



# PNEUMATIC RACK AND PINION ACTUATOR

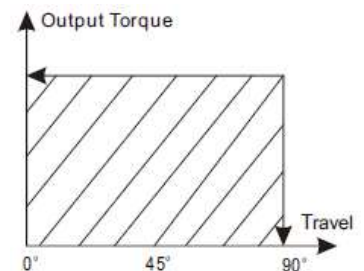
## Selection and Verification

When using pneumatic actuators, first confirm the torque of the valve and then consider the pipeline media and calculate a factor of safety that meets your criteria. Recommended safety factors: Increase the actuator torque value by 25% if the media is water vapor or non-lubricating. Increase torque value by 60% if the media is non-lubricated dry gas. Increase the torque value by 100% if the media is non-lubricating air with particles. Increase the torque by 20% if the media is clean, frictionless and lubricated. Then using your working air pressure, find the corresponding actuator in the double or single acting torque tables to find the appropriate actuator model.

Correctly matching the pneumatic actuator, valve and service conditions directly affects the safe operation and service life of the actuator.

## Double Acting Actuator Selection

Under normal operating conditions, double acting actuators should have a safety factor of 20% to 30% (consult the selection and verification section for other condition considerations). Find your air supply (PSI) in the chart below and select the model with the torque closest to your requirements without dropping below your service conditions' safety factor.



## Output Torque for PDC Series Double Acting Actuators (in-lbs)

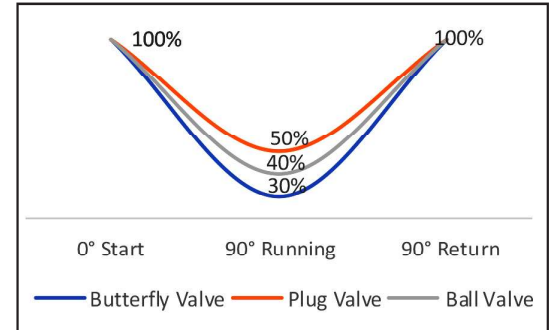
PDC Series MAGNUS FORCE (in-lbs)										
Model	Air Supply (PSI)									
	30	40	50	60	65	70	80	90	100	115
32D	27	35	44	53	62	71	71	80	97	106
40D	44	53	62	89	97	106	115	124	150	168
52D	71	89	106	142	159	177	195	212	248	283
63D	133	159	195	257	292	319	354	389	451	513
75D	177	221	266	354	398	443	487	531	620	708
83D	274	345	416	558	620	690	761	832	974	1106
92D	398	496	602	797	903	1000	1097	1195	1398	1602
105D	584	735	876	1168	1319	1460	1611	1752	2045	2337
125D	885	1106	1363	1770	2000	2222	2443	2664	3107	3549
140D	1513	1894	2328	3027	3408	3779	4160	4540	5293	6054
160D	2354	2938	3549	4709	5293	5886	6470	7063	8240	9417
190D	3770	4709	5718	7532	8479	9417	10355	11302	13188	15064
210D	4709	5886	6983	9417	10594	11771	12949	14126	16480	18834
240D	6806	8514	10267	13621	15321	17029	18728	20428	23835	27243
270D	10355	12940	15586	20702	23295	25880	28464	31057	36235	41413
300D	13506	16887	20259	27012	30393	33766	37147	40519	47272	54025
350D	20224	25278	30332	40448	45502	50555	55609	60663	70779	80887
400D	28818	36014	43218	57627	64841	72036	79250	86454	100845	115272



## Single Acting Actuator Selection

Under normal operating conditions, single acting actuators should have a safety factor of 30% to 50% (consult the selection and verification section for other condition considerations). Find your air supply (PSI) in the chart below and select the model and spring quantity with the torque closest to your requirements without dropping below your service conditions safety factor.

Different styles of valves have different torque distributions while opening, running and closing. Confirm that both the air and spring output torques are enough for your requirements.



