

MOUNTING AND OPERATING INSTRUCTIONS



EB 8321 EN

Translation of original instructions



Type 3278 Pneumatic Rotary Actuator

Type 3278 Pneumatic Rotary Actuator

Actuator area: 160 and 320 cm²

Edition January 2021

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. The images shown in these instructions are for illustration purposes only. The actual product may vary.

- 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 (aftersaleservice@samsongroup.com).



Documents relating to the device, such as the mounting and operating instructions, are available on our website at www.samsongroup.com > **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

Note

Additional information

Tip

Recommended action

1	Safety instructions and measures	1-1
1.1	Notes on possible severe personal injury	1-3
1.2	Notes on possible personal injury	1-4
1.3	Notes on possible property damage	1-5
1.4	Warnings on the device.....	1-5
2	Markings on the device	2-1
2.1	Actuator nameplate.....	2-1
3	Design and principle of operation	3-1
3.1	Direction of action.....	3-1
3.2	Signal pressure routing.....	3-1
3.3	Fail-safe action	3-1
3.4	Versions	3-3
3.5	Accessories	3-3
3.6	Technical data	3-3
4	Shipment and on-site transport	4-1
4.1	Accepting the delivered goods	4-1
4.2	Removing the packaging from the actuator	4-1
4.3	Transporting and lifting the actuator	4-1
4.3.1	Transporting the actuator	4-2
4.3.2	Lifting the actuator	4-2
4.4	Storing the actuator.....	4-3
5	Installation	5-1
5.1	Preparation for installation.....	5-1
5.2	Mounting the device.....	5-1
5.2.1	Mounting the actuator onto the valve	5-2
5.2.2	Signal pressure connection	5-2
5.2.3	Adjusting the stop bolts	5-2
6	Operation	6-1
6.1	Throttling service.....	6-1
6.2	Manual mode (versions with handwheel only)	6-1
7	Malfunctions	7-1
7.1	Troubleshooting	7-1
7.2	Emergency action	7-1

Contents

8	Servicing and conversion	8-1
8.1	Periodic testing	8-2
8.2	Preparation for servicing or conversion work.....	8-2
8.3	Mounting the actuator on the valve after service or conversion work	8-2
8.4	Service work.....	8-2
8.4.1	Replacing the diaphragm	8-2
8.5	Conversion work.....	8-3
8.5.1	Changing the fail-safe action/reversing the direction of action	8-3
8.5.2	Changing the bench range	8-3
8.6	Ordering spare parts and operating supplies	8-4
9	Decommissioning	9-1
10	Removal	10-1
10.1	Removing the actuator from the valve	10-1
10.2	Relieving the spring compression in the actuator.....	10-1
11	Repairs	11-1
11.1	Returning devices to SAMSON	11-1
12	Disposal	12-1
13	Annex	13-1
13.1	Tightening torques.....	13-1
13.2	Spare parts	13-1
13.3	After-sales service	13-3

1 Safety instructions and measures

Intended use

The SAMSON Type 3278 Actuator is mounted on butterfly valves and other final control elements with rotary closure members. In combination with the valve, the actuator is used to shut off the flow of liquids, gases or vapors in the pipeline. The actuator is suitable for both throttling and on/off service. The actuators can be used in processing and industrial plants.

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

SAMSON does not assume any liability for damage resulting from the failure to use the device 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 by the technical data
- Use outside the limits defined by the accessories connected to 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

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 must 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 3278 Pneumatic Rotary Actuator:

- Protective gloves and safety footwear when mounting or removing the actuator
 - Eye protection and hearing protection while the actuator is operating.
- ➔ Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications of 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 3278 Actuator does not have any special safety features.

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 signal pressure, stored spring energy or moving parts by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warning and caution notes in these mounting and operating instructions.

Responsibilities of the operator

Operators are responsible for proper use 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, operators must ensure that operating personnel or third parties 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 specified hazard statements, warnings and caution notes. Furthermore, operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards, directives and regulations

According to the ignition risk assessment performed in accordance with Clause 5.2 of ISO 80079-36, 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 Clause 6.4 of EN 60079-14 (VDE 0165-1).

Referenced documentation

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

- Mounting and operating instructions for the valve on which it is mounted
- Mounting and operating instructions for mounted valve accessories (positioner, solenoid valve etc.)

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 affected and the actuator.

1.2 Notes on possible personal injury

WARNING

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension.

- Only open the actuator housing to safely relieve the energy of the spring compression following the instructions in this document. See 'Relieving the spring compression in the actuator' in the 'Removal' section.

Risk of personal injury when the actuator vents.

The actuator is operated with air. As a result, air is vented during operation.

- Install the control valve in such a way that vent openings are not located at eye level and the actuator does not vent at eye level in the work position ¹⁾.
- Use suitable silencers and vent plugs.
- Wear eye and hearing protection when working near the actuator.

Risk of personal injury through incorrect operation, use or installation as a result of information on the actuator being illegible.

Over time, markings, labels and nameplates on the actuator may become covered with dirt or become illegible in some other way. As a result, hazards may go unnoticed and the necessary instructions not followed. There is a risk of personal injury.

