the adjusting screw gently against the stop.
5. Seal with thread sealing tape and lock with the nut.

Tightening torque: tie-rods and nuts

The table 1 (to the right) shows the maximum permitted tightening torques for tightening tie-rods and nuts when the actuator has been dismantled.

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

Table 1

Service and maintenance

SOMAS actuator type A is in principle maintenance free, provided that it is supplied with dry and clean instrument air at the correct pressure.

Spare parts are available in the form of sealing kits and repair kits.

The sealing kit contains a number of seals necessary for a standard overhaul of the cylinder section.

The repair kit contains all of the sealing components, bushings and bearings required to restore the actuator to its original condition.

Order numbers for respective kits and actuator sizes can be found in table below.

Kit components are shown in the drawings on pages 9 through 11.

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

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

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

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

Table 2



Replacing the sealing kit

For actuators in option -E (ATEX), see also service- and mounting instruction Mi-503-E.

Double-acting actuator types:

A11, 21, 31, 41, 51 - DA (Fig. 8)

1. Disconnect internal air piping.
2. Unscrew the nuts (A). Remove the washers (B) and the end cover (C).
3. Dismantle the cylinder tube (D).
4. Dismantle the screw (E), washer (F), guide ring (G) and piston (H).
5. Loosen the screws (I) and dismantle the seal retainer (J).
6. Replace the piston rod seal (K) and refit the seal retainer.
7. Replace the O-ring (L) in the housing end cover and the O-ring (M) on the piston rod.
8. Fit a new piston seal (N) and a new O-ring (O) on the piston disc (H). Screw together the complete package on the piston rod and fit a new guide ring (G).
9. Replace the O-ring (P) on the end cover. Refit the cylinder tube and end cover.

A13, 23, 33, 43 - DA (Fig. 7)

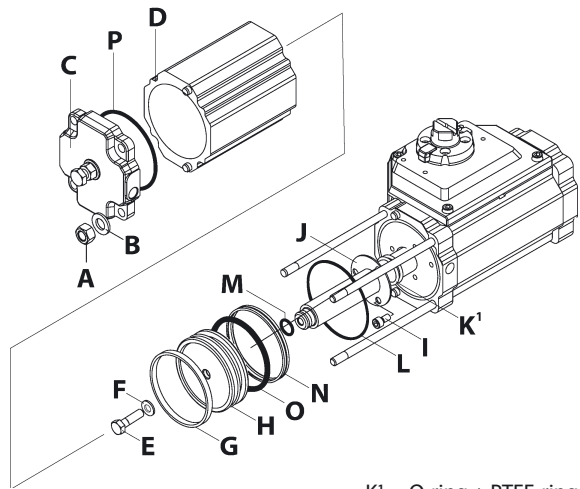
1. Disconnect internal air piping.
2. Unscrew the nuts (A). Remove the washers (B) and the end cover (C).
3. Loosen the nuts (R). Dismantle the washers (S) the cylinder tube (D) and the tie-rods (Y).
4. Unscrew the screw (E). Dismantle the washer (F) and piston (H).
5. Unscrew the screws (U) and remove front end cover (V).
6. Replace the piston rod seal (K) and O-ring (L).
7. Refit the front end cover.
8. Replace the O-ring (Z) in the front end cover and the O-ring (M) on the piston rod.
9. Fit a new piston seal (N) and new O-ring (O) on the piston rod.
10. Screw together the complete package on the piston rod and fit a new guide ring (G).
11. Replace the new O-ring (P) in the end cover.
12. Refit the cylinder tube, tie-rods and end cover.

A22, 32, 42, 52 - DA

See "Replacing the sealing kit" A11, 21, 31, 41, 51 - DA above.

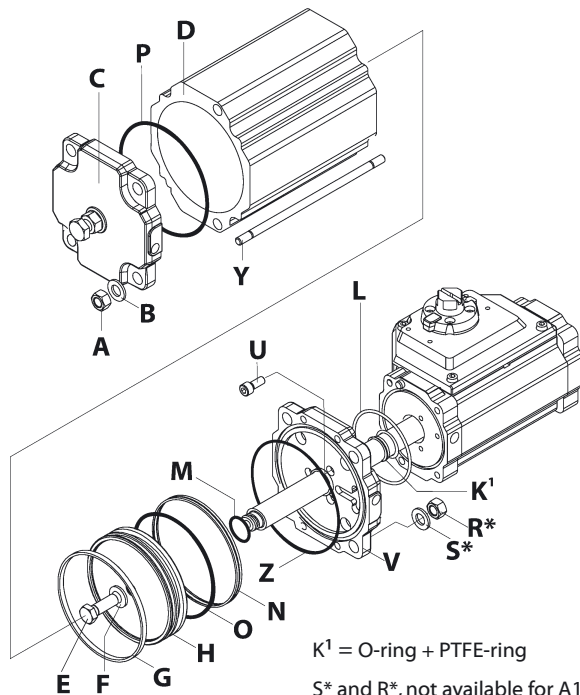
A24, 34, 44 - DA

See "Replacing the sealing kit" A11, 21, 31, 41, 51 - DA and "Replacing the sealing kit" A13, 23, 33, 43 - DA above.



