GMIX1A Series

Magnetic, Incremental - Length Measuring System

- 5 different adjustable resolutions between 0.1 and 0.01 mm's (at 4 edge triggering)
- repeat accuracy +/- 1 increment
- 5V-TTL or 10...30 V Push/Pull outputs selectable

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

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Contents:

1. Introduction

The GMIX1A is an incremental measuring system, which is used for the measurement of lengths and distances. The translator is accommodated in a separate box, in which the spent square-wave pulses are signaled by LED's. A further LED serves for the announcement of the operating status.

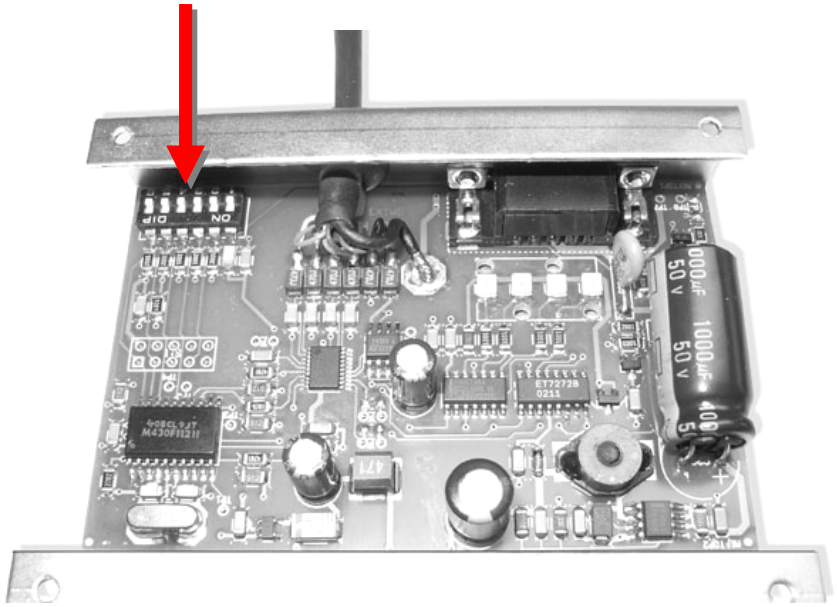
Different adjustments can be done with the internal 6 pin DIL-switch:

- Output levels (TTL- Line driver or 24 VDC push/pull)
- The configuration of speed monitoring VMAX
- The resolution of the measuring system

2. Adjustments

In order to be able to change the adjustments, the cover of the evaluation box must be removed before. Loosen for this the 4 cross-notched screws on the top side and then remove the cover. With the 6 pin DIL-switch the settings can be done.

DIL-switch for adjustments



2.2 Adjustment of output levels

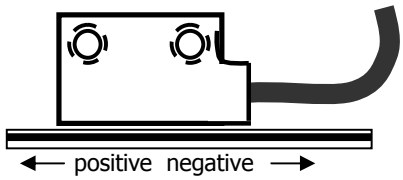
DIL-switch	OFF	ON
1	TTL- Line driver	24 V push/pull

2.3 Speed monitoring VMAX

DIL-switch	OFF	ON
2	deactivated	activated

2.4 Adjustment of VMAX act-direction

DIL-switch	OFF	ON
3	with positive counting direction	with negative counting direction



(see page 5/ chapter 4.)

2.5 Setup of resolution

Resolution (in mm's)

DIL-switch	0,1	0,05	0,025	0,02	0,01
4	**ON**	**OFF**	**ON**	**ON**	**OFF**
5	**ON**	**ON**	**OFF**	**OFF**	**OFF**
6	**ON**	**ON**	**ON**	**OFF**	**OFF**

With appropriate indication in the order (see last side "Type designation")
the desired configuration will be made by factory.

