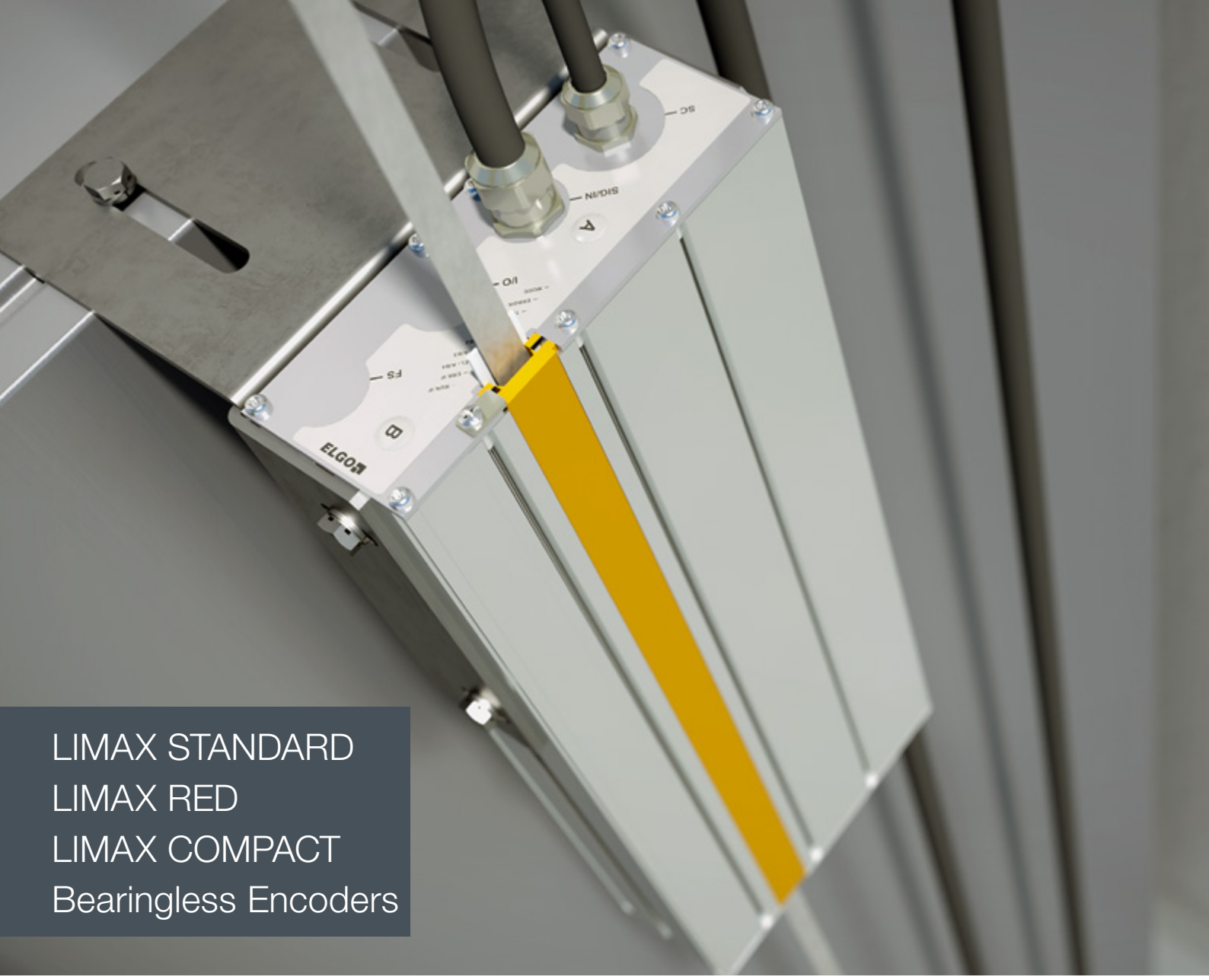

LIMAX STANDARD
LIMAX RED
LIMAX COMPACT
Bearingless Encoders

LIMAX

Shaft Information Systems

Innovative Solutions for Elevators

MEASURING ▸ POSITIONING ▸ CONTROL

ELGO ELECTRONIC

Innovative Solutions for Elevators

LIMAX STANDARD

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LIMAX inside

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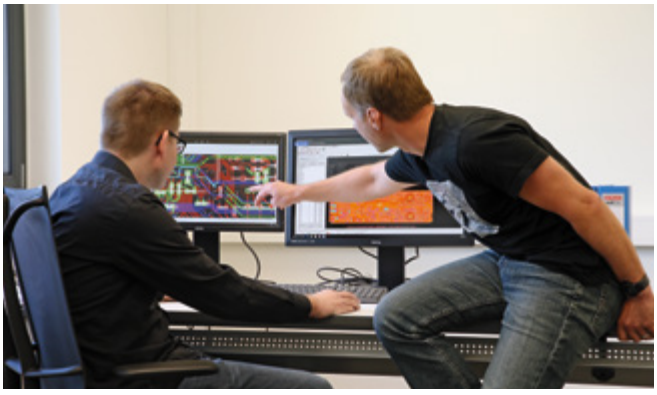
ELGO –
Your proven partner for

Moritz, Helmut and Felix Grimm | Executive Management



ELGO is certified according to DIN ISO 9001:2015

shaft information

The ELGO-Group

Measuring and positioning technology since 1978

With more than 3,500,000 metres of magnetic tape produced annually and 160,000 ready-made electronic assemblies, the family-run ELGO Group is one of the leading companies in the field of magnetic based measuring and positioning technology. For four decades we have been developing and manufacturing sensors, measuring and positioning systems for a wide variety of industries and applications.

Innovative solutions for elevator technology

For more than 20 years ELGO has been developing and producing high-precision, magnetic tape based measuring systems for position determination in elevators. In 2003 the first absolute magnetic tape based shaft copying system was launched, which revolutionized elevator positioning and has become the industry standard today. ELGO Batscale AG in Liechtenstein operates within the ELGO Group as a competence center for the further development of the LIMAX technology.

Broad product portfolio

Today we cover the most diverse requirements with a comprehensive sensor program. Thanks to continuous research and development, our high quality standards and the consistent compliance with elevator relevant standards, we have always succeeded in creating added value for our customers. So that elevators all over the world can reach the desired floor reliably, quickly and safely.

LIMAX STANDARD

Entry-level models for different hoisting heights, ideal for modernizations and retrofitting

LIMAX1M

Pseudo-absolute measurement of the car position

For hoisting heights up to 90 m | Speeds up to 4 m/s

p. 10

LIMAX2M

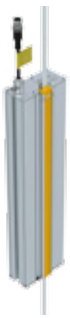
Absolute measurement of the car position

For hoisting heights up to 130 m | Speeds up to 4 m/s

p. 12

LIMAX RED

All systems are designed redundantly and can be used for safety-related applications up to SIL3.



LIMAX3R

Absolute redundant detection of the car position

For hoisting heights up to 260 m | Speeds up to 10 m/s

p. 16

LIMAX4R

Absolute redundant measurement of the car position

For hoisting heights up to 1,500 m | Speeds up to 18 m/s

p. 18

SAFEBOX

Evaluation box

Safety monitoring for elevators, in combination with **LIMAX3R** and **LIMAX4R**

p. 20

LIMAX COMPACT

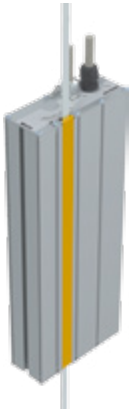
Absolute position detection and safety monitoring in one housing

