FLUCON®
Fluid Systems Control

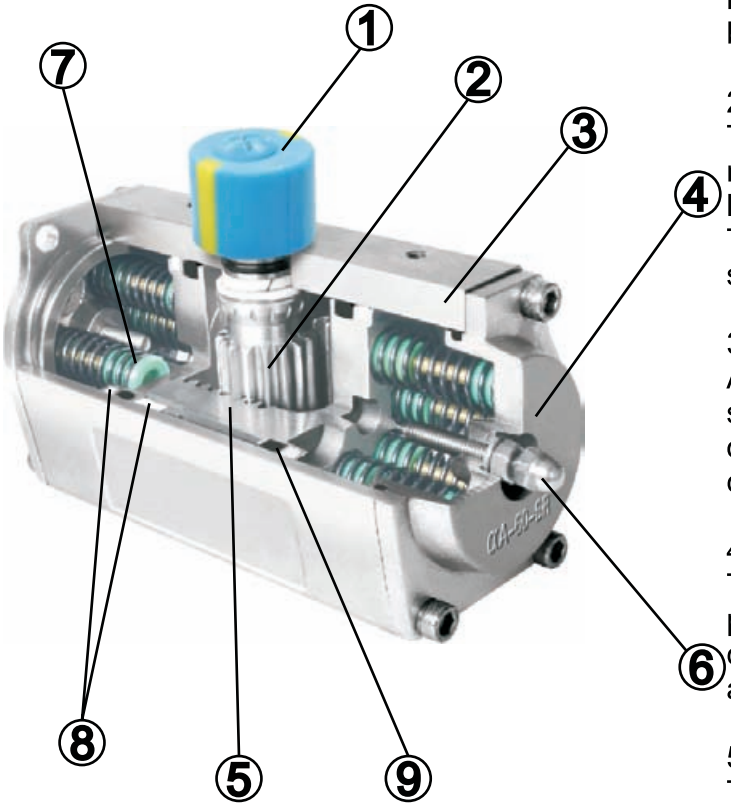
PA 20 Series Stainless Stell Rack & Pinion Pneumatic Actuator

CONTENTS

Design

A Series pneumatic actuators are stainless steel actuator which incorporate latest mechanical technology, materials available and our patented technology, through designing, developing, testing and engineering application, we have obtained a high grade product with the characteristics of reliability, high performance, long cycle life, large adjustment, highest levels of corrosion protection, wide selection of model with easy and economy.

Structure



1.Indicator
Position indicator with NAMUR is convenient for mounting accessories such as limit switch box,positioner and so on.

2. Pinion
The pinion is high-precision and integrative, made from nickel alloy steel, full conform to the latest standards of ISO5211, DIN3337, NAMUR. The dimensions can be customized and the stainless steel is available.

3. Actuator body
According to the different requirements, the stainless steel body with electro-polish finish offer excellent resistance to most corrosive chemicals as well as industrial atmospheres.

4. End caps
The stainless steel end-cap body with electro-polish finish offer excellent resistance to most corrosive chemicals as well as industrial atmospheres.

5. Pistons
The twin rack pistons are made from investment casting stainless steel resistance to most corrosive chemicals as well as industrial atmospheres.

6.Travel adjustment
External stroke adjustment screw can adjust ±4°at the position of 90°.

7. High performance springs
Preloaded coating springs are made from the high quality material for resistant to corrosion and longer cycle life, which can be demounted safely and conveniently to satisfy different requirements of torque by changing quantity of springs.

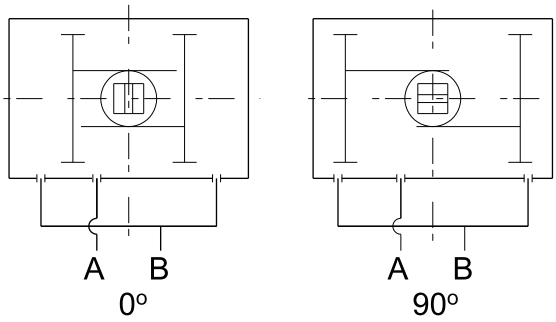
8. Bearings & guides
Made from low friction, long-life compound material, to avoid the direct contact between metals. The maintenance and replacement are easy and convenient.

9. O-rings
NBR rubber o-rings provide trouble-free operation at standard temperature ranges. For high and low temperature, viton or silicone is used.

