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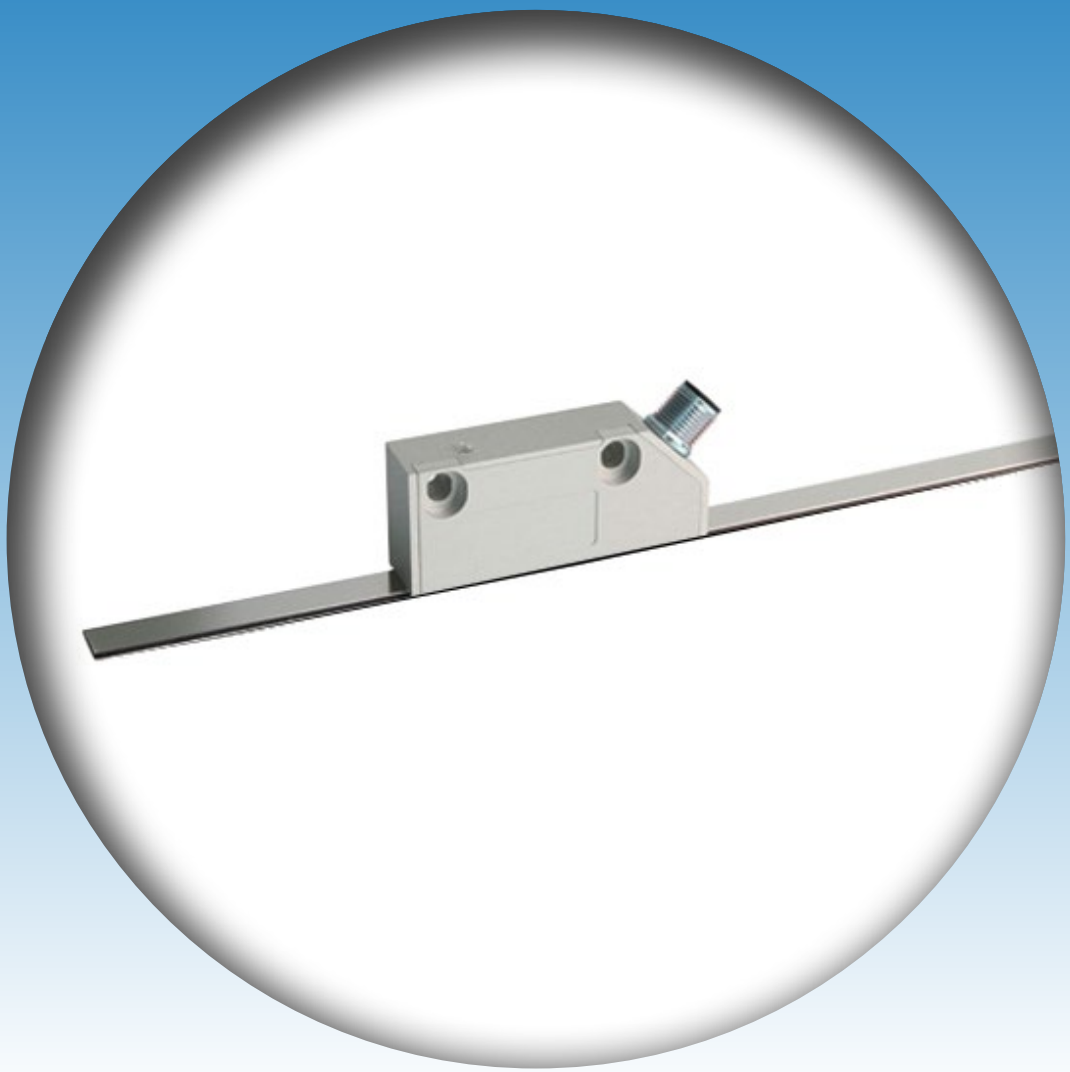
Elektrotechnik Werne

Operating Manual

Series EMAX-HI

Magnetic Absolute Length Measuring System



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1 Contents

2 General, Safety, Transport and Storage

2.1 Information Operating Manual

This manual contains important information regarding the handling of the device. For your own safety and operational safety, please observe all safety warnings and instructions.
Precondition for safe operation is the compliance with the specified safety and handling instructions. Moreover, the existing local accident prevention regulations and the general safety rules at the site of operation have to be observed.
Please read the operating manual carefully before starting to work with the device! It is part of the product and should be kept close to the device and accessible for the staff at any time. The illustrations in the manual are for better demonstration of the facts. They are not necessarily to scale and can slightly differ from the actual design.

2.2 Explanation of Symbols

Special notes in this manual are characterized by symbols. The notes are introduced by signal words which express the magnitude of danger. Please follow this advice and act carefully in order to avoid accidents, damage, and injuries.

Warning notes:

	DANGER! This symbol in connection with the signal word "Danger" indicates an immediate danger for the life and health of persons. Failure to heed these instructions can result in serious damage to health and even fatal injury.
	WARNING! This symbol in connection with the word „Warning" means a possibly impending danger for the life and health of persons. Failure to heed these instructions can result in serious damage to health and even fatal injury.
	CAUTION! This symbol in connection with the signal word "Caution" indicates a possibly dangerous situation. Failure to heed these instructions can lead to minor injuries or damage of property.

