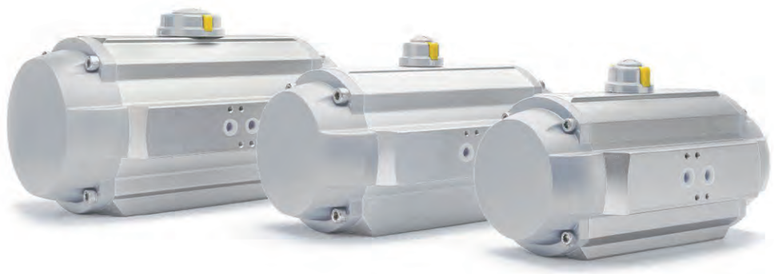
气动执行器
Pneumatic actuator



1、挤压铝缸体采用阳极氧化等防腐蚀工艺处理，使用寿命长，摩擦系数低。
2、双活塞齿条采用铸铝硬质氧化工艺处理，结构紧凑、运行迅速、使用寿命长，简单的对调活塞可以改变气缸旋转方向。
3、一体式齿轮输出轴，表面采用镀镍工艺处理，使用寿命高，同时可定制尺寸和不锈钢材料。
4、压铸铝合金端盖表面喷塑处理，防腐性能好，可定制各种喷涂颜色或PTFE涂层。
5、两个独立的外部行程调节螺栓，在开启和关闭位置上可以精确地调整+/- 5°。
6、齿条和活塞上采用低摩擦力的导向环，避免金属与金属的直接接触，低摩擦力长寿命，维修更换简单方便。
7、组合式预压弹簧采用防腐涂层处理，具有较强的抗腐蚀性和使用寿命，拆装安全可靠，通过改变弹簧数量实现不同的力矩输出。
8、执行器全部采用优质的不锈钢紧固件，具有良好的抗腐蚀能力。
9、符合最新国际标准:ISO 5211, DIN 3337和VDI/VDE 3845 NAMUR，产品互换性高，便于限位开关和其他附件的安装连接。

1、Extruded aluminium body, with both internal and external hard anodized corrosion protection having honed cylinder surface for longer life and lower coefficient of friction.
2、Dual piston rack and pinion design for compact construction, symmetric mounting position, high cycle life and fast operation, reverse rotation can be accomplished in the field by simply inverting the pistons.
3、One-piece gear output shaft, with nickel plated, long service life. And can be customized size and stainless steel material as option.
4、Die-cast aluminum alloy end caps,epoxy coated with high anti-corrosion performance.Can be customized various colors or PTFE coating.
5、Two indipendent external travel stop adjustments. Permits an easy and precise adjustment of +/- 5° in both directions, in the open and close positions for an accurate valve alignment
6、Selected high quality bearings and seal for low friction, high cycle life and a wide operating temperature range.
7、Modular preloaded spring cartridge design. With coated spring for simple versatile range, greater safety and corrosion resistance.
8、Internal and external stainless steel fasteners for long term corrosion resistance.
9、ISO 5211, DIN 3337和VDI/VDE 3845 NAMUR : Full conformance to the latest specifications:ISO 5211, DIN 3337 and VDI/VDE 3845 NAMUR for product interchangeability and easy mounting of solenoids, limit switches and other accessories.

型号编制
Moddel prepartion

FV 055 D (K12) { D11 F05 090 S A }

1、FLOECONTROL
气动二代执行器

2、执行器规格
Actuator model
005、010、015、020、025、030、035、
040、045、050、055、060、065、070、

3、作用形式
Action type
D = 双作用 D=Double acting
SC = 单作用常闭 SC=Spring return(Fail close)
SO = 单作用常闭 SO=Spring return(Fail open)

