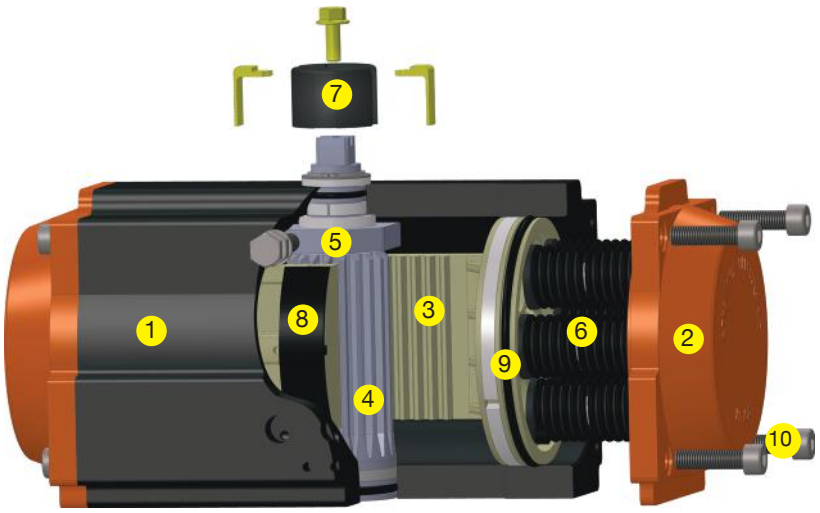
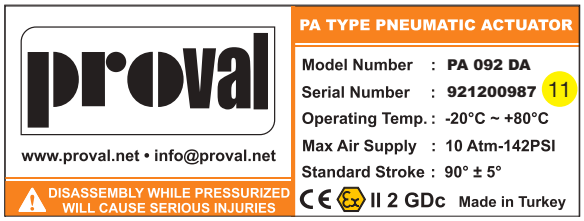
A210 Series Pneumatic Actuators

Technical Features of PROVAL Pneumatic Actuators

PROVAL A210 Series actuators are designed to meet the demanding needs of todays process flow control requirements. Proval actuators are strictly inspected during production and each actuator is 100% tested before delivery.



Actuator Labels



1. Actuator Body

Extruded Alu Alloy ASTM6005 body is hard anodised to protect the internal and external components against corrosion, which reduces the friction on moving pistons and extends the life cycle of the actuators. Alternative coatings are available such as ENP (Electroless Nickle Plating), Powder Polyester, PFA, ECTFE for more aggressive environments.

2. End Caps

Diecasted aluminum end caps are primerely Alodine Chromatized coated which provides longer life cycles against corrosion and reduces wearing resistance. Secondary standard coating is powder polyester coating and also ENP, PFA, ECTFE etc coatings are offered alternatively for agressive environments.

3. Pistons

Diecasted aluminum twin rack pistons are equipped with slide guides and seals in good quaility. Alodine Chromatized coated pistons ensure longer life cycles against corrosion and wearing resistance.Pistons that are identical on both sides allowreverse rotation simply by inverting the pistons.

4. Pinion (Drive Shaft)

Alloy steel pinion is electroless nickel plated in order to reduce the friction, provide maximum wear resistance and protection against corrosion under severe conditions as it fully conforms to the latest standards of ISO5211, DIN3337, NAMUR. Double square, paralel or diagonal square or key way type shaft can be supplied in accordance with customer demands.

5. Travel Adjustment

Bi-directional external travel stop adjustment bolts can adjust the position ± 5° between 85° to 95° at both opening and closing directions for accurate valve allignment. 0-90° full scale limit position adjustment can also be offered optionally.

6. Preloaded Springs

Cardridge design in high grade coated steel springs provide great safety and corrosion resistance in fail safe and emergency shut down operations.

7. Indicator

All actuators are equipped with regular position indicator showing the current state of the actuators and valves.

8. Bearings & Guides

Low friction piston guides provide high trust and stability during operation of actuators.

9. Seals

NBR rubber O-rings provide trouble-free operation at standard temperature ranges between -20 °C to +80 °C temperature ranges. For high and low temperature applications Viton (-20 °C ~ +150 °C) and Silicone (-35 °C ~ +80 °C) seals are available optionally.

