Installation Instruction SMGZ

Hermetically sealed measuring block for strip tension control

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2 Safety instructions

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to the equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not stress the equipment over the specification limits neither during assembly nor operation. To do so can be potentially harmful to persons or equipment in the event of a fault to the equipment.

2.1 Presentation of safety information

The following safety symbols appear in this manual.

2.1.1 Danger that could result in minor or moderate injuries

Danger, warning, caution

Failure to follow wiring instructions in this manual may result in equipment damage or personal injury.

2.1.2 Note regarding proper function

Note

Note regarding roper operation
Simplification of operation
Ensuring function

2.2 General safety information

The force sensors may not be stressed over the specification limits neither during assembly nor operation. The unit's overload protection value may not be exceeded.

The attachment points for the force sensors on the machine frame must be properly designed. The pillow blocks need to be appropriately mounted.

3 Product information

3.1 Product description

The force sensors of the SMGZ-Series, designed for the measurement of strip tension on continuous metal processing lines, are used in combination with standard pillow blocks. This feature allows for easy maintenance or exchange of the blocks, bearings and roll. Block mounting is simple utilizing four fasteners into the bottom surface and mounting holes for the pillow block bearing are included based on your specifications. In addition, the 6 m cable allows for an electrical connection away from the harsh environment. The SMGZ-Series is available in two measuring, horizontal and vertical, and thus can be specified for use in any mounting orientation and strip wrap configuration. With the superior performance of the SMGZ-Series, accurate tension readings are obtained even with low web wrap angles and high roll weights.

3.2 Functional description

Standard pillow blocks are installed on the force measuring blocks of the SMGZ-Series. This design combines force sensor and bearing seat and allows for easy maintenance or exchange of the blocks, bearings and roll. The SMGZ-Series is available in two measuring versions, horizontal and vertical, and thus can be specified for use in any mounting orientation and material wrap configuration. The substantial overload protection translates to eliminated / minimized calibration issues due to machine upset conditions. The design includes dual bending beams, and this serves to eliminate the load specific influence of torque. The movement of the bending beams, which is proportional to the applied force, is detected by strain gauges arranged in a full bridge circuit and then converted into an electrical signal. This simple measurement principle delivers precise results even with low material tension and small strip wrap angles. The Red Point, as located on the sensor body, should be aligned with the direction of the resultant force due to strip tension.

3.3 System arrangement

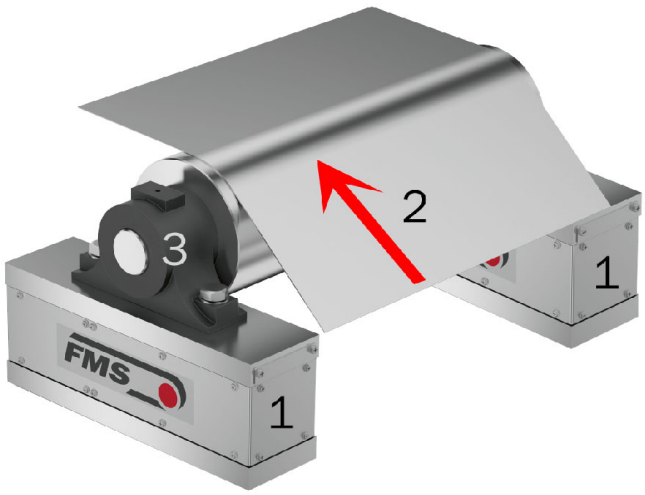
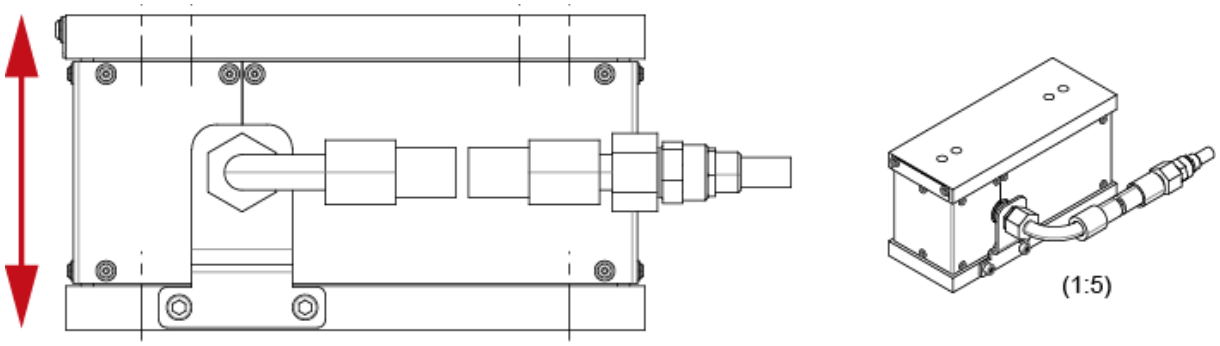


