

Series 250

**Type 3252-1 and Type 3252-7
Pneumatic Control Valves**



Type 3252 High-pressure valve with Type 3277 Pneumatic Actuator and Type 3767 Electropneumatic Positioner

**Mounting and
Operating Instructions**

EB 8053 EN

Edition June 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

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1 General safety instructions

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

- The valve is to be mounted, started up or operated only by trained and experienced personnel familiar with the product.
- 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.
- Any hazards that could be caused in the valve by the process medium, the signal pressure or by moving parts are to be prevented by taking appropriate precautions.
- 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.

To avoid damage to any equipment, the following also applies:

- Proper shipping and storage are assumed.

2 Design and principle of operation

The Type 3252 Valve with a globe-style or angle-style body can be combined with either a Type 3271 Pneumatic Actuator or a Type 3277 Pneumatic Actuator with integral positioner attachment.

The standard valve bodies have threaded ends with either G or NPT thread.

Special valve versions are designed with either weld-on flanges or welding ends for welding into the pipeline.

The modular design allows the actuators to be exchanged and an insulating section or metal bellows to be fitted to the standard valve version

The medium flows through the valve in the direction indicated by the arrow. The plug 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) by the stem connector (7).

The plug stem is sealed by a spring-loaded V-ring packing (4.2).

2.1 Fail-safe position

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

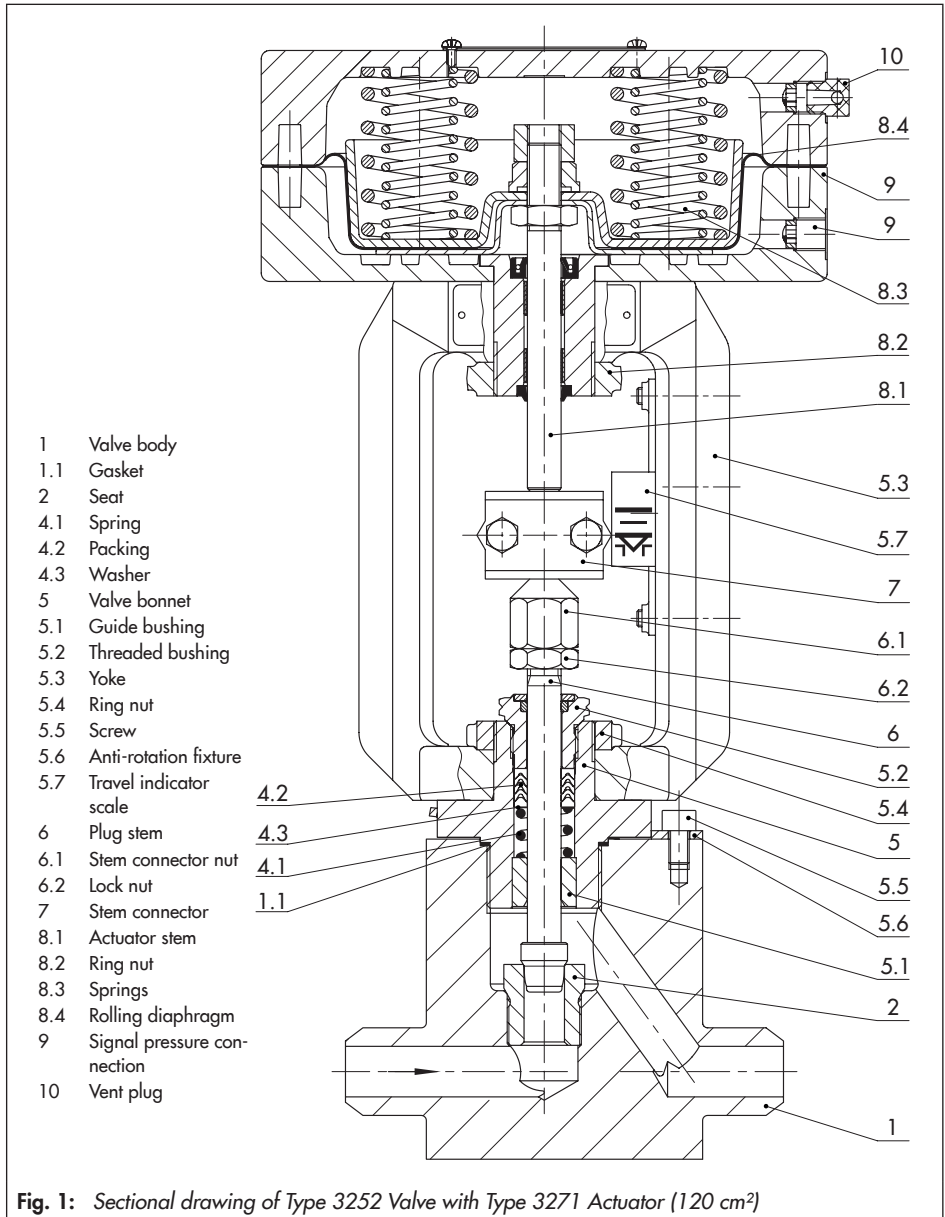
Actuator stem extends (fail-close): When the pressure is relieved from the diaphragm or the supply air fails, the actuator springs close the valve.