LIMAX2CP

Absolute redundant detection of the car position and safety monitoring

For hoisting heights up to 130 m | Speeds up to 6 m/s

p. 22



LIMAX3CP

Absolute redundant detection of the car position and safety monitoring

For hoisting heights up to 260 m | Speeds up to 10 m/s

p. 24

ACCESSORIES

Floor Sensor

for exact detection of door zones

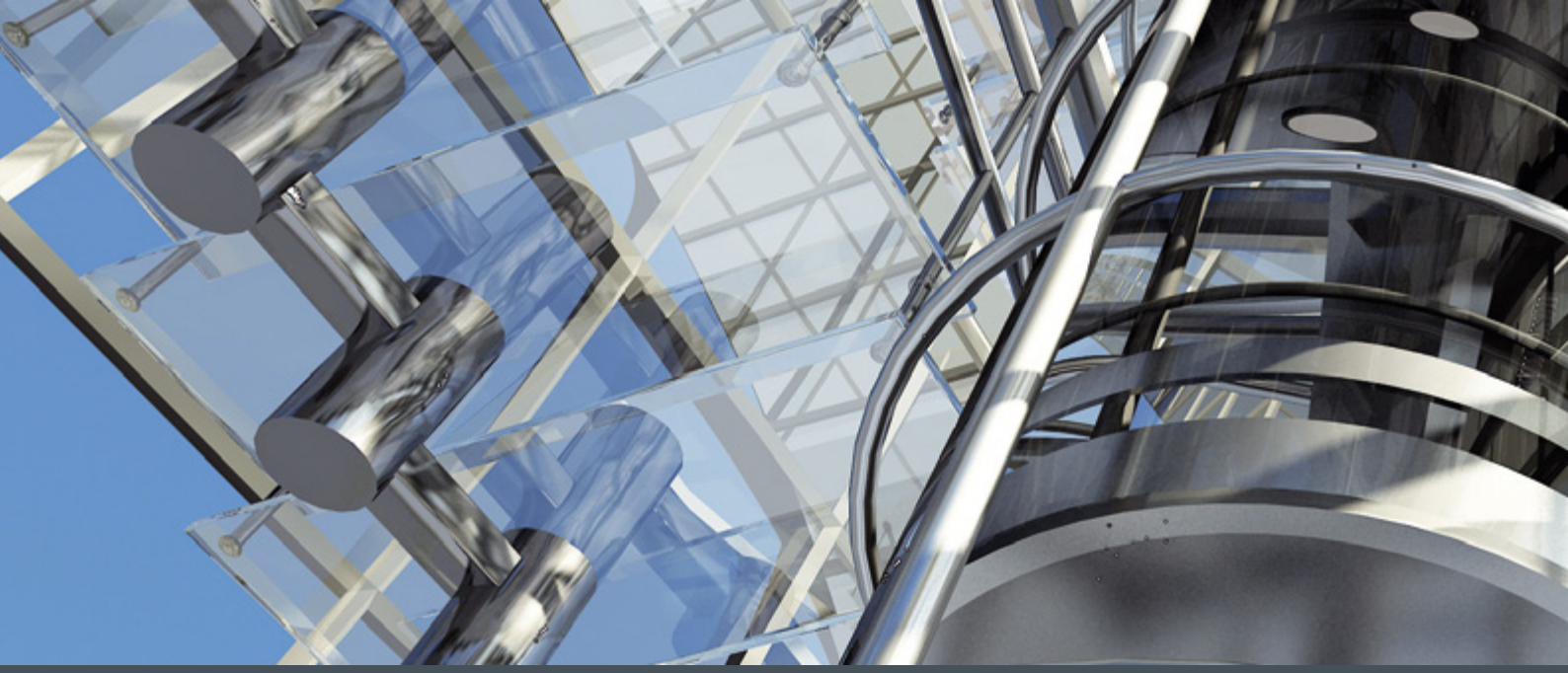
p. 26

BEARINGLESS ENCODERS

for direct drives and escalators. Available in various versions

DMIX3 with dismountable magnetic ring for speed measurement on escalators.

p. 30



LIMAX –
Absolute positioning of the

Always the right solution

- For heights up to 1,500 m and speeds up to 18 m/s
- Compact design
- Broad interface range
- For new plants, modernisation and retrofitting

Reliable

- Excellent measurement quality unaffected by dust, dense smoke and moisture
- Almost wear-free, therefore long service life

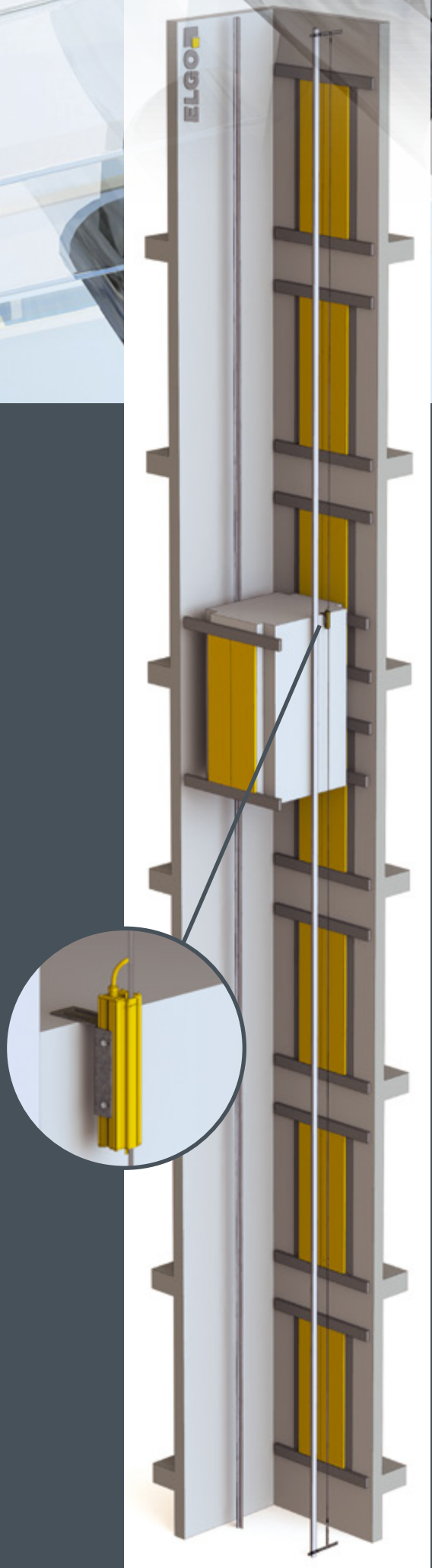
Safe

- Proven non-contact magnetic tape technology
- Absolute position measurement – Even after a power failure, the car position is available in the shaft – no referencing is required.
- Direct detection of the car position: Typical measurement errors due to rope slip or dynamic rope effects (rope elongation) are eliminated.
- High precision - resolution up to 50 µm

Simple and quick assembly

- Complete system and assembly accessories from a single source
- Quick and easy assembly

elevator car



LIMAX shaft information systems use magnetic tape technology to detect the of the elevator car's position in the shaft with high precision.

The principle is simple: A sensor mounted on the elevator car detects the current absolute car position using Hall sensors, which read the magnetic tape mounted in the shaft without any contact. In this way, the car's position can be determined at any time with high accuracy.

Since its introduction in 2003, LIMAX shaft information systems have proven to be a worldwide success and have set a new standard in elevator technology – whether in high-rise buildings with fast elevators or building with standard elevators. More than half a million elevators worldwide now use LIMAX technology to precisely reach the desired floor.

LIMAX1 M

MINI

TOP FEATURES

- Fits into the smallest gap, extremely compact design
- Pseudo-absolute shaft information system (only one-time referencing of 242 mm required)
- Attractive price
- Connection via Mini USB or RJ45 connector
- Low power consumption
- Simple assembly
- Suitable for cloud applications
- Ideally suited for modernizations

original size

LIMAX STANDARD

≤ 90 m | ≤ 4 m/s

The pseudo-absolute measuring system not only offers the smallest sensor in the entire LIMAX series, but is also a particularly cost-effective solution for the detection of hoisting heights up to 90 meters. That makes the sensor especially attractive for modernization and retrofitting.

As this is a quasi-absolute system, a one-time referencing is required during commissioning or after a power failure. After a short travel of approx. 24 cm, the system is able to calculate the absolute position. Due to the very low power consumption, however, it is possible to connect the LIMAX1M system to the emergency power supply, the referencing after a power failure can be omitted in this case.

Assembly – easy and flexible

The assembly of the LIMAX system components is very easy and can be carried out by assembly specialists in less than one hour. All parts required for installation are included in the various LIMAX assembly kits.
The kits facilitate assembly and prevent errors in alignment and tape pre-tension. For the guided LIMAX systems the magnetic tape is mounted free-hanging along the entire shaft. The sensor is attached to the cabin by means of a mounting bracket. The tape guide integrated in the sensor housing ensures the correct distance between the magnetic tape and the reading head at all times.

When installing the LIMAX system components, the respective conditions in the elevator shaft can be flexibly taken into account. LIMAX is therefore suitable for installation in any elevator configuration as well as for modernization and retrofitting.

