Type 3349-1 and Type 3349-7 Pneumatic Control Valves

Type 3349 Aseptic Angle Valve with USP-VI diaphragm

Type 3349-7 Control Valve with Type 3730 Electropneumatic Positioner

Type 3349 Aseptic Angle Valve

Mounting and Operating Instructions

EB 8048-2 EN

Edition February 2014

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

Refer to Data Sheet ▶ **T 8048-2 EN** for **dimensions and weights** of **Type 3349-1/-7** Control Valves as well as **Type 3349** Aseptic Angle Valve.

Refer to the SAMSON website (www.samson.de) for more product documentation.

1 General safety instructions

- The valve must be mounted, started up or serviced by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. Make sure employees or third persons are not exposed to any danger.
- All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up and maintenance, must be strictly 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 dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- The valves comply with the requirements of the European Pressure Equipment Directive 97/23/EC. The declaration of conformity issued for a valve bearing the CE marking includes information on the applied conformity assessment procedure. The declaration of conformity is available on request.
- To ensure appropriate use, only use the valve in applications where the operating pressure and temperatures do not exceed the specifications used for sizing the valve at the ordering stage.
- The manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.
- Any hazards that could be caused in the valve by the process medium, operating pressure or by moving parts are to be prevented by taking appropriate precautions.
- Proper transport, storage, installation, operation and maintenance are assumed.

Note: Non-electric actuators and control valve versions do not have their own potential ignition source according to the ignition risk assessment stipulated in EN 13463-1: 2009, section 5.2, even in the rare incident of an operating fault. Therefore, they do not fall within the scope of Directive 94/9/EC.
For connection to the equipotential bonding system, observe the requirements specified in section 6.3 of EN 60079-14: 2011 (VDE 0165 Part 1).

2 Process medium and scope of application

Control valve for aseptic applications in the food and pharmaceutical industries according to DIN or ANSI standards. With PTFE diaphragm according to USP Standard Class VI for the US pharmaceutical industry.

Standard version	DN 15 to 50	·	NPS ½ to 2
Micro-flow valve	DN 6 to 25	·	NPS ¼ to 1
Maximum pressure	10 bar	·	150 psi
Temperature range	0 to 160 °C	·	32 to 320 °F

2.1 Transportation and storage

It is essential that you observe the instructions on the correct handling of control valves during transportation, storage and hoisting.

! ***NOTICE***
Do not attach any lifting equipment, slings or supports to mounting parts, such as actuator, positioner or pressure lines.
Parts may get damaged.
Fasten the lifting sling only to the valve body or valve bonnet.

- Protect the valve against adverse influences, such as dirt, moisture and temperatures outside the specified temperature range from 0 to 160 °C (32 to 320 °F).
- Leave the control valves in their transport container or on the pallet for as long as possible. Store the valves in a dry location until they are installed.
- Protect the valve, particularly the actuator stem, against impacts and vibration. Immediately remove any damage caused to the corrosion protection (paint, coating, oiled surface).
- Never stand, walk or work underneath an overhead load. Before lifting a valve, check its weight based on the documentation provided by SAMSON.
- Only use lifting equipment whose safe working load (SWL) is sufficient for the valves to be lifted. Carefully lift the valve at first to check that the hoisting straps or chains are properly attached and that the valve is properly balanced.
- Lift the control valve in the same orientation that it will be installed in.
- Do not remove the protective caps from the valve ports until immediately before installing the valve into the pipeline.

3 Design and principle of operation

See Fig. 1 on page 7.

The Type 3349 Angle Valve can be combined with either a Type 3271 Pneumatic Actuator or a Type 3277 Pneumatic Actuator with integral positioner attachment.

Version

Angle valve made of bar stock with flanged-on valve bonnet, with or without packing. Sealed by PTFE diaphragm according to USP Standard Class VI for the US pharmaceutical industry.

The standard valve body is equipped with welding ends (DIN 11866) for welding into pipelines. Other versions are equipped with threaded or flanged ends, or clamp connections.

The valve body is designed without cavities, allowing it to be cleaned or sterilized prior to the production process according to the CIP (clean-in-place) or SIP (sterilization-in-place) method.

In the version with optional packing (4.2), the pressure can be monitored at the test connection (4.4).

The medium flows through the valve in the direction indicated by the arrow. The plug (3) is moved by changing the signal pressure acting on the diaphragm of the actuator.

