



KLINGER ACTUATORS



PNEUMATIC RACK & PINION ACTUATORS
90° - 120° - 180°

September 2016

ALPHAIR PNEUMATIC ACTUATORS

90° - STD Series

120° - Y Series

180° - X Series

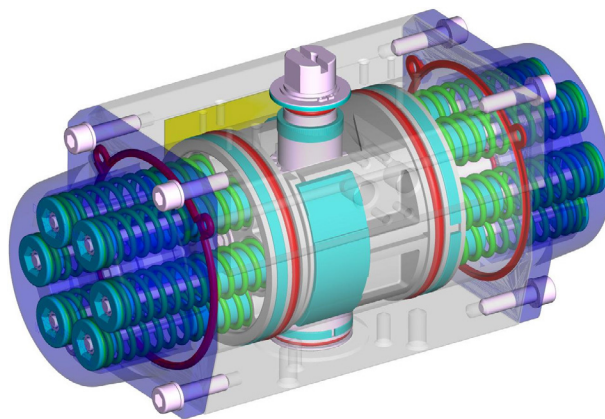


ALPHAIR pneumatic actuators are made by the best manufacture experience on design, material, machining, assembly.

The internal rotation adjusting system is ever free of side-loads on pistons, shaft and body at every feeding pressure.

HEAVY DUTY, MAXIMUM LIFETIME!

ALPHAIR pneumatic actuators are compact, heavy and reliable. Easy assembly/change on every mean of valve.



STANDARD VERSION FEATURES

- **EN AW 6063 T6 extruded Aluminium Body**, inside surface finish Ra=0,4-0,6. 50 micron Hard Anodizing.
- **EN AB 46100 T6 die-casted Aluminium alloy Pistons**, 15 micron Anodizing.
- **EN AB 46100 T6 die-casted Aluminium alloy Covers**, painted with 60-80 micron polyester powder.
- **Carbon steel Shaft**, 20 micron nickel-plated. Optional 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 acetal resin LAT-LUB, easily replaceable for maintenance. Optional HIGH/LOW Temperature = PA 66.
- Pre-compressed Spring Cartridges, easily replaceable for maintenance, 60-80 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.
- 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.
- Lubrification 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 each individual product.
- Standard execution for temperatures from -20°C to +80°C (optional, special execution for extreme temperatures).
- Conformity for use in explosive environment; certification for STANDARD versioned actuators = II 2GD c Tmax 95°C.
- According to **EN 15714-3** design and manufacture standard requirements.

AIR SUPPLY	TEMPERATURE RANGE	FEEDING PRESSURE	ROTATION ADJUSTING
Dry or lubricated filtered compressed air.	Standard -20° +80°C (-4 +175°F) 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)	8 bar/120 psi - CONTINUOUS 10 bar/142 psi - MAXIMUM	+ \- 5°

DOUBLE ACTING TORQUE RATINGS IN Nm

STD Series = 90°
Y Series = 120°
X Series = 180°

TYPE	AIR SUPPLY IN BAR									
	1	2	3	4	5	6	7	8	9	10
AP 032	-	-	-	5,0	6,3	7,6	8,8	10,0	11,4	12,6
AP 042	-	-	6,5	8,7	10,9	13,0	15,2	17,3	19,5	21,7
AP 050	3,0	6,1	9,2	12,3	15,4	18,5	21,5	24,6	27,7	30,8
AP 063	5,5	11,0	16,5	22,0	27,5	33,0	38,5	44,0	49,5	55,0
AP 075	11,7	23,4	35,1	46,8	58,5	70,2	81,9	93,6	105,3	117,0
AP 085	17,8	35,6	53,4	71,2	89,0	106,9	124,7	142,4	160,3	178,1
AP 100	27,7	55,4	83,2	110,9	138,6	166,4	194,1	221,8	249,5	277,3
AP 115	45,7	91,5	137,2	183,0	228,7	274,5	320,2	366,0	411,7	457,5
AP 125	60,1	120,3	180,5	240,7	300,9	361,1	421,2	481,4	541,6	601,8
AP 145	86,7	173,4	260,1	346,8	433,5	520,2	606,9	693,6	780,3	867,0
AP 160	118,3	236,7	355,0	473,4	591,7	710,1	828,4	946,8	1065	1183

