ELGO ELECTRONIC

SERIES *CMIX3*

Programmable magnetic incremental measuring system with resolutions up to 16 nm

- Resolutions up to 16 nm (with X4 encoding)
- For linear and rotary applications
- Compact design integrates processing electronics
- Direct, contactless measuring
- Periodic index pulse or arbitrary chosen reference pulse (option)
- IP67 – protected against dust, dirt and fluids
- In-field programmable parameters: Resolution, index pulse width, hysteresis, counting direction, output level, maximum permissible output frequency and more
- Integrated event / fault memory
- Customer-specific behavior retrofittable via software add-ons
- RGB LED for distance monitoring, error indication and status display

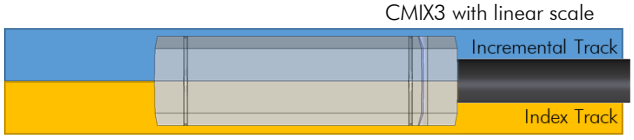
CMIX3 – Programmable magnetic incremental measuring system

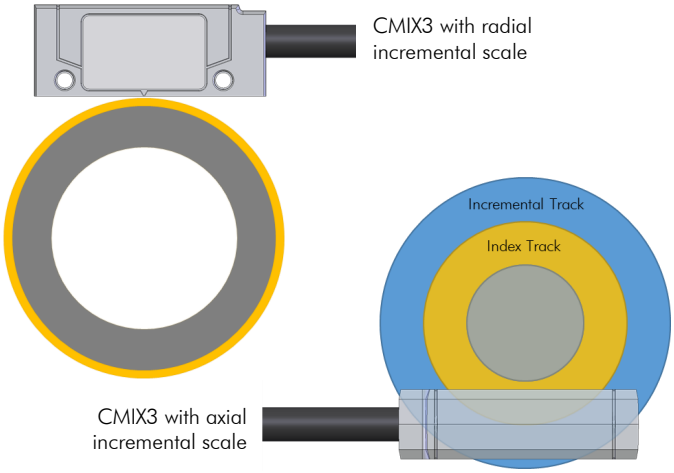
General:

The CMIX3 series is a magnetic measuring system exhibiting highest resolution down to the double-digit nanometer range. Therefore, the sensor is suitable for applications, where optical solutions were required up until now. The sensing head integrates the necessary electronic processing as well as a programming interface for various software parameters. Consequently, the system allows for versatile adaptation to the requirements of any given application – even after installation. Contactless sensing, a maximum travel speed of more than 100 m/s, fast installation in linear and rotary configurations and a robust zinc die-cast housing complying with IP67 protection class render the sensor a versatile product that is always reliable even in harsh environments. Due to its operating principle, the system works completely maintenance- and wear-free. An error indicating LED and the integrated fault memory allow for speedy troubleshooting, thus reducing downtime.

Mounting and alignment on the magnetic scale:

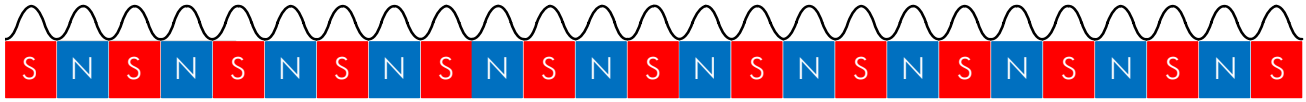
The sensing head is guided along the measured length of a corresponding ELGO magnetic scale. For this purpose, the magnetic scale is stuck onto a flat surface using the supplied adhesive tape. The sensor head should be mounted over the center of the magnetic scale at a distance of 1/3 · pole pitch.





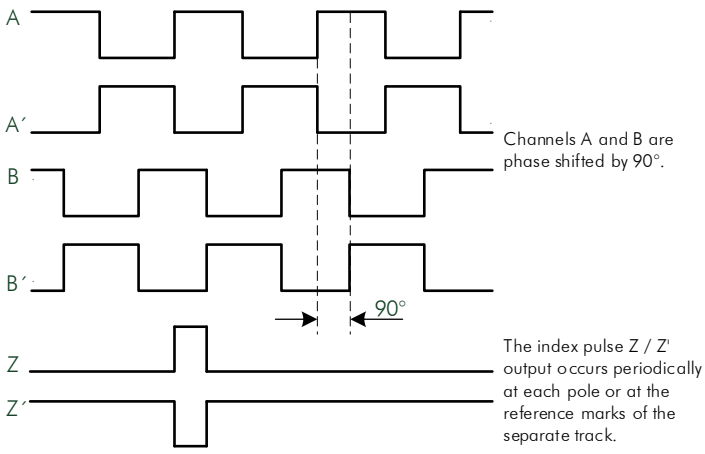
Operating Principle:

The measurement principle of incremental measuring systems is based on electronic, contactless capturing of magnetic north and south poles encoded onto a magnetic scale, where a sine/cosine signal is generated as the sensing head runs along the pattern. This signal is then interpolated by electronic means and determines, depending on the amount of interpolation and combined with the pole pitch of the magnetic scale, the system resolution.



Particular processing electronics are utilized to interpret the sinusoidal signals sampled from the magnetic scale in order to generate square wave outputs of much higher frequency. These output signals are compatible to conventional rotary encoders or optical linear measuring systems. For choice of output levels, refer to 'Technical data'.

Pulse diagram of the outputs:



Connections:

Color	Function	Description
Red	VCC	7-35 VDC / 5 VDC
Blue	GND	0 V / GND
Brown	A	Channel A
Gray	B	Channel B
Pink	Z	Channel Z
Green	A'	Channel A'
Yellow	B'	Channel B'
White	Z'	Channel Z'
Screen	PE / shield	Earth / Shielding

CMIX3 – Programmable magnetic incremental measuring system

Technical Data:

Mechanical Data	
Measurement principle	incremental
Repeatability	±1 increment (@ resolutions ≥ 1 µm)
Air gap to scale	min.: 0.1 mm max.: 1/2 · pole pitch rec.: 1/3 · pole pitch
Housing material	zinc die-cast
Housing dimensions	L x W x H = 38 x 11 x 15 mm³
Connection(s)	D-SUB 9P (male)
Encoder weight	approx. 20 g
Cable weight	approx. 40 g per meter
Electrical Data	
Supply voltage (V_{in})	7-35 VDC or 5 VDC
Residual ripple	< ±5 %
Current consumption	< 250 mA (@ V_{in} = 5 VDC)
Output signals	A, A', B, B', Z, Z'
Output levels	24 V-HTL, 5 V-TTL, 5 V-RS422 (depending on selected supply voltage)
Resolution (@ X4 encoding)	16 nm - 1.25 mm (depending on selected pole pitch)
Output current	max. 150 mA (per differential channel)
Max. operating speed	< 100 m/s (depending on pole pitch and resolution)
Sensor cable	suitable for drag chain > $1 \cdot 10^7$ cycles (@ 9·Ø)*
Cable length	1.5 m standard length (other lengths on request)
Bend radius (Cable)	static: min. 27 mm dynamic: min. 49 mm (9·Ø)
Environmental Conditions	
Operation temperature	-20 ... +70° C
Storage temperature	-20 ... +80° C
Protection class	IP67
Humidity	max. 95 %, non-condensing*

*provisional data

Type Designation:

Device Designation 1

CMIX3 - _ _ _ - _ _ . _ - _ _ _ _ - _ _ - _ _ _
A A A - B B . B - C C C C - D D - E E E

A Version
- 000 = without index track
- 100 = with index track

B Sensor cable length
- 01.5 = 1.5 m standard length (others on request)

C Resolution
- 0001 = 1 µm (others on request)
- xxxx = from 15.26 nm (1 mm pole pitch) to 20 mm (5 mm pole pitch)
  e.g. 100 n = 100 nm, 1u50 = 1.5 µm

D Power supply / Output levels
- 00 = 7-35 VDC / 7-35 VDC Push-Pull HTL
- 01 = 7-35 VDC / 5 VDC RS422
- 03 = 7-35 VDC / 5 VDC Push-Pull TTL
- 11 = 5 VDC / 5 VDC RS422
- 13 = 5 VDC / 5 VDC Push-Pull TTL

E Options
- D1 = D-SUB 9P ELGO standard pin assignment
- D1R = D-SUB 9P alternative pin assignment
- D4 = D-SUB 15P

Device Designation 2

_ _ _ _ - _ _ _ _ (-) _ _ _ _ (-) _ _ _ _ _ _ _
P P P P - O[...] (- O[...])

