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Mounting orientation

'Rod down' is the preferred orientation for mounting a gas spring. An optimum design would permit the support to be oriented rod down through its entire actuation. There are several reasons for this:

In order to achieve the damping or 'cushion' at the end of the gas spring's stroke, the piston assembly inside of the gas spring must travel through oil at the end of the stroke. 'Rod down' orientation ensures that the oil is in the proper location for full damping to occur.

'Rod down' orientation ensures that the rod and sealing components are lubricated with every stroke of the gas spring. This reduces seal wear and helps to inhibit corrosion.

The expected life of a gas spring

When estimating the life of a gas spring, one must first determine how much force the support can lose before the application becomes unacceptable. The time it takes to lose this amount of force is considered to be the life of the support.

All Gas springs lose output force over time. The rate at which force loss occurs varies greatly between application and manufacturer. Many factors affect the rate of force loss, such as: size of the support, orientation, amount of cycles, ambient temperature, vibration, and the geometry of the application and time (cycle time). Considering all of the variables, it is very difficult to estimate life accurately without actual testing on the application.

As noted above, all Gas springs will lose output force over time. It is recommended that the gas springs be periodically checked to ensure that they are functioning as intended. This inspection should be implemented as part of a planned maintenance activity, if possible.

Temperature Affect

Temperature affects Gas springs in two ways, output force change and increased susceptibility to gas loss.

As the temperature of the Gas spring changes, the internal pressure changes according to the relationship $P1/T1 = P2/T2$. Therefore, as the temperature increases, so does the internal pressure. As the internal pressure increases, so does the output force. For every 10ºC (18ºF) change in temperature, the output force changes 3.5 percent.

Very high or very low temperatures can adversely affect the Gas spring's ability to retain its gas charge. At very high temperatures, the permeability of rubber increases and the gas molecules may diffuse through the seal more quickly. Additionally, rubber compounds may begin to soften at elevated temperatures and lose their ability to seal properly. At very low temperatures, rubber compounds may stiffen and also lose their ability to seal properly. Camloc's seal design and rubber compound helps to minimize problems at temperature extremes. This allows Camloc Gas Springs to perform reliably at temperatures ranging from -30ºC to +100ºC

Within their specified range, Dampers are affected by temperature. The damping effectiveness increases or decreases as the temperature rises and falls. For example, damping increases at lower temperatures

To ensure the longest life for a Gas spring in an application

Orient the support "rod down". As explained above, this will continually lubricate the seal and rod and reduce permeation through the seal.

Utilize the largest gas volume possible in the support. In general, use the minimum stroke required with the largest body possible. In a support with a large gas volume, small gas losses are imperceptible in the output force. The temperature of the Gas spring should remain well within the temperature limits. If temperature extremes will be encountered, it should be for a short duration and the support should not be cycled while at the extremes. Utilize the highest force Gas spring possible that still provides acceptable handling loads for the application. This will allow for some force loss without the loss of function of the application. Avoid side load, vibration, contamination and damage to the rod.

Provide multiple mounting locations so that the support can be moved to accommodate for force loss as the support ages.

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De-gassing the Vari-lift Gas Springs

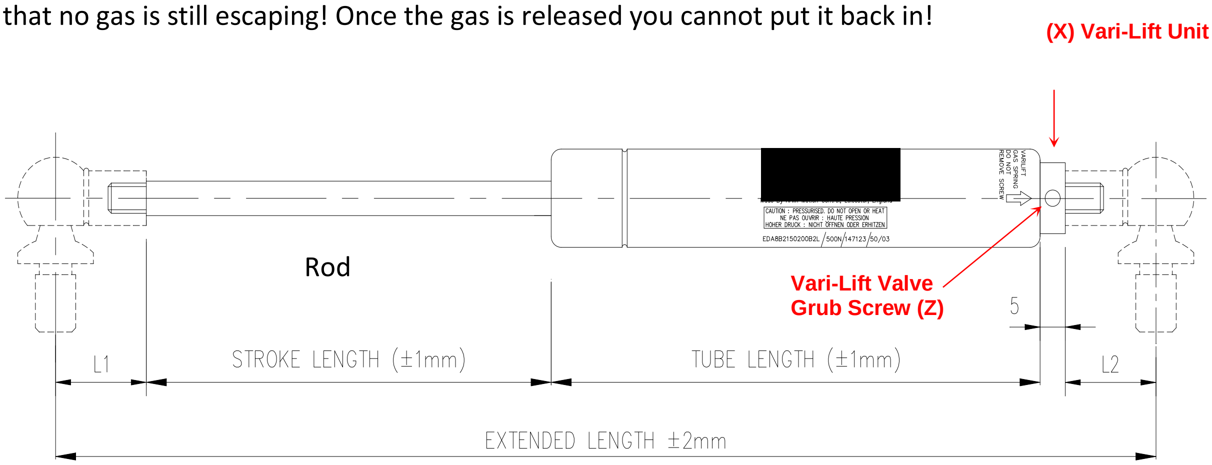
Vari-lift Springs are supplied fitted with a Vari-lift brass valve. The force in the gas spring is supplied set to it's maximum pressure. Each gas spring is then de-gassed to the force required using a standard 2mm Allen key.

Valve Adjustment Instructions:

Fit the gas spring with the cylinder / tube in the uppermost position, rod down. The Vari-lift valve can be seen at the top of the cylinder / tube (X).