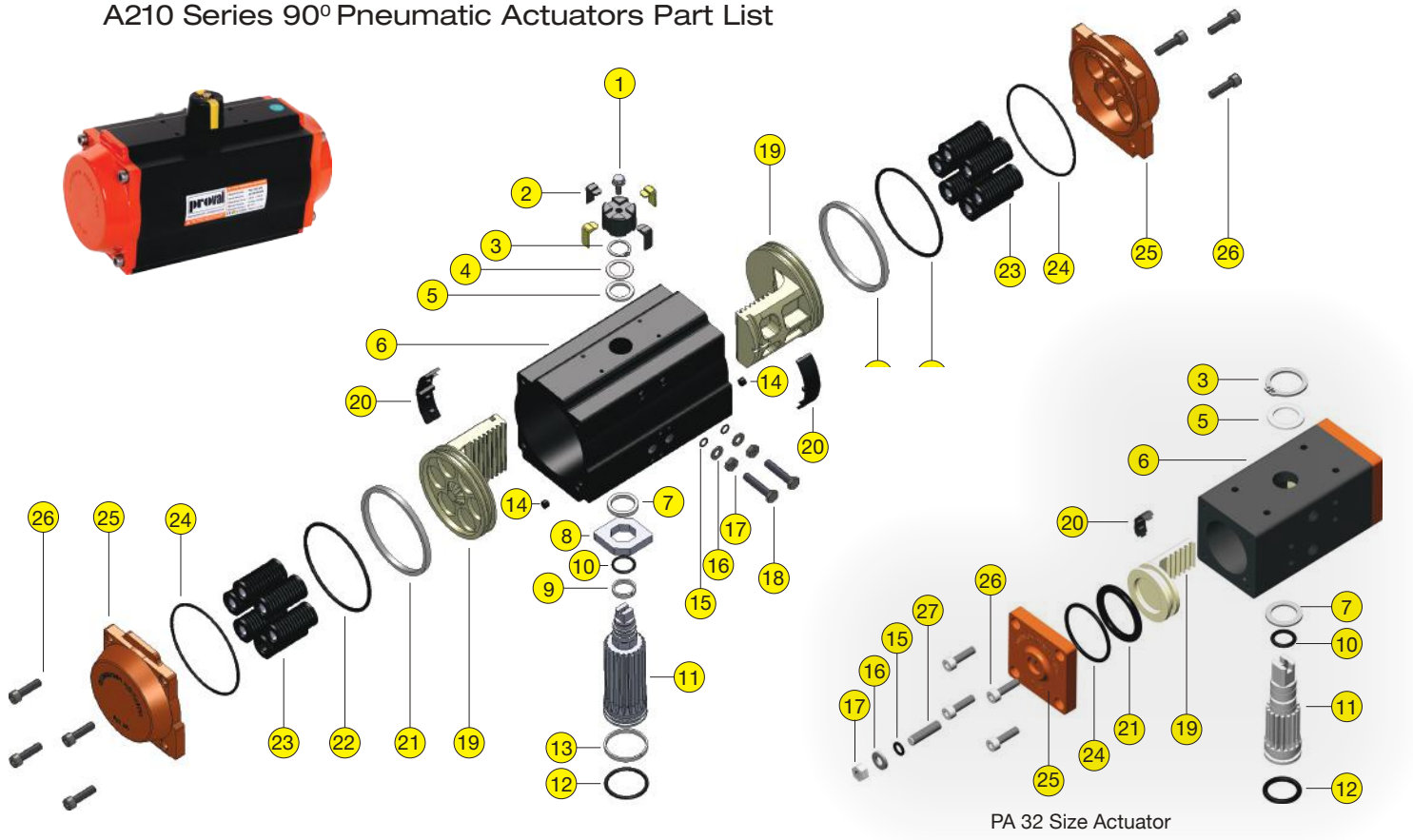
10. Fasteners

Stainless steel fasteners for long life corrosion resistant application.

11. Traceability

Each individual actuator is assigned an unique identification number allowing full traceability.