K¹ = O-ring + PTFE-ring

Fig. 6



K¹ = O-ring + PTFE-ring

S* and R*, not available for A13-DA

Fig. 7

Replacing the sealing kit, continued.



SAFETY WARNING!
Read instructions carefully.

Single-acting actuator types:

A13, 23, 33, 43 - SC (Fig. 8)

1. Disconnect internal air piping.
2. Unscrew the adjusting screw (Q) to its outermost position.
3. Loosen the nuts (R), 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 (S) completely. Check with Somas if "tension" from the spring remains.
For actuator size A13-SC loosen the nuts (A) in the same way.
4. Dismantle the end cover (C), cylinder tube (D) and tie-rods (Y).
5. Unscrew the screw (E), dismantle the guide ring (G), piston (H) and spring package (T).
6. Unscrew the screws (U). Remove the front end-cover (V). Replace the piston rod seal (K) and O-ring (L). Refit the front end cover.
7. Replace the O-ring (Z) in the front end cover and the O-ring (M) on the piston rod.
8. Refit the spring package.
9. Fit a new piston seal (N) and O-ring (O) on the piston disc. Screw together the complete package on the piston rod and fit a new guide ring (G).
10. Replace the O-ring (P) on the end cover.
11. Refit the cylinder tube, tie-rods and end cover.
12. Tighten the nuts (R), alternating crosswise. Do not exceed maximum tightening torques for tightening (see table 1, at page 5).

An end position adjustment should be made if the device is fitted on a valve. See page 4.

A13, 23, 33, 43 - SO (Fig. 9)

1. Disconnect internal air piping.
2. Screw the adjusting screw (Q) to its outermost position.
3. Loosen the nuts (R) 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 (S) completely. Check with Somas if "tension" from the spring remains.
For actuator size A13-SO loosen the nuts (A) in the same way.
4. Dismantle the end cover (C), cylinder tube (D), tie-rods (Y) and spring package (T).
5. Unscrew the spacer (X) and dismantle the piston (H).
6. Unscrew the screws (U). Remove the front end cover (V). Replace the piston rod seal (K) and O-ring (L). Refit the front end cover.
7. Replace the O-ring (Z) in the front end cover and the O-ring (M) on the piston rod.
8. Fit a new piston seal (N) and O-ring (O) on the piston disc and screw the entire package on the piston rod.
9. Fit a new guide ring (G) and refit the spacer.
10. Refit the spring package and fit a new O-ring (P) in the end cover.
11. Refit the cylinder tube, tie-rods and end cover.
12. Tighten the nuts (R), alternating crosswise. Do not exceed maximum tightening torques for tightening (see table 1, at page 5).

An end position adjustment should be made if the device is fitted on a valve. See page 4.

A24, 34, 44 - SC and A24, 34, 44 - SO

See "Replacing the sealing kit" A13, 23, 33, 43 - SC and "Replacing the sealing kit" A13, 23, 33, 43 - SO above.

Tightening torque: tie-rods and nuts

The table 1 (to the right) shows the maximum permitted tightening torques for tightening tie-rods and nuts when the actuator has been dismantled.

