

F-Series

PNEUMATIC ACTUATOR



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MAC series pneumatic actuator is the new product with latest technology, nice shape and compact structure. MAC has three series due to torque: MACP pinion-and-rack Type, MACF Fork Type, and MACB large Fork Type. MAC series is widely used in the field of automatic control.

◆ MAC series Pneumatic Actuator of Pinion-and-rack Type

◆ Structure

1. Indicator

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

2. Pinion

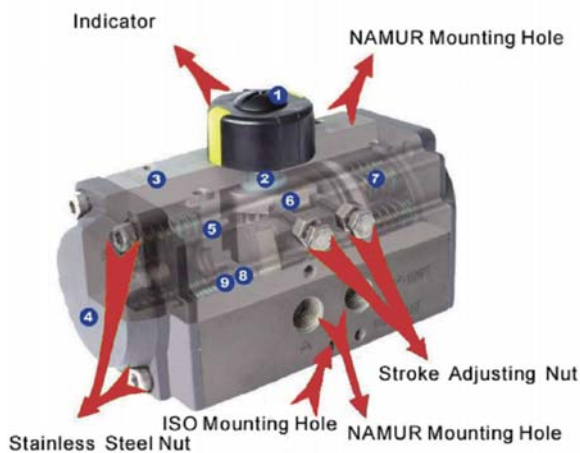
The pinion is high-precision and integrative, made from nickel-plating steel, full conform to the standards of ISO05211, DIN3337, NAMUR. The size can be customized and stainless steel is available.

3. Actuator Body

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

4. End cap

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



5. 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.

6. Stroke adjustment

The two independent external travel bolts can accurately adjust ± 5 at both open and close position.

7. 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.

8. 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.

9. 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 or non-corrosive air. Dust below 30 micron.

2. Air Supply Pressure

Min. air pressure is 2.5 bar, max. air pressure is 8bar.

3. Operating Temperature

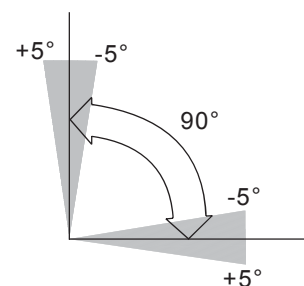
Standard: $-20^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Low: $-35^{\circ}\text{C} \sim +80^{\circ}\text{C}$