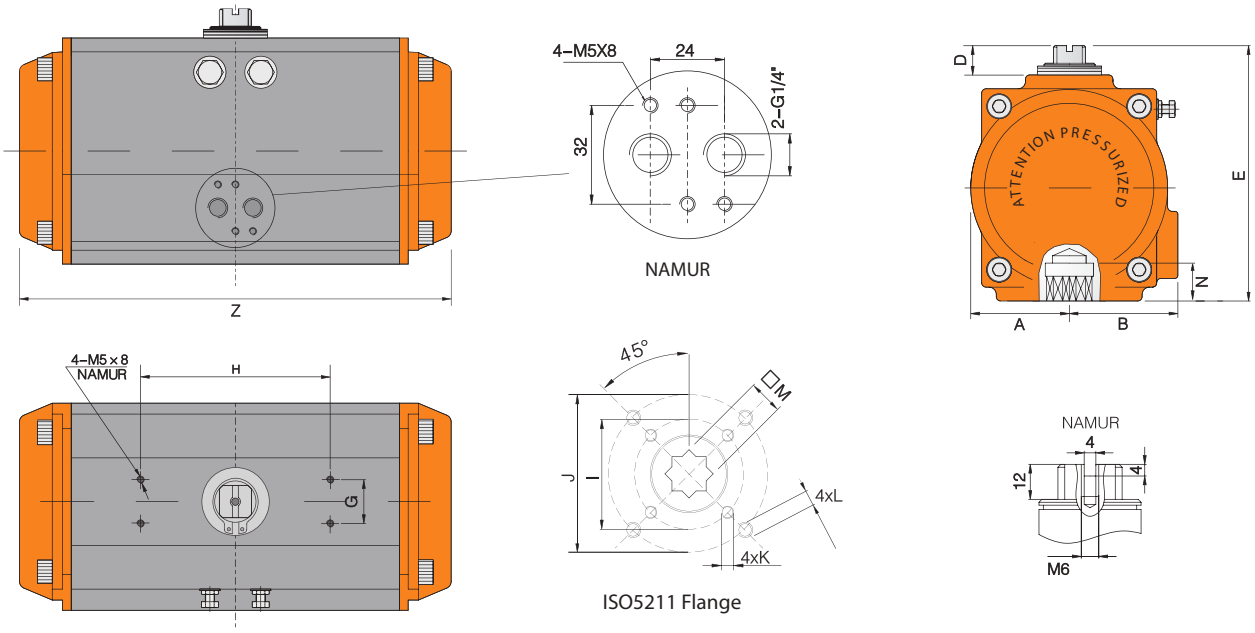
A210 Series 90º Pneumatic Actuators Part List



PA 32 Size Actuator

No.	Description	Qty	Standard Material	Protection	Optional Material
1	Indicator Screw	1	Carbon Steel	Galvanizing	Stainless Steel
2	Indicator	1	Plastic		
3	Circlip	1	Stainless Steel		
4	Metal Washer	1	Stainless Steel		
5	Washer	1	Engineering Plastics		
6	Body	1	Extruded Aluminum Alloy	Hard Anodizing	Polyester, ENP, PFA, ECTFE Coatings
7	Inner Washer	1	Engineering Plastics		
8	Cam	1	Alloy Steel	Galvanizing	
9	Pinion Upper Bearing	1	Engineering Plastics		Viton/Silicon
10	Pinion Upper O-Ring	1	NBR		
11	Pinion	1	Alloy steel	Nickel plated	Stainless Steel
12	Pinion Lower O-Ring	1	NBR		
13	Pinion Lower Bearing	1	Engineering Plastics		
14	Sealant	2	NBR		Viton/Silicon
15	Adjustment Screw O-Ring	2	NBR		Viton/Silicon
16	Washer (Adjustment Screw)	2	Stainless Steel		
17	Nut (Adjustment Screw)	2	Stainless Steel		
18	Limit Adjustment Screw	2	Stainless Steel		
19	Piston	2	Aluminium Die Cast	Chromatized	Stainless Steel
20	Slide Piston	2	Engineering Plastics		
21	Slide Guide	2	Engineering Plastics		
22	Piston O-Ring	2	NBR		Viton/Silicon
23	Cartridge Springs	0~12	Spring Steel	Cataphoresis Coating	
24	End Cap O-Ring	2	NBR		Viton/Silicon
25	End Cap	2	Cast Aluminium	Chromatized & Polyester	ENP, PFA, ECTFE Coatings
26	Cap Screw	8	Stainless Steel		
27	Travel Stop	2	Stainless Steel		

