

### **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. The generation of force that is independent of the stroke makes MagSprings preferable for balancing weight forces in vertical drive applications.

### LinMot®

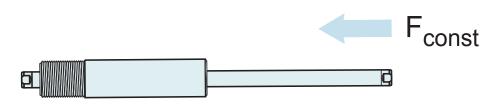
#### **Mode of operation**

The mode of operation is based on the attractive force of permanent magnets. Accordingly, no energy source (electricity, compressed air, etc.) is needed. 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.

#### **WEIGHT LOAD COMPENSATION**

Linear motors and other direct drives must provide a constant force in vertical orientations, in order to oppose the weight load. Using a MagSpring installed in parallel with the linear motor, this weight load can be passively balanced. The linear motor is then only used for the actual positioning operation and dynamic forces, and can therefore be correspondingly smaller in design.

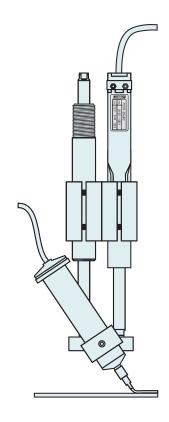
#### **APPLICATION OF CONSTANT FORCE**



#### **HOLDING FUNCTION (POWER OFF)**

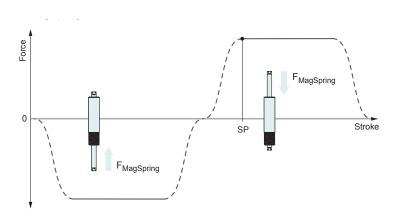
Since MagSprings are purely passive elements, a defined function or position of a device can be ensured in a power-off condition. For example, a gripper or press head on a vertical mount can be held up, or a slider can be pushed in or pulled out with a constant force.

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.

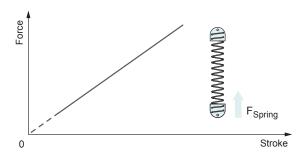




#### MagSpring ©



#### **Mechanical Spring**



### **Working Range**

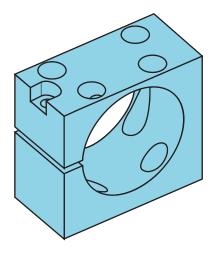
In the relaxed state, the slider is approximately centered in the stator, while the working end of the slider extends somewhat out of the end of the stator. Fundamentally, however, both ends of the slider can be used to mount loads. From this rest position, the slider can be pulled or pushed out of the stator in both directions. The force in creases 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.



#### **MOUNTING**

#### **COMBINATION WITH H-GUIDES**

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.



The illustration on the page before 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**

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Chromium-Nickel Steel 1.4301





Stator:

Iron, electroless nickel plated



**Bearing:** 

POM based



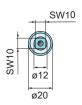
# MagSpring M01-20

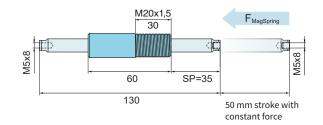


- Constant force along the entire stroke
- Stroke up to 290 mm
- Force up to 22 N
- Purely passive, no electricity needed nor compressed air
- Ideal for compensating the gravitational force
- Also suitable for dynamic movements
- Compatible with H-guides



#### M01-20x60/50: FORCE 11-22N / STROKE 50 mm



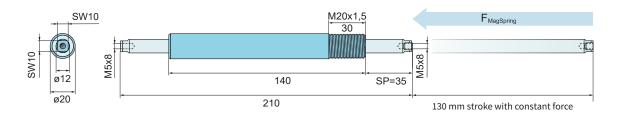


Dimensions in mm

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).

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-20x60/50-11	11	75 (0.16)	75 (0.16)
M01-20x60/50-17	17	75 (0.16)	75 (0.16)
M01-20x60/50-22	22	75 (0.16)	75 (0.16)

#### M01-20x140/130: FORCE 11-22N / STROKE 130 mm

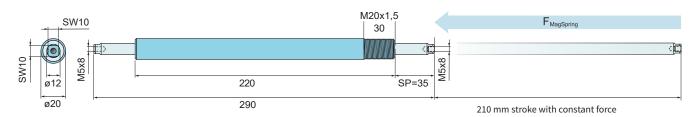


Dimensions in mm

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).

