# DATA SHEET

**T 8310-3 EN**

**Pneumatic Actuator 1400-60 cm²**

**Type 3271**

## Application

Linear actuators particularly suitable for mounting on SAMSON Series 240, 250, 280, 290 and SMS Valves

| | |
|---|---|
| Actuator area | **1400-60 cm²** |
| Rated travel | **60 mm** |

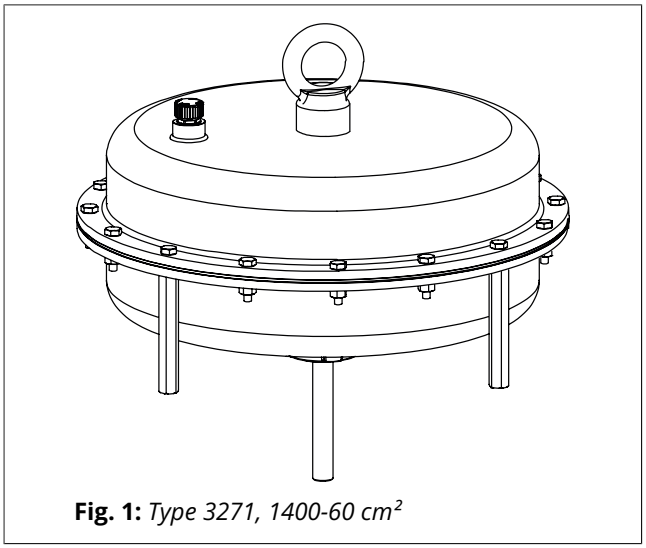

**Fig. 1:** *Type 3271, 1400-60 cm²*

## Special features

The Type 3271 Pneumatic Actuator is a diaphragm actuator with a rolling diaphragm and internal springs.

- Powerful thrust at high stroking speed
- Low friction
- Various bench ranges by varying the number of springs or changing the spring compression
- No special tools required to change the bench range or reverse the direction of action (including actuator with handwheel)
- Permissible operating temperatures from -50 to +120 °C
- Female thread on the top diaphragm case to attach an eyebolt or swivel hoist

A safety manual containing the safety-related data is optionally available for use in safety-instrumented systems (SIL requirements).

## Versions

- **Type 3271 · Pneumatic actuator, 1400-60 cm² actuator area**
- With (optional) **travel stop**, minimum or maximum travel mechanically adjustable
- v1 construction with **clamped-in diaphragm** (actuator area specified in cm², no extra identification)

## Further versions

- Versions for **other control media** (e.g. water) available on request
- **Type 3273 Side-mounted Handwheel** · See Data Sheet ▶ T 8312

## Design and principle of operation

The actuators mainly consist of two diaphragm cases, a rolling diaphragm with diaphragm plate and internal springs. Several springs may be fitted into one another.

The signal pressure $p_{st}$ creates the force $F = p_{st} \cdot A$ at the diaphragm surface A, which is opposed by the springs in the actuator. The bench range is determined by the number of actuator springs used and their compression, taking into account the rated travel. The travel H is proportional to the signal pressure $p_{st}$. The direction of action of the actuator stem depends on how the springs are installed in the actuator and the location of the signal pressure connection.

The v1 actuator construction has a clamped-in diaphragm.

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The diaphragm is clamped to the diaphragm plate using a hose clamp.

The stem connector clamps connect the actuator stem with the plug stem of the valve.

The travel of the version with an adjustable travel stop can be permanently limited by up to 50 % in both directions (actuator stem extends or retracts).

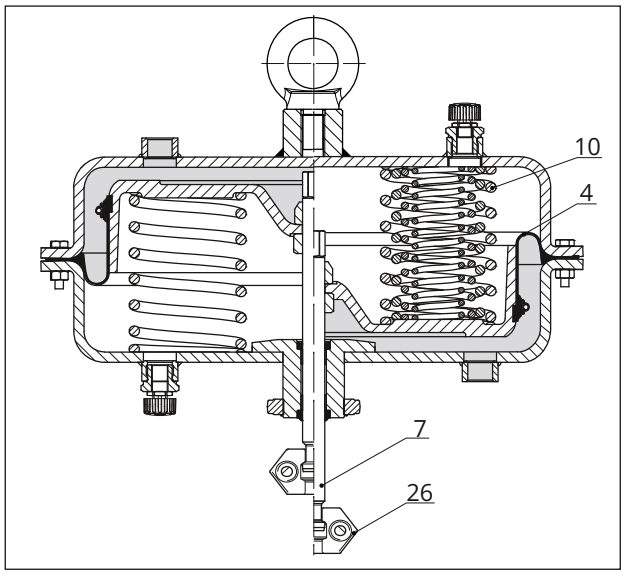


**Fig. 2:** *Type 3271, 1400-60 cm² · "Actuator stem retracts" direction of action (left) · Additional springs and "actuator stem extends" direction of action (right)*

| | | | |
|---|---|---|---|
| 4 | Diaphragm | 10 | Springs |
| 7 | Actuator stem | 26 | Stem connector |

