



**RE SERIES**

**Alphaair**

**EXTERNAL ADJUSTMENT**

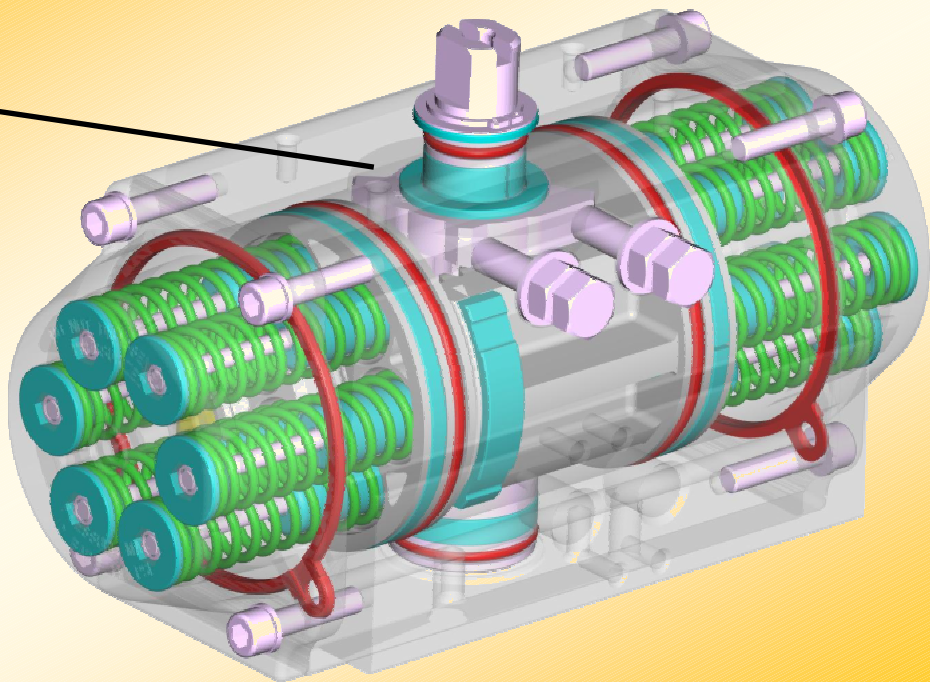
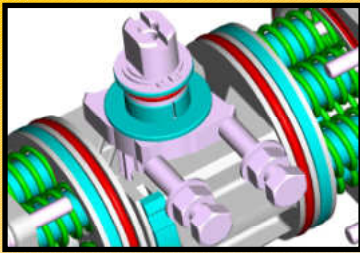


90° PNEUMATIC ACTUATORS

September 2014



# ALPHAIR PNEUMATIC ACTUATORS EXTERNAL ADJUSTMENT New "RE" SERIES



The new series of ALPHAIR Pneumatic Actuators with special "External Adjustment" system meets every quality and precision requirement.

The new "External Adjustment" system guarantees maximum precision on rotation adjusting, for normal and heavy conditions, in any application field.

Suitable for every requirement, ALPHAIR Pneumatic Actuators with special "External Adjustment" system are carefully designed for maximum torque rating and maximum lifetime.

More compact, heavy and reliable, ALPHAIR Pneumatic Actuators with special "External Adjustment" system can be easily assembled on every kind of valve.

## STANDARD VERSION FEATURES

- ASTM 6063 extruded Aluminium Body, inside surface finishing Ra= 0,4-0,6. 25 µ Hard Anodizing.
- EN AB 46100 die-cast Aluminium alloy Pistons, 15 micron Anodizing.
- EN AB 46100 die-cast Aluminium alloy Covers, painted with 60-80 µ polyester powder.
- Carbon steel Shaft, 20 µ nickel-plated. Stainless Steel AISI 304 (A2) or AISI 316 (A4) as Optional.
- External adjusting gear, in Stainless Steel AISI 316 (A4).
- Screws in Stainless Steel AISI 304 (A2).
- Seals in nitrile rubber NBR.
- Optional HIGH Temperature = FPM/FKM. Optional LOW Temperature = SILICONE.
- Bearings in low friction LAT-LUB acetalic resin, easily replaceable for maintenance.
- Optional HIGH/LOW Temperature = PA 66. Optional VERY LOW Temperature = LEXAN.
- Pre-compressed Spring Cartridges, easily replaceable for maintenance, 25-30 micron polyester painted.
- Standard grease: High performances Syntetic Grease. Optional: special grease for HIGH/LOW Temperature.
- Several special protections available for chemical, pharmaceutical, food and industrial environments.
- Rotation adjustment +/-5° in both opening and closing position. Assembly precision +/-1°, made by electronic devices.
- Double lower drilling for valve fastening and centering, according to **ISO 5211-DIN 3337 Standards**.
- Double square lower female shaft key (starlike), according to **ISO 5211-DIN 3337 Standards** for assembly on valves with square key on line (0°) and diagonal key (45°).
- Solenoid connections according to **NAMUR VDI\VDE-3845 Standards**.
- Top drilling for accessories fastening, and upper shaft end according to **NAMUR VDI\VDE-3845 Standards**.
- Position indicator on request, enabling switch-box assembly on top.
- Aluminium adhesive nameplates, with progressive serial number punched.
- Lubrication carried out by the manufacturer, guaranteed for min. 1.000.000 operations.
- Running test and 100% seal test carried out with electronic equipment and certification of every individual product.
- Standard execution for temperatures from -20°C to +80°C (optional, special execution for extreme temperatures).
- According to **ATEX-94/9-CE Standard** for explosive environment; STANDARD version actuator: II 2GD c Tmax = 95°C.
- According to EN 15714-3 design and manufacture standard requirements.

