

## GMIX2 Series

### Magnetic, Incremental - Length Measuring System

- Resolution of 2.5 mm (at 4 edge triggering)
- Repeating accuracy +/- 1 Increment
- Small sensor head with integrated translator
- Speed-proportional square wave outputs



**Only functional with an ELGO MB20-50-10-1-R magnetic tape!**



**Note: Read this operating instructions carefully before first start-up and consider you the installation hints in chapter 6, please!**

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## 1. Introduction

The magnetic length measuring system GMIX2 scans the coded magnetic tape MB20.50 and supplies speed-proportionally, incremental square wave signals.

## 2. The sensor

### 2.1 Function principle of the sensor

Integrated in the sensor head are the magneto resistor 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.

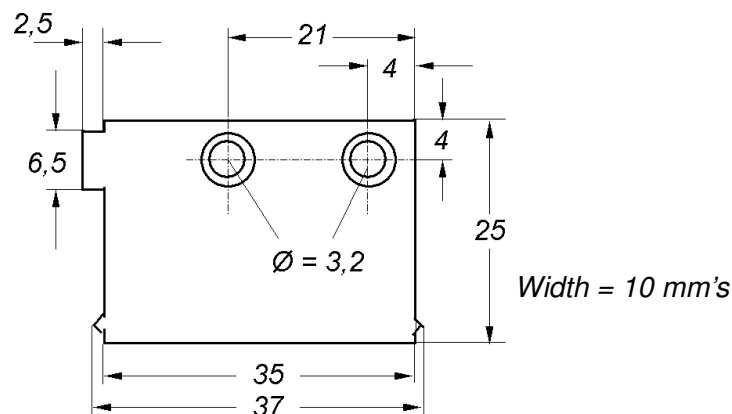
The distance between sensor and tape must not be larger than 0,8 mm. Every smaller value (0.1 – 4.0 mm) is allowed. The sensor cable is an eight wire cable, highly flexible and suitable for tug chains. It consists of twisted pair wires and is shielded.

**Note: The gap between sensor and tape must not be larger than 4.0 mm! Every smaller distances (0.1 – 4.0 mm) are allowed.**

### 2.2 Resolution / Edge- Multiplier

The resolution of GMIX2 is 2.5 mm's at 4 times edge multiplier of the following circuit. That means, with a movement of 2.5 mm's the GMIX2 spends 1 output-pulse.

### 2.3 Dimensions



### 2.4 Assembly direction

At the underside of the sensor head is a sticker, which shows the magnetic tape side (scale side).



Additionally the counting direction is shown with this marker.

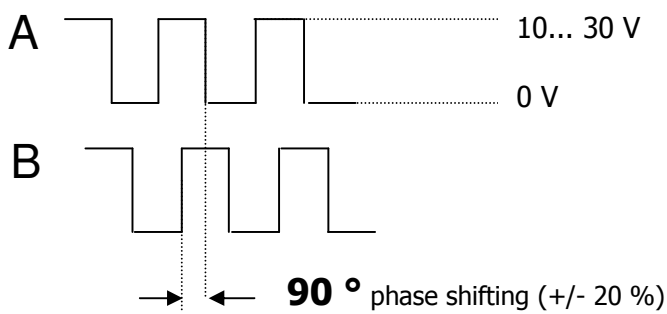
### 3. Supply- and Output-Levels

The sensor must be supplied with stabilized 10.. 30 VDC supply voltages  
 The output levels are corresponding to the connected supply voltage (10... 30 VDC / HTL),  
 minus approx 0.7 V (due to internal pole protection diode).

### 4. Connections of GMIX2

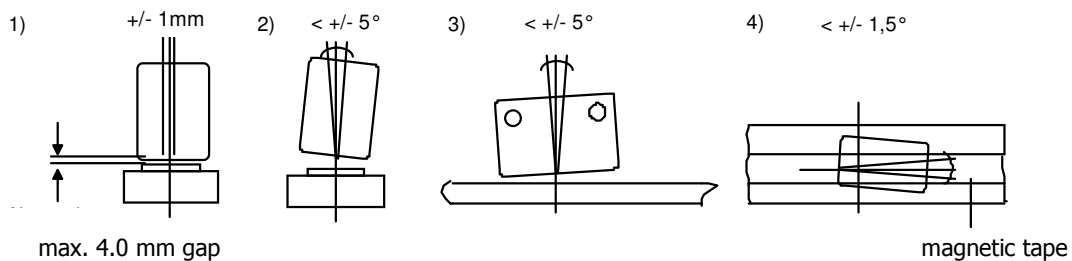
Function	Color
0V (GND)	black
10-30 VDC in	brown
channel A	red
channel B	orange
screen/shield	blank

