

**SIO**  
Valves & Automation

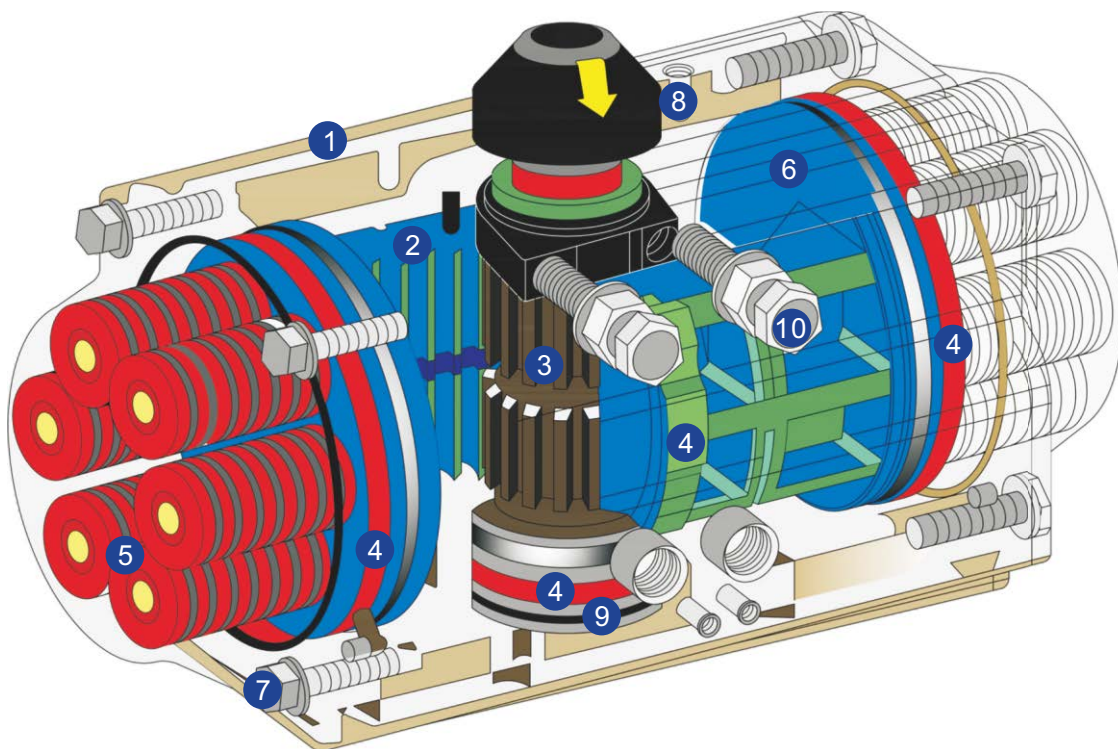


**SP**

**RACK & PINION ACTUATORS**

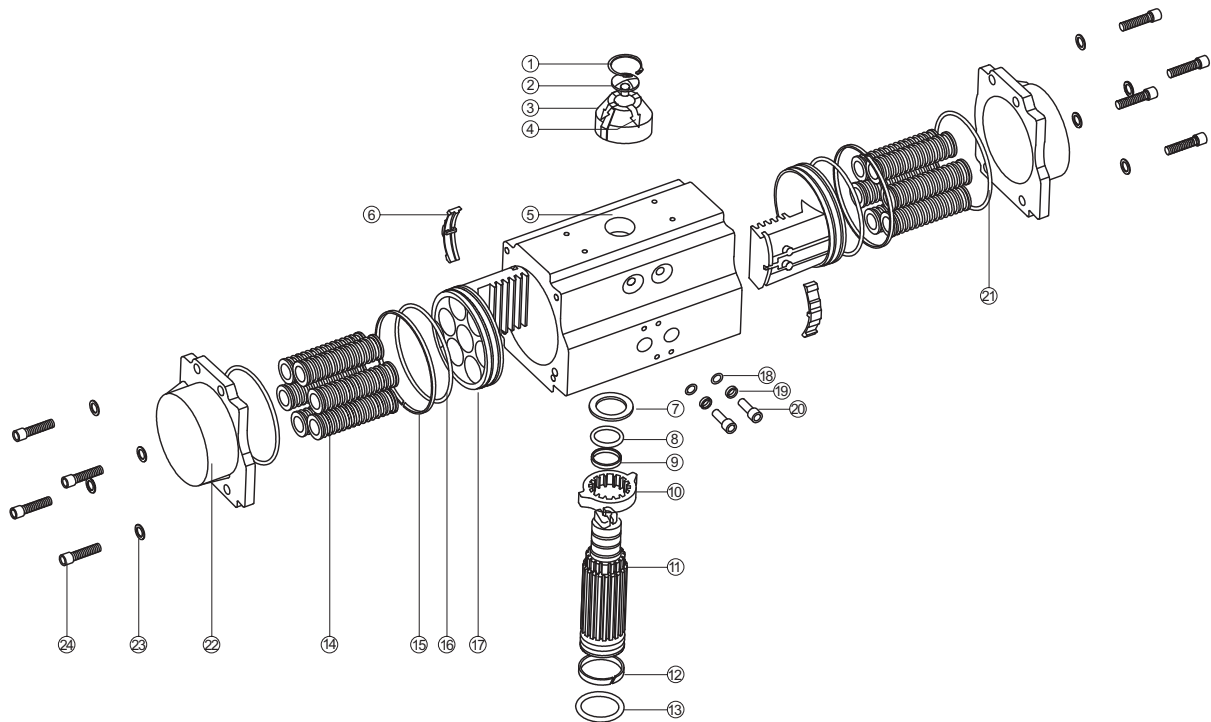
## Features

1. Extruded aluminum ASTM6005 body with internal surface having honed cylinder for longer life and low friction coefficient, and both internal and external corrosion protection treated with hard anodized and the external yellow powder polyester painted.
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. Standard Rotation: Counter Clock Wise open / Clock Wise close.
4. Multiple bearings and guides on racks and pistons, low friction, high cycle life and prevent shaft blow out.



5. Modular preloaded spring cartridge design, with coated spring for simple versatile range, greater safety and corrosion resistance, longer cycle life.
6. Fully machined teeth on piston and pinion for accurate low backlash rack and pinion engagement, maximum efficiency.
7. Stainless steel fasteners for long term corrosion resistance
8. Full conformance to the latest specifications: ISO5211, DIN 3337 and NAMUR or product interchange ability and easy mounting of solenoids, limit switches and other accessories.
9. High Quality Selected O-rings provides Trouble free operation for wide range temperature applications.
10. Independent Travel Stop Adjustments of  $\pm 5^\circ$  in both open and closed positions for easily exact valve alignment

## PART AND MATERIAL



N°	Name	Quantity	Material
1	Spring clip	1	Stainless Steel
2	Housing indicator Screw	1	Plastic
3	Housing indicator	1	Plastic
4	Indicator	1	Plastic
5	Body	1	Extruded aluminium alloy
6	Guide piston	2	Engineering plastics
7	O-ring (pinion top)	1	NBR
8	Washer (pinion top)	1	Engineering plastics
9	Bearing (pinion top)	1	Engineering plastics
10	Cam	1	Alloy steel
11	Pinion	1	Alloy steel
12	Bearing (pinion bottom)	1	Engineering plastics
13	O-ring (pinion bottom)	1	NBR
14	Spring	0-12	Stainless Steel
15	Ring (Piston)	2	Engineering plastics
16	O-ring (Piston)	2	NBR
17	Piston	2	Cast aluminium
