

# Pneumatic Control Valves Type 3244-1 and Type 3244-7

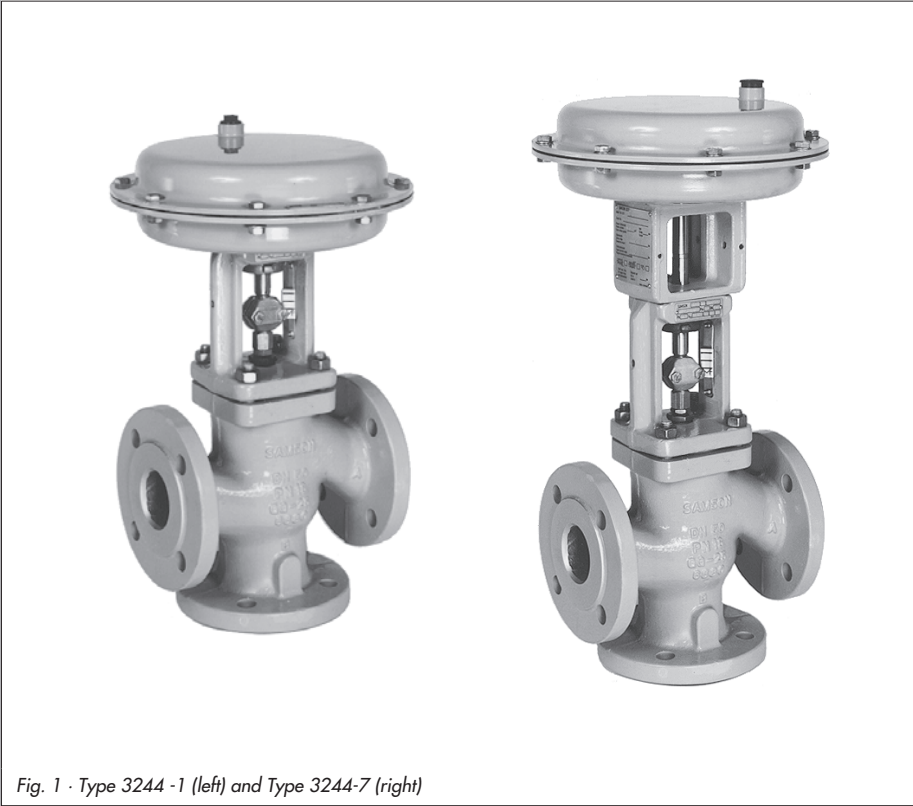


Fig. 1 · Type 3244 -1 (left) and Type 3244-7 (right)

## Mounting and Operating Instructions

**EB 8026 EN**

Edition June 2004



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**Note!**

Non-electrical actuators and control valves do not have their own potential ignition source according to the risk assessment in the rare incident of an operating fault, corresponding to EN 13463-1: 2001 paragraph 5.2, and therefore do **not** fall within the scope of the European Directive 94/9/EC.

Refer to paragraph 6.3 of EN 60079-14:1977 VDE 0165 Part 1 concerning connection to equipotential bonding system.



### General safety instructions

- ▶ The control valve may only be mounted, started up or serviced by fully trained and qualified personnel, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger. All safety instructions and warnings in these mounting and operating instructions, particularly those concerning assembly, start-up and maintenance, must be observed.
- ▶ The control valves fulfill the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity that includes information about the applied conformity assessment procedure.  
The corresponding declaration of conformity can be viewed and downloaded on the Internet at <http://www.samson.de>.
- ▶ For appropriate operation, make sure that the control valve is only used in areas where the operating pressure and temperatures do not exceed the operating values which are based on the valve sizing data submitted in the order. The manufacturer does not assume any responsibility for damage caused by external forces or any other external influence! Any hazards which could be caused in the control valve by the process medium, operating pressure, signal pressure or by moving parts are to be prevented by means of the appropriate measures.
- ▶ Proper shipping and appropriate storage of the control valve are assumed.

### Caution!

- ▶ For installation and maintenance work on the valve, make sure the relevant section of the pipeline is depressurized and, depending on the process medium, drained as well. If necessary, allow the control valve to cool down or warm up to reach ambient temperature prior to starting any work on the valve.
- ▶ Prior to performing any work on the valve, make sure the supply air and control signal are disconnected or blocked to prevent any hazards that could be caused by moving parts.
- ▶ Special care is needed with pneumatic control valves when the actuator springs are pretensioned. These actuators are labeled correspondingly and can also be identified by three long bolts protruding from the bottom of the actuator. Prior to starting any work on the control valve, relieve the compression from the pretensioned springs.

### 1 Design and principle of operation

The Type 3244-1 and Type 3244-7 Pneumatic Control Valves consist of a Type 3244 Three-way Valve and either a Type 3271 or a Type 3277 Pneumatic Actuator.

Thanks to the modular design, the actuators can be exchanged, and the standard version of the valve can be supplemented to form a version with insulating section or metal bellows seal.

Depending on the plug arrangement, the three-way valve operates either as mixing or flow-diverting valve (in DN 15 to 25, the plugs are identical).

In mixing valves, the media to be mixed enter through ports **A** and **B**. The combined flow leaves at port **AB**.

In diverting valves, the medium enters through port **AB** and the diverted flows exit at ports **A** and **B**.

The flow rate from **A** or **B** to **AB** or vice versa is determined by the cross-sectional area released between the seat (2.1, 2.2) and the plug (3), and thus by the position of the plug stem (6).

The plug (3) is moved by the changing signal pressure acting on the diaphragm of the actuator. The plug stem (6) and the actuator stem (8.1) are connected over the stem connector (7); they are sealed by a spring-loaded PTFE ring packing (4.2).

#### Fail-safe position

Depending on the arrangement of the compression springs in the actuator, the control valve has two different fail-safe positions:

#### Actuator stem extends

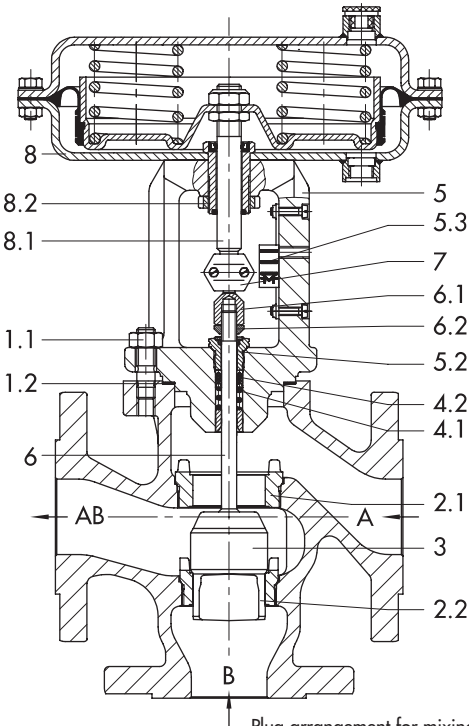
When the pressure is relieved or the supply air fails, the springs cause port **B** (mixing valves) or port **A** (diverting valves) to close. Ports **B** or **A** are opened against the force of the springs when the signal pressure increases.

#### Actuator stem retracts

When the diaphragm is relieved of pressure or when the supply air fails, the springs cause port **B** (mixing valves) or port **A** (diverting valves) to open. Ports **B** or **A** are closed against the force of the springs when the signal pressure increases.

- 1.1 Nuts
- 1.2 Gasket
- 2.1 Top seat ring
- 2.2 Bottom seat ring
- 3 Plug
- 3.1 Plug part
- 3.2 Screws
- 4.1 Spring
- 4.2 Packing
- 5 Valve bonnet
- 5.2 Threaded bushing
- 5.3 Travel indicator scale
- 6 Plug stem
- 6.1 Stem connector nut
- 6.2 Lock nut
- 7 Stem connector
- 8 Actuator
- 8.1 Actuator stem
- 8.2 Nut

Type 3271 Actuator



Type 3277 Actuator

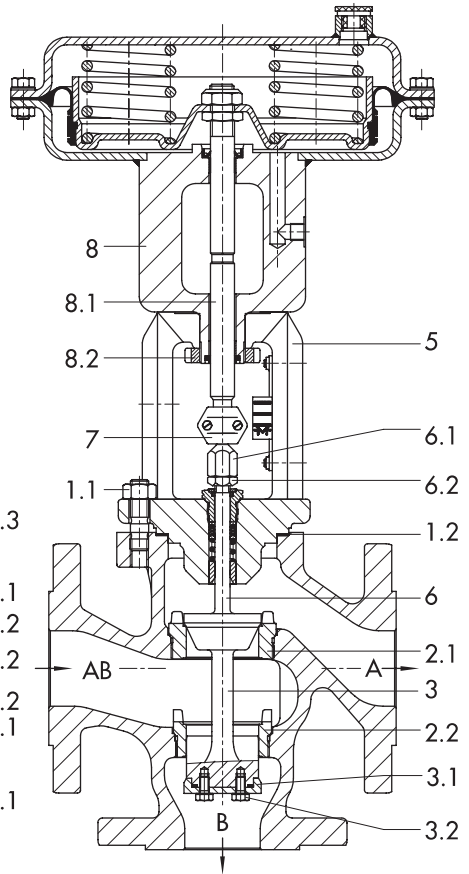


Fig. 2 - Sectional drawings

## 2 Assembling valve and actuator

Instead of the simple pneumatic actuator, it is also possible to attach an actuator with additional handwheel or an electric actuator.

A pneumatic actuator (with or without handwheel) can be replaced by a pneumatic actuator in a different size.

If the travel range of the actuator exceeds that of the valve in the valve-actuator configuration, the manufacturer will adjust the spring assembly of the actuator such that the travels match.

### 2.1 Assembly and adjustment

If the valve and actuator have not already been assembled by the manufacturer, or if the original actuator is replaced by a different actuator size or model, proceed as follows to assemble the valve and actuator:

1. Loosen lock nut (6.2) and stem connector nut (6.1) from the valve.  
Firmly press the plug with the plug stem into the seat ring. Turn stem connector nut and lock nut downward.
2. Remove clamps of the stem connector (7) and annular nut (8.2) from the actuator (8). Push annular nut over the plug stem.
3. Place actuator on the valve bonnet (5) and screw tight with the annular nut (8.2).
4. Read bench range (or range with pretensioned springs) and fail-safe action from the nameplate of the actuator (e.g. 0.2 to 1 bar and "Actuator stem extends").

