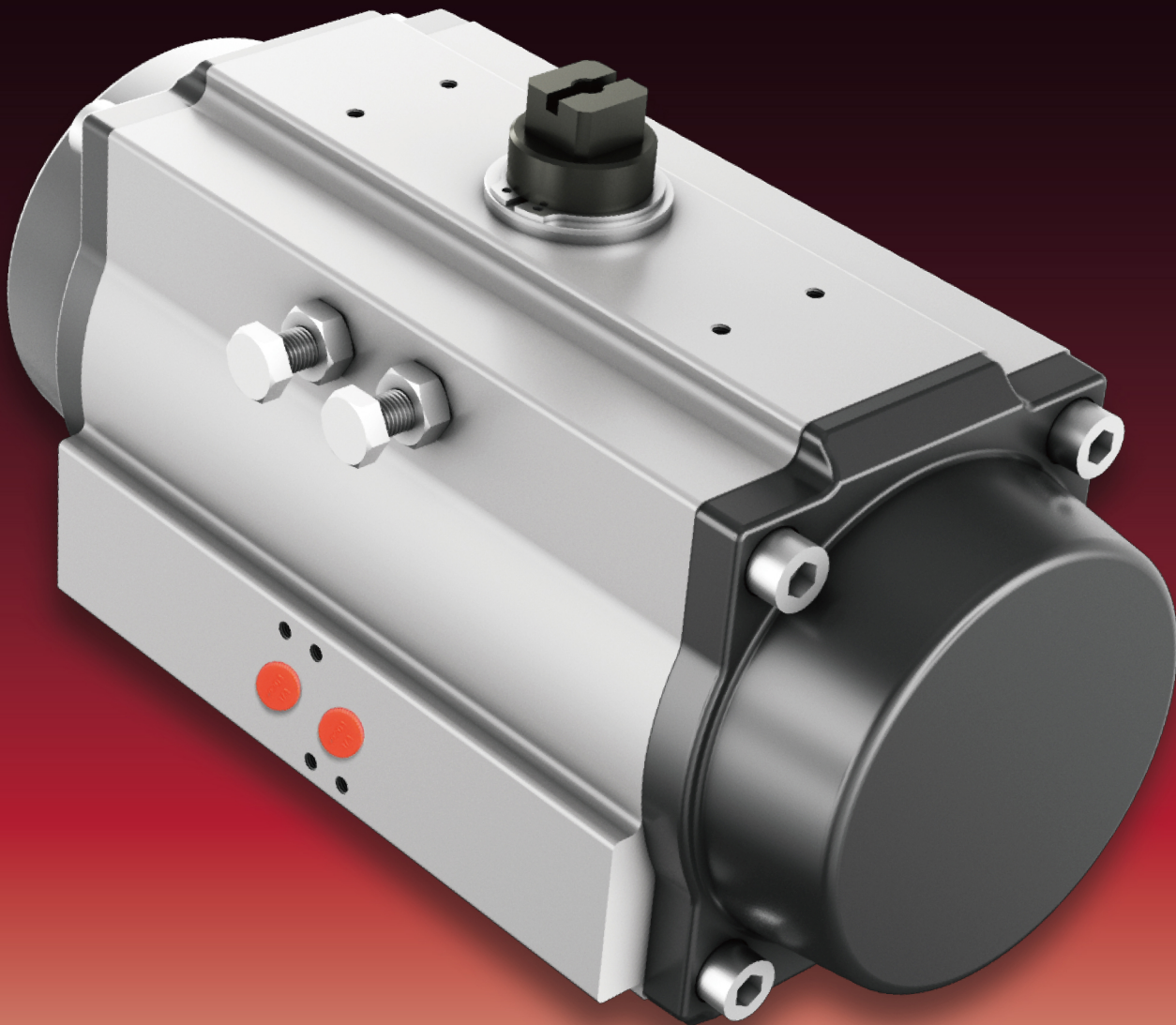


mcsys®



MAC-SERIES

PNEUMATIC ACTUATOR

Mechanical and Fluid Control Systems
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NEW PRODUCTS IN 2024



MAC-SERIES

Pneumatic Actuator

Mcsys Motto: "Be the Highest of Standards".
Mcsys motto reflects our desire to create world-class products that speak for themselves. The McSYS approach always stresses three major points: market-leading innovation, first-rate performance and unfailing reliability. In short, our goal is to offer to our clients and partners work that is nothing but the highest standards in engineering and design.



MAC Series Pneumatic Actuator Of Pinion And Rack Type

Structure

➤ Indicator

Multi-function position indicator with NAMUR is convenient for mounting accessories such as valve positioner, limit switch.

