



BR 31a · PFEIFFER Rotary Actuator Edition 2020+

Single and double acting piston actuator

Application

Piston actuator 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**

VDI/VDE 3847 - Plug and Play

In addition to the NAMUR interface on the front, the actuator has a pneumatic interface next to the top end of the drive shaft. The automation only takes minutes and is done without piping.

The conventional automation according to VDI/VDE 3845 is still possible.

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
- 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 and VDI/VDE 3847
- Simple attachment acc. to DIN ISO 5211

Versions

Type SRP and DAP in sizes from 60 to 1200

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



Fig. 1: Rotary actuator BR 31a Edition 2020+



Fig. 2: Rotary actuator BR 31a Edition 2020+

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.

Due to the adjustable limit stop screws the end positions can be finely adjusted to $+5^\circ / -15^\circ$.

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 Actuator is designed without springs.
The actuator does not move to a defined end position when the supply air fails.

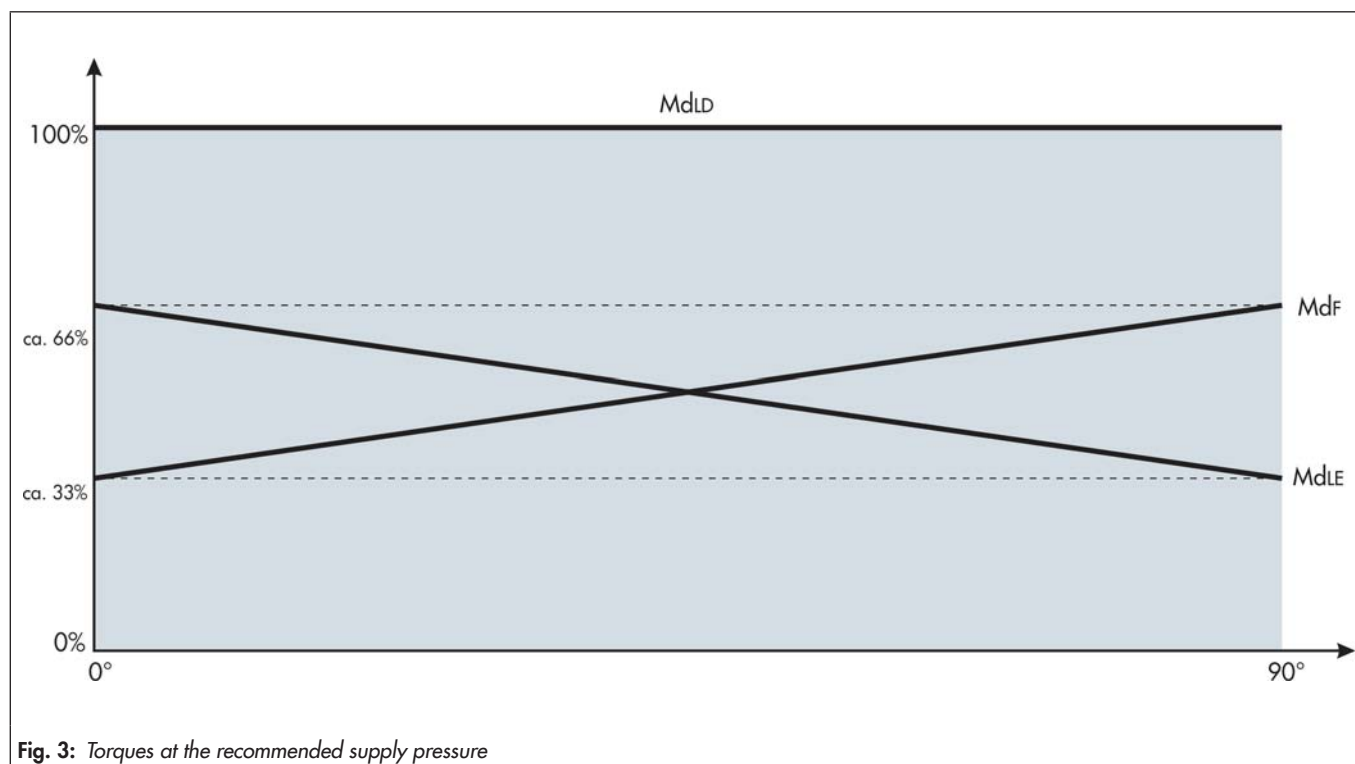
Torques for air strokes

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).



