



Installation Instructions

RMGZ300A

Compact force sensor for stranding machines with medium wire tension

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**Diese Montageanweisung ist auch in Deutsch erhältlich.
Bitte kontaktieren Sie die nächstgelegene FMS Vertretung.**

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2 Safety Information

All safety information, operating and installation regulations listed here ensure proper function of the device. Safe operation of the system requires compliance at all times. Noncompliance with the safety information or using the device outside of the specified performance data can endanger the safety and health of persons.

Work with respect to operation, maintenance, retrofit, repair, or setting the device described here must only be performed by expert personnel.

2.1 Presentation of Safety Information

2.1.1 Danger that Could Result in Minor or Moderate Injuries



Danger, warning, caution

Type of danger and its source

Possible consequences of nonobservance

Measure for danger prevention

2.1.2 Note Regarding Proper Function



Note

Note regarding proper operation

Simplification of operation

Ensuring function

2.2 General Safety Information



The force sensors may not be subjected to loads outside of the specified values during installation and operation later



The fastening points for supporting the force sensor must be designed correctly. Pay attention to correct installation of the pillow blocks.

3 Product Information

3.1 Product description

Designed to meet the requirements of planetary and tubular stranders, a force sensor of the RMGZ300-Series is also applicable to bunchers and twisters. The innovative dual flexion beam construction provides the foundation for accurate and reproducible measurements in difficult operating conditions. Once the load rating and housing configuration are properly specified for the application, the sensor is easily mounted to the machine with two fasteners. A single cable (power in / signal out) is connected at the sensor housing. Standard pulleys are not supplied by FMS.

3.2 Functional description

The RMGZ300-Series force measuring sensor combines the bearing seat of the pulley and the force sensor within the same housing, thus minimizing the required installation space. 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 web wrap angles. The Red Point, as located on the sensor body, should be aligned with the direction of the resultant force due to material tension.

