

EMICO

EA SERIES SR & DA PNEUMATIC ACTUATORS





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DESIGN

EMICO's EA Series, Aluminium Rack & Pinion, Double Acting and Spring Return Pneumatic Actuators are based on innovative and patented technology.

These actuators feature a top-mount malfunction indicator and open / close stop adjustment as standard.

State-of-the-art engineering has also enabled reduction in size without the loss of torque.

The features and characteristics of these actuators have kept pace with fourth generation pneumatic actuators around the world.

FEATURES

- **Indicator**

Visual position indicator to NAMUR standard is convenient for mounting accessories such as limit switch, positioner, etc.

- **Pinion**

The pinion is high-precision and integrative, made from nickel alloy steel and in full conformance to the latest standards of ISO5211, DIN3337 and NAMUR. Dimensions can be customised. Also available in stainless steel.

- **Actuator Body**

The extruded aluminium alloy ASTM6005 body is first hard anodized (40um thick), followed by polyester powder coating (min. 70um thick). Other coatings such as PTFE or nickel plated are available on request.

- **End Caps**

Die-cast aluminium is first hard anodized (40um thick), followed by polyester powder coating (min. 70um thick). Other coatings such as PTFE or nickel plated are available on request.

- **Pistons**

The twin-rack pistons are made from die-cast hard-anodised aluminium. They have symmetric mounting position, long life cycle and fast operation. Rotation may be reversed by simply inverting the pistons.

- **Travel Adjustment**

Two independent, external travel-stop adjustment bolts allow precise and easy adjustments to $\pm 5^\circ$ in both open and close positions.

- **High Performance Springs**

Pre-loaded, coated stainless steel springs are corrosion-resistant and offer longer cycle life. They can be dis-assembled safely and conveniently. Different torque requirements can be accommodated by changing the number of springs.

- **Bearings & Guides**

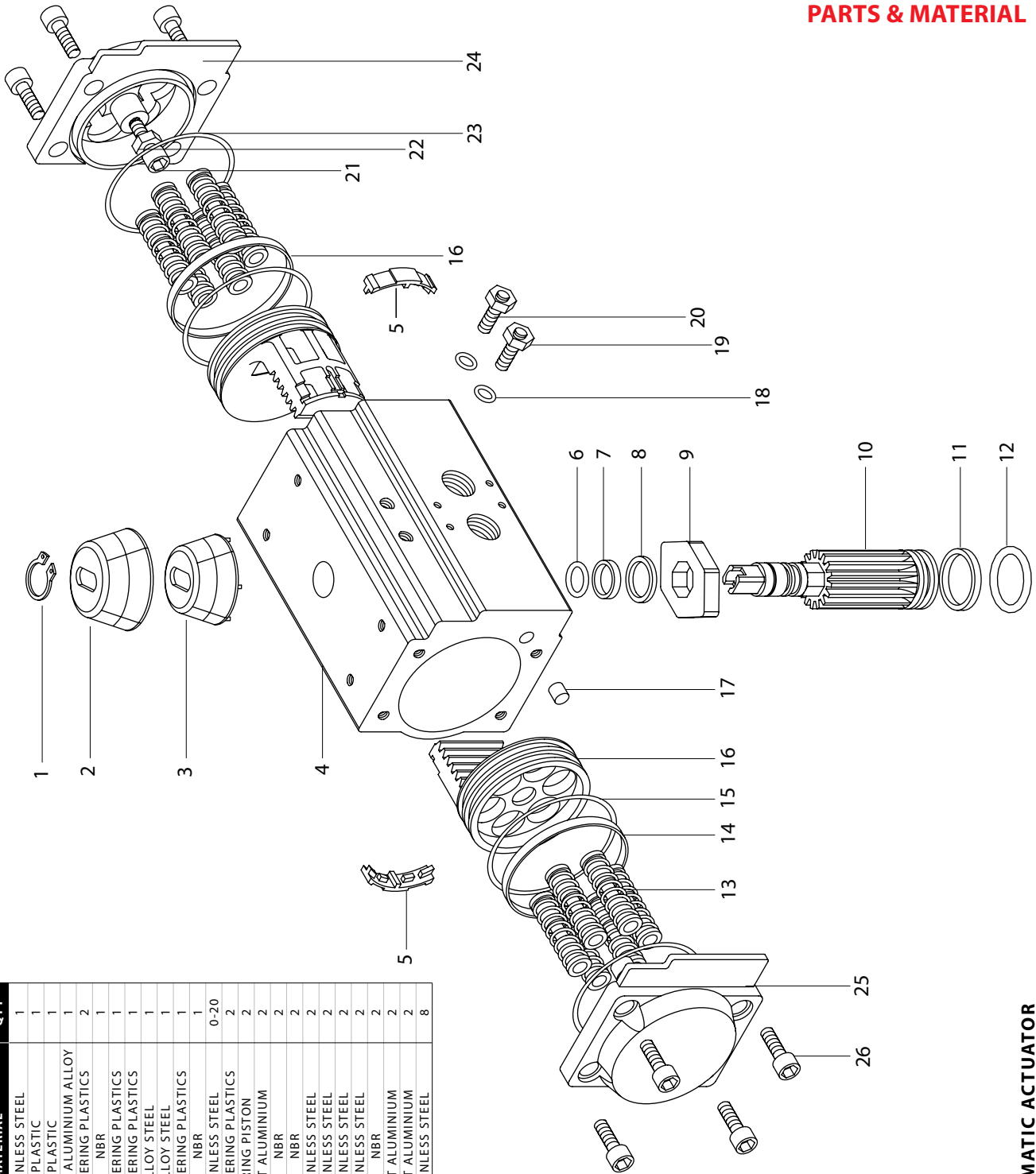
These are made from low-friction, long-life engineered plastic material to avoid direct contact between metals and assist with smooth operation. Maintenance and replacement is easy and convenient.

