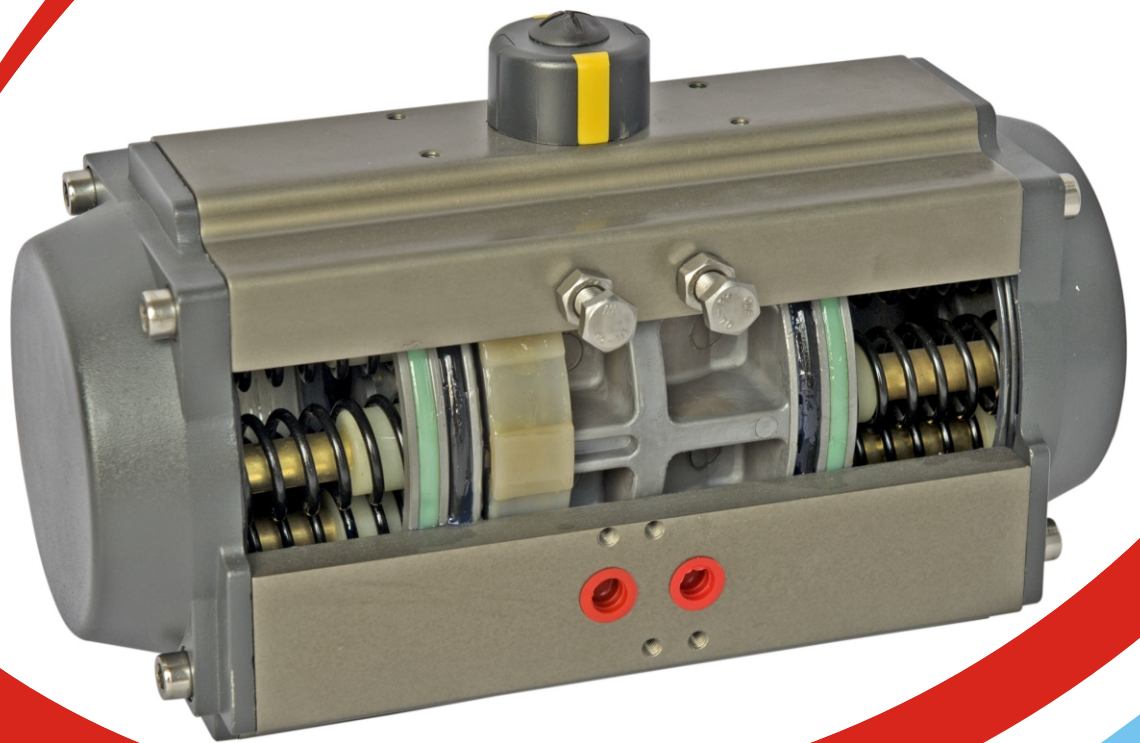


## **AT Series Pneumatic Actuators**



**PAV VALVE CO.,LTD**  
[WWW.PIPE-ARMATUREN.COM](http://WWW.PIPE-ARMATUREN.COM)

## 1.Design and characteristics:

AT series pneumatic actuator is researched, developed and designed on the basis of integrated application of new technologies, new materials, new processes and new ideas at home and abroad. It has the following characteristics:

- ★ Full compliance with the latest international specifications: ISO5211, DIN3337, and VDI/VDE3845, the NAMUR standards.
- ★ The internal surface of the extruded high-strength aluminum cylinders is fine ground and treated by hard anodic oxidation, with a long service life, low friction coefficient and fast operation.
- ★ Beautiful, compact and modern design, specifications of product series make the product selection more affordable.
- ★ All active surfaces are selected with high quality bearings, with low friction, long service life and no noise.
- ★ Two independent stroke adjusters are externally installed, to facilitate adjustment of  $\pm$  °C fully open or fully closed position.
- ★ The actuator with the same external structure has double-action and single-action (reset with spring) options, and the single-action types are normally closed and normally open.
- ★ Multi-functional position indicator in line with NAMUR standard can visually indicate, install and output all the accessories.
- ★ Pre-compression load spring is safe and easy to install and uninstall.
- ★ Piston and end caps are made of die-cast aluminum alloy, with high strength and light weight.
- ★ Change the sealing material, and it can be applied to high or low temperature cases.
- ★ A wide range of angular travel (such as: 120°C, 135°C and 180°C) and three-position pneumatic actuators can be provided as required. A connecting board is not needed, and the solenoid valve can be directly installed.

