

# Pneumatic Rotary Actuators

## Double Acting and Spring Return



## Specifications

- ▶ **Pressure range:**  
2 bar to 8 bar double acting  
3 bar to 8 bar spring return  
Max. Working pressure 10 bar
- ▶ **Media:**  
Dry or lubricated air, non corrosive gas, water or light hydraulic oil
- ▶ **Temperature range:**  
-20°C to +100°C
- ▶ **Rotation:**  
Clockwise when port 'A' is pressurized for double acting actuators  
Anti-clockwise for spring return actuators
- ▶ **Stroke:**  
90° (+/- 5°)
- ▶ **Lubrication:**  
All moving parts are factory lubricated for cycle life of actuator
- ▶ **External travel stops:**  
Standard adjustable +5° or -5° over 90° stroke
- ▶ **Construction:**  
Suitable for indoor or outdoor application
- ▶ **Dimensions:**  
For valve mounting in accordance with ISO5211 Topwork and pinion to NAMUR

## Design

The actuators are of the rack and pinion type where the linear kinetic energy is directly transformed into a "quarter turn" operation with a constant output torque over the full stroke.

Both double acting and spring return actuators have twin cylinders horizontally opposed and incorporate piston guides to ensure correct contact between the rack and pinion at all pressures.

High quality materials are employed throughout the construction and the compact design is readily fitted

to any type of ball, butterfly or plug valve, plus other equipment requiring efficient pneumatic actuators.

The actuator is suitable for mounting a full range of accessories, such as limit switches, solenoid valves, positioners, manual override, etc.

Double acting and spring return models are of similar overall size.

## Materials

### Actuator body:

Extruded aluminium alloy, gold anodized

### End cap:

Pressure die casting aluminium alloy, black epoxy coated

### Pinion:

Carbon steel, zinc plate

### Piston:

Pressure die casting aluminium alloy, natural

### Guide:

Acetal resin, natural

### 'O' rings:

Nitrile rubber (Buna N), 50 IRHD

### Springs:

Spring steel, zinc plate

### End cap bolts:

Carbon steel, zinc plate

**bürkert**  
Eas4 Fluid Control Systems

# Pneumatic Rotary Actuators

## Air Consumption, Liters

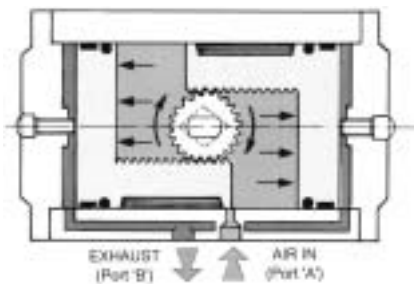
Model	AP0		AP1		AP2		AP3		AP3,5		AP4		AP4,5		AP5		AP5,5		AP6		AP8	
	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR	DA	SR
Volume	0,05	-	0,18	0,08	0,28	0,12	0,68	0,24	1,04	0,48	1,64	0,68	2,6	1,0	3,56	1,4	4,16	1,6	7,2	3,2	13,9	5,3

## Opening / Closing Time [sec.] at 5,6 bar - 80 P.S.I.

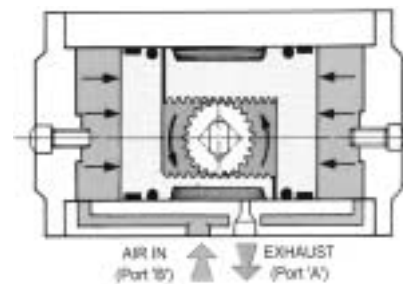
Model	AP0	AP1	AP2	AP3	AP3,5	AP4	AP4,5	AP5	AP5,5	AP6	AP8
Double Acting	Less Than 0,5 sec	Less Than 0,5 sec	Less Than 1 sec	Less Than 1 sec	Less Than 1 sec	Less Than 1 sec	Less Than 1 sec	Less Than 1,25 sec	Less Than 1,5 sec	1,5 ÷ 2 sec	3 ÷ 4 sec
Spring Return	-	Less Than 0,5 sec	Less Than 1 sec	Less Than 1 sec	Less Than 1 sec	Less Than 1 sec	Less Than 1 sec	1,5 ÷ 2 sec	Less Than 2 sec	3 ÷ 3 sec	4 ÷ 6 sec

