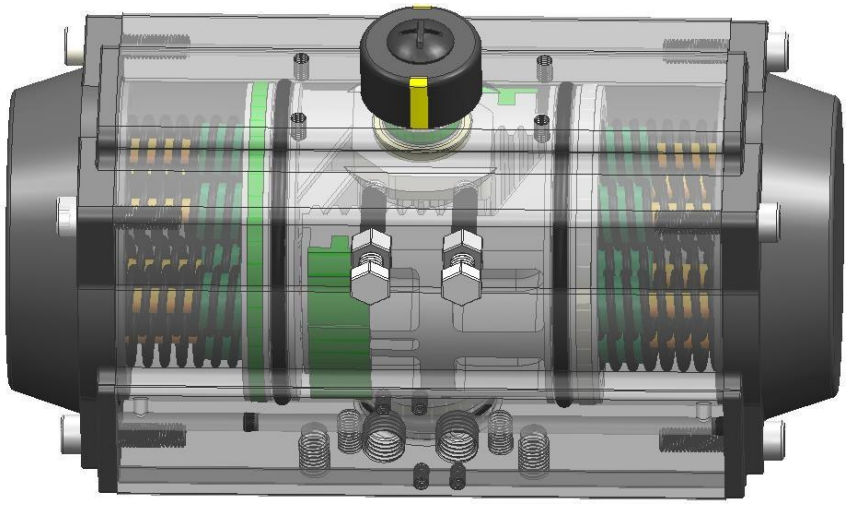
Accessories

AT pneumatic rack and pinion actuator

AT pneumatic rack and pinion actuator is the driving gear in the industrial automation system. It has an aluminum cylinder type rack and pinion structure, featuring with a simple and delicate structure, smooth and reliable work, and large output force. What's more, it will act more precisely with a positioner. It is especially suitable for rotary on-off valves and adjusting valves with small and medium calibre, quick action and required high reliability.



Structure Features:

Compact and stylish combined design

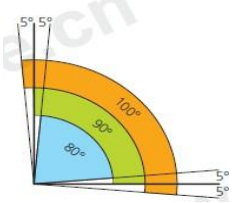
Double acting actuator and spring return (single acting) actuator have the same cylinder, end cover, piston and so on. Therefore, two actuators have great versatility and small inventory, and through retrofitting or removing spring assemblies, or fitting piston teeth diversely, different modes of action in this field can be realized.

Wide range of air supply pressure

Working pressure for double acting actuator

Working pressure for single acting actuator

Two independent external travel stops



With 2 independent travel stop bolts at 0°and 90°, it can adjust withing ±5°.

High-quality seal ring

O ring is made up of Buna-N rubber， silicone rubber, and fluororubber respectively, at normal, low, and high temperature, and it's working temperature is -40~+120°.

High-performance oil

Imported lubricating grease, with good thermal stability, no melting, low volatility, resistance against chemical and water vapor corrosion, non-reaction with rubber, and good oxidation and aging resistance, ensures long-term stable lubrication effect of the cylinder.

（6）Cylinder block with anodic oxidation

The cylinder is moulded with ASTM 6005 aluminum alloy, featuring with high strength and beautiful appearance.

The whole manufacturing process is controlled by the machining center, which ensures the inner hole roughness under 0.4. Besides, overall surface anodic oxidation treatment implements comprehensive anti-corrosion protection. At the same time, thanks to anodic oxidation's low friction coefficient and wear resistance, they greatly lengthen the service life. According to the different environmental requirements, inner cavity coating can adopt teflon or nickel plating process and so on.

Piston structure

Double piston rack and pinion structure, compact overall structure, symmetrical installation, long service life and quick action;

Easy to disassemble and replace action mode. Simply by flipping the piston, reversal or action mode

The whole surface of the cylinder block is anodized to make it more resistant to corrosion and wear.

(8) Drive shaft with strong versatility and anti-fracture structure:

With alloy steel + nickel-plated surface treatment, the one-piece output shaft has high-precision and high-strength

Namur standard design on the top standardizes installation of limit switches and positioners;

Bottom design up to ISO5211 and DIN3337 standard, is four-directional with strong versatility.

(9) End cover with changeable color

Made of the same aluminum alloy material as the cylinder body, the end cover's surface is sprayed. Normally, it can reach the C3 protection level and is dark gray. It can also be sprayed in a specific color according to requirements on site.

(10) Combined preloaded spring and stable output torque



a.High-quality spring steel material, reasonable heat treatment, and high-quality coating treatment, ensure the spring a good service life and corrosion resistance;

b.The combined multi-spring mode, by changing the number of springs, can adjust different output torques, as well as different air supply pressure. requirements on site;

c.The preloaded spring makes it easier and more convenient to assemble and disassemble, and makes it safer and more convenient for after-sales seals replacement.

Each spring is screened by force test before delivery to ensure the stability of the output torque of each actuator.

(11) **Stainless steel fasteners**

All fasteners such as bolts, nuts, and clamp rings are made of 304 stainless steel, with good corrosion resistance and if needed, they can be changed to 316L.