18	O-ring	2	NBR
19	Adjust Nut	2	Stainless Steel
20	Adjust screw	2	Stainless Steel
21	O-ring (End cap)	2	NBR
22	End cap	2	Cast aluminium
23	Cap Washer	8	Stainless Steel
24	Cap screw	8	Stainless Steel

## DOUBLE ACTING SIZING

The suggested safety factor for Double Acting actuators under normal working conditions is 20%-30%.

Example:

- The torque needed by valve=100Nm
- The torque considered safety factor (1+30%)=130 Nm
- Air Supply = 5 Bar

According to the above Torque Table, we can choose the minimum model is: **SP 115**.

## SPRING RETURN SIZING

The suggested safety factor for spring return actuator under normal working conditions is 30-50%

Example:

- The torque needed by valve =100 Nm
- The torque consider safety factor (1+30%) =130 Nm
- Air Supply = 5 bar

According to the table of spring return actuators' output, we find output torque of **SP 145 S10 (5+ 5)** is:

Air stroke 0°= 240 Nm

Air stroke 90°= 157 Nm

Spring stroke 90°=230 Nm

Spring stroke 0°=147 Nm

All the output torque is larger than we needed.

## DOUBLE ACTING ACTUATORS TORQUES

Model	Air supply pressure (Unit Bar)									
	2.5	3	3.5	4	4.5	5	5.5	6	7	8
SP 42	4.7	5.7	6.6	7.6	8.5	9.4	10.4	11.4	13.2	15.2
SP 50	7.3	8.9	10.3	11.8	13.3	14.7	16.2	17.7	20.7	23.6
SP 63	13	15.6	18.2	20.9	23.5	26	28.6	31.3	36.5	41.7
SP 75	25.9	31	36.2	41.4	46.6	51.8	57	62.1	72.4	82.8
SP 90	40.7	48.9	57	65.1	73.3	81.4	89.9	97.9	113.9	130
SP 100	59.2	71	82.8	94.3	106.8	118.4	130	142.4	165.5	189.6
SP 115	95.2	115	133.5	153	172	191	210	230	268	306
SP 125	123	148	172.6	197.6	221.6	246.5	271.5	295.5	345.3	394.3
SP 145	193	232	270	310	348	387	425	464	542	619
SP 160	253	302	353	404	454	504	555	606	706	808
SP 190	473	567	662	756	851	946	1040	1134	1324	1512
SP 210	588	706	824	942	1059	1176	1295	1412	1648	1884
SP 240	922	1107	1291	1476	1660	1844	2029	2214	2582	2952
SP 270	1313	1576	1839	2101	2364	2626	2889	3152	3678	4202
SP 300	1801	2162	2522	2882	3243	3602	3963	4324	5044	5765
SP 400	3843	4612	5380	6149	6918	7686	8455	9224	10760	12298