- Keep all relevant markings and inscriptions on the device in a constantly legible state.
- Immediately renew damaged, missing or incorrect nameplates or labels.

¹⁾ If not described otherwise in the valve documentation, the work position for the control valve is the front view looking onto the operating controls (including valve accessories).

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 any other mounting parts.

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

Observe the specified torques when tightening actuator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are not tightened far enough may loosen.

→ Observe the specified tightening torques.

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

Certain tools are required to work on the actuator.

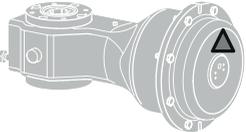
→ Only use tools approved by SAMSON.

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 surfaces.

→ Only use lubricants approved by SAMSON.

1.4 Warnings on the device

Warning	Meaning of the warning	Location on the device
	<p>Warning to indicate that the springs in the actuator are preloaded.</p> <p>Actuators with preloaded springs are under tension. Incorrect opening of the actuator can lead to personal injury through the sudden and uncontrolled projection of parts.</p> <p>Before starting any work on the actuator, relieve the compression from the preloaded springs. See 'Relieving the spring compression in the actuator' in the 'Removal' section.</p>	

2 Markings on the device

2.1 Actuator nameplate

It includes all details required to identify the device (see Fig. 2-1):

- 1 Order number and item
- 2 Actuator type and size
- 3 Max. supply pressure
- 4 Min. bench range
- 5 Max. bench range
- 6 Date of manufacture (month and year)

The nameplate is stuck on the housing.

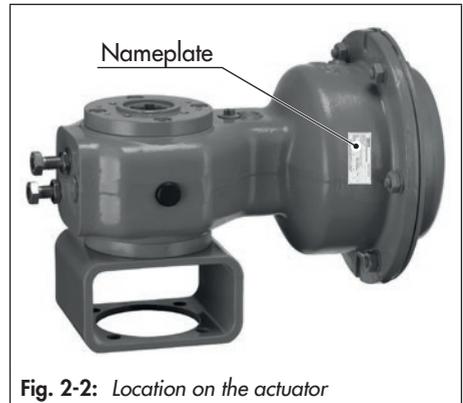


Fig. 2-2: Location on the actuator

SAMSON		Made in Germany			
VETEC Ventiltechnik GmbH		6			
Auftragsnr./Pos. Order No/Pos.		1			
Pneumatischer Antrieb/Pneumatic Actuator					
Typ Type		2	Max. Luftdruck Max. Air pressure		bar 3
Federbereich Spring Range		bar	min 4	max 5	
Sicherheitsstellung wird vom Anbau des Antriebs an das Ventil bestimmt! Fail-safe position is determined by the attachment of the actuator to the valve!					

Fig. 2-1: Nameplate of Type 3278 Actuator

3 Design and principle of operation

The single-acting Type 3278 Rotary Actuator with spring return mechanism is mounted on butterfly valves and other final control elements with rotary closure members.

The rotary actuator mainly consists of the diaphragm actuator with diaphragm (20) and springs (8, 9, 10) and the lever system (2.2) with actuator stem (2.1) and actuator shaft (2.3) inside the housing.

The signal pressure creates a force at the diaphragm surface which is opposed by the springs (8, 9, 10) in the actuator. The travel movement of the actuator stem (2.1), which is proportional to the signal pressure, is transferred to the lever system (2.2) where it is converted into a rotary motion. The number of springs and their compression determine the signal pressure range and the useable actuator torque. The two externally accessible stop bolts (42) can be used to limit the lower and upper opening angles.

3.1 Direction of action

The direction of action is determined by how the actuator is mounted on the valve. The reversal of the direction of action depends on the valve on which the actuator is mounted if the valve's direction of rotation or the fail-safe position of the entire valve assembly is to be changed. In this case, remove the valve from the actuator housing and mount it on the opposite flange (see the 'Servicing and conversion' section).

3.2 Signal pressure routing

When the signal pressure fails, the mounted valve is moved to its fail-safe position. The actuator springs open or close the valve, depending on whether the valve is mounted on the housing flange 1 or 2. '1' or '2' is cast on the corresponding side of the housing.

3.3 Fail-safe action

When the signal pressure is reduced or the air supply fails, the installed springs move the actuator stem in a linear motion causing the lever system to turn the actuator shaft to its end position. This causes the valve to move to its fail-safe position determined by the direction of action.

Fail-close valve

Valve mounted on housing flange 2: the actuator springs close the mounted valve when the pressure acting on the diaphragm decreases and when the supply air fails. The valve opens opposing the force of the actuator springs when the signal pressure increases.

Fail-open valve

Valve mounted on housing flange 1: the actuator springs open the mounted valve when the pressure acting on the diaphragm decreases and when the supply air fails. The valve closes opposing the force of the actuator springs when the signal pressure increases.

