Type 3271 and Type 3277 Pneumatic Actuators
Actuator area: 240, 350, and 700 cm²

Edition March 2017
Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

→ For the safe and proper use of these instructions, read them carefully and keep them for later reference.

→ If you have any questions about these instructions, contact SAMSON’s After-sales Service Department (aftersalesservice@samson.de).

The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samson.de > Service & Support > Downloads > Documentation.

Definition of signal words

⚠️ **DANGER**

Hazardous situations which, if not avoided, will result in death or serious injury

⚠️ **WARNING**

Hazardous situations which, if not avoided, could result in death or serious injury

⚠️ **NOTICE**

Property damage message or malfunction

ℹ️ **Note**

Additional information

☀️ **Tip**

Recommended action
## Contents

1 Safety instructions and measures ...............................................................5
  1.1 Notes on possible severe personal injury .............................................7
  1.2 Notes on possible personal injury .........................................................8
  1.3 Notes on possible property damage .....................................................9
2 Markings on the device ............................................................................10
  2.1 Actuator nameplate ...........................................................................10
3 Design and principle of operation ..............................................................11
  3.1 Type 3271 .......................................................................................11
  3.2 Type 3277 .......................................................................................12
  3.3 Direction of action ............................................................................13
  3.4 Signal pressure routing .....................................................................13
    3.4.1 Type 3271 ................................................................................13
    3.4.2 Type 3277 ................................................................................13
  3.5 Fail-safe action ................................................................................13
    3.5.1 Version with direction of action "actuator stem extends" (FA) ........14
    3.5.2 Version with direction of action "actuator stem retracts" (FE) ........14
  3.6 Versions .........................................................................................14
  3.7 Technical data ..................................................................................15
4 Measures for preparation ........................................................................19
  4.1 Unpacking .......................................................................................19
  4.2 Transporting and lifting ....................................................................19
    4.2.1 Transporting ...............................................................................20
    4.2.2 Lifting .......................................................................................20
  4.3 Storage .............................................................................................22
  4.4 Preparation for installation .................................................................23
5 Mounting and start-up ............................................................................24
  5.1 Mounting the actuator onto the valve ................................................24
  5.2 Preloading the springs ....................................................................27
    5.2.1 Tensioning the springs ...............................................................27
    5.2.2 Increasing the actuator thrust ......................................................27
    5.2.3 Adapting the travel range ............................................................28
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Operation</td>
<td>30</td>
</tr>
<tr>
<td>6.1</td>
<td>Throttling service</td>
<td>30</td>
</tr>
<tr>
<td>6.2</td>
<td>On/off service</td>
<td>30</td>
</tr>
<tr>
<td>6.3</td>
<td>Reversal of the direction of action</td>
<td>31</td>
</tr>
<tr>
<td>6.3.1</td>
<td>Reversal of the direction of action from stem extends to stem retracts</td>
<td>31</td>
</tr>
<tr>
<td>6.3.2</td>
<td>Reversal of the direction of action from stem retracts to stem extends</td>
<td>33</td>
</tr>
<tr>
<td>6.4</td>
<td>Version with handwheel</td>
<td>35</td>
</tr>
<tr>
<td>6.4.1</td>
<td>Extending the actuator stem manually</td>
<td>35</td>
</tr>
<tr>
<td>6.4.2</td>
<td>retracting the actuator stem manually</td>
<td>35</td>
</tr>
<tr>
<td>6.5</td>
<td>Adjusting the travel stop</td>
<td>36</td>
</tr>
<tr>
<td>6.5.1</td>
<td>Bottom travel stop (minimum travel)</td>
<td>36</td>
</tr>
<tr>
<td>6.5.2</td>
<td>Top travel stop (maximum travel)</td>
<td>36</td>
</tr>
<tr>
<td>7</td>
<td>Servicing</td>
<td>38</td>
</tr>
<tr>
<td>7.1</td>
<td>Replacing the diaphragm</td>
<td>39</td>
</tr>
<tr>
<td>7.2</td>
<td>Replacing the actuator stem seals</td>
<td>42</td>
</tr>
<tr>
<td>7.3</td>
<td>Preparation for return shipment</td>
<td>44</td>
</tr>
<tr>
<td>7.4</td>
<td>Ordering spare parts and operating supplies</td>
<td>45</td>
</tr>
<tr>
<td>8</td>
<td>Malfunctions</td>
<td>46</td>
</tr>
<tr>
<td>9</td>
<td>Decommissioning and disassembly</td>
<td>48</td>
</tr>
<tr>
<td>9.1</td>
<td>Decommissioning</td>
<td>48</td>
</tr>
<tr>
<td>9.2</td>
<td>Removing the actuator from the valve</td>
<td>48</td>
</tr>
<tr>
<td>9.3</td>
<td>Relieving the spring compression in the actuator</td>
<td>48</td>
</tr>
<tr>
<td>9.4</td>
<td>Disposal</td>
<td>48</td>
</tr>
<tr>
<td>10</td>
<td>Annex</td>
<td>50</td>
</tr>
<tr>
<td>10.1</td>
<td>After-sales service</td>
<td>50</td>
</tr>
<tr>
<td>10.2</td>
<td>Spare parts</td>
<td>51</td>
</tr>
</tbody>
</table>
1 Safety instructions and measures

Intended use
The SAMSON Type 3271 and Type 3277 Actuators are designed for operating a mounted globe valve. In combination with the valve, the actuators are used to shut off the flow of liquids, gases or vapors in the pipeline. Depending on the version, the actuators are suitable for throttling or on/off service. The actuators can be used in processing and industrial plants.

The actuators are designed to operate under exactly defined conditions (e.g. thrust, travel). Therefore, operators must ensure that the actuators are only used in applications that meet the specifications used for sizing the actuators at the ordering stage. In case operators intend to use the actuators in other applications or conditions than specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the valve for its intended purpose or for damage caused by external forces or any other external factors.

⇒ Refer to the technical data and nameplate for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse
The actuator is not suitable for the following applications:
- Use outside the limits defined during sizing and in the technical data
- Use outside the limits defined by the accessories mounted on the actuator

Furthermore, the following activities do not comply with the intended use:
- Use of non-original spare parts
- Performing service and repair work not described in these instructions

Qualifications of operating personnel
The actuator must be mounted, started up, serviced, and repaired by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
Safety instructions and measures

Personal protective equipment
We recommend wearing the following personal protective equipment when handling the Type 3271 and Type 3277 Pneumatic Actuators:
- Protective gloves when mounting or removing the actuator
⇒ Check with the plant operator for details on further protective equipment.

Revisions and other modifications
Revisions, conversions or other modifications to the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Safety devices
The Type 3271 and Type 3277 Actuators do not have any special safety equipment.

Warning against residual hazards
To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the actuator by the process medium, the operating pressure, the signal pressure or by moving parts by taking appropriate precautions. They must observe all hazard statements, warning and caution notes in these mounting and operating instructions, especially for installation, start-up, and service work.

Responsibilities of the operator
The operator is responsible for proper operation and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, the operator must ensure that operating personnel or third persons are not exposed to any danger.