AIR SUPPLY	TEMPERATURE RANGE	FEEDING PRESSURE	TURNING ROTATION RANGE
Dry or lubricated filtered compressed air.	<b>Standard</b> -20° +80°C (-4 +175°F)	<b>8 bar/120 psi – CONTINUOUS</b> 10 bar/142 psi - MAXIMUM	+/- 5°
	HIGH Temperature -20° +150°C (-4 + 300°F) LOW Temperature -40° +80°C (-40 + 175°F) VERY LOW Temperature -60° +80°C (-76 + 175°F)		

**DOUBLE ACTING TORQUES IN Nm**

**RE Series = 90°**

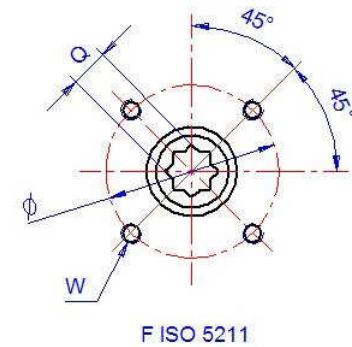
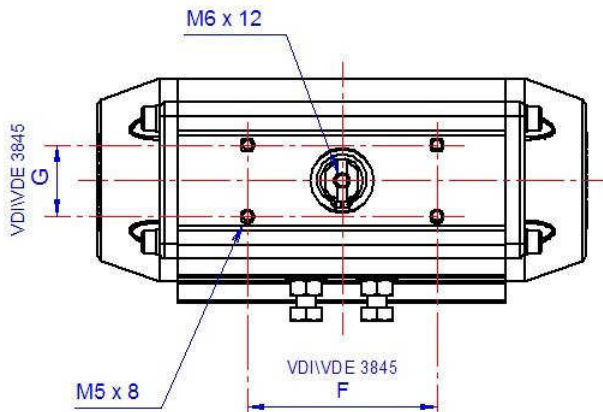
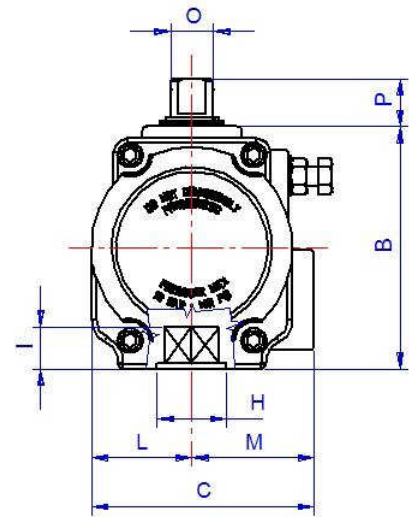
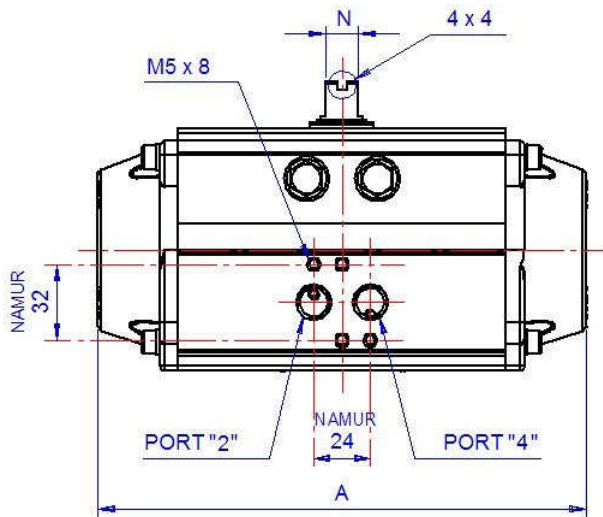
TYPE	AIR SUPPLY IN BAR									
	1	2	3	4	5	6	7	8	9	10
RE 051	3,3	6,7	10,0	13,4	16,7	<b>20,1</b>	23,4	26,8	30,1	33,5
RE 064	5,9	11,8	17,8	23,7	29,6	<b>35,5</b>	41,4	47,4	53,3	59,2
RE 076	11,8	23,5	35,3	47,1	58,9	<b>70,6</b>	82,4	94,2	105,9	117,7
RE 086	17,2	34,5	51,7	68,9	86,1	<b>103,4</b>	120,6	137,8	155,0	172,3
RE 101	27,5	54,9	82,4	109,8	137,3	<b>164,8</b>	192,2	219,7	247,1	274,6
RE 116	43,7	87,4	131,1	174,9	218,6	<b>262,3</b>	306,0	349,7	393,4	437,1
RE 126	56,6	113,3	169,9	226,5	283,2	<b>339,8</b>	396,4	453,0	509,7	566,3
RE 146	88,4	176,7	265,1	353,4	441,8	<b>530,1</b>	618,5	706,9	795,2	883,6
RE 161	114,9	229,7	344,6	459,5	574,3	<b>689,2</b>	804,1	918,9	1034	1149
RE 181	156,6	313,1	469,7	626,3	782,9	<b>939,4</b>	1096	1253	1409	1565
RE 201	215,3	430,6	646,0	861,3	1077	<b>1292</b>	1507	1723	1938	2153
RE 241	372,5	745,0	1118	1490	1863	<b>2235</b>	2608	2980	3353	3725
RE 271	539,2	1078	1617	2157	2696	<b>3235</b>	3774	4314	4853	5392
RE 331	911,5	1823	2734	3646	4558	<b>5469</b>	6835	7292	8204	9115
RE 421	1671	3342	5013	6684	8354	<b>10025</b>	11696	13367	-	-