## SPRING RETURN ACTUATORS TORQUES

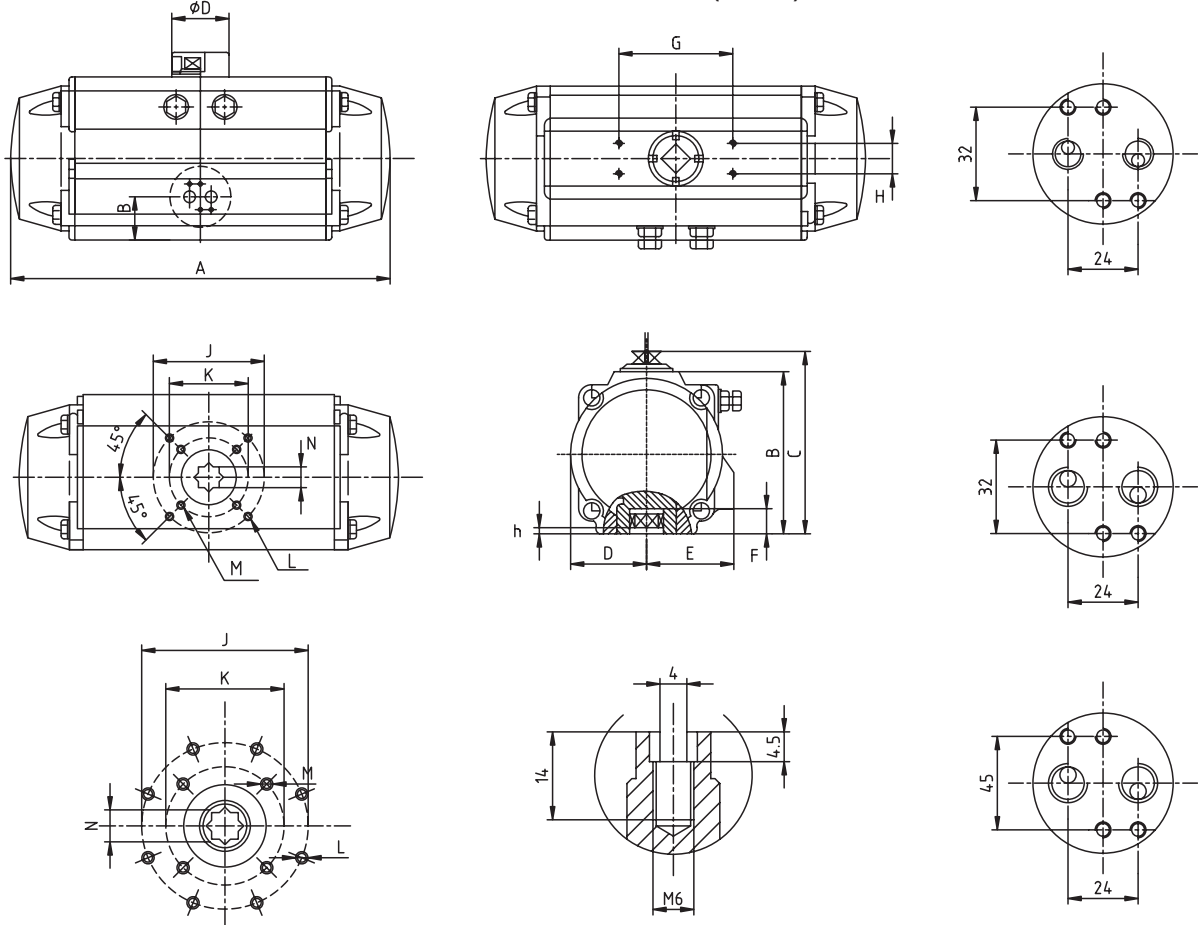
Model	Spring Qty	Air supply in Bar																		Spring output				
		2.5		3		3.5		4		4.5		5		5.5		6		7				8		
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°	
SP 42	3+2	2.5	0.8	3.5	1.8	4.4	2.7	5.4	3.7	6.3	4.6	7.2	5.5										3.9	2.2
	3+3	2	0.1	3	1.1	3.9	2	4.9	3	5.8	3.9	6.7	4.8	7.7	5.8								4.6	2.7
	4+3			2.5	0.4	3.4	1.3	4.4	2.3	5.3	3.2	6.2	4.1	7.2	5.1	8.2	6.1						5.3	3.2
	4+4					2.9	0.6	3.9	1.6	4.8	2.5	5.7	3.4	6.7	4.4	7.7	5.4	9.5	7.2				6	3.7
	5+4							3.4	0.9	4.3	1.8	5.2	2.7	6.2	3.7	7.2	4.7	9	6.5	11	8.5	6.7	4.2	
	5+5									3.8	1.1	4.7	2	5.7	3	6.7	4	8.5	5.8	10.5	7.8	7.4	4.7	
	6+5											4.2	1.3	5.2	2.3	6.2	3.3	8	5.1	10	7.1	8.1	5.2	
	6+6													4.7	1.6	5.7	2.6	7.5	4.4	9.5	6.1	8.8	5.7	

