



AIR TORQUE®



4th Generation Line
Upgrade Series

PNEUMATIC ACTUATORS



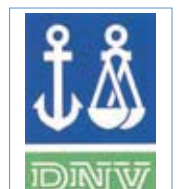
ATEX 94/9/EC



SIL3 IEC 61508



GOST-R



TYPE APPROVAL



The 4th Generation Line pneumatic actuators, Upgrade Series, are the result of the Air Torque mission to offer always innovative products by combining the long field experience as market leader, the innovational spirit, the well-known reliability in actuator designing and the high quality manufacturing level.

The Air Torque experience has produced the following main key features included in the 4th Generation Line, *Upgrade Series*:

Reliable and flexible solutions

By combining high quality products, field and design experience, Air Torque is able to satisfy all the customers and market expectations by offering reliable, flexible and customized solutions together with a qualified service.

Innovative Patented Design

The new technical features developed and incorporated in the 4th Generation Line pneumatic actuators, *Upgrade Series*, permit to have the best product versatility for an easier and easier valve automation. The Upgrade Series are covered by five International patents.

The most complete range and options

The *Upgrade Series* pneumatic actuators are available in:

- Eighteen models
- Spring return and double acting versions
- Torque up to 10.000 Nm
- Six different protection levels
- Low and high temperature constructions
- Large availability of many ISO flanges and drive shaft connections for direct valve automation
- 120°-135°-180° rotation both in double acting and spring return
- 180° spring return Fail-Mid
- 3 Position actuators, 90° and 180° rotation, both double acting and spring return versions
- Fast acting actuators
- Hydraulic damper actuators

High quality level production

The 4th Generation Line pneumatic actuators, *Upgrade Series*, have been designed and tested to obtain the highest cycling life and the most reliable performance with very reduced maintenance and service.

International Standard

The 4th Generation Line pneumatic actuators, *Upgrade Series*, have been designed, manufactured and tested in full compliance with all the applicable International standards.

Technology and material

The 4th Generation Line pneumatic actuators, *Upgrade Series*, are manufactured with the highest material quality, the most accurate material selections and the latest production technologies.



TECHNICAL FEATURES

1. Alodur hard anodized body

Extruded aluminum body with Alodur special hard anodization applied internally and externally for a complete corrosion protection, a lower friction coefficient and an increased surface hardness for the longest wearing resistance.

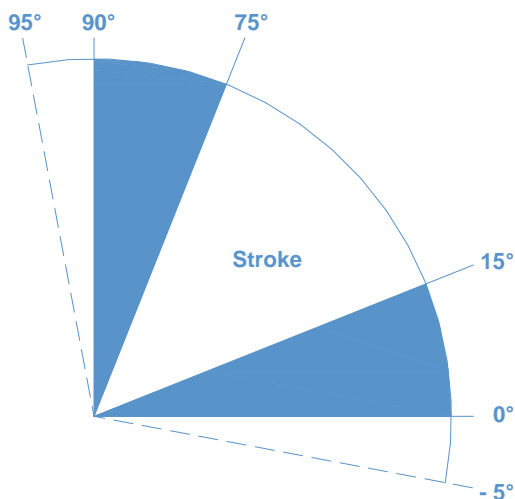
Many additional protective coatings are available on the external surface for different environmental working conditions.

2. Pistons design

Dual piston rack and pinion design for compact construction, symmetric mounting position, high-cycle life and fast operation, reverse rotation can be accomplished in the field by simply inverting the pistons. Both pistons are anodized for a better corrosion and wearing resistance.

3. Two independent external travel stop adjustments

As a standard, travel stops allowing adjustment for -5° up to $+15^\circ$ on the close position, and for $+5^\circ$ up to -15° on the open position. This allows accurate valve alignment, stroke limitation and provides on actuator a large travel adjustment.



4. Universal and anti-blowout drive shaft

It permits an easy conversion from parallel to diagonal square and vice versa. It is also available in double square; both solutions permit a lower and more flexible inventory.

5. Drive shaft top adaptor

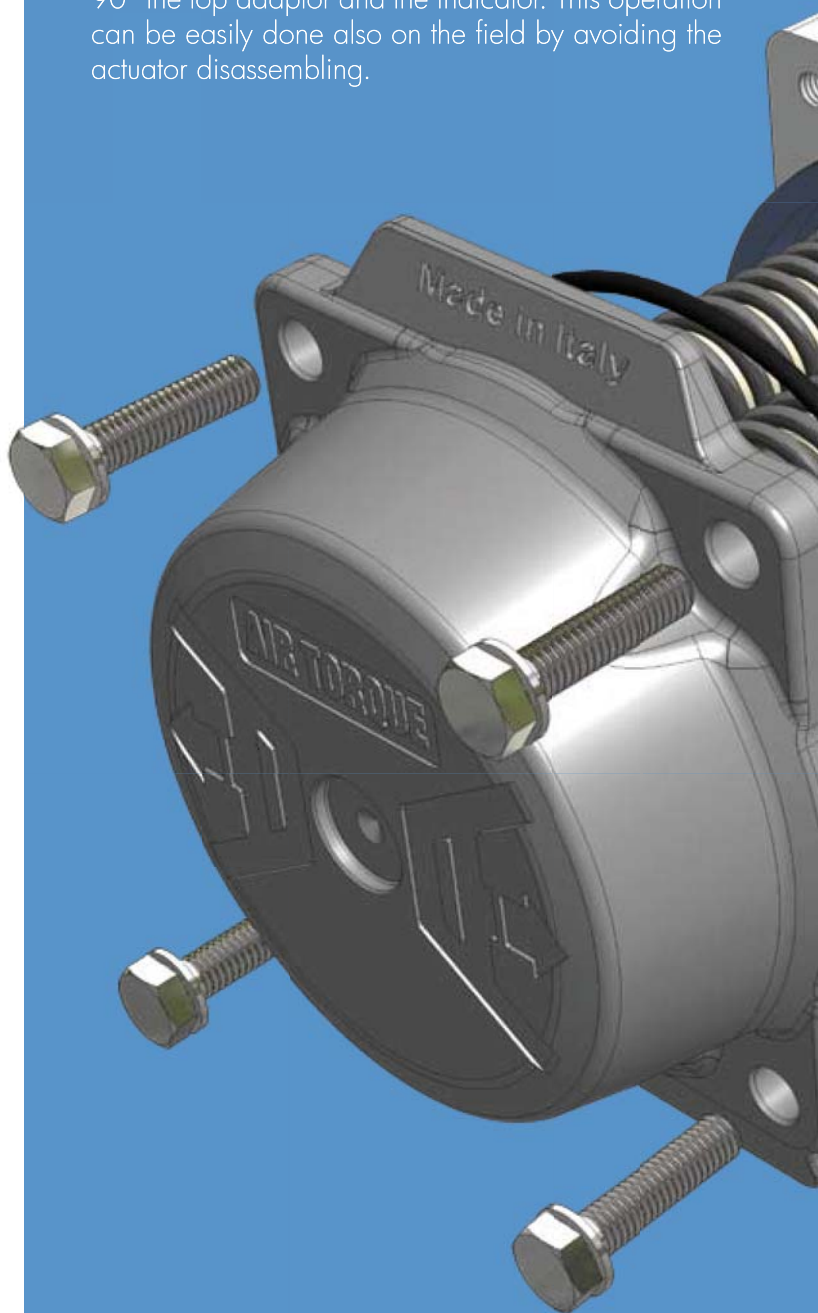
The aluminum top adaptor for ancillary driving/attachment gives a more precise and stable coupling with ancillary stem suitable for higher temperature application. It is suitable and available both for single (diagonal and parallel) and double square drive shafts.

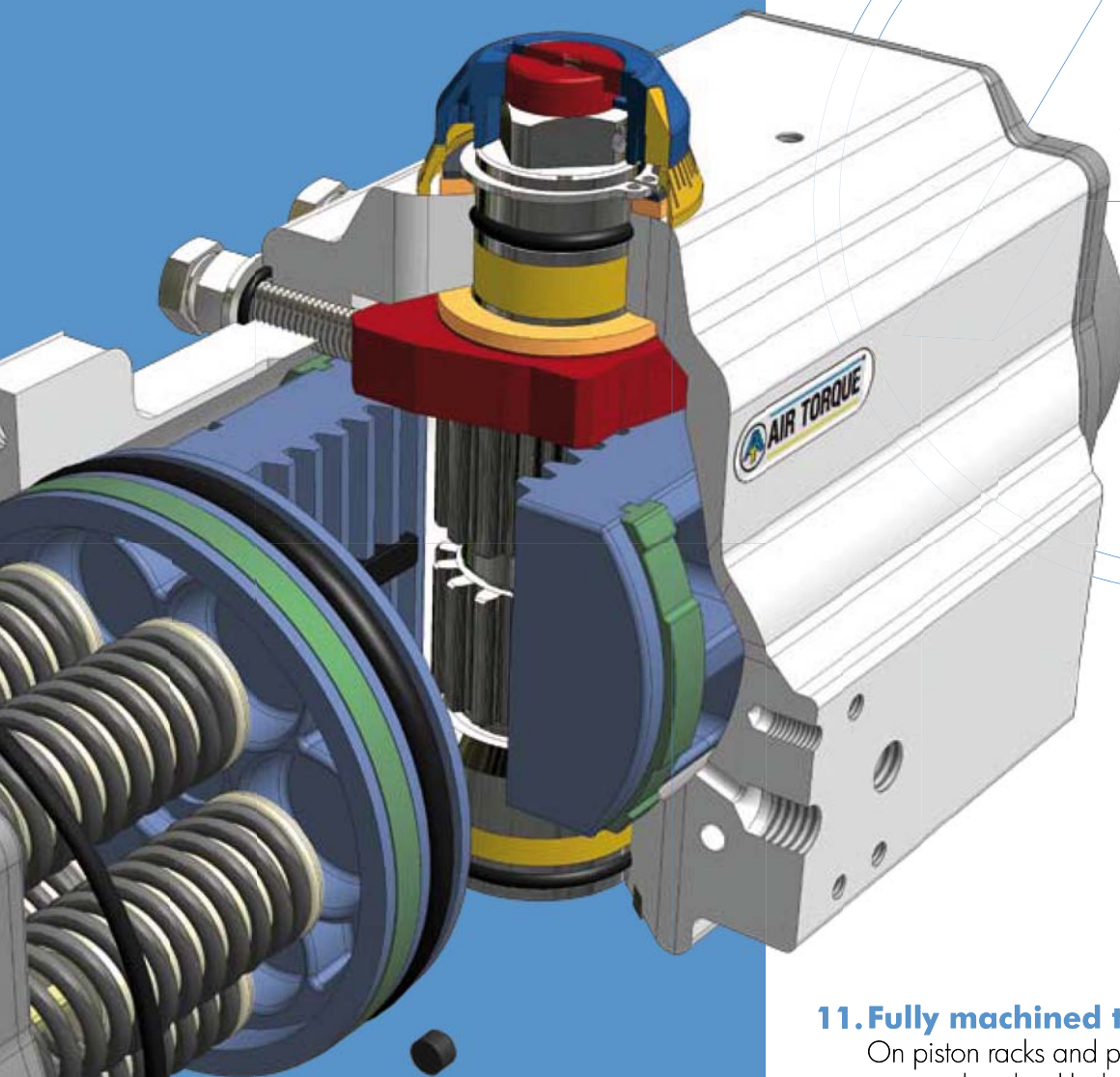
6. One compact and modern design

With identical body and end caps for double acting and spring return model to reduce inventory, allows field conversion, by adding or removing modular spring cartridge.

