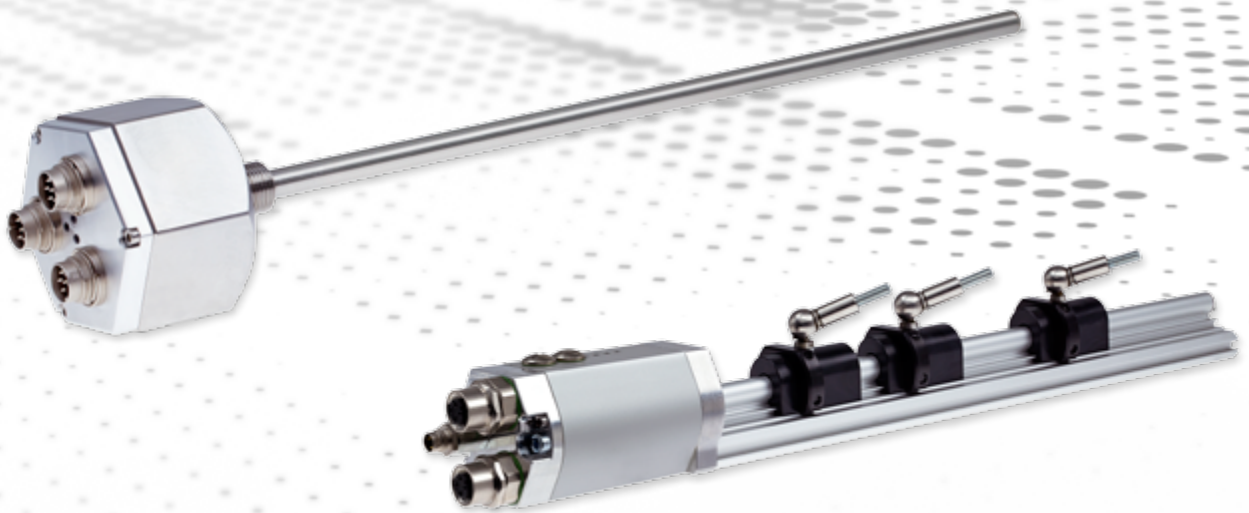
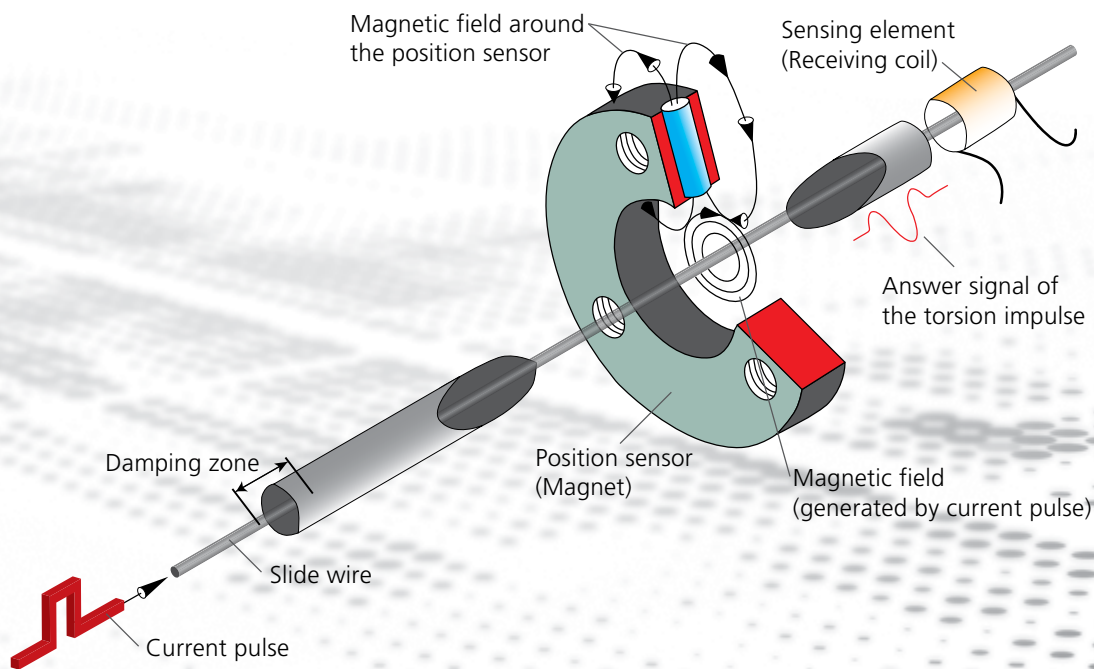


Linear Encoders

Overview



Magnetostriction



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.

LMP146



LMR48



LMP30



Contents

| | | | |
|--|---|---------------------------------|----|
| Technical Information | 2 | Types by mechanical Design..... | 10 |
| - Theory of Operation | 2 | - Tube Housing | 10 |
| - Three Measurement Systems in One - LMR70 | 5 | - Profile Housing..... | 22 |
| - Contact Free up to 20 m - LMC55 | 6 | - Plastic Housing..... | 38 |

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.

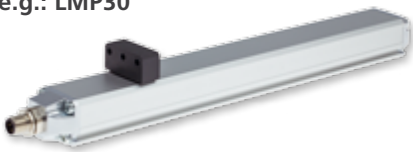
Direct integration into hydraulic cylinders by using pressure proof tube housings made from stainless steel.

e.g.: **LMRI46**



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.

e.g.: **LMP30**



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.

e.g.: **LMC55 (modular setup)**

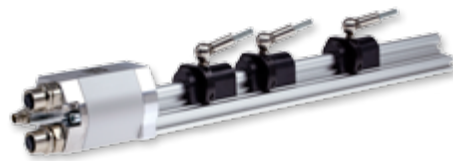


Power that fulfils your needs

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
- e.g.: **LMPI46**



Standard

- _ Resolution 0,01 mm
 - _ Stroke up to 3.000 mm
 - _ Direct interfaces (SSI, Analog), CAN
- e.g.: **LMRS34**



Basic

- _ Resolution 0,1 mm
 - _ Stroke up to 2.500 mm
 - _ Direct interfaces
- e.g.: **LMP48**



Three Measuring Systems in One – LMR70

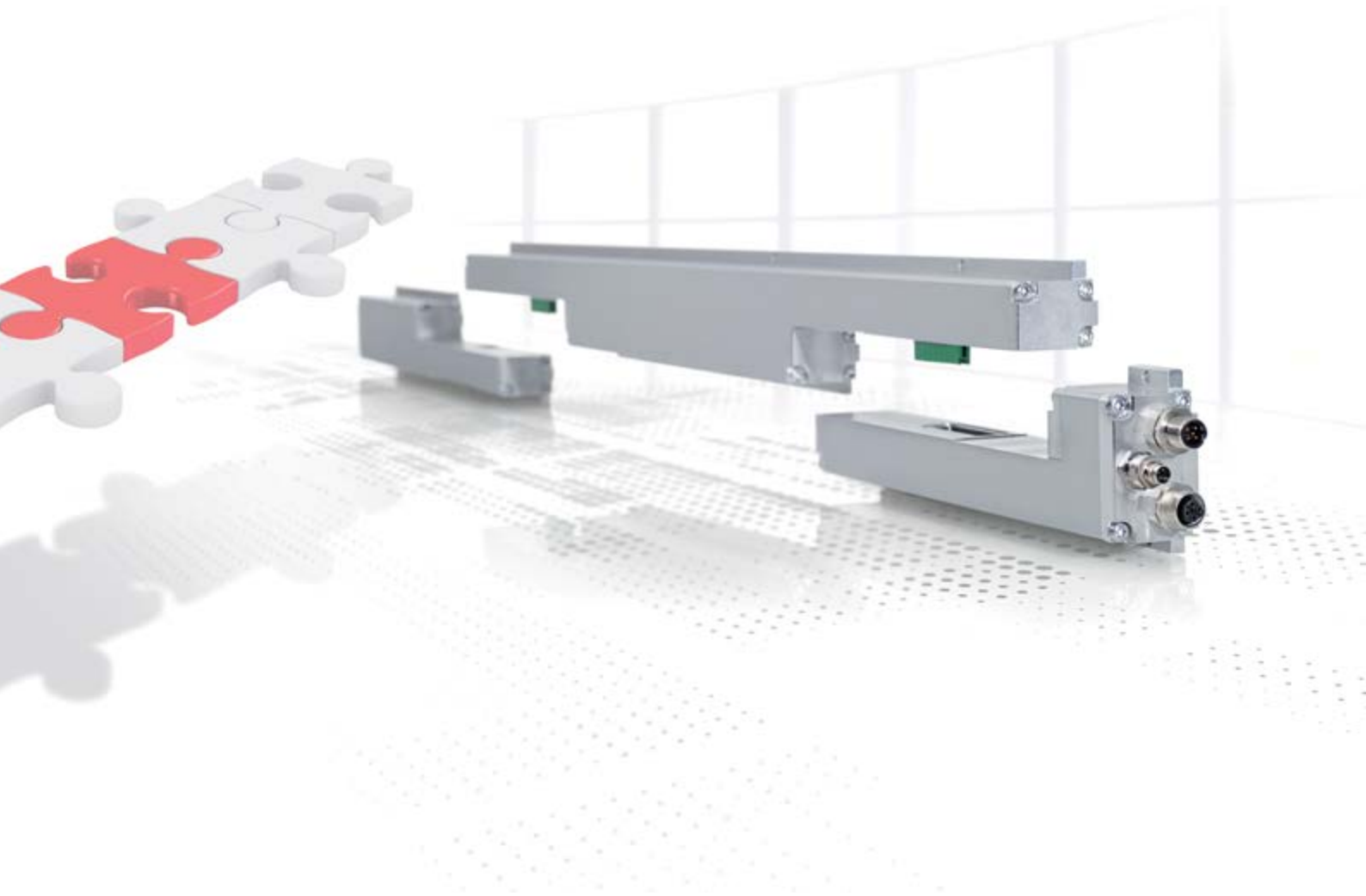


Triple-redundant linear absolute measurement system provides longterm availability even with difficult access

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.

Contact-Free and Wear-Free scanning up to 20 m – LMC55



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.

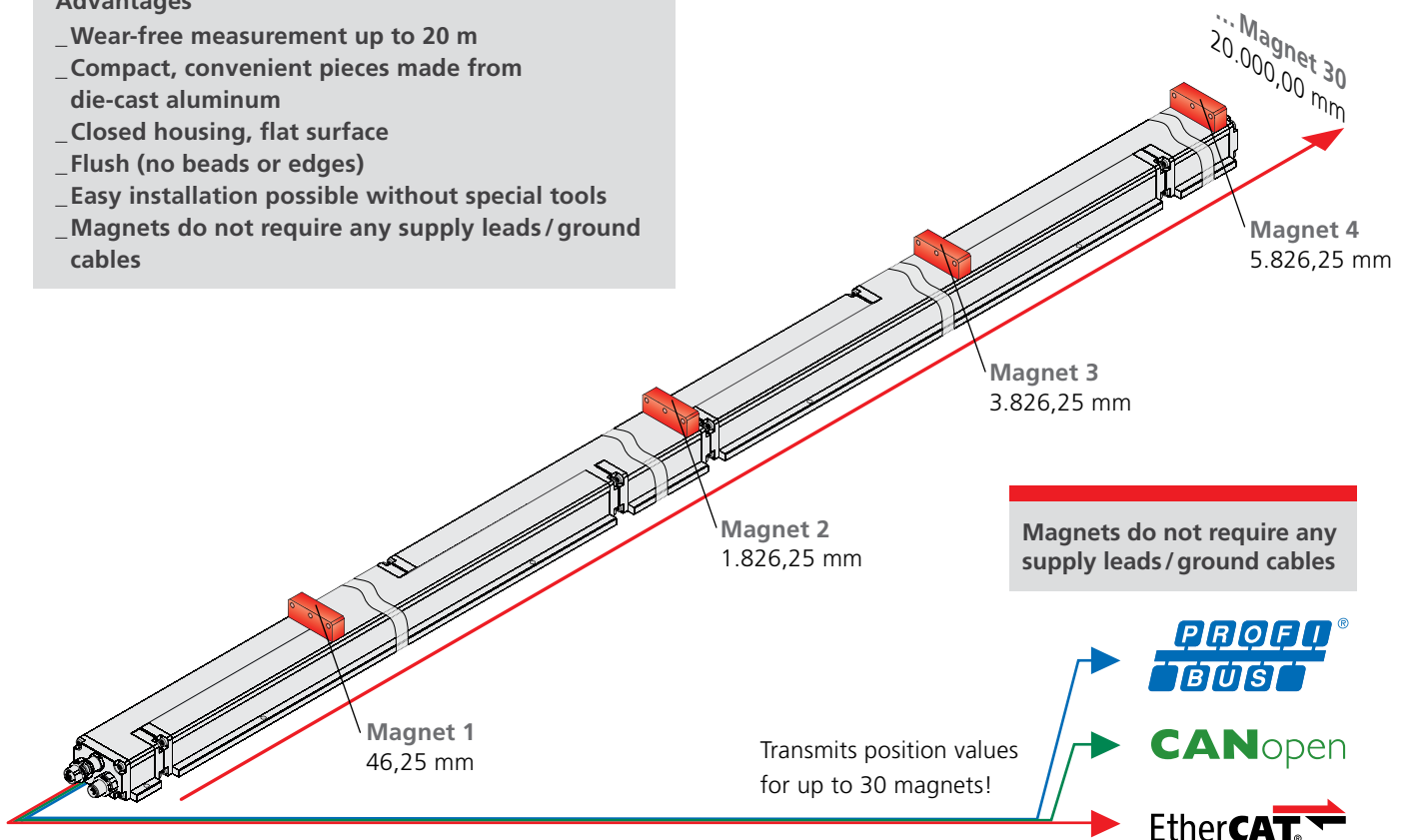
With LMC55 we have closed this gap: up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require power supply. The measuring system is only assembled to the full measuring length in

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.

