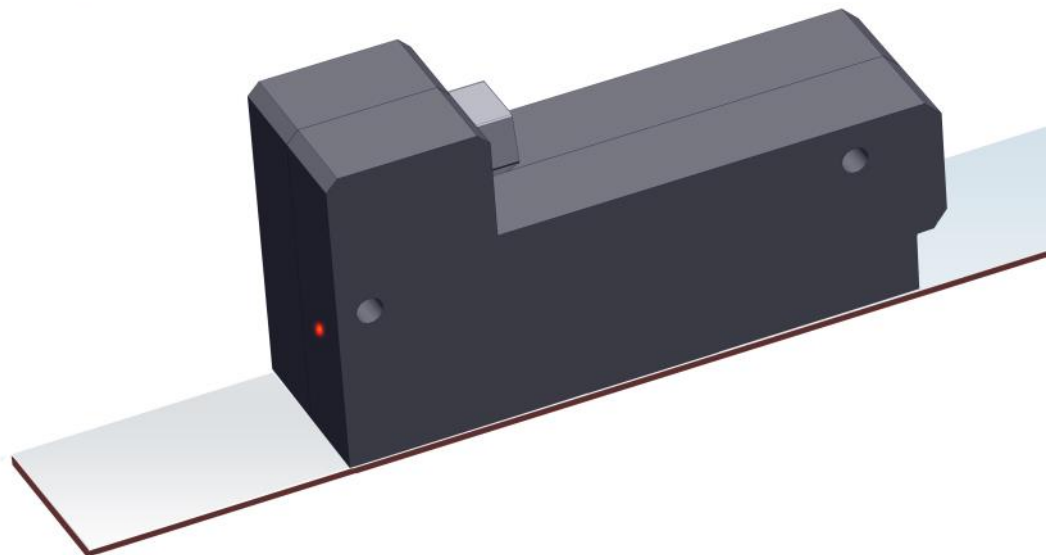


# **EMAX/EMAL - IO**

Magnetic Absolute Linear Encoder with IO-Link Interface

 **IO-Link**



- IO-Link interface according to IEC 61131-9
- Absolute measurement with 10  $\mu\text{m}$  resolution
- Contactless and wear free measurement
- Measuring length 10 m (EMAX) resp. 20 m (EMAL)
- No referencing necessary (position changes are also detected in the de-energized state)
- With distance detection: LED lights up red if the distance to the magnetic tape is not correct

# EMAX/EMAL - IO - Magnetic Absolute Linear Encoder with IO-Link Interface

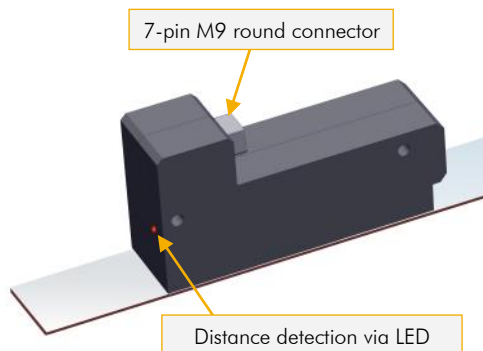
## General

The series *EMAX / EMAL* is an absolute length measuring system. Sensor and translator and interpolation unit are together in the same compact housing. The magnetic tape of series EMAB is paste up to a plain area. The *EMAX / EMAL* encoders can be mounted with a maximum distance of 1.5 mm to the magnetic tape. With a reduced measuring accuracy the sensor distance can be up to 2.0 mm.

The only difference between *EMAX* and *EMAL* is the maximum measuring length (see „product features“ below):

### Product Features

- Absolute measurement with 10  $\mu\text{m}$  resolution
- No referencing necessary (position changes are also detected in the de-energized state)
- Contactless and wear free measurement
- Type *EMAX*: max. 10 m measuring length  
Type *EMAL*: max. 20 m measuring length
- With distance detection: LED lights up red if the distance to the magnetic tape is not correct



## Applications

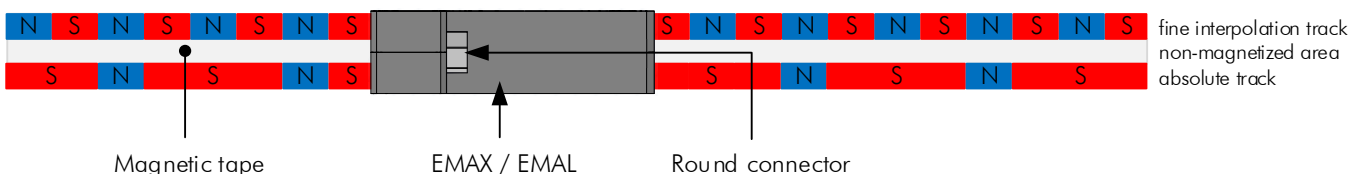
Typical applications are handling systems, storage and conveying technology, injection moulding machines, linear guides and many more.

