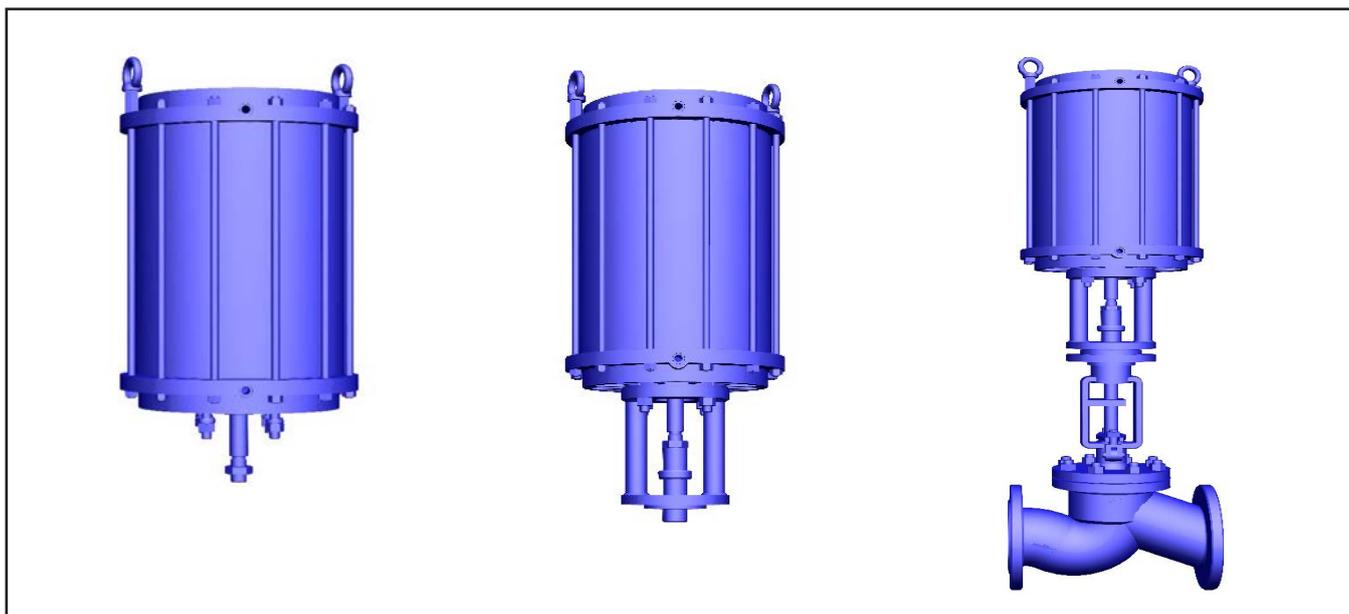


SISTO-LAP

For use on valves with
a linear stem movement



Contents

	Glossary	3
1	General	4
	1.1 Principles	4
	1.2 Contact data	4
	1.3 Target group.....	4
	1.4 Other applicable documents	4
2	Safety	4
	2.1 Key to safety symbols/markings	4
	2.2 General	5
	2.3 Intended use	5
	2.4 Consequences and risks caused by non-compliance with these instructions	5
	2.5 Safety awareness	6
	2.6 Safety information for the operator/user	6
	2.7 Safety information for maintenance, inspection and installation.....	6
	2.8 Unauthorised modification and manufacture of spare parts	6
	2.9 Unauthorised modes of operation.....	6
3	Transport and storage	6
	3.1 Checking the condition upon delivery	6
	3.2 Corrosion protection.....	6
	3.3 Transport.....	6
	3.4 Storage	7
4	Product information	7
5	Marking of the pneumatic actuators	7
6	Pneumatic piston actuator for industry and building services	8
	6.1 Sectional drawings/ Drawings.....	8
	6.2 Function	9
	6.3 Installation.....	9
	6.4 Commissioning/Start-up/Shutdown	11
7	Manual override of pneumatically actuated valves	11
	7.1 Manual override of double-acting (LAP-AZ) actuators.....	11
	7.2 Manual override of fail-open (LAP-OF) actuators	12
	7.3 Manual override of fail-close (LAP-SF) actuators	12
	7.4 Manual override with travel stop in closing direction of double-acting (LAP-AZ) actuators	13
	7.5 Manual override with travel stop in opening direction of fail-open (LAP-OF) actuators.....	13
	7.6 Manual override with travel stop in opening direction of fail-close (LAP-SF) actuators.....	14
8	Servicing/Maintenance	14
	8.1 Safety informations	14
	8.2 Maintenance	14
9	Removing a pneumatic actuator from a valve/Mounting a pneumatic actuator on a valve	15
10	Trouble-shooting	16
	10.1 General	16
	10.2 Faults and remedies	16
11	Disposal and recycling	16
	Declaration of incorporation of partly completed machinery in accordance with machinery directive 2006/42/EC	17

Glossary

Type series booklet

The type series booklet SISTO-LAP (9210.1) can be downloaded at:

www.sisto.lu or
<https://products.ksb.com/>

Operating manual

The operating manual can be downloaded at:

www.sisto.lu or
<https://products.ksb.com/>

LAP-AZ = OPEN/CLOSED = double-acting actuators

- Air-to-open
- Air-to-close

LAP-OF = opening spring = actuator fail-open

- Spring-to-open
- Air-to-close

LAP-SF = closing spring = actuator fail-closed

- Air-to-open
- Spring-to-close

1 General

1.1 Principles

These installation instructions for partly completed machinery apply to all pneumatic actuators of the type series SISTO-LAP.

In the event of damage, discrepancies and questions, immediately contact SISTO Armaturen S.A. in order to maintain the right to claim under warranty.

Correct installation and maintenance or repair will ensure smooth operation of the pneumatic actuators.

The manufacturer assumes no responsibility for the pneumatic actuators if these installation instructions are not complied with.

The descriptions and instructions in the installation instructions refer to the standard models but are also applicable to variants.

The sectional drawings shown in these installation instructions provide examples of the general design of the pneumatic actuators.

The numbers in brackets [] refer to the part numbers in the list of components of the relevant type series booklet SISTO-LAP 9210.1.

1.2 Contact data

SISTO Armaturen S.A.
After Sales Services
18, rue Martin Maas
L-6468 Echternach Luxembourg

Tel.: +352 32 50 85-1

Fax: +352 32 89 56

E-mail: sisto@ksb.com

www.sisto.lu

1.3 Target group

The target group of these installation instructions is technically trained specialist personnel.

