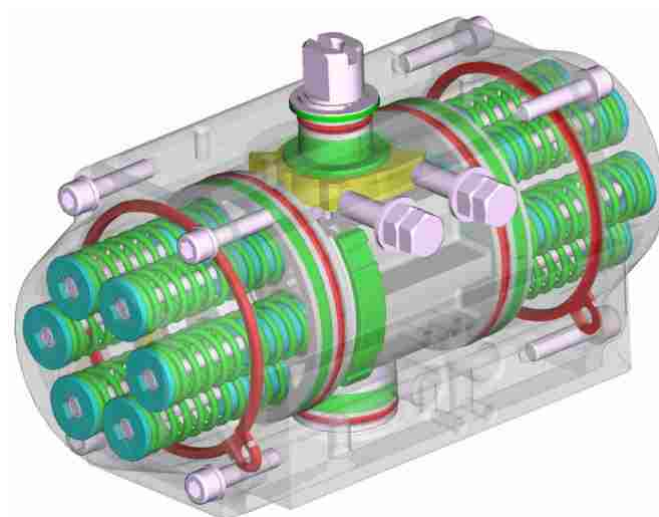
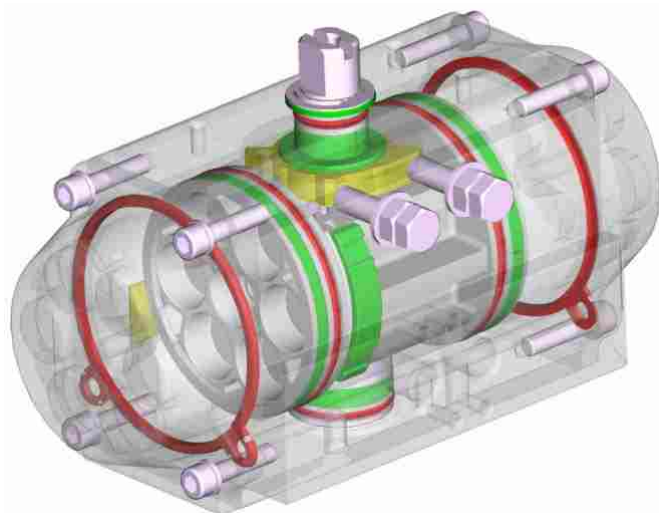




"RE" SERIES

TECHNICAL CATALOGUE

Aluminium "RE" SERIES			
CHAPTER	DESCRIPTION	CONTENT	PAGE
A	INTRODUCTION	"EXTERNAL ADJUSTMENT" - ALPHAIR Pneumatic Actuators new series	A-01
		Standard version features	A-02
B	FEATURES	Actuator identification	B-01
		Construction parts – Specification	B-02
		Rotation adjustment	B-03
		Available force intakes	B-05
		Actuator working temperatures	B-06
C	SIZING AND TORQUE RATINGS	A guide to valve \actuator size matching	C-01
		Double Acting "DA" actuators sizing	C-02
		Double Acting "DA" torque ratings in Nm	C-03
		Spring Return "SR" actuators sizing	C-04
		Spring balanced torques	C-05
		Spring Return "SR" torque ratings in Nm	C-06
D	PROTECTIONS	"AV" protection	D-01
		"NN" protection	D-02
		"TF TF" protection	D-03
		Technical features and resistance of anodizing surface treatment	D-04
		Technical features and resistance of polyester painting surface treatment	D-05
		Technical features and resistance of electroless nickel plating surface treatment	D-06
		Technical features and resistance of anodizing + PTFE coating surface treatment	D-07
E	DATASHEETS	Data sheet RE 051	E-01
		Data sheet RE 064	E-02
		Data sheet RE 076	E-03
		Data sheet RE 086	E-04
		Data sheet RE 101	E-05
		Data sheet RE 116	E-06
		Data sheet RE 126	E-07
		Data sheet RE 146	E-08
		Data sheet RE 161	E-09
F	VALVES	Brass ball valves	F-01
		2 way brass ball valves + "DA" pneumatic actuators	F-02
		2 way brass ball valves + "SR" pneumatic actuators	F-03
		3 way "L/T" brass ball valves, two (2) gaskets + "DA" pneumatic actuators	F-04
		3 way "L/T" brass ball valves, two (2) gaskets + "SR" pneumatic actuators	F-05
		3 way "L/T" brass ball valves, four (4) gaskets + "DA" pneumatic actuators	F-06
		3 way "L/T" brass ball valves, four (4) gaskets + "SR" pneumatic actuators	F-07
G	ACCESSORIES	Accessories	G-01
		Adapters	G-02
		Brackets	G-03
		"RQ" Square reducers	G-04
		"RDD" reducers	G-05
		"RSTQ" reducers	G-06
		"RQDD" reducers	G-07
		Spacers	G-08
		CAM position indicators type "A - B - C - D - E"	G-09
		"CAM" position indicators	G-10
		Switch-box - Features	G-11
		Switch-box - Dimensions	G-12
		Switch-box - Brackets	G-13
		Solenoid valves	G-14
H	INSTALLATION AND MAINTENANCE	Directions for actuator installation	H-01
		Notice and notes for actuators use in explosive environments – "ATEX" 94\9\CEE Directive	H-02
		Installation operation	H-03
		Spare-parts sets and springs	H-04
		Maintenance, substitution of spare -part sets and springs	H-05
		Assembly variations	H-06
J	CERTIFICATIONS	Certifications	I-01
		"MACHINE DIRECTIVE" – 98\37\CEE	I-02
		"PED" – 97\23\CEE	I-03
		"IP" INSULATION PROTECTION – EN 60529\A 1	I-04
		"ATEX" - 94\9\CEE	I-05
		"GOST" certificate	I-06
		ISO 9001:2000	I-07
L	COMPANY PROFILE	Company profile	L-01

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

ALPHAIR PNEUMATIC ACTUATORS

EXTERNAL ADJUSTMENT "RE" NEW SERIES

Alpha Pompe SPA has been manufacturing high precision pneumatic actuators for over 10 years, for automation of industrial valves.

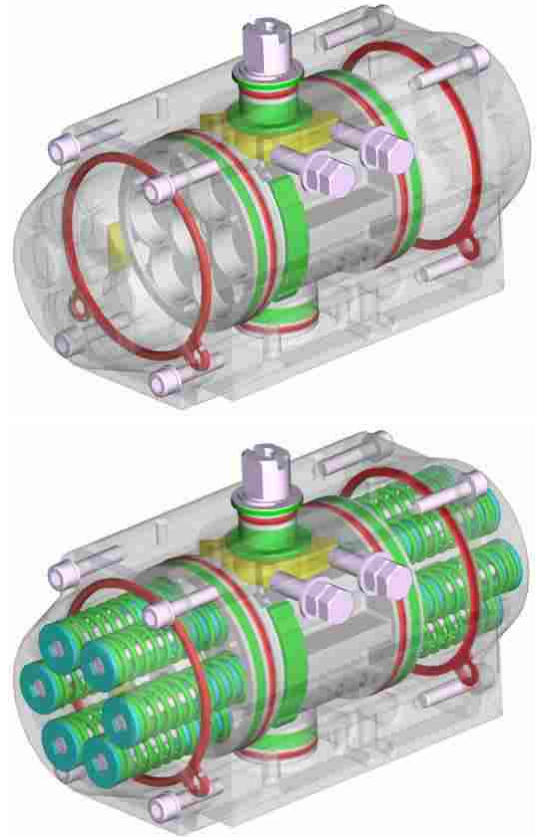
A new line of aluminium products was recently developed, equipped with external rotation adjustment, combining great reliability to very interesting technical features.

Suitable for every application and utilization field, even more compact, strong and reliable, the new "RE" pneumatic actuators fit every type of valve.

The new "RE" pneumatic actuators are accurately engineered thanks to the most advanced CAD drawing systems, in able to simulate the behaviour of these devices along their lifetime, to guarantee best performance and maximum duration.

Besides, the new "External Adjustment" system assures maximum precision in regulating rotation, even in most difficult applications.

Production is made using high precision devices, which guarantee best quality features of every single component.



- According to most recent standards: ISO 5211, DIN 3337, VDI/VDE-3845.
- According to 98/37/CEE "Machines Directive".
- Exclusion from "PED" 97/83/CEE as for Art. 1.3.10.
- Suitable for use in explosive atmosphere according to ATEX.

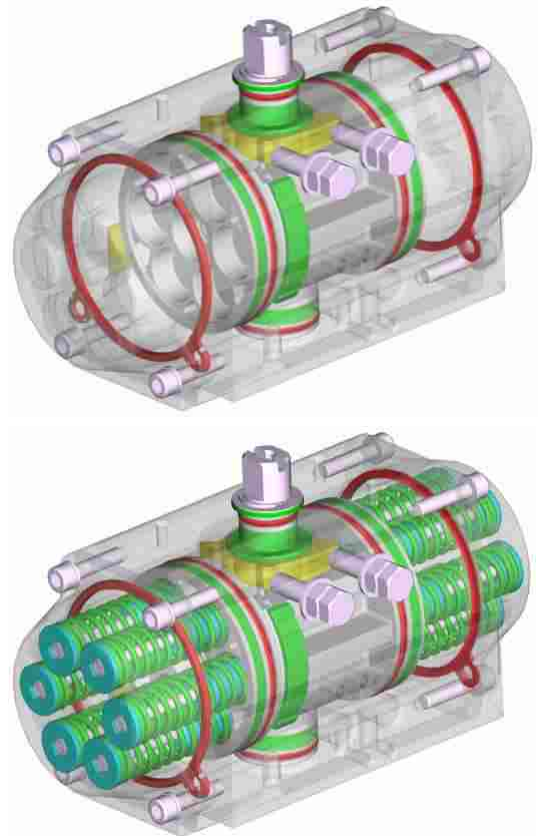
Certified Quality system according to UNI EN ISO 9001:2000 by DNV-Italy.

**COMPANY WITH QUALITY MANAGEMENT
SYSTEM CERTIFIED BY DNV
= ISO 9001:2000 =**

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

STANDARD VERSION FEATURES

- Ø **ASTM 6063 T6 extruded Aluminium Body**, inside surface finish Ra=0,4-0,6. 25 micron Hard Anodizing.
- Ø **EN AB 46100 die-casted Aluminium alloy Pistons**, 15 micron Anodizing.
- Ø **EN AB 46100 die-casted Aluminium alloy Covers**, painted with 60-80 micron polyester powder.
- Ø **Carbon steel Shaft**, 20 micron nickel-plated. Optional in Stainless Steel AISI 316 (A4).
- Ø **External adjusting gear**, in Stainless Steel AISI 316 (A4).
- Ø Screws in Stainless Steel AISI 304 (A2).
- Ø Seals in nitrile rubber NBR.
- Optional HIGH Temperature = FPM\FKM.
- Optional LOW Temperature = SILICONE.
- Ø Bearings in low friction acetal resin LAT-LUB, easily replaceable for maintenance.
- Optional HIGH/LOW Temperature = PA 66.
- Ø Pre-compressed Spring Cartridges, easily replaceable for maintenance, 25-30 micron polyester painted.
- Ø Standard grease: Molibdenum Bisulphide.
- Optional: special grease for HIGH/LOW Temperature.
- Ø Several special protections available for chemical, pharmaceutical, food and industrial environments.

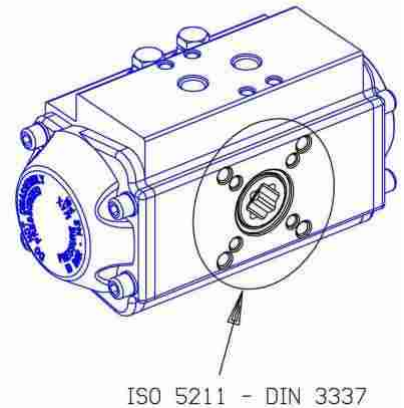
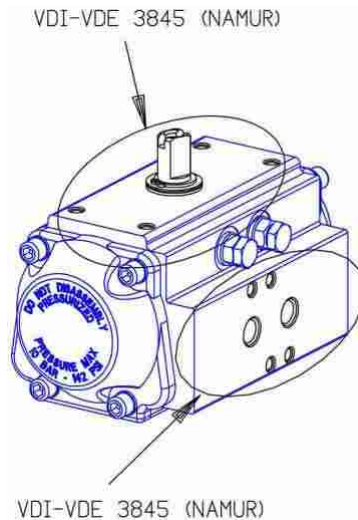
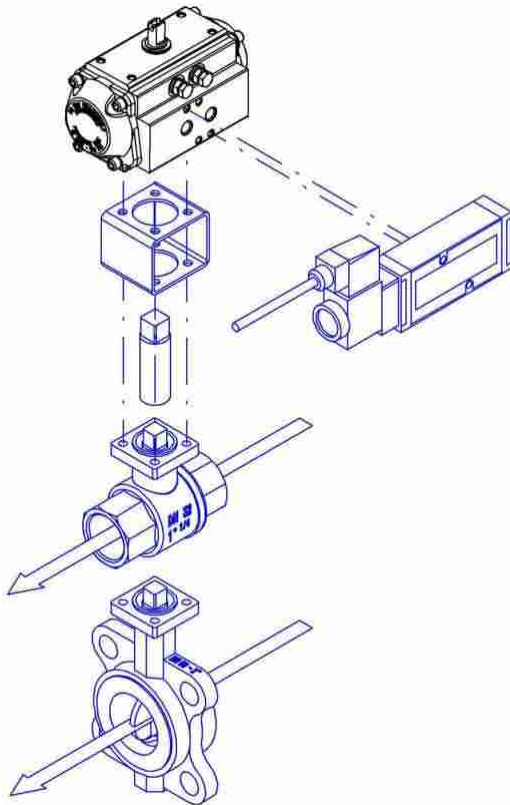


- Supply: dry or lubricated compressed air.
- Working pressure = 8 BAR - 120 PSI. Max. = 10 BAR – 145 PSI.
- Rotation adjustment +\ -5° in both opening and closing position. Assembly precision +\ -1°, made by electronic devices.
- Double lower drilling for valve fastening and centering, according to **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 **NMUR VDI \VDE-3845 Standards**.
- Top drilling for accessories fastening, and upper shaft end according to **NMUR 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 each individual product.
- Standard execution for temperatures from -20°C to +80°C (optional, special execution for extreme temperatures).
- According to **ATEX-94-9-CEE Standard** for explosive environment;
- **STANDARD version actuator: II 2GD c Tmax = 95°C.**
- According to **CEN\TC69\WG1\SG10** design and manufacture standard requirements.

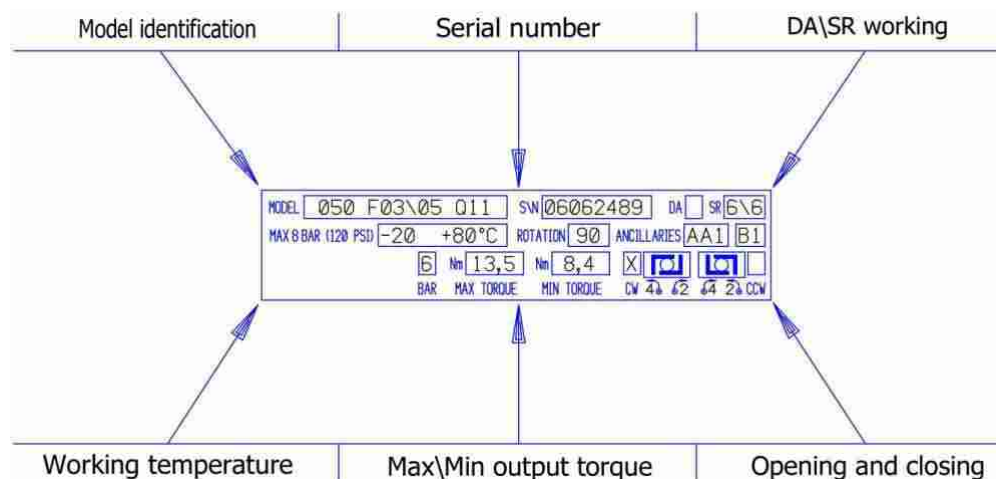
Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

ACUATOR IDENTIFICATION

Pneumatic rotary actuators are engineered to induce opening and closing of ball and butterfly valves, by means of compressed air feeding. They are provided with interfaces for auxiliary connection according to ISO 5211 standard, DIN 3337 and VDI/VDE 3845 (NAMUR).

