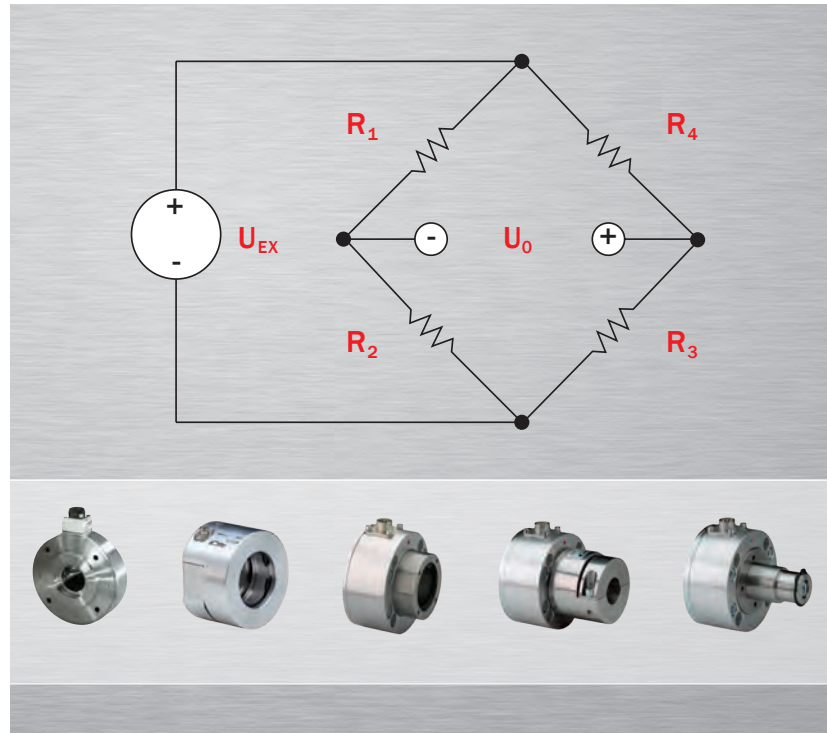


Overview

FMS Tension Control Force Sensors

- **Highest sensitivity for precise measurement**
Strain gauges in a full Wheatstone bridge circuit, reliable technology with compensation of ambient temperature changes
- **Perfect fit for each installation and application**
Various series, sizes and nominal forces for a wide range of material tension
- **Long lifetime, maintenance-free operation**
Sensor body and housing of stainless steel or high strength aluminum; mechanical overload protection, robust design with high repeatability
- **Options for demanding applications**
For increased temperatures, aggressive media, special installation requirements, vacuum and many more














FMS Force Sensors

FMS manufactures force sensors since more than 25 years. Our innovations have created a second to none portfolio which enjoys one of the best reputations in regards of quality and lifetime. New developments and product improvements to a range of force sensors that offers highest efficiency and best performance for end users and machine builders. The main design principles like the use of strain gauges in full Wheatstone bridge circuits and double bending- beams have stood the test of time and help us to fulfill the market requirements.

Functional description



The amplifier provides a highly stable excitation voltage of 5 VDC to the force sensors. When a load is applied to the bending-beam of the force sensors the strain gauges are either elongated or compressed. This change in length leads to a change of the overall resistance of the circuit. The downstream electronics (amplifier or tension controller) detect s these changes and calculates a force reading. The main advantage of the full Wheatstone bridge circuit is its simple and robust setup. Ambient temperature changes are fully compensated and contribute to precise measuring results and long lifetime. The integrated mechanical overload protection prevents damage from the force sensors from unpredictable overload situations. All FMS tension control products can be combined freely with each other. So you have the possibility to configure the best solution for your specific application.







