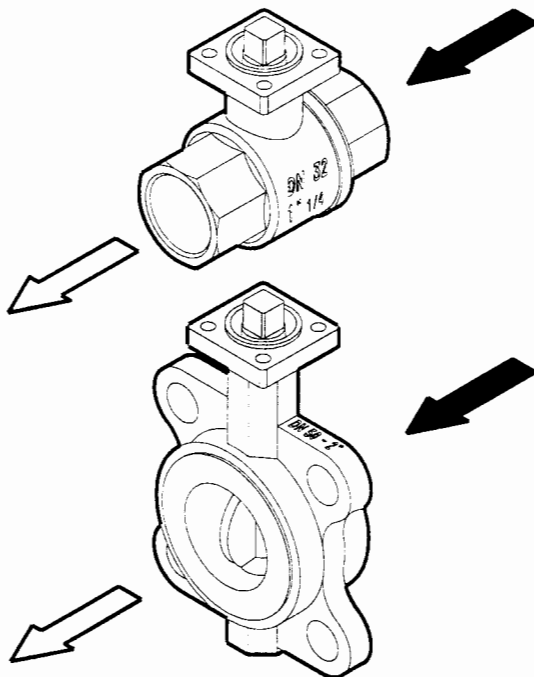
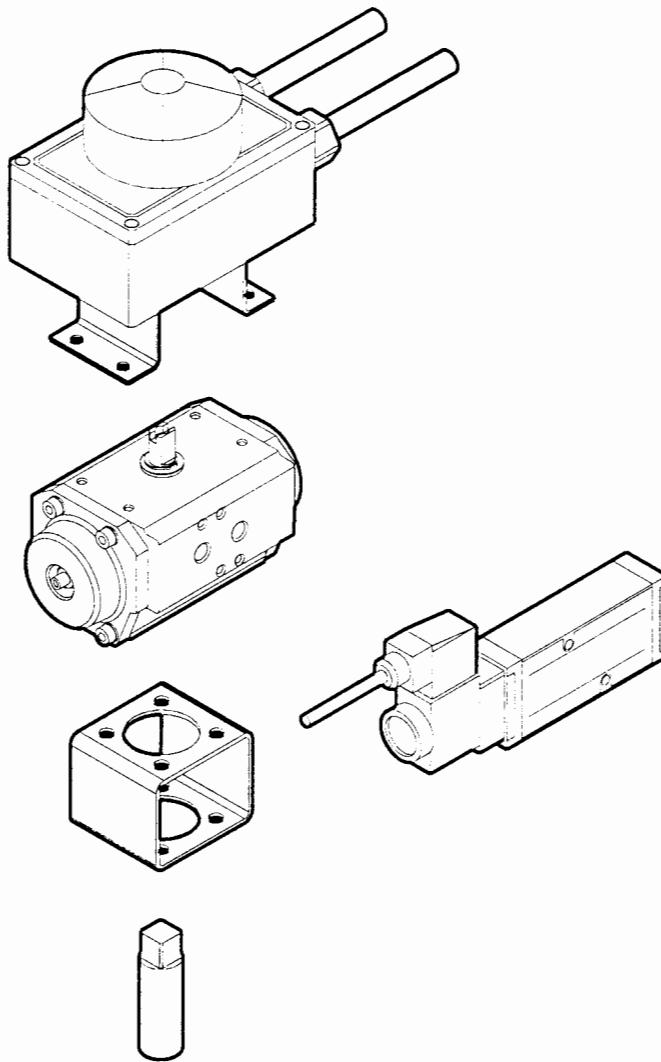


# Alphair

PNEUMATIC  
ROTARY  
ACTUATORS

INSTRUCTION MANUAL  
FOR INSTALLATION,  
USE AND MAINTENANCE

2001



ALPHA POMPE SPA

VIA MOLINO EMILI 16  
25030 MACLODIO - BS -  
ITALY

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The manufacturer of ALPHAIR pneumatic rotary actuators and the drawer of this "INSTRUCTION MANUAL FOR USE AND MAINTENANCE" is:

**ALPHA POMPE SPA – Via Molino Emili, 16 – 25030 Maclodio (BS) Italia**  
**Phone (+39) 030 978661/2 Fax (+39) 030 978663**

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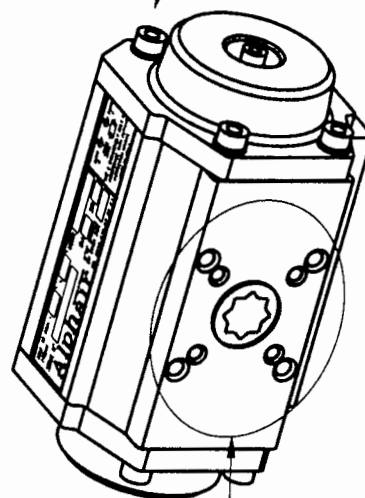
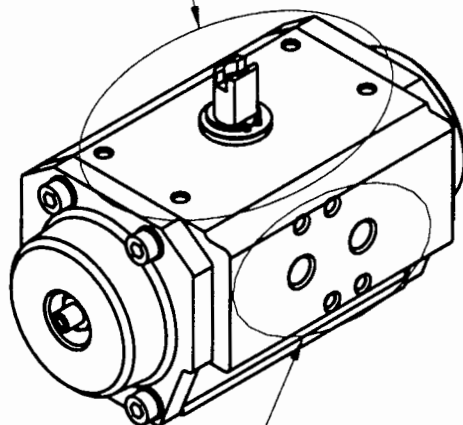
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- DEVICE IDENTIFICATION.

UPPER AUXILIARY CONNECTION INTERFACE  
FOR SWITCH-BOXES, POSITION INDICATORS,  
ETC. ...

NORM: VDI/VDE 3845 (NAMUR)

IDENTIFICATION NAMEPLATE.



SIDE AUXILIARY CONNECTION INTERFACE  
FOR AIR FEEDING THROUGH ELECTRO-VALVES  
OR GAS-NPT FITTINGS.

NORM: VDI-VDE 3845 (NAMUR)

MAIN LOWER CONNECTION INTERFACE FOR VALVES,  
BRACKETS WITH ADAPTERS, RELEASES AND/OR  
MANUAL GEAR OPERATORS.

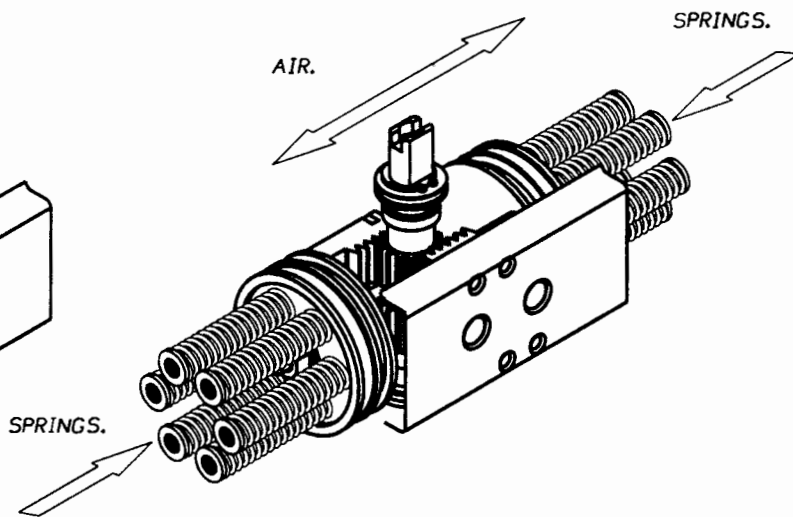
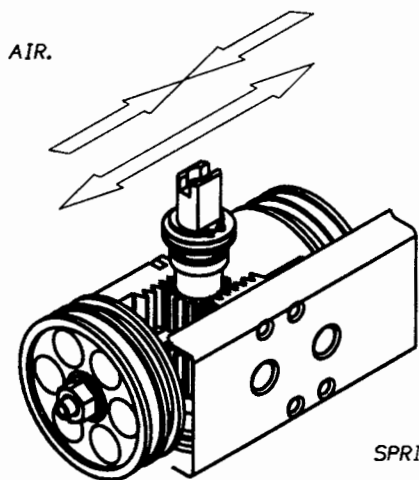
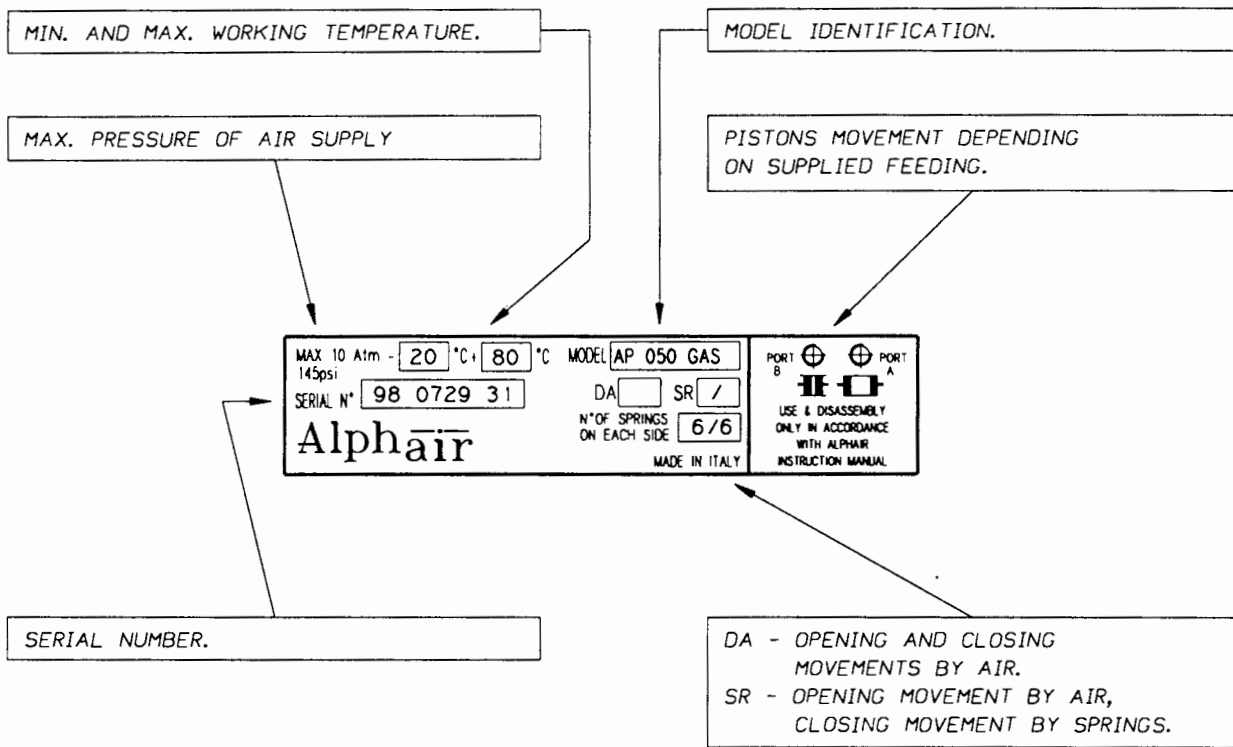
NORM: ISO 5211 - DIN 3337

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- IDENTIFICATION NAMEPLATE.



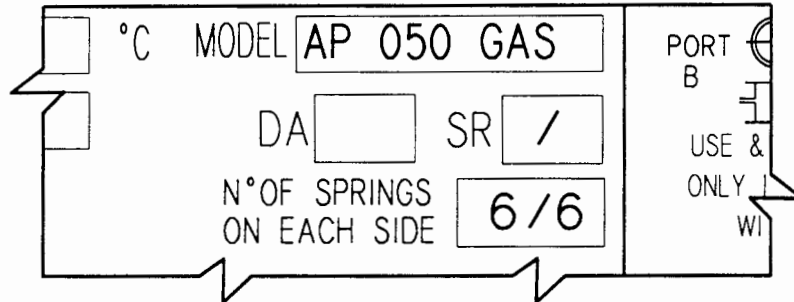
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- MODEL IDENTIFICATION.



PART OF IDENTIFICATION NAMEPLATE.

SIZE	ROTATION ANGLE	THREAD OF HOLES FOR FEEDING	TYPE OF WORKING	INTERNAL SPRINGS
AP 032	STANDARD = 0°-90° (NOT PUNCHED)	NPT CONICAL	DA AIR OPENS AIR CLOSES	2\2
AP 050				2\3
AP 063		Y = 0°-120°	GAS CYLINDRICAL	SR AIR OPENS SPRINGS CLOSE
AP 075	X = 0°-180°	3\4		
AP 085	DRIVE SHAFT ROTATION FIELD	THREAD OF SIDE AUXILIARY CONNECTION INTERFACE FOR AIR FEEDING THROUGH ELECTRO-VALVES AND FITTINGS.	TYPE OF WORKING AIR/SPRINGS.	4\4
AP 100				4\5
AP 115				5\5
AP 125				5\6
AP 145				6\6
AP 160				
AP 180				
AP 200				
AP 270				

NUMBER OF  
SPRINGS FOR  
EACH SIDE.

DEVICE SIZE,  
CORRESPONDING TO  
INTERNAL CYLINDER  
DIAMETER IN MM.