4、弹簧数量
Spring quantity
两端总数 = 4~12 Spring quantity=4~12pcs

5、输出轴尺寸
Output shaft
D = 八角 D=Octagon
H = 椭圆 H=Oval
W = 双键槽 W=Dual Keyway

6、国际标准ISO5211连接尺寸
ISO5211 connection size
F03、F05、F07、F10、F12、F14、F16、F25

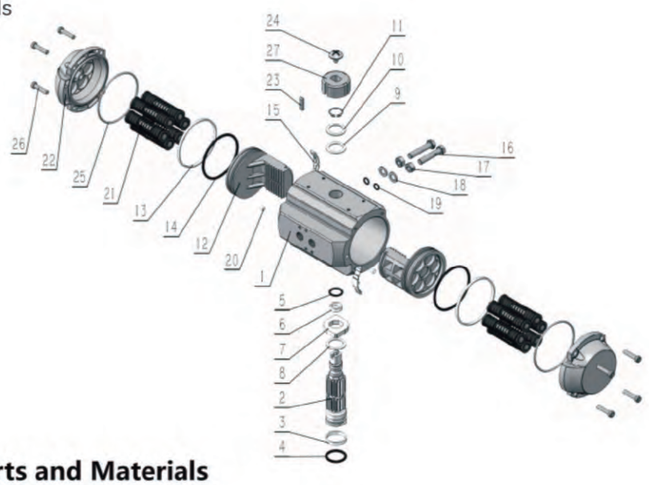
7、旋转行程角度
Rotary
30°、45°、60°、90°、120°、180°

8、操作温度
Working temperature
S = 标准操作温度丁腈橡胶O形圈 -20°~+80°C S=Standard NBR O-ring -20℃~+80℃
H = 高温氟橡胶O形圈 -20°~+160°C H=High temperature Viton O-ring -20℃~+160℃
L = 低温硅橡胶O形圈 -40°~+80°C L=Low temperature Silicon O-ring -40℃~+80℃