1.4 Other applicable documents

Document	Description
Type series booklet SISTO-LAP 9210.1 (download at: www.sisto.lu or at https://products.ksb.com/)	Description of the actuator SISTO-LAP
Operating manual/Installation instructions for partly completed machinery 0570.821 (download at: www.sisto.lu or at https://products.ksb.com/)	Operating manual/Installation for partly completed machinery for diaphragm valves, swing check valves and pneumatic actuators

2 Safety

2.1 Key to safety symbols/markings

Symbol	Description
	DANGER In conjunction with the signal word DANGER this symbol indicates a high-risk hazard which, if not avoided, will result in death or serious injury.
	WARNING In conjunction with the signal word WARNING this symbol indicates a medium-risk hazard which, if not avoided, could result in death or serious injury.
	CAUTION In conjunction with the signal word CAUTION this symbol indicates a low-risk hazard which, if not avoided, could result in minor injury.
	ATTENTION In conjunction with the signal word ATTENTION this symbol indicates a hazard for the machine and its functions.
	NOTE This symbol indicates recommendations and important information on how to handle the product.

2.2 General

These installation instructions contains general installation, operating and maintenance instructions. These instructions must be observed to ensure safe operation and prevent personal injury and damage to property.

Comply with all the safety instructions given in the individual sections of this installation instruction.

The installation instructions must be read and understood by the responsible specialist personnel/operators prior to installation and commissioning.

The contents of these installation instructions for partly completed machinery must be available to the specialist personnel at the site at all times.

Information attached directly to the pneumatic actuator (e.g. nominal pressure) must always be complied with and be kept in a perfectly legible condition at all times.

The operator is responsible for any eventualities or incidents which may occur during installation performed by the customer, operation and maintenance.

The operator is responsible for ensuring compliance with all local regulations.

Pneumatic actuators must only be operated by skilled personnel.

Incorrect operation of a pneumatic actuator may have adverse effects on the entire system, for example:

- Leakage of the fluid handled.
- System/machine brought to a standstill.
- Impairment/reduction/increase of the system's/machine's function/effect.

For any queries or in the event of damage, contact the manufacturer.

For any queries and repeat orders, in particular for purchasing spare parts, please specify if possible:

- type series and/or variant details,
- order number,
- year of construction
- part number.

The installation instructions for partly completed machinery must be kept for the entire life cycle of the equipment.

When assembling components from various manufactures, the operating manuals of the individual components must also be complied with.

The design, manufacture and testing of SISTO Armaturen S.A. pneumatic actuators are subject to a QM system to DIN EN ISO 9001 as well as the Machinery Directive 2006/42/EC.

Other than normal loads and operating conditions (temperature, pressure, special corrosive, chemical or abrasive influences, etc.) must be specified fully and clearly in the purchase order so that the actuator manufacturer can prepare and suggest suitable measures. Such measures may influence

- selection of the materials,
- variants.

The pneumatic actuators must not be operated outside the permissible operating range. The application limits are indicated on the nameplate or in the applicable type series booklet. Operation outside the above-mentioned conditions will result in overloads the pneumatic actuators cannot withstand.

Non-observance of this warning may cause personal injury and damage to property, for example:

- Injuries resulting from fluid leakage (cold/hot, toxic, pressurised, etc.).
- Impairment of the pneumatic actuator's function or their destruction.

2.3 Intended use

- The intended use of the pneumatic actuators is documented in the corresponding type series booklets.
- The pneumatic actuators must only be operated in perfect technical condition. The temperature range and pressure range indicated in the corresponding type series booklet.
- SISTO pneumatic actuators can be used with the control medium air according to ISO 8573-1.
Operation above 0 °C, purity class 5.4.4 should be used: filter 40 µm, oil concentration 5 mg/m³, dewpoint 3 °C.
Operation until -10 °C purity class 5.3.4 should be used: filter 40 µm, oil concentration 5 mg/m³, dewpoint -20 °C.
To determine the required air quality, take into account the specification of all components used in the system.

2.4 Consequences and risks caused by non-compliance with these instructions

Non-compliance with safety information can jeopardize the safety of personnel, the environment and the pneumatic actuator itself.

Non-compliance with these installation instructions will result in loss of warranty and forfeiture of any and all rights to claims for damages.

Non-compliance can, for example, have the following consequences:

- failure of important pneumatic actuator functions,
- failure of prescribed maintenance and servicing practices,
- hazard to persons by electrical, mechanical and chemical effects,
- hazard to the environment due to leakage of hazardous substances.

2.5 Safety awareness

In addition to the safety information contained in this operating manual and the intended use (see chapter 2.3), the following safety regulations shall be complied with:

- accident prevention, health regulations and safety regulations,
- explosion protection regulations,
- safety regulations for handling hazardous substances,
- applicable standards, directives and laws.

2.6 Safety information for the operator/user

The pneumatic actuators are intended for use in areas which cannot be accessed by unauthorised persons. Operation of the pneumatic actuators in areas which can be accessed by unauthorised persons is only permitted if appropriate protective equipment are fitted at the site. This is the responsibility of the integrator or operator.

- Fit protective equipment (e.g. contact guards) supplied by the operator for hot, cold or moving parts, and check that the equipment functions properly.
- Do not remove any protective equipment (e.g. contact guards) during operation.
- Electrical hazards must be eliminated. For details refer to VDE regulations and the safety regulations laid down by the local energy supply companies, for instance.
- Guards for live components must be regularly checked for any damage. The valve must never be operated without appropriate protection.

2.7 Safety information for maintenance, inspection and installation

- The operator is responsible for ensuring that all maintenance, inspection and installation work be performed by skilled and trained personnel.
- Only perform work on an unpressurised, cooled down and completely drained pneumatic actuator.
- Shut down the the pneumatic actuator before performing any work on it. The shutdown procedure described in these installation instructions must be adhered to without fail.
- As soon as the work has been completed, re-install and re-activate any safetyrelevant devices and protective devices.
- Before returning the product to service, observe all instructions on commissioning.

2.8 Unauthorised modification and manufacture of spare parts

Modifications or alterations of the pneumatic actuator are only permitted with the manufacturer's prior consent.