P Pole pitch
- P1.0 = 1 mm pole pitch
- P2.0 = 2 mm pole pitch (standard)
- P2.5 = 2.5 mm pole pitch
- P5.0 = 5 mm pole pitch

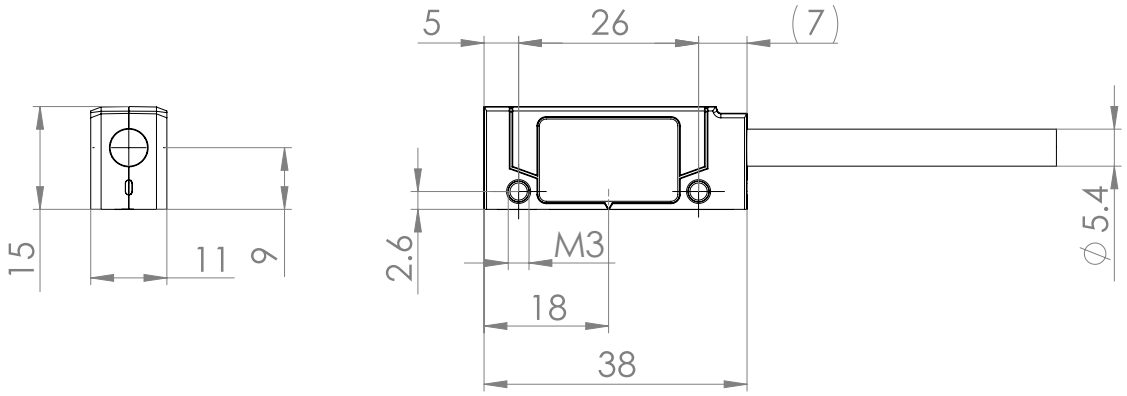
O Options
- Hx[x...] = Hysteresis of x increments (e.g. H1, H8, H20)
- Axx[x...] = Limitation of the output frequency per channel in kHz (e.g. A1000=1 MHz, A3500=3.5 MHz)
- ... = Other options possible if required (e.g. cable typ, connector)
- Zx[x...] = Pulse width of the Z signal in x increments

Order example:
CMIX3 - 0 0 0 - 0 1 . 5 - 2 u 2 0 - 1 1 - D 1 R
A A A - B B . B - C C C C - D D - E E E

P 2 . 0 - H 8 - Z 5 0
P P P P - O[...]

CMIX3 in standard version with 1.5 m cable length, 2.2 µm resolution, 5 VDC supply voltage, 5 VDC RS422 output level, D-SUB 9P (male) connector with alternative pin assignment, 2 mm pole pitch, hysteresis of 8 increments and a pulse width of 50 increments for the Z-signal.

Dimensions:
(all dimensions in mm)

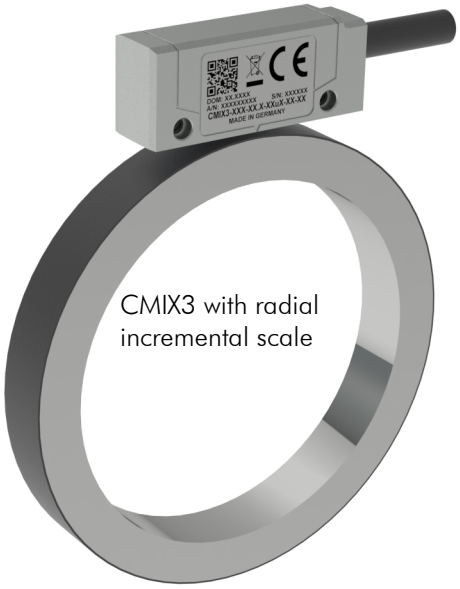


Application example:

CMIX3 with linear incremental scale

CMIX3 with axial incremental scale

CMIX3 with radial incremental scale



Accessories:

Order description	Description
MB20-XX*-10-Y**-R	Magnetic linear scale
AP1.0	Cover profile for magnetic linear scale
Art. No. 731031002	Magnetic tape end caps 10 mm - Set Two end caps (10 mm) and two M3 screws; additional fixation in the radial and linear range and protection of the magnetic tape ends
Art. No. 731031000	Magnetic tape end cap 10 mm

* XX=10; 20; 50
** Y=1; 2

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