

Operating Manual

SERIES IMAX

Magnetic, Self-Referencing Pseudo-Absolute Linear Encoder



- Pseudo-absolute measurement by self-referencing
- Resolution 1 mm and repeat accuracy ± 1 mm
- Suitable for storage and conveyor technology
- Long measuring distances up to 1048 m possible
- CANopen standard (DS406 encoder profile) or SSI (binary or Gray) interface
- Robust housing for use in harsh environments
- Wear-free and contactless measuring principle
- Insensitive against dust, dirt and water

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4 General, Safety, Transport and Storage

4.1 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.

4.2 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.

4.3 Statement of Warranties

The producer guarantees the functional capability of the process engineering and the selected parameters.

4.4 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.

Safety



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.

4.5 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.

4.6 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:

	<p>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 jewelry.</p>
	<p>PROTECTIVE GLOVES ...for protecting the hands against abrasion, wear and other injury of the skin.</p>
	<p>PROTECTIVE HELMET ...for protection against injuries of the head.</p>

4.7 Conventional Use

The ELGO-device is only conceived for the conventional use described in this manual.
The ELGO linear encoder IMAX only serves to measure lengths and positions.



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:

- Remodeling, 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.

4.8 Safety Instructions for Transport, Unpacking and Loading



CAUTION!

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

4.9 Handling of Packaging Material

Notes for proper disposal: ☞ 4.4

4.10 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.

4.11 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 (☞ 6) needs to be observed
- Relative humidity (☞ 6) must not be exceeded
- Inspect packages regularly if stored for an extensive period of time (>3 months)

5 Product Features

The IMAX series is a Pseudo-absolute magnetic length measuring system. Pseudo-absolute means, that the absolute code is recognized through a one-time movement of approx. 274 mm's into an arbitrary direction after power up. At this point the IMAX measures really absolute. Thus it is possible to guarantee an absolute measurement over a total measuring length of 1048 m (CANopen) resp. 262 m (SSI) with a short sensor head length of only 50 mm.

The sensors and the necessary evaluation electronics are integrated in a compact metal housing, which converts the scanned signals into the desired interface format. By using the supplied adhesive tape, the absolutely coded magnetic tape is glued onto a flat surface.

The maximum allowed mounting distance between IMAX sensor and magnetic tape is 1.8 mm.

Advantages:

Major advantages of the IMAX are its compact design and the high maximum measuring length. Further, the system is equally suitable for retrofitting as well as new installations in existing machines and plants.

Essential features are:

- Pseudo-absolute, self-referencing measurement
- Compact design and high IP67 protection class
- Contactless measuring principle
- Resolution 1 mm (others on request)
- Measuring length up to 1048 resp. 262 m



5.1 Functional Principle

The IMAX sensor is guided over a magnetic tape which is written with an absolute track. Due to automatic referencing, the current position is detected by the sensor system after a movement of approx. 274 mm. The sensor system scans the code sequence of the north and south poles and delivers a Pseudo-absolute value with a resolution of 1 mm. The designation of the respective ELGO magnetic tape type depends on the output interface used. For more information, refer to the technical data ☞ 6.3.

The measured value is processed by the internal evaluation electronics and is available either via a CANopen interface (DS406 encoder profile) or SSI interface (binary or Gray code). From here the measured position can be further processed by the subsequent electronics.



Figure 1: Single-track coding of the magnetic tape

5.2 Available Output Interfaces

Depending on the interface option ordered (see Type Designation ☞ 10), the sampled signal information is converted by the internal evaluation electronics into one of the following output signals:

Interface option **CA00** → CANopen standard interface according to DS406 (encoder profile)

Interface option **SSB0** → SSI interface, 25 bit (binary code)

Interface option **SSG0** → SSI interface, 25 bit (Gray code)

Further information can be found in chapter ☞ 8 Connections and Interfaces.

6 Technical Data

6.1 Identification

The type label serves for the identification of the unit. It is located on the housing of the device and indicates the exact type designation (= order reference \varnothing 10) with the corresponding part number. Furthermore, the type label contains a unique, traceable device number. When corresponding with ELGO please always indicate this data.