- **O-Rings**

NBR rubber O-Rings provide trouble-free operation at standard temperature ranges. Viton or Silicone is used for lower or higher temperatures.



PARTS & MATERIAL

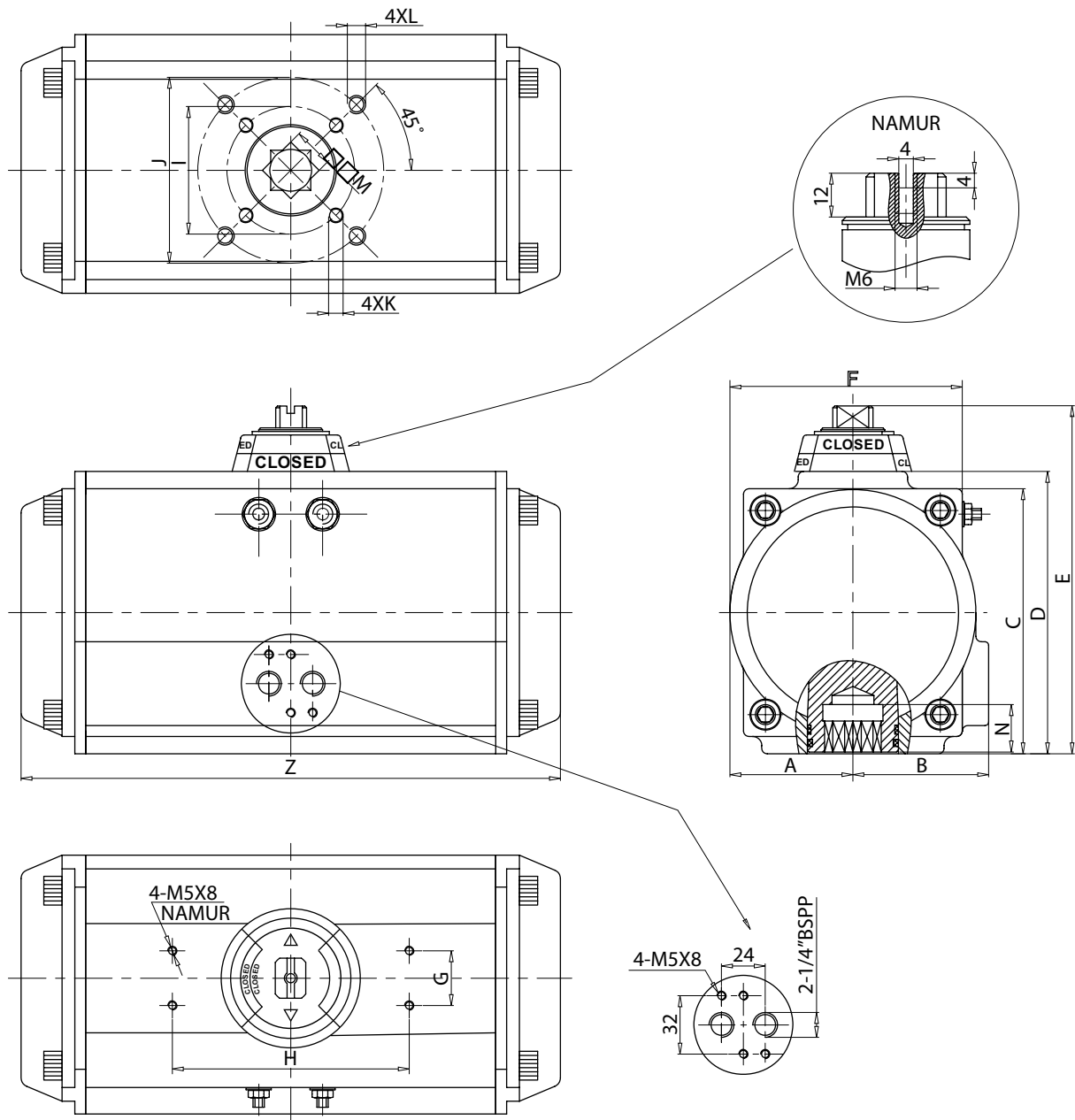


NO.	PART	MATERIAL	QTY
1	SPRING CLIP	STAINLESS STEEL	1
2	HOUSING INDICATOR	PLASTIC	1
3	INDICATOR	PLASTIC	1
4	BODY	EXTRUDED ALUMINIUM ALLOY	1
5	GUIDE PISTON	ENGINEERING PLASTICS	2
6	O-RING (PINION TOP)	NBR	1
7	WASHER (PINION TOP)	ENGINEERING PLASTICS	1
8	BEARING (PINION TOP)	ENGINEERING PLASTICS	1
9	CAM	ALLOY STEEL	1
10	PINION	ALLOY STEEL	1
11	BEARING (PINION BOTTOM)	ENGINEERING PLASTICS	1
12	O-RING (PINION BOTTOM)	NBR	1
13	SPRING	STAINLESS STEEL	0-20
14	RING (PISTON)	ENGINEERING PLASTICS	2
15	O-RING (PISTON)	O-RING PISTON	2
16	PISTON	CAST ALUMINIUM	2
17	HOLE SEALANT	NBR	2
18	O-RING	NBR	2
19	ADJUSTMENT NUT	STAINLESS STEEL	2
20	ADJUSTMENT SCREW	STAINLESS STEEL	2
21	STOP SCREW	STAINLESS STEEL	2
22	NUT (STOP SCREW)	STAINLESS STEEL	2
23	O-RING (END CAP)	NBR	2
24	END CAP RIGHT	CAST ALUMINIUM	2
25	END CAP LEFT	CAST ALUMINIUM	2
26	CAP SCREW	STAINLESS STEEL	8



