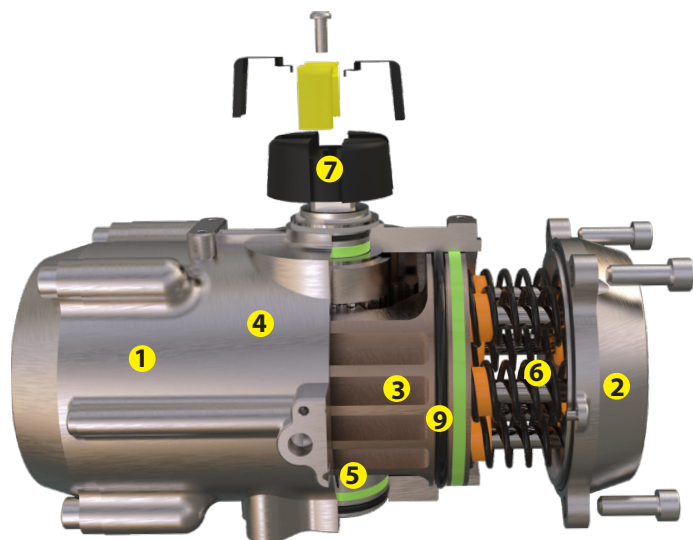




A215 Series Pneumatic Actuators

Proval A215 Series innovative, compact design pneumatic rack and pinion rotary actuators including all critical components are manufactured in-house using dedicated state-of-the-art CNC machines following ISO quality assurance standards. Proval pneumatic actuators that can be set either to fail-open or fail-close, comes in 12 different sizes in both double and single acting types. This Series of actuators having torque figures in ranges 18 to 9744 Nm are well suited to operate on part-turn valves such as plug, ball and butterfly valves



General Features

- Compact design
- Available in 12 different sizes
- Spring return or double acting versions
- High and Low temperature executions
- Common end caps on SR and DA
- Namur accessory mounting configuration
- Bi-directional stroke adjustment bolts
- Operating media - clean, dry air or non-corrosive gases
- Modular preloaded spring cartridges
- Durable, trouble free operation

1. Actuator Body

Heavy duty investment casting stainless steel body made from AISI304, AISI316 or AISI316L material with electro polish finishing allowing the actuators to be used in harsh environments.

2. End Caps

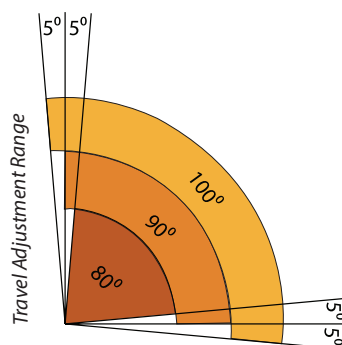
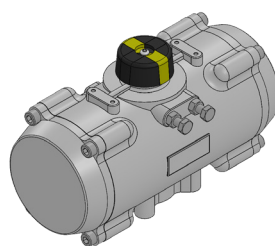
Heavy duty investment casting stainless steel end caps made from AISI304, AISI316 or AISI316L material with electro polish finishing allowing the actuators with electro polish finishing to be used in harsh environments.

3. Pistons

Investment casting stainless steel pistons are made from AISI304, or AISI316 material are durable for any environment application. The direction of pinion rotation (CCW to CW) can be changed by rotating the pistons 180° around their axis as the pistons installed at the both ends of the actuator are identical to each other..

4. Travel Adjustment

Each end of actuator travel (CW and CCW) can be adjusted by $\pm 5^\circ$ turning the right and left stroke adjustment bolts placed independently of each other, IN or OUT.

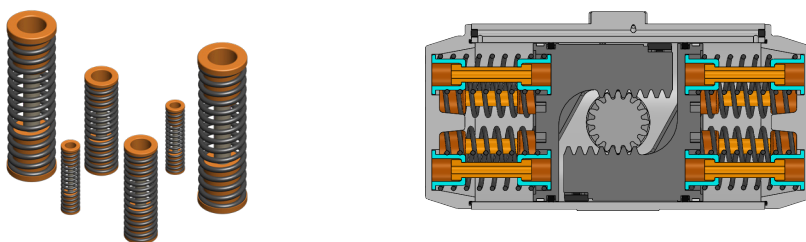


5. Pinion (Drive Shaft)

Stainless steel AISI304 or AISI316 shafts are designed and machined precisely in compliance with ISO5211, DIN3337, VDI/VDE 3845 standards

6. Preloaded Cartridge Springs

High grade steel spring cartridges are cataphoresis coated to provide highly improved safety and corrosion resistance in fail safe and emergency shut down operations.