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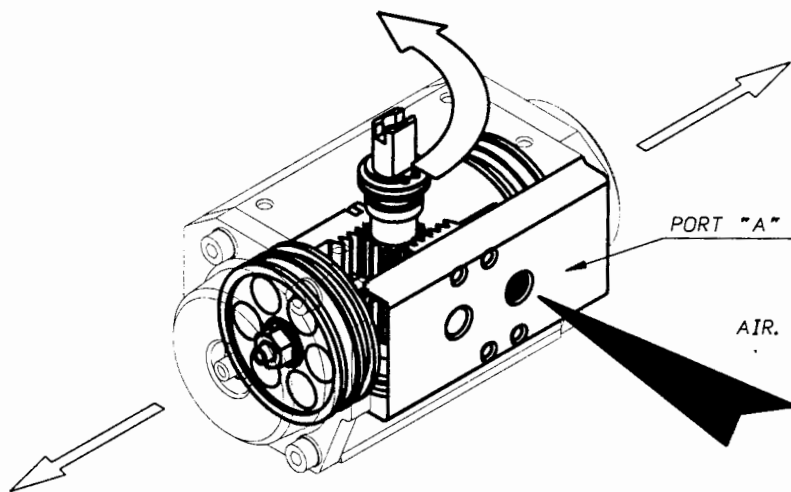
# Alphair

## - TYPE OF WORKING

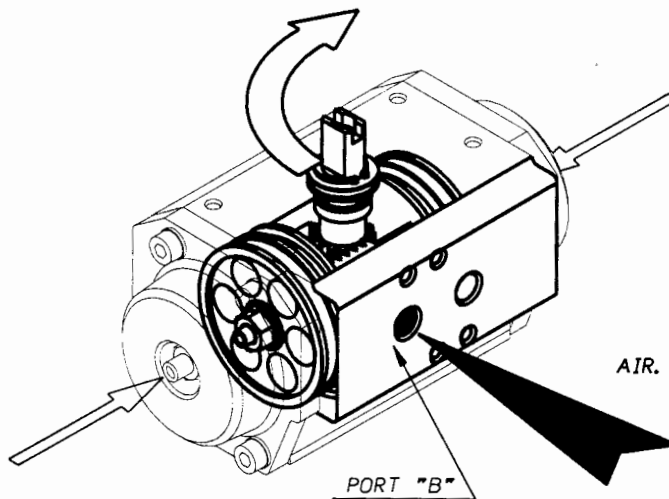
DA - OPENING AND CLOSING MOVEMENTS BY AIR.

EXAMPLE FOR "A" ASSEMBLY VARIATION (STANDARD).

FEEDING BY PORT "A" OPENS PISTONS  
AND CAUSES SHAFT'S ROTATION.



FEEDING BY PORT "B" CLOSES PISTONS  
AND CAUSES SHAFT'S COUNTER-ROTATION.



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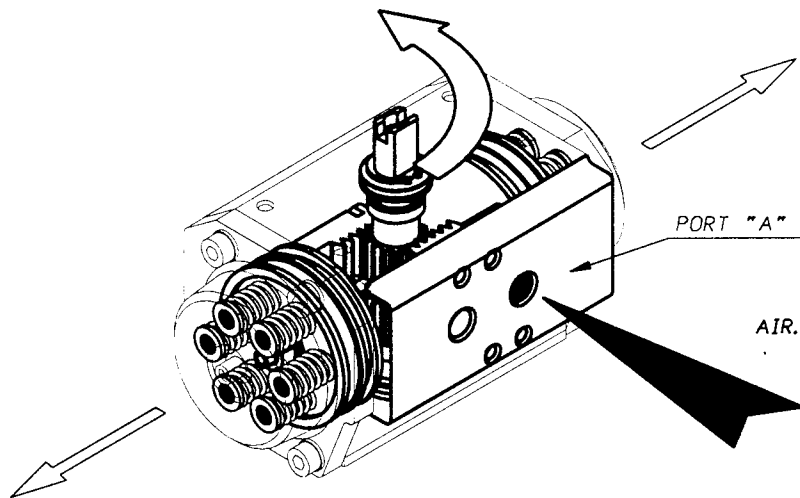
# Alphair

## - TYPE OF WORKING

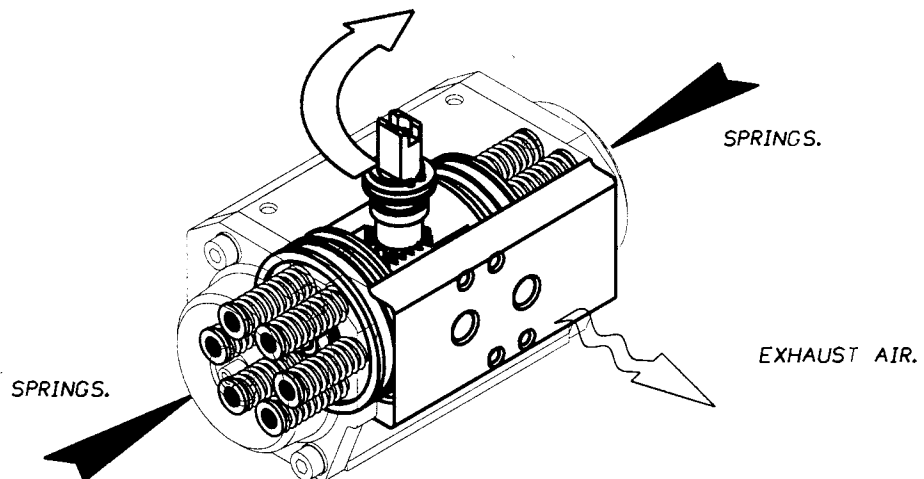
SR - OPENING MOVEMENT BY AIR, CLOSING MOVEMENT BY SPRINGS.

EXAMPLE FOR "A" ASSEMBLY VARIATION (STANDARD).

FEEDING BY PORT "A" OPENS PISTONS  
AND CAUSES SHAFT'S ROTATION.



FALL ON FEEDING PRESSURE IN PORT "A" CLOSES  
PISTONS AND CAUSES SHAFT'S COUNTER-ROTATION.



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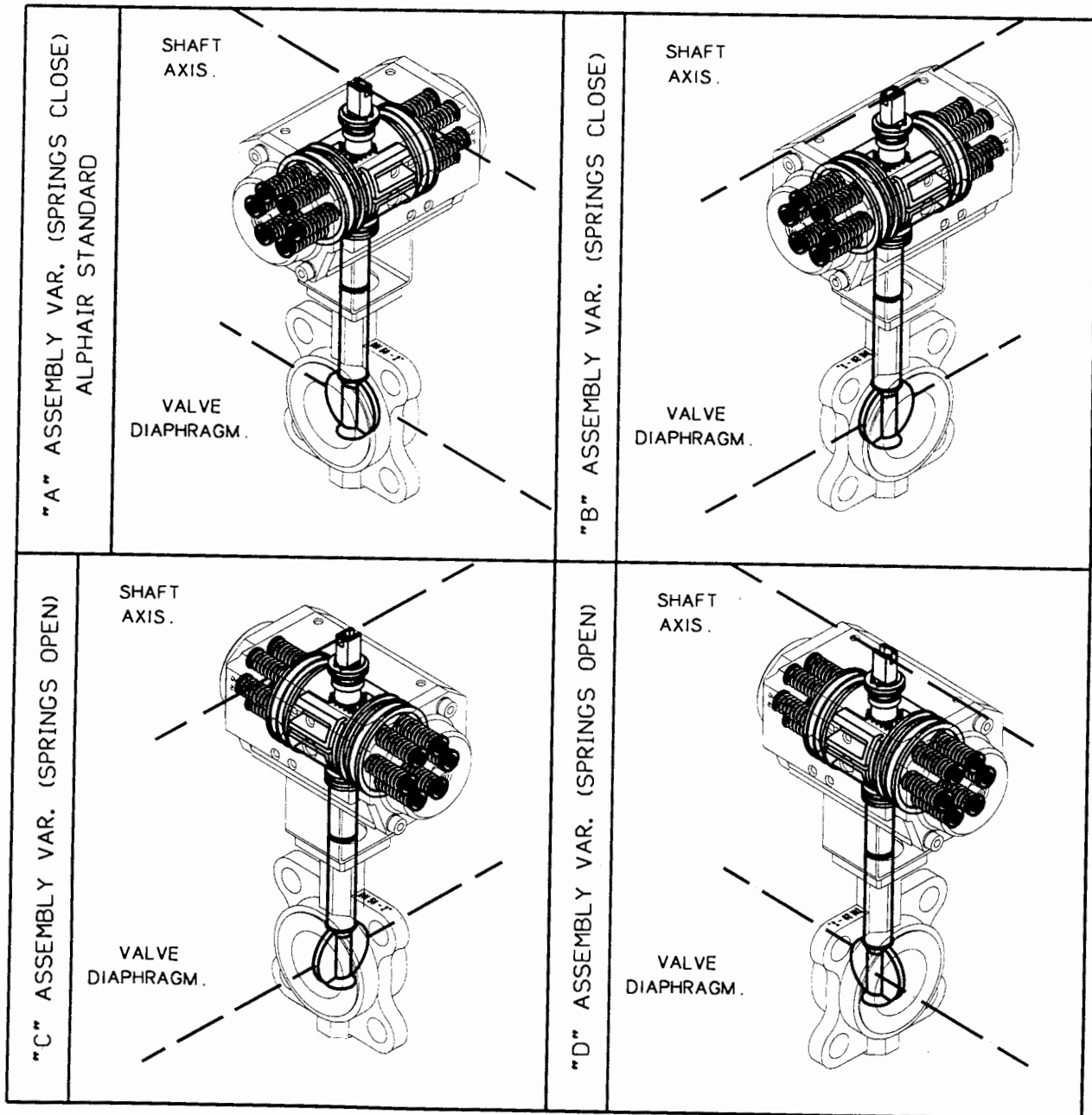
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## - WORKING PRINCIPLE OF ASSEMBLY VARIATIONS.

THE PRESENCE OF SPRINGS INSIDE THE BODY, THAT CLOSE PISTONS WHEN AIR FEEDING PRESSURE OF THE DEVICE IS INTERRUPTED; THE POSITION OF THE ACTUATOR AS TO THE AUTOMATED VALVE, REQUIRE FOUR ASSEMBLY VARIATIONS IN ORDER THAT THE FOLLOWING CONDITIONS CAN BE RESPECTED:

- VALVES ROTATION SENSE IS CLOCKWISE (ISO 5211 - DIN 3337)
- AXIS ON STEM MUST INDICATE THE POSITION OF VALVE'S DIAPHRAGM (VDI/VDE 3845 (NAMUR))



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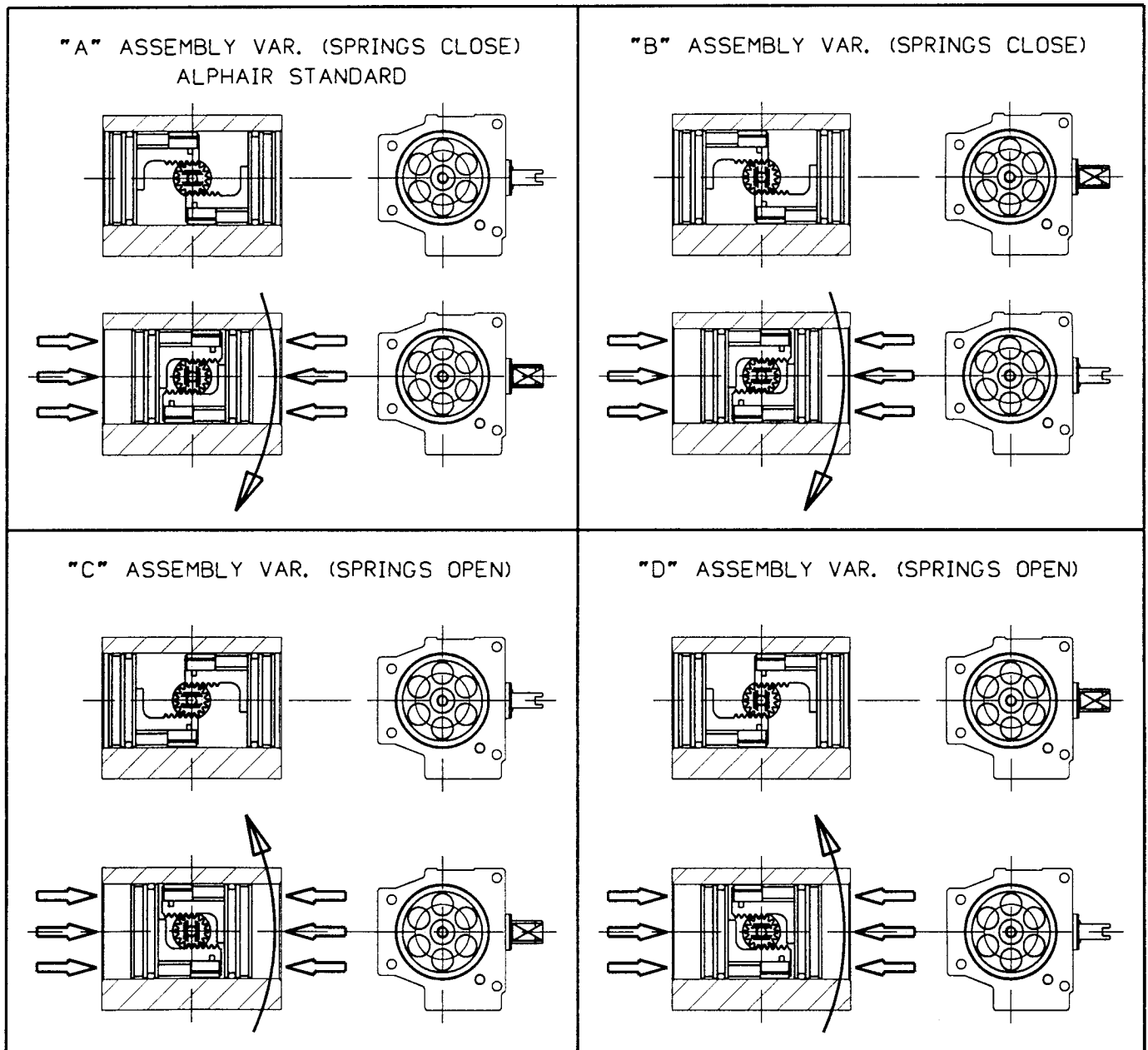
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## - WORKING PRINCIPLE OF ASSEMBLY VARIATIONS

MECHANICAL ASSEMBLY.

MECHANICAL ASSEMBLY SCHEMES OBSERVED IN ORDER TO OBTAIN THE FOUR DESCRIBED ASSEMBLY VARIATIONS.



