MAGNOSENS
Magnetostrictive Displacement Transducers
Model series MPL: Analogue output or start/stop

- Measuring strokes from 50 to 2500 mm (analog.) respectively 3000 mm (start/stop)
- Contactless, robust system
- Infinite resolution
- Unique reproducibility

Structure and operation
The displacement transducers operate according to the principle of run time measurement between two points of a magnetostrictive waveguide. One point is determined by a moveable position magnet, whose distance from the null point corresponds to the section to be measured. The run time of an emitted impulse is directly proportionate to this section. Conversion to an analogue measuring signal takes place in the downstream electronics.

Standard measuring strokes:
(Other measuring strokes on request)
- ≤ 500 mm in 50 mm steps
- > 500 - ≤ 2500 mm in 50 mm steps
- > 2500 mm in 50 mm steps
  (only for output start/stop)

Standard designs

<table>
<thead>
<tr>
<th>Output signal</th>
<th>Mean at</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 20 mA / 20 - 4 mA</td>
<td>12 mA</td>
</tr>
<tr>
<td>0 - 10 V / 10 - 0 V</td>
<td>5 V</td>
</tr>
<tr>
<td>Start / stop</td>
<td></td>
</tr>
</tbody>
</table>

The direction of the measurement signal must be specified on ordering. Subsequent changes to the direction of the measurement signal and setting the starting and end points are not possible.

Technical data
- Operating voltage range $V_S$: 24 VDC (+20% / -15%) (protection against reverse polarity)
- Operating current $I_S$: 50 - 140 mA (depending on length and output)
- Linearity: < 0.02% (minimum 60 μm)
- Repeatability: < 0.001% (minimum 2.5 μm)

- Measurement signals 4 ... 20 mA, 0 ... 10 V or start/stop signal
- Protection type IP 67
- Operating temperature range -40 °C ... +75 °C

The waveguide is housed in an extruded aluminium profile. The electronics is housed in a die-cast aluminium sensor head. Electrical connection is implemented via a circular connector.

The position magnet is located either in a slider, which is linked to the moving part of the machine via a ball joint, or it moves as a liftable position magnet, without wear, over the profile.

- Hysteresis: < 4 μm
- Measuring frequency: Analogue: < 3 kHz, digital: depending on evaluation electronics
- Temperature drift: < 40 ppm / °C
- Op. temperature range: - 40 °C to + 75 °C
- Shock test: 100 g to IEC Standard 68-2-27
- Vibration test: 15 g / 10 to 2000 Hz to IEC Standard 68-2-6
- Protection type: IP 67 (with proper installed connector)

- Current output:
  - Output signal: 4...20 mA / 20...4 mA
  - Apparent ohmic resistance: 0 - 500 Ω

- Voltage output:
  - Output signal: 0...10 VDC / 10...0 VDC
  - Permissible load: ≥ 5 Ω

- Start/stop output:
  - RS422 differential signal

- Mating connector:
  - Housing: Metal (straight or angled 90°)
  - Contacts: Socket, gold plated
  - Cable diameter: 6 -8 mm
  - Wire connection: Screws
  - Cable cross-section: max. 0.75 mm²
Purchase order codes

- Displacement transducer
  MPL 1 / 1000 S B M 01

Electrical and mechanical variants (assigned by TWK)
- 01 = standard
- Connection
  M = connector M12
- Output signals:
  B = 4 - 20 mA
  C = 0 - 10 VDC *
  D = start/stop
- Signal curve: *
  S = Positively ascending on movement from the flange towards rod end
  N = Descending on movement from the flange towards rod end
- Measuring stroke in mm
- Position sender:
  1 = Position slider, central ball joint
  2 = Position slider, lateral ball joint
  3 = Liftable position magnet
- Model

* Output signal C always supplies 0-10 V and 10-0 V. Please specify signal curve „S“ on ordering. (Pin assignment, see below)

Scope of delivery:
Displacement sensor with position magnet or position slider and 2 mounting feet up to a measuring length of 1250 mm. 1 additional mounting foot every 500 mm.

Accessories: (Please order separately)
- Position magnets
  - PS01 Position slider, central ball joint
  - PS02 Position slider, ball joint at side
  - PR03 Liftable position magnet
- Mounting connector
  - Analogue: STK5 GS 56 (straight)
    STK5 WS 58 (angled 90°)
  - Start / Stop: STK8 GS 54 (straight)
    STK8 WS 86 (angled 90°)
- Mounting foot
  - MB-MPX
- Adapter cable
  - M12 to M16 KABEL-0,3-162

Electrical connections

- Analogue output
  - connection side of connector

<table>
<thead>
<tr>
<th>pin</th>
<th>voltage / current</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+ 24 VDC</td>
</tr>
<tr>
<td>2</td>
<td>signal</td>
</tr>
<tr>
<td>3</td>
<td>GND (PWR)</td>
</tr>
<tr>
<td>4</td>
<td>2. signal</td>
</tr>
<tr>
<td>5</td>
<td>GND (Signal)</td>
</tr>
</tbody>
</table>

- Start/stop output
  - connection side of connector

<table>
<thead>
<tr>
<th>pin</th>
<th>start / stop</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>start +</td>
<td>5</td>
<td>n.c.</td>
</tr>
<tr>
<td>2</td>
<td>start -</td>
<td>6</td>
<td>n.c.</td>
</tr>
<tr>
<td>3</td>
<td>stop +</td>
<td>7</td>
<td>+ 24 DC</td>
</tr>
<tr>
<td>4</td>
<td>stop -</td>
<td>8</td>
<td>GND</td>
</tr>
</tbody>
</table>

Notes: On installation of the MAGNOSENS, careful shielding from magnetic and electromagnetic fields must be ensured. The cable shield must be mounted on the connector and connected to ground at the evaluation electronics. Wherever possible, use non-magnetisable material to fasten the liftable position magnet. If magnetisable material is used, the position magnet must be mounted via a non-magnetisable spacer washer with a minimum thickness of 5 mm using non-magnetisable bolts.

Attention!
The EP sensor is now fixed isolated from machine ground. It is now necessary that the sensor housing is grounded with the flat pin terminal of the sensor head.

Further documentation:

- On www.twk.de:
  - MWA 10318 installation instructions
  - Available position magnets MXX 11469
MPL magnetostrictive displacement transducers

**Sensor head**

**Installation zone**

**Active measuring range**

**Damping zone**

**Mounting foot**

**Measuring rod**

Vertically: 18°

Horizontally: 360°

Measuring length

50-2500 mm (analogue)

50-3000 mm (Start/Stop)

Mating connector (straight)

Mating connector (angled 90°)

Dimensions in mm

Central ball joint

Lateral ball joint

Liftable portion magnet:

Hole-ø 5.5 mm

12°

2x ø 4 mm

13.8

26.5

14°

25.5

ø 33

PS01

PS02

PR03

MPL1

MPL2

MPL3

PS01

PS02

PR03

MPL1

MPL2

MPL3

M5

M5

M5