NOVOPAD Position Transducer up to 200 mm non-contacting Series LS1 with analog interface

Position transducer, based on our NOVOPAD non-contacting inductive measurement technology, provides direct, accurate measurement of travel for display or feedback applications.

The push rod is supported on both ends by metal glide bearings, allowing high lateral forces on the tip of the rod. The robust and compact housing design make the LS1 a reliable solution for the industrial environment.

A ball coupling enables a backlash and shear force free operation, even with perpendicular or angular misalignment between the transducer axis and the direction of movement.

The integrated signal processor with programmable end-points (Teach-in) function provides an absolute and proportional voltage or current output signal. The LS1 uses a non-contacting technology, and is maintenance and wear free. The transducers provide optimal reproducibility, resolution and linearity.

LS1 sensors can be exchanged without recalibration. Magnetic fields do not have any effect on the measurement signal.

**Special features**
- long life, up to 100 million movements, depending on application
- outstanding linearity ±0.15 %
- teach-in (min-max) via push-buttons with status LED
- standard voltage or current output signals
- insensitive to magnetic fields
- compact 18x18 mm profile
- double-sided support for push rod
- compatible to standard probe tips
- cable or connector version available

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Aluminium, anodized</td>
</tr>
<tr>
<td>Mounting</td>
<td>adjustable clamps</td>
</tr>
<tr>
<td>Actuating rod</td>
<td>stainless steel, AISI 303, external thread M5x0.5</td>
</tr>
<tr>
<td>Ball coupling</td>
<td>hardened ball with spring pressure on carbide plate</td>
</tr>
<tr>
<td>Bearings</td>
<td>both ends in metal-polymer glide bearings</td>
</tr>
<tr>
<td>Measurement principle</td>
<td>NOVOPAD inductive</td>
</tr>
<tr>
<td>Electrical connections</td>
<td>3-pin round connector, shielded, M8 x 1 3-wire PVC-cable, 3x 0.14 mm², shielded 2 m length</td>
</tr>
<tr>
<td>Electronic</td>
<td>SMD with ASIC, integrated</td>
</tr>
</tbody>
</table>
Rising characteristics

Mechanical stroke (dimension B)

Electr. measuring range

3.5 ±0.5 Electr. zero point

3.5 ±0.5

Signal

min.

max.

