



real **hightech**

**LIMAX** | LIMAXSAFE

Shaft Information and Safety Systems



  
MEASURING ▶ POSITIONING ▶ CONTROL

**ELGO**   
**ELECTRONIC** 

# LIMAX

## The Leader in Shaft Inform

### LIMAX

Shaft Information Systems

LIMAX02 M. ....	page 12/13
LIMAX02. ....	page 14/15
LIMAX22 DUE. ....	page 16/17

### LIMAX SAFE

Shaft Information and  
Safety Systems

LIMAX33 RED. ....	page 18/19
LIMAX44 RED. ....	page 20/21
SAFE BOX:	
LIMAX34 SAFE   LIMAX44 SAFE. ....	page 22/23
LIMAX33 CP. ....	page 24/25



ation

## Accessories

Floor sensors and floor magnets . . . . . page 26/27  
Magnetic tapes . . . . . page 28/29

Assembly . . . . . page 30/31

ELGO worldwide . . . . . page 34/35

# LIMAX inside

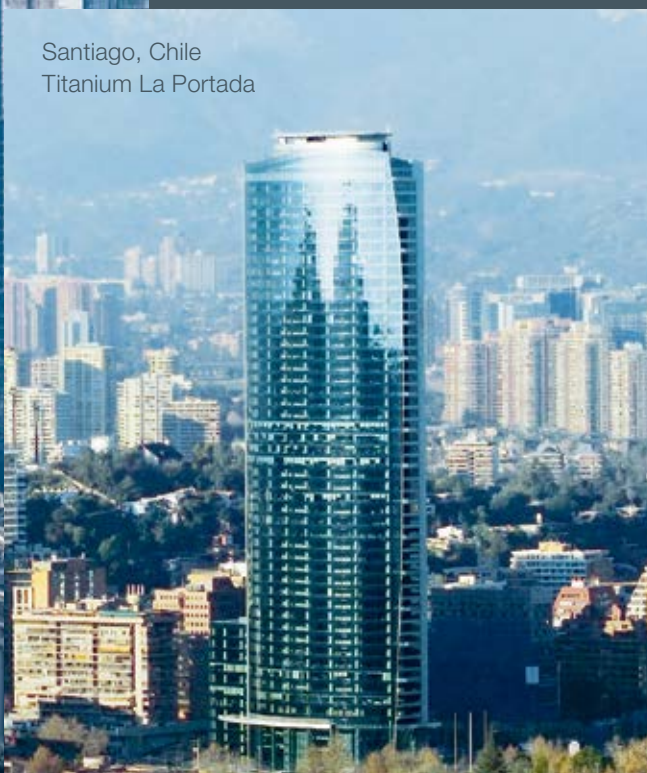
Shanghai, China  
World Financial Center



Hongkong, China  
International Commerce Center



Santiago, Chile  
Titanium La Portada



Berlin, Germany  
TV Tower

New York City, USA  
Hearst Tower



## WHO WE ARE.

The ELGO Group stands for many years of experience in the fields of measuring, controlling and positioning. In our plants in Rielasingen (Germany) and Balzers (Liechtenstein), we develop and produce electronic measurement and control systems for the engineering, automation and elevator industries. ELGO was founded in 1977 by Helmut Grimm; today, his sons assist him in the management.

Since 1998, ELGO has been active in the development and production of high precision, magnetic tape-based measurement systems for positioning in elevator systems. Since then, thousands of elevators worldwide reliably and precisely reach the desired floor with LIMAX shaft information systems.

Our strong international focus is impressively demonstrated by an export share of 80%, four international subsidiaries and agents in 30 countries. Globally, 140 people are involved in our success.



## Shaft Information Systems

At a  
glance

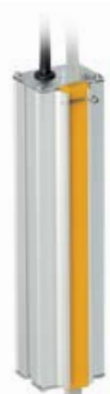


### LIMAX02 M

**low-rise**

Absolute measurement of the car position

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

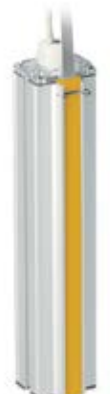


### LIMAX02

**mid-rise**

Absolute measurement of the car position

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



### LIMAX22 DUE

**mid-rise**

Absolute, redundant measurement of the car position

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



## Shaft Information and Safety Systems



### LIMAX33 RED mid-rise

Absolute, redundant recording of the car position. The safe position is provided to the elevator controller or an external electronic evaluation unit.

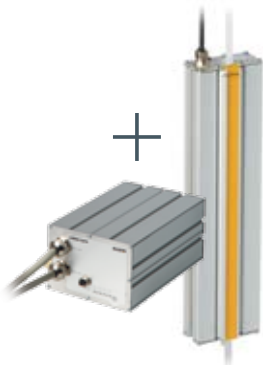
**For hoisting heights up to 260 m |  
Speeds up to 10 m/s**



### LIMAX44 RED high-rise

Absolute, redundant recording of the car position for the highest buildings. The safe position is provided to the elevator controller or an external electronic evaluation unit.

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



### LIMAX34 SAFE mid-rise

Modular system consisting of the LIMAX33 RED sensor for safe recording of the car position and the Safe Box electronic evaluation unit, in which the car position and speed-dependent switching and control functions are integrated.

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



### LIMAX44 SAFE high-rise

Modular system for high-rise buildings, consisting of the LIMAX44 RED redundant sensor and the Safe Box electronic evaluation unit, in which the relevant safety functions are integrated.

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



### LIMAX33 CP mid-rise

Shaft information system based on the LIMAX33 RED sensor for safe position detection. The safety-related switching and control functions are integrated in the sensor housing.

