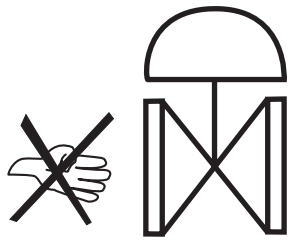
OPERATING INSTRUCTION
PNEUMATIC ACTUATOR TYPE S

Mi-501 EN

Edition: 1999-06



Safety Information

To make absolutely sure that no one can be injured when operating a valve equipped with an actuator (pneumatic, electric or hydraulic), outside the pipe system, fingers, hands or arms should not be placed inside the valve or at the sealing surface when the supply energy is connected to the actuator.

The Somas type S actuator is a double-acting pneumatic actuator for rotation angles of up to 90°.. Characteristic of this actuator is its low friction and freedom from backlashes, giving low hysteresis. It is well suited for on-off and control applications.
The actuator has been developed for Somas ball segment- and butterfly valves, but can easily be adapted to valves of other makes.

STORAGE AND HANDLING

Check on delivery of the actuator that it has not suffered any damage in transit.

Store the actuator so it is protected from contamination. A good storage area will usually be dry, cool and clean.

LIFTING

Lift the actuator at the central part. If a valve is fitted, see the instructions for the valve. If a valve positioner is fitted to the actuator, never lift the actuator by the impulse pipes.

FITTING TO A VALVE

The actuator type S is mounted to the valve by using a bracket.

In the bottom of the central part of the actuator there are drilled and tapped holes used for mounting.

Check that the keyway and key in the valve stem are undamaged.

Make sure that correct function is obtained when the actuator is placed over the stem.

When a bracket is used, this must first be fitted to the valve, after which the actuator is fitted to the bracket. The screws must be screwed into the actuator from below through the bracket. (Four screws for S21 and larger actuators).

When the actuator has been mounted, the end position must be adjusted. See ADJUSTMENT.

ALTERNATIVE MOUNTING ARRANGEMENTS

Actuator S will work in any position and can be mounted in four different positions. Alternative 1 below is the standard mounting arrangement, but other mounting arrangements may be used, as dictated by the circumstances.

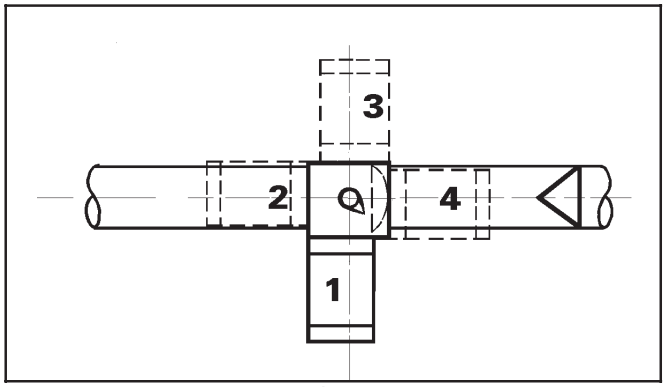


Fig. 1

CHANGING THE MOUNTING POSITION

Unscrew the screws securing the actuator to the valve or bracket. Turn the actuator so that the valve opens 110° from the closed position. Drive the actuator upwards with a rubber or plastic mallet. For pressing the actuator of the stem use the existing screws acc. to the fig. Lift the actuator right off the spindle and then put it back in the desired position. Remount the actuator.

Position the actuator in the correct mounting position. Turn the valve stem and the actuator 110° towards open position. Drive down the actuator with a plastic or a rubber mallet. Turn the actuator back to the closed position.
Make sure that the open and closed position of the actuator is correct versus the bracket and the valve. Tighten the screws towards the actuator and the valve. After the mounting position has been changed, the limit positions should be adjusted.

ADJUSTMENT

The motion of the actuator is limited in the closed position by a stop screw and in the open position by a limit position screw.
The stop screw allows the rotation angle on closing to be limited ± 5°.
The limit position screw is used to limit the stroke of the valve, which in turn depends on its function. Each screw must be operative when the actuator is at the relevant end position.

