Type 3248-1 and Type 3248-7 Pneumatic Control Valves





Mounting and Operating Instructions

EB 8093 EN

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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

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1 General safety instructions

For your own safety, follow these instructions concerning the mounting, start-up and operation of the device:

- The control 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.
- The control valves comply with the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity which includes information about 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, the operating
 pressure, the signal pressure or by moving parts are to be prevented by taking appropriate precautions.
- Proper shipping and storage are assumed.
- For installation and maintenance, make sure the relevant section of the pipeline is depressurized and, depending on the process medium, drained as well. Depending on the field of application, allow the valve to cool down or heat up to reach ambient temperature before starting any work on it.

When working on the valve, make sure that the pneumatic air supply as well as the control signal are disconnected to prevent any hazards caused by moving parts.

 Be particularly careful if the actuator springs are preloaded. Such actuators are labeled correspondingly and can also be identified by three long bolts protruding from the bottom of the actuator. Before starting any work on the valve, relieve the compression from the preloaded springs.



Note:

According to the ignition risk assessment performed in accordance with EN 13463-1: 2009, section 5.2, the non-electrical actuators and valves 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 94/9/EC.

For connection to the equipotential bonding system, observe the requirements specified in section 6.3 of EN 60079-14: 2014-10 (VDE 0165 Part 1).

2 Design and principle of operation

The Type 3248 Cryogenic Valve can be combined with either a Type 3271 Pneumatic Actuator or a Type 3277 Pneumatic Actuator with integral positioner attachment.

The globe-pattern or angle-pattern valve body is designed for welding in vacuuminsulated pipelines or for installation in coldbox applications.

The cryogenic extension bonnet consists of a metal bellows located directly above the valve body and the insulating section above the bellows seal.

The test connection (42) allows the pressure to be monitored in order to check the metal bellows for leakage. The medium flows through the valve in the direction indicated by the arrow. The plug (5) is moved by changing the signal pressure acting on the diaphragm of the actuator.

The plug stem extension consists of a spacer stem (71) and bellows stem (37). The stem extension is connected by the stem connector (A.51) to the actuator stem (A.7).

The stem is sealed by the metal bellows and the backup packing (15) with a spring-loaded PTFE/carbon V-ring packing (Fig. 6).





Fail-safe action:

Depending on how the springs are arranged in the actuator, the control valve assumes one of two different fail-safe positions:

Actuator stem extends:

When the pressure is relieved from the diaphragm or the supply air fails, the actuator springs move the actuator stem downward and close the valve.

Actuator stem retracts:

When the pressure is relieved from the diaphragm or the supply air fails, the actuator springs move the actuator stem upward and open the valve.



Note: The Type 3248 Valve bears both the CE and EAC marks of conformity:

3 Assembling and adjusting the valve and actuator

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:

Removing a mounted actuator

- When removing an actuator with failsafe action "actuator stem extends" 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 lower signal pressure connection.
- Remove the stem connector clamps (A.51) between the actuator stem and spacer stem and unscrew the ring nut (A.9).
- 3. Lift the actuator (A.1) off the valve.

Mounting the actuator

- Undo the lock nut (10) and stem connector nut (9) on the valve. Firmly press the plug (5) into the seat (4). Thread down the lock nut and stem connector nut.
- Remove the clamps of the stem connector (A.51) and the ring nut (A.9) from the actuator (A.1).

- 3. Slide the ring nut over the spacer stem (71).
- Place the actuator onto the valve bonnet
 (2) and secure it with the ring nut (A.9).
- Read the bench range (or signal pressure range with preloaded springs) and operating direction of the actuator specified on the actuator nameplate.

Note:

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.

6. 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 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 connection on the top diaphragm chamber.

 Screw on the stem connector nut (9) by hand until it touches the actuator stem (A.7). Then turn it a further ¹/₄ turn and secure this position with the lock nut (10).

- Position clamps of the stem connector (A.51) and screw them tight.
- Align travel indicator scale (84) with the tip of the stem connector; for actuators with fail-safe action "actuator stem extends" align it with lower marking (valve closed) and for actuators with fail-safe action "actuator stem retracts" align it with top marking (valve open).

3.1 Option of preloading springs for "actuator stem extends"

To achieve a greater positioning force, the springs of the actuators can be preloaded by up to 12.5 % (240 cm²), 25 % (350 and 700 cm²) or 75 % (700 cm²) 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.

When adjusting the valve, set the lower bench range value to 0.3 bar.

Write the new bench range with preloaded springs of 0.3 to 1.1 bar on the nameplate.

3.2 Actuator springs preloaded by the manufacturer

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.