**SINGLE ACTING TORQUES IN Nm**

**RE Series = 90°**

TYPE	SPRINGS for each piston side	AIR SUPPLY IN BAR												SPRINGS TORQUE	
		3		4		5		6		7		8		90°	0°
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		
RE 051	3	<b>5,8</b>	<b>4,3</b>	9,1	7,6	12,5	10,9	15,8	14,3	19,2	17,6	22,5	21,0	<b>5,8</b>	<b>4,3</b>
	4	4,4	2,3	<b>7,8</b>	<b>5,7</b>	11,1	9,0	14,4	12,3	17,8	15,7	21,1	19,0	<b>7,8</b>	<b>5,7</b>
	5			6,3	3,7	<b>9,7</b>	<b>7,1</b>	13,0	10,4	16,4	13,8	19,7	17,1	<b>9,7</b>	<b>7,1</b>
	6					8,2	5,1	<b>11,6</b>	<b>8,5</b>	14,9	11,8	18,3	15,2	<b>11,6</b>	<b>8,5</b>
RE 064	3	<b>10,7</b>	<b>7,1</b>	16,6	13,0	22,5	18,9	28,5	24,8	34,4	30,8	40,3	36,7	<b>10,7</b>	<b>7,1</b>
	4	8,4	3,5	<b>14,3</b>	<b>9,4</b>	20,2	15,4	26,1	21,3	32,0	27,2	38,0	33,1	<b>14,3</b>	<b>9,4</b>
	5			11,9	5,9	<b>17,8</b>	<b>11,8</b>	23,8	17,7	29,7	23,6	35,6	29,6	<b>17,8</b>	<b>11,8</b>
	6					15,5	8,2	<b>21,4</b>	<b>14,1</b>	27,3	20,1	33,2	26,0	<b>21,4</b>	<b>14,1</b>
RE 076	3	<b>21,1</b>	<b>14,3</b>	32,8	26,0	44,6	37,8	56,4	49,6	68,1	61,3	79,9	73,1	<b>21,1</b>	<b>14,3</b>
	4	16,3	7,2	<b>28,1</b>	<b>19,0</b>	39,8	30,8	51,6	42,5	63,4	54,3	75,2	66,1	<b>28,1</b>	<b>19,0</b>
	5			23,3	12,0	<b>35,1</b>	<b>23,8</b>	46,9	35,5	58,6	47,3	70,4	59,1	<b>35,1</b>	<b>23,8</b>
	6					30,3	16,7	<b>42,1</b>	<b>28,5</b>	53,9	40,3	65,6	52,0	<b>42,1</b>	<b>28,5</b>
RE 086	3	<b>33,8</b>	<b>17,8</b>	51,1	35,1	68,3	52,3	85,5	69,5	102,7	86,7	120,0	104,0	<b>33,8</b>	<b>17,8</b>
	4	27,9	6,6	<b>45,1</b>	<b>23,8</b>	62,3	41,0	79,6	58,2	96,8	75,5	114,0	92,7	<b>45,1</b>	<b>23,8</b>
	5			39,2	12,5	<b>56,4</b>	<b>29,7</b>	73,6	47,0	90,8	64,2	108,1	81,4	<b>56,4</b>	<b>29,7</b>
	6					50,4	18,5	<b>67,7</b>	<b>35,7</b>	84,9	52,9	102,1	70,1	<b>67,7</b>	<b>35,7</b>
RE 101	3	<b>50,1</b>	<b>32,3</b>	77,5	59,7	105,0	87,2	132,5	114,7	159,9	142,1	187,4	169,6	<b>50,1</b>	<b>32,3</b>
	4	39,3	15,6	<b>66,8</b>	<b>43,0</b>	94,2	70,5	121,7	98,0	149,2	125,4	176,6	152,9	<b>66,8</b>	<b>43,1</b>
	5			56,0	26,4	<b>83,5</b>	<b>53,8</b>	110,9	81,3	138,4	108,7	165,9	136,2	<b>83,5</b>	<b>53,8</b>
	6					72,7	37,1	<b>100,2</b>	<b>64,6</b>	127,6	92,0	155,1	119,5	<b>100,2</b>	<b>64,6</b>
RE 116	3	<b>80,7</b>	<b>50,5</b>	124,4	94,2	168,1	137,9	211,8	181,6	255,5	225,3	299,3	269,0	<b>80,7</b>	<b>50,5</b>
	4	63,9	23,5	<b>107,6</b>	<b>67,3</b>	151,3	111,0	195,0	154,7	238,7	198,4	282,4	242,1	<b>107,6</b>	<b>67,3</b>
	5			90,8	40,4	<b>134,5</b>	<b>84,1</b>	178,2	127,8	221,9	171,5	265,6	215,2	<b>134,5</b>	<b>84,1</b>
	6					117,7	57,2	<b>161,4</b>	<b>100,9</b>	205,1	144,6	248,8	188,3	<b>161,4</b>	<b>100,9</b>
RE 126	3	<b>105,0</b>	<b>64,9</b>	161,6	121,5	218,2	178,2	274,9	234,8	331,6	291,4	388,1	348,0	<b>105,0</b>	<b>64,9</b>
	4	83,3	29,9	<b>140,0</b>	<b>86,5</b>	196,6	143,2	253,2	199,8	309,9	256,4	366,5	313,0	<b>140,0</b>	<b>86,6</b>
	5			118,3	51,5	<b>175,0</b>	<b>108,2</b>	231,6	164,8	288,2	221,4	344,8	278,1	<b>175,0</b>	<b>108,2</b>
	6					153,3	73,2	<b>210,0</b>	<b>129,8</b>	266,6	186,4	323,2	243,1	<b>210,0</b>	<b>129,8</b>
RE 146	3	<b>162,5</b>	<b>102,6</b>	250,8	190,9	339,2	279,3	427,5	367,7	515,9	456,0	604,3	544,4	<b>162,5</b>	<b>102,6</b>