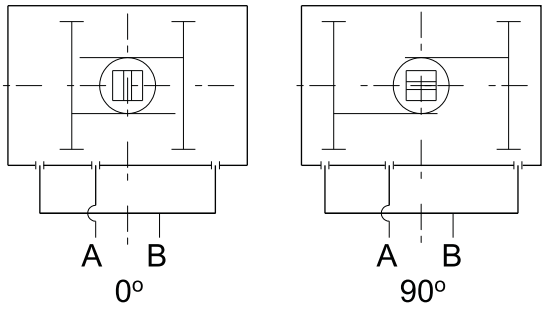
Operating Principle

Double acting

Standard rotation



Reverse rotation

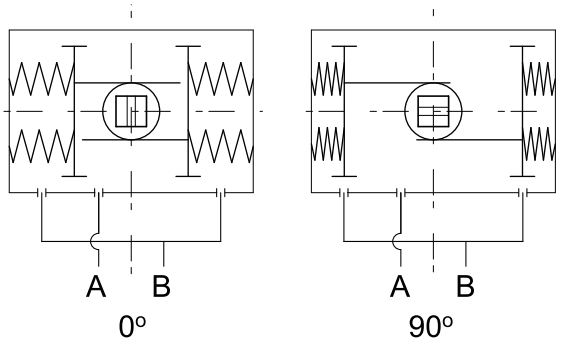


Standard Rotation:
Air to port A forces the pistons outwards, causing the pinion to turn counterclockwise while the air is being exhausted from port B. Air to port B forces the pistons inwards, causing the pinion to turn clockwise while the air is being exhausted from port A.

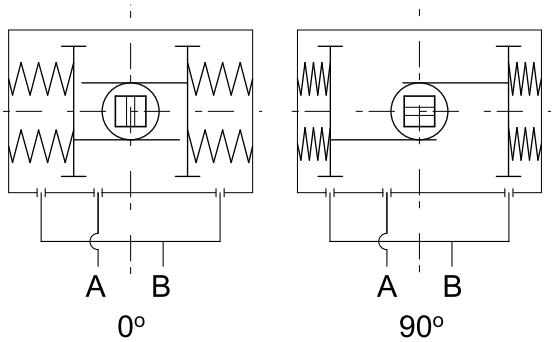
Reverse Rotation:
Air to port A forces the pistons outwards, causing the pinion to turn clockwise while the air is being exhausted from port B. Air to port B forces the pistons inwards, causing the pinion to turn counterclockwise while the air is being exhausted from port A.

