



Installation Instructions

FA-Series

Ultra-flat, stainless steel force sensor for use with
dead shaft rolls

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**Diese Bedienungsanleitung ist auch in Deutsch erhältlich.
Bitte kontaktieren Sie Ihre nächstgelegene FMS Vertretung.**

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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 proper 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 sensor 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.

3 Product information

3.1 Product description

The force sensors of the FA-Series feature an extremely slim design. The dead shaft adapter allows for a quick exchange for the roll and the bearings. The installation on the machine is simply realized with two shoulder bolts. Adapter diameters are available in various dimension, in metric as well as in imperial sizes.

3.2 Functional description

The FA-Series force measuring sensor combines the bracket for the dead shaft idler roll 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 web tension.

3.3 Scope of delivery

Included in scope of delivery

Force sensor, clip ring, setting gauge

Options

None

Accessories

Prefabricated cable (specify length) with connector (straight or right-angle), dowel screw $\varnothing 6 \times 30$, M5, dowel pin $\varnothing 6 \text{ h}6 \times 20$

3.4 Order code

| FA-Series : Order code | | |
|------------------------|---------|---|
| FA | 202-M20 | .50 |
| | | Nominal force rating in N |
| | | Size: shaft- \varnothing in mm (20 mm) or in inches (e.g. 075 = 0.75 in.) |
| | | Series |

Figure 1: order code

Datasheet_FA_series.indd

4 Installation

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 sensor 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 sensor 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.

4.1 Installation options

The force sensors of the FA-series can be installed in different ways.

You can use the accessories:

- dowel screw $\varnothing 6 \times 30$, M5
- dowel pin $\varnothing 6 \text{ h}6 \times 20$