Design and principle of operation

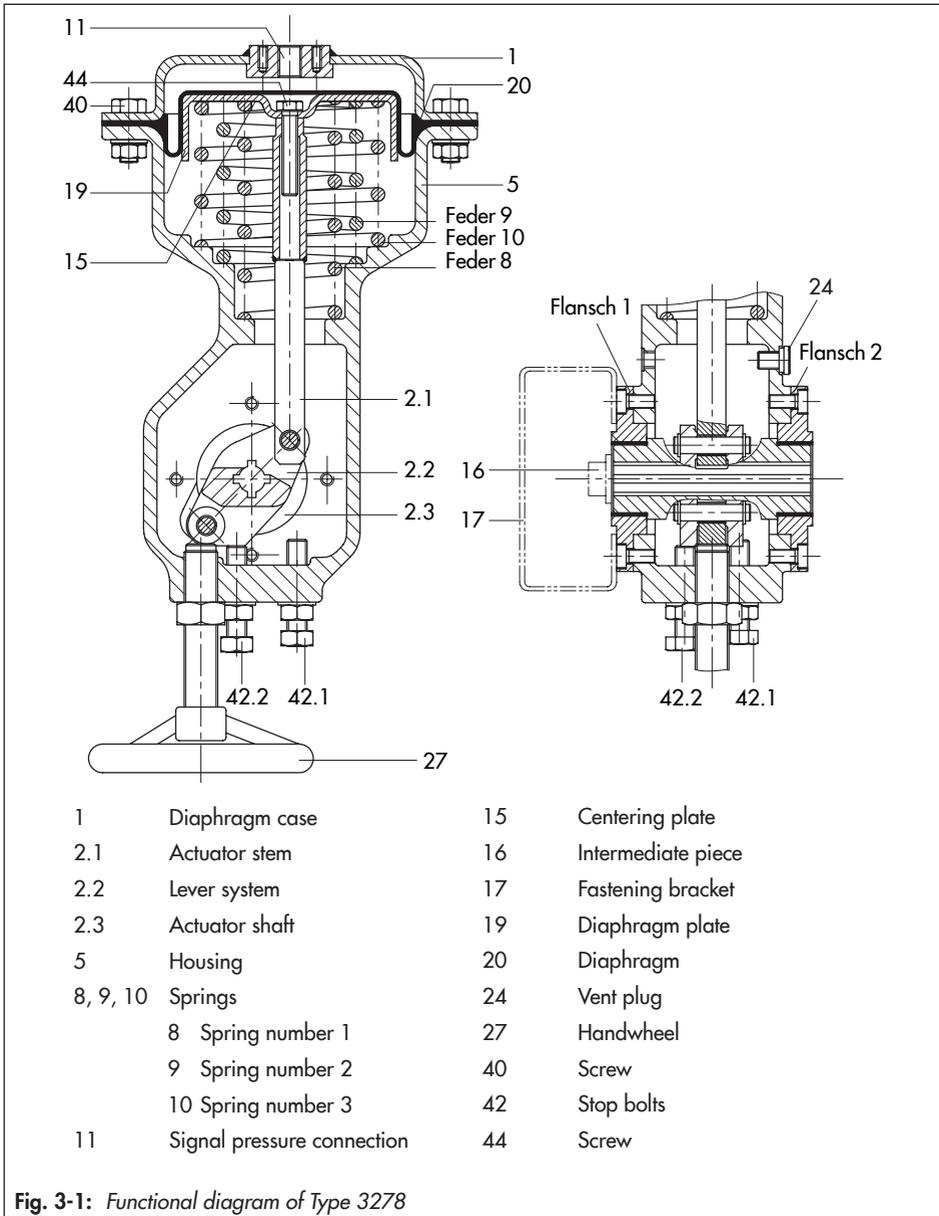


Fig. 3-1: Functional diagram of Type 3278

3.4 Versions

Version with handwheel

A handwheel can be retrofitted.

The spindle acts on the lever system of the valve to position the valve manually.

3.5 Accessories

Handwheel

Actuator area	Handwheel material number
160 cm ²	1690-3394
320 cm ²	1690-6699

Positioner mounting kit

A mounting kit with a bracket, intermediate piece and screws is required to attach a non-SAMSON positioner (according to VDI/VDE 3845). The positioner is mounted on the side opposite to the flange connection.

Actuator area	Material number of mounting kit
160 cm ²	1400-5890
320 cm ²	1400-5891

Vent plugs

Vent plugs are screwed into the exhaust air ports of pneumatic and electropneumatic devices. They ensure that any exhaust air that forms can be vented to the atmosphere (to avoid excess pressure in the device). Furthermore, the vent plugs allow air intake to prevent a vacuum from forming in the device.

► AB 07

Actuator springs

Actuator area	Material no.		
	Spring 8	Spring 9	Spring 10
160 cm ²	0270-2055	0270-2056	0270-2057
320 cm ²	0270-2234	0270-2235	0270-2236

3.6 Technical data

The nameplate provides information on the actuator version (see the 'Markings on the device' section).

i Note

More information is available in Data Sheet
► T 8321.