➤ Pinion

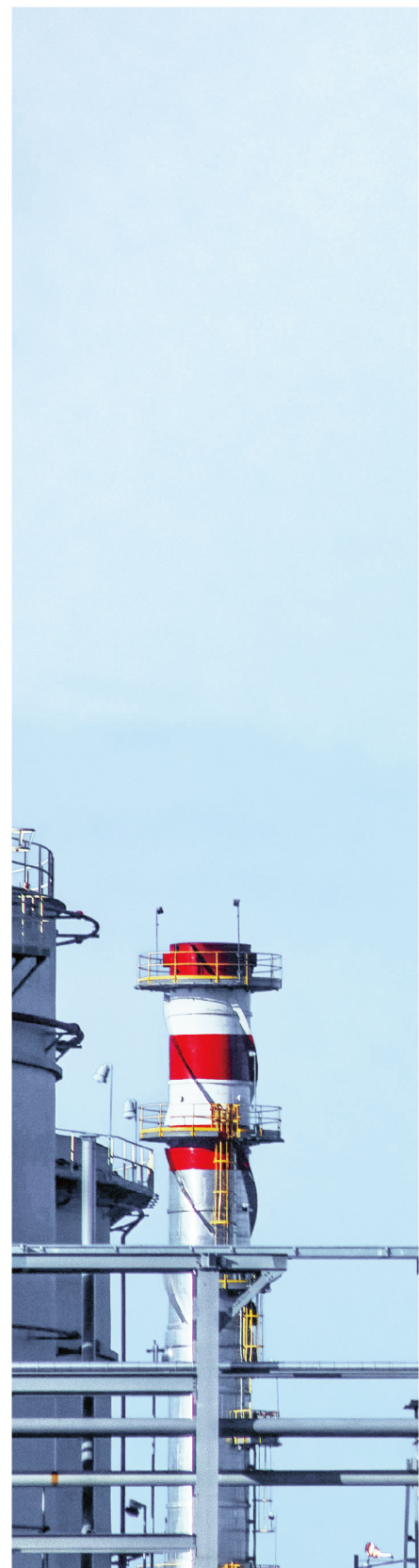
The pinion is high-precision and integrative, made from nickel-plating steel, full conform to the standards of ISO05211, DIN3337, NAMUR. The size can be customized and stainless steel is available.

➤ Actuator Body

According to the different requirements, the extruded aluminum alloy ASTM6005 body can be coated with hard anodized, polyester, PTFE or nickel.

➤ End Cap

End caps are made of Aluminum die-casting, and can be coated with polyester, metal powder, PTFE and nickel.



➤ **Piston**

The twin rack pistons are made of aluminum die-casting coated with hard anodized or steel coated with Zinc. Long lifespan, fast operation and reversed rotation by simple reversing.

➤ **Stroke Adjustment**

The two independent external travel bolts can accurately adjust $\pm 5\%$ at both open and close position.

➤ **High Performance Spring**

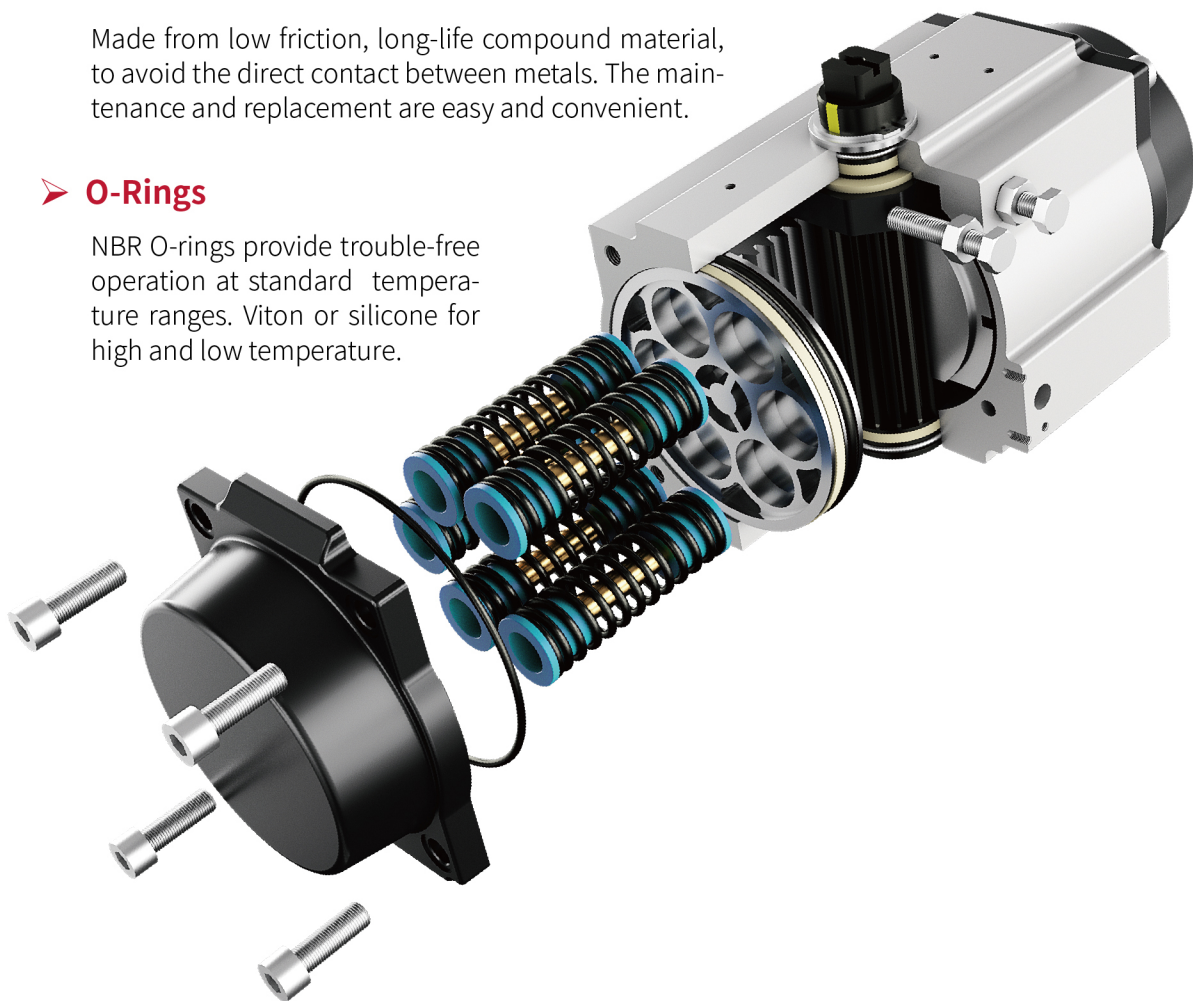
Preloaded springs are made from high quality material for resistant to corrosion and longer lifespan, which can be demounted safely and conveniently to satisfy different requirements of torque by changing quantity of springs.

