

Multi-Turn Actuator Series 30a

Application:

Single-acting pneumatic diaphragm multi- turn actuator for control and shut-off valves with rotating flow restrictors :

- Quarter turn 93°
- Air supply to 6 bar
- Temperatures -35°C to 90°C

The pneumatic multi- turn actuators of the series 30a are diaphragm actuators with rolling diaphragm and centrally fitted readjusting spring. The regulating pressure supplied generates a force at the diaphragm surface which opposes the compression springs arranged in the actuator. The stroke of the drive rod is transmitted via a lever mechanism onto the drive shaft. The actuators, which are free of nonferrous metals, distinguish themselves by:

- Effective diaphragm surfaces from 60 cm² to 1300 cm²
- Torques from 15 Nm to 5619 Nm
- High control forces with greater regulating speed and minimal friction by using low-wear rolling diaphragms as well as play- and maintenance-free bearings
- Various regulating pressure ranges through progressively adjustable spring preloading or variation of the springs,
- Alteration of the regulating pressure range without special tools
- Direction of operation (spring opens / spring closes) depends on connection to the quarter-turn valve
- Externally adjustable stop screws to limit the bevel
- Excellent control characteristics due to large stroke
- Attachments according to DIN/ISO 5211

Versions:

Pneumatic multi- turn actuator for quarter turn 90 ±3°, effective diaphragm surfaces 60 cm², 105 cm², 240 cm², 470 cm², 780 cm² or 1300 cm².

- Maximum regulating pressure 3,5 bar, with spring 1
- Maximum regulating pressure 6,0 bar, with spring 2

Special designs:

- With manual actuation
- With double diaphragm for very high torques



Fig. 1 – Series 30a Multi-turn actuator



Fig. 2 – Series 30a Multi- turn actuator with Series 14a Butterfly valve and attached positioner