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



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

Fields of application

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

- _ Replaces easily soiled, optical axes e.g. in profile cutting machines
- _ Wear-free Y-axis in high-rack warehouse (replaces wire-actuated encoder) and much more.

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

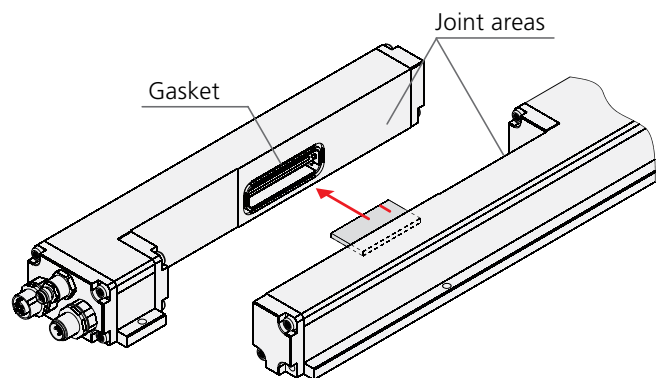
The type 2 end component forms the end element in conjunction with a type 1 slave.

Correct configuration before measurement

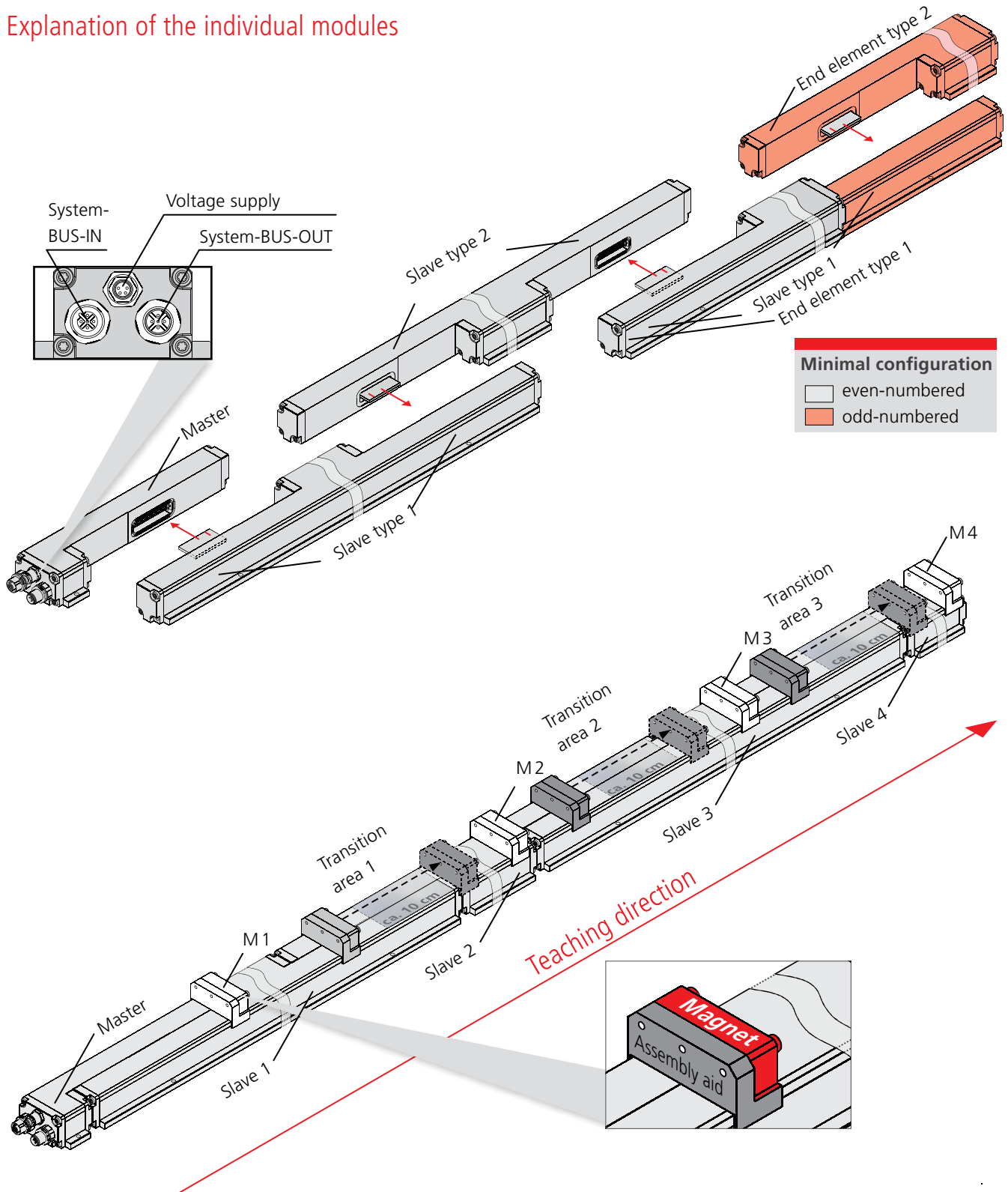
Before the measuring system can be operated, e.g. on PROFIBUS, the mechanically installed individual components, the so-called slaves, must first be detected using the teach-in function.

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.



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.





Contents

| | |
|---------------------------|----|
| Products..... | 11 |
| Suggested Products..... | 14 |
| Dimensional Drawings..... | 16 |

LMRI46

LMRS34

LMR48

| Product | LMRI46 | LMRS34 | LMR48 |
|--------------------------------|---|---|---|
| |  |  |  |
| Mechanic execution | (R) Tube, (H) detachable tube | (R) Tube | (R) Tube |
| Range | 50...4000 mm*, in steps | 50...3000 mm, in steps | 50...2500 mm*, in steps |
| Size | 46 | 34 | 48 |
| Supply voltage | 24 VDC, -20...+10 %* | 24 VDC, -20...+10 %* | 12..24 VDC, +- 10% |
| Resolution | 0,001 mm | 0,01 mm | 0,05 mm |
| Linearity defect | typical $\pm 30 \mu\text{m}$ $\pm 50 \mu\text{m}$ < 1000 mm $\pm 0,1\text{mm}$ 1000 mm-1500 mm $\pm 0,15 \text{ mm}$ > 1500 mm | $\leq \pm 0,015 \%$ FS (min $\pm 50 \mu\text{m}$) | $\pm 0,04 \%$ + 1 LSB |
| Reproducibility | 0,005 mm | $\leq \pm 0,005 \%$ FS (min $\pm 10 \mu\text{m}$) | |
| Hysteresis | typical < 10 μm < 20 μm < 1000 mm 0,1mm 1000 mm-1500 mm 0,15 mm > 1500 mm | | 0,1 mm |
| Temperature coefficient | | | |
| Ambient temperature | -20...+70 °C; 0...+70 °C | -40...+80 °C | -40...+85 °C |
| Protection class | IP65 | IP67 | IP65, option IP69K |
| Options | Multimagnet*, tube tip support | | |
| Orientation | Any desired | Any desired | Any desired |
| Material | Cr/Ni-Alloy | Cr/Ni-Alloy | Cr/Ni-Alloy |
| Maximum pressure | 600 bar, static | 400 bar static, 450 bar peak | 450 bar, static |
| Interface | SSI  Analog  EtherCAT   EtherNet/IP CANopen  ETHERNET POWERLINK DeviceNet  SERCOS the automation bus | SSI  CANopen Analog  IO-Link | SSI  CANopen Analog |
| Weblink | www.tr-electronic.com/s/S011361 | www.tr-electronic.com/s/S018151 | www.tr-electronic.com/s/S007102 |
| QR-Code |  |  |  |







*depends on interface

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

LMR48/46


LMR27

LMR27 Analog

| Product | LMR48/46 | LMR27 | LMR27 Analog 12 bit |
|-------------------------|--|---|---|
| |  |  |  |
| Mechanic execution | (R) Tube | (R) Tube | (R) Tube |
| Range | 50...2500 mm, in steps | 50...2000 mm, in steps | 50...2000 mm, in steps |
| Size | 48 | 27 | 27 |
| Supply voltage | 12..24 VDC, +- 10% | 24 VDC, -20...+10 % | 24 VDC, -20...+10 % |
| Resolution | 0,05 mm | 0,1 mm | 12 bit (> 0,1 mm) |
| Linearity defect | ± 0,04 % + 1 LSB | ± 0,20 mm (ML ≤ 2000 mm) | ± 0,20 mm (ML ≤ 2000 mm) |
| Reproducibility | | 0,1mm | 0,1mm |
| Hysteresis | 0,1 mm | 0,1mm (ML ≤ 2000 mm) | 0,1mm (ML ≤ 2000 mm) |
| Temperature coefficient | | | |
| Ambient temperature | -40...+85 °C | -20...+70 °C; 0...+70 °C | -20...+70 °C; 0...+70 °C |
| Protection class | IP65, option IP69K | IP65 | IP65 |
| Options | | | |
| Orientation | Any desired | Any desired | Any desired |
| Material | Cr/Ni-Alloy | Cr/Ni-Alloy | Cr/Ni-Alloy |
| Maximum pressure | 450 bar, static | 600 bar, static | 600 bar, static |
| Interface | Analog | SSI Ether CAT Analog Ether Net/IP PROFIBUS ETHERNET POWERLINK CANopen SERCOS <small>the automation bus</small> PROFINET | Analog |
| Weblink | www.tr-electronic.com/s/S010986 | www.tr-electronic.com/s/S011927 | www.tr-electronic.com/s/S011928 |
| QR-Code |  |  |  |

* depends on interface

LMR70

| | |
|--|--|
| | <p>LMR70</p>  |
| (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 | |
| | <p>Analog</p> |
| | <p>www.tr-electronic.com/s/S008380</p> |
| |  |

Suggested Products

| Ordering code | Name | Remark | Measurement length | Tube length | Resolution |
|------------------------|---------------------------|---|--------------------|-------------|------------|
| LMRI46 Analog | | | | | |
| 339-00009 | LMRI_46*250 ANA_U+JUSTAGE | Voltage, 16 bit, cable gland, 2 m, open end | 250,00 mm | 340,00 mm | 16 BIT; |
| 339-00057 | LMRI_46*480 ANA_I+JUSTAGE | Current, 16 bit, cable gland, 2 m, open end | 480,00 mm | 570,00 mm | 16 BIT; |
| 339-00062 | LMRI_46*200 ANA_I+JUSTAGE | Current, 16 bit, 8pin | 200,00 mm | 290,00 mm | 16 BIT; |
| 339-00217 | LMRI_46*200 ANA_I+JUSTAGE | Current, 16 bit, 8pin | 200,00 mm | 290,00 mm | 16 BIT; |
| 339-00450 | LMRI_46*500 ANA_I+JUSTAGE | Current, 16 bit, multipin connector | 500,00 mm | 590,00 mm | 16 BIT; |
| 339-00435 | LMRI_46*677 ANA_I+JUSTAGE | Current, 16 bit, multipin connector | 677,00 mm | 767,00 mm | 16 BIT; |
| 339-00436 | LMRI_46*323 ANA_I+JUSTAGE | Current, 16 bit, multipin connector | 323,00 mm | 413,00 mm | 16 BIT; |
| LMRI46 EtherCAT | | | | | |
| 339-00041 | LMRI_46*200 ETC | R 0,005 MM 2x4pinM12 1x4pinM8, 2 magnets | 200,00 mm | 290,00 mm | 0,005 mm |
| 339-00432 | LMRI_46*1950 ETC | R 0,005 MM 2x4pinM12 1x4pinM8, 2 magnets | 1920,00 mm | 2040,00 mm | 0,005 mm |
| LMRI46 PROFIBUS | | | | | |
| 339-00061 | LMRI_46*200 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 200,00 mm | 290,00 mm | 0,001 mm |
| 339-00500 | LMRI_46*200 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 220,00 mm | 290,00 mm | 0,001 mm |
| 339-00499 | LMRI_46*335 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 335,00 mm | 425,00 mm | 0,001 mm |
| 339-00498 | LMRI_46*430 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 430,00 mm | 520,00 mm | 0,001 mm |
| 339-00063 | LMRI_46*600 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 600,00 mm | 690,00 mm | 0,001 mm |
| 339-00497 | LMRI_46*660 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 660,00 mm | 750,00 mm | 0,001 mm |
| 339-00030 | LMRI_46*1050 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 1050,00 mm | 1140,00 mm | 0,001 mm |
| 339-00496 | LMRI_46*1280 PB | R 0,001 MM 2x4pinM12 1x4pinM8 | 1280,00 mm | 1370,00 mm | 0,001 mm |
| LMRI46 PROFINET | | | | | |
| 339-00034 | LMRI_46*200 EPN | R 0,005 MM 2x4pinM12 1x4pinM8 | 200,00 mm | 290,00 mm | 0,005 mm |
| 339-00064 | LMRI_46*300 EPN | R 0,005 MM 2x4pinM12 1x4pinM8 | 300,00 mm | 390,00 mm | 0,005 mm |
| 339-00008 | LMRI_46H*550 EPN | R 0,005 MM 2x4pinM12 1x4pinM8 | 550,00 mm | 640,00 mm | 0,005 mm |
| 339-00437 | LMRI_46*600 EPN | R 0,005 MM 2x4pinM12 1x4pinM8 | 600,00 mm | 690,00 mm | 0,005 mm |

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

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

Suggested Products

| Ordering code | Name | Remark | Measurement length | Tube length | Resolution |
|-----------------------|--------------------------|--|--------------------|-------------|------------|
| LMRI46 SSI | | | | | |
| 339-00013 | LMRI_46*204 SSI | R 0,005 mm, M23, 12 pin | 204,00 mm | 294,00 mm | 0,005 mm |
| 339-00068 | LMRI_46*495 SSI | R 0,001 mm, cable gland, 5m, open End | 495,00 mm | 585,00 mm | 0,001 mm |
| 339-00002 | LMRI_46H*605 SSI | R 0,001 mm, cable gland, 5 m, open end | 605,00 mm | 695,00 mm | 0,001 mm |
| 339-00055 | LMRI_46*755 SSI | R 0,002 mm, cable gland, 7 m, open end | 755,00 mm | 845,00 mm | 0,002 mm |
| 339-00026 | LMRI_46*1055 SSI | R 0,001 mm, cable gland, 3m, open End | 1055,00 mm | 1150,00 mm | 0,001 mm |
| LMR70 Analogue | | | | | |
| 335-00001 | LMR_70*180 ANA_I+JUSTAGE | | 180,00 mm | 264,00 mm | 16 BIT; |
| LMR27 Profibus | | | | | |
| 341-00003 | LMR_27*300 PB | Cable sensor - connection terminal 2 m | 300,00 mm | 393,00 mm | 0,1 mm |

