

# 702-703 XS-P BALL VALVE WITH AP-RE PNEUMATIC ACTUATOR

## FEATURES

The 702 and 703 XS-P ball valves with PEEK seats + AP-RE actuator are dedicated to the automatic shut off of industrial fluid's lines up to 137 bar pressure and 250°C temperature. The construction type of this high-performance valve is a full bore 3 pieces with body-integrated screws. The double tightness system for body and stem, the anti-static device and the fire safe design make the valve applicable for oil and gas uses. This valve is CE, fire safe and ATEX certified. The ISO 5211 standardized mounting pad allows an easy actuation of the valve. The actuation with AP pneumatic actuator is available both with double effect and spring return types. Numerous options and accessories are available.



## AVAILABLE MODELS

**702 XS-P:** carbon steel body

**703 XS-P:** stainless steel body

**Sizes:** 1/4 " to 2"

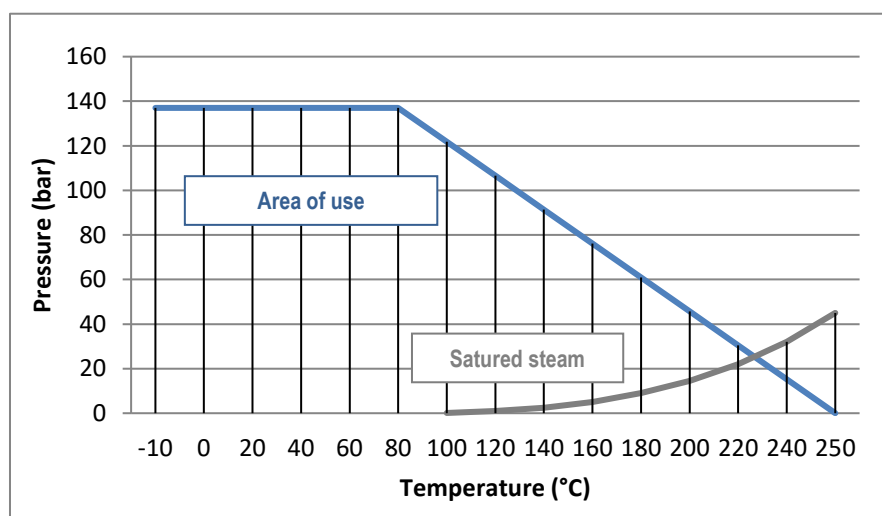
**Connections:** SW welded.

Double effect and spring return actuator.



## LIMITS OF USE

|                           |                                            |
|---------------------------|--------------------------------------------|
| Pressure : PS             | 137 bar                                    |
| Temperature of fluid : TS | CS : -10°C / +250°C<br>SS : -20°C / +250°C |
| Limits of use with steam  | 25 bar / +226°C                            |
| Room temperature          | -25°C / +80°C                              |
| Compressed air feeding    | mini 4 bar / maxi 10 bar                   |



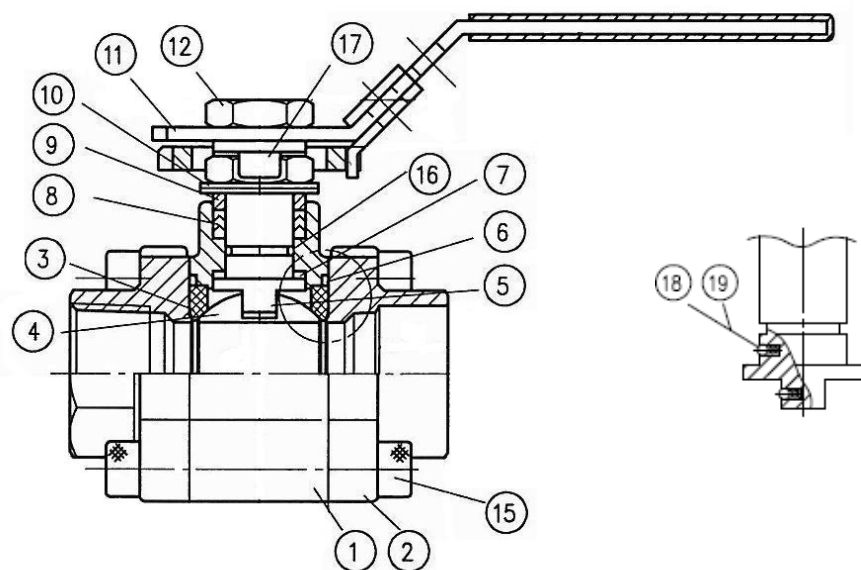
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|  |                                                                                                                                                                                                                                                                                  | Ref.  | FT702XSP+AP-RE ENG |
|  |                                                                                                                                                                                                                                                                                  | Rev.  | 02                 |
|  |                                                                                                                                                                                                                                                                                  | Date  | 10/2023            |

# 702-703 XS-P BALL VALVE WITH AP-RE PNEUMATIC ACTUATOR

## REGULATIONS AND STANDARDS OF CONSTRUCTION

| OBJET                   | Standard                      | NB        | OBJET                            | Standard     |
|-------------------------|-------------------------------|-----------|----------------------------------|--------------|
| P.E.D CE 2014/68        | 1/2" to 1": not concerned     |           | Final testing                    | API 598      |
|                         | 1" 1/4 to 2": category III    | TÜV 0035  | Material certificate             | EN 10204     |
| Conception              | ANSI B16.34                   |           | Corrosion resistance             | NACE MR-0175 |
| Body sizing             | EN 12516-1                    |           | Fire safe                        | API 607/4    |
| Materials               | EN 1503-2                     |           | Motorization connection          | ISO 5211     |
| BSP threaded connection | ISO 228-1                     |           | Pilote solenoid valve connection | NAMUR        |
| ATEX directive          | II 2G/D Tx areas 1,2,21 et 22 | SIRA 0518 | NPT Threaded connection          | ANSI B1.20   |
|                         | EN 13463-1                    |           | LSB connection                   | VDI/VDE 3845 |



## CONSTRUCTION

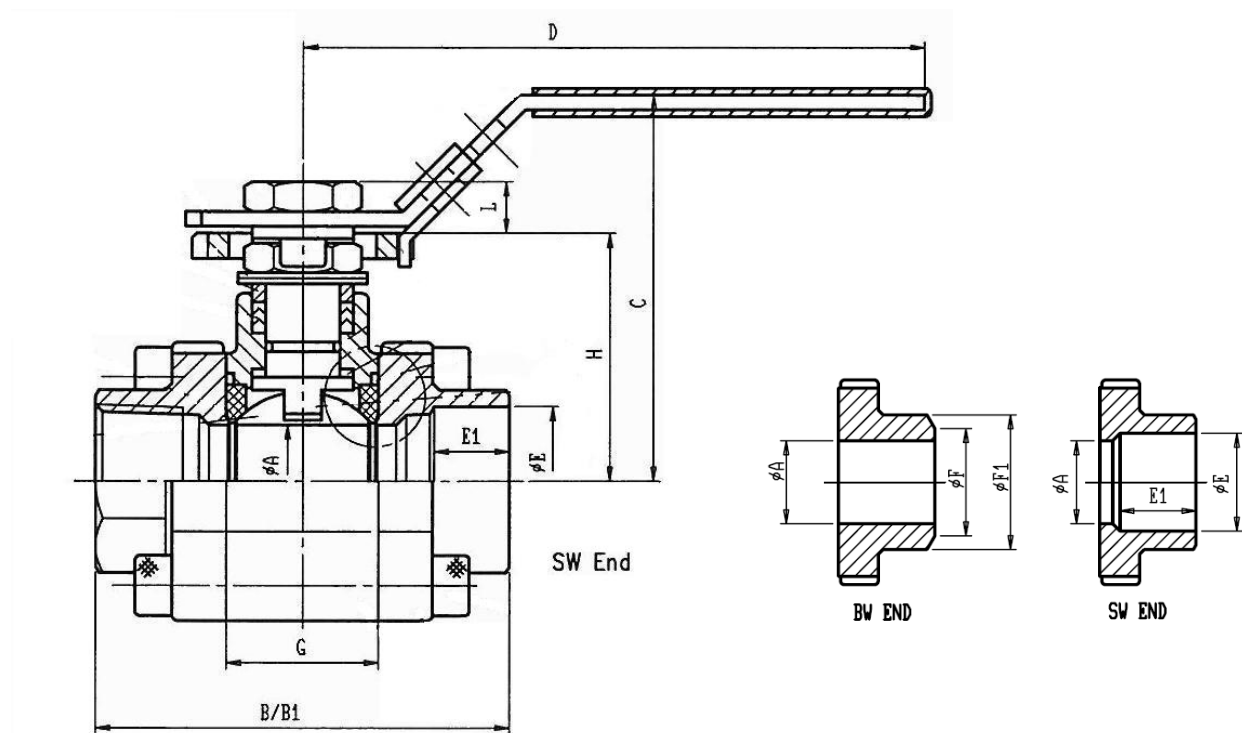
| Item | Part        | Carbon steel | Stainless steel | Item | Part              | Carbon and stainless steel |
|------|-------------|--------------|-----------------|------|-------------------|----------------------------|
| 1    | Body        | CS 1.0619    | SS 1.4408       | 10   | Belleville washer | Inox 301                   |
| 2    | Caps        | CS 1.0619    | SS 1.4408       | 11   | Lever             | SS 304                     |
| 3    | Seats       | PEEK         |                 | 12   | Lever nut         | SS 304                     |
| 4    | Ball        | SS 316       |                 | 13   | Pin               | SS 304                     |
| 5    | Stem        | SS 316       |                 | 14   | Cover             | PVC                        |
| 6    | Body gasket | Graphite     |                 | 15   | Screw             | ISO 898 12.9               |
| 7    | Ring        | PEEK         |                 | 16   | O-ring            | FPM                        |
| 8    | Packing     | Graphite     |                 | 17   | Locking device    | SS 304                     |
| 9    | Ring        | SS 304       |                 | 18   | Anti-static ball  | SS 316                     |
|      |             |              |                 | 19   | Spring            | SS 316                     |