7. Indicator

All actuators are furnished with a local position indicator that provides visual indication of valve/actuator position.

8. Bearings & Guides

High quality, low friction bearings and guides to avoid metal-to-metal contact and ensure reliable and stable linear motion.

9. Seals

Actuators fitted with NBR o-rings are suitable for use at temperatures ranging from -20 °C to +80 °C. FKM and Silicon O-rings are available for low and high temperature executions.



10. Traceability

A unique serial number is assigned to all actuators to facilitate identification and provide maximum traceability.



CE II 2 GDc PG Made in Turkey

**DISASSEMBLY WHILE PRESSURIZED
WILL CAUSE SERIOUS INJURIES**

PA TYPE PNEUMATIC ACTUATOR

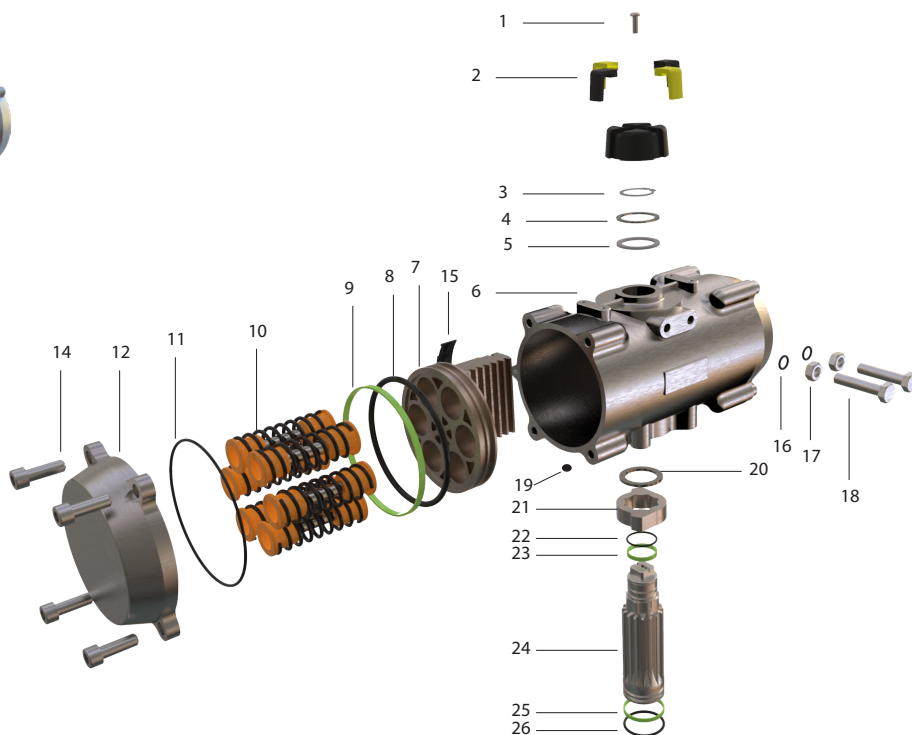
Model Nr / Type : PA 052 DA
ISO Flange / Sq. : F03/F05 - 11X11
Rotation / Stroke: CCW / 90° ± 5°
Inlet Port : G 1/4"
Op. Temperature: -20°C ~ 80°C
Max Air Supply : 8 Bar
Seal / Stem Mtrl : NBR / STL+ENP
Body Finish : STANDARD
Serial Number : 10140255

