

# Gas Springs

## Overview

### Gas Springs

High pressure gas (Nitrogen gas: non-combustible) is sealed in a cylinder, and the gas reaction force is used as spring. Because this small gas spring receive small spring constant from large initial load in spite of its size, it can be used for wide range of applications including machines, furniture, cars, office automation equipment, etc.

### Feature

- In spite of its size and weight, large spring (reaction) force can be obtained.
- Spring (reaction) force is almost constant throughout its stroke.

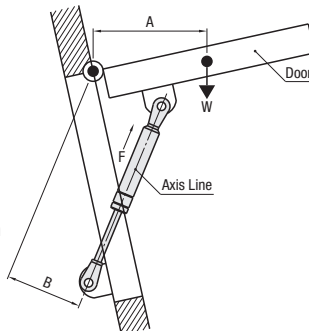
### About Initial Selection

- Calculate the necessary reaction force (F) through the following formula, then find out possible model types.

$$F = \frac{W \times A}{B}$$

F: Necessary Reaction Force (at Max. Length)  
W: Weight of Doors, etc.  
A: Horizontal Distance between Fulcrum (Door Hinge, etc.) and the Center of Gravity  
B: Vertical Distance between Fulcrum (Door Hinge, etc.) and the Axis of Gas Spring

- Select Fx1.1 or more for the gas spring reaction force. Gas reaction forces may vary within about ±10%.
- If required reaction force (Fx1.1) is larger than the reaction force at the max. length of gas spring (-) mm, use 2 or more springs.
- Reaction forces are designed at 20°C. Reaction forces increase or decrease as the temperature changes.



### About Final Selection

- Load may vary depending on door angles or gas spring mounting positions. Calculate the reaction force moment based on the subject design drawing.

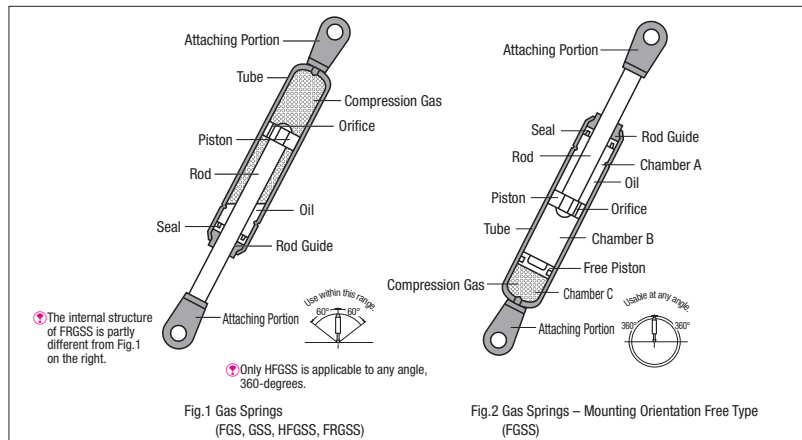
### Precautions for Use (for FGS, GSS, FGSS, HFGSS and FRGSS)

- Pay attention to temperature of gas springs during use. Do not store for prolonged duration. It will cause premature seal deterioration and reaction force decline. (Product Temperature Range: GSS, FGSS: -20°C~60°C / HFGSS: -20°C~80°C / FRGSS: -30°C~80°C Some products have different temperature range. Confirm for each product page.)
- Gas reaction forces are slightly different among individual products and may change depending on the temperature.
- Reaction force may decrease depending on the operating condition and times of use. Please replace it when it cannot reach the necessary reaction force.
- Do not store or use in the environments where the rod may rust, or in chemical atmosphere. Furthermore, do not paint the gas spring.
- Do not damage the cylinders and rods. If rods are wrapped with tape or plastic strings, adhesives or fibers remained on the surface will come inside, resulting in gas / oil leakage. Be sure to see if there is no rust, scratches, adhesives and foreign objects on the rod before use.
- Do not apply forces like bending load and torsion. Receiving load only with gas springs results in unbalanced load, which causes early deterioration and gas/oil leakage. For rotating motion, be sure to secure smooth sliding on the hinge. For linear motion, install a guide, etc. to prevent unbalanced load.
- Do not extend gas springs beyond its max. length. Even in the max. stroke (during compression), it must remain about 10mm away from the stroke end. Do not extend and compress at high speeds (with 1m/s or more).
- Use FGS and GSS with the cylinder side up and the rod side down, so that internal oil protects the rubber seal. For FGS, GSS and FRGSS, do not tilt more than 60 degrees. When it is necessary to temporarily store, do not tilt more than 60 degrees.
- Although there is no restriction in the use angle for the FGSS and HFGSS, rod downward is recommended.