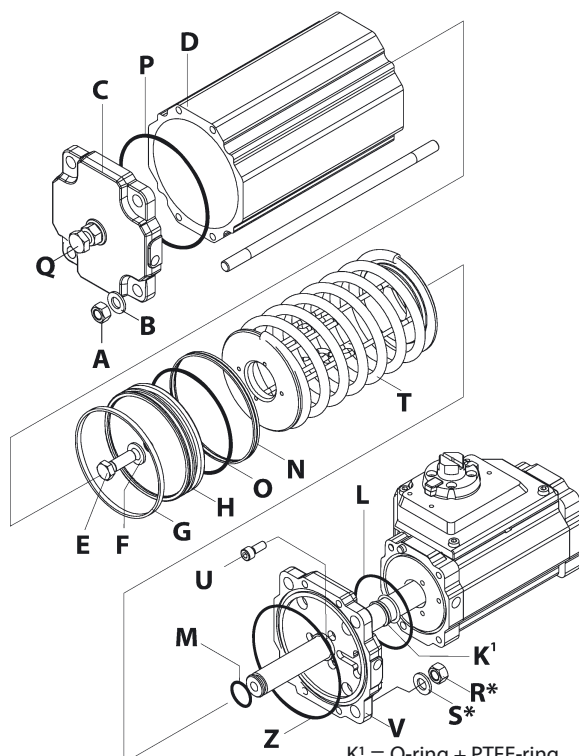


Fig. 8

K' = O-ring + PTFE-ring
S* and R*, not available for A13-SC

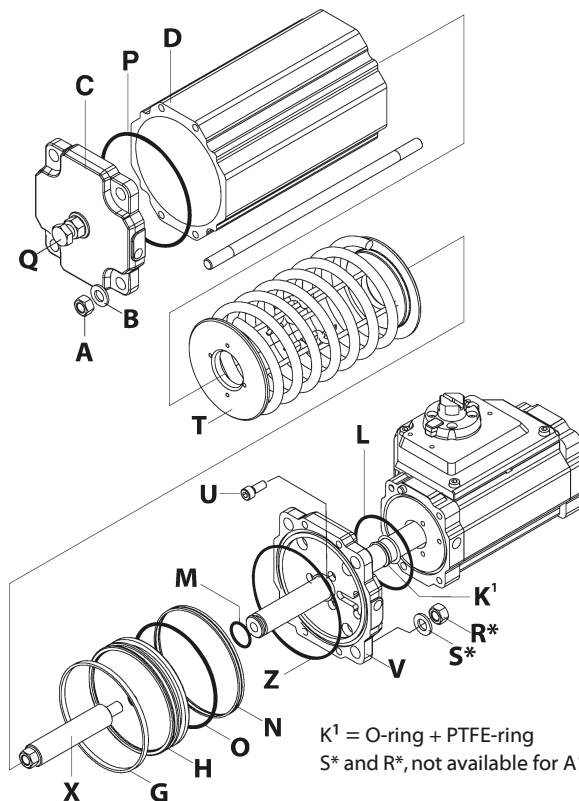


Fig. 9

K' = O-ring + PTFE-ring
S* and R*, not available for A13-SO

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

Table 1



Replacing the repair kit

For actuators in option -E (ATEX), see also service- and mounting instruction Mi-503-E.

1. Dismantle the actuator from the valve.
2. Dismantle the driver (B) by loosening the screws (A). If your actuator includes a positioner, dismantle the positioner/switch box and mounting block first.
3. Loosen the screws (C) and dismantle the cover (D).
4. Dismantle the screw (E) and lift up the pivot pin (F).
5. Twist the upper link arm (G) off of the lever and pull it out from the piston rod together with the swivel bolt (H).
6. Move the piston rod so that the whole lever can be lifted out of the housing and dismantle the lower link arm (L) from the lever.
7. Fit new bushings (I) in the cover (D) respective bottom of the housing.
8. Fit new O-rings (J) and new bushings (K) on the lever.
9. Fit the new lower link arm (L) with pivot pin (M) on the lever. Lock with the screw (N).

NOTE! The position of the washers.

10. Fit the new pin bolt (H) and washer on the new upper link arm (G) and lock with locking ring (O).
11. Refit the lever in the actuator housing. For ATEX connect the grounding cable (R) 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 (F). NOTE! The right position for the washers is demonstrated in the drawing, see Fig. 11). Lock with screw (E).
14. Fit a new seal (P) and refit the cover and the driver.

See "Replacing the sealing kit" on pages 6 and 7 to replace other parts in the repair kit. Note that 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.

