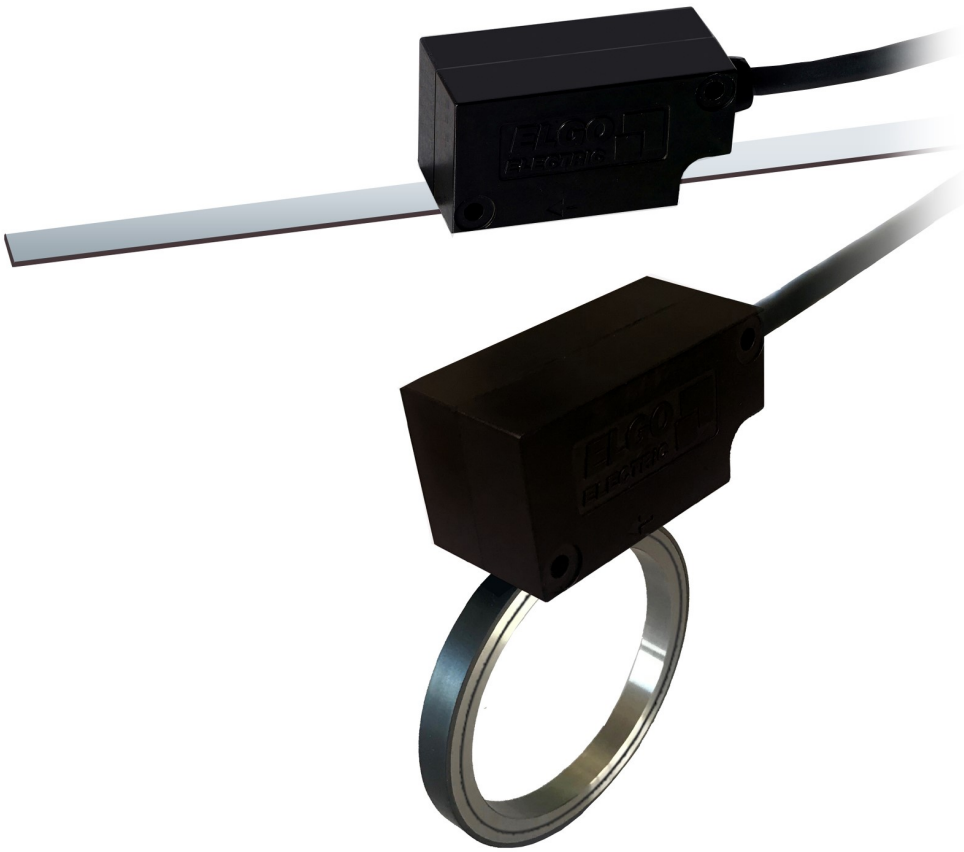
ELGO ELECTRONIC

FMAX2 / FMAX3

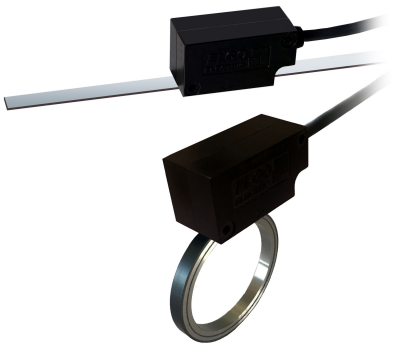
Magnetic Absolute Encoders for linear and rotative Applications



- Magnetic absolute measurement with 19 bit resolution
- Cost-effective alternative to comparable measuring systems
- Suitable for linear and rotary applications
- Ideal solution for motor feedback systems
- Two versions for different measuring lengths:
  FMAX2: max. 192 mm / FMAX3: max. 240 mm
- Insensitive to dust, dirt and water
- Contactless, wear-free measuring principle
- Position detection even in de-energized state
- Additional incremental output signals
  (HTL, TTL or SIN/COS) optionally available
- Quick and easy installation

FMAX2 / FMAX3 - Absolute Encoders for linear and rotative Applications

General:



FMAX2 is a magnetic absolute measuring system designed for linear measuring lengths up to 192 mm or for rotative applications with a diameter of around 61 mm. In contrast, the FMAX3 variant processes lengths up to max. 240 mm and diameters of 80 mm. A compact metal housing includes the sensor system and the required evaluation electronics, which convert the measured signals into an SSI interface format.

In linear application with a coded magnetic tape, the sensor system processes operating speeds of up to 16 m/s. In the rotary range and when using a coded magnetic ring, speeds of up to 6,000 rpm can be processed. Hard ferrite rings are available on request.

