

# AIR TORQUE HEAVY DUTY AT-HD EXTENDED SERIES

Scotch yoke actuator  
“manufactured in Italy”



## AT-HD HEAVY DUTY ACTUATORS EXTENDED SERIES

The Air Torque AT-HD Heavy Duty Actuator Extended Series is designed for on/off and modulating duties. The AT-HD actuators can be supplied either with symmetric or canted yoke and can operate ball valve, butterfly valve and plug valves. The AT-HD Series is available in both double acting and spring return configuration. The modular design allows for easy manual overrides.

The AT-HD Series is also available with pneumatic drive supply and hydraulic drive supply.

The AT-HD Series is ready for automation, with all the ancillary attachments in compliance with the international standards. The AT-HD actuators can be equipped with various accessories and panels directly mounted on board or supplied free standing. All is completed in Air Torque factory.

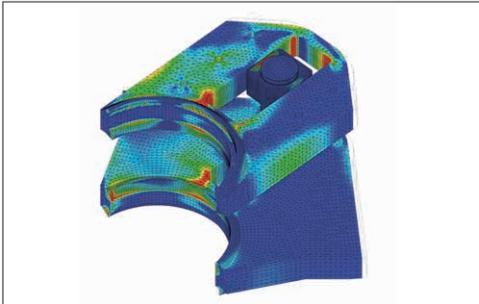
The Air Torque AT-HD Series incorporates several international patents which make these actuators unique for construction details and functionality properties.



# MAIN FEATURES

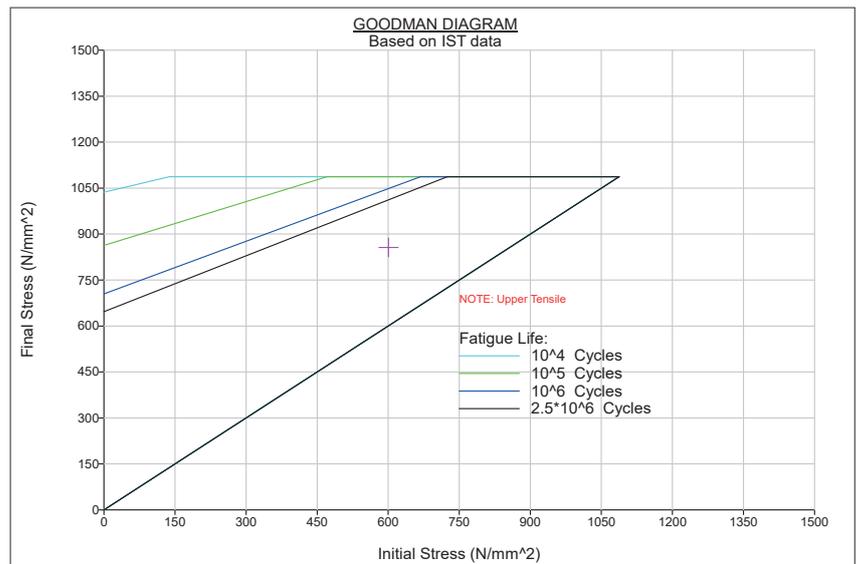
## Robust And Innovative Design

The AT-HD series is designed and fully tested in Air Torque facilities according to the latest and most severe international standards. Special technical features and grade materials are integrated in this product line to withstand the heaviest working condition.



## Quality Proved by Testing

Thanks to recognized know-how, reliability and strong experience in valve automation, Air Torque performs the test in house in order to guarantee compliance with the technical specification related to the quality and reliability of the AT-HD actuators.



## Working conditions

### Symmetric and canted yoke:

The scotch yoke mechanism is available both in symmetric and in canted design. These options allow for greater cost efficiency by leveraging changes to internal mechanism.