A210 Series 90º Pneumatic Actuators Dimensions and Weight Information



Dimensions (mm)

Model	A	B	D	E	G	H	ISO5211 Flange	I	J	K	L	M	N	Z	Air Supply
PA 32	23	23	20	65	25	50	F03	Ø36	-	M5x8	-	9	14	105	G1/8”
PA 40	29	36	20	80	30	80	F03+F05	Ø36	Ø50	M5x8	M6x10	9-11	18	121	G1/4”
PA 52	30	40	20	92	30	80	F03+F05	Ø36	Ø50	M5x8	M6x10	9-11	18	148	G1/4”
PA 63	36	47	20	107	30	80	F03*+F05+F07	Ø50	Ø70	M6x10	M8x13	9-11-14	18	168	G1/4”
PA 75	42	52	20	120	30	80	F05+F07	Ø50	Ø70	M6x10	M8x13	11-14	18	186	G1/4”
PA 83	47	57	20	128	30	80	F05+F07	Ø50	Ø70	M6x10	M8x13	14-17	21	206	G1/4”
PA 92	50	59	20	137	30	80	F05+F07	Ø50	Ø70	M6x10	M8x13	14-17	21	254	G1/4”
PA 105	58	63	20	153	30	80	F07+F10	Ø70	Ø102	M8x13	M10x16	17-22	25	268	G1/4”
PA 125	68	75	20	174	30	80	F07+F10	Ø70	Ø102	M8x13	M10x16	22	26	302	G1/4”
PA 140	75	77	20	192	30	80	F10+F12	Ø102	Ø125	M10x16	M12x20	27	31	390	G1/4”
PA 160	87	87	20	217	30	80	F10+F12	Ø102	Ø125	M10x16	M12x20	27	31	452	G1/4”
PA 190	103	103	30	260	30	130	F14		Ø140		M16x25	36	40	525	G1/4”
PA 210	113	113	30	285	30	130	F14		Ø140		M16x25	36	40	532	G1/4”
PA 240	130	130	30	318	30	130	F16		Ø165		M20x25	46	50	610	G1/4”
PA 270	147	147	30	356	30	130	F16		Ø165		M20x25	46	50	722	G1/4”-G1/2*”

** On request.*

Actuator Weights (Kg/Pc)

Model	PA 32	PA 40	PA 52	PA 63	PA 75	PA 83	PA 92	PA 105	PA 125	PA 140	PA 160	PA 190	PA 210	PA 240	PA 270
Spring Return	-	-	1,5	2,2	2,9	3,6	5,5	6,7	10,4	14,4	23,3	46,1	53,1	73,3	115,9
Double Acting	0,49	0,7	1,4	2,1	2,7	3,3	5,0	5,9	9,0	12,0	19,0	39,1	44,1	59,0	93,6

Air Consumption of Actuators (Lt/Stroke)

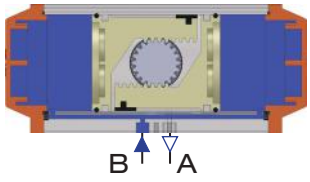
Model	PA 32	PA 40	PA 52	PA 63	PA 75	PA 83	PA 92	PA 105	PA 125	PA 140	PA 160	PA 190	PA 210	PA 240	PA 270
Opening	0,03	0,06	0,12	0,21	0,30	0,43	0,64	0,88	1,4	2,2	3,2	5,4	6,8	9	14
Closing	0,04	0,08	0,16	0,23	0,34	0,47	0,73	0,95	1,6	2,5	3,7	5,9	7,5	11	17

A210 Series 90º Double Acting Pneumatic Actuators Working Principles

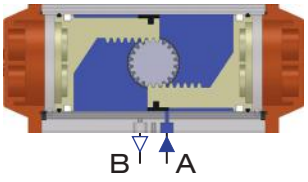
Double acting actuators are rotated by supplying air to related port until it reaches desired position.

Counterclockwise Rotation (CCWR)

Air to port **B** forces the pistons inwards, causing the pinion to rotate clockwise while the air is exhausted from port **A**.