## 2.Operating conditions

### Operating medium

Clean dry or lubricated air or inert gas is a non-corrosive gas compatible with the internal parts and lubricants of the actuator. The dew-point temperature of the operating medium is 20°C. The size of impurity particles in the medium does not exceed 30u. When choosing a positioner, the size of impurity particles in the medium is no larger than 5U.

**Air pressure:3bar to 8bar**

### Working environment temperature

**Standard 20°C to + 80°C**

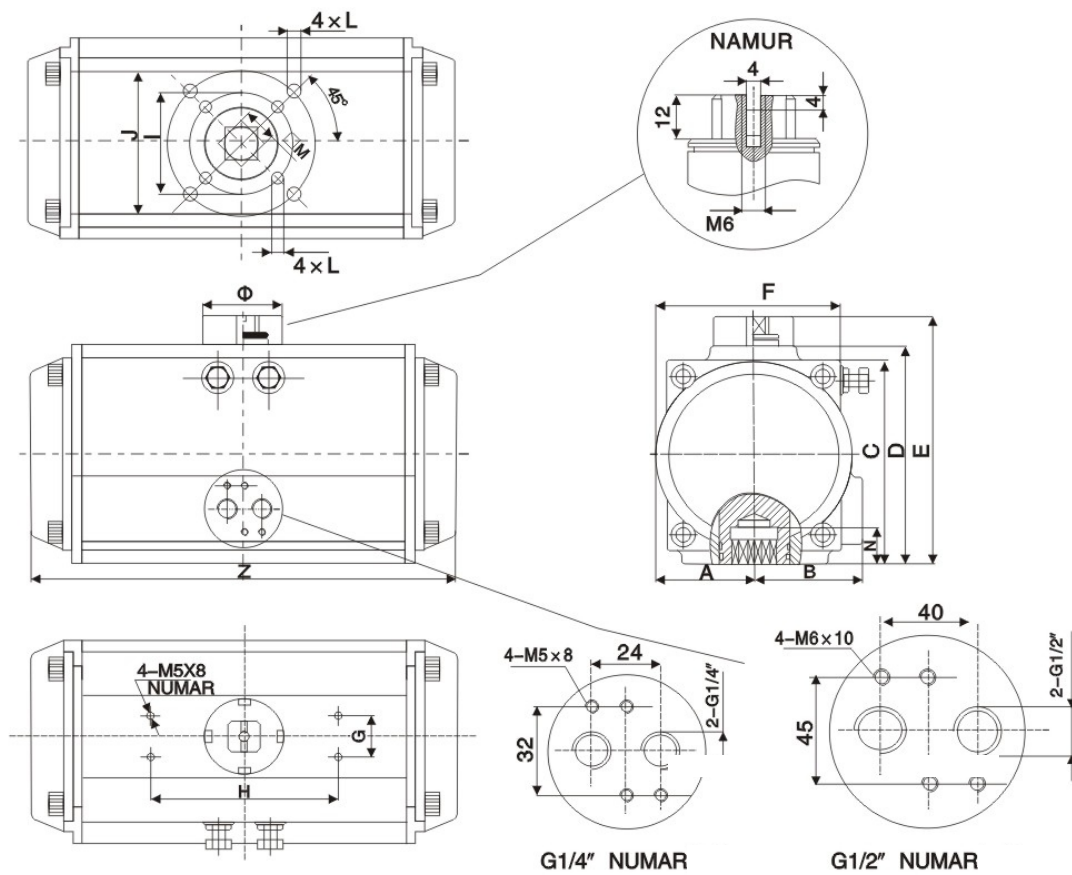
**Low temperature 40°C to + 80°C**

**High temperature 20°C to + 160°C**

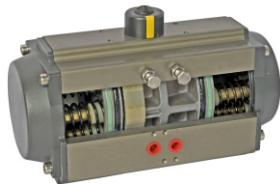
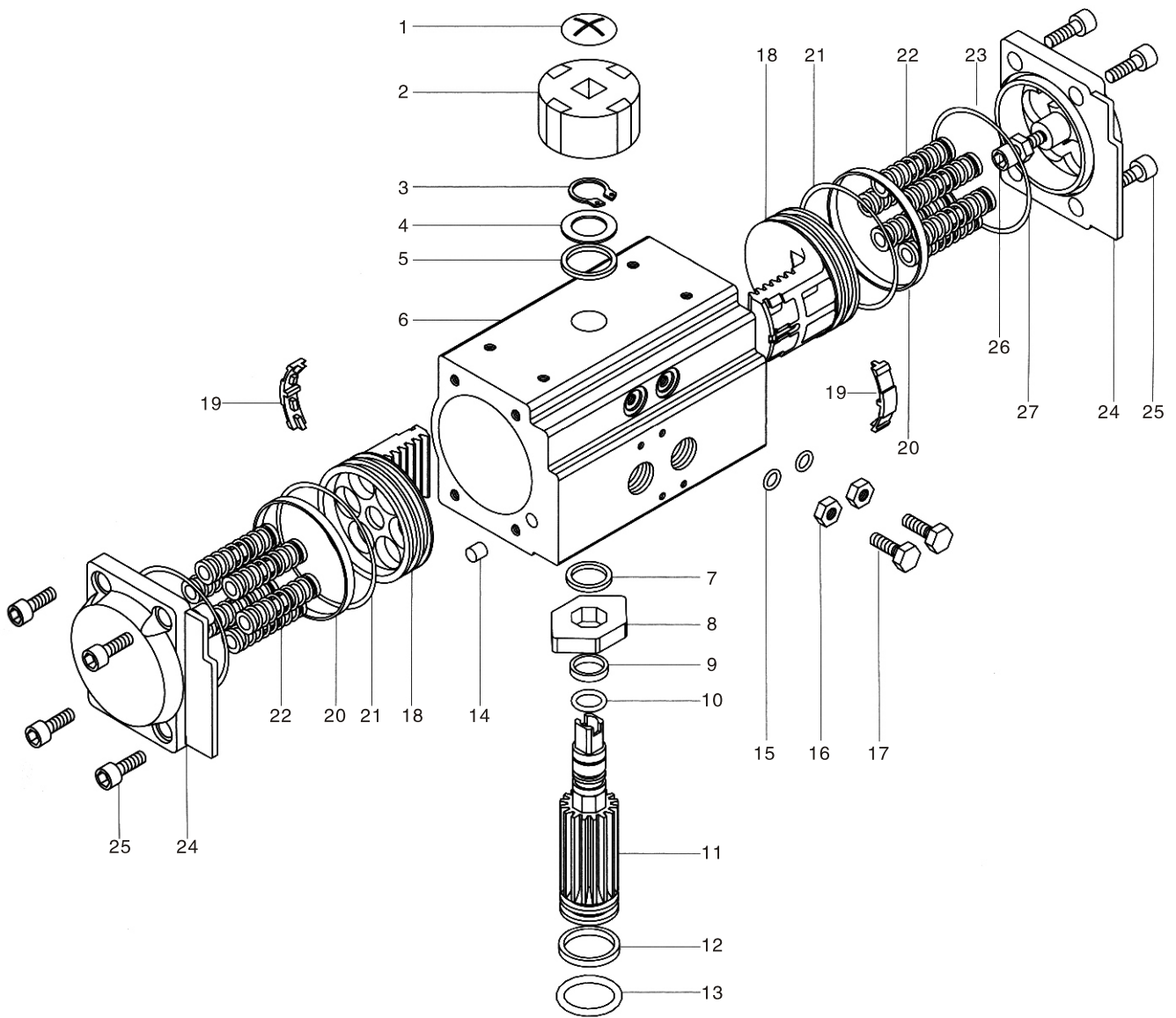
### Lubrication

Under normal conditions of use, no lubricant is added for the standard type. For low or high-temperature applications, special lubricants need to be used.

