

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.

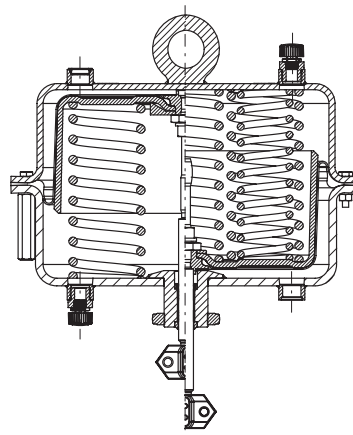


Fig. 4 · Sectional drawing of Type 3271 Actuator with 1000 cm²

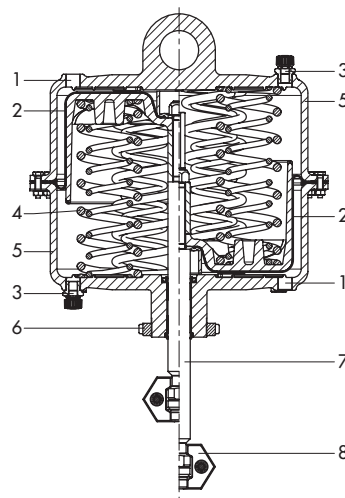


Fig. 5 · Type 3271, version 1400-120

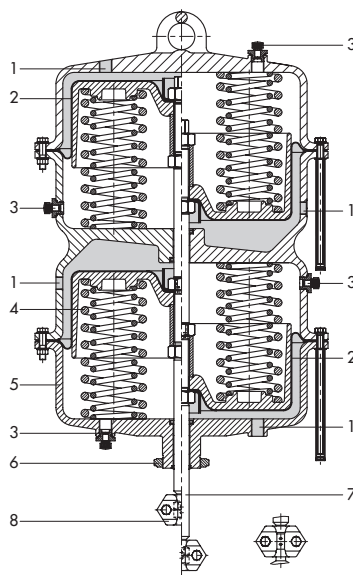


Fig. 6 · Tandem actuator with 2 x 2800 cm²

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 | |

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.

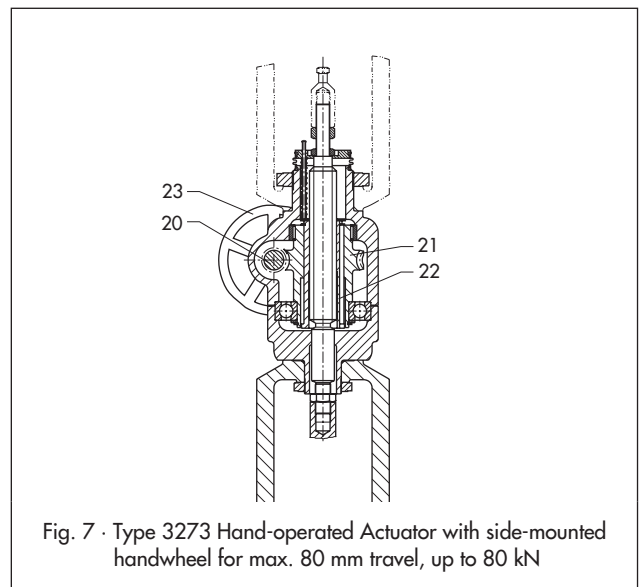


Fig. 7 · Type 3273 Hand-operated Actuator with side-mounted handwheel for max. 80 mm travel, up to 80 kN

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	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
	H4 _{rated} FA	165	165	285		315
	H4 _{max} FA	169	169	288		325
	H4 _{max} FE	185	185	315		355
	H6	54	54	85		85
	H7	90	90	110		110
Travel stop	H8 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)

