

Application

Hand-operated actuator for attachment to valves, especially for Series 240, 250 and 260 Control Valves.

Rated travels of 15 and 30 mm · Nominal thrusts up to 32 kN

The Type 3273 Hand-operated Actuator is a spindle actuator equipped with a non-rising handwheel.

Special features

- Low overall height
- Simple connection to the control valve
- Manual forces specified in DIN 3230, Part 2
- Locking mechanism securing the valve stem position against accidental adjustment
- Replaceable with a pneumatic or electric actuator

Versions

Type 3273-1 · Handwheel diameter of 180 mm and a maximum nominal thrust of 18 kN

Type 3273-2 · Handwheel diameter of 250 mm and a maximum nominal thrust of 32 kN

Actuators for valves with travels > 30 mm and/or required nominal thrusts > 30 kN upon request

Combination options:

Series 240 Valves, nominal sizes DN 15 to DN 150 (max. travel 30 mm), see Table 3a.

Series 250 Valves, nominal sizes DN 15 to 100 (DN 100 to 200 with maximum travel of 30 mm), see Table 3b.

Series 260 Valves, DN 80 to 150, see Table 3c.

Principle of operation

The hand-operated actuator is connected to the yoke using the supplied nut (5). The coupling element (6) connects the threaded spindle (1) to the plug stem of the valve. The locking mechanism (4) locks the handwheel (3) and protects the valve stem position against accidental adjustment. Adjustment of the valve is only possible after releasing the locking mechanism (4).

Ordering text

Type 3273-1 or 3273-2 Hand-operated Actuator

For Type... Control Valve DN... PN...

Seat bore ...mm, Δp ...bar



Fig. 1 · Type 3273 Hand-operated Actuator attached to Type 3241 Valve

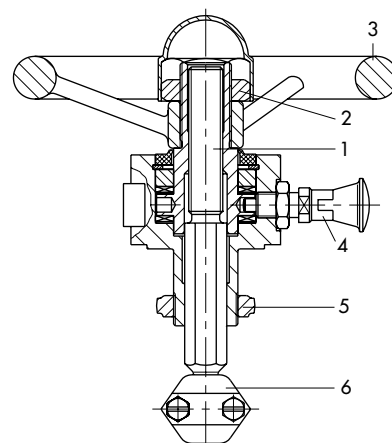


Fig. 2 · Type 3273 Actuator, sectional view

- | | |
|--------------------|---------------------|
| 1 Threaded spindle | 4 Locking mechanism |
| 2 Threaded nut | 5 Nut |
| 3 Handwheel | 6 Coupling element |

Table 1 · Technical data

Type		3273-1	3273-2
Rated travel	mm	15/30	
Maximum travel	mm	23/38	
Maximum thrust	kN	18	32
Req. manual force	N	230	300
Max. temperature	°C	100	

Table 2 · Materials

Spindle and threaded nut	Stainless steel 1.4104 or 1.4006
Body	Sheet steel St 37-2, powder coated
Handwheel	Aluminum

Table 3 · Hand-operated actuator and valve allocation
Table 3a · Series 240

Valve seat \varnothing in mm	Δp in bar		
	40	30	20
	Actuator		
≤ 12	On request		
24	3273-1		
31	3273-1		
38	3273-1		
48	3273-1		
63	3273-1		
80	3273-2	3273-1	
100	–	3273-2	
110	–	3273-2	
130	–	–	3273-2

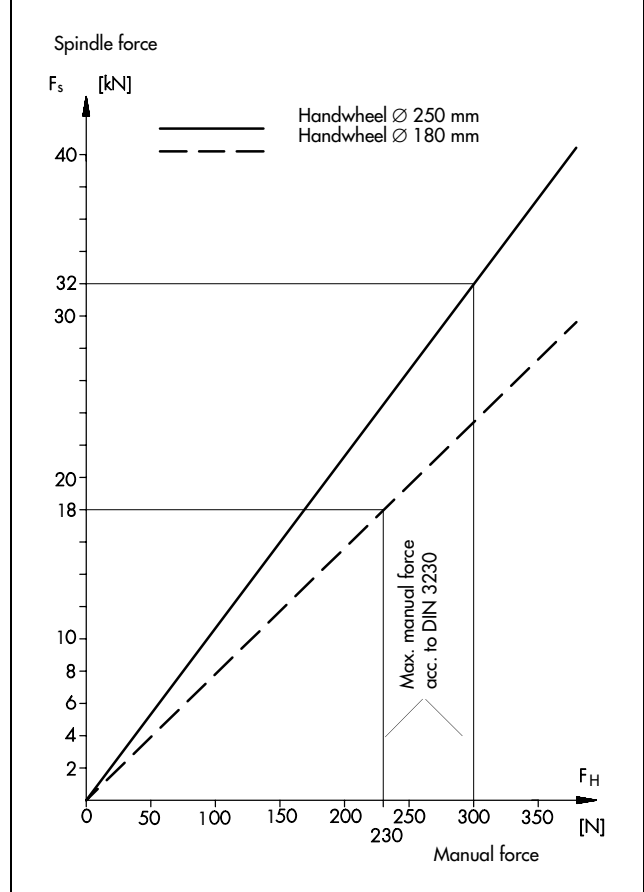
Table 3b · Series 250

Valve seat \varnothing in mm	Δp in bar			
	160	100	63	40
	Actuator			
≤ 12	On request			
24	3273-1			
31	3273-1			
38	3273-2	3273-1		
50	–	3273-2	3273-1	
63	–	–	3273-2	
80	–	–	–	3273-2
100	–	–	–	3273-2

Table 3c · Series 260

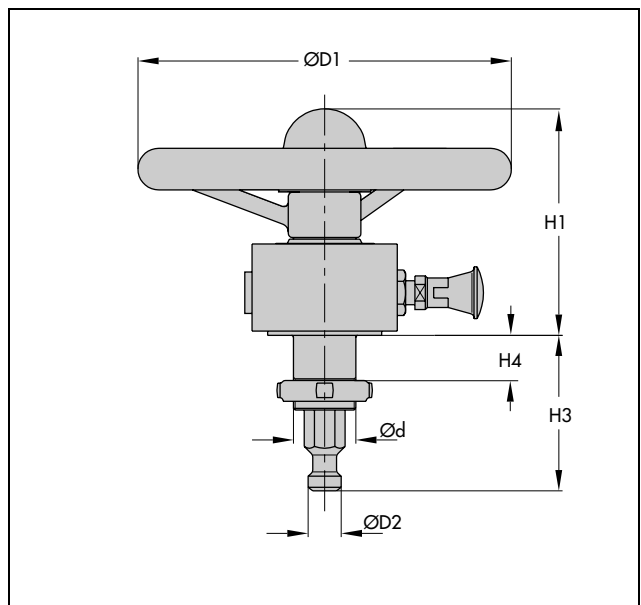
Valve seat \varnothing in mm	$\Delta p = 6$ bar
	Actuator
15...65	3273-1
80	3273-1
100	3273-1
125	3273-1
150	3273-1

Spindle force versus manual force diagram



Dimensions in mm and weights

Type	H1	H3 (valve closed) Rated travel		H4	$\varnothing D1$	$\varnothing D2$	$\varnothing d$	Weight appr. kg
		15 mm	30 mm					
3273-1	130	75	90	22	180	16	M30x1.5	2
3273-2	135	75	90	22	250	16	M30x1.5	2.5



Specifications subject to change without notice.



Pneumatic Actuators up to 700 cm²



Type 3271 and Type 3277 for integral positioner attachment

Application

Linear actuators in particular for attachment to Series 240, 250, 280 Control Valves and Type 3510 Micro-flow Valves

Diaphragm area 60 to 700 cm²

Rated travel 7.5 to 30 mm

The Types 3271 and 3277 Pneumatic Actuators contain 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 or their compression
- No special tools required to change the bench range and to reverse the actuator action (also version with handwheel)
- Permissible operating temperatures from -50 to +120 °C
- Direct attachment of accessories on additional yoke for Type 3277 with concealed travel pick-off (Figs. 2, 3 and 6)

Pneumatic actuator versions

- **Type 3271** · Diaphragm areas 80, 240, 350, 700 cm² (Fig. 1), optional stainless steel version (made of 1.4301 for 240, 350 and 700 cm²)
- **Type 3277** · Diaphragm areas 240, 350, 355, 700 cm² for direct attachment of accessories (Figs. 2, 3), optional stainless steel version (made of 1.4301 for 240, 350, 700 cm²)
- **Type 3271-52** · Diaphragm area 60 cm², aluminum housing, especially for Type 3510 Micro-flow Valve (Fig. 4 and Data Sheet T 8091 EN)
- **Type 3271-5** · Diaphragm area 120 cm², die-cast aluminum housing (Fig. 5), optionally with additional handwheel (Fig. 13a)
- **Type 3277-5** · Diaphragm area 120 cm², die-cast aluminum housing for direct attachment of accessories (Fig. 10), optionally with additional handwheel (Figs. 6 and 13b)
- **Types 3271 or 3277** · **Additional handwheel** with diaphragm areas of 240, 350 or 700 cm² (Fig. 7, 12 and Data Sheet T 8312 EN)
- **Type 3271** · **Mechanical travel stop** (Fig. 14), min. or max. travel mechanically adjustable in versions with 120, 240, 350 or 700 cm²
- **Type 3271/7** · **Fire-Lock version** (Fig. 15) fail-safe action in case of fire, in versions with 240, 350, 700 cm²

Further versions

- Versions for other control media (e.g. water) · Details available on request



Fig. 1 · Type 3271



Fig. 2 · Type 3277



Fig. 3 · Type 3277, 355 cm²



Fig. 4 · Type 3271-52

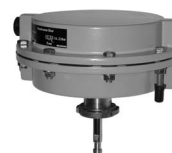


Fig. 5 · Type 3271-5

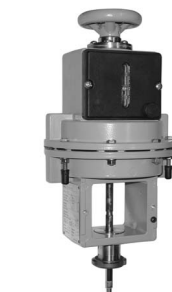


Fig. 6 · Type 3277-5 with additional handwheel



Fig. 7 · Type 3271 with additional handwheel

Principle of operation

The signal pressure p_{st} generates a force $F = p_{st} \times A$ 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 of the valve.

The adjustable **mechanical travel stop** (Fig. 14) is suitable for actuators made of sheet steel with effective diaphragm areas of 120, 240, 350 or 700 cm². Using the travel stop, the actuator travel can be limited by up to 50 % in both directions (actuator stem extends or retracts) and permanently adjusted.

