

**TECHNICAL PROCEEDINGS OF THE MANUFACTURING
OF PRISMA PNEUMATIC ACTUATORS**
Rev. 1

Prepared by:

Carlos Federico
Technical Department

Revised by

Andreu Sampedro
Quality Assurance

Approved by:

Jordi Sanromà
Rafael Albareda
Directors

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1.- GENERALITIES

1.1.- Scope

The present proceedings apply to the models:

PW	PWS	PPW	PPWS								
P00	P00S	PP00	PP00S	PI00	PI00S	PH00	PH00S	PIM00	PIM00S		
P05	P05S										
P10	P10S	PP10	PP10S	PI10	PI10S	PH10	PH10S	PIM10	PIM10S	PG10	PG10S
P15	P15S										
P20	P20S	PP20	PP20S	PI20	PI20S	PH20	PH20S	PIM20	PIM20S	PG20	PG20S
P25	P25S										
P30	P30S	PG30	PG30S	PNI30	PNI30S						
P40	P40S										
P50	P50S										

1.2.- Versions

Prisma actuators are produced in four versions:

- P- Construction in Rilsan epoxy (cataphoresis) double coated aluminium
- PP- Construction in Industrial Polyamide
- PI- Construction in Stainless Steel AISI 316
- PH- Construction in Teflon coated aluminium for high temperatures
- PG- Construction in Rilsan epoxy (cataphoresis) double coated aluminium
- PIM- Construction in AISI-316 stainless steel with steel internals
- PNI- Construction in chemical Nickel Plated aluminium

1.3.- Basic characteristics

Feeding fluid: Air and other non aggressive fluids
Maximum feeding pressure:

Models P and PP: 8 bar
Models PI and PH: 10 bar

Temperature:

Models P, PP, PI, PG, PIM and PNI: -32°C to +90°C (short picks up -43°C to +120°C)
Models PH: -32°C to +265°C

Stroke:

Models P, PP, PI, PH, PIM and PNI: 90° with a tolerance of +2° at opening and closing
Models PG: 180° with a tolerance of +2° at opening and closing

Feeding connection: Two ¼” BSP threads

1.4:- Air consumption

To calculate the consumption of air of a Prisma actuator, multiply the feeding pressure by the figure in the chart below :

DOUBLE ACTING ACTUATORS		
MODEL	TO OPEN	TO CLOSE
PW	0,075	0,05
P00	0,15	0,1
P05	0,28	0,25
P10	0,35	0,32
P15	0,65	0,55
P20	0,8	0,7
P25	1,5	1,2
P30	2,05	1,9
P40	3,98	3,6
P50	10,5	7

SPRING RETURN ACTUATORS	
MODEL	TO OPEN
PWS	0,075
P00S	0,15
P05S	0,28
P10S	0,35
P15S	0,65
P20S	0,8
P25S	1,5
P30S	2,05
P40S	3,98
P50S	10,5

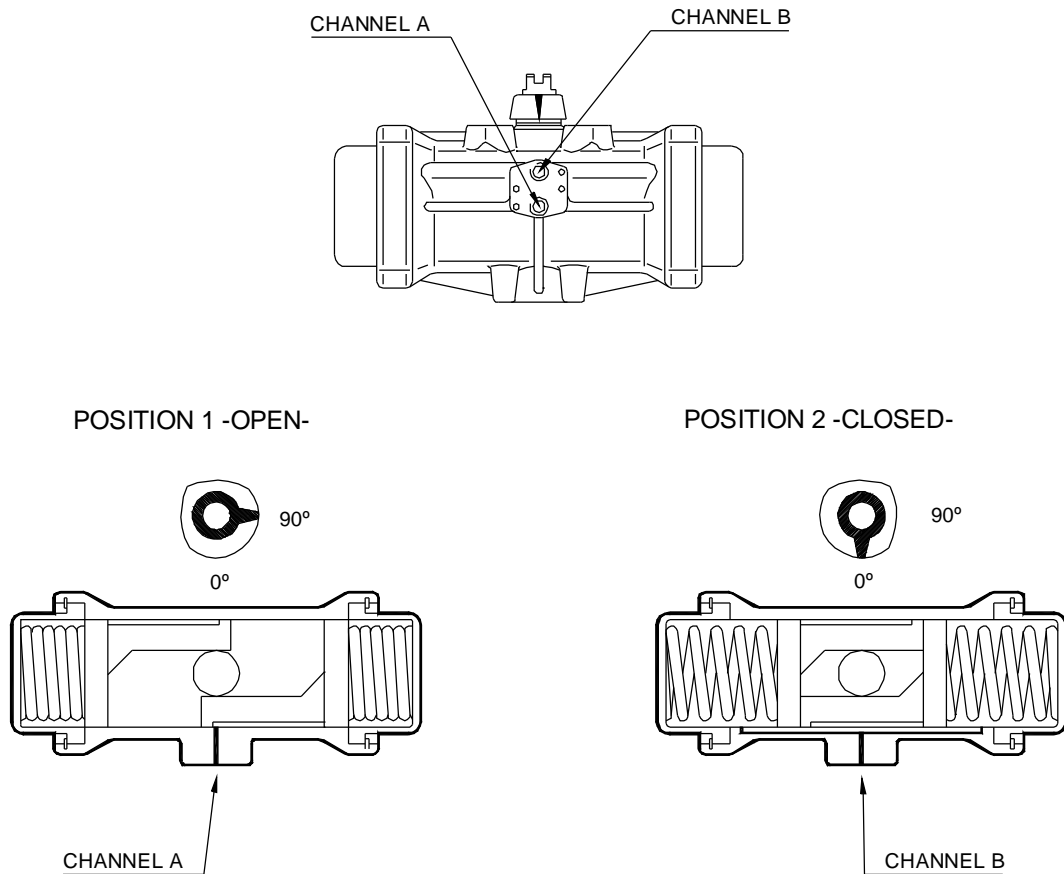
Data in litres

Same consumptions for models PP, PI, PH, PG, PIM and PNI

1.5.- Weights

CONSTRUCTION	D.A. ACTUATORS		S.R. ACTUATORS	
	MODEL	WEIGHT (Kg)	MODEL	WEIGHT (Kg)
CATAPHORESIS + RILSAN COATED ALUMINIUM	PW	0,49	PWS	0,65
	P00	1,03	P00S	1,3
	P05	1,5	P05S	2,3
	P10	1,87	P10S	2,58
	P15	2,6	P15S	4
	P20	3,57	P20S	5,76
	P25	5,9	P25S	9,2
	P30	8,8	P30S	16,3
	P40	19,4	P40S	32,4
	P50	35	P50S	61,6
POLYAMIDE	PPW	0,33	PPWS	0,47
	PP00	0,76	PP00S	1,03
	PP10	1,41	PP10S	2,15
	PP20	2,94	PP20S	4,95
STAINLESS STEEL	PI00	2,25	PI00S	2,5
	PI10	4	PI10S	4,7
	PI20	7,2	PI20S	9,23
HIGH TEMPERATURE	PH00	1,46	PH00S	1,68
	PH10	2,96	PH10S	3,72
	PH20	5,85	PH20S	7,9
180°	PG10	3,9	PG10S	4,5
	PG20	6,6	PG20S	8,7
	PG30	14,8	PG30S	22,3
STEEL INTERNALS	PIM00	2,7	PIM00S	2,9
	PIM10	5,1	PIM10S	5,9
	PIM20	9,5	PIM20S	11,4
CHEMICAL NICKEL PLATED	PNI30	8,8	PNI30S	16,3

1.6.- Operation



- **Double acting:**

Pressurized air introduced by channel “A” (POSITION 1) displaces the two opposite pistons to the ends of the cylinder, transmitting a 90° turn to the shaft of the actuator by the RACK and PINION system, prompting its OPENING.
Pressurized air introduced thru channel “B” (POSITION 2)
Reverses the movement of pistons, placing them to the initial position (CLOSING).