## Double Acting Actuator

Clockwise output Rotation



Anti-Clockwise output Rotation

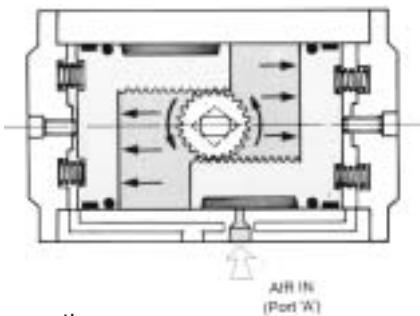


### Principle of operation

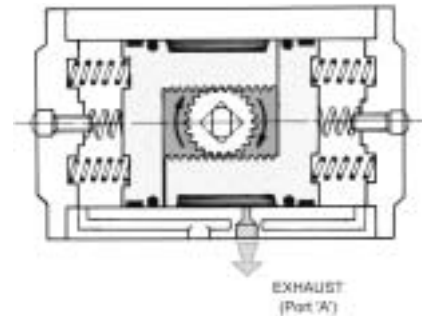
Clockwise output operation is achieved by inserting pressure into Port 'A', to force the pistons apart thus rotating the actuator pinion clockwise. During this operation, air from the outer chambers is exhausted through Port 'B'. Anti-clockwise output operation is achieved by reverse of the above and by inserting pressure into Port 'B'.

## Spring Return Actuator

Anti-Clockwise output Rotation



Clockwise output Rotation



### Principle of operation

Pressure applied to Port 'A' will cause the inner chambers to be pressurized, forcing the pistons outward to compress the springs. The pinion is rotated anticlockwise. Upon release of pressure through Port 'A' the springs will exert pressure to close the pistons and rotate the pinion clockwise rapidly. This action will often be used to close a quarter turn valve in shutdown mode.

## Torque Output Double Acting Actuator [DA] Nm, Order No.

Model	Order No.	Operating Pressure [bar]							
		2	3	4	5	6	7	8	
AP0 DA	SN40108	2.4	3.6	4.8	6	7.3	8.5	9.7	
AP1 DA	SN40007	5.9	8.9	11.8	14.8	17.7	21.7	24.8	
AP2 DA	SN40008	9.4	14.1	18.8	23.5	28.2	32.9	37.6	
AP3 DA	SN40009	20	30	40	50	60	70	80	
AP3,5 DA	SN40010	34	51	68	85	102	119	136	
AP4 DA	SN40011	48	71	95	119	142	168	192	
AP4,5 DA	SN40109	87.2	130.8	174.4	218	261.6	305.2	348.8	
AP5 DA	SN40012	111	167	222	278	333	388.5	444	
AP5,5 DA	SN40110	157.6	236.4	315.3	394.1	473	551.8	630.6	
AP6 DA	SN40013	227	340	454	567	680	794.5	908	
AP8 DA	SN40014	426	638	851	1064	1276	1491	1704	