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|                                                                                     |                                                                                                                                                                                                                                                                                  | Date  | 10/2023            |

# 702-703 XS-P BALL VALVE WITH AP-RE PNEUMATIC ACTUATOR

## DIMENSIONS (mm)



| Size    | 1/2" | 3/4" | 1"   | 1" 1/4 | 1" 1/2 | 2"    |
|---------|------|------|------|--------|--------|-------|
| A       | 16   | 20   | 24,5 | 32     | 38     | 50    |
| B (SW)  | 75   | 80   | 90   | 110    | 120    | 140   |
| B1 (BW) | 75   | 90   | 100  | 110    | 125    | 150   |
| C       | 70.9 | 73.4 | 84.1 | 89.3   | 109.5  | 118.9 |
| D       | 110  | 110  | 135  | 135    | 165    | 165   |
| E       | 21.8 | 27.2 | 33.9 | 42.7   | 48.8   | 61.2  |
| E1      | 11.2 | 14.3 | 15.8 | 17.5   | 19.1   | 21.3  |
| F (BW)  | 17   | 22   | 28   | 37     | 43     | 54    |
| F1 (BW) | 21.3 | 26.9 | 33.7 | 42.4   | 48.3   | 60.3  |
| G       | 25.2 | 27.7 | 33   | 41.2   | 49.3   | 63.6  |
| H       | 42.3 | 44.8 | 54   | 59.2   | 73.5   | 82.9  |
| L       | 8    | 8    | 10   | 10     | 14.8   | 14.8  |

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# 702-703 XS-P BALL VALVE WITH AP-RE PNEUMATIC ACTUATOR

## MOTORIZATION WITH AP ACTUATOR

The ALPHAIR actuators are sized for following operating conditions:

- rack and pignon anodized aluminium actuator.
- 1,6 minimum safety factor on nominal torque value of the valve.
- dry, non-lubricated air.
- max. differential pressure upstream/downstream  $\Delta P=20$  bar.

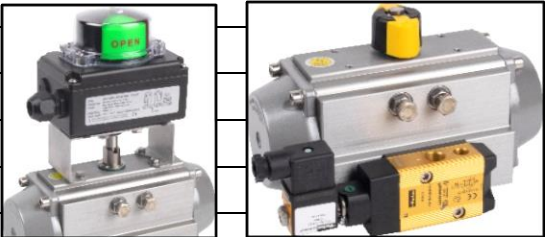
The mounting of the AP actuator on the valve is direct (excepted for size  $\frac{3}{4}$ ") is in stainless steel and according to standard EN 15081.

| Size  | Double effect | V (liters) | Time (s)* | Spring return | V (liters) | Time (s)* |
|-------|---------------|------------|-----------|---------------|------------|-----------|
| 1/2"  | RE 51         | 0,23       | 1         | RES 76/6      | 0,61       | 1         |
| 3/4"  | RE 64         | 0,45       | 1         | RES 76/6      | 0,61       | 1         |
| 1"    | RE 86         | 0,98       | 2         | RES 101/6     | 1,8        | 2         |
| 1"1/4 | RE 86         | 0,98       | 2         | RES 101/6     | 1,8        | 2         |
| 1"1/2 | RE 101        | 1,8        | 2         | RES 116/6     | 2,8        | 2         |
| 2"    | RE 126        | 3,7        | 2         | RES 146/6     | 4,9        | 2         |

\*adverage time of opening or closing for free of pressure valve.

## OPTIONS OF MOTORIZATION

There are numerous options for which we advise you to ask our commercial department:

|    |                                                   |                                                                                      |
|----|---------------------------------------------------|--------------------------------------------------------------------------------------|
| 1  | Oversized actuator for 3 or 4 bar compressed air  |  |
| 3  | Special coated actuator, stainless steel actuator |                                                                                      |
| 10 | Filter-regulator for compressed air               |                                                                                      |
| 11 | All types of pilote solenoid valves               |                                                                                      |
| 12 | All types of limit switch box                     |                                                                                      |
| 14 | Quick exhaust                                     |                                                                                      |
| 15 | Flow limiter on exhaust way                       |                                                                                      |
| 16 | Air lock                                          |                                                                                      |

## INSTALLATION IN EXPLOSIVE AREA

In case of use of the automatic 702 XS – 703 XS+AP-RE valve in ATEX areas 1,2, 21 or 22, it is necessary to specify it when you order. Our technical department will proceed to an assembly verification, set a grounding strip and issue an assembly conformity certificate. These operations are made in our workshop by ATEX certified workers. Please consult.

It is also necessary to follow the special instructions of mounting and use of actuated valve in hazardous area "IMEATEX".

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## ASSEMBLY AND MAINTAINANCE INSTRUCTIONS

### 1 - Installation

#### 1.1 - Checks

- Check that the material of the valve body is chemically compatible with the fluid.
- Check that the pressure and service conditions are compatible with the (P, T) diagram of the valve. See § "Service limits"
- Check that the fluid is clean and free of particles. The latter could scratch the ball and damage the seats, hence causing the valve to leak. If need be, install an upstream filter.
- Check that there is no risk of thermal expansion of the fluid, which could damage the seats. In the open position, a hole at the top of the ball balances the pressures between the body cavity and the flow of the fluid. As an option, we recommend a relief hole upstream of the valve for equalising the pressures for fluids such as ammonia, LPG, chlorine, etc.
- Check that the valve is not used for flow or pressure control since it is not intended for this use and there is a risk of premature wear of the seats, in particular in the event of high pressure and/or temperature. For this special application, preferably use our "V-port" version with a V-shaped hole in the ball. Please contact us.
- Check that the valve is not used on a gas which might condense at certain times during the process. In such a case, the pressure within the body cavity could become negative, which could lead to a significant deformation of the seats. Please contact us.
- Static electricity: the valve will be supplied with a ball-stem-body internal electrical continuity tester. If the service conditions require the electrical continuity of the installation, check its earthing.
- If the valve is installed in an explosive zone, you must follow the additional "IMEVMATEX" instructions.

#### 1.2 - Storage before installation

- Follow our general "IMESTOCK" instructions for storage.

#### 1.3 - Installation

- Before any installation, isolate the piping upstream and downstream, depressurize the piping and bring the installation to ambient temperature. Carefully clean the piping of any particle (foreign body, dust, rust, etc.) or shavings by water rinsing or air blowing.
- Remove the protective tips from the valve ends.
- Check the cleanliness of the internal surfaces of the valve and if need be, clean them.
- Direction of mounting: the valves do not have a preferred direction of mounting, unless a relief hole was drilled into the ball.
- Check the perfect alignment and the proper support of the pipe installation upstream and downstream of the valve. Alignment defects cause mechanical deformations which can block the valve or lead to leaks at the body gaskets.