The lower bench range value (0.2 bar) corresponds to the lower signal pressure range to be adjusted; the upper bench range value (1 bar) corresponds to the upper signal pressure range.

In Type 3271 Actuators, the fail-safe action "Actuator stem extends" is indicated by FA and "Actuator stem retracts" by FE on the nameplate. Type 3277 Actuators bear a corresponding symbol on the nameplate.

5. In actuator version "**Actuator stem extends**", apply a pressure corresponding to the lower bench range value (e.g. 0.2 bar) to the signal pressure connection on the bottom diaphragm case.  
In actuator version "**Actuator stem retracts**", apply a pressure corresponding to the upper bench range value (e.g. 1 bar) to the connection on the top diaphragm case.
6. Turn stem connector nut (6.1) by hand until it touches the actuator stem (8.1). Turn it another quarter turn and secure position with the lock nut (6.2).
7. Attach clamps of the stem connector (7) and screw them tightly together.  
Align travel indicator scale (5.3) with the tip of the stem connector.

**Note on disassembling the actuator:**

When disassembling actuators with fail-safe action "Actuator stem extends" and particularly versions with pretensioned springs, apply a pressure slightly higher than the lower bench range value (see actuator nameplate) to the bottom signal pressure connection beforehand before unscrewing the annular nut (8.2).

## 2.2 Option to pretension the springs for actuator version "Actuator stem extends"

To achieve a greater thrust, the actuator springs can be pretensioned by up to 12.5 % (120 and 240 cm<sup>2</sup>) or by up to 25 % (350 cm<sup>2</sup> and larger) of their travel or their bench range span.

**Example:**

If, with a bench range of 0.2 to 1 bar, the springs are to be pretensioned by 0.1 bar, for example, the bench range is shifted by 0.1 bar, resulting in a new bench range of 0.3 to 1.1 bar (0.1 bar corresponds to a compression of 12.5 %).

When adjusting the valve, a signal pressure of 0.3 bar is to be set as the lower signal pressure range.

The new bench range of 0.3 to 1.1 bar must be marked on the nameplate as bench range with pretensioned springs.

**Caution!**

Actuators with springs that have already been pretensioned by the manufacturer without attachment to a valve are marked by an appropriate label.

In addition, such actuators can be identified by three bolts and nuts protruding from the bottom diaphragm case. These bolts and nuts allow you to evenly relieve the compression when disassembling the actuator.

## 3 Installation

### 3.1 Mounting position

The valve can be mounted in any desired position. However, vertical installation with the actuator pointing upwards is preferable for valves in nominal size DN 100 or larger. Otherwise, it may be difficult to perform maintenance work on the control valve. For valves with insulating section or metal bellows seal, or for actuators weighing more than 50 kg, mount a suitable support or suspension for the actuator.



**Note!**

*The valve must be installed with as little vibration as possible and free of stress.  
Flush the pipeline thoroughly before installation.*

### 3.2 Arrangement of the control valve

Arrange the control valve depending on the desired service as illustrated in Fig. 3. The installation examples refer to the standard application using fail-safe action "Actuator stem extends" for heating service and "Actuator stem retracts" for cooling service. When the fail-safe action is triggered, the valve shuts off the heating or cooling media. The plug arrangement for either mixing or diverting service is marked on a plate on the valve body. Valves in sizes DN 15 to 25 have an identical plug arrangement for both mixing and diverting service.

### 3.3 Signal pressure line

Connect the signal pressure line to the bottom diaphragm case for valves with actuator version "Actuator stem extends" and to the top diaphragm case for valves with actuator version "Actuator stem retracts". In the Type 3277 Actuator, the bottom connection is located at the side of the yoke on the bottom diaphragm case.

### 3.4 Strainer, bypass

We recommend you to install a SAMSON Type 2 Strainer upstream of the valve body. We also recommend to install a shut-off valve both upstream of the strainer and downstream of the valve, as well as a bypass, so that you do not need to shut down the plant for maintenance.

### 3.5 Test connection

If there is a test connection (G 1/8) at the upper flange of a valve version with metal bellows seal (Fig. 5), you can check the tightness of the bellows there. Particularly for liquids and vapors, we recommend you to install a suitable leak indicator at the test connection, such as a contact pressure gauge, an outlet into an open vessel or an inspection window.



**Mixing service**

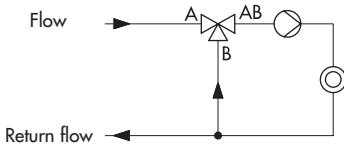
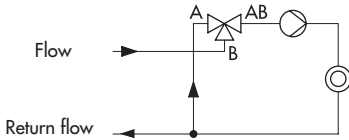
Temperature control  $Q = \text{constant}$

Fail-safe action: FA = Actuator stem extends, FE = Actuator stem retracts  
 In heating service with FA, the heating medium (flow) is shut off in fail-safe position.  
 In cooling service with FE, cooling is continued when the fail-safe action is triggered.

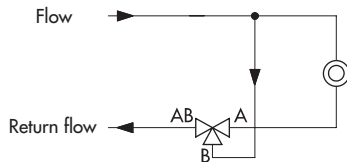
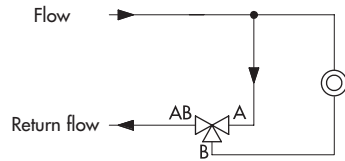
**Flow-diverting service**

Flow rate control  $Q = 0 \text{ to } 100 \%$

Heating with mixing valve FA or cooling with mixing valve FE  
 Installation in the flow pipe



Installation in the return flow pipe



Heating with diverting valve FA or cooling with diverting valve FE  
 Installation in the return flow pipe

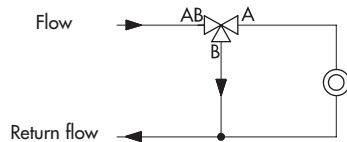
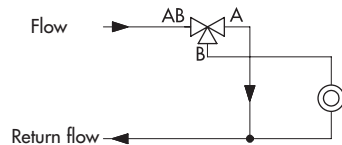
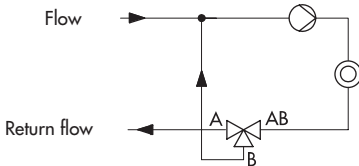
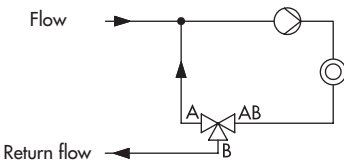


Fig. 3 · Typical installations

## 4 Operation

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

For details, refer to the Mounting and Operating Instructions of the respective pneumatic actuator.

EB 8310 EN for Type 3271 and  
EB 8311 EN for Type 3277.

## 5 Maintenance – Replacing parts

The control valve is subject to natural wear, especially at the seat, plug and packing. Depending on the application, the valve needs to be checked regularly to prevent against possible failures.

If leakage occurs, this could be caused by a damaged packing or a defective metal bellows.

If the valve does not seal properly, the tight shut-off may be impeded by dirt or other impurities caught between the seat and plug, or by damaged seat joints.

Remove the parts, clean them thoroughly and replace them, if necessary.

### **Note!**

*Suitable seat and special tools as well as the appropriate tightening torques required for installation are listed in EB 029 EN (formerly WA 029 EN) which can be viewed on the Internet at [http://www.samson.de/pdf\\_en/e00290en.pdf](http://www.samson.de/pdf_en/e00290en.pdf).*



### **Note!**

*Before servicing or disassembling the control valve, depressurize the concerned section of the plant and drain it, if necessary, depending on the medium used.*

*Wait until the medium has cooled down, if necessary.*

*As valves are not free of cavities, there might still be residual medium in the valve.*

*This applies, in particular, for valve versions with insulating section or metal bellows seal.*

*We recommend removing the valve from the pipeline.*

### **Caution!**

*On performing any work on the valve body, first shut off the supply pressure, disconnect the supply pressure line and remove the actuator.*

### **Disassembling the actuator:**

1. Remove stem connector (7) and unscrew annular nut (8.2).  
To remove the annular nut (8.2), apply a pressure slightly higher than the lower bench range value (see actuator nameplate) before disassembling actuators with fail-safe action "Actuator stem extends" and particularly actuator versions with pretensioned springs.
2. Lift actuator from the valve bonnet.

## 5.1 Standard valve version

### 5.1.1 Stuffing box packing

1. Unscrew stem connector nut and lock nut (6.1, 6.2) from the plug stem.
2. Unscrew threaded bushing (5.2).
3. Remove nuts (1.1). Lift valve bonnet (5) from the body over the plug stem.
4. Pull complete packing assembly out of the packing chamber using a suitable tool. Replace damaged parts as necessary.  
Thoroughly clean the packing chamber.
5. Remove gasket (1.2) and carefully clean the sealing surfaces in the valve body and on the bonnet.
6. Apply lubricant (order no. 8150-0111) to all parts of the packing assembly and the plug stem (6).
7. Place a new gasket (1.2) into the valve body. Place valve bonnet (5) over the plug stem on the valve body and secure with nuts (1.1).
8. Carefully push packing assembly (4.1, 4.3 and 4.2) over the plug stem into the packing chamber, observing the proper order.  
Screw in threaded bushing (5.2) and tighten.
9. Loosely screw lock nut (6.2) and stem connector nut (6.1) onto the plug stem.
10. Mount actuator and adjust upper and lower bench range values as described in section 2.1.

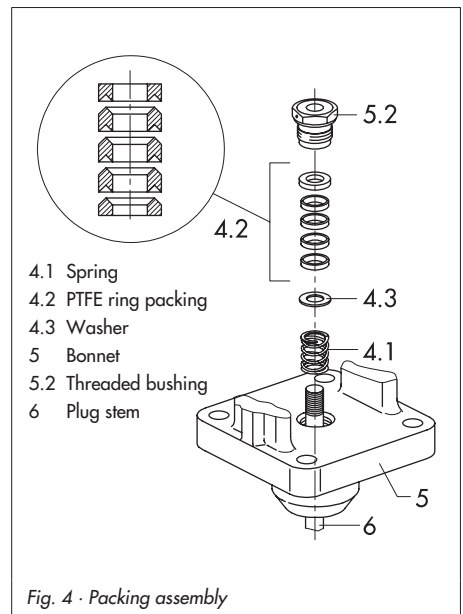
### 5.1.2 Seat and/or plug

We recommend you to also replace the packing (4.2) when exchanging the seat and plug.