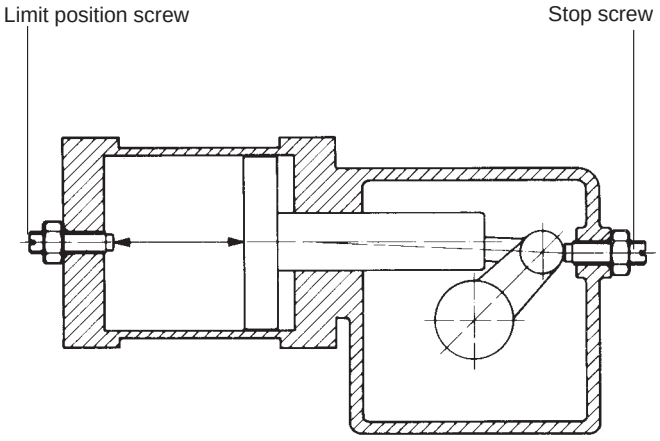


Fig. 2

Adjusting the closed position

Check that the supply pressure to the actuator is correct. Slacken the lock nut and unscrew the stop screw a few turns.

For KVT + KVTW + KVTF:

Operate the actuator with a key or with air so that the segment centres in the seat. Having first applied sealing tape to the stop screw thread, screws in the stop screw and lock with the lock nut. (S3 + S4 with double pistons).

For KVX + KVXW + KVXF:

Fit a reducing valve in the air supply. Set the pressure to 50% of the appropriate supply pressure. Operate the valve to the closed position with air. Check that the segment meets the seat. Then open and close the valve, increasing the supply pressure by 0,5 bar steps. When the valve begins to have difficulty in opening after closing, reduce the pressure by 0,5 bar and close the valve. Seal the stop screw thread with tape and screw in the screw to the stop. (S3 + S4 with double pistons).

For VSS + MTV:

Fit a reducing valve in the air supply. Set the pressure to 50% of the appropriate supply pressure and close the valve with the stop screw backed off. Screw in the stop screw to the stop and then screw it out half a turn. Seal the stop screw thread with tape. (S3 + S4 with double pistons). Lock with the lock nut.

Adjusting the open position

Check the operation of the valve and its opening angle. Slacken the limit position screw and unscrew it a few turns.

For KVT/KVX + KVTW/KVXW + KVTF/KVXF:

In both on-off and control applications the valve must be operated 90symbol 176 \f “Kino MT” \s 12. Open the valve fully with a key or air and check that the orifice is completely free.

Screw the end position screw lightly against the stop. Seal with tape (S3 + S4 with double pistons). Lock with the lock nut.

For VSS + MTV:

As an on-off valve, the valve must open 80° for max. capacity. As a control valve it must open 60°.

Open the valve to the desired position. Screw in the screw, seal with tape (S3 + S4 with double pistons). Lock with the lock nut.

INSTRUCTIONS

The exploded drawing in Fig. 3a and Fig. 3b is largely self-explanatory as far as dismantling and assembly are concerned. Instructions for certain operations are given below.

Replacing the piston seal

1. Remove the rear cylinder end plate. Pull the cylinder tube off the piston. Check the cylinder inside for scratch marks and other possible damages.
   Clean and lubricate the cylinder inside with any pure silicon grease.
2. Remove the old piston seal and clean the groove thoroughly.
3. Fit a new piston seal. Slip the PTFE ring carefully over the piston. No scarp tools to be used.
4. If necessary, replace the O-rings in the cylinder end plates.
5. Check the position of the piston seal on the piston on reassembly.
6. Refit the cylinder end plate.
7. Test the piston unit for leakage by connection of supply pressure.