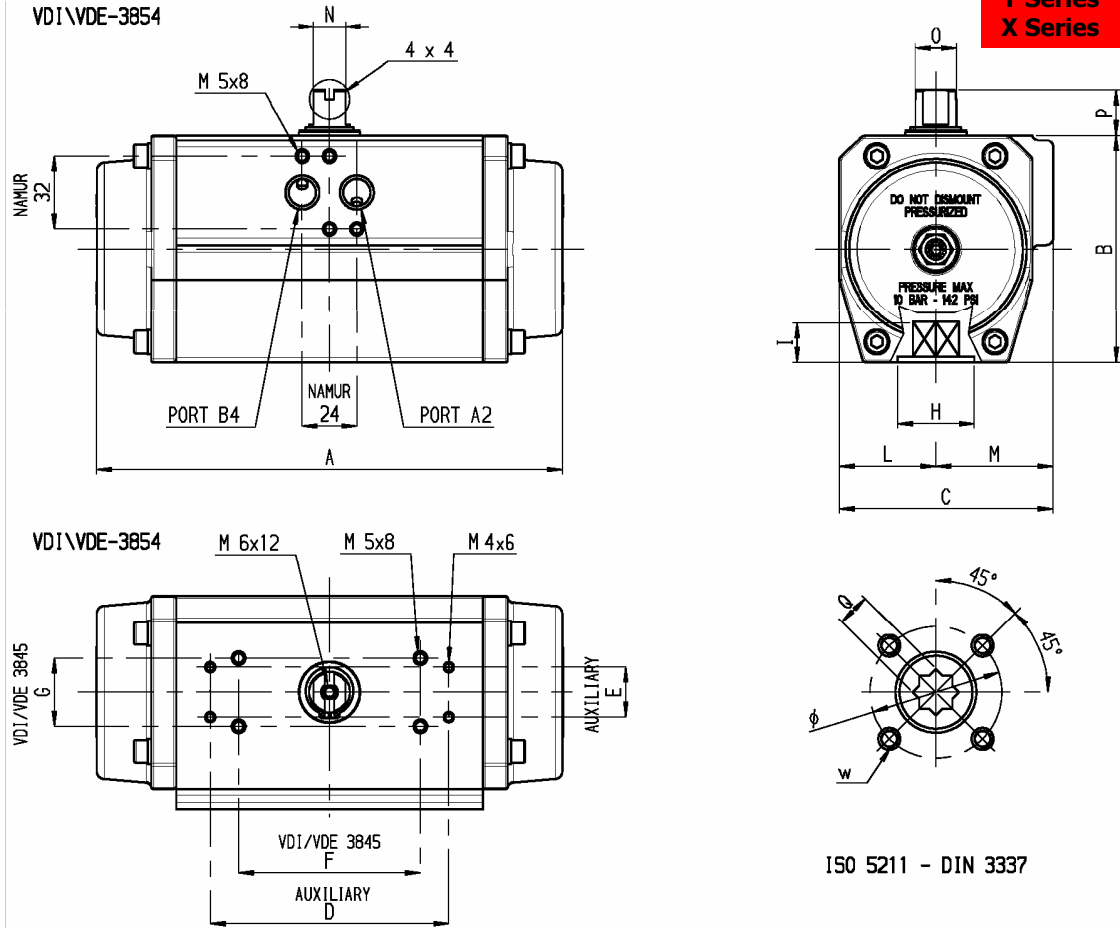
STD Series = 90°

AP 180	159,7	319,4	479,0	638,6	798,3	958,0	1119	1277	1437	1598
AP 200	221,8	443,7	665,6	887,5	1109	1333	1553	1775	1997	2219
AP 240	372,5	745,0	1118	1490	1863	2235	2608	2980	3353	3725
AP 270	539,2	1078	1617	2157	2696	3235	3774	4314	4853	5392
AP 330	911,5	1823	2734	3646	4558	5469	6835	7292	8204	9115
AP 420	1671	3342	5013	6684	8354	10025	11696	13367	-	-