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

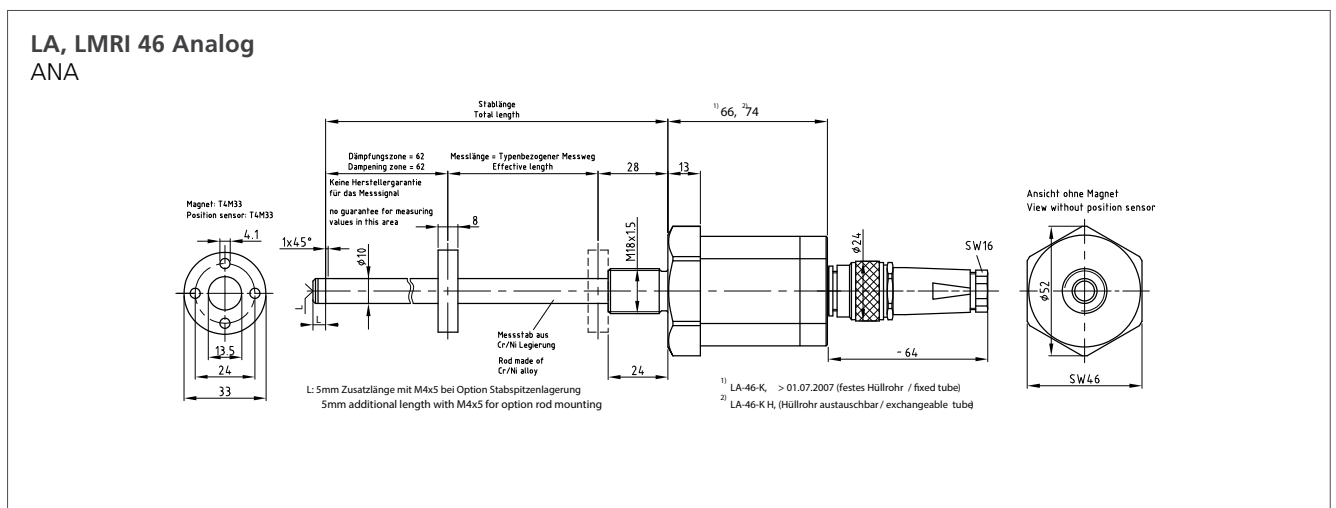
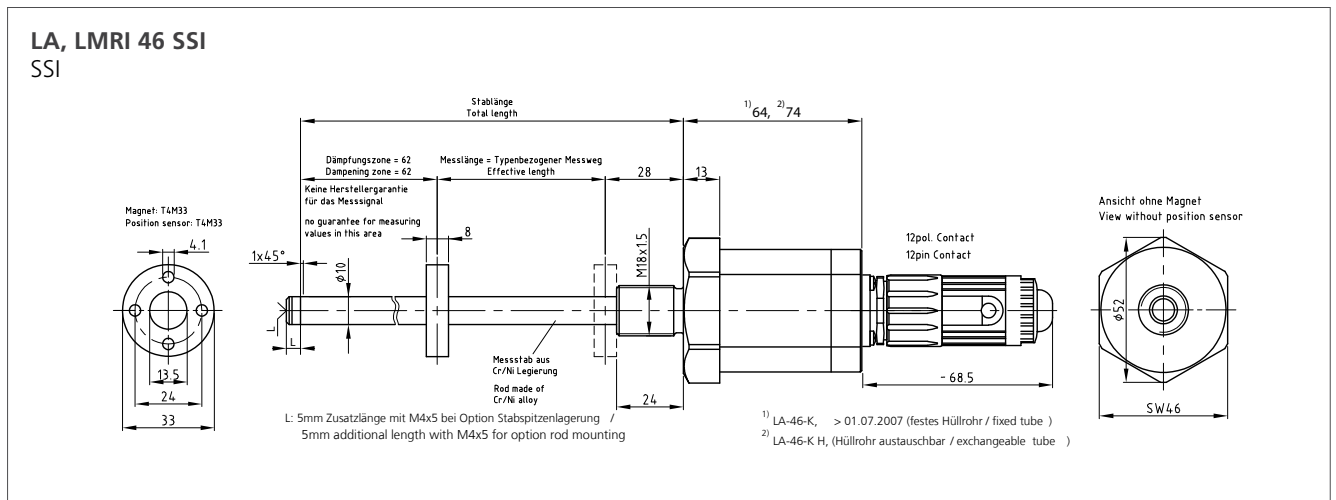
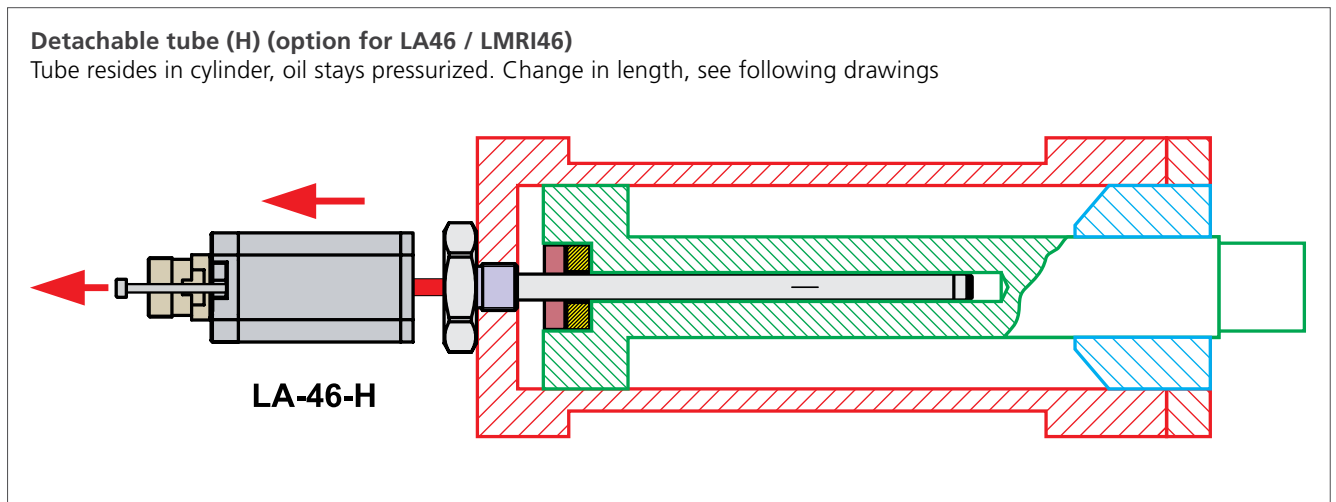


3. Choose desired information



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

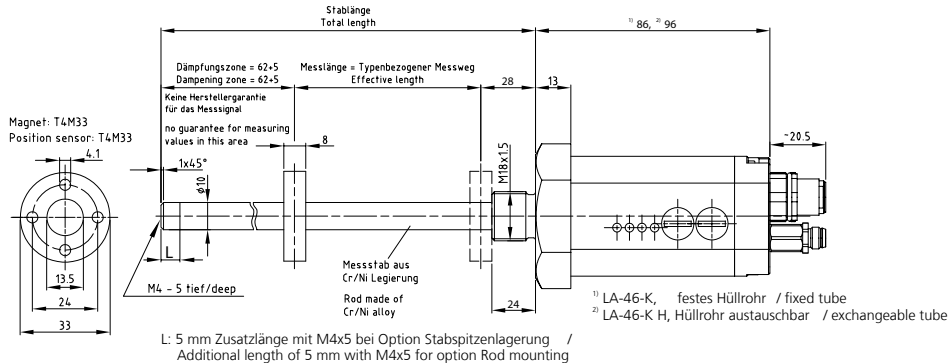
Dimensional Drawings



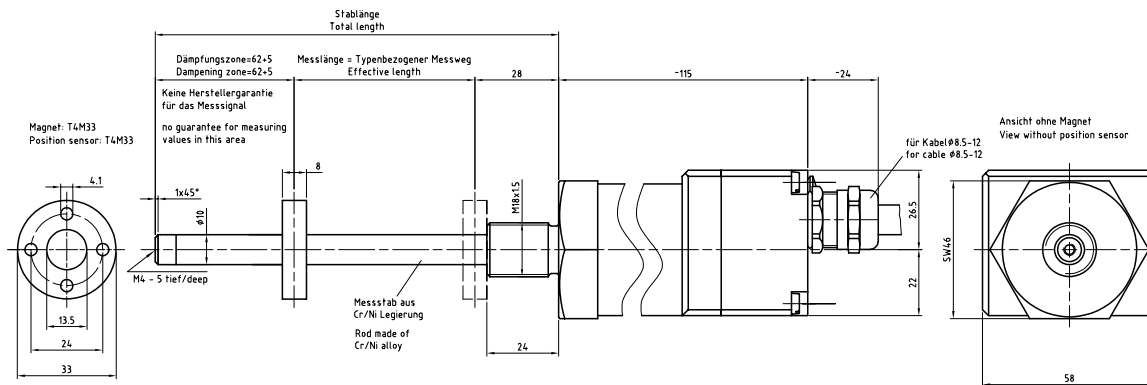
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