Actuator stem retracts (fail-open): When the pressure is relieved from the diaphragm or the supply air fails, the actuator springs open the valve.

2.2 Replacing the actuator

A pneumatic actuator can be replaced by another pneumatic actuator in a different size.

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



3 Assembling and adjusting the valve and actuator

Proceed as follows if the original actuator is to be replaced by an actuator of another type or size:

1. Loosen the lock nut (6.2) and stem connector nut (6.1) on the valve.
2. Press the plug together with the plug stem firmly into the seat. Thread down the lock nut and stem connector nut.
3. Remove the clamps of the stem connector (7) and the ring nut (8.2) from the actuator. Slide the ring nut over the plug stem.
4. Place the actuator onto the yoke (5.3) and secure it with the ring nut (8.2).
5. 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 **fail-close actuators**, apply a signal pressure that corresponds to the lower bench range value (e.g. 0.6 bar for a range between 0.6 and 1 bar) to the signal pressure connection on the bottom diaphragm chamber.

For **fail-open actuators**, apply a signal pressure that corresponds to the upper bench range value (e.g. 0.6 bar for a range between 0.2 and 0.6 bar) to the signal pressure connection on the top diaphragm chamber.

7. Screw on the stem connector nut (6.1) by hand until it touches the actuator stem (8.1). Then turn it a further $\frac{1}{4}$ turn and secure this position with the lock nut (6.2).
8. Position clamps of the stem connector (7) and screw them tight. Align the travel indicator (5.7) with the tip of the stem connector.

The following applies to removing the actuator:

- Apply a signal pressure that is slightly higher than the lower bench range value (see actuator nameplate) to the signal pressure connection.



Note:

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

3.1 Reversal of the operating direction

The operating direction and fail-safe action of pneumatic actuators can be changed. Refer to the mounting and operating instructions of the actuator for details on how to proceed:

- Types 3271 and 3277 Actuator (120 cm²):
 - ▶ EB 8310-1 EN
- Types 3271 and 3277 Actuator (350 and 700 cm²):
 - ▶ EB 8310-6 EN

4 Installation

The following applies concerning the installation of the valve:

- The valve can be mounted in any desired position. The flow of direction must correspond with the direction indicated by the arrow on the valve body.
- Make sure the valve is installed free of stress. If necessary, support the pipelines near the connections.
- Flush the pipeline thoroughly before installing the valve (valve open).

The following points additionally apply to the version with welding ends:

- The valve must be welded into the pipeline by trained personnel observing the applicable standards.
- Before welding the valve into the pipeline, move the plug out of the seat. The entire valve does not need to be dismantled.
- Before start-up, make sure that the valve is free from weld spatter and other impurities.

4.1 Signal pressure line

Connect the signal pressure line for a valve with fail-close actuator to the connection on the bottom diaphragm case, and for a valve with fail-open actuator to the connection on the top diaphragm case.

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

5 Troubleshooting

External leakage can indicate that the packing is defective or the metal bellows is defective (in a version with a bellows seal).

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.