### Working temperature range:

S (standard working temp.) -40°C to +80°C (-40°F to 176°F)

H (high working temp.) -15°C to +150°C (+5°F to 302°F)

L (Low working temp.) -60°C to +80°C (-76°F to 176°F)

### Supply medium:

Air, nitrogen or sweet gas, special version available for other gases

### Working pressure (for std actuators):

**Pneumatic:** up to 10 bar (150 PSI) - higher pressure upon request

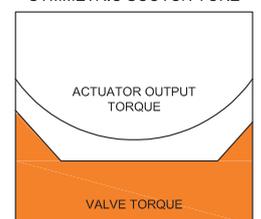
**Hydraulic:** up to 207 bar (3000 PSI)

### Output torque:

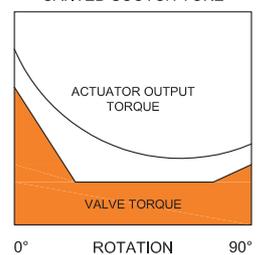
**Double acting configuration:** up to 100.000 Nm (885.000 Lb • in)

**Spring return configuration:** up to 60.000 Nm (531.000 Lb • in)

### SYMMETRIC SCOTCH YOKE



### CANTED SCOTCH YOKE



# DESING DETAILS

## 1. Power module

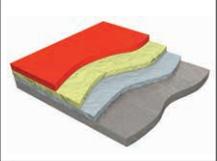
Together with the most popular scotch yoke design with external tie rods for power module, Air Torque developed a new and innovative pneumatic module design without tie rods.

- Cleaner design
- More consistent coating
- Less tie rod elongation trouble under temperature variation
- Easy coating maintenance
- Easier painting process

As standard AT-HD power cylinders are provided without tie rod up to size 685.

## 2. Corrosion protection

The AT-HD series is weatherproof. The actuator shaft is offered with coating, adhering to Air Torque's attention to detail commitment maximum level of protection possible. High corrosion resistance material, coupled with multy layer coating of the components, improve the longevity.



## 3. Flexibility for control panel

As standard the AT-HD can offer fixing points for control panel in both central module sides



## Power modules available

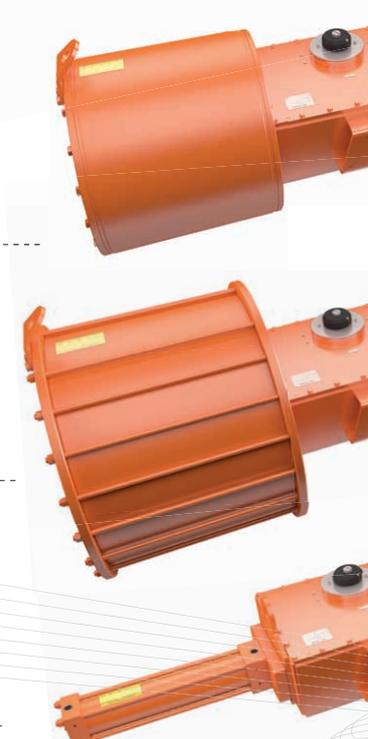
Pneumatic module without tie rods

Pneumatic module with tie rods

Hydraulic module

## 6. Easy maintenance

The unique Air Torque AT-HD power module configuration allows the direct access to the actuator piston after removing the external flange. The cylinder and inner flange is anyway kept in position without any stress on the piston stem. This feature permit easy, quick and safe power cylinder maintenance.



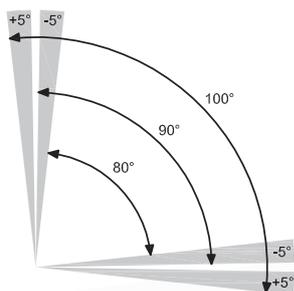
#### 4. Frontal stroke adjustment

The stroke adjustment is possible through screws located in the frontal area of the actuator:

- Simpler stroke adjustment
- Shorter actuator
- Less extended area of potential corrosion



