



**Specification**

**DESIGN**

Double-piston actuator, maintenance free, double-acting / single-acting

**ROTATORY**

90°(adjustment ±5°)

**OPERATION**

DIN ISO5211 in the bottom side (refer to dimension table), Gear according to DIN 3337.Interface for Solenoid valve or signal generator acc.to NAMUR

**PILOT MEDIA**

Filtered gases (oil, ash and water removal)

**TEMPERATURE RANGE**

NBR: -23°C - +82°C  
HNBR: -40°C - +80°C  
FKM: -20°C - +205°C

**MATERIALS**

Body: Aluminium alloy(anodized)  
Cap: Aluminium/stainless steel

Gears: Stainless steel  
Alloy steel,nickel plated

Guides: Lubricated plastic

Seal: NBR/FKM/HNBR

Fasteners: Stainless steel

**PILOT PRESSURE**

3 - 7 bar  
(Lower pilot pressure on request)

**TORQUE RANGE**

According to diagram

**OPTIONS**

Directly separately mounted 3/2-ways and 5/2-ways valve, electronic or physicandicator, positioner with NAMUR-Interface

The above information is for reference only and Eicmation reserves the right to alter without prior notice



Type:  
PA

Pneumatic actuator  
8Nm-8100Nm

Double-acting  
Single-acting

**Ordering example:** e.g. PA1113110

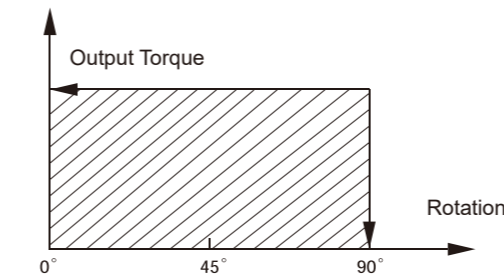
= Pneumatic actuator,Double acting,Aluminium alloyPiston Ø52mm ,NBR,Gear, 0-90°

Actuator

A Type	B+C Function	D Material	E+F Specifications		G Seal	H Structure	I Trip
PA=Pneumatic actuator	1=Double acting 2=Single acting-close 3=Single acting-open	1=Aluminium alloy 2=Stainless steel	13=Ø52	22=Ø190	1=NBR 2=HNBR 3=FKM	1=Gear	0=0-90° 1=0-120° 2=0-135° 3=0-150° 4=0-180° 5=0-270°
			14=Ø63	23=Ø210			
			15=Ø75	24=Ø240			
			16=Ø83	25=Ø270			
			17=Ø92	26=Ø300			
			18=Ø105	27=Ø350			
			19=Ø125	28=Ø400			
			20=Ø140				
			21=Ø160				

**Torque output change and model selection**

Output torque of double acting actuators

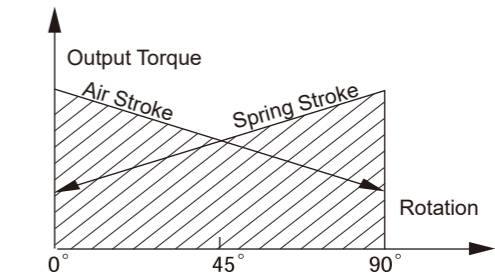


Sizing:double acting actuator

The suggested safety factor for double acting actuator under normal working conditions is 20%-30%

Example: The torque valve = 100 Nm,The torque consider safety factor (1+30%)=130Nm,Air Supply = 5 Bar  
According to the above table ,we can choose the minimum model is PA111831

Output torque of spring return actuators



Sizing:spring return actuator

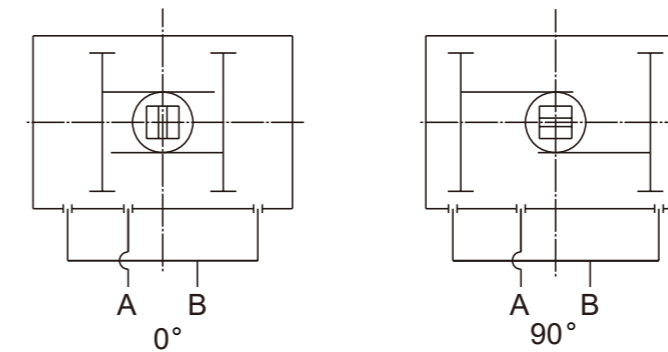
The suggested safety factor for spring return actuator under normal working conditions is 30%-50%

Example: The torque needed by valve = 80 Nm,The torque consider safety factor (1+30%)=104Nm,Air Supply = 5 Bar  
According to the table of spring return actuators'output,we find output torque of PA212031 K7 is:  
Air stroke 0° = 308Nm,90° = 247Nm,Spring stroke 90° = 181Nm, 0° = 120Nm  
All the output torque is larger than we needed.