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.

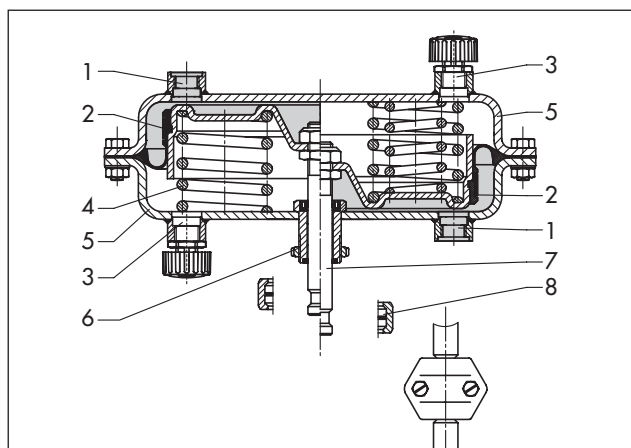


Fig. 8 · Type 3271 (right: with additional springs)

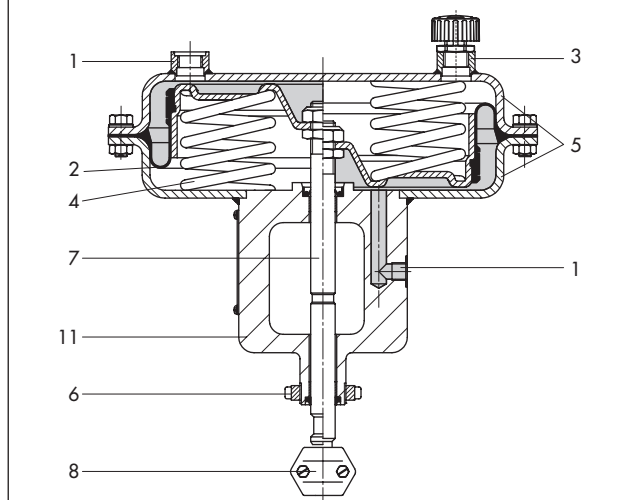


Fig. 9 · Type 3277 for direct attachment of accessories

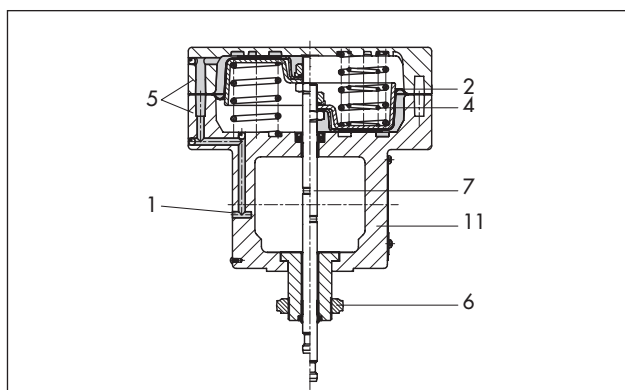


Fig. 10 · Type 3277-5 for direct attachment of accessories

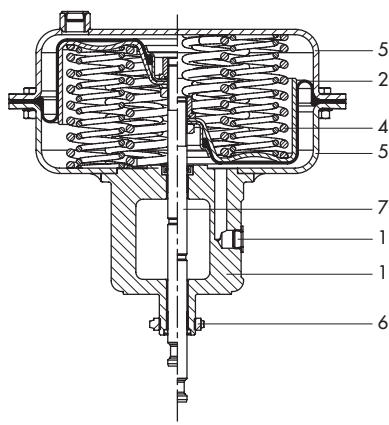


Fig. 11 · Type 3277, version with 355 cm² actuator area

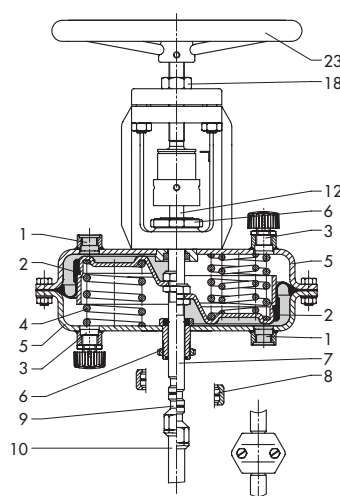


Fig. 12 · Type 3271 with additional handwheel

Legend (Figs. 8 to 15)

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

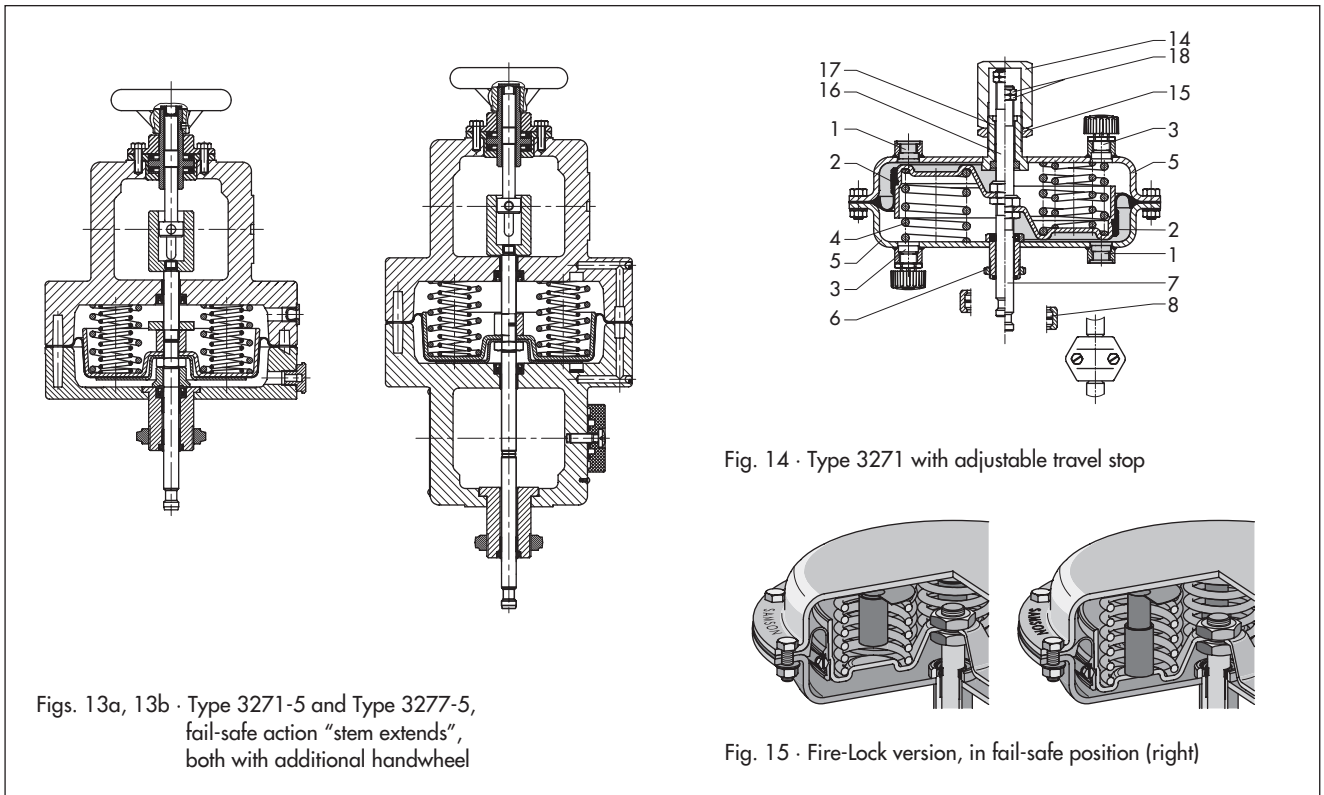


Table 1a · Technical data for Type 3271 Pneumatic Actuator

Version	Type 3271	Type 3271 Stainless steel	Type 3277	Type 3277 Stainless steel	Type 3271-52 f. micro-flow valve	Type 3271-5 Type 3277-5
Diaphragm area	cm ²	80* · 240 · 350 · 700	240 · 350 · 355* · 700		60	120
Max. supply pressure		6 bar · See restrictions in on/off service on page 6				
Permissible operating temperatures		-35 to 90 °C ¹⁾ made of standard material NBR			-35 to 80 °C ¹⁾	-35 to 90 °C ¹⁾
		-50 to 120 °C ²⁾ made of special material EPDM, for air free of oil and grease and actuator versions with 240, 350 and 700 cm ²				
		Up to 80 °C in Fire-Lock version (for 240, 350 and 700 cm ²)				
Materials						
Rolling diaphragm	NBR (nitrile rubber) with fabric reinforcement				NBR with fabric reinforcement	
	EPDM with fabric reinforcement (not for 355 cm ²)					
Actuator stem	CrNiMo steel				1.4305/1.4571	1.4305
Actuator stem sealing	NBR				NBR	NBR
	EPDM					
Diaphragm cases	Sheet steel, powder-varnish coated	Stainless steel 1.4301 (not for 80 and 355 cm ²)	Sheet steel, powder-varnish coated	Stainless steel 1.4301 (not for 355 cm ²)	Aluminum, powder-varnish coated	Die-cast aluminum, powder-varnish coated