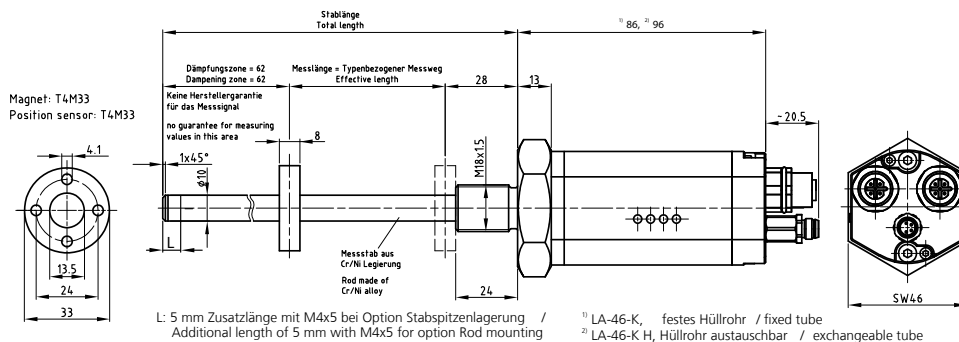
LA, LMRI 46 Profibus, CANopen PB, CO



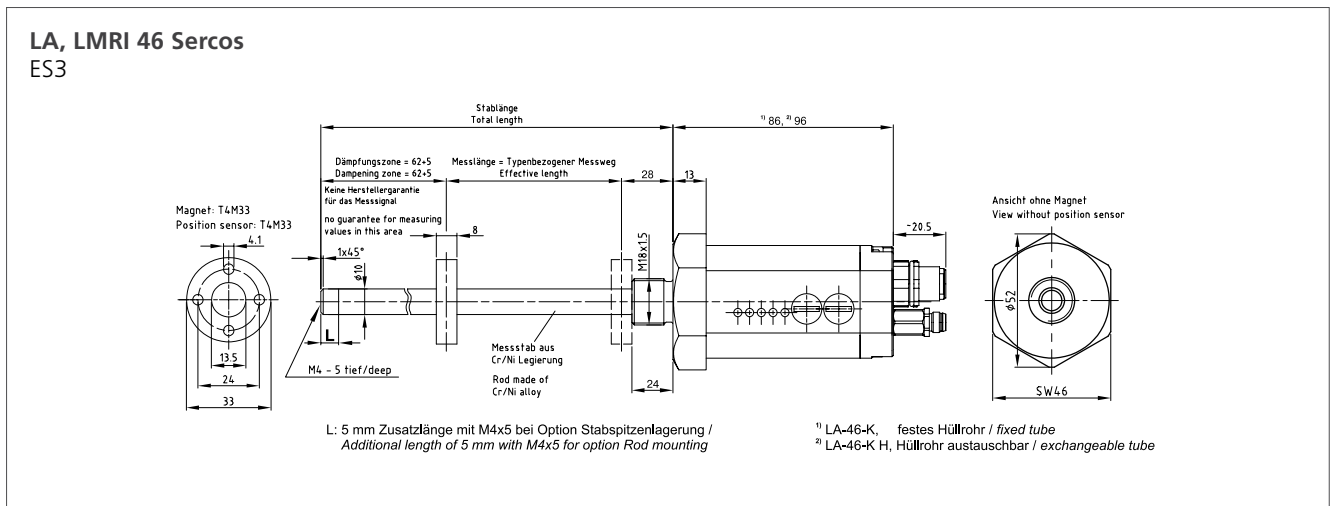
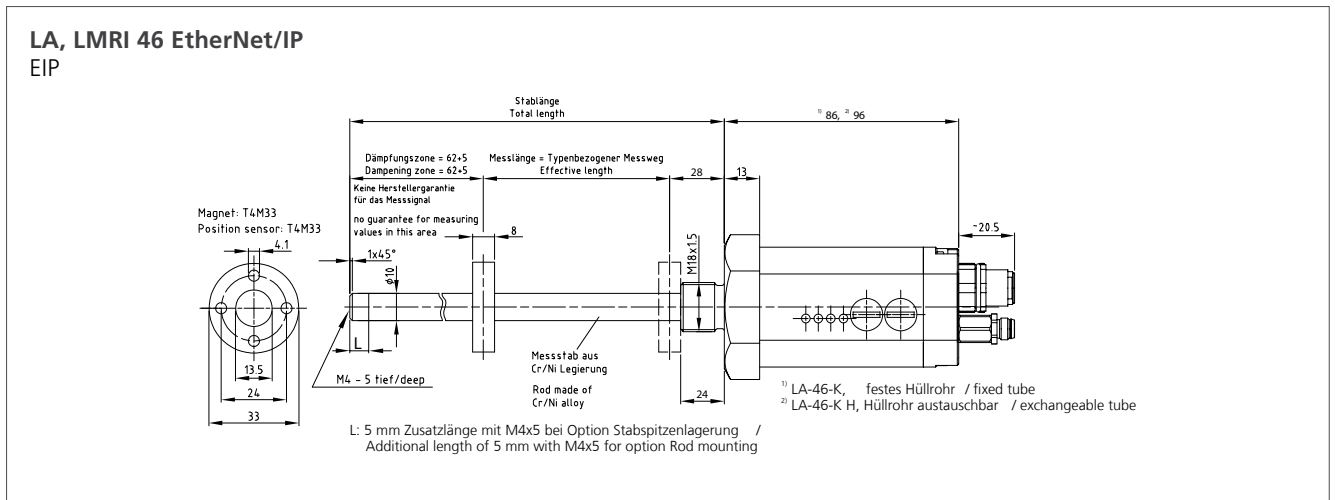
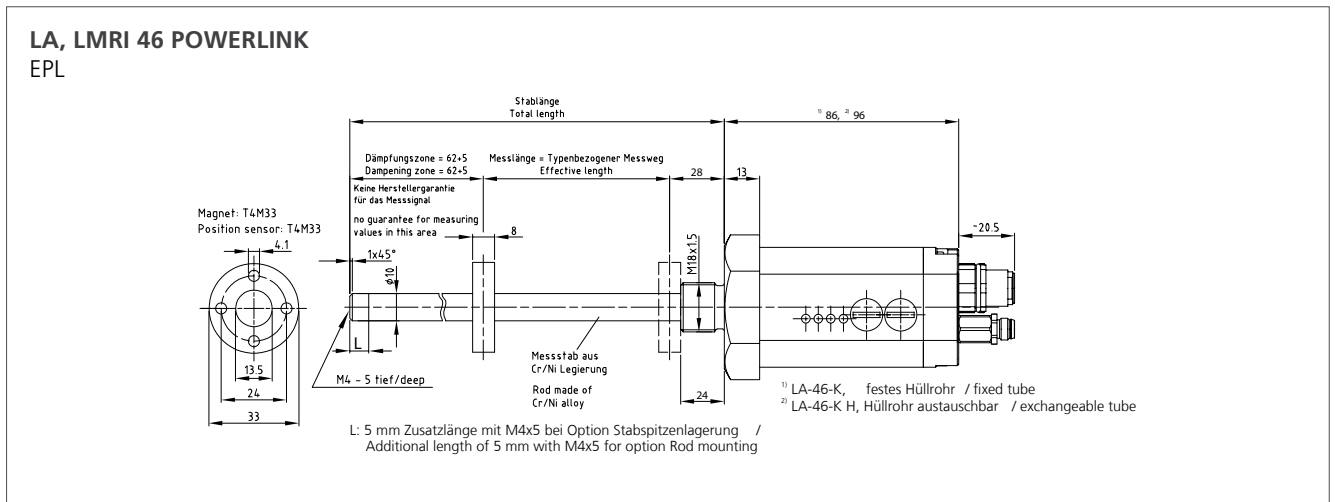
LA, LMRI 46 CAN DeviceNet DN



LA, LMRI 46 EtherCAT, PROFINET IO ETC, EPN

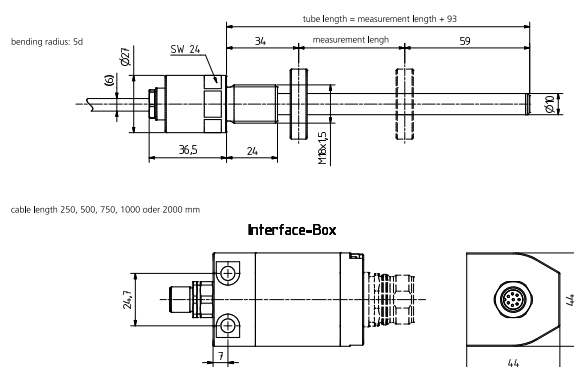


Dimensional Drawings

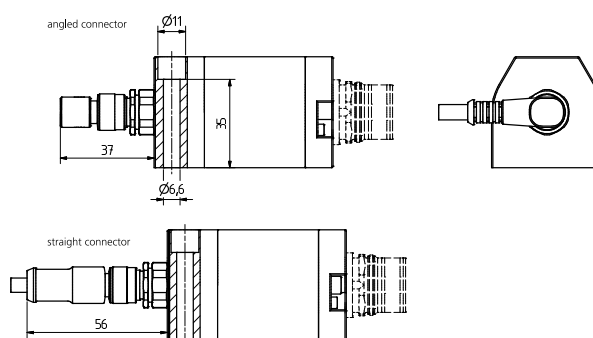


Dimensional Drawings

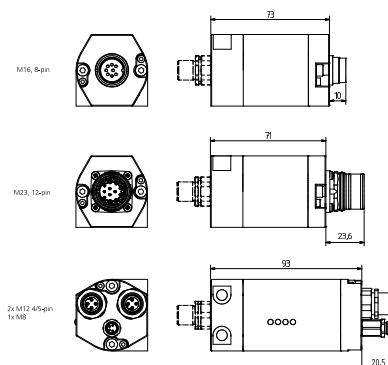
LMR27 Sensorhead



LMR27 Interface Box

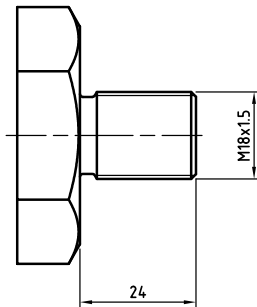


LMR27 Connections

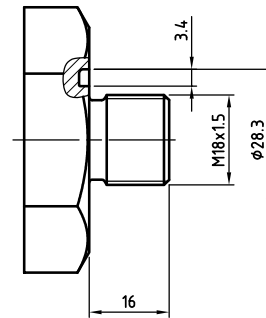


Dimensional Drawings

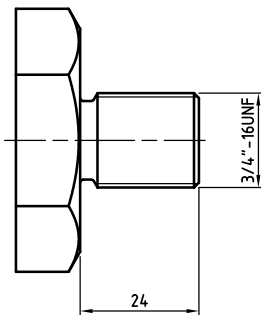
LA, LMRI 46 Flange type M18 x 1,5
O-Ring gasket in thread undercut



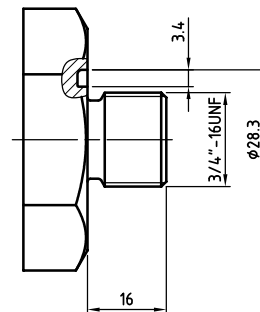
LA, LMRI 46 flange type M18 x 1,5 with groove (LA46/42)
O-Ring gasket in addl. groove



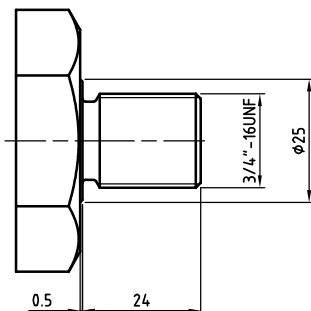
LA, LMRI 46 flange type 3/4' - 16UNF
O-Ring gasket in thread undercut



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

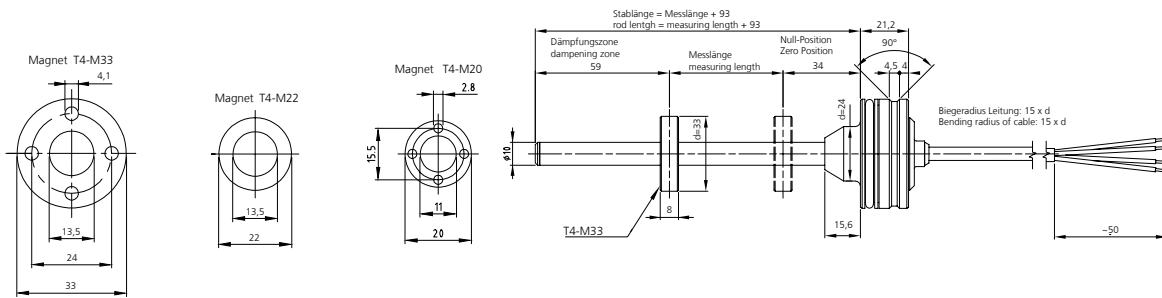


LA, LMRI 46 flange type 3/4' - 16UNF with chamfer
Chamfer on flange

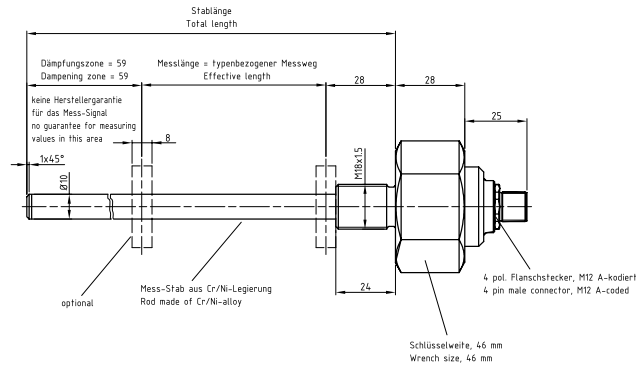


Dimensional Drawings

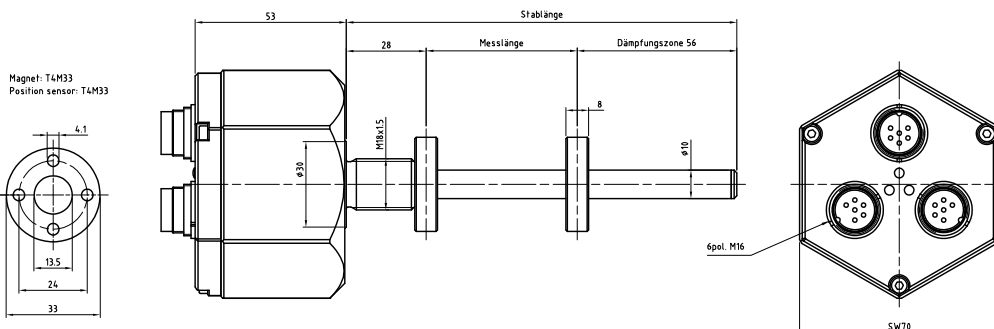
LMR 48 SSI, Analog, CAN SSI, ANA, CAN



LMR 48/46 Analog ANA



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



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.







Contents

| | |
|---------------------------|----|
| Products..... | 23 |
| Suggested Products..... | 24 |
| Dimensional Drawings..... | 27 |

LMPI46

LMP30

LMP48

| Product | LMPI46 | LMP30 | LMP48 |
|--------------------------------|---|--|---|
| |  |  |  |
| Mechanic type | (P) Profile | (P) Profile | (P) Profile |
| Range | 50...4000 mm*, in steps | 50...4000 mm*, in steps | 30...3000 mm*, in steps |
| Size | 46 | 30 | 48 |
| Supply voltage | 24 VDC, -20...+10 %* | 24 VDC, -20...+10 %* | 24 VDC +- 20%; 9...36 VDC * |
| Resolution | 0,001 mm | 0,01mm * | 0,05 mm |
| Linearity defect | typical $\pm 15 \mu\text{m}$ $\pm 30 \mu\text{m} < 1000 \text{ mm}$ $\pm 0,1 \text{ mm } 1000 \text{ mm}-1500 \text{ mm}$ $\pm 0,15 \text{ mm } > 1500 \text{ mm}$ | $\pm 0,15 \text{ mm} \leq 1500 \text{ mm}$ $\pm 0,20 \text{ mm} > 1500 \text{ mm}$ | $< 0,01 \% \text{ FS}, \geq 60 \mu\text{m}$ $\pm 0,1 \% \text{ FS} *$ |
| Reproducibility | 0,005 mm | 0,005 mm * | $< 0,005 \% \text{ FS} \geq 50 \mu\text{m}$ $\pm 0,1 \% \text{ FS} *$ |
| Hysteresis | typical $< 6 \mu\text{m}$ $< 15 \mu\text{m} < 1000 \text{ mm}$ $0,1 \text{ mm } 1000 \text{ mm}-1500 \text{ mm}$ $0,15 \text{ mm } > 1500 \text{ mm}$ | 0,02 mm $\leq 1500 \text{ mm}$ 0,1 mm $> 1500 \text{ mm}$ | $\pm 0,1 \% \text{ FS} *$ |
| Temperature coefficient | $< 8 \mu\text{m}/^\circ\text{C} \leq 500 \text{ mm}$ $< 15 \text{ ppm}/^\circ\text{C} > 500 \text{ mm} *$ | $< 8 \mu\text{m}/^\circ\text{C} \leq 500 \text{ mm}$ $< 15 \text{ ppm}/^\circ\text{C} > 500 \text{ mm} *$ | 100 ppm/ $^\circ\text{C}$ |
| Ambient temperature | -20...+70 $^\circ\text{C}$; 0...+70 $^\circ\text{C}$ | -20...+70 $^\circ\text{C}$; 0...+70 $^\circ\text{C}$ | -40...+75 $^\circ\text{C}$; -20...+75 $^\circ\text{C}$ |
| 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    CANopen    | SSI  Analog  ISI    CANopen | SSI  Analog |
| Weblink | www.tr-electronic.com/s/S011362 | www.tr-electronic.com/s/S008395 | www.tr-electronic.com/s/S008396 |
| QR-Code |  |  |  |