1. Unscrew stem connector nut and lock nut (6.1, 6.2) from the plug stem.
2. Remove threaded bushing (5.2).
3. Remove nuts (1.1). Lift valve bonnet (5) from the body over the plug stem (6).

### Mixing valve

4. Unscrew top seat ring (2.1) using a SAMSON seat wrench.
5. Remove plug stem (6) together with the plug (3).



6. Check seating surfaces of the seat rings. If necessary, unscrew bottom seat ring (2.2) as well and replace it.
7. Apply lubricant and sealant (order no. 8150-0119) to the thread and sealing cone of the seat rings. Also apply lubricant (order no. 8150-0111) to the plug stem.
8. Reassemble in reverse order. Observe tightening torques for seat rings and nuts of the body flanges as specified in EB 029 EN.

### Flow-diverting valve

DN 32 to DN 150  
(DN 15 to DN 25 as for mixing valves)

4. Remove screws (3.2). Also remove plug piece (3.1) with its sealing ring from the plug (3).
5. Proceed as described for mixing valves under items 5 to 8. Check sealing ring when mounting the plug piece (3.1) and replace it, if necessary.

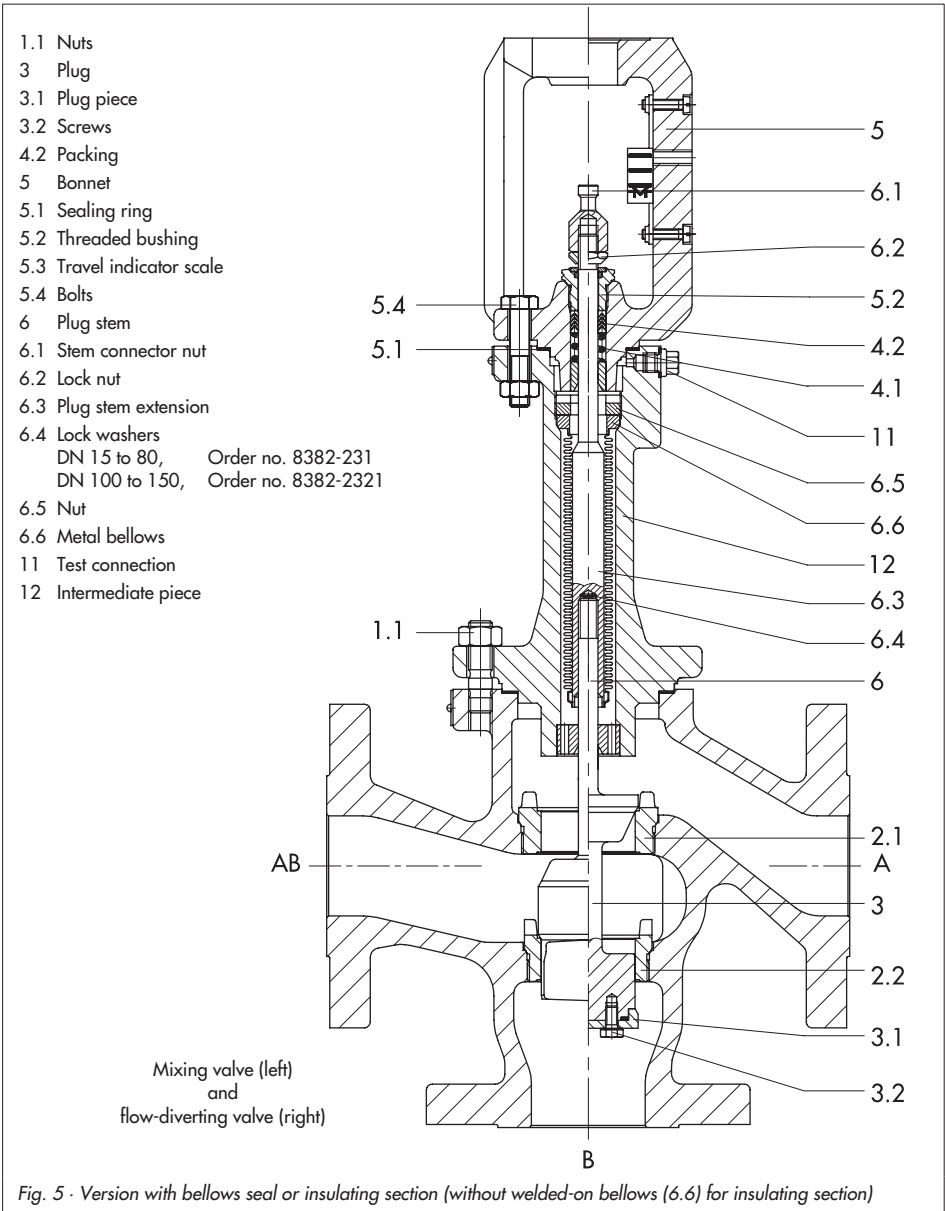
### Mixing and diverting valves

9. Loosely screw lock nut (6.2) and stem connector nut (6.1) onto the plug stem.
10. Mount actuator and adjust upper and lower bench range values as described in section 2.1.

## 5.2 Valve with insulating section or metal bellows seal

### 5.2.1 Stuffing box packing

1. Unscrew stem connector nut and lock nut (6.1, 6.2) from the plug stem extension (6.3). Remove threaded bushing (5.2) of the packing.
2. Remove bolts (5.4). Carefully lift valve bonnet (5) from the body over the plug stem extension.
3. Pull complete packing assembly out of the packing chamber using a suitable tool.  
Replace damaged parts as necessary. Thoroughly clean the packing chamber.
4. Remove gasket (5.1) in the intermediate piece (12) and carefully clean the sealing surfaces.
5. Apply lubricant (order no. 8150-0111) to all parts of the packing assembly and the plug stem extension (6).
6. Place a new gasket (5.1) into the intermediate piece. Carefully place bonnet (5) over the plug stem extension onto the intermediate piece (12) and tighten with bolts (5.4).  
(Tightening torques in EB 029 EN).
7. Carefully push packing assembly (4.1, 4.3 and 4.2) over the plug stem into the packing chamber observing the proper order.  
Screw in threaded bushing (5.2) and tighten.
8. Loosely screw lock nut (6.2) and stem connector nut (6.1) onto the plug stem.



9. Mount actuator and adjust upper and lower bench range values as described in section 2.1.

## 5.2.2 Seat and plug

We recommend also to replace the packing (4.2) when installing a new seat and plug.



### Caution!

*To avoid damage in the metal bellows version (the version with insulating section does not have a bellows), make sure that no torque is applied to the bellows, which is screwed to the intermediate piece. It is recommended to use a SAMSON clamping tool.*

1. Unscrew stem connector nut and lock nut (6.1, 6.2) from the plug stem.
2. Remove threaded bushing (5.2).
3. Remove bolts (5.4). Carefully lift bonnet (5) from the intermediate piece (12) over the plug stem extension (6.3).

### Mixing valves

4. Insert SAMSON plug tool through valve port **B** to hold the plug stationary. Unscrew nut (6.5) using a socket wrench.
5. Tightly screw stem connector nut (6.1) and lock nut (6.2) onto the free threaded end of the plug stem extension (6.3) to hold the plug stem stationary.
6. Unscrew plug from the plug stem extension using a SAMSON plug tool.

7. Remove nuts (1.1) from the body. Lift intermediate piece (12) together with the plug stem extension (6.3) from the valve body.

If necessary, replace the metal bellows together with the plug stem extension (see section 5.2.3).

8. Unscrew top seat ring (2.1) and remove plug from the body. Unscrew bottom seat ring (2.2) as well.

### Diverting valves

DN 32 to DN 150

(DN 15 to DN 25 as for mixing valves)

4. Remove screw (3.2) from the plug through valve port **B**. Take plug piece (3.1) together with the sealing ring off the plug (3).
5. Remove nuts (1.1). Also remove intermediate piece (12) together with plug stem extension, plug stem and plug (3) from the valve body (1).
6. Tightly screw stem connector nut (6.1) and lock nut (6.2) onto the free threaded end of the plug stem extension (6.3) to hold the plug stem stationary.
7. Unscrew plug (3) from the plug stem extension (6.3).  
If necessary, replace the metal bellows together with the plug stem extension (see section 5.2.3).
8. Replace seats as described in section 5.2.2.
9. Apply lubricant (order no. 8150-0111) to the plug stem (6) of the new plug. Make sure that both lock washers (6.4) are still located in the plug stem exten-

sion. Tightly screw plug stem into plug stem extension (6.3) with a tightening torque of 50 Nm for  $\varnothing$  10 mm and 80 Nm for  $\varnothing$  16 mm.

### 5.2.3 Metal bellows

Refer to section 5.2.2, item 7 for mixing and flow-diverting valves.

1. Pull plug stem extension with weld-on metal bellows (6.6) out of the intermediate piece.
2. Clean seating surfaces on the intermediate piece.
3. Push new plug stem extension including metal bellows into the intermediate piece (12).

### 5.2.4 Reassembly

1. Place a new gasket (1.2) into the valve body. Place intermediate piece onto valve body and tighten with nuts (1.1). Observe tightening torques as specified in EB 029 EN.
2. Place a new gasket (5.1) into intermediate piece, place it on the valve bonnet (5) and fasten with nuts and bolts (5.4). Observe tightening torques as specified in EB 029 EN.
3. Tighten threaded bushing (5.2).
4. Loosely screw lock nut (6.2) and stem connector nut (6.1) onto plug stem extension (6.3) or plug stem.
5. Mount actuator and adjust upper and lower bench range values as described in section 2.1.