Special safety instructions:

	DANGER! This symbol in connection with the signal word "Danger" indicates an immediate danger for the life and health of persons due to voltage. Failure to heed these instructions can result in serious damage to health and even fatal injury. The operations may only be carried out by a professional electrician.

Tips and recommendations:

	NOTE! … points out useful tips and recommendations as well as information for an efficient and trouble-free operation.

Reference marks:

☞ Marks a reference to another chapter of this manual.
🕮 Marks a reference to another chapter of another document.

2.3 Statement of Warranties

The statement of warranties is enclosed separately in the sales documents.
Guarantee:
The producer guarantees the functional capability of the process engineering and the selected parameters. The period of warranty is one year and begins with the date of delivery.

2.4 Demounting and Disposal

Unless acceptance and disposal of returned goods are agreed upon, demount the device considering the safety instructions of this manual and dispose it with respect to the environment.
Before demounting: Disconnect the power supply and secure against re-start. Then disconnect the supply lines physically and discharge remaining energy. Remove operational supplies and other material.
Disposal:
Recycle the decomposed elements: Metal components in scrap metal, Electronic components in electronic scrap, Recycle plastic components, Dispose the remaining components according to their material consistence

	CAUTION! Wrong disposal causes environmental damages! Electronic scrap, electronic components, lubricants and other auxiliary materials are subject to special refuse and can only be disposed by authorized specialists!

Local authorities and waste management facilities provide information about environmentally sound disposal.

Sicherheit

	CAUTION! Please read the operating manual carefully, before using the device! Observe the installation instructions! Only start up the device if you have understood the operating manual. The operating company is obliged to take appropriate safety measure. The initial operation may only be performed by qualified and trained staff. Selection and installation of the devices as well as their embedding into the controlling system require qualified knowledge of the applicable laws and normative requirements on the part of the machine manufacturer.

2.5 General Causes of Risk

This chapter gives an overview of all important safety aspects to guarantee an optimal protection of employees and a safe and trouble-free operation.
Non-observance of the instructions mentioned in this operating manual can result in hazardous situations.

2.6 Personal Protective Equipment

Employees have to wear protective clothing during the installation of the device to minimize danger of health.
Therefore:
Change into protective clothing before performing the works and wear them throughout the process.
Additionally observe the labels regarding protective clothing in the operating area.

Protective clothing:

	PROTECTIVE CLOTHING … is close-fitting working clothing with light tear strength, tight sleeves and without distant parts. It serves preliminarily for protection against being gripped by flexible machine parts. Do not wear rings, necklaces or other jewellery.
	PROTECTIVE GLOVES … for protecting the hands against abrasion, wear and other injury of the skin.
	PROTECTIVE HELMET … for protection against injuries of the head.

2.7 Conventional Use

The product described in this manual was developed to execute safety-related functions as a part of an entire assembly or machine. It is the responsibility of the manufacturer of a machine or installation to ensure the proper functioning of the system. The ELGO-device is only conceived for the conventional use described in this manual.

CAUTION!
Danger through non conventional use!
Non-intended use and non-observance of this operating manual can lead to dangerous situations.
Therefore:

- Only use the device as described
- Strictly follow the instructions of this manual

Avoid in particular:

- Remodelling, refitting or changing of the construction or single components with the intention to alter the functionality or scope of the device.

Claims resulting from damages due to non-conventional use are not possible.
Only the operator is liable for damages caused by non-conventional use.

2.8 Safety Instructions for Transport, Unpacking and Loading

CAUTION!
Transport the package (box, palette etc.) professionally.
Do not throw, hit or fold it.

2.9 Handling of Packaging Material

Notes for proper disposal: ☞ 0

2.10 Inspection of Transport

Check the delivery immediately after the receipt for completeness and transport damage.
In case of externally recognizable transport damages:

- Do not accept the delivery or only accept under reserve.
- Note the extent of damages on the transportation documents or delivery note.
- File complaint immediately.

NOTE!
Claim any damage immediately after recognizing it. The claims for damage must be filed in the lawful reclaim periods.

2.11 Storage

Store the device only under the following conditions:

- Do not store outside
- Keep dry and dust-free
- Do not expose to aggressive media
- Protect from direct sun light
- Avoid mechanical shocks
- Storage temperature (☞ 4 Technical Data) needs to be observed
- Relative humidity (☞ 4 Technical Data) must not be exceeded
- Inspect packages regularly if stored for an extensive period of time (>3 months)

3 Product Features

EMAX-HI is a magnetic length measuring system. Sensor and translator are integrated in one housing. The magnetic tape is attached to a flat surface using the adhesive tape included in the delivery. EMAX-HI can be installed at a distance of up to 0.5mm from the magnetic tape (without cover tape).

The absolute measuring system provides the following advantages:

- No referencing necessary.
- Direct and contactless measurement.
- The distance between the sensor and the magnetic tape can vary between 0.1 and 0.5mm (without covering tape). The LED on the housing of the sensor glows RED if this distance is crossed.
- Measuring length up to 8 m.
- High resolution: 0.001 mm.
- Repeating accuracy +/- 1 Increment.
- Very robust against dirt.

Regarding the interface, different options are available SSI and CANopen (DS 406), addressable RS422 and CAN VASIC (CN0) on request

Typical applications are linear drives.

3.1 Functional principle

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

The figure shows two magnetic traces, with north pole and south pole magnetization. The fine interpolation trace encloses alternately north and south pole traces with a distance of 1 mm, these are scanned with resistance bridges and provide a resolution of 0.001 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 8 m.