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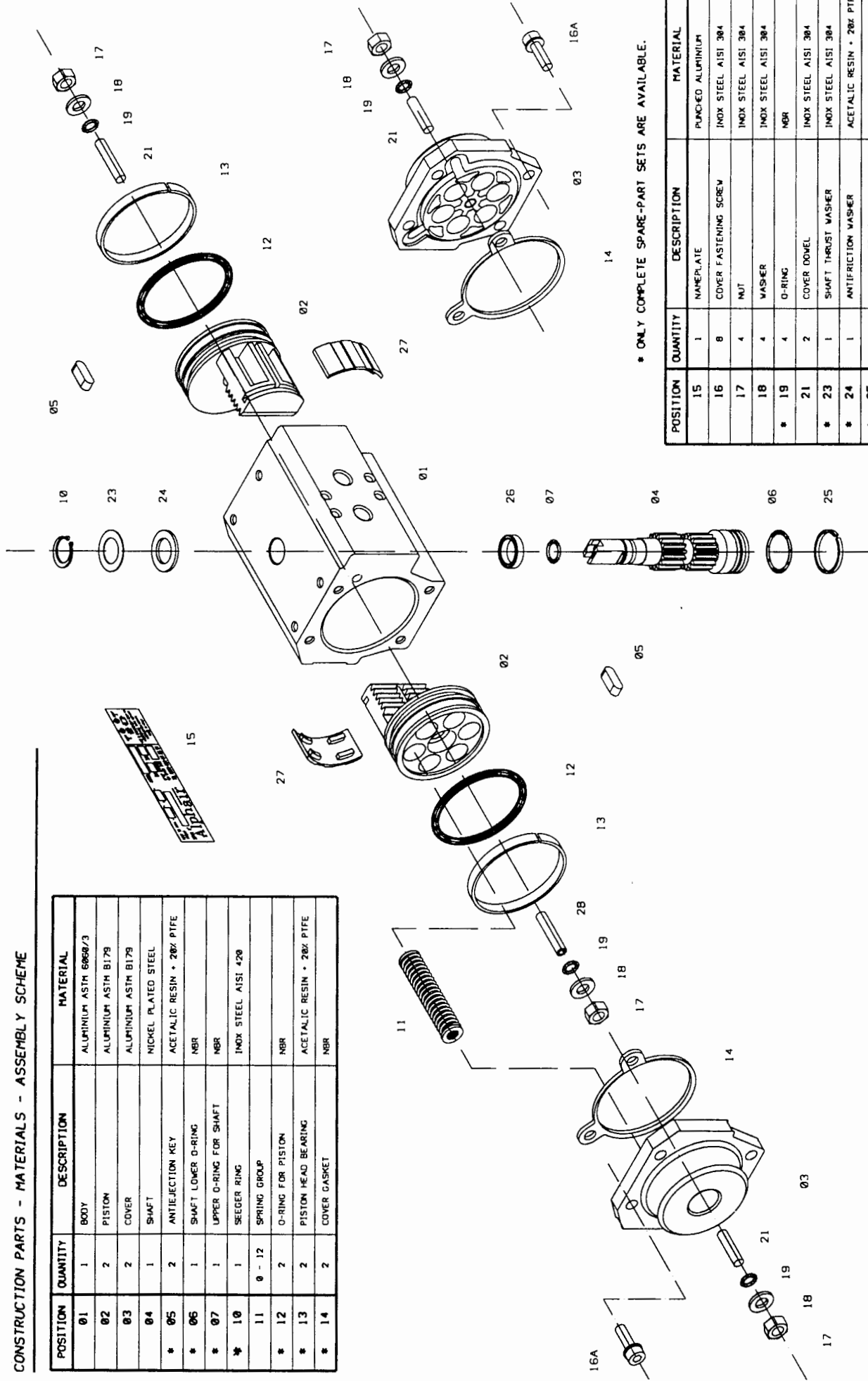
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## CONSTRUCTION PARTS - MATERIALS - ASSEMBLY SCHEME

POSITION	QUANTITY	DESCRIPTION	MATERIAL
01	1	BODY	ALUMINIUM ASTM 6068/3
02	2	PISTON	ALUMINIUM ASTM B179
03	2	COVER	ALUMINIUM ASTM B179
04	1	SHAFT	NICKEL PLATED STEEL
* 05	2	ANTIJECTION KEY	ACETALIC RESIN + 20% PTFE
* 06	1	SHAFT LOWER O-RING	NBR
* 07	1	UPPER O-RING FOR SHAFT	NBR
* 10	1	SEEGER RING	INOX STEEL AISI 420
11	0 - 12	SPRING GROUP	
* 12	2	O-RING FOR PISTON	NBR
* 13	2	PISTON HEAD BEARING	ACETALIC RESIN + 20% PTFE
* 14	2	COVER GASKET	NBR



POSITION	QUANTITY	DESCRIPTION	MATERIAL
15	1	NAMEPLATE	PUNCHED ALUMINIUM
16	8	COVER FASTENING SCREW	INOX STEEL AISI 304
17	4	NUT	INOX STEEL AISI 304
18	4	WASHER	INOX STEEL AISI 304
* 19	4	O-RING	NBR
21	2	COVER DOWEL	INOX STEEL AISI 304
* 23	1	SHAFT THRUST WASHER	INOX STEEL AISI 304
* 24	1	ANTI-FRICTION WASHER	ACETALIC RESIN + 20% PTFE
* 25	1	LOWER PILOT RING FOR SHAFT	ACETALIC RESIN + 20% PTFE
* 26	1	UPPER PILOT RING FOR SHAFT	ACETALIC RESIN + 20% PTFE
* 27	2	PISTON BEARING	ACETALIC RESIN + 20% PTFE
28	2	PISTON DOWEL	INOX STEEL AISI 304

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- DIRECTIONS FOR INSTALLATION, USE AND MAINTENANCE.

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This part of our Instruction Manual contains notes for storage, installation and maintenance of the actuator.

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:

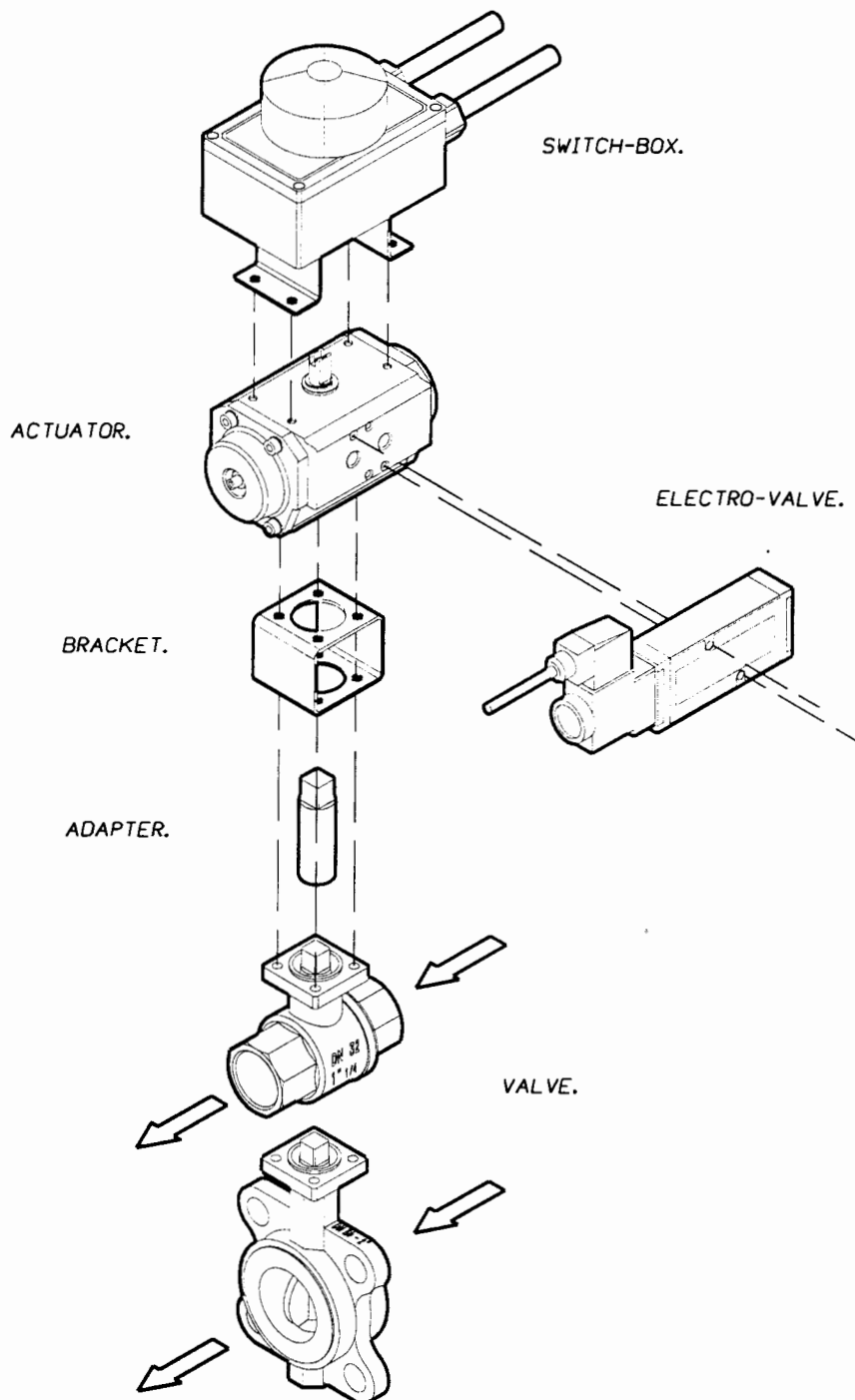
- Move without crashes
- Keep actuators in their original packaging, that contain the relevant contents slips.
- Stock in warehouse between 0° C and + 40° C also for long periods of time.
- Installation of the device is forbidden before the plant is declared in accordance to CE norms or to eventual technical norms that must regulate the plant's working.
- Construction materials, surface treatments and paintings are physically steady and chemically inactive only under the conditions which are indicated on the identification nameplate.
- Because of the possible arising of oily fogs inside the device, you cannot freely discharge exhaust feeding air: filtrate or recycle by means of specific electro-valves.
- Device lubrication is made in our plants; its working warranty, this means the number of movements that can be made without further maintenance, is reported on our ALPHAIR general catalogue and refers to standard models only.
- Springs' working is guaranteed for 100.000 movements (opening and closing movement) before their testing: they have to be substituted when they bear marks of corrosion, wear or side yield.
- For model AP 032 standard, all 120° and 180° actuators, drive shaft ejection from the body may occur, in presence of air feeding and without mounted valve, because there is no anti-ejection key, just a seeger ring.
- To move model AP 270, that weights more than 60 kg, please use suitable threaded holes for fastening to male eyebolts, made on the upper part of device's body.

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- APPLICATIONS.



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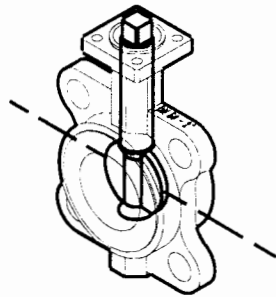
## - ACTUATOR'S INSTALLATION

### GENERAL PRINCIPLES

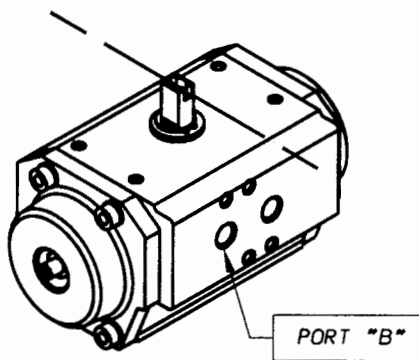
WARNING: INSTALLATION, ADJUSTMENT AND MAINTENANCE MUST BE EFFECTED UNDER SAFETY CONDITIONS.

ACTUATOR MUST BE PREVIOUSLY DISCONNECTED FROM PNEUMATIC AND ELECTRICAL FEEDING, IN ORDER TO AVOID ANY FALSE MOVE.

1 - BE SURE THAT BOTH VALVE AND ACTUATOR ARE CLOSED

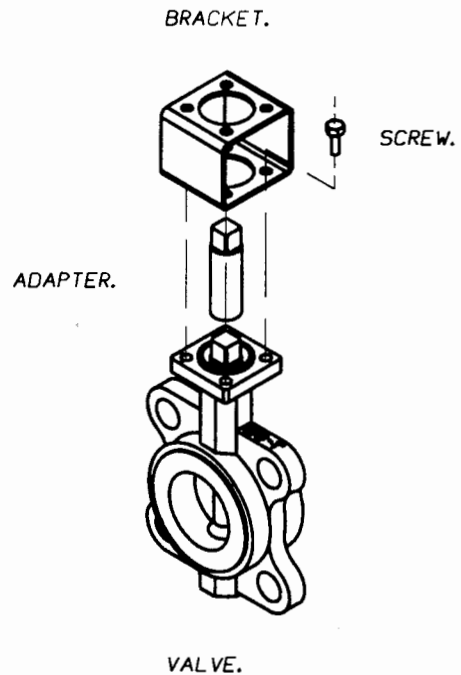


CLOSED VALVE.



CLOSED ACTUATOR.  
- "SR" MODELS NORMALLY CLOSED.  
- "DA" MODELS, FEED BY PORT "B"  
TO REACH THE CORRECT POSITIONING  
(SEE IDENTIFICATION NAMEPLATE).