- **Spring return:**

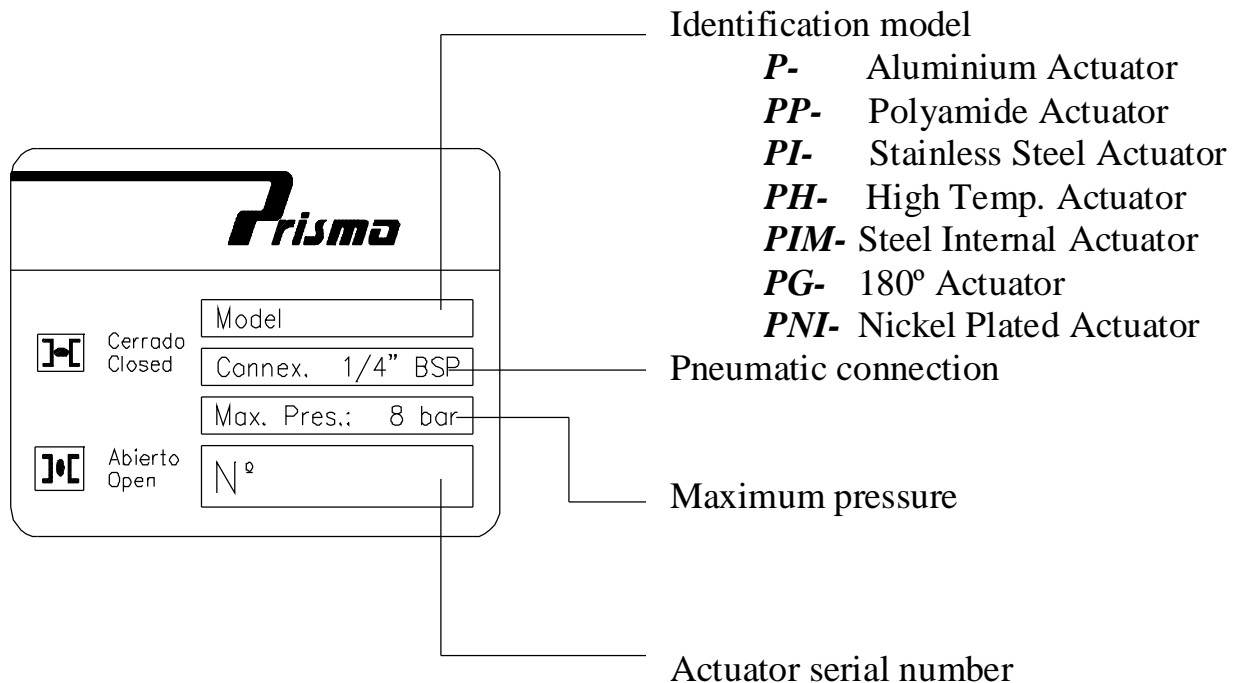
These models contain compressed springs, situated between the caps and the pistons. The pressure made by these springs keep the pistons in the POSITION 2 (CLOSED). Pressurized air introduced by channel “A” displaces the two opposite pistons to the ends of the cylinder, compressing the springs further, to POSITION 1. When the air pressure ceases, the springs press the pistons to their initial position (CLOSING).

Depending on the position where the actuator is mounted onto the valve, we'll obtain the NORMALLY OPEN (N.A.) or NORMALLY CLOSED (N.C.).

MOUNTING POSITION		FUNCTIONING
ACTUATOR	VALVE	
CLOSED	CLOSED	N.C.
OPEN	OPEN	
CLOSED	OPEN	N.O.
OPEN	CLOSED	

1.7. Identification

All PRISMA pneumatic actuators carry, on the rear side, an identification label described as follows :



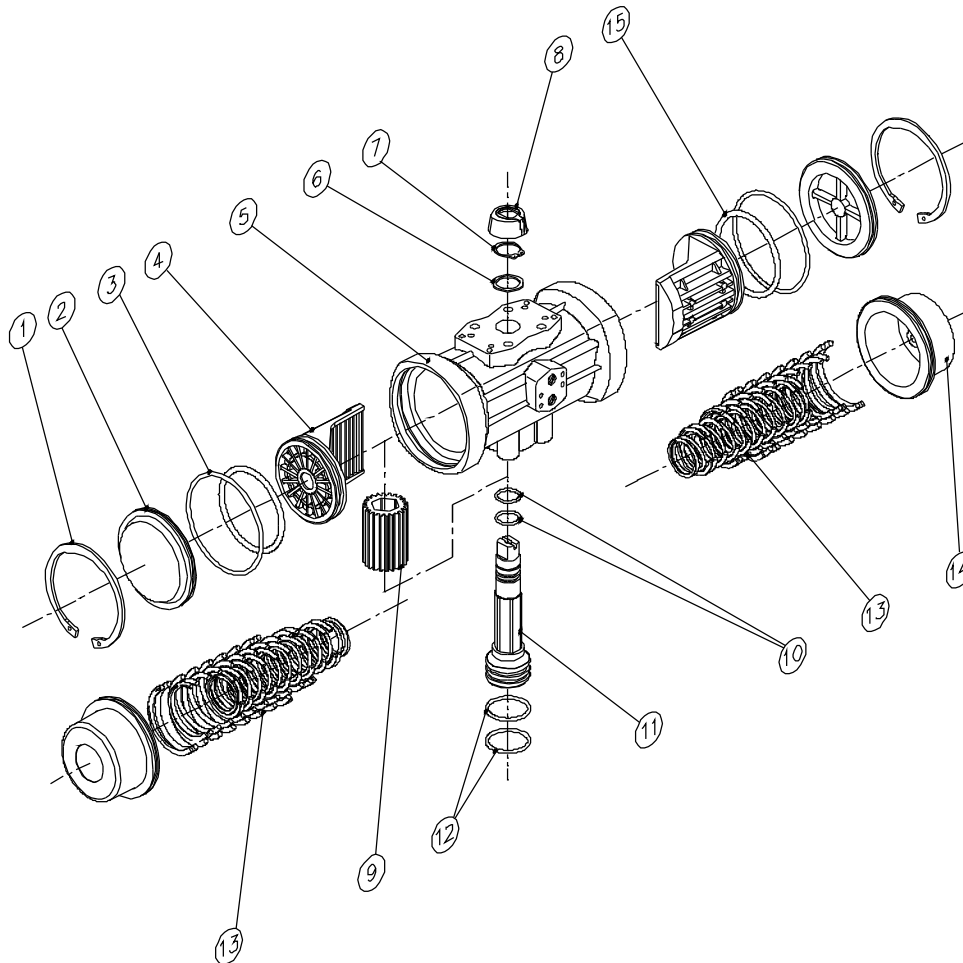
Besides, all the spring return models carry a “WARNING” label on both caps.



