Linear Encoders
Overview
Functional description

The magnetostrictive linear encoders of TR capture linear movements and convert them into electrical output signals. This measuring principle is based on a travel time delay measurement. Current pulses are sent through a magnetostrictive wire, positioned inside a protective tube, creating a ring-shaped magnetic field around the wire. A non-contact permanent magnet serves as a position sensor, touching the waveguide with its magnetic field. The magnetic field created by the current pulses generates a magnetostriction at the point of measurement due to the two differently aligned magnetic fields. The resulting torsion pulse spreads out from the position sensor with constant ultrasonic speed, moving along the waveguide in both directions. The time difference between the transmission of the torsion pulse and its arrival at the sensing element at the detector head is converted electronically into a distance proportional signal, which is provided either as a digital or analog output signal.
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Magnetostriction – LMC55

Linear encoder with magnetostriction - how to find the perfect fit

The right type for your application

Linear absolute position measurement systems (magnetostriction) measure linear movements without tear or wear, even in aggressive media.

Direct integration into hydraulic cylinders by using pressure proof tube housings made from stainless steel.

For use in chemical aggressive surroundings or for liquid level measurement in food and beverage or galvanic industry, you find linear encoders in housings made of polypropylene. Linear encoders in profile housing can be easily mounted to machines and appliances. We have available versions with guided magnet and those with flat housing without guiding track. All systems are capable for detection of multiple magnets. That means that position of several magnets can be detected with one single measurement device.

Cascadeable linear-absolute position sensors in profile housing measure strokes of up to 20 m. They are used e.g. in roller cutters or as wear free vertical axis in automated storage systems.

Power that fulfils your needs

Different basic detection units fulfil efficiently various requirements on resolution and precision.

Industrial

Resolution 1 µ
Stroke up to 4000 mm
Direct interfaces, Fieldbus and Industrial Ethernet

Standard

Resolution 0,01 mm
Stroke up to 3.000 mm
Direct interfaces (SSI, Analog), CAN

Basic

Resolution 0,1 mm
Stroke up to 2.500 mm
Direct interfaces
What sounds like a child’s naive wish is a clear demand for automated solutions where the technical facilities are extremely difficult to access. Applications in power plant technology and in locks and weirs “sink” the technology into machine rooms below the waterline. They are therefore difficult to access. Even the long service life that has been established in this industry is not long enough for system lifecycles that last several years without requiring maintenance. TR-Electronic has developed the LMR 70 for these applications. The linear-absolute position measuring system works just like its simpler colleagues, touch-free and low on wear and tear with magnetostriction. It has been designed for direct installation in hydraulic cylinders - the stainless steel pipe withstands constant pressures of up to 400 bar and pressure peaks of 600 bar.

The diameter of the pipe and the available flange threads are compatible with the standard. It is the larger evaluation unit with a diameter of 70 mm that reveals what is special about this system: there are 3 sensor elements working at the same time within a single system. Each has its own connection for supply voltage and signal output from the power supply via the sensor wire and receiving coil to the output driver - everything is installed three times. Each of the three systems works alone. If more than one are active at the same time they synchronize - the magnetic field builds up at the same time so that the systems do not interfere with each other. Each user decides for himself whether to operate the measuring systems on their own or to increase reliability with triangulation or a “2 from 3” evaluation. The measuring values are output via the tried and trusted robust analog interface; transmission as a 4 … 20 mA current is advantageous for extended systems. The LMR 70 measuring systems measure up to 2 m. The analog interface resolves 12 or 16 bits. The internal reproducibility is 5 µm.
Measure reliably over long distances

Wire-actuated encoders are subject to wear, and laser measuring systems cannot acquire several positions simultaneously in the same clear width. Magnetic tapes are susceptible to ferromagnetic chips, position marks read optically with readers can become soiled, magnetostrictive measuring systems are limited in their measuring length, and glass scales are unaffordable with increasing measurement lengths.

With LMC55 we have closed this gap: up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require power supply. The measuring system is only assembled to the full measuring length in the machine, and the individual parts are convenient (with a length of 2 m) to transport and store. The final measuring length is defined in situ by connecting the intermediate elements together to the desired overall length. Up to 20 m absolute position detection is supplied as standard (special lengths on request).