- ➔ In this case, remove parts, carefully clean them and renew them, if necessary.
- ➔ Before starting any work on the valve body, first remove the actuator (see section 5.1).



WARNING!

Risk of injury due to process medium escaping under pressure.

Depressurize the relevant section of the pipeline and, if necessary, drain it as well. When used at high temperatures, allow the plant section to cool down to ambient temperature.



Tip:

Before performing maintenance work, we recommend removing the valve from the pipeline or the entire valve construction when the valve is welded into the pipeline.

5.1 Removing the actuator from the valve

1. Mount the stem connector clamps (7) between the actuator stem and the plug stem.
2. For fail-close actuators, apply a signal pressure that is higher than the lower bench range value (see nameplate) to the actuator so that the ring nut (8.2) can be unscrewed.
3. Unscrew the ring nut.
4. Disconnect the signal pressure again.
5. Remove the actuator from the valve yoke.

5.2 Replacing the packing in standard valves



Note:

Contact your nearest SAMSON subsidiary or the SAMSON After-sales Service department for information on suitable lubricants.

- ➔ See Fig. 1 on page 7

If the packing leaks, replace it as follows:

1. Unscrew the ring nut (5.4) and remove the yoke (5.3) from the valve bonnet.
2. Unscrew the lock nut (6.2) and stem connector nut (6.1). Unscrew the screw (5.5) for the anti-rotation fixture. Remove the anti-rotation fixture (5.6).
3. Undo screws (5) on the valve bonnet. Remove the valve bonnet along with the plug stem (6).

4. Undo the threaded bushing (5.2). Pull the plug stem along with the plug out of the valve bonnet.
5. Unscrew thread bushing (5.2) and push out the packing rings (4.2), washer (4.3) and spring (4.1) using a suitable tool.
6. Clean the packing chamber thoroughly.
7. Apply a suitable lubricant to the plug stem and packing rings (4.2).
8. Slide the plug stem with the plug into the valve bonnet.
Slide the spring (4.1), washer (4.3) and new packing rings over the plug stem into the packing chamber.
9. Insert the threaded bushing (5.2) and tighten it as far as it will go.
10. Loosely screw the lock nut (6.2) and stem connector nut (6.1) onto the plug stem (6).
11. Insert the new gasket (1.1) into the body.
12. Fasten the valve bonnet to the body (tightening torque of 500 Nm).
13. Place the anti-rotation fixture (5.6) on the valve bonnet ensuring that the screw (5.5) is inserted into the long hole. Fasten tight.
14. Place the yoke (5.3) on the valve body and secure it with the ring nut (5.4).
15. Mount the actuator and adjust the upper and lower bench range values (see section 3).



Tip:

When replacing the seat and plug, we also recommend replacing the packing (4.2).

5.2.1 Plug

- ➔ Proceed as described in section 5.2. Replace the old plug with a new plug with plug stem.
- ➔ Apply a suitable lubricant to the plug stem before insertion.

5.2.2 Seat

- ➔ Proceed as described in section 5.2 and additionally unscrew the seat (2).
- ➔ Apply a suitable lubricant to the thread and the sealing cone of the new seat. Screw in the seat (tightening torque of 180 Nm).
Alternatively, an old seat can be used after it has been machined or thoroughly cleaned.

5.3 Replacement in valve with insulating section or bellows seal

5.3.1 Packing

1. Unscrew the ring nut (5.4) and lift off the yoke (5.3).
2. Unscrew the lock nut (6.2) and stem connector nut (6.1). Undo the threaded bushing (5.2).
3. Unscrew the screw (1.6). Remove the anti-rotation fixture (5.6).
4. Undo screws (5) on the valve bonnet. Lift the valve bonnet over the plug stem extension (12).
5. Replace packing as described in section 5.2.