7. Position indication

The combination of the new top adaptor and the new position indicators allows to achieve easily the correct actuator/valve position indication by just rotating of 90° the top adaptor and the indicator. This operation can be easily done also on the field by avoiding the actuator disassembling.





8. Multiple bearings and guide

Bearings on piston and racks for precise operation, low friction, high cycle life and piston guides preventing shaft blowout.

9. Modular preloaded springs

Cartridge design in high grade coated steel for simple range versatility, greater safety and corrosion resistance.

10. Electroless nickel-plated drive-shaft

Blow-out proof, bearing guided for improved safety and maximum cycle life.

11. Fully machined teeth

On piston racks and pinion shaft for accurate positioning, low backlash and maximum engagement resulting in overall efficient operation.

12. Selected and high quality bearings and seals

Provide a wide operating temperature range, low friction and high cycle life.

13. Fasteners

Stainless steel fasteners for long term corrosion resistance.

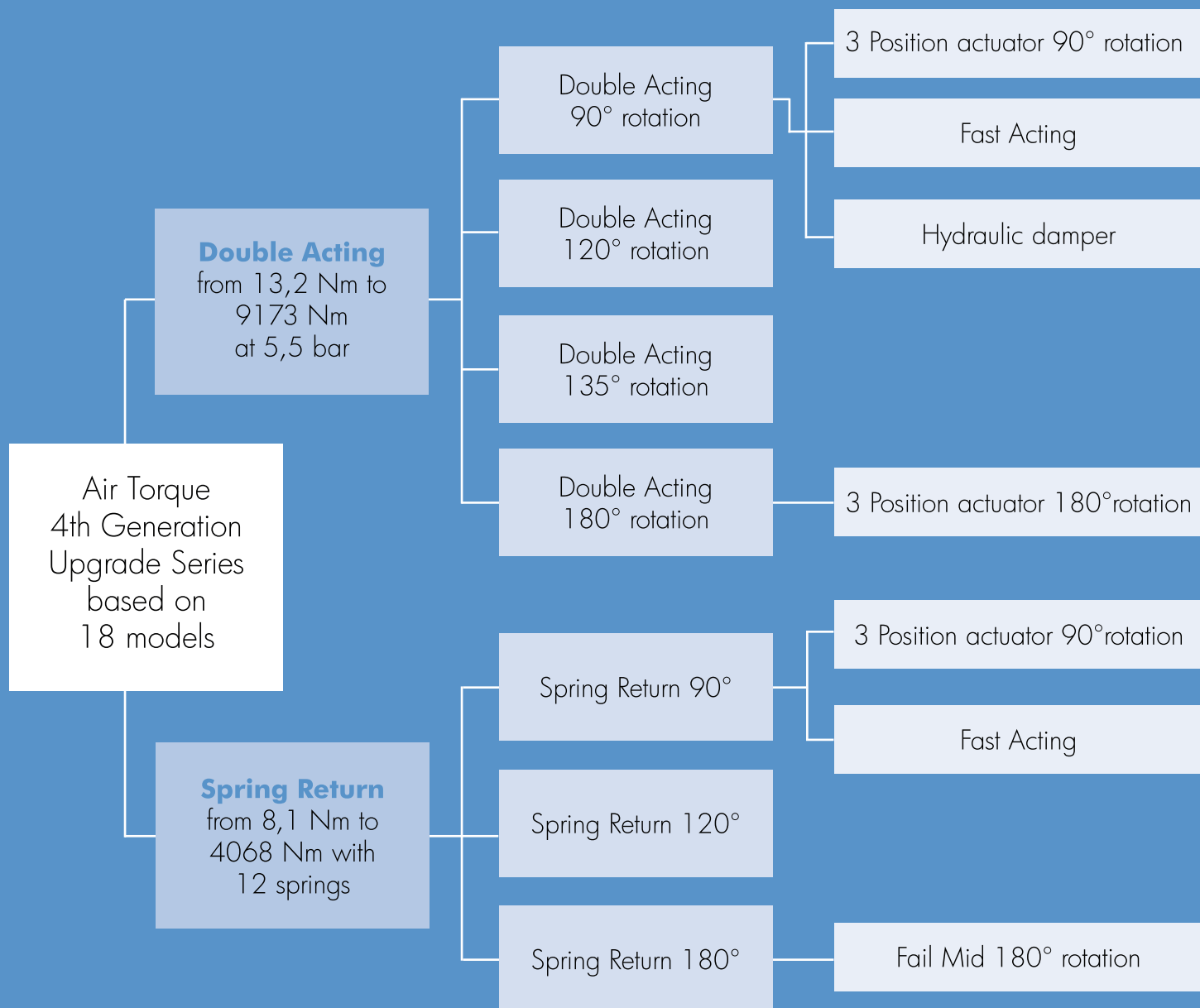
14. Full compliance

To specifications ISO 5211, DIN 3337 and VDI/VDE 3845 providing the product interchangeability and the easiest valve automation and accessories installation.

15. Product Identity

Plastic insert with Air Torque logo and unique patented design.

PRODUCT RANGE



THE PRODUCT RANGE INCLUDES ALSO THE FOLLOWING OPTIONS



LOCK-OUT CAPABILITY

In order to permanently lock the actuator in position, the actuator can be supplied with a special locking device by using a padlock and therefore preventing unwanted operation.



100% TRAVEL STOP LIMITATION

When a stroke of less than 90° is required e.g. 1°, 5°, 10°, 25°, 50°, 70° and the standard adjustment is not suitable, the actuator can be supplied with special bolts in both End-Caps to allow stroke adjustment or limitation from 0° to 90° according to customer requirements.

1. Operating media

Dry or lubricated air, inert/non-corrosive gases provided that they are compatible with the internal actuator parts

2. Supply pressure

For Double Acting and Spring Return actuators the maximum supply pressure is up to 8 bar (116 PSI), the minimum supply pressure is 2.5 bar (36 PSI).

3. Working Temperature

- Standard actuator construction suitable from -40°C (-40°F) to $+80^{\circ}\text{C}$ ($+176^{\circ}\text{F}$)
- High temperature – HT – actuator construction suitable from -15°C ($+5^{\circ}\text{F}$) to $+150^{\circ}\text{C}$ ($+302^{\circ}\text{F}$)
- Extreme low temperature – LLT – actuator construction suitable from -55°C (-67°F) to $+80^{\circ}\text{C}$ ($+176^{\circ}\text{F}$)

4. Lubrication

Actuators are factory lubricated for life under normal operating conditions.

The standard lubricant is suitable for use from -40°C (-40°F) to $+80^{\circ}\text{C}$ ($+176^{\circ}\text{F}$)

5. Installation

Actuator suitable both for indoor and outdoor installation.

6. Protection and Corrosion resistance

Air Torque actuators are available in 6 different protection levels suitable for different environmental conditions. For severe duties select from the protection level table or contact AIR TORQUE.

7. Actuator selection and Marking

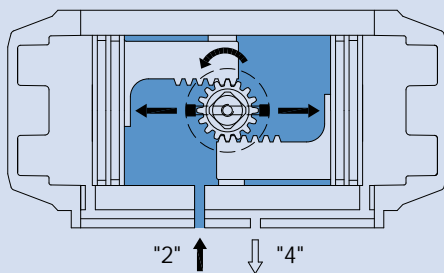
To have a correct actuator selection, the operating conditions have to be evaluated and defined; they will be marked on the actuator identification label.

ACTUATOR FUNCTION and ROTATION

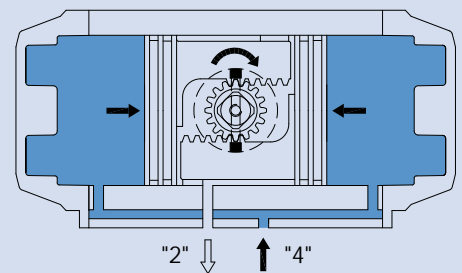
The standard actuator rotation is clockwise to close, a counter-clockwise rotation is achieved when port 2 is pressurized. Non standard actuator rotation is counter-clockwise to close, a clockwise rotation is achieved when port 2 is pressurized. See the technical data-sheet for details.

Double Acting operation function (standard rotation) TOP View:

Air supplied to Port 2 forces the pistons towards the actuator end caps, with the exhaust air exiting from Port 4, a counter-clockwise rotation is achieved.

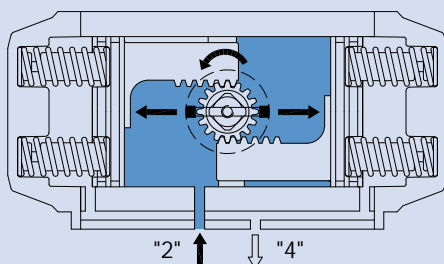


Air supplied to Port 4 forces the pistons inward, exhaust air exits from Port 2, a clockwise rotation is achieved.

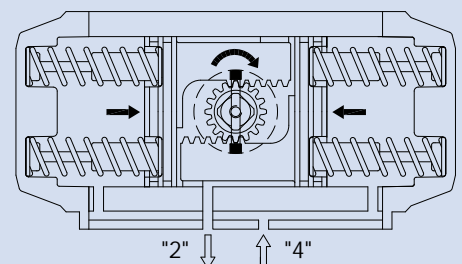


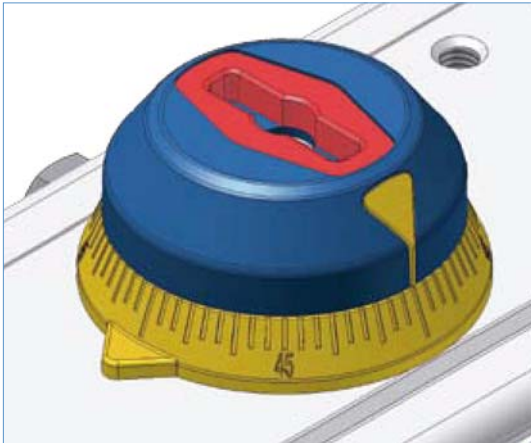
Single Acting operation function (standard rotation) TOP View:

Air supplied to Port 2 forces the pistons toward the actuator end caps, compressing the springs, with the exhaust air exiting from Port 4, a counter-clockwise rotation is achieved.



The loss of air pressure (air or electric failure) at Port 2 allows the springs to force the pistons inward with the exhaust air exiting from Port 2, a clockwise rotation is achieved.

