Installation Manual CR208 / 210 / 212

Force Measuring Roller

Version 1.05  07/2008 ff

This operation manual is also available in German
Please contact your local representative.

Diese Bedienungsanleitung ist auch in Englisch erhältlich.
Bitte kontaktieren Sie Ihre nächstgelegene FMS Vertretung.
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1 Dimensions / Scope of Delivery

Fig 1: Dimensions CR208/210/212 Force Measuring Roller

<table>
<thead>
<tr>
<th>Nominal Force</th>
<th>Order Code FMS</th>
<th>Weight w/o pulley</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>[lbs]</td>
<td>Order Code FMS</td>
</tr>
<tr>
<td>1000</td>
<td>[225]</td>
<td>CR208.1000 CR210.1000 CR212.1000</td>
</tr>
</tbody>
</table>

Suffixes for special versions:
(e.g. Order Code: CR208.250.PH.H14)
PH = pilot hole mounting option
H14 = right-angled plug
H16 = temperature range up to 120°C

Scope of delivery for standard version:
Sensor, M12x25 mounting screw and washer, straight connector

Scope of delivery for PH version:
Sensor, four M6x40 mounting screws and washers, straight connector

Not included in the scope of delivery
Snap ring, pulley, bearing
2 Assembly Preparations

The force measuring rollers of the CR208, CR210 and CR212 Series are ideal devises to measure tensions in wires, cables and narrow flat materials. Because of their ability to accept a wide range of standard sheaves they can be utilised very flexibly. Sheave and bearing mount to the bearing seat of the load cell. The assembly of sheave and sensor to the machine frame is straight forward and quickly done. The red point at the connector indicates the positive measuring direction.

2.1 Assembly Conditions

The Force Measuring Roller CR208/210/212 is 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 of the Measuring Roller must be met:

Caution

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

Caution

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

Caution

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

2.2 Mounting the Force Measuring Sensors

There are four basic mounting possibilities for the CR208/210/212 sensors:

A) Front mounting using centring shoulder (Fig. 2, detail A)
B) Front mounting without centring shoulder (Fig. 2, detail B)
C) Central mounting using the centring shoulder (Fig. 2, detail C)
D) Central mounting without centring shoulder (flat rear side, Fig. 2, detail D)

The mounting form depends from the space conditions and assembly concept in the machine. Screws and washers for the different assembly concepts are delivered with the force measuring roller.
2.3 Preparing the Machine Frame

For the most common mounting form (central mounting without centring shoulder, Fig. 2, detail D) a large bore for the M12 mounting screw and a small bore for a position pin (that prevents radial displacement) should be provided in the machine frame (see Fig. 1).

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Fig 2: Mounting possibilities CR208 /210 / 212 Sensor

C203006d
2.4 Mounting the Roller into the Machine Frame

1. Slide carefully your sheave with internal bearing to the bearing seat of the load cell.
2. Secure the self-aligning ball bearing with a snap ring
3. Turn the Red Point and cable connector of the sensor in the desired mounting position.
4. Tighten the aligned sensor to the machine frame with the mounting screws.
5. Make sure the roller is turning smoothly.

2.5 Wiring

Connection between the Force Measuring Sensor and measuring amplifier or controller is done by using 2x2x0.25mm² [AWG 23] shielded twisted-pair cables. These cables must be run separate from power cables. The connection is to be done referring to (Fig.4). The shield should be connected only to the measuring amplifier.

3 Maintenance / Disassembly

3.1 Maintenance

All FMS Force Measuring Sensors are maintenance-free. Depending on the type of bearing used, it may be necessary to periodically lubricate the bearings.

3.2 Disassembly

The disassembly of the Force Measuring Sensors is done by reversing the order of the assembly procedure.
4 Technical Data

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Sensitivity</td>
<td>1.8mV/V</td>
</tr>
<tr>
<td>Tolerance of sensitivity</td>
<td>&lt; ±0.2%</td>
</tr>
<tr>
<td>Accuracy class</td>
<td>±0.5% [relating to $F_{nominal}$]</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±0.1% / 10K [±0.0055% / °F]</td>
</tr>
<tr>
<td>Temperature range</td>
<td>–10...+60°C [14°F...140°F]</td>
</tr>
<tr>
<td>Input resistance</td>
<td>350Ω</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>1...12VDC</td>
</tr>
<tr>
<td>Overload protection</td>
<td>10 times the rated nominal force</td>
</tr>
<tr>
<td>Material</td>
<td>Stainless Steel sensor and adapter, Aluminum cover</td>
</tr>
</tbody>
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5 Torque Specifications

<table>
<thead>
<tr>
<th>Bolt / Screw Size</th>
<th>Torque / Maximum</th>
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<tbody>
<tr>
<td>M4 Set Screw</td>
<td>2 Nm (1.5 ft/lb)</td>
</tr>
<tr>
<td>M4 Low Head Socket Cap Screw (S)</td>
<td>2.9 Nm (2.1 ft/lb)</td>
</tr>
<tr>
<td>M12 Bolt</td>
<td>100 Nm (73 ft/lb)</td>
</tr>
</tbody>
</table>

6 Functional Description

Foil type strain gauges mounted in a full Wheatstone Bridge configuration in each sensor perform the actual tension measurement. The dual flexion beam design eliminates angular deflection and load dependent torque effects. The CR208 / 210 / 212 Force Measuring Rollers ensure tension measurement with the highest accuracy and reliability under the most stringent requirements. Even with low material wrap angles and high roller weights, tension will still be measured accurately. A built in mechanical hard-stop provides high overload protection and ensures that frequent calibration is not required.