

**Type 3345-1 and Type 3345-7  
Pneumatic Control Valves  
Type 3345 Diaphragm Valve**

**SAMSON**



Type 3345-1



Type 3345-7  
Version for food processing industry

**Mounting and  
Operating Instructions**

**EB 8031 EN**

Edition August 2016

**CE**

## 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

- 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 2014/68/EU. 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.



#### **WARNING!**

- *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.*



#### **Note:**

*According to the ignition risk assessment performed in accordance with EN 13463-1, 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 2014/34/EU. For connection to the equipotential bonding system, observe the requirements specified in section 6.4 of EN 60079-14 (VDE 0165 Part 1).*

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## 2 Design and principle of operation

The Type 3345-1 and Type 3345-7 Pneumatic Control Valves consist of the Type 3345 Diaphragm Valve and either a Type 3271 or Type 3277 Pneumatic Actuator.

The diaphragm stem (6) of the valve diaphragm is connected to the actuator stem (8.1) by a stem connector (7) or they are screwed together (in the stainless steel version up to DN 20). To protect the valve diaphragm, stops (4 and 6.3) are fitted at the top and bottom of the actuator stem.

The process medium can flow through the valve in both directions. The position of the valve diaphragm (3) determines the flow rate through the valve.

The diaphragm stem (6) is moved by changing the signal pressure acting on the diaphragm of the actuator.

### Fail-safe position

Depending on how the compression springs 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 downward 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 upward and open the valve. The valve closes when the signal pressure is increased enough to overcome the force exerted by the springs.

### Legend for Fig. 1

1	Body	5.4	Filter
1.1	Nuts	6	Diaphragm stem
1.2	Screws	6.1	Stem connector nut
2	Compressor	6.2	Lock nut
3	Diaphragm	6.3	Stop
4	Stop	7	Stem connector
4.1	Dowel pin	8	Actuator
5	Valve bonnet	8.1	Actuator stem
5.1	Wiper ring	8.2	Nut
5.2	Guide bushing	8.3	Vent plug
5.3	Travel indicator scale		

