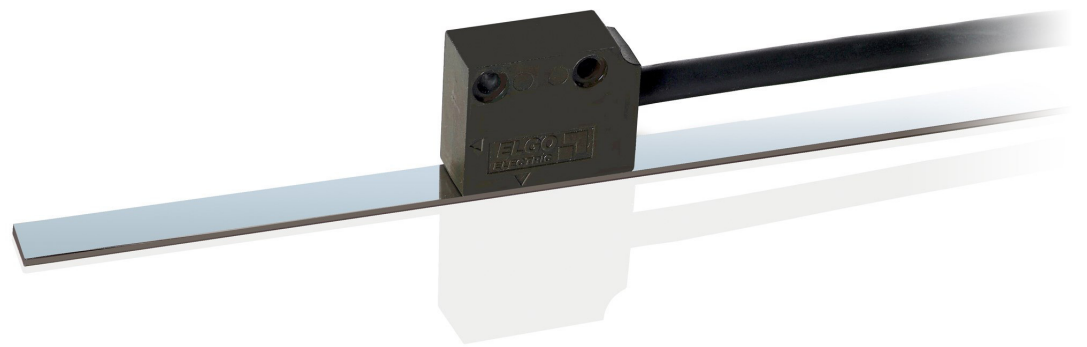


SERIES EMIX23

Magnetic Incremental Linear Encoder with 1 μm Resolution



- Magnetic measuring principle with contactless scanning
- Compact sensor with integrated evaluation electronics
- Speed proportional square wave signal outputs
- High 1 μm resolution (at 4-edge triggering)
- Ideal for applications in control technology
- With periodic index pulse output (standard) or definable reference pulse position (option)
- LED distance monitoring available (option)
- Measuring lengths theoretically unlimited
- Quick and easy installation
- High IP67 protection class

EMIX23 - Magnetic Incremental Linear Encoder with 1 μm Resolution

General:

The EMIX23 series is a compact, magnetic linear encoder for precise measuring tasks in the μ -range. The required evaluation electronics are already integrated in the sensor head. Thus, the system is completely ready for connection to subsequent electronics. EMIX23 can be supplied with 10 ... 30 VDC or 5 VDC (depending on order information).

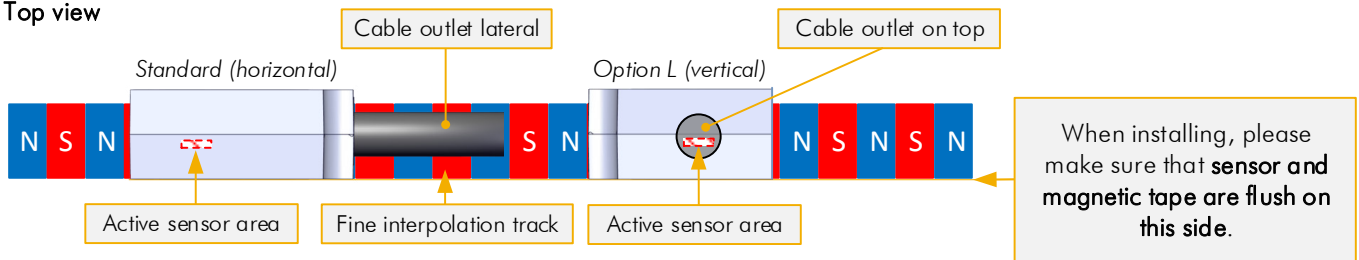
Installation with Magnetic Tape:

Along the measuring section, the sensor head is guided over an ELGO magnetic tape of the type MB20-20-10-1-R. The magnetic tape is glued to a flat surface with the supplied adhesive tape. The sensor head can be mounted at a distance of up to 0.8 mm to the magnetic tape. The alignment of the sensor head to the magnetic tape is as shown in the following figures:

Standard without reference pulse

Required single-track magnetic tape: MB20-20-10-1-R

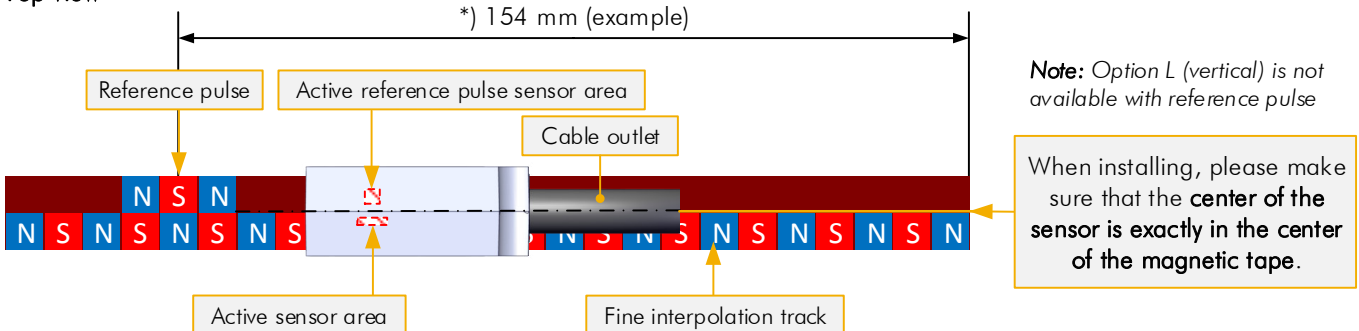
Top view



With Reference pulse (Option R) via separate magnetic tape track

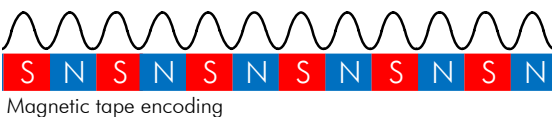
Required dual-track magnetic tape: MB20-20-10-2-R-REF0154 (example)*

Top view



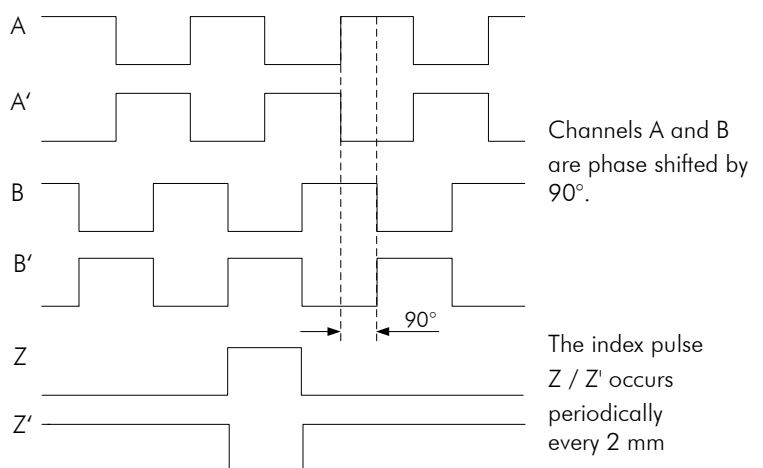
Functional Principle:

The basis of the incremental measuring systems consists of an electronic scanning system which contactlessly scans the north and south poles on the coded magnetic tape and generates one sine/cosine signal per pole.



The complete sine/cosine signal process is interpolated electronically. Depending on refinement of the interpolation, together with the pole distance of the magnetic tape, the resolution of the measuring system is determined. The magnetic tape has a pole pitch of 2 mm.

