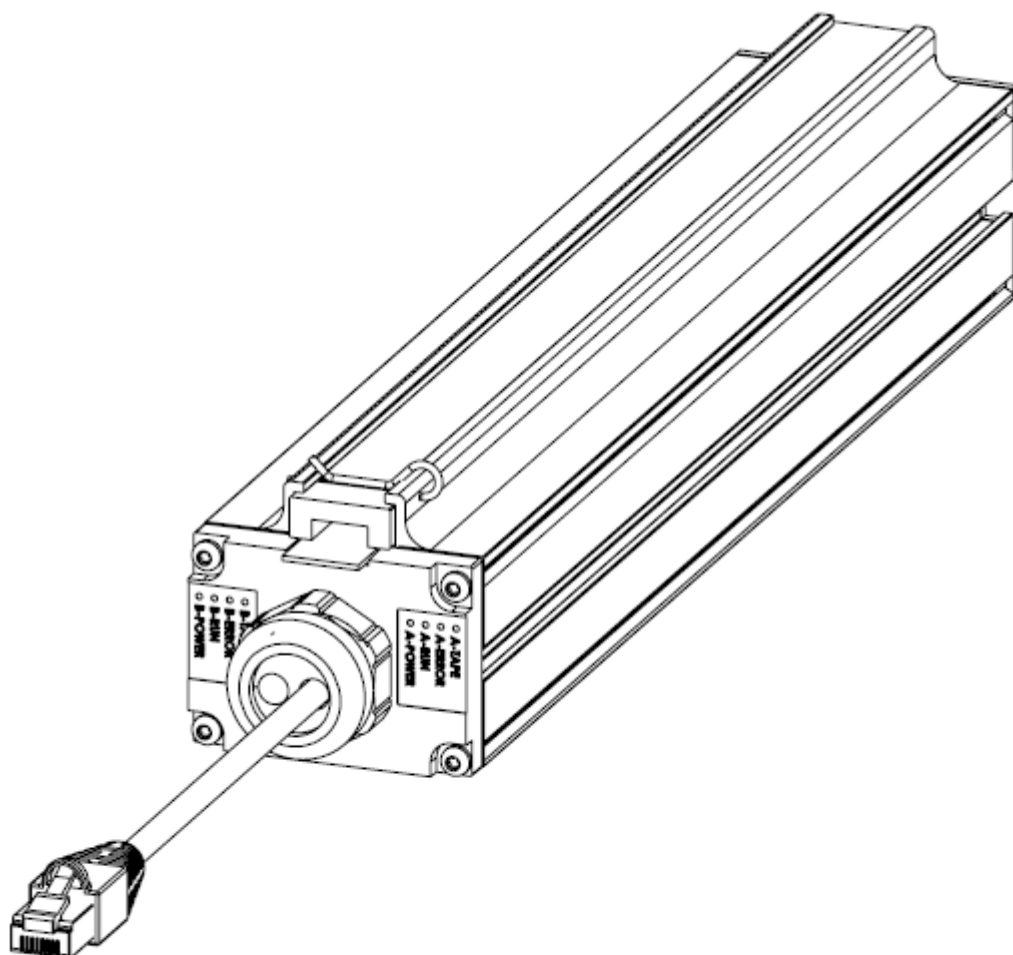


Operating Manual

LIMAX22 DUE



Magnetic Absolute Shaft Information System For Elevators

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1 General

1.1 Information operation manual

The operation manual provides important hints for handling the device. The safety instructions and handling instructions are to be strictly observed to guarantee an accurate operation. Furthermore all local and valid preventions and general safety instructions have to be observed to avoid accidents. Please consider all instructions of operation manual carefully. The operation manual is a part of this product. Keep the operation manual always closed to the product to grant that it is reachable for personnel. The illustrations of operation manual are to demonstrate topics better and might not come up true to scale. The explanations might be different regarding the real operation.




1.2 Explanation of symbols

Warning notices


Warning notices are characterised by symbols in the operation manual.

The notes will be introduced by signal words to express the magnitude of the danger.

Follow these advices in order to avoid accidents and injuries to persons and property.

	<p>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.</p>
	<p>WARNING! This symbol in connection with the word „Warning“ means a possible impend danger for healthy and life of persons. Failure to heed these instructions can result in serious damage to health and even fatal injury.</p>
	<p>CAUTION! This symbol in connection with the signal word „CAUTION“ indicates a possible dangerous situation. Failure to heed these instructions can lead to minor injury or property damage.</p>

Specific safety instructions

	<p>DANGER! ...marks perilous situations by electricity. By non-observance of the safety instructions the possibilities of death or severe injuries exist. The operations have to be carried out only by an electrician.</p>
---	--

Tips and recommendations

**HINT**

...shows adjuvant Tips and recommendations as well as information for an efficiently and interference-free operation.

1.3 Statement of Warranties

The guarantee conditions are enclosed and separate in the sales documents

Period of warranty

The manufacturer guarantees functionality through process engineering and the related function parameters. The period of warranty is one year and starts at the date of delivery.

Demounting and disposal

As there are no agreements regarding demounting and disposal, please arrange demounting and disposal professional of the device with adherence of the safety hints regarding this operation manual.

Before demounting

Turn power supply off and safe against resetting. Straight after separate power supply lines physical and discharge the residual energy. Remove operation fluids and auxiliaries as well as the rest of substances.

For demounting:

Use constituent parts for recycling:

- metallic components are to dispose for scrap metal
- electronic components are to dispose for electronic scrap
- plastic parts are to dispose for recycling
- the rest of components are to dispose regarding material consistence

**CAUTION!**

Environmental damages caused by wrong disposal!
Electronic scrap, electronic components, lubricants and other auxiliaries are to treat as hazardous waste. So disposing is only allowed by authorized companies.



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

2 Product Features

LIMAX22 DUE is an absolute measuring system, which is assembled for positioning of the elevator cabins. The complete measuring system consists of the LIMAX22 DUE sensor itself and the magnetic tape.

The LIMAX22 DUE consists of two sensors which are embedded in a high-quality aluminium housing. Both sensors perform the same function and operate completely independently without mutual monitoring. The functionality of both must be determined and monitored by the master controller of the elevator system. This technique doubles the security in the form that upon failure of a sensor, the second sensor ensures lift operation.

The magnetic tape contains the clearly information of position as magnetic code. It will be mounted freely suspended with the aid of a mounting kit through a plastic guide on sensor at the cabin. Measuring principle is basically contactless. The functionality of the guide only keeps the tape due to a defined distance from the sensor.

The magnetic measuring principle provides extreme high robustness. Dust, Dirt and moisture do not affect the measurement in any way. Furthermore smoke and increased temperatures do not impact the measurement, so LIMAX22 DUE is especially suitable for elevators of fire departments. As a result of dirt stacking the tape enacts a high level of resistance for roughly conditions at mounting and operation of elevators.