**Double Acting Actuators**

**Dress**

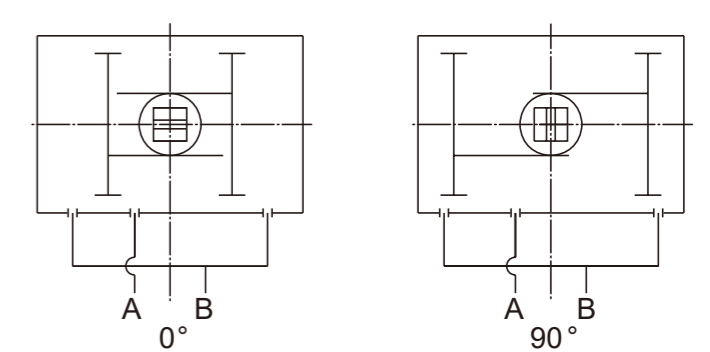
Air to Port A forces the pistons outwards,causing the pinion to turn counterclockwise while the air is being exhausted from Port B.  
Air to Port B forces the pistons inwards,causing the pinion to turn clockwise while the air is being exhausted from Port A.



Dress

**Anti-loaded**

Air to Port A forces the pistons outwards,causing the pinion to turn clockwise while the air is being exhausted from Port B.  
Air to Port B forces the pistons inwards,causing the pinion to turn counterclockwise while the air is being exhausted from Port A.



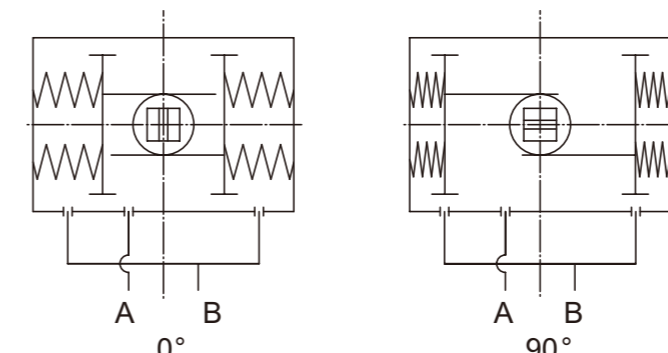
Anti-loaded

**Spring Return Actuators**

**Dress**

Air to Port A forces the pistons outwards,causing the springs to compress,The pinion turns counterclockwise while air is being exhausted from Port B.

Loss of air pressure on port A,The stored energy in the spring forces the pistons inwards. The pinion to turn clockwise while the air is being exhausted from Port A.