6.2 Dimensions IMAX Sensor

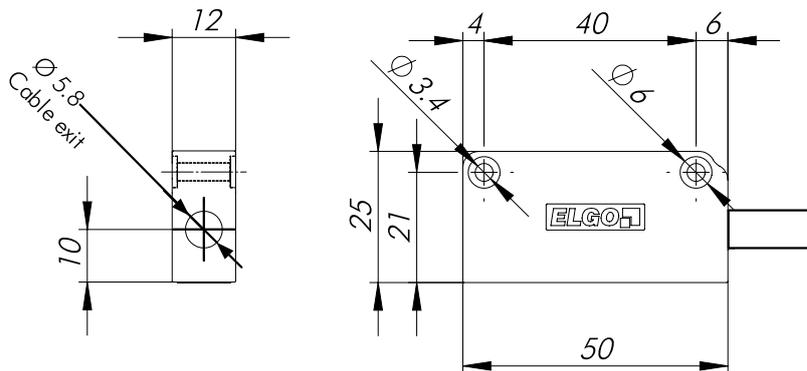


Figure 2: Dimensions IMAX sensor

6.3 Technical Data Sensor

IMAX (standard version)

Mechanical Data

Measuring principle	Pseudo-absolute (self-referencing)
Repeat accuracy	±1 increment
System accuracy in μm at 20° C	± (1250 + 50 x L) L= measuring length in meters
Distance sensor - tape	max. 1.8 mm
Maximum measuring length	CANopen: 1048 m / SSI : 262 m
Housing material	ABS plastic
Dimensions	L x W x H = 50 x 12 x 25 mm
Magnetic tapes for CANopen:	AB20-80-10-1-R-17 (adhesive mounting, see section 7.2.4) AB20-80-10-1-R-D-17-BK80 (rail mounting, see option 7.3.1) AB20-80-20-1-R-D-17-BK100 (rail mounting, see option 7.3.2)
Magnetic tapes for SSI:	AB20-80-10-1-R-15 (adhesive mounting, see section 7.2.4) AB20-80-10-1-R-D-15-BK80 (rail mounting, see option 7.3.1) AB20-80-20-1-R-D-15-BK100 (rail mounting, see option 7.3.2)
Available magnetic tape lengths	see 6.4 Technical Data Magnetic Tape
Basic pole pitch	8mm
Sensor cable length	standard: 1.5 m (others on request)
Weight	approx. 40 g without cable; cable approx. 60 g/m

Electrical Data

Power supply voltage	10 ... 30 VDC
Residual ripple	10 ... 30 VDC < 10 %
Current consumption	max. 150 mA
Available interfaces	CANopen standard (DS406) or SSI (binary or Gray) 10
Connections	standard: open cable ends connectors optionally, see 10
Resolution	1 mm
Operating speed	max. 4.0 m/s

Environmental Conditions

Storage temperature	-25 ... +85° C
Operation temperature	-10 ... +70° C -25 ... +85° C (on request)
Humidity	max. 95 %, non-condensing
Protection Class	IP67