2 - ASSEMBLY BRACKET AND ADAPTER FOLLOWING THE INDICATED SCHEME



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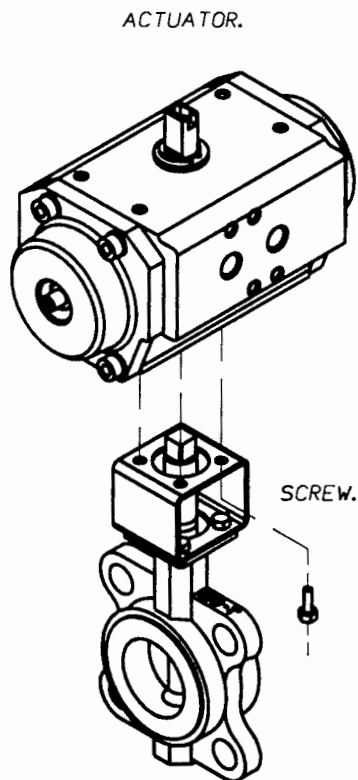
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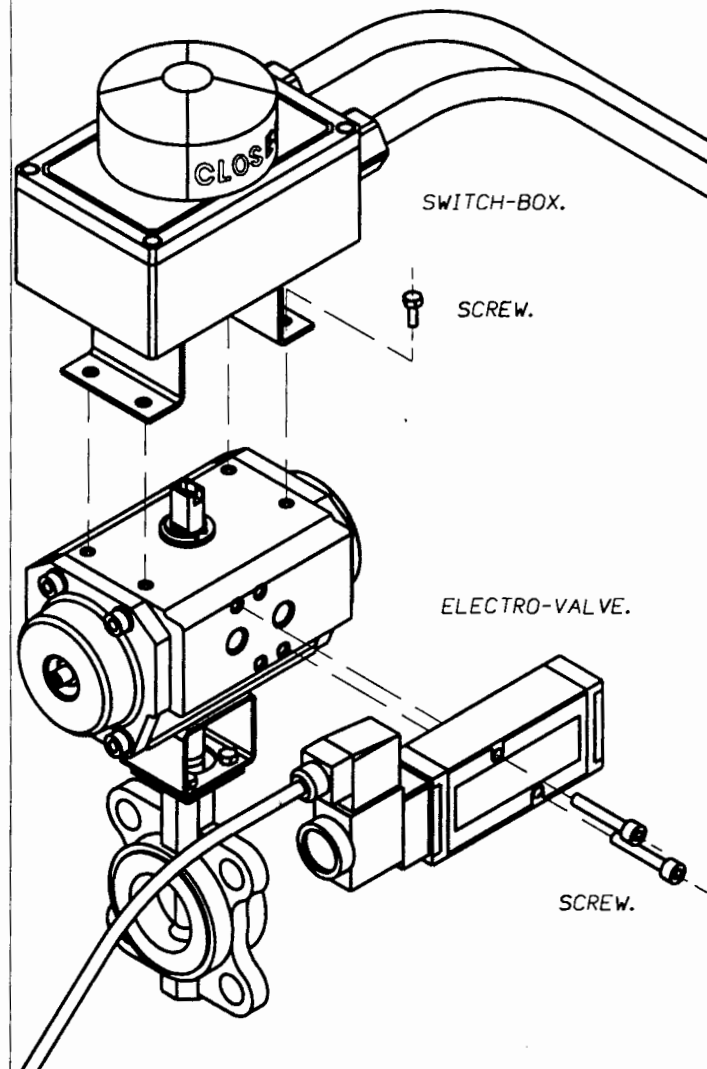
## - ACTUATOR'S INSTALLATION

### GENERAL PRINCIPLES.

3 - ASSEMBLY ACTUATOR ON TOP OF BRACKET AND ADAPTER FOLLOWING THE INDICATED SCHEME.



4 - CONNECT EVENTUAL ACCESSORIES AND MAKE SURE OF THE CORRESPONDENCE BETWEEN THE REAL AND THE INDICATED POSITION OF THE VALVE.



5 - NOW THE COMPLETE SET IS READY TO BE CONNECTED PNEUMATICALLY AND ELECTRICALLY FOR WORKING TEST. THE SAME SAFETY RULES AS FOR THE INSTALLATION ARE VALID. IN CASE OF DIFFICULTY, DO NOT MECHANICALLY FORCE THE ELEMENTS, BECAUSE THEY HAVE TO COUPLE WITHOUT STRESS, BUT GET SURE THAT THE COUPLING FOLLOWS A PRECISE AXIS, THAT THE SUPPLIED AIR FEEDING IS CORRECT, AND THAT THE DIMENSIONING OF VALVE AND ACTUATOR IS RIGHTLY MADE. (POSSIBLY GET IN TOUCH WITH YOUR SUPPLIER.) DISASSEMBLY IS MADE FOLLOWING ALL DESCRIBED OPERATIONS IN OPPOSITE DIRECTION: 4,3,2,1.

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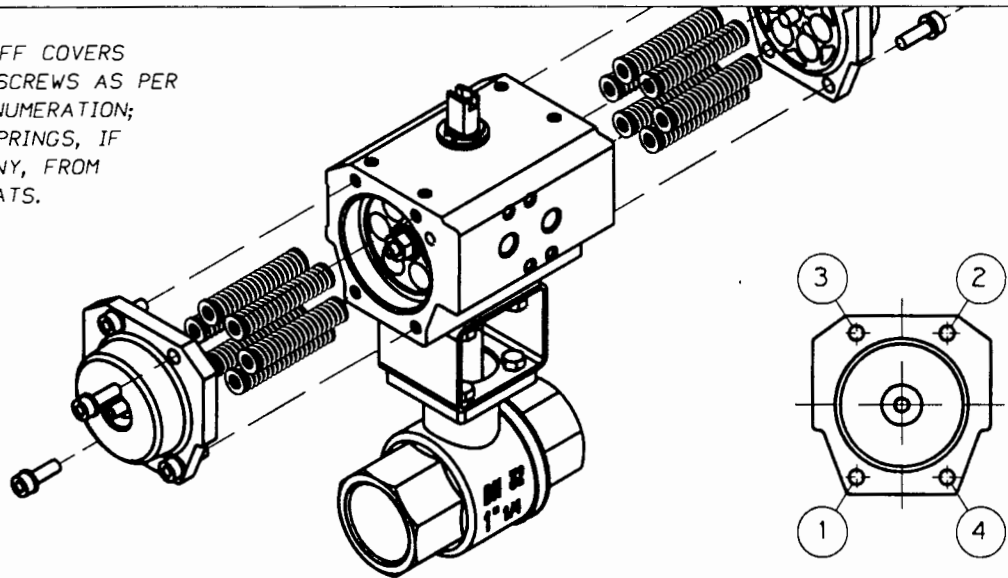
## - ADJUSTMENTS.

### REGULATION IN ACTUATOR CLOSING (0°) - BALL VALVES.

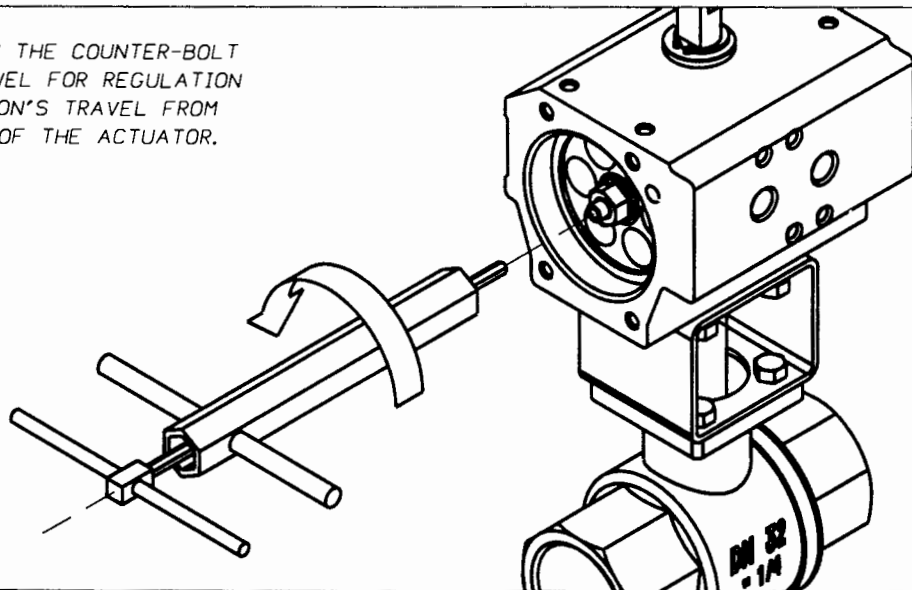
WARNING: INSTALLATION, ADJUSTMENT AND MAINTENANCE MUST BE EFFECTED UNDER SAFETY CONDITIONS. ACTUATOR MUST BE PREVIOUSLY DISCONNECTED FROM PNEUMATIC AND ELECTRICAL FEEDING, IN ORDER TO AVOID ANY FALSE MOVE.

THE FIRST REGULATION IN ACTUATOR CLOSING (0°) IS MADE BY ALPHA POMPE SPA, THEREFORE THE DEVICE IS READY FOR AUTOMATING BALL VALVES. FOR FURTHER REGULATION, PLEASE FOLLOW THESE INSTRUCTIONS:

1 - TAKE OFF COVERS  
LOOSENING SCREWS AS PER  
INDICATED NUMERATION;  
PULL OUT SPRINGS, IF  
THERE IS ANY, FROM  
PISTONS SEATS.



2 - UNSCREW THE COUNTER-BOLT  
AND THE DOWEL FOR REGULATION  
OF THE PISTON'S TRAVEL FROM  
BOTH SIDES OF THE ACTUATOR.



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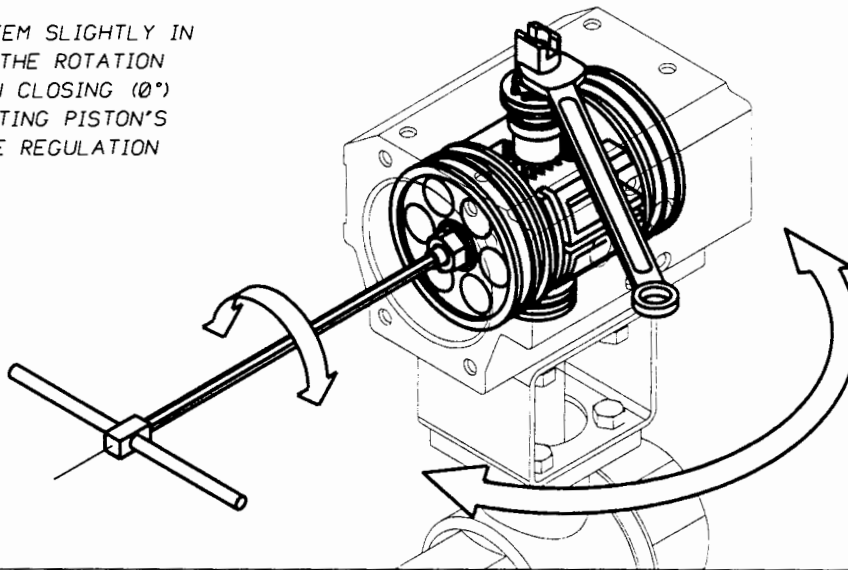
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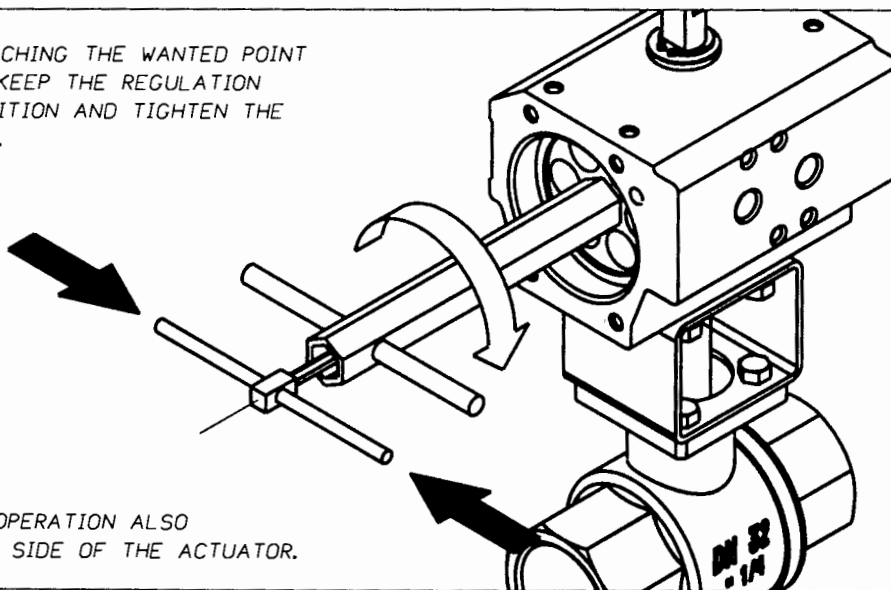
## - ADJUSTMENTS.

REGULATION IN ACTUATOR CLOSING (0°) - BALL VALVES.

3 - KEEPING THE STEM SLIGHTLY IN TENSION, REGULATE THE ROTATION OF THE ACTUATOR IN CLOSING (0°) ON ONE SIDE, ADJUSTING PISTON'S TRAVEL THROUGH THE REGULATION DOWEL.



4 - WHEN REACHING THE WANTED POINT OF CLOSURE, KEEP THE REGULATION DOWEL IN POSITION AND TIGHTEN THE COUNTER-BOLT.



REPEAT THIS OPERATION ALSO ON THE OTHER SIDE OF THE ACTUATOR.

RE-ASSEMBLY SPRINGS, IF THERE IS ANY, AND COVERS FOLLOWING IN OPPOSITE DIRECTION OPERATIONS IN POINT 1. SCREWS ON COVERS HAVE TO BE TIGHTENED FOLLOWING THE NUMERATION, A LITTLE AT A TIME.

NOW THE COMPLETE SET IS READY TO BE CONNECTED PNEUMATICALLY AND ELECTRICALLY FOR WORKING TEST.