EMICO EA SERIES SR & DA PNEUMATIC ACTUATOR

DIMENSIONAL DRAWINGS



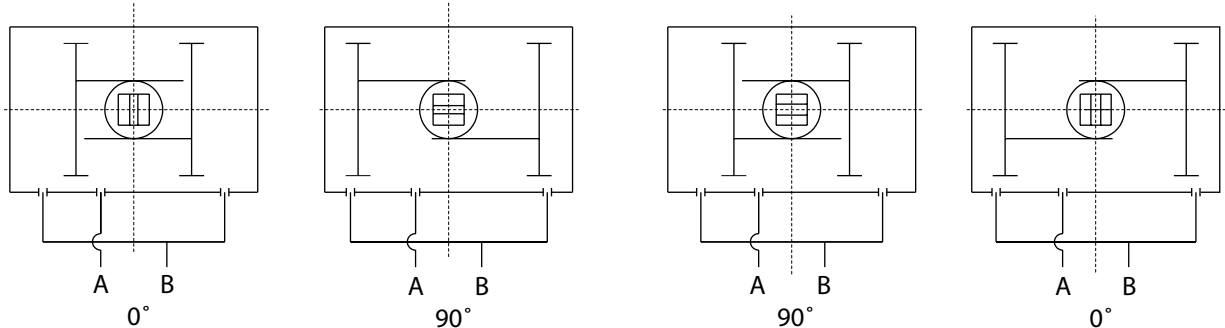
Unit: mm

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Z	Air Connection
EA-40	28.5	36.5		60	90	52	30	80	F36	F50	M5x8	M6x10	11	14	120	1/4"BSPP
EA-52	30	41.5	65.5	72	102	65	30	80	F36	F50	M5x8	M6x10	11	14	147	1/4"BSPP
EA-63	36	47	81	87.5	117.5	72	30	80	F50	F70	M6x10	M8x13	14	18	168	1/4"BSPP
EA-75	42	53	94	99.5	129.5	81	30	80	F50	F70	M6x10	M8x13	14	18	184	1/4"BSPP
EA-83	46	57	98.5	108.7	138.7	92	30	80	F50	F70	M6x10	M8x13	17	21	204	1/4"BSPP
EA-92	50	58.5	111	116.5	146.5	98	30	80	F50	F70	M6x10	M8x13	17	21	262	1/4"BSPP
EA-105	57.5	64	122.5	133	163	109.5	30	80	F70	F102	M8x13	M10x16	22	26	268	1/4"BSPP
EA-125	67.5	74.5	145.5	155	185	127.5	30	80	F70	F102	M8x13	M10x16	22	26	301	1/4"BSPP
EA-140	75	77	161	172	202	137.5	30	80	F102	F125	M10x16	M12x20	27	31	390	1/4"BSPP
EA-160	87	87	184	197	227	158	30	80	F102	F125	M10x16	M12x20	27	31	458	1/4"BSPP
EA-190	103	103	216	230	260	189	30	80/130		F140		M16x25	36	50	525	1/4"BSPP
EA-210	113	113	235.5	255	285	210	30	80/130		F140		M16x25	36	50	532	1/4"BSPP
EA-240	130	130	264.5	289	319	245	30	80/130		F165		M20x25	46	60	602	1/4"BSPP
EA-270	147	147	299	326	356	273	30	80/130		F165		M20x25	46	60	722	1/4"BSPP

OPERATING PRINCIPLES

Pneumatic actuators are available in two versions - double acting and single acting (spring return).

DOUBLE ACTING



Standard Rotation

(Actuator closed with valve closed):

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

Air to port B forces pistons inwards, causing pinion to turn clockwise while air is being exhausted from port A.

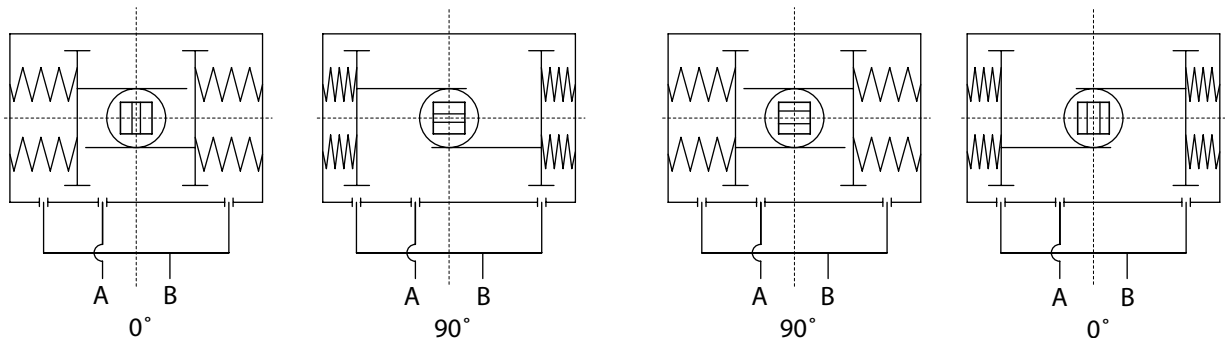
Reverse Rotation

(Actuator closed with valve open):

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

Air to port B forces pistons inwards, causing pinion to turn counterclockwise while air is being exhausted from port A.

SPRING RETURN



Standard Rotation

(Actuator closed with valve closed):

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

With loss of air pressure on port A, the stored energy in the springs forces pistons inwards. The pinion turns clockwise while air is being exhausted from port A.