#### Rotation and stroke adjustment



#### 5. Greased for life

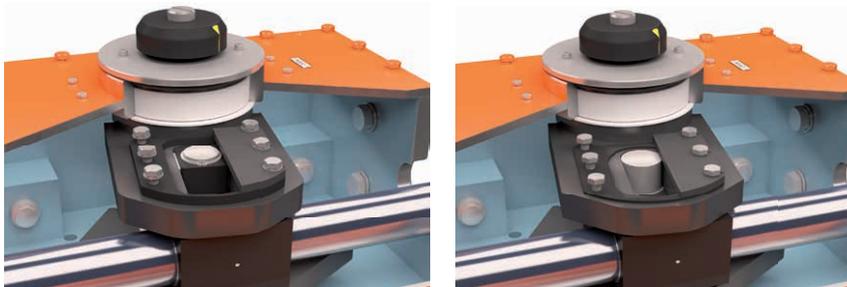
The unique design of the scotch yoke mechanism coupled with special grease selection, delivers a long grease retention and less maintenance over the life of the actuator



#### 7. Long life - minimized maintenance

The AT-HD series is designed to minimize the maintenance frequency and so to provide lasting and efficient performance.

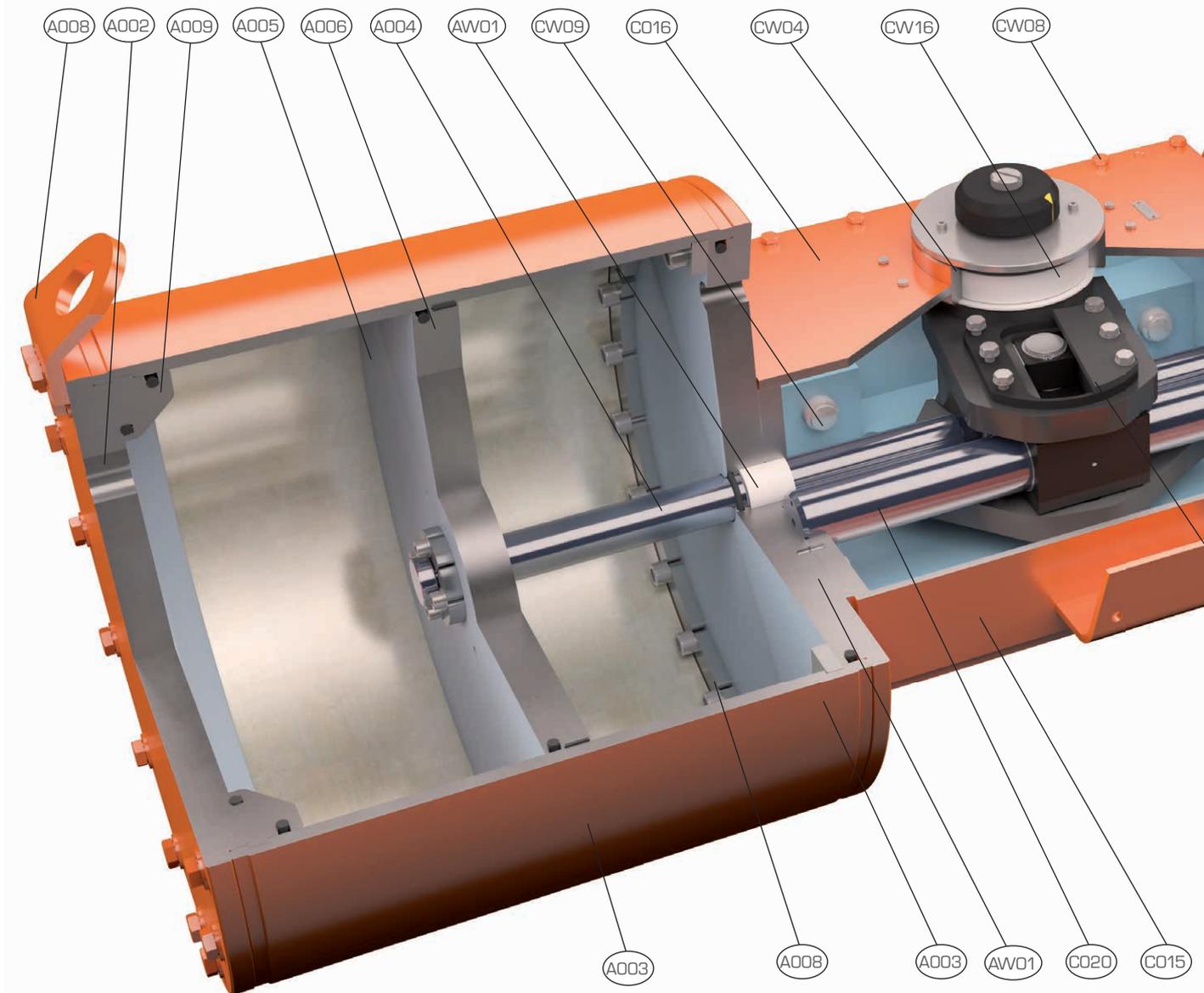
- Innovative and unique engineering
- State-of-art materials and surface treatments
- Extended lifespan
- High frequency cycle service