The flat housing of the actual measuring system can be installed flush with the floor. As it has no beads, product residues cannot stick to it. The actual positions are output to the control via PROFIbus, EtherCAT or CANopen. Quick activation is ensured with a little technical skill and standard tools. Other interfaces are available on request.
Features

- 5/100 mm precise, absolute, contact-free position measurement
- Short cycle time: 10 m ~ 4 ms
- Multiple measurement of up to 30 positions simultaneously
- Reliable, tight system with protection class IP65
- Can be installed in any position (automatic addressing)
- Device foot for mounting using holes or clamping shoes

Advantages

- Wear-free measurement up to 20 m
- Compact, convenient pieces made from die-cast aluminum
- Closed housing, flat surface
- Flush (no beads or edges)
- Easy installation possible without special tools
- Magnets do not require any supply leads / ground cables

Fields of application

- Pneumatic workstations
- Reel cutter
- Event technology
- Transfer vehicles

Reliably tight – easy installation

- Flat surface without beads or edges, plane joint
- Features stable extruded aluminium profile
- Device foot for mounting using existing holes or clamping shoes
Explanation of the individual modules – LMC55

Explanation of the individual modules

**Master**
This contains the intelligence of the measuring system, manages the individual modules and offers connection options for the respective output interface.
Connection options: Slave type 1, or end element type 1.

**Slave type 1**
This is suitable for connection to a master system, or forms the intermediate element in conjunction with two type 2 slaves.

**Slave type 2**
This forms the intermediate element in conjunction with two type 1 slaves.

**End element type 1**
This is suitable for connection to a master system, or forms the end element in conjunction with a type 2 slave.

**End element type 2**
The type 2 end component forms the end element in conjunction with a type 1 slave.

Correct configuration before measurement

Before the measuring system can be operated, e.g. on PROFIBUS, the mechanically installed individual components, the so-called slaves, must first be detected using the teach-in function.
The slaves are mounted side by side to form transition areas, which form the basis for the detection. Each slave has two transition areas, one at the beginning and one at the end. An exception is formed by the slave after the master and the end elements (only one transition area).
At the time of teaching only one magnet may be located in the same transition area. The teaching procedure is performed starting from the master towards the end. The teaching activity or end of the teaching process can be monitored via the status byte. The exact teaching status is indicated by the device-specific diagnosis.

![Diagram showing the correct configuration before measurement with joint areas, gasket, and end elements](image-url)
Explanation of the individual modules
Linear Encoder - Magnetostriction - Tube Housing

The universal standard for absolute position detection.

Linear absolute encoders for touchless measurement (based on magnetostriction) sense linear absolute movements without wear or tear, even in aggressive media. Pressure-proof protection tubes made from stainless steel allow direct integration into hydraulic cylinders. For easy exchange of the sensing element, choose the version “H” with detached protective tube - the tube remains in the cylinder, the system stays pressurized. Depending on the interface, multiple detection is possible. Depending on mechanical design, the measurement systems are fully integrated into hydraulic cylinders or are accessible from the outside. Linear encoders are available with a large number of interfaces beginning with direct analogue output up to high speed industrial ethernet. A special device is the triple-redundant LMR70 - three independent measurement systems in one tube guarantee longterm availability for applications with difficult access.

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## LMRI46  
### Mechanic execution  
(R) Tube, (H) detachable tube  
### Range  
50...4000 mm*, in steps  
### Size  
46  
### Supply voltage  
24 VDC, -20...+10 %*  
### Resolution  
0,001 mm  
### Linearity defect  
Typical ± 30 µm  
± 0,015 % FS (min ± 50 µm)  
± 0,04 % + 1 LSB  
### Reproducibility  
0,005 mm  
### Hystheresis  
Typical < 10 µm  
≤ ± 0,005 % FS (min ± 10 µm)  
### Temperature coefficient  
Ambient temperature  
-20...+70 °C; 0...+70 °C  
### Protection class  
IP65  
### Options  
Multimagnet*, tube tip support  
### Orientation  
Any desired  
### Material  
Cr/Ni-Alloy  
### Maximum pressure  
600 bar, static  
### Interface  
SSI, Analog, EtherCAT, CANopen  
### Weblink  
www.tr-electronic.com/s/501361  
### QR-Code  
![QR-Code](image1)  