STANDARD SPECIFICATIONS

Series	AT
Type	Rotary stem motion type and cylinder piston type
Model	(Double acting type): AT52D、AT63D、AT75D、AT83D、AT92D、AT105D、AT125D、 AT140D、AT160D、AT190D、AT210D、AT240D、AT270D、AT300D、AT350D、AT400D Spring return type）: AT52S、AT63S、AT75S、AT83S、AT92S、AT105S、AT125S、AT140S、AT160S、AT190S、AT210S、AT240S、AT270S、AT300S、AT350S、 AT400S
Dimensions	1 See Table 4 & Fig.1
Cylinder Valve	See Table 1
Output torque	See Table 2
Trael	0～90°

Air supply pressure	(Double acting type) 300～700kPa； (Spring return type) 400~600 kPa
Air connection	AT52~210 NPT1/4” AT240~400 NPT1/2”
Perfor mance	Hysteresis error: Less than 2% of Full stroke with the positioner. Intrinsic error: Less than ±2% of Full stroke with the positioner.
Ambient Temp.	Standard type -20～+80℃High Temp. - 15°～+120℃ Low Temp. -40～+80℃
Mate rials	Cylinder …… Aluminum alloy piston…… end cover…… Aluminum alloy stem…… 45+ nickel plating seal-ring .....BR、FKM、MVQ
Surface coating	Anodized cylinder, light gray; Plastic sprayed end cover, dark grey, color code RAL7043
Access ories	Positioner, Air-set, Limit switch, Handwheel and so on

TECHNICAL SPECIFICATIONS

AIR CONSUMPTION

Determined by air supply pressure, travel, cylinder volume and times of action, the formula is as follows: l/m=Cylinder volume (A+B) × 丿 } 〕 ｜ { 「 + 101.3 Air supply（KPa） /101.3 ×times/m

Table 1 CYLINDER VOLUME **UNIT:L**

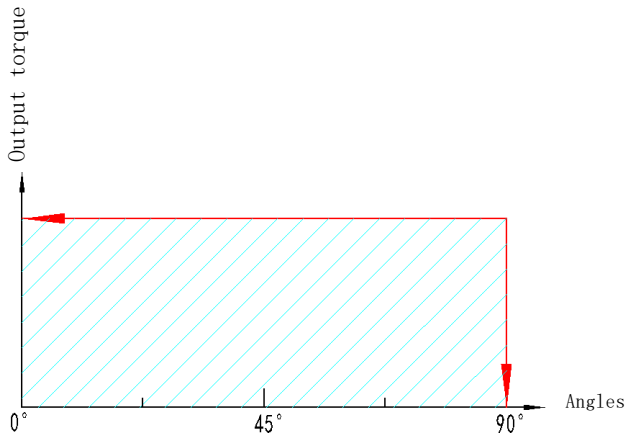
Model	A	B	A+B
AT52	0.12	0.16	0.28
AT63	0.22	0.33	0.55
75	0.3	0.5	0.8
AT83	0.5	0.7	1.2
AT92	0.9	1.2	2.1
AT105	1	1.3	2.3
AT125	1.6	2.2	3.8
AT140	2.5	2.8	5.3
AT160	3.7	4.1	7.8
AT190	5.9	7.2	13.1
AT210	7.6	10.3	17.9
AT240	11.4	15.1	26.5
AT270	17	18.8	35.8
AT300	23.8	29.7	53.5
AT350	35.1	46.3	81.4
AT400	58	62.1	120.1

Note: A represents the volume that has been gained by one single action type’s operation at one time; A+B represents the volume that has been gained by a double acting type’s action at one time.

Table 2 MANUAL DRIVEN ACTUATOR AND HANWHEEL PARAMETER

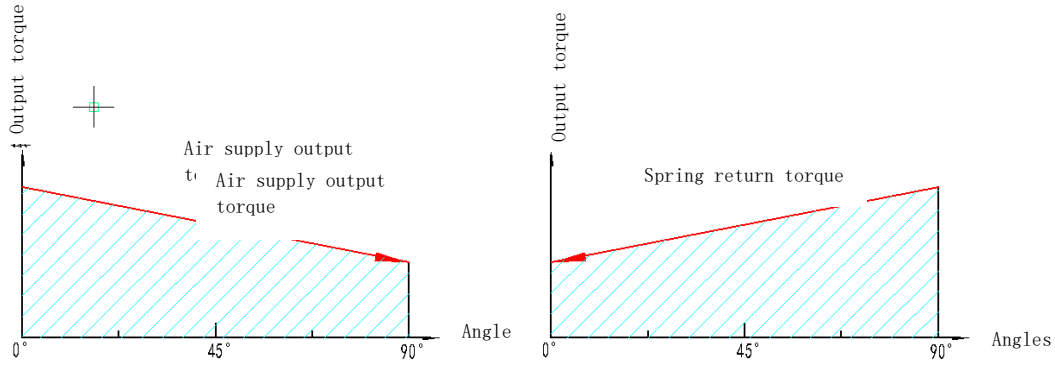
Model (Doule acting)	**Model(Single acting)**	**Handwheel**	**Gear ratio**	**N*m Handwheel input torque**	**N*m Handwheel output torque**
AT52D	AT52S	SD-0	26	12	60
AT63D、AT75D	AT63S、AT75S	SD-1	26	12	60
AT83D、AT92D	AT83S、AT92S	SD-2	28	27	135
AT105D、AT125D	AT105S、AT125S	SD-3	38	35	300
AT140D、AT160D	AT140S、160S	SD-4	54	60	800
AT190D、AT210D	AT190S、AT210S	SD-5	80	105	1600
AT240D、AT270D	AT240S	SD-6	78	200	3500
AT300D	AT270S、AT300S	SD-7	98	200	4600
AT350D	AT350S	SD-8	98	250	7000
AT400D	AT400S	SD-9	100	-	-