WEB / STRIP	LMGZ-Series	LMGZ.D-Series	F-Series	FA-Series	A-Series	AA-Series	C-Series	CA-Series	CZ-Series	ZMGZ-Series	UMGZ-Series	UMGZP-Series	SMGZ-Series	PMGZ-Series
	Force measuring bearing	Double-range force measuring bearing	Ultra flat force measuring bearing	Ultra flat force measuring bearing with adapter	Aluminum force measuring bearing	Aluminum force measuring bearing with adapter	Compact force measuring bearing	Compact force measuring bearing with adapter	Compact force measuring bearing for rollers w/o shaft	Force sensor rolls without shaft	Force measuring block, pillow block	Force measuring block with increased stiffness	Force measuring block, pillow block for strip tension measurement	Force measuring block, pillow block for web tension measurement
														
Installation														
Mount options (see below right)	Flange mount, with pilot hole	Flange mount, with pilot hole	Flat mount, with dowel pin	Flat mount, with dowel pin	Flange mount, with pilot hole ¹⁾	Flange mount, with pilot hole ¹⁾	Flange mount, with pilot hole ¹⁾	Flange mount, with pilot hole ¹⁾	Flange mount, with pilot hole ¹⁾	Flat mount, with dowel pin	Pillow block	Pillow block	Pillow block	Pillow block
Shaft type	Life shaft	Life shaft	Life shaft	Dead shaft	Life shaft	Dead shaft	Life shaft	Dead shaft	No shaft	No shaft	Life shaft	Life shaft	Life shaft	Life shaft
Shaft diameter mm (in.)	9 to 80	15 to 40	15	20, 25 (¾, 1)	17	(¾)	17, 25, (1)	25, 30 (1, 1¼, 1½)			12 to 160	30 to 40	20 to 160	20 to 160
Nominal force (FNom)														
Minimum N (lbf.)	33 (7)	33 (7)	50 (11)	50 (11)	50 (11)	50 (11)	50 (11)	50 (11)	50 (11)	100 (22)	250 (56)	1'000 (225)	1'000 (225)	1'000 (225)
Maximum N (lbf.)	25'000 (5'620)	6'000 (1'350)	500 (110)	500 (110)	1'000 (220)	500 (110)	2'000 (440)	1'500 (330)	1'500 (330)	3'000 (674)	100'000 (22'500)	10'000 (2'248)	80'000 (17'985)	80'000 (17'985)
Measuring accuracy														
Accuracy class(%FNom)	±0.3%	±0.3%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
Measuring range	100:1	500:1	30:1	30:1	30:1	30:1	30:1	30:1	30:1	30:1	20:1	30:1	30:1	30:1
Environmental														
Protection class	IP42	IP42	IP42	IP42	IP42	IP42	IP42	IP42	IP42	IP42	IP42	IP42	IP67	IP67
Options														
H13	●	●	-	-	-	-	-	-	-	-	-	-	-	-
H14	●	●	-	-	-	-	●	●	●	-	●	●	-	●
H15	●	-	-	-	-	-	-	-	-	-	-	-	-	-
H16	●	●	-	-	-	-	●	●	●	●	●	●	-	-
H18	●	-	-	-	-	-	-	-	-	●	-	-	-	-
H19	●	●	-	-	-	-	-	-	-	-	-	-	-	-
H21	●	●	-	-	-	-	●	●	●	●	●	●	-	-
H26	-	-	-	-	-	-	-	-	-	-	-	-	●	●
H28	-	-	-	-	-	-	-	-	-	●	-	-	-	-
H29	●	●	-	-	-	-	-	-	-	●	●	-	-	-
H30	●	●	-	-	-	-	-	-	-	●	●	-	-	-
H31	●	●	-	-	-	-	●	●	●	●	●	-	-	-
H32	●	●	-	-	-	-	●	●	●	-	-	-	-	-
H33	●	●	-	-	-	-	●	●	●	-	●	●	-	-

¹⁾ Flat

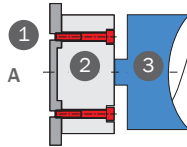
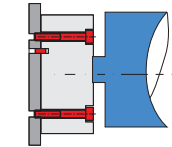
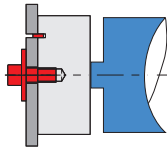
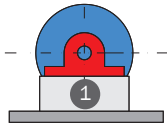
Force Sensors : Options	
H11	small connector, round type C 091
H12	axial electrical connection, repaces radial, small connector, round type C 091
H13	open covers for both sides, additional scope of supply 1 pcs. V-ring
H14	right-angle connector in scope of supply, replaces straight connector
H15	connector offset 90°, red point on connector side
H16	temperature range up to 120°C (248°F)
H18	straight, water tight connector
H19	grease nipple
H21	electrical connection with PG gland with 5 m (16.4 ft.) cable, replaces connector
H23	additional 1 pcs. ball bearing 61812 in scope of delivery
H25	connector offset 180°
H26	right-angle electrical connection