## LMRS34  
### Mechanic execution  
(R) Tube  
### Range  
50...3000 mm, in steps  
### Size  
34  
### Supply voltage  
24 VDC, -20...+10 %*  
### Resolution  
0,01 mm  
### Linearity defect  
Typical < 10 µm  
0,1mm 1000 mm-1500 mm  
0,15 mm > 1500 mm  
≤ ± 0,015 % FS (min ± 50 µm)  
± 0,04 % + 1 LSB  
### Reproducibility  
0,005 mm  
### Hystheresis  
Typical < 10 µm  
≤ ± 0,005 % FS (min ± 10 µm)  
### Temperature coefficient  
Ambient temperature  
-40...+80 °C  
### Protection class  
IP67  
### Options  
Multimagnet*, tube tip support  
### Orientation  
Any desired  
### Material  
Cr/Ni-Alloy  
### Maximum pressure  
400 bar static, 450 bar peak  
### Interface  
SSI, Analog, EtherCAT, CANopen  
### Weblink  
www.tr-electronic.com/s/5018151  
### QR-Code  
![QR-Code](image2)  

## LMR48  
### Mechanic execution  
(R) Tube  
### Range  
50...2500 mm*, in steps  
### Size  
48  
### Supply voltage  
12...24 VDC, ± 10%  
### Resolution  
0,05 mm  
### Linearity defect  
Typical ± 0,1 mm  
0,1mm 1000 mm-1500 mm  
0,15 mm > 1500 mm  
≤ ± 0,015 % FS (min ± 50 µm)  
± 0,04 % + 1 LSB  
### Reproducibility  
0,005 mm  
### Hystheresis  
Typical < 10 µm  
≤ ± 0,005 % FS (min ± 10 µm)  
### Temperature coefficient  
Ambient temperature  
-40...+85 °C  
### Protection class  
IP65, option IP69K  
### Options  
Multimagnet*, tube tip support  
### Orientation  
Any desired  
### Material  
Cr/Ni-Alloy  
### Maximum pressure  
450 bar, static  
### Interface  
SSI, Analog, EtherCAT, CANopen  
### Weblink  
www.tr-electronic.com/s/5007102  
### QR-Code  
![QR-Code](image3)  

*depends on interface
## Linear Encoder - Magnetostriction - Tube Housing

### LMR48/46
### LMR27
### LMR27 Analog

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<th>LMR48/46</th>
<th>LMR27</th>
<th>LMR27 Analog 12 bit</th>
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<th>(R) Tube</th>
<th>(R) Tube</th>
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<td>50...2500 mm, in steps</td>
<td>50...2000 mm, in steps</td>
<td>50...2000 mm, in steps</td>
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<tr>
<td>Size</td>
<td>48</td>
<td>27</td>
<td>27</td>
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<tr>
<td>Supply voltage</td>
<td>12...24 VDC, ±10%</td>
<td>24 VDC, -20%+10%</td>
<td>24 VDC, -20%+10%</td>
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<td>12 bit (&gt; 0,1 mm)</td>
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<td>Linearity defect</td>
<td>± 0,04 % + 1 LSB</td>
<td>± 0,20 mm (ML &lt;= 2000 mm)</td>
<td>± 0,20 mm (ML &lt;= 2000 mm)</td>
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<tr>
<td>Reproducibility</td>
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<td>0,1 mm</td>
<td>0,1 mm</td>
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<td>Hystheresis</td>
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<td>0,1 mm (ML &lt;= 2000 mm)</td>
<td>0,1 mm (ML &lt;= 2000 mm)</td>
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<td>Temperature coefficient</td>
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<tr>
<td>Ambient temperature</td>
<td>-40...+85 °C</td>
<td>-20...+70 °C; 0...+70 °C</td>
<td>-20...+70 °C; 0...+70 °C</td>
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<td>Protection class</td>
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<td>IP65</td>
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<td>Options</td>
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<td>Any desired</td>
<td>Any desired</td>
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<td>Material</td>
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<td>Cr/Ni-Alloy</td>
<td>Cr/Ni-Alloy</td>
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<tr>
<td>Maximum pressure</td>
<td>450 bar, static</td>
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| QR-Code             | ![Image](https://example.com/image7.png) | ![Image](https://example.com/image8.png) | ![Image](https://example.com/image9.png) |