### 5. Output pulse diagram



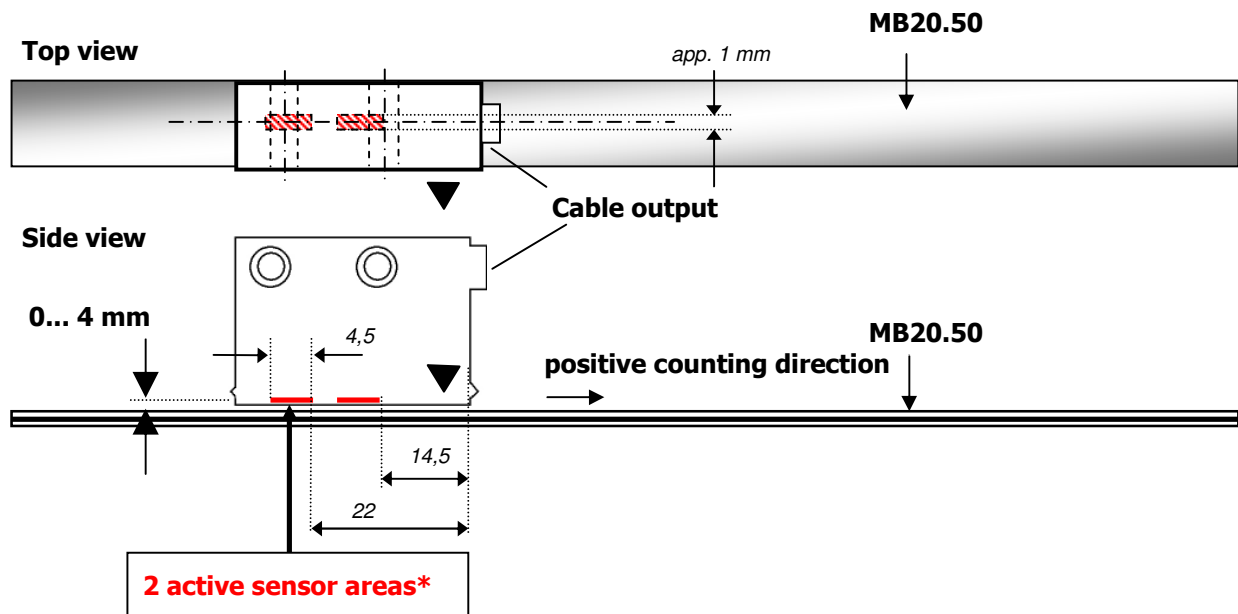
### 6. Installation of GMIX2

#### 6.1 Allowed affection tolerances of the sensor



## 6.2 Assembly with magnetic tape MB 20.50

The sensor and the tape must be installed as follows:



### 6.2.1 Assembly with pole wheels

(or specific tapes with a smaller width)

It is to be made certain that both active sensor surfaces are covered \* within the permitted 4 mm's distance. I.e. with magnet wheels the radius of the wheel must be selected in an accordingly large.

## 6.3 Place of installation



Principle install GMIX2 separately from load current lines. A distance from at least 0.5 m to inductive and capacitive interference sources like contactors, relays, engines, switch power packs, clocked automatic controllers etc. must be kept. Lay the GMIX2-cable separately from load current lines and keep distance to interference sources. When assembling in the proximity of foreign magnets a minimum distance from 100 mm to the magnetic tape is necessary.

## 6.4 Fault clearance

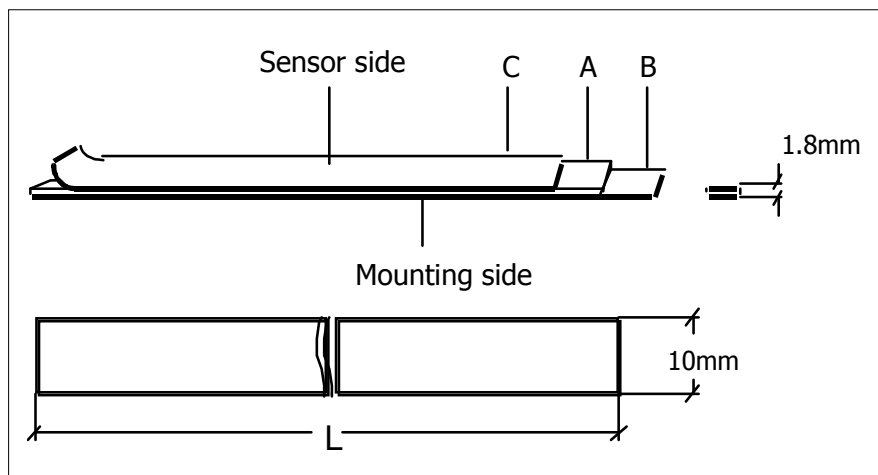
If there occurs interferences in spite of applying all above mentioned measures proceed as follows:



1. Add RC elements over contactor reels of AC contactors (for example 0,1  $\mu\text{F}/100 \Omega$ ).
2. Add recovery diodes over DC inductances
3. Add RC elements over each engine phase (in connector box of the engine)
4. Install a power filter before the external power supply

## 7. The Magnetic Tape MB20-50-10-1-R

The ELGO magnetic tape consists of three components:



Deliverable Lengths 0.5 – 32 m, other length on request

- A** The magnetized, highly flexible rubber tape, connected on the bottom with:
- B** A magnetized, flexible steel tape. This steel tape protects the rubber 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 rubber tape and must be stuck on the magnetic rubber 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.

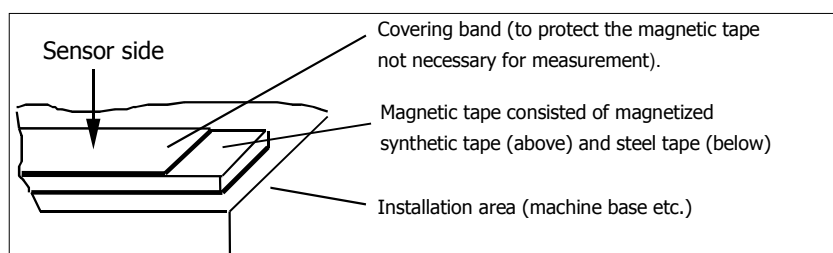
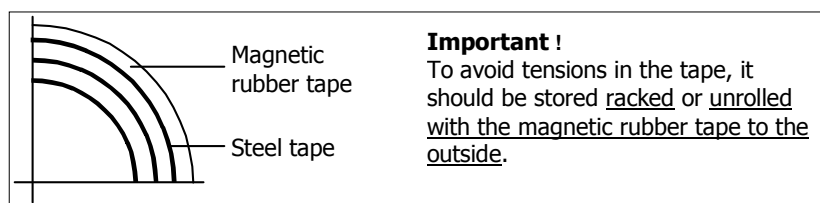
### Proof:

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 to 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%	-olean 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

### Sensor

Resolution	: 2.5 mm
Repeating accuracy	: +/- 1 Increment
Accuracy at 20° C in $\mu\text{m}$	: +/- (25 + 20 x L) L = effective measuring length in meters
Distance tape/sensor	: max. 4.0 mm
Power supply	: 10... 30 VDC, stabilized
Output levels	: HTL 10... 30 VDC (corresponding to the supply level minus app. 0,7 V)
Housing material	: HM-PA (Polyamide), black
Protection class	: IP 67
Operating temperature	: -10... +70 °C (-25... +85 °C) auf Anfrage
Output current	: max. 20 mA per channel
Outputs	: push/pull durable short circuit proofed
Consumption	: ca. 30 mA
Output frequency	: 4 kHz (channel A or B)
Operation speed	: max. 10,0 m/s
Length of cable	: max. 30 m possible

### Magnetic tape MB 20.50 (accessories)

Linear extension coefficient	: $16 \times 10^{-6} 1/K$
Bending radius	: minimal 150 mm
Protection class	: IP65

## 9. Type designation

**GMIX2 – XXX - XX.X**

**Series/Type** \_\_\_\_\_

**SN-Number** \_\_\_\_\_

**000** = standard

**001** = first special version

**002...** etc.

**Cable length in XX,X m** \_\_\_\_\_



## Magnetic tape key (accessories)

**MB20 - 50 - 10 - 1- R- XX.X**

**ELGO Magnetic tape**

**Pole distance**

5.0 mm

**Width**

10 mm

**Number of magnetic tracks**

1 = Single track system

**Tape construction**

R = Standard

**Tape length**

Please indicate the desired Length in XX.X Meters

## 10. 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. Reprint, duplication and translation, even in extracts, are only allowed with a written authorization by the company ELGO Electric GmbH. We constantly strive for improving our products, therefore we keep all rights reserved for any technical modifications without any notice.

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Damages verifiably not caused by ELGO-Electric GmbH and due to improper handling are excluded from any guarantee e.g. by applying faulty voltage, diffusion of liquid into the interior of the engine, using force, scratching the surface, chemical influences etc.!!

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**ELGO - Electric - GmbH**

*Measure - Control - Position*

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