➤ **Bearing & Guide**

Made from low friction, long-life compound material, to avoid the direct contact between metals. The maintenance and replacement are easy and convenient.

➤ **O-Rings**

NBR O-rings provide trouble-free operation at standard temperature ranges. Viton or silicone for high and low temperature.



Application

Applied on small/middle rotary valves, such as ball valve, butterfly valve.

Technical Parameters

1 Work Medium

Dry or lubricated air, the non-corrosive gases or oil.

2 Air Supply Pressure

Min. air pressure is 2 bar, max. air pressure is 8bar.

3 Operating Temperature

Standard: -20 ~ +80°C

Low: -40 ~ +80°C

High: -20 ~ +150°C



4 Stroke Adjustment

$\pm 5^\circ$ Adjustment range at 0° and 90° point for rotation.

5 Lubrication

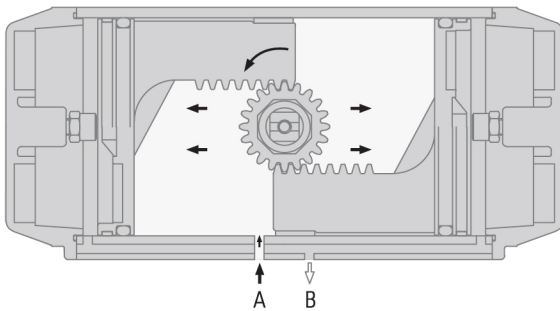
All the moving parts are coated with lubricants, extending their service life.

6 Application

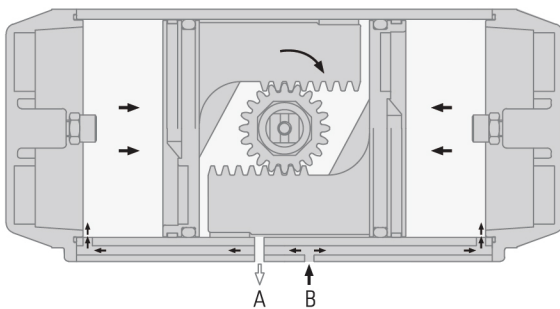
Either indoor or outdoor.

Operating Principle

CCW-Counter Clockwise



CW-Clockwise



Single Acting

Air from Port A forces the pistons outwards, causes the springs to compress, the pinion turns anticlockwise while the air exhausted through Port B.

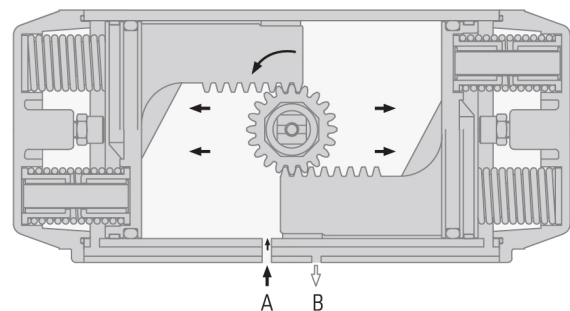
Loss of air force, compressed springs force the pistons inwards, causes the pinion turns clockwise while the air exhausted through Port A.

Double Acting

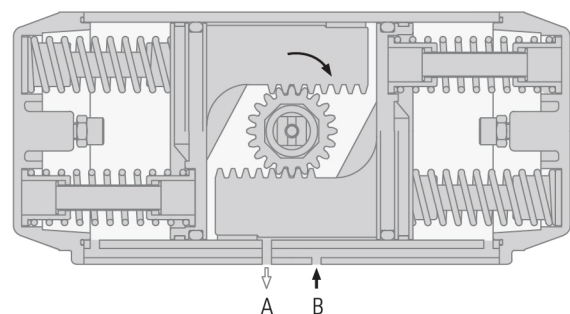
Air from Port B forces the pistons inwards, causes the pinion to turn clockwise while the air exhausted through Port A.

Air from Port A forces the pistons outwards, causes the pinion to turn counter clockwise while the air exhausted through Port B.