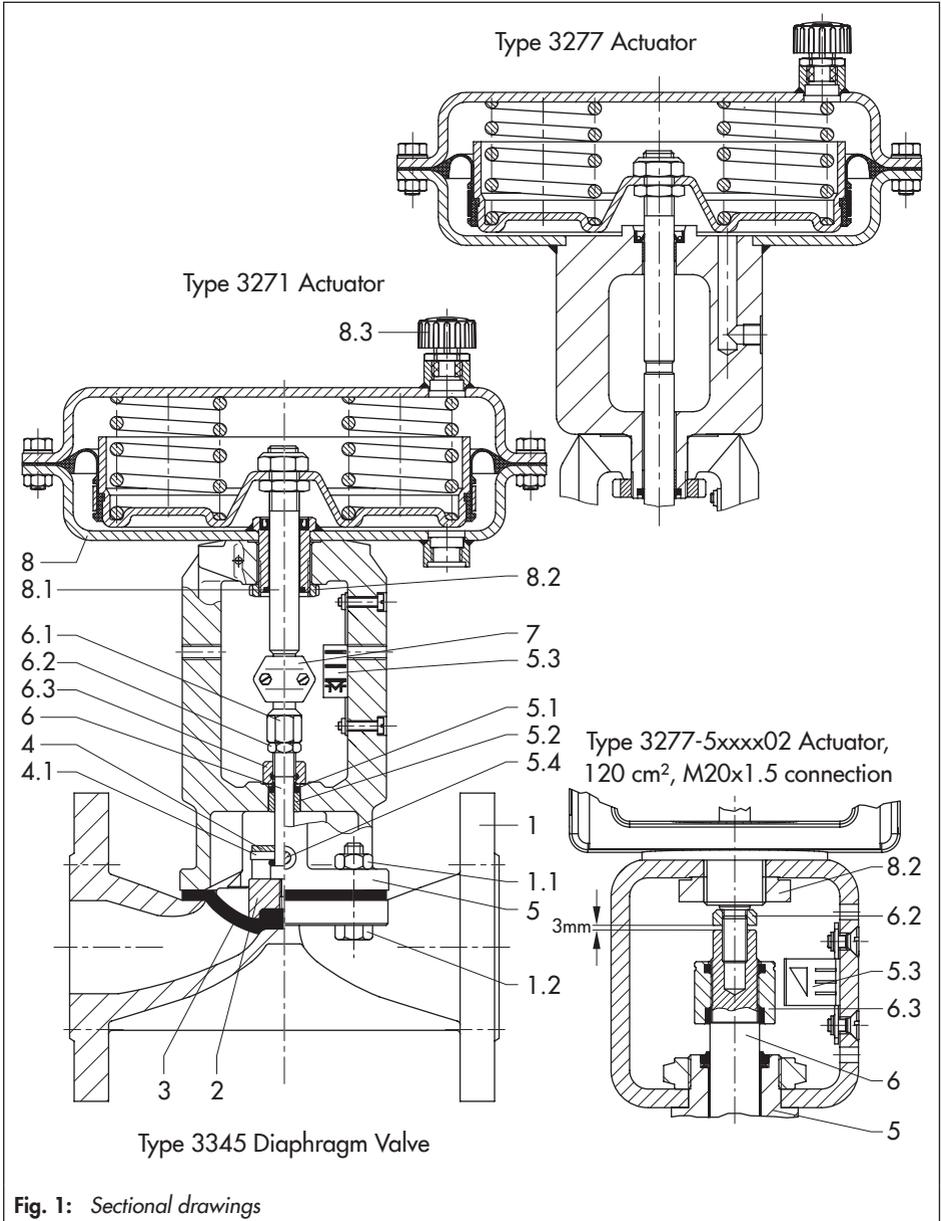


Fig. 1: Sectional drawings

### 3 Assembling valve and actuator

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

#### 3.1 Type 3271 and Type 3277 Actuators

1. Undo the lock nut (6.2) and stem connector nut (6.1) on the diaphragm stem and thread them downward.
2. Pull the diaphragm stem upward as far as it will go.
3. Remove the clamps of the stem connector (7) and the nut (8.2) from the actuator (8).
4. Slide the nut over the diaphragm stem.
5. Place the actuator onto the valve bonnet (5) and secure it with the nut (8.2).
6. Read the bench range and the actuator's fail-safe action (e.g. 0.2 to 1 bar and "actuator stem extends") from the actuator's nameplate. In this case, the lower value (0.2 bar) corresponds to the lower bench range value to be adjusted, whereas the upper value (1 bar) corresponds to the upper bench range value. The fail-safe action "stem extends" or "stem retracts" is marked by FA or FE on the Type 3271 Actuator, and by a corresponding symbol on the Type 3277 Actuator.
7. For actuators with "stem extends" fail-safe action, apply a signal pressure that

corresponds to the upper bench range value (e.g. 1.0 bar) to the connection on the bottom diaphragm chamber.

For actuators with "stem retracts" fail-safe action, apply a signal pressure that corresponds to the lower bench range value (e.g. 0.2 bar) to the top diaphragm chamber connection.

#### Travel adjustment

8. Screw on the stem connector nut (6.1) by hand until it touches the actuator stem (8.1). Turn the stem connector nut a further quarter turn and secure this position with the lock nut (6.2).
9. Position clamps of the stem connector (7) and screw them tight. Align the travel indicator scale (5.3) with the tip of the stem connector clamp.
10. If, after moving the valve through the whole bench range, the travel seems to be too large or too small, adjust the stem connector nut (6.1) accordingly on the thread of the diaphragm stem.
11. Repeat this adjustment until the required travel is achieved. Lock this position with the lock nut.



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**Note:**

*When removing an actuator with "stem extends" fail-safe action from a valve, apply a signal pressure that is slightly higher than the upper bench range value to the bottom signal pressure connection so that the nut (8.2) can be unscrewed.*

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### 3.2 Type 3271-5 and Type 3277-5 Actuators

Mounting actuators on valves for food processing and valves with stainless steel bodies  $\leq$  DN 20 (Fig. 1, bottom right)

1. Thread the lock nut (6.2) on the plug stem upward until it reaches the stop.
2. Pull the diaphragm stem right up to open the valve. Slide the nut (8.2) over the diaphragm stem (6).
3. Actuator with "stem extends" fail-safe action: apply a signal pressure that exceeds the upper bench range value to allow you to loosen the nut (8.2).

Screw on the actuator leaving an approximate 3 mm gap between the lock nut and diaphragm stem.

4. Align actuator and fasten it to the yoke with the nut (8.2).
5. Thread the lock nut (6.2) toward the diaphragm stem (6).
6. Align the travel indicator scale (5.3) with the ring groove of the stop (6.3).
7. If, after moving the valve through the whole bench range, the travel seems to be too small, reduce the 3 mm gap.  
If the valve does not shut off tightly enough, increase the size of this gap.

