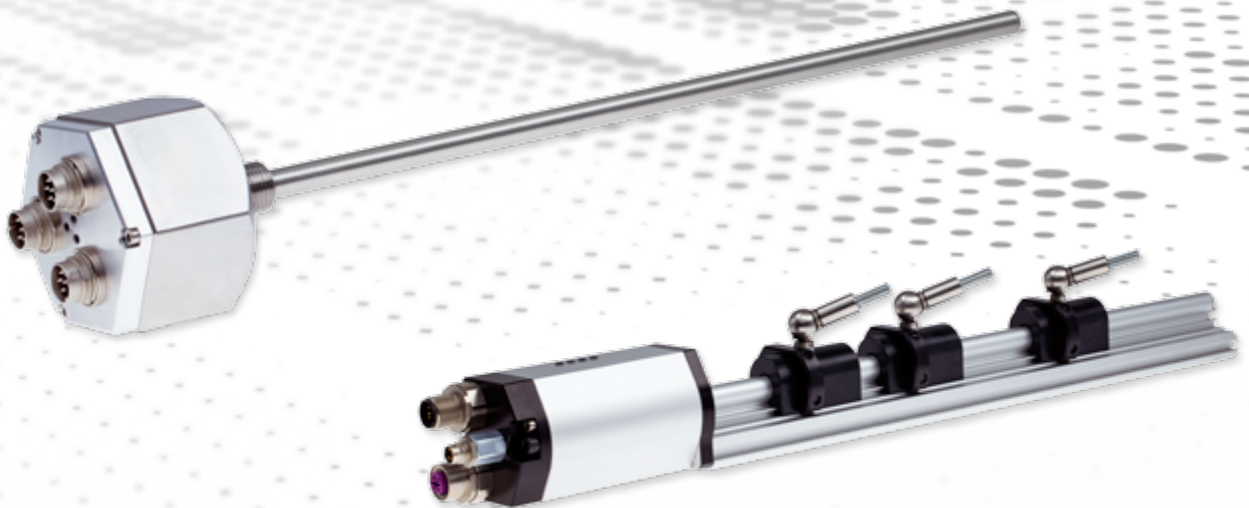
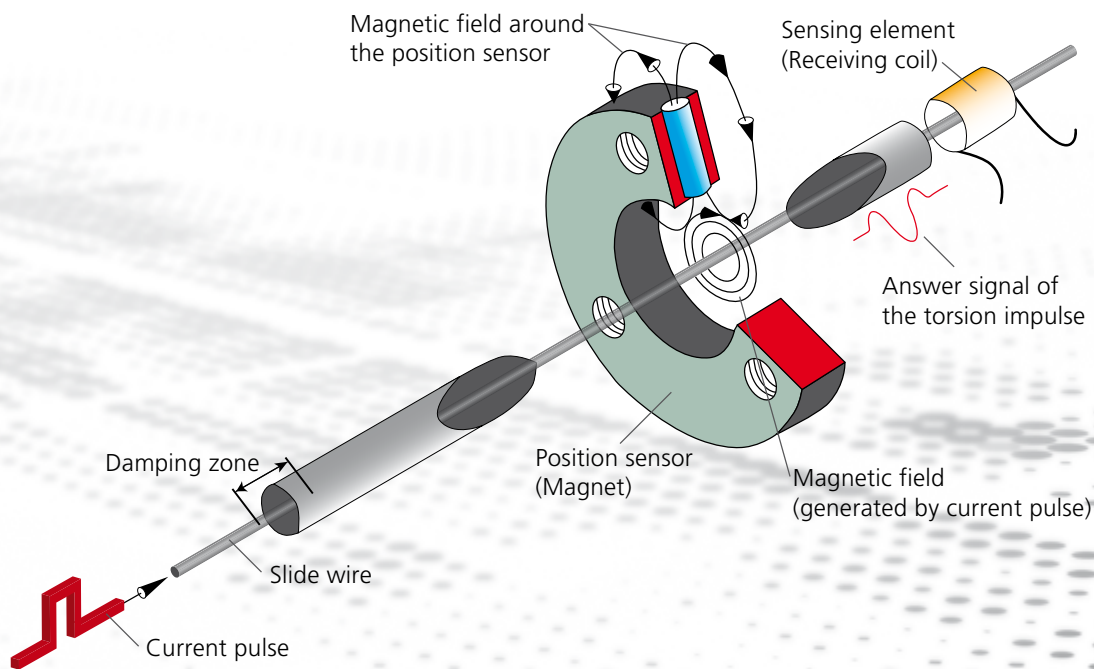


Linear Encoders

Overview



Magnetostriction



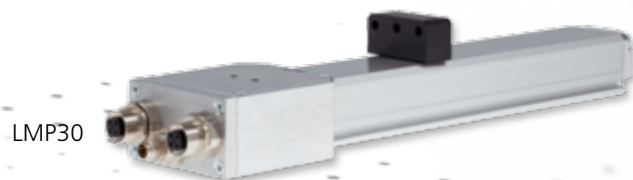
Functional description

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.

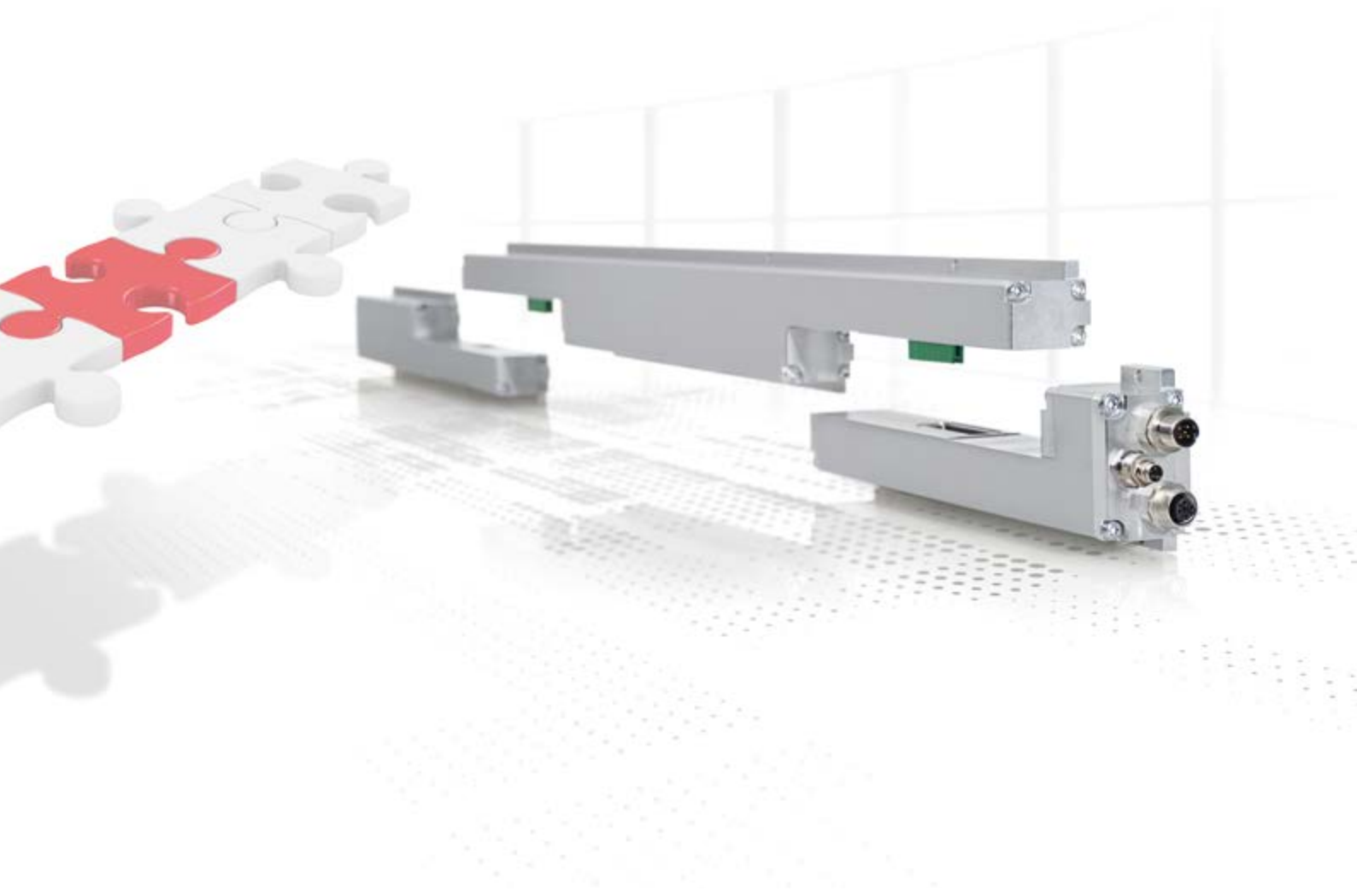
The time difference between the transmission of the torsion pulse and its arrival at the sensing element at the detector head is converted electronically into a distance proportional signal, which is provided either as a digital or analog output signal.



Contents

Technical Information	2	Types by Mechanical Design	10
Theory of Operation	2	- Tube Housing	10
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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.

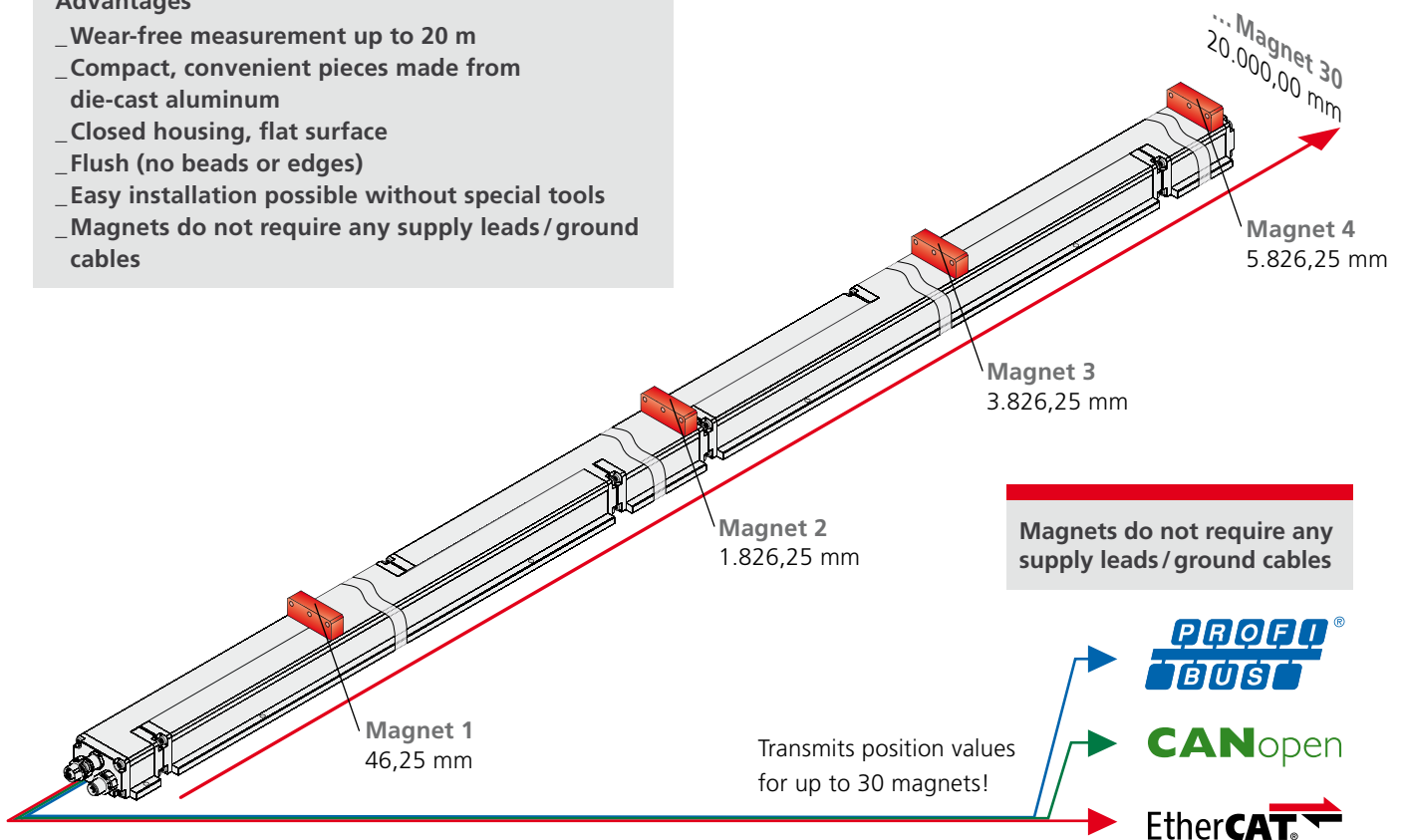
With LMC55 we have closed this gap: up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require power supply. The measuring system is only assembled to the full measuring length in

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



Magnets do not require any supply leads / ground cables

Transmits position values for up to 30 magnets!