Another advantage of the system is the easy and flexible mounting. The Installation may be carried out in 1 or 2 hours by an expert. The installation could be effect, depending on space conditions, at an arbitrary place in shaft. LIMAX22 DUE offers with its humble size ratio a space for reconstruction and updating.

LIMAX22 DUE is able to cover heights of stroke up to 260 meters as well as speed up to 10 m/s. Superior heights of stroke are available on request. Regarding standard figuration LIMAX22 DUE evaluates the positions with a resolution of 1mm. Resolutions up to 0.0625 mm are possible.

LIMAX22 DUE will be delivered with several interfaces and is able to connect to the most common elevator controls directly.

Overview of criteria:

- double sensor
- Absolute measuring of position with a measuring length up to 260 m
- Insensitive against dirt, smoke and moisture
- Robust measuring principle for roughly conditions
- Easy and flexible mounting
- High accuracy and repeatability
- No slip
- Absolute position always & direct available – no teach rides, even after long electrical power outages
- Compatible for many common controls with absolute value interfaces
- Soundless measuring principle
- Available interfaces: SSI, CAN, RS422, RS485

3 Safety

3.1 General Cause of Risks




The following chapter provides an overview about all important safety instructions for an adequate protection of personnel as well as for a safe and accurate operation. Non-considering of instructions and safety hints due to this operation manual may impact substantial risks.

3.2 Personal Protective Equipment

For mounting the device, it is essential to wear personal safety equipment to minimize health hazards. Please wear personal safety equipment duly during working. Wear protection clothes, especially for operations which enable special protection equipment. In addition please consider signs attached for personal protection equipment.

Protective clothing

Please consider to wear protecting equipment for all working operations

	<p>Protecting clothing ...is closely fitted protecting closing, providing a humble breaking strength with cramped sleeves without any sticking parts. It is predominant used for protection against contact though moving parts.</p>
	<p>Protecting gloves ...for protection of the hands against abrasions or similar cursory injury of skin.</p>
	<p>Head protection ...it's necessary to wear a helm in the shaft to protect your head.</p>

3.3 Conventional Use

ELGO LIMAX22 DUE absolute length measuring systems are only created for the operation described as listed below:

The purpose of the LIMAX22 DUE – ELGO – length measuring system is to survey distances.



WARNING!

Danger, triggered by non improper application!

Every application, which is not appropriated, is able to cause danger situations:

Therefore:

- LIMAX22 DUE is only to be used in accordance with regulations
- All instructions of the operation manual have to be strictly observed.

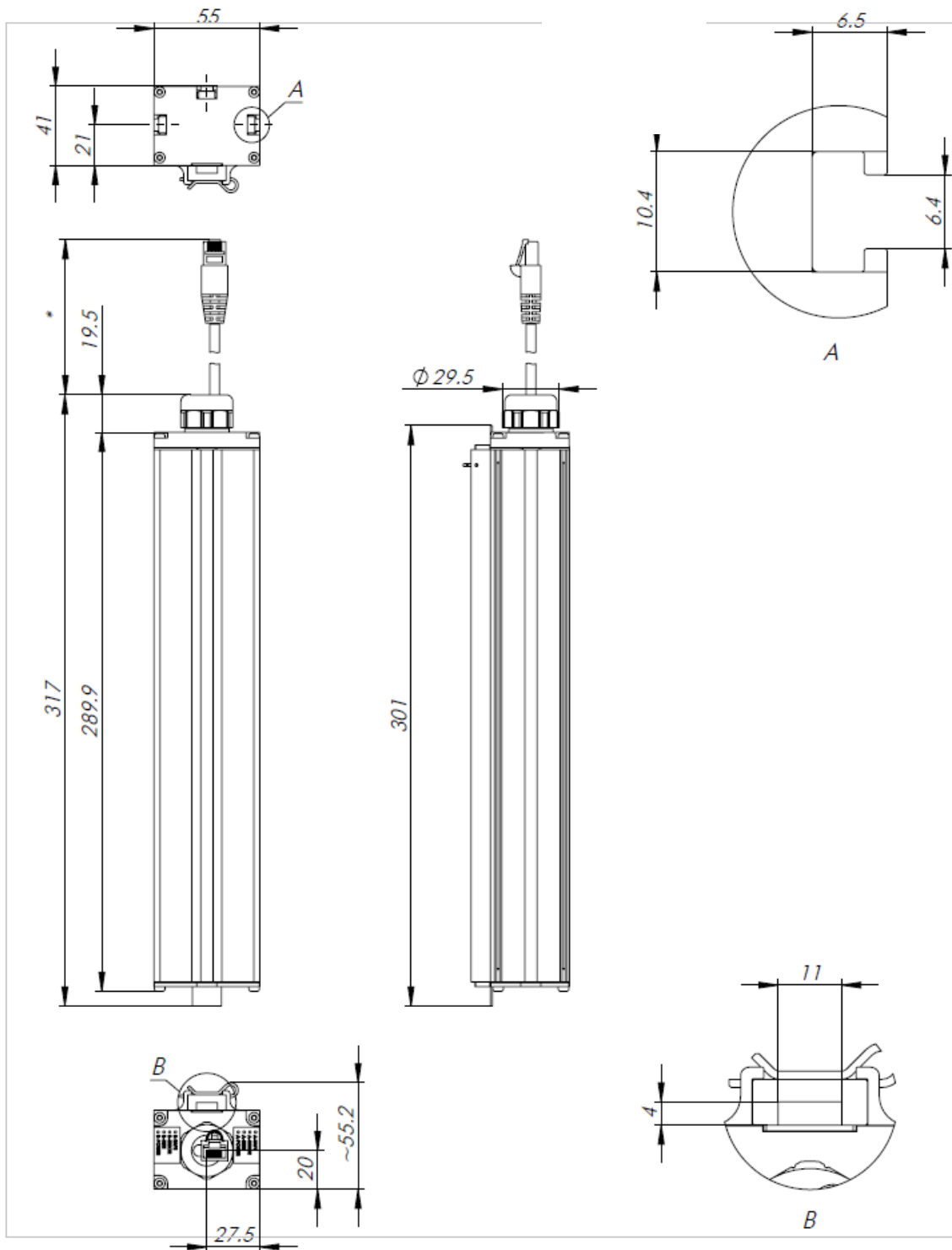
Please omit the following assignment, they are not in accordance with regulations. Rebuilding, altering or changing of the construction or applicability of constituent components of **LIMAX22 DUE**.

All claims, caused by damages as a result of improper assignment are excluded. For all damages, caused by improper using, the adhesion is concerned by the operator.