The plug stem (6) is connected to the actuator stem (8.1) using the stem connector (7) with a stem connector nut (6.1) and lock nut (6.2). In the micro-flow valve version, the plug stem (6) and actuator stem (8.1) are connected directly by the stem connector (7). The plug stem is sealed by the diaphragm (6.3) and additionally by the backup packing (4) if this option is selected.

Fail-safe position

Depending on how the compression springs (8.3) are arranged in the actuator, the valve has two different fail-safe positions:

Actuator stem extends

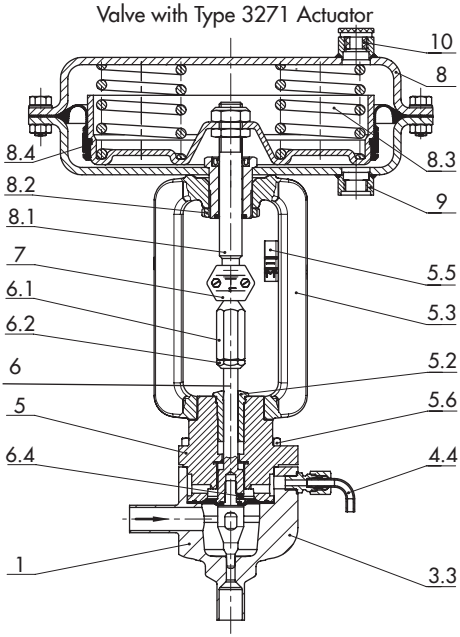
When the signal pressure is reduced or the air supply fails, the springs move the actuator stem downwards and close the valve.

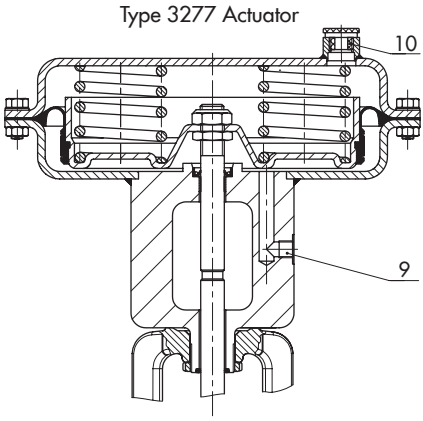
The valve opens when the signal pressure is increased enough to overcome the force exerted by the springs.

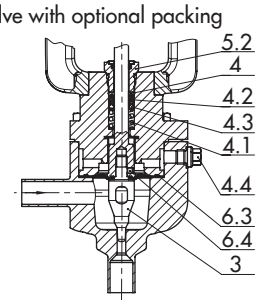
Actuator stem retracts

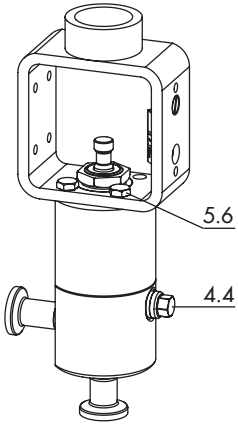
When the signal pressure is reduced or the air supply fails, the springs move the actuator stem upwards and open the valve.

The valve closes when the signal pressure is increased enough to overcome the force exerted by the springs.









1 Valve body
3 Plug
4 Packing
4.1 Spring
4.2 Packing
4.3 Washer
4.4 Test connection (screw/ moveable discharge pipe)
5 Valve bonnet
5.1 Guide bushing
5.2 Threaded bushing
5.3 Yoke
5.4 Screws
5.5 Travel indicator scale
5.6 Screws
6 Plug stem
6.1 Stem connector nut
6.2 Lock nut
6.3 USP-VI diaphragm
6.4 Grub screw
7 Stem connector
8 Actuator
8.1 Actuator stem
8.2 Ring nut
8.3 Compression spring
8.4 Rolling diaphragm
9 Loading pressure connection
10 Vent screw

Fig. 1: *Functional diagram*

4 Connection between valve and actuator

Note:
Pay particular attention to correct hygiene and ensure that control valves for food and pharmaceutical industries are kept absolutely clean.
Only use a lubricant suitable for foodstuffs for any parts to be lubricated.
Contact your nearest SAMSON subsidiary or the SAMSON After-sales Service department for information on suitable lubricants.

The basic pneumatic actuator can be replaced by a pneumatic actuator with additional handwheel or by an electric actuator.

The standard pneumatic actuator can be replaced by a smaller or larger actuator for all nominal valve sizes.