High: $-15^{\circ}\text{C} \sim +150^{\circ}\text{C}$

4. Stroke Adjustment

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



◆ Operating Principle

◆ Double Acting

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

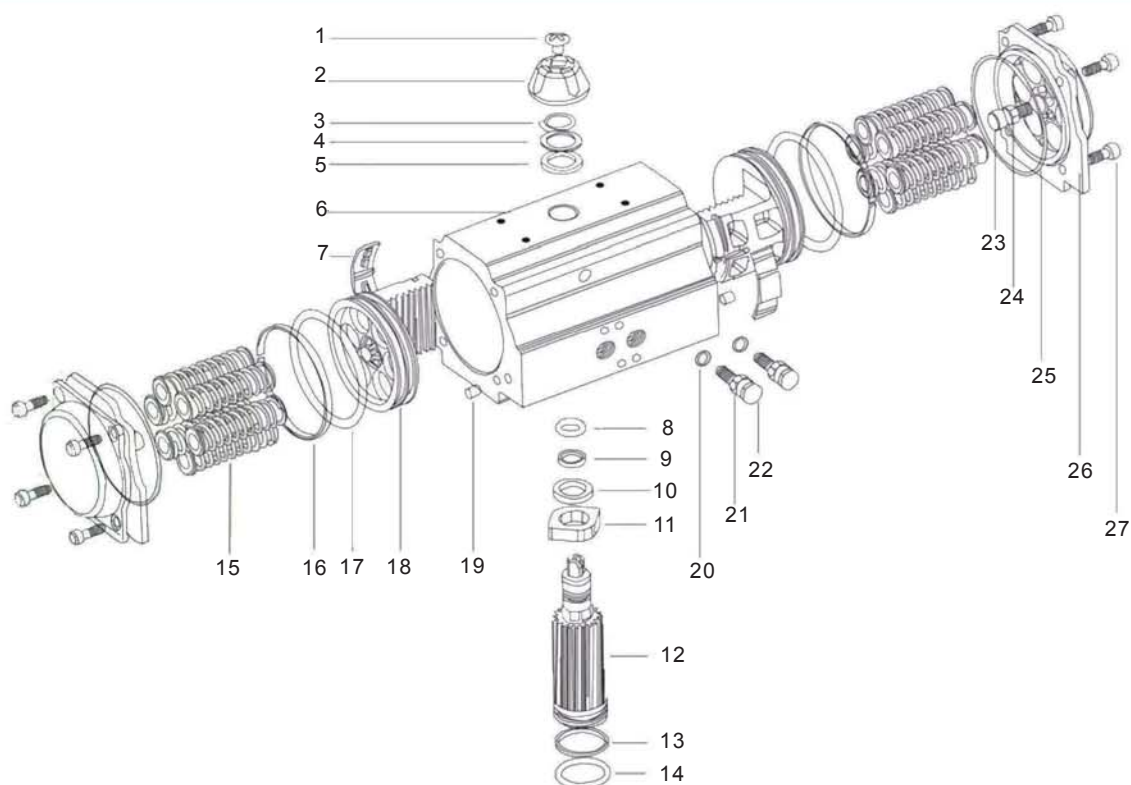


◆ Single Acting

1. Air from Port A forces the pistons outwards, causes the springs to compress, the pinion turns anticlockwise while the air exhausted through port B.
2. Loss of air force, compressed springs force the pistons inwards, causes the pinion turns clockwise while the air exhausted through Port A.