4 Technical Data

Mechanical Data	
Measuring principle	absolute
Repeat accuracy	+/- 1
System accuracy in μm at 20 °C	+/- (1000 μm + 50 μm x L) L = measuring length in meters
Sensor distance for the magnetic tape	4 mm
Tape thickness	1.4 mm
Basic pole pitch	8 mm
Sensor material	Aluminium
Measuring of the sensor housing	L x W x H = 317x 55 x 55 mm
Necessary magnetic tape	AB20-80-10-1-R-D-15-BK80
Maximum measuring length	260 m
Connection	Open cable end (optional plugs see type designation)
Weight	ca. 460 g without cable cable: ca. 60 g per meter
Conditions	
Storage temperature	-25... +85 °C
Operation temperature	-10... +70 °C (-25... +85 °C) on request
Protection class	IP50
Electrical Data	
Power supply	10 – 30 VDC
Periodic and random deviation	10 – 30 V: < 10%
Current consumption	max. 0,2 A
Interfaces	SSI, CAN, RS422, RS485
Resolution	According to type designation (see chap. 12)
max. operation speed	max. 10m/s
Sensor cable	3 m standard-cable length, others on request, Drag chain compliant

4.1 Dimensions LIMAX22 DUE



5 Transportation and Storage

5.1 Safety Instructions for Transport, Unpacking and Loading

**ATTENTION!**

The transport should be carried out duly. Do not throw, bounce or edging.

5.2 Handling of Packaging Material

Proper disposal as in chapter demounting and disposal.

5.3 Check of Transport

The delivery has to be checked immediately of completeness and transport damages.

Recognizing of external transport damage:

- Do not accept delivery or accept under conditional acceptance only.
- Remark the extent of damage in the transport documents or in delivery note.
- Introduce complaints immediately

**HINT**

Please complain every blemish immediately after recognizing. Claims of compensations for damages could only be carried out during the period of time for reclamation.

6 Storage

Storage of device only under the following instructions:

- 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: -25 °C to +85 °C
- Relative humidity: 100 % non-condensing
- Inspect packages regularly if stored for an extensive period of time (> 3 months)

7 Installation and Commissioning

When mounting the sensor head two M3 screws are used. Please observe the tolerances for distance and angle.



Improper maintenance

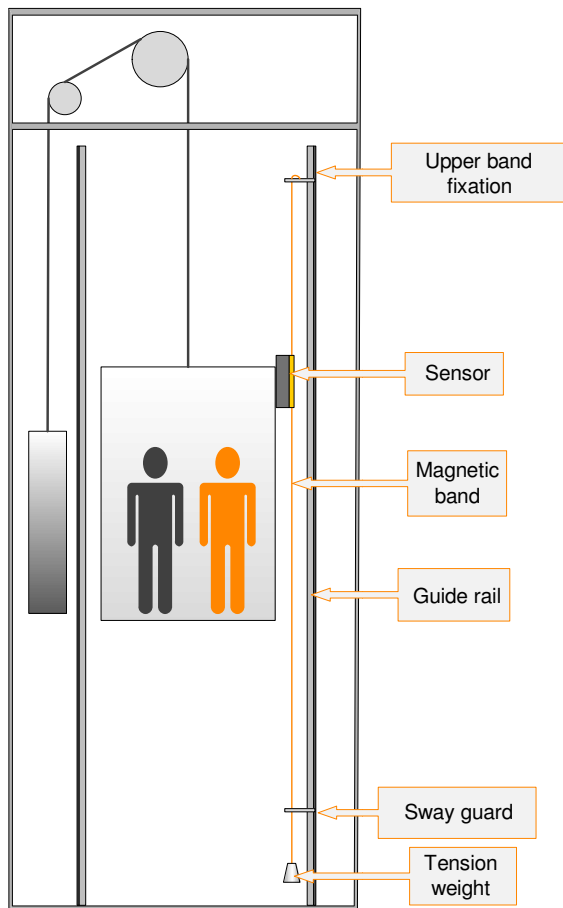
... may lead to serious injuries or property damage.

Therefore:

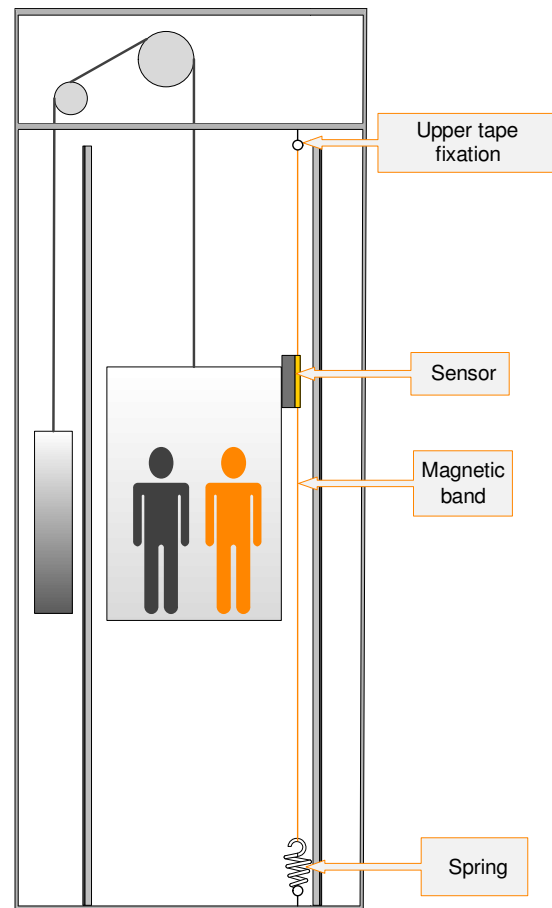
Maintenance work may only be carried out by authorized and instructed personnel, chosen by an operator.

7.1 Mounting principle

Rail installation with tension weight



Installation with dowel and spring



LIMAX22 DUE can be mounted at any position in the shaft – depending on circumstances of the particular elevator.

The magnetic band is installed vertically in the hoistway. Top fixation is either on the guide rail or directly bolted into the ceiling. The necessary tension in the band is provided by a tension weight of about 5kg. A sway guard at the bottom is recommended. This will keep the band from swaying in an uncontrolled manner which may cause damage to the band or other components in the shaft.

The sensor head can be mounted onto the car body or car frame – again depending on the specific conditions of the elevator.

7.2 Installation of Sensor

The integrated mounting notches on the housing of the sensor head allow for a very simple and self-explanatory installation from three sides. You can either use M6 hexagon head screws (DIN 933) or M6 square nuts (DIN 562), to mount the system at the desired position.

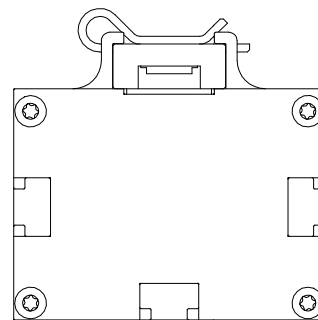


Illustration1: Mounting notches on sensor



ATTENTION!

During installation of the magnetic band in the sensor pay attention to the marks on the magnetic band and on the sensor head.

Wrong orientation of band vs. sensor head will yield incorrect position readings!