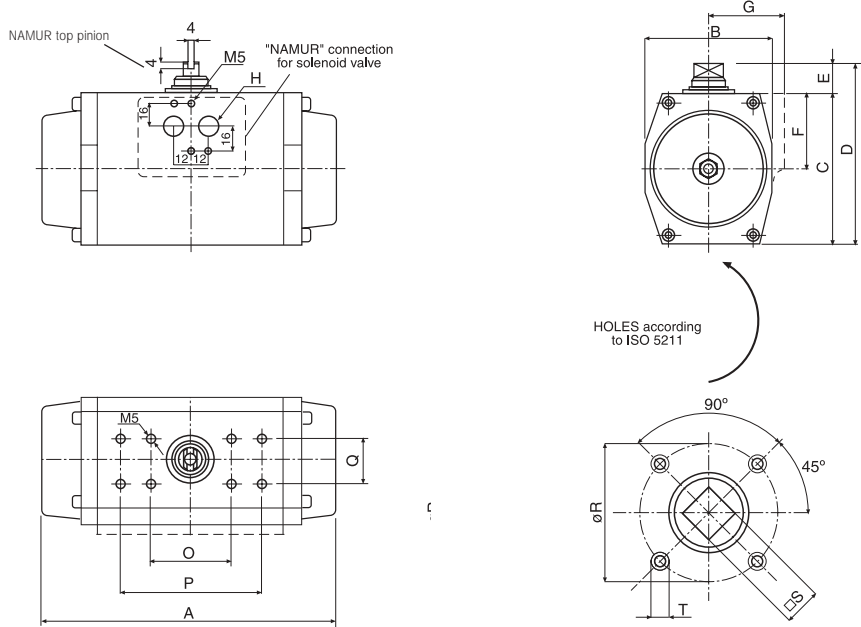
# Pneumatic Rotary Actuators

## Torque Output Spring Return Actuator [SR] Nm , Order No.

Model	Order No.	Springs on each side	Operating Pressure [bar]													
			3		4		5		6		7		8		Spring Stroke	
			0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
AP1 SR-S	SN40015	2	6,5	5,4	9,4	8,3	12,4	11,3	15,3	14,2	19,3	18,2	22,4	21,3	3,5	2,4
		3	5,3	3,7	8,2	6,6	11,2	9,6	14,1	12,5	18,1	16,5	21,2	19,6	5,2	3,6
		4	4,1	1,9	7,0	4,8	10,0	7,8	12,9	10,7	16,9	14,7	20,0	17,8	7,0	4,8
		5	//	//	5,8	3,1	8,8	6,1	11,7	9,0	15,7	13,0	18,8	16,1	8,7	6,0
		6	//	//	4,6	1,3	7,6	4,3	10,5	7,2	14,5	11,2	17,6	14,3	10,5	7,2
AP2 SR-S	SN40016	2	10,3	8,5	15,0	13,2	19,7	17,9	24,4	22,6	29,1	27,3	33,8	32,0	5,6	3,8
		3	8,4	5,7	13,1	10,4	17,8	15,1	22,5	19,8	27,2	24,5	31,9	29,2	8,4	5,7
		4	6,5	2,9	11,2	7,6	15,9	12,3	20,6	17,0	25,3	21,7	30,0	26,4	11,2	7,6
		5	//	//	9,3	4,8	14,0	9,5	18,7	14,2	23,4	18,9	28,1	23,6	14,0	9,5
		6	//	//	7,4	2,0	12,1	6,7	16,8	11,4	21,5	16,1	26,2	20,8	16,8	11,4
AP3 SR-S	SN40017	2	22,0	18,0	32,0	28,0	42,0	38,0	52,0	48,0	62,0	58,0	72,0	68,0	12,0	8,0
		3	18,0	12,0	28,0	22,0	38,0	32,0	48,0	42,0	58,0	52,0	68,0	62,0	18,0	12,0
		4	14,0	6,0	24,0	16,0	34,0	26,0	44,0	36,0	54,0	46,0	64,0	56,0	24,0	16,0
		5	//	//	20,0	10,0	30,0	20,0	40,0	30,0	50,0	40,0	60,0	50,0	30,0	20,0
		6	//	//	16,0	4,0	26,0	14,0	36,0	24,0	46,0	34,0	56,0	44,0	36,0	24,0
AP3,5 SR-S	SN40018	2	41,5	30,0	58,5	47,0	75,5	64,0	92,5	81,0	109,5	98,0	126,5	115,0	21,0	9,5
		3	32,0	20,0	49,0	37,0	66,0	54,0	83,0	71,0	100,0	88,0	117,0	105,0	31,0	19,0
		4	26,0	3,0	43,0	20,0	60,0	37,0	77,0	54,0	94,0	71,0	111,0	88,0	48,0	25,0
		5	//	//	36,0	16,0	53,0	33,0	70,0	50,0	87,0	67,0	104,0	84,0	52,0	32,0
		6	//	//	30,0	5,0	47,0	22,0	64,0	39,0	81,0	56,0	98,0	73,0	63,0	38,0
AP4 SR-S	SN40019	2	52,7	42,4	76,7	66,4	100,7	90,4	123,7	113,4	149,7	139,4	173,7	163,4	28,6	18,3
		3	43,0	28,0	67,0	52,0	91,0	76,0	114,0	99,0	140,0	125,0	164,0	149,0	43,0	28,0
		4	34,0	14,0	58,0	38,0	82,0	62,0	105,0	85,0	131,0	111,0	155,0	135,0	57,0	37,0
		5	//	//	49,0	23,0	73,0	47,0	96,0	70,0	122,0	96,0	146,0	120,0	72,0	46,0
		6	//	//	40,0	9,0	64,0	33,0	87,0	56,0	113,0	82,0	137,0	106,0	86,0	55,0