TYPE	N° OF SPRINGS PER SIDE OF PISTON	AIR SUPPLY IN BAR								SPRING STROKE					
		3		4		5		6		7		8		90°	0°
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		
AP 042	3	-	-	-	-	7,1	4,1	9,3	6,3	11,5	8,5	13,7	10,7	6,8	3,8
	4	-	-	-	-	8,1	4,1	10,2	6,2	12,4	8,4	15,1	10,7	9,0	5,0
AP 050	3	5,7	3,5	8,9	6,6	12,0	9,6	15,1	12,7	18,1	15,7	21,2	18,8	5,7	3,5
	4			7,7	4,7	10,8	7,7	13,9	10,8	16,9	13,8	20,0	16,9	7,7	4,7
	5					9,6	5,8	12,7	8,9	15,7	11,9	18,8	15,0	9,6	5,8
	6					8,4	3,9	11,5	7,0	14,5	10,0	17,6	13,1	11,5	7,0
AP 063	3	9,4	6,3	14,9	11,7	20,4	17,2	25,9	22,7	31,4	28,2	36,9	33,7	10,2	7,2
	4			12,3	8,3	17,8	13,8	23,3	19,3	28,8	24,8	34,3	30,3	13,7	9,7
	5					15,4	10,4	20,9	15,9	26,4	21,4	31,9	26,9	17,1	12,1
	6					13,0	7,0	18,5	12,5	24,0	18,0	29,5	23,5	20,5	14,5
AP 075	3	22,5	12,6	34,2	24,4	46,0	36,1	57,7	47,8	69,4	59,5	81,1	71,2	22,5	12,6
	4			30,0	16,9	41,8	28,6	53,5	40,3	65,2	52,0	76,9	63,7	30,0	16,9
	5					37,6	21,1	49,3	32,8	61,0	44,5	72,7	56,2	37,6	21,1
	6					33,4	13,6	45,1	25,3	56,8	37,0	68,5	48,7	45,1	25,3
AP 085	3	34,5	18,9	52,4	36,7	70,2	54,5	88,0	72,3	105,8	90,1	123,6	107,9	34,5	18,9
	4			46,1	25,2	63,9	43,0	81,7	60,8	99,5	78,6	117,3	96,4	46,1	25,2
	5					57,6	31,5	75,4	49,3	93,2	67,1	111,0	84,9	57,6	31,5
	6					51,5	20,0	69,1	37,8	86,9	55,6	104,7	73,4	69,1	37,8
AP 100	3	53,2	30,0	80,9	57,7	108,7	85,4	136,4	113,1	164,1	140,8	191,8	168,5	53,2	30,0
	4			70,9	40,0	98,7	67,7	126,4	95,4	154,1	123,1	181,8	150,8	70,9	40,0
	5					88,7	50,0	116,4	77,7	144,1	105,4	171,8	133,1	88,7	50,0
	6					78,7	32,2	106,4	60,0	134,1	87,7	161,8	115,4	106,4	60,0
AP 115	3	84,3	53,0	130,0	98,8	175,8	144,5	221,6	190,3	267,3	236,0	313,0	281,7	84,3	53,0
	4			112,3	70,7	158,1	116,4	203,9	162,2	249,6	207,9	295,3	253,6	112,3	70,7
	5					140,4	88,3	186,2	134,1	231,9	179,8	277,6	225,5	140,4	88,3
	6					122,7	60,2	168,5	106,0	214,2	151,7	259,9	197,4	168,5	106,0
AP 125	3	116,8	63,7	177,0	123,9	237,3	184,1	297,5	244,2	357,6	304,3	417,7	364,4	116,8	63,7
	4			155,7	85,0	216,0	145,2	276,2	205,3	336,3	265,4	396,4	325,5	155,7	85,0
	5					194,7	106,3	254,9	166,4	315,0	226,5	375,1	286,6	194,7	106,3
	6					173,4	67,4	233,6	127,5	293,7	187,6	353,8	247,7	233,6	127,5
AP 145	3	158,0	92,0	245,0	179,0	332,0	265,0	418,0	352,0	505,0	439,0	592,0	526,0	158,0	102,0