PROFI[®]
BUS

CANopen

EtherCAT[®]

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

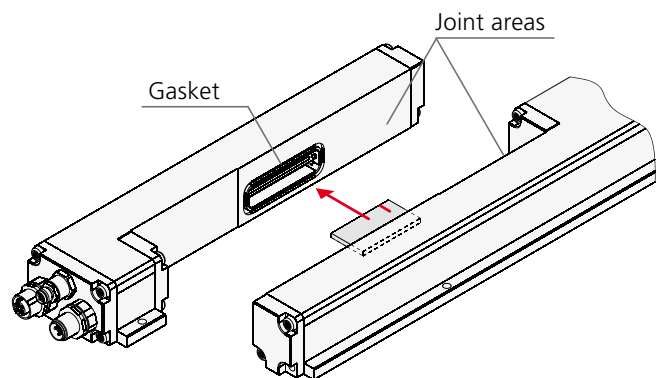
The type 2 end component forms the end element in conjunction with a type 1 slave.

Correct configuration before measurement

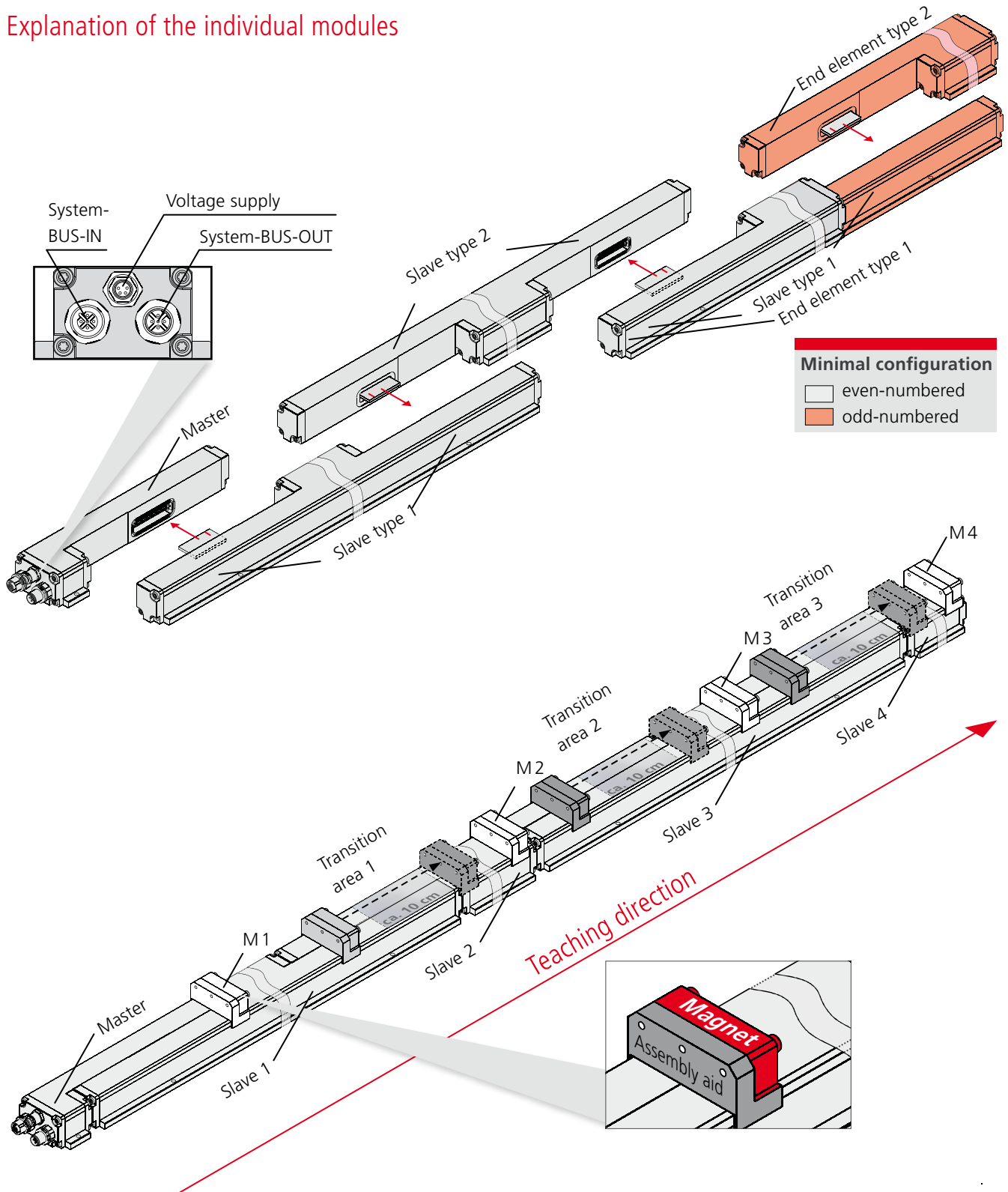
Before the measuring system can be operated, e.g. on PROFIBUS, the mechanically installed individual components, the so-called slaves, must first be detected using the teach-in function.

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.



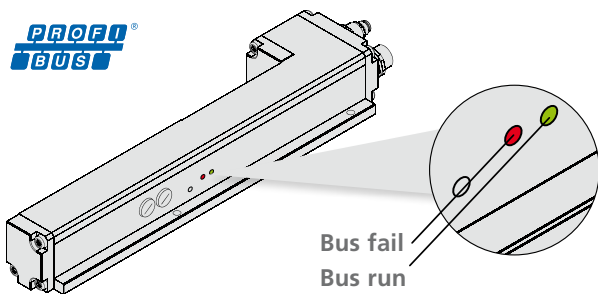
Explanation of the individual modules



Bus status display – LMC55

Example: Profibus

The measuring system has two LEDs. A green LED (Bus run) to display status information and a red LED (Bus fail) to display errors. When the measuring system starts up, both LEDs flash briefly. The display then depends on the operating status of the measuring system.



LED, green	Bus run
● = on	ready for operation
○ = off	supply absent, hardware error
○ = 10 Hz	parameterization or configuration errors

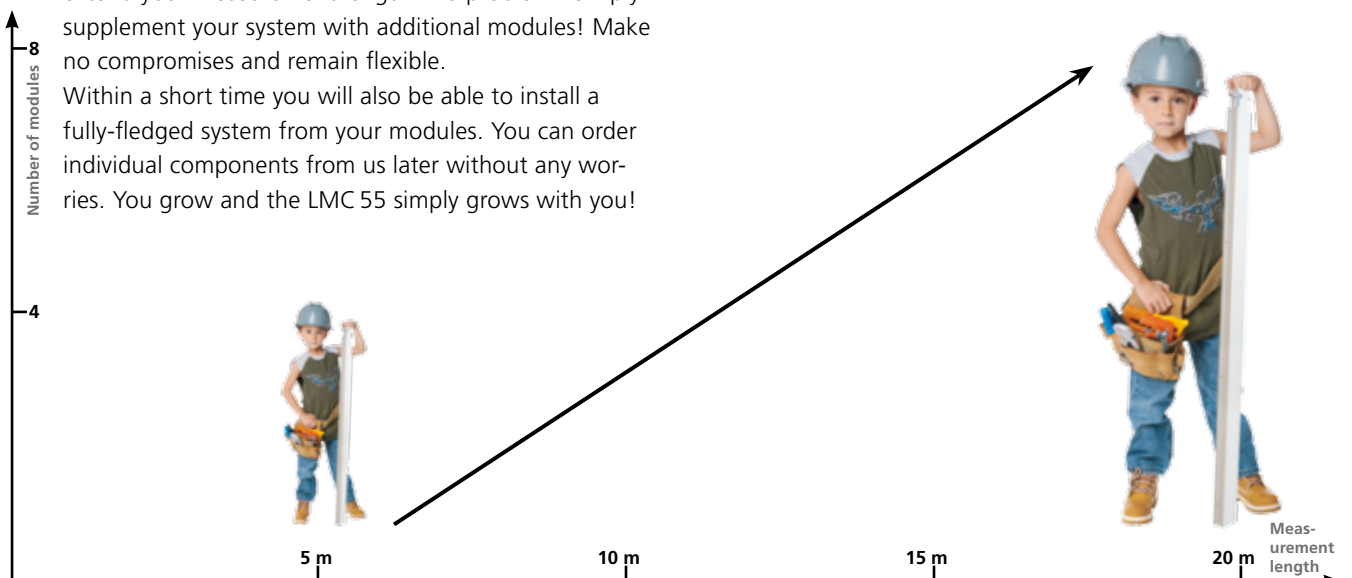
LED, red	Bus fail
○ = off	No error, bus in cycle
● = 1 Hz	Measuring system not addressed by the master, no data exchange
● = 10 Hz	Measuring system is in data exchange and has not detected any magnets.

Can be extended at any time – individual measuring lengths in stock

Simply keep individual components in stock. If a replacement is required, you will have the replacement modules immediately available. You can replace the necessary modules and then carry out the repair unhurriedly - also resulting in minimal downtime. Thanks to its compact design it only requires minimal storage space.

Demands in the industry are increasing, and you need to extend your measurement length? No problem - simply supplement your system with additional modules! Make no compromises and remain flexible. Within a short time you will also be able to install a fully-fledged system from your modules. You can order individual components from us later without any worries. You grow and the LMC 55 simply grows with you!

- _ full interchangeability of the individual components
- _ only needs minimal storage space (handy modules)
- _ measuring system grows as requirements increase
- _ with minimal downtime (in the event of repairs)



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.

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.

LA46

LMR48





Product	LA46 	LMR48 
Mechanic execution	(R) Tube, (H) detachable tube	(R) Tube
Range	50...4000 mm*, in steps	50...3000 mm*, in steps
Size	46	48
Supply voltage	24 VDC, -20...+10 %*	12..24 VDC, +- 10%
Resolution	0,005 mm	0,05 mm
Linearity defect	± 0,10 mm ≤ 1500 mm ± 0,15 mm > 1500 mm	± 0,04 % + 1 LSB
Reproducibility	0,005 mm	
Hysteresis	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm	0,1 mm
Temperature coefficient	< 15 ppm/°C > 500 mm *	± 30 ppm/°C
Ambient temperature	-20...+70 °C; 0...+70 °C	-40...+85 °C
Protection class	IP65	IP65, option IP69K
Options	Multimagnet*, tube tip support	
Orientation	Any desired	Any desired
Material	Cr/Ni-Alloy	Cr/Ni-Alloy
Maximum pressure	600 bar, static	450 bar, static
Interface	<p>SSI </p> <p>Analog </p> <p> </p> <p>CANopen </p> <p> </p>	<p>SSI CANopen</p> <p>Analog</p>
Weblink	www.tr-electronic.com/s/S006913	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

LMR70

Product	LMR48/46	LMR70
		
Mechanic execution	(R) Tube	(R) Tube
Range	50...3000 mm, in steps	50...2000 mm
Size	48	70 (triple redundant)
Supply voltage	12..24 VDC, +- 10%	24 VDC, -20...+20 %
Resolution	0,05 mm	12 bit or 16 bit
Linearity defect	± 0,04 % + 1 LSB	± 0,10 mm ≤ 1500 mm ± 0,15 mm > 1500 mm
Reproducibility		0,04mm
Hysteresis	0,1 mm	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm
Temperature coefficient	± 30 ppm/°C	< 15 ppm/°C > 500 mm *
Ambient temperature	-40...+85 °C	-40...+85 °C
Protection class	IP65, option IP69K	IP65
Options		Tube tip support
Orientation	Any desired	Any desired
Material	Cr/Ni-Alloy	Cr/Ni-Alloy
Maximum pressure	450 bar, static	600 bar, static
Interface	Analog	SSI Analog
Weblink	www.tr-electronic.com/s/S010986	www.tr-electronic.com/s/S008380
QR-Code		

* depends on interface

Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
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LA46 SSI

321-00975	LA_46K*150 SSI	4...20mA 16 bit w/ mating plug	150,00 mm	240,00 mm	0,002 mm
321-00872	LA_46K*500 SSI	4...20mA 16 bit w/ mating plug	500,00 mm	590,00 mm	0,002 mm
321-00801	LA_46K*750 SSI	4...20mA 16 bit w/ mating plug	750,00 mm	840,00 mm	0,005 mm
321-00569	LA_46K*1000 SSI	4...20mA 16 bit w/ mating plug	1.000,00 mm	1.090,00 mm	0,01 mm

