Elevator Solutions

Dedicated drives and motors technology that is easy to select, set-up and optimize while providing class-leading ride comfort

Control Techniques™

Leroy-Somer™

EMERSON™
Industrial Automation

Emerson Industrial Automation – the market leader in dedicated elevator drive and motor technology

Emerson Industrial Automation is a leader in the provision of drive and motor technology to the elevator industry, with over 3 million elevators in operation with our control equipment worldwide. Backed by our global network of Automation Centers we provide local expertise and support, along with quick delivery of robust and dependable products.

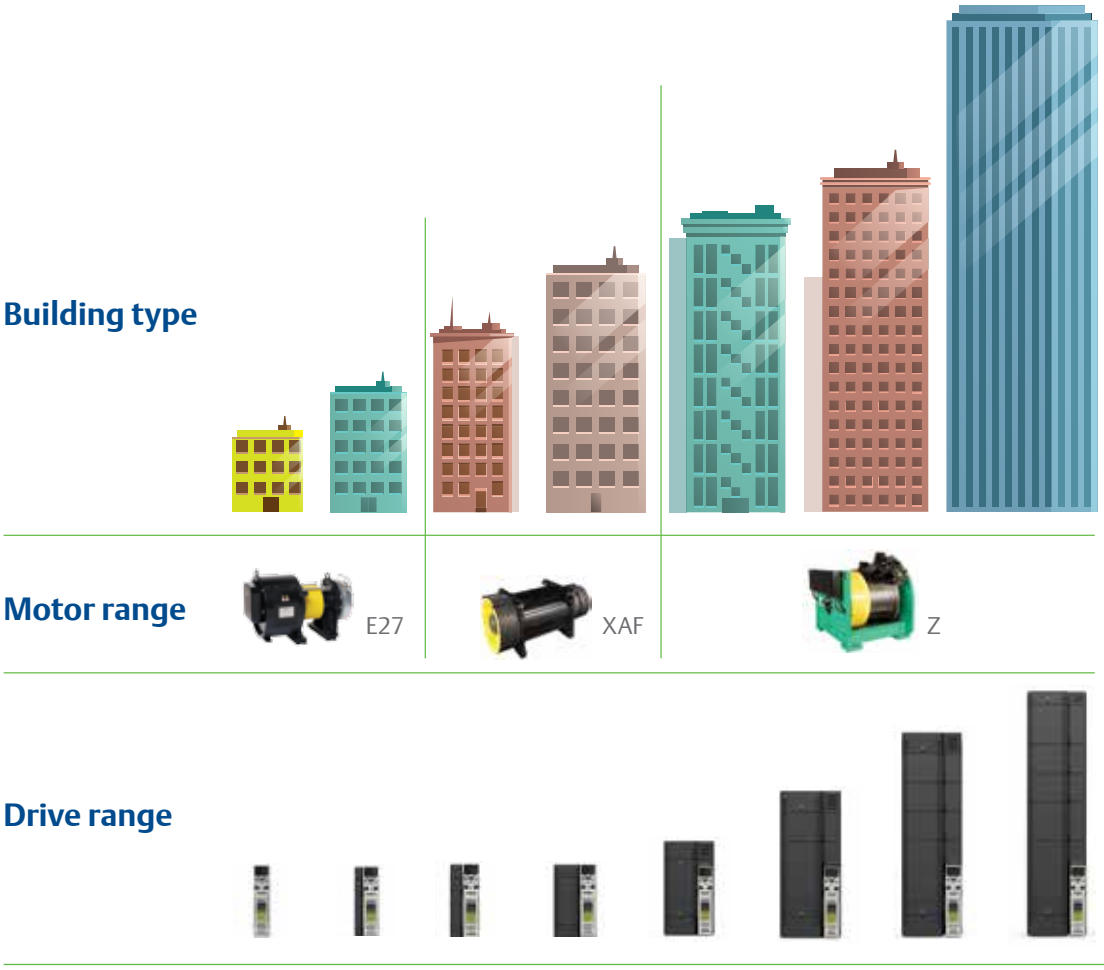
With solutions available for all sizes and types of building, whether for new or modernization projects, our dedicated drives and motors make installing and commissioning elevator systems simpler and therefore quicker. Intuitive user interfaces and software tools for adjusting parameters, enabling functions and system optimization, save valuable site time. Our solutions provide improved energy efficiency and dependable operation throughout the service life of an elevator system.