9、防腐等级
Anti-corrosion grade
A = 阳极氧化 A=Hard anodized
B = 喷涂 B=Epoxy coated



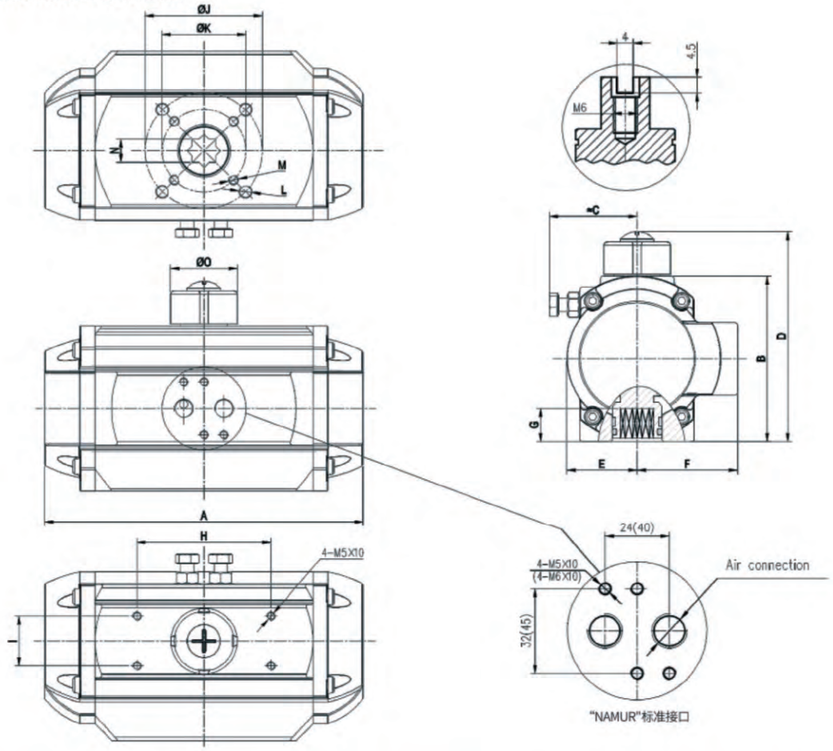
零部件及材料
parts and materials



零件和材料 Parts and Materials

NO.	名称	Description	数量Qty	材料	Material	防腐处理	Material
1	缸体	Body	1	铝合金	Aluminium Alloy	硬质氧化	Anodized Oxygenation
2	转轴	Pinion	1	合金钢	Alloy Steel	镀镍	Nickel Plated
3	下轴支承环	Bearing(Lower Pinion)	1	聚甲醛	POM		
4	下轴O形圈	O-Ring(Lower Pinion)	1	丁腈橡胶	NBR		
5	上轴O形圈	O-Ring(Top Pinion)	1	丁腈橡胶	NBR		
6	上轴支承环	Bearing(Top Pinion)	1	聚甲醛	POM		
7	定位片	Spacer	1	合金钢	Alloy Steel		
8	内垫圈	Thrust Bearing Pinion	1	聚甲醛	POM		
9	外垫圈	Thrust Bearing Pinion	1	聚甲醛	POM		
10	垫圈	Thrust Washer(Pinion)	1	不锈钢	Stainless Steel		
11	卡簧	Spring Clip	1	不锈钢	Stainless Steel		
12	活塞	Piston	2	铝合金	Alloy Steel	硬质氧化	Hard Anodized
13	活塞导向环	Guide Ring(Piston)	2	聚甲醛	POM		
14	活塞O形圈	O-Ring(Piston)	2	丁腈橡胶	NBR		
15	活塞支承环	Bearing Ring(Piston)	2	聚甲醛	POM		
16	调节螺钉	Adjusting Screw	2	不锈钢	Stainless Steel		
17	调节螺母	Adjusting Nut	2	不锈钢	Stainless Steel		
18	调节螺钉垫圈	Washer(Adjusting Screw)	2	不锈钢	Stainless Steel		
19	调节螺钉O形圈	O-Ring(Adjusting Screw)	2	丁腈橡胶	NBR		
20	堵头	Plug	2	丁腈橡胶	NBR		
21	弹簧	Spring	4~12	弹簧钢	Spring steel	浸漆	Zinc Phosphate Coated
22	端盖	End Cap	2	铝合金	Alloy Steel	喷塑	Epoxy Coated
23	端盖调节螺钉	Adjusting Screw(End Cap)	2	不锈钢	Stainless Steel		
24	端盖调节螺母	Adjusting Nut(End Cap)	2	不锈钢	Stainless Steel		
25	端盖O形圈	O-Ring(End Cap)	2	丁腈橡胶	NBR		
26	端盖螺栓	Bolts(End Cap)	8	不锈钢	Stainless Steel		
27	指示器	Indicator	1	工程塑料	Engineering Plastics		
28	指示器螺钉	Nut(Indicator)	1	工程塑料	Engineering Plastics		

外形及连接尺寸
External Connection Dimension



型号Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Air
FV005	111	46	52	66	21	31	14	50	25	/	F03Φ36	/	M5X8	9	40	G1/8
FV010	154	74	45	99	30	47	14	80	30	F05Φ50	F03Φ36	M6X11	M5X10	11	40	G1/4
FV015	173	88	50	113	36	54	18	80	30	F07Φ70	F05Φ50	M8X14	M6X11	14	40	G1/4
FV020	190	100	55	125	42	60	20	80	30	F07Φ70	F05Φ50	M8X14	M6X11	14	40	G1/4
FV025	208	109	60	134	46	65	20	80	30	F07Φ70	F05Φ50	M8X14	M6X11	17	40	G1/4
FV030	254	120	70	145	51	70	22	80	30	F07Φ70	F05Φ50	M8X14	M6X11	17	40	G1/4
FV035	282	135	70	160	58	76	24	80	30	F10Φ102	F07Φ70	M10X18	M8X14	22	40	G1/4
FV040	312	155	80	182	68	87	28	80	30	F10Φ102	F07Φ70	M10X18	M8X14	22	65	G1/4
FV045	380	178	95	205	76	96	32	80	30	F12Φ125	F10Φ102	M12X22	M10X18	27	65	G1/4
FV050	426	197	100	224	87	107	34	80	30	F12Φ125	F10Φ102	M12X22	M10X18	27	65	G1/4
FV055	484	235	125	275	103	126	40	130	30	F14Φ140	/	M16X23	/	36	78	G1/4
FV060	532	260	130	300	113	137	40	130	30	F14Φ140	/	M16X25	/	36	78	G1/4
FV065	610	292	145	330	146	158	50	130	30	F16Φ165	/	M20X28	/	46	78	G1/2(1/4)
FV070	704	330	170	370	165	175	57	130	30	F16Φ165	/	M20X28	/	46	78	G1/2

