
PNEUMATIC ACTUATOR

New DR/SC-Series FHP 052 to FHP 400



FLOWTECAL GROUP CO. LIMITED



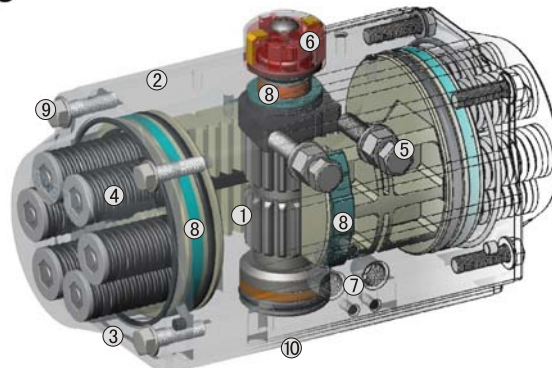
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New Pneumatic Valve Actuator of Series DR/SC

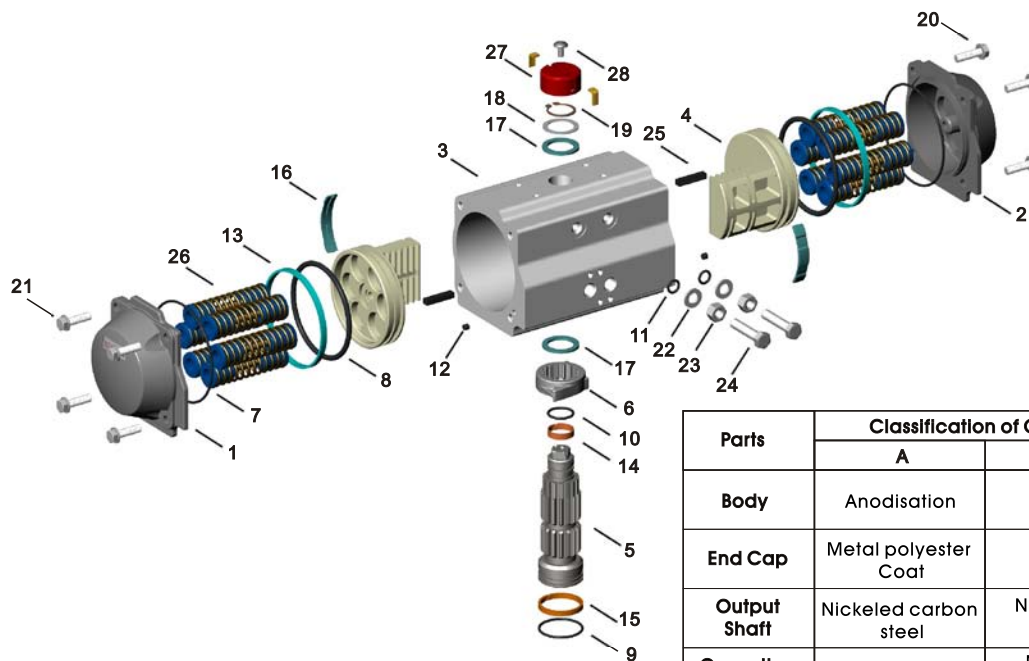
The new DR/SC pneumatic actuator of rack and gear wheel type is manufactured by FLOWTECAL GROUP CO.LIMITED adopting the latest technique of the world. CAD based 3D model is also applied to optimize the design of the products and to make innovation on the design as well. the aspect of the product is modern, compact and good looking. Built with new materials and new process, the quality of the products could be guaranteed as well as the performance. Moreover more types of products are available to benefit customers. All the products are completely designed and manufactured in according to the latest international standard specification of technology to meet the requirement now and in future.



- ① the rack, gear wheel and the two pistons are designed in symmetric structure to perform stably and rapidly with high accuracy and high power output. the rotation in the inverse direction can be performed by simply changing the assembling location of the pistons.
- ② the extruded cylinder body is made of high quality stainless steel with fine machined socket and hard anodized outer surface(Teflon coat + anodisation would be provided at special occasion)to prolong the service life and lower the coefficient of friction.
- ③ One-piece design is adopted. All type of single acting actuators and double acting actuators are provided with same cylinder body and end cap. The acting module could be easily changed by installing or demounting springs.

- ④ Combined preload security group spring could be mounted or increased/decreased easily and safely during assembling or during in field usage
- ⑤ the two sole adjusting screws at the side surface of the actuator which has been already installed on the valve could make the adjustment of location of the valve opening and closing more convenient and accurate. The special adjusting screws which are much longer would be provided if full stroke adjustment is needed.
- ⑥ Multifunctional location indicator, in field visible indicator and standard socket in accordance to VDI/VDE3845、NAMUR could be installed and export all the accessories such as limit switch cabinet, electric localizer and position sensor(JEELON, P+F, Turck).

- ⑦ the air supply interface is built according to NUMAR criterion. To the interface the NUMAR solenoid valve can be installed directly.
- ⑧ the composite material made bearing shell at the back of the rack, the deflector ring of the pistons as well as the bearing shaft of the output shaft are provided with more lubrication to protect them against the metal-metal friction. Thus, a prolong service life and the low friction could be guaranteed.
- ⑨ All the fasteners are made of stainless steel to be resistant to corrosion for a long time.
- ⑩ the pontes are built in according to latest version of ISO5211、DIN3337(F03-F25) to guarantee the interchangeability and versatility of the products


Components, Material and Corrosion Protection


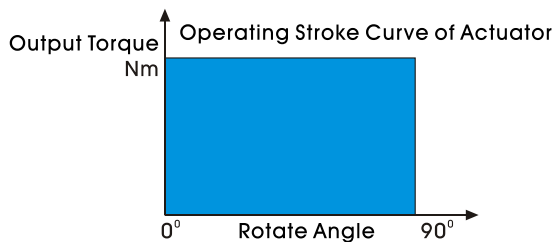
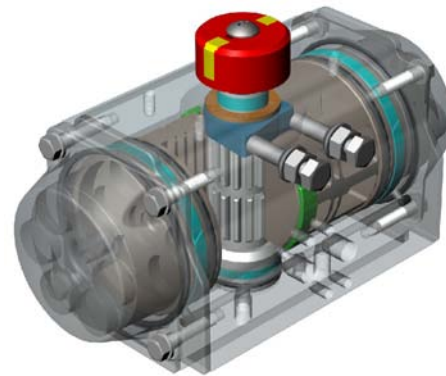
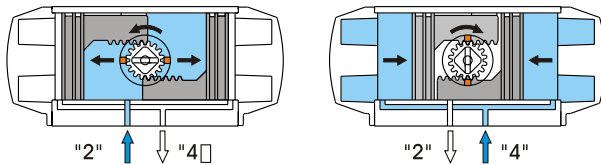
Parts	Classification of Corrosion Protection	
	A	B
Body	Anodisation	PTFE coat + Anodisation
End Cap	Metal polyester Coat	PTFE coat
Output Shaft	Nickel carbon steel	Nickel carbon steel or stainless steel
Operating Environment	Normal occasion	Normal occasion or environment with low concentration of the acidity