Integrated automation according to VDI/VDE 3847

Due to an attachment according to VDI/VDE 3847 a special interface is provided. The interface permits a pipeless mounting of positioners, solenoid valves and other accessories.

By locking the actuator with the integrated air blocker individual accessories can be exchanged or added without the need of dismantling the actuator and valve or interrupting the process.

All components are easily mounted.

Advantages of integrated mounting according to VDI/VDE 3847

- Heavily reduced assembly time
- Space-saving, compact installation
- No piping used
- During the process accessories can be changed or maintained
- Solenoid valves are easily retrofitted
- Integrated pneumatic pilot-operation for solenoid valves



Fig. 5: Rotary actuator BR 31a Edition 2020+ with Positioner, Solenoid valve and Limit switch



Fig. 4: Rotary actuator BR 31a Edition 2020+ with Positioner, Solenoid valve and Limit switch

- The exhaust air is returned into the spring chamber
- No corrosive atmosphere can enter the spring chamber
- Less potential leakage
- The mounting of a compact positioner is still possible
- The actuator can be locked manually and leak tightness can be tested internally
- Easy comparison of valve-monitoring-data because of standardised air guide
- During installation the actuator can achieve the operating position without an electrical signal by a special adapter plate

Dimensions and Weights

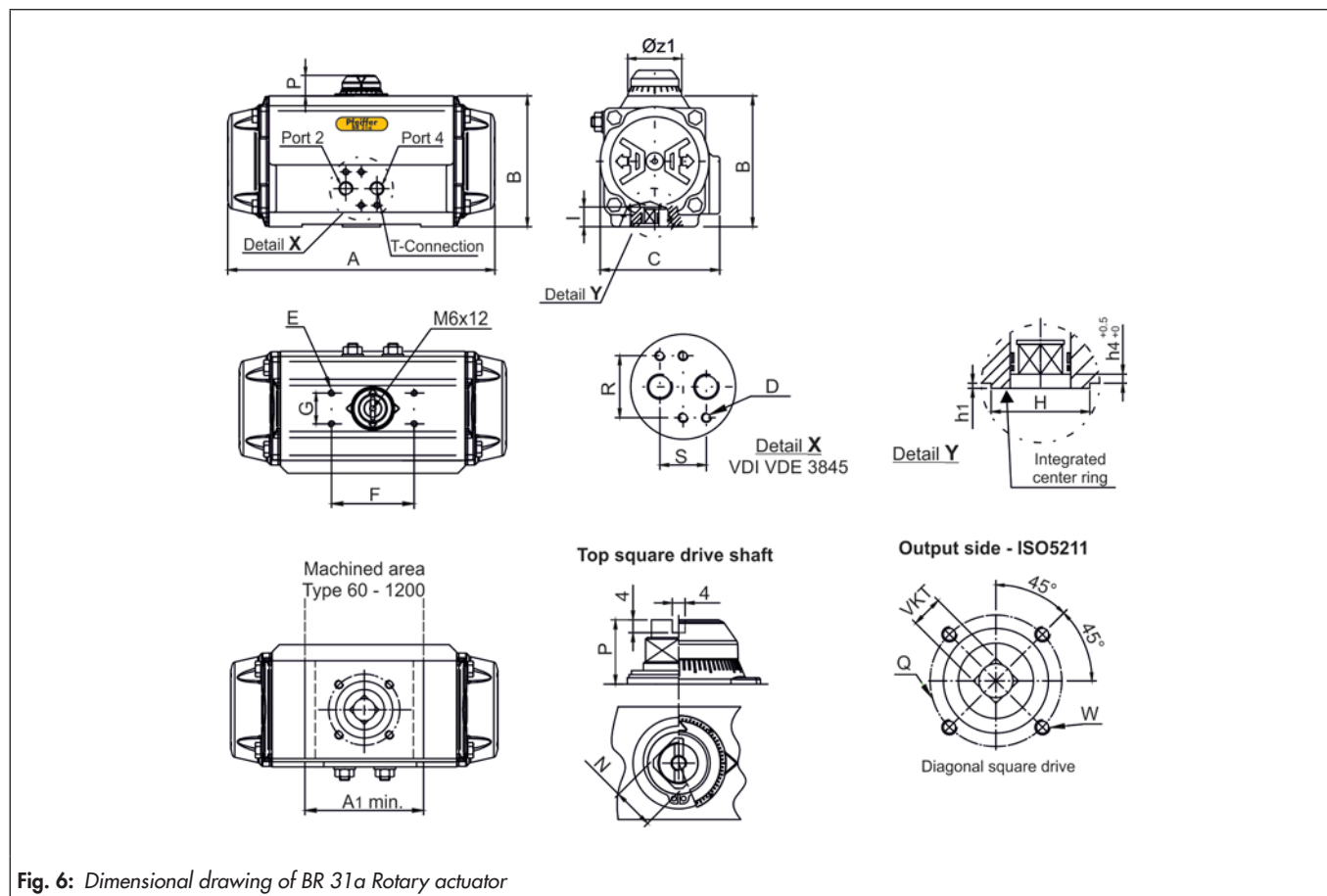


Fig. 6: Dimensional drawing of BR 31a Rotary actuator

Table 1: Dimensions in mm and Weights in kg

