DATA SHEET

T 8310-2/7 EN

Pneumatic Actuators 1000, 1400-120, 2800 and 2x 2800 cm²

Type 3271

Application

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

Actuator area	**1000 to 2800 cm²**
Rated travel	**Up to 160 mm**

Fig. 1: *Type 3271, 1000 cm²*

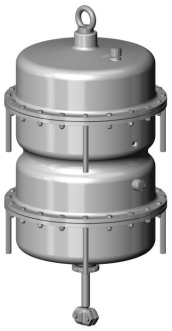

Fig. 3: *Type 3271 as tandem actuator, 2x 2800 cm²*

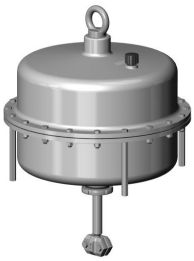

Fig. 2: *Type 3271, 2800 cm²*

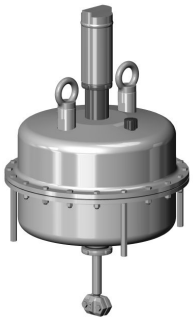

Fig. 4: *Type 3271, 2800 cm², with travel stop*

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) (including tandem actuator)
- Permissible operating temperatures from -60 to +90 °C
- Female thread on the top diaphragm case to attach an eyebolt or swivel hoist

Versions

- **Type 3271 · Pneumatic actuator, 1000, 1400-120 or 2800 cm² actuator area**
- **Type 3271 · Pneumatic tandem actuator, 2x 2800 cm² actuator area**
- With (optional) **travel stop**, minimum or maximum travel mechanically adjustable

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

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the actuator and the location of the signal pressure connection.

The v1 actuator construction has a clamped-in diaphragm.

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).

Actuators with 1400-120 cm² actuator area are fitted with an anti-rotation fixture.

The tandem actuator (2x 2800 cm²) contains two coupled diaphragms. They produce a positioning force that is twice as high as the force of a single actuator (2800 cm²).