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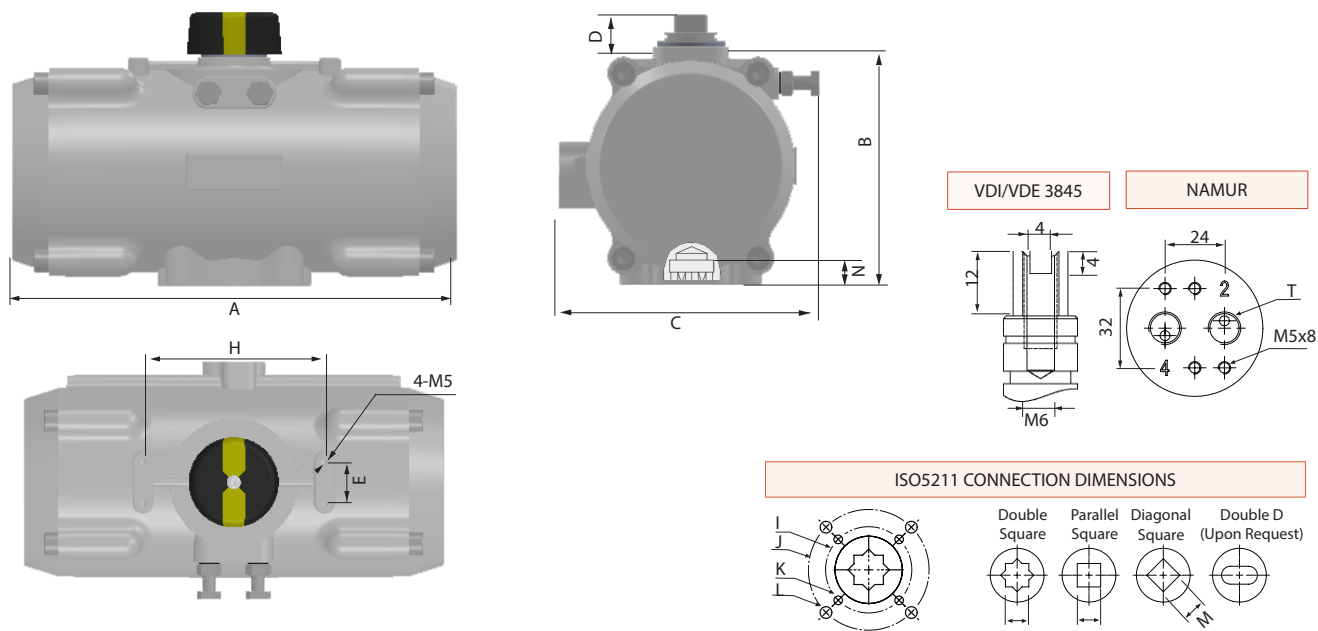
High quality, durable and self-adhesive stickers indicating temperature/pressurating limitations of actuators are affixed to actuators and need to be strictly considered when commissioning

A215 Series 90° Rotation Pneumatic Actuators Part List



No.	Description	QTY.	Standards Material
1	Indicator Screw	1	Plastic
2	Indicator	1	Plastic
3	Circlip	1	Stainless steel
4	Washer	1	Stainless steel
5	Outside Washer	1	Engineering Plastics
6	Body	1	Stainless steel
7	Piston	2	Stainless steel
8	Piston O-ring	2	Viton/NBR
9	Piston Bearing	2	Engineering Plastics
10	Spring	0-12	Spring Steel
11	End-Cap O-ring	2	Viton/NBR
12	End-Cap	2	Stainless steel
13	Stop screw(Piston)	2	Stainless steel
14	End-Cap Stop Screw	8	Stainless steel
15	Guide Piston	2	66 Nylon 66
16	O-ring(Adjust screw)	2	NBR
17	Nut(Adjust screw)	2	Stainless steel
18	Adjust screw	2	Stainless steel
19	Plug	2	NBR
20	Inside Washer	1	Engineering Plastics
21	Cam	1	Stainless steel
22	O-ring(Top)	1	Viton/NBR
23	Bearing Top	1	Engineering Plastics
24	Pinion	1	Stainless steel
25	Bearing Bottom	1	Engineering Plastics
26	O-ring Bottom	1	Viton/NBR

A215 Series 90° Rotation Pneumatic Actuators Dimensions and Weight Information



Dimensions(mm)