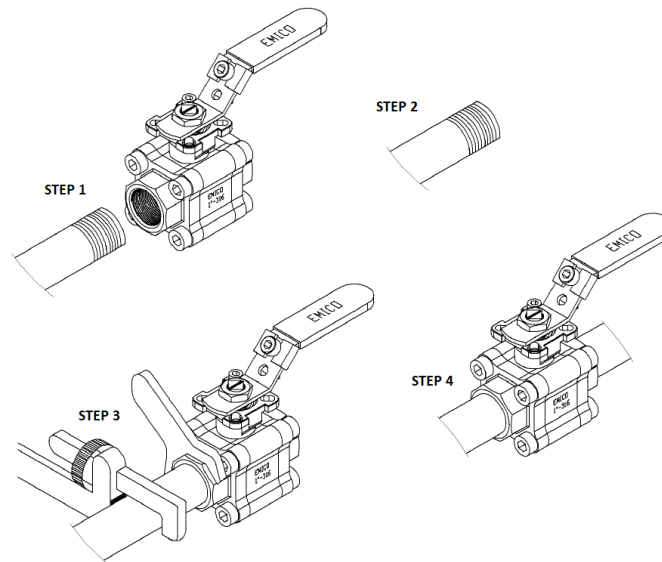
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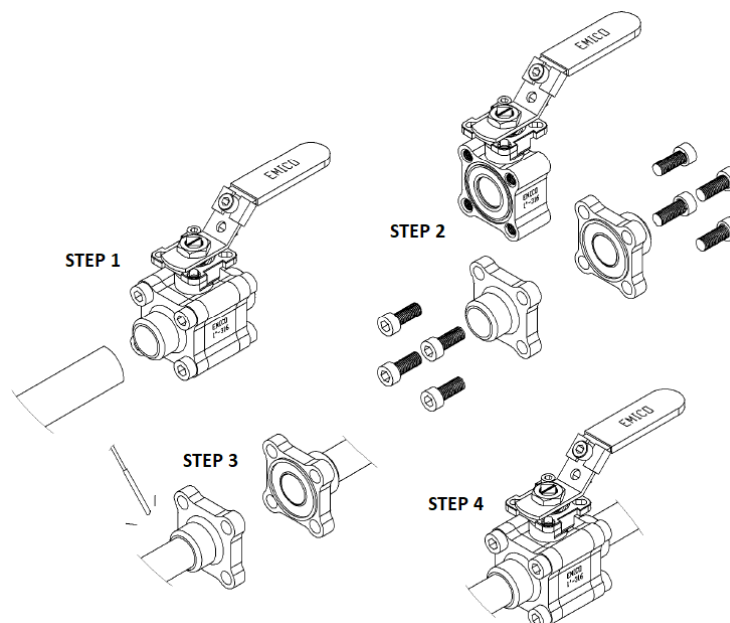
### ○ Threaded valve connection:

- Check that the standards for the valve internal thread and pipe thread are the same.
- Cover the pipe threads using a sealing material (tow, PTFE tape, sealing glue, etc.) which is suitable for the fluids.
- Screw the tube into the valve end clockwise, as shown in the diagram below.
- Check the sealing of the connection using a suitable test (hydrostatic test or leak detection spray).



### ○ Connection of weld-on valves:

- Remove the end (items 2) by unscrewing the tie-bolts, and remove the central body.
- Weld each end onto the upstream or downstream pipe, following the alignment of the tie-bolt holes.
- Cool down to the room temperature the welded ends, then put back the central body complying with the tightening torques shown in the table below.
- Check the sealing of the connection using a suitable test (hydrostatic test or leak detection spray).



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- Hydraulic test of the installation
  - Valves were tested at the factory at 1.5 x WP.
  - If a hydrostatic test is carried out on the installation, do not exceed the authorised pressure.

## 2 - Service

- If a hot fluid flows across the valve, do not touch the valve surface.
- Always operate the valve slowly and smoothly.
- Opening clockwise, closing anti-clockwise.

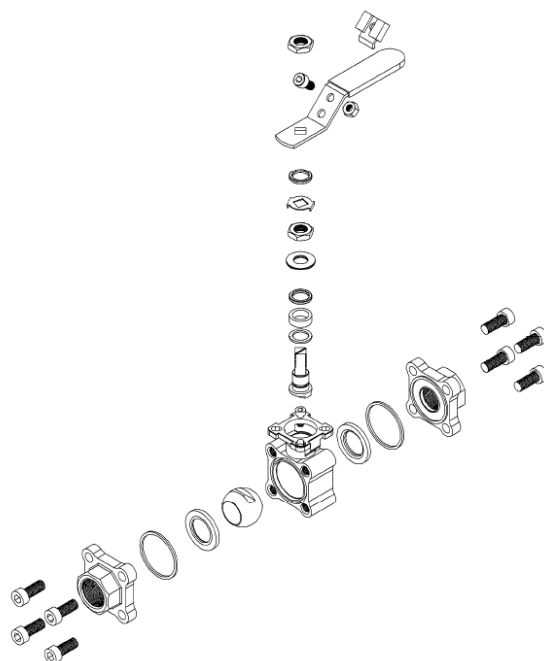
## 3 - Servicing

### 3.1 - Frequency of servicing

- The servicing frequency depends upon the use of the valve, of the type of fluid, of its velocity, of its frequency of operation, of the cycles of rise and fall in pressure and temperature.
- Before any intervention, isolate the upstream and downstream pipe installation using the valves provided for this purpose. Depressurize the pipe installation and bring it to ambient temperature.
- If the lever has to be removed, do that before disassembling the body.
- To remove the central body, unscrew the tie-bolts symmetrically. Then gently remove the central part avoiding to drop the ball.
- To remove the ball from the body, turn the stem by a quarter turn.

### 3.2 – Inspecting the state of the valve and possible repair

- Check the state of the ball (Item 4): it has to be clean and unscratched. If the cleaning or polishing is not possible, replace it (see the § on spare parts).
- Check the state of the seats (3.1 and 3.2): they must not be deformed, nor scratched, nor worn, or dirty. Otherwise, replace them with parts from the gasket kit.
- Check the state of the packing gland (7, 8, 9 and 16): no leak at the stem should be found, and the rings should not be excessively worn. If need be, replace the gaskets.
- Check the state of the body gaskets (6.1 and 6.2). Replace them if necessary.
- Reassemble the different parts of the valve, following the tightening torques shown in the table below.
- Check that the stem manoeuvring is smooth. Perform about ten manoeuvres.



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# 702-703 XS-P BALL VALVE WITH AP-RE PNEUMATIC ACTUATOR

**TABLE OF THE TIGHTENING TORQUES OF THE TIE-BOLTS AND OF THE LEVER NUT**

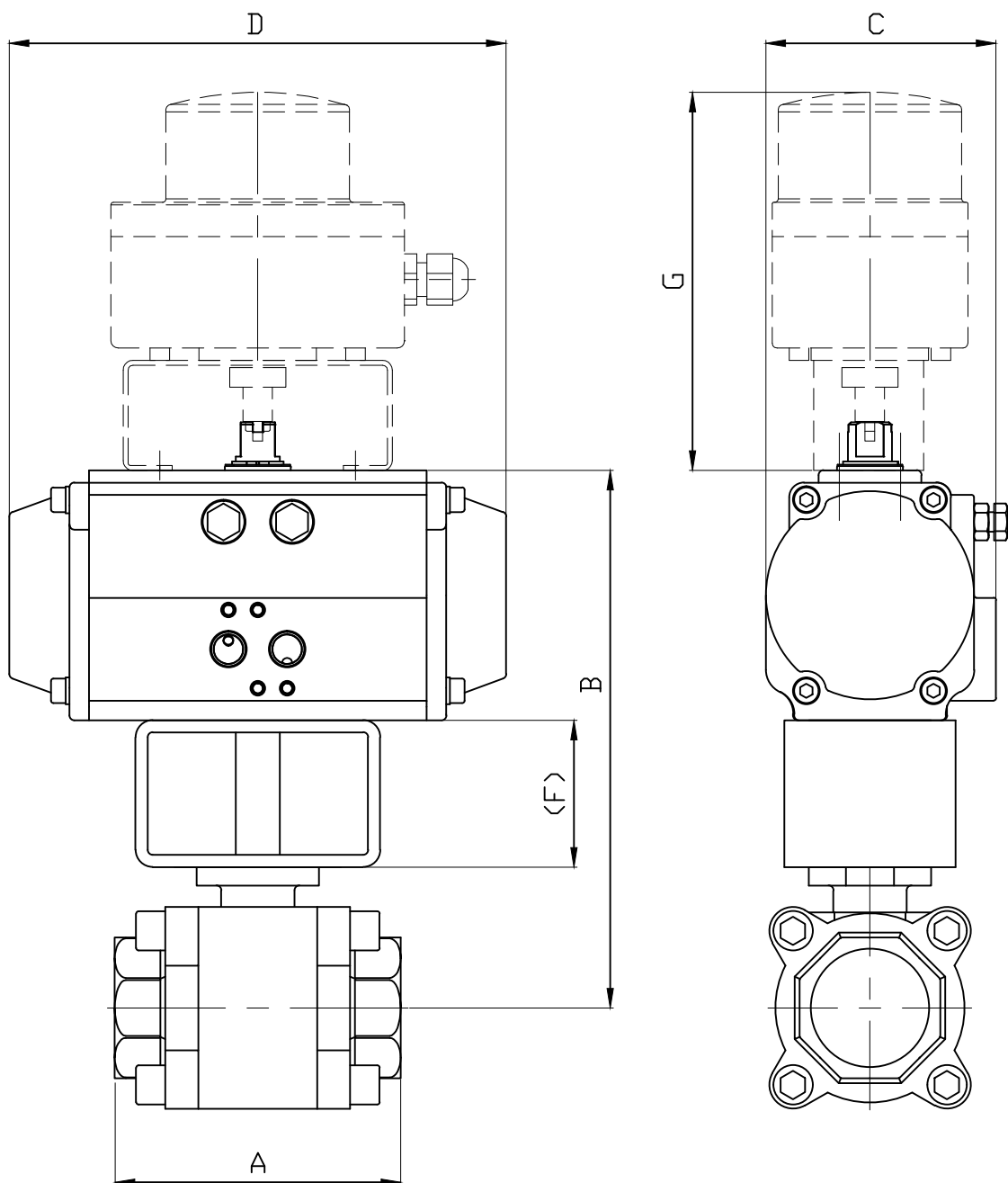
| DN         | Thread | Torque (Nm) | Lever nut (Nm) |
|------------|--------|-------------|----------------|
| 1/2" - 15  | M8     | 22          | 4              |
| 3/4" - 20  | M8     | 22          | 4              |
| 1" - 25    | M10    | 40          | 4.5            |
| 1"1/4 - 32 | M12    | 100         | 4.5            |
| 1"1/2 - 40 | M12    | 100         | 5.5            |
| 2" - 50    | M12    | 100         | 5.5            |

