



BR 31a · PFEIFFER Rotary Actuator Edition 2010

Single and double acting piston actuator

Application

Single-acting or double-acting piston actuators for butterfly valves, ball valves and other final control elements with rotary closure members. Particularly suitable for high process requirements in chemical plants:

- **Opening angle 90°**
- **Supply pressure up to 10 bar**
- **Temperatures -40°C to +80°C**

The pneumatic rotary actuators are suitable for throttling or on/off service. Special features include:

- Wide adjustment range of the limit stops (+5°/–15°)
- Square drive either diagonal or parallel
- Position indicator can be adjusted as required (in steps of 45°)
- No special tools needed for mounting and conversion
- Various spring cartridges
- Power transmission without clearance thanks to involute gearing
- Direction of rotation can be reversed without additional components
- Special surface treatment method (Kesternich and salt spray testing)
- Standardized mounting of accessories acc. to VDI/VDE 3845
- Simple attachment according to ISO 5211

Versions

Type **SRP** and **DAP** in sizes from 1.5 to 10000

- **Type SRP**
Single-acting rotary actuator with spring-return mechanism
- **Type DAP**
Double-acting rotary actuator without spring-return mechanism



Fig. 1: BR 31a Rotary Actuator (showing adjustment screws for limit stops)

Fig. 2: BR 31a Rotary Actuator (showing NAMUR interface)

Special versions

- For continuous operation at temperatures from -15 to +150°C due to the use of FPM (FKM) O-rings
- For continuous operation at temperatures from -55 to +80°C due to the use of silicone seals
- With opening angles of 120° and 180°
- Dosage actuator with adjustable mid position
- Three-position actuator
- With hydraulic rotating speed adjuster
- Stainless steel rotary actuator
- Extendable limit stops between 0° and 90° implemented by internal or external limit stops
- Special version with slotted screws and glued centering ring

Additional equipment and mounting parts

The following accessories are available (separately or in combination):

- Positioner
- Limit switches
- Solenoid valves
- Air pressure reducing station
- Pressure gauge mounting blocks
- Restrictors
- Pneumatic volume booster
- Quick exhaust valves

Further accessories are available on request to meet customer specifications.

Principle of operation

The supply pressure p_{st} generates a force at the piston surface which is balanced either by the compression springs in the actuator (single-acting version) or by a corresponding counterpressure (double-acting version).

The force generated at the pistons is converted into a rotary motion by the pinion shaft.

The adjustable limit stops for OPEN and CLOSED position allow the end positions to be finely adjusted to $\pm 5^\circ / -15^\circ$.

In the single-acting version, the spring return torque and the required supply pressure are determined by the number of springs.

Fail-safe position

- The **Type SRP Rotary actuator** offers two possible fail-safe actions (rotary motions) in case the supply air fails or the pistons are relieved of pressure.
The rotation directions apply when looking from the actuator towards the valve.
- **Springs turn clockwise:**
The springs rotate clockwise when the pressure drops.
- **Springs turn counterclockwise:**
The springs rotate counterclockwise when the pressure drops.
- The **Type DAP rotary actuator** is designed without springs.
The actuator does not move to a defined end position when the supply air fails.

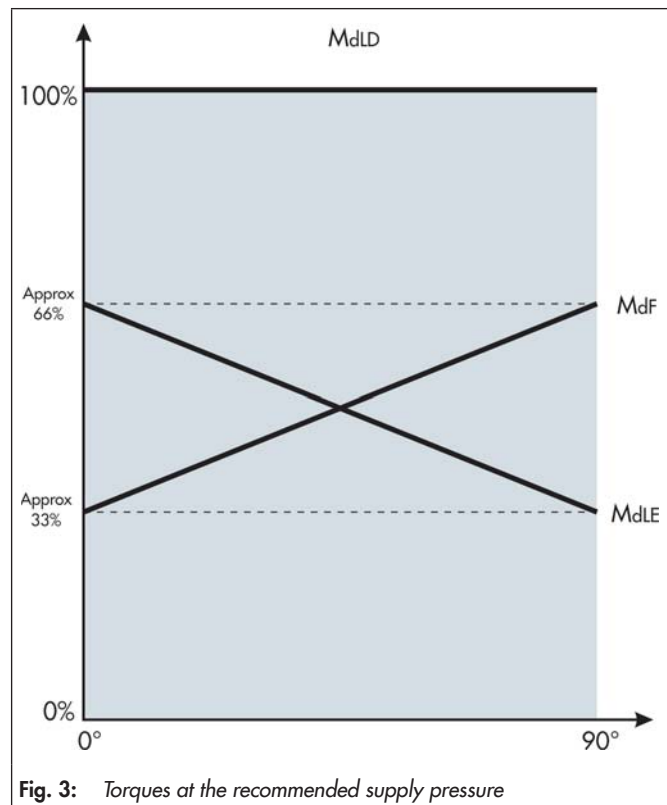
Torques for air strokes

Fig. 3 shows the usable air strokes (torques)

- M_{dLE} for the single-acting version
- M_{dLD} for the double-acting version

and the usable spring stroke M_{dF} depending on the opening angle.