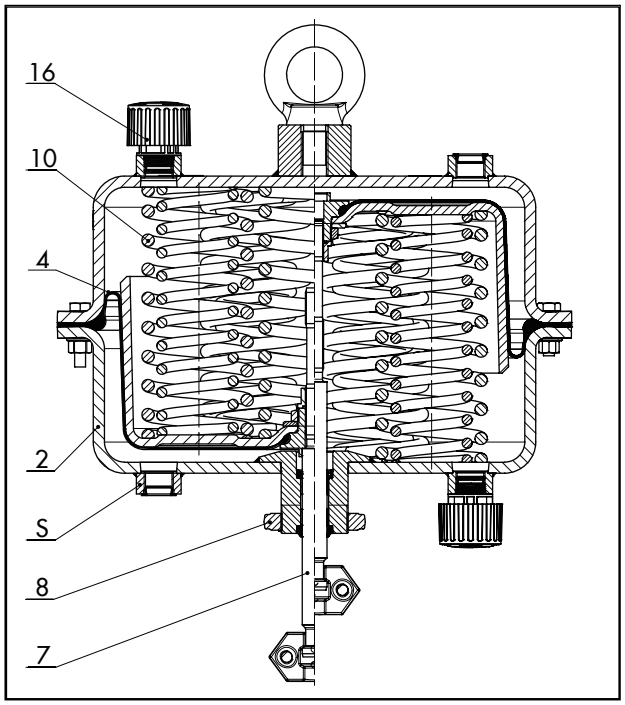

Fig. 5: *Type 3271 with 1000 cm² actuator area*

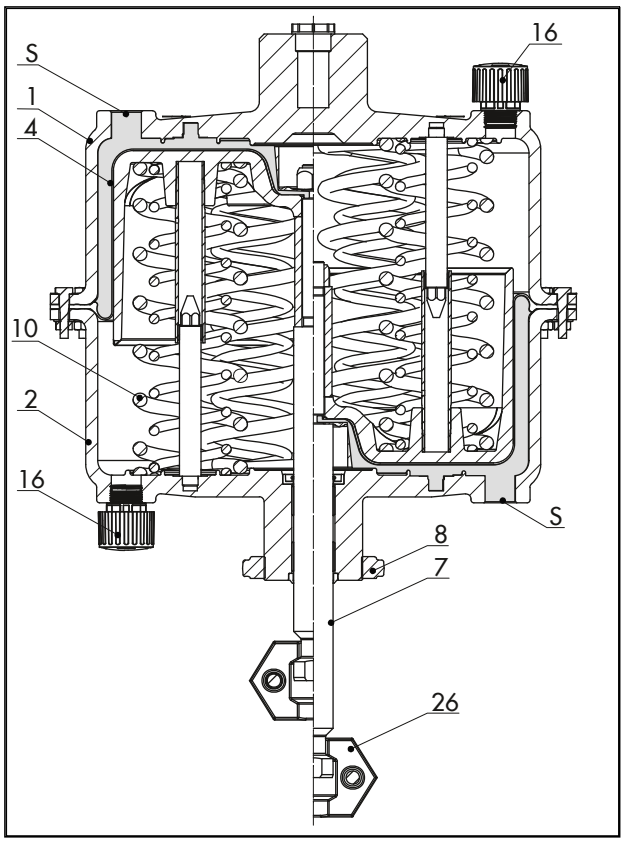

Fig. 6: *Type 3271, 1400-120 cm² with female thread on the top diaphragm case*

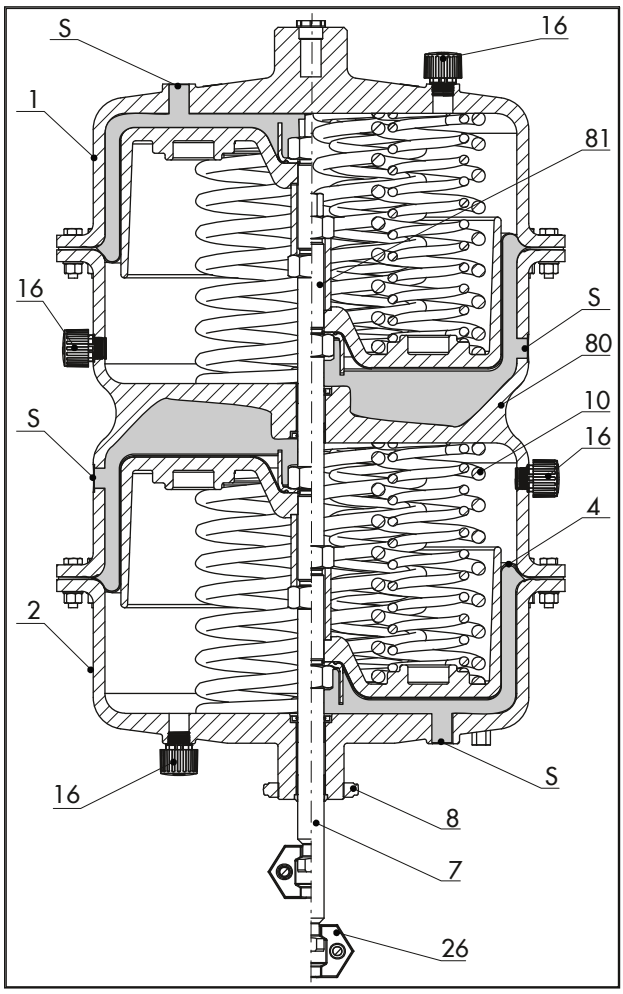

Fig. 7: *Tandem actuator with 2x 2800 cm² actuator area with female thread on the top diaphragm case*

Legend for Fig. 5 to Fig. 7	
1	Top diaphragm case
2	Bottom diaphragm case
4	Diaphragm
7	Actuator stem
8	Ring nut
10	Springs
16	Vent plug
26	Stem connector
80	Diaphragm case (tandem actuator)
81	Actuator stem (tandem actuator)
S	Signal pressure connection

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.