AP4,5 SR-S	SN40111	2	96,8	77,5	140,4	121,1	184,0	164,7	227,6	208,3	271,2	251,9	314,8	295,5	53,3	34,0
		3	79,8	50,9	123,4	94,5	167,0	138,1	210,6	181,7	254,2	225,3	297,8	268,9	79,9	51,0
		4	62,8	24,2	106,4	67,8	150,0	111,4	193,6	155,0	237,2	198,6	280,8	242,2	106,6	68,0
		5	//	//	89,4	41,1	133,0	84,7	176,6	128,3	220,2	171,9	263,8	215,5	133,3	85,0
		6	//	//	72,4	14,4	116,0	58,0	159,6	101,6	203,2	145,2	246,8	188,8	160,0	102,0
AP5 SR-S	SN40020	2	123,7	99,4	178,7	154,4	234,7	210,4	289,7	265,4	345,2	320,9	400,7	376,4	67,6	43,3
		3	103,0	66,0	158,0	121,0	214,0	177,0	269,0	232,0	324,5	287,5	380,0	343,0	101,0	64,0
		4	81,0	32,0	136,0	87,0	192,0	143,0	247,0	198,0	302,5	253,5	358,0	309,0	135,0	86,0
		5	//	//	114,0	53,0	170,0	109,0	225,0	164,0	280,5	219,5	336,0	275,0	169,0	108,0
		6	//	//	92,0	19,0	148,0	75,0	203,0	130,0	258,5	185,5	314,0	241,0	203,0	130,0
AP5,5 SR-S	SN40112	2	179,8	136,4	258,7	215,3	337,5	294,1	416,4	373,0	495,2	451,8	574,0	530,6	100,0	56,6
		3	151,5	86,4	230,4	165,3	309,2	244,1	388,1	323,0	466,9	401,8	545,7	480,6	150,0	84,9
		4	123,1	36,4	202,0	115,3	280,8	194,1	359,7	273,0	438,5	351,8	517,3	430,6	200,0	113,3
		5	//	//	173,7	65,3	252,5	144,1	331,4	223,0	410,2	301,8	489,0	380,6	250,0	141,6
		6	//	//	145,3	15,3	224,1	94,1	303,0	173,0	381,8	251,8	460,6	330,6	300,0	170,0
AP6 SR-S	SN40021	2	257,0	200,0	371,0	314,0	484,0	427,0	597,0	540,0	711,5	654,5	825,0	768,0	140,0	83,0
		3	215,0	130,0	329,0	244,0	442,0	357,0	555,0	470,0	669,5	584,5	783,0	698,0	210,0	125,0
		4	173,0	60,0	287,0	174,0	400,0	287,0	513,0	400,0	627,5	514,5	741,0	628,0	280,0	167,0
		5	//	//	245,0	104,0	358,0	217,0	471,0	330,0	585,5	444,5	699,0	558,0	350,0	209,0
		6	//	//	203,0	34,0	316,0	147,0	429,0	260,0	543,5	374,5	657,0	488,0	420,0	251,0
AP8 SR-S	SN40022	2	478,0	386,0	691,0	599,0	904,0	812,0	1116,0	1024,0	1331,0	1239,0	1544,0	1452,0	252,0	160,0
		3	398,0	260,0	611,0	473,0	824,0	686,0	1036,0	898,0	1251,0	1113,0	1464,0	1326,0	378,0	240,0
		4	318,0	134,0	531,0	347,0	744,0	560,0	956,0	772,0	1171,0	987,0	1384,0	1200,0	504,0	320,0
		5	//	//	451,0	221,0	664,0	434,0	876,0	646,0	1091,0	861,0	1304,0	1074,0	630,0	400,0
		6	//	//	371,0	95,0	584,0	308,0	796,0	520,0	1011,0	735,0	1224,0	948,0	756,0	480,0