MagSpring	Constant force [N]	Stator mass [g (lb)]		Slider mass [g (lb)]	
M01-20x140/130-11	11	180	(0.39)	155	(0.34)
M01-20x140/130-17	17	180	(0.39)	155	(0.34)
M01-20x140/130-22	22	180	(0.39)	155	(0.34)

#### M01-20x220/210: FORCE 11-22N / STROKE 210 mm

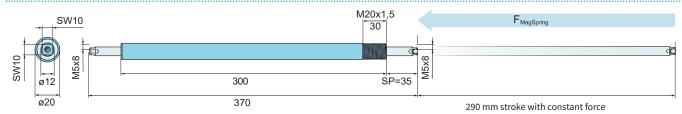


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

MagSpring	Constant force [N]	Stator ma	ss [g (lb)]	Slider mas	ss [g (lb)]
M01-20x220/210-11	11	285	(0.62)	220	(0.49)
M01-20x220/210-17	17	285	(0.62)	220	(0.49)
M01-20x220/210-22	22	285	(0.62)	220	(0.49)



#### M01-20x300/290: FORCE 11-22N / STROKE 290 mm



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

MagSpring	Constant force [N]	Stator mas	ss [g (lb)]	Slider mas	ss [g (lb)]
M01-20x300/290-11	11	388	(0.86)	280	(0.61)
M01-20x300/290-17	17	388	(0.86)	280	(0.61)
M01-20x300/290-22	22	388	(0.86)	280	(0.61)



#### **ORDERING INFORMATION**

M01-20x60/50		MagSpring M01-20	with 50 mm stroke		
		Stator	MS01-20x60	MagSpring Stator 20x60 mm	0250-2200
		Statol	WI301-20X00	MagSpiritg Stator 20x00 mm	0250-2200
	L	Slider	ML01-12x130/80-10	Slider for MagSpring M01-20x60/50, Force 11N	0250-2300
			ML01-12x130/80-15	Slider for MagSpring M01-20x60/50, Force 17N	0250-2308
			ML01-12x130/80-20	Slider for MagSpring M01-20x60/50, Force 22N	0250-2301

M01-20x140/130		MagSpring M01-20	with 130 mm stroke		
	<b>—</b>	Stator	MS01-20x140	MagSpring Stator 20x140 mm	0250-2201
	<b></b>	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	0250-2309
			ML01-12x210/160-20	Slider for MagSpring M01-20x140/130, Force 22N	0250-2303

M01-20x220/210		MagSpring M01-20	with 210 mm stroke		
				1	
	<b>—</b>	Stator	MS01-20x220	MagSpring Stator 20x220 mm	0250-2202
	<b>└</b>	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 290 mm stroke		
-	-	Stator	MS01-20x300	MagSpring Stator 20x300 mm	0250-2207
L	<b></b>	Slider	ML01-12x370/320-10	Slider for MagSpring M01-20x300/290, Force 11N	0250-2311
			ML01-12x370/320-15 ML01-12x370/320-20	Slider for MagSpring M01-20x300/290, Force 17N Slider for MagSpring M01-20x300/290, Force 22N	0250-2312 0250-2313



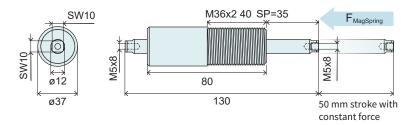
# MagSpring M01-37



- Constant force along the entire stroke
- Stroke up to 350 mm
- Force up to 60 N
- Purely passive, no electricity needed nor compressed air
- Ideal for compensating the gravitational force
- Also suitable for dynamic movements
- Compatible with H-guides