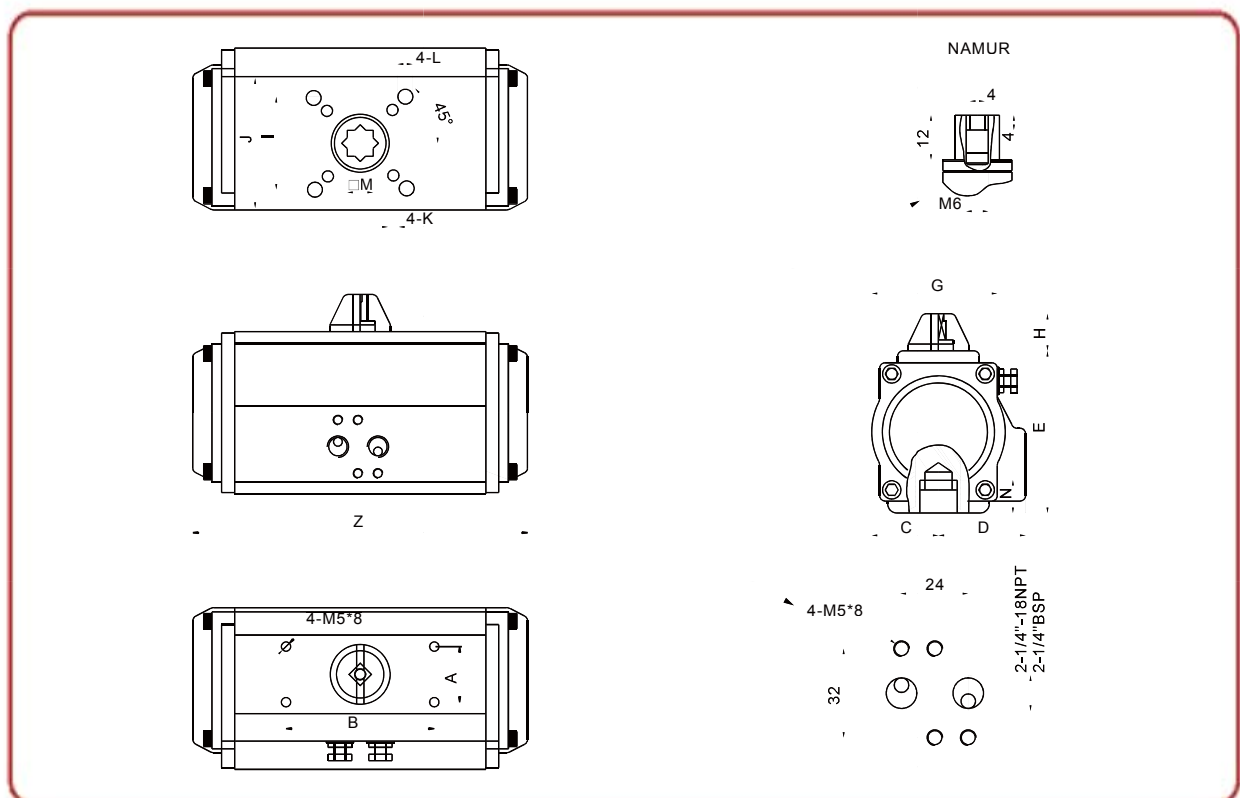
◆ ACCESSORIES



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No.	Description	Quantity	Material	Protection	Optional Material
1	Indicator Screw	1	Stainless Steel		
2	Indicator	1	ABS		
3	Spring clip	1	Stainless Steel		
4	Thrust washer	11	Stainless Steel		
5	Outside washer	1	Engineering Plastic		
6	Body	1	Aluminum Die-casting		
7	Guide(piston)	2	Engineering Plastic		
8	O-ring (pinion top)	1	Alloy steel	Hard anodized	
9	Bearing (pinion top)	1	Engineering Plastic		
10	Inside washer	1	NBR		Viton/Silicone
11	Cam	1	Spring Steel	Nickel plated	Stainless Steel
12	Pinion	1	Engineering Plastic		
13	Bearing (pinion bottom)	1	NBR		Viton/Silicone
14	O-ring (pinion bottom)	1	NBR		Viton/Silicone
15	Spring	5-12	NBR		Viton/Silicone
16	Bearing(piston)	2	Stainless Steel		
17	O-ring(pinion)	2	Stainless Steel		
18	Piston	2	Aluminum Die-casting Steel Die-casting	anodized/ Zinc plated	Stainless Steel
19	Plug	2	Engineering Plastic		
20	O-ring(Adjust screw)	2	Engineering Plastic		
21	Nut(Adjust screw)	2	NBR		Viton/Silicone
22	Adjust screw	2	Spring Steel	dip coating	
23	Stop screw	2	NBR		Viton/Silicone
