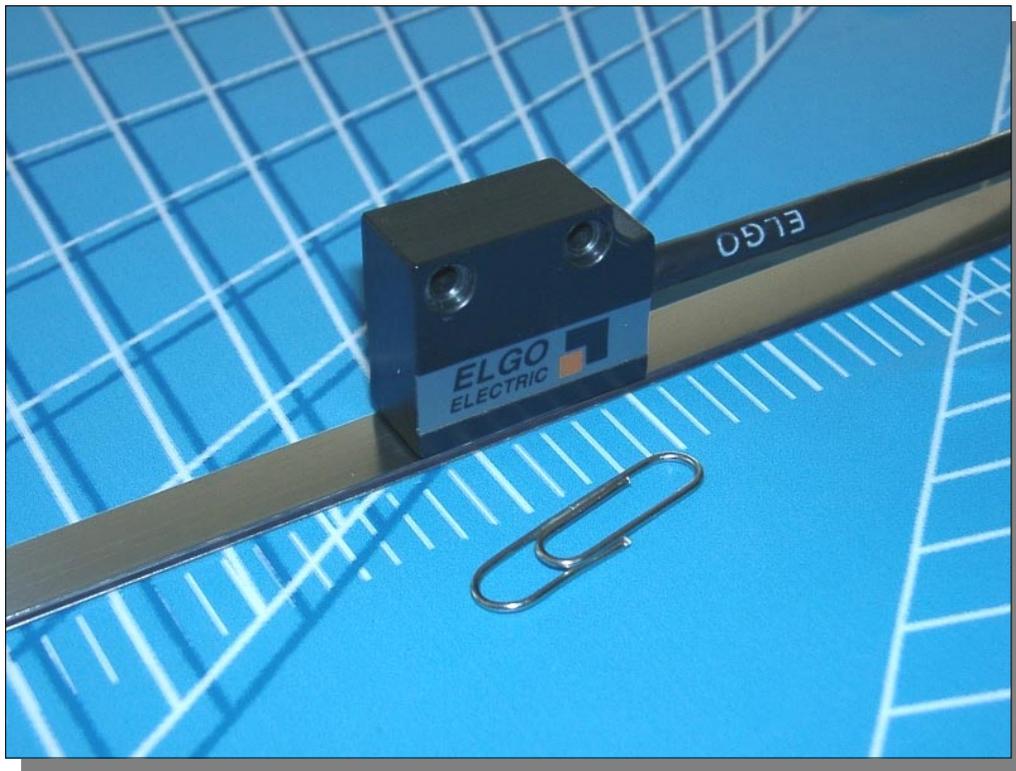


SERIES LMIX2

Magnetic Length Measuring System

- With index pulse
- Resolution 0.025 mm (using 4 times edge multiplier)
- Repeating accuracy +/- 0.025 mm
- Small sensor with integrated translator
- Speed proportional output of the square waves



Only functional with magnetic tape ELGO MB20.50 !

ELEKTRO-TRADING sp. Z o.o.

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1. Introduction

The magnetic length measuring system LMIX2 extends the existing LMIX product range and offers two considerable advantages:

1. In spite of its small dimensions, the translator is integrated in the sensor head.
2. The installation of the sensor can also be done vertical.
This must be mentioned when ordering. (**Option L**)