Use only original spare parts and parts authorised by the manufacturer. The use of other parts can invalidate any liability of the manufacturer for resulting damage.

2.9 Unauthorised modes of operation

The warranty relating to the operating reliability and safety of the pneumatic actuator supplied is only valid if the equipment is used in accordance with its intended use as described in Section 2.3 and in accordance with the operating manual of the valve.

The limits stated in the technical documentation must not be exceeded under any circumstances.

3 Transport and Storage

The pneumatic actuators are ready for operation upon delivery. The connection ports are closed with suitable material (caps, plugs, covers).

3.1 Checking the condition upon delivery

Upon receipt of the goods, check immediately that the goods are complete and undamaged.

3.2 Corrosion protection

As a standard, pneumatic actuators made of non-corrosion-resistant materials are coated with a primer offering adequate corrosion protection under ambient conditions normally encountered in buildings.

	ATTENTION
If the equipment is intended for use in a corrosion-inducing atmosphere, the user must apply a protective coating on site.	

3.3 Transport

- Take suitable precautions to prevent damage during transport.
- Ensure sufficient stability. Use standard-compliant transport equipment.

Use any lifting lugs provided.

Transport lugs acc. to DIN 580 on the actuators shall be used exclusively for transporting actuators that are not mounted on a valve (see Figs. 1 and 2).



Figure 1: Correctly suspended



Figure 2: Incorrectly suspended

For the weight of the pneumatic actuator refer to the relevant type series booklet or the nameplate.

After delivery and prior to installation, check the pneumatic actuator for any in-transit damage.

3.4 Storage

Storage/temporary storage of the pneumatic actuators must ensure that even after a prolonged period of storage the function of the pneumatic actuator will not be impaired. The following requirements must be met:

- Storage in packaged condition to protect the seating surfaces against damage.
- Measures are taken to protect the equipment against dirt, humidity, frost and corrosion:
 - using foils,
 - using caps,
 - storage in dry, closed rooms.
- The storage temperature must be between -30 °C and +50 °C.

Ensure sufficient stability.

4 Product information

Product information as per Regulation No. 1907/2006 (REACH):

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see <http://www.ksb.com/reach>.

5 Marking of the pneumatic actuators

The nameplate indicates the following information:

- Type series designation
- Actuator size, spring code, stroke
- Pmax (max. control pressure), date of manufacture
- Ident.-number
- Weight

SISTO	
Typ/Type	<input type="text"/>
Größe/Size	<input type="text"/>
Steuerdruck Supply pressure max.bar(g)	<input type="text"/> Dat: <input type="text"/>
SISTO-Nr SISTO-No	<input type="text"/>
sisto@ksb.com A KSB Company • KSB	

Figure 3: Nameplate

Spring-loaded actuators are additionally marked with a sign reading „**WARNING: Loaded spring, do not disassemble!**“.



Figure 4: Warning sign

6 Pneumatic piston actuator for industry and building services

6.1 Sectional drawings/ Drawings

The sectional drawings below provide examples of the general design/configuration of the pneumatic actuators.

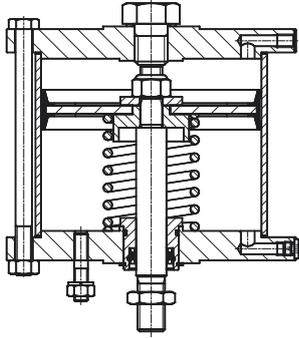


Figure 5: SISTO-LAP-OF

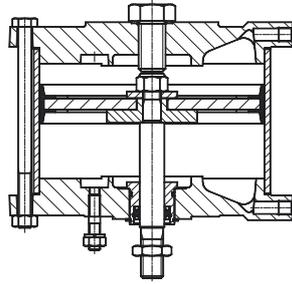


Figure 6: SISTO-LAP-AZ

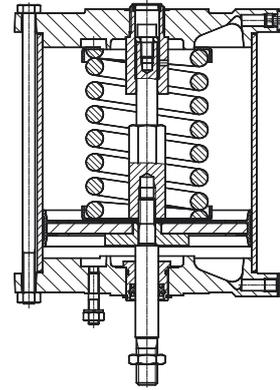


Figure 7: SISTO-LAP-SF

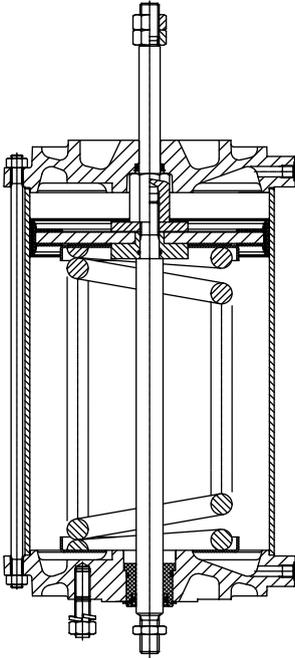


Figure 8: SISTO-LAP-OF-DK

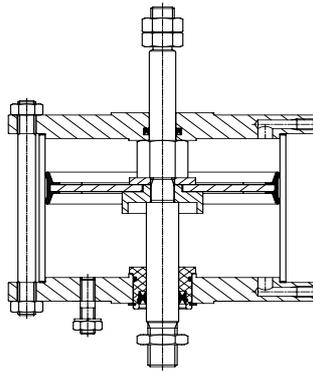


Figure 9: SISTO-LAP-AZ-DK

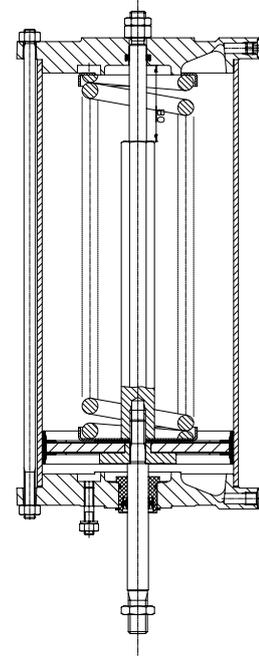


Figure 10: SISTO-LAP-SF-DK

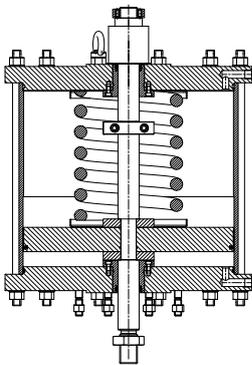


Figure 11: SISTO-LAP-SF-500-DK

6.2 Function

Pneumatic actuators are available in the following designs: "fail-closed" = SF, "fail-open" = OF and "double-acting" = AZ.