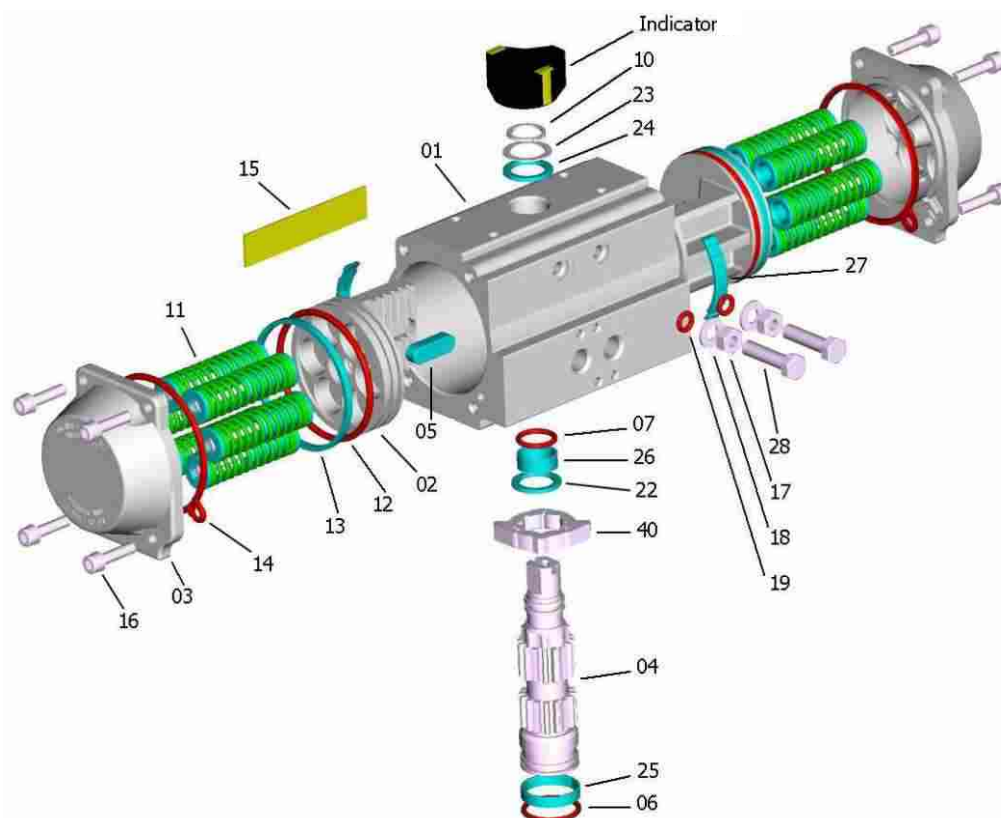


- Every actuator bears an identification nameplate (Fig. 03) that shows:
- Working pressure, air feeding by dry/lubricated air
- Working temperature: keep to indicated field of use
- Model identification. (More features on "General Catalogue")
- Serial number
- DA/SR working – TYPE OF OPERATION
- Opening and closing movements depending on supplied feeding.



Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

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	EN AB 46100	A
3	2	Cover	Aluminium alloy	EN AB 46100	N - V - TF
4	1	Shaft	Carbon steel optional Stainless Steel	ASTM A105 AISI 316 (A4)	N
5 *	2	Antiejection key	Acetalic resin – PA66 – PA66		
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		
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		
23 *	1	Shaft thrust washer	Stainless Steel	AISI 304 (A2)	
24 *	1	Shaft antifriction washer	Acetalic resin – PA66 – PA66		
25 *	1	Lower shaft pilot ring	Acetalic resin – PA66 – PA66		
26 *	1	Upper shaft pilot ring	Acetalic resin – PA66 – PA66		
27 *	2-4	Piston bearing	Acetalic resin – PA66 – PA66		
28	2	Piston screw	Stainless Steel	AISI 304 (A2)	
40	1	External adjusting gear	Stainless Steel	AISI 316 (A4)	
* SPARE PARTS SET: Standard Special HIGH Temperatures Special LOW Temperatures					
Protections A = Anodizing N = chemical Nickel-plating V = Painting TF = Anodizing+PTFE					

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

ROTATION ADJUSTMENT

The rotation adjustment is now easier.

Rotation adjustment operations are made through apposite external screws, with immediate verification of the result, and without actuator disassembly.

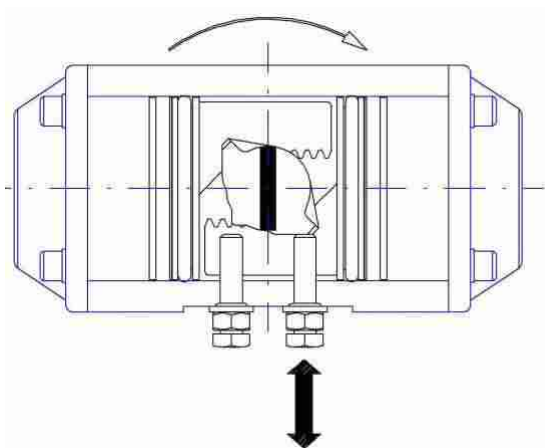
The gear/shaft tooling is high precision made, and this guarantees no mechanical clearances inside, with maximum precision of rotation adjustment and maximum lifetime!

Below figures show the rotation adjustment operations, as intended per STANDARD "A" and "B" assembly variation actuators, that have clockwise "CW" closing rotation.

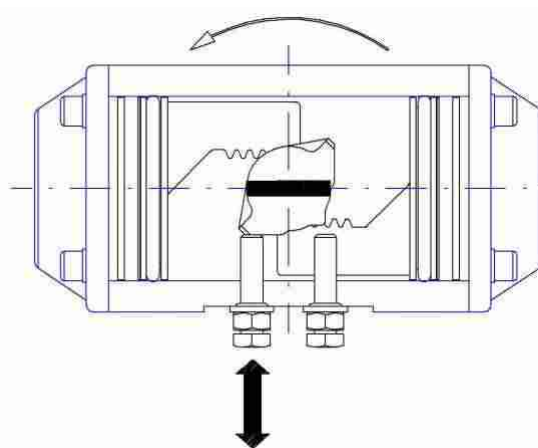
P.N. "C" and "D" assembly variation actuators have counter-clockwise "CCW" enclosure rotation, so adjustments shall be made by the opposite screws.

The actuator's closing rotation is punched and shown on the nameplate: as "CW" (clockwise), or "CCW" (counter-clockwise). See ASSEMBLY VARIATION sheet.

CLOSING rotation adjustment

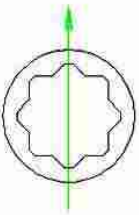
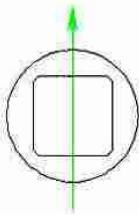
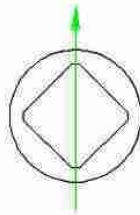
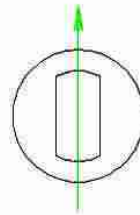
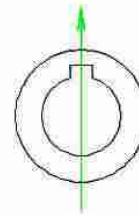
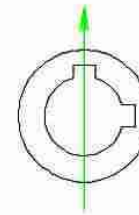


OPENING rotation adjustment



Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

AVAILABLE FORCE INTAKES

VDI\VDE 3845 	VDI\VDE 3845 	VDI\VDE 3845 	VDI\VDE 3845 	VDI\VDE 3845 	VDI\VDE 3845 
STANDARD ALPHAIR S= L&D	L	D	H	V	W

TYPE	ISO 5211 FLANGE	SHAFT FORCE INTAKE
RE 051	F03 F03\05 F04 F05	S = 9 – 11
RE 064	F03\05 F04 F05 F05\07	S = 9 – 11 – 14
RE 076	F04 F05\07	S = 11 – 14 – 17
RE 086	F05\07	S = 14 – 17
RE 101	F07\10 F05\07\10	S = 17 – 22
RE 116	F07\10	S = 17 – 22
RE 126	F10\12 F12	S = 17 – 22 – 27
RE 146		
RE 161		

ALPHAIR standard force intake is called "S TYPE" (starlike), which enables direct assembly on valves with both L (0°) and D (45°) drive square. It is available in all indicated sizes.

Above mentioned **boldtype** shaft force intakes are available also in L (0°) and D (45°), whereas H (flat-head), V (one key) and W (two keys) force intake types, can be supplied on request.

Special shaft working is also available on request, for special applications.

All dimensions and tolerances according to ISO 5211 and DIN 3337 standards.

AVAILABLE FORCE INTAKES

F CODE		DESCRIPTION	TYPE							
A	*	F 03 Q09	RE 051							
		F 03 Q11	RE 051							
		F 03 Q14					* STANDARD IN STOCK			
B		F 04 Q09	RE 051	RE 064						
	*	F 04 Q11	RE 051	RE 064	RE 076					
		F 04 Q14		RE 064	RE 076					
		F 04 Q17			RE 076					
AC		F 03\05 Q09	RE 051	RE 064						
		F 03\05 Q11	RE 051	RE 064						
		F 03\05 Q14		RE 064						
C		F 05 Q09	RE 051	RE 064						
		F 05 Q11	RE 051	RE 064						
	*	F 05 Q14		RE 064						
D		F 05\07 Q11		RE 064	RE 076					
		F 05\07 Q14		RE 064	RE 076	RE 086				
	*	F 05\07 Q17		RE 064	RE 076	RE 086				
DE		F 5\07\10 Q17				RE 101				
		F 5\07\10 Q22				RE 101				
E		F 07\10 Q17				RE 101	RE 116	RE 126		
	*	F 07\10 Q22				RE 101	RE 116	RE 126		
	*	F 07\10 Q27						RE 126		
F		F 10\12 Q22								
	*	F 10\12 Q27								
		F 10\12 Q36								
G		F 12 Q17						RE 126		
		F 12 Q22						RE 126		
		F 12 Q27						RE 126		

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

ACTUATOR WORKING TEMPERATURES

A few important points have to be considered about how to order and install ALPHAIR pneumatic actuators in high or low temperature environments.

The two most common examples concern applications in hot or cold surroundings or those involving direct contact with sources of heat.

In case of hot or cold environment, it is important to know that devices will slowly tend to get as hot or cold as their surroundings. In some cases a protective screen may be placed between automated valve and its surroundings. But if this is not enough, the exact temperature must be measured and actuators have to be ordered with components for high or low temperature.

In case of direct contact with sources of hot or cold (for example actuators applied to valves where hot or cold fluid passes), a direct assembly of the actuator onto the valve is not recommended: where possible, a bracket and an adapter should be placed between them, thus reducing the hot contact surface just to the pinion's head. In spite of using bracket and adapter, it may be cheaper to order actuators with components for high or low temperature.

Following tables describe different ALPHAIR executions.

VERY LOW TEMPERATURE		-60° + 80°C (-76 +175°F)
Plastic antifriction components	Sealing o-rings and gaskets	GREASE
		LEXAN EXL1330
		Silicone
		Klüber ISOFLEX TOPAS L32
		3M 9473 Hard acrylic
LOW TEMPERATURE		-40° + 80°C (-40 +175°F)
Plastic antifriction components	Sealing o-rings and gaskets	GREASE
		Polyamide PA66 (Zytel)
		Silicone
		Klüber ISOFLEX TOPAS L32
		3M 9473 Hard acrylic
STANDARD TEMPERATURE		-20° + 80°C (-4 +175°F)
Plastic antifriction components	Sealing o-rings and gaskets	GREASE
		Acetalic Resin LAT-LUB + 15% PTFE
		NBR Rubber
		Esso MOLY EP2 - Agip SM2 SE
HIGH TEMPERATURE		-20° + 150°C (-4 +300°F)
Plastic antifriction components	Sealing o-rings and gaskets	GREASE
		Polyamide PA66 (Zytel)
		FPM/FKM Rubber
		Klüber PARALIQ GB363 - MOLYKOTE 1102
		3M 9473 Hard acrylic

Attention must be paid when taking environment temperature: no responsibility is undertaken for actuator's applications that are not duly carried out.

Working temperature of complete actuators is punched on every identification nameplate.

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

A GUIDE TO VALVE\ACTUATOR SIZE MATCHING

1) GENERAL INFORMATION ON AUTOMATABLE VALVES

Valves in general are devices that, by means of opening and closing various internal components, enable to stop, regulate and vary the flow of a liquid that passes through them.

Pneumatic actuators are devices constructed to manipulate these valves, which come in a variety of types (ball, butterfly, screw valves, membrane, pin, deviator, three-way, claps etc.) and sizes and can be made of a number of different materials in order to be most suitable to the operating conditions. **The types of valves that can be automated by means of pneumatic actuators are: ball - butterfly - pin - 90°/120°/180° ball deviators.**

Depending on their size and type, the condition they work in and their state of repair, the type of fluid that circulates inside them etc., valves operate to different degrees of efficiency and will need different manoeuvring forces in order to work.

2) GENERAL INFORMATION ON MATCHING SIZES

On valves technical charts, the forces of manoeuvre or, more correctly, **the manoeuvre torques, are given in Newton per metre (Nm).**

The Newton is a unit of weight corresponding to 103 grams; the metre is the standard unit of length used in Europe: we can hence deduce that, to obtain a torque, we need a force and a length at which that force is applied.

Thus, a Newton per metre is the torque produced when 1 Newton is applied at the end of a 1 metre long lever.

In general, the maximum manoeuvre torque to be applied to a valve is that one needed to pass from the closed position to the opened one. So our actuator must be able to apply more than this, even in the most adverse operating conditions. In fact it is necessary to allow a suitable safety margin that will vary depending on the type of use and the guarantee of correct working that we wish to obtain. This can only be established with practical tests or where prescribed by certain laws that call into effect various technical norms.

It is important to bear in mind that all valve manufacturers issue diagrams or charts containing all technical specifications of the valves, including the manoeuvre torque values and the safety margins for different operating conditions, and it is essential to have this information in order to correctly match the actuator to the valve.

Even measuring the torque directly on the valve using specific instruments is no guarantee that the torques will remain constant under certain conditions. For example, in event of long periods of disuse, during which the sealing elements tend to stick to the moving parts thus increasing both friction and the manoeuvre torque itself.

3) EXAMPLES OF DIMENSIONING

There are fundamentally two ways of applying a movement and its relative inversion on a pneumatic actuator: either by air in both directions or by air one way and by springs during the inversion. In both events, the feeding air pressure is the one which determines the torque that the actuator can develop. Greater is the pressure, greater is the torque and, as a result, the capacity to manoeuvre larger valves.

The examples of the following pages are just mentioned to illustrate and clarify in general terms the matching of valves to actuators, therefore have to be considered only indicative and not binding towards Alpha Pompe S.p.A.