Replacing the link arm

1. Remove cover, cylinder end plate and cylinder. Release the link arm from the lever and pull the piston straight out.
2. Release the flanged tube and drive out the piston bolt, part No. 6.
3. Fit a new link arm, the piston bolt and O-ring.
4. Put back the flanged tube. This will be easier if a mounting sleeve is used; see Fig. 4.
   Lock the screws in the flanged tube with Loctite.

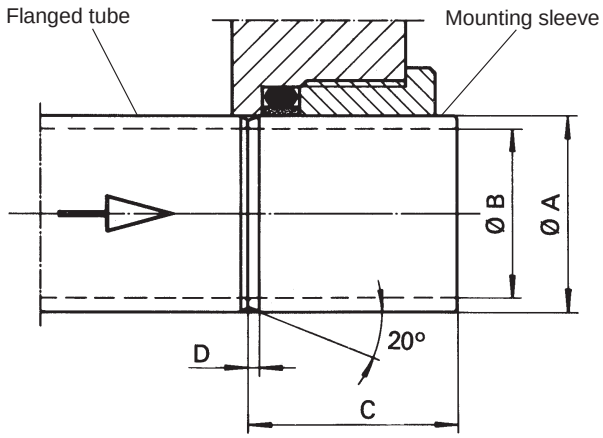


Fig. 4

Replacing the lever bearing

1. Remove any positioner. Remove pointer and cover.
2. Remove locking pin 16 and swivel bolt 17. Use pliers.
3. Twist the lever out of the link arm and pull it straight upwards.
4. Drive the bushings out of the cover and actuator centre. Drive them from the top of the cover and from the bottom of the actuator.
5. Fit new bushings.
6. Replace the lever O-rings and, if necessary, the cover gasket.
7. Reassemble.

Replacing the flanged tube bearing

1. Remove the cover, end plate and cylinder tube.
2. Release link arm from the lever.
3. Pull the piston straight out.
4. Remove the front cylinder end plate.
5. Unscrew the bushing from the end plate.
   Avoid impacts; grind a flat piece of metal to fit the slots in the bushing.
6. Remove the seal and clean before fitting a new seal.
7. Replace the bushing if necessary and tighten, firmly on assembly.
8. Replace the gasket between housing and end plate if it is damaged.
9. Fit the front cylinder end plate. Apply Loctite to threads and underside of screw head.
10. Test the piston unit for leakage by connection of supply pressure.
11. Reassemble.

Actuator	A	B	C	D
S10 - 13	25	22	35	2
S21 - 24	38	34	40	2.5
S31 - 35	55	50	50	2.5
S41 - 48	75	69	70	3