	4			211,0	123,0	298,0	210,0	384,0	269,0	471,0	383,0	558,0	470,0	224,0	136,0
	5					264,0	154,0	350,0	240,0	437,0	327,0	524,0	414,0	280,0	170,0
	6					230,0	98,0	316,0	184,0	403,0	271,0	490,0	358,0	336,0	204,0
AP 160	3	222,4	132,6	340,7	251,0	459,1	369,3	577,4	487,6	695,7	605,9	814,0	724,2	222,4	132,6
	4			296,5	176,9	414,9	295,2	533,2	413,5	651,5	531,8	769,8	650,1	296,5	176,9
	5					370,7	221,1	489,0	339,4	607,3	457,7	725,6	576,0	370,7	221,1
	6					326,5	147,0	444,8	265,3	563,1	383,6	681,4	501,9	444,8	265,3
AP 180	3	287,9	191,0	447,6	350,7	607,3	510,4	766,9	670,0	926,6	829,7	1068,0	989,1	287,9	191,0
	4			383,9	254,7	543,6	414,4	703,3	574,0	862,9	733,7	1022,3	893,1	383,9	254,7
	5					479,9	318,4	639,6	478,1	792,2	637,7	958,6	797,1	479,9	318,4
	6					416,2	222,4	575,9	382,1	735,6	541,8	894,9	701,1	575,9	382,1
AP 200	3	423,6	242,0	644,7	463,8	867,4	685,8	1089	907,7	1311	1130	1533	1351	423,6	242,0
	4			564,8	322,6	786,7	544,6	1008	766,5	1230	988,4	1452	1209	564,8	322,6
	5					706,0	403,4	927,9	625,3	1150	847,2	1372	1068	706,0	403,4
	6					625,3	262,2	847,2	484,1	1069	706,0	1291	927,0	847,2	484,1
AP 240	3	664,0	453,6	1037	826,2	1409	1199	1782	1571	2154	1944	2527	2316	664,0	453,6
	4			885,4	604,8	1258	977,4	1630	1350	2003	1722	2376	2095	885,4	604,8
	5					1107	756,0	1479	1129	1852	1501	2224	1874	1107	756,0
	6					955,5	534,7	1328	907,2	1701	1280	2073	1653	1328	907,2
AP 270	3	912,5	705,1	1452	1244	1991	1783	2530	2323	3069	2862	3608	3401	912,5	705,1
	4			1216	940,2	1756	1479	2295	2019	2834	2558	3373	3097	1217	940,1
	5					1521	1175	2060	1714	2599	2144	3138	2793	1521	1175
	6					1286	871,0	1825	1410	2364	1954	2903	2489	1825	1410
AP 330	3	1626	1108	2538	2020	3450	2931	4361	3843	5273	4755	6184	5666	1626	1108
	4			2168	1477	3080	2389	3992	3301	4903	4212	5815	5123	2168	1477
	5					2711	1847	3622	2759	4534	3670	5445	4582	2711	1847
	6					2341	1305	3253	2216	4165	3128	5076	4040	3253	2216
AP 420	3	2999	2014	4670	3685	6340	5356	8011	7026	9682	8697	11353	10368	2999	2014
	4			3998	2685	5669	4356	7340	6027	9011	7698	10682	9369	3998	2685
	5					4998	3356	6669	5027	8340	6698	10010	8369	4998	3356
	6					4327	2357	5997	4028	7668	5698	9339	7369	5997	4028
Torque output available from air supply													Springs torque output		