24	Nut (Stop screw)	2	Aluminum Die-casting	Pow der polyester painted	
25	O-ring(End cap)	2	Stainless Steel		
26	End cap	2	Stainless Steel		
27	Cap screw	8	Stainless Steel		

◆ DIMENSION



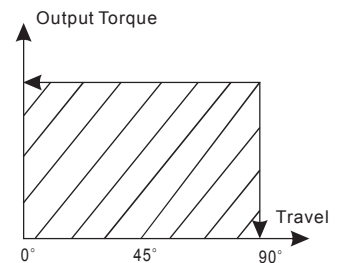
◆ DIMENSION

Model	A	B	C	D	E	G	H	I	J	K	L	M	N	Z	Port Size
MAC52	30	80	30	41.5	72	65	20	Φ35	Φ50	M5 × 8	M6 × 10	11	14	147	G1/4
MAC63	30	80	36	47	87.5	72	20	Φ50	Φ70	M6 × 10	M8 × 13	14	18	168	G1/4
MAC75	30	80	42	53	99.5	81	20	Φ50	Φ70	M6 × 10	M8 × 13	14	18	184	G1/4
MAC83	30	80	46	57	108.8	92	20	Φ50	Φ70	M6 × 10	M8 × 13	17	21	204	G1/4
MAC92	30	80	50	61	116.5	98	20	Φ50	Φ70	M6 × 10	M8 × 13	17	21	262	G1/4
MAC105	30	80	57.5	64	133	109.5	20	Φ70	Φ102	M8 × 13	M10 × 16	22	26	268	G1/4
MAC125	30	80	67.5	74.5	155	127.5	20	Φ70	Φ102	M8 × 13	M10 × 16	22	26	296	G1/4
MAC140	30	80	75	77	172	137.5	20	Φ102	Φ125	M10 × 16	M12 × 20	27	31	390	G1/4
MAC160	30	80	87	87	197	158	20	Φ102	Φ125	M10 × 16	M12 × 20	27	31	454	G1/4
MAC190	30	130	103	103	230	189	30		Φ140		M16 × 25	36	40	525	G1/4
MAC210	30	130	114	114	255	211	30		Φ140		M16 × 25	36	40	532	G1/4
MAC240	30	130	130	130	289	245	30		Φ165		M20 × 25	46	50	610	G1/4
MAC270	30	130	147	147	326	273	30		Φ165		M20 × 25	46	50	722	G1/2