6.4 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 AB20-80-10-1-R-XX*

Coding	absolute, dual track system
Pole pitch	8 mm
Number of magnetic tracks	1
Number of bits CANopen	17 bit coding
Number of bits SSI	15 bit coding
Operation temperature installed	-20 °C ... +65 °C (-20°C ... +80°C when using 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 without adhesive tape, options „B“ or „D“)
Gluing temperature:	+18°C ... +30°C
Accurateness at 20°C	± (1000 + 50 x L) L= measuring length in meters
Material carrier tape	Precision Strip Steel 1.4310 / X10CrNi 18-8 (EN 10088-3)
Double-faced adhesive tape	3M-9088 (observe instructions), others on request
Width of the magnetic tape	10 mm
Height of the magnetic tape	with back iron, without adhesive tape: 1.35 mm (± 0.11) with back iron + adhesive tape, without protective foil: 1.55 mm (± 0.13) with back iron + adhesive tape + protective foil: 1.63 mm (± 0.14)
Height of the cover tape	without adhesive tape and protective foil: 0.20 mm (± 0.01) with adhesive tape without protective foil: 0.40 mm (± 0.03) with adhesive tape and protective foil: 0.48 mm (± 0.04)
Magnetic tape options	BK80 for rail mounting: see ☞ 7.3.1 BK100 for rail mounting: see ☞ 7.3.2
Length expansion coefficient	$\alpha \approx 16 \times 10^{-6} \text{ 1/K}$
Thermal length expansion	$\Delta L[\text{m}] = L[\text{m}] \times \alpha[1/\text{K}] \times \Delta \vartheta[\text{K}]$ (L = tape length in meters, $\Delta \vartheta$ = relative temperature change)
Bending radius	min. 150 mm (smaller on request)
Available lengths CANopen	Rolls up to max. 600 m (longer on request)
Available lengths SSI	Rolls up to max. 262 m
Weight magnetic tape	ca. 62 g/m (incl. magnetic tape and cover tape)
Tape imprint	ELGO standard, printing color black, digit height ≥ 5 mm
Relative humidity	max. 95 %, non-condensing
Protection class	IP65
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.

7 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.

ELGO is not liable for any secondary damage and for damage to persons, property or assets.

The operator is obliged to take appropriate safety measures.

The first start-up may only be performed by qualified staff that has been trained and authorized by the operator.

7.1 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.

7.2 Installation of the Magnetic Tape



NOTE: External Magnetic Fields

The magnetic tape must not be influenced by external magnetic fields!
The magnetic tape must not come into direct contact with other magnetic fields (e.g. permanent magnets, magnetic clamps, electromagnets, magnetic stands)! This may cause irreparable damage, which will compromise the measuring accuracy or even the functioning.

7.2.1 The Magnetic Tape

For IMAX with CANopen interface the absolute coded ELGO magnetic tape **AB20-80-10-1-R-17** must be used, while for versions with SSI interface the type **AB20-80-10-1-R-15** is required. The two magnetic tape types only differ in their coding (CANopen = 17 bit / SSI = 15 bit).

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

The magnetic tape consists of 2 pre-assembled components (see figure below):

- A magnetized, flexible plastic tape (Pos. 3), which is connected with a magnetically conductive steel tape as inference band (Pos. 4) and is supplied with an adhesive tape (Pos. 5).
- A magnetized permeable cover tape (Pos. 1), which serves for the mechanical protection of the plastic tape (not required for the measurement) and is supplied with an adhesive tape (Pos. 2).

Therefore a divergent tape structure and scope of delivery is also possible.
The cover tape is also available separately