If the travel range of the actuator is larger than the travel of the valve, the springs in the actuator are preloaded by the manufacturer so that the travel ranges match.

4.1 Assembly and adjustment

See Fig. 1 on page 7.

Proceed as follows if the valve and actuator have not been assembled by the manufacturer or if the actuator is to be replaced by an actuator of another type or size:

NOTICE
The plug stem can turn on tightening the lock nut
The diaphragm may be damaged.
In this case, on undoing or tightening the lock nut (6.2), place a wrench on the stem connector nut (6.1) to hold the plug stem stationary.

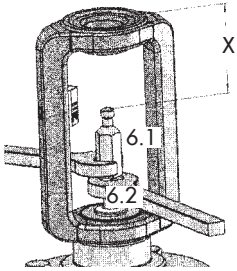


Fig. 2: *Mounting the actuator (standard version)*

Note:
In the micro-flow valve version, the plug stem (6) and actuator stem (8.1) are connected directly by the stem connector (7).

1. Unscrew the lock nut (6.2) and stem connector nut (6.1) on the valve. Firmly press the plug together with the plug stem into the seat. Thread down the stem connector nut to the dimension X and tighten the lock nut.

Valve/nominal size	Dimension X
Standard valve/Micro-flow valve DN 6 to 25 · NPS ¼ to 1	67.5 mm
DN 32 to 50 · NPS 1¼ to 2	75 mm

2. Remove the clamps of the stem connector (7) and ring nut (8.2) from the actuator. Slide the ring nut over the plug stem.
3. Read the bench range (e.g. 0.2 to 1 bar or 0.6 to 1 bar) and the actuator's fail-safe action (e.g. actuator stem extends) from the actuator's nameplate.

The fail-safe action "actuator stem extends" or "actuator stem retracts" is marked by FA or FE on the Type 3271 Actuator, and by a corresponding symbol on the nameplate of the Type 3277 Actuator.

The lower value corresponds to the lower bench range value to be adjusted, whereas the upper value corresponds the upper bench range value.

4. For actuators with "actuator stem extends" fail-safe action, apply a signal pressure that corresponds to the lower bench range value (e.g. 0.2 or 0.6 bar) to the connection on the bottom diaphragm chamber. For actuators with "actuator stem retracts" fail-safe action, apply a signal pressure that corresponds to the upper bench range value (e.g. 1 bar) to the top diaphragm chamber connection.
5. Place the actuator onto the valve bonnet (5) and secure it with the ring nut (8.2).
6. Position clamps of the stem connector (7) and screw them tight. Align travel indicator scale (5.5) with the tip of the stem connector; for actuators with "actuator stem extends" fail-safe action align it with lower marking (valve closed) and for actuators with "actuator stem retracts" fail-safe action align it with top marking (valve open).

Note:
When removing an actuator with "actuator stem extends" fail-safe action and especially an actuator with preloaded springs, apply a signal pressure that is slightly higher than the lower bench range value (see actuator nameplate) to the bottom loading pressure connection so that the ring nut (8.2) can be unscrewed.

4.2 Option of preloading springs for "actuator stem extends" fail-safe action

To achieve a greater positioning force, the springs of the actuators can be preloaded by up to 12.5 % of their travel or bench range (with 350 cm² up to 25 % of their travel or bench range).

When a preload of, e.g. 0.1 bar, is desired for a bench range of 0.2 to 1 bar, the lower bench range value is shifted by 0.1 bar to 0.3 bar (0.1 bar correspond to a preload of 12.5 %).

When adjusting the valve, now apply a pressure of 0.3 bar as the lower bench range value. Write the new bench range with preloaded springs of 0.3 to 1.1 bar on the nameplate.

Note:
The springs have already been preloaded by 50 % for valves in nominal sizes DN 15 to 25 with 7.5 mm travel, 0.6 to 1 bar bench range and "actuator stem extends" fail-safe action.

Actuators that have already been preloaded by the manufacturer without mounting the valve are labeled correspondingly. Additionally, they can be identified by three longer bolts with nuts protruding from the bottom diaphragm case.

NOTICE
The spring energy can suddenly be released while dismantling the actuator.
Risk of personal injury!
First relieve the compression from the preloaded springs by unthreading the nuts on the long bolts a few turns, alternating between them to gradually release the tension.

5 Installation

See Fig. 1 on page 7.