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.

Table 1: *Technical data*

Actuator area in cm²		1000	1400-120	2800	2x 2800
Max. supply pressure		6 bar[1]	6 bar[1]	6 bar[1]	6 bar[1]
Permissible ambient temperatures with diaphragm material	NBR	-35 to +90 °C[2][4]	-35 to +90 °C[2][4]	-35 to +90 °C[2][4]	-35 to +90 °C[2][4]
	PVMQ	-60 to +90 °C[4]	-60 to +90 °C[4]	-60 to +90 °C[4]	-60 to +90 °C[4]
Degree of protection		IP54[5]	IP54[5]	IP54[5]	IP54[5]

1) Observe supply pressure restrictions.

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

4) Install vent plug (▶ AB 07) for temperatures below -20 °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	1000	1400-120	2800	2x 2800
Actuator stem	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Actuator stem sealing	NBR	NBR	NBR	NBR
	EPDM	PVMQ	PVMQ	PVMQ
Housing and associated ambient temperatures	1.0982 S460 MC Sheet steel, painted ≥-60 °C	EN-GJS-400-18-LT[2] -20 to +90 °C[1]	EN-GJS-400-18-LT[2] -20 to +90 °C[1]	EN-GJS-400-18-LT[2] -20 to +90 °C[1]
	–	1.5638/A352 LC3 Painted cast steel ≥-60 °C	1.5638/A352 LC3 Painted cast steel ≥-60 °C	1.5638/A352 LC3 Painted cast steel ≥-60 °C

1) Lower temperatures on request

2) Not with diaphragm material PVMQ

Table 3: *Versions*

Version	1000 cm²	1400-120 cm²	2800 cm²	2x 2800 cm²
Mechanical travel stops on both sides	•	•	•	•
Additional handwheel, 50 kN	•	–	–	–
Additional handwheel, 80 kN	•	•[1]	•[1] (max. 3 bar)	–
Additional handwheel, 150 kN	–	•	•	•
Throttling service	•	•	•	•
On/off service	•	•	•	•

1) Max. 60 mm

Table 4: *Bench ranges*

Actuator area in cm²	Rated travel in mm	Travel volume at rated travel in dm³	Dead volume in dm³	Max. travel in mm[12]	Bench range in bar (signal pressure range at rated travel)	Add. possible spring compression in %	Operating range with spring compression in bar	Number of springs	Spring force at 0 mm travel in kN[1][3]	Spring force at rated travel in kN[3]	Thrust in kN[3] at rated travel and supply pressure in bar of 1.4	2.0	3.0	4.0	5.0	6.0
1000	60	6.4	6.1	80	0.4 to 2.0	25	0.8 to 2.4	6	4	20	–	–	10	20	30	–
					0.6 to 3.0		1.2 to 3.6	9	6	30	–	–	–	10	20	30
					0.8 to 2.8		1.3 to 3.3	9	8	28	–	–	2	12	22	–
					1.0 to 3.2[6]		1.5 to 3.7	10	10	32	–	–	–	8	18	28
					1.5 to 4.2[6]		2.1 to 4.8	13	15	42	–	–	–	–	8	18