The torque graph applies to the supply pressure assigned to the recommended number of springs (highlighted by a gray background and printed in bold in the torque tables).



Useful new features

The Pfeiffer rotary actuators benefit from a series of technical improvements and useful new features. The actuators were developed according to the latest edition of the ISO 5211 standard.

- **Temperature range**

The temperature range of the standard actuators has been extended down to -40°C with new and improved sealing materials.

This allows the actuators with the standard temperature range to be used at ambient temperatures down to -40°C .

Additionally, the low-temperature version for -55 to $+80^{\circ}\text{C}$ and the high-temperature version suitable for temperatures from -15 to $+150^{\circ}\text{C}$ are still available.

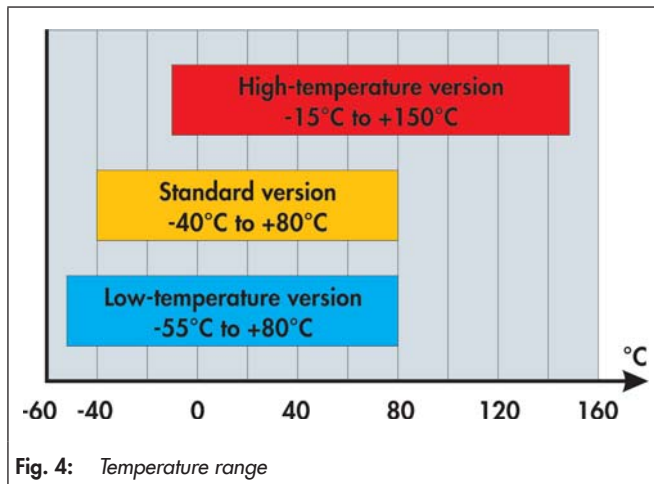


Fig. 4: Temperature range

- **Position indicator**

The position indicator on the actuator makes it easy to read off the opening angle at the actuator.

The degree reading can be mounted offset in steps of 45° .

Control and signal units can pick up the rotary motion of the actuator at a metal tag.

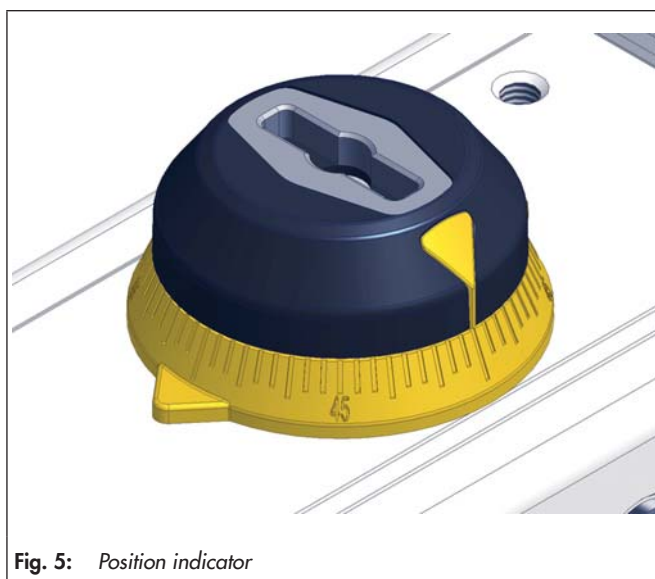


Fig. 5: Position indicator

- **Wider adjustment range of the limit stops**

The adjustment range of the limit stops has been considerably increased.

The anti blowout screws can be adjusted within a range of 20° at both ends. This allows the adjustment of the limit stops between -5° and $+15^{\circ}$ as well as between 75° and 95° .

Risk of injury while turning the adjustment screws in the pressurized state is ruled out since the screws are installed from the inside to be blowout proof.

To easily identify tampering, the screws are sealed with anti-tampering paint.

The adjustment screws are located at the back of the actuator to prevent accidental contact with the pneumatic unit and to make them easily accessible.