Design and principle of operation

Table 3-1: *Technical data for Type 3278*

Permissible signal pressure	6 bar
Actuator area	160 cm ² · 320 cm ²
Opening angle	90°
No. of springs	3
Signal pressure ranges	7 (through different spring combinations)
Permissible temperatures	-35 to +90 °C in continuous operation

Table 3-2: *Materials*

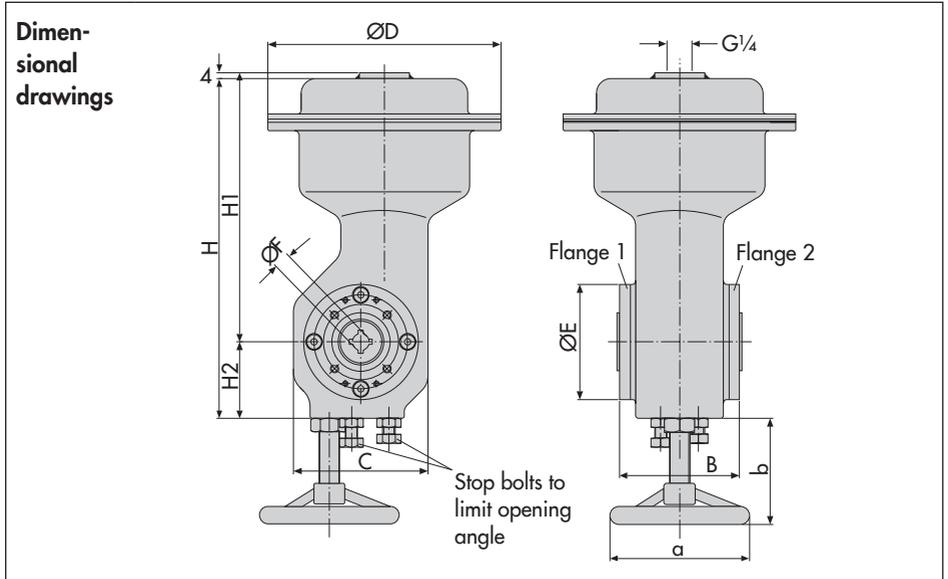
Enclosure	EN-JS1049, powder coating
Rolling diaphragm	NBR (nitrile butadiene rubber) with fabric reinforcement (polyester)
Diaphragm plate	Sheet steel, zinc plated/chromate coating
Springs	55 Si Cr 6
Actuator stem	St 37, zinc plated/chromate coating
Actuator shaft	EN-JS1049, zinc plated/chromate coating

Table 3-3: *Dimensions in mm and weights in kg*

Actuator area	ØD	H	H1	H2	C	B	ØE	ØF ²⁾	Øa	b (approx.)	Connecting flanges acc. to DIN ISO 5211	Weight, approx.
160 cm ²	225	332	260	72	132	118	110	16 ¹⁾ 20/25	250	120	F07	16
320 cm ²	295	516	421	95	183	162	150	25 ¹⁾ 40	385	150	F12	50

¹⁾ Standard version for Type 3331 Butterfly Valve

²⁾ Hollow shaft with four keyways offset by 90° to accommodate the shaft of the valve (shaft end with feather key notch according to DIN 6885)



4 Shipment and on-site transport

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Check that the specifications on the actuator nameplate match the specifications in the delivery note. See the 'Markings on the device' section for nameplate details.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).
3. Determine the weight and dimensions of the units to be lifted and transported in order to select the appropriate lifting equipment and lifting accessories. Refer to the transport documents and the 'Technical data' section.

4.2 Removing the packaging from the actuator

Observe the following sequence:

- Do not open or remove the packaging until immediately before mounting the actuator.

- Leave the actuator in its transport container or on the pallet to transport it on site.
- Dispose and recycle the packaging in accordance with the local regulations.

4.3 Transporting and lifting the actuator

⚠ DANGER

Danger due to suspended loads falling.

- *Stay clear of suspended or moving loads.*
 - *Close off and secure the transport paths.*
-

⚠ WARNING

Risk of lifting equipment tipping over 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 (including the packaging, if applicable).*
-

⚠ WARNING

Risk of personal injury due to the actuator tipping.

- *Observe the actuator's center of gravity.*
 - *Secure the actuator against tipping over or turning.*
-

WARNING

Risk of injury due to incorrect lifting without the use of lifting equipment.

Lifting the actuator without the use of lifting equipment may lead to injuries (back injury in particular) depending on the weight of the actuator.

→ Observe the occupational health and safety regulations valid in the country of use.

NOTICE

Risk of actuator damage due to incorrectly attached slings.

→ Do not attach load-bearing slings to the handwheel or any other mounting parts.

→ Observe lifting instructions (see section 4.3.2).

Tip

Our after-sales service can provide more detailed transport and lifting instructions on request.

4.3.1 Transporting the actuator

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 'Technical data' in the 'Design and principle of operation' section).

4.3.2 Lifting the actuator

To mount large actuators onto the valve, use lifting equipment (e.g. crane or forklift) to lift it.

Lifting instructions

- Use a hook with safety latch to secure the slings from slipping off the hook during lifting and transporting.
- Attach the slings in such a way that the slings attached to the actuator housing bear the entire load. Any other slings only serve to stabilize the position for transporting.
- Secure slings on the object to be transported against slipping.
- Make sure the slings can be removed from the actuator once it has been mounted on the valve.
- Prevent the actuator from tilting or tipping.