3. Signal LED's

The LEDs at the translator box signals as follows:

green **Status** = Diverse flashing sequences (system status)

red **A** = On if signal output of channel A

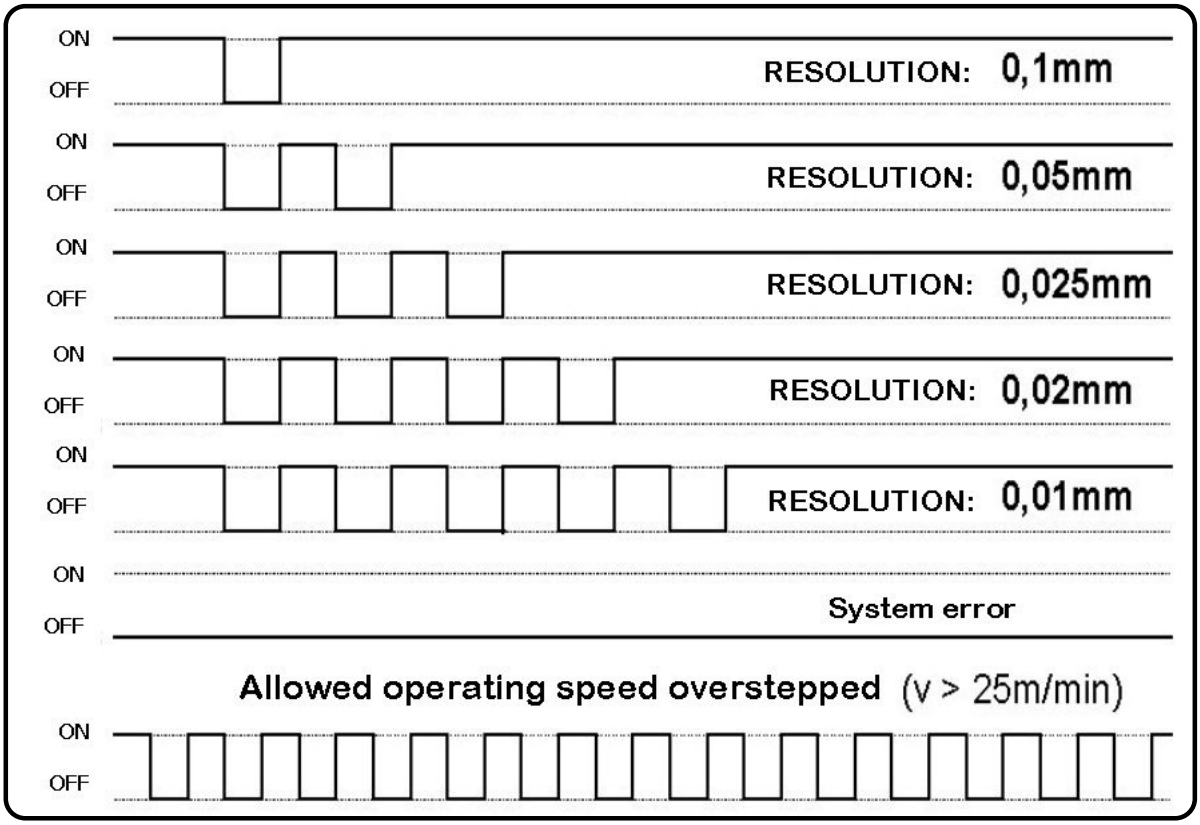
red **B** = On if signal output of channel B

red **0** = On if signal output of channel Z

With very slow frequencies the red LED's shines not statically, but flashes.

3.1 Flashing sequences of status LED's

On the basis of following representation the flashing sequences of status LED are assigned to the different operating conditions:



4. Speed monitoring (VMAX - output)

VMAX activated (DIL-switch 2 = „ON"):

The output VMAX (on supply potential) switches off the voltage (wire break security) if the operating speed of 25 m/min is exceeded, according to the adjusted act-direction (see 2.4 on page 4). This will signaled by the status LED with the associated flashing sequence (see above).