Output Pulse Diagram:



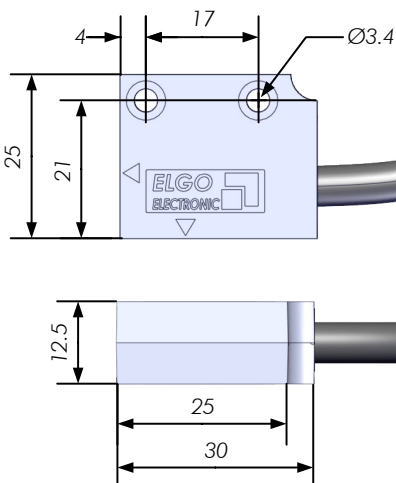
Special evaluation electronics are used to process the sinusoidal signal. It generates square wave signals from the signal information of the magnetic tape. These output signals are compatible with conventional rotary encoders or optical linear measuring systems. Depending on the order specification, the output level is HTL or TTL.

EMIX23 - Magnetic Incremental Linear Encoder with 1 μm Resolution

Technical Data:

Mechanical Data	
Measuring principle	incremental
Repeat accuracy	± 1 increment at resolutions $> 10 \mu\text{m}$ $\pm 2 \mu\text{m}$ at resolutions $\leq 10 \mu\text{m}$
System accuracy in μm at 20° C	$\pm (20 + 20 \times L)$ L = measuring length in meters
Distance sensor / tape	max. 0.8 mm
Sensor housing material:	zinc die cast
Sensor housing dimensions:	L x W x H = 30 x 12.5 x 25 mm
Required magnetic tape	MB20-20-10-1-R
Magnetic tape pole pitch	2 mm
Maximum measuring length	theoretically unlimited
Connection type	open cable ends (connectors optional)
Sensor cable	1.5 m standard length (others on request), drag chain suitable
Sensor cable bending radius	min. 60 mm
Weight	approx. 40 g without cable (cable approx. 60 g/m)
Electrical Data	
Power supply	5 VDC or 10 ... 30 VDC
Residual ripple	5 V: ± 25 mV; 10 ... 30 V: < 10 %
Consumption	max. 200 mA
Output channels	A, A', B, B', Z, Z' resp. R, R' (option) push-pull, durable short circuit proof
Output levels	HTL or TTL (depends on order)
Output current	max. 20 mA per channel
Output frequency	1 MHz per channel (higher on request)
Resolution	1 μm (at 4-edge triggering)
Index pulse (Z/Z')	every 2 mm periodically
Verfahrgeschwindigkeit	max. 2 m/s
Environmental Conditions	
Storage temperature:	-20 ... +85° C
Operation temperature:	-10 ... +70° C (-25 ... +85° C on request)
Humidity:	max. 95 %, not condensing
Protection class:	IP67

Dimensions:



Magnetic Tape:

IMPORTANT NOTE:

EMIX23 with a high resolution of $\leq 1 \mu\text{m}$ (e.g. 0.001 mm) require single pole magnetized magnetic tapes with the order suffix "EPS". Otherwise the accuracy cannot be guaranteed.

For resolutions $> 1 \mu\text{m}$ (e.g. 0.005 mm) the conventional magnetic tape can be used without "EPS".

Type Designation Sensor:

EMIX23 - - - - - -
AAA - BB.B - CCCC - DD - EE

A Version:

000 = standard version
001 = first special version etc.

B Sensor Cable Length:

01.5 = 1.5 m standard (others on request)

C Resolution (at 4-edge triggering):

0001 = 0.001 mm $\cong 1 \mu\text{m}$

D Power Supply / Output Levels:

00 = 10 ... 30 VDC / HTL
01 = 10 ... 30 VDC / TTL
11 = 5 VDC / TTL

E Options:

D1 = with 9-pin D-SUB connector
D3 = with 8-pin round connector for SKA-1 cable
L = vertical position of the sensor
R = with free definable single reference pulse*
E = with LED distance monitoring (see last page)

*) Option R combined with option L is not possible

Example:

EMIX23 - 000 - 01.5 - 0001 - 01 - D1
AAA - BB.B - CCCC - DD - EE

Standard EMIX23 with 1.5 m signal cable, 1 μm resolution, 10-30 VDC supply, TTL output levels, connections via 9-pin D-SUB connector