All these unique benefit are granted by Air Torque two different mechanism concepts, both covered by international patents: roll-in pin (for size up to AT-HD 085 included) and sliding block with special insert (from the sizes AT-HD 100 and bigger).

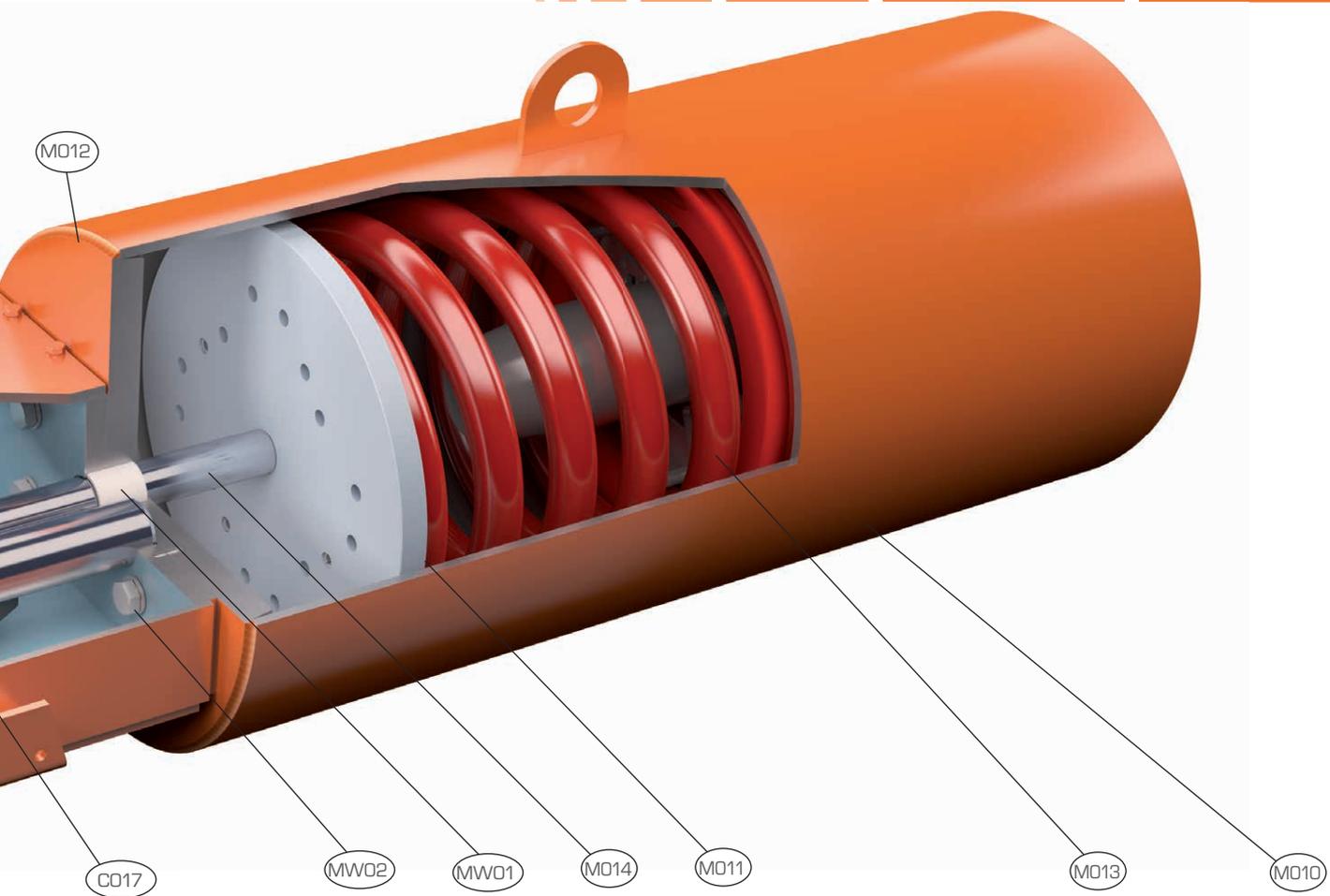
- Low friction level
- Longer life
- Stable actuators output torque through the life of the actuator