DIMENSIONS - European sizes in millimetres

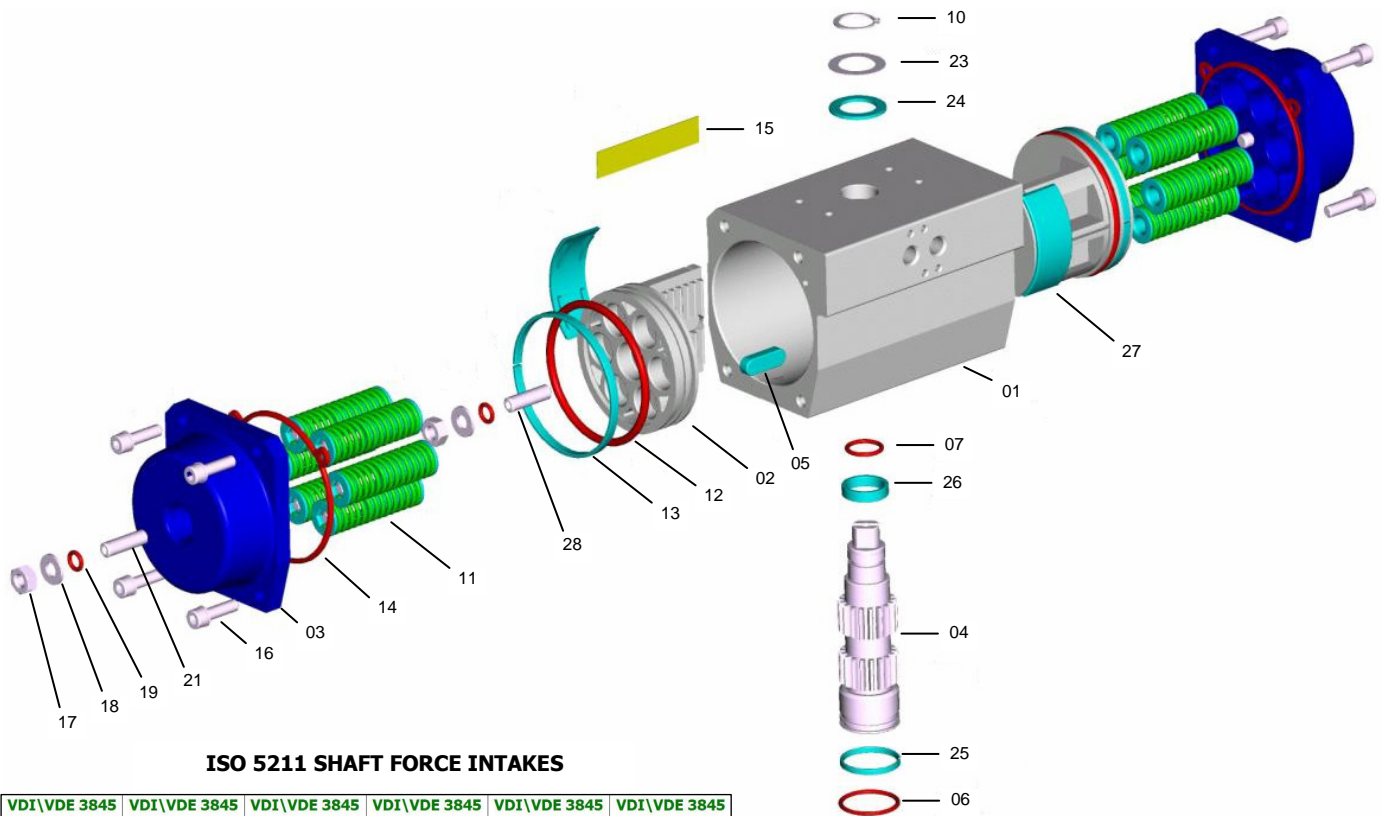
STD Series = 90°
Y Series = 120°
X Series = 180°



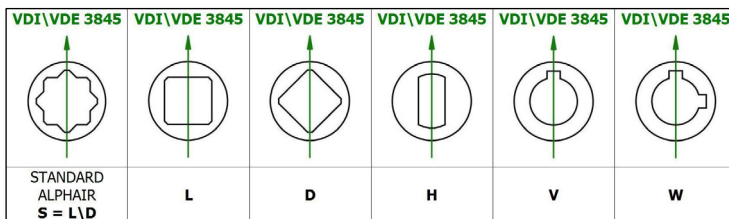
Standard feeding connection 1/2" GAS – NPT for AP 240, 270, 330, 420
Special NAMUR plate on request

POS.	TYPE																	
	AP032	AP042	AP050	AP063	AP075	AP085	AP100	AP115	AP125	AP145	AP160	AP180	AP200	AP240	AP270	AP330	AP420	
A-90°	100	139	139	152	205	230	275	309	360	392	462	482	562	604	684	850	940	
A-120°	133	166	163	180	239	273	322	363	424	-	-	-	-	-	-	-	-	
A-180°	175	211	196	214	297	332	398	451	518	-	-	-	-	-	-	-	-	
B	45	57	68	83,5	100	110	125	142	155	175	196	220	240	298	332	415	542	
C	49	60,5	75	86	94	104	120	134	141	163	176	196	220	300	352	408	528	
AUXILIARY D x E	-				105 x 22				139 x 22				-					
VDI/VDE 3845 F x G	50x25		80 x 30						130 x 30						200x50			
L	23,5	27	33,5	38	42,5	49	55	63,5	69,5	80	88	98	110	150	176	190,5	234	
M	25,5	33,5	41,5	48	51,5	55	65	70,5	71,5	83						217,5	294	
Port A Port B DIN 259	1/8" GAS NPT				1/4" GAS NPT						1/2" GAS NPT							
N x O	8 x 12			14 x 18				27 x 36				32 x 42		42 x 60		55 x 80		
P	20						30				50						80	
Q x I	9 x 10	9 x 10 11 x 13	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	14 x 16 17 x 20 22 x 25	17 x 20 22 x 25	17 x 20 22 x 25 27 x 30	22 x 25 27 x 30	22 x 25 27 x 30	27 x 30 36 x 39	27 x 30 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	
F ISO 5211	F03	F04	F04	F05	F05/07	F05/07	F07/10	F07/10	F07/10	F10/12	F10/12	F10/12	F14	F14	F16	F16/25	F25/30	
Optional	F04	F03/05	F03 F03/05 F05	F03/05 F3/5/7 F04 F05/07	F04		F5/7/10		F12		F14	F14	F10/12	F(12)/16 F16	F(12)/16 F14		F(16) /25/30	