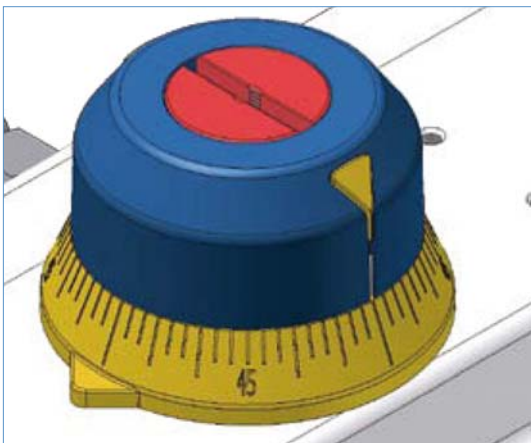
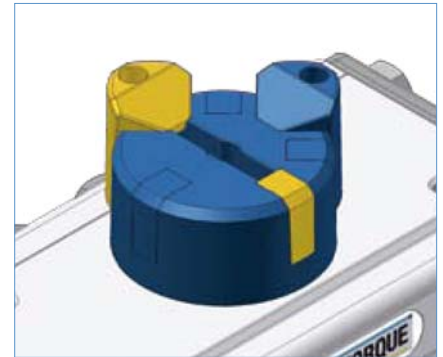
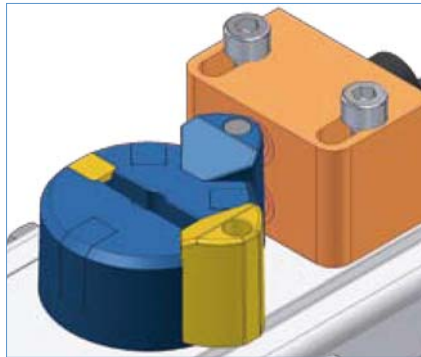
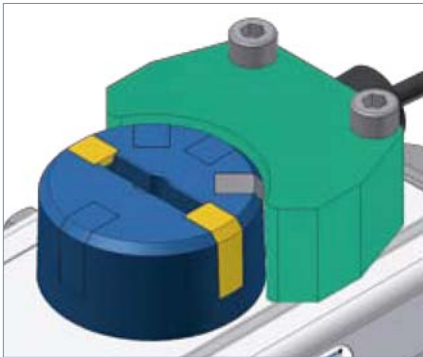




Options available for AT045U and AT101U

Standard position indicator **with stainless steel insert** for ancillary driving/attachment for a more precise and stable coupling with ancillary stem. A graduated ring is fitted, as a standard, under the position indicator in order to have an accurate position indication.

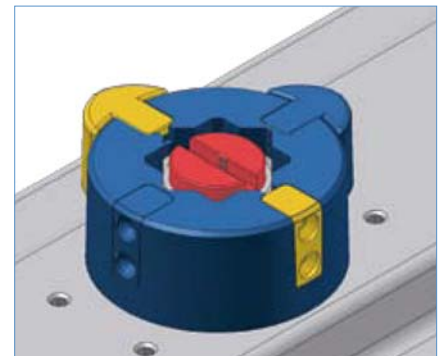
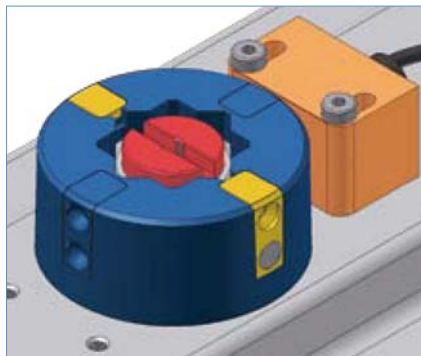
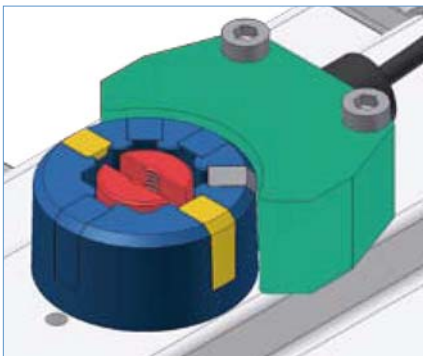
Optional indicators for direct mounting of sensors (P+F, IFM, etc.) and mechanical limit-switches



Options available for AT201U and AT1001U

Standard position indicator **with aluminum top adaptor** for ancillary driving/attachment for a more precise and stable coupling with ancillary stem. A graduated ring is fitted, as a standard, under the position indicator in order to have an accurate position indication.

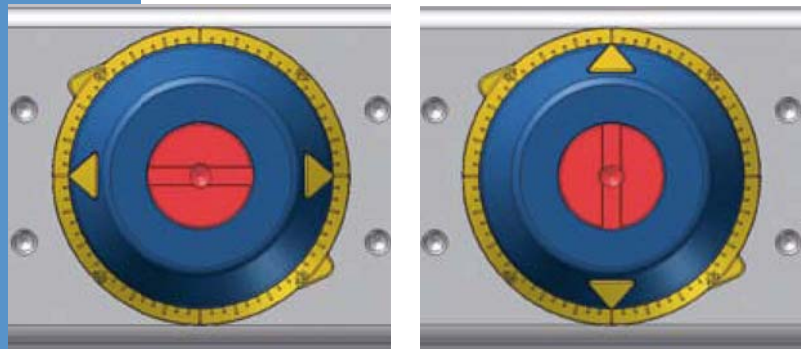
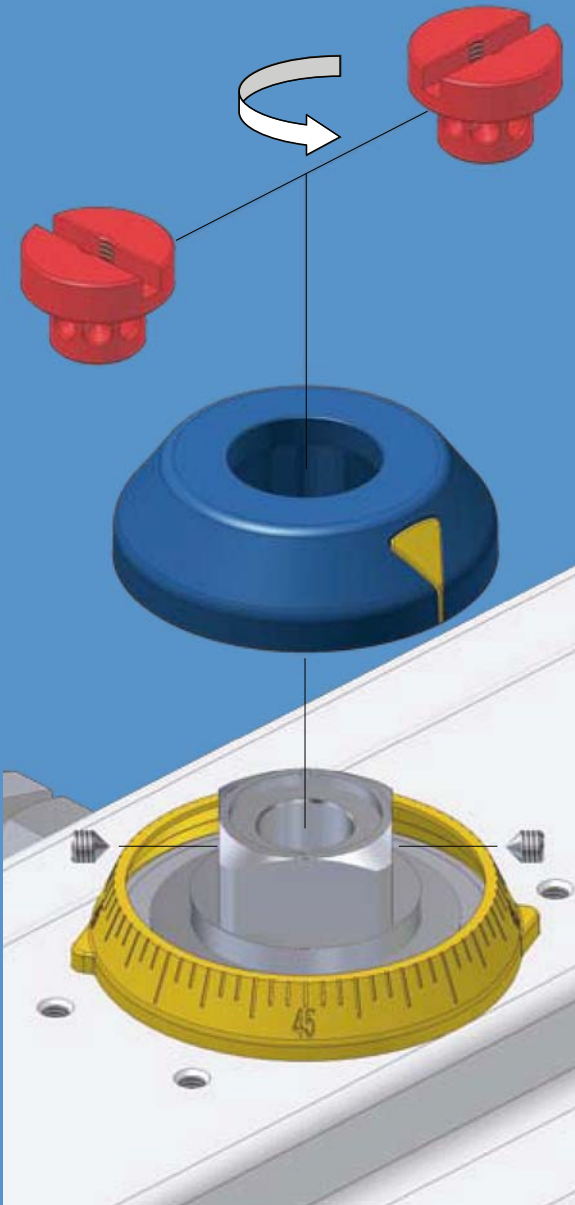
Optional indicators for direct mounting of sensors (P+F, IFM, etc.) and mechanical limit-switches



In line and across line actuator installation versatility

The patented design of the top adaptor in combination with the position indicator permits to easily achieve the right actuator/valve position indication since both can be easily fitted in any 45° position. Therefore during the valve automation it is not necessary to reassemble the drive shaft in order to achieve the correct position indication.

The top adaptor is suitable and available for any drive shaft connections like single square (diagonal and parallel), double square, head flat or key head.

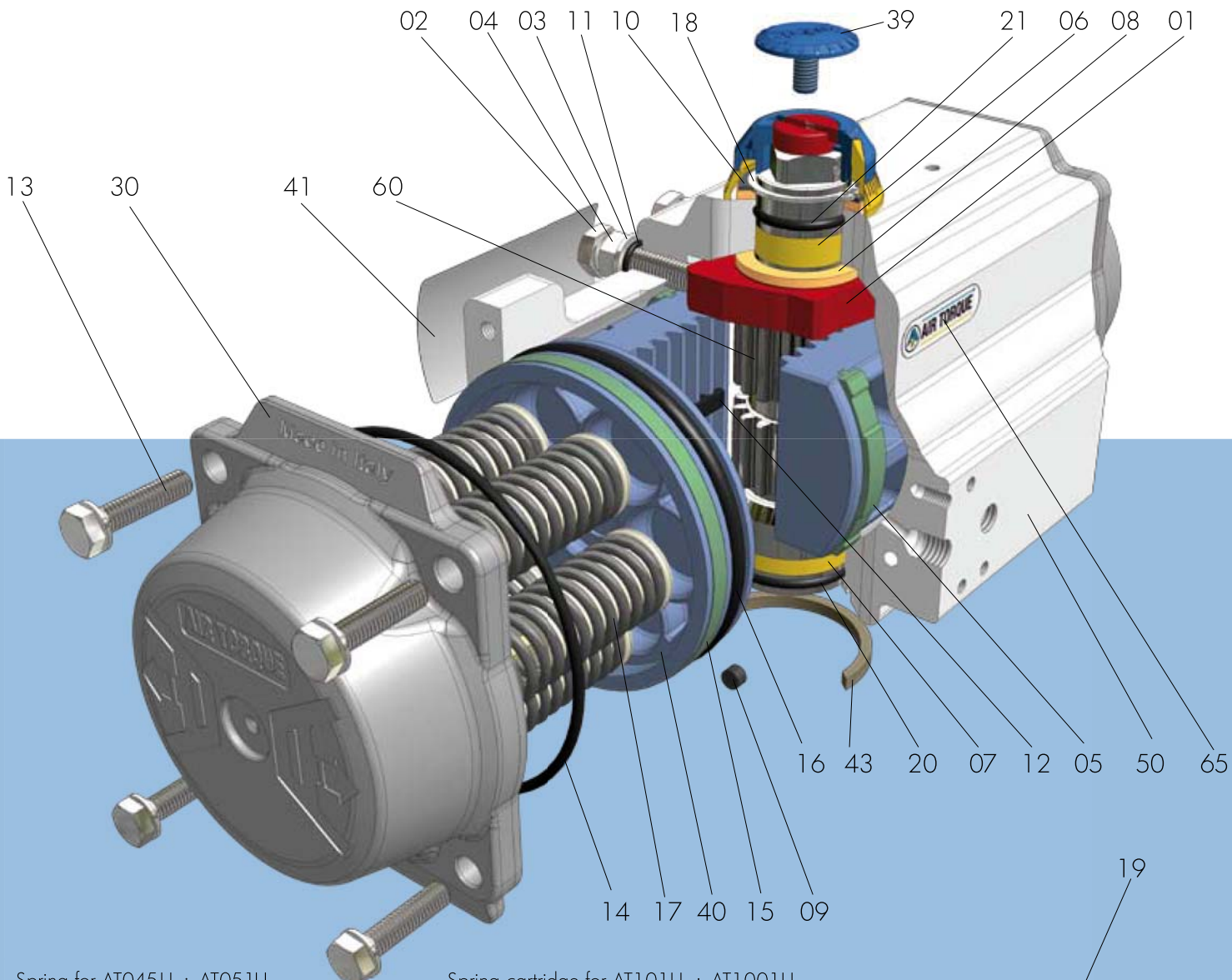


Actuator in close position and **IN LINE** installation

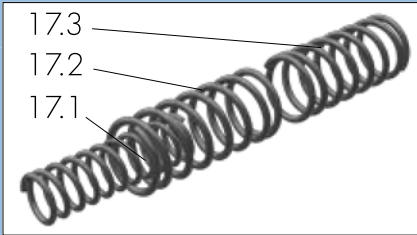


Actuator in close position and **ACROSS LINE** installation (Top adaptor and position indicator 90° rotated)