Table **3 NR/Dm**



Model	(N*m) air supply output torque （100kpa） air supply pressure							kg weight
	3	3.5	4	4.5	5	5.5	6	
AT52DR/D0	12	14	16	18	20	22	24	1.4
AT63DR/D0	22	25	29	32	36	40	44	2.1
AT75DR/D0	30	35	40	45	50	55	60	3
AT83DR/D0	47	55	63	70	78	86	94	3.8
AT92DR/D0	67	78	90	101	113	124	135	5.3
AT105DR/D0	97	113	130	146	165	180	195	6.3
AT125DR/D0	150	175	200	225	250	275	300	11
AT140DR/D0	255	295	340	382	420	470	510	14
AT160DR/D0	400	460	530	595	660	730	790	20.5
AT190DR/D0	640	740	850	955	1060	1170	1270	31
AT210DR/D0	795	925	1060	1190	1330	1460	1590	47
AT240DR/D0	1150	1340	1530	1720	1920	2110	2300	67
AT270DR/D0	1750	2040	2330	2620	2920	3210	3500	97
AT300DR/D0	2300	2670	3050	3430	3810	4190	4570	110
AT350DR/D0	3430	4000	4570	5140	5710	6280	6850	186
AT400DR/D0	4880	5700	6510	7320	8140	8950	9760	290

Table 4 SINGLE ACTING OUTPUT TORQUE N*m

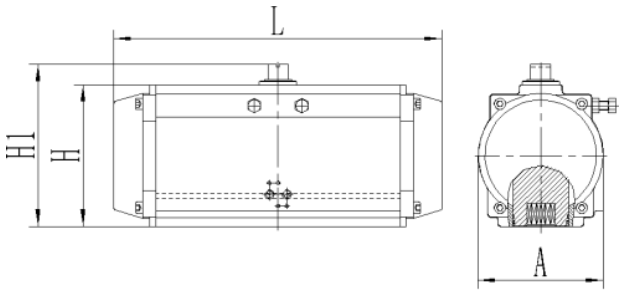


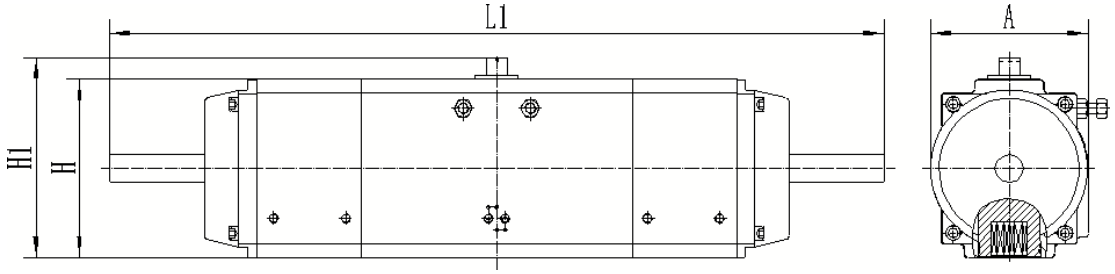
Model	number of springs	air supply output torque (100Kpa) air supply pressure						(N*m) Spring return torque		Kg weight
		4		5		6				
		0°	90°	0°	90°	0°	90°	90°	0°	
AT52SR/D4	8	9	6	13	9	17	12	9.5	6.5	1.5
AT52SR/D5	10	7	3.5	11.5	6.5	16	9.5	12	8.5	

AT63SR/D4	8	18	12	25.5	19.5	33	27	16.5	10.5	2.3
AT63SR/D5	10	14	8	22.5	15.5	31	23	20.5	13.5	
AT75SR/D4	8	23	16	33	27	43	37	23	15	3.3
AT75SR/D5	10	19	11	28	21	37	30	29	20	
AT83SR/D4	8	37	25	53	41	68	55	36	25	4.3
AT83SR/D5	10	31	16	46	32	60	45	46	30	
AT92SR/D4	8	52	35	75	57	98	77	55	35	5.9
AT92SR/D5	10	43	21	66	44	88	65	68	44	
AT105SR/D4	8	81	53	114	86	145	115	78	50	7.2
AT105SR/D5	10	68	33	102	66	135	95	92	63	
AT125SR/D4	8	115	75	165	125	215	170	125	82	12.6
AT125SR/D5	10	95	44	145	94	195	140	157	102	
AT140SR/D4	8	205	135	290	220	370	300	192	132	16
AT140SR/D5	10	170	80	255	165	335	245	240	165	
AT160SR/D4	8	300	190	440	335	570	460	325	215	24
AT160SR/D5	10	250	115	385	245	510	360	410	270	
AT190SR/D4	8	530	355	740	565	950	770	480	300	35
AT190SR/D5	10	450	230	660	445	760	540	600	370	
AT210SR/D4	8	620	455	890	720	1150	980	580	425	55
AT210SR/D5	10	510	300	780	570	1050	820	730	530	
AT240SR/D4	8	880	650	1265	1035	1650	1400	840	640	80
AT240SR/D5	10	715	430	1100	815	1490	1190	1050	800	
AT270SR/D4	8	1440	1080	2025	1665	2600	2200	1200	880	120
AT270SR/D5	10	1220	765	1805	1350	2380	1900	1500	1100	
AT300SR/D4	8	1750	1160	2510	1920	3250	2650	1600	1120	136
AT300SR/D5	10	1420	700	2190	1450	2950	2200	2000	1400	
AT350SR/D4	8	2480	1540	3620	2680	4750	3800	2720	1840	235
AT350SR/D5	10	1960	750	3100	1920	4200	3050	3400	2300	
AT400SR/D4	8	3590	1935	5220	3650	6850	5300	4480	2800	360
AT400SR/D5	10	2500	700	4050	1730	5600	3300	5600	3600	