Note:
Pay particular attention to correct hygiene and ensure that control valves for food and pharmaceutical industries are kept absolutely clean.
Only use a lubricant suitable for foodstuffs for any parts to be lubricated.
Contact your nearest SAMSON subsidiary or the SAMSON After-sales Service department for information on suitable lubricants.

Install the control valve with the actuator in the upright position.

Note:
In the valve version with welding ends, after undoing the four screws (5.4), remove the entire valve assembly from the valve body before welding it into the pipeline.

Flush and clean the pipeline thoroughly before installing the valve.

Make sure the valve is installed free of stress. If necessary, support the pipelines near the connections.

Note
Do not attach supports directly to the valve or actuator.

5.1 Signal pressure line

Connect the signal pressure line for valves with actuator with "actuator stem extends" fail-safe action to the connection on the bottom diaphragm case and with "actuator stem retracts" fail-safe action to the connection on the top diaphragm case.

In the Type 3277 Actuator, the bottom loading pressure connection (9) is located at the side of the yoke under the bottom diaphragm case.

6 Operation

See Fig. 1 on page 7.

To reverse the fail-safe action of the pneumatic actuator, refer to the Mounting and Operating Instructions of the actuator:

▶ **EB 8310-x EN** for Type 3271 and Type 3277

6.1 Start-up

First start up the valve after mounting all parts.

As a general rule: open and close shut-off valves slowly. Open the shut-off valves first on the upstream pressure side. Afterwards, open all the valves on the consumer side (downstream of the valve).

Note:
In the version with test connection and additional packing (4):
The screw (4.4) can be replaced by a pressure sensor to monitor the diaphragm (6.3) for leakage.

7 Maintenance

See Fig. 1 on page 7.

Note:
Pay particular attention to correct hygiene and ensure that control valves for food and pharmaceutical industries are kept absolutely clean.
Only use a lubricant suitable for foodstuffs for any parts to be lubricated.
Contact your nearest SAMSON subsidiary or the SAMSON After-sales Service department for information on suitable lubricants.

The control valve is subject to normal wear, especially at the seat and plug. Depending on the operating conditions, check the valve at regular intervals to prevent possible failure before it can occur.

External leakage can indicate that the diaphragm (6.3) and, in the special version, the PTFE V-ring packing (4.2) are defective.

If the valve does not close tightly, tight shut-off may be impaired by dirt stuck between the seat and plug or by damaged facings.

We recommend removing the parts, cleaning them, and, if necessary, replacing them with new ones.

Before starting any work on the valve body, disconnect the signal pressure and remove the signal pressure line as well as the actuator. Make sure that none of the process medium is in the pipeline.

When used at high temperatures, allow the plant section to cool down to ambient temperature.

Actuators with preloaded springs are labeled correspondingly and can also be identified by three long bolts protruding from the bottom of the actuator.

NOTICE
The spring energy can suddenly be released while dismantling the actuator.
Risk of personal injury
First relieve the compression from the preloaded springs by unthreading the nuts on the long bolts a few turns, alternating between them to gradually release the tension.

7.1 Replacing sealing parts and plug

Note:
Before starting any work on the valve body, first remove the actuator.

1. Apply a signal pressure that is higher than the lower bench range value (see nameplate) to the actuator.
2. Remove the clamps of the stem connector (7) between the actuator stem and the plug stem and unscrew the ring nut (8.2).
3. Remove nuts (6.1 and 6.2).
4. Lift the actuator off the valve.
5. Unscrew four screws (5.6) on the valve bonnet. Remove the valve bonnet (5) together with plug (3) and diaphragm (6.3). In the version with packing, also unscrew the threaded bushing (5.2).
6. Pull plug stem (6) together with plug (3) and diaphragm (6.3) out of the valve bonnet. In the version with packing, also unscrew the screw (4.4). Unscrew the threaded bushing (5.2). Remove the packing rings (4.2), washer (4.3) and spring (4.1). Clean the packing chamber thoroughly.
7. Unscrew grub screw (6.4) on the plug.
8. Clamp the plug into a vice using plastic jaws (SAMSON order no. 1281-0053). Unscrew the plug stem.
9. Remove the damaged diaphragm (6.3).
10. Remove the plug and insert a new diaphragm. To prevent seizure, apply a suitable lubricant to the threads of the plug stem and plug.
11. To prevent any damage, place the plug in a suitable clamping fixture and tighten the plug stem using the two locked nuts at the end of the plug stem.