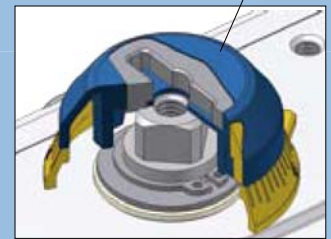




Spring for AT045U ÷ AT051U



Spring cartridge for AT101U ÷ AT1001U

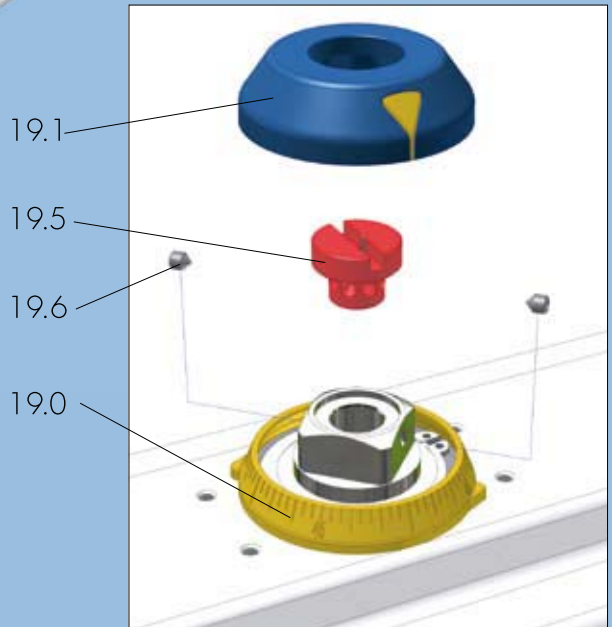
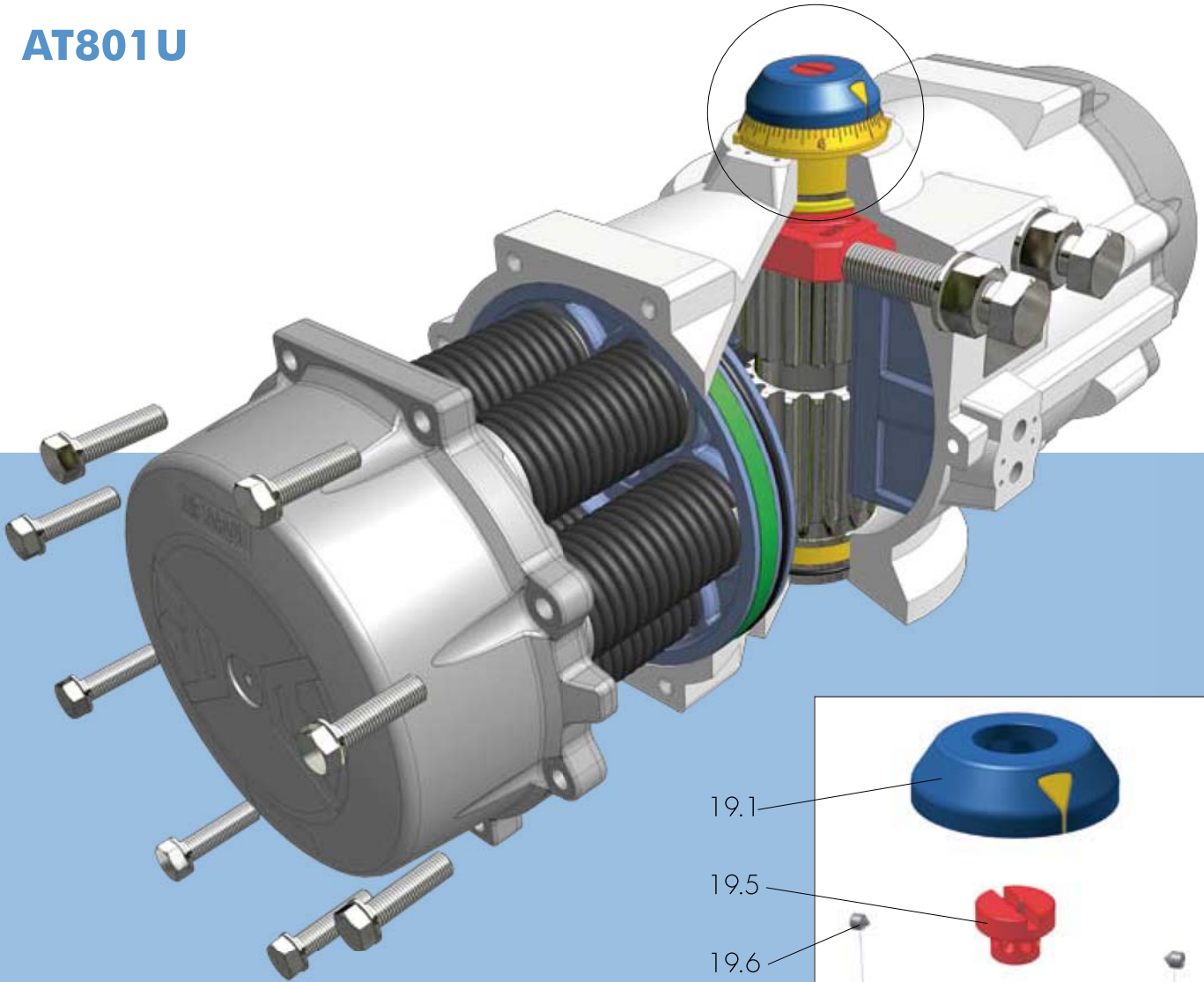


| PART N° | Spare Parts | UNIT Q.TY / NOTE | | PART DESCRIPTION | STANDARD MATERIAL |
|---------|-------------|------------------|----------------------|-----------------------------|---|
| 01 | | 1 | NA for AT045U | OCTI-CAM (Stop arrangement) | Stainless Steel (only for AT051U ÷ AT301U) Carbon Steel / Nodular Cast Iron, zinc coated |
| 02 | | 2 | NA for AT045U | STOP CAP SCREW | Stainless Steel |
| 03 | | 2 | NA for AT045U | WASHER | Stainless Steel |
| 04 | | 2 | NA for AT045U | NUT (Stop screw) | Stainless Steel |
| 05 | ○ | 2 | | BEARING (Piston back) | High-grade polymers |
| | | 4 | for AT1001U | | |
| 06 | ○ | 1 | | BEARING (Pinion top) | High-grade polymers |
| 07 | ○ | 1 | | BEARING (Pinion bottom) | High-grade polymers |
| 08 | ○ | 2 | 1 Pc. for AT045U | THRUST BEARING (Pinion) | High-grade polymers |
| 09 | ○ □ | 2 | | PLUG | M-NBR / Silicone |
| 09.1 | ○ □ | 2 | for AT801U ÷ AT1001U | "O-RING" PLUG | M-NBR / Silicone |
| 10 | | 1 | | THRUST WASHER (Pinion) | Stainless Steel |
| 11 | ○ □ | 2 | NA for AT045U | "O" RING (Stop screw) | M-NBR |
| 12 | | 2 | NA for AT045U | PISTON GUIDE | High-grade polymers |

○ Parts included in Complete spare parts kit

□ Parts included in "O" ring spare parts kit

AT801U

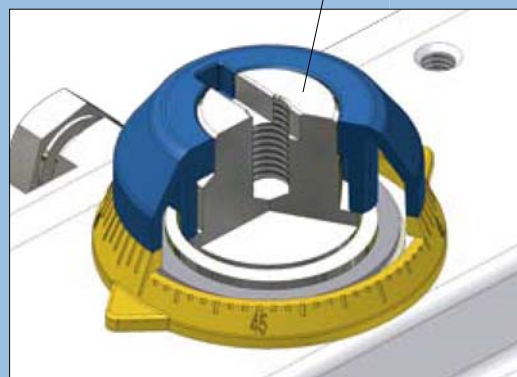
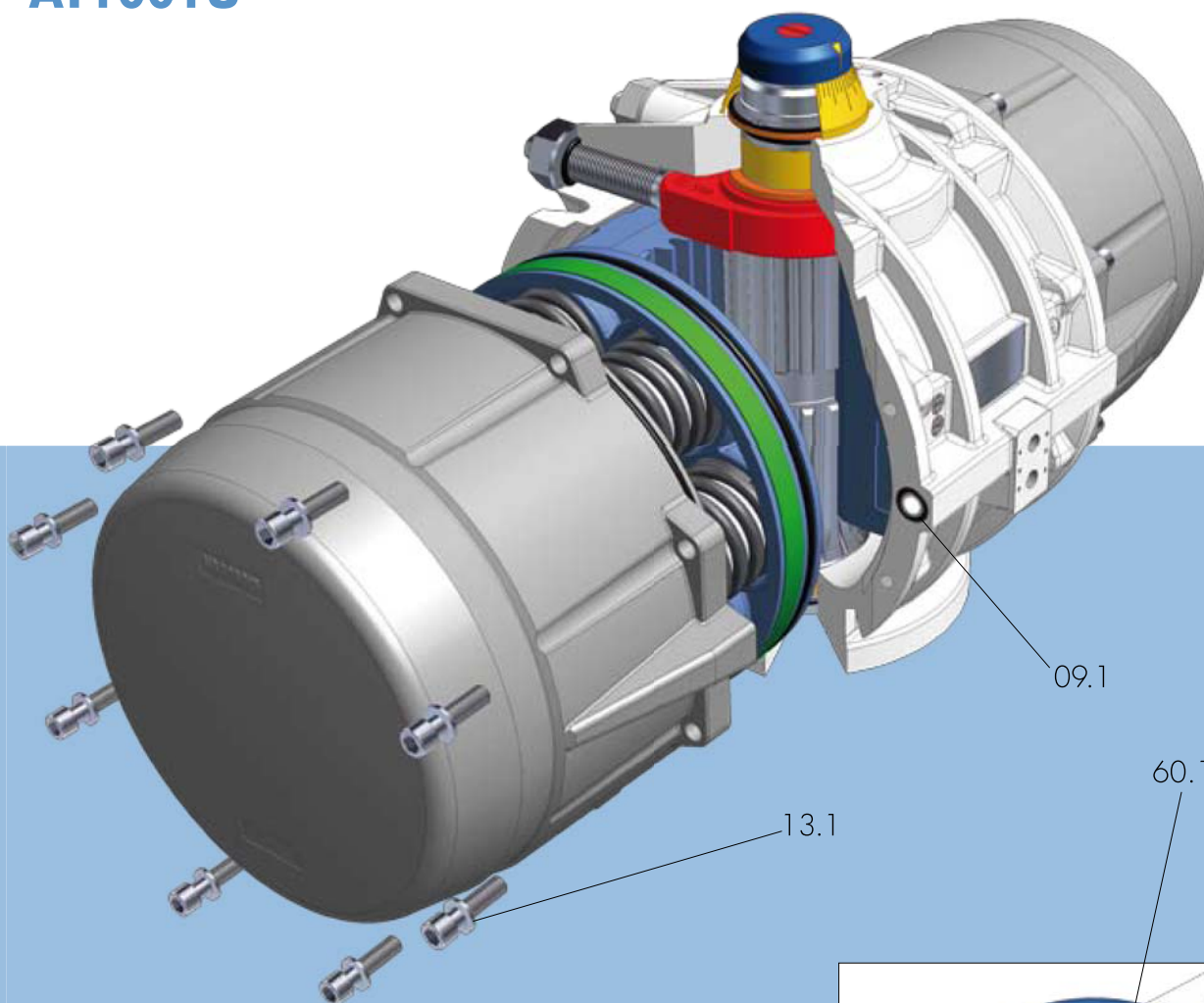