Fig 1. DIMENSIONS

Common outline drawing of ATxxx



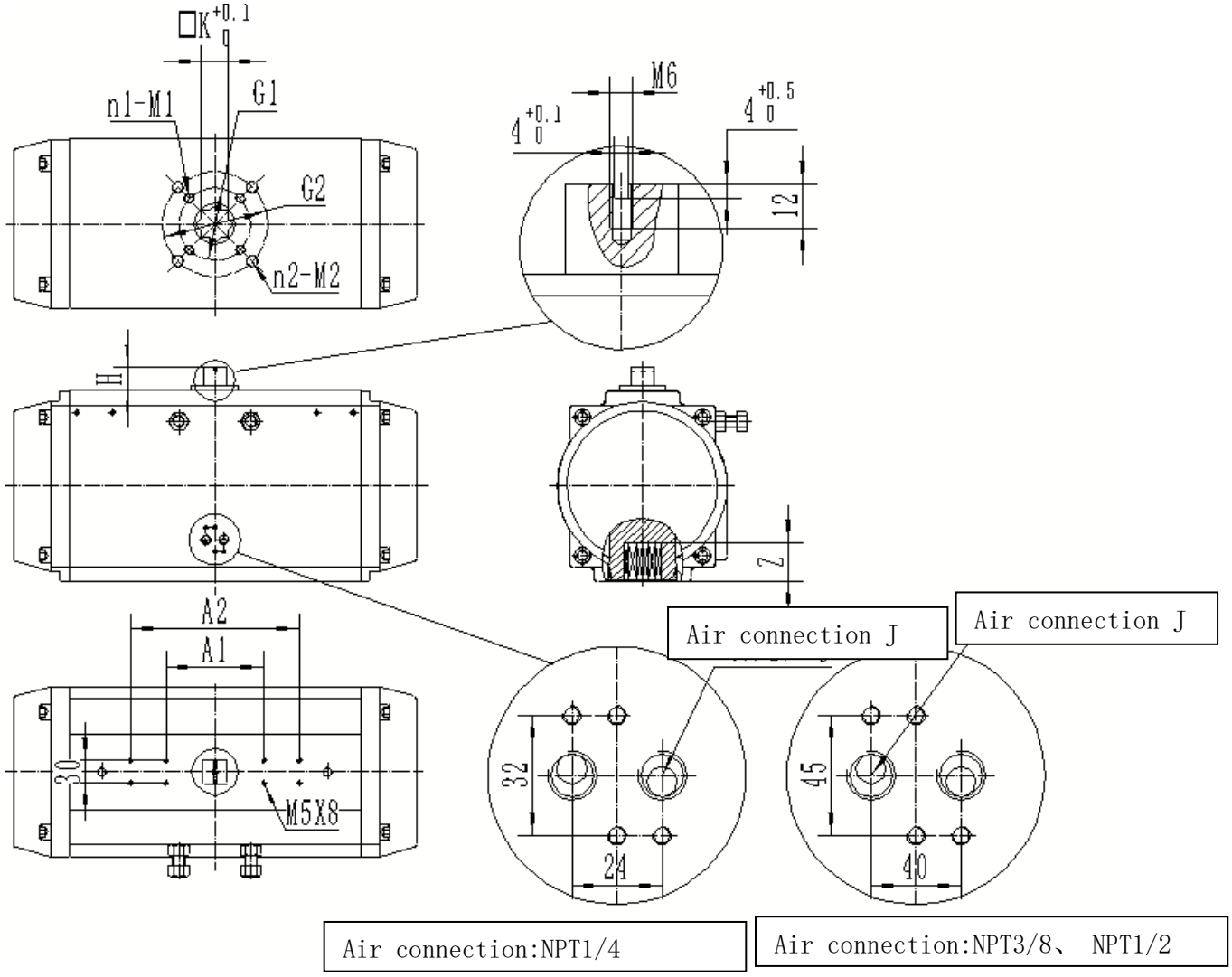


Outline drawing of ATxxxx-3P (three phrases)