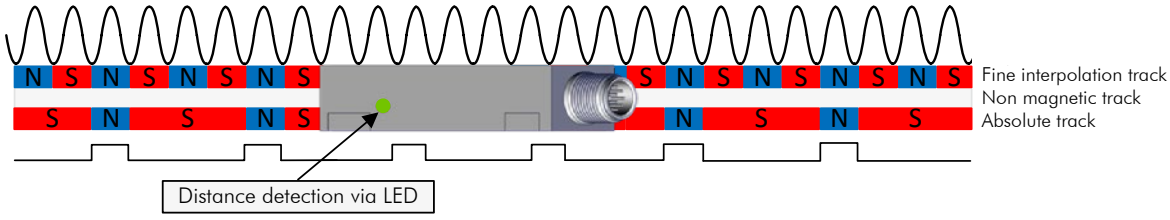


Fig. 1 Mounting direction

4 Technical Data

4.1 Identification

The type label serves for the identification of the unit. It is located on the housing of the sensor and gives the exact type designation (=order reference, see type designation) with the corresponding part number. Furthermore, the type label contains a unique, traceable device number.

4.2 Dimensions Sensor

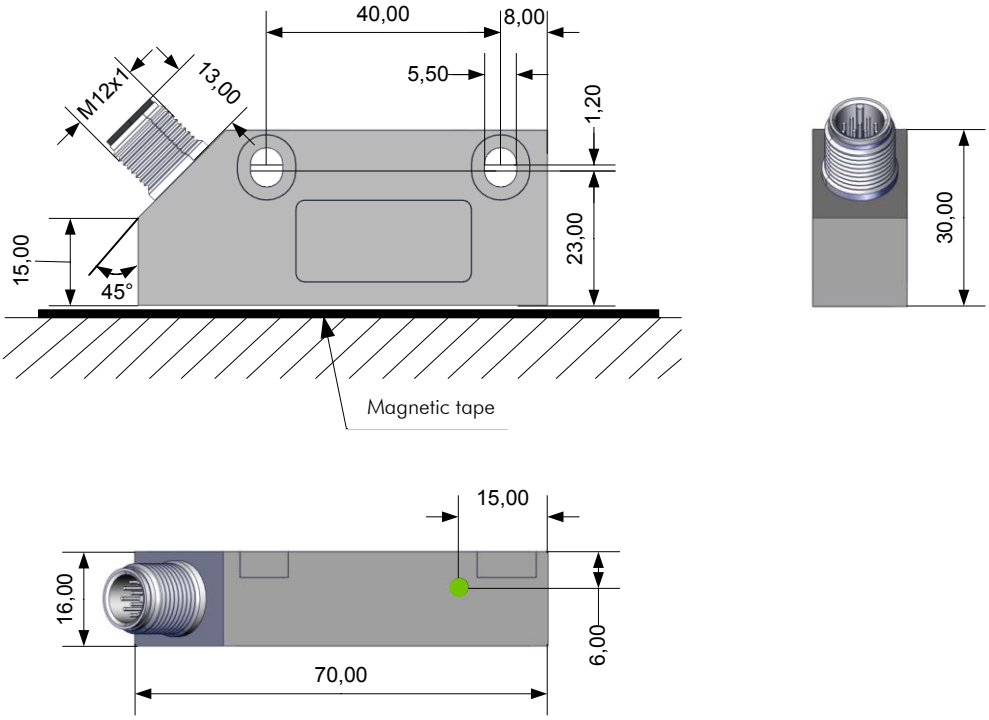


Fig. 2 Dimensions Sensor

4.3 Technical Data Sensor

EMAX-HI (Standard version)	
Mechanical Data	
Measuring principle	absolute
Repeat accuracy	+/- 1 Increment
System accuracy in at 20°C	+/- (10 µm + 20 µm x L[m]) L = measuring length in meter
Distance from sensor to magnetic tape	Max. 0,5 mm (without covering tape)
Basic pole pitch	1 mm
Sensor housing material	aluminium
Sensor housing dimensions	L x B x H = 70 x 16 x 30 mm
Necessary type	AB20-10-10-2-R-11
Maximum measuring length	8 m
Connection	circular plug 12-pole M12 outboard
Sensor cable	5 m standard cable length (others upon request)
Weight	Ca. 50 g without cable; cable ca. 60 g/m (accessories)
Electrical Data	
Supply voltage	10 … 30 VDC
Residual ripple	10 … 30 VDC < 10%
Power input	max. 150 mA
Interfaces	SSI, CANopen (DS406), CAN BASIC (CN0), RS422 and addressable RS422 upon request
Resolution	0,001 mm
Speed	1 m/s at permanent absolute position readout 10 m/s at SC10 readout 2 m/s at TTL square wave readout
Conditions	
Storage temperature	-20 °C … +85 °C
Operation temperature	-10 °C … +70 °C (-20 °C … +75 °C upon request)
Humidity	max. 95 %, non-condensing
Protection class	IP 50 (standard) IP 65 (option V) Higher protection class upon request

4.4 Technical Data Magnetic Tape

The magnetic tape consists of two components:

- The actual magnetic tape which carries the position information
- A mechanical stainless steel back iron

