

ELGO Magnetic tapes **MB20-XX / AB20-XX**

Installation, specifications, type designation and accessories



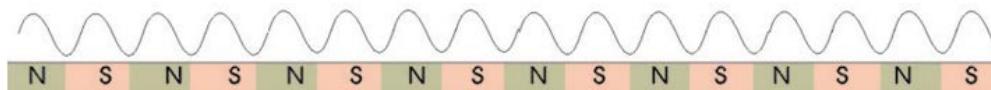
The ELGO magnetic tapes contain digital information, which are necessary for magnetic measurement by ELGO linear encoder types, either as an incremental or absolute code. The tape must be installed along the measuring distance and can be stuck (standard tape construction R) or can also be installed owing to its own magnetization on ferro-magnetic surfaces (when ordered tape construction A).

By using ELGO linear encoders, the correct magnetic tape type, according to the respective encoder type, must be selected. A wrong magnetic tape delivers wrong or none measurement results! Basically two different kinds of magnetic tapes are available: **Incremental** or **absolute** coded variants, which must be selected according to the respective linear encoder type. Further the magnetic tapes differ in its pole length, which determines the accuracy and the resolution of the measuring system, together with the magnet sensor.

With absolute coded tapes, three different track systems are available.

Basically differences of magnetic measurement

MB20-XX - Incremental: The basis of the magnetic incremental encoders consists of a scanning technology, which scans the north and south poles on the coded magnetic tape and produces a single Sinus/Cosinus wave for each pole.



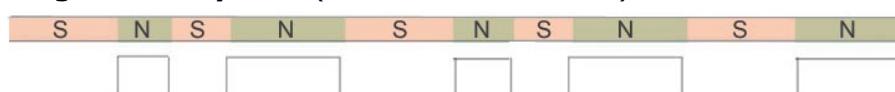
The complete sine/cosine signal process is interpolated electronically. Depending on refinement of the interpolation, together with the pole distance of the magnetic tape, the resolution of the measuring system is determined. There are magnetic tapes with different pole distances available, which are used for different products (depending on demanded accuracy).

A special evaluation electronic (translator) processes the sine/cosine wave into square output signals from the signal information of the magnetic tape. These square signals are equivalent to conventional optical rotary- or linear encoders outputs. Depending upon requirement, the translator circuit is already integrated in the sensor head or situated in an external box or in the D-SUB-connector housing.

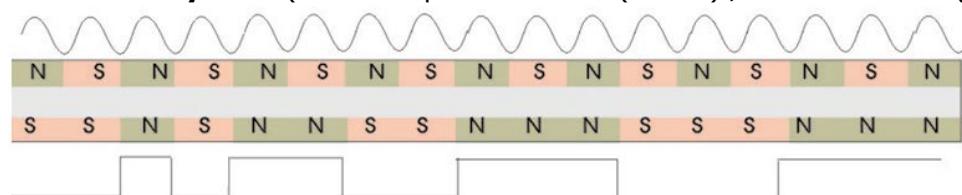
AB20-XX - Absolute: As soon as supply voltage is connected, the actual position is immediately recognized in real time as a fixed value by the interface of the magnetic sensors and transfers it to follow-up electronics. The magnetic tape is magnetically coded as "absolute", which combined with a multitude of sensors in the sensor head displays a unique position for every step of the resolution. For safety and quality considerations absolute systems offer more comfort and additional security. Further no referencing or gauging are necessary with absolute systems.

An absolute encoder needs a serial based output interface, because a real position value must be processed here (not only a square wave signal like an incremental system). There are 1, 2 and 3 track systems, which exhibit different characteristics and technical data (see image):

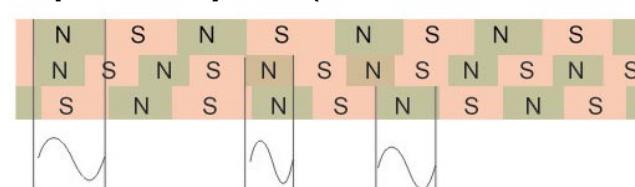
Single-track system (Pseudo-Random Code)



Dual track system (Fine interpolation track (above) / Absolute track (below))