## 6 Material identifying marks

Guide bushing, seat and plug have the following identifying marks:

**Guide bushing** (groove on plane face)

- ▶ No groove: 1.4305
- ▶ Sharp recessed groove: 1.4571
- ▶ Flat recessed groove: Hastelloy

### Seat

The material number is either stamped or engraved on the seat.

- ▶ Stellite seats are marked by a stamped-on "st".

### Plug

Groove below the plug stem thread:

- ▶ No groove: 1.4006
- ▶ Sharp recessed groove: 1.4571
- ▶ Two sharp recessed grooves: 1.4301
- ▶ Flat recessed groove: Hastelloy
- ▶ When other materials are used, either the material number or its designation is engraved on the plug.

The **Kvs value and characteristic** are engraved on the plug.

- ▶ Stellite plugs are marked by an engraved "st".

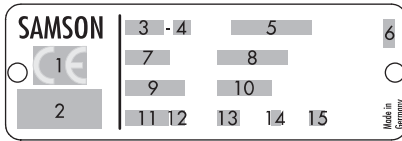
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*Dimensions and weights of the valve versions can be found in Data Sheet T 8026 EN.*

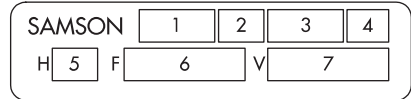
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## 7 Description of nameplates



- 1 CE marking or "Art. 3, Abs.3" (see article 3, § 3 of PED), where applicable
- 2 Identification no. of notified body, fluid group and category, where applicable
- 3 Type designation
- 4 Modification index of valve
- 5 Material
- 6 Year of manufacture
- 7 Nominal size: DIN: DN, ANSI: Size
- 8 Permissible excess pressure at room temperature  
DIN: PN, ANSI: CL
- 9 Order number with modification index
- 10 Position of item in order
- 11 Flow coefficient:  
DIN:  $K_{vs}$ , ANSI:  $C_v$
- 12 Characteristic:  
% equal percentage, Lin linear,  
DIN: **A/Z** quick opening, ANSI: **O/C**
- 13 Sealing:  
**ME** metal, **ST** stellited, **Ni** nickel-plated  
**PT** soft sealing with PTFE,  
**PK** soft sealing with PEEK
- 14 Pressure-balanced: DIN: **D**, ANSI: **B**
- 15 I or III flow divider



- 1 Type designation
- 2 Modification index
- 3 Effective diaphragm area
- 4 Fail-safe action:  
FA Actuator stem extends  
FE Actuator stem retracts
- 5 Travel
- 6 Bench range (spring range)
- 7 Bench range with pretensioned springs

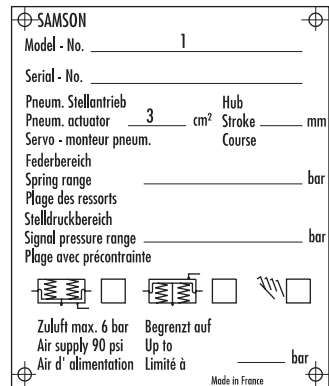


Fig. 6 · Valve nameplate (left) and actuator nameplates (right)

## 8 Customer inquiries

Please submit the following details:

- ▶ Order number
- ▶ Type, product number, nominal size and version of the valve

- ▶ 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)
- ▶ Has a strainer been installed?
- ▶ Installation drawing



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**EB 8026 EN**

S/Z 2005-01

# Pneumatic Actuators up to 700 cm<sup>2</sup>



## Type 3271 and Type 3277 for integral positioner attachment

### Application

Linear actuator for attachment to final control elements, particularly suitable for Series 240, 250, 280 Control Valves and Type 3510 Micro-flow Valves

**Diaphragm area** 60 to 700 cm<sup>2</sup>

**Rated travel** 7.5 to 30 mm

The Type 3271 and Type 3277 Pneumatic Actuators are diaphragm actuators equipped with a rolling diaphragm and internal springs.

### Special features

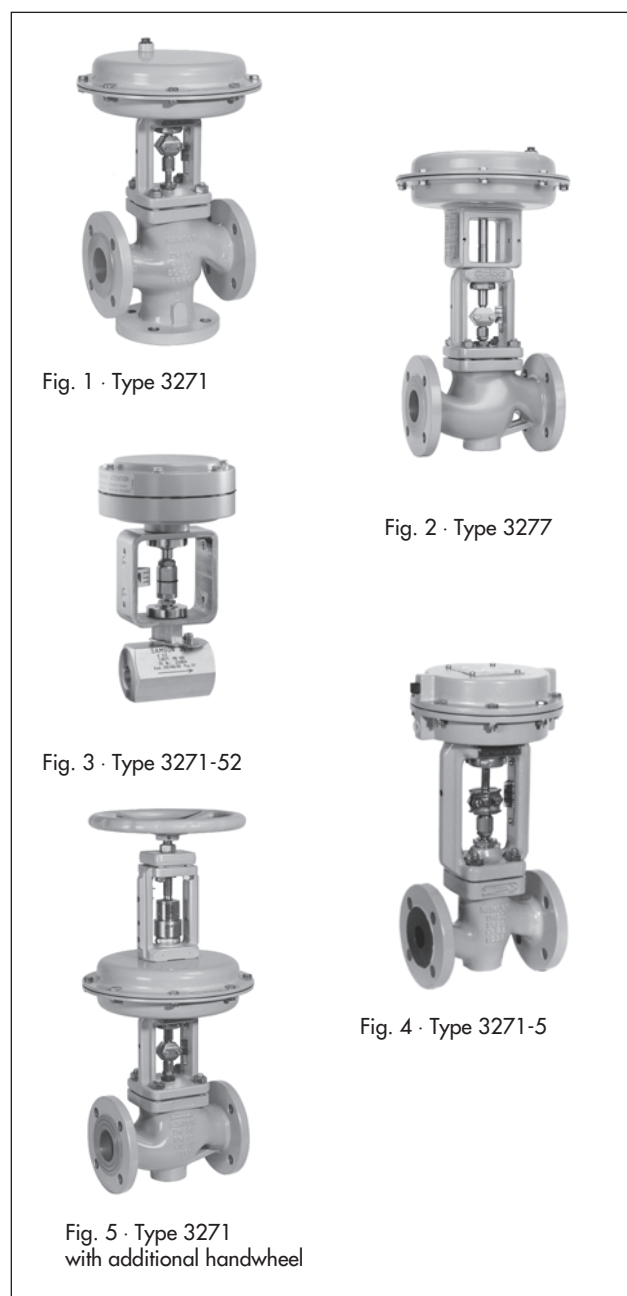
- Low overall height
- Powerful thrust at high response speed
- Low friction
- Various bench ranges by varying the number of springs and their compression
- No special tools required to change the bench range and to reverse the actuator action (also in version with handwheel)
- Designed for supply pressures up to 6 bar
- Continuous operation at temperatures from -35 to +90 °C
- Direct attachment of accessories on additional yoke for Type 3277 Actuator with concealed travel pick-off (Fig. 2)

### Versions

- **Type 3271** · Diaphragm areas 80, 240, 350, 700 cm<sup>2</sup> (Fig. 1), optional stainless steel version (1.4301)
- **Type 3277** · Diaphragm area 240, 350, or 700 cm<sup>2</sup> for direct attachment of accessories (Fig. 2), optional stainless steel version (1.4301)
- **Type 3271-52** · Diaphragm area 60 cm<sup>2</sup>, die-cast aluminum body, particularly for Type 3510 Micro-flow Valve (Fig. 3 and Data Sheet T 8091 EN)
- **Type 3271-5** · Diaphragm area 120 cm<sup>2</sup>, die-cast aluminum body (Fig. 4)
- **Type 3277-5** · Diaphragm area 120 cm<sup>2</sup>, die-cast aluminum body for direct attachment of accessories (Fig. 8)
- **Type 3271 or 3277** · **Additional handwheel** for pneumatic actuators with diaphragm areas of 240, 350, or 700 cm<sup>2</sup> (Fig. 5 and Data Sheet T 8312 EN)
- **Type 3271** · **Mechanical travel stop** (sectional drawing 10), minimum or maximum travel mechanically adjustable in version with 240, 350, or 700 cm<sup>2</sup>
- **Type 3271/7** · **Fire-Lock version** (Fig. 11) fail-safe action in case of fire, diaphragm areas of 240, 350, 700 cm<sup>2</sup>

### Further versions

- For other process media (e.g. water or oxygen) · Details available on request
- For high temperatures up to 120 °C · On request



- For low temperatures down to -40 °C · On request

### Principle of operation

The signal pressure  $p_{st}$  generates a force  $F = p_{st} \cdot A$  on the diaphragm area  $A$  (2). This force is balanced by the actuator springs (4). Taking into account the rated travel, the number of springs and their compression determine the bench range. The travel  $H$  is proportional to the signal pressure  $p_{st}$ . The operating direction of the actuator stem (7) depends on the arrangement of the springs and the signal pressure connection (1).

The stem connector (8) connects the actuator stem (7) with the plug stem (10) of the valve.

The adjustable **mechanical travel stop** (Fig. 10) is suitable for actuators made of sheet steel with effective diaphragm areas of 240, 350, or 700 cm<sup>2</sup>. Using the limit stop, the actuator travel can be limited by up to 50 % in both directions (actuator stem "extends" or "retracts") and permanently adjusted. A special version with one-sided travel stop for actuators with an effective diaphragm area of 120 cm<sup>2</sup> is available.

### Actuators are available with the following fail-safe actions:

#### "Actuator stem extends (FA)"

The springs cause the actuator stem to move to the lower end position (sectional drawings, right) when the diaphragm is relieved of pressure or when the supply air fails.

#### "Actuator stem retracts (FE)"

The springs cause the actuator stem to retract (sectional drawings, left) when the diaphragm is relieved of pressure or when the supply air fails.