Code of The Parts	Number for Each type	Name of The Parts	Standard Material	Material Selection
01	1 ⁽¹⁾	Left end cap	Aluminium die-cast alloys	Stainless steel
02	1 ⁽¹⁾	Right end cap	Aluminium die-cast alloys	Stainless steel
03	1	Cylinder body	Extruded aluminum alloy	Stainless steel
04	2	Piston	Aluminium die-cast alloys	-----
05	1	Output shaft	Carbon-steel	Stainless steel
06	1	Adjusting cam	Stainless steel	-----
07 *	2	O-ring (end cap)	Nitrile rubber	FPM or silicon rubber
08 *	2	O-ring (piston)	Nitrile rubber	FPM or silicon rubber
09 *	1	O-ring (bottom of output shaft)	Nitrile rubber	FPM or silicon rubber
10 *	1	O-ring (top of output shaft)	Nitrile rubber	FPM or silicon rubber
11 *	2	O-ring (adjusting screw)	Nitrile rubber	FPM or silicon rubber
12 *	2	Stopper end (cylinder body)	Nitrile rubber	FPM or silicon rubber
13 *	2	Bearing shaft (pistons)	Fluorocarbon	-----
14 *	1	Bearing shaft(top of output shaft)	PA66	-----
15 *	1	Bearing shaft(bottom of output shaft)	PA66	-----
16 *	1	Pilot bearing (back of the piston)	Pa66	-----
17 *	2	Thrust bearing (output shaft)	PA66	-----
18	2	Filler piece (output shaft)	PA66	-----
19	1	Elastic collar	Stainless steel	-----
20	8/12/16 ⁽²⁾	End cap screw	Stainless steel	-----
21	8/12/16 ⁽²⁾	End cap filler piece	Stainless steel	-----
22	2	Filler piece	Stainless steel	-----
23	2	Screw cap	Stainless steel	-----
24	2	Adjusting screw	Stainless steel	-----
25	2	Guide pad	PA66 + 30%fg	-----
26	5-12	Spring subassembly	Alloy spring steel	-----
27	1	Location indicator	PP + 30%gf	-----
28	1	Screw	Stainless steel	-----



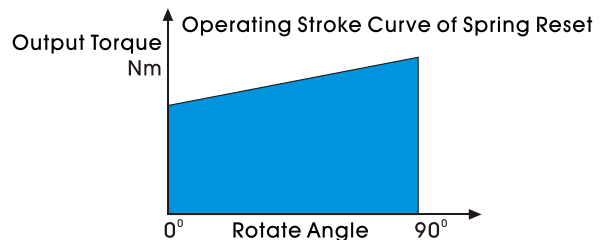
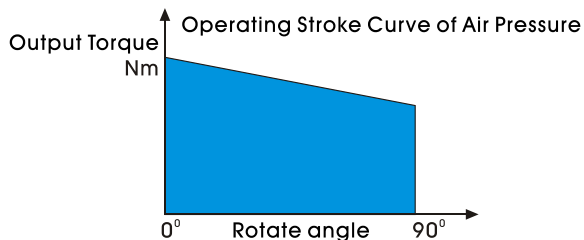
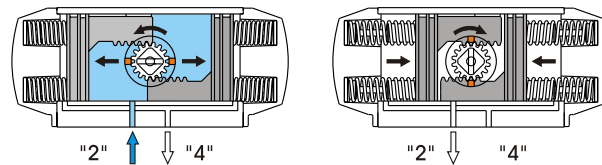
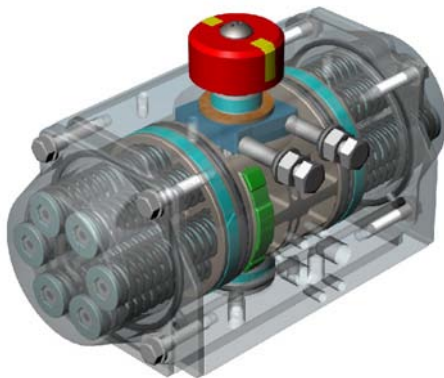
Operating Principle of DR(DL) Double Acting Type

The air source pressure comes into the cylinder body between the two pistons from air entrance (2) and pushes the pistons toward the end of the cylinder body. The air between the pistons and the ends of the cylinder body is released from air entrance (4). Meanwhile the racks of pistons rotate the output shaft anticlockwise (gear wheel) simultaneously, whereas if the air source pressure comes into the ends of the cylinder body from air entrance (4) and pushes the pistons toward each other with the air between two pistons released from air entrance (2), the output shaft (gear wheel) would be driven by the racks of the pistons simultaneously to rotate clockwise. (if the pistons are assembled in different direction from each other, the output shaft would turn out to rotate in inverse direction, namely the double acting reverse **DL** type)



Operating Principle of SC(SO) Single Acting Type

The air source pressure comes into the cylinder body between the two pistons from air entrance (2) and pushes the pistons toward the end of the cylinder body while the springs at each ends inside the cylinder body is forced to shrink with the air between the pistons and the ends of the cylinder body released from air entrance (4). in the meantime, the racks of pistons drive the output shaft (gear wheel) simultaneously to rotate anticlockwise. After the direction of the air source pressure is reversed by the solenoid valve, the springs at each end begin to reset and the pistons are forced toward each other by the elasticity with the air between two pistons released from air entrance (2). Meanwhile the output shaft (gear wheel) would be driven by the racks of the pistons simultaneously to rotate clockwise. (if the pistons are assembled in different direction from each other, the output shaft would turn out to rotate in inverse direction when the springs reset, namely the single acting reverse **SO** type)



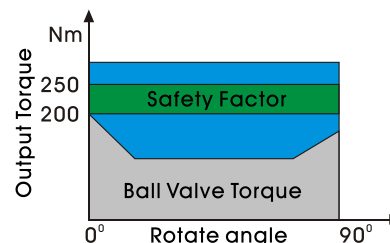


Pattern Selection of the Actuator

An increment should be added to the identified valve torque for safe when select the pattern of the pneumatic actuator. For vapor or non-lubricant liquor medium, the increment should be up to 25% of the valve torque, 30% for non-lubricant pasting liquor medium, 40% for non-lubricant dry air medium, 60% for non-lubricant particle medium delivered be air and 20% for lubricating clean medium with low friction respectively.(the safe increment above is recommended in theory for reference)

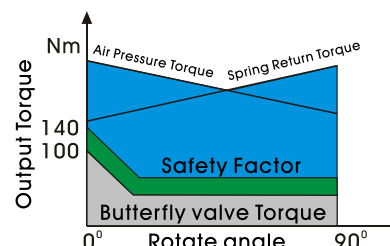
Sizing Example for Double-acting Actuator:

- * Published ball valve torque = 200 Nm
- * Operating medium = non-lubricated steam
- * Safety factor = 200 Nm + 25% = 250 Nm
- * Air supply pressure available = 5 bar
- * The double acting actuator that produces a minimum of 250 Nm at 5 bar is the DR00300 of 277 Nm according to the output torque table of the DR actuator.



Sizing of A Single-acting Actuator:

- * Published butterfly valve torque = 100Nm
- * Operating medium = non-lubricated dry air
- * Safety factor = 100Nm + 40% = 140Nm
- * Air supply pressure available = 4.5 bar
- * the spring return actuator selected is the SC00450 (9 springs) with a most similar ending torque of 148Nm at 4.5 bar according to the SC output torque table. (The relative balance of torques between air supply pressure and spring return should be noted)



(A) the acting time of the actuator be tested under following conditions:(1)normal temperature (2)90° stroke (3)caliber of the solenoid valve should be 4mm with the flow quantity of Qn400 L / min (4)inner diameter of the pipe should be 8mm (5) neutrally clean air (6)air source pressure at 5,5bar (7) actuator with no load
PS: the acting time would change as one or more variables change in field test.
(B) suppose every SC actuator weighs as 10 springs, the increase/decrease weight of the actuator could be calculated by calculating the increase/decrease number of springs.