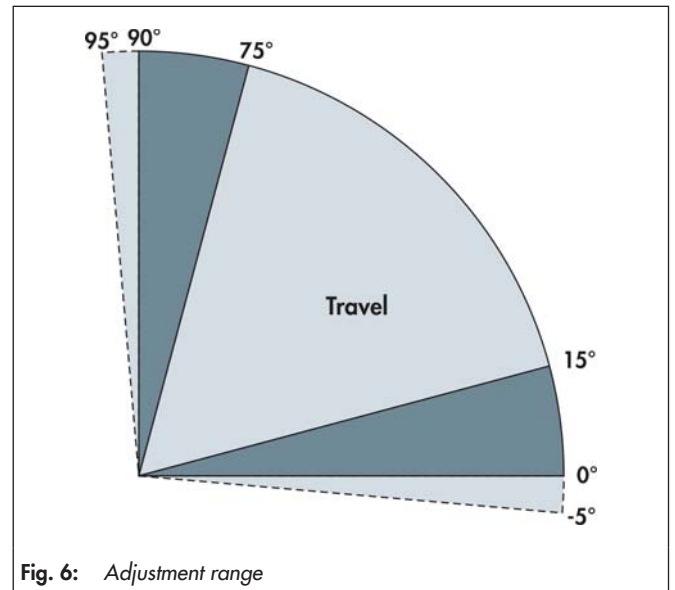


Fig. 6: Adjustment range

- **Flat end cap design**

The new end cap design makes it easier and safer to perform maintenance on the actuator. The actuator can simply be rested on one end without the risk of it tipping over since the end is flat.



Fig. 7: End cap design

General technical data

Table 1: Technical Data

Version	Single-acting	Double-acting
Max. perm. supply pressure	10 bar ¹⁾	
Sizes	15 • 30 • 60 • 100 • 150 • 220 • 300 • 450 • 600 • 900 • 1200 • 2000 • 3000 • 4000 • 5000 • 10000	
Perm. temperature range	-40°C to 80°C in continuous operation	
Connection interface (Valve)	DIN ISO 5211	
Interface for positioners or signal transmitters	Type 15 - 150	VDI VDE 3845, size 1
	Type 220 - 600	VDI VDE 3845, size 2
	Type 900 - 5000	VDI VDE 3845, size 4
	Type 10000	VDI VDE 3845, size 5
Connection for solenoid valves	VDI VDE 3845	



¹⁾ Note:
Contact PFEIFFER for torques
for 10 bar.