2. The Sensor

2.1 Functionality of the sampling sensors

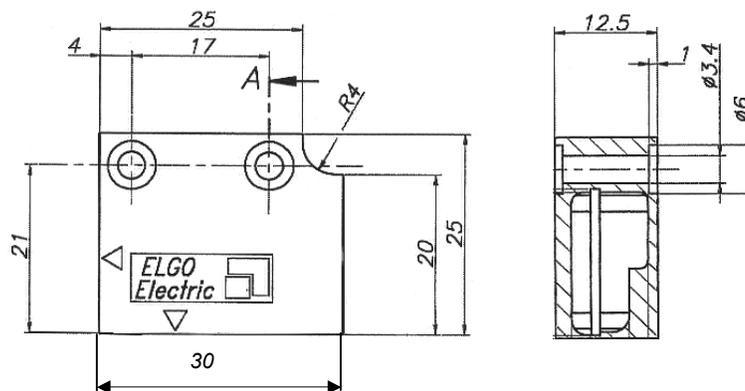
Integrated in the sensor head are the magneto resistive measuring-bridges as well as the interpolation circuit and the output drivers. The bridge generates the distance dependent count pulses for the signal processing electronic.

The distance between sensor and tape must not be larger than 2.0 mm. Every smaller value (0.1 – 2.0 mm) is allowed. The sensor cable is an eight wire cable, highly flexible and suitable for tug chains. It consists of twisted pair wires and is shielded.

2.2 Resolution/Edge trigger

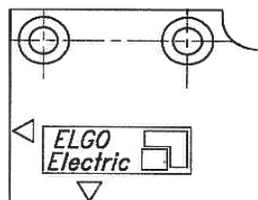
The resolution is 0.1 mm (using 4 times edge multiplier), respectively 0.025 mm (using 4 times edge multiplier)

2.3 Dimensions

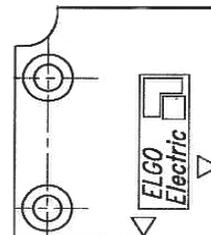


2.4 Installation possibilities

Standard (horizontal)



Option L (vertical)
To mention when ordering!



3. Supply Varieties and Output Varieties

The following combination of supply and output levels are deliverable:

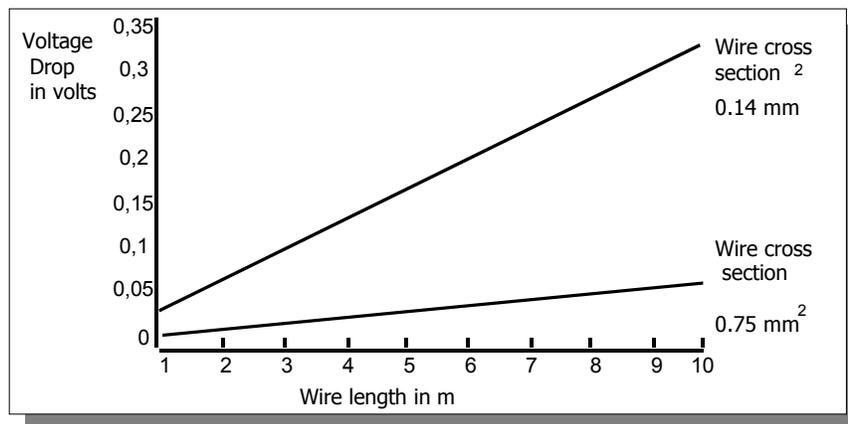
1. **Order index 00*** = supply voltage **10 - 30 V** / output level **10 - 30 V**
2. **Order index 01*** = supply voltage **10 - 30 V** / output level **TTL Line Driver**
3. **Order index 11*** = supply voltage **5 V** / output level **TTL Line Driver**

* **Order index** (see page 10 / point 9 type designation)

Hinweis:

To reach the largest possible interference distance it is recommended to supply the magnetic length system LMIX2 with 10-30 VDC and to select the A/B signals TTL-compatible (5V) (**Index 01**) and to evaluate them differential.