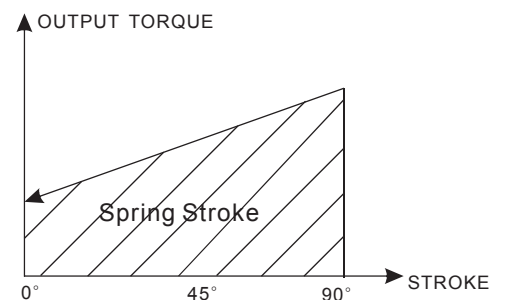
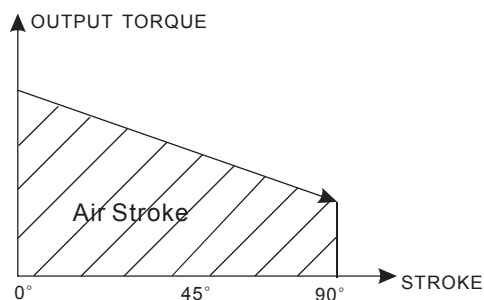
◆ OUTPUT TORQUE OF DOUBLE ACTING ACTUATOR

Unit: Nm

Model	Air supply pressure(Unit: bar)									
	2.0	2.5	3.0	4.0	4.5	5.0	5.5	6.0	7.0	8.0
MAC52D	8.1	10.1	12.1	16.1	18.1	20.2	22.2	24.2	28.2	32.3
MAC63D	14.4	18.0	21.7	28.9	32.5	36.1	39.7	43.3	50.5	57.7
MAC75D	20.1	25.2	30.2	40.3	45.3	50.3	55.4	60.4	70.5	80.5
MAC83D	31.2	39.0	46.8	62.4	70.2	78.0	85.8	93.8	109.2	124.8
MAC92D	45.4	56.8	68.2	90.9	102.3	113.6	125.0	136.3	159.1	181.8
MAC105D	65.8	82.2	98.7	131.6	148.0	164.4	180.9	197.3	230.2	263.1
MAC125D	102.5	128.2	153.8	205.1	230.7	256.4	282.0	307.6	358.9	410.2
MAC140D	175.4	219.3	263.1	350.8	394.7	438.5	482.4	526.2	613.9	701.6
MAC160D	267.3	334.1	400.9	534.6	601.4	668.2	735.0	801.8	935.5	1069.1
MAC190D	430.7	538.4	646.1	861.5	969.2	1076.9	1184.5	1292.2	1507.6	1723.0
MAC210D	526.2	657.8	789.3	1052.4	1184.0	1315.5	1447.1	1578.6	1841.7	2104.8
MAC240D	773.2	996.5	1159.8	1546.4	1739.7	1933.0	2126.3	2319.6	2706.2	3092.8
MAC270D	1169.6	1462.1	1754.5	2339.3	2631.7	2924.1	3216.5	3508.9	4093.7	4678.6