#### M01-37x80/50: FORCE 40-60N / STROKE 50 mm

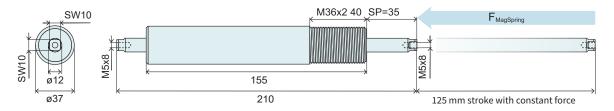


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

Dimensions in mm

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-37x80/50-40	40	440 (0.90)	75 (0.16)
M01-37x80/50-50	50	440 (0.90)	75 (0.16)
M01-37x80/50-60	60	440 (0.90)	75 (0.16)

#### M01-37x155/125: FORCE 40-60N / STROKE 125 mm

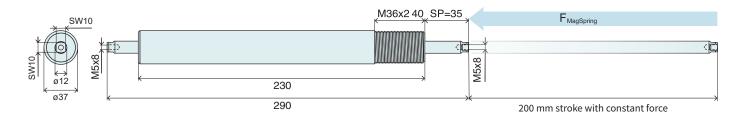


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

Dimensions in mm

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-37x155/125-40	40	880 (1.80)	155 (0.34)
M01-37x155/125-50	50	880 (1.80)	155 (0.34)
M01-37x155/125-60	60	880 (1.80)	155 (0.34)

#### M01-37x230/200: FORCE 40-60N / STROKE 200 mm

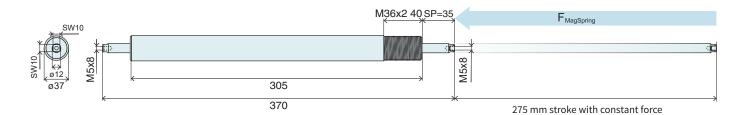


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-37x230/200-40	40	1320 (2.70)	220 (0.49)
M01-37x230/200-50	50	1320 (2.70)	220 (0.49)
M01-37x230/200-60	60	1320 (2.70)	220 (0.49)



#### M01-37x305/275: FORCE 40-60N / STROKE 275 mm

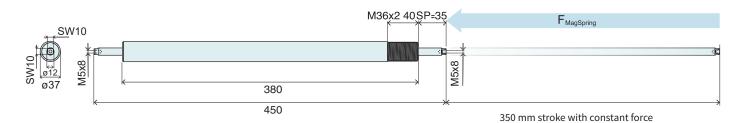


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

Dimensions in mm

MagSpring	Constant force [N]	Stator mass [g (lb)]		Slider mas	ss [g (lb)]
M01-37x305/275-40	40	1800	(3.90)	280	(0.61)
M01-37x305/275-50	50	1800	(3.90)	280	(0.61)
M01-37x305/275-60	60	1800	(3.90)	280	(0.61)

#### M01-37x380/350: FORCE 60N / STROKE 350 mm



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).

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-37x380/350-60	60	2200 (4.85)	420 (0.93)





#### **ORDERING INFORMATION**

M01-37x80/50	MagSpring M01-37 with 50 mm stroke				
	8-18				
<u> </u>	Stator	MS01-37x80	MagSpring Stator 37x80mm	0250-2203	
	→ Slider	ML01-12×130/80-10	Slider for MagSpring M01-37x80/50, Force 40N	0250-2300	
	Silder	ML01-12x130/80-10	Slider for MagSpring M01-37x80/50, Force 50N	0250-2300	
		ML01-12x130/80-15	Slider for MagSpring M01-37x80/50, Force 50N Slider for MagSpring M01-37x80/50, Force 60N	0250-2308	
		WLU1-12X130/00-20	Silder for magapring mor-strooy so, i orce doin	0230-2301	
M01-37x155/125	MagSpring M	101-37 with 125 mm stroke			
<u> </u>	<b>→</b> Stator	MS01-37x155	MagSpring Stator 37x155mm	0250-2204	
	Slider	ML01-12x210/160-10	Slider for MagSpring M01-37x155/125, Force 40N	0250-2302	
		ML01-12x210/160-15	Slider for MagSpring M01-37x155/125, Force 50N	0250-2309	
		ML01-12x210/160-20	Slider for MagSpring M01-37x155/125, Force 60N	0250-2303	
M01-37x230/200	MagSprings	M01-37 with 200 mm stroke			
	Stator	MS01-37x230	MagSpring Stator 37x230mm	0250-2205	
	Slider	ML01-12x290/240-10	Slider for MagSpring M01-37x230/200, Force 40N	0250-2304	
		ML01-12x290/240-15	Slider for MagSpring M01-37x230/200, Force 50N	0250-2310	
		ML01-12x290/240-20	Slider for MagSpring M01-37x230/200, Force 60N	0250-2305	
M01-37x305/275	MagSprings	M01-37 with 275 mm stroke			
	→ Stator	MS01-37x305	MagSpring Stator 37x305mm	0250-2206	
	Statui	M201-21X202	Magaphing Stator 37X303Hilli	0230-2206	
	Slider	ML01-12x370/320-10	Slider for MagSpring M01-37x305/275, Force 40N	0250-2311	
		ML01-12x370/320-15	Slider for MagSpring M01-37x305/275, Force 50N	0250-2312	
		ML01-12x370/320-20	Slider for MagSpring M01-37x305/275, Force 60N	0250-2313	
M01-37x380/350	MagSpring M	101-37 with stroke 350 mm			
	→ Stator	MS01-37x380	MagSpring Stator 37x380mm	0250-2209	
	Stato	M301 317300	magophing stator or vocation	0230 2203	
1	Slider	ML01-12x450/400-20	Slider for MagSpring M01-37x380/350, Force 60N	0250-2332	



