Transducer up to 4500 mm touchless absolute

Series TMI with CANopen interface

**Special features**
- Rod style integrable transducer
- Touchless magnetostrictive NOVOSTRICTIVE® measuring process
- Non-contact guiding with ring-shaped 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
- Operating pressure up to 350 bar
- Screw flange M18x1.5 or 3/4"-16UNF
- CANopen compatible CiA standard DS-301 Rev. 4.02 and standard device profile DSP-406 Rev. 3.1 according to encoder class C1
- Encoder class C1
- Up to 2 position markers adaptable
- Speed, cams programmable
- Address adjustment via LSS DSP 305 V1.1.2 or SDO object 0x2000
- Autobaud function

Transducers employing the NOVOSTRICTIVE® touchless magnetostrictive measuring process for direct, precise and absolute measurement of travel and length in control, positioning and measuring technology.

The measurement is accomplished using a passive position marker which can be moved as a free-floating element. The non-contact coupling version makes installation even simpler, and the wear-free operation means unlimited mechanical life expectancy and unlimited traverse speed of the position marker. Stroke lengths up to 4500 mm are permitted.

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 means that the system is highly resistant to shock and vibration.

Via CAN Interface the node ID, baud rate, transmission cycle time, slope and travel direction and other parameters can be largely varied. The parameters for configuration of the sensor are sent by the CAN controller in “Service Data Objects” (SDO’s). Node ID and data rate are varied either in Layer Setting Service (LSS; nach DSP 305 V1.1.2) or using SDO Object 0x2000. They are stored in non-volatile memory.

As a special feature, the sensor offers the Autobaud function: The sensor is able to detect the bit rate of the CAN network by “listening” to the communication of existing bus members and to adjust its bit rate accordingly.

Additional interfaces see separate data sheet.
<table>
<thead>
<tr>
<th>PIN</th>
<th>Connector Pin Code 105</th>
<th>Connector Pin Code 106</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CAN_L</td>
<td>CAN_L</td>
</tr>
<tr>
<td>2</td>
<td>CAN_H</td>
<td>CAN_V+</td>
</tr>
<tr>
<td>3</td>
<td>(CAN_SHLD)</td>
<td>CAN_GND</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>CAN_H</td>
</tr>
<tr>
<td>5</td>
<td>CAN_V+</td>
<td>CAN_L</td>
</tr>
<tr>
<td>6</td>
<td>CAN_GND</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Signal Description**

- **CAN_L**: CAN_L bus line (dominant low)
- **CAN_H**: CAN_H bus line (dominant high)
- **CAN_SHLD**: Optional CAN shield (internally connected to CAN_GND)
- **CAN_V+**: +24 VDC
- **CAN_GND**: Ground 0 VDC
Type designations: TMI xxxx 00x 6xx xxx
CANopen interface

**Electrical Data**
- **Defined electrical range** (dimension L): from 0050 to 4000 mm
- **Absolute linearity**: ≤ ± 30 µm
- **Output signal digital (CAN bus)**: reverse polarity protected
- **Resolution**: ≤ 1 digit
- **Reproducibility**: ≤ 2 digits
- **Hysteresis**: ≤ 1 digit
- **Supply voltage**: 24 ± 20 % VDC
- **Supply voltage ripple**: max. 10 % Vpp
- **Current draw**: ≤ 100 typical mA
- **Output update rate**: ≤ 16 kHz
- **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

**Environmental Data**
- **Operating temperature range**: -40...+85 °C
- **Storage temperature range**: -40...+100 °C
- **Operating humidity range**: 0...100 %R.H.
- **Shock per DIN IEC68-2-27**: 100 (11 ms) g
- **Vibration per DIN IEC68-2-6**: 20 (5...2000 Hz, A max = 0,75 mm) g
- **Protection class per DIN 40050 IEC 529**: IP67 with fastened connector

**Mechanical data when used with floating position marker**
- **Pressure rating**
  - Working pressure: ≤ 350 bar
  - Burst pressure: ≥ 700 bar
- **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 L)
  - 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
  - Radiated immunity EN 61000-4-3
  - BURST EN 61000-4-4
  - Conducted disturbances induced by RF fields EN 61000-4-6
Ordering specifications

<table>
<thead>
<tr>
<th>Electrical Interface</th>
<th>Output signal CANopen interface 6XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>6: CANopen DS301 V 4.1 DS406 V 3.1</td>
<td>1: 1 x pos. resolution 5 µm and 1 x vel. resolution 0.5 mm/s</td>
</tr>
<tr>
<td></td>
<td>3: 1 x pos. resolution 1 µm and 1 x vel. resolution 0.1 mm/s</td>
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<tr>
<td></td>
<td>5: 2 x pos. resolution 5 µm and 2 x vel. resolution 0.5 mm/s</td>
</tr>
<tr>
<td></td>
<td>6: 2 x pos. resolution 1 µm and 2 x vel. resolution 0.1 mm/s</td>
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</tbody>
</table>

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<thead>
<tr>
<th>CANopen interface 6XX</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1: baud rate 1000 kBaund, Default Node-ID 127</td>
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<tr>
<td>2: baud rate 800 kBaund, Default Node-ID 127</td>
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<tr>
<td>3: baud rate 500 kBaund, Default Node-ID 127</td>
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<tr>
<td>4: baud rate 250 kBaund, Default Node-ID 127</td>
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<tr>
<td>5: baud rate 125 kBaund, Default Node-ID 127</td>
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<tr>
<td>7: baud rate 50 kBaund, Default Node-ID 127</td>
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</tr>
<tr>
<td>8: baud rate 20 kBaund, Default Node-ID 127</td>
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<tr>
<td>9: baud rate 10 kBaund, Default Node-ID 127</td>
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<table>
<thead>
<tr>
<th>Electrical connection</th>
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<tbody>
<tr>
<td>105: 1 x 6-pol. round connector IEC130-9</td>
<td></td>
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<tr>
<td>106: 1 x 5-pol. round connector M12x1</td>
<td></td>
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<tr>
<th>Defined electr. range</th>
<th>Several standard lengths from 0050 to 4500 mm</th>
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<tbody>
<tr>
<td>Mech. configuration</td>
<td></td>
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<tr>
<td>002: screw flange M18x1.5</td>
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<tr>
<td>003: screw flange 3/4&quot;-16UNF</td>
<td></td>
</tr>
<tr>
<td>004: screw flange M18x1.5 zero point at 51 mm without step Ø 25.0 mm</td>
<td></td>
</tr>
<tr>
<td>006: screw flange 3/4&quot;-16UNF zero point at 51 mm without step Ø 25.0 mm</td>
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</table>

**Required accessories**
- Ring position marker
  - Z-TMI-P02, Art.No. 005652;
  - Z-TMI-P14, Art.No. 005657;
- Other position marker and float position marker on request

**Available on request**
- Other resolutions
- Specific connectors
- Other interface variations
- Start-Stop, SSI, DyMoS, Analogue, field bus.

**Recommended accessories**
- Connector IEC 130-9, EEM 33-82, IP67, Art.No. 005639;
- Angled connector IEC130-9, EEM 33-94, IP67, Art.No. 005648;
- Connector M12x1, EEM 33-73, IP67, Art.No. 005645;
- Angled connector M12x1, EEM 33-75, IP67, Art.No. 005646;

**Important**
Avoid equalizing currents in the cable shield caused by potential differences. Twisted pair cable is recommended.