3.3 Designations

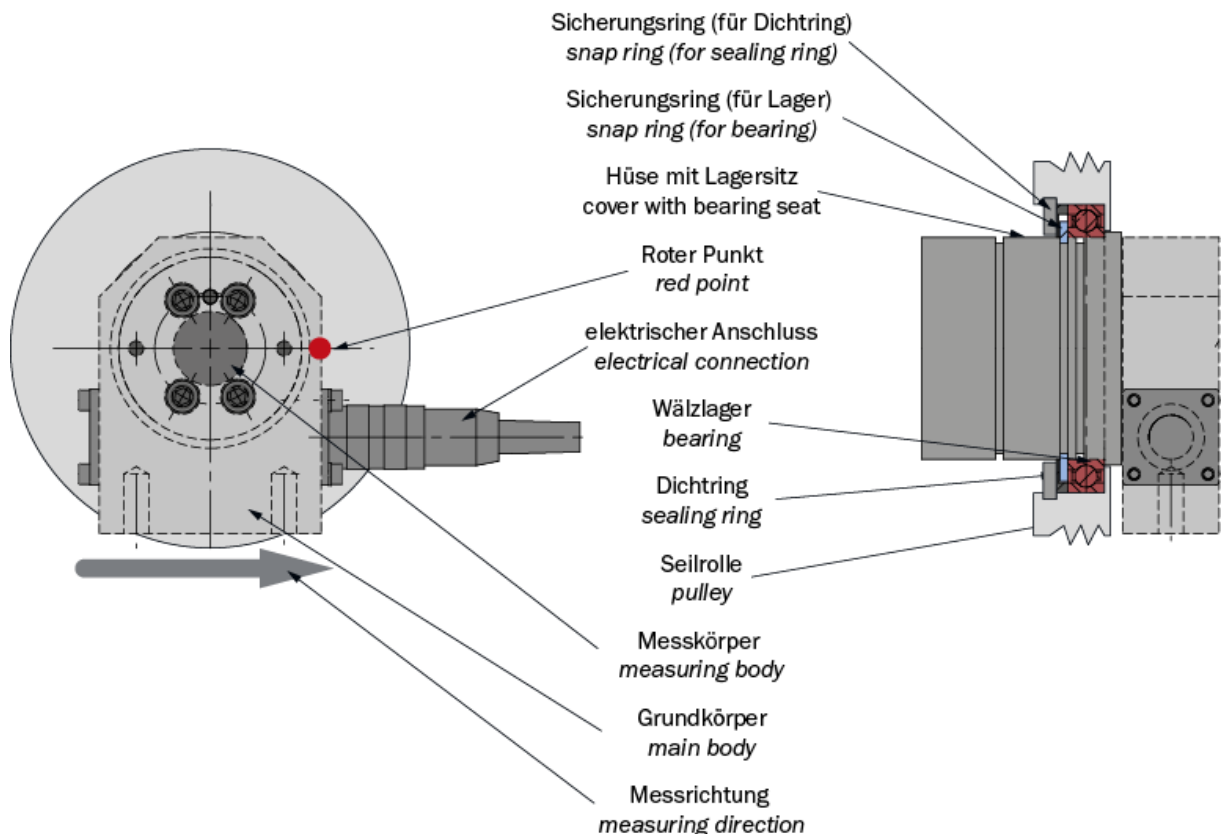


Figure 1: Designations, standard, no options

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3.4 Scope of delivery

Included in scope of delivery

force sensor, straight connector (female), 3 pcs. clip rings, thin-section bearing, distance ring

Options

H14 right-angle connector in scope of supply, replaces straight connector

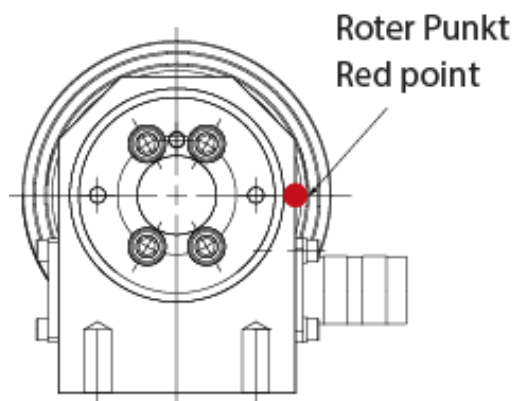
H21 electrical connection with PG gland with 5 m (16 ft.) cable, replaces connector

H23 additional 1 pcs. ball bearing 61812 in scope of delivery

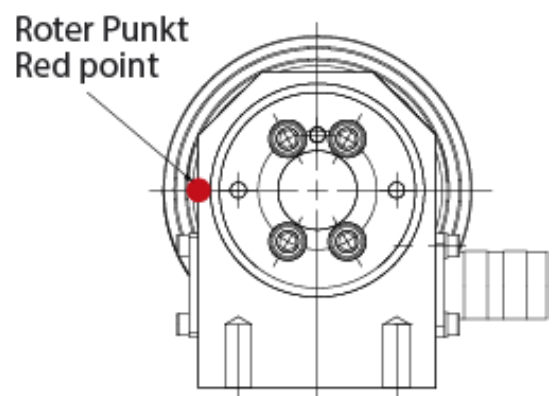
H25 Connector offset 180°

H28 red point offset 180°

Standard - Stecker rechts, roter Punkt rechts
Standard - Connector right, red point right