* depends on interface
LMR70

(R) Tube
50…2000 mm
70 (triple redundant)
24 VDC, -20…+20 %
12 bit or 16 bit
± 0,10 mm <= 1500 mm
± 0,15 mm > 1500 mm

0,04mm
0,02 mm <= 1500 mm
0,1 mm > 1500 mm

-40…+85 °C
IP65
Tube tip support
Any desired
Cr/Ni-Alloy
600 bar, static

Analog

www.tr-electronic.com/s/S008380
## Suggested Products

<table>
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<th>Ordering code</th>
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<th>Tube length</th>
<th>Resolution</th>
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<td><strong>LMRI46 Analog</strong></td>
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<tr>
<td>339-00009</td>
<td>LMRI_46*250 ANA_U+JUSTAGE</td>
<td>Voltage, 16 bit, cable gland, 2 m, open end</td>
<td>250,00 mm</td>
<td>340,00 mm</td>
<td>16 Bit;</td>
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<tr>
<td>339-00057</td>
<td>LMRI_46*480 ANA_I+JUSTAGE</td>
<td>Current, 16 bit, cable gland, 2 m, open end</td>
<td>480,00 mm</td>
<td>570,00 mm</td>
<td>16 Bit;</td>
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<tr>
<td>339-00062</td>
<td>LMRI_46*200 ANA_I+JUSTAGE</td>
<td>Current, 16 bit, 8pin</td>
<td>200,00 mm</td>
<td>290,00 mm</td>
<td>16 Bit;</td>
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<td>290,00 mm</td>
<td>16 Bit;</td>
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<td>Current, 16 bit, multipin connector</td>
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<td>590,00 mm</td>
<td>16 Bit;</td>
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<td>339-00435</td>
<td>LMRI_46*677 ANA_I+JUSTAGE</td>
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<td>767,00 mm</td>
<td>16 Bit;</td>
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<td>323,00 mm</td>
<td>413,00 mm</td>
<td>16 Bit;</td>
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<td><strong>LMRI46 EtherCAT</strong></td>
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<td>339-00041</td>
<td>LMRI_46*200 ETC</td>
<td>R 0,005 MM 2x4pinM12 1x4pinM8, 2 magnets</td>
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<td>LMRI_46*1950 ETC</td>
<td>R 0,005 MM 2x4pinM12 1x4pinM8, 2 magnets</td>
<td>1920,00 mm</td>
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<td>339-00061</td>
<td>LMRI_46*200 PB</td>
<td>R 0,001 MM 2x4pinM12 1x4pinM8</td>
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<td>1280,00 mm</td>
<td>1370,00 mm</td>
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<td>339-00034</td>
<td>LMRI_46*200 EPN</td>
<td>R 0,005 MM 2x4pinM12 1x4pinM8</td>
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<tr>
<td>339-00064</td>
<td>LMRI_46*300 EPN</td>
<td>R 0,005 MM 2x4pinM12 1x4pinM8</td>
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<td>339-00008</td>
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<td>550,00 mm</td>
<td>640,00 mm</td>
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For further product information simply enter the order number in the search field at www.tr-electronic.com.
Suggested Products

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<th>Resolution</th>
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<td>LMRI_46*495 SSI</td>
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LMR70 Analogue

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<td>335-00001</td>
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LMR27 Profibus

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<td>393,00 mm</td>
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For further product information simply enter the order number in the search field at www.tr-electronic.com.
Dimensional Drawings

Detachable tube (H) (option for LA46 / LMRI46)
Tube resides in cylinder, oil stays pressurized. Change in length, see following drawings