LA46 Analog

321-00593	LA_46K*150 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	150,00 mm	240,00 mm	16 BIT;
321-00616	LA_46K*300 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	300,00 mm	390,00 mm	16 BIT;
321-00599	LA_46K*500 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	500,00 mm	590,00 mm	16 BIT;
321-01002	LA_46K*750 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	750,00 mm	840,00 mm	16 BIT;
321-00597	LA_46K*1000 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	1.000,00 mm	1.090,00 mm	16 BIT;

LA46 Profibus

321-01271	LA_46K*150 PB	R 0,005mm 2x5pinM12 1x4pinM8	150,00 mm	240,00 mm	0,005 mm
321-01041	LA_46K*300 PB	R 0,005mm 2x5pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm
321-00805	LA_46K*500 PB	R 0,005mm 2x5pinM12 1x4pinM8	500,00 mm	590,00 mm	0,005 mm
321-00806	LA_46K*750 PB	R 0,005mm 2x5pinM12 1x4pinM8	750,00 mm	840,00 mm	0,005 mm
321-00654	LA_46K*1000 PB	R 0,005mm 2x4pinM12 1x4pinM8	1.000,00 mm	1.090,00 mm	0,005 mm

LA46 DeviceNet

321-00151	LA_46*150 DN	R 0,01 mm fieldbus hood	150,00 mm	240,00 mm	0,01 mm
321-00508	LA_46*500 DN	R 0,005 mm fieldbus hood	500,00 mm	590,00 mm	0,005 mm
321-01285	LA_46*750 DN	R 0,01 mm fieldbus hood	750,00 mm	840,00 mm	0,01 mm
321-00961	LA_46*1000 DN	R 0,01 mm fieldbus hood	1.000,00 mm	1.090,00 mm	0,005 mm

LA46 Profinet

321-01103	LA_46*150 EPN	R 0,005mm 2x4pinM12 1x4pinM8	150,00 mm	240,00 mm	0,005 mm
321-00884	LA_46*300 EPN	R 0,005mm 2x4pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm
321-00809	LA_46*750 EPN	R 0,005mm 2x4pinM12 1x4pinM8	750,00 mm	840,00 mm	0,005 mm
321-00942	LA_46*1000 EPN	R 0,005mm 2x4pinM12 1x4pinM8	1.000,00 mm	1.090,00 mm	0,005 mm

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

Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
LA46 Ethernet/IP					
321-00897	LA_46*300 EIP	R 0,005mm 2x4pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm
321-01564	LA_46/42*150 EIP	Flange M18 x 1,5 with groove (LA46/42)	150,00 mm	232,00 mm	0,005 mm
321-01565	LA_46/42*150 EIP	Flange M18 x 1,5 with groove (LA46/42)	350,00 mm	432,00 mm	0,005 mm
321-01566	LA_46/42*150 EIP	Flange M18 x 1,5 with groove (LA46/42)	750,00 mm	832,00 mm	0,005 mm
LMR70 Analogue					
335-00001	LMR_70*180 ANA_I+JUSTAGE		180,00 mm	264,00 mm	16 BIT;

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

Further product information

1. Enter order code into ...



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



3. Choose desired information

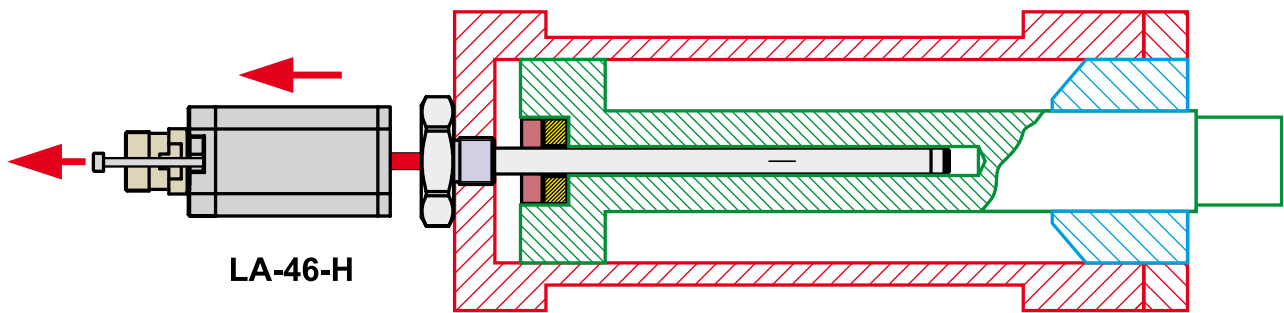


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

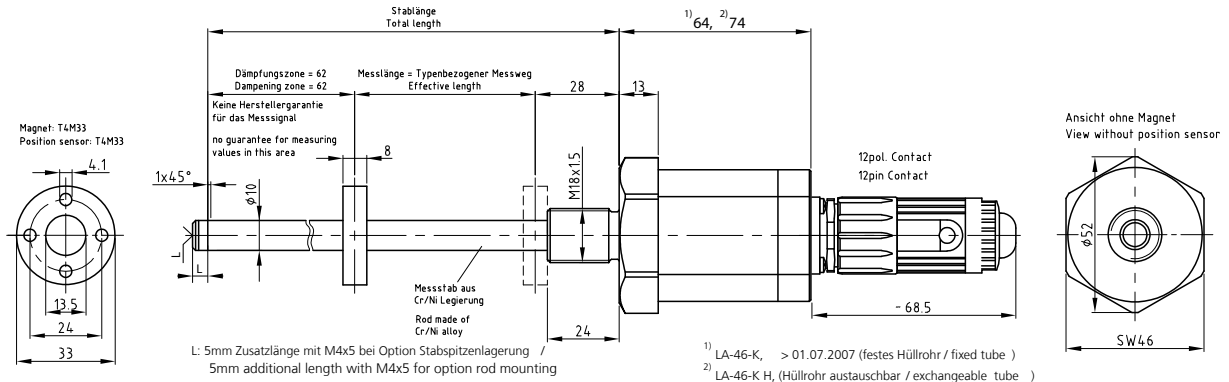
Dimensional Drawings

Detachable tube (H) (option for LA46)

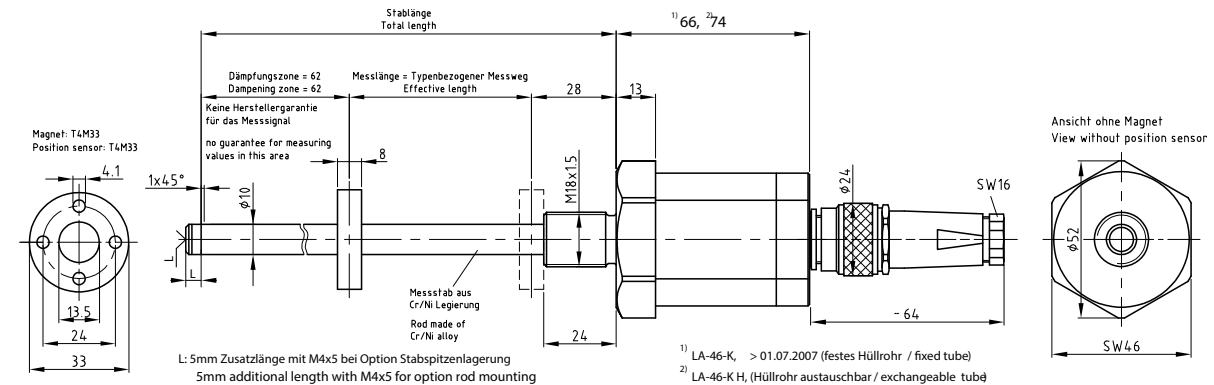
Tube resides in cylinder, oil stays pressurized. Change in length, see following drawings



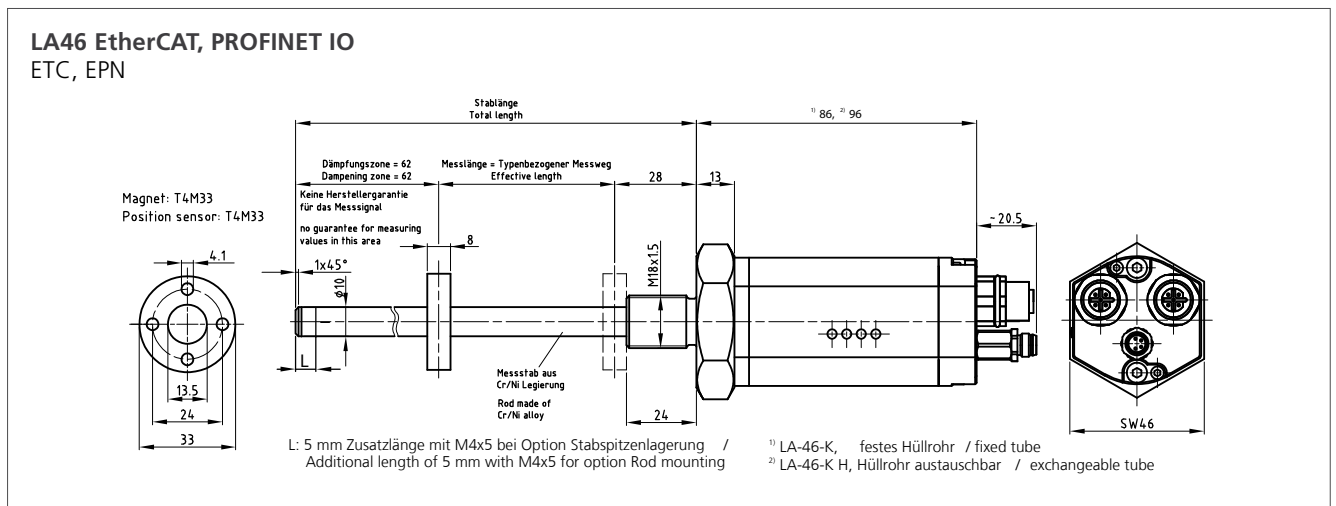
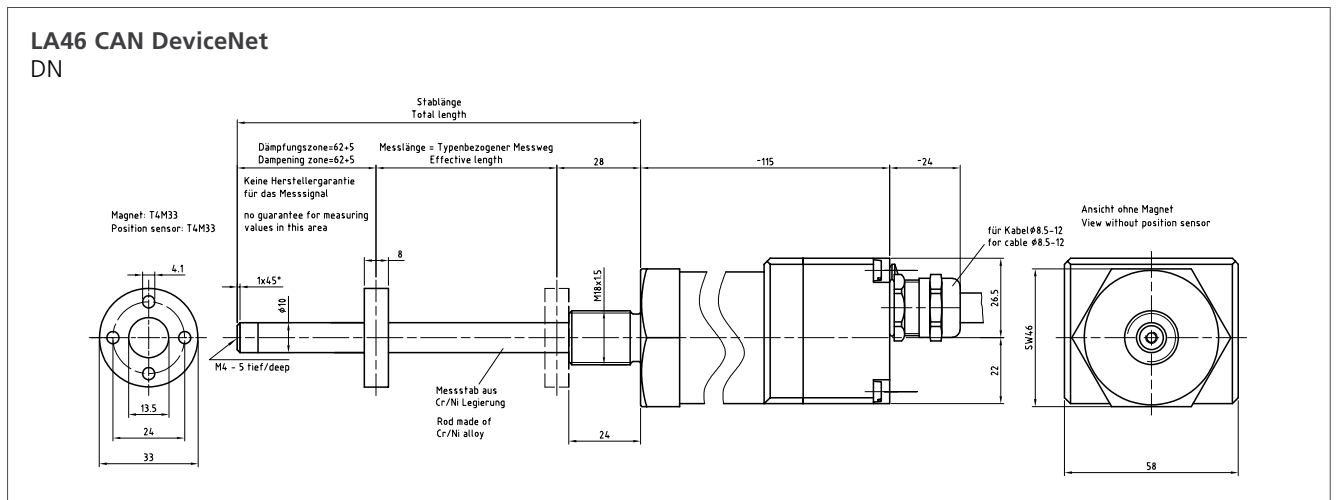
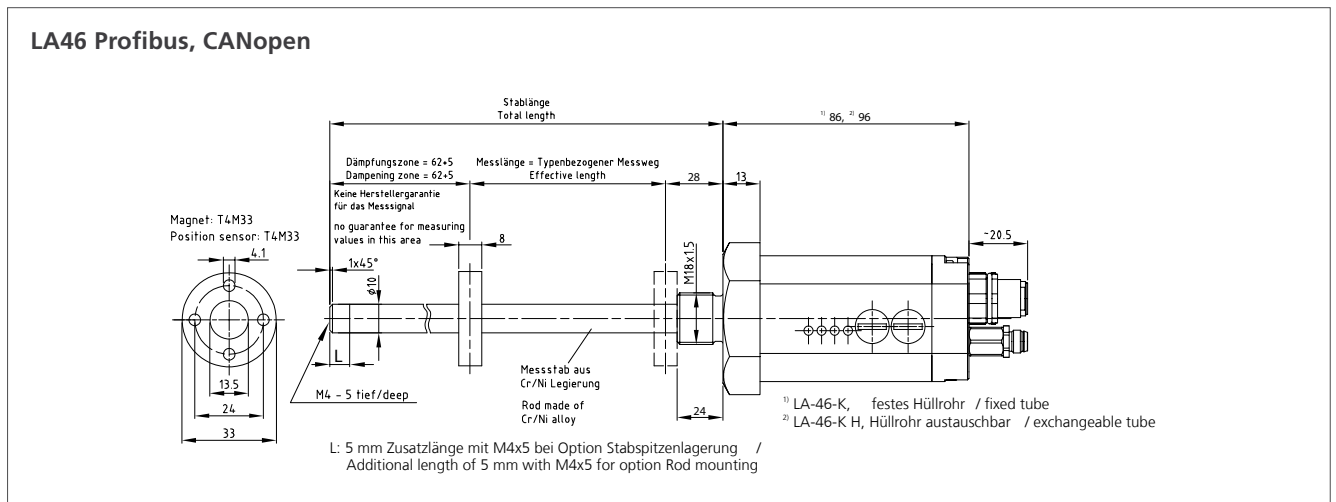
LA46 SSI