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



# LIMAX – Shaft Information

## Always the right solution

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

## Safe

- Proven non-contact magnetic tape technology
- Directly determines car position: Prevents typical measurement errors caused by rope slips or dynamic rope effects (rope expansion).
- Absolute position measurement: The exact car position within the shaft is available even after a power failure – no test drives necessary.
- High precision – resolution up to 0.05 mm
- High accuracy and reproducibility

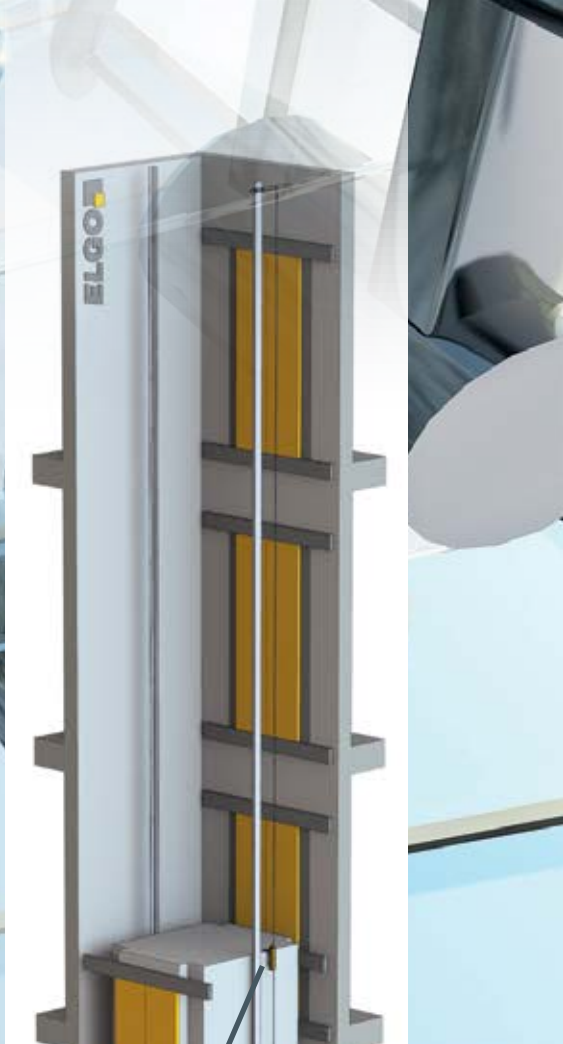
## Reliable

- Extremely robust structure
- Excellent measurement quality unaffected by dust, dense smoke and moisture
- Long, maintenance-free service life

## Easy, quick assembly

- Complete system and assembly accessories from a single source
- Quick, easy assembly
- Variable assembly of system components



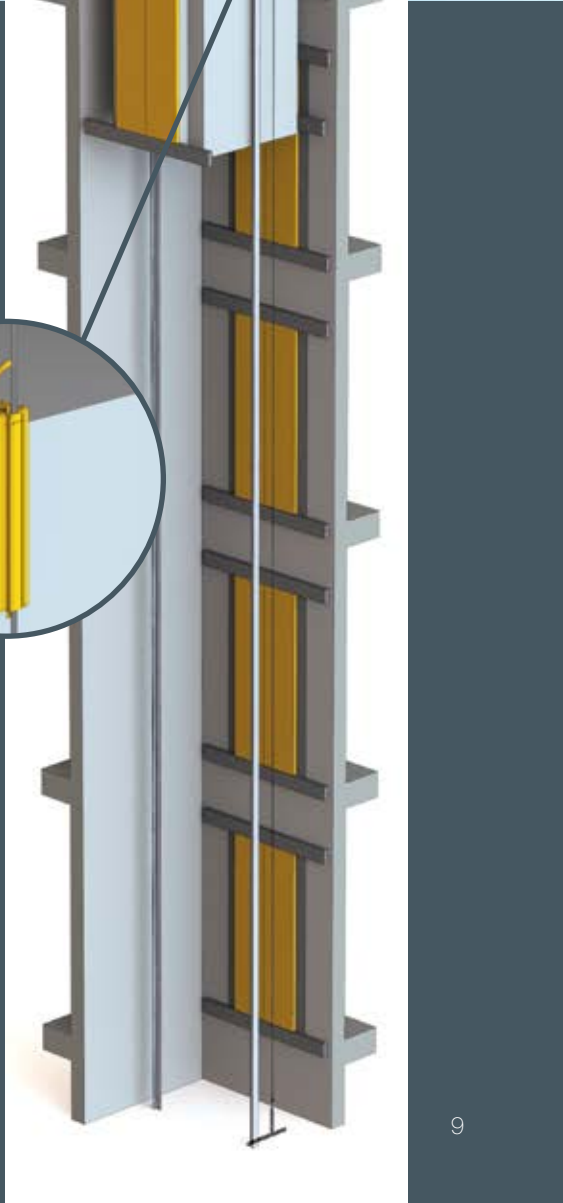


# Systems

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

The concept 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. Through this method, the car's position can be determined at any time with high accuracy.

Since its introduction in 2004, 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 buildings with standard elevators. Over 100,000 elevators worldwide now use LIMAX technology to precisely reach their desired floors.



# LIMAX02 M

## TOP-FEATURES

- Contactless, absolute position detection up to 130 m
- For travel speeds up to 4 m/s
- Comprehensive interface range RS422, CAN, CANopen, SSI
- Entry-level model with attractive price
- Perfectly suited for new installations in the standard range as well as for use in modernizations and retrofits



This absolute measuring system not only offers the sensor with the smallest design in the LIMAX series, LIMAX02 M is also a particularly inexpensive alternative to conventional shaft information systems that rely on incremental measurement.

LIMAX02 M offers a wide range of interfaces with different protocol variants, making it compatible with almost all common elevator controls. We also create customized solutions on request.

The assembly of the system components is very simple and can be performed by specialists in less than an hour. With the variable installation options and its small footprint, LIMAX02 M is ideal for any elevator configuration, modernization, and retrofit.