Linear Measurements with Magnetic Tape:

For linear measuring tasks, the dual-track absolute coded magnetic tape is glued onto a flat surface by using the supplied adhesive tape. The absolute measuring system is mounted with a maximum reading distance of 0.3 mm to the magnetic tape. When using the magnetic without cover tape, an extended reading distance of up to 0.6 mm is possible. The width of the magnetic tape is 10 mm.

Rotative Measurements with Magnetic Ring:

For radial or rotative measuring tasks, a 6 mm wide ELGO magnetic tape is bonded at the factory to a steel ring. This "magnetic ring" contains 128 individual poles (≙ 64 pole pairs). It can be mounted on the axis either as a thermal fit or by gluing. We recommend the use of Loctite AA 326 adhesive with pre-treatment with Loctite 7649 activator. The maximum permitted reading distance of the sensor to the magnetic ring is 0.6 mm.

Advantages:

With its high measuring accuracy at 19 bit resolution and non-contact scanning, FMAX2 / FMAX3 represents a cost-effective and wear-free alternative to comparable measuring systems. Further, the system is very quick and easy to install.

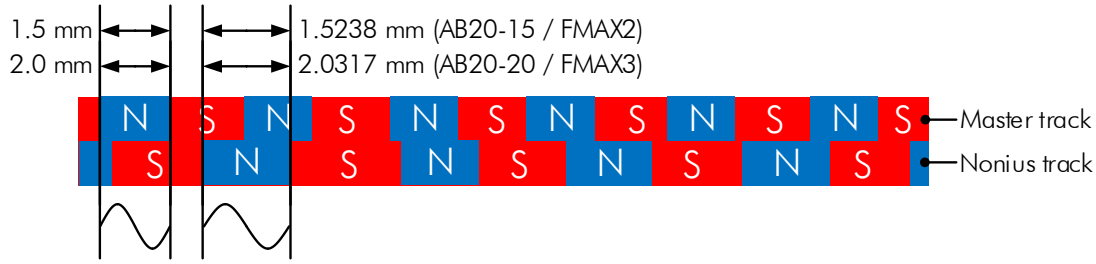
Applications:

A typical application for FMAX2 and FMAX3 are motor feedback systems. The system is also suitable for a wide range of linear, radial and rotary applications in mechanical engineering, e.g. in wood, sheet metal and metal processing.

The absolute Measuring Principle:

With the absolute measuring principle, the current position value is always present. No data is lost even in the event of a power failure. In the installed condition it is generally recommended to calibrate the measuring system once. Afterwards no further calibration is required.

The functional Principle:



For scanning, two Hall sensors are guided over a magnetic tape or a magnetic ring with a master track and a nonius track. Both tracks consist of an alternating north/south pole magnetization. From the combinatorics of the phase position of the two magnetic tracks a clear assignment of the absolute position is possible. The pole pitch of the master track is 1.5 mm for FMAX2 and 2 mm for FMAX3 .

Optional Incremental Signal Outputs:

Optionally, the FMAX2 and FMAX3 measuring systems can be equipped with incremental HTL, TTL or SIN/COS output signals, which can be used for speed evaluation in addition to the position determination.

FMAX2 / FMAX3 - Absolute Encoders for linear and rotative Applications

Technical Data:

Mechanical Data	
Measuring principle	absolute
Repeat accuracy	±1 increment
System accuracy in µm at 20° C	± (50 + 20 x L) L= measuring length in meters
Distance sensor - tape	max. 0.3 mm with cover tape, resp. 0.6 mm without cover tape
Distance sensor - ring	max. 0.6 mm
Pole pitch FMAX2	1,5 mm (Master) / 1,5238 mm (Nonius)
Pole pitch FMAX3	2,0 mm (Master) / 2,0317 mm (Nonius)
Max. measuring length	FMAX2: 192 mm / FMAX3: 240 mm
Housing material	zinc die cast
Dimensions	L x W x H = 50 x 24 x 26 mm
Magnetic tape type	see "Accessories" on last page ☞
Magnetic ring type	see "Accessories" on last page ☞
Magnet ring outer-Ø	FMAX2: 61.1 mm / FMAX3: 80 mm
Sensor cable length	standard: 1.5 m (others on request)
Weight without cable	approx. 50 g; cable approx. 60 g/m
Electrical Data	
Power supply voltage	10 … 30 VDC
Residual ripple	10 … 30 VDC <10 %
Current consumption	max. 150 mA
Interface	SSI (binary or Gray)
Connection type	open cable ends (connectors on request)
Resolution	19 Bit
Rotational speed resp. operating speed	max. 16.0 m/s resp. 6,000 rpm
Environmental Conditions	
Storage temperature	−25 … +85° C
Operating temperature	−25 … +85° C
Humidity	max. 95 %, non-condensing
Protection class	IP54 (IP67 with option V)

Type Designation:

FMAX_ __ ___ __ ____ _ _ _ _ _
A BB CCC DD EEE F GGGG

FMAX = Absolute Encoder

A Measuring Length / Outer Diameter
- 2 = max. 192 mm / Ø 61.1 mm
- 3 = max. 240 mm / Ø 80.0 mm

B Version
- 00 = *ELGO* standard version
- 01 = first special version etc.