H28 - Roter Punkt links
H28 - Red point left



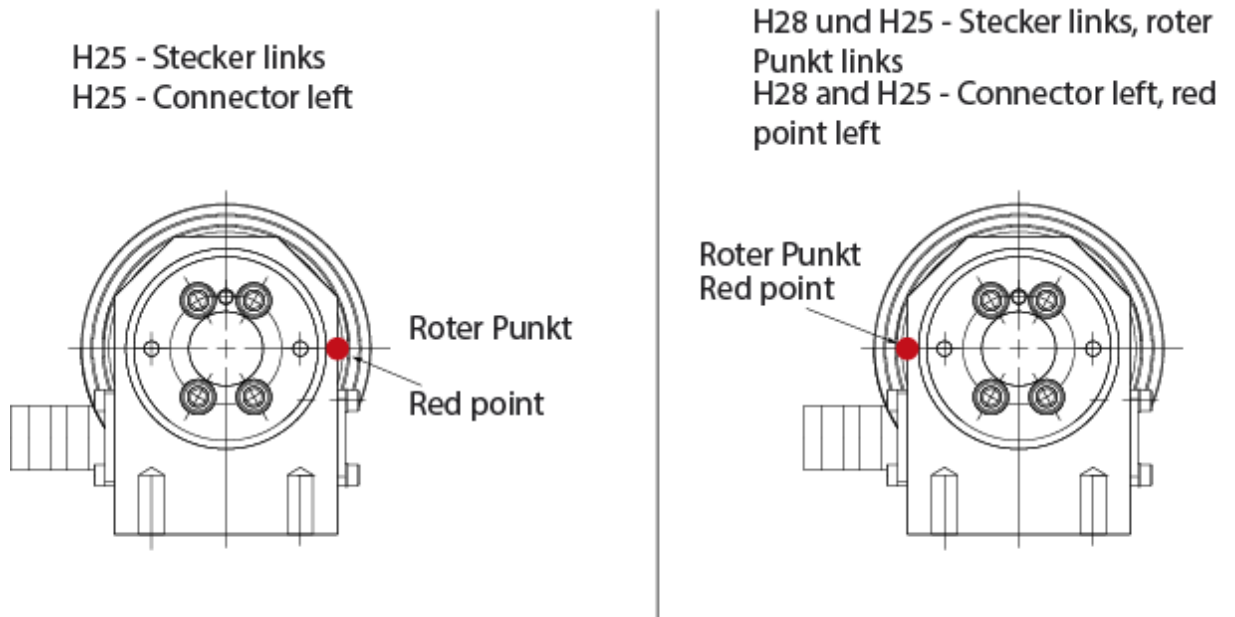


Figure 2: Options H25, H28

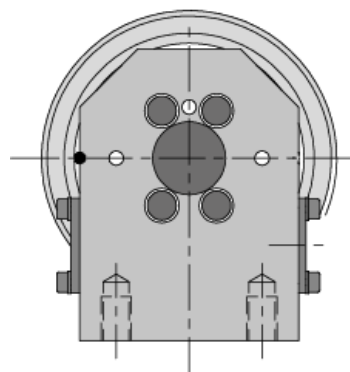
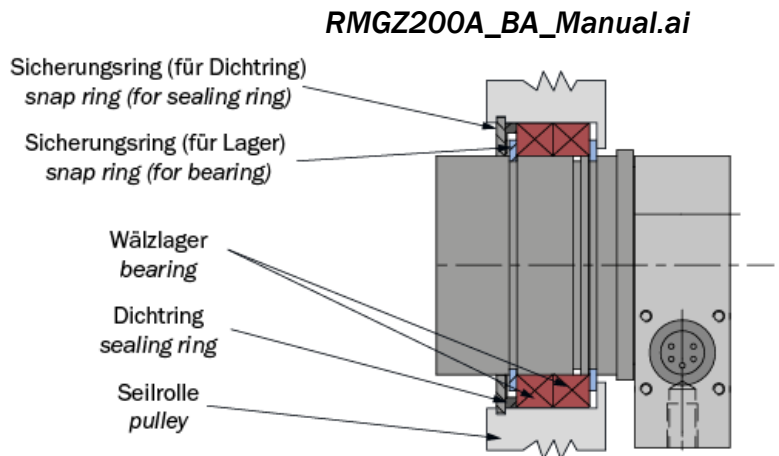


Figure 3: Options H23



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Accessories

Prefabricateed cable (specify length) with connector (straight or right-angle)

3.5 Order code

RMGZ300A-Series : Order code			
RMGZ3	00A	.20	.H25.H28
			Options
			Nominal force rating in N
			Size, design revision A
			Series

Figure 1: order code

Datasheet_RMZ300_series.indd

4 Installation

4.1 Preparation

The force sensors are defined as “incomplete machine” in line with EC Directive 2006/42/EC, Article 2. When installing the force sensors, the following conditions must be met to ensure proper function and installation in a machine without negative impact on safety and health of persons:



The force sensors may not be subjected to loads outside of the specified values during installation and operation later



The fastening points for supporting the force sensor must be designed correctly. Pay attention to correct installation of the pillow blocks.



The force sensors must be connected electrically correctly.