## Functional Principle

A Hall sensor and a magneto-resistive impedance measuring bridge are guided over a dual-track magnetic tape with a fine-interpolation track and an absolute track. Together with the sensor line the absolute track provides an absolute value and the fine-interpolation track provides together with the interpolation electronic the measuring systems high resolution.

The fine interpolation track encloses alternately north and south pole tracks with a distance of 5 mm. These are scanned with resistance bridges and provide a resolution of 0.01 mm. The absolute value provides the sensor line with 16 single Hall sensors; these sensors are scanning the code sections of the north and south poles. The absolute value on the magnetic tape recurs every 10 m with an *EMAX* resp. every 20 m with an *EMAL* system.

## Measurement principle and coding of the magnetic tape



# EMAX/EMAL - IO - Magnetic Absolute Linear Encoder with IO-Link Interface

## Technical Data

### EMAX/EMAL - IO

#### Mechanical Data

Measuring principle	absolute
Measurement	linear
Repeat accuracy	±1 increment
System accuracy in $\mu\text{m}$ at 20° C (L = measuring length in meter)	$\pm(150 + 20 \times L)$ = standard 010 $\pm(50 + 20 \times L)$ = option F10
Distance from sensor to the magnetic tape	max. 1,5 mm (2,0 mm at reduced measurement accuracy)
Basic pole pitch	5 mm
Sensor housing material	aluminium
Sensor housing dimensions	L x W x H = 75 x 22 x 39 mm
Required magnetic tape	EMAX: AB20-50-20-R-11 EMAL: AB20-50-10-R-12
Measuring length	EMAX: max. 10 m EMAL: max. 20 m
Connection	7-pin M9 round connector
DKA signal cable for IO-Link	5 m standard length (accessories)
Sensor weight	ca. 100 g

#### Electrical Data

Power supply voltage	+ 10 ... 30 VDC
Residual ripple	10 - 30 V; <10 %
Current consumption	max. 150 mA
Interfaces	IO-Link according to IEC 61131-9
Resolution	10 $\mu\text{m}$
Operating speed	max. 4 m/s

#### Environment Conditions

Storage temperature	-20 ... +85° C
Operation temperature	-10 ... +70° C (-20 ... +85° C on request)
Humidity	max. 95 %, not condensing
Protection Class	IP40 (Standard) IP65 (Option V)

## Type Designation

Please use the following code to order:

AAAA BBCC DD EEE FFFF G HHHH I

### A Series / Type

EMAX = measuring length up to 10 m  
EMAL = measuring length up to 20 m

### B Version

00 = standard  
01 = first special version etc.

### C Sensor Housing / Cable Outlet

000 = no cable, housing with M9 round connector  
(DKA cable as accessory part available)

### D Resolution in $\mu\text{m}$

010 = 10  $\mu\text{m}$  - at system accuracy in  $\mu\text{m} \pm(150 + 20 \times L)$   
F10\* = 10  $\mu\text{m}$  - at system accuracy in  $\mu\text{m} \pm(50 + 20 \times L)$   
) \* Variant F10 at extra charge

### E Interface

IOL = IO-Link according to IEC 61131-9 standard

### F Bit rate

230k = 230400 Bit/s (default setting)

### Additional Options

### G Address

- = none (bus-compatible interface)

### H Connections

---- = none (connector on housing)

### I Construction

V = sealed IP65 housing

**Remark:** Order options that are not desired will be filled in with "-!"

Order example:

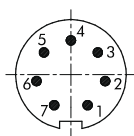
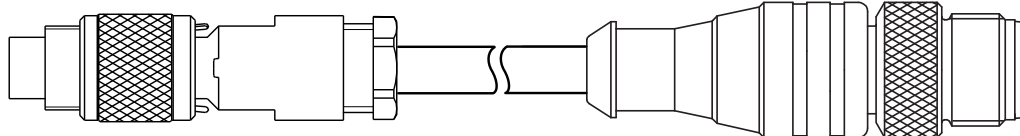
EMAX 00 000 010 IOL 230K - - - - -  
AAAA BB CCC DD EEE FFFF G HHHH I