Type Designation Magnetic Tape:

MB20 - - - - - - -
AA - BB - C - D - E - FFF

A Basic Pole Pitch:

20 = 2 mm

B Magnetic Tape Width:

10 = 10 mm

C Number of Magnetic Tracks:

1 = single-track system
2 = dual-track system (required for reference pulse)

D Tape Construction:

R = standard: magnetic tape glued on back iron tape
(with adhesive tape on back iron and with separate cover tape equipped with adhesive tape)

E Options:

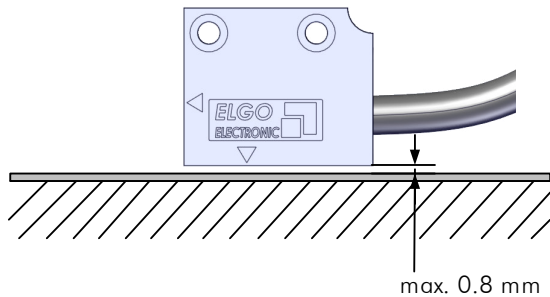
B = without adhesive tape on back iron side
C = without supplied cover tape
D = without adhesive tape and cover tape (B+C)

F Additional Information:

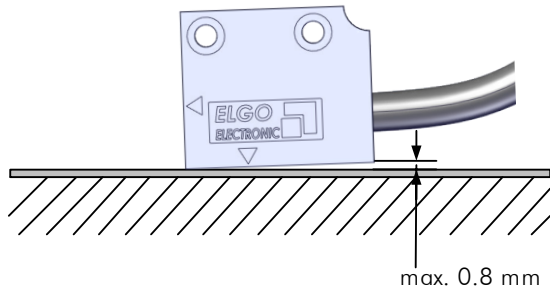
REF0154 = reference pulse after 154 mm (example)
BK80 = 8 mm magnetic tape on 10 mm carrier tape
EPS = single pole magnetization (for resolutions $\leq 1 \mu\text{m}$)

Mounting Tolerances:

Sensor distance



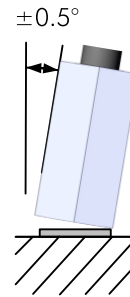
Pitch



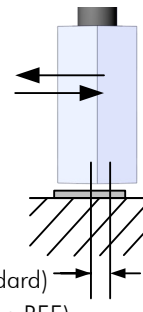
Yaw



Roll



Lateral offset



±2.5 mm* (standard)

±0.5 mm* (option REF)

*) Related to the system accuracy (see Technical Data) and 10 mm wide tape

Note: The mounting tolerances apply to the horizontal standard version and to the vertical option L.

LED Distance Monitoring (Option E):



If option E is ordered, the sensor head is equipped with an LED to maintain the correct mounting distance (lights green = distance is ok / lights red = distance is not ok). The LED can also assist you during the installation process.

Please note: This option is only available for the version with 5 VDC supply and TTL output level!

Applications:

With its high resolution of up to 1 μm , EMIX23 is ideally suited for precise measurement applications, e.g. in control technology. Thanks to the wear-free magnetic measuring principle and the high IP67 protection class, the sensor always operates unaffected and reliably even in harsh environments.

Accessories:

Order Designation	Description
FW2070	Guide carriage for EMIX23
FS1000, FS1500 oder FS2000	Guide rail for magnetic tape (length 1.0, 1.5 or max. 2.0 m). For larger distances several guide rails can be rowed together.
AP-00-XX	Cover profile (length: AP-00-1m = 1.0 m / AP-00-2m = 2.0 m)
End cap set 10 mm	End caps for additional fixation and protection of the magnetic tape ends
FBK80	Guiding profile for magnetic tape BK80
AFBK80	Connection profile for the connection of FBK80
POSU	Pole finder card 85 x 55 mm for magnetic tapes