4.1.1 Pulley

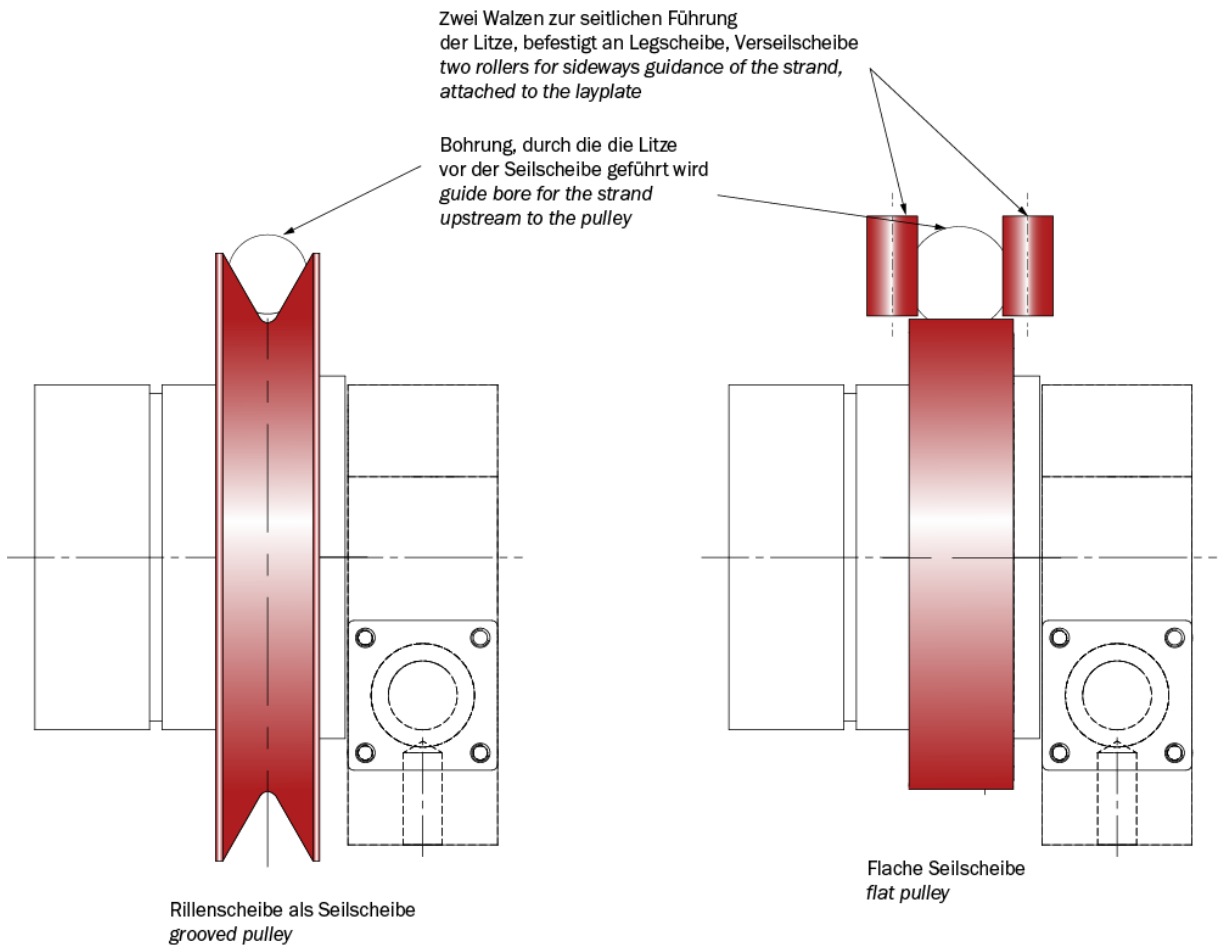


Figure 4: Pulley as Grooved Pulley and Flat Pulley Design

In the case of the grooved pulley design, sideways acting forces may occur pressing against the sides of the grooved pulley. This falsifies the measuring result. This has been observed mainly for large differences between the strand diameter and the diameter of the guide bore in the lay-plate.

To avoid this source of errors, we recommend the use of a flat pulley. Side guidance of the strand is ensured, e.g., using two rollers that can be attached to the lay plate downstream of the guide bores. As a result, vertically acting forces are measured using the force sensor only.