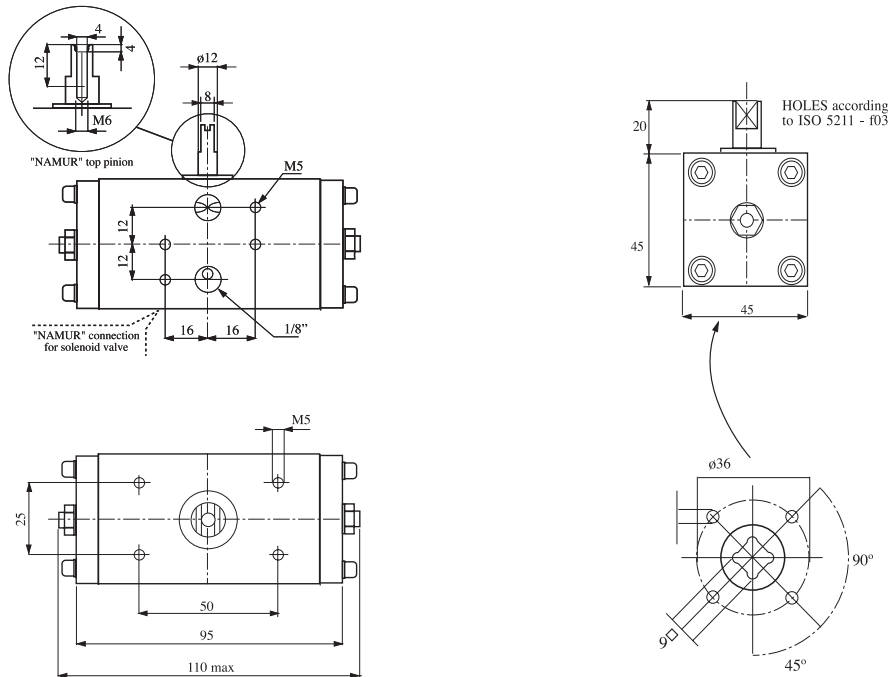
# Pneumatic Rotary Actuators

Dimensions, mm [unless otherwise indicated]