**SPARE PARTS**

| DN             | PTFE-STAINLESS STEEL gasket kit | PEEK gasket kit | Ball   | V30° ball | V60° ball | Lever  |
|----------------|---------------------------------|-----------------|--------|-----------|-----------|--------|
| Reference mark | 3-6-7-8-16                      | 3-6-7-8-16      | 4      | 4         | 4         | 11     |
| 1/2" - 15      | 982712                          | 982722          | 980032 | 980042    | 980052    | 982802 |
| 3/4" - 20      | 982713                          | 982723          | 980033 | 980043    | 980053    | 982802 |
| 1" - 25        | 982714                          | 982724          | 980034 | 980044    | 980054    | 982804 |
| 1"1/4 - 32     | 982715                          | 982725          | 980035 | 980045    | 980055    | 982804 |
| 1"1/2 - 40     | 982716                          | 982726          | 980036 | 980046    | 980056    | 982806 |
| 2" - 50        | 982717                          | 982727          | 980037 | 980047    | 980057    | 982806 |

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| DN      | 1/2"  |       | 3/4"  |       | 1"   |        | 1 1/4" |        | 1 1/2" |        | 2"    |        |
|---------|-------|-------|-------|-------|------|--------|--------|--------|--------|--------|-------|--------|
| ALPHAIR | RE51  | RES76 | RE64  | RES76 | RE86 | RES101 | RE86   | RES101 | RE101  | RES116 | RE126 | RES146 |
| A       | 75    |       | 80    |       | 90   |        | 110    |        | 120    |        | 140   |        |
| B       | 171.3 | 204.3 | 190.8 | 206.8 | 226  | 241    | 231.2  | 246.2  | 260.5  | 279    | 300.4 | 339.9  |
| C       | 75    | 94    | 86    | 94    | 104  | 120    | 104    | 120    | 120    | 134    | 144.5 | 164.5  |
| D       | 138   | 203   | 155   | 203   | 239  | 261    | 239    | 261    | 261    | 304    | 333   | 398    |
| F       | 60    |       | 60    |       | 60   |        | 60     |        | 60     |        | 60    |        |
| G       | 135   |       | 135   |       | 135  |        | 135    |        | 135    | 145    | 145   | 145    |
| KG      | 2.54  | 4.7   | 3.3   | 4.9   | 6.54 | 9.2    | 7.47   | 10.1   | 10.44  | 14.7   | 18.6  | 28.1   |

Informations données à titre indicatif et sous réserve de modifications éventuelles  
data subject to alteration

| Ech: /                                                                                                                                                                                      | Date :12/07/2019 | Dessiné par : E.D. | Tolérances générales : +/- 0.2 | Modifications       | Date | REV. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|--------------------------------|---------------------|------|------|
| <b>ROBINET A TOURNANT SPHERIQUE 702XS-703XS</b><br><b>PEEK/BALL VALVE 702XS-703XS PEEK +</b><br><b>ACTIONNEUR ALPHAIR RE/PNEUMATIC ACTUATOR</b><br><b>ALPHAIR RE + BFC/LIMIT SWITCH BOX</b> |                  |                    |                                | Matière :           |      |      |
|                                                                                                                                                                                             |                  |                    |                                | Poids <Kg> :        |      |      |
|                                                                                                                                                                                             |                  |                    |                                | Traitement : SANS   |      |      |
|                                                                                                          |                  |                    |                                | 45, Rue du Ruisseau |      |      |
| 38297 SAINT QUENTIN FALLAVIER                                                                                                                                                               |                  |                    |                                | Plan n° Ens 1365    |      |      |



# RE SERIES

**PNEUMATIC ACTUATORS  
WITH EXTERNAL ADJUSTMENT**

**ROTATION 90°**



English edition



**Alphaair**



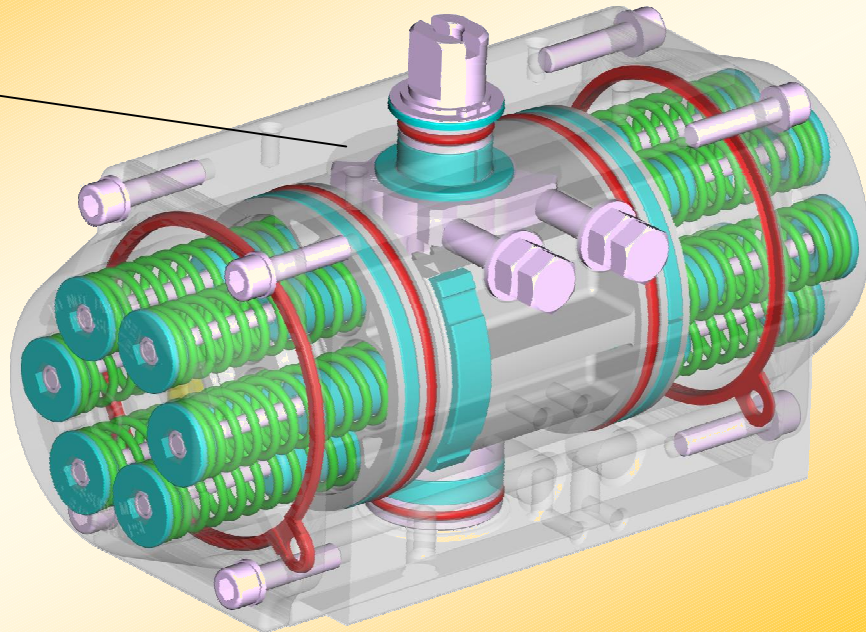
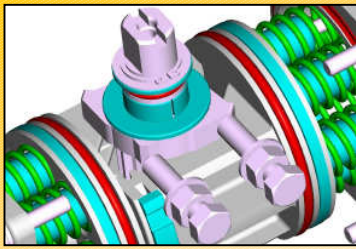
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**2017**

# ALPHAIR PNEUMATIC ACTUATORS

## EXTERNAL ADJUSTMENT

### New "RE" SERIES



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

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

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

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

#### STANDARD VERSION FEATURES

- **EN AW 6063 extruded aluminium Body**, inside surface finishing Ra= 0,4-0,6. 25 µ Hard Anodizing.
- **EN AB 46100 die-cast aluminium alloy Pistons**, 15 micron Anodizing.
- **EN AB 46100 die-cast aluminium alloy Covers**, painted with 60-80 µ polyester powder.
- **Carbon steel Shaft**, 20 µ nickel-plated. Stainless Steel AISI 304 (A2) or AISI 316 (A4) as Optional.
- **External adjusting gear, made of Stainless Steel AISI 316 (A4).**
- **AISI 316 (A4) Stainless Steel Screws.**
- **NBR nitrile rubber seals.** FPM/FKM or SILICONE on request.
- Acetalic resin + 20% PTFE bearings, for low friction, easily replaceable for maintenance. PA66 or LEXAN on request.
- Pre-compressed Spring Cartridges, easily replaceable for maintenance, 60-80 micron polyester painted.
- High performances Syntetic Grease as standard grease. Special grease supplied for HIGH/LOW/VERY LOW temperatures.
- Several special protections available for chemical, pharmaceutical, food and industrial environments.
- Rotation adjustment  $\pm 5^\circ$  in both opening and closing position. Assembly precision  $\pm 1^\circ$ , 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 ( $0^\circ$ ) and diagonal key ( $45^\circ$ ).
- Solenoid connections according to NAMUR VDI/VDE-3845 Standards.
- Top drilling for accessories fastening, and upper shaft end according to NAMUR VDI/VDE-3845 Standards.
- Position indicator on request, enabling switch-box assembly on top.
- Aluminium adhesive nameplates, with progressive serial number punched.
- Lubrication carried out by the manufacturer, guaranteed for min. 1.000.000 operations.
- Running test and 100% seal test carried out with electronic equipment and certification of every individual product.
- Standard execution for temperatures from  $-20^\circ\text{C}$  to  $+80^\circ\text{C}$  (optional, special execution for extreme temperatures).
- Conformity for use in explosive environment; Ex II 2 GD "c" protection type.
- According to EN 15714-3 design and manufacture standard requirements.

