

## LMGZ Series Force Measuring Sensor

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**20 times overload protection**

**No recalibration required**

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**20:1 force measuring range**

**Accuracy class 0.3%**

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**Nominal forces from 7 lbs. - 22,000 lbs.**

**Sizes available for every application**

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**Stainless steel sensor**

**Corrosion resistant, ultra durable**

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● **LMGZ Series**

The LMGZ series tension sensors offer the highest accuracy, reliability, and durability in the industry. Utilizing a combination of stainless steel construction, a built in mechanical hard stop, and individual sensor performance verification, the LMGZ series tension sensors are perfect for all high performance running web applications.

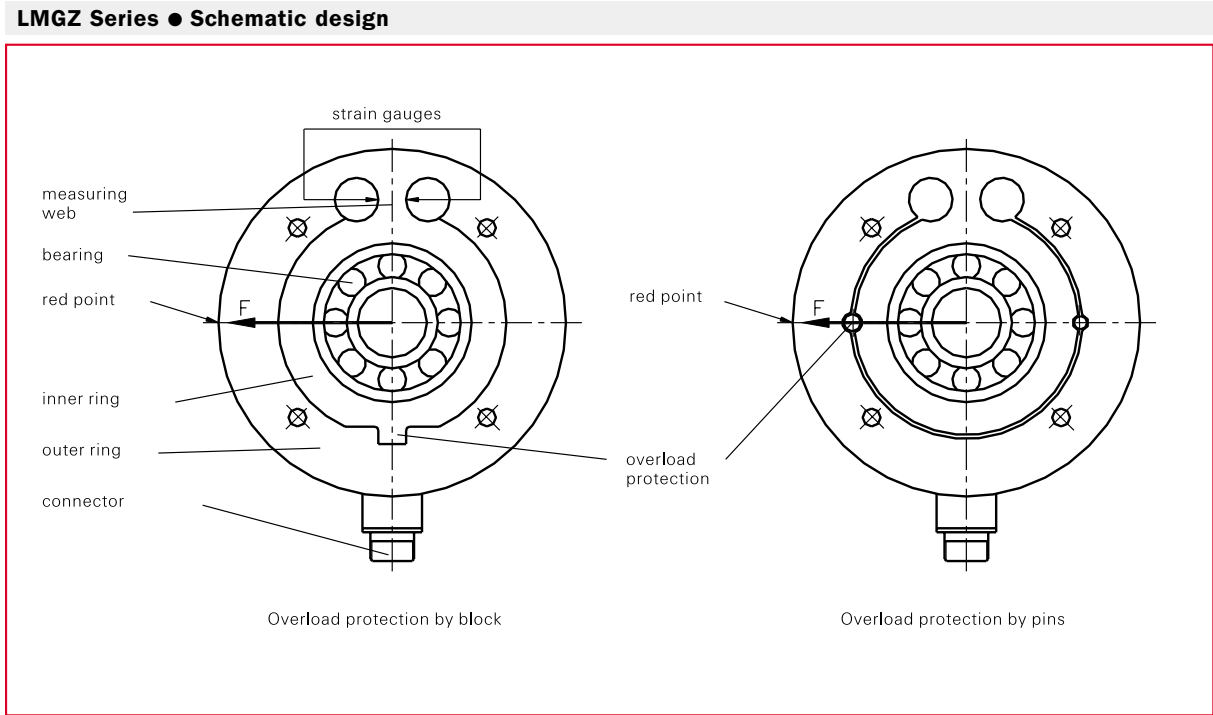
● **Functional Description**

Foil type strain gauges in a full Wheatstone Bridge configuration perform the actual tension measurement. FMS Force Measuring Sensors are designed to combine the live shaft bearings with the tension sensors to minimize machine space requirements. They can be mounted in any orientation directly to the machine frame or with supports. The red point on the outside of the sensor indicates the positive measuring direction. The high accuracy design ensures that even with low material wrap angles and high roller weights, tension can still be measured accurately.