| PART N° | Spare Parts | UNIT Q.TY / NOTE | PART DESCRIPTION | STANDARD MATERIAL |
|---------|--------------------------|------------------------------|---------------------------------|---------------------------------------|
| 13 | | 8 for AT045U ÷ AT651U | CAP SCREW (End cap) | Stainless Steel |
| | | 12 for AT701U ÷ AT751U | | |
| | | 16 for AT801U ÷ AT1001U | | |
| 13.1 | | 16 for AT1001U | WASHER (Cap Screw end cap) | Stainless Steel |
| 14 | <input type="checkbox"/> | 2 | "O" RING (End cap) | M-NBR |
| 15 | <input type="checkbox"/> | 2 | BEARING (Piston head) | High-grade polymers |
| 16 | <input type="checkbox"/> | 2 | "O" RING (Piston) | M-NBR |
| 17 | | max. 12 for AT101U ÷ AT1001U | SPRING (Cartridge) | SiCr Spring alloy Steel coated |
| 17.1 | | | SPRING | |
| 17.2 | | max. 2 for AT045U ÷ AT051U | SPRING | |
| 17.3 | | | SPRING | |
| 18 | | 1 | SPRING CLIP (Pinion) | Spring Steel, ENP |
| 19 | | 1 for AT045U ÷ AT101U | POSITION INDICATOR | High-grade polymers / Stainless Steel |
| 19.0 | | 1 | GRADUATED RING | High-grade polymers |
| 19.1 | | 1 NA for AT045U ÷ AT101U | POSITION INDICATOR | High-grade polymers |
| 19.5 | | 1 NA for AT045U ÷ AT101U | TOP ADAPTOR | Extruded Aluminium alloy, anodized |
| 19.6 | | 2 NA for AT045U ÷ AT101U | HEX. SOCKET SCREW (Top Adaptor) | Stainless Steel |

Parts included in Complete spare parts kit

Parts included in "O" ring spare parts kit

AT1001U



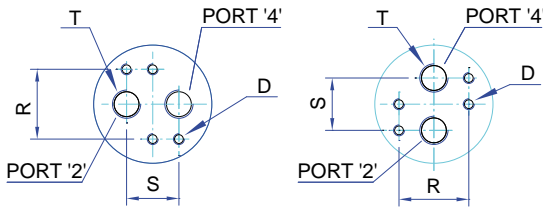
| PART N° | Spare Parts | UNIT Q.TY / NOTE | PART DESCRIPTION | STANDARD MATERIAL |
|---------|--|------------------|-------------------------------|---|
| 20 | <input type="radio"/> <input type="checkbox"/> | 1 | "O" RING (Pinion bottom) | M-NBR |
| 21 | <input type="radio"/> <input type="checkbox"/> | 1 | "O" RING (Pinion top) | M-NBR |
| 30 | | 2 | END CAP | Pressure Die Cast Aluminium alloy, anodized and coated Cast Aluminium alloy, anodized and coated (for AT1001U) |
| 39 | | 1 | CAP SCREW (Indicator) | High-grade polymers |
| 40 | | 2 | PISTON | Pressure Die Cast Aluminium alloy, anodized Cast Aluminium alloy, anodized (for AT1001U) |
| 41 | | 1 | ACTUATOR IDENTIFICATION LABEL | Polyester-Silver |
| 42 | | 2 | END CAP LABEL | Polyester-Silver |
| 43 | | 1 | SPIGOT (Only on request) | Extruded Aluminium alloy, anodized |
| 50 | | 1 | BODY | Extruded Aluminium alloy, coated Cast Aluminium alloy, coated (for AT801U and AT1001U) |
| 60 | | 1 | DRIVE SHAFT | Extruded Aluminium alloy, anodized (for AT045U and AT1001U) Steel, ENP |
| 60.1 | | 1 | INTEGRAL DRIVE SHAFT | Stainless Steel, ENP |
| 65 | | 1 | PLASTIC INSERT | High-grade polymers |

Parts included in Complete spare parts kit

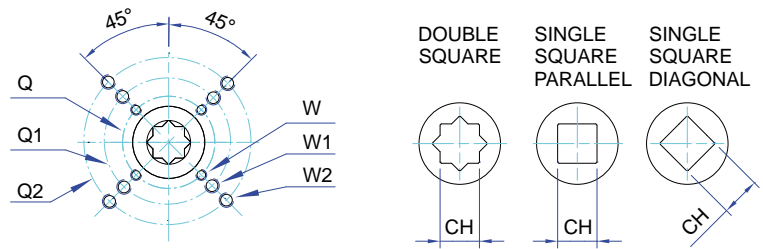
Parts included in "O" ring spare parts kit

DIMENSIONS AND TECHNICAL DATA

AIR CONNECTION VDI/VDE 3845



BOTTOM VIEW ISO 5211



DIMENSIONS IN mm

| ACTUATOR MODEL | AT045U D/S | AT051U D/S | AT101U D/S | AT201U D/S | AT251U D/S | AT301U D/S | AT351U D/S | AT401U D/S | AT451U D/S | AT501U D/S | AT551U D/S | AT601U D/S | AT651U D/S | AT701U D/S | AT751U D/S | AT801U D/S | AT1001U D/S |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------------|
| A | 118 | 135,5 | 153,5 | 203,5 | 241 | 259 | 304 | 333 | 394,5 | 422,5 | 474 | 528 | 605 | 710 | 812 | 855 | 950 |
| B | 66 | 69 | 85 | 102 | 115 | 127 | 145 | 157 | 177 | 196 | 220,5 | 245 | 298,5 | 330 | 383 | 410 | 518 |
| C | 62 | 71 | 84,5 | 93 | 106 | 118,5 | 136 | 146,5 | 166 | 181 | 200 | 221,5 | 262 | 330 | 371 | 418 | 528 |
| D | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M6x10 | M6x10 | M6x10 | M6x10 | M6x10 |
| E | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M5x8 | M6x10 |
| F | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 130 | 130 | 130 | 130 | 130 | 130 | 200 |
| G | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 50 |
| N | 11 | 11 | 11 | 17 | 17 | 17 | 27 | 27 | 27 | 27 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| P | 15/20 | 20 | 20 | 20 | 20 | 20 | 30 | 30 | 30 | 30 | 50 | 50 | 50 | 50 | 50 | 50 | 80 |
| R | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 45 | 45 | 45 | 45 | 45 |
| S | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 40 | 40 | 40 | 40 | 40 |
| T ISO 228 | 1/8" | 1/8" | 1/8" | 1/8" | 1/8" | 1/4" | 1/4" | 1/4" | 1/4" | 1/4" | 1/4" | 1/4" | 3/8" | 1/2" | 1/2" | 1/2" | 1/2" |
| Ø Z1 | 42 | 42 | 42 | 42 | 42 | 42 | 58 | 58 | 67,5 | 67,5 | 80 | 80 | 115 | 115 | 115 | 115 | 135 |
| ISO Flange | F04 | F04 | F05 + F07 | F05 + F07 | F05 + F07 | F07 + F10 | F07 + F10 | F07 + F10 | F10 + F12 | F10 + F12 | F14 | F14 | F16 | F16 | F16 | F16 + F25 | F16 + F25 + F30 |
| Q | 42 | 42 | 50 | 50 | 50 | 70 | 70 | 70 | 102 | 102 | 140 | 140 | 165 | 165 | 165 | 165 | 165 |
| Q1 | - | - | 70 | 70 | 70 | 102 | 102 | 102 | 125 | 125 | - | - | - | - | - | 254 | 254 |
| Q2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 298 |
| W | M5 | M5 | M6 | M6 | M6 | M8 | M8 | M8 | M10 | M10 | M16 | M16 | M20 | M20 | M20 | M20 | M20 |
| W1 | - | - | M8 | M8 | M8 | M10 | M10 | M10 | M12 | M12 | - | - | - | - | - | M16 | M16 |
| W2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | M20 |

| OPTIONAL ISO Flange | F03 | F03 + F05 | F03 + F05 | F05 | F07 | F05 + F07 | F10 | F10 | F12 | F12 | F10 + F12 | F10 + F12 | F12 | F12 | F14 | F25 | F30 |
|---------------------|-----|-----------|-----------|-----------|---------|-----------|---------|---------|---------|---------|-----------|-----------|---------|---------|-----------|---------|---------|
| | - | - | F05 | F04 + F07 | | F07 | | | | | | | F14 | F14 | F16 + F25 | | |
| CH x l min. | D | 9 x 11 | 9 x 11 | 11 x 12 | 11 x 12 | 14 x 16 | 14 x 16 | 17 x 19 | 22 x 24 | 22 x 24 | 22 x 24 | 22 x 24 | 27 x 29 | 27 x 29 | 55 x 59 | 55 x 59 | 75 x 80 |
| | DS | 11 x 12 | 11 x 12 | 14 x 16 | 14 x 16 | 17 x 19 | 17 x 19 | 17 x 19 | 22 x 24 | 22 x 24 | 22 x 24 | 27 x 29 | 27 x 29 | 36 x 39 | 36 x 39 | 46 x 49 | 46 x 49 |