1.8- Components

1.8.1- Aluminium coated with Rilsan Actuators

Models: PW, PWS, P00, P05, P05S, P10, P10S, P15, P15S, P20, P20S, P25, P25S, P30, P30S

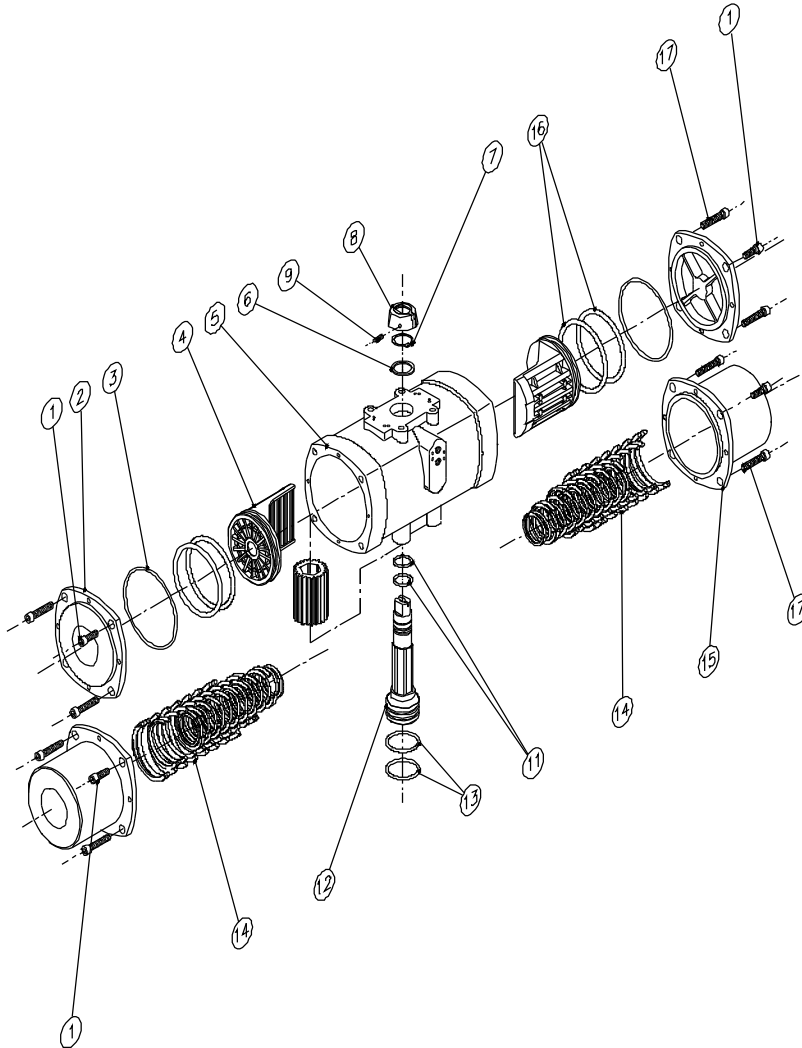


N°	Description	Quant.	Material	N°	Description	Quant.	Material
1	Seeger Ring	2	Steel (2)	9	Gear	1	Aluminium Alloy (2)
2	Double Acting Cap	2	Aluminium Alloy (6)	10	O-Ring	(4)	NBR
3	Cap O-Ring	2	NBR	11	Shaft	1	(3)
4	Piston	2	Polyarilamide	12	O-Ring	(4)	NBR
5	Cylinder	1	Aluminium Alloy (1)	13	Springs set	1	Steel DIN-17223 C (2)
6	Washer	1	Polyamide	14	Sring Return Cap	2	Aluminium Alloy (6)
7	Seeger Ring	1	Steel (7)	15	Piston O-Ring	(5)	NBR
8	Position Indicator	1	Polyamide				

- (1) Covered by cataphoresis + Rilsan
- (2) Covered by cataphoresis
- (3) Mod. PW: Polyamide + F.G. With inox insert
Mod P00 to P20: AISI-303 Stainless Steel
Mod. P25, P30: Covered Steel by cataphoresis

- (4) Mod. PW, 1 piece.
Mod P00 to P30, 2 pieces.
- (5) Mod. PW to P25, 2 pieces.
Mod. P30, 4 piece
- (6) Covered with Rilsan
- (7) Covered with Dacromed + P.T.F.E.

**1.8.2- Aluminium coated with Rilsan Actuators
Models: P40, P40S, P50, P50S**



Nº	Description	Quant.	Material
1	Waterthightness Allen	2	Stainless Steel AISI-304
2	Double Acting Cap	2	Aluminium Alloy (1)
3	Cap O-Ring	2	NBR
4	Piston	2	(2)
5	Cylinder	1	Aluminium Alloy (3)
6	Washer	1	Polyamide
7	Seeger Ring	1	Steel (6)
8	Position Indicator	1	Polyamide
9	Thread Pin DIN 914	1	Stainless Steel AISI-304

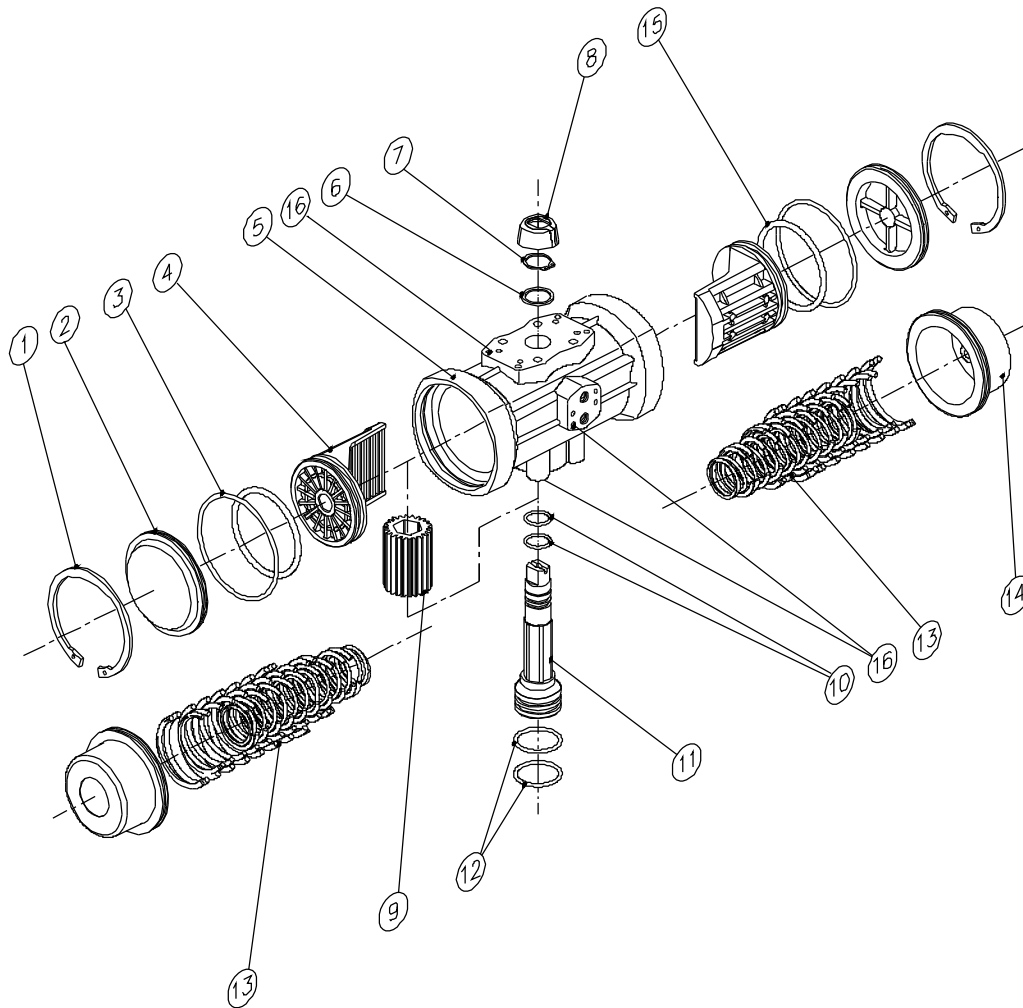
Nº	Descripción	Cant.	Material
10	Gear	1	(5)
11	O-Ring	2	NBR
12	Shaft	1	Steel (4)
13	O-Ring	2	NBR
14	Springs Set	1	Steel DIN-17223C (4)
15	Spring Return Cap	2	Aluminium Alloy (1)
16	Piston O-Ring	4	NBR
17	Allen	14	Stainless Steel AISI-304

- (1) Covered with Rilsan
- (2) Mod. P40: Polyarilamide
Mod. P50: Auminium Alloy
- (3) Covered by Cataphoresis + Rilsan

- (4) Covered by cataphoresis
- (5) Mod. P40: Aluminium covered by cataphoresis
Mod. P50: Steel covered by cataphoresis
- (6) Covered with Dacromed + P.T.F.E.