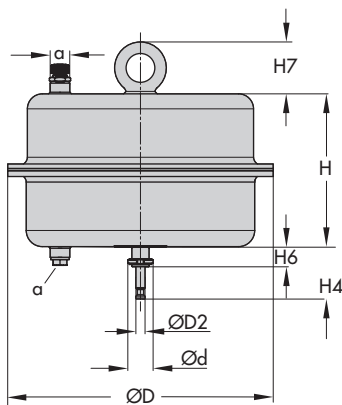


Fig. 8 · Type 3271 Actuator with 1000 cm²

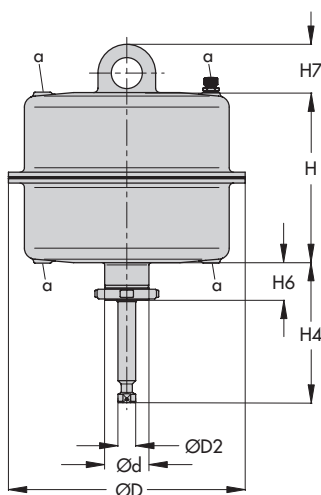


Fig. 9 · Type 3271 Actuator, 1400-120 version

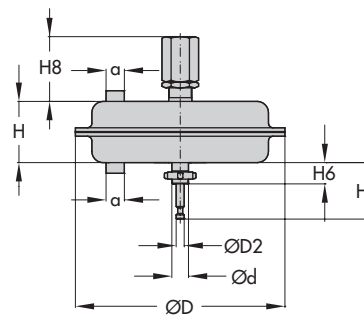


Fig. 10 · Version with mechanical travel stop

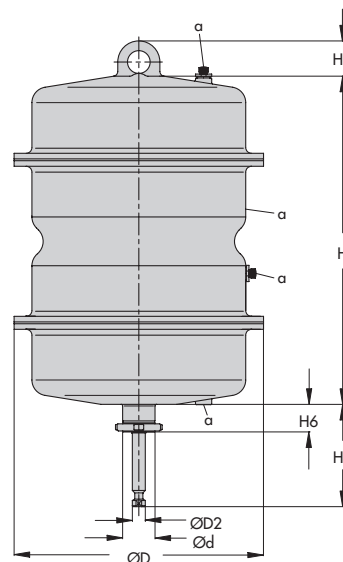


Fig. 11 · Type 3271 as tandem actuator

**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

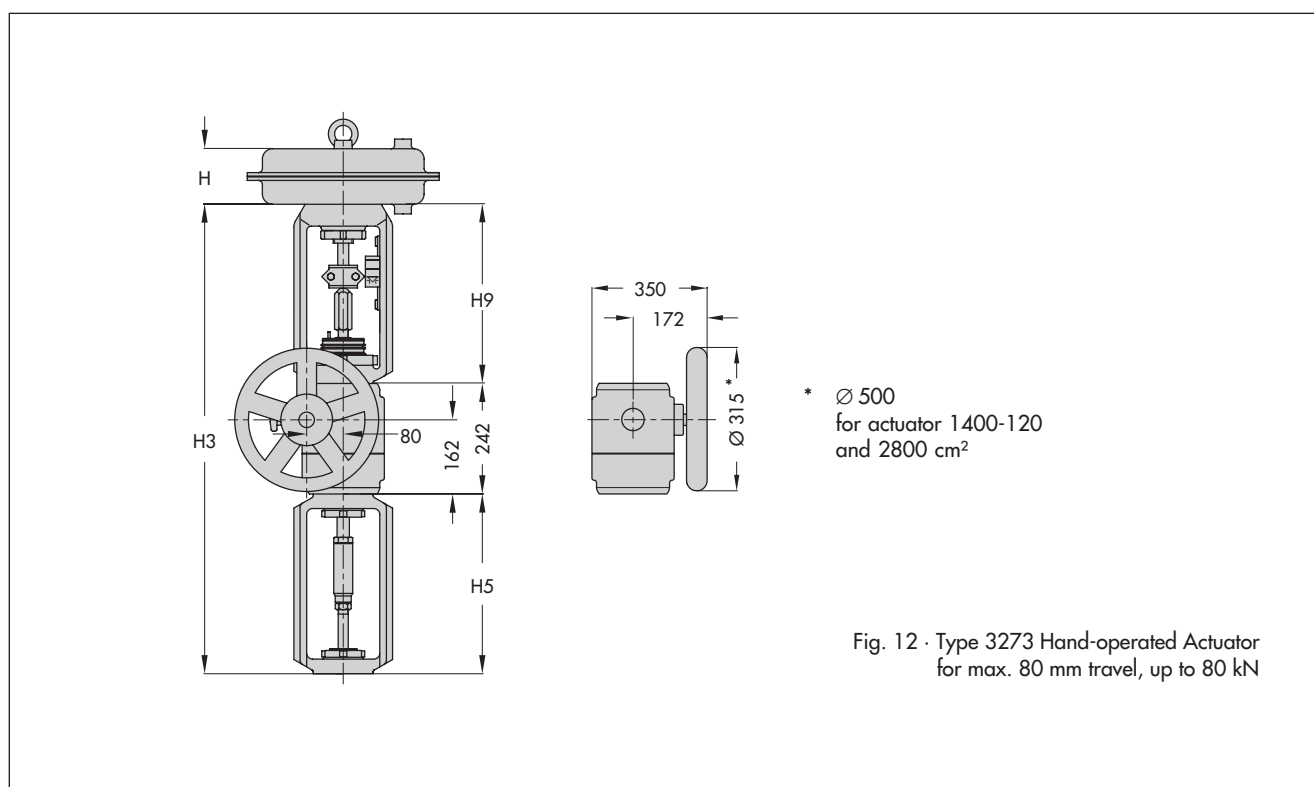
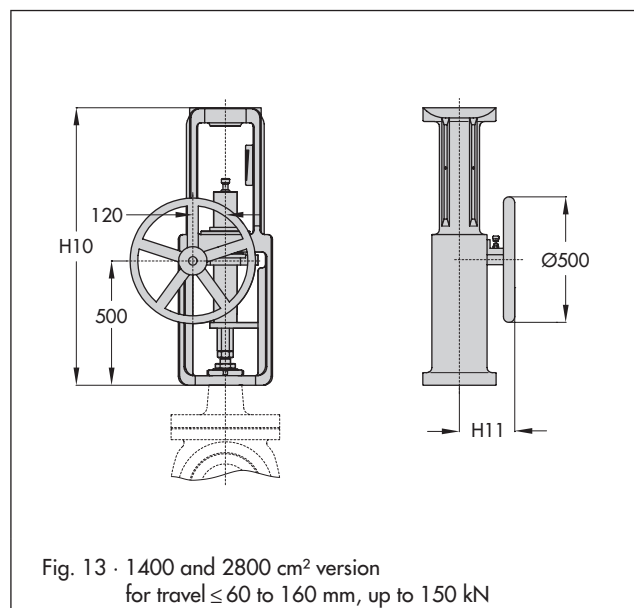


Fig. 12 · Type 3273 Hand-operated Actuator
 for max. 80 mm travel, up to 80 kN

**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.