Adjustment of the Grub Screw:

Ensure the 2mm Allen key (provided) is located in the grub screw (Z) to its maximum depth. Undo the screw carefully with approximately ¼ of a turn by rotating anti-clockwise until the gas is heard escaping. Do not remove the Allen key. Tighten the grub screw almost immediately. When re-tightening care should be taken to ensure that excessive force is not applied, as this will damage the hexagon in the grub screw and make it inoperative. Be careful not to drop the Allen key and ensure that no gas is still escaping! Once the gas is released you cannot put it back in!



Repeat the process gently releasing a small amount of gas at a time until the required lifting action is achieved. If using two gas springs on the application (which is recommended) then repeat the above process on each spring in turn (alternate between both springs).

WARNING: The force can be adjusted **downwards** only.

It is advisable to add approximately 10% to the weight being supported when adjusting the gas spring. This will reduce the chance of releasing too much gas.

UNDER NO CIRCUMSTANCES SHOULD THE GRUB SCREW BE REMOVED

Note: A slight mist of oil may sometimes be seen escaping when venting gas. This is normal.

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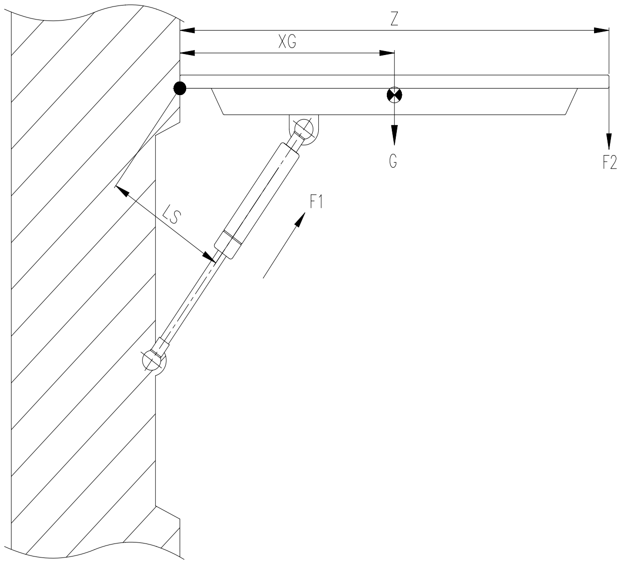
Calculations and Mounting Guide

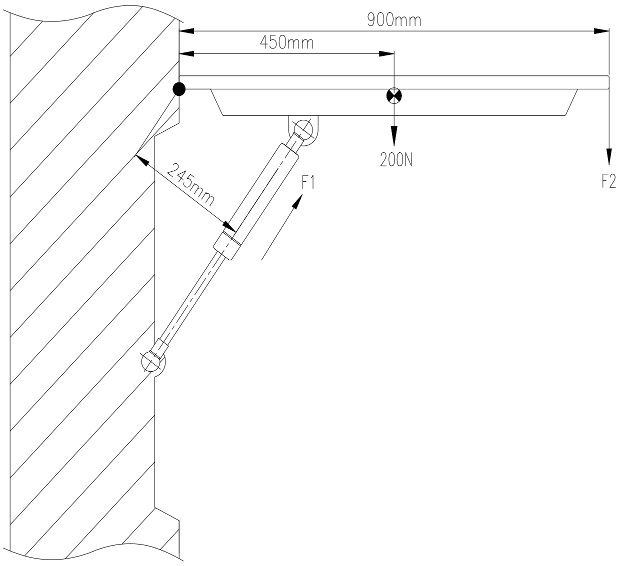
Below is a basic calculation which gives an approximation of the minimum required gas spring force for a specified mounting position geometry.

Please remember, we offer an engineering application solutions service. Through the use of our expert system selection software we can quickly determine the optimum mounting points, the resultant handling forces (both opening and closing forces) and recommend the correct gas spring specification and part number.



$$F1 = \frac{G \times XG}{LS \times A}$$

Estimating Gas Spring Force F1 (N)
Z = Length of lid from pivot(hinge) point(mm)
XG = Centre of Gravity(mm). (N.b. take account of Uneven distribution of weight, depending on lid Shape, handles, locks, other components)
G = Weight of lid in Newtons (kg x 10)
LS = Radius of Gas Spring Force(mm)
A = Number of gas springs per application, 2 is usually recommended.



Worked Example for Estimating Gas Spring Force F1 (N)

$$F1 = \frac{200N \times 450mm}{245mm \times 2}$$

$$F1 = 183.67N$$

To estimate the closing effort F2 (N)

$$F2 = \frac{A \times F1 \times LS}{Z}$$

$$F2 = \frac{2 \times 183.67 \times 245}{900} = 100N$$

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Shelf Life and Storage Recommendations

Camloc Gas springs should be stored in a clean, dry environment at room temperature between 10 and 25°C. Spring must be stored with the rod facing downwards.

Some force loss should be expected due to sealing material aging and gas permeability through the seal, typically this would be around 1 to 2% per year.

Failure to store the springs in the correct orientation can lead to the seal drying-out which will accelerate force loss.

Factors such as temperature changes and environmental conditions can affect seal aging and speed up the process of force loss.

The majority of applications will tolerate a maximum force loss of 10%, although this is application dependant.

If storage is necessary Camloc recommend you adopt a "first in - first out" policy.

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