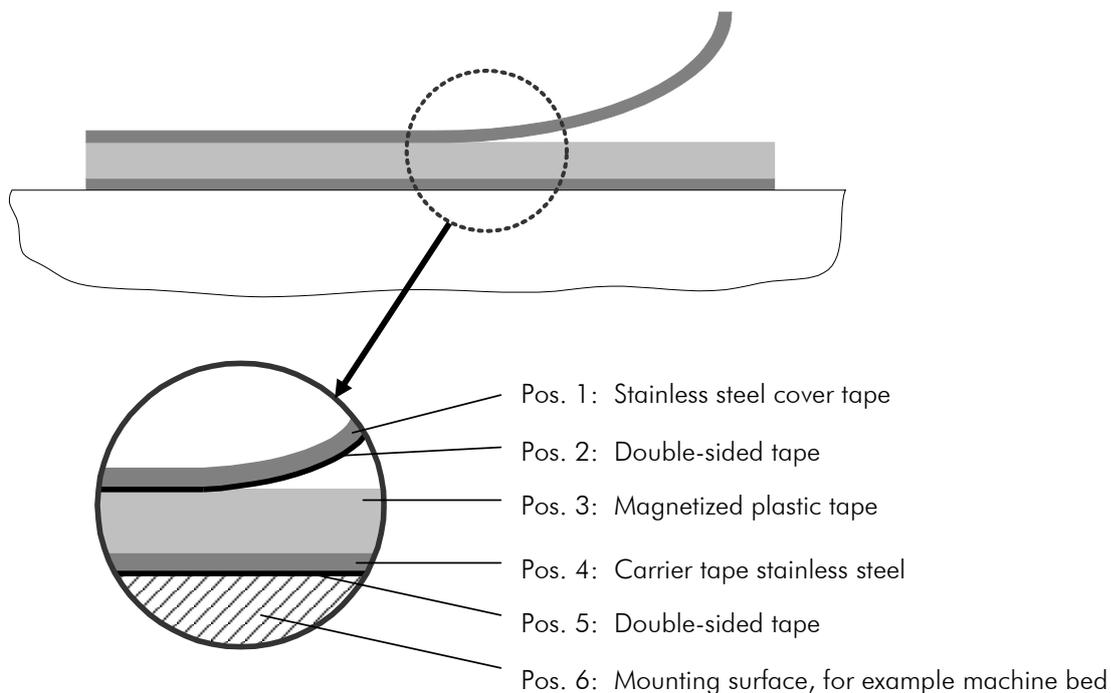


Figure 3: Components of the magnetic tape

7.2.2 Handling

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 is 150 mm.



Figure 4: Magnetic tape handling

7.2.3 Processing hint for the gluing of magnetic tapes

Surface-Preparation: In order to guarantee optimal adhesion, all anti-adhesive contamination (e.g. oil, grease, dust, separating agents) has to be removed using solvents with residue-free evaporation. Suitable agents are ketones or alcohols. Typical solvents for cleaning the surface are a 50/50 isopropyl alcohol/water mixture or heptane. Those agents are offered by Loctite and 3M among others as surface cleaners. When using solvents, always observe the manufacturer instructions! If the surface is copper, brass etc., it should be sealed to avoid oxidation.

Contact-Pressure: The strength of the adhesion is directly dependent on the contact the adhesive can form with the surface. Therefore it is important to use as much pressure as possible when gluing the tape, possibly by using aids such as draw rolls. The optimum contact pressure is 4...5 kg/cm².

Gluing temperature: The optimal gluing temperature is between + 18° C and 30° 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). For gluing use only the supplied adhesive tape.

7.2.4 Cutting and Gluing

The magnetic tape is already cut to the required length at the factory.

	<p>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. An already glued magnetic tape is destroyed after the removal, and cannot be used again. Note also the direction of counting of the measuring system</p> <p>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.</p> <p>When unprotected, the cover tape may peel off!</p> <p>Therefore: Use tape end caps (☞ 10.1) or let the cover tape overlap the end of the magnetic tape and fix it with a screw.</p>
---	---

The tape must be glued smoothly on the surface. The measuring accuracy decreases if the tape is not even! Before gluing the magnetic tape and the cover tape onto the surface, they should be left lying on the mounting surface for ca. 30 minutes so that the temperature matches. This prevents strain in the tape due to thermal expansion.

Mounting steps:

1. Thoroughly clean the surface (☞ 7.2.3)
2. Acclimatization: let magnetic tape and cover tape adjust their temperature
3. Remove the protection foil from the magnetic tape
4. Glue magnetic tape under great pressure
5. Thoroughly clean surface of magnetic tape
6. Remove the protection foil from the cover tape
7. Glue the cover tape under great pressure
8. Safeguard the ends of the cover tape against peeling off, e.g. by using end caps (☞ 10.1)

7.2.1 Resistance against Chemical Influence

Table 1: Resistance against Chemical Influence

Show no or little effect in constant contact after 2-5 years:

formic acid	glycerol 93°C	linseed oil	soy beans oil
cotton seed oil	N-hexane	lactic acid	
formaldehyde 40%	Iso octane	petroleum	

Show weak to moderate effects in constant contact after approximately 1 year:

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

Have strong effects when contacting permanently after 1-5 months:

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

7.3 Magnetic Tape Options BK80 / BK100

Especially in applications with long measuring lengths, it is not always possible to bond the magnetic tape over the entire measuring distance. The options **BK80** and **BK100** offer a remedy here, as these are assembled in such a way that they are suitable for mounting in a profile rail. The magnetic tape is mounted here by inserting it into the corresponding profile rail.