单作用执行器输出力矩

Output torque of single acting actuator

型号	气源压力（bar）	弹簧数量	气源克服弹簧输出力矩 Output Torque of Air Supply 3 0° 起点	3 90° 终点	4 0° 起点	4 90° 终点	5 0° 起点	5 90° 终点	6 0° 起点	6 90° 终点	7 0° 起点	7 90° 终点	弹簧输出力矩 Output Torque of Spring 0° 终点	弹簧输出力矩 Output Torque of Spring 90° 起点
FV010S		5	8.2	5.6	12.1	9.4							3.7	6.0
		6	7.4	4.4	11.4	8.2							4.4	7.1
		7	6.7	3.2	10.6	7.0							5.2	8.3
		8			9.9	5.9	13.9	9.7					5.9	9.5
		9			9.2	4.7	13.1	8.5					6.6	10.7
		10			8.4	3.5	12.4	7.3	16.3	11.2			7.4	11.9
		11					11.6	6.1	15.6	10.0	19.6	13.8	8.1	13.1
		12					10.9	4.9	14.9	8.8	18.8	12.6	8.9	14.3
FV015S		5	14.2	9.9	21.2	16.7							6.7	10.5
		6	12.9	7.8	19.9	14.6							8.1	12.6
		7	11.5	5.7	18.5	12.5	25.5	19.3					9.4	14.7
		8			17.2	10.4	24.1	17.2	31.1	23.9			10.8	16.8
		9			15.8	8.3	22.8	15.1	29.8	21.9			12.1	18.9
		10			14.5	6.2	21.5	13.0	28.4	19.8	35.4	26.5	13.4	21.0
		11			13.1	4.1	20.1	10.9	27.1	17.7	34.1	24.4	14.8	23.1
		12					18.8	8.8	25.7	15.6	32.7	22.3	16.1	25.2
FV020S		5	19.3	14.6	29.2	24.2							10.3	14.2
		6	17.2	11.8	27.1	21.4							12.4	17.0
		7	15.2	8.9	25.0	18.5							14.4	19.9
		8			23.0	15.7	32.8	25.3					16.5	22.7
		9			20.9	12.8	30.8	22.4					18.5	25.5
		10			18.9	10.0	28.7	19.6	38.6	29.2			20.6	28.4
		11					26.7	16.8	36.5	26.4	46.4	36.0	22.7	31.2
		12					24.6	13.9	34.5	23.5	44.3	33.1	24.7	34.1
FV025S		5	27.9	20.4	42.0	34.1							14.4	20.8
		6	25.0	16.2	39.2	30.0							17.3	25.0
		7	22.1	12.1	36.3	25.8							20.2	29.1
		8			33.4	21.6	47.5	35.4					23.1	33.3
		9			30.5	17.5	44.6	31.2					26.0	37.4
		10			27.6	13.3	41.7	27.1	55.9	40.8			28.9	41.6
		11					38.8	22.9	53.0	36.6	67.1	50.4	31.8	45.7
		12					36.0	18.7	50.1	32.5	64.2	46.2	34.7	49.9
FV030S		5	45.1	32.9	67.4	54.6							22.0	32.3
		6	40.7	26.4	63.0	48.2							26.4	38.8
		7	36.3	20.0	58.6	41.7							30.8	45.2
		8			54.2	35.2	76.6	57.0					35.2	51.7
		9			49.8	28.8	72.2	50.5					39.6	58.2
		10			45.4	22.3	67.8	44.1	90.1	65.8			44.0	64.6
		11					63.4	37.6	85.7	59.3	108.1	81.1	48.4	71.1
		12					59.0	31.1	81.3	52.9	103.7	74.6	52.8	77.6
FV035S		5	64.9	47.0	97.3	78.5							32.2	47.4
		6	58.5	37.5	90.9	69.0							38.6	56.9
		7	52.1	28.0	84.4	59.5							45.1	66.4
		8			78.0	50.0	110.4	81.5					51.5	75.9
		9			71.6	40.5	103.9	72.0					57.9	85.4
		10			65.1	31.0	97.5	62.5	129.9	94.0			64.4	94.8
		11					91.0	53.0	123.4	84.5	155.9	116.0	70.8	104.3
		12					84.6	43.5	117.0	75.0	149.4	106.5	77.3	113.8