Responsibilities of operating personnel
Operating personnel must read and understand these mounting and operating instructions as well as the referenced documents and observe the hazard statements, warning and caution notes specified in them. Furthermore, the operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.
Referenced standards and regulations

According to the ignition risk assessment performed in accordance with EN 13463-1:2009, section 5.2, the non-electrical actuators do not have their own potential ignition source even in the rare incident of an operating fault. As a result, they do not fall within the scope of Directive 2014/34/EU.

⇒ For connection to the equipotential bonding system, observe the requirements specified in section 6.4 of EN 60079-14 (VDE 0165 Part 1).

Referenced documentation

The following documents apply in addition to these mounting and operating instructions:

− Mounting and operating instructions for the mounted valve
− Mounting and operating instructions for mounted valve accessories (positioner, solenoid valve etc.)
− Safety Manual ♦ SH 8310 for use in safety-instrumented systems
− ♦ AB 0100 for tools, tightening torques, and lubricant

1.1 Notes on possible severe personal injury

⚠️ DANGER

Risk of bursting in the actuator.

Actuators are pressurized. Improper opening can lead to actuator components bursting.

⇒ Before starting any work on the actuator, depressurize all plant sections concerned and the actuator.
1.2 Notes on possible personal injury

**WARNING**

Cush hazard arising from moving parts.
The actuator contains moving parts (actuator stem), which can injure hands or fingers if inserted into the actuator.

- Do not insert hands or fingers into the yoke while the valve is in operation.
- While working on the actuator, disconnect and lock the pneumatic air supply as well as the control signal.

Risk of personal injury when the actuator vents.
While the valve is operating, the actuator may vent during closed-loop control or when the valve opens or closes.

- Install the control valve in such a way that the actuator does not vent at eye level.
- Use suitable silencers and vent plugs.
- Wear eye protection when working in close proximity to the control valve.

Risk of personal injury due to preloaded springs.
Actuators with preloaded springs are under tension. They can be identified by the long bolts protruding from the bottom of the actuator.

- Before starting any work on the actuator, relieve the compression from the preloaded springs (see section 9.3).

Damage to health relating to the REACH regulation.
If a SAMSON device contains a substance which is listed as being a substance of very high concern on the candidate list of the REACH regulation, this circumstance is indicated on the SAMSON delivery note.

- Information on safe use of the part affected, see [http://www.samson.de/reach-en.html](http://www.samson.de/reach-en.html).
1.3 Notes on possible property damage

NOTICE

Risk of actuator damage due to incorrectly attached slings.

➔ Do not attach load-bearing slings to the handwheel or travel stop.

Risk of actuator damage due to excessively high or low tightening torques.

Observe the specified torques on tightening actuator components. Excessively tightened torques lead to parts wearing out quicker. Parts that are not tightened far enough may loosen.

➔ Observe the specified tightening torques ( ► AB 0100).

Risk of actuator damage due to the use of unsuitable tools.

Certain tools are required to work on the actuator.

➔ Only use tools approved by SAMSON ( ► AB 0100).

Risk of actuator damage due to the use of unsuitable lubricants.

The lubricants to be used depend on the actuator material. Unsuitable lubricants may corrode and damage the valve surface.

➔ Only use lubricants approved by SAMSON ( ► AB 0100).
2 Markings on the device

2.1 Actuator nameplate

The nameplate is stuck on the diaphragm casing. It includes all details required to identify the device:

2 Configuration ID
3 Serial number
4 Actuator area
5 Bench range in bar
6 Bench range in psi
7 Operating travel in mm
8 Operating range in bar
9 Operating range in psi
10 Permissible supply pressure $p_{\text{max}}$ in bar
11 Permissible supply pressure $p_{\text{max}}$ in psi
12 Symbol indicating fail-safe action
   - Actuator stem extends (FA)
   - Actuator stem retracts (FE)
   - Manual override
14 Connecting thread
15 Diaphragm material
16 Date of manufacture

Fig. 1: Nameplate of Type 3271 Actuator
3 Design and principle of operation

The SAMSON Type 3271 and Type 3277 Actuators with 240, 350, and 700 cm² actuator areas are mounted to Series 240, 250, 280, and 290 Valves (globe valves).

3.1 Type 3271

The actuator mainly consists of two diaphragm cases (A1, A2), the diaphragm (A4) with diaphragm plate (A5), and springs (A10) (see Fig. 2).

The signal pressure \( p_s \) creates the force \( F = p_s \cdot A \) at the diaphragm surface \( A \) which is opposed by the springs (A10) in the actuator. The bench range is determined by the number of springs used and their compres-
Design and principle of operation

The travel is proportional to the signal pressure $p_{st}$. The direction of action of the actuator stem (A7) depends on how the springs are installed in the actuator.

A maximum of 12 springs (240 and 350 cm$^2$) and a maximum of 18 springs (700 cm$^2$), partly fitted into one another, can be installed in the actuator.

The stem connector clamps (A26/27) connect the actuator stem (A7) with the plug stem of the globe valve.

3.2 Type 3277

The principle of operation is the same as that of the Type 3271 Actuator. The Type 3277 Actuator is fitted with an additional yoke on the bottom diaphragm case (A2) (see Fig. 3). The yoke allows the direct attachment of a positioner and/or limit switch. The benefit of this design is that the travel pick-off located inside the yoke is protected against external influences.

Refer to the mounting and operating instructions of the valve accessories to be mounted for more details on their attachment and the accessories required.

**Fig. 3:** Type 3277 Pneumatic Actuator
### 3.3 Direction of action

The direction of action is determined by how the springs (A10) and diaphragm plate (A5) are arranged in the actuator.

With direction of action "actuator stem extends", the compressed air is applied to the signal pressure connection on the bottom diaphragm case.

With direction of action "actuator stem retracts", the compressed air is applied to the signal pressure connection on the top diaphragm case.

The actuator's direction of action can be reversed (see section 6.3).

### 3.4 Signal pressure routing

#### 3.4.1 Type 3271

In the "actuator stem extends" version, the signal pressure is routed through the bottom signal pressure connection (S) to the bottom diaphragm chamber and moves the actuator stem (A7) upward opposing the spring force (see Fig. 2, right).

In the "actuator stem retracts" version, the signal pressure is routed through the top signal pressure connection (S) to the top diaphragm chamber and moves the actuator stem (A7) downward opposing the spring force (see Fig. 2, left).

#### 3.4.2 Type 3277

In the "actuator stem extends" version, a signal pressure connection (S) is located on the side of the yoke which is connected to the bottom diaphragm chamber over an internal hole (see Fig. 3, right). The signal pressure moves the actuator stem upward opposing the spring force. A positioner can be connected using a connection block at this point. No additional piping to the actuator is required. Refer to the associated positioner documentation for more details.

In the "actuator stem retracts" version, the signal pressure is routed through the top signal pressure connection (S) to the top diaphragm chamber and moves the actuator stem (A7) downward opposing the spring force (see Fig. 3, left).

### 3.5 Fail-safe action

When the signal pressure is reduced or the control signal fails, the fail-safe position of the control valve depends on whether the springs are installed in the top or bottom diaphragm chamber.