Model	Spring Qty	Air supply in Bar																				Spring output	
		2.5		3		3.5		4		4.5		5		5.5		6		7		8			
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
SP50	3+2	4.3	3.0	5.9	4.6	7.3	6.0	8.8	7.5	10.3	9	11.7	10.4									4.3	3.0
	3+3	3.8	2.2	5.4	3.8	6.8	5.2	8.3	6.7	9.8	8.2	11.2	9.6	12.7	11.1							5.1	3.5
	4+3			4.8	2.9	6.2	4.3	7.7	5.8	9.2	7.3	10.6	8.7	12.1	10.2	13.6	11.7					6.0	4.1
	4+4					5.5	3.4	7.0	4.9	8.5	6.4	9.9	7.8	11.4	9.3	12.9	10.8	15.9	13.8			6.9	4.8
	5+4							6.4	4.0	7.9	5.5	9.3	6.9	10.8	8.4	12.3	9.9	15.3	12.9	18.2	15.8	7.8	5.4
	5+5									7.4	4.7	8.8	6.1	10.3	7.6	11.8	9.1	14.8	12.1	17.7	15.0	8.6	5.9
	6+5											8.2	5.2	9.7	6.7	11.2	8.2	14.2	11.2	17.1	14.1	9.5	6.5
	6+6													9.0	5.8	10.5	7.3	13.5	10.3	16.4	13.2	10.4	7.2
SP63	3+2	8.1	5.5	10.7	8.1	13.3	10.7	16	13.4	18.6	16	21.1	18.5									7.5	4.9
	3+3	7.1	4.0	9.7	6.6	12.3	9.2	15	11.9	17.6	14.5	20.1	17	22.7	19.6							9.0	5.9
	4+3			8.7	5.1	11.3	7.7	14	10.4	16.6	13	19.1	15.5	21.7	18.1	24.4	20.8					10.5	6.9
	4+4					10.3	6.2	13	8.9	15.6	11.5	18.1	14	20.7	16.6	23.4	19.3	28.6	24.5			12.0	7.9
	5+4							12	7.4	14.6	10	17.1	12.5	19.7	15.1	22.4	17.8	27.6	23	32.8	28.2	13.5	8.9
	5+5									13.6	8.5	16.1	11	18.7	13.6	21.4	16.3	26.6	21.5	31.8	26.7	15.0	9.9
	6+5											15.2	9.2	17.8	11.8	20.5	14.5	25.7	19.7	30.9	24.9	16.8	10.8
	6+6													16.8	10.7	19.5	13.4	24.7	18.6	29.9	23.8	17.9	11.8
SP75	3+2	16	10.5	21.1	15.6	26.3	20.8	31.5	26	36.7	31.2	41.9	36.4									15.4	9.9
	3+3	14.1	7.4	19.2	12.5	24.4	17.7	29.6	22.9	34.8	28.1	40	33.3	45.2	38.5							18.5	11.8
	4+3			17.2	9.5	22.4	14.7	27.6	19.9	32.8	25.1	38	30.3	43.2	35.5	48.3	40.6					21.5	13.8
	4+4					20.5	11.6	25.7	16.8	30.9	22	36.1	27.2	41.3	32.4	46.4	37.5	56.7	47.8			24.6	15.7
	5+4							23.7	13.7	28.9	18.9	34.1	24.1	39.3	29.3	44.4	34.4	54.7	44.7	65.1	55.1	27.7	17.7
	5+5									26.9	15.8	32.1	21	37.3	26.2	42.4	31.3	52.7	41.6	63.1	52	30.8	19.7
	6+5											30.2	17.9	35.4	23.1	40.5	28.2	50.8	38.5	61.2	48.9	33.9	21.6
	6+6													33.4	20.1	38.5	25.2	48.8	35.5	59.2	45.9	36.9	23.6
SP90	3+2	24.4	15	32.6	23.2	40.7	31.3	48.8	39.4	57	47.6	65.1	55.7									25.7	16.3
	3+3	21.1	9.8	29.3	18	37.4	26.1	45.5	34.2	53.7	42.4	61.8	50.5	70.3	59							30.9	19.6
	4+3			26	17.9	34.1	21	42.2	29.1	50.4	37.3	58.5	45.4	67	53.9	75	61.9					36	22.9
	4+4					31	15.9	39.1	24	47.3	32.2	55.4	40.3	63.9	48.8	71.9	56.8	87.9	72.8			41.1	26
	5+4							35.7	18.8	43.9	27	52	35.1	60.5	43.6	68.5	51.6	84.5	67.6	100.6	83.7	46.3	29.4
	5+5									40.6	21.8	48.7	29.9	57.2	38.4	65.2	46.4	81.2	62.4	97.3	78.5	51.5	32.7
	6+5											45.5	24.9	54	33.4	62	41.4	78	57.4	94.1	73.5	56.5	35.9
	6+6													50.8	28.2	58.8	36.2	74.8	52.2	90.9	68.3	61.7	39.1
SP100	3+2	36.7	24.2	48.5	36	60.3	47.8	71.8	59.3	84.3	71.8	95.9	83.4									35	22.5
	3+3	32.2	17.1	44	28.9	55.8	40.7	67.3	52.2	79.8	64.7	91.4	76.3	103	87.9							42.1	27
	4+3			39.4	22	51.2	33.8	62.7	45.3	75.2	57.8	86.8	69.4	98.4	81	110.8	93.4					49	31.6
	4+4					46.8	26.8	58.3	38.2	70.8	50.8	82.4	62.4	94	74	106.4	86.4	129.5	109.5			56	36
	5+4							53.7	31.2	66.2	43.7	77.8	55.3	89.4	66.9	101.8	79.3	124.9	102.4	149	126.5	63.1	40.6
	5+5									61.7	36.7	73.3	48.3	84.9	59.9	97.3	72.3	120.4	95.4	144.5	119.5	70.1	45.1
	6+5											68.8	41.3	80.4	52.9	92.8	65.3	115.9	88.4	140	112.5	77.1	49.6
	6+6													75.9	45.9	88.3	58.3	111.4	81.4	135.5	105.5	84.1	54.1
SP115	3+2	58.7	36.9	78.5	56.7	97	75.2	116.5	94.7	135.5	113.7	154.5	132.7									58.3	36.5
	3+3	51.4	25.2	71.2	45	89.7	63.5	109.2	83	128.2	102	147.2	121	166.2	140							70	43.8
	4+3			63.9	33.4	82.4	51.9	101.9	71.4	120.9	90.4	139.9	109.4	158.9	128.4	178.9	148.4					81.6	51.1
	4+4					75.1	40	94.6	59.5	113.6	78.5	132.6	97.5	151.6	116.5	171.6	136.5	209.6	174.5			93.5	58.4
	5+4							87.3	48	99	67	125.3	78.8	144.3	105	164.3	125	202.3	163	240.3	201	105	65.7
	5+5										55.4	118	67	137	93.4	157	113.4	195	151.4	233	189.4	116.6	73
	6+5											110.7	55.4	129.7	82	149.7	102	187.7	140	225.7	178	128	80.3
	6+6													122.3	70.3	142.3	90.3	180.3	128.3	218.3	166.3	139.7	87.7
SP125	3+2	76.3	50	101.3	75	125.9	99.6	150.9	124.6	174.9	148.6	199.8	173.5									73	46.7
	3+3	67	35	92	60	116.6	84.6	141.6	109.6	165.6	133.6	190.5	158.5	215.5	183.5							88	56
	4+3			82.6	45.7	107.2	70.3	132.2	95.3	156.2	119.3	181.1	144.2	206.1	169.2	230.1	193.2					102.3	65.4
	4+4					97.8	55.1	122.8	80.1	146.8	104.1	171.7	129	196.7	154	220.7	178	270.5	277.8			117.5	74.8
	5+4							113.6	65.9	137.6	89.9	162.5	114.8	187.5	139.8	211.5	163.8	261.3	213.6	310.3	262.6	131.7	84
	5+5									128.1	74.6	153	99.5	178	124.5	202	148.5	251.8	198.3	300.8	247.3	147	93.5
	6+5											143.5	85.5	168.5	110.5	192.5	134.5	242.3	184.3	291.3	233.3	161	103
	6+6													159.5	95.5	183.5	119.5	233.3	169.3	282.3	218.3	176	112