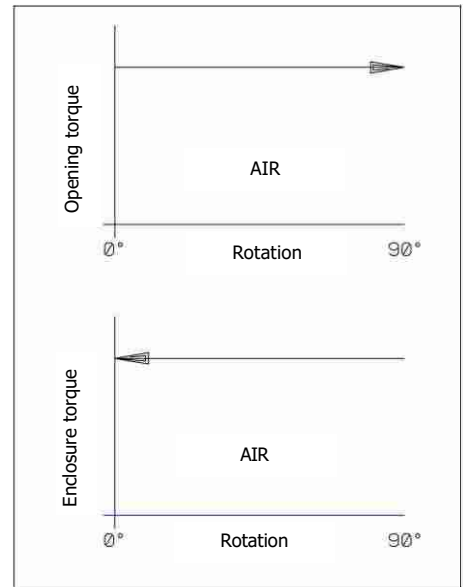
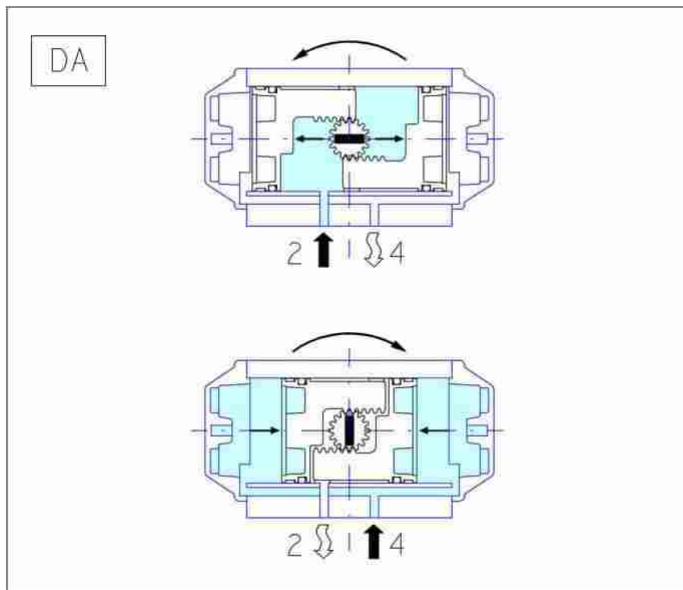
For further informations or specific needs please contact our technical office.

DOUBLE ACTING "DA" ACTUATOR SIZING

Double Acting "DA" operation (air-air), mentioned on actuator's nameplate, indicates:

- Feeding by port "2" opens pistons with shaft's rotation.
- Feeding by port "4" closes pistons with shaft's counter -rotation.

In case of pneumatic fail: actuators and valves stand still in reached position.



Double Acting "DA" actuator generates **a constant torque through all 90° rotation**. Torque output depends on actuator size (piston's diameter), and pressure feeding: it raises according to their increase.

Under normal working conditions, the suggested safety factor for "DA" valve \actuator sizing must be 15-20% minimum. It may obviously be increased depending on application requirements.

DOUBLE ACTING "DA" ACTUATOR SIZING

see DOUBLE ACTING "DA" TORQUE RATINGS datasheet

Maximum valve break torque:	50 Nm
Required safety factor:	15%
Actuator required minimum output torque:	$50 + 15\% = 57,5 \text{ Nm}$
Actuator pressure feeding:	6 BAR

Suggested actuator:

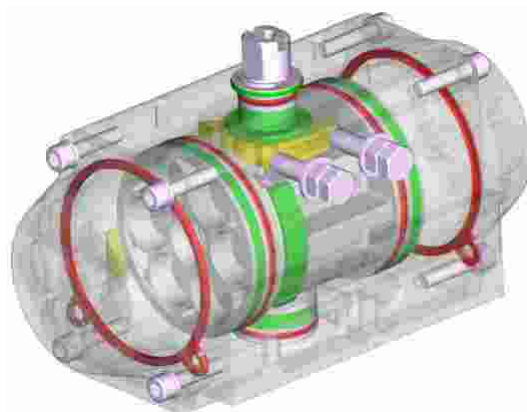
Final safety factor:

RE 076 (constant torque 75,9 Nm)

$(75,9 - 50)/55 = 52\%$

DOUBLE ACTING "DA" TORQUE RATINGS IN Nm

I series = 90°



TYPE	AIR SUPPLY IN BAR									
	1	2	3	4	5	6	7	8	9	10
RE 051	3,6	7,2	10,9	14,5	18,1	21,7	25,3	28,9	32,6	36,2
RE 064	6,4	12,8	19,1	25,5	31,9	38,3	44,6	51,0	57,4	63,8
RE 076	12,6	25,3	37,9	50,6	63,2	75,9	88,5	101,1	113,8	126,4
RE 086	18,6	37,1	55,7	74,2	92,8	111,3	129,9	148,4	167,0	185,5
RE 101	28,9	57,8	86,6	115,5	144,4	173,3	202,2	231,0	259,9	288,8
RE 116	46,7	93,3	140,0	186,7	233,3	280,0	326,7	373,3	420,0	466,7
RE 126	60,1	120,3	180,4	240,6	300,7	360,9	421,0	481,1	541,3	601,4
RE 146										
RE 161										

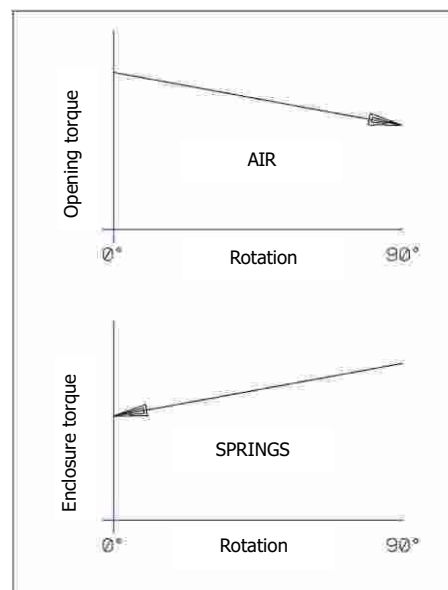
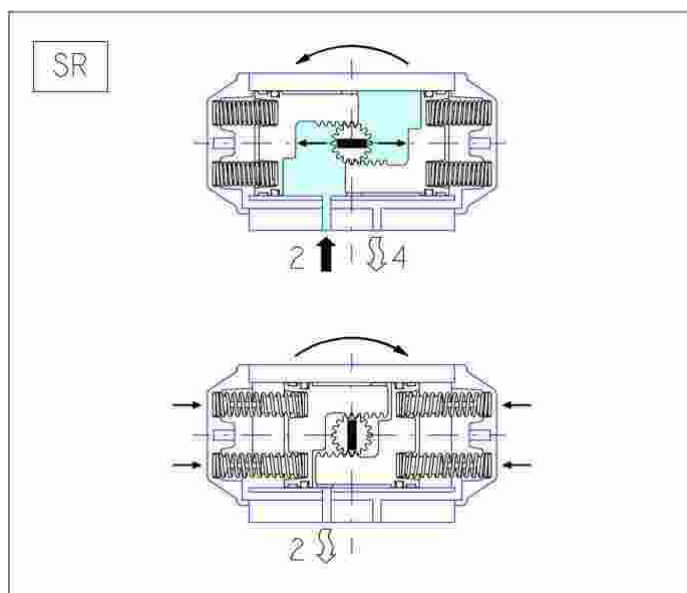
Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

SPRING RETURN "SR" ACTUATOR SIZING

Spring Return "SR" operation (air-springs), mentioned on actuator's nameplate, indicates:

- Feeding by port "2" opens pistons with shaft's rotation.
- Fall of feeding pressure by port "2" closes pistons with shaft's counter-rotation.

In case of pneumatic fail: springs close actuator and valve (fail safe).



Spring Return "SR" actuator generates **different torques through all 90° rotation**. Torque output does not depend only on a ctuator size and pressure feeding (raising according to their increase), but also on stroke position and whether it is generated by the air or by the springs.

Actuator opening by air, generates at 0° (break torque) a torque that constantly decreases because of increasing of springs compression; at 90° this torque outoput reaches its minimum value.

Actuator closing by springs, generates at 90° a torque that constantly decreases until complete springs extension; at 0° this torque outoput reaches its minimum value (complete valve closing).

Under normal working conditions, the suggested safety factor for "SR" valve/actuator is higher than "DA" suggested safety factor, because of springs construction tolerance and their progressive subsidence (mechanical stress). It must be minimum 25-30% but it may obviously be increased depending on application requirements.

P.N.

Safety factor has to be calculated on 90° springs torque (complete valve closing).

SPRING RETURN "SR" ACTUATOR SIZING

see SPRING RETURN "SR" TORQUE RATINGS datasheet

Maximum valve break torque:	50 Nm
Required safety factor:	25%
Actuator required minimum output torque:	$50 + 12,5\% = 62,5 \text{ Nm}$
Actuator pressure feeding:	6 BAR

Suggested actuator: **RE 101 SR-6\6 (minimum spring torque 67,0 Nm)**

Final safety factor: $(67,0 - 50)/50 = 34\%$

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

BALANCING OF SPRING TORQUE

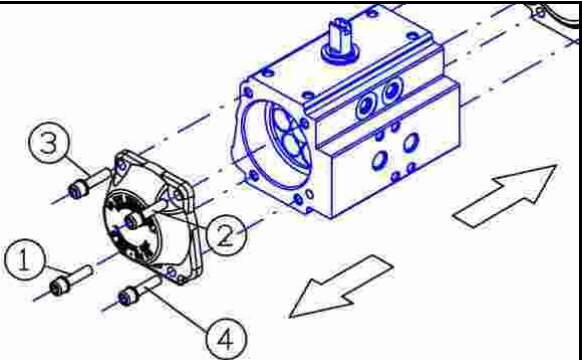
Spring Return "SR" actuators may be originally equipped with springs inside. Their presence and their number are mentioned on identification nameplate.

In case of need, Double Acting "DA" actuators can be converted into Spring Return "SR" actuators just inserting necessary springs.

In any case, attention must be paid to some technical norms for correct sizing.

- 1 – Each spring per side of actuator generates a torque output that balances 1 BAR (14,5 PSI) air pressure.
 - Example 1: for 5 BAR actuator pressure feeding, 5 springs per each side are required.
 - Example 2: for 4,5 BAR actuator pressure feeding, 5 springs on one side and 4 springs on the other side are required.
- 2 – While changing the number of springs, actuator performance varies.
See SPRING RETURN "SR" TORQUE RATINGS datasheet.
- 3 – Some particular applications may require a higher safety factor: if possible one more spring can be added, as higher safety for valve closing.

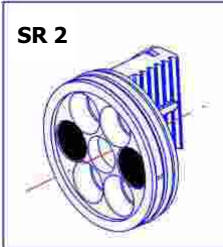
For safe conversion into "SR" spring return actuators, please follow this procedure.



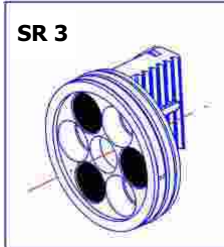
Take off covers loosening screws, as per indicated numeration.

Insert springs in the seats, as per required quantity.

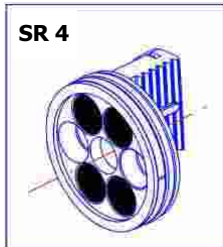
SR 2



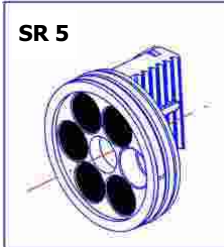
SR 3



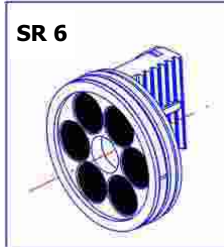
SR 4

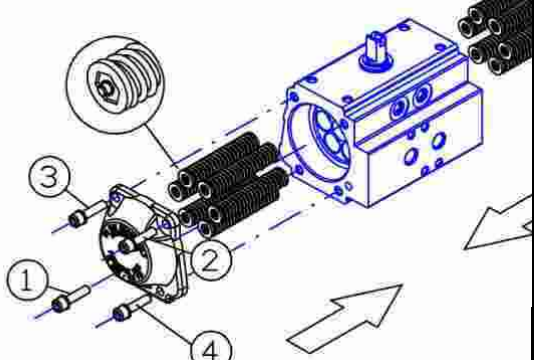


SR 5



SR 6





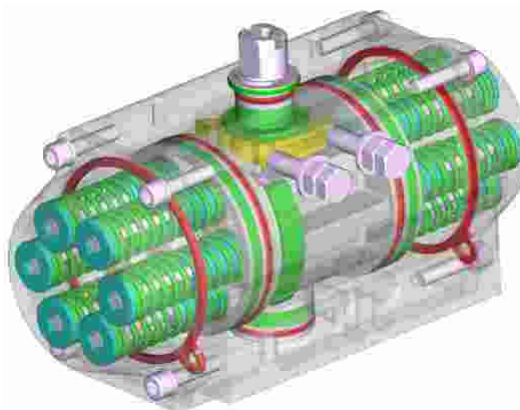
Assembly covers tightening screws, as per indicated numeration.
Tightening screws torques according following label.

M5	M6	M8	M10	M12	M14	M16
4,5 Nm.	8 Nm.	19 Nm.	38 Nm.	65 Nm.	115 Nm.	116 Nm.

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

SPRING RETURN "SR" TORQUE RATINGS IN Nm

I series = 90°



TYPE	SPRINGS FOR EACH SIDE	AIR SUPPLY IN BAR												SPRINGS TORQUE	
		3		4		5		6		7		8			
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
RE 051	3	6,6	4,1	10,3	7,7	13,9	11,3	17,5	15,0	21,1	18,6	24,7	22,2	6,7	4,2
	4	5,2	1,9	8,9	5,5	12,5	9,1	16,1	12,7	19,7	16,3	23,3	20,0	9,0	5,6
	5			7,4	3,2	11,1	6,9	14,7	10,5	18,3	14,1	21,9	17,7	11,2	7,0
	6					9,7	4,6	13,3	8,2	16,9	11,8	20,5	15,5	13,5	8,4
RE 064	3	11,7	9,3	18,1	13,7	24,5	20,1	30,9	26,4	37,2	32,8	43,6	39,2	11,8	7,4
	4	9,3	3,4	15,7	9,8	22,0	16,1	28,4	22,2	34,8	28,9	41,2	35,3	15,7	9,8
	5			13,2	5,8	19,6	12,2	26,0	18,6	32,3	24,9	38,7	31,3	19,7	12,3
	6					17,1	8,3	23,5	14,6	29,9	21,0	36,2	27,4	23,6	14,8
RE 076	3	23,3	14,5	36,0	27,2	48,6	39,8	61,2	52,5	73,9	65,1	86,5	77,8	23,4	14,6
	4	18,4	6,7	31,1	16,4	43,7	32,0	56,4	44,7	69,0	57,3	81,7	70,0	31,2	19,5
	5			26,2	11,6	38,9	24,2	51,5	36,9	64,1	49,7	76,8	62,2	39,0	24,4
	6					34,0	16,4	46,6	26,1	59,3	41,3	81,9	54,4	46,8	29,2
RE 086	3	34,2	21,3	52,7	39,8	71,3	58,4	89,8	76,9	108,4	95,5	126,9	114,0	34,4	21,5
	4	27,0	9,8	45,5	28,3	64,1	46,9	82,7	65,4	101,2	84,0	119,8	102,6	45,9	28,7
	5			38,4	16,9	56,9	35,4	75,5	54,0	94,0	72,5	112,6	91,1	57,3	35,8
	6					49,8	24,0	68,3	42,5	86,9	61,1	105,4	79,6	68,8	43,0
RE 101	3	53,2	33,1	82,0	62,0	110,9	90,8	139,8	119,7	168,7	148,6	197,6	177,5	53,6	33,5
	4	42,0	15,2	70,9	44,1	99,8	73,0	128,6	101,9	157,5	130,7	186,4	159,6	71,4	44,6
	5			59,7	26,2	88,6	55,1	117,5	84,0	146,4	112,9	175,2	141,8	89,3	55,8
	6					77,4	37,3	106,3	66,1	135,2	95,0	164,1	123,9	107,1	67,0
RE 116	3	86,1	53,8	132,8	100,5	179,5	147,2	226,2	193,8	272,8	240,5	319,5	287,2	86,2	53,9
	4	68,2	25,1	114,9	71,8	161,5	118,5	208,2	165,1	254,9	211,8	301,5	258,5	114,9	71,8
	5			96,6	43,1	143,6	89,7	190,3	136,4	236,9	183,1	283,6	229,7	143,6	89,8
	6					125,6	61,0	172,3	107,7	219,0	154,3	265,6	201,0	172,3	107,7
RE 126	3	111,0	69,4	171,2	129,5	231,3	189,7	291,4	249,8	351,6	310,0	411,7	370,1	111,0	69,4
	4	87,9	32,4	148,0	92,5	208,2	152,7	268,3	212,8	328,4	273,0	388,6	333,1	148,0	92,5
	5			124,9	55,5	185,0	115,7	245,2	175,8	305,3	236,0	356,5	296,1	185,0	115,7
	6					161,9	78,7	222,0	138,8	282,2	198,9	342,3	259,1	222,0	138,8
RE 146	3														
	4														
	5														
	6														
RE 161	3														
	4														
	5														
	6														
Torques rated by air supply														Torques rated by spring return	
0° = closed pistons, elongated springs														90° = opened pistons, compressed springs	
Air \springs balanced torques															
0° - MAXIMUM OPENING BREAK TORQUE BY AIR								0° - MINIMUM ENCLOSURE TORQUE BY SPRINGS							

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

"AV" PROTECTION

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

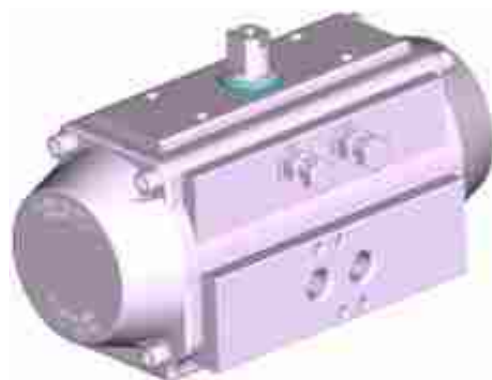
ALPHAIR standard "AV" protection allows an optimal lifetime in most common industrial environments.