### 3.Main connection and Shape Reference size



Model	F	G	H	I	J	K	L	M	N	$\Phi$	Air Connection	A	B	C	D	E	Z
AT52	65	30	80		$\Phi 50$		M6x10	11	14	$\Phi 40$	NAMUR G1/4"	30	41.5	65.5	72	95	147
AT65	72	30	80	$\Phi 50$	$\Phi 70$	M6x10	M8x13	14	18	$\Phi 40$	NAMUR G1/4"	36	47	84	89	107.5	168
AT83	92	30	80	$\Phi 50$	$\Phi 70$	M6x10	M8x13	17	21	$\Phi 40$	NAMUR G1/4"	46	57	98.5	108.7	128.7	204
AT105	109.5	30	80	$\Phi 70$	$\Phi 102$	M8x13	M10x16	22	26	$\Phi 40$	NAMUR G1/4"	57.5	64	122.5	133	153	268
AT130	127.5	30	80	$\Phi 70$	$\Phi 102$	M8x13	M10x16	22	26	$\Phi 55$	NAMUR G1/4"	67.5	74.5	145.5	160	175	301
AT140	137.5	30	80	$\Phi 102$	$\Phi 125$	M10x16	M12x20	27	31	$\Phi 55$	NAMUR G1/4"	75	77	161	172	192	390
AT160	158	30	80	$\Phi 102$	$\Phi 125$	M10x16	M12x20	27	31	$\Phi 55$	NAMUR G1/4"	87	87	184	197	217	458
AT190	189	30	130		$\Phi 140$		M16x25	36	50	$\Phi 80$	NAMUR G1/4"	103	103	216	230	260	525
AT210	210	30	130		$\Phi 140$		M16x25	36	50	$\Phi 80$	NAMUR G1/4"	113	113	235.5	255	285	532



#### 4. Parts and material

NO.	Description	Qty	STANDARD METERIAL	PROTECTION	OPTIONALMETERIAL
1	Indicator screw	1	Plastic		
2	Indicator	1	Plastic		
3	Spring clip	1	Stainless Steel		
4	Thrust washer	1	Stainless Steel		
5	Outside washer	1	engineering plastics		
6	Body	1	Extruded alluminum alloy	Hard anodized etc	
7	Inside washer	1	engineering plastics		
8	Fork	1	Alloy steel		
9	O-ring(pinion top)	1	NBR		Viton/silicone
10	Bearing(pinion top)	1	engineering plastics		
11	Pinion	1	Alloy steel		
12	O-ring(pinion bottom)	1	engineering plastics	Nickel plated	Stainless steel
13	Bearing(pinion bottom)	1	NBR		Viton/silicone
14	plug	2	NBR		Viton/silicone
15	O-ring(Adjust scrw)	2	NBR		Viton/silicone
16	Nut(Adjust screw)	2	Stainless Steel		
17	Adjust screw	2	Stainless Steel		
18	Piston	2	Cast alluminum/casting	anodized/zinc galvanized	Stainless steel
19	Guide(Piston)	2	engineering plastics		
20	Bearing(Piston)	2	engineering plastics		
21	O-ring(Piston)	2	NBR		Viton/silicone
22	Spring	0~12	Stainless Steel	dip coation	
23	O-ring(End cap)	2	NBR		Viton/silicone
24	End cap	2	Cast alluminum	powder polyster painted etc	
25	Cap screw	8	Stainless Steel		
26	stop screw	2	Stainless Steel		
27	Nut(stop screw)	2	Stainless Steel		

#### 5.Double-acting actuator output torque

Mode	Supply pressure (unit: bar)									
	2	2.5	3	4	4.5	5	5.5	6	7	8
AT52	8.0	10.0	12.0	16.0	18.0	20.0	21.9	23.9	27.9	31.9
AT65	14.6	18.2	21.9	29.2	32.8	36.5	40.1	43.8	51.5	58.4
AT83	31.4	39.2	47.0	62.7	70.5	78.4	86.2	94.1	109.7	125.4
AT105	66.1	82.7	99.2	132.2	148.8	165.3	181.8	198.4	231.4	264.5
AT130	100.3	125.4	150.5	200.6	225.7	250.8	275.9	301.0	351.1	401.3
AT150	171.0	213.8	256.5	342.0	384.8	427.5	470.3	513.0	598.5	684.0
AT160	266.0	332.5	399.0	532.0	598.5	665.0	731.5	798.0	931.0	1064.0
AT190	425.6	532.0	638.4	851.2	957.6	1064.0	1170.4	1276.8	1489.6	1702.4
AT210	532.0	665.0	798.0	1064.0	1197.0	1330.0	1463.0	1596.0	1862.0	2128.0