	4	128,3	48,4	<b>216,6</b>	<b>136,8</b>	305,0	225,1	393,3	313,5	481,7	401,9	570,1	490,2	<b>216,6</b>	<b>136,8</b>
	5			182,4	82,6	<b>270,8</b>	<b>171,0</b>	359,1	259,3	447,5	347,7	535,9	436,0	<b>270,8</b>	<b>171,0</b>
	6					236,6	116,8	<b>324,9</b>	<b>205,2</b>	413,3	293,5	501,7	381,9	<b>325,0</b>	<b>205,2</b>
RE 161	3	<b>202,7</b>	<b>141,9</b>	317,5	256,8	432,4	371,6	547,3	486,5	662,1	601,4	777,0	716,2	<b>202,7</b>	<b>141,9</b>
	4	155,3	74,3	<b>270,2</b>	<b>189,2</b>	385,1	304,1	499,9	418,9	614,8	533,8	729,7	648,7	<b>270,2</b>	<b>189,2</b>
	5			222,9	121,6	<b>337,8</b>	<b>236,5</b>	452,6	351,4	567,5	466,2	682,4	581,1	<b>337,8</b>	<b>236,5</b>
	6					290,4	168,9	<b>405,3</b>	<b>283,8</b>	520,2	398,6	635,0	513,5	<b>405,3</b>	<b>283,8</b>
RE 181	3	<b>281,6</b>	<b>188,2</b>	438,1	344,7	594,7	501,3	751,3	657,9	907,8	814,5	1064	971,0	<b>281,6</b>	<b>188,2</b>
	4	218,8	94,3	<b>375,4</b>	<b>250,9</b>	532,0	407,5	688,5	564,0	845,1	720,6	1002	877,2	<b>375,4</b>	<b>250,9</b>
	5			312,7	157,0	<b>469,3</b>	<b>313,6</b>	625,8	470,2	782,4	626,8	939,0	783,3	<b>469,3</b>	<b>313,6</b>
	6					406,5	219,8	<b>563,1</b>	<b>376,3</b>	719,7	532,9	876,2	689,5	<b>563,1</b>	<b>376,3</b>
RE 201	3	<b>386,2</b>	<b>259,8</b>	601,5	475,13	816,8	690,5	1032	905,8	1247	1121	1436	1336	<b>386,2</b>	<b>259,8</b>
	4	299,6	131,1	<b>514,9</b>	<b>46,4</b>	730,2	561,8	945,5	777,1	1160	992,4	1376	1208	<b>514,9</b>	<b>346,4</b>
	5			428,3	217,7	<b>643,6</b>	<b>433,0</b>	858,9	648,4	1074	863,7	1290	1079	<b>643,6</b>	<b>433,0</b>
	6					557,0	304,3	<b>772,3</b>	<b>519,6</b>	987,6	735,0	1203	950,3	<b>772,3</b>	<b>519,6</b>
RE 241	3	<b>664,0</b>	<b>453,6</b>	1037	826,2	1409	1199	1782	1571	2154	1944	2527	2316	<b>664,0</b>	<b>453,6</b>
	4			<b>885,4</b>	<b>604,8</b>	1258	977,4	1630	1350	2003	1722	2376	2095	<b>885,4</b>	<b>604,8</b>
	5					<b>1107</b>	<b>756,0</b>	1479	1129	1852	1501	2224	1874	<b>1107</b>	<b>756,0</b>
	6					955,5	534,7	<b>1328</b>	<b>907,2</b>	1701	1280	2073	1653	<b>1328</b>	<b>907,2</b>
RE 271	3	<b>912,5</b>	<b>705,1</b>	1452	1244	1991	1783	2530	2323	3069	2862	3608	3401	<b>912,5</b>	<b>705,1</b>
	4			<b>1217</b>	<b>940,2</b>	1756	1479	2295	2019	2834	2558	3373	3097	<b>1217</b>	<b>940,1</b>
	5					<b>1521</b>	<b>1175</b>	2060	1714	2599	2144	3138	2793	<b>1521</b>	<b>1175</b>
	6					1286	871,0	<b>1825</b>	<b>1410</b>	2364	1954	2903	2489	<b>1825</b>	<b>1410</b>
RE 331	3	<b>1626</b>	<b>1108</b>	2538	2020	3450	2931	4361	3843	5273	4755	6184	5666	<b>1626</b>	<b>1108</b>
	4			<b>2168</b>	<b>1477</b>	3080	2389	3992	3301	4903	4212	5815	5123	<b>2168</b>	<b>1477</b>
	5					<b>2711</b>	<b>1847</b>	3622	2759	4534	3670	5445	4582	<b>2711</b>	<b>1847</b>
	6					2341	1305	<b>3253</b>	<b>2216</b>	4165	3128	5076	4040	<b>3253</b>	<b>2216</b>
RE 421	3	<b>2999</b>	<b>2014</b>	4670	3685	6340	5356	8011	7026	9682	8697	11353	10368	<b>2999</b>	<b>2014</b>
	4	2327	1014	<b>3998</b>	<b>2685</b>	5669	4356	7340	6027	9011	7698	9369	9369	<b>3998</b>	<b>2685</b>
	5			3327	1685	<b>4998</b>	<b>3356</b>	6669	5027	8340	6698	8369	8369	<b>4998</b>	<b>3356</b>
	6					4327	2357	<b>5997</b>	<b>4028</b>	7668	5698	7369	7369	<b>5997</b>	<b>4028</b>
Torque by air													Torque by springs		