**Measuring Principle**

Foil type strain gauges mounted in a full Wheatstone Bridge configuration in each sensor perform the actual tension measurement. The live shaft bearing applies the force to the measuring web in a parallel plane as opposed to a typical bending beam, thus ensuring maximum accuracy and

measuring sensitivity. A mechanical hardstop, which operates in both directions, ensures the highest overload protection and makes the sensor virtually indestructible. This combination guarantees the highest accuracy and reliability without the need for frequent recalibration.



There are 2 design types of overload protection devices: block or pins

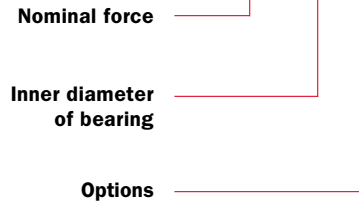
LMGZ Series ● Technical Data	
<b>Sensitivity</b>	1.8 mV / V
<b>Tolerance of sensitivity</b>	< ± 0.2%
<b>Accuracy class</b>	± 0.3%
<b>Temperature coefficient</b>	± 0.1% / 10 K [0.0055% / °F]
<b>Temperature range</b>	-10...+60°C [14 °F...140°F]
<b>Input resistance</b>	350 Ω
<b>Supply voltage</b>	1...12 VDC
<b>Overload Protection</b>	20 times rated nominal force
<b>Axial load</b>	20% Nominal force
<b>Sensor material</b>	Stainless steel

**LMGZ Series Options:**

- H13** = open covers on both sides
- H14** = right angle connector
- H15** = 90° offset connection plug
- H16** = temperature range up to 150°C [300 °F]
- H18** = straight waterproof plug
- H19** = grease nipple
- H21** = PG gland with 10 m PVC cable replaces plug
- H29** = modified wiring and sealing for use in aggressive media and high temperatures to 150°C [300°F]
- H30** = modified wiring and sealing for oil based environments