Table 5 EXT RNAL DIMENSIONS mm

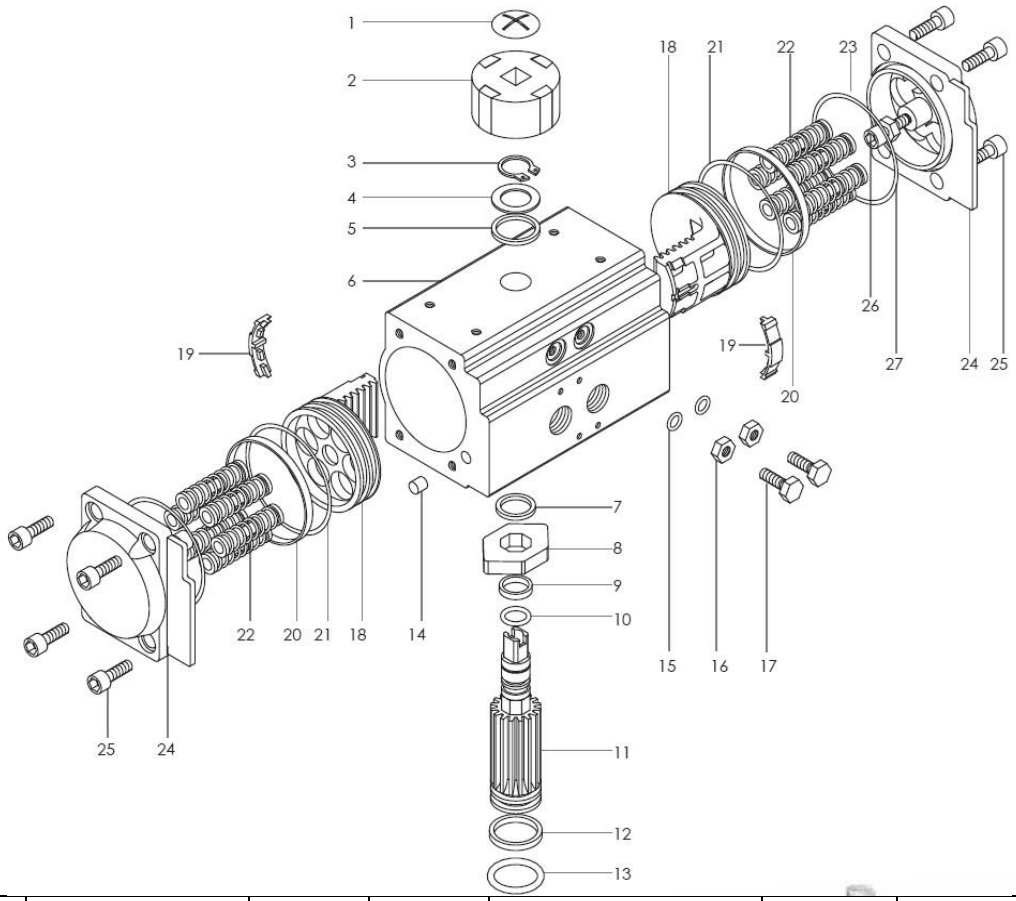
Model	mm Cylinder diameter	L Length L	L1 Length L1	A Width A	H Height H	H1 Overall height H1
AT52xxx	φ52	160	—	80	80	100
AT63xxx	φ63	195	—	100	95	115
AT63xxx-3P		—	480			
AT75xxx	φ75	220	—	110	105	125
AT75xxx-3P		—	500			
AT83xxx	φ83	235	—	120	120	140
AT83xxx-3P		—	550			
AT92xxx	φ92	275	—	135	130	150
AT92xxx-3P		—	630			
AT105xxx	φ105	285	—	145	145	165
AT105xxx-3P		—	660			
AT125xxx	φ125	350	—	165	170	200
AT125xxx-3P		—	710			
AT140xxx	φ140	405	—	190	190	220
AT140xxx-3P		—	870			
AT160xxx	φ160	470	—	210	210	240
AT160xxx-3P		—	980			
AT190xxx	φ190	540	—	230	245	275
AT190xxx-3P		—	1180			
AT210xxx	φ210	560	—	250	270	300
AT210xxx-3P		—	1180			
AT240xxx	φ240	620	—	275	305	335
AT240xxx-3P		—	1300			
AT270xxx	φ270	740	—	310	345	375
AT270xxx-3P		—	1500			
AT300xxx	φ300	800	—	420	370	400
AT300xxx-3P		—	1700			
AT350xxx	φ350	930	—	475	425	455
AT350xxx-3P		—	1900			
AT400xxx	φ400	970	—	535	495	525