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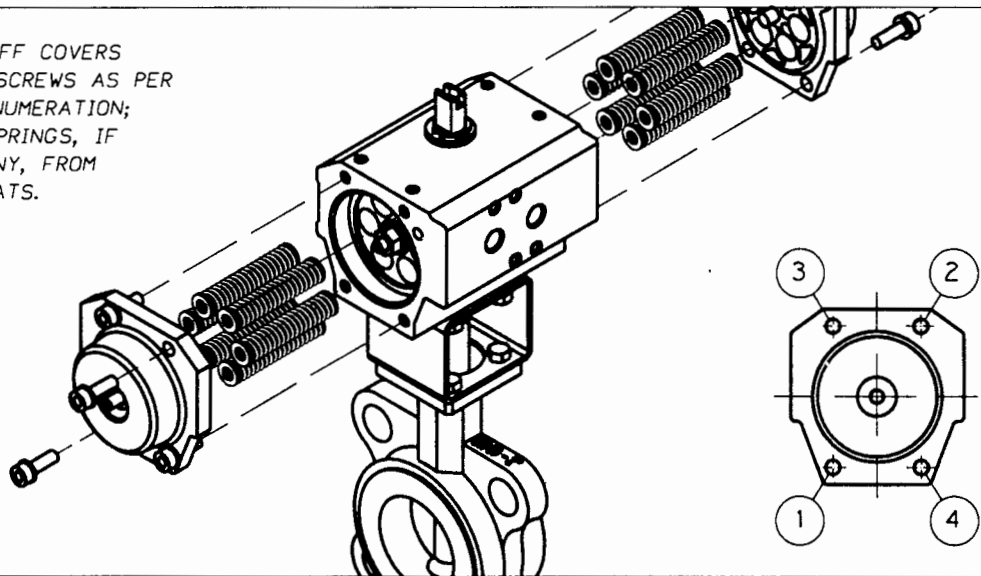
## - ADJUSTMENTS

### REGULATION IN ACTUATOR CLOSING ( $0^\circ$ ) - BUTTERFLY VALVES

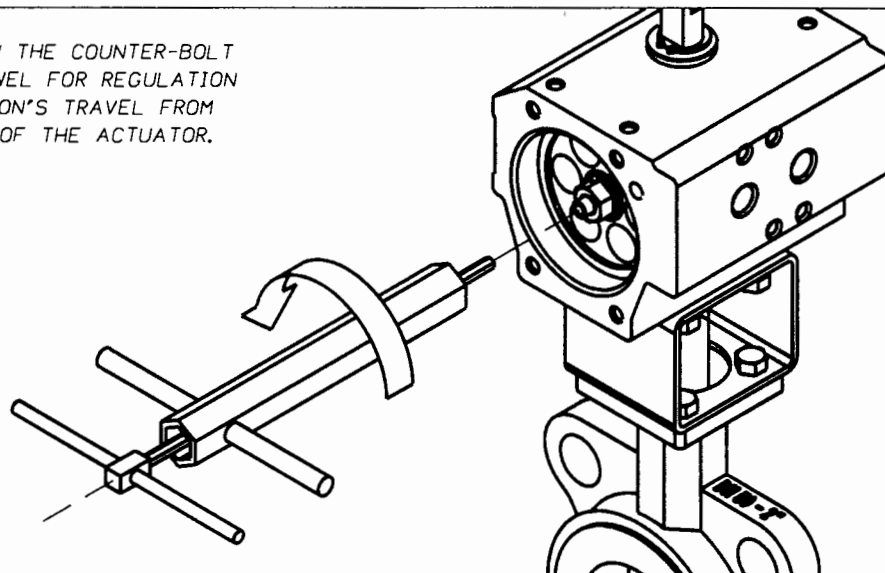
WARNING: INSTALLATION, ADJUSTMENT AND MAINTENANCE MUST BE EFFECTED UNDER SAFETY CONDITIONS. ACTUATOR MUST BE PREVIOUSLY DISCONNECTED FROM PNEUMATIC AND ELECTRICAL FEEDING, IN ORDER TO AVOID ANY FALSE MOVE.

THE FIRST REGULATION IN ACTUATOR CLOSING ( $0^\circ$ ) IS MADE BY ALPHA POMPE SPA, BUT FOR BUTTERFLY VALVES AUTOMATION, A NEW REGULATION THROUGH SPECIAL DYNAMOMETRICAL KEY IS NECESSARY, FOLLOWING THE DIRECTION OF THE VALVE'S MANUFACTURER.

1 - TAKE OFF COVERS  
LOOSENING SCREWS AS PER  
INDICATED NUMERATION;  
PULL OUT SPRINGS, IF  
THERE IS ANY, FROM  
PISTONS SEATS.



2 - UNSCREW THE COUNTER-BOLT  
AND THE DOWEL FOR REGULATION  
OF THE PISTON'S TRAVEL FROM  
BOTH SIDES OF THE ACTUATOR.



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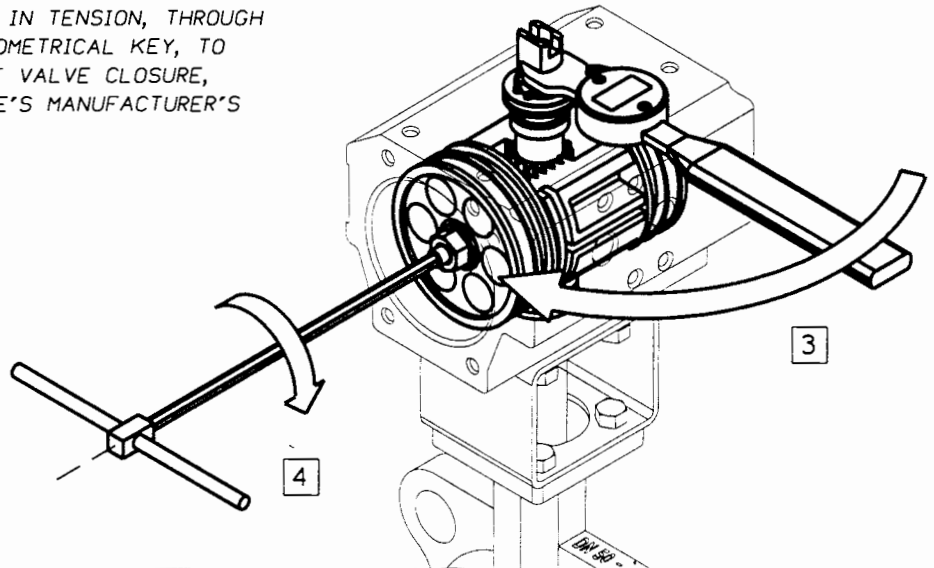
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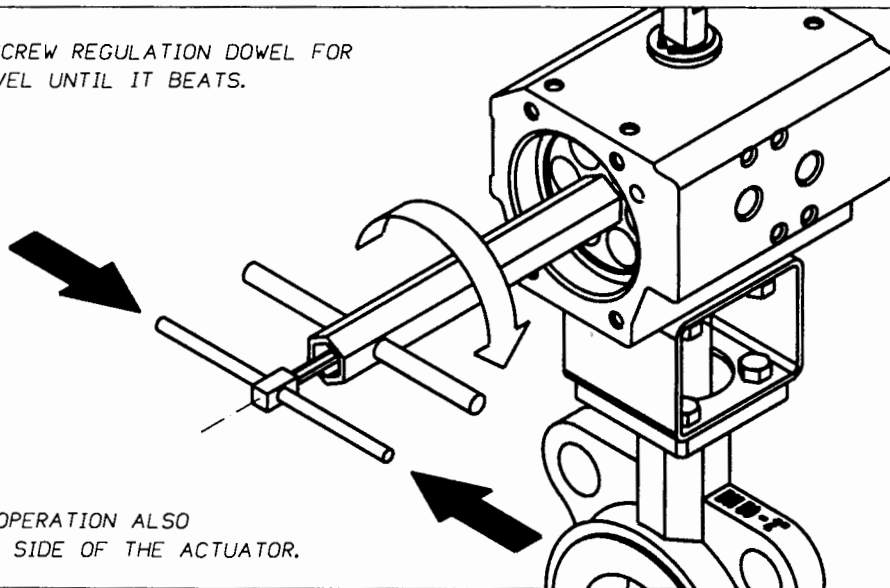
## - ADJUSTMENTS.

REGULATION IN ACTUATOR CLOSING ( $0^\circ$ ) - BUTTERFLY VALVES.

3 - KEEP THE STEM IN TENSION, THROUGH THE SPECIAL DYNAMOMETRICAL KEY, TO OBTAIN THE PERFECT VALVE CLOSURE, ACCORDING TO VALVE'S MANUFACTURER'S DIRECTIONS.



4 - SOFTLY SCREW REGULATION DOWEL FOR PISTON'S TRAVEL UNTIL IT BEATS.



REPEAT THIS OPERATION ALSO ON THE OTHER SIDE OF THE ACTUATOR.

RE-ASSEMBLY SPRINGS, IF THERE IS ANY, AND COVERS FOLLOWING IN OPPOSITE DIRECTION OPERATIONS IN POINT 1. SCREWS ON COVERS HAVE TO BE TIGHTENED FOLLOWING THE NUMERATION, A LITTLE AT A TIME.

NOW THE COMPLETE SET IS READY TO BE CONNECTED PNEUMATICALLY AND ELECTRICALLY FOR WORKING TEST.

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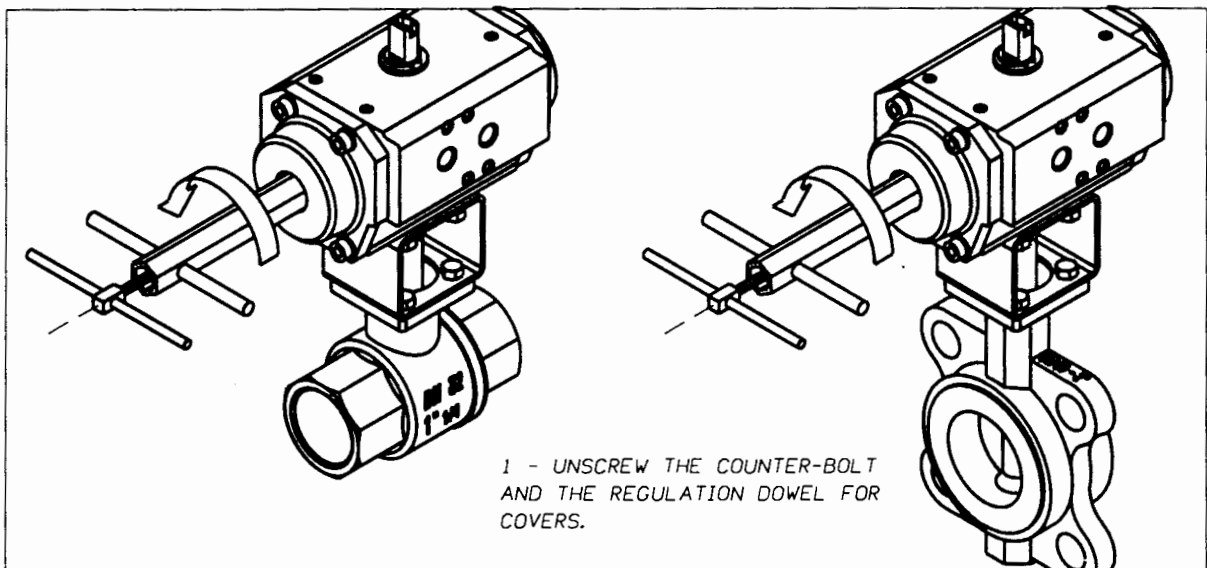
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## - ADJUSTMENTS.

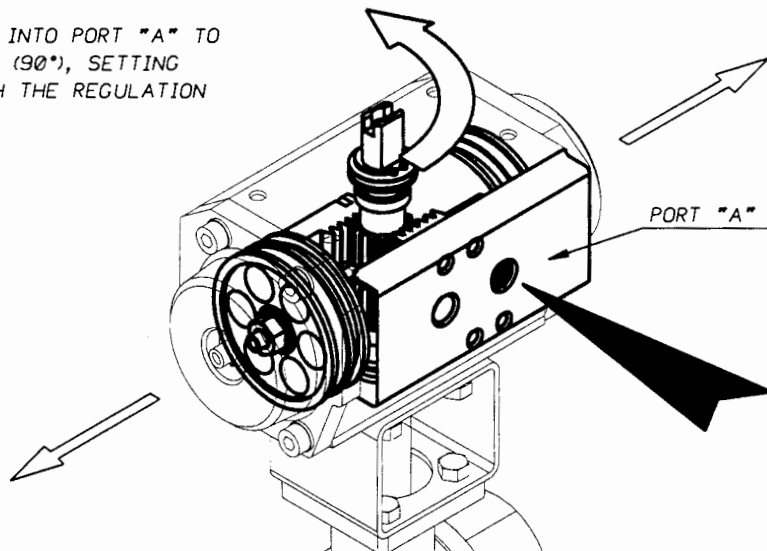
REGULATION IN ACTUATOR OPENING (90°) - BUTTERFLY AND BALL VALVES.

WARNING: INSTALLATION, ADJUSTMENT AND MAINTENANCE MUST BE EFFECTED UNDER SAFETY CONDITIONS. ACTUATOR MUST BE PREVIOUSLY DISCONNECTED FROM PNEUMATIC AND ELECTRICAL FEEDING, IN ORDER TO AVOID ANY FALSE MOVE.

THE FIRST REGULATION IN ACTUATOR OPENING (90°) IS MADE BY ALPHA POMPE SPA, THEREFORE THE DEVICE IS READY FOR AUTOMATING BOTH BUTTERFLY AND BALL VALVES. FOR FURTHER REGULATION, PLEASE FOLLOW THESE INSTRUCTIONS:



2 - CONNECT AIR FEEDING INTO PORT "A" TO HAVE ACTUATOR'S OPENING (90°), SETTING THE PISTONS IN BEAT WITH THE REGULATION DOWELS OF THE COVERS.