- Do not leave loads suspended when interrupting work for longer periods of time.
- See associated valve documentation for instructions on how to lift a control valve.
- 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.

4.4 Storing the actuator

NOTICE

Risk of actuator damage due to improper storage.

- Observe the storage instructions.
- Avoid long storage times.
- Contact SAMSON in case of different storage conditions or longer storage times.

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).
- Secure the actuator in the stored position against slipping or tipping over.
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.

- Make sure that the ambient air is free of acids or other corrosive media.
- Observe permissible temperatures (see 'Technical data' in the 'Design and principle of operation' section).
- 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

Our after-sales service can provide more detailed storage instructions on request.

5 Installation

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

5.1 Preparation for installation

Before mounting, make sure the following conditions are met:

- The actuator is not damaged.
- The type designation, material and temperature range of the actuator match the ambient conditions (temperatures etc.). See the 'Markings on the device' section for nameplate details.

Proceed as follows:

- Lay out the necessary material and tools to have them ready during mounting.
- Check that the vent plugs to be used are not blocked.
- Check any pressure gauges mounted on valve accessories to make sure they function properly.
- When the valve and actuator are already assembled, check the tightening torques of the bolted joints. Components may loosen during transport.

5.2 Mounting the device

Depending on the version, SAMSON control valves are either delivered with the actuator already mounted on the valve or the valve and actuator are delivered separately. When delivered separately, the valve and actuator must be assembled together on site. Proceed

as follows to mount the actuator and before start-up.

⚠ WARNING

Risk of personal injury due to exhaust air being vented.

The actuator is operated with air. As a result, air is vented during operation.

- *During mounting make sure that vent openings are not located at eye level in the work position of the control valve and the actuator does not vent at eye level in the work position.*
 - *Wear eye and hearing protection when working near the actuator.*
-

⚠ NOTICE

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

Observe the specified torques when tightening actuator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are not tightened far enough may loosen.

- *Observe the specified tightening torques.*
-

⚠ NOTICE

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

- *Only use tools approved by SAMSON.*
-

5.2.1 Mounting the actuator onto the valve

On mounting the rotary actuator onto the valve, it is important to pay attention to the actuator's direction of rotation and the resulting fail-safe action. As the signal pressure rises, the actuator shaft turns counterclockwise (view onto flange 1) and clockwise (view onto flange 2). In this case, mount a valve opening in the counterclockwise direction on flange 2 if the valve is to fail-close.

→ The actuator is mounted according to DIN ISO 5211.

5.2.2 Signal pressure connection

The signal pressure connection is designed as a borehole with a G 1/4 female thread. This type of connection allows the direct connection (VDE/VDE 3845) of a solenoid valve without the need for additional hook-up.

In combination with SAMSON Type 3766 and Type 3767 Positioners, a ready-made pipe connection with a connecting plate is available as an accessory for connection (see 'Accessories' in the 'Design and principle of operation' section).

5.2.3 Adjusting the stop bolts

The stop bolts (42) allow the opening angle of the rotary actuator to be limited depending on the valve version on which the actuator is mounted. The maximum angle of rotation without limit is 90°. If the butterfly valve is to be adjusted to an opening angle of 70° for throttling service, proceed as follows:

a) Fail-close valve

1. Loosen stop bolts (42.1 and 42.2).
2. Apply a signal pressure to the signal pressure connection (11) which corresponds to the lower bench range value (see nameplate).
3. Adjust the stop bolt for 0° opening angle (42.2) at the point where the butterfly valve is completely closed.
4. Apply a signal pressure to the signal pressure connection (11) which corresponds to the upper bench range value. Turn the other stop bolt (42.1) until the butterfly valve stops at an opening angle of 70°.
Read the angle off angle indication scale on the butterfly valve or from the positioner display.
5. Lock the position of both stop bolts with the lock nuts.
6. Write down the adjusted opening angle on the actuator's nameplate.

b) Fail-open valve

1. Loosen stop bolts (42.1 and 42.2).
2. Apply a signal pressure to the signal pressure connection (11) which corresponds to the upper bench range value (see nameplate).
3. Adjust the stop bolt for closed position (42.1) at the point where the butterfly valve is completely closed.
4. Apply a signal pressure to the signal pressure connection (11) which corresponds to the lower bench range value. Turn the other stop bolt (42.2) until the butterfly valve stops at an opening angle of 70°.

Read the angle off the angle indication scale on the butterfly valve or from the positioner display.

5. Lock the position of both stop bolts with the lock nuts.
6. Write down the adjusted opening angle on the actuator's nameplate.

6 Operation

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ WARNING

Risk of personal injury due to exhaust air being vented.

The actuator is operated with air. As a result, air is vented during operation.

→ *Wear eye and hearing protection when working near the actuator.*

⚠ WARNING

Risk of personal injury through incorrect operation, use or installation as a result of incorrect information on the actuator.

After any adjustment or conversion work, the details on the actuator nameplate may no longer be correct. This applies to the bench range, for example.