## Output Torque for PDC Series Spring Return Actuators (in-lbs)

Air Supply Pressure	Model	Spring Qty.	40 PSI		50 PSI		60 PSI		65 PSI		80 PSI		90 PSI		115 PSI		Spring Output Torque	
			0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
52S	5	50	34	67	50												55	38
	6	43	22	61	40	96	75										65	44
	7	35	12	53	29	87	65	124									76	52
	8			46	18	81	53	117	125	152	125						88	59
	9			38	7	73	42	109	113	144	113	180	149				98	67
	10					65	32	102	103	137	103	173	138				110	75
	11					58	20	94	92	129	92	165	127	200	162		120	82
	12							86	81	122	81	158	108	193	151		131	90
63S	5	101	68	133	101	197	132										92	60
	6	89	50	120	82	185	147	250									111	73
	7	76	32	111	64	173	128	237									129	85
	8			96	45	161	110	226	239	290	239	355	304				148	96
	9					149	92	213	220	278	220	343	285				166	109
	10					124	73	202	202	266	202	330	266	396	331		185	121
	11							190	183	254	183	319	248	383	312		203	133
	12							177	165	242	165	306	229	371	295		221	145
75S	5	128	94	172	137	261	227										128	93
	6	110	67	153	112	243	201	332									154	112
	7	92	42	135	86	224	176	313									180	131
	8			116	60	204	150	295	327	382	327	472	416				205	150
	9					186	125	276	302	364	302	453	391				231	168
	10					168	98	255	276	345	276	435	365	523	453		257	187
	11							239	250	239	250	416	340	504	428		282	205
	12							220	225	220	225	397	313	486	402		307	224
83S	5	206	142	275	212	414	351										204	140
	6	178	102	248	171	387	311	526									244	168
	7	150	61	219	131	358	270	497									285	196
	8			192	89	331	228	470	506	609	506	748	645				326	224
	9					303	189	442	466	581	466	719	605				366	252
	10					274	147	413	425	552	425	691	564	830	702		407	280
	11							386	384	525	384	664	523	802	662		448	308
	12							358	344	497	344	635	482	774	621		489	336



### Output Torque for PDC Series Spring Return Actuators (in-lbs)

Air Supply Pressure	Model	Spring Qty.	40 PSI		50 PSI		60 PSI		65 PSI		80 PSI		90 PSI		115 PSI		Spring Output Torque	
			0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
92S	5	277	195	391	212	591	495										304	206
	6	251	135	350	171	551	434	751									365	248
	7	211	73	309	131	509	373	710									426	289
	8			277	112	468	312	668	712	868	712	1068	912				487	330
	9					427	251	628	651	828	651	1027	851				548	372
	10					386	190	586	590	786	590	985	789	1186	990		608	413
	11							544	530	744	530	943	729	1144	929		669	455
	12							503	469	703	469	902	668	1102	868		730	496
105S	5	451	296	597	442	890	735										435	280
	6	396	208	541	354	834	648	1127									523	336
	7	340	121	486	268	778	561	1071									610	392
	8			429	181	722	474	1015	1059	1307	1059	1600	1352				697	448
	9					666	387	959	972	1252	972	1544	1265				784	504
	10					610	296	903	882	1196	882	1489	1174	1781	1467		871	560
	11							847	797	1139	797	1432	1090	1724	1382		959	616
	12							791	713	1084	713	1376	1005	1669	1298		1045	672
125S	5	646	416	867	637	1310	1080										699	460
	6	558	274	779	496	1221	947	1664									832	558
	7	460	133	682	354	1124	797	1575									974	646
	8			593	221	1036	664	1478	1558	1921	1558	2372	2000				1106	743
	9					947	522	1390	1407	1832	1407	2275	1859				1248	832
	10					850	389	1292	1275	1735	1275	2186	1717	2629	2168		1390	929
	11							1204	1133	1646	1133	2089	1575	2531	2018		1531	1018
	12							1106	1000	1558	1000	2000	1443	2443	1885		1664	1106
140S	5	1133	752	1513	1124	2266	1885										1142	761
	6	982	522	1363	903	2115	1655	2876									1372	912
	7	832	292	1213	673	1965	1434	2726									1602	1062
	8			1062	443	1814	1204	2576	2717	3328	2717	4089	3469				1823	1213
	9					1655	974	2416	2487	3169	2487	3930	3248				2053	1372
	10					1505	743	2266	2257	3018	2257	3779	3009	4532	3770		2283	1522
	11							2106	2027	2868	2027	3620	2779	4381	3540		2514	1673
	12							1956	1797	2717	1797	3469	2558	4231	3310		2744	1823
160S	5	1708	1097	2292	1690	3469	2868	0									1841	1239
	6	1460	735	2053	1319	3231	2496	4408									2213	1487
	7	1213	363	1797	947	2974	2124	4151									2584	1735
	8			1558	584	2735	1761	3912	4116	5089	4116	6266	5293				2947	1974
	9					2478	1390	3655	3744	4833	3744	6010	4921				3319	2222
	10					2239	1018	3416	3372	4594	3372	5771	4549	6948	5726		3691	2469
	11							3169	3009	4346	3009	5523	4186	6700	5364		4054	2717
	12							2921	2638	4098	2638	5275	3815	6452	4992		4425	2965