Figure 5: Example BK80

Two variants are available for rail mounting of the magnetic tape:

7.3.1 BK80

As shown in the following figure, the tape consists of a 8 mm wide magnetic tape which is connected to a 10 mm wide back iron stripe. The cover tape is not supplied with this variant.

Top view

<SN XX/000000001/00000	MB20-80-10-1-R-D-1X-BK80	ELGO
------------------------	--------------------------	------

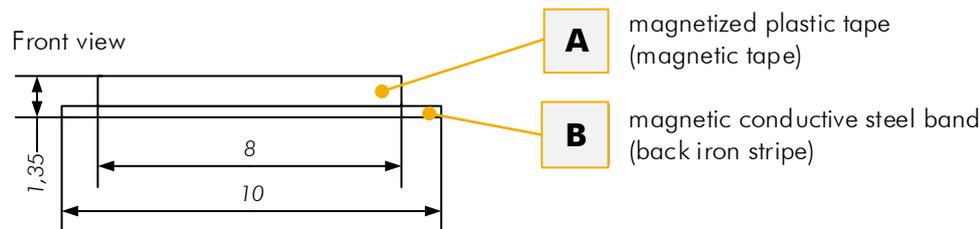


Figure 6: Magnetic tape construction BK80

The exact ordering codes for the magnetic tapes can be found in section 10.1 Accessories.

7.3.2 BK100

As shown in the following figure, the tape consists of a 10 mm wide magnetic tape which is connected to a 20 mm wide back iron stripe. The cover tape is not supplied with this variant.

Top view

<SN XX/000000001/00000	MB20-80-20-1-R-D-1X-BK100	ELGO
------------------------	---------------------------	------

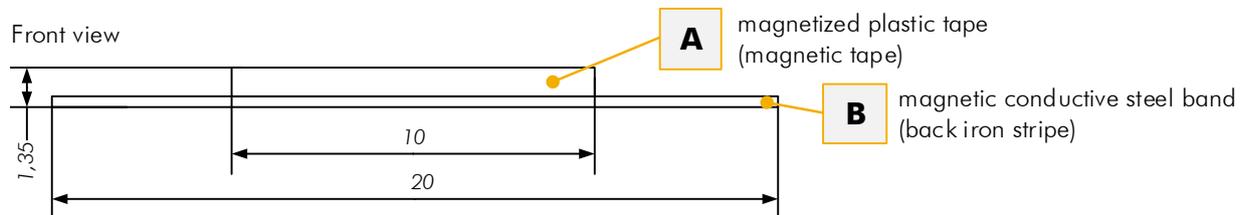


Figure 7: Magnetic tape construction BK100

The exact ordering codes for the magnetic tapes can be found in section 10.1 Accessories.

7.4 Installation of the Sensor

Fasten the sensor with two M3 cylinder head screws of suitable length (see ☞ 6.2). For absolute coded magnetic tapes it is important that the sensor is mounted in the correct direction to the tape. Otherwise no measurement is possible. Therefore the positive counting direction is indicated by arrows on the upper side of the magnetic tape.

7.4.1 Sensor Alignment to the Magnetic Tape

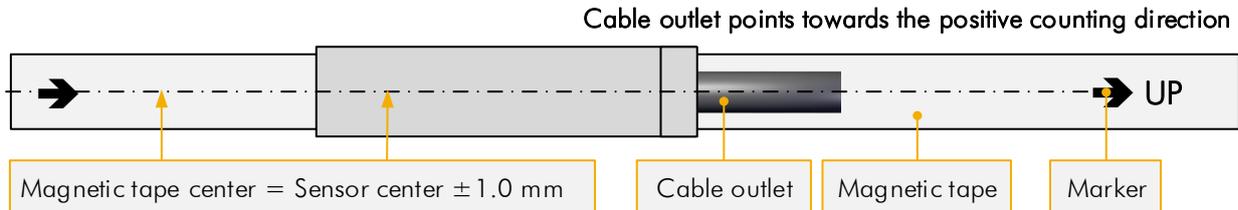


Figure 8: Sensor alignment to the magnetic tape

- The cable outlet of the sensor points towards the positive counting direction.
- The center of the sensor must be aligned with the center of the magnetic tape (see figure above).