* Versions with 80 and 355 cm² only in sheet steel, not corrosion-resistant

¹⁾ Lower temperature limited to -20 °C in on/off service

²⁾ Lower temperature limited to -40 °C in on/off service

Table 1b · Technical data for additional handwheel

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

Table 2 · Bench ranges for pneumatic actuators up to 700 cm²

Effective diaphragm area [cm ²]	Rated travel [mm]	Travel volume at rated travel [dm ³]	Dead volume [dm ³]	Max. travel [mm] ^{1) 2)}	Bench range [bar] (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] ¹⁾	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	0.05	0.06	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 ³⁾		-	4	0.84	1.38	-	-	1.02	1.62	2.22	
					2.1...3.3 ³⁾		-	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 ³⁾		-	6	2.04	2.52	-	-	1.08	2.28	3.48	4.68
					2.4...3.0 ³⁾		-	12	2.88	3.6	-	-	1.2	2.4	3.6	
120	15	0.2	0.10	17	0.2...1.0	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	1.4...2.3 ³⁾		-	6	1.68	2.76	-	0.84	2.04	3.24	4.44	
					2.1...3.3 ³⁾		-	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	0.2...1.0	25	0.4...1.2	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	
				15	0.6...3.0		12	2.1	10.5	-	-	3.5	7	10.5		
					1.4...2.3 ³⁾		6	4.9	8.05	-	-	2.45	5.95	9.45	13	
355	30	1.06	0.8	38	0.2...1.0	25	0.4...1.2	3	0.7	3.55	1.4	3.55	7.1	10.6	14.2	17.7
					0.4...2.0		6	1.4	7.1	-	-	3.55	7.1	10.6	14.2	
					0.6...3.0		12	2.1	10.6	-	-	-	3.55	7.1	10.6	
					0.9...1.7		4	3.2	6.0	-	1.1	4.6	8.2	11.7	15.3	
					1.4...2.6		8	5.0	9.2	-	-	1.4	5.0	8.5	12.1	
					1.9...3.3		10	6.5	11.7	-	-	-	2.5	6.0	9.6	
					2.25...3.65		10	6.5	11.7	-	-	-	2.5	6.0	9.6	
700	30	2.1	2.4	38	0.2...1.0	25	0.4...1.2	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	1.4...2.3 ³⁾		8	9.8	16.1	-	-	4.9	11.9	18.9	25.9	
					2.1...3.3 ³⁾		12	14.7	23.1	-	-	-	4.9	11.9	18.9	
					2.35...3.8 ^{3) 4)}		15	16.5	26.6	-	-	-	1.4	8.4	15.4	
2.6...4.3 ^{3) 4)}	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

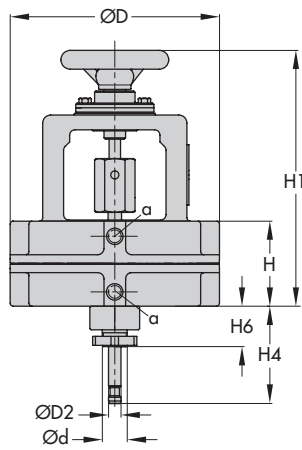


Fig. 16 · Type 3271-5 with additional handwheel

Fig. 17a · Type 3277-5 with 7.5 mm travel for Type 3510 Micro-flow Valve

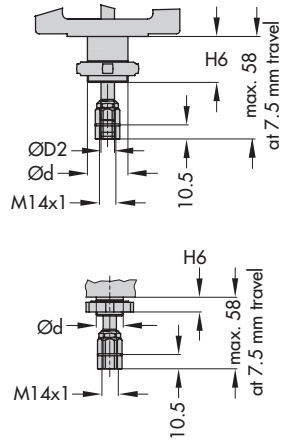


Fig. 17 · Type 3277-5 with additional handwheel

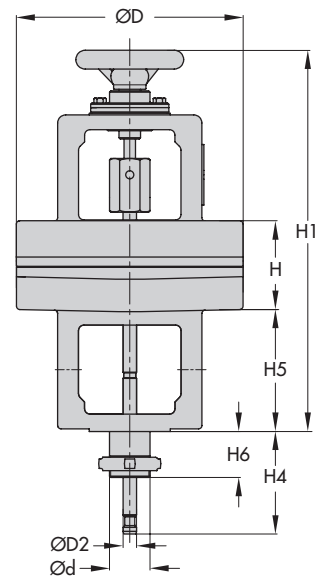


Fig. 17a · Types 3271-5 with 7.5 mm travel for Type 3510 Micro-flow Valve

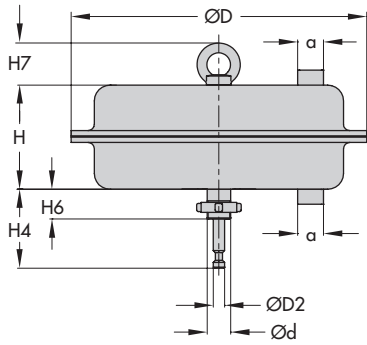


Fig. 18 · Type 3271 (700 cm² version with lifting ring)

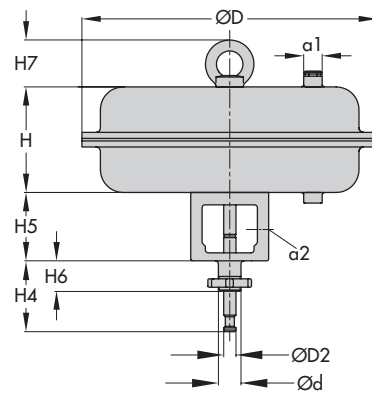


Fig. 19 · Type 3277 (700 cm² version with lifting ring)

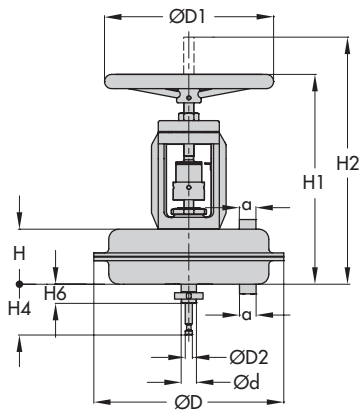


Fig. 20 · Type 3271 with additional handwheel

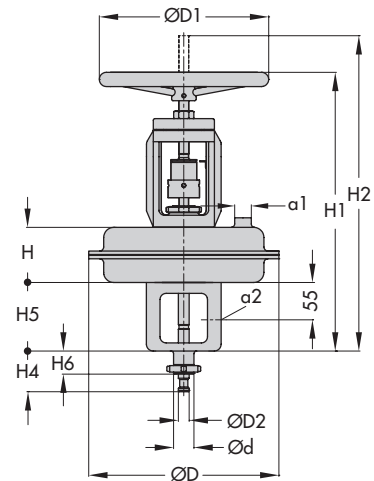


Fig. 21 · Type 3277 with additional handwheel

Table 3 · Dimensions and weights

Actuator	Type	3271			3271			3277	3277				
		Version	-52		-5			-5					
Refer to Fig.		16	18	16	18/20	18/20	18/20	17	19/21	19/21	19/21	19/21	
Effective area	cm ²	60	80	120	240	350	700	120	240	350	355	700	
Height	H	63	62	69	62	82	134	70	65	82	121	135	
	H1	-		205	300	320	490	293	400	420	-	590	
	H2 _{max}	-			345	365	540	-	445	465	-	640	
	H4 _{rated} FA	51	75	75	75	75	90	75	75	75	90	90	
	H4 _{max} FA	52.5	78	78	78	78	95	78	78	78	93	95	
	H4 _{max} FE	52.5	78	78	78	85	104	78	78	85	96	104	
	H5	-							88	101	101	101	101
	H6	23.8	34	34	34	34	34	34					
Travel stop	H7	-					65	-				65	
	H8 ²⁾	-		75	75	85	115	75	75	85	-	115	
Diameter	∅ D	120	150	168	240	280	390	168	240	280	280	390	
	∅ D1	-		80	180	250	400	80	180	250	-	400	
	∅ D2	10				16		10	16				
∅ d (thread)	M20x1.5	M30 x 1.5 ¹⁾					M30 x 1.5 ¹⁾						
Connection (a optionally)	a	G 1/8	G 1/4	G 1/8	G 1/4	G 3/8		G 1/8	G 1/4	G 3/8			
		1/8 NPT	1/4 NPT	1/8 NPT	1/4 NPT	1/4 NPT							
	a2	-							-	G 3/8			
Weight in kg													
Without handwheel		1.3	2	2.5	5	8	22	3.2	9	12	19	26	
With handwheel		-		4	9	13	27	4.5	13	17	-	31	

1) 120 cm² effective area with connection for Type 3510 Micro-flow Valve with M20 x 1.5

2) Travel stop on both sides (Fig. 22)

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 restricted.

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.

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 at the maximum.

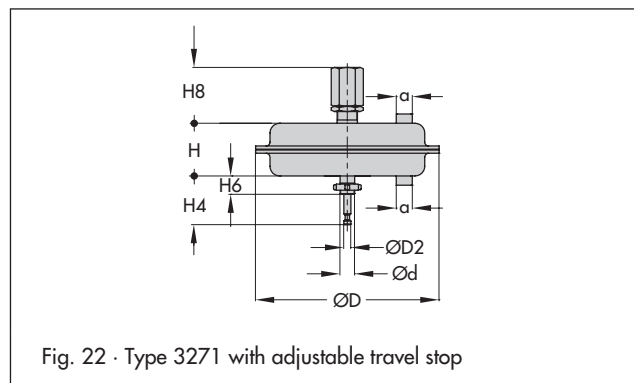


Fig. 22 · Type 3271 with adjustable travel stop

Ordering text

Actuator	Type 3271 or Type 3277 for direct attachment of accessories
Optional	Handwheel Travel stop Fire-Lock version
Diaphragm area	... cm ²
Travel	... mm
Bench range	... bar
Fail-safe action	Actuator stem extends (FA) or Actuator stem retracts (FE)
Signal pressure connection	G ... / ... NPT
Rolling diaphragm	NBR/EPDM

Specifications subject to change without notice.



Type 3271

Hand-operated Actuator Type 3273

Application

Linear actuator in particular for attachment to Series 240, 250, and 280 Control Valves

Diaphragm area 1000 to 2800 cm²

Travel Up to 160 mm

The Type 3271 Pneumatic Actuator contains a rolling diaphragm and internal springs.

Special features

- Powerful thrust at high response speed
- Low friction
- Various bench ranges by varying the number of springs or their compression
- No special tools required to change the bench range and to reverse the actuator action (also for tandem actuator and version with handwheel)
- Permissible operating temperatures from -50 to +120 °C
- Type 3273 Hand-operated Actuator for travels up to 160 mm

Versions

- **Type 3271 · Pneumatic actuator** (Figs. 1 and 2), effective diaphragm areas of 1000, 1400 and 2800 cm²
- **Type 3271 · Pneumatic tandem actuator** (Fig. 3), effective diaphragm area of 2 x 2800 cm²
- **Type 3271 · Pneumatic actuator with Type 3273 Hand-operated Actuator**, for travels up to 160 mm using side-mounted handwheel (Figs. 12 and 13), effective diaphragm areas of 1000, 1400 or 2800 cm²
- **Type 3271 · Actuator with travel stop** (Fig. 10), minimum or maximum travel mechanically adjustable for 1400 cm² actuators with 60 mm travel and 2800 cm² actuators as well as 2 x 2800 cm² tandem actuators

Further versions

- Versions for other control media (e.g. water)
- **Type 3273 · Hand-operated Actuator** without pneumatic actuator, operated using side-mounted handwheel for travels up to 80 mm · On request



Fig. 1 · Type 3271
(1000 cm²)



Fig. 2 · Type 3271
(1400-120)



Fig. 3 · Type 3271 Tandem Actuator
with 2 x 2800 cm²

Principle of operation

The signal pressure p_{st} generates a force $F = p_{st} \times A$ 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.