## 6.Single-acting actuator output torque

Air to overcome the spring output torque														Spring output torque	
Air pressure		3Bar		4Bar		5Bar		6Bar		7Bar		8Bar			
Mode	Spring Quantity	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
AT52	5	7.6	5.7											36.2	4.3
	6	6.9	4.5	10.9	8.5									7.4	5.0
	7	6.0	3.3	9.8	7.3	14.0	10.4							8.6	5.9
	8	5.2	2.0	9.2	6.0	13.2	9.1	17.2	14.1					9.9	6.7
	9	4.3	0.8	8.3	4.8	12.3	7.9	16.3	12.8	20.3	16.8			11.1	7.6
	10			7.4	3.6	11.5	6.7	15.5	11.6	19.5	15.6			12.4	8.5
	11			6.6	2.3	10.6	5.4	14.6	10.4	18.6	14.3	22.6	18.3	13.6	9.3
	12					9.7	4.2	13.8	9.1	17.8	12.2	21.8	17.1	14.8	10.2
AT65	5	15.0	11.4	22.3	14.9									10.4	6.8
	6	13.6	9.3	20.9	16.6	28.3	23.9							12.5	8.2
	7	12.5	7.2	19.5	14.5	26.8	21.9							14.6	9.6
	8	10.9	5.1	18.2	12.4	25.5	19.8	32.8	27.0	40.1	34.3			16.7	10.9
	9			16.8	10.4	24.1	17.7	31.4	24.9	38.7	32.2			18.8	12.3
	10			1.4	8.2	22.8	15.6	30.3	22.8	37.3	30.1	44.7	37.4	20.9	13.7
	11					21.5	13.5	28.7	20.7	36.0	28.0	43.3	35.3	22.9	15.0
	12					20.0	11.4	27.3	18.6	34.6	25.9	41.9	33.3	25.0	16.4
AT83		31.1	24.0	46.8	39.7									23.0	15.8
	6	28.0	19.3	43.7	35.1	59.4	50.7							27.6	19.0
	7	24.8	14.8	40.5	30.5	56.2	46.2							32.2	22.1
	8	21.7	10.1	37.4	25.8	53.1	41.5	68.8	57.2	84.5	72.9			36.8	25.3
	9			34.2	21.3	49.9	37.0	65.6	52.6	81.2	68.3			41.4	28.5
	10			31.0	16.6	46.7	32.3	62.4	48.0	78.1	63.7	93.8	79.3	46.0	31.6
	11					43.6	27.7	59.3	43.4	75.0	59.1	90.6	74.8	50.6	34.8
	12					40.4	23.2	56.1	38.9	71.7	54.5	87.4	70.2	55.2	38.0
AT105	5	67.5	49.9	100.6	83.0									49.2	91.6
	6	61.1	40.0	94.2	73.2	127.3	106.2							59.1	38.0
	7	54.9	30.3	87.9	63.4	121.0	96.4							68.9	44.3
	8	48.5	20.4	81.6	53.3	114.7	86.5	147.7	119.6	180.8	152.7			78.7	50.6
	9			75.3	43.7	108.4	76.8	141.5	109.8	174.5	142.9			88.6	56.9
	10			68.9	33.4	102.0	66.5	135.1	99.6	168.2	132.6	201.2	165.7	98.4	63.3
	11					95.7	57.0	128.7	90.1	161.8	123.1	194.8	156.2	108.3	69.6
	12					89.4	47.5	122.5	80.6	155.5	113.6	188.6	146.7	118.1	75.9
AT130	5	98	72	148	122									79	52
	6	88	56	138	107	188	157							94	63
	7	77	40	127	90	178	141							110	73
	8	67	25	117	75	167	125	217	176	268	226			125	84
	9			107	59	157	109	207	159	257	210			141	94
	10			96	44	148	94	196	144	247	194	297	245	157	105
	11					136	78	188	128	236	178	286	228	173	115
	12					125	63	176	113	226	163	276	213	188	125