Technical Data

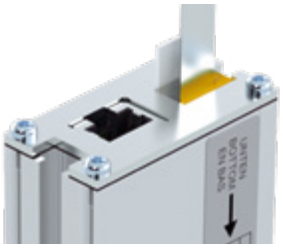
Measuring principle	pseudo-absolute, 240 mm travel
Repeat accuracy	± 1 increment
Housing dimensions (L x W x H)	75 x 64 x 30 mm
Required magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	90 m
Weight	approx. 60 g without cable
Power supply voltage	10… 30 VDC
Current consumption	max. 150 mA
Interfaces	USB, CANopen (DS406 or DS417), RS422, RS485 or SSI (Gray or binary)
Resolution	standard: 1 mm optional: 0.5 / 0.25 / 0.125 / 0.0625 mm
Max. operating speed	4 m/s
Cycle time	10 ms
Achieved SIL	no safety device
Conformity / Standards / Certificates	EN81-20/50
Operating temperature	-10 … +70 °C -25 … +85 °C on request
Operating altidtude	max. 2000 m above sea level
Protection class	IP43

Further data can be found at www.elgo.de

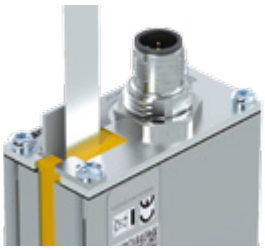
LIMAX2 M

TOP FEATURES

- Absolute shaft information system
- No referencing required
- Compact sensor design
- With RJ45 connector (IP43)
- Optionally available with M12 round plug (IP54) - 100% compatible with the previous version
- Both versions with or without galvanic isolation of the CAN interface available
- Extensive interface spectrum CAN/CANopen (DS417), SSI, RS422,RS485
- Different measurement resolutions up to 62.5 µm available
- Ideally suited for new installations in the standard range as well as for modernizations and retrofits



Bottom with RJ45 connector



Bottom with M12 round plug

LIMAX STANDARD

≤ 130 m | ≤ 4 m/s

LIMAX2M is an absolute shaft copying system. Due to the absolute measurement no further referencing of the system is necessary after commissioning or after a power failure – the absolute position is permanent available.

The "M" in the type designation stands for "Mini". Together with the pseudo-absolute system LIMAX1M the LIMAX2M belongs to the LIMAX systems with the smallest space requirement. With the variable installation possibilities and the low space requirement LIMAX2M is suitable for any elevator configuration, modernization and retrofitting. The installation of the system components is very simple and can be carried out in less than one hour.

LIMAX2M offers an extensive interface spectrum in different protocol variants and is therefore compatible with almost all common elevator controls. Customer-specific solutions can also be created on request.

LIMAX2M is available in two versions. The standard version with RJ45 connector has protection class IP43, optionally LIMAX2M is also available with M12 round plug in protection class IP54 and is 100% compatible with the previous version.

For high environmental requirements (fire brigade lifts or outdoor lifts) the sensor is also available in IP55.

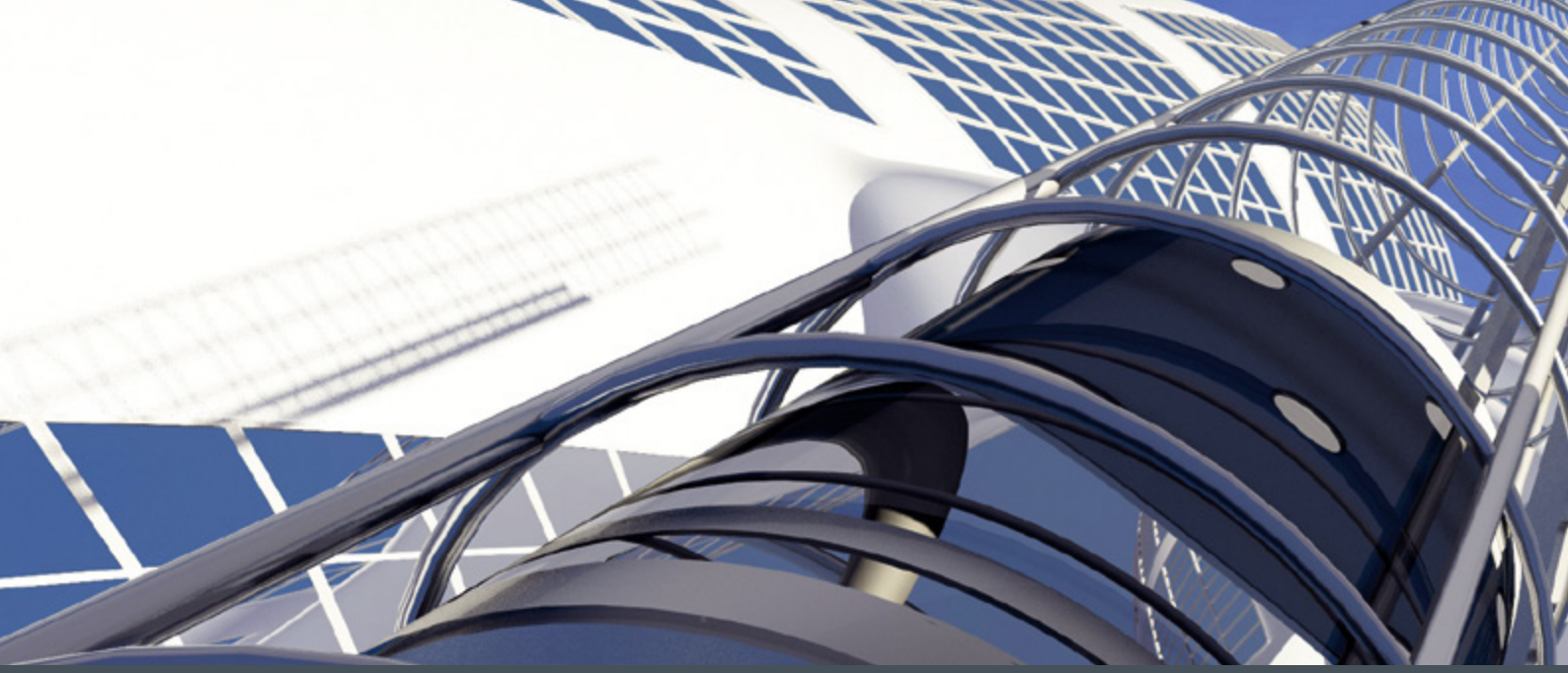
Robust and insensitive to smoke

Due to its robustness, magnetic tape technology is ideally suited for use in elevator systems - dust, dirt, even dense black smoke won't effect measurement quality. The system also withstands humidity and high temperatures without any problems - making LIMAX ideally suited for firefighters' elevators. All that plus a long, maintenance-free service life.

Technical Data

Measuring principle	absolute
Repeat accuracy	± 1 increment
Housing dimensions (L x W x H)	247 x 54 x 27 mm
Required magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	130 m
Weight	approx. 320 g without cable cable: approx. 60 g per meter
Power supply voltage	10… 30 VDC
Current consumption	max. 200 mA
Interfaces	CAN/CANopen (DS406 or DS417), RS422, RS485 or SSI (Gray or binary)
Resolution	standard: 1 mm optional: 0.5 / 0.25 / 0.125 / 0.0625 mm
Max. operating speed	4 m/s
Cycle time	10 ms
Achieved SIL	no safety device
Conformity / Standards / Certificates	EN81-20/50
Operating temperature	-10 … +70 °C -25 … +85 °C on request
Operating altitude	max. 2000 m above sea level
Protection class	IP43 (standard), optionally available as IP54

Further data can be found at www.elgo.de



SIL3-Shaft Information Systems **LIMAX** RED **LIMAX** COMPACT

The sensors of the LIMAX RED and LIMAX COMPACT series are SIL3 certified. The position detection is redundant via a double sensor.

In combination with a safe elevator control or evaluation unit (Safebox), the systems are able to carry out various safety-relevant monitoring operations via the redundant absolute value information. In case of a fault, the elevator is quickly and reliably switched off or set to a safe state. In general, this is done by opening the safety circuit or by triggering the safety gear. In contrast to the LIMAX STANDARD systems, many conventional safety switches in the shaft can therefore be omitted.

Due to the reduced component requirement, the use of a LIMAX-SIL3 shaft copying system offers clear time savings during installation and commissioning and enables a lower stock-keeping. By the simple parameterization of the safety parameters directly at the plant, stock keeping can be further reduced, with at the same time high reaction speed of the service employees on site.

With regard to preventive maintenance in the context of industry 4.0, the LIMAX-SIL3 systems offer the advantage that they generate both condition and wear data as well as error messages, which can be called up and transmitted, thus enabling optimized maintenance deployment.