Magnetic Tape AB20-10-10-2-R-11	
Coding	absolute, two tracks system
Pole pitch	1 mm
Operation temperature installed	-20 °C … +65 °C (-20 °C … +80 °C usage without adhesive tape , options „B“ or „D“)
Storage temperature uninstalled	Short-term: -10°C … +60°C Medium-term: 0°…+40°C Long-term: +18°C (-20°C … +80°C when using the tape without adhesive tape, options „B“ or „D“)
Gluing temperature:	+18°C … +30°C
Relative humidity	max. 95 %, non-condensing
Accurateness 20°C in mm	+/- (10 + 20 x L[m]) (L = measuring length in meters)
Material carrier tape	Precision strip 1.4310 / X10CrNi 18-8 (EN 10088-3)
Double-faced adhesive tape	3M-9088 (observe instructions), others on request
Dimensions	➔ without adhesive tape: 10 mm (+/- 0,1) x 1,35 mm (+/- 0,11) ➔ with adhesive tape (excl. carrier): 10 mm (+/- 0,1) x 1,56 mm (+/- 0,13) ➔ with adhesive tape (incl. carrier): 10 mm (+/- 0,1) x 1,63 mm (+/- 0,14)
Length expansion coefficient	$\alpha \approx 16 \times 10^{-6}$ 1/K
Thermal length expansion	$\Delta L[m] = L[m] \times \alpha[1/K] \times \Delta\vartheta[K]$ (L = tape length in meters, $\Delta\vartheta$ = relative temperature change)
Available lengths	Up to 8 m
Weight magnetic tape	ca. 62 g/m (incl. magnetic tape and cover tape)
Tape imprint	standard, printing color black, digit height >= 5 mm
Influence of external magnets	External magnetic fields must not exceed 64 mT (640 Oe; 52 kA/m on the surface of the magnetic tape as this could damage or destroy the code on the tape.
Protection class	IP65

4.5 Resistance against Chemical Influence

Table 1 Chemical Resistance of the Magnetic Tape

None or only low effects in constant contact after 2 – 5 years points			
Formic acid	Glycerin 93°C	Soybean oil	
Cotton seed oil	N-Hexane	Lactic acid	
Formaldehyde 40%	Iso Octane	Petroleum	
Weak to middle effects in constant contact after approx. 1 year points			
Acetone	Petrol	Acetic acid 30%	Oleic acid
Acetylene	Steam	Acetic acid	Saltwater
Ammoniac	Acetic acid 20%	Isopropyl	Stearic acid 70°C anhydrous
Kerosin			
Strong effects in constant contact after 1 – 5 months points			
Benzol	Nitric acid 70%	Turpentine	Toluol
Paint solvent	Red fuming nitric acid	Carbon tetrachloride	Tetrahydrofuran
Trichloroethylene	Nitrobenzene	Hydrochloric acid 37 % 93 °C	Xylene

5 Installation and First Start-Up

CAUTION
Please read the operating manual carefully before using the device! Strictly observe the Installation instructions!
In case of damage caused by failure to observe this operating manual, the warranty expires.

We are not liable for any secondary damage and for damage to persons, property or assets.

Der Betreiber ist dazu verpflichtet, geeignete sicherheitsrelevante Maßnahmen zu ergreifen und durchzuführen.

The operator is obliged to take appropriate safety measures. The first start-up may only be performed by staff that has been trained and authorized by the operator.

5.1 Operating Area

WARNING!
Do not use the device in explosive or corrosive environments!
The device must not be installed close to sources of strong inductive or capacitive interference or strong electrostatic fields!

CAUTION!
The electrical connections must be made by suitably qualified personnel in accordance with local regulations.

The device may be designed for switchboard mounting. During work on the switchboard, all components must be de-energized if there is a danger of touching the energized parts! (protection against contacts)

Wiring works may only be performed in the de-energized state!

Thin cable strands have to be equipped with end sleeves!

Before switching on the device, connections and plug connectors have to be checked!

The device must be mounted in a way that it is protected against harmful environmental influences such as splashing water, solvents, vibration, shock and severe pollution and the operating temperature must not be exceeded.

5.2 Description installation / Installation of the indicator

5.2.1 Mounting Tolerance

NOTE!
Pay attention to correct distance sensor / magnetic tape 0,1 mm…max. 0,5 mm! The LED-Indicator on the sensor housing flashs red, if this distance is exceeded.
The direction arrow have to point in the same direction by the assembly.

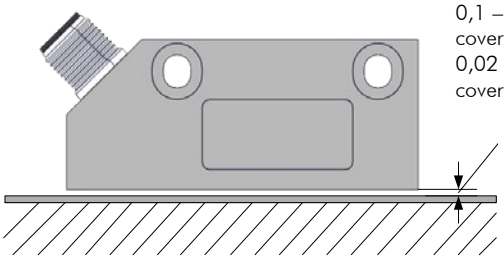
Notice by the installation of the system the compliance of the given tolerance! Outside these areas the function is not guaranteed!

Instal the sensor with M3 screws, see chapter “Dimensions of sensor”.