Model	Spring Qty	Air supply in Bar																		Spring output			
		2.5		3		3.5		4		4.5		5		5.5		6		7				8	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
SP145	3+2	120	78	159	117	197	155	237	195	275	233	314	272									115	73
	3+3	105	55	144	94	182	132	222	172	260	210	299	249	337	287							138	88
	4+3			130	72	168	110	208	150	246	188	285	227	323	265	362	304					160	102
	4+4					153	87	193	127	231	165	270	204	308	242	347	281	425	359			183	117
	5+4							178	104	216	142	255	181	293	219	332	258	410	336	487	413	206	132
	5+5									201	118	240	157	278	195	317	234	395	312	472	389	230	147
	6+5											226	135	264	173	303	212	381	290	458	367	252	161
	6+6													249	150	288	189	366	267	443	344	275	176
SP 160	3+2	153	105	202	154	253	205	304	256	354	306	404	356									148	100
	3+3	133	76	182	125	233	176	284	227	334	257	384	307	435	358							177	120
	4+3			162	95	213	146	264	297	314	247	364	297	415	348	466	399					207	140
	4+4					193	116	244	267	294	217	344	267	395	318	446	369	546	469			237	160
	5+4							224	138	274	188	324	238	375	289	426	340	526	440	628	542	266	180
	5+5									254	159	304	209	355	260	406	311	506	411	608	513	295	200
	6+5											284	179	335	230	386	281	486	381	588	483	325	220
	6+6													315	200	366	251	466	351	568	453	355	240
Sp190	3+2	306	215																			258	167
	3+3	273	163	367	257	462	352															310	200
	4+3	240	112	334	206	429	301	523	395	618	490											361	233
	4+4			300	154	395	249	489	343	584	438	679	533	773	627							413	267
	5+4							456	292	551	387	646	482	740	576	834	670					464	300
	5+5							422	240	517	335	612	430	706	524	800	618	990	808	1178	996	516	334
	6+5											579	379	673	473	767	567	957	757	1145	945	567	367
	6+6											546	327	640	421	734	515	924	705	1112	893	619	400
SP 210	3+2	359	271																			317	229
	3+3	313	208	431	326	549	444															380	275
	4+3	267	145	385	263	503	381	621	499	738	616											443	321
	4+4			339	200	457	318	575	436	692	553	809	670	928	789							506	367
	5+4							529	393	646	490	763	607	882	726	999	843					569	413
	5+5							484	309	601	426	718	543	837	662	954	779	1190	1015	1426	1251	633	458
	6+5											672	480	791	599	908	716	1144	952	1380	1188	696	504
	6+6											626	417	745	536	862	653	1098	889	1334	1125	759	550
SP 240	3+2	580	427	765	612	949	796	1134	981	1318	165	1502	1349									495	342
	3+3	511	328	696	513	880	697	1065	882	1249	1066	1433	1250	1618	1435							594	411
	4+3			627	413	811	597	996	782	1180	966	1364	1150	1549	1335	1734	1520					694	480
	4+4					743	499	928	684	1112	868	1296	1052	1481	1237	1666	1422	2034	1790			792	548
	5+4							859	585	1043	769	1227	953	1412	1138	1597	1323	1965	1691			891	617
	5+5									975	670	1159	854	1344	1039	1529	1224	1897	1592	2335	2061	990	685
	6+5											1091	755	1296	940	1461	1125	1829	1493	2267	1962	1089	753
	6+6													1207	841	1392	1026	1760	1394	2199	1863	1188	822
SP 270	3+2	939	647																			666	474
	3+3	744	514	1007	777	1270	1040															799	569
	4+3	650	381	913	644	1176	907	1438	1169	1701	1432											932	663
	4+4			818	510	1081	773	1343	1035	1606	1298	1868	1560	2131	1823							1066	758
	5+4					986	640	1248	902	1511	1165	1773	1427	2036	1690	2299	1953	2730				1199	853
	5+5							1153	769	1416	1032	1678	1294	1941	1557	2204	1820		2346	3254	2870	1332	948
	6+5									1322	899	1584	1161	1847	1424	2110	1687	2636	2213	3160	2737	1465	1042
	6+6											1489	1028	1752	1291	2015	1554	2541	2080	3065	2604	1598	1137
SP 300	3+2	1115	804	1476	1165																	997	686
	3+3	978	604	1339	965	1699	1325															1197	823
	4+3	840	405	1201	766	1561	1126	1721	1486													1396	961
	4+4					1424	927	1784	1287	2145	1648	2504	2007									1595	1098
	5+4							1647	1088	2008	1449	2367	1808	2728	2169	3089	2530					1794	1235
	5+5							1510	887	1871	1248	2230	1607	2591	1968	2952	2329	3672	3049	4393	3770	1995	1372
	6+5									1733	1049	2090	1408	2453	1769	2814	2130	3534	2850	4255	3571	2194	1510
	6+6											1955	1209	2316	1570	2677	1931	3397	2651	4118	3372	2393	1647
SP 400	3+2	2117	1136																			2707	1726
	3+3	1869	749	2639	1518	3406	2286															3094	1974
	4+3			2392	1131	3160	1899	3929	2668													3481	2220
	4+4			2145	744	2913	1512	3682	2281	4451	3050	5219	3818									3868	2467
	5+4							3435	1895	4204	2664	4972	3432	5741	4201	6510	4970					4254	2714
	5+5									3958	2276	4726	3044	5495	3813	6264	4582	7800	6118	9338	7656	4642	2960
	6+5											4479	2658	5248	3427	6017	4196	7553	5732	9091	7270	5028	3207
	6+6											4232	2271	5001	3040	5770	3809	7306	5345	8844	6883	5415	3454
											3986	1884	4755	2653	5524	3422	7060	4958	8598	4690	5802	3700	
													4508	2266	5277	3035	6813	4571	8351	6109	6189	3947	