| FEEDING                                               | TEMPERATURE RANGE                                                                                                                                                                                                                                                                                                  | SUPPLY PRESSURE                                                  | ROT. ADJUSTMENT                                          |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------|
| Dry or lubricated<br>50 um filtered<br>compressed air | Standard $-20^\circ +80^\circ\text{C}$ ( $-4 +175^\circ\text{F}$ )<br>HIGH Temperature $-20^\circ +150^\circ\text{C}$ ( $-4 +300^\circ\text{F}$ )<br>LOW Temperature $-40^\circ +80^\circ\text{C}$ ( $-40 +175^\circ\text{F}$ )<br>VERY LOW Temperature $-60^\circ +80^\circ\text{C}$ ( $-76 +175^\circ\text{F}$ ) | 8 bar/120 psi<br>Continuous working<br>10 bar/142 psi<br>MAXIMUM | $\pm 5^\circ$<br>in both OPENING<br>and CLOSING position |

# DOUBLE ACTING TORQUES IN Nm

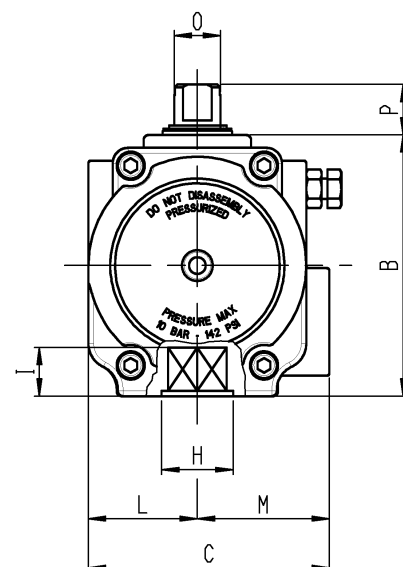
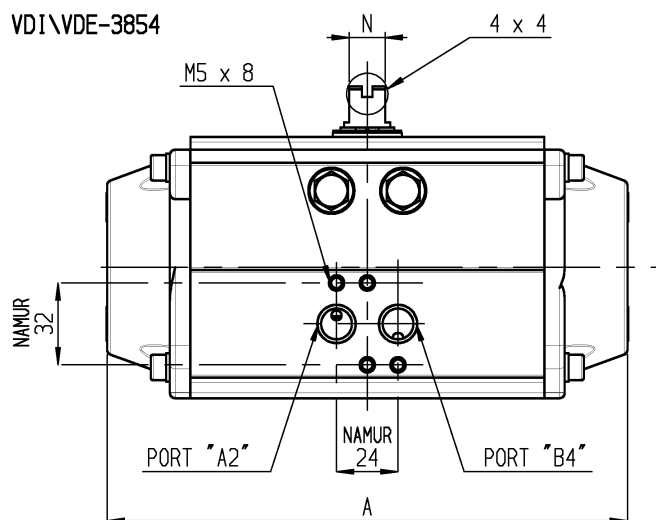
| TYPE   | AIR SUPPLY PRESSURE (bar) |       |       |       |       |       |       |       |       |       |
|--------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|        | 1                         | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |
| RE 043 | -                         | -     | 6,5   | 8,7   | 10,9  | 13,0  | 15,2  | 17,3  | 19,5  | 21,7  |
| RE 051 | 3,3                       | 6,7   | 10,0  | 13,4  | 16,7  | 20,1  | 23,4  | 26,8  | 30,1  | 33,5  |
| RE 064 | 5,9                       | 11,8  | 17,8  | 23,7  | 29,6  | 35,5  | 41,4  | 47,4  | 53,3  | 59,2  |
| RE 076 | 11,8                      | 23,5  | 35,3  | 47,1  | 58,9  | 70,6  | 82,4  | 94,2  | 105,9 | 117,7 |
| RE 086 | 17,2                      | 34,5  | 51,7  | 68,9  | 86,1  | 103,4 | 120,6 | 137,8 | 155,0 | 172,3 |
| RE 101 | 27,5                      | 54,9  | 82,4  | 109,8 | 137,3 | 164,8 | 192,2 | 219,7 | 247,1 | 274,6 |
| RE 116 | 43,7                      | 87,4  | 131,1 | 174,9 | 218,6 | 262,3 | 306,0 | 349,7 | 393,4 | 437,1 |
| RE 126 | 56,6                      | 113,3 | 169,9 | 226,5 | 283,2 | 339,8 | 396,4 | 453,0 | 509,7 | 566,3 |
| RE 146 | 88,4                      | 176,7 | 265,1 | 353,4 | 441,8 | 530,1 | 618,5 | 706,9 | 795,2 | 883,6 |
| RE 161 | 114,9                     | 229,7 | 344,6 | 459,5 | 574,3 | 689,2 | 804,1 | 918,9 | 1034  | 1149  |
| RE 181 | 156,6                     | 313,1 | 469,7 | 626,3 | 782,9 | 939,4 | 1096  | 1253  | 1409  | 1565  |
| RE 201 | 215,3                     | 430,6 | 646,0 | 861,3 | 1077  | 1292  | 1507  | 1723  | 1938  | 2153  |
| RE 241 | 372,5                     | 745,0 | 1118  | 1490  | 1863  | 2235  | 2608  | 2980  | 3353  | 3725  |
| RE 271 | 539,2                     | 1078  | 1617  | 2157  | 2696  | 3235  | 3774  | 4314  | 4853  | 5392  |
| RE 331 | 911,5                     | 1823  | 2734  | 3646  | 4558  | 5469  | 6385  | 7292  | 8204  | 9115  |
| RE 421 | 1671                      | 3342  | 5013  | 6684  | 8354  | 10025 | 11696 | 13367 | -     | -     |