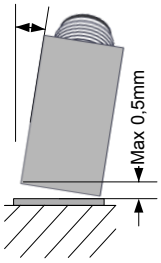
Table 2 Mounting Tolerance

Tolerances	
Magnetic tape type	AB20-10-10-2-R-11
Ride height	0,1 mm…max. 0,5 mm (without cover band) 0,02 mm…max. 0,2 mm (with cover band)
Pitch	Max. Distance 0,5 mm must not be exceeded at any position
Yaw angle	< +/- 1 °
Roll	Max. Distance 0,5 mm must not be exceeded at any position
Lateral offset	+/- 0,5 mm

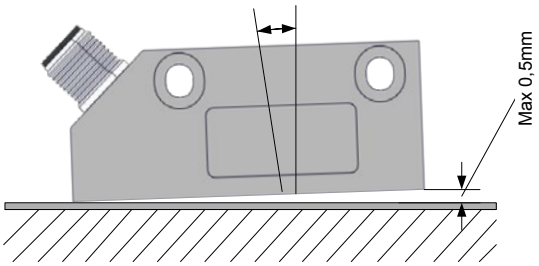
Ride height



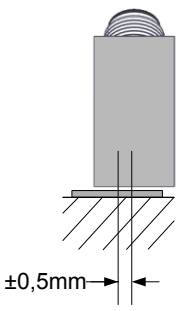
Roll



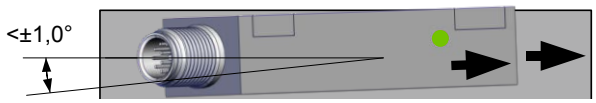
Pitch



Lateral offset



Yaw angle



5.3 Description installation / Mounting of the Magnetic Tape

5.3.1 Components and Storage of the Magnetic Tape

In the standard case, the magnetic tape is delivered as described. It is installed by gluing it to the respective mounting surface.

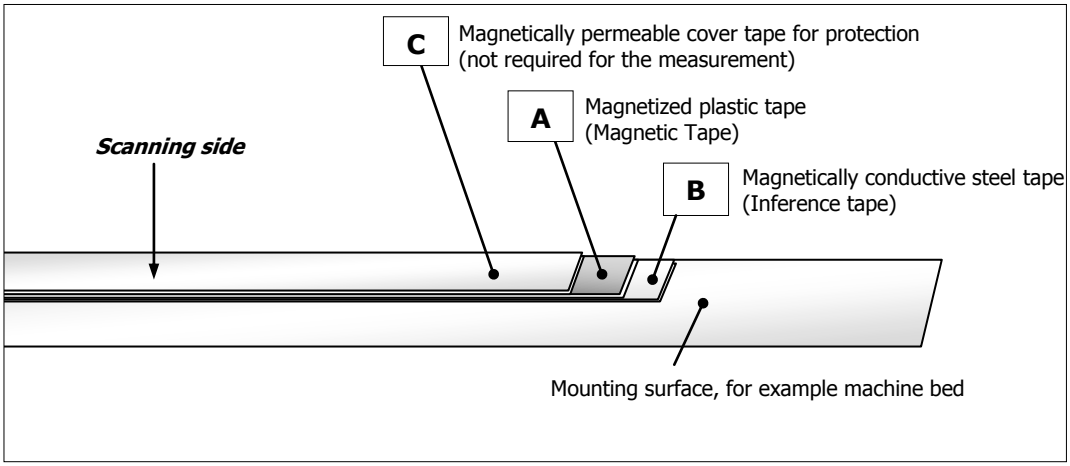


Fig. 3 Components of the Magnetic Tape

5.3.2 Handling of the Magnetic Tape

In order to avoid tension in the tape, it must not be stretched, compressed or twisted.
It should be stored with the magnetized plastic tape to the outside (the minimum bending radius must be 150 mm).

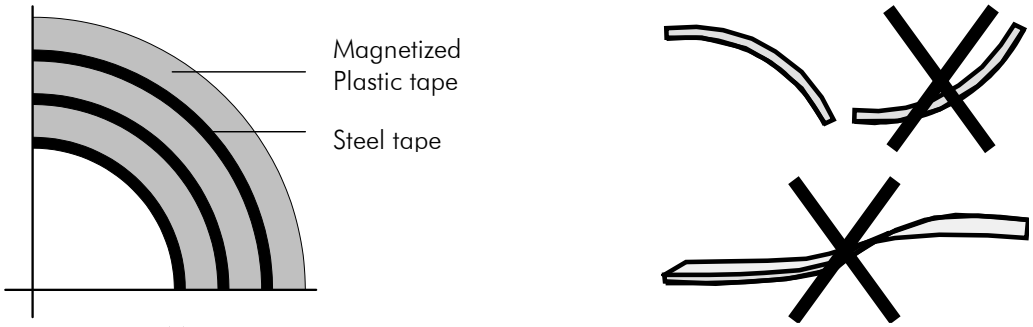


Fig. 4 Handling Magnetic Tape

5.3.3 Processing hint for the gluing of magnetic tapes

The delivered sticky tapes stick well on clean, dry and smooth surfaces. The surface should be better cleaned, the dirtier the operating area is. It is advisable to use the surface finish $R_a <= 3,2$ ($R_z <= 25$ / N8. Typical solvents for cleaning the surface are a 50/50 isopropyl alcohol/water mixture or heptane. If the surface is copper, brass etc, it should be sealed to avoid oxidation. The strength of the adhesion is directly dependent on the contact the adhesive can form with the surface. A high pressure ensures a good surface contact.
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 to 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). For gluing use only the supplied adhesive tape.