LA, LMRI 46 SSI

LA, LMRI 46 Analog

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
Dimensional Drawings

LA, LMRI 46 Profibus, CANopen
PB, CO

LA, LMRI 46 CAN DeviceNet
DN

LA, LMRI 46 EtherCAT, PROFINET IO
ETC, EPN

Magnets etc. see chapter - Accessories - Linear Encoders

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

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Dimensional Drawings

LA, LMRI 46 POWERLINK
EPL

LA, LMRI 46 EtherNet/IP
EIP

LA, LMRI 46 Sercos
ES3

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
Dimensional Drawings

LMR27
Sensorhead

LMR27
Interface Box

LMR27
Connections

Magnets etc. see chapter - Accessories - Linear Encoders

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
Dimensional Drawings

LA, LMRI 46 Flange type M18 x 1,5
O-Ring gasket in thread undercut

LA, LMRI 46 flange type M18 x 1,5 with groove (LA46/42)
O-Ring gasket in addl. groove

LA, LMRI 46 flange type 3/4' - 16UNF
O-Ring gasket in thread undercut

LA, LMRI 46 flange 3/4' - 16UNF with groove (LA46/42)
O-Ring gasket in addl. groove

LA, LMRI 46 flange type 3/4' - 16UNF with chamfer
Chamfer on flange

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
Dimensional Drawings

LMR 48 SSI, Analog, CAN
SSI, ANA, CAN

LMR 48/46 Analog
ANA

LMR 70 Analog, triple-redundant
For applications with difficult access

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
Linear Encoder - Magnetostriction - Profile Housing

The universal standard for absolute position detection.

Linear absolute encoders for touchless measurement (based on magnetostriction) sense linear absolute movements without wear or tear. Depending on the interface, multiple detection is possible. Families LP46 and LMP48 are suitable for magnet sliders and can guide the magnet. Family LMP30 is flat; magnets are to be guided by customer-side mechanics. Linear encoders are available with a large number of interfaces beginning with direct analogue output up to high speed industrial ethernet.

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### LMPI46
#### Product

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<thead>
<tr>
<th></th>
<th>LMPI46</th>
<th>LMP30</th>
<th>LMP48</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanic type</strong></td>
<td>(P) Profile</td>
<td>(P) Profile</td>
<td>(P) Profile</td>
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<tr>
<td><strong>Range</strong></td>
<td>50…4000 mm*, in steps</td>
<td>50…4000 mm*, in steps</td>
<td>30…3000 mm*, in steps</td>
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<tr>
<td><strong>Size</strong></td>
<td>46</td>
<td>30</td>
<td>48</td>
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<tr>
<td><strong>Supply voltage</strong></td>
<td>24 VDC, -20…+10 %*</td>
<td>24 VDC, -20…+10 %*</td>
<td>24 VDC ± 20%; 9…36 VDC *</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>0,001 mm</td>
<td>0,01 mm *</td>
<td>0,05 mm</td>
</tr>
</tbody>
</table>
| **Linearity defect** | typical ± 15 µm ≤ 1000 mm
0,1 mm 1000 mm-1500 mm
0,15 mm > 1500 mm | ± 0,15 mm ≤ 1500 mm
0,2 mm > 1500 mm | < 0,01 % FS, ≥ 60 µm
± 0,1 % FS * |
| **Reproducibility** | 0,005 mm | 0,005 mm * | < 0,005 % FS ≥ 50 µm
± 0,1 % FS * |
| **Hysteresis** | typical ± 6 µm
0,1 mm 1000 mm-1500 mm
0,15 mm > 1500 mm | 0,02 mm ≤ 1500 mm
0,1 mm > 1500 mm | ± 0,1 % FS * |
| **Temperature coefficient** | ≤ 8 µm/°C ≤ 500 mm
< 15 ppm/°C > 500 mm * | < 8 µm/°C ≤ 500 mm
< 15 ppm/°C > 500 mm * | 100 ppm/°C |
| **Ambient temperature** | -20…+70 °C; 0…+70 °C | -20…+70 °C; 0…+70 °C | -40…+75 °C; -20…+75 °C |
| **Protection class** | IP65 | IP65 | IP67 |
| **Options** | Multimagnet*, ATEX-zone 2/22, | Multimagnet* | |
| **Orientation** | Any desired | Any desired | Any desired |
| **Material** | Aluminum extruded profile | Aluminum extruded profile | Aluminum extruded profile |
| **Interface** | SSI Analog, EtherCAT, CANopen | SSI Analog, EtherCAT, CANopen | SSI Analog, CANopen |
| **QR-Code** | ![QR-Code LMPI46](image1)
![QR-Code LMP30](image2)
![QR-Code LMP48](image3) |