**Note**

The listed fail-safe actions apply to SAMSON Series 240, 250, 280 and 290 Valves (globe valves).
3.5.1 Version with direction of action "actuator stem extends" (FA)
When the signal pressure is reduced or the control signal fails, the springs move the actuator stem downward and close the globe valve. The valve opens when the signal pressure is increased enough to overcome the spring force.

3.5.2 Version with direction of action "actuator stem retracts" (FE)
When the signal pressure is reduced or the control signal fails, the springs move the actuator stem upward and open a mounted globe valve. The valve closes when the signal pressure is increased enough to overcome the spring force.

3.6 Versions
The Type 3271 and Type 3277 Pneumatic Actuators with 240, 350 or 700 cm² actuator area are available in the following versions:

- **Standard version**
The top and bottom diaphragm cases are made of painted sheet steel.

- **Corrosion-resistant version**
The top and bottom diaphragm cases are made of stainless sheet steel (1.4301).

- **Additional (top-mounted) handwheel**
The actuators can be fitted with an additional (top-mounted) handwheel (▶ T 8312).

- **Travel stop**
The actuators as a special version can be fitted with a mechanically adjustable travel stop. The travel is reduced by up to 50 % in both directions of action (stem extends or retracts).

- **Side-mounted handwheel**
The actuators can be combined with a Type 3273 Side-mounted Handwheel with max. 30 mm travel (▶ T 8312).
3.7 Technical data

The nameplate provides information on the actuator version (see section 2.1).

**Note**

More information is available in Data Sheet T 8310-1.

Supply pressure

The maximum permissible supply pressure is 6 bar in throttling service. See section 6.2 for restrictions in on/off service.

Temperature range

The permissible temperature range depends on the actuator service and diaphragm material:

<table>
<thead>
<tr>
<th>Diaphragm material</th>
<th>Temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Throttling service</td>
</tr>
<tr>
<td>NBR</td>
<td>−35 to +90 °C</td>
</tr>
<tr>
<td></td>
<td>−31 to +194 °F</td>
</tr>
<tr>
<td>EPDM</td>
<td>−50 to +120 °C</td>
</tr>
<tr>
<td></td>
<td>−58 to +248 °F</td>
</tr>
<tr>
<td></td>
<td>On/off service</td>
</tr>
<tr>
<td>NBR</td>
<td>−20 to +90 °C</td>
</tr>
<tr>
<td></td>
<td>−4 to +194 °F</td>
</tr>
<tr>
<td>EPDM</td>
<td>−40 to +120 °C</td>
</tr>
<tr>
<td></td>
<td>−40 to +248 °F</td>
</tr>
</tbody>
</table>

Compliance

The Type 3271 and Type 3277 Pneumatic Actuators bear the EAC mark of conformity.
Design and principle of operation

Dimensions and weights

The dimensions and weights are listed in Table 1. The lengths and heights in the dimension diagrams are shown on page 17 onwards.

Table 1: Dimensions in mm and weights in kg

<table>
<thead>
<tr>
<th>Actuator area</th>
<th>Type</th>
<th>Actuator area cm²</th>
<th>3271</th>
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<th>700</th>
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<td>Travel limitation</td>
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<td>250</td>
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<td>250</td>
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<td></td>
<td>ØD2</td>
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<td>16</td>
<td>16</td>
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<tr>
<td>Ød (thread)</td>
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<td>M30 x 1.5</td>
<td>M30 x 1.5</td>
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<tr>
<td>Air connection</td>
<td>a</td>
<td>G ¼ NPT</td>
<td>G ¾ NPT</td>
<td>G ¾ NPT</td>
<td>G ¼ NPT</td>
<td>G ¾ NPT</td>
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<tr>
<td></td>
<td>a2</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>G ¾</td>
<td>G ¾</td>
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<tr>
<td>Weight</td>
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<td>8</td>
<td>22</td>
<td>9</td>
<td>12</td>
<td>26</td>
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<tr>
<td></td>
<td></td>
<td>With handwheel</td>
<td>9</td>
<td>13</td>
<td>27</td>
<td>13</td>
<td>17</td>
<td>31</td>
</tr>
</tbody>
</table>
Design and principle of operation

Dimensional drawings

Standard version of Type 3271 (700 cm²)

Standard version of Type 3277 (240, 350 cm²)

Type 3277 (side view)

Type 3271 with travel stop
Type 3277 with handwheel
4 Measures for preparation

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Compare the shipment received against the delivery note.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

4.1 Unpacking

*Note*

Do not remove the packaging until immediately before mounting.

Proceed as follows to lift and mount the actuator:

1. Remove the packaging from the actuator.
2. Dispose of the packaging in accordance with the valid regulations.

4.2 Transporting and lifting

*Danger*  
Hazard due to suspended loads falling. Stay clear of suspended or moving loads.

*Warning*  
Risk of lifting equipment tipping and risk of damage to lifting accessories due to exceeding the rated lifting capacity.
- Only use approved lifting equipment and accessories whose minimum lifting capacity is higher than the weight of the actuator.
- Refer to section 3.7 for weights.

*Notice*  
Risk of actuator damage due to incorrectly attached slings.
- The welded-on lifting eyelet on the top diaphragm case is intended for mounting and removing the actuator as well as lifting the actuator without valve. Do not lift the entire control valve assembly using the lifting eyelet.
- Do not attach load-bearing slings to the travel stop.
- Observe lifting instructions (see section 4.2.2).

*Tip*  
SAMSON's After-sales Service department can provide more detailed transport and lifting instructions on request.
Measures for preparation

4.2.1 Transporting

The actuator can be transported using lifting equipment (e.g. crane or forklift).

➔ Leave the actuator in its transport container or on the pallet to transport it.
➔ Observe the transport instructions.

Transport instructions

– Protect the actuator against external influences (e.g. impact).
– Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
– Protect the actuator against moisture and dirt.
– Observe permissible temperatures (see section 3.7).

4.2.2 Lifting

To mount a large actuator, use lifting equipment (e.g. crane or forklift) to lift it.

Lifting instructions

– Secure slings against slipping.
– Make sure the slings can be removed from the actuator once it has been mounted onto the valve.
– Prevent the actuator from tilting or tipping.
– Do not leave loads suspended when interrupting work for longer periods of time.
– Make sure that the additional sling between the lifting eyelet and rigging equipment (hook, shackle etc.) does not bear any load when lifting control valves larger than DN 150 with the actuator already mounted. The sling only protects the control valve from tilting while being lifted. Before lifting the control valve, tighten the sling. The slings attached to the valve body must bear the entire load (see Fig. 5).
Lifting the actuator (without valve)

⚠️ NOTICE
Risk of actuator damage due to incorrectly attached slings.
The welded-on lifting eyelet on the top diaphragm case is intended for mounting and removing the actuator as well as lifting the actuator without valve. Do not lift the entire control valve assembly using the lifting eyelet.

1. Attach a sling to the lifting eyelet of the actuator and to the rigging equipment (e.g. hook) of the crane or forklift (see Fig. 4).

2. Carefully lift the actuator. Check whether the lifting equipment and accessories can bear the weight.

3. Move the actuator at an even pace to the mounting site.

4. Mount the actuator to the valve. See section 5.1.

5. Remove slings after mounting.

💡 Tip
− We recommend using a hook with safety latch (see Fig. 4). The safety latch prevents the slings from slipping during lifting and transporting.
− Special tools exist for lifting actuators with 240 and 350 cm² actuator areas (▶ AB 0100).