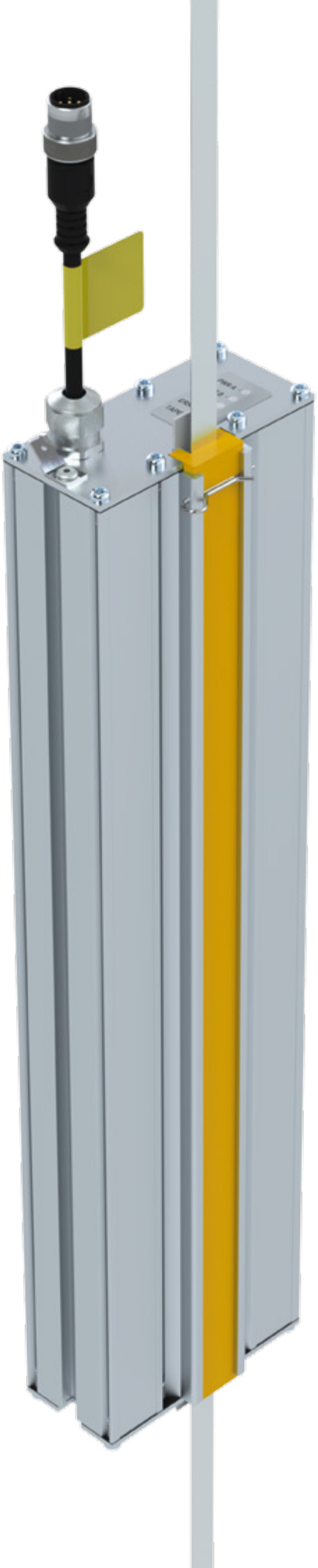
An advantage for architects and building owners: the systems of the LIMAX RED and LIMAX COMPACT series also score with regard to the design of the elevator system. Especially for elevators with visible shafts, the non-existent safety switches in the shaft offer a design advantage.

Safety Functions		Savings Potential
Speed monitoring relative to shaft end, ETSL	⇨	Optical or mechanical ETSL systems
Limit switches and inspection limit switches	⇨	Conventional limit switches and inspection limit switches
Door zone functions, such as retraction with doors opening, readjustment and monitoring of unintentional car movement	⇨	Magnetic or optical systems for floor detection
Safety gear triggering	⇨	Overspeed governor, governor rope, underrope tensioning device

LIMAX3R

TOP FEATURES

- SIL3 certified
- Redundant detection of the absolute cabin position up to 260 m
- In combination with a safe elevator control or evaluation unit (Safebox), safety functions up to SIL3 can be fulfilled.
- Door zone display for up to 128 floors
- Standard RS485 interface, optional CAN and other safe interfaces
- Certified magnetic tape assembly set with tape presence control (acc.EN61508)



Functional Safety

LIMAX3R is a SIL3 certified shaft copying system that detects the car's absolute position in the shaft in a self-monitoring way. The reading electronics are completely redundant and will be permanently checked for functionality by a monitoring system integrated in the sensor. This ensures that the position values and any system errors that may occure are reliably detected and that any failure of the absolute shaft position always leads to a safe condition of the system (usually by opening the safety circuit).

The sensor is designed to be used as a safe sensor together with a safe evaluation unit, such as the Safebox, or directly with a safe elevator control system. In combination, the system fulfils safety functions and replaces a large number of conventional shaft switches.

Note: If the RED sensors are combined with a safe controller, an additional type examination is nevertheless required.

Additional safety: The magnetic tape presence detector

The certified mounting kit S-RMS makes the tape assembly very easy and straight forward. The magnetic tape is easily installed by simply rolling it out. A safety switch (tape presence detector) serves to detect tape presence and ensures that the tape is always in the correct position or, in the event of a deviation, initiates the opening of the safety circuit.

Technical Data

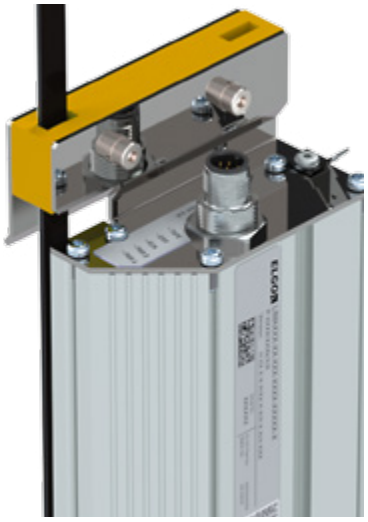
Measuring principle	absolute, redundant
Repeat accuracy	± 1 increment
Housing dimensions (L x W x H)	355 x 85 x 48 mm
Required magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	260 m
Weight	approx. 900 g with 2 m cable
Power supply voltage	2-channel: +18 ... 29 VDC (stabilized) 1-channel: +10 ... 18 VDC (stabilized) Attention: only use SELV or PELV power supplies
Current consumption	max. 600 mA
Interfaces	RS485, others on request
Resolution	62.5 µm, others on request
Max. operating speed	10 m/s
Cycle time	4 ms
Achieved SIL	SIL3 (TÜV certified)
Conformity / Standards / Certificates	EN81-20/50, IEC61508, TSG T7007, A17.5, CSA B44.1-11
Operating temperature	-10 … +70 °C -25 … +85 °C on request
Operating altitude	max. 2000 m above sea level
Protection class	IP54 (according to EN60529) higher on request

Further data can be found at www.elgo.de

LIMAX4R

TOP FEATURES

- Absolute, safe shaft copying for high-rise elevators
- SIL3 certified
- Magnetic measuring principle is completely insensitive to dirt, smoke and dripping water
- Magnetic tape can be mounted unguided (glued to rail groove) or guided (freely suspended)
- Also suitable for inclined lifts
- In combination with a safe lift control or evaluation unit (Savebox), safety-relevant functions are fulfilled.
- In combination with ELGO floor sensors, the building compression is detected



LIMAX4R with punctual tape guide

Functional Safety

LIMAX4R is designed specifically for the requirements of high-rise elevators and is used in the tallest buildings worldwide. It detects the absolute car position in the shaft up to a hoisting height of 1,500 m and is suitable for speeds up to 18 m/s. In combination with ELGO floor sensors and magnets, building compression can be detected and counter-balanced via a master control / evaluation unit.

In contrast to the freely suspended and guided LIMAX systems, the self-adhesive magnetic tape is attached directly to the guide rail. This type of magnetic tape assembly has proven to be successful in very high elevator shafts. Thanks to the unguided installation LIMAX4R works without any noise even at high speeds. As the system is completely non-contact, it is not subject to any wear and tear and therefore has a very long service life. Depending on the magnetic tape, the maximum allowed distance between sensor and tape ranges up to 12 mm.

Optionally a version with a punctual tape guidance at the side parts is available.

The sensor is designed to be used as a safe sensor together with a safe evaluation unit (see Safebox) or directly with a safe elevator control. Together, the system performs safety-relevant functions in the elevator.

Interfaces

The LIMAX sensor technology includes interfaces with SSI, Can/CANopen (DS406, DS417) as well as special RS485 and RS422 protocols. Special protocols are also available for customer-specific variants. CANopen DS406 and DS417 are available for sensors certified according to EN61508 (SIL3).

Technical Data

Measuring principle	absolute, redundant
Repeat accuracy	± 1 increment
Housing dimensions (L x W x H)	466 x 78 x 36 mm
Required magnetic tape	AB20-120-10-1-R1-C-16A-4943F, AB20-120-20-1-R1-C-16A-4943F
Max. measuring length	786 m certified 1,500 m on request
Weight	approx. 820 g unguided, approx. 1030 g half-guided, without cable
Power supply voltage	2-channel: +18 ... 29 VDC (stabilized) 1-channel: +10 ... 18 VDC (stabilized) Attention: only use a SELV or PELV power supply!
Current consumption	max. 600 mA
Interfaces	RS485, others on request
Resolution	62.5 µm, others on request
Max. operating speed	18 m/s
Cycle time	4 ms
Achieved SIL	SIL3 (TÜV certified)
Conformity / Standards / Certificates	EN81-20/50, IEC61508, TSG T7007, A17.5, CSA B44.1-11
Operating temperature	-10 … +70 °C -25 … +85 °C on request
Operating altitude	max. 2000 m above sea level
Protection class	IP54 (according to EN60529) higher on request

Further data can be found at www.elgo.de

SAFEBOX

Functional Safety

TOP FEATURES

- Safety monitoring for lifts
- Up to four safety relay pairs for safety-relevant switching and control functions
- Safety functions: Delay monitoring ETSL, final limit positions, door zones, triggering of the safety gear
- Flexibility in adapting and extending of the implemented switching and safety functions
- Two safety circuit inputs 110 V, 220 VAC or 48 VDC
- CAN interface DS406 or DS417 for parameter setting or cabin position transmission, optional SIL3 CAN interface possible
- Customer-specific software can be implemented

LIMAX RED

Evaluation unit, can be combined with LIMAX3R / LIMAX4R

The Safebox is an evaluation unit which, in combination with the safe shaft information systems LIMAX3R and LIMAX4R, guarantees safety-relevant functions.

