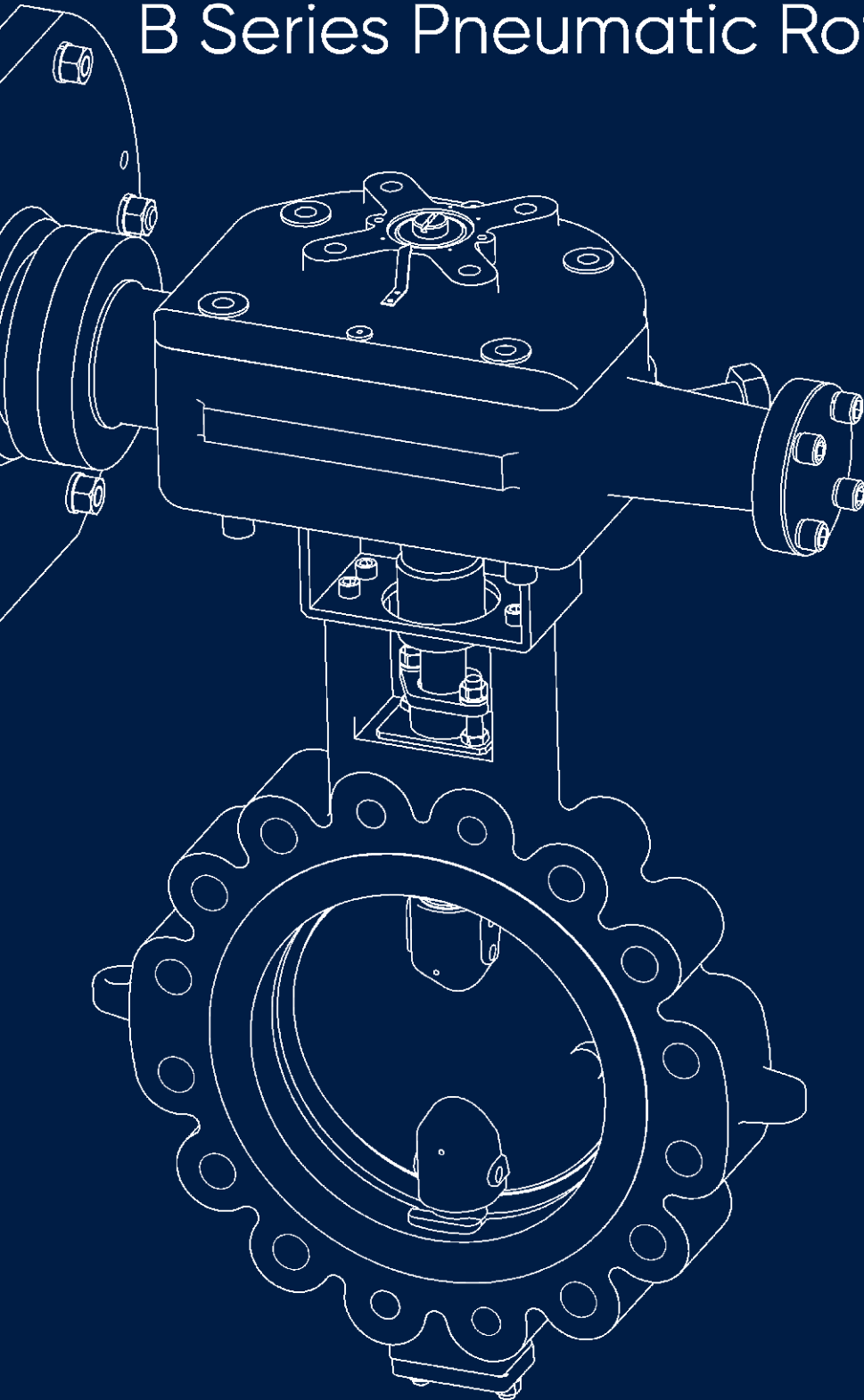


B Series Pneumatic Rotary Actuator

Sizes 25 in² to 200 in²



It all flows from expertise.

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B SERIES

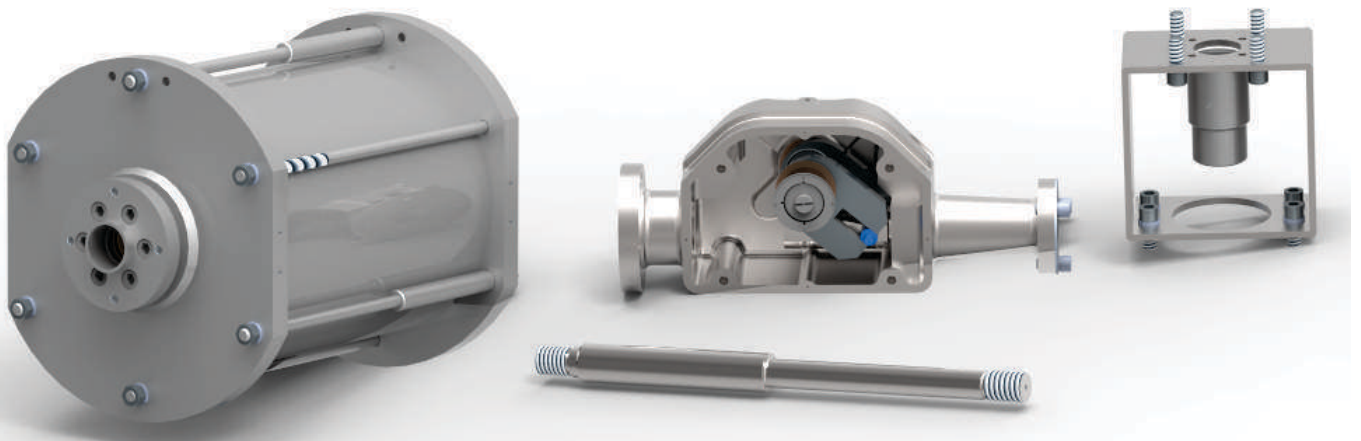
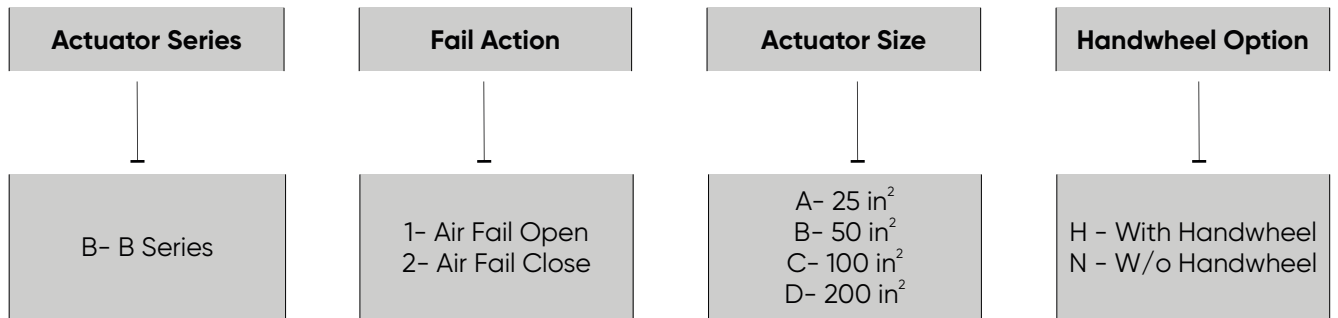
The B Series Pneumatic Rotary Actuator is designed to meet wide ranging torque requirements with precision control and material option to suit the demanding requirements of hydrocarbon and similar process industries.

Salient Features

- The Scotch Yoke Mechanism is designed to deliver more torque when the valve is unseating and seating.
- Standardized actuator components and interchangeability across sizes enables less inventory and spares, paving way for stocking and shorter lead time. The product is designed for ease in manufacturing, assembly, operation and maintenance.
- Scotch yoke box fitted with bidirectional mechanical end stops for $\pm 5^\circ$ adjustment of valve rotation.
- Change of fail action is field reversible.

Actuator Model Numbering

This series cover actuator from size 25 in² to 200 in² with variety of spring, scotch yoke box and mounting options.



Model : Series B Pneumatic Rotary Actuator

Actuator Sizes

Four standard sizes available: 25, 50, 100, 200 sq. in

Pneumatic Pressure Supply

Maximum supply pressure of 7 bar

Maximum Design Pressure : 10 bar

Ambient Temperature Range

Standard : - 20°C to + 80°C.

Special material options available for use in low temperature applications down to -40°C

Degree of Travel

0 to 90°

Fail Action

The actuator can be easily converted to fail open from fail close, by inverting the Scotch yoke box. Action is field reversible without additional parts

Manual Override

A range of gear operated handwheels which can be mounted on the scotch yoke box is available

Positioner Input Signals

Using Bracket mounted external positioners, Normally double acting type, 3-15 psig (0.2-1.0 bar), 4-20 mA, digital. Also split ranges of the above signals. Digital "Smart" positioners are available

Operating Media

Air, Nitrogen.

Options: Methane (Natural gas) Filter regulator recommended to ensure clean supply

Valve Mounting : ISO 5211

Port Connection

Actuator sizes,
P25 - 1/4"
P50 - 3/8"
P100 - 3/8"
P200 - 1/2"

Torque

Spring Torque ranging from 936 lb.in to 26915 lb.in
Double Acting without spring torque ranging up to 80000 lb.in

Hysteresis and Linearity : Within +/- 1%

Speed and Sensitivity

Signal change of 0.01 psig (0.013 mA) reverses

Life Span : Extended service life assured by rugged steel construction provides increased stability, corrosion protection and protection from deformation when over pressurisation occurs

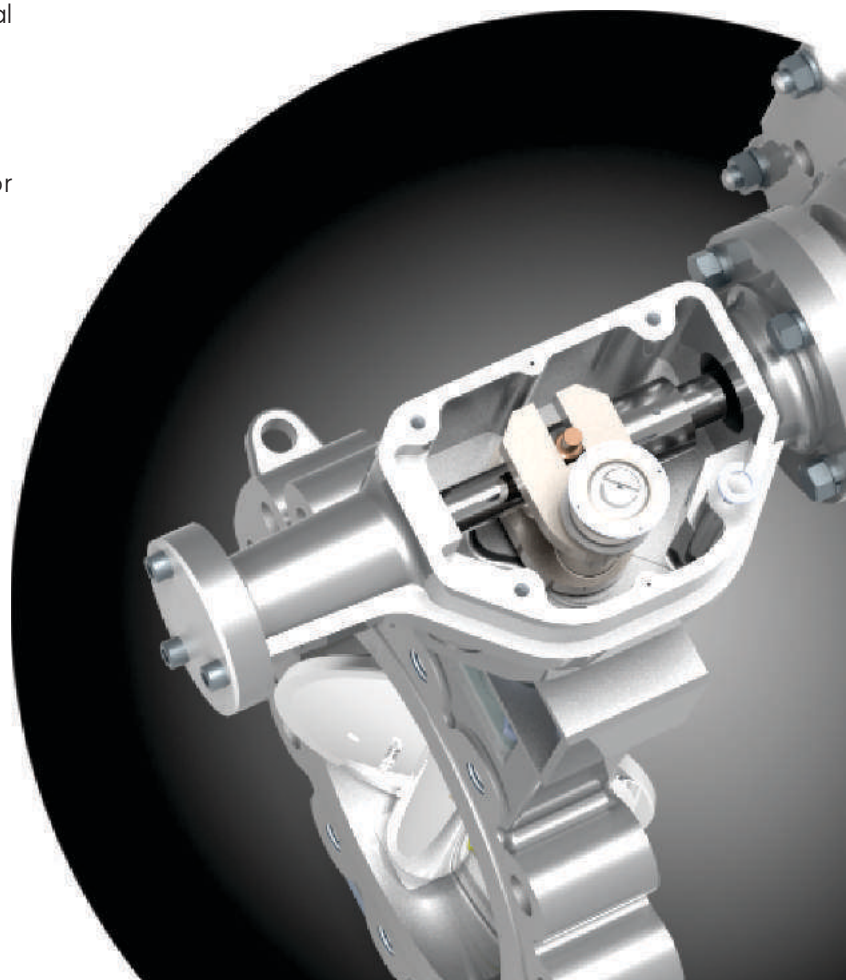
Paint : Epoxy paint system is used as standard

CE Marking : B Series actuator is certified in accordance with machinery directive 2006/42/EC

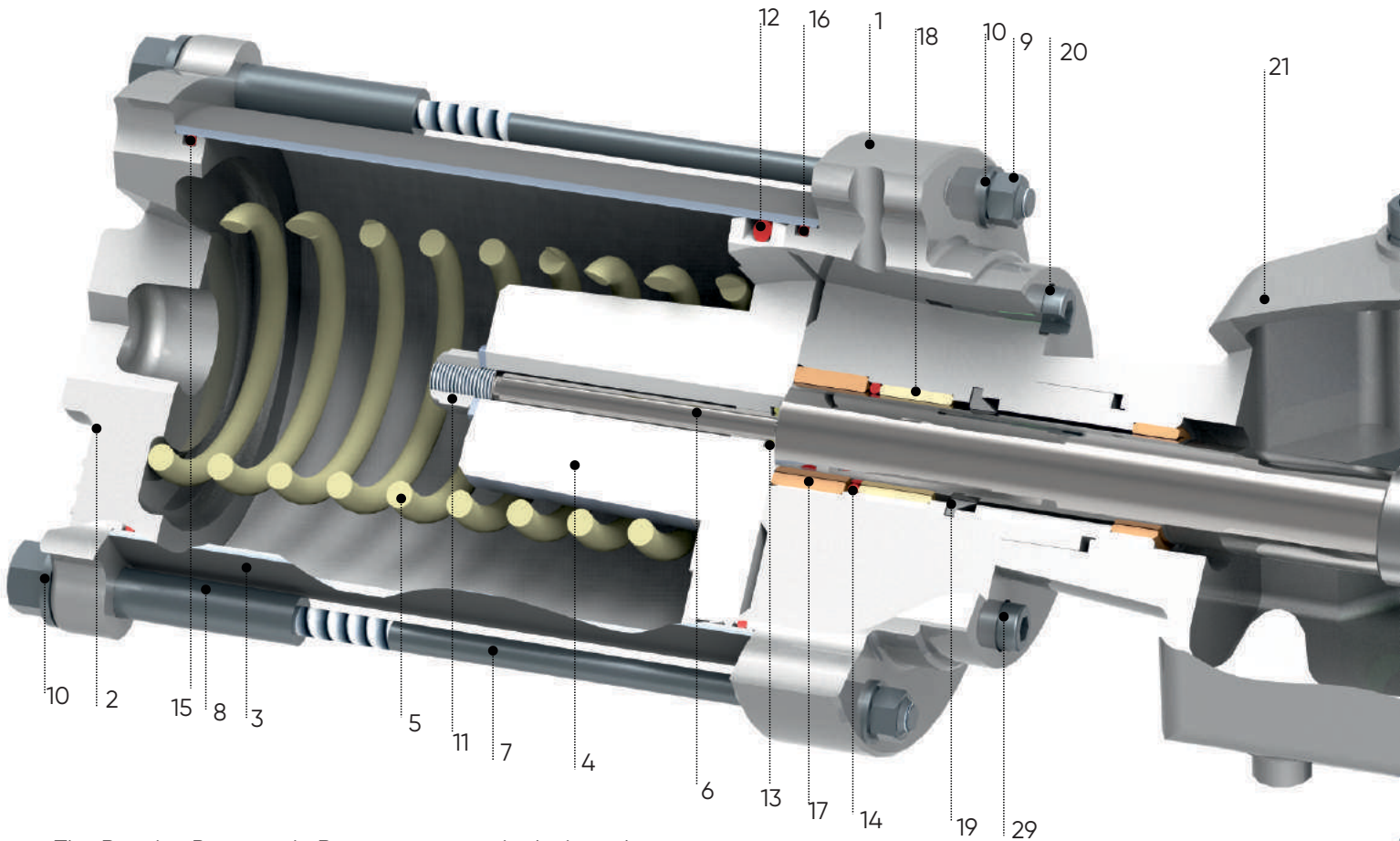
Design Options

Extended Travel Stop

Special O-Rings for low temperature and high temperature applications



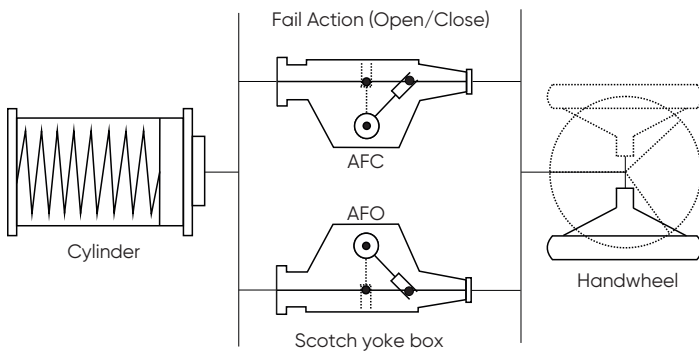
Components, Materials and Design Features



The B series Pneumatic Rotary actuator is designed for use with quarter turn valves. It offers material combination and reliable service in all hydrocarbon applications. In addition to the standard material combination, optional combinations are also available which fulfill the need for a wide variety of control valve applications.

Modular Construction

One of the interesting features of this actuator series is its modular construction design. This design enables ease in assembly. The scotch yoke box is available in three different sizes and a pneumatic cylinder is attached to one side and a handwheel on the other. The two different fail action can be achieved by just inverting the scotch yoke box (bottom cover on top) with no change in the cylinder and handwheel position. The modular construction and stocking of components result in quick delivery time.



Modular Construction

Manual Override options

The actuators under this series are facilitated with handwheel options. The handwheel can be oriented in different positions depending upon the application.

Components, Materials and Design Features

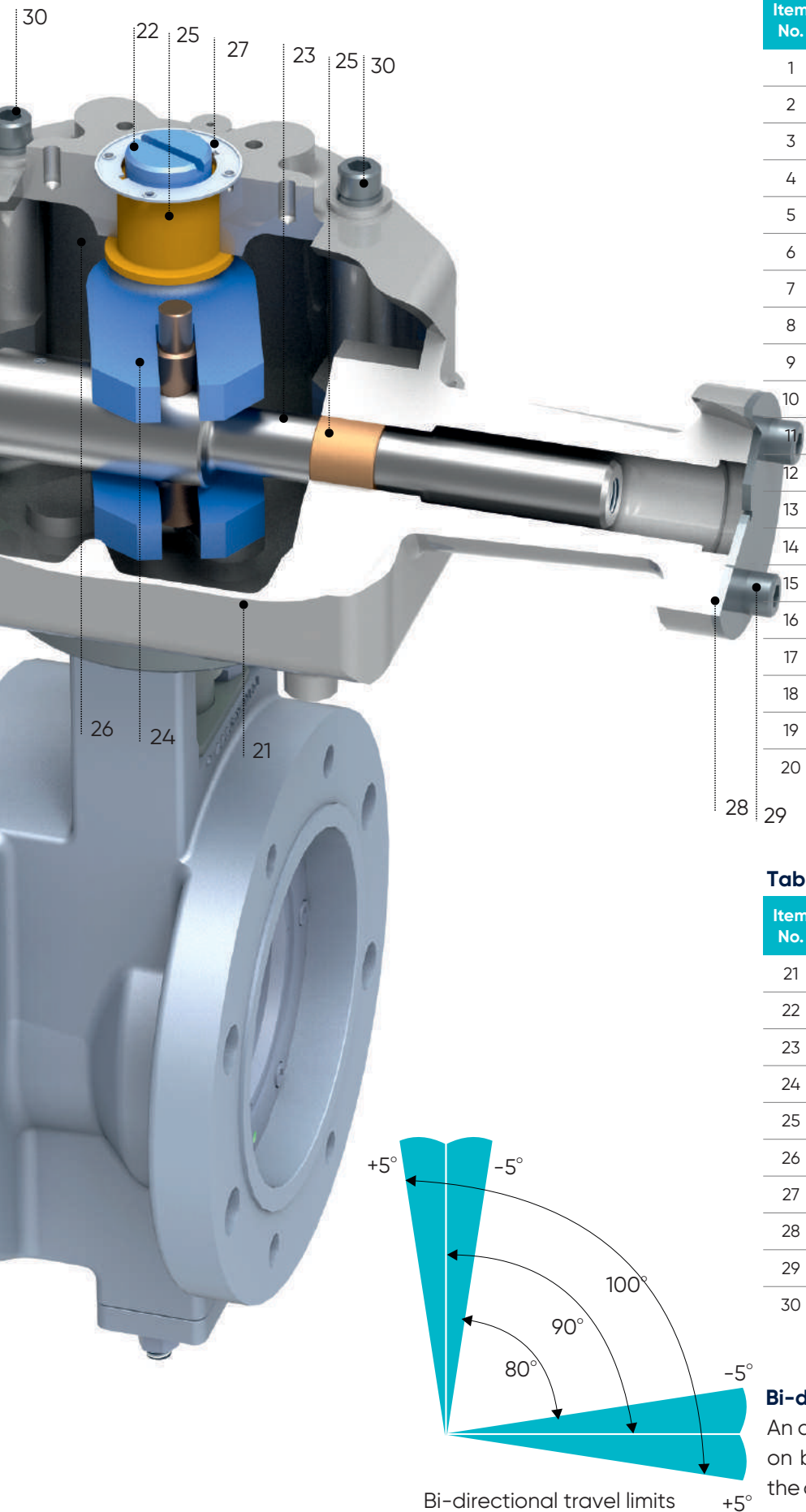


Table 1 : Pneumatic cylinder assembly

Item No.	Parts	Material
1	Base Plate	Carbon Steel
2	Top Cap	Carbon Steel
3	Cylinder	Carbon Steel Plated
4	Piston	Aluminium
5	Spring	Alloy Steel
6	Piston Rod	Stainless Steel
7	Tie Rod	B7, HDG
8	Tension Nut	2H, HDG
9	Full Nut	2H, HDG
10	Washer	Stainless Steel
11	Nylock nut	Carbon Steel
12	Piston O-ring Large	Nitrile
13	Piston O-ring Small	Nitrile
14	Piston rod O-ring	Nitrile
15	Top Cap O-Ring	Nitrile
16	Base Plate O-ring	Nitrile
17	Piston rod Upper guide	Oilite
18	Piston rod Lower guide	Oilite
19	Wiper ring	Hallprene
20	Adaptor Plate	Carbon Steel

Table 2 : Scotch yoke box assembly

Item No.	Parts	Material
21	Rotary Cover Box	Carbon Steel
22	Drive Shaft	Hardened 410 SS
23	Linkage Shaft	Stainless Steel
24	Drive Pin	Aluminium Bronze
25	Bush	Oilite
26	Thrust Washer	Oilite
27	Indicator Plate	Stainless Steel
28	Cover plate	Carbon Steel
29	Cap Screw	Stainless Steel
30	Washer	Stainless Steel

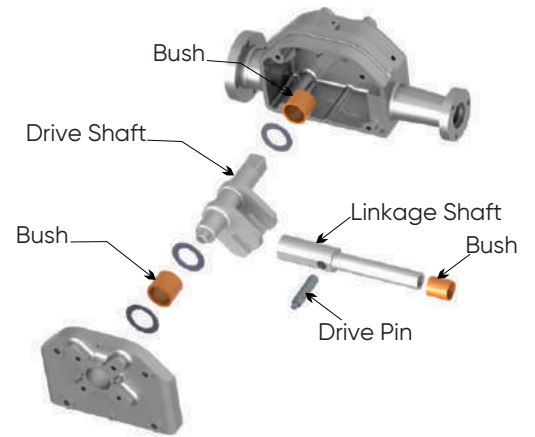
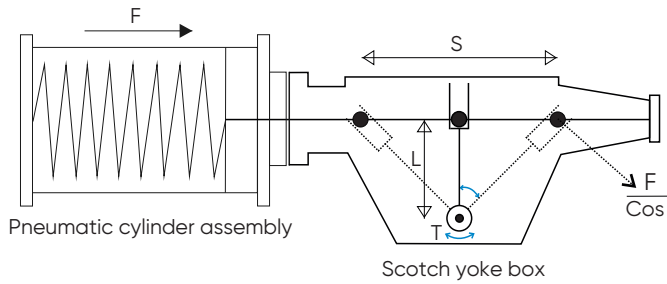
Bi-directional End Stops

An adjustable end stop of +/- 5° is provided on both the opening and closing phase of the actuator stroke

Torque Tables and Charts

Scotch Yoke Mechanism :

The scotch yoke mechanism converts linear motion of the pneumatic cylinder into rotary motion.



Mid Position = $F \times L$

End position = $\frac{F}{\cos \theta} \times \frac{L}{\cos \theta}$

Where,

S - Stroke length

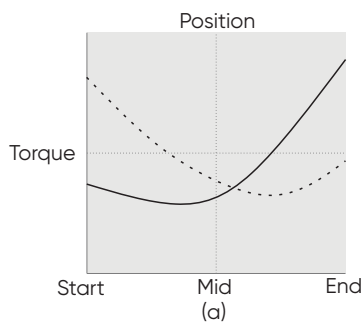
T - Actuator Torque

F - Spring/ Pneumatic thrust

L - Arm Length

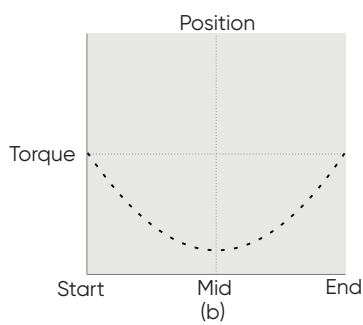
Table 3 : Scotch yoke unit

Scotch Yoke Box	S	L
Sy1	4	2
SY2	4	2
SY3	6	3



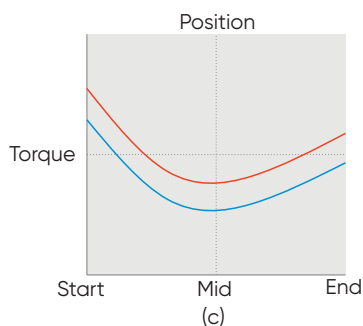
(a) - Single acting with spring

— Spring Torque
 - - - Pneumatic Torque



(b) - Double acting without spring

- - - Pneumatic Torque



(c) - Double acting with spring

— Net Torque (Spring force acting along the Pneumatic thrust)
 — Net Torque (Spring force opposing the Pneumatic thrust)

Torque Tables and Charts

Table 4 : Single acting actuator - with spring

Size in ²	Scotch Yoke Box	Spring Type	Spring torque (lb in)			Net torque (lb in) -3.5 Bar			Net torque (lb in) -4 bar			Net torque (lb in) -5 bar		
			Start	Mid	End	Start	Mid	End	Start	Mid	End	Start	Mid	End
P25	SY1	STD	2071	796	937	3858	1742	2724	4544	2104	3410	5914	2829	4780
P50	SY1	STD	6048	2400	3024	6568	2675	3544	7938	3400	4914	10679	4850	7655
P100	SY2	STD/IN	7698	3710	6328	15158	7658	13788	18227	9282	16857	24366	12530	22996
		STD/OT	10861	5342	9333	12153	6026	10624	15222	7650	13693	21361	10898	19832
		STD/2	18559	9053	15661	5825	2315	2926	8894	3939	5996	15033	7187	12135
P100	SY3	STD/IN	12574	5837	9492	22737	11215	19654	27341	13651	24259	36549	18523	33467
		STD/OT	17439	8317	13999	18229	8735	14790	22833	11171	19394	32041	16043	28602
		STD/2	30012	14154	23491	8737	2898	2216	13342	5334	6820	22550	10206	16028
P200	SY3	MED	28492	9675	8080	48607	20318	28195	56706	24603	36294	72902	33173	52490
		HVY	47061	17700	19845	36842	12293	9626	44940	16578	17724	61137	25148	33921
		E/HVY	63827	24006	26915	29772	5987	-	37870	10272	958	54066	18842	17155

Table 5 : Double acting actuator - without spring

Size in ²	Scotch Yoke Box	Net torque (lb.in) - 3.5 bar			Net torque (lb in) - 4 bar			Net torque (lb in) - 5 bar			Net torque (lb in) - 5.5 bar		
		Start	Mid	End	Start	Mid	End	Start	Mid	End	Start	Mid	End
P25	SY1	4796	2538	4796	5481	2900	5481	6851	3625	6851	7536	3988	7536
P50	SY1	9592	5075	9592	10962	5800	10962	13703	7250	13703	15073	7975	15073
P100	SY2	21486	11368	21486	24555	12992	24555	30694	16240	30694	33763	17864	33763
P100	SY3	32228	17052	32228	36832	19488	36832	46040	24360	46040	50644	29769	50644
P200	SY3	56687	29993	56687	64785	34278	64785	80982	42848	80982	89080	47132	89080

Dimensions and Weights

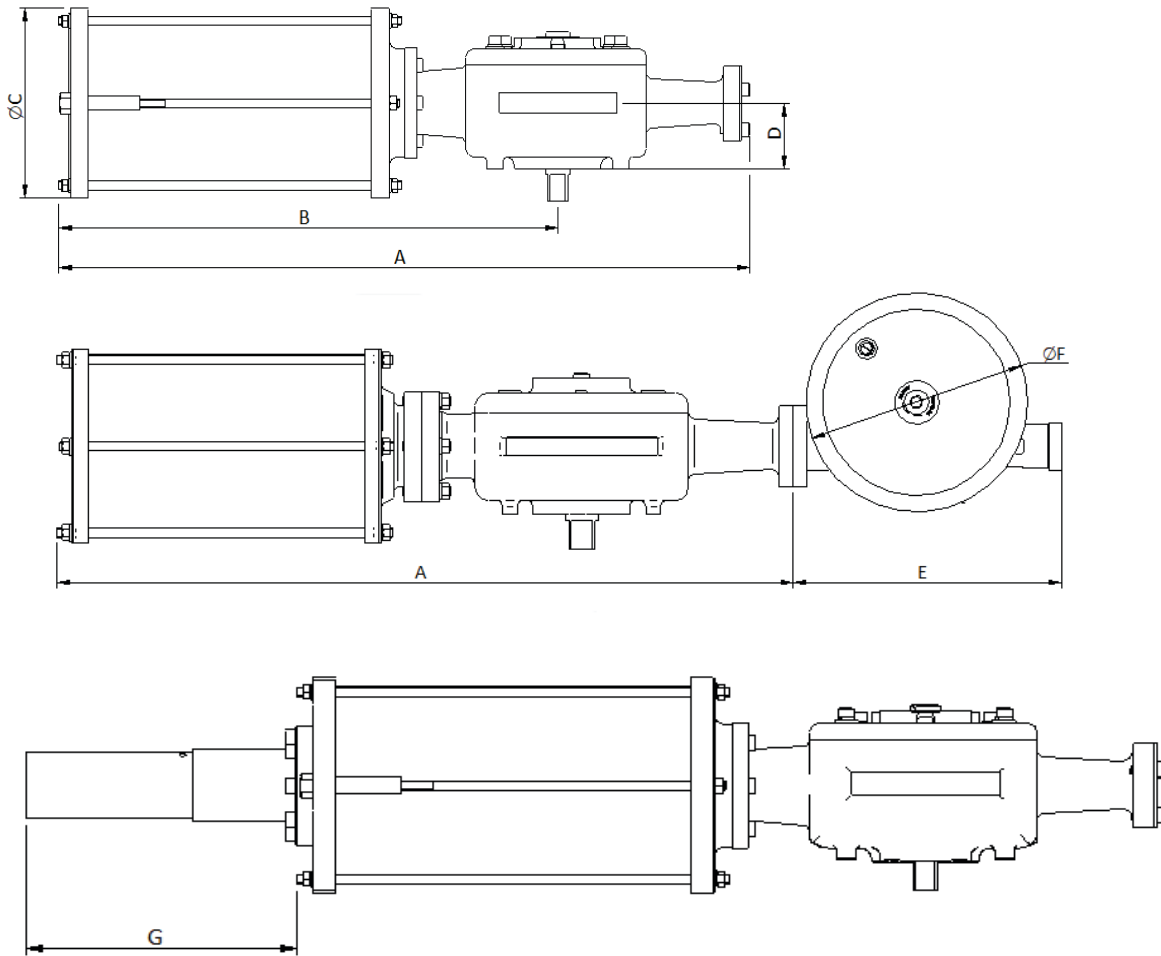


Table 6 : Dimensions and Weights

Size (in ²)	Scotch Yoke type	Spring type	A	B	ØC	D	ØE	F	G	Weight W/o HW	Weight With HW
25	SY1	NONE	690	440	210	80	580	305	230	36	65
		STD	770	520			390			52	81
50	SY1	NONE	730	490	260	80	580	305	280	49	78
		STD	880	640			390			70	99
100	SY2	NONE	770	490	390	90	630	380	450	135	192
		STD/IN	1080	800			510			193	250
		STD/OT					510			193	250
	STD/2	1080	800	510		193	250				
	SY3	NONE	1060	680		120	770			169	226
		STD/IN	1280	900			460			242	299
STD/OT		460			242		299				
STD/2	1280	900	460	242	299						
200	SY3	NONE	1050	670	530	120	770	380	430	270	327
		MED	1380	1000			460			385	442
		HVY					460			385	442
		E/HVY					460			385	442

Where the unit of the dimension is not indicated consider the unit as "mm".

Dimensions and Weights / Extended Travel Stop

Mounting Details:

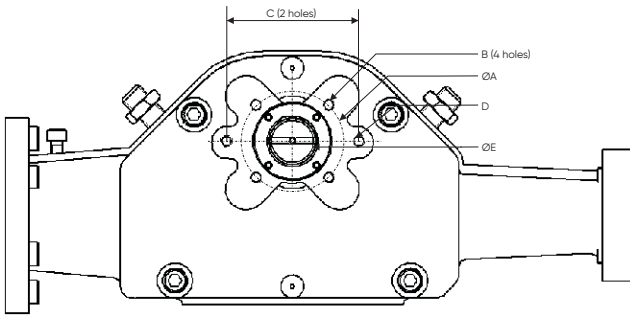


Table 7 : Mounting dimensions

SY	ISO	PCD 'ØA'	B	C	D	ØE
SY1	F07	70	M8 X 15 deep	90	M8 X 15 deep	38
SY2	F10	102	M10 X 20 deep	90	M8 X 15 deep	50
SY3	F16	165	M20 X 35 deep	90	M8 X 15 deep	70

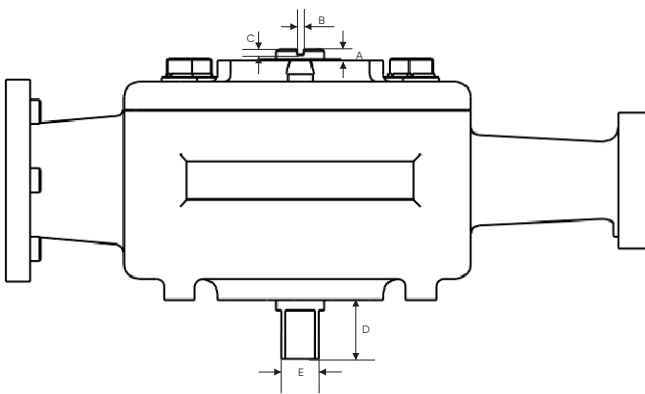
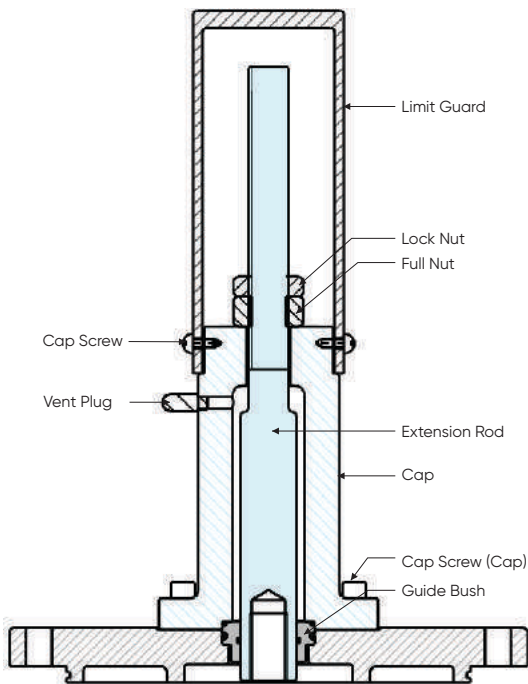


Table 8 : Drive Shaft dimensions

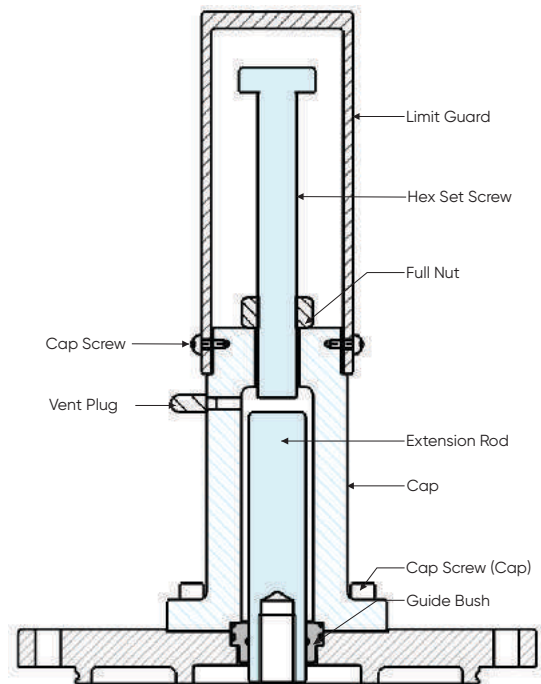
SY	A	B	C	D	E
SY1	8	4	5	40	25
SY2	8	4	5	45	32
SY3	8	4	5	60	44

Extended Travel Stop

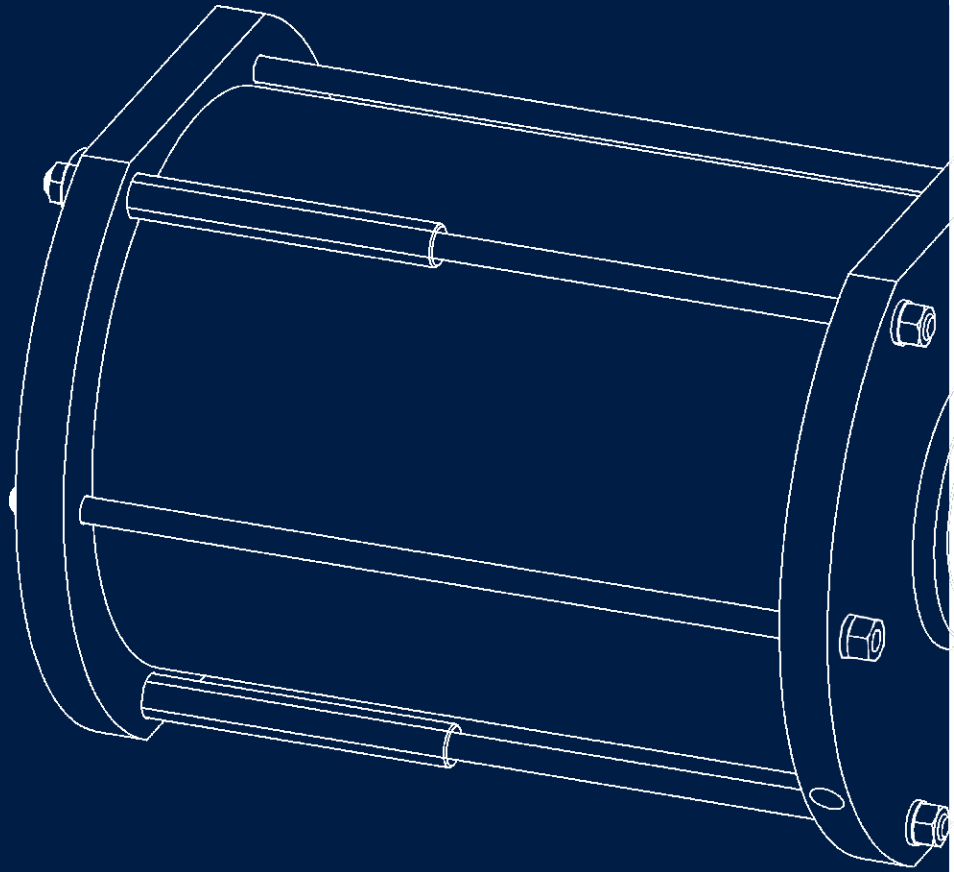
The travel stop mounted in the cylinder, used to control the opening/ closing of valve above 5° travel



Limit open in Air fail Open Valve
Limit close in Air fail Close Valve



Limit open in Air fail Close Valve
Limit close in Air fail Open Valve



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Our policy is one of continuous improvement and we reserve the right to modify these specification details without notice.

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