Reverse Rotation

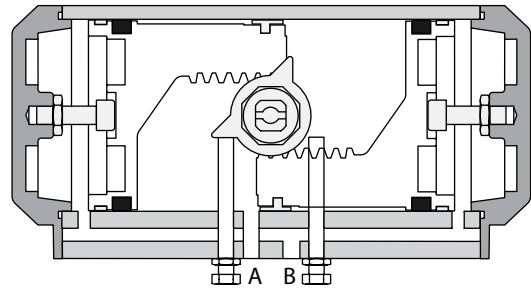
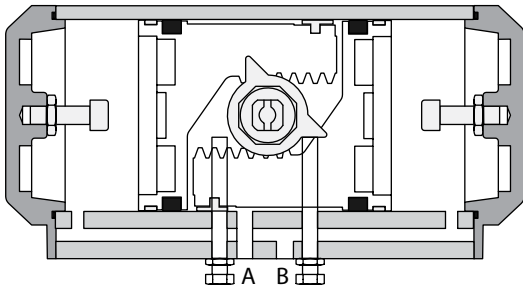
(Actuator closed with valve open):

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

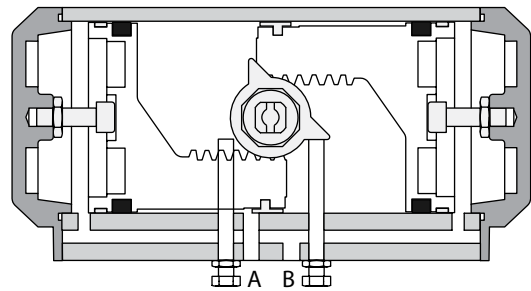
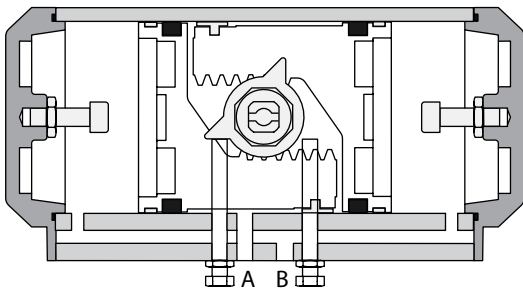
With loss of air pressure on port A, the stored energy in the springs forces pistons inwards. The pinion turns counterclockwise while air is being exhausted from port A.

LIMIT STOP ADJUSTMENT

STANDARD ROTATION (R-Closed)



REVERSE ROTATION (R-Closed)

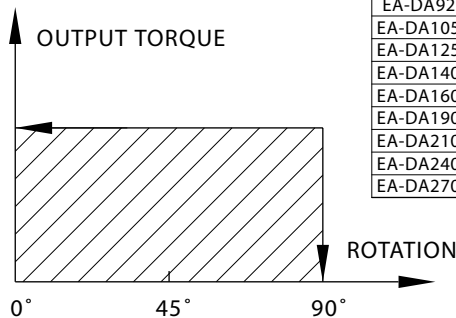


Limit Stop bolt adjustment is the same for both standard and reverse rotation.
The right bolt is for the valve closed position adjustment at 0° with $\pm 5^\circ$.
The left bolt is for the valve open position adjustment at 90° with $\pm 5^\circ$.

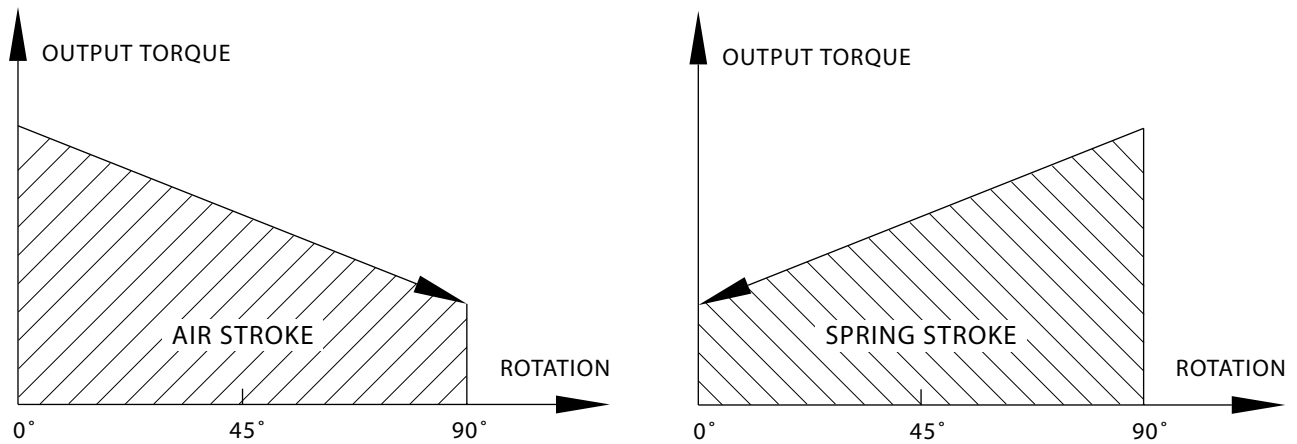
OUTPUT TORQUE FOR DOUBLE ACTING ACTUATORS