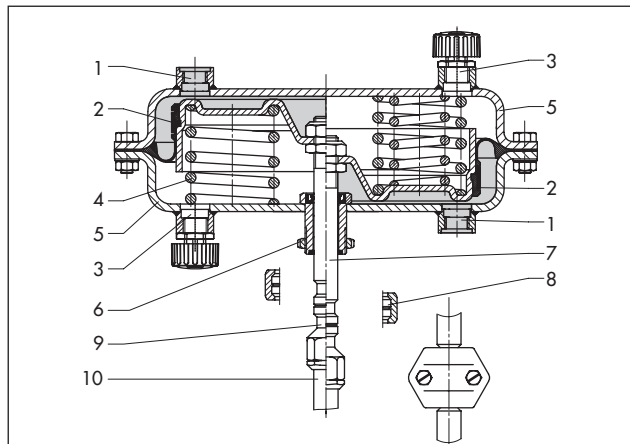


Fig. 6 · Type 3271 (right: with additional springs)

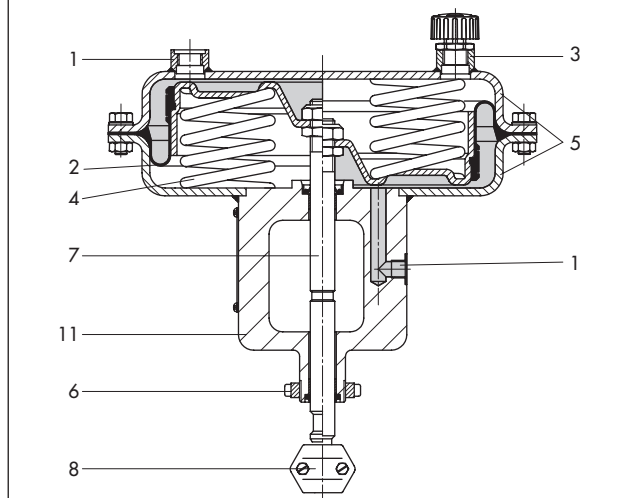


Fig. 7 · Type 3277

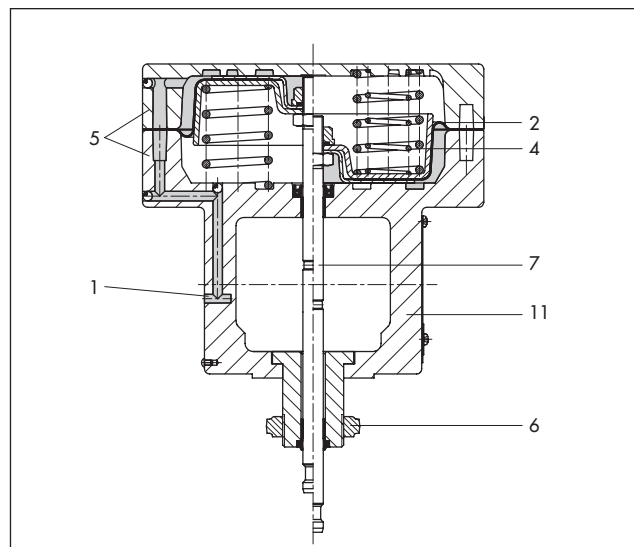


Fig. 8 · Type 3277-5

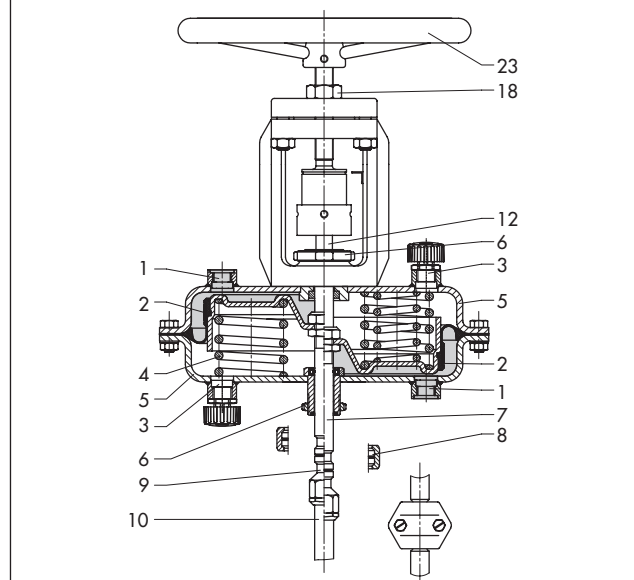


Fig. 9 · Type 3271 with handwheel

### Legend

|                              |                               |
|------------------------------|-------------------------------|
| 1 Signal pressure connection | 11 Yoke                       |
| 2 Diaphragm                  | 12 Actuator stem to handwheel |
| 3 Vent                       | 14 Cap                        |
| 4 Springs                    | 15 Nut                        |
| 5 Diaphragm cases            | 16 Spindle                    |
| 6 Annular nut                | 17 Plain bearing              |
| 7 Actuator stem              | 18 Lock nut                   |
| 8 Stem connector             | 23 Handwheel                  |
| 9 Coupling nut               |                               |
| 10 Plug stem                 |                               |

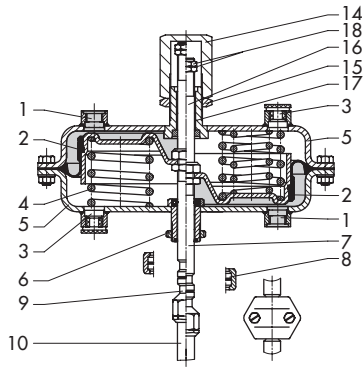


Fig. 10 · Type 3271 with adjustable travel stop

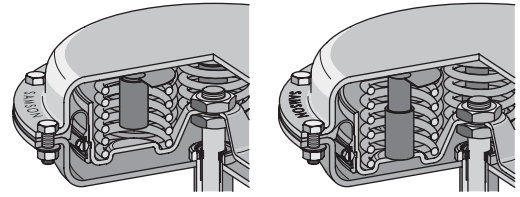


Fig. 11 · Fire-Lock version, in fail-safe position (right)

Table 1a · Technical data for Type 3271 Pneumatic Actuator

| Version   | Type 3271  | Type 3271<br>Stainless steel       | Type 3277                                | Type 3277<br>Stainless steel  | Type 3271-52<br>for micro valve             | Type 3271-5<br>Type 3277-5 |
|---|--|------------------------------------|--|-------------------------------|---|----------------------------|
| Diaphragm area                                      | cm <sup>2</sup>  | 80 · 240 · 350 · 700 <sup>1)</sup> |  | 240 · 350 · 700 <sup>1)</sup> |   | 60                         |
| Max. supply pressure                                | 6 bar · See restrictions in on/off service on page 6   |                                    |  |                               |   |                            |
| Permissible temperatures<br>in continuous operation | -35 to 90 °C made of standard material NBR   |                                    |  |                               | -35 to 80 °C                                | -35 to 90 °C               |
|   | -40 to 120 °C made of special material EPDM, for air free of oil and grease and actuator versions with 240, 350, and 700 cm <sup>2</sup> |                                    |  |                               |   |                            |
|   | Up to 80 °C in Fire-Lock version (for 240, 350, and 700 cm <sup>2</sup> )  |                                    |  |                               |   |                            |
| <b>Materials</b>                                    |  |                                    |  |                               |   |                            |
| Rolling diaphragm                                   | NBR (nitrile rubber) with fabric insert  |                                    |  |                               | NBR with fabric insert                      |                            |
|   | EPDM with fabric insert  |                                    |  |                               |   |                            |
| Actuator stem                                       | 1.4305   |                                    |  |                               | 1.4305/1.4571                               | 1.4305                     |
| Actuator stem sealing                               | NBR  |                                    |  |                               | NBR   | NBR                        |
|   | EPDM   |                                    |  |                               |   |                            |
| Diaphragm cases                                     | Sheet steel,<br>powder-varnish<br>coated   | Stainless steel<br>1.4301          | Sheet steel,<br>powder-varnish<br>coated | Stainless steel<br>1.4301     | Die-cast aluminum,<br>powder-varnish coated |                            |

<sup>1)</sup> Only for initial spring value ≤ 2.1 bar

Table 1b · Technical data for additional handwheel

| Version for actuator | Type 3271-5<br>Type 3277-5 | Type 3271<br>Type 3277   |
|----------------------|----------------------------|--|
| Diaphragm area       | 120 cm <sup>2</sup>        | 240 cm <sup>2</sup> , 350 cm <sup>2</sup><br>700 cm <sup>2</sup> (only for initial spring value ≤ 2.1 bar) |
| Materials            | Body                       | Die-cast aluminum, powder-varnish coated   |
|                      | Spindle                    | 1.4305   |
|                      | Handwheel                  | Aluminum, powder-varnish coated  |
|                      |                            | St 37-2, powder-varnish coated   |
|                      |                            | Stainless steel 1.4104   |
|                      |                            | Aluminum   |