1.8.3- Polyamide Actuators

Models: PPW, PPWS, PP00, PP00S, PP10, PP10S, PP20, PP20S



N°	Description	Quant.	Material	N°	Description	Quant.	Material
1	Seeger Ring	2	Steel (1)	9	Gear	1	Aluminium Alloy (1)
2	Double Acting Cap	2	Polyamida + F.G.	10	O-Ring	2	NBR
3	Cap O-Ring	2	NBR	11	Shaft	1	(2)
4	Piston	2	Polyarilamde	12	O-Ring	(3)	NBR
5	Cylinder	1	Polyamide + F.G.	13	Springs Set	1	Steel DIN-17223 C (1)
6	Washer	1	Polyamide	14	Spring Return Cap	2	Polyamide + F.G.
7	Seeger Ring	1	Stainless Steel	15	Piston O-Ring	2	NBR
8	Position Indicator	1	Polyamide	16	Thread Inserts	12	Stainless Steel

(1) Covered by cataphoresis

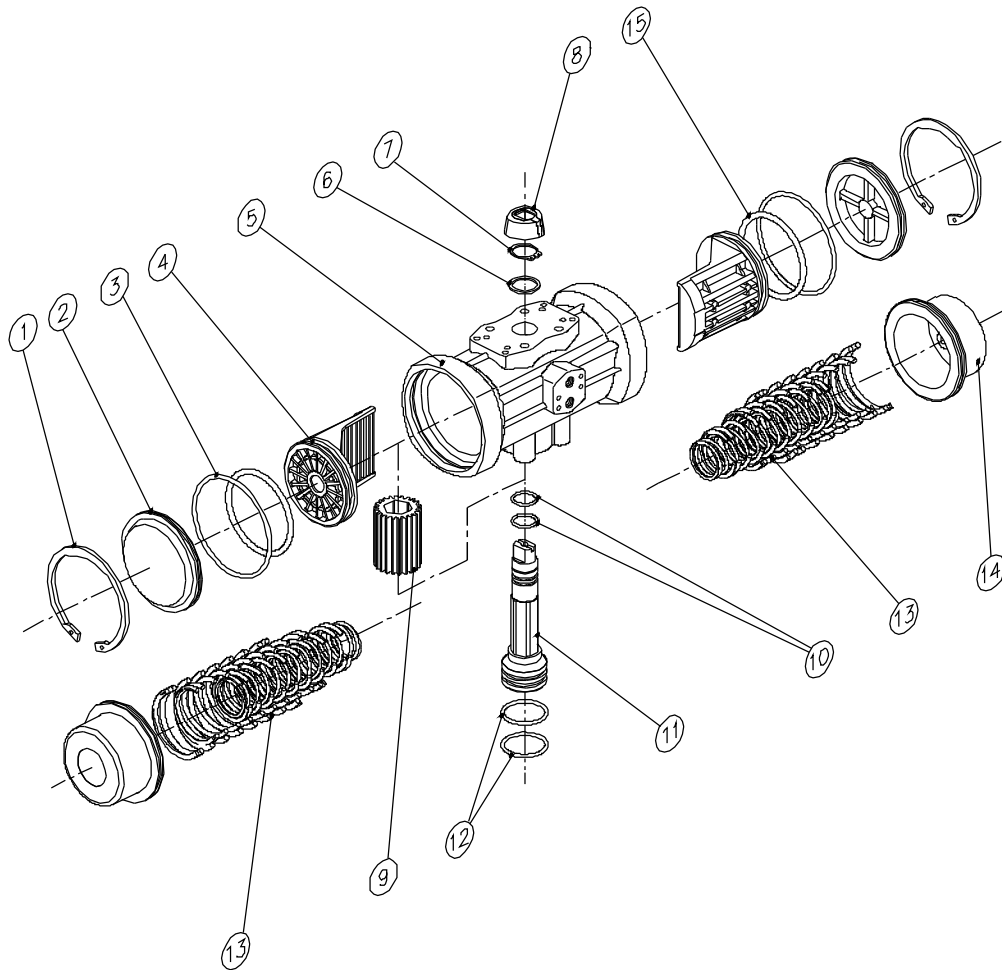
(2) Mod. PPW: Polyamide + F.G. With inox insert
Mod. PP00, PP10, PP20: Stainless Steel AISI-303

(3) Mod. PPW, 1 piece.

Mod PP00, PP10, PP20, 2 pieces.

1.8.4- Stainless Steel Actuators

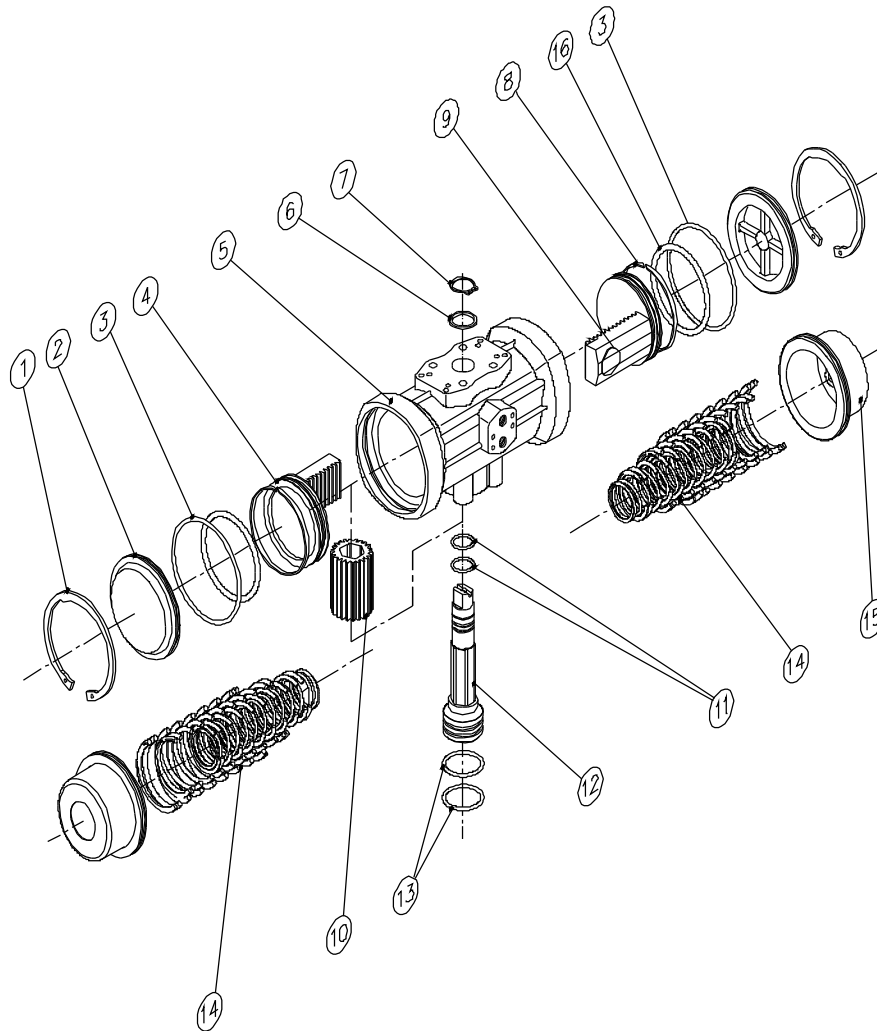
Models: PI00, PI00S, PI10, PI10S, PI20, PI20S