Relevant Data About The Actuator

TYPE	Max. Pressure	Rotate Angl	Operating Temperature	Stroke adjustment per 1° laps	Diameter Φ(mm)	Ayr Volume(l)		Moving time (sec)(A)		weight (kg)(B)	
						Opening	Closing	Opening	Closing	Single	Spring
FHP-052	Dry Or Lubricating Clean Compressed Air 8bar	90° ± 4° or Full Stroke 0° ~ 90°	ST (standard) NBR O-ring -20 to +80 HT (high Temperature) FPM O-ring -15 to +150 LT (low Temperature) Silicon O-ring -40 to +80	1/6	50	0.1	0.2	DR 0.2	DR 0.3	DR 1.1	-----
SC 0.3								SC 0.3	SC 1.2	0.01	
FHP-063				1/6	63	0.2	0.3	DR 0.3	DR 0.3	DR 1.6	-----
SC 0.3								SC 0.4	SC 1.8	0.02	
FHP-075				1/5	75	0.3	0.5	DR 0.3	DR 0.4	DR 2.8	-----
SC 0.4								SC 0.5	SC 3.2	0.03	
FHP-083				1/5	88	0.5	0.8	DR 0.4	DR 0.5	DR 4.0	-----
SC 0.5								SC 0.6	SC 4.7	0.06	
FHP-092				1/5	100	0.7	1.1	DR 0.5	DR 0.6	DR 5.9	-----
SC 0.7								SC 0.9	SC 6.7	0.07	
FHP-105				1/5	115	1.2	1.8	DR 0.7	DR 0.8	DR 8.5	-----
SC 0.9								SC 1.1	SC 10.0	0.13	
FHP-125				1/4	125	1.5	2.3	DR 0.9	DR 1.1	DR 10.7	-----
SC 1.2								SC 1.4	SC 12.5	0.16	
FHP-140				1/4	145	2.4	3.8	DR 1.2	DR 1.4	DR 15.5	-----
SC 1.5								SC 1.8	SC 18.3	0.25	
FHP-160	1/4	160	3.1	4.9	DR 1.5	DR 1.7	DR 19.5	-----			
SC 1.8					SC 2.1	SC 23.3	0.36				
FHP-190	1/4	180	4.3	6.9	DR 2.0	DR 2.2	DR 26.7	-----			
SC 2.4					SC 2.8	SC 32.8	0.50				
FHP-210	1/4	200	5.9	9.5	DR 2.7	DR 3.2	DR 35.6	-----			
SC 3.5					SC 4.0	SC 43.6	0.62				
FHP-240	1/4	240	10.0	15.2	DR 3.5	DR 4.0	DR 58.2	-----			
SC 4.1					SC 4.6	SC 71.0	1.12				
FHP-270	1/4	265	14.5	21.4	DR 4.0	DR 4.5	DR 78.8	-----			
SC 4.5					SC 5.0	SC 96.5	1.56				
FHP-350	1/4	330	25.0	40.0	DR 6.0	DR 7.0	DR 130.	-----			
SC 7.5					SC 8.5	SC 163.	2.95				



Output Torque of FHP-052 to FHP-400



Output Torque of DR Double Acting Type (NM)

Model	2 Bar	3 bar	4 bar	5 bar	6 bar	7 bar	8 bar
FHP-052DA	8.32	12.48	16.64	20.8	24.96	29.12	33.28
FHP-063DA	14.64	21.96	29.28	36.6	43.92	51.24	58.56
FHP-075DA	23.5	35.3	47	58.8	70.5	82.3	94
FHP-083DA	29.7	44.5	59.4	74.2	89.1	103.9	118.8
FHP-092DA	45.5	68.2	91.1	113.7	136.4	159.2	181.9
FHP-105DA	67.88	101.8	136.7	169.7	203.6	237.6	271.5
FHP-125DA	116.6	174.9	233.2	291.5	349.8	408.1	466.4
FHP-140DA	175.48	263.22	350.96	438.7	526.44	614.18	701.92
FHP-160DA	267.4	401.1	534.8	668.5	802.2	935.9	1069.6
FHP-190DA	430.96	646.44	861.9	1077.4	1292.9	1508.4	1723.8
FHP-210DA	592.2	888.4	1184.5	1480.6	1776.7	2072.8	2369
FHP-240DA	928.3	1392.5	1856.6	2320.8	2785	3249.1	3713.3
FHP-270DA	1305.4	1958.2	2610.9	3263.6	3916.3	4569	5221.8
FHP-300DA	1602	2403	3205	4006	4807	5608	6409
FHP-350DA	2399	3598	4798	5998	7197	8397	9596
FHP-400DA	3418	5127	6837	8546	10255	11964	13673

Output Torque of Single Acting (Spring Return) Type (NM)

Air Supply		3 (bar)		4 (bar)		5 (bar)		6 (bar)		7 (bar)		8 (bar)	
Model	Spring Qty.	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
FHP-052S	5	8.48	6.28	12.64	10.44							4	6.2
	6	7.68	4.98	11.84	9.14							4.8	7.5
	7	6.98	3.78	11.14	7.94							5.5	8.7
	8			10.34	6.74	14.5	10.9					6.3	9.9
	9			9.54	5.44	13.7	9.6					7.1	11.2
	10			8.74	4.24	12.9	8.4	17.06	12.56			7.9	12.4
	11					12.1	7.1	16.26	11.26	20.42	15.42	8.7	13.7
	12					11.3	5.9	15.46	10.06	19.62	14.22	9.5	14.9
FHP-063S	5	15	11.2	22.3	18.5	29.6	25.8					7	10.8
	6	13.5	9	20.8	16.3	28.1	23.7					8.5	12.95
	7	12	6.9	19.4	14.2	26.7	21.5					9.9	15.1
	8			18	12	25.3	19.3	32.6	26.6			11.3	17.3
	9			16.5	9.9	23.9	17.2	31.2	24.52			12.7	19.4
	10			15.3	7.7	22.6	15	29.9	22.3	37.2	29.6	14	21.6
	11			13.8	5.6	21.1	12.9	28.4	20.2	35.7	27.5	15.5	23.7
	12					19.7	10.7	27	18	34.3	25.3	16.9	25.9
FHP-075S	5	23.4	17.8	35.1	29.5							11.9	17.5
	6	21.1	14.3	32.8	26							14.2	21
	7	18.7	10.8	30.4	22.5							16.6	24.5
	8			28	19	39.8	30.8					19	28
	9			25.7	15.5	37.5	27.3					21.3	31.5
	10			23.3	12	35.1	23.8	46.8	35.5	58.6	47.3	23.7	35
	11					32.7	20.3	44.4	32	56.2	43.8	26.1	38.5
	12					30.4	16.8	42.1	28.5	53.9	40.3	28.4	42