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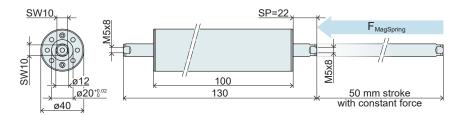
## MagSpring M01-40-SSC



- Stainless steel design of the proven MagSpring
- Constant force along the entire stroke
- Stroke up to 350 mm
- Force up to 60 N
- Purely passive, no electricity needed nor compressed air
- Ideal for compensating the gravitational force
- Also suitable for dynamic movements



#### M01-40x100-SSC/50: FORCE 40-60N / STROKE 50 mm

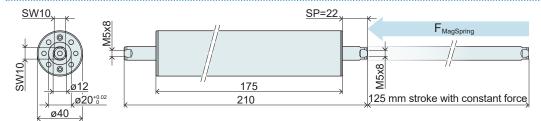


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

Dimensions in mm

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-40x100-SSC/50-40	40	440 (0.90)	75 (0.16)
M01-40x100-SSC/50-50	50	440 (0.90)	75 (0.16)
M01-40x100-SSC/50-60	60	440 (0.90)	75 (0.16)

#### M01-40x175-SSC/125: FORCE 40-60N / STROKE 125 mm

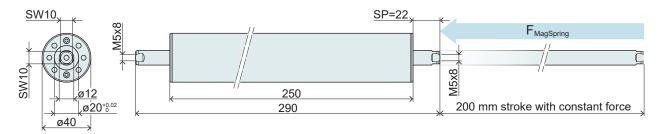


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

Dimensions in mm

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-40x175-SSC/125-40	40	880 (1.80)	155 (0.34)
M01-40x175-SSC/125-50	50	880 (1.80)	155 (0.34)
M01-40x175-SSC/125-60	60	880 (1.80)	155 (0.34)

#### M01-40x250-SSC/200: FORCE 40-60N / STROKE 200 mm

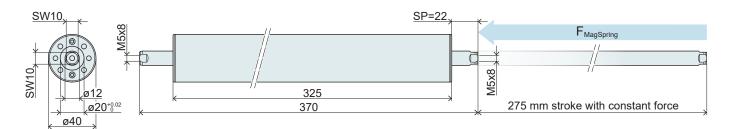


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

MagSpring	Constant force [N]	Stator mass [g (lb)]		Constant force [N] Stator mass [g (lb)] Slider mass [g (lb)]		ss [g (lb)]
M01-40x250-SSC/200-40	40	1320	(2.70)	220	(0.49)	
M01-40x250-SSC/200-50	50	1320	(2.70)	220	(0.49)	
M01-40x250-SSC/200-60	60	1320	(2.70)	220	(0.49)	