Observe the following tightening torques:

Nominal size	Tightening torque
Micro-flow valve DN 6 to 25 NPS ¼ to 1	6 Nm
DN 15 to 25 NPS ½ to 1	15 Nm
DN 32 to 50 NPS 1¼ to 2	120 Nm

12. Secure plug with grub screw (6.4).

Note:
Generally check the concentricity of the plug to the plug stem.
It must not deviate by more than 0.01 mm at the maximum in DN 6 to 25 (micro-flow valve and standard valve).
It must not deviate by more than 0.04 mm at the maximum in DN 32 to 50.

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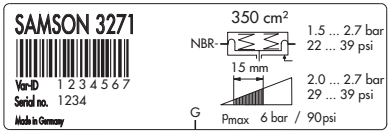
13. Slide the plug stem with assembled plug into the valve bonnet. In the version with packing, slide the spring (4.1), washer (4.3) and new packing rings over the plug stem into the packing chamber. Insert the threaded bushing (5.2) and tighten it as far as it will go.
14. Apply a lubricant suitable for foodstuffs to the four screws (5.6) and the flanges of the valve bonnet and body. Carefully place the valve bonnet (5) level on the valve body (1).
15. Tighten the screws evenly in a criss-cross pattern.

Observe the following tightening torques:

Nominal size	Tightening torque
Micro-flow valve DN 6 to 25 NPS ¼ to 1	4 Nm
DN 15 to 25 NPS ½ to 1	15 Nm
DN 32 to 50 NPS 1¼ to 2	29 Nm

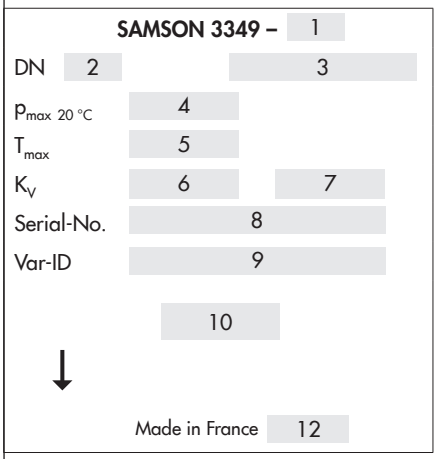
16. Thread the lock nut (6.2) and nut (6.1) loosely onto the plug stem (6).
17. Mount the actuator and adjust the upper and lower bench range values as described in section 4.1 on page 8.

8 Nameplates



- Manufacturer and type number
- Configuration ID (Var.-ID) as bar code and plain text
- Serial number
- Country of origin
- Diaphragm area (350 in this case) cm²
- Diaphragm material: NBR, EPDM or PVMQ
- Symbol indicating fail-safe action: stem extends or retracts (stem extends in this example)
- Bench range in bar and psi
- Symbol for operating travel in mm
- Bench range with preloaded springs
- Thread for pneumatic connection in G, NPT or Rc
- Permissible supply pressure p_{max} in bar and psi

Fig. 3: *Nameplate for Type 3271/3277 Actuator*



1	Type 3349 - Modification index
2	Valve size DN/NPS
3	Body material
4	Perm. operating gauge pressure at 20 °C bar/psi
5	Max. operating temperature °C/°F
6	Flow coefficient and characteristic % = equal percentage, L = linear
7	Seat/plug seal: ME = metal PK = soft PEEK seal PT = soft PTFE seal
8	Serial number
9	Configuration ID
10	Compliance with food industry requirements
11	PED labeling
12	Year of manufacture

Fig. 4: *Nameplate for Type 3349 Valve*

9 Customer service

If malfunctions or defects occur, contact the SAMSON After-sales Service Department for support.

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.

Please send your inquiries to: service@samson.de

To assist diagnosis, specify the following details (see section 8 on page 14 and valve labeling):

- Type designation (valve, actuator) and nominal size of the valve
- Serial number and configuration ID (Var-ID)
- Upstream and downstream pressure
- Process medium and its temperature
- Installation drawing showing the exact location of the valve and all the additionally installed components (shut-off valves, pressure gauge, etc.)
- Bench range of the actuator (e.g. 0.2 to 1 bar)
- For return inquiries: Phone number or e-mail address

The valve (lasered onto it) and the actuator each have a nameplate on then.

Note:
*Refer to the Data Sheet ▶ **T 8048-2 EN** for the dimensions and weights of the various valve versions.*

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