## The LIMAX series

Robust and resistant to smoke

Due to its robustness, the magnetic tape technology is ideal for use in elevator systems – dust, dirt and even dense black smoke won't affect measurement quality. The system even 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

### Mechanical Data

Measuring principle	absolute
System accuracy in $\mu\text{m}$ at 20 °C	+/- (1000 $\mu\text{m}$ + 100 $\mu\text{m}$ x L) L = measuring length in meters
Distance between sensor and magnetic tape	correct distance is guaranteed by guidance
Sensor housing material	aluminum
Sensor housing dimension L x W x H	247 x 54 x 27 mm
Necessary magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	130 m
Connection	M12 circular plug, RJ45-plug connector
Sensor cable	3 m standard-cable length, others on request, drag chain compliant
Weight	approx. 320 g without cable, cable approx. 60 g per meter

### Electrical Data

Power supply	10 ... 30 VDC
Current consumption	max. 0.2 A
Interfaces	CAN, CANopen (DS406, DS417), RS422, SSI, others on request
Resolution	up to 0.0625 mm (optional 0.05 mm)
Travel speed	max. 4 m/s

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C / -25 ... +85 °C on request
Humidity	max. 95 %, non-condensing
Protection class	IP54, IP67 on request

Updated data can be found on [www.elgo.de](http://www.elgo.de)

# LIMAX02

## TOP-FEATURES

- Absolute detection of the car position up to 260 m
- For travel speeds up to 10 m/s
- High accuracy and reproducibility
- Compatible with many common controls with an absolute encoder interface, such as RS232, RS422, RS485 (on request), CAN, CANopen, SSI
- Extremely robust system resistant to dirt and smoke



LIMAX02 detects the absolute car position up to a hoisting height of 260 meters and is designed for speeds of up to 10 m/s.

Thanks to the robust magnetic tape technology, the measurements are not affected by dust, dirt and moisture. Additionally, smoke and high temperatures do not affect measurement quality, making LIMAX02 also ideally suited for use in firefighters' elevators.

LIMAX02 comes with various interfaces and thus can be directly connected to the most common elevator controls.

## The LIMAX series

Assembly – easy and flexible

Assembly of the LIMAX system components is very easy and can be performed by assembly specialists in less than an 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. With the guided LIMAX systems, the magnetic tape is freely suspended along the entire shaft. The sensor is mounted to the car through the use of a mounting bracket. The guided tape system integrated in the sensor housing ensures the correct distance between the magnetic tape and reading head at all times.

## Technical Data

### Mechanical Data

Measuring principle	absolute
System accuracy in $\mu\text{m}$ at 20 °C	+/(1000 $\mu\text{m}$ + 100 $\mu\text{m}$ x L) L = measuring length in meters
Distance between sensor and magnetic tape	correct distance is guaranteed by guidance
Sensor housing material	aluminum
Sensor housing dimensions L x W x H	246 x 55 x 55 mm
Necessary magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	260 m
Connection	open cable end, optional plug
Sensor cable	3 m standard-cable length, others on request, drag chain compliant
Weight	approx. 460 g without cable, cable: approx. 60 g per meter

### Electrical Data

Power supply	10 ... 30 VDC
Current consumption	max. 0.2 A
Interfaces	SSI, CAN, CANopen (DS406, DS417), RS422, RS232, RS485 on request
Resolution	up to 0.0625 mm (optional 0.05 mm)
Travel speed	max. 10 m/s

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C -25 ... +85 °C on request
Humidity	max. 95 %, non-condensing
Protection class	IP50, higher on request

Updated data can be found on [www.elgo.de](http://www.elgo.de)

# LIMAX22 DUE

## TOP-FEATURES

- Absolute position detection up to 260 m
- For travel speeds up to 10 m/s
- Redundant detection of the car position through double sensor
- Extensive interface range: RS232, RS422, RS485 (on request), SSI, CAN, CANopen (DS406, DS417)
- Extremely robust system resistant to dirt, dust and smoke



LIMAX22 DUE is an absolute magnetic measuring system that offers redundant detection of the car's absolute position in the elevator shaft. The sensor housing contains two mutually independent sensors, both of which have the same function. The functionality of both sensors is recorded and monitored by the elevator system's master control. With this technology, safety is doubled in such a manner that, in case of failure of one sensor, the other sensor is able to ensure continued operation of the elevator.

## The LIMAX series

Suitable for every elevator configuration

The assembly of the LIMAX system components can be optimized to the particular circumstances of any elevator shaft. Using the guided systems, the magnetic tape can either be mounted to one of the elevator guiding rails using crossbeams, in the shaft head on a support bar, or directly to the ceiling by screw anchors. The sensor is mounted on the car ceiling or in the car frame using a mounting bracket. Each particular situation can be taken into account flexibly. LIMAX is thus suitable for installation for any elevator configuration as well as for modernizations and retrofits.

## Technical Data

### Mechanical Data

Measuring principle	absolute
System accuracy in $\mu\text{m}$ at 20 °C	+/- (1000 $\mu\text{m}$ + 100 $\mu\text{m}$ x L) L = measuring length in meters
Distance between sensor and magnetic tape	correct distance is guaranteed by guidance
Sensor housing material	aluminum
Sensor housing dimensions L x W x H	290 x 55 x 55 mm
Necessary magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	260 m
Connection	open cable end, optional plug
Sensor cable	3 m standard-cable length, others on request, drag chain compliant
Weight	approx. 550 g without cable, cable: approx. 60 g per meter