*depends on interface

Can’t find the right variant? Please contact us (info@tr-electronic.de)
Suggested Products

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Name</th>
<th>Remark</th>
<th>Measurement length</th>
<th>Tube length</th>
<th>Resolution</th>
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<tbody>
<tr>
<td>Linear encoder profile housing SSI LMP30 SSI</td>
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<tr>
<td>322-00112</td>
<td>LMP_30*150 SSI</td>
<td>0,5 m cable, M23 12 pin, including mating plug</td>
<td>150,00 mm</td>
<td>290,00 mm</td>
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<td>1.140,00 mm</td>
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<td>621,00 mm</td>
<td>0,005 mm</td>
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For further product information simply enter the order number in the search field at www.tr-electronic.com.
## Suggested Products

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<th>Measurement length</th>
<th>Tube length</th>
<th>Resolution</th>
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<td>1.121,00 mm</td>
<td>0,005 mm</td>
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<td><strong>Linear encoder profile housing SSI LMP48 SSI</strong></td>
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<td>333-00003</td>
<td>LMP_48*750 SSI</td>
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<td>839,00 mm</td>
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<td>333-00121</td>
<td>LMP_48*900 SSI</td>
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<td>989,00 mm</td>
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<td>333-00102</td>
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<td>999,00 mm</td>
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<td>1.089,00 mm</td>
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<td>1.100,00 mm</td>
<td>1.189,00 mm</td>
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<tr>
<td>333-00113</td>
<td>LMP_48*1600 SSI</td>
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<td>1.689,00 mm</td>
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<td>333-00101</td>
<td>LMP_48*1900 SSI</td>
<td>1x M12, 8 pin</td>
<td>1.900,00 mm</td>
<td>1.989,00 mm</td>
<td>0,01 mm</td>
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</table>

For further product information simply enter the order number in the search field at www.tr-electronic.com.
## Suggested Products

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<th>Measurement length</th>
<th>Tube length</th>
<th>Resolution</th>
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<td>333-00001</td>
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<td>1,600,00 mm</td>
<td>1,689,00 mm</td>
<td>0,05 mm</td>
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</tbody>
</table>

For further product information simply enter the order number in the search field at www.tr-electronic.com.
Dimensional Drawings

LMPI 46 SSI
SSI

LP46 SSI ATEX
SSI

LMPI 46 Analog
ANA

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

www.tr-electronic.com
Dimensional Drawings

LMPI 46 Profibus, CANopen
PB, CO

LMPI 46 CAN DeviceNet
DN

LMPI 46 EtherCAT, PROFINET IO
ETC, EPN

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
Dimensional Drawings

LMPI 46 EtherNet/IP, POWERLINK
EIP, EPL

LMPI 46 Sercos
ES3

LMP30 SSI, Analog
SSI, ANA

Magnets etc see chapter - Accessories - Linear Encoders

We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).
Dimensional Drawings

LMP30 Incremental Serial
ISI

LMP30 Profibus
PB

LMP30 CANopen
CO

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Magnets etc. see chapter - Accessories - Linear Encoders
Dimensional Drawings

LMP30 Profinet, Ethernet/IP, EtherCAT, Powerlink
EPN, EIP, ETC, EPL

LMP48 Analog, SSI, CAN
AN, SSI, CAN

Magnets etc see chapter - Accessories - Linear Encoders
Cascadable Linear Encoders

Measure reliably over long distances

Wire-actuated encoders are subject to wear; laser measuring systems cannot acquire several positions simultaneously in the same clear width. Magnetic tapes are susceptible to ferromagnetic chips, position marks read optically with readers can become soiled, magnetostrictive measuring systems are limited in their measuring, and glass scales are unaffordable from certain measurement lengths. For those applications, TR-Electronic provides the patented cascadeable linear measurement system LMC55.