单作用执行器输出力矩

Output torque of single acting actuator

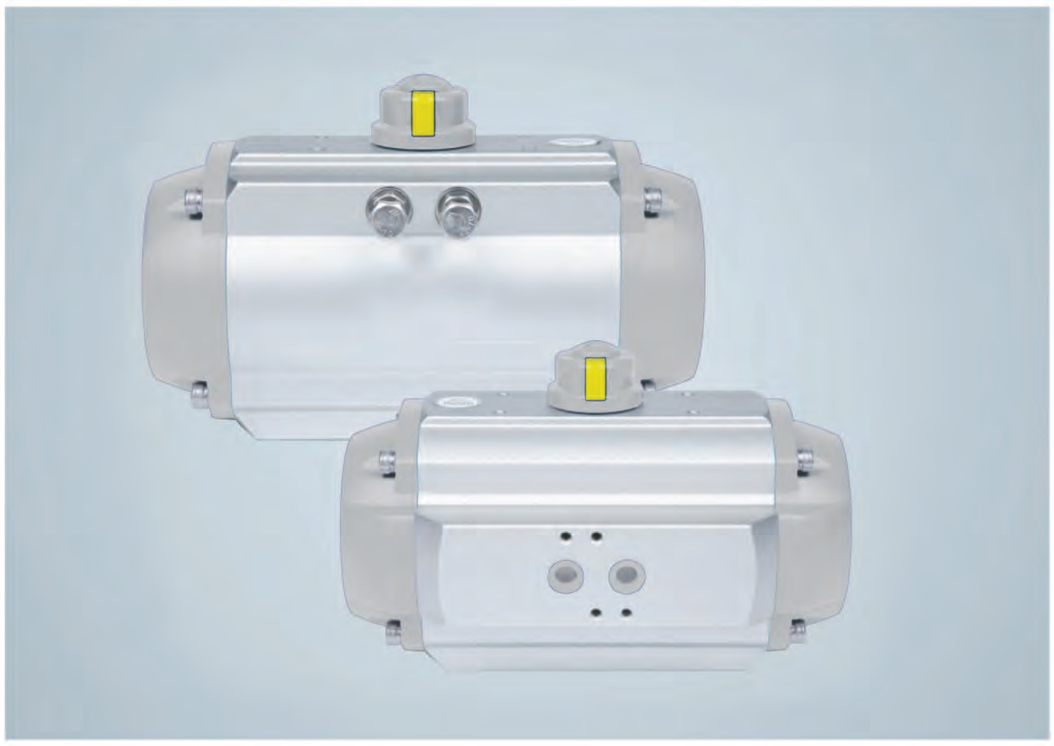
型号	气源压力（bar）	弹簧数量	气源克服弹簧输出力矩 Output Torque of Air Supply 3 0° 起点	3 90° 终点	4 0° 起点	4 90° 终点	5 0° 起点	5 90° 终点	6 0° 起点	6 90° 终点	7 0° 起点	7 90° 终点	弹簧输出力矩 Output Torque of Spring 0° 终点	弹簧输出力矩 Output Torque of Spring 90° 起点
FV040S		5	100.1	74.8	150.5	123.9							51.3	72.3
		6	89.8	60.4	140.3	109.4							61.6	86.8
		7	79.5	45.9	130.0	94.9							71.9	101.2
		8			119.7	80.5	170.2	129.5					82.1	115.7
		9			109.5	66.0	159.9	115.1					92.4	130.1
		10			99.2	51.6	149.7	100.6	200.2	149.6			102.6	144.6
		11					139.4	86.1	189.9	135.2	240.4	184.2	112.9	159.1
		12					129.2	71.7	179.6	120.7	230.1	169.8	123.2	173.5
FV045S		5	158.1	116.4	237.3	193.4							79.3	114.8
		6	142.3	93.4	221.4	170.5							95.2	137.8
		7	126.4	70.4	205.6	147.5							111.1	160.7
		8			189.7	124.5	268.8	201.6					126.9	183.7
		9			173.8	101.6	253.0	178.6					142.8	206.7
		10			158.0	78.6	237.1	155.7	316.3	232.7			158.7	229.6
		11					221.2	132.7	300.4	209.8	379.6	286.8	174.5	252.6
		12					205.4	109.8	284.5	186.8	363.7	263.9	190.4	275.5
FV050S		5	225.1	165.6	337.9	275.4							113.3	163.6
		6	202.4	132.9	315.2	242.7							135.9	196.4
		7	179.8	100.2	292.6	209.9							158.6	229.1
		8			269.9	177.2	382.7	287.0					181.2	261.8
		9			247.2	144.5	360.0	254.2					203.9	294.6
		10			224.7	111.7	337.4	221.5	450.2	331.3			226.5	327.3
		11					314.7	188.8	427.5	298.5	540.3	408.3	249.2	360.0
		12					292.1	156.0	404.9	265.8	517.6	375.6	271.8	392.7
FV055S		5	356.4	267.1	536.6	442.7							184.3	259.6
		6	319.5	215.2	499.8	390.8							221.2	311.5
		7	282.7	163.3	462.9	338.9							258.1	363.4
		8			426.0	287.0	606.3	462.5					295.0	415.3
		9			389.2	235.0	569.4	410.6					331.8	467.3
		10			352.3	183.1	532.5	358.7	712.8	534.3			368.7	519.2
		11					495.7	306.8	675.9	482.3	856.2	657.9	405.6	571.1
		12					458.8	254.9	639.0	430.4	819.3	606.0	442.4	623.0
FV060S		5	514.1	388.8	773.2	641.5							263.0	369.2
		6	461.5	315.0	720.6	567.6							315.6	443.0
		7	408.9	241.1	668.0	493.8							368.2	516.9
		8			615.4	420.0	874.4	672.6					420.8	590.7
		9			562.8	346.1	821.8	598.8					473.4	664.6
		10			510.2	272.3	769.2	524.9	1028.3	777.6			526.0	738.4
		11					716.6	451.1	975.7	703.8	1234.7	956.4	578.6	812.2
		12					664.0	377.3	923.1	629.9	1182.1	882.6	631.2	886.1
FV065S		5	746	572	1126	944							396	542
		6	667	464	1047	835							475	651
		7	587	355	968	727							555	759
		8			889	618	1269	990					634	867
		9			809	510	1190	881					713	976
		10			730	402	1111	773	1492	1144			792	1084
		11					1032	665	1412	1036	1793	1407	872	1193
		12					952	556	1333	928	1714	1299	951	1301
FV070S		5	1156	852	1734	1416							578	842
		6	1041	683	1619	1248							694	1011
		7	925	515	1503	1079							809	1179
		8			1388	911	1966	1476					925	1348
		9			1272	742	1850	1307					1040	1516
		10			1157	574	1735	1139	2313	1703			1156	1685
		11					1619	970	2197	1535	2775	2099	1272	1853
		12					1503	802	2082	1366	2660	1931	1387	2022