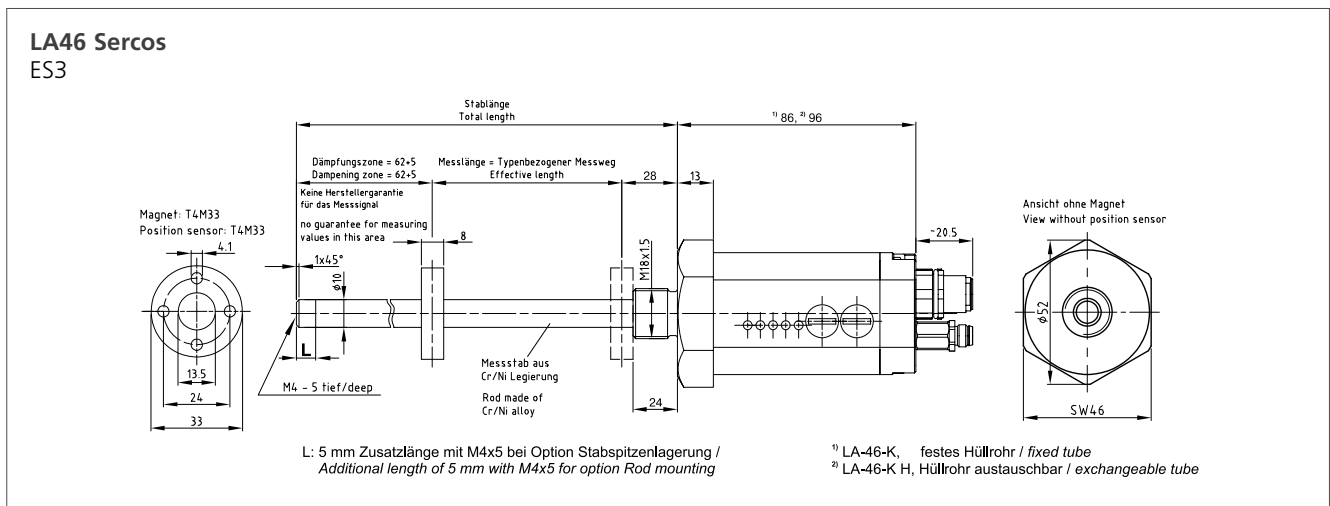
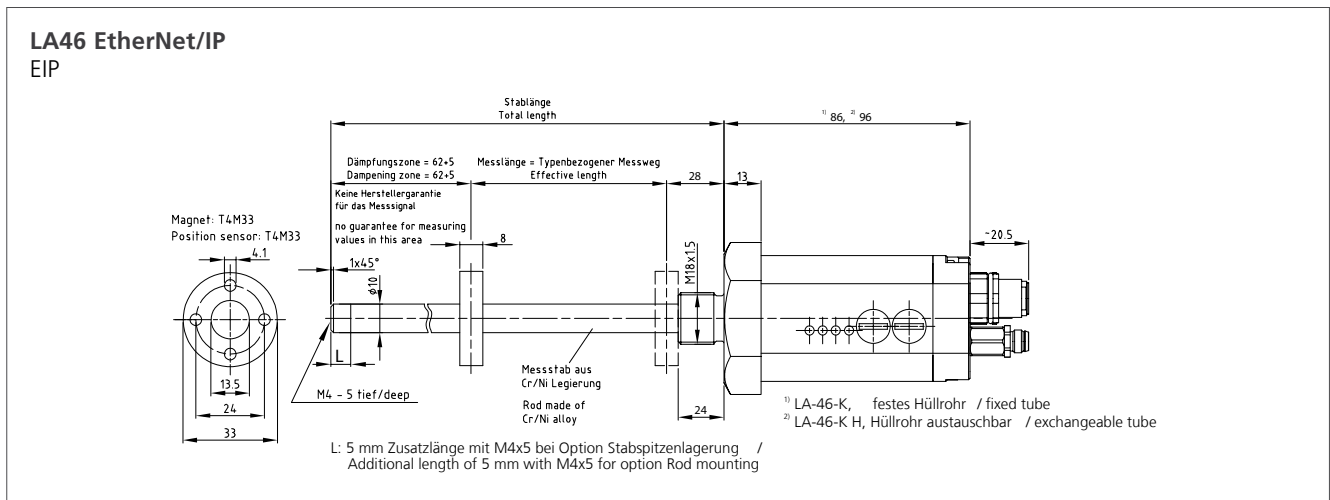
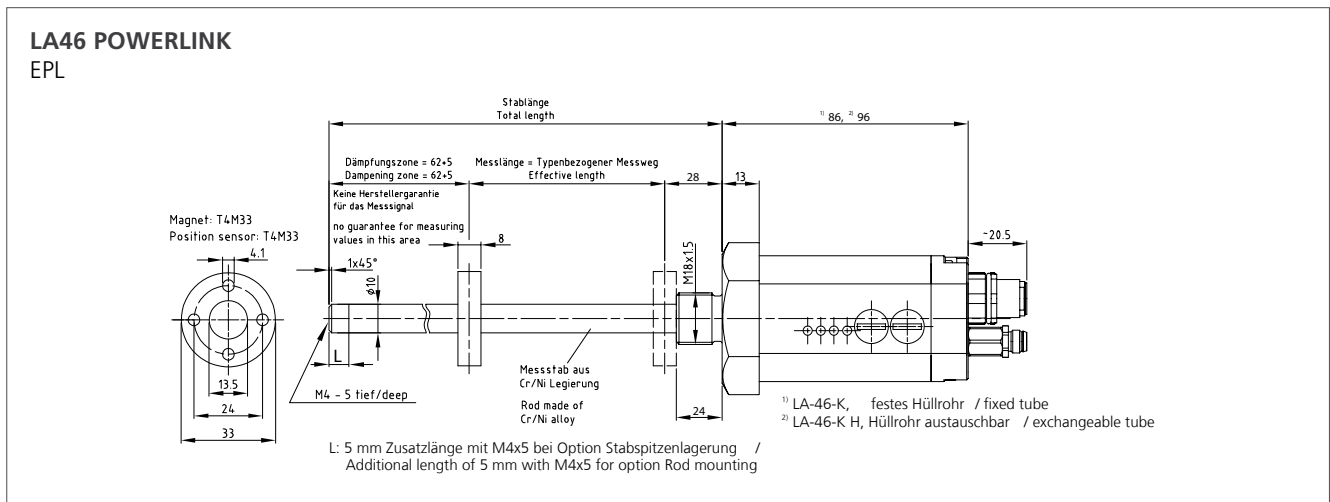
LA 46 Analog



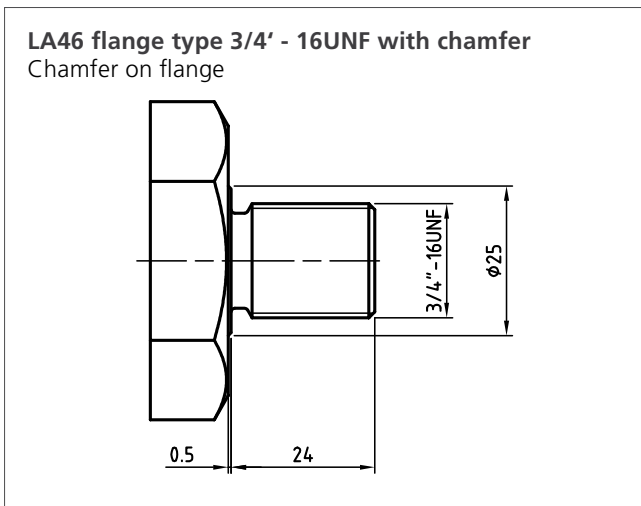
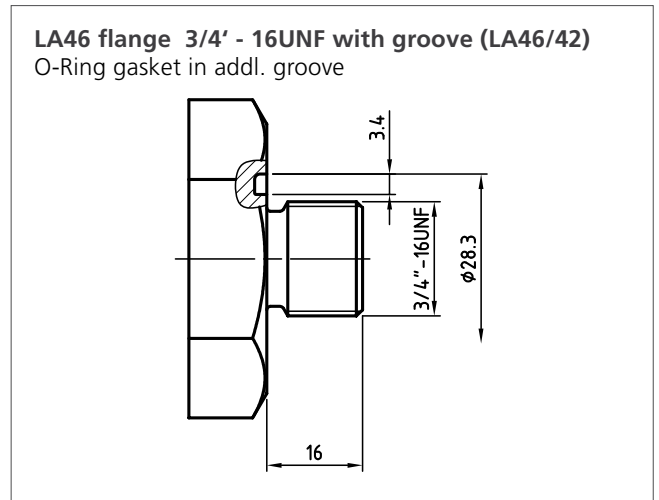
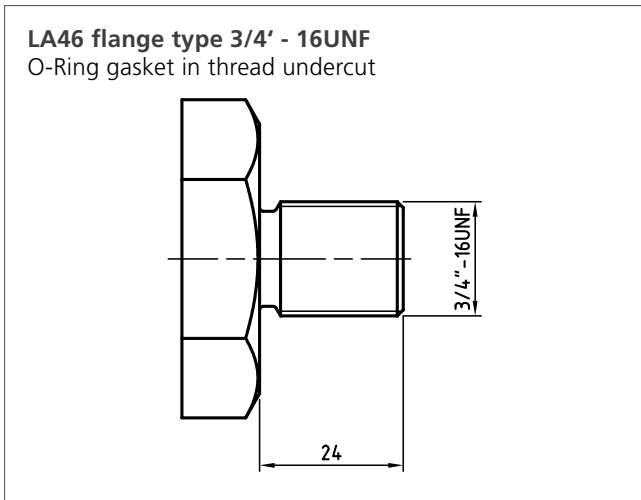
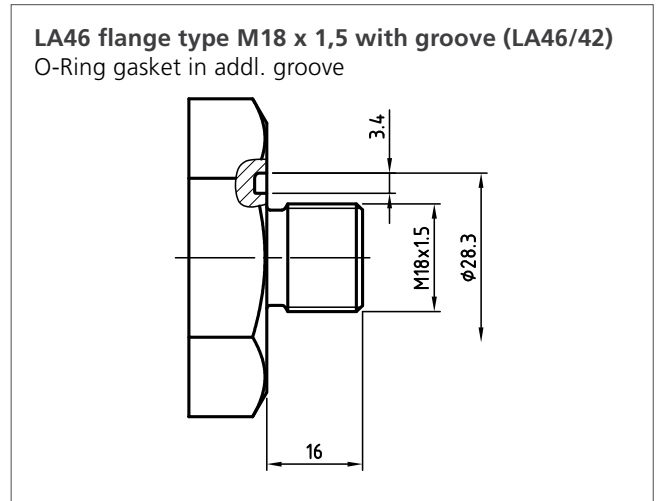
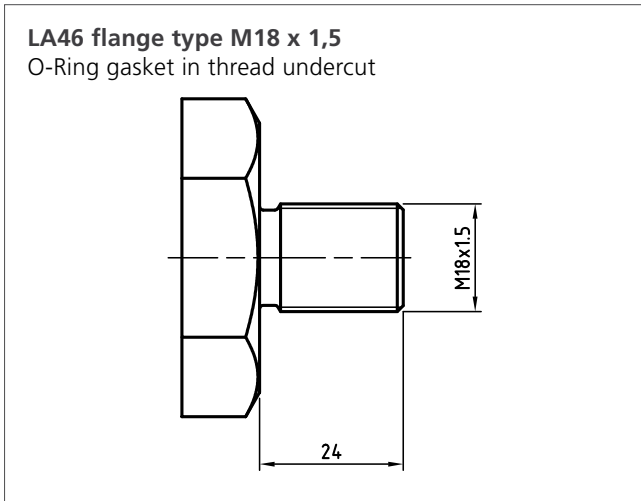
Dimensional Drawings