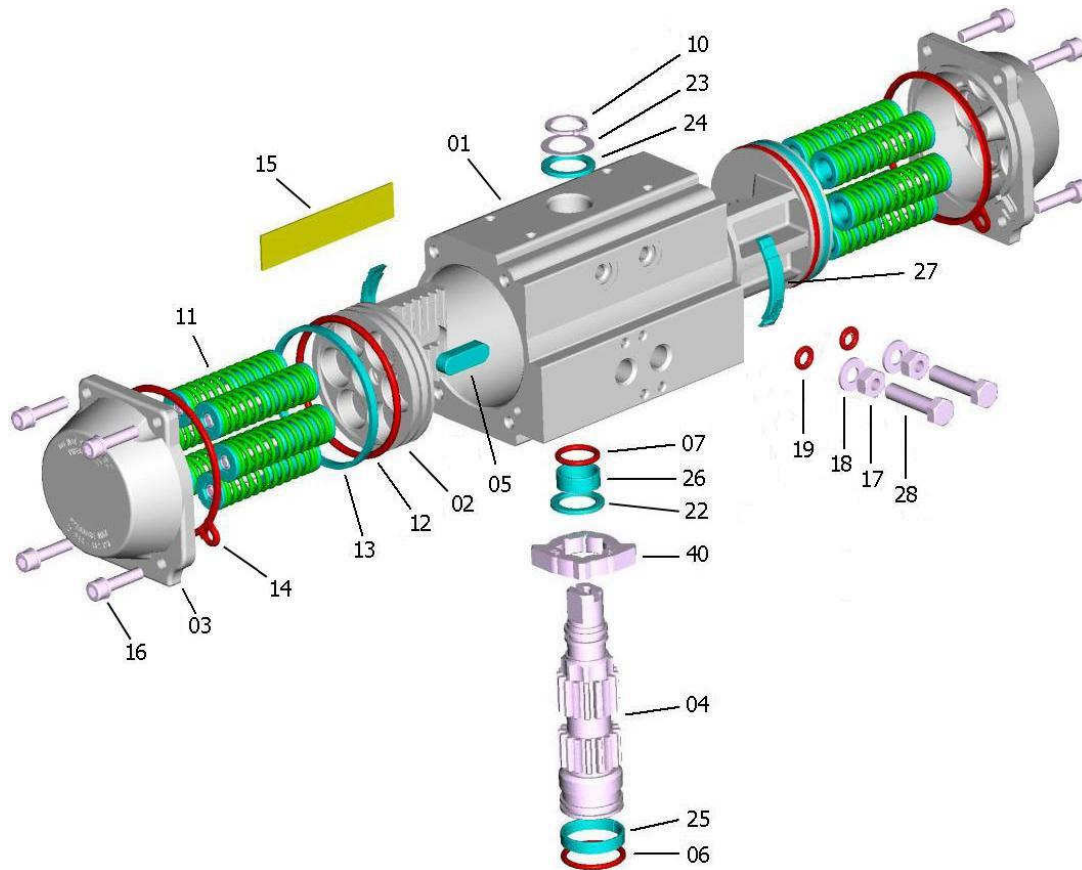
\* RE 331, soon in production.