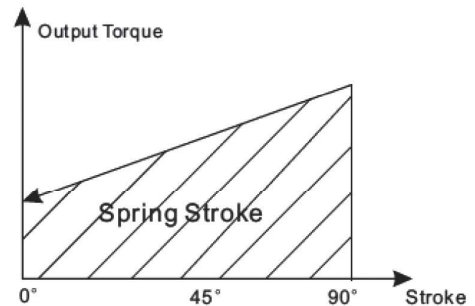
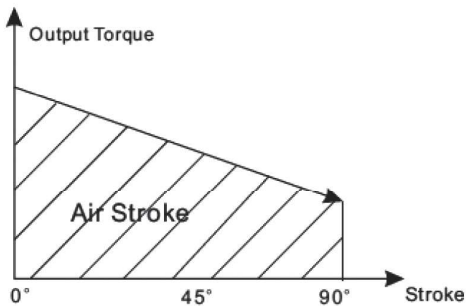
## Output Torque for PDC Series Spring Return Actuators (in-lbs)

Air Supply Pressure	Model	Spring Qty.	40 PSI		50 PSI		60 PSI		65 PSI		80 PSI		90 PSI		115 PSI		Spring Output Torque	
			0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
190S	5	2938	1965	3877	2912	5762	4797										2735	1770
	6	2584	1425	3523	2363	5408	4248	7293									3284	2124
	7	2230	876	3169	1814	5054	3700	6939									3832	2478
	8			2815	1266	4700	3151	6585	6921	8470	6921	10347	8806				4381	2832
	9					4346	2611	6231	6373	8116	6373	10001	8258				4930	3186
	10					3992	2062	5877	5824	7762	5824	9647	7709	11524	9594		5470	3540
	11							5523	5284	7408	5284	9293	7160	11178	9045		6019	3894
	12							5169	4735	7054	4735	8939	6620	10824	8497		6567	4248
210S	5	3452	2522	4629	3700	6983	6054										3363	2434
	6	2965	1850	4142	3027	6496	5381	8851									4036	2921
	7	2478	1177	3655	2354	6010	5594	8364									4709	3408
	8			3169	1682	5523	4036	7877	8745	10231	8745	12586	11099				5381	3894
	9					5036	3363	7390	8072	9745	8072	12099	10426				6054	4381
	10					4549	2691	6904	7399	9417	7399	11612	9754	13966	12108		6727	4868
	11							6417	6727	8771	6727	11125	9081	13480	11435		7399	5355
	12							5930	6054	8284	6054	10639	8408	12993	10763		8072	5841
240S	5	4886	3620	6585	5310	9992	8718										4903	3629
	6	4160	2629	5505	4328	9267	7736	12674									5886	4355
	7	3434	1655	5133	3354	8532	6762	11940									6859	5089
	8			4408	2372	7815	5780	11214	12586	14621	12586	18029	15993				7842	5806
	9					7081	4797	10488	11603	13887	11603	17294	15011				8833	6541
	10					6355	3815	9762	10630	13170	10630	16569	14037	19976	17436		9807	7266
	11							9037	9647	12444	9647	15852	13046	19259	16454		10789	7992
	12							8311	8665	11710	8665	15117	12064	18525	15471		11771	8718
270S	5	7992	5974	10577	8568	15745	13736										6966	4956
	6	6992	4594	9585	7178	14754	12356	19932									8346	5948
	7	6010	3195	8603	5788	13772	10957	18949									9745	6930
	8			7612	4399	12780	9568	17958	19932	23136	19932	28314	25101				11134	7921
	9					11789	8169	16967	18533	22145	18533	27322	23702				12533	8913
	10					10798	6789	15976	17144	21153	17144	26322	22313	31509	27499		13913	9904
	11							14984	15745	20162	15745	25331	20923	30517	26101		15312	10895
	12							14002	14365	19180	14365	24348	19534	29526	24711		16701	11878
300S	5	9709	6452														9391	6461
	6	8275	4372	11648	7744												11267	7753
	7	6833	2283	10205	5656	16958	12409										13143	9045
	8			8771	3567	15524	10267	22277									15020	10338
	9					14090	8231	20844	21737	27597	21737						16896	11630
	10					12657	6151	19410	19658	26163	19658	32916	26411	39669	33164		18781	12922
	11							17967	17569	24720	17569	31473	24322	38226	31075		20658	14214
	12							16533	15480	23286	15480	30039	22233	36793	28986		22534	15507