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

Fig. 12 shows the side-mounted **Type 3273 Hand-operated Actuator** for actuators with effective diaphragm areas of 1000 and 2800 cm² and a maximum **travel of up to 80 mm**. The handwheel (23) is fixed to the worm-gear shaft (20) and moves the actuator stem over the worm-gear wheel (21) and the threaded bushing (22).

A side-mounted handwheel as illustrated in Fig. 13 is available for valves with **120 mm travel**.

The adjustable **mechanical travel stop** (Fig. 10) is suitable for actuator versions 1400-60, 1400-120 as well as 2800 cm² actuators and tandem actuators. The actuator travel can be limited by up to 50 % in both directions (actuator stem extends or retracts) and permanently adjusted.

The tandem actuator (Fig. 6) contains two coupled diaphragms; they produce a positioning force that is twice as high as the force of a single actuator.

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.

Legend

- | | |
|------------------------------|---------------------|
| 1 Signal pressure connection | 20 Worm-gear shaft |
| 2 Diaphragm | 21 Worm-gear wheel |
| 3 Vent | 22 Threaded bushing |
| 4 Springs | 23 Handwheel |
| 5 Diaphragm cases | |
| 6 Annular nut | |
| 7 Actuator stem | |
| 8 Stem connector | |

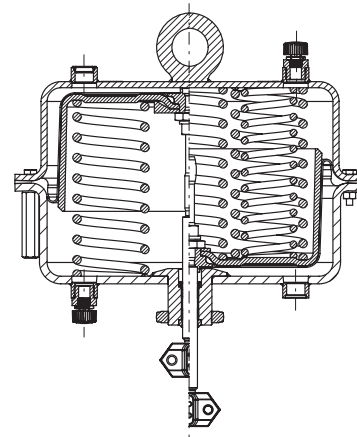


Fig. 4 · Sectional drawing of Type 3271 Actuator with 1000 cm²

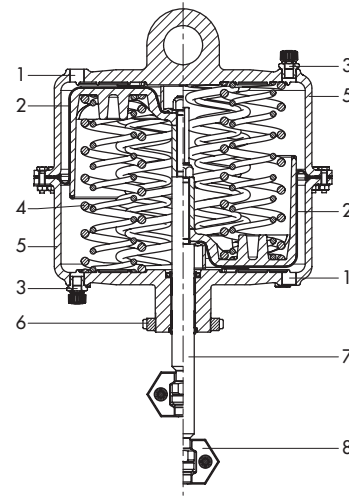


Fig. 5 · Type 3271, version 1400-120

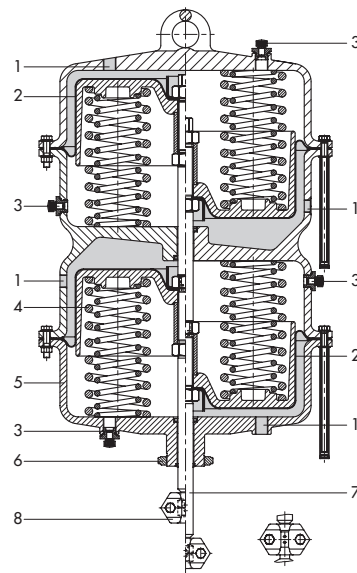


Fig. 6 · Tandem actuator with 2 x 2800 cm²

Throttling or on/off service

In throttling service, the Types 3271 Pneumatic Actuator can be used for supply pressures up to max. 6 bar.

In on/off service and for 1000 cm² effective diaphragm area used in throttling 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.

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 at the maximum.

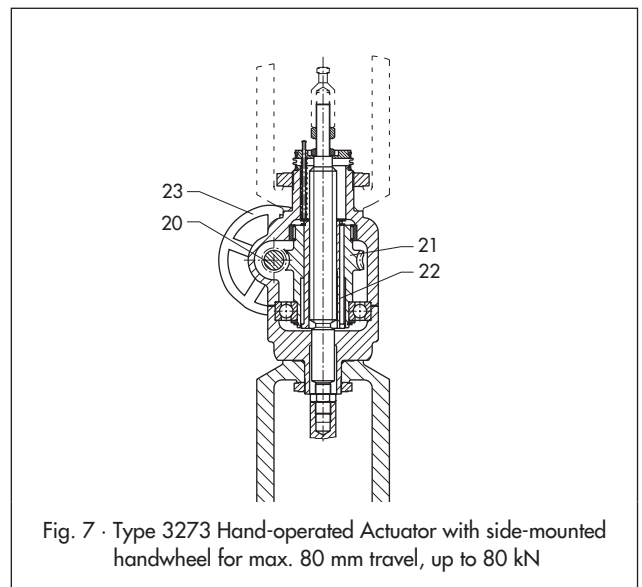


Fig. 7 · Type 3273 Hand-operated Actuator with side-mounted handwheel for max. 80 mm travel, up to 80 kN

Table 1a · Technical data for Type 3271 Pneumatic Actuator

Version	cm ²	1000	1400-60	1400-120	2800	2 x 2800
Maximum supply pressure		6 bar ¹⁾				
Permissible operating temperatures		Standard material NBR -35 to 90 °C ²⁾	Standard material NBR -35 to 90 °C ²⁾	Standard material NBR -35 to 90 °C ²⁾	Standard material NBR -35 to 90 °C ²⁾	
	Special material EPDM (for air free of oil) -50 to 120 °C ³⁾					
Materials						
Rolling diaphragm		NBR with fabric reinforcement	NBR (nitrile rubber) Butyl with fabric reinforcement	NBR with fabric reinforcement		
			EPDM with fabric reinforcement			
Actuator stem		1.4548.4	1.4571	1.4548.4	1.4548.4	
Actuator stem sealing		NBR	NBR (nitrile rubber)		NBR	
			EPDM	NBR		
Diaphragm cases		Sheet steel, powder-varnish coated	Sheet steel, powder-varnish coated	EN-JS1030 (GGG-40)		

¹⁾ Observe restrictions as specified above · ²⁾ Lower temperature limited to -20 °C in on/off service

³⁾ Lower temperature limited to -40 °C in on/off service

Table 1b · Technical data for Type 3273 Hand-operated Actuator

Version	3273 (Fig. 7, 12)	3273 (Fig. 13)
Max. travel range	80 mm	160 mm
Permissible force	80 kN	150 kN
Permissible temperature	100 °C	100 °C
Materials		
Housing	EN-JS1030 (GGG-40)	EN-JS1030 (GGG-40)
Spindle and threaded nut	1.4104/G-CuSn12Pb	EN-GJS-500-7 (GGG-50)/1.0503
Handwheel	Aluminum	EN-JL1040 (GG-25)

Table 1c · Available versions

Version	1000 cm ²	1400-60	1400-120	2800 cm ²	2 x 2800 cm ²
Travel stop, on both sides	•	•	•	•	•
Type 3273, max. 80 mm travel	•	•	•	• (max. 3 bar)	–
Side-mounted Type 3271, max. 120 mm travel	–	–	•	•	•
Type 3271	60 mm rated travel	•	•	•	•
Throttling service	•	•	•	•	•
On/off service	–	•	•	•	•

Table 2 · Bench ranges for 1000, 1400 and 2800 cm² Pneumatic Actuators · All pressures in bar (gauge)

Pretensioned springs cannot be used with fail-safe action "Actuator stem retracts" for Series 240, 250, and 280 Control Valves.

Actuator Type	Effective diaphragm area [cm ²]	Rated travel [mm]	Travel volume at rated travel [dm ³]	Dead volume [dm ³]	Max. travel [mm] ¹⁾	Bench range [bar] (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] ²⁾	Spring force at rated travel [kN] ²⁾	Thrust [kN] ²⁾ at rated travel and a supply pressure [bar] of					
												1.4	2.0	3.0	4.0	5.0	6.0
Type 3271	1000	60	6.4	6.1	80	0.2...1.0	25	0.4...1.2	3	2	10	4	10	20	30	40	50
						0.4...2.0		6	4	20	-	10	20	30	40		
						0.6...3.0		9	6	30	-	-	10	20	30		
						1.0...3.2		10	13	27	-	3	13	23	33		
						1.5...4.2		13	19	39	-	-	1	11	21		
Type 3271	1400	60	8.3	5.7	80	0.2...1.0	25	0.4...1.2	6	2.8	14	5.6	14	28	42	56	70
						0.4...2.0		12	5.6	28	-	14	28	42	56		
						0.5...2.5		18	7	35	-	7	21	35	49		
						1.1...2.4		18	15.4	33.6	-	8.4	22.4	36.4	50.4		
						1.3...2.8		24	18.2	39.2	-	2.8	16.8	30.8	44.8		
Type 3271	1400	120	16.6	4.7	130	0.4 ... 1.2	0 ³⁾	-	3	5.6	16.8	2.8	11.2	25.2	39.2	53.2	67.2
						0.8 ... 2.4			6	11.2	33.6	-	-	8.4	22.4	36.4	50.4
						1.0 ... 3.0			9	14	42	-	-	-	14	28	42
						1.2 ... 3.6			12	16.8	50.4	-	-	5.6	19.6	33.6	
Type 3271	2800	120	33	16.5	160	0.2...1.0	25	0.4...1.2	3	5.6	28	11.2	28	56	84	112	140
						0.4...2.0		6	11.2	5.6	-	28	56	84	112		
						0.5...2.5		9	14	70	-	14	42	70	98		
						0.6...3.0		12	16.8	84	-	-	28	56	84		
						0.8...1.7		6	22.4	47.6	-	8.4	36.4	64.4	92.4	120.4	
						0.9...2.2		9	25.2	61.6	-	-	22.4	50.4	78.4	106.4	
						1.0...2.7		12	28.0	75.6	-	-	8.4	36.4	64.4	92.4	
						1.1...2.3		6	30.8	64.4	-	-	19.6	47.6	75.6	104	
						1.2...2.8		9	33.6	78.4	-	-	5.6	33.6	61.6	89.6	
						1.3...3.3		12	36.4	92.4	-	-	19.6	47.6	75.6		