Fig. 4: Lifting point on the actuator
Fig. 5: Lifting points on the control valve (example)
Lifting the entire control valve assembly

- See associated valve documentation for instructions on how to lift a control valve.

### 4.3 Storage

**NOTICE**

Risk of actuator damage due to improper storage.
- Observe storage instructions.
- Avoid long storage times.
- Contact SAMSON in case of different storage conditions or long storage periods.

**Note**

We recommend regularly checking the actuator and the prevailing storage conditions during long storage times.

**Storage instructions**

- When the valve and actuator are already assembled, observe the storage conditions for control valves. See associated valve documentation.
- Protect the actuator against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the actuator against moisture and dirt. Store it at a relative humidity of less than 75%. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- Observe permissible temperatures (see section 3.7).
- Do not place any objects on the actuator.

**Special storage instructions for elastomers**

Elastomer, e.g. actuator diaphragm
- To keep elastomers in shape and to prevent cracking, do not bend them or hang them up.
- We recommend a storage temperature of 15 °C for elastomers.
- Store elastomers away from lubricants, chemicals, solutions, and fuels.

**Tip**

SAMSON’s After-sales Service department can provide more detailed storage instructions on request.
4.4 Preparation for installation

Proceed as follows:

➔ Check the actuator for damage.

➔ Check to make sure that the type designation, material and temperature range of the actuator match the ambient conditions (temperatures etc.).

➔ Check the pressure gauge installed on valve accessories to make sure it functions.

➔ When the valve and actuator are already assembled, check the tightening torques of the bolted joints (▶ AB 0100). Components may loosen during transport.
5 Mounting and start-up

SAMSON control valves are delivered ready for use. In special cases, the valve and actuator are delivered separately and must be assembled on site. The procedure to mount and start up the actuator are described in following.

![NOTICE]

Risk of actuator damage due to excessively high or low tightening torques. Observe the specified torques on tightening actuator components. Excessively tightened torques lead to parts wearing out quicker. Parts that are not tightened far enough may loosen.

Observe the specified tightening torques (AB 0100).

![NOTICE]

Risk of actuator damage due to the use of unsuitable tools. Only use tools approved by SAMSON (AB 0100).

![Note]

See associated valve documentation for additional mounting instructions.

5.1 Mounting the actuator onto the valve

Proceed as follows if the valve and actuator have not been assembled by SAMSON:

![Note]

- Remove the mounted actuator before mounting another actuator (see section 9.2).
- Preloading the actuator springs increases the thrust and reduces the travel range of the actuator (see section 5.2).

![Tip]

The valve and actuator are assembled with special attention paid to the actuator’s bench range and direction of action. These details are specified on the actuator nameplate (see section 2.1).

1. Loosen the lock nut (10) and stem connector nut (9) on the valve.
2. Press the plug together with the plug stem firmly into the seat ring.
3. Thread down the lock nut and stem connector nut.
4. Remove the clamps of the stem connector (A26/27) and the ring nut (A8) from the actuator.
5. Slide the ring nut over the plug stem.
6. Place the actuator onto the valve bonnet (2) and secure it with the ring nut.
7. Determine the lower and upper signal pressure range values:
Mounting and start-up

Fig. 6: Type 3271 Pneumatic Actuator mounted on globe valve

2 Bonnet/flange
8 Threaded bushing
9 Stem connector nut
10 Lock nut
84 Travel indicator scale
A7 Actuator stem
A8 Ring nut
A26/27 Stem connector clamps
Dimension α Refer to Table 2
Dimension x Refer to Table 3

Dimension a Refer to Table 2

x
Mounting and start-up

The lower signal pressure range value is the same as the minimum value of the bench range or operating range (with preloaded springs).

The upper signal pressure range value is the same as the maximum value of the bench range or operating range (with preloaded springs).

For actuator springs that are to be pre-loaded subsequently, determine the upper and lower signal pressure range as described in section 5.2.

8. Depending on the direction of action:

**Actuator stem extends**
Apply a signal pressure that corresponds to the lower signal pressure range value to the connection on the bottom diaphragm chamber.

**Actuator stem retracts**
Apply a signal pressure that corresponds to the upper signal pressure range value to the connection on the top diaphragm chamber.

9. Screw on the stem connector nut (9) by hand until it touches the actuator stem (A7).

10. Turn the stem connector nut a further quarter turn and secure this position with the lock nut (10).

11. Position clamps of the stem connector (A26/27) and screw them tight.

12. Make sure that the dimension a is adjusted as specified in Table 2.

13. Align the travel indicator (84) with the tip of the stem connector clamp.

---

**Table 2: Values for dimension x \(^{1)}\) (see Fig. 6)**

<table>
<thead>
<tr>
<th>Actuator area</th>
<th>Travel in mm</th>
<th>Dimension a in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>240</td>
<td>0 (0 %)</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>15 (100 %)</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>17 (112.5 %)</td>
<td>58</td>
</tr>
<tr>
<td>350</td>
<td>0 (0 %)</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>15 (100 %)</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>19 (125 %)</td>
<td>53</td>
</tr>
<tr>
<td>700</td>
<td>0 (0 %)</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>30 (100 %)</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>38 (125 %)</td>
<td>52</td>
</tr>
</tbody>
</table>

\(^{1)}\) Type 3271: bottom edge of the bottom case to the top of the actuator stem  
Type 3277: bottom edge of the bottom case to the top of the actuator stem
5.2 Preloading the springs

By preloading the springs in the actuator, the following can be achieved:

- The thrust is increased (only actuators with "stem extends")
- In combination with a SAMSON valve: the actuator travel range can be adapted to a smaller valve travel range

**Note**

Actuators that have already been preloaded by SAMSON without mounting the valve are labeled correspondingly. Additionally, they can be identified by three longer bolts with nuts protruding from the bottom diaphragm case. They allow the spring compression to be relieved evenly when disassembling the actuator (see section 9.3).

5.2.1 Tensioning the springs

**Notice**

Risk of actuator damage due to the springs being tensioned unevenly.

- Distribute clamping bolts and nuts evenly around the circumference.
- Tighten the nuts gradually in a crisscross pattern.

1. Distribute the long bolts (A22) evenly around the circumference.
2. Screw the long nuts (A23) together with one washer (A25) onto the clamping bolts (A22) until they rest on the bottom diaphragm case (A2).
3. To tension the springs evenly, tighten the nuts (A23) gradually in a crisscross pattern until both diaphragm cases (A1, A2) rest on the diaphragm (A4). Hold the bold head stationary with a suitable tool and apply the tightening torque to the nuts. Observe tightening torques.
4. Insert the short bolts (A20) through the intended holes on the diaphragm cases (A1, A2).
5. Screw the short nuts (A21) with washers (A25) onto the bolts (A20). Observe tightening torques.

5.2.2 Increasing the actuator thrust

The thrust can only be increased in actuators with "stem extends" direction of action. To achieve this, the springs of the actuators can be preloaded by up to 12.5 % (240 cm²) or by up to 25 % (350 and 700 cm²) of their travel or bench range.

