Transducers employing the NOVOSTRICTIVE® touchless magnetostrictive measuring process for direct, precise and absolute measurement of linear position in control, positioning and measuring applications.

The measurement is accomplished using a passive position marker which is available in a guided or in an unguided version.

Side coupling of the position marker reduces the installation assembly dimension, prevents the pump effect of slide arms and permits stroke lengths up to 4500 mm.

The unguided version makes installation even simpler, and the wear-free operation enables unlimited mechanical life expectancy and unlimited traverse speed of the position marker.

The temperature coefficient of the transducer is extremely low thanks to the measuring principle, design and selected materials.

The high mechanical ruggedness of the transducer combined with the underlying measuring technique stands for the system's high resistance against shock and vibration.

The active sensing element is encased in an aluminum housing rated to IP 67. This makes the transducer resistant to contamination, dust, moisture and oils.

Mounting is accomplished using clamps that allow precise mechanical adjustment.

A sophisticated ASIC in the transducer provides for standard absolute output signals.

To make a reference drive obsolete, the sensor puts out the actual position value during the initialisation phase to the processing unit (power-on burst).

Output are compatible A/B/Z-signals. A and B do have a phase difference of 90° to each other. The output is optionally available as RS422 or as push-pull output (level 5 V or 24 V). Exceeding the maximum velocity does not result in losing increments after lowering the velocity below the specified maximum.

The transducers series TLM with quadrature output are directly compatible with common encoder input devices. So the TLM with all its advantages like robustness, dust insensitivity, mounting friendliness and its attractive price now is applicable for present glass or magnetic scale applications in linear positioning devices.

The transducer up to 4500 mm touchless absolute Series TLM with Quadrature-Interface

Special features
- absolute transducer, no slide arm required
- NOVOSTRICTIVE®, touchless magnetostrictive measuring method
- non-contacting guiding with floating position marker
- unlimited mechanical life
- no velocity limit for position marker
- outstanding linearity performance up to 30 µm
- resolution up to 0.001 mm regardless of stroke length
- low temperature coefficient <20 ppm/K
- insensitive to shock and vibration
- optionally cable or plug connection
- protection class IP67 / IP68

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Basic description

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Anodized aluminium with metal end cap</td>
</tr>
<tr>
<td>Mounting</td>
<td>Compression clamps, longitudinally adjustable</td>
</tr>
<tr>
<td>Position marker</td>
<td>Floating marker (unguided), plastic Guided marker, ball coupling</td>
</tr>
<tr>
<td>Measuring technique</td>
<td>NOVOSTRICTIVE®, touchless magnetostrictive</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>8-pin round connector, shielded, M12x1 8-conductor cable, shielded, 1 m long</td>
</tr>
<tr>
<td>Electronics</td>
<td>Integrated SMD with ASIC Connect cable shield to housing</td>
</tr>
</tbody>
</table>

Siede Group
**Connector Pin Code 162**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Cable colours</th>
<th>Connector with cable</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIN 1</td>
<td>YE</td>
<td>WH</td>
<td>A+</td>
</tr>
<tr>
<td>PIN 2</td>
<td>GY</td>
<td>BN</td>
<td>B+</td>
</tr>
<tr>
<td>PIN 3</td>
<td>GN</td>
<td>GN</td>
<td>B-</td>
</tr>
<tr>
<td>PIN 4</td>
<td>WH</td>
<td>Z+</td>
<td></td>
</tr>
<tr>
<td>PIN 5</td>
<td>RD</td>
<td>GY</td>
<td>Z-</td>
</tr>
<tr>
<td>PIN 6</td>
<td>BU</td>
<td>PK</td>
<td>supply voltage GND</td>
</tr>
<tr>
<td>PIN 7</td>
<td>BN</td>
<td>BU</td>
<td>+24 VDC</td>
</tr>
<tr>
<td>PIN 8</td>
<td>PK</td>
<td>RD</td>
<td>A-</td>
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</tbody>
</table>

**Quadrature Interface**

<table>
<thead>
<tr>
<th>Transmission standard of A/B/Z</th>
<th>RS422 / 5 V or 24 V Push-Pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. pulse frequency at power-on (Initialization)</td>
<td>156 kHz</td>
</tr>
<tr>
<td>High speed mode</td>
<td>78 kHz</td>
</tr>
<tr>
<td>Low speed mode</td>
<td>78 kHz</td>
</tr>
<tr>
<td>Max. operation speed</td>
<td>2.2 m/s</td>
</tr>
<tr>
<td>High speed mode</td>
<td>1.1 m/s</td>
</tr>
<tr>
<td>Low speed mode</td>
<td>1.1 m/s</td>
</tr>
<tr>
<td>Update rate internal</td>
<td>16 kHz</td>
</tr>
<tr>
<td>Frequency A/B-signal</td>
<td>depends on transducer’s velocity</td>
</tr>
<tr>
<td>Missing increments when exceeding the max. operation speed</td>
<td>none</td>
</tr>
<tr>
<td>Length Z-pulse</td>
<td>1 increment</td>
</tr>
<tr>
<td>Type designations</td>
<td>TLM xxxx xxx 8xx xxx</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>Quadrature Interface</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Electrical Data**