## 7. Single-acting actuator output torque

Air to overcome the spring output torque														Spring output torque	
Air pressure		3Bar		4Bar		5Bar		6Bar		7Bar		8Bar			
Mode	Spring Quantity	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
AT140	5	171	127	256	213									129	86
	6	154	102	239	187	325	273							155	103
	7	137	76	222	162	308	247							181	120
	8	120	50	205	136	291	221	376	307	462	392			206	137
	9			187	110	273	196	358	281	444	367			232	155
	10			170	84	256	168	341	255	427	340	512	420	253	172
	11					238	143	324	229	409	314	495	400	284	189
	12					221	118	307	203	392	289	478	374	310	206
AT160	5	259	191	392	324									208	140
	6	232	149	365	282	498	415							250	168
	7	203	107	336	240	469	373							292	196
	8	176	66	309	199	442	237	575	465	708	598			333	223
	9			280	157	413	290	546	423	679	556			375	251
	10			253	115	386	248	519	381	652	514	785	647	417	279
	11					358	207	491	340	624	473	757	606	458	307
	12					330	165	463	298	596	431	729	564	500	335
AT190	5	438	329	651	542									309	200
	6	398	267	611	480	824	693							371	240
	7	358	205	571	418	784	631							433	280
	8	318	143	531	356	744	569	957	782	1169	995			495	320
	9			491	295	704	507	917	720	1130	933			557	360
	10			451	233	664	446	877	658	1090	871	1302	1084	618	400
	11					624	384	837	597	1050	809	1263	1022	680	440
	12					584	322	797	535	1010	748	1223	960	742	480
AT210	5	523	418	789	684									380	275
	6	466	342	734	608	1000	874							456	330
	7	413	266	679	532	945	798							532	385
	8	358	190	624	456	890	722	1156	988	1422	1254			608	440
	9			569	380	835	646	1101	912	1367	1178			684	495
	10			514	304	780	570	1046	836	1312	1102	1578	1368	760	550
	11					725	494	911	760	1257	1026	1523	1292	836	605
	12					670	418	936	684	1202	950	1468	1216	912	660

8. Air consumption

Mode	Open volume (L)	Off volume (L)	Mode	Open volume (L)	Off volume (L)
AT52	0.12	0.16	AT140	2.5	2.2
AT65	0.21	0.23	AT160	3.7	3.2
AT83	0.43	0.47	AT190	5.9	5.4
AT105	0.95	0.88	AT210	7.5	7.5
AT130	1.6	1.4			

9. Weight Table

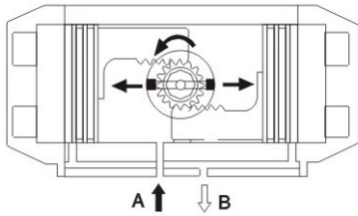
Mode	AT52	AT65	AT83	AT105	AT130	AT140	AT160	AT190	AT210
(ATD) Weight	1.38Kg	2.03Kg	3.13Kg	6.77Kg	8.9Kg	13.25Kg	20.14Kg	31.3Kg	46.80Kg
(ATS) Weight	1.45Kg	2.05Kg	3.6Kg	6.85Kg	10.1Kg	15.55Kg	24Kg	35.25Kg	54.8Kg

Note: 1, SR for 12 spring; 2, the weight of the net weight

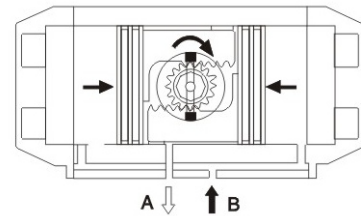


## 10. Working principle (standard action)

### Single-action type (standard action)

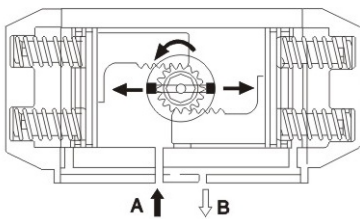


Compressed air is input from the inlet A, making the left and right piston move in the opposite direction and the output shaft run counterclockwise; open the valve, and the air of two piston sides is discharged from the outlet B.

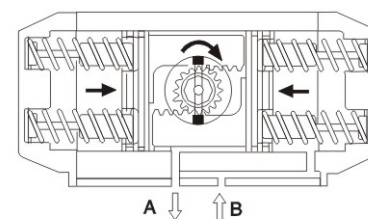


Compressed air is input from the inlet B, making the left and right piston move in the opposite direction and the output shaft run clockwise; close the valve, and the air in the middle of two pistons is discharged from the outlet A.

### Single-action type (Top view)



Compressed air is input from the inlet A, making the left and right piston move in the opposite direction and the output shaft run counterclockwise; open the valve, and the air of two piston sides is discharged from the outlet B.