The arrows printed on the magnetic band and sensor head point in positive counting direction (in the direction of the shaft head)!

7.3 Installation

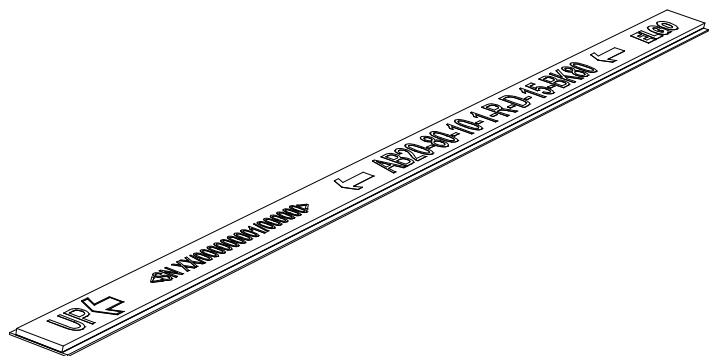
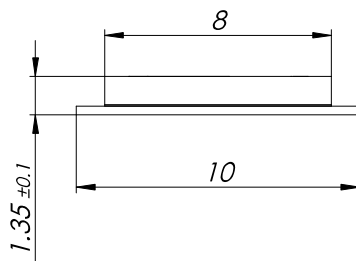
General Aspect

The LIMAX22 DUE magnetic tape technology is very suitable as a result of its robustness. The measuring principle is insensitive for roughly conditions, for example in shaft. High temperatures, moisture and dirt affect neither the magnetic coding of the tape nor the aptitude to read. Even weak magnetic fields, for example they occur as a result of door magnets, are not a problem.

LIMAX22 DUE offers an easy mounting, operation and durability under considering of several principles.

One important issue to consider is the protection of the magnet tape against mechanical wear. The LIMAX22 DUE tape consists of two components:

- The magnetic tape which actually carries the position information
- A protective steel tape which gives the mechanical properties.



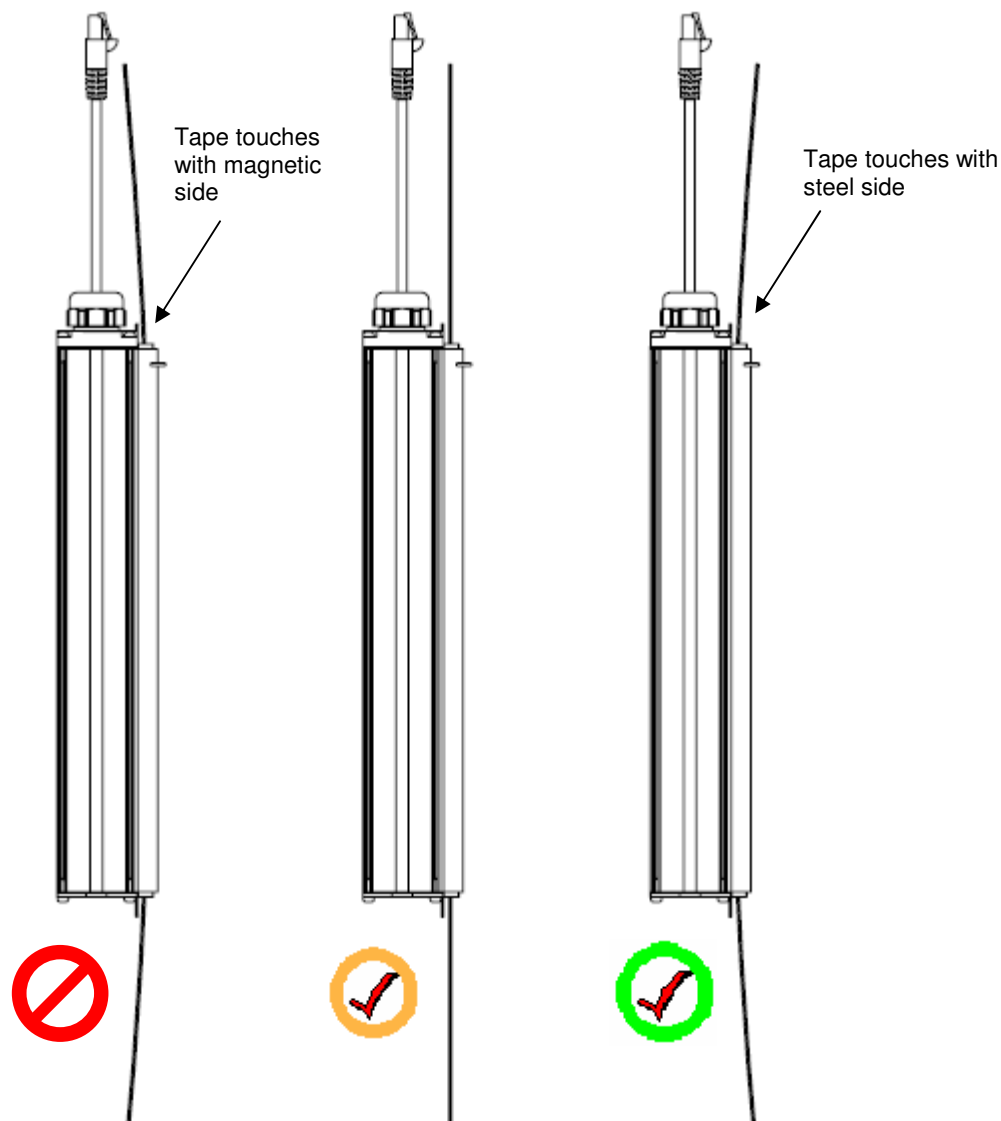
7.4 Concept of Installation

Basic principle for the mounting

The magnetic band itself is not designed to withstand excessive mechanical wear. It is therefore important to ensure that the system is installed such that the mechanical contact between band and sensor head is mainly between the steel band and the polymer sensor guide. These two materials have been specifically paired for this application.

Avoiding contact between the magnetic side and the sensor could be achieved with a perfectly perpendicular installation of the band. Yet, in reality this is not practicable.

It is therefore preferable to install the tape with a horizontal offset from the sensor. During operation this method will result in a forced contact between the steel side of the band and the polymer guide of the sensor which guarantees an optimal operation of the system.



Wrong

Constant contact between magnetic side and sensor-housing lead to abrasion.

Tolerable

Vertical alignment. minimal contact between tape und sensor.