Spring return

Standard rotation



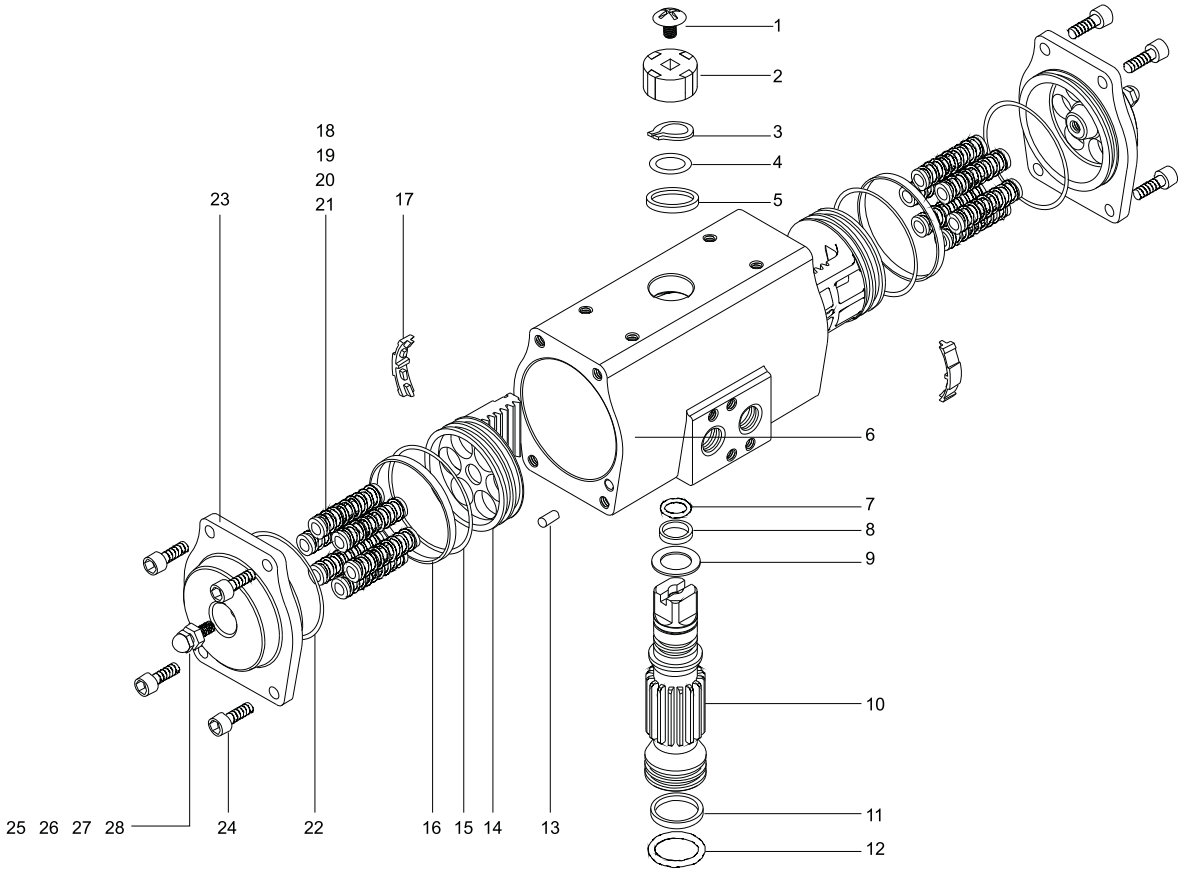
Reverse rotation



Standard Rotation:
Air to port A forces the pistons outwards, causing the springs to compress, the pinion turns counterclockwise while air is being exhausted from port B. Loss of air pressure on port A, the stored energy in the springs forces the pistons inwards. The pinion turns clockwise while air is being exhausted from port A.

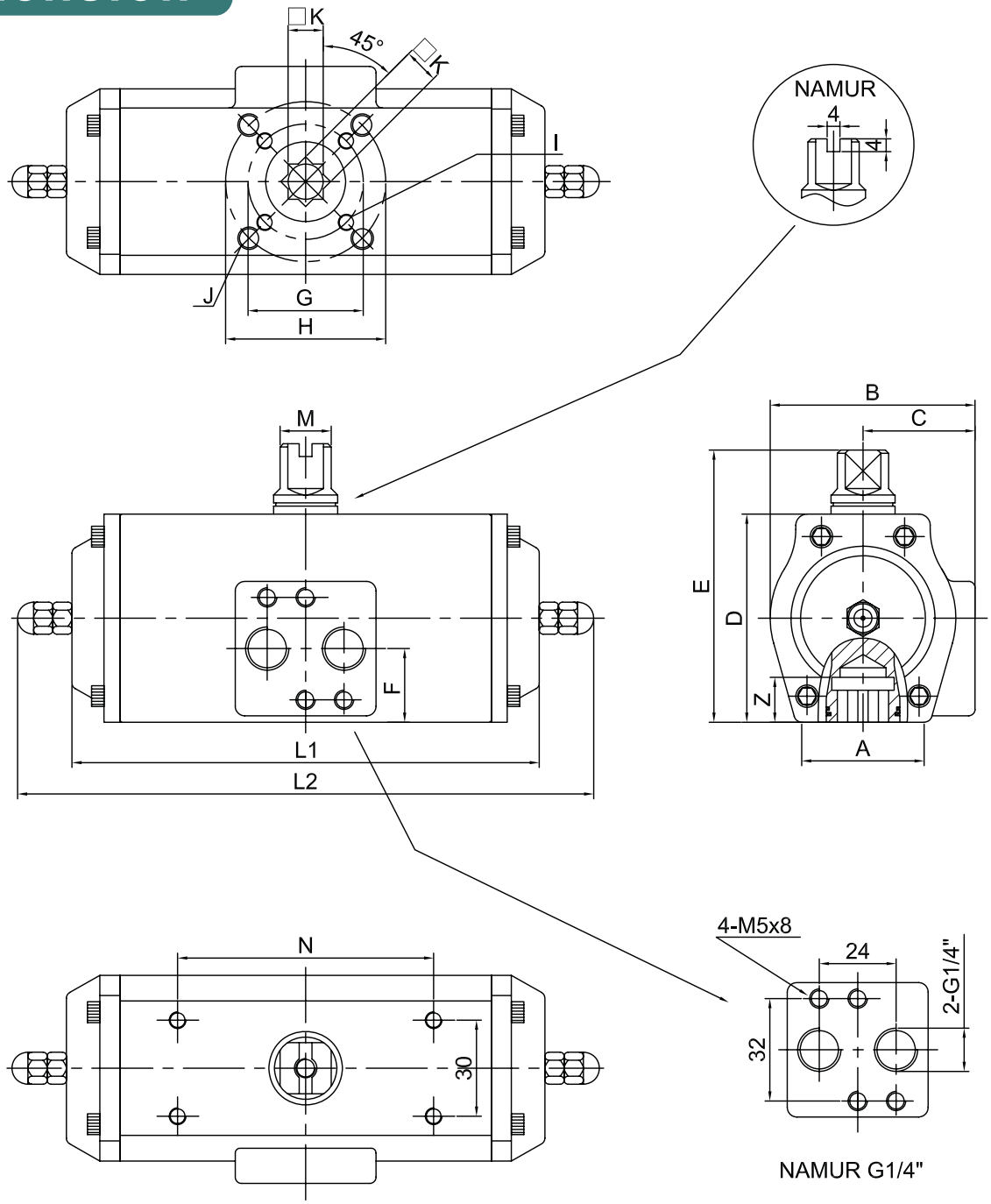
Reverse Rotation:
Air to port A forces the pistons outwards, causing the springs to compress, the pinion turns clockwise while air is being exhausted from port B. Loss of air pressure on port A, the stored energy in the springs forces the pistons inwards. The pinion turns counterclockwise while air is being exhausted from port A.