The Safebox evaluates the received safe position information, calculates speed and acceleration and autonomously triggers the necessary steps via safety relays to ensure safe operation of the elevator. In case of a fault, this means opening the safety circuit and/or triggering of the safety gear. As a complete system, practically all safety-relevant switches, light barriers and similar systems can be replaced.

The Safebox is connected to the elevator control system via a CAN interface and can be installed both on the car roof and in the machine room.

LIMAX safety functions in the elevator shaft

The safety-relevant functions that can be implemented in the electronic evaluation include:

- Monitoring of final limit switch position
- Monitoring of door zone areas incl. door bridging for premature door opening, adjustment and quick start
- Monitoring of nominal speed
- Monitoring of inspection speed during inspection operation
- UCM monitoring during door bridging in the door zone area
- Delay control for fast systems with shortened shaft head/pit
- Protective area monitoring during inspection operation for systems with shortened shaft head/pit

Technical Data

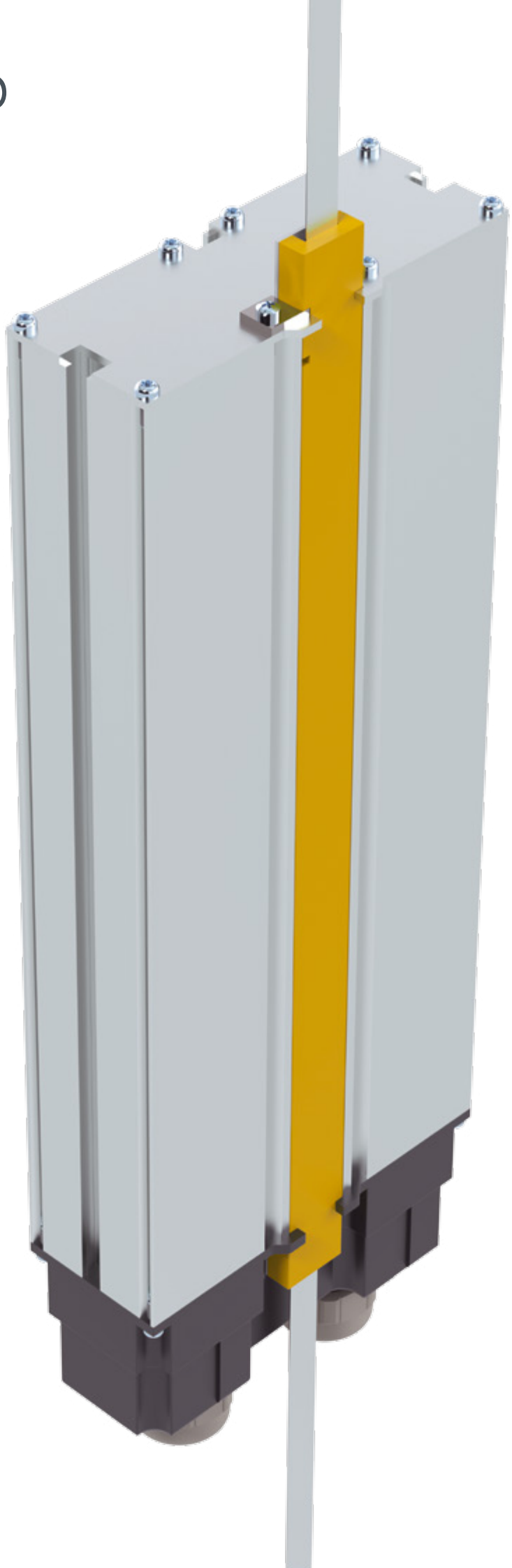
Housing dimensions (L x W x H)	203 x 125 x 66 mm
Weight	approx. 2000 g (without cable), cable approx. 60 g/m
Power supply voltage	24 VDC, +20 % / -25 %
Current consumption	max. 500 mA
Battery voltage	12 VDC ± 20%
Interfaces	CANopen - DS406 (others on request), RS485 for sensor communication
Number of safe inputs	5
Number of safety circuit inputs	1 (110 V, 220 VAC)
Number of electronic outputs	1
Number of safety relays	3 (OC, NOC, SGC)
Voltage	110 VAC / 220 VAC / 24 VDC
Contact load	max. 1 A
Response time	<55 ms
Achieved SIL	SIL3
Fullfilled standards	EN81-20, TSG7007, IEC61508
Operating temperature	0 … +65 °C -25 … +85 °C on request
Operating altitude	max. 2000 m above sea level
Protection class	IP54 (according to EN60529), higher on request
Delay by motor brake	>1,7 m/s^2
Delay by elevator control	<1,2 m/s^2
Buffer dimensioning	>0,63 m/s (inspection speed)

Further data can be found at www.elgo.de

LIMAX2 CP

TOP FEATURES

- Reliable, absolute position detecti-on up to 130 m and safety-relevant switching and control functions in one housing
- IP43 or IP54 available
- Electronic disconnection of the safety circuit
- Door functions
- UCM monitoring
- Overspeed
- Test of unintentional door bridging
- ETSL
- SIL3 certified in China and Europe
- EU type tested according to EN81-20/50, EN61508 (SIL3) and GB 7588



Functional Safety

The SIL3 certified LIMAX2CP combines shaft position detection and safety functions in one housing. The position sensor detects the current absolute car position.
This position information is processed internally, speed and acceleration of the elevator are calculted from this and converted into corresponding switching functions via the safety relays. In the case of overspeed or other faults, the safety circuit is opened and/or the safety gear is triggered.

The sensor also contains a push-pull output which is switched within the door zone in order to facilitate car evacuation from the shaft area in case of an emergency.

LIMAX RED and LIMAX COMPACT Savings potential

Depending on the device version, the following safety-relevant electromechanical switches, light barriers and similar systems can be replaced in the shaft:

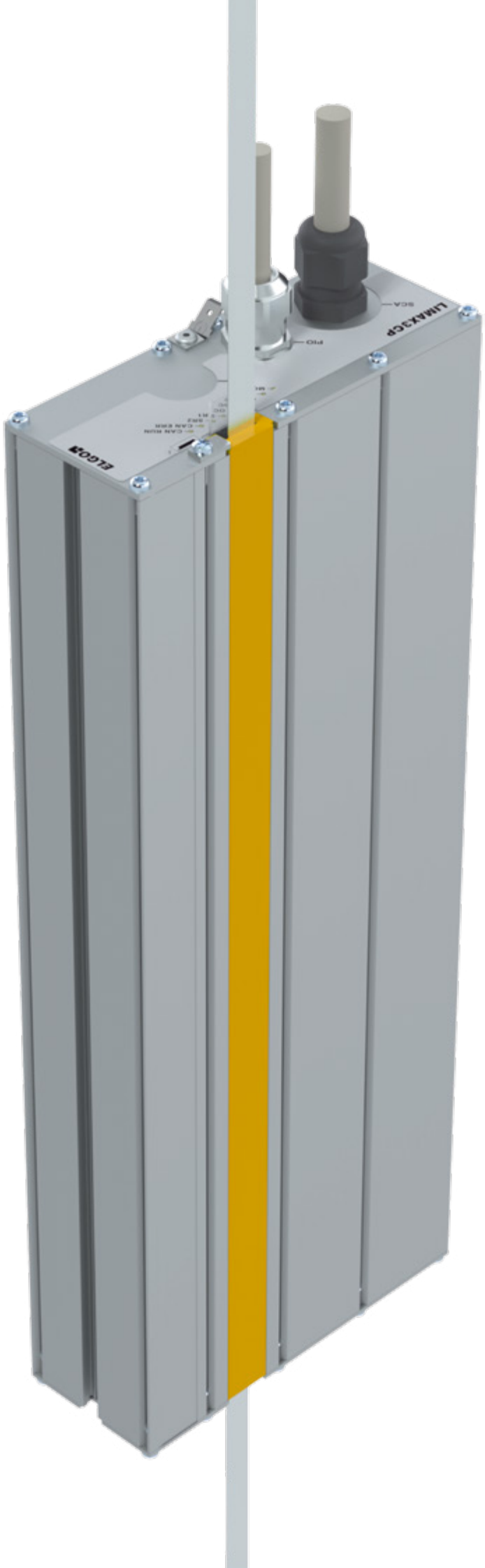
- Speed limiter systems at the shaft end
- Floor magnets and switches
- Final limit and inspection limit switches
- Mechanical overspeed governors
- Reduced height of shaft pits or shaft heads (EN81-21)