→ *Immediately renew any nameplates or labels with incorrect or outdated information.*

→ *Add any new values to the nameplate. If necessary, contact SAMSON to obtain a new nameplate.*

- The handwheel of valves with actuators fitted with a handwheel must be turned sufficiently far enough for normal operation to ensure that the opening angle stops are performed by the stop bolts and not the handwheel. Use the lock nut to secure the neutral position of the handwheel.

6.2 Manual mode (versions with handwheel only)

In the manual mode, the valve can be opened and closed by the handwheel. The valve position is independent of the signal pressure.

6.1 Throttling service

- The Type 3278 Pneumatic Rotary Actuator with 160 or 320 cm² actuator area is designed for a maximum supply pressure of 6 bar when used for throttling service.

7 Malfunctions

Read hazard statements, warnings and caution notes in the 'Safety instructions and measures' section.

7.1 Troubleshooting

Malfunction	Possible reasons	Recommended action
Actuator shaft does not move on demand.	Actuator is blocked.	Check attachment. Remove the blockage.
	Insufficient signal pressure	Check the signal pressure. Check the signal pressure line for leakage.
	Signal pressure not connected to the correct connection.	See 'Signal pressure routing' in the 'Design and principle of operation' section.
	Diaphragm in the actuator defective	See 'Replacing the diaphragm' in the 'Servicing' section.
Actuator shaft does not stroke through its complete opening angle.	Handwheel restricts the opening angle	Turn the handwheel to the neutral position (see the 'Operation' section).
	Insufficient signal pressure	Check the signal pressure. Check the signal pressure line for leakage.
	Incorrect setting of valve accessories.	Check the actuator without valve accessories. Check the settings of the valve accessories.

i Note

Contact our after-sales service for malfunctions not listed in the table.

7.2 Emergency action

Plant operators are responsible for emergency action to be taken in the plant.

8 Servicing and conversion

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Pneumatic actuators are pressure equipment that may burst when handled incorrectly.

Flying projectile fragments or components can cause serious injury or even death.

Before working on the actuator:

- ➔ Depressurize all plant sections concerned and the actuator. Release any stored energy.

⚠ WARNING

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension.

- ➔ Only open the actuator following the instructions in this document. See 'Relieving the spring compression in the actuator' in the 'Removal' section.

⚠ WARNING

Risk of personal injury due to exhaust air being vented.

The actuator is operated with air. As a result, air is vented during operation.

- ➔ Wear eye and hearing protection when working near the actuator.

⚠ WARNING

Risk of personal injury through incorrect operation, use or installation as a result of incorrect information on the actuator.

After any adjustment or conversion work, the details on the actuator nameplate may no longer be correct. This applies to the bench range, for example.

- ➔ Immediately renew any nameplates or labels with incorrect or outdated information.
- ➔ Add any new values to the nameplate. If necessary, contact SAMSON to obtain a new nameplate.

⚠ NOTICE

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

Observe the specified torques when tightening actuator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are not tightened far enough may loosen.

- ➔ Observe the specified tightening torques.

⚠ NOTICE

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

- ➔ Only use tools approved by SAMSON.

NOTICE

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

→ Only use lubricants approved by SAMSON.

Note

- 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.
- Only use original spare parts by SAMSON, which comply with the original specifications.

8.1 Periodic testing

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

Tip

Our after-sales service can support you in drawing up an inspection and test plan for your plant.

8.2 Preparation for servicing or conversion work

1. Lay out the necessary material and tools to have them ready for the intended work.

2. Put the actuator out of operation (see the 'Decommissioning' section).

3. Remove the actuator from the valve.

The following service and/or conversion work can be performed after preparation is completed:

- Replace the diaphragm (see section 8.4.1)
- Changing the fail-safe action/reversing the direction of action (see section 8.5.1)
- Changing the bench range (see section 8.5.2)

8.3 Mounting the actuator on the valve after service or conversion work

- Mount the actuator (see the 'Installation' section).

8.4 Service work

See Fig. 3-1 in the 'Design and principle of operation' section

8.4.1 Replacing the diaphragm

1. Unthread and remove the nuts (50) and bolts (50) (including the washers) on the diaphragm case (1).
2. Remove the diaphragm case (1) and take out the diaphragm (20).
3. Insert a new diaphragm.

- Place on diaphragm case (1) and refasten it to the housing (5) with bolts (40), washers (54) and nuts (50).

8.5 Conversion work

See Fig. 3-1 in the 'Design and principle of operation' section

8.5.1 Changing the fail-safe action/reversing the direction of action

The reversal of the direction of action depends on the valve on which the actuator is mounted if the valve's direction of rotation or the fail-safe position of the entire valve assembly is to be changed.

- Remove the valve from the actuator housing and mount it on the opposite flange.
- Readjust the stop bolts (42.1 and 42.2) to limit the opening angle (see 'Adjusting the stop bolts' in the 'Installation' section).

8.5.2 Changing the bench range

The useable actuator torques depend on the diaphragm area, maximum signal pressure and bench range of the actuator.

It is possible to subsequently change the bench range by removing or adding spring 8, 9 or 10 in the housing (see Table 8-4).