Technical features:

- **Body:** outside mechanical brushing of the aluminium body, that allows better anodizing uniformity. 25? special electrochemical anodizing for good corrosion resistance. Inside surface with low friction and high hardness for abrasion-free and higher sealing lifetime.
- **Covers:** special sandblasting, that allows better polyester painting adhesion to metal. High painting thickness (60-80?) for good elasticity and abrasion-free material.
- **Pistons:** special sandblasting, that allows a better uniformity of further anodizing (15?, for a good resistance to condensation of compressed air feeding).
- **Shaft:** the carbon steel optimal mechanical resistance is joined to outstanding hardness and chemical resistance of the electroless high phosphorous (12%) nickel plating. High coating thickness (20 ?) for maintenance-free operations and good outside looking.
- **AISI 316 (A4) and AISI 304 (A2) Stainless Steel shaft – OPTIONAL:** available for very corrosive environments, high temperatures, marine and off-shore plants or chemicals, food industry and health services, Stainless Steel is well know for its strength and chemical resistance.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

"NN" PROTECTION



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

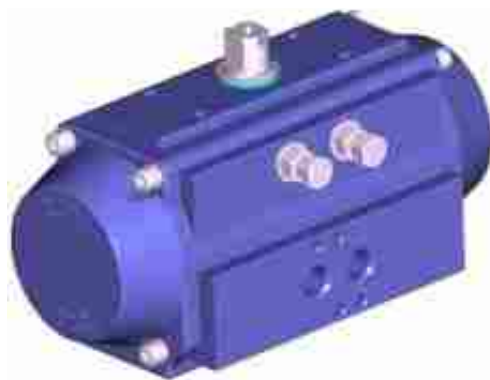
ALPHAIR OPTIONAL "NN" protection allows applications in several light corrosive industrial environments. Good outside looking.

Technical features:

- **Body:** outside mechanical brushing of the aluminium body, that allows better nickel plating adhesion to metal and uniformity. High coating thickness (20?) electroless high phosphorous (12%) nickel plating for a great chemical resistance, outstanding hardness and a very good look. Inside surface with extra-low friction for abrasion-free and higher sealing lifetime.
- **Covers:** special sandblasting, that allows better nickel plating adhesion to metal and uniformity. High coating thickness (20?) electroless high phosphorous (12%) nickel plating for a great chemical resistance, outstanding hardness and a very good look.
- **Pistons:** special sandblasting, that allows a better uniformity of further anodizing (15?, for a good resistance to condensation of compressed air feeding).
- **Shaft:** the carbon steel optimal mechanical resistance is joined to outstanding hardness and chemical resistance of the electroless high phosphorous (12%) nickel plating. High coating thickness (20 ?) for maintenance-free operations and good outside looking.
- **AISI 316 (A4) and AISI 304 (A2) Stainless Steel shaft – OPTIONAL:** available for very corrosive environments, high temperatures, marine and off-shore plants or chemicals, food industry and health services, Stainless Steel is well know for its strength and chemical resistance.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

"TF TF" PROTECTION



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

ALPHAIR OPTIONAL "TFTF" protection allows applications in several medium corrosive industrial environments. They may substitute AISI 316 (A4) Stainless Steel more expensive actuators in some applications.

Technical features:

- **Body:** outside mechanical brushing of the aluminium body, that allows better previous anodizing uniformity. 25? previous special electrochemical anodizing for a good corrosion resistance and best PTFE treatment adhesion to metal. Inside surface with low friction and high hardness for abrasion-free and higher sealing lifetime.
Additional 15? PTFE treatment, for maximum chemical, electrical and high temperature resistance.
- **Covers:** special sandblasting, that allows previous better anodizing uniformity. 15? previous special electrochemical anodizing for a good corrosion resistance and best PTFE treatment adhesion to metal.
Additional 15? PTFE treatment, for maximum chemical, electrical and high temperature resistance.
- **Pistons:** special sandblasting, that allows a better uniformity of further anodizing (15?, for a good resistance to condensation of compressed air feeding).
- **Shaft:** the carbon steel optimal mechanical resistance is joined to outstanding hardness and chemical resistance of the electroless high phosphorous (12%) nickel plating. High coating thickness (20?) for maintenance-free operations and good outside looking.
- **AISI 316 (A4) and AISI 304 (A2) Stainless Steel shaft – OPTIONAL:** available for very corrosive environments, high temperatures, marine and off-shore plants or chemicals, food industry and health services, Stainless Steel is well know for its strength and chemical resistance.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

TECHNICAL FEATURES AND RESISTANCE OF ANODIZING SURFACE TREATMENT

Anodizing is an electrolytic treatment by which we obtain the forming of an oxide layer with generally high thickness (25-100 microns). It is composed by alumina, and it causes a light dimensional increase of the treated surfaces.

Hard anodizing is mainly used to:

- Increase the resistance to abrasion.
- Increase the resistance to corrosion.
- Increase the surface hardness.
- Increase thermal insulation.
- Increase electrical insulation.

Properties and features of this treatment are considerably affected both by the alloy and the manufacture processes; extrusion alloys and plastic machining are currently classified as "Class 1".

The resistance to abrasion is measured by using wheels (ISO 8251), spurs of hard material (ISO 8252) or by Taber method, with consequent observation of the lack of thickness on the oxide layers.

The resistance to corrosion is measured by using appropriate tight chambers and by bathing the parts in 5% NaCl salty fog for 336 hours minimum (ISO 9227, DIN 179\1\2\3). After the test, no corrosion mark must be visible; moreover, accurate treatments can give effective protections beyond 1000 hours.

The hardness of aluminium oxide is measured through application of weights on conic and pyramidal punches (UNI ISO 4516) and consequent observation of the left trace. Aluminium oxide is one of the hardest known materials, reaching values of 400-600 HV (45-65 HRC).

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

TECHNICAL FEATURES OF POLYESTER PAINTING AND RESISTANCE TO COMMON INDUSTRIAL PRODUCTS

This treatment is obtained through polyester powder coating on polarized parts, by means of light differences in electrical potentials. After application, parts are baked in order to polymerise and let the painting be spread to avoid micro-porosity.

A thickness from 30 to 120 microns derives, which is extremely constant. The best elasticity can be obtained at 60-80 microns. A satisfactory adhesion to metal can be assured both by sandblasting or brushing, and by particular degreasing baths of the rough pieces to be treated.

Properties and features of this treatment are considerably affected both by the metallic substrata and the manufacture processes; the relevant resistance tests are carried out on 60-80microns nominal thickness.

Polyester powder painting is mainly used to:

- Increase the resistance to corrosion.
- Supply a protection against crashes, allowing to handle parts under safety
- Better external appearance.
- Increase resistance to chemical agents.

The resistance to corrosion is measured y by using appropriate tight chambers and by bathing the parts in 5% NaCl salty fog for 500 hours minimum (ISO 9227, DIN 50021). After the test, no corrosion mark must be visible; moreover, accurate treatments can give effective protections beyond 1000 hours.

The superficial hardness is measured through application of weights on conic and pyramidal punches (UNI ISO 2815) and consequent observation of the left trace. Medium values of 90-100° Buchholz can be reached, a very good result for this treatment.

The resistance to crashes is really high, reaching 50-100 kg on 1 cmq of detached material (Gardner). The average grade of adhesion is GT-0 (ISO 2409).

The resistance to light (UVA-UVB) and heat is excellent; the resistance to several chemical agents is good.

It is interesting to note that usually, a thickness of more than 60-80 microns does not increase the chemical resistance at all.

TECHNICAL FEATURES OF ELECTROLESS NICKEL PLATING AND RESISTANCE TO COMMON INDUSTRIAL PRODUCTS

Chemical nickel plating is an electroless coating process by which we obtain nickel layers with extremely constant thickness also on sharp angles, blind holes, threads and inner channels.

During the process, nickel is combined with phosphor in variable percentages: 6% (low phosphor), 8-9% (medium phosphor), 12% (high phosphor), this last is the most valued. The obtained thickness varies from 5 to 30 microns, but at 15-20 microns we obtain the best adhesion.

Electroless nickel plating is mainly used to:

- Increase the resistance to abrasion.
- Increase the resistance to corrosion.
- Increase the surface hardness.
- Better external appearance.
- Increase resistance to alkali and detergents in sanitary and food applications.

The resistance to abrasion is measured by using wheels (ISO 8251), spurts of hard material (ISO 8252) or by Taber method, with consequent observation of the lack of thickness on the nickel layer.

The resistance to corrosion is measured by using appropriate tight chambers and by bathing the parts in 5% NaCl salty fog for 144 hours minimum (ISO 9227, DIN 179/1/2/3).

The surface hardness is measured through application of weights on conic and pyramidal punches (UNI ISO 4516) and consequent observation of the left trace. Medium results reach values of 400-480 HV (45-55 HRC).

The external appearance of the treated parts is good, for it is quite bright and similar to stainless steel.

It is interesting to note that usually, a thickness of more than 15-20 microns does not increase the chemical resistance of the coating. In fact, it is always scantily resistant to acids because of its natural superficial micro-porosity.

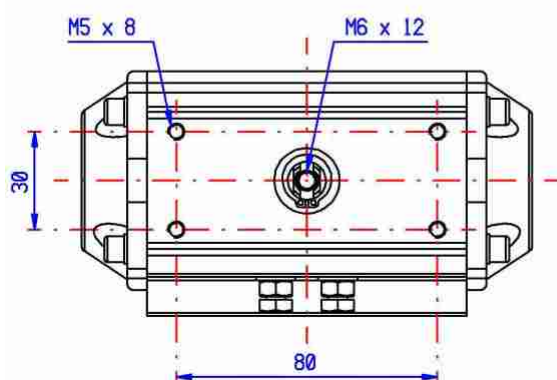
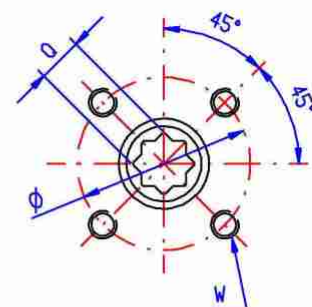
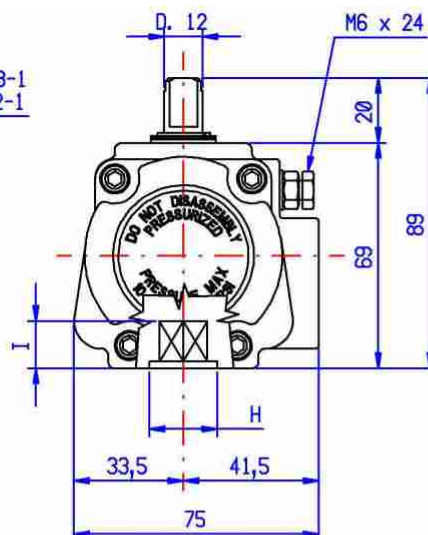
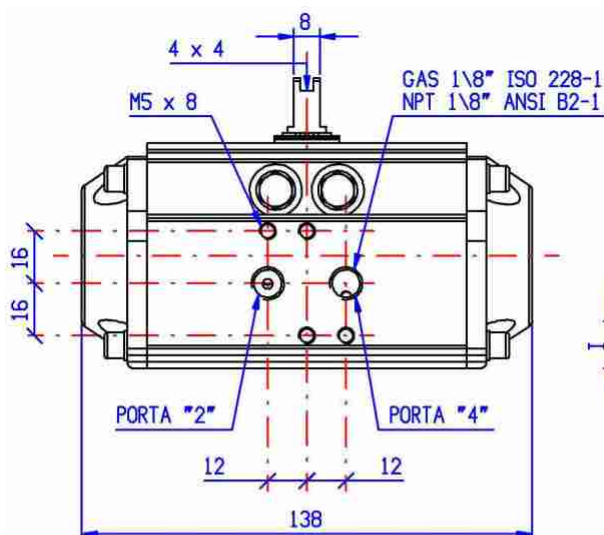
Reproduction forbidden. All rights reserved. Rev. 01\01\2007

TECHNICAL FEATURES OF HARD ANODIZING + PTFE COATING AND RESISTANCE TO COMMON INDUSTRIAL PRODUCTS

As further improvement of the hard anodizing 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).

The resistance to corrosion is measured by using appropriate tight chambers and by bathing the parts in 5% NaCl salty fog for 500 hours minimum (ISO 9227, DIN 179/1/2/3).