Assemble, Parts and Material



No.	Description	Qty	StandardsMaterial
1	Indicator Screw	1	Stainless steel
2	Indicator	1	plastic
3	Snap Ring	1	Stainless steel
4	Washer	1	Stainless steel
5	Outside Washer	1	Polyoxymethylene
6	Body	1	Stainless steel
7	O-ring(Top)	1	Viton/NBR
8	Bearing Top	1	Polyoxymethylene
9	Inside Washer	1	Polyoxymethylene
10	Pinion	1	Stainless steel
11	Bearing Bottom	1	Polyoxymethylene
12	O-ring Bottom	1	Viton/NBR
13	Plug	2	NBR
14	Piston	2	Stainless steel
15	Piston O-ring	2	Viton/NBR
16	Piston Bearing	2	Polyoxymethylene
17	Guide Piston	2	Nylon66
18	Spring	*	Spring steel
19	Spring Retainer(L)	*	Nylon66
20	Spring Retainer(R)	*	Nylon66
21	Retainer Connector	*	Brass
22	End-Cap O-ring	2	Viton/NBR
23	End-Cap	2	Stainless steel
24	End-Cap Stop Screw	8	Stainless steel
25	Adjust Screw	2	Stainless steel
26	Adjust Screw Nut	2	Stainless steel
27	Adjust Screw Washer	2	Stainless steel
28	Adjust Screw O-ring	2	Viton/NBR