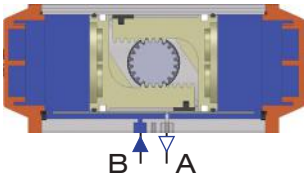


Air to port **A** forces the pistons outwards, causing the pinion to rotate counterclockwise while the air is exhausted from port **B**.

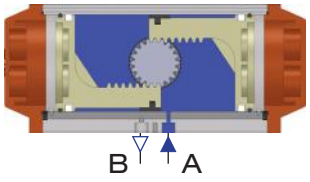


Clockwise Rotation (CWR)

Air to port **B** forces the pistons inwards, causing the pinion to rotate counterclockwise while the air is exhausted from port **A**.



Air to port **A** forces the pistons outwards, causing the pinion to rotate clockwise while the air is exhausted from port **B**.



Double Acting Actuators Torque Values (Nm)

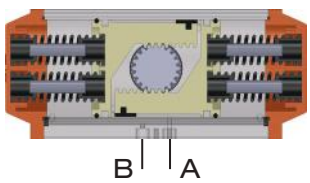
Model	Air Supply Pressure (bar)									
	2	2,5	3	4	4,5	5	5,5	6	7	8
PA 32DA	1	2	3	4	5	6	7	9	11	13
PA 40DA	6	8	10	13	14	16	18	20	22	26
PA 52DA	8	10	12	16	18	20	22	28	30	34
PA 63DA	15	19	22	30	33	37	40	44	52	58
PA 75DA	20	26	30	40	45	50	55	60	70	80
PA 83DA	33	40	48	63	71	79	86	94	110	125
PA 92DA	45	57	68	90	102	113	124	136	158	182
PA 105DA	66	83	100	132	149	166	182	200	232	265
PA 125DA	101	126	151	202	226	252	276	301	352	402
PA 140DA	171	214	257	342	385	428	471	513	599	684
PA 160DA	266	333	399	532	600	665	732	798	932	1064
PA 190DA	426	532	639	852	958	1064	1170	1277	1490	1702
PA 210DA	532	665	798	1064	1198	1330	1463	1596	1862	2128
PA 240DA	770	962	1155	1540	1732	1924	2117	2309	2693	3078
PA 270DA	1169	1462	1755	2340	2632	2925	3217	3510	4095	4680

A210 Series 90º Spring Return Pneumatic Actuators Working Principles

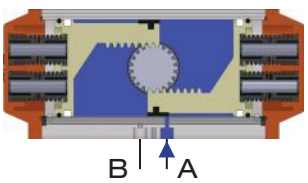
Single acting actuators are rotating one side by air while the springs are loaded and return action is done by means of spring force

Counterclockwise Rotation (CCWR)

Loss of air at port **B**, causing the energy stored springs to force the pistons inwards and rotating the pinion clockwise.

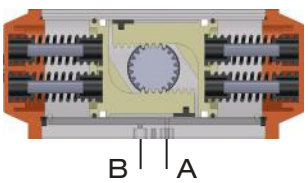


Air to port **A** forces the pistons outwards, causing the pinion to rotate counterclockwise while the springs are compressed.

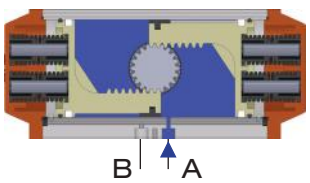


Clockwise Rotation (CWR)

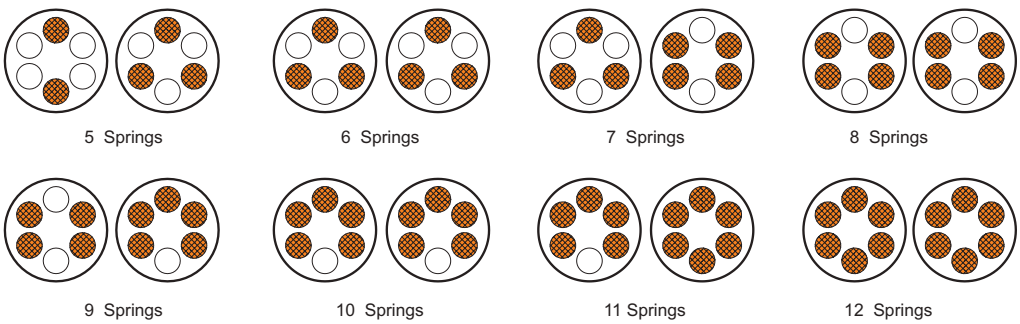
Loss of air at port **B**, causing the energy stored springs to force the pistons inwards and rotating the pinion counterclockwise.