POS.	F ISO 5211												
	F03	F04	F03/05	F05	F05/07	F5/7/10	F07/10	F10/12	F12	F14	F16	F25	F30
Ø (W)	36 (M5x8)	42 (M5x8)	36 (M5x8) 50 (M6x9)	50 (M6x9)	50 (M6x9) 70 (M8x12)	50 (M6x9) 70 (M8x12) 102 (M10x15)	70 (M8x12) 102 (M10x15)	102 (M10x15) 125 (M12x18)	125 (M12x18)	140 (M16x24)	165 (M20x30)	254 (M16x24)	298 (M20x35)
H	25 escluso AP 032	30	25	35	35 AP085=40	40	55	AP145 = 70 AP160 = 75 AP180 = 85 AP200 = 85	75	100 AP270 = 104	130 AP200 = 85	200	200



ISO 5211 SHAFT FORCE INTAKES





PART	QUANTITY	DESCRIPTION	MATERIAL	SPECIFICATION	PROTECTION
1	1	Body	Extruded aluminium alloy	EN AW 6063 T6	A - N - TF
2	2	Piston	Aluminium alloy	EN AB 46100 T6	A
3	2	Cover	Aluminium alloy	EN AB 46100T6	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	8-16	Cover fastening screw	Stainless Steel	AISI 304 (A2)	
17	4	Nut	Stainless Steel	AISI 304 (A2)	
18	4	Washer	Stainless Steel	AISI 304 (A2)	
19 *	4	O-Ring	NBR – FPM\FKM – Silicone		
21	2	Cover dowel	Stainless Steel	AISI 304 (A2)	
23 *	1	Shaft thrust washer	Stainless Steel	AISI 304 (A2)	
24 *	1	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 *	2-4	Piston bearing	Acetalic resin – PA66\PA66 – LEXAN		
28	2	Piston dowel	Stainless Steel	AISI 304 (A2)	


* SPARE PARTS SET: Standard, Special HIGH Temperatures, Special LOW Temperatures, Special VERY-LOW Temperatures


Protection

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

	AV	DESCRIPTION				APPLICATION FIELD
		Body	Covers	Pistons	Shaft	
	standard	Hard Anodizing	Polyester painting	Anodizing	High phosphorous nickel-plating (12%) opt. AISI 316 (A4)	- Industry, general use.
	Colour	Dark gray	Several available	Brown	Polished steel	
	Thickness	50 µ	60/80 µ	15 µ	20 µ	

	NV	DESCRIPTION				APPLICATION FIELD
		Body	Covers	Pistons	Shaft	
		High phosphorous nickel-plating (12%)	Polyester painting	Anodizing	High phosphorous nickel-plating (12%) opt. AISI 316 (A4)	- Industry, general use. - Caustic soda. - Detergents. - Low alkaline solutions.
	Colour	Polished steel	Several available	Brown	Polished steel	
	Thickness	20 µ	60/80 µ	15 µ	20 µ	

	NN	DESCRIPTION				APPLICATION FIELD
		Body	Covers	Pistons	Shaft	
		High phosphorous nickel-plating (12%)	High phosphorous nickel-plating (12%)	Anodizing	High phosphorous nickel-plating (12%) 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	

	TF TF	DESCRIPTION				APPLICATION FIELD
		Body	Covers	Pistons	Shaft	
		Hard Anodizing + PTFE coating	Anodizing + PTFE coating	Anodizing	High phosphorous nickel-plating (12%) 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 50 µ PTFE 15 µ	Anodizing 50 µ PTFE 15 µ	15 µ	20 µ	

HARD 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 Hard Anodizing (alumine thickness 50 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 phosphor 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.**

HARD ANODIZING + PTFE COATING

As further improvement of the hard anodizing on aluminium alloys, protective coating made of PTFE is used, 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 surfaces, subjected to corrosion).

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

AISI 316 (A4) STAINLESS STEEL SHAFT - OPTIONAL

AISI 316 (A4) Stainless Steel shaft, with its great corrosion resistance, is recommended for special applications such as: marine and chemical environments, food and pharmaceutical industry, high temperature applications.



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