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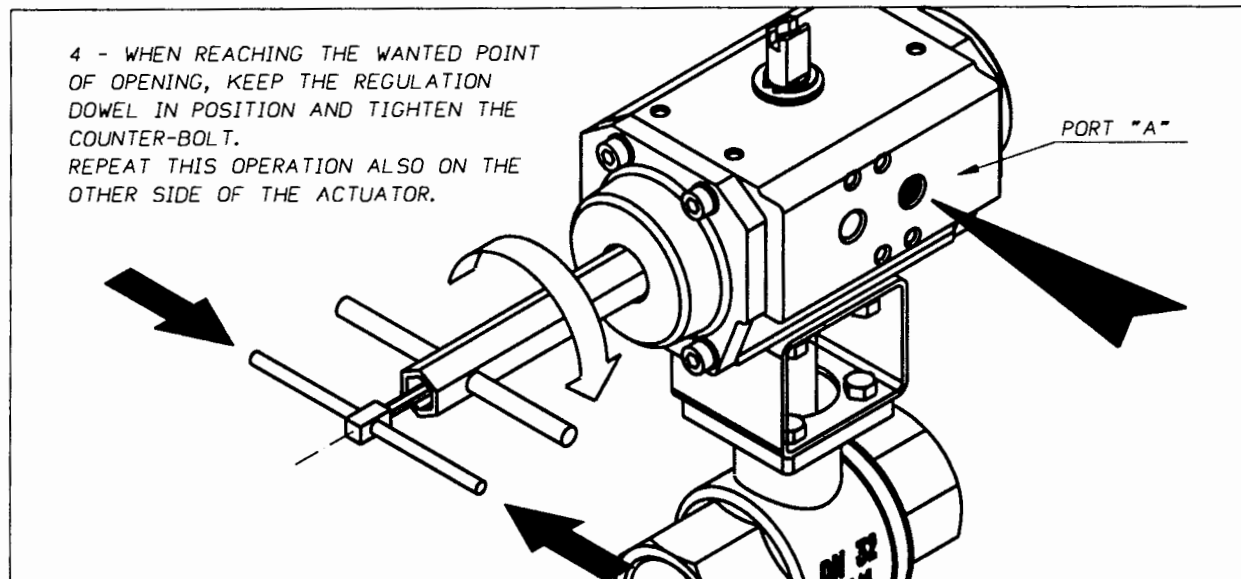
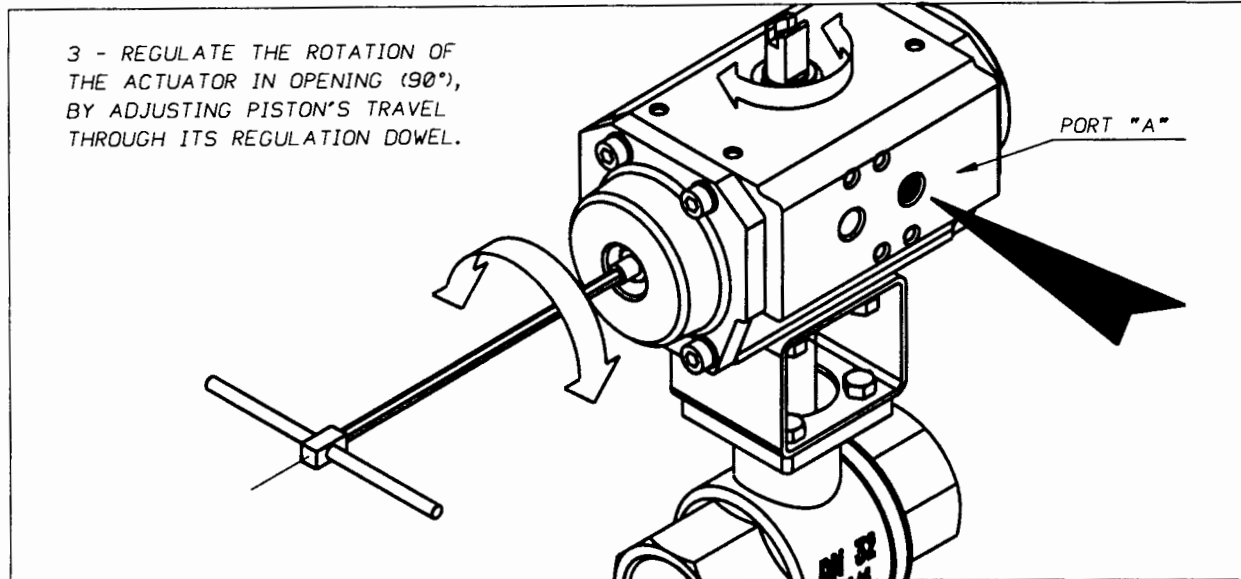
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## - ADJUSTMENTS.

REGULATION IN ACTUATOR OPENING (90°) - BUTTERFLY AND BALL VALVES.



NOW THE COMPLETE SET IS READY TO BE CONNECTED PNEUMATICALLY AND ELECTRICALLY FOR WORKING TEST.

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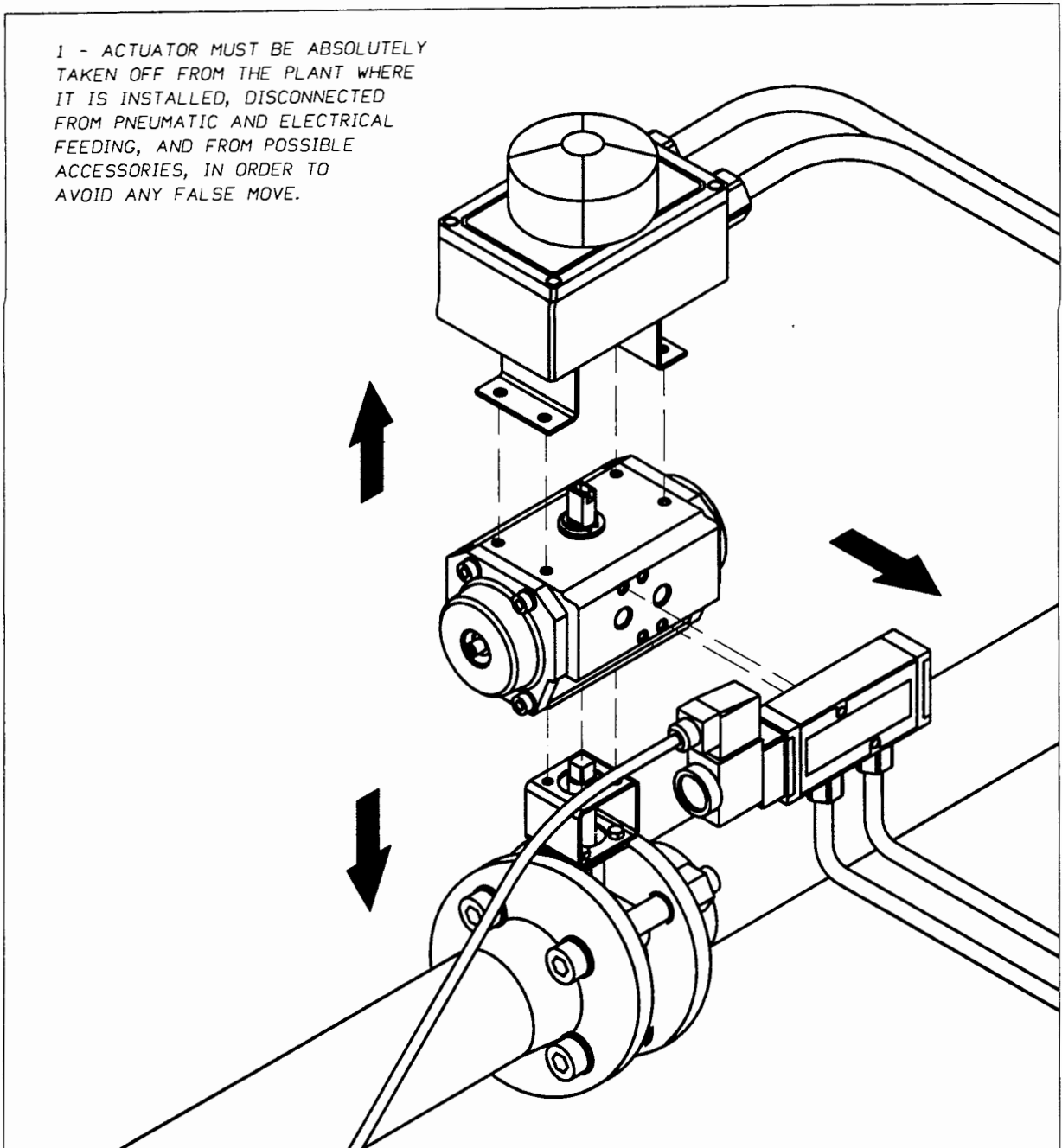
# Alpha<sup>air</sup>

## - MAINTENANCE.

### SUBSTITUTION OF SPARE-PARTS.

WARNING: INSTALLATION, ADJUSTMENT AND MAINTENANCE MUST BE EFFECTED UNDER SAFETY CONDITIONS. WE SUPPLY COMPLETE SPARE-PARTS KITS (SEE PAGE 9), FOR THEIR SUBSTITUTION, PLEASE FOLLOW THESE INSTRUCTIONS:

1 - ACTUATOR MUST BE ABSOLUTELY TAKEN OFF FROM THE PLANT WHERE IT IS INSTALLED, DISCONNECTED FROM PNEUMATIC AND ELECTRICAL FEEDING, AND FROM POSSIBLE ACCESSORIES, IN ORDER TO AVOID ANY FALSE MOVE.



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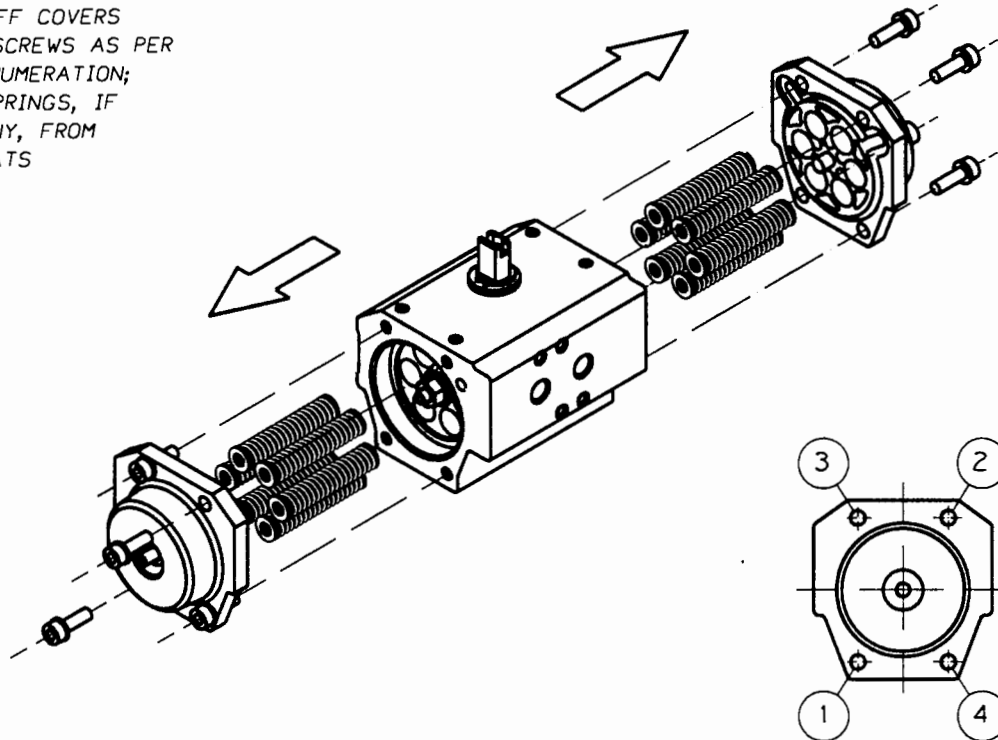
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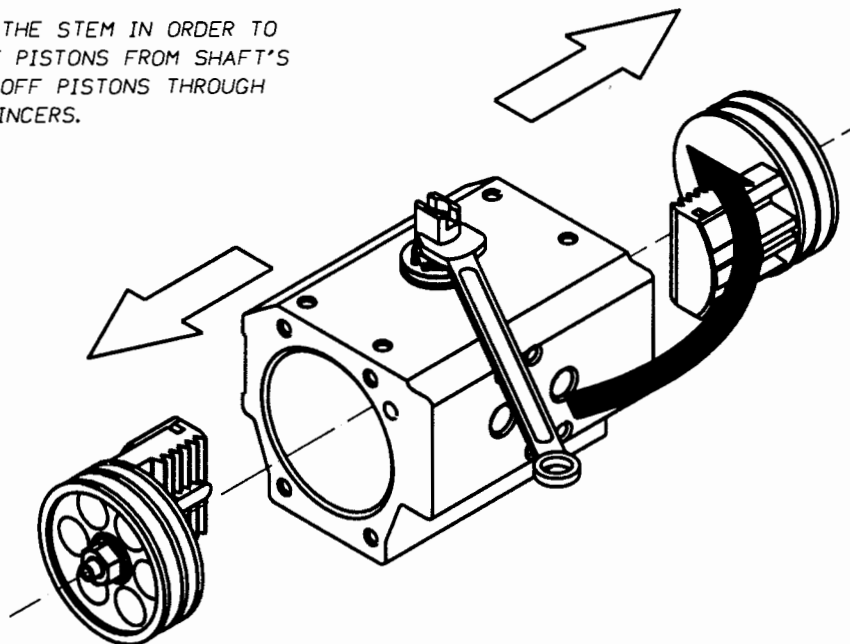
- MAINTENANCE.

SUBSTITUTION OF SPARE-PARTS.

2 - TAKE OFF COVERS  
LOOSENING SCREWS AS PER  
INDICATED NUMERATION;  
PULL OUT SPRINGS, IF  
THERE IS ANY, FROM  
PISTONS SEATS



3 - ROTATE THE STEM IN ORDER TO  
RELEASE THE PISTONS FROM SHAFT'S  
RACK. TAKE OFF PISTONS THROUGH  
A PAIR OF PINCERS.



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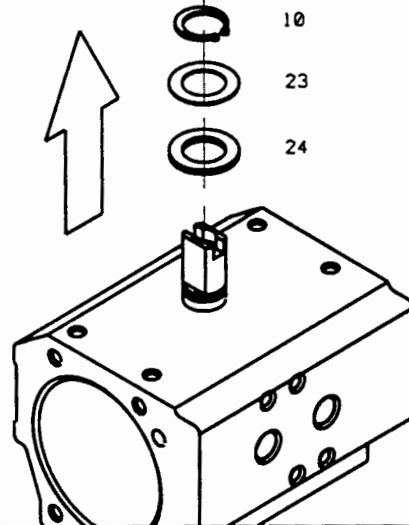
## - MAINTENANCE.