### Main Dimension (mm)



Model	Outlet Dimension					Depth of Axle	limit switch installation		Valve Part ISO 5211					Air Connection	Weight (Kg)	
	A	B	C	D	E		F	G	H	J	K	L	M		N	DA
Sp42	115	55	75	24	33	12	50	30	φ F05 φ F50	φ F03 φ F36	M6	M5	9	G1/8"	0.6	0.7
SP50	155	69	89	29	41	12	80	30	φ F05 φ F50	φ F03 φ F36	M6	M5	11	G1/4"	1.1	1.3
SP63	168	85	105	36.5	46.5	14	80	30	φ F05 φ F50	φ F03 φ F36	M6	M5	11	G1/4"	1.6	1.8
SP75	219	102.5	122.5	43	52.5	18	80	30	φ F07 φ F70	φ F05 φ F50	M8	M6	14	G1/4"	2.7	3
SP90	249	115	135	49	56.5	18	80	30	φ F07 φ F70	φ F05 φ F50	M8	M6	17	G1/4"	4	4.5
SP100	274	127.5	147.5	55.5	66.5	20	80	30	φ F10 φ F102	φ F07 φ F70	M10	M8	17	G1/4"	5.5	6.3
SP115	315	140	170	61.5	71	26	130	30	φ F10 φ F102	φ F07 φ F70	M10	M8	22	G1/4"	7.5	8.5
SP125	355	156.5	186.5	69.5	80.5	32	130	30	φ F10 φ F102	φ F07 φ F70	M10	M8	22	G1/4"	10.5	12
SP145	417	176	206	78.5	91	36	130	30	φ F12 φ F125	φ F10 φ F102	M12	M10	27	G1/4"	15.1	17.5
SP160	452	196	226	88	97	36	130	30	φ F12 φ F125	φ F10 φ F102	M12	M10	27	G1/4"	19.5	22.6
SP190	540	231	261	105	110	40	130	30	φ F14 φ F140		M16		27	G1/4"	31.3	36
SP210	585	253.5	283.5	116	119.5	40	130	30	φ F14 φ F140		M16		36	G1/4"	39.7	45.8
SP240	685	291	331	130.5	130.5	50	130	30	φ F16 φ F165		M20		36	G3/8"	58.5	72
SP270	743	331.5	371.5	147	147	50	130	30	φ F16 φ F165		M20	M20	46	G3/8" G1/2"	84	99.5
SP300	857	354	394	162	173	60	130	30	φ F16 φ F165		M20	M20	46	G3/8" G1/2"	117.5	137
SP400	1035	466	506	260	260	60	130	30	φ F25 φ F254	φ F16 φ F165	M16		55	G3/8" G1/2"	205	245