**Table 2 Bench ranges for pneumatic actuators up to 700 cm<sup>2</sup>**

| Effective diaphragm area [cm <sup>2</sup> ] | Rated travel [mm] | Travel volume at rated travel [dm <sup>3</sup> ] | Dead volume [dm <sup>3</sup> ] | Max. travel [mm] <sup>1) 2)</sup> | Bench range [bar]<br>(signal pressure range at rated travel) | Additionally possible spring compression [%] | Operating range with spring compression [bar] | Number of springs | Spring force at 0 mm travel [kN] <sup>1)</sup> | Spring force at rated travel [kN] | Thrust [kN] at rated travel and a supply pressure [bar] of |      |      |      |      |      |
|---|-------------------|--|--------------------------------|-----------------------------------|--|--|---|-------------------|--|-----------------------------------|--|------|------|------|------|------|
|   |                   |  |                                |                                   |  |  |   |                   |  |                                   | 1.4  | 2.0  | 3.0  | 4.0  | 5.0  | 6.0  |
| 60  | 7.5               | 0.09   | 0.1                            | 10.5                              | 0.2...1.0  | 0  | -   | 2                 | 0.12   | 0.6                               | 0.24   | 0.6  | 1.2  | 1.8  | 2.4  | 3    |
|   |                   |  |                                |                                   | 0.4...2.0  |  | -   | 4                 | 0.24   | 1.2                               | -  | 0.6  | 1.2  | 1.8  | 2.4  |      |
|   |                   |  |                                |                                   | 1.4...2.3 <sup>3)</sup>                                      |  | -   | 4                 | 0.84   | 1.38                              | -  | 1.02 | 1.62 | 2.22 |      |      |
|   |                   |  |                                |                                   | 2.1...3.3 <sup>3)</sup>                                      |  | -   | 8                 | 1.26   | 1.98                              | -  | 0.42 | 1.02 | 1.62 |      |      |
| 80  | 15                | 0.12   | 0.13                           | 16                                | 0.2...1.0  | 12.5   | 0.3...1.1                                     | 3                 | 0.16   | 0.8                               | 0.32   | 0.8  | 1.6  | 2.4  | 3.2  | 4    |
|   |                   |  |                                |                                   | 0.4...2.0  |  | 6   | 0.32              | 1.6  | -                                 | 0.8  | 1.6  | 2.4  | 3.2  |      |      |
|   |                   |  |                                |                                   | 0.6...3.0  |  | 12  | 0.48              | 2.4  | -                                 | 0.8  | 1.6  | 2.4  |      |      |      |
| 120   | 7.5               | 0.09   | 0.12                           | 9                                 | 0.4...0.8  | 0  | -   | 3                 | 0.48   | 0.96                              | 0.72   | 1.44 | 2.64 | 3.84 | 5.04 | 6.24 |
|   |                   |  |                                |                                   | 0.8...1.6  |  | -   | 6                 | 0.96   | 1.92                              | -  | 0.48 | 1.68 | 2.88 | 4.08 | 5.28 |
|   |                   |  |                                |                                   | 1.7...2.1 <sup>3)</sup>                                      |  | -   | 6                 | 2.04   | 2.52                              | -  | 1.08 | 2.28 | 3.48 | 4.68 |      |
|   |                   |  |                                |                                   | 2.4...3.0 <sup>3)</sup>                                      |  | -   | 12                | 2.88   | 3.6                               | -  | 1.2  | 2.4  | 3.6  |      |      |
| 120   | 15                | 0.2  | 0.10                           | 16<br>(17)                        | 12.5   | 0.2...1.0                                    | 3   | 0.24              | 1.2  | -                                 | 1.2  | 2.4  | 3.6  | 4.8  | 6    |      |
|   |                   |  |                                | 0.4...2.0                         |  | 6  | 0.48  | 2.4               | -  | 1.2                               | 2.4  | 3.6  | 4.8  |      |      |      |
|   |                   |  |                                | 15<br>(17)                        |  | 0  | 1.4...2.3 <sup>3)</sup>                       | 6                 | 1.68   | 2.76                              | -  | 0.84 | 2.04 | 3.24 | 4.44 |      |
|   |                   |  |                                | 2.1...3.3 <sup>3)</sup>           |  |  | 12  | 2.52              | 3.96   | -                                 | 0.84   | 2.04 | 3.24 |      |      |      |
| 240   | 15                | 0.36   | 0.38                           | 17                                | 0.2...1.0  | 12.5   | 0.3...1.1                                     | 3                 | 0.48   | 2.4                               | 0.96   | 2.4  | 4.8  | 7.2  | 9.6  | 12   |
|   |                   |  |                                |                                   | 0.4...2.0  |  | 6   | 0.96              | 4.8  | -                                 | 2.4  | 4.8  | 7.2  | 9.6  |      |      |
|   |                   |  |                                |                                   | 0.6...3.0  |  | 12  | 1.44              | 7.2  | -                                 | 2.4  | 4.8  | 7.2  |      |      |      |
| 350   | 15                | 0.53   | 0.6                            | 22                                | 25   | 0.2...1.0                                    | 3   | 0.7               | 3.5  | 1.4                               | 3.5  | 7    | 10.5 | 14   | 17.5 |      |
|   |                   |  |                                |                                   |  | 0.4...2.0                                    | 6   | 1.4               | 7  | -                                 | 3.5  | 7    | 10.5 | 14   |      |      |
|   |                   |  |                                |                                   |  | 0.6...3.0                                    | 12  | 2.1               | 10.5   | -                                 | 3.5  | 7    | 10.5 |      |      |      |
|   |                   |  |                                | 15                                | 0  | 1.4...2.3 <sup>3)</sup>                      | 6   | 4.9               | 8.05   | -                                 | 2.45   | 5.95 | 9.45 | 13   |      |      |
| 2.1...3.3 <sup>3)</sup>                     | 12                | 7.35   | 11.6                           |                                   |  | -  | 2.45  | 5.95              | 9.45   |                                   |  |      |      |      |      |      |
| 700   | 30                | 2.1  | 2.4                            | 38                                | 25   | 0.2...1.0                                    | 3   | 1.4               | 7  | 2.8                               | 7  | 14   | 21   | 28   | 35   |      |
|   |                   |  |                                |                                   |  | 0.4...2.0                                    | 6   | 2.8               | 14   | -                                 | 7  | 14   | 21   | 28   |      |      |
|   |                   |  |                                |                                   |  | 0.6...3.0                                    | 12  | 4.2               | 21   | -                                 | 7  | 14   | 21   |      |      |      |
|   |                   |  |                                | 30                                | 0  | 1.4...2.3 <sup>3)</sup>                      | 8   | 9.8               | 16.1   | -                                 | 4.9  | 11.9 | 18.9 | 25.9 |      |      |
|   |                   |  |                                |                                   |  | 2.1...3.3 <sup>3)</sup>                      | 12  | 14.7              | 23.1   | -                                 | 4.9  | 11.9 | 18.9 |      |      |      |
| 2.35...3.8 <sup>3) 4)</sup>                 | 15                | 16.5   | 26.6                           | -                                 | 1.4  | 8.4  | 15.4  |                   |  |                                   |  |      |      |      |      |      |
| 2.6...4.3 <sup>3) 4)</sup>                  | 18                | 18.2   | 30.1                           | -                                 | 4.9  | 11.9   |   |                   |  |                                   |  |      |      |      |      |      |

1) Based on lower bench range value, taking zero travel (to unseat the plug) into account  
 2) Zero travel as in Table 3 depending on fail-safe action  
 3) Pretensioned springs  
 4) Version not available with additional handwheel

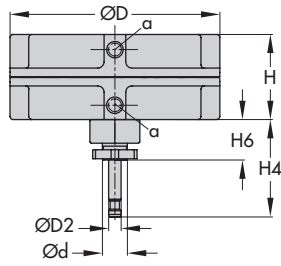


Fig. 12 · Type 3271-5

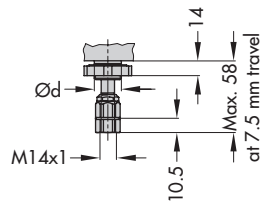


Fig. 12a · Types 3271-5/3277-5 with 7.5 mm travel for Type 3510 Micro Valve

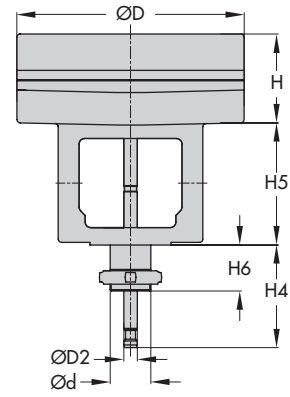


Fig. 13 · Type 3277-5

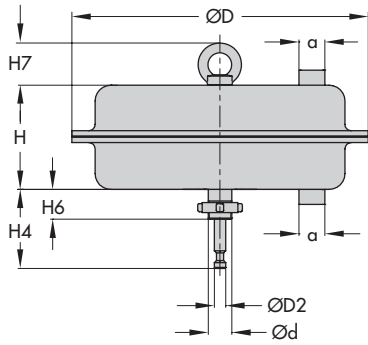


Fig. 14 · Type 3271 (700 cm<sup>2</sup> version with lifting ring)

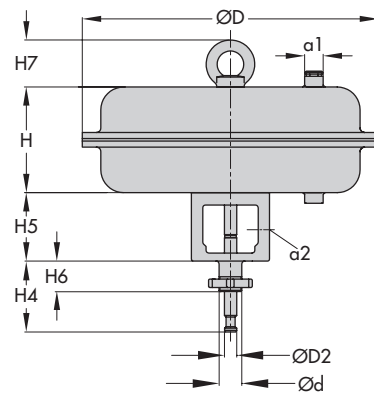


Fig. 15 · Type 3277 (700 cm<sup>2</sup> version with lifting ring)