◆ OUTPUT TORQUE OF SINGLE ACTING ACTUATOR



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Output Torque of Spring Return Actuators(Nm)																			
Supply Pressure		2bar		2.5bar		3bar		4bar		5bar		6bar		7bar		8bar		Spring Torque	
Model	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	0° Start	90° End
MAC52S	5	3.8	1.9	5.8	3.9	7.8	5.9	11.8	9.9	15.9	14.0							6.2	4.3
	6			5.1	2.7	7.1	4.7	11.1	8.7	15.2	12.8							7.4	5.0
	7					6.2	3.5	10.2	7.5	14.3	11.6	18.3	15.6					8.6	5.9
	8							9.4	6.2	13.5	10.3	17.5	14.3	21.5	18.3			99.9	6.7
	9							8.5	5.0	12.6	9.1	16.6	13.1	20.6	17.1	24.7	21.2	11.1	7.6
	10									11.7	7.8	15.7	11.8	19.7	15.8	23.8	19.9	12.4	8.5
	11									10.9	6.6	14.9	10.6	18.9	14.4	23.0	18.7	13.6	9.3
	12											14.0	9.4	18.0	13.4	22.1	17.5	14.8	10.2
MAC63S	5	7.6	4.0	11.2	7.6	11.3	19.3	22.1	18.5	29.3	25.7							10.4	6.8
	6			9.8	5.5	9.2	18.0	20.7	16.4	27.9	23.6							12.5	8.2
	7					7.1	16.6	19.3	14.3	26.5	21.5	33.7	28.7					14.6	9.6
	8							18.0	12.2	25.5	19.4	32.4	26.6	39.6	33.8			16.7	10.9
	9							16.6	10.1	23.8	17.3	31.0	24.5	38.2	31.7	45.4	38.9	18.8	12.3
	10									22.4	15.2	29.6	22.4	36.8	29.6	44.0	36.8	20.9	13.7
	11									21.1	13.2	28.3	20.4	35.5	27.6	42.7	34.8	22.9	15.0
	12											26.9	18.3	34.1	25.5	41.3	32.7	25.0	16.4
MAC75S	5	9.6	5.6	14.7	10.7	19.7	15.7	29.8	25.8	39.8	35.8							2	22.1
	6			12.5	7.8	17.5	12.8	27.6	22.9	37.6	32.9							17.4	12.7
	7					15.4	9.9	25.5	20	35.5	30	45.5	40.1					20.3	14.8
	8							23.4	17.1	33.4	27.1	43.5	37.2	53.6	47.3			23.2	16.9
	9							21.3	14.2	31.3	24.2	41.4	34.3	51.5	44.4	61.5	54.4	26.1	19
	10									29.2	21.3	39.3	31.4	49.4	41.5	59.4	51.5	29	21.1
	11									27.1	18.4	37.2	28.5	47.3	38.6	57.3	48.6	31.9	23.2
	12											35.1	25.7	45.2	35.8	55.2	45.8	34.7	25.3
MAC83S	5	15.4	8.2	23.2	16	31	23.8	46.6	39.4	62.6	55							23	15.8
	6			20	11.4	27.8	19.2	43.4	34.8	59	50.4							27.6	19
	7					24.7	14.6	40.3	30.2	55.9	45.8	71.5	61.4					32.2	22.1
	8							37.1	25.5	52.7	41.2	68.3	56.8	83.9	72.4			36.8	25.3
	9							33.9	21	49.5	36.6	65.1	52.2	80.7	67.8	96.3	83.4	41.4	28.5
	10									45.4	32	62	47.6	77.6	63.2	93.2	78.8	46	31.6
	11									43.2	27.4	58.8	43	74.4	58.6	90	74.2	50.6	34.8
	12											55.5	38.4	71.2	54	86.8	69.6	55.2	38
MAC92S	5	22.1	11	33.5	22.4	44.9	33.8	67.5	56.5	90.3	79.2							34.4	23.3
	6			28.8	15.6	40.2	27	62.9	49.7	85.6	72.4							41.2	28
	7					35.5	20.1	58.2	42.8	80.9	65.5	103.6	88.2					48.1	32.7
	8							53.6	35.9	76.3	58.6	99	81.1	121.8	104.1			55	37.3
	9							48.9	29	71.6	51.7	94.3	74.4	117.1	97.2	139.8	119.9	61.9	42
	10									66.9	44.9	89.6	67.6	112.4	90.4	135.1	113.1	68.7	46.7
	11									62.2	38	84.9	60.7	107.7	83.5	130.4	106.2	75.6	51.4
	12											80.3	53.8	103.1	76.6	125.8	99.3	82.5	56
MAC105S	5	34.2	16.6	50.6	33	67.1	49.5	100	82.4	132.8	115.2							49.2	31.6
	6			44.2	23.1	60.7	39.6	93.6	72.5	126.4	153.3							59.1	38
	7					54.4	29.8	87.3	62.7	120.1	95.5	153	128.4					68.9	44.3
	8							81	52.9	113.8	85.7	146.7	118.6	179.6	151.5			78.7	50.6
	9							74.7	43	107.5	75.8	140.4	108.7	173.3	141.6	206.2	174.5	88.6	56.9
	10									101.1	66	134	98.9	166.9	131.8	199.8	164.7	98.4	63.3
	11									94.8	56.1	127.7	89	169.6	121.9	193.5	154.8	108.3	69.6
	12											121.4	79.2	154.3	112.1	187.2	145	118.1	75.9
MAC125S	5	50.5	23.5	76.2	49.2	101.8	74.8	153.1	126.1	204.4	177.4							79	52
	6			65.2	34.2	90.8	59.8	142.1	111.1	193.4	162.4							94	63
	7					80.8	43.8	132.1	95.1	183.4	146.4	234.6	197.6					110	73
	8							121.1	80.1	172.4	131.4	223.6	182.6	274.9	233.9			125	84
	9							111.1	64.1	162.4	115.4	213.6	186.6	264.9	217.9	316.2	269.2	141	94
	10									154.4	99.4	202.6	150.5	253.9	201.9	305.2	253.2	157	105
	11									141.4	83.4	192.6	134.6	243.9	185.9	295.2	237.2	173	115
	12											182.6	119.6	233.9	170.9	285.2	222.2	188	125
MAC140S	5	89.4	46.4	133.3	90.3	177.1	134.1	264.6	221.8	352.5	309.5							129	86
	6			116.4	64.3	160.1	108.1	247.8	195.8	335.5	283.5							155	103
	7					143.1	82.1	230.8	169.8	318.5	257.5							181	120
	8							213.8	144.8	301.5	232.5	389.2	320.2	476.9	407.9			206	137
	9							195.8	118.8	283.5	206.5	371.2	294.2	458.9	381.9	546.6	469.6	232.2	155
	10									266.5	180.5	354.2	268.2	441.9	355.9	529.6	443.6	258	172