Recommended

Forced contact between steel tape and polymer-housing

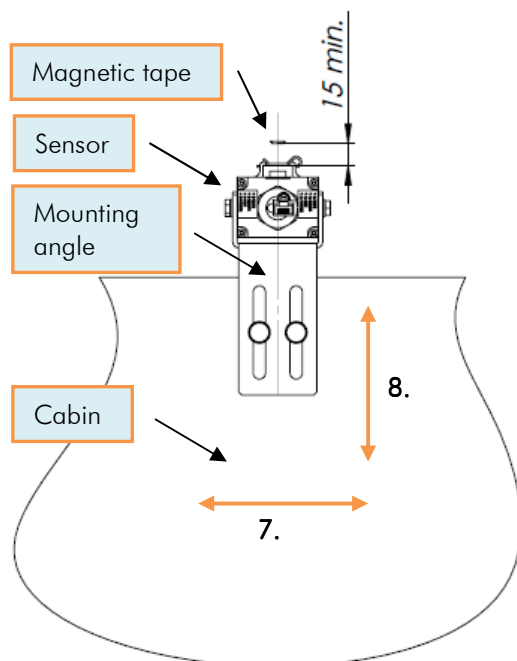
7.5 Installation procedure

Locate the optimal installation space for band and sensor. Placement is possible at any position in the hoistway. This offers maximum flexibility especially for modernization.

1. Attach the top end of the band in the shaft head with suitable installation hardware. Check for correct orientation of the band. The arrows on the magnetic side must point in upward direction.



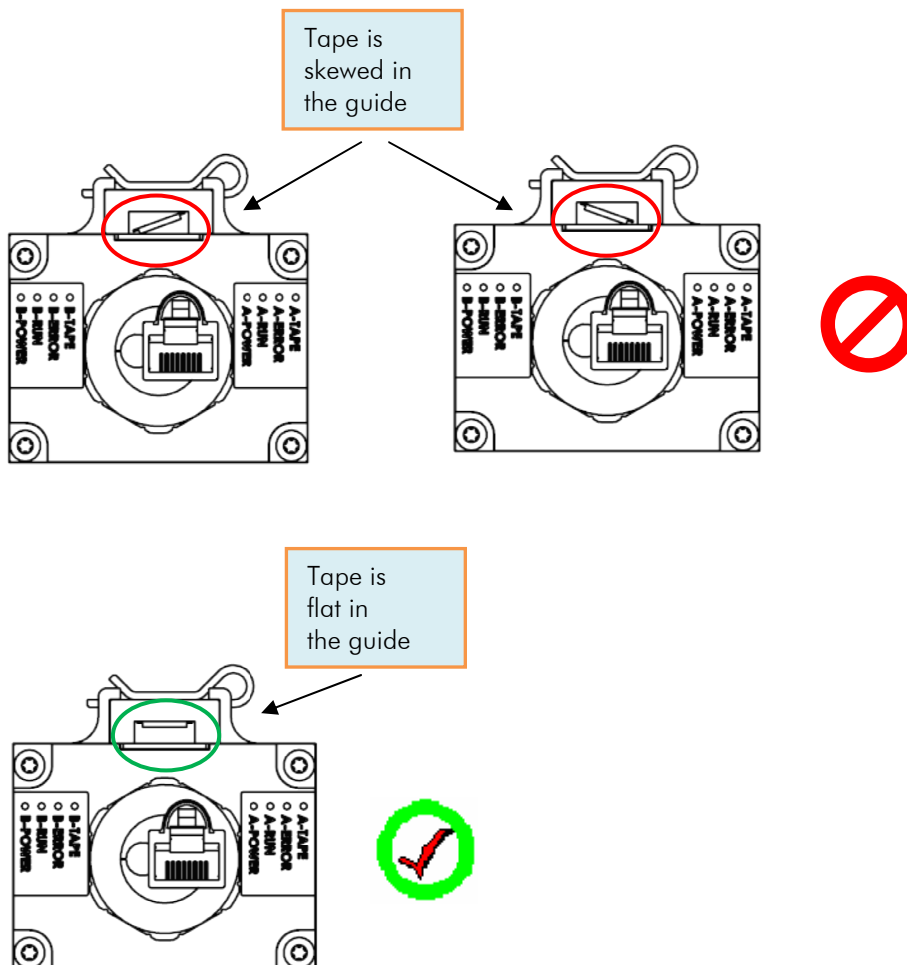
2. The magnetic side of the band must face the sensor body. In most situations this means that the steel side points to the hoistway wall.
3. Drive down the hoistway with inspection speed and unroll the band. The ELGO band packaging system has been specifically designed for this purpose. The band can be unwound directly from the box without opening.
4. Attach the tension weight (about 7.5 kg) at the bottom end of the band in the hoistway. Secure the band with a sway guard. Pay attention to a proper vertical mounting of the band. If you use dowels to fix the tape in the hoistway, tighten the spring such, that the according tractions results to minimum 7.5 kg. When using the ELGO Mounting Kit RMS/RMS90 this is equivalent to a spring elongation of about 90mm. Note that slightly higher tensile forces are never a problem, but avoid under-tensioning. In higher buildings it may even be preferable to slightly increase the tension in order to prevent flapping of the band during operation. However, if correctly installed tensile forces of more than 10 kg should never be necessary.
5. Drive the car to the middle of the hoistway.
6. Attach the sensor to the car. The side with the cable outlet and the LED's must face upward.
7. Adjust the sensor using the band as a reference. First, align sensor and magnet band on their centerline.