Type DAP/SRP	60	100	150	220	300	450	600	900	1200
ISO 5211	F05	F07	F07	F10	F10	F12	F12	F14	F14
VKT	14H9	17H9	17H9	22H9	22H9	27H9	27H9	36H9	36H9
A	203.5	241	259	304	333	394.5	422.5	474	528
A1	115	140	150	180	190	230	240	210	210
B	102	115	127	145	157	177	196	220.5	245
C	93	106	118.5	136	146.5	166	181	200	221.5
D	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8
E	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8
F	80	80	80	80	80	80	80	130	130
G	30	30	30	30	30	30	30	30	30
N	17	17	17	27	27	27	27	36	36
P	20	20	20	30	30	30	30	50	50
R	32	32	32	32	32	32	32	32	32
S	24	24	24	24	24	24	24	24	24
T ISO 228	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"
Øz1	42	42	42	58	58	67.5	67.5	80	80
ØQ	50	70	70	102	102	125	125	140	140
W	M6	M8	M8	M10	M10	M12	M12	M16	M16
ØH	35	55	55	70	70	85	85	100	100
h1	Min.	0.5	0.5	0.5	0.5	0.5	0.5	1	1
	Nominal	1	1	1	1.2	1.2	1.2	1.7	1.7
	Max.	3	3	3	3	3	3	4	4
h4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
l min.	16	19	19	24	24	29	29	38	38
Weight DAP	2.7	3.8	5.4	8.4	10.2	14.5	19.8	25	35.5
Weight SRP with 6 springs	3.2	4.4	6.5	9.8	12.6	18.1	24	31.6	45.1

Table 2: General technical data

Version	Single-acting	Double-acting
Max. perm. supply pressure	10 bar ¹⁾	
Sizes	60 • 100 • 150 • 220 • 300 • 450 • 600 • 900 • 1200	
Perm. temperature range	-40°C bis 80°C in continuous operation	
Connection interface (valve)	DIN ISO 5211	
VDI / VDE 3845	Typ 60 - 150	VDI/VDE 3845, AA1
	Typ 220 - 600	VDI/VDE 3845, AA2
	Typ 900 - 1200	VDI/VDE 3845, AA4
Integrated automation	VDI/VDE 3847	



¹⁾ **Info:**
Contact Pfeiffer for
torques for 10 bar.