Technical Data

Measuring principle	absolute, redundant
Repeat accuracy	± 1 increment
Housing dimensions (L x W x H)	354 x 136 x 54 mm
Required magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	130 m
Weight	approx. 1100 g without cable cable: approx. 60 g per meter
Power supply voltage	10 ... 30 VDC (stabilized) Attention: only use PELV power supplies!
Current consumption	max. 400mA at 24 VDC
Interfaces	CANopen DS417
Resolution	configurable from 62.5 µm (recommended: 1.0 / 0.5 / 0.25 / 0.125 / 0.0625 mm) delivery state: 1 mm
Max. operating speed	6 m/s
Cycle time	< 40 ms
Achieved SIL	SIL3 (TÜV certified)
Conformity / Standards / Certificates	EN81-20/50, IEC61508, TSG T7007
Operating temperature	-20 … +65 °C -25 … +85 °C on request
Operating altitude	max. 2000 m above sea level
Protection class	IP43, IP54 (according to EN60529), higher on request

Further data can be found at www.elgo.de

LIMAX3 CP



TOP FEATURES

- Reliable, absolute position detecti-on up to 260 m and safety-relevant switching and control functions in one housing
- Up to four safety relay pairs for SIL3-compliant transmission to the controller
- Scalable functional safety architecture
- Door functions
- UCM monitoring
- Triggering of the safety gear
- Test of unintentional door bridging door bypass lt. Liftlex
- ETSL
- Shortened shaft head/pit
- I nspection control
- Working Platform
- EU type tested according to EN81-20/50, EN61508 (SIL3) and GB 7588

Functional Safety

LIMAX3CP is designed for safe, absolute position detection up to 260 m and speeds up to 10 m/s. The safety-relevant switching and control functions are combined in one housing. A redundant dual sensor with integrated monitoring function detects the current, absolute car position. This position information is processed internally, speed and acceleration of the elevator are calculated from this and converted into corresponding switching functions via the safety relays. In the event of overspeed or other faults, the safety circuit is opened and/or the safety gear is triggered.

Shortened shaft head and shaft pit are monitored, even during inspection of the service functions.

Technical Data

Measuring principle	absolute, redundant
Repeat accuracy	± 1 increment
Housing dimensions (L x W x H)	354 x 136 x 54 mm
Required magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	260 m
Weight	approx. 1400 g without cable cable: approx. 60 g per meter
Power supply voltage	18 ... 30 VDC (stabilized) Attention: only use PELV power supplies!
Current consumption	max. 600 mA at 24 VDC
Interfaces	CANopen (DS406 or DS417), others on request
Resolution	configurable from 62.5 µm (recommended: 1.0 / 0.5 / 0.25 / 0.125 / 0.0625 mm) delivery state: 1 mm
Max. operating speed	10 m/s
Cycle time	< 55 ms
Achieved SIL	SIL3 (TÜV certified)
Conformity / Standards / Certificates	EN81-20/50, IEC61508, TSG T7007
Operating temperature	-20 … +65 °C -25 … +85 °C on request
Operating altitude	max. 2000 m above sea level
Protection class	IP54 (according to EN60529) higher on request

Further data can be found at www.elgo.de

Floor sensor

TOP FEATURES

- Fully encapsulated housing for increased durability
- 10 ms pulse at flush position / flag output signal
- Sensor available in IP54 or IP67
- Teach drive can be carried out via floor sensor

Floor sensors and magnets are used for the exact detection of the floor door zones. The magnets are mounted on the floor door thresholds or on the shaft wall, the floor sensor on the car. During the test drive, the elevator automatically detects the exact position and transmits this information to the elevator control. Manual fine adjustment of the floors is no longer necessary.

High buildings are slowly compressed over time. This may mean that the car is no longer precisely aligned to the doors on the floor. Since the magnets are attached to the building structure, any position deviation is immediately transmitted to the elevator control. This adjusts the changed ground level of the floor and guarantees the precise alignment of the car to the floor.

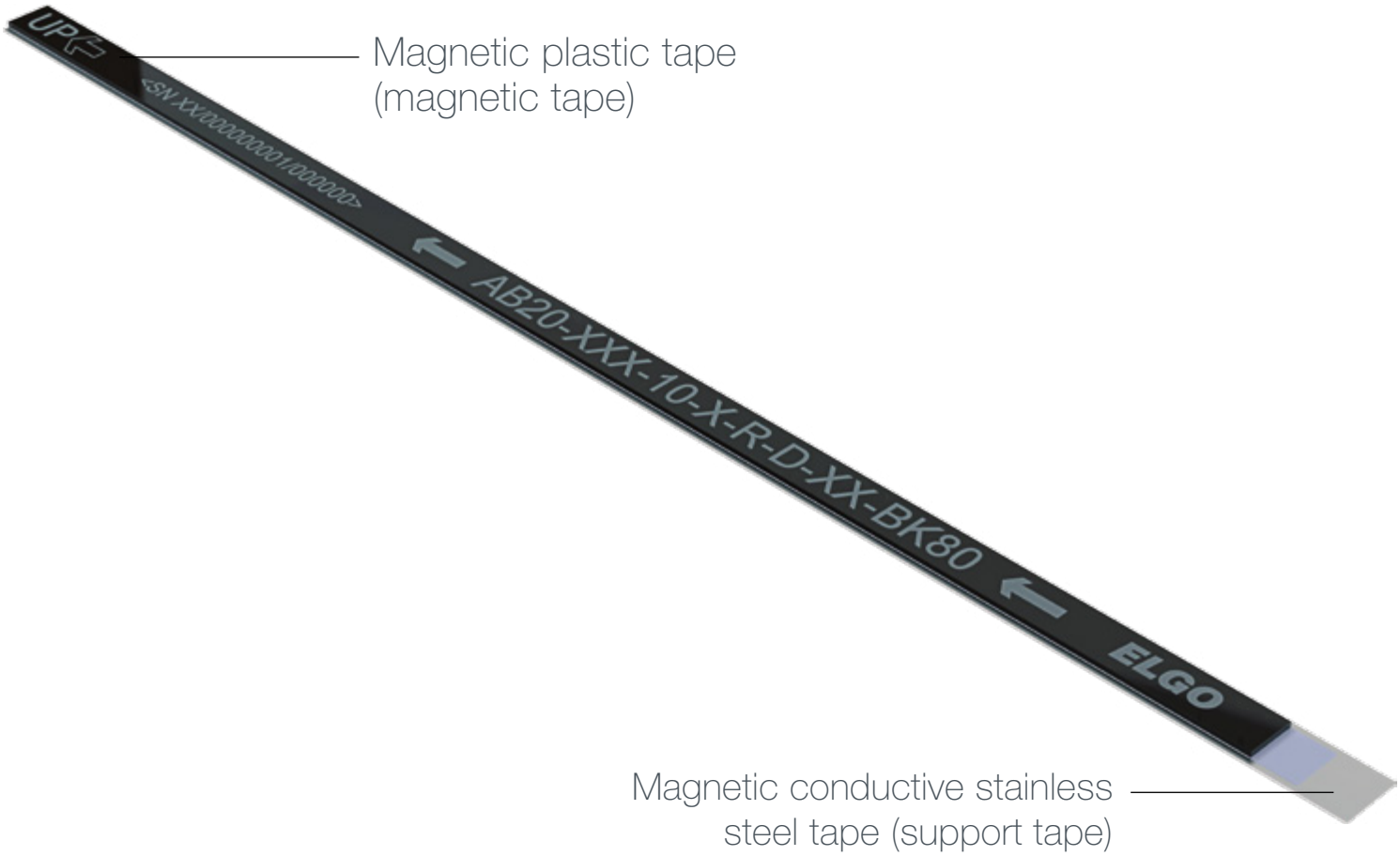
Technical Data

Detection principle	magnetic (Hall Sensor)
Reading distance	10 mm ± 2 mm
Housing Material	PC-VO
Housing dimensions (L x W x H)	84 x 24 x 17 mm
Signal cable	material: HLF cable diameter: 4.8 mm cable shielding: no
Weight	approx. 30 g without cable cable approx. 60 g/m
Power supply	9 ... 30 VDC
Current consumption	max. 30 mA @ Vcc = 24 VDC
Detection speed	2.5 m/s
Operation temperature	-10 … +65 °C -25 … +85 °C on request
Protection class	IP54 (standard)

Further data can be found at www.elgo.de

Magentic tapes

The ELGO magnetic tapes used in the LIMAX shaft information systems contain the necessary digital information for the car position detection. These are absolutely coded single track systems which always issue the actual position value.
The special random code enables a travel distance of up to 1,500 meters with a measuring accuracy of +/- 0.5 mm.
The magnetic tapes consist of a magnetized plastic tape, which is connected to a magnetic conductive, flexible steel tape on the bottom side. The steel tape protects the plastic tape from mechanical influences and at the same time represents a magnetic short-circuit. This significantly increases the functional safety under extreme magnetic influences.
Due to its resistance to smoke, dirt, oil, moisture, vibration and shock, the tape system and its associated sensors are ideal for installation in elevator shafts.
The magnetic tape is particularly easy to unroll thanks to the packaging specially designed for the elevator area.