Output Torque of FHP-052 to FHP-400



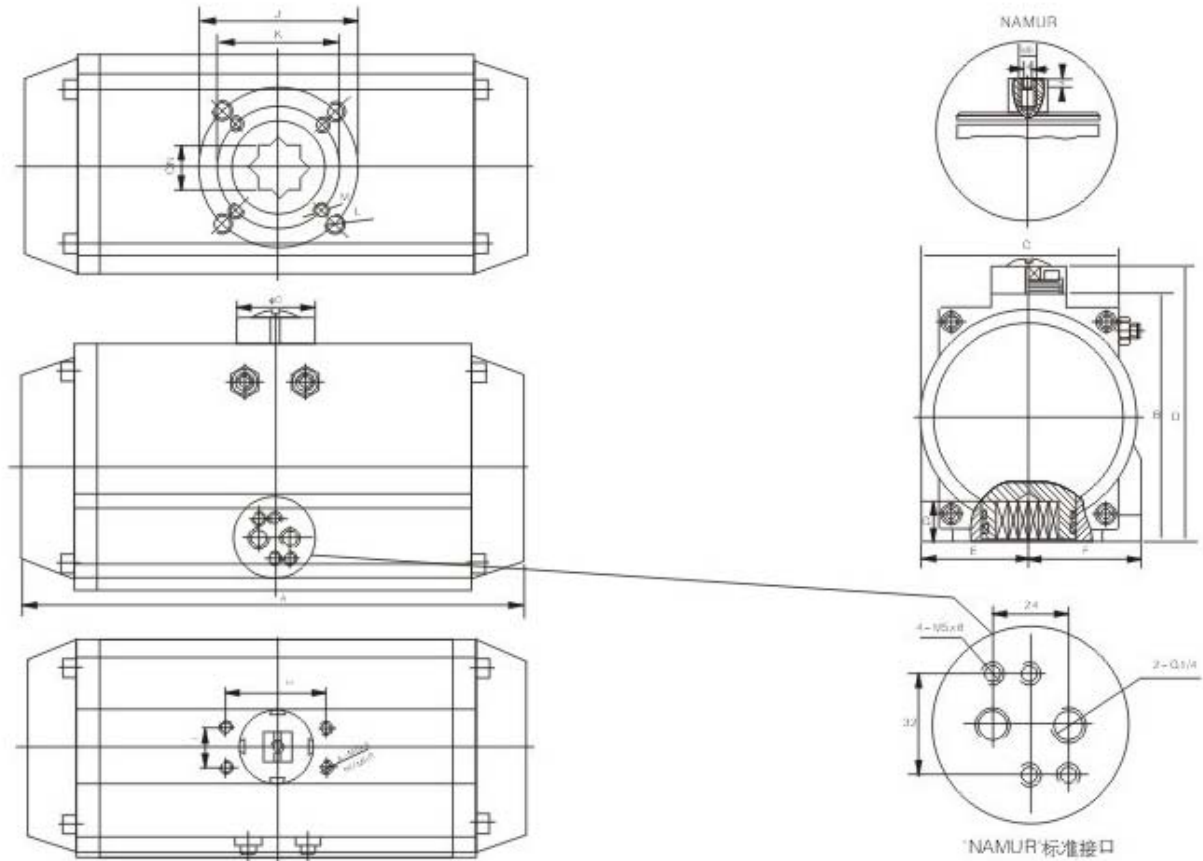
Air Supply		3 (bar)		4 (bar)		5 (bar)		6 (bar)		7 (bar)		8 (bar)	
Model	Spring Qty.	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
FHP-083S	5	30.9	23.8	46.1	38.9							14.5	21.7
	6	28.1	19.5	43.3	34.6							17.39	26
	7	25.2	15.1	40.3	30.2							20.3	30.4
	8			37.4	25.9	52.6	41.1					23.2	34.7
	9			34.5	21.5	49.7	36.7					26.1	39.1
	10			31.6	17.2	46.8	32.4	62	47.6	77.1	62.7	29	43.4
	11					43.9	28.1	59.1	43.3	74.2	58.4	31.9	47.7
	12					41	23.7	56.2	38.8	71.3	54	34.78	52.08
FHP-092S	5	50.28	37.78	75.54	63.03							25.5	38
	6	45.18	30.18	70.44	55.44							30.6	45.6
	7	40.08	22.58	65.34	47.84							35.7	53.2
	8			60.24	40.24	85.5	65.5					40.8	60.8
	9			55.14	32.69	80.4	57.9					45.9	68.4
	10			50.04	25.04	75.3	50.3	100.56	75.56	125.82	100.82	51	76
	11					70.2	42.7	95.46	67.96	120.72	93.22	56.1	83.6
	12					65.1	35.1	90.36	60.36	115.6	85.6	61.2	91.2
FHP-105S	5	68.6	52	103.6	87							33.2	49.8
	6	61.9	42	96.9	77							39.9	59.8
	7	55.3	32.1	90.3	67.1							46.5	69.7
	8			83.7	57.1	116.6	90					53.1	79.7
	9			77	47.4	109.9	80.3					59.8	89.4
	10			70.4	37.2	103.3	70.1	137.3	104	171.2	138	66.4	99.6
	11					96.7	60.1	130.6	94	164.6	128	73	109.6
	12					90	50.2	123.9	84.1	157.9	118.1	79.7	119.5
FHP-125S	5	115.5	88	173.8	146.3							59.4	86.9
	6	103.6	70.6	161.9	128.9							71.3	104.3
	7	91.8	53.5	150.1	111.6							83.1	121.6
	8			138.2	94.2	196.5	152.5					95	139
	9			126.3	76.8	184.6	135.1					106.9	156.4
	10			114.4	59.4	172.7	117.7	231	176			118.8	173.8
	11					160.9	100.4	219.2	158.7	277.5	217	130.6	191.1
	12					149	83	207.3	141.3	265.6	199.6	142.5	208.5
FHP-140S	5	174.7	131.2	262.5	219							88.5	132
	6	157	104.8	244.8	192.6							106.2	158.4
	7	133.9	78.4	227.1	166.2							123.9	184.8
	8			209.4	139.8	297.1	227.5					141.6	211.2
	9			191.7	113.4	279.4	201.1					159.3	237.6
	10			174	87	261.7	174.7	349.4	262.4	437.8	350.1	177	264
	11					244	148.3	331.7	236	419.5	323.8	194.7	290.4
	12					226.3	121.9	314	209.6	401.8	297.4	212.4	316.8
FHP-160S	5	264.6	197.1	398.3	330.8							136.5	204
	6	237.3	156.2	371	289.9							163.8	244.9
	7	210	115.4	343.7	249.1							191.1	285.7
	8	182.7	74.6	316.4	208.3	450.1	341.9					218.4	326.5
	9			289.1	167.5	422.8	301.2					245.7	367.3
	10			261.8	126.7	395.5	260.4	529.2	394.1			273	408.1
	11					368.2	219.6	501.9	353.3	635.6	487	300.3	448.9
	12					340.9	178.8	474.6	312.5	608.3	446.2	327.6	489.7



Output Torque of FHP-052 to FHP-400



Air Supply		3 (bar)		4 (bar)		5 (bar)		6 (bar)		7 (bar)		8 (bar)	
Model	Spring Qty.	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
FHP-190S	5	429	320.4	644.5	535.9							217.4	326
	6	385.5	255.2	601	470.7							260.9	391.2
	7	342	190	557.5	405.5							304.4	465.4
	8			514	340.3	729.5	555.8					347.9	521.6
	9			470.6	275.1	686.1	490.6					391.3	586.8
	10			427.1	209.9	642.6	425.4	858.1	640.9	1073.6	856.4	434.8	652
	11					599.1	360.2	814.6	575.7	1030.1	791.2	478.3	717.2
	12					555.6	295	771.1	510.5	986.6	726	521.8	782.4
FHP-210S	5	589.6	440.6	885.7	736.7							298.8	447.8
	6	529.8	351.1	825.9	647.2							358.6	537.3
	7	470.1	261.5	766.2	557.6							418.3	626.9
	8			706.4	468.1	1002.5	764.2					478.1	716.4
	9			646.7	375.5	942.8	671.6					537.8	809
	10			586.9	289	883	585.1	1179.1	881.2	1475.2	1177.3	597.6	895.5
	11					823.2	495.5	1119.3	791.6	1415.4	1087.7	657.4	985.1
	12					763.5	406	1059.6	702.1	1355.7	998.2	717	1074.6
FHP-240S	5	924	690.5	1488.1	1154.6							468.5	702
	6	829.9	550.1	1294	1014.2							562.6	842.4
	7	736.7	409.7	1200.8	873.8							655.8	982.8
	8			1107.1	733.4	1571.3	1197.6					749.5	1123.2
	9			1013.4	593	1477.6	1057.2					843.2	1263.6
	10			919.7	452.6	1383.9	916.8	1848.1	1381	2312.2	1845.1	936.9	1404
	11					1290.2	776.4	1754.4	1240.6	2218.5	1704.7	1030.6	1544.4
	12					1196.5	636	1660.7	1100.2	2124.8	1564.3	1124.3	1684.8
FHP-270S	5	1299.7	971.2	1952.4	1623.9							658.5	987
	6	1168	773.8	1820.7	1426.5							790.2	1184.4
	7	1036.3	576.4	1689	1229.1							921.9	1381.8
	8			1557.3	1031.7	2210	1684.4					1053.6	1579.2
	9			1425.6	834.3	2078.3	1487					1185.3	1776.6
	10			1293.9	636.9	1946.6	1289.6	2599.3	1942.3	3252	2595	1317	1974
	11					1814.9	1092.2	2467.6	1744.9	3120.3	2397.6	1448.7	2171.4
	12					1683.2	894.8	2335.9	1547.5	2988.6	2200.2	1580.4	2368.8
FHP-300S	5	1603	1183									800	1220
	6	1483	1066									920	1337
	7	1330	844	2132	1464							1073	1559
	8	1177	621	1979	1423	2780	2224					1226	1782
	9			1825	1201	2626	2002	3427	2803			1380	2004
	10			1652	977	2473	1778	3274	2579	4075	3380	1533	2228
	11					2320	1556	3121	2357	3922	3158	1686	2450
	12					2014	1077	2815	1878	3686	2679	1922	2929
FHP-350S	5	2399	1739									1199	1859
	6	2120	1453									1478	2145
	7	1874	1096	3074	2296							1724	2502
	8	1627	738	2827	1938	4027	3138					1971	2860
	9			2580	1581	3780	2781	4979	3980			2218	3217
	10			2335	1223	3535	2423	4734	3622	5934	4822	2463	3575
	11					3288	2066	4487	3265	5687	4465	2710	3932
	12					3120	1537	4319	2736	5519	3936	2878	4461



Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	ΦO	A I r
FHP052	158.4	74	60	94	30	41	14	80	30	F05	F03	M6*11	M5*10	11	40	G1/4
FHP063	190	88	69	108	36	45	18	80	30	F07	F05	M8*15	M6*12	14	40	G1/4
FHP075	207	100	79	120	42	52	20	80	30	F07	F05	M8*13	M6*11	14	40	G1/4
FHP083	213	109	88	129	46	52.5	20	80	30	F07	F05	M8*15	M6*12	17	40	G1/4
FHP092	259	120	97.5	140	51	57.5	22	80	30	F07	F05	M8*13	M6*12	17	40	G1/4
FHP105	287	133	105.5	153	57.5	64	24	80	30	F10	F07	M10*18	M8*14	22	40	G1/4
FHP125	340	155	120.5	175	67.5	70	27.5	80	30	F10	F07	M10*18	M8*14	22	65	G1/4
FHP140	414	171.5	137	191.5	76	77	32	80	30	F12	F10	M12*22	M10*18	27	65	G1/4
FHP160	476	197	159.5	217	86.5	87.5	34	80	30	F12	F10	M12*22	M10*18	27	65	G1/4
FHP190	535	230	186	260	103	103	40	130	30	F14		M16*23		36	78	G1/4
FHP210	567.5	255	202	285	113	113	40	130	30	F14		M16*25		36	78	G1/4
FHP240	668	291.4	233	321.4	129	129	50	130	30	F16		M20*28		46	78	G3/8
FHP270	744	320	264	350	146	146	57	130	30	F16		M20*28		46	78	G1/2
FHP300	830	361.97	312.5	391.97	194.5	194.5	57	130	30	F25	F16	M16*24	M20*28	46	78	G1/2
FHP350	920	412.74	353.5	442.74	221.5	221.5	60	130	30	F25	F16	M16*24	M20*28	55	95	G1/2
FHP400	1012	464.91	391	494.91	248	248	60	130	30	F25	F16	M16*24	M20*28	55	95	G1/2



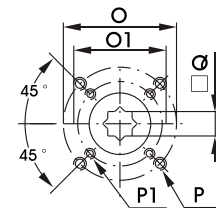
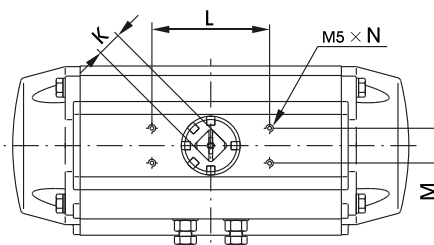
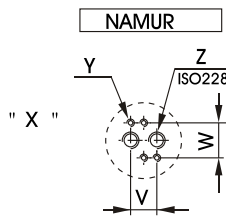
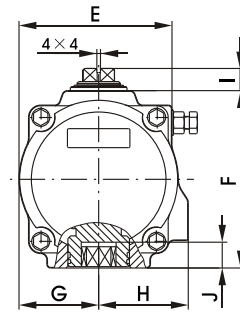
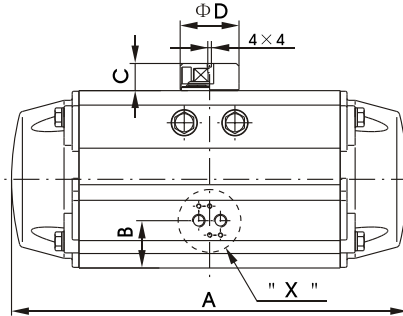
FT

120°/180° Stroke Double Acting Actuator



Configuration and Connection Size of 120°/180° Stroke Actuator(Double Acting)

ISO5211 / VDI/VDE3845



1. Actuators of other types could be provided as customer requires
2. Actuators with different stroke type could be provided, such as 140° or 160° stroke.

TYPE	00015	00030	00060	00100	00150	00220	00300	00450	00600	00900	01200	02000	03000	05000
	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR
ISOflange	—	F05	F05-07	—	F07-10	—	F07-10	—	F10-12	—	F14	—	—	—
A(120°)	—	183	243	—	309	—	397	—	504	—	622	—	—	—
A(180°)	—	225	305	—	385	—	498	—	630	—	775	—	—	—
B	—	30	30.5	—	37.5	—	45	—	52	—	62.5	—	—	—
C	—	20	20	—	20	—	30	—	30	—	50	—	—	—
ΦD	—	40	40	—	40	—	56	—	65	—	80	—	—	—
E	—	72	84.5	—	111	—	136	—	169	—	213	—	—	—
F	—	85	102	—	127	—	157	—	196	—	245	—	—	—
G	—	36	42.5	—	56	—	69.5	—	88	—	110	—	—	—
H	—	47	52	—	67	—	82	—	99	—	112	—	—	—
I	—	14.5	14.5	—	14.5	—	24.5	—	24.5	—	44.5	—	—	—
Jmm	—	16	16	—	19	—	24	—	29	—	38	—	—	—
K	—	11	17	—	17	—	27	—	27	—	36	—	—	—
L	—	80	80	—	80	—	80	—	80	—	130	—	—	—
M	—	30	30	—	30	—	30	—	30	—	30	—	—	—
N	—	8	8	—	8	—	8	—	8	—	8	—	—	—
ΦO1	—	50	50	—	70	—	70	—	102	—	140	—	—	—
ΦO	—	---	70	—	102	—	102	—	125	—	---	—	—	—
P1	—	4-M6	4-M6	—	4-M8	—	4-M8	—	4-M10	—	4-M16	—	—	—
P	—	---	4-M8	—	4-M10	—	4-M10	—	4-M12	—	---	—	—	—
□Q	—	14	14	—	17	—	22	—	27	—	36	—	—	—
ΦR	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	—	—	—	—	—	—	—	—	—	—	—	—	—	—
T	—	—	—	—	—	—	—	—	—	—	—	—	—	—
U	—	—	—	—	—	—	—	—	—	—	—	—	—	—
V	—	24	24	—	24	—	24	—	24	—	24	—	—	—
W	—	32	32	—	32	—	32	—	32	—	32	—	—	—
Y	—	M5x8	M5x8	—	M5x8	—	M5x8	—	M5x8	—	M5x8	—	—	—
Z	—	1/8 "	1/8 "	—	1/4 "	—	1/4 "	—	1/4 "	—	1/4 "	—	—	—

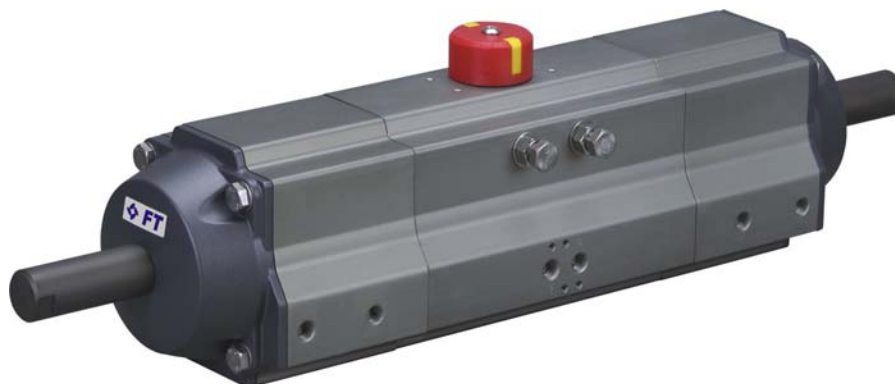


DR/SC 3-Position Pneumatic Actuator 0°-45°-90°/0°-90°-180°



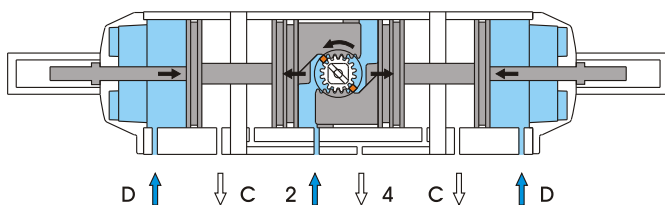
3-Position Pneumatic Actuator

Two types of 3-position pneumatic actuators can be provided, namely 0°-45°-90° type and 0°-90°-180° type respectively. After the air comes into the cylinder from the air entrance " 2 ", the pistons' movements toward the ends would be limited by the auxiliary pistons mechanism. Thus the pistons would stay in the middle position. The position of the mid position could be adjust to 20°, 30°, 50°, 75° and 95°, 120°, 130°, 150°, 175° etc by using the adjusting screws at each end of the surface.