Model	A	B	C	D	E	F	G	H	O	P	Q	ØR	□S	T	ISO 5211
AP1	137	60	67	87	20	42	41	1/8"	80	//	30	36	9	M5	F03
AP2	150	73	83	103	20	42	44,5	1/4"	80	//	30	50	11	M6	F05
AP3	204	85	100	120	20	50	49,5	1/4"	80	//	30	50/70	14	M6/M8	F05/F07
AP3,5	230	98	110	130	20	50	53	1/4"	80	//	30	70	17	M8	F07
AP4	271	110	125	145	20	50	58	1/4"	80	//	30	70/102	17	M8/M10	F07/F10
AP4,5	305	128	142	172	30	58	69	1/4"	80	130	30	102	22	M10	F10
AP5	360	140	155	185	30	//	//	1/4"	80	130	30	102	22	M10	F10
AP5,5	380	160	176	206	30	//	//	1/4"	80	130	30	125	27	M12	F12
AP6	462	175	200	230	30	//	//	1/4"	80	130	30	125	27	M12	F12
AP8	530	215	250	300	50	//	//	1/4"	//	130	30	140	36	M16	F14

## APO Dimensions



## Weight [Kg]

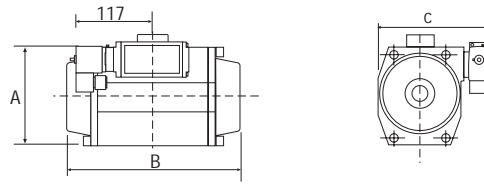
Model	AP0	AP1	AP2	AP3	AP3,5	AP4	AP4,5	AP5	AP5,5	AP6	AP8
Spring Return	//	1,08	1,74	3,16	4,66	6,34	9,8	13,1	15,2	24,6	54,5
Double Acting	0,48	0,85	1,62	2,92	4,18	5,86	8,6	11,18	18,8	21,2	43

In case of special application requirements, please consult for advice.

We reserve the right to make technical changes without notice. siractu/mc/bc-sin/5099

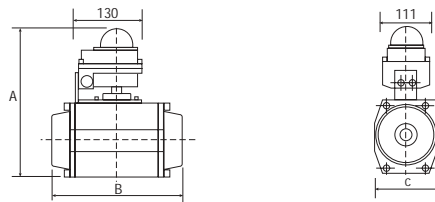
# Pneumatic Rotary Actuators

Accessories (other options on request)



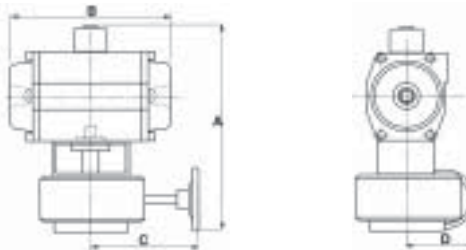
**Namur solenoid valve available in 3/2, 4/2 or 5/2 way.**  
Solenoid valve body of Brass or Polyamide with NBR seal.  
Inlet/exhaust port connection in 1/8" or 1/4".  
Standard voltage of 24VDC, 24, 110 or 230 VAC.  
Explosion proof and intrinsically safe version on request.

Model	A	B	C
AP1DA/SR	97	137	97
AP2DA/SR	113	150	110
AP3DA/SR	130	204	122
AP3.5DA/SR	140	230	135
AP4DA/SR	155	271	147
AP4.5DA/SR	182	305	165
AP5DA/SR	195	360	177
AP5.5DA/SR	216	380	197
AP6DA/SR	240	462	212
AP8DA/SR	310	530	252



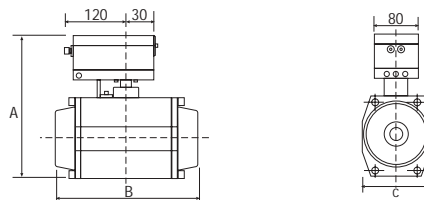
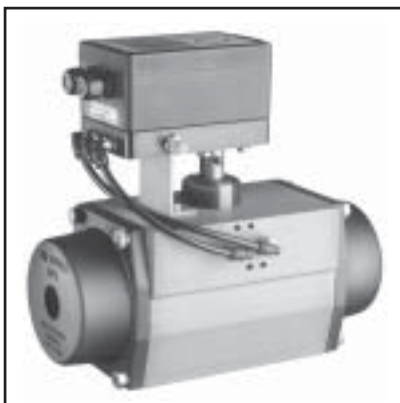
**Limit switch box with tri-dimensional position indicator.**  
Weather-proof IP65 enclosure of powder coated die-cast aluminium and polycarbonate position indicator cover.  
Standard with 2 x SPDT mechanical switches with 1/2" dual conduit entries.  
Transmitter current output, proximity switch, potentiometer resistive output and explosion proof version on request.