Technical Data

Mechanical Data			
	Magnetic tape AB20-80-10-1-R-D-15-BK80 Suitable for sensors: LIMAX1M, LIMAX2M, LIMAX3R, LIMAX2CP, LIMAX3CP	Magnetic tape AB20-120-10-1-R1-C-16A 4943F Suitable for sensor: LIMAX4R	Magnetic tape AB20-120-20-1-R1-C-16A-4943F Suitable for sensor: LIMAX4R
Typ	absolute coded magnetic tape	absolute coded magnetic tape	absolute coded magnetic tape
Track number	single track system	single track system	single track system
Pole pitch	8 mm	8 mm	12 mm
Tape construction	Magnetic tape on stainless steel tape	Magnetic tape on stainless steel / ste el tape with double-faced adhesive tape	
Width	10 mm (+/-0.1 mm)	10 mm (+/-0.1 mm)	20 mm (+/-0.1 mm)
Thickness	1.35 mm (+/-0.1 mm)	1.35 mm (+/-0.1 mm)	2.45 mm (+/-0.1 mm)
Linear thermal expansion	$\Delta L[m] = L[m] \times \alpha[1/K] \times \Delta\vartheta[K]$ L = tape length in meters, Δ [K] = relative change of temperature		
Coefficient of extension	$\alpha \approx 16 \times 10^{-6}$ 1/K	$\alpha \approx 16 \times 10^{-6}$ 1/K	$\alpha \approx 11 \times 10^{-6}$ 1/K
Available lengths	max. 262 m per role	max. 760 m per role	max. 285 m per role, segmented thereafter

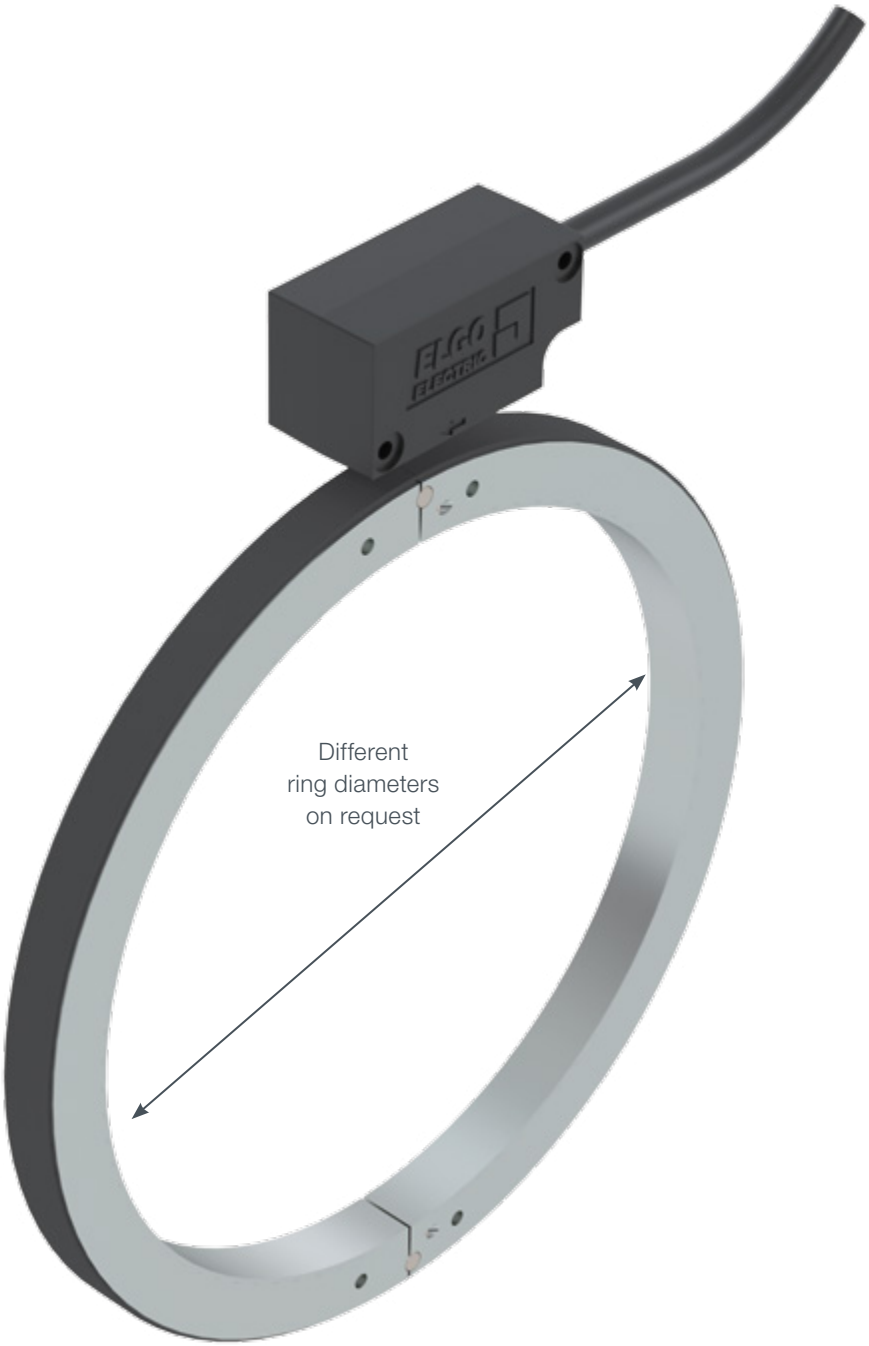
Environmental Condition			
Storage temperature	-40 … +85 °C	-40 … +85 °C	-10 … +60 °C
Operation temperature	-20 … +70 °C	-20 … +70 °C	-10 … +60 °C
Humidity	max. 95 %, non-condensing		
Protection class	carrier tape stainless steel	carrier tape stainless steel	carrier tape steel

Further data can be found at www.elgo.de

DMIX3
with dismountable magnetic ring

TOP FEATURES

- Rotative speed encoder system for escalators
- Contactless detection of speed and direction
- Wear-free magnetic measuring principle
- Two separate ring halves for quick and direct mounting on the shaft
- Space and cost savings
- Optionally also available in SIL2



The bearingless encoder, consisting of a dismountable magnetic ring and a sensor, is predestined for installation conditions such as those found in compact, extremely flat external rotor motors or on the main axes of escalators due to its small installation depth.

The measuring system is available with various ring diameters for shafts up to 450 mm. By dividing the ring into two parts, it can be used flexibly and is also ideally suited for modernization. The special magnetization of the ring allows an uninterrupted reading of the coding.

Technical Data

Measuring principle	incremental, rotativ
Repeat accuracy	± 1 increment
Resolution	0,592° resp. 1 mm (at 4-edge triggering)
System accuracy	< 1°
Revolution speed	max. 600 rpm
Housing dimensions (L x W x H)	50 x 24 x 26 mm
Reading distance	10 ± 3 mm
Weight	approx. 60 g without cable, cable approx. 60 g/m
Power supply voltage	10 ... 30 VDC or 5 VDC
Current consumption	max. 150 mA
Output signals	A, A', B, B', Z, Z' (differential), push/pull, short-circuit-proof
Output frequency	max. 20 kHz per channel
Operating temperature	-10 … +70 °C
Protection class	IP40 (IP65 optional)

Magnetic ring (example)

Carrier material	1.0402 steel
Encor layer	ferrite filled rubber
Number of magnet poles	38
Pole pitch	16 mm
Dimensions	outer diameter 173.5 mm / inner diameter 149.5 mm, width 12 mm
Suitable shaft diameter	∅ 148 mm

Further data can be found at www.elgo.de

Assembly
Simple and flexible

Assembly sets for magnetic tape

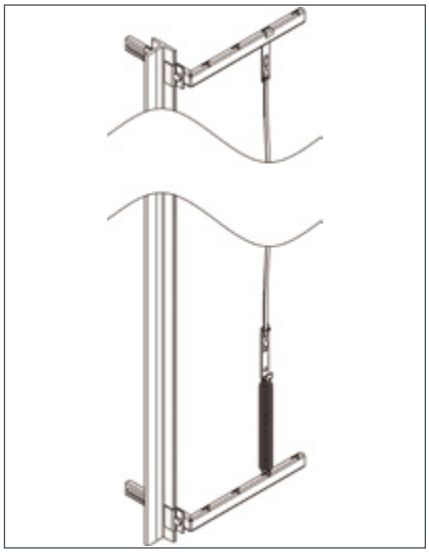
The assembly of the LIMAX system components is very simple and can be performed by assembly specialists in less than one hour – almost without any tools. All parts required for installation are included in the various LIMAX assembly kits.