# ACTUATOR PART LIST

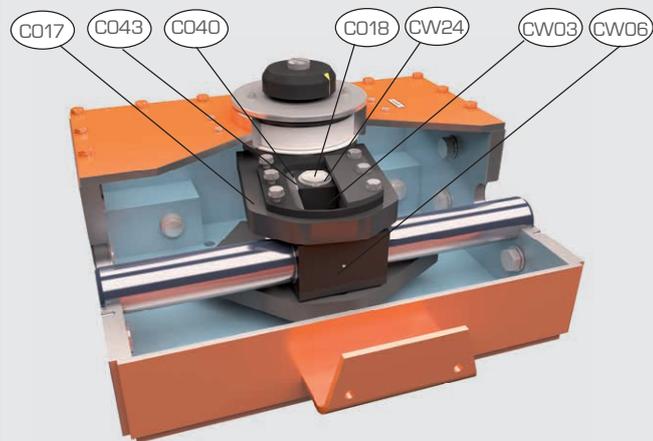


| PART N°. | DESCRIPTION                      | STD OP. TEMP. MATERIAL         |
|----------|----------------------------------|--------------------------------|
| C017     | Scotch yoke                      | High alloy steel/ Carbon steel |
| C015     | Housing                          | Carbon steel                   |
| C016     | Cover                            | Carbon steel                   |
| C020     | Guide bar                        | High alloy steel               |
| C024     | Shaft extension                  | Stainless steel                |
| C025     | Shaft cover                      | Stainless steel                |
| CW04     | O-Ring (shaft)                   | M-NBR                          |
| CW08     | Hex. Screw (Cover)               | Stainless steel                |
| CW12     | Stop hex. Screw                  | Stainless steel                |
| CW16     | Shaft bearing                    | High grade polymer             |
| A001     | Power cylinder connection flange | Carbon steel                   |
| A002     | End cylinder flange              | Carbon steel                   |
| A003     | Power cylindr                    | Carbon steel                   |

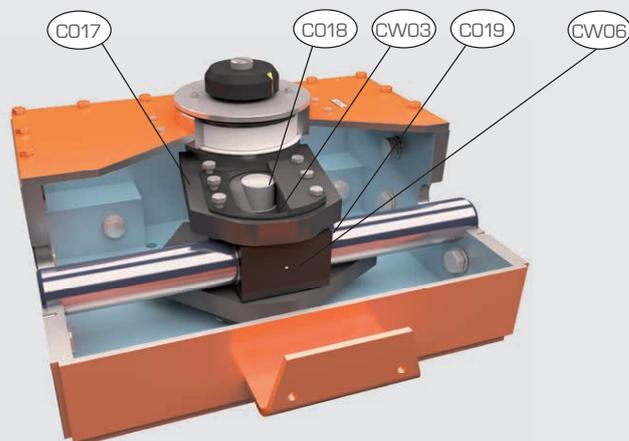
| PART N°.  | DESCRIPTION                     | STD OP. TEMP. MATERIAL         |
|-----------|---------------------------------|--------------------------------|
| A004      | Piston shaft                    | High alloy steel               |
| A005      | Piston                          | Carbon steel                   |
| A006      | Bearing                         | PTFE                           |
| A008      | Sector                          | High alloy steel/ Carbon steel |
| A009      | Retainer flange                 | Carbon steel                   |
| AW01      | Sleeve                          | High grade polymer             |
| AW03 MW02 | Hex. Screw (Module connection)  | Carbon steel                   |
| M010      | Catridge spring cylinder        | Carbon steel                   |
| M011      | Spring compression plate        | Carbon steel                   |
| M012      | Spring module connection flange | Carbon steel                   |
| M013      | Spring                          | Spring alloy steel             |
| M014      | Shaft (Spring module)           | High alloy steel               |
| MW01      | Sleeve                          | High grade polymer             |



### MECHANISM TYPE



Standard for AT-HD 100 and bigger (Smaller available on request)



Standard for AT-HD 065-085

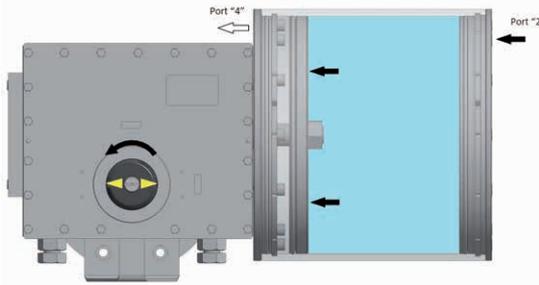
| PART N°. | DESCRIPTION           | STD OP. TEMP. MATERIAL         |
|----------|-----------------------|--------------------------------|
| C017     | Scotch yoke           | High alloy steel/ Carbon steel |
| C018     | Pin                   | Alloy steel                    |
| C019     | Central sliding block | High strength steel            |
| C040     | Yoke sliding block    | High strength steel            |
| C043     | Sliding block         | High grade polymer             |
| CW03     | Sleeve (Pin)          | Hardened steel                 |
| CW06     | Screw (Sliding block) | Stainless steel                |
| CW24     | Smalley               | Stainless steel                |

| PART N°. | DESCRIPTION           | STD OP. TEMP. MATERIAL         |
|----------|-----------------------|--------------------------------|
| C017     | Scotch yoke           | High alloy steel/ Carbon steel |
| C018     | Pin                   | Alloy steel                    |
| C019     | Central sliding block | High strength steel            |
| CW03     | Sleeve (Pin)          | Hardened steel                 |
| CW06     | Screw (Sliding block) | Stainless steel                |

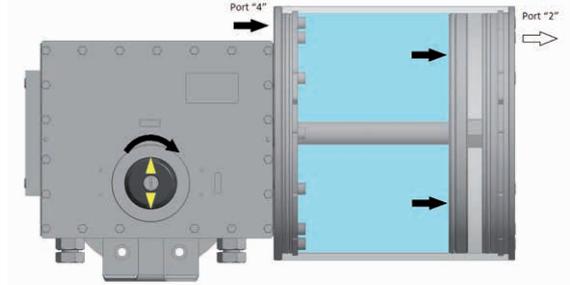
# OPERATING FUNCTION SCHEME

## DOUBLE ACTING PNEUMATIC ACTUATORS - CLOCKWISE CLOSING ROTATION (top view)

Air supplied to port 2 forces the piston toward the central module. A counter clockwise rotation is achieved. Exhaust air flows through the port 4.