After a time of 60 seconds the output VMAX will be reset. Signaling of exceeding the speed limit over the status LED is only deactivated after putting a procedure distance back by 200 mm in positive or negative counting direction.

VMAX deactivated (DIL-switch 2 = „OFF"):

The exit VMAX is permanently on the supply potential. The monitoring of the operating speed is not active.

5. Safety

Attention!
To ensure a perfect function of GMIX1A the following installation guidelines must be strictly observed and followed. Otherwise the guarantee expires and ***ELGO Electric GmbH*** *takes no liability and guarantee for malfunctions or damages caused e.g. by incorrect installed wires or other external sources of error or interference, which are exactly explained below. Please read the instructions carefully before putting the controller into operation.*

As well the company ELGO Electric GmbH is not responsible for possible machine and/or personal injuries, which can result from incorrect material at the measuring system and follow-up electronics. The machine manufacturer is obligated to accomplish safety-relevant measures

The type-label on the translator box serves for the exact identification of the measuring system. There is about the exact type designation (see chapter 10. on page 10), the delivery date and the manufacturing number. These datas are also helpfully at service calls and other contacts with ELGO company.

5.1 Interference suppressions

The screen of the signal cables should be connected only on one side with follow-up circuits. The signal output cable is to be laid in principle separately from load current lines and 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.

If disturbances should arise despite adherence to all points described above, must be proceeded as follows:

- Attach from RC elements over contactor coils of AC contactors (e.g. 0,1 µF / 100 Ω).
- Attach recovery diodes over DC inductances.
- Attach from RC elements over the individual engine phases and over the brake (in the terminal box of the engine).

5.2 Place of installation:

Principle install GMIX1A 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 GMIX1-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 is necessary to the magnetic tape.

6. Connections

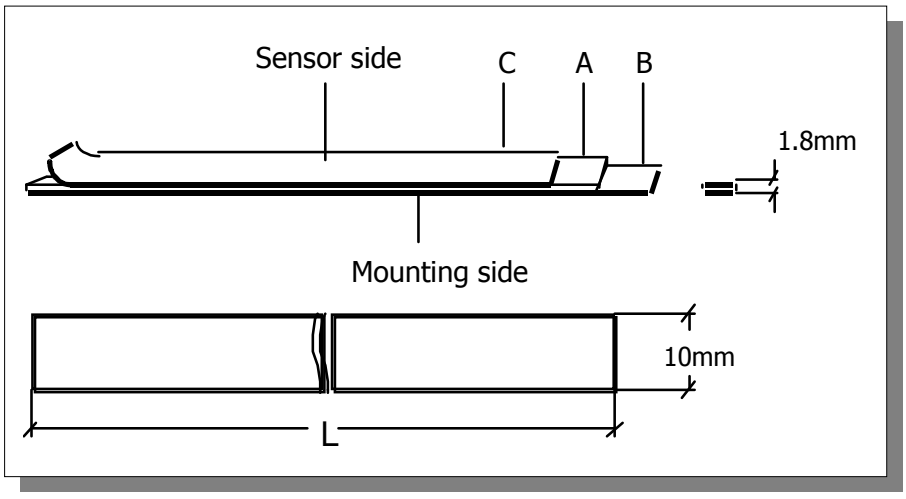
The 9 pin D-SUB connector is assigned as follows:

Pin	Function
1	A
2	A’
3	0 V - GND
4	B
5	B’
6	VMAX
7	Z (Index pulse)
8	10...30 VDC
9	0 V - GND

Erläuterung: A, B, Z = normal tracks
A’ und B’ = inverted tracks
VMAX see page 5 chapter 4.

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.

