Paper

Tension Measurement and Tension Control

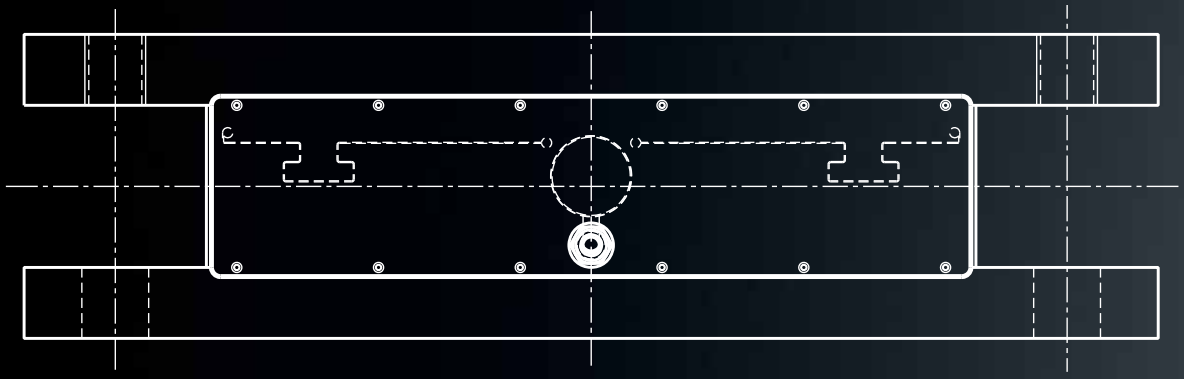
SWISSMADE

FMS: Process Security = Product Quality

FMS, the international leader in tension measurement and controls, is the first choice of many OEMs, integrators, and end users of the paper industry. Our expertise in web tension measurement and control is based on years of experience with applications in the processing of paper, cardboard, printing, plastics, steel, metal finishing and wire and cable manufacturing. New product developments and process enhancements fortify our position as market leader and are the cornerstone of FMS's sucess in the web measuring industry.

Web and felt tension is a major factor in the production of paper and cardboard. Accurately controlled tension results in a better quality product, less waste, improved yield, and faster production machine capability.

The Point is Technology



FMS: Application Capabilities

	**Products**	Paper / Cardboard
	**Processes**	Paper making / Felt tension / Wire tension / Drying / Painting / Coating / Slitting / Winding / Rewinding
	**FMS**	Material tension measurement / Material tension control
	**Advantages**	Reliability / Process stability / Documented quality / Minimum waste / No material tear / Cost reduction

FMS: Top of the Line

All FMS force sensors offer the highest accuracy, reliability, and durability in the industry. Utilizing a combination of stainless steel construction, built-in mechanical hard-stop overload protection, and individual sensor performance verification, FMS sensors are perfect for all high performance tension measurement applications.

High accuracy foil type strain gauges mounted in a full Wheatstone Bridge configuration in each sensor perform the actual tension measurement. This in combination with the mechanical hard stop ensures the highest overload protection without the need for recalibration.

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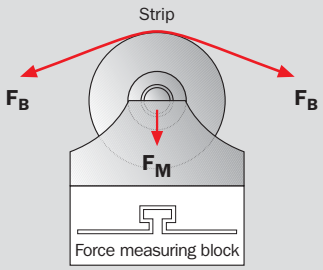
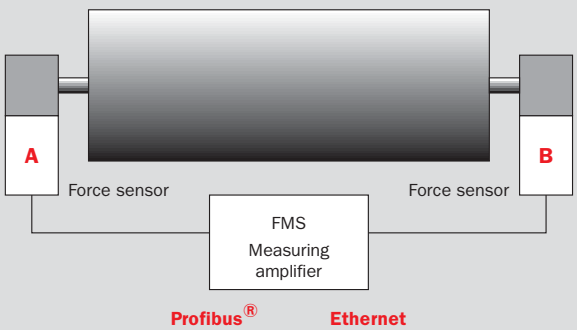
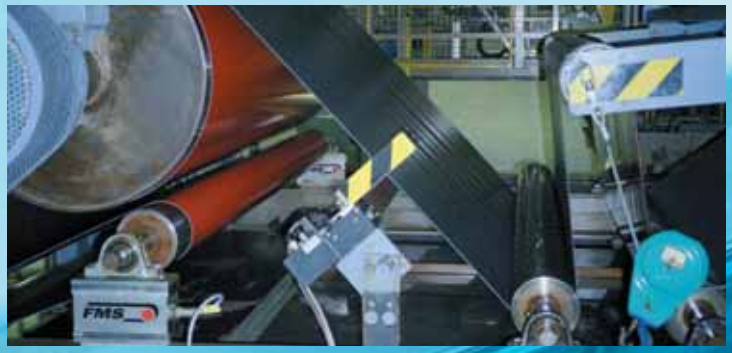