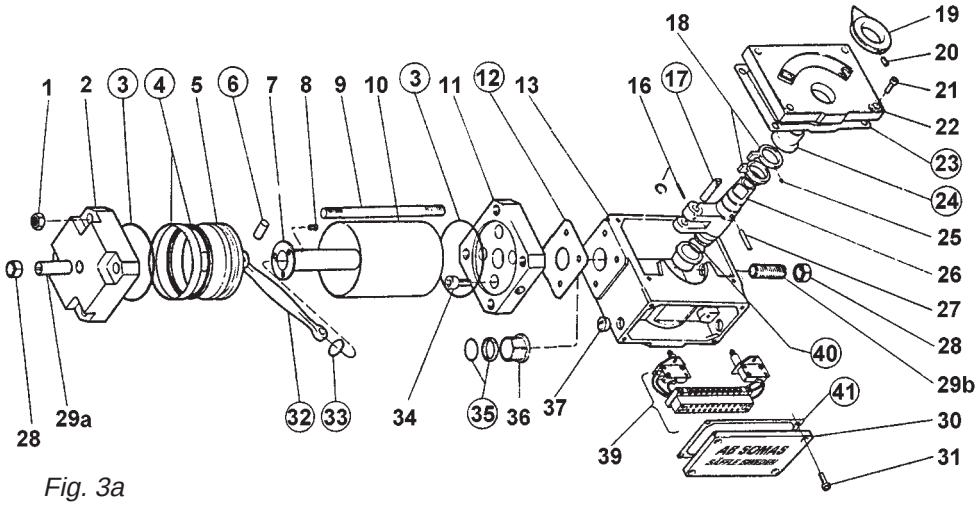


Fig. 3a

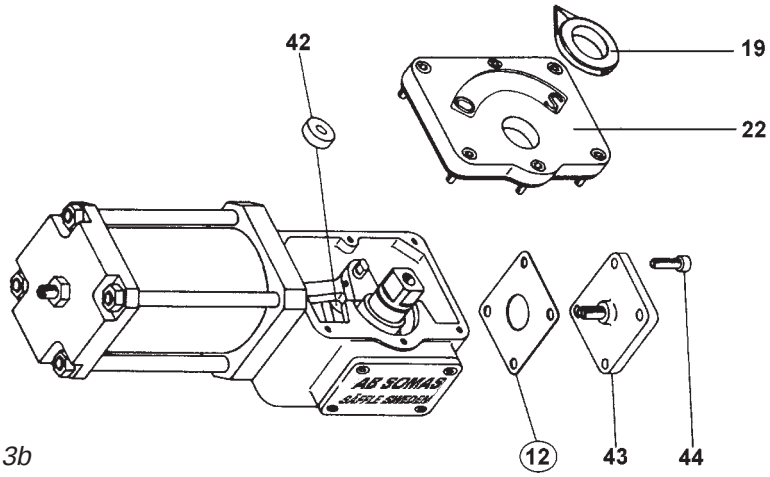


Fig. 3b

Item No.	Description	Included in the sealing kit	Included in the repair kit
1	Nut		
2	Rear end plate		
3	O-ring	X	X
4	Piston sel cpl.	X	X
5	Piston		
6	Piston bolt		X
7	Flanged tube		
8	Screw		
9	Pull rod		
10	Cylinder tube		
11	Front end plate		
12	Gasket	X	X
13	Housing		
16	Locking pin		
17	Swivel bolt	X	X
18	Indicator ring		
19	Indicator		
20	Stop screw		
21	Screw		
22	Cover		

Item No.	Denominación	Included in the sealing kit	Included in the repair kit
23	Gasket	X	X
24	Bushing		X
25	Stop screw		
26	Lever		
27	Roll pin		
28	Nut		
29	Adjusting screw		
30	Cover		
31	Screw		
32	Link arm		X
33	O-ring	X	X
34	Screw		
35	Shaft seal, cpl.	X	X
36	Bushing		
37	Plug		
39	End position switches		
40	O-ring	X	X
41	Gasket	X	X
42	Spacer ring		
43	Cover		
44	Screw		

SERVICING AND MAINTENANCE

Actuators type S are essentially maintenance-free, if the actuator is supplied with dry, clean air at the correct pressure. Larger actuators, size S41 and upwards, have two nipples to lubricate the lever.
The recommended lubrication interval for heavy duty is once a month, and these actuators should therefore be included in a lubrication chart.

Spare parts

Four size classes of actuator type S are available. Difference between the classes being in the central part. For each size there is several variants suitable for different valve size and torque requirements. Each type of actuator contains a number of components. Experience has shown that it is hardly any demand for a range of spares covering every part. Somas will therefore supplies most of the spares in kits to cover most needs.

When ordering please state actuator type, size and part number. Recommended sealing and repairing kits may be ordered by stating the part number below.

Sealing kit

This kit contains all seals, as shown in the diagram below. The description and instructions apply in principle, even if the actuator in question has two cylinders. In such cases the sealing kit will have twice the number of relevant parts.

The entire sealing kit is a recommended spare part. Its ordering number is given below.

Repair kit

Restore the actuator to the ”as new” condition by using the repair kit containing the parts listed below.