#### M01-40x325-SSC/275: FORCE 40-60N / STROKE 275 mm

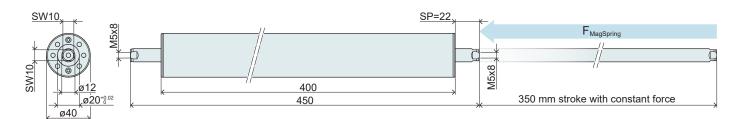


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

Dimensions in mm

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-40x325-SSC/275-40	40	1800 (3.90)	280 (0.61)
M01-40x325-SSC/275-50	50	1800 (3.90)	280 (0.61)
M01-40x325-SSC/275-60	60	1800 (3.90)	280 (0.61)

#### M01-40x400-SSC/350: FORCE 60N / STROKE 350 mm

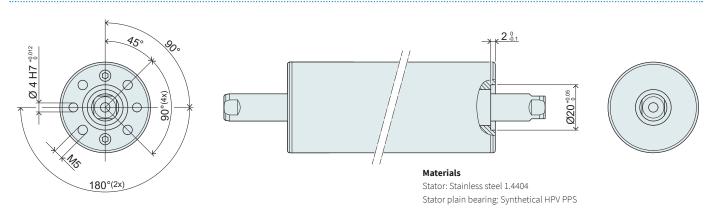


The MagSpring has a constant force, as soon as the slider has been pulled out or pushed by the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded end).

Dimensions in mm

MagSpring	Constant force [N]	Stator mass [g (lb)]	Slider mass [g (lb)]
M01-40x400-SSC/350-60	60	2200 (4.85)	420 (0.93)

#### **ASSEMBLY DRAWING**







#### **ORDERING INFORMATION**

M01-40x100-SSC/50	MagSpring M	MagSpring M01-40-SSC with 50 mm stroke				
	► Stator	MS01-40x100-SSC	MagSpring SSC Stator 40x100mm	0250-1006		
	➤ Slider	ML01-12×130/80-10	Slider for MagSpring M01-40x100/50, force 40N	0250-2300		
		ML01-12×130/80-15	Slider for MagSpring M01-40x100/50, force 50N	0250-2308		
		ML01-12x130/80-20	Slider for MagSpring M01-40x100/50, force 60N	0250-2301		
M01-40X75-SSC/125	MagSpring M	101-40-SSC with 125 mm stro	ke			
_	► Stator	MS01-40x175-SSC	MagSpring SSC Stator 40x175mm	0250-1005		
	► Slider	ML01-12×210/160-10	Slider for MagSpring M01-40x175-SSC/125, force 40N	0250-2302		
		ML01-12×210/160-15	Slider for MagSpring M01-40x175-SSC/125, force 50N	0250-2309		
		ML01-12×210/160-20	Slider for MagSpring M01-40x175-SSC/125, force 60N	0250-2303		
M01-40X250-SSC/200	MagSprings M01-40-SSC with 200 mm stroke					
	Stator	MS01-40x250-SSC	MagSpring SSC Stator 40x250mm	0250-1007		
	Slider	ML01-12×290/240-10	Slider for MagSpring M01-40x250-SSC/200, force 40N	0250-2304		
		ML01-12x290/240-15	Slider for MagSpring M01-40x250-SSC/200, force 50N	0250-2310		
		ML01-12x290/240-20	Slider for MagSpring M01-40x250-SSC/200, force 60N	0250-2305		
M01-40X325-SSC/275	MagSprings	M01-40-SSC with 275 mm str	oke			
<u> </u>	Stator	MS01-40x325-SSC	MagSpring SSC Stator 40x325mm	0250-1008		
	Slider	ML01-12x370/320-10	Slider for MagSpring M01-40x325-SSC/275, force 40N	0250-2311		
		ML01-12x370/320-15	Slider for MagSpring M01-40x325-SSC/275, force 50N	0250-2312		
		ML01-12x370/320-20	Slider for MagSpring M01-40x325-SSC/275, force 60N	0250-2313		
101-40X400-SSC/350	MagSpring M	101-40-SSC with 350 mm stro	ke			
_	Stator	MS01-40x400-SSC	MagSpring SSC Stator 40x400mm	0250-1009		
	➤ Slider	ML01-12x450/400-20	Slider for MagSpring M01-40x400-SSC/350, force 60N	0250-2332		



### Accessories

Mounting flanges and adaptors 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.