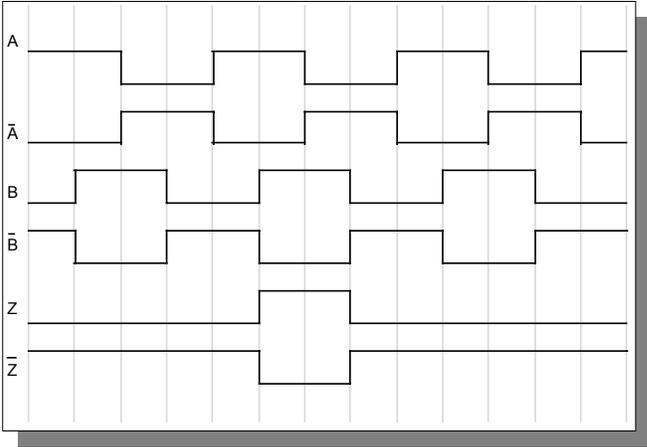
Voltage drop referring to wire length (only with supply voltage 5 VDC)



4. Connectors of LMIX2

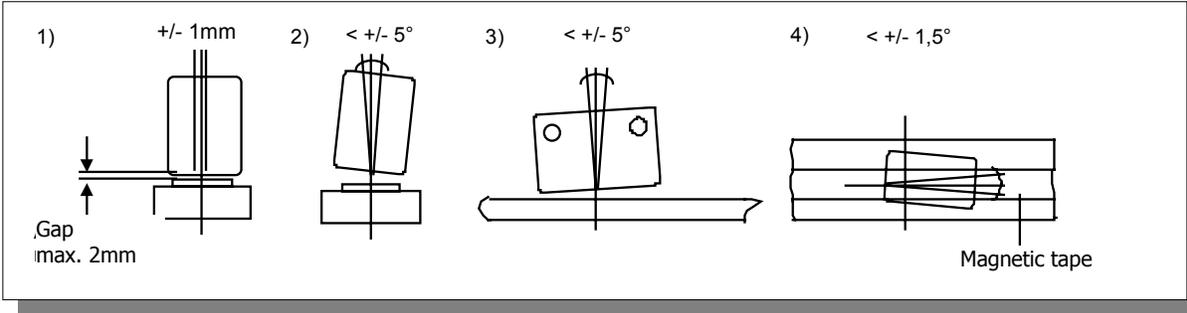
	Cable end open Standard	D-SUB 9 pins Option D1 (Elgo-D-SUB wiring)	D-SUB 9 pins Option D2 (18.50 compatible wiring)
Function	Color	Pin no.	Pin no.
0V (GND)	White	1	1
5VDC/10-30 VDC in	Brown	2	2
Channel A	Green	3	3
Channel B	Yellow	4	4
Channel Z	Black	8	Not available
Channel A'	Violet	6	7
Channel B'	Orange	7	8
Channel Z'	Gray	9	Not available
Shielding	PE \perp	Connected to housing	5