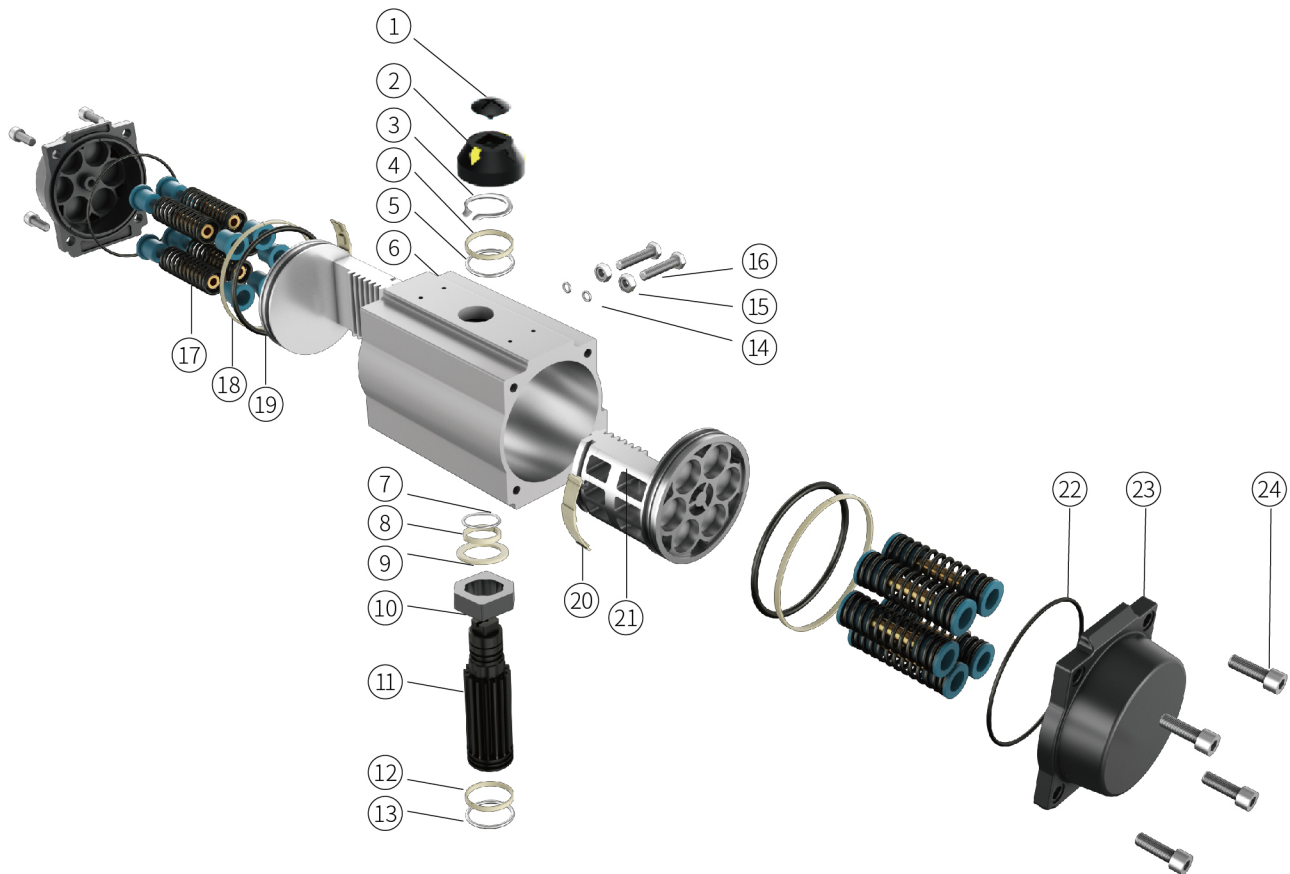
CCW-Counter Clockwise



CW-Clockwise

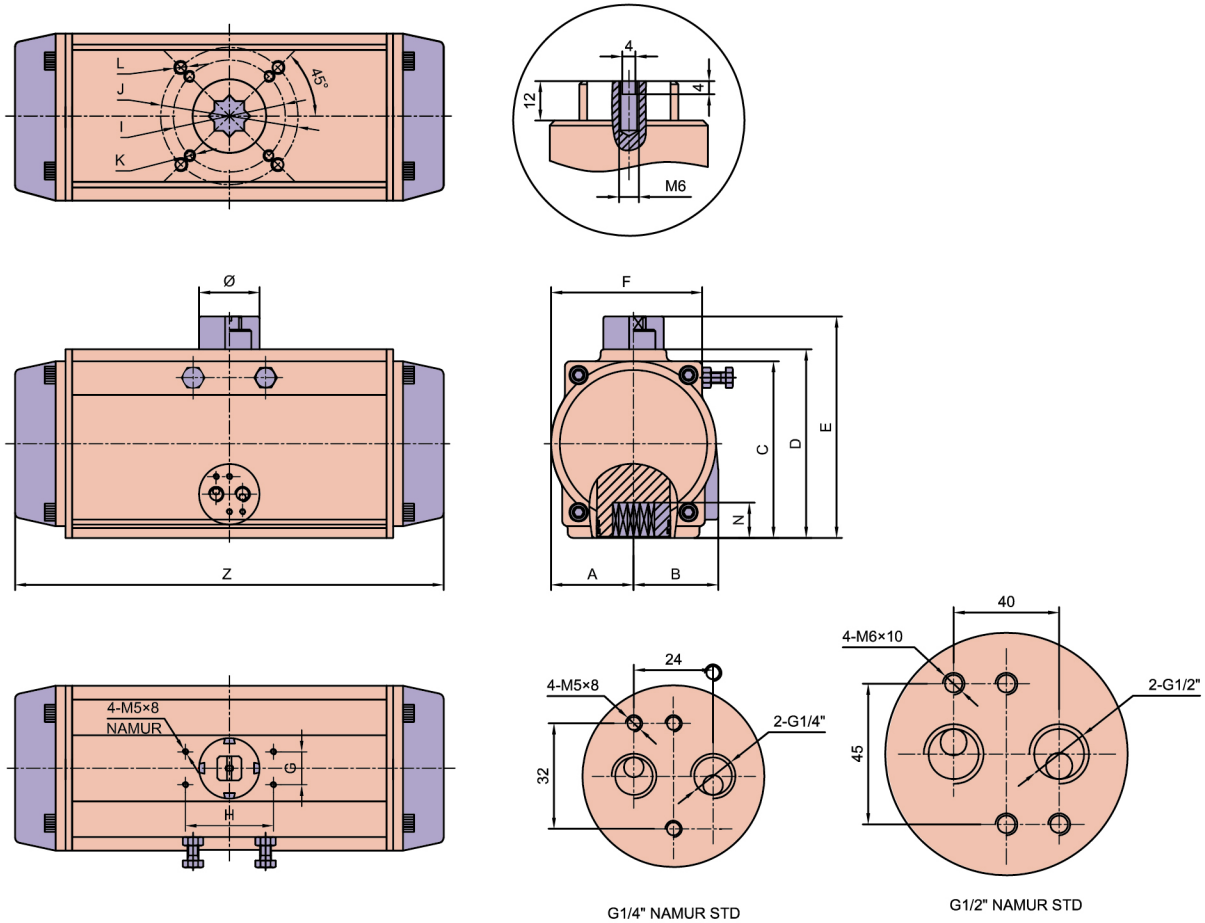


Part & Material



NO	Description	Qty	Standard Material	NO	Description	Qty	Standard Material
1	Indicator Screw	1	ABS	13	Bottom O-Ring	1	NBR/FBM
2	Position Indicator	1	ABS	14	Adjust O-Ring	2	NBR
3	Spring Clip	1	Stainless Steel	15	Adjust Nut	2	Stainless Steel
4	Washer	1	Stainless Steel	16	Adjust Bolt	2	Stainless Steel
5	Outside Washer	1	POM	17	Spring Assembly	5-12	Spring Steel, Die Casting
6	Top O-Ring	1	Aluminum Alloy	18	Piston Bearing	2	POM
7	Top Bearing	1	NBR/FBM	19	Piston O-Ring	2	NBR/FPM
8	Spacer Washer	1	POM	20	Guide Plate	2	PA66
9	Travel Cam	1	POM	21	Piston	2	Aluminum Alloy
10	Drive Shaft	1	Carbon Steel	22	End Cover O-Ring	2	NBR/FPM
11	Bottom Bearing	1	Carbon Steel	23	End Cover	2	Aluminum Alloy
12	Bottom O-Ring	1	POM	24	End Cover Bolt	8	Stainless Steel

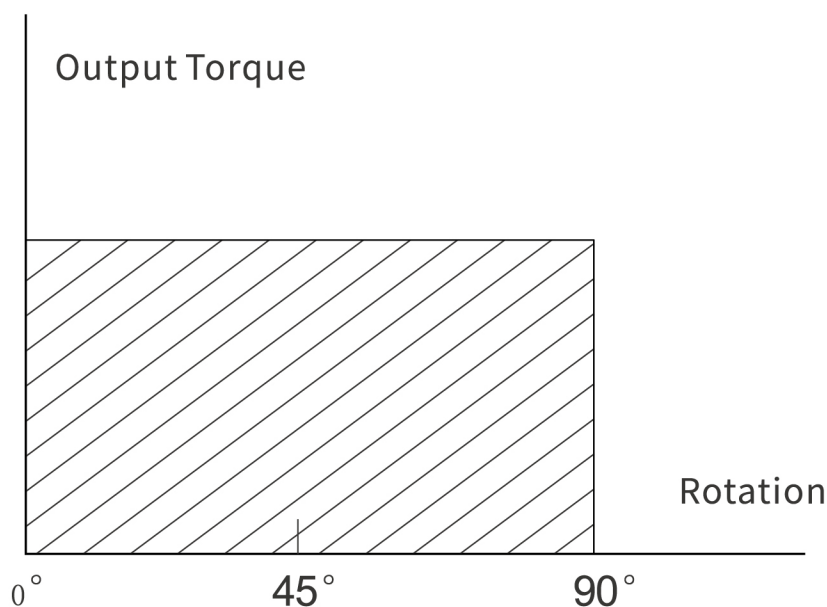
Installation Size Table



Unit:mm

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Z	Φ	Air Connection
