DATA SHEET

T 8316 EN

Type 3204-1 and Type 3204-7 Pneumatic Actuator with Rotary Lever

Application

Pneumatic actuator for final control elements with rotary closure members, particularly for butterfly valves and louvers (shutters)

The Type 3204-1 and Type 3204-7 Pneumatic Actuators consist of a yoke with attached rotary lever and a Type 3271 or Type 3277 Pneumatic Actuator with rolling diaphragm and installed compression springs (see Data Sheet ▶ T 8310-1 for details on the actuators).

Special features

- Low overall height
- High thrusts
- Fast stroking speed
- Various bench ranges by varying the number of springs (3 to 12) or their compression
- No special tools required to change the bench range or reverse the direction of action
- Maintenance-free joints with plain bearings free of non-ferrous metal

Attachment of pneumatic or electropneumatic positioners, solenoid valves and limit switches according to IEC 60534 and NAMUR recommendation. The Type 3204-7 is intended for integral positioner attachment (see Data Sheet ▶ T 8355 for details)

Versions

With actuator areas of 350 or 700 cm²

– **Type 3204-1** · Pneumatic actuator with rotary lever (Fig. 1)
– **Type 3204-7** · Pneumatic actuator with rotary lever for integral positioner attachment (Fig. 2)

Further versions

– Handwheel on the outer diaphragm case

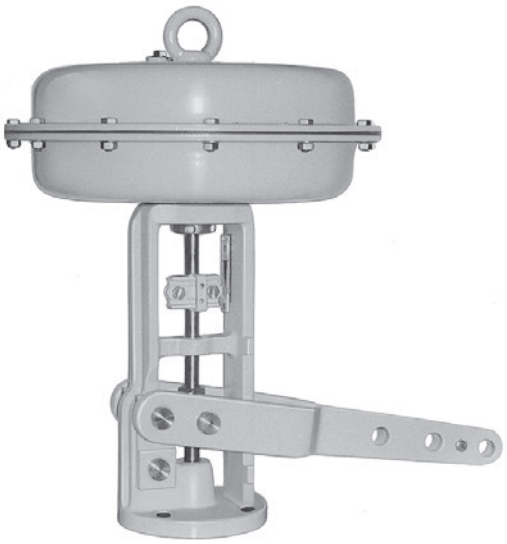

Fig. 1: *Type 3204-1 Pneumatic Actuator*

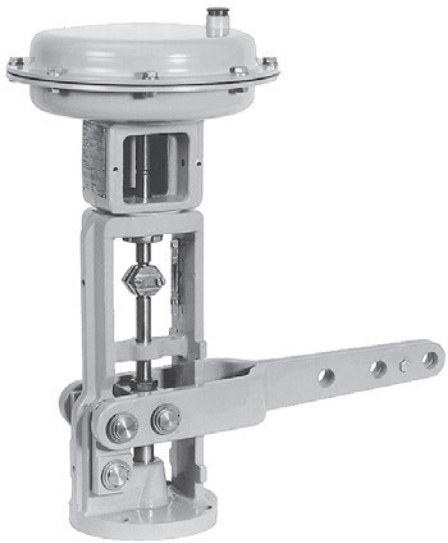

Fig. 2: *Type 3204-7 Pneumatic Actuator*

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Edition September 2020

Principle of operation

The signal pressure p_{st} creates a force at the diaphragm (2), which force is opposed by the springs (4) in the actuator. The number of actuator springs and their compression determine the bench range (signal pressure range). The position of the actuator stem (7) is transmitted to the actuator lever (12) by the stem connector (8), linear shaft (9) and adjustable coupling (10). The lever can rotate over a pivot in the yoke (11). It has three holes at the free end for fastening the forkhead with pin and locking washer.

Which hole is selected depends on the required thrust and the travel necessary for the connected linkage.