Actuator Type	Effective diaphragm area [cm ²]	Rated travel [mm]	Travel volume at rated travel [dm ³]	Dead volume [dm ³]	Max. travel [mm] ¹⁾	Bench range [bar] (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] ²⁾	Spring force at rated travel [kN] ²⁾	Thrust [kN] ²⁾ at rated travel and a supply pressure [bar] of					
												1.4	2.0	3.0	4.0	5.0	6.0
Type 3271	2x 2800	120	66	33	160	0.2...1.0	25	0.4...1.2	6	11.2	56	22.4	56	112	168	224	280
						0.4...2.0		12	22.4	11.2	-	56	112	168	224		
						0.5...2.5		18	28	140	-	28	84	140	196		
						0.6...3.0	25	1.2...3.6	24	33.6	168	-		56	112	168	
						0.8...1.7		12	44.8	95.2	-	16.8	74.8	128.8	184.8	240.8	
						0.9...2.2	25	1.2...2.5	18	50.4	123.2	-		44.8	100.8	156.8	212.8
						1.0...2.7		24	56.0	151.2	-		16.8	72.8	128.8	184.8	
						1.1...2.3	25	1.4...2.6	12	61.6	128.8	-		39.2	95.2	151.2	208
						1.2...2.8		18	67.2	156.8	-		11.2	67.2	123.2	179.2	
						1.3...3.3		24	72.8	184.8	-		39.2	95.2	151.2		

¹⁾ Based on lower bench range value. Zero travel not taken into account (see Table 3a)

²⁾ The forces specified relate to the bench range

³⁾ Springs already pretensioned

FA = Actuator stem extends · FE = Actuator stem retracts

Table 3 · Dimensions and weights

Table 3a · Versions without handwheel

Actuator	Type	3271				
		1, 8	2, 9	9	9	3, 11
Refer to Fig.						
Effective area	cm ²	1000	1400-60	1400-120	2800	2 x 2800
Height	H	265	197	380	520	1020
	H _{4rated} FA	165	165	285		315
	H _{4max} FA	169	169	288		325
	H _{4max} FE	185	185	315		355
	H ₆	54	54	85		85
	H ₇	90	90	110		110
Travel stop	H ₈ ¹⁾	–	180	–		500
Diameter	∅ D	462	530	534		770
	∅ D2	22	22	40		40
∅ d (thread)		M60 x 1.5		M100 x 2	M100 x 2	
Pneum. connection (optional)	a	G 3/4 / 3/4 NPT	G 3/4 / 3/4 NPT	G 1/1 NPT	G 1/1 NPT	
	a2	–	–	–	–	
Weight in kg						
Without handwheel	kg	80	70	175	450	950

¹⁾ Travel stop on both sides (Fig. 10)

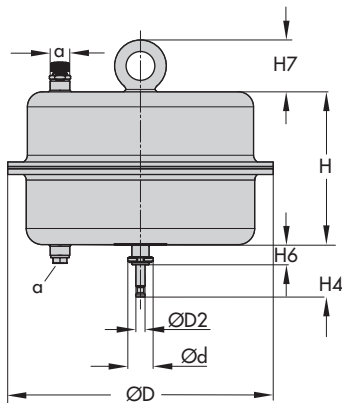


Fig. 8 · Type 3271 Actuator with 1000 cm²

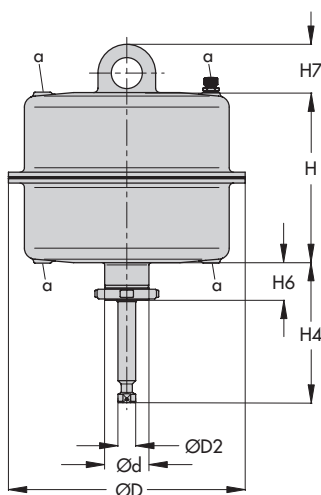


Fig. 9 · Type 3271 Actuator, 1400-120 version

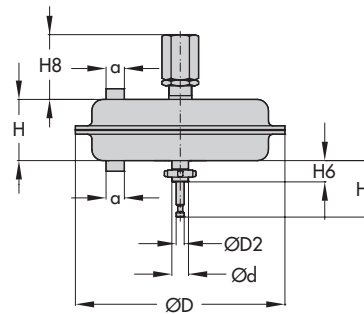


Fig. 10 · Version with mechanical travel stop

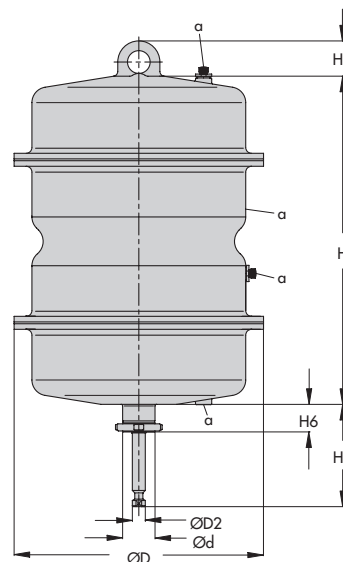


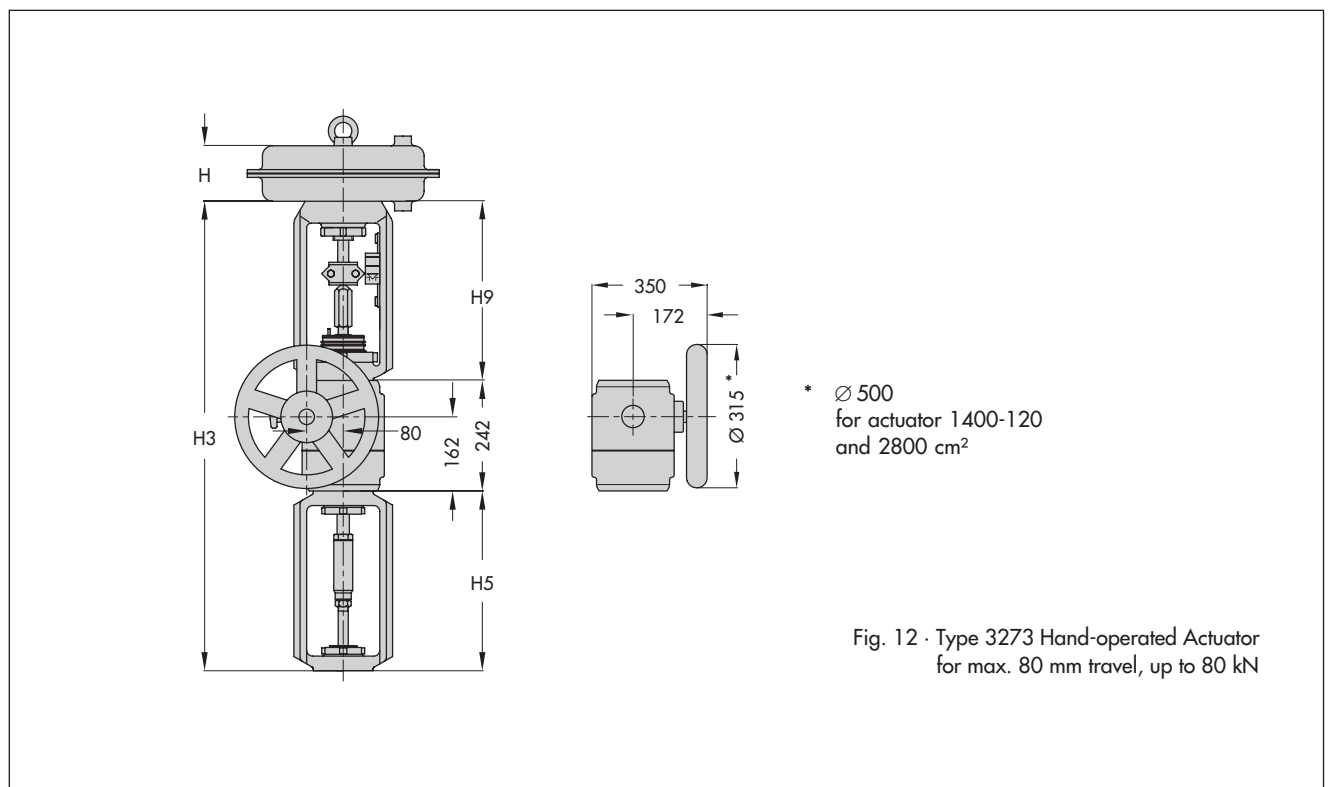
Fig. 11 · Type 3271 as tandem actuator

**Table 3b · Type 3271 Pneumatic Actuator and Type 3273 Hand-operated Actuator with side-mounted handwheel
 ≤ 80 mm travel · Fig. 12**

Valve	DN	50 ... 100				125 ... 150			
	NPS	2 ... 4				6			
Seat bore	mm	≤ 100				≤ 150			
Travel	mm	Up to 30				Up to 60			
Actuator	cm ²	1000	1400-60	1400-120	2800	1000	1400-60	1400-120	2800
H3	mm	932		1202		1032		1202	
H5	mm	295		480		395		480	
H9	mm	395		480		395		480	
Weight in kg									
With actuator		180	165	300	575	184	169	303	578
Without actuator ¹⁾		70				70			

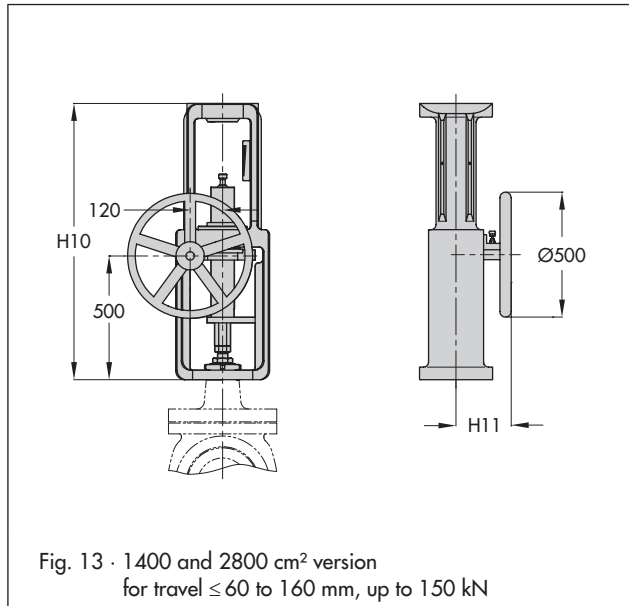
Valve	DN	200 ... 250				300 ... 500			
	NPS	8 ... 10				12 ... 20			
Seat bore	mm	≤ 200				≤ 200			
Travel	mm	Up to 60				Up to 60			
Actuator	cm ²	1000	1400-60	1400-120	2800	1000	1400-60	1400-120	2800
H3	mm	1032		1202		1117		1222	
H5	mm	395		480		480		500	
H9	mm	395		480		395		480	
Weight in kg									
With actuator		187	172	305	580	190	175	310	585
Without actuator ¹⁾		70				70			

¹⁾ Gear only



**Table 3c · Pneumatic actuator and hand-operated actuator with side-mounted handwheel · Travel 160 mm or smaller
Fig. 13**

Actuator	cm ²	1400-120	2800	2 x 2800
H10	mm	1105	1105	1105
H11	mm	220	220	220
Weight without actuator	kg	250	250	250



Ordering text

Actuator	Type 3271 or
Optional	Handwheel
	Travel stop
	Tandem actuator
Diaphragm area	... cm ²
Travel	... mm
Bench range	... bar
Fail-safe action	Actuator stem extends/retracts
Signal pressure connection	G ... / ... NPT
Rolling diaphragm	NBR/EPDM

Specifications subject to change without notice.