The kits facilitate installation and prevent misalignment and tape pre-tension.

With the LIMAX guided systems, the magnetic tape is mounted in a freely suspended manner along the entire shaft. The sensor is mounted to the car by means of a mounting bracket. The tape guiduing attached to the sensor ensures the correct distance between the magnetic tape and the reading head at all times.

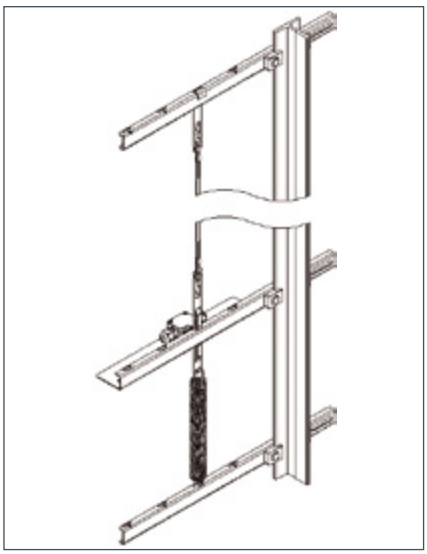
LIMAX RMS
for centrally guided cars

LIMAX RMS 90
angeled for backpack car guiding

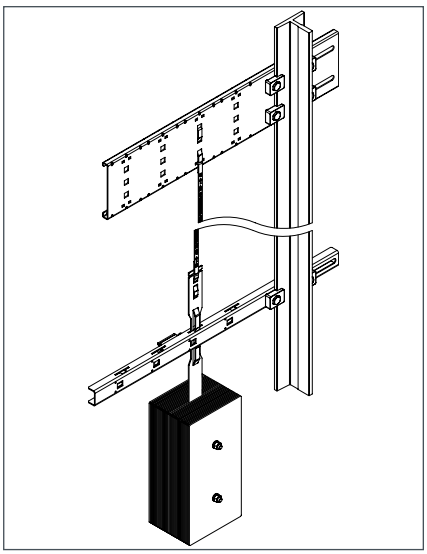


LIMAX MKF
screw anchor assembly

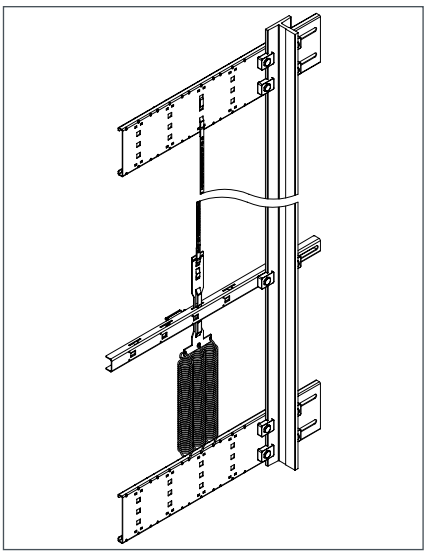
LIMAX S-RMS
with safety position switch
(tape presence detector)



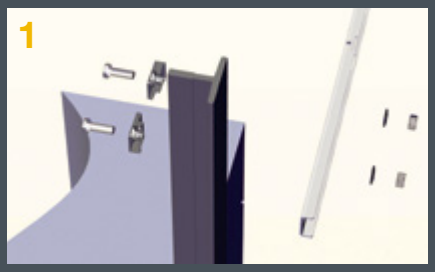
LIMAX S-RMS-WH
For high-rise elevators, with tape detection and tension weight



LIMAX S-RMS-H
For high-rise elevators, with tape detection and tension spring

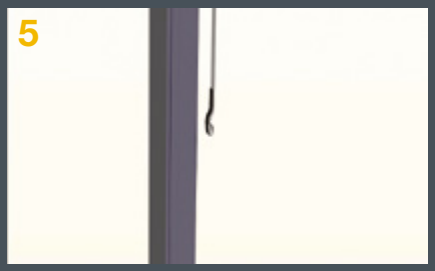


Magnetic tape assembly **LIMAX** S-RMS

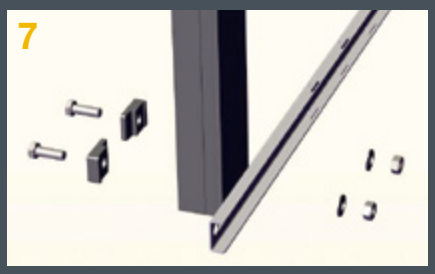


A cross beam is mounted at the upper end of the shaft on the elevator guiding rail.

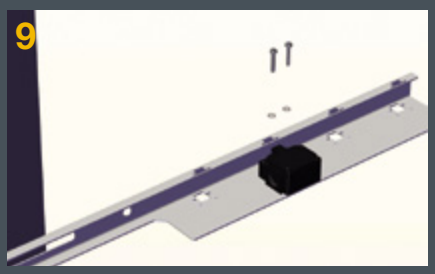
The magnetic tape is inserted in the tape suspension.



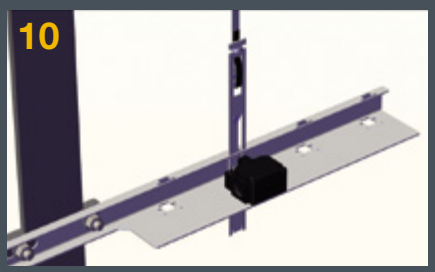
Standing on the car roof, the magnetic tape is rolled out during the ride down and inserted at the lower end in the tape suspension.



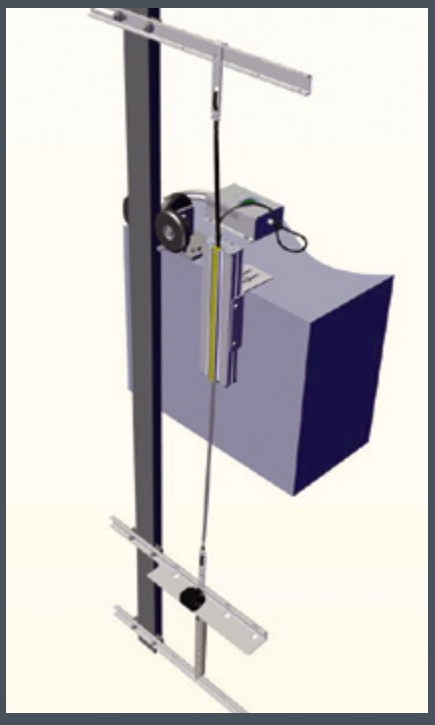
Another cross beam is attached in the shaft pit.



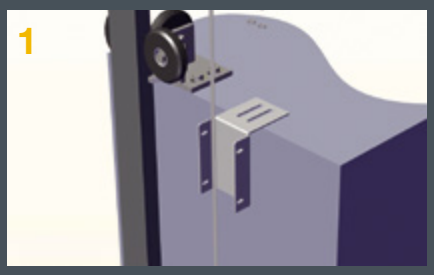
A third cross beam is mounted for the tape presence detector.

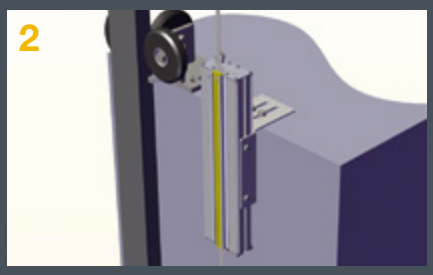


The tape suspension is hooked on the tension spring.



Sensor assembly





The sensor is mounted on the car using a mounting bracket and connected to the controller or Safebox via cable.

DONE

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