Multi - Turn Actuator Series 30a

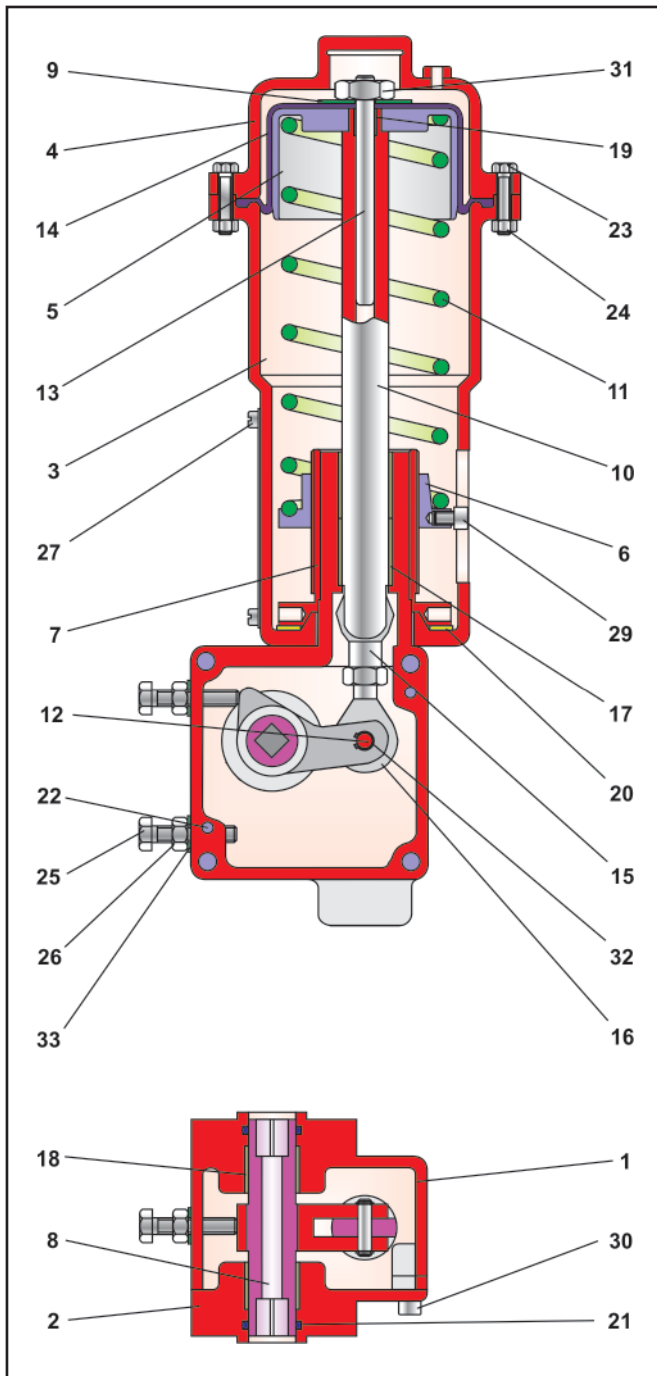


Bild 3 - Schwenktrieb BR 30a

Additional equipment and add-on pieces:

For the actuators, the following accessories are available either individually or in combination:

- Positioner
- Limit switch
- Solenoid valves
- Air supply stations
- Pressure gauge set

Further accessories are available on request for customer specifications. Details on request.

Principle of operation:

The regulating pressure p_{st} generates at the diaphragm surface "A" (14) the force $F = p_{st} \times A$, which opposes the compression springs (11) arranged in the actuator.

The diaphragm stroke "H" is transmitted via the drive shaft (10) and the ball-and-socket heads (15) and (16) onto the lift shaft (8) and turned into a motion of rotation.

By means of two external stop screws (25), the starting and finishing point of the bevel can be limited.

The stroke "H" is proportional to the regulating pressure p_{st} . The spring rate and the spring prestress determine the respective regulating pressure range.

This may be altered by turning the plate spring (7) in a wide range. For each size of actuator, there are two different springs foreseen as standard. Spring 1 can be employed to a pressure of 3,5 bar, spring 2 to max. 6 bar.

The connection of the valve can optionally be effected at both ends of the swivel joint (8).

Both connections are designed as square sockets in accordance with DIN/ISO 5211.

These various connection alternatives determine the safety positioning of the control element:

Safety position , "spring closing":

The spring (11) closes the valve when pressure is reduced on the diaphragm or in the case of power failure. With increasing regulating pressure, opening occurs against the force of the spring.

Safety position , "spring opening":

The spring (11) opens the control element when pressure is reduced on the diaphragm or in the case of power failure. With increasing regulating pressure, closing occurs against the force of the spring.

Item	Description	Item	Description
1	Bearing housing	17	Bushing
2	Bearing cover	18	Bushing
3	Actuator body	19	Bushing
4	Cover	20	Bearing washer
5	Diaphragm disk	21	O-ring
6	Spring plate	22	Tapered pin
7	Adjustable plate spring	23	Screw
8	Swivel joint	24	Nut
9	Washer	25	Screw
10	Axle drive shaft	26	Nut
11	Compression spring	27	Screw
12	Connection pin	29	Screw
13	Centring pin	30	Screw
14	Diaphragm	31	Nut
15	Connection link	32	Circlip
16	Connection link	33	Spring washer

Table 1 - List of parts

General technical data:

Operation		Single-acting
Max. perm. regulating pressure	Spring 1	3.5 bar
	Spring 2	6.0 bar
Sizes		0 • 1 • 2 • 3 • 4 • 5 • 6
Perm. temperature range		-35°C to 90°C
Connection to valve		DIN EN ISO 5211

Table 2 - Technical data

Materials:

Body and cover	EN-JS 1049 (GGG 40.3)
Diaphragm	NBR (Nitril-Kautschuk) mit Gewebeeinlage
Axle drive shaft	1.4104 / 1.4006
Swivel joint	1.0570 / 1.0601
Compression spring	1.8159
Bushings	PTFE
O-ring	Viton
Coating	PVC black (RAL 9005)

Table 3 - Materials

Progression of the torques:

The progression of the torques is determined by the lift geometry. A typical example is shown in Fig. 4.