They allow the spring compression to be relieved evenly when disassembling the actuator.

4 Installation

The medium must flow through the valve in the direction indicated by the arrow on the valve body.

4.1 Mounting position

We recommend mounting the valve at an angle between 15 and 25° to the horizontal plane. Please contact SAMSON for smaller mounting angles as additional measures are required in this case.

Additional points that apply concerning installation:

- ➔ If a version with side-mounted handwheel is installed at an angle of less than 45° to the horizontal plane, additional supports must be attached to the actuator.
- ➔ For a control valve with "actuator stem extends" direction of action Before welding the valve body into the pipeline, apply a signal pressure to the actuator of a valve mounted on an actuator with fail-safe action "actuator stem extends" to move the valve plug out of the seat. This prevents the trim from being damaged by high temperatures generated during the welding process.
- → Remove stopper from the test connection (42) to monitor the metal bellows (37) for leakage.

4.2 Signal pressure line

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

In the Type 3277 Actuator, the lower signal pressure connection is located at the side of the yoke under the bottom diaphragm case.

5 Operation

Follow the instructions described in the Mounting and Operating Instructions EB 8310-x EN to reverse the operating direction of the Type 3271 and Type 3277 Pneumatic Actuators.

6 Maintenance



WARNING!

Excessive pressure. Risk of personal injury. Before starting any work on the valve body, disconnect the signal pressure and remove the signal pressure line as well as the actuator.

NOTICE

Risk of leakage and valve damage due to excessively high or low tightening torques.

Observe the specified torques on tightening control valve components. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage. Observe the specified tightening torques (► AB 0100).

NOTICE

Risk of valve damage due to the use of unsuitable tools. Certain tools are required to work on the valve. Only use tools approved by SAMSON (► AB 0100). Į

NOTICE

Risk of valve damage due to the use of unsuitable lubricants. The lubricants to be used depend on the valve material. Unsuitable lubricants may corrode and damage the valve surface. Only use lubricants approved by SAMSON (> AB 0100).

External leakage can indicate that the metal bellows (37) or packing (15) are defective.

If the valve does not close tightly, tight shutoff 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.

Additional points that apply concerning work on the valve:

- → Allow the valve to cool down or heat up to reach ambient temperature.
- → As valves are not free of cavities, residual process medium might still be contained in the valve.
- → We recommend removing the valve from the pipeline or the entire valve construction when the valve is welded into the pipeline.

6.1 Replacing the packing, seat and plug

Removing the actuator from the valve

Before starting any work on the valve body, remove the actuator from the valve.

- When removing an actuator with failsafe action "actuator stem extends" and especially an actuator with preloaded springs, apply a pressure that is slightly higher than the lower bench range value (see actuator nameplate) to the lower signal pressure connection.
- Remove the stem connector clamps (A.51) between the actuator stem and spacer stem and unscrew the ring nut (A.9).
- 3. Lift the actuator off the valve.

Packing (Fig. 6)

- 1. Unscrew the lock nut (9) and stem connector nut (10).
- 2. Unscrew the threaded bushing (8) to relieve the packing (15).
- 3. Remove the nuts (33) on the valve bonnet. Lift off the valve bonnet (2) from the flange of the cryogenic extension bonnet (1.2).
- Unscrew the threaded bushing (8). Use a suitable tool to remove the parts of the packing (15), such as packing rings (16), washer (12) and spring (11). Renew damaged parts. Clean the packing chamber thoroughly.

Plug

- 1. Unscrew spacer stem (71).
- Unthread the bellows nut (41) using a SAMSON socket wrench. Pull out the bellows stem together with the metal bellows (37), guide bushing (24) and plug (5) out of the cryogenic extension bonnet (1.2).
- 3. Clamp the bellows stem (37) using a suitable tool.
- 4. Unscrew the plug from the bellows stem.
- Loosen the nut (35). Unscrew the guide bushing (24). Unscrew second nut on larger valves and remove the guide bushing.



Note:

In some versions with reduced height, the guide bushing is not used in NPS 4 and 6 in Class 150 and 300.

- 6. Apply a suitable lubricant to the plug stem thread of new plug or original plug that has been machined.
- Screw guide bushing (24) onto the bellows stem as far as it will go. Lock into position with the nut (35) or slide on the guide bushing and fasten with the two nuts.
- Replace old washers (30) with new ones. Screw the plug stem tightly into the bellows stem. Observe tightening torques.

Seat:

If the seat must also be replaced, proceed as follows:

- 1. Unscrew the seat (4) from the valve body using a suitable tool.
- Apply a suitable lubricant to the seat thread of the new seat and screw in tightly observing the tightening torques.