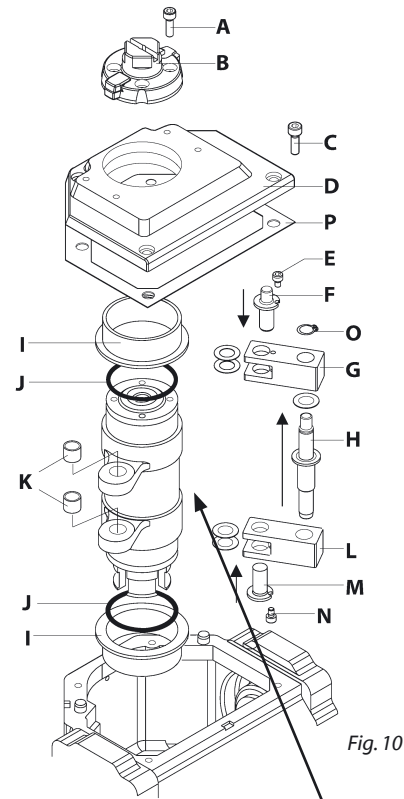


Fig. 10

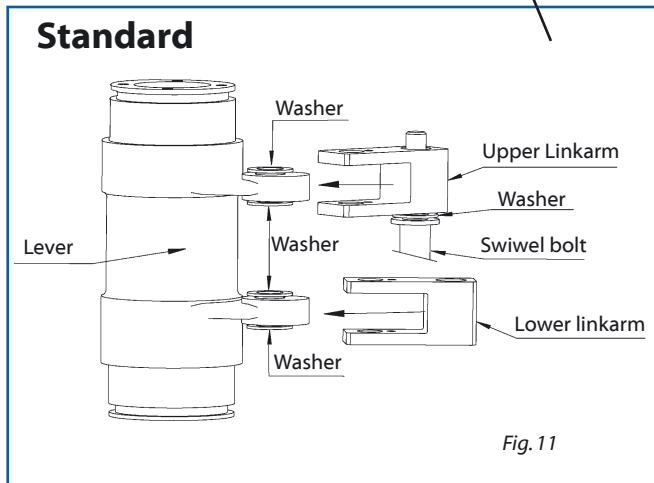


Fig. 11

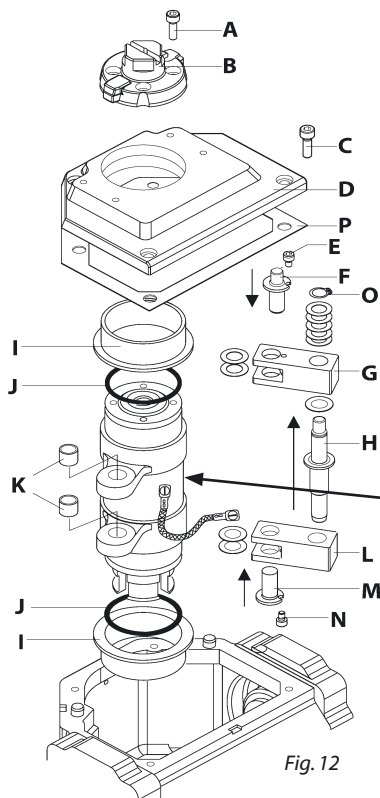


Fig. 12

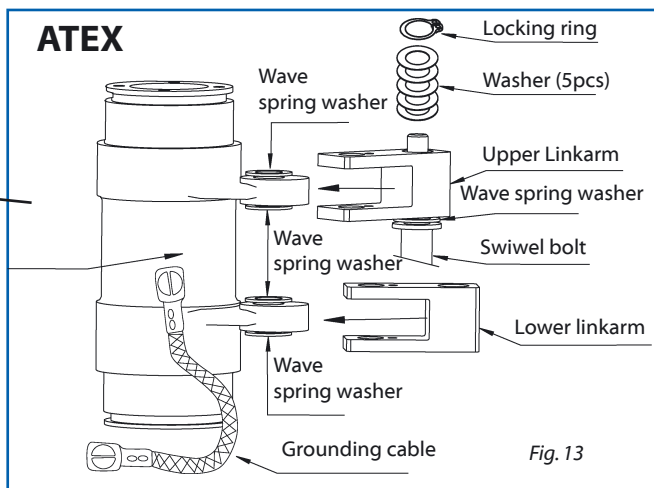


Fig. 13



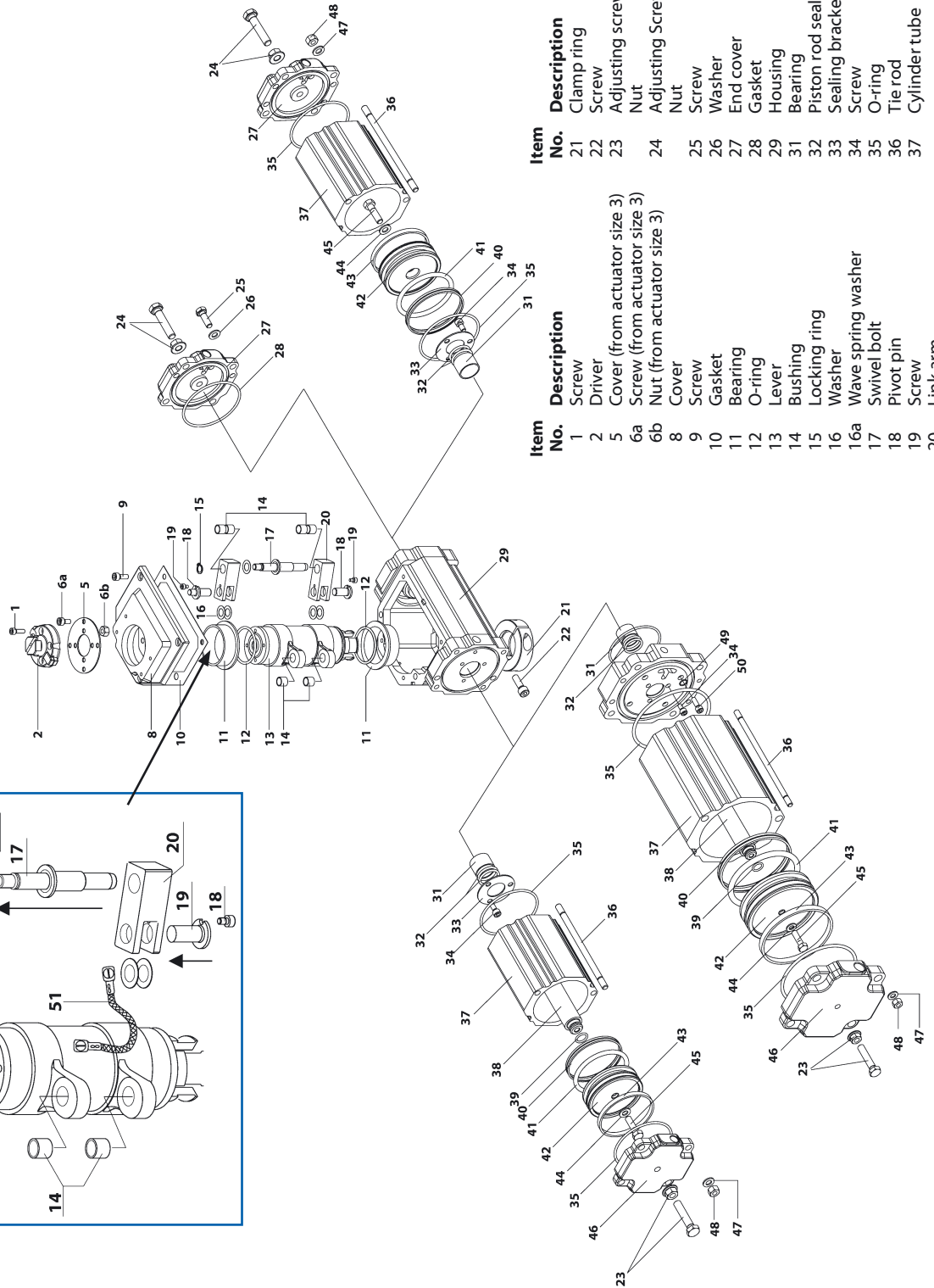
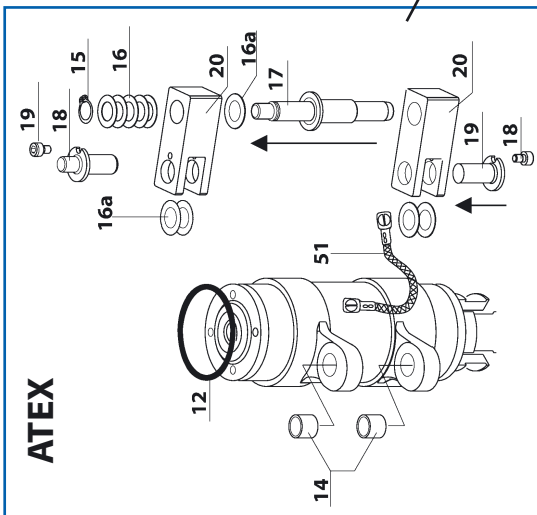
Actuator type DA

Sealing kit (A-DA)

Item No. 28, 32, 35, 39, 40, 41 and 43.

Repair kit (A-DA)

Item No. 10, 11, 12, 14, 15, 16, 16a, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 and 51.



Item No.	Description
1	Screw
2	Driver
5	Cover (from actuator size 3)
6a	Screw (from actuator size 3)
6b	Nut (from actuator size 3)
8	Cover
9	Screw
10	Gasket
11	Bearing
12	O-ring
13	Lever
14	Bushing
15	Locking ring
16	Washer
16a	Wave spring washer
17	Swivel bolt
18	Pivot pin
19	Screw
20	Link arm
21	Clamp ring
22	Screw
23	Adjusting screw
24	Nut
24	Adjusting Screw
24	Nut
25	Screw
26	Washer
27	End cover
28	Gasket
29	Housing
31	Bearing
32	Piston rod seal, cpl.
33	Sealing bracket
34	Screw
35	O-ring
36	Tie rod
37	Cylinder tube
38	Piston rod
39	O-ring
40	Piston seal
41	O-ring
42	Piston
43	Guide ring
44	Washer
45	Screw
46	End cover
47	Washer
48	Nut
49	O-ring
50	Screw
51	Grounding cable