Model	A	B	C
AP1DA/SR	231	137	60
AP2DA/SR	247	150	73
AP3DA/SR	264	204	85
AP3.5DA/SR	274	230	98
AP4DA/SR	289	271	110
AP4.5DA/SR	316	305	128
AP5DA/SR	329	360	140
AP5.5DA/SR	350	380	160
AP6DA/SR	374	462	175
AP8DA/SR	444	530	215



**Manual override gear box.**  
Weather proof housing of cast iron with treated carbon steel worm. Lubricated for life.

Model	A	B	C	D
AP1DA/SR	228	137	214	167
AP2DA/SR	244	150	214	167
AP3DA/SR	261	204	214	167
AP3.5DA/SR	271	230	214	167
AP4DA/SR	286	271	214	167
AP4.5DA/SR	313	305	214	167
AP5DA/SR	326	360	214	167
AP5.5DA/SR	350	380	343	247
AP6DA/SR	374	462	343	247
AP8DA/SR	444	530	343	247

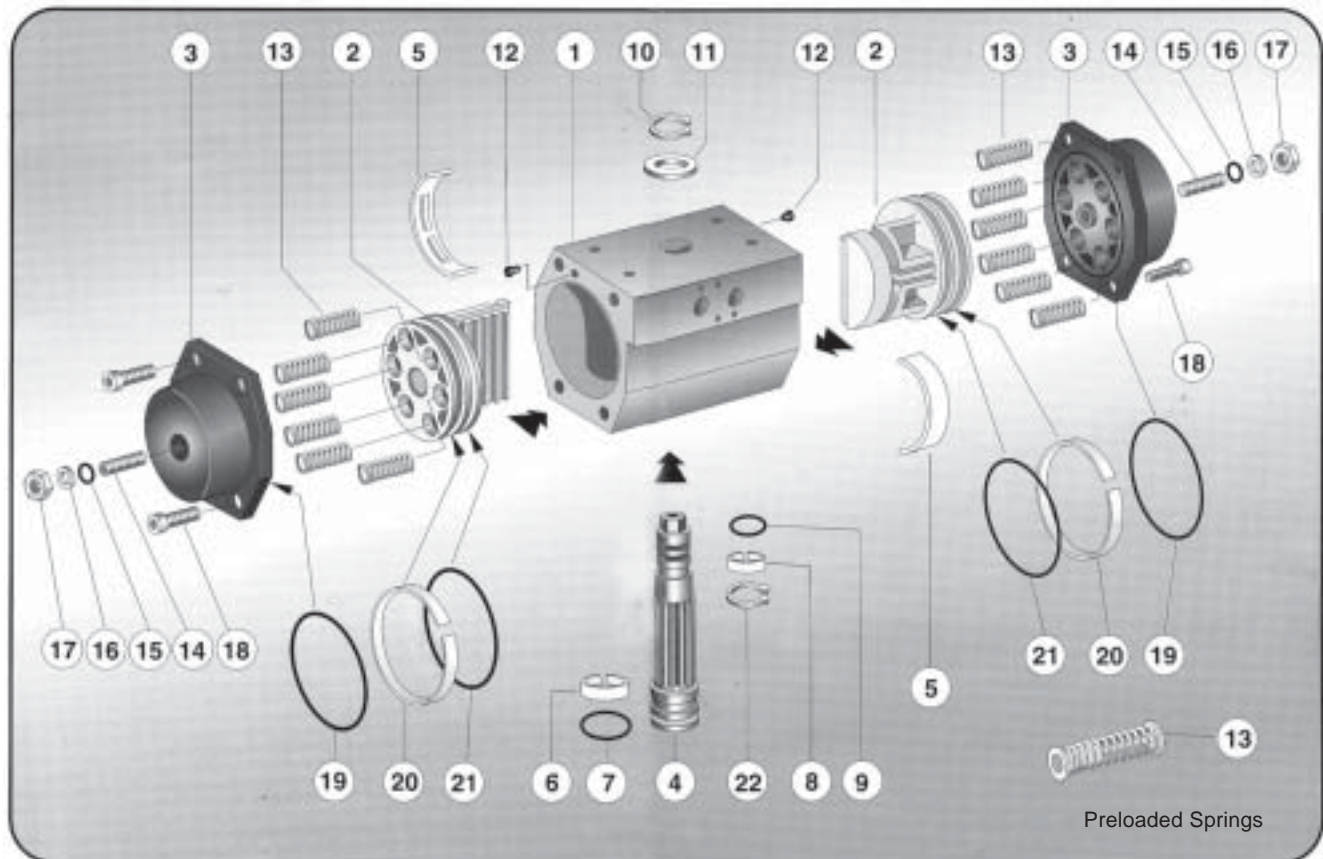


**Smart I/P positioner, integrated process controller with PID algorithm.**  
Power supply 24 VDC.  
Positioner input signal, selectable 0-10V, 0-20mA, 4-20mA.  
Process controller input signal, 4-20mA.  
LCD display with user friendly menu guided operation.  
Programmable flow curves.  
Automatic self-adjustment of basic parameters.

Model	A	B	C
AP1DA/SR	197	137	60
AP2DA/SR	213	150	73
AP3DA/SR	230	204	85
AP3.5DA/SR	240	230	98
AP4DA/SR	255	271	110
AP4.5DA/SR	282	305	128
AP5DA/SR	295	360	140
AP5.5DA/SR	316	380	160
AP6DA/SR	340	462	175
AP8DA/SR	410	530	215

# Pneumatic Rotary Actuators

## Installation and Maintenance Instruction



### Lubrication

All moving parts are factory lubricated for cycle life of actuator. However, under continuous operation and arduous environmental conditions, re-lubrication may be required.