## 4 Installation

### 4.1 Mounting position

The valve can be mounted in any desired position. However, we recommend installing valves in sizes larger than DN 100 with the actuator pointing up. Otherwise, increased wear at the guide bushing can be expected. For actuators weighing more than 50 kg, the actuator needs to be supported or suspended.

**!** **NOTICE**  
Install valves for food processing in the pipeline at an approx. 20° incline to allow them to drain easily.

**!** **NOTICE**

- Prior to installing valve, fit suitable spacers in the pipeline to protect the valve diaphragm from dirt, and flush the pipeline thoroughly.
- Install the valve free of stress and with the least amount of vibrations as possible.

### 4.2 Signal pressure line

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

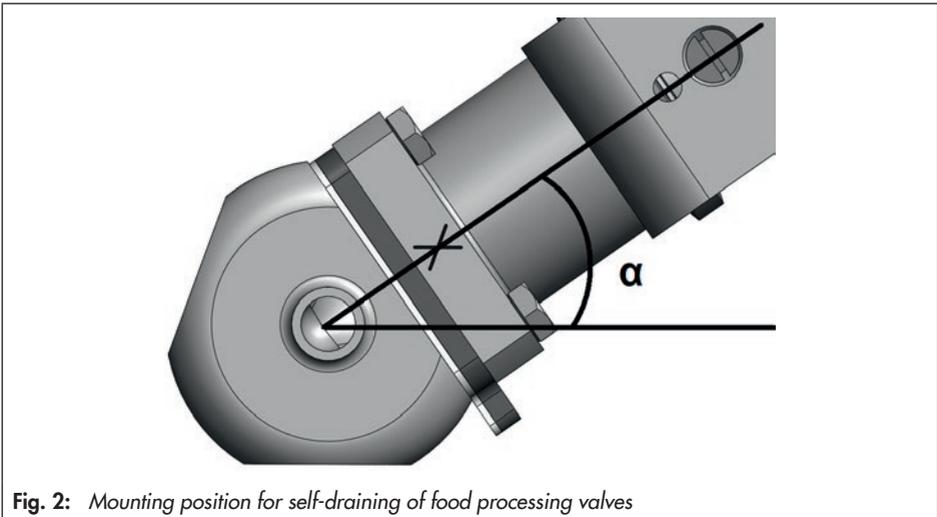


Fig. 2: Mounting position for self-draining of food processing valves

## 5 Operation

(e.g. reversing the direction of action etc.)

Refer to the mounting and operating instructions of the pneumatic actuators:

- ▶ EB 8310 for Type 3271
- ▶ EB 8311 for Type 3277

## 6 Maintenance

The control valve is subject to normal wear, especially at the diaphragm.

Depending on the operating conditions, check the valve at regular intervals to prevent possible failure before it can occur.

If the valve does not close tightly, tight shut-off may be impaired by dirt on the diaphragm.

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



### **WARNING!**

- Before performing any work on the control valve, make sure the relevant plant section has been depressurized and drained.
- Before starting any work on the valve body, disconnect the signal pressure and remove the signal pressure line as well as the actuator.
- When used at high temperatures, allow the plant section to cool down to ambient temperature.

- Valves for food processing that have been installed at an approx. 20° incline in the pipeline still hold small amounts of the process medium, which need to be removed by a suitable cleaning procedure.
- As valves installed in horizontal pipelines are not free of cavities, residual process medium might still be contained in the valve. We recommend removing the valve from the pipeline.

### **Removing the actuator (see Fig. 1)**

1. Remove the stem connector clamps (7) (undo the lock nut (6.2) on Type 3277-5 Actuator) and unscrew the nut (8.2).  
Actuator with "stem extends" fail-safe action: apply a signal pressure that exceeds the upper bench range value to allow you to loosen the nut (8.2).
2. Remove or unscrew the actuator from the valve bonnet.

## Replacing the diaphragm (Fig. 1 to Fig. 5)

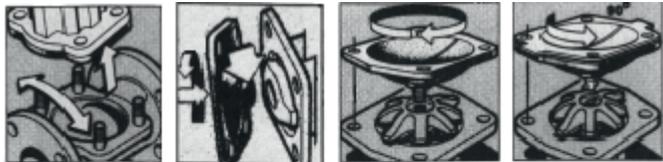
3. Unscrew screws (1.2) or nuts and bolts (1.1) and lift the valve bonnet off the body.
4. Slide the diaphragm stem toward the valve body until the stop (6.3) rests on the valve bonnet. This can be done with the actuator still mounted.
5. Remove diaphragm from the compressor (depending on the version and how it is fixed either by a screwed, bayonet or nipple connection).
6. Replace the diaphragm and reassemble in reverse order.