Dimensions and weights

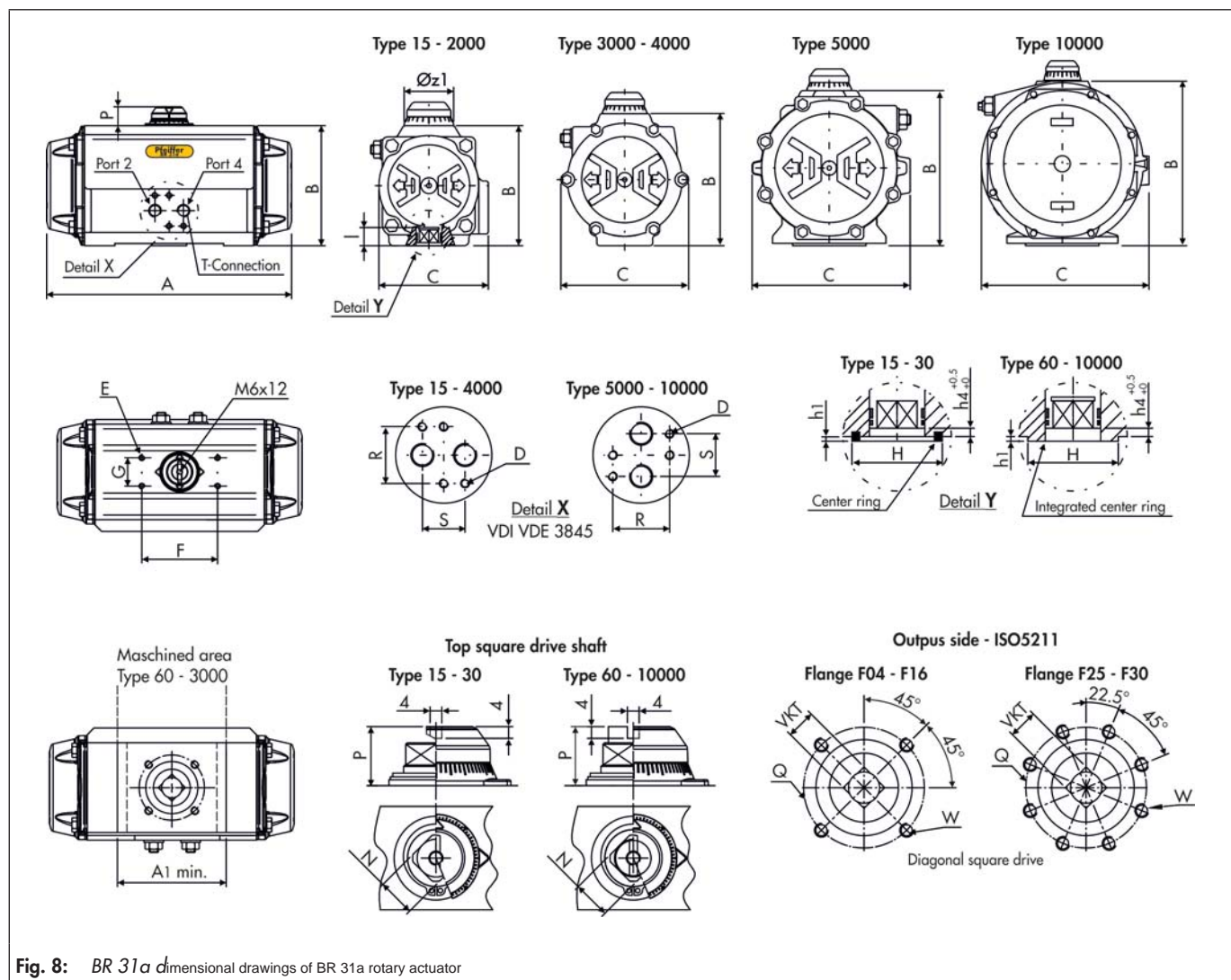


Fig. 8: BR 31a dimensional drawings of BR 31a rotary actuator

Table 2: Dimensions in mm and weights in kg

Type DAP/SRP	15	30	60	100	150	220	300	450	600	900	1200	2000	3000	4000	5000	10000
ISO 5211	F04	F05	F05	F07	F07	F10	F10	F12	F12	F14	F14	F16	F16	F16	F25	F30
VKT	11H9	14H9	14H9	17H9	17H9	22H9	22H9	27H9	27H9	36H9	36H9	46H9	46H9	46H9	55H9	75H9
A	135.5	153.5	203.5	241	259	304	333	394.5	422.5	474	528	605	710	812	855	950
A1	-	-	115	140	150	180	190	230	240	210	210	230	340	390	-	-
B	69	85	102	115	127	145	157	177	196	220.5	245	298.5	330	383	410	518
C	71	84.5	93	106	118.5	136	146.5	166	181	200	221.5	262	330	371	418	528
D	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M6x10	M6x10	M6x10	M6x10	M6x10
E	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M6x10
F	80	80	80	80	80	80	80	80	80	130	130	130	130	130	130	200
G	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	50
N	11	11	17	17	17	27	27	27	27	36	36	36	36	36	36	36
P	20	20	20	20	20	30	30	30	30	50	50	50	50	50	50	80
R	32	32	32	32	32	32	32	32	32	32	32	45	45	45	45	45
S	24	24	24	24	24	24	24	24	24	24	24	40	40	40	40	40
T ISO 228	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/2"	1/2"	1/2"	1/2"	1/2"
Øz1	42	42	42	42	42	58	58	67.5	67.5	80	80	115	115	115	115	135
ØQ	42	50	50	70	70	102	102	125	125	140	140	165	165	165	254	298
W	M5	M6	M6	M8	M8	M10	M10	M12	M12	M16	M16	M20	M20	M20	M20	M20
ØH	30	35	35	55	55	70	70	85	85	100	100	130	130	130	200	230
h1	Min.	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1
	Nominal	1.5	2	1	1	1	1.2	1.2	1.2	1.2	1.7	1.7	2	2	2	2