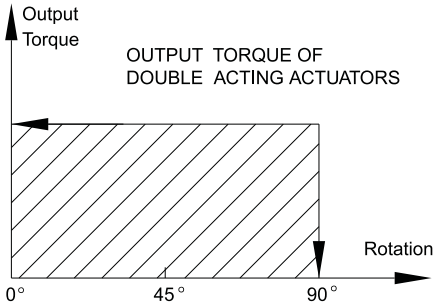
Dimension



Unit: mm

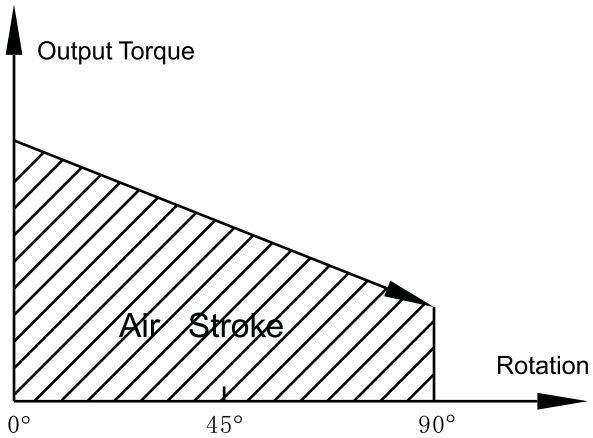
SIZE	A	B	C	D	E	F	G	H	I	J	K	L1	L2	M	N	Z	AirConnection
αA-45	42	64	35	65	85	23	Φ36	Φ50	M5×8	M6×10	11	147	180	16	80	14	G1/4"(1/4"NPT)
αA-60	48.5	74	39	81	101	23		Φ50		M6×10	14	146	180	16	80	18	G1/4"(1/4"NPT)
αA-85	66	101	52	108	128	24	Φ50	Φ70	M6×10	M8×13	17	198	213	16	80	21	G1/4"(1/4"NPT)
αA-105	80	118	60	133	153	24		Φ70		M8×13	22	251	266	16	80	26	G1/4"(1/4"NPT)
αA-125	100	138	69	155	185	28	Φ70	Φ102	M8×13	M10×16	22	242	298	22	130	26	G1/4"(1/4"NPT)
αA-140	115	153	77	171	201	34	Φ102	Φ125	M10×16	M12×20	27	358	368	22	130	31	G1/4"(1/4"NPT)
αA-160	132	174	87	197	227	39	Φ102	Φ125	M10×16	M12×20	27	325	375	22	130	31	G1/4"(1/4"NPT)

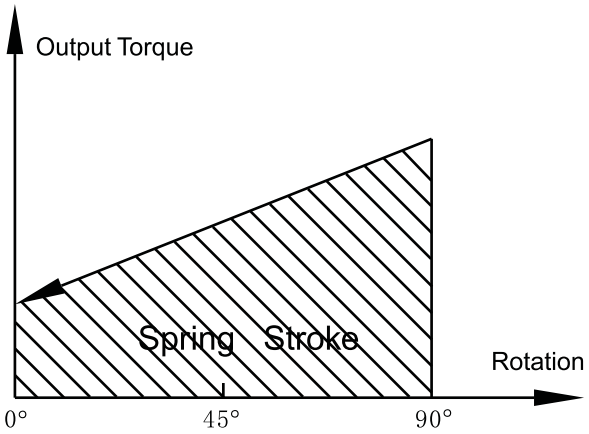
Out torque table of double acting



OUTPUT TORQUE OF DOUBLE ACTING ACTUATORS (Unit:Nm)								
Model	Air supply pressure (Unit:Bar)							
	2	3	4	5	6	7	8	10
αA-45DA	6.0	9.1	12.1	15.1	18.1	21.1	24.2	30.2
αA-60DA	12.9	19.3	25.8	32.2	38.7	45.1	51.5	64.4
αA-85DA	32.3	48.5	64.7	80.8	97.0	113.1	129.3	161.6
αA-105DA	65.8	98.7	131.6	164.4	197.3	230.2	263.1	328.9
αA-125DA	102.5	153.8	205.1	256.4	307.6	358.9	410.2	512.7
αA-140DA	175.4	263.1	350.8	438.5	526.2	613.9	701.6	877.0
αA-160DA	267.3	400.9	534.6	668.2	801.8	935.5	1069.1	1336.4

Out torque table of spring return





OUTPUT TORQUE OF SPRING RETURN ACTUATORS (Unit:Nm)																						
Output torque of air to springs																					Springs' output	
Air pressure		2Bar		2.5Bar		3Bar		4Bar		5Bar		6Bar		7Bar		8Bar		10Bar			
Model	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
	Q.ty	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
αA-45SR	5	3.1	1.4	4.7	3.0	6.2	4.5	9.2	7.5	12.2	10.5									4.6	2.9
	6			4.1	2.1	5.6	3.6	8.6	6.6	11.6	9.6									5.5	3.5
	7					5.0	2.6	8.0	5.6	11.0	8.6	14.0	11.6							6.5	4.1
	8							7.5	4.7	10.5	7.7	13.5	10.7	16.5	13.7					7.4	4.6
	9							6.9	3.8	9.9	6.8	12.9	9.8	15.9	12.8	19.0	15.9			8.3	5.2
	10									9.3	5.9	12.3	8.9	15.3	11.9	18.4	15.0	24.4	21.0	9.2	5.8
	11									8.7	5.0	11.7	8.0	14.7	11.0	17.8	14.1	23.8	20.1	10.1	6.4
	12											11.1	7.0	14.1	10.0	17.2	13.1	23.2	19.1	11.1	7.0