- **Defined electrical range (dimension B):** 0050 to 4500 mm
- **Absolute linearity:** ≤ ± 30 µm
- **Output signal:** digital
- **Resolution:** ≤ 1 digit
- **Reproducibility:** ≤ 2 digits
- **Hysteresis:** ≤ 1 digit
- **Supply voltage:** 24 ± 20 % VDC, reverse polarity protected
- **Supply voltage ripple:** max. 10 % Vpp
- **Current draw:** ≤ 100 typical mA
- **Output update rate:** 16 MHz
- **Shielding:** connected to housing
- **Temperature coefficient:** ≤ 20 ppm/K
- **Overvoltage protection:** 40 (Transzorb protection diodes) VDC
- **Reverse voltage:** yes
- **Insulation resistance:** ≥ 10 MΩ (500 V, 1 bar, 2 s)

**Mechanical Data**

- **Dimensions:** see drawing
- **Physical length (dimension A):** Dimension B + 160 ± 2 mm

**Environmental Data**

- **Operating temperature range:** -40...+85 °C
- **Storage temperature range:** -40...+100 °C
- **Operating humidity range:** 0...100 %R.H.
- **Shock per DIN IEC68T2-27:** 100 (11 ms) g
- **Vibration per DIN IEC68T2-6:** 20 (5...2000 Hz, Amax = 0,75 mm) g
- **Protection class per**: IP67 with fastened connector
- **Mechanical data when used with unguided position marker**
  - Traverse speed of position marker: unlimited ms⁻¹
  - Traverse acceleration of position marker: unlimited ms⁻²
  - Life: unlimited (mechanical) movements
  - Standard defined electr. range (dimension B):
    - 0050 up to 1000 in 50 mm steps, 1000 up to 2000 in 100 mm steps, 2000 up to 4500 in 250 mm steps; other lengths in 10 mm steps on request

**CE-conformity**

- **Emissions:** RF noise field strength EN 55011 Group 1 Class A
- **Noise immunity:** ESD EN 61000-4-2
- **Conducted disturbances EN 61000-4-6**
**Ordering specifications**

<table>
<thead>
<tr>
<th>T</th>
<th>L</th>
<th>M</th>
<th>0</th>
<th>0</th>
<th>0</th>
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<th>0</th>
<th>7</th>
<th>1</th>
<th>1</th>
<th>0</th>
<th>2</th>
</tr>
</thead>
</table>

**Included in delivery**
- Mounting clamps Z46
- Electrically isolating incl. fillister head screws

**Required accessories**
- Floating position marker Z-TLM-P01, Art.No. 005651
- Z-TLM-P04, Art.No. 005654
- Guided position marker Z-TLM-P05, Art.No. 005655
- Other position markers on request

**Recommended accessories**
- Connector M12x1, 2 m cable, EEM 33-86, IP67, Art.No. 005629
- Angled connector M12x1, 2 m cable, EEM 33-87, IP67, Art.No. 005630
- Connector with longer cable length on request

**Available on request**
- Standard cable 10 m
- Specific connectors
- Without power-on burst
- Burst on demand
- Z-pulse teach-in
- Other resolutions
- Analogue, digital and fieldbus interface see separate data sheet

**Important**
- Avoid equalizing currents in the cable shield caused by potential differences. Twisted pairs are recommended.

**Electrical Interface**

- Incremental Quadrature Interface

**Output signal Incremental Interface 8XX**
- 4: Resolution 5 µm, variable frequency, high speed mode, power-on burst
- 6: Resolution 1 µm, variable frequency, high speed mode, power-on burst
- 7: Resolution 5 µm, variable frequency, low speed mode, power-on burst
- 9: Resolution 1 µm, variable frequency, low speed mode, power-on burst

**Incremental Interface 8XX**
- 1: 5 V level, differential = line driver (A+ A- B+ B- Z+ Z-)
- 2: 5 V level, single line = fixed level = Push-Pull on request
- 5: 24 V level, single line = fixed level = Push-Pull on request

**Electrical connection**
- 102: 8 pin round connector M12x1
- 201: NT standard cable 1 m
- 203: NT standard cable 3 m
- 205: NT standard cable 5 m

**Mech. configuration**
- 001: Profile design

**Defined electr. range**
- Several standard lengths from 0050 bis 4500 mm