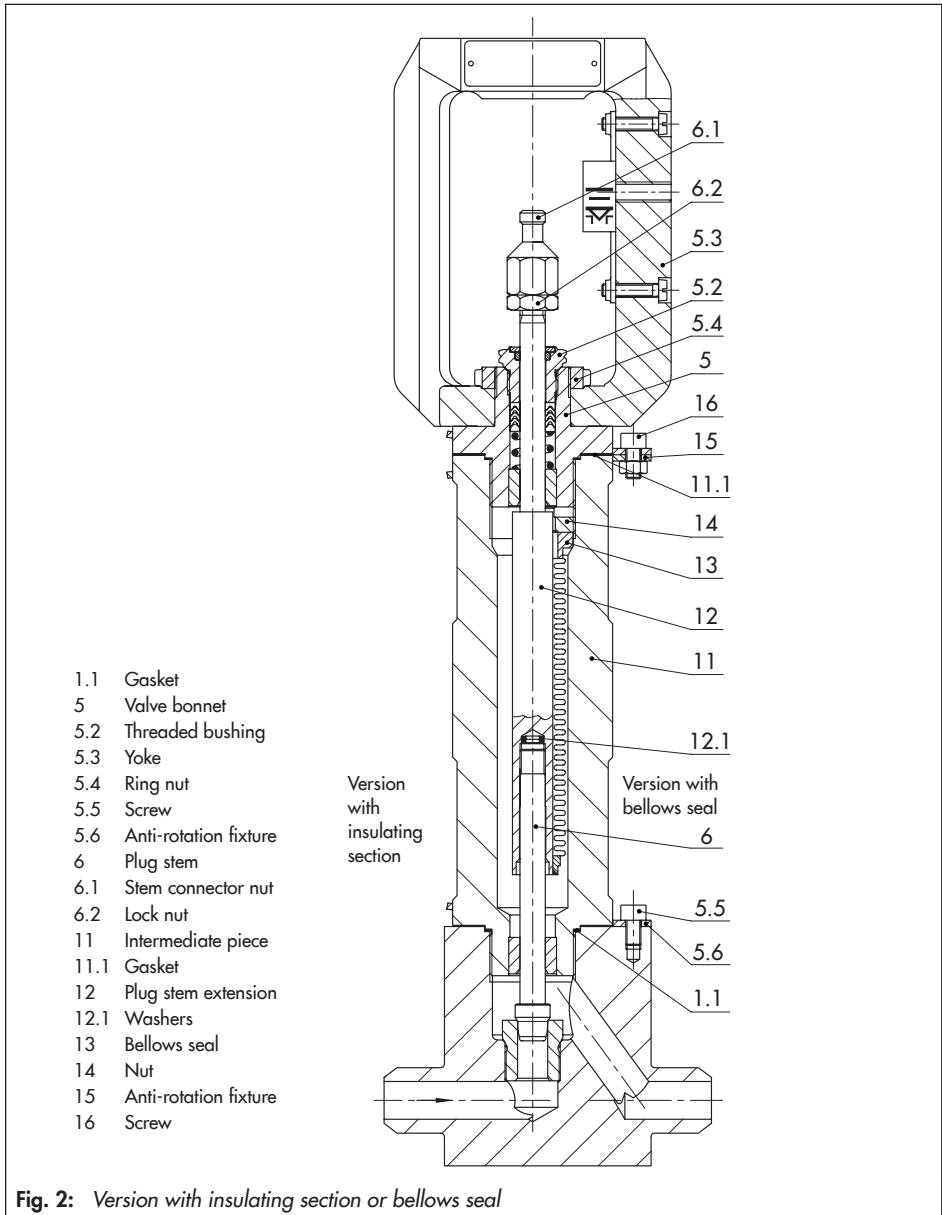
5.3.2 Plug

1. Unscrew the ring nut (5.4) and lift off the yoke (5.3).
 2. Unscrew the screw (5.5). Remove the anti-rotation fixture (5.6).
 3. Undo screws (5) on the valve bonnet. Lift the valve bonnet along with the intermediate piece (11) of the bellows seal or insulating section off the valve body.
- To unscrew the plug stem (6) from the plug stem extension (12), screw the stem connector nut (6.1) and lock nut (6.2) until they lock each other. Place a wrench on the nuts to allow the plug stem extension to be held stationary.

- Make sure that absolutely no torque is transferred to the bellows which is attached to the intermediate piece.
4. Apply a suitable lubricant to the the plug stem (6) of the old machined or new plug.
 5. Check whether the two washers (12.1) are still in the plug stem extension (12). Screw the plug stem tightly into the plug stem extension (tightening torque of 50 Nm).