C Signal Cable Length (in dm)
- 015 = 15 dm (≙1.5 m) standard (others on request)

D Resolution
- 19 = 19 bit

E Interface
- SB0 = SSI interface, 25 bit binary code
- SG0 = SSI interface, 25 bit Gray code

(others on request)

F Additional Options
- V = sealed IP67 construction

G Additional Incremental Output Signals
- H16B = FMAX2/FMAX3: HTL with 16 bit resolution (other resolutions on request)
- T16B = FMAX2/FMAX3: TTL with 16 bit resolution (other resolutions on request)
- SC30 = only FMAX2: SIN/COS (1 period / 3 mm)
- SC40 = only FMAX3: SIN/COS (1 period / 4 mm)

Ordering example:

FMAX3 00 015 19 SB0 V SC40
A BB CCC DD EEE F GGGG

FMAX3 up to 240 mm measuring length, with 1.5 m long signal cable, 19 bit resolution, SSI interface (25 bit binary), sealed IP67 housing and optional 1 Vpp SIN/COS output signals (1 period per 4 mm).

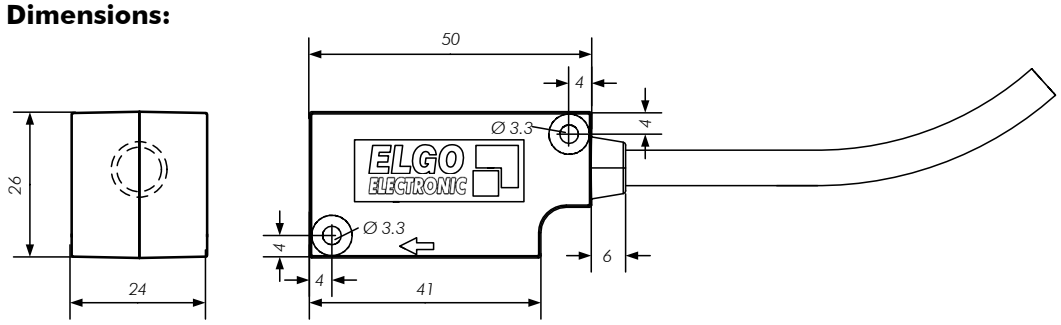
Magnetic Tape and Rings:

Order designations see "Accessories" on last page ☞

Connections:

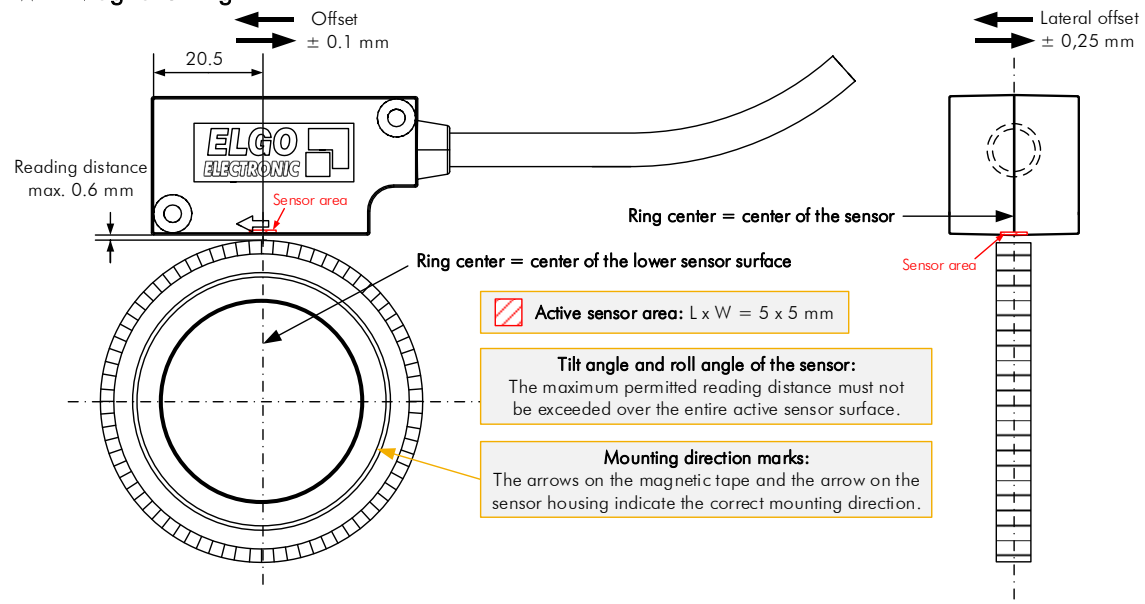
Signal cable	Function
brown	+VCC
blank	Shield
white	0 V / GND
grey	-
green	CLOCK+
black	-
yellow	DATA+
violet	CLOCK−
orange	DATA−