◆ OUTPUT TORQUE OF SINGLE ACTING ACTUATOR

Output torque of air to spring(Nm)																			
supply pressure		2bar		2.5bar		3bar		4bar		5bar		6bar		7bar		8bar		Spring torque	
Model	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	0° Start	90° End
MAC160S	5	127.3	59.3	194.1	128.1	260.9	192.9	394.6	326.6	528.2	460.2							208.0	140.0
	6			166.1	64.1	232.9	150.9	366.6	284.6	500.2	418.2							250.0	168.0
	7					204.9	108.9	338.6	242.6	472.2	376.2	605.8	509.8					292.0	196.0
	8							311.6	201.6	445.2	335.2	578.8	468.8	712.5	602.5			333.0	223.0
	9							283.6	159.6	417.2	293.2	550.8	426.8	684.5	560.5	818.1	694.1	375.0	251.0
	10									389.2	251.2	522.8	384.8	656.5	518.5	790.1	652.1	417.0	279.0
	11									361.2	210.2	494.8	343.8	628.5	477.5	762.1	611.1	458.0	307.0
	12											466.8	301.8	600.5	435.5	734.1	569.1	500.0	335.0
MAC190S	5	230.7	121.7	338.4	229.4	446.1	337.1	661.5	552.5	876.9	767.9							309.0	200.0
	6			298.4	167.4	406.1	275.1	621.5	490.5	836.9	705.9							371.0	240.0
	7					366.1	213.1	581.5	428.5	796.9	643.9	1012.2	859.2					433.0	280.0
	8							541.5	366.5	756.9	581.9	972.2	797.2	1187.6	1012.6			495.0	320.0
	9							501.5	304.5	716.9	519.9	932.2	735.2	1147.6	950.6	1363.0	1166.0	557.0	360.0
	10									676.9	458.9	892.2	674.2	1107.6	889.6	1323.0	1105.0	618.0	400.0
	11									636.9	395.9	852.2	612.2	1067.6	827.7	1283.0	1043.0	680.0	440.0
	12											812.2	550.2	1027.6	765.6	1243.0	981.0	742.0	480.0
MAC210S	5	251.2	146.2	382.8	277.8	514.3	409.3	777.4	672.4	1040.5	935.5							380.0	275.0
	6			327.8	201.8	459.3	333.3	722.4	596.4	985.5	859.5							456.0	330.0
	7					404.3	257.3	667.4	520.4	930.5	783.5	1193.6	1046.6					532.0	385.0
	8							612.4	444.4	875.5	707.5	1138.6	970.6	1401.7	1233.7			608.0	440.0
	9							557.4	368.4	820.5	631.5	1083.6	894.6	1346.7	1157.7	1609.8	1420.8	684.0	495.0
	10									765.5	555.5	1028.6	818.6	1291.7	1081.7	1554.8	1344.8	760.0	550.0
	11									710.5	479.5	973.6	742.6	1236.7	1005.7	1499.8	1268.8	836.0	605.0
	12											918.6	666.6	1181.7	929.7	1444.8	1192.8	912.0	660.0
MAC240S	5	363.2	219.2	556.5	412.5	749.8	605.8	1136.4	940.5	1523.0	1379.0							554.0	410.0
	6			474.5	301.5	667.8	494.8	1054.4	864.7	1441.0	1268.0							665.0	492.0
	7					584.8	384.8	971.4	742.6	1358.0	1158.0	1744.6	1544.6					775.0	575.0
	8							890.4	635.4	1277.0	1047.0	1663.6	1433.6	2050.2	1820.2			886.0	656.0
	9							807.4	536.4	1194.0	935.0	1580.6	1321.6	1967.2	1708.2	2353.8	2094.8	998.0	939.0
	10									1112.0	825.0	1498.6	1211.6	1885.2	1598.2	2271.8	1984.8	1108.0	821.0
	11									1030.0	714.0	1416.6	1100.6	1803.2	1487.2	2189.8	1873.8	1219.0	903.0
	12											1334.6	989.6	1721.2	1376.2	2107.8	1762.8	1330.0	985.0
MAC270S	5			903.0	675.0	1195.0	968.0	1779.0	1552.0									787.0	560.0
	6			790.0	519.0	1083.0	811.0	1667.0	1396.0	2252.0	1981.0							943.0	672.0
	7			679.0	361.0	972.0	654.0	1556.0	1238.0	2141.0	1823.0							1101.0	783.0
	8					860.0	479.0	1444.0	1081.0	2029.0	1666.0	2614.0	2252.0	3199.0	2836.0			1258.0	895.0
	9							1332.0	923.0	1917.0	1509.0	2502.0	2094.0	3087.0	2678.0			1416.0	1007.0
	10							1220.0	767.0	1805.0	1352.0	2390.0	1937.0	2974.0	2521.0	3560.0	3107.0	1572.0	1119.0
	11									1693.0	1194.0	2278.0	1779.0	2862.0	2364.0	3448.0	2949.0	1730.0	1231.0
	12									1582.0	1037.0	2167.0	1623.0	2751.0	2207.0	3336.0	2792.0	1887.0	1342.0

◆ PART NO.

MAC [1] [2] [3]

[1] Body Diameter Size

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

[2] Acting Type

D: Double Type
S: Single Type

[3] Quantity of Springs (For Single Type Only)

K5 ~ K12

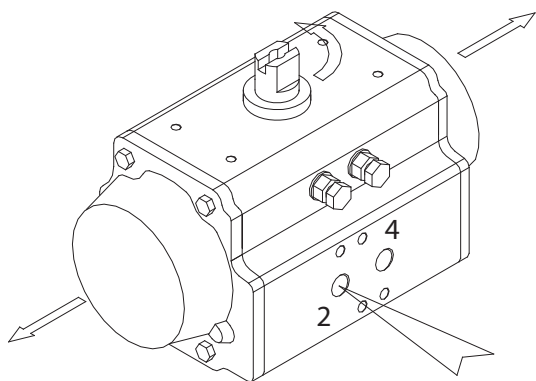
Remark: 1. Default 10pcs springs;