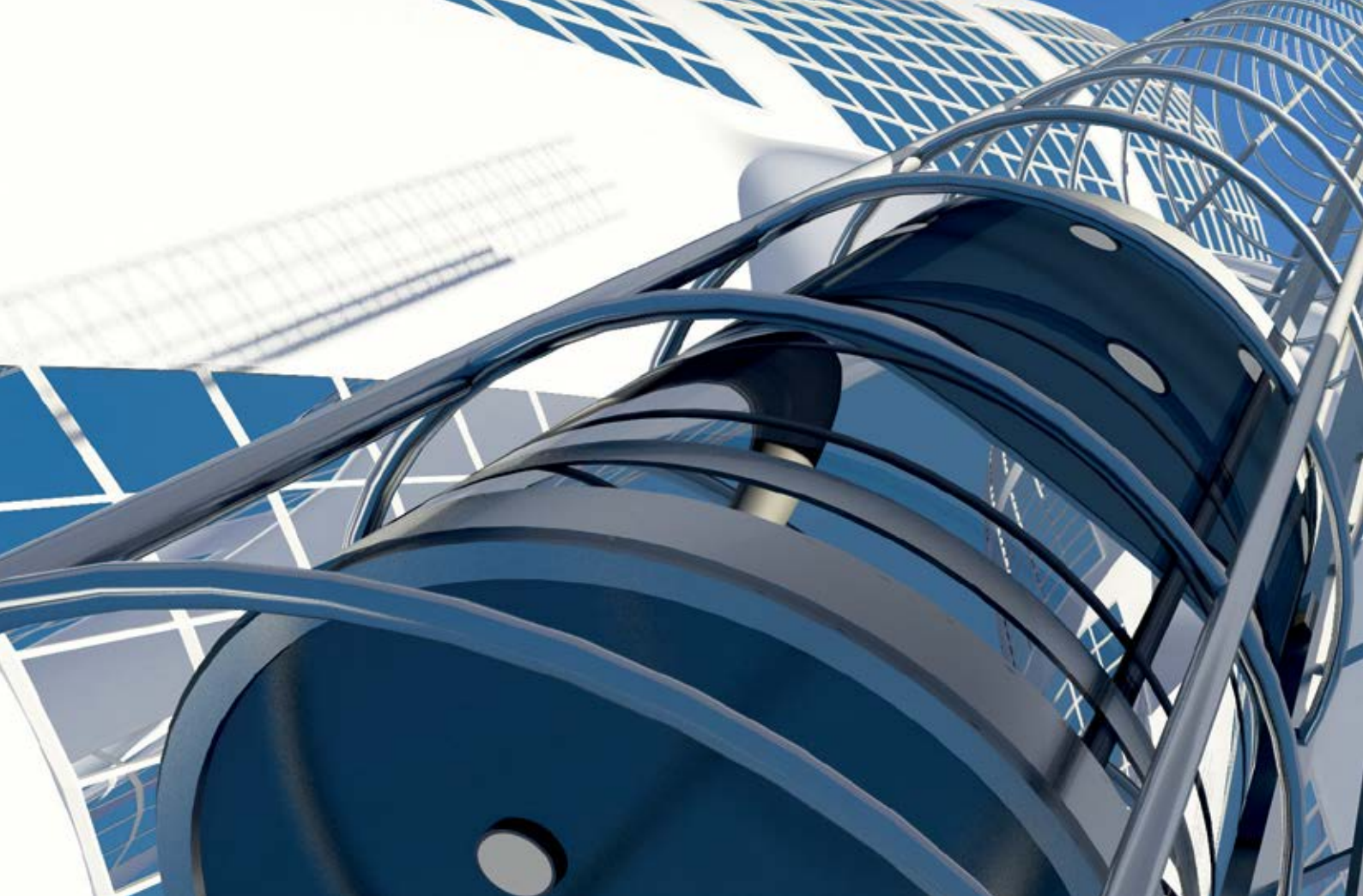
### Electrical Data

Power supply	10 ... 30 VDC
Current consumption	max. 0.2 A
Interfaces	SSI, CAN, CANopen (DS406, DS417 optional), RS422, RS232, RS485 on request
Resolution	up to 0.0625 mm (optional 0.05 mm)
Travel speed	max. 10 m/s

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C -25 ... +85 °C on request
Humidity	max. 95 %, non-condensing
Protection class	IP50, higher on request

Updated data can be found on [www.elgo.de](http://www.elgo.de)



# LIMAXSAFE – Integrated

## Economic

- Safe position detection. Safety-relevant functions can be implemented in the software in combination with a safe elevator control or with an electronic evaluation unit
- Considerably reduces the number of individual components and subsystems in the elevator shaft
- Saves time during assembly and maintenance

## Reliable

- Robust structure
- High accuracy and reproducibility
- Excellent measurement quality even in case of dust, dense smoke and moisture
- Long, maintenance-free service life

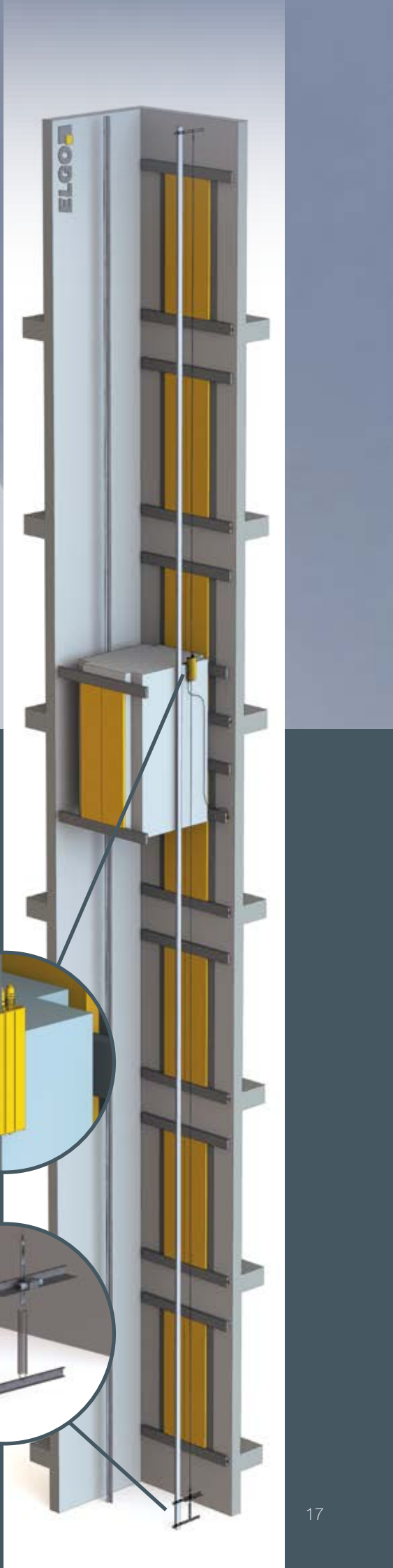
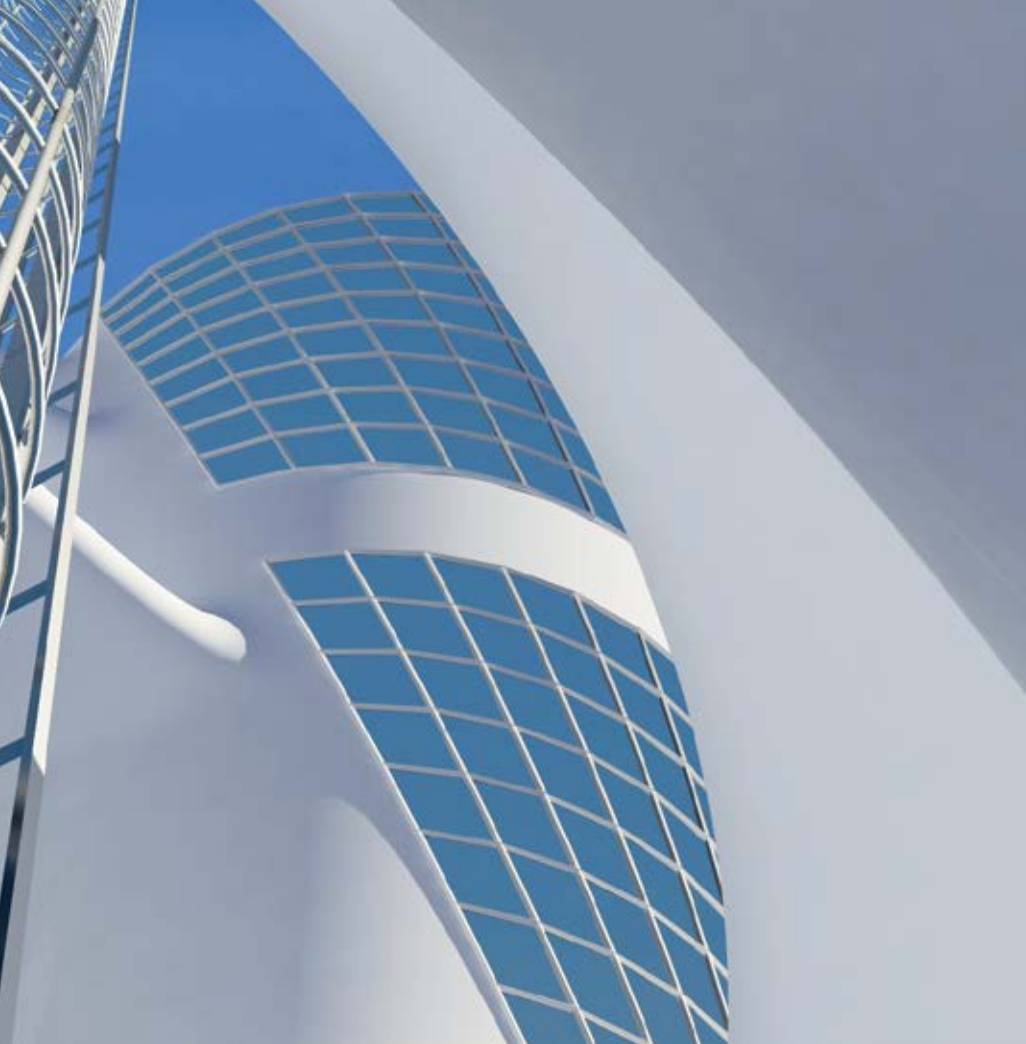
## Safe