Reproduction forbidden. All rights reserved. Rev. 01\01\2007



AVAILABLE FORCE INTAKES F03 - F03\05 - F04 - F05

ISO 5211	F03		F04		F05	
Ø	36		42		50	
W	M 5x8		M 5x8		M 6x9	
Q	9	11	9	11	9	11
I	10	13	10	13	10	13
H	25		30		35	

DOUBLE ACTING TORQUE RATINGS IN NEWTONxMETRE (Nm)

RE 051 DA	AIR SUPPLY IN BAR								WEIGHT kg
	3	4	5	6	7	8	9	10	
	10,9	14,5	18,1	21,7	25,3	28,9	32,6	36,2	1,015

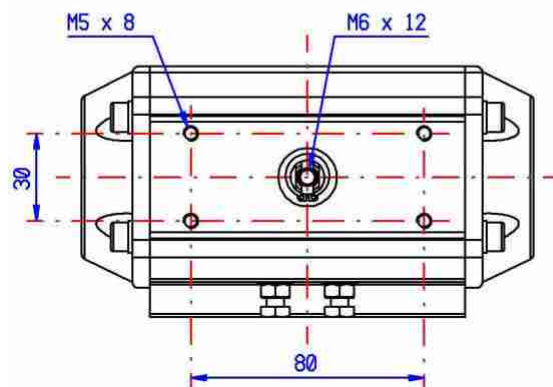
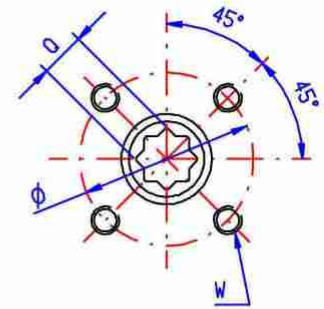
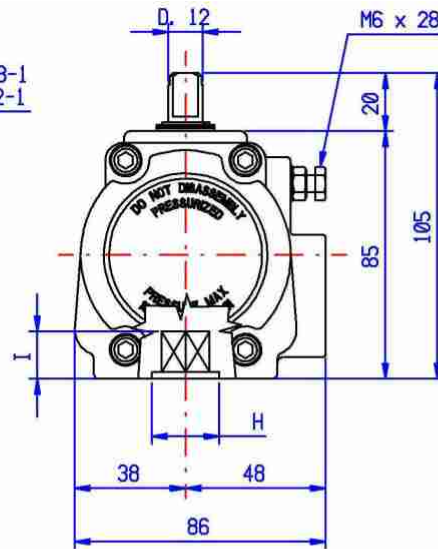
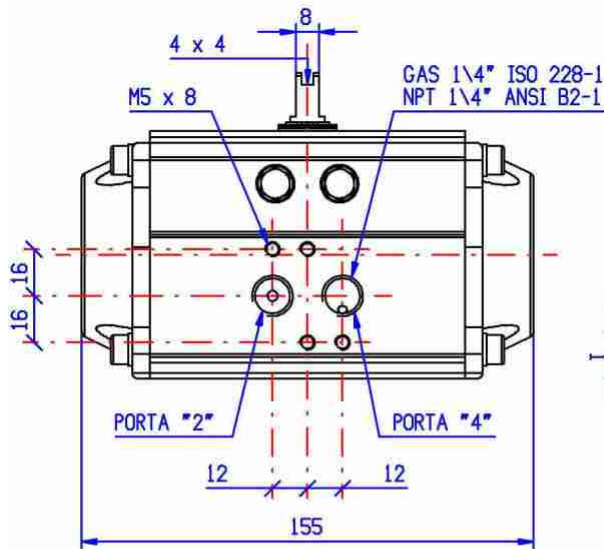
SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)															WEIGHT kg
RE 051 SR	AIR SUPPLY IN BAR												SPRINGS		
	3		4		5		6		7		8		END	START	
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°	
SR 3\3	6,6	4,1	10,3	7,7	13,9	11,3	17,5	15,0	21,1	18,6	24,7	22,2	6,7	4,2	1,075
SR 4\4	5,2	1,9	8,9	5,5	12,5	9,1	16,1	12,7	19,7	16,3	23,3	20,0	9,0	5,6	1,095
SR 5\5			7,4	3,2	11,1	6,9	14,7	10,5	18,3	14,1	21,9	17,7	11,2	7,0	1,114
SR 6\6					9,7	4,6	13,3	8,2	16,9	11,8	20,5	15,5	13,5	8,4	1,135

ADDITIONAL DATA

Chamber Diam.	MAX.PRESSURE	ROTATION	VOLUME	CLOSING TIME	OPENING TIME	STD. GREASE
50 mm	8 BAR	90° ± 5°	0,3 litres	0,5 seconds	0,5 seconds	MOLYBDENUM BISULP.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007



AVAILABLE FORCE INTAKES F03\05 - F04 - F05 - F05\07

ISO 5211	F03	F04	F05	F07
Ø	36	42	50	70
W	M 5x8	M 5x8	M 6x9	M 8x12
Q	9 11 14	9 11 14	9 11 14	9 11 14
I	10 13 16	10 13 16	10 13 16	10 13 16
H	25	30	35	35

DOUBLE ACTING TORQUE RATINGS IN NEWTONxMETRE (Nm)

RE 064 DA	AIR SUPPLY IN BAR								WEIGHT kg
	3	4	5	6	7	8	9	10	
	19,1	25,5	31,9	38,3	44,6	51,0	57,4	63,8	1,490

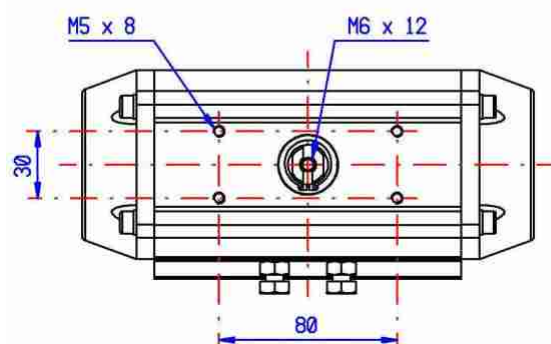
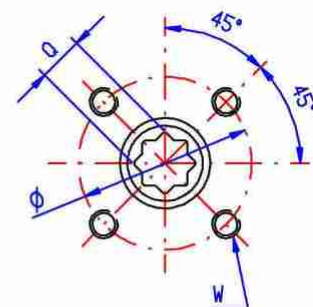
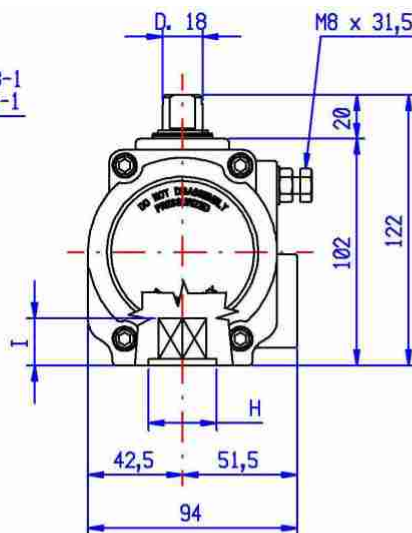
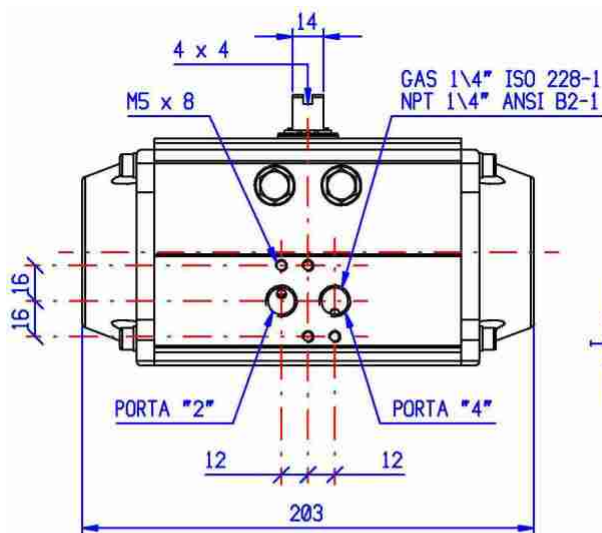
SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)														WEIGHT kg	
RE 064 SR	AIR SUPPLY IN BAR												SPRINGS		
	3		4		5		6		7		8		END		START
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°		0°
SR 3\3	11,7	9,3	18,1	13,7	24,5	20,1	30,9	26,4	37,2	32,8	43,6	39,2	11,8	7,4	1,590
SR 4\4	9,3	3,4	15,7	9,8	22,0	16,1	28,4	22,2	34,8	28,9	41,2	35,3	15,7	9,8	1,625
SR 5\5			13,2	5,8	19,6	12,2	26,0	18,6	32,3	24,9	38,7	31,3	19,7	12,3	1,660
SR 6\6					17,1	8,3	23,5	14,6	29,9	21,0	36,2	27,4	23,6	14,8	1,695

ADDITIONAL DATA

Chamber Diam.	MAX.PRESSURE	ROTATION	VOLUME	CLOSING TIME	OPENING TIME	STD. GREASE
63 mm	8 BAR	90° ± 5°	0,5 litres	0,5 seconds	0,5 seconds	MOLYBDENUM BISULP.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007



AVAILABLE FORCE INTAKES F04 - F05\07

ISO 5211	F04	F05	F07
Ø	42	50	70
W	M 5x8	M 6x9	M 8x12
Q	11 14 17	11 14 17	11 14 17
I	13 16 20	13 16 20	13 16 20
H	30	35	35

DOUBLE ACTING TORQUE RATINGS IN NEWTONxMETRE (Nm)

RE 076 DA	AIR SUPPLY IN BAR								WEIGHT kg
	3	4	5	6	7	8	9	10	
	37,9	50,6	63,2	75,9	88,5	101,1	113,8	126,4	

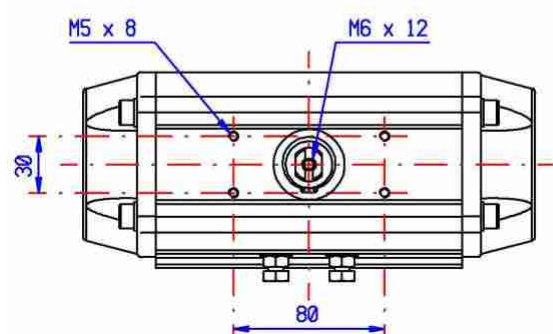
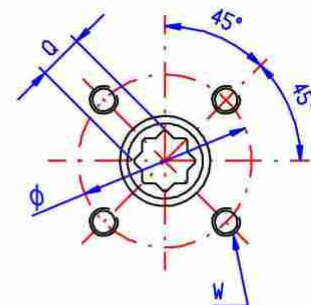
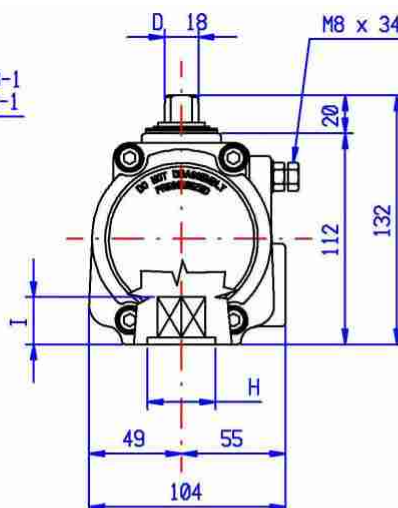
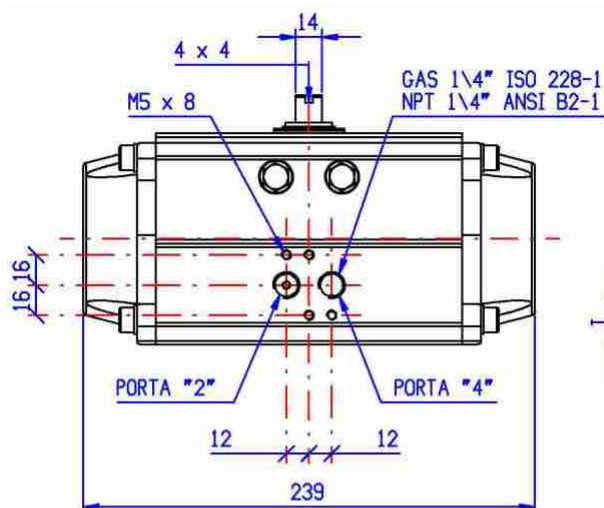
SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)															WEIGHT kg
RE 076 SR	AIR SUPPLY IN BAR												SPRINGS		
	3		4		5		6		7		8		END	START	
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°	
SR 3\3	23,3	14,5	36,0	27,2	48,6	39,8	61,2	52,5	73,9	65,1	86,5	77,8	23,4	14,6	2,720
SR 4\4	18,4	6,7	31,1	16,4	43,7	32,0	56,4	44,7	69,0	57,3	81,7	70,0	31,2	19,5	2,790
SR 5\5			26,2	11,6	38,9	24,2	51,5	36,9	64,1	49,7	76,8	62,2	39,0	24,4	2,860
SR 6\6					34,0	16,4	46,6	26,1	59,3	41,3	81,9	54,4	46,8	29,2	2,930

ADDITIONAL DATA

Chamber Diam.	MAX.PRESSURE	ROTATION	VOLUME	CLOSING TIME	OPENING TIME	STD. GREASE
75 mm	8 BAR	90° ± 5°	0,7 litres	0,7 seconds	0,7 seconds	MOLYBDENUM BISULP.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007



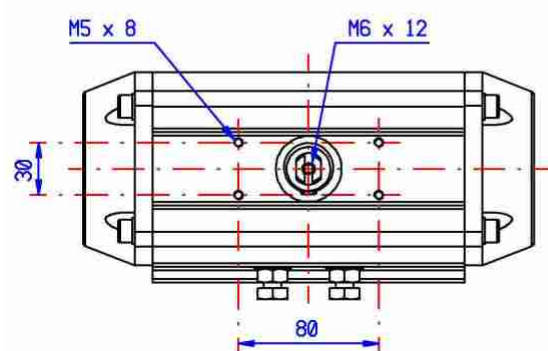
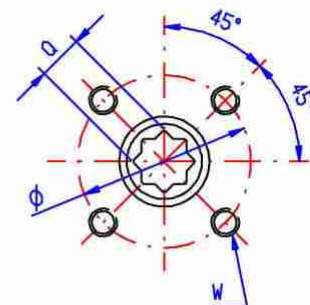
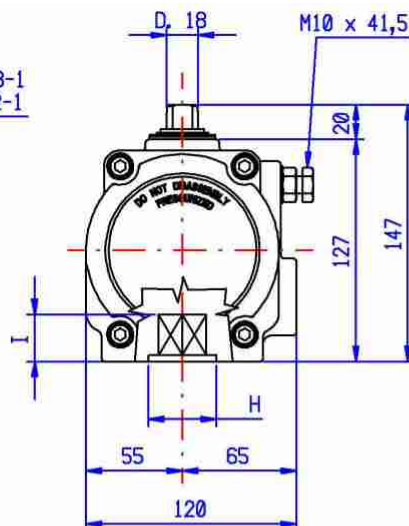
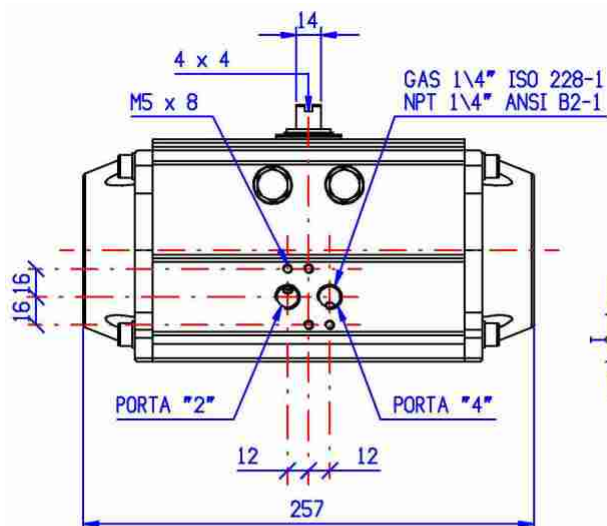
AVAILABLE FORCE INTAKES F05\07				
ISO 5211	F05		F07	
Ø	50		70	
W	M 6x9		M 8x12	
Q	14	17	14	17
I	16	20	16	20
H	40		40	

DOUBLE ACTING TORQUE RATINGS IN NEWTONxMETRE (Nm)									WEIGHT kg
RE 086 DA	AIR SUPPLY IN BAR								
	3	4	5	6	7	8	9	10	
	55,7	74,2	92,8	111,3	129,9	148,4	167,0	185,5	

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)														WEIGHT kg	
RE 086 SR	AIR SUPPLY IN BAR												SPRINGS		
	3		4		5		6		7		8		END		START
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°		0°
SR 3\3	34,2	21,3	52,7	39,8	71,3	58,4	89,8	76,9	108,4	95,5	126,9	114,0	34,4	21,5	3,825
SR 4\4	27,0	9,8	45,5	28,3	64,1	46,9	82,7	65,4	101,2	84,0	119,8	102,6	45,9	28,7	3,935
SR 5\5			38,4	16,9	56,9	35,4	75,5	54,0	94,0	72,5	112,6	91,1	57,3	35,8	4,045
SR 6\6					49,8	24,0	68,3	42,5	86,9	61,1	105,4	79,6	68,8	43,0	4,155

ADDITIONAL DATA						
Chamber Diam.	MAX.PRESSURE	ROTATION	VOLUME	CLOSING TIME	OPENING TIME	STD. GREASE
85 mm	8 BAR	90° ± 5°	1,0 litres	0,8 seconds	0,8 seconds	MOLYBDENUM BISULP.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007



AVAILABLE FORCE INTAKES F5\7\10 – F07\10

ISO 5211	F05		F07		F10	
Ø	50		70		102	
W	M 6x9		M 8x12		M 10x15	
Q	17	22	17	22	17	22
I	20	25	20	25	20	25
H	40		55		55	

DOUBLE ACTING TORQUE RATINGS IN NEWTONxMETRE (Nm)