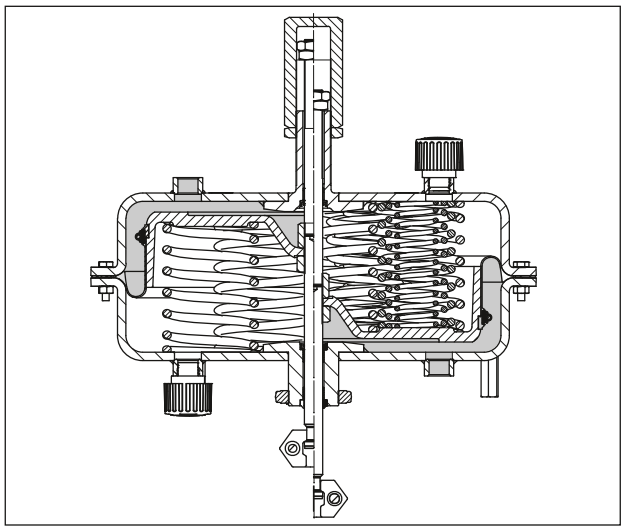

**Fig. 3:** *1400-60 cm² version with mechanical travel stops on both sides*

## Direction of action

Actuators are available with the following directions of action:

- **Actuator stem extends (FA):** The springs cause the actuator stem to move to the lower end position 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 when the diaphragm is relieved of pressure or when the supply air fails.

## Throttling or on/off service

The Type 3271 Pneumatic Actuators are designed for a maximum supply pressure of 6 bar when used for throttling service.

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

With "actuator stem extends" direction of action and travel stop, the supply pressure must not exceed the upper bench range value by more than 1.5 bar at the maximum.

With "actuator stem retracts" direction of action, the supply pressure must not exceed the upper bench range value by more than 3 bar at the maximum.

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

## Conformity

The actuator bears the EAC mark of conformity.

EAC

**Table 1:** *Technical data*

| **Actuator area in cm²** | | **1400-60** |
|---|---|---|
| Max. supply pressure | | 6 bar[1)] |
| Perm. ambient temperatures with diaphragm material | NBR | -35 to +90 °C[2)] |
| | EPDM | -50 to +120 °C[3)]<br>(with air free of oil and grease) |
| Degree of protection | | IP54[5)] |

1) Observe supply pressure restrictions.

2) In on/off service, lowest temperature restricted to -20 °C

3) In on/off service, lowest temperature restricted to -40 °C

5) The pneumatic actuators do not pose any risk in the sense of the protection requirements described in EN 60529. The IP rating depends on the connecting parts used on the pressurized side and the spring chamber side of the actuator. In this case, components (vent plugs as well as valves accessories, such as solenoid valves, positioners etc.) must be used that comply with the requirements. The maximum rating that can be achieved with the standard vent plug is IP54 (▶ AB 07). Depending on the IP rating of the valve accessories, a maximum rating of IP66 can be achieved for an actuator with air purging of the actuator spring chamber.

**Table 2:** *Materials*

| **Actuator area in cm²** | **1400-60** |
|---|---|
| Actuator stem | Stainless steel |
| Actuator stem sealing | NBR |
| | EPDM |
| Housing | Sheet steel, plastic-coated |
| Rolling diaphragm | NBR (nitrile butadiene rubber)<br>Butyl with fabric reinforcement |
| | EPDM with fabric reinforcement |

**Table 3:** *Versions*

| **Version** | **1400-60 cm²** |
|---|---|
| Mechanical travel stops on both sides | • |
| Throttling service | • |
| On/off service | • |