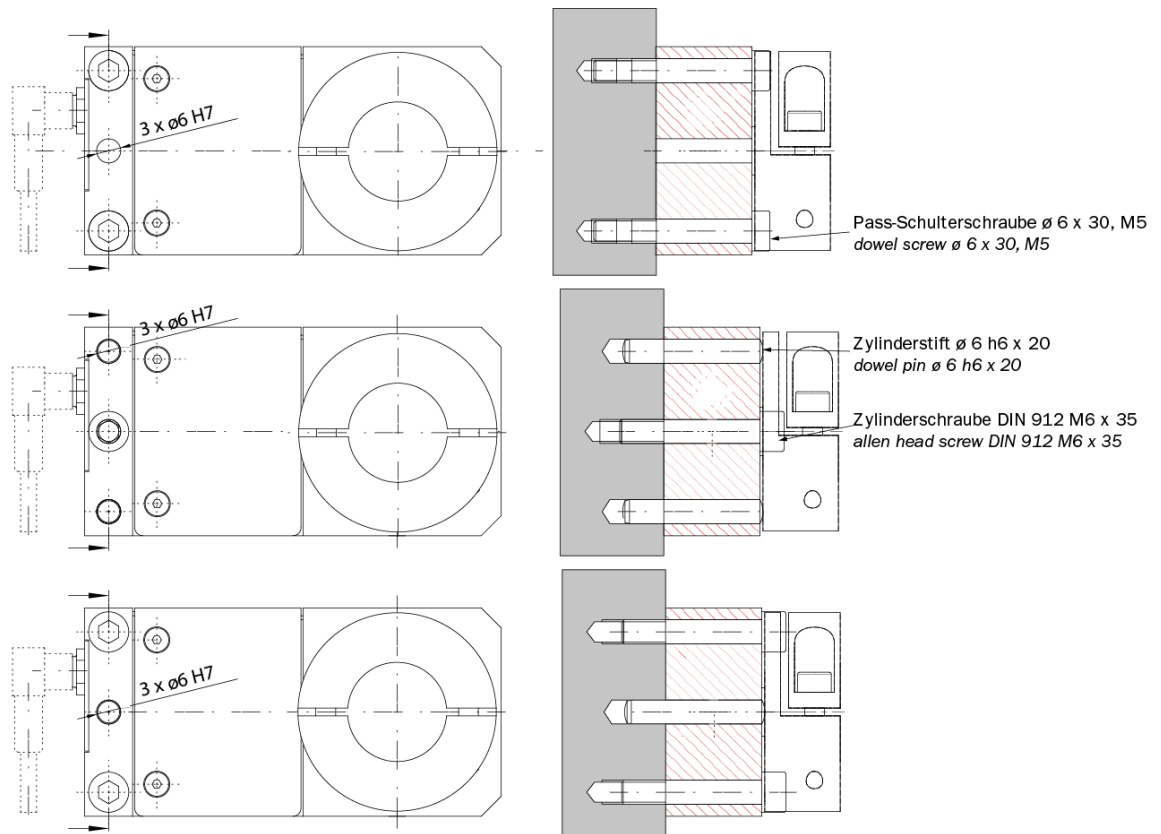


Figure 2: installation options

FA_BA_Manual.ai

We recommend the first two mounting options since they can absorb potential moments of tilt more efficiently.

4.2 Bearings



Self-aligning bearings

The FA-Series is equipped with a self-aligning bearing that allows for compensation of angular misalignment ($<2^\circ$) of the shaft.

4.3 Installation

- Depending on the diameter of the roll it can be useful to insert the installation screws and pins into the force sensor prior to installation.
- Insert position pin into its corresponding hole.
- Tighten the M8 bolt again.
- Remove the clamps (M6 bolts) and place both ends of the shaft in the adapters.
- The axial play between the sensor and the adapter in the fixed bearing side can be adjusted with the setting gauge.