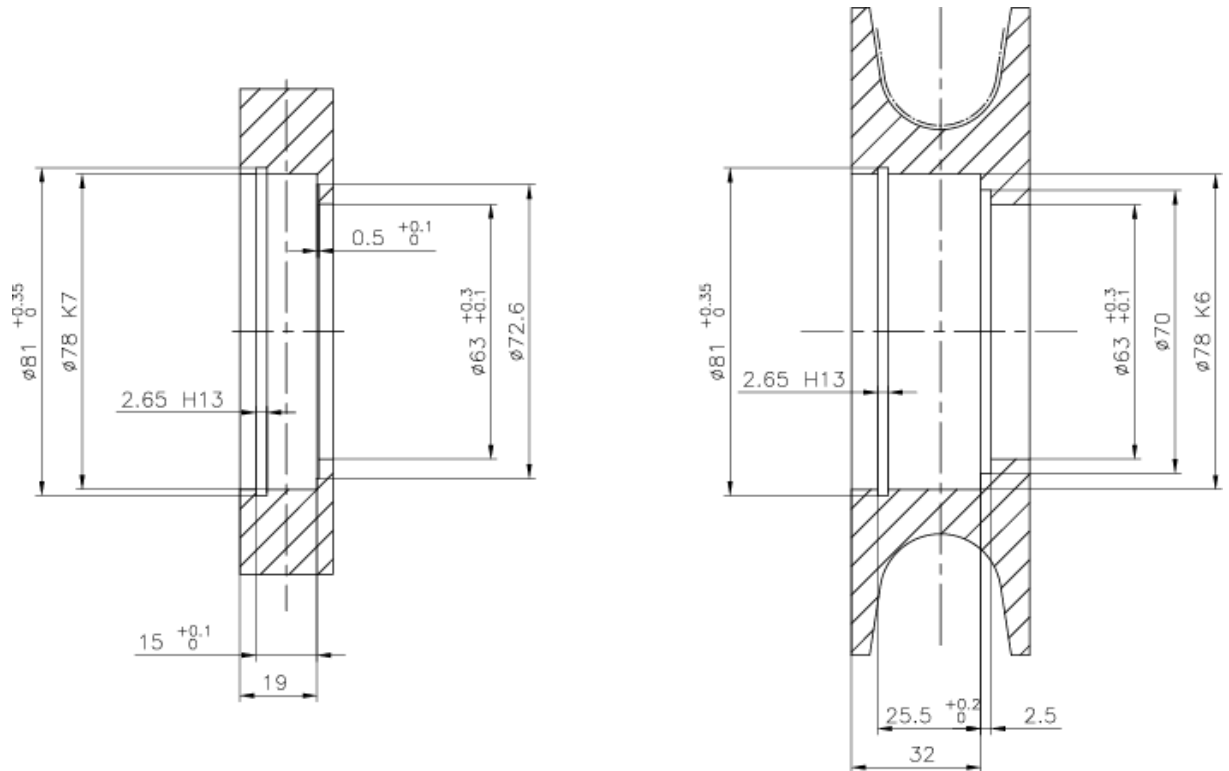


Figure 5: Basic Dimensions for pulley (proposal) single and dual bearing RMGZ300A_BA_Manual.ai

The dimensions in parentheses are reference values only. Pay attention to the lowest weight possible during the design.