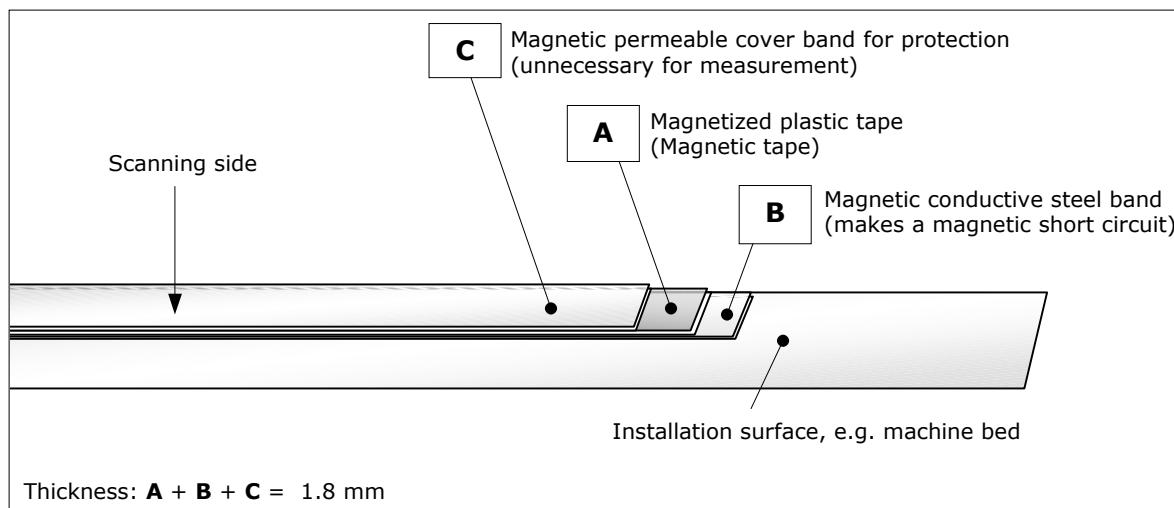


Triple track system (Phase different measurement after the nonius principle)



Construction R - 3 components tape (standard)

In the standard case the magnetic tape is delivered as described here. The tape must be bonded on the mounting surface.



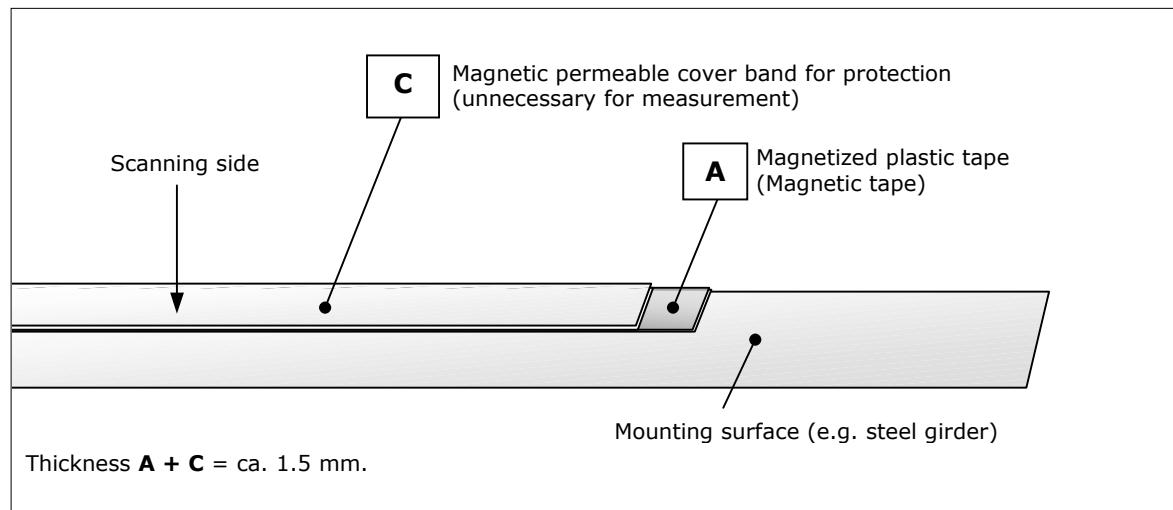
Available lengths: See technical specifications

The Magnetic tape consists of 3 components:

- A** The magnetized, highly flexible plastic tape, connected on the lower side with:
- B** Magnetic conductable and flexible stainless steel tape. It protects the plastic tape from mechanical damages and is a magnetic short circuit at the same time. This increases significantly the functional security under extreme magnetic influences. Both parts A and B are already factory-bonded (by ELGO). Alternatively the single components can be ordered separately (see type designation).
- C** To keep the flexibility for transport and installation, the third part a stainless, magnetic permeable steel tape is delivered separately. It serves for mechanical protection of the plastic tape, is already equipped with a sticky tape and must be bonded on the magnetic plastic tape after installation.