- Direct and absolute detection of exact car position
- Ensures safety thanks to completely redundant system architecture
- Enables integration of safety features in the software, such as speed limit, end switch, door-bridging (releveling, pre-opening doors etc.), triggering of electro-mechanically activated safety brake
- SIL3 type-examination tested (EU)

## Easy, quick assembly

- Complete system from a single source
- No installation, wiring and adjustment of various switches and light barriers necessary
- Simplified troubleshooting





# safety

To satisfy functional safety requirements, the LIMAX absolute car position measurement sensors – from the LIMAX33 RED series onwards – are fully redundant and thus can be used for safety-related applications up to SIL3. Therefore, safety-relevant switching and control functions that depend on the position and the speed of the car can be implemented in the software. Depending on the control system concept on site, the secured position is provided to a safe elevator control via interface signal or forwarded to an external electronic evaluation unit such as the Safe Box where the switching and control functions are integrated in the form of relay contacts and which is, inter alia, integrated in the safety circuit of the elevator.

LIMAX Safe Systems are available for hoisting heights of up to 1,500 meters and travel speeds of up to 18 m/s, and are suitable both for new installations of standard manufactured elevators and the modernization and retrofitting of existing elevator systems.

# LIMAX33 RED

## TOP-FEATURES

- Safe detection of the absolute car position up to 260 m
- For travel speeds up to 10 m/s
- In combination with a safe elevator control/evaluation unit, safety functions can be fulfilled up to SIL3
- Door zone display for up to 128 floors
- RS485 interface as standard, optional CANopen Safety and other secure interfaces
- Resistant to dirt, smoke and moisture
- Certified magnetic tape assembly kit with tape presence control (acc. to EN61508)
- SIL3 type-examination tested (EU)



# Shaft Information and Safety System

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

LIMAX33 RED is a SIL3 certified absolute measurement system that detects the car's absolute position in the shaft in a self-monitoring way. In order to satisfy functional safety requirements, reader electronics are fully redundant. The housing contains two channels which are checked for their functionality by a monitoring system integrated into the sensor. This ensures that the position values as well as any possible system errors are reliably detected. In case of the failure of one sensor channel, LIMAX33 RED reports the error to the master control. The sensor is designed to be used as a safe sensor along with a safe evaluation unit (see SAFE Box: LIMAX34 Safe) or directly with a safe elevator control. Used together, the system performs elevator safety functions.

## The LIMAX series

### Easy assembly

The certified mounting kit S-RMS makes the tape assembly very easy and straight forward. The tape presence detector in the complete system ensures that the tape is in its correct position at all times. The tape presence detector has a contact system which opens the safety circuit if the magnetic tape is not in the proper position. It thus serves to ensure that the magnetic tape is in the intended position and remains there, as various safety functions depend on the position derived from it.