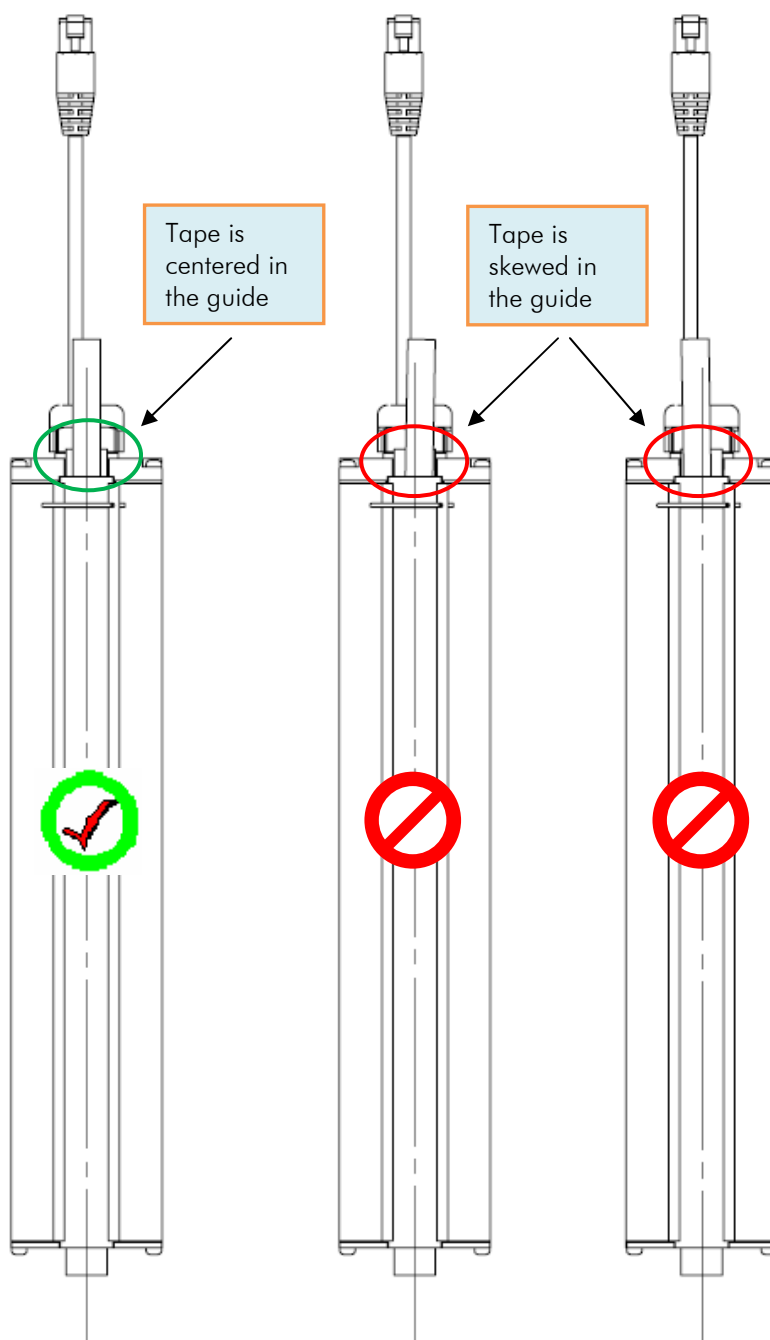


- Adjust now the distance between sensor and band. Up to a travel height of 50 m we recommend an offset of at least 15 mm. This will ensure steady contact between steel side of the band and the polymer guide of the sensor. In higher installations this distance may be increased.

Pay attention to a perpendicular alignment of the sensor. Misalignment will lead to increased wear.

- Pass the band through the sensor. Loosen the splint-pin and release the polymer guide. Insert the tape and re-attach the guide with the tape in its position. Take care of the plastic base which should remain in the enclosure.
- Check for proper alignment of band vs. sensor. Any angular offset should be correct



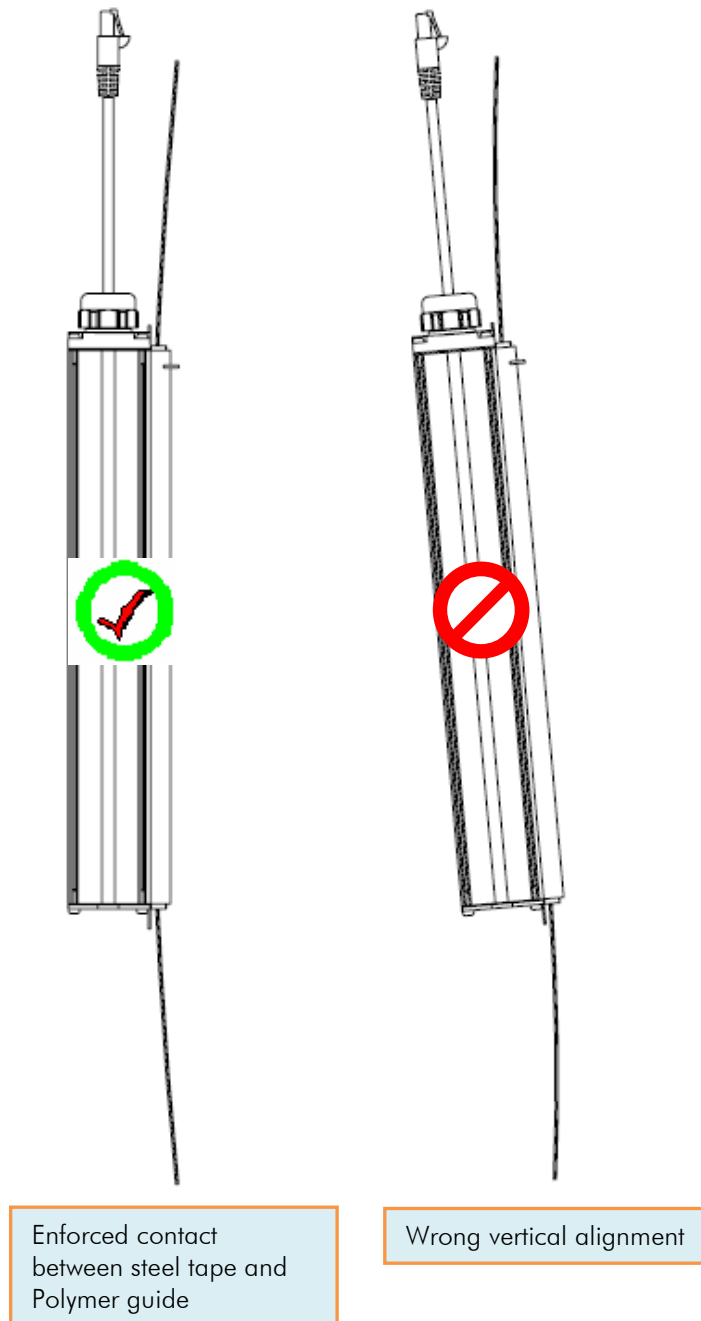


11. **IMPORTANT:** Installation check!

Values for band tension and offset between band and sensor are guidelines based on experience. But in any case, a proper check after installation is mandatory. **It must absolutely be avoided that the magnetic side constantly grinds on the sensor body during operation.**

Run an inspection trip along the complete hoistway. Observe the system and pay attention to the respective positions of band and sensor. You have achieved an optimal installation if the steel side of the band is constantly pressed slightly against the polymer guide of the sensor. At

some points in the hoistway also double-check on the bottom side of the sensor. If the sensor is tilted it may look good on top but the band can still grind along the bottom edge of the sensor.



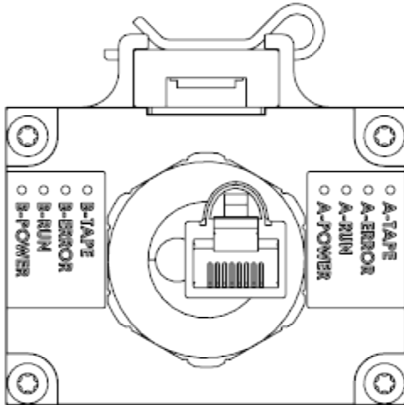
12. After completion of the installation clean the band. Beginning at the top of the hoistway drive down the complete travel distance pulling the magnet band through a dry cloth. Be specifically alert if steel construction work is taking place in the hoistway. Steel particles released by grinding, welding, or such work will adhere to the magnetic band. Clean this debris off instantly as this may have an effect similar to sand paper. Repeat the cleaning process before putting the elevator into service after complete installation.

8 Electrical Operation and Functions

8.1 LED's (Operating status and notices - not for LIMAX2D-01)

The LED's located on the front serve for monitoring of operating conditions.