Illustration 1: arrangement of force sensors *smgz_mit_walze_und_blech.tif*

System arrangement	
Position	Description
1	Force sensors (electrical connections are not displayed)
2	Strip with moving direction
3	Left pillow block with shaft and roller

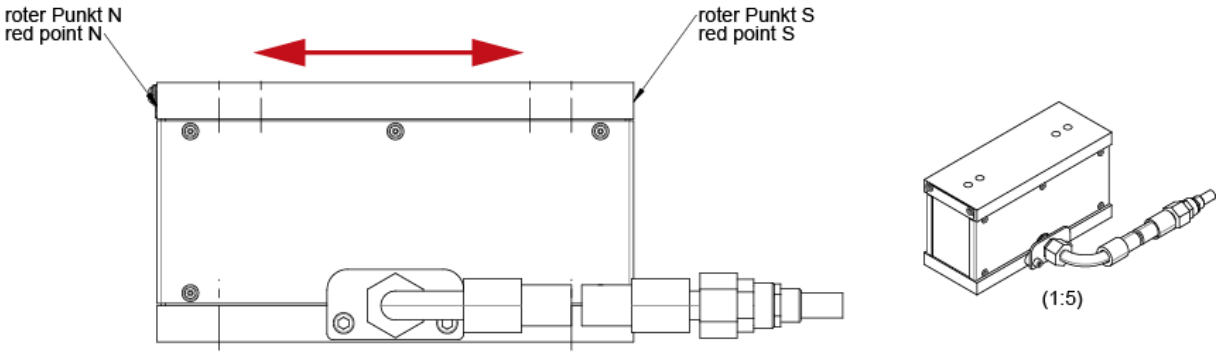
3.3.1 Vertical measuring block



Vertikaler Messblock - kein roter Punkt
vertical measuring block - no red point

Illustration 2: Side view of vertical version with measuring direction SMGZ_PMGZ_BA_Manual.ai

3.3.2 Horizontal measuring block



Horizontaler Messblock - Orientierung roter Punkt in Abhängigkeit von elektrischem Anschluss
horizontal measuring block - red point orientation depending on electrical connection

Illustration 3: Side view of horizontal version with measuring direction SMGZ_PMGZ_BA_Manual.ai

3.4 Scope of delivery

Included:

straight electrical connection, 6 m (19.7 ft.) cable, 5 m (16.4 ft.) cable protection hose, other lengths on request, the sealing of the open end of the cable is provided with a threaded connection M16 x 1.5mm (female thread required)