More information about the mounting tolerances can be found in section ☞ 7.4.2.

7.4.2 Mounting Tolerances



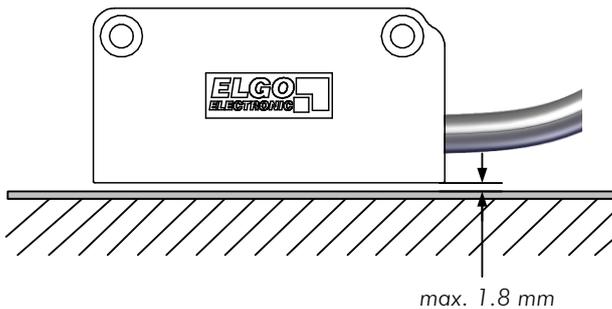
REMARKS!

- Ensure correct distance sensor / magnetic tape 0.1 mm ... max. 1.8 mm!
The LED on the sensor housing lights up red as soon as this distance is exceeded.
- The cable outlet of the sensor points towards the counting direction (see section 7.4.1.)
- Observe the specified tolerances when installing the system!
Outside these areas the function is not guaranteed!

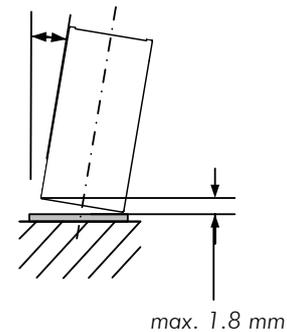
Table 2: Mounting tolerances

Tolerances	
Reading distance	max. 1.8 mm
Lateral angle	the maximum permissible reading distance must not be exceeded at any position
Pitch angle	the maximum permissible reading distance must not be exceeded at any position
Lateral offset	sensor center = magnetic tape center ± 1.0 mm
Yaw angle	$\pm 0.5^\circ$

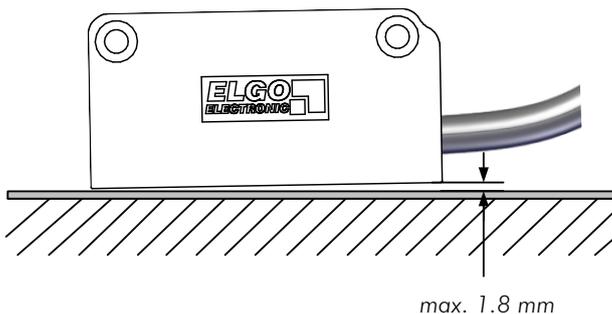
Reading Distance



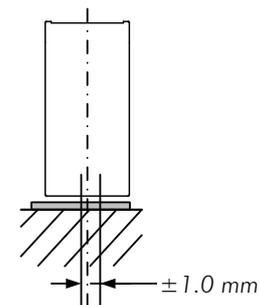
Lateral Angle



Pitch Angle



Lateral Offset



Yaw Angle



Figure 9: Mounting tolerances of the sensor

7.5 Self-Referencing of the Measuring Range

During movement, the IMAX first determines its starting from the switch-on position. After a moving distance of approx. 274 mm, the IMAX has collected all necessary information to determine the absolute position.

8 Connections and Interfaces

8.1 CANopen Interface (CA0)

When ordering the CA0 interface option, the IMAX measuring system is equipped with a CAN interface according to CANopen standard DS406 for encoder device profiles.

The CAN interface is terminated internally with a 120 Ω terminating resistor as standard. If no internal termination is required, the additional option "A" must be specified with the order (☞ 10).