# SINGLE ACTING TORQUES IN Nm

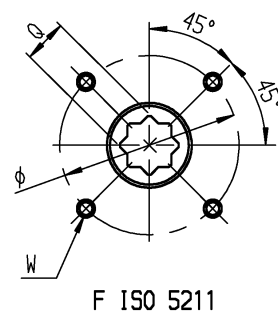
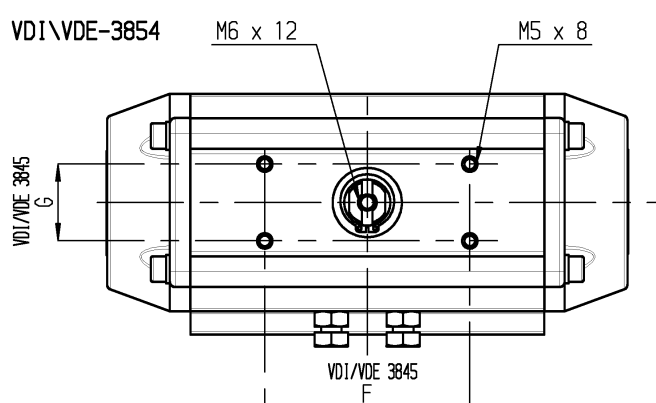
| TYPE          | SPRING SET | AIR SUPPLY PRESSURE (bar) |       |       |        |       |       |       |       |       |       |       |       | SPRING TORQUE     |       |
|---------------|------------|---------------------------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------|-------|
|               |            | 3                         |       | 4     |        | 5     |       | 6     |       | 7     |       | 8     |       |                   |       |
|               |            | 0°                        | 90°   | 0°    | 90°    | 0°    | 90°   | 0°    | 90°   | 0°    | 90°   | 0°    | 90°   | 90°               | 0°    |
| RE 043        | SR 3/3     | -                         | -     | -     | -      | 7,1   | 4,1   | 9,3   | 6,3   | 11,5  | 8,5   | 13,7  | 10,7  | 6,8               | 3,8   |
|               | SR 4/4     | -                         | -     | -     | -      |       |       | 8,1   | 4,1   | 10,2  | 6,2   | 12,4  | 8,4   | 9,0               | 5,0   |
| RE 051        | SR 3/3     | 5,8                       | 4,3   | 9,1   | 7,6    | 12,5  | 10,9  | 15,8  | 14,3  | 19,2  | 17,6  | 22,5  | 21,0  | 5,8               | 4,3   |
|               | SR 4/4     | 4,4                       | 2,3   | 7,8   | 5,7    | 11,1  | 9,0   | 14,4  | 12,3  | 17,8  | 15,7  | 21,1  | 19,0  | 7,8               | 5,7   |
|               | SR 5/5     |                           |       | 6,3   | 3,7    | 9,7   | 7,1   | 13,0  | 10,4  | 16,4  | 13,8  | 19,7  | 17,1  | 9,7               | 7,1   |
|               | SR 6/6     |                           |       |       |        | 8,2   | 5,1   | 11,6  | 8,5   | 14,9  | 11,8  | 18,3  | 15,2  | 11,6              | 8,5   |
| RE 064        | SR 3/3     | 10,7                      | 7,1   | 16,6  | 13,0   | 22,5  | 18,9  | 28,5  | 24,8  | 34,4  | 30,8  | 40,3  | 36,7  | 10,7              | 7,1   |
|               | SR 4/4     | 8,4                       | 3,5   | 14,3  | 9,4    | 20,2  | 15,4  | 26,1  | 21,3  | 32,0  | 27,2  | 38,0  | 33,1  | 14,3              | 9,4   |
|               | SR 5/5     |                           |       | 11,9  | 5,9    | 17,8  | 11,8  | 23,8  | 17,7  | 29,7  | 23,6  | 35,6  | 29,6  | 17,8              | 11,8  |
|               | SR 6/6     |                           |       |       |        | 15,5  | 8,2   | 21,4  | 14,1  | 27,3  | 20,1  | 33,2  | 26,0  | 21,4              | 14,1  |
| RE 076        | SR 3/3     | 21,1                      | 14,3  | 32,8  | 26,0   | 44,6  | 37,8  | 56,4  | 49,6  | 68,1  | 61,3  | 79,9  | 73,1  | 21,1              | 14,3  |
|               | SR 4/4     | 16,3                      | 7,2   | 28,1  | 19,0   | 39,8  | 30,8  | 51,6  | 42,5  | 63,4  | 54,3  | 75,2  | 66,1  | 28,1              | 19,0  |
|               | SR 5/5     |                           |       | 23,3  | 12,0   | 35,1  | 23,8  | 46,9  | 35,5  | 58,6  | 47,3  | 70,4  | 59,1  | 35,1              | 23,8  |
|               | SR 6/6     |                           |       |       |        | 30,3  | 16,7  | 42,1  | 28,5  | 53,9  | 40,3  | 65,6  | 52,0  | 42,1              | 28,5  |
| RE 086        | SR 3/3     | 33,8                      | 17,8  | 51,1  | 35,1   | 68,3  | 52,3  | 85,5  | 69,5  | 102,7 | 86,7  | 120,0 | 104,0 | 33,8              | 17,8  |
|               | SR 4/4     | 27,9                      | 6,6   | 45,1  | 23,8   | 62,3  | 41,0  | 79,6  | 58,2  | 96,8  | 75,5  | 114,0 | 92,7  | 45,1              | 23,8  |
|               | SR 5/5     |                           |       | 39,2  | 12,5   | 56,4  | 29,7  | 73,6  | 47,0  | 90,8  | 64,2  | 108,1 | 81,4  | 56,4              | 29,7  |
|               | SR 6/6     |                           |       |       |        | 50,4  | 18,5  | 67,7  | 35,7  | 84,9  | 52,9  | 102,1 | 70,1  | 67,7              | 35,7  |
| RE 101        | SR 3/3     | 50,1                      | 32,3  | 77,5  | 59,7   | 105,0 | 87,2  | 132,5 | 114,7 | 159,9 | 142,1 | 187,4 | 169,6 | 50,1              | 32,3  |
|               | SR 4/4     | 39,3                      | 15,6  | 66,8  | 43,0   | 94,2  | 70,5  | 121,7 | 98,0  | 149,2 | 125,4 | 176,6 | 152,9 | 66,8              | 43,1  |
|               | SR 5/5     |                           |       | 56,0  | 26,4   | 83,5  | 53,8  | 110,9 | 81,3  | 138,4 | 108,7 | 165,9 | 136,2 | 83,5              | 53,8  |
|               | SR 6/6     |                           |       |       |        | 72,7  | 37,1  | 100,2 | 64,6  | 127,6 | 92,0  | 155,1 | 119,5 | 100,2             | 64,6  |
| RE 116        | SR 3/3     | 80,7                      | 50,5  | 124,4 | 94,2   | 168,1 | 137,9 | 211,8 | 181,6 | 255,5 | 225,3 | 299,3 | 269,0 | 80,7              | 50,5  |
|               | SR 4/4     | 63,9                      | 23,5  | 107,6 | 67,3   | 151,3 | 111,0 | 195,0 | 154,7 | 238,7 | 198,4 | 282,4 | 242,1 | 107,6             | 67,3  |
|               | SR 5/5     |                           |       | 90,8  | 40,4   | 134,5 | 84,1  | 178,2 | 127,8 | 221,9 | 171,5 | 265,6 | 215,2 | 134,5             | 84,1  |
|               | SR 6/6     |                           |       |       |        | 117,7 | 57,2  | 161,4 | 100,9 | 205,1 | 144,6 | 248,8 | 188,3 | 161,4             | 100,9 |
| RE 126        | SR 3/3     | 105,0                     | 64,9  | 161,6 | 121,5  | 218,2 | 178,2 | 274,9 | 234,8 | 331,6 | 291,4 | 388,1 | 348,0 | 105,0             | 64,9  |
|               | SR 4/4     | 83,3                      | 29,9  | 140,0 | 86,5   | 196,6 | 143,2 | 253,2 | 199,8 | 309,9 | 256,4 | 366,5 | 313,0 | 140,0             | 86,6  |
|               | SR 5/5     |                           |       | 118,3 | 51,5   | 175,0 | 108,2 | 231,6 | 164,8 | 288,2 | 221,4 | 344,8 | 278,1 | 175,0             | 108,2 |
|               | SR 6/6     |                           |       |       |        | 153,3 | 73,2  | 210,0 | 129,8 | 266,6 | 186,4 | 323,2 | 243,1 | 210,0             | 129,8 |
| RE 146        | SR 3/3     | 162,5                     | 102,6 | 250,8 | 190,9  | 339,2 | 279,3 | 427,5 | 367,7 | 515,9 | 456,0 | 604,3 | 544,4 | 162,5             | 102,6 |
|               | SR 4/4     | 128,3                     | 48,4  | 216,6 | 136,8  | 305,0 | 225,1 | 393,3 | 313,5 | 481,7 | 401,9 | 570,1 | 490,2 | 216,6             | 136,8 |
|               | SR 5/5     |                           |       | 182,4 | 82,6   | 270,8 | 171,0 | 359,1 | 259,3 | 447,5 | 347,7 | 535,9 | 436,0 | 270,8             | 171,0 |
|               | SR 6/6     |                           |       |       |        | 236,6 | 116,8 | 324,9 | 205,2 | 413,3 | 293,5 | 501,7 | 381,9 | 325,0             | 205,2 |
| RE 161        | SR 3/3     | 202,7                     | 141,9 | 317,5 | 256,8  | 432,4 | 371,6 | 547,3 | 486,5 | 662,1 | 601,4 | 777,0 | 716,2 | 202,7             | 141,9 |
|               | SR 4/4     | 155,3                     | 74,3  | 270,2 | 189,2  | 385,1 | 304,1 | 499,9 | 418,9 | 614,8 | 533,8 | 729,7 | 648,7 | 270,2             | 189,2 |
|               | SR 5/5     |                           |       | 222,9 | 121,6  | 337,8 | 236,5 | 452,6 | 351,4 | 567,5 | 466,2 | 682,4 | 581,1 | 337,8             | 236,5 |
|               | SR 6/6     |                           |       |       |        | 290,4 | 168,9 | 405,3 | 283,8 | 520,2 | 398,6 | 635,0 | 513,5 | 405,3             | 283,8 |
| RE 181        | SR 3/3     | 281,6                     | 188,2 | 438,1 | 344,7  | 594,7 | 501,3 | 751,3 | 657,9 | 907,8 | 814,5 | 1064  | 971,0 | 281,5             | 188,2 |
|               | SR 4/4     | 218,8                     | 94,3  | 375,4 | 250,9  | 532,0 | 407,5 | 688,5 | 564,0 | 845,1 | 720,6 | 1002  | 877,2 | 375,4             | 250,9 |
|               | SR 5/5     |                           |       | 312,7 | 157,0  | 469,3 | 313,6 | 625,8 | 470,2 | 782,4 | 626,8 | 939,0 | 783,3 | 469,3             | 313,6 |
|               | SR 6/6     |                           |       |       |        | 406,5 | 219,8 | 563,1 | 376,3 | 719,7 | 532,9 | 876,2 | 689,5 | 563,1             | 376,3 |
| RE 201        | SR 3/3     | 386,2                     | 259,8 | 601,5 | 475,13 | 816,8 | 690,5 | 1032  | 905,8 | 1247  | 1121  | 1436  | 1336  | 386,2             | 259,8 |
|               | SR 4/4     | 299,6                     | 131,1 | 514,9 | 46,4   | 730,2 | 561,8 | 945,5 | 777,1 | 1160  | 992,4 | 1376  | 1208  | 514,9             | 346,4 |
|               | SR 5/5     |                           |       | 428,3 | 217,7  | 643,6 | 433,0 | 858,9 | 648,4 | 1074  | 863,7 | 1290  | 1079  | 643,6             | 433,0 |
|               | SR 6/6     |                           |       |       |        | 557,0 | 304,3 | 772,3 | 519,6 | 987,6 | 735,0 | 1203  | 950,3 | 772,3             | 519,6 |
| RE 241        | SR 3/3     | 664,0                     | 453,6 | 1037  | 826,2  | 1409  | 1199  | 1782  | 1571  | 2154  | 1944  | 2527  | 2316  | 664,0             | 453,6 |
|               | SR 4/4     | 521,8                     | 232,3 | 885,4 | 604,8  | 1258  | 977,4 | 1630  | 1350  | 2003  | 1722  | 2376  | 2095  | 885,4             | 604,8 |
|               | SR 5/5     |                           |       | 734,2 | 383,5  | 1107  | 756,0 | 1479  | 1129  | 1852  | 1501  | 2224  | 1874  | 1107              | 756,0 |
|               | SR 6/6     |                           |       |       |        | 955,5 | 534,7 | 1328  | 907,2 | 1701  | 1280  | 2073  | 1653  | 1328              | 907,2 |
| RE 271        | SR 3/3     | 912,5                     | 705,1 | 1452  | 1244   | 1991  | 1783  | 2530  | 2323  | 3069  | 2862  | 3608  | 3401  | 912,5             | 705,1 |
|               | SR 4/4     | 677,5                     | 400,8 | 1217  | 940,2  | 1756  | 1479  | 2295  | 2019  | 2834  | 2558  | 3373  | 3097  | 1217              | 940,1 |
|               | SR 5/5     |                           |       | 981,7 | 635,8  | 1521  | 1175  | 2060  | 1714  | 2599  | 2144  | 3138  | 2793  | 1521              | 1175  |
|               | SR 6/6     |                           |       |       |        | 1286  | 871,0 | 1825  | 1410  | 2364  | 1954  | 2903  | 2489  | 1825              | 1410  |
| RE 331        | SR 3/3     | 1626                      | 1108  | 2538  | 2020   | 3450  | 2931  | 4361  | 3843  | 5273  | 4755  | 6184  | 5666  | 1626              | 1108  |
|               | SR 4/4     | 1257                      | 565,8 | 2168  | 1477   | 3080  | 2389  | 3992  | 3301  | 4903  | 4212  | 5815  | 5123  | 2168              | 1477  |
|               | SR 5/5     |                           |       | 1799  | 935,2  | 2711  | 1847  | 3622  | 2759  | 4534  | 3670  | 5445  | 4582  | 2711              | 1847  |
|               | SR 6/6     |                           |       |       |        | 2341  | 1305  | 3253  | 2216  | 4165  | 3128  | 5076  | 4040  | 3253              | 2216  |
| RE 421        | SR 3/3     | 2999                      | 2014  | 4670  | 3685   | 6340  | 5356  | 8011  | 7026  | 9682  | 8697  | 11353 | 10368 | 2999              | 2014  |
|               | SR 4/4     | 2327                      | 1014  | 3998  | 2685   | 5669  | 4356  | 7340  | 6027  | 9011  | 7698  | 9369  | 8369  | 3998              | 2685  |
|               | SR 5/5     |                           |       | 3327  | 1685   | 4998  | 3356  | 6669  | 5027  | 8340  | 6698  | 8369  | 8369  | 4998              | 3356  |
|               | SR 6/6     |                           |       |       |        | 4327  | 2357  | 5997  | 4028  | 7668  | 5698  | 7369  | 7369  | 5997              | 4028  |
| Torque by air |            |                           |       |       |        |       |       |       |       |       |       |       |       | Torque by springs |       |