**Example:** Preloading is required for a bench range of 0.4 to 2 bar. 25 % of this span corresponds to 0.4 bar. Therefore, the signal pressure range is shifted by 0.4 bar to 0.8 to 2.4 bar. The new lower signal pressure range value is 0.8 bar and the new upper signal pressure range value 2.4 bar.

⇒ Write the new signal pressure range of 0.8 to 2.4 bar on the actuator nameplate as the operating range with preloaded springs.
### 5.2.3 Adapting the travel range

In some cases, the valve and actuator have different rated travels. Depending on the direction of action, proceed as follows:

**Direction of action: actuator stem extends**

Always use actuators with preloaded springs when the valve's rated travel is smaller than the rated travel of the actuator.

**Example:** DN 50 valve with 15 mm rated travel and 700 cm² actuator with 30 mm rated travel; 0.4 to 2 bar bench range.

The signal pressure for half of the actuator travel (15 mm) is 1.2 bar. Adding it to the lower signal pressure range value of 0.4 bar results in a signal pressure of 1.6 bar required for preloading the springs. The new lower signal range value is 1.6 bar and the new upper signal range value 2.4 bar.

---

**A1** Top diaphragm case  
**A2** Bottom diaphragm case  
**A4** Diaphragm  
**A20** Hexagon screw  
**A21** Hexagon nut  
**A22** Hexagon bolt (preloading)  
**A23** Hexagon nut (preloading)  
**A24** Blanking plug  
**A25** Washer

---

**Fig. 7: Actuator with clamping nuts and bolts**
Write the new signal pressure range of 1.6 to 2.4 bar on the actuator nameplate as the operating range with preloaded springs.

**Direction of action: actuator stem retracts**

The springs of actuators with "stem retracts" action cannot be preloaded. When a SAMSON valve is combined with an oversized actuator (e.g. the rated travel of the actuator is larger than the rated travel of the valve), only the first half of the actuator's bench range can be used.

**Example:** DN 50 valve with 15 mm rated travel and 700 cm² actuator with 30 mm rated travel; 0.2 to 1 bar bench range.

At half the valve travel, the operating range is between 0.2 and 0.6 bar.
6 Operation

**WARNING**
Crush hazard arising from moving parts.
The actuator contains moving parts (actuator stem), which can injure hands or fingers if inserted into the actuator.
- Do not insert hands or fingers into the yoke while the valve is in operation.
- While working on the actuator, disconnect and lock the pneumatic air supply as well as the control signal.

**WARNING**
Risk of personal injury when the actuator vents.
Wear eye protection when working in close proximity to the control valve.

**NOTICE**
Operating disturbed by a blocked actuator stem.
Do not impede the movement of the actuator stem by inserting objects into its path.

6.1 Throttling service
The Types 3271 and Type 3277 Pneumatic Actuators with 240, 350, and 700 cm² actuator areas are designed for a maximum supply pressure of 6 bar when used for throttling service.

6.2 On/off service
In on/off service, the supply pressure must be limited depending on the bench range or operating range of the actuator. The applicable bench range or operating range which the actuator can move through is written on the nameplate (see section 2.1).

**Actuator stem retracts (FE)**
For the direction of action "actuator stem retracts (FE)”, the permissible supply pressure must not exceed the upper bench range value by more than 3 bar:

<table>
<thead>
<tr>
<th>Bench range</th>
<th>Fail-safe action</th>
<th>Max. supply pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 to 1.0 bar</td>
<td>Actuator stem retracts</td>
<td>4 bar</td>
</tr>
<tr>
<td>0.4 to 2.0 bar</td>
<td></td>
<td>5 bar</td>
</tr>
<tr>
<td>0.6 to 3.0 bar</td>
<td></td>
<td>6 bar</td>
</tr>
</tbody>
</table>

**Actuator stem extends (FA)**
With fail-safe action "actuator stem extends" and travel stop, the supply pressure must not exceed the upper spring range value by more than 1.5 bar.

**Additional points that apply concerning operation:**
- Label actuator with reduced supply pressure with a sticker ("Max. supply pressure limited to ... bar").
- Only apply the signal pressure to the signal pressure connection (S) on the diaphragm chamber of the actuator which does not contain any springs (see Fig. 3).
Only use vent plugs that let air through them (A16 in Fig. 3).

6.3 Reversal of the direction of action

The direction of action (and fail-safe action) of pneumatic actuators can be changed. The fail-safe action is indicated on the nameplate by a symbol:

- Actuator stem extends
- Actuator stem retracts

**DANGER**

Risk of bursting in the actuator. Actuators are pressurized. Improper opening can lead to actuator components bursting. Before starting any work on the actuator, depressurize all plant sections concerned and the actuator.

**WARNING**

Risk of personal injury due to preloaded springs. Actuators with preloaded springs are under tension. They can be identified by three long bolts protruding from the bottom of the actuator. Before starting any work on the actuator, relieve the compression from the preloaded springs (see section 9.3).

### 6.3.1 Reversal of the direction of action from stem extends to stem retracts

1. Lift the actuator off the valve. See section 9.2.
2. Unscrew the nuts (A21) and bolts (A20) on the diaphragm case.
3. Relieve the spring compression of actuators with preloaded springs (see section 9.3).
4. Lift off the top diaphragm case (A1) and remove springs (A10).
5. Pull the diaphragm plate assembly consisting of the diaphragm plate (A5), diaphragm (A4), and actuator stem (A7) out of the bottom diaphragm case (A2).
6. Clamp the bottom section of the actuator stem (A7) into a vise using protective jaws. Make sure that the actuator stem is not damaged.
7. Unscrew and remove the collar nut (A15), while holding the nut (A9) stationary.
Operation

**NOTICE**
Mallfunction due to loosened nut.
The nut (A9) on the actuator stem serves to adjust the dimension x. Do not undo the nut. If the nut has come undone, readjust the dimension x as specified in Table 3.

8. Remove the diaphragm plate (A5) with diaphragm (A4) from the actuator stem and place them back on in reverse order.

9. Tighten the collar nut (A15), while holding the nut (A9) stationary. Observe tightening torques.

10. Apply a suitable lubricant to the actuator stem (A7).

11. Clamp the top diaphragm case (A1) with the opening facing upward into a suitable clamping fixture.

12. Place the diaphragm plate assembly together with the actuator stem (A7) pointing upward into the diaphragm case (A1).

13. Place the springs (A10) in the diaphragm plate (A5), centering them in the intended recesses.

14. Carefully guide the bottom diaphragm case (A2) over the actuator stem (A7) and place it on the springs (A10). Make sure that the sealing elements are not damaged. Ensure that the compressed air connections on the cases (A1, A2) are correctly aligned with each other.

15. Fasten the top and bottom diaphragm cases (A1, A2) together using the nuts (A21) and bolts (A20). Observe tightening torques.

---

**Fig. 8:** Arrangement of parts for "stem retracts" direction of action (left) and "stem extends" direction of action (right)
16. Unscrew the vent plug (A16) from the top signal pressure connection and screw it into the bottom connection (S). The actuator springs, which now push against the diaphragm plate from below, cause the actuator stem to retract. The signal pressure is connected to the top connection (S) on the top diaphragm case. As a result, the actuator stem extends opposing the spring force as the signal pressure increases.