In order to start the communication with the IMAX an NMT command has to be sent first. The following identifiers are given:

CAN - Identifier
(6 Byte telegram)

181 (16) = Identifier
 First 4 bytes = Position (resolution 1 mm), Bit rate = 125 KB/s*
 Next 2 bytes = Speed in mm/s
 Heart Beat = OFF
 Node-ID = 0x04
 Event-Timer 1st TPDO = 5 ms

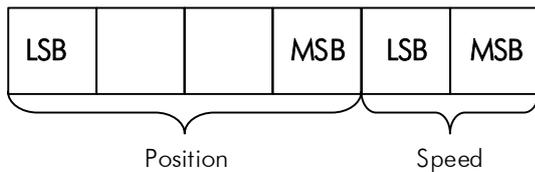
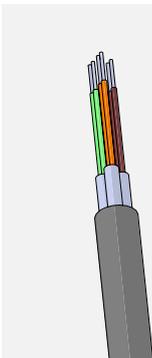


Figure 10: CANopen interface

*) The bit rate and other parameters can be changed via CAN interface.

8.1.1 Connections CAN Interface

Table 3: Connections CANopen - (open cable ends)

Connection Type	Drawing	Color	Function	Description
Open cable ends		black	0 V / GND	Ground
		brown	+VCC	10 ... 30 VDC
		yellow	CAN HIGH	positive CAN signal
		green	CAN LOW	negated CAN signal
		blank	Shield	CAN shielding

8.2 SSI Interface (SSB0 and SSG0)

Principle of the function: If the clock is not interrupted for the time $T_m - T/2$ (output of further 25 periods), the shift register clocks once again the same data value (error recognition in evaluation). With the SSI interface, transmission frequencies up to max. 250 KHz can be ensured. The SSI interface is generally terminated with an internal terminating resistor.

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

With IMAX the PFB is always „low“, unless the maximum allowed distance from sensor to tape is exceeded.

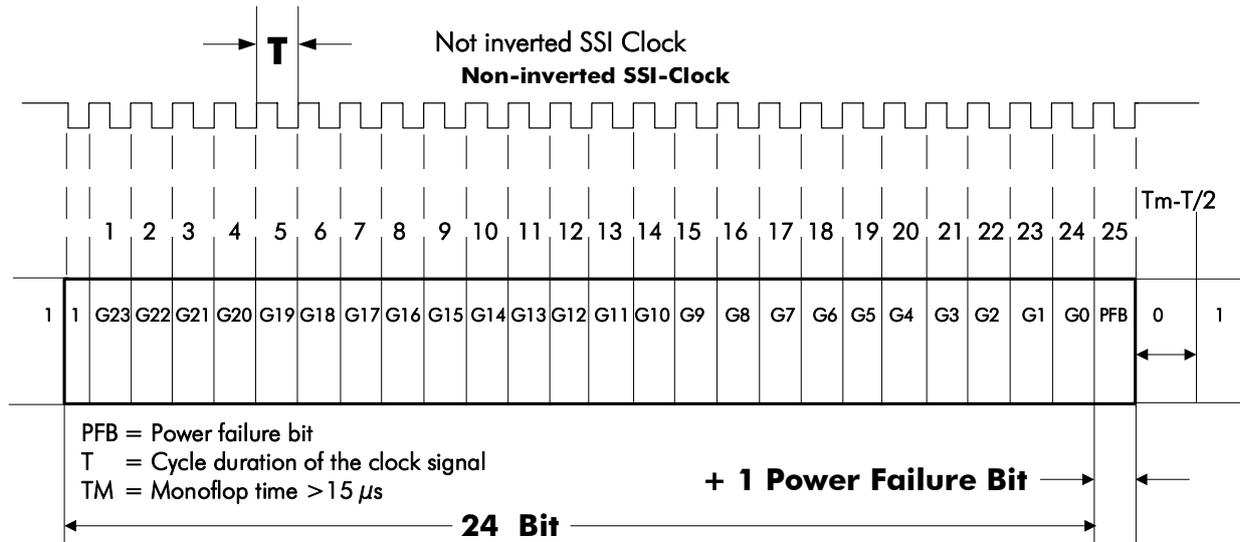


Figure 11: SSI - reading the data

The data format of the SSI interface depends on the respective order designation in the type code (☞ 10):

- SSB0 = binary code
- SSG0 = Gray code

8.2.1 Connections SSI Interface

Table 4: Connections SSI - (open cable ends)

Connection Type	Drawing	Color	Function	Description
Open cable ends		black	0 V / GND	Ground
		brown	+VCC	10 ... 30 VDC
		green	SSI_DATA+	positive SSI-DATA signal
		yellow	SSI_DATA-	negated SSI-DATA signal
		red	SSI_CLK+	positive SSI-CLOCK signal
		orange	SSI_CKL-	negated SSI-CLOCK signal
		blank	Shield	Shielding

9 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 9.1. 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).