Smooth, reliable and quiet operation means that our drives and motors have become the products of choice for modern elevator systems. We have an extensive portfolio of applications based on numerous partnerships with leading system providers in the elevator industry. Our reputation for industry leading ride comfort is second to none.

Over 40 Automation Centers Globally

Drive and motor solutions to match all elevator requirements

We can provide a dedicated elevator package that includes matched drives, motors and options for any size of building, from residential to high rise. Our drive and motor combinations are easy to select, install and set-up, while being designed and rated to give optimum performance, regardless of traffic requirements or installation preference. Ultra-high speed and smooth control provides a high quality, low noise and industry leading jerk-free ride.



Typical application examples

Motor	Cabin load (kg)	Speed (m/s)	Drive
E 27	450 to 1,000	1.0 to 1.6	E300
XAF	1,000 to 2,500	1.0 to 2.5	E300
Z	1,250 to 5,000	1.0 to 5.0	E300

Roping 2:1 - Travel 30m - Counterweight ratio: 50% - Grid Voltage: 400V - Single Wrap - No rope compensation

Simple drive and motor selection software tools

We provide easy-to-use software tools to help select the correct drive and motor package to meet your elevator system specification.

Taking elevator drives to another level

1. Simple selection

Product range

Full range of drives & gearless motors to cover all building sizes (residential to high rise)

Up to 5,000 kg & 5 m/s

E27 motor

- Central sheave allows for simpler and lighter mounting support
- Optimized for 6/6.5 mm steel ropes and plastic coated ropes
- Brake management & rescue with Braking Control Unit

Fully flexible control interface

- Analog speed reference
- Digital I/O control
- Comms control
- Digital communications control - CANopen & Ethernet

Intelligent thermal model

Provides:

- Advanced forced cooling control
- Increased drive lifetime through IGBT control
- Elimination of nuisance trips during overload operation

Encoder range

Flexible encoder interface supporting 15 different encoder types without the need for additional interface cards. Includes Incremental, SinCos, SSI, EnDat and Hiperface

2. Quick set-up

Lightweight chassis construction

For easier handling and installation of drives and motors

Shielded motor cables

- Available in a range of lengths to suit your application
- Fast connectors for power supply to motor, brakes, encoder and thermal sensor (E27 motor)

Pluggable drive terminals

All control wiring terminals are pluggable and biased to ensure correct connection

Power terminals are pluggable up to 22 kW

Flexible drive mounting options

To ensure optimization of enclosure space

Easy system set-up

Full access to the sheave and traction ropes

All leads (power, thermal sensor, encoder and brakes) can be connected once the mechanical installation is completed with no risk of damage (E27 motor)

throughout the lifetime of your application

3. Easy optimization

Elevator specific menu structure

For quick access to make the adjustments required without needing to refer to the documentation

Static autotune

For encoder offset detection and optimum current loop configuration without the need to lift the brake or de-rope the system

Parameter storage & cloning with SD cards

Backed-up drive configuration values can be simply & quickly installed

PC tools

Advanced graphic interface to make fine-tuning your elevator system a quick and simple process

4. Class leading performance and maintenance support

Diagnostics

- Trip codes fully enumerated for ease of diagnostics
- Last 10 trip codes recorded within the drive to aid trouble shooting
- Time and date stamp option with Local Remote keypad

Quiet operation

High switching frequencies and intelligent thermal management mean near silent operation is achievable. Cooling fans only operate when the power circuits require additional cooling

Flight recorder

All drives have a built in data logger that acts as a flight recorder and can monitor any parameter. User configurable, for example can be set to speed reference, speed feedback, load and I/O status. In the event of a drive trip or user input these values are recorded. Time and date stamping are provided with the Local Remote keypad fitted