Unit: Nm

Model	Air Pressure (Bar)									
	2	2.5	3	4	4.5	5	5.5	6	7	8
EA-DA40	4.8	6.0	7.2	9.5	10.7	11.9	13.1	14.31	16.71	19.1
EA-DA52	8.0	10.0	12.0	16.0	18.0	20.0	21.9	23.9	27.9	31.9
EA-DA63	14.6	18.2	21.9	29.2	32.8	36.5	40.1	43.8	51.1	58.4
EA-DA75	20.1	25.1	30.1	40.1	45.1	50.2	55.2	60.2	70.2	80.3
EA-DA83	31.4	39.2	47.0	62.7	70.5	78.4	86.2	94.1	109.7	125.4
EA-DA92	45.1	56.4	67.7	90.3	101.6	112.9	124.1	135.4	158.0	180.6
EA-DA105	66.1	82.7	99.2	132.2	148.8	165.3	181.8	198.4	231.4	264.5
EA-DA125	100.3	125.4	150.5	200.6	225.7	250.8	275.9	301.0	351.1	401.3
EA-DA140	171.0	213.8	256.5	342.0	384.8	427.5	470.3	513.0	598.5	684.0
EA-DA160	266.0	332.5	399.0	532.0	598.5	665.0	731.5	798.0	931.0	1064.0
EA-DA190	425.6	532.0	638.4	851.2	957.6	1064.0	1170.4	1276.8	1489.6	1702.4
EA-DA210	532.0	665.0	798.0	1064.0	1197.0	1330.0	1463.0	1596.0	1862.0	2128.0
EA-DA240	769.5	961.9	1154.3	1539.0	1731.4	1923.8	2116.1	2308.5	2693.3	3078.0
EA-DA270	1169.6	1462.1	1754.5	2339.3	2631.7	2924.1	3216.5	3508.9	4093.7	4678.6