双作用执行器输出力矩

Output torque of double acting actuator

Unit:Nm

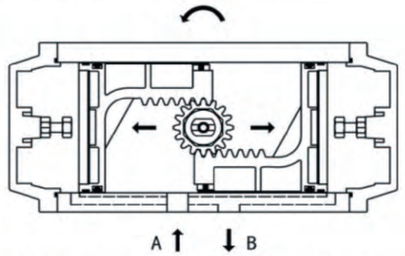
型号Model	输入气源压力（Bar） Air Pressure						
	2	3	4	5	6	7	8
FVO05D	2.7	4.2	5.8	7.4	9.0	10.5	11.8
FVO10D	7.9	11.9	15.9	19.9	23.8	27.8	31.7
FV015D	14.0	21.0	28.0	35.0	42.0	49.0	55.9
FV020D	19.8	29.7	39.6	49.5	59.4	69.2	79.1
FV025D	28.3	42.5	56.6	70.7	84.9	99.0	113.2
FV030D	44.7	67.1	89.5	118.9	134.2	156.6	179.0
FV035D	64.8	97.1	129.5	161.9	194.3	226.7	259.0
FVO40D	101.0	151.4	201.9	252.4	302.9	353.4	403.8
FV045D	158.3	237.5	316.6	395.8	474.9	554.1	633.2
FV050D	225	338	451	564	677	790	902
FV055D	361	541	721	901	1082	1262	1442
FVO60D	518	777	1036	1295	1554	1813	2072
FV065D	761	1142	1523	1903	2284	2665	3045
FVO70D	1156	1734	2312	2891	3469	4047	4625