### Supply

Filtered dry or lubricated air, non-corrosive gas, water or light hydraulic oil can be used.

### Hand Controls

When fully de-pressurised, the actuator can be operated by handlever or gearbox for emergency operation.

### Installation

The actuator can be mounted in any position. Before mounting the actuator on the valve, make sure that the actuator shaft and the valve shaft are aligned properly to avoid any friction.

### Adjustment

All actuators have a standard 90° stroke. External travel stops at both end caps allow adjustment by +/- 5°.

### Maintenance

- A) Before dismantling make sure that air supply and all electrical connections have been disconnected.
- B) Remove end bolts (18) from end cap (3).
- C) Take off end caps (3).
- D) Turn pinion (4) counter clockwise, so that pistons (2) get out of the body (1).
- E) Remove the pinion (4) from the lower part of the body by pressing from above.
- F) Replace wearing parts (please refer to suggested spare parts list for maintenance), as necessary.
- G) Internal parts have to be re-lubricated accordingly.
- H) For re-assembly, follow above procedure in reverse orders.

Items	Description	Qty
1	Actuator body	1
2	Piston	2
3	End cap	2
4	Pinion	1
*5	Piston guide	2
*6	Pinion guide ring	1
*7	"O" ring	1
*8	Pinion guide ring	1
*9	"O" ring	1
10	Circlip	1
11	Thrust washer	1
*12	Plug	2
13	Springs	4-12
14	Screw external stroke	2
15	"O" ring	2
16	Plain washer	2
17	Stop nut	2
18	End cap bolts	8
*19	"O" ring	2
*20	Piston guide ring	2
*21	"O" ring	2
22	Circlip anti-blow out	1

\* Suggested spare parts list for maintenance