Force Sensors : Options	
H27	connector rotated 90° (red point on opposite side of connector)
H28	red point offset 180°
H29	resistant against aggressive media, especially acids (please specify), up to 120°C (248°F)
H30	resistant against aggressive media, especially hydrocarbons (please specify) up to 120°C (248°F)
H31	for vacuum applications to 1E-7 hPa 1E-5 Torr, temperature range up to 120°C (248°F)
H32	vacuum to 1E-7 hPa 1E-5 Torr, up to 150°C (302°F), with pg-gland and 5 m (16.4 ft.) cable
H33	temperature range up to 150°C (302°F), with pg-gland and 5 m (16.4 ft.) cable
.E	material aluminium, surface clear anodized
.D	material aluminum, Ra = 1.6
.EB	material aluminum, suface anodized black
.SS	material stainless steel
.A	other materials (on request)

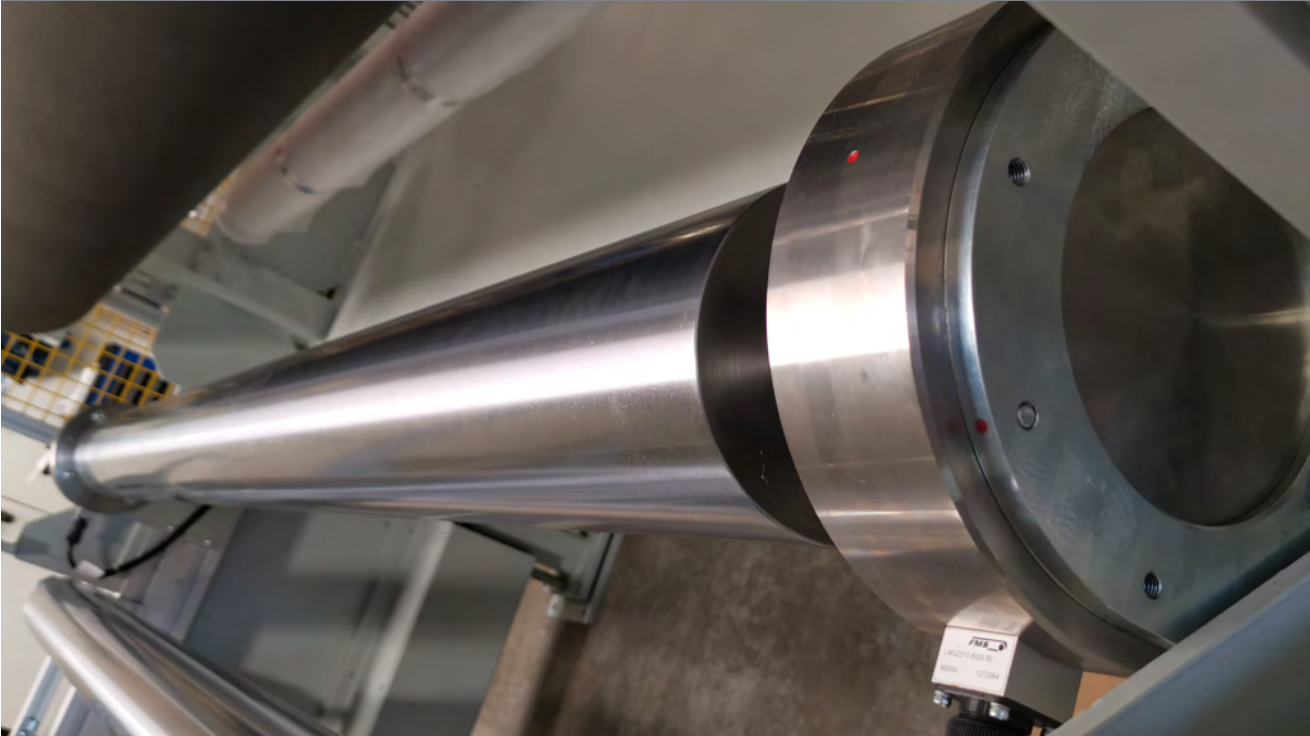
CANTILEVER	RMGZ 9-Series	RMGZ 9M-Series
	Fully configurable force measuring roller	Economic force measuring roller
		