**Order code:**

**LMGZ201.125.12.H13.H16**

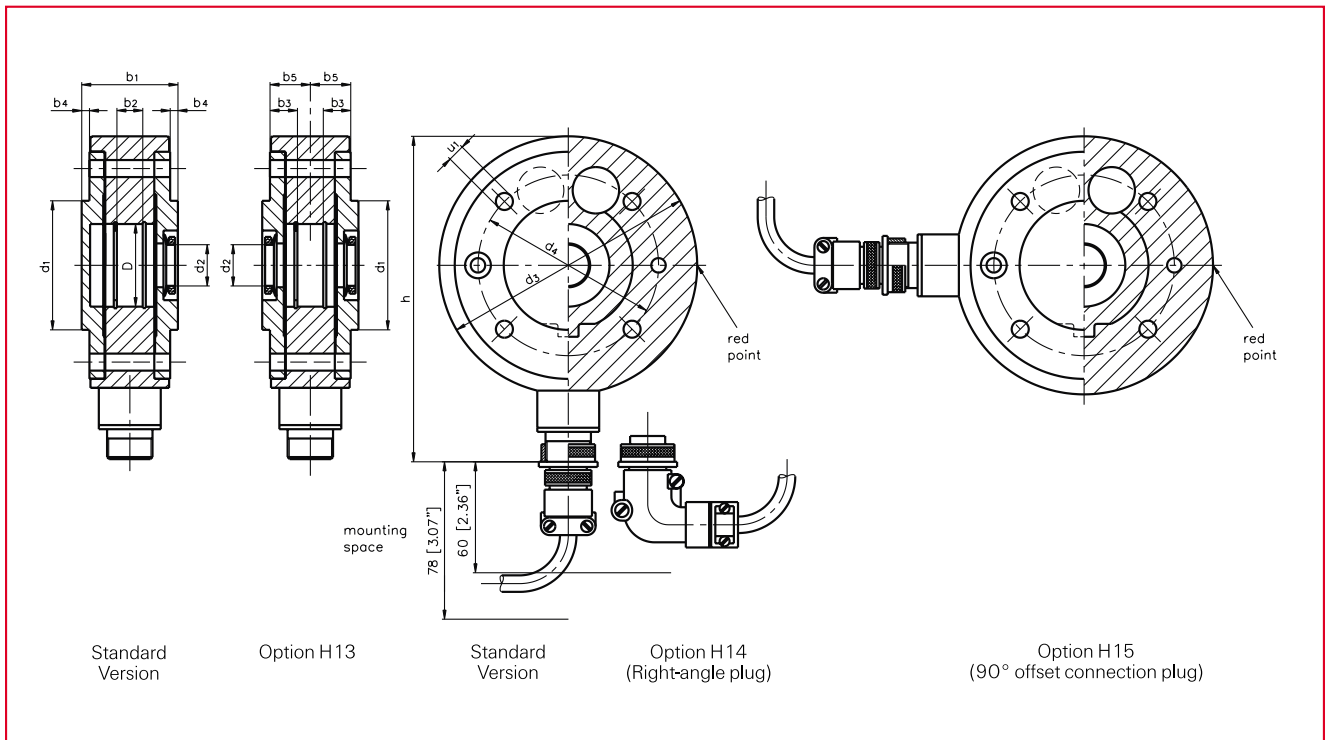


**Scope of delivery:**

Covers for both sides, 1 V ring seal, and connection plug

Special versions for specific applications are available on request.

**LMGZ Series ● Dimensions in mm [inch]**



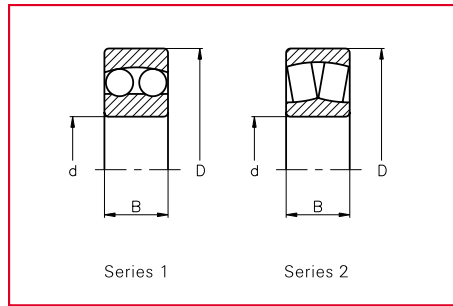
**LMGZ Series ● Nominal Force / Dimensions**

FMS Order Code	Nominal Force		Bearing ø <sup>1</sup>	Dimensions in mm [inch]												Deflection mm [inch]	Weight	
	N	lbs		D	d1	d2	d3	d4	b1	b2	b3	b4	b5	h	u1		kg	lbs
LMGZ200	100	22.5	9	26	50	14	94	64	37	8	11.35	3	15.25	126.5	5.5	0.13 [0.005]	1.5	3.3
	50	11.2	[0.354]	[1.024]	[1.968]	[0.51]	[3.7]	[2.52]	[1.45]	[0.32]	[0.45]	[0.12]	[0.6]	[5.0]	[0.21]			
	33	7.4																
LMGZ201	500	112	12	32	50	16	100	70	37	10	10.35	3	15.25	132	6.6	0.15 [0.006]	1.6	3.5
	250	56	[0.472]	[1.260]	[1.968]	[0.63]	[3.94]	[2.76]	[1.45]	[0.39]	[0.41]	[0.12]	[0.6]	[5.2]	[0.26]			
	125	28																
	50	11.2																
LMGZ203	1000	225	17	40	60	22	105	75	37	12	9.35	3	15.25	137	6.6	0.15 [0.006]	1.7	3.7
	750	168	[0.669]	[1.575]	[2.362]	[0.87]	[4.13]	[2.95]	[1.45]	[0.47]	[0.37]	[0.12]	[0.6]	[5.4]	[0.26]			
	500	112																
	250	56																
	125	28																
	50	11.2																
LMGZ205	1500	337	20	52	70	31	125	95	48	15	12.2	4	19.6	157.5	6.6	0.20 [0.008]	2.9	6.4
	750	168	[0.787]	[2.047]	[2.756]	[1.22]	[4.92]	[3.74]	[1.89]	[0.59]	[0.48]	[0.16]	[0.77]	[6.2]	[0.26]			
	375	84	or 25															
	200	45	[0.984]															
	125	28																
LMGZ307	3000	675	35	80	100	44	175	135	66	21	18.1	4	28.5	207.5	9	0.35 [0.014]	8.3	18.2
	1500	337	[1.378]	[3.150]	[3.937]	[1.73]	[6.89]	[5.31]	[2.6]	[0.83]	[0.71]	[0.16]	[1.12]	[8.2]	[0.35]			
	750	168	or 40															
	375	84	[1.575]															
LMGZ310	12,000 <sup>2</sup>	2700	50	110	130	64	225	175	76	27	20.1	4	33.5	258	11	0.10 [0.004]	15.0	33.0
	6000	1350	[1.968]	[4.33]	[5.118]	[2.52]	[8.86]	[6.89]	[3.0]	[1.06]	[0.79]	[0.16]	[1.32]	[10.0]	[0.43]			
	3000	675	or 60															
	1500	337	[2.362]															
	750	168																
LMGZ313	25,000 <sup>2</sup>	5620	65	140	160	80	270	220	81	33	19.6	4	36	303	11	0.10 [0.004]	22.5	49.6
	10,000	1350	[2.560]	[5.51]	[6.30]	[3.15]	[10.6]	[8.66]	[3.16]	[1.3]	[0.77]	[0.16]	[1.42]	[12.0]	[0.43]			
	5000	1124	or 80															
	2500	562	[3.150]															
LMGZ316	50,000 <sup>2</sup>	11,240	80	170	200	95	350	300	115	39	29.7	8	49	383	13	0.10 [0.004]	57	125
LMGZ320	100,000 <sup>2</sup>	22,480	100	215	260	117	430	380	139	47	36.2	9.5	59.5	463	13	0.10 [0.004]	102	225