9.1 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 through 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 μ F / 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

9.2 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 7.



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

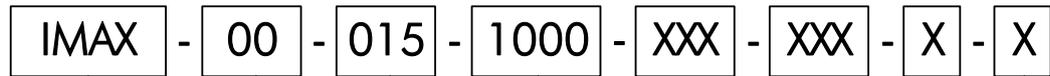
9.3 Maintenance

The device is maintenance-free.

9.4 Cleaning

In principle, cleaning with a damp cloth is recommended, without the use of aggressive cleaning agents. Otherwise, a cleaning method according to the protection class (☞ 6.3) must be selected.

10 Type Designation



Designation: _____

IMAX = Pseudo-Absolute Encoder

Version: _____

00 = standard version

01 = first special version (etc.)

Cable Length (max. 10.0 m): _____

015 = 1.5 m (standard)

020 = 2.0 m (example)

Resolution in μm : _____

1000 = 1000 $\mu\text{m} \pm 1 \text{ mm}$

Interface: _____

SSB0 = SSI interface (25 bit binary code) - max. 262 m

SSG0 = SSI interface (25 bit Gray code) - max. 262 m

CA00 = CANopen interface (DS406 encoder profile) - max. 1048 m

Bit Rate (only for CANopen interface): _____

125k = 125000 bit/s

250k = 250000 bit/s

500k = 500000 bit/s

1MHz = 1000000 bit/s

Additional Options

Device Address (only for CANopen interface): _____

0 = standard setting (0 ... F available)

Termination (only for CANopen interface): _____

A = CANopen without internal termination resistor



REMARK:

When ordering, please use the code above. Options that are not required are filled in with "-".

10.1 Accessories

Table 5: IMAX accessories

Order Designation	Description
AB20-80-10-1-R-17	For adhesive mounting: 10 mm wide, 17 bit coded magnetic tape for IMAX with CAN-open interface (max. coding length = max. measuring length = 1048 m). The maximum ordering length as roll material is 600 m. Higher lengths are available on request.
AB20-80-10-1-R-15	For adhesive mounting: 10 mm wide, 15 bit coded magnetic tape for IMAX with SSI interface (max. coding length = max. measuring length = 262 m).
End cap set 10 mm	2 end caps (10 mm) and 2 x M3 screw; for additional fixation of the <u>adhesive mounted</u> magnetic tape, as well as for the protection of the magnetic tape ends.
AB20-80-10-1-R-D-17-BK80	For rail mounting (8 mm wide magnetic tape on 10 mm wide back iron): 17 bit coded magnetic tape for IMAX with CAN-open interface (max. coding length = max. measuring length = 1048 m). The maximum ordering length as roll material is 600 m. Higher lengths are available on request.
AB20-80-20-1-R-D-17-BK100	For rail mounting (10 mm wide magnetic tape on 20 mm wide back iron): 17 bit coded magnetic tape for IMAX with CAN-open interface (max. coding length = max. measuring length = 1048 m). The maximum ordering length as roll material is 600 m. Higher lengths are available on request.
AB20-80-10-1-R-D-15-BK80	For rail mounting (8 mm wide magnetic tape on 10 mm wide back iron): 15 bit coded magnetic tape for IMAX with SSI interface (max. coding length = max. measuring length = 262 m).
AB20-80-20-1-R-D-15-BK100	For rail mounting (10 mm wide magnetic tape on 20 mm wide back iron): 15 bit coded magnetic tape for IMAX with SSI interface (max. coding length = max. measuring length = 262 m).
POSU	Pole finder card 85 x 55 mm with pole finder foil for magnetic tapes

Notes:

Notes:

Notes:

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