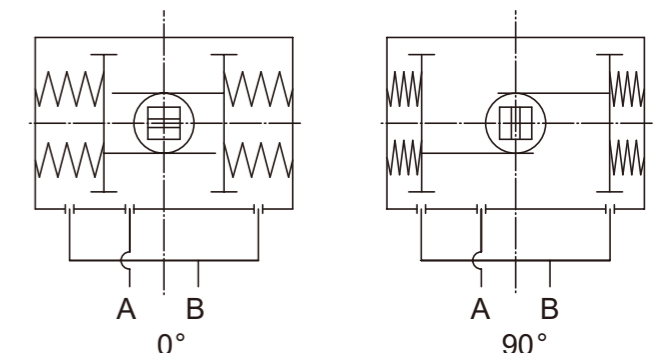


Dress

**Anti-loaded**

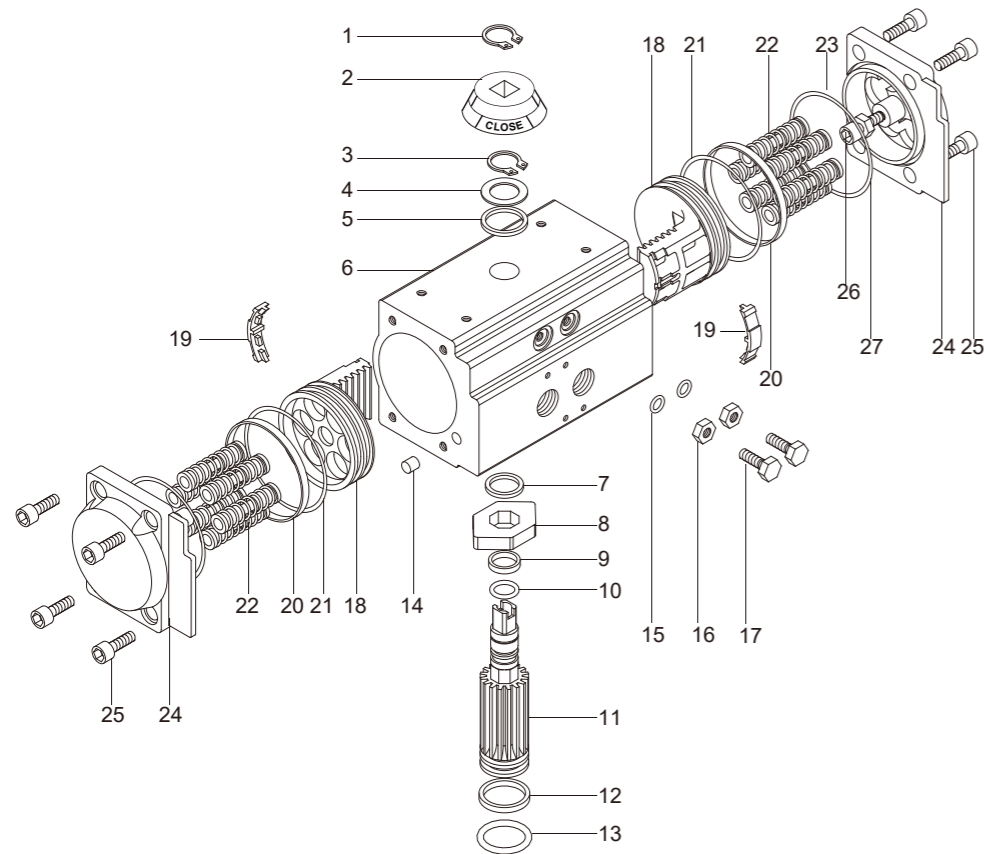
Air to Port B forces the pistons outwards,causing the springs to compress,The pinion turns clockwise while air is being exhausted from Port B;

Loss of air pressure on port A,The stored energy in the spring forces the pistons inwards. The pinion to turn counterclockwise while the air is being exhausted from Port A.