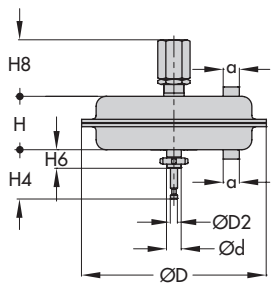


Fig. 16 · Type 3271 with adjustable travel stop

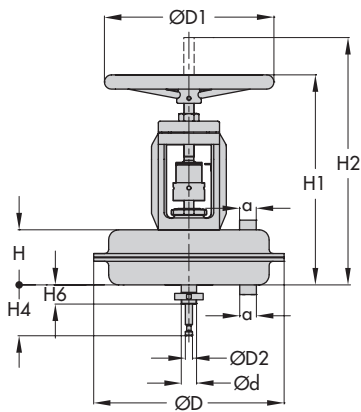


Fig. 17 · Type 3271 with additional handwheel

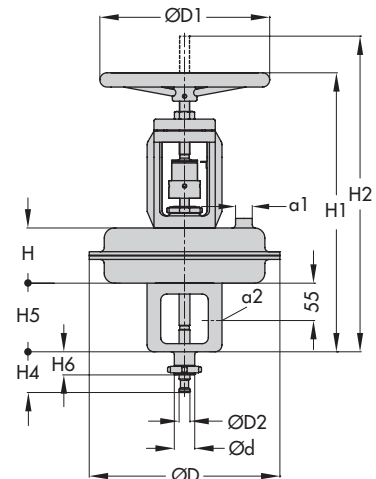


Fig. 18 · Type 3277 with additional handwheel

**Table 3 · Dimensions and weights**

| Actuator          | Type                   | 3271    |       |         | 3271    |         |     | 3277  | 3277  |       |     |
|-------------------|------------------------|---------|-------|---------|---------|---------|-----|-------|-------|-------|-----|
|                   |                        | -52     |       | -5      |         |         |     | -5    |       |       |     |
| Diaphragm area    | cm <sup>2</sup>        | 60      | 80    | 120     | 240     | 350     | 700 | 120   | 240   | 350   | 700 |
| Height            | H                      | 63      | 62    | 69      | 62      | 82      | 134 | 70    | 65    | 85    | 135 |
|                   | H1                     | –       |       |         | 300     | 320     | 490 | –     | 400   | 420   | 590 |
|                   | H2 <sub>max</sub>      | –       |       | 208     | 345     | 365     | 540 | –     | 445   | 465   | 640 |
|                   | H4 <sub>rated</sub> FA | 51      | 75    | 75      | 75      | 75      | 90  | 78    | 75    | 75    | 90  |
|                   | H4 <sub>max</sub> FA   | 52.5    | 78    | 78      | 78      | 78      | 95  | 78    | 78    | 78    | 90  |
|                   | H4 <sub>max</sub> FE   | 52.5    | 78    | 78      | 78      | 85      | 104 | 78    | 78    | 85    | 104 |
|                   | H5                     | –       |       |         |         |         |     | 84    | 101   | 101   | 101 |
|                   | H6                     | 23.8    | 34    | 34      | 34      | 34      | 34  | 14    | 34    |       |     |
|                   | H7                     | –       |       |         |         |         |     | 62    | –     |       | 65  |
| Diameter          | ∅ D                    | 120     | 150   | 168     | 240     | 280     | 390 | 168   | 240   | 280   | 390 |
|                   | ∅ D1                   | –       | –     | 80      | 180     | 250     | 250 | –     | 180   | 250   | 250 |
|                   | ∅ D2                   | 10      | 10    | 10      | 10      | 16      | 16  | 10    | 16    |       |     |
| ∅ d (thread)      | 20                     | 30      |       |         |         |         | 20  | 30    |       |       |     |
| a (optional)      |                        | G 1/8   | G 1/4 | G 1/8   | G 1/4   | G 3/8   |     | G 1/8 | G 1/4 | G 3/8 |     |
|                   |                        | 1/4 NPT |       | 1/8 NPT | 1/4 NPT | 3/8 NPT |     |       |       |       |     |
|                   | a2                     | –       |       |         |         |         | –   | G 3/8 |       |       |     |
| Weight in kg      |                        |         |       |         |         |         |     |       |       |       |     |
| Without handwheel |                        | 1.3     | 2     | 2       | 5       | 8       | 22  | 3.2   | 9     | 12    | 26  |
| With handwheel    |                        | –       |       | 4       | 9       | 13      | 27  | –     | 13    | 17    | 31  |

### Throttling or on/off service

In throttling service, the pneumatic actuators can be used for supply pressures up to max. 6 bar.

In on/off service, the supply pressure must be reduced.

For fail-safe action "Actuator stem retracts (FE)", the permissible supply pressure must not exceed the upper bench range value by more than 3 bar.

Actuators to be used with reduced supply pressures are labeled accordingly.

### Example

| Bench range     | Fail-safe action       | Max. supply pressure |
|-----------------|------------------------|----------------------|
| 0.2 ... 1.0 bar | Actuator stem retracts | 4 bar                |
| 0.4 ... 2.0 bar |                        | 5 bar                |
| 0.6 ... 3.0 bar |                        | 6 bar                |

For fail-safe action "Actuator stem extends (FA)" and travel stop, the supply pressure must not exceed the upper bench range value by more than 1.5 bar.

### Ordering text

Actuator

Optionally

Diaphragm area

Travel

Bench range

Fail-safe action

Signal pressure connection

Rolling diaphragm

Type 3271 or  
Type 3277 for direct attachment  
of accessories

Handwheel  
Travel stop  
Fire-Lock version

... cm<sup>2</sup>

... mm

... bar

Actuator stem extends (FA) or  
Actuator stem retracts (FE)

G ... / ... NPT

NBR/EPDM

Specifications subject to change without notice.





# Electropneumatic Positioner Type 4763

# Pneumatic Positioner Type 4765



## Application

Single-acting positioner for attachment to pneumatic control valves. Reference variable is either a standardized electric signal from 4(0) to 20 mA or 1 to 5 mA (Type 4763) or a pneumatic standardized signal from 0.2 to 1 bar (3 to 15 psi) (Type 4765).

**Rated travels from 7.5 to 90 mm**



The positioners ensure predetermined assignment of the valve stem position (controlled variable  $x$ ) to the electric or pneumatic input signals (reference variable  $w$ ) supplied by the controller. They compare the input signal coming from the controller to the travel of the control valve and produce the corresponding pneumatic output signal pressure  $p_{st}$  (output variable  $y$ ).

## Special features

- Compact, low-maintenance design
- Any mounting position possible
- Resistant to mechanical vibrations
- Reversible operating direction
- Excellent dynamic behavior
- Suitable for normal or split-range operation
- Adjustable proportional band (P-band)
- Adjustable air output capacity
- Low energy consumption
- Special versions for oxygen

Attachment to valves with cast yokes or rod-type yokes according to IEC 60534-6.

Optionally available with two pressure gauges to monitor supply air and signal pressure, with stainless steel housing and connections optionally nickel-plated or made of stainless steel.

The Type 4765 Pneumatic Positioner can be subsequently modified to an electropneumatic positioner.

## Versions

### All versions of Type 4763 Electropneumatic Positioner

Reference variable: 4(0) to 20 mA, 1 to 5 mA,  
Supply air: 1.4 to 6 bar (20 to 90 psi),  
Signal range: 0 to 6 bar (0 to 90 psi)

### Type 4763-0 · Version for non-hazardous areas

### Type 4763-1 · Version for hazardous areas

input circuit with type of protection  $\text{Ex II 2 G EEx ia IIC T6 acc. to ATEX}$  (see explosion protection certificates" on pages 2 and 3)

### Type 4763-8 · i/p Positioner in EEx nA "non-sparking"

**Type 4765/6116 · i/p Positioner** with type of protection "Flameproof Enclosure" EEx d with Type 6116 i/p Converter (Figs. 2 and 3; for certificates, refer to Data Sheet T 6116 EN).

### Type 4765 · Pneumatic Positioner

Reference variable: 0.2 to 1 bar (3 to 15 psi)  
Signal range: 0 to 6 bar (0 to approximately 90 psi)  
Supply air: 1.4 to 6 bar (20 to 90 psi)



Fig. 1 · Type 4763 / Type 4765 Positioner



Fig. 2 · Type 6116 i/p Converter, opened



Fig. 3 · Type 4765/6116 Ex d Positioner Attachment to NAMUR rib

## Principle of operation

The only difference between the Type 4765 Pneumatic Positioner and the Type 4763 Electropneumatic Positioner is that an electropneumatic (i/p) converter has been added to the latter in order to convert the electric signal received from a controller into a proportional pneumatic signal.

These positioners use a flapper-nozzle system which operates according to the force-balance principle. They can be applied for both normal and split-range operation.

## Operating direction

When the reference variable ( $p_e$ ) increases, the pneumatic output signal pressure  $p_{st}$  can be selected to be increasing-increasing (direct action  $\gg$ ) or increasing-decreasing (reverse action  $\ll$ ). The operating direction depends on the position of the nozzle block that can be turned by  $180^\circ$ . The visible mark ( $\gg$  or  $\ll$ ) indicates the respective operating direction. If the operating direction or the fail-safe position is to be subsequently modified, note that the positioner must also be mounted at a different position (Figs. 5 to 8)!

## Attachment according to IEC 60534-6 and NAMUR

The various ways in which the positioner can be attached to the actuator correspond to the IEC 60534-6 and NAMUR recommendation. Positioners may be attached to valves with either cast yokes (e.g. SAMSON Series 240) or rod-type yokes. Each type of attachment requires special mounting parts.

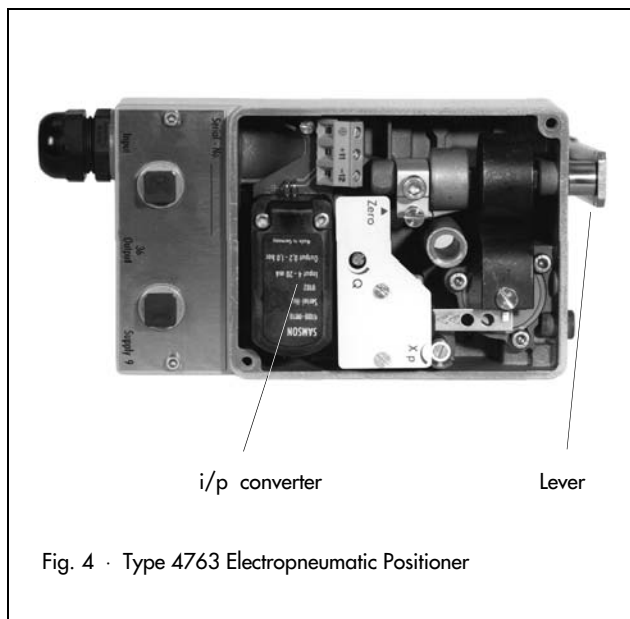


Fig. 4 · Type 4763 Electropneumatic Positioner

## Combining the positioner and the actuator

Figs. 5 to 8 schematically illustrate the arrangement of the actuator, the mounting position of the positioner, the reference variable, and the operating direction.