With startup it has to be ensured that the yellow LED illuminates as this monitors the internal supply voltage.



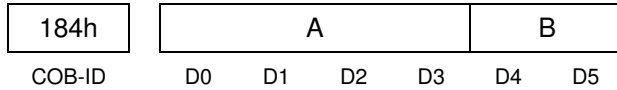
- | | | |
|--|---|--|
| <ul style="list-style-type: none"> ▪ PWR YELLOW | <ul style="list-style-type: none"> → = = | <ul style="list-style-type: none"> Supply voltage Supply voltage OK Supply voltage not provided |
| <ul style="list-style-type: none"> ▪ RUN GREEN | <ul style="list-style-type: none"> for CANopen device: other device: | <ul style="list-style-type: none"> RUN-LED according to DR 303-3 Interface state, flashes during active communication |
| <ul style="list-style-type: none"> ▪ ERR RED | <ul style="list-style-type: none"> for CANopen device: other device: ON OFF | <ul style="list-style-type: none"> ERR-LED according to DR303-3 Error message = State error, system not operational = State OK, system ready for operation |
| <ul style="list-style-type: none"> ▪ TAPE YELLOW | <ul style="list-style-type: none"> ON OFF | <ul style="list-style-type: none"> → Indicator for magnet tape = Magnet tape missing = Magnet tape available |

9 Interfaces and Protocols

9.1 CAN Standard

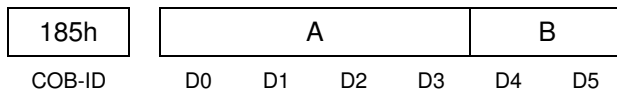
Bitrate: 250 kbps
Resolution: 1.0 mm

CAN-Telegram:



Field	Content	Format	Unit
A	Position	unsigned, Big-Endian (MSB first)	mm
B	Velocity	signed, Big-Endian (MSB first)	mm/s

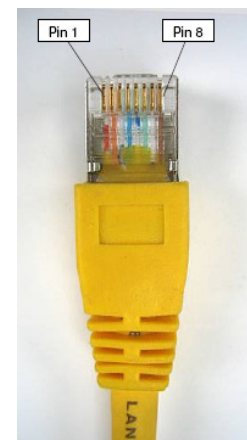
CAN-Telegram:



Field	Content	Format	Unit
A	Position	unsigned, Big-Endian (MSB first)	mm
B	Velocity	signed, Big-Endian (MSB first)	mm/s

9.1.1 Cable configuration CAN Bus isolated and not isolated

Pin number		TIA/EIA-568-B norm
Pin 1	CAN L sensor A	white/orange stripe
Pin 2	CAN H sensor A	orange solid
Pin 3	0V GND sensor A	white/green stripe
Pin 4	+V _{CC} sensor A	blue solid
Pin 5	0V GND sensor B	white/blue stripe
Pin 6	+V _{CC} sensor B	green solid
Pin 7	CAN L sensor B	white/brown stripe
Pin 8	CAN H sensor B	brown solid

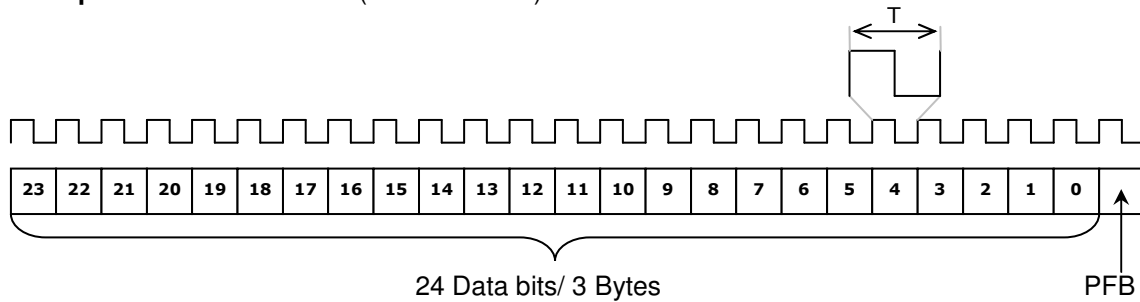


9.2 SSI Interface

Functional principle

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 the evaluation). Some encoders contain a Power Failure Bit (PFB). **Attention:** With the LIMAX22 DUE the PFB is always "LOW"!

Data protocol: data readout (with 25 clocks)



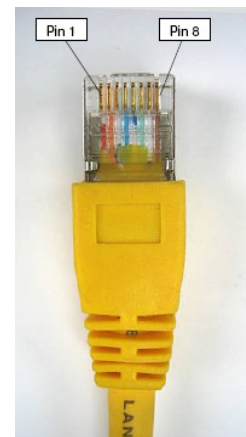
PFB = Power Failure Bit

T = length of clock signal

T_m = monostable multivibrator time > 10 μ s

9.2.1 Cable configuration SSI (two separate cables)

Pin number	Sensor A	Sensor B	TIA/EIA-568-B norm
Pin 1	CLK L	CLK L	white/orange stripe
Pin 2	CLK H	CLK H	orange solid
Pin 3	0V GND	0V GND	white/green stripe
Pin 4	+V _{CC}	+V _{CC}	blue solid
Pin 5	0V GND	0V GND	white/blue stripe
Pin 6	+V _{CC}	+V _{CC}	green solid
Pin 7	DATA L	DATA L	white/brown stripe
Pin 8	DATA H	DATA H	brown solid



9.3 RS-232 / RS-422 / RS485*) Interfaces

*) Attention: RS485 just unidirectional

If the measuring system is equipped with an RS232, RS422 or RS485 interface, the data communication has the following format:

9600 bps (other baud rates on request)

1 Start bit

8 data bits

1 stop bit

no parity

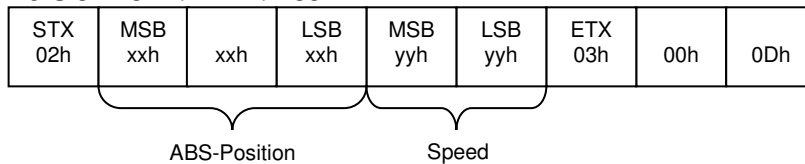
Transmitting cycle 12.5ms (80Hz)

Resolution 1mm

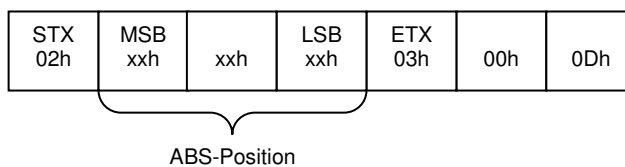
Data protocol:

The absolute position will be illustrated binary in the 3 ABS-Data Bytes.