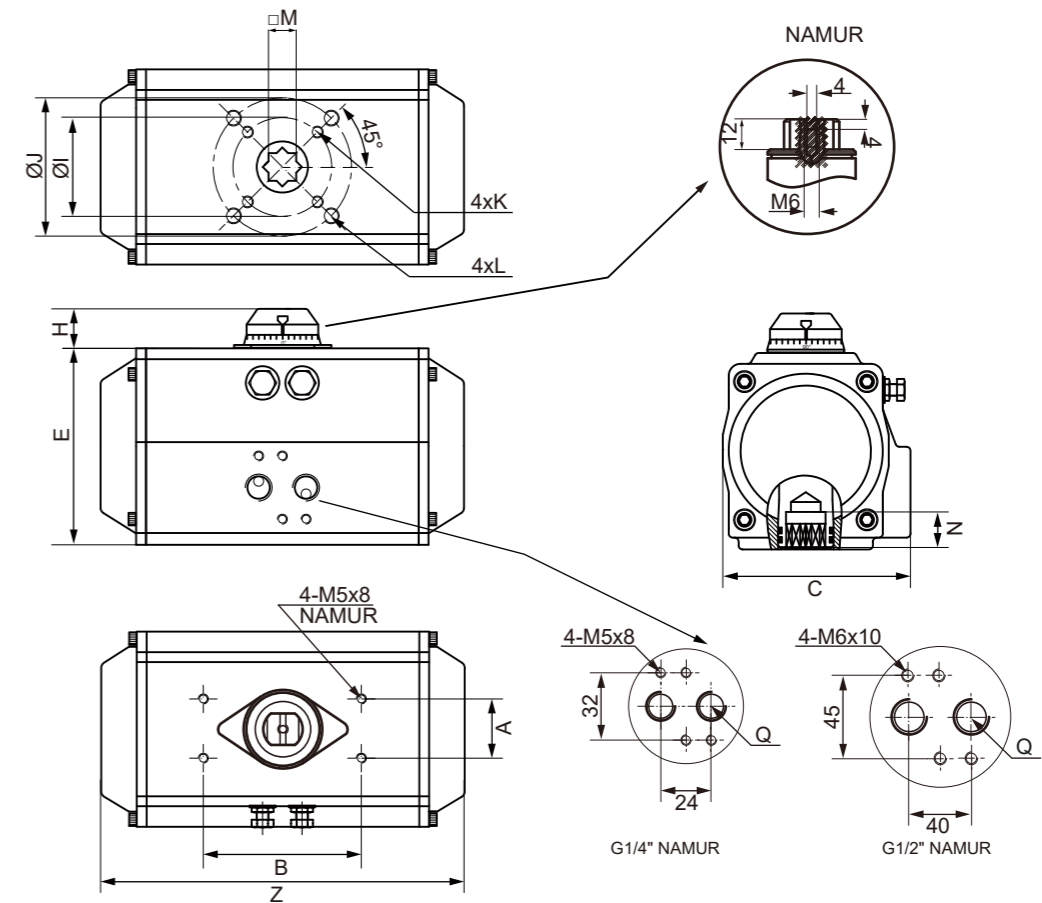
Anti-loaded

### Parts list



NO.	Description	Standrd Material	Qty
1	Spring clip	Stainless Steel	1
2	Indicator	plastic	1
3	Spring clip	Stainless Steel	1
4	Thrust washer	Stainless Steel	1
5	Outside washer	engineering plastics	1
6	Body	Extruded alluminum alloy/Hard anodized etc	1
7	Inside washer	engineering plastics	1
8	Cam	Alloy steel	1
9	O-ring (pinion top)	NBR/Viton/Silicone	1
10	Bearing(pinion top)	engineering plastics	1
11	Pinion	Alloy steel/Nickel plated/Stainless Steel	1
12	Bearing(pinion bottom)	engineering plastics	1
13	O-ring pinion bottom	NBR/Viton/Silicone	1
14	Plug	NBR/Viton/Silicone	2
15	O-ring(Adjust screw)	NBR/Viton/Silicone	2
16	Nut(Adjust screw)	Stainless Steel	2
17	Adjust screw	Stainless Steel	2
18	Piston	Cast/alluminum/casting steel/anodized/Zinc /galvanized/Stainless Steel	2
19	Guide(Piston)	engineering plastics	2
20	Bearing(Piston)	engineering plastics	2
21	O-ring(Piston)	NBR/Viton/Silicone	2
22	Spring	Spring steel/dip coating	0~12
23	O-ring(End cap)	NBR/Viton/Silicone	2
24	End cap	Cast alluminum/powder painted etc	2
25	Cap screw	Stainless Steel	8
26	Stop screw	Stainless Steel	2
27	Nut(stop screw)	Stainless Steel	2

### Dimensions



Model	Specifications	Z	E	C	H	BxA	N	M	J	I	L	K	Air connection
PA1113110	Ø52	147	72	72	20	80×30	14	11	Ø50	Ø36	M6×10	M5×7.5	NAMUR G1/4"
PA1114110	Ø63	172	88	83	20	80×30	18	14	Ø70	Ø50	M8×13	M6×10	NAMUR G1/4"
PA1115110	Ø75	184	100	95	20	80×30	20	14	Ø70	Ø50	M8×13	M6×10	NAMUR G1/4"
PA1116110	Ø83	204	109	103	20	80×30	21	17	Ø70	Ø50	M8×13	M6×10	NAMUR G1/4"
PA1117110	Ø92	262	117	109	20	80×30	22	17	Ø70	Ø50	M8×13	M6×10	NAMUR G1/4"
PA1118110	Ø105	268	133	121	20	80×30	26	22	Ø102	Ø70	M10×16	M8×13	NAMUR G1/4"
PA1119110	Ø125	301	155	143	20	80×30	27	22	Ø102	Ø70	M10×16	M8×13	NAMUR G1/4"
PA1120110	Ø140	394	173	152	20	80×30	32	27	Ø125	Ø102	M12×20	M10×16	NAMUR G1/4"
PA1121110	Ø160	458	198	174	20	80×30	34	27	Ø125	Ø102	M12×20	M10×16	NAMUR G1/4"
PA1122110	Ø190	528	232	206	30	130×30	40	36	Ø140	-	M16×24	-	NAMUR G1/4"
PA1123110	Ø210	532	257	226	30	130×30	40	36	Ø140	-	M16×24	-	NAMUR G1/4"
PA1124110	Ø240	660	291	260	30	130×30	50	46	Ø165	-	M20×25	-	NAMUR G1/4"
PA1125110	Ø270	740	330	294	30	130×30	50	46	Ø165	-	M20×25	-	NAMUR G1/2"
PA1126110	Ø300	798	354	336	30	130×30	60	46	Ø165	-	M20×25	-	NAMUR G1/2"
PA1127110	Ø350	880	408	385	30	130×30	60	46	Ø165	-	M20×25	-	NAMUR G1/2"
PA1128110	Ø400	950	464	516	30	130×30	60	55	Ø254	Ø165	8-M16×25	M20×25	NAMUR G1/2"