5. Pulse diagram



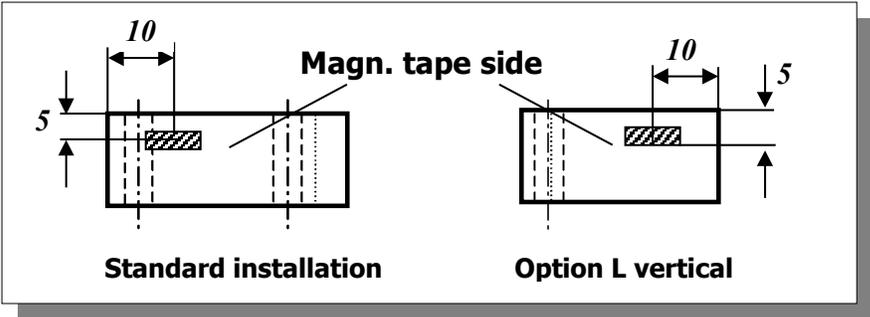
6. Installation of LMIX2

6.1 Hade tolerances of the sensors



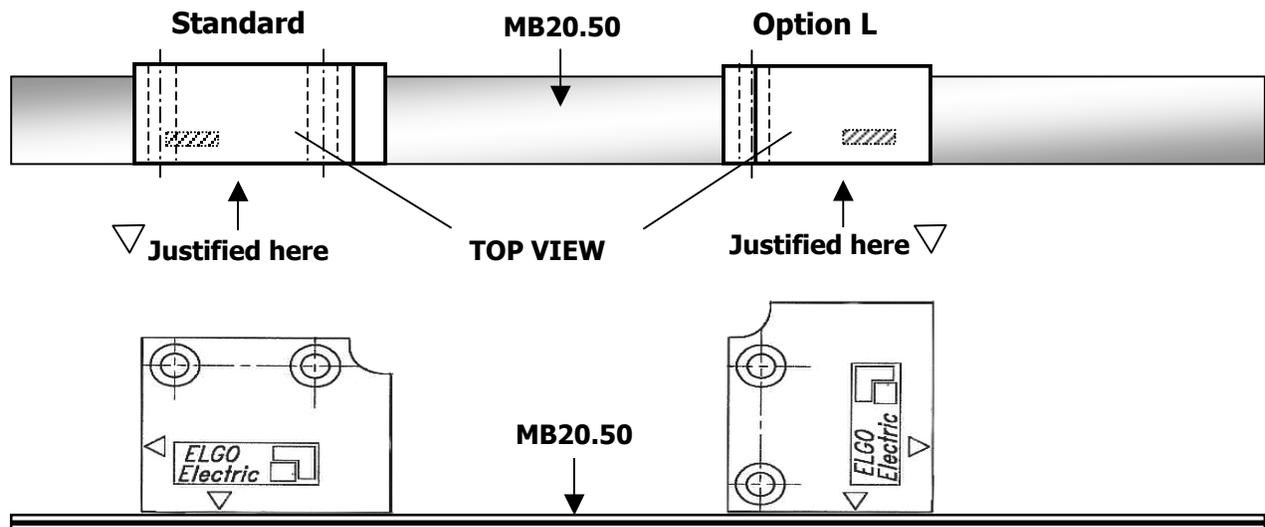
6.2 Active sensor areas

The active sensor area is shown in the following drawing as a hatched area.



6.3 Installation with magnetic tape MB 20.50

It is very important that sensor and tape are justified with the active sensor area side as shown in the following drawing!



6.4 Installation with pole wheels (or special magnetic tapes with small width)

It is important that the active sensor area is positioned in the middle of the pole wheel respectively magnetic tape.

6.5 Installation place

The installation place must be at least 0.5 m away from inductive and capacitive interference sources as contactors, relays, engines, switch power pack, clocked controllers, etc. The LMIX2 cable must principally be wired separately from heavy duty current wires and a distance to interference sources must be kept.

6.6 Supply voltage

The supply voltages must be stabilized DC voltages and should not exceed 5 VDC with a tolerance of $\pm 2.5\%$. Allowed ripple at 10-30 VDC and 5 VDC is: < 50 mV.

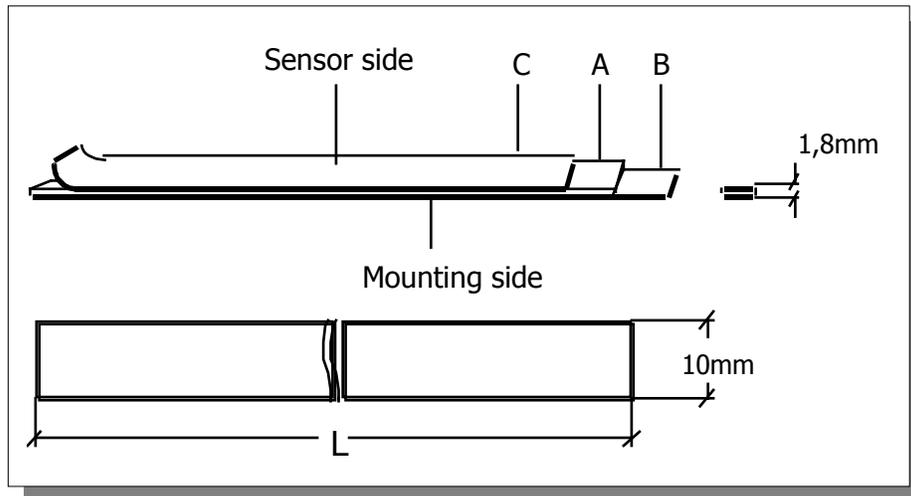
6.7 Fault clearance

If there arise interferences in spite of observing all above mentioned points, proceed as follows:

1. Add RC elements over contactor reels of AC contactors (e.g. $0.1 \mu\text{F}/100 \Omega$).
2. Add recovery diodes over DC inductances
3. Add RC elements over each engine phase and over the engine brake
4. Use separate power pack for following circuits (e.g. indicator, counter etc.)

7. The Magnetic Tape MB20.50

The ELGO magnetic tape consists of three components:



Deliverable Lengths 0.5 – 32 m, other length on request

- A** The magnetized, highly flexible synthetic tape, connected on the bottom with:
- B** A magnetized, flexible steel tape. This steel tape protects the synthetic tape from mechanical damages and is at the same time a magnetic short circuit. This increases significantly the functional security under extreme magnetic influences. **A** and **B** are already factory-bonded (by ELGO).
- C** To keep the flexibility for transport and installation, the third part, also a steel tape (magnetic permeable), is delivered separately. It serves for mechanical protection of the synthetic tape and must be stuck on the magnetic synthetic tape after installation.

7.1 Processing hint for the sticking of magnetic tapes

Materials to stick:

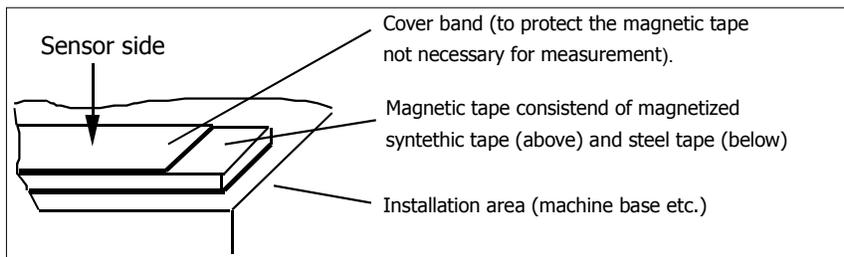
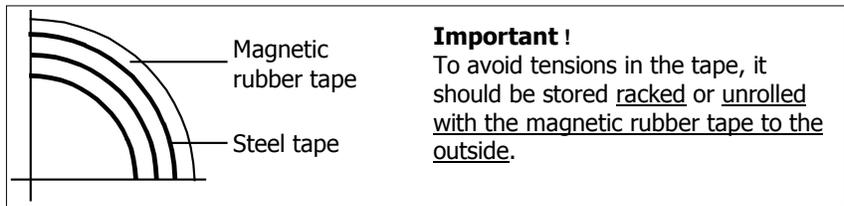
The provided sticky tapes stick well on clean, dry and plain surfaces. Typical solvent for cleaning surfaces are a 50/50 mixed isopropyl-alcohol / water mixture or heptane. (Important: Please observe carefully the caution hints of the producer when using the solvent.) The surfaces of materials as copper, brass etc. should be sealed to avoid an oxidation.

Proof:

The stability of the adhesion is directly depending on the contact, which the adhesive develops to the stick together surfaces. A high proof results in a good surface contact.

Sticking temperature:

The optimal sticking temperature is between + 21°C and 38°C. Avoid colder sticking surfaces than + 10°C, because in this case the adhesive becomes too hard and perhaps a sufficient immediate adhesion is hardly to achieve. After proper sticking the stability of the connection is ensured also when the temperature is below zero. The final tackiness of a sticking is from experience reached after approximately 72 hours (at + 21°C).