Actuator type A-SC

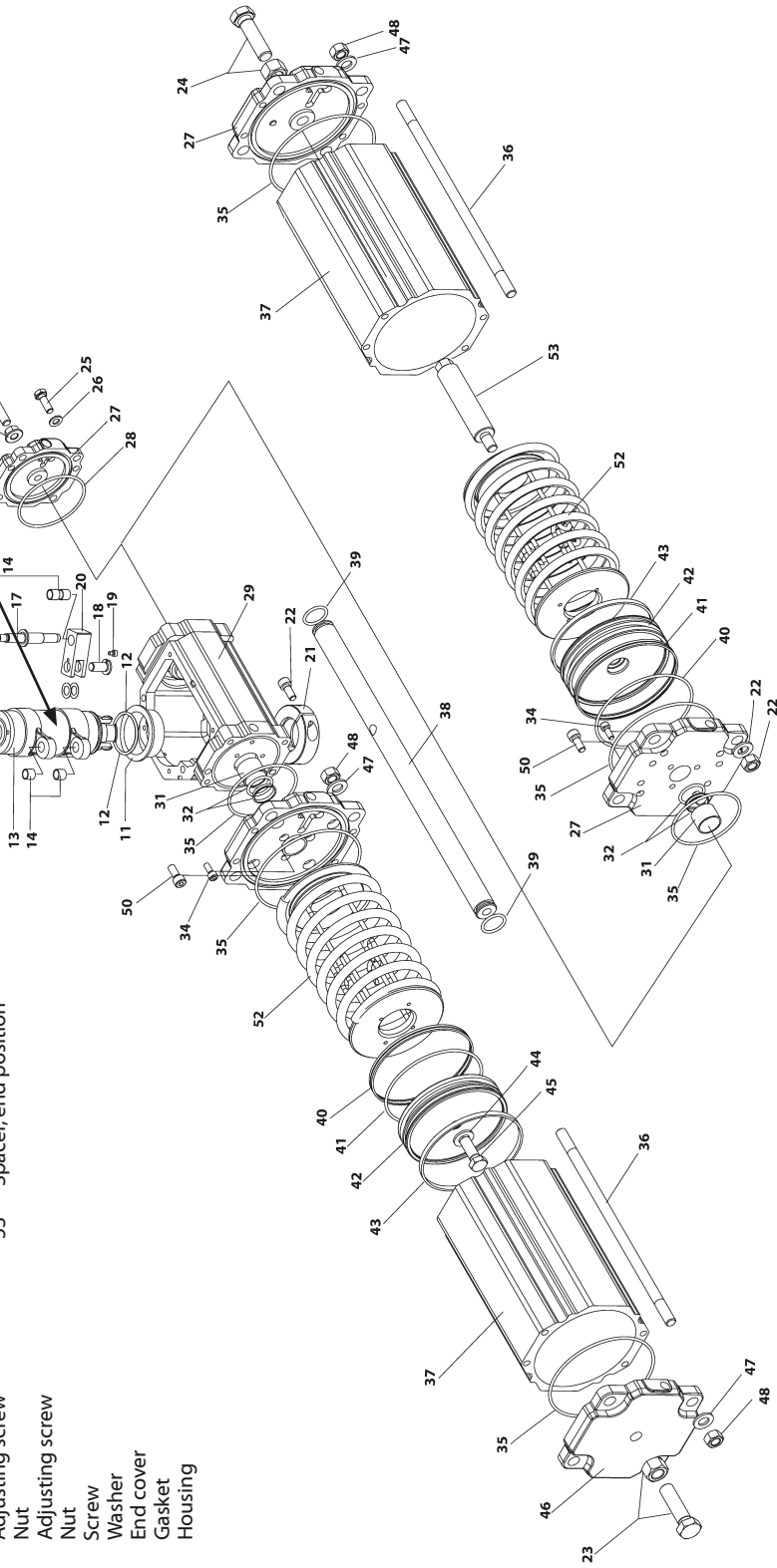
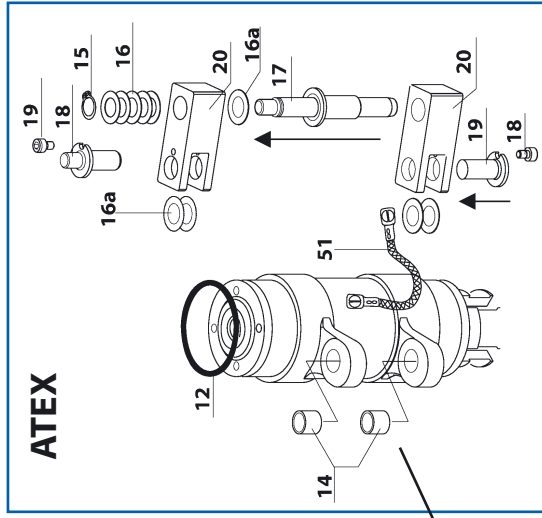
Sealing kit (A-SC)

Item No. 28, 32, 35, 39, 40, 41 and 43.

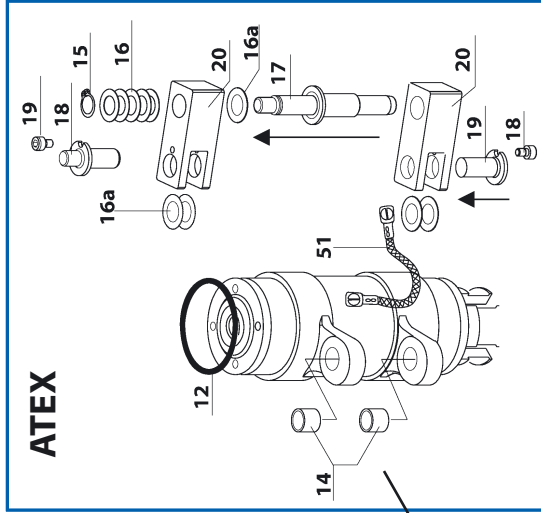
Repair kit (A-SC)

Item No. 10, 11, 12, 14, 15, 16, 16a, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43 and 51.