RE 101 DA	AIR SUPPLY IN BAR								WEIGHT kg
	3	4	5	6	7	8	9	10	
	86,6	115,5	144,4	173,3	202,2	231,0	259,9	288,8	

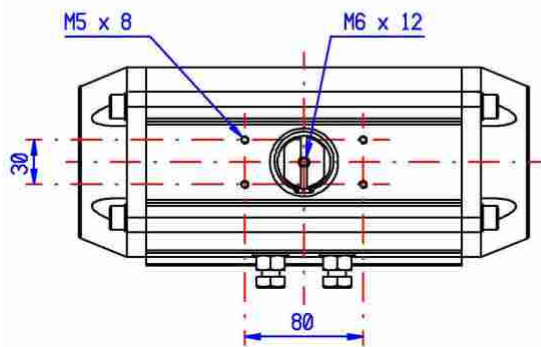
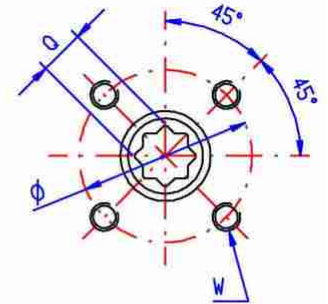
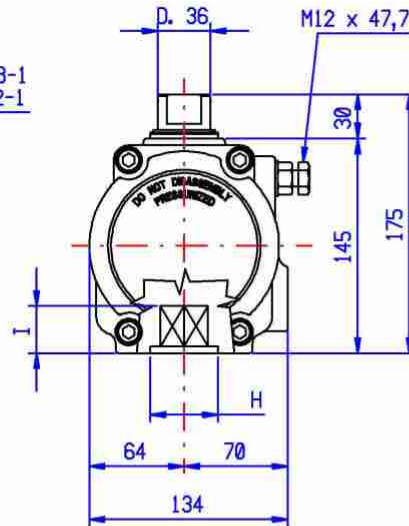
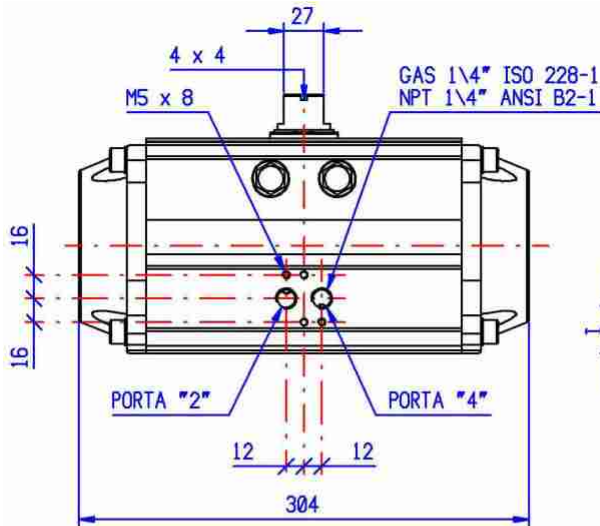
SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)														WEIGHT kg	
RE 101 SR	AIR SUPPLY IN BAR												SPRINGS		
	3		4		5		6		7		8		END		START
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°		0°
SR 3\3	53,2	33,1	82,0	62,0	110,9	90,8	139,8	119,7	168,7	148,6	197,6	177,5	53,6	33,5	5,175
SR 4\4	42,0	15,2	70,9	44,1	99,8	73,0	128,6	101,9	157,5	130,7	186,4	159,6	71,4	44,6	5,325
SR 5\5			59,7	26,2	88,6	55,1	117,5	84,0	146,4	112,9	175,2	141,8	89,3	55,8	5,475
SR 6\6					77,4	37,3	106,3	66,1	135,2	95,0	164,1	123,9	107,1	67,0	5,625

ADDITIONAL DATA

Chamber Diam.	MAX.PRESSURE	ROTATION	VOLUME	CLOSING TIME	OPENING TIME	STD. GREASE
100 mm	8 BAR	90° ± 5°	1,8 litres	0,9 seconds	0,9 seconds	MOLYBDENUM BISULP.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007



AVAILABLE FORCE INTAKES F07\10

ISO 5211	F07	F10
Ø	70	102
W	M 8x12	M 10x15
Q	17 22	17 22
I	20 25	20 25
H	55	55

DOUBLE ACTING TORQUE RATINGS IN NEWTONxMETRE (Nm)

RE 116 DA	AIR SUPPLY IN BAR								WEIGHT kg
	3	4	5	6	7	8	9	10	
	140,0	186,7	233,3	280,0	326,7	373,3	420,0	466,7	

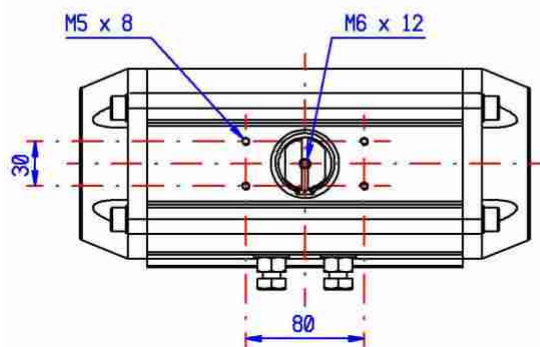
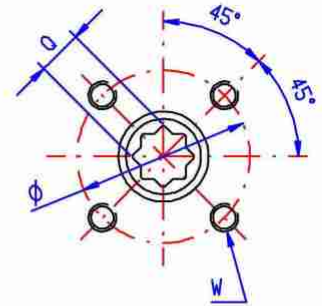
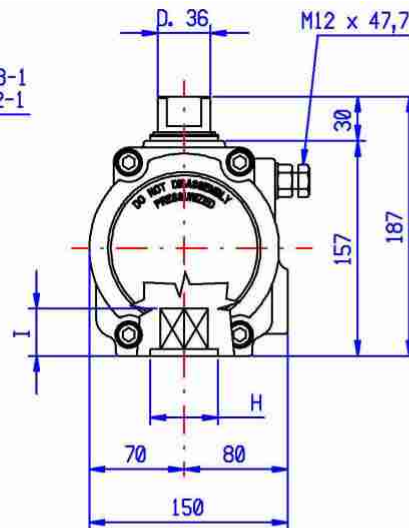
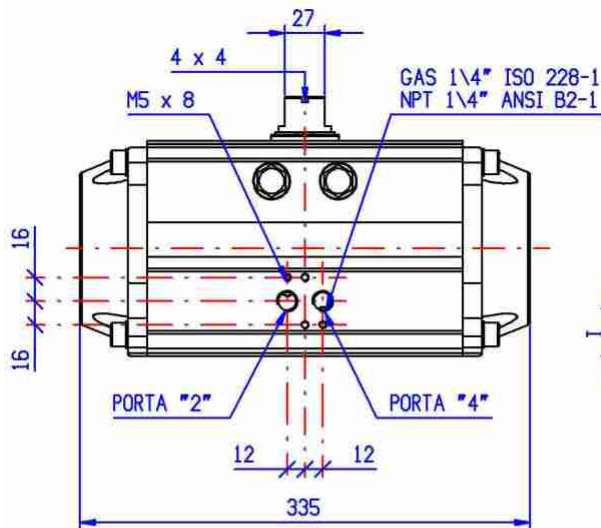
SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)														WEIGHT kg	
RE 116 SR	AIR SUPPLY IN BAR												SPRINGS		
	3		4		5		6		7		8		END		START
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°		0°
SR 3\3	86,1	53,8	132,8	100,5	179,5	147,2	226,2	193,8	272,8	240,5	319,5	287,2	86,2	53,9	7,970
SR 4\4	68,2	25,1	114,9	71,8	161,5	118,5	208,2	165,1	254,9	211,8	301,5	258,5	114,9	71,8	8,200
SR 5\5			96,6	43,1	143,6	89,7	190,3	136,4	236,9	183,1	283,6	229,7	143,6	89,8	3,430
SR 6\6					125,6	61,0	172,3	107,7	219,0	154,3	265,6	201,0	172,3	107,7	8,660

ADDITIONAL DATA

Chamber Diam.	MAX.PRESSURE	ROTATION	VOLUME	CLOSING TIME	OPENING TIME	STD. GREASE
115 mm	8 BAR	90° ± 5°	2,9 litres	1,0 seconds	1,0 seconds	MOLYBDENUM BISULP.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007



AVAILABLE FORCE INTAKES F07\10

ISO 5211	F07	F10
Ø	70	102
W	M 8x12	M 10x15
Q	17 22 27	17 22 27
I	20 25 30	20 25 30
H	55	55

DOUBLE ACTING TORQUE RATINGS IN NEWTONxMETRE (Nm)

RE 126 DA	AIR SUPPLY IN BAR								WEIGHT kg
	3	4	5	6	7	8	9	10	
	180,4	240,6	300,7	360,9	421,0	481,1	541,3	601,4	

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)

SPRING RETURN TORQUE RATINGS IN NEWTONxMETRE (Nm)														WEIGHT kg	
RE 126 SR	AIR SUPPLY IN BAR												SPRINGS		
	3		4		5		6		7		8		END		START
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°		0°
SR 3\3	111,0	69,4	171,2	129,5	231,3	189,7	291,4	249,8	351,6	310,0	411,7	370,1	111,0	69,4	10,070
SR 4\4	87,9	32,4	148,0	92,5	208,2	152,7	268,3	212,8	328,4	273,0	388,6	333,1	148,0	62,5	10,470
SR 5\5			124,9	55,5	185,0	115,7	245,2	175,8	305,3	236,0	356,5	296,1	185,0	115,7	10,870
SR 6\6					161,9	78,7	222,0	138,8	282,2	198,9	342,3	259,1	222,0	138,8	11,270

ADDITIONAL DATA

Chamber Diam.	MAX.PRESSURE	ROTATION	VOLUME	CLOSING TIME	OPENING TIME	STD. GREASE
125 mm	8 BAR	90° ± 5°	3,7 litres	1,2 seconds	1,2 seconds	MOLYBDENUM BISULP.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

DIRECTIONS FOR ACTUATOR INSTALLATION

Duration and safety use of actuators and plants, for all operators within their range of action, also depends on the attention paid to the following directions.

- Move carefully, without crashes.
- Keep actuators in their original packaging, with the relevant contents slips.
- Stock in warehouse between 0° C and + 40° C., even for long periods.
- Construction materials, surface treatments and paintings are physically steady and chemically inactive only under the conditions which are indicated on the identification nameplate.
- Possible arising of oily fogs inside the device: filtrate exhaust feeding air or recycle through specific solenoid-valves.
- Actuator's lubrication is made by the manufacturer. Its operation warranty, identified as number of movements before main metallic part substitution, is 1.000.000 manoeuvres (opening and closing). It is referred to standard models only.
- Springs operation, is guaranteed for 100.000 manoeuvres (opening and closing) before it has to be tested: they must be substituted in case of corrosion marks, wear or side yield.
- Antifriction plastic parts and rubber seals identified as "spare parts set" operation, is guaranteed for 300.000 manoeuvres (opening and closing) before it has to be tested: they must be substituted in case of corrosion marks or pressure losses.
- Installation of the actuator is forbidden before the plant is declared in accordance to CE norms or to eventual technical norms that must regulate the plant's working.

In case of need, about correct operation, call please our Technical Office.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

ALUMINIUM "RE" SERIES ACTUATORS

NOTICE AND NOTES FOR ACTUATORS USE IN EXPLOSIVE ENVIRONMENTS "ATEX" 94\9\CEE DIRECTIVE

"RE" Series Rack & Pinion Actuators in aluminium alloy are carefully engineered and manufactured according to the relevant technical norms and safety european directives.

They can be used in "ATEX" 94\9\CEE Directive dangerous zones, according to the following manufacturer classification.

Device Group II (surface) - Category 2 - G (gas) and D (dust) use

- | | | | |
|--------------------|------------------------|---|--------------------------------------|
| • Low Temperature | -40 +80°C (-40 +176°F) |  | II 2GD c Tmax = 95°C (203°F) |
| • Standard | -20 +80°C (-4 +176°F) |  | II 2GD c Tmax = 95°C (203°F) |
| • High Temperature | -20 +150°C (-4 +302°F) |  | II 2GD c Tmax = 165°C (203°F) |

Due to the relevant safe condition needs, for applications in that particular environment, carefully read please the above notices.

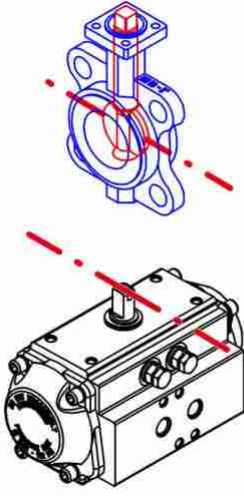
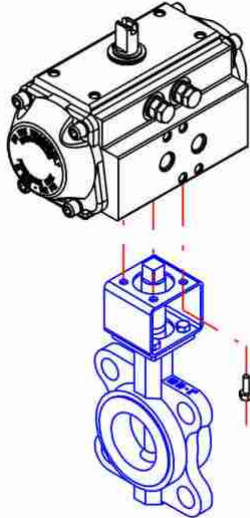
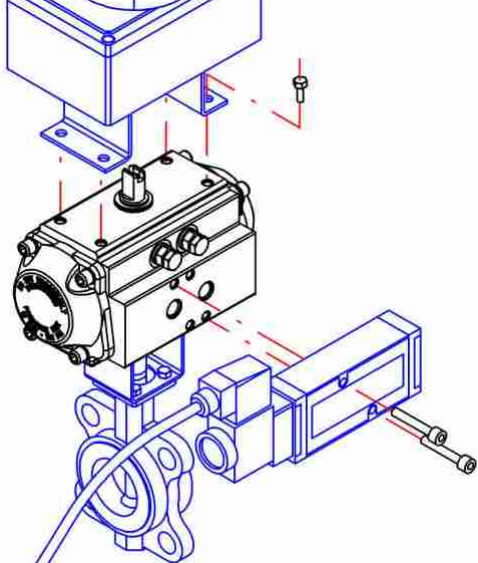
- Before installation, please read our "Instruction manual for use and maintenance" carefully.
- Follow the use expected for actuators.
- Follow the indications of maximum temperature-environment of use, punched on identification nameplate.
- Don't let the actuator be fed by flammable, explosive or burning fluids (oxygen, acetylene etc...).
- Avoid the penetration of explosive atmospheres inside actuators.
- Do not hit the external parts of actuators (both aluminium and steel parts) through metallic objects (it may cause sparkles).
- Do not manually force actuators over the maximum output torque.
- Avoid accumulation of combustible dusts on actuator surfaces.
- Avoid accumulation of electrostatic charges on insulating surfaces of APR, by providing suitable "grounding", using for example the valve fixing screws.
- All components and accessories installed on APR for drive and control purposes, must be suitable for those uses in accordance to the danger classification of the area.
- Maintenance operations on actuators must be made according to the norms in force, (for example EN 50281, EN 60079 etc...) and to the danger classification of the area.
- Do not make maintenance operations in places with explosive atmosphere.
- Verify springs functioning every 100.000 (one hundred thousand) cycles: substitute complete spring cartridges when necessary, but do not try to disassembly them.
- Verify all rubber sealing elements (o-ring s and plane gaskets) and all plastic anti-friction pads every 300.000 (three hundred thousand) cycles: substitute the complete spare-parts set when necessary.
- Use and operation not in accordance to a.m. notes, may cause danger or damage to people and things, and let every legal responsibility lose from Manufacturer side.

In case of need, about correct operation, call please our Technical Office.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

INSTALL OPERATION

For a safe install operation, follow please the above procedure.