	NOTE
	The actuators are automatically taken to their fail-safe positions as soon as the control air is intentionally or unintentionally released. The visible moving parts of the actuator (Fig. 12) also serve as position indicators.

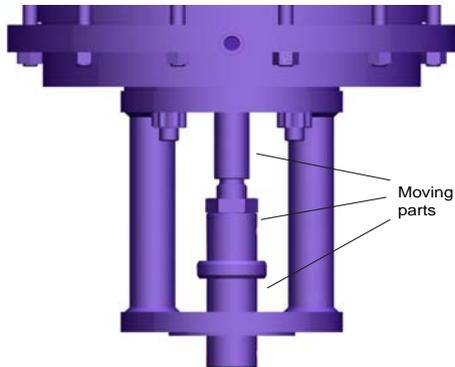


Figure 12: SISTO-LAP

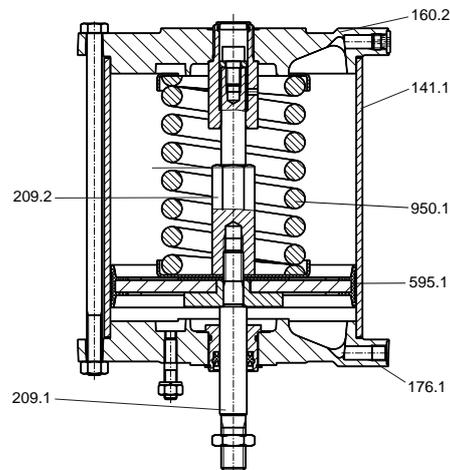


Figure 13: SISTO-LAP-SF

The functional unit of the pneumatic piston actuator (Fig. 13) consists:

- Bottom end cap [176.1],
- Cylinder [141.1],
- Top end cap [160.2],
- Piston [595],
- Spring [950.1],
- Lower piston rod [209.1],
- Upper piston rod [209.2].

6.3 Installation

6.3.1 General information/Safety regulations

Responsibility for positioning and installing the pneumatic actuators always lies with the engineering company, construction company or operator/user.

Planning and installation errors may impair the reliable function of the pneumatic actuators and pose a substantial safety hazard. Compliance with the following requirements is of particular importance.

Pneumatic actuators must be set for the stroke of the valve to be automated, see Section 9.2.

	NOTE
	Do not paint any parts which are relevant to the function of the actuators, such as moving piston rods, Coupling and position indicator. Do not use actuators as footholds.

	CAUTION
	Risk of crushing through moving parts! Pneumatic actuators with external moving elements must be fitted with protective covers, or other suitable measures must be taken to prevent accidents.

	ATTENTION
	Protect pneumatic actuators from too high or too low temperatures! If valves are operated at high temperatures (>+80 °C) or at low temperatures (<-10 °C), the actuators must be protected. The temperature limits are specified in the type series booklet.

6.3.4 Installation position

Shut-off valves with pneumatic actuators must be installed with the stem in a vertical position. If this condition cannot be met, adequately support the valve on site or consult the manufacturer. We generally recommend supporting actuators to withstand vibrations in the piping (see Figures 14 and 15).

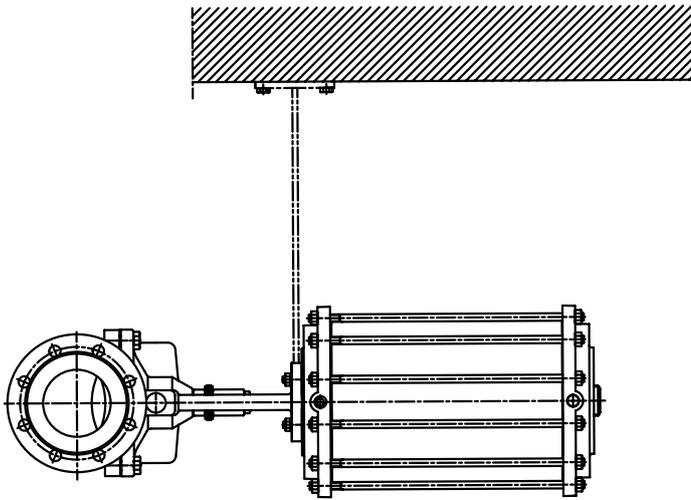


Figure 14: Sketch of the support of a pneumatic actuator – horizontal

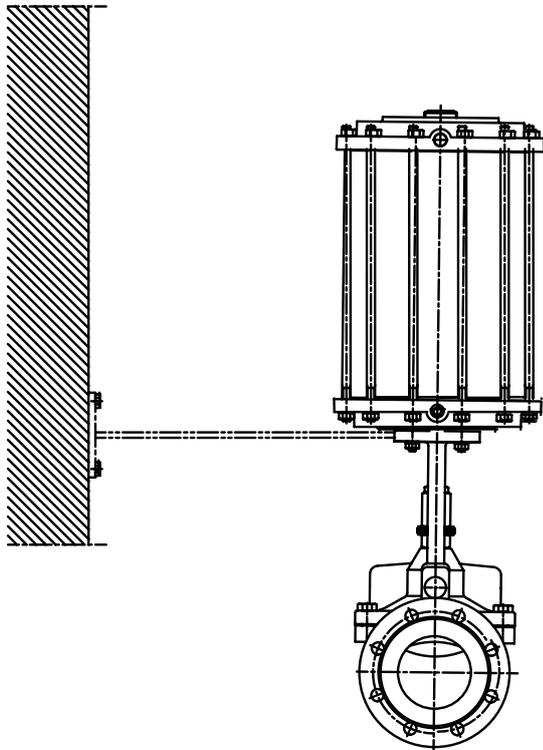


Figure 15: Sketch of the support of a pneumatic actuator - vertical

6.3.5 Special designs

For positioning and installing special valve designs please, contact the consultant, construction company or operator.

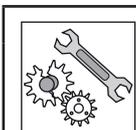
6.3.6 Insulation

If the valve is to be insulated, make sure that the insulation does not impair the function of the valve. SISTO Armaturen S.A. recommends to make sure that the sealing areas at the bonnet joints and at the stem passage are easily accessible and visible.