## Technical Data

### Mechanical Data

Measuring principle	absolute
System accuracy in $\mu\text{m}$ at 20 °C	+/- (1000 $\mu\text{m}$ + 100 $\mu\text{m}$ x L) L = measuring length in meters
Distance between sensor and magnetic tape	correct distance is guaranteed by guidance
Sensor housing material	aluminum
Sensor housing dimensions L x W x H	355 x 85 x 48 mm
Necessary magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	260 m
Connection	M12 circular plug 5 pole, others on request
Sensor cable	2 m, 3.2 m, 5 m standard- cable length, others on request, drag chain compliant
Weight	approx. 900 g without cable, cable: approx. 60 g per meter

### Electrical Data

Power supply	18 ... 29 VDC (stabilized) in dual-channel operation, 10 ... 18 VDC (stabilized) in single-channel operation
Current consumption	max. 0.6 A
Interfaces	RS485, others on request
Resolution	up to 0.0625 mm (optional 0.05 mm)
Travel speed	max. 10 m/s

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C -25 ... +85 °C on request
Humidity	max. 95 %, non-condensing
Protection class	IP54, higher on request

Updated data can be found on [www.elgo.de](http://www.elgo.de)

# LIMAX44 RED

## TOP-FEATURES

- Safe, absolute position detection up to 1,500 m
- For travel speeds up to 18 m/s
- Unguided, completely noiseless technology
- In combination with a safe elevator control/processing unit, safety functions can be fulfilled (see SAFE BOX: LIMAX44 SAFE)
- In combination with ELGO floor sensors, building compression can be counterbalanced.
- Simplified assembly for high-rise buildings, no assembly clips required
- SIL3 type-examination tested (EU) (customer-specific options)



# Shaft Information and Safety System

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

LIMAX44 RED is designed specifically for the requirements of particularly high elevator systems and is used in the tallest buildings in the world. 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 counterbalanced via a master control/evaluation unit.

In contrast to the freely suspended and guided LIMAX systems, the self-adhesive magnetic tape is directly attached 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, LIMAX44 RED works without any noise even at high speeds. Because the system is completely non-contact, it is not subject to wear and tear and thus has a virtually infinite service life. Depending on the magnetic tape used, the max. allowed distance between sensor and tape ranges up to 12 mm.

The sensor is designed to be used as a safe sensor along with a safe evaluation unit (see Safe Box: LIMAX44 SAFE) or directly with a safe elevator control. Together, the system performs safety-relevant functions.

## Technical Data

### Mechanical Data

Measuring principle	absolute
System accuracy in $\mu\text{m}$ at 20 °C	+/- (1000 mm + 100 $\mu\text{m}$ x L) L = measuring length in meters
Distance between sensor and magnetic tape	9 mm, 12 mm (depends on type of magnetic tape)
Sensor housing material	aluminum
Sensor housing dimensions L x W x H	475 x 78 x 35 mm
Necessary magnetic tape	AB20-120-10-1-R1-C-16A-4943F, AB20-120-20-1-R1-C-16A-4943F
Max. measuring length	768 m / 1500 m (depending on type of magnetic tape)
Connection	M12 circular plug 5 pole, others on request
Sensor cable	2 m, 3.2 m, 5 m standard- cable length, others on request, drag chain compliant
Weight	approx. 900 g without cable, cable: approx. 60 g per meter

### Electrical Data

Power supply	10 ... 30 VDC
Current consumption	max. 0.6 A
Interfaces	RS485, others on request
Resolution	1 mm, others on request
Travel speed	max. 18 m/s

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C -25 ... +85 °C on request
Humidity	max. 95 %, non-condensing
Protection class	IP54, higher on request

Updated data can be found on [www.elgo.de](http://www.elgo.de)

# SAFE BOX

## LIMAX34 SAFE | LIMAX44 SAFE

### TOP-FEATURES

- Safety monitoring for elevators
- Electronic evaluation unit in which safety-relevant switching and control functions are implemented
- Up to 4 pairs of safety relays for safety-relevant switching and control functions
- Safety functions: ETSL delay control, end positions, door zones, safety brake release
- Flexibility in the adaptation and expansion of the implemented switching and safety functions
- Up to 29 safety inputs, 8 outputs
- 2 safety circuit inputs (110 V, 220 VAC, or 48 VDC)
- DS406 or DS417 CAN interface for parameter setting or car position transmission, optional SIL3 CAN interface possible
- Customer-specific software can be implemented
- SIL3 type-examination tested (EU) (customer-specific options)



### LIMAX34 SAFE

SAFE BOX + LIMAX33 RED  
Safe measurement of the absolute car position up to 260 m | 10 m/s



### LIMAX44 SAFE

SAFE BOX + LIMAX44 RED  
Safe measurement of the absolute car position up to 1,500 m | 18 m/s

The SAFE BOX is a function and monitoring component which ensures numerous safety-relevant requirements in the elevator shaft in combination with the LIMAX33 RED and LIMAX44 RED safe position sensors.

The SAFE BOX evaluates the safe position information retrieved from LIMAX33 RED/ LIMAX44 RED, calculates speed and acceleration and autonomously triggers necessary steps via safety relays to ensure the safe operation of the elevator. In case of failure, this means the opening of a safety circuit and/or the release of the safety brake. As a total system, LIMAX34 SAFE/LIMAX44 SAFE virtually replaces all safety-relevant switches, light barriers and related systems in the shaft. The elimination of these conventional shaft monitoring components results in considerable saving potential in the elevator shaft.

The Safe Box is connected to the elevator control via a CAN interface and can be installed on the car roof or in the engine room.

## LIMAX SAFE

### Safety in the elevator shaft

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

- Safe signal output at the shaft end
- Delay control, also relative to the distance to the shaft end
- Door overbridging with readjustments and for premature opening of the doors when entering the floor
- Recognition of departure with open doors
- Stopping at overspeed and release of the safety brake (optional)
- Ensuring protective areas with reduced shaft heads / shaft pits (EN81-21)

## Technical Data SAFE BOX

### Mechanical Data

Housing material	aluminum
Housing dimensions L x W x H	SAFE BOX L: 220 x 134 x 97 mm SAFE BOX XL: 220 x 134 x 134 mm
Cable length	1.5 m standard-cable length
Weight	SAFE BOX L: approx. 1,640 g SAFE BOX XL: approx. 1,800 g each without cable

### Electrical Data

Power supply	24 VDC, +20 %/-25 %
Current consumption	SAFE BOX L: max. 400 mA SAFE BOX XL: max. 500 mA
Interfaces	RS485, others on request
Number of safe inputs	SAFE BOX L: 7 SAFE BOX XL: 21 + 8
Number of outputs	SAFE BOX XL: 8
Number of safety circuit inputs	2 (110 V, 220 VAC or 48 VDC)

### Safety Relais

Voltage	230 VAC / 110 VAC / 24 VDC
Current consumption	max. 2 A
Quantity	4

### Connection Sensor

Power supply	24 VDC
Interface	RS485

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C -25 ... +85 °C on request
Humidity	max. 95 %, non-condensing
Protection class	IP54, higher on request