17. Affix a new nameplate with changed symbol and new configuration ID to the actuator.

6.3.2 Reversal of the direction of action from stem retracts to stem extends

1. Lift the actuator off the valve. See section 9.2.
2. Unscrew the nuts (A21) and bolts (A20) on the diaphragm case.
3. Lift off the top diaphragm case (A1).
4. Pull the diaphragm plate assembly consisting of the diaphragm plate (A5), diaphragm (A4), and actuator stem (A7) out of the actuator.
5. Take the springs (A10) out of the bottom diaphragm case (A2).
6. Unscrew and remove the collar nut (A15), while holding the nut (A9) stationary.

⚠️ NOTICE
Malfunction due to loosened nut.
The nut (A9) on the actuator stem serves to adjust the dimension x. Do not undo the nut. If the nut has come undone, readjust the dimension x as specified in Table 3.

7. Clamp the bottom section of the actuator stem (A7) into a vise using protective jaws. Make sure that the actuator stem is not damaged.
8. Remove the diaphragm plate (A5) with diaphragm (A4) from the actuator stem and place them back on in reverse order.

---

Table 3: Values for dimension x (see Fig. 8)

<table>
<thead>
<tr>
<th>Type</th>
<th>Actuator area</th>
<th>Travel in mm</th>
<th>Dimension x in mm (top of the nut to the bottom of the actuator stem)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3271</td>
<td>240</td>
<td>15</td>
<td>98.25</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>15</td>
<td>107.25</td>
</tr>
<tr>
<td></td>
<td>700</td>
<td>30</td>
<td>144</td>
</tr>
<tr>
<td>3277</td>
<td>240</td>
<td>15</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>15</td>
<td>209</td>
</tr>
<tr>
<td></td>
<td>700</td>
<td>30</td>
<td>246</td>
</tr>
</tbody>
</table>
9. Tighten the collar nut (A15), while holding the nut (A9) stationary. Observe tightening torques.

10. Apply a suitable lubricant to the actuator stem (A7).

11. Place the diaphragm plate assembly together with the actuator stem (A7) pointing downward into the bottom diaphragm case (A2). Make sure that the sealing elements are not damaged.

12. Place the springs (A10) into the bottom diaphragm case, centering them in the intended recesses.

13. Place on the top diaphragm case (A1).

14. If necessary, preload the springs (see section 5.2).

15. Fasten the top and bottom diaphragm cases (A1, A2) together using the nuts (A21) and bolts (A20). Observe tightening torques.

16. Unscrew the vent plug (A16) from the bottom signal pressure connection and screw it into the top connection (S). The actuator springs, which now push against the diaphragm plate from above, cause the actuator stem to extend. The signal pressure is connected to the bottom connection (S) on the bottom diaphragm case. As a result, the actuator stem retracts opposing the spring force as the signal pressure increases.

17. Affix a new nameplate with changed symbol and new configuration ID to the actuator.
6.4 Version with handwheel

The stem connector (A51) connects the actuator stem (A7) with the actuator stem (A50) of the handwheel. The actuator stem position can be adjusted using the handwheel (A60). See Fig. 9.

Note

If you want to fit a handwheel to an actuator, contact SAMSON's After-sales Service department.

6.4.1 Extending the actuator stem manually

1. Loosen the lock nut (A66) to unlock the handwheel (A60).
2. Turn the handwheel clockwise to extend the actuator stem.
3. To change from manual to automatic operation, put the handwheel into the neutral position by aligning the pointer (A55) with the groove on the stem connector (A51).
4. Tighten the lock nut (A66) to lock the handwheel.

6.4.2 Retracting the actuator stem manually

1. Loosen the lock nut (A66) to unlock the handwheel (A60).
Operation

2. Turn the handwheel counterclockwise to retract the actuator stem.

3. To change from manual to automatic operation, put the handwheel into the neutral position by aligning the pointer (A55) with the groove on the stem connector (A51).

4. Tighten the lock nut (A66) to lock the handwheel.

6.5 Adjusting the travel stop

In the version with travel stop, the maximum and minimum actuator travel can be limited as follows:

<table>
<thead>
<tr>
<th>Direction of action</th>
<th>Min. stop</th>
<th>Max. stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem extends (FA)</td>
<td>0 to 125 %</td>
<td>50 to 125 %</td>
</tr>
<tr>
<td>Stem retracts (FE)</td>
<td>0 to 100 %</td>
<td>50 to 100 %</td>
</tr>
</tbody>
</table>

6.5.1 Bottom travel stop (minimum travel)

1. Loosen top lock nut (A74) and unscrew cover (A73).
2. Loosen bottom lock nut (A74) and turn the adjustment nut (A70) to adjust the travel stop.
3. Tighten bottom lock nut (A74).
4. Attach the cover (A73) and retighten the lock nut (A74).

6.5.2 Top travel stop (maximum travel)

1. Loosen top lock nut (A74).
2. Adjust the cover (A73) to the required travel stop.
3. Retighten top lock nut (A74).
Operation

Left half: Actuator stem retracts (FE)
Right half: Actuator stem extends (FA)

A5  Diaphragm plate
A7  Actuator stem
A50 Top actuator stem
A70 Adjustment nut
A73  Cover
A74  Lock nut
A75  Top diaphragm case

Fig. 10: Travel stop
7 Servicing

⚠️ DANGER
Risk of bursting in the actuator.
Actuators are pressurized. Improper opening can lead to actuator components bursting.
Before starting any work on the actuator, depressurize all plant sections concerned and the actuator.

⚠️ WARNING
Risk of personal injury due to preloaded springs.
Actuators with preloaded springs are under tension. They can be identified by three long bolts protruding from the bottom of the actuator.
Before starting any work on the actuator, relieve the compression from the preloaded springs (see section 9.3).

⚠️ NOTICE
Risk of actuator damage due to excessively high or low tightening torques.
Observe the specified torques on tightening actuator components. Excessively tightened torques lead to parts wearing out quicker. Parts that are not tightened far enough may loosen.
Observe the specified tightening torques (➔ AB 0100).

⚠️ NOTICE
Risk of actuator damage due to the use of unsuitable tools.
Only use tools approved by SAMSON (➔ AB 0100).

⚠️ NOTICE
Risk of actuator damage due to the use of unsuitable lubricants.
Only use lubricants approved by SAMSON (➔ AB 0100).

⚠️ NOTE
Risk of actuator damage due to incorrect service or repair.
- Do not perform any service or repair work other than the activities described in this section on your own. Contact SAMSON’s After-sales Service department.
- Service and repair work must only be performed by staff trained for this purpose.

- The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON’s After-sales Service department.
- Only use original spare parts by SAMSON, which comply with the original specifications.
7.1 Replacing the diaphragm

⚠️ NOTICE
Risk of malfunction due to damaged hose clamp.
Do not reuse hose clamps. Use a new hose clamp every time the diaphragm is replaced.

⚠️ NOTICE
Risk of property damage and malfunction due to incorrect mounting of the hose clamp.
Tighten the hose clamp using a torque wrench and use a special tool to position it centrically.