Nº	Description	Quant.	Material	Nº	Descripción	Cant.	Material
1	Seeger Ring	2	Steel (1)	9	Gear	1	Aluminium Alloy (1)
2	Double Acting Cap	2	Stainless Steel AISI-316	10	O-Ring	2	NBR
3	Cap O-Ring	2	NBR	11	Shaft	1	Stainless Steel AISI-303
4	Piston	2	Polyarilamide	12	O-Ring	2	NBR
5	Cylinder	1	Stainless Steel AISI-316	13	Springs Set	1	Shaft DIN-17223 C (1)
6	Washer	1	Polyamide	14	Spring Return Cap	2	Stainless Steel AISI-316
7	Seeger Ring	1	Stainless Steel	15	Piston O-Ring	2	NBR
8	Position Indicator	1	Polyamide				

(1) Covered with cataphoresis

1.8.5- High Temperature Actuators
Models: PH00, PH00S, PH1, PH1S, PH2, PH2S



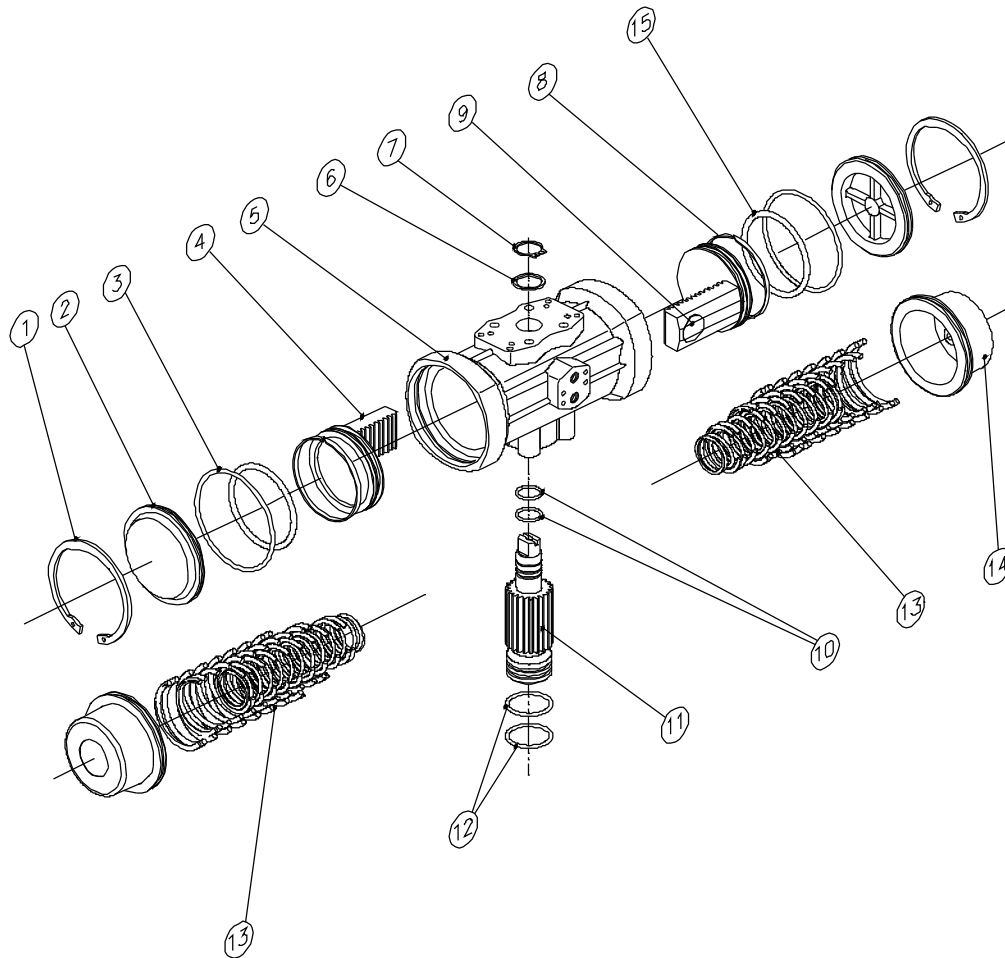
Nº	Description	Quant.	Material	Nº	Descripción	Quant.	Material
1	Seeger Ring	2	Steel (1)	9	Piston's band	2	P.T.F.E.+ Graphite
2	Double Acting Cap	2	Aluminium Alloy (2)	10	Gear	1	Aluminium (1)
3	Cap O-Ring	2	Temper. Viton	11	O-Ring	2	Temper. Viton
4	Piston	2	Bichromated steel	12	Shaft	1	Stainless Steel
5	Cylinder	1	Aluminium Alloy (2)	13	O-Ring	2	Temper. Viton
6	Washer	1	Stainless Steel	14	Springs Set	1	Stainless Steel
7	Seeger Ring	1	Stainless Steel	15	Spring Return Cap	2	Aluminium Alloy (2)
8	Piston bearings	2	P.T.F.E.+ Graphite	16	Piston O-Ring	2	Temper. Viton

(1) Covered by Cataphoresis

(2) Covered with P.T.F.E.