**Table 4:** *Bench range with "actuator stem extends" direction of action*

| **Actuator area in cm²** | **Travel volume at rated travel in dm³** | **Dead volume in dm³** | **Rated travel in mm** | **Max. travel in mm[1)2)]** | **Number of springs** | **Bench range in bar (signal pressure range at rated travel)** | **Spring force at 0 mm travel in kN[1)3)]** | **Spring force at rated travel in kN[3)]** | **Additional spring compression for rated travel in %** | **Operating range for preloaded springs in %** | **Operating range with spring compression in bar** | **Spring force at 0 mm operating travel in kN** | **Spring force at operating travel in kN** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1400 | 8.3 | 5.7 | 60 | 80 | 6 | 0.2...1.0 | 2.8 | 14 | 25 | 25 %...125 % (= 100 %) | 0.4...1.2 | 5.6 | 16.8 |
| | | | | | 12 | 0.4...2.0 | 5.6 | 28 | | | 0.8...2.4 | 11.2 | 33.6 |
| | | | | | 18 | 0.5...2.5 | 7 | 35 | | | 1.0...3.0 | 14 | 42 |
| | | | | | 18 | 1.1...2.4 | 15.4 | 33.6 | | | 1.4...2.7 | 19.6 | 37.8 |
| | | | | | 24 | 1.3...2.8 | 18.2 | 39.2 | | | 1.7...3.2 | 23.8 | 44.8 |

1) Based on lower bench range value. The zero travel is not taken into account.

2) Zero travel as listed in 'Dimensions' table depending on fail-safe action

3) The forces specified relate to the bench range.

**Table 5:** *Bench range with "actuator stem retracts" direction of action*

| Actuator area in cm² | Rated travel in mm | Max. travel in mm[1)2)] | Bench range in bar (signal pressure range at rated travel) | Thrust in kN[3)] at rated travel and supply pressure in bar of | | | | | Operating range in % at max. travel | Bench range in bar (signal pressure range at max. travel (125 %)) | Thrust in kN[3)] at max. travel (125 %) and supply pressure in bar of | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | | | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 |
| 1400 | 60 | 80[5)] | 0.2...1.0 | 14 | 28 | 42 | 56 | 70 | – | – | – | – | – | – | – |
| | | | 0.4...2.0 | – | 14 | 28 | 42 | 56 | | | – | – | – | – | – |
| | | | 0.5...2.5 | – | 7 | 21 | 35 | 49 | | | – | – | – | – | – |
| | | | 1.1...2.4 | – | 8.4 | 22.4 | 36.4 | 50.4 | | | – | – | – | – | – |
| | | | 1.3...2.8 | – | 2.8 | 16.8 | 30.8 | 44.8 | | | – | – | – | – | – |

1) Based on lower bench range value. The zero travel is not taken into account.

2) Zero travel as listed in 'Dimensions' table depending on fail-safe action

3) The forces specified relate to the bench range.

5) On request

**Table 6:** *Dimensions[1)] in mm · Type 3271*

| Actuator area in cm² | | 1400-60 |
|---|---|---|
| Height | H[2)] | 247 |
| | H' | 201 |
| | Ha | 19 |
| | $H4_{rated}FA$ | 165 |
| | $H4_{max}FA$ | 169 |
| | $H4_{max}FE$ | 185 |
| | H6 | 54 |
| | H7[3)] | 90 |
| Travel stop | $H8_{max}$ | 180 |
| Diameter | ØD | 530 |
| | ØD2 | 22 |
| Ød (thread) | | M60x1.5 |
| Connection (a optionally) | a | G ¾ |
| | | ¾ NPT |

1) The specified dimensions are theoretical maximum design values for a specific standard device configuration. They do not reflect every possible case of use. The actual values for individual devices may differ depending on the device configuration and the specific application.

2) H' and H are identical for versions on which the lifting eyelet is welded directly onto the housing. The value H' applies in this case.

3) Height of eyebolt according to DIN 580. Height of the swivel hoist may differ.