Options

H26 right-angled electrical connection

Accessories

None

3.5 Order code

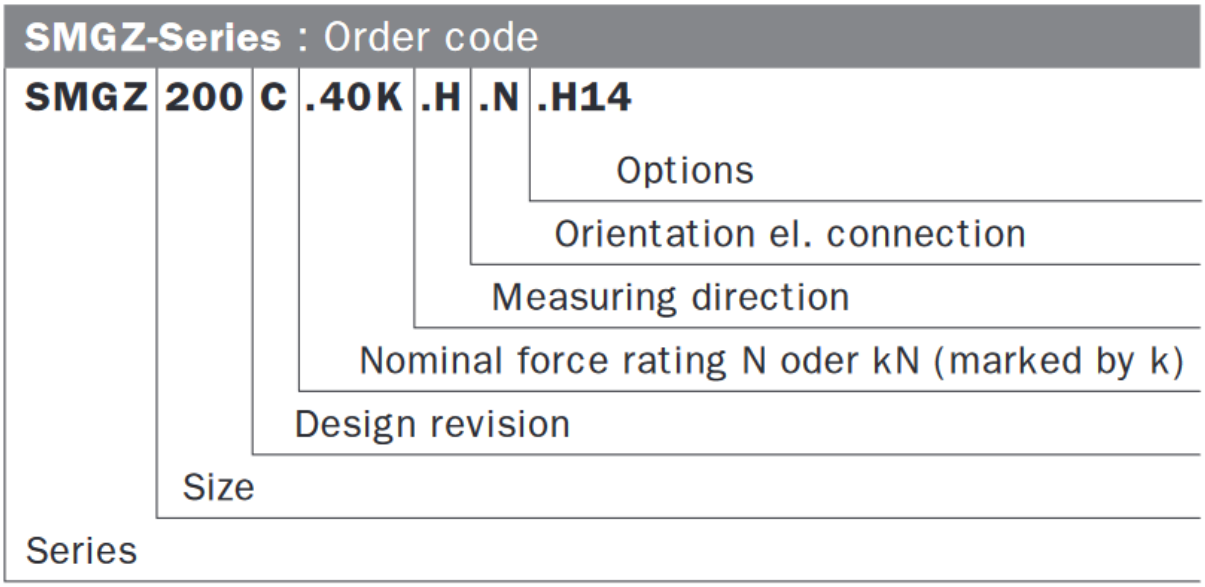


Illustration 4: Ordering code *Datesheet_SMGZ_series.indd*

4 Installation

4.1 Installation conditions

Force sensors are defined as “partly completed machinery” according to the Directives 2006/42/EC, article 2. In order to assure a proper functionality of the parts and assure the essential safety requirements of operators working with it, the following conditions for the assembly must be met:

The Force Measuring Rollers may not be stressed over the specification limits neither during assembly nor operation. The unit’s overload protection value may not be exceeded.

The mounting points for the Force Measuring Rollers on the machine frame must be properly designed. The bearings need to be appropriately mounted.

For proper installation and operation, follow the electrical wiring diagram and instructions in this manual.

4.2 Preparing the machine frame

Two force sensors are required to equip a measuring roller. For the installation of each block an even surface with the respective bore pattern needs to be prepared on on the machine frame.

The contact surfaces for both force sensors must be even and aligned in the same height to ensure proper alignment of the measuring roller.

Vertical measuring blocks:

These version measures forces in vertical direction. Compressive force leads to a positive, tensile force will generate a negative signal from the force sensor. **Vertical measuring blocks do not have a Red Point**.

Horizontal measuring blocks:

The Red Point indicated the direction where a applied force will generate a positive signal.

The design will allow the easy installation of a pillow block. With a customized adapter plate the force sensor will be able to hold any other type of roller supports.

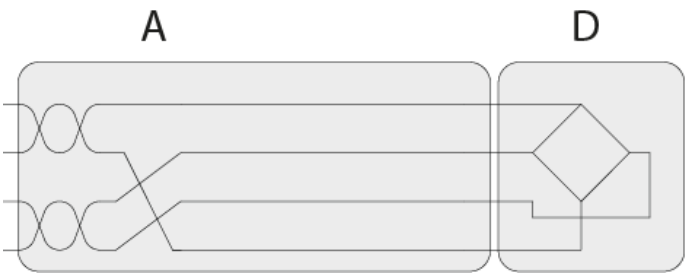
The roller support needs to be realized with fixed and a floating bearing side.