### Air consumption

Actuator(Ømm)	52	63	75	83	92	105	125	140	160	190	210	240	270	300	350	400
Middle volume(L)	0.12	0.21	0.3	0.43	0.64	0.95	1.6	2.5	3.7	5.9	7.5	11	17	23.8	35.1	52.6
Both ends volume(L)	0.16	0.23	0.34	0.47	0.73	0.88	1.4	2.2	3.2	5.4	7.5	9	14	29.7	46.3	56

Air consumption rest with Air Supply,Air volume and Action cycle time,expressions:

$$L/Min = \text{Air volume (Intermediate volume+Both ends of the volume)} \times \left[ \frac{\text{Air Supply(Kpa)+101.3}}{101.3} \right] \times \text{Action cycle times(/min)}$$

### Actuator weight

Actuator(Ømm)	52	63	75	83	92	105	125	140	160	190	210	240	270	300	350	400
Single acting actuator (Kg)	1.522	2.33	2.954	3.662	5.362	6.824	10.608	16.02	23.772	37.4	46.7	67.9	96.5	141.3	234	360
Double acting actuator (Kg)	1.426	2.172	2.722	3.356	4.766	6.066	9.504	14.234	20.762	32.8	38.9	56.7	79	114.8	186	289

### Torque ( Nm ) double acting actuators

Model	Air supply pressure (Unit: bar)					
	3.0	4.0	5.0	6.0	7.0	8.0
PA1113110	12.0	16.0	20.0	24.0	28.0	32.0
PA1114110	21.7	28.9	36.0	43.4	50.6	57.8
PA1115110	30.0	40.0	50.0	60.0	70.0	80.0
PA1116110	46.8	62.4	78.0	93.6	109.2	124.8
PA1117110	67.6	90.1	112.6	135.2	157.7	180.2
PA1118110	97.7	130.3	162.9	195.5	228.0	260.6
PA1119110	150.5	200.6	250.8	301.0	351.1	401.3
PA1120110	260.7	347.6	433.8	521.4	608.3	695.2
PA1121110	397.2	529.6	662.0	794.4	926.8	1059.2
PA1122110	640.2	853.6	1067.0	1280.4	1493.8	1707.2
PA1123110	798.0	1064.0	1330.0	1596.0	1862.0	2128.0
PA1124110	1154.3	1539.0	1923.8	2308.5	2693.3	3078.0
PA1125110	1755.0	2340.0	2924.0	3510.0	4095.0	4680.0
PA1126110	2291.4	3055.2	3819.0	4582.8	5346.6	6110.4
PA1127110	3426.0	4568.0	5710.0	6852.0	7994.0	9136.0
PA1128110	4872.0	6496.0	8120.0	9744.0	11368.0	12992.0