Dimensional Drawings

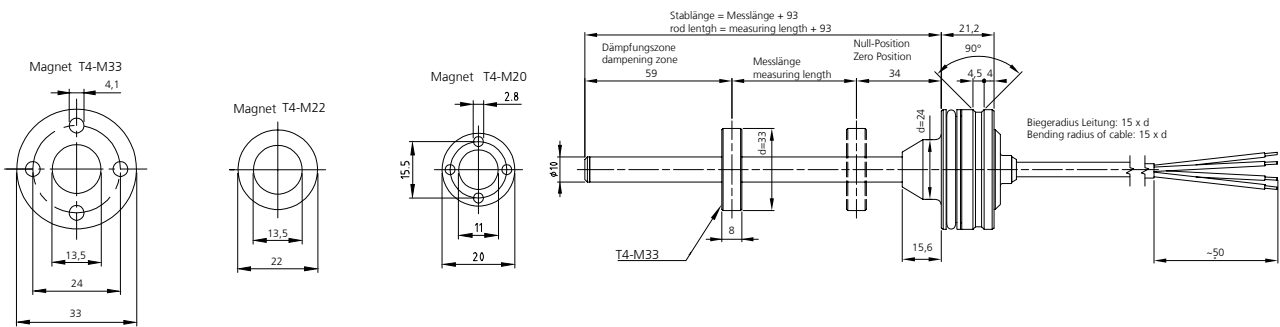


Dimensional Drawings

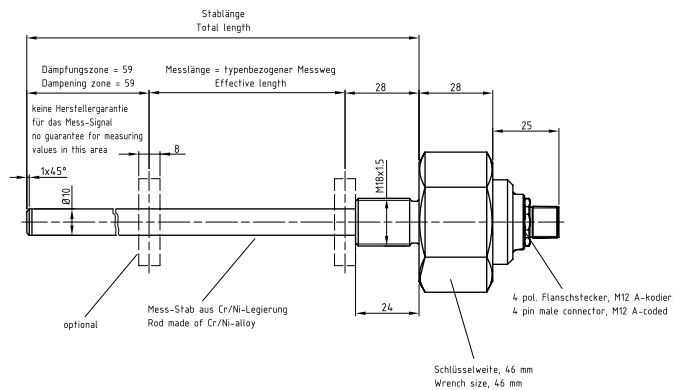


Dimensional Drawings

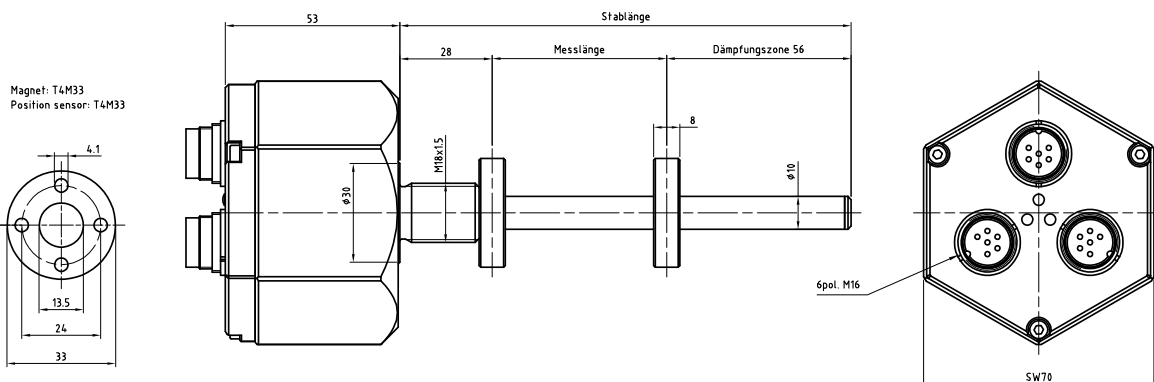
LMR48 SSI, Analog, CAN SSI, ANA, CAN



LMR48/46 Analog ANA



LMR70 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.

LP46

LMP30

LMP48

Product	LA46	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	0,005 mm	0,01mm *	0,05 mm
Linearity defect	± 0,10 mm ≤ 1500 mm ± 0,15 mm > 1500 mm	± 0,15 mm ≤ 1500 mm ± 0,20 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	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm	± 0,1 % FS *
Temperature coefficient	< 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
Maximum pressure			
Interface	<p>SSI </p> <p>Analog </p> <p> </p> <p>CANopen </p> <p> SERCOS the automation bus</p>	<p>SSI </p> <p>Analog </p> <p>ISI </p> <p> </p> <p>CANopen</p>	<p>SSI CANopen</p> <p>Analog</p>
Weblink	www.tr-electronic.com/s/S008394	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 LP46 SSI					
320-00185	LP_46K*150 SSI	M23, 12 pin including mating plug	150,00 mm	239,00 mm	0,002 mm
320-00352	LP_46K*300 SSI	M23, 12 pin including mating plug	300,00 mm	389,00 mm	0,002 mm
320-00226	LP_46K*500 SSI	M23, 12 pin including mating plug	500,00 mm	589,00 mm	0,002 mm
320-00631	LP_46K*750 SSI	M23, 12 pin including mating plug	750,00 mm	839,00 mm	0,002 mm
320-00327	LP_46K*1000 SSI	M23, 12 pin including mating plug	1.000,00 mm	1.089,00 mm	0,002 mm
Linear encoder profile housing Analogue LP46 A					
320-00257	LP_46K*150 ANA_I+JUSTAGE	Current, 8 pin including mating plug	150,00 mm	239,00 mm	16 BIT
320-00258	LP_46K*300 ANA_I+JUSTAGE	Current, 8 pin including mating plug	300,00 mm	389,00 mm	16 BIT
320-00321	LP_46K*500 ANA_I+JUSTAGE	Current, 8 pin including mating plug	500,00 mm	589,00 mm	16 BIT
320-00232	LP_46K*750 ANA_I+JUSTAGE	Current, 8 pin including mating plug	750,00 mm	839,00 mm	16 BIT
320-00370	LP_46K*1000 ANA_I+JUSTAGE	Current, 8 pin including mating plug	1.000,00 mm	1.089,00 mm	16 BIT
Linear encoder profile housing Profibus LP46 PB					
320-00282	LP_46K*150 PB	2x M12, 1 x M8	150,00 mm	239,00 mm	0,005 mm
320-00360	LP_46K*300 PB	2x M12, 1 x M8	300,00 mm	389,00 mm	0,005 mm
320-00438	LP_46K*500 PB	2x M12, 1 x M8	500,00 mm	589,00 mm	0,005 mm
320-00259	LP_46K*750 PB	2x M12, 1 x M8	750,00 mm	839,00 mm	0,005 mm
320-00260	LP_46K*1000 PB	2x M12, 1 x M8	1.000,00 mm	1.089,00 mm	0,005 mm
Linear encoder profile housing DeviceNet LP46 DN					
320-00132	LP_46*150 DN	Fieldbus hood, 2x cable gland M16x1,5	150,00 mm	239,00 mm	0,01 mm
320-00187	LP_46*300 DN	Fieldbus hood, 2x cable gland M16x1,5	300,00 mm	389,00 mm	0,01 mm
320-00188	LP_46*500 DN	Fieldbus hood, 2x cable gland M16x1,5	500,00 mm	589,00 mm	0,01 mm
320-00632	LP_46*750 DN	Fieldbus hood, 2x cable gland M16x1,5	750,00 mm	839,00 mm	0,01 mm
320-00633	LP_46*1000 DN	Fieldbus hood, 2x cable gland M16x1,5	1.000,00 mm	1.089,00 mm	0,01 mm

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

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

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
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Linear encoder profile housing Profinet LP46 PN

320-00289	LP_46*150 EPN	2x M12, 1 x M8	150,00 mm	239,00 mm	0,005 mm
320-00498	LP_46*300 EPN	2x M12, 1 x M8	300,00 mm	389,00 mm	0,005 mm
320-00419	LP_46*500 EPN	2x M12, 1 x M8	500,00 mm	589,00 mm	0,005 mm
320-00342	LP_46*750 EPN	2x M12, 1 x M8	750,00 mm	839,00 mm	0,005 mm
320-00600	LP_46*1000 EPN	2x M12, 1 x M8	1.000,00 mm	1.089,00 mm	0,005 mm

Linear encoder profile housing Powerlink LP46 EPL

320-00194	LP_46*150 EPL_2	2x M12, 1 x M8	150,00 mm	239,00 mm	0,005 mm
320-00198	LP_46*300 EPL_2	2x M12, 1 x M8	300,00 mm	389,00 mm	0,005 mm

Linear encoder profile housing ATEX SSI LP46 SSI

334-00001	LP_46K*300 SSI ATEX	M23, 12 pin with 1 m cable	300,00 mm	389,00 mm	0,002 mm
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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

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

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

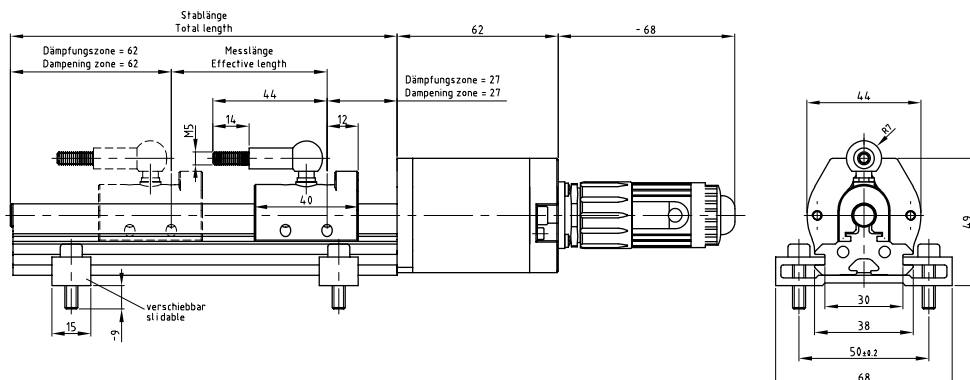
Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
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 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
Linear encoder profile housing Analogue LMP48 A					
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

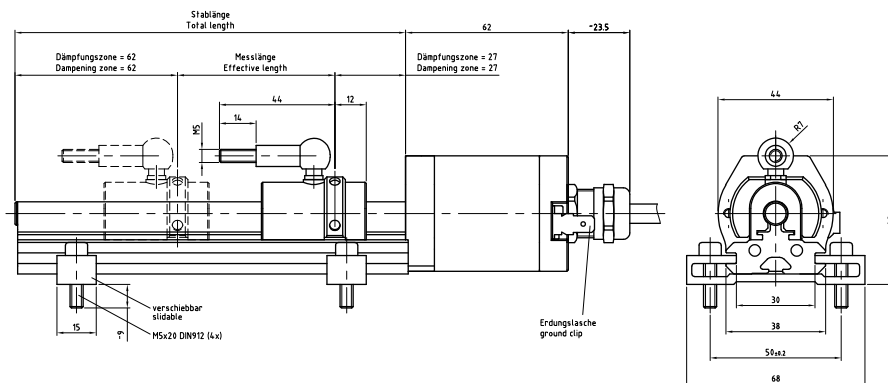
For further product information simply enter the order number in the search field at www.tr-electronic.de.