ELGO standard EMAX with max. 10 m measuring length, 10  $\mu\text{m}$  resolution and IO-Link interface with 230400 bit/s (standard setting)

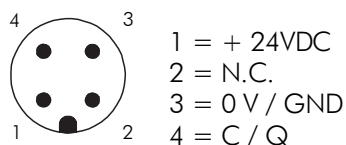
## IO-Link DKA Signal Cable

Sensor side

Customer side



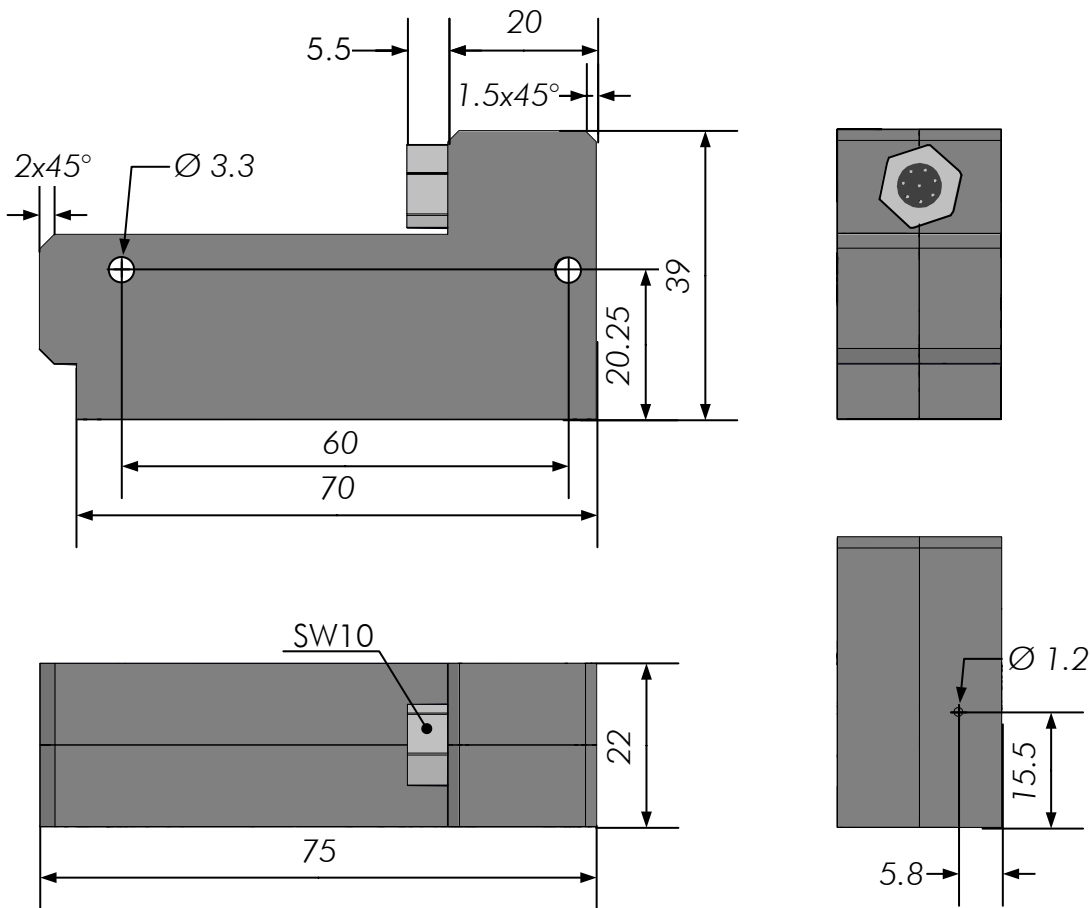
M9-7



M12-4

Order designation see ☞ „Accessories“ on the last page

## Sensor Housing Dimensions



## Accessories

Order Designation	Description
AB20-50-20-2-R-11	Absolute coded magnetic tape for EMAX
AB20-50-20-2-R-12	Absolute coded magnetic tape for EMAL
End cap set (20 mm)	2 end caps (20 mm) and two M3 screws; additional fixation in the radial and linear range and protection of the magnetic tape ends
FS-1000, FS1500 or 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.
DKA-00-Q7F0-050*-R4MA-04-N-N-N	IO-Link signal cable for versions with connector on housing. )* 050 = standard length 5 m
PNO1	SSI/ PROFIBUS Converter
710000130	PSF 30 x 30 mm pole finder foil for magnetic tapes