DIMENSIONS OF FLANGE CONNECTION



Model	Mm Cylinder diameter	G1	n1-M1	G2	n2-M2	K	Z	J Air conneio n J	A 1	A2	H	Connection standard
AT52	52	Φ36	4-M5X8	Φ50	4-M6X10	11	14	NPT 1/4”	80	-	20	F03/F05
AT63	63	Φ50	4-M6X10	Φ70	4-M8X13	14	18	NPT 1/4”	80	-	20	F05/F07
AT75	75	Φ50	4-M6X10	Φ70	4-M8X13	14	18	NPT 1/4”	80	-	20	F05/F07
AT83	83	Φ50	4-M6X10	Φ70	4-M8X13	17	21	NPT 1/4”	80	-	20	F05/F07
AT92	92	Φ50	4-M6X10	Φ70	4-M8X13	17	21	NPT 1/4”	80	-	20	F05/F07
AT125	125	Φ70	4-M8X13	Φ102	4-M10X16	22	26	NPT 1/4”	130	-	30	F07/F10
AT140	140	Φ102	4-M10X16	Φ125	4-M12X20	27	31	NPT 1/4”	130	-	30	F10/F12
AT160	160	Φ102	4-M10X16	Φ125	4-M12X20	27	31	NPT 1/4”	130	-	30	F10/F12
AT190	190	-	-	Φ140	4-M16X25	36	40	NPT 1/4”	130	-	30	F14
AT210	210	-	-	Φ140	4-M16X25	36	40	NPT 1/4”	130	-	30	F14
AT240	240	-	-	Φ165	4-M20X25	46	50	NPT 1/2”	130	-	30	F16
AT270	270	-	-	Φ165	4-M20X25	46	50	NPT 1/2”	130	-	30	F16
AT300	300	-	-	Φ165	4-M20X25	46	50	NPT 1/2”	130	-	30	F16
AT350	350	-	-	Φ254	8-M16X25	55	60	NPT 1/2”	130	-	30	F25
AT400	400	-	-	Φ254	8-M16X25	55	60	NPT 1/2”	130	-	30	F25
Note: The flange connection size of the three-phrase actuator is the same as that of the non-three-phrase-actuator.												
AT105	105	Φ70	4-M8X13	Φ102	4-M10X16	22	26	NPT 1/4”	80	-	20	F07/F10

Fig.3 CONFIGURATION

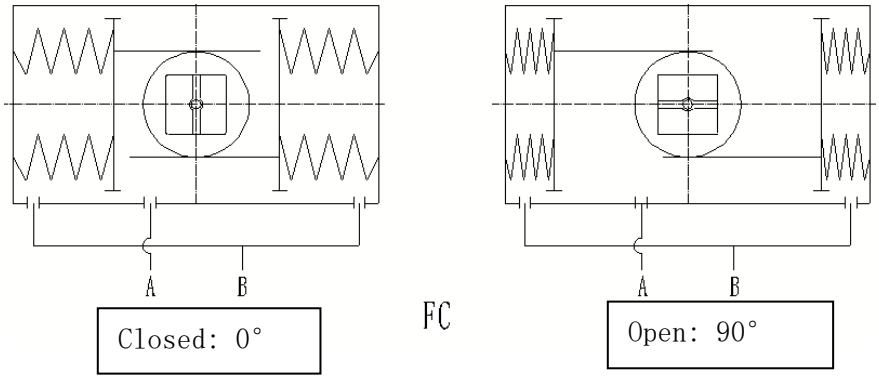


Number	Name		Number	Name	Number	Name
1	indicator bolt		10	upper shaft O ring	19	piston guide plate
2	indicator		11	axis	20	Piston bearing
3	Circlip		12	Bottom shaft	21	Piston O ring
4	gasket		13	Bottom shaft O ring	22	spring

5	Outer gasket		堵 Choke plug	23	End cover O ring
6	cylinder	15	Adjusting bolt O ring	24	End cover
7	Inner gasket	16	Adjusting nut	25	End cover bolt
8	cam	17	Adjusting bolt	26	Limit bolt
9	Upper shaft	18	plug	27	Limit bolt

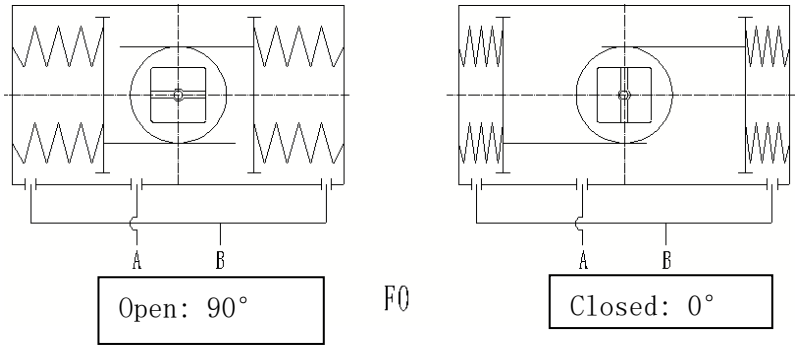
Table 4. WORKING PRINCIPLES

（1） SINGLE ACTING

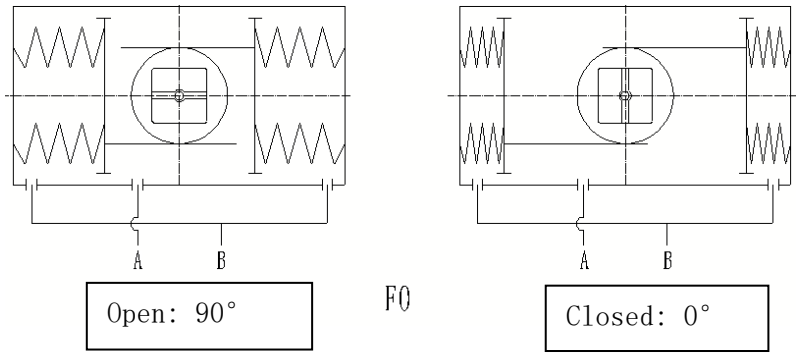


Fail closed FC: Intaken at port A, compressed air overcomes the force of the spring, and pushes the piston outward. Viewed from top to bottom, the output shaft of the actuator rotates counterclockwise (0°-90°), and port B exhausts.