The direction of action of the actuator stem (7) depends on how the springs are installed in the actuator and the location of the signal pressure connection:

– **Actuator stem extends (FA):**
  The spring (4) move the actuator stem downward. The signal pressure connection (1) is located on the bottom diaphragm case.
– **Actuator stem retracts (FE):**
  The spring (4) move the actuator stem upward. The signal pressure connection (1) is located on the top diaphragm case.

The fail-safe action of these versions are defined in the same manner.

Table 1: *Technical data and materials*

Technical data	
Max. permissible signal pressure	6 bar
Permissible temperatures in continuous operation	Standard material NBR: –35 to +90 °C
	Special material EPDM (with air free of oil and grease): –35 to +120 °C
Materials	
Rolling diaphragm	NBR (nitrile butadiene rubber) with fabric reinforcement
	EPDM with fabric reinforcement
Actuator stem	1.4305
Actuator stem sealing	NBR (nitrile butadiene rubber)
	EPDM
Diaphragm cases	Sheet steel, plastic-coated
Yoke and lever	Spheroidal graphite iron
Linear shaft	1.4006

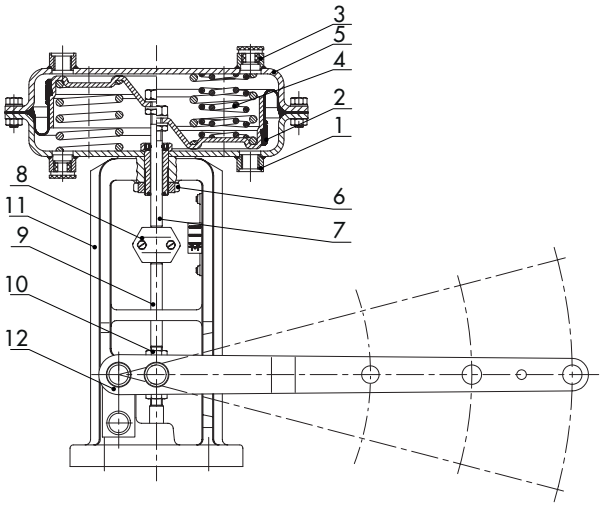

Fig. 3: *Type 3204-1 Pneumatic Actuator (right half with additional springs)*

1 Signal pressure connection
2 Diaphragm
3 Vent plug
4 Springs
5 Diaphragm cases
6 Nut
7 Actuator stem
8 Stem connector with travel indicator
9 Linear shaft
10 Adjustable coupling
11 Yoke
12 Lever

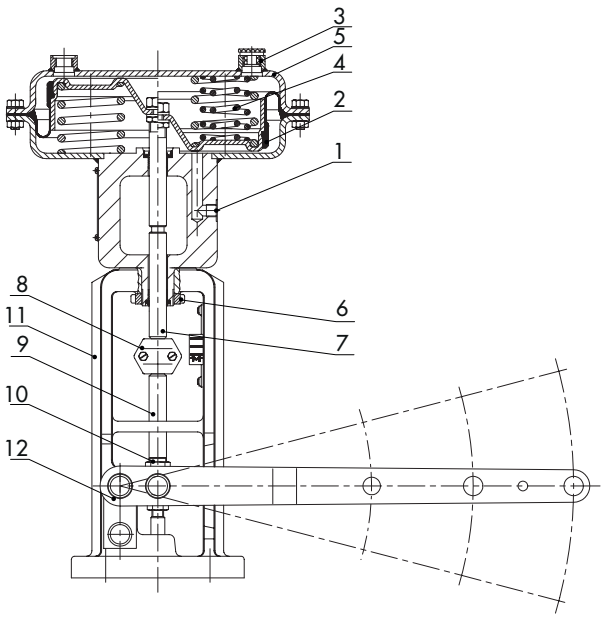

Fig. 4: *Type 3204-7 Pneumatic Actuator*

Table 2: *Bench ranges and thrusts*

All pressures in bar (gauge) · All forces in Nm

The specified forces are the minimum forces at 0 % travel and p_{st} = 0 bar.

Values specified in the gray-shaded columns correspond to the normal case.

The thrusts specified in the white columns apply to maximum pretensioned springs.