MAC-52	30	41.5	65.5	72	92	65	30	80	Φ36	Φ50	M5x8	M6x10	11	14	147	Φ40	G1/4
MAC-63	36	47	81	88	108	72	30	80	Φ50	Φ70	M6x10	M8x13	14	18	168	Φ40	G1/4
MAC-75	42	53	94	99.5	119.5	81	30	80	Φ50	Φ70	M6x10	M8x13	14	18	186	Φ40	G1/4
MAC-83	46	57	98.5	108.7	128.7	92	30	80	Φ50	Φ70	M6x10	M8x13	17	21	212	Φ40	G1/4
MAC-92	50	58.5	111	116.5	136.5	98	30	80	Φ50	Φ70	M6x10	M8x13	17	21	262	Φ40	G1/4
MAC-105	57.5	64	122.5	133	153	109.5	30	80	Φ70	Φ102	M8x13	M10x16	22	26	268	Φ40	G1/4
MAC-125	67.5	74.5	145.5	155	185	127.5	30	130	Φ70	Φ102	M8x13	M10x16	22	26	301	Φ55	G1/4
MAC-140	75	77	161	172	202	137.5	30	130	Φ102	Φ125	M10x16	M12x20	27	31	390	Φ55	G1/4
MAC-160	87	87	184	197	227	159	30	130	Φ102	Φ125	M10x16	M12x20	27	31	458	Φ55	G1/4
MAC-190	103	103	215	230	260	189	30	130		Φ140		M16x23	36	50	534	Φ80	G1/4
MAC-210	113	113	235.5	255	285	210	30	130		Φ140		M16x23	36	50	538	Φ80	G1/4
MAC-240	130	130	264.5	289	319	245	30	130		Φ165		M20*25	46	60	602	Φ80	G1/4
MAC-270	147	147	299	326	356	273	30	130		Φ165		M20*25	46	60	718	Φ80	G1/2

