Transducer
up to 4500 mm
Touchless Absolute
Series TLM with Start/Stop-, SSI-, DyMoS-, Analog- Interface

Special features
- absolute transducer, no slide arm required
- NOVOSTRICTIVE®, touchless magnetostrictive measuring process
- high-dynamic serial DyMoS® interface with data transmission monitoring
- 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
- analog interfaces have end-user output range programming capability
- low temperature coefficient <20 ppm/K
- insensitive to shock and vibration
- optionally cable or plug connection
- protection class IP67 / IP68

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

The measurement is accomplished using a passive position marker which can be moved as a free-floating or guided element.

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

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.

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

The high mechanical ruggedness of the transducer combined with the underlying measuring technique mean that the system is highly resistant to 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. In addition to the familiar interfaces such as the synchronous serial interface (24 or 25 bits), the Start/Stop pulse interface and analog voltage or current interfaces, a high-dynamic serial DyMoS® interface with data transfer monitoring is offered.

The advantages of conventional interfaces and bus interfaces have been combined in Novotechnik’s DyMoS® interface. In addition to the position value, the DyMoS® interface also allows the actual traverse velocity to be sent. The pulse interface also allows fully tolerated processing of both edges of the Start/Stop signal. As an option, the transducer can also be operated with multiple position markers.

Additional interfaces see separate data sheet.

<table>
<thead>
<tr>
<th>Description</th>
<th>Description</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, 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</td>
</tr>
<tr>
<td></td>
<td>8-pin round connector, shielded, IEC130-9</td>
</tr>
<tr>
<td></td>
<td>8-conductor cable, shielded, 1 m long</td>
</tr>
<tr>
<td>Electronics</td>
<td>Integrated SMD with ASIC</td>
</tr>
<tr>
<td></td>
<td>Connect cable shield to housing</td>
</tr>
</tbody>
</table>
Connector pin code 101, 102  |  Cable colors code 201, 203, 205  |  Connector with cable EEM33-86, EEM33-87  |  Start/Stop pulse interface  |  SSI interface  |  DyMoS® interface  |  Analog interfaces  
---|---|---|---|---|---|---
PIN 1  YE  WH  + INIT  + Clk  + Clk  0(4)...20 mA  
PIN 2  GY  BN  + Start/Stop  + Data  + Data 1  Signal GND  
PIN 3  PK  GN  - INIT  - Clk  - Clk  ±10...±10 VDC  
PIN 4  RD  YE  open  open  Data 2  open  
PIN 5  GN  GY  - Start/Stop  - Data  - Data 1  0(-10)...+10 VDC  
PIN 6  BU  PK  supply voltage GND  supply voltage GND  supply voltage GND  supply voltage GND  
PIN 7  BN  BU  +24 VDC  +24 VDC  +24 VDC  +24 VDC  
PIN 8  WH  RD  open  open  Data 2  open  

Additional interfaces see separate data sheets. The unipolar analog interfaces includes standard teach-in function via the electrical connection. Important Avoid equalizing currents in the cable shield caused by potential differences. Twisted pair cable is recommended.

Subject to changes  
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### Type designations

<table>
<thead>
<tr>
<th>Start/Stop pulse interface</th>
<th>Synchronous serial interface</th>
<th>DyMoS® interface</th>
<th>Analog interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLM xxxx 001 1xx xxx</td>
<td>TLM xxxx 001 2xx xxx</td>
<td>TLM xxxx 001 3xx xxx</td>
<td></td>
</tr>
</tbody>
</table>

### Electrical Data

<table>
<thead>
<tr>
<th>Defined electrical range (dimension B)</th>
<th>≤ 50 µm</th>
<th>≤ 200 µm</th>
<th>≤ 200 µm</th>
<th>≤ 0.02% (min. 50 µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute linearity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>impulse</td>
<td>digital</td>
<td>digital</td>
<td>0 (10...10 VDC (load ≥10 kΩ)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 (4)...20 mA (burden ≤500Ω)</td>
</tr>
<tr>
<td>Resolution</td>
<td>≤ 2 µm</td>
<td>≤ 1 digit</td>
<td>≤ 1 digit</td>
<td>≤ 0.01%</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>≤ 6 µm</td>
<td>≤ 2 digits</td>
<td>≤ 2 digits</td>
<td>≤ 0.02%</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>≤ 4 µm</td>
<td>≤ 1 digit</td>
<td>≤ 1 digit</td>
<td>≤ 0.01%</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 ± 20%</td>
<td>reverse polarity protected</td>
<td>reverse polarity protected</td>
<td>reverse polarity protected</td>
</tr>
<tr>
<td>Supply voltage ripple</td>
<td>max. 10%</td>
<td>max. 10%</td>
<td>max. 10%</td>
<td>max. 10% Vpp</td>
</tr>
<tr>
<td>Current draw</td>
<td>≤ 100 typical</td>
<td>≤ 100 typical</td>
<td>≤ 100 typical</td>
<td>≤ 100 typical mA</td>
</tr>
<tr>
<td>Output update rate</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16 kHz</td>
</tr>
<tr>
<td>Shielding</td>
<td>connected to housing</td>
<td>connected to housing</td>
<td>connected to housing</td>
<td>connected to housing</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>≤ 20</td>
<td>≤ 20</td>
<td>≤ 20</td>
<td>≤ 20 ppm/K</td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td>40 (Transzorb protection diodes)</td>
<td>40 (Transzorb protection diodes)</td>
<td>40 (Transzorb protection diodes)</td>
<td>40 (Transzorb protection diodes) VDC</td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 10</td>
<td>≥ 10</td>
<td>≥ 10</td>
<td>≥ 10 MΩ</td>
</tr>
</tbody>
</table>