Tightening torques for body screws						
DN	15	20	25	32	40	50
Nm	5	5	6	8	13	25
DN	65	80	100	125	150	–
Nm	35	50	40	45	80	–

### NOTICE

First tighten the body screws by hand. Afterwards, tighten them with a wrench in a crisscross pattern until the diaphragm is stretched tightly. It is essential that the tightening torques listed in the table are observed. On installing the valve, recheck the tightening torques as the diaphragm may slacken after a while.

Apply some grease (order no. 8150-9002) to the diaphragm version with nipple connection to facilitate assembly.



Diaphragm with nipple, screwed or bayonet (1/4 turn) connection

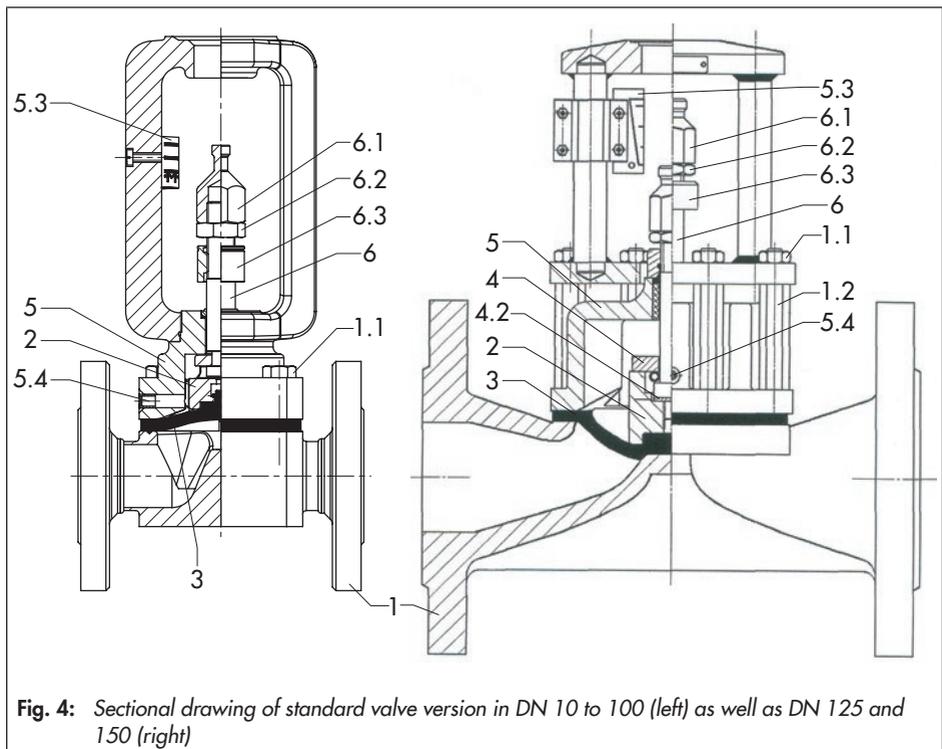


Fig. 3: Replacing the valve diaphragm

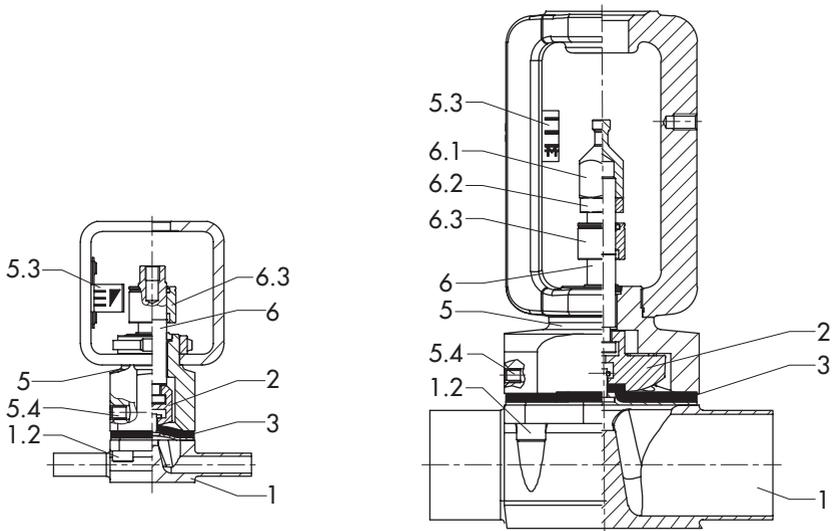
7. Mount the actuator as described in section 3 and adjust the upper and lower bench range values.
8. If the position of the stop (6.3) was altered on disassembling the valve, apply a signal pressure to the actuator to make the valve close. Position the stop to rest on the valve bonnet.