4.3 Electrical connections

Connection between the force sensors and the amplifier is realized by means of a 4-pole cable with a cross-section of 0.25mm². The cable must be installed separate from power lines.

The shield needs to be connected to the amplifier only.

The single wires are labeled with numbers.



Litze/Wire	DE	EN	IEC 60757
3	Speisung +	Excitation +	WH
2	Signal -	Signal -	WH
4	Speisung -	Excitation -	WH
1	Signal +	Signal +	WH

	DE	EN
D	Kraftaufnehmer	Force Sensor
n.a.	Stecker	Plug
n.a.	Buchse	Socket
A	Kabel	Cable

Illustration 5: electrical connection
Pin_Assignment_Sensorkabel_Farben_Stecker.ai

4.1 Sensitivity of 0.5 mV/V

Special measuring amplifiers

With these force sensors, FMS recommends the combination with measuring amplifiers with the option V05

If you are using a regular measuring amplifier without option V05:

Scaling of measuring signal, gain factor

Especially for small wrap angles you should increase the parameter "system force" in the measuring amplifier by factor 3.6.

This will provide a significantly improved output signal.

Example

You are using two forces measuring blocks with 3000 N nominal force each. This results in a system force of 2 x 3000 N = 6000 N.

WE recommend to adjust the system force to 3.6 x 6000 = 21600 N

5 Technical data

Sensitivity	0.5 V/mV
Tolerance of the sensitivity	<± 0.2 %
Accuracy class	±0.5% of the nominal force
Temperature coefficient	±0.1%/10K
Temperature range	-10 to +90°C (14 to 195F)
Input resistance	350Ω
Excitation voltage	1 to 10VDC
Overload protection	10-time the nominal force
Material sensor body	Stainless steel
Protection rating	IP67
Electrical connection	PG gland with 6 m cable (VG 95218), other lengths on request
Repeatability error	0.05%
Measuring range	30:1