Dimensions:

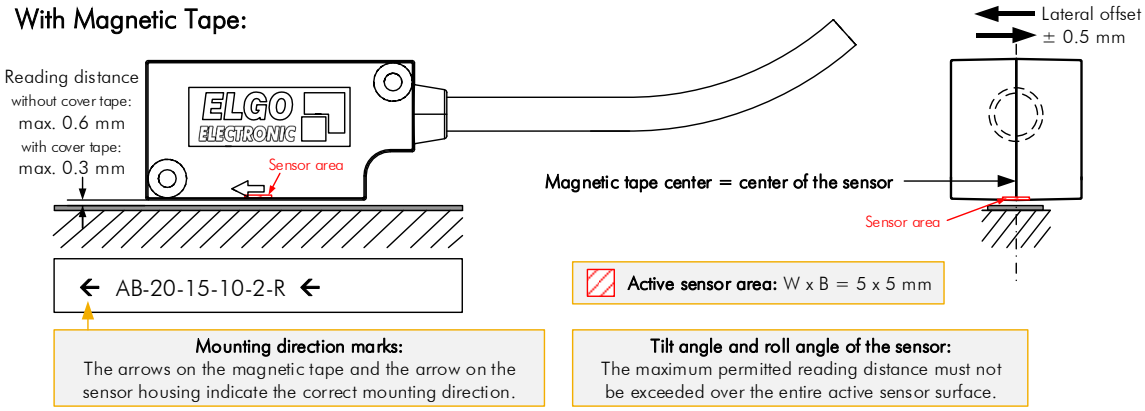


Alignment & Tolerances:

With Magnetic Ring:



With Magnetic Tape:

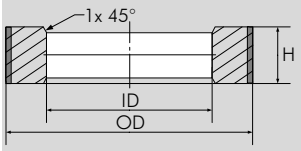


Accessories:

Magnetic Tape and Accessories:

Order Designation	Description
AB20-15-10-2-R	Magnetic tape (pole pitch 1.5 mm) only for **FMAX2**. Please indicate the length in XX.X meters. **Note:** *Order length = measuring length + 50 mm sensor length + 50 mm (for end caps)*
AB20-15-10-2-R-D	As above, but without cover tape (increases the max. reading distance from 0.3 to 0.6 mm). **Note:** *Order length = measuring length + 50 mm sensor length + 50 mm (for end caps)*
AB20-20-10-2-R	Magnetic tape (pole pitch 2 mm) only for **FMAX3**. Please indicate the length in XX.X meters. **Note:** *Order length = measuring length + 50 mm sensor length + 50 mm (for end caps)*
AB20-20-10-2-R-D	As above, but without cover tape (increases the max. reading distance from 0.3 to 0.6 mm). **Note:** *Order length = measuring length + 50 mm sensor length + 50 mm (for end caps)*
End cap set 10 mm	2 end caps (10 mm) and 2 x M3 screws. Used for additional fixation of the magnetic tape and for protection of the magnetic tape ends.
POSU	Pole finder card 85 x 55 mm (makes the magnetic tape poles visible)

Magnetic Ring Types:

Order Designation	Description	Dimensions
MRR-00-061-050-006-0128	Magnetic ring only for **FMAX2**: OD = 61.1 mm, ID = 50 mm, H = 6.3 mm, number of poles = 128. The pole pitch is 1.5 mm.	
MRR-00-080-072-007-0128	Magnetic ring only for **FMAX3**: OD = 80 mm, ID = 72 mm, H = 7 mm, number of poles = 128. The pole pitch is 2 mm.	

The following applies to both magnetic ring types: The magnetic layer consists of elastomer-bonded hard ferrite. The carrier material consists of ferromagnetic steel 1.4104 (other material is available on request).

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