These files can be written to an onboard SD card or retrieved by the lift controller if a communications link is connected

Sleep mode

To optimize energy consumption, sleep mode can be initiated either from the elevator controller or via an internal function during quiet traffic periods. This can be configured to turn off non-essential circuits within the drive to minimize standby current consumption

Blocked cabin release function

This assists in releasing a blocked cabin after the emergency brakes have been deployed, negating the need for human entrance into the shaft

Innovative technology that delivers solutions to simplify your installation

Designed together, our complete package is easy to integrate with a range of expansion and communication options to meet specific application requirements and to optimize performance. Control Techniques and Leroy-Somer continually work with elevator industry user groups and legislators to bring proven technology and innovative features that continue to drive safety, efficiency and value.

The advantages of contactorless operation

A full Emerson solution provides contactorless operation in elevator applications, bringing with it many advantages.

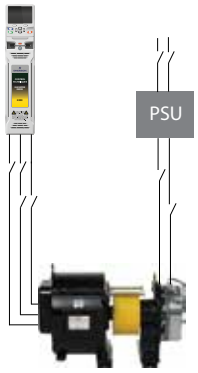
The Safe Torque Off (STO) function of our elevator drives provides a highly dependable method for preventing the motor from being driven, removing the need for both output motor contactors.

Our Brake Control Unit (BCU) removes the need for an external power supply unit (PSU) and power cut-off, along with brake contactors and relay.

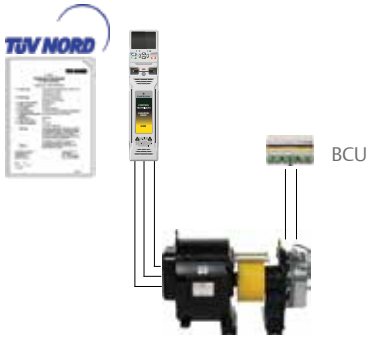
This enables:

- Compliance with EN81-20
- Reduced EMC issues
- Reduced acoustic noise
- Minimized cabinet space
- Lower system costs
- Improved system reliability

Traditional EN81-20 system



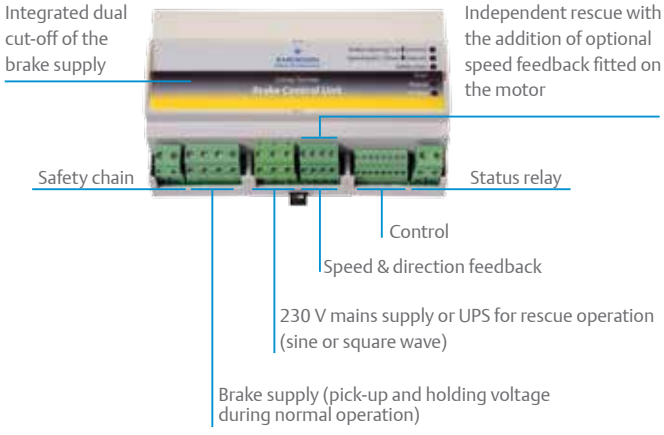
Solution using E200/E300 and Brake Control Unit



Benefits of incorporating our Brake Control Unit into your system

The following functions of the elevator system can be controlled by the BCU:

- Brake management
- Rescue operation
- Testing of the brakes with Brake Test Module (BTM)



Simplicity of dealing with a single supplier

Along with all the technical benefits of having a full package, there is also the practicality of having a single supplier. This includes:

- A single point of contact and purchase order, to reduce admin costs
- Quick standard lead-times for all components and consolidated shipments for specific projects
- Local round-the-clock technical and maintenance support for all Emerson elevator system components
- Assured product quality throughout the system, for reliable & optimized performance
- Customized training, onsite if required, to ensure your teams maximize the functionality of our products
- Constant analysis of product quality and delivery performance to ensure customer satisfaction

Drive features and benefits

Rapid set-up and adjustment

- Simple and intuitive parameter adjustment via a bright back-lit LCD keypad
- Set-up in familiar elevator language and units
- Top level menu; all your frequently needed functions in one location
- No de-roping for encoder phasing test, no need to rotate motor