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
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

Table 4: Torques for single-acting Type SRP Rotary Actuator (2,5 bar ... 4,2 bar)

Type SRP	Numbers of springs	Air strokes (Nm) with a supply pressure from 2.5 ... 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°
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

Table 5: Torques for single-acting Type SRP Rotary Actuator (4,5 bar ... 8 bar)

Type SRP	Numbers of springs	Air strokes (Nm) with a supply pressure from 4.5 ... 8 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°
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

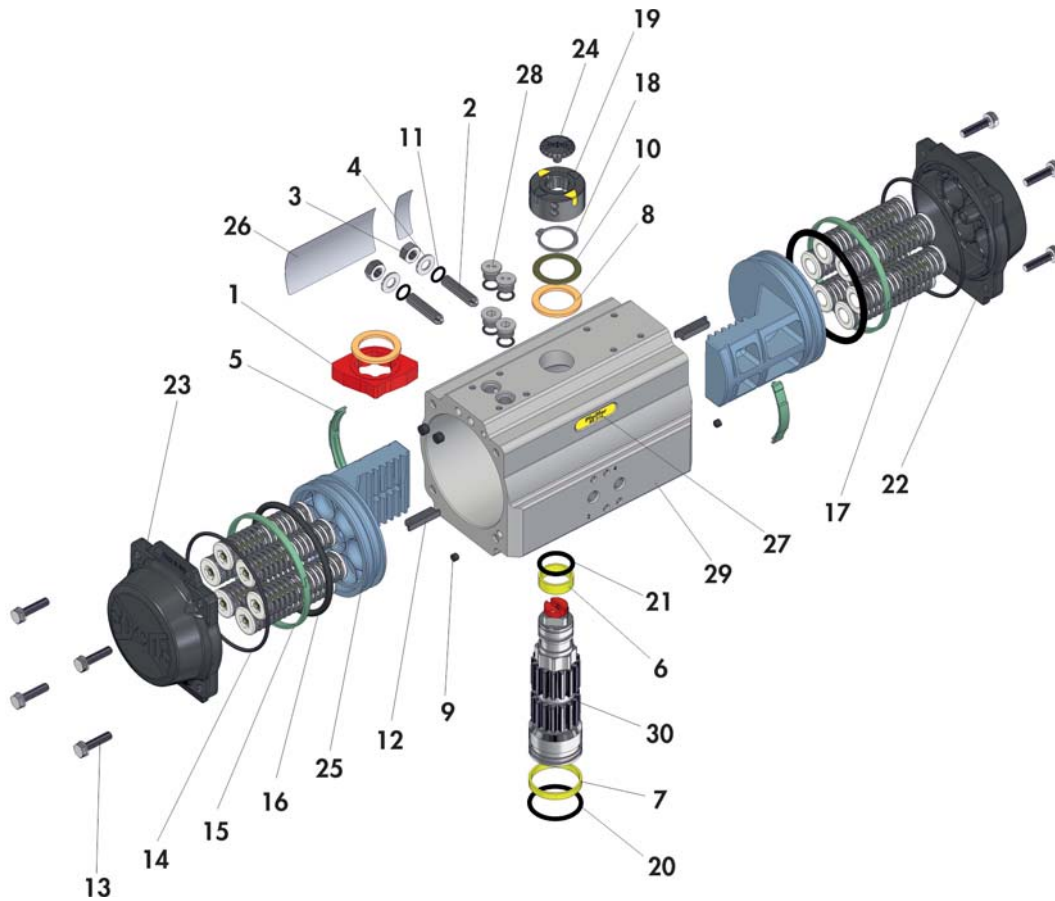


Fig. 7: Explosion view of BR 31a Rotary actuator

Table 6: Parts list

Item.	Qty.	Description	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	Screw (end cap)	A2-70
14	2	Seal (end cap)	NBR
15	2	Piston ring	POM

Item.	Qty.	Description	Material
16	2	Piston gasket	NBR
17	4 - 12	Compression spring cartridge	SiCr Federstahl
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	4	Locking screw	EN AW 6063
29	1	Housing	EN AW 6063
30	1	Shaft	C22