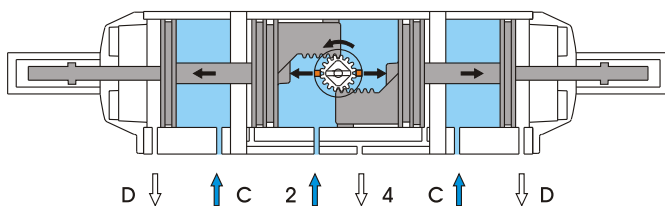
Operating Principles:

The control circuit with solenoid valve is designed to complete the operation of 3-position pneumatic actuator. The control principles are as followed.



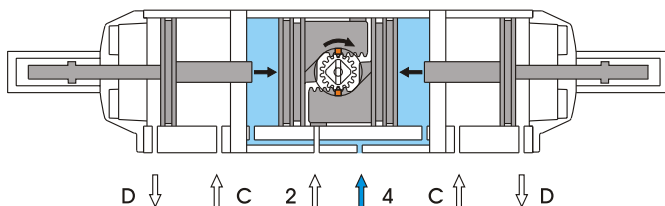
Position 1 (mid position)

Air source pressure come into both entrance 2 and entrance D simultaneously and press out the air from entrance 4 and C. The inner pistons move along Entrance 2 while the inner pistons are limited in the mid position which is decided before by the auxiliary pistons mechanism through entrance D.



Position 2 (complete open position)

Air source pressure come into both entrance 2 and entrance C simultaneously and press out the air from entrance 4 and D. The inner pistons in entrance 2 keeps moving while the lock of auxiliary pistons mechanism is released through entrance C and the inner pistons reach complete open position.



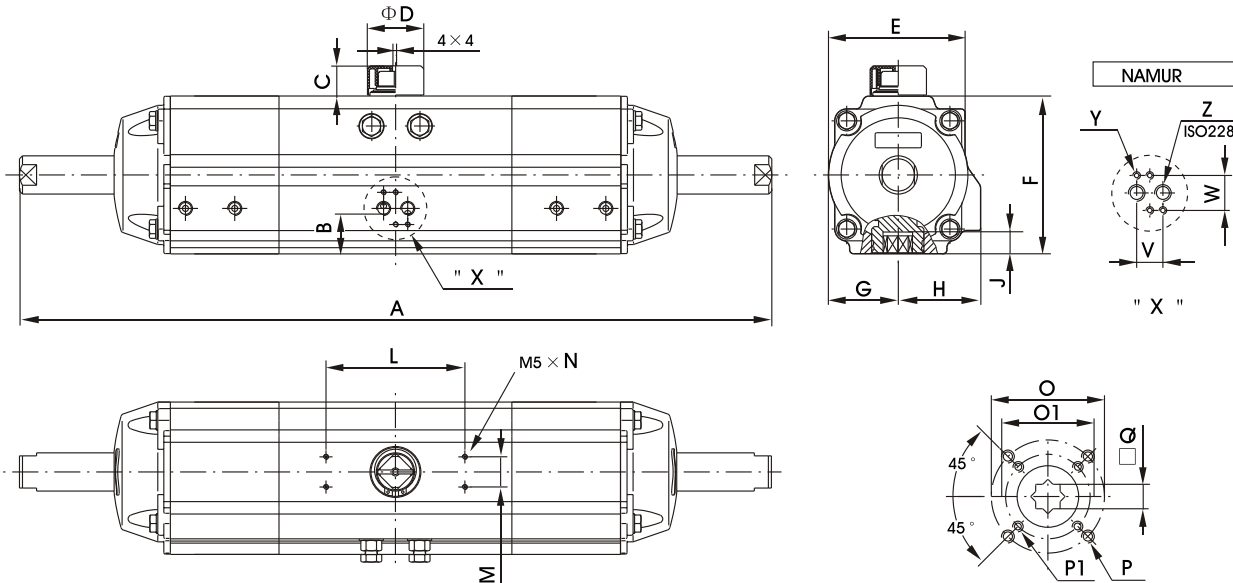
Position 3 (complete close position)

Air source pressure come into entrance 4 and press out the air from entrance 2. The inner pistons move toward midposition to reach complete close position. Springs with 3 different reset type, namely 0°-45°-90° are provided. When air supply or power supply are cut off (or when air source fails), the springs would force the inner pistons to move to the complete close position.



DR/SC 3-Position Pneumatic Actuator

0°-45°-90°/0°-90°-180°



Configuration and Connection Size(mm)

TYPE	A		B	C	ΦD	E	F	G	H	J	L	M	N	O1	O	P1	P	□Q	V	W	Y	Z
	0°-45°-90°	0°-90°-180°																				
DRSC00030	390	440	30	20	40	72	85	36	47	16	80	30	8	50	—	4-M6	—	14	24	32	M5×8	1/8"
DRSC00060	480	570	30.5	20	40	84.5	102	42.5	52	16	80	30	8	50	70	4-M6	4-M8	14	24	32	M5×8	1/8"
DRSC00150	600	710	37.5	20	40	111	127	56	67	19	80	30	8	70	102	4-M8	4-M10	17	24	32	M5×8	1/4"
DRSC00300	720	910	45	30	56	136	157	69.5	82	24	80	30	8	70	102	4-M8	4-M10	22	24	32	M5×8	1/4"
DRSC00600	915	1130	52	30	65	169	196	88	99	29	80	30	8	102	125	4-M10	4-M12	27	24	32	M5×8	1/4"
DRSC01200	1155	1400	62.5	50	80	213	245	110	112	38	130	30	8	140	—	4-M16	—	36	24	32	M5×8	1/4"

Output Torque of DR Double Acting Type(Nm)

TYPE	2.5bar	3.0bar	3.5bar	4.0bar	4.5bar	5.0bar	5.5bar	6.0bar	7.0bar	8.0bar
DR00030	14.7	17.6	20.5	23.5	26.4	29.3	32.2	35.2	41.0	46.9
DR00060	29.1	34.9	40.7	46.5	52.3	58.2	64.0	69.8	81.4	93.0
DR00150	66.5	79.7	93.0	106	120	133	146	160	186	213
DR00300	138	166	194	221	249	277	304	332	387	443
DR00600	283	340	397	453	510	567	623	680	793	907
DR01200	531	638	744	850	956	1063	1169	1275	1488	1700



FT

SC 0°-45°-90° Single Acting 3-p Actuator



SC 0°-45°-90° Single Acting Output Torque (spring Resets) (Nm)