Optimum ride comfort

- Direct-to-floor positioning
- Peak curve operation
- High resolution multi-step S-ramp for start, run, slowdown and stopping
- Ultra-fast current loop for vibration free motor control
- Advanced brake control management, no rollback on starting without the need of load sensor
- Mechanical brake control with optimum start sequencing for smoothest car movement

Silent operation

- No motor contactors required, advanced EN81-20 TÜV certified STO enable input
- High switching frequencies selectable up to 16 kHz
- Variable speed cooling fan

Energy efficient

- Standby sleep/wake mode, powers down unused circuitry during prolonged periods of standby
- Easy connection to a range of regenerative modules

Flexible integration

- Modbus RTU communications
- Parallel I/O interface
- +/- 10V analog reference control
- Direct RS485 comms control
- Tile mount for low profile shaft mounting
- 24 Vdc backup
- Simple UPS connection with load direction signal
- Dynamic braking transistor fitted to all drives as standard

Robust

- Active thermal management for tripless operation under extreme conditions
- Advanced power circuit design using latest IGBT technology
- Conformal coating for use in harsh environments
- Phase loss detection on both input and output

Enhanced elevator data logger

- User configurable, for example speed reference, speed feedback, current and I/O sequence can all be recorded for every car journey
- Can be stored in the event of system fault
- Available for offline viewing to aid system diagnostics

Keypad and menu structure

Easy to use menu structure for quick and simple access to key adjustments

Key features of E300 drive

Easy click-in keypad connection

Slot for Smartcard / SD Card Adaptor for parameter storage back-up of drive configuration values and cloning of parameters

Dedicated elevator keypad supplied as standard, providing:

- Easy-to-use menu and parameter structure
- Local and remote mounting
- Real-time clock

Terminal cover for DC bus, braking terminal and onboard EMC filter*

Power on / Drive status LED

RS485 communications port MODBUS RTU

Single screw removable cover

Aluminum chassis - allows flexible mounting, with high performance extruded heatsink

3 x System Integration (SI) module slots for communications, I/O, additional feedback devices and automation controllers

User-friendly power connections with removable terminals*

Pluggable control connections

Flexible dual port universal encoder interface supporting Incremental, SinCos, SSI, EnDat and Hiperface feedback types

Robust cable management system providing grounding point for shielded control and power cables

* Features and their locations vary on some drive sizes

CODESYS SIL3 RoHS Compliant N1652 E171230

Functional testing

The E300 and E200 drives have been extensively tested with a range of elevator motor and controller technologies at the UK National Lift Tower ensuring the highest level of performance can be achieved no matter how the elevator system is configured.

The National Lift Tower is an independent 127 m (418 ft) research and development facility located in Northampton, England. There are six lift shafts of varying heights and speeds, one of which is a high speed shaft with a travel of 100 m and a theoretical maximum speed of 10 m/s.