*depends on interface

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

Suggested Products

| Ordering code | Name | Remark | Measurement length | Tube length | Resolution |
|---------------|------|--------|--------------------|-------------|------------|
|---------------|------|--------|--------------------|-------------|------------|

| Linear encoder profile housing SSI LMP30 SSI | | | | | |
|--|-----------------|--|-------------|-------------|---------|
| 322-00112 | LMP_30*150 SSI | 0,5 m cable, M23 12 pin, including mating plug | 150,00 mm | 290,00 mm | 0,05 mm |
| 322-00166 | LMP_30*300 SSI | 0,5 m cable, M23 12 pin, including mating plug | 300,00 mm | 440,00 mm | 0,01 mm |
| 322-00250 | LMP_30*500 SSI | 0,5 m cable, M23 12 pin, including mating plug | 500,00 mm | 640,00 mm | 0,01 mm |
| 322-00148 | LMP_30*1000 SSI | 0,5 m cable, M23 12 pin, including mating plug | 1.000,00 mm | 1.140,00 mm | 0,01 mm |

| Linear encoder profile housing Analogue LMP30 A | | | | | |
|---|-------------------|-----------------------|-------------|-------------|--------|
| 322-00392 | LMP_30*300 ANA_I | 3,0 m cable, open end | 300,00 mm | 440,00 mm | 12 BIT |
| 322-00209 | LMP_30*1000 ANA_I | 3,0 m cable, open end | 1.000,00 mm | 1.140,00 mm | 12 BIT |

| Linear encoder profile housing Profibus LMP30 PB | | | | | |
|--|----------------|----------------|-------------|-------------|----------|
| 322-00098 | LMP_30*150 PB | 2x M12, 1 x M8 | 150,00 mm | 271,00 mm | 0,005 mm |
| 322-00290 | LMP_30*300 PB | 2x M12, 1 x M8 | 300,00 mm | 421,00 mm | 0,005 mm |
| 322-00056 | LMP_30*500 PB | 2x M12, 1 x M8 | 500,00 mm | 621,00 mm | 0,005 mm |
| 322-00055 | LMP_30*750 PB | 2x M12, 1 x M8 | 750,00 mm | 871,00 mm | 0,005 mm |
| 322-00072 | LMP_30*1000 PB | 2x M12, 1 x M8 | 1.000,00 mm | 1.121,00 mm | 0,005 mm |

| Linear encoder profile housing Profinet LMP30 PN | | | | | |
|--|-----------------|----------------|-------------|-------------|----------|
| 322-00452 | LMP_30*150 EPN | 2x M12, 1 x M8 | 150,00 mm | 271,00 mm | 0,005 mm |
| 322-00412 | LMP_30*1000 EPN | 2x M12, 1 x M8 | 1.000,00 mm | 1.121,00 mm | 0,005 mm |

| Linear encoder profile housing Powerlink LMP30 ETC | | | | | |
|--|----------------|----------------|-----------|-----------|----------|
| 322-00413 | LMP_30*300 ETC | 2x M12, 1 x M8 | 300,00 mm | 421,00 mm | 0,005 mm |
| 322-00454 | LMP_30*500 ETC | 2x M12, 1 x M8 | 500,00 mm | 621,00 mm | 0,005 mm |

| Linear encoder profile housing EtherCAT LMP30 ETC | | | | | |
|---|----------------|----------------|-----------|-----------|----------|
| 322-00462 | LMP_30*150 ETC | 2x M12, 1 x M8 | 150,00 mm | 271,00 mm | 0,005 mm |

| Linear Encoder Profilgehäuse Powerlink LMP30 EPN | | | | | |
|--|----------------|----------------|-----------|-----------|----------|
| 322-00471 | LMP_30*750 EPN | 2x M12, 1 x M8 | 750,00 mm | 871,00 mm | 0,005 mm |
| 322-00519 | LMP_30*500 EPN | 2x M12, 1 x M8 | 500,00 mm | 621,00 mm | 0,005 mm |

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

* depends on interface

Suggested Products

| Ordering code | Name | Remark | Measurement length | Tube length | Resolution |
|---------------|------|--------|--------------------|-------------|------------|
|---------------|------|--------|--------------------|-------------|------------|

Linear encoder profile housing Powerlink LMP30 ETC

| | | | | | |
|-----------|--------------------|----------------|-------------|-------------|----------|
| 322-00549 | LMP_30*1000 ETC | 2x M12, 1 x M8 | 1.000,00 mm | 1.121,00 mm | 0,005 mm |
|-----------|--------------------|----------------|-------------|-------------|----------|

Linear Encoder Profilgehäuse Powerlink LMP30 EPN

| | | | | | |
|-----------|--------------------|----------------|------------|-------------|----------|
| 322-00560 | LMP_30*300 EPN | 2x M12, 1 x M8 | 300,00 mm | 421,00 mm | 0,005 mm |
| 322-00667 | LMP_30*1150 EPN | 2x M12, 1 x M8 | 1150,00 mm | 1.271,00 mm | 0,005 mm |

Linear encoder profile housing Powerlink LMP30 EPL

| | | | | | |
|-----------|----------------------|----------------|-------------|-------------|----------|
| 322-00318 | LMP_30*150 EPL_2 | 2x M12, 1 x M8 | 150,00 mm | 271,00 mm | 0,005 mm |
| 322-00174 | LMP_30*300 EPL_2 | 2x M12, 1 x M8 | 300,00 mm | 421,00 mm | 0,005 mm |
| 322-00321 | LMP_30*500 EPL_2 | 2x M12, 1 x M8 | 500,00 mm | 621,00 mm | 0,005 mm |
| 322-00178 | LMP_30*750 EPL_2 | 2x M12, 1 x M8 | 750,00 mm | 871,00 mm | 0,005 mm |
| 322-00180 | LMP_30*1000 EPL_2 | 2x M12, 1 x M8 | 1.000,00 mm | 1.121,00 mm | 0,005 mm |

Linear encoder profile housing SSI LMP48 SSI

| | | | | | |
|-----------|--------------------|----------------|-------------|-------------|---------|
| 333-00003 | LMP_48*750 SSI | 1x M12, 12 pin | 750,00 mm | 839,00 mm | 0,01 mm |
| 333-00121 | LMP_48*900 SSI | 1xM12, 8pin | 900,00 mm | 989,00 mm | 0,01 mm |
| 333-00102 | LMP_48*910 SSI | 1xM12, 8pin | 910,00 mm | 999,00 mm | 0,01 mm |
| 333-00023 | LMP_48*1000 SSI | 1xM12, 8pin | 1.000,00 mm | 1.089,00 mm | 0,01 mm |
| 333-00122 | LMP_48*1100 SSI | 1xM12, 8pin | 1.100,00 mm | 1.189,00 mm | 0,01 mm |
| 333-00113 | LMP_48*1600 SSI | 1xM12, 8pin | 1.600,00 mm | 1.689,00 mm | 0,01 mm |
| 333-00101 | LMP_48*1900 SSI | 1xM12, 8pin | 1.900,00 mm | 1.989,00 mm | 0,01 mm |

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

Suggested Products

| Ordering code | Name | Remark | Measurement length | Tube length | Resolution |
|---------------|------|--------|--------------------|-------------|------------|
|---------------|------|--------|--------------------|-------------|------------|

| Linear encoder profile housing Analogue LMP48 A | | | | | |
|---|--------------------|---------------|-------------|-------------|---------|
| 333-00140 | LMP_48*30 ANALOG | 1x M12, 4 pin | 30,00 mm | 119,00 mm | 0,01 mm |
| 333-00007 | LMP_48*150 ANALOG | 1x M12, 4 pin | 150,00 mm | 239,00 mm | 12 BIT |
| 333-00008 | LMP_48*200 ANALOG | 1x M12, 4 pin | 200,00 mm | 289,00 mm | 12 BIT |
| 333-00006 | LMP_48*350 ANALOG | 1x M12, 4 pin | 350,00 mm | 439,00 mm | 12 BIT |
| 333-00005 | LMP_48*500 ANALOG | 1x M12, 4 pin | 500,00 mm | 589,00 mm | 12 BIT |
| 333-00009 | LMP_48*1250 ANALOG | 1x M12, 4 pin | 1.250,00 mm | 1.339,00 mm | 12 BIT |

| Linear encoder profile housing CAN LMP48 CAN | | | | | |
|--|----------------------|---------------|-------------|-------------|---------|
| 333-00001 | LMP_48*750 CAN OPEN | 1x M12, 5 pin | 750,00 mm | 839,00 mm | 0,05 mm |
| 333-00017 | LMP_48*300 CAN OPEN | 1x M12, 5 pin | 300,00 mm | 389,00 mm | 0,05 mm |
| 333-00099 | LMP_48*800 CAN OPEN | 1x M12, 5 pin | 800,00 mm | 889,00 mm | 0,05 mm |
| 333-00111 | LMP_48*1600 CAN OPEN | 1x M12, 5 pin | 1.600,00 mm | 1.689,00 mm | 0,05 mm |

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Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



3. Choose desired information

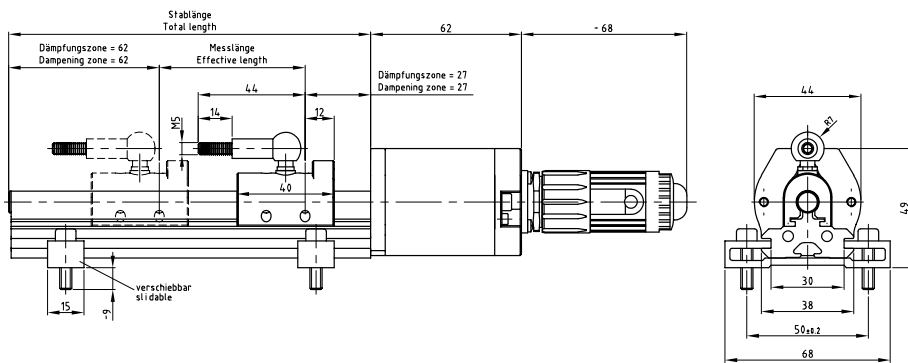


* depends on interface

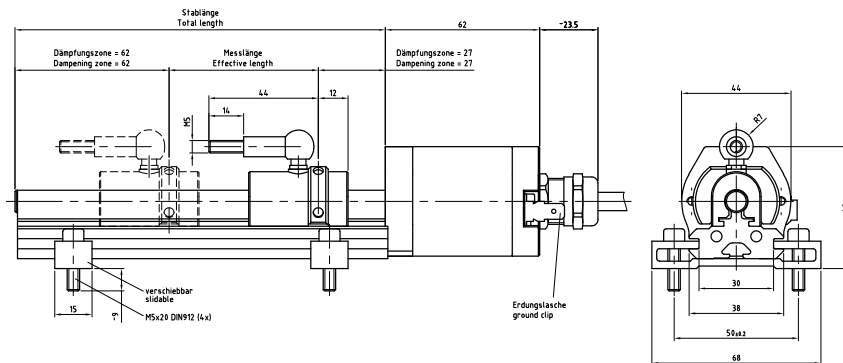
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