Item No.	Description
1	Screw
2	Bearing
31	Bearing
32	Piston rod seal, cpl.
34	Screw
35	O-ring
36	Tie rod
37	Cylinder tube
38	Piston rod
39	O-ring
40	Piston seal
41	O-ring
42	Piston
43	Guide ring
44	Washer
45	Screw
46	End cover
47	Washer
48	Nut
49	O-ring
50	Screw
51	Spring kit
52	Grounding cable
53	Spacer, end position
5	Cover (from actuator size 3)
6a	Screw (from actuator size 3)
6b	Nut (from actuator size 3)
8	Cover
9	Screw
10	Gasket
11	Bearing
12	O-ring
13	Lever
14	Bushing
15	Locking ring
16	Washer
16a	Wave spring washer
17	Swivel bolt
18	Pivot pin
19	Screw
20	Link arm
21	Clamp ring (D≤50)
22	Screw
23	Adjusting screw
24	Nut
25	Adjusting screw
26	Nut
27	Screw
28	Washer
29	End cover
30	Gasket
31	Housing



Actuator type A-SO



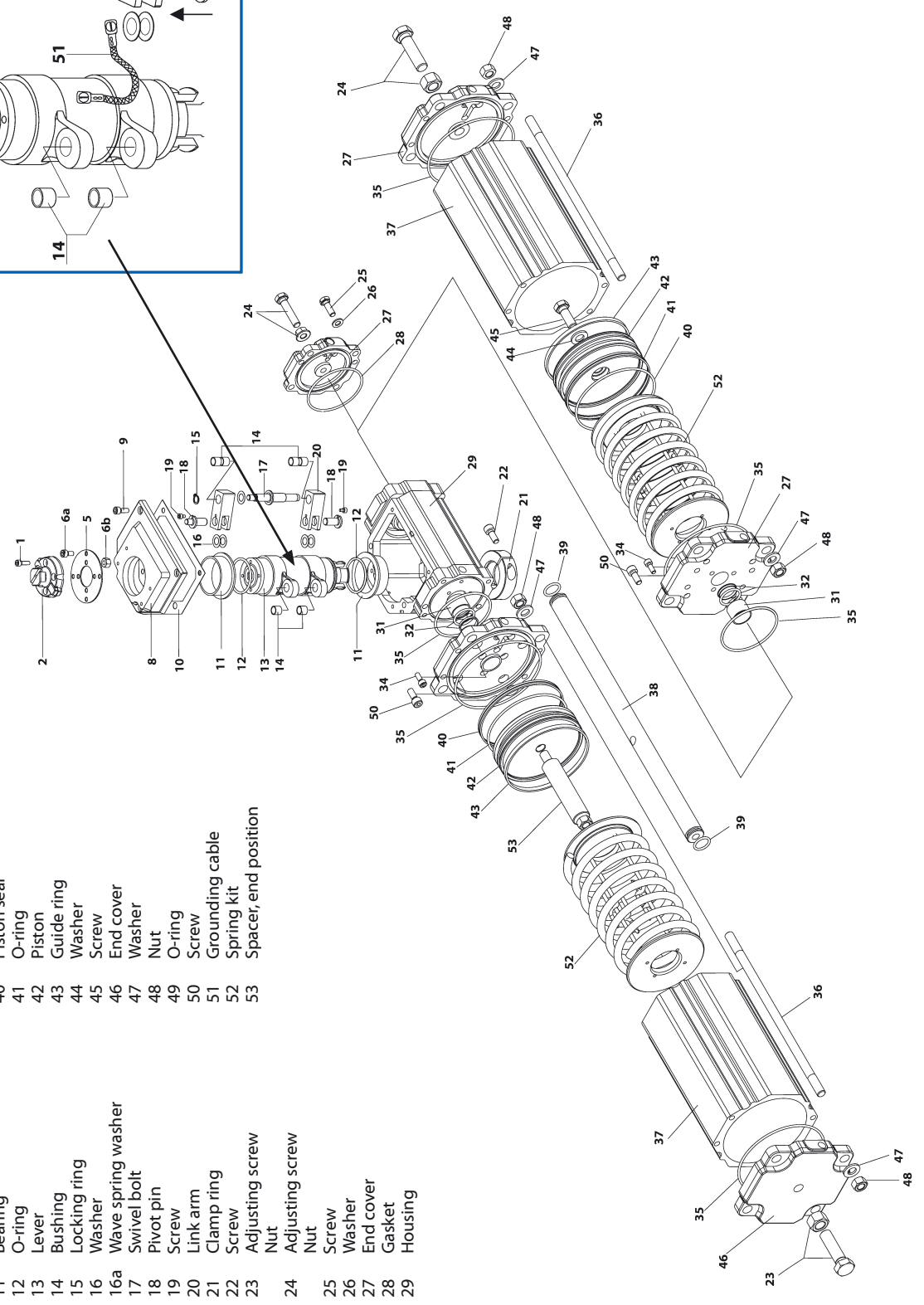
Sealing kit (A-SO)