Construction A - 2 components tape (deviating)

This deviating variant is delivered without the magnetic conductive steel band. Therefore the tape must be installed on a magnetic conductive surface, in order to increase the electric field strength. The magnetic tape can be stuck together here or alternatively fastened by its own magnetization e.g. on a steel girder.



Available lengths: See technical specifications

This variant consist of 2 components:

A The magnetized, highly flexible plastic tape

C To keep the flexibility for transport and installation the second part, a stainless, magnetic permeable steel tape is delivered separately. It serves for mechanical protection of the plastic tape, is already equipped with a sticky tape and must be bonded on the magnetic plastic tape after installation.

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 surfaces stuck together. 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).



Note for storage: In order to avoid tensions in the tape, it should be stored in stretched or rolled up condition - with the magnetized plastic tape resp. scanning side outward (see image).

Resistance against chemical influences

Chemicals, showing no or only small effects:

- 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 effects:

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

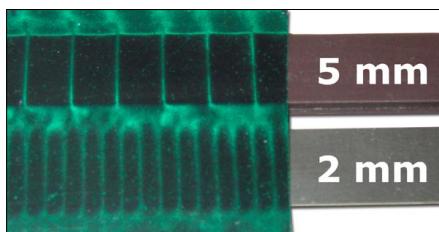
Chemicals, showing strong effects:

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

Technical specifications

Working temperature range	0°... + 70°C
Operating temperature range	- 20°... + 85°C
Stock temperature range	- 40°... + 95°C
Operation height	max. 2000 m above sea level
Humidity	max 80 % (not condensing)
Linear extension (relative) ΔL	$\Delta L = L \times \alpha \times \Delta \vartheta$ (L = Measuring length in meters) ($\Delta \vartheta$ = relative change of temperature in °K, based on 20° C room temperature)
Coefficient of extension α	16×10^{-6} 1/K
Bending radius	minimum 150 mm
Protection class	IP67
Available widths	10 mm +/- 0.2 mm 20 mm +/- 0.3 mm 5 mm +/- 0.1 mm (on request) 2 mm +/- 0.1 mm (on request)
Thickness	1,5 mm +/- 0.1 mm (without cover band) 1,8 mm +/- 0.1 mm (incl. cover band)
max. possible length	Incremental: Standard roll 32 m (up to 70 m on request) Absolute: up to 600 m as roll ware (longer on request)
Pole length	see type designation
Number of absolute tracks	see type designation
Influence of external magnets	External magnetic fields must not exceed 64 mT (640 Oe; 52kA/m) at the surface of the magnetic tape. Higher values will damage or destroy the magnetic tape code. Magnetic fields > 1 mT at the measuring system has negative influences on the system's accuracy.

Determination of pole length resp. number of tracks on already installed tapes:



A special pole foil (app. 4 cm x 4 cm) is available as accessories and is useful to make the tape magnetization visible. The pole length or the number of absolute tracks can be determined, in order to replace an already installed or unknown tape correctly.

Incremental tapes with different pole lengths

The pole foil can be ordered by using the following Article Number: **511000220**

Type designation:

MB20-	AA-	BB-	C-	D-	E-	FF
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Designation: _____

MB20 -> Incremental magnetic tape
 AB20 -> Absolute magnetic tape

Basic pole division: _____

Basic pole division with 100 µm resolution:
 20 = 2 mm pole division (e.g. EMIX, EMIX23)
 25 = 2.5 mm pole division (e.g. Z15, Z16, Z17)
 40 = 4 mm pole division (e.g. AZ16, LMAX)
 50 = 5 mm pole division (e.g. MIX, LMIX)
 70 = 7 mm pole division
 120 = 12 mm pole division