TECHNICAL DATA (METRIC UNIT)

| METRIC | MODEL TYPE | AT045U | | AT051U | | AT101U | | AT201U | | AT251U | | AT301U | | AT351U | | AT401U | | AT451U | | AT501U | | AT551U | | AT601U | | AT651U | | AT701U | | AT751U | | AT801U | | AT1001U | |
|---------------------------|------------|--------|------|--------|------|--------|------|--------|-----|--------|-----|--------|-----|--------|-----|--------|------|--------|------|--------|------|--------|------|--------|------|--------|-----|--------|------|--------|-----|--------|-----|---------|-----|
| | | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S |
| Opening Time (Sec.) | | 0,15 | 0,2 | 0,2 | 0,25 | 0,25 | 0,3 | 0,3 | 0,4 | 0,4 | 0,5 | 0,5 | 0,7 | 0,7 | 0,9 | 0,9 | 1,2 | 1,2 | 1,5 | 1,5 | 1,8 | 2 | 2,4 | 2,7 | 3,5 | 3,5 | 4,1 | 4 | 4,5 | 5 | 6 | 6 | 7,5 | 8 | 10 |
| Closing Time (Sec.) | | 0,2 | 0,25 | 0,25 | 0,3 | 0,3 | 0,35 | 0,35 | 0,5 | 0,5 | 0,6 | 0,6 | 0,9 | 0,8 | 1,1 | 1,1 | 1,4 | 1,4 | 1,8 | 1,7 | 2,1 | 2,2 | 2,8 | 3,2 | 4 | 4 | 4,6 | 4,5 | 5 | 6 | 7 | 7 | 8,5 | 9 | 11 |
| Air Volume Opening (L) | | 0,06 | | 0,09 | | 0,16 | | 0,31 | | 0,51 | | 0,71 | | 1,19 | | 1,54 | | 2,41 | | 3,14 | | 4,26 | | 5,94 | | 10 | | 14,5 | | 20 | | 25 | | 49 | |
| Air Volume Closing (L) | | 0,1 | | 0,15 | | 0,26 | | 0,49 | | 0,78 | | 1,11 | | 1,8 | | 2,34 | | 3,78 | | 4,92 | | 6,89 | | 9,46 | | 15,2 | | 21,4 | | 33 | | 40 | | 84 | |
| Approximate Weight (Kg) | | 0,75 | 0,9 | 1,1 | 1,3 | 1,6 | 1,8 | 2,7 | 3 | 3,8 | 4,4 | 5,2 | 6 | 8,1 | 9,4 | 10 | 12,4 | 14,2 | 17,1 | 17,8 | 21,4 | 24,3 | 32,7 | 34,3 | 43,6 | 54,6 | 69 | 76,3 | 95,5 | 118 | 150 | 127 | 169 | 170 | 238 |

Note: (A) The above moving times of the actuator are obtained in the following test conditions:

For model AT045U ÷ AT501U: (1) Room Temperature, (2) Actuator Stroke 90°, (3) Solenoid Valve with Orifice Of 4 mm and a flow capacity Qn 400L/min., (4) Inside pipe diameter 8 mm, (5) Medium clean air, (6) Air supply pressure 5,5 bar (79,75 Psi), (7) Actuator without external resistance load.

For model AT551U ÷ AT1001U: (1) Room Temperature, (2) Actuator Stroke 90°, (3) Solenoid Valve with Orifice Of 11 mm and a flow capacity Qn 6000L/min., (4) Inside pipe diameter 11 mm, (5) Medium clean air, (6) Air supply pressure 5,5 bar (79,75 Psi), (7) Actuator without external resistance load.

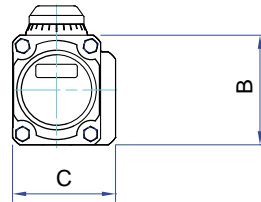
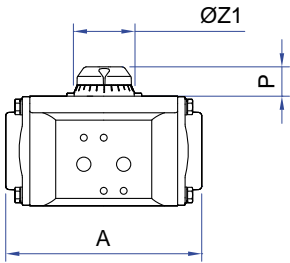
Cautions: obviously on the field applications when one or more of the above parameter are different, the moving time will be different.

FRONT VIEW

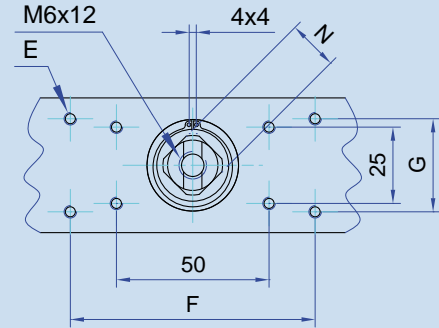
SIDE VIEW

TOP DETAIL

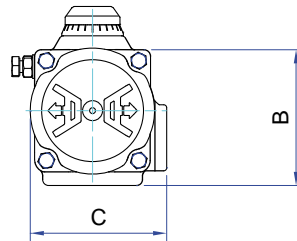
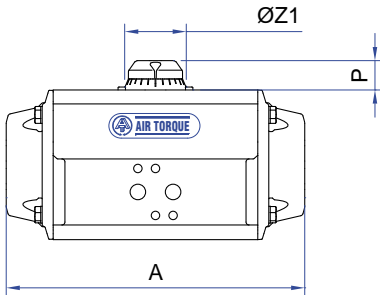
AT045U



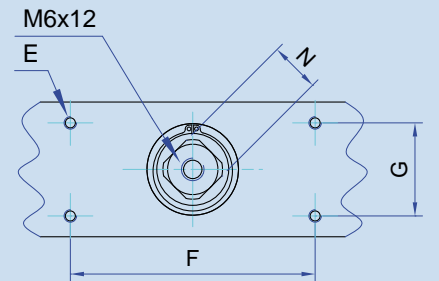
AT045U



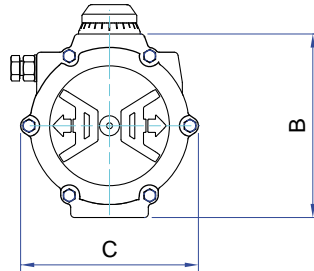
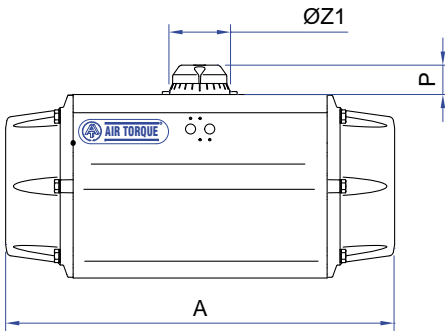
AT051 U ÷ AT651U



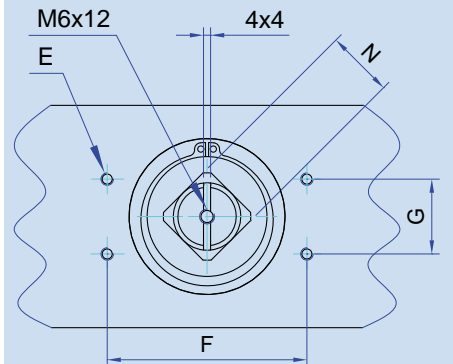
AT051U ÷ AT101U



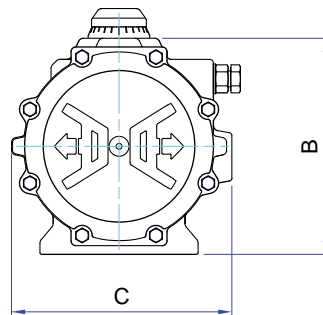
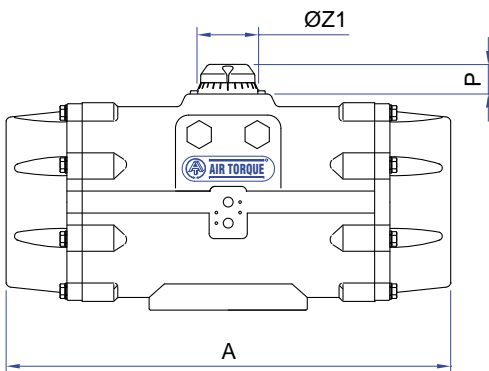
AT701 U ÷ AT751U



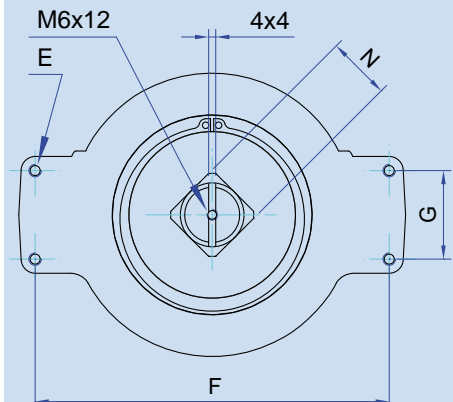
AT201U ÷ AT751U



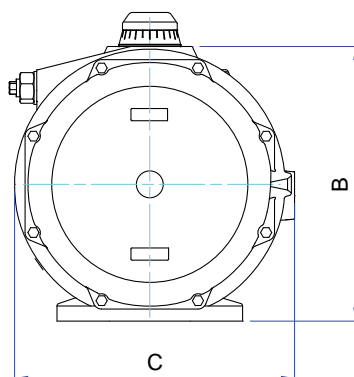
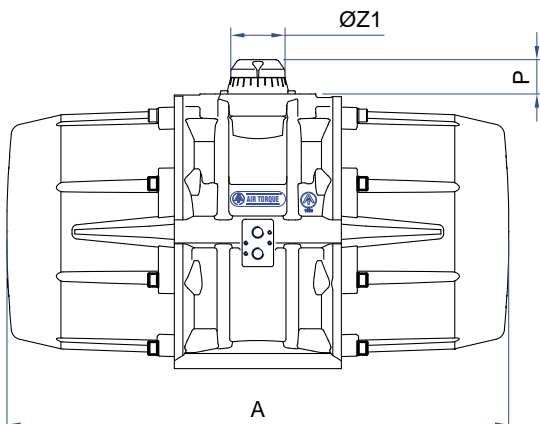
AT801U



