

LMGZ Series Force Measuring Sensor

20 times overload protection

No recalibration required

20:1 force measuring range

Accuracy class 0.3%

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

Sizes available for every application

Stainless steel sensor

Corrosion resistant, ultra durable



● **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.

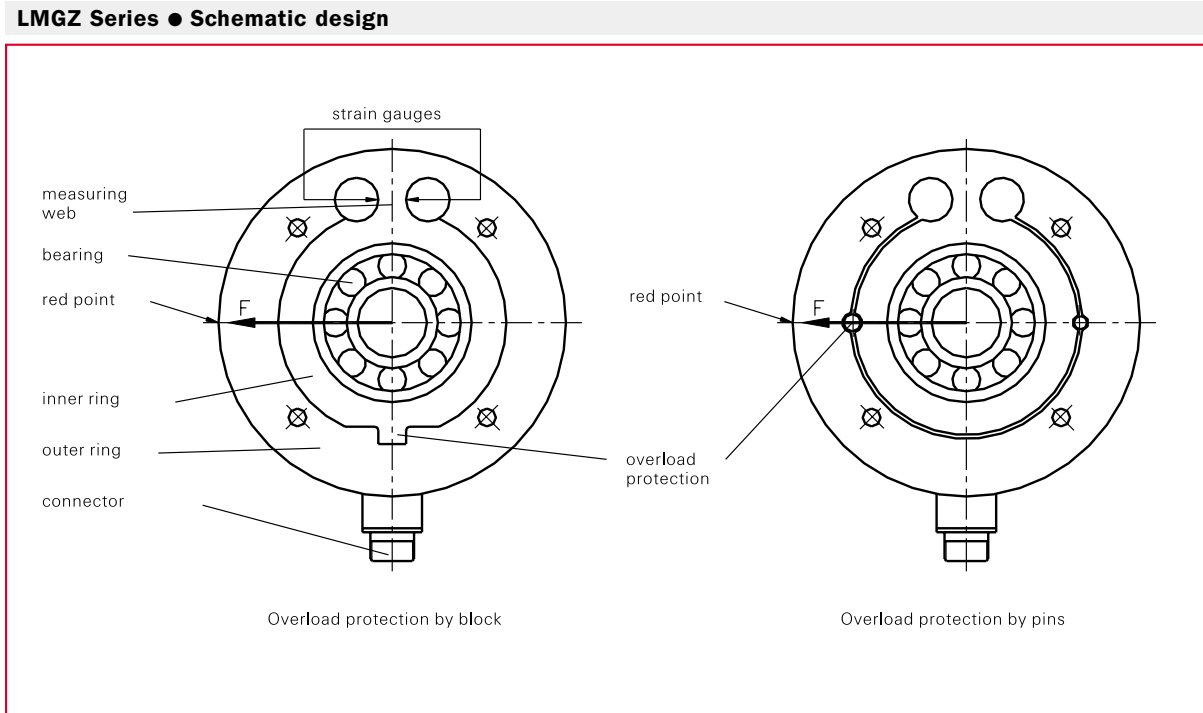
● **Functional Description**

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

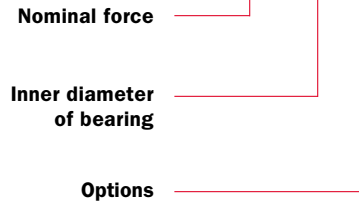
| LMGZ Series ● Technical Data | |
|-------------------------------------|------------------------------|
| Sensitivity | 1.8 mV / V |
| Tolerance of sensitivity | < ± 0.2% |
| Accuracy class | ± 0.3% |
| Temperature coefficient | ± 0.1% / 10 K [0.0055% / °F] |
| Temperature range | -10...+60°C [14 °F...140°F]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