Assembly

- Slide bellows stem together with metal bellows (37), guide bushing (24), and plug into the body.
- Insert bellows nut (41) and screw tight. Screw spacer stem onto the bellows stem (observing tightening torques).
- Insert new gasket (17) into the flanged section. Slide valve bonnet over the spacer stem and place it on the flanged section.
- 4. Screw on the nuts (33) and tighten them. Observe tightening torques.
- 5. Apply a suitable lubricant to the packing parts and threaded bushing (8).

Slide spring (11), washer (12) and new packing rings (16) over the spacer stem into the packing chamber. Insert the threaded bushing (8) and tighten it as far as it will go.

- 6. Thread the lock nut (10) and nut (9) loosely onto the spacer stem (71).
- Mount the actuator and adjust the upper and lower bench range values as described in section 3.

7 Protective cover

To keep the overall height of the valve as small as possible for transportation purposes in cold-box installations, the actuator and valve bonnet must be removed from the flanged section of the cryogenic extension bonnet and the bellows stem protected by a protective cover.

General

The protective cover with adjustment bolt must meet the following requirements when the valve is installed in the plant:

 It must be possible to open the valve to its rated travel to allow the pipeline and the valve to be flushed.



 It must be possible to close the valve to perform a pressure test (to check the tightness of the plant section). The bellows seal is the primary sealing element. The protective cover merely serves to transmit the force.

WARNING!

Risk of personal injury and valve damage.

During the pressure test, increased pressure is released, which may damage the protective cover. Loosen the screw plug (95.6) before performing the pressure test.

Functional description

Upon delivery, the protective cover is mounted and the valve is open (the thread of the bellows stem is completely screwed into the adjustment bolt).

To perform a leak test in the plant section, turn the adjustment bolt counterclockwise (valve closed).

If the adjustment bolt is turned clockwise, the plug is lifted out of the seat (valve opens).

Mounting the protective cover

Note:

For actuators with fail-safe action "actuator stem extends" and particularly for actuators with preloaded springs, apply a signal pressure to retract the actuator stem slightly.

1. Remove the mounted actuator as described in section 3.

- Detach the spacer stem (71) from the bellows stem (37) by unscrewing the stem connector nut and lock nut.
- Remove the nuts (33) on the valve bonnet. Carefully lift off the valve bonnet (2) including the spacer stem from the flange of the cryogenic extension bonnet (1.2).
- 4. Align the protective cover with glued-on O-ring (95.7) with the studs (32).
- Place the protective cover with adjustment bolt (95.2) on the thread of the bellows stem (37).
- 6. Turn the adjustment bolt (SW 19) clockwise.
- 7. Top plate of protective cover (95.1) is lowered onto the flange.
- 8. Turn the adjustment bolt clockwise as far as it will go (valve opens).
- 9. Fasten tight the studs (32) with nuts (33) and spacer sleeves/washers (95.9).

Removing the protective cover

- Remove nuts (33) and spacer sleeves/ washers (95.9).
- Turn the adjustment bolt (95.2) counterclockwise. The plug is lowered and the protective cover is lifted off the flange.
- 3. After the end of the thread is reached, remove the protective cover.
- Use the nuts (33) to mount the actuator. The spacer sleeves/washers (95.9) are no longer required.

Mounting the valve bonnet with spacer stem

- 1. Insert new gasket (17) into the body flange.
- Place the valve bonnet (2) with spacer stem (71) onto the body flange. To do so, place the spacer stem over the thread of the bellows stem (37) and tighten by hand. While doing so, do not change the position of the stem connector nut (9) or the lock nut (10) on the spacer stem!
- Tighten the nuts (33) on the studs (32) in a criss-cross pattern. Observe the torques.
- Use the stem connector nut (9) to fasten the spacer stem (71) and the bellows stem (37). Observe the torques.
- 5. Check whether the threaded bushing (8) is tightened as far as it will go.
- 6. Mount the actuator.

If the position of the stem connector nut and lock nut has not been changed while the valve bonnet was removed, the bench range is still correct and does not need to be re-adjusted. When the stem connector nut and lock nut have been removed, the spacer stem

can also be tightened over its hex end. In this case, the bench range of the actuator must be re-adjusted.

Further details are available on request.

8 Customer inquiries

Please submit the following details:

- Type designation and order number (on nameplate)
- Serial number, nominal size, and valve version
- Pressure and temperature of the process medium
- Flow rate in m³/h
- Bench range (spring range)
 (e.g. 0.2 to 1 bar) of the actuator
- Installation drawing

Note:

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For dimensions and weights of the valves, refer to Data Sheet T 8093.



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