	Max.	3	3	3	3	3	3	3	3	3	4	4	5	5	5	5
h4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
l min.	12	16	16	19	19	24	24	29	29	38	38	48	48	48	57	77
Weight DAP	1	1.6	2.7	3.8	5.4	8.4	10.2	14.5	19.8	25	35.5	53	83	118	134	171
Weight SRP with 6 springs	1.1	1.7	3.2	4.4	6.5	9.8	12.6	18.1	24	31.6	45.1	64.2	102.2	150	169	251

Torque for Rotary actuator BR 31a

Table 3: Torques for double-acting Type DAP Rotary Actuator

Type DAP	Air strokes (Nm) with a supply pressure from 2.5 to 8 bar													
	2.5 bar	3 bar	3.5 bar	4 bar	4.2 bar	4.5 bar	5 bar	5.5 bar	6 bar	6.5 bar	7 bar	7.5 bar	8 bar	
15	8.3	10.0	11.6	13.3	14.0	15.0	16.6	18.3	19.9	21.6	23.3	24.9	26.6	
30	14.7	17.6	20.5	23.5	24.6	26.4	29.3	32.0	35.2	38.1	41.0	44.0	46.9	
60	29.1	34.9	40.7	46.5	48.9	52.4	58.2	64.0	69.8	75.6	81.4	87.3	93.1	
100	45.8	54.9	64.1	73.2	76.9	82.4	91.5	101	110	120	128	138	146	
150	66.5	79.8	93.1	106	112	120	133	146	160	173	186	199	213	
220	107	129	150	172	181	193	215	236	258	279	301	322	344	
300	138	166	194	222	233	249	277	305	332	360	388	415	443	
450	217	261	304	348	365	391	435	478	522	565	609	652	696	
600	284	340	397	454	477	511	567	624	681	737	794	851	908	
900	383	459	536	613	643	689	766	842	919	996	1072	1149	1225	
1200	532	638	745	851	893	957	1064	1170	1276	1383	1489	1595	1702	
2000	893	1072	1251	1430	1501	1608	1787	1966	2144	2318	2502	2684	2859	
3000	1297	1556	1815	2075	2179	2334	2594	2853	3112	3372	3631	3890	4150	
4000	1795	2154	2513	2872	3015	3231	3590	3949	4308	4667	5026	5400	5744	
5000	2252	2703	3153	3604	3784	4054	4504	4955	5405	5855	6306	6756	7207	
10000	4169	5003	5837	6671	7005	7505	8339	9173	10007	10841	11674	-	-	