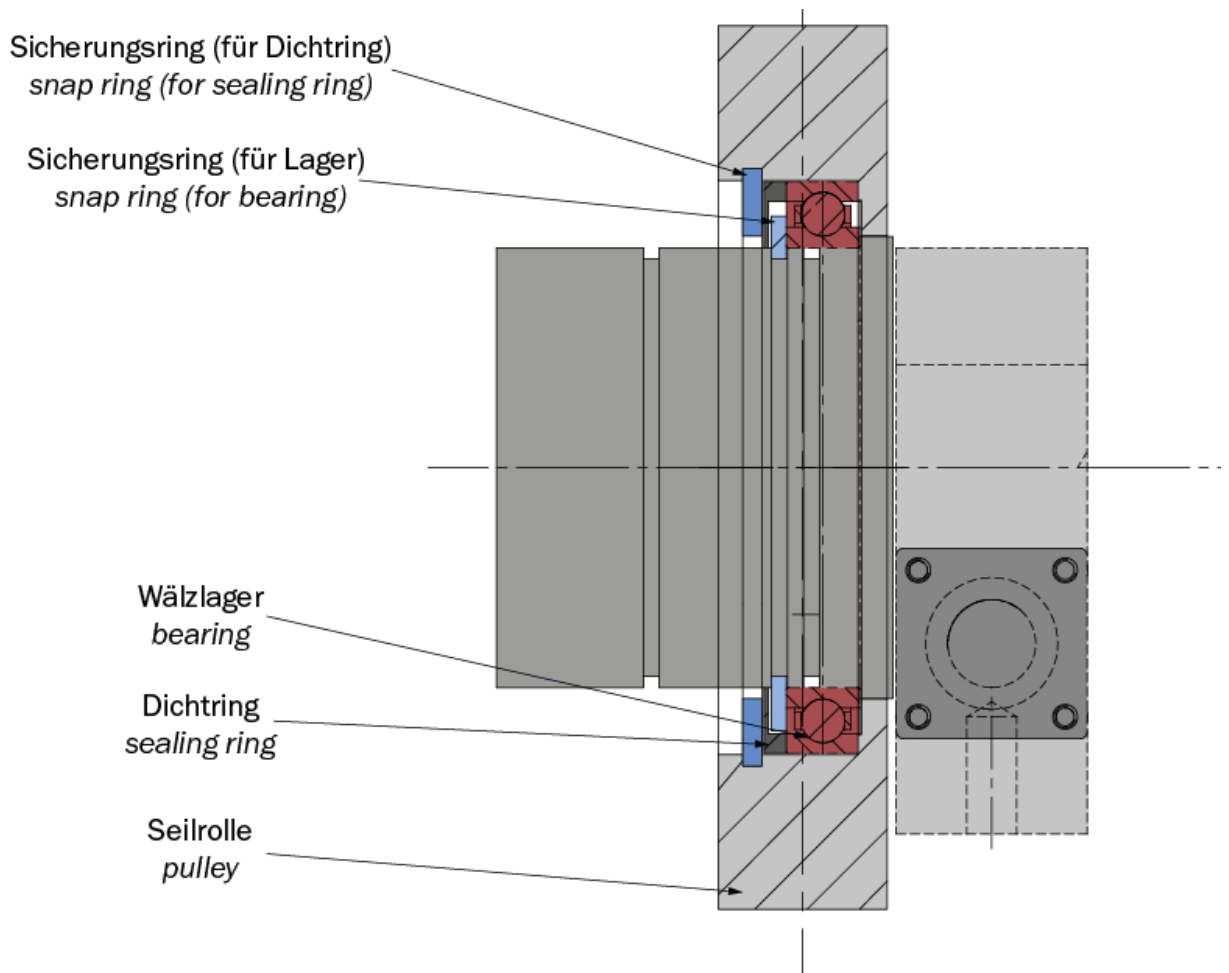


Figure 6: Installation of bearings and pulley

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4.2 System Requirements of Rotating Applications