### SUBSTITUTION OF SPARE-PARTS.

4 - RELEASE SEEGER RING (PART. 10)  
FROM STEM AND TAKE AWAY:

- PINION THRUST WASHER (PART. 23)
- ANTI-FRICTION WASHER (PART. 24)

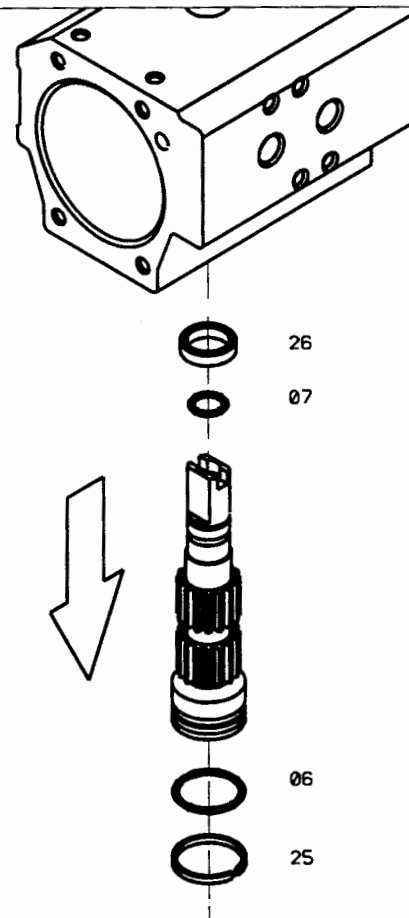
BECAUSE THEY HAVE TO BE SUBSTITUTED.



5 - EXTRACT SHAFT FROM ACTUATOR'S BODY  
AND TAKE OFF:

- UPPER PILOT RING FOR SHAFT (PART. 26)
- UPPER O-RING FOR SHAFT (PART. 07)
- LOWER O-RING FOR SHAFT (PART. 06)
- LOWER PILOT RING FOR SHAFT (PART. 25)

BECAUSE THEY HAVE TO BE SUBSTITUTED.



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## - MAINTENANCE.

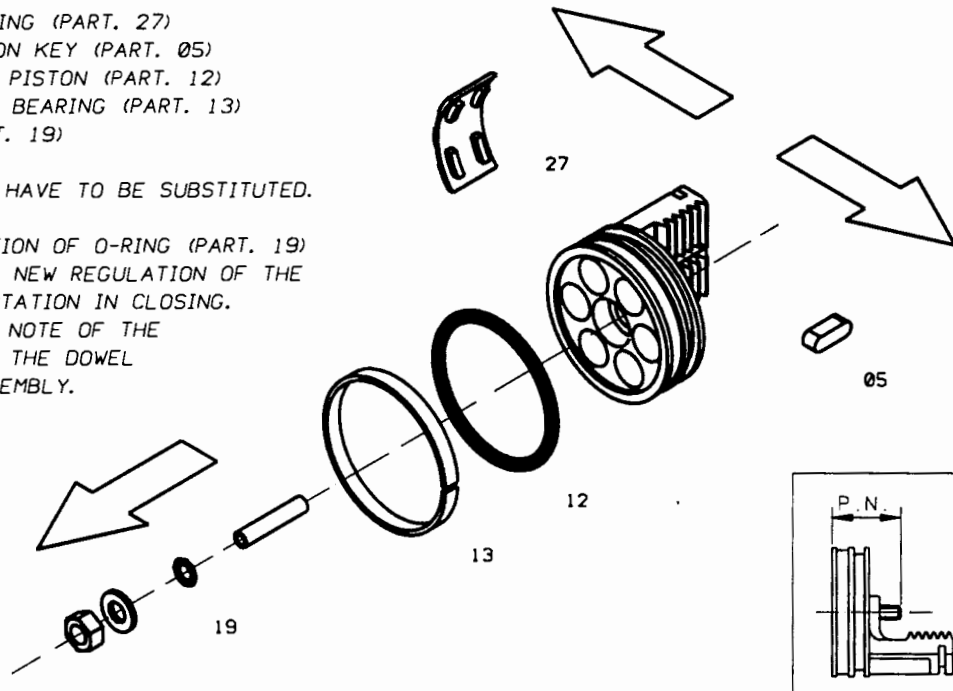
### SUBSTITUTION OF SPARE-PARTS.

6 - FROM BOTH PISTONS TAKE OFF:

- PISTON BEARING (PART. 27)
- ANTI-EJECTION KEY (PART. 05)
- O- RING FOR PISTON (PART. 12)
- PISTON HEAD BEARING (PART. 13)
- O-RING (PART. 19)

BECAUSE THEY HAVE TO BE SUBSTITUTED.

P.N. SUBSTITUTION OF O-RING (PART. 19) MAY REQUIRE A NEW REGULATION OF THE ACTUATOR'S ROTATION IN CLOSING. YOU CAN TAKE NOTE OF THE PROJECTION OF THE DOWEL BEFORE DISASSEMBLY.

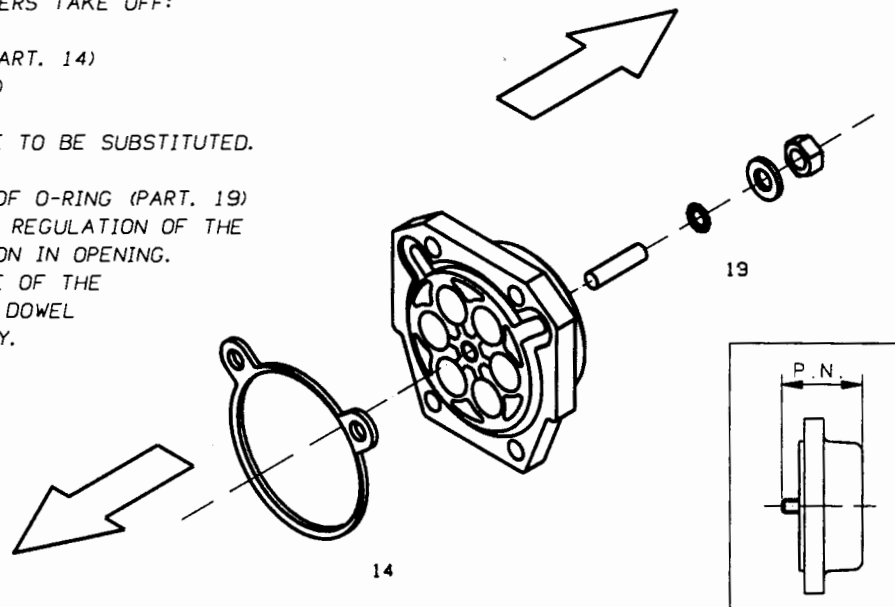


7 - FROM BOTH COVERS TAKE OFF:

- COVER GASKET (PART. 14)
- O-RING (PART. 19)

BECAUSE THEY HAVE TO BE SUBSTITUTED.

P.N. SUBSTITUTION OF O-RING (PART. 19) MAY REQUIRE A NEW REGULATION OF THE ACTUATOR'S ROTATION IN OPENING. YOU CAN TAKE NOTE OF THE PROJECTION OF THE DOWEL BEFORE DISASSEMBLY.



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## - MAINTENANCE.

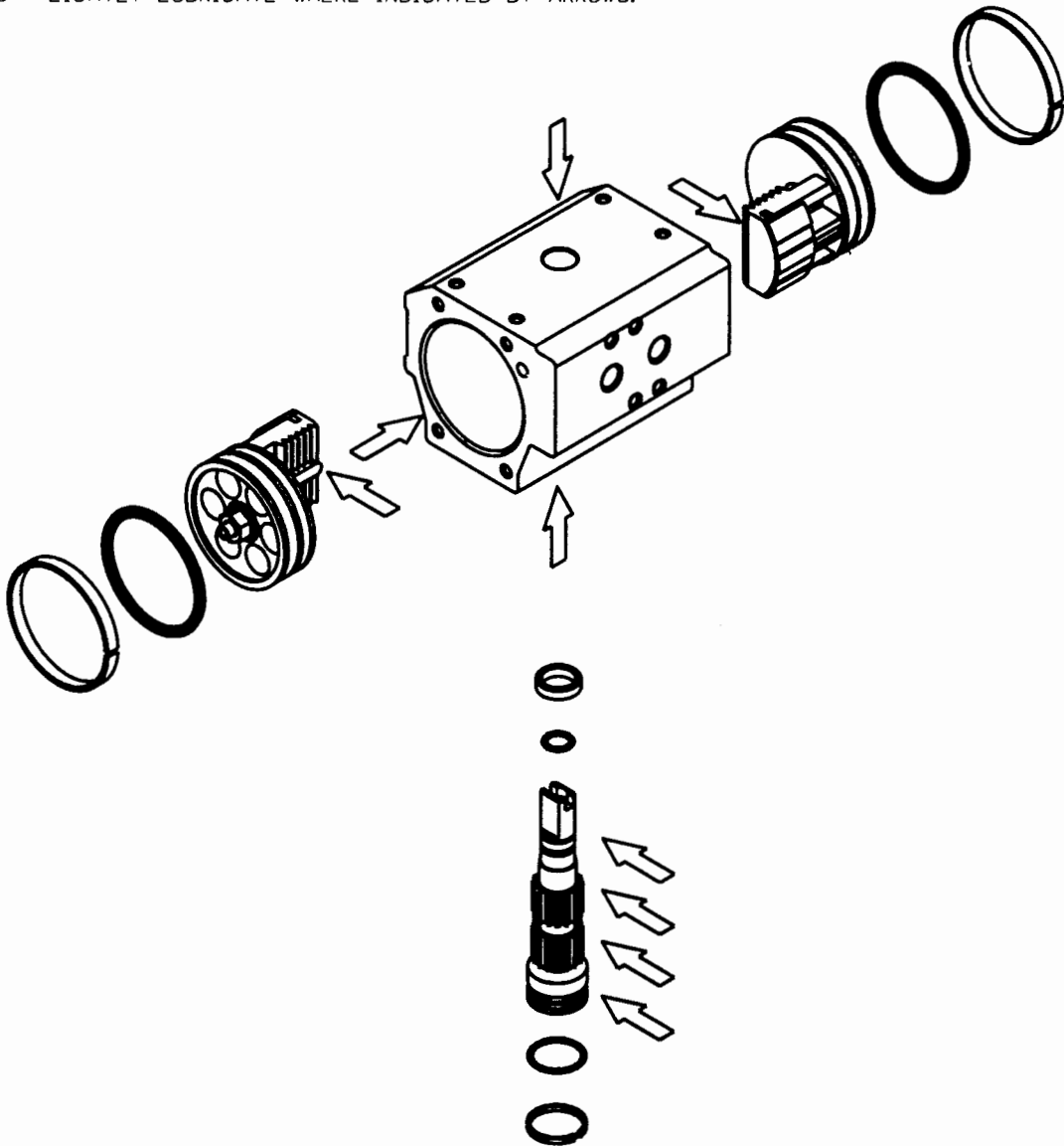
SUBSTITUTION OF SPARE-PARTS.

WARNING: AFTER DISASSEMBLY ALL PARTICULARS TO BE SUBSTITUTED, AND BEFORE PROCEEDING WITH THEIR REPLACEMENT, CAREFULLY CLEAN ALL COMPONENTS.  
WHEN ASSEMBLY, WE SUGGEST LUBRICATING WITH MOLYBDENUM BISULPHIDE GREASE

**ESSO MOLY EP-2**

OR SIMILAR.

8 - LIGHTLY LUBRICATE WHERE INDICATED BY ARROWS.



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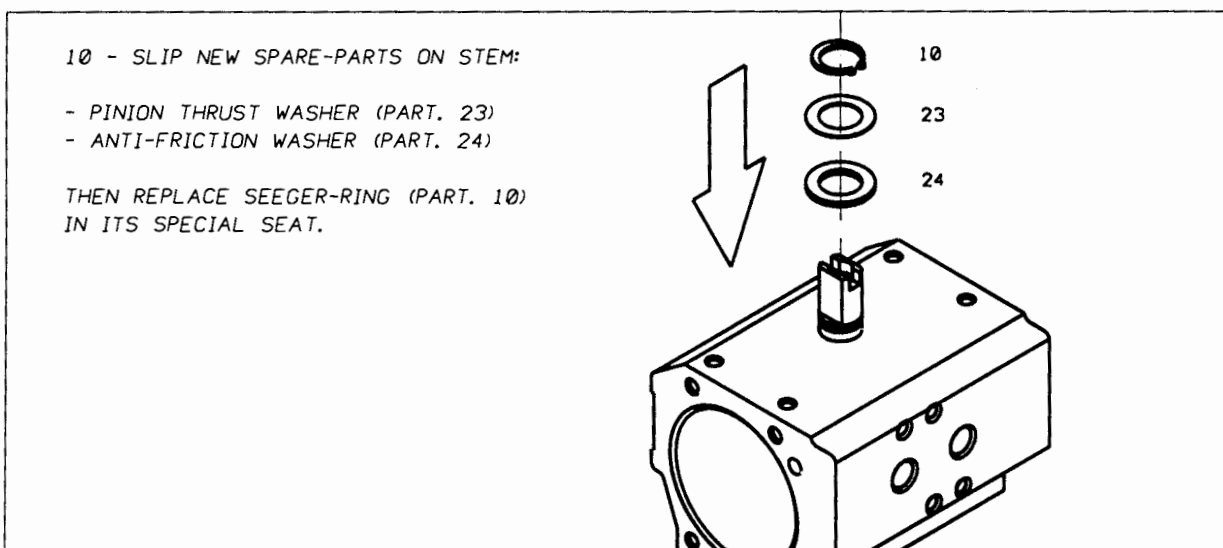
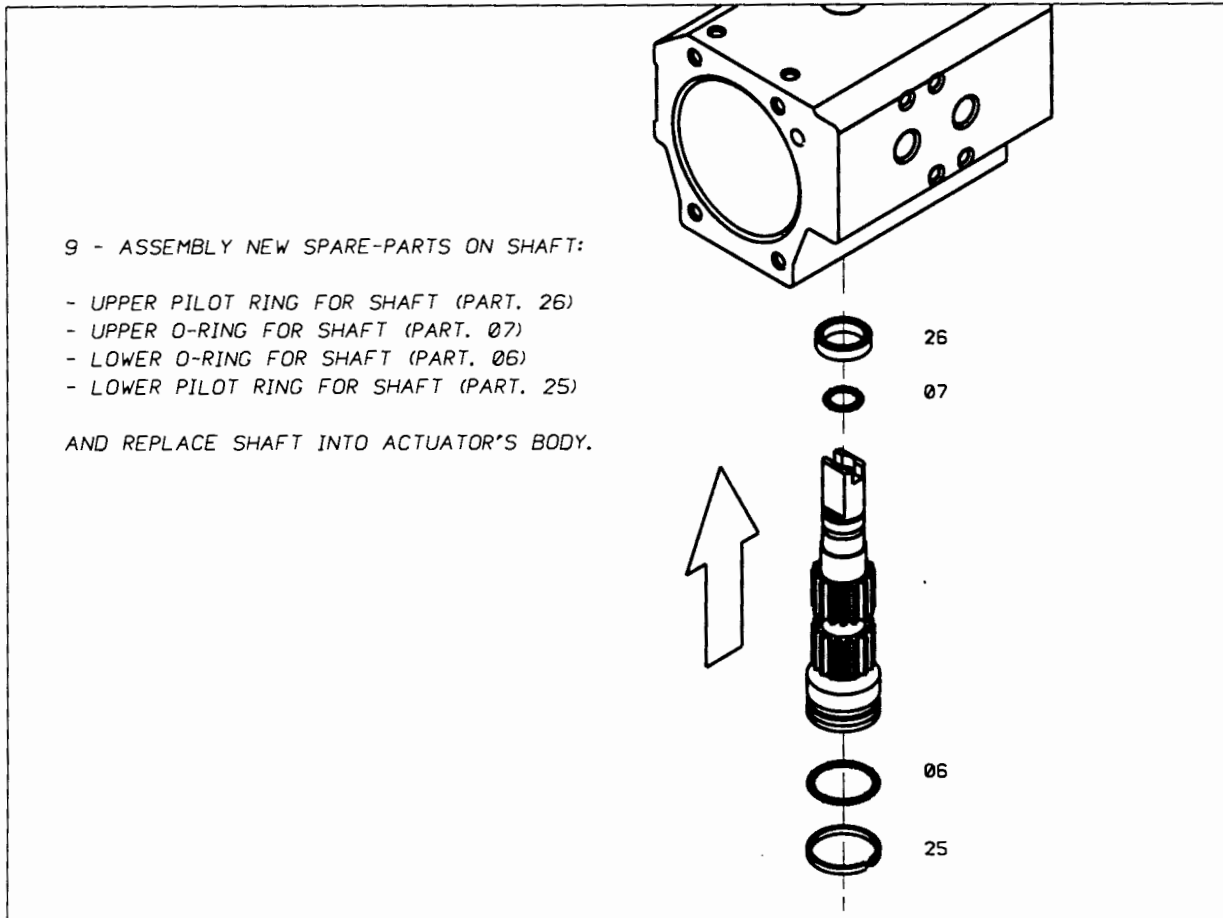
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## - MAINTENANCE