Air to port **A** forces the pistons outwards, causing the pinion to rotate clockwise while the springs are compressed.



Positioning of Springs for Spring Return Actuators



Preloaded Cardridge Springs

A210 Series 90° Single Acting Actuators Torque Output Vales (Nm)

OUTPUT TORQUES OF SPRING RETURN ACTUATORS (Nm)																	
Air to Springs Torque Output Vales (Nm)																Spring Torque (Nm)	
Air Suplly	Nr of Springs	2,5 Bar		3 Bar		4 Bar		5 Bar		6 Bar		7 Bar		8 Bar			
Model		0° Start	90° Stop	0° Start	90° Stop	0° Start	90° Stop	0° Start	90° Stop	0° Start	90° Stop	0° Start	90° Stop	0° Start	90° Stop	90° Start	0° Stop
PA 52SR	5	6	4	8	6											6	4
	6	5	3	7	5	11	9									7	5
	7	4	1	6	3	10	7	14	10							9	6
	8			5	2	9	6	13	9	17	14					10	7
	9			4	1	8	5	12	8	16	13	20	17			11	8
	10					7	4	12	7	16	12	20	16			12	9
	11					7	2	11	5	15	10	19	14	23	18	14	9
	12							10	4	14	9	18	12	22	17	15	10
PA 63SR	5	11	8	15	11	22	15									10	7
	6	10	6	14	9	21	17	28	24							13	8
	7	9	4	13	7	20	15	27	22							15	10
	8			11	5	18	12	26	20	33	27	40	34			17	11
	9					17	10	24	18	31	25	39	32			19	12
	10					14	8	23	16	30	23	37	30	45	37	21	14
	11							22	14	29	21	36	28	43	35	23	15
	12							20	11	27	19	35	26	42	33	25	16
PA 75SR	5	15	11	19	16	30	26									15	11
	6	12	8	17	13	27	23	38	33							17	13
	7	10	5	15	10	25	20	35	30							20	15
	8			13	7	23	17	33	27	43	37	53	47			23	17
	9					21	14	31	24	41	34	51	44			26	19
	10					19	11	29	21	39	31	49	41	59	51	29	21
	11							27	18	37	28	47	38	57	48	32	23
	12							25	15	35	25	45	35	55	45	35	25
PA 83SR	5	23	16	31	24	47	40									23	16
	6	20	12	28	19	44	35	59	51							28	19
	7	17	7	25	15	41	31	56	46							32	22
	8			22	10	37	26	53	42	69	57	85	73			37	25
	9					34	21	50	37	66	53	81	68			41	29
	10					31	17	47	32	62	48	78	64	94	79	46	32
	11							44	28	59	43	75	59	91	75	51	35
	12							40	23	56	39	72	55	87	70	55	38
PA 92SR	5	33	22	44	33	67	56									34	23
	6	28	15	40	26	62	49	85	72							41	28
	7	24	8	35	19	58	42	80	65							48	33
	8			31	13	53	35	76	58	98	81	121	103			55	37
	9					48	28	71	51	94	74	116	96			62	42
	10					44	22	66	44	89	67	111	89	134	112	69	47
	11							62	37	54	60	107	82	129	105	76	51
	12							57	30	79	53	102	76	125	98	83	56
PA 105SR	5	51	33	68	50	101	83									49	32
	6	45	24	61	40	94	73	127	106							59	38
	7	38	14	55	30	88	63	121	96							69	44
	8			49	20	82	54	115	87	148	120	181	153			79	51
	9					75	44	108	77	142	110	175	143			89	57
	10					69	33	102	67	135	100	168	133	201	166	98	63
	11							96	57	129	90	162	123	195	156	108	70
	12							89	48	123	81	156	114	189	147	118	76