### Mechanical Data

<table>
<thead>
<tr>
<th>Dimensions (dimension A)</th>
<th>Dimension B = 160</th>
<th>Dimension B = 160</th>
<th>Dimension B = 160</th>
<th>Dimension B = 160 ± 2 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical length</td>
<td>see drawing</td>
<td>see drawing</td>
<td>see drawing</td>
<td>see drawing</td>
</tr>
</tbody>
</table>

### Environmental Data

| Operating temperature range | -40...+85 | -40...+85 | -40...+85 | -40...+85 °C |
| Storage temperature range  | -40...+120 | -40...+120 | -40...+120 | -40...+120 °C |
| Operating humidity range   | 0...100     | 0...100     | 0...100     | 0...100 %R.H. |
| Shock per DIN IEC6179-7-27 | 100 (11 ms) | 100 (11 ms) | 100 (11 ms) | 100 (11 ms) g |
| Vibration per DIN IEC68-7-6 | 20 (5...2000 Hz Amax = 0.75 mm) | 20 (5...2000 Hz Amax = 0.75 mm) | 20 (5...2000 Hz Amax = 0.75 mm) | 20 (5...2000 Hz Amax = 0.75 mm) g |

### Protection class per DIN 40050 IEC 529

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP67 with fastened connector</th>
<th>IP67 with fastened connector</th>
<th>IP67 with fastened connector</th>
<th>IP67 with fastened connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 40050 IEC 529</td>
<td>IP67 with cable connection</td>
<td>IP67 with cable connection</td>
<td>IP67 with cable connection</td>
<td>IP67 with cable connection</td>
</tr>
</tbody>
</table>

### Mechanical data when used with unguided position marker

<table>
<thead>
<tr>
<th>Traverse speed of position marker</th>
<th>unlimited</th>
<th>unlimited</th>
<th>unlimited</th>
<th>unlimited</th>
<th>ms⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traverse acceleration of position marker</td>
<td>unlimited</td>
<td>unlimited</td>
<td>unlimited</td>
<td>unlimited</td>
<td>ms⁻²</td>
</tr>
<tr>
<td>Life</td>
<td>unlimited (mechanical)</td>
<td>unlimited (mechanical)</td>
<td>unlimited (mechanical)</td>
<td>unlimited (mechanical)</td>
<td>movements</td>
</tr>
</tbody>
</table>

### Standard defined electr. range (dimension B)

| 50 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

<table>
<thead>
<tr>
<th>Emissions</th>
<th>RF noise field strength EN 55011 Group 1 Class A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise immunity</td>
<td>ESD EN 61000-4-2 Radiated immunity EN 61000-4-3 BURST EN 61000-4-4</td>
</tr>
<tr>
<td>Conducted disturbances induced by RF fields EN 61000-4-6</td>
<td></td>
</tr>
</tbody>
</table>
Ordering specifications

**Electr. Interface**
1 Standard: Impulse Interface, supply voltage 24 VDC ±20%
2 Optional: Synchronous Serial Interface, supply voltage 24 VDC ±20%
3 Alternative: DyMoS® Interface, resolution 5 µm
4 Alternative: Analog Interface, supply voltage 24 VDC ±20%

**Output signal Impulse Interface 1XX**
1 Standard: Start Stop Signal (P) (M)
2 Alternative: Measuring time / impulse range (L)

**Output signal Synchronous Serial Interface 2XX**
1 Standard: 24 Bit
2 Alternative: 25 Bit

**Output signal DyMoS® Interface 3XX**
1 Standard: Pos. 1 + Vel. 1
2 Alternative: Pos. 1 + Vel. 2
3 Optional: (Pos. 1 + Vel. 1) and (Pos 2 + Vel. 2) two channel

**Output signal Analog Interface 4XX**
1 Standard: Voltage output
2 Optional: Current output

**Impulse Interface Start Stop Signal 11X**
4 Standard: Variable for 1 to 3 PG

**Impulse Interface measuring time / impulse range 12X**
1 Standard

**Synchronous Serial Interface 2XX**
1 Standard: Binary Code, resolution 5 µm
2 Alternative: Gray Code, resolution 5 µm

**DyMoS® Interface 3XX**
1 Standard: Binary Code, resolution 5 µm

**Analog Interface voltage output 41X**
1 Standard: 0 VDC...10 VDC and 10 VDC...0 VDC
2 Alternative: 0 VDC...10 VDC (Pos. 1 + Pos. 2)
3 Optional: -10 VDC...+10 VDC, +10 VDC...-10 VDC

**Analog Interface current output 42X**
1 Standard: 0 mA...20 mA
2 Alternative: 20 mA...0 mA
3 Alternative: 4 mA...20 mA
4 Alternative: 20 mA...0 mA

**Electrical connection**
101 Alternative: 8 pin round connector IEC130-9
102 Standard: 8 pin round connector M 12x1
201 Alternative: NT standard cable 1 m
203 Optional: NT standard cable 3 m
205 Optional: NT standard cable 5 m

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

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

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**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 pos. marker on request

**Recommended accessories**
- Connector IEC 130-9, EEM 33-84, IP67, Art.No. 005627;
- Angled connector IEC 130-9, EEM 33-85, IP67, Art.No. 005628;
- Connector M12x1, 2 m cable, EEM 33-86, IP67, Art.No. 005629;
- Angled connector M12x1, 2m cable, EEM 33-87, IP67, Art.No. 005630;
- Connector with longer cable length on request

**Available on request**
- Standard cable, 10 m
- Specific connectors
- Other resolutions
- SSI 26 Bit, SSI two-channel
- Current output two-channel,
  Incremental interface,
  Field bus interface.

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