Fig. 1
Type 3372-04xx
Pneumatic Actuator



Fig. 2
V 2001-IP Control Valve
Type 3372-0511/0531 Electropneumatic
Actuator with Type 3321 Valve

Mounting and Operating Instructions

EB 8313 EN

Edition February 2004

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- ▶ *Assembly, start-up, and operation of the device may only be performed by trained and experienced personnel familiar with this product. According to these mounting and operating instructions, trained personnel is referred to as individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards. Explosion-protected versions of this device may only be operated by personnel who have undergone special training or instructions or who are authorized to work on explosion-protected devices in hazardous areas.*
- ▶ *Any hazards which could be caused at the valve by the process medium, the operating pressure, the signal pressure or moving parts are to be prevented by means of the appropriate measures. If inadmissible motions or forces are produced in the pneumatic actuator as a result of an excessive supply pressure, this must be restricted by means of a suitable pressure reducing station.*
- ▶ *The springs in the actuator housing are pretensioned. Therefore, the diaphragm actuator may only be opened with special tools by the manufacturer.*
- ▶ *Proper shipping and appropriate storage are assumed.*
- ▶ **Note!** *The device with a CE marking fulfils the requirements of the Directives 94/9/EC (ATEX) and 89/336/EEC (EMC). The declaration of conformity can be viewed and downloaded on the Internet at <http://www.samson.de>.*

1 Design and principle of operation

The actuators are designed for attachment to Series V 2001 Valves (Type 3321, Type 3323, Type 3531, Type 3535, Type 3214 (DN 65 to 100) and Type 3260 (DN 65 and 80).

The actuators basically consist of two diaphragm cases, a rolling diaphragm and springs.

The electropneumatic actuators are additionally equipped with an i/p converter and a pneumatic control system for control operation. For actuators with fail-safe position "Actuator stem extends", the converter and the control system are mounted in the lower diaphragm case, and for versions "Actuator stem retracts", in the upper diaphragm case.

The signal pressure creates a force which acts on the diaphragm. The springs installed in the diaphragm chamber oppose this force, thus ensuring compensation.

When the signal pressure fails, the springs installed either in the top or bottom diaphragm chamber determine the actuator's operating direction and **fail-safe position**.

Actuator stem extends:

Upon signal pressure failure, the actuator stem extends and closes the valve (globe valve).

Actuator stem retracts:

Upon signal pressure failure, the actuator stem retracts and opens the valve (globe valve).

Electropneumatic actuators

The electric control signal issued by the controller as reference variable ranging from 4 to 20 mA is transmitted to the i/p converter

where it is converted into a proportional pressure signal.

The pressure signal creates a force that acts on the measuring diaphragm (11). This force is then compared with the force of the measuring spring (13). The movement of the measuring diaphragm is transmitted via the lever (12) to the force switch (15), and finally a corresponding signal pressure is produced.

Changes in the input signal or the valve position cause a change in the actuator stem position, corresponding to the reference variable.

Tight-closing function:

The electropneumatic actuator is either fully vented or fully pressurized whenever the reference variable exceeds or falls below a certain preset value.

Type 3372: "Actuator stem extends"

includes a switch-off function that is activated when the switching point of 4.08 mA is not reached. The actuator will be fully vented. In globe valves, the actuator springs will close the valve.

In three-way valves, port **B** is closed when the valve is used for mixing service and port **A** is closed when the valve is used for diverting service.

Type 3372: "Actuator stem retracts"

includes a switch-on function that is activated when the switching point of 19.92 mA is exceeded. The actuator will be pressurized, causing a globe valve to close tightly.

In three-way valves, port **B** is closed when the valve is used for mixing service and port **A** is closed when the valve is used for diverting service.

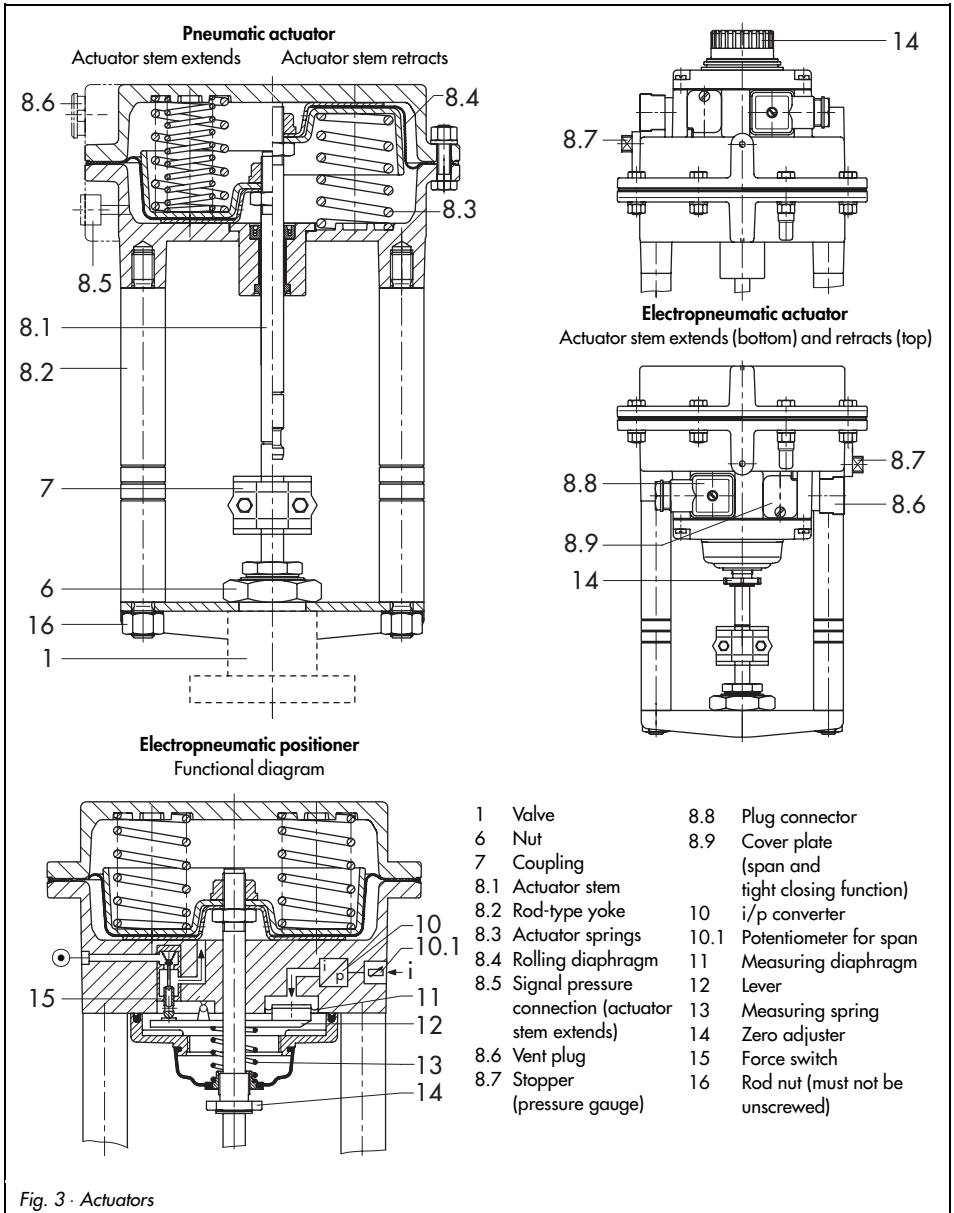


Fig. 3 · Actuators

1.1 Technical data

Actuator	Pneumatic actuator for V 2001-P		Electropneumatic actuator for V 2001-IP	
Fail-safe position	Type 3372			
Actuator stem ext. (FA)	- 0411	- 0431	- (0/1)511	- (0/1)531
Actuator stem retr. (FE)	- 0421	- 0441	- (0/1)521	- (0/1)541
Rated travel	15	15 (12, 6)	15	15
Bench range	FA FE	2.1...3.3 0.4...1.4	1.4...2.3 1.4...2.3	2.1...3.3 0.4...1.4
Supply pressure	Max. 6 bar	Max. 4 bar	Max. 6 bar	Max. 4 bar
Reference variable			4 to 20 mA, min. current 3.6 mA Load impedance ≤ 6 V (300 Ω for 20 mA)	
Span adjustment			With potentiometer, 25 % of the travel range	
Operating direction			Increasing/increasing, fixed	
Characteristic			Linear, deviation of ≤ 2 % when adjusted to fixed value	
Hysteresis			≤ 1 %	
Variable position			≤ 7 %	
Tight-closing function (deactivation via jumper)			FA: switched off at ≤ 4.08 mA, FE: switched on at ≥ 19.92 mA Differential gap: 0.09 mA	
Air consumption in steady state			When w = 100 %: 6 bar ≤ 200 l _n /h 4 bar ≤ 160 l _n /h	
Temperature range	-35 to 90 °C		-30 to 70 °C	
Degree of protection			IP 54 ¹⁾ Explosion protection EEx ia II C T5 optional	
Weight	3.3 kg		3.7 kg	
Limit switch				
Explosion protection	Explosion-proof enclosure EEx d II CT6 according to PTB No. Ex-79/1016			
Load	AC voltage: 250 V / 5 A		DC voltage: 250 V / 0.4 A	
Perm. ambient temp.	-20 to +60 °C			
Degree of protection	IP 66			
Weight approx. kg	0.4			

¹⁾ IP 65 if the vent plug is replaced by a filter check valve (order no. 1790-7408).