6.4 Commissioning/Start-up/Shutdown

(Please also refer to Section 6.3, Installation)

6.4.1 Commissioning/Start-up

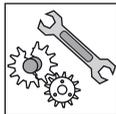


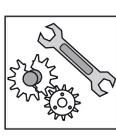
ATTENTION

SISTO pneumatic actuators can be used with the control medium air according to ISO 8573-1.

- Operation above 0 °C, purity class 5.4.4 should be used: filter 40 µm, oil concentration 5 mg/m³, dewpoint 3 °C.
- Operation until -10 °C purity class 5.3.4 should be used: filter 40 µm, oil concentration 5 mg/m³, dewpoint -20 °C.

To determine the required air quality, take into account the specification of all components used in the system.

	<p>ATTENTION</p> <p>On valves with pneumatic actuators the actuator strokes must be limited. Non-compliance could result in substantial valve damage.</p>
---	--

	<p>ATTENTION</p> <p>Risk of overload!</p> <p>For pneumatic actuators, the control pressures specified in the order shall be complied with. Non-observance may damage the actuator.</p> <p>For actuating forces please contact the manufacturer, if required.</p>
---	--

6.4.2 Shutdown

Measures to be taken for shutdown:

1. Shutdown the valve (refer to the relevant documentation of the valve).
2. Stop pneumatically auxiliary energy and depressurize actuator.
3. Further procedure see Section 9.1.

7 Manual override of pneumatically actuated valves by fitted emergency handwheel in the event of auxiliary energy failure

7.1 Manual override of double-acting actuators (LAP-AZ):

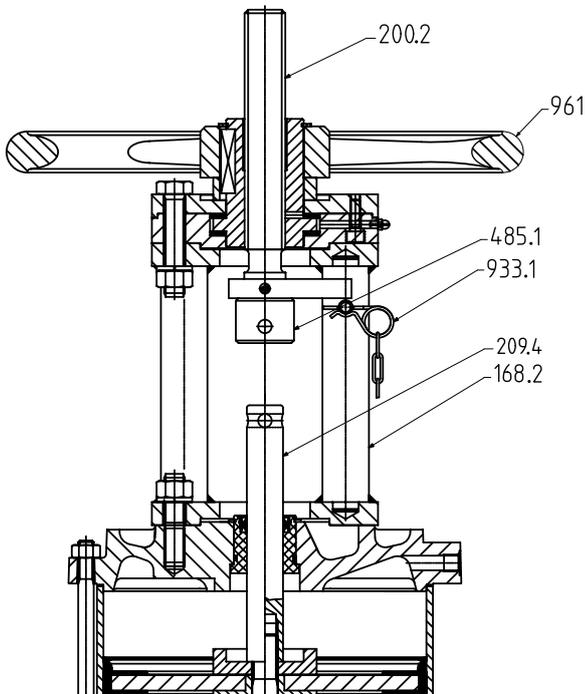


Figure 16 - Double-acting actuator (LAP-AZ)

If the auxiliary energy supply fails, the actuator can be operated manually by means of the emergency handwheel [961] mounted on the pneumatic actuator (LAP).

For the pneumatic actuator to be operated via the emergency handwheel [961] in emergencies, the two systems connected with each other:

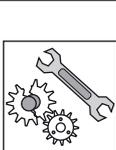
1. Turn the handwheel [961] in clockwise direction to position the upper stem [200.2] and stem coupling [485.1] on the upper piston rod [209.4].
2. Connect the stem coupling [485.1] and the piston rod [209.4] using the splint pin [933.1] supplied.

Actuator in closed position: Turn the handwheel [961] clockwise.

Actuator in open position: Turn the handwheel [961] anti-clockwise.

In normal operation, the emergency handwheel [961] is disengaged from the pneumatic actuator.

	<p>ATTENTION</p> <p>Risk of system malfunction!</p> <p>Automatic operation of the pneumatic actuator with the manual override engaged could result in actuator/valve damage and system malfunction.</p>
---	---

	<p>ATTENTION</p> <p>Risk of system malfunction!</p> <p>Prior to returning to normal operation:</p> <ol style="list-style-type: none"> 1. Remove the splint pin [933.1]. 2. Turn the handwheel [961] anti-clockwise until the stem [200.2] has been returned to its initial position. 3. Finally, remove the splint pin [933.1] and insert it into the drilled hole provided in the yoke [168.2] below the anti-rotation device fitted on the stem.
---	---

7.2 Manual override of fail-open actuators (LAP-OF):

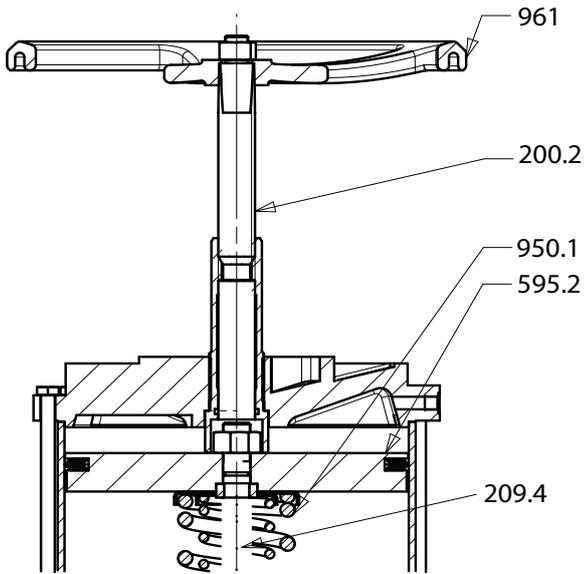


Figure 17: Fail-open actuator (LAP-OF)

If the auxiliary energy supply fails, the actuator can be manually operated in closing direction by means of the emergency handwheel [961] mounted on the pneumatic actuator (LAP).

To operate the pneumatic actuator via the emergency handwheel [961] in emergencies, proceed as follows:

1. Turn the handwheel [961] clockwise.
2. The stem [200.2] will compress the spring pack via the piston [595.2], thus closing the valve.
3. The emergency handwheel [961] cannot be used to actuate a mechanically blocked valve.

In normal operation, the emergency handwheel [961] is without function.