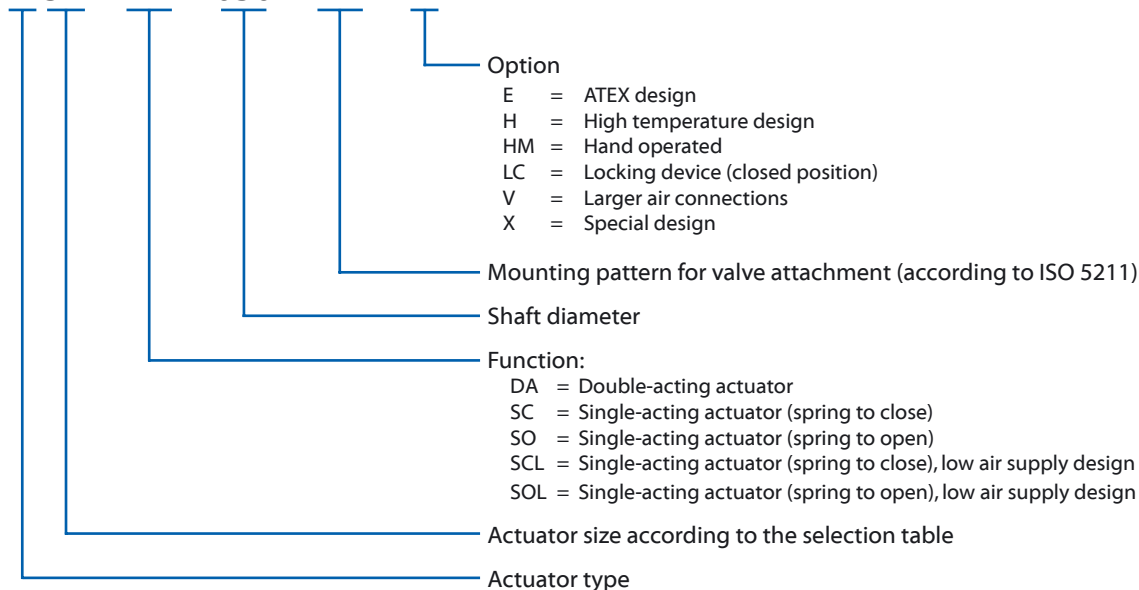
Item No. 28, 32, 35, 39, 40, 41 and 43.

Repair kit (A-SO)

Item No. 10, 11, 12, 14, 15, 16, 16a, 17, 18, 20, 28, 31, 32, 35, 39, 40, 41, 43, and 51.

Item No.	Description	Item No.	Description
1	Screw	31	Bearing
2	Driver	32	Piston rod seal, cpl.
5	Cover (from actuator size 3)	34	Screw
6a	Screw (from actuator size 3)	35	O-ring
6b	Nut (from actuator size 3)	36	Tie rod
8	Cover	37	Cylinder tube
9	Screw	38	Piston rod
10	Gasket	39	O-ring
11	Bearing	40	Piston seal
12	O-ring	41	O-ring
13	Lever	42	Piston
14	Bushing	43	Guide ring
15	Locking ring	44	Washer
16	Washer	45	Screw
16a	Wave spring washer	46	End cover
17	Swivel bolt	47	Washer
18	Pivot pin	48	Nut
19	Screw	49	O-ring
20	Link arm	50	Screw
21	Clamp ring	51	Grounding cable
22	Screw	52	Spring kit
23	Adjusting screw	53	Spacer, end position
24	Nut		
25	Adjusting screw		
26	Washer		
27	End cover		
28	Gasket		
29	Housing		



**Type designation, actuator type A****A 32 – DA – 050 – F14 – H****Material specification**

Housing, cover, End cover:	Aluminium (Duasolid painted)
Cylinder:	Aluminium (Duasolid painted)
Tie rod:	EN 1.4305
Piston seal:	Carbon filled PTFE- + O-ring made of cold-resistant nitrile rubber
Screws/nuts:	Stainless steel
Connection:	Plastic tubing (standard)
(between actuator and accessories)	Stainless steel tubing (option)

Technical specification

Supply air:	Dry and clean instrument air
Air supply:	4 - 8 bar
Rotary motion:	Max 95° adjustable travel stops
Ambient temperature:	– 40° to + 90° C (standard) (+ 120° C Option O-ring made of Viton)

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SOMAS reserves the right to make changes to these instructions and specifications without prior notice.**SOMAS**®

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