Dimensional Drawings

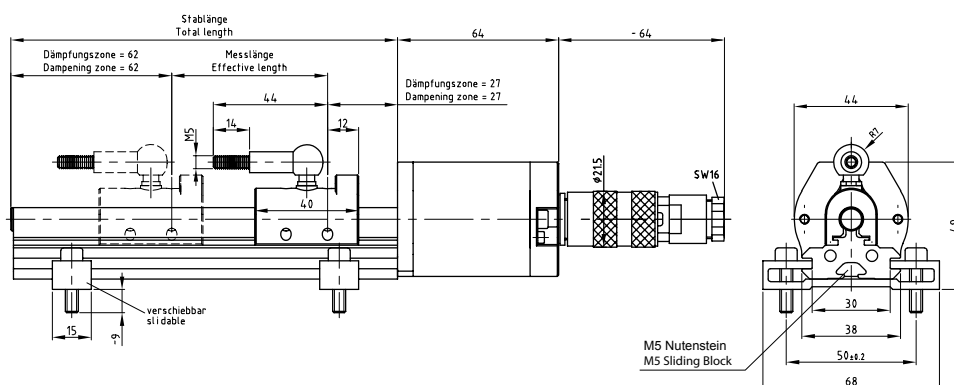
LP46 SSI SSI



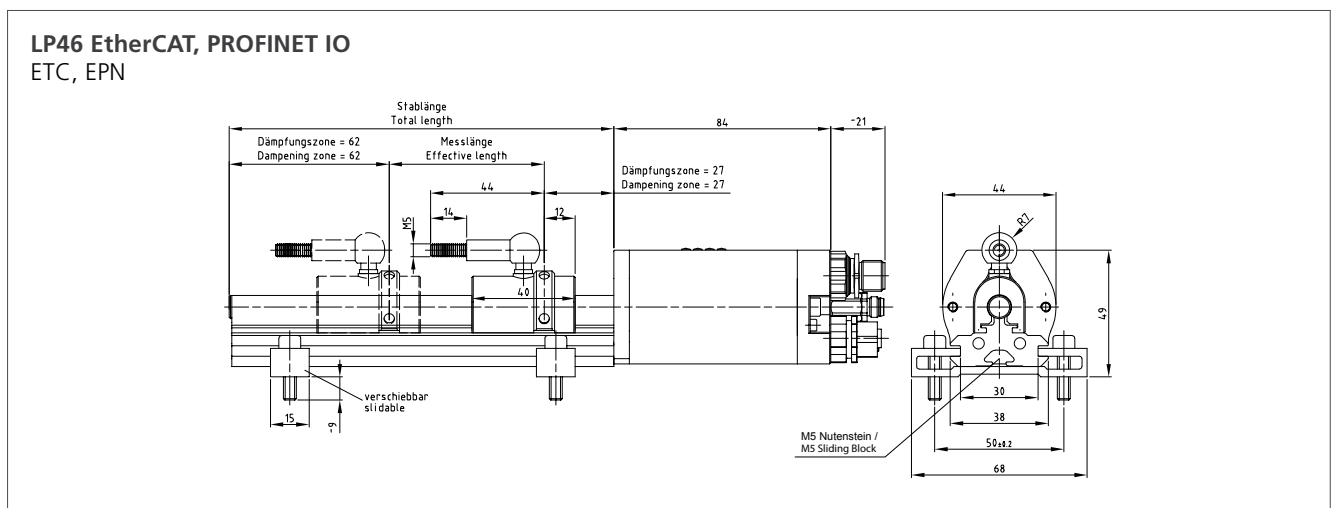
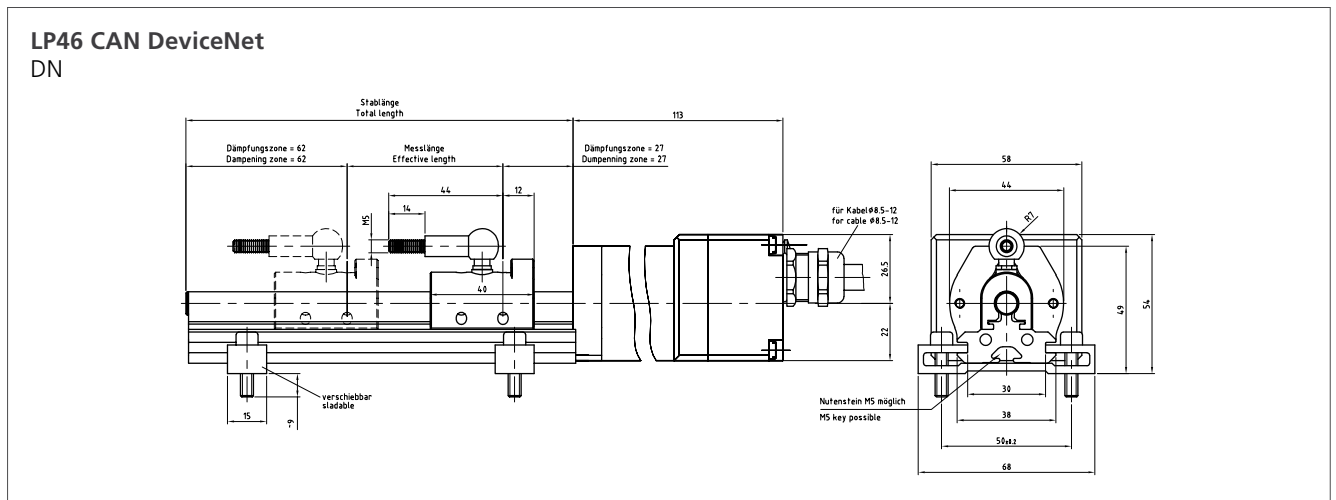
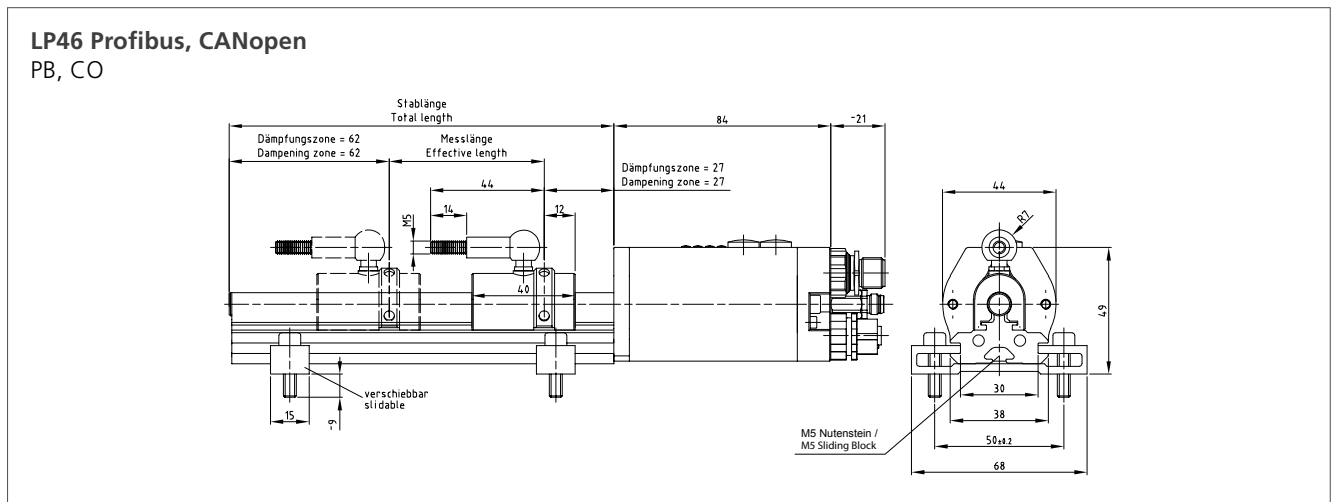
LP46 SSI ATEX SSI