Version with direction of action "actuator stem extends" (FA)
1. Lift the actuator off the valve. See section 9.2.
2. Unscrew the nuts (A21) and bolts (A20) on the diaphragm case.
3. Relieve the spring compression of actuators with preloaded springs (see section 9.3).
4. Lift off the top diaphragm case (A1) and remove springs (A10).
5. Pull the diaphragm plate assembly consisting of the diaphragm plate (A5), diaphragm (A4), and actuator stem (A7) out of the bottom diaphragm case (A2).
6. Clamp the bottom section of the actuator stem (A7) into a vise using protective jaws. Make sure that the actuator stem is not damaged.
7. 240 cm²: undo the latch of the hose clamp (A6). Take the hose clamp (A6) and diaphragm (A4) off the diaphragm plate (A5).
350 and 700 cm²: undo the latch of the hose clamp (A6). Take the compressor (A19), hose clamp (A6), and diaphragm (A4) off the diaphragm plate (A5).

Fig. 11: Arrangement of parts for "stem extends" direction of action
Servicing

8. Mount the new diaphragm (A4). Make sure the diaphragm is correctly aligned with the diaphragm plate. The imaginary line through two opposing recesses for springs on the diaphragm plate must be aligned centrally between two bolting holes in the diaphragm (see Fig. 12).

9. Place the hose clamp (A6) evenly into the groove in the diaphragm (A4) intended for it.

10. **240 cm²:** turn the screw on the latch of the hose clamp until the hose clamp rests completely in the groove. Tighten the screw of the latch using a suitable tool. Observe tightening torques.

**350 and 700 cm²:** turn the screw on the latch of the hose clamp until only a gap of just a few millimeters remains between the diaphragm (A4) and hose clamp (A6).

Place and align the compressor (A19) beneath the clamp’s latch (see Fig. 12). Tighten the screw of the latch using a suitable tool. Observe tightening torques.

11. Apply a suitable lubricant to the actuator stem (A7).

12. Place the diaphragm plate assembly consisting of the diaphragm plate (A5), new diaphragm (A4), and actuator stem (A7) into the bottom diaphragm case (A2).

---

**Fig. 12: Aligning the diaphragm**
Make sure that the sealing elements are not damaged.

13. Place the springs (A10) into the bottom diaphragm case, centering them in the intended recesses.

14. Place on the top diaphragm case (A1).

15. If necessary, preload the springs (see section 5.2).

16. Fasten the top and bottom diaphragm cases (A1, A2) together using the nuts (A21) and bolts (A20). Observe tightening torques.

17. Mount the actuator on the valve (see section 5.1).

**Version with direction of action "actuator stem retracts" (FE)**

1. Lift the actuator off the valve. See section 9.2.

2. Unscrew the nuts (A21) and bolts (A20) on the diaphragm case.

3. Lift off the top diaphragm case (A1).

4. Pull the diaphragm plate assembly consisting of the diaphragm plate (A5), diaphragm (A4), and actuator stem (A7) out of the actuator.

5. Take the springs (A10) out of the bottom diaphragm case (A2).

6. Clamp the bottom section of the actuator stem (A7) into a vise using protective jaws. Make sure that the actuator stem is not damaged.

7. **240 cm²:** undo the latch of the hose clamp (A6). Take the hose clamp (A6) and diaphragm (A4) off the diaphragm plate (A5).

**350 and 700 cm²:** undo the latch of the hose clamp (A6). Take the compressor (A19), hose clamp (A6), and diaphragm (A4) off the diaphragm plate (A5).

8. Mount the new diaphragm (A4). Make sure the diaphragm is correctly aligned with the diaphragm plate. The imaginary line through two opposing recesses for springs on the diaphragm plate must be

![Diagram](image-url)
9. Place the hose clamp (A6) evenly into the groove in the diaphragm (A4) intended for it.

10. **240 cm²**: turn the screw on the latch of the hose clamp until the hose clamp rests completely in the groove. Tighten the screw of the latch using a suitable tool. Observe tightening torques.

**350 and 700 cm²**: turn the screw on the latch of the hose clamp until only a gap of just a few millimeters remains between the diaphragm (A4) and hose clamp (A6).

Place and align the compressor (A19) beneath the clamp’s latch (see Fig. 12). Tighten the screw of the latch using a suitable tool. Observe tightening torques.

11. Apply a suitable lubricant to the actuator stem (A7).

12. Clamp the top diaphragm case (A1) with the opening facing upward into a suitable clamping fixture.

13. Place the diaphragm plate assembly consisting of the diaphragm plate (A5), new diaphragm (A4), and actuator stem (A7) with the actuator stem pointing upward into the diaphragm case (A1).

14. Place the springs (A10) in the diaphragm plate (A5), centering them in the intended recesses.

15. Carefully guide the bottom diaphragm case (A2) over the actuator stem (A7) and place it on the springs (A10). Make sure that the sealing elements are not damaged. Ensure that the compressed air connections on the cases (A1, A2) are correctly aligned with each other.

16. Fasten the top and bottom diaphragm cases (A1, A2) together using the nuts (A21) and bolts (A20). Observe tightening torques.

17. Mount the actuator on the valve (see section 5.1).

### 7.2 Replacing the actuator stem seals

**Version with direction of action "actuator stem extends" (FA)**

1. Lift the actuator off the valve. See section 9.2.

2. Unscrew the nuts (A21) and bolts (A20) on the diaphragm case.

3. Relieve the spring compression of actuators with preloaded springs (see section 9.3).

4. Lift off the top diaphragm case (A1) and remove springs (A10).

5. Pull the diaphragm plate assembly consisting of the diaphragm plate (A5), diaphragm (A4), and actuator stem (A7) out of the bottom diaphragm case (A2).

6. Use a suitable punch to remove the radial shaft seal (A40).

7. Apply a suitable lubricant to the new radial shaft seal (A40).

8. Use a suitable mandrel to mount the radial shaft seal (A40).
9. Renew the dry bearing (A42) and wiper (A41), if necessary.

10. Apply a suitable lubricant to the actuator stem (A7).

11. Place the diaphragm plate assembly consisting of the diaphragm plate (A5), new diaphragm (A4), and actuator stem (A7) into the bottom diaphragm case (A2). Make sure that the sealing elements are not damaged. Ensure that the compressed air connections on the cases (A1, A2) are correctly aligned with each other.

12. Place the springs (A10) into the bottom diaphragm case, centering them in the intended recesses.

13. Place on the top diaphragm case (A1).

14. If necessary, preload the springs (see section 5.2).

15. Fasten the top and bottom diaphragm cases (A1, A2) together using the nuts (A21) and bolts (A20). Observe tightening torques.

16. Mount the actuator on the valve (see section 5.1).

Version with direction of action "actuator stem retracts" (FE)

1. Lift the actuator off the valve. See section 9.2.

2. Unscrew the nuts (A21) and bolts (A20) on the diaphragm case.

3. Lift off the top diaphragm case (A1).

4. Pull the diaphragm plate assembly consisting of the diaphragm plate (A5), dia-

Fig. 14: Actuator stem seals
phragm (A4), and actuator stem (A7) out of the actuator.

