



## MagSpring<sup>®</sup> Magnetic Springs





The constant force spring for industrial applications!



#### Magnetic Springs MagSpring Operating Principle

MagSpring® are best described as ,magnetic springs'. The term spring is to be interpreted as meaning, that MagSpring® components generate a constant force along the entire stroke, while the typical characteristic of a mechanical spring is the stroke dependent increase of the force.

Due to the motion-independent force generation, MagSpring®'s are ideal for weight force compensation in vertical motion applications.



#### **Operating Principle**

The operating principle is based on the attraction force of permanent magnets. Therefore, no energy supply (electricity, compressed air, etc.) is necessary, which makes safety-related applications possible as well. Due to the specific design of the elements in the magnetic flux, as well as the magnets, the strongly non-linear relation between force and stroke of the magnet-iron arrangement, are transferred into a constant force design. Depending on the force classification of the MagSpring®, the permanent magnets are either located in the slider or in the stator as well. The bearing of the slider takes place through an integrated plain bearing, so that MagSpring®'s, compared constructively, can be used similar like gas pressurized springs.







#### MagSpring<sup>®</sup> - Letting Masses Float!

#### **MagSpring**®



# Magnetic Spring

#### Work Area

In its initial state the slider is located roughly in the center of the stator, whereby the so-called work end of the slider is protruding slightly more out of the stator.

Generally both ends of the slider can be used to attach the load. From the resting position, the slider can be pulled or pressed out from the stator. In doing so, on a short path, the force is

built up from zero to a nominal value. Subsequently, the working stroke with a constant force begins.

The starting position (SP) describes the distance between the work end of the slider and the end of the stator at the beginning of the constant force area.

#### **Constant Force Applications**

Thanks to the constant force over stroke relation, many applications are possible, like the position independent generation of a constant pressure, the application of a constant holding force over a large stroke or the compensation of the weight force in vertical applications.

The emitted constant force in push and pull direction lies within the range of +/-10% of the specified nominal force, due to the material and manufacturing tolerances. Because it is also dependent on the abrasion, the dirt and the installation conditions, the force tolerance is not further specified by us

### Holding Function (when power-off)

Because MagSpring®'s are purely passive elements, a defined function or position can be ensured when power is off. For example the lifting up of a gripper or button in a vertical arrangement or the pulling in or out of a slider with constant force.







#### M01-20x60/50: force 11-22N / stroke 50mm





dimensions in mm

The MagSpring generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

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 130mm



dimensions in mm

The MagSpring generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

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 210mm



dimensions in mm

The MagSpring generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

MagSpring	constant force [N]	stator mass [g (lb)]	slider mass [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 290mm



dimensions in mm

The MagSpring generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

MagSpring	constant force [N]	stator mass [g (lb)]	slider mass [g (lb)]
M01-20x300/290-11	11	388 (0.86)	520 (1.15)
M01-20x300/290-17	17	388 (0.86)	520 (1.15)
M01-20x300/290-22	22	388 (0.86)	520 (1.15)



#### **Order Information**

M01-20x60/50		MagSpring M01-2	20 with 50mm stroke	
		stator	MS01-20x60	MagSpring stator 20x60mm
		alidar	MI 01 10-120/00 10	alidar with MagCaring M01 20vC0/E0 fares 11N
		Siluei	ML01-12x130/00-10	sider with MagSpring M01-20x60/50, force 11N
			ML01-12x130/80-15	slider with MagSpring M01-20x60/50, force 17N
			WILUT-12X130/60-20	sider with MagSpring Mot-20x80/50, force 22N
M01-20x140/130		MagSpring M01-2	20 with 130mm stroke	
	$ \rightarrow $	stator	MS01-20x140	MagSpring stator 20x140mm
	$ \rightarrow $	slider	ML01-12x210/160-10	slider with MagSpring M01-20x140/130, force 11N
			ML01-12x210/160-15	slider with MagSpring M01-20x140/130, force 17N
			ML01-12x210/160-20	slider with MagSpring M01-20x140/130, force 22N
M01-20x220/210		MagSpring M01-2	20 with 210 mm stroke	
		stator	MS01-20x220	MagSpring stator 20x220mm
	$\rightarrow$	slider	ML01-12x290/240-10	slider with MagSpring M01-20x220/210, force 11N
			ML01-12x290/240-15	slider with MagSpring M01-20x220/210, force 17N
			ML01-12x290/240-20	slider with MagSpring M01-20x220/210, force 22N
M01-20x300/290		MagSpring M01-2	20 with 290mm stroke	
		stator	MS01-20x300	MagSpring stator 20x140mm 0250-2207
		- Balan		
		slider	$M_{\rm I}$ 01-12x370/320-10	SUGEr With WaaShring W01-202300/290 torce 11N 0250-2311
		Shaer		
			ML01-12x370/320-15	slider with MagSpring M01-20x300/290, force 17N 0250-2312





#### M01-37x80/50: force 40-60N / stroke 50mm





dimensions in mm

The MagSpring generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

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 generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

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 200mm



dimensions in mm

The MagSpring generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

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)

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#### M01-37x305/275: force 40-60N / stroke 275mm



dimensions in mm

The MagSpring generates a constant force, when the slider is pulled or pushed out over the distance SP. The distance SP is measured between the unmarked slider end and the end of the stator (threaded side).