Resistance to chemicals of the magnetic tape

Chemicals, showing no or only a small effect:

-formic acid	-glycerol 93°C	-linseed oil	-soy beans oil
-cotton seed oil	-N-hexane	-lactic acid	
-formaldehyde 40%	-iso octane	-petroleum	

Chemicals, showing small to medium effect:

-acetone	-gasoline	-acetic acid 30%	-Olein acid
-acetylene	-steam	-acetic acid, pure acetic acid	-sea water
-ammonia anhydrous	-acetic acid 20%	-isopropyl ether	-stearic acid 70°C
	-kerosene		

Chemicals, showing strong effect:

-benzene	-nitric acid 70%	-turpentine	-toluene
-lacquer solvent	-nitric acid, red, vitriolic	-carbon tetrachloride	-trichloroethane
-nitrobenzene	-hydrochloric acid 37%, 93°C	-tetrahydrofuran	-xylene

8. Technical Specifications

General specifications

Distance tape/sensor	: max. 2.0 mm
Housing	: die cast zinc
Protection class	: IP 65
Operation temperature	: 0° to + 50°C
Output current	: max. 20 mA per channel
Outputs	: push-pull, permanent short-circuit-proof
Index pulse	: cycle duration dependent on operation speed

00 – Supply voltage / level

Tolerance/supply voltage
Consumption
Output frequency
Operation speed
max. wire length

10 - 30 VDC / 10 –30 VDC

: stabilized, ripple max. 5 %
: max. 150 mA
: 16 kHz (per channel A or B)
: max. 1.5 m/s
: 30 m

01 - Supply voltage / level

Tolerance/supply voltage
Consumption
Output frequency
Operation speed
max. wire length

10 - 30 VDC / 5 V-TTL- line driver

: stabilized, ripple max. 5 %
: max. 150 mA
: 100 kHz (per channel A or B)
: max. 10.0 m/s
: 50 m

11 - Supply voltage / level

Tolerance/supply voltage
Consumption
Output frequency
Operation speed
max. wire length

5 VDC / 5 V-TTL- line driver

: +/- 2.5%, ripple < 50 mV
: max. 200 mA
: 100 kHz (per channel A or B)
: max. 10.0 m/s
: 10 m

Technical specifications MB 20.50 (accessories)

Pole gap	: 5 mm
Operation temperature	: 0° to + 60°C
Accuracy at 20° C in mm	: +/- (0.025 + 0.02 x L), L = effective measuring length in m
Length expansion coefficient	: $16 \times 10^{-6} 1/K$
Bend radius	: minimal 150 mm
Protection class	: IP65

9. Type designation

LMIX2 – XXX - XX.X – X – XX - XXX

Series/type _____

SN-Number _____

000 = standard

001 = first customer specified version

002... etc.

Signal wire length in XX.X m _____

Resolution (at LMIX2 always index 1) _____

1 = 0.025 mm (4 times edge trigger)

0.1 mm (single edge trigger)

Power supply / output level _____

00 = 10-30 VDC/10-30 VDC

01 = 10-30 VDC/5 V-TTL line driver

11 = 5VDC/5V-TTL line driver

Options _____

D1 = connection over D-SUB 9 pins (pin assignment in ELGO-standard)

D2 = connection over D-SUB 9 pins (pin assignment as 18.50 replacement)

L = Vertical sensor position (PCB and sensor installation)

Accessories:

MB20.50 - XX.X

ELGO-magnetic tape 5mm pole division _____

Length (in m) _____

Liability exclusion / Guarantee

We have checked the contents of this instruction manual carefully, to the best of our knowledge and belief for conformity with the described hardware and software.

Nevertheless errors, mistakes or deviations can not be excluded, therefore we do not guarantee complete conformity.

Necessary corrections will be included in the subsequent editions.

We appreciate your ideas and improvement suggestions very much.

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