

# Gas Springs

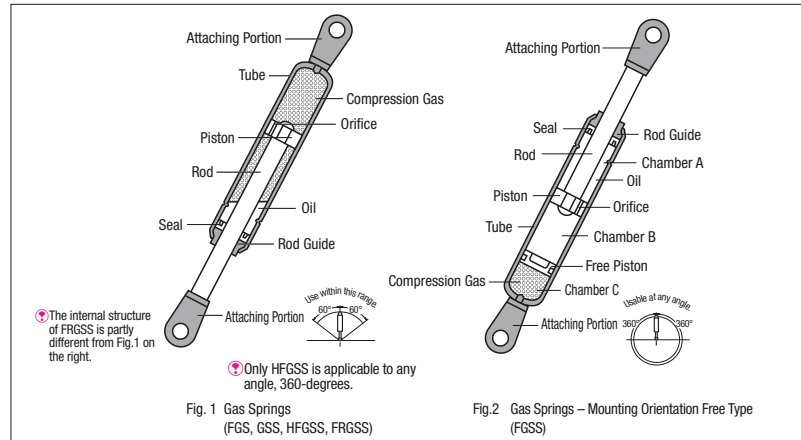
## Overview

### 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 equipments, etc.

### Features

- In spite of its size and weight, large spring (reaction) force can be obtained.
- Spring (reaction) force is almost constant throughout its stroke.
- Can be designed as required for wide applications.



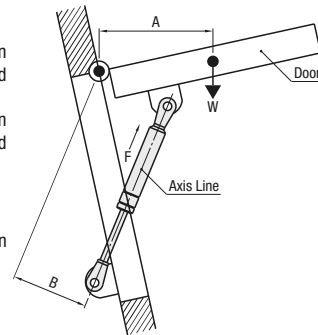
### About Initial Selection

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

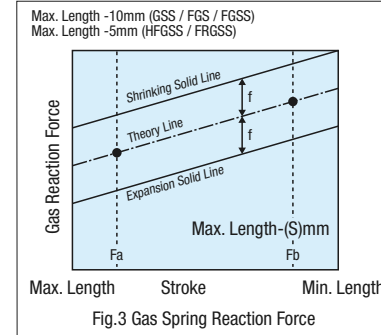
$$F = \frac{W \times A}{B}$$

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.



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 read the value on the stroke to conjecture.



### 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 on 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.

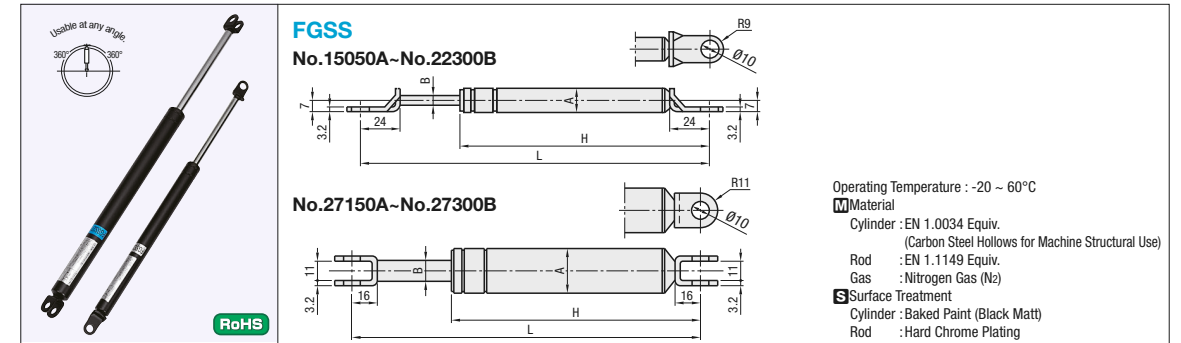
### Features of Mounting Orientation Free Gas Springs (FGSS)

#### 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 Springs

## Mounting Orientation Free Type



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 Rate	
				Lmax. -10mm Stroke		Lmax. -(S)mm Stroke								10-14	15-20
				N	kgf	N	kgf								
<b>Type</b>	<b>No.</b>														
	15050A			49	5	69	7								
	15050K	246	196	70	7.1	90	9.1	40				125			
	15050B			98	10	127	13								
	15080A	330	250	49	5	69	7	70	15	7		150			
	15080B			98	10	127	13								
	15090A	360	270	49	5	69	7	80				155			
	15090B			98	10	127	13								
	15100A	386	286	49	5	69	7	90				170			
	15100B			98	10	127	13								
	18100A	386	286	196	20	255	26								
	18100B			294	30	382	39	140	18	8		210			
	18150A	526	376	196	20	265	27								
	18150B			294	30	392	40					280			
	22050A	246	196	196	20	265	27	40				215			
	22050B			294	30	402	41								
	22050C			392	40	529	54								
	22050D			490	50	655	66								
	22080A	330	250	196	20	274	28	70							
	22080B			294	30	412	42					270			
	22080C			392	40	539	55								
	22080D			490	50	675	68								
	22090A	360	270	196	20	265	27	80							
	22090B			294	30	402	41					280			
	22090C			392	40	529	54								
	22090D			490	50	659	67								
	22100A	386	286	196	20	274	28	90							
	22100B			294	30	412	42					305			
	22100C			392	40	549	56								
	22120A	440	320	196	20	274	28	110							
	22120B			294	30	402	41					320			
	22120C			392	40	539	55								
	22120D			490	50	672	68								
	22130A	470	340	196	20	274	28	120							
	22130B			294	30	402	41					330			
	22130C			392	40	539	55								
	22150A	526	376	196	20	274	28	140							
	22150B			294	30	402	41					400			
	22150C			392	40	539	55								
	22180A	610	430	196	20	274	28	170							
	22180B			294	30	402	41					420			
	22180C			392	40	539	55								
	22200A	666	466	196	20	265	27	190							
	22200B			294	30	402	41					480			
	22200C			392	40	529	54								
	22250A	750	500	196	20	304	31	240							
	22250B			294	30	451	46					540			
	22250C			392	40	598	61								
	22300A	850	550	196	20	323	33	290							
	22300B			294	30	490	50					600			
	27150A	526	376	490	50	657	67	140							
	27150B			588	60	784	80					610			
	27150C			686	70	921	94								
	27200A	666	466	490	50	657	67	190							
	27200B			588	60	784	80					760			
	27200C			686	70	921	94								
	27250A	750	500	490	50	725	74	240							
	27250B			588	60	872	89					900			
	27250C			686	70	1019	104								
	27300A	850	550	490	50	774	79	290							
	27300B			588	60	931	95					1000			

For Mounting Brackets, see P.384, 385.