2 Attachment to valve

Note!

Pressurize actuators with fail-safe position "**Actuator stem extends**" before attaching them to a valve to allow the actuator stem to retract slightly.

Should no signal pressure or, for electro-pneumatic actuators, should also no electric control signal be available during the mounting procedure, tighten the hexagon nut (6) against the force of the preloaded springs using a hexagonal wrench with width across flats SW 36.

Caution!

Under no circumstances must the rod nuts of the rod-type yoke be unscrewed.

Actuators with fail-safe position "**Actuator stem retracts**" only require to be pressurized for attaching the stem connector. The reason for this is that in three-way valves, for example, the plug stem might not reach the actuator stem after being pulled out of the valve body. If this is the case, the top diaphragm chamber must be pressurized until the plug stem and actuator stem come into contact so that the stem connector can be mounted.

For electropneumatic actuators, a signal pressure can be applied to the pressure gauge connection, however, the stopper (8.7, Fig. 3 top) must be removed first.

Attachment using signal pressure or mA control signal

1. **For the pneumatic actuator**, apply a pressure of approx. 3 bar to the lateral signal pressure connection (8.5) located at the bottom diaphragm chamber.
For the electropneumatic actuator, apply a pressure of approx. 3 bar to the "Supply" connection and additionally connect a control signal of approx. 10 mA to retract the actuator stem.
2. Remove the hexagon nut (6) from the valve bonnet and place the actuator with its stem retracted by means of the signal pressure on the valve bonnet.
3. Make sure the actuator is in the proper position and secure the hexagon nut (SW 36) applying a tightening torque of min. 150 Nm.
4. Pull up plug stem (3) until it contacts the actuator stem.
5. Attach the stem connector pieces to each stem and screw tight using the fastening screws.

3 Connections

3.1 Pneumatic connections

The air connections of the pneumatic actuator are tapped holes with G1/8 thread, whereas the electropneumatic actuator has tapped holes with G1/4 thread. The customary male connections for metal pipes or plastic hoses can be used.

Important! *The supply air must be dry, oil and dust free. You are required to strictly observe the maintenance instructions for upstream reducing stations. Thoroughly purge the air pipes prior to installation.*

The required supply pressure depends on the bench range and the operating direction (fail-safe position) of the actuator. The bench range is written on the nameplate, the operating direction is indicated by **FA** or **FE**, or by the respective symbol.

Pneumatic actuator:

- ▶ For "Actuator stem extends", connect the signal pressure to the bottom diaphragm chamber and for "Actuator stem retracts" to the top diaphragm chamber. The connection not used must be sealed with a vent plug.

Electropneumatic actuator:

- ▶ Connect the supply air to the "Supply" connection.

Actuator stem extends (FA):

(Types 3372-x51x and 3372-x53x Actuators)

Fail-safe position "Valve closed"

(for globe and angle valves)

Required supply pressure =
upper bench range value + 0.5 bar.

Actuator stem retracts (FE):

(Types 3372-x52x and 3372-x54x Actuators)

Fail-safe position "Valve open"

(for globe and angle valves)

The signal pressure must be sufficiently high so that the control valve closes tightly even against the upstream system pressure.

For the required supply pressure for a tight-closing valve, refer to the mounting and operating instructions of the respective valve, or roughly calculate as follows, using the maximum signal pressure $p_{st_{max}}$:

$$p_{st_{max}} = F + \frac{d^2 \cdot \pi \cdot \Delta p}{4 \cdot A} \quad [\text{bar}]$$

d = Seat diameter [cm]

Δp = Differential pressure across the valve [bar]

A = Actuator area [cm²]

F = Upper bench range value of actuator

If nothing is indicated, proceed as follows:

Required supply pressure =

upper bench range value + 1 bar

Signal pressure display:

To monitor the signal pressure, a pressure gauge with G1/8 thread can be screwed into the diaphragm chamber in place of the stopper (8.7).

Caution! *In case you need to deactivate the control valve, you must switch off the reference variable. Note that it is not enough to disconnect the supply air.*

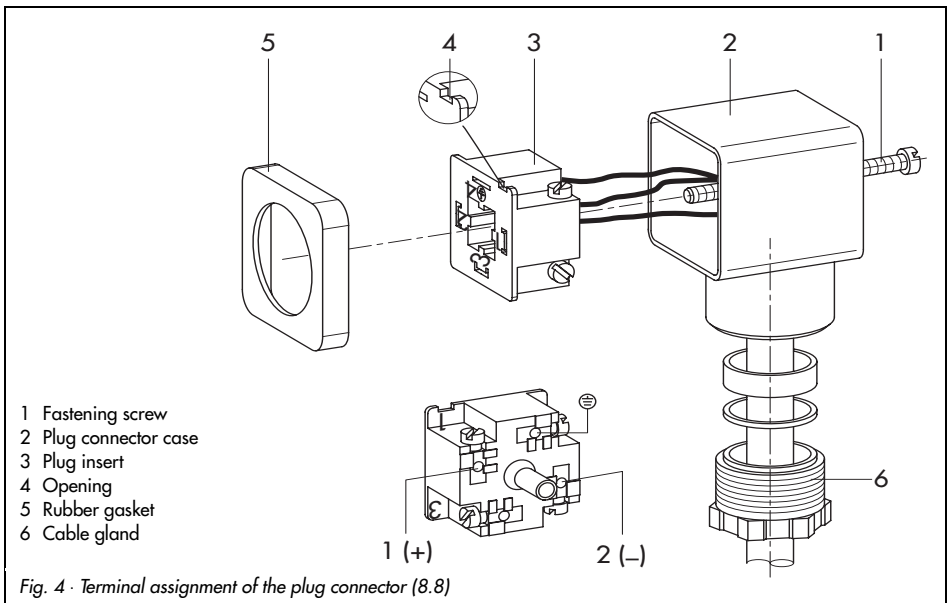
3.2 Electrical connection

(Electropneumatic actuator only)

1. Unthread the fastening screw (1) of the plug connector and remove the plug connector from the female connector on the actuator housing.

Note! Do not remove the female connector from the actuator housing. Correct ground connection can only be guaranteed when it is in its original position.

2. Pull the fastening screw (1) out of the plug connector and remove the rubber gasket (5).
3. Lever the plug insert (3) out of the plug connector case (2) at the opening (4) using a screw driver.
4. Connect the wires transmitting the control signal via the cable gland (6) of the plug connector case to the terminals of the insert which are marked 1 (+), 2 (-) and to its ground terminal. Secure them with screws.
5. Reinstall the insert (3) in the plug connector case. Be sure that the cable gland (6) points to the desired direction (the plug connector case can be turned by 90° around the insert to point to all four directions).
6. Put on the rubber gasket (5).
7. Plug the plug connector back in the actuator housing and secure with fastening screw (1).



4 Checking – adjusting zero and span

(Electropneumatic actuator only)

Note!

Make adjustments on the mounted valve only!

Zero and span are adjusted to determine the starting point and the upper range value of the actuator.

When the control signal (reference variable) issued by the controller changes from 4 to 20 mA, the control valve must correspondingly pass through its entire travel range from 0 to 100 %.

Zero adjustment is always based on the closed position of the control valve.

Assuming a globe valve (closed fail-safe position) combined with Type 3372-(0/1)511 or 3372-(0/1)531 Actuator with fail-safe position "Actuator stem extends", zero (starting point) must be adjusted to 4 mA and the upper range value to 20 mA.

Whereas assuming a globe valve (open fail-safe position) combined with Type 3372-(0/1)521 or Type 3372-(0/1)541 Actuator with fail-safe position "Actuator stem retracts", zero must be adjusted to 20 mA and the upper range value to 4 mA.

Important!

Zero and span of the electropneumatic actuator are adjusted to rated travel by the manufacturer.

We recommend, however, that you check zero after the actuator has been attached to the valve. Proceed as described below:

1. Connect an ammeter to the control signal input and apply compressed air to the "Supply" input.
2. Loosen the fastening screw and push the cover plate (8.9) aside.
3. Pull the jumper from the pins to deactivate the tight-closing function.

Zero is adjusted on the adjuster (14) and the upper range value on the potentiometer for span (10.1).

Important!

Any span adjustment results in a shift of zero. Therefore, the zero point must be readjusted after span adjustment.

4.1 Adjusting actuators with fail-safe position "Actuator stem extends"

Zero point (starting point)

1. Use an ammeter to adjust the input signal to 4 mA.
2. Turn zero adjuster (14) until the plug stem just begins to move from its rest position.
3. Switch off the input signal and then slowly increase it again. Check if the plug stem begins to move at $4(+0.1)$ mA.
4. Correct any deviations via the zero adjuster (14).

Turning clockwise causes the valve to leave its rest position earlier, whereas turning counterclockwise delays the valve leaving its rest position.

Upper range value

5. After you have adjusted the starting point, use the ammeter to increase the input signal to 20 mA. When reaching the upper range value of $20(-0.1)$ mA, the plug stem must have passed through its entire rated travel range of 100 %.
6. Adjust the potentiometer for span (10.1) until the upper range value is correct. Turning clockwise increases the travel, turning counterclockwise reduces the travel.
7. After correction, switch off the input signal and slowly increase it again. First check the starting point (4 mA), then the upper range value (20 mA).
8. Repeat the correction procedure until both values are correct.
9. Plug jumper on the pins again to activate the tight-closing function.