Flange MF01

#### **MOUNTING**

## 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.

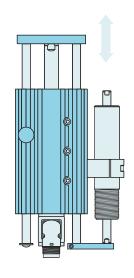
For weight balancing in vertical installations, the lower slider end of the MagSpring is attached to the guide shaft of the guide using the Adaptor.

Depending on the installation orientation of the guide, the Adaptor 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).

#### **MOTOR ON THE TOP**

Flange MA01

#### **MOTOR ON THE BOTTOM**

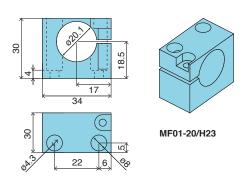




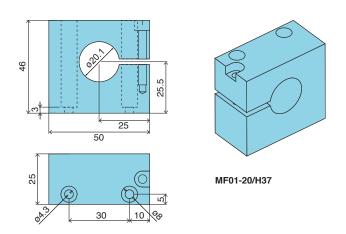
#### FLANGE AND ADAPTOR FOR MAGSPRING



#### **FLANGES FOR MAGSPRING M01-20**



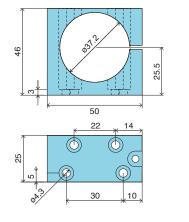
**Material:** Aluminum (AlMgSi), black anodized **Mass:** MF01-20/H23 approx. 30g (0.066lb) MF01-20/H37 approx. 125g (0.276lb)

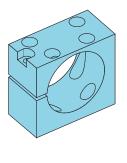


Dimensions in mm

Item	Description	Item No.
MF01-20/H23	Flange MagSpring M01-20 - fits guides H01-23	<u>0250-2306</u>
MF01-20/H37	Flange MagSpring M01-20 - fits guides H01-37	0250-2315

#### FLANSCHE UND ADAPTER FÜR MAGSPRING

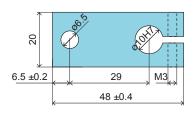


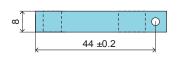


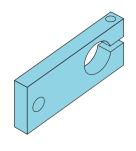
Item	Description	Item No.
MF01-37/H37	Flange MagSpring M01-37 - fits guides H01-37 und B01-37 - fits guides H01-48 und B01-48	0250-2307



#### **ADAPTOR FOR MAGSPRING M01-20 AND GUIDES H01-23**







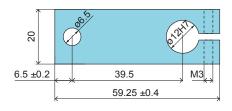
Material: Aluminum (AlMgSi), black anodized

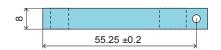
**Mass:** approx. 18g (0.066lb)

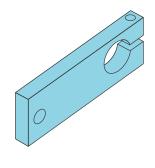
Dimensions in mm

Item	Description	Item No.
MA01-20/H23	Adaptor MagSpring M01-20 / Guides H01-23	<u>0250-0116</u>

#### ADAPTOR FOR MAGSPRING M01-37 AND GUIDES H01-37 / B01-37







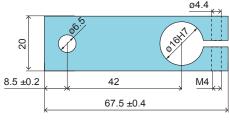
 $\textbf{Material:} \ \textbf{Aluminum} \ (\textbf{AlMgSi}), \ \textbf{black anodize}$ 

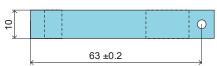
Mass: approx. 18g (0.066lb)

Dimensions in mm

Item	Description	Item No.
MA01-37/H37	Adaptor MagSpring M01-37 / Guides H01-37 und B01-37	<u>0250-0117</u>

#### ADAPTOR FOR MAGSPRING M01-37 AND GUIDES H01-48 / B01-48







Item	Description	Item No.
MA01-37/H48	Adaptor MagSpring M01-37 / Guides H01-48 und B01-48	<u>0250-0118</u>



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