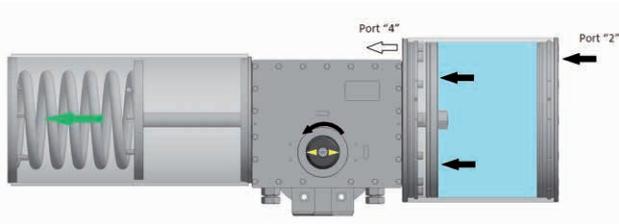


Air supplied to port 4 forces the piston far from the central module/toward the end of the power module. A clockwise rotation is achieved. Exhaust air flows from the port 2

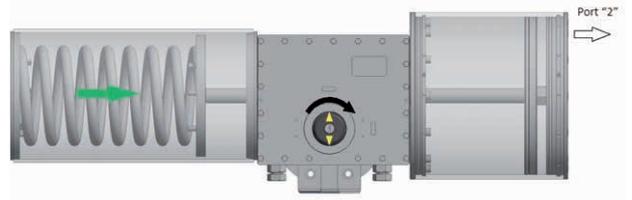


## SPRING RETURN PNEUMATIC ACTUATORS - CLOCKWISE CLOSING ROTATION (top view)

Air supplied to port 2 forces the piston toward the central module, compressing the spring. A counter clockwise rotation is achieved. Exhaust air flows from port 4.

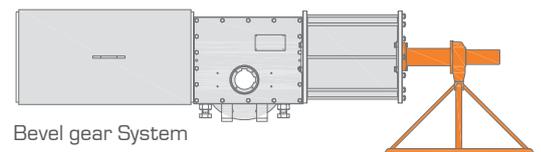
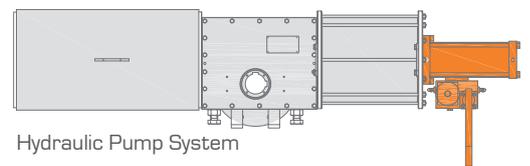


The depressurization to the port 2 (due to air supply cut or electricity cut) allows the spring to move the piston far from the central module/toward the end of the power module. A clockwise rotation is achieved. Exhaust air flows from port 2.



# AVAILABLE OPTIONS FOR EMERGENCY MANUAL OPERATIONS

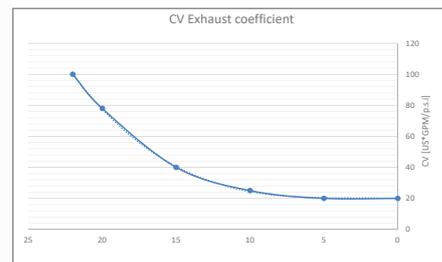
Different options are available for emergency operations. Manual overrides are an important options for valve automation.



## DESIGNED FOR FIELD SPECIFICATION

### FAST ACTING AND Q&D SYSTEM

For specific application Air Torque can supply the AT-HD actuator series with the ability to stroke rapidly (opening and closing). Depending on the application the fast acting option can be combined with the actuator dampening features which allows for the modulation of the content of energy discharged over the valve stem due to quick maneuver.



### DEDICATED VALVE INTERFACE

AT-HD actuators can be supplied with linkage to the valve. As alternative the valve interface of the actuator can be designed specifically to fit to the valve top mounting.



### CONTROL SYSTEM

The control panels and control systems package is an added value Air Torque can offer. With extensive field experience in valve automation we are able to satisfy almost all the customers requirements. The applications of our control systems are vast, from Emergency shutdown (ESD) to partial stroke (PST), and quick operation to fieldbus modulating duties, to complete HIPPS systems control units.

Air Torque has the ability to size, design and manufacture the control panels.



### FIRE PROTECTION SOLUTIONS

Our extensive experience in oil and gas, refineries and petrochemical industries enable us to provide the AT-HD equipped with different fire protections in order to permit the AT-HD actuators and related control system to continuously operate under a direct fire action for example with a temperature up to 1093°C/2000°F for 30 minutes in accordance with the ANSI/UL 1709 Standards.

Air Torque can offer different fire proofing systems from flexible and semirigid jackets to intumescent coating directly applied to the actuators.



# CERTIFICATIONS/COMPLIANCE

Air Torque S.p.A. is fully complying with the standard international requirements.

The management and quality system is certified according to the ISO 9001. Together with this certification the Air Torque complete range of actuators has been awarded with additional approvals and certifications.

## CERTIFICATION:

- ATEX 2014/34/EU
- SIL3 capable
- EC Declaration of conformity
- TR CU 010/2011
- TR CU 012/2011
- IP67 - Degree of protection
- .....