Model	Dimension (mm)												
	A	B	C	D	E	H	I	J	K	L	M	N	T
PA 45	133	64	70	20	30	80	Φ36	Φ50	4-M5×7.5	4-M6×10	11	14	G 1/4"
PA 52	146	72	79	20	30	80	Φ36	Φ50	4-M5×7.5	4-M6×10	11	14	G 1/4"
PA 63	173	88	92	20	30	80	Φ50	Φ70	4-M6×10	4-M8×13	14	18	G 1/4"
PA 83	204	108	113,5	20	30	80	Φ50	Φ70	4-M6×10	4-M8×13	17	21	G 1/4"
PA 105	270	133	137	20	30	80	Φ70	Φ102	4-M8×13	4-M10×16	22	26	G 1/4"
PA 125	302	155	156,5	20	30	130	Φ70	Φ102	4-M8×13	4-M10×16	22	27	G 1/4"
PA 140	394	172	172,5	20	30	130	Φ102	Φ125	4-M10×16	4-M12×20	27	32	G 1/4"
PA 160	456	198	193	20	30	130	Φ102	Φ125	4-M10×16	4-M12×20	27	34	G 1/4"
PA 210	568	257	254	30	30	130	-	Φ140	-	4-M16×24	36	40	G 1/4"
PA 240	608	291	293	30	30	130	-	Φ165	-	4-M20×25	46	50	G 1/4"
PA 300	820	354	354	30	30	130	-	Φ165	-	4-M20×25	46	60	G 1/2"
PA 400	934	464	435	30	30	130	Φ165	Φ254	4-M20×25	8-M16×25	55	60	G 1/2"

Actuator Unit Weights (Kg/Pc)

Model	PA 45	PA 52	PA 63	PA 83	PA 105	PA 125	PA 140	PA 160	PA 210	PA 300
Spring Return	1.8	2.5	3.79	6.5	10	13.5	15.5	28	71.5	170.5
Double Acting	2.1	2.63	3.96	6.8	10.8	13.95	18.65	31.7	80.0	198.1

Air Consumption of Actuators (Lt/Stroke)

Model	PA 45	PA 52	PA 63	PA 83	PA 105	PA 125	PA 140	PA 160	PA 210	PA 300
Opening (Lt)	0.08	0.12	0.21	0.43	0.95	1.60	2.50	3.70	7.50	23.8
Closing (Lt)	0.11	0.16	0.23	0.47	0.88	1.40	2.20	3.20	7.50	29.7

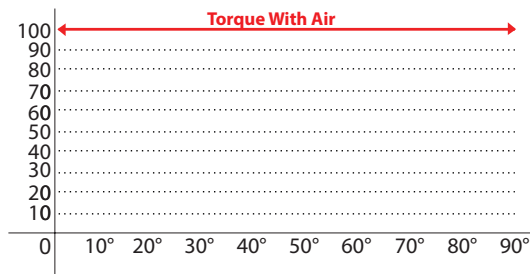


A215 Series 90° Rotation Double Acting Pneumatic Actuators Working Principles

A215 Series Double acting actuators require compressed air to be supplied in both opening and closing directions.

The output torques generated by actuators in double acting configuration vary mainly depending on the cylinder diameter and air supply pressure; it is simply calculated by multiplying the piston area by pitch circle radius of the pinion and by the supply pressure.

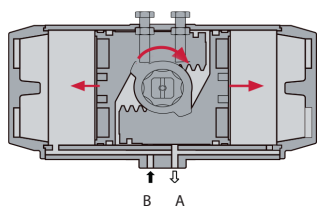
As shown in the diagram at the right the double acting pneumatic actuators are capable of offering constant torque through the 90° full stroke



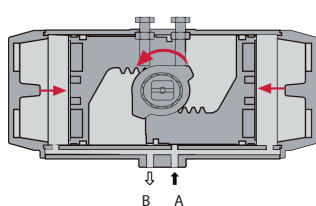
Torque Output Through Full 90° Stroke

Counter Clockwise Rotation (CCWR)

Air supplied through port B forces the piston towards each other causing the pinion to rotate clockwise while air is being exhausted through port A.

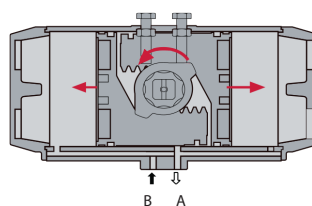


Air supplied through port A forces the piston away from each other causing the pinions to rotate counter clockwise while air is being exhausted through port B.

