MagSpring, unlike mechanical springs, deliver a constant force over their entire working range.

MagSpring consists of only two components: a stator and a slider.

MagSprings are totally passive. Their operation is based entirely on a unique application of permanent magnets – no electricity at all.

The constant force spring technology for industrial applications

www.motiontech.com.au
Magnetic Spring MagSpring

MagSpring products can best be described as "magnetic springs." The term "spring", however, is to be understood to mean that MagSpring components generate a constant force over their entire working range, while the characteristic curve for a typical mechanical spring shows an increase in force with increasing displacement (see Fig. Right). The generation of force that is independent of the stroke makes MagSprings preferable for balancing weight forces in vertical drive applications. MagSpring products can best be described as "magnetic- Since MagSprings are purely passive elements, a defined function or position of a device can be ensured in a power-off condition. For example, a gripper or press head on a vertical mount can be held up, or a slider can be pushed in or pulled out with a constant force.

Mode of Operation

The mode of operation is based on the attractive force of permanent magnets. Accordingly, no energy source (electricity, compressed air, etc.) is needed, so that safety-related applications can also be addressed. The special design of the flow-guiding components and the magnets translates the strongly non-linear relationship between force and displacement in magnet-iron arrangements into a constant force curve. Depending on the strength class of the MagSpring, the permanent magnets are either in the stator, in the slider, or in both components. The slider is guided by an integrated plain bearing, so that MagSprings can be used comparably to gas pressure springs in a design.
Application of Constant Force

Thanks to the constant force-displacement curve, many other applications are possible, such as the generation of a constant press force, regardless of position; application of a constant holding force across a large stroke range; or single-sided force support in drive applications.

The effective force is in the range of +/- 10% of the nominal force, due to material and manufacturing tolerances.

Working Range

In the relaxed state, the slider is approximately centered in the stator, while the working end of the slider extends somewhat out of the end of the stator. (Fundamentally, however, both ends of the slider can be used to mount loads.) From this rest position, the slider can be pulled or pushed out of the stator in both directions. The force increases from zero to the nominal force within a short stroke length. The working stroke then continues with a constant force. The start position (SP) describes the distance between the working end of the slider and the end of the stator at the beginning of the constant force range.

Holding Function (Power-off)

Since MagSprings are purely passive elements, a defined function or position of a device can be ensured in a power-off condition. For example, a gripper or press head on a vertical mount can be held up, or a slider can be pushed in or pulled out with a constant force.
The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

### Dimensions in mm

<table>
<thead>
<tr>
<th>MagSpring</th>
<th>Constant force [N]</th>
<th>Stator mass [g (lb)]</th>
<th>Slider mass [g (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M01-20x60/50-11</td>
<td>11</td>
<td>75 (0.16)</td>
<td>75 (0.16)</td>
</tr>
<tr>
<td>M01-20x60/50-17</td>
<td>17</td>
<td>75 (0.16)</td>
<td>75 (0.16)</td>
</tr>
<tr>
<td>M01-20x60/50-22</td>
<td>22</td>
<td>75 (0.16)</td>
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</tr>
</tbody>
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</tr>
</thead>
<tbody>
<tr>
<td>M01-20x140/130-11</td>
<td>11</td>
<td>180 (0.39)</td>
<td>155 (0.34)</td>
</tr>
<tr>
<td>M01-20x140/130-17</td>
<td>17</td>
<td>180 (0.39)</td>
<td>155 (0.34)</td>
</tr>
<tr>
<td>M01-20x140/130-22</td>
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<td>180 (0.39)</td>
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</tr>
</thead>
<tbody>
<tr>
<td>M01-20x220/210-11</td>
<td>11</td>
<td>285 (0.62)</td>
<td>220 (0.49)</td>
</tr>
<tr>
<td>M01-20x220/210-17</td>
<td>17</td>
<td>285 (0.62)</td>
<td>220 (0.49)</td>
</tr>
<tr>
<td>M01-20x220/210-22</td>
<td>22</td>
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The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

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<tr>
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<th>Stator mass [g (lb)]</th>
<th>Slider mass [g (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M01-20x300/290-11</td>
<td>11</td>
<td>388 (0.86)</td>
<td>520 (1.15)</td>
</tr>
<tr>
<td>M01-20x300/290-17</td>
<td>17</td>
<td>388 (0.86)</td>
<td>520 (1.15)</td>
</tr>
<tr>
<td>M01-20x300/290-22</td>
<td>22</td>
<td>388 (0.86)</td>
<td>520 (1.15)</td>
</tr>
</tbody>
</table>

Ordering Information

M01-20x60/50 MagSpring M01-20 with 50mm stroke
- Stator: MS01-20x60 MagSpring Stator 20x60mm 0250-2200
- Slider: ML01-12x130/60-10 Slider for MagSpring M01-20x60/50, Force 11N 0250-2300
  ML01-12x130/60-15 Slider for MagSpring M01-20x60/50, Force 17N 0250-2308
  ML01-12x130/60-20 Slider for MagSpring M01-20x60/50, Force 22N 0250-2301

M01-20x140/130 MagSpring M01-20 with 130mm stroke
- Stator: MS01-20x140 MagSpring Stator 20x140mm 0250-2201
- Slider: ML01-12x210/160-10 Slider for MagSpring M01-20x140/130, Force 11N 0250-2302
  ML01-12x210/160-15 Slider for MagSpring M01-20x140/130, Force 17N 0250-2308
  ML01-12x210/160-20 Slider for MagSpring M01-20x140/130, Force 22N 0250-2303

M01-20x220/210 MagSpring M01-20 with 210 mm stroke
- Stator: MS01-20x220 MagSpring Stator 20x220mm 0250-2202
- Slider: ML01-12x290/240-10 Slider for MagSpring M01-20x220/210, Force 11N 0250-2304
  ML01-12x290/240-15 Slider for MagSpring M01-20x220/210, Force 17N 0250-2310
  ML01-12x290/240-20 Slider for MagSpring M01-20x220/210, Force 22N 0250-2305

M01-20x300/290 MagSpring M01-20 with 290mm stroke
- Stator: MS01-20x300 MagSpring Stator 20x140mm 0250-2207
- Slider: ML01-12x370/320-10 Slider for MagSpring M01-20x300/290, Force 11N 0250-2311
  ML01-12x370/320-15 Slider for MagSpring M01-20x300/290, Force 17N 0250-2312
  ML01-12x370/320-20 Slider for MagSpring M01-20x300/290, Force 22N 0250-2313
The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

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<th>MagSpring</th>
<th>Constant force [N]</th>
<th>Stator mass [g (lb)]</th>
<th>Slider mass [g (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M01-37x80/50-40</td>
<td>40</td>
<td>440 (0.90)</td>
<td>75 (0.16)</td>
</tr>
<tr>
<td>M01-37x80/50-60</td>
<td>50</td>
<td>440 (0.90)</td>
<td>75 (0.16)</td>
</tr>
<tr>
<td>M01-37x80/50-60</td>
<td>60</td>
<td>440 (0.90)</td>
<td>75 (0.16)</td>
</tr>
</tbody>
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The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

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<th>Slider mass [g (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M01-20x140/130</td>
<td>11</td>
<td>880 (1.80)</td>
<td>155 (0.34)</td>
</tr>
<tr>
<td>M01-20x140/130</td>
<td>22</td>
<td>880 (1.80)</td>
<td>155 (0.34)</td>
</tr>
<tr>
<td>M01-20x140/130</td>
<td>40</td>
<td>880 (1.80)</td>
<td>155 (0.34)</td>
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</tbody>
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The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

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<th>Slider mass [g (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M01-37x230/200</td>
<td>40</td>
<td>1320 (2.70)</td>
<td>220 (0.49)</td>
</tr>
<tr>
<td>M01-37x230/200</td>
<td>50</td>
<td>1320 (2.70)</td>
<td>220 (0.49)</td>
</tr>
<tr>
<td>M01-37x230/200</td>
<td>60</td>
<td>1320 (2.70)</td>
<td>220 (0.49)</td>
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<th>MagSpring</th>
<th>Constant force [N]</th>
<th>Stator mass [g (lb)]</th>
<th>Slider mass [g (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M01-37x305/275-40</td>
<td>40</td>
<td>1800 (3.90)</td>
<td>280 (0.61)</td>
</tr>
<tr>
<td>M01-37x305/275-50</td>
<td>50</td>
<td>1800 (3.90)</td>
<td>280 (0.61)</td>
</tr>
<tr>
<td>M01-37x305/275-60</td>
<td>60</td>
<td>1800 (3.90)</td>
<td>280 (0.61)</td>
</tr>
</tbody>
</table>

**Ordering Information**

- **M01-37x80/50**
  - **MagSpring M01-37 with 50mm stroke**
    - **Stator**: MS01-37x80, MagSpring Stator 37x80mm
    - **Slider**: ML01-12x130/60-10, Slider for MagSpring M01-37x80/50, Force 40N
    - **Slider**: ML01-12x130/60-15, Slider for MagSpring M01-37x80/50, Force 50N
    - **Slider**: ML01-12x130/60-20, Slider for MagSpring M01-37x80/50, Force 60N

- **M01-37x155/125**
  - **MagSpring M01-37 with 125mm stroke**
    - **Stator**: MS01-37x155, MagSpring Stator 37x155mm
    - **Slider**: ML01-12x210/160-10, Slider for MagSpring M01-37x155/125, Force 40N
    - **Slider**: ML01-12x210/160-15, Slider for MagSpring M01-37x155/125, Force 50N
    - **Slider**: ML01-12x210/160-20, Slider for MagSpring M01-37x155/125, Force 60N

- **M01-37x230/200**
  - **MagSprings M01-37 with 200mm stroke**
    - **Stator**: MS01-37x230, MagSpring Stator 37x230mm
    - **Slider**: ML01-12x290/240-10, Slider for MagSpring M01-37x230/200, Force 40N
    - **Slider**: ML01-12x290/240-15, Slider for MagSpring M01-37x230/200, Force 50N
    - **Slider**: ML01-12x290/240-20, Slider for MagSpring M01-37x230/200, Force 60N

- **M01-37x305/275**
  - **MagSprings M01-37 with 275mm stroke**
    - **Stator**: MS01-37x305, MagSpring Stator 37x305mm
    - **Slider**: ML01-12x370/320-10, Slider for MagSpring M01-37x305/275, Force 40N
    - **Slider**: ML01-12x370/320-15, Slider for MagSpring M01-37x305/275, Force 50N
    - **Slider**: ML01-12x370/320-20, Slider for MagSpring M01-37x305/275, Force 60N
Flanges

Flange and Adaptor for MagSpring

Flange for MagSpring M01-20

Material: Aluminum (AlMgSi), black anodized
Mass: approx. 30g (0.066lb)

Dimensions in mm

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF01-20/H23</td>
<td>Flange MagSpring M01-20 - fits guides H01-23</td>
<td>0250-2306</td>
</tr>
</tbody>
</table>

Flange for MagSpring M01-37

Material: Aluminum (AlMgSi), black anodized
Mass: approx. 70g (0.15lb)

Dimensions in mm

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF01-37/H37</td>
<td>Flange MagSpring M01-20 - fits guides H01-37 and B01-37 - fits guides H01-48 and B01-48</td>
<td>0250-2307</td>
</tr>
</tbody>
</table>
### Adaptor for MagSpring M01-20 and Guides H01-23

**Item** | **Description** | **Part Number**  
---|---|---  
MA01-20/H23 | Adaptor MagSpring M01-20 / Guides H01-23 | 0250-0116

**Material:** Aluminum (AlMgSi), black anodized  
**Mass:** approx. 18g (0.066lb)

**Dimensions in mm**

| 20 | 6.5 ± 0.2 | 29 | 48 ± 0.4 |
| 44 ± 0.2 |

---

### Adaptor for MagSpring M01-37 and Guides H01-37 / B01-37

**Item** | **Description** | **Part Number**  
---|---|---  
MA01-37/H37 | Adaptor MagSpring M01-37 / Guides H01-37 and B01-37 | 0250-0117

**Material:** Aluminum (AlMgSi), black anodized  
**Mass:** approx. 18g (0.066lb)

**Dimensions in mm**

| 20 | 6.5 ± 0.2 | 39.5 | 59.25 ± 0.4 |
| 55.25 ± 0.2 |

---

### Adaptor for MagSpring M01-37 and Guides H01-48 / B01-48

**Item** | **Description** | **Part Number**  
---|---|---  
MA01-37/H48 | Adaptor MagSpring M01-37 / Guides H01-48 and B01-48 | 0250-0118

**Material:** Aluminum (AlMgSi), black anodized  
**Mass:** approx. 32g (0.034lb)

**Dimensions in mm**

| 20 | 8.5 ± 0.2 | 42 | 67.5 ± 0.4 |
| 63 ± 0.2 |
Mounting flanges and adapters are available for mounting MagSpring magnetic springs. Using these accessories, the magnetic springs can be mounted directly on an H01 linear guide or a B01 bridge guide.

The flange for mounting the MagSpring stators is secured with T-nuts in the T-slot provided for this purpose on the linear or bridge guide.

For weight balancing in vertical installations, the lower slider end of the MagSpring is attached to the guide shaft of the guide using the adapter.

Depending on the installation orientation of the guide, the adapter is attached to the guide shaft at the front mounting plate (motor on top) or the rear end of the guide shaft (motor on the bottom).
Combination with H-Guides

The illustration to the right shows a vertical arrangement of an H01 linear guide together with a MagSpring. The MagSpring presses upward with a constant force. The weight load is balanced by the MagSpring, and the linear motor thus bears less load.

If the electrical power supply is interrupted, the MagSpring supports the load, or moves it into a safe waiting position.

Materials

Slider:
Chromium-Nickel Steel 1.4301

Stator:
Iron, electroless nickel plated

Bearing:
POM based

Mounting

The stators can be mounted via the screw thread, or with a clamp, as desired. There are appropriate mounting flanges for both sizes. When attaching the slider to the load mass, care should be taken that any parallelism errors are compensated for with a flexible coupler.
Magnetic Springs

Remove Gravity from your Application

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