When the air is cut off, the piston returns inwardly under the spring force. Viewed from top to bottom,



the output shaft of the actuator rotates clockwise (90°-0°), and A port exhausts.

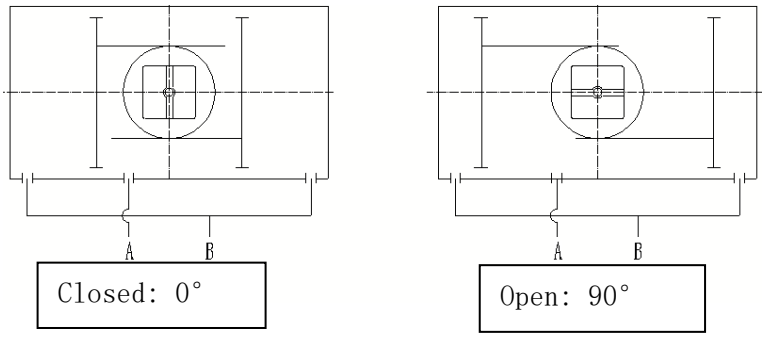


at port A, compressed air overcomes the spring force and pushes the piston to move outward. Viewed from top to bottom, the output shaft of the actuator rotates clockwise (90°-0°), and port B exhausts.

When the air is cut off, the piston returns inwardly under the spring force. Viewed from top to bottom, the output shaft of the actuator rotates counterclockwise (0°

-90°), and A port exhausts.

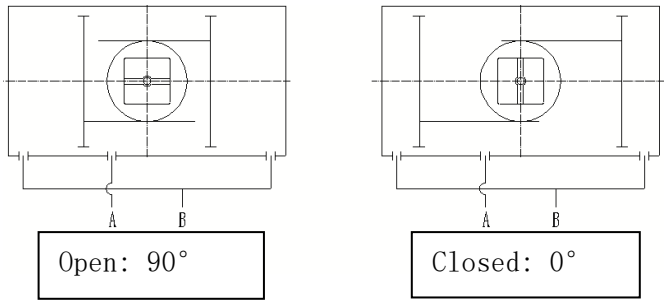
（2） DOUBLE ACTING



Fail closed or fail limit: Intaken from A port, compressed air pushes the piston to move outwards. Viewed from top to bottom, the output shaft of the actuator rotates counterclockwise (0°-90°), and port B exhausts;

Intaken from B port, the compressed air pushes the piston to move inward. Viewed from top to bottom, the output shaft of the actuator rotates clockwise

(90°-0°), and A exhausts.



Fail open: Intaken from A port, the compressed air pushes the piston outwards. Viewed from top to bottom, the output shaft of the actuator rotates clockwise (90°-0°), and B port exhausts.

Intaken from B port, the compressed air pushes the piston to move inward. Viwed from top to bottom, the output shaft of the actuator rotates counterclockwise (0°-90°), and A port exhausts.