Rod fully extended

1.6

Anzudrehmoment tightening torque

max. 140 Ncm

Kugelkupplung ball coupling

M5x0.5

28.8 +0.3

40

DIN EN ISO 1207
M4x10

A

8

22

15

22

Z-45

10

7

M5x0.5

28.8 +0.3

40

Kabel 3 m lang
cable 2m long

22

10

45

2.4

2.4

18

18

2

2

Z-45

Kugelkupplung ball coupling

SW-10

max. 4

max. 4

max. 4

max. 4

max. 4

max. 4

max. 4

max. 4

max. 4

max. 4

max. 4
<table>
<thead>
<tr>
<th>Type designations</th>
<th>LS1</th>
<th>LS1</th>
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<tbody>
<tr>
<td></td>
<td>0025</td>
<td>0050</td>
<td>0075</td>
<td>0100</td>
<td>0150</td>
<td>0200</td>
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<tr>
<td><strong>Electrical Data</strong></td>
<td></td>
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<tr>
<td>Electrical measuring range</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>150</td>
<td>200 mm</td>
</tr>
<tr>
<td>Absolute linearity</td>
<td>&lt; ± 0.1</td>
<td>&lt; ± 0.15</td>
<td>% FS</td>
<td></td>
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<tr>
<td>Tolerance of electrical zero point</td>
<td>± 0.5 mm</td>
<td></td>
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<tr>
<td>Output signal voltage or current</td>
<td>0.1 ... 10 VDC (load 470 kΩ) allowed load &gt; 10 kΩ</td>
<td>10 ... 0.1 VDC (load 470 kΩ) allowed load &gt; 10 kΩ</td>
<td>4 ... 20 mA (load &lt; 500 Ω)</td>
<td>20 ... 4 mA (load &lt; 500 Ω)</td>
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<tr>
<td>Internal resistance of voltage output</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Output, short-circuit-proof</td>
<td>against supply max. ... 30 VDC and GND (permanent)</td>
<td></td>
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<tr>
<td>Repeatability</td>
<td>high speed mode &lt; 10 mV, typical &lt; 3 mV</td>
<td>low speed mode &lt; 5 mV, typical &lt; 2 mV</td>
<td>high speed mode &lt; 16 μA, typical &lt; 5 μA</td>
<td>low speed mode &lt; 8 μA, typical &lt; 3 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>16 ... 30 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage ripple</td>
<td>max. 10 % FS</td>
<td></td>
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</tr>
<tr>
<td>Power consumption without load</td>
<td>&lt; 1 W</td>
<td></td>
<td></td>
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<tr>
<td>Temperature coefficient</td>
<td>± 50 ppm/K</td>
<td></td>
<td></td>
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<tr>
<td>Overvoltage protection</td>
<td>&lt; 40 VDC (permanent)</td>
<td></td>
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<tr>
<td>Polarity protection</td>
<td>up to Umax VDC</td>
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<tr>
<td>Insulation resistance (500 VDC)</td>
<td>≥ 10 MΩ</td>
<td></td>
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<tr>
<td><strong>Mechanical Data</strong></td>
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<tr>
<td>Body length (dimension A)</td>
<td>63</td>
<td>88</td>
<td>113</td>
<td>138</td>
<td>188</td>
<td>238</td>
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<tr>
<td>Mechanical stroke (dimension B)</td>
<td>30</td>
<td>55</td>
<td>80</td>
<td>105</td>
<td>155</td>
<td>205</td>
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<tr>
<td>Weight approx. with cable</td>
<td>140</td>
<td>160</td>
<td>170</td>
<td>190</td>
<td>220</td>
<td>260 g</td>
</tr>
<tr>
<td>with connector</td>
<td>86</td>
<td>107</td>
<td>132</td>
<td>150</td>
<td>190</td>
<td>230 g</td>
</tr>
<tr>
<td>Operating force (horizontal)</td>
<td>≤ 0.3 N</td>
<td></td>
<td></td>
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<tr>
<td>Mobility of ball coupling</td>
<td>± 1 mm parallel offset, ± 2.5° angular offset</td>
<td></td>
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<tr>
<td>Maximum permitted tightening torque for mounting screws</td>
<td>140 Ncm</td>
<td></td>
<td></td>
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<tr>
<td><strong>Environmental Data</strong></td>
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<tr>
<td>Operating temperature range</td>
<td>-40 ... +45 with connector °C</td>
<td>-30 ... +100 with cable °C</td>
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<tr>
<td>Operating humidity range</td>
<td>0 ... 95 (no condensation) % RH</td>
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<tr>
<td>Shock IEC 60068-2-27</td>
<td>100 (11 ms) (single event) g</td>
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<tr>
<td>Vibration IEC 60669-2-6</td>
<td>20 (10 ... 2000 Hz, Amax = 0.75 mm) g</td>
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<td>Protection class DIN EN 60529</td>
<td>IP 40</td>
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<tr>
<td>Operating velocity maximum</td>
<td>5 m/s</td>
<td></td>
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<tr>
<td>Operating acceleration maximum</td>
<td>5 g</td>
<td></td>
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<tr>
<td>Life</td>
<td>&gt; 100x10⁶ movements</td>
<td></td>
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<tr>
<td>MTF (IEC 60050)</td>
<td>81 years</td>
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<tr>
<td><strong>Functional Safety</strong></td>
<td>If you need assistance in using our products in safety-related systems, please contact us</td>
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<td><strong>EMC-Conformity</strong></td>
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<tr>
<td>Emission</td>
<td>RF noise field strength EN 55011, class B</td>
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<tr>
<td>Noise immunity</td>
<td>ESD EN 61000-4-2</td>
<td>Radiated immunity EN 61000-4-3</td>
<td>Burst EN 61000-4-4</td>
<td>Conducted disturbances induced by RF fields EN 61000-4-6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FS = Full scale: Signal span according to electrical measuring range
### Electrical Interface

#### Analog Interface

1. **Connector**
   - M8x1, 3-pin, axial outlet
   - Cable, 3-pole, L = 2 m, axial outlet

2. **Analog Interface voltage output**
   - 41:
     - 1: 0.1 VDC ... 10 VDC (high speed mode)
     - 2: 10 VDC ... 0.1 VDC (high speed mode)
     - 3: 0.1 VDC ... 10 VDC (low speed mode)
     - 4: 10 VDC ... 0.1 VDC (low speed mode)

3. **Output signal analog Interface**
   - 1: Voltage output
   - 2: Current output

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### Mechanical version

#### Position transducer with one-side actuating rod

- Various standard lengths
  - from 0025 mm up to 0200 mm

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### Ordering specifications

#### Series

- LS1 - 0200 - 001 - 411 - 101

#### Mechanical version

- Position transducer with one-side actuating rod

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### Included in delivery

2 mounting clamps Z-45 incl.
4 cylinder screws M4x10,
1 ball coupling.

### Optional accessories

4 mounting clamps Z3-31 incl.
4 cylinder screws M4 x 10,
P/N 059010:
- PUR-cable with 3-pin female connector, M8 x 1,
  - 3 x 0.25 mm², shielded:
    - 2 m length, EEM 33-56,
    - 5 m length, EEM 33-58,
    - 10 m length, EEM 33-60;
- PUR-cable with 3-pin female angled connector, M8 x 1,
  - 3 x 0.25 mm², shielded:
    - 2 m length, EEM 33-57,
    - 5 m length, EEM 33-59,
    - 10 m length, EEM 33-61.

### On request available

Customized length and electrical connection e.g.
- cable with connector.

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### Output connector

- Code 101
- Connector with cable
  - EM 33-56 /-57 /-58 /-59 /-60 /-61

### Signal

<table>
<thead>
<tr>
<th>Pin 1</th>
<th>Pin 4</th>
<th>Pin 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>GN</td>
<td>WH</td>
<td>BN</td>
</tr>
<tr>
<td>BN</td>
<td>BK</td>
<td>BU</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>Output signal</td>
<td>GND</td>
</tr>
</tbody>
</table>

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Subject to changes.

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