1.8.6- 180° ACTUATORS

Models: PG10, PG10S, PG20, PG20S, PG30, PG30S

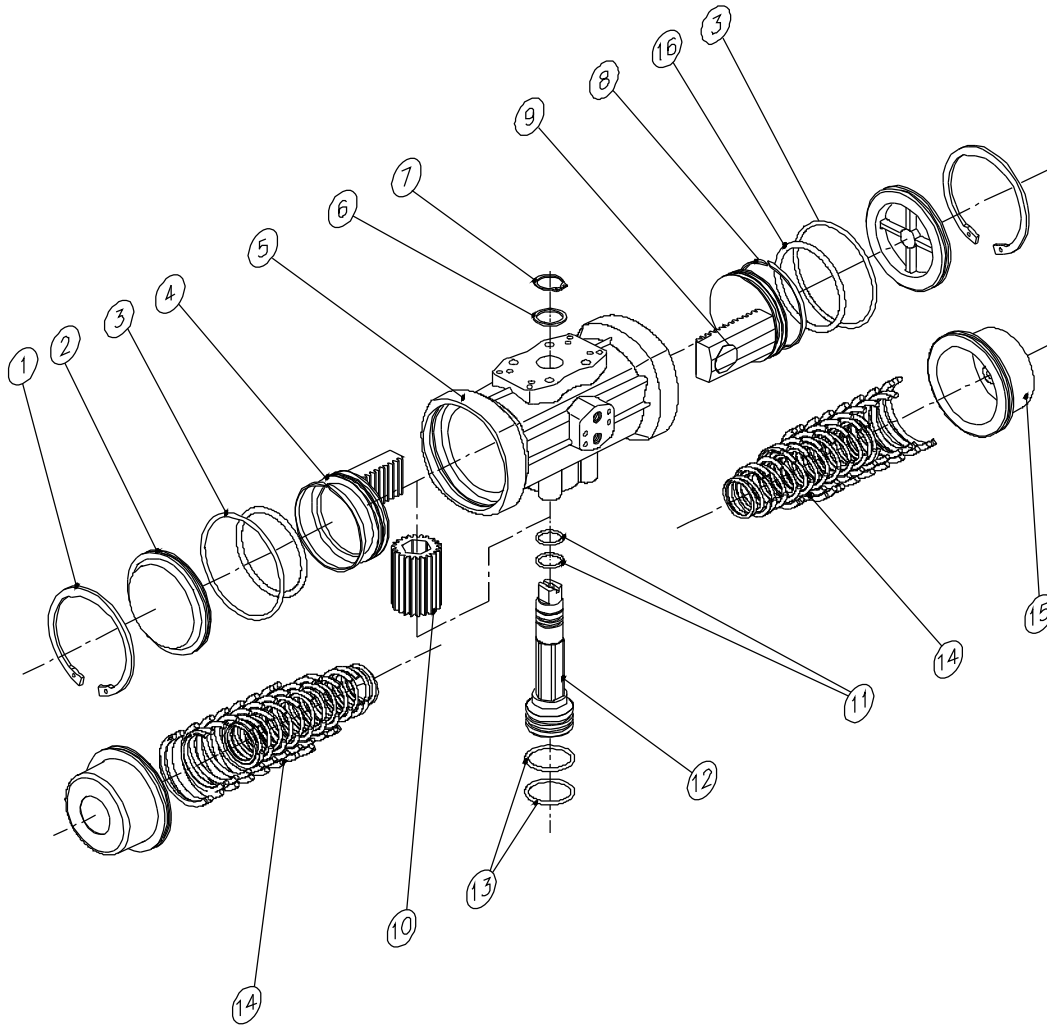


N°	Description	Quant.	Material	N°	Descripción	Quant.	Material
1	Seeger ring	2	Steel (1)	9	Piston's band	2	P.T.F.E.+ Graphite
2	Double Acting Cap	2	Aluminium alloy (2)	10	O-ring	2	NBR
3	Cap o-ring	2	NBR	11	Shaft	1	(4)
4	Piston	2	Bichromated steel	12	O-ring	2	NBR
5	Cylinder	1	Aluminium alloy (3)	13	Springs set	1	Steel DIN-17223 C (1)
6	Washer	1	Polyamide	14	Spring return cap	2	Aluminium alloy (2)
7	Seeger ring	2	Steel (1)	15	O-ring	2	NBR
8	Piston bearings	2	P.T.F.E.+ Graphite				

- (1) Covered by Cataphoresis
- (2) Covered with Rilsan
- (3) Covered by cataphoresis + Rilsan

- (4) Mod PG10 and PG20: AISI-303 Stainless Steel
Mod. PG30: Covered Steel by cataphoresis
- (5) Covered with Dacromed + P.T.F.E.

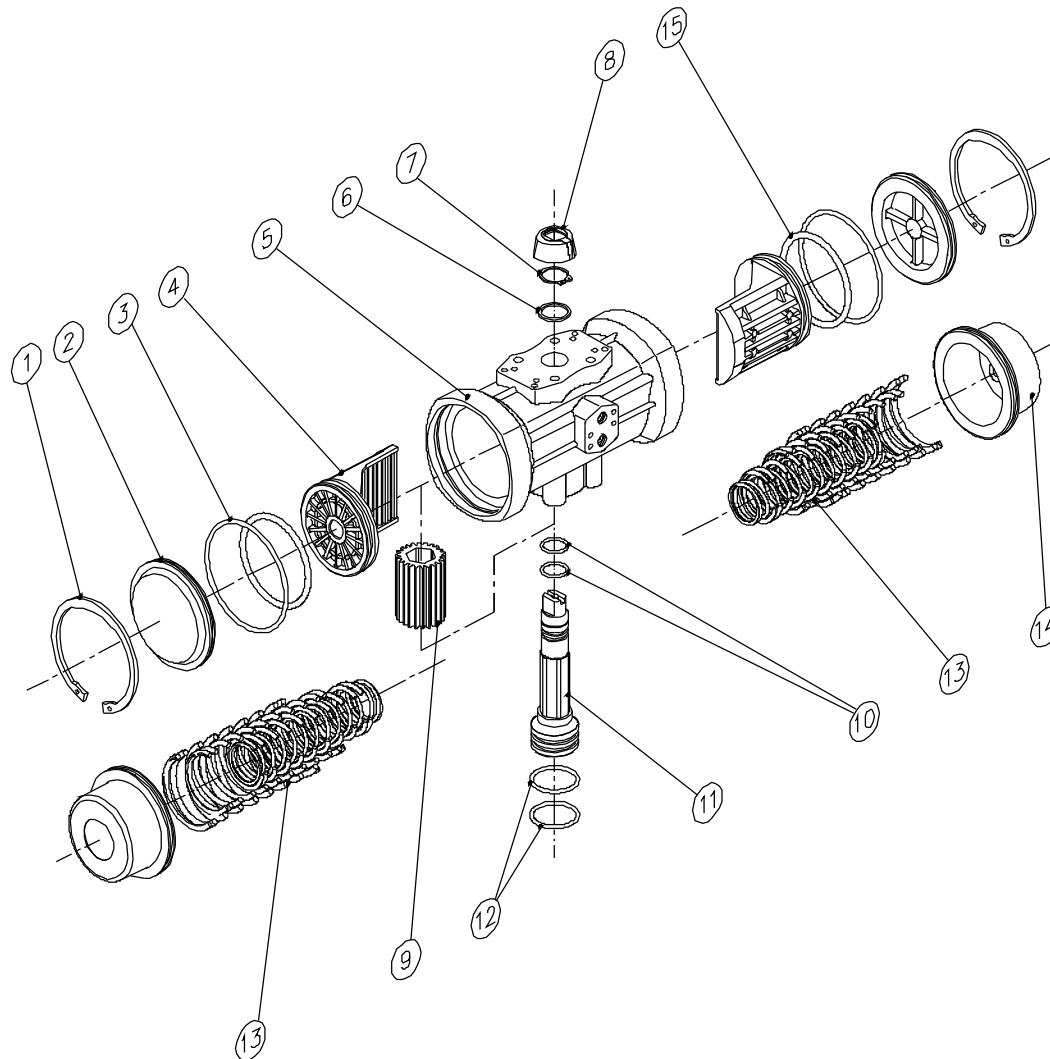
1.8.7- Stainless Steel Actuators with steel internals
Models: PIM00, PIM00S, PIM10, PIM10S, PIM20, PIM20S



Nº	Description	Quant.	Material	Nº	Descripción	Quant.	Material
1	Seeger ring	2	Steel (1)	9	Piston's band	2	P.T.F.E.+ Graphite
2	Double Acting Cap	2	Stainless Steel AISI-316	10	Gear	1	Aluminium (1)
3	Cap O-Ring	2	NBR	11	O-Ring	2	NBR
4	Piston	2	Bichromated steel	12	Shaft	1	Stainless Steel AISI-303
5	Cylinder	1	Stainless Steel AISI-316	13	O-Ring	2	NBR
6	Washer	1	Stainless Steel	14	Springs Set	1	Stainless Steel
7	Seeger ring	1	Steel (1)	15	Spring Return Cap	2	Stainless Steel AISI-316
8	Piston bearings	2	P.T.F.E.+ Graphite	16	Piston O-Ring	2	NBR