OUTPUT TORQUE OF SPRING RETURN ACTUATORS (Unit:Nm)																						
Output torque of air to springs																					Springs' output	
Air pressure		2Bar		2.5Bar		3Bar		4Bar		5Bar		6Bar		7Bar		8Bar		10Bar				
Model	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
	Q.ty	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
αA-60SR	5	6.1	2.5	9.3	5.7	12.5	8.9	19.0	15.4	25.4	21.8									10.4	6.8
	6			7.9	3.6	11.1	6.8	17.6	13.3	24.0	19.7									12.5	8.2
	7					9.7	4.7	16.2	11.2	22.6	17.6	29.1	24.1							14.6	9.6
	8							14.9	9.1	21.3	15.5	27.8	22.0	34.2	28.4					16.7	10.9
	9							13.5	7.0	19.9	13.4	26.4	19.9	32.8	26.3	39.2	32.7			18.8	12.3
	10									18.5	11.3	25.0	17.8	31.4	24.2	37.8	30.6	50.7	43.5	20.9	13.7
	11									17.2	9.3	23.7	15.8	30.1	22.2	36.5	28.6	49.4	41.5	22.9	15.0
	12											22.3	13.7	28.7	20.1	35.1	26.5	48.0	39.4	25.0	16.4
αA-85SR	5	16.5	9.3	24.6	17.4	32.7	25.5	48.9	41.7	65.0	57.8									23.0	15.8
	6			21.4	12.8	29.5	20.9	45.7	37.1	61.8	53.2									27.6	19.0
	7					26.4	16.3	42.6	32.5	58.7	48.6	74.9	64.8							32.2	22.1
	8							39.4	27.9	55.5	44.0	71.7	60.2	87.8	76.3					36.8	25.3
	9							36.2	23.3	52.3	39.4	68.5	55.6	84.6	71.7	100.8	87.9			41.4	28.5
	10									49.2	34.8	65.4	51.0	81.5	67.1	97.7	83.3	130.0	115.6	46.0	31.6
	11									46.0	30.2	62.2	46.4	78.3	62.5	94.5	78.7	126.8	111.0	50.6	34.8
	12											59.0	41.8	75.1	57.9	91.3	74.1	123.6	106.4	55.2	38.0
αA-105SR	5	34.2	16.6	50.6	33.0	67.1	49.5	100.0	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	105.3									59.1	38.0
	7					54.4	29.8	87.3	62.7	120.1	95.5	153.0	128.4							68.9	44.3
	8							81.0	52.9	113.8	85.7	146.7	118.6	179.6	151.5					78.7	50.6
	9							74.7	43.0	107.5	75.8	140.4	108.7	173.3	141.6	206.2	174.5			88.6	56.9
	10									101.1	66.0	134.0	98.9	166.9	131.8	199.8	164.7	265.6	230.5	98.4	63.3
	11									94.8	56.1	127.7	89.0	160.6	121.9	193.5	154.8	259.3	220.6	108.3	69.6
	12											121.4	79.2	154.3	112.1	187.2	145.0	253.0	210.8	118.1	75.9
αA-125SR	5	50.1	24.1	75.8	49.8	101.4	75.4	152.7	126.7	204.0	178.0									78.4	52.4
	6			65.4	34.1	91.0	59.7	142.3	111.0	193.6	162.3									94.1	62.8
	7					80.5	44.1	131.8	95.4	183.1	146.7	234.3	197.9							109.7	73.3
	8							121.3	79.7	172.6	131.0	223.8	182.2	275.1	233.5					125.4	83.8
	9							110.9	64.0	162.2	115.3	213.4	166.5	264.7	217.8	316.0	269.1			141.1	94.2
	10									151.7	99.6	202.9	150.8	254.2	202.1	305.5	253.4	408.0	355.9	156.8	104.7
	11									141.2	84.0	192.4	135.2	243.7	186.5	295.0	237.8	397.5	340.3	172.4	115.2
	12											181.9	119.5	233.2	170.8	284.5	222.1	387.0	324.6	188.1	125.7
αA-140SR	5	89.6	46.4	133.5	90.3	177.3	134.1	265.0	221.8	352.7	309.5									129.0	85.8
	6			116.4	64.5	160.2	108.3	247.9	196.0	335.6	283.7									154.8	102.9
	7					143.0	82.6	230.7	170.3	318.4	258.0	406.1	345.7							180.5	120.1
	8							213.5	144.5	301.2	232.2	388.9	319.9	476.6	407.6					206.3	137.3
	9							196.4	118.7	284.1	206.4	371.8	294.1	459.5	381.8	547.2	469.5			232.1	154.4
	10									266.9	180.6	354.6	268.3	442.3	356.0	530.0	443.7	705.4	619.1	257.9	171.6
	11									249.8	154.8	337.5	242.5	425.2	330.2	512.9	417.9	688.3	593.3	283.7	188.7
	12											320.3	216.7	408.0	304.4	495.7	392.1	671.1	567.5	309.5	205.9
αA-160SR	5	127.6	59.0	194.4	125.8	261.2	192.6	394.9	326.3	528.5	459.9									208.3	139.7
	6			166.1	84.1	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	1057.4	919.4	417.0	279.0
	11									361.2	210.2	494.8	343.8	628.5	477.5	762.1	611.1	1029.4	878.4	458.0	307.0
	12											466.8	301.8	600.5	435.5	734.1	569.1	1001.4	836.4	500.0	335.0