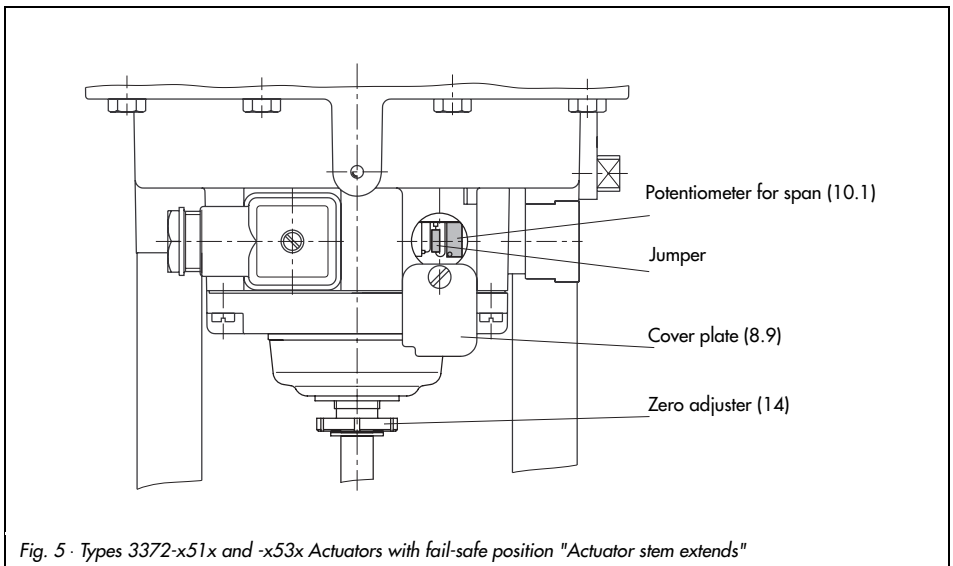


Fig. 5 - Types 3372-x51x and -x53x Actuators with fail-safe position "Actuator stem extends"

4.2 Adjusting actuators with fail-safe position "Actuator stem retracts"

Zero point (starting point)

1. Use ammeter to adjust the input signal to 20 mA.
2. Remove the protective cap and turn the zero adjuster (14) until the plug stem just begins to move from its rest position.
3. Increase the input signal and slowly reduce it again to 20 mA. Check if the plug stem begins to move at 20 mA.
4. Correct any deviations via the zero adjuster (14).
Turning counterclockwise causes the valve to move from its rest position with delay, whereas turning clockwise causes the valve to move earlier.

Upper range value

5. Having completed adjustment of the starting point, use the ammeter to adjust the input signal to 4 mA. After having reached the upper range value of 4 mA, the plug stem must pass through its entire rated travel range of 100 %.
6. Adjust the potentiometer for span (10.1) until the upper range value is correct. Turning clockwise increases the travel, and turning counterclockwise reduces the travel.
7. After correction, increase the input signal again. First check the starting point (20 mA), then the upper range value (4 mA).
8. Put the protective cap back over the zero adjuster.
9. Plug the jumper on the pins again to activate the tight-closing function.

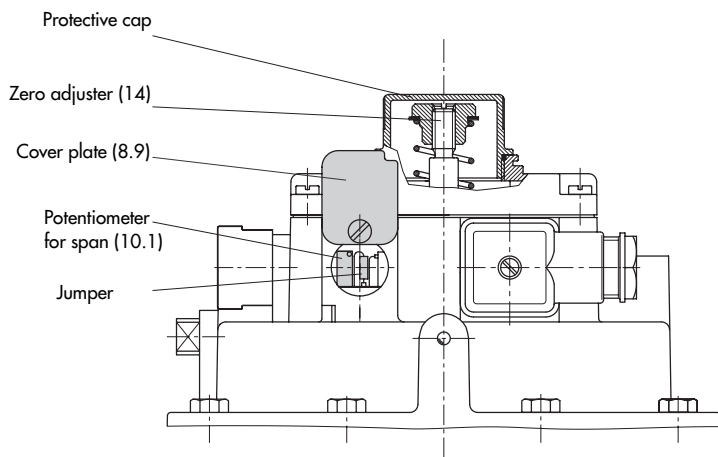


Fig. 6 · Types 3372-x52x and -x54x Actuators with fail-safe position "Actuator stem retracts"

5 Activating and deactivating the tight-closing function

The electronic switch-off and switch-on system integrated in the actuator ensures tight closing of the control valve whenever the switching point is exceeded or not reached.

Actuator stem extends:

Should the electric control signal (reference variable) fall below the switching point of $4.08 \text{ mA} \pm 0.09 \text{ mA}$ differential gap, the actuator will be fully vented to close a connected globe valve.

Actuator stem retracts:

Should the electric control signal (reference variable) exceed the switching point of $19.92 \text{ mA} \pm 0.09 \text{ mA}$ differential gap, the pneumatic output will be fully pressurized to close a connected globe valve.

The tight-closing function will be activated when the jumper is plugged in. Removing the jumper deactivates this function.

6 Version with limit switch - adjustment

1. Loosen stem connectors on the valve and exchange front connector for a clamped connector (from the accessories).
2. Move the control valve to the switching position in which the contact is to be made.
3. Position clamping plate on the rod-type yoke and shift plate until the lever rests on the stem connector clamp. Align clamping plate and screw tight.
4. Establish electrical connection according to the label on the clamping plate as follows:
Black (BK)/blue (BU) > contact open and black (BK)/brown (BN) > contact made (closed).
5. Go below and exceed the desired switching position. Use the adjustment screw to set the exact switching point.

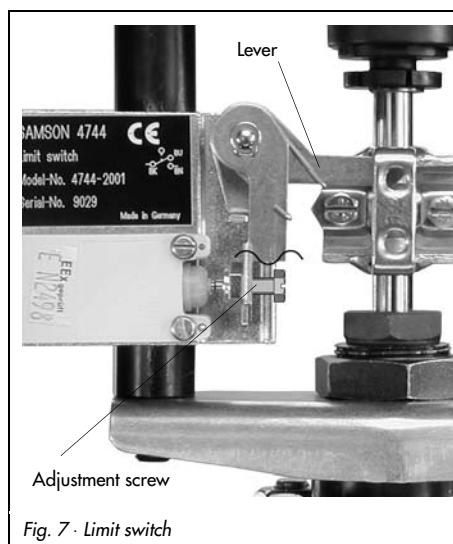


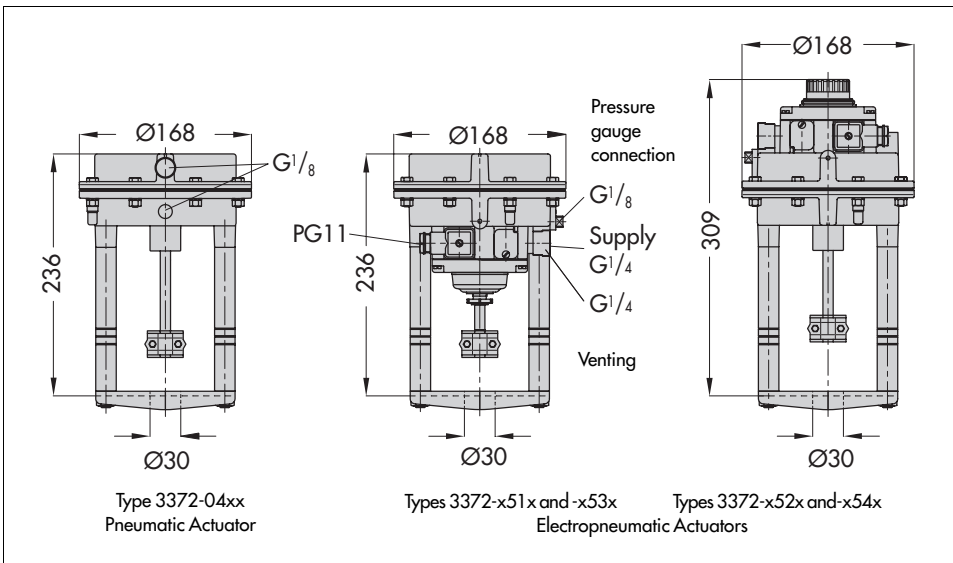
Fig. 7 · Limit switch

7 Customer inquiries

If you have any inquiries, submit the following details:

- ▶ Type designation
- ▶ Bench range (signal pressure range) of the actuator

Dimensions in mm



TRANSLATION

EC TYPE EXAMINATION CERTIFICATION

- (1)
- (2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**
- (3) EC Type Examination Certificate Number

PTB 02 ATEX 2078

- (4) Equipment: Model 4763-1... 1/P Positioner
- (5) Manufacturer: SAMSON AG, Mess- und Regeltechnik
- (6) Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany
- (7) This equipment and any acceptable variations thereof are specified in the schedule to this certificate.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102, in accordance with article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment complies with the Essential Health and Safety Rules relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres as specified in Annex II to the Directive.

The examination and test results are recorded in confidential report
PTB-Ex 02-22054.

- (9) The Essential Health and Safety Requirements are satisfied by compliance with
EN 50014: 1997+A1 +A2 **EN 50020: 1994**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) According to the Directive 94/9/EC, this EC TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of the equipment.

EC Type Examination Certificates without signature and seal are invalid.
This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig

(12) The marking of the equipment shall include the following:



Zertifizierungsstelle Explosionsschutz Braunschweig, 19. July 2002
By order

(Signature) (Seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirigktor

EC Type Examination Certificates without signature and seal are invalid.
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Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(13)

Schedule

(14) **EC TYPE EXAMINATION CERTIFICATE No. PTB 02 ATEX 2078**

(15) **Description of Equipment**

The Model 4763-1...1/P Positioner is intended for attachment to pneumatic control valves. It serves for converting control signals of (0)...20 mA or 1...5 mA from a controlling system into a pneumatic actuating pressure of 6 bar max. For auxiliary power non-combustible media are used.

The I/p converter circuit is a passive two-terminal network which may be connected to any certified intrinsically safe circuit, provided the permissible maximum values of U_i and P_i are not exceeded.

The device is intended for use inside and outside of hazardous locations.

The correlation between version, temperature classification, permissible ambient temperature ranges and maximum short-circuit currents is shown in the table below.

Version 4763-1...1, with Model 6109 I/P Module

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	-45 °C... 60 °C	
T5	-45 °C... 70 °C	85 mA
T4	-45 °C... 80 °C	
T5	-45 °C... 70 °C	100 mA
T4	-45 °C... 80 °C	

Version 4763-1...2, with Model 6112 I/P Module

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	-45 °C... 60 °C	85 mA or
T5	-45 °C... 70 °C	100 mA
T4	-45 °C... 80 °C	120 mA

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PTB

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Electrical data

Signal circuit
(terminals 11/12)

Type of protection: Intrinsic safety EEx ia IIC
only for connection to a certified
intrinsically safe circuit

Maximum values:

U_i = 28 V
I_i = 110 mA or 85 mA
P_i = 0.7 W

or

U_i = 25 V
I_i = 120 mA

P_i = 0.7 W

C_i = negligible

L_i = negligible

(16) **Test Report PTB Ex 02-22054**

(17) **Special conditions for safe use**

None

(18) **Essential Health and Safety Requirements**

In compliance with the standards specified above.

Zertifizierungsstelle Explosionsschutz

By order

Braunschweig, 19. July 2002

(Signature) (seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor