

# Air Springs for Industrial Applications



**ITT**

ENGINEERED FOR LIFE

# Air Spring Overview

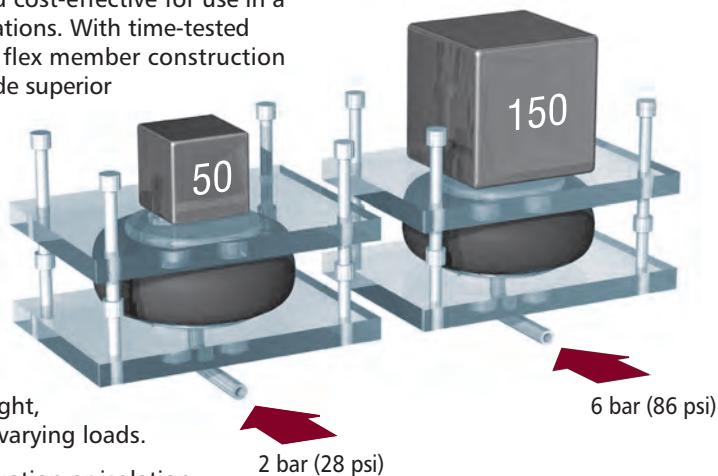
## ITT air springs are air-tight and sturdy pneumatic actuators for demanding industrial applications.

Air springs are highly durable, precisely engineered and cost-effective for use in a wide variety of actuation and vibration isolation applications. With time-tested designs, fabric-reinforced Neoprene or Natural Rubber flex member construction and corrosion-protected end retainers, air springs provide superior quality and performance.

As an actuator, air springs provide linear or angular motion. These air springs offer a favorable stroke-to-compressed-height ratio when compared to air cylinders, and can accept a wide variety of actuation media such as air, water, nitrogen or anti-freeze.

As an isolator, air springs are effective in reducing the harmful effects of vibration. They can simultaneously isolate vibration and regulate load height, as well as allow for consistent vibration isolation under varying loads.

ITT offers a variety of air spring types to meet your actuation or isolation needs. The Single, Double and Triple Convolute Bellows, Rolling Lobe and Sleeve Types are available in a wide range of sizes, with the End Retainer Style required for your installation.



*Varying loads can be supported by one Air Spring size. Therefore, no re-design is necessary for varying loads.*

### Temperature Range Guidelines

Air springs are constructed of Natural Rubber (NR) or Chloroprene Epichlorohydrin (CR) elastomeric compounds. The temperature range guidelines for air spring applications vary depending on construction and nature of service.

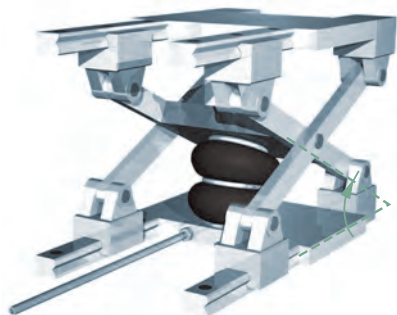
### Continuous Service

The maximum operating temperature for NR air springs should not exceed 135°F (57°C) while for CR, 158°F (70°C). Continuous service is defined as operating 40 or more hours per week at this temperature. Minimum allowable operating temperature is -22°F (-30°C) for air spring products made with Chloroprene, -56°F (-49°C) for products made with Natural Rubber.

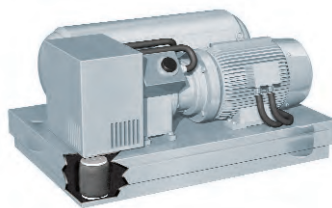
### Intermittent Service

The maximum allowable temperature should not exceed 158°F (70°C) for NR. Intermittent Service is defined as operating less than 40 hours per week at this temperature. Minimum allowable operating temperature is -22°F (-30°C) for products made with Neoprene and -76°F (-60°C) for products made with Natural Rubber. Note that minor cracking may occur with any prolonged operation at these minimum temperatures.

## Application Examples:



- Material Handling Industry
- Lumber Industry
- Aluminum Can Recycling
- Container Manufacturers
- Paper Industry
- Press Manufacturing
- Vibrating Equipment & Conveyors



- Shaker Screens
- Steel Manufacturing Equipment
- Automotive Related (Plate Glass)
- Oil Exploration
- Foundries
- Bottling Equipment
- Valve Manufacturing



- Logging Industry
- Rubber Industry
- Amusement Rides
- Food Packaging
- Scissor Lift Manufacturing
- Glass Manufacturing (Plate Glass)
- Sewage Processing Equipment

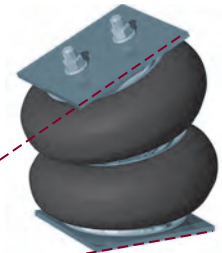
# Advantages of Air Springs



**Max. displacement 1.18 in.**  
Displacement permissible between upper and lower end plate. Therefore, no costly machining of the mounting holes is required.

1.18 in. Maximum for triple convoluted

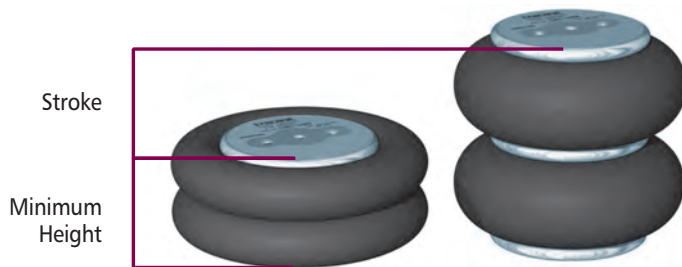
**Maximum tilt angle of 30°**  
No costly reversing devices are necessary. Contact ITT or your local representative for technical help.



Max 25°  
for triple convoluted

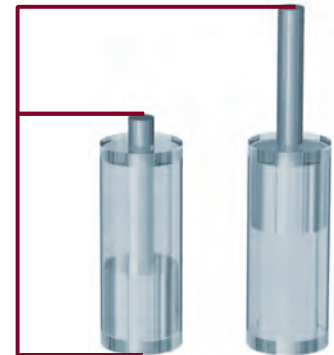
## Little space required, no sealing required

Compared to conventional pneumatic cylinders, the minimum height of the ITT Air Spring is significantly lower at the same stroke.



Stroke

Minimum Height



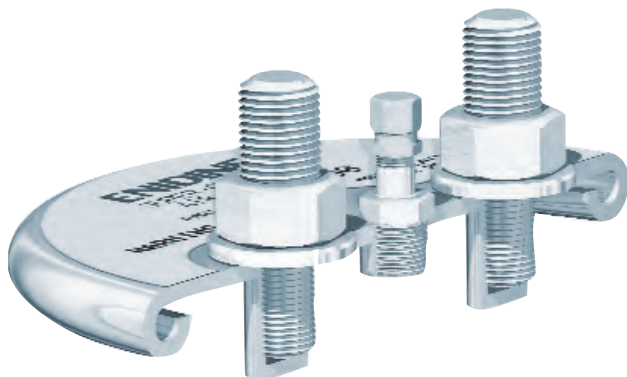
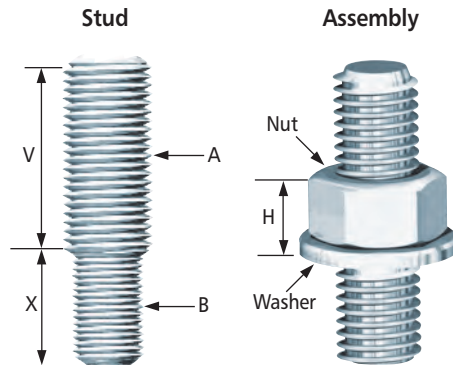
# Accessories

## Assembly (Stud + Nut + Washer)

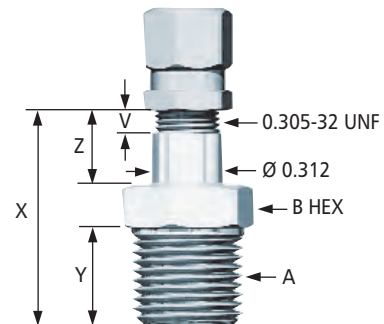
Part Number	A	B	H in.	V in.	X in.
YI-578-9-056	1/2" UNC	3/8" UNC	.53	2.50	.56

## Tank Valves Including Safety Cap

Part Number	A	B in.	V in.	X in.	Y in.	Z in.
YI-579-08-9-033	1/8" NPTF	.44	.31	1.31	.38	.75
YI-578-92-9-122	1/4" NPTF	.56	.31	1.31	.56	.56
YI-579-08-9-033M	1/8" BSP	.51	.31	1.66	.51	.87
YI-578-92-9-122M	1/4" BSP	.91	.31	1.66	.51	.87

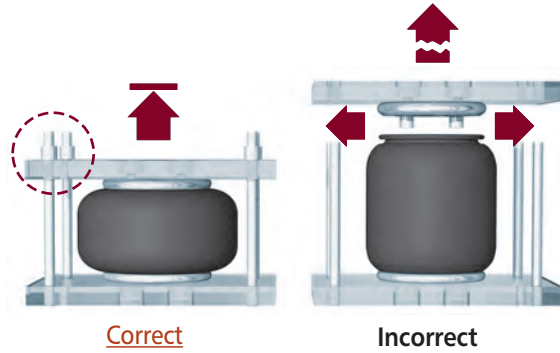


## Tank Valve Including Safety Cap

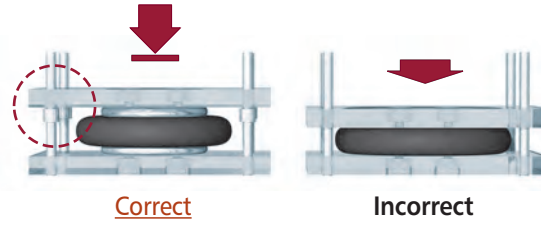


# Installation and Operating Instructions

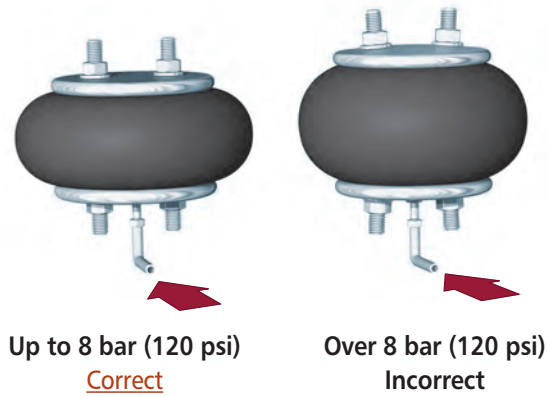
Provide stroke limitations, to prevent exceeding the maximum allowable stroke height.



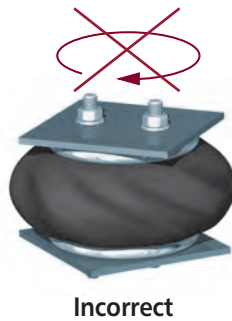
Provide stops for minimal height, or use Air Springs with optional Internal Bumper.



Max. allowable pressure: 8 bar (120 psi).

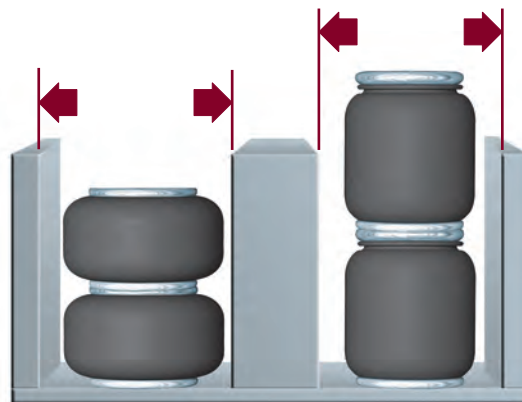


Never use Air Springs in torsion.



## Installation Space

Sufficient clearance should be allowed to avoid any chafing with the walls of the bellows.



# Elastomer Materials and Special Type Air Actuators

## Natural Rubber (NR)

Good all-round properties make natural rubber the ideal material for standard actuators.

- Standard material for the model series C and R
- High dynamic capability
- Elasticity
- Tensile strength
- Resistance to tear propagation
- Resistance to abrasive wear

# NR

## Chloroprene Rubber (CR)

Chloroprene rubber boasts good resistance to environmental influences (weather, ozone, UV, aging)

- Standard material for the model series S, also available as a special version for the model series C and R
- Broader temperature range than NR
- Flame-retardant
- Limited resistance to mineral oils

# CR

## Epichlorohydrin (ECO)

Epichlorohydrin rubber is suitable for high-temperature applications.

- Available as a special version for the model series C, D and R
- Resistant to mineral oils and fuels
- Very high sustained heat resistance

# ECO

## Air Actuators with Stainless-Steel Connecting Parts

- Connecting plates made of 304 stainless steel and bead rings made of 316T and stainless steel.
- High resistance to media such as acids, chemicals and cleaning agents
- High wear-resistance and durability

# Niro

## Reinforced Actuators

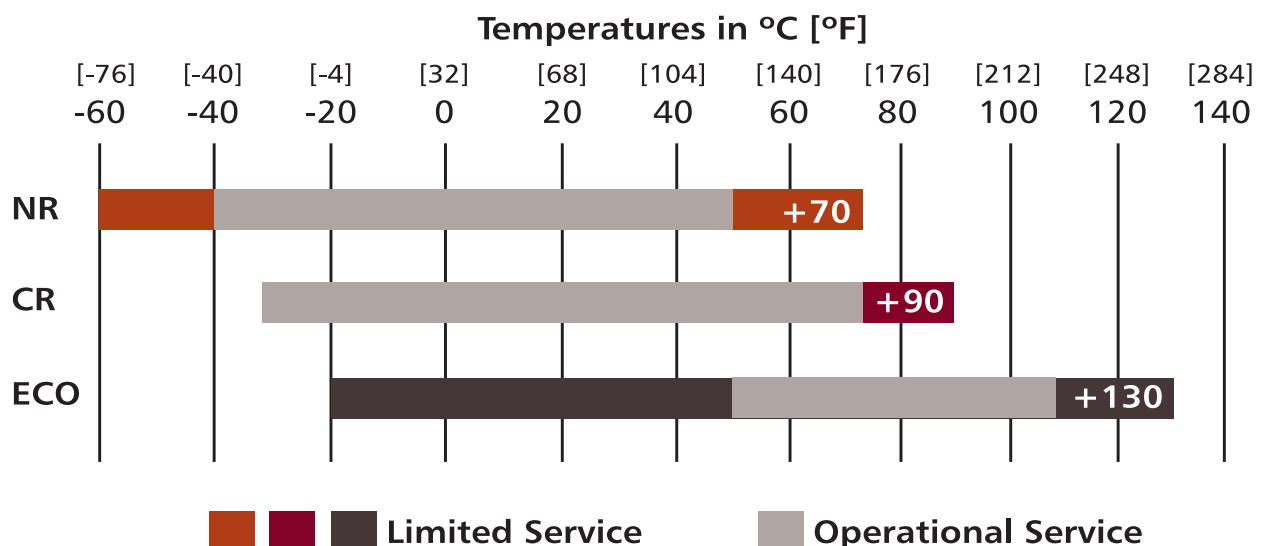
- Pressure range of the reinforced design: 0 to 12 bar (174 psi)
- Designs for pressure above 12 bar (174 psi) available on request

# HP

## Air Actuator with Tank Valve

- Air inlet and air outlet via tank valve
- Operation without permanent high-pressure supply
- Connection identical to car tire valves, allows for easy filling

# V



# How to Order Air Springs

Selecting the correct air spring is simple using the provided guide below. Simply plug in the correct code abbreviations to determine the type and model from the following charts located within this catalog, this will be the part number you will use to order your specific model of air spring.

## Air Spring Part Number Ordering Example:

**YI FS 330-11 040**

<p>YI - Imperial YM - Metric YR - Bellows Only</p>	
<p>F - Bellows air spring R - Rolling lobe air spring S - Sleeve-type rolling lobe air spring</p>	
<p>S - Single convolution bellows D - Double convolution bellows T - Triple convolution bellows Z - Cylindrical rolling lobe air spring K - Conical rolling lobe air spring</p>	
<p>Mean effective surface area, guide value in cm<sup>2</sup></p>	
<p>Stroke, guide value in cm</p>	
<p>Assembly Number 3-5 digit code to designate:</p> <ul style="list-style-type: none"> <li>- Air inlet style</li> <li>- Elastomeric material</li> <li>- Special type: Niro, HP, etc.</li> </ul> <p>* Standard assembly numbers are listed in this catalog. Please contact ITT for special configurations and non-standard items.</p>	

## ITT Catalog Table Example:

**FS 120-10**

**Air Spring  
Configurations**

Model Number	Assembly Number	Standard Air Inlet
YM [YI] FS 70-7	0160 [731•742]	G1/4 [1/4 NPT • 3/4 NPT]

- YM FS 70-7-0160:** FS 70-7 Air Spring with metric mounting and G1/4 air inlet.  
**YI FS 70-7-731:** FS 70-7 Air spring with imperial mounting and 1/4 NPT air inlet.  
**YI FS 70-7-742:** FS 70-7 Air spring with imperial mounting and 3/4 NPT air inlet.

# Model Series S



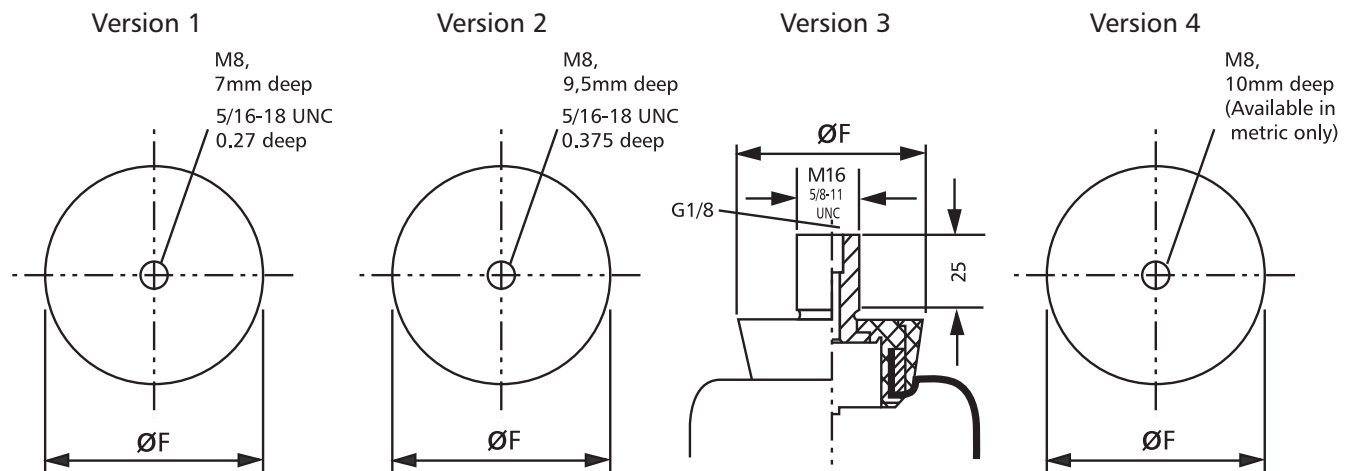
## Specific Properties

- Sleeve-type Rolling lobe type
- Elastomer bellows permanently press-fitted to the connecting parts by metal crimp rings
- Plastic connecting parts for smaller models
- CR-elastomer
- SZ air actuators require a minimum pressure
- Version 4 including M30 x 1.5 nut
- Version 2 and 3 with brass bolt

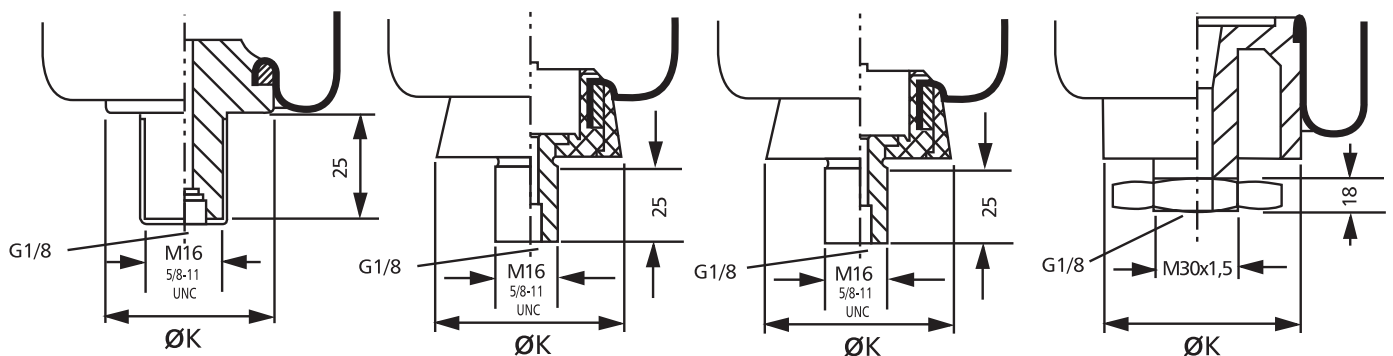
Model	Assembly No.	Min. Install Height mm/[in]	Max. Dia. mm/[in]	Required Clearance mm/[in]	Max. Stroke*** mm/[in]	Force with P = 8 bar [120 psi]			Min. Pressure bar/[psi]	Conn. Port Variant	Top Conn. Port ØF mm/[in]	Bottom Conn. Port ØK mm/[in]
						Min Height kN/[lbs]	Min Stroke kN/[lbs]	Max Stroke kN/[lbs]				
YM [YI] SK 19-4	3250 [008]	30 [1.2]	60 [2.4]	70 [2.8]	33 [1.3]	1.4 [314]	0.8 [179]	0.4 [89]	-	1	34.0 [1.3]	34.0 [1.3]
YM [YI] SK 37-6	3250 [001]	38 [1.5]	88 [3.5]	100 [3.9]	46 [1.8]	3.1 [696]	2.6 [584]	1.5 [337]	-	2	76.0 [3.0]	61.0 [2.4]
YM [YI] SK 37-8	3250 [003]	38 [1.5]	88 [3.5]	100 [3.9]	72 [2.8]	3.1 [696]	3.0 [674]	1.2 [269]	-	2	76.0 [3.0]	61.0 [2.4]
YM [YI] SK 37-10	3250 [004]	65 [2.6]	100 [3.9]	120 [4.7]	95 [3.7]	3.5 [786]	3.0 [674]	0.5 [112]	-	3	61.0 [2.4]	50.0 [2.0]
YM SZ 35-11	3250	95 [3.7]	80 [3.1]	100 [3.9]	110 [4.3]	2.2 [494]	2.2 [494]	1.9 [426]	0.9 [13]	4	76.5 [3.0]	50.0 [2.0]
YM SZ 50-11	3250	95 [3.7]	97 [3.8]	115 [4.6]	105 [4.1]	3.3 [741]	3.3 [741]	2.8 [628]	0.9 [13]	4	86.5 [3.4]	60.5 [2.4]
YM SZ 70-11	3250	95 [3.7]	123 [4.8]	140 [5.5]	105 [4.1]	5.7 [1279]	5.7 [1279]	5.0 [1122]	0.9 [13]	4	106.5 [4.2]	89.0 [3.5]
YM SZ 100-11	3250	95 [3.7]	151 [5.9]	170 [6.7]	105 [4.1]	7.8 [1747]	7.8 [1747]	5.4 [1211]	0.9 [13]	4	126.5 [5.0]	89.0 [3.5]
YM SZ 140-11	3250	95 [3.7]	173 [6.8]	190 [7.5]	105 [4.1]	11.0 [2470]	10.9 [2447]	7.9 [1773]	0.9 [13]	4	148.0 [5.8]	114.0 [4.5]

Notes: \*No internal bumper unless otherwise stated \*\*More designs available on request. \*\*\*It is not recommended to exceed 80% of the maximum stroke.

## Top Connection



## Bottom Connection



# Model C Series



## Specific Properties

- Crimped bead plate connecting parts, permanently connected to the reinforced bead of the elastomer bellows via a forming process
- Standard design uses NR elastomer
- Also available in special types: ECO, CR, Niro and HP

## Single Bellows

Model	Assembly No.	Min. Install Height mm/[in]	Max. Dia. mm/[in]	Required Clearance mm/[in]	Max. Stroke mm/[in]	Force with P = 8 bar [120 psi]			Connecting Port Variant	Distance D mm/[in]	Distance E mm/[in]	Standard air inlet P1		
						Min Height kN/[lbs]	Half Stroke kN/[lbs]	Max Stroke kN/[lbs]						
YM [YI] FS 40-6	[000]	50 [2.0]	145 [5.7]	160 [6.3]	60 [2.4]	6.9 [1551]	5.2 [1169]	2.4 [540]	1	20 [0.8]	-	G1-8 [1/8 NPT]		
YM [YI] FS 50-5	001 [000]	51 [2.0]	150 [6.0]	165 [6.5]	44 [3.1]	9 [2023]	5.4 [1214]	2.2 [495]	2	44.5 [1.8]	-	G1/4 [1/4 NPT]		
YM [YI] FS 70-7	0160 [731 • 742]	51 [2.0]	165 [6.5]	180 [7.1]	64 [2.5]	9.9 [2226]	7.5 [1686]	5.2 [1169]				G1/4 [1/4 • 3/4 NPT]		
YM [YI] FS 100-10	0160 [45] • 484]	51 [2.0]	210 [8.3]	225 [8.9]	94 [3.7]	14.7 [3305]	11.0 [2472]	1.6 [360]				G1/4 [1/4 • 3/4 NPT]		
YM FS 120-9	358 • 0170	50 [2.0]	215 [8.5]	230 [9.1]	85 [3.3]	17.7 [3979]	12.4 [2788]	6.6 [1484]				G1/4 • G3/4		
[YI] FS 120-10	[564 • 561]	51 [2.0]	231 [9.1]	245 [9.6]	99 [3.9]	19.5 [4384]	15.0 [3372]	4.6 [1034]		3		70.0 [2.8]	-	[1/4 • 3/4 NPT]
YM FS 120-10	0160 • 0170													G1/4 • G3/4
[YI] FS 120-12	[598 • 605]	51 [2.0]	235 [9.3]	250 [9.8]	119 [4.7]	18.7 [4189]	15.9 [3574]	7.2 [1618]						[1/4 • 3/4 NPT]
YM FS 120-12	0160 • 0170													G1/4 • G3/4
YM [YI] FS 200-10	0160 [460 • 465]	51 [2.0]	250 [9.8]	265 [10.4]	89 [3.5]	23.8 [5350]	17.5 [3934]	9.1 [2045]	3		89.0 [3.5]	38.1 [1.5]		G1/4 [1/4 • 3/4 NPT]
YM [YI] FS 330-11	0160 [040 • 130]	51 [2.0]	325 [12.8]	340 [13.4]	99 [3.9]	43.9 [9868]	36.7 [8250]	22.4 [5035]			157.5 [6.2]	73.0 [2.9]		G1/4 [1/4 • 3/4 NPT]
[YI] FS 330-14	[009 • 042]	51 [2.0]	343 [13.5]	360 [14.2]	129 [5.1]	47.3 [5350]	37.8 [8497]	13.0 [2922]	4		158.8 [6.3]	79.4 [3.1]		[1/4 • 3/4 NPT]
YM FS 330-14	0160 • 0170													G1/4 • G3/4
[YI] FS 530-11	[103 • 101]	51 [2.0]	385 [15.2]	400 [15.7]	124 [4.9]	68.4 [15376]	53.0 [11914]	20.8 [4675]		[1/4 • 3/4 NPT]				
YM FS 530-11	0160 • 0170									G1/4 • G3/4				
[YI] FS 530-14	[091 • 092]	51 [2.0]	405 [15.9]	420 [16.5]	134 [5.3]	69.6 [15646]	60.2 [13532]	20.8 [4675]		[1/4 • 3/4 NPT]				
YM FS 530-14	0160 • 0170									G1/4 • G3/4				
[YI] FS 960-12	0170	63 [2.5]	450 [17.7]	480 [18.9]	117 [4.6]	98.3 [22097]	78.2 [17579]	40.4 [9081]		5	114.3 [4.5]		-	G3/4
YM [YI] FS 1330-11	0170 [0130]	63 [2.5]	530 [20.9]	570 [22.4]	107 [4.2]	141.6 [31831]	121.8 [27380]	63.3 [14229]			152.5 [6.0]		-	G3/4 [3/4 NPT]

## Double Bellows

Model	Assembly No.	Min. Install Height mm/[in]	Max. Dia. mm/[in]	Required Clearance mm/[in]	Max. Stroke** mm/[in]	Force with P = 8 bar [120 psi]			Connecting part variant	Distance D mm/[in]	Distance E mm/[in]	Standard air inlet P1				
						Min Height kN/[lbs]	Half Stroke kN/[lbs]	Max Stroke kN/[lbs]								
YM [YI] FD 40-10	0150 [0110]	70 [2.8]	145 [5.7]	160 [6.3]	100 [3.9]	7.4 [1663]	5.5 [1236]	2.5 [562]	1	20 [0.8]	-	G1/8 [1/8 NPT]				
YM [YI] FD 70-13	0160 [025]	72 [2.8]	165 [6.5]	180 [7.1]	128 [5.0]	11.6 [2607]	7.8 [1753]	2.6 [584]	2	44.5 [1.8]	-	G1/4 [1/4 NPT]				
[YI] FD 110-15	[400 • 403]	72 [2.8]	203 [8.0]	215 [8.5]	156 [6.1]	16.5 [2607]	10.5 [2360]	2.9 [651]				[1/4 • 3/4 NPT]				
YM FD 110-15	0160 • 0170											G1/4 • G3/4				
YM [YI] FD 120-17	0160-0170 [030]	75 [3.0]	215 [8.5]	230 [9.1]	155 [6.1]	18.0 [4046]	13.1 [2944]	6.3 [1416]				70.0 [2.8]	-	G1/4 • G3/4 [3/4 NPT]		
[YI] FD 120-20	[325 • 327]	77 [3.0]	218 [8.6]	235 [9.3]	193 [7.6]	19.6 [4406]	14.4 [3237]	6.6 [1483]		3		157.5 [6.2]	73.0 [2.9]	[1/4 • 3/4 NPT]		
YM FD 120-20	0160 • 0170													G1/4 • G3/4		
YM [YI] FD 200-19	0170 [910 • 900]	75 [3.0]	250 [9.8]	265 [10.4]	200 [7.9]	26.1 [5867]	18.3 [4113]	5.7 [1281]						89.0 [3.5]	38.1 [1.5]	G3/4 [1/4 • 3/4 NPT]
YM FD 200-22	0160	77 [3.0]	255 [10.0]	265 [10.4]	218 [8.6]	26.2 [5889]	17.6 [3956]	7.0 [1573]						157.5 [6.2]	73.0 [2.9]	G1/4
YM [YI] FD 200-25	0160 [951 • 952]	77 [3.0]	260 [10.2]	275 [10.8]	248 [9.8]	25.4 [5709]	18.8 [4226]	8.2 [1843]	G3/4 [1/4 • 3/4 NPT]							
YM [YI] FD 330-22	0160 [180 • 184]	75 [3.0]	325 [12.8]	340 [13.4]	230 [9.1]	46.4 [10430]	33.8 [7598]	14.3 [3214]	4		158.8 [6.3]	79.4 [3.1]		G3/4 [1/4 • 3/4 NPT]		
YM [YI] FD 330-30	0160 [473 • 472]	77 [3.0]	340 [13.4]	355 [14.0]	283 [11.1]	49.0 [11015]	39.6 [8902]	13.7 [3079]						G3/4 [1/4 • 3/4 NPT]		
[YI] FD 530-22	[145 • 143]	77 [3.0]	385 [15.2]	400 [15.7]	233 [9.2]	65.5 [14724]	52.9 [11891]	21.8 [4900]	5					114.3 [4.5]	-	[1/4 • 3/4 NPT]
YM FD 530-22	0160 • 0180 [800]									G1/4 • G3/4 • G1						
YM [YI] FD 530-30	0160 • 0180 [800]	77 [3.0]	400 [15.7]	415 [16.3]	273 [10.7]	71.2 [16005]	56.4 [12678]	21.6 [4855]		152.5 [6.0]	-		[1/4 • 3/4 NPT]			
[YI] FD 530-35	[810 • 811]	77 [3.0]	405 [15.9]	420 [16.5]	313 [12.3]	74.8 [16815]	57.9 [13015]	21.0 [4720]		305 [12]	G1/4 • G1					
YM FD 530-35	0160 • 0180									G3/4						
YM FD 960-22	271	95 [3.7]	444 [17.5]	490 [19.3]	225 [8.9]	101.0 [22704]	81.1 [18231]	37.0 [8317]		6	114.3 [4.5]		-	G3/4		
YM FD 1330-25	797	92 [3.6]	518 [20.4]	570 [22.4]	243 [9.6]	145.4 [32685]	113.0 [25402]	46.5 [10453]			152.5 [6.0]	-	G3/4			
YM FD 1330-70	0170	120 [4.7]	640 [25.2]	700 [27.5]	680 [26.8]	195.0 [43838]	120.0 [26977]	58 [13039]		305 [12]	-	G3/4				

Notes: \*No internal bumper unless otherwise stated \*\*More designs available on request. \*\*\*It is not recommended to exceed 80% of the maximum stroke.



# Model C Series



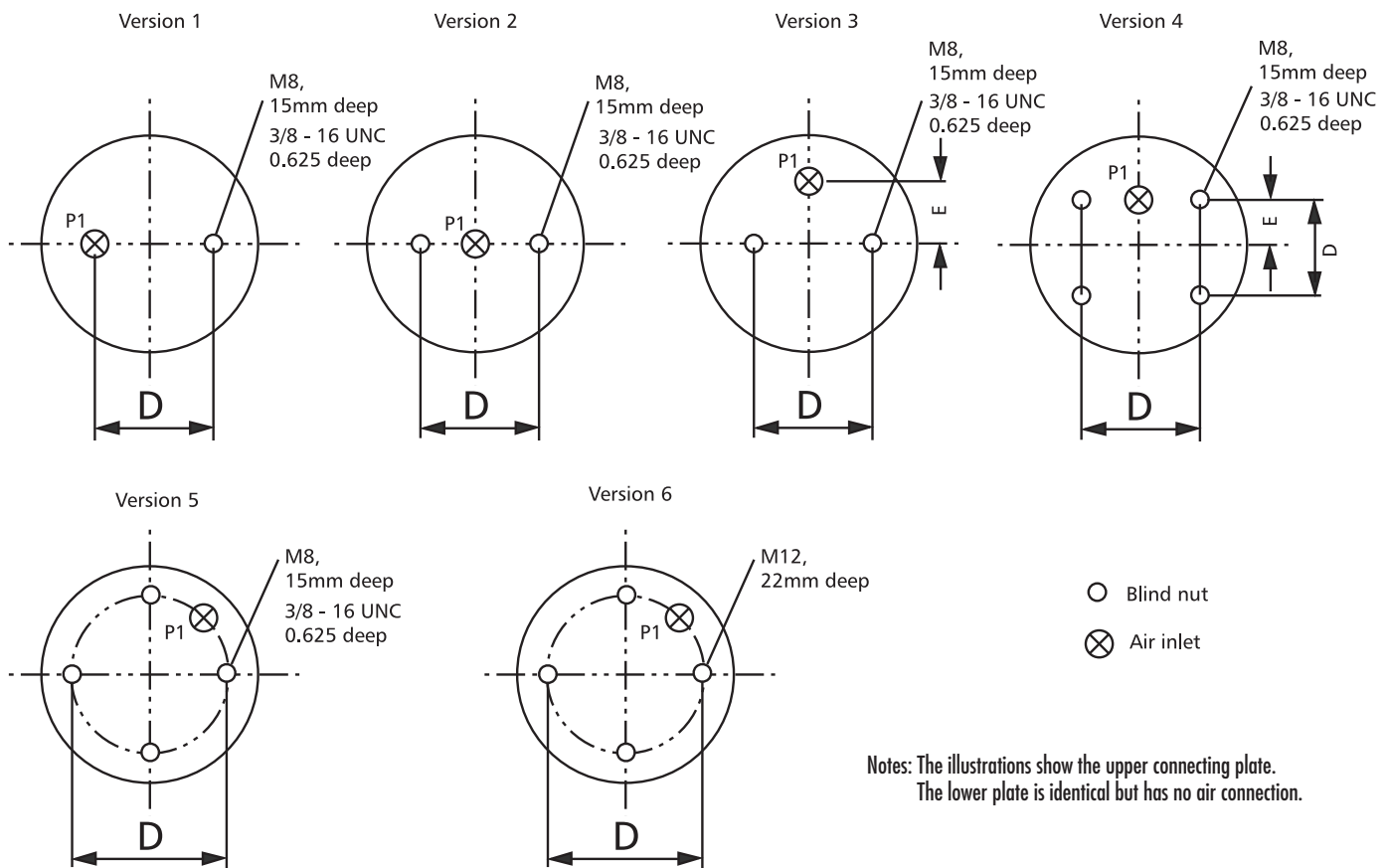
## Specific Properties

- Crimped bead plate connecting parts, permanently connected to the reinforced bead of the elastomer bellows via a forming process
- Standard design uses NR elastomer
- Also available in special types: ECO, CR, Niro and HP

## Triple Bellows

Model	Assembly No.	Min. Install Height mm/[in]	Max. Dia. mm/[in]	Required Clearance mm/[in]	Max. Stroke*** mm/[in]	Force with P = 8 bar [120 psi]			Connecting Port Variant	Distance D mm/[in]	Distance E mm/[in]	Standard air inlet P1
						Min Height kN/[lbs]	Half Stroke kN/[lbs]	Max Stroke kN/[lbs]				
YM [YI] FT 330-29	0160 [048 • 047]	110 [4.3]	325 [12.8]	345 [13.6]	320 [12.6]	46.4 [10430]	33.7 [7575]	17.8 [4001]	3	157.5 [6.2]	73.0 [2.9]	G1/4 [1/4 • 3/4 NPT]
YM [YI] FT 430-32	0160 • 0170 [044]	115 [4.5]	330 [13.0]	355 [14.0]	315 [12.4]	53.4 [12004]	39.2 [8812]	17.0 [3821]				G1/4 • 3/4 [3/4 NPT]
YM [YI] FT 530-32	0160 [808 • 802]	110 [4.3]	384 [15.1]	410 [16.1]	325 [12.8]	69.3 [15578]	54.6 [12274]	24.7 [5552]				G1/4 [1/4 • 3/4 NPT]
[YI] FT 530-35	[845 • 842]	115 [4.5]	405 [15.9]	430 [16.9]	395 [15.6]	77.0 [17309]	53.8 [12094]	27.2 [6114]	4	158.8 [6.3]	79.4 [3.1]	[1/4 • 3/4 NPT]
YM FT 530-35	0160 • 0180											G1/4 • G1
YM FT 960-34	0170	120 [4.7]	462 [18.2]	510 [20.1]	335 [13.2]	99.9 [22457]	77.2 [17354]	32.0 [7193]	5	114.3 [4.5]	-	G3/4
YM FT 1330-35	274	120 [4.7]	521 [20.5]	570 [22.4]	350 [13.8]	148.2 [333154]	119.4 [26841]	26.3 [5912]				G3/4

Notes: \*No internal bumper unless otherwise stated \*\*More designs available on request. \*\*\*It is not recommended to exceed 80% of the maximum stroke.



Notes: The illustrations show the upper connecting plate. The lower plate is identical but has no air connection.

# Model R Series



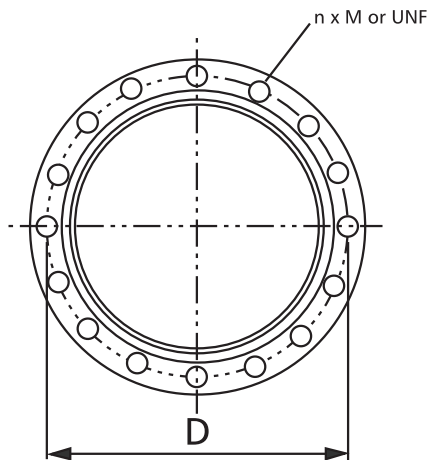
## Specific Properties

- Bead ring connecting parts can be disassembled
- Standard design uses NR elastomer
- Also available in special types: ECO, CR, Niro and HP

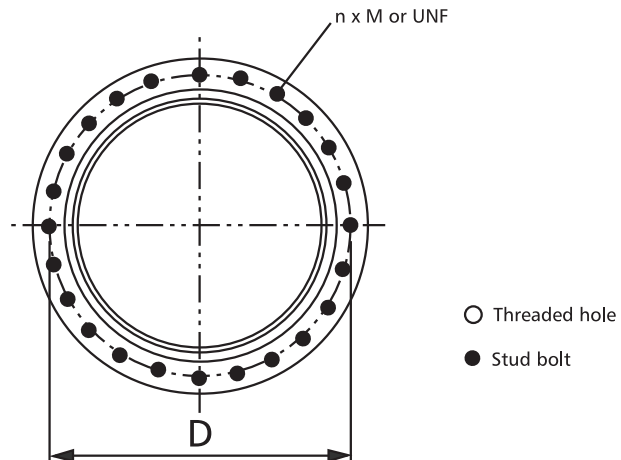
Model	Assembly No. metric [imperial]	Min. Install Height (1) mm/[in]	Max. Dia. mm/[in]	Required Clearance mm/[in]	Max. Stroke** mm/[in]	Force with P = 8 bar [120 psi]			Pitch Circle ØD mm/[in]	Type	Dim. n	Thread M or UNF
						Min Height kN/[lbs]	Min Stroke kN/[lbs]	Max Stroke kN/[lbs]				
<b>SINGLE CONVOLUTION BELLOWS</b>												
YM [YI] FS 960-12	61898 [478]	51 [2.0]	442 [17.4]	480 [18.9]	124 [4.9]	104 [23379]	78.3 [17601]	31.3 [7036] <sup>(2)</sup>	350 [13.8]	RS	18	M10 [3/8-24UNF]
YM [YI] FS 1330-11	61899 [197]	51 [2.0]	530 [20.9]	570 [22.4]	114 [4.5]	142.4 [32011]	119.0 [26751]	66.1 [14859]	419 [16.5]	RS	24	M10 [3/8-24UNF]
YM [YI] FS 1710-12	61900 [727]	51 [2.0]	580 [22.8]	620 [24.4]	126 [5.0]	182.5 [41026]	147.2 [33090]	61.4 [13802] <sup>(2)</sup>	482 [19.0]	RS	24	M10 [3/8-24UNF]
YM [YI] FS 2870-16	61901 [737]	51 [2.0]	715 [28.1]	760 [30.0]	164 [6.5]	298.0 [66990]	238.0 [53502]	81.0 [18208] <sup>(2)</sup>	596 [23.5]	RS	32	M10 [3/8-24UNF]
YM [YI] FS 5450-16	61902 [601]	64 [2.5]	950 [37.4]	1000 [39.37]	151 [5.9]	520.1 [116918]	437.9 [98439]	200.9 [45162] <sup>(2)</sup>	830 [32.7]	RS	40	M10 [3/8-24UNF]
<b>DOUBLE CONVOLUTION BELLOWS</b>												
YM [YI] FD 960-22	2200 [191]	84 [3.3]	444 [17.5]	490 [19.3]	226 [8.9]	106.3 [23896]	84.1 [18905]	21.8 [4900] <sup>(2)</sup>	350 [13.8]	RS	18	M10 [3/8-24UNF]
YM FD 1120-30	2100	90 [3.5]	510 [20.1]	550 [21.7]	315 [12.4]	120.0 [26975]	89.3 [20074]	25.7 [5777] <sup>(3)</sup>	354 [13.9]	RI	16	M8
[YI] FD 1120-30											24	[3/8-24UNF]
YM [YI] FD 1330-25	2200 [227]	84 [3.3]	518 [20.4]	570 [22.4]	246 [9.7]	144.2 [32416]	114.0 [27907]	50.7 [11397] <sup>(3)</sup>	419 [16.5]	RS	24	M10 [3/8-24UNF]
YM [YI] FD 1710-25	2200 [203]	84 [3.3]	577 [22.7]	620 [24.4]	251 [9.9]	185.4 [41677]	137.6 [30932]	48.0 [10790] <sup>(2)</sup>	482 [19.0]	RS	24	M10 [3/8-24UNF]
YI FD 1730-40	2100	100 [3.9]	610 [24.0]	650 [25.6]	400 [15.7]	161.1 [36214]	134.1 [30145]	54.1 [12161]	395 [15.6]	RI	16	M16
YM FD 1730-40											24	[3/8-24UNF]
YM [YI] FD 2380-24	2200 [772]	84 [3.3]	660 [26.0]	710 [28.0]	231 [9.1]	241.3 [54244]	202.8 [45589]	80.3 [18051]	558 [22.0]	RS	24	M10 [3/8-24UNF]
[YI] FD 2470-40	2100	84 [3.3]	710 [28.0]	750 [29.5]	400 [15.7]	246.0 [55300]	209.2 [47027]	117.0 [26301]	495 [19.5]	RI	16	M16
YM FD 2470-40											24	[3/8-24UNF]
YM [YI] FD 2870-30	2200 [230]	84 [3.3]	709 [27.9]	760 [29.9]	271 [10.7]	276.6 [62179]	232.0 [52153]	87.8 [19737] <sup>(2)</sup>	596 [23.5]	RS	32	M10 [3/8-24UNF]
YM [YI] FD 5450-28	2200 [602]	107 [4.2]	950 [37.4]	1000 [39.37]	283 [11.1]	515.5 [115884]	410.7 [92325]	206.1 [46331] <sup>(2)</sup>	830 [32.7]	RS	40	M10 [3/8-24UNF]
<b>TRIPLE CONVOLUTION BELLOWS</b>												
YM [YI] FT 960-34	2200 [761]	114 [4.5]	462 [18.2]	510 [20.1]	336 [13.2]	109.0 [24503]	77.2 [17354]	29.5 [6631] <sup>(2)</sup>	350 [13.8]	RS	18	M10 [3/8-24UNF]
YM [YI] FT 1330-35	2200 [823]	114 [4.5]	521 [20.5]	570 [22.4]	356 [14.0]	148.7 [33427]	115.6 [25986]	38.0 [8542] <sup>(2)</sup>	419 [16.5]	RS	24	M10 [3/8-24UNF]
YM [YI] FT 1710-38	2200 [324]	114 [4.5]	580 [22.8]	630 [24.8]	356 [14.0]	187.5 [42150]	149.1 [33517]	61.8 [13892] <sup>(2)</sup>	482 [19.0]	RS	24	M10 [3/8-24UNF]
YM [YI] FT 2870-45	2200 [230]	114 [4.5]	720 [28.3]	770 [30.3]	455 [18.2]	289.0 [64967]	231.0 [51928]	46.2 [10385] <sup>(2)</sup>	596 [23.5]	RS	32	M10 [3/8-24UNF]
YM [YI] FD 5450-44	2200 [603]	140 [5.5]	950 [37.4]	1000 [39.37]	440 [17.3]	526.7 [118402]	448.0 [100710]	218.1 [48028] <sup>(2)</sup>	830 [32.7]	RS	40	M10 [3/8-24UNF]

Notes: \*More designs available on request. \*\*It is not recommended to exceed 80% of the maximum stroke. (1) Does not apply to ECO or HP, (2) with p=6, (3) with p=7 bar.

Air Actuator, Type RI



Air Actuator, Type RS



# Air Springs for Vibration Isolation

In addition to actuation, many of our air springs can also be utilized as isolators with load bearing capacities ranging from 0.5 kN (112 lbs.) to over 350 kN (78 kip), A number of unique product features make air springs an ideal solution for many different and challenging vibration isolation applications.

## Product Features

### Constant Operating Height

Our Air Springs are pressurized to maintain a set height, regardless of the load. There is no static spring deflection as with other spring elements. A user-friendly, automatic control system guarantees a constant operating height even under varying loads

### Lateral Stability

Depending on the type of air spring used, their lateral stiffness can reach up to a 100% of the vertical stiffness.

### Low Frequency, Load-Independent Vibration Isolation

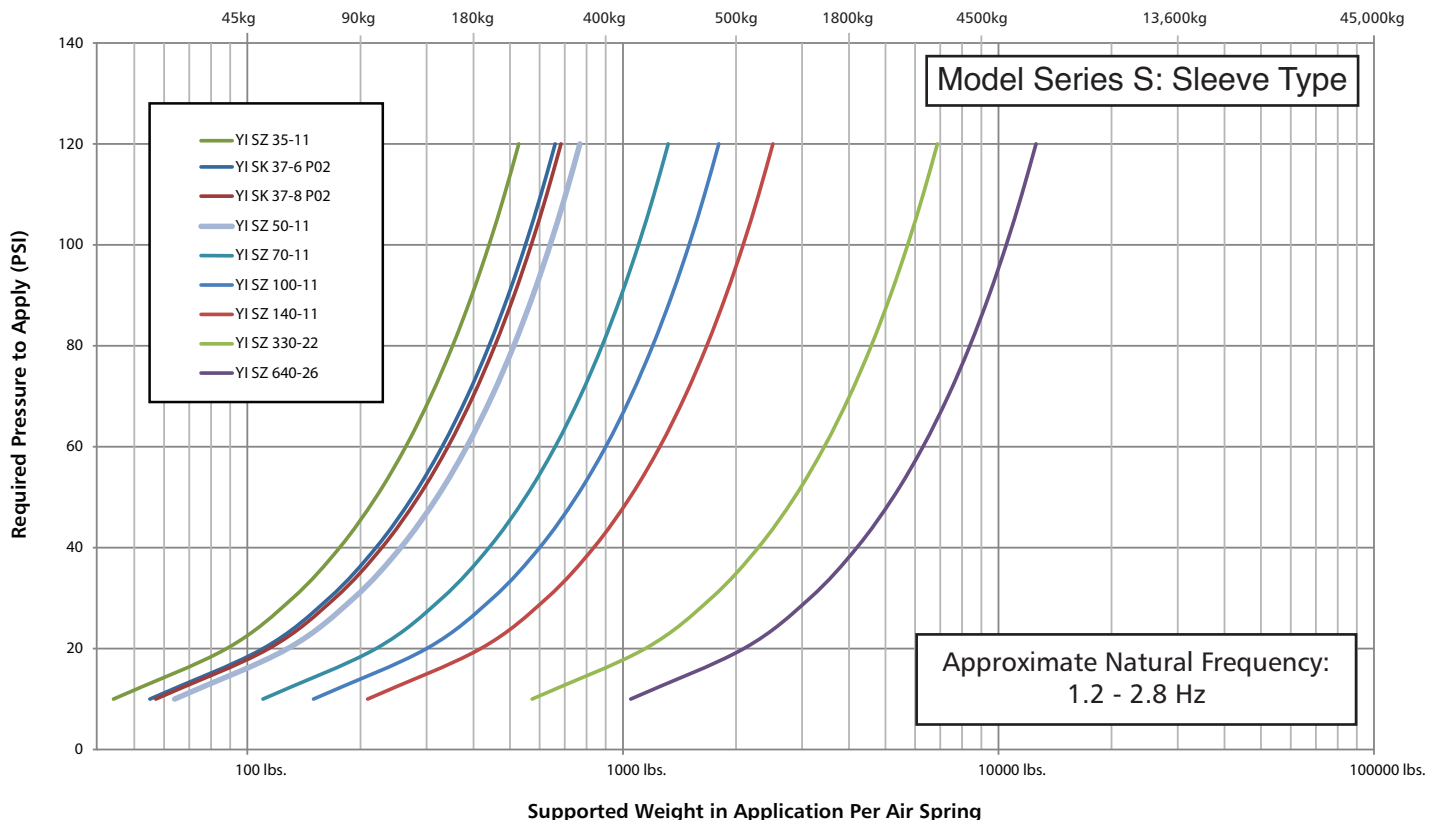
Air Springs enable a very low resonant frequency from approximately 1 Hz to 4 Hz. Here, the resonant frequency is virtually independent of the load-bearing capacity. The excellent insulating effect remains virtually constant even under changing loads.

### Compact Component Height

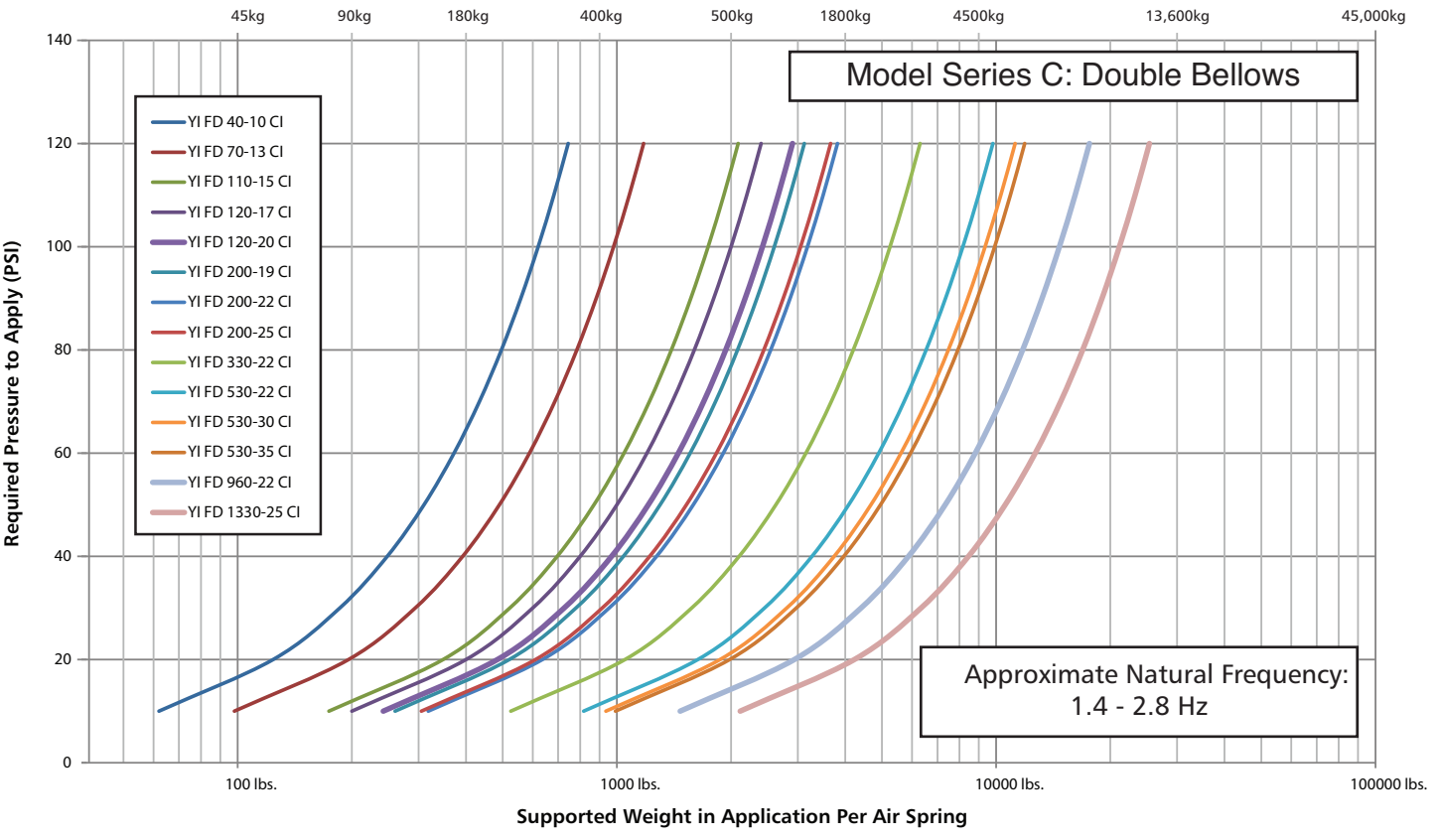
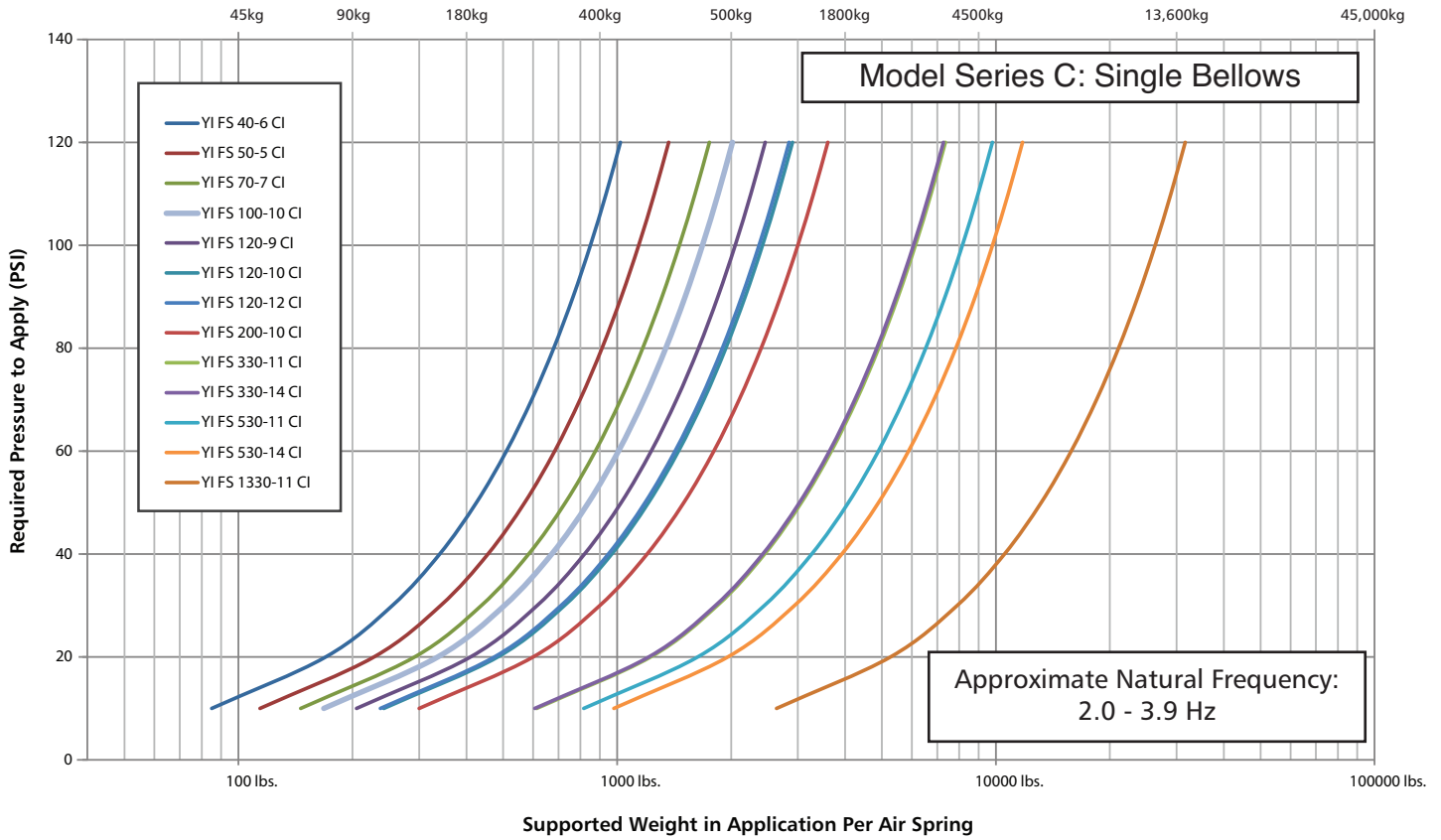
Our air springs offer a compact component height. There is no static spring deflection.

## Air Springs for Vibration Isolation - Model S Series

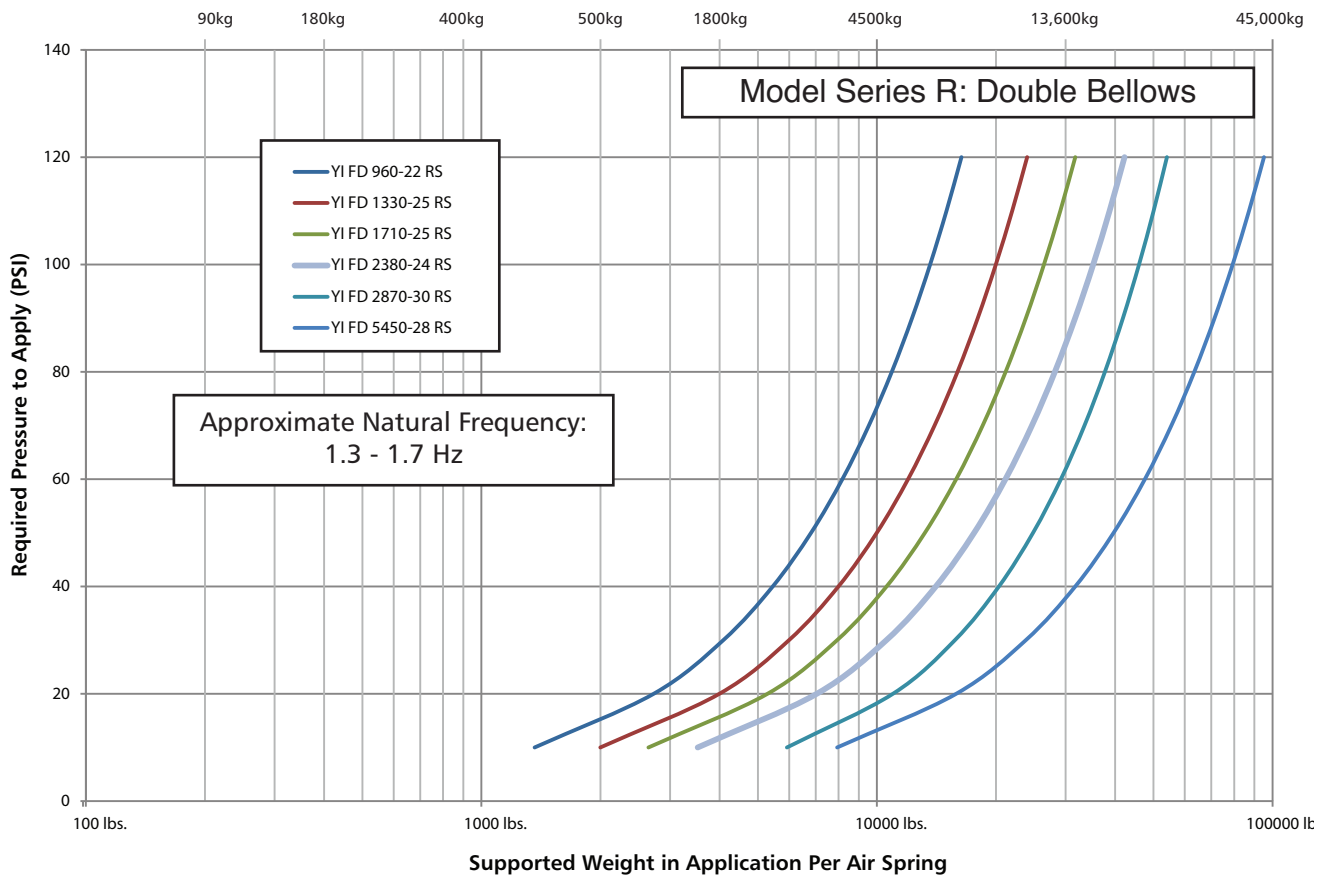
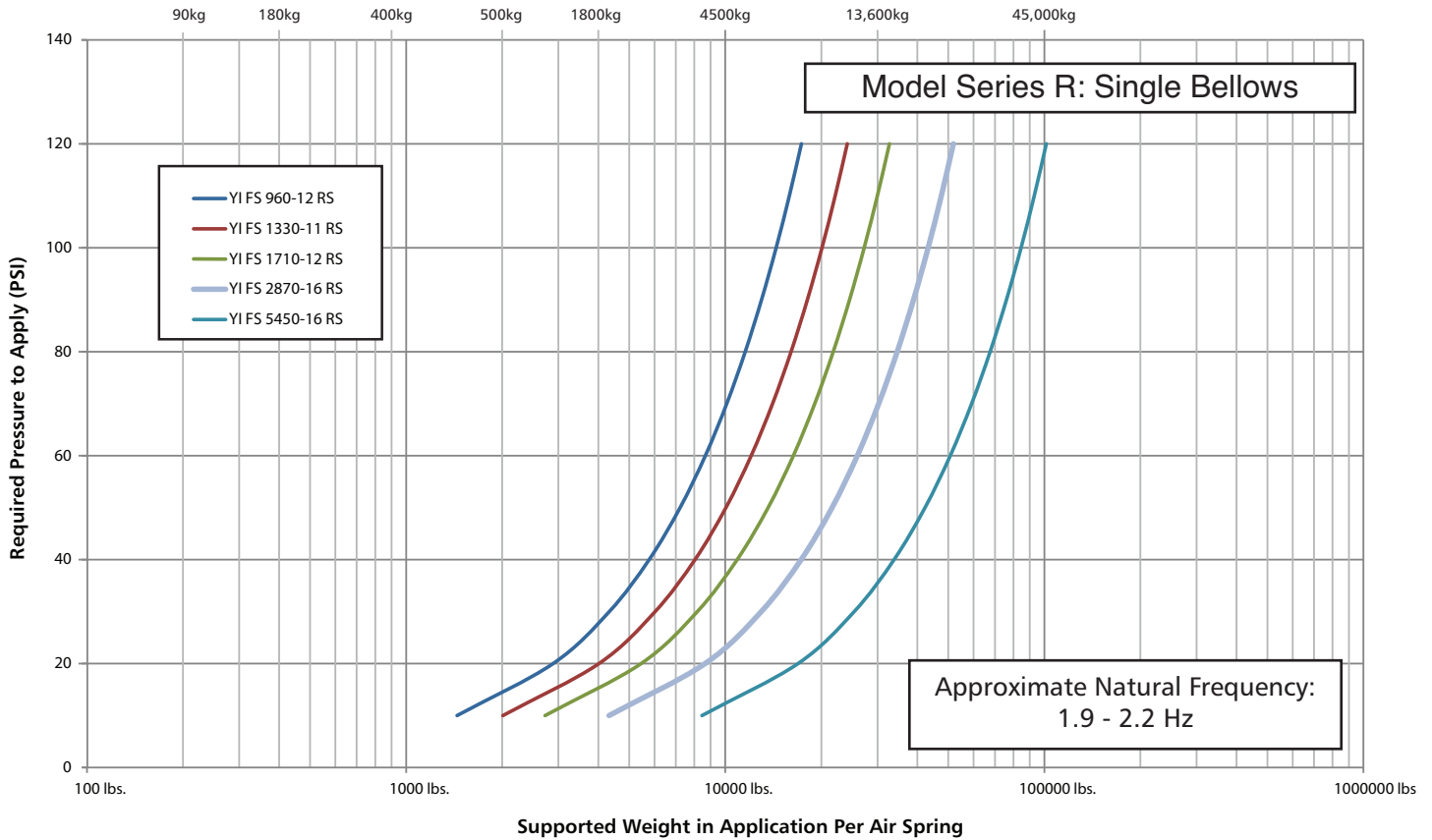
- The following curves represent acceptable points of operation for each series of air springs when used as an isolator.
- The natural frequency range provided for each series is applicable when operating within any of the curves shown.
- The triple bellows version within any air spring series is not recommended for use as an isolator due to stability concerns.



# Air Springs for Vibration Isolation - Model C Series



# Air Springs for Vibration Isolation - Model R Series



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- A comprehensive, website full of application information, technical data, sizing examples and information to assist in selecting the product that's right for you.

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ITT Enidine provides quality energy absorption and vibration isolation products and services to a variety of heavy industries throughout the globe. These industries include; steel and aluminum rolling mills, manufacturers of mill equipment, gantry cranes, ship to shore cranes, overhead bridge crane manufacturers and automated stacker cranes. ITT is a diversified leading manufacturer of highly engineered critical components and customized technology solutions for growing industrial end-markets in energy infrastructure, electronics, aerospace and transportation.

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A photograph of an industrial manufacturing facility. In the foreground, a large roll of white material is being processed by machinery. A large metal hook is suspended from a crane system, positioned over the roll. The background shows various industrial structures, including yellow railings and green machinery, under bright lighting. The overall scene depicts a complex industrial environment.

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