Hydraulic and Pneumatic Actuators
THE COMPANY

AFC is an Italian company founded at the beginning of 2013, specialized in manufacturing of HYDRAULIC & PNEUMATIC ACTUATORS for valve automation.

AFC plant is located in Mesero (MI), a town in the North of Italy, very close to the International airport of Milano Malpensa, and a few minutes from one of the main Italian highway (A4 Torino-Trieste). This geographical area is historically tied up with the Italian energy market and related industrial technologies and valve manufacturers.

The management team is made up by young and skilled people with a solid background in project engineering, production and executive responsibilities. Coming from some of the most important Italian actuators companies, these people have worked for years behind the scenes of some of the largest worldwide projects.

AFC was born with the intention of producing the best and compact actuators for all applications and different requirements in order to always guarantee the best product to the end user.

The cornerstones of our business are an extraordinarily wide range of products, the commitment to excellence in our field, and the will to face new challenges.
**DESIGN**

Due to the ability of highly qualified engineers, to the competence acquired over years and the most advanced design techniques, our team is able to internally develop innovative products in the field of flow control.

All the main parts are designed using 3D CAD software, optimized and revised by Finite Elements Analysis to guarantee product integrity in the most critical conditions and applications. This approach enables us to produce the most compact actuators in the world.

A very strong knowledge and competence in the design of large springs permits us to optimize the spring pack reducing dimensions and weights.

Our extensive know-how and experience in the field of actuators permits us to manufacture Scotch-Yoke, Rack & Pinion, Helical Slot & Helical Spline, Rod & Crank actuators; standard and extremely compact linear actuators in both hydraulic and pneumatic execution.

We are able to provide a complete design activity according to the customer requests, producing tailor-made solutions.

Our engineering activity is made according to the most known design codes.

Particular attention is paid to the testing of new projects during the engineering phase: cycle load test and simulation tests are accurately realized on our test bench equipped with appropriate measurement instruments.

**MANUFACTURING**

Suppliers are a decisive component of a company system. For this reason, the partnership with the suppliers has to guarantee mutual respect, a common point of view, the interaction of management processes and technologies and the exchange of knowledge and information. It is also from the supplier that depends the quality of the product.

This is why AFC chooses its suppliers according to specific evaluation criteria in order to:

- establish partnerships for the common development and improvement;
- inspire, encourage and recognize its suppliers’ improvements;
- simplify communication and information exchange;
- set long lasting relationship of mutual benefit;
- exchange experience and resources;
- identify and choose key suppliers.
TESTING

**FAT TEST**

For each assembled actuator, AFC performs an accurate Factory Acceptance Test to evaluate all the principal parameters of the machinery:

- Dimensional check on the actuator in compliance with the approved G.A. drawings;
- Actuator to valve interface compliance with applicable valve top mounting;
- Hydrostatic Test at 1,5 times the maximum working pressure;
- Cylinder Leakage tests checked with gas leakage detector after pressurization.

**STATIC PERFORMANCE TEST**

The static performance test permits to measure actuator performances (torque/thrust) locking the test bench in defined angular/linear stroke position and visualize/record performance value to a fixed input pressure.

A very accurate oleodynamic test bench connected to a PC through a PLC permits a real time performances check.

**DYNAMIC PERFORMANCE TEST**

The dynamic performance test consists of measuring actuator performances during all complete angular/linear stroke, maintaining the pressure at a set value (typically min. and max. working pressure).

This test allows to evaluate the complete stroke and analyze possible discontinuity point in the performance graph.

**VALVE SIMULATION TEST**

The simulation test allows to simulate the valve resistance torque point by point during the complete angular/linear stroke: the automatic test bench modulates the inlet pressure and the brake force to simulate the real valve presence.

A complete Test Report is automatically filled in during the test by the computerized control systems, all the main data are recorded (inlet pressure, torque, thrust, temperature).
AFTER SALES

The reliability and high productivity are fundamental values in the life of a machine. AFC engineering staff is at the customer's disposal, to provide quick and efficient technical support.

SPARE PARTS

The availability of spare parts is an essential element to reduce production standstill and to support the preventive maintenance.

AFC ensures the supply and delivery of the spares in a short time, and the possibility to have a dedicated stock of spares on demand.

ASSISTANCE

In case the problem on the machine cannot be solved through on-line support, AFC engineers are ready to intervene in person at the customer's plant in order to provide the necessary assistance to restore the machine fully functioning. Trained personnel can support the customer in equipment installation, problems detection, operation and maintenance aspects directly on site, providing the required experience.

QUALITY AND CERTIFICATIONS

AFC has been awarded with the quality system certification due to its full compliance to Quality standard ISO9001. The ISO 9001:2008 is a globally recognized standard for quality management systems and processes, that ensures consistency in the quality of the services delivered to the clients.

Our actuators have been designed and built to guarantee safety and maximum life under the heaviest possible conditions. Every detail is designed, verified and checked during all production process steps, then all finished products are tested and certified with care according the severe criteria required by the UNI EN ISO 9001-08 quality standard.

Our quality policy is to supply our customer with professional services which are perfectly able to fulfill the expectations and fully comply with the agreed requirements.
The Scotch Yoke mechanism is a device that employs a sliding pin in a yoke such that the effective moment arm is constantly changing.

The moment arm is longest at the start and end of the turning moment.

The Scotch Yoke actuators series YS (Yoke Symmetric) end YC (Yoke Canted) have been designed to act rotary valves up to 1,700,000 Nm. Thanks to the torque curve of this mechanism, this series is particularly suited to move ball or butterfly valves, both ON/OFF and modulation ones.

The actuators have been designed by using finite elements calculation methods, the bodies have very high stiffness values to reduce misalignment and friction thus increasing efficiency and the actuator's working life itself.

A wide range of variants will meet the different requirements of each plant and environmental use. Thanks to AFC expertise and flexibility, other solutions and certifications may be arranged and designed according to the customer specific needs.

The Symmetric Yoke allows an equal torque at both start and end positions.

This is the best choice in applications where the torque requirements at the break to open and break to close are similar.

The Canted Yoke mechanism delivers more torque at one extremity of stroke.

The use of canted torque arms can reduce costs, weight and size of the actuator where the valve torque demand is highest at one end of stroke.
Main Features

- Guide bar to absorb lateral load and guarantee extended life
- Extremely compact design that extends in only one side
- Canted or Symmetric design to best adapt to the valve torque
- In line external travel stop 90° ±4° to eliminate asymmetrical loads
- Easily visible local position indicator with Namur interface
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Multiple spring design, increased reliability and std. configurations
- Suitable for high frequency and high speed operation (< 0.2 s)
- Modulation and ON/OFF design to operate in all conditions
- Compliant to PED 97/23/EC. ATEX.

This is the smallest Scotch Yoke actuators series designed for torques from 500 Nm to 10.000 Nm. It is extremely compact and flexible, it extends only in one side direction and it is particularly suitable for ball and butterfly valves, both ON/OFF than modulation ones.

The welded body is equipped with in-slot gaskets for each coupling zone in order to ensure direct contact between metal parts and avoid reciprocal movements which often cause uncontrolled wear, considerable performance decrease or screws loosening.

This type of actuator can house up to 3 concentric springs, for a total of 7 spring pack configurations covering the widest range of valves. Considering the two typologies of yoke (symmetric and canted) the possible configurations amount to 14.

An innovative engageable handweel manual control, which is perfectly integrated in the body, is directly acting on the guide block ensuring the handling in all conditions. This system is equipped with a security lock to avoid accidental handling.

The actuator is easily and quickly disassembling with standard tools. All the maintenance and control operations can be easily and quickly carried out thanks to the actuator design which is been expressly studied to facilitate these operations.
SCOTCH YOKE ACTUATORS YC SERIES

This scotch yoke series covers torque values up to 850,000 Nm and it is been studied in detail to ensure high performance and long lasting quality.

Different sets of concentric springs have been designed to reduce dimensions; the spring pack can be separately assembled using screws which are easily accessible from the outside and without the aid of special tools.

With a basic and sturdy design, it takes up a minimal amount of space considering the torque it produces.

A wide range of variants will meet the different requirements of each plant and environmental use. Thanks to AFC expertise and flexibility, other solutions and certifications may be arranged and designed according to the customer specific needs.

- Guide bar to absorb lateral load and guarantee extended life
- Canted or Symmetric design to best adapt to the valve torque
- In line external travel stop 90° ±4° to eliminate asymmetrical loads
- Easily visible local position indicator with Namur interface
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
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- Compliant to PED 97/23/EC. and ATEX
This is the most powerful actuator series manufactured by AFC. Thanks to the double scotch yoke configuration, the actuator is perfectly balanced and easy to move and match to the valve. It is available only in the hydraulic version, it can develop torques up to 1.700,000 Nm and reach less than 4 seconds operating time including time for braking.

A particular hydraulic dumper system guarantees a rapid and controlled deceleration without sudden shocks thus avoiding water hammer and the resulting excessive pressurization of the cylinder.

It is possible to set the damper's efficacy and point of insertion during the braking. The hydraulic communication allows the braking to be simultaneous and perfectly balanced in the two cylinders, reducing shock and vibrations.

**Main Features**

- Double scotch yoke guarantees the balance of all the internal forces
- Double guide bar to absorb lateral load and guarantee extended life
- Compact size, balanced weight and symmetrical extension
- Canted or Symmetric design to best adapt to the valve torque
- In line external travel stop 90° ±4° to eliminate asymmetrical loads
- Redundant piston sealing arrangement
- High strength materials for internal parts
- Easily visible local position indicator with Namur interface
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
The rack and pinion actuators often represent the cheapest solution for rotary small dimension valves or valves that need a constant torque during the entire stroke. They are particularly suited for modulation valves and can reach high torques up to 1.100.000 Nm.

For this type of actuator it is extremely important to efficiently support the rack that is subject to heavy forces due to the inclination of the gear tooth. AFC specifically studied an extremely rigid body to easily support the rack during the entire stroke.

The racks slide on composite dry sliding bushing guides ensuring maximum performance and fluidity of movement in each situation of load.

The actuators have been designed by using finite elements calculation methods, the bodies have very high stiffness values to reduce misalignment and friction thus increasing efficiency and the actuator’s working life itself.

A wide range of variants will meet the different requirements of each plant and environmental use. Thanks to AFC expertise and flexibility, other solutions and certifications may be arranged and designed according to the customer specific needs.
This is the smallest rack and pinion series for torques up to 10,000 Nm. It is characterized by the extremely compact and basic design but at the same time it is able to guarantee outstanding resistance and stiffness to the system.

This economical selection of actuators is designed to use the same cylinders and spring packs of the corresponding scotch yoke actuator series in order to guarantee spares parts always available in stock. Thanks to this and other expedients, these actuators can be supplied in a very short time.

**Main Features**

- Rack is completely supported to absorb lateral load
- Extremely compact and flexible design
- Strong materials for internal parts
- Overturnable body for spring to open or spring to close
- Easily visible local position indicator with Namur interface
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Multiple spring design, increased reliability and std. configurations
- Suitable for high frequency and high speed operation (< 0.2 s)
- Modulation and ON/OFF design to operate in all conditions
- Compliant to PED 97/23/EC. and ATEX
RACK AND PINION ACTUATORS RP SERIES

This is the medium-size rack and pinion series for torques up to 550,000 Nm. Its design is very flexible, there can be many possible configurations thanks to the modular components and to the design specifically studied to satisfy different dimensional and torque needs.

The interface is developed and optimized to allow the interchange of cylinders and spring packs of the corresponding scotch yoke actuators. By doing so, productivity is optimized and it is possible to reduce costs and delivery time.

The pneumatic version employs tandem and triple cylinders up to a diameter of 935 mm in order to ensure a great dimensional versatility and a wide range of pressure to be used.

**Main Features**

- Rack completely supported to absorb lateral forces
- Extremely compact body with rigid design
- Easily visible local position indicator with Namur interface
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Multiple spring design, increased reliability and std. configurations
- Suitable for high frequency and high speed operation (< 0.2 s)
- Modulation and ON/OFF design to operate in all conditions
- Compliant to PED 97/23/EC. and ATEX
- In line travel stop 90° ±4° to eliminate asymmetrical loads

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**Configuration Options**

- Hydraulic single acting with manual gear
- Pneumatic double acting
- Hydraulic double acting with manual gear
- Pneumatic single acting with manual gear
- Pneumatic double acting with two cylinders
- Hydraulic double acting with manual pump
- Pneumatic double acting with manual gear
- Pneumatic single acting
The biggest rack and pinion series has two opposing racks so that the stress on the gear tooth is halved and this allows to obtain a balanced torque on the pinion.

There can be many possible configurations thanks to the modular components and to the design specifically studied to satisfy different dimensional and torque needs.

Special configurations that extends in only one side for all the situation with particular installation problems.

A particular Hydraulic dumper system guarantees a rapid and controlled deceleration without sudden shocks thus avoiding water hammer and the resulting excessive pressurization of the cylinder.

It is possible to set the dumper's efficacy and point of insertion during the braking. The hydraulic communication allows the braking to be simultaneous and perfectly balanced in the two cylinders, reducing shock and vibrations.

**Main Features**

- Rack completed supported to absorb lateral forces
- Extremely compact body with rigid design
- Easily visible local position indicator with Namur interface
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Multiple spring design, increased reliability and std. configurations
- Suitable for high frequency and high speed operation (< 0.2 s)
- Modulation and ON/OFF design to operate in all conditions
- Compliant to PED 97/23/EC. and ATEX
- In line travel stop 90° ±4° to eliminate asymmetrical loads
- Helical or Belleville springs for greater reliability

**RP 340-540-700-1100**

- Hydraulic single acting
- Fast acting one side execution
- Hydraulic double acting
- With four cylinder for low pressure
- In one side execution
Rotary Rod and Crank actuators (RC Series) are particularly suitable to act modulation valves thanks to their mechanism which has no play, and thanks to their characteristic torque curve.

AFC studied this mechanism to be perfectly housed in the body of YS and YC scotch yoke actuators: this approach allows to use all the components already studied and normally used and to provide a torque range from 500 Nm to 1.700.000 Nm. Therefore AFC is able to repeat the innumerable variations of the scotch and yoke series and guarantee shorter delivery time and very competitive prices.

The following pictures show the tree families of actuators assembled in the rod and crank configuration.

All variants, pressure and temperature limits of the corresponding scotch yoke serie stay unchanged in the Rod and Crank series.
In the helical slot (HS) actuators the linear movement of the piston is turned into rotary movement thanks to a cam specifically machined through a CAD-CAM system. The profile is studied point by point for each 90 degree of angular stroke to obtain the required torque. The absence of sliding elements and the highest flexibility in the gear ratio make this type of actuator particularly suitable for modulation.

This is a very flexible series, the external dimensions (height per diameter ratio) and the torque curve can be modified almost at will.

The actuator is cylindrical and very compact, it can achieve up to 600,000 Nm torque in the standard configuration, it can be equipped with helical or Belleville springs which ensure greater reliability.

**Main Features**

- Extremely compact design and balanced weight
- Torque curve can be customized according to valve
- Design particularly suitable for offshore applications
- Single spring, multiple spring or Belleville spring
- Strong materials for internal parts
- Adjustable travel stop 90° ±4° of angular extra-stroke
- Easily visible local position indicator with Namur interface
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Redundant piston sealing arrangement
- Pneumatic or hydraulic execution
- Fast acting execution (< 0.2 sec)
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request

**Main Features**

- From 10,000 to 600,000 Nm
- +100 (212° f)
- -30 (-22° f)
- 12 bar (145 psig) pneumatic
- 207 bar (3,000 psig) hydraulic
HELICAL SPLINE ACTUATORS HP SERIES

In the helical spline actuators (HP) the piston thrust is converted into torque through a constant pitch helical gear. These actuators act like the rack and pinion ones providing a linear torque curve due to the constant gear ratio. The very basic and simply mechanism ensures reliability, few maintenance and long working life in the heaviest conditions.

The amount of space covered by the cylinder makes this series particularly suitable for offshore installations or in all those cases in which the overall dimensions of the system represent an obstacle for the installation of other types of actuator.

**MAIN FEATURES**

- Extremely compact design and balanced weight
- Linear torque curve suitable for regulating valve
- Dimensions can be customized to best adapt to the valve torque
- Its design is particularly suitable for offshore applications
- Single spring, multiple spring or Belleville spring
- High strength materials for internal parts
- Adjustable travel stop 90° ±4° of angular extra-stroke
- Easily visible local position indicator with Namur interface
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request

**Technical Specifications**

- Pneumatic: from 10,000 to 125,000 bar (145 psig)
- Hydraulic: +100 (212° f) to -30 (-22° f)
- 12 bar (145 psig) pneumatic
- 207 bar (3,000 psig) hydraulic
The linear standard actuators (LS) with a stroke up to 65 mm is used to act linear valves up to 2” with a thrust of 150,000 N.

The design is very compact due to the use of concentric coil springs always available in stock.

The spring preload system is situated internally while outside there are only stay bolts: this system avoids corrosion phenomenon on the safety parts.

These actuators can be equipped with extremely effective pneumatic dumpers which guarantee a soft braking in case of rapid operation (time < 0.2 sec.)

**Main Features**

- Chromium plated carbon steel shaft and cylinder
- Spring preload system simple and safe
- Easy to be disassembled with standard tools
- Compact and modular design
- Adjustable travel stop (on request)
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Std. design pressure 12 bar
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Multiple spring design, increased reliability and std. configurations
- Suitable for high frequency and high speed operation (< 0.2 s)
- Modulation and ON/OFF design to operate in all conditions
- Compliant to PED 97/23/EC. and ATEX
LINEAR STANDARD ACTUATORS LS SERIES

The LS 205 actuators series is been designed to produce thrust up to 1,500,000 N and strokes up to 1,600 for linear valves up to 60°. It can be supplied both in hydraulic than pneumatic execution.

The design is compact thanks to the springs that lay directly on the piston through a swivel disk that allows to compensate the mismatches caused by the springs.

The spring pack can be easily disassembled and assembled using standard tools thanks to a simple but effective system of springs preload completely and internally integrated, in order to protect safety bolts from corrosive phenomena. The shaft is guided in two points so to obtain a perfect alignment during the entire stroke and guarantee a fluid movement which is essential in modulation system.

As for every AFC actuators the part subjected to rubbing/friction are equipped with bearings and chromed surfaces.

**Main Features**

- Compact design and modularity
- Adjustable travel stop (on request)
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Std. design pressure 10 bar
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Multiple spring design, increased reliability and std. configurations
- Suitable for high frequency and high speed operation (< 0.2 s)
- Modulation and ON/OFF design to operate in all conditions
- Compliant to PED 97/23/EC. and ATEX
The linear compact actuator series (LC) is been specifically studied for those cases where there is limited space and it is absolutely necessary to reduce the overall dimensions.

AFC faced the problem by designing an actuator that couples directly to the valve without any kind of spool or bracket. During the stroke the valve shaft runs inside the actuator's body.

The connection to the valve is extremely simple and fast, the position indicator is proportional to the stroke and easily visible thanks to its lateral position, the shaft is perfectly guided in two points to guarantee a fluid movement.

Thanks to the direct connection to the valve, the outer insulation of the actuator is particularly effective as all moving parts are situated inside, protected by external environmental conditions.

**Main Features**

- Extremely compact design to reduce the space
- Direct and very easy valve coupling system
- High protection degree and insulation
- All moving parts are located internally
- Chromium plated carbon steel shaft and cylinder
- Spring preload system simple and safe
- Easy to disassemble with standard tools
- Easily visible local position indicator with Namur interface
- Std. temperatures (-30° +100°); low (-60°) and high (+200°) on request
- Totally enclosed IP 66 construction; IP 67 and IP 68 on request
- Multiple spring design, increased reliability and std. configurations
- Suitable for high frequency and high speed operation (< 0.2 s)
AFC Gas Over Oil and Direct Gas control system are designed to operate using directly the pipeline gas with pressure up to 1500 psi as their power fluid.

Pipeline gas is drawn off from the pipeline, flows through the filter were it is filtered, dehydrated and sweetened in case of H2S presence, then through the control valves flows into the tank to pressurize oil for the actuator operation (opening or closing).

AFC Gas Over Oil control system can be coupled with linear or quarter-turn actuators to provide torque up to 1.700.000 Nm for ball, butterfly and plug valves or thrust up to 1.500.000 N for gate and globe valves.

In direct Gas execution, the pipeline gas, is filtered and directly used to pressurize the actuator cylinder, avoiding oil and tanks.

Both AFC Gas Over Oil and Direct Gas actuators, are designed for rugged, heavy-duty performance in every environments and in the most heavy working conditions.
AIR OVER OIL ACTUATORS

Compressed air is suitable for many low-power systems, but air’s compressibility makes it difficult to control actuators smoothly and accurately. Some low-power systems need the smooth control, rigidity, or synchronization capabilities normally associated with hydraulic systems.

All of these features are available to low-power circuits by using AFC air-over-oil system that uses compressed air for power, and oil for control thus giving smooth control when the power requirement is low.

AFC air-over-oil system uses low-pressure hydraulic cylinders coupled with air-oil tanks, (see figure).

Air pressure is applied to the top of a closed oil tank, and this develops an equal oil pressure which can be handled with low pressure hydraulic components such as flow control, check, and directional control valves, to give smooth, accurate cylinder control.

The advantages are the following:

- cylinder can be throttled more accurately;
- better control over lunge if the tool breaks through the work;
- cylinder can be stopped more accurately in mid stroke.

A single-tank system is used for controlled slow feeding in one direction, with rapid cylinder return.

The diagram above on the left shows slow feeding on the extension stroke with flow control valve V2.

For slow feed on the retraction stroke, the cylinder connections would be reversed.

A double-tank system is used for controlled motion in both directions.

To restore the balance of oil between the tanks, needle valve V4 may be opened when the air pressure is on the tank with the most oil, and this will transfer to the depleted tank.
POSITION INDICATOR AND SWITCH BOXES

Rotary limit switch boxes provide a visual and remote electrical indication of quarter turn valve/actuator position.

BENEFITS:
- explosion proof CE Atex for gases and powders
- 3D two colors visual indicator
- heavy duty metal housing
- twin shaft design
- up to 3 threaded cable entries
- extra terminals for solenoid valve connection (double solenoid)
- ISO F05 and Namur shaft mounting pattern
- high resolution, easy-set, independently adjustable splined cams without tools
- low temperature execution up to -40°C available on request

CLASS AND MATERIALS:
- explosion proof Ex II 2 GD EEx d IIB T4/T5/T6
- waterproof IP67 (IP 68 on request)
- aluminium body and cover die chromium plated and polyester powder coated
- stainless steel body and cover (AISI 316L) on request
- stainless steel shafts

SWITCH OPTIONS:
- el.mechanical SPDT or DPDT silver or gold plated contacts sealed or not (up to 4)
- magnetic proximity SPST, SPDT or DPDT inert gas hermetically sealed (up to 4)
- Namur (EEx ia), PNP 3 wire or 2 wire amplified inductive proximity
- 4-20 mA position transmitter
- AS-I interface
# ORDERING CODE

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**Frame**
- 1R - Actuator model
  - YS = Yoke Symmetric
  - YC = Yoke Canted
  - RP = Rack & Pinion
  - RC = Rod & Crank
  - HS = Helical Slot
  - HP = Helical Spline
- 2R - Frame size
  - 001 = 1000 Nm
  - 003 = 3000 Nm
  - 006 = 5000 Nm
  - 009 = 9000 Nm

**Configuration**
- 4 - Fail mode
  - C = fail close
  - O = fail open
- 6 - Optional device
  - X = without
  - F = dumper
  - B = brake

**Cylinders**
- 8 - N° of cylinders
  - S = single
  - D = double
  - T = triple
  - Q = quad.

**Springs**
- 9 - Spring Cartridge
  - XXXX = without
  - 0101 = ex. code

**Flange**
- 10 - Flange Type
  - from F10 to F60
  - acc. to ISO 5211

**Power Fluid**
- P = pneumatic (air)
- H = hydraulic (oil)
- G = Gas

**Stroke [mm]**
- 065 = 65 mm
- XXX = XXX mm
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