5.3.4 Cutting and Gluing

NOTE!
When sticking the magnetic tape pay attention to the markings on the tape and the Sensor. Improper installation does not provide the correct values. A already glued magnetic tape is destroyed after the removal, and cannot be used again. Note also the direction of counting of the measuring system
Before starting the gluing process, both the magnetic and the cover tape have to be cut to the required length

Length Magnetic tape = measuring length + sensor length + 50mm (end caps)

Preferably the magnetic tape should be glued close to an edge or into a groove, which should be deep enough to embed the magnetic tape and the cover tape.
The gluing is carried out as follows:
The magnetic tape and the steel tape are already work-sided connected with each other. On the support side (= steel tape) the attached adhesive tape is glued.
Now, the magnetic tape will adjusted and then glued. The easiest way is to stick the magnetic tape in two steps. First remove the adhesive film up to half and stick it on and then the remaining length. Then the cover tape is pasted with the adhesive tape. Therefore it does not matter on which side is the sticky tape is glued. On the visible brown magnetized plastic tape will the cover tape glued.

6 Connections and Interfaces

6.1 Assignment

Table 3 Pin Assignment

The colors are valid to the DKA signal cable, which is available as an option.

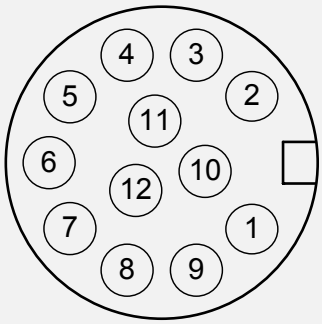
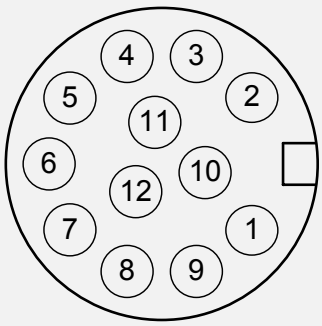
Cable plug 12 pol M12x1	PIN-Nr.	Function
	1 (white)	0V/GND
	2 (brown)	10…30 VDC
	3 (green)	CLK +
	4 (yellow)	CLK -
	5 (grey)	DATA +
	6 (pink)	DATA -
	7 (blue)	COS + or B +
	8 (red)	COS - or B -
	9 (black)	SIN + or A +
	10 (violet)	SIN - or A -
	11 NC	NC
	12 NC	NC

Table 4 Assignment CA0 / optional with incremental signal

The colors are valid to the DKA signal cable, which is available as an option.

Cable plug 12 pol M12x1	PIN-Nr.	Function
	1 (white)	0V/GND
	2 (brown)	10…30 VDC
	3 (green)	CAN-L
	4 (yellow)	CAN-H
	5 NC	NC
	6 NC	NC
	7 (blue)	COS + or B +
	8 (red)	COS - or B -
	9 (black)	SIN + or A +
	10 (violet)	SIN - or A -
	11 NC	NC
	12 NC	NC

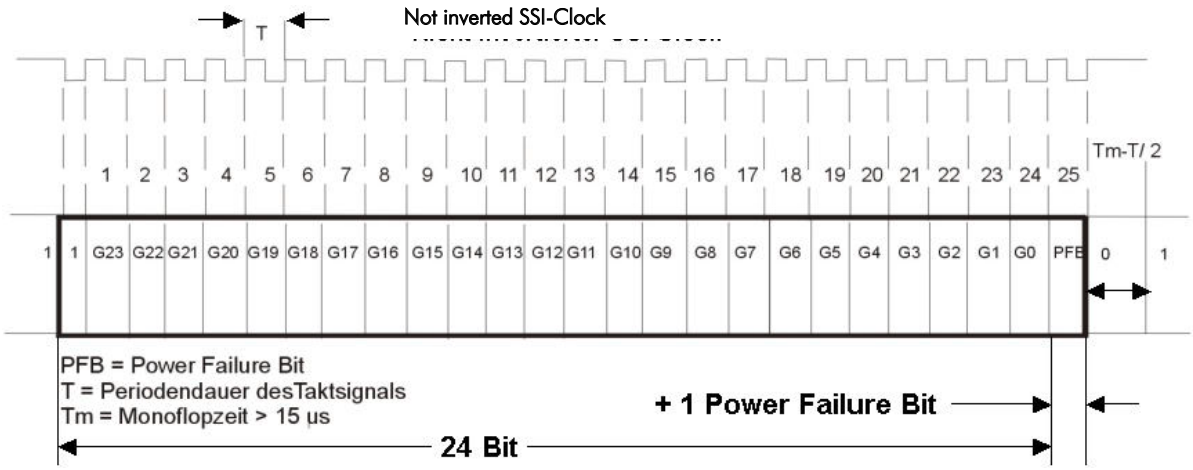
6.2 Interfaces

6.2.1 Interface SSI (option SB0 and SG0)

If the clock is not interrupted for the time Tm-T/2 (output of further 25 periods), the shift register clocks once again the same data value (error recognition in evaluation).

Some encoders contain a **Power Failure Bit (PFB):**

With EMAX-HI the PFB is always „low".



6.2.2 Interface CANopen (option CA0)

As standard the EMAX-HI measuring system is equipped with a CANopen standard interface DS406, when ordering option CA0.