www.nationallifttower.co.uk

Drive ratings

400 V Drives

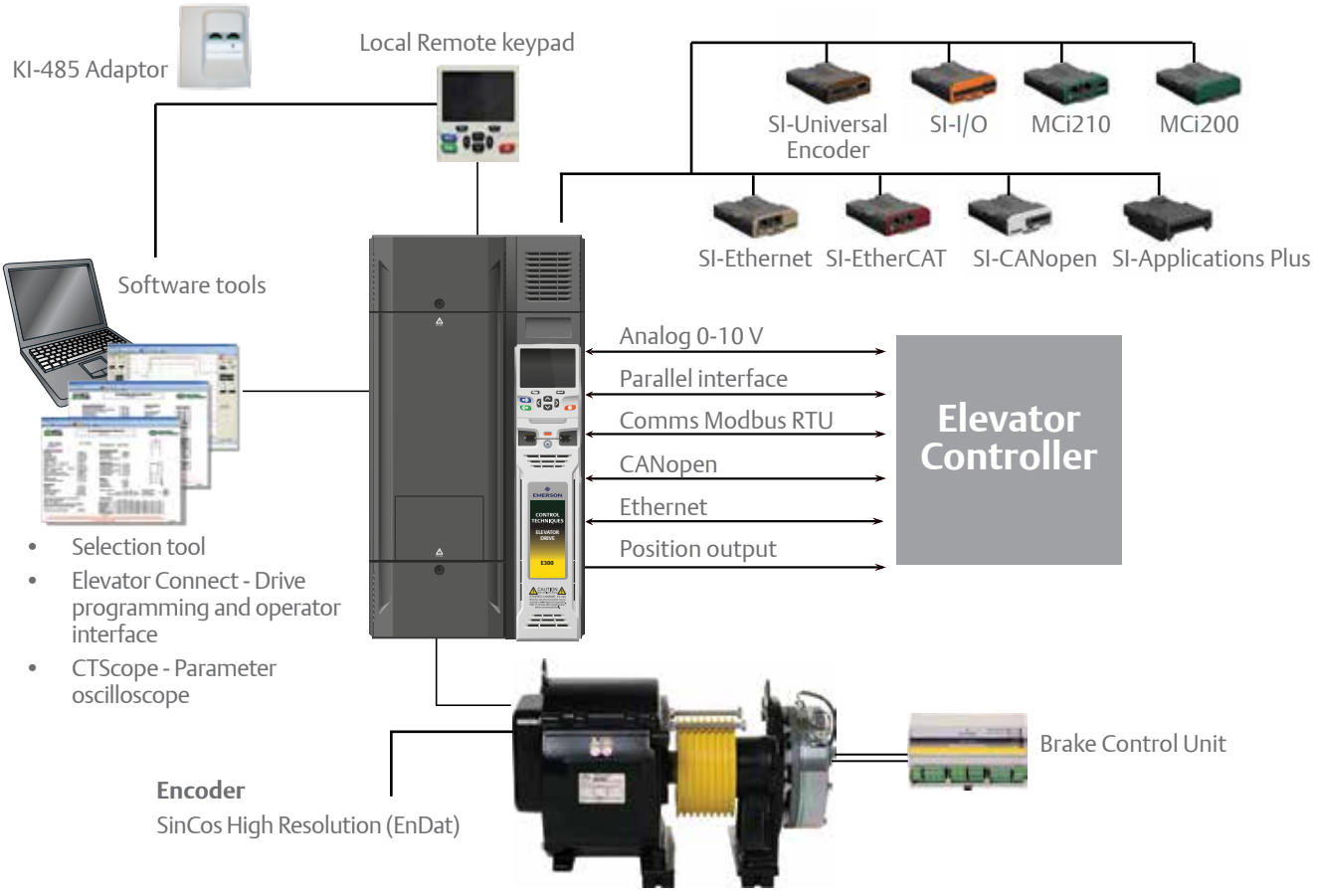
E300 E200		03400062A10	03400078A10	03400100A10	04400150A10	04400172A10	05400270A10	05400300A10	06400350A10	06400420A10	06400470A10	07400660A10	07400770A10	07401000A10	08401340A10	08401570A10	09402000A10	09402240A10	10402700E	10403200E
Peak current	A	12.4	15.6	20	30	34.4	54	60	70	84	94	132	154	200	268	314	400	448	540	640
Nominal current @ 40° C	A	6.2	7.8	10	15	17.2	27	30	35	42	47	66	77	100	134	157	200	224	270	320
Switching frequency	kHz	8 (Selectable 3 to 16 kHz @50 % ED)																		
Input voltage	V	3 phase 380 - 480 Vac, 50-60 Hz ± 10 %																		
Braking transistor		Built in as standard																		

200 V Drives

E300 E200		03200106A10	04200137A10	04200185A10	05200250A10	06200330A10	06200440A10	07200610A10	07200750A10	07200830A10	08201160A10	08201320A10	09201760A10	09202190A10	10202830A	10203000A
Peak current	A	21.2	27.4	37	50	66	88	122	150	166	232	264	352	438	566	600
Nominal current @ 40° C	A	10.6	13.7	18.5	25	33	44	61	75	83	116	132	176	219	283	300
Switching frequency	kHz	8 (Selectable 3 to 16 kHz @50 % ED)														
Input voltage	V	3 phase 200 to 240 Vac, 50-60 Hz ± 10 %														
Braking transistor		Built in as standard														