LP46 Analog ANA

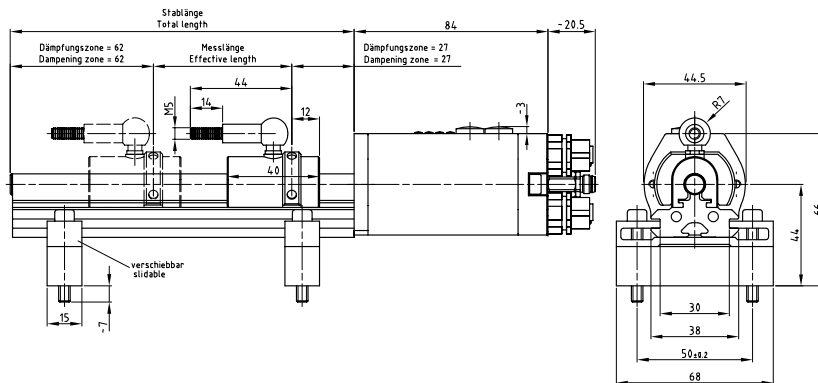


Dimensional Drawings

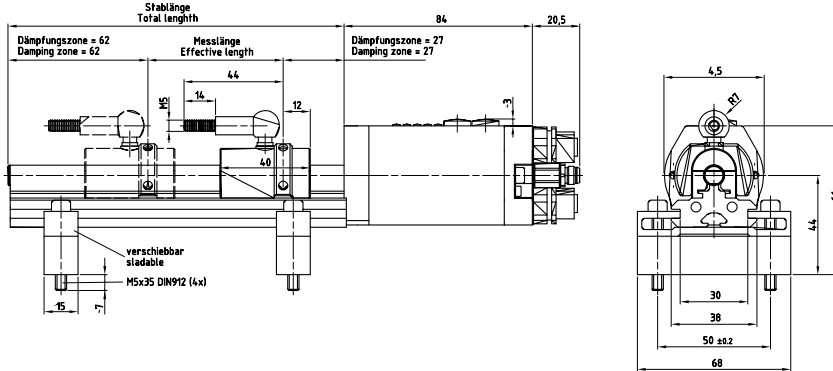


Dimensional Drawings

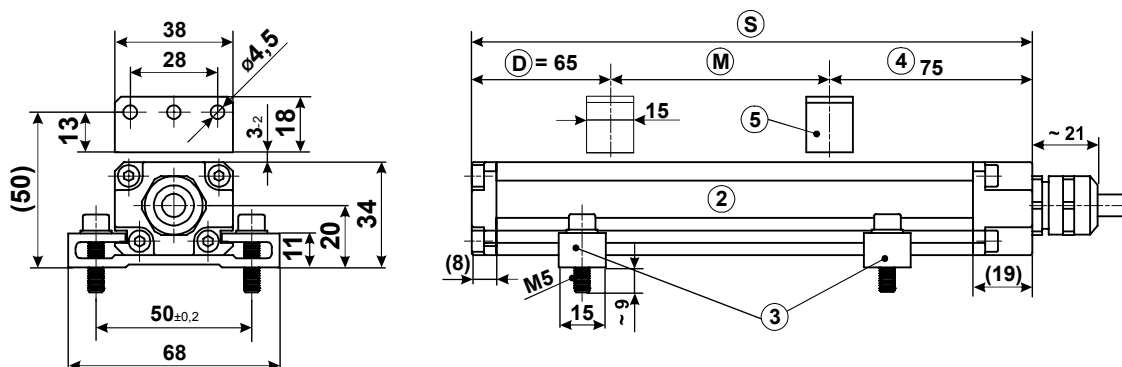
LP46 EtherNet/IP, POWERLINK EIP, EPL



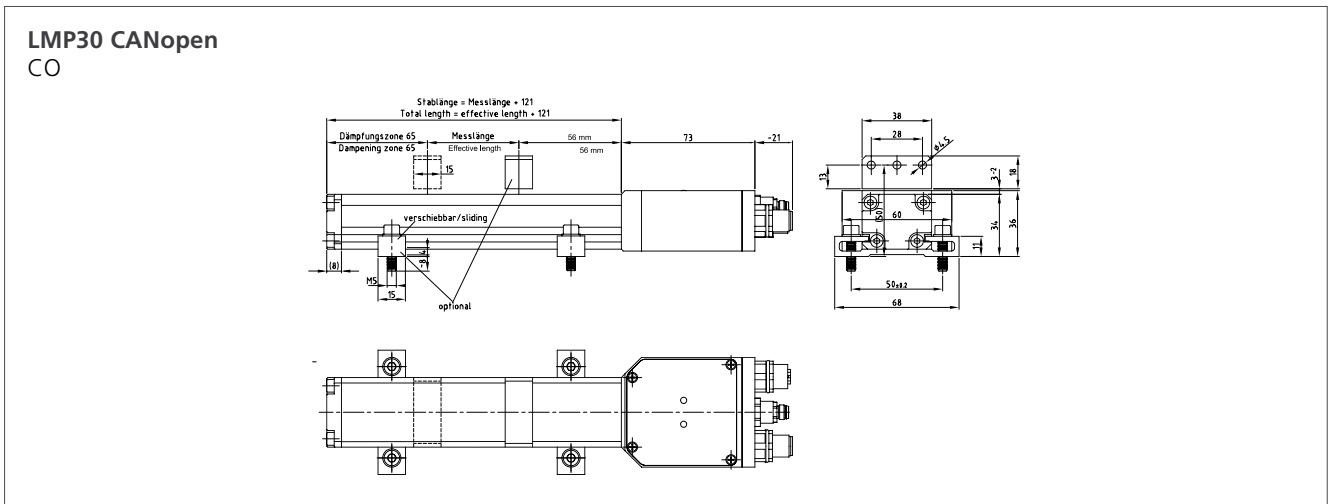
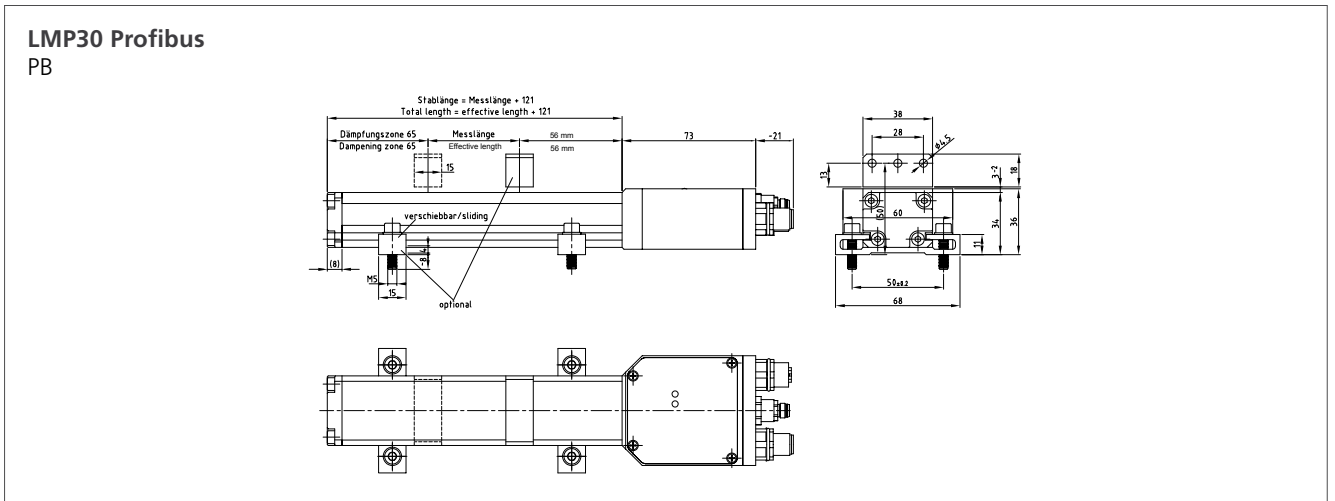
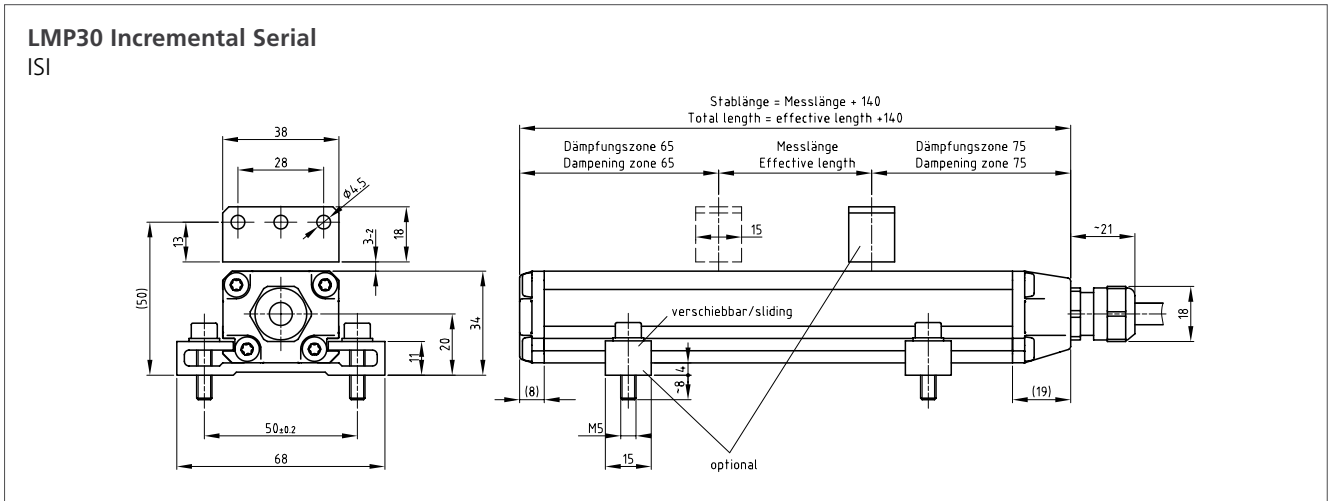
LP46 Sercos ES3



LMP30 SSI, Analog SSI, ANA

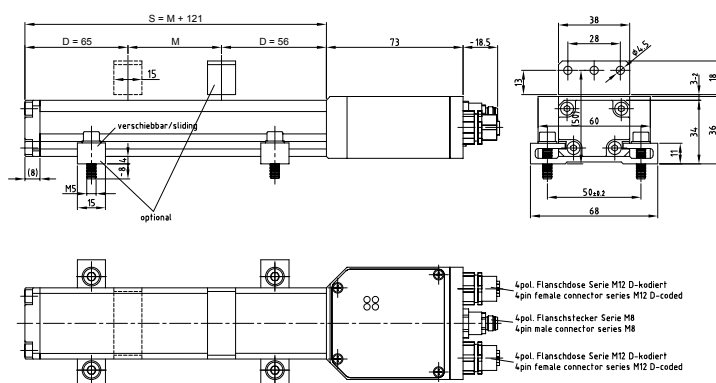


Dimensional Drawings

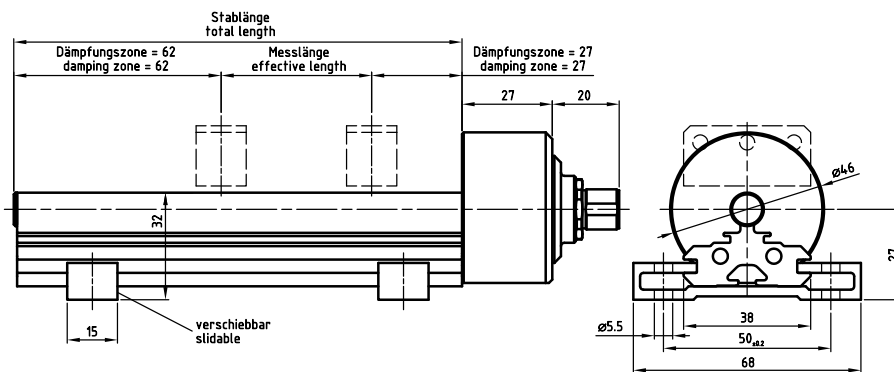


Dimensional Drawings

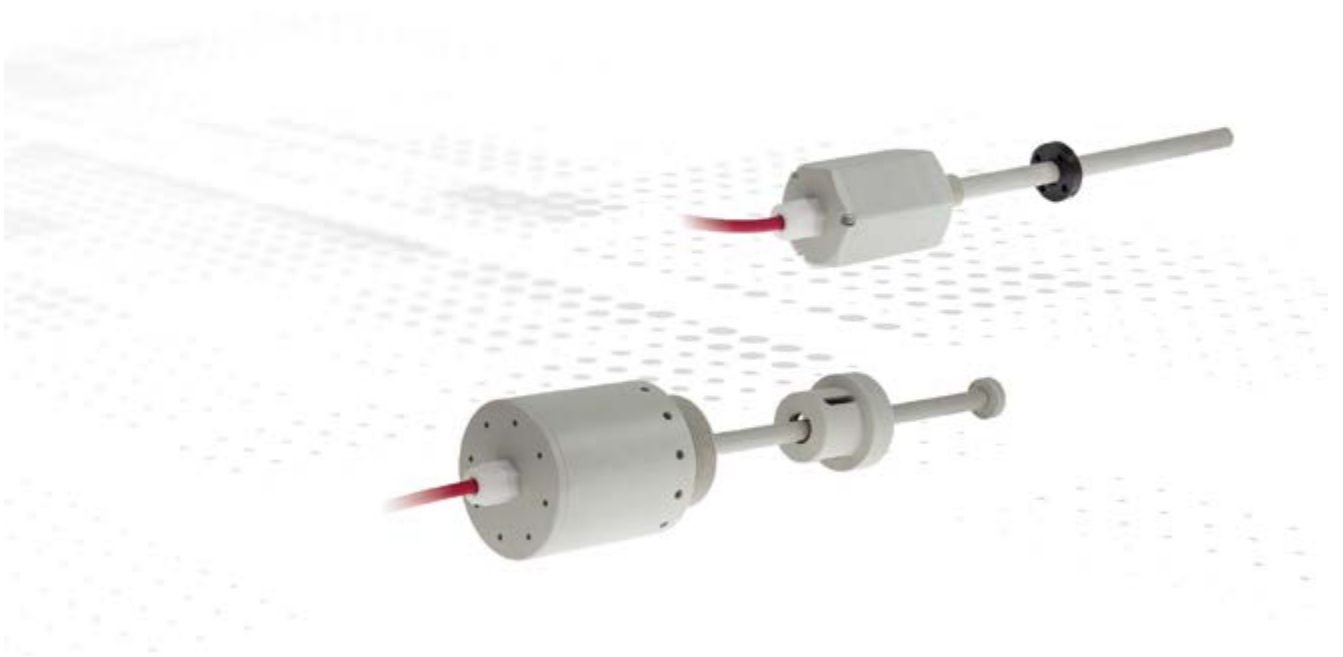
LMP30 Profinet, Ethernet/IP, EtherCAT, Powerlink EPN, EIP, ETC, EPL



LMP48 Analog, SSI, CAN AN, SSI, CAN



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.

LA50

LA80

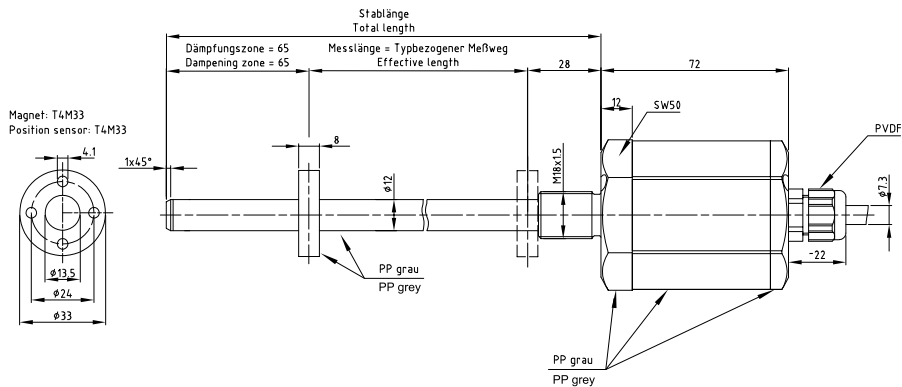
Product	LA50	LA80
		
Mechanic type	(R) Tube (plastic)	(R) Tube (plastic)
Range	100 ... 1000 mm (in steps)	100 ... 1000 mm (in steps)
Size	50	80
Supply voltage	24 VDC, -20...+10 %	24 VDC, -20...+10 %
Resolution	0,001 mm	0,01 mm
Linearity deviation	± 0,10 mm	< 0,05 %
Reproducibility	0,005 mm	0,01 mm
Hysteresis	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

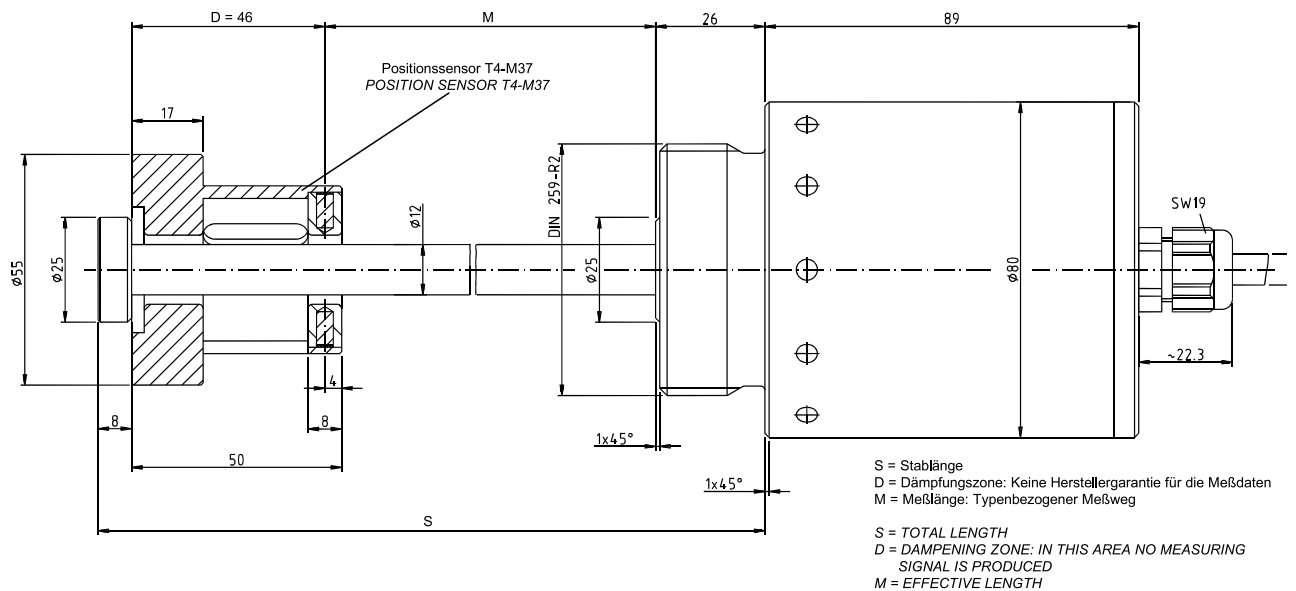
Can't find the right variant? Please contact us (info@tr-electronic.de)