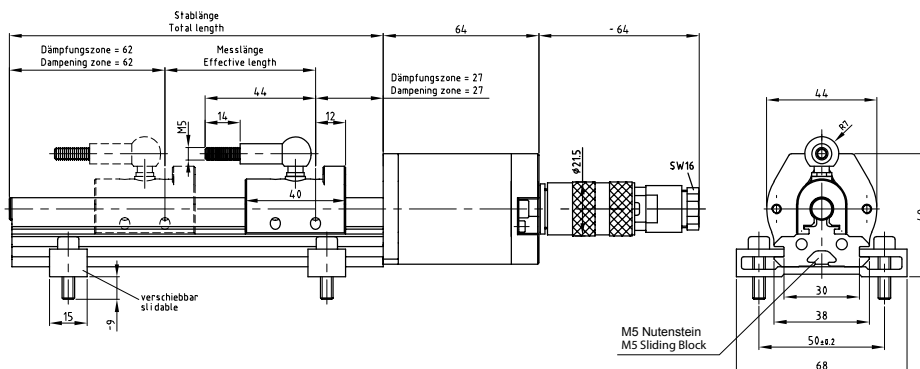
LMPI 46 SSI SSI



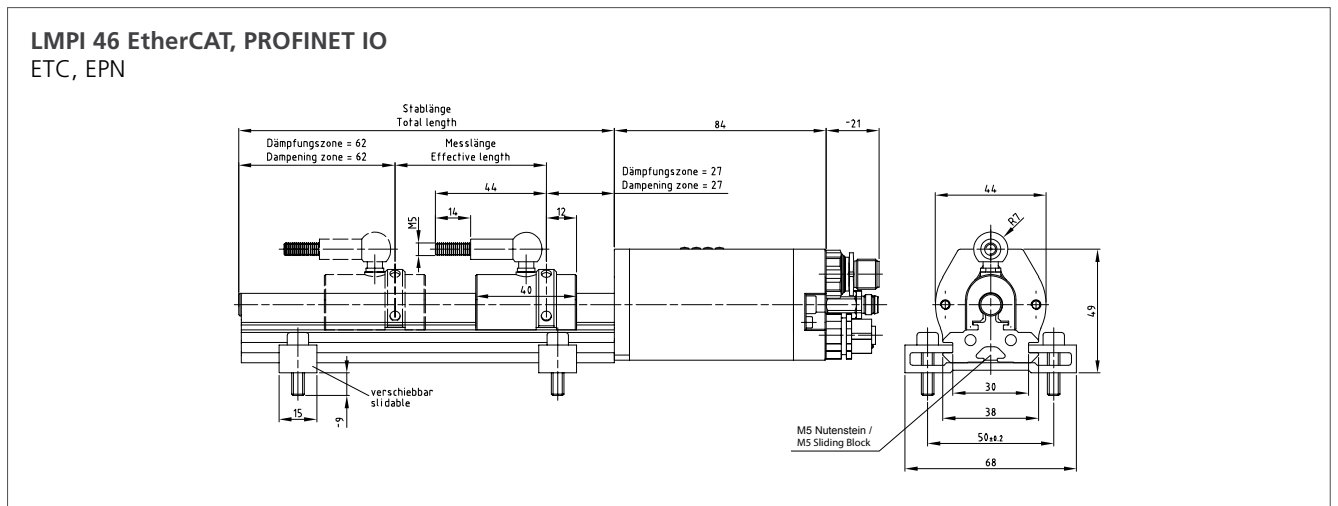
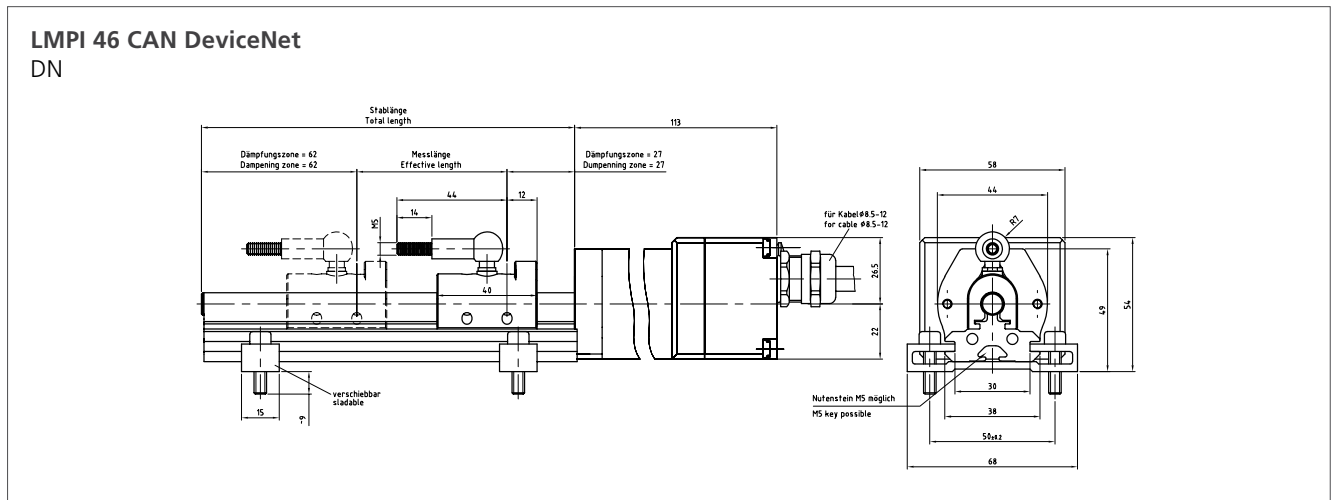
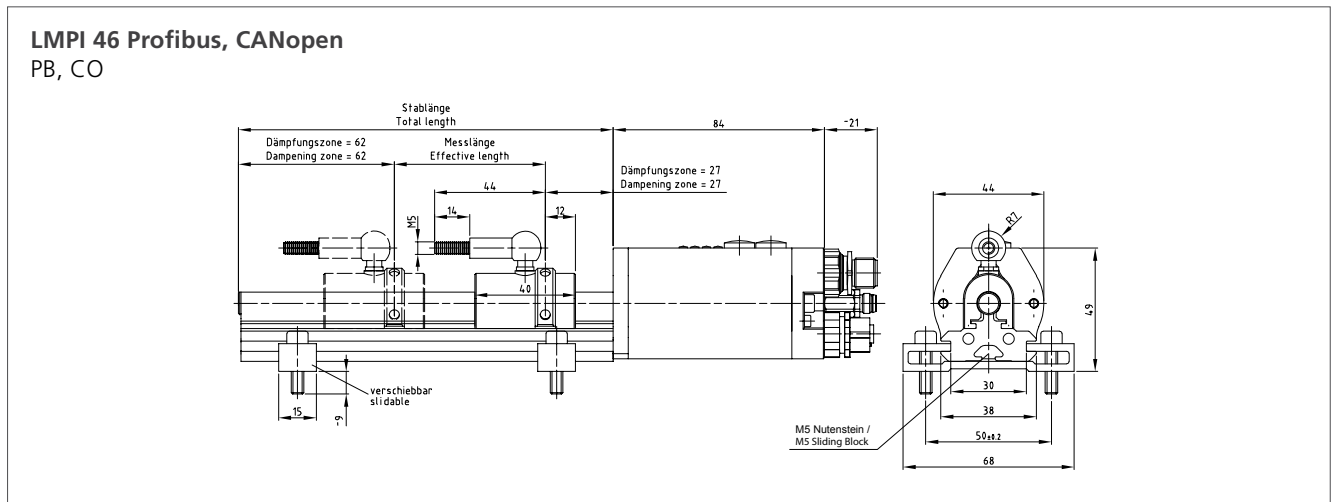
LP46 SSI ATEX SSI



LMPI 46 Analog ANA

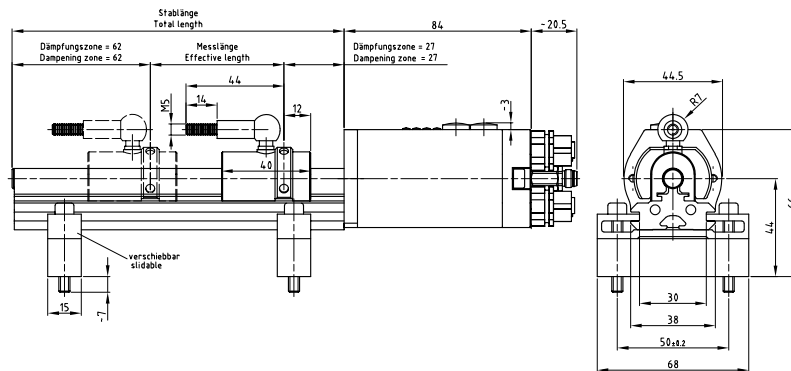


Dimensional Drawings

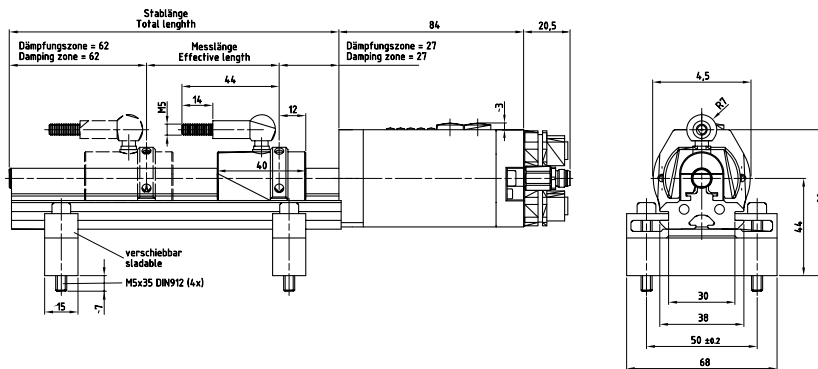


Dimensional Drawings

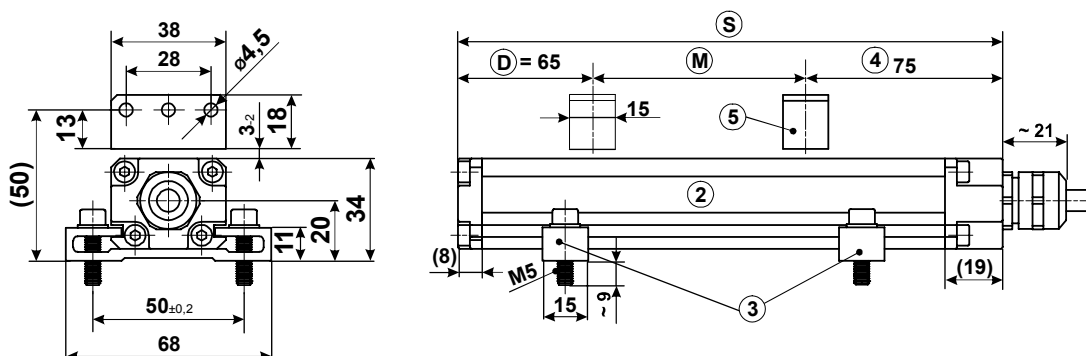
LMP1 46 EtherNet/IP, POWERLINK EIP, EPL



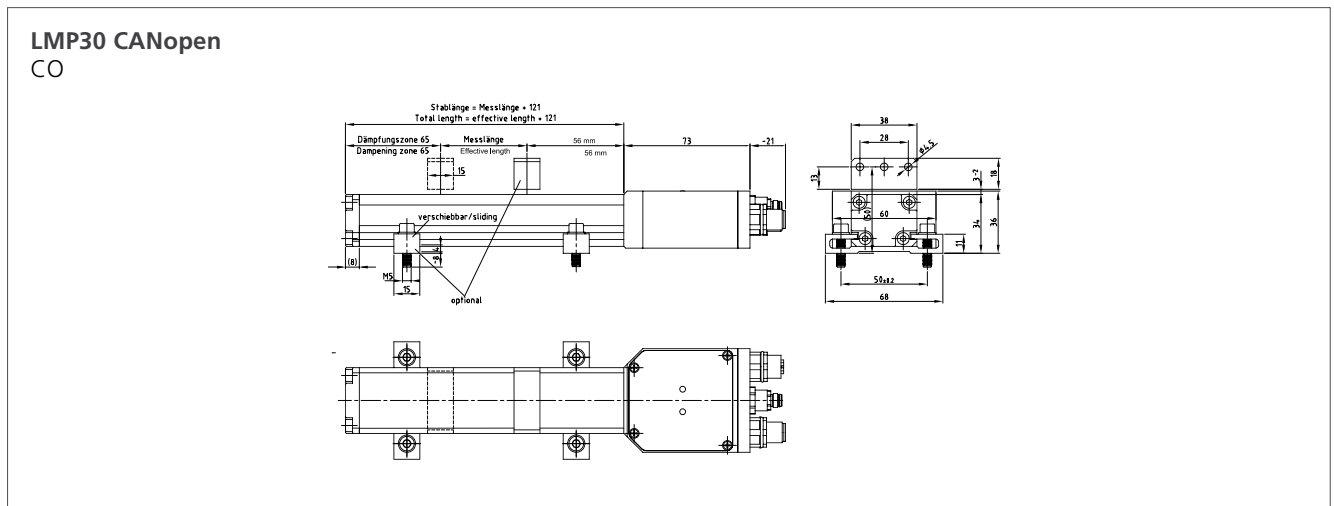
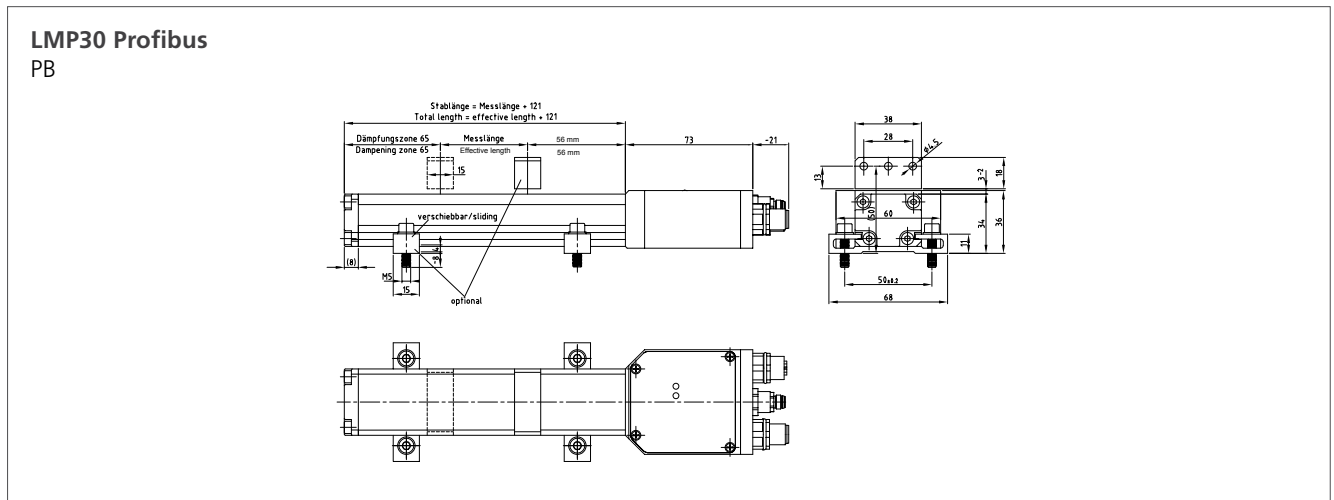
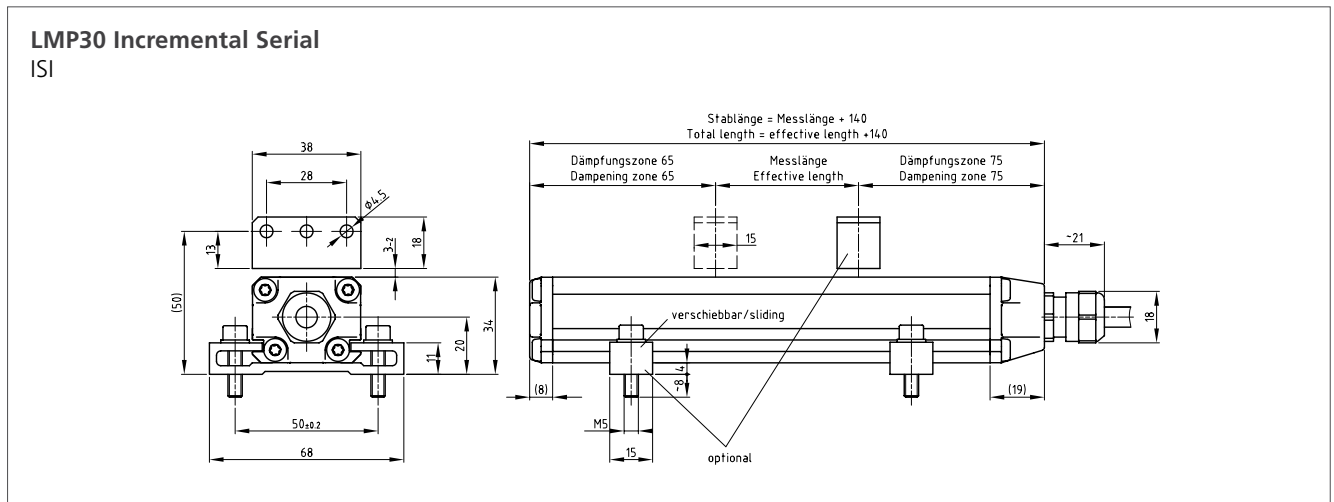
LMP1 46 Sercos ES3



