

# Gas Springs

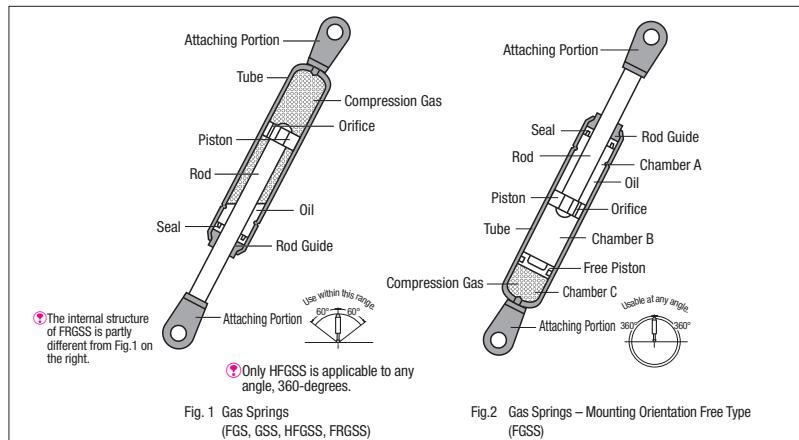
## Overview

### 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.

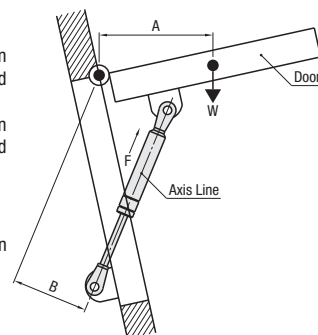


### About Initial Selection

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

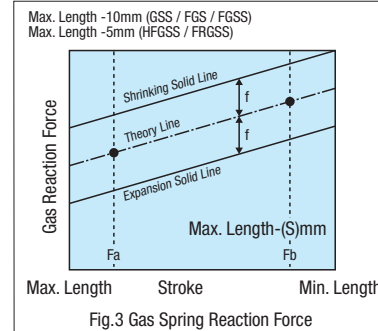
$$F = \frac{W \times A}{B}$$

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.

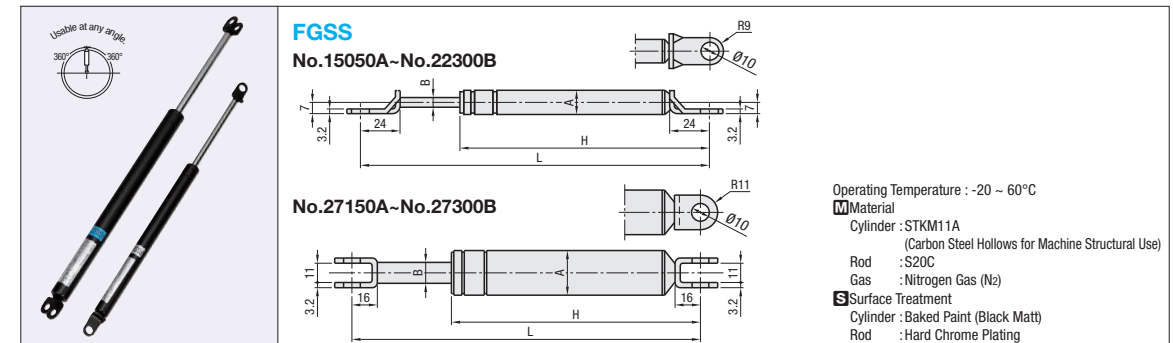
### Features of Mounting Orientation Free Gas Springs (FGSS)

#### 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 10-14	Volume Discount Rate 15-20
				Lmax. -10mm Stroke		Lmax. -(S)mm Stroke									
				N	kgf	N	kgf								
15050A	246	196	50	49	5	69	7	40	15	7	164	125			
15050K				70	7.1	90	9.1								
15050B				98	10	127	13								
15080A	330	250	80	49	5	69	7	70	15	7	218	150			
15080B				98	10	127	13								
15090A				49	5	69	7								
15090B	98	10	127	13	80	15	7	238	170						
15100A	49	5	69	7											
15100B	98	10	127	13											
18100A	386	286	100	196	20	255	26	90	18	8	253	210			
18100B				294	30	382	39								
18150A				196	20	265	27								
18150B	294	30	392	40	140	18	8	343	280						
22050A	196	20	265	27											
22050B	294	30	402	41											
22050C	392	40	529	54	40	22	10	163	215						
22050D	490	50	655	66											
22080A	196	20	274	28											
22080B	294	30	412	42	70	22	10	217	270						
22080C	392	40	539	55											
22080D	490	50	675	68											
22090A	360	270	90	196	20	265	27	80	22	10	237	280			
22090B				294	30	402	41								
22090C				392	40	529	54								
22090D	490	50	659	67	90	22	10	253	305						
22100A	196	20	274	28											
22100B	294	30	412	42											
22100C	392	40	549	56	110	22	10	287	320						
22120A	196	20	274	28											
22120B	294	30	402	41											
22120C	392	40	539	55	120	22	10	307	330						
22120D	490	50	672	68											
22130A	196	20	274	28											
22130B	294	30	402	41	140	22	10	343	400						
22130C	392	40	539	55											
22150A	196	20	274	28											
22150B	294	30	402	41	170	22	10	397	420						
22150C	392	40	539	55											
22180A	196	20	274	28											
22180B	294	30	402	41	190	22	10	433	480						
22180C	392	40	539	55											
22200A	196	20	265	27											
22200B	294	30	402	41	240	22	10	467	540						
22200C	392	40	529	54											
22250A	196	20	304	31											
22250B	294	30	451	46	290	22	10	517	600						
22250C	392	40	598	61											
22300A	196	20	323	33											
22300B	294	30	490	50	140	27.4	12.5	351	610						
27150A	490	50	657	67											
27150B	588	60	784	80											
27150C	686	70	921	94	190	27.4	12.5	441	760						
27200A	490	50	657	67											
27200B	588	60	784	80											
27200C	686	70	921	94	240	27.4	12.5	475	900						
27250A	490	50	725	74											
27250B	588	60	872	89											
27250C	686	70	1019	104	290	27.4	12.5	525	1000						
27300A	490	50	774	79											
27300B	588	60	931	95											

For Mounting Brackets, see P.384, 385.