Dimensional Drawings

LA50 SSI, Analog
SSI, ANA



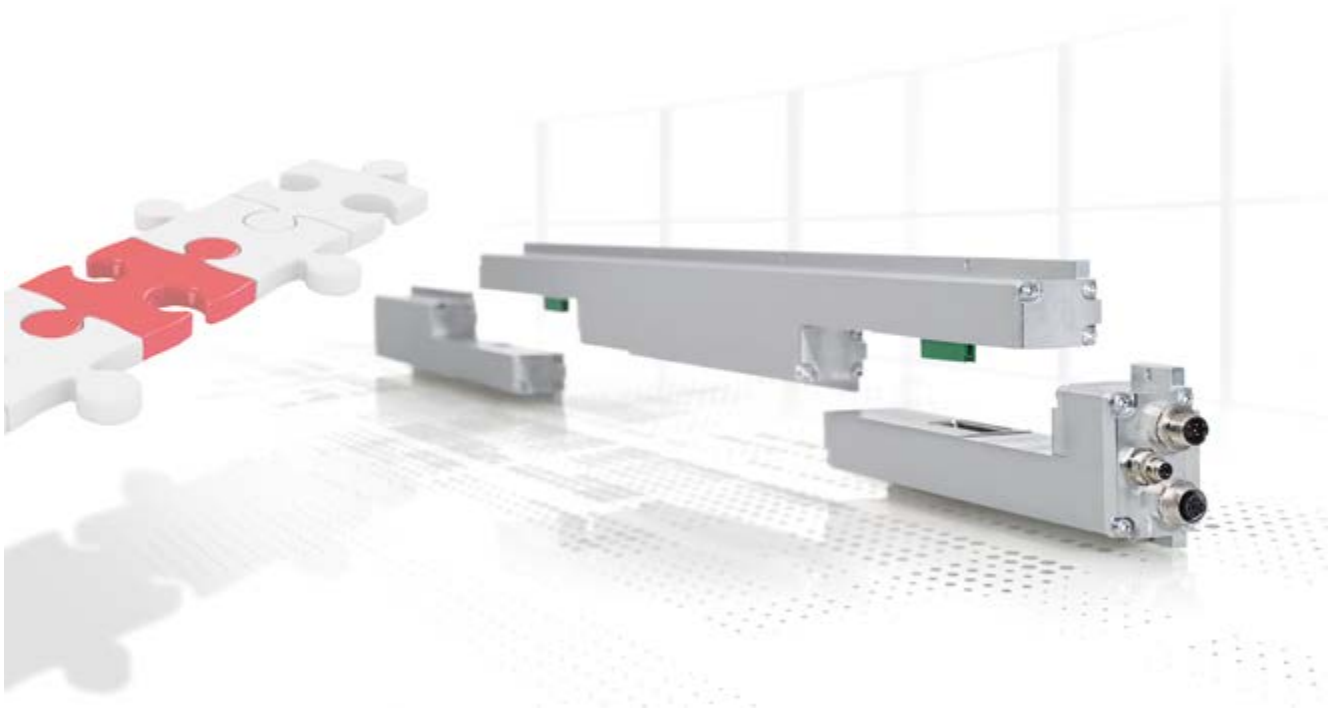
LA80 SSI, Analog
SSI, ANA



Meßlänge M (mm) EFFECTIVE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (MM)	Zykluszeit (ms) CYCLE (ms)	Meßlänge M (mm) EFFECTIVE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (MM)	Zykluszeit (ms) CYCLE (ms)
100	180	1,5	600	680	1,5
150	230	1,5	650	730	1,5
200	280	1,5	700	780	1,5
250	330	1,5	750	830	1,5
300	380	1,5	800	880	1,5
350	430	1,5	850	930	1,5
400	480	1,5	900	980	1,5
450	530	1,5	950	1030	1,5
500	580	1,5	1000	1080	1,5
550	630	1,5	-	-	-



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. 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
- _ Interfaces: PROFIBUS, CANopen, EtherCAT
- _ Magnets do not require any supply leads

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	Name	Measurement length
LMC55 master		
326M-00001	PROFIBUS	
326M-00002	CANopen	
326M-00003	EtherCAT	
LMC55 Slave		
326S-00002	typ 1	2,000 mm
326S-00001	typ 2	2,000 mm
LMC55 End element typ 1		
326E-00009	typ 1	250 mm
326E-00005	typ 1	500 mm
326E-00011	typ 1	750 mm
326E-00017	typ 1	850 mm
326E-00004	typ 1	1,000 mm
326E-00013	typ 1	1,250 mm
326E-00001	Typ 1	1,500 mm
326E-00015	typ 1	1,750 mm
326E-00015	typ 1	2,000 mm
LMC55 End element typ 2		
326E-00010	typ 2	250 mm
326E-00006	typ 2	500 mm
326E-00012	typ 2	750 mm
326E-00018	typ 2	850 mm
326E-00003	typ 2	1,000 mm
326E-00014	typ 2	1,250 mm
326E-00002	typ 2	1,500 mm
326E-00016	typ 2	1,750 mm
326E-00008	typ 2	2,000 mm

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

Ordering code	Name	Measurement length
Magnet		
49155009	Magnet T1-S5520 (black)	Distance from measuring system: 3 mm
Bus terminator		
40803-40005	PROFIBUS, B-coded, 220 Ω	
62000-1366	CANopen, A-coded, 120 Ω	

Further product information

1. Enter order code into ...



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

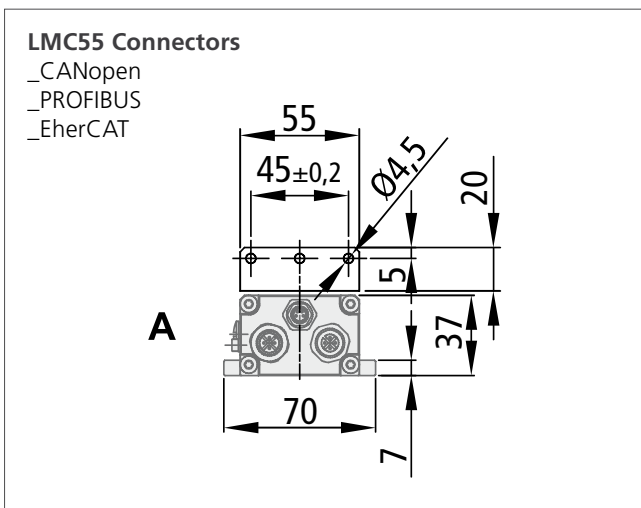
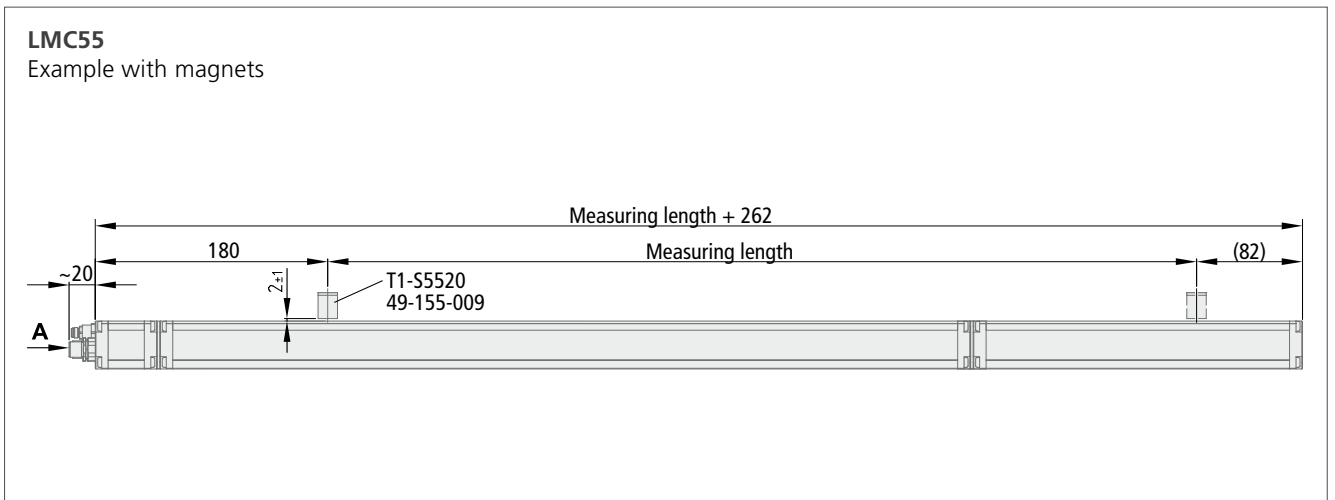
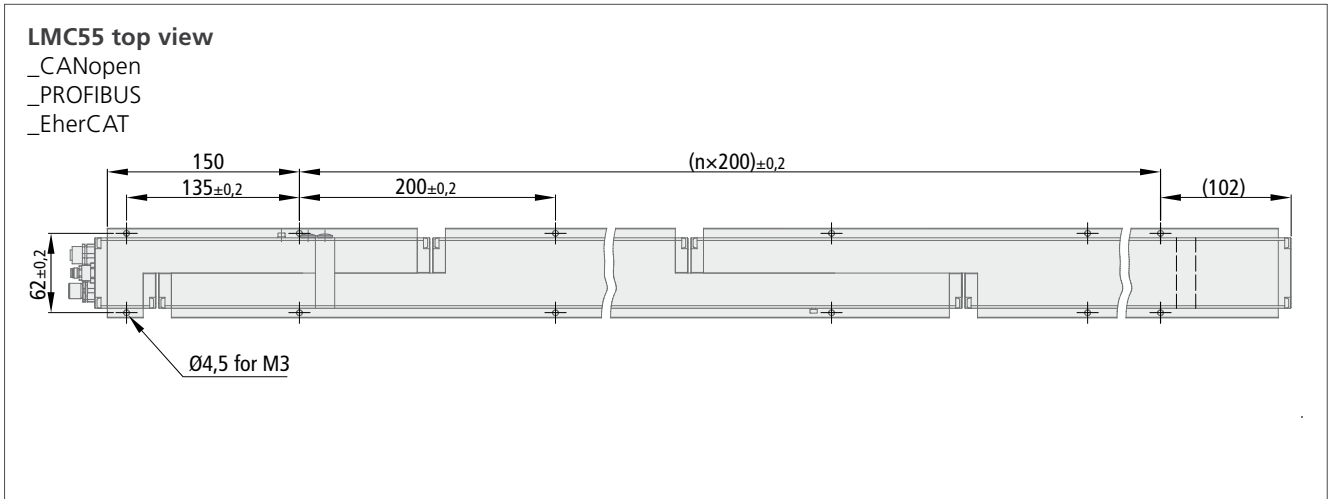


3. Choose desired information



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

Dimensional Drawings





TR-Electronic – your partner in automation

Rotary encoders

Absolute encoder, incremental rotary encoder, wire-actuated encoder

Rotary encoders with optical and magnetic scanning functions register the precise position in a wide variety of applications and industries. In medical engineering, miniature versions ensure correct positioning while SIL3-approved absolute rotary encoders provide the necessary safety. We offer not only high-quality rotary encoders (from Ø 22 to 160 mm) for almost any application but also a comprehensive range of accessories.

Linear encoders

Linear absolute measuring systems, laser displacement measurement

Linear encoders register linear motions in machines, tools and systems according to the specific requirements of different technologies. Linear encoders allow measuring distances of max. 20 m almost without any wear. This value is max. 240 m for laser measuring systems. Machines and systems can be precisely controlled to reach their desired positions.

Motion

Servo drives, compact drives, process drives

Intelligent encoTRive drives are available with the current field bus systems, such as PROFIBUS, PROFINET and CANopen, within a power range of up to 300 watts. These drives are configured to meet customer requirements and can be freely combined with a precision gear, holding brake and I/O. Values of up to 4,350 rpm and a powerful 200 Nm are available to cope with demanding applications.



Components

**Industrial PC, field bus I/O,
PLC, HMI controller**

Industrial PCs are available in numerous variants and offer customized calculation power for PC-assisted automation. Programmable logic controllers (PLC) are the traditional means for automation. HMI controllers establish the interface for the user. Field bus nodes, I/O modules and cam controllers complete the range of automation components.

Automation

**Consulting and implementation
for new machines and retrofitting**

You want to set up a largely automated new machine or retrofit and modernize your existing machine with automation systems? Then you need our extensive expert knowledge and our more than 20 years of experience.

Unidor

**Blanking and forming,
systems, controls and sensors**

Pioneering blanking and forming technology for more than 30 years, we are your reliable partner in the world of blanking and pressing and have proved this with the thousands of machines which we have successfully installed all over the world. Sensors, controls and systems ensure optimal results in machines, tools and retrofit projects.



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