DA: Double Acting

SR: Spring Return type based on 10 springs

## Operating Conditions

### 1. Operating media

Dry or lubricated air, the non-corrosive gases or oil.

### 2. Air supply pressure

Double acting: 2.5-8 Bar;

Spring return: 2.5-8 Bar

### 3. Operating temperature

Standard: -20°C+80°C

### 4. Travel adjustment

Have adjustment range of  $\pm 5^\circ$  for the rotation at  $90^\circ$

### 5. Lubrication

Under normal operating condition, need not accrete lubricant

### 6. Application

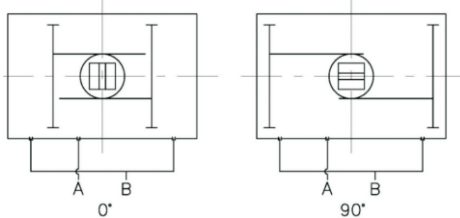
Either indoor or outdoor

### 7. Highest pressure

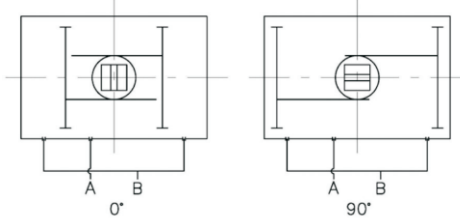
The maximum input pressure is 8 Bar

### Double acting

Standard rotation

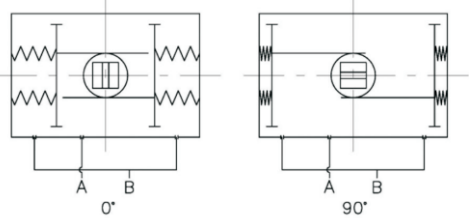


Reverse rotation

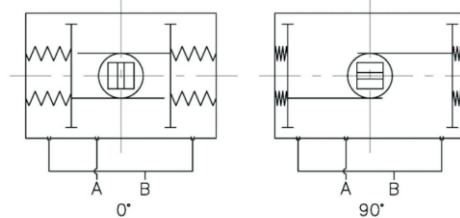


### Spring return

Standard rotation



Reverse rotation



## Air Consumption/ Operating Time

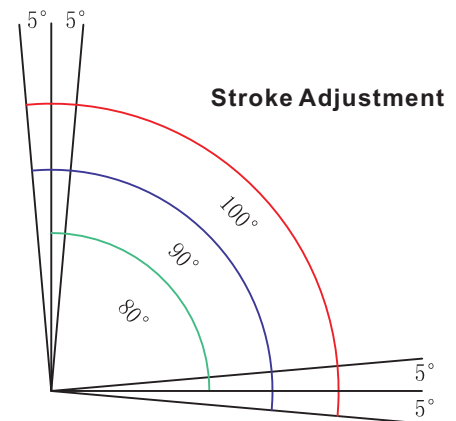
Model	Air consumption(L)		Cycle time(S)			
	Volume opening	Volume closing	Open		Close	
			DA	SR	DA	SR
Sp42	0.05	0.07	0.2	0.3	0.2	0.3
SP50	0.08	0.12	0.2	0.3	0.2	0.3
SP63	0.16	0.24	0.3	0.3	0.3	0.4
SP75	0.3	0.43	0.3	0.4	0.4	0.5
SP90	0.5	0.68	0.4	0.5	0.5	0.6
SP100	0.7	0.98	0.5	0.7	0.6	0.9
SP115	1.05	1.33	0.7	0.9	0.8	1.1
SP125	1.42	2	0.9	1.2	1.1	1.4
SP145	2.2	3.1	1.2	1.5	1.4	1.8
SP160	3.1	4.2	1.5	1.8	1.7	2.1
SP190	4.6	7	2	2.4	2.2	2.8
SP210	6.5	9.8	2.7	3.5	3.2	4
SP240	10.2	14.6	3.5	4.1	4	4.6
SP270	15.5	22.5	4	4.5	4.5	5
SP300	20.7	29	7.5	13.8	9.6	15.2
SP400	46	68.5	16.8	32.4	22.1	38.6