ATTENTION	
	<p>Risk of system malfunction!</p> <p>Before reactivating normal operation:</p> <ul style="list-style-type: none"> • Turn the handwheel [961] anti-clockwise to return the stem [200.2] to its initial position up to the stop. <p>Otherwise valve stroke would be restricted, resulting in a reduced volume flow through the valve.</p>

7.3 Manual override of fail-close actuators (LAP-SF):

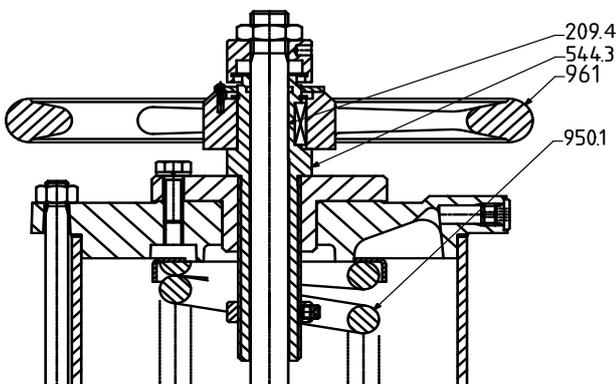


Figure 18: Fail-close actuator (LAP-SF)

If the auxiliary energy supply fails, the actuator can be manually operated in opening direction by means of the emergency handwheel [961] mounted on the pneumatic actuator (LAP).

To operate the pneumatic actuator via the emergency handwheel [961] in emergencies, proceed as follows:

1. Turn the handwheel [961] anti-clockwise.
2. The threaded bush [544.3] will contract the spring [950.1] via the upper piston rod [209.4], thus opening the valve.
3. The emergency handwheel [961] cannot be used to close a mechanically blocked valve.

In normal operation, the emergency handwheel [961] is without function.

ATTENTION	
	<p>Risk of system malfunction!</p> <p>Before reactivating normal operation:</p> <ul style="list-style-type: none"> • Turn the handwheel [961] clockwise to return the threaded bush [544.3] to its initial position up to the stop. <p>Otherwise valve stroke would be restricted, preventing the valve from reaching the fully closed position and providing tight shut-off.</p>

7.4 Manual override with travel stop in closing direction of double-acting actuators (LAP-AZ):

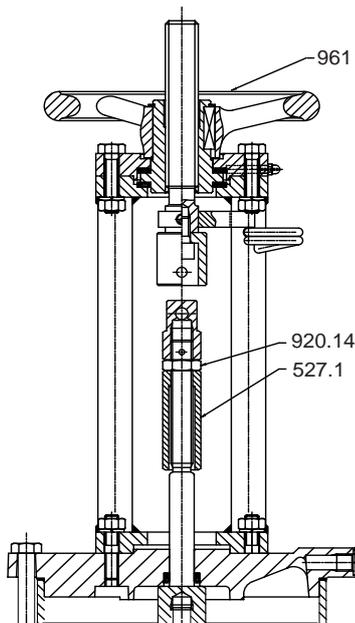
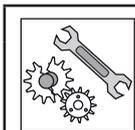


Figure 19: Double-acting actuator (LAP-AZ)

For operating the emergency handwheel [961]: see Section 7.1.

For setting the travel stop:

1. Loosen the nut [920.14] which locks the locating sleeve [527.1] in position.
2. The actuator must be in the „OPEN“ position.
3. The travel stop in closing direction can be positioned as required by turning it clockwise.
4. Screw the nut [920.14] down against the locating sleeve [527.1] and lock it firmly.



ATTENTION

Risk of system malfunction!

Vibrations may result in the locked nuts working loose. The travel stop, therefore, needs to be checked regularly.

7.5 Manual override with travel stop in opening direction of fail-open actuators (LAP-OF):

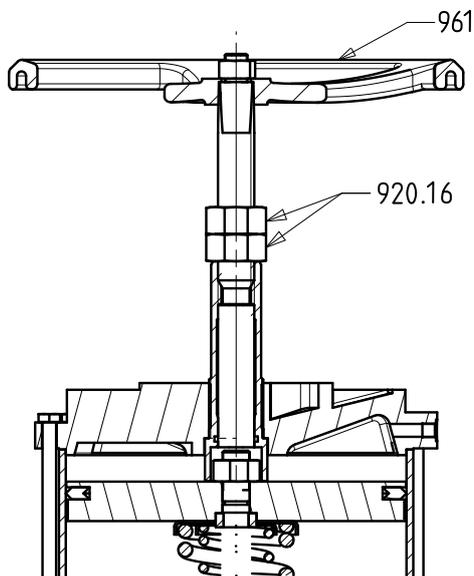


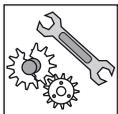
Figure 20: Fail-open actuator (LAP-OF)

For operating the emergency handwheel [961]:

1. Loosen the two nuts [920.16] and screw them into their upper limit position.
2. Further procedure see Section 7.2.

For setting the travel stop:

1. Loosen the two nuts [920.16] and screw them upwards.
2. The actuator must be in the „CLOSED“ position.
3. Then turn the handwheel [961] into „CLOSED“ position until travel is restricted as required.
4. Screw the two nuts [920.16] downwards up to the stop and lock them firmly.



ATTENTION

Risk of system malfunction!

Vibrations may cause the counter-nuts to loosen. The travel stop, therefore, needs to be checked regularly.

7.6 Manual override with travel stop in opening direction of fail-close actuators (LAP-SF):

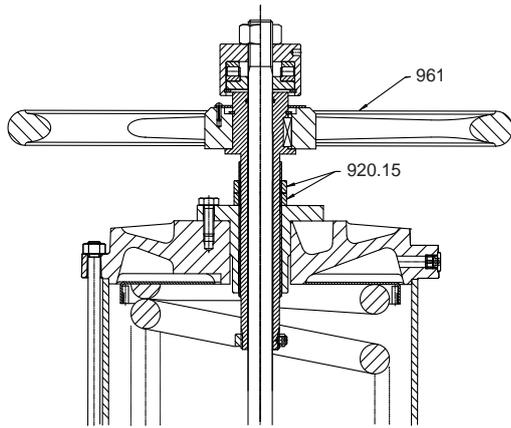


Figure 21: Fail-close actuator (LAP-SF)

For operating the emergency handwheel [961]:

1. Loosen the two nuts [920.15].
2. Further procedure see Section 7.3.

For setting the travel stop:

1. Loosen the two nuts [920.15] and screw them upwards.
2. The actuator must be in the „CLOSED“ position.
3. Then turn the handwheel [961] in closing position until is restricted as required.
4. Screw the two nuts [920.15] downwards up to the stop and lock them firmly.