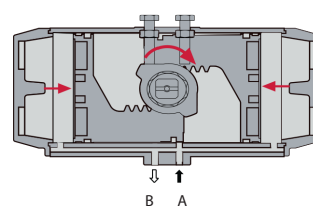


Clockwise Rotation (CWR)

Air supplied through port B forces the piston towards each other causing the pinion to rotate counter clockwise while air is being exhausted through port A.



Air supplied through port A forces the piston away from each other causing the pinions to rotate clockwise while air is being exhausted through port B.



The Proval actuators typically operate counter clockwise to open and clockwise to close. The direction of pinion rotation (CCW to CW) can be reversed changing the orientation of pistons as shown in the picture above.

Double Acting Actuators Torque Values (Nm)

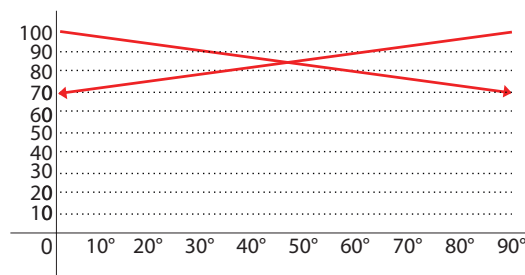
Model	Air pressure(Bar)					
	3	4	5	6	7	8
	(Nm)					
PA45DA	9	12	15	18	21	24
PA52DA	12	16	20	24	28	32
PA63DA	22	29	36	43	51	58
PA83DA	43	57	71	86	100	114
PA105DA	98	130	163	196	228	261
PA125DA	173	231	289	347	404	462
PA140DA	261	348	434	521	608	695
PA160DA	397	530	662	794	927	1059
PA190DA	640	854	1067	1280	1494	1707
PA210DA	798	1064	1330	1596	1862	2128
PA240DA	1154	1539	1924	2309	2693	3078
PA300DA	2291	3055	3819	4583	5347	6110
PA400DA	4872	6496	8120	9744	11368	12992

A215 Series 90° Rotation Spring Return Pneumatic Actuators Working Principles

Spring return actuators require compressed air to be supplied for the opening stroke only as they utilize pre-stressed cartridge springs for reversing the rotation.

Unlike acting actuators the output torques generated by spring return actuators depends not only on the cylinder diameter and input air pressure but also on the force created by the springs. Therefore spring return actuators are larger than the double acting actuators that produce the same torque.

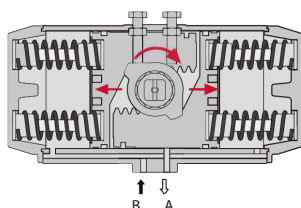
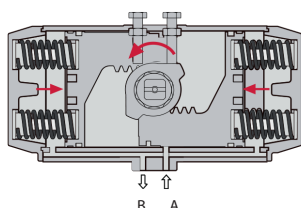
As shown in the diagram at the right, the torque curve is a straight line sloping down due to preloaded springs.



Counterclockwise Rotation (FAIL CW)

Air supplied through port A forces the piston away from each other, compressing springs and causing the pinion to rotate counterclockwise while air is being exhausted through port B.

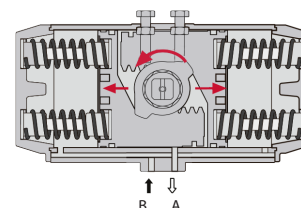
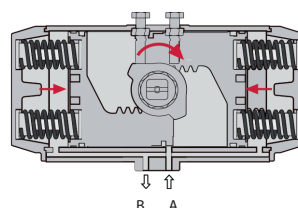
In case of loss/release of air pressure, springs force the pistons towards each other causing the pinion to rotate counterclockwise with exhaust air existing through port A.



Clockwise Rotation (CWR)

Air supplied through port A forces the pistons away from each other, compressing springs and causing the pinion to rotate clockwise while air is being exhausted through port B.