<sup>1</sup> Indicate inner diameter of bearing when ordering <sup>2</sup> Types available only in H15 version

**Bearings**

Various types of bearings can be utilized with an LMGZ series sensor. FMS recommends the use of self-aligning versions to compensate for shaft alignment errors and to avoid measuring inconsistencies.



**LMGZ Series ● Bearings**

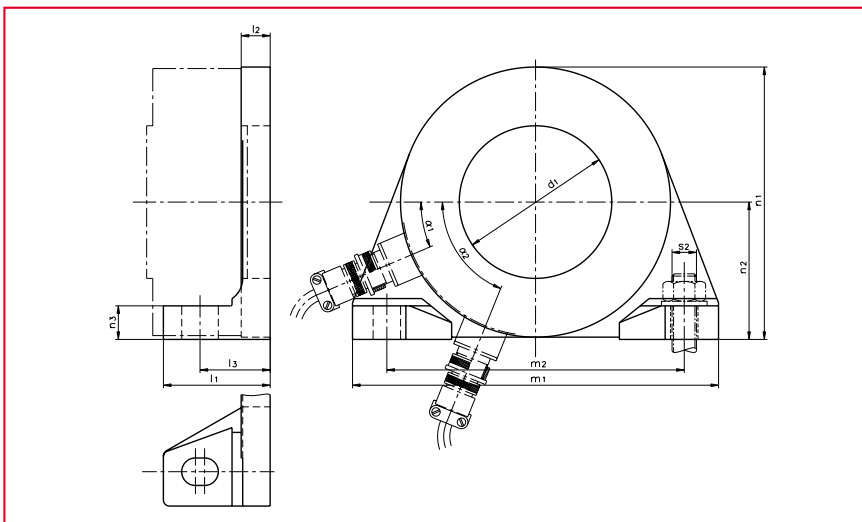
FMS Sensor Series	Bearings (Bearings must be ordered separately)							
	Type	Series	Dimensions		D	B	Dimensions	
			d	inch			mm	inch
<b>LMGZ200</b>	129	1	9	0.354	26	1.024	8	0.315
<b>LMGZ201</b>	1201	1	12	0.472	32	1.260	10	0.394
<b>LMGZ203</b>	1203	1	17	0.670	40	1.575	12	0.472
<b>LMGZ205</b>	1304	1	20	0.787	52	2.047	15	0.591
	1205	1	25	0.984	52	2.047	15	0.591
<b>LMGZ307</b>	1307	1	35	1.378	80	3.150	21	0.827
	1208	1	40	1.575	80	3.150	18 <sup>1</sup>	0.709
<b>LMGZ310</b>	1310	1	50	1.969	110	4.331	27	1.063
	2212	1	60	2.362	110	4.331	28 <sup>2</sup>	1.102 <sup>2</sup>
	21310	2	50	1.969	110	4.331	27	1.063
	22212	2	60	2.362	110	4.331	28 <sup>2</sup>	1.102 <sup>2</sup>
<b>LMGZ313</b>	1313	1	65	2.560	140	5.512	33	1.299
	2216	1	80	3.150	140	5.512	33	1.299
	21313	2	65	2.560	140	5.512	33	1.299
	22216	2	80	3.150	140	5.512	33	1.299
<b>LMGZ316</b>	1316	1	80	3.150	170	6.692	39	1.535
	21316	2	80	3.150	170	6.692	39	1.535
<b>LMGZ320</b>	1320	1	100	3.937	215	8.465	47	1.850
	21320	2	100	3.937	215	8.465	47	1.850