LMP30 SSI, Analog SSI, ANA

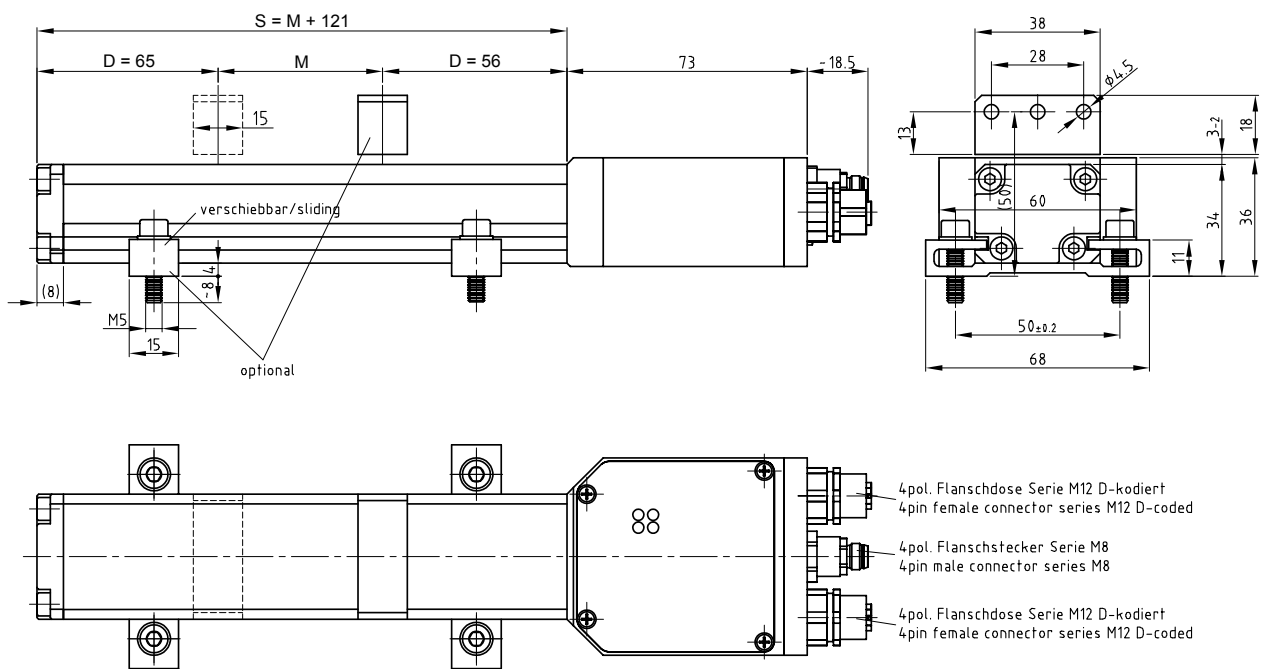


Dimensional Drawings

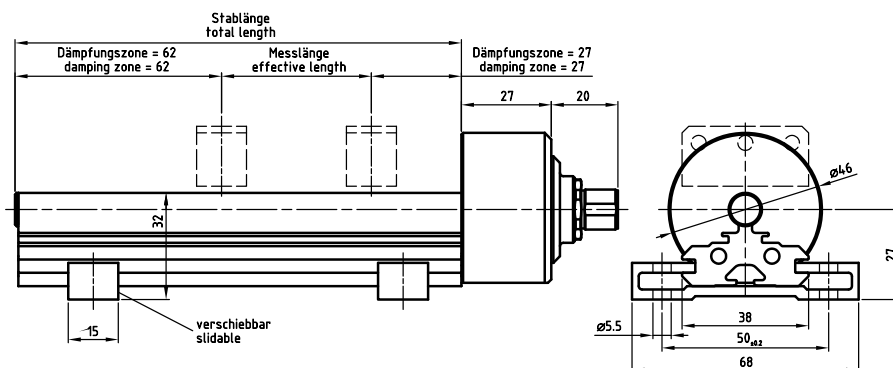


Dimensional Drawings

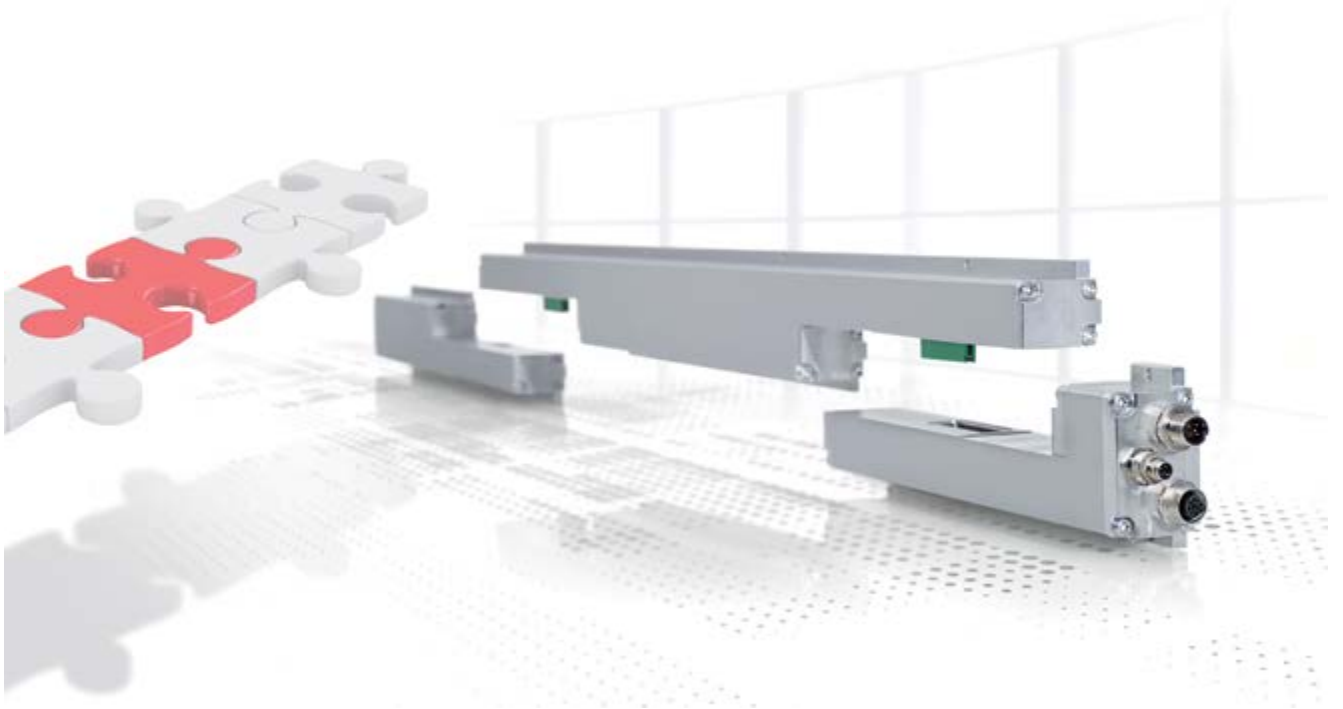
LMP30 Profinet, Ethernet/IP, EtherCAT, Powerlink EPN, IIP, ETC, EPL



LMP48 Analog, SSI, CAN AN, SSI, CAN



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

Contents

| | |
|---------------------------|----|
| Products..... | 33 |
| Suggested Products..... | 34 |
| Dimensional Drawings..... | 36 |

Cascadable, 20 m length

| | |
|----------------------------------|---|
| Product | LMC55  |
| Supply voltage | 24 VDC, -20 ... +10 % |
| Current consumption, no load | 24 ... 30 VDC |
| _ Master system | < 60 mA |
| _ Single component | < 90 mA |
| Measuring principle | magnetostrictive |
| Measuring length, standard | 5 ... 20 m |
| Resolution | 0,05 mm |
| Linearity deviation | < 0,02 %, $\pm 0,20$ mm / modul |
| Reproducibility | 0,05 mm |
| Hysteresis | 0,1 mm |
| Material - Measuring body | Aluminium extruded profile |
| Cycle time, internal | ≤ 2 ms |
| Optional magnets | 30 |
| Magnet - Minimum distance | 100 mm |
| Working temperature | 0 ... +70 °C |
| Working temperature optional | -20 ... +70 °C |
| Storage temperature, dry | -30 ... +85 °C |
| Protection class | IP65 |
| Stray magnetic field | < 3 mT |
| Measuring reference | Measuring plane |
| Interface (others on request) |      |
| Weblink | www.tr-electronic.com/s/S008458 |
| QR-Code |  |

Suggested Products

| Ordering code | Article description | Range |
|---------------------------------|---------------------|----------|
| LMC55 Master | | |
| 326M-00001 | PROFIBUS | |
| 326M-00002 | CANopen | |
| 326M-00003 | EtherCAT | |
| 326M-00004 | Ethernet Powerlink | |
| 326M-00005 | PROFINET IO | |
| 326M-00006 | Ethernet/IP | |
| LMC55 middle part | | |
| 326S-00002 | type 1 | 2.000 mm |
| 326S-00001 | type 2 | 2.000 mm |
| LMC55 end element type 1 | | |
| 326E-00009 | type 1 | 250 mm |
| 326E-00005 | type 1 | 500 mm |
| 326E-00011 | type 1 | 750 mm |
| 326E-00017 | type 1 | 850 mm |
| 326E-00004 | type 1 | 1.000 mm |
| 326E-00013 | type 1 | 1.250 mm |
| 326E-00002 | type 1 | 1.500 mm |
| 326E-00015 | type 1 | 1.750 mm |
| 326E-00015 | type 1 | 2.000 mm |
| LMC55 end element type 2 | | |
| 326E-00010 | type 2 | 250 mm |
| 326E-00006 | type 2 | 500 mm |
| 326E-00012 | type 2 | 750 mm |
| 326E-00018 | type 2 | 850 mm |
| 326E-00003 | type 2 | 1.000 mm |
| 326E-00014 | type 2 | 1.250 mm |
| 326E-00001 | type 2 | 1.500 mm |
| 326E-00016 | type 2 | 1.750 mm |
| 326E-00008 | type 2 | 2.000 mm |

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

Suggested Products

| Ordering code | Article description | Range |
|-----------------------|--------------------------|-------------------------------|
| Magnet | | |
| 49155009 | Magnet T1-S5520 | Distance to sensor: max. 3mm |
| 49155032 | Magnet T2-S5520N | Distance to sensor: max. 8 mm |
| Bus terminator | | |
| 40803-40005 | PROFIBUS, B-coded, 220 Ω | |
| 62000-1366 | CANopen, A-coded, 120 Ω | |