**Note:**

- For dimensions and weights of the valves refer to Data Sheet  
▶ T 8031.
- The type of attachment may differ from the one shown.



**Fig. 4:** Sectional drawing of standard valve version in DN 10 to 100 (left) as well as DN 125 and 150 (right)



**Fig. 5:** *Stainless steel version for 120 cm<sup>2</sup> actuator (left) and special version for the food industry in DN 32 to 100 (right)*

**Legend for Fig. 4 and Fig. 5**

- |     |                        |     |                    |
|-----|------------------------|-----|--------------------|
| 1   | Body                   | 6   | Diaphragm stem     |
| 1.1 | Nuts                   | 6.1 | Stem connector nut |
| 1.2 | Screws                 | 6.2 | Lock nut           |
| 2   | Compressor             | 6.3 | Stop               |
| 3   | Diaphragm              | 7   | Stem connector     |
| 4   | Stop                   | 8   | Actuator           |
| 4.1 | Dowel pin              | 8.1 | Actuator stem      |
| 5   | Valve bonnet           | 8.2 | Nut                |
| 5.1 | Wiper ring             | 8.3 | Vent plug          |
| 5.2 | Guide bushing          |     |                    |
| 5.3 | Travel indicator scale |     |                    |
| 5.4 | Filter                 |     |                    |

## 7 Technical data

The technical data as well as the dimensions and weights for the DIN and ANSI versions of the Type 3345 Valve are listed in the corresponding Data Sheet ► T 8031.

The Type 3345 Valve bears both the CE and EAC marks of conformity:



## 8 Customer inquiries

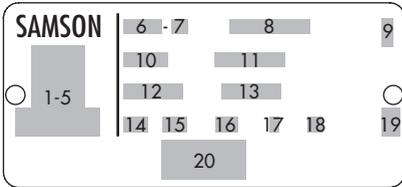
Please submit the following details:

- Order number
- Type, model number, nominal size, and valve version
- Pressure and temperature of the process medium
- Flow rate in m<sup>3</sup>/h
- Bench range of the actuator (e.g. 0.2 to 1 bar)
- Installation drawing

## 9 Nameplates

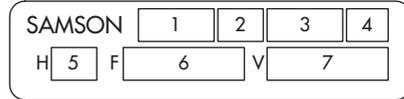
Valves with a cast iron bonnet have a nameplate attached. Stainless steel bonnets have inscriptions written directly on them.

### Valve nameplate



- 1 Order-related specifications
- to CE marking or "Art. 4, Abs. 3" (see
- 5 article 4, § 3 of PED)
- Identification no. of notified body, fluid group and category, where applicable
- 6 Type designation
- 7 Device modification index
- 8 Material
- 9 Year of manufacture
- 10 Valve size: DIN: **DN**, ANSI: **NPS**
- 11 Perm. operating gauge pressure at room temperature  
DIN: **bar**, ANSI: **psi**
- 12 Serial number
- 13 free
- 14 Flow coefficient:  
DIN: **K<sub>vs</sub>**, ANSI: **C<sub>v</sub>**
- 15 Characteristic:  
% equal percentage, Lin linear,  
DIN: **A/Z** (quick opening)  
ANSI: **O/C** (quick opening)
- 16 Travel
- 17 free
- 18 free
- 19 Country of origin
- 20 Compliance with food industry requirements (FDA, 3A)

### Nameplate of Type 3271 Actuator



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

### Nameplate of Type 3277 Actuator

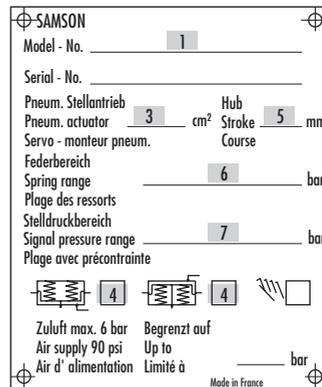


Fig. 6: Nameplates









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