POSITION	TYPE														
	RE 051	RE 064	RE 076	RE 086	RE 101	RE 116	RE 126	RE 146	RE 161	RE 181	RE 201	RE 241	RE 271	RE 331	RE 421
<b>A-90°</b>	138	155	203	239	257	304	335	398	424	482	527	604	685	850	934
<b>B</b>	69	85	102	112	127	145	157	177	196	220	248	298	332	414	534
<b>C</b>	75	86	94	104	120	134	150	164	182	201	222	300	352	400	521
<b>VDI/VDE 3845 F x G</b>	80 x 30					80 x 30 130 x 30		130 x 30						200 x 50	
<b>L</b>	33,5	38	42,5	49	55	64	70	80	89	99	110	150	166	190	249
<b>M</b>	41,5	48	51,5	55	65	70	80	84	93	102	112	150	166	210	272
<b>Port A Port B DIN 259</b>	1/8" GAS-NPT		1/4" GAS-NPT								1/2" GAS-NPT				
<b>N x O</b>	8 x 12		14 x 18			27 x 36			32 x 42		32 x 60		55 x 80		
<b>P</b>	20					30			50					80	
<b>Q x I</b>	9 x 10 11 x 13	9 x 10 11 x 13 14 x 16	11 x 13 14 x 16 17 x 20	14 x 16 17 x 20	17 x 20 22 x 25	17 x 20 22 x 25	17 x 20 22 x 25 27 x 29	22 x 25 27 x 29	22 x 25 27 x 29	27 x 29 36 x 39	27 x 29 36 x 39	36 x 39 46 x 50	36 x 39 46 x 50	46 x 50 55 x 60	55 x 60 75 x 80
<b>F ISO 5211</b>	F04	F05/07	F05/07	F05/07	F07/10	F07/10	F07/10	F10/12	F10/12	F10/12	F14	F14	F16	F16/25	F25/30
Optional	F03/05	F04 F3/5/7		F04	F5/7/10		F12			F14	F10/12	(F12) F16	(F12) F14		(F16)

