Position transducer with return spring, 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.

The design of the rear end stop nut on the push rod simplifies the connection of actuators like pneumatic cylinders and solenoids.

NOVOPAD
Position Transducer with return spring up to 100 mm non-contacting
Series LS1 with analog interface

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

NOVOPAD Position Transducer with return spring up to 100 mm non-contacting Series LS1 with analog interface

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.

<table>
<thead>
<tr>
<th>Description</th>
<th></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, with anti-rotation safeguard, internal thread M2.5x6</td>
</tr>
<tr>
<td>Probe tip</td>
<td>stainless steel with external thread M2.5 and pressed-in hardened metal ball</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</td>
</tr>
<tr>
<td></td>
<td>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

Stroke [mm]

Signal

Mechanical stroke (dimension B)

Min.

Max.

Rod fully extended

± 0.5 Electr. zero point

SW-10

Kabel 2 m lang
cable 2m long

bei Endposition
at end position

DIN EN ISO 1207
M4x16
Anzehrdrehmoment
tightening torque
max. 140 Ncm

bei Endposition
at end position

DIN EN ISO 1207
M4x16
Anzehrdrehmoment
tightening torque
max. 140 Ncm
### Type designations

<table>
<thead>
<tr>
<th></th>
<th>LS1</th>
<th>LS1</th>
<th>LS1</th>
<th>LS1</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0025</td>
<td>0050</td>
<td>0075</td>
<td>0100</td>
</tr>
</tbody>
</table>

### Electrical Data

#### Electrical measuring range
- LS1: 25, 50, 75, 100 mm

#### Absolute linearity
- < ±0.1 % FS

#### Tolerance of electrical zero point
- ±0.5 mm

#### Output signal or current
- 0.1 ... 10 VDC (load > 470 kΩ) allowed load > 10 kΩ
- 10 ... 0.1 VDC (load > 470 kΩ) allowed load > 10 kΩ
- 4 ... 20 mA (load < 500 Ω)
- 20 ... 4 mA (load < 500 Ω)

#### Internal resistance of voltage output
- 120 Ω

#### Output, short-circuit-proof against supply max. ± 20 VDC and GND (permanent)

#### Update Rate
- High speed mode > 950; low speed mode > 50 Hz

#### Repeatability
- High speed mode < 10 mV, typical < 3 mV
- Low speed mode < 5 mV, typical < 2 mV
- High speed mode < 16 μA, typical < 5 μA
- Low speed mode < 8 μA, typical < 3 μA

#### Supply voltage
- 16 ... 30 VDC

#### Supply voltage ripple
- max. 10 % Vss

#### Power consumption without load
- < 1 W

#### Temperature coefficient
- ± 50 ppm/K

#### Overvoltage protection
- < 40 (permanent) VDC

#### Polarity protection
- up to Umax VDC

#### Insulation resistance (500 VDC)
- ± 10 MΩ

### Mechanical Data

#### Body length (dimension A)
- 63, 94.4, 134.4, 166 ±1 mm

#### Mechanical stroke (dimension B)
- 30, 55, 80, 105 ±1.5 mm

#### Weight approx.
- with cable: 120, 150, 180, 200 g
- with connector: 86, 107, 132, 150 g

#### Operating force (horizontal)
- ≤ 2.5 N

#### Operating force retracted (horizontal)
- ≤ 5.0 N

#### Operating force to end stop
- max. 8 N

#### Operating frequency max.
- 18, 14, 11, 10 Hz

#### Maximum permitted tightening torque for mounting screws
- 140 Ncm

### Environmental Data

#### Operating temperature range
- -40 ... +85 with connector
- -30 ... +100 with cable °C

#### Operating humidity range
- 0 ... 95 % (no condensation) % RH

#### Shock (IEC 60068-2-27)
- 102 (11 ms, single event) g

#### Vibration (IEC 60068-2-6)
- 20 (10 ... 2000 Hz, Amax < 0.75 mm) g

#### Protection class DIN EN 60529
- IP40

#### Operating velocity maximum
- 5 m/s

#### Operating acceleration maximum
- 5 g

#### Life
- > 100 x 10^6 movements

#### MTTF (IEC 60050)
- 81 years

### Functional safety

If you need assistance in using our products in safety-related systems, please contact us.

### EMC-Conformity

- Emission
  - RF noise field strength EN 55011, class B

- 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

FS = Full scale: Signal span according to electrical measuring range
Ordering specifications

Preferred types printed in bold

Output connector

<table>
<thead>
<tr>
<th>Code</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Pin 1: GN</td>
</tr>
<tr>
<td></td>
<td>Pin 4: WH</td>
</tr>
<tr>
<td></td>
<td>Pin 3: BN</td>
</tr>
</tbody>
</table>

Cable

<table>
<thead>
<tr>
<th>Code</th>
<th>Pin 2</th>
<th>Pin 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>202</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connector with cable

- EEM 33-56 /-57 /-58 /-59 /-60 /-61

Series

- Various standard lengths from 0025 mm up to 0100 mm

Electrical Interface

4: Analog interface

Output signal analog Interface 4:

1: Voltage output
2: Current output

Analogue 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)

Analogue Interface voltage output 42:

1: 4 ... 20 mA (high speed mode)
2: 20 ... 4 mA (high speed mode)
3: 4 ... 20 mA (low speed mode)
4: 20 ... 4 mA (low speed mode)

Optional accessories

- 4 mounting clamps Z3-31 incl.
- 4 cylinder screws M4 x 10,
- 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;
- roller head Z-R50.

On request available

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