5. Take the springs (A10) out of the bottom diaphragm case (A2).

6. Use a suitable punch to remove the radial shaft seal.

7. Apply a suitable lubricant to the new radial shaft seal (A40).

8. Use a suitable mandrel to mount the radial shaft seal (A40).

9. Renew the dry bearing (A42) and wiper (A41), if necessary.

10. Apply a suitable lubricant to the actuator stem (A7).

11. Clamp the top diaphragm case (A1) with the opening facing upward into a suitable clamping fixture.

12. Place the diaphragm plate assembly together with the actuator stem (A7) pointing upward into the diaphragm case (A1).

13. Place the springs (A10) in the diaphragm plate (A5), centering them in the intended recesses.

14. Carefully guide the bottom diaphragm case (A2) over the actuator stem (A7) and place it on the springs (A10). Make sure that the sealing elements are not damaged. Ensure that the compressed air connections on the cases (A1, A2) are correctly aligned with each other.

15. Fasten the top and bottom diaphragm cases (A1, A2) together using the nuts (A21) and bolts (A20). Observe tightening torques.

16. Mount the actuator on the valve (see section 5.1).

7.3 Preparation for return shipment

Defective actuators can be returned to SAMSON for repair.

Proceed as follows to return valves to SAMSON:

1. Put the control valve out of operation. See associated valve documentation.

2. Lift the actuator off the valve. See section 9.2.

3. If necessary, relieve the spring compression (see section 9.3).

4. Send the actuator to your nearest SAMSON subsidiary. SAMSON subsidiaries are listed on our website at www.samson.de > Contact.
7.4 Ordering spare parts and operating supplies

Contact your nearest SAMSON subsidiary or the SAMSON After-sales Service department for information on spare parts, lubricants, and tools.

Spare parts
See section 10.2 for details on spare parts.

Lubricant
Details on suitable lubricants can be found in the document AB 0100.

Tools
Details on suitable tools can be found in the document AB 0100.
8 Malfunctions

Depending on the operating conditions, check the actuator at certain intervals to prevent possible failure before it can occur. Operators are responsible for drawing up an inspection plan.

Troubleshooting

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible reasons</th>
<th>Recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator stem does not move on demand.</td>
<td>Actuator is blocked.</td>
<td>Check attachment. Unblock the actuator.</td>
</tr>
<tr>
<td></td>
<td>Insufficient signal pressure</td>
<td>Check the signal pressure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the signal pressure line for leakage.</td>
</tr>
<tr>
<td></td>
<td>Signal pressure not connected to the correct diaphragm chamber</td>
<td>See section 3.4.</td>
</tr>
<tr>
<td>Actuator stem does not stroke through its complete travel range.</td>
<td>Travel stop active</td>
<td>See section 6.5.</td>
</tr>
<tr>
<td></td>
<td>Insufficient signal pressure</td>
<td>Check the signal pressure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the signal pressure line for leakage.</td>
</tr>
<tr>
<td></td>
<td>Valve accessories incorrectly set.</td>
<td>Check the actuator without valve accessories.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the settings of the valve accessories.</td>
</tr>
</tbody>
</table>
9 Decommissioning and disassembly

DANGER
Risk of bursting in the actuator.
Actuators are pressurized. Improper opening can lead to actuator components bursting.
Before starting any work on the actuator, depressurize all plant sections concerned and the actuator.

WARNING
Risk of personal injury due to preloaded springs.
Actuators with preloaded springs are under tension. They can be identified by three long bolts protruding from the bottom of the actuator.
Before starting any work on the actuator, relieve the compression from the preloaded springs (see section 9.3).

9.1 Decommissioning
To decommission the actuator for service and repair work or disassembly, proceed as follows:
1. Put the control valve out of operation.
   See associated valve documentation.
2. Disconnect the pneumatic air supply to depressurize the actuator.

9.2 Removing the actuator from the valve
1. Put the control valve out of operation.
   See associated valve documentation.
2. Undo the clamps of the stem connector (A26/27).
3. Loosen the stem connector nut (9) and lock nut (10).
4. Removing actuators with "stem extends" action with/without preloaded springs: to undo the ring nut (A8), apply approx. 50 % signal pressure to open the valve.
5. Unscrew the ring nut on the valve bonnet.
6. Disconnect the signal pressure again.
7. Separate the actuator from the valve by undoing the ring nut.
8. Fasten the lock nut and stem connector nut on the valve.

9.3 Relieving the spring compression in the actuator
1. Undo the short nuts (A21) and bolts (A20) on the diaphragm cases (A1, A2).
2. Undo the the long nuts (A23) and bolts (A22) on the diaphragm cases evenly in a crisscross pattern.

9.4 Disposal
→ Observe local, national, and international refuse regulations.
→ Do not dispose of components, lubricants, and hazardous substances together with your other household waste.
Decommissioning and disassembly

Fig. 15: Actuator with clamping nuts and bolts

A1     Top diaphragm case
A2     Bottom diaphragm case
A4     Diaphragm
A20    Hexagon screw
A21    Hexagon nut
A22    Hexagon bolt (preloading)
A23    Hexagon nut (preloading)
A24    Blanking plug
A25    Washer
10 Annex

10.1 After-sales service

Contact SAMSON's After-sales Service department for support concerning service or repair work or when malfunctions or defects arise.

E-mail

You can reach the After-sales Service Department at aftersalesservice@samson.de.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on the SAMSON website, in all SAMSON product catalogs or on the back of these Mounting and Operating Instructions.

Required specifications

Please submit the following details:

- Order number and position number in the order
- Type, model number, actuator area, travel, direction of action and bench range (e.g. 0.2 to 1 bar) or the operating range of the actuator
- Type designation of mounted valve (if applicable)
- Installation drawing
10.2 Spare parts

1  Top diaphragm case
2  Bottom diaphragm case
4  Diaphragm
5  Diaphragm plate
6  Hose clamp
7  Actuator stem
8  Ring nut
9  Hexagon nut
10 Spring
11 Spring
12 Spring
15 Collar nut
16 Vent plug
19 Compressor on the hose clamp (6)
20 Hexagon bolt
21 Hexagon nut
22 Hexagon bolt (preloading)
23 Hexagon nut (preloading)
24 Screw plug
25 Washer
26/27 Stem connector clamp
28 Clamp with bracket
29 Hexagon bolt
30 Hexagon nut
32 Hanger
40 Radial shaft seal
41 Wiper
42 Dry bearing
43 Hexagon screw for hanger (32)
49 Wiper 1)
50 Top actuator stem
51 Stem connector
52 Screwed flange
54 Ring
55 Pointer
56 Hexagon nut 1)
57 Coupling nut
58 Washer
59 Yoke
60 Handwheel
61 Dowel pin
62 Dowel pin
63 Threaded pin
64 Cap screw
65 Hexagon screw
66 Lock nut
67 Snap ring
68 Axial needle seal
69 Washer
70 Adjustment nut
73 Cover
74 Lock nut
75 Top diaphragm case
76 Radial shaft seal
77 Dry bearing
100 Nameplate
101 Label (preloading)
106 Grooved pin

1) Only for version with 240 cm² actuator area
2) Replaces collar nut (15) in version with travel stop or handwheel