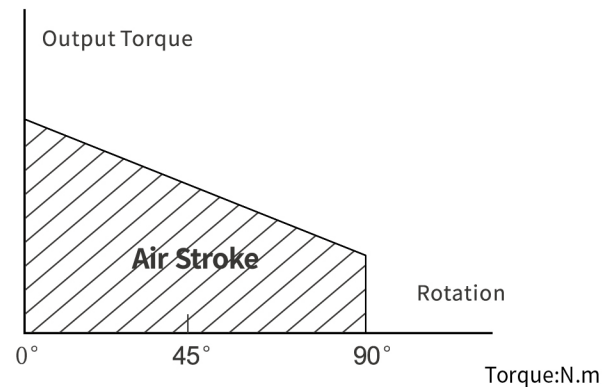
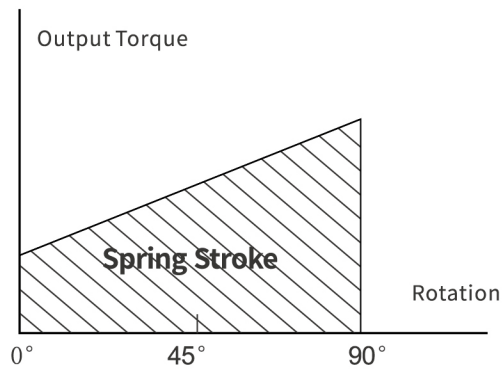
Output Torque of Double Acting Actuator



Torque:N.m

Model	Air Connection(bar)									
	2	2.5	3	4	4.5	5	5.5	6	7	8
MAC-52D	8.1	10.1	12.1	16.1	18.1	20.2	22.2	24.2	28.2	32.3
MAC-63D	14.2	17.8	21.3	28.4	32.0	35.5	39.1	42.6	49.7	56.8
MAC-75D	20.1	25.2	30.2	40.3	45.3	50.3	55.4	60.4	70.5	80.5
MAC-83D	30.8	38.5	46.2	61.6	69.4	77.1	84.8	92.5	107.9	123.3
MAC-92D	45.4	56.8	68.2	90.9	102.3	113.6	125.0	136.3	159.1	181.8
MAC-105D	65.8	82.2	98.7	131.6	148.0	164.4	180.9	197.3	230.2	263.1
MAC-125D	103	128	154	205	231	256	282	308	359	410
MAC-140D	175	219	263	351	395	439	482	526	614	702
MAC-160D	267	334	401	535	601	668	735	802	935	1069
MAC-190D	431	538	646	861	969	1077	1185	1292	1508	1723
MAC-210D	526	658	789	1052	1184	1316	1447	1579	1842	2105
MAC-240D	773	966	1160	1546	1740	1933	2126	2320	2706	3093
MAC-270D	1174	1468	1761	2349	2642	2936	3229	3523	4110	4697

Output Torque of Single Acting Actuator



Model	Air Connection(bar)																			
			2		2.5		3		4		5		6		7		8		Spring Torque	
	Spring Qty	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	90° Start	0° End	
MAC - 52S	5	3.7	1.6	5.7	3.6													6.2	4.2	
	6	2.8	0.3	4.8	2.3	6.8	4.3											7.4	5.1	
	7			3.9	1.0	5.9	3.0	9.9	7.0	14.0	11.1							8.6	5.9	
	8					5.0	1.7	9.0	5.7	13.1	9.8							9.9	6.8	
	9							8.1	4.4	12.2	8.5	16.2	12.5					11.1	7.6	
	10							7.2	3.1	11.3	7.2	15.3	11.2	19.3	15.2	23.4	19.3	12.4	8.5	
	11									10.4	5.9	14.4	9.9	18.4	13.9	22.5	18.0	13.6	9.3	
	12									9.5	4.6	13.5	8.6	17.5	12.6	21.6	16.7	14.8	10.1	
MAC - 63S	5	7.0	3.2	10.6	6.8													10.4	6.8	
	6	5.6	1.0	9.2	4.6	12.7	8.1											12.5	8.2	
	7			7.7	2.4	11.2	5.9	18.3	13.0	26.8	21.9							14.6	9.6	
	8					9.8	3.7	16.9	10.8	24.0	17.9							16.7	10.9	
	9							15.4	8.6	22.5	15.7	29.6	22.8					18.8	12.3	
	10							14.0	6.4	21.1	13.5	28.2	20.6	35.3	27.7	42.4	34.8	20.9	13.7	
	11									19.7	11.3	26.8	18.4	33.9	25.5	41.0	32.6	22.9	32.6	
	12									18.2	9.1	25.3	16.2	32.4	23.3	39.5	30.4	25.0	16.4	
MAC - 75S	5	9.0	4.9	14.1	10.0													14.5	10.5	
	6	6.8	1.8	11.9	6.9	16.9	11.9											17.4	12.7	
	7			9.7	3.9	14.7	8.9	24.8	19.0	35.4	29.9							20.3	14.8	
	8					12.4	5.8	22.5	15.9	32.5	25.9							23.2	16.9	
	9							20.3	12.9	30.3	22.9	40.4	33.0					26.1	19.0	
	10							18.1	9.8	28.1	19.8	38.2	29.9	48.3	40.0	58.3	50.0	29.1	21.1	
	11									25.9	16.8	36.0	26.9	46.1	37.0	56.1	47.0	31.9	23.2	
	12									23.7	13.7	33.8	23.8	43.9	33.9	53.9	43.9	34.7	25.3	
MAC - 83S	5	14.2	6.6	21.9	14.3													23.0	15.8	
	6	10.8	1.7	18.5	9.4	26.2	17.1											27.6	19.0	
	7			15.2	4.6	22.9	12.3	3.8	27.7	56.2	46.2							32.2	22.1	
	8					19.6	7.4	35.0	22.8	50.5	38.3							36.8	25.3	
	9							31.6	18.0	47.1	33.5	62.5	48.9					41.4	28.5	
	10							28.3	13.2	43.8	28.7	59.2	44.1	74.6	59.5	90.0	74.9	46.0	31.6	
	11									40.5	23.8	55.9	39.2	71.3	54.6	86.7	70.0	50.6	34.8	
	12									37.1	19.0	52.5	34.4	67.9	49.8	83.3	65.2	55.2	38.0	
MAC - 92S	5	20	9	32	20													34	23	
	6	15	2	27	13	38	24											41	28	
	7			22	6	33	17	56	40	80	64							48	32	
	8					28	10	51	33	74	55							55	37	
	9							46	25	69	48	92	71					61	42	
	10							41	18	64	41	87	63	110	86	132	109	68	46	
	11									59	34	82	56	105	79	127	102	75	51	
	12									54	26	77	49	100	72	122	95	82	56	