### Features of Mounting Orientation Free Gas Springs (FGSS)

#### Mounting Orientation Free Gas Springs

- Nitrogen gas (non-combustible) is sealed in the gas chamber C with a free moving piston intervening, and gas reaction force is used as a spring.
- Gas chamber C has a constant reaction force in extending direction since it pressurizes oil chamber AB. Therefore the size of reaction force depends on the inner pressure of gas chamber C.
- When rod moves from the predetermined position, oil in chamber AB moves through orifice hole of the piston.
- The rod volume change in the cylinder is adjusted by the change of gas chamber C.



Gas reaction force at the max. length -10 (5) mm and the max. length -(S) mm are listed in this catalog. Gas reaction force generally changes proportionately. If the gas reaction force on a certain stroke is required, connect the 2 points with a straight line as shown in Fig. 3 and extrapolate the stroke value.

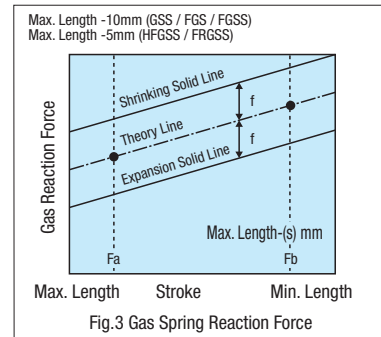


Fig.3 Gas Spring Reaction Force

f= Internal Sliding Resistance (Theoretical Value x0.1)

# Gas Springs

## Mounting Orientation Free Type

		<b>FGSS</b> No. 15050A ~ No. 22300B				<b>No. 27150A ~ No. 27300B</b>				Operating Temperature: -20~60°C <b>M</b> Material: Cylinder: 1008 Pipe Steel (Carbon Steel Hollows for Machine Structural Use) Rod: 1020 Carbon Steel Gas: Nitrogen Gas (N <sub>2</sub> ) <b>S</b> Surface Treatment: Cylinder: Baked-On (Black Matt) Rod: Hard Chrome Plating															
Part Number		Max. Length Lmax	Min. Length Lmin	Stroke	Gas Reaction Force (20°C)				A	B	H	Applicable Mounting Bracket	Weight (g)	Unit Price 1~9 pc(s).	Volume Discount										
					Lmax. -10mm Stroke		Lmax. -(S)mm Stroke								Rate										
Type	No.				Fa	kgf	Fb	kgf							(S)	10~14	15~19								
FGSS	15050A	246	196	50	N	kgf	N	kgf	40	15	7	164	125												
	49				5	69	7																		
	70				7.1	90	9.1																		
	98				10	127	13																		
	15050B	330	250	80	49	5	69	7	70			218	150												
	98				10	127	13																		
	15080A				360	270	90	49									5	69	7	80	238	155			
	98							10									127	13							
	15090A	386	286	100				49	5			69	7	90	254	170									
	98							10	127			13													
	15100A				386	286	100	196	20	255	26	140	18							8	253	210			
	18100A							294	30	382	39														
	18100B	196	20	265				27																	
	18150A	294	30	392				40																	
	22050A	526	376	150	196	20	265	27	40			163	215												
	22050B				294	30	402	41																	
	22050C				392	40	529	54																	
	22050D				490	50	655	66																	
	22080A	330	250	80	196	20	274	28	70			217	270												
	22080B				294	30	412	42																	
	22080C				392	40	539	55																	
	22080D				490	50	675	68																	
	22090A	360	270	90	196	20	265	27	80			237	280												
	22090B				294	30	402	41																	
	22090C				392	40	529	54																	
	22090D				490	50	659	67																	
	22100A	386	286	100	196	20	274	28	90			253	305												
	22100B				294	30	412	42																	
	22100C				392	40	549	56																	
	22120A				196	20	274	28																	
	22120B	440	320	120	294	30	402	41	110			287	320												
	22120C				392	40	539	55																	
	22120D				490	50	672	68																	
	22130A				196	20	274	28																	
	22130B	470	340	130	294	30	402	41	120			307	330												
	22130C				392	40	539	55																	
	22150A				196	20	274	28																	
	22150B				294	30	402	41																	
	22150C	526	376	150	392	40	539	55	140			343	400												
	22180A				196	20	274	28																	
	22180B				294	30	402	41																	
	22180C				392	40	539	55																	
	22200A	610	430	180	196	20	265	27	170			397	420												
	22200B				294	30	402	41																	
	22200C				392	40	529	54																	
	22250A				196	20	304	31																	
	22250B	750	500	250	294	30	451	46	240			467	540												
	22250C				392	40	598	61																	
	22300A				196	20	323	33																	
	22300B				294	30	490	50																	
	27150A	850	550	300	490	50	657	67	290			517	600												
	27150B				588	60	784	80																	
	27150C				686	70	921	94																	
	27200A				490	50	657	67																	
	27200B	666	466	200	588	60	784	80	190			441	760												
	27200C				686	70	921	94																	
	27250A				490	50	725	74																	
27250B	588				60	872	89																		
27250C	750	500	250	686	70	1019	104	240			475	900													
27300A				490	50	774	79																		
27300B				588	60	931	95																		