A210 Series 90⁰ Single Acting Actuators Torque Output Vales (Nm)

OUTPUT TORQUES OF SPRING RETURN ACTUATORS (Nm)																	
Air to Springs Torque Output Vales (Nm)																Spring Torque (Nm)	
Air Suplly	Nr of Springs	2,5 Bar		3 Bar		4 Bar		5 Bar		6 Bar		7 Bar		8 Bar			
Model		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
		Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop
PA 125SR	5	73	47	98	72	148	122									79	52
	6	63	31	88	56	138	107	188	157							94	63
	7	52	15	77	40	127	90	178	141							110	73
	8			67	25	117	75	167	125	217	176	268	226			125	84
	9					107	59	157	109	207	159	257	210			141	94
	10					96	44	146	94	196	144	247	194	297	245	157	105
	11							136	78	186	128	236	178	286	228	173	115
	12							125	63	176	113	226	163	276	213	188	125
PA 140SR	5	128	85	171	127	256	213									129	86
	6	111	59	154	102	239	187	325	273							155	103
	7	94	33	137	76	222	162	308	247							181	120
	8			120	50	205	136	291	221	376	307	462	392			206	137
	9					187	110	273	196	358	281	444	367			232	155
	10					170	84	256	169	341	255	427	340	512	426	258	172
	11							238	143	324	229	409	314	495	400	284	189
	12							221	118	307	203	392	289	478	374	310	206
PA 160SR	5	193	124	259	191	392	324									208	140
	6	165	83	232	149	365	282	498	415							250	168
	7	137	41	203	107	336	240	469	373							292	196
	8			176	66	309	199	442	290	575	465	708	598			333	223
	9					280	157	413	237	456	423	679	556			375	251
	10					253	115	386	248	519	381	652	514	786	647	417	279
	11							358	207	491	340	624	473	757	606	458	307
	12							330	165	463	298	596	431	729	564	500	335
PA 190SR	5	332	222	438	329	651	542									309	200
	6	292	161	398	267	611	480	824	693							371	240
	7	252	99	358	205	571	418	784	631							433	280
	8			318	143	531	356	744	569	957	782	1169	995			495	320
	9					491	295	704	507	917	720	1130	933			557	360
	10					451	233	664	446	877	658	1090	871	1302	1084	618	400
	11							624	384	837	597	1050	809	1263	1022	680	440
	12							584	322	797	535	1010	748	1223	960	742	480
PA 210SR	5	390	285	523	418	789	684									380	275
	6	335	209	468	342	734	608	1000	874							456	330
	7	280	133	413	266	679	532	945	798							532	385
	8			358	190	624	456	890	722	1156	988	1422	1254			608	440
	9					569	380	835	646	1101	912	1367	1178			684	495
	10					514	304	780	570	1046	836	1312	1102	1578	1368	760	550
	11							725	494	991	760	1257	1026	1523	1292	836	605
	12							670	418	936	684	1202	950	1468	1216	912	660
PA 240SR	5	552	409	744	600	1129	985									554	410
	6	470	297	662	489	1047	874	1432	1259							665	492
	7	388	187	580	379	964	764	1349	1149							775	575
	8			498	268	883	653	1267	1037	1652	1422	2037	1807			886	656
	9					800	542	1185	926	1569	1311	1954	1696			998	739
	10					718	431	1103	816	1488	1201	1872	1586	2257	1970	1108	821
	11							1021	705	1406	1090	1791	1474	2176	1859	1219	903
	12							939	594	1323	979	1708	1363	2093	1748	1330	985
PA 270SR	5	903	675	1195	968	1779	1552									787	560
	6	790	519	1083	811	1667	1396	2252	1981							943	672
	7	679	361	972	654	1556	1238	2141	1823							1101	783
	8			860	497	1444	1081	2029	1666	2614	2252	3199	2836			1258	895
	9					1332	923	1917	1509	2502	2094	3087	2678			1416	1007
	10					1220	767	1805	1352	2390	1937	2974	2521	3560	3107	1572	1119
	11							1693	1194	2278	1779	2862	2364	3448	2949	1730	1231
	12							1582	1037	2167	1623	2751	2207	3336	2792	1887	1342