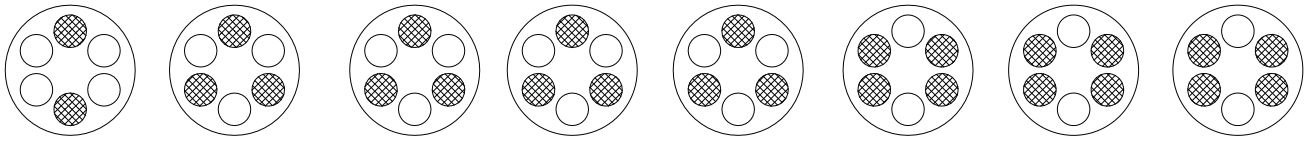
Operating Conditions

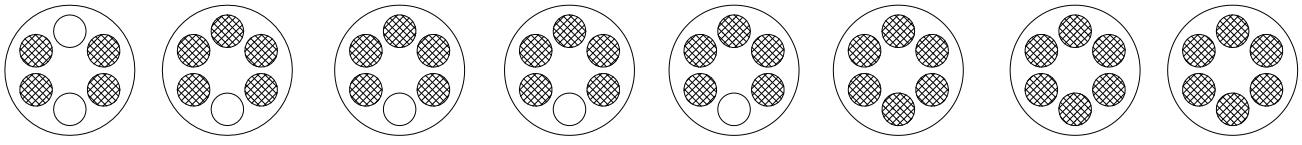
1. Operating media
Dry or lubricated air, the non-corrosive gasses or oil
2. Air supply pressure
Double acting:2~8Bar;Spring return:2~8Bar
3. Operating temperature
Standard(NBR O-ring):–20°C~+80°C
Low temperature(Silicone O-ring):–35°C~+80°C
High temperature(Viton O-ring): –15°C~+150°C
4. Travel adjustment
Have adjustment range of ±4°for the rotation at 90°
5. Lubrication
Under normal operating condition, need not accrete lubricant
6. Application
Either indoor or oarutdoor
7. Highest pressure
The maximum input pressure is 10 Bar

Manual Operation

Remove any manual opening device from the valve, leaving the valve stem clear. Make sure that the shape of the stem fit the actuator output and that the rotation is not hindered in any way. Mount the actuator onto the valve, certaining it well on the stem. Make sure that the rotation direction is correct, in any case do not insert your hands inside the valve. We strongly suggest checking the cleanness of the air-supply pipes, especially when the plant is not provided with filters. A spacer between actuator and valve will be necessary with fluids at high temperature.

Springs mounting form for spring return actuators:





Maintenance

1.It is recommended that periodic checks be performed to make sure that all fasteners remain tight.
2.The actuator is supplied ready-lubricated no further lubrication is required. If lubrication is deemed necessary , use EP-1 grease.
3.Under certain working conditions (heavy duty, non-compatible operating media or abnormal operating conditions)internal seals should be checked periodically and replaced when necessary.
4.On spring return actuators, spring fatigue may set in requiring the replacement of springs. Spring should always be replaced in full sets.

NOTE

If an actuator is properly assembled and used , it will be maintenance free, as it has been lubricated enough to last a normal working life under normal working conditions. Should it get necessary to replace its seals, we suggest turning to my company where the product will be overhauled first, and then tested. On request, my company will be willing to provide its customers with kits and instructions.