	ATTENTION
	<p>Risk of system malfunction! Vibrations may cause the counter-nuts to loosen. The travel stop, therefore, needs to be checked regularly.</p>

8 Servicing/Maintenance

8.1 Safety informations

Servicing and maintenance work must only be performed by competent personnel taking into account the relevant health and safety regulations. It is imperative that the below safety instructions and the general information on safety as per Section 2, Safety, be observed for all service and maintenance work to be performed at the pneumatic actuators.

	ATTENTION
	<p>Damage of the actuator by not suitable tools! Always use suitable spare parts and tools, even in emergencies, to ensure proper functioning of the pneumatic actuator.</p>

	DANGER
	<p>Risk of injury by actuator under pressure! Never open a pneumatic actuator under pressure (danger to life)! Depressurize before opening. Wear personal protective equipment if necessary!</p>

	WARNING
	<p>Risk of injury by releasing spring energy! Actuators with integrated spring mechanism contain pre-loaded springs. They shall only be dismantled with extreme caution, using the requisite locking devices. Danger to life by releasing spring energy.</p>

If you have any questions please contact the manufacturer.

8.2 Maintenance

All pneumatic actuator components have been designed to be largely maintenance-free. The materials of the sliding parts have been selected for minimum wear.

We recommend checking the actuators regularly for proper function and tightness.

The user is responsible for defining appropriate intervals for checks and maintenance, depending on the frequency of pneumatic actuator starts.

The service life of the pneumatic actuators can be prolonged by:

- Actuating the valve (open-close) at least once or twice a year to check its function.
- Lubricating the movable parts with standardised lubricants acc. to DIN 51825 which are suitable for the application of the pneumatic actuator.

Observe the safety information in Section 2 and Section 8.1.

9 Removing a pneumatic actuator from a valve/Mounting a pneumatic actuator on a valve

9.1 Dismantling

1. Vent the actuator and disconnect it from the compressed air supply.
2. Loosen the hexagon nut [920.8] by approx. 1 turn.
3. Unscrew the hexagon nut [920.10] (4 nos.).
4. Turn the coupling [840] clockwise, using a suitable tool, until the piston rod [209.1] is fully unscrewed.
5. Lift the actuator off the yoke [166.1].



WARNING

Risk of injury by releasing spring energy!

- Further dismantling of spring-loaded actuators may only be carried out at the supplying factory.
- Actuators with function the « opening spring » and « closing spring » are equipped with a spring mechanism. The studs [902.3], hexagon nut [920.3] or the hexagon head bolts [901.3], which serve as tie rods, must never be cut through or unscrewed.

Danger to life by releasing spring energy!

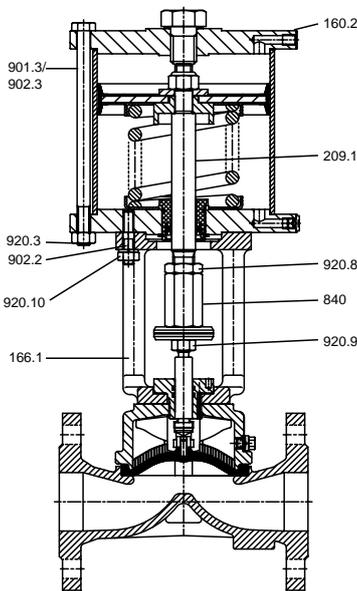


Figure 22: SISTO-LAP-OF

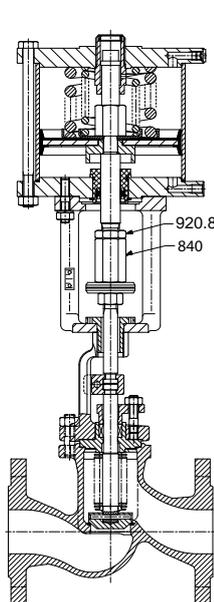


Figure 23: SISTO-LAP-SF

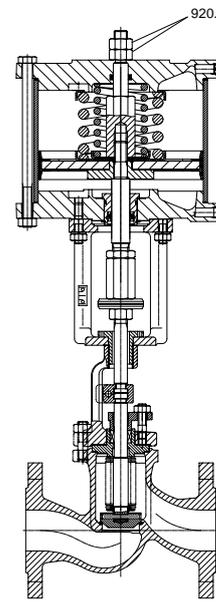


Figure 24: SISTO-LAP-SF with piston rods protruding from both cylinder end caps

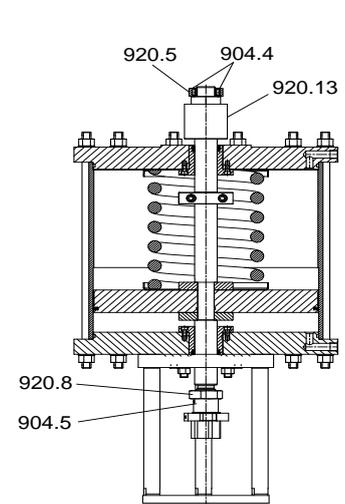


Figure 25: SISTO-LAP-SF-500

9.2 Reassembly

The instructions given in the valve manufacturer's operating manual (e.g. travel stop at valve's limit position) must be complied with before mounting the pneumatic actuator on the valve.

1. Use stud [902.2] to align the actuator with the bolt circle of the yoke [166.1] and place the actuator on the yoke [166.1] (**IMPORTANT:** note position of compressed air supply connection!).
2. Tighten the hexagon nuts [920.10] crosswise.
3. Screw the coupling [840] onto the piston rod [209.1] by 3 to 4 turns.
If necessary, use compressed air supply to move the piston rod [209.1] (OF/AZ) carefully in closing direction.
4. Take the actuator to the open position using the compressed air supply. Screw the coupling [840] onto the piston rod [209.1] up to the stop, then release one turn.
5. Lock the coupling [840] in position with the hexagon nut [920.8].
LAP-500: Subsequently tighten stud [904.5].
6. Connect the actuator to the compressed air supply.