POSITION	F ISO 5211											
	F03	F04	F03/05	F05	F05/07	F5/7/10	F07/10	F10/12	F14	F16	F25	F30
<b>Ø (W)</b>	Ø 36 (M5x8)	Ø 42 (M5x8)	Ø 36 (M5x8) Ø 50 (M6x9)	Ø 50 (M6x9)	Ø 50 (M6x9) Ø 70 (M8x12)	Ø 50 (M6x9) Ø 70 (M8x12) Ø 102 (M10x15)	Ø 70 (M8x12) Ø 102 (M10x15)	Ø 102 (M10x15) Ø 125 (M12x18)	Ø 140 (M16x24)	Ø 165 (M20x30)	Ø 254 (M16x24) N°8 FORI	Ø 298 (M20x35) N°8 FORI
<b>H</b>	25	30	25	35	35 (RE 086=40)	40	55	85 (RE 161=75)	100	130	200	200

## CONSTRUCTION PARTS - SPECIFICATIONS



PART	QUANTITY	DESCRIPTION	MATERIAL	SPECIFICATION	PROTECTION
1	1	Body	Extruded aluminium alloy	ASTM 6063 T6	A - N - TF
2	2	Piston	Aluminium alloy	ASTM B179 - DIN1725/5	A
3	2	Cover	Aluminium alloy	ASTM B179 - DIN1725/5	N - V - TF
4	1	Shaft	Carbon steel optional S.S. AISI 304 (A2) optional S.S. AISI 316 (A4)	ASTM A105	N
5 *	2	Antiejection key	Acetalic resin - PA66 - PA66 - Lexan		
6 *	1	Lower shaft O-Ring	NBR - FPM\FKM - Silicone		
7 *	1	Upper shaft O-Ring	NBR - FPM\FKM - Silicone		
10 *	1	Seeger ring	Carbon steel		N
11	0-12	Spring cartridge	Carbon steel, PA 66, S.S.	C-98	V
12 *	2	Piston O-Ring	NBR - FPM\FKM - Silicone		
13 *	2	Piston head bearing	Acetalic resin - PA66 - PA66 - Lexan		
14 *	2	Cover gasket	NBR - FPM\FKM - Silicone		
15	1	Nameplate	Aluminium		
16	4+4	Cover fastening screw	Stainless Steel	AISI 304 (A2)	
17	2	Nut	Stainless Steel	AISI 304 (A2)	
18	2	Washer	Stainless Steel	AISI 304 (A2)	
19 *	2	O-Ring	NBR - FPM\FKM - Silicone		
22 *	1	Gear antifriction washer	Acetalic resin - PA66 - PA66 - Lexan		
23 *	1	Shaft thrust washer	Stainless Steel	AISI 304 (A2)	
24 *	1	Shaft antifriction washer	Acetalic resin - PA66 - PA66 - Lexan		
25 *	1	Lower shaft pilot ring	Acetalic resin - PA66 - PA66 - Lexan		
26 *	1	Upper shaft pilot ring	Acetalic resin - PA66 - PA66 - Lexan		
27 *	2	Piston bearing	Acetalic resin - PA66 - PA66 - Lexan		
28	2	Adjusting gear screw	Stainless Steel	AISI 304 (A2)	
40	1	Adjusting gear	Stainless Steel	AISI 316 (A4)	

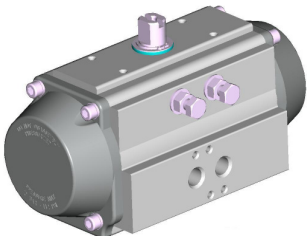
\* SPARE PARTS SET:      Standard    Special HIGH Temperature    Special LOW Temperature    Special EXTRA LOW Temperature