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

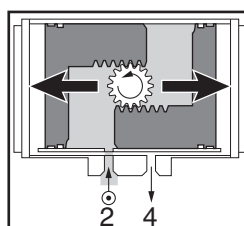
PRINCIPLES OF OPERATION

Air connections double acting

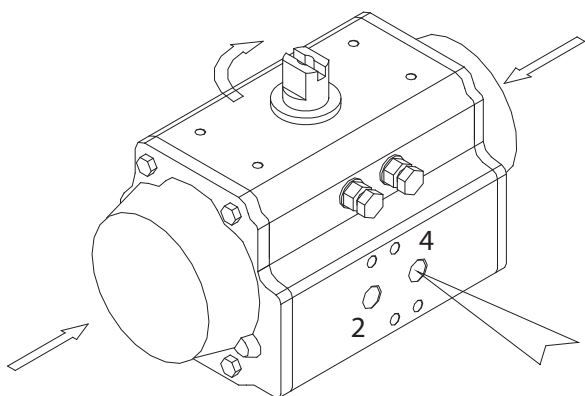
OPEN



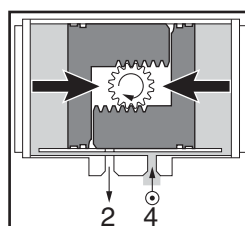
Air to port 2: counterclockwise/open



CLOSE



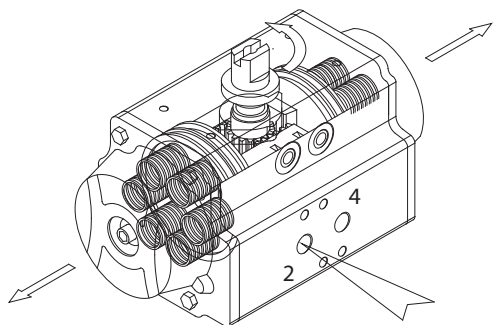
Air to port 4: clockwise/close



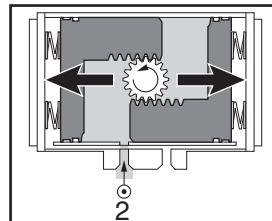
* Pistons must be inverted to reverse actuator rotation

Air connections spring return

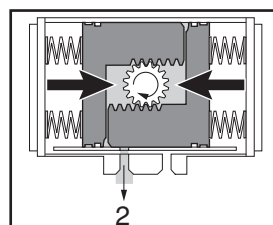
Spring to close



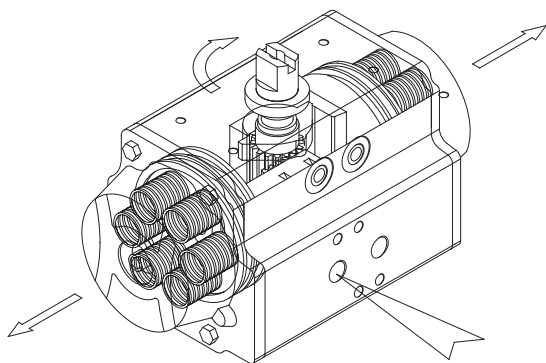
Air to port 2: counterclockwise/open



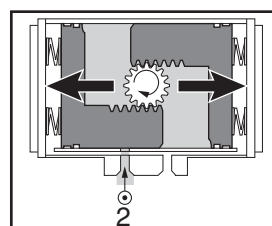
Spring return: clockwise/close



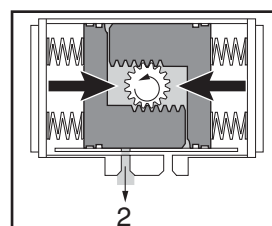
Spring to open



Air to port 2: clockwise/close



Spring return: counter clockwise/open



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