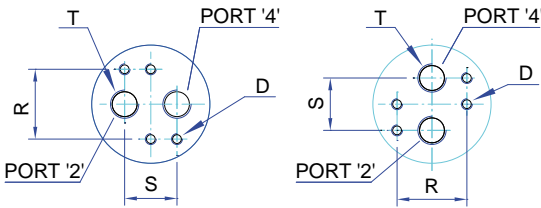
AT801U ÷ AT1001U



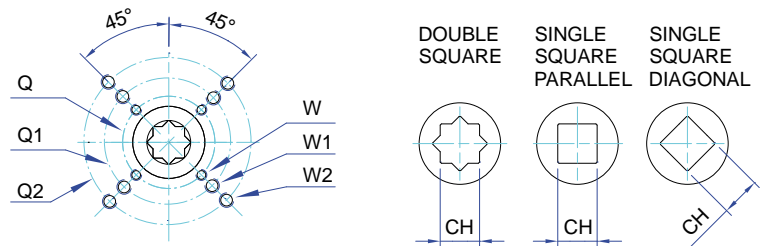
AT1001U



AIR CONNECTION VDI/VDE 3845



BOTTOM VIEW ISO 5211



DIMENSIONS IN INCH

| ACTUATOR MODEL | AT045U D/S | AT051U D/S | AT101U D/S | AT201U D/S | AT251U D/S | AT301U D/S | AT351U D/S | AT401U D/S | AT451U D/S | AT501U D/S | AT551U D/S | AT601U D/S | AT651U D/S | AT701U D/S | AT751U D/S | AT801U D/S | AT1001U D/S | | | | |
|---------------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------|-------------|-------------|-------------|-------------|
| A | 4,65 | 5,33 | 6,04 | 8,01 | 9,49 | 10,20 | 11,97 | 13,11 | 15,53 | 16,63 | 18,66 | 20,79 | 23,82 | 27,95 | 31,97 | 33,66 | 37,40 | | | | |
| B | 2,60 | 2,72 | 3,35 | 4,02 | 4,53 | 5,00 | 5,71 | 6,18 | 6,97 | 7,72 | 8,68 | 9,65 | 11,75 | 12,99 | 15,08 | 16,14 | 20,39 | | | | |
| C | 2,44 | 2,80 | 3,33 | 3,66 | 4,17 | 4,67 | 5,35 | 5,77 | 6,54 | 7,13 | 7,87 | 8,72 | 10,31 | 12,99 | 14,61 | 16,46 | 20,79 | | | | |
| D | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M6x0,39 | M6x0,39 | M6x0,39 | M6x0,39 | M6x0,39 | | | | |
| E | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M5x0,31 | M6x0,39 | | | | |
| F | 3,15 | 3,15 | 3,15 | 3,15 | 3,15 | 3,15 | 3,15 | 3,15 | 3,15 | 3,15 | 5,12 | 5,12 | 5,12 | 5,12 | 5,12 | 5,12 | 7,87 | | | | |
| G | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,18 | 1,97 | | | | |
| N | 0,43 | 0,43 | 0,43 | 0,67 | 0,67 | 0,67 | 1,06 | 1,06 | 1,06 | 1,06 | 1,42 | 1,42 | 1,42 | 1,42 | 1,42 | 1,42 | 1,42 | | | | |
| P | 0,59/0,79 | 0,79 | 0,79 | 0,79 | 0,79 | 0,79 | 1,06 | 1,18 | 1,18 | 1,18 | 1,97 | 1,97 | 1,97 | 1,97 | 1,97 | 1,97 | 3,15 | | | | |
| R | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,26 | 1,77 | 1,77 | 1,77 | 1,77 | 1,77 | | | | |
| S | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 0,94 | 1,57 | 1,57 | 1,57 | 1,57 | 1,57 | | | | |
| T * ISO 228 | 1/8" | 1/8" | 1/8" | 1/8" | 1/8" | 1/4" | 1/4" | 1/4" | 1/4" | 1/4" | 1/4" | 1/4" | 3/8" | 1/2" | 1/2" | 1/2" | 1/2" | | | | |
| ØZ1 | 1,65 | 1,65 | 1,65 | 1,65 | 1,65 | 1,65 | 2,28 | 2,28 | 2,66 | 2,66 | 3,15 | 3,15 | 4,53 | 4,53 | 4,53 | 4,53 | 5,31 | | | | |
| ISO Flange | F04 | F04 | F05 + F07 | F05 + F07 | F05 + F07 | F07 + F10 | F07 + F10 | F07 + F10 | F10 + F12 | F10 + F12 | F14 | F14 | F16 | F16 | F16 | F16 + F25 | F16 + F25 + F30 | | | | |
| Q | 1,65 | 1,65 | 1,97 | 1,97 | 1,97 | 2,76 | 2,76 | 2,76 | 4,02 | 4,02 | 5,51 | 5,51 | 6,50 | 6,50 | 6,50 | 6,50 | 6,50 | | | | |
| Q1 | - | - | 2,76 | 2,76 | 2,76 | 4,02 | 4,02 | 4,02 | 4,92 | 4,92 | - | - | - | - | - | 10 | 10 | | | | |
| Q2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 11,73 | | | | |
| W | M5 | M5 | M6 | M6 | M6 | M8 | M8 | M8 | M10 | M10 | M16 | M16 | M20 | M20 | M20 | M20 | M20 | | | | |
| W1 | - | - | M8 | M8 | M8 | M10 | M10 | M10 | M12 | M12 | - | - | - | - | - | M16 | M16 | | | | |
| W2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | M20 | | | | |
| OPTIONAL ISO Flange | F03 | F03 + F05 | | F04 + F07 | | F07 | F05 + F07 | | F10 | F10 | F12 | F12 | F10 + F12 | | F12 | F12 | F14 | F14 | F16 + F25 | F25 | F30 |
| | | F03 | F05 | F04 | F07 | | F07 | F12 | | | | | F12 | F14 | | | | | | | |
| CH x l min. | D | - | 0,35 x 0,43 | 0,35 x 0,43 | 0,43 x 0,47 | 0,43 x 0,47 | 0,55 x 0,63 | 0,55 x 0,63 | 0,67 x 0,75 | 0,67 x 0,75 | 0,87 x 0,94 | 0,87 x 0,94 | 0,87 x 0,94 | 0,87 x 0,94 | 1,06 x 1,14 | 1,06 x 1,14 | 1,27 x 1,35 | 1,27 x 1,35 | 1,57 x 1,65 | 1,57 x 1,65 | 1,87 x 1,95 |
| | DS | 0,35 x 0,43 | 0,43 x 0,47 | 0,43 x 0,47 | 0,55 x 0,63 | 0,55 x 0,63 | 0,67 x 0,75 | 0,67 x 0,75 | 0,87 x 0,94 | 0,87 x 0,94 | 1,06 x 1,14 | 1,06 x 1,14 | 1,06 x 1,14 | 1,06 x 1,14 | 1,42 x 1,54 | 1,42 x 1,54 | 1,81 x 1,93 | 1,81 x 1,93 | 2,17 x 2,32 | 2,17 x 2,32 | 2,95 x 3,15 |

* NPT (ANSI B1-20-1) threads available on request.

TECHNICAL DATA (IMPERIAL UNIT)

| IMPERIAL MODEL TYPE | AT045U | | AT051U | | AT101U | | AT201U | | AT251U | | AT301U | | AT351U | | AT401U | | AT451U | | AT501U | | AT551U | | AT601U | | AT651U | | AT701U | | AT751U | | AT801U | | AT1001U | |
|------------------------------|--------|------|--------|------|--------|------|--------|-----|--------|-----|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|-----|--------|-----|--------|-----|--------|-----|---------|-----|
| | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S | D | S |
| Opening Time (Sec.) | 0,15 | 0,2 | 0,2 | 0,25 | 0,25 | 0,3 | 0,3 | 0,4 | 0,4 | 0,5 | 0,5 | 0,6 | 0,7 | 0,8 | 0,9 | 1,1 | 1,2 | 1,4 | 1,5 | 1,7 | 2 | 2,2 | 2,7 | 3,2 | 3,5 | 4 | 4 | 4,5 | 5 | 6 | 6 | 7,5 | 8 | 10 |
| Closing Time (Sec.) | 0,2 | 0,25 | 0,25 | 0,3 | 0,3 | 0,35 | 0,35 | 0,5 | 0,5 | 0,6 | 0,7 | 0,8 | 0,9 | 1,1 | 1,2 | 1,4 | 1,5 | 1,8 | 1,8 | 2,1 | 2,4 | 2,8 | 3,5 | 4 | 4,1 | 4,6 | 4,5 | 5 | 6 | 7 | 7 | 8,5 | 9 | 11 |
| Air Volume Opening (Cu. In.) | 3,66 | | 5,5 | | 9,8 | | 18,9 | | 31,1 | | 43,3 | | 72,6 | | 94 | | 147,1 | | 191,6 | | 260 | | 362,5 | | 610,2 | | 884,8 | | 1220 | | 1526 | | 2990 | |
| Air Volume Closing (Cu. In.) | 6,1 | | 9,2 | | 15,9 | | 29,9 | | 47,6 | | 67,7 | | 109,8 | | 142,8 | | 230,7 | | 300,2 | | 420,5 | | 577,3 | | 927,6 | | 1305 | | 2014 | | 2441 | | 5126 | |
| Approximate Weight (Lbs) | 1,65 | 1,98 | 2,4 | 2,9 | 3,5 | 4,0 | 6,0 | 6,6 | 8,4 | 9,7 | 11,5 | 13,2 | 17,9 | 20,7 | 22,0 | 27,3 | 31,3 | 37,7 | 39,2 | 47,2 | 53,6 | 72,1 | 75,6 | 96,1 | 120 | 152 | 168 | 211 | 260 | 331 | 280 | 371 | 375 | 525 |

Note: (A) The above moving times of the actuator are obtained in the following test conditions:

For model AT045U ÷ AT501U: (1) Room Temperature, (2) Actuator Stroke 90°, (3) Solenoid Valve with Orifice Of 4 mm and a flow capacity Qn 400L/min., (4) Inside pipe diameter 8 mm, (5) Medium clean air, (6) Air supply pressure 5,5 bar (79,75 Psi), (7) Actuator without external resistance load.

For model AT551U ÷ AT1001U: (1) Room Temperature, (2) Actuator Stroke 90°, (3) Solenoid Valve with Orifice Of 11 mm and a flow capacity Qn 6000L/min., (4) Inside pipe diameter 11 mm, (5) Medium clean air, (6) Air supply pressure 5,5 bar (79,75 Psi), (7) Actuator without external resistance load.

Cautions: obviously on the field applications when one or more of the above parameter are different, the moving time will be different.

SPRING SET CONFIGURATION

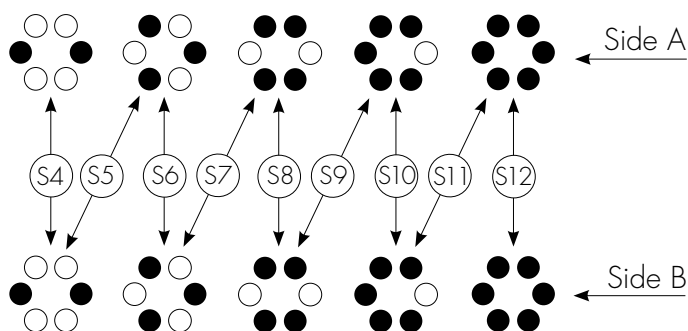
AT045U configuration

| Spring Set | Side B | Side A |
|------------|--------------------|--------------------|
| | AT045U Spring type | AT045U Spring type |
| S1-1 | 1 (green) | 1 (green) |
| S1-2 | 1 (green) | 2 (red) |
| S2-2 | 2 (red) | 2 (red) |
| S2-3 | 2 (red) | 3 (black) |
| S3-3 | 3 (black) | 3 (black) |

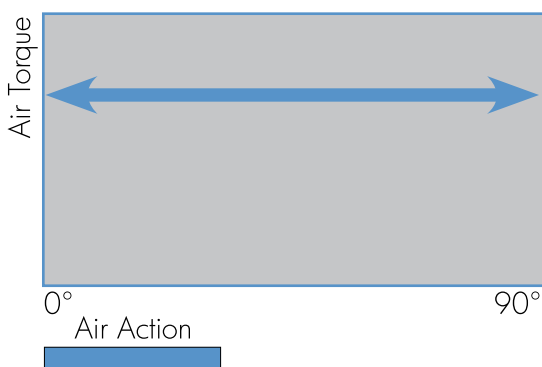
AT051U configuration

| Spring Set | Side B | | Side A | |
|------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | AT051U Internal Spring type | AT051U External Spring type | AT051U Internal Spring type | AT051U External Spring type |
| S1 | 1 (green) | ----- | ----- | 2 (black) |
| S2 | ----- | 2 (black) | ----- | 2 (black) |
| S3 | ----- | 2 (black) | ----- | 3 (red) |
| S4 | ----- | 3 (red) | ----- | 3 (red) |
| S5 | ----- | 3 (red) | 1 (green) | 2 (black) |
| S6 | 1 (green) | 2 (black) | 1 (green) | 2 (black) |
| S7 | 1 (green) | 2 (black) | 1 (green) | 3 (red) |
| S8 | 1 (green) | 3 (red) | 1 (green) | 3 (red) |

AT101U to AT1001U configuration

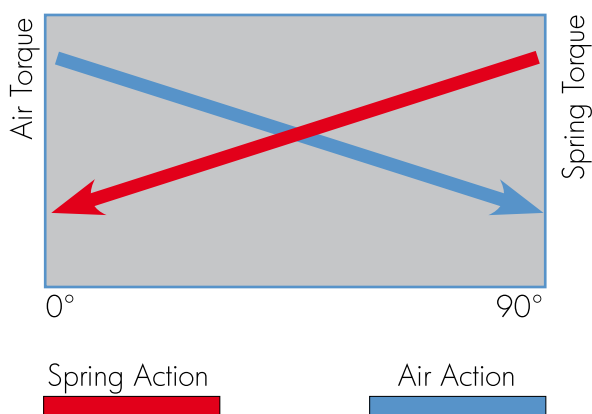


TYPICAL TORQUE CURVES FOR RACK PINION ACTUATORS



Torque output double acting

The double acting actuator has constant torque over the whole stroke, so that all that needs to be known for sizing is the maximum valve torque, which is multiplied by a safety factor (usually at least 25%-30% depending on the valve and service). The value thus obtained is then compared with figures in the minimum air pressure column in the actuator torque tables. After having found the same or nearest value (in excess), the suitable actuator model can be read from the column to the left.