## Dimensional drawings

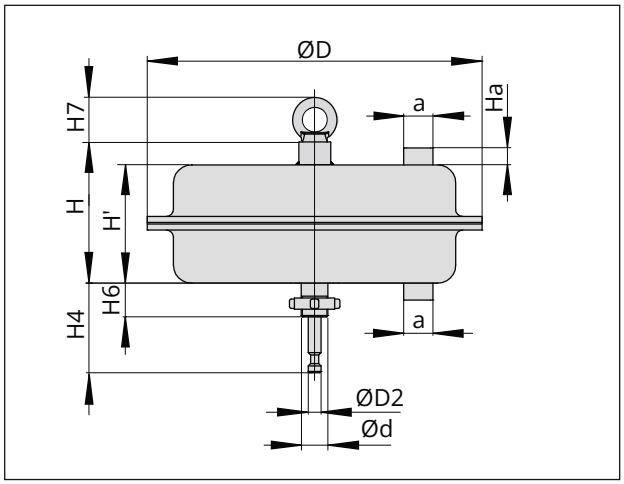


**Fig. 4:** *Type 3271 with 1400-60 cm² actuator area*

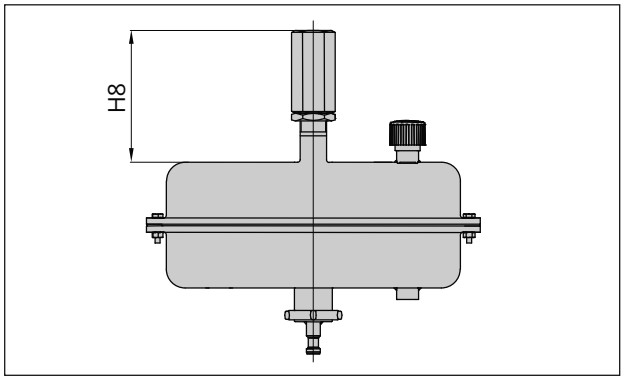


**Fig. 5:** *1400-60 cm² actuator area, with adjustable travel stop*

**Table 7:** *Weights[1] for Type 3271 Pneumatic Actuators*

| Type ... Actuator | Actuator area in cm² | | 1400-60 |
|---|---|---|---|
| 3271 | Without handwheel | kg | 70 |
| 3271 | With handwheel | kg | 175 |

1) The weights specified apply to a specific standard device configuration. Weights of other actuator configurations may differ depending on the version (material, number of actuator springs etc.).

## Accessories

### Swivel hoist

Large pneumatic actuators (with >355v2 cm² actuator area) have a female thread on the top diaphragm case to allow an eyebolt or swivel hoist to be screwed into it. The eyebolt can be used to vertically lift the actuator and is included in the scope of delivery. The swivel hoist is designed for setting a control valve assembly upright or for lifting the actuator without valve. The swivel hoist can be ordered (accessories).

| Actuator area in cm² | Material number | |
|---|---|---|
| | Eyebolt (DIN 580) | Swivel hoist |
| 1400-60 | 8325-0135 | 8442-1018 |

### Feedback connection (travel pick-off interface) according to DIN EN 60534-6-1

Various valve accessories according to DIN EN 60534-6-1 and NAMUR recommendation can be mounted on SAMSON control valves designed according to the modular principle (see associated valve documentation). The travel pick-off interface for these mounted devices is included in the scope of delivery of the following SAMSON actuators:

– Type 3271 with 1400-60 cm² actuator area

## List of documentation for Type 3271 and Type 3277 Pneumatic Actuators

| Device type | Actuator area in cm² | Data sheet | | Mounting and operating instructions |
|---|---|---|---|---|
| | | General product line | SAM001[1] product line | |
| Types 3271 and 3277 Pneumatic Actuators | 120 | ▶ T 8310-1/4/5/6 | ▶ T 8310-11/14/15/16 | ▶ EB 8310-1 |
| | 350 | | | ▶ EB 8310-6 |
| | 175v2 · 350v2 · 750v2 | | | ▶ EB 8310-5 |
| | 355v2 | | | ▶ EB 8310-4 |
| Type 3271 Pneumatic Actuator | 1000 · 1250v2 | ▶ T 8310-2/7 | ▶ T 8310-12 | ▶ EB 8310-2 |
| | 1400-120 · 2800 · 2x 2800 | | – | ▶ EB 8310-7 |
| | 1400-60 | ▶ T 8310-3 | ▶ T 8310-13 | ▶ EB 8310-3 |
| | 1400-250 | ▶ T 8310-8 | – | ▶ EB 8310-8 |

[1] The customer standard SAM001 indicates SAMSON devices that comply with the NAMUR Recommendation NE 53. After subscribing to ▶ NE53 newsletter, users of these devices automatically receive information on any hardware or software changes. Separate data sheets have been created for Type 3271 and Type 3277 Pneumatic Actuators that comply with the SAM001 standard.

**Information Sheet for control valves** ▶ T 8000-1

## Ordering text

| | |
|---|---|
| Type ... Actuator | 3271 |
| Actuator area | ... cm² |
| Travel | ... mm |
| Optional | Travel stop |
| Bench range | ... bar |
| Direction of action | Actuator stem extends (FA)<br>Actuator stem retracts (FE) |
| Signal pressure connection | G .../... NPT |
| Housing material | See Table 2 |
| Rolling diaphragm | NBR<br>EPDM |