Further information from your supplier is available on the following features:

- UPS operation - all drives have a dedicated rescue mode allowing operation from 200 V UPS
- DC supply - all drives have the possibility of being supplied from a DC source from 24 V to the maximum voltage rating of the product
- 500 V, 525 V, 575 V and 690 V units are also available



E27
Synchronous gearless motors for elevators

450 kg to 1,000 kg, 1 or 1.6 m/s, 2:1 roping

The E27 is a dedicated motor for elevator applications, providing flexibility for system designers and compliance with all essential industry safety standards. Compact, silent and designed to ease mechanical installation constraints it enables increased ride quality, benefiting elevator manufacturers, installers and users.

Benefits of flexible counterweight ratios

The E27 motor provides different counterweight ratio possibilities, offering:

- Flexibility & rationalization
  > As an example; a 630 kg motor can be used for a 675 kg load with a counterweight ratio of 45 %
- System cost and energy savings
  > A counterweight ratio of 40 % can be used

Safety and compliance with industry standards

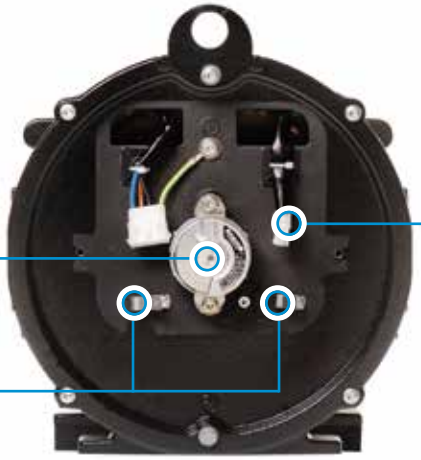
The E27 motor complies with:

- 95/16/CE Elevator guidelines
- EN 81-1: 1998 + A3: 2009

Technical data

Type	E27 S	E27 M	E27 L
Sheave diameter (mm)	160	160	180
Sheave usable width (mm)	87	87	113
Shaft load (kg)	1,500	1,500	2,500
Number of poles	24	24	24
Max. speed (min^{-1})	400	400	400
Nominal torque (Nm)	125	175	305
Maximum torque (Nm)	190	260	445
Rated current (A)	7.6	9.5	16.5
Number of brakes	2	2	2
Torque per brake (Nm)	140	225	325
Motor weight (kg)	93	106	167
Rotor inertia ($kg.m^2$)	0.11	0.15	0.26