The final measuring length is defined in situ by connecting the intermediate elements together to the desired overall length. Up to 20 m absolute position detection is supplied as standard (special lengths on request).

- Wear-free measurement up to 20 m
- Compact, convenient pieces made from strand-cast aluminium
- Closed housing, flat surface
- Flush (no beads or edges)
- Easy installation possible without special tools
- Magnets do not require any supply leads

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Cascadable, 20 m length

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<tr>
<th>Product</th>
<th>LMC55</th>
</tr>
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<tbody>
<tr>
<td>Supply voltage</td>
<td>24 VDC, -20 … +10 %</td>
</tr>
<tr>
<td>Current consumption, no load</td>
<td>24 … 30 VDC</td>
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<td>Master system</td>
<td>&lt; 60 mA</td>
</tr>
<tr>
<td>Single component</td>
<td>&lt; 90 mA</td>
</tr>
<tr>
<td>Measuring principle</td>
<td>magnetostrictive</td>
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<tr>
<td>Measuring length, standard</td>
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<tr>
<td>Resolution</td>
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<tr>
<td>Linearity deviation</td>
<td>&lt; 0,02 %, ±0,20 mm / modul</td>
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<tr>
<td>Reproducibility</td>
<td>0,05 mm</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>0,1 mm</td>
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<tr>
<td>Material - Measuring body</td>
<td>Aluminium extruded profile</td>
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<tr>
<td>Cycle time, internal</td>
<td>&lt;= 2 ms</td>
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<tr>
<td>Optional magnets</td>
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<tr>
<td>Magnet - Minimum distance</td>
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<tr>
<td>Working temperature</td>
<td>0 … +70 °C</td>
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<td>-20 … +70 °C</td>
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<td>Stray magnetic field</td>
<td>&lt; 3 mT</td>
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<tr>
<td>Measuring reference</td>
<td>Measuring plane</td>
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<td>Interface (others on request)</td>
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Suggested Products

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<td>CANopen</td>
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For further product information simply enter the order number in the search field at www.tr-electronic.com.
# Suggested Products

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<th>Article description</th>
<th>Range</th>
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<td>Magnet T2-S5520N</td>
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<tr>
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<td>CANopen, A-coded, 120 Ω</td>
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For further product information simply enter the order number in the search field at www.tr-electronic.com.

---

## Further product information

1. Enter order code into ...
2. Searchfield (top right) on www.tr-electronic.com
3. Choose desired information

We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).
Dimensional Drawings

**LMC55 top view**

![LMC55 top view diagram]

**LMC55 Example with magnet**

![LMC55 example with magnet diagram]

**LMC55 Connectors**

![LMC55 connectors diagram]

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
Linear Encoder with Plastic Housing

For aggressive surroundings

Linear absolute encoders for touchless measurement (based on magnetostriction) sense linear absolute movements without wear or tear. For especially aggressive surroundings, TR provides the series LA 50 and 80 in plastic housing. The full measurement system is housed in Polypropylene (PP) or, on request, in Polytetrafluoroethylene (PTFE). These materials withstand most liquids in industrial applications. Series LA 50 is optimized for liquid level measurement. It is mounted with a tube thread acc. DIN 259 (Size R2) inserted into process vessels. The float cannot be lost due to a mechanical block at the end of the tube. The Series LA 50 can be used similarly to the standard range LA 46. With different magnets available, it can be used for precise position measurement in aggressive surroundings.
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<td>24 VDC, -20…+10 %</td>
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<tr>
<td><strong>Resolution</strong></td>
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<td>Any desired (when used as level sensor: vertical)</td>
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* depends on Measurement Length and Interface
Dimensional Drawings

**LA50 SSI, Analog**
SSI, ANA

**LA80 SSI, Analog**
SSI, ANA

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Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.
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