Installation		
Mount options (see below right)	Flat	Flat
Nominal force (FNom)		
Minimum N (lbf.)	50 (11)	20 (4.5)
Maximum N (lbf.)	1'000 (220)	500 (110)
Roller dimensions		
Diameter mm (in.)	69 (2.7) to 119 (4.7)	40 (1.6)
Length mm (in.)	250 (9.8) to 900 (35.4)	100 (3.9) to 250
Measuring accuracy		
Accuracy class (%FNom)	±0.5%	±0.5%
Measuring range	30:1	30:1
Environmental		
Protection class	IP42	IP42
Options		
.E	Standard	Standard
.D	●	-
.EB	●	-
.SS	●	-
.A	●	-
H11	●	-
H12	●	-
H14	●	●
H16	●	-
H18	●	-
H21	●	-
H27	●	-
H31	●	●

FILAMENT FIBRE, STRAND	RMGZ 100-Series	RMGZ 200-Series	RMGZ 300-Series	RMGZ 400-Series	RMGZ 800-Series	CR-Series
	Small force measuring sensor for pulleys	Small force measuring sensor for pulleys (rotating)	Medium force measuring sensor for pulleys (rotating)	Medium measuring sensor for pulleys	Heavy duty measuring sensor for pulleys	Static force measuring sensor for pulleys (static)
						
Installation						
Centrifugal force limit (g-force, at minimum nominal force)	5	600	140	300	800	
Inner diameter pulley mm (in.)	19 (0.75)	42 (1.65)	78 (3.07)	85 (3.35)	125 (4.92)	22 (0.87)
						26 (1.02)
						28 (1.10)
Nominal force (FNom)						
Minimum N (lbf.)	6 (1.4)	10 (2.25)	20 (4.5)	60 (13)	100 (22)	50 (11)
Maximum in N (lbf.)	300 (67)	200 (45)	1'000 (224)	1'000 (224)	8'000 (1'760)	1'500 (330)
Measuring accuracy						
Accuracy class (%FNom)	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
Measuring range	30:1	30:1	30:1	30:1	30:1	30:1
Environmental						
Protection class	IP42	IP42	IP40	IP40	IP40	IP42
Options						
H14	●	-	●	●	●	●
H16	●	-	-	●	●	●
H18	-	-	-	●	●	-
H21	-	-	●	-	-	●
H23	-	-	●	-	-	-
H25	-	●	●	-	-	-
H28	-	●	●	-	-	-
H29	-	-	-	-	●	-
H31	-	-	-	-	-	●
H32	-	-	-	-	-	●
H33	-	-	-	-	-	●









Force Sensors : Technical data	
Temperature range	-10 to 60°C (14 to 140°F)
Power supply	1 to 10 VDC
Temperature coefficient	±0.1% / 10K
Red point	indicates measuring direction with positive sensor signal
Overload protection	10-times the nominal force
Repeatability error	< 0.1% of nominal force

Force Sensors : Installation options	
Flange	
A: with pilot hole for centering	
B: with dowel pin	
1. machine frame	
2. force sensor	
3. roller	
Flat with dowel pin	
Pillow block	
1. force sensor	

LMGZ-Series : Typical application



Customized solutions : Force sensors and special solutions

Stainless steel	Integrated amplifier	
		
Protection class IP 67	Ultra-compact	„Integrated“ tension sensing roller
		
Axial forces	Sea water resistant	Force sensors for direct replacements
		

Other products : Tension Control

Measuring amplifiers	Tension controllers	ATEX-intrinsically safe barriers
		

Assortment range : FMS

Tension Control	Web Guiding	Telemetry Systems
		

About us
FMS Force Measuring Systems AG is the market leader in the field of web tension measurement, control and specialist for web guiding solutions. For the wire industry we are the only manufacturer offering a complete range of technologies for force measurement, data processing and radio transmission of signals. Our in house developed products are used in the manufacturing industry, converting, metals, paper, textiles, as well as in cable and wire rope production. Utilising the latest technology, high quality components and a firm understanding of customer applications, FMS supports customers worldwide in the effort to maximize the productivity of their machines. Since 1993, our highly qualified employees have been creating high-end solutions for machine builders and plant operators. As an owner-managed company, we pride ourselves on being personal and approachable with the ability to make decisive moves fast.