## HOW TO ORDER:

|   |                                |  |    |                              |  |
|---|--------------------------------|--|----|------------------------------|--|
| 1 | <b>ACTUATORS MODEL</b>         | AT-HD= for models with lever arm from 065 mm including and bigger.   | 10 | <b>SUPPLY MEDIUM</b>         | P = Pneumatic<br>H = Hydraulic<br>G = Gas  |
| 2 | <b>TRAVEL STOP</b>             | C = Central travel stop 0-90°<br>D = Central travel stop 0-80°<br>F = Central travel stop 0-60°<br><i>Different stroke adjustment are available on request</i> | 11 | <b>POWER CYLINDER SIZE</b>   | From P235 up to P1150<br>From H40 up to H200   |
| 3 | <b>ACTUATOR CENTRAL MODULE</b> | ...065 - 085 - 100 - 130 - 160 - 200...  | 12 | <b>POWER MODULE</b>          | For pneumatic module:<br>0 = From P235 up to P685 without tie rods<br>1 = From P735 up to P1150 with tie rods<br>For hydraulic module: With tie rods |
| 4 | <b>YOKE TYPE</b>               | S = Symmetric<br>C = Canted  | 13 | <b>OPERATING TEMPERATURE</b> | S = Standard -40°C ÷ +80°C<br>H = High temperature -15°C ÷ +150°C<br>L = Low temperature -60°C ÷ +80°C   |
| 5 | <b>MECHANISM TYPE</b>          | 0 = Rolling pin<br>1 = Sliding block   | 14 | <b>SUPPLY CONNECTION</b>     | STANDARD: 1/4" NPT up to 1"NPT<br>AS OPTION: 1/4" GAS up to 1"GAS  |
| 6 | <b>ACTION</b>                  | D = Double acting<br>DD = Doble-Double acting<br>SC = Spring return / Fail to CLOSE<br>SO = Spring return / Fail to OPEN                                       | 15 | <b>OPTIONS</b>               | OO = Standard without manual override<br>BG = Bevel gear<br>HP = Hydraulic pump<br>GD = Quick and damper (Q&D)                                       |
| 7 | <b>SPRING MODULE</b>           | O2 = Spring set O2<br>O4 = Spring set O4<br>O6 = Spring set O6<br>O8 = Spring set O8<br>Sprign set. 10 is available on reques                                  | 16 | <b>ACTUATOR COATING</b>      | STD = standard painting<br>Different coatings are available on request   |
| 8 | <b>ISO 5211 FLANGE</b>         | up to F48  | 17 | <b>FINAL COLOR</b>           | standard = RAL2008<br>Different color are available on request   |
| 9 | <b>DRIVE CONNECTION</b>        | Standard: double key dimension(*)<br>Different connections are available on request  |    |                              |  |

## HOW TO ORDER: EXAMPLES

|       |          |     |     |         |    |    |     |        |    |     |    |
|-------|----------|-----|-----|---------|----|----|-----|--------|----|-----|----|
| 1     | 2        | 3   | 4   | 5       | 6  | 7  | 8   | 9      | 10 | 11  | 12 |
| AT-HD | C        | 100 | S   | 1       | SC | 02 | F30 | D80X22 | P  | 435 | 0  |
| 13    | 14       | 15  | 16  | 17      | 18 |    |     |        |    |     |    |
| S     | 3/4" NPT | 00  | STD | RAL2008 | -  |    |     |        |    |     |    |

## STANDARD ACTUATOR MARKING:

|       |   |     |   |   |    |    |    |     |    |
|-------|---|-----|---|---|----|----|----|-----|----|
| 1     | 2 | 3   | 4 | 5 | 6  | 7  | 10 | 11  | 15 |
| AT-HD | C | 100 | S | 1 | SC | 02 | P  | 435 | 00 |

For complete dimensions and performance data, refer to:

HD - E - 02/M (metric)

HD - E - 02/I (imperial)



HEAD OFFICE AND WORKS



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