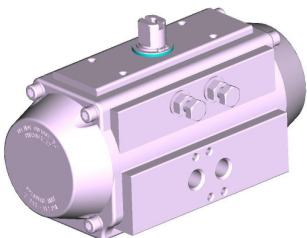
Protections

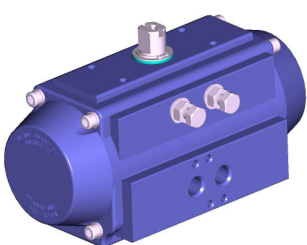
A = Anodizing    N = chemical Nickel-plating    V = Painting    TF = Anodizing+PTFE



## COATINGS – MATERIAL TREATMENTS

	<b>AV</b>	<b>DESCRIPTION</b>				<b>USED FOR</b>	
		<b>Body</b>	<b>Covers</b>	<b>Pistons</b>	<b>Shaft</b>		
	standard	Anodizing	Polyester painting	Anodizing	High phosphorous nickel-plating (12%) opt. AISI 304 (A2) opt. AISI 316 (A4)		- Industry, general use.
	Colour	Grey	Grey	Brown	Polished steel		
Thickness	25 µ	60/80 µ	15 µ	20 µ			

	<b>NN</b>	<b>DESCRIPTION</b>				<b>USED FOR</b>	
		<b>Body</b>	<b>Covers</b>	<b>Pistons</b>	<b>Shaft</b>		
	standard	High phosphorous nickel-plating (12%)	High phosphorous nickel-plating (12%)	Anodizing	High phosphorous nickel-plating (12%) opt. AISI 304 (A2) opt. AISI 316 (A4)		- Industry, general use. - Caustic soda. - Detergents. - Low alkaline solutions.
	Colour	Polished steel	Polished steel	Brown	Polished steel		
Thickness	20 µ	20 µ	15 µ	20 µ			

	<b>TF TF</b>	<b>DESCRIPTION</b>				<b>USED FOR</b>	
		<b>Body</b>	<b>Covers</b>	<b>Pistons</b>	<b>Shaft</b>		
	standard	Anodizing + PTFE coating	Anodizing + PTFE coating	Anodizing	High phosphorous nickel-plating (12%) opt. AISI 304 (A2) opt. AISI 316 (A4)		- Industry, general use. - Low alkaline and low acid solutions. - Marine environments. - High temperatures.
	Colour	Blue	Blue	Brown	Polished steel		
Thickness	Anodizing 25 µ PTFE 15 µ	Anodizing 15 µ PTFE 15 µ	15 µ	20 µ			

### ANODIZING

Anodizing is an electrolytic process that produces anodic coating on aluminum, called alumine, with high thickness. Alumine is one of the most hard known materials, with resistance values up to 400-600 HV (45-65 HRC); properties and features of Anodizing (alumine thickness 25 micron) are well know and appreciated both for mechanical and chemical resistance.

- > **Best friction and corrosion resistance, best surface hardness, good thermic and electrical insulation.**

### ELECTROLESS NICKEL-PLATING

Chemical nickel-plating is an electroless coating process that gives nickel layers at extremely constant thickness also on sharp angles, blind-holes, threads and grooves recess. During the process, nickel is combined with phospor at a percentage of 12% (high-phospor). The obtained surface hardness is about 400-480 HV (45-55 HRC).

- > **Best friction and corrosion resistance, best surface hardness, best external appearance similar to S.S., increased resistance to alcali and detergents in sanitary and food applications.**

### POLYESTER PAINTING

Polyester painting is obtained through powder coatings on polarized parts, by means of light differences in electrical potentials. After applications, parts are baked in order to polymerize and let the painting be spread to avoid micro-porosity. The best elasticity can be obtained at 60/80 micron thickness; a satisfactory adhesion can be assured by sandblasting or brushing, and by special degreasing baths of the rough pieces to be treated.

- > **Better corrosion resistance, protection against crashes, better external appearance and several available colours, resistance to chemicals.**

### ANODIZING + PTFE COATING

As further improvement of the hard anodising treatment on aluminium alloys, protective coatings made of PTFE are used; this material is known for its particular chemical and physical features. On these double treated surfaces, oxide hardness and low roughness (internal slipping parts) is summed to the chemical resistance and the excellent qualities as a thermic barrier of PTFE (external surface, subject to corrosion).

- > **Better corrosion resistance, protection against high temperatures and crashes, extreme resistance to chemicals and in marine environments.**

### AISI 304 (A2) OR AISI 316 (A4) STAINLESS STEEL SHAFT - OPTIONAL

AISI 304 (A2) and AISI 316 (A4) Stainless Steel shafts, with their great corrosion resistance, are recommended for special applications such as: marine and chemical environments, food and pharmaceutical industry, high temperature applications.



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