- The play must be $2 \text{ mm} \pm 1 \text{ mm}$ (0.039" - 0.079"). This will provide the required gap for movement due to thermal expansion and for the self-aligning capability of the unit to function properly.
- Slide the setting gage between adapter and sensor body.
- Tighten the clamp on the fixed bearing side.
- Tighten the set screw on the fixed bearing side.

- The axial play between the sensor and the adapter in the floating bearing side can also be adjusted with the setting gauge.
- Slide the setting gage between adapter and sensor body.
- Tighten down the second clamp.
- On the floating bearing side, the set screw may not be tightened. We recommend to remove the set screw to avoid accidental tightening later on.
- Remove the setting gage.

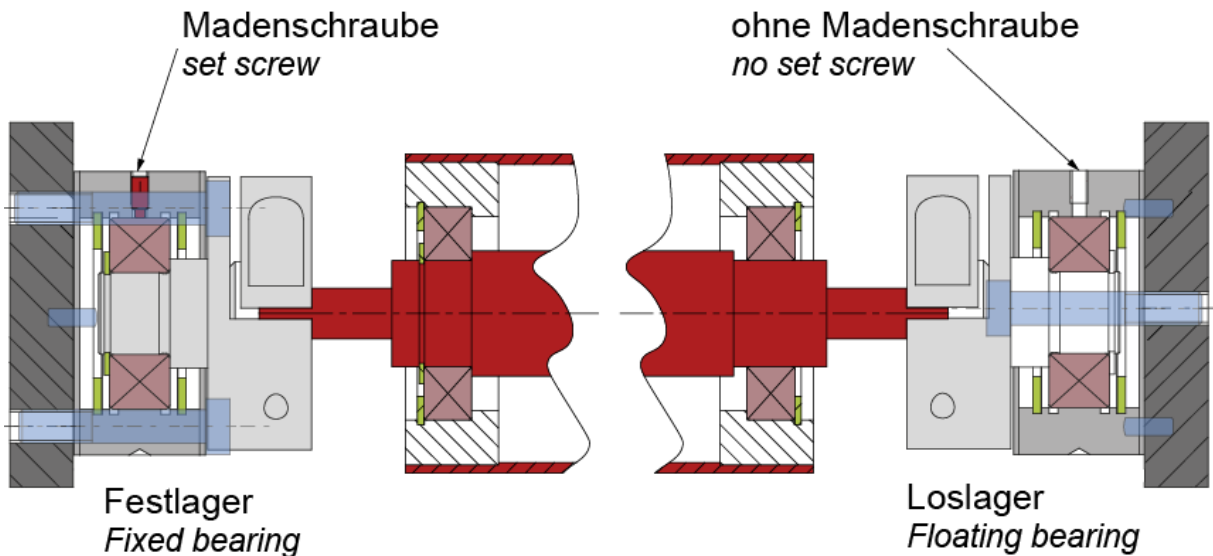
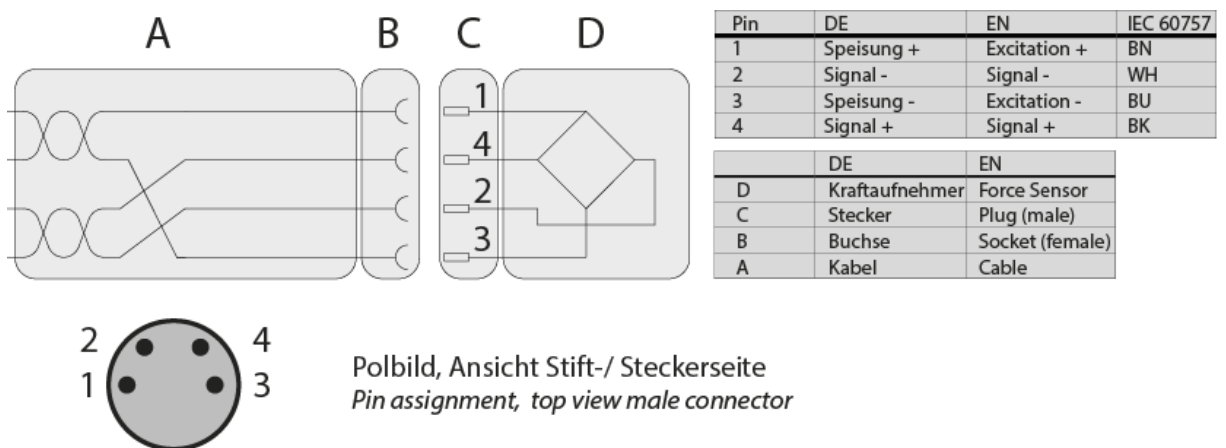