Width of the tape: _____

Width in mm:
 02= 2 mm / 05= 5 mm / 10= 10 mm / 20= 20 mm

Number of tracks: _____

Number of magnetic tracks
 1 = Single track system (Incr. or Abs.)
 2 = Dual track system (e.g. EMAX)
 3 = Triple track system (e.g. FMAX)

Bandaufbau: _____

R = standard: magnetic tape on magnetized steel band
 (bonded on the magnetic short circuit side
 and includes a separate cover band with sticky tape)
 A = magnetic tape with cover band (no further accessories)

Options: _____

B = without sticky tape on the magnetic short circuit side
 C = without cover band
 D = without sticky tape an cover band (B + C)

Number of Bits: _____

Number of Bits with absolute code:

11 = 11 Bit Code
 14 = 14 Bit Code
 16 = 16 Bit Code
 17 = 17 Bit Code
 18 = 18 Bit Code

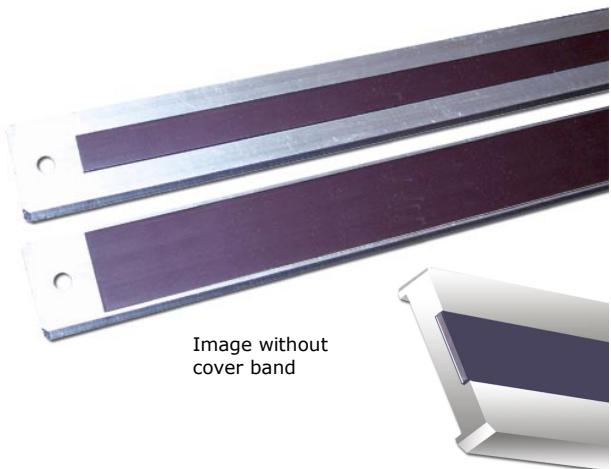
Magnetic tape Accessories

FS - Guide rail:

Guide rail for 10 and 20 mm tape. These special 25 mm wide and 6 mm high aluminum rail is provided with a groove on both sides (1 x 10 mm and 1 x 20 mm) into which the magnetic tape can be bonded respectively. The rails are available in maximum lengths up to 2 meters and already prepared with 4.5 mm mounting holes.

Type designation: **FS-XXXX**

(Please indicate Length in XXXX millimeters!)



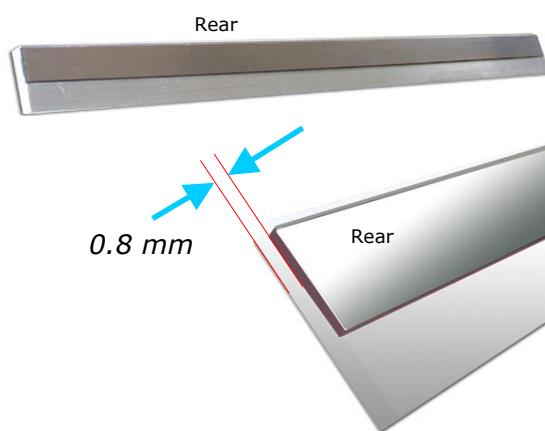
FW-2060 - Guide carriage for FS:

An ideal addition of the FS guide rail: The guide carriage consists of a slidable self-lubricating plastic material and is suitable for the following encoder types resp. measuring units: LMIX 1, EMIX1, Z15, Z16, Z17 and Z20 SN005.

Outer dimensions:

L = 80 x W = 48 x H = 33 mm

Type designation: **FW-2060**



AP - Cover tape profile:

This 2 mm high and 20 mm wide aluminum cover tape profile can be used alternatively for the cover band. The magnetic tape is bonded without the steel cover band into the groove and is optimally protected. The profile is available in lengths up to 2 meters.

Type designation:

AP.X.X (Length in X.X Meters)

Movable guide unit:

This mechanical guide unit is suitable for LMIX2 systems (e.g. applications for elevators). It guides a hung or spring loaded magnetic tape optimally in horizontal and vertical direction thanks to its own 2 movable slides. All movable parts are made from self-lubricating plastic.

A) 45 mm movement is possible

B) 30 mm movement is possible

C) Guidance for tape (can be ordered separately)

Article number: **733250125**