Torque:N.m

Model	Air Connection(bar)																			
	Spring Qty		2		2.5		3		4		5		6		7		8		Spring Torque	
			0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	90° Start	0° End
MAC - 105S	5	32	14	48	30														49	31
	6	25	3	42	20	58	36												59	38
	7			35	9	52	26	85	59	121	96								68	44
	8					45	15	78	48	111	81								78	50
	9							71	38	104	71	137	104						88	56
	10							65	28	97	60	130	93	163	126	196	159		98	63
	11									91	50	124	83	156	116	189	149		108	69
	12									84	40	117	73	150	105	183	138		118	75
MAC - 125S	5	47	20	72	45														78	52
	6	36	4	61	29	87	55												94	62
	7			50	12	76	38	127	89	178	141								109	73
	8					65	22	116	73	167	124								125	83
	9							105	56	156	107	208	159						141	94
	10							94	40	145	91	197	143	248	194	299	245		156	104
	11									134	74	186	126	237	177	288	228		172	115
	12									123	58	175	110	226	161	277	212		188	125
MAC - 140S	5	84	39	128	83														129	85
	6	66	12	110	56	154	100												154	102
	7			92	29	136	73	224	161	380	247								180	120
	8					118	45	206	133	294	221								260	137
	9							188	106	276	194	363	281						232	154
	10							170	79	258	167	345	254	433	342	521	430		257	171
	11									240	140	327	227	415	315	503	403		283	188
	12									222	113	309	200	379	288	485	376		309	205
MAC - 160S	5	120	47	187	114														208	139
	6	90	3	157	70	224	137												250	169
	7			128	27	195	94	329	228	469	373								292	196
	8					165	50	299	184	432	317								333	223
	9							270	140	403	273	537	407						375	251
	10							241	96	374	229	508	363	641	496	775	630		417	279
	11									344	185	478	319	611	452	745	586		458	307
	12									315	141	449	275	582	408	716	542		500	335
MAC - 190S	5	220	105	327	212														293	190
	6	178	40	285	147	393	255												352	227
	7			243	82	385	190	566	405	784	631								410	265
	8					309	125	524	340	740	556								469	303
	9							482	275	698	491	913	706						527	341
	10							440	210	656	426	871	641	1087	857	1302	1072		586	379
	11									614	361	829	576	1045	792	1260	1007		645	417
	12									572	295	787	511	1003	727	218	942		703	455
MAC - 210S	5	237	126	369	258														360	260
	6	179	46	311	178	442	309												432	313
	7			253	99	384	23	647	493	908	754								503	365
	8					326	150	589	413	853	677								575	417
	9							531	333	795	597	1058	860						647	469
	10							473	253	737	517	1000	780	1263	1043	1526	1306		719	521
	11									679	437	942	700	1205	963	1468	1226		791	573
	12									621	357	884	620	1147	883	1410	1146		863	625
MAC - 240S	5	341	190	534	388														525	389
	6	255	73	448	266	642	460												630	467
	7			361	150	555	344	941	730	1349	1149								735	544
	8					469	227	855	613	1242	1000								840	622
	9							768	496	1155	883	1542	1270						945	700
	10							682	380	1069	767	1456	1154	1842	1540	2229	1927		1050	778
	11									983	650	1370	1370	1756	1423	2143	1810		1155	855
	12									896	533	1283	920	1669	1306	2056	1698		1260	933

Sizing Single Acting (Spring Return) Actuators

The suggested safety factor for spring return actuator under normal working conditions is 30%-50%.

For Example

The torque needed by valve = 80N.m

The torque consider safety factor $(1+30\%)=104\text{N.m}$

According to the output torque of the single acting (spring return) actuator, the output torque of MAC140S7 at a pressure of 5 bar is:

Air stroke $0^\circ=380\text{N.m}$

Air stroke $90^\circ=247\text{N.m}$

Spring stroke $90^\circ=180\text{N.m}$

Spring stroke $0^\circ=120\text{N.m}$

All the output torque is larger than we required.



Remark

During the restoration, the single acting (spring return) actuators output torque will not be affected by the inputting air from the port B. On the contrary, it will help the restoration of springs.

During selecting the single acting (spring return) actuators, we can choose the more reasonable and more economical actuators, if we know the different torque needed by the valve working at opening, operating and closing.

Part No.

MAC **1** **2** **3**

MAC **1**

Body Diameter Size

50,63,75,83,92,105,
125,140,160,190,210,
240,270

MAC **2**

Acting Type

S: Single Type
D: Double Type

MAC **3**

Quantity of Springs (For Single Type Only) S5~S12

Remark:

- Default of the stroke angle is 90°.120°and 180° should confirm first.