FMS Web tension measurement
The web tension is measured on an idler roll. Via the wrap angle, the web tension generates a proportional force whose horizontal or vertical component is measured by the force sensor.



FMS Measuring amplifier
The signals from the force sensor are transmitted to the measuring amplifier. The measuring amplifier is installed either in a sealed housing directly on the machine or designed into the controls cabinet.



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1 *Production of abrasive paper. This equipment measures tension and controls the intermediate drive.*

2 *Felt tension control in a paper making machine. High humidity and high temperature environment.*

3 *Tension control of line drives in a paper converting line.*

4 *Paper slitting application.*

5 *Paper rewinding application.*

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FMS: Product Flexibility

FMS force sensors can be combined with any FMS measuring amplifiers and controllers. Both offer a high level of operational and functional security. FMS force sensors are suitable for web tension measurement in dry or harsh environments including water, paper pulp, humidity and high temperature in the drying sections.

They are suitable for the largest paper making machines to the smallest laboratory equipment. All requirements can be met by the variety of electronic units available. Several variations are available from cost-effective analogue amplifiers to fully integrated field bus connections with multi-channel measuring amplifiers.

FMS Material tension measurement and control ● Force sensors

PMGZ force measuring blocks for harsh environments

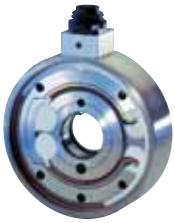
- *IP 68 protected*
- *For web tensions from 2 kN to 100 kN*
- *Many dimensions available*
- *10 times overload protection*
- *Waterproof and high temperature capable (120 °C)*

UMGZ force measuring blocks for dry environments

- *IP 42 protected*
- *For web tensions from 0,5 kN to 100 kN*
- *10 times overload protection*
- *Special versions up to 150 °C*
- *Many dimensions available*

LMGZ force measuring bearings with integrated bearings

- *Combines force sensor with bearing*
- *For web tensions from 33 N to 100 kN*
- *20 times overload protection*
- *Special versions up to 150 °C*



LMGZ.D double range force measuring bearings

- *Extreme tension ranges up to 1:100 accurately measurable*
- *For web tensions from 33 N to 6 kN*
- *High overload protection*
- *Special versions up to 150 °C*

FMS Material tension measurement and control ● Electronics

EMGZ 309 Digital Tension Measuring Amplifier

- *3 programming keys*
- *Two-line LCD each at 8 characters*
- *Available in housings for wall, rail and panel mount*
- *Auto-Calibration und Auto-Tare Weight*
- *Ethernet-capability*
- *Galvanic isolated*

EMGZ 321 Left/Right Tension Measuring Amplifier

- *Separate force evaluation for left and right*
- *Load distribution monitoring over the measuring roller with great accuracy*
- *Ethernet/IP connectivity via web browser*
- *Freely configurable digital inputs and outputs*
- *Available in housings for wall, rail and panel mount*
- *Protection class for wall mount housing IP 65*

EMGZ 470 series digital field bus measuring amplifiers

- *No analogue settings required*
- *All functions can be parameterised via field bus*
- *Compact IP 67 sealed versions*
- *Galvanically isolated*
- *DIN rail mountable versions*

EMGZ 480 series digital CAN bus measuring amplifiers

- *No analogue settings required*
- *All functions can be parameterised via CAN bus*
- *Compact IP 67 sealed versions*
- *Galvanically isolated*

EMGZ 600 series digital measuring amplifiers

- *Up to 4 measuring channels*
- *Monitoring with limit switches*
- *Field bus connection integratable*
- *Left / right reporting*
- *Integrated LCD display*
- *IP 54 sealed housing*
- *Galvanically isolated*

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