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**

![Diagram of magnetic tape installation](image)

**With Reference pulse** (Option R) via separate magnetic tape track
Required dual-track magnetic tape: MB20-20-10-2-R-REF0154 (example)*

**Top view**

![Diagram of magnetic tape installation with reference pulse](image)

**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.

![Magnetic tape encoding diagram](image)

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.

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.

**Output Pulse Diagram:**

- Channels A and B are phase shifted by 90°.
- The index pulse Z / Z' occurs periodically every 2 mm
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Technical Data:

**Mechanical Data**
- Measuring principle: incremental
- Repeat accuracy: ± 1 increment at resolutions > 10 µm
- System accuracy in µm at 20° C: ± (20 + 20 x L)
- 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: MB20-10-1-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 (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 levels: HTL or TTL (depends on order)
- Output current: max. 40 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
- Humidity: max. 95 %, not condensing
- Protection class: IP67

**Type Designation Sensor:**

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

**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 - AAA - BB.B - C.C - D.E - FFF

**Dimensions:**

**Magnetic Tape:**

**IMPORTANT NOTE:**
EMIX23 with a high resolution of ≤ 1 µm (e.g. 0.001 mm) requires single pole magnetized magnetic tapes with the order suffix ‘EPS’. Otherwise the accuracy cannot be guaranteed.

For resolutions > 1 µm (e.g. 0.005 mm) the conventional magnetic tape can be used without ‘EPS’.
Mounting Tolerances:

Sensor distance

![Diagram of sensor distance]

- Max. 0.8 mm

Pitch

![Diagram of pitch]

- Max. 0.8 mm

Lateral offset

![Diagram of lateral offset]

- ±2.5 mm* (standard)
- ±0.5 mm* (option REF)

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

Yaw

![Diagram of yaw]

- ±0.5°

Roll

![Diagram of roll]

- ±0.5°

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:

<table>
<thead>
<tr>
<th>Order Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FW2070</td>
<td>Guide carriage for EMIX23</td>
</tr>
<tr>
<td>FS1000, FS1500, FS2000</td>
<td>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.</td>
</tr>
<tr>
<td>AP-00-XX</td>
<td>Cover profile (length: AP-00-1m = 1.0 m / AP-00-2m = 2.0 m)</td>
</tr>
<tr>
<td>End cap set 10 mm</td>
<td>End caps for additional fixation and protection of the magnetic tape ends</td>
</tr>
<tr>
<td>FBK80</td>
<td>Guiding profile for magnetic tape BK80</td>
</tr>
<tr>
<td>AFBK80</td>
<td>Connection profile for the connection of FBK80</td>
</tr>
<tr>
<td>POSU</td>
<td>Pole finder card 85 x 55 mm for magnetic tapes</td>
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</tbody>
</table>