Actuator area in cm²	Rated travel in mm	Travel volume at rated travel in dm³	Dead volume in dm³	Max. travel in mm[1)2)]	Bench range in bar (signal pressure range at rated travel)	Add. possible spring compression in %	Operating range with spring compression in bar	Number of springs	Spring force at 0 mm travel in kN[1)3)]	Spring force at rated travel in kN[3)]	Thrust in kN[3)] at rated travel and supply pressure in bar of					
											1.4	2.0	3.0	4.0	5.0	6.0
1400	120	16.6	4.7	130	0.4 to 1.2	0[4)]	–	3	5.6	16.8	2.8	11.2	25.2	39.2	53.2	67.2
					0.8 to 2.4		–	6	11.2	33.6	–	–	8.4	22.4	36.4	50.4
					1.0 to 3.0		–	9	14	42	–	–	–	14	28	42
					1.2 to 3.6		–	12	16.8	50.4	–	–	–	5.6	19.6	33.6
2800	120	33	16.5	160	0.2 to 1.0	25	0.4 to 1.2	3	5.6	28	11.2	28	56	84	112	140
					0.4 to 2.0		0.8 to 2.4	6	11.2	56	–	–	28	56	84	112
					0.5 to 2.5		1.0 to 3.0	9	14	70	–	–	14	42	70	98
					0.6 to 3.0		1.2 to 3.6	12	16.8	84	–	–	–	28	56	84
					0.8 to 1.7	25	1.0 to 1.9	6	22.4	47.6	–	8.4	36.4	64.4	92.4	120.4
					0.9 to 2.2		1.2 to 2.5	9	25.2	61.6	–	–	22.4	50.4	78.4	106.4
					1.0 to 2.7		1.4 to 3.1	12	28.0	75.6	–	–	8.4	36.4	64.4	92.4
					1.1 to 2.3	25	1.4 to 2.6	6	30.8	64.4	–	–	19.6	47.6	75.6	104
					1.2 to 2.8		1.6 to 3.2	9	33.6	78.4	–	–	5.6	33.6	61.6	89.6
					1.3 to 3.3		1.8 to 3.8	12	36.4	92.4	–	–	–	19.6	47.6	75.6
2x 2800	120	66	33	160	0.2 to 1.0	25	0.4 to 1.2	6	11.2	56	22.4	56	112	168	224	280
					0.4 to 2.0		0.8 to 2.4	12	22.4	112	–	–	56	112	168	224
					0.5 to 2.5		1.0 to 3.0	18	28	140	–	–	28	84	140	196
					0.6 to 3.0		1.2 to 3.6	24	33.6	168	–	–	–	56	112	168
					0.8 to 1.7	25	1.0 to 1.9	12	44.8	95.2	–	16.8	74.8	128.8	184.8	240.8
					0.9 to 2.2		1.2 to 2.5	18	50.4	123.2	–	–	44.8	100.8	156.8	212.8
					1.0 to 2.7		1.4 to 3.1	24	56.0	151.2	–	–	16.8	72.8	128.8	184.8
					1.1 to 2.3	25	1.4 to 2.6	12	61.6	128.8	–	–	39.2	95.2	151.2	208
					1.2 to 2.8		1.6 to 3.2	18	67.2	156.8	–	–	11.2	67.2	123.2	179.2
					1.3 to 3.3		1.8 to 3.8	24	72.8	184.8	–	–	–	39.2	95.2	151.2

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.

4) Preloaded springs

6) Not available with “actuator stem retracts” direction of action

Table 5: *Dimensions[1)] in mm · Type 3271*

Actuator area in cm²		1000	1400-120	2800	2x 2800
Height	H[2)]	313	–	–	–
	H'	267	470	585	1085
	Ha	19	–	–	–
	$H4_{rated}FA$	165	285	315	315
	$H4_{max}FA$	169	288	325	325
	$H4_{max}FE$	185	315	355	355
	H6	54	85	85	85
	H7[3)]	90	128	128	128
Travel stop	$H8_{max}$	220	500	500	500
Diameter	ØD	462	534	770	770
	ØD2	22	40	40	40
Ød (thread)		M60x1.5	M100x2	M100x2	M100x2
Connection (a optionally)	a	G ¾	G 1	G 1	G 1
		¾ NPT	1 NPT	1 NPT	1 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