The following identifiers are given:

CAN - Identifier
(6 Byte telegram)
181 (16) = Identifier with device address 1
First 4 bytes = Position
Next 2 bytes = Speed in mm/s
Baud rate = 250 KB/s

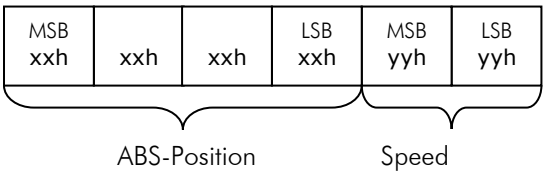


Fig. 6 Interface CAN

6.2.3 A/B – Incremental Signal TTL / HTL

As an option, there are two 90 ° phase shifted rectangle signals (compatible to rotary encoders) with HTL output level (push-pull, push / pull).

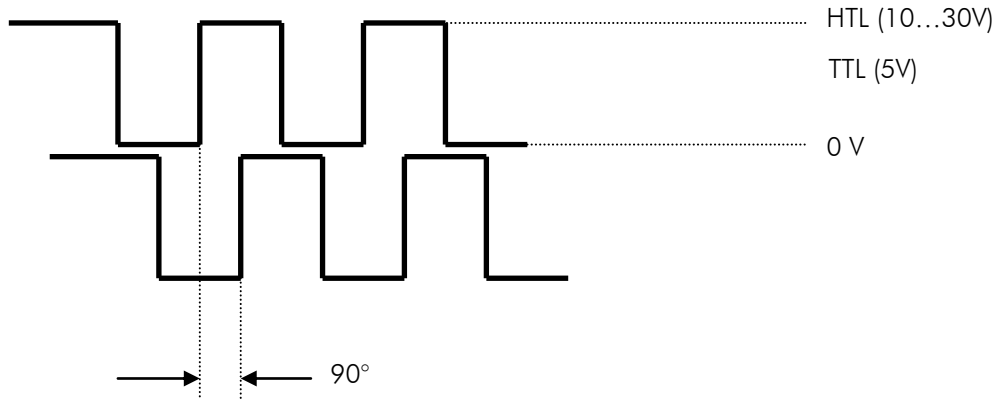
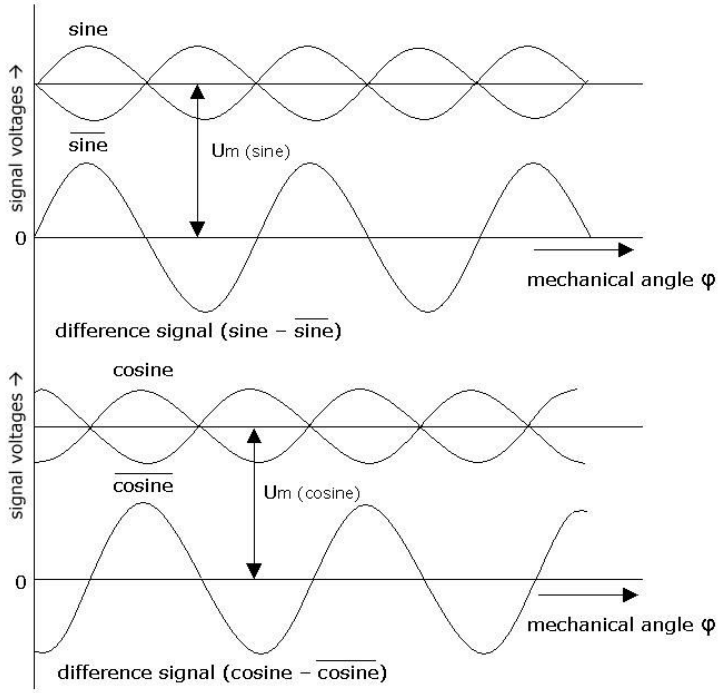


Fig. 7 A/B - Incremental Signal TTL / HTL

6.2.4 Sine-Cosine Incremental Signal (Option SC10)

Sine-Cosine signals with 1 Vss are available as an option (push-pull output stage, short-circuit proof)



Parameter	Description	min.	typ.	max.	unit
Medium voltage	at (sin), at (cos)	2.4	2.5	2.6	V
Amplitude	sin – $\overline{\text{sin}}$ cos - $\overline{\text{cos}}$	400	500	600	mV
proportion	(sin – $\overline{\text{sin}}$) / (cos – $\overline{\text{cos}}$)	0.9	1.0	1.1	-
Phase shift	φ	89	90	91	° Grad
Distortion factor	K	-	-	2	%

7 Accessories

Order Designation	Description	Article No.
AB20-10-10-2-R-11	Magnetic Tape for EMAX-HI (max. measuring length 8 m)	
Magnetic tape end cap set 10mm	2 end caps (10 mm) and 2 x M3 screws; Additional fixation for linear or radial application, As well as for protection of magnetic tape ends	
FS-1000	FS=Guide rail, 1000=length in mm	
PNO1	SSI/ Profibus converter	
DKA-00-RCF0-050-XXXX-12-T-D-S	Connection cable for EMAX-HI with 12-pole M12 female connector, cable length 5.0 m, customer sided with open cable end, 12-wire, twisted pair, drag chain suitable, screen available	

7.1 Type designation

DKA	-AA	-BBBB	-CCC	-DDDD	-EE	-F	-G	-H

SN-Number:

00 = Standard version

Connection unit-side:

RCF0 = M12 thread, 12 pin cable connector female, 0 = Elgo standard pin assignment

Cable length in dm:

Available cable length:
050 = 5 m
Other lenghs on request

Connection customer side:

XXXX = open wires, twisted and tinned
Other connectors on request

Wire quantity :

08 = 8 wires
12 = 12 wires

Cable model:

T = Twisted pair

Drag chain suitable :

D = Drag chain

Schield protection:

S = with shield
N = without shield

8 Disturbances, Maintenance, Cleaning

This chapter describes possible causes for disturbances and measures for their removal. In case of increased disturbances, please follow the measures for fault clearance in chapter 8.1.
In case of disturbances that cannot be eliminated by following the advice and the fault clearance measures given here, please contact the manufacturer (see second page).