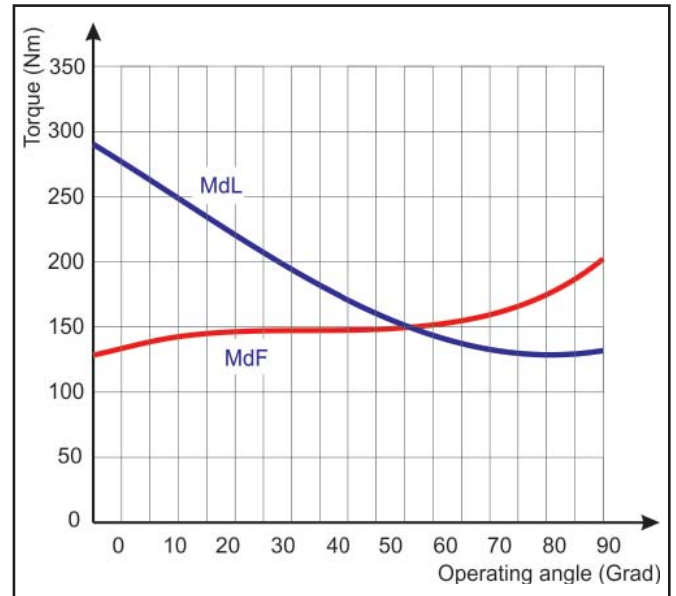


Fig. 4 – Example for torque progression for actuator size 3 with spring 1 at 2,5 bar inlet air

Torques:

Type	Air inlet	2,5 bar	3 bar	3,5 bar	4 bar	4,5 bar	5 bar	5,5 bar	6 bar
	Spring (1=3,5 / 2=6):	1	1	1	2	2	2	2	2
Size 0	Md Air min. [Nm]:	16	21	27	24	29	34	42	52
	Md Air max. [Nm]:	40	46	53	65	72	77	86	97
	Md Spring min. [Nm]:	15	21	25	24	29	34	36	36
	Md Spring max. [Nm]:	34	39	43	56	60	65	67	67
Size 1	Md Air min. [Nm]:	40	57	76	56	67	83	101	120
	Md Air max. [Nm]:	95	120	147	160	176	198	225	252
	Md Spring min. [Nm]:	40	42	42	56	67	72	72	72
	Md Spring max. [Nm]:	60	61	61	105	114	117	117	117
Size 2	Md Air min. [Nm]:	59	77	95	84	102	121	139	170
	Md Air max. [Nm]:	155	179	204	259	282	307	331	373
	Md Spring min. [Nm]:	59	77	95	83	102	121	139	139
	Md Spring max. [Nm]:	111	125	139	188	204	218	233	233
Size 3	Md Air min. [Nm]:	129	173	233	160	197	234	269	306
	Md Air max. [Nm]:	291	353	437	510	557	605	652	703
	Md Spring min. [Nm]:	128	149	149	160	197	233	269	302
	Md Spring max. [Nm]:	201	219	219	373	402	431	460	487
Size 4	Md Air min. [Nm]:	249	319	389	380	451	521	592	705
	Md Air max. [Nm]:	595	694	792	972	1068	1167	1265	1426
	Md Spring min. [Nm]:	249	319	389	379	451	521	592	600
	Md Spring max. [Nm]:	417	473	529	689	747	803	858	865
Size 5	Md Air min. [Nm]:	570	734	894	798	966	1131	1294	1458
	Md Air max. [Nm]:	1398	1629	1862	2352	2578	2807	3037	3268
	Md Spring min. [Nm]:	570	733	894	798	966	1130	1294	1457
	Md Spring max. [Nm]:	892	1013	1132	1546	1671	1794	1915	2037
Size 6	Md Air min. [Nm]:	926	1235	1536	1601	1904	2205	2502	3011
	Md Air max. [Nm]:	2464	2834	3211	3825	4199	4577	4957	5619
	Md Spring min. [Nm]:	926	1235	1535	1600	1903	2204	2502	2518
	Md Spring max. [Nm]:	2147	2427	2700	3294	3570	3842	4112	4127

Table 4 - Table of torques

The lowest and highest torques are respectively underlain and printed in bold type

Dimensions and Weights:

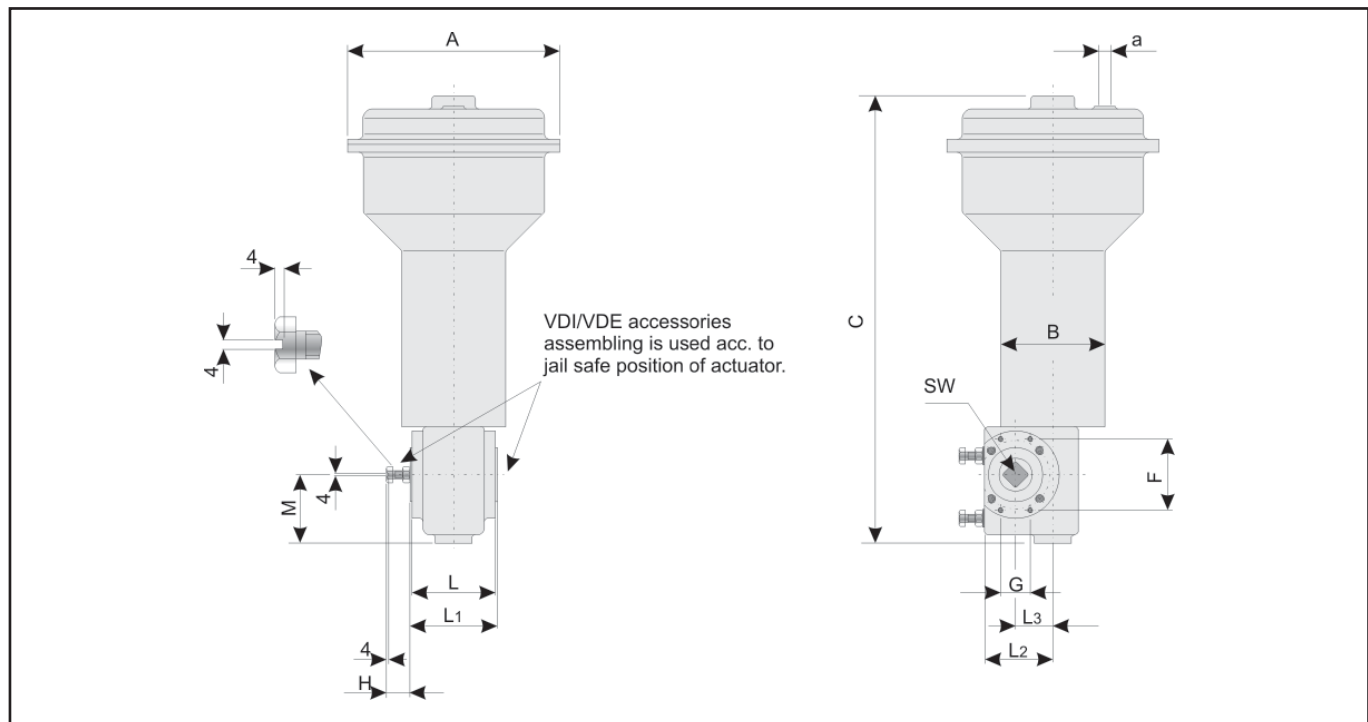


Fig. 5 - Dimensional drawing

Size	0	1	2	3	4	5	6
Ø A	134	175	189	240	333	410	510
Ø B	90	114	120	150	198	244	250
C	364	453	550	570	706	989	1128
L	94	94	126	126	148	152	190
L1	100	100	132	132	156	160	200
L2	75	75	100	100	145	130	165
L3	40	40	56	56	64	80	90
M	60	76	95	95	104	145	145
a	G1/4"	G1/4"	G1/4"	G1/4"	G3/8"	G1/2"	G1/2"
SW	11	14	17	22	36	36	46
DIN/ISO	F04	F05	F07	F10	F14	F14	F16
F	80	80	80	130	130	130	80
G	30	30	30	30	30	30	30
H	30	30	30	30	30	30	30
VDI/VDE	2	2	2	3	3	3	2
Weight	10	16	22	30	70	120	190

Table 5 - Dimensions in mm and weights in kg

Size	0	1	2	3	4	5	6
Effective diaphragm area [cm ²]	60	105	125	240	470	780	1300
Rated travel [mm]	55	60	90		120		
Travel volume at rated travel [dm ³]	0,33	0,63	1,13	2,16	4,23	9,36	15,6

Table 6 - Air volume

Order text:

Pneumatic Multi- turn actuator Series 30a
 Size
 Max. regulating pressure bar
 Limit switch manufacturer:
 Solenoid valve manufacturer:
 Positioner:
 Other:

For your special requirements please contact our technical sales department.

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Values subject to change