In case of air loss or power failure, the spring enables the two pistons to move to the centre, and the output shaft turns clockwise; close the valve, and air discharged from the outlet A and air enters into the inlet B to accelerate closing the valve.

- Note: 1. Close the valve when the direction of rotation of standard action is clockwise. Open the valve when it is counterclockwise
2. Reverse the direction of rotation of the piston assembly to counterclockwise, while the valve is closed. Open the valve when it is clockwise.

## 11. Model selection

First of all, determine the torque needed to start and close the valve, and under normal conditions of use, the recommended safety factor is 152%. For steam or non-lubricating liquid media, the security value is increased to 25%, and the security value is increased to 40% for the non-lubricating paste liquid media; the security value is increased to 80% for the non-lubricating powder particle media. Then find the double-action/single-action output torque table based on the air pressure used, and you can obtain an accurate pneumatic actuator model. In the single-action actuator output torque table, the torque in the ending column of spring output torque torque is for the closed valve.

★ Torque required for ball valve = 280N.m

★ Usable medium: water

★ Safety factor (20%): 280 (1+20%) bis 336N.m

★ Air pressure = 4.5Bar

★ Check the model of the double-action output torque table: JATI40D, and the output torque under 4.5Bar steam pressure is 384.8N.m

## 12. Common trouble and inspection and elimination method

Failure phenomenon	Check project	Solve Method
Pneumatic valve does not work	1. Whether the solenoid valve is normal. Whether the coil is burned out, and whether the solenoid valve cartridge is stuck by dirt	Replace the solenoid valve and the coil, and clear the dirt
	2. A separate gas test is done for the pneumatic actuator. Inspect whether the seal ring and cylinder are damaged	Replace the bad seal ring and cylinder
	3. The valve cartridge is stuck by impurities in the valve	Clear the impurities and replace the damaged parts
	4. The handle of the manual machine is at the manual position	Turn the handle to the pneumatic position
Act slowly, creep	1. Insufficient air pressure	Increase air pressure (0 to 4 plus 7MPa)
	2. The output torque of the pneumatic actuator is too small	Increase the pneumatic actuator model or specification
	3. The valve cartridge or other valves is assembled too tight	Readjust and reassemble
	4. Air source pipe is blocked, and the flow rate is too small.	Exclude the fault and replace the filter cartridge
Responder with no signal	1. Power supply short circuit or open circuit	Repair the power supply line
	2. The cam position in the responder is inaccurate	Adjust the cam to the correct position
	3. The micro switch is damaged	Replace the micro switch

### 13. Function and usage of pneumatic actuator accessories

1. Double-action pneumatic actuator: control the opening and closing of valves.
2. Single-action pneumatic actuator: if the circuit and pneumatic valves are cut off or malfunction, the valves are automatically shut off.
3. Single electrically controlled solenoid valve: the valves are open or closed when powered on, and the valves are closed or open in case of power outage.
4. Double electric control solenoid valve: the valve is open when a coil is powered on, and the valve is closed when a second coil is powered on, with memory function.
5. Responder: the signal of valve opening or closing position is sent distantly.
6. Electrical positioner: according to the size of current signals (4~20mA) the valve opening (that is, medium flow) is regulated and controlled.
7. Electrical converter: convert current signal into pneumatic signal, used with pneumatic positioner.
8. Pneumatic positioner: according to the size of pneumatic signal (0.02~0.1MPa) the valve opening is controlled for regulation and control.
9. Pneumatic triple: pressure reducing valve, filter and air lubricator, keep air source stable and clean and lubricate the moving parts.
10. Manual mechanism: when the circuit or gas circuit is cut off or when there is a fault, it is used to open and close the valve.

### 14. Ordering instructions

- ★ Pneumatic actuator: double-action, single-action (normally closed or normally open).
- ★ Valve operating pressure, media and ambient temperature, hard or soft sealing.
- ★ Solenoid valve: double electrically controlled solenoid valve, single electrically controlled solenoid valve, working voltage, explosion-proof.
- ★ Signal feedback: mechanical switch, proximity switch, working voltage, output current signal, explosion-proof;
- ★ Positioner: pneumatic positioner, electrical positioner, current signal, air pressure signal, electrical converter, explosion-proof;
- ★ Air treatment triple
- ★ Manual installation
- ★ Special customization
- ★ The domestic or imported should be indicated in the annex.