Table 4: Torques for single-acting Type SRP Rotary Actuator

Type SRP	Number of springs	Air strokes (Nm) with a supply pressure from 2.5 to 4.2 bar										Spring strokes	
		2.5 bar		3 bar		3.5 bar		4 bar		4.2 bar		Start	End
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
15	2/3	5.0	3.0	7.0	4.7	8.0	6.3	10.0	8.0	10.7	8.7	5.3	3.3
	3	4.0	1.9	6.0	3.6	7.7	5.3	9.3	6.9	10.0	7.6	6.4	4.0
	3/4			5.3	2.5	7.0	4.2	8.7	5.8	9.4	6.6	7.4	4.6
	4					6.3	3.0	8.0	5.0	8.7	5.5	8.5	5.3
	4/5							7.3	3.7	8.1	4.4	9.6	5.9
30	2/3	9.1	6.2	12.0	9.2	15.0	12.1	17.9	15.0	19.1	16.2	8.4	6.0
	3	8	4.5	10.9	7.5	13.9	10.4	16.8	13.3	18.0	14.5	10.1	7.0
	3/4			9.8	5.8	12.8	8.7	15.7	11.6	16.9	12.8	11.8	7.8
	4					11.6	7.0	14.6	10.0	15.7	11.1	13.5	9.0
	4/5							13.5	8.3	14.6	9.4	15.2	10.0
60	2/3	18.0	11.8	23.8	17.6	29.7	23.4	35.5	29.9	37.8	31.6	17.3	11.1
	3	15.8	8.3	21.6	14.1	27.5	19.9	33.3	25.8	35.6	28.1	20.8	13.3
	3/4			19.4	10.7	25.2	16.5	31.1	22.3	33.4	24.6	24.2	15.5
	4					23.0	13.0	28.8	18.8	31.2	21.2	27.7	17.7
	4/5							26.2	15.4	29.0	17.7	31.2	19.9
100	2/3	27.4	16.9	36.6	26.0	45.7	35.2	54.9	44.3	58.5	48.0	28.9	18.3
	3	23.8	11.1	32.9	20.3	42.1	29.4	51.2	38.6	54.9	42.2	34.7	22.0
	3/4			29.2	14.5	38.4	23.6	47.5	32.8	51.2	36.4	40.4	25.7
	4					34.7	17.9	43.9	27.0	47.5	30.7	46.2	29.3
	4/5							40.2	21.2	43.9	24.9	52.0	33.0
150	2/3	41.1	27.1	54.4	40.4	67.7	53.7	81.0	67.0	86.3	72.3	39.4	25.3
	3	36.1	19.2	49.4	32.5	62.7	45.8	76.0	59.1	81.3	64.4	47.3	30.4
	3/4			44.3	24.6	57.6	37.9	70.9	51.2	76.2	56.5	55.1	35.5
	4					52.5	30.0	65.8	43.3	71.1	48.7	63.0	40.5
	4/5							60.8	35.5	66.1	40.8	70.9	45.6
220	2/3	66.5	41.9	87.9	63.4	109	84.9	131	106	140	115	66.5	41.0
	3	58.3	28.8	79.7	50.3	101	71.8	123	93.3	131	102	78.6	49.2
	3/4			71.5	37.2	93.0	59.0	115	80.2	123	88.8	91.7	57.4
	4					84.8	45.6	106	67.1	115	75.7	105	65.6
	4/5							98.1	54.0	107	62.6	118	73.8
300	2/3	86.0	56.1	114	83.8	141	111	169	139	180	150	82.4	52.5
	3	75.5	39.6	103	67.3	131	95.0	159	123	170	134	98.9	63.0
	3/4			93.0	50.8	120	78.5	148	106	159	117	115	73.5
	4					110	62.0	138	89.7	149	101	132	84.0
	4/5							127	73.3	138	84.3	148	94.5
450	2/3	135	88.6	179	132	222	176	265	219	283	236	129	82.4
	3	119	63.0	162	106	206	150	249	193	266	211	155	99.0
	3/4			146	80.0	189	124	233	167	250	185	180	115
	4					173	98.0	216	142	233	159	206	132
	4/5							200	116	217	133	232	148
600	2/3	171	118	228	174	285	231	342	288	364	310	166	112
	3	149	84.0	206	141	262	198	319	255	342	277	199	135
	3/4			183	108	240	165	297	221	319	244	233	157
	4					218	131	274	188	297	211	266	180
	4/5							252	155	275	178	299	202
900	2/3	225	146	301	223	378	299	455	376	485	406	237	158
	3	193	99.0	270	175	346	252	423	329	454	359	284	190
	3/4			238	128	315	205	391	281	422	312	332	221
	4					283	157	360	234	390	264	379	253
	4/5							328	186	359	217	426	285
1200	2/3	319	217	426	323	532	430	638	536	681	578	315	213
	3	277	154	383	260	489	367	596	473	638	515	378	255
	3/4			341	197	447	304	553	410	596	453	441	298
	4					404	241	511	347	553	390	504	340
	4/5							468	284	511	327	567	383
2000	2/3	533	372	712	551	890	730	1069	908	1141	980	521	360
	3	461	268	640	447	818	625	997	804	1068	876	625	433
	3/4			568	343	746	521	925	700	996	771	730	505
	4					674	417	853	596	924	667	834	577
	4/5							781	491	852	563	938	649
3000	2/3	751	496	1011	755	1270	1015	1529	1274	1633	1378	801	546
	3	642	336	902	595	1161	854	1420	1114	1524	1217	961	655
	3/4			793	435	1053	694	1312	954	1415	1057	1121	764
	4					943	534	1202	793	1306	897	1281	873
	4/5							1093	633	1197	737	1442	982
4000	2/3	1064	703	1423	1062	1782	1421	2141	1780	2284	1924	1092	731
	3	918	485	1277	844	1636	1203	1995	1562	2138	1706	1310	877
	3/4			1131	626	1489	985	1848	1344	1992	1487	1528	1023
	4					1343	766	1702	1125	1846	1269	1746	1170
	4/5							1556	907	1700	1051	1965	1316
5000	2/3	1332	1014	1783	1465	2233	1915	2684	2365	2864	2546	1238	920
	3	1149	767	1599	1217	2049	1667	2500	2118	2680	2298	1486	1104
	3/4			1415	969	1865	1420	2316	1870	2496	2050	1733	1288
	4					1682	1172	2132	1623	2312	1803	1981	1472
	4/5							1948	1375	2128	1555	2229	1656
10000	2/3	2474	1695	3308	2529	4142	3362	4976	4196	5310	4530	2475	1695
	3	2135	1200	2969	2034	3803	2867	4637	3701	4971	4035	2970	2034
	3/4			2630	1539	3464	2373	4298	3206	4632	3540	3465	2373
	4					3125	1878	3959	2711	4292	3045	3960	2712
	4/5							3620	2217	3953	2550	4455	3051