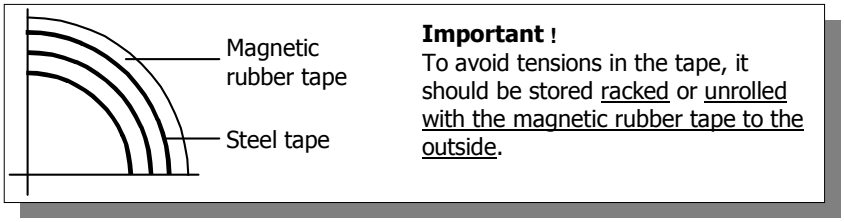
Proof:

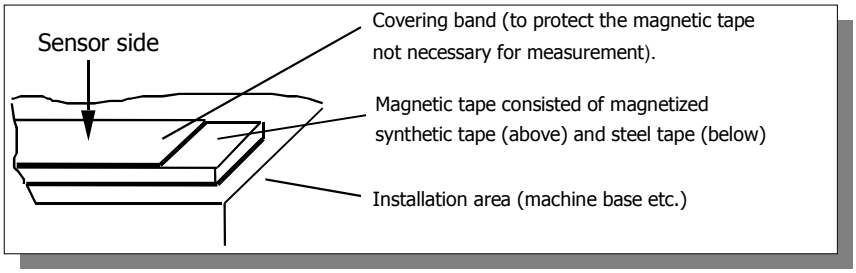
The stability of the adhesion is directly depending on the contact, which the adhesive develops to the stick together surfaces. A high proof results in a good surface contact.

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%	-isooctane	-petroleum	

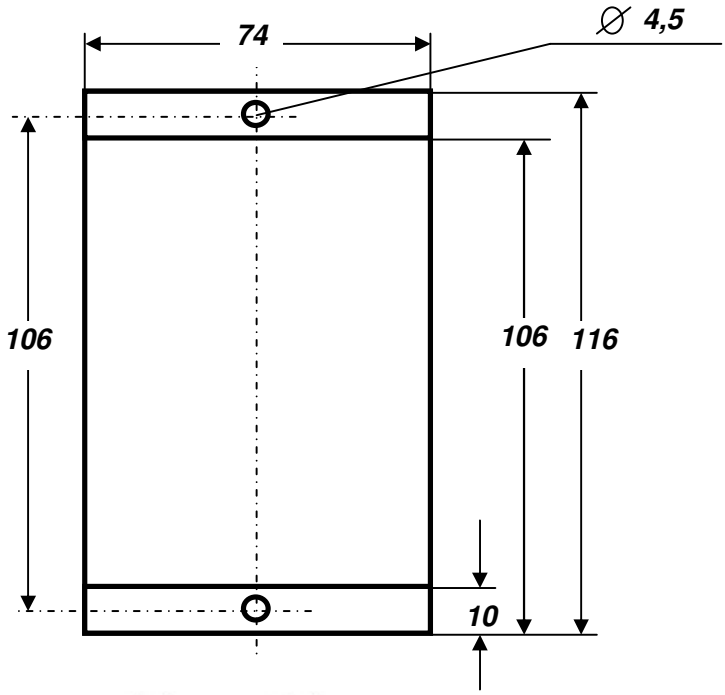
Chemicals, showing small to medium effect:

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

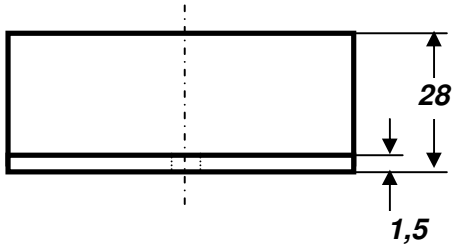
Chemicals, showing strong effect:

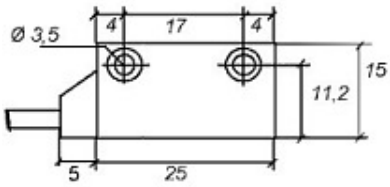
-benzene	-nitric acid 70%	-turpentine	-toluene
-lacquer solvent	-nitric acid, red, vitriolic	-carbon tetrachloride	-trichloroethane
-nitrobenzene	-hydrochloric acid 37%, 93°C	-tetrahydrofuran	-xylene