Version 2321 / 4221 / 4851



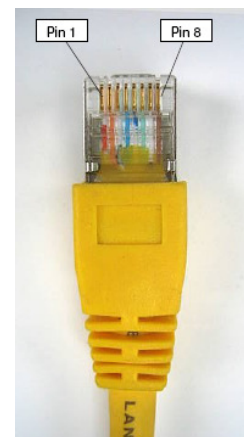
Version 2320 / 4220 / 4850



STX = starts a message
ETX = ends a message

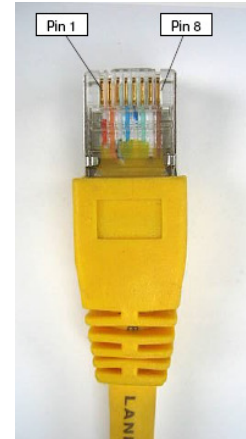
9.3.1 Cable configuration RS422 (two separate cables)

Pin number	Sensor A	Sensor B	TIA/EIA-568-B norm
Pin 1	RX -	RX -	white/orange stripe
Pin 2	RX +	RX +	orange solid
Pin 3	0V GND	0V GND	white/green stripe
Pin 4	+V _{CC}	+V _{CC}	blue solid
Pin 5	0V GND	0V GND	white/blue stripe
Pin 6	+V _{CC}	+V _{CC}	green solid
Pin 7	TX -	TX -	white/brown stripe
Pin 8	TX +	TX +	brown solid



9.3.2 Cable configuration RS485 and RS4221 (equal RS422 unidirectional)

Pin number		TIA/EIA-568-B norm
Pin 1	TX – sensor A	white/orange stripe
Pin 2	TX + sensor A	orange solid
Pin 3	0V GND sensor A	white/green stripe
Pin 4	+V _{CC} sensor A	blue solid
Pin 5	0V GND sensor B	white/blue stripe
Pin 6	+V _{CC} sensor B	green solid
Pin 7	TX – sensor B	white/brown stripe
Pin 8	TX + sensor B	brown solid



10 Interference


The following chapters describe possible causes for malfunction and the instructions to correct them. If you encounter problems check for proper installation first. Make sure that power is supplied to the system and that band and sensor head have the correct orientation.

If you observe recurring errors you might consider electrical interference suppression measures as described in section 10.2.

If errors cannot be corrected with the following instructions please contact the manufacturer (see last page).

10.1 Electrical Safety

Basics:



WARNING!
Risks of injury from improper fault clearances!
 Improper fault clearances can cause serious personal or property damage.


Therefore:

- Fault clearance may only be carried out by qualified and instructed personnel
- Prior to the beginning of work provide sufficient room to assemble the equipment
- Please look for cleanliness at the place of installation
- Loosely around laying parts and tools are sources of accidents

If components have to be replaced:

- Look for correct installation of spare parts
- All mounting elements have to be assembled correctly
- Before resetting please ensure that all covers and protective devices are installed correctly and function properly

10.2 Electrical Interference Suppression



The ground of LIMAX22 DUE should not be connected with protection earth. Do not connect the shielding on both sides to protective earth (PE). The signal output cable has to be installed separate of the load current wires and a safety interval of minimum 0.5m to inductive and capacitive sources of interference like contactors, relays, engines, switching power supply, cyclical controls etc. needs to be hold. If there occurs an interference despite the observance of all the above mentioned points, you need to proceed as follows:

- Installation of RC elements above contactor coils of AC contactors (e.g. 0,1 μ F / 100 Ω).
- Installation of recovery diodes via DC inductors
- Installation of RC elements via the different drive phases and via the drive brake (in the terminal box of the drive)
- Do not connect protective earth and ground (GND)

10.3 Restart after fault clearance

After fault clearance:

1. Reset emergency stop switch.
2. Quit disturbance on the control system.
3. Make sure that no person is located in the danger zone.
4. Start operating as explained in chapter "Operation".

11 Maintenance

The LIMAX22 DUE shaft information system requires little maintenance. On the occasion of regular elevator inspection and maintenance do the following:

- Optical inspection of proper alignment between sensor and band. Worn off material indicates possible alignment flaws. Check for proper guiding of the band along the complete travel distance. Correct if necessary as described in the installation procedure above.
- Optical inspection of the band. Check for abrasions or other mechanical damages. Small mechanical damages (scratches, dents, or even small chips) do not interfere with the measuring performance at all. However, a pre-damaged band is more exposed to mechanical stress and is prone to further wear.
- Check for proper tension of the band. If the mounting was via a flute, the tension can decrease over time. Readjust if necessary.
- Inspect the polymer guide for wear. Clean if dust and dirt have accumulated between polymer guide and sensor case. The polymer guide is a wear part. Replace if necessary.
- Clean the band. Use a dry and clean cloth. Begin at the head of the hoistway drive down the complete travel distance pulling the magnet band through a dry cloth.

12 Type Designation

Example: **LIMAX2D** - **00** - **030** - **1000** - **CO0T** - **D9M**

Device designation:
LIMAX2D = LIMAX22 DUE (2 channel)

Version:
00 = standard version
01 = 1. special version (etc.)

Cable length:
030 = 3,0 m (Standard)
050 = 5,0 m
other cable length on request

Resolution:
62N5 = 62,5 μm = 0,0625 mm
0125 = 125 μm = 0,125 mm
0250 = 250 μm = 0,25 mm
0500 = 500 μm = 0,50 mm
1000 = 1000 μm = 1,00 mm

Interface:

2320	= RS232	[Standard Protocol RS232 / position]
2321	= RS232	[Extended Protocol RS232 / position & speed]
4220	= RS422	[Standard Protocol RS422 / position]
4221	= RS422	[Extended Protocol RS422 / position & speed]
4850	= RS485	on request
CN0	= CAN	[Standard Protocol Basic-CAN]
SSB0	= SSI-Interface	[25 Bit binary code / position]
SSG0	= SSI-Interface	[25 Bit gray code / position]

Caution:
-> CAN interface is optional available with galvanic isolation / assembly CAN- load resistor selectable.
-> RS232- interface is never terminated!
-> RS422- & RS485- & SSI- interface is basically terminated!

CAN- interface	Without galvanic isolation	With galvanic isolation (G)
Terminated 120R (T)	CN0T (Standard)	CN0TG
Not terminate	CN0	CN0G

SSI- interface	
Without optocoupler at clock input (terminated 120R)	With optocoupler at clock input (G) (terminated 120R)
SSB0 (Standard)	SSB0G
SSG0 (Standard)	SSG0G

connector-options:

D9M	= 9-pol. D-Sub-connector	[CAN & CANopen]
RJ45	= Network cable connection	

(open cable end if no option is selected)

other connectors on request

13 Document History

Rev.	Date	Author	Changes
0	10.10.11	RG	
1	08.05.11	CP	Layout changes
2	11.10.12	CP	Formating, layout changes
3	12.12.12	CP	Matching interface descriptions and drawings
4	22.01.13	CP	Additional details in chapter 2 'Product features'; revised chapter with interface description