Table 5: Torques for single-acting Type SRP Rotary Actuator

Type SRP	Numbers of spring	Air strokes (Nm) with a supply pressure from 2.5 to 4.2 bar										Spring strokes	
		4.5 bar		5 bar		5.5 bar		6 bar		8 bar		Start	End
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
15	4	9.7	6.4	11.3	8.1	13.0	9.8	14.7	11.4			8.5	5.3
	4/5	9.0	5.4	10.7	7.0	12.3	8.7	14.0	10.0	20.6	17.0	9.6	5.9
	5	8.4	4.3	10.0	6.0	11.7	7.6	13.3	9.3	20.0	16.0	10.6	6.6
	5/6			9.4	4.9	11.0	6.6	13.0	8.2	19.3	14.9	11.7	7.3
	6					10.4	6.0	12.0	7.2	18.7	13.8	12.8	7.9
30	4	17.5	12.9	20.4	15.8	23.4	18.7	26.3	21.7			13.5	9.0
	4/5	16.4	11.2	19.3	14.1	22.3	17.1	25.2	20.0	36.9	31.7	15.2	10.0
	5	15.3	9.5	18.2	12.4	21.1	15.4	24.1	18.3	35.8	30.0	16.9	11.1
	5/6			17.1	10.8	20.0	13.7	23.0	16.6	34.7	28.3	18.6	12.0
	6					18.9	12.0	21.9	14.9	33.6	26.7	20.2	13.3
60	4	34.7	24.7	40.5	30.5	46.3	36.8	52.1	42.1			27.7	17.7
	4/5	32.5	21.2	38.3	27.0	44.1	32.8	49.9	38.6	73.2	61.9	31.2	19.9
	5	30.2	17.7	36.1	23.6	41.9	29.4	47.7	35.2	71.0	58.5	34.6	22.1
	5/6			33.8	20.1	39.7	25.9	45.5	31.7	68.7	55.0	38.1	24.3
	6					37.5	22.4	43.3	28.3	66.5	51.5	41.5	26.5
100	4	53.0	36.2	62.2	45.3	71.3	54.5	80.5	63.6			46.2	29.3
	4/5	49.4	30.4	58.5	39.5	67.7	48.7	76.8	57.8	113	94.5	52.0	33.0
	5	45.7	24.6	54.8	33.8	64.0	42.9	73.1	52.1	110	88.7	57.8	36.7
	5/6			51.2	28.0	60.3	37.1	69.5	46.3	106	82.9	63.5	40.3
	6					56.7	31.4	65.8	40.5	102	77.1	69.3	44
150	4	79.1	56.6	92.4	69.9	106	83.2	119	96.5			63.0	40.5
	4/5	74.0	48.8	87.3	62.1	101	75.3	114	88.6	167	142	70.9	45.6
	5	69.0	40.9	82.3	54.2	95.6	67.5	109	80.8	162	134	78.8	50.7
	5/6			77.2	46.3	90.5	59.6	104	72.9	157	126	86.7	55.7
	6					85.4	51.7	99.0	65.0	152	118	94.5	60.8
220	4	128	88.6	149	110	171	132	192	153			105	65.6
	4/5	120	75.5	141	97.0	163	118	184	140	270	226	118	73.8
	5	111	62.0	133	83.9	154	105	176	127	262	213	131	82.0
	5/6			125	71.0	146	92.3	168	114	254	200	144	90.2
	6					138	79.0	159	101	245	187	157	98.4
300	4	165	117	193	145	221	173	248	201			132	84.0
	4/5	155	101	182	129	210	156	238	184	349	295	148	94.5
	5	144	84.0	172	112	200	140	227	168	338	278	165	105
	5/6			161	96.0	189	123	217	151	328	262	181	116
	6					179	107	206	135	317	245	198	126
450	4	260	185	303	229	347	272	390	316			206	132
	4/5	243	159	287	203	330	246	374	290	547	464	232	148
	5	227	134	270	177	314	221	357	264	531	438	258	165
	5/6			254	151	297	195	341	238	515	412	283	181
	6					281	169	324	213	498	386	309	198
600	4	331	245	388	302	444	358	501	415			266	180
	4/5	309	212	365	268	422	325	479	382	706	609	299	202
	5	286	178	343	235	400	292	456	349	683	575	332	224
	5/6			320	202	377	259	434	315	661	542	365	247
	6					355	225	411	282	638	509	399	269
900	4	436	310	513	387	589	464	666	540			379	253
	4/5	405	263	481	340	558	416	634	493	941	799	426	285
	5	373	216	450	292	526	369	603	445	909	752	474	316
	5/6			418	245	495	321	571	398	877	704	521	348
	6					463	274	540	351	846	657	568	379
1200	4	617	453	723	560	830	666	936	772			504	340
	4/5	575	390	681	497	787	603	894	709	1319	1135	567	383
	5	532	327	638	434	745	540	851	646	1277	1072	630	425
	5/6			596	371	702	477	809	583	1234	1009	693	468
	6					660	414	766	520	1192	946	756	510
2000	4	1032	774	1210	953	1389	1132	1568	1310			834	577
	4/5	959	670	1138	849	1317	1028	1495	1206	2210	1921	938	649
	5	887	566	1066	745	1245	923	1423	1102	2138	1817	1042	721
	5/6			994	640	1173	819	1351	998	2066	1713	1146	793
	6					1101	715	1279	894	1994	1608	1251	865
3000	4	1461	1053	1721	1312	1980	1571	2239	1831			1281	873
	4/5	1352	893	1612	1152	1871	1411	2130	1671	3168	2708	1442	982
	5	1245	732	1504	992	1763	1251	2023	1510	3060	2548	1602	1091
	5/6			1395	832	1654	1091	1914	1350	2951	2388	1762	1200
	6					1545	931	1805	1190	2842	2228	1922	1309
4000	4	2061	1484	2420	1843	2779	2202	3138	2561			1746	1170
	4/5	1915	1266	2274	1625	2633	1984	2992	2343	4428	3779	1965	1316
	5	1769	1048	2128	1407	2487	1766	2846	2125	4282	3560	2183	1462
	5/6			1982	1188	2341	1547	2700	1906	4135	3342	2401	1608
	6					2194	1329	2553	1688	3989	3124	2620	1754
5000	4	2582	2073	3033	2524	3483	2974	3934	3424			1981	1472
	4/5	2398	1825	2849	2276	3299	2726	3750	3177	5551	4978	2229	1656
	5	2215	1578	2665	2028	3115	2479	3566	2929	5386	4731	2476	1839
	5/6			2481	1781	2931	2231	3382	2682	5184	4483	2724	2023
	6					2748	1983	3198	2434	5000	4236	2971	2207
10000	4	4793	3545	5627	4379	6461	5213	7294	6047			3960	2712
	4/5	4454	3050	5288	3884	6122	4718	6955	5552	10291	8887	4455	3051
	5	4115	2555	4949	3389	5783	4223	6616	5057	9952	8393	4949	3390
	5/6			4610	2894	5444	3728	6277	4562	9613	7898	5444	3729
	6					5105	3233	5938	4067	9274	7403	5939	4068