Fig.5 DIMENSIONS AND CONNECTION SIZE OF HANDWHEEL

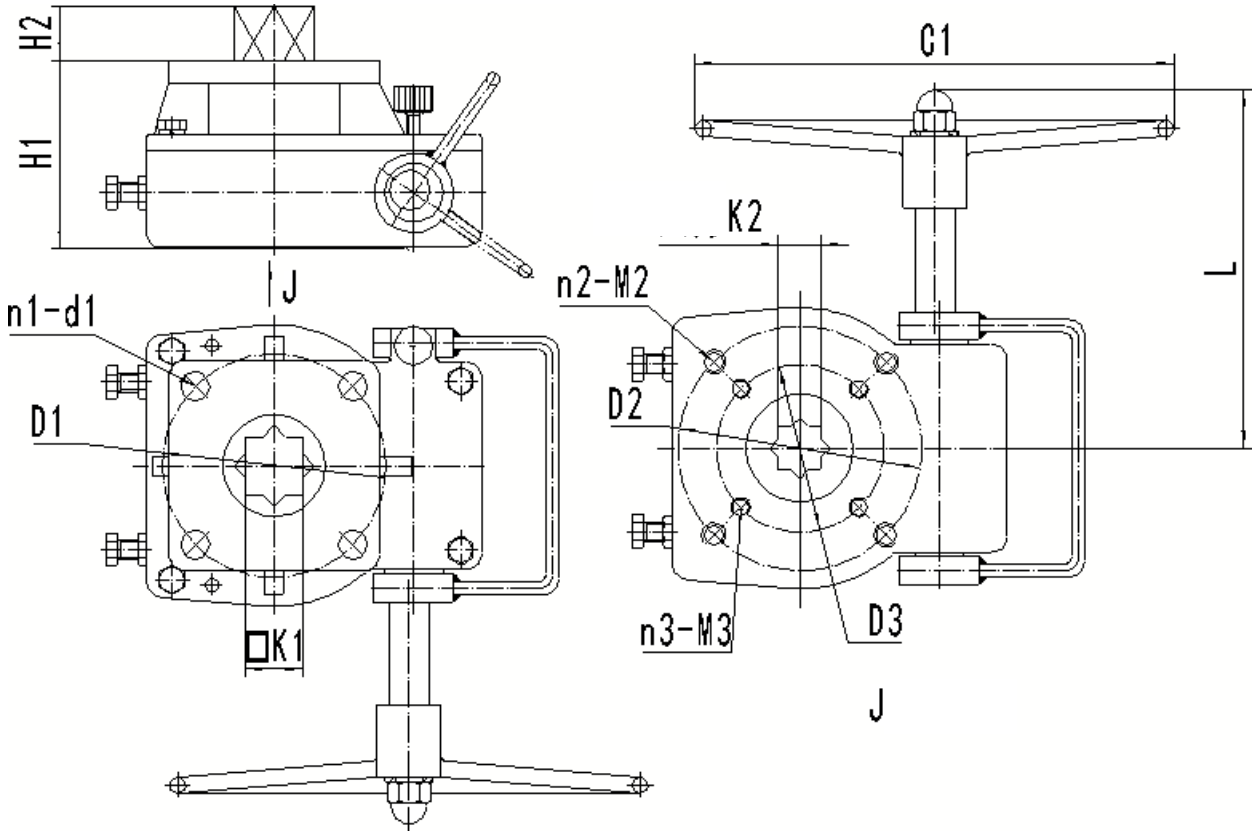


Table 7 Handwheel Shape and Connection Dimensions mm

Model	H1	H2	D1	n1-d1	K1	D2	n2-M2	D3	n3-M3	K2	L	C1	Kg Weight
SD-0	110	12	Φ50	4-Φ7	11	Φ50	4-M6	Φ36	4-M5	11	180	Φ180	3
SD-1	110	15	Φ70	4-Φ9	14	Φ70	4-M8	Φ50	4-M6	14	180	Φ180	3
SD-2	130	19	Φ70	4-Φ9	17	Φ70	4-M8	Φ50	4-M6	17	210	Φ200	5
SD-3	130	23	Φ102	4-Φ12	22	Φ102	4-M10	Φ70	4-M8	22	240	Φ280	7
SD-4	165	28	Φ125	4-Φ14	27	Φ125	4-M12	Φ102	4-M10	27	300	Φ320	15
SD-5	185	37	Φ140	4-Φ18	36	Φ140	4-M16	-	-	36	330	Φ400	22
SD-6	200	47	Φ165	4-Φ22	46	Φ165	4-M20	-	-	46	350	Φ500	30
SD-7	200	47	Φ165	4-Φ22	46	Φ165	4-M20	-	-	46	365	Φ600	40
SD-8	230	56	Φ254	8-Φ18	55	Φ254	8-M16	-	-	55	460	Φ800	-
SD-9	-	56	Φ254	8-Φ18	55	Φ254	8-M16	-	-	55	500	Φ800	-

Typen-Programm											
Series	AT										Pneumatic rack and pinion actuator
Specifications		5	2								cylinder diameter 52mm
		6	3								cylinder diameter 63mm
		7	5								cylinder diameter 75mm
		8	3								cylinder diameter 83mm
		9	2								cylinder diameter 95mm
		1	0	5							cylinder diameter 105mm
		1	2	5							cylinder diameter 125mm
		1	4	0							cylinder diameter 140mm
		1	6	0							cylinder diameter 160mm
		1	9	0							cylinder diameter 190mm
		2	1	0							cylinder diameter 210mm
		2	4	0							cylinder diameter 240mm
		2	7	0							cylinder diameter 270mm
		3	0	0							cylinder diameter 300mm
		3	5	0							cylinder diameter 350mm
		4	0	0							cylinder diameter 400mm
Action manner					D						Double acting
					S						Single acting
Action type						R					Single acting, Fail closed FC; Double acting, FC or Fail Limit FL
						D					Single acting, Fail Open FO; Double acting, FO
spring specifications							0				Double acting
							3				Spring of 3kg air supply pressure (6)
							4				Spring of 4kg air supply pressure (8)
							5				Spring of air supply pressure (10)
							6				Spring of 6kg air supply pressure (12)
hyphen								-			
three-phrase requirement									None		None
									3P		Three-phrase actuator requirement

Ordering instructions

When ordering, please specify:

1. Model of actuator (including specifications、 action manner, action type and specification of springs)
2. Air supply pressure:
3. Ambient temperature, normal Temp. (-20~+80°), low Temp. (-40~80°), high Temp. (-15~120°) And if your order is special, please note.
4. The standard type doesn't have any handwheel, if you need one, please note.
5. The standard doesn't have fail limit function, if you need it, please note of which type of limit and the limit valve. Open limit: Your valve won't be fully open. Close limit: your valve won't be fully closed.
6. The standard protection level of the spray is level 3, and if you have higher requirements, please note.
7. The standard color of the cylinder is natural light gray after anodization, and the end cover's color is dark gray, according to the color code RAL7043. If you have any special requirements, please note; (**If there is any change in the color code, please refer to the latest version)**
8. The standard delivery doesn't have yoke or connector, and if required, it is a special order. Please note and provide the connection size.