### Torque ( Nm ) spring return actuators

Model	Spring quantity	Air supply pressure (Unit: bar)												
		Spring output torque (Nm)		3.0		4.0		5.0		6.0		7.0		
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	
PA2113110	5	4.0	6.2	8.1	5.8	12.1	9.8							
	6	4.7	7.4	7.3	4.6	11.3	8.6							
	7	5.5	8.7	6.5	3.3	10.5	7.3	14.5	11.3					
	8	6.3	9.9			9.7	6.1	13.7	10.1					
	9	7.1	11.2			8.9	4.8	12.9	8.8	16.9	12.8			
	10	7.9	12.4			8.1	3.6	12.1	7.6	16.1	11.6	20.1	15.6	
	11	8.7	13.6			7.3	2.4	11.3	6.4	15.3	10.4	19.3	14.4	
	12	9.5	14.9					10.5	5.1	14.5	9.1	18.5	13.1	
	PA2114110	5	6.8	10.4	14.9	11.3	22.1	18.5						
		6	8.2	12.5	13.5	9.2	20.7	16.4						
		7	9.6	14.6	12.1	7.1	19.3	14.3	26.5	21.5				
		8	10.9	16.7			18.0	12.2	25.2	19.4				
9		12.3	18.9			16.6	10.0	23.8	17.2	31.1	24.5			
10		13.7	20.9			15.2	8.0	22.4	15.2	29.7	22.5	36.9	29.7	
11		15.0	22.9					21.1	13.2	28.4	20.5	35.6	27.7	
12		16.4	25.0					19.7	11.1	27.0	18.4	34.2	25.6	
PA2115110		5	10.0	15.0	20.0	15.0	30.0	25.0						
		6	12.0	18.0	18.0	12.0	28.0	22.0						
		7	14.0	21.0	16.0	9.0	26.0	19.0						
		8	16.0	24.0			24.0	16.0	34.0	26.0				
	9	18.0	27.0			22.0	13.0	32.0	23.0	42.0	33.0			
	10	20.0	30.0			20.0	10.0	30.0	20.0	40.0	30.0	50.0	40.0	
	11	22.0	33.0			18.0	7.0	28.0	17.0	38.0	27.0	48.0	37.0	
	12	24.0	36.0					26.0	14.0	36.0	24.0	46.0	34.0	
	PA2116110	5	15.5	23.0	30.5	23.0	46.5	39.0						
		6	18.6	27.6	27.4	18.4	43.4	34.4						
		7	21.7	32.2			40.3	29.8	56.3	45.8				
		8	24.8	36.8			37.2	25.2	53.2	41.2				
9		27.9	41.4			34.1	20.6	50.1	36.6	65.1	51.6			
10		31.0	46.0			31.0	16.0	47.0	32.0	62.0	47.0	77.0	62.0	
11		34.1	50.6					43.9	27.4	58.9	42.4	73.9	57.4	
12		37.2	55.2					40.8	22.8	55.8	37.8	70.8	52.8	
PA2117110		5	23.0	33.0	44.6	34.7	67.1	57.2						
		6	27.6	39.5	40.0	28.1	62.5	50.6						
		7	32.2	46.1			57.9	44.0	80.4	66.5				
		8	36.8	52.7			53.3	37.4	75.8	59.9				
	9	41.4	59.3			48.7	30.8	71.2	53.3	93.8	75.9			
	10	46.0	65.9			44.1	24.2	66.6	46.7	89.2	69.3	111.7	91.8	
	11	50.6	72.5					62.0	40.1	84.6	62.7	107.1	85.2	
	12	55.2	79.1					57.4	33.5	80.0	56.1	102.5	78.6	
	PA2118110	5	31.8	49.3	66.0	48.4	98.6	81.0						
		6	38.1	59.2	59.6	38.5	92.2	71.1						
		7	44.5	69.0			85.9	61.3	118.5	93.9				
		8	50.8	78.9			79.5	51.4	112.1	84.0				
9		57.2	88.7			73.2	41.6	105.8	74.2	138.4	106.8			
10		63.5	98.6			66.8	31.7	99.4	64.3	132.0	96.9	164.5	129.4	
11		69.9	108.5					93.1	54.4	125.7	87.0	158.2	119.5	
12		76.2	118.3					86.7	44.6	119.3	77.2	151.8	109.7	
PA2119110		5	50.0	78.0	100	72	150	122						
		6	60.0	93.6	90	56	140	106						
		7	70.0	109.2			130	91	181	142				
		8	80.0	124.8			120	75	171	126				
	9	90.0	140.4			110	60	161	110	211	161			
	10	100.0	156.0			100	44	151	95	201	145	251	195	
	11	110.0	171.6					141	79	191	129	241	179	
	12	120.0	187.2					131	64	181	114	231	164	