DA: Double Acting

SR: Spring Return type based on 10 springs

Air consumption depends on Air Supply, Air volume and Action cycle times, the calculating as follows

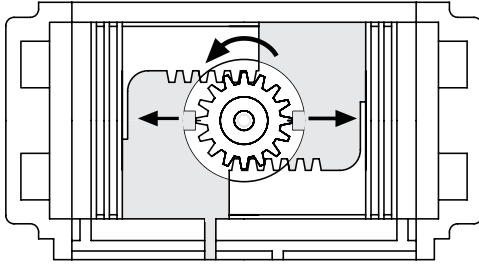
$I/\text{min} = \text{Air volume (Air volume Opening + Air volume closing)} / (\text{Air Supply (Kpa)} + 101.3) / 101.3 \times \text{Action cycle times (}/\text{min)}$





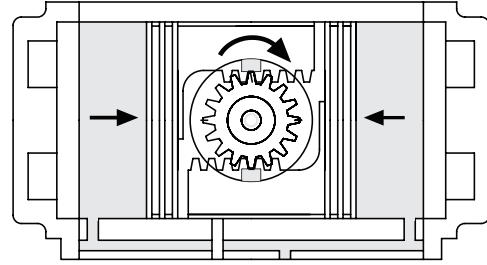
## Operation

### Double Acting



A ↑ ↓ B

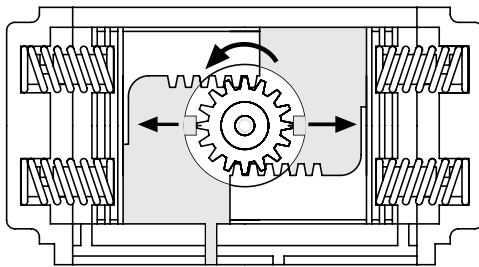
By supplying air to Port A, pressure is applied to the center chamber and forces the dual pistons outward. Linear piston force is transferred via gear racks to the pinion gear, causing the pinion to turn counterclockwise while the air is being exhausted from Port B.



A ↓ ↑ B

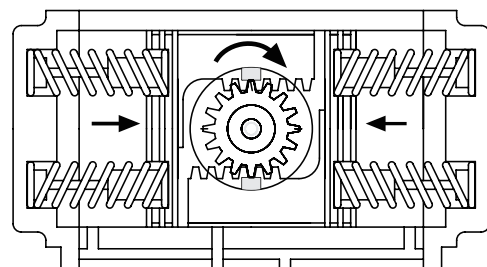
By supplying air to Port B, pressure is applied to the outside chamber and drives the dual pistons inward. The action causes the pinion to turn clockwise while the air is being exhausted from Port A.

### Spring Return



A ↑ ↓ B

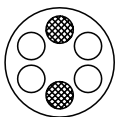
By supplying air to Port A, pressure is applied to the center chamber, forces the dual pistons outward and compresses the springs in the outside chambers and produce counterclockwise rotary. Exhaust air exits at Port B.



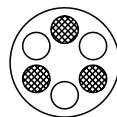
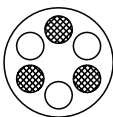
A ↓ ↑ B

Upon loss of air pressure, the stored energy in the compressed springs forces the pistons inwards producing rotary motion with exhaust air exiting at Port A. This "fail safe" position is held by spring force until air pressure reapplied to Port A.

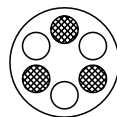
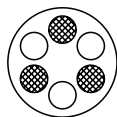
## Installation of Springs for Spring Return Actuator



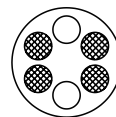
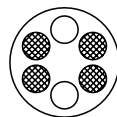
5 Springs



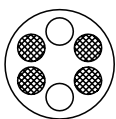
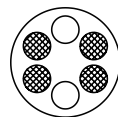
6 Springs



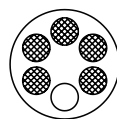
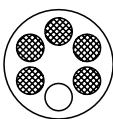
7 Springs



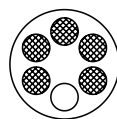
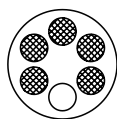
8 Springs



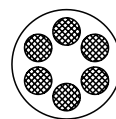
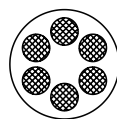
9 Springs



10 Springs



11 Springs



12 Springs

Even spring set is recommended for high cycle application.

## HOW TO ORDER

### Example

**FIG NO: SP100SR10**

<b>SP100</b>	<b>SR</b>	<b>10</b>
<b>MODEL NO</b>	<b>ACTING TYPE</b>	<b>SRING QTY</b>

**RACK & PINION PNEUMATIC ACTUATOR SP100 SPRING RETURN ACTING 10PCS SPRINGS**

<b>MODEL NO</b>	<b>ACTING TYPE</b>	<b>SRING QTY</b>
SP42	SR	5
SP50	DA	6
SP63		7
SP75		8
SP90		9
SP100		10
SP115		11
SP125		12
SP145		
SP160		
SP190		
SP210		
SP240		
SP270		
SP300		
SP400		



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Valves & Automation

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