# DIMENSIONS – European Sizes in millimetres

VDI/VDE-3854



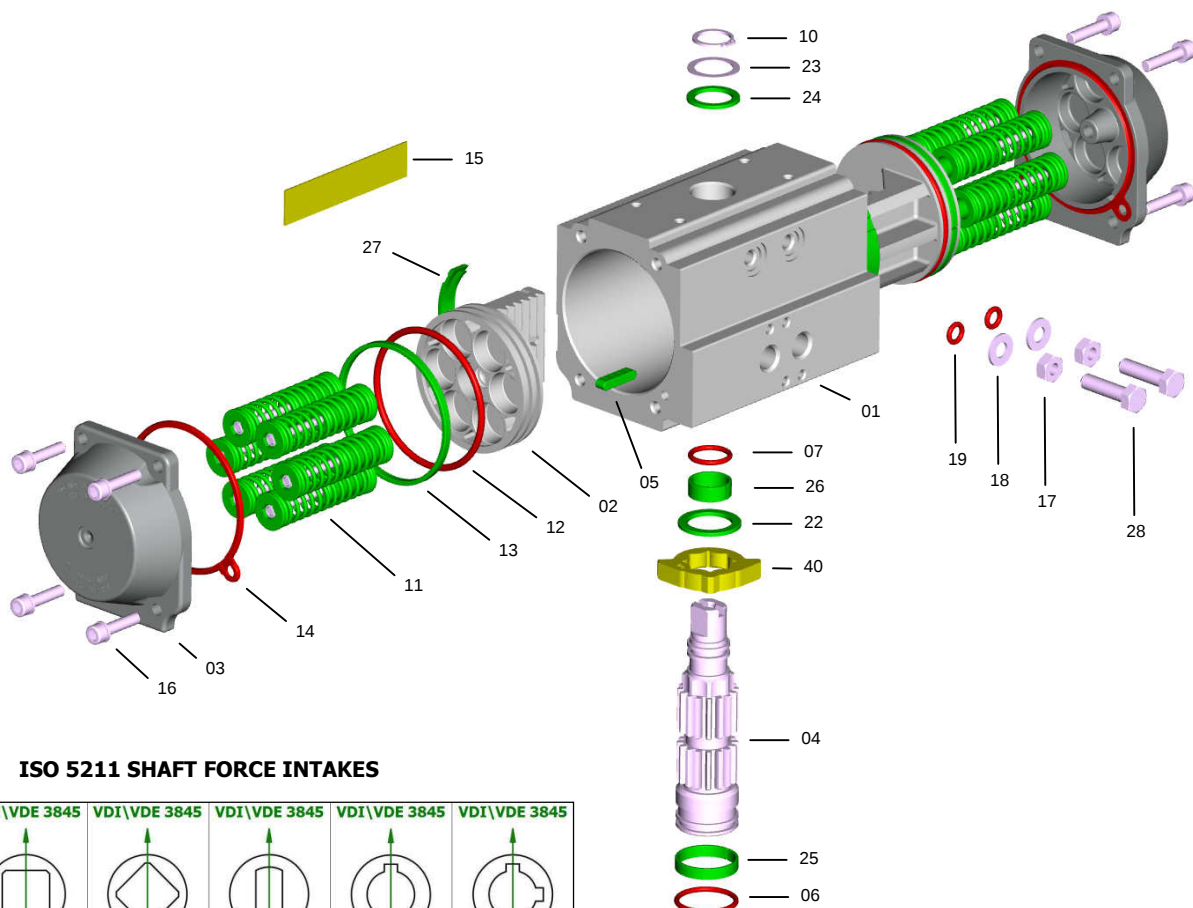
VDI/VDE-3854



| POSITION                    | TYPE               |                   |                              |                               |                    |                               |                     |                               |                    |                    |                    |                    |                    |                    |                     |                     |  |
|-----------------------------|--------------------|-------------------|------------------------------|-------------------------------|--------------------|-------------------------------|---------------------|-------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|--|
|                             | RE 043             | RE 051            | RE 064                       | RE 076                        | RE 086             | RE 101                        | RE 116              | RE 126                        | RE 146             | RE 161             | RE 181             | RE 201             | RE 241             | RE 271             | RE 331              | RE 421              |  |
| A                           | 141                | 138               | 155                          | 203                           | 239                | 261                           | 304                 | 333                           | 398                | 424                | 482                | 528                | 604                | 684                | 850                 | 940                 |  |
| B                           | 62                 | 69                | 86                           | 102                           | 112                | 127                           | 145,5               | 157,5                         | 177                | 196                | 220                | 246                | 298                | 332                | 414                 | 542                 |  |
| C                           | 63,5               | 75                | 86                           | 94                            | 104                | 120                           | 133,5               | 144,5                         | 164,5              | 182                | 203,5              | 222                | 300                | 352                | 400                 | 528                 |  |
| VDI/VDE<br>3845<br>F x G    | 80 x 30<br>50 x 25 | 80 x 30           |                              |                               |                    |                               | 80 x 30<br>130 x 30 |                               | 130 x 30           |                    |                    |                    |                    |                    | 200 x 50            |                     |  |
| L                           | 27                 | 33,5              | 38                           | 42,5                          | 49                 | 55                            | 63,5                | 69,5                          | 80,5               | 89                 | 99,5               | 110                | 150                | 176                | 190                 | 234                 |  |
| M                           | 36,5               | 41,5              | 48                           | 51,5                          | 55                 | 65                            | 70                  | 75                            | 84                 | 93                 | 104                | 112                | 150                | 176                | 210                 | 294                 |  |
| Port A<br>Port B<br>DIN 259 | 1/8" GAS-NPT       |                   | 1/4" GAS-NPT                 |                               |                    |                               |                     |                               |                    |                    |                    |                    | 1/2" GAS-NPT       |                    |                     |                     |  |
| N x O                       | 8 x 12             |                   |                              | 14 x 18                       |                    |                               | 27 x 36             |                               |                    |                    | 32 x 42            |                    | 42 x 60            | 55 x 80            |                     |                     |  |
| P                           | 20                 |                   |                              |                               |                    |                               | 30                  |                               |                    | 50                 |                    |                    |                    |                    |                     | 80                  |  |
| Q x I                       | 9 x 10<br>11 x 13  | 9 x 10<br>11 x 13 | 9 x 10<br>11 x 13<br>14 x 16 | 11 x 13<br>14 x 16<br>17 x 20 | 14 x 16<br>17 x 20 | 14 x 16<br>17 x 20<br>22 x 25 | 17 x 20<br>22 x 25  | 17 x 20<br>22 x 25<br>27 x 29 | 22 x 25<br>27 x 29 | 22 x 25<br>27 x 29 | 27 x 29<br>36 x 39 | 27 x 29<br>36 x 39 | 36 x 39<br>46 x 50 | 36 x 39<br>46 x 50 | *46 x 50<br>55 x 60 | *55 x 60<br>75 x 80 |  |
| F ISO 5211                  | F04                | F04               | F05/07                       | F05/07                        | F05/07             | F07/10                        | F07/10              | F07/10                        | F10/12             | F10/12             | F10/12             | F14                | F14                | F16                | F16/25              | F25/30              |  |
| Optional                    | F03/05             | F03/05            | F3/5/7                       |                               |                    | F5/7/10                       |                     | F7/10/12                      |                    |                    | F14                | F10/12             | F(12)/16           | F(12)/16           |                     | F(16)               |  |
| Volume DE                   | 0,180 lt           | 0,300 lt          | 0,500 lt                     | 0,700 lt                      | 1,000 lt           | 1,800 l                       | 2,900 lt            | 3,700 lt                      | 6,100 lt           | 7,900 lt           | 11,2 lt            | 14,4 lt            | 19,2 lt            | 32,2 lt            | 62,8 lt             | 131 lt              |  |
| Volume SE                   | 0,072 lt           | 0,120 lt          | 0,200 lt                     | 0,280 lt                      | 0,400 lt           | 0,720 l                       | 1,160 lt            | 1,480 lt                      | 2,440 lt           | 3,160 lt           | 4,480 lt           | 5,760 lt           | 7,680 lt           | 12,9 lt            | 25,1 lt             | 52,4 lt             |  |