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

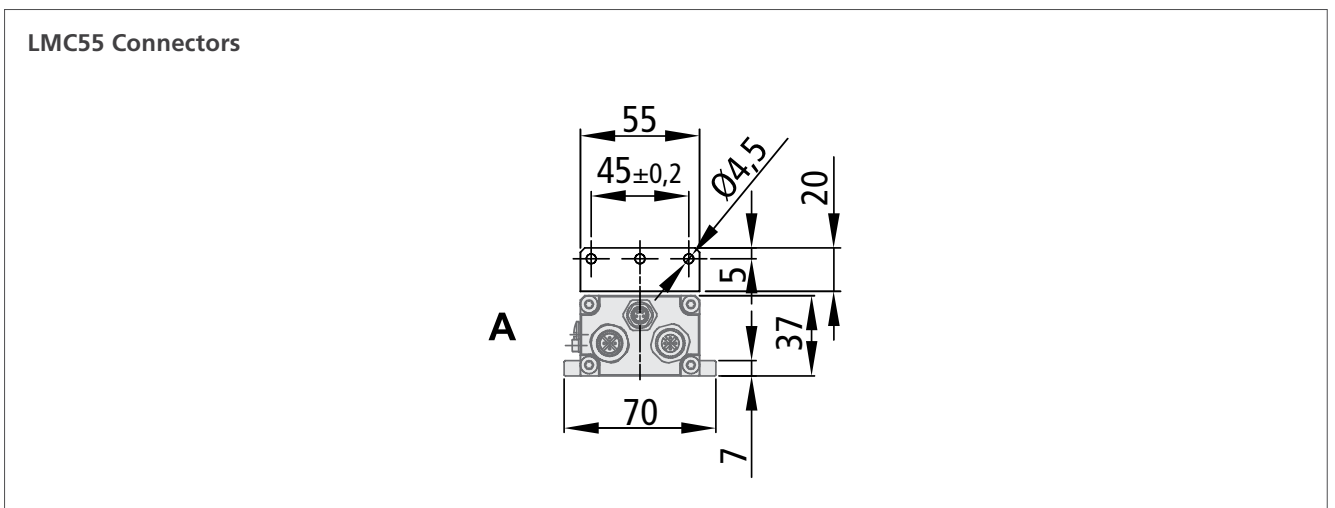
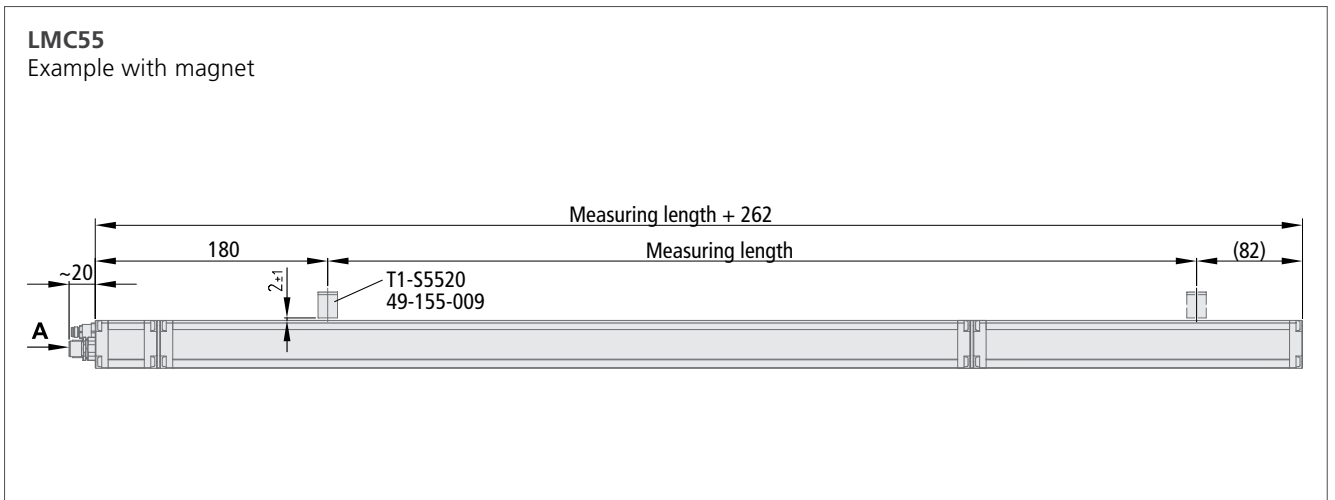
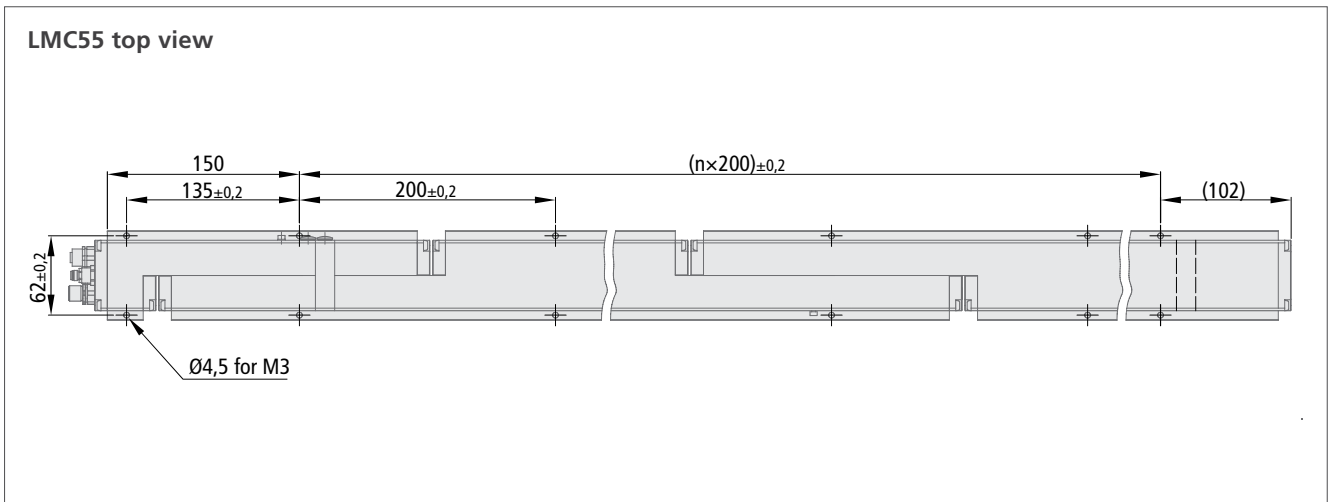


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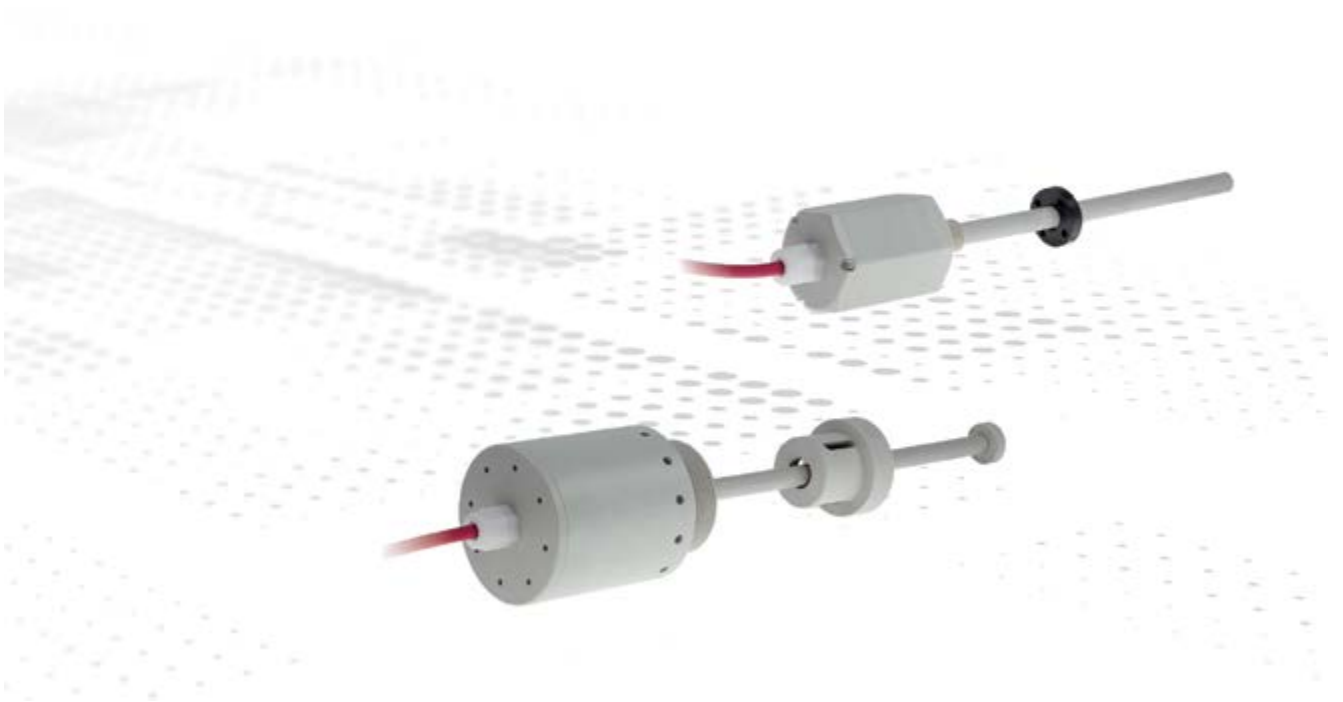
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings





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 Polytetrafluorethylene (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.

Contents

| | |
|---------------------------|----|
| Products..... | 39 |
| Dimensional Drawings..... | 40 |

LA50

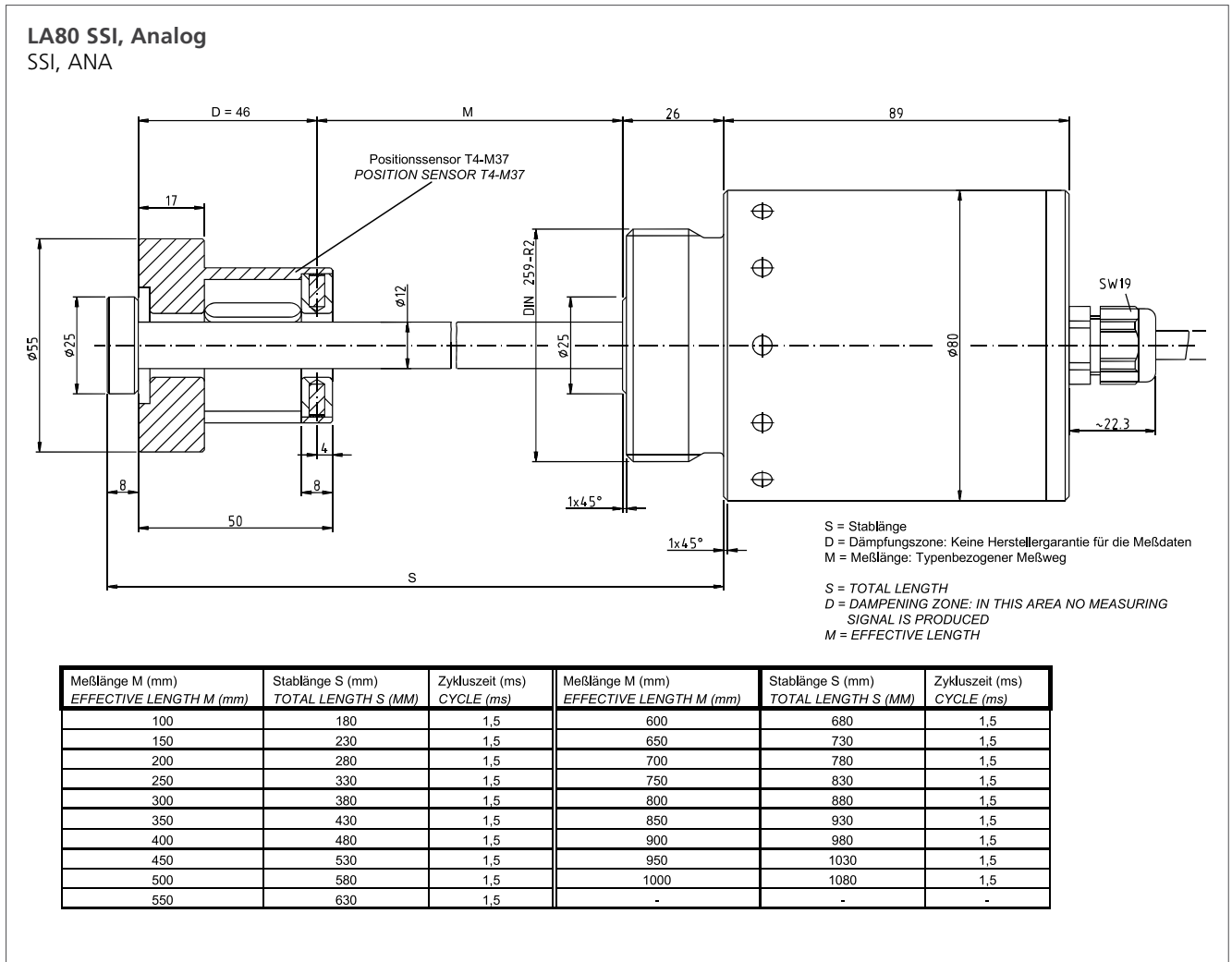
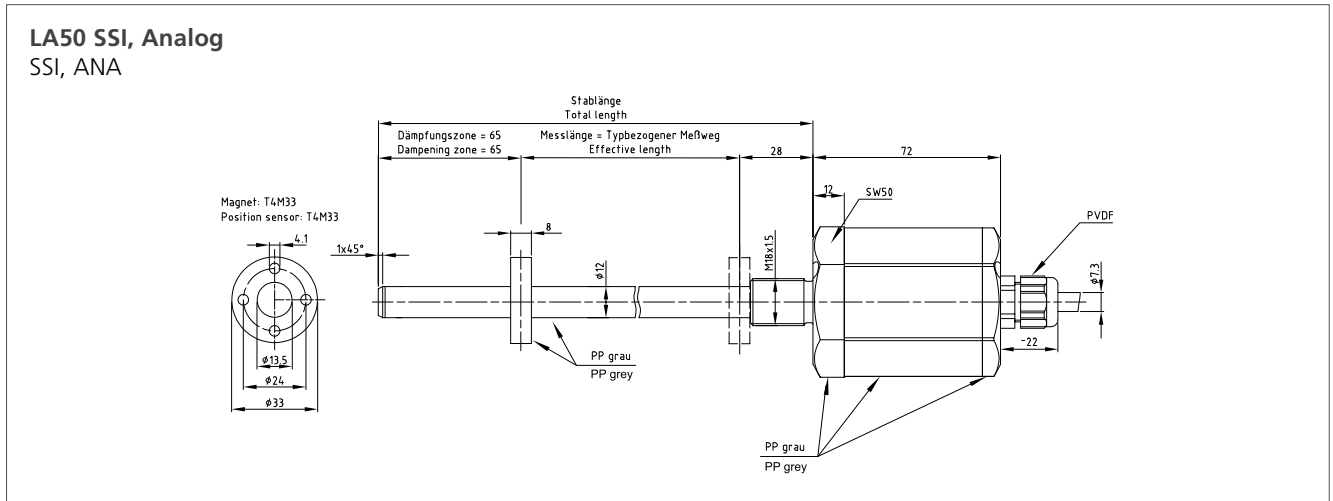
LA80

| | | |
|--------------------------------|---|--|
| Product | LA50  | LA80  |
| Mechanic type | (R) Tube (plastic) | (R) Tube (plastic) |
| Range | 100 ... 1000 mm (in steps) | 100 ... 1000 mm (in steps) |
| Size | 50 | 80 |
| Supply voltage | 24 VDC, -20...+10 % | 24 VDC, -20...+10 % |
| Resolution | 0,001 mm | 0,01 mm |
| Linearity deviation | ± 0,10 mm | < 0,05 % |
| Reproducibility | 0,005 mm | 0,01 mm |
| Hysteresis | 0,02 mm | 0,1 mm |
| Temperature coefficient | < 8 µm/°C * | < 8 µm/°C * |
| Ambient temperature | -20...+70 °C; 0...+70 °C | -20...+70 °C; 0...+70 °C |
| Protection class | IP68 | IP67 |
| Options | | |
| Orientation | Any desired | Any desired (when used as level sensor: vertical) |
| Material | PP (option PTFE) | PP (option PTFE) |
| Interface | SSI Analog | SSI Analog |
| Weblink | www.tr-electronic.com/s/S008501 | www.tr-electronic.com/s/S008502 |
| QR-Code |  |  |

*depends on Measurement Length and Interface

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

Dimensional Drawings



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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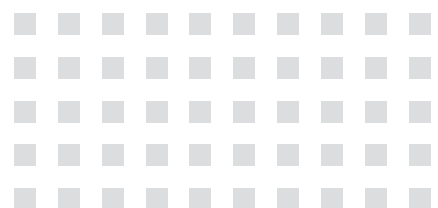
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