- Unthread and remove the nuts (50) and bolts (50) (including the washers) on the diaphragm case (1).
- Remove the diaphragm case (1) and take out the diaphragm (20).
- Slowly unthread the screw (44) on the diaphragm plate (19) to gradually relieve the spring spring compression.
- Hold the diaphragm plate (19) stationary until the screw (44) is completely unscrewed.
- Lift the diaphragm plate (19) and centering plate (15) off the springs.
- Add or remove the corresponding springs 8, 9 or 10 (see Table 8-4).
- Replace the centering plate (15) and diaphragm plate (19) on the springs and fasten them to the actuator stem (2.1) with screw (44).
- Insert diaphragm.
- Place on diaphragm case (1) and fasten it to the housing (5) with bolts (40), washers (54) and nuts (50).
- Affix a new nameplate with the new bench range to the actuator.

Table 8-4: Assignment of actuator springs and bench ranges

Bench range	0.4 to 0.8	0.5 to 1.0	0.8 to 1.6	0.9 to 1.8	1.2 to 2.4	1.3 to 2.6	1.7 to 3.4
Item (spring number)	10 (3)	9 (2)	8 (1)	9 and 10 (2 and 3)	8 and 10 (1 and 3)	8 and 9 (1 and 2)	8, 9 and 10 (1, 2 and 3)

8.6 Ordering spare parts and operating supplies

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

Spare parts

See Annex for details on spare parts.

Lubricant

See document ► AB 0100 for details on suitable lubricants.

Tools

See document ► AB 0100 for details on suitable tools.

9 Decommissioning

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Pneumatic actuators are pressure equipment that may burst when handled incorrectly.

Flying projectile fragments or components can cause serious injury or even death.

Before working on the actuator:

- *Depressurize all plant sections concerned and the actuator. Release any stored energy.*

⚠ WARNING

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension.

- *Only open the actuator following the instructions in this document. See 'Relieving the spring compression in the actuator' in the 'Removal' section.*

⚠ WARNING

Risk of personal injury due to exhaust air being vented.

The actuator is operated with air. As a result, air is vented during operation.

- *Wear eye and hearing protection when working near the actuator.*

To decommission the actuator for service work or before removing it from the valve, 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.

10 Removal

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Pneumatic actuators are pressure equipment that may burst when handled incorrectly.

Flying projectile fragments or components can cause serious injury or even death.

Before working on the actuator:

→ *Depressurize all plant sections concerned and the actuator. Release any stored energy.*

⚠ WARNING

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension.

→ *Only open the actuator following the instructions described in section 10.2.*

⚠ WARNING

Risk of personal injury due to exhaust air being vented.

The actuator is operated with air. As a result, air is vented during operation.

→ *Wear eye and hearing protection when working near the actuator.*

Before removing the valve, make sure the following conditions are met:

- The actuator is put out of operation (see the 'Decommissioning' section).

10.1 Removing the actuator from the valve

→ Mounting and removal of the actuator according to DIN ISO 5211.

10.2 Relieving the spring compression in the actuator

To relieve the compression of the springs in the actuator, proceed as follows:

1. Unthread and remove the nuts (50) and bolts (50) (including the washers) on the diaphragm case (1).
2. Remove the diaphragm case (1) and take out the diaphragm (20).
3. Slowly unthread the screw (44) on the diaphragm plate (19) to gradually relieve the spring spring compression.
4. Hold the diaphragm plate (19) stationary until the screw (44) is completely unscrewed before lifting the diaphragm plate (19) and centering plate (15) off the springs.

11 Repairs

If the actuator does not function properly according to how it was originally sized or does not function at all, it is defective and must be repaired or exchanged.

! NOTICE

Risk of actuator damage due to incorrect service or repair work.

- ➔ *Do not perform any repair work on your own.*
- ➔ *Contact SAMSON's After-sales Service for repair work.*

11.1 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair.

Proceed as follows to return devices:

1. Exceptions apply concerning some special device models
 - ▶ www.samsongroup.com > Service & Support > After-sales Service.
2. Send an e-mail
 - ▶ retouren@samsongroup.com to register the return shipment including the following information:
 - Type
 - Article no.
 - Configuration ID
 - Original order

- Completed Declaration on Contamination, which can be downloaded from our website at
 - ▶ www.samsongroup.com > Service & Support > After-sales Service.

After checking your registration, we will send you a return merchandise authorization (RMA).

3. Attach the RMA (together with the Declaration on Decontamination) to the outside of your shipment so that the documents are clearly visible.
4. Send the shipment to the address given on the RMA.

i Note

Further information on returned devices and how they are handled can be found at

- ▶ www.samsongroup.com > Service & Support > After-sales Service.

12 Disposal

- Observe local, national and international refuse regulations.
- Do not dispose of components, lubricants and hazardous substances together with your household waste.