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

# CONSTRUCTION PARTS – SPECIFICATIONS



ISO 5211 SHAFT FORCE INTAKES

| VDI\UDE 3845                   | VDI\UDE 3845 | VDI\UDE 3845 | VDI\UDE 3845 | VDI\UDE 3845 | VDI\UDE 3845 |
|--------------------------------|--------------|--------------|--------------|--------------|--------------|
|                                |              |              |              |              |              |
| STANDARD<br>ALPHAIR<br>S = L\D | L            | D            | H            | V            | W            |

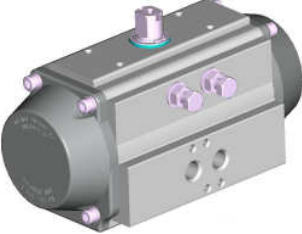
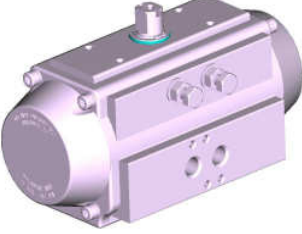
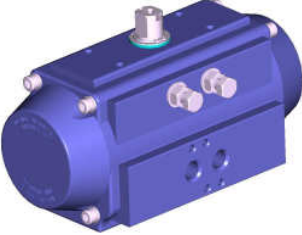
| PART | QUANTITY | DESCRIPTION               | MATERIAL                                   | SPECIFICATION                                | PROTECTION |
|------|----------|---------------------------|--------------------------------------------|----------------------------------------------|------------|
| 1    | 1        | Body                      | Extruded aluminium alloy                   | EN AW 6063 T6                                | A - N - TF |
| 2    | 2        | Piston                    | Aluminium alloy                            | EN AB 46100 T6                               | A          |
| 3    | 2        | Cover                     | Aluminium alloy                            | EN AB 46100 T6                               | N - V - TF |
| 4    | 1        | Shaft                     | Carbon steel<br>Stainless Steel – optional | ASTM A-105<br>AISI 304 (A2)<br>AISI 316 (A4) | N          |
| 5 *  | 2        | Antiejection key          | Acetalic resin – PA66 – PA66 – LEXAN       |                                              |            |
| 6 *  | 1        | Lower shaft O-Ring        | NBR – FPM\FKM – Silicone – Silicone        |                                              |            |
| 7 *  | 1        | Upper shaft O-Ring        | NBR – FPM\FKM – Silicone – Silicone        |                                              |            |
| 10 * | 1        | Seeger ring               | Carbon steel                               |                                              | N          |
| 11   | 0 ... 12 | Spring cartridge          | Carbon steel, PA 66, Stainless Steel       | C-98                                         | V          |
| 12 * | 2        | Piston O-Ring             | NBR – FPM\FKM – Silicone – Silicone        |                                              |            |
| 13 * | 2        | Piston head bearing       | Acetalic resin – PA66 – PA66 – LEXAN       |                                              |            |
| 14 * | 2        | Cover gasket              | NBR – FPM\FKM – Silicone – 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 – Silicone        |                                              |            |
| 22 * | 1        | Gear antifriction washer  | Acetalic resin – PA66 – PA66 – LEXAN       |                                              |            |
| 23 * | 1        | Shaft thrust washer       | Stainless Steel                            | AISI 304 (A2)                                |            |
| 24 * | 1        | Shaft antifriction washer | Acetalic resin – PA66 – PA66 – LEXAN       |                                              |            |
| 25 * | 1        | Lower shaft pilot ring    | Acetalic resin – PA66 – PA66 – LEXAN       |                                              |            |
| 26 * | 1        | Upper shaft pilot ring    | Acetalic resin – PA66 – PA66 – LEXAN       |                                              |            |
| 27 * | 2        | Piston bearing            | Acetalic resin – PA66 – PA66 – LEXAN       |                                              |            |
| 28   | 2        | Adjusting gear screw      | Stainless Steel                            | AISI 304 (A2)                                |            |
| 40   | 1        | Adjusting gear            | Stainless Steel                            | AISI 316 (A4)                                |            |

\* SPARE PARTS SET: Standard, Special HIGH Temperatures, Special LOW Temperatures, Special EXTRA LOW Temperatures

## PROTECTIONS

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

## COATINGS – MATERIAL TREATMENTS

|                                                                                   |                       | DESCRIPTION                           |                                       |           |                                                                                   | APPLICATION FIELD                                                                                                    |
|-----------------------------------------------------------------------------------|-----------------------|---------------------------------------|---------------------------------------|-----------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|                                                                                   |                       | Body                                  | Covers                                | Pistons   | Shaft                                                                             |                                                                                                                      |
|  | <b>AV</b><br>standard | Anodizing                             | Polyester painting                    | Anodizing | High phosphorous nickel-plating (12%)<br>opt. AISI 304 (A2)<br>opt. AISI 316 (A4) | - Industry, general use.                                                                                             |
|                                                                                   | Colour                | Gray                                  | Gray                                  | Brown     | Polished steel                                                                    |                                                                                                                      |
|                                                                                   | Thickness             | 25 µ                                  | 60/80 µ                               | 15 µ      | 20 µ                                                                              |                                                                                                                      |
|  | <b>NN</b>             | DESCRIPTION                           |                                       |           |                                                                                   | APPLICATION FIELD                                                                                                    |
|                                                                                   |                       | Body                                  | Covers                                | Pistons   | Shaft                                                                             |                                                                                                                      |
|                                                                                   |                       | High phosphorous nickel-plating (12%) | High phosphorous nickel-plating (12%) | Anodizing | High phosphorous nickel-plating (12%)<br>opt. AISI 304 (A2)<br>opt. AISI 316 (A4) |                                                                                                                      |
|                                                                                   | Colour                | Polished steel                        | Polished steel                        | Brown     | Polished steel                                                                    | - Industry, general use.<br>- Caustic soda.<br>- Detergents.<br>- Low alkaline solutions.                            |
|                                                                                   | Thickness             | 20 µ                                  | 20 µ                                  | 15 µ      | 20 µ                                                                              |                                                                                                                      |
|  | <b>TF TF</b>          | DESCRIPTION                           |                                       |           |                                                                                   | APPLICATION FIELD                                                                                                    |
|                                                                                   |                       | Body                                  | Covers                                | Pistons   | Shaft                                                                             |                                                                                                                      |
|                                                                                   |                       | Anodizing + PTFE coating              | Anodizing + PTFE coating              | Anodizing | High phosphorous nickel-plating (12%)<br>opt. AISI 304 (A2)<br>opt. AISI 316 (A4) |                                                                                                                      |
|                                                                                   | Colour                | Blue                                  | Blue                                  | Brown     | Polished steel                                                                    | - Industry, general use.<br>- Low alkaline and low acid solutions.<br>- Marine environments.<br>- High temperatures. |
|                                                                                   | Thickness             | Anodizing 25 µ<br>PTFE 15 µ           | Anodizing 15 µ<br>PTFE 15 µ           | 15 µ      | 20 µ                                                                              |                                                                                                                      |

### ANODIZING

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

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

### ELECTROLESS NICKEL-PLATING

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

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

### POLYESTER PAINTING

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

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

### ANODIZING + PTFE COATING

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

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

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

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



Via Molino Emili, 16 - 25030 MACLODIO (BS) Italy - Tel. +39 030 97 86 61/2- Fax +39 030 97 86 63  
www.alphair.it - www.alphapompe.it

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