(1) Covered by cataphoresis

1.8.8- Chemical Nickel Plated Actuators
Models: PNI30, PNI30S



Nº	Description	Quant.	Material	Nº	Descripción	Quant.	Material
1	Seeger ring	2	Steel (1)	9	Gear	1	Aluminium Alloy (2)
2	Double acting cap	2	Aluminium alloy (1)	10	O-Ring	(4)	NBR
3	Cap o-ring	2	NBR	11	Shaft	1	Steel (1)
4	Piston	2	Polyarilamide	12	O-ring	2	NBR
5	Cylinder	1	Aluminium Alloy (1)	13	Springs set	1	Steel DIN-17223 C (2)
6	Washer	1	Polyamide	14	Spring Return Cap	2	Aluminium Alloy (1)
7	Seeger Ring	1	Stainless Steel	15	Piston O-Ring	4	NBR
8	Position Indicator	1	Polyamide				

(1) Chemical Nickel Plated

(2) Covered by cataphoresis

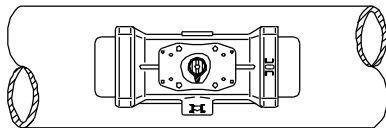
2 - START UP

2.1 – TRANSPORT AND INSTALLATION

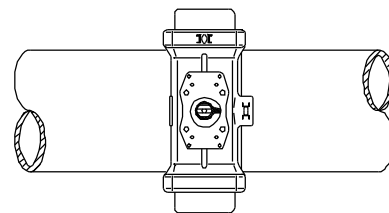
- Take the utmost precautions when transporting and handling the actuators as any damage in the external coating (regarding models in P, PH, PG and PNI) could reduce the resistance of the pneumatic actuator in front of external agents.
- Do not remove the obstructers which protect the threads of the connection until the moment of operation.
- Be sure that the air supply is sufficiently clean and free of solid particles in suspension which in the long run could damage the internal parts of the actuator. For this reason is advisable to install air filters along the pneumatic installation to insure the cleanness of the air.
- Check “on site” that the pressure of air supply is the necessary (normally 6 bar)
- Although is not strictly necessary, an slight lubrication of the air enlarges the life of the actuator.

2.2 – ASSEMBLY ONTO THE VALVE

- Be sure that the position of the actuator regarding the valve is the correct one (N.O. or N.C.) (see point 1.6)
- PRISMA pneumatic actuator can be assembled indistinctly parallel or perpendicular to the pipe in any operation N.O or N.C. Be sure that the assembly position is the desired one.



PARALLEL



PERPENDICULAR

- When spring return actuators are used, don't remove the FITTING – FILTER fixed in the top air supply connection, except if a NAMUR solenoid valve should be installed, as it avoids the entry of external elements (dust, water, etc) into the chamber of springs.

2.3 - Supply

- PRISMA pneumatic actuators can operate with an air pressure between 3 and 16 depending on the model (see attached table). Its standard functioning is at 6 bar, for pressures lower than 6 bar, please consult.

Models P, PP, PG and PNI	From 3 to 8 bar
Models PI and PG	From 3 to 10 bar
Models PIM	From 3 to 16 bar

3 - MAINTENANCE

3.1. Preventive maintenance

To insure the right performance of set ACTUATOR-VALVE, it's recommended:

3.1.1.- ANNUALLY

- Check that the air supply is clean and with the right pressure.
- Depending on the nature of the fluid flowing through the pipes and with the appropriate frequency, there should be necessary to clean the valve and the seats of possible incrustations which would increase the resistant torque.

3.1.2.- BI-ANNUALLY

- Depending on the number of cycles performed by the actuator, it would be advisable to replace all the O-rings in order to prevent any loss of torque of the actuator.

In internal tests carried out on our test bench, the water tightness of the O-rings is kept after 1.000.000 complete cycles (open-close), under the following conditions:

- | | |
|-----------------------|---|
| -Frequency | Models PW to P20, 500 cycles per hour
Models P30 to P50, 120 cycles per hour |
| - Supply | Clean air at 6 bar pressure |
| -Ambiance temperature | Between 0°C and 50°C |

3.2 - DISASSEMBLY

Never handle the pneumatic actuators under air pressure conditions or connected to any accessory.

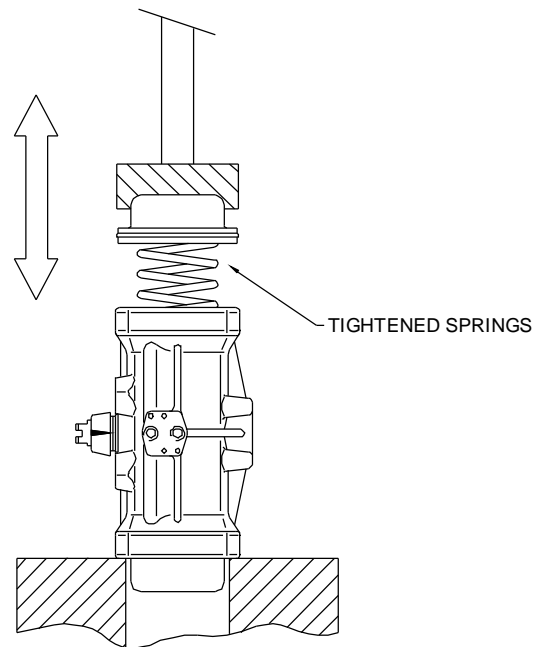
3.2.1. Caps

Double acting models

- To remove the caps in models PW thru P30, take off the fixing seeger rings . In model P40 it should be taken into account that one bolt is shorter than the other three. It's necessary to take the caution to screw this shorter bolt in the same thread, keeping its water tightness with teflon. In model P50 it's necessary to notice the position of the cap respect of the cylinder, keeping in its position the flat watertight joint when reassembling. Proceeding otherwise could block the internal air conducts, rendering the actuator idle.

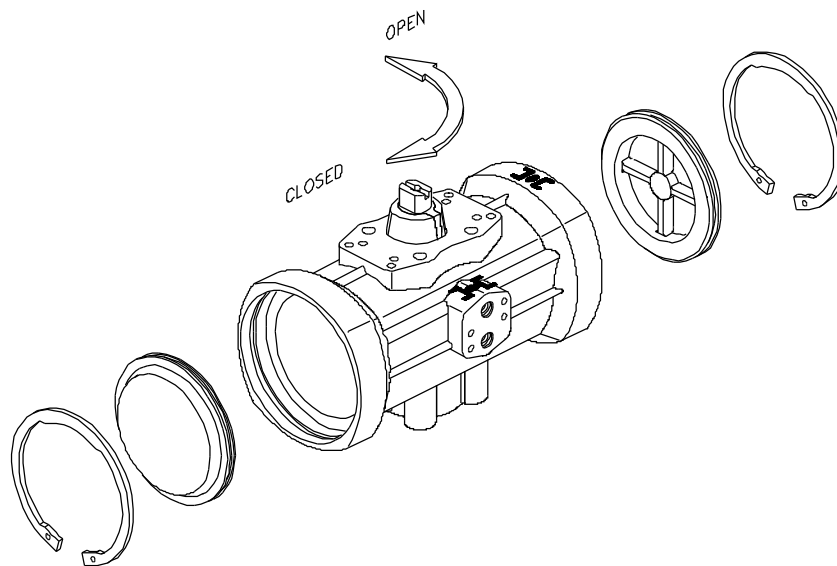
Single acting models

- In this case, caps contain **SPRINGS IN TENSION**. To remove a cap is necessary to keep the cap tight to the cylinder by some mechanic device (for example a foot drilling machine or hydraulic press) before taking off the seeger ring (models PWS to P3S) or the fixing bolts (models P40S and P50S), proceeding then to rise the cap by the mechanic device till the springs lose their tension completely. This operation **SHOULD NEVER BE DONE MANUALLY**. As in double acting models P40 and P50 position of bolts and caps should be taken into account.