Signal pressure range		**0.2 to 1**	**0.4 to 1.2**	**0.4 to 2**	**0.8 to 2.4**	**0.6 to 3**	**1.2 to 3.6** [1]	**1.4 to 2.3**	**2.1 to 3.3**
Required supply pressure		1.2	1.6	2.4	3.2	3.6	4.8	3.7	5.4
350 cm² actuator, 15 mm rated travel									
Thrust in N	F1	100	200	200	400	300	600	700	1050
	F2	71	140	140	280	210	420	500	750
	F3	55	110	110	220	160	330	380	580
700 cm² actuator, 30 mm rated travel									
Thrust in N	F1	230	470	470	950	710	1420	1660	2500
	F2	190	380	380	760	570	1140	1330	2000
	F3	150	310	310	630	470	950	1110	1670

[1] Only for version with "actuator stem extends" fail-safe action. We recommend using a positioner for 0.2 to 1 bar signal pressure range. In all other cases, a positioner is required.

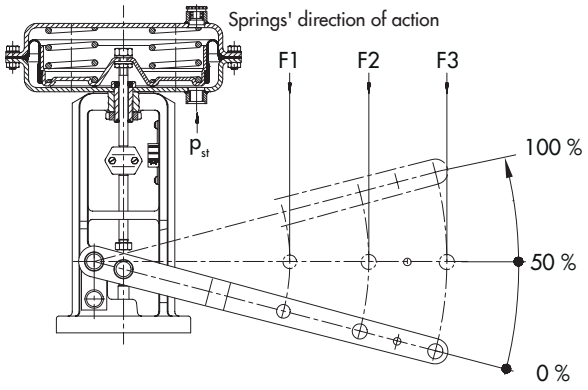

Fig. 5: *Version with "actuator stem extends" fail-safe action*
Lever position for pressure p_{st} = 0 bar (travel 0 %)

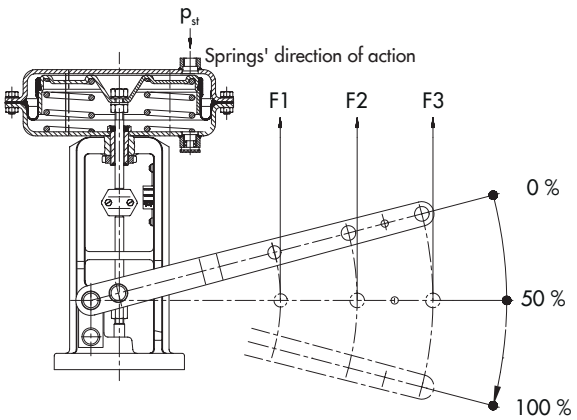

Fig. 6: *Version with "actuator stem retracts" fail-safe action*
Lever position for pressure p_{st} = 0 bar (travel 0 %)

Ordering data

Pneumatic actuator with rotary lever	Type 3204-1/Type 3204-7
Manual override	With/without
Actuator area	350 or 700 cm²
Signal pressure range	… bar
Direction of action	Actuator stem extends or retracts
Rolling diaphragm	NBR or EPDM
Accessories	Fastening bracket, forkhead
Optionally, special version	
Valve accessories	Positioner, solenoid valve, limit switch