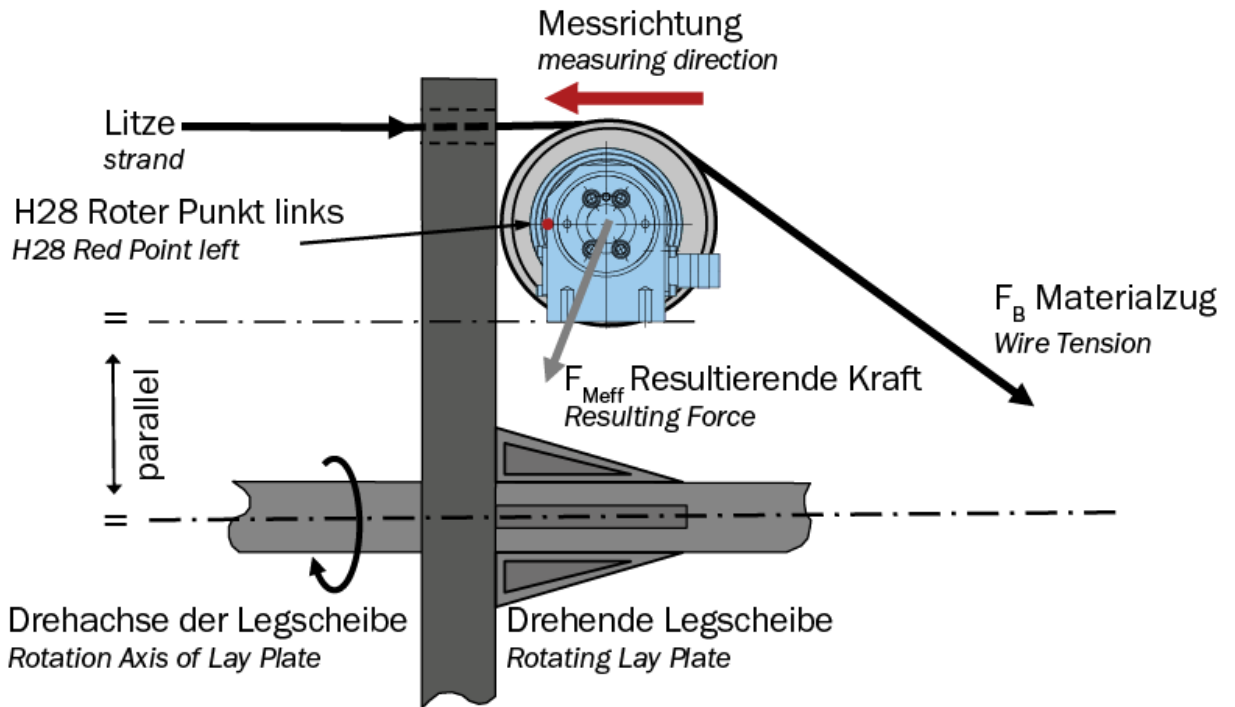


Figure 7: Force Sensor Arrangement

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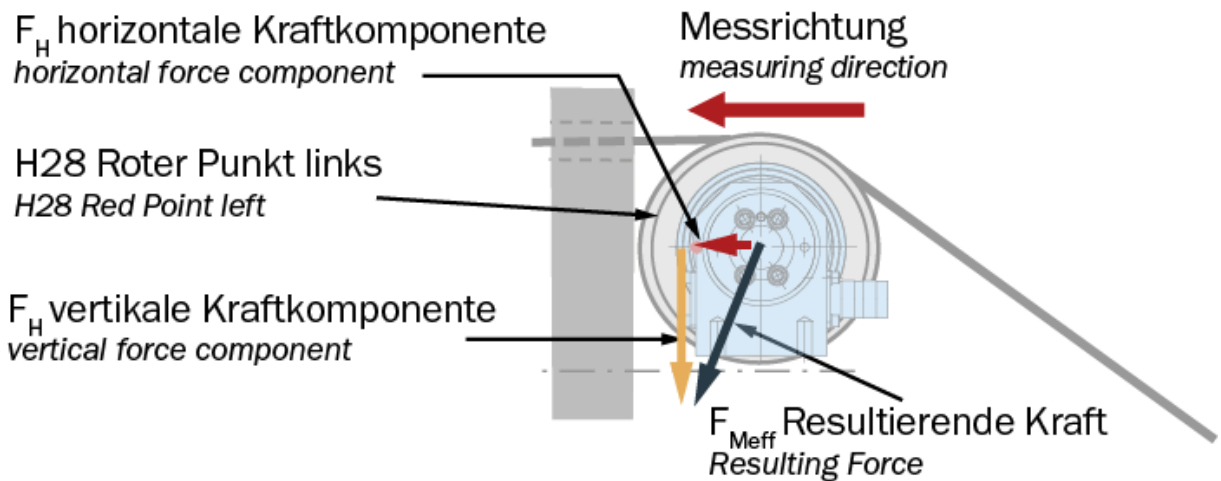


Figure 8: Measuring direction and force components

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To ensure that the centrifugal force has no influence on the measuring result, the horizontal component of the resulting force is measured only.

The example above shows the horizontal components of the resulting force to the left. Option H28 was used to ensure that the measuring direction of the force sensor matches the direction of the force. Otherwise, the measuring signal would be outputted as negative value.

4.3 Installation of the Force Sensor for Rotating Applications

Overload Protection



The force sensors are protected against overload by a mechanical stop.

Exceeding the maximum permissible forces leads to permanent damage to the measuring body. This leads to incorrect measuring results.

One force sensor each is used for measuring a strand. A flat surface and respective fastening bores must be provided for on the machine frame for the installation of each force sensor (lay-plate, etc.).

The contact surface must be flat and parallel, if possible, aligned perpendicularly to the axis of rotation of the machine to ensure the best possible alignment of the force sensor and proper measurement. The center of the measuring body together with the red point must form a line parallel to the axis of rotation of the machine.

4.3.1 Alignment Verification

To verify correct alignment, the consistency of the measuring results must be verified in the running machine. If sinusoidal measuring results in the frequency of the machine speed occur, the alignment should be corrected via fine adjustment.