 1	 2
Make sure that both valve and actuator are closed. • Standard SR models normally closed. • Standard DA models, feed by port "2" in order to reach the correct positioning.	Assembly through screws, bracket and adapter. N.B. Not for valve\actuator direct assembly.
 3	 4
Insert actuator on top of adapter and assembly it through screws.	Connect accessories, making sure of the real position of the valve. Connect pneumatic/electrical feeding and verify correct operation.

Disassembly is made following all described operations, backwards.

Pay attention to safety rules.

In case of difficulty, do not force the elements, but verify clearances, axis position, supplied feeding and correct torque dimensioning of valve and actuator.

In case of need, about correct operation, call please our Technical Office.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

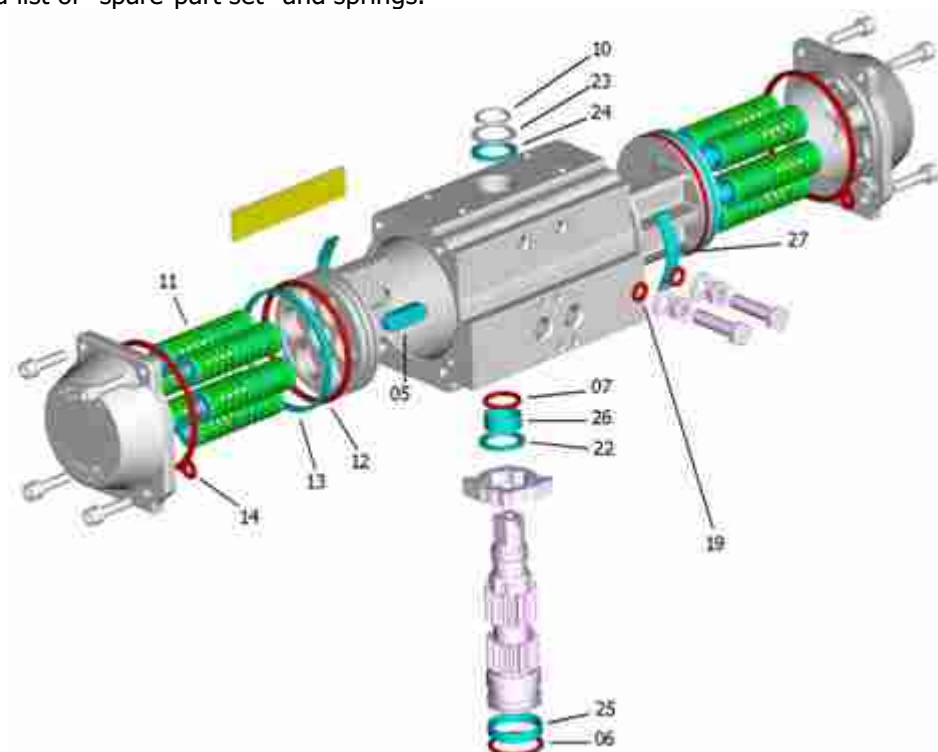
SPARE-PART SET AND SPRINGS

Please note that, depending on working conditions of the actuator, it may be necessary to make a "spare-part set" periodic substitution, this means a change of all antifriction plastic parts and of all rubber seals. Their lifetime duration is guaranteed only for 300.000 manoeuvres (opening and closing), before a new inspection comes to be necessary: in case of corrosion marks or pressure losses, these parts must be substituted.

It may be also necessary to substitute a "spare-part set" for use at a different working temperature. In this case, please verify that both "spare-part set" and lubricant are suitable for the new environmental conditions (see "Actuator working temperatures" datasheet).

Please remember that springs lifetime duration is guaranteed only for 100.000 manoeuvres (opening and closing), before a new inspection comes to be necessary: they must be substituted in case of corrosion marks, wear or side yield.

This is a list of "spare-part set" and springs.



PART	QUANTITY	DESCRIPTION	MATERIAL	SPECIFICATION	PROTECTION
5 *	2	Antiejection key	Acetalic Resin – PA66 – PA66		
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		Nichel plating
11	0 ... 12	Spring cartridge	Carbon+Stainless Steel, PA 66	AISI 304 (A2)	Painting
12 *	2	Piston O-Ring	NBR - FPM\FKM - Silicone		
13 *	2	Piston head bearing	Acetalic Resin – PA66 – PA66		
14 *	2	Cover gasket	NBR - FPM\FKM - Silicone		
19 *	2	O-Ring	NBR - FPM\FKM - Silicone		
22 *	1	Gear antifriction washer	Acetalic Resin – PA66 – PA66		
23 *	1	Shaft thrust washer	Stainless Steel	AISI 304 (A2)	
24 *	1	Shaft antifriction washer	Acetalic Resin – PA66 – PA66		
25 *	1	Lower shaft pilot ring	Acetalic Resin – PA66 – PA66		
26 *	1	Upper shaft pilot ring	Acetalic Resin – PA66 – PA66		
27 *	2	Piston bearing	Acetalic Resin – PA66 – PA66		
* Standard SPARE-PARTS SET in NBR - Special HIGH Temperature in FPM\FKM - Special LOW Temperature in Silicone					

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

MAINTENANCE, SPARE-PART SET AND SPRINGS SUBSTITUTION

In event of "spare-part set" and/or spring substitution, follow please the above procedure also listed on actuator handbook (held inside every actuator box).

MAINTENANCE, SPARE PARTS SET AND SPRING SUBSTITUTION

Actuator must be absolutely taken off from the plant where it is installed, disconnected from pneumatic and electrical feeding, and from possible accessories, see Fig. 14.

Warning!

Installation, adjustment and maintenance must be effected under safety conditions. Do not connect pneumatic/electrical feeding until all operations are terminated. For all numbered parts, only complete spare-part sets are available.

TAKE OFF!
ZERLEGEN!
DEMONTER!
DESMONTAR!
DISINSTALLARE!

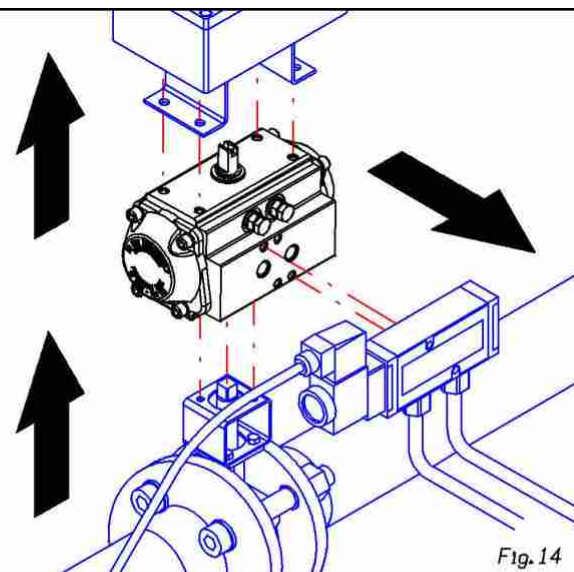


Fig. 14

DISASSEMBLY
ENTFERNEN
DEMONTER
DESMONTAR
SMONTARE

1 Take off external adjusting screws, see Fig. 15.

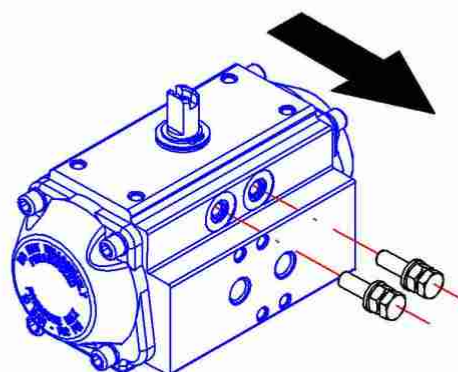


Fig. 15

DISASSEMBLY
ENTFERNEN
DEMONTER
DESMONTAR
SMONTARE

2 Take off covers loosening screws as per indicated numeration; pull out springs, if any, from pistons seats, see Fig. 16.

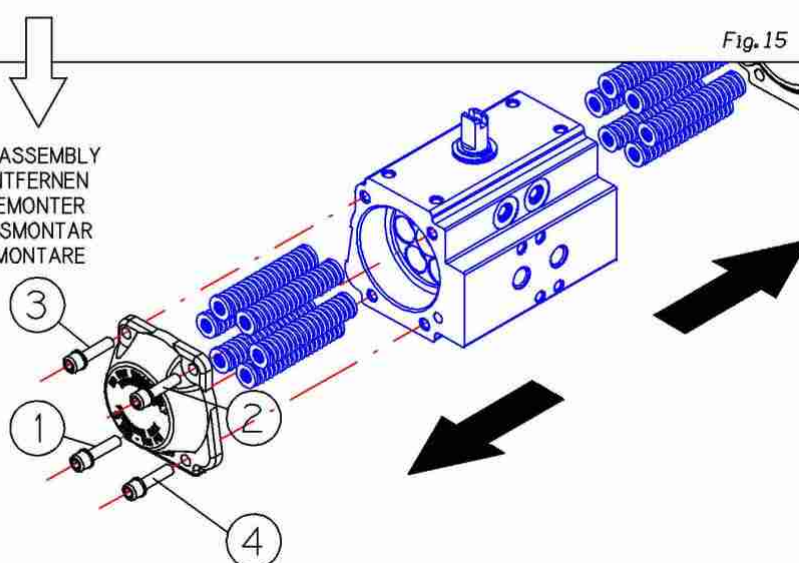


Fig. 16

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

3 Rotate top stem in order to release pistons from shaft's rack. Take off pistons through a pair of pincers, see Fig. 17.

TAKE OUT
AUSZIEHEN
EXTRAIRE
EXTRAER
ESTRARRE

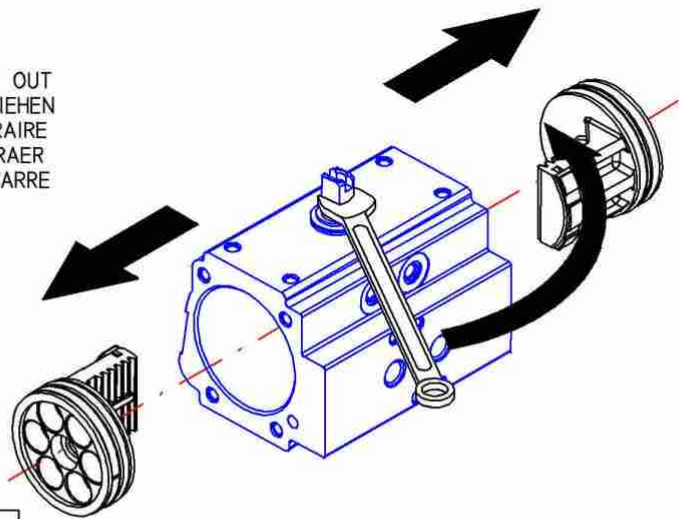
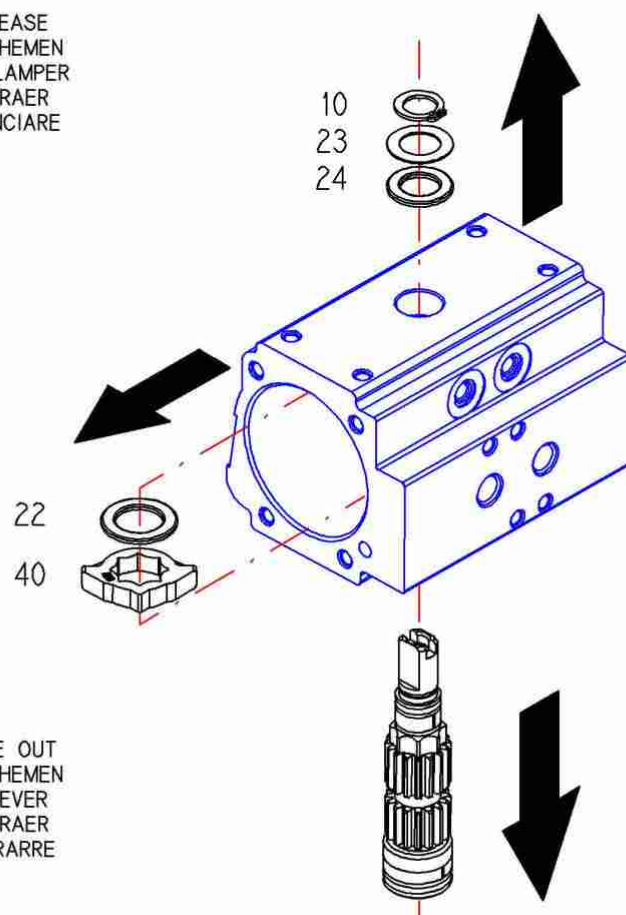


Fig. 17

4 Release seeger ring (Part 10) from the shaft top and take away:
 • Shaft thrust washer (Part 23),
 • Anti-friction washer (Part 24),
 • Gear antifriction washer (Part 22),
 • External adjusting gear (Part 40) and the shaft too, see Fig. 18.

RELEASE
ABNEHEMEN
DE CLAMPER
EXTRAER
SGANCIARE



TAKE OUT
ABNEHEMEN
ENLEVER
EXTRAER
ESTRARRE

Fig. 18

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

SPARE PARTS SET
ERSATZTEILKIT
KIT DE RECHANGE
JUEGO DE RECAMBIO
SET-RICAMBI

5a From both covers take off:
• Cover gasket (Part 14).

5b From both pistons take off:
• Piston bearing (part 27),
• Anti-ejection key (Part 05),
• O-rings (Part 12),
• Piston head bearing (Part 13).

5c From the shaft take off:
• Upper pilot ring for shaft (Part 26),
• O-rings (Part 06-07),
• Lower pilot ring for shaft (Part 25).

See Fig. 19.

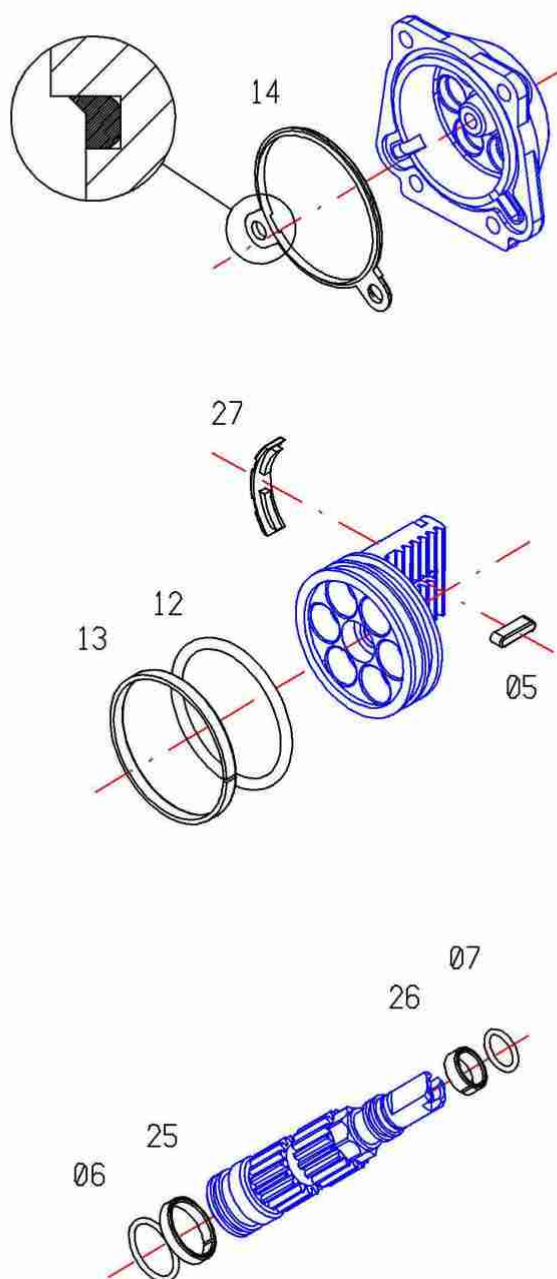


Fig. 19

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

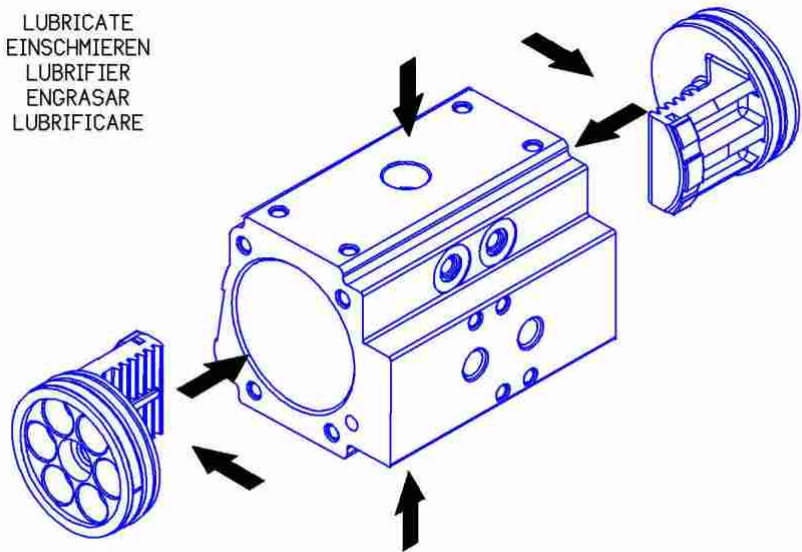
WARNING!