<sup>1</sup> The difference between dimension B (above) and b2 (page 4) is compensated for with washers <sup>2</sup> Grind off 0.5 mm/0.02 inch from each snap ring

**GMGZ Series supports for LMGZ Series Sensors**

When it is not conducive to mount the sensors directly onto the machine frame, the GMGZ Series supports are available for all sizes of LMGZ sensors. They are made of durable cast iron and can either be supplied blank (customer drills the sensor mounting holes in them to optimize the positioning of the sensor) or with a 360° pattern of pre-drilled mounting holes. Mounting positions between  $\alpha 1$  and  $\alpha 2$  are not possible as the support foot interferes with the sensor connector.

**GMGZ Series supports ● Dimensions**



**GMGZ Series ● Mounting dimensions**

FMS Sensor Series	Support Order Code	Dimensions in mm [inch]										Weight		
		d1	l1	l2	l3	m1	m2	n1	n2	n3	s2	$\alpha 1 \dots \alpha 2$	kg	lbs
LMGZ200	GMGZ201	50	40	10	25.25	140	115	109	56	12	M8	17°...74°	0.92	2.0
	GMGZ201-15GRAD-12xM5 <sup>1</sup>	[1.968]	[1.57]	[0.39]	[0.99]	[5.5]	[4.53]	[4.3]	[2.20]	[0.5]				
LMGZ201	GMGZ201	50	40	10	25.25	140	115	109	56	12	M8	17°...74°	0.92	2.0
	GMGZ201-15GRAD-12xM6 <sup>1</sup>	[1.968]	[1.57]	[0.39]	[0.99]	[5.5]	[4.53]	[4.3]	[2.20]	[0.5]				
LMGZ203	GMGZ203	60	40	10	25.25	140	115	109	56	12	M8	17°...74°	0.91	2.0
	GMGZ203-15GRAD-12xM6 <sup>1</sup>	[2.362]	[1.57]	[0.39]	[0.99]	[5.5]	[4.53]	[4.3]	[2.20]	[0.5]				
LMGZ205	GMGZ205	70	45	13	32.75	170	140	130	67	16	M10	20°...69°	1.62	3.6
	GMGZ205-15GRAD-12xM6 <sup>1</sup>	[2.756]	[1.77]	[0.51]	[1.29]	[6.7]	[5.51]	[5.1]	[2.64]	[0.6]				
LMGZ307	GMGZ307	100	70	19	47.5	240	195	178	90	22	M16	22°...60°	6.41	14.1
	GMGZ307-15GRAD-12xM8 <sup>1</sup>	[3.937]	[2.75]	[0.75]	[1.87]	[9.5]	[7.68]	[7.0]	[3.54]	[0.8]				
LMGZ310	GMGZ310	130	90	24	57.5	290	240	232	118	28	M20	28°...65°	8.27	18.2
	GMGZ310-15GRAD-12xM10 <sup>1</sup>	[5.118]	[3.54]	[0.94]	[2.26]	[11.4]	[9.45]	[9.1]	[4.65]	[1.1]				
LMGZ313	GMGZ313	160	100	24	62.5	340	290	270	137	28	M20	28°...65°	11.1	24.5
	GMGZ313-15GRAD-12xM10 <sup>1</sup>	[6.299]	[3.94]	[0.94]	[2.46]	[13.4]	[11.42]	[10.6]	[5.40]	[1.1]				

<sup>1</sup> part number for support with 12 pre-drilled mounting holes every 15°

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