Figure 3: Fixed and floating bearing installation

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4.4 Electrical connections

Connection between the Force Measuring Rollers and machine controller is realized by means of a 5-pole cable with a cross-section of 0.25mm². The cable must be installed separate from power lines.



Farbangaben (IEC60757) und Codierung gelten nur für FMS Komponenten!
Color scheme (IEC60757) and pin codes are valid for FMS components, only!

Figure 4: pin assignment M12

Pin_Assignment_Sensorkabel_Farben_Stecker.ai

5 Technical data

| Technical data | |
|--------------------------|-------------------------------------|
| Sensitivity | 1.8 mV/V |
| Tolerance of sensitivity | $\pm 2\%$ |
| Accuracy class | $\pm 0.5\%$ of nominal force rating |
| Temperature coefficient | $\pm 0.1\%/10\text{K}$ |
| Temperature range | -10 to +60°C |
| Input resistance | 350Ω |
| Excitation voltage | 1 to 12 VDC |
| Overload protection | 10 times nominal force |
| Material | Stainless steel |
| Protection class | IP42 |
| Electrical connection | Male connector M8, 4-pole |
| Measuring range | 30:1 |

Table 1: technical data

5.1 Dimensions

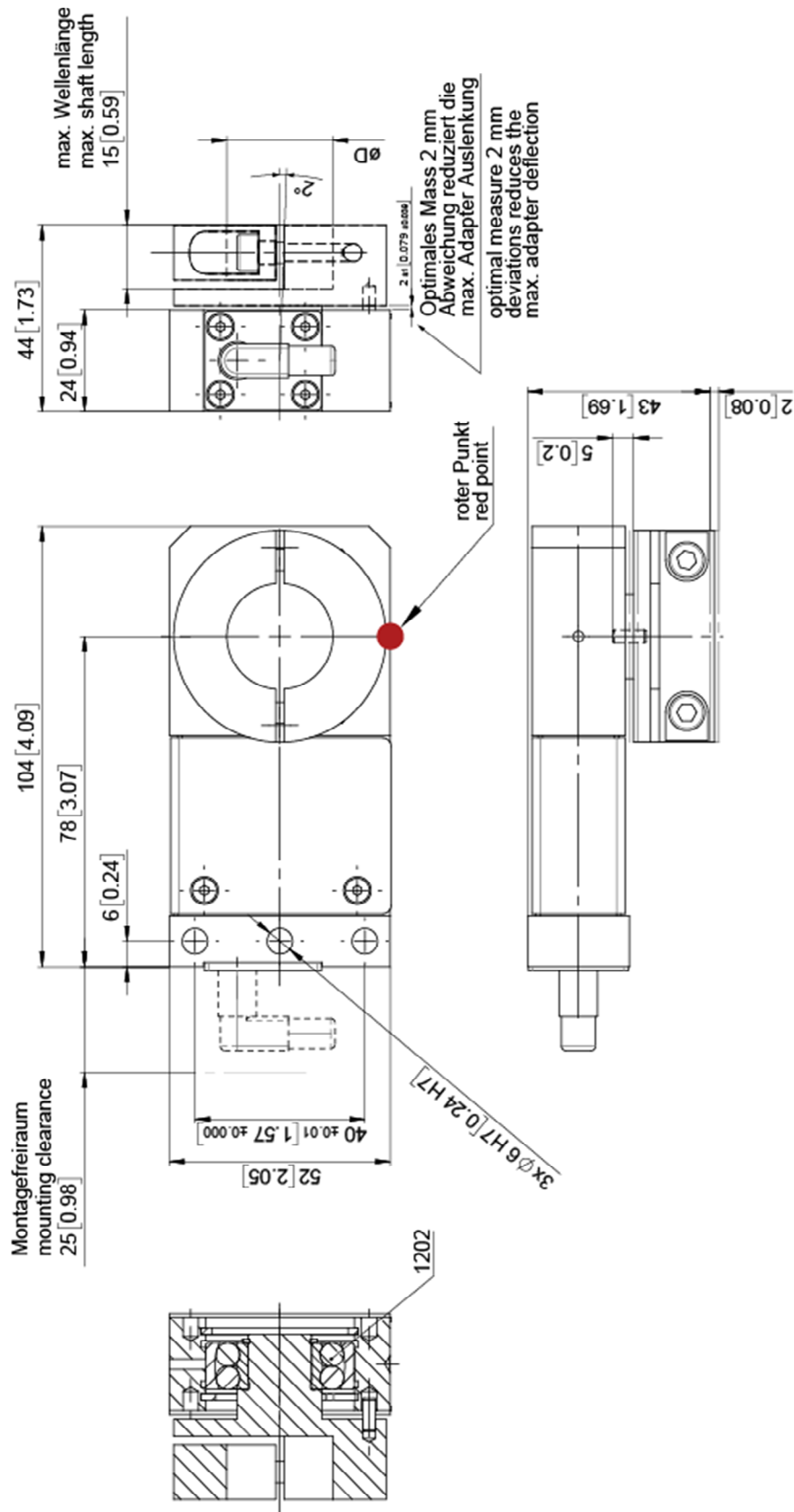


Figure 5: Dimensions

| FA-Series : Journal diameter, Weight | | | | |
|---|---------------------------|---------|--|---------------|
| Size | Journal diameter D | | | Weight |
| Type | mm (in.) | | | kg (.lbs) |
| FA202-075 | 19.05 | (0.75) | | 1.18 (1.96) |
| FA202-100 | 25.4 | (1.00) | | 1.18 (1.96) |
| FA202-M20 | 20.0 | (44.09) | | 1.18 (1.96) |
| FA202-M25 | 25.0 | (55.12) | | 1.18 (1.96) |

| FA-Series : Nominal forces, Deflection | | | | |
|---|----------------------|-------------------|--|-------------------|
| Size | Nominal force | | | Deflection |
| Type | N (.lbf) | | | mm (in.) |
| FA202-075 | 50, 125, 250, 500 | (11, 27, 55, 110) | | 0.15 (0.33) |
| FA202-100 | 50, 125, 250, 500 | (11, 27, 55, 110) | | 0.15 (0.33) |
| FA202-M20 | 50, 125, 250, 500 | (11, 27, 55, 110) | | 0.15 (0.33) |
| FA202-M25 | 50, 125, 250, 500 | (11, 27, 55, 110) | | 0.15 (0.33) |



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