Air Consumption of Double Acting Actuator

Air consumption rate can be calculated as follows:

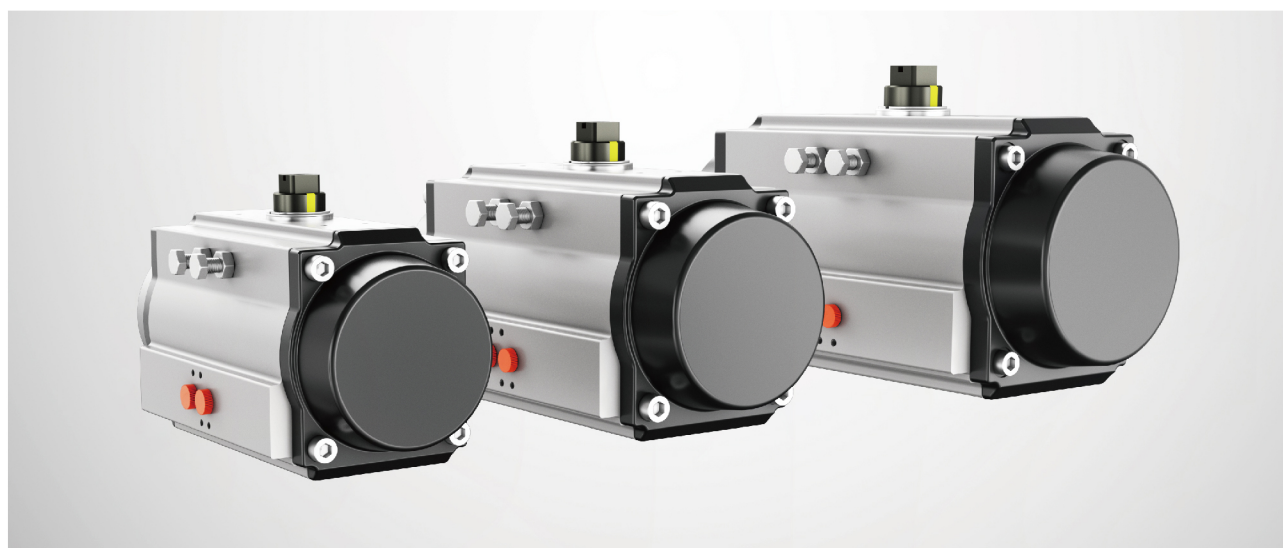
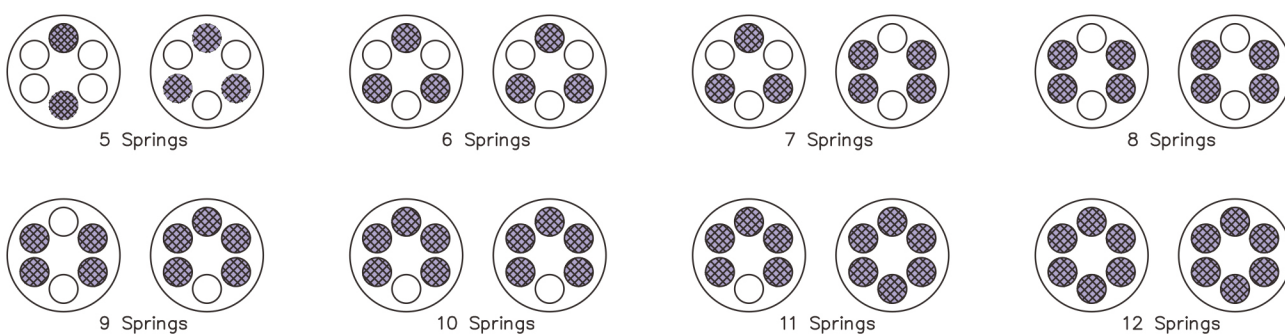
MODEL	VOLUME OPENING	VOLUME CLOSING	MODEL	VOLUME OPENING	VOLUME CLOSING
MAC-52D	0.11	0.14	MAC-140D	2.43	3.20
MAC-63D	0.20	0.23	MAC-160D	3.65	5.03
MAC-75D	0.29	0.38	MAC-190D	5.9	7.9
MAC-83D	0.41	0.55	MAC-210D	7.4	9.7
MAC-92D	0.62	0.91	MAC-240D	10.7	14.3
MAC-105D	0.94	1.18	MAC-270D	16.9	22.5
MAC-125D	1.47	1.85			

WEIGHT TABLE

MODEL	MAC-32	MAC-40	MAC-52	MAC-63	MAC-75	MAC-83	MAC-92	MAC-105	MAC-125
WEIGHT(DA)	0.7KG	1KG	1.4KG	2KG	2.7KG	3.5KG	4.7KG	5.7KG	8.1KG
WEIGHT(SR)	-	1.1KG	1.5KG	2.1KG	2.9KG	4KG	5.4KG	7.0KG	10.5KG

MODEL	MAC-140	MAC-160	MAC-190	MAC-210	MAC-240	MAC-270	MAC-300	MAC-350	MAC-400
WEIGHT(DA)	12.3KG	20KG	33KG	37.8KG	56KG	80KG	100.6KG	160KG	197.3KG
WEIGHT(SR)	16KG	25.4KG	39KG	47.4KG	69.2KG	102.2KG	128.2KG	209.2KG	243KG

SPRINGS MOUNTING FORM FOR SINGLE ACTING (SPRING RETURN) ACTUATORS





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