### Torque (Nm) spring return actuators

Model	Spring quantity	Spring output torque (Nm)		Air supply pressure (Unit: bar)										
				3.0		4.0		5.0		6.0		7.0		
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	
PA2120110	5	86.0	129.0	174	131	261	218							
	6	103.2	154.8	157	105	244	192							
	7	120.4	180.6			227	166	314	253					
	8	137.6	206.4			209	141	296	228					
	9	154.8	232.2			192	115	279	202	366	289			
	10	172.0	258.0			175	89	262	176	349	263	436	350	
	11	189.2	283.8					245	150	332	237	585	324	
	12	206.4	309.6					228	124	315	211	402	298	
	PA2121110	5	139.5	192.5	258	205	390	337						
		6	167.4	231.0	230	166	362	298						
		7	195.3	269.5			334	260	467	393				
		8	223.2	308.0			306	221	439	354				
9		251.1	346.5			278	183	411	316	543	448			
10		279.0	385.0			250	144	383	277	515	409	647	541	
11		306.9	423.5					355	239	487	371	619	503	
12		334.8	462.0					327	200	459	332	591	464	
PA2122110		5	190	320	451	320	664	533						
		6	227	384	413	256	626	469						
		7	265	448			588	405	802	619				
		8	303	512			550	341	764	555				
	9	341	576			512	277	726	491	939	704			
	10	379	640			474	213	688	427	901	640	1114	853	
	11	417	704					650	363	863	576	1076	789	
	12	455	768					612	299	825	512	1038	725	
	PA2123110	5	261	440	619	439	912	732						
		6	313	528	566	351	859	644						
		7	365	616			807	556	1101	850				
		8	417	704			755	468	1049	762				
9		469	792			703	380	997	674	1290	967			
10		521	880			651	292	945	586	1238	879	1531	1172	
11		573	968					893	498	1186	791	1479	1084	
12		625	1056					841	410	1134	703	1427	996	
PA2124110		5	389	685	990	694	1449	1153						
		6	467	822	912	557	1371	1016						
		7	545	959			1293	879	1753	1339				
		8	622	1096			1216	742	1676	1202				
	9	700	1233			1138	605	1598	1065	2057	1524			
	10	778	1370			1060	468	1520	928	1979	1387	2439	1847	
	11	856	1507					1442	791	1901	1250	2361	1710	
	12	934	1644					1364	654	1823	1113	2283	1573	
	PA2125110	5	505	960	1434	979	2080	1625						
		6	606	1152	1333	787	1979	1433						
		7	707	1344			1878	1241	2523	1886				
		8	808	1536			1777	1049	2422	1694				
9		909	1728			1676	857	2321	1502	2967	2148			
10		1010	1920			1575	665	2220	1310	2866	1956	3513	2603	
11		1111	2112					2119	1118	2765	1764	3412	2411	
12		1212	2304					2018	926	2664	1572	3311	2219	
PA2126110		5	725	1145	1522	1102	2271	1851						
		6	870	1374	1377	873	2126	1622						
		7	1015	1603			1981	1393	2730	2142				
		8	1160	1832			1836	1164	2585	1913				
	9	1305	2061			1691	935	2440	1684	3189	2433			
	10	1450	2290			1546	706	2295	1455	3044	2204	3793	2953	
	11	1595	2519					2150	1226	2899	1975	3648	2724	
	12	1740	2748					2005	997	2754	1746	3503	2495	

### Torque ( Nm ) spring return actuators

Model	Spring quantity	Spring output torque (Nm)		Air supply pressure (Unit: bar)										
				3.0		4.0		5.0		6.0		7.0		
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	
PA2127110	5	1173	1703	2003	1474	3145	2616							
	6	1408	2043	1768	1133	2910	2275							
	7	1642	2384			2676	1935	3818	3077					
	8	1877	2724			2441	1594	3583	2736					
	9	2111	3065			2207	1254	3349	2396	4491	3538			
	10	2346	3405			1972	913	3114	2055	4256	3197	5398	4339	
	11	2581	3746					2879	1715	4021	2857	5413	3999	
	12	2815	4086					2645	1374	3787	2516	4928	3658	
	PA2128110	7	1837	2881	2812	1768								
		8	2099	3292	2550	1225								
		9	2362	3704	2259	768	3887	2396						
		10	2624	4115	1967	311	3595	1939	5223	3567				
11		2886	4527			3303	1482	4931	3110	6559	4738			
12		3149	4938			3012	1025	4641	2653	6268	4281	7895	5908	
13		3411	5350					4348	2195	5976	3823	7603	5450	
14		3674	5761					4057	1738	5685	3366	7312	4993	
15		3936	6173					3765	1281	5393	2909	7020	4536	
16		4198	6584							5101	2452	6728	4079	