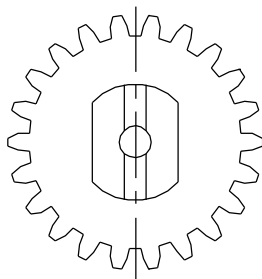
3.2.2 Pistons

To disassemble the pistons, once the caps are removed, the actuator should be operated manually (**NEVER WITH AIR PRESSURE**) towards the open position (counter clockwise), till the pistons get out of the cylinder.

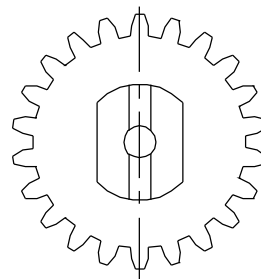


3.2.3 Shaft

Before taking it out, it must be turned to one of the extreme positions, watching to which symbol the upper flats of the stem are aiming at (open or close), to reassemble in the same position. Then proceed to remove the visual position indicator, the washer and the shaft seeger ring, and take the shaft out by the bottom of the cylinder. See below the position of the pinion in respect of the two upper flats of the shaft.



MOD. P10, P20, P25



MOD. P15, P30, P40

3.3 Assembly

3.3.1.- Shaft

Enter the shaft into the body by the bottom, procuring that the pinion (models P15 and P50), be centred respect of the hole thru which the pistons move. Once it's completely entered, place the washer and the shaft seeger ring. Then place the visual position indicator.

3.3.2.- Pistons

Enter them both simultaneously in a way that they always be equidistant to the shaft. In their final position (in contact one to the other), the shaft upper flats should aim at the close symbol.

3.3.3.- Caps

To reassemble the caps please read point 3.2.1 .

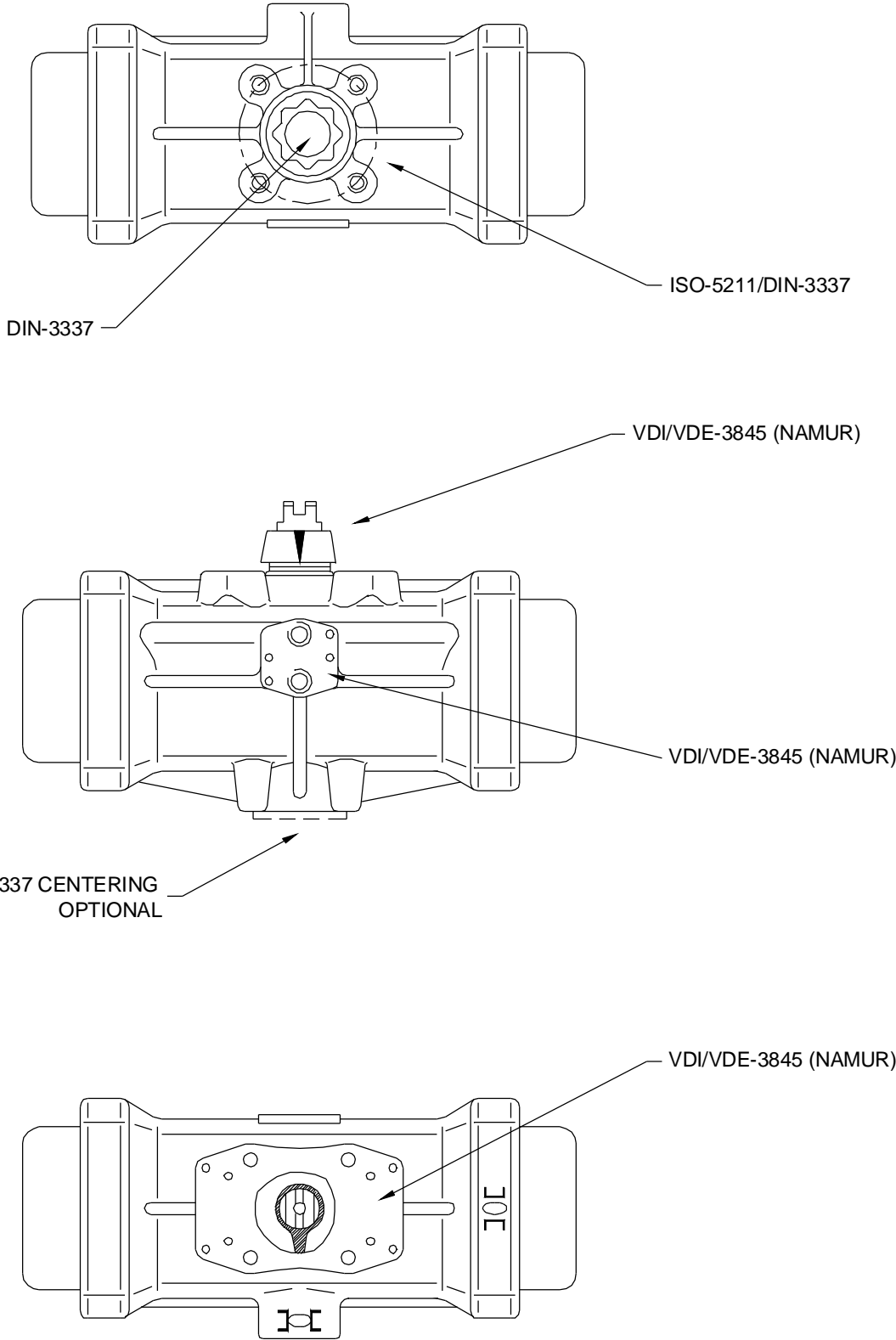
When disassembling any part of a Prisma pneumatic actuator, it's recommended to change all the O-rings and grease again all the internals with a neutral grease. Mecánica Prisma uses KLUBER silicone free.

3.4 Recommended spare parts (For 10 actuators)

Depending on the frequency of cycles, it's recommended to have the following parts:

- Two sets of O-rings
- One set of seeger rings and /or bolts
- Two position indicators

4.- NORMS OF CONSTRUCTION APPLIED



5.- INTERNAL DISPOSITIONS FOR MAINTAINING OF CONFORMITY

Certificate of approval according to UNE EN ISO 9001: 1994, issued by the BVQI under the following credits:

- ENAC certification number 98.0037
- ANSI-RAB certification number 44374
- DAR certification num. 44374
- N.A.C.C.B. certification num. 44374



6.- WARRANTY

Mecánica Prisma in its quality of manufacturer of pneumatic actuators, guarantees their products for a period of two years against any defect of construction which could affect their good functioning, as long as this functioning is according to the following working conditions:

- Feeding: clean air without particles in suspension
- Maximum pressure:

Aluminium coated with Rilsan + cataphoresis	8 bar
Polyamide	8 bar
Stainless Steel	10 bar
High temperature	10 bar
180°	8 bar
Steel internals	16 bar
Chemical Nickel plated	8 bar

- Assembly onto: ball, butterfly and plug valves.
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- Resistant torque of valve: Maximum 75% of the torque of the actuator
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- Ambiance temperature:

Aluminium coated with Rilsan + cataphoresis	From -32°C to 90°C
Polyamide	From -32°C to 90°C
Stainless Steel	From -32°C to 90°C
High temperature	From -32°C to 265°C (1)
180°	From -32°C to 90°C
Steel internals	From -32°C to 90°C
Chemical Nickel plated	From -32 ^a c to 90°C

(1) According to certification L.G.A.I. num 94007802