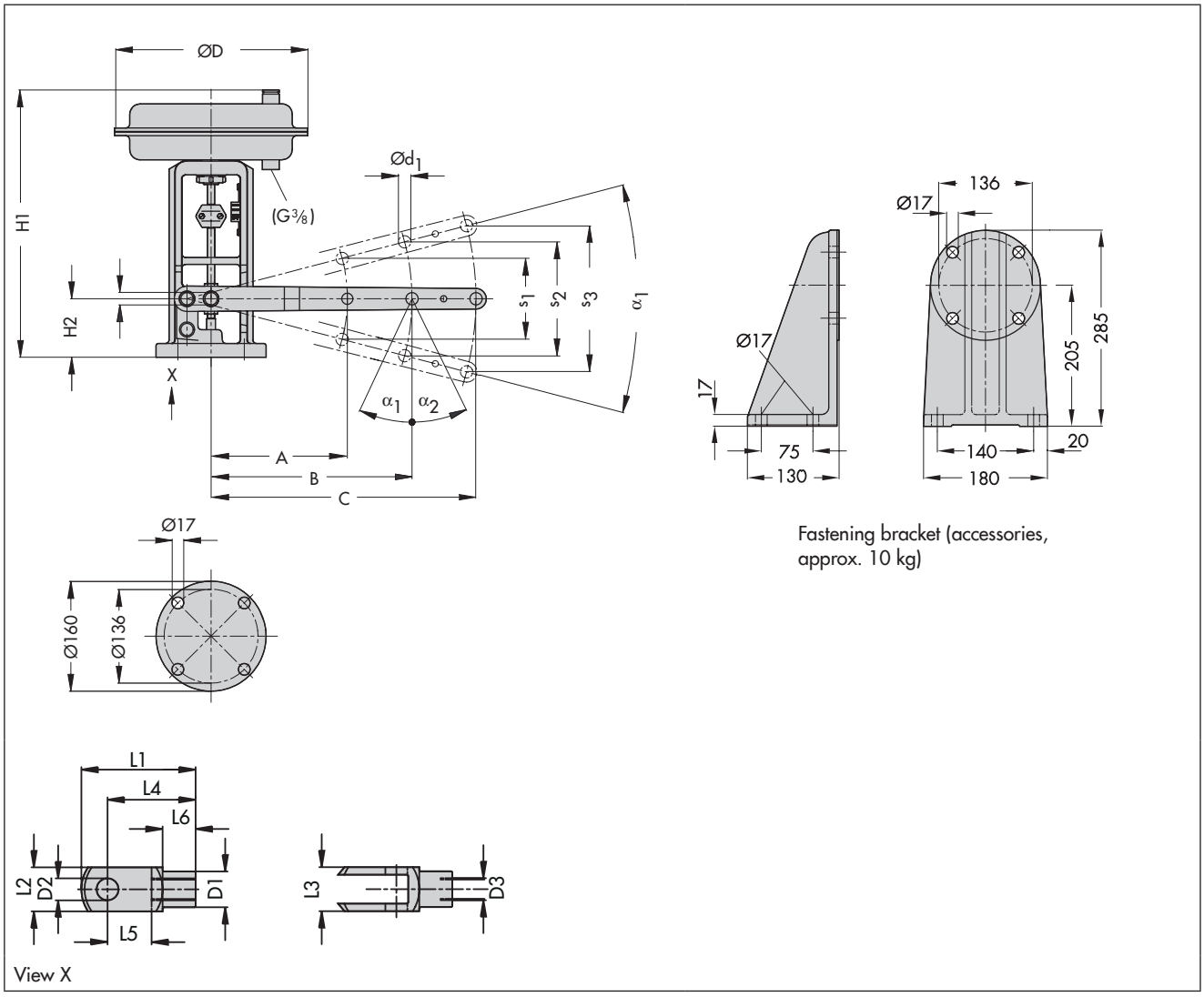

Table 3: *Dimensions and weights*

Dimensions in mm and weights in kg for Type 3204-1

Actuator (cm^2)	Rated travel	D	H1	H2	A	B	C	s_1	s_2	s_3	Ød1	α_1	α_2	Weight, approx.
350	15	280	383	85	198	292	385	100	140	180	16.2	25°	26°	20 kg
700	30	390	484	120	217	283	350	160	200	240	20.2	35°	14°	38 kg

The values for Type 3204-7 are higher as follows:

– H1 increases by approx. 100 mm.
– The weight increases by approx. 2 kg.

Table 4: *Forkhead with pin and locking washer*

Dimensions in mm and weights in kg

Actuator	L1	L2, L3, L5	L4	L6	D1	D2	D3	Weight, approx.
350 cm^2	83	32	64	24	26	16 H8	M16	0.3
700 cm^2	105	40	80	30	34	20 H8	M20	0.5