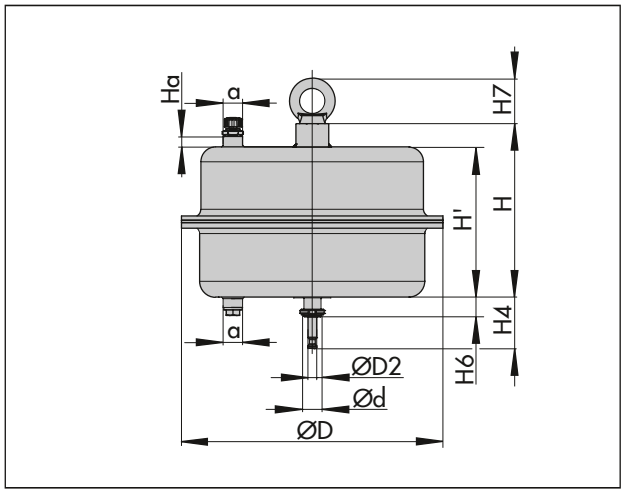

Fig. 8: *Type 3271 with 1000 cm² actuator area*

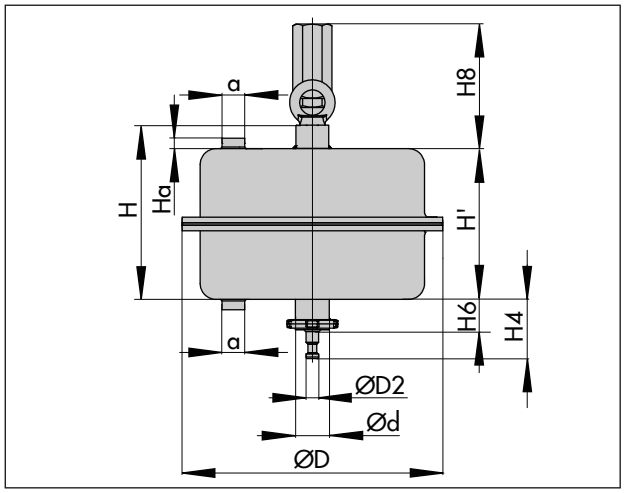

Fig. 9: *1000 cm² actuator area, with adjustable travel stop*

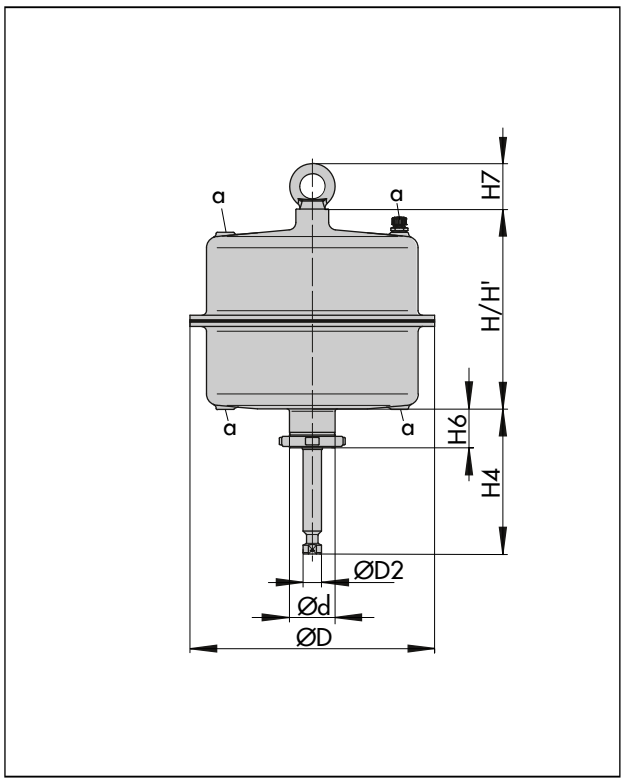

Fig. 10: *Type 3271 with 1400-120 cm² actuator area*

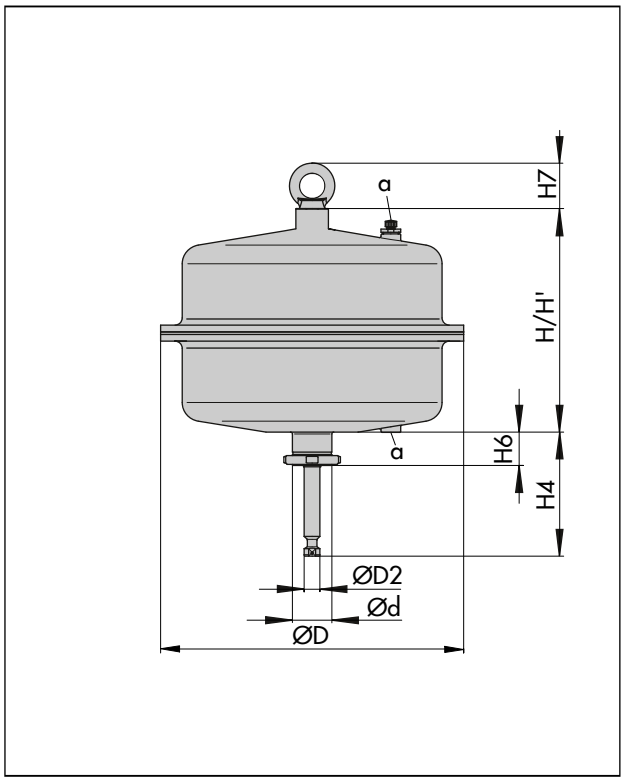

Fig. 11: *Type 3271 with 2800 cm² actuator area*

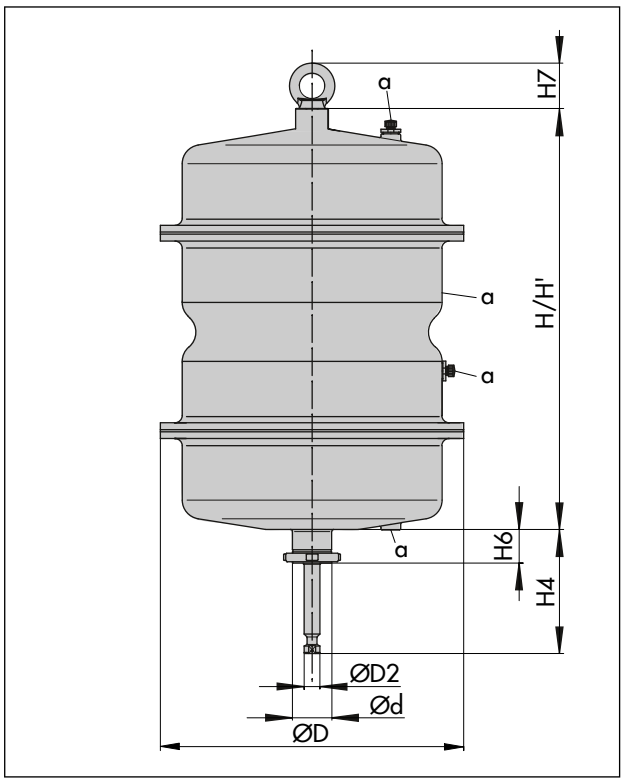

Fig. 12: *Type 3271 as tandem actuator*

Table 6: *Actuator weights[1] in kg*

Type ... Actuator	Actuator area in cm²		1000	1400-120	2800	2x 2800
3271	Without handwheel	kg	80	175	450	950
3271	With handwheel	kg	180	300[2]/ 425[3]	575[2]/ 700[3]	On request

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.).

2) Side-mounted handwheel up to 80 mm travel

3) Side-mounted handwheel with travel higher than 80 mm travel

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
1400-120 2800 2x 2800	8325-1101	8442-1019
1000	8322-0135	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 1000 cm² actuator area
- Type 3271 with 1400-120 cm² actuator area
- Type 3271 with 2800 cm² actuator area
- Type 3271 with 2x 2800 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
	Tandem actuator
Bench range	… bar
Direction of action	Actuator stem extends (FA)
	Actuator stem retracts (FE)
Signal pressure connection	G …/… NPT
Housing material	See Table 2
Rolling diaphragm	NBR
	PVMQ

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