TYPE	Spring Quantity	Air Pressure Torque																Spring Torque						
		2.5bar		3.0bar		3.5bar		4.0bar		4.5bar		5.0bar		5.5bar		6.0bar		7.0bar		8.0bar		90° Start	0° 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	0° Start	90° End	0° Start	90° End			
SC00030	05	9.1	6.2	12	9.1	15	12	17.9	15	20.8	17.9	23.7	20.8									8.5	5.5	
	06	8	4.5	10.9	7.4	13.8	10.3	16.8	13.3	19.7	16.2	22.6	19.1	25.6	22.1							10.2	6.7	
	07			9.8	5.7	12.7	8.7	15.7	11.6	18.6	14.5	21.5	17.4	24.5	20.4	27.4	23.3						11.8	7.8
	08					11.6	7	14.6	9.9	17.5	12.8	20.4	15.8	23.3	18.7	26.3	21.6	32.1	27.5				13.5	8.9
	09							13.4	8.2	16.4	11.1	19.3	14.1	22.2	17	25.2	19.9	31	25.8	36.9	31.6		15.2	10
	10									15.3	9.4	18.2	12.4	21.1	15.3	24.1	18.2	29.9	24.1	35.8	29.9		16.9	11.1
	11											17.1	10.7	20	13.6	22.9	16.5	28.8	22.4	34.7	28.2		18.6	12.2
	12													18.9	11.9	21.8	14.8	27.7	20.7	33.5	26.6		20.3	13.3
SC00060	05	18	11.7	23.8	17.6	29.6	23.4	35.4	29.2	41.2	35	47.1	40.8									17.3	11.1	
	06	15.8	8.3	21.6	14.1	27.4	19.9	33.2	25.7	39	31.5	44.8	37.3	50.7	43.2							20.8	13.3	
	07			19.4	10.6	25.2	16.4	31	22.3	36.8	28.1	42.6	33.9	48.4	39.7	54.3	45.5					24.2	15.5	
	08					23	13	28.8	18.8	34.6	24.6	40.4	30.4	46.2	36.2	52	42	63.7	53.7				27.7	17.7
	09							26.6	15.3	32.4	21.1	38.2	27	44	32.8	49.8	38.6	61.5	50.2	73.1	61.8	31.1	19.9	
	10									30.2	17.7	36	23.5	41.8	29.3	47.6	35.1	59.2	46.7	70.9	58.4	34.6	22.1	
	11											33.8	20	39.6	25.8	45.4	31.7	57	43.3	68.7	54.9	38.1	24.3	
	12													37.4	22.4	43.2	28.2	54.8	39.8	66.4	51.4	41.5	26.5	
SC00150	05	41.1	27	54.4	40.3	67.7	53.6	81	66.8	94.2	80.1	108	93.4									39.4	25.3	
	06	36.1	19.1	49.3	32.4	62.6	45.7	75.9	58.9	89.2	72.2	103	85.5	116	98.8							47.3	30.4	
	07			44.3	24.5	57.6	37.8	70.8	51.1	84.1	64.3	97.4	77.6	111	90.9	124	104					55.2	35.4	
	08					52.5	29.9	65.8	43.2	79.1	56.5	92.3	69.7	106	83	119	96.3	146	123				63.1	40.5
	09							60.7	35.3	74	48.6	87.3	61.9	101	75.1	114	88.4	140	115	167	142	71	45.5	
	10									68.9	40.7	82.2	54	95.5	67.3	109	80.5	135	107	162	134	78.8	50.6	
	11											77.2	46.1	90.5	59.4	104	72.7	130	99	157	126	86.7	55.6	
	12													85.4	51.5	98.7	64.8	125	92	152	118	94.6	60.7	
SC00300	05	85.9	55.9	114	84	141	111	169	139	197	167	224	194									82.5	52.5	
	06	75.4	39.4	103	67	131	95	158	122	186	150	214	178	241	205							98.9	62.9	
	07			92.6	50.6	120	78	148	106	176	134	203	161	231	189	259	217					115	73.4	
	08					110	62	137	89.4	165	117	193	145	221	173	248	200	304	256				132	83.9
	09							127	72.9	155	101	182	128	210	156	238	184	293	239	348	294	148	94.4	
	10									144	84	172	112	200	140	227	167	283	223	338	278	165	105	
	11											161	95.3	189	123	217	151	272	206	327	261	181	115	
	12													179	107	206	134	262	190	317	245	198	126	
SC00600	05	171	117	228	174	285	231	341	287	398	344	455	401									166	112	
	06	149	84	206	141	262	197	319	254	376	311	432	367	489	424							199	135	
	07			183	108	240	164	296	221	353	278	410	334	466	391	523	448					233	157	
	08					217	131	274	188	331	244	387	301	444	358	501	414	614	528				266	179
	09							252	154	308	211	365	268	422	324	478	381	592	494	705	608	299	202	
	10									286	178	343	235	399	291	456	348	569	461	683	575	332	224	
	11											320	201	377	258	433	315	547	428	660	541	365	247	
	12													354	225	411	281	524	395	638	508	399	269	
SC01200	05	319	216	425	323	532	429	638	535	744	641	850	748									315	212	
	06	277	153	383	260	489	366	595	472	702	578	808	685	914	791							378	255	
	07			340	197	447	303	553	409	659	515	765	622	872	728	978	834					441	297	
	08					404	240	510	346	617	452	723	559	829	665	935	771	1148	984				504	340
	09							468	283	574	389	680	496	787	602	893	708	1105	921	1318	1133	567	382	
	10									532	326	638	433	744	539	850	645	1063	858	1275	1070	630	425	
	11											595	370	702	476	808	582	1020	795	1233	1007	693	467	
	12													659	413	766	519	978	732	1191	944	756	510	

The darkened recommendation index under the air pressure torque are in accordance with the spring return torque datas and the spring number.



FT

SC 0°-90°-180°Stoke Single Acting Actuator

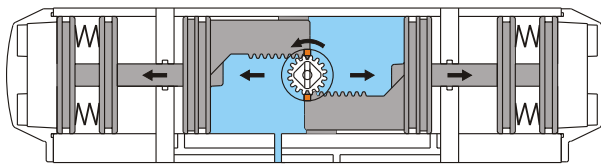


180°Stroke Single Acting Actuator (spring Reset)

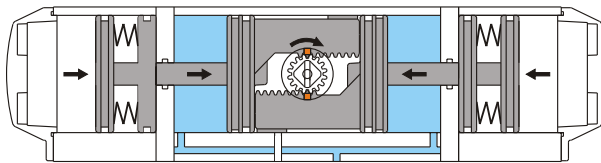
Spring subassembly are provided at each end of 180°spring reset type pneumatic actuator which is suitable to act the back-and-forth movement among 0°-90°-180°and comes back to the position of 90°by spring resetting when air source pressure drops (or fails).
The 180° full -open position and the 0° shut-up position can be made for precious external adjustment at ±4° via standard methods.



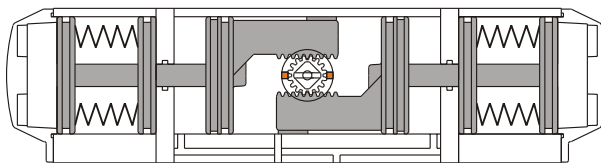
Control Principle



"2" ↑ ↓ "4"



"2" ↓ ↑ "4"



"2" ↓ ↓ "4"

From 90° to 180°

The air source pressure comes into the cylinder body between the two pistons from air entrance (2) and pushes the pistons toward the end of the cylinder body. The spring subassembly at each end is forced to shrink while the air between the pistons and the ends of the cylinder body is released from air entrance (4). Meanwhile the racks of pistons drive the output shaft (gear wheel) simultaneously to rotate anticlockwise to 180° .

From 90° to 0°

The air source pressure comes into the cylinder body between the two pistons from air entrance (4) and pushes the pistons toward each other. The spring subassembly at each end begins to reset while the air between the pistons is released from air entrance (2). Meanwhile the racks of pistons rotate the output shaft (gear wheel) clockwise simultaneously to 0°.