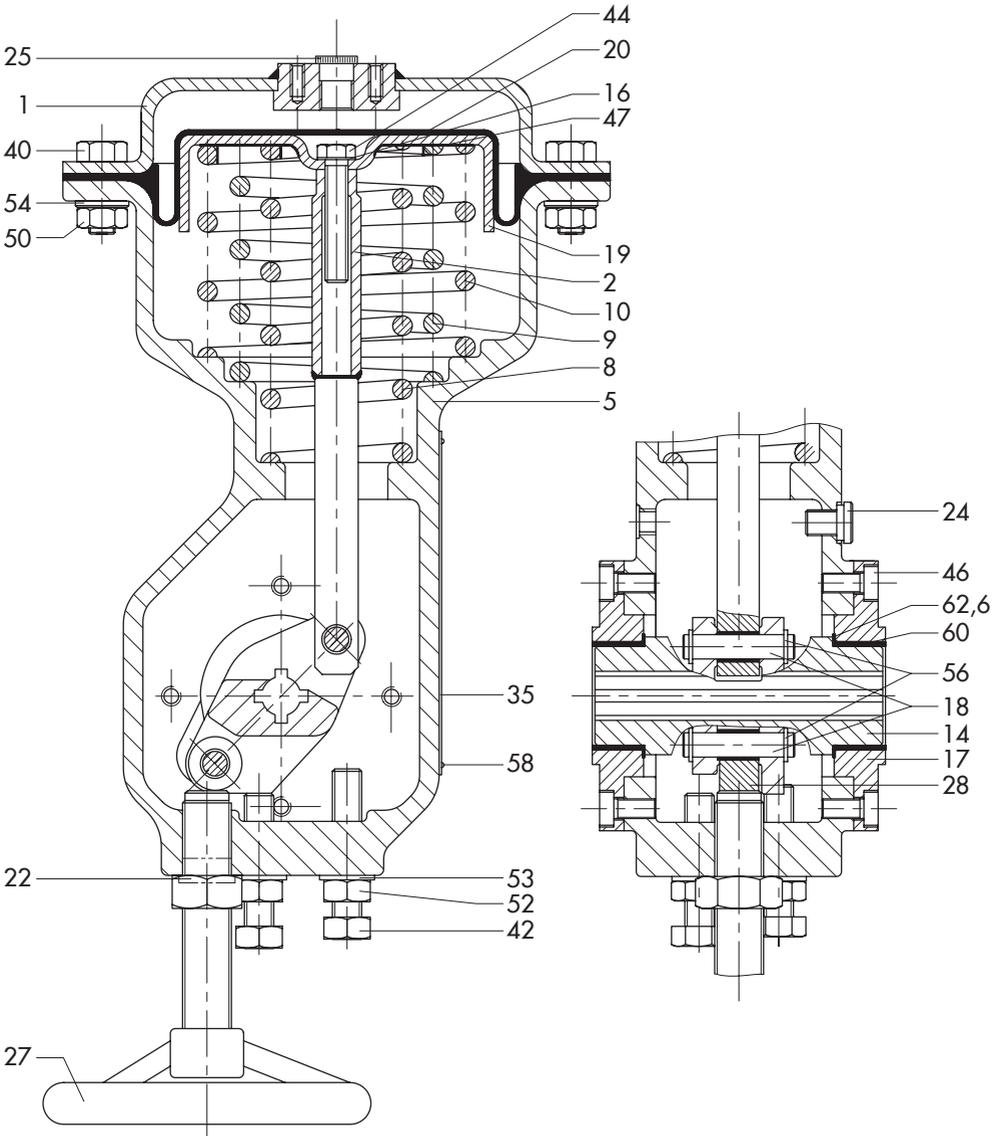
13 Annex

13.1 Tightening torques

Item	Part	Materials of nuts and bolts	Tightening torque
40	Hex bolts M10 (diaphragm case bolting)	A2/70 - A4/70 · 1.7709 - A193 B8M	30 to 35 Nm
44	Hex screw M12 (fastening of the diaphragm plate)	A2/70 - A4/70 · 1.7709 - A193 B8M	50 to 60 Nm
46	Cap screws M12 (fastening of the flange)	A2/70 - A4/70 · 1.7709 - A193 B8M	50 to 60 Nm

13.2 Spare parts

1	Diaphragm case	44	Hex bolt
2	Slide rod assembly	46	Cap screw
5	Housing	47	Spring washer
8	Spring	50	Hex nut
9	Spring	52	Hex nut
10	Spring	53	Spring washer
14	Shaft	54	Washer
16	Washer	56	Retaining ring
17	Flange	58	Round-head grooved pin
18	Pin	60	Dry bearing
19	Diaphragm plate	62	Thrust washer
20	Diaphragm	63	Shim
22	Blanking plug		
24	Screw plug		
25	Blanking plug		
27	Handwheel assembly		
28	Bushing assembly		
35	Label		
40	Hex bolt		
42	Hex bolt		



13.3 After-sales service

Contact our after-sales service for support concerning service or repair work or when malfunctions or defects arise.

E-mail address

You can reach our after-sales service at aftersalesservice@samsongroup.com.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on our website (www.samsongroup.com) or in all SAMSON product catalogs.

Required specifications

Please submit the following details:

- Order number and position number in the order
- Type, model number, actuator area, opening angle, 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

EB 8321 EN



SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samsongroup.com · www.samsongroup.com