8.1 Fault Clearance

CAUTION!
The device, the connection line and the signal cable must not be installed next to sources of interference that emit strong inductive or capacitive interference or strong electrostatic fields.

External perturbations can be avoided thorough suitable cable routing.

The screen of the signal output cable should only be connected to the following circuit on one side. The screens should not be grounded on both sides. Signal cables always have to be routed separately from the load power line. A safety distance of at least 0,5 m has to be kept from inductive and capacitive sources of interference such as contactors, relays, motors, switching power supplies, clocked controllers etc!

If interferences occur in spite of all the items stated above being observed, please proceed as follows:

1. Installation of RC-circuits via contactor coils of AC-contactors (e.g. 0,1 µF / 100 Ω)
2. Installation of recovery diodes via DC-inductors
3. Installation of RC-circuits via the different motor phases (in the terminal box of the motor)
4. Do not connect protective earth and ground
5. Connect a mains filter ahead of the external power pack

8.2 Re-start after Fault Clearance

After the fault clearance:

1. Reset the emergency stop mechanism if necessary
2. Reset the error report at the super-ordinate system if necessary.
3. Ensure that there are no persons in the danger area.
4. Follow the instructions from chapter 5.

WARNING!
Danger of injury through non-conventional fault clearance!

Non-conventional fault clearance can lead to severe injuries and damage of property.

Therefore:

- Any work to clear the faults may only be performed by sufficiently qualified staff
- Arrange enough space before starting the works
- Make sure that the mounting area is clean and tidy. Loose components and tools are sources of accidents.

If components need to be replaced:

- Pay attention to a correct installation of the spare parts.
- Reinstall all the fixing elements properly
- Before turning on the device, ensure that all covers and safety equipment is installed correctly and functions properly

8.3 Maintenance

The device is maintenance-free.

WARNING!
Danger through non-conventional maintenance!

Non-conventional maintenance can lead to severe injuries and damage of property.

Therefore:
Maintenance works may only be completed by staff that has been authorized and trained by the operator.

8.4 Cleaning

WARNING!
The device can only be cleaned with a damp cloth, do not use aggressive cleanser!

9 Type designation

9.1 Type designation

HMAX	XX	XXX	XXX	XXX	XXXX	X	XXXX	X	X	XXXX
	AA	BBB	CCC	DDD	EEEE	F	GGGG	H	I	JJJJ

Series/Type:
EMAX-HI measurement system

Versions-No.:
00 = Standard

Signal Cable length in dm:
000 = Standard without cable

Resolution in µm :
001=1µm – with system accuracy in µm+/-(10+20xL)

Interface
SBO = SSI Interface (25 Bit binary code)
SGO = SSI Interface (25 Bit gray code)
CA0 = CANopen (DS406)
CN0 = CAN BASIC ELGO
420 = RS422
A20 = addressable RS422

Bitrate
09k6 = 9600Bit/s-Standard bitrate for RS232 (230) and 422 (422/A20)
19k2 = 19200Bit/s for RS232 or RS422
38k4 = 38400Bit/s for RS232 or RS422
125k = 125000Bit/s for CAN
250k = 250000Bit/s for CAN
500k = 500000Bit/s for CAN
1MHz= 1000000Bit/s for CAN

Additional Options
Device address 0..F
Standard Setting: Device address 0

Standard version always with 12-pin M12 plug

Version
V = sealed Version

Terminating resistor
A = without terminating resistor

Incremental signal
H001 =iIncrementale square wave signals HTL with 1µm resolution
H005 = incrementale square wave signals with 5µm resolution
H010 = incrementale square wave signals HTL with 10µm resolution
T001 =incrementale square wave signals TTL with 1µm resolution
T005 = incrementale square wave signals TTL with 5µm resolution
T010 = incrementale square wave signals TTL with 10µm resolution
SC10= sine-cosine-signal 1 Vss, 1mm pole pitch

9.1.1 Ordering Example

HMAX	00	000	001	SB0	----	-	----	-	-	----
	AA	BBB	CCC	DDD	EEEE	F	GGGG	H	I	JJJJ

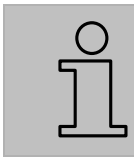
EMAX-HI with SSI Binary interface , 25Bit

HMAX	00	000	001	SG0	----	-	----	-	-	T005
	AA	BBB	CCC	DDD	EEEE	F	GGGG	H	I	JJJJ

EMAX-HI with SSI Gray interface, 25B it TTL-Square wave and 5µm resolution

HMAX	00	000	001	CN0	125k	0	----	-	-	----
	AA	BBB	CCC							

EMAX-HI with CAN BASIC – Interface 125 kbit/s and device address: 0



NOTE
When ordering, please use the here described ordering code (Type Designation). Options that are not required are filled in with „-„.

10 Index