### Fail-safe action

The pneumatic actuators (Type 3271 and Type 3277) are available with the following fail-safe actions. They move the valve in the predetermined position whenever the signal pressure decreases or air supply fails:

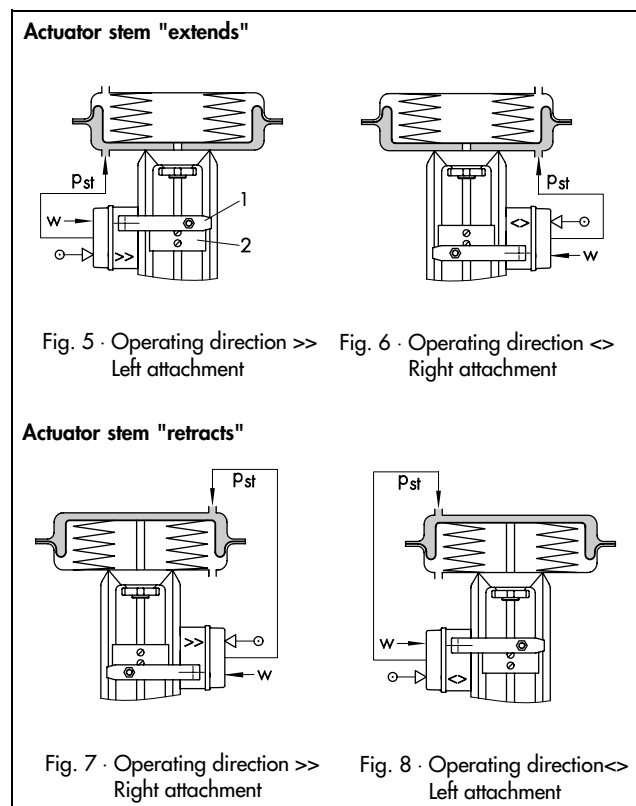
#### Actuator stem "extends" (Figs. 5, 6)

Whenever the pressure acting on the diaphragm decreases or air supply fails, the compression springs installed in the actuator force the actuator stem to extend.

#### Actuator stem "retracts" (Figs. 7, 8)

Same as above, except: the compression springs force the actuator stem to retract.

Refer to Data Sheets T 8310 EN and T 8311 EN for more details. Figs. 5 to 8 illustrate the different operating directions and the mounting positions of the positioner. "Right..." and "Left attachment" apply when looking onto the lever (1) and plate (2).



## Summary of approved explosion protection certificates for Type 4763 Electropneumatic Positioner

| Certificate type          | Certificate number   | Date       | Comment                                     |
|---------------------------|----------------------|------------|---|
| Statement of Conformity   | PTB 03 ATEX 2183 X   | 2003-09-30 | ⊕ II 3 G EEx nA II T6, Zone 2               |
| EC Type Examination Cert. | PTB 02 ATEX 2078     | 2002-07-19 | ⊕ II 2 G EEx ia IIC T6                      |
| Certificate of Conformity | PTB No. Ex-93.C.4031 | 1993-05-05 | EEx ia IIC T6                               |
| 1st Addendum              |                      | 1993-11-22 | -45 °C ambient temperature                  |
| 2nd Addendum              |                      | 1994-05-30 | With i/p module 6109                        |
| SEV Certificate           | 98.5.50771.03        | 1998-04-24 | EEx ia IIC T4-T6                            |
| FMRC Certificate          | J.I. 1Y8A9.AX        | 1994-05-11 | Class I, II, III; Div. 1                    |
|                           | J.I. 5Y2A3.AX        | 1995-04-26 | Groups A, B, C, D, E, F, G; Div. 2          |
| CSA                       | LR 54227-20          | 1996-04-22 | Class I; Div. I; Groups A, B, C, D; Encl. 3 |

EEx d certifications for Type 6116 i/p Converter can be found in Data Sheet T 6116 EN.

## Additional approval certificates for Type 4763

| Certificate type                        | Certificate number | Date                       | Comment   |
|---|--------------------|----------------------------|---|
| CZ Certificate                          | FTZÜ 98 Ex 0987 X  | 1998-09-28                 | Ex II 1 G EEx ia IIC T6; valid until 2001-09-28   |
| BKI Certificate<br>1st extension        | Ex 96.C.094        | 1996<br>1999-11-01         | EEx ia IIC T6; valid until 1998-12-31<br>Valid until 2002-11-01                             |
| GOST Certificate                        | A-0392             | 1996-07-05                 | 1 Ex ia IIC T6, valid until 2001  |
| JIS Certificate (Japan)                 | C 12589<br>C 12590 | August 1997<br>August 1997 | Ex ia IIC T6 (with Type 6109)<br>Ex ia IIC T6; valid until 2002-11-01                       |
| Certificate for Type 4763 and Type 4765 |                    |                            |   |
| AIR LIQUIDE                             | 2003/OL 216        | 2003-07-30                 | Oxygen as operating medium with Type 6109<br>i/p Converter, perm. ambient temperature 60 °C |

**Table 1 · Technical data**

| Positioner  | Type 4763  | Type 4765   |
|---|--|---|
| Travel range<br>with extended lever   | 7.5 ... 60 mm<br>7.5 ... 90 mm   |   |
| Reference variable (input signal)<br>Span for split-range operation<br>0 to 50 % and 50 to 100 %<br><br>(R <sub>i</sub> = coil resistance at 20 °C) | 4 ... 20 mA (only Ex) · R <sub>i</sub> ≅ 250 Ω ± 7 %<br>4 ... 20 mA (non-Ex) · R <sub>i</sub> ≅ 200 Ω ± 7 %<br>0 ... 20 mA · R <sub>i</sub> ≅ 200 Ω ± 7 %<br>1 ... 5 mA · R <sub>i</sub> ≅ 880 Ω ± 7 % | 0.2 ... 1 bar<br>(3 ... 15 psi)   |
| Supply air  | 1.4 ... 6 bar (20 ... 90 psi)  |   |
| Output signal pressure  | Max. 0 ... 6 bar   |   |
| Characteristic  | Linear; deviation from terminal-based conformity < 1.5 %   |   |
| Hysteresis  | < 0.5 %  |   |
| Sensitivity   | < 0.1 %  |   |
| Operating direction   | Reversible   |   |
| Proportional band X <sub>p</sub><br>(at 1.4 bar supply air)   | Springs 1, 2<br>Spring 3   | 1 ... 3 %<br>1 ... 1.5 %  |
| Air consumption in steady<br>state, X <sub>p</sub> =1 %   | Supply 1.4 bar<br>6 bar  | 0.19 m <sub>n</sub> <sup>3</sup> /h<br>0.5 m <sub>n</sub> <sup>3</sup> /h |
| Air output capacity for Δp  | 1.4 bar<br>6 bar   | 3 m <sub>n</sub> <sup>3</sup> /h<br>8.5 m <sub>n</sub> <sup>3</sup> /h    |
| Transit time for Type 3271 Actuator "extends"   | 240 cm <sup>2</sup> : ≤ 1.8 s · 350 cm <sup>2</sup> : ≤ 2.5 s · 700 cm <sup>2</sup> : ≤ 10 s   |   |
| Permissible ambient temperature   | -20 ... 70 °C<br>With metal cable entry: -35 ... 70 °C<br>Special version: -45 ... 80 °C   |   |
|   | -35 ... 80 °C<br>Special version: -50 ... 80 °C  |   |
|   | Version for oxygen as the operating medium up to max. 60 °C<br>The limits in the EC type examination certificate also apply for explosion-protected devices  |   |
| Influence (X <sub>p</sub> = 1 %)  | Temperature < 0.03 %/°C, air supply < 0.3 %/0.1 bar  |   |
| Effect of vibration   | < 2 % between 10 ... 150 Hz and 1.5 g  | -   |
| Variable position when turned by 180°   | < 3.5 %  | -   |
| Degree of protection  | IP 54 (special version IP 65)  |   |
| Weight  | Approx. 1.2 kg   | 1.1 kg  |

**Table 2 · Assignment of lever and measuring spring**

| Lever   | Rated travel mm | Travel min./max. mm | Reference variable (input signal) | Measuring spring |
|---|-----------------|---------------------|-----------------------------------|------------------|
| Lever length L<br>40 ... 127 mm                   | 15              | 7.5 ... 15          | 100 %<br>50 %                     | 1<br>2           |
|   | 30              | 14 ... 32           | 100 %<br>50 %                     | 2<br>3           |
|   | 60              | 30 ... 70           | 100 %                             | 3                |
| Lever length L<br>with extension<br>40 ... 200 mm | 20              | 7.5 ... 26          | 100 %<br>50 %                     | 1<br>2           |
|   | 40              | 14 ... 50           | 100 %<br>50 %                     | 2<br>3           |
|   | >60             | 30 ... 90           | 100 %                             | 3                |

## Ordering nomenclature

Type designation 4763 -  0 1  0 0     0

Explosion protection

- Without 0
- ⊕ II 2 G EEx ia IIC T6 1
- Ex ia FMRC/CSA 3
- ⊕ II 3 G EEx nA II T6 8

Measuring spring

- 1 1
- 2 2
- 3 3

Pneumatic connections

- G 1/4 1
- 1/4 NPT 3

Electrical connections

- M 20x1.5, blue 1
- M 20x1.5, black 2
- Plug connector Harting HAN 7 D 5

Reference variable

- 4 ... 20 mA 1 1
- 0 ... 20 mA 2 2

Type designation 4765 - 0 1  0 0  1

Measuring spring

- 1 1
- 2 2
- 3 3

Pneumatic connections

- G 1/4 1
- 1/4 NPT 3

## Accessories

Adapter 1/2 NPT for electrical connections

Exhaust air filter check valve for IP 65

## Materials (material number acc. to DIN)

|                     |                                    |
|---------------------|------------------------------------|
| Case                | Die-cast aluminum, plastic-coated  |
| External parts      | Stainless steel, 1.4571 and 1.4301 |
| Measuring diaphragm | Silicone                           |

## Additional ordering details

Without/with pressure gauges

Pressure gauge housing of CrNiMo steel, nickel-plated connection, completely made of CrNiMo steel

### Specify when mounting on the control valve

Adjusted reference variable ... ; supply air ... bar

Operating direction: increasing-increasing/  
increasing-decreasing

Piping: galvanized steel/completely CrNiMo steel/  
tubing natural PE, DN 6/10

### Specify when attaching to valves with cast yokes

Travel ... mm

### Specify when attaching to valves with rod-type yokes

Travel ... mm

Rod diameter ... mm

When the positioner is delivered without a specific arrangement to a particular control valve, the mounting parts required are listed in Mounting and Operating Instructions EB 8359-1 EN (Type 4765 Pneumatic Positioner) or EB 8359-2 EN (Type 4763 Electropneumatic Positioner).

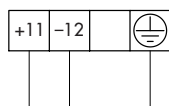
Optionally, special version

Wider temperature range

Special version with oxygen as operating medium

Specifications subject to change without notice.

## Electrical connection and dimensions in mm



Input control signal  
4(0) to 20 mA