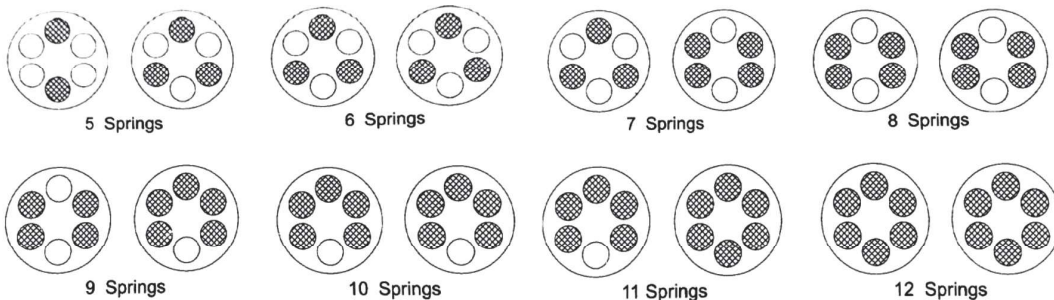


## Output Torque for PDC Series Spring Return Actuators (in-lbs)

Air Supply Pressure	Model	Spring Qty.	40 PSI		50 PSI		60 PSI		65 PSI		80 PSI		90 PSI		115 PSI		Spring Output Torque		
			0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	
350S	5	5	13745	8532													15064	10382	
	6	6	11435	5187	16489	10240											18082	12462	
	7	7	9125	1841	14179	6895	24295	17011									21091	14533	
	8	8			11869	3549	21985	13666	32093									24109	16613
	9	9					19684	10311	29526	30526	39899	30526						27119	18693
	10	10					17374	6966	27482	27181	37589	27181	47706	37297	57813	47405	30137	20764	
	11	11							25172	23835	35279	23835	45395	33951	55503	44059	33146	22844	
	12	12							22870	20481	32978	20481	43094	30597	53202	40705	36253	24924	
400S	7	7	17949	7691													25490	16259	
	8	8	15365	3638	22569	10842											29137	18587	
	9	9			19994	6797	34403	21206										32774	20905
	10	10			17409	2753	31818	17162	46227									36421	23224
	11	11					29234	13117	43643	41935	58052	41935						40058	25552
	12	12					26658	9072	41067	37890	55477	37890	69877	52290	84286	66699	43705	27871	
	13	13							38483	33836	52892	33836	67292	48237	81701	62646	47343	31571	
	14	14							35907	29792	50317	29792	64717	44192	79126	58601	50989	27526	
	15	15							33323	25747	47732	25747	62132	40147	76524	54556	54627	23481	
16	16								21702	45148	21702	59548	36102	73957	50511	58273	37164		



### Spring Locations for Spring Return Actuators





Namur Air Connections for easy mounting of Solenoids and other accessories



Standard Namur pattern for mounting of positioner, limit switches or accessories. Position Indicator can be rotated to F.O. or F.C. and used with accessories.



Bottom mounting conforms to ISO5211 and DIN3337. Models PDC32 and PDC190 to PDC300 have 1 bolt pattern, all others have 2.

Weight (lbs.)									
Model	PDC 32	PDC 40	PDC 52	PDC 63	PDC 75	PDC 83	PDC 92	PDC 105	PDC 125
Double Acting	1.5	2.2	3.1	4.4	6.0	6.8	10.1	15.0	19.6
Single Return	-	2.4	3.31	4.6	6.4	7.9	11.5	15.2	22.3
Model	PDC 140	PDC 160	PDC 190	PDC 210	PDC 240	PDC 270	PDC 300	PDC 350	PDC 400
Double Acting	28.7	44.1	68.3	103.6	147.7	213.8	242.5	410.1	637.1
Single Return	33.1	53.0	77.1	121.3	176.4	260.1	286.6	515.9	793.7

Air Consumption Opening & Closing (in <sup>3</sup> )									
Model	PDC 32	PDC 40	PDC 52	PDC 63	PDC 75	PDC 83	PDC 92	PDC 105	PDC 125
Air Volume Opening	2.4	4.9	7.3	12.8	18.3	26.2	39.1	58.0	97.6
Air Volume Closing	3.1	6.7	9.8	14.0	20.7	28.7	44.5	53.7	85.4
Model	PDC 140	PDC 160	PDC 190	PDC 210	PDC 240	PDC 270	PDC 300	PDC 350	PDC 400
Air Volume Opening	152.6	225.8	360.0	457.7	671.3	1037.4	1452.4	2141.9	3209.8
Air Volume Closing	134.3	207.5	329.5	457.7	549.2	854.3	1812.4	2825.4	3417.3

Product Number: PDC ①②③④⑤-⑥					
① Model Number	② Operation Type	③ Quantity of Springs (Spring Return Only)	④ Stroke Angle	⑤ Ambient Temp.	⑥ Fail Position
52,63,75,83, etc.	D: Double Acting S: Spring Return	K5 - K16 Default 10 springs (PDC 400 has 12 springs)	NONE: 90° T: Special angle	None: -4°F to 176°F HT: 5°F to 248°F LT: -31°F to 176°F	FC: Fail Close FO: Fail Open None: ("in place" for Double Acting)