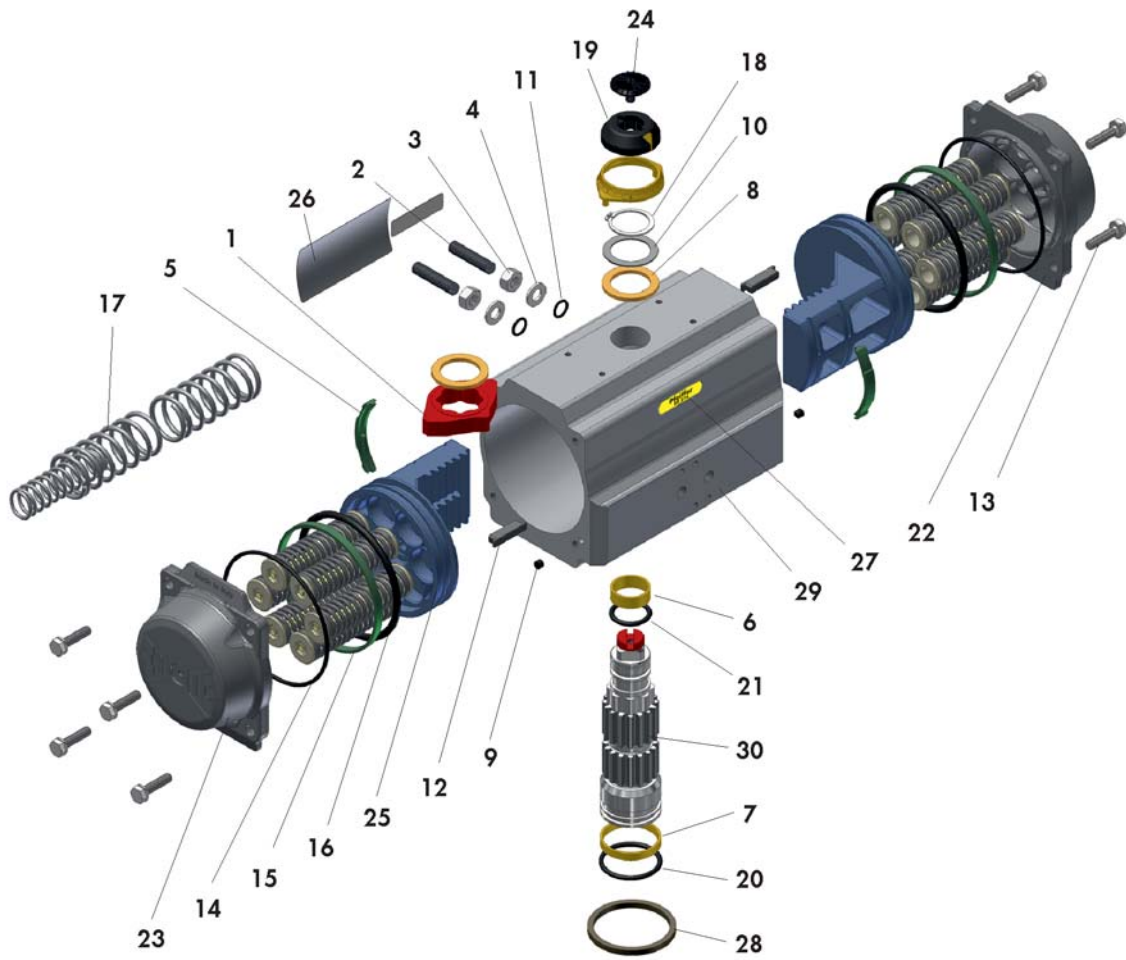


Fig. 9: Explosion view of Type 31a Rotary actuator

Table 6: Parts list

Item	Qty.	Designation	Material
1	1	Cam (end position adjustment)	GS400-15
2	2	Adjustment screw	A2-70
3	2	Lock nut	A2-70
4	2	Washer	A2
5	2	Piston guide jaw	Nylon 46
6	1	Shaft bearing bushing (top)	PA 46
7	1	Shaft bearing bushing (bottom)	PA 46
8	2	Thrust washer	Nylon 46
9	2	Stopper for air duct	NBR
10	1	Washer	1.4301
11	2	Seal (adjustment screw)	NBR
12	2	Supporting collar	Nylon 66 + 30% GF
13	8 / 12 / 16	Screw (end cap)	A2-70
14	2	Seal (end cap)	NBR
15	2	Piston ring	POM

Item	Qty.	Designation	Material
16	2	Piston gasket	NBR
17	4 - 12	Compression spring cartridge	SiCr spring steel
18	1	Retaining ring	C 75
19	1	Position indicator	PP + 30% GF
20	1	Shaft seal (bottom)	NBR
21	1	Shaft seal (top)	NBR
22	1	End cap (right)	GD-ALSi8.5Cu3.5Fe
23	1	End cap (left)	GD-ALSi8.5Cu3.5Fe
24	1	Screw (position indicator)	A2-70
25	2	Piston	GD-ALSi8.5Cu3.5Fe
26	1	Nameplate	Polyester/aluminium
27	2	Nameplate	Polyester/aluminium
28	1	Center ring	EN AW 6063
29	1	Housing	EN AW 6063
30	1	Shaft	C22

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