Table 1: Technical data

6 Dimensions in mm (in.)

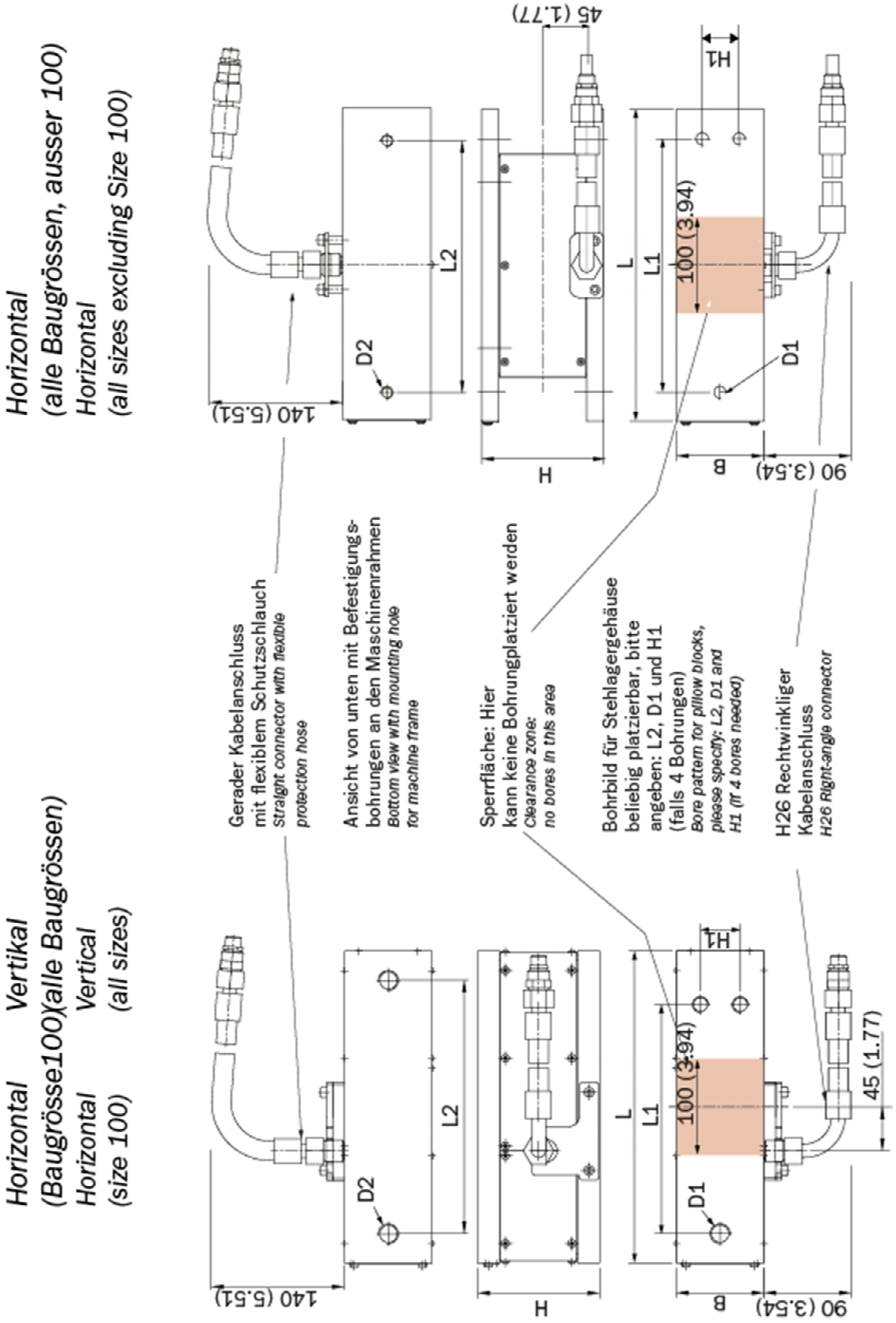


Illustration 6: Dimensions of vertical version *SMGZ_PMGZ_BA_Manual.ai*

SMGZ-Series : Dimensions, Installation bores								
Size	**Dimensions** mm (in.)						**Installation bores bottom**	
Type	L		B		H		L 2 x D 2 mm (in.)	
SMGZ100C	230	(9.06)	90	(3.54)	125	(4.92)	170 x M16	(6.69 x M16)
SMGZ200C	320	(12.60)	90	(3.54)	125	(4.92)	260 x M20	(10.24 x M20)
SMGZ300C	380	(14.96)	110	(4.33)	125	(4.92)	320 x M24	(12.60 x M24)
SMGZ400C	450	(17.72)	130	(5.12)	125	(4.92)	390 x M24	(15.35 x M24)
SMGZ500C	560	(22.05)	170	(6.69)	150	(5.91)	470 x M30	(18.50 x M30)

SMGZ-Series : Deflection, Weight								
Size	**Deflection** mm (in.)				**Weight** kg (lbs.)			
Type	horizontal		vertical		vertical		horizontal	
SMGZ100C	0.03	(0.0012)	0.05	(0.0020)	20	(44.09)	20	(44.09)
SMGZ200C	0.03	(0.0012)	0.09	(0.0035)	28	(61.73)	24	(52.91)
SMGZ300C	0.05	(0.0020)	0.16	(0.0055)	41	(90.39)	35	(77.16)
SMGZ400C	0.10	(0.0039)	0.54	(0.0213)	57	(125.66)	51	(112.44)
SMGZ500C	0.06	(0.0024)	0.33	(0.0130)	105	(231.46)	90	(198.42)

Table 2: Dimension overview *Datasheet_SMGZ_series.indd*

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