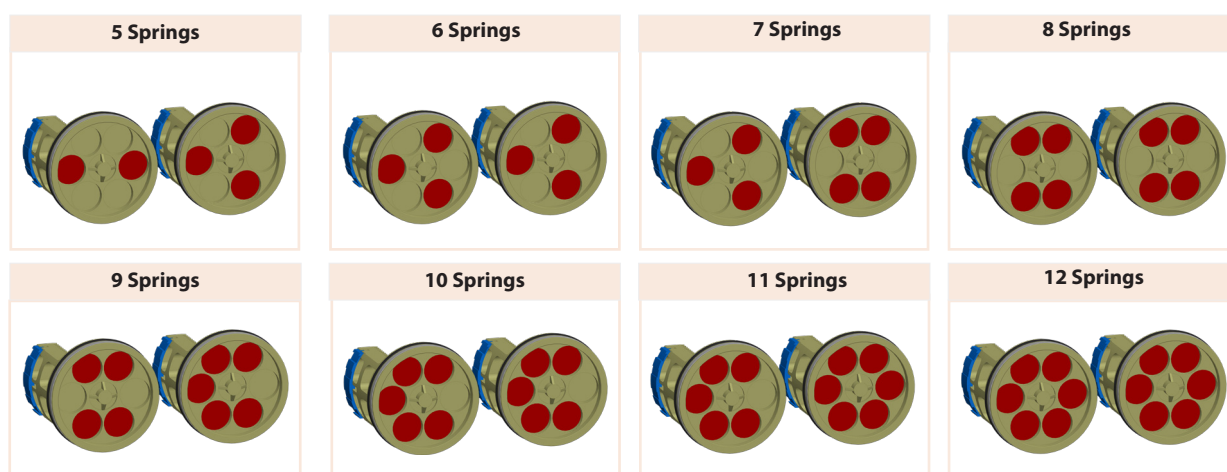
In case of loss/release of air pressure, springs force the pistons towards each other causing the pinion to rotate counterclockwise with exhaust air existing through port A.



The proval actuators are preset for fail closed (CW) operation as standard, but can be adjusted easily for fail open (CCW) rotation.

Positioning of Springs for Spring Return Actuators

Springs must be inserted in a symmetrical manner as shown below to prevent side load from occurring between the pistons and actuators



Unless otherwise specified, Proval pneumatic actuators supplied as standard with a complete spring pack (12 springs) sized for 6 bar supply pressure. For different air supplies, actuators can be configured by removing springs from the end caps.



A215 Series 90° Rotation Single Acting Actuators Torque Output Values (Nm)

		Air to Springs Torque Output Values (Nm)														Spring Torque (Nm)	
Air Supply	Nr of Springs	2 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-45SR	2			4,2	1,3	7,2	4,3	10,2	7,3							7,4	4,6
	3					6	2,4	9	5,4	12	8,4	15	11,4	18,1	14,5	9,2	5,8
	4							7,8	3,5	10,8	6,5	13,8	9,5	16,9	12,6	11,1	7
PA-52SR	4	4,6	3	8,6	7											5	3,4
	5			7,6	5,7											6,2	4,3
	6			6,9	4,5	10,9	8,5									7,4	5
	7			6	3,3	9,8	7,3	14	10,4							8,6	5,9
	8			5,2	2	9,2	6	13,2	9,1	17,2	14,1					9,9	6,7
	9			4,3	0,8	8,3	4,8	12,3	7,9	16,3	12,8	20,3	16,8			11,1	7,6
	10					7,4	3,6	11,5	6,7	15,5	11,6	19,5	15,6			12,4	8,5
	11					6,6	2,3	10,6	5,4	14,6	10,4	18,6	14,3	22,6	18,3	13,6	9,3
	12							9,7	4,2	13,8	9,1	17,8	12,2	21,8	17,1	14,8	10,2
	PA-83SR	4	9,2	6,3	16,5	13,6	23,8	20,9									8,3
5				15	11,4	22,3	14,9									10,4	6,8
6				13,6	9,3	20,9	16,6	28,3	23,9							12,5	8,2
7				12,5	7,2	19,5	14,5	26,8	21,9							14,6	9,6
8				10,9	6,1	18,2	12,4	25,5	19,8	32,8	27	40,1	34,3			16,7	10,9
9						16,8	10,4	24,1	17,7	31,4	24,9	38,7	32,2			18,8	12,3
10						15,5	8,2	22,8	15,6	30	22,8	37,3	30,1	44,7	37,4	20,9	13,7
11								21,5	13,5	28,7	20,7	36	28	43,3	35,3	22,9	15
PA-83SR	12							20	11,4	27,3	18,6	34,6	25,9	41,9	33,3	25	16,4
	4	18,7	13	34,3	28,6	50	44,3									18,4	12,7
	5			31,1	24	46,8	37,9									23	15,8
	6			28	19,3	43,7	35,1	59,4	50,7							27,6	19
	7			24,8	14,8	40,5	30,5	56,2	46,2							32,2	22,1
	8			21,7	10,1	37,4	25,8	53,1	41,5	68,8	57,2	84,5	72,9			36,8	25,3
	9					34,2	21,3	49,9	37	65,6	52,6	81,2	68,3			41,4	28,5
	10					31	16,6	46,7	32,3	62,4	48	78,1	63,7	93,8	79,3	46	31,6
PA-105SR	11							43,6	27,7	59,3	43,4	75	59,1	90,6	74,8	50,6	34,8
	12							40,4	23,2	56,1	38,9	71,7	54,5	87,4	70,2	55,2	38
	4	40,8	26,7	73,3	59,8	106,9	92,8									39,4	25,3
	5			67,5	49,9	100,6	83									49,2	31,6
	6			61,1	40	94,2	73,2	127,3	106,2							59,1	38
	7			54,9	30,3	87,9	63,4	121	96,4							68,9	44,3
	8			48,5	20,4	81,6	53,5	114,7	86,5	147,7	119,6	180,8	152,7			78,7	50,6
	9					75,3	43,7	108,4	76,8	141,5	109,8	174,5	142,9			88,6	56,9
PA-125SR	10					68,9	33,4	102	66,5	135,1	99,6	168,2	132,6	201,2	165,7	98,4	63,3
	11							95,7	57	128,7	90,1	161,8	123,1	194,8	156,2	108,3	69,6
	12							89,4	47,5	122,5	80,6	155,5	113,6	188,6	146,7	118,1	75,9
	4	59	37	109	87	159	137									63	42
	5			98	72	148	122									79	52
	6			88	56	138	107	188	157							94	63
	7			77	40	127	90	178	141							110	73
	8			67	25	117	75	167	125	217	176	268	226			125	84
PA-125SR	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