4.3.2 Fine Adjustment of the Alignment

After the force sensor is installed, the fine adjustment of the alignment can be achieved by using shims.

4.4 Electrical Connection

The connection between force sensor and measuring amplifier is realized using a $4 \times 0.25 \text{ mm}^2$ [AWG 23] cable. The cable must be routed separately from the power cable.

The cable shielding must only be connected on the side of the measuring amplifier.

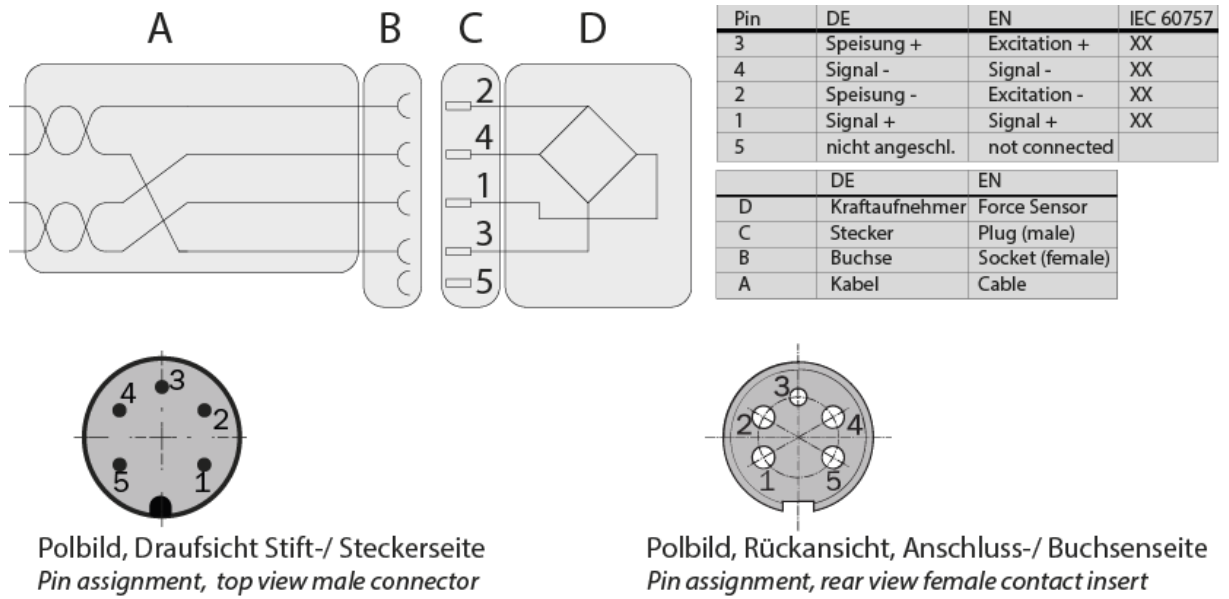


Figure 9: Electrical Connection Pin_Assignment_Sensorkabel_Farben_Stecker.ai

5 Technical Data

Designations	
Sensitivity	1.8 mV/V
Sensitivity tolerance	<± 0.2 %
Accuracy class	± 0.5% (F _{Nom})
Temperature coefficient	±0.1% / 10 K
Temperature range	-10 to +60 °C (14 to 140 F)
Input resistance	Ω 350
Excitation voltage	1 to 7 VDC
Overload protection	10-times the nominal force F _{Nom}
Measuring body material	Stainless steel
Protection class	IP40
Measuring range	30:1
Repeatability	0.05%

Table 1: Technical Data



FMS Force Measuring Systems AG
Aspstrasse 6
8154 Oberglatt (Switzerland)
Tel. 0041 1 852 80 80
Fax 0041 1 850 60 06
info@fms-technology.com
www.fms-technology.com

FMS USA, Inc.
2155 Stonington Avenue Suite 119
Hoffman Estates,, IL 60169 (USA)
Tel. +1 847 519 4400
Fax +1 847 519 4401
fmsusa@fms-technology.com

FMS (UK)
Aspstrasse 6
8154 Oberglatt (Switzerland)
Tel. +44 (0)1767 221 303
fmsuk@fms-technology.com

FMS Italy
Aspstrasse 6
8154 Oberglatt (Switzerland)
Tel. +39 02 39487035
fmsit@fms-technology.com