Updated data can be found on [www.elgo.de](http://www.elgo.de)

# LIMAX33 CP

## TOP-FEATURES

- Safe and absolute position detection up to 260 m and safety-relevant switching and control functions in one housing
- Up to 3 pairs of safety relays
- Up to 13 safe inputs for SIL3 compliant controller transfer
- Floor sensor possible (optional)
- CANopen interface (DS406) for car position and parameter transfer, other secure interfaces possible
- Scalable functional safety architecture (e.g. solution for EN81-A3 functionality with 2 safety relays)
- Advantages of magnetic tape technology (resistant to dirt and smoke, quick assembly)
- SIL3 type-examination tested (EU) (customer-specific options)





# Shaft Information and Safety System

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

LIMAX33 SAFE CP is the first system on the market which combines all of the functions of LIMAX34 SAFE (such as shaft information and safety functions) in one housing, thereby contributing to a further reduction of components in the elevator shaft. The position sensor detects the current absolute car position. This position information is processed internally; speed and acceleration of the elevator are calculated from the unit, and implemented via safety relays in the corresponding switching functions. Via up to 13 safe inputs, additional status signals of the elevator can be detected. In case of overspeed or other errors, the safety circuit will be opened and/or the safety brake released. In addition, the sensor includes a push-pull output, which is switched within the door zones of the stored floor positions in order to facilitate car evacuation from the shaft area in case of an emergency.

## LIMAX SAFE

### Saving potential

LIMAX SAFE – safe shaft information and control systems can replace – among other things – the following safety-relevant electromechanical switches, light barriers and related systems in the shaft:

- Speed limit systems at the end of the shaft
- Floor magnets and switches
- Safety limit and inspection limit switches
- Mechanical speed limiter
- Reduced heights of shaft pits or shaft heads (EN81-21)

## Technical Data

### Mechanical Data

Measuring principle	absolute
System accuracy in $\mu\text{m}$ at 20 °C	+/- (1000 mm + 100 $\mu\text{m}$ x L) L = measuring length in meters
Distance between sensor and magnetic tape	correct distance is guaranteed by guidance
Sensor housing material	aluminum
Sensor housing dimensions L x W x H	354 x 136 x 54 mm
Necessary magnetic tape	AB20-80-10-1-R-D-15-BK80
Max. measuring length	260 m
Connection	M12 circular plug 5 pole, others on request
Sensor cable	3 m standard cable length, others on request, drag chain compliant
Weight	1,384 g without cable

### Electrical Data

Power supply	18 ... 29 VDC (stabilized)
Current consumption	max. 0.6 A
Interfaces	CAN, CANopen (DS406, DS417 on request), others on request
Resolution	up to 0.0625 mm (optional 0.05 mm)
Travel speed	max. 10 m/s
Number of safe inputs	5, +8 optional
Number of safety circuit inputs	1 (110 V, 220 VAC or 48 VDC)

### Safety Relais

Voltage	230 VAC / 110 VAC
Current consumption	max. 2 A
Quantity	1 - 3 (110 V, 220 VAC or 48 VDC), others on request

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C -25 ... +85 °C on request
Humidity	max. 95 %, non-condensing
Protection class	IP54, higher on request

Updated data can be found on [www.elgo.de](http://www.elgo.de)

# Floor sensors & floor magnets

## TOP-FEATURES

- Precise detection of door zones
- Automatic teach-in process possible
- Simple and space-saving magnets
- Resistant to dirt, moisture and smoke
- IP67 high protection class



## Floor sensors

for additional shaft information

Floor sensors and magnets are used for accurate detection of the floor door zones. The magnets are mounted on the floor door thresholds or to the shaft wall and the floor sensor to the car. During the test drive, the elevator automatically detects the exact position and transmits the information to the elevator control. The fine manual adjustment of individual floors can thus be eliminated.

Tall 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 positional deviation is immediately transmitted to the elevator control. This adjusts the changed ground level of the floor. This guarantees the precise alignment of the car to the floor.

## Technical Data

### Mechanical Data

Distance between sensor and storey magnet	3 ... 25 mm
Lateral guiding tolerance	+/- 0.5 mm
Sensor housing material	zinc die casting
Dimensions L x W x H	sensor: 50 x 24 x 26 mm magnet: 30 x 30 x 6 mm
Connection	open cable ends
Weight	approx. 40 g without cable, cable approx. 60 g per meter

### Electrical Data

Power supply	12 VDC, +/-20 %
Output current	max. 40 mA
Output level	LOW-active, push/pull, short-circuit-proof
Sensor cable	5 m standard cable length, others on request, drag chain compliant

### Environmental Condition

Storage temperature	-25 ... +85 °C
Operation temperature	-10 ... +70 °C -25 ... +85 °C on request
Protection class	IP67 (waterproof version)

Updated data can be found on [www.elgo.de](http://www.elgo.de)



# Magnetic 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 up to 1,500 meters with a measurement accuracy of +/- 0.5 mm.


The magnetic tapes consist of a magnetized plastic tape which is connected to a magnetically conductive, flexible steel tape on the bottom side. The steel tape protects the

plastic tape from mechanical influences and simultaneously 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 packaging has been exclusively developed for elevator areas, and the magnetic tape can easily be rolled off.

**A** Magnetic plastic tape  
(magnetic tape)



**B** Magnetic conductive stainless  
steel tape (support tape)

## Technical Data

Mechanical Data			
	Magnetic tape AB20-80-10-1-R-D-15-BK80 Suitable for sensors: LIMAX02 M, LIMAX 02, LIMAX22 DUE, LIMAX33 RED	Magnetic tape AB20-120-10-1-R1-C-16A 4943F Suitable for sensor: LIMAX44 RED	Magnetic tape AB20-120-20-1-R1-C-16A-4943F Suitable for sensor: LIMAX44 RED
Type	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	12 mm	12 mm
Tape construction	Magnetic tape on stainless steel tape	Magnetic tape on stainless steel 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)	2,45 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, $\Delta \vartheta [K]$ = relative change of temperature		
Coefficient of extension	$\alpha \approx 16 \times 10^{-6} 1/K$	$\alpha \approx 11 \times 10^{-6} 1/K$	$\alpha \approx 11 \times 10^{-6} 1/K$
Available lengths	max. 262 m per role	max. 285 m per role, segmented thereafter	max. 285 m per role, segmented thereafter
Environmental Condition			
Storage temperature	-40 ... +85 °C	-10 ... +60 °C	-10 ... +60 °C
Operation temperature	-20 ... +70 °C	-10 ... +60 °C	-10 ... +60 °C
Humidity	max. 95%, non-condensing		
Protection class	carrier tape stainless steel	carrier tape steel	carrier tape steel

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# Assembly

## easy and flexible

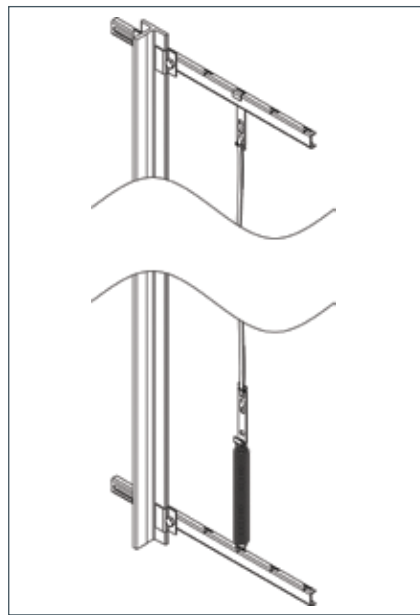
The assembly of the LIMAX system components is very easy and can be performed by assembly specialists in less than an hour – almost without any tools. All parts required for installation are included in the various LIMAX assembly kits. The kits facilitate assembly and prevent errors in alignment and tape pre-tension.

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 guiding attached to the sensor guarantees the correct distance between magnetic tape and reading head at all times.

### Assembly sets for magnetic tape

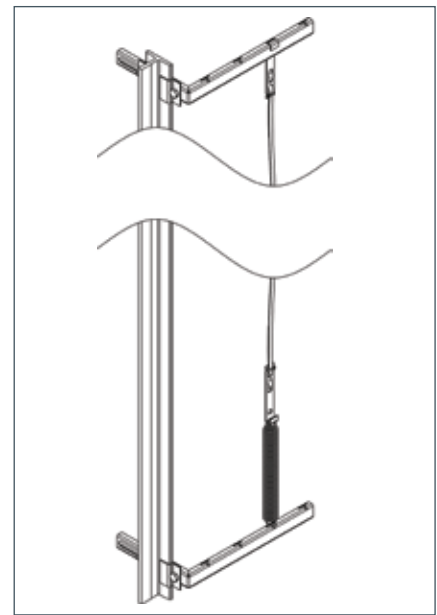
#### LIMAX RMS

for centrally guided car



#### LIMAX RMS 90

angled for backpack car guiding



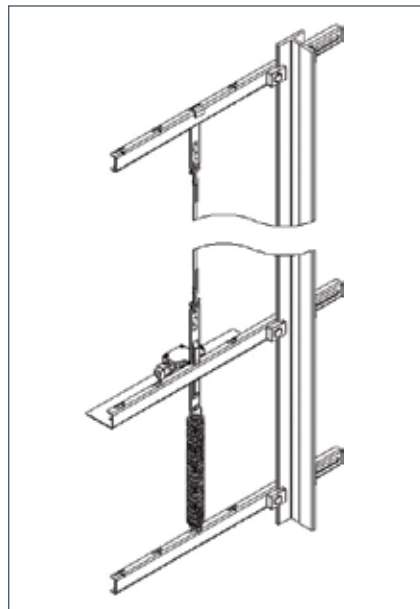
#### LIMAX MKF

Screw anchor assembly



#### LIMAX S-RMS

with safety position switch  
(tape presence detector)

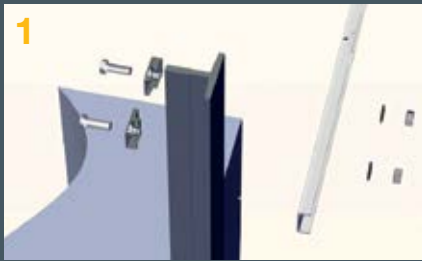


#### LIMAX S-RMS 160

Position switch with tension weight



## Magnetic tape assembly LIMAX S-RMS



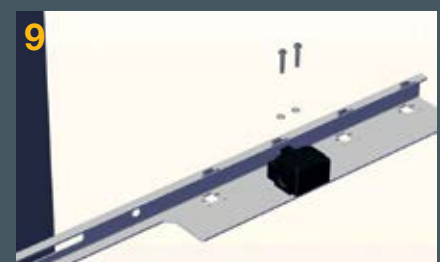
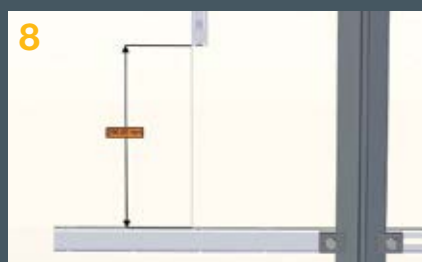
1 A cross beam is mounted at the upper end of the shaft on the elevator guiding rail.



3 The magnetic tape is inserted in the tape suspension.

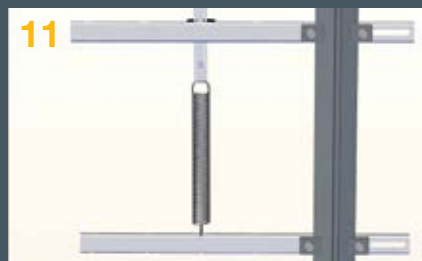
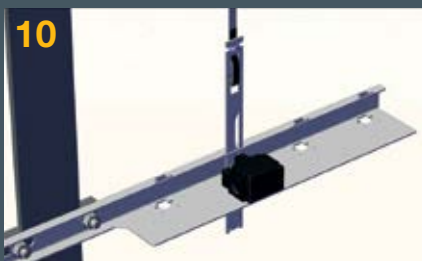


4 Standing on the car roof, the magnetic tape is rolled out during the ride down and inserted at the lower end in the tape suspension.



7 Another cross beam is attached in the shaft pit.

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



10 The tape suspension is hooked on the tension spring.

## Sensor assembly



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



DONE

# CLIMAX





# ↳ Inside





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