工作原理（标准动作）

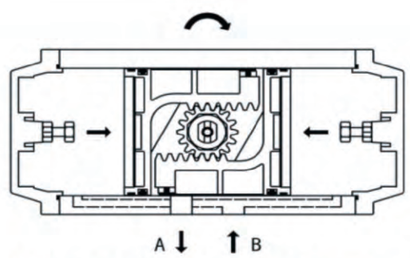
How it Works (standard action)

■ 双作用式 Dual action



1、压缩空气由A口输入，使左右活塞向相反方向运动，输出轴逆时针方向转动，打开阀门，两活塞侧面的空气由B口排出。

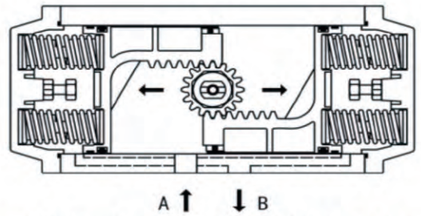
Air from Port A forces the pistons outwards,causing the springs to compress, the pinion turns counter-clockwise to open the valve while air is being exhausted from Port B.



2、压缩空气由B口输入，使左右活塞向中心移动，输出轴顺时针方向转动，关闭阀门，两活塞中间的空气由A口排出。

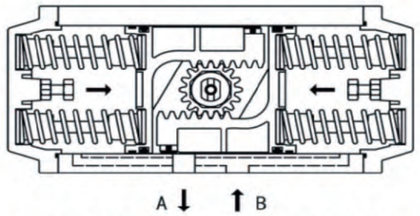
Air from Port B forces the pistons inwards, causing the springs to compress, the pinion turns clockwise to close the valve while air is being exhausted from Port A.

■单作用式（常闭式） Spring return (FC)



1、压缩空气由A口输入，使左右活塞向相反方向运动，输出轴逆时针方向转动，打开阀门，两活塞侧面的空气由B口排出。

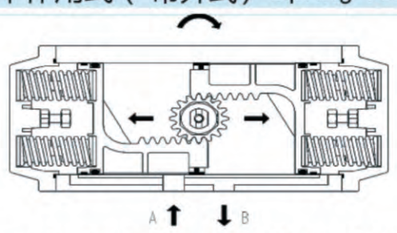
Air from Port A forces the pistons outwards, causing the springs to compress, the pinion turns counter-clockwise to open the valve while air is being exhausted from Port B.



2、失气或失电时，由于弹簧的作用使两活塞向中心移动，输出轴顺时针方向转动，关闭阀门，空气由A口排出，B口进气可加速关闭阀门。

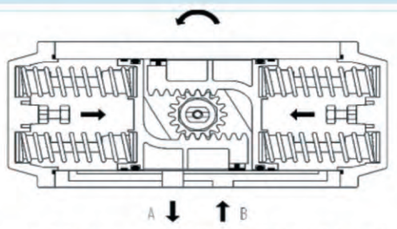
In case of air or power disruption, the rebound of springs forces the pistons inwards, the pinion turns clockwise to close the valve while air is being exhausted from Port A. Air from Port B can accelerate the close of the valve.

■单作用式（常开式） Spring return (F0)



1、压缩空气由A口输入，使左右活塞向相反方向运动，输出轴顺时针方向转动，关闭阀门，两活塞侧面的空气由B口排出。

Air from Port A forces the pistons outwards, causing the springs to compress, the pinion turns clockwise to close the valve while air is being exhausted from Port B.



2、失气或失电时，由于弹簧的作用使两活塞向中心移动，输出轴逆时针方向转动，打开阀门，空气由A口排出，B口进气可加速打开阀门。

In case of air or power disruption, the rebound of springs forces the pistons inwards, the pinion turns counter-clockwise to open the valve while air is being exhausted from Port A. Air from Port B can accelerate the open of the valve.