After disassembly all particulars to be substituted, and before proceeding with their replacement, carefully clean all components: body, pistons, covers and shaft.

Replace now the old particulars with the new ones.

Before assembly, lubricate please where indicated with molybdenum bisulphide grease type: ESSO MOLY EP-2, AGIP SM2 SE or similar, see Fig. 20.

LUBRICATE
EINSCHMIEREN
LUBRIFIER
ENGRASAR
LUBRIFICARE



ESSO MOLY EP2
AGIP SM2 SE

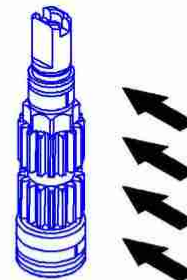


Fig.20

RE-INSERT
EINFUEGEN
REINSERER
ALOJAR
REINSERIRE

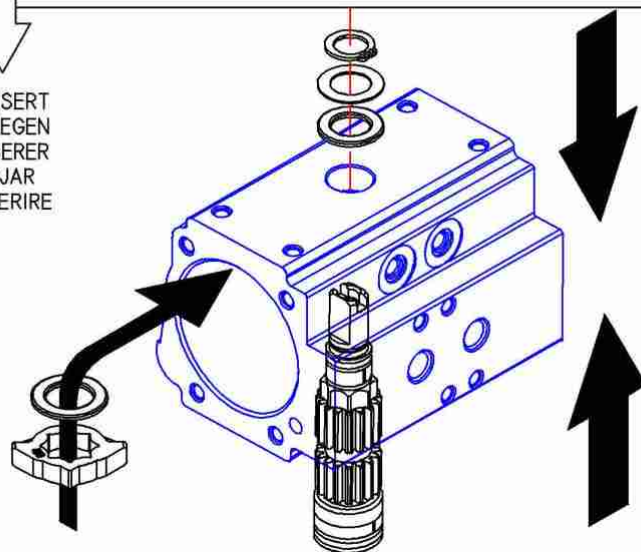


Fig.21

6 Re-insert the shaft in the body, with external adjusting gear and gear antifriction washer on its inside. Slip the external washers and clip the seeger ring: be shure please that they are well engaged, see Fig. 21.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

7 Fig. 22 shows the correct gearing by gear and shaft, and the direction of the gear's arrow respect to the body (actuator top vision).

In order to easy subsequent operation (inserting pistons in the body), it is suggested to respect this schema.

BE SURE ! ACHTUNG ! S'ASSURER ! ASEGURARSE ! ASSICURARSI !

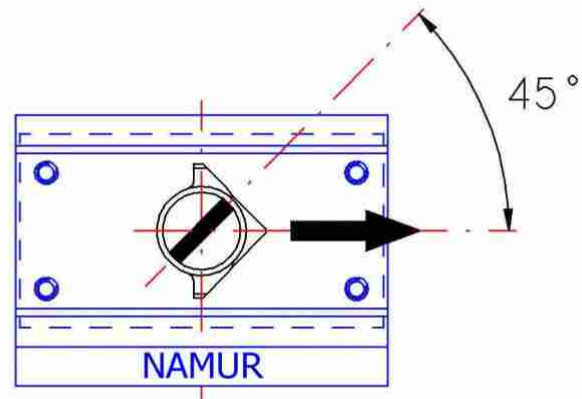


Fig. 22

8 Insert the pistons in the body, see Fig. 23.

WARNING!

If the assembly variation is not STANDARD = A (see "ASSEMBLY VARIATION" data sheet or the handbook's TAB A-B-C-D), it need reverse the gearing angle by gear and shaft (Fig. 22), or the rotation of the pistons respect to the body (Fig. 23), or both.

RE-INSERT
EINFUEGEN
REINSERER
ALOJAR
REINSERIRE
(TAB A-B-C-D)

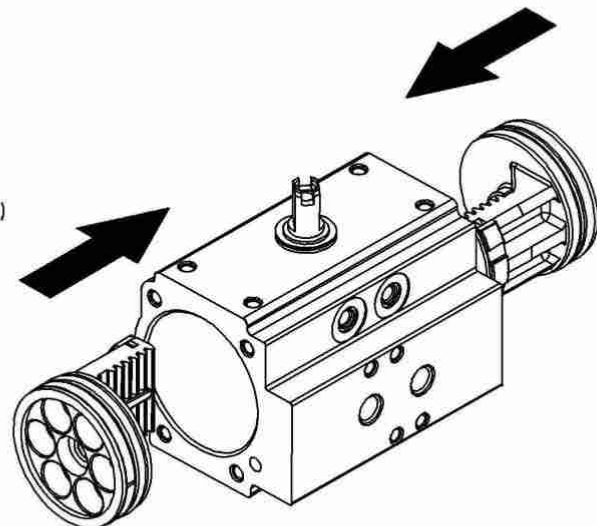


Fig. 23

BE SURE ! ACHTUNG ! S'ASSURER ! ASEGURARSE ! ASSICURARSI !

9 Verify the piston's "right phase": this means they are engaged with the same tooth on shaft, and verify that shaft rotation induces a piston's symmetrical opening, see Fig. 23-A.

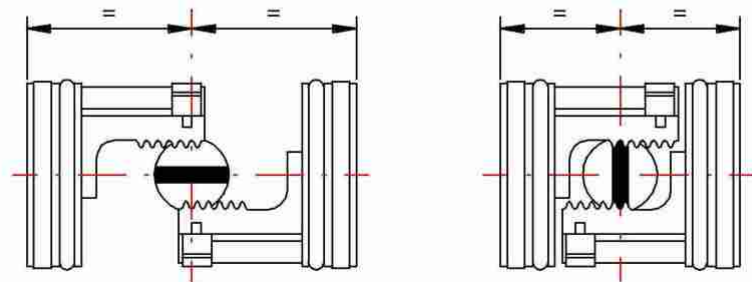


Fig. 23-A

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

10 Verify that after a $90^\circ + 5^\circ$ shaft rotation the pistons rest inside to the body, see Fig. 23- B.

BE SURE !
ACHTUNG !
S'ASSURER !
ASEGURARSE !
ASSICURARSI !

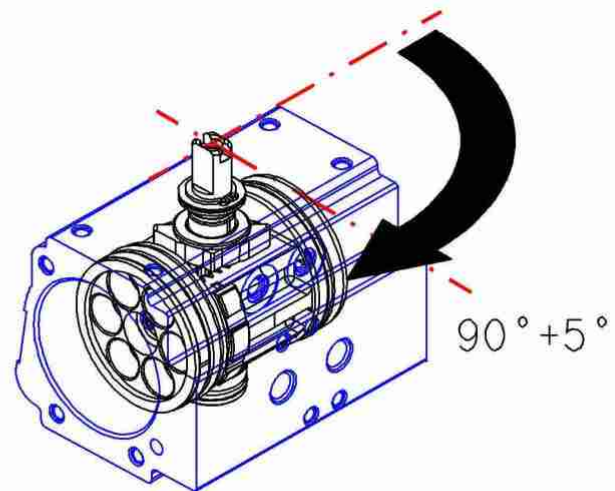


Fig. 23-B

11 Adjust the 90° actuator rotation, re-inserting the appropriate external adjusting screws, see Fig. 24.

ADJUST
VERSTELLEN
REGLER
AJUSTE
REGOLARE

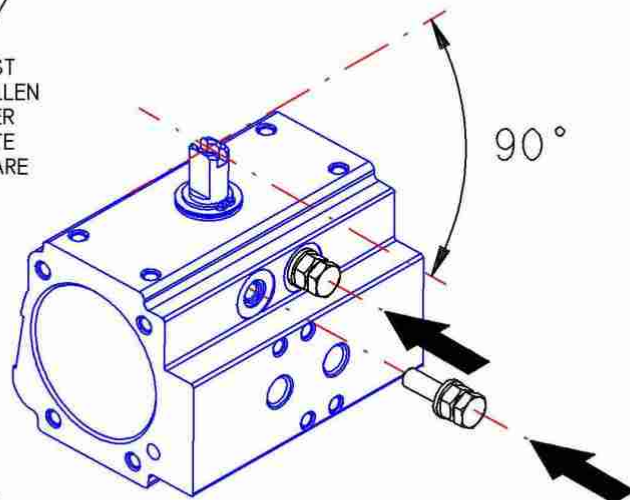


Fig. 24

12 Fig. 25 shows, if presents, the optimal springs layout.

PAY ATTENTION
ACHTUNG
ATTENTION
ATENCIÓN
ATTENZIONE

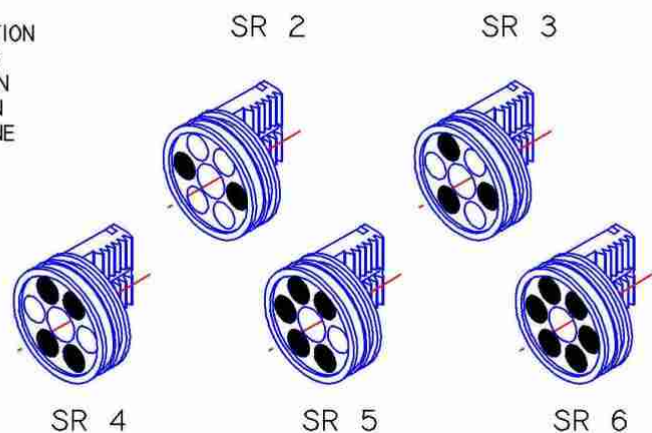


Fig. 25

Reproduction forbidden. All rights reserved. Rev. 01 \01\2007

13 Assembly covers tightening screws as per indicated numeration. Note please the screws tightening torque table, see Fig. 26.

In order to easy that operation, is better to dispose the actuator in vertical position.

ASSEMBLY
ZUSAMMENFUEGEN
ASSEMBLER
MONTAR
ASSEMBLARE

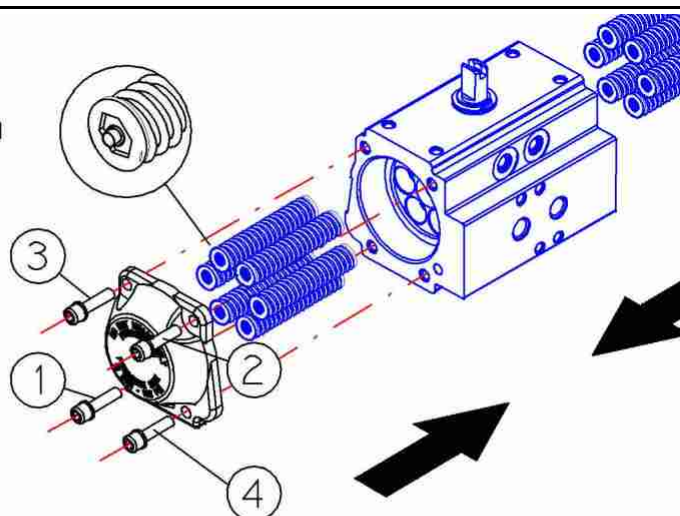


Fig.26

TIGHTENING TORQUE TABLE - TABELLE DER ANZUGS DREHMOMENTE !
TABLE DE COUPLE SERRAGE - TABLA DE PAR DE APRIETE
TABELLA COPPIE DI SERRAGGIO

M 5	M 6	M 8	M 10	M 12	M 14	M 16
4, 5 Nm	8 Nm	19 Nm	38 Nm	65 Nm	115 Nm	160 Nm

RE-INSTALL AND CHECK
INSTALLIEREN UND UEBERPRUEFEN
INSTALLER ET ESSAIER
REINSTALAR Y COMPROBAR
REINSTALLARE E PROVARE

14 Re-assembly the actuator to the plant where it where installed, connect pneumatic and electrical feeding and verify correct operation, see Fig. 27.

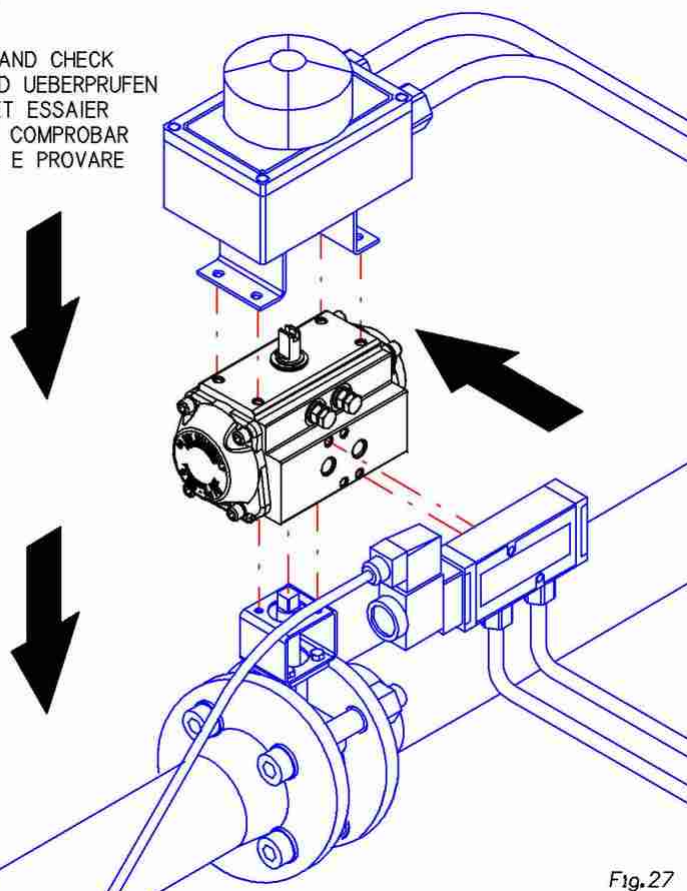


Fig.27

Reproduction forbidden. All rights reserved. Rev. 01\01\2007

ASSEMBLY VARIATIONS

Valid for both aluminium "AP" and AISI 316 (A4) Stainless Steel "AP-A" actuators. There are four different assembly variations that are able to solve every need of valve/actuator placing combined with fail occurrence (fail-safe). They are mainly used for Spring Return "SR" operation.

The position of the upper part of actuator's shaft has to indicate the position of the valve. **ALPHAIR's standard assembly variation is: "A".**

P.N. According to ISO 5211 – DIN 3337, closing rotation of the valve has to be clockwise.

TYPE	ASSEMBLY SCHEME	TYPICAL APPLICATION	UTILITY
A			SPRINGS CLOSE THE VALVE In event of fail, the valve is closed (fail-safe).
B			SPRINGS CLOSE THE VALVE In event of fail, the valve is closed (fail-safe).
C			SPRINGS OPEN THE VALVE In event of fail, the valve is opened.
D			SPRINGS OPEN THE VALVE In event of fail, the valve is opened.

Reproduction forbidden. All rights reserved. Rev. 01\01\2007