Part No. for spare part

Actuator size	**S10**	**S12**	**S13**	**S15**	**S21**	**S22**	**S23**	**S24**	**S31**
Sealing kit	13519	13519	13520	13519	13521	13522	13522	13523	13528
Repair kit	13547	13547	13574	13577	13548	13549	13549	13550	13565
Actuator size	**S32**	S33	**S35**	**S41**	**S42**	**S45**	**S46**	**S47**	**S48**
Sealing kit	13529	13530	13540	13535	13534	13536	13537	13539	13538
Repair kit	13559	13567	13563	13571	13561	13570	13566	13564	13562

LIMIT SWITCHES

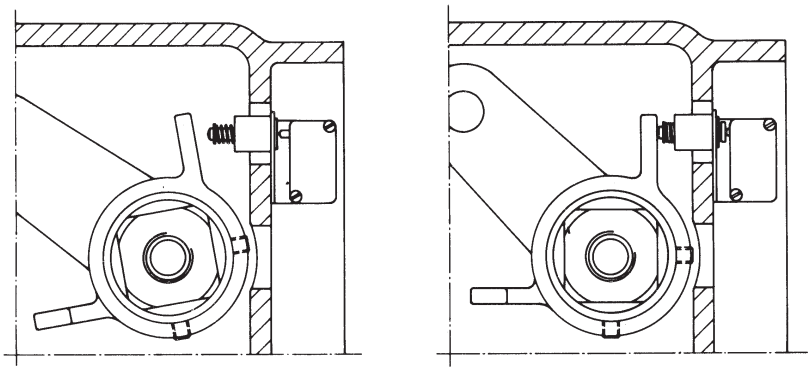
Actuator type S can be fitted with limit switches, built in or external. External switches are special, and are subject to separate instructions.
On the side of the actuator it is a cast box in which mechanical or inductive switches can be fitted.

Mechanical limit positions

The mechanical limit position switches are Honeywell type V5-CO1OTB3. They are available as a spare part, mounted on an angle bracket with a mechanical, spring-loaded stop pin, and connected to a terminal block with 12 connections.

The type designation for mechanical switches is:

L00 Double switches for open-closed position.
L01 Single switch, closed position.
L02 Single switch, open position.

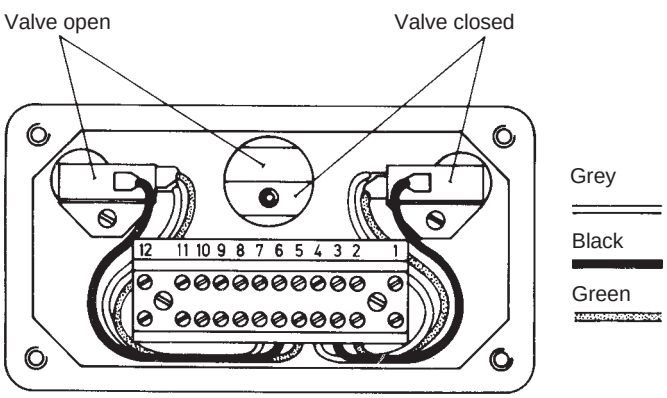


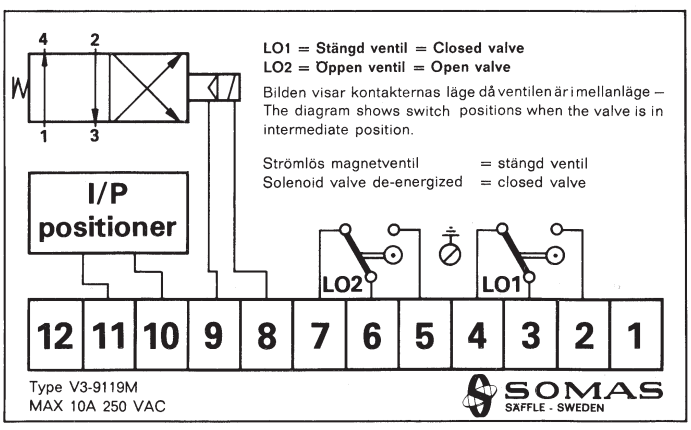
Installation

Remove the cover from the box. Position the valve at the limit position at which the switch is required to operate. Install the switch(s) in the two holes in the bottom of the box and secure with screws. Fit the terminal block.