Key features of E27 motor



Absolute encoder (SC.EnDat) fitted as standard

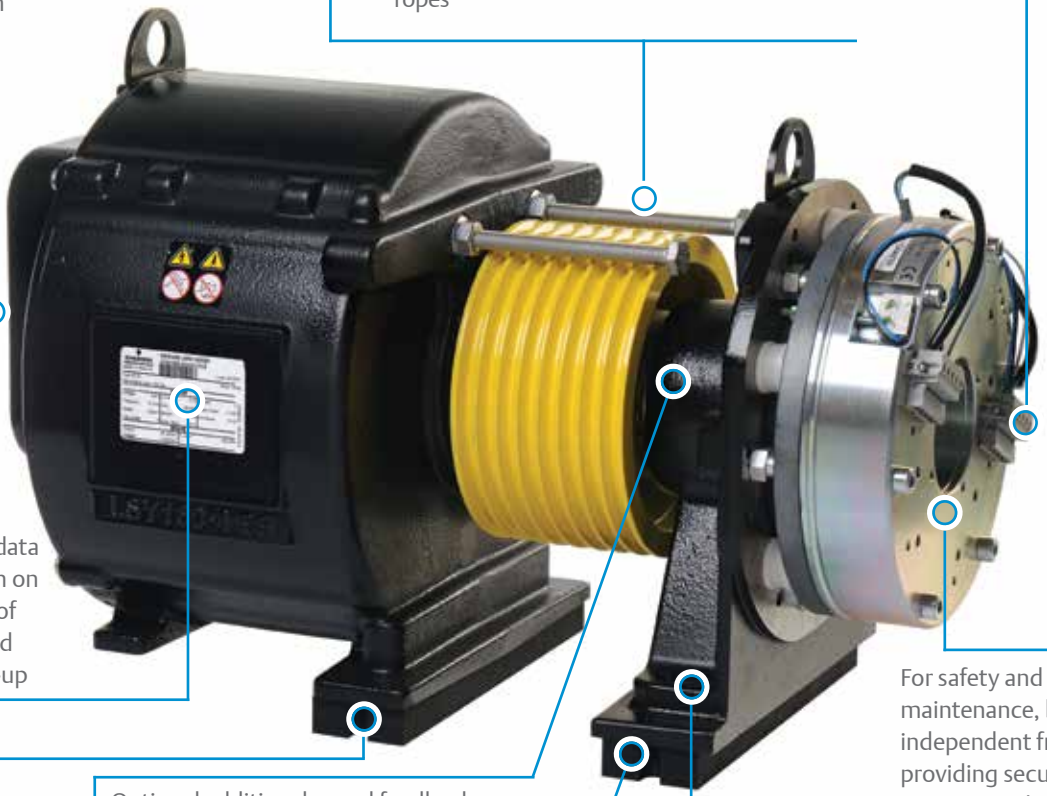
Grounding points for shielded cables

Fast connectors for power supply to motor, brakes and thermal sensor allowing quick electrical installation

Central sheave and separated end-shields designed to provide easy mechanical installation:

- Forces are applied on end-shields in the same direction as the load
- Allows simplified chassis
- Enables full access to the sheave and traction ropes

Encoder mechanically encased preventing damage during transportation and installation



Key rating data information on both sides of motor to aid system set-up

Optional additional speed feedback allowing the Brake Control Unit (BCU) to manage the rescue independently in case of a drive or encoder failure

For safety and optimized maintenance, brakes are independent from the motor, providing secured static braking torque. Can be dismounted and reassembled without losing the encoder phasing

Flexible pads supplied with the motor

Optional load cell for car load information to enhance ride quality

Extended range of gearless elevator motors perfect for new installations or modernization projects

XA synchronous permanent magnet motor range
1,000 kg to 2,500 kg, 3 m/s, 2:1 roping

The XA range, featuring optimized tooth windings and high efficiency permanent magnets, provides passengers with a luxurious silent ride. This compact motor ensures a reduced installation footprint with a shaft capacity of 1 to 6 tonnes.

Easy mechanical installation

- Easy installation of ropes
- Compact and lightweight solution

Enhanced ride quality

Optimized comfort and silence is provided with:

- Noise level: <55 dB(A) at 1 m
- Vibration level: high ISO ride quality (A95)
- Absolute encoder (SC.EnDat) fitted as standard

Safety standards

Compliance with:

- 95/16/CE Elevator guidelines
- EN 81-1: 1998 + A3: 2009EN81.1 European Safety Code

Z external rotor gearless motor range
Up to 5,000 kg, 5 m/s, 1:1 or 2:1 roping

The Z range is particularly suitable for projects requiring double wrapping, high speed and large cabin capacities such as hospitals or high rise elevators.

Flexible mechanical options

- Damping pads
- Brake release levers

Accurate positioning

- Absolute encoder (SC.EnDat) fitted as standard

Selection software

- Motor and inverter selection
- Traction calculations for better wrapping solutions
- Rope & groove profile suggestions

Safety standards

Compliance with:

- 95/16/CE Elevator guidelines
- EN 81-1: 1998 + A3: 2009EN81.1 European Safety Code
- ASME A17.1 North American Elevator Safety Code

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Moteurs Leroy-Somer SAS. Headquarters: Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France. Share Capital: 65 800 512 €, RCS Angoulême 338 567 258.

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