8. Dimensions

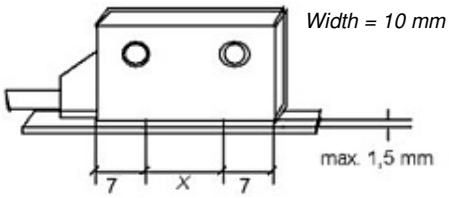


Translator box

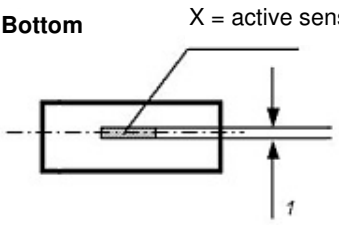




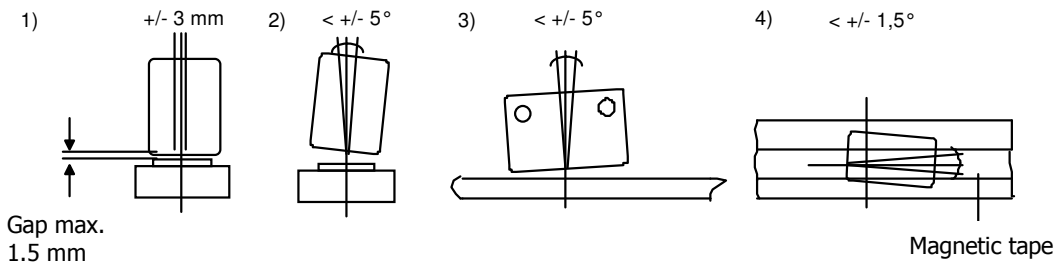
Sensor head



Bottom



9. Affection tolerances of sensor



10. Technical specifications

Sensor	
Length of sensor cable	3 m
Protection class	IP 67
Operation temperature:	0° ... + 50° C
Bending radius of sensor cable:	min. 60 mm
Housing material:	Die cast zinc
Allowed distance to the magn. tape	max. 1.5 mm
Magnetic tape	
Operation temperature:	-10 ... +70 °C
Linear expansion coefficient:	16 x 10^{-6} 1/K
Bending radius:	min. 150 mm
Translator box	
Power supply:	10…30 VDC
Consumption:	max. 300 mA
Output signals:	selectable TTL- Line driver or 24 VDC push/pull
Resolution:	5 adjustable resolutions (0.01 ...0.1 mm) at 4 times edge multiplier
Repeating accuracy:	+/- 1 increment
Accuracy at 20° C in µm	+/- (25 + 20 x L) L = effective measuring length in m
Operation temperature:	0... + 50 ° C
Housing material:	Zinc-plated sheet
Protection class:	IP 40
EMC-Generic standard	NS 73/23/EWG – EMV 89/336/EWG
Output VMAX (Pin 6)	
Output voltage:	Power supply voltage (10...30 VDC) – 0,7 V
Consumption:	max. 200 mA (Ohm's, inductive or capacitive load)
Other:	Output is durable short circuit proofed and current limited

11. Type designation GMIX1A

GMIX1A - XXX - XX.X - X - XX

Series
Magnetic, incremental length measuring system

Version
000 = standard
001 = first special version

Length of sensor cable in meters

Resolution (if pre-setting desired)
1 = 0.1 mm's
2 = 0.05 mm's
3 = 0.025 mm's
4 = 0.02 mm's
5 = 0.01 mm's

Power supply / Output levels (if pre-setting desired)
00 = 10-30 V / 10-30 V Push/Pull
01 = 10-30V / TTL- Line driver

Magnetic tape (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

12. 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.

ELGO Electric does not assume any liability for possible errors or mistakes.

The guarantee period is one calendar year from the date of delivery and includes the delivered unit with all components. ELGO Electric GmbH will at its option replace or repair without charge defects at the unit or the included parts, verifiable caused by faulty manufacturing and/or material in spite of proper handling and compliance to the instruction manual.

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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