OUTPUT TORQUE FOR SPRING RETURN ACTUATORS



Unit: N·m

Model	Spring Qty	Air Pressure (Bar)														Spring Output		
		2.5		3		4		5		6		7		8		90°	0°	
		0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	Start	End	
EA-SR52	5	5.7	3.8	7.6	5.7												6.2	4.3
	6	4.9	2.5	6.9	4.5	10.9	8.5										7.4	5.0
	7	4.0	1.3	6.0	3.3	9.8	7.3	14.0	10.4								8.6	5.9
	8			5.2	2.0	9.2	6.0	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
EA-SR63	5	11.4	7.7	15.0	11.4	22.3	14.9										10.4	6.8
	6	10.1	5.7	13.6	9.3	20.9	16.6	28.3	23.9								12.5	8.2
	7	8.6	3.6	12.5	7.2	19.5	14.5	26.8	21.9								14.6	9.6
	8			10.9	5.1	18.2	12.4	25.5	19.8	32.8	27.0	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					1.4	8.2	22.8	15.6	30.0	22.8	37.3	30.1	44.7	37.4		20.9	13.7
	11							21.5	13.5	28.7	20.7	36.0	28.0	43.3	35.3	22.9	15.0	
EA-SR75	5	14.4	10.6	19.4	15.5	29.5	25.7										14.5	10.5
	6	12.4	7.6	17.3	12.6	27.4	22.7	37.5	32.8								17.4	12.7
	7	10.4	4.8	15.2	9.7	25.3	19.9	35.4	29.9								20.3	14.8
	8			13.1	6.8	23.1	16.9	33.3	27.0	43.2	37.0	53.3	47.0				23.2	16.9
	9					21.0	14.1	31.2	24.1	41.1	34.1	51.2	44.2				26.1	19.0
	10					19.0	11.1	28.8	21.2	39.0	31.2	49.1	41.2	59.1	51.2		29.0	21.1
	11							27.0	18.3	37.0	28.3	47.0	38.4	57.0	48.4	31.9	23.2	
EA-SR83	5	23.3	16.1	31.1	24.0	46.8	39.7										23.0	15.8
	6	20.1	11.5	28.0	19.3	43.7	35.1	59.4	50.7								27.6	19.0
	7	17.0	6.9	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	37.0	65.6	52.6	81.2	68.3				41.4	28.5
	10					31.0	16.6	46.7	32.3	62.4	48.0	78.1	63.7	93.8	79.3		46.0	31.6
	11							43.6	27.7	59.3	43.4	75.0	59.1	90.6	74.8		50.6	34.8
EA-SR92	5	33.1	22.0	44.2	33.2	66.8	55.9										34.4	23.3
	6	28.4	15.2	39.6	26.4	62.2	49.0	84.8	71.6								41.2	28.0
	7	23.8	8.2	34.9	19.4	57.5	42.1	80.2	64.7								48.1	32.7
	8			31.3	12.6	52.9	35.2	75.5	57.9	98.1	80.5	120.7	103.0				55.0	37.3
	9					48.2	28.4	70.9	51.0	93.5	73.6	116.0	96.1				61.9	42.0
	10					43.6	21.5	66.2	44.1	88.8	66.7	111.3	89.2	134.0	111.8		68.7	46.7
	11							61.5	37.2	84.1	59.9	106.6	82.4	129.2	105.0	75.6	51.4	
EA-SR105	5	51.0	33.4	67.5	49.9	100.6	83.0										49.2	31.6
	6	44.7	23.5	61.1	40.0	94.2	73.2	127.3	106.2								59.1	38.0
