

**PATENT PENDING (Application No. 201921049425)**

# **PNEUMATIC AND HYDRAULIC SCOTCH YOKE ACTUATORS**

## Key Features:

- Integrated NAMUR Solenoid Mounting (Patent Pending)
- Safe Tamperproof Design (Patent Pending)
- Unique Flexible Joint (Patent Pending)
- Integrated NAMUR Switch Box Mounting
- Truly Modular Design
- Symmetric / Canted Yoke
- Water Ingress Protected - IP67M (1m)
- Guaranteed Torque Outputs
- Five Years Warranty

## Operating Ranges:

### Torque Outputs:

Double Acting: 63 - 670,000 Nm (557 - 5,906,668 lb-in)

Spring-return End Torque: 49 - 330,064 Nm (433 - 2,921,312 lb-in)

### Operating Pressure:

Pneumatic: 3 - 13.8 bar (40 - 200 PSIG)

Hydraulic: 27 - 345 bar (400 - 5000 PSIG)

### Operating Temperature:

Standard Range: -37 °C to 100 °C (-35° F to 212° F)

High Range: -26 °C to 204 °C (-15° F to 400° F)

Low Range: -40 °C to 148 °C (-40° F to 300° F)

## Standards & Certifications:

### Self Certifications:

**IP**  
Rating

### In Process Third Party Certifications:

**SIL 3**  
Suitability

**IP**  
Rating

**PED**  
Compliant

**CE**

**Ex**  
ATEX

**Patent Application No:**  
201921049425

## Benefits:

### Safest / Concealed Tamperproof Actuator Design (Patent Pending):

Tie rods are enclosed within cylinder and tie rod nuts are enclosed within the body making it the safest tamperproof actuator available in the entire industry.

### NAMUR Solenoid Mounting Pattern (Patent Pending):

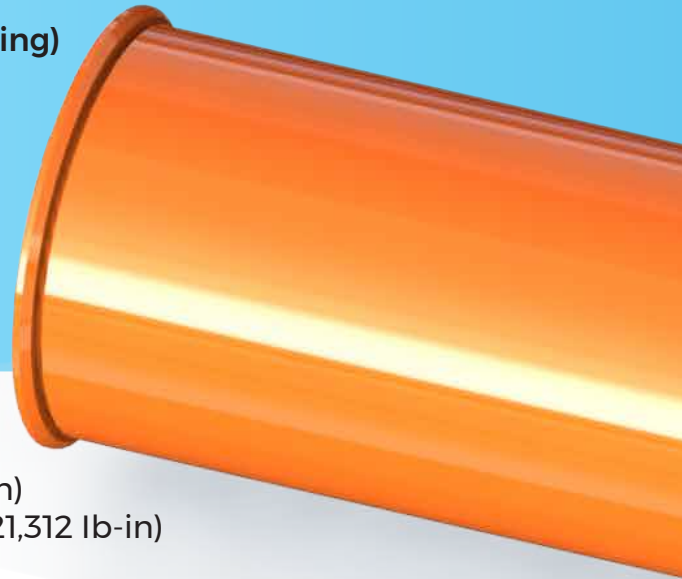
Integrated NAMUR solenoid mounting design allows for compact-control accessory mounting. This reduces external tubing, fittings and eliminates potential leakage paths.

### Compact and Light-Weight Actuators:

Advanced material selection, optimised design and improved center of gravity location make our actuators compact and light-weight compared to other actuators having same torque output.

### Wear Resistant Design:

Unique Flexible Joint (Patent Pending) eliminates side loading enhancing component life and reducing wear. Self-lubricating bearings and high surface finish enhance cyclic life and reduce the component wear.



# A SERIES

49 to 330,064 Nm



### Superior Coatings:

Xylan coating on cylinders and spring can, QPQ coatings on critical components and external paint options results in better performance in harsh environments.

### Best In Industry Warranty:

A Series actuators are backed by 5 year material and workmanship warranty.

### Versatility:

A series actuator Power Modules and Spring Modules can be interchanged easily for the reversal of fail stroke, from fail clockwise to fail counter-clockwise.

### Standard NAMUR Switch Box Mounting Pattern:

Switch Box Mounting / Position Indicator interface as per NAMUR standard.

### Water Ingress Protection:

A Series actuators meets IP67M (Ingress Protection) specifications. Only O-Ring Seals are used (No Gaskets).

### Symmetric or Canted Yoke:

A Series actuators available in symmetric or canted yoke configurations, depending on break torque requirements.

### Interchangeable Module Design:

Truly modular design ensures that Power and Spring Modules can be removed and are interchangeable without removing the top cover while maintaining Ingress Protection integrity. This makes the actuator serviceable while actuator is installed on the pipeline. Modules are available for separate purchase. One can mix and match modules to generate a range of torques for a given actuator body thereby reducing part inventory.

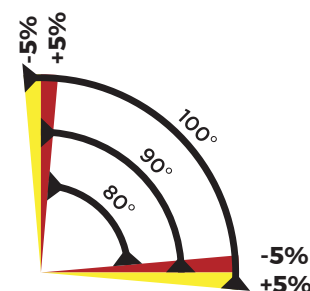
### ISO Valve Mounting:

A Series actuators valve interface is as per the dimensional requirements of ISO 5211.

### Travel Stop Adjustment:

Bi-Directional Travel Stops integral to the actuator, the stops allow 80° to 100° total travel adjustment. 10° of stroke adjustment possible at each end of stroke.

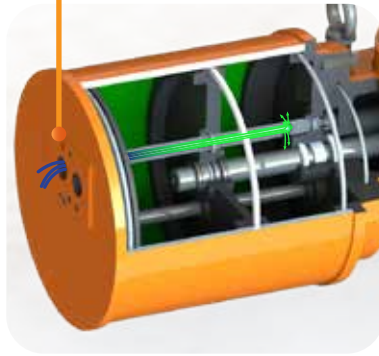
\*Extended travel stops mounted on the cylinder are optional.





**NPT Ports**

Pneumatic and Hydraulic units have NPT Ports. Consult factory for BSP ports and other options.

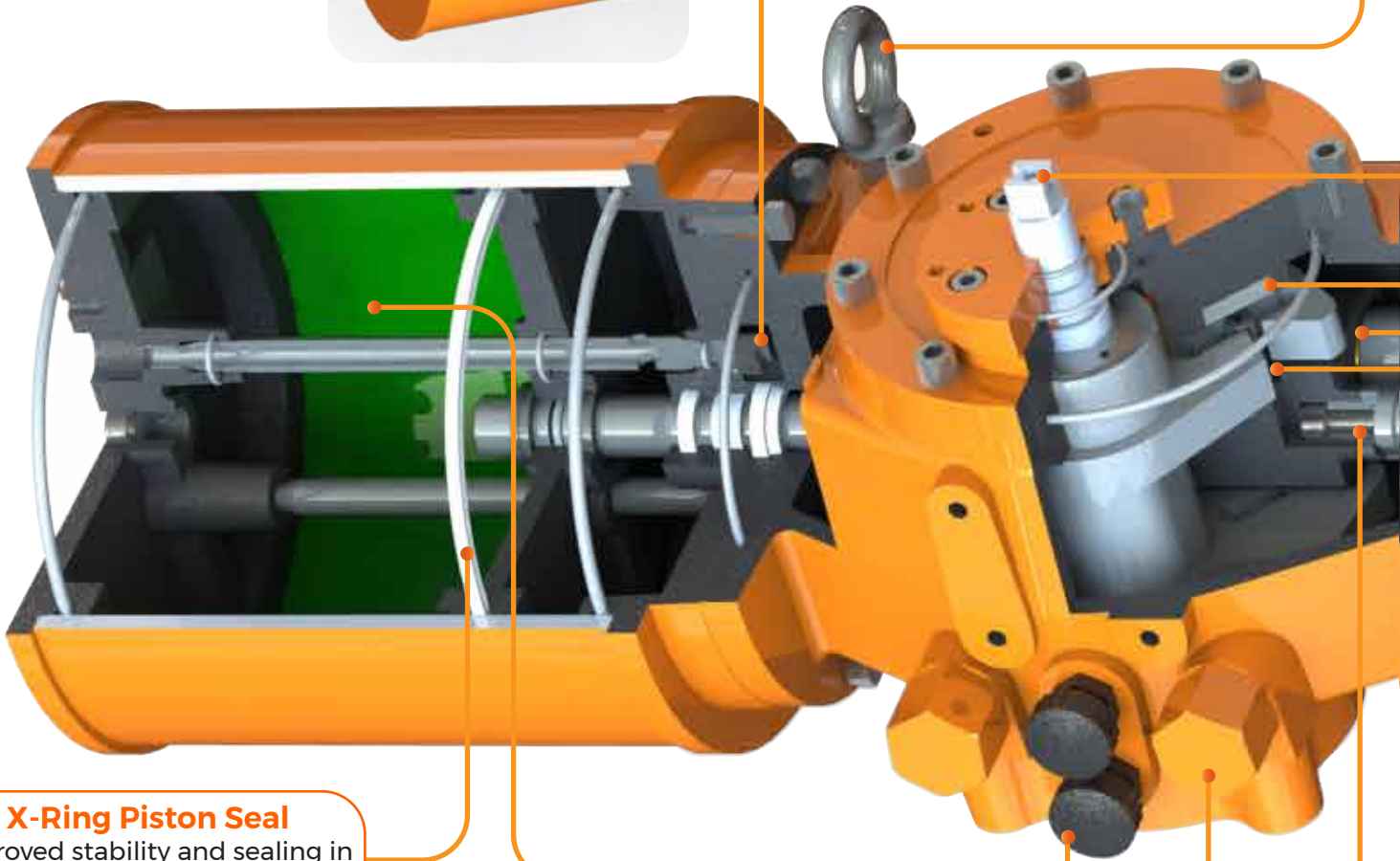


**Solenoid NAMUR Mounting Pattern (Patent Pending)**

Solenoid NAMUR Mounting Pattern eliminates / reduces tubing, fittings and fluid leakage paths. This design prevents air losses and makes the controls and accessories package compact.

**Tampersafe Power Module (Patent Pending)**

Our concealed tamperproof design enhances safety and eliminates unwanted tampering on pressurized equipment.



**X-Ring Piston Seal**

Improved stability and sealing in dynamic applications, greater lubrication retention, reduced friction and wear resulting in improved cycle life.

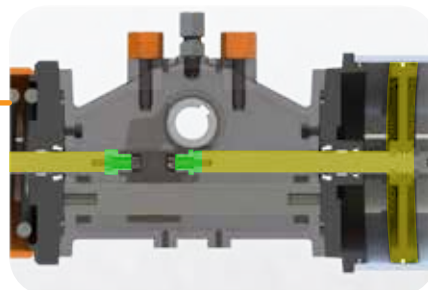
**Vent Checks**

Two drive module vent checks release overpressure. Lower vent isolates the valve stem leakage and Fugitive emissions monitoring devices could also be attached to it.



**Unique Flexible Joint (Patent Pending)**

Unique Flexible Joint connects the piston rod / spring rod with guide block. Patent pending Unique Flexible Joint eliminates side loading enhancing component life and reducing wear of rod, bearings and seals.



# DESIGN FEATURES

## Easy Lifting

Balanced lifting eye bolts for safe actuator handling during shipping, installation and removal.

## Optional Flexible Switch Box Coupling

Enhances seal life and helps maintain switch box integrity.

## Self Lubricated Bearings

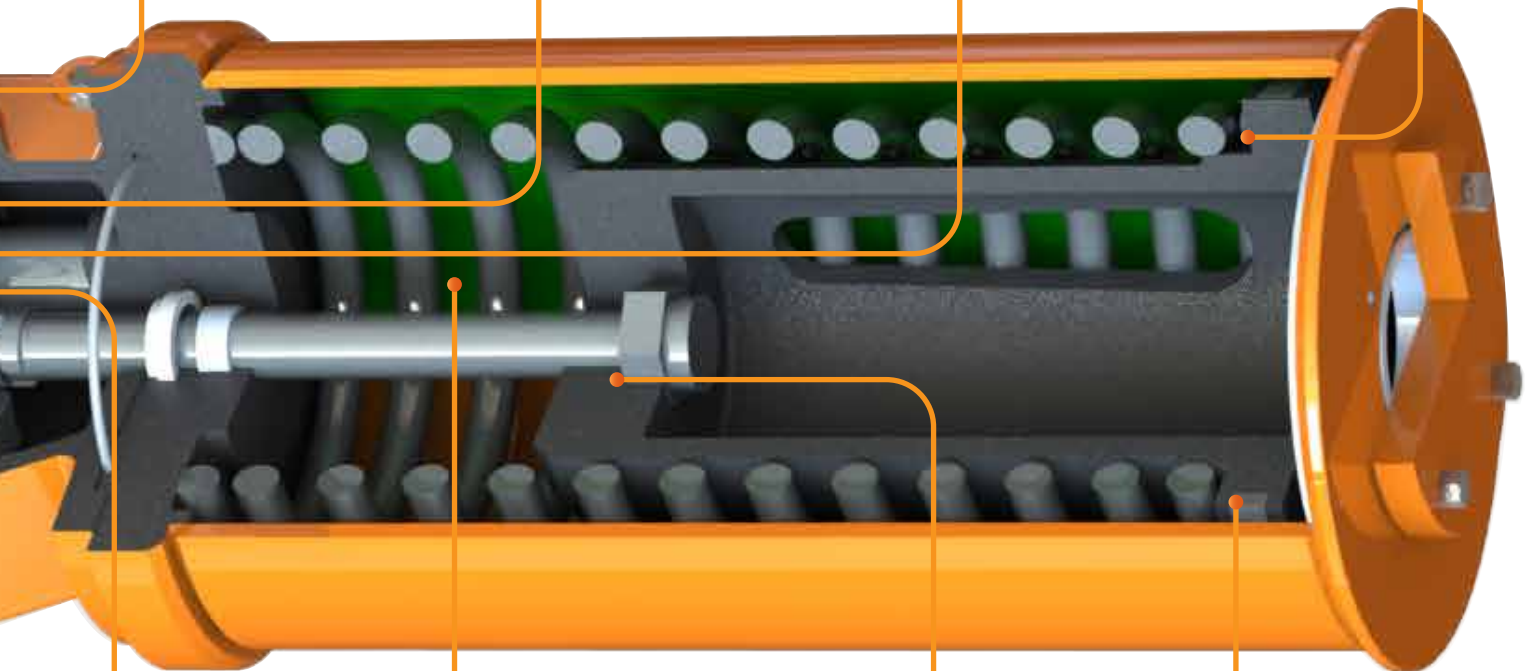
Protect sliding and rotating components, with suitability for either dry or lubricated working conditions.

## Thrust Pin Bearing

Non-metallic thrust bearing prevents thrust pin axial movement.

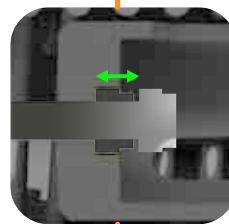
## Inboard Loaded Spring Design

Inboard loaded spring design with spring guide results in more efficient spring stroke.



## Xylan Coating

Reduces friction, improves wear resistance, enhances cycle life of soft seals on piston and improves life of spring guide bushing.



## Long Lasting Bearings

Guided by self-lubricating and self-aligning guide bearings in the Spring Can.

## Travel Stroke Adjustment

Bi-Directional Travel Stops integral to the actuator, the stops allow 80° to 100° total travel adjustment. Cylinder mounted extended travel stops are optional.

## Spring Lock Mechanism

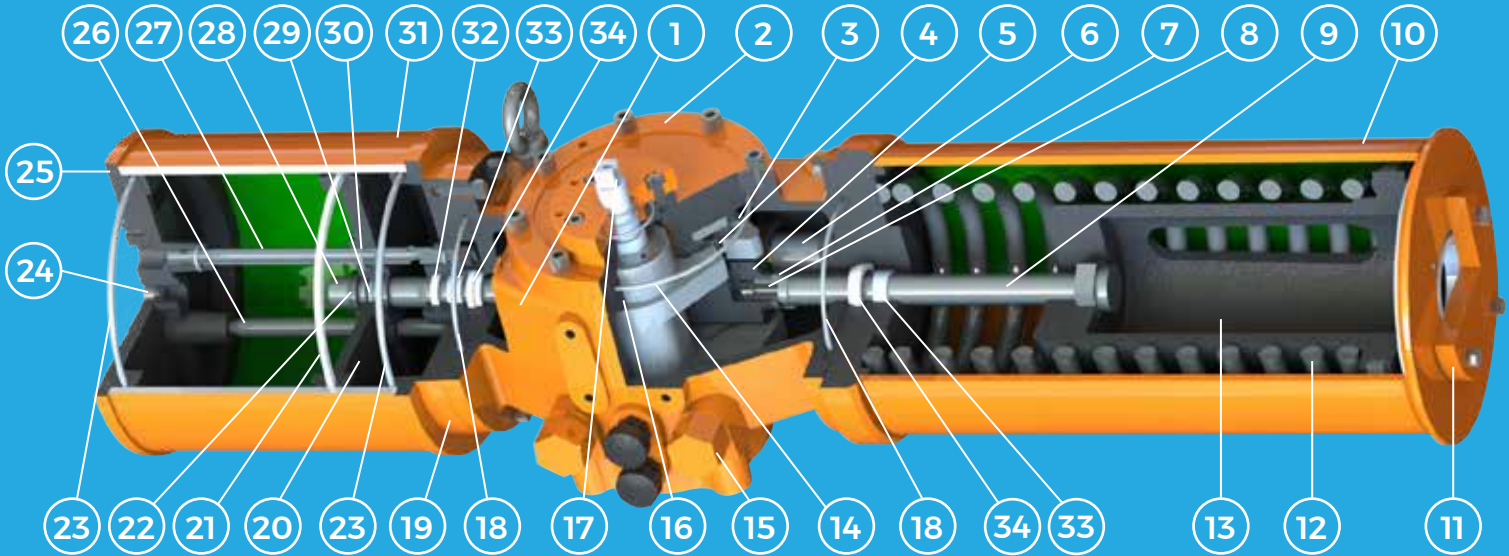
Spring Lock Design prevents disassembly of spring rod from the guide block if spring is energized. The Spring Module disassembly is only possible once spring is de-energized enhancing safety.

## Thrust Pin Bushing

Thrust Pin Bushing aligns the guide block within the yoke arms to prevent metal to metal contact and enhance the Unique Flexible Joint mechanism.

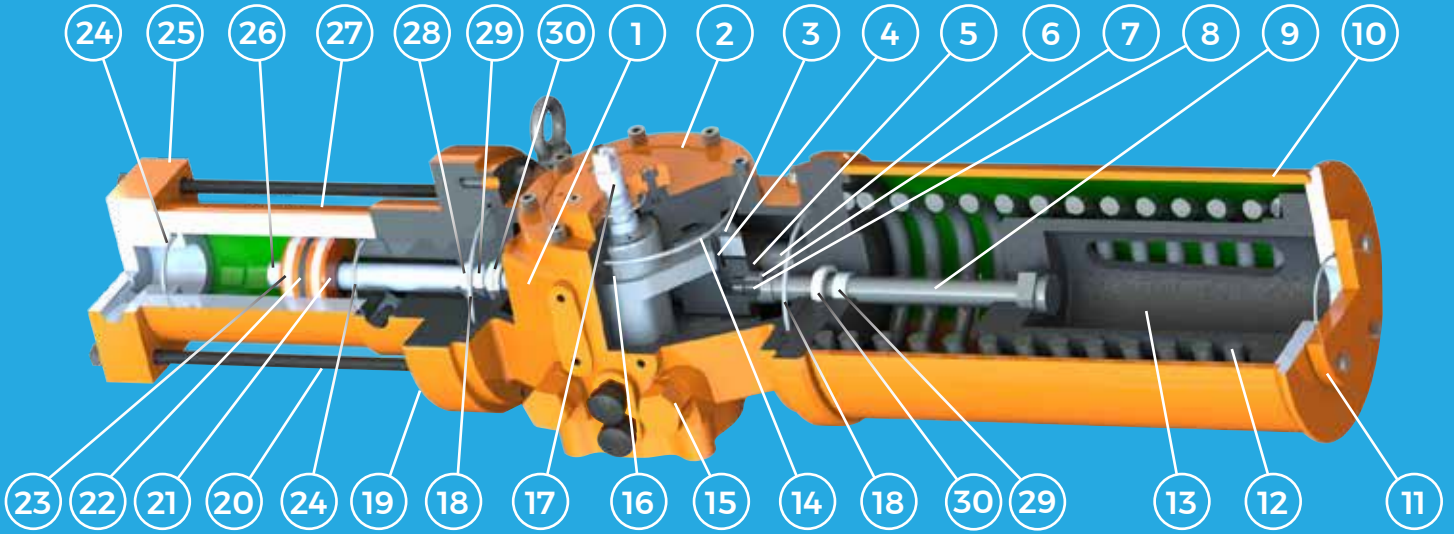
## Internally Installed Optional Hydraulic Override

Compactly designed Hydraulic override cylinder module for spring-return models ensures fitment in small envelope dimensions.

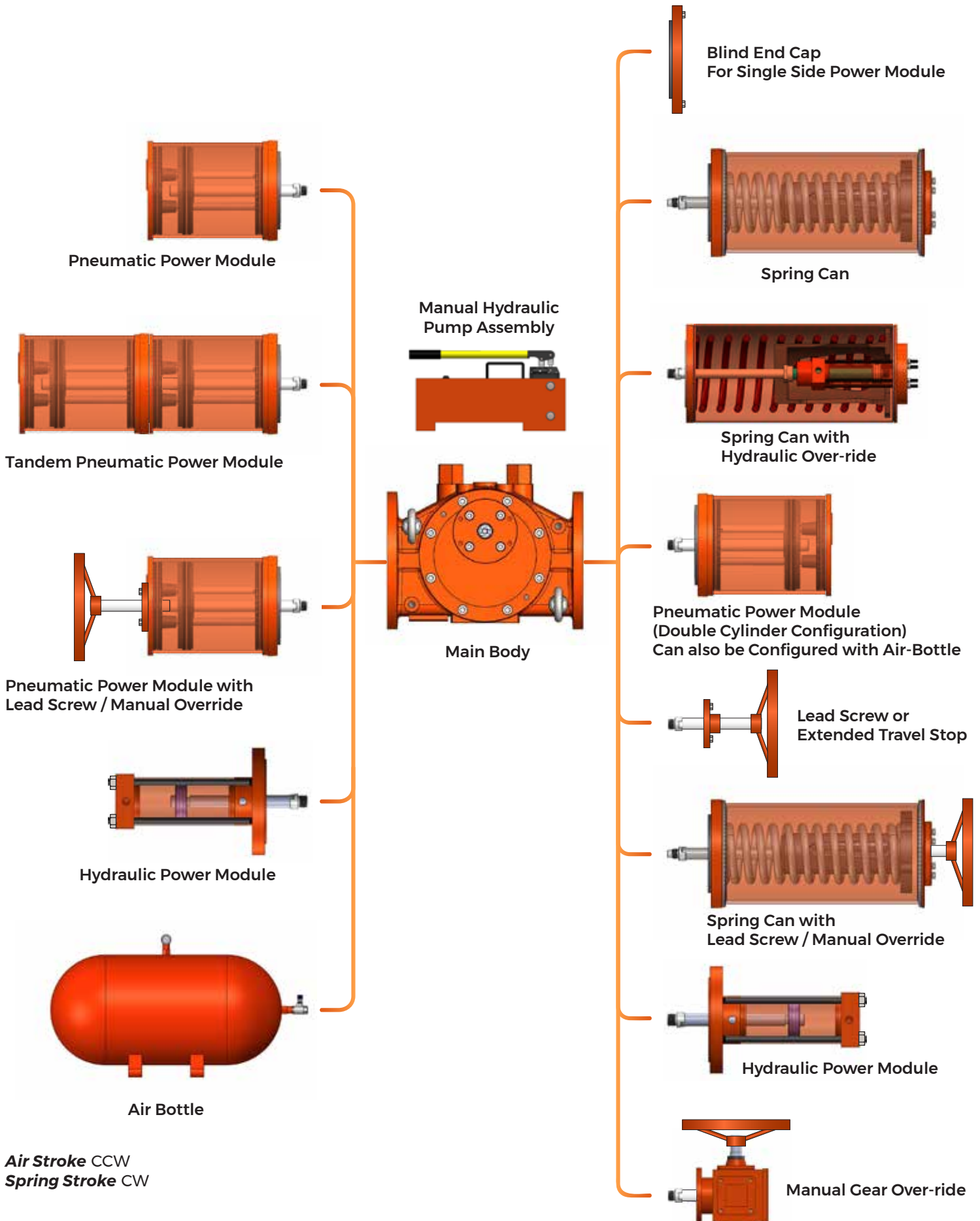


Sr. No.	Part Name	Material Of Construction
1.	Main Body	Ductile Iron
2.	Top Cover	Ductile Iron
3.	Yoke	Ductile Iron
4.	Thrust Pin	Alloy Steel
5.	T Guide Block	Ductile Iron
6.	Guide Rod	Alloy Steel
7.	Unique Flexible Joint Nut	Alloy Steel
8.	Unique Flexible Joint Bolt	Alloy Steel
9.	Spring Rod	Alloy Steel
10.	Spring Can	Carbon Steel
11.	Cover Plate for Spring Can	Carbon Steel
12.	Spring	Alloy Steel
13.	Spring Guide	Ductile Iron
14.	Top Cover O-Ring	Nitrile Rubber (NBR) / Viton
15.	Stroke Adjustment Screw	Alloy Steel
16.	Yoke Bearing	DU Bearing
17.	Position Indicator Shaft	Alloy Steel
18.	Body Module Face O-Ring	Nitrile Rubber (NBR) / Viton
19.	Body Side End Cap	Ductile Iron
20.	Piston	Ductile Iron
21.	Piston X-Ring	Nitrile Rubber (NBR) / Viton
22.	Spiral Retaining Ring	Stainless Steel
23.	End Cap O-Ring	Nitrile Rubber (NBR) / Viton
24.	Center Plug	Carbon Steel
25.	Outer End Cap	Ductile Iron
26.	Tie Rod Without Hole	Alloy Steel
27.	Tie Rod With Hole	Alloy Steel
28.	Piston Rod	Alloy Steel
29.	Piston Rod O-Ring	Nitrile Rubber (NBR) / Viton
30.	Tie Rod O-Ring	Nitrile Rubber (NBR) / Viton
31.	Pneumatic Cylinder	Carbon Steel
32.	Polypak Seal	Polyurethane / Other
33.	Rod Bearing	Derlin
34.	Wiper Seal	Polyurethane / Other





Sr. No.	Part Name	Material of Construction
1.	Main Body	Ductile Iron
2.	Top Cover	Ductile Iron
3.	Yoke	Ductile Iron
4.	Thrust Pin	Alloy Steel
5.	T Guide Block	Ductile Iron
6.	Guide Rod	Alloy Steel
7.	Unique Flexible Joint Nut	Alloy Steel
8.	Unique Flexible Joint Bolt	Alloy Steel
9.	Spring Rod	Alloy Steel
10.	Spring Can	Carbon Steel
11.	Cover Plate for Spring Can	Carbon Steel
12.	Spring	Alloy Steel
13.	Spring Guide	Ductile Iron
14.	Top Cover O-Ring	Nitrile Rubber (NBR) / Viton
15.	Stroke Adjustment Screw	Carbon Steel
16.	Yoke Bearing	DU Bearing
17.	Position Indicator Shaft	Alloy Steel
18.	Body Module Face O-Ring	Nitrile Rubber (NBR) / Viton
19.	Body Side End Cap	Ductile Iron
20.	Tie Rods	Alloy Steel
21.	Piston	Ductile Iron
22.	Piston Sealing Set	Nitrile Rubber (NBR) / Viton
23.	Guide Ring	Nitrile Rubber (NBR) / Viton
24.	Piston Rod	Alloy Steel
25.	End Cap O-Ring	Nitrile Rubber (NBR) / Viton
26.	Outer End Cap	Ductile Iron
27.	Hydraulic Cylinder	Carbon Steel
28.	Polypak Seal	Polyurethane / Other
29.	Rod Bearing	Derlin
30.	Wiper Seal	Polyurethane / Other





# B SERIES

7 to 82 Nm

## Key Features:

- Flippable ISO Valve Mounting Pattern
- Stainless Steel / Carbon Steel Options
- Water Ingress Protected - IP67M (1m)
- Guaranteed Torque Outputs
- Five Years Warranty

## Operating Ranges:

### Torque Outputs:

Double Acting: 7 - 235 Nm (88 - 2079 lb-in)  
Spring-return end torque: 7 - 82 Nm (88 - 725 lb-in)

### Operating Pressure:

Pneumatic: 3 - 13.8 bar (40 - 200 PSIG)

### Operating Temperature:

Standard range: -37 ° C to 100 ° C (-35° F to 212° F)  
High range: -26 ° C to 204 ° C (-15° F to 400° F)  
Low range: -40 ° C to 148 ° C (-40° F to 300° F)

## Benefits:

### Wear Resistant:

Self-lubricating bearings, high surface finishes makes it resistant to wear.

### Superior Coatings:

With external paint (RAL 2005) and internal coating B Series perform better in harsh environmental conditions.

### Water Ingress Protection:

B Series actuators meet both IP66 and IP67M specifications. No gaskets used, sealing done using O-rings.

### Construction Options:

The actuators are available in Carbon Steel, SS 304 and SS 316 options. Critical torque transmitting components are 17-4 PH Steel.

### Best In Industry Warranty:

B Series actuators are backed up by 5 year material and workmanship warranty.

### ISO Valve Mounting:

B Series actuators valve interface is as per the dimensional requirements of ISO 5211.



### Flippability:

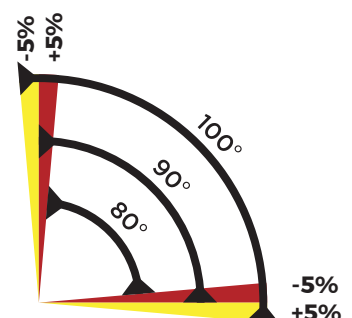
B Series actuators do not require and disassembly / assembly on site for conversion from CW to CCW or vice versa. The symmetric Valve Mounting design with male torque shaft can be flipped for conversion from CW to CCW and vice versa. In spring return actuators flippability allows for changing the fail-safe direction onsite.

### Investment casting:

Excellent surface finish and accurate, superior dimensional integrity can be achieved using investment castings.

### Travel Stop Adjustment:

Bi-Directional Travel Stops integral to the actuator, the stops allow 80° to 100° total travel adjustment. Cylinder mounted extended travel stops are optional.



### Flippable ISO Valve Mounting

Symmetric ISO valve mounting design with male shaft allows for Flippable CW to CCW conversion on site. In spring return actuators flippability allows for changing fail-safe (Fail CW / Fail CCW) direction on site.

### Long Lasting Bearings

Guided by self-aligning Piston Rod and Thrust Pin Bearings.

### NAMUR Position Indicator

Drive slot at the output shaft allows for mounting of accessories closer to the actuator making it compact and helps accessory alignment thereby eliminating the use of coupling.

### Better Wear Resistance

Heat treated 17-4PH yoke, thrust pin for better wear life.

### Xylan Coating

Reduces friction, improves wear resistance resulting in increased lifespan of piston / spring guide and cylinder seals.

### Reduced Maintainance

Use of piston rod bearings, piston rod bushings and output shaft bushings enhances life, reduces maintainance.

### Travel Stroke Adjustment

Bi-Directional Travel Stops are integral to the actuator, the stops allow 80° to 100° total travel adjustment. Cylinder mounted extended travel stops are optional.

### X-Ring Piston Seal

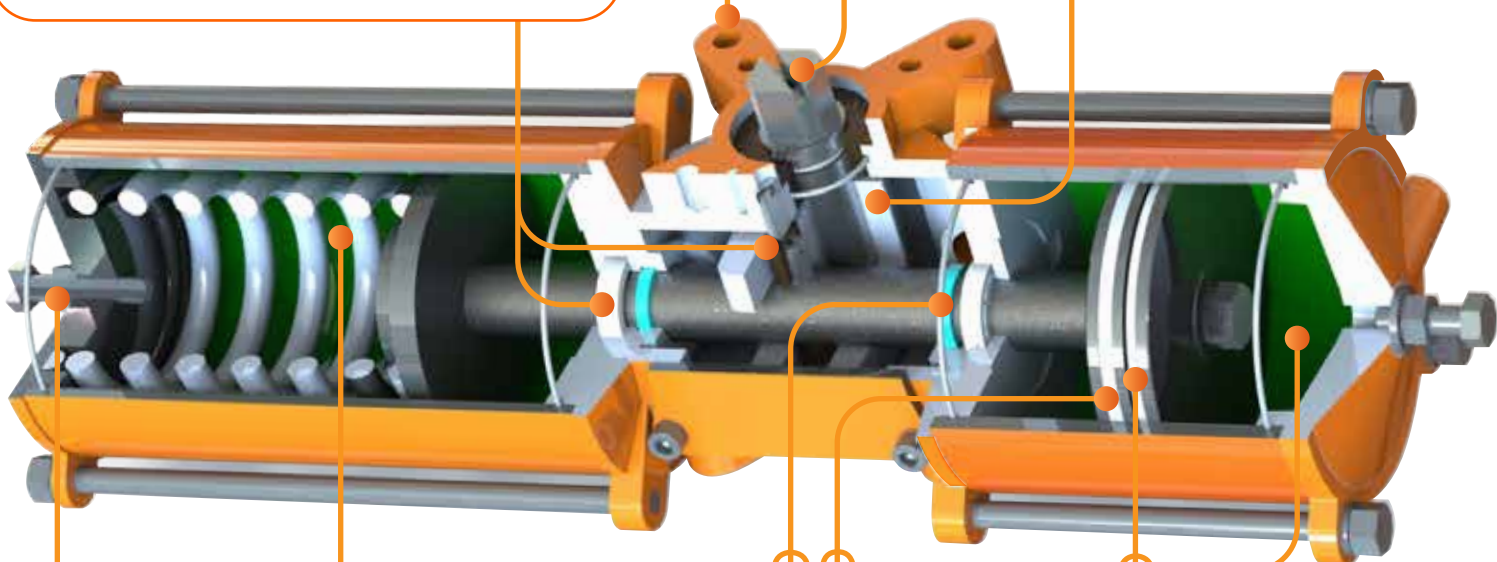
Improved stability and sealing in dynamic applications, greater lubrication retention, reduced friction and wear resulting in improved cycle life.

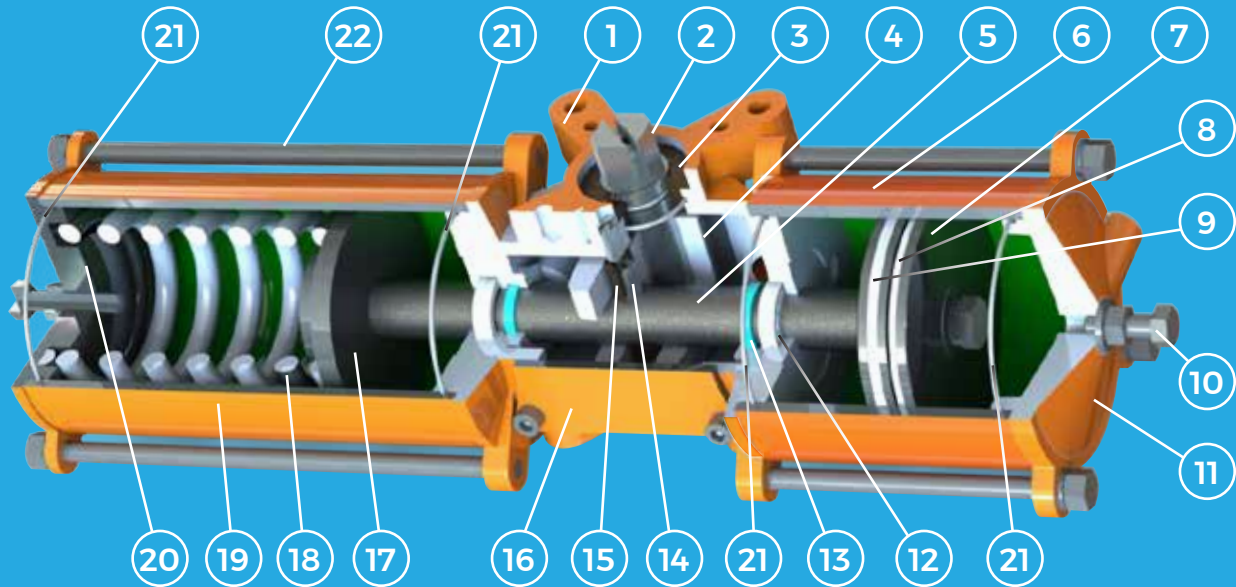
### Piston Bearing

Piston bearing enhances cycle life and lubricated for life.

### Lockout

Lockout / tag out arrangements can be provided if required.





Sr. No.	Part Name	Material of Construction *		
		B (Standard)	S	C
1.	Main Body	Stainless Steel	Stainless Steel	WCB
2.	Output Shaft	17-4PH	Stainless Steel	Carbon Steel
3.	Yoke Bushing	Phosphor Bronze	Phosphor Bronze	Phosphor Bronze
4.	Yoke	17-4PH	Stainless Steel	Carbon Steel
5.	Piston Rod	17-4PH	Stainless Steel	Carbon Steel
6.	Piston Cylinder	Stainless Steel	Stainless Steel	Carbon Steel
7.	Piston	Stainless Steel	Stainless Steel	Carbon Steel
8.	X-Ring Piston Seal	NBR / Viton	NBR / Viton	NBR / Viton
9.	Piston Bearing	Derlin	Derlin	Derlin
10.	Stroke Adjustment Bolt	Alloy Steel	Stainless Steel	Alloy Steel
11.	Cylinder End Cap	Stainless Steel	Stainless Steel	Carbon Steel
12.	Polypak Seal	PU / Other	PU / Other	PU / Other
13.	Wiper Seal	PU / Other	PU / Other	PU / Other
14.	Thrust Pin	17-4PH	Stainless Steel	17-4PH
15.	Thrust Pin Bushing	Phosphor Bronze	Phosphor Bronze	Phosphor Bronze
16.	Cover Plate	Stainless Steel	Stainless Steel	Carbon Steel
17.	Spring Guide	Carbon Steel	Stainless Steel	Carbon Steel
18.	Spring	Steel	Steel	Steel
19.	Spring Can	Stainless Steel	Stainless Steel	Carbon Steel
20.	Spring Can End Cap	Stainless Steel	Stainless Steel	Carbon Steel
21.	End Cap O-Ring	NBR / Viton	NBR / Viton	NBR / Viton
22.	Tie Rod	Stainless Steel	Stainless Steel	Alloy Steel

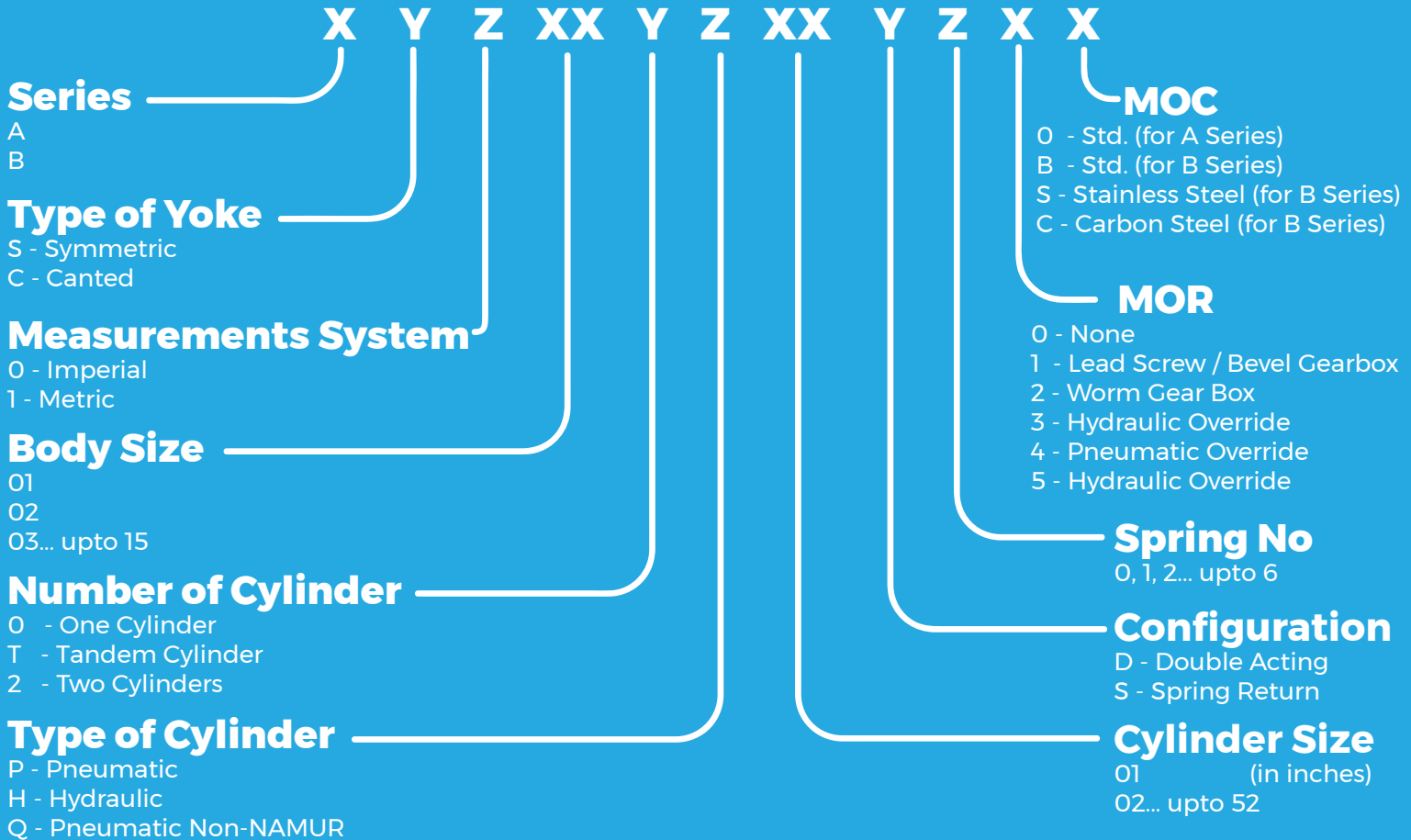
\*Notes :

NBR - Nitrile Rubber

PU - Polyurethane

MOC Options of B ( Std.), S and C are available only in B Series Actuators. Use B, S, C at the end of the model number during ordering for appropriate MOC as required.





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