Torque output spring return

The spring return actuator has four different torque values: the air torques at 0° and 90° when it is pressurized, and the spring torques at 90° and 0° when the pressure is discharged. For a correct sizing, the torque curves of the actuator in both strokes have to be higher than the valve torque curves. Also for the spring return actuator sizing, the valve torques have to be multiplied by a safety factor (usually at least 25%-30% depending on the valve and service). The 4th Generation Line Upgrade Series are designed to give a balanced torque when the number of springs per side is equal to the air pressure supply in bar (for example 4 bar, 4 springs per side).

ACTUATOR INTERFACE FOR AUTOMATION

VDI/VDE3845 for ancillary attachment

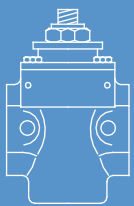
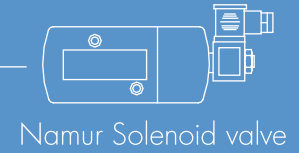
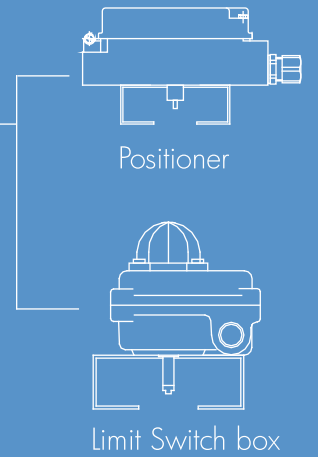


VDI/VDE3845
for actuator pneu-
matic controls

ISO5211/DIN3337
for valve assembling



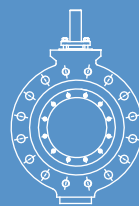
Spigot (on request)



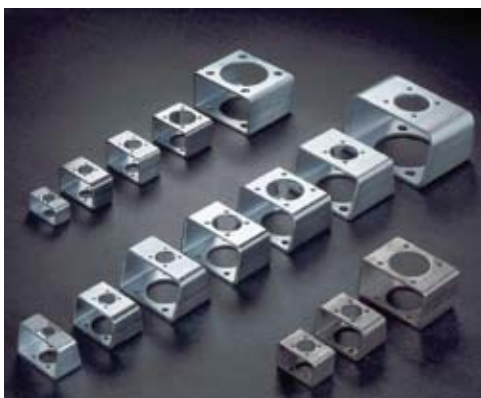
Plug valve



Ball valve



Butterfly valve



COUPLING AND BRACKETS

Air Torque has a large stock of couplings and brackets. All the accessories for valve automation available on request.

STANDARD PROTECTION LEVELS



| PARTS | COATING |
|---|--|
| Body (AT045U to AT751U) | ALODUR anodized |
| Body (AT801U and AT1001U) | Anodized plus epoxy primer, plus polyurethane coating (RAL9007 - grey) |
| End-caps (AT045U to AT801U) | Anodized plus polyester coating (RAL9007 - grey - or RAL5015 blue) |
| End-caps (AT1001U) | Anodized plus polyester coating (RAL9007 - grey) |
| Carbon steel drive shaft (AT051U to AT801U) | ENP |
| Aluminum alloy drive shaft (AT045U and AT1001U) | ALODUR anodized |

PROTECTION LEVEL A



| PARTS | COATING |
|---|--|
| Body | ALODUR anodized plus PTFE coating (light grey) |
| End-caps | Anodized plus PTFE coating (light grey) |
| Carbon steel drive shaft (AT051U to AT801U) | ENP |
| Aluminum alloy drive shaft (AT045U and AT1001U) | ALODUR anodized |

PROTECTION LEVEL D



| PARTS | COATING |
|-------------------------------|---|
| Body | ALODUR anodized plus epoxy coating (RAL7046 - grey) |
| End-caps | Anodized plus epoxy coating (RAL7046 - grey) |
| Stainless steel drive shaft | ENP |
| Stainless steel 316 fasteners | NA |

PROTECTION LEVEL F



STANDARD PROTECTION LEVELS



| PARTS | COATING |
|---|--|
| Body | ALODUR anodized plus PTFE coating (light grey) |
| End-caps | Anodized plus polyester coating (RAL9007 - grey - or RAL5015 blue) |
| End-caps (AT1001U) | Anodized plus polyester coating (RAL9007 - grey) |
| Carbon steel drive shaft (AT051U to AT801U) | ENP |
| Aluminum alloy drive shaft (AT045U and AT1001U) | ALODUR anodized |

PROTECTION LEVEL B



| PARTS | COATING |
|-----------------------------|--|
| Body | ALODUR anodized plus PTFE coating (light grey) |
| End-caps | Anodized plus PTFE coating (light grey) |
| Stainless steel drive shaft | ENP |

PROTECTION LEVEL E



| PARTS | COATING |
|---|-----------------|
| Body (AT045U to AT751U) | ALODUR anodized |
| Body (AT801U and AT1001U) | Anodized |
| End-caps | Anodized |
| Carbon steel drive shaft (AT051U to AT801U) | ENP |
| Aluminum alloy drive shaft (AT045U and AT1001U) | ALODUR anodized |

PROTECTION LEVEL P



AVAILABLE OPTIONS AND ORDERING CODES

| | | | |
|-----------|--|-----------|--|
| 0 | Blank: octi-cam assembled for standard travel stop adjustment K: octi-cam assembled for lock-out capability (stroke adjustment limited at +/- 5°). | 7 | XXD (square dimensions): single square dimension and diagonal assembling XXL: single square dimension and parallel assembling XXDS: dimension and double square S x d (a): flat head dimensions W x d: double keys dimensions |
| 00 | Blank: for standard actuator R50: 50% travel stop limitation (45° up to 90°) R100: 100% travel stop limitation (0° up to 90°) FA: fast acting FM: fail mid 180° rotation 3P: 3 position (only for spring return) 3PD: 3 position (both for spring return and double acting) HC: hydraulic damper TS: top smart connection | 8 | Blank: actuator with standard seals suitable for -40°C (-40°F) to 80°C (+176°F) HT: actuator construction suitable for -15°C (+5°F) to 150°C (+302°F) LLT: actuator construction suitable for -55°C (-67°F) to 80°C (+176°F) |
| 1 | Actuator model, series and rotation AT045U to AT1001U: 90° (standard) AT052U up to AT752U: 120° AT053U to AT753U: 135° AT058U to AT758U: 180° | 9 | Blank: standard assembly type ST, clockwise to close (spring to close) and close indication at air failure condition (or with pressurized port 4 for double acting) for in line mounting. STR: clockwise to close (spring to close) and close indication at air failure condition (or with pressurized port 4 for double acting) for across line mounting. LF: counterclockwise to close (spring to open) and open indication at air failure condition (or with pressurized port 4 for double acting) for across line mounting. LFR: counterclockwise to close (spring to open) and open indication at air failure condition (or with pressurized port 4 for double acting) for in line mounting. |
| 2 | S: spring return D: double acting | | |
| 3 | Only for spring return: number of springs, spring configuration set | | |
| 4 | A, B, D, E, F, P: Protection level | | |
| 5 | ISO Flange | | |
| 6 | Blank: no spigot Y: with spigot | 10 | Further requested options |

(a) head flat orientation to be specified

Examples of model designation

| 0 | 00 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|----|--------|---|----|---|---------|---|-----|----|---|----|
| - | - | AT201U | S | 12 | B | F05-F07 | Y | 14D | HT | - | - |

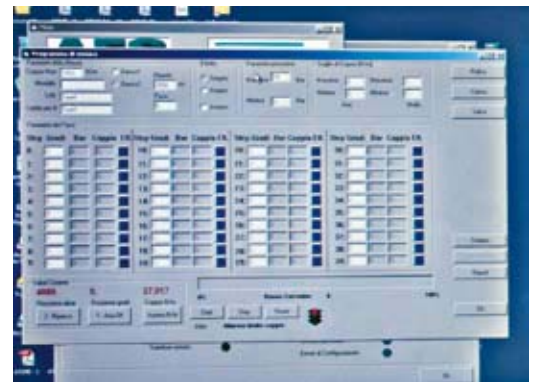
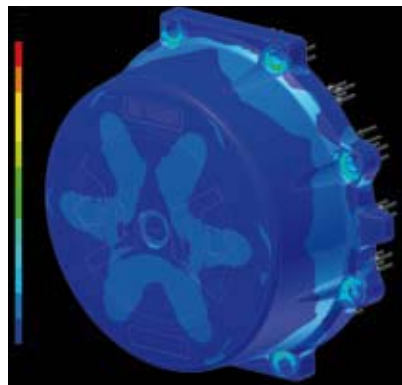
AT201, Upgrade Series, spring return with 12 springs, protection level B, ISO flange F05-F07, with spigot, 14 mm diagonal single square and high temperature construction.

| 0 | 00 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|----|--------|---|---|---|---------|---|------|---|-----|----|
| K | - | AT351U | D | - | A | F07-F10 | - | 17DS | - | LFR | - |

AT351, Upgrade series, with lock-out capability, double acting, protection level A, ISO flange F07-F10, 17 mm double square and counterclockwise to close (spring to open) and open indication at air failure condition (or with pressurized port 4 for double acting) for in line mounting.

- All the Air Torque products are designed, developed and manufactured in Italy.
- Each individual actuator is factory inspected and tested.
- Each individual actuator is supplied with Certificate of Conformity.
- Each individual actuator has a serial number for full traceability.
- Each individual actuator is packed in a special cardboard carton for protection, with a product description label for easy identification and includes installation, operation and maintenance instructions in 5 languages.

AIR TORQUE PRODUCT DESIGN AND TESTING



CERTIFICATIONS

ISO 9001- 2000

SIL3 IEC 61508

ATEX 94/9/EC

Type Approval

GOST
Rostekhnadzor

GOST-R

EN 60529 IEC 529

Nemico

Certificate of Approval
Air Torque S.p.A.
Via alla Campagna, 1
Costa di Mezzate - Bergamo, Italy

Ex

INERIS

SKS VERITAS
TYPE APPROVAL CERTIFICATE

СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
РОСТЕХНАДЗОР РОССИИ

ДЕКЛАРАЦИЯ
СООТВЕТСТВИЯ

REPORT
EN-182
Actuator
A F07-F10/22