A215 Series 90° Rotation Single Acting Actuators Torque Output Values (Nm)

Air to Springs Torque Output Values (Nm)																Spring Torque (Nm)	
Air Supply	Nr of Springs	2 Bar		3 Bar		4 Bar		5 Bar		6 Bar		7 Bar		8 Bar		90°	0°
Model		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		
		Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop		
PA-140SR	4	102	68	188	153	273	239									103	69
	5			171	127	256	213									129	86
	6			154	102	239	187	325	273							155	103
	7			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
PA-160SR	4	154	100	278	233	420	366									166	112
	5			259	191	392	324									208	140
	6			232	149	365	282	498	415							250	168
	7			203	7	336	240	469	373							292	196
	8			176	66	309	199	442	332	575	465	708	598			333	223
	9					280	157	413	290	546	423	679	556			375	251
	10					253	115	386	248	519	381	652	514	785	647	417	279
	11							358	207	491	340	624	473	757	606	458	307
PA-210SR	4	312	228	578	494	844	760									304	220
	5			523	418	789	684									380	275
	6			468	342	734	608	1000	874							456	330
	7			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
PA-300SR	4	942	611													849	584
	5															1061	730
	6			1316	875											1273	876
	7			1153	639	1916	1402									1485	1022
	8			991	403	1754	1166	2517	1929							1697	1168
	9					1592	930	2355	1693	3118	2456					1909	1314
	10					1430	695	2193	1458	2956	2221	3719	2984	4482	3747	2122	1460
	11							2030	1222	2793	1985	3556	2748	4319	3511	2334	1606
PA400SR	12							1868	986	2631	1749	3394	2512	4157	3275	2546	1752
	7															2650	1690
	8			2346	1127											3028	1932
	9			2078	706	3576	2204									3406	2173
	10			1810	286	3307	1784	4805	3282							3786	2414
	11					3038	1363	1536	2861	6034	4358					4164	2656
	12					2771	943	4268	2440	5766	3938	7263	543			4543	2897
	13							4000	2019	5498	3517	6994	5014			4921	3139
14							3732	1599	5230	3096	6727	4594			5300	3380	
15							3464	1178	4962	2676	6458	4173			5678	3622	
16									4692	2256	6190	3752			6057	3863	