5.3.3 Metal bellows

1. Unscrew the plug stem (6) along with plug out of the plug stem extension (12) as described in section 5.3.2.
2. Unscrew the nut (14) using a SAMSON socket wrench (order no. 93252-0000-085).
3. Pull the bellows seal (13) with the plug stem extension welded to it out of the intermediate piece (11).
4. Clean the sealing faces on the intermediate piece.
5. Slide the new bellows seal into the intermediate piece and fasten with nut (14) (tightening torques: up to PN 160 = 85 Nm, up to PN 400 on request).
6. Check whether the two washers (12.1) are still in the plug stem extension.
7. Apply a suitable lubricant to the thread of the plug stem and screw the plug stem tightly into the plug stem extension (12) (tightening torque of 50 Nm).



- 1.1 Gasket
- 5 Valve bonnet
- 5.2 Threaded bushing
- 5.3 Yoke
- 5.4 Ring nut
- 5.5 Screw
- 5.6 Anti-rotation fixture
- 6 Plug stem
- 6.1 Stem connector nut
- 6.2 Lock nut
- 11 Intermediate piece
- 11.1 Gasket
- 12 Plug stem extension
- 12.1 Washers
- 13 Bellows seal
- 14 Nut
- 15 Anti-rotation fixture
- 16 Screw

Version with insulating section

Version with bellows seal

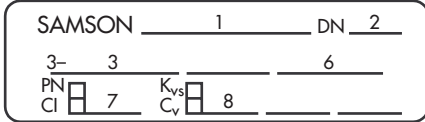
Fig. 2: Version with insulating section or bellows seal

5.3.4 Reassembly

1. After exchanging the plug, seat and metal bellows, renew the gaskets (1.1 and 11.1) on the intermediate piece (11).
2. Fasten the intermediate piece (11) to the valve body (tightening torque of 500 Nm).
3. Place the anti-rotation fixture (5.6) on the valve body ensuring that the screw (5.5) is inserted into the long hole. Fasten tight.
4. Place the valve bonnet (5) over the plug stem extension onto the intermediate piece (12) and fasten it in the intermediate piece (tightening torque of 120 Nm).
5. Place the anti-rotation fixture (15) on the valve bonnet ensuring that the screw (16) is inserted into the long hole. Fasten tight.
6. Reapply a suitable lubricant to the plug stem and packing rings.
Slide the spring (4.1), washer (4.3) and packing rings (4.2) over the plug stem into the packing chamber.
7. Insert the threaded bushing (5.2) and tighten it as far as it will go.
8. Loosely screw the lock nut (6.2) and stem connector nut (6.1) onto the plug stem extension (12).
9. Place the yoke onto the valve bonnet and secure it with the ring nut (5.4).
10. Mount the actuator and adjust the upper and lower bench range values as described in section 3.

6 Appendix

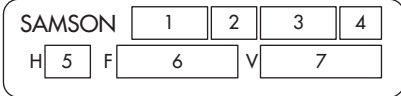
6.1 Nameplate



SAMSON _____ 1 _____ DN _____ 2 _____
 3- _____ 3 _____ 6 _____
 PN _____ K_{vs} _____
 CI _____ 7 _____ Cv _____ 8 _____

- 1 Type designation
- 2 Nominal size
- 3 Order no. with modification index
- 6 Material
- 7 Nominal pressure
- 8 K_{vs}/C_v coefficient

Fig. 3: Nameplate for valve



SAMSON [1] [2] [3] [4]
 H [5] F [6] V [7]

- 1 Type designation
- 2 Modification index
- 3 Actuator area
- 4 Fail-safe action:
FA Actuator stem extends
FE Actuator stem retracts
- 5 Actuator travel
- 6 Bench range
- 7 Bench range with preloaded springs

Fig. 4: Nameplate for Type 3271 Actuator

6.2 Customer inquiries

Please submit the following details:

- Type designation and order number (stamped on the nameplate)
- Version and nominal size of the valve
- Pressure and temperature of the process medium
- Flow rate in m³/h
- Bench range of the actuator
- Installation drawing



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