Air fail Operation

when the position is at 180°: when the air source pressure of entrance (2) is lost or the power supply of the solenoid valve is cut, the springs force the pistons to move toward the middle of the cylinder body which would rotate the output shaft clockwise to position of 90°

when the position is at 0°: when the air source pressure of entrance (4) is lost or the power supply of the solenoid valve is cut, the springs force the pistons to move toward the end of the cylinder body which would rotate the output shaft anticlockwise to position of 90°



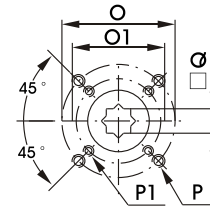
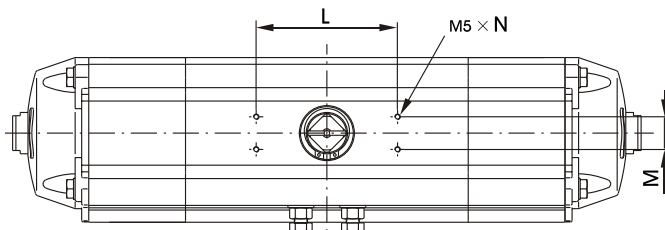
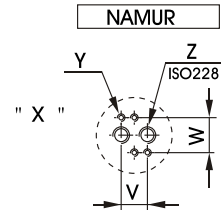
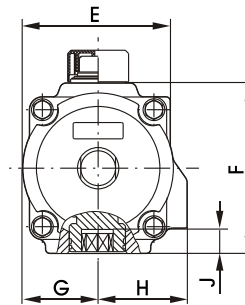
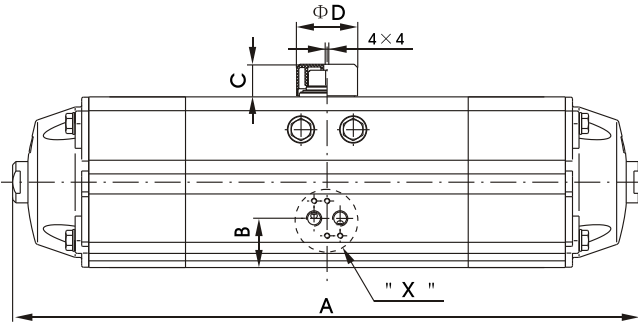
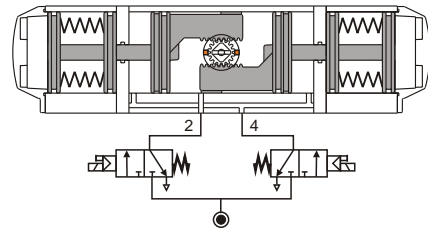
FT

SC 0°-90°-180°Stoke Single Acting Actuator



Control Principle

In order to control the operation of the actuators 180° with 90° fail safe position , a system of solenoid valves controlling a sequence of air supplies to the actuator is required as described besides.
The actuator may be controlled by two 3/2 way solenoid valves or by one 5/3 way solenoid valve.



Configuration And Connection Size(mm)

TYPE																					
	A	B	C	ΦD	E	F	G	H	J	L	M	N	O1	O	P1	P	□Q	V	W	Y	Z
SC00150	630	37.5	20	40	111	127	56	67	19	80	30	8	70	102	4-M8	4-M10	17	24	32	M5×8	1/4"
SC00300	812	45	30	56	136	157	69.5	82	24	80	30	8	70	102	4-M8	4-M10	22	24	32	M5×8	1/4"
SC00600	1007	52	30	65	169	196	88	99	29	80	30	8	102	125	4-M10	4-M12	27	24	32	M5×8	1/4"
SC01200	1242	62.5	50	80	213	245	110	112	38	130	30	8	140	—	4-M16	—	36	24	32	M5×8	1/4"

Output Torque

TYPE	Spring Quantity	Air Pressure Torque																Spring Torque					
		2.5bar		3.0bar		3.5bar		4.0bar		4.5bar		5.0bar		5.5bar		6.0bar				7.0bar		8.0bar	
		0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°	0° and 90°	180°
SC00150	06	36.1	19.1	49.3	32.4	62.6	45.7	75.9	58.9	89.2	72.2	103	85.5	116	98.8							47.3	30.4
	08					52.5	29.9	65.8	43.2	79.1	56.5	92.3	69.7	106	83	119	96.3	146	123			63.1	40.5
	10									68.9	40.7	82.2	54	95.5	67.3	109	80.5	135	107	162	134	78.8	50.6
	12													85.4	51.5	98.7	64.8	125	92	152	118	94.6	60.7
SC00300	06	75.4	39.4	103	67	131	95	158	122	186	150	214	178	241	205							98.9	62.9
	08					110	62	137	89.4	165	117	193	145	221	173	248	200	304	256			132	83.9
	10									144	84	172	112	200	140	227	167	283	223	338	278	165	105
	12													179	107	206	134	262	190	317	245	198	126
SC00600	06	149	84	206	141	262	197	319	254	376	311	432	367	489	424							199	135
	08					217	131	274	188	331	244	387	301	444	358	510	414	614	528			266	179
	10									286	178	343	235	399	291	456	348	569	461	683	575	332	224
	12													354	225	411	281	524	395	638	508	399	269
SC01200	06	277	153	383	260	489	366	595	472	702	578	808	685	914	791							378	255
	08					404	240	510	346	617	452	723	559	829	665	935	771	1148	984			504	340
	10									532	326	638	433	744	539	850	645	1063	858	1275	1070	630	425
	12													659	413	766	519	978	732	1191	944	756	510



Standard Solenoid Valve
Could Be Provided
VDI/VDE3845、NAMUR



Standard Switch Cabinet
Could Be Provided
VDI/VDE3845



Standard Valve Positioner
Could Be Provided
VDI/VDE3845



Manual Clutch Could Be Provided



Pneumatic Ball Valve
Pneumatic Butterfly Valve





Flowtecal Control Co. Ltd is the forecast specialist valves and controls manufacturing company in the world. Flowtecal strategy is to be the low-cost, high quality maker and provider in each of its markets. Flowtecal supplies end users with a wide product range to meet modern industry flow control requirements in the following markets:

- General industry
- Chemical Oil & Gas
- Pulp & Paper
- Food & Pharmaceutical
- HVAC & Water system
- Petrochemical & Refining
- Metals and Mining

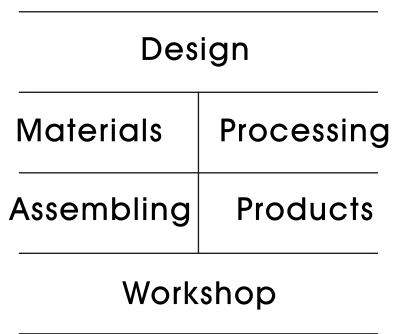
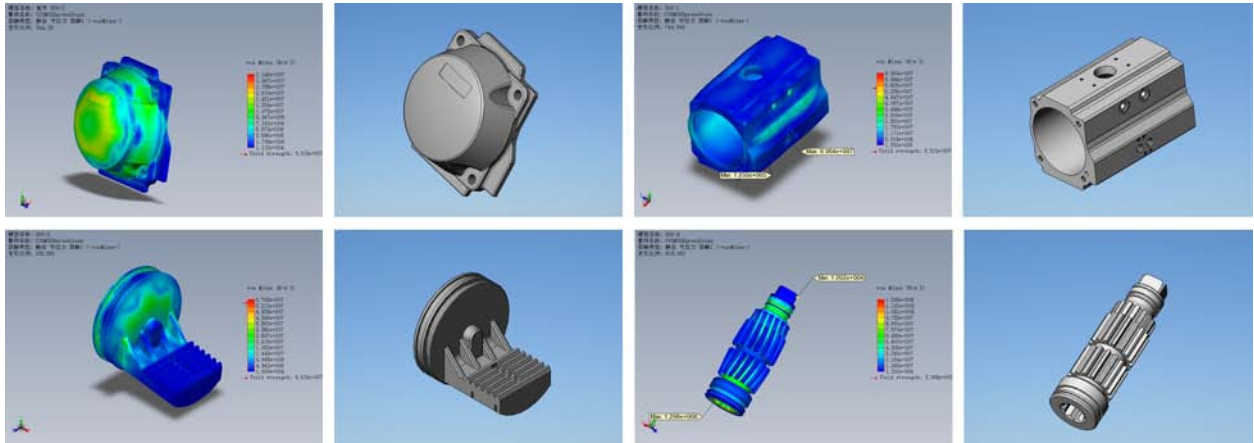
Flowtecal can supply not only reliable products to ensure extended service life, but experienced technical support and unmatched after sales service.

Factory Garden



Factory Outlook





All the valve manufacturers, aggregate unit manufacturers, valve franchisers, project contractors, designing institutes and ultimate customers desire to cooperate with the partner who can provide products of high quality. We hope all the customers can benefit from our professional technology, high quality products and our best service.

Distributor