### SUBSTITUTION OF SPARE-PARTS.



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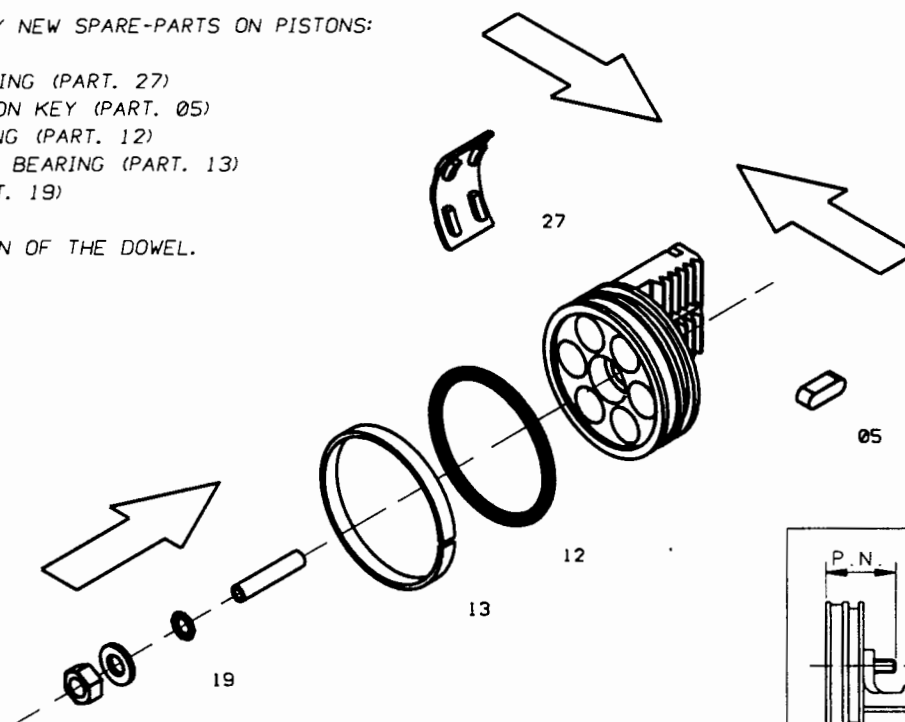
## - MAINTENANCE

### SUBSTITUTION OF SPARE-PARTS.

#### 11 - ASSEMBLY NEW SPARE-PARTS ON PISTONS:

- PISTON BEARING (PART. 27)
- ANTI-EJECTION KEY (PART. 05)
- PISTON O-RING (PART. 12)
- PISTON HEAD BEARING (PART. 13)
- O-RING (PART. 19)

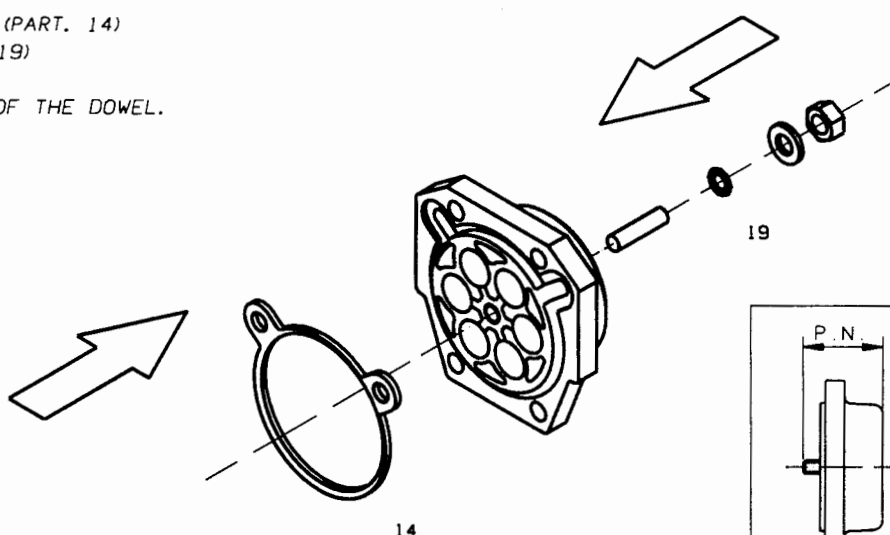
P.N. PROJECTION OF THE DOWEL.



#### 12 - ASSEMBLY NEW SPARE-PARTS ON COVERS:

- COVER GASKET (PART. 14)
- O-RING (PART. 19)

P.N. PROJECTION OF THE DOWEL.



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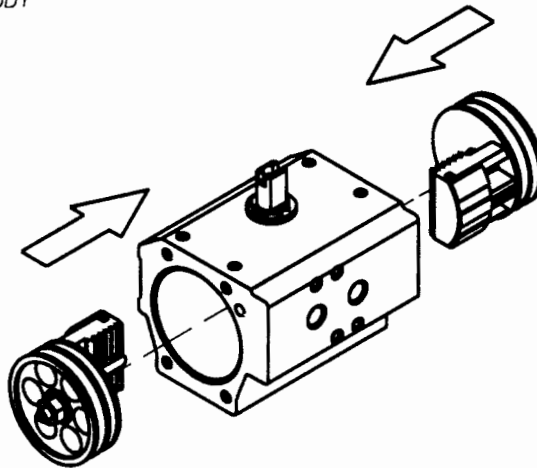
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## - MAINTENANCE.

### SUBSTITUTION OF SPARE-PARTS.

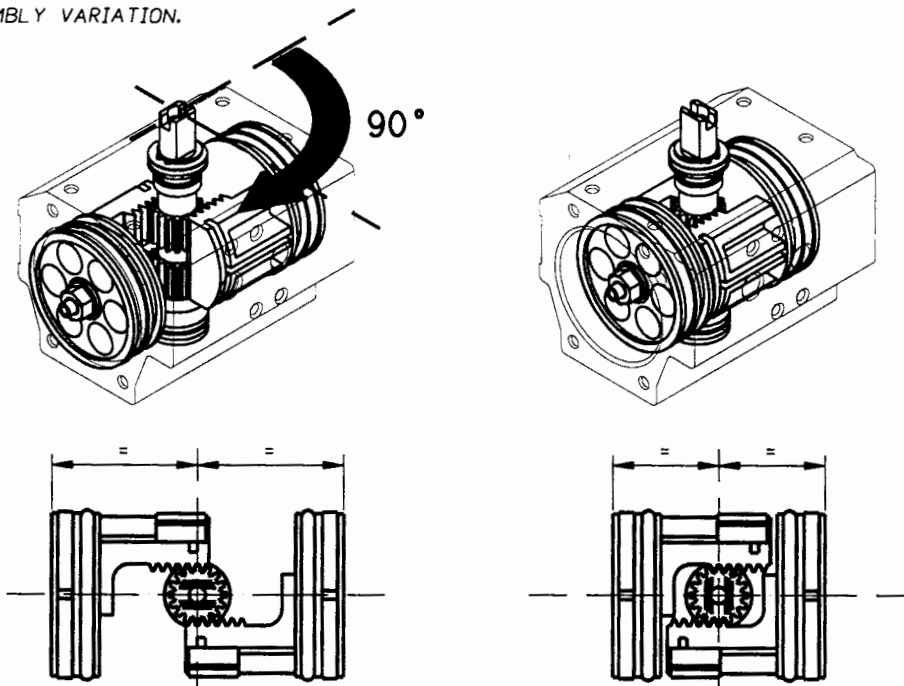
13 - REPLACE PISTONS IN THE BODY  
IN ACCORDANCE TO THE REQUIRED  
ASSEMBLY VARIATION  
(SEE PAGE 7 AND 8).

EXAMPLE OF "A" STANDARD  
ALPHAIR ASSEMBLY VARIATION.



14 - GET SURE THAT PISTONS ARE "IN RIGHT PHASE", THIS MEANS THEY ARE ENGAGED  
WITH THE SAME TOOTH ON THE SHAFT.  
MAKE SURE THAT THE SHAFT'S ROTATION FIELD IS THE REQUIRED ONE.

EXAMPLE OF "A" STANDARD  
ALPHAIR ASSEMBLY VARIATION.



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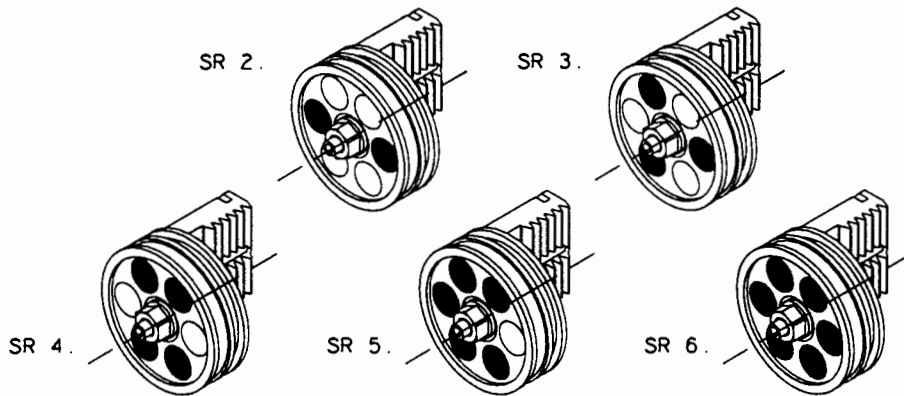
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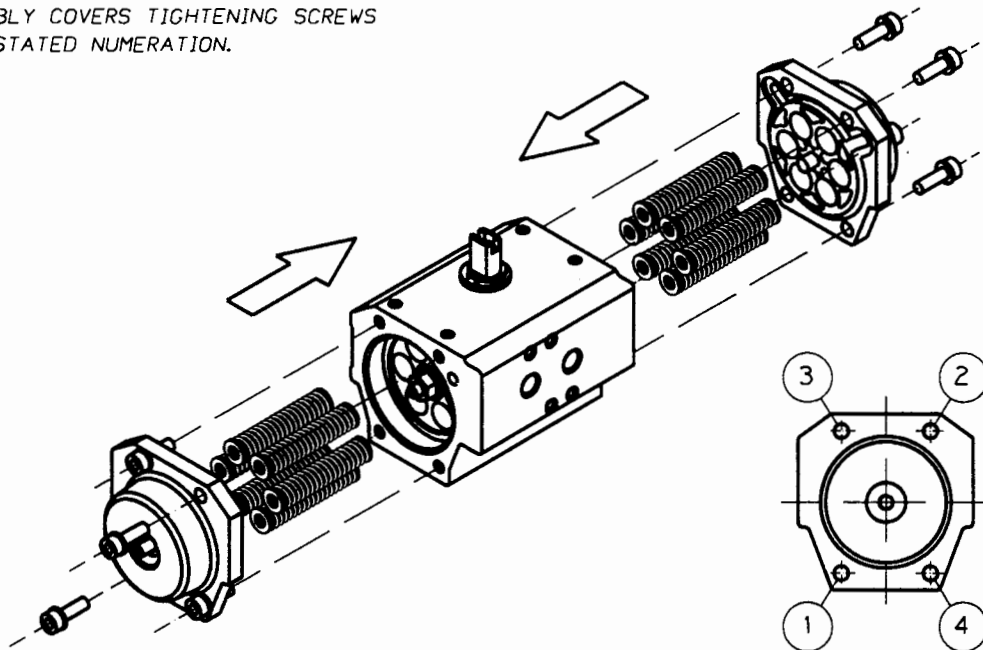
- MAINTENANCE.

SUBSTITUTION OF SPARE-PARTS.

15 - REPLACE EVENTUAL SPRINGS, FOLLOWING THIS SCHEME.



16 - ASSEMBLY COVERS TIGHTENING SCREWS FOLLOWING STATED NUMERATION.



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