9.2 Reassembly

	NOTE
	<p>The functional test shall be performed by pressurizing the valve in the pipeline. If the hexagon nut [920.9] rests on the yoke [166.1] or, in the case of actuators with piston rods protruding from both cylinder end caps, the hexagon nut [920.5] rests on the top end cap [160.2], the valve probably does not shut off tightly.</p> <p>To remedy the fault, move the actuator into its open position.</p> <p><u>Actuators with piston rod extending from one end only:</u></p> <ol style="list-style-type: none"> 1. Loosen the hexagon nut [920.8]. 2. Turn the coupling (840) approx. half a turn anti-clockwise. 3. Re-lock the hexagon nut [920.8]. <p><u>Actuators with piston rods protruding from both cylinder end caps:</u></p> <ol style="list-style-type: none"> 1. Loosen the upper hexagon nut [920.5]. 2. Turn the lower hexagon nut [920.5] approx. half a turn anti-clockwise. 3. Re-lock the upper hexagon nut (920.5). <p><u>Actuator LAP-500 with piston rods protruding from both cylinder end caps:</u></p> <ol style="list-style-type: none"> 1. Loosen the two grub screws [904.4] before unlocking the hexagon nut. 2. Hexagon nut [920.13] approx. half a turn anti-clockwise. 3. Lock the hexagon nut (920.5) with a torque of 250 Nm, then tighten the two grub screws (904.4) to 18 Nm.

10 Trouble-shooting

10.1 General

Pneumatic actuators made by SISTO Armaturen S.A. are robust in design. Nevertheless, malfunctions e.g. caused by maloperation, lack of maintenance or improper use cannot be ruled out completely.

All repair and maintenance work shall be performed by competent personnel using suitable tools and original spare parts.

We recommend to have this work performed by our service personnel.

	WARNING
	<p>Risk of injury ! Improper remedial work on the pneumatic actuator.</p> <p>For any work performed in order to remedy faults on the pneumatic actuator observe the relevant information given in this installation instruction and the product literature provided by the valve manufacturers.</p>

10.2 Faults and remedies

If problems occur that are not described in the following table, consultation with SISTO Armaturen S.A. is required.

Problem	Possible cause	Remedy
Leackage	Wear	<ul style="list-style-type: none"> • Dismantle, clean • Replace sealing elements.

11 Disposal and recycling

Technical equipment supplied by SISTO Armaturen S.A. is made of high-quality materials. Details regarding the materials used can be found in the technical documentation supplied with the equipment.

	WARNING
	<p>Risk of injury by releasing spring energy!</p> <ul style="list-style-type: none"> • Pneumatic actuators may contain pre-loaded springs. • Dismantling may only be performed by trained personnel observing the safety instructions and information provided in this installation instruction. <p>Danger to life by releasing spring energy!</p>

Comply with applicable legal requirements and regulations.

EC Machinery directive 2006/42/EC
 Maschinenrichtlinie 2006/42/EG
 Directive 2006/42/CE relative aux « Machines »

Declaration of incorporation according to annexe IIB
 Einbauerklärung entsprechend Anhang IIB
 Déclaration d'incorporation suivant annexe IIB

Manufacturer's Name, address: **SISTO Armaturen S.A.**
 Hersteller, Adresse: **18, rue Martin Maas**
 Fabricant, adresse : **L-6468 Echternach/Luxembourg**

Description of incorporation machinery:
 Beschreibung der unvollständigen Maschine:
 Description de la quasi-machine :

Pneumatic-actuator Type SISTO-LAP
Pneumatik-Antrieb Typ SISTO-LAP
Actionneur pneumatique type SISTO-LAP

Essential requirements applied and complied with:
 Im Einklang mit folgenden angewendeten grundlegenden Anforderungen:
 En conformité avec les exigences de base suivantes appliquées:

**1.1.3, 1.1.5, 1.2, 1.3.1, 1.3.2, 1.3.4, 1.3.8.1, 1.4, 1.4.1, 1.4.2.1, 1.5.1, 1.5.13, 1.5.2,
 1.5.3, 1.5.4, 1.5.5, 1.5.7, 1.5.8, 1.6.1, 1.7.1, 1.7.2, 1.7.3, 1.7.4**

The following harmonised standards, according to the Machinery directive 2006/42/EC, have been applied.
 Folgende harmonisierte Normen im Sinne der Maschinenrichtlinie 2006/42/EG wurden angewendet.
 Les normes harmonisées ci-après, conformes à la directive 2006/42/CE relative aux « Machines », ont été appliquées.

EN ISO 12100 : 2011-3

The technical documents correspond to Annex VII, part B, of EC Machinery directive 2006/42/EC, will be provided by SISTO Armaturen S.A., 18 rue Martin Maas, 6468 Echternach, Luxemburg, on demand of the responsible national authorities.

Die technischen Unterlagen entsprechend Anhang VII, Teil B, der EG-Richtlinie 2006/42/EG, werden von SISTO Armaturen S.A., 18, rue Martin Maas, 6468 Echternach, Luxemburg, auf Verlangen der zuständigen nationalen Behörde zur Verfügung gestellt.

Les documents techniques figurant à l'annexe VII, partie B, de la directive CE 2006/42/CE, sont fournis par SISTO Armaturen S.A., 18, rue Martin Maas, 6468 Echternach, Luxembourg, sur demande des autorités nationales compétentes.

Warning: The pneumatic-actuator, to which this declaration of incorporation relates, must not be put into service until the relevant machinery, into which it is to be integrated has been declared compliant with the provisions of the machinery directives 2006/42/EC

Hinweis: Wir erklären hiermit, dass der beschriebene Pneumatik-Antrieb zum Einbau in eine Maschine geeignet ist, deren Inbetriebnahme solange untersagt ist, bis festgestellt wurde, dass die Maschine der Maschinenrichtlinie 2006/42/EG entspricht.

Remarque : Nous déclarons par la présente que l'actionneur pneumatique décrit est destiné au montage dans une machine dont la mise en service est interdite jusqu'à ce que sa conformité à la directive 2006/42/CE relative aux « Machines » soit confirmée.

Echternach, 13.01.2016



Robert Britz
 Head of Design and Development



SISTO Armaturen S.A.

18, rue Martin Maas • 6468 Echternach • (Luxembourg)

Tel. (+352) 32 50 85-1 • Fax (+352) 32 89 56 • e-mail: sisto@ksb.com

www.sisto.lu

A KSB company •  KSB



Subject to technical modification without prior notice

30.04.2020

0570.823/10-1 - ORIGINAL