Adjustment

In the bottom of the box it is a round hole through which two indicator rings can be seen. The lower ring is intended for adjusting the closed-position contact, the right-hand switch. The indicator ring is locked with an Allen screw accessible through the hole. Slacken the screw and turn the indicator ring by means of the Allen key tool until its switch is activated. Tighten the screw and check for correct operation by connection the switch when operating the actuator. For double switches, turn the actuator to the other limit position, when the Allen screw of the other indicator ring will appear, and adjust the switch as above.





PROXIMITY LIMIT SWITCHES

All the brands and types in dimension M12 are possible to mount. Depending on lengths one or two extension frame/s have to be used on the box. The standard switches are mounted on a mounting plate and connected to a terminal block.

The type designations are:

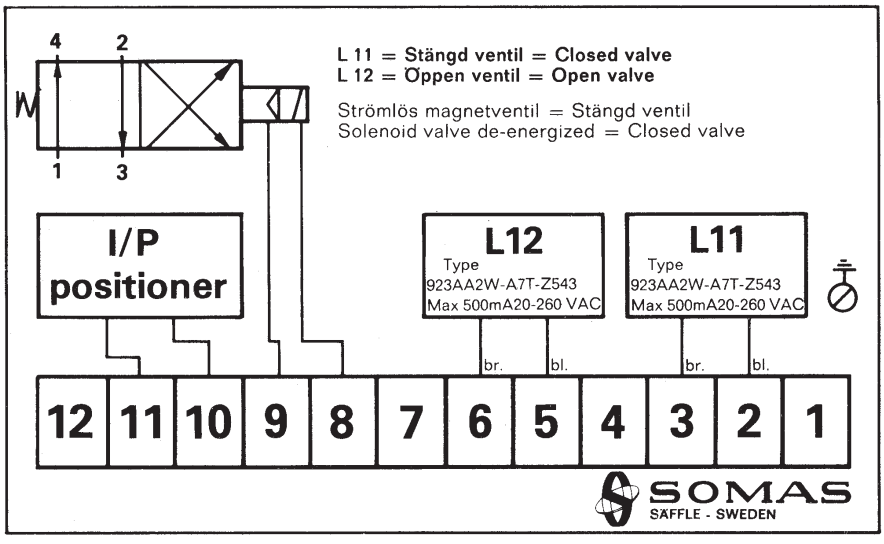
L10 Double switches for Open-Closed.
L11 Single switch for Closed position.
L12 Single switch for Open position.

Installation

Remove the cover on the box. Proximity switches are supplied with an extension frame, special screw for fixing and distance pins to mount the terminal block. Fit the inductive proximity to the round holes in the bottom of the box and secure them with screws. See Fig. Fit the terminal block with distance pins. Fit the extension frame after the limit positions have been adjusted.

Adjustment

Turn the actuator to the limit position to be adjusted. Check that the switch has not been screwed in so far that it is damaged by the indicator ring.
The lower ring activates the right-hand switch, which is for the closed position. The upper ring activates the left-hand switch in the open position.
Slacken the Allen screw retaining the indicator ring. Connect the proximity switch electrically so that a signal can be obtained. Check that the actuator is at its limit position. Turn the ring by means of the Allen key tool until the switch operates. The switch can be adjusted vertically in its fixing plate. By altering this vertical adjustment and turning the indicator ring, adjust for reliable switch operation without the risk of harmful mechanical contact.



Wiring

Wiring diagram is to be found inside the box.

Air supply

Somas type S actuators must be supplied with dry, clean instrument air. The listed torque figures are for 6 bar supply air pressures. Certain combinations of actuator and valve are intended to be supplied at lower pressures. Always check the correct supply pressure before connecting.

Somas reserves the right to make improvements without prior notice.

SOMAS®

Representative

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