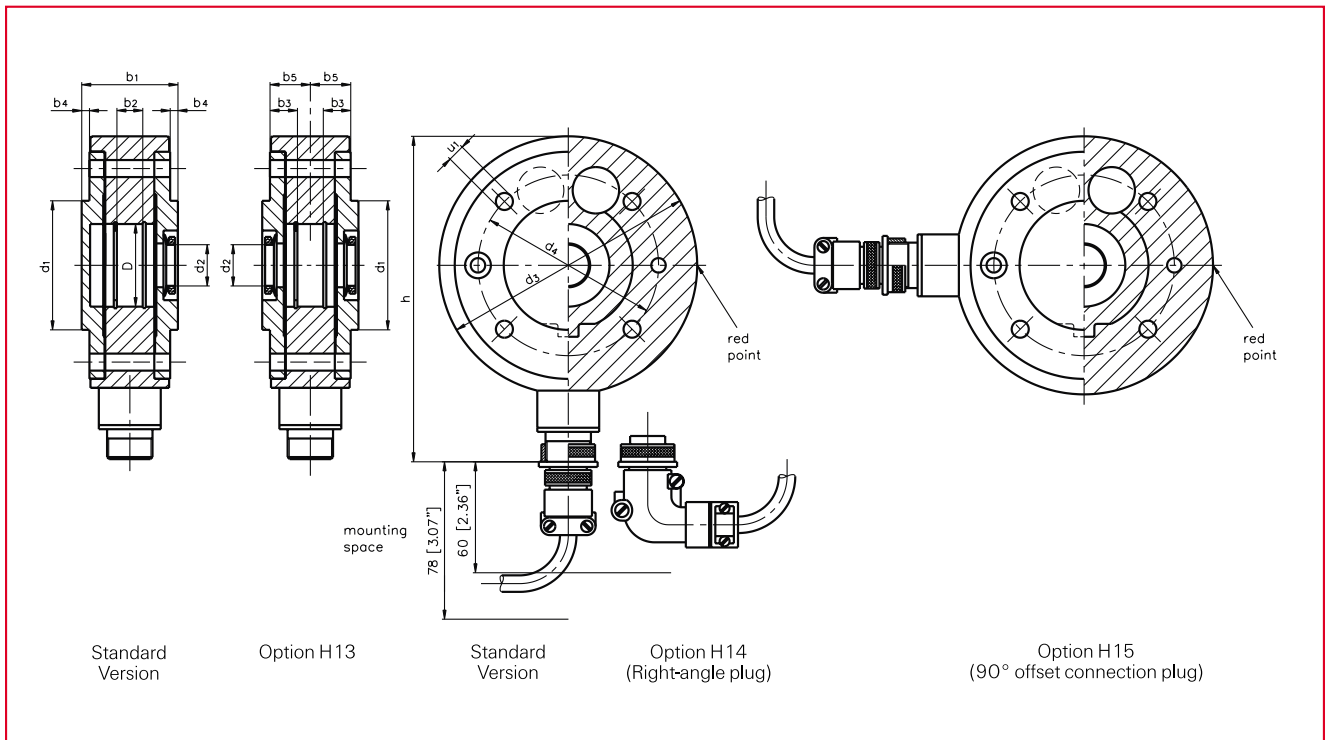


Scope of delivery:

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]



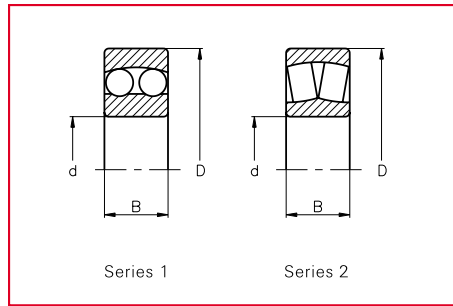
LMGZ Series ● Nominal Force / Dimensions

| FMS Order Code | Nominal Force | | Bearing ø ¹ | 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 ² | 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 ² | 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] | | | | | | | | | | | | | | | |

¹ Indicate inner diameter of bearing when ordering ² 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

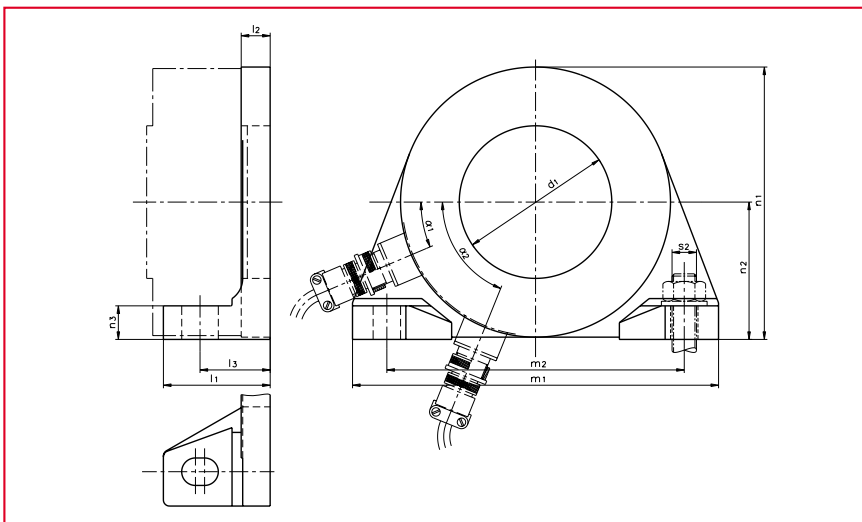
| FMS Sensor Series | Bearings (Bearings must be ordered separately) | | | | | | | |
|-------------------|--|--------|------------|-------|-----|-------|-----------------|--------------------|
| | Type | Series | Dimensions | | D | B | mm | inch |
| | | | d | inch | | | | |
| LMGZ200 | 129 | 1 | 9 | 0.354 | 26 | 1.024 | 8 | 0.315 |
| LMGZ201 | 1201 | 1 | 12 | 0.472 | 32 | 1.260 | 10 | 0.394 |
| LMGZ203 | 1203 | 1 | 17 | 0.670 | 40 | 1.575 | 12 | 0.472 |
| LMGZ205 | 1304 | 1 | 20 | 0.787 | 52 | 2.047 | 15 | 0.591 |
| | 1205 | 1 | 25 | 0.984 | 52 | 2.047 | 15 | 0.591 |
| LMGZ307 | 1307 | 1 | 35 | 1.378 | 80 | 3.150 | 21 | 0.827 |
| | 1208 | 1 | 40 | 1.575 | 80 | 3.150 | 18 ¹ | 0.709 |
| LMGZ310 | 1310 | 1 | 50 | 1.969 | 110 | 4.331 | 27 | 1.063 |
| | 2212 | 1 | 60 | 2.362 | 110 | 4.331 | 28 ² | 1.102 ² |
| | 21310 | 2 | 50 | 1.969 | 110 | 4.331 | 27 | 1.063 |
| | 22212 | 2 | 60 | 2.362 | 110 | 4.331 | 28 ² | 1.102 ² |
| LMGZ313 | 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 |

¹ The difference between dimension B (above) and b2 (page 4) is compensated for with washers ² 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 ¹ | [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 ¹ | [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 ¹ | [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 ¹ | [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 ¹ | [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 ¹ | [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 ¹ | [6.299] | [3.94] | [0.94] | [2.46] | [13.4] | [11.42] | [10.6] | [5.40] | [1.1] | | | | |

¹ part number for support with 12 pre-drilled mounting holes every 15°

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