	7	38.4	13.7	54.9	30.3	87.9	63.4	121.0	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
	10					68.9	33.4	102.0	66.5	135.1	99.6	168.2	132.6	201.2	165.7	98.4	63.3	
	11							95.7	57.0	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		

Unit: Nm

Model	Spring Qty	Air Pressure (Bar)														Spring Output		
		2.5		3		4		5		6		7		8		90°	0°	
		0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	90° Start	0° End	
EA-SR125	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
EA-SR140	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
EA-SR160	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	237	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
	12							330	165	463	298	596	431	729	564		500	335
EA-SR190	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
EA-SR210	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
EA-SR240	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
EA-SR270		903	675	1195	968	1779	1552										787	560
		790	519	1083	811	1667	1396	2252	1981								943	672
		679	361	972	654	1556	1238	2141	1823								1101	783
				860	497	1444	1081	2029	1666	2614	2252	3199	2836				1258	895
						1332	923	1917	1509	2502	2094	3087	2678				1416	1007
						1220	767	1805	1352	2390	1937	2974	2521	3560	3107		1572	1119
								1693	1194	2278	1779	2862	2364	3448	2949		1730	1231
								1582	1037	2167	1623	2751	2207	3336	2792		1887	1342

AIR CONSUMPTION

Unit: L

Model	Air Volume Opening	Air Volume Closing	Model	Air Volume Opening	Air Volume Closing
EA-40	0.05	0.06	EA-125	1.6	1.4
EA-52	0.12	0.16	EA-140	2.5	2.2
EA-63	0.21	0.23	EA-160	3.7	3.2
EA-75	0.3	0.34	EA-190	5.9	5.4
EA-83	0.43	0.47	EA-210	7.5	7.5
EA-92	0.64	0.73	EA-240	11	9
EA-105	0.95	0.88	EA-270	17	14

Air consumption is calculated from Air Supply, Air Volume and Action Cycle Times, as follows:

$$\frac{\text{L / Min}}{\text{Action Cycle Times (/ min)}} = \frac{\text{Air Volume (Air Volume Opening + Air Volume Closing)} \times \left[\frac{[\text{Air Supply (Kpa)} + 101.3]}{101.3} \right]}{1}$$

WEIGHT

Unit:Kg

Model	EA-40	EA-52	EA-63	EA-75	EA-83	EA-92	EA-105	EA-125	EA-140	EA-160	EA-190	EA-210	EA-240	EA-270
DA	0.8	1.38	2.03	2.7	3.13	4.6	6.77	8.9	13.25	20.14	31.3	46.8	67.28	96.9
SR		1.45	2.05	2.9	3.6	5.22	6.85	10.11	15.55	24	35.25	54.8	80.2	118

MANUAL TO ACTUATOR OPERATION

1. Remove handle and other parts, eg. circlip from valve stem, valve travel stop plate, from manual valve.
2. If actuator is to be mounted "fail close", turn valve stem 90° using handle. If "fail open", then leave as is.
3. Fit mounting kit and adapter and bolt up.
4. Assemble actuator to mounting kit.
5. Test assembled package for open/close operation using compressed air to actuator port.
6. Do not insert your hands inside the valve.
7. We suggest ensuring clean air supply pipes, especially when the plant is without an air filtration system.
8. A spacer between the actuator and valve will be necessary with fluids at high temperature.

OPERATING CONDITIONS

Operating Media

Dry or lubricated air or non-corrosive gas. Maximum particle size should be less than 30um.

Air Supply Pressure

Minimum supply pressure is 2.5 Bar. Maximum supply pressure is 10 Bar.

Operating Temperature

Standard (NBR O-Ring): -20°C~+80°C.

Low Temperature (Silicone O-Ring): -35°C~+80°C.

High Temperature (Viton O-Ring): -15°C~+150°C.

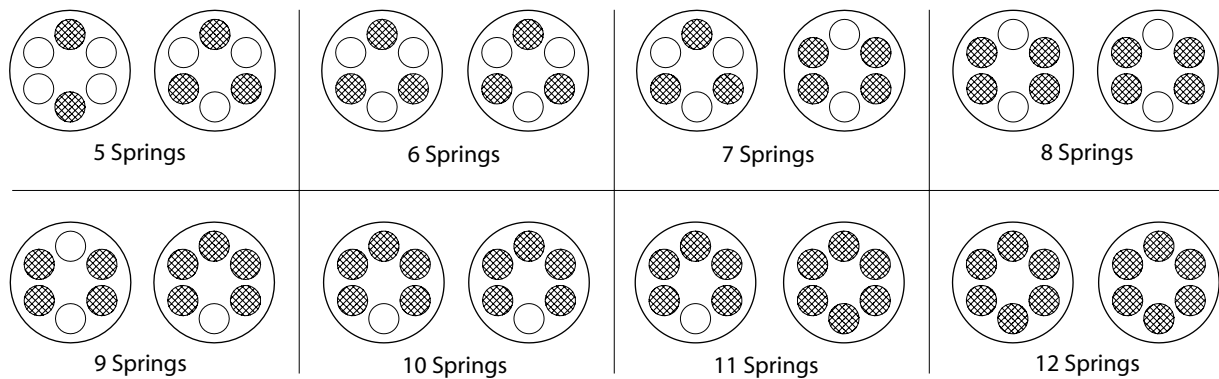
Travel Adjustment

Adjustment range of ±5° for 0° and 90° rotation.

Application

Indoor and outdoor.

SPRING PACKS FOR SPRING RETURN ACTUATORS



MAINTENANCE

- It is recommended that periodic checks be carried out to ensure that all fasteners remain tight.
- The actuator is supplied ready-lubricated with no further lubrication required. If lubrication is deemed necessary, use EP-1 grease or local equivalent.
- Under certain working conditions (heavy duty, non-compatible operating media or abnormal working conditions), it is recommended that internal seals be checked periodically and replaced when necessary.
- On spring return actuators, spring fatigue may set in, requiring replacement. Springs should always be replaced in full sets.

NOTE:

Under normal working conditions, the actuators will be maintenance-free as it has been lubricated to last a normal working life. Should it become necessary to replace seals, please contact us for assistance. Kits and Instructions are available to customers on request.

ACCESSORIES



EMICO ALS-200 Series Mini Type Limit Switch Box

- Weather Protection IP67.
- ISO5211 Bracket. Carbon Steel and Stainless Steel available.
- Mechanical Switches, Proximity Sensors, etc.

EMICO ALS-300 Series Multi-Function Type Limit Switch Box

- Weather Protection IP67.
- ISO5211 Bracket. Carbon Steel and Stainless Steel available.
 - Mechanical Switches, Proximity Sensors, etc.
 - Position Transmitter (4-20mA) available.





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