MagSpring	constant force [N]	stator mass [g (lb)]	slider mass [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)	



#### **Order Information**

M01-37x80/50		MagSpring M01-3	7 with 50mm stroke	
		stator	MS01-37x80	MagSpring stator 37x80mm
	$\rightarrow$	slider	ML01-12x130/80-10	slider with MagSpring M01-37x80/50, force 40N
			ML01-12x130/80-15	slider with MagSpring M01-37x80/50, force 50N
			ML01-12x130/80-20	slider with MagSpring M01-37x80/50, force 60N
M01-37x155/125		MagSpring M01-3	7 with 125mm stroke	
		stator	MS01-37x155	MagSpring stator 37x155mm
		slider	ML01-12x210/160-10	slider with MagSpring M01-37x155/125, force 40N
			ML01-12x210/160-15	slider with MagSpring M01-37x155/125, force 50N
			ML01-12x210/160-20	slider with MagSpring M01-37x155/125, force 60N
M01-37x230/200		MagSprings M01	37 with 200mm stroke	
		010		
		stator	MS01-37x230	MagSpring stator 37x230mm
		slider	ML01-12x290/240-10	slider with MagSpring M01-37x230/200, force 40N
			ML01-12x290/240-15	slider with MagSpring M01-37x230/200, force 50N
			ML01-12x290/240-20	slider with MagSpring M01-37x230/200, force 60N
M01-37x305/275		MagSprings M01	37 with 275mm stroke	
M01-37x305/275		MagSprings M01	37 with 275mm stroke	
M01-37x305/275		MagSprings M01-	37 with 275mm stroke	MagSpring stator 37x305mm
M01-37x305/275	L,	MagSprings M01	37 with 275mm stroke MS01-37x305	MagSpring stator 37x305mm
M01-37x305/275		MagSprings M01- stator	<b>37 with 275mm stroke</b> MS01-37x305 ML 01-12x370/320-10	MagSpring stator 37x305mm
M01-37x305/275	L	MagSprings M01- stator slider	<b>37 with 275mm stroke</b> MS01-37x305 ML01-12x370/320-10 ML 01-12x370/320-15	MagSpring stator 37x305mm slider with MagSpring M01-37x305/275, force 40N slider with MagSpring M01-37x305/275, force 50N
M01-37x305/275	L,	MagSprings M01- stator slider	<b>37 with 275mm stroke</b> MS01-37x305 ML01-12x370/320-10 ML01-12x370/320-15 ML 01-12x370/320-20	MagSpring stator 37x305mm Slider with MagSpring M01-37x305/275, force 40N slider with MagSpring M01-37x305/275, force 50N slider with MagSpring M01-37x305/275, force 60N





#### Flanges for general Applications



#### Flange for MagSpring M01-20



#### Flange for MagSpring M01-37

item





#### MagSpring<sup>®</sup> Combinations

#### Combinations with HighDynamic<sup>®</sup> Linear Motor Modules

The images show arrangements and combinations from our HighDynamic<sup>®</sup> linear motor construction kit.

Arrangement in both force directions, pulling and pushing, is possible, as well as flying adaptations without a fixed slider mounting. The parallel arrangement of MagSprings<sup>®</sup> makes it possible to compensate higher weight forces, for example 120 N with two MagSprings<sup>®</sup>.



MagSpring® in pulling arrangement (force to the left)



MagSpring<sup>®</sup> in pushing arrangement (force to the right)





two MagSpring®'s in parallel and pushing arrangement with flying coupling to the moving guide over ball heads

MagSpring®'s in parallel arrangement 120 N constant force

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# MagSpring®

For weightlessness in your application

MagSpring<sup>®</sup>'s and linear motor systems from a single source!

MagSpring<sup>®</sup> let masses float!

JUNG ANTRIEBSTECHNIK U. AUTOMATION GMBH

Felsweg 18 35435 Wettenberg Germany Tel.: +49-(0)641